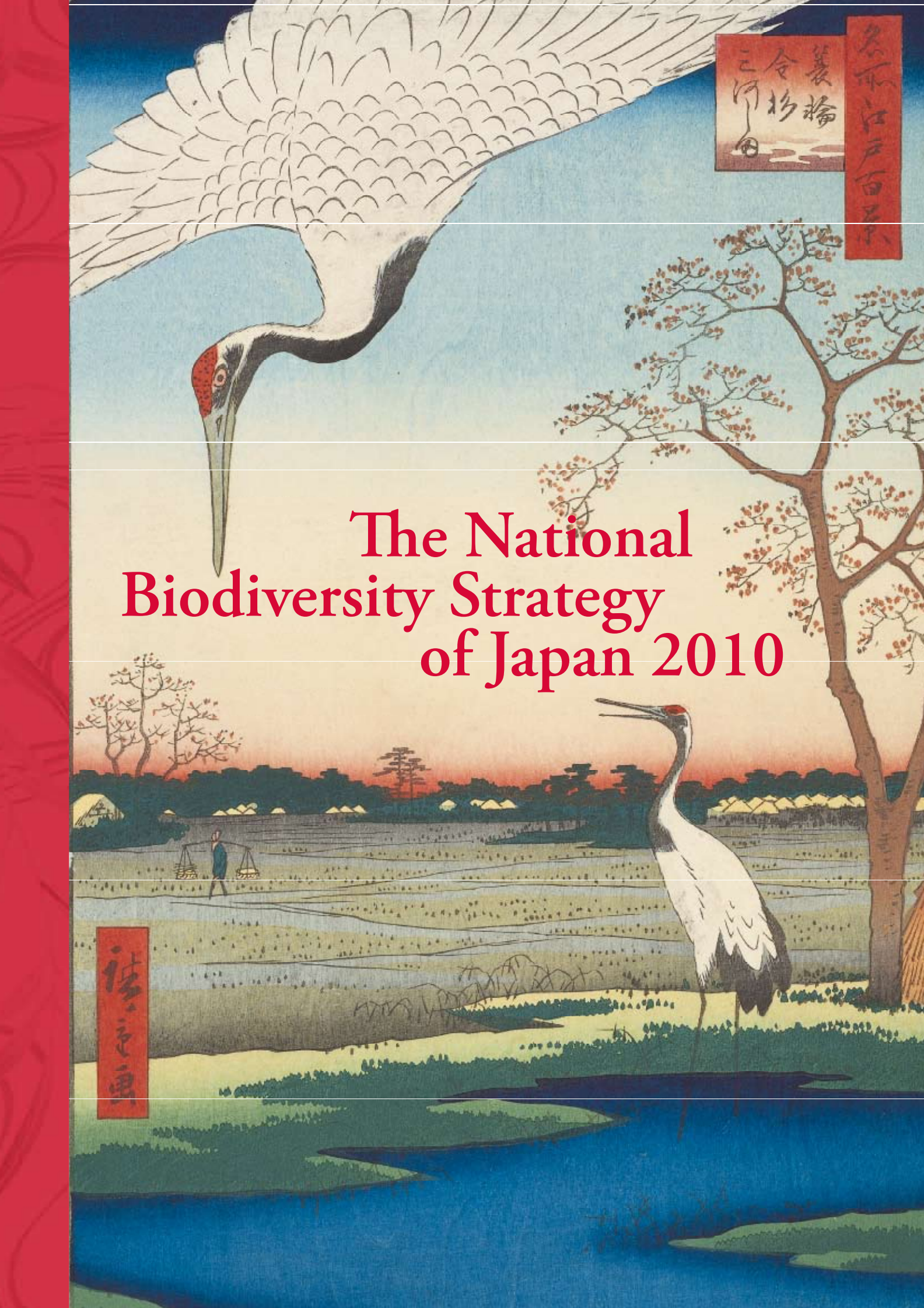




The National Biodiversity Strategy of Japan 2010

OUTLINE of the National Biodiversity Strategy of Japan 2010

Preamble

- Convention on Biological Diversity and National Strategy
- Review of Previous National Strategies
- Background to Formulation

- Character and Role of the National Biodiversity Strategy of Japan 2010
- Roles of Entities
- Checks and Reviews of the Implementation

Part 1 Strategy

Chapter 1 Importance of Biodiversity and its Rationales

1.1 Diversity of Life on the Earth

- Origin of the Earth and the Birth of Life
- Mass Extinction and Human Activities
- What is Biodiversity?

1.2 Biodiversity that Supports Life and Livelihoods

- ① Air and water nourished by living organisms: Supply of oxygen, recycling of water and nutrients, soil richness, adjustments to temperature and humidity
- ② Basis for human livelihoods: Food, lumber, clothing, medicine, breed improvement, biomimicry
- ③ Biological and cultural diversity: Knowledge and culture in harmony with nature, rich local cultures
- ④ How our lives are protected by nature: Mitigating the effects of disasters, ensuring efficient safety, safe foods

1.3 Rationales for Conservation and Sustainable Use of Biodiversity

- Biodiversity, ① Provides the basis of all life's existence: Essentials for life at present and in the future
② Offers value that supports human life: Value that enriches lives at present and in the future
③ Becomes a fountain of rich culture: Spiritual foundation and fountain of rich local cultures
④ Ensures safe human livelihoods for many years to come: Efficiency and safety for generations present and future

Chapter 2 Status and Problems

2.1 Biodiversity Crises

- Three Crises
First Crisis: Crisis brought about by human activities and development
Second Crisis: Crisis brought about by underutilization of Satoyama biotopes
Third Crisis: Crisis brought about by artificially-introduced factors
- Crisis Brought about by Global Warming
A serious problem that can no longer be avoided

2.2 Global Warming and Biodiversity

2.3 Background of Three Crises

2.4 Status of Biodiversity

2.5 Status of Conservation and Sustainable use of Biodiversity

Chapter 3 Targets

3.1 Targets and Assessment

- 2010 Targets and the Next Global Targets
- Japan's Targets:
2050: Mid / long-term Target
Improve the state of biodiversity in Japan from the current level
2020: Short-term Targets
Actions to be taken by 2020, so as to halt the loss of biodiversity:
① Conservation of species and ecosystems, prevention of extinction and restoration of threatened population
② Sustainable use of the components of biodiversity
③ Mainstreaming the conservation and sustainable use of biodiversity into socioeconomic activities
- Comprehensive Assessment of Biodiversity of Japan

3.2 Grand Design of the National Land from the Perspective of Biodiversity

- National Land from the Perspective of Biodiversity
- Basic Stance: "Centennial Plan"
① Restore ecosystems over a 100-year period
② Develop unique and attractive regions
③ Make investments into land management more important and more efficient, and perform ecological land management
④ Improve the quality of nature throughout the country in an adaptive manner
⑤ Accumulate scientific data, change people's awareness and behavior patterns
- Grand Design in Accordance with National Land Characteristics
Mountainous regions, Satoyama, paddy and farm regions, urban regions, river and marsh regions, coastal regions, marine regions, and island regions

Chapter 4 Basic Policies

4.1 Basic Perspective

- ① Scientific recognition and preventive/adaptive attitudes
- ② Community-oriented attitude and broad geographical perspectives
- ③ Coordination and collaboration
- ④ Use of socioeconomic systems
- ⑤ Integrated and long-term viewpoint

4.2 Basic Strategies

- ① Mainstreaming biodiversity in society
- ② Rebuilding sound relationships between man and nature in local communities
- ③ Securing linkages among forests, countrysides, rivers and the sea
- ④ Taking action with global perspective

Part 2 Action Plan

Chapter 1 Measures and Policies for National Land Area

Measures and Policies Based on Wide-Area Coordination

- 1.1 Ecological Networks
- 1.2 Conservation of Priority Areas
- 1.3 Nature Restoration
- 1.4 Agriculture, Forestry and Fisheries

Regional Space Measures

- 1.5 Forests
- 1.6 Countryside and Satoyama Areas
- 1.7 Urban Areas
- 1.8 Rivers and Wetlands
- 1.9 Coastal and Marine Areas

Chapter 2 Cross-sectional and Foundational Measures and Policies

- 2.1 Conservation and management of wildlife
- 2.2 Sustainable use of genetic resources
- 2.3 Communication and implementation
- 2.4 International cooperation
- 2.5 Information management and technology development
- 2.6 Efforts against global warming
- 2.7 Efforts to build a sound material-cycle society and low-carbon society
- 2.8 Environmental Impact Assessments

Examples of numerical targets

- Wetlands designated as Ramsar Convention sites
...Add 6 new sites (current 37 sites)
- Rare species of domestic fauna and flora designated under the Species Preservation Law
...Designate approximately 5 additional species (current 82 species)
- Specified Wildlife Conservation and Management Plans
...Increase total number of plans to 170 (current 107 plans)
- Public recognition of the word "biodiversity"
...Increase to more than 50% (36% in 2009)
- Formulate Regional Biodiversity Strategies
...Have all 47 prefectures start to develop strategies

Events Leading up to the Formulation of the National Biodiversity Strategy of Japan 2010

May, 1992 Convention on Biological Diversity adopted

October, 1995 National Biodiversity Strategy of Japan adopted

March, 2002 Second National Biodiversity Strategy of Japan adopted

● Enactment and revision of relevant laws 2002

- Enactment of the Law for the Promotion of Nature Restoration
- Revision of the Natural Parks Law
- Revision of the Wildlife Protection and Hunting Law

- Enactment of the Cartagena Law (the Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms)

- Enactment of the Invasive Alien Species Act

- Revision of the Wildlife Protection and Hunting Law

- Enactment of the Law for the Promotion of Ecotourism
- Enactment of the Basic Act on Ocean Policy

● International Developments

2002 2010 Biodiversity Target

...The target was adopted at COP6 of the Convention on Biological Diversity that the Parties to the Convention commit themselves to achieving by 2010 a significant reduction of the current rate of biodiversity loss

2005 Millennium Ecosystem Assessment (MA)

2006 Global Biodiversity Outlook 2 (GBO2)

2007 The Fourth Assessment Report by IPCC

(Article 6) The signatory nations shall formulate their national strategies aimed at conservation and sustainable use of biodiversity.

November, 2007 Third National Biodiversity Strategy of Japan adopted

May, 2008 COP9 to the Convention on Biological Diversity (Bonn, Germany)

...Nagoya City, Aichi Prefecture, was selected as the site of the 10th Conference of the Parties (2010).

May, 2008 G8 Environment Ministers Meeting (Kobe, Japan)

...Kobe Call for Action for Biodiversity agreed upon.

June, 2008 Basic Act on Biodiversity enacted

Article 11 of the Act requires the national government to formulate a National Biodiversity Strategy.

- Revision of the Natural Parks Law
- Revision of the Nature Conservation Law

● Review Process

Request for a report submitted to the Central Environmental Council

Joint Committee on Natural Environment and Wildlife (1st meeting)

Subcommittee on National Biodiversity Strategy (1st meeting to 4th meeting)

- Hearings with ministries and local governments, NGOs, economic organizations.
- Examining the major new issue
- Examining the draft of the national strategy

December, 2009

Local meetings held (7 locations)

December, 2009 to January, 2010

Opinions solicited from the public

Joint Committee on Natural Environment and Wildlife (2nd and 3rd meeting)

March 1, 2010

Report on the review was submitted by the Central Environmental Council

July, 2008 G8 Summit (Toyako, Japan)

...Importance of biodiversity reaffirmed in Leaders' Declaration.

April, 2009 G8 Environment Ministers Meeting (Syracuse, Italy)

...Syracuse Charter on Biodiversity adopted.

July, 2009 G8 Summit (L'Aquila, Italy)

...Necessity of setting post-2010 targets stressed in Leaders' Declaration, and Syracuse Charter approved.

January, 2010 "International Year of Biodiversity" begins

January, 2010 Japan submits proposal for post-2010 targets

...Japanese government submits a proposal concerning the post-2010 targets to the Secretariat of the Convention on Biological Diversity to be discussed at COP10.

March 16, 2010 National Biodiversity Strategy of Japan 2010 approved by Cabinet resolution

October, 2010 10th Conference of the Parties to the Convention on Biological Diversity (COP 10) to be held (Nagoya City, Aichi Prefecture)

The National Biodiversity Strategy of Japan 2010

March 16, 2010

Cabinet Decision

Table of Contents

Preamble.....	5
Part 1 Strategy.....	13
Chapter 1 Importance of Biodiversity and its rationales.....	13
Section 1 Diversity of Life on the Earth	13
1 Air and water nourished by living organisms	15
2 Basis for human livelihoods.....	15
3 Biological and Cultural Diversity	18
4 How our lives are protected by nature	19
Section 3 Rationales for Conservation and Sustainable Use of Biodiversity ...	21
Chapter 2 Status and Problems	22
Section 1 Biodiversity Crises	22
1 Three crises	22
(1) First crisis (brought about by human activities and development)	22
(2) Second crisis (brought about by reduced human activities)	23
(3) Third crisis (brought about by artificially introduced factors)	24
2 Crisis brought about by global warming.....	24
Section 2 Global Warming and Biodiversity	26
1 Impacts of global warming on biodiversity	26
2 Effects on human lives through changes in biodiversity due to global warming.....	27
3 Mitigation of global warming and adaptation to effects from the perspective of biodiversity	28
Section 3 Background of Three Crises	30
1 Drastic development for 50 years after the war	30
2 Decrease in population and change in usage of natural resources in “Satochi-Satoyama” areas	30
3 Globalization of the economy and society	31
Section 4 Status of Biodiversity	33
1 Biodiversity in the world.....	33
2 Biodiversity in Japan.....	35
3 Japan’s biodiversity connecting to the world.....	42
Section 5 Status of Conservation and Sustainable Use of Biodiversity	43
1 Overview of legal systems for the conservation and sustainable use of biodiversity	43
2 Overview of area designation system for the conservation of biodiversity	44
3 Efforts by local governments	46
4 Efforts by private enterprises	48
5 Efforts by nongovernmental organizations (NGOs) and citizens	49
6 Efforts by Academic Societies and Scientific Groups.....	50
Chapter 3 Targets.....	51

Section 1	Targets and Assessment.....	51
3	Comprehensive Assessment of Biodiversity in Japan.....	53
Section 2	Grand Design of National Land from the Perspective of Biodiversity .	
		55
1	National land from the perspective of biodiversity.....	55
2	Basic stance.....	55
3	Grand design in accordance with national land characteristics.....	56
Chapter 4	Basic Policies	68
Section 1	Basic Perspectives.....	68
1	Scientific recognition and preventive/adaptive attitude.....	68
2	Community-oriented attitude and broad geological perspectives	69
3	Coordination and collaboration.....	70
4	Use of socioeconomic systems	71
5	Integrated and long-term viewpoint.....	71
Section 2	Basic Strategies	73
1	Mainstreaming biodiversity in our daily life.....	73
2	Rebuilding sound relationship between man and nature in local communities	77
3	Securing linkages among forests, the countryside, rivers and the sea.....	84
4	Taking action with global perspective.....	90
Part 2	Action Plan	98
Preface		98
Chapter 1	Measures and Policies for National Land Area	102
Section 1	Ecological Networks	102
1	Promoting the formation of ecological networks.....	102
Section 2	Conservation of Priority Areas.....	106
1	Conservation under the Nature Conservation Law	107
2	Natural parks.....	109
3	Wildlife protection areas	115
4	Natural habitat conservation areas.....	116
5	Places of scenic beauty, natural monuments, cultural landscapes.....	117
6	Protected forests and protection forests.....	121
7	Special green conservation areas, etc.....	122
8	Ramsar sites	124
9	World Heritage sites.....	125
10	Biosphere reserves	127
11	Regions managed by independent local groups	128
Section 3	Nature Restoration.....	130
1	Steady implementation of measures for nature restoration	131
2	Promotion of new measures for nature restoration	134

Section 4	Agriculture, Forestry and Fisheries	136
1	Biodiversity in agriculture, forestry and fisheries.....	139
Section 5	Forests.....	143
1	Forests	145
Section 6	Countryside and Satochi-Satoyama Areas	170
1	Countryside and Satochi-Satoyama areas	170
Section 7	Urban Areas	181
1	Formulating comprehensive plans on the conservation, restoration, creation and management of green space	182
2	Promoting measures for the conservation, restoration, creation and management of green space and waterside areas	184
3	Raising public awareness of the conservation, restoration, creation and management of green space.....	195
Section 8	Rivers and Wetland Areas	197
1	Conserving and restoring the habitat environments of living organisms	198
2	Improvement of water environments	208
3	Coordination and collaboration with residents	215
4	Environmental education and hands-on nature experience using rivers	216
5	Survey and research on river environments	219
Section 9	Coastal Areas and Oceanic Areas	225
1	Comprehensive conservation of biodiversity in coastal areas and oceanic areas	226
2	Fisheries in Satoumi and oceanic areas.....	235
3	Coastal environments.....	243
4	Port environment.....	247
5	Measures against marine pollution	249
Chapter 2	Cross-Sectoral and Fundamental Measures and Policies	253
Section 1	Conservation and Management of Wildlife	253
1	Protection of threatened species.....	254
2	Management of wildlife (wild birds and animals)	261
3	Coping with factors causing disturbance to ecosystems	273
4	Welfare and proper management of animals.....	280
Section 2	Sustainable Use of Genetic Resources	284
1	Use and conservation of genetic resources	285
2	Use and conservation of microbial resources.....	293
3	Use of biomass.....	297
Section 3	Communication and Implementation	301
1	Communication and public involvement	302
2	Economic measures	307
3	Interaction with nature	309

4	Education and learning	319
5	Development of human resources	323
Section 4	International Cooperation	326
1	Japan's international leadership and coordination with Asian and other neighboring countries	326
2	Implementing other conventions related to the Convention on Biological Diversity	334
3	Implementing international programs	344
4	Cooperation for developing countries	356
Section 5	Information Management and Technology Development	361
1	Comprehensive assessment of biodiversity	361
2	Promoting survey and information management	364
3	Promoting research and development of technology	373
Section 6	Efforts against Global Warming	379
1	Mitigation of global warming and adaptation to its effects from the perspective of biodiversity	379
Section 7	Efforts to build a sound material-cycle society and low-carbon society	385
1	Promoting efforts toward forming a symbiotic, circulatory, low carbon society	386
Section 8	Environmental Impact Assessments	392
1	Environmental Impact Assessment	393
2	Other major efforts to reduce environmental impact	396

Preamble

Over four billion years since the birth of the earliest forms of life, life on earth has evolved through adapting to diverse environments into a great variety of life-forms. The number of species is estimated at approximately 30 million including the unknown ones. Each of these numerous life-forms, having its own individuality, is interconnected in varied ways to form a complex web of life. This is what biodiversity looks like. The environment of the planet where we live is the result of vast, diverse interconnections and flourishing interactions between living things over the years.

Mankind is part of this complex web of life. We live linked with many other living things. Without living things around us, humans cannot survive. The benefits of biodiversity allow us to survive.

We have regionally different traditional cultures and have accumulated knowledge vital to our well-being. It may be said that such diverse cultures have arisen from the rich biodiversity in various regions and now represent indigenous essential assets.

The birth of humankind is a relatively recent event in light of the earth's long history. As humankind has achieved obtained great power, the growing human population has consequently impacted the global ecosystem significantly.

Supported by various living things on the one hand, humankind has exterminated many living things on the other. It is said that over the past several hundred years humankind has accelerated the average extinction rate to 1,000 times the past rate. Despite all the progress made in science and technology, life can not be created today and moreover, even many creature-to-creature relationships largely remain unknown. We must humbly recognize the fact that our lives coexist with every life-form on the earth. We are further obliged to protect biodiversity and take sustainable approaches to its utilization, so as not to adversely affect biodiversity.

Since the Meiji Restoration in the 19th century and then during the postwar period, our country has achieved remarkable economic development, while otherwise rich biodiversity has been lost in a country that stretches north to south and is surrounded on all four sides by the sea. It was often forgotten that the richness of biodiversity leads to our good life.

Throughout Japan's long history of agriculture, forestry and fishery activities in coastal areas, we have built up an indigenous culture in which we coexist with various living things and enjoy bountiful nature. However, as a country with few energy-producing or other natural resources, Japanese society has developed its industries and achieved modernization through progress made in science and technology, as well as through international trade and exchange. In this process, the close relations with nature have diminished among the Japanese people, causing the gradual disappearance of a specific climate in which regional culture and nature are closely connected. In contrast to the world's growing population, Japan's population—according to some demographic estimates—will actually decline until being reduced to half the current level by 2107, about 100

years from now. The expected population at that time will roughly match Japan's population in the late Meiji era about 100 years ago. Our country, having enjoyed remarkable economic progress over these 100 years, must now strive to attain both economic development and rich biodiversity over the next 100 years. During the past 100 years of ongoing population growth, the ecosystems of Japan's national land have deteriorated due to various reasons. From the perspective of biodiversity, we should recover damaged ecosystems according to a so-called "centennial plan" based on the long time expected to be necessary for the recovery of natural ecosystems.

As biodiversity continues to be depleted on a global scale, it is important for Japan to assume a leadership role in the global community in order to protect biodiversity, because Japan and its economy are viable only through the tightly interlinked, mutually dependent relationships with other countries.

The National Biodiversity Strategy of Japan 2010 is the government's plan to promote the conservation of biodiversity and sustainable use of its components, aiming at "building a sustainable society coexisting with flourishing biodiversity." The nation nurtures rich biodiversity through the coexistence of humankind and nature, and by securing a better balance between humankind and nature. Realistic and steady activities in local communities are thus most essential to attaining this aim, and at the same time, cooperation among various entities including local governments, private enterprises, and the Japanese people is also necessary for this purpose. Under the grand policy of this national strategy, each person, irrespective of age or sex, must move forward toward a prosperous future for a nation abounding in life.

Convention on Biological Diversity and the National Strategy

In time for the United Nations Conference on Environment and Development (The Earth Summit) held in Rio de Janeiro, Brazil, in 1992, the United Nations Framework Convention on Climate Change (UNFCCC) and Convention on Biological Diversity (CBD) were adopted. Japan concluded the CBD as the 18th signatory state in May 1993. The Convention became effective in December of that year. There are a total of 193 signatory countries under the Convention as of March 2010. The Convention was drawn up driven by our sense of crisis over the rapid destruction of tropical rainforests, the ongoing extinction of species, and loss of biological resources essential to humankind's survival, in order to set up a comprehensive international framework for the overall conservation of life on earth. As objectives of the Convention, the themes of "conservation of biodiversity," "its sustainable use," and "fair and equitable sharing of benefits arising out of the utilization of genetic resources" were adopted.

Under Article 6 of the Convention, individual governments are required to formulate national strategies aimed at the conservation and sustainable use of biodiversity. With the conclusion of the Convention, the government-wide Council of Ministers for Global Environment Conservation formulated the first National Biodiversity Strategy of Japan in October 1995, and then in March 2002 established the 2nd National Biodiversity Strategy of Japan—a drastic revision of the first strategy. When this new strategy was subject to review in November 2007, the 3rd National Biodiversity Strategy of Japan was approved by a Cabinet resolution.

Enactment and Enforcement of the Basic Act on Biodiversity

As interest in matters of biodiversity continued to grow domestically and internationally, Japan's ruling and opposition parties came together to discuss the enactment of a basic law on biodiversity. As a result of those discussions, a jointly-sponsored bill on a Basic Act on Biodiversity came before the Diet in May 2008 and was unanimously approved, going into effect in June of the same year. The aim of the Basic Act is to protect levels of biodiversity and create a society capable of functioning in harmony with nature, so that the benefits of biodiversity may be enjoyed well into the future by promoting the conservation and sustainable use of biodiversity in a comprehensive and systematic manner. The Basic Act explicitly prescribes the formulation of a national biodiversity strategy in line with the Convention on Biological Diversity. It also presents the fundamental framework upon which Japan should pursue biodiversity conservation policies. This framework includes basic stipulations on the conservation and use of biodiversity, urges the submission of annual reports on biodiversity before the Diet, and outlines 13 basic steps to be taken by the national government. The Act outlines the responsibilities not only of the national government, but also of local administrative authorities, businesses, private groups, and individual citizens. It also mandates that Japan's prefectures and municipalities work to draft basic plans (known as regional biodiversity strategies) for the conservation and sustainable use of biodiversity within their respective jurisdictions.

Previous National Biodiversity Strategies

The main issues brought up concerning the National Biodiversity Strategy of Japan as formulated in 1995 were as follows:

1. Promptly devising a strategy in response to the CBD in less than two years after it took effect;
2. Using the keyword "biodiversity," ensuring that the ministries concerned work together;
3. In line with the makeup of the Convention, coordinating the actions to be taken by the ministries while leaving nothing to be desired.

In the meanwhile, the following must be improved:

1. Though the measures and policies to be taken were described in parallel, no attention was paid to cooperation among the ministries;
2. The path toward achieving the objectives is not so clear, and measures and policies are not concretely proposed;
3. Neither any socioeconomic frame of reference nor an analysis of biota or ecosystems is given;
4. The ministries formulated the strategy without fully consulting relevant experts or other conservation groups.

The 2nd National Biodiversity Strategy of Japan of 2002 was designed as a comprehensive plan for the government as a whole to put the principle of "society in peaceful coexistence with nature" into practice. The second strategy was characterized by the following:

1. The current status of biodiversity in our country was organized into "three crises";
2. "Five rationales" were employed as principles for the conservation and sustainable use of

biodiversity, with “seven main themes” as the concrete measures.

In the meanwhile, the 2nd National Biodiversity Strategy of Japan has turned out to be a national strategy drastically revised in the following respects:

1. Restoration of nature as well as the conservation of remaining nature was suggested to enhance the overall quality of nature in the national land;
2. Approaches reflecting cooperation among the ministries in restoring nature as well as conserving “Satochi-Satoyama” areas (rural landscapes formed by the sustainable use of natural resources) were promoted at the level of measures or plans;
3. In present data analysis, special attention was paid to socioeconomic aspects as well as biota and ecosystem analysis;
4. Ministries tried to consult a wide range of experts and conservation groups during the process of formulating the strategy.

Improvements, however, are required with regard to the following:

1. Neither the objectives nor the indicators are concretely given, and the path toward actions is not clearly shown;
2. Some measures and policies to be taken by the ministries were still described in parallel;
3. The content of the strategy is too stiff and formal to be appealing to the Japanese public;
4. The strategy provides little of a long-term outlook or a global view regarding biodiversity;
5. The strategy focuses on approaches at the national level but does not encourage local governments or private organizations to participate in the activities.

In the 2007 Third National Biodiversity Strategy of Japan, we again used the crises identified and rationales employed in the 2nd National Biodiversity Strategy, and included therein our willingness to advance and enhance efforts to cope with the changing situations at home and abroad.

In order to draft the new policy, an informal committee for reviewing the national biodiversity strategy was convened from August 2006 to March 2007, at which issues were brought up and sorted through. The major issues that came up in the committee were explained at local meetings held at eight locations, with opinions being solicited from the public. In April 2007, a request for a report was submitted to the Central Environmental Council, after which the Subcommittee on National Biodiversity Strategy—set up by the Council’s Joint Committee on Natural Environment and Wildlife—held six meetings involving the relevant ministries, local public authorities, companies, NGOs, and academic societies. The subcommittee incorporated the pertinent feedback from these proceedings and produced a proposal, which was submitted for public comment (i.e., opinions from the general public). In November 2007, the Central Environmental Council submitted a response, from which the 3rd National Biodiversity Strategy was developed and approved.

The Third National Biodiversity Strategy of Japan featured the following:

1. It was set up as an action plan that included as many targets and indicators of individual efforts as possible, so as to represent a clear path toward implementing the strategy;
2. To list the tasks of individual ministries as clearly as possible, the strategy arranged the tasks in

groups under such categories as coastal and oceanic areas according to respective roles of the ministries;

3. It described biodiversity in relation to human life in order to help the public easily understand the concept;

4. It provided the image of long-term targets for the ecological management of national land under a so-called “centennial plan,” particularly regarding its relation to global biodiversity;

5. It suggested that local governments, private enterprises, NGOs and the people should be encouraged to participate in the activities.

Background to formulation

Once the Basic Act on Biodiversity became effective in June of 2008, the government was now required by law to draft a national biodiversity strategy. Under the Act, plans developed by the national government other than a basic environment plan and national biodiversity strategy must be rooted in a national biodiversity strategy that addresses matters of conserving and using biodiversity. The Act also stipulates that the prefectures and local municipalities in Japan strive to formulate regional biodiversity strategies based on the national strategy. In order to make these stipulations legally binding, it was necessary to formulate a national strategy with a legal basis as quickly as possible. In May 2008, it was also decided that the 10th meeting of Conference of the Parties to the Convention on Biological Diversity (COP10) would be held in Nagoya, Aichi Prefecture, in October 2010. These developments, coupled with the “Leadership Declaration” to bolster efforts to protect biodiversity issued at the G8 Summit held at Toyako, Hokkaido Prefecture, in July 2008, have led to higher levels of awareness and interest in biodiversity issues in Japan and abroad.

Given these developments, in July of 2009, a request was submitted to the Central Environmental Council concerning the formulation of a national biodiversity strategy pursuant to the Basic Act on Biodiversity. The Council’s Joint Committee on Natural Environment and Wildlife and the subcommittee formed therein began deliberations. In formulating the strategy, it was decided that the basic framework (including the basic structure and timetables) of the 3rd National Biodiversity Strategy of Japan would be maintained, and that efforts would be expanded and implementation of the strategy’s measures monitored in order to leave room for later changes in conjunction with COP10.

The deliberations initially involved the Inter-Ministerial Committee on the National Biodiversity Strategy of Japan checking and reviewing the progress of steps called for in the 3rd National Biodiversity Strategy of Japan. The Inter-Ministerial Committee reported their findings to the above subcommittee, and after meetings were held with local public authorities, companies and NGOs, and opinions collated from regular citizens, further deliberations were held through a transparent means.

Character and Role of the National Biodiversity Strategy of Japan 2010

Strategy 2010 is the first national biodiversity strategy to be grounded in the Basic Act on Biodiversity. It serves as the government’s basic plan for the conservation and sustainable use of

biodiversity. While the 3rd National Biodiversity Strategy of Japan is undoubtedly at its foundation, necessary improvements and changes are currently being formulated. The strategy consists of two parts: “Part 1: Strategy for Conservation and Sustainable Use of Biodiversity” and “Part 2: Action Plan on Conservation and Sustainable Use of Biodiversity.” Part 1 describes the importance of biodiversity that supports life and livelihood, biodiversity’s relationship with global warming that may significantly affect biodiversity, five fundamental frames of reference including the performance of a comprehensive assessment of biodiversity in our country, a grand design as a future vision of national land from the perspective of biodiversity, “Scientific Recognition and Preventive and Adaptive Attitude,” four basic strategies including making biodiversity mainstream in our daily lives, and a roadmap to the target year (about 2012) for pursuing activities to promote the conservation and sustainable use of biodiversity in light of the current situation at home and abroad. Part 2 systematically describes all of our measures and policies on biodiversity as a practical action plan, and itemizes particular measures and policies to show the path toward implementation.

This strategy can be considered the fundamental plan to build up a “society in harmony with nature” that secures our enjoyment of the benefits of nature for many years to come in consideration of four long-term targets of the Basic Environment Plan: “environmentally sound material cycle,” “harmonious coexistence,” “participation” and “international activities” in order to create a “sustainable society,” and a “low-carbon society” in response to the issue of global warming and the goals of a “society with an environmentally sound material cycle” that minimizes the environmental impact caused by the extraction and disposal of resources.

Considering the recent situations of biodiversity in Japan and abroad, and in order to fully utilize the opportunity of Japan hosting COP10, we have placed in the present national biodiversity strategy a particular focus on identifying priority issues in Japan, and also amended the 3rd National Biodiversity Strategy of Japan to include important perspectives and steps that we expect will be necessary in the future.

Roles of Entities

The strategy is a plan that puts together the principles and the government’s measures and policies concerning the conservation and sustainable use of biodiversity. The Basic Act on Biodiversity outlines the obligations of the national government, local public authorities, businesses, and private groups, as well as Japanese citizens who do not fall under these groups. In this same spirit, as the conservation and sustainable use of biodiversity closely relates to the life of the people, the strategy should not only be implemented by the nation but also addressed by local governments, private enterprises, NGOs, the people and other entities in a voluntary and cooperative manner. Each entity is asked to play a role in carrying out the tasks described below.

The nation systematically implements measures and policies set forth in the strategy, promoting collaboration among the ministries and agencies involved in the national biodiversity strategy. It also provides proper systems and guidelines, enhances economic measures, builds up data bases, and secures its sharing and providing of appropriate information to progressively help regions promote

efforts according to their respective roles. Moreover the nation encourages each entity to voluntarily engage in activities by evaluating and introducing the outstanding efforts made in other regions.

Local governments are expected to follow the guiding principles set forth in the strategy, in order to systematically and comprehensively implement measures conforming to national policies or their own policies in accordance with natural and social conditions of their regions. For this to happen, it is important for local administrations to develop regional biodiversity strategies in accordance with the Basic Act on Biodiversity in a manner that promotes efforts that fit the characteristics of their respective regions. A wide range of experts and regional residents must cooperate and participate in order to successfully implement such efforts. School education offered to children of the regions also plays an important role in teaching that life is irreplaceable, as well as having the children interact with living things there.

The employers of private enterprises or others are asked to secure biodiversity-friendly raw materials, procure, produce and sell biodiversity-friendly products, conserve rich biodiversity in their lands or the sites of their factories or business offices, give consideration to conserving biodiversity through investment and financing activities, and disclose information concerning the conservation of biodiversity. The important assignments expected of employers also include social contribution activities pertaining to the conservation of biodiversity in forests or *Satoyama* at home and abroad, support for NGOs engaged in activities aimed at conserving biodiversity with funds from private enterprises, public-interest corporations and other sources. Moreover, they are expected to take an interest in such information on biodiversity as provided by international organizations including the national government, the Conference of the Parties of the Convention on Biological Diversity, and others, encourage domestic or overseas enterprises to address the conservation and sustainable use of biodiversity by using the networks formed through their business activities, and promote it in cooperation with such enterprises.

NGOs and private groups are expected to conduct various activities to conserve biodiversity specific to a given region, provide programs or formulate systems to invite a wide range of individuals to participate in the efforts. Individuals are also asked to utilize their respective expertise and experience to support and promote efforts in cooperation with educational institutions including administrative institutions, private enterprises, and museums. They are also expected to give a wide range of people in the region opportunities to participate in work-study programs.

We, the citizens, being fully aware of the close relationship between the conservation of biodiversity and our daily lives, try to conduct ourselves moderately, contact and appreciate nature, and realize rich biodiversity through experiences in a natural environment. We are expected to participate in activities toward conserving biodiversity or in survey activities via civic participation, as well as contribute to the conservation and sustainable use of biodiversity through our choices and purchases of appropriate products. It is also very important for each person to understand the activities toward conserving biodiversity or, for instance, to support such activities by soliciting contributions or making a contribution. We are also expected to assume the roles of local residents or parents in handing down the natural riches of the region to the children who will lead the next era,

and organizing opportunities for the children to experience bountiful nature or study nature in schools, or during outdoor activities or local community activities. Specifically elderly people are asked to tell children about the manner in which people used to coexist with nature, convey to them traditional knowledge, culture, plays, customs or skills nurtured by biodiversity. Middle-aged and older retired persons are expected to play a major role in conserving biodiversity in the region by returning to the farm after retirement or engaging in activities based on the rich experience, knowledge and skills accumulated in society.

Checks and reviews of the implementation

To ensure the steady implementation of measures and policies under the national strategy, the Inter-Ministerial Committee on the National Biodiversity Strategy of Japan annually checks the implementation of the strategy and reports the results to the Central Environmental Council, so that those results will be reflected in the report submitted to the Conference of the Parties under the provisions of the Convention.

In order to most objectively follow up the progress made in implementing measures and policies from the perspective of biodiversity for checking said implementation, each of the ministries concerned conducts a voluntary check based on the action plan described in Part 2 and by using indicators that show the progress of measures and policies of that action plan, as well as indicators to be developed in a comprehensive assessment of biodiversity. After compiling the check results obtained by the ministries, the committee solicits comments on those results from wide-ranging segments of the public and submits its report to the Central Environmental Council. At that time, the Central Environmental Council checks the implementation of measures and policies by the ministries according to the national strategy from the perspective of biodiversity, and then expresses its views on the directions of those measures and policies when necessary.

The tentative duration of the current strategy lasts until 2012. After the conclusion of COP10 in 2010, the government will begin reviewing the strategy, taking into account input from the Conference. One of the goals of COP10 is to assess the progress of the 2010 biodiversity target, which was “to achieve by 2010 a significant reduction of the current rate of biodiversity loss” as agreed upon at COP6, and to study future strategic plans, including the next global targets (Post 2010 Biodiversity Targets). This is just one more reason that Japan needs to improve and strengthen its strategies concerning the conservation of biodiversity.

Part 1 Strategy

Chapter 1 Importance of Biodiversity and its rationales

Section 1 Diversity of Life on the Earth (Origin of the earth and the birth of life)

The earth originated 4.6 billion years ago. It is believed that 4 billion years ago a primitive life-form was created from an organism in the prehistoric seas. Although the atmosphere of the early earth was thought to lack oxygen, the emergence of blue-green algae and other life-forms that photosynthesize resulted in more, oxygen being released into the atmosphere. From the higher concentrations of oxygen, the ozone layer formed around the earth and absorbs harmful intense ultraviolet rays from the sun, thereby resulting in the current atmospheric composition and relatively stable climate, and leading to the creation of an environment that enabled life to emerge on land. Flora then reached shore, followed by the creation of ancient forests where animals evolved, resulting in land ecosystems being created. Thus, innumerable life-forms and their interconnections formed the atmosphere and soil of the earth, with next-generation life-forms continuing to evolve in environments created by the preceding generation of life-forms.

In the meantime, a variety of changes occurred in the environment. Species that could not adapt to the changes perished, while many other new species evolved into an estimated 30 million species of life and their links—the web of life. The biodiversity around us is something irreplaceable, nurtured during the long history of the earth.

(Mass extinction and human activities)

The present age might be considered “the 6th Age of Mass Extinction.” Since the earliest life-forms evolved on the earth, our planet is said to have experienced five major extinctions, during which large numbers of organisms died out. Mass extinction in the present age is characterized by a very high rate of extinction, the main factor of which is human activities. Homo sapiens—the species to which modern humans belong—represent a relatively new species appearing about 300,000 years ago, in contrast to the long history of billion years of life on earth. Humans, just one species of life, possess enormous power that may change the environment.

In the United States, an estimated 60 million bison in the early 19th century were significantly reduced to just a few thousand (1/60,000 of the population in the 19th century) in less than 100 years. An estimated 5 billion passenger pigeons existed in the early 19th century. Due to excessive hunting, they finally became extinct in the early 20th century when the last one died. While the status of life in the oceans remains largely unknown unlike the status of life on land, the population of Atlantic cod is known to have rapidly decreased by 1992 due to excessive human fishing activities. Although human power may be much more enormous than we imagine, humans have a significant impact on the complex world of living organisms without even being aware of the fact.

Humans later developed science and technology to obtain even more enormous power. Nonetheless, humans are indeed just one species and a component of biodiversity. Nature's world or the world of "biodiversity" is in fact based on a complicated balance among various factors. There are many we don't fully understand. Continuing the existing rate of biodiversity loss could result in the premature or eventual "extinction" of human beings. There would be nothing more foolhardy than humankind being annihilated as a result of environmental deterioration caused by human actions.

(What is biodiversity?)

The Convention on Biological Diversity formulates a definition that considers biodiversity as the existence of differences among all living organisms. It provides that biodiversity is found at three levels: ecosystem, among species, and within species (in genes).

In terms of biodiversity at the ecosystem level, it relates to various types of nature including the tideland in Tokyo Bay, the coral reef of the Okinawa Islands, natural forests and *Satoyama* (Japanese traditional rural landscapes formed by the sustainable use of natural resources), artificial or other forests, the Kushiro and Oze wetlands, and large and small rivers. The diversity of species refers to a situation where, because our national land extending in a north-to-south direction has complex topography, the Japanese enjoy a plentiful supply of water due to the wet climate together with four distinct seasons, and numerous species of animals live amid a variety of flora. Biodiversity at the gene level refers to, for example, differences between the west and east sides of the central mountainous area in cycles in which "Genji fireflies" (*Luciola cruciata Motschulsky*) emit light, as well as various decorative patterns on the surface of clam shells. Thus, it should be noted that, various differences are found at many levels in the natural world as described above. And it is of particular significance that the differences should appear as the impartially and comprehensively maintained diversity of organisms that represent inherited results over the long history of evolution.

Partially because the term "biodiversity" is so difficult to comprehend, many people do not fully understand the importance of related problems. Thus, we can translate "biodiversity" into the two concepts of "interconnection" and "character" to enhance public awareness of the problems. "Interconnection" refers to a food chain, an ecological link, the relation between living things, or the inheritance of life among generations. It also refers to a large-scale link, such as that between Japan and the world, among regions, and that through the hydraulic cycle. In terms of "character," it should be noted that within the same species, characteristics vary a little among individuals and regions have a specific nature linked with the indigenous culture to form a specific climate. "Interconnection" and "character" are the result of accumulation during the long history of evolution. "Biodiversity" that includes such aspects supports "life" on earth and "livelihood" by providing various benefits.

Section 2 Biodiversity that Supports Life and Livelihoods

1 Air and water nourished by living organisms

The oxygen we need to breathe accounts for 20% of the earth's atmosphere. That is not the case with other planets. Oxygen has been produced from the photosynthetic activity of various plants over several billion years. Plants in forests or other habitats absorb carbon dioxide (CO₂) and release oxygen. Such release allows fauna and flora to respire normally. Stabilized temperature brings abundant water, followed by the formation of clouds and subsequent rainfall that gives rise to the hydraulic cycle. A good cycle that nurtures many living things supports the earth's environment. We should be aware that our planet's environment is based on oxygen produced by plants, and that humans could by no means create an atmosphere which includes oxygen.

Fertile soil is produced from the decomposition of dead animals and the leaves of plants. The groundwater recharge function and supply of nutritive salts containing nitrogen and phosphoric acid indispensable to marine life play significant roles in the circulation of water necessary to maintain life. Moreover, temperature and humidity are regulated by atmospheric circulation or transpiration by the flora in forests. Thus, a proper maintenance of biodiversity based on the natural circulation of necessary materials ensures an environment on which all life including humans relies.

2 Basis for human livelihoods

(Food, lumber and other natural resources)

The food necessary for our daily life such as the rice, vegetables, fish and meat we eat every day are obtained from paddy fields, forests, the sea or other sources through agricultural, forestry, fishing or other activities.

Japan is a narrow country but rich in fertile soil and with an abundant supply of fresh water. Therefore, a variety of agricultural products have been produced in the country. These products are grown through linkage with beneficial or harmful insects, and various other living things. Beneficial insects such as spiders that consume harmful insects in farmlands support the production of agricultural products. There are various living things in farmlands that include paddy fields. In the fields we produce agricultural products by nurturing fauna and flora, and making use of the circulation functions that involve both.

The food we gather in forests is also vital. We used to live by making use of the benefits derived from forests, such as mushrooms, edible wild plants, and nuts. Given today's changing lifestyles, such foods are not so vital for our diet. But it may be said that forests remain a treasury of foodstuffs (products of the local climate) suitable for Japanese cooking.

Since the Jomon era, fish and seafood have been very precious foodstuffs on which the Japanese people rely as part of their diet. As an island country, Japan is blessed with bountiful seas having many converging points of warm and cold currents. Moreover, the seaweed beds in coastal areas, tidelands, rivers and lakes bring us almost daily benefits from nature, as well as diverse species of fish and types of seafood including cuttlefish, octopus, and seaweed. We Japanese never

miss a day without eating fish.

Salmon and trout migrate toward rivers in Japan's northeastern region and Hokkaido. In spring, ayu (sweetfish) can be seen swimming upstream. Both eel and tuna—essential to Japanese food culture—are not always raised in fish farms throughout the process from ovum collection to adult fish production, but are often artificially raised using captured glass eels and small tuna. A large portion of the eel and tuna we eat are in fact natural products.

To ensure a stable supply of marine resources, it is essential that the diversity of marine life should be rich and sound. Humans should conserve the biodiversity of marine organisms, while striving to implement a sustainable use of marine resources.

Lumber has often been used in Japan. Horyuji Temple—the first World Heritage site in Japan—and other traditional architectural structures are built of wood. Lumber used to be indispensable not only for our homes but also our lives, as various tools and utensils including farm equipment were also made of wood. Wood used to be essential in our country. Thus, in Japan, people have long been taking advantage of an environment bounding in forests to create a “wood culture” in which lumber was incorporated into our lives in many ways according to its kind and type.

Before fossil fuels became widely used, the main energy resource had been fuelwood (or firewood) in our country. The amount of wood regularly used as fuel for cooking, heating baths and homes, and other applications greatly decreased due to the increased use of oil or other fossil fuels.

Even today large amounts of lumber are used to build housing, because wood is recognized as an important factor in creating a place of relaxation. It is also seen in a new light as fuel for heating in some areas where stoves for burning solid-pellet fuel made from wood chips are becoming popular. In addition, paper is also being consumed in large quantities today, requiring a greater volume of wood to produce the paper. For our daily lives, we unavoidably need lumber—another benefit from forests that remain a key component of biodiversity.

Silk, wool, cotton, hemp, and other animal and vegetable fibers are also used in ways that maximize their individual properties, fulfilling invaluable roles in human lifestyles.

Since Japan imports 60% of its food and 80% of its lumber from overseas, it may be said that we live on benefits arising from the utilization of global biodiversity. However globally, biodiversity loss is increasing as seen in land degradation due to resource-stripping production activities including excessive cultivation or grazing, deforestation and forest degradation caused by excessive or illegal deforestation and wildfires, and fewer living marine resources due to excessive fishing. Therefore, most importantly, every Japanese person should be aware that our lavish consumption supported by the natural resources of foreign countries is in fact based on the benefits from biodiversity in these exporting countries. Now that biodiversity loss concerns us globally, it is necessary for our country, relying upon imports for a greater part of its food and lumber demand, to strive to realize sustainable use of the natural environment and resources from an international perspective by incorporating the aspect of material balance including the nitrogen cycle.

In terms of fishery products landed in Japan, not all are caught in the country's exclusive

economic zone where we have priority use of the resources; some fishery products are caught on the high seas or in the exclusive economic zones of other nations under agreements made with those nations. More than half of the fishery products consumed in Japan are imported from other countries. And the world's oceans are interlinked, allowing large numbers of fish to freely move around. Therefore, we do indeed depend on global ocean biodiversity.

(Functions and shapes of living things)

• Medicines

The functions and shapes of living things are specific to individual species. Such characteristics are inherited by the next generations. Genetic information encoded in the DNA of individual species has been created over 4 billion years of the history of organic evolution. Humans use information regarding the functions and shapes of various living things, backed by a long history, in many ways.

One familiar example of our use of the functions of living things is medicine. Traditionally a variety of organisms including plants have been used as medicines. For instance, aspirin was synthesized from the components of willow bark having an analgesic antipyretic effect. The components of oseltamivir phosphate (marketed as Tamiflu®) used for influenza treatment are extracted from star anise (seeds of *illicium verum*), which is used as a foodstuff for Chinese cooking. Without these plants, we would have suffered from such illnesses. Research and development projects targeting new medicines synthesized from the components of living organisms containing rich genetic information are being implemented quite actively to continue supporting our lives.

• Breeding

The basic foodstuffs for Japanese dietary life are just a few crops such as rice, wheat and soybean, and livestock such as cattle and chickens. Nevertheless, there are supposedly 7,000 species of vascular plants (grass and trees) alone in the country. It may be said that progress in agriculture is synonymous with the history of breeding useful organisms for humans as selected among numerous wild species. Indeed humans have attained a good life through streamlined food production made possible by breeding specific living organisms. Conversely, breeding has sometimes brought about such negative effects as “unification” (concentration of species), as opposed to diversification (diversity). To broaden the choices available to breeders, we should secure the sound maintenance of closely related wild organisms as rich genetic resources. In the future when genetically “homogenized” crops and livestock can no longer adapt to altered environments, additional genetic resources will be needed to make further improvements. Biodiversity is thus an important factor that serves as a basis for the production of effective as well as efficient agricultural products.

• Application of functions and shapes

Living things have evolved over an extended period of time, adapted to environments, and developed excellent functions that may far exceed human arts and skills. Silk spun from the cocoons of silkworms offers excellent breathability and hygroscopicity, and has a soft touch as well as

functions to filter out UV rays. Any other textile synthesized chemically with advanced technology is not comparable to silk. Moreover, worn-out silk goods decompose naturally and add no burden to ecosystems. And migratory birds can fly long distances using less energy, but aircraft cannot.

By mimicking and taking cues from the shapes or functions available in the world of nature, problems in the human world can sometimes be resolved with epoch-making technological innovations often being realized. This is known as “biomimicry.” This term refers to studying nature’s best ideas and then imitating the designs and functions to solve human problems. For instance, the shape of the bill of a common Indian kingfisher was applied to designing the nose cone of the first Shinkansen bullet train for achieving low air resistance; by mimicking of the surface structures of a lotus leaf, a stain-resistant paint finish method was successfully developed.

Rich biodiversity possessing many hidden functions and the performance of living things evolving through a long history therefore represent a treasury of technologies that may be potentially developed in the future.

3 Biological and Cultural Diversity

(Japanese wisdom and traditions not conflicting but coexisting with nature)

As an island country, Japan is blessed with bountiful seas having many converging points of warm and cold currents. The people enjoy plentiful rainfall due to a wet climate together with four distinct seasons, and numerous species of animals live there along with a variety of flora. Since ancient times, Japan has been called *Toyoashihara-mizuho-no-kuni* (a country abundant in golden ears of rice with green reeds growing on watersides). In such a country where there is a rich growth of all forms of life, the Japanese have nurtured a culture in which humans live according to the changing seasons, while being forced to live with the threat of such natural disasters as earthquakes, volcanic eruptions, and landslides.

Thus in the face of a rich but violent natural environment, the Japanese have cultivated wide-ranging knowledge, skills, characteristic arts, great sensitivity, and a sense of beauty that do not conflict with but adapt to nature. We later created a diverse culture in which our traditional view of coexisting with nature is believed to have been formed.

In particular, the Japanese people have developed dry fields, paddy fields, ponds or other sites for the production of agricultural products over a long period of time. In olden times, they would build a tutelary shrine sheltered in a grove and dedicated to many gods. This practice reveals a certain human fear of nature. The view that all resources should not be used up reflects the Japanese attitude toward “coexistence with nature.” In the utilization of Satochi-Satoyama areas, local people used to formulate specific systems or rules so as not to use up the areas. Even today many locals tend not to pick up all wild vegetables and leave a portion untouched for next year. Therefore, to build up a society or create a lifestyle in coexistence with nature, we have much to learn from such traditional wisdom and attitudes toward nature that place great importance on nature and natural resources.

(Climate with rich regional characteristics)

The word “climate” refers to the integration of nature and culture in Japan. The characteristic climate of the region relates closely to its specific biodiversity and has nurtured diverse food culture, crafts, and performance arts among other things. For instance, food culture is created by cooking vegetables, fish, mushrooms and other produce from the region according to recipes specific to the region. *Zoni* (rice cake boiled with vegetables on New Year’s Day) is a traditional Japanese food. It varies in characteristic features according to its recipe, foodstuffs and shape of the rice paste. And due to the high temperature and wet climate of Japan, various food products have been developed, including pickles, *narezushi* (sushi made of rice and fish fermented with salt in a barrel), *miso* (soybean paste), soy sauce, and *sake* (a Japanese alcoholic beverage). These kinds of foods are produced from a complicated combination of microorganisms, climate, water, and ingredients suitable for regional characteristics. Today many foods are mass-produced along with the large-scale distribution of food products, leading to a loss of traditional knowledge and skills, as well as fewer endemic organisms being supplied as foodstuffs. And what is worse, traditional food cultures that represent respective regions are consequently being lost at a rapid pace.

At the same time, many citizens living in cities where biodiversity is being degraded are still eager to interact with and appreciate nature in immediate environments or participate in experiential activities conducted in natural districts, while more children do not know how to get along with nature, because they lack opportunities for regular contact. It has been pointed out that growing up without any experience playing in natural environments or intimate contact with nature is contributing to mental instability among more children.

For these reasons, now is the time to offer opportunities for learning about and enjoying contact with Japan’s abundant nature, in order to promote the sound growth of children who will lead the next generation. We need to understand that cultural diversity, which is nurtured and supported by rich biodiversity, is integral to rewarding and spiritually fulfilling lifestyles, and has contributed to the sustainable development of local communities by fostering a culture unique to the region.

4 How our lives are protected by nature

Our lives are secured by a sound ecosystem. In particular, the proper conservation of forests, promotion of thinning and conversion to broadleaf forests, or long rotation forest management facilitates the effective maintenance of diverse and sound forests that contribute to the creation of rich nature, including the nurturing of numerous fauna and flora. Also, creating rivers abounding in living things or conserving riverside forests contributes to the prevention of mountain disasters or soil erosion, and helps secure safe drinking water. In the aftermath of the huge tsunami caused by the 2004 Indian Ocean earthquake and tsunami, damage from the tsunami was reportedly lessened in areas where natural coastlines were maintained. Moreover, the abundant forests of Japan help curtail the damage wrought by typhoons. Such rich biodiversity thus helps to reduce the damage from natural disasters.

Since improvements to residential environments in line with the natural landscape also contribute

to safe living, people in the past when large-scale civil engineering works were not available used the land according to the natural terrain. Making use of such wisdom is so vital to ensuring a higher degree of safety.

From the standpoint that agriculture is an activity of not only producing food products but also creating diverse living things, the proper use of environment-friendly agrichemicals or fertilizers as well as sustainable agriculture management including organic agriculture is recommended instead of the improper use of pesticides or excessive dependence on chemical fertilizers in farming. Such an approach will contribute to both conserving biodiversity and ensuring safe food products. Thus, the conservation of biodiversity containing soil microbes or endemic natural insect pests in agricultural surroundings will elicit a pest-controlling potential in agro-ecosystems.

As described above, it is no exaggeration to say that thinking highly of biodiversity in considering the safety in our lives offers the advantage of enhanced economic efficiency of investments as well.

Section 3 Rationales for Conservation and Sustainable Use of Biodiversity

Based on what is described in Section 2, “Biodiversity that Supports Life and Livelihood,” here we employ the following four rationales that represent the significance of the conservation and sustainable use of biodiversity.

Conservation and sustainable use of biodiversity;

1 “prepares the basis for the existence of all life”

Living organisms on the earth are closely related within a link—the ecosystem. These organisms live linked with each other. The basic requirements for the existence of all life at present and in the future are derived from functioning (including the release of oxygen and absorption of CO₂ by plants and forests), climate control or atmospheric circulation via transpiration, the creation of soil through the decomposition of dead animals and leaves, and other factors.

2 “has a useful value for humans”

As human beings, we rely on food, lumber, textiles, medicines and diverse organisms for our daily lives. Biodiversity allows us to apply the functions and morphology of living things to industrial use and indirect or potential utilization, including the breeding of farm products in the future. Such value leads to a good life both at present and in the future.

3 “becomes a fountain of rich culture”

Since ancient times, the Japanese have maintained an attitude toward nature that considers all living things to be interconnected and mutually supportive. We have thought highly of and coexisted with nature to cultivate an enriched sensitivity and a sense of beauty which has helped to create Japan’s diverse culture. Biodiversity has built up a basis for such a spirit. Moreover, it provides a fountain for such culture that includes so-called indigenous assets such as foods, crafts and festivals, and is fostered by the local natural environment.

4 “insures safety of life for many years to come”

Proper conservation to create diverse, sound forests and not improperly converting the landscape helps prevent sediment discharge and disruption, and ensures safe drinking water. From a long-term perspective, it also leads to efficiently ensuring the safety of life for future generations.

Our planet’s environment and the biodiversity on which it is based are irreplaceable, given their creation and development during the long history of life on earth. That life is very diverse and includes human beings. Such long-established biodiversity is valuable in itself. In our attempts to stay safe as living beings from dangerous organisms, we must also respect the right of those organisms to exist. This biodiversity often forms the basis of a specific region’s uniqueness and has contributed to the development of diverse and unique traditional cultures, in addition to often serving as integral parts of lifestyle and culture.

Chapter 2 Status and Problems

Section 1 Biodiversity Crises

The biodiversity crisis in Japan is classified based on an analysis of its causes and results as described below. Various measures and policies have been implemented against the following three crises that are still in progress.

First crisis: The decrease in and extinction of species brought about directly by human activities, development or reduction and loss of habitats through the destruction, fragmentation, and deterioration of ecosystems

Second crisis: Changes in environmental quality in Satochi-Satoyama areas (rural landscapes formed by the sustainable use of natural resources), decrease in species, and changes in the status of habitats due to reduced or discontinued human approaches to nature, along with such socioeconomic changes as those in lifestyle and industrial structure, and a decrease in population

Third crisis: Disturbances in ecosystems caused by artificially introduced factors including alien species and chemical compounds

In recent years, the progress of global warming has been seriously affecting global biodiversity. It is predicted that global warming will cause various problems, including the extinction of many species and disruption of fragile ecosystems. Global warming presumably poses an inevitable grave threat to biodiversity.

These three crises remain serious for the following reasons:

- (1) Many citizens are unaware of the significance and value of biodiversity, and reluctant to participate in environmental activities, considering global warming as their own problem.
- (2) The state of biodiversity dictated by vast and diverse interconnections and characteristics is not well understood, coupled with a lack of fundamental knowledge necessary for assessment and countermeasures based on scientific recognition.
- (3) Though biodiversity conservation activities including the restoration of nature and conservation of Satochi-Satoyama areas are in progress, such activities remain sporadic. Also, interdisciplinary approaches as measures against the biodiversity crises have not made much progress.

1 Three crises

(1) First crisis (brought about by human activities and development)

The first crisis involves the effects on biodiversity due to negative factors generated by human activities and development. Specifically, the negative factors are the direct collection of life-forms (e.g., overexploitation of populations, illegal digging, excessive collection for ornamental and commercial use), as well as the destruction of habitats and deterioration of habitat environments due

to land reclamation/development in coastal areas and changes in land use (e.g., changeover of forests). Vast floodplains and the loss of grasslands and wetlands caused by the straightening and immobilization of rivers, and the development of agricultural land are also negative factors.

It can be said that these effects are being stabilized because the total land area converted from forests and agricultural land for urban land use, and the reclamation areas along the coast have recently decreased compared to such areas during the periods of high economic growth and the bubble economy. However, these effects are still continuing though the levels thereof have been somewhat curtailed.

For these problems, it is necessary to properly avoid or reduce the effects caused by human activities according to the characteristics and importance of the object. It is also important to strengthen the conservation of virgin nature and thoroughly consider whether the alteration of nature ecosystems is truly necessary. Moreover, it is necessary to positively promote the restoration of already lost or deteriorated ecosystems based on scientific knowledge.

(2) Second crisis (brought about by reduced human activities)

Contrary to the first crisis, the second crisis involves the effects caused by reduced or discontinued human approaches to nature. Secondary forests (e.g., fuelwood/farm forests) and secondary grasslands (e.g., meadows) had been maintained as necessities for economic activities. Such human-made areas had grown a variety of living things specific to each environment. With a decrease in areas including floodplains that have suffered natural disturbances, such areas are considered to be positioned as alternative habitats.

In Satochi-Satoyama areas where the forms of agriculture and lifestyle are rapidly changing with a decrease in population and an aging society, however, reduced human activities are causing an expanding crisis. Ecosystems that once formed intricate mosaic patterns due to various levels of disturbance by humans through logging and mowing have lost their diversity in being free from such disturbances. Thus, many animals and plants living in Satochi-Satoyama areas are designated as threatened species.

With respect to artificial forests, deterioration in their functioning including water conservation and the prevention of soil erosion, and in their quality as habitats for living things concerns us deeply because of insufficient thinning and care due to lower profitability and stagnant forestry production activities.

On the other hand, the populations of large and medium-size mammals (including deer, monkeys and wild boars) have increased significantly along with expanding distribution, thereby resulting in serious damage to agriculture and forestry, and adversely affecting ecosystems.

To address these problems, the structuring of a more effective conservation/management system must be promoted according to the natural and social characteristics under current socioeconomic conditions. Approaches to these problems have already been initiated in many parts of Japan, but remain sporadic in local areas and have not developed into an extensive nationwide approach.

(3) Third crisis (brought about by artificially introduced factors)

The third crisis has been brought about by factors introduced by humans in the age of modern life. The first factor is ecosystems being disturbed by alien species. Beyond the travel capacity of such wildlife as the small Indian mongoose, raccoon, and largemouth bass, alien species introduced by humans intentionally or unintentionally from foreign countries or other areas of Japan now pose a grave threat to regionally-specific biota and ecosystems. Especially on isolated islands where many endemic species live, such alien species may significantly alter the existing biota and ecosystems. With respect to the alien species problem, the control of imports and feeding based on the Invasive Alien Species Act has already begun, but eliminating alien species that have settled in Japan will take a good deal of time and effort.

Living things introduced unintentionally to Japan with materials or other animals/plants and those introduced to islands or environmentally important regions from other regions of Japan also pose a great threat, given the difficulty of controlling them under the Invasive Alien Species Act. Appropriate measures must be taken at each step of (1) preventing invasion, (2) detecting invasion and taking action at an early stage, and (3) controlling settled alien species. Chemical substances whose effects are not well known also pose the threat of impacting ecosystems. Many chemical substances were developed and spread rapidly from the beginning of the 20th century. Ecosystems are now exposed to many kinds of chemical substances for long periods. There are some chemical substances whose impact on ecosystems has been pointed out. For example, the effects of DDT on birds were documented in the book *Silent Spring*, published in 1962 in the United States, as well as tributyltin compounds affecting mollusks in Japan. There are still other chemical substances whose impact on ecosystems has yet to be clarified, and which may adversely affect ecosystems without our knowledge. For this reason, it is necessary to make positive efforts to detect changes in wildlife and the signs thereof, and promote risk management through proper risk assessments on the impacts of chemical substances on ecosystems.

2 Crisis brought about by global warming

In addition to the three crises above, the effects of global warming must be considered a major problem.

The Fourth Assessment Report (2007) of the Intergovernmental Panel on Climate Change (IPCC), which conducts comprehensive assessments based on scientific knowledge and the observation of anthropogenic climate change, related effects, and adaptation/mitigation measures from scientific, technical and socioeconomic perspectives, concluded that warming of the climate system is unequivocal, and that most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations.. The report stated that average Northern Hemisphere temperatures during the second half of the 20th century were likely the highest in at least the past 1300 years.. The global average temperature increased by 0.74°C (0.56 to 0.92°C) on a long-term basis over the past 100 years (1906 to 2005), and the linear warming trend over the 50 years from 1956 to 2005 (0.13 [0.10 to

0.16]°C per decade) is nearly twice that for the 100 years from 1906 to 2005. The increase in average temperature at the end of this century will be about 1.8°C (1.1 to 2.9°C) in a society where the global coexistence of environmental conservation and economic development is assumed. However, the increase in average temperature is estimated at about 4.0°C (2.4 to 6.4°C) in a society that is expected to attain high economic growth while depending on fossil fuels. Biodiversity is particularly vulnerable to climate change. The report predicts that if the increase in the average global temperature exceeds 1.5 to 2.5°C, 20 to 30% of all animals and plants that have been assessed will face a greater risk of extinction. If the increase exceeds 4.0°C, there will be a grave global extinction of 40% or more of all species.

Living things that cannot adapt to environmental changes will become extinct unless they can “evolve *in situ*” or “move to an inhabitable place.” Sufficient scientific knowledge about predicting the effects on life and ecosystems in Japan in case global warming continues has yet to be accumulated, but serious impacts on the biodiversity in Japan are anticipated, centering on areas subject to environmental changes, such as islands, coastal areas, subalpine zones, and alpine zones.

For these reasons, it is necessary to understand the effects of global warming on biodiversity, mitigate those effects, and pursue adaptive measures from the perspective of conserving biodiversity.

Section 2 Global Warming and Biodiversity

1 Impacts of global warming on biodiversity

There are concerns over the serious effects on biodiversity, including the disturbance of ecosystems and extinction of species, with an increase in global warming. A change in temperature will change the flowering and fruiting cycles of each plant, as well as the distribution of flora. Since the pace of such changes differs depending on the species and taxa, the correlation of living things (e.g., predation, pollination by insects and seed dispersion by birds) will likely be disrupted. In Europe the bird breeding period is reportedly much different from when insects become available as food for birds; consequently, this has reduced the successful breeding rate of birds and bird populations in some areas.

With the advance of global warming, many species are predicted to face a greater risk of extinction, and an increase in sea surface temperature by about 1 to 3°C will cause coral bleaching and widespread extinction.

There are also new reports on the impact of global warming on the inhabitation of individual species. For example, an ice-covered sea is an essential condition for polar bears to live because they hunt seals emerging from the water to breathe and rest on the ice. According to research conducted in Canada's Hudson Bay, however, both male and female polar bears living there are in a poor state of health (decreased weight per area of body surface), and the birth rate is also declining. This is because the ice has gradually melted earlier in the year ever since 1975, thereby reducing the available period for hunting seals, and possibly preventing polar bears from getting sufficient nutrition. In 2006, the International Union for Conservation of Nature and Natural Resources (IUCN) designated polar bears on its Red List as a threatened species.

In recent years, many areas of the world have been frequently beset by disasters caused by abnormal weather, including unusually strong typhoons, hurricanes and cyclones, as well as torrential rains, droughts, and heat waves. It cannot be definitively concluded that global warming is responsible for these abnormal weather patterns, but the possibility has been raised that as global warming progresses, abnormal weather events may increase in strength and severity.

Many possible effects of global warming are also being predicted and assessed in Japan. For example, as the areas suitable for Japanese beech forests and subalpine/subarctic coniferous forests are expected to decrease, and there are areas where alpine flora communities are expected to rapidly decline. Moreover, in the Tohoku region, bamboo forests are expected to expand, while pine wilt disease is expected to spread.

There is another prediction in Japan concerning mountain-dwelling grouse—a species of bird considered among the most susceptible to global warming. Namely, this species may become extinct with a reduction of alpine zones if the annual average temperature increases by 3°C. It is not certain that this prediction is only due to global warming, but many cases possibly related to global warming have been observed. The flowering of cherry trees that marks the beginning of spring has occurred about 4.2 days earlier each year over the past 50 years since the Japan Meteorological Agency first

began phenological observations in 1953.

According to an investigation conducted on the breeding ecology of the chestnut-cheeked starling in the city of Niigata, the egg-laying time has become earlier (by 0.73 day per year) since 1978. This may be related to higher temperatures in Niigata and in the city of Naha, Okinawa, which is located along their migratory route. Greater white-fronted geese and bean geese that depend mainly on fresh-water wetlands have wintered in places much further north since 1990s. Their beevies for overwintering can be seen regularly in Hokkaido, and the distribution is expanding. Furthermore, the distribution of deer has spread in recent years, thereby affecting the natural vegetation. The accumulation of snow is considered to be related to the inhabitation of deer, raising the possibility that the expanded distribution of deer is linked with global warming.

The effects are not limited to terrestrial areas. To the northwest of the Sea of Okhotsk, for example, as sea ice forms, highly saline, cold, heavy seawater flows along the continental shelf, carrying iron from the Amur River to south of the Sea of Okhotsk and into the North Pacific. As the ocean surface cools in winter, the circulation of convection-driven seawater again brings the iron content to the surface, allowing phytoplankton to thrive and thereby supporting marine and terrestrial ecosystems. It has been noted that if global warming inhibits the formation of sea ice, biological productivity in related marine ecosystems could possibly be affected over broad areas.

2 Effects on human lives through changes in biodiversity due to global warming

It is predicted that global warming will greatly affect human lives and have socioeconomic impacts through changes in biodiversity.

Globally, the potential producible amount of food will increase within a range of increase in average regional temperature of 1 to 3°C, but will decrease if the temperature exceeds this range. Extreme weather phenomena such as droughts and heat waves will increase with climate change, and these phenomena may significantly impact the world's production of grains and other foods.

With greater concentrations of carbon dioxide in the air, more carbon dioxide dissolves in seawater, gradually acidifying the seawater. This prevents the calcification that forms the skeletons of coral made of calcium carbonate and the shells of plankton. If the acidification of seawater progresses to a certain level, it has been pointed out that some species may be unable to form their own skeletons or shells. If these living things that support marine biodiversity are lost, marine biodiversity will be greatly affected, and this in turn may consequently reduce the fish catches made through fishery activities.

With respect to the effects on human health, a surge in the number of mosquitoes that transmit infectious diseases (e.g., *Aedes aegypti*, *Anopheles gambiae*, *Aedes albopictus*) is predicted to occur as the temperature rises and the habitats of mosquitoes are subsequently relocated northward.

As for Japanese food, higher temperatures may adversely affect rice production. If global warming continues, the yield and quality of rice may decline in areas except Hokkaido, the number of harmful insects (e.g., *Chilo suppressalis*, *Nephotettix cincticeps*) may increase, and their breeding

areas and period may change, possibly affecting the growth of rice. With respect to fruits, the lands suitable for growing satsuma mandarin may become more northward. Thus, most of the current main production areas may not be suitable for growing satsuma mandarin in the future.

With respect to fisheries, it is indicated that fishing grounds and the fishing season may change as the habitats of target species are relocated further north. According to an investigation conducted on the catches of sea urchins in the coastal areas of Hokkaido since 1985, northern sea urchin that had mostly been caught off southern Hokkaido is now being caught largely off Soya subprefecture in northern Hokkaido. In addition, longheaded eagle ray typically live in coastal areas in the subtropical to tropical zones, but many longheaded eagle rays also live in the Ariake Sea and Seto Inland Sea where fishery damage to Japanese littleneck and pen shells has been reported. Thus, it is also pointed out that living things that adversely affect fishery activities have migrated northward.

With respect to the effects on the health of Japanese people, a large-scale epidemic of infectious disease due to global warming is not predicted, but a greater risk of infection is considered due to the expanded distribution of vectors caused by global warming. In addition, poisonous redback spiders that are not indigenous have been found in areas centering on the Kansai region, and brown widow spiders have been found in Okinawa Prefecture and other areas. The distribution of these insects may expand with an increase in temperature.

3 Mitigation of global warming and adaptation to effects from the perspective of biodiversity

Climate change has already been very obvious. Even if greenhouse gas emissions and the amount of greenhouse gases absorbed by nature are in a balanced relation, climate change is considered to be caused by the greenhouse gases already emitted for a certain period. Since species and ecosystems experience environmental changes including climate change, both are considered to have adapted to such changes and have further evolved. But the rapid climate change now underway due to an artificial increase in greenhouse gas emissions exceeds the pace at which species and ecosystems can catch up. Therefore, it is predicted that this rapid climate change will have enormous effects on species and ecosystems, including the extinction of many species.

Mitigating global warming by reducing greenhouse gas emissions to decrease the impact and slow down the pace of climate change is very important for conserving biodiversity, because it gives species and ecosystems more time to adapt to climate change.

It is important—from the perspectives of conserving biodiversity and mitigating global warming—to prevent the deterioration and destruction of forests where the trees and soil contain much carbon, as well as maintain grasslands and wetlands that store carbon in peat and soil, and employ methods of farming, such as agriculture without cultivating fields to reduce greenhouse gas emissions. Plant biomass generated by the proper management of ecosystems, including the thinning of artificial forests, management of Satochi-Satoyama areas, mowing in waterside areas and grass collection in secondary grasslands can be used as such alternative sources of energy as pellet stove fuel, bioethanol fuel and power generation using grass resources instead of fossil fuels. This will

reduce the greenhouse gas emissions generated by fossil fuels. Moreover, the use of wood as a housing material will lead to an accumulation of carbon in the long run. These measures for both conserving biodiversity and preventing global warming must be promoted from a comprehensive perspective. Considerations must be given to both the potentially positive and negative effects that such measures may have on biodiversity. At the same time, care must be taken so that these steps do not overly emphasize short-term efficiency or either aspect mentioned above at the cost of the other.

In addition to the measures taken for reducing global warming, we must consider actions to take against the effects caused by global warming. Specifically, the progress of global warming may seriously affect vulnerable ecosystems on islands, along coasts, and in subalpine and alpine zones. It may also affect agriculture, forestry and fisheries, as well as the biodiversity in urban areas. There is a limit to the ability of various species and ecosystems to adapt to global warming and change their life cycles and distributions. Therefore, it is important to study measures for conserving biodiversity, which can mitigate the impacts of global warming as much as possible, as measures to adapt to global warming. Regarding the effects of global warming, it is necessary to study effective and efficient methods of adapting, and then apply those methods. In developing approaches to deal with the problem, it is important to understand that the impact of global warming on ecosystems is not something that can be avoided entirely, and that implementing adaptive strategies will entail considerable financial costs, and based on upon this understanding, to build a societal consensus based on scientific knowledge.

To this end, continued monitoring to grasp the impacts of global warming on the biodiversity in Japan and establishing a research system are both important. To respond to the impacts both grasped and estimated, we must promote the conservation and regeneration of good ecosystems that are specific to each region and highly adaptive to environmental changes. Since the vulnerability and adaptability to such impacts differ depending on the species and ecosystems, it is important to make wide-ranging efforts so that a variety of species and ecosystems can change together with global warming on a long-term basis. To this end, it is necessary to preserve the groupings of and connections within significantly broad regions rich in biodiversity according to regional characteristics, including floodplains, wetlands, and managed secondary grasslands/forests for species that flourish in a bright living environment. In particular, it is essential to take measures for building ecological networks that take into account, for example, latitudinal variances and elevation differences in the same mountain chain, so that organisms can alter their distributions to accommodate a certain degree of global warming. Moreover, it is also necessary to identify locations relatively resistant to the effects of global warming as refuges for certain species, and prevent the extinction of species by conserving such refuges.

Section 3 Background of Three Crises

1 Drastic development for 50 years after the war

Japan has changed dramatically during the 50 years since the end of World War II. The gross domestic product (GDP) was 48 trillion yen in 1955 after the special procurement boom of the Korean War, but rapidly increased more than tenfold to total 481 trillion yen in 1995. For example, product shipments in terms of industrial statistics expanded to 309 trillion yen (in 1995) from 15.5 trillion yen (in 1960), reflecting a 20-fold increase over that 35-year period, and a 30-fold increase in the amount of investments in construction/civil engineering industries during the same period. According to data on trends in housing land area from the Meiji era, the annual rate of increase was more than 10 times in the 1960s and about 20 times in the 1970s (compared to the average rate during the 50 years up to 1940), indicating a sharp increase in housing land area since 1960.

Thanks to industrialization and subsequent development at a pace without parallel in Europe or the United States, the area of tidal flats most affected by the formation of coastal industrial regions has decreased by about 40% from 1945 to 1994. Tidal flats in Tokyo Bay were found in most areas along Tokyo Bay, but now only the small Sanbanse and Banzu tidal flats remain in Chiba Prefecture, with others already being reclaimed. Such extensive development is believed to have affected various ecosystems. More than 60% of wetlands were lost according to contour maps from the Meiji and Taisho eras, and those from 1975 to 1997. In addition, a large area of natural forests and secondary forests was lost from 1955 to 1974, with more than 50% of natural coasts being lost in Japan proper. These facts confirm rapid and widespread damage, and a loss of biodiversity.

Today such rapid development has leveled off. Although Japan's GDP has slightly increased since 1995, the total value of manufactured products has remained largely the same, and construction investments have declined. However, the reclamation of coastal areas remains at the same level of about 800 hectares per year, and the total land area converted from forests and agricultural land to urban land use also remains at the same level of about 17,000 hectares per year. Although the pace of development pace has slowed down, new development continues. Once biodiversity is lost through the conversion of land use, it cannot be easily restored.

Although the GDP is projected to increase somewhat, the total pressure imposed by rapid development will be reduced by pursuing development centering on the redevelopment of already developed lands in view of a decreasing population,. However, blue tide occurs continuously in enclosed coastal sea areas due to oxygen-deficient water mass. It is thus necessary to improve circumstances while considering the effects on our valuable and fragile nature.

2 Decrease in population and change in usage of natural resources in "Satochi-Satoyama" areas

Many Satochi-Satoyama areas (rural landscapes formed by the sustainable use of natural resources) have experienced a major environmental change due to a decrease in population, an aging workforce, changes in industrial structure, and fewer natural resources being circulated through the

use of Satoyama forests and native grasslands (secondary grasslands).

According to the percentage distribution of employees by industry, primary industries accounted for up to 50% of the total number of employees several years after World War II, but this percentage drastically decreased to 6% by 1995 (50 years after the end of the war) and to 5% by 2005. During this period the number of core persons mainly engaged in farming decreased from 11.75 million (in 1960) to 2.56 million (in 1995), and then to 2.22 million (in 2005). Senior citizens accounted for nearly 20% until the 1980s, but then significantly increased to 40% (by 1995) and to 57% (by 2005). Considering that the agricultural population did not change much from the Meiji Restoration until 1960 in contrast to the large increase in total population, the agricultural population has rapidly decreased and grown significantly older since 1960.

From the postwar period to 1980, the main source of energy shifted to fossil fuels including oil, thereby replacing fuelwood, and the production of chemical fertilizers increased rapidly. Consequently, such natural resources as fuelwood and compost in rural areas have been less used and human connection with the Satoyama forests and native grasslands has become less intimate. As a result, Satoyama forests and native grasslands previously maintained by such forms of management as regenerative branching and intentional burning were left uncontrolled and rapidly decreased. This situation now threatens the fauna and flora found in Satoyama areas and grasslands with extinction.

The improper use of fertilizers and agricultural chemicals, and the fragmentation of ecosystems in water areas during infrastructural development are believed to have seriously impacted the biodiversity in rural areas.

Japan's total population peaked in 2004 and will continue to gradually decline. By the year 2050, Japan's population will be less than 100 million and senior citizens aged 65 and over will account for 40%. Thus, the advent of an aging society with a smaller population is widely expected.

According to population forecasts by sphere, even in major regional metropolitan spheres such as Sapporo and Sendai where population is expected to increase, urban population growth will peak around 2015, followed by a decrease in population, becoming less than 90% of the total population by 2050. In areas other than major regional cities and their surroundings, the population will decrease to 70% of the current population by 2050. Thus, depopulation will accelerate and some settlements may face a fateful crisis. The conservation of biodiversity in Satoyama areas, which have been maintained in relation to human activities over a long period of history, should be considered based on the future of Satoyama areas.

3 Globalization of the economy and society

The globalization of the economy and society also quickly advanced in the 50 years following World War II, and has again expanded in recent years with economic development in China, India, and other Asian countries. The movement of both humans and materials is rapidly increasing due to globalization of the economy and society. Accordingly, living things that may affect biodiversity are believed to be increasing both intentionally and unintentionally.

The total value of imports dramatically expanded to 32 trillion yen by 1995, which is 91 times the figure of 34.8 billion yen recorded in 1950. Although stagnant for a few years, total imports again increased to 73 trillion yen in 2007. This shows that connections to countries around the world have increased through the intermediation of materials in recent years. The import volume of goods involved also increased from 10.5 million tons (in 1950) to 760 million tons (72 times) in 1995 and to 810 million tons in 2007. The number of people traveling abroad also increased from 0.58 million in 1965 to 25 million (43 times) in 2008.

Japan is also importing many pet animals and plants. We should recognize that such imports of animals and plants may not only affect the biodiversity in Japan but also that in partner countries, as wild animals and plants are included. In 2008, about 300,000 mammals including hamsters (but excluding livestock), about 40,000 birds (excluding poultry), about 400,000 reptiles including tortoises/turtles, and about 80 million insects were imported. Moreover, about 60 million ornamental fish were also imported.

Should rapid economic development continue in China, India, and other Asian countries, globalization of the economy and society is expected to continue as well for the time being. Accordingly, the movement of both humans and materials, including imports of living things, is expected to increase on an ongoing basis. Therefore, it is necessary to reduce the effects on biodiversity both in Japan and in foreign countries.

Mass production, mass consumption, and mass waste have become central to our socioeconomic framework. Our procurement of raw materials and the forms of energy, greenhouse gas emissions, and waste disposal activities have all had a major impact on biodiversity both domestically and globally.

Moreover, the relationship between economic activities and biodiversity loss is not necessarily unilateral. In fact, the loss of biodiversity could weaken economies. In 2009, as the world was still reeling from the effects of the global recession that began in the latter half of 2008, the Syracuse Charter on Biodiversity was adopted at the G8 Environment Ministers Meeting held in Italy. The Charter expresses serious concerns over a loss of biodiversity and the ensuing decrease in ecosystem services, which in turn could affect food and water supplies, and inhibit the effects of biodiversity on mitigating and adjusting to climate change, resulting in a negative impact on the world economy. As such, the Charter requires every signatory country to make more efforts toward conserving biodiversity.

Section 4 Status of Biodiversity

1 Biodiversity in the world

(Species in the world)

A great variety of ecosystems on which various living things rely exist on the earth in areas ranging from tropical zones to polar zones, and from coastal/oceanic areas to mountainous areas. There are about 1,750,000 known species—about 6,000 species of mammals, 9,000 species of birds, 950,000 species of insects, and 270,000 species of vascular plants. It is generally accepted that there are about 5,000,000 to 30,000,000 species of life existing on earth, including unknown species.

(Millennium Ecosystem Assessment)

The Millennium Ecosystem Assessment (MA) is a worldwide project that conducted assessments of global biodiversity and ecosystems from 2001 to 2005. This represented an unprecedented large-scale project involving 1,360 participants from 95 countries. This ecosystem assessment project focused its attention on ecosystem services (benefits from ecosystem services such as food, water, and climatic stability) and clarified the relationship between biodiversity and human life. This comprehensive assessment confirmed that our daily lives are supported by various ecosystem services based on healthy ecosystems, and that the freedom of selection and action is affected by changes in ecosystem services such as the supply of food and fresh water.

(Status of ecosystem services and changes in biodiversity)

The MA assessed the status and trend of changes for 24 typical ecosystem services on a global basis. The assessment revealed that only four items (i.e., grain, livestock, aquaculture, climate adjustment) out of the 24 ecosystem services have been improved, and that 15 items (e.g., fish catches, wood fuel, genetic resource, fresh water, disaster control) have deteriorated or are being used in an unsustainable form.

Furthermore, the MA showed that more than two-thirds of grassland area in the temperate zone and more than half of the dry broadleaf forest area in the tropical zone and broadleaf forest area in the temperate zone had been altered by 1990. The MA showed the quantity of artificially altered ecosystems in the world for each type of land ecosystem, revealing that the structure and function of global ecosystems had been changed in the second half of the 20th century at a rate unprecedented in human history. The MA also showed that humans have accelerated the species extinction rate by about 1,000 times in recent centuries, and that humans are fundamentally changing biodiversity on the earth. Based on the future outlook using the data on these ecosystem services and biodiversity as well as scenario analysis, the MA concluded the following:

- A major irreversible anthropogenic change in biodiversity occurred in the past 50 years through human activities.
- Alterations of ecosystems have greatly benefited humans, but also cause many ecosystem services to deteriorate, increase of the risk of accelerated and irreversible change, and worsen

resultant poverty. If we fail to address these problems, future generations will benefit much less from ecosystem services.

- Ecosystem services will continue to deteriorate in the first half of the 21st century.
- To curtail the deterioration of ecosystems while responding to increasing demands for ecosystem services, related policies, systems, and practices must be strictly reviewed and drastically reformed.

The MA has sounded the alarm on current human activities and social systems through its assessment of ecosystems and biodiversity, and emphasizes the importance of adaptive ecosystem management.

Some species of living things that have diversified during the course of evolution are now threatened with extinction due to human activities. In comparing the Red Lists published by the International Union for Conservation of Nature and Natural Resources (IUCN) in 2000 and 2008, many taxa show a higher ratio of species facing a greater risk of extinction; it is estimated that 10 to 30% of all known species of mammals, birds, and amphibians face the risk of extinction.

Living things decrease in number due to deforestation, the loss or disturbance of ecosystems by alien species, and the excessive use of living resources. The following describes forests and seas that are closely related to these concerns.

(Global deforestation)

The various types of forests on the earth are vital ecosystems for the conservation of biodiversity. According to a global forest resource assessment conducted by the Food and Agriculture Organization (FAO) of the United Nations, the world's forests accounted for a total area of 3.95 billion hectares in 2005, nearly 30% of the world's total land area.

According to the MA, global wood production increased by 60% in the 40 years prior to 2000, and about 40% of the total forest area was lost during the period of industrialization. According to FAO's global forest resource assessment, forests (particularly tropical forests) are continuously losing by about 12.90 million hectares per year. The destruction of forest areas is most widespread in Africa and South America. When excluding the area expanded by planting, restoring vegetation, and the natural recovery of forests, the world's forest area has been reduced by about 7.30 million hectares per year (about one-fifth of Japan's total land area).

(Marine biodiversity)

Nearly 70% of the earth's surface is covered by oceans. All living things originated in the sea and some came ashore over a long period of history. Although much about the sea remains unknown, humans use fish and seaweed as marine resources thanks to rich biodiversity.

According to the MA, however, coastal areas with rich biodiversity are experiencing lower levels of underwater flora and coral due to the great effect of human activities. About 20% of the

world's coral reefs were lost and another 20% deteriorated in the last decades of the 20th century. In countries for which adequate data are available, nearly 35% of mangroves have been lost in the past 20 years. Against the backdrop of these facts, it is clearly evident that ecosystems in coastal areas face a serious crisis of loss.

The yield from fishery activities increased until the second half of 1980s, but have since remained at about the same level, even through fish-catching technology has improved and fishing efforts (in terms of the number of fishing days and number of fishing boats) have increased. While the global demand for marine products is increasing, fish species corresponding to one-fourth of all marine resources are considered to be seriously depleted. In particular, the fishery yield of the most consumed fish (such as tuna and codfish) positioned high in the food chain has decreased, thereby suggesting the degradation of marine biodiversity.

With respect to the impact of environmental contamination in the sea on marine biodiversity, marine life is adversely affected by heavy metals, harmful chemical substances and red tide, and cases where such marine animals as sea turtles mistakenly consume drifting waste and waste washing ashore (such as plastics) as food. Thus, many cases of damage to marine wildlife have been reported.

2 Biodiversity in Japan

(Features of biodiversity in Japan)

The number of known species of Japanese living things is estimated to surpass 90,000, and exceeds 300,000 when including unclassified species. With a small land area of only about 38 million hectares, Japan has a rich biota. Japan also features a high rate of endemic species. Nearly 40% of land mammals and vascular plants, 60% of reptiles, and 80% of amphibian species are endemic ones. Japan has a rich natural environment where wild monkeys (the only ones in developed countries) and many other medium-size and large wild animals such as bears and deer live.

Japan's characteristic biota formed due to the diverse habitat environments created through geological history, including the Japanese archipelago that stretches 3,000 km north to south, four distinct seasons due to annual monsoons, a vertical drop from coasts to mountains, thousands of islands, a connection to and separation from the mainland Asian continent, and various disturbances such as volcanic eruptions, the flooding of precipitous rivers, and typhoons. These natural disturbances have been reduced by using banks to prevent floods, while partly artificial environments have been created through agriculture and forestry, allowing living things (e.g., pasque flower, *shijimiaeoides divinus*—a kind of butterfly) that flourish in such environments to exist.

In Japan, the existing 1:50,000 vegetation map that covers all of Japan's land mass is being improved based on the results of the National Survey on the Natural Environment. With respect to the percentage of each type of vegetation to the total land area, forests (natural forests, secondary forests close to natural forests, secondary forests, and plantations) account for 67%, roughly as high as in northern European countries such as Sweden (70%), and much higher than among other developed countries including the United Kingdom (12%) and the United States (33%). Natural

forests account for 17.9% and natural vegetation (natural forests plus natural grasslands) accounts for 19.0% of the total forest area, or nearly two-thirds of Japan's total land area. These natural vegetation areas are distributed mainly in regions that are largely untouched by humans, such as steep mountains, peninsulas, and remote islands. In flatlands and gently contoured mountains, there are high percentages of secondary vegetation such as secondary forests and secondary grasslands, plantations and cultivated land. Ecosystems exist at various levels in many latitudinal, altitudinal and aqueous environments, providing a very rich diversity of ecosystems. In particular, it is important that such ecosystems as grasslands including wetlands and secondary grasslands, floodplains and secondary forests retain a bright environment, in order to allow many plants and insects that flourish in a bright environment to live in Japan with its large amount of precipitation in the midst of natural transitions. Such ecosystems are said to characteristically result from life in good harmony with the climate, geohistory and nature, but are being lost over a wide range.

Diverse environments have also formed in the sea, coupled with the landforms along which the Kuroshio, Oyashio and Tsushima Currents flow north and south along the Japanese archipelago. In coastal areas, we can see diverse ecosystems with long indented coastlines having a length equivalent to three-fourth of the earth's circumference, as well as tidal flats, underwater forests and coral reefs that are rich in biota. Therefore, Japan also features many sea fish species living in nearby sea areas (comparable to the Mediterranean Sea and West Coast of North America located at the same latitude). The seas close to Japan have a rich diversity of species, including 50 of the 112 species of marine animals worldwide (e.g., 40 species of whales/dolphins, 8 species of seals/sea lions, sea otters, dugongs), about 3,700 species (25%) of about 15,000 species of marine fish worldwide, and about 122 species of about 300 species of seabirds worldwide.

(Area classification for the conservation of biodiversity)

Japan's natural environment entails various diverse aspects such as geohistory, climate, vegetation, fauna and flora. This makes it difficult to handle the nationwide conservation of biodiversity in Japan with unified standards and methods. For the conservation of biodiversity, the Japan's natural environment should be classified into several units according to differences in meteorological phenomena and landforms.

In 2001, the Ministry of the Environment provided an area classification (draft) for the conservation of biodiversity that classifies the natural environment in terms of Japan's land areas into 10 regions: eastern Hokkaido, western Hokkaido, north-central Honshu on the Pacific side, north-central Honshu on the Japan Sea side, Hokuriku/San-in, central Honshu on the Pacific side, region around the Seto Inland Sea, the Kii Peninsula/Shikoku/Kyushu, Ryukyu Islands, and Ogasawara Islands. Considering this area classification, Monitoring Site 1000 has been set up and the natural environments in these land areas are now being monitored.

The draft also formulated notable vegetation that shows the characteristics of each region. As a result of extraction and formulation through a questionnaire survey on natural vegetation in the land areas given to nationwide researchers and local prefectural governments, 396 regions were extracted

as regions where important vegetation (e.g., Yezo spruce and Todo fir forests in eastern Hokkaido, beech forests in northern Honshu, and *castanopsis cuspidata* forests in central Honshu on the Pacific side) is widely distributed.

It is necessary for the conservation of biodiversity in Japan to take appropriate conservation measures such as formulating conservation management policy, setting protected areas, and giving consideration for conservation based on the natural environment characteristics of each region.

We should also make efforts for conserving coastal and oceanic areas according to such regional characteristics as ocean current and climate.

(Status of threatened wildlife)

The Red List issued by the Ministry of the Environment that designates threatened species of wildlife classifies more than 30% of reptiles, amphibia (tetrapods) and brackish/freshwater fish, more than 20% of mammals and vascular plants, and more than 10% of birds living in Japan as threatened species. Many of these species live on the Nansei Islands and Ogasawara Islands, and efforts are being made for the protection and proliferation of some species including the Okinawa rail (*Gallirallus okinawae*) and Tsushima leopard cat (*Prionailurus bengalensis euptailurus*). As typified by killifish, many familiar species living in Satochi-Satoyama areas and those living in waterside areas are also designated as threatened species. Like bears living on the Shimokita Peninsula and in the western Chugoku region, some wildlife species are threatened regionally by fragmented habitats. The destruction and fragmentation of habitats, environmental changes due to less human contact, overexploitation, and alien species are indicated as causes of the decrease in these wildlife species. Conversely, there are also species that have become less threatened (e.g., primrose, water fringe) through efforts made for conservation. However, it is still necessary to make ongoing efforts for conserving such species.

(Review of the Red List)

The Ministry of the Environment began reviewing the Red List in 2002, and published a new Red List for four taxa (birds, reptiles, amphibia, and other invertebrates) among 10 taxa in total in December 2006, and for six taxa (mammals, brackish/freshwater fish, insects, shellfish, plants I [vascular], and plants II [nonvascular]) in August 2007. As a result, the number of threatened species increased from 2,694 (before the review) to 3,155.

As for mammals, the number of threatened species excluding marine mammals (except dugongs that depend on neritic areas) decreased to 42 (minus 6). This is because the crisis rank of 13 of the 46 species of bat (accounting for the majority of assessed mammals) was lowered thanks to more data being accumulated. Iriomote cats (*Mayailurus iriomotensis*) were ranked higher given their decreasing population. Dugongs depending on neritic areas were newly added to the assessment target species and designated as a threatened species. In contrast, *Macaca fuscata yakui* [a subspecies of Japanese macaque (*Macaca fuscata*) living on Yaku Island] and the Shimokita populations of *Macaca fuscata fuscata* [a subspecies of Japanese macaque living in Honshu,

Shikoku and Kyushu (except Yaku Island)] that were previously listed as regional populations of species were put outside the rank because their populations are increasing.

As for birds, the total number of threatened species increased to 92 (plus 3). In more detail, there are 11 species that ranked lower than before, but 26 species (including 9 species newly designated as threatened species) ranked higher. Thus, many species ranked higher than before. Many higher ranked species live in grasslands, scrub forests and island areas, and may be affected by the deteriorated habitat environments in these areas and by alien species in island areas. As for birds of prey, for example, grey-faced buzzard eagles (*Butastur indicus*) living mainly in Satochi-Satoyama areas were designated as a threatened species, and accipiter gentilis shifted from being a threatened species to a near threatened species.

As for reptiles, the number of threatened species increased to 31 (plus 13), among which 30 species live on the Nansei Islands. It can thus be said that many reptiles living on the Nansei Islands face a crisis of extinction. The deterioration of habitat environments and effects of alien species have been indicated for many species, but some species may be affected due to overexploitation for raising and breeding purposes.

As for amphibian species, the total number of threatened species increased to 21 (plus 7). Many higher ranked species may be affected by small-scale development or alien species, and some may be affected by overexploitation for raising and breeding purposes. Notably, 11 out of 19 species of salamander living in Japan were designated as threatened species. The deterioration of habitat environments is considered to be the cause.

As for brackish/freshwater fish, the total number of threatened species increased to 144 (plus 68). This is because many species living around the Nansei Islands were assessed and Japanese bitterlings (*Pisces, Cyprinidae*) living in the countryside ranked higher than before. In addition, *carassius auratus grandoculis* and *carassius cuvieri* in Lake Biwa were newly designated. These species may be affected by the deterioration of their habitat environments and alien species including largemouth bass (*micropterus salmoides*). Moreover, musashi ninespine sticklebacks (*Pungitius pungitius*) and Venus fish (*aphycocypris chinensis*) that live in limited habitats were again designated as threatened species.

As for insects, the total number of threatened species increased to 239 (plus 68). In particular, insects living on the Ogasawara Islands and Nansei Islands are facing a serious crisis due to the effects of alien species, and many diving beetles ranked higher than before. This may be due to the deterioration of their habitat environments and the effects of overexploitation for raising or breeding purposes.

As for shellfish, the total number of threatened species increased to 377 (plus 126). This is mainly because many newly assessed species living in brackish areas such as the mouth of a river were designated as threatened species, and the inhabitation status of terrestrial snails has deteriorated.

As for invertebrates, the total number of threatened species increased to 56 (plus 23). This mainly resulted from more data being accumulated and deteriorated habitat environments. For

example, fiddler crabs (*uca arcuata*) living in tidal flats ranked higher than before. Horseshoe crabs (*Tachypleus tridentatus*) that live in the tidal flats in western Japan were again designated as a threatened species.

As for type I plants (vascular plants), the total number of threatened species increased to 1,690 (plus 25). Specifically, many species ranked higher or lower than before as a result more data being accumulated. There are also species that shifted from threatened to near threatened species such as primrose (*Primula sieboldii*), water fringe (*Nymphoides peltata*), and white egret flower (*Habenaria radiata*), thanks to efforts made for conservation. In addition, yellow waxbell (*Kirengeshoma palmata*) was newly designated as a threatened species due to the feeding damage caused by deer mainly in western Japan. The populations of some species have been depleted by overexploitation for cultivation or decorative purposes.

As for type II plants (nonvascular plants), the total number of threatened species increased to 463 (plus 134). This is because some species were added to the assessment target species and many algal species living in lakes and ponds were designated as threatened species. This may be due to the deteriorated habitat environments of these species.

(Changes in distribution of medium-size and large mammals)

As a result of a comparison made between the mammal distribution survey as part of the Sixth National Survey on the Natural Environment (conducted from 2000 to 2003) and the nationwide distribution in 1978, the distribution areas of all seven assessed species (sika deer (*cervus nippon*), Japanese serow (*Capricornis crispus*), Japanese macaque (*macaca fuscata*), bears, wild boars, foxes, and raccoon dogs) were found to be expanding. Above all, the nationwide species occupation rate of *cervus nippon* increased to 42% from 24%, and that of Japanese serow increased to 29% from 17%. The distribution in regions accounting for more than 10% of the nation's total land area is also expanding. This is attributed to more land areas for cultivation being abandoned due to depopulation, the aging of settlements that have produced an environment suitable for medium-size and large mammals, and less snowfall in areas of typically heavy snowfall in the Tohoku region. It is predicted that a combination of several social and natural factors has resulted in the expansion and change of distribution areas.

While the distribution of certain mammals is expanding, the distribution areas of monkeys living in northern Ou, the Kitakami Plateau and on Mt. Kinka, and bears living on the Shimokita Peninsula, Kii Peninsula, in the eastern Chugoku region, western Chugoku region, Shikoku Mountains and Kyushu region are isolated. These species are listed in the Red List as populations of threatened species.

(Changes in the breeding distribution of birds)

As a result of a comparison made between the bird breeding distribution survey as part of the Sixth National Survey on the Natural Environment (conducted in 2002) and the nationwide distribution in 1978, no significant change was found in the breeding distribution of nearly 80% of the 248 species surveyed, but some species expanded or reduced their breeding distributions to a

certain level.

In particular, the breeding distribution of great cormorants (*Phalacrocorax carbo*) and gray herons (*Ardea cinerea*) that eat river fish was significantly expanded. In contrast, the breeding distribution of Japanese quails (*Coturnix japonica*), brown shrikes (*Lanius cristatus*) and tick-billed shrikes (*Lanius tigrinus*) that live along the edges of forests to grasslands and wetlands was greatly reduced. The breeding distribution of some shorebird bred in wetlands and other areas in Japan was also reduced. As for alien species, the red-billed leiothrix (*Leiothrix lutea*) and laughing thrush (*Garrulax canorus*) expanded their breeding distributions, while the red avadavat (*Amandava amandava*) reduced its breeding distribution.

The reasons for such significant expansion and reduction in breeding distribution must be considered for respective species, and cannot be judged based only on the results of this survey. Thus, the expansion or reduction in breeding distribution is considered greatly affected by the changes in habitat environments.

(Expansion of conflict with birds and animals)

As stated before, the distribution regions of monkey, deer, wild boar, and bear species are expanding. Their distribution regions and populations are generally considered to be expanding due to less human interaction with nature resulting from depopulation and aging mainly in rural areas, more lands for cultivation being abandoned, crops not being harvested, fewer hunters, and less hunting pressure due to aging. This situation is causing great damage and seriously impacting the agriculture and fishery industries, as well as natural ecosystems.

Specifically, the damage to agricultural production caused by wild birds and animals totaled 19.9 billion yen in 2008. The number of harmful wild animals captured to minimize damage, such as deer and wild boars, is on the rise, but the damage they cause has not decreased. Furthermore, impacts on natural ecosystems, including damage to rare alpine plants by deer and bark-stripping in forests in 19 national parks (including Minami Alps National Park and Nikko National Park) have been confirmed. In 2008, 49 incidents involving attacks by Japanese black bears (*Selenarctos thibetanus*) that resulted in human injury or death were reported, with 1,024 bears being captured or killed.

The population of great cormorants had previously decreased significantly, but now their distribution and population have rapidly increased due to improved water quality, more available food resources, and better protected colonies. At the same time, great cormorants are causing fishery damage to sweetfish, zacco platypus, and other species, as well as killing trees with their dung.

To address these problems caused by the recent and rapid increases in the distribution and population of birds and animals that conflict with human life and ecosystems, it is essential to take comprehensive conservation and management measures to avoid such conflict through damage prevention, habitat management and population control, while responding to fewer hunters and developing leaders for regional conservation and management.

(Alien species)

In recent years, nonnative animals and plants have become problematic entities. They directly or indirectly impact ecosystems in Japan and damage farm produce and humans. Specifically, small Indian mongooses were introduced to the main island of Okinawa in 1910 to control lancehead snakes and rats that damaged farm produce, and then later introduced to Amami Oshima (island) around 1979. These mammals have expanded their habitats and now pose a great threat as a predator of rare wildlife such as the Okinawa rail in the Yanbaru region of the main island of Okinawa and Amami rabbits on Amami Oshima. Damage to poultry farming and farm produce has also been reported. Damage to farm produce and the predation of native species have been reported with regard to raccoons (*Procyon*) originally introduced as pets and then settling outdoors, resulting in an expanded distribution. Largemouth bass distributed nationwide are also impacting ecosystems and fishery activities, including the predation of native species. Large earth bumblebees used for the pollination of farm crops may affect ecosystems in competition with native bumblebees over nest sites and inhibit the breeding of wildlife due to their habit of sucking nectar from flowers without contributing to the pollination of plants. There is also a concern over the damage and injury caused by the bite of snapping turtles.

As in the case of wild goats on the Ogasawara Islands and feral cats in the Yanbaru region of the main island of Okinawa, for example, introducing nonnative species from other locations may also have impacts. In particular, alpine zones and islands that are important for conserving biodiversity may suffer great effects due to the introduction of nonnative species. There is another concern about the effects caused by living things unintentionally introduced by adhering to other living things or such cargo such as imported grains and marine products.

In 2006, *Batrachochytrium dendrobatidis*—a kind of fungus reportedly causing infections in amphibians in other countries—was detected on frogs imported from overseas; consequently, a study was conducted on their impact on domestic amphibians. Although no cases of the fungus killing amphibians in the wild have been reported, it is still necessary to continue monitoring and preventing any impact from unintentionally introduced organisms.

(Genetic diversity)

Even living things belonging to the same species have diversity at a genetic level. When an aggregate of species is genetically diverse, the probability of survival is considered high in case of environmental changes. Conversely, any decrease in the genetic diversity of an aggregate of species due to fragmented habitats and a decrease in population may lower the capability to adapt to environmental changes, in case the probability of genetic disorder by inbreeding is raised or a disease afflicting the aggregate spreads due to the uniform characteristics of that aggregate. Accordingly, genetic diversity is an important issue for conserving biodiversity.

It has recently been pointed out that human activities adversely affect genetic diversity on many levels. Once the genetic diversity of a species suffering a significant loss of population is damaged, it is difficult to restore the genetic diversity even if the population is restored. For example, the number of Japanese red-crowned cranes living in eastern Hokkaido decreased to only several tens due to

overexploitation and the development of wetlands. The number has now increased to nearly one thousand thanks to feeding and the protection of habitat environments, but the genetic diversity still remains at a very low level.

The disturbance of genes due to artificial movement or the introduction of a species will disturb the genetic structure of that species. The light-emitting cycle of the firefly differs between western and eastern Japan. This difference is considered due to the difference in genetic characteristics. This is an example used for an easy understanding of genetic diversity. Many species that have the genetic characteristics of central and western Japan are found in the Tokyo area. This may be due to the artificial introduction of such species. There is also a concern in the plant sector that genetic disturbance may be caused by greening plants (e.g., mugwort, lespedeza bicolor) introduced from abroad that have the same names as native species.

Many local aggregates of species may be now facing a crisis with genetic diversity not being fully understood. Therefore, it is necessary to understand the status of genetic diversity.

3 Japan's biodiversity connecting to the world

The history of connection to and separation from the mainland Asian continent has witnessed the formation of specific biota, such as relicts of the Ice Age. Such wild animals as migratory birds, sea turtles and other marine mammals came to Japan from countries in Asia and along the Pacific Rim. In particular, Japan's biodiversity has wide connections with the Asian region.

Many kinds of greater white-fronted geese and whooper swans (typical winter birds that can be seen in Japan) breed in Siberia in summer and pass the cold winter in Japan or other countries. Swallows that come to Japan in summer pass the winter mainly in the Philippines, Indonesia, Malaysia, and southern Vietnam; therefore, Taiwan is an important stopover point for them. Shorebirds use the tidal flats in Japan as a stopover point in spring and autumn. Black-faced spoonbills breed on remote islands in coastal areas along the Yellow Sea and winter in Japan and Taiwan. It is important to consider these connections in order to conserve biodiversity.

For example, summer birds that come to Japan can no longer survive unless habitats in Japan and wintering places in Asian countries are both conserved. Schrenck's little bitterns (*Ixobrychus eurhythmus*), small herons and fairy pittas (*Pitta nympha*) with their beautiful wings are threatened species. Their survival is threatened not only by changes in habitat environments in Japan but also by the destruction of wintering environments in Southeast Asia.

As for living things other than migratory birds, loggerhead turtles hatched in Japan grow much during their migration to the coast of North America, and then return to Japan for laying eggs. It has been clarified that eels (that are part of Japanese food culture and migrate upstream in rivers in Japan) are hatched near the Mariana Islands in the North Pacific. Salmon hatched in Japan migrate via the Bering Sea, and humpback whales that breed near Japan use the coastal waters of the North Pacific as feeding grounds. Thus, many migratory fish and marine mammals use a vast range of the sea beyond national borders. To conserve these animals traveling across borders, efforts in cooperation with the foreign countries involved as well as domestic efforts are essential.

Section 5 Status of Conservation and Sustainable Use of Biodiversity

1 Overview of legal systems for the conservation and sustainable use of biodiversity

There are a variety of individual laws in Japan covering a wide range of subjects related to the conservation and sustainable use of biodiversity. The Basic Act on Biodiversity plays a role in bringing together these individual legal systems.

The Basic Act on Biodiversity follows the fundamental principles laid out in the Basic Environment Law.

The National Land Use Planning Act and the National Spatial Planning Act are provided for the usage of national land, and the National Land Utilization Plan (a nationwide plan) is established based on the National Land Use Planning Act.

From the perspectives of conserving and using the natural environment/landscape, the Natural Parks Law, Nature Conservation Law, the Law for the Promotion of Nature Restoration, the Landscape Act, and other laws are provided. The Law for the Promotion of Nature Restoration was enacted in 2002 as a legal framework for the conservation, restoration, creation and maintenance management of damaged natural environments. The Landscape Act was enacted in 2004 as a legal framework to promote the formation of good landscapes. Furthermore, the Natural Parks Law was revised in 2009, and contributing to the protection of biodiversity was added to its stated purposes. At the same time, the revisions established a marine park zone system to comprehensively protect both undersea and sea surface areas, as well as an ecosystem maintenance and recovery program to proactively manage ecosystems. The Nature Conservation Law likewise made the protection of biodiversity one of its explicitly stated purposes, in addition to other revisions to the same effect as those made to the Natural Parks Law.

There are many laws related to the conservation and use of ecosystems. The Basic Law on Forest and Forestry and the Forest Law are provided for forest ecosystems. The Basic Law on Food, Agriculture and Rural Areas, the Agricultural Land Act, the Law Concerning the Improvement of the Agricultural Promotion Area, and the Organic Agriculture Promotion Act are provided for agricultural land ecosystems. The River Law, the Water Pollution Control Law, the Law Concerning Special Measures for Conservation of Lake Water Quality, and the Erosion Control Act are provided for river/lake ecosystems. The Basic Act on Ocean Policy, the Fisheries Basic Act, the Fisheries Law, the Fisheries Resource Protection Law, the Seacoast Law, and the Port and Harbor Law are provided for coastal/marine ecosystems. Moreover, the City Park Law and the Urban Green Space Conservation Law are provided for urban ecosystems.

The Wildlife Protection and Hunting Law, the Law for the Conservation of Endangered Species of Wild Fauna and Flora, the Invasive Alien Species Act, and the Law for Protection of Cultural Properties are provided for the protection and management of wildlife. The Wildlife Protection and Hunting Law was revised in 2002 for adding marine mammals including seals to targets of the law, and then later revised in 2006 for establishing a hunter approval system and conservation projects.

The Invasive Alien Species Act was enacted in 2004 to control the import and feeding of specified alien species that damage ecosystems, as well as to promote the control of such alien species. In an attempt to take a comprehensive and effective approach to preventing damage by wildlife, the Act on Special Measures for the Prevention of Damage due to Wildlife was also enacted in 2007.

Based on the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, which regulates and controls the transboundary movement of genetically modified organisms, the Act on the Conservation and Sustainable Use of Biological Diversity through Regulations was enacted in 2003 to prevent the impact of living modified organisms on biodiversity. The Act stipulates measures for the use of genetically modified species and others.

The Law Concerning the Examination and Regulation of Manufacture, etc of Chemical Substances (to protect the impact of chemical substances on ecosystems), the Environmental Impact Assessment Law, the Law for Enhancing Motivation on Environmental Conservation and Promoting of Environmental Education, the Ecotourism Promotion Law, the Tourism-aspired Nation Promotion Basic Law, and the Law for the Humane Treatment and Management of Animals are also closely related to the conservation of biodiversity.

There are also laws concerning the promotion of specific areas that are closely related to biodiversity issues. For example, the plans for promoting and developing the Amami Islands as formulated pursuant to the Act on Special Measures for the Promotion and Development of the Amami Islands are explicitly required to follow the basic principles of the Basic Act on Biodiversity.

The legal system for the conservation and sustainable use of biodiversity thus covers a wide range of sectors. It is important to effectively use these laws in a complementary manner under the Basic Act on Biodiversity. This national strategy assumes a role to provide the basic policy.

2 Overview of area designation system for the conservation of biodiversity

The conservation of biodiversity should center on conservation conducted within respective wildlife habitats. Since various protected areas have been specified in Japan based on laws and regulations for the conservation of nature, Japan is attempting to properly manage these protected areas by considering the conservation of biodiversity and continuously securing habitats for wildlife, while taking into account the linkage between protected areas so that biodiversity can be conserved. This protected area system covers nature conservation areas based on the Nature Conservation Law, nature parks based on the Natural Parks Law, habitat protection areas based on the Law for the Conservation of Endangered Species of Wild Fauna and Flora, and wildlife protection areas based on the Wildlife Protection and Hunting Law. Regarding forests in particular, the protected area system covers conservation forests based on the Forest Law and forest reserves based on the Management Rule of National Forest Land. For urban regions, the protected area system includes green conservation areas based on the Urban Green Space Conservation Law and related laws.

In addition, international protected areas include Ramsar wetlands based on the Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention) and world natural heritage areas based on the Convention Concerning the Protection of the World

Cultural and Natural Heritage. Important natural environments are also conserved on a global basis.

These protected area systems include those directly targeting the conservation of nature and those contributing to the conservation of nature through action and control. Nature conservation areas, nature parks, habitat protection areas, wildlife protection areas, and the forest reserves of national forests apply to the Ramsar Convention. With regard to nature parks in particular, national parks, quasi-national parks and prefectural nature parks account for a total area of 5.41 million ha—nearly 14.3% of Japan's total land area. Among nature parks, special areas that require permission for development account for 1.5 million hectares (national parks), 1.27 million hectares (quasi-national parks), and 0.71 million hectares (prefectural nature parks), respectively. The total area accounts for about 9.2% of Japan's total land area. These facts suggest that national parks and other nature parks play a considerable role in the conservation of biodiversity. On the other hand, wildlife protection areas consist of national wildlife protection areas and prefectural wildlife protection areas, accounting for a total area of 3.64 million ha, or about 9.6% of Japan's total land area. The total area of special protected areas that require permission for development and capturing wildlife accounts for 290,000 ha, or about 0.8% of Japan's total land area. With respect to nature conservation areas, the wilderness conservation areas, nature conservation areas and prefectural nature conservation areas account for a total area of about 100,000 ha, or about 0.3% of Japan's total land area. The nine habitat protection areas account for a total area of 885 ha. With respect to national forests distributed around the backbone of mountains, various types of forests in Japan are classified by area, and forest reserves used as forest ecosystem protection areas to be comprehensively conserved are being specified. The area of forest reserves totals 780,000 ha—accounting for nearly 10% of the total area of national forests.

In relation to these areas, the conservation status of various ecosystems in the protected areas among them (including national parks, quasi-national parks, wilderness conservation areas, nature conservation areas, habitat protection areas, and national wildlife protection areas) as directly specified by the government for the conservation of nature is as follows: Nearly 25% of areas with a very high degree of human disturbance of vegetation in natural forests and natural grasslands (degree of human disturbance of vegetation: 9 or 10) are designated as protected areas, of which many are national parks. Nearly 35% of the 500 important wetlands selected from the perspective of conserving biodiversity are designated as protected areas. These areas are mainly designated as national parks and quasi-national parks, with 7% designated as national wildlife protection areas.

With respect to coastal/oceanic areas, 40% to 50% of underwater forests and coral reefs are designated as protected areas (mainly national parks and quasi-national parks), most of which are loosely controlled normal areas of national/quasi-national parks. Only about 10% of tidal flats are designated as protected areas. Since neritic areas such as tidal flats, underwater forests and coral reefs are important for the conservation of biodiversity, further promoting the conservation of these areas poses a challenge.

Regarding the relationship between rare species and conservation by means of protected areas, the data on designating protected areas where more than 10 threatened wildlife species live (former

Red List species) show that only 7% of the plant distribution area and 8% of the animal distribution area are designated as protected areas. This raises an issue about the use of protected areas as the habitats of rare wildlife.

The status of protected area conservation in the Kyushu-Okinawa region is as follows: Nearly 39% of secondary laurel forests with a degree of human disturbance of vegetation of 8 (as examined by the Ministry of the Environment) and nearly 40% of natural vegetation with a degree of human disturbance of vegetation of 9 or 10 (except laurel forests) are designated as protected areas. Conversely, only 13% of natural laurel forests with a degree of human disturbance of vegetation of 9 are designated as protected areas. Thus, there is a difference in the level of conserving protected areas. In particular, most natural laurel forests that occupy a large area in the Yanbaru region in the northern part of Okinawa and on Amami Oshima are not designated as protected areas.

Under these circumstances, the government is making efforts to promote and improve various area designation systems based on the principles underlying the Convention on Biological Diversity and the Basic Act on Biodiversity, and also taking the initiative regarding national forests. Specifically, the government is making efforts for conserving biodiversity through such actions as promoting the designation of protected areas such as national parks where nature should be conserved, and revising the Natural Parks Law to provide for expanded systems of protection for marine areas. The government is also working on forming forest reserves that conserve variable forest ecosystems as a core of the biodiversity in national forests and a network by setting up a green corridor, as well as promoting forestation according to regional characteristics. It is very important for the government to proactively address the conservation of biodiversity while maintaining the linkage with various entities.

3 Efforts by local governments

The Basic Act on Biodiversity stipulates that prefectures and local administrative authorities make an effort to draft regional biodiversity strategies. In September 2009, the Ministry of the Environment published “Guide to the Regional Biodiversity Strategies,” which is a collection of useful information for drafting these strategies.

At the 9th Conference of the Parties to the Convention on Biological Diversity (COP9), which was held in May 2008 in Bonn, Germany, the Decision IX/28 (Promoting engagement of cities and local authorities) was adopted. This decision encourages governments to assist local authorities in formulating biodiversity strategies and action plans, and reflects a global awareness of the need to take active steps at the community level to protect biodiversity.

Several local public authorities, including the prefectures of Chiba, Saitama, Aichi, Hyogo and Nagasaki, have already developed carefully crafted plans of their own regarding biodiversity. These public authorities have instituted various ordinances regarding the protection of natural environments, as well as legal systems and projects that cover various ecosystems, such as those found in farmlands and forests. These strategies will take on greater significance in the future as more regions pursue steps that are fine-tuned and customized to suit the natural and socioeconomic

conditions specific to their respective areas.

Protected areas designated by prefectural governments include prefectural nature parks, prefectural nature conservation areas, prefectural wildlife protection areas, and other protected areas uniquely designated by prefectural governments. The Minister of the Environment designates a quasi-national park after receiving an offer from a prefectural government, but the prefectural government concerned then assumes responsibility for managing and maintaining the park.

A total of 309 prefectural nature parks have been designated, accounting for a total area of about 1.96 million hectares or 5.2% of Japan's total land area. In addition, 3,815 wildlife protection areas have been designated by prefectural governments, accounting for a total area of about 3.09 million hectares, or 8.2% of Japan's total land area.

The efforts taken by each prefectural government to protect rare wildlife include the creation of a red list and red data book for species to be conserved regionally, and the conservation of rare wildlife according to a unique protection ordinance. By 2005, all prefectural governments had created red lists and red data books. In addition, 29 prefectural governments have established unique protection ordinances for rare wildlife (as of October 2009). These efforts show that wildlife conservation systems are in progress in accordance with the situation in each region.

With respect to wildlife protection management, 107 specified wildlife conservation and management plans have been formulated at 46 prefectural governments as of November 2009 (following the establishment of such management in 1999), thereby showing steady progress in the scientifically organized management of wildlife protection.

Alien species lists have been created at 24 prefectural governments (as of August 2009), and ordinances that contain descriptions of alien species, including those in nature conservation ordinances, rare wildlife protection ordinances and other applicable ordinances, have been enacted by 17 prefectural governments. In addition, 20 prefectural governments have been checking the control of the 22 designated alien species as part of controls based on the Invasive Alien Species Act. Thus, the measures being taken for controlling invasive alien species are expanding.

Steps for conserving Satochi-Satoyama areas are also expanding through the establishment of Satochi-Satoyama area conservation ordinances and the formation of such frameworks as agreements to conserve Satoyama along with public cooperation.

Systems for the conservation of forests and water sources, such as a forest environment tax, have been introduced in 30 prefectures (as of April 2009). Measures for conserving forests and water sources are being promoted by using financial resources including the forest environment tax. The conservation of rich biodiversity in upstream areas is also being promoted by many residents in river-basin areas.

In addition to the efforts above, we are also seeing unique ordinances with a variety of purposes being implemented. Some include steps to systematically protect and restore a range of environments such as forests, rivers and coastlines, while others focus on rivers and watersheds, for example, and aim not only to preserve ecosystems and landscapes, but also to encourage a more harmonious existence between people and watershed environments.

4 Efforts by private enterprises

As an example of efforts made by economic organizations focused on conserving nature and biodiversity, Nippon Keidanren (Japan Economic Federation) established the Nature Conservation Fund Steering Committee in 1992 (renamed “Nippon Keidanren Committee on Nature Conservation” in 2000), through which Nippon Keidanren has supported nature conservation projects mainly for the Asia-Pacific region. In March 2009, the Federation came out with the “Declaration on Biodiversity by Nippon Keidanren,” which expanded the scope of its “Declaration of Nippon Keidanren on Nature Conservation” in 2003. Keidanren declared that it fully recognized that biodiversity is a critical foundation for building a sustainable society, and that as members of the global community, all people must share the responsibilities, and coordinate and cooperate in taking action for conserving biodiversity.

In April 2009, the Shiga Committee for Economic Development announced its “Biodiversity Initiative for Lake Biwa” that consists of a declaration of 10 articles including “We shall take responsibility for the conservation of at least one species or habitat,” in an attempt to develop a model biodiversity conservation program that utilizes corporate participation. Another of the many examples of efforts involving private enterprises is the Japan Business Initiative for Conservation and Sustainable Use of Biodiversity (JBIB), which was established in April 2008 for the purpose of educating people about conserving biodiversity and its sustainable use. As examples of efforts made at private enterprises, descriptions of efforts to conserve nature and biodiversity appear in the environmental reports of 365 companies (nearly 80%) out of the 2005 environmental reports of 481 companies. Among these efforts, cleaning and beautification activities are prominent, but there are also many other activities for greening, creating and conserving biotopes, maintaining, conserving and restoring Satoyama and national forests, raising environmental awareness, and helping to support other entities. The 2007 Environmental Report Guidelines revised in June 2007 added “status of the conservation of biodiversity and sustainable use of biological resources” as information to be described in environmental reports. Major impacts on ecosystems and wildlife in the raw material procurement process, and an assessment of such impacts are described in the guidelines as examples of appropriate information. The document also points out that the major causes of impacts on biodiversity (such as using raw materials manufactured by a method that adversely affects biodiversity) must be eliminated, while widely considering the supply chain ranging from the procurement of raw materials and manufacturing to distribution and sales. The document must also include various types of other information and indexes. Nature conservation activities are thus expected to be further expanded each time an environmental report is created.

There are many private enterprises with their own vast forest and/or urban land. Lands that have not been used directly for corporate activities and which are well maintained for conserving biodiversity can be used for the conservation of wildlife and nature education activities. Urban lands that are used infrequently or not at all can be used as the habitats for familiar living things in urban areas by promoting greening using native plants. These efforts are expected as part of corporate philanthropy programs.

Corporate efforts for the conservation of biodiversity are also expected in the biodiversity convention. COP8—held at Curitiba, Brazil, in March 2006—adopted the decision to encourage private sector participation in the convention, clearly showing the importance of corporate roles in conserving biodiversity. The decision encourages the following roles required for private enterprises: (1) Adapt corporate management policy and activities to the three objectives of the convention (i.e., conservation of biodiversity, sustainable use of its components, fair and equitable sharing of benefits arising out of the utilization of genetic resources); (2) report independent efforts that will contribute to attaining the 2010 objective “to achieve by 2010 a significant reduction of the current rate of biodiversity loss” to the Conference of the Parties; and (3) participate in the Conference of the Parties, the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), and the meetings of experts.

At a ministerial-level meeting at COP9 in May 2008, the German government announced the “Leadership Declaration” on its Business and Biodiversity Initiative. By signing the declaration, companies commit to making biodiversity concerns part of their business goals and demonstrate that commitment through their business activities. There were 34 signatory companies, nine of which were Japanese.

In August 2009, Japan’s Ministry of the Environment issued the “Guidelines for Private Sector Engagement in Biodiversity,” a set of guidelines designed to be used by a broad spectrum of enterprises, most notably companies, for implementing their own biodiversity conservation initiatives. It is hoped that with these guidelines, and by following the Basic Act on Biodiversity, business leaders will do more to help protect biodiversity and use what their initiatives can offer in a sustainable manner, if for no other reason than the fact that biodiversity is inextricably linked to the stable continuation of their businesses.

5 Efforts by nongovernmental organizations (NGOs) and citizens’ groups

NGOs and other citizens’ groups also conduct wide-ranging activities for conserving biodiversity. One NGO is developing biodiversity conservation activities in important areas concerning biodiversity, one is monitoring citizen participation, one is providing children with nature education, and another NGO conducts national trust activities. They are also engaged in efforts to import and sell farm products produced by foreign sustainable methods, operate systems to authenticate sustainable forest management and forestry products, promote organic agriculture without using chemical fertilizers and agricultural chemicals in principle, and conduct guided eco-tours to experience rich biodiversity. Many of these are community-based activities that reflect the needs of citizens—something that cannot be fully done by government. Such community-based activities are important in promoting the conservation of biodiversity in accordance with regional characteristics. The conservation of biodiversity can be developed into extensive activities by promoting these activities and exchanging information in close linkage with the parties concerned.

Community-based activities are also underway. An NGO working for communities is making efforts for forestation and the conservation of fields on the sides of a valley in collaboration with

companies, and an international NGO is developing a project to jointly conserve foreign forests and neritic areas with local NGOs in cooperation with overseas companies. Although biodiversity conservation activities including philanthropy are drawing increasing attention from companies, there are few experts in companies. Therefore, some companies are engaged in a good partnership with NGOs for better activities. This is also beneficial for NGOs because they can develop activities with financial aid from companies. It is essential for both NGOs and companies to enjoy the benefits from continuous activities. Biodiversity conservation activities are expected to be expanded by having more opportunities for exchanging information between companies interested in conserving biodiversity and NGOs working at home and overseas.

Recent years have also seen more partnerships between NGOs. In January 2009, NGOs working on biodiversity issues in the same spirit as the Convention on Biological Diversity led the initiative to establish the Japan Civil Network for Convention on Biological Diversity (JCN-CBD) , intended for global citizens to share information and suggestions.

Community residents are conducting surveys to monitor organisms in certain areas. Japan's Red Data Book on vascular plants was developed from objective stochastic assessments of the risks of extinction. Nevertheless, the wealth of information painstakingly gathered over many years by "amateur" naturalists active in their respective communities is invaluable. In Hokkaido, for example, cooperative efforts between universities and the prefecture are underway to monitor and reduce the populations of large earth bumblebees, a designated alien species, but in fact much of the fieldwork is done by concerned citizens who volunteer their time.

6 Efforts by Academic Societies and Scientific Groups

Researchers and scientific groups have likewise stepped up various efforts prior to COP10 in 2010. In preparation for COP10, the Subcommittee on Natural Environment Restoration of the Committee on Environmental Sciences has been the driving force behind the Science Council of Japan in holding symposia and hearings concerning biodiversity, and in studying potential strategies. The Ecological Society of Japan has also held symposia and open conferences on such subjects as conservation ecology, strategies to address invasive alien species, the restoration of nature, climate change, activities by the private sector, and the science of sustainability, at which researchers from various fields give presentations and hold discussions.

The Group on Earth Observations Biodiversity Observation Network (GEO BON) was set up in 2008 to monitor ecosystems and biodiversity around the world. Japan followed suit by establishing the Japanese Biodiversity Observation Network (JBON) the following May, and in July of that year the Asia-Pacific Biodiversity Observation Network (AP BON) was formed. These organizations facilitate cooperation between research institutions and relevant government agencies in order to create networks for monitoring biodiversity.

Chapter 3 Targets

This chapter describes the targets to be achieved against the backdrop of Chapter 1, “Importance and Rationales of Biodiversity,” and in response to Chapter 2, “Status and Problems of Biodiversity.” First of all, this chapter describes international trends in biodiversity targets, Japanese ideas, and proposals for worldwide post 2010 targets. It then describes medium- and long-term targets to build a “society in harmony with nature,” and the results of the Comprehensive Assessment of Biodiversity in Japan (JBO: Japan Biodiversity Outlook) that assessed the state of biodiversity in Japan. In that context, it also shows what the nation, its regions and society should be in the future as images of the targets to be achieved on a very long-term basis (100-year level), and as part of the nation’s grand design from the perspective of biodiversity, along with concrete images.

Section 1 Targets and Assessment

1 2010 Targets and the next global targets

At COP6 in 2002, exactly 10 years after the adoption of the Convention on Biological Diversity, one target set was “to achieve a significant reduction of the current rate of biodiversity loss by 2010.” As 2010 is the target year for the previous set of targets, the Secretariat of the Convention on Biological Diversity is currently assessing the progress made in the past 10 years, but it appears very unlikely that said target will be met.

Given the progress made towards achieving the 2010 targets, the main agenda scheduled to be addressed at COP10, which will be held in Japan, is for formulating new CBD strategy plans, including matters related to post 2010 targets. As the host of COP10, Japan is committed to giving weight to various opinions from NGOs and other specialists in Japan and abroad, taking the initiative in proposing post 2010 targets that countries around the world can and should share, and leading international discussions.

(Japanese proposal for post 2010 targets)

In January 2010, Japan submitted its proposal for post 2010 targets to the Secretariat of the Convention on Biological Diversity. There were significant problems with the 2010 targets, most notably the lack of concrete methods on how to achieve the targets and no objective methods given to measure progress. For these reasons, the Japanese proposal includes medium/long-term targets ending in 2050, as well as a short-term target by 2020 designed to achieve those targets. The Japanese plan also features individual concrete targets, specific methods of achieving those targets, and the means for measuring the progress thereof.

The harsh fact that biodiversity loss worldwide is unlikely to be stopped is anticipated with regard to the med/long-term targets (2050), although all parties to the Convention are requested to strive for the common human ideal of “Enhancing the harmony between human being and nature all around the world, to improve the state of biodiversity from the current level as well as to sustainably

increase the benefits of ecosystem services.”

The short-term (2020) target is aimed at stopping the loss of biodiversity, and to this effect the proposal includes three sub-targets: ” To conduct full observations and analyses on the state of biodiversity at global scale and on scientific justification. To make ecosystem services respected in every aspect of human society.” ; ” To expand activities for biodiversity conservation, to promote practical methods for sustainable use of biodiversity and to establish mechanisms for reducing adverse effects of human activities on biodiversity.”; and ” To mainstream biodiversity by ensuring new steps to be taken by various individuals.”

In an attempt to facilitate the means of achieving the sub-targets laid out in the short-term target, Japan has presented domestic case examples of demonstrating progressive methods, including those that other countries may use in their initiatives, those for which Japan may be able to provide technical and financial assistance to other countries in their attempts to meet their goals, and those for which cooperation from international NGOs and other organizations may be expected. As a specific example, the Japanese proposal outlines mechanisms for managing national parks with the cooperation of diverse local interests and community residents, and expresses its intention to help expand protected areas worldwide and improve their management. The proposal also presents action plans and guidelines to encourage initiatives lead by international bodies, governments, local authorities, companies, scholars, NGOs, residents, indigenous peoples and other diverse parties, and aims to promote their participation, cooperation and the taking of action.

2 Japan’s targets

The post 2010 Japanese proposal is intended for Japan, the host nation for COP10, to take the opportunity to present innovative, aggressive and practical ideas for achieving the objectives of the Convention on Biological Diversity, and contribute to conserving global biodiversity by offering necessary assistance. The proposal is also the basis for domestic initiatives to promote the conservation of biodiversity. Based on the post 2010 Japanese proposal, socioeconomic conditions, and the state of biodiversity, Japan has set med/long-term target ending in 2050 for the purpose of preserving biodiversity well into the future, thereby allowing future generations to benefit from the richness of biodiversity, and create a Society in Harmony with Nature that makes those things possible. To realize these medium/long-term objectives, the Japanese proposal also sets short-term targets to be achieved in the 10-year period until the target year of 2020.

These targets exceed the term provided for in the strategy presented, but it is necessary to consistently advance the national strategy during this period by employing the steps prescribed in Section 2, “Basic Strategies,” in Chapter 4, and the pursuant policies in Part 2, “Action Plan.”

Discussions involving the adoption of post 2010 targets are currently underway at the global level. Even after COP10, it is necessary to redouble efforts to conserve biodiversity in a manner suited to the targets that end up being adopted. Given this necessity, Japan will use the knowledge gained from the global discussions on the post 2010 targets and other COP10 findings to fine tune its national strategy once the conference is over.

< The mid/long-term target (2050)>

- Enhance the harmony between human being and nature at national and local levels, improve the state of biodiversity in Japan from the current level, and sustainably increase the benefits of ecosystem services.

<Short-term targets (2020)>

Actions to be taken by 2020, so as to halt the loss of biodiversity:

- (1) Conduct full observations and analyses of the state of biodiversity in Japan based on scientific evaluation. Expand activities for biodiversity conservation, conserve indigenous species of fauna and flora and ecosystems, and build ecological networks that can maintain and restore biodiversity at the national level.
In particular, stabilize and restore populations of species currently threatened with extinction, and take measures to prevent new species from becoming endangered by proper measures.
- (2) Establish mechanisms for reducing adverse effects of human activities on biodiversity and promote practical methods for sustainable use of national land and natural resources across generations.
- (3) Make ecosystem services respected in every aspect of human society. Mainstream conservation of biodiversity and its sustainable use into socioeconomic activities of general public, by ensuring new steps taken by various stakeholders.

These three targets are mutually related as follows: (1) show the general target of conserving biodiversity, focusing on the conservation of species, (2) show the target for using the components of biodiversity, and (3) show the target of Japan's future economic society to be aimed at surely achieving targets (1) and (2).

To achieve target (1), it is important to strengthen the conservation of remaining nature and restore already damaged nature. To achieve target (2), it is important to maintain sustainable use of the components of biodiversity, while conserving biodiversity in connection with human life and production activities, as well as to protect specific rare species and wild nature. To achieve target (3), it is important to design Japan's socioeconomic structure also based on an international perspective and consider changes in the nation's lifestyles.

3 Comprehensive Assessment of Biodiversity in Japan

In order to achieve the goals outlined above, the status of biodiversity in Japan should be comprehensively assessed first in terms of public awareness of biodiversity and public participation in biodiversity conservation activities (including the socioeconomic aspects), and then the progress made must be properly evaluated. Japan will conduct comprehensive biodiversity assessments by learning from examples of the globally accepted Millennium Ecosystem Assessment (MA) and the Global Biodiversity Outlook 2 (GBO2), in addition to the protocol for the Economics of

Ecosystems and Biodiversity (TEEB), and employ a method suited to our nation's natural and socioeconomic conditions. Furthermore, by referring to the nine indicators established to monitor the conservation of biodiversity in the Third Basic Environment Plan (April 2006), as well as indicators adopted by the Conference of the Parties, we will develop clearer indicators for evaluating changes in biodiversity as well as the effectiveness of biodiversity strategies in Japan. Comprehensive Assessments of Biodiversity in Japan began in Fiscal Year 2008 and have continued ever since. The report (JBO: Japan Biodiversity Outlook) is due out on International Day for Biodiversity (May 22, 2010). It will be subsequently necessary to implement measures that take into account the results of COP10, as well as new domestic and international findings. While conducting the comprehensive assessments, we will specifically map the status of the biodiversity crisis for use as a diagnostic record to indicate a prescription for the crisis, and select hot spots (important areas for the conservation of biodiversity) to preferentially promote efforts in such areas. Thus, we will strive to significantly decrease the rate of biodiversity loss.

In considering the connection of biodiversity between Japan and the rest of the world, Japan is responsible for making a positive contribution to restoring and conserving healthy global ecosystems and giving consideration to prevent a deterioration of global biodiversity, through efforts toward achieving the post 2010 biodiversity targets. We will encourage the G8 participant nations to conduct assessments equivalent to Japan's comprehensive biodiversity assessments and technically assist Asian regions with the assessment method.

Japan must rethink the biodiversity indicators and reassess its own levels of biodiversity based on the post 2010 targets adopted by COP10.

Japan must also analyze the proper relationship between urban and agricultural areas for the upcoming period of a declining population based on an analysis of multiple scenarios with regard to the effects on biodiversity, and maintain ecosystem services in a sustainable manner.

To continue comprehensive assessments, scientific data on biodiversity must be improved and maintained. A certain volume of data has already been accumulated in Japan through a basic survey on the conservation of nature and other surveys conducted for many years. However, it is necessary to strengthen the collaboration with other organizations, such as sharing data with the ministries involved and museums of natural history, make reports more quickly, grasp the populations and population densities of medium-size to large mammals, and collect data on Satochi-Satoyama, coastal and oceanic areas in accordance with the Third Phase of the Science and Technology Basic Plan (March 2006) whose policy target is the sustainable conservation and use of ecosystems.

Section 2 Grand Design of National Land from the Perspective of Biodiversity

1 National land from the perspective of biodiversity

The biodiversity in Japan has been formed by the platform of nature (e.g., landforms, geological features, climate) and years of human life accumulated on that platform. Japan's national land is broadly classified into land and sea areas. However, it can be classified into the following seven areas from the perspective of biodiversity, or from the relationship between biota and human activities.

- (1) Natural mountain areas.....Area with a relatively high degree of naturalness
- (2) The Satoyama countryside areas
 - Areas positioned between (1) and (3) with medium nature quality and interference by humans (including areas where artificial forests take precedence)
- (3) Urban areas.....Areas where human activities are concentrated
- (4) River/wetland areas.....Water system as the core of ecological network connecting areas
- (5) Coastal areas.....Land area and sea area on either side of the coastline
- (6) Marine areas.....Vast sea area beyond the coastal area
- (7) Islands Islands located in the coastal area and oceanic area

2 Basic stance

The Meiji Shrine forest where a rich forest ecosystem can be seen has developed into the present-day rich forest over nearly 100 years since being newly created by humans having a 100-year vision. In order to realize a “society in harmony with nature” where the conservation of biodiversity and sustainable use of the components of biodiversity are consistent, we should consider realizing a “society in harmony with nature” on a 100-year basis, by taking the period required for the restoration of natural ecosystems into account. To this end, it is important to present a grand design of national land from the perspective of biodiversity as a forward-looking (100-year level) common vision, so that the various entities engaged in the conservation of biodiversity and its sustainable use can make efforts from a long-term perspective.

First of all, the basic stance when considering the grand design of national land from the perspective of biodiversity with a 100-year vision is shown below as the “centennial plan.”

- (1) Restore the ecosystems found on national land that have been damaged or destroyed over the past 100 years of population growth and for the next 100 years of declining population by greatly changing human involvement with nature—from the unilateral exploitation of natural resources and destruction of nature to active human contributions to nature.
- (2) Make the most of regional resources in an age when national land can be used more easily due to a declining population, for the purpose of developing a unique and attractive region based on region-specific nature and culture.
- (3) Conduct ecological land management focused on harmony with nature and prioritize and

streamline the investments necessary for national land management, while the use of national land use is being reorganized to deal with areas where the current level of national land management cannot be maintained due to fewer and aging primary sector workers, the conversion to intensive urban structures, and increased investments in maintaining and upgrading social capital.

- (4) Aim to steadily improve the quality of nature throughout the country. Since it takes a long period until various efforts become effective, improve the quality of nature in an adaptive manner. To address problems of damage to agriculture and forestry caused by wildlife, it is essential to restore a better balance between humans and nature step by step while obtaining social agreement.
- (5) The adaptive attitude in flexibly reviewing the content and method of efforts in response to changes in nature and socioeconomic status for 100 years requires support by accumulating scientific data. Changes in public awareness and action patterns also become important factors. In 100 years, the forest environment tax being promoted in local areas may become popular throughout Japan with biodiversity possibly being incorporated into the socioeconomic structure. In this context, consider the possible realization of a possible action pattern and a system framework not currently prevalent for the conservation of biodiversity.

The following estimate is assumed when considering a society 100 years in the future. According to the medium variant (reference data provided by the National Institute of Population and Social Security Research), the future population is assumed to be less than 50 million (less than 40% of the current population) with the ratio of people aged 65 and over accounting for 40% of the total population (nearly double the current ratio). Temperature is assumed to have increased by 1.8°C (the best predicted value), with more measures expected to be taken against global warming in a society where environmental conservation and economic development are consistent globally as shown in the IPCC Fourth Assessment Report.

As the first step of the centennial plan toward realizing this grand design, the main direction of national policies to be implemented until around FY 2012 is described in Section 2, “Basic Strategies,” of Chapter 4, and specific policies in line with those basic strategies are described in Part 2, “Action Plan.”

In principle, the grand design will not be revised significantly for 100 years, but the relation with the direction of efforts stated in the basic strategy will be reviewed according to the situation at that time when the national strategy is reviewed in about five years. Furthermore, at the time of review after about 10 years, the need for review in accordance with changes in nature and socioeconomic status will also be considered.

3 Grand design in accordance with national land characteristics

The following is a detailed description of the overall image of the grand design of national land from the perspective of biodiversity.

- I The design should focus on the spatial relationships among such ecosystems as watersheds, and the national and regional governments should coordinate with each other so that regional biodiversity strategies and the national biodiversity strategy are developed hierarchically and organically. Based on these approaches, an ecological network that interconnects and properly lays out habitats around large protected areas according to the ecological characteristics of each species is firmly formed nationwide. The river/wetland area that connects the natural mountain area, Satochi-Satoyama area/countryside, urban area and coastal area as a continuous space, and the coastal area and roadside green space in the urban area are positioned as the vertical axis and horizontal axis of the country's ecological network.
- II Some species living on islands and in alpine zones that are ecosystems vulnerable to the effects of global warming will face a higher risk of extinction. However, the number of species ranking lower in the red list will exceed the number of species ranking higher in the red list through the effective protection of life, while monitoring systems are established nationwide. The risk of extinction facing species throughout the country will be lower. No new risk due to an alien species will increase because the dependence on overseas natural resources will decrease and the system at the border for checking the unintended introduction of alien species will be improved, as well as various efforts undertaken to control alien species in each region, backed by a declining population and more effective use of domestic resources.
- III The procurement of law materials and other activities will be conducted by private enterprises and people engaged in agriculture and fishery with sustainable methods, in consideration of the impacts on biodiversity. Thus, domestic natural resources will be used effectively in a manner consistent with efforts for conserving biodiversity, such as the protection of region-specific rare species.
- IV The formation of a transborder ecological network will be developed centering on the Asia-Pacific region, such as for the conservation/restoration of wetlands as habitats for migratory birds, and networking in protected areas for coral reefs. A lower dependence on overseas natural resources including the imports of pet animals and wider sustainable use of marine resources thanks to international cooperation will reduce Japan's impact on global biodiversity.
- V The conservation of biodiversity and sustainable use of its components will be incorporated into various social mechanisms, and international cooperation for supporting resource-producing countries, economic measures such as funding aid, and corporate philanthropy will be firmly established. Education on life and nature will also be well developed. People will enjoy the richness of biodiversity while voluntarily participating in biodiversity conservation/restoration activities, thereby contributing to the support for activities, and selectively purchasing biodiversity-friendly agricultural and marine products. Thus, people will establish a new lifestyle through such actions in a society that is consistent with nature.

In addition to the overall image, target images of the grand design 100 years in the future for each of the seven areas in accordance with national land characteristics are shown below.

(1) Natural mountain areas

[Current status]

The natural mountain area is an area with a relatively high degree of naturalness, and which contains the backbone of mountains and receives little impact from humans. This area functions as the backbone of biodiversity in the country, and is home to wild nature, the core habitats of large mammals (such as bears and serows) and birds of prey with a large home range (e.g., golden eagles (*Aquila chrysaetos*), mountain hawk-eagles—(*spizaetus nipalensis*)), and the sources of rivers. Natural vegetation consisting of natural forests and natural grasslands accounting for nearly 20% of Japan's total land area is distributed in the natural mountain area. This area is widely distributed among the ridges in central Honshu and Hokkaido. In areas where natural vegetation only remains in limited areas such as high mountain areas like the Chugoku region, areas with relatively high degrees of naturalness such as secondary forests left to natural transitions are included in the natural mountain area.

This area where representative and typical natural vegetation exists according to climatic conditions is vital as a core area for the representative fauna and flora of each area to survive in future years.

Once vegetation is lost due to terrain changes in a steep area, it can hardly be restored. In particular, since the ecosystem in a high-mountain or particular rocky soil area is subjected to a severe environment, it is susceptible even to small-scale human activities.

[Directions to be pursued]

- Conserve sufficiently large natural mountain areas in each region.
- Minimize the impact on ecosystems caused by human activities (mountain climbing, etc.) through nature-oriented management.

[Image of desirable area]

The natural mountain area is basically under nature-oriented management as the core area of the country's ecological network and also as an area allowing representative fauna and flora to survive in their respective areas.

Organized natural mountain areas are secured through efforts to improve the quality of nature by converting a secondary forest adjacent to a natural forest into a natural forest, while leaving it to natural transitions to a certain extent. In western Japan, large secondary forests left to natural transitions to a certain extent have expanded, allowing bears having an isolated habitat to eat nuts in remote forests. Thus, natural mountain areas that are little affected by humans and also used as the main habitat of large mammals are collectively conserved in each region.

In high-mountain areas isolated due to surrounding lowlands, endemic species and relicts are

changing their structures and distribution ranges under the influence of global warming, but natural mountain areas are continuously conserved and monitored to avoid suffering anthropogenic effects other than global warming, by excluding alien species or taking other measures.

Mountain climbers who enjoy mountain areas must obtain permission to enter a vulnerable or overused area where they can enjoy mountain climbing by the rules, while giving consideration to not adversely impact nature of the mountain area.

The vegetation in mountain areas damaged by treading due to overuse is restored with the cooperation of volunteers. In areas where the natural regeneration of forests is difficult due to lush bamboo or artificially converted areas, rich forests can be seen through efforts to restore nature through the auxiliary care provided by humans.

(2) The Satoyama countryside areas

[Current status]

The Satochi-Satoyama area/countryside is positioned between the natural mountain area and urban area with medium nature quality and interference by humans. The Satochi-Satoyama area/countryside is a vast area that includes areas where artificial forests take precedence and a countryside abundant with paddy fields, as well as rural areas. The total area of the Satochi-Satoyama area/countryside accounts for about 80% of Japan's total national land.

A Satochi-Satoyama area is an area where specific nature has been formed through various human approaches over a long period of history. It is a concept of region where secondary forests surround communities and includes artificial forests, agricultural lands, reservoirs and grasslands. At present, only secondary forests as the core of the Satochi-Satoyama area account for about 20% of Japan's total national land, and about 40% when including the surrounding agricultural land. Human approaches to this area are expected to decrease overall, in line with a declining population and aging society in the future.

A natural environment that contains secondary forests, paddy fields, channels and reservoirs is a good habitat for various living things including many endemic and threatened species, and is becoming more valuable as a place for residents in suburban areas to appreciate nature. At the same time, the Satochi-Satoyama area is also a place for living and production activities for humans. Thus, the Satochi-Satoyama area has many characteristics, such as intricate values and rights.

While adapting to traditional management methods unique to each region, including water management methods for paddy cultivation and secondary forest/grassland management methods, diverse biota and rich culture based on that biota have been formed in this area. Along with natural mountain areas, Satochi-Satoyama areas and the countryside have played an important role in supporting the diverse biota in Japan.

With the modernization of lifestyle and agriculture initiated from around 1955, many secondary forests have been left unused or uncontrolled, resulting in a significant decrease of secondary grasslands. In addition, more lands for cultivation have been abandoned from about 1975. With these changes, the distribution of habitats and number of habitats for medium-size to large mammals

(including deer, wild boars and monkeys) are increasing, resulting in greater damage to human living environments, agriculture and forestry. The quality of habitat environments for various region-specific living things such as the grey-faced buzzard-eagle, killifish, *Luehdorfia japonica* (a kind of butterfly), and dogtooth violet is deteriorating. According to research by the Ministry of the Environment, more than half of the habitats of threatened species are distributed in Satochi-Satoyama areas.

[Directions to be pursued]

- Realize better harmony between humans and nature by focusing on biodiversity through the activation of sustainable agriculture and forestry.
- Promote compartmentalization between humans and wildlife by maintaining buffer zones, etc.
- Positively use natural resources in the area effectively by utilizing eco-tours, biomass resources, etc.
- In addition to the activation of rural areas, promote the creation of a system to be supported by the whole community including city residents.

[Image of desirable area]

In areas dominated by agricultural land, many people are engaged in agriculture using production methods that focus on the conservation of biodiversity while utilizing the cycling function of nature; as a result, various forms of life are flourishing in paddy fields and other types of agricultural land. Maintaining the agricultural production base allows reservoirs and ridges between paddy fields to be managed, so as to retain rich biodiversity and secure an ecological connection between paddy fields and rivers. Thus, fauna and flora that have been maintained along with agricultural operations are living here and there. Children collect insects and flowers, and local school students examine living things together with farmers, by making full use of healthy ecosystems on the agricultural land. A rich connection between people is thus nurtured in the area. A part of agricultural land where cultivation has been abandoned becomes a wetland or biotope, and environmentally friendly agriculture (including organic agriculture) that nurtures diverse life is disseminated. Such land of abandoned cultivation is maintained as agricultural land with the activation of domestic agriculture. In advanced areas of Japan where positive efforts have been made to conserve biodiversity, the areas where people live are full of various forms of life, such as where oriental storks and Japanese crested ibises peck at food and fly elegantly into the sky.

Because the range managed according to the previous style of usage is limited in secondary forests, the area targeted for positive control becomes an adventure land for children through management as a bright accessible forest where such native species as great purple emperors and beetles can be seen here and there. Thus, such a controlled secondary forest creates scenery full of variety including spring budding and beautiful autumn leaves. Greatly extended bamboo groves are restored partly as a natural forest or secondary forest, and people dig bamboo shoots in controlled bamboo groves. Wood produced from controlled Satoyama is used in respective areas as biomass

resources such as bolts and pellets that produce shiitake mushrooms and other mountain blessings.

In artificial forests, the problem of delayed thinning has been solved and the biodiversity conservation function is enhanced by converting to broadleaf forests and extending the thinning period according to local characteristics. Thus, artificial forests are managed to meet regional needs. Even waste wood and thinned wood produced in mature artificial forests are effectively used in surrounding areas.

Various types of ecosystems are restored through the diverse use of land and resources in Satochi-Satoyama areas where secondary forests, artificial forests and agricultural land are well combined. Secondary grasslands once broadly distributed are continuously managed throughout the country for supplying grass resources as a source of biomass energy or other purposes, and are home to many wild herbs blooming and butterflies flying about. As a result, more rare species of fauna and flora can be seen here and there. Moreover, the scenery is beautifully maintained to attract more city residents moving to the Satochi-Satoyama areas, as well as more foreign sightseers. The vigorous construction of communities is also realized thanks to the spreading and penetration of eco-tourism. Since the value of Satochi-Satoyama areas is clearly recognized by the public through these efforts, these areas are managed and maintained partly through public or private funding and by volunteers. Furthermore, traditional knowledge and technologies making use of the biodiversity cultivated in respective areas are inherited by children, and a specific climate linked with regional culture is valued in the symbiosis with rich biodiversity through the use of natural resources.

In addition to improved habitat environments through active diverse forestation such as the conversion to broadleaf forests, setting up visible buffer zones, removing uncollected farm produce and tree fruit that will provide food for wildlife in winter, taking preventive measures throughout the entire area to keep wildlife away, and regulating animal populations through appropriate hunting will successfully prevent medium-size to large mammals including bears, deer, wild boars, and monkeys from appearing frequently in areas adjacent to agricultural land or villages.

(3) Urban areas

[Current status]

An urban area is where human activities are concentrated and typified by a very small natural space for various forms of life to live, due to high-density land use and a high level of concentrated environmental impact. The distribution ranges of many familiar living things such as skylarks and fireflies have been driven out to suburban areas with the expansion of urban areas. As a result, only limited living things can be seen in an urban area, including those that live in isolation in remaining green spaces scattered in slope forests, shrine/temple forests and premises forests, and certain species (including crows and grey starlings) that can adapt to artificial environments. Few species of fish live in the moats, rivers and channels that comprise historical elements of an urban environment, and when pet red-eared sliders (a type of turtle) are released and many nonnative afforestation plant species are used there, alien species consequently spread. The need to interact with nearby nature around residential areas is rapidly increasing. Conversely, against a backdrop of small green space

and scarce biodiversity in the living area, more children do not know how to interact with nature and more adults cannot explain how to do so to their children.

[Directions to be pursued]

- Promote the development of urban areas full of water and green in rich nature.
- Secure contact with nature in the common livelihood of people.
- Settle sustainable consumption from a global perspective.

[Image of desirable area]

Developed forms of public transportation move along routes lined with thick trees in compact urban areas featuring small populations, high-energy efficiency, and long-lasting buildings. Giant trees rise even in central areas and waterfront areas through the large-scale development of green space like the Meiji Shrine forest by using unused or little-used land, and birds of prey fly slowly above these giant trees. Small spaces that allow urban residents and children to touch living things are created here and there by using springs. The trees lining a street and green space contribute to global warming measures, help alleviate the heat island phenomenon, and create a good landscape in urban areas.

The restoration of biodiversity is targeted by conserving, restoring and creating forests and waterside areas in urban areas centering on the green space in hilly areas and areas along cliffs, rivers, spring areas and coasts to secure wind paths and healthy water cycling, and by networking healthy ecosystems. Suburban areas that have room for land usage have restored rich ecosystems through the restoration of forests and wetlands. Moreover, the status of biodiversity is mainly monitored mainly by local residents.

Green space with forests has expanded with a rich variation of landforms, such as the biotopes at schools, kindergartens and nursery schools where many forms of life are nurtured. Infants grow up while playing and venturing onto the soil even in an urban area. The positive cooperation of residents in managing forests and green space strengthens the community network that includes children.

Conservation activities are actively conducted in small paddy fields in the valleys of suburban areas, where people engage in agriculture in jointly managed agricultural land and children shout for joy in catching fish and playing in water.

With respect to food and wood to be consumed by urban residents, more people are selecting those produced in consideration of conserving biodiversity and its sustainable use or those produced nearby. Such products are naturally provided with added value and extensively introduced at festivals held at a large park to connect urban consumers with farm producers. Cities with rich green space and plentiful water are vibrant upon becoming bases for sightseeing with excellent landscapes.

(4) River/wetland areas

[Current status]

Water is vital to life on earth. Rivers and other water systems including lakes, wetlands and springs represent a vital platform for biodiversity. Water systems become a vital axis of the ecological network of national land when interconnecting forests, agricultural land, cities and coastal areas. Earth, sand and nutrients generated in the river-basin area, as well as contaminated substances generated through the use of land, are carried downstream through this interconnection, and at the same time, salmon and eel migrate upstream via interconnection from the sea.

Water systems are vital habitats of aquatic life (such as fish), water birds, and many other forms of life. In particular, wetlands have a rich biodiversity, but are also ecosystems easily susceptible to the effects of human activities.

Wetlands and forests in riverside floodplains have been developed and used as agricultural land or building land for a long time. Along with a reduced flow rate due to the repair of rivers, river ecosystems have been greatly affected by changes in or the fragmentation of water cycling routes, a reduced supply of sand gravel, diminished disturbance, and water contamination. About one-third of all waterweed species growing in Japan are designated as threatened species, and many threatened species live in a waterside environment. On the other hand, the migration of sweetfish has been restored through improvements in the river environment such as higher water quality.

[Directions to be pursued]

- Conserve and restore the habitats of various forms of life by conserving/restoring diverse river areas, maintaining a sufficient volume of water, restoring river variability, and connecting upstream/downstream areas to river-basin areas.
- Establish domestic river-basins and international networks of life.
- Improve water quality so that people can interact with various species of aquatic life, and secure a healthy water cycle including groundwater and springs.
- Restore Japan's unique rivers where rich ecosystems and the regional history, culture and life are in good harmony.

[Image of desirable area]

Promoting the conservation of natural river banks, wetlands and riverside groves as a surrounding floodplain and making efforts to restore nature will form a river in a river area affected by disturbances due to flooding, thereby leading to the creation of a diverse river area. Diverse river ecosystems exist there, with riverside willow groves, specific plants such as *Aster kantoensis*, a kind of composite growing in river channels, and species peculiar to brackish water areas such as brackish-water clam (*Pseudozizeeria maha*) and *Mortonagrion hirosei*, a kind of damselfly at the mouths of rivers. Rapids and an abyss form in the streams and riverbeds suitable for living things to find food and breed there. Thus, rivers are good habitats for aquatic life, particularly fish. Various technologies are also used to conserve the variability of rivers.

In the stagnant wetlands surrounding a river area, floating leaved plants such as *Nuphar japonicum* and submerged plants such as *Potamogeton crispus* and *Potamogeton oxyphyllus* grow thickly. Such areas provide a place for crucians and Japanese eight-barbel loaches to live and lay eggs. Living things can move between rivers, surrounding wetlands, and agricultural land. Many previously common forms of life (e.g., catfish (*Silurus asotus*), golden crucian carp (*Carassius langsdorfii*)) can now be seen moving between rivers and paddy fields. Furthermore, the continuity within the range from upstream of a river to its mouth and the nearby coastal area has been improved, and a sufficient volume of water and good water quality are maintained thanks to healthy water cycling in the river-basin area. Rich water area ecosystems are therefore conserved, restoring the migration of sweetfish and gobies.

Thanks to the improvements made in river water quality due to the reduced impact of contamination in river-basin areas, pure water now flows from the headwater point to the mouths of rivers. Migratory birds from the Asia-Pacific region reach lakes and wetlands with improved water quality, paddy fields filled with water even in winter, and tidal flats at the mouths of rivers. Thus, the network of stopovers for migratory birds is secured at home and abroad.

With the percolation of rainwater into the soil in urban areas and improved water environments on agricultural land, previously familiar channels and springs are being restored and healthy water cycle is secured for better human life. Beautiful watersides and rich nature in the area create a scene of a very Japanese river in harmony with the history, culture, and lives of people. Native fish that have grown with the healthy water cycle are used as regional daily food. Well-suntanned children can now play and shout in clean rivers during summer.

(5) Coastal areas

[Current status]

With its rich biodiversity, a coastal area that includes a complicated and varied coastline and a front neritic sea area (including tidal flats, underwater forests and coral reefs) is closely related to people's lives through its industrial and recreational use. Above all things, an area closely related to the lives of people who have thrived on blessings of the sea since olden times is called a "Satoumi" area. It can be said that our life and culture have historically been developed, while largely dependent on coastal areas. On the other hand, neritic sea areas are greatly affected by land impacts from river-basin areas and the inflow of nutritive substances and fresh water, thereby playing an important role in facilitating a river's function to carry dirt and sand to form a sandy beach.

Tidal flats, underwater forests and coral reefs are distributed in a coastal area where the land area and sea area interact with each other. Coastal areas have various important functions as places for diverse forms of life to breed and grow, to produce abundant marine resources, improve water quality, and where to interact with nature. Animals and plants specific to such landforms as sandy beaches, cliffs and tidal flats can be seen on beaches. Moreover, the natural environment of the beachside vegetation zone and beach is an important axis of the country's ecological network. Conversely, the populations and many industries concentrated in coastal areas have significantly

affected such areas due to land reclamation, water contamination, and the fragmentation and reduced connection to rivers. Thus, the reduced area of tidal flats, environmental deterioration, and the conversion of coastlines have isolated humans from the sea. Horseshoe crabs (*Tachypleus tridentatus*) and fiddler crabs (*Uca arcuata*) living in tidal flats are designated as threatened species, possibly due to the deterioration of their habitat environments. In addition, a deteriorated coastal environment has reduced the production yield of coastal fishery activities and is affecting the inhabitation of diverse benthic life. There are also impacts due to various changes in ecosystems, such as barren grounds (e.g., significant deterioration of underwater forests with thick large seaweed) and coral bleaching, as well as by drifting waste and waste washing ashore.

[Directions to be pursued]

- Restore the connection between people, the sea, and rich biota inherent in coastal areas where the land area interacts with the sea area.
- Restore coasts that people can visit and enjoy through the conservation and restoration of natural coasts and neritic sea areas, and the creation of diverse habitats.
- Activate sustainable fishery in coastal areas through efforts for upstream forestation, water quality improvement, etc.

[Image of desirable area]

The important habitats remaining in coastal areas such as tidal flats, underwater forests and coral reefs are suffering great effects from higher seawater temperature and rising sea levels due to global warming. However, the coastal ecosystems of tidal flats, underwater forests and coral reefs are richly secured, while being subject to such natural disturbances as typhoons, through restoration efforts backed by scientific knowledge that are conducted based on accumulating data, conservation efforts made for healthy ecosystems, and an analysis of environmental conditions including the depth of water, tidal streams, and bottom sediments. Also, Japanese littlenecks, various kinds of crabs (e.g., fiddler crabs) and various species of marine life live in tidal flats throughout the country, where shorebirds peck at food and many people enjoy digging clams. In enclosed coastal seas such as inner bays, the problems posed by a deteriorated coastal environment (including accumulated sludge and the generation of an oxygen-deficient water mass) have been addressed, upstream forests are now being properly maintained in cooperation with fishermen and others involved, and rich fishing grounds preserved. Coastal areas that grow rich species continuously supply large quantities of various kinds of seafood and maintain healthy ecosystems. Seals can be seen swimming in northern seas as well as dugongs in southern seas. The inhabitation of horseshoe crabs is also ensured in western Japan by securing the continuity of an ecosystem that starts from sandy beaches and extends through tidal flats and underwater forests to the bottom of the sea.

Although coasts are affected by rising sea levels due to global warming, natural coasts are being conserved and sandy beaches maintained with the supply of dirt and sand from rivers through which continuity is secured from the mountains. Sea turtles come ashore, little terns breed, and coastal

plants grow well on such sandy beaches. With the cooperation of Asian and other foreign countries, people are enjoying sea bathing along clean coasts free of litter and waste.

(6) Marine areas

[Current status]

The oceanic area extending offshore to the vast ocean is also a backbone structure that supports the biodiversity of Japan. The oceanic area is about 12 times larger than Japan's total land area, and has exclusive economic zones. While there are various ecosystems in the abyssal sea, scientific data on biota, etc. remain insufficient, although data on targeted marine species are organized by using past data.

The oceanic area accounts for about 70% of the earth's total surface area. The oceanic area is a huge stock for water cycling and closely related to the formation of global climate with its enormous heat energy. The oceanic area also functions as a huge sink of carbon dioxide through carbon cycling, and governs stabilization of the air. Because Japan is an island nation, its terrestrial climate, distribution of land animals and plants, and ecosystems are greatly affected by the sea.

The seas near Japan enrich the country's marine biodiversity due to their varied oceanic structures as typified by a cold water mass (i.e., Oyashio Current from the north) and a warm water mass (i.e., Kuroshio Current from the south) that flow together carrying remote forms of life, the Japan Sea that was long isolated in history, and the Japan Trench that reaches a maximum depth of nearly 10,000 meters. At the same time, waste from other countries in the world, harmful chemical substances, and oil spilled from ships and boats affect marine ecosystems in the oceanic area.

[Directions to be pursued]

- Promote the conservation of long-distance migratory animals while monitoring the trend toward international coordination.
- Organize general marine data including data on marine resources, ensure genetic diversity, and then promote sustainable fishery activities through resource management based on ecosystems.
- Strengthen efforts to remove and prevent marine contamination with international collaboration.

[Image of desirable area]

Habitat environments are improved for marine mammals, sea birds, sea turtles and fish that travel long distances in their life cycles through conservation activities conducted in cooperation with Pacific nations and other countries involved. Thanks to advanced techniques to avoid the bycatch problem, these living things can be seen in many places and regional revitalization is being promoted, while maintaining the coexistence of fishery and eco-tours such as whale watching. In the oceanic area where these forms of life live comfortably, and in the light of the trend toward international coordination, the standing crop of marine resources, etc. is understood in a scientific and objective manner, and sustainable fishery activities in compliance with rules (regarding fish catches, etc.) are actively conducted along with efforts for conserving biodiversity.

Efforts are underway with international cooperation to remove and prevent marine contamination due to drifting waste, waste washing ashore, harmful chemical substances, and oil spills that adversely affect marine ecosystems.

(7) Islands

[Current status]

In addition to the four main islands of Hokkaido, Honshu, Shikoku and Kyushu, Japan includes more than 6,800 islands of varying sizes. Among them, there are some islands including the Ogasawara Islands and Nansei Islands that feature distinctive biota nurtured over a long period of history and isolated by the sea. A unique ecosystem is formed with a fine balance in the small area of these islands. Therefore, it can be said that the island area is a vulnerable one that is easily affected by the destruction of habitats and alien species. Since there are many region-specific species with a limited distribution range in island areas and vulnerable to anthropogenic effects, many of the species living in island areas are designated as threatened species.

[Directions to be pursued]

- Promote the conservation of distinctive ecosystems and proper biota through the protection and breeding of rare species, and the exclusion of alien species.
- Promote the creation of fulfilled communities making the most of their originality.

[Image of desirable area]

Specific species of fauna and flora live stably in island areas, including the Tsushima leopard cat on Tsushima Island, the Iriomote cat on Iriomote Island, Amami rabbit on Amami Oshima, the Okinawa rail on Okinawa, and *melastoma tetramerum*, a kind of melastome on the Ogasawara Islands. Their distinctive ecosystems and proper biota are thoroughly examined and well recognized as irreplaceable properties of the region, and some of which as the world's properties. Furthermore, the introduction of alien species from outside the islands is checked at the border, and groups of tourists participate in the nighttime examination of specific species. Eco-tours are actively conducted while taking every care regarding the environment and utilizing the characteristic nature and culture. As a result, fulfilled communities that connect the unique nature and culture of these islands are now being created.

The habitats and egg-laying/breeding places for sea turtles, sea birds (including the albatross and common murre), and marine mammals (including seals) are conserved without excessive interference by humans as vital areas for the conservation of biodiversity.

Chapter 4 Basic Policies

This chapter presents the basic policies for the measures we should take to realize the three targets and grand design looking 100 years ahead, as set forth in Chapter 3 and based on the “Status and Problems of Biodiversity” in Japan discussed in Chapter 2. To begin with, the basic perspectives we should maintain in implementing the measures will be explained. Then, with these perspectives in mind, the broad directions toward fulfilling the measures on which we should focus until around FY 2012 will be presented as the basic strategies for achieving our goals.

Section 1 Basic Perspectives

In implementing the measures intended for the conservation and sustainable use of biodiversity, the following five basic perspectives should be maintained as the crucial and common bases for those measures: 1. scientific recognition and preventive/adaptive attitude; 2. community-oriented attitude and wide-area view; 3. coordination and collaboration; 4. use of socioeconomic systems; and 5. integrated and long-term viewpoint.

1 Scientific recognition and preventive/adaptive attitude

The conservation and sustainable use of biodiversity should be pursued based on scientific data while using as important suggestions the accumulated wisdom gained from coexisting with nature in the local community. By doing so, many local residents will better understand the importance of such efforts and the effects they actually produce. For example, it is necessary to make much of the data and samples obtained through long-term monitoring of the local natural environment, and activities geared toward the conservation, restoration and sustainable use of biodiversity should be promoted by utilizing such data and samples. Properly understanding and recognizing the status quo of biodiversity in the community based on scientific data constitutes the starting point and basis for policy-making and the activities to be implemented.

Human beings are also among the species living on earth and a component of the world's ecosystem. However, what differentiates us most from other living organisms is that we have gained possession of technologies that can exert extremely great impact on the natural environment. In order to use this power for realizing a harmonious coexistence between humans and nature instead of using it indiscriminately, it is necessary to place great importance on the viewpoints below, in addition to following the concept of the “ecosystem approach” agreed upon at the meeting of the Conference of the Parties of the Convention on Biological Diversity:

1. Human beings should recognize that they can never fully understand everything about the living organisms and their ecosystems on earth. We should always be modest enough to act cautiously. Moreover, we should not defer implementing biodiversity conservation measures because of incomplete scientific evidence, but should assume a preventive attitude of always striving to

enrich scientific findings so that we can take measures in a timely manner.

2. As a principle of conserving biodiversity, we should recognize that the ecosystem of which human beings are a component has a complicated structure that is ceaselessly changing, and that the management and use of the natural resources it provides should be implemented in an adaptive manner within the extent whereby the structure and function of the ecosystem can be well maintained. For that purpose, it is important to monitor changes in the ecosystem accurately, and review the method of managing and using it as required.

3. It is necessary that all people concerned have in common a wide range of science-based information on nature and society, and that policies for the management and use of natural resources should be determined as a choice of society.

2 Community-oriented attitude and broad geological perspectives

The conservation of biodiversity cannot be achieved only by developing and implementing national strategies, but should be supported by community activities aiming to preserve the local natural environment. To that end, a community-oriented perspective is important. Appropriate, long-standing activities in the community will lead to the construction of a community rich in biodiversity, and, through this process, strengthen the relationships among residents ranging from children to the elderly. As a result, the beautiful biodiversity-based landscape unique to the community and rich culture developed in such an environment will be handed down from generation to generation, thus fostering feelings of pride in and stronger attachment to the community among residents, arousing the interest of outsiders, and revitalizing the community both economically as well as socially.

In developing various measures to conserve biodiversity, it is also essential to adopt the views of people actually engaged in conservation work. The biodiversity conservation activities differ from community to community, and have unique characteristics. The people involved in those activities form the heart of a conservation project, and have accumulated the wisdom of properly managing natural resources from a wealth of experiences acquired in their own communities. While it is important to cultivate community staff inheriting such local wisdom and encourage community-driven activities, there also needs to be a wide-area perspective for constructing a network of humans and information among many communities engaged in conservation activities, in order to further invigorate and expand such activities.

Rivers connect forests with the ocean, and the biodiversity in each segment is also inextricably interconnected through the flow of water, dirt and nutritive salts, and through the fish that swim upriver. Therefore, as we can see in such cases as forestation in the upper reaches of a river for preserving the fisheries of the sea into which the river flows, and in wide-area coordinated protection and management efforts for preserving common cormorants that migrate over a wide area, it will be possible to promote biodiversity conservation activities in a manner whereby an activity in one community has beneficial ripple effects on other communities.

Moreover, the socioeconomic activities and biodiversity of Japan are closely connected with

those of the world, especially the Asian region. For this reason, by taking the advantage of our experiences in preserving nature on a community basis and what we have done to foster biodiversity in our daily lives, it is possible for us to actively contribute to international activities for conserving biodiversity, particularly in the Asia-Pacific region. Considering that Japan heavily depends on other countries for living resources, such as lumber, agricultural and marine products, and natural resources such as fossil fuels and mineral resources, the use of these resources may seriously affect the ecosystems of the exporting countries. It is important to recognize that the overall consumption of goods and economic activities in Japan have a major impact on biodiversity throughout the world. Furthermore, cooperation is necessary not only at the government level, but also on the part of consumers who choose and purchase goods and services, companies that procure raw materials, companies involved in development, and many other entities. Given the global interconnectedness of biodiversity, we must advance conservation activities both at home and abroad from a wide-area perspective. For this reason, we should collaborate with the countries producing such natural resources to help achieve the sustainable use thereof in view of biodiversity, while making further efforts domestically to utilize local resources as efficiently as possible.

3 Coordination and collaboration

Ever since the First National Biodiversity Strategy of Japan was developed, the ministries and agencies concerned have worked in close cooperation to advance their efforts in a comprehensive manner. However, in such fields as the restoration of nature, maintenance and conservation of forests, conservation and use of Satochi-Satoyama areas (rural landscapes formed by the sustainable use of natural resources), preservation and management of coastal and oceanic areas, environmental education and learning, ecotourism and other activities in contact with nature, the appropriate conservation of genetic resources, and enrichment of data on the natural environment, we must further enhance coordination and collaboration among the ministries concerned by taking effective steps, such as launching a model undertaking and establishing a liaison meeting among the authorities concerned according to the concept of each measure being implemented.

In advancing measures based on the national strategies, it is also crucial to establish a system that promotes closer coordination among a wide range of entities including the government, local public bodies, private enterprises and organizations, experts, and community residents. In order to enhance the conservation and sustainable use of biodiversity on a community basis, it is particularly important for the local public bodies and community residents, who are to be involved in such activities as part of a daily routine, to take the initiative in planning and implementing those activities in a manner that best suits the characteristics of the community. Recently, there have been more cases of private enterprises and organizations cooperating with each other to conduct similar activities, and such collaborated work should be further enhanced. In addition, the activities should be advanced on the basis of scientific findings and information, and in view of promoting the sharing of such findings and information among all parties concerned; therefore,

the participation of experts, involvement of coordinators to link communications between the experts and ordinary residents, and timely disclosure of information are especially important. In this way, coordination and collaboration among all parties concerned must be ensured in order to implement measures for the conservation of biodiversity and its sustainable use.

4 Use of socioeconomic systems

In order to promote the conservation of biodiversity and its sustainable use as long-standing efforts instead of temporary ones, it is important that the people engaged in such activities should benefit from them and not be heavily burdened, at least not economically. One measure to realize this is to adopt the systems used back in the days of recycling the natural resources used for fuel and fertilizer within the community. Of course, it is impossible to incorporate such systems as they were into the present framework, because they were long used inevitably out of socioeconomic necessity in those days. However, what is important is to learn from the recycling system of the old days and devise a new one that can be applied to present-day circumstances. Among the examples of such activities already underway are those related to the commercial success of “Kounotori-no-sato Rice” (rice produced at the home of white storks), which is produced using a biodiversity-friendly technique in the city of Toyooka in Hyogo Prefecture, and other rice brands named after living organisms typical of the place of origin, and the certification systems sponsored by the private sector with a view to promoting fishery and forest management and product distribution that give due consideration to the conservation and sustainable use of biodiversity, namely, MSC/MEL Japan (for fishery management and the distribution of marine products) and FSC/SGEC (for forestry management and the distribution of forest products). As a completely new socioeconomic undertaking, ecotourism has been pursued extensively. It aims to preserve the natural environment and resources of the local community, while utilizing this approach commercially within the framework of sightseeing. These activities under socioeconomic systems are quite important in terms of involving large numbers of people in efforts made for the conservation and sustainable use of biodiversity that can be continued for a long time.

The monetary value of the benefits of biodiversity must also be estimated and then incorporated into socioeconomic systems. The forest environment tax adopted in many municipalities is a typical example of such a system. It aims to reallocate the benefits that local residents enjoy from biodiversity and the many functions of a forest to activities aimed at preserving and maintaining that biodiversity. Incorporating biodiversity conservation efforts into such socioeconomic systems is an important way to advance conservation efforts in the long run.

5 Integrated and long-term viewpoint

The three crises of biodiversity do not exist independently. The first and second crises, which are seemingly contradictory, work together to aggravate a critical situation in such a way that, as we can see in Satochi-Satoyama areas in the environs of a large city, urbanization enhances

the loss and fragmentation of species, which in turn leads to inadequate ecosystem management on the part of human beings. In such areas, the third crisis also emerges due to the increase of alien species originated from such animals as raccoons used for breeding, thereby accelerating destruction of the ecosystem concerned.

In order to aim for a sustainable society, it is necessary to integrate the “society in harmony with nature, low-carbon society and sound material-cycle society” into one comprehensive society. For example, we must take extra care not to carelessly dispose of such resources as bamboo and the branches and leaves derived from forest management activities, in order to conserve biodiversity. We also need to change our economic system and lifestyles to achieve a sustainable society. For that purpose, these three societies should be analyzed from socioeconomic and various other aspects for a better understanding in an integrated manner.

In this way, to advance the activities for the conservation and sustainable use of biodiversity, it is important to coordinate various aspects of such activities from an integrated perspective.

In our socioeconomic activities, we tend to seek short-term productivity and efficiency. From a long-term point of view, however, it is considered more economical to simply preserve the ecosystem sustainably and allow it recover by itself, instead of changing it as we desire. According to the Millennium Ecosystem Assessment, developing wetlands into agricultural land will enhance economic value by making it possible to produce a harvest, but will reduce values regarding the conservation of reaches, water purification, and recreation. Developing a mangrove forest for cultivating shrimp will deprive the forest of its functions to absorb carbon dioxide and preserve nearby coastal areas, and increase the risk of exposure for coastal residents to flooding and wind damage. The overexploitation of marine resources may increase profits in the short run. But once those resources are depleted, no profits can be expected and the fishery will collapse. Artificial disaster prevention measures for a river will enhance safety, but will also reduce the supply of nutritive salts, dirt and sand depending on the technique employed, thus possibly reducing nature’s blessings that we enjoy from tidal flats and sandy beaches.

It is important for the Japanese people and human beings in general to make much of the benefits they can sustainably receive from biodiversity in the long run, and act from the perspective of maintaining, preserving and restoring sound ecosystems. Then we can hand down the blessings of rich biodiversity to future generations, as it is our generation’s responsibility to do so.

Section 2 Basic Strategies

In order to promote activities for the conservation and sustainable use of biodiversity, it is essential that many entities become interested and actively participate in those activities, in order to plan measures that reflect characteristics of the nature and society of their local communities. To secure sound ecosystems highly adaptive to environmental change, it is also important to further expand efforts to construct an ecological network on both nationwide and global scales.

With these considerations in mind, the broad directions toward fulfilling the measures on which we should focus until around FY 2012 are presented as four basic strategies for achieving our long-term goals that look ahead 100 years from now: 1. Mainstreaming biodiversity in our daily life; 2. Rebuilding a sound relationship between man and nature in local communities; 3. Securing linkages among forests, the countryside, rivers and the sea; and 4. Taking action with a global perspective.

1 Mainstreaming biodiversity in our daily life

The condition of biodiversity is worsening on a global scale, and the biodiversity crisis we have faced in our country has yet to be resolved. Though biodiversity has a direct impact on our lives, the concept of biodiversity is still poorly recognized in our country. According to a 2004 survey (conducted by the Ministry of the Environment), 10% of the respondents knew the meaning of the word “biodiversity” and about 30% had heard of it, including those who knew the meaning. In a similar study (conducted by the Cabinet Office) five years later in 2009, those figures were 13% and 36%, respectively, suggesting that while there is somewhat wider recognition, it remains low. In order for a national land rich with nature’s blessings to be inherited from generation to generation, each of us as citizens must be aware and conscious of biodiversity not just in our daily lives, but as a society in general. Local public authorities, companies, NGOs, academic societies and other groups have already begun various efforts, but are still currently limited to a small number of forward-thinking groups. It is necessary to use the hosting of COP10 as an impetus to nurture and expand such efforts, become more aware of biodiversity issues, and translate that into increased action in the form of a national, grassroots movement. To that end, the “Our Life on Biodiversity Project” being driven through numerous partnerships, in addition to other efforts customized by specific groups, will be promoted with the participation of many people and organizations, so that local public authorities, companies and ordinary citizens become more fully aware of the importance of conserving biodiversity and begin taking more action. Put simply, this amounts to the “mainstreaming” of biodiversity in society at large. Besides, education, learning and hands-on experience regarding biodiversity will be provided extensively, and biodiversity-oriented lifestyles proposed as measures to disseminate the concept of biodiversity throughout society.

〈Promotion of PR and public-private partnership〉

Taking the opportunity of COP10 being hosted in Japan in 2010—“the International Year of

Biodiversity” declared by the United Nations—activities that afford people a better understanding of the current state and importance of biodiversity should be advanced in the spirit of the COP10 slogan: “Life in harmony, into the future.” In order to do so, great efforts will be put into PR activities, and in addition to regular activities to help people realize and become familiar with the deep relationship between biodiversity with our living, events to raise awareness about biodiversity will be held on the International Day for Biological Diversity (May 22). The risks that people’s thoughtless actions pose to biodiversity will be clearly explained by citing concrete examples, such as leaving fishing lines by a river and abandoning pets in the countryside. As part of the PR activities, cooperation will be sought from the media in order to disseminate clear and concise information to as many people as possible.

We shall increase membership in the “Life on Earth Cheering Squad,” which will also help to disseminate information about biodiversity to the people. In addition, we will facilitate a greater awareness of biodiversity issues among the Japanese people through increased exposure of the “For All the Life on Earth” logo, which was designed as a communication tool.

In promoting these activities, it is necessary to enhance coordination among the government and local public bodies, and private enterprises and organizations including NGOs.

As 2010 is the UN’s International Year of Biodiversity, the UN has encouraged the formation of a national committee with members from a diverse range of fields. The International Year of Biodiversity Domestic Committee will be established, and function as a forum for partnership between the public and private sectors, including the national government, local public authorities, business leaders, members of the media, NGOs, and experts. The cooperation between such diverse entities will be utilized to further efforts.

〈Participation by local public bodies, private enterprises and citizens〉

Developing national strategies alone will not realize the conservation of biodiversity. The strategies must be materialized as activities on a community basis. To that end, the local public bodies including urban and rural prefectures should develop regional biodiversity strategies, by first taking into consideration the characteristics of each local community. And based on those strategies, they should then make community residents full aware of the importance of conserving biodiversity and promote various activities aiming to create a society coexisting with nature through coordinated efforts aimed at conserving biodiversity among administrative agencies, private enterprises, NGOs, and community residents. The Basic Act on Biodiversity also stipulates that local public authorities must strive to formulate regional biodiversity strategies. Such local strategies are also necessary for enhancing mutual cooperation among the local agencies concerned with biodiversity, and it is hoped that such strategies will soon be prepared by all local public authorities in the country, as in the case of the Red Data Book and Red List. One promising option is for two or more local authorities to cooperate in preparing a regional strategy in case there are, for example, watersheds, mountainous regions or other areas that overlap administrative boundaries. The government will distribute the “Guide to the Regional

Biodiversity Strategies” to Japan’s prefectures and other local public authorities, and introduce cases of biodiversity conservation activities conducted by various entities, thereby encouraging the development of effective strategy and implementation of activities at the local level. At the same time, the government will study guidelines for efficiently formulating regional strategies that emphasize dealing with all environmental spatial features, such as watershed areas.

Recent years have seen a spreading global movement called the “Green New Deal” that aims to focus investment on efforts to reduce the burden on the environment, and at the same time reap economic benefits and create jobs. The ultimate purpose of the initiative is to create a society in which both the environment and economy can be developed. Also recently, there are increasing numbers of biodiversity-conscious activities being conducted by private enterprises. In March 2009, Nippon Keidanren (Japan Economic Federation) issued the “Declaration on Biodiversity by Nippon Keidanren,” which includes seven articles and an action plan stating that, as members of the global community, all people must share responsibilities, and coordinate and cooperate in order to take action that contributes to the preservation of biodiversity. The following are examples of individual businesses promoting biodiversity. A fishery company attaches MSC ecolabels to the marine products it distributes for showing consumers that the products come from sustainable fisheries. A livelihood cooperative association has been conducting research on organisms living in paddy fields to promote the use of organic farming, which enriches biodiversity. There is a company cooperating in the conservation of overseas tropical forests, from which it procures raw materials. Another company is restoring paddy fields along valley streams in cooperation with an NGO as part of a recreational program for employees to raise their awareness of environmental problems, as well as to participate in biodiversity conservation activities. Private enterprises have an impact on biodiversity besides benefitting from it through many aspects of their business activities, including the procurement of raw materials, utilization of genetic information, and civil engineering work. Moreover, their business activities are closely associated with the social awareness of consumers, and influence the consuming behavior of individual citizens. The survey conducted by the Cabinet Office in June 2009 found that more than 80% of respondents thought that biodiversity-conscious business activities were commendable. In this sense, private enterprises should incorporate the perspectives of the conservation and sustainable use of biodiversity into their socioeconomic systems in connection with all of their business activities including CSR activities. The Japanese government sought opinions from business leaders, NGOs, experts, and the general public in order to form the Biodiversity Activity Guidelines for Private Enterprises, which are designed to encourage private enterprises to participate in biodiversity-related activities on their own initiative. These guidelines will be distributed to a broad range of groups and individuals, and the use thereof will be strongly encouraged. In addition to demonstrating these efforts to other countries, the government is also studying more systems through which interested businesses can participate, such as the Business and Biodiversity Initiative. Furthermore, there are ongoing efforts for using expos and similar opportunities to introduce biodiversity-friendly goods, services, and agricultural/marine products, in order to spread the use of “seal of approval” systems

that are appropriate for such products, and develop mechanisms for estimating the market values of real estate in a way that addresses biodiversity concerns. The government will strive to enhance the synergistic effects brought about by interactions between biodiversity-conscious businesses and biodiversity-conscious consumers, by providing information that investors and consumers need to make responsible decisions.

It is important that various entities including local public bodies, private enterprises, NGOs, and community residents advance biodiversity conservation activities from a perspective unique to their own communities. For this reason, it is necessary to encourage the participation of wide-ranging entities, support conservation activities based on diversified ideas such as those proposed by individual citizens, and improve support systems including economic assistance and systems of social assessment. Based on the above, the government will study ways to promote the conservation of biodiversity through collaboration involving various members of the local community by, for example, matching the needs of private groups, landowners, businesses, local public authorities, and other such entities. It will also provide support for locally-led efforts and comprehensive planning to protect or restore biodiversity, such as the protection and management of wild flora and fauna, dealing with alien species, and instituting conservation measures in priority areas. The government will also promote the construction of “human” and “information” networks among the communities engaged in conservation activities, in order to clearly convey informative and educational examples of such activities. As a part of such efforts, a citizen-based survey will be conducted to monitor the condition of biodiversity in the local community by soliciting the participation of people engaged in biodiversity conservation activities there, along with experts and NGOs acquainted with the local nature playing the central role. The results of the survey will be announced publicly to deepen the awareness of biodiversity among local residents.

〈Provision of education, learning and hands-on experiences, and change of lifestyle〉

It is necessary that many people recognize the fact that biodiversity is an important issue involving all living species including human beings. To achieve this, education and learning designed for each group of residents should be provided. Among other groups, children are the most important target. They should learn about biodiversity and biology, and the topographical and geographical features of the community at home, in school and at community gatherings. Learning about nature and living beings from experiences at an early age is quite important. To this end, environmental education including biology and geography will be promoted within the framework of school education, and training on environmental education and hands-on experiences will be provided to teachers and those engaged in environmental preservation activities in the community. Such occasions will be arranged with the cooperation of the community where children can learn about nature from experiences by communing with nature unique to the community after school. In order to overcome the crisis posed to biodiversity, ensure environmental sustainability, and allow for economic development, we shall explore new

modes of environmental education designed to instill the importance of creating a sustainable society, and train people to carry out such education programs.

Social education for the adult residents is also important. By utilizing various public facilities in the community such as museums and research institutions, education and learning about biodiversity will be provided. Experts in the field of biodiversity will also be supported to lend their active participation in the international scene, along with assistance for fostering environmental experts at universities.

In addition, environmentally responsible and properly controlled forms of ecotourism will also be promoted as a means of educating people and cultivating a better understanding of environmental conservation among them, and by doing so, helping to protect biodiversity and create a vibrant, sustainable society.

Children these days have fewer opportunities to interact with nature, and it is important to afford them more chances to feel nature with their “five senses” from an early age, and not merely learn about it in classrooms and other formal educational settings in their communities. Social systems in which they can experience nature will be created. For example, forests, the countryside, riversides and beaches will be upgraded so that children can play there feeling at ease; parks and other spots will be created in urban areas to provide children with chances to contact with familiar nature in the neighborhood; moreover, long-stay programs in farming, mountain and fishing villages will be offered.

By taking advantage of the educational opportunities offered by nature tours and visitor centers at national parks that feature splendid natural environments, the government will provide opportunities for many people to interact with nature and experience the richness of Japan’s natural environment.

Japan imports many kinds of natural resources including food and lumber from overseas, and our consumption behavior heavily depends on biodiversity in the exporting countries. Our recognition of this fact and subsequently changing our behavior will have a great impact on advancing the conservation and sustainable use of biodiversity on a global scale. More specifically, we can selectively purchase biodiversity-friendly food and lumber products, and products offered by companies engaged in biodiversity conservation activities, and also invest in such companies. In conjunction with disseminating the Guidelines for Private Sector Engagement in Biodiversity, the government will present easy-to-use indicators for judging whether a product is biodiversity-friendly, and cite clear examples of how different actions affect biodiversity.

2 Rebuilding sound relationship between man and nature in local communities

In the long history of agriculture in our country, people used to live in a close relationship with nature. As urban areas expanded and many people moved to live there, such a relationship with nature has become increasingly tenuous these days. In farming and mountain villages, the use of natural resources in the community has been reduced due to the mechanization of agriculture and introduction of chemical fertilizers. Before the Meiji era, there were vast meadowlands south of the Kanto region including the environs of urban areas, where oxen and

horses used for agriculture were bred and compost was produced. While such meadows served as a good source of resources for citizens, they were also the habitats for insects, together with the wetlands contained inside. In recent years, however, there are only a few open fields remaining, to say nothing of meadows, due to increased urbanization in that region.

Satochi-Satoyama areas, in contrast, have been left uncontrolled to offer an ideal environment for birds and such animals as deer, wild boars and bears to live, and the friction between humans and wildlife has become a serious problem.

Under these circumstances, the coexistence between human beings and nature will be enhanced through such measures as conserving Satochi-Satoyama areas, rebuilding a sound relationship with wildlife, promoting agriculture, forestry and fishery practices that foster life, and creating places to foster diversified wildlife.

By producing renewable sources of energy and minimizing the burden imposed on the environment by the exploitation and disposal of resources, organisms will facilitate the creation of sound material-cycle societies, and by locking in the carbon in trees and soil, keep greenhouse gases at low, stable levels, thereby helping to create low-carbon societies. As a comprehensive step towards creating a society that is material cycle-based, low-carbon, and non-disruptive to the environment, the government will curb final waste disposal levels and fossil fuel use levels, and encourage the use of biomass generated through nature management activities.

〈Conservation of Satochi-Satoyama areas and coexistence with wildlife〉

Satochi-Satoyama areas account for about 40% of our country's total land area. They constitute a so-called secondary natural environment, which emerged after the natural forests and floodplains. Unique biota has been formed there as a result of the modest artificial modification caused by agricultural and other human activities.

The socioeconomic needs for Satochi-Satoyama areas have been reduced these days, and when considering the declining population and aging of the residents, it is not practical to maintain those areas using labor and cost. It is important to take such factors into account and rethink the secondary and artificial forests that make up Satochi-Satoyama areas. We must consider the various roles of forests, such as how they help protect biodiversity, cultivate sources of water, and protect the country's land. Depending on the natural and socioeconomic conditions of specific communities, there will be cases where the active management of secondary and artificial forests will be promoted, and cases where they will be managed primarily for the purpose of conversion (mostly through natural transition processes) into forests whose functions can be maintained and fulfilled. Satoyama forests such as Japanese oak forests (*quercus crispula*) and sprout forests of chinquapin and oak growing near deep mountain areas, which generally turn into natural forests without maintenance work, should be left untouched, allowing them to generally follow the natural course of change. It is appropriate that the vegetation should be restored only as required. The government will collect, analyze and make available examples from around the country of distinctive initiatives to use resources in a sustainable manner. These examples will then be used as

hints on how to properly conserve Satochi-Satoyama areas. In addition, the use and methods of managing traditional Satochi-Satoyama areas will be reassessed, new utilization methods introduced to preserve and restore these areas, and strategies examined for encouraging the participation by more diverse entities, including urban residents and businesses. Through these processes, the advice and know-how necessary for community-based efforts will be provided to facilitate the preservation and restoration of Satochi-Satoyama areas throughout the country.

In order to maintain the living environment of wildlife unique to Satochi-Satoyama areas, a modest level of disturbance should be applied through proper utilization. For the conservation of biodiversity, it is important that various components of the environment such as secondary forests, farmland, grasslands and reservoirs emerge in the form of a resultant mosaic. Now that the need to use natural resources for fuel or fertilizer has been reduced in community life, the relationship between humans and nature should be reconstructed with the help of various entities besides community residents. To achieve this, a system of managing Satochi-Satoyama areas as common resources (commons) jointly owned by various entities including urban citizens and private enterprises, in addition to the owners of farmland and forests, will be examined by developing new methods of utilizing Satochi-Satoyama areas such as for environmental education, ecotourism, the use of biomass, and promoting environmentally-friendly agriculture.

In order to rebuild the coexisting relationship between humans and nature that once existed in Satochi-Satoyama areas, it is important to construct a community network among residents engaged in agriculture, forestry and fishery activities, and NGOs in maintaining Satochi-Satoyama areas and restoring forests with the help of local public bodies, private enterprises and urban residents. As a new scheme, Tokyo's Shinagawa ward is involved in a conservation activity in the Satochi-Satoyama areas of Hayakawa-cho in Yamanashi Prefecture under an agreement. By actively promoting cultural exchange between urban areas and farming, mountain and fishing villages, and organizing a network of information about proper management and the people engaged in conservation activities, an efficient framework for the sustainable use of Satochi-Satoyama areas has been established with the participation of various entities. It should be noted, however, that in such a scheme, both urban residents lending support and community residents receiving support need to have feelings of gratitude toward each other.

For areas where natural environments have been maintained through various human efforts, methods will be studied for enlisting the cooperation of many players, including government, community residents, enterprises engaged in agriculture, forestry, and fisheries, NGOs, landowners, and businesses, in order to facilitate sustained, community-based nature conservation efforts.

Satochi-Satoyama areas in the environs of cities are important natural environments left in the urban areas, and conservation activities are actively promoted by NGOs and urban residents. The government will enhance the conservation and management of such Satochi-Satoyama areas near cities by utilizing the existing systems for preserving urban parks and open green spaces.

According to a survey conducted from 2000 to 2003, it was estimated that the habitat areas of deer, monkeys and wild boars expanded 1.7, 1.5 and 1.3 times, respectively, or as large as those 20

years ago, partly due to changes in the relationship between humans and nature in the local community, and with increasingly serious damage caused by wildlife to agricultural products and vegetation. In some years, Japanese bears frequently appear in human habitations, thereby leading to more incidents resulting in personal injury or death and requiring the large-scale capture of bears. In order to prevent this situation, it is important to create a community where bears, deer and other wildlife that may cause damage to humans and agricultural products cannot easily enter human habitations. In some communities, attempts are being made to improve the relationship between human beings and wildlife by installing and properly managing buffer zones between a forest inhabited by wildlife and human habitations by using existing grazing land, or by removing agricultural products and fruits left in human habitations that would otherwise be found by wildlife searching for food in winter. Such efforts have met with some measure of success. Therefore, efforts based on specified wildlife conservation and management plans, damage prevention plans created by local authorities under the Wildlife Damage Prevention Special Measures Act, and similar efforts at segregating habitats between humans and wildlife will be extensively promoted nationwide.

With regard to Japanese black bears that cross prefectural borders, great cormorants which range over broad areas and travel beyond neighboring prefectures, and other wildlife requiring effective measures to be taken in multiple prefectures, the relevant governments, specialized organizations and other entities must collaborate in various ways to determine such factors as the range of movement, population, reproductive capacity, seasonal migration, and long-term trends in movement of specific species of wildlife, and then draft wide-area protection and management plans that clarify the proper measures for protection and management over wide areas. By facilitating such collaboration and cooperation among the entities concerned, the government will promote measures to stabilize populations that have declined locally or, alternatively, measures to prevent harm to people in cases where wildlife populations have skyrocketed.

As fewer people are now engaged in agriculture and hunting in farming and mountain villages, the number of people involved in wildlife protection and management activities is also declining. The fostering of such human resources to carry out initiatives based on local circumstances will therefore be promoted.

〈Agriculture, forestry and fishery that contribute to biodiversity〉

In order to meet consumer demand for a stable supply of safe food, sustainable agriculture, forestry and fishery based on biodiversity-friendly techniques must be promoted, along with the farming, mountain and fishing villages forming the basis thereof being revitalized. For that purpose, in implementing measures related to agriculture, forestry and fishery, higher priority will be placed on conserving biodiversity; sustainable agriculture, forestry and fishery that upgrade the quality of environments for living organisms; moreover, the revitalization of farming, mountain and fishing villages will be pursued.

Satochi-Satoyama areas where people can interact with nature teeming with various species

of fauna and flora are closely associated with agricultural, forestry and fishery activities. It is important to afford people a better understanding of such activities. For that purpose, events to experience agriculture, forestry and fishery in farming, mountain and fishing villages will be held and education about foods provided, so that the people can deepen their understanding of the relationship between biodiversity and agriculture, forestry and fishery.

The efforts being made for the conservation of biodiversity will become more effective with various entities participating and working in cooperation with those engaged in agriculture, forestry and fishery. Therefore, in view of wide-ranging support activities being conducted by various entities including those engaged in agriculture, forestry and fishery, community residents, NGOs, private enterprises, and local public bodies, the existing activities conducted by utilizing original ideas, know-how and techniques accumulated in the community will be reviewed to lend even more support. In this way, the activities for conserving biodiversity will be promoted in a comprehensive manner with the understanding and participation of a wide range of people.

The conservation of biodiversity by promoting the agriculture, forestry and fishery of our country, and the proper preservation and management of forests will be actively pursued, thereby reducing the impact on the biodiversity of other countries and helping to preserve the environment on a global scale.

In the countryside and Satochi-Satoyama areas, it is feared that the improper use of pesticides and fertilizers, and infrastructural development implemented using a cost-effective method of construction may adversely affect biodiversity. In addition, more fields are being abandoned due to a shortage of workers engaged in agriculture, forestry and fishery. Therefore, agricultural production and the upgrading/preservation of the countryside, Satochi-Satoyama areas, and other rural areas will be promoted with top priority placed on conserving biodiversity, so that the people of our country can enjoy safe and good-quality foods, as well as a natural environment with rich biodiversity. From the viewpoint of agriculture as an activity that introduces diversified living organisms to the world as well as producing food, the government will promote activities to offer people the opportunity to commune with nature and deepen their awareness about the relationship between agriculture and biodiversity, thereby revitalizing farming and mountain villages.

The forests that cover two-thirds of Japan's total land area are important components of our country's biodiversity, as various types of forests ranging from natural to artificial forests serve as the habitats of wide-ranging wildlife. As a result of revitalizing the forestry and lumber industry—one that relies on the productivity of forest ecosystems—forestry is being conducted in a manner that sustains forest resources, thus contributing to rational utilization of the multifaceted functions of forests, not the least of which is fostering biodiversity. For this reason, by properly applying the forest planning system as well as forest certification systems offered by third-party institutions, the government will cooperate with relevant entities to promote thinning and other measures to properly manage forests resulting from revitalization of the forestry and lumber

industry.

The environment-dependent fishery industry is greatly influenced by conditions of the blessings of the sea, rivers, lakes and marshes, thus making it important to always maintain sound ecosystems (the basis of productivity) and conserve biodiversity in those regions. The coastal areas of our country are closely associated with human activities, such as the long-time practice of collecting shellfish and seaweed. Coastal sea areas where high productivity and rich biodiversity have been conserved through modification, while maintaining harmony with natural ecosystems are known as Satoumi areas—the marine counterpart to Satochi-Satoyama areas. It is thus necessary to conserve such areas continuously into the future. The government will promote the establishment of vigorous fishery activities and revitalized fishing villages by implementing activities for the conservation and sustainable use of biodiversity in all ocean areas including Satoumi areas, so that people can enjoy a stable supply of marine products, which have played an important role in Japanese eating habits, and will continue to do so over many years to come.

〈Creation of spaces fostering diversified wildlife〉

The conservation of species unique to communities and ecosystems in order to avoid extinction is an issue of utmost priority in terms of preventing the degradation of species diversity. For this reason, the effectiveness and progress of the Law for the Conservation of Endangered Species of Wild Fauna and Flora will be examined, with effective steps later being taken. For example, species in danger of extinction will be identified, the factors threatening those species analyzed, and then the necessary steps taken for improving the situation as clarified for each species. Furthermore, the effectiveness in terms of protection afforded by the system designating “national endangered species of wild fauna and flora” will be examined. In cases deemed effective, efforts will be stepped up; in cases where measures have been insufficient, the reasons will be analyzed and effective conservation measures clarified for each species.

To further mitigate the risk of extinction, we must focus on individual species and also study the possibility of identifying important areas and giving priority to steps to be taken in those areas. Particularly important areas for conserving biodiversity at such “hot spots” as island areas where endangered species are concentrated shall be identified, with the systems/techniques for preserving or restoring the biodiversity of entire regions being studied in cooperation with relevant local parties. Promoting the protection, breeding and return to the wild of the Japanese crested ibis, white stork, Tsushima leopard cat and Okinawa rail is particularly important as being symbolic of the activities to create spaces where diversified wildlife can be nurtured. To promote a return to the wild of birds such as the ibis (which depends on broadleaf forests and paddy fields for its habitat) and the Tsushima leopard cat, it is necessary to disseminate biodiversity-friendly agriculture and foster the numerous living organisms they feed on. Organic agriculture using paddy fields flooded in winter or well before the planting season can be seen in many parts of the country, and in the environs of Nagurinuma (famous for its white-fronted geese) in Miyagi Prefecture, diversified forms of wildlife are thriving as a result of such efforts. As practiced in Sadogashima in Niigata

Prefecture, where activities for helping white storks return to the wild are being promoted, spaces to nurture not only the living organisms on which rare species feed but also more diversified forms of wildlife will be created in cooperation with local community residents.

Alien species jeopardizing the existence of native species should be subject to control measures. To curb the influence of such widely ranging species as the raccoon and largemouth bass, more effective control measures will be developed and disseminated to as many communities as possible. On the island of Amami Oshima, the small Indian mongoose introduced by humans has had invasive effects on Amami rabbits and other rare species. The ongoing implementation of control measures has proved successful, and efforts aimed at exterminating this mongoose will continue. To prevent the extinction of wildlife indigenous to island regions, measures are necessary to prohibit the introduction of alien species from outside the islands. Therefore, measures to inhibit the movement of alien species within the country will be examined. Moreover, measures to prevent the unintentional introduction of alien species or other non-invasive species along with raw materials will also be examined.

<Comprehensive efforts to achieve a low-carbon, sound material-cycle society in harmony with nature>

The benefits of biodiversity depend on the production of organic matter through photosynthesis, the food chain, natural degradation, the movement of individual species and other phenomena caused by the organisms themselves, as well as the recycling of matter between the earth's atmosphere, water and soil. Moreover, forests and grasslands store carbon that mitigates global warming, and the proper use of these biomass resources helps curb the use of fossil fuels.

In order to maintain these processes of recycling life and matter, and combat global warming, it is important to consider the synergistic effects, including the conservation and sustainable use of biodiversity, curbing the consumption of natural resources, reducing the burden imposed on the environment, and work in a comprehensive manner for promoting the construction of a low-carbon, sound material-cycle society that can exist in harmony with nature.

In order to prevent the loss of natural habitats associated with the exploitation of resources and ensure that the proper cycle of matter in the natural world is maintained, we shall control the volume of non-renewable fossil fuels and mineral resources used, curb the amount of final waste disposal, and promote the sustainable use of naturally renewable biomass.

In order to control the volumes of fossil fuels and mineral resources used and the waste disposed, we shall promote longer lifecycles of products manufactured with new resources from nature, as well as the reclamation of discarded products for recycled materials or energy recovery.

Regarding the use of biomass, we shall promote the use of biomass resources derived from lumber/wood from forests that are properly managed and protected. We shall also advance the use of hitherto unused natural resources, such as rainwater in urban areas, rice straw from rural areas, and grass/wood resources that can be gathered from properly managed Satochi-Satoyama areas.

3 Securing linkages among forests, the countryside, rivers and the sea

The forests and the sea are linked by rivers. The transfer of dirt and sand through this interconnected network forms tidal flats and sandy beaches, and the nutritive salts supplied from forests nurture living organisms including fish in the rivers and sea, thus creating rich Satoumi areas. Nutritive salts from the sea are carried to forests by salmon migrating upstream to mate. In countryside areas, a network has been formed that involves rivers, wetlands, paddy fields, and such man-made water systems as reservoirs and channels, and the fish use such a network for their movement. In view of securing such a linkage of places that serve as the basis of inhabitation for living organisms, the government seeks to construct an ecological network that links communities having a natural environment to be conserved over many years or excellent natural conditions in an organized manner, thereby actively promoting the conservation and restoration of forests, countryside areas, rivers, and the sea as a continuous space of various scales from the perspective of managing the ecosystems of entire reaches.

〈Ecological network and protected areas, and restoration of nature〉

In order to ensure the stable retention of biota unique to a community or restore damaged biota, it is important to construct an ecological network of protected areas having ample sizes in which habitats are properly linked and arranged according to the ecological characteristics of each living organism. By further examining the method of planning and materializing the construction of such an ecological network, and promoting information exchange and PR activities, preparations for developing such a plan and implementing actual undertakings will be made for various network scales (at the nationwide, wide-area, prefectural and municipal levels). As it is particularly important to demonstrate the ecological network at a wide-area level in a concrete manner, the method of visualizing the ecological network will be examined in close cooperation with the ministries and agencies concerned. In so doing, constructing a network in terms of water systems involving rivers, lakes, marshes, wetlands, floodplains, groundwater, spring water and paddy fields, and one in terms of the water cycle in coastal areas is important in addition to the network of forests and open green spaces. Therefore, measures to effectively promote the conservation of ecosystems in the entire reaches of a river and the construction of networks will be examined. It is important to construct networks in urban areas as well by connecting greenery and water environments using ecological corridors. For this reason, we will preserve, create and restore green areas—the foci of urban ecosystems—and promote the construction of water and greenery networks.

Less developed, deep mountain areas are also important as part of the framework of a nationwide ecological network. Natural parks including national and quasi-national parks, which are mainly composed of mountainous backbones, cover more than 14% of the nation's total land area, and serve as the foundation of conserving biodiversity in Japan. Steps shall be taken to protect sites of excellent natural landscapes in the natural parks by enlisting the help of various entities. In response to changes in the natural environment and social conditions, as well as

diversified evaluations of landscape, the quality of national and quasi-national parks will be checked from a comprehensive viewpoint, with their designations being reviewed for reorganization by taking the construction of ecological networks into consideration. During this process, “laurel forests,” “Satochi-Satoyama areas” and “sea areas” will be evaluated on a priority basis as places having excellent natural landscapes. Among others, the laurel forests of the Amami Islands in Kagoshima Prefecture and in the Yanbaru district in Okinawa Prefecture will be subject to conservation and management measures, with an eye toward designation as a national park or forest reserves. For marine areas, the seagrass/seaweed beds, mudflats and coral reefs that are at the heart of biodiversity in broad sections of the sea will be considered with respect to distribution, ocean currents, and connections with the land, and the designation of “marine park zones” of national and quasi-national parks shall be expanded. Constructing an ecological network having a nationwide framework requires coordination among various systems. With this in mind, such measures as designation as a forest reserve and green corridor, and conversion into a broadleaf forest will be taken to diversify forests in efforts toward conserving and restoring forests.

A fragmented ecological network should be restored. By actively promoting various activities, including the restoration of nature based on scientific findings in order to protect hot spots and secure the network, the securing of spaces for inhabitation and growth, and ecological corridors to link those spaces will be pursued.

Also, in order to maintain or restore healthy ecosystems in national parks and protect them from damage caused by the grazing and bark-stripping by deer, the animals must be captured or protective fences erected.

The restoration of nature will be pursued in an effective manner pursuant to the Basic Policy for Nature Restoration, which was revised in 2008. Broad-scale measures will be strengthened, and natural environmental education and research promoted, with restoration projects being advanced with due consideration given to ecological networks and other aspects of national land policy.

In order to manage watershed ecosystems in their entirety and facilitate efforts at the community level, support shall also be given to local public authorities for assisting them in formulating regional biodiversity strategies, to efforts toward constructing ecological networks in communities, and to nature restoration projects.

〈Conservation and maintenance of forests〉

Japan is a country with rich green forests that cover two-thirds of the country’s total land area, and which constitute an important component of ecological networks.

Existing Japanese forest resources are about to enter a usable stage with the artificial forests planted after World War II accounting for a major proportion. In these artificial forests, conducting such maintenance measures as thinning at proper stages of growth, and creating diversified forests of different ages through cutting and renewal will ensure sound growth as well as the conservation of biodiversity. At the same time, the effective use of lumber (friendly to

both humans and the environment) will lead to the formation of a sound material-cycle society, the prevention of global warming, and a revitalization of mountain villages. Therefore, the use of lumber should be further enhanced. In case of secondary forests, maintenance and preservation should be properly conducted by utilizing the forests as resources according to needs of the community. Natural forests should also be properly preserved and maintained in response to the social needs of natural environment preservation. It is important to properly manage different types of forests such as artificial, secondary and natural forests depending on local natural conditions and local needs, and properly locate forests for the formation of ecological networks.

As forests constitute an important component of biodiversity, the measures to maintain and preserve forests should be implemented from a comprehensive point of view, so that forests can fully perform their multi-faceted functions, including the conservation of biodiversity. To promote the appropriate thinning in mature artificial forests and the creation of diversified forests through the expansion of laurel forests and long-term logging programs suited to location-related features, the government will unveil its “National Initiative of Creating Beautiful Forests” as an extensive collaborative undertaking to be carried out with the understanding and cooperation from a variety of entities. This initiative will comprehensively promote the utilization of domestic lumber, the training of forestry workers, and community revitalization.

〈The conservation and restoration of open green spaces in urban areas, and other issues〉

Because human activities are concentrated in urban areas, the natural habitats for diverse creatures are rapidly disappearing. Over half of the world’s population lives in urban areas, and since these areas are centers of economic activity, the problems facing urban areas and biodiversity will become increasingly important worldwide, thereby requiring a more aggressive approach.

The open green spaces in urban areas that include small forested and grassy areas are not only vital to organisms that live and grow in urban spaces, they are also extremely important for urban residents as familiar places to commune with nature. These spaces are linked to forests and the sea, and play a central role in the ecological networks of urban areas where many people live.

To retain rich biodiversity in an urban area, areas of a substantial scale must be secured as habitats for living organisms to serve as the core of open green spaces, with due consideration given to the original features of natural environments in those areas. The government seeks to secure large-scale open green spaces worthy of being called forests inside urban areas or in seaside areas, by preserving and restoring green spaces and creating parks by learning from the example of Meiji-no-Mori, where an artificially created forest now has rich biodiversity. The government will also go ahead with initiatives to create more green spaces by using both privately- and publicly-owned land, connect those green spaces to marine environments through ecological corridors, and in so doing secure appropriate levels of greenery in terms of surface area. It also aims to construct a network of water and green spaces inclusive of the micro-topography inside an urban area, thereby seeking to secure thriving habitats for living organisms.

In order to conserve biodiversity in the environs of urban areas, it is effective to cooperate

with urban residents who are highly conscious of the natural environment, or private enterprises doing business in urban areas. Therefore, the government will support conservation and management activities led by groups of urban residents such as the National Trust, or activities to preserve and manage green areas promoted by private enterprises in cooperation with NGOs by utilizing the land they own. And in order to encourage businesses to participate in such activities and increase the levels of willingness to participate, the government will initiate programs to assess the greenery conservation and restoration activities undertaken by companies. Moreover, the government will also increase motivation on the part of urban residents and businesses by using a variety of awareness-raising tactics, such as publicizing greenery projects led by community residents.

The waterside spaces in an urban area are important places where urban residents can commune with nature. In order to improve waterside biodiversity and the natural water cycle (both of which have deteriorated substantially), measures developed in terms of volume and quality will be taken in coordination with measures to upgrade the open green spaces. In view of preventing the eutrophication of lakes, marshes and closed water areas to conserve biodiversity in those areas, the amount of pollution flowing from urban areas will be reduced through the advanced wastewater treatment of sewerage.

〈Preservation and restoration of rivers and wetlands〉

Water is the origin of life, and water systems play a central role in the ecological network linking the forests and countryside with the sea.

In the rivers, efforts to improve the river environment have been made so that fish can move upstream and down more easily. In Shiretoko—an area designated as a World Natural Heritage site—internal river structures have been improved so as not to obstruct the migration of white and pink salmon. In improving the river environment for the inhabitation and growth of living organisms as part of ongoing efforts to create rivers with rich nature, ecological networks will be constructed by considering the entire flow of a river into the sea, such as the variability in water volume and flow from the upper to lower reaches, and the flow of dirt and sand.

As in the case of crucian carp (*Carassius auratus grandoculis*) that move between Lake Biwa and nearby paddy fields, some living organisms move among multiple ecosystems in land and water areas, while others like eel and salmon move between the sea and rivers. To secure the continuity of movement, Shiga Prefecture is conducting its “Paddy Fields as a ‘Fish Cradle’ Project” and other activities to restore a water environment that extends from Lake Biwa to nearby paddy fields without interruption. Referring to those examples, the government will construct a network linking rivers, lakes and marshes, wetlands, spring water, reservoirs, channels and paddy fields for allowing the uninterrupted movement of living organisms among these components. In addition, paddy fields flooded for an extended period and floodplains that used to occupy large areas along the rivers are important stopover places for certain species. Such ecosystems in water areas will therefore be preserved and restored.

The wetlands are important habitat areas for various living organisms including water birds, but the ecosystem formed there is among those that are largely deteriorating. Besides preserving such wetlands, the restoration of wetlands and creation of biotopes will be promoted by using land areas for cultivation that have been abandoned and fallow paddies. In addition to water above the land surface, groundwater is also very important. Therefore, the preservation of groundwater and spring water will be advanced.

〈Preservation and restoration of coastal/ocean area〉

Japan is surrounded by the sea on all sides, having many inland seas and inner bays. Its waters extend from a floating ice area in the north to a coral reef area in the south, with cold and warm currents converging therein. The coastal/ocean area is divided into coastal and ocean areas. The coastal area consists of neritic areas containing beaches, tidal flats, kelp coasts and coral reefs, and inner bays having rich biodiversity. The ocean area contains various environments below the water surface down to the deep sea, and is inhabited by various living organisms such as sea mammals, sea birds and fish. It also includes the world's sixth largest exclusive economic zone. The oceans are interconnected beyond national borders through the ocean currents, and their ecosystems have a close relationship with those of the land through the flow of dirt and sand, and supply of nutritive salts. Assuming that water systems in the land area denote the vertical axis of this ecological network, the coastal area denotes its horizontal axis.

The Basic Act on Ocean Policy, which passed the Diet in April 2007, and the Act-based Basic Plan on Ocean Policy passed by a Cabinet resolution in March 2008 specify that the government should take necessary measures to conserve the ocean environment including the biodiversity of marine life. To develop and implement conservation measures, scientific findings on marine life and the ocean environment should be enriched. It is also important to strengthen the collaborative relationship among the ministries and agencies concerned with the ocean, and examine measures to comprehensively conserve and manage the ocean environment.

Fishery has long been among Japan's major industries, and consequently there are substantial findings on fishery resources. Though the National Survey on the Natural Environment and similar surveys conducted to upgrade data on coastal areas, which are important for the conservation of biodiversity in tidal flats, kelp coasts and coral reefs, the data on marine life other than fishery-targeted species remain insufficient. Therefore, the data on the life and ecosystems in coastal areas will be further enriched by extensively conducting another National Survey on the Natural Environment and other studies, and exchanging information among the ministries and agencies concerned. For the overall upgrading of comprehensive data on biodiversity in the ocean, effective and efficient methods of collecting data will be examined, including the form of collaboration among the ministries. As the first step, a natural environment map of the sea area must be prepared.

In order to effectively preserve and restore the vast coastal and ocean areas, it is necessary to fully understand coastal and marine ecosystems, and then implement systematic regulations and

projects based on that understanding. For this purpose, ocean currents and climatic/geographical conditions shall be used to divide marine ecosystems into regional divisions. The initial focus will be on areas important as wildlife habitats or breeding grounds, such as mudflats, seagrass beds, coral reefs, and other divisions that have distinctive characteristics typical of their divisions. Important marine areas will then be selected based on priority in terms of their importance for biodiversity. For each type of ecosystem, the conservation status of important marine areas will be considered along with the degree of necessity for conserving specific areas, based on which the extent of marine areas in need of stronger conservation measures will be determined. These factors will be taken into account when formulating a marine biodiversity conservation strategy, which will include basic policies on how to go about pursuing marine biodiversity conservation in a comprehensive manner. In protecting specific coastal and marine areas, some areas have, for example, been designated as marine park zones or shore protection areas according to the Natural Parks Law or the Seacoast Law, respectively, thereby imposing regulations on the excavation of dirt and sand, and protecting Japan's territory and coastal environments. Based on past efforts, the relevant government ministries and agencies will cooperate in line with the Basic Plan on Ocean Policy, clarify how to select shore protection areas, and then implement those designations.

In a coastal area where land and sea areas meet, ecosystems important for the conservation of biodiversity are formed in tidal flats, along kelp coasts, amid coral reefs and on sandy beaches. However, these ecosystems are easily affected by human activities, and influences from both the land and sea should be considered for the preservation and restoration of those areas. Therefore, conserving the biodiversity of the entire reaches of a river, and preserving, restoring and creating tidal flats, kelp coasts, coral reefs and beaches will all be promoted by taking into account the influences exerted from the land area. The current situation of designating tidal flats, kelp coasts and coral reefs as part of national and quasi-national parks and national wildlife protection areas shows that 40 to 50% of kelp coasts and coral reefs have been designated as "ordinary zones of national and quasi-national parks" (where regulation is relatively lenient). Only 10% of the tidal flats have obtained such designation. More aggressive measures to protect marine areas will thus be taken. For example, national park and quasi-national park designations will be expanded in the future, and areas within national parks that are especially important will be liberally designated and properly managed as marine park zones. In reference to the Comprehensive Sea Area Control Plan for the Shiretoko World Natural Heritage Site, where the conservation of biodiversity in a sea area is being pursued while fishery resources are principally maintained by the self-imposed control of fishermen based on the concept of adaptive management, and the case of sand eel fishery in Aichi Prefecture, where an adaptive no-fishing area has been set to realize sustainable fishery, the government will also examine activities aimed at reconciling the conservation of biodiversity and the multiple uses thereof, including fishery activities under self-imposed resource management based on agreement within the local community, and a method of promoting the conservation of biodiversity in protected sea areas.

In the coastal areas of our country, regional communities have controlled the use and

maintenance of natural resources for many years, as in the case of fishery resource management by fishermen. Even today, resource management is being conducted voluntarily in sandfish fishery activities north of the Sea of Japan by restricting the size of fishnet meshes; moreover, it is essential that local communities take the initiative to preserve coastal areas, so as to make the sustainable use of resources possible. In this way, the preservation of natural coasts, measures to prevent water pollution in closed water areas, and the creation of forests in the upper reaches of rivers should be promoted to restore Satoumi areas—sea areas rich with the blessings of nature that people can enjoy for many years to come.

Wide-area and international activities will also be enhanced with the migration of sea birds and sea turtles in mind, and the preservation of important habitats such as breeding areas, and the development and dissemination of techniques to prevent the bycatch problem will be promoted.

It is also important to prevent marine pollution from influencing ecosystems, and prevent animals from ingesting drifting waste. For this purpose, the conditions of marine pollution in the sea areas surrounding Japan will be continuously monitored, with measures being taken against heavy metals, harmful chemicals and red tide to prevent marine pollution from occurring. Such measures as monitoring the conditions of currents, eliminating the sources of occurrence (through international action if necessary), and providing assistance for a heavily damaged area will be implemented to combat drifting waste at sea, thus contributing to the conservation of biodiversity in the coastal/ocean area.

4 Taking action with global perspective

The biodiversity of our country is linked with those of other countries through the sea and sky. Most natural resources we use are imported from other countries, and consequently we impact the biodiversity of the world. We should have such a global perspective, and recognize that it is our responsibility to take the initiative in conserving the biodiversity of the world in cooperation with other countries.

Because COP10 will be held in 2010 in Nagoya, Aichi Prefecture, many people will be looking for Japan—as the chair and host nation—to act as a leader in the international community. As for the main agenda (i.e., topics of discussion such as post 2010 targets that will affect biodiversity worldwide), Japan is committed to leading international debate and making COP10 a success, and in so doing, will concretely demonstrate unique ways in which it can contribute to international society.

In pursuing the conservation of biodiversity, we will also act from a global perspective by utilizing the benefits of international cooperation, particularly with countries in the Asia-Pacific Region, with which we have had close relationships.

<Contributing to the success of COP10 and the development of a new strategic plan>

COP10 will be held in 2010 in Nagoya, Aichi Prefecture. Japan will act from a global perspective, and as the COP chair, will make COP10 a success. High on the CO10 agenda are

scheduled revisions to the Convention's strategic plan. The direction that future efforts should take based on the Convention will be discussed. Most notably, performance based on the 2010 targets will be examined and post 2010 targets debated. Japan is prepared to exchange ideas with other parties concerning the post 2010 targets, head discussions, and lead international debate at COP10 by proposing targets formulated in Japan. The Japanese proposal aims to promote the ideal of living in harmony with nature among the peoples of the world. The proposal includes indicators to measure targeted progress and concrete techniques for achieving individual targets. By broadly sharing these targets, seeking understanding, and attempting to make biodiversity a mainstream societal issue, Japan intends to help create societies where diverse entities act on their own initiative to achieve those targets.

With respect to discussions of an international framework for Access and Benefit-Sharing (ABS), Japan is committed to adopting a leadership role as the chair nation, so that a framework can be developed that takes into account the current use of genetic resources worldwide, makes access easier, and ensures the fair and equitable distribution of benefits derived from that access in order to contribute to the conservation and sustainable use of biodiversity. Regarding discussions of "liability and redress" at the 5th Conference of the Parties/Meeting of the Parties to the Cartagena Protocol (COP-MOP5) to be held prior to COP10, Japan will join the deliberations as chair to the meeting and work to ensure that the end result is something that all the countries, each having their own stance on the issue of living modified organisms, may implement.

In order to make COP10 successful, facilitating a broad engagement by NGOs and civil society at large is important. To this end, we will hold a "CBD/COP10 Multi-Stakeholder's Roundtable Meeting" with wide-ranging parties participating, and set up additional forums for dialogue throughout the country in hopes of exchanging ideas and promoting cooperation and collaboration among diverse entities, including NGOs.

The City Biodiversity Summit 2010, which is scheduled to be held in conjunction with COP10, will afford a unique opportunity for local public authorities, who play a vital role in conserving biodiversity at the community level, to get together, reaffirm the importance of their efforts, and form partnerships with one another. Japan shall support the efforts made by local governments so that community-based biodiversity conservation efforts may gain more momentum as an international movement.

It is also important to use COP10 and the "International Year of Biodiversity" as opportunities to get economic associations to increase their level of engagement. In cooperation with the Japan Economic Federation, the government is developing frameworks (such as the "Business and Biodiversity Initiative") under which Japanese companies voluntarily involved in the conservation and sustainable use of biodiversity can demonstrate their activities to the entire world.

Japan shall serve as the COP chair until COP11 in 2012. As the chair nation, Japan will serve in an international leadership capacity for this duration, and thereafter continue being a source of information domestically and internationally on forward-thinking steps being taken here that involve the conservation and sustainable use of biodiversity. It is also incumbent upon Japan to lead

international efforts to achieve the post 2010 targets.

〈Constructing and communicating common global philosophies on the sustainable use and management of natural resources in Satochi-Satoyama and similar areas〉

Japan has its own view on nature developed in the monsoon climate, which blesses the country with much rain and four distinct seasons. The Japanese people, over centuries of agrarian life, have accumulated diverse, deep wisdom and traditions on how to peacefully coexist with nature. Our ancestors taught us how to foster nature by using it rather than leaving it untouched, in order to protect it.

In Satoyama, for example, the use of compost and fuel collected there was strictly restricted based on the commons. They were considered the common resources of local residents, and the place, period and even the method of collection were dictated and strictly controlled by a self-governing regional organization in view of using the commons for an extended period of years into the future. In the sea areas, such cases can be seen even today where fishery resources are under strict control of community organizations. Compared to the restrictions imposed by law, in some cases such community-led, self-imposed efforts can be more effective in preserving and managing biodiversity. Given Japan's limited amount of land, the management of resources and resultant sustainable use thereof has led to the conservation of biodiversity. The government will reexamine traditional modes of coexistence with nature with a view to implementing those modes in modern society as a *new* system of cooperative use and management of natural resources, along with the participation of various entities including urban residents, private enterprises, NGOs and local community residents, by incorporating the perspective of recycling of resources, and the revitalized use of ecotourism and biomass.

Examples of the sustainable use and management of resources in Japan's Satoyama areas can also be seen throughout the world. At the same time, in many places around the globe, the overexploitation of resources and growing population have made sustainable use and management impossible to achieve, a fact that threatens the livelihoods of many people. This problem is being exacerbated by the effects of abnormal weather associated with climate change on crops, as well as food crises brought on by skyrocketing grain prices.

For these reasons, the government will work to develop common global philosophies on the sustainable use and management of natural resources. Knowledge developed in Japan on how to live in harmony with nature will form the basis, but examples and traditions from other countries will also be examined. The basis for these philosophies can be summed up by the following three ideas: "the accumulation of knowledge on how people can live in harmony with nature," "the fusion of traditional wisdom with modern scientific knowledge," and the "creation of new 'commons'" where resources are collectively managed by people of the local community. The government will also present guidelines on realizing, and promote efforts based on these ideals. Under what is called the "SATOYAMA Initiative," Japan will present these ideas to the international community and use COP10 as an opportunity to seek support and participation from

diverse entities, and develop a framework for reaching an international consensus. By promoting the Initiative worldwide, Japan hopes to contribute solutions to certain problems mentioned above.

Projects based on the “SATOYAMA Initiative” have the potential to contribute to stable supplies of food and fuel by raising the stability of local ecosystems in the face of climate change, thereby contributing to higher standards of human welfare.

It is also important to communicate to the world Japan’s unique style of coexistence with nature in a clear manner. Among others, the Japanese system of national parks, which promotes the handing down of beautiful nature to future generations while enhancing the coexistence between nature and the local community, the beautiful forests symbolic of the harmony between conservation and use, and other examples of Japan’s forward-thinking initiatives involving sustainable modes of agricultural, forestry, and fisheries industries will be introduced to countries of the world. The government will lend support to Asian and other countries according to the social conditions of local communities there.

〈Implementation of comprehensive assessment and monitoring the effects of global warming on biodiversity〉

According to past global biodiversity assessments, it has become clear that, regarding many indicators measuring the pace at which biodiversity is being lost around the world, the downward trend has yet to be reversed, and the 2010 biodiversity target of substantially reducing the rate of biodiversity loss will unlikely be met. In order for Japan to contribute to the set targets, it must know precisely where its own levels of biodiversity stand, to what extent the conservation measures have progressed, and what effects have been produced, in addition to such international assessment attempts. The national strategies are checked every year, with the progress of measures being reported. Using 2010 as the base year, a comprehensive assessment will be conducted based on scientific findings while taking into account the socioeconomic aspects, in order to gain an overall outlook of our country’s biodiversity. For this purpose, the indices used to measure the conditions of biodiversity in our country and the effects of measures taken in a comprehensive manner will be developed in cooperation with the ministries concerned. Then, by using these indices, the risk conditions of biodiversity can be visualized in the form of a map. Important areas in terms of conserving biodiversity (“hot spots”) can then be identified on the map to implement conservation and restoration measures on a priority basis. Such an attempt to conduct a comprehensive assessment of biodiversity at a national level has rarely been seen in the world, and Japan will call for similar attempts among the G8 countries, in hopes that this approach will eventually be used extensively throughout the world in the future. In addition, technical support will be extended to the Asian-Pacific region, including cooperative efforts to collect basic data on the natural environment by using earth observation satellites, with a view toward achieving a remarkable reduction in the rate of global biodiversity loss. In order to fully utilize COP10 in 2010 as an opportunity to promote the conservation and sustainable use of biodiversity, Japan will work to further improve legal mechanisms under the aegis of the Basic Act on

Biodiversity, and allow for stronger, more organic ways to use different legal systems in tandem.

In order to conduct a comprehensive assessment on an ongoing basis, data on the natural environment must be improved and continually upgraded, and with methods of quickly reporting the results being enhanced. To this end, the conditions of Japan's natural environment will be continuously monitored by implementing Monitoring-Site 1000. Among others, currently lacking data on the inhabitation conditions of medium-size to large mammals, data on living species and ecosystems in the ocean/coastal area, and data on the expansion of bamboo forests in Satochi-Satoyama areas will be collected on a priority basis. Through these measures, a comprehensive ecosystem monitoring system designed to detect changes in ecosystems and monitor the effects of global warming will be established, and by using this system in combination with prediction techniques, preventive conservation measures will be implemented.

The representatives from relevant government ministries and agencies, research institutions, and ordinary citizens with existing information on biodiversity will also come together to establish complementary methods of management. It is hoped that this approach will act as a sensor able to detect changes in biodiversity, including those brought about by global warming. The government is now studying the functions and mechanisms necessary to make such an arrangement work.

It is important to properly monitor the progress of the national biodiversity strategy so that future revisions or improvements to individual aspects can be made. For this purpose, the government will establish indices/indicators that will play an important part in measuring the progress made toward the goal of preventing the loss of Japan's biodiversity.

〈Mitigation of global warming from the perspective of biodiversity and adaptation to its impact〉

Global warming has become an established fact. At COP9, it was decided that the Framework Convention on Climate Change and Convention on Biological Diversity would be used in tandem, and that a group of experts would be established to provide advice on matters concerning the Framework Convention on Climate Change, with various strategies to do so being considered by specialists all over the world. Moreover, at the 2009 G8 Environment Ministers' Meeting and G8 Summit, agreement was also reached among the parties to promote efforts contributing to both solutions to global warming and the conservation of biodiversity, and aggressively pursue adaptive global warming measures.

Based on the fact that conserving the sound ecosystems of forests, grasslands, peat marshes and other wetlands, and the soil that secures a large amount of carbon will inhibit the release of greenhouse gases, efforts to help mitigate global warming and measures to conserve and sustainably use biodiversity will be promoted.

The functions of forests—a major one being absorbing greenhouse gases—are effective in mitigating global warming, in addition to conserving biodiversity. Upgrading and preserving forests will be promoted so that forests can fulfill their functions to the fullest extent. Moreover,

vegetation-derived biomass produced as a result of ecosystem management efforts to conserve rich biodiversity, such as the thinning of artificial forests, control of secondary forests, mowing along the waterside, and grazing in secondary grasslands, will be used extensively as an alternative form of energy instead of fossil fuels. This will also lead to the revitalization of local industry.

It is important that effective and efficient adaptive steps to manage the impact of global warming be studied and a consensus formed, before it becomes a serious issue in many parts of the country. Adaptation measures will be examined from the perspective of conserving biodiversity, including enhanced monitoring to incorporate the impact of global warming, surveys on ecological networks highly adaptive to environmental change including climate change, and key points on conserving and restoring sound ecosystems. Islands, alpine regions and other ecosystems that are vulnerable to the effects of global warming may be susceptible to sudden but irreversible changes due to the progression of global warming. Based on the notion that factors other than global warming that might worsen its effects should be eliminated, protected areas will be established, endangered species protected, and their populations increased in size, with more aggressive steps taken to deal with alien species. The government will work at these improvements in order to maintain ecosystems in a healthy state, so as to better able to withstand the effects of global warming.

〈Promotion of international cooperation〉

The year 2010, in addition to being the year that Japan hosts COP10, has also been declared by the UN as the “International Year of Biodiversity.” As Japan is the host and chair nation, many are hoping that Japan will contribute more to the global community.

Japan will strengthen the avenues for international cooperation concerning biodiversity issues in order to help developing nations, including nearby countries in Asia, achieve the post 2010 targets.

In order to conserve the habitat environments of animals migrating beyond national borders, it is necessary to foster international cooperation rather than attempting to achieve it single-handedly. It is also necessary to conserve areas already rich in biodiversity by promoting conservation measures from a global perspective in the form of international efforts.

As a part of efforts in this context, Japan will take the initiative in the fields of preserving coral reefs, seagrass beds, tidal flats and other wetlands, and the conservation of migratory birds in the Asia-Pacific region by holding the International Reef Protected Area Network Conference, and establishing a network in East Asia and surrounding areas for important coral reefs, while utilizing such frameworks as the International Coral Reef Initiative (ICRI), the Partnership for the East Asian-Australasian Flyway, the conventions and agreements for the protection of migratory birds, and the Ramsar Convention. In such fields as the management of protected areas including national parks and collecting data on the natural environment, we will also establish bilateral and multilateral networks, enhance international collaboration, lend support to fostering human resources, provide relevant information, and promote the SATOYAMA Initiative.

To support biodiversity conservation measures in developing countries, we will continue our

assistance by running the Global Environment Facility (GEF)—the original fund managing mechanism of the Convention on Biological Diversity and one in which Japan currently participates as a major donor. We will consider continuing our support of the Critical Ecosystem Partnership Fund (CEPF) that supports NGOs conducting activities to conserve “biodiversity hot spots” (areas especially rich in living species and which face a critical condition) in developing nations.

From a global perspective, the state of biodiversity is deteriorating due to the destruction of forests for expanding agricultural land, as well as illegal logging, desertification and similar factors. Recognizing that Japan imports a major proportion of such resources as food and lumber from overseas, we should contribute to the conservation of biodiversity on a global scale. For that purpose, we will actively participate in discussions at the Food and Agriculture Organization (FAO), United Nations Forum on Forests (UNFF), International Tropical Timber Organizations (ITTO), United Nations Convention to Combat Desertification (UNCCD) and Asia Forest Partnership (AFP), and promote international cooperation in connection with sustainable forest management, including measures against desertification and illegal logging. Japan will also actively engage in debate on ways to address such climate change issues as Reducing Emissions from Deforestation and Forest Degradation (REDD), in order to do its part in contributing to the conservation of biodiversity.

<Strengthening links between science and policy, and developing better scientific foundations>

In order to properly implement policy decisions concerning biodiversity, it is important for specialists to make assessments based on the latest scientific findings and share those results with the larger world. Japan will actively join international deliberations over establishing the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which has been called the biodiversity equivalent of the Intergovernmental Panel on Climate Change (IPCC), in the hopes of helping to make it a more effective, science-based framework.

Accurately measuring the value of biodiversity is extremely important when considering sustainable modes of use. In order to work on and cooperate with the coordinating work done as part of the protocol for the Economics of Ecosystems and Biodiversity (TEEB)—a global initiative to economically analyze the loss of biodiversity and ecosystem services—Japan will promote policy research related to economic evaluations of biodiversity, and based on the findings of such research and trends in the global debate, explore the kinds of policy options that are available.

There are also attempts underway to construct and improve international scientific information infrastructures related to biodiversity. Japan shall cooperate in improving existing initiatives on global biodiversity data infrastructure, such as the Global Biodiversity Information Facility (GBIF), the Group on Earth Observations Biodiversity Observation Network (GEO BON), and the International Long Term Ecological Research (ILTER) network.

Japan enjoys a relative wealth of biodiversity-related information systems and human resources. By utilizing these strengths and hosting international workshops, meetings of experts, and other conducting activities, Japan supports the priority construction of a biodiversity monitoring network

in the Asia Pacific region. Domestically, by cooperating and collaborating with JBON (established in May 2009 by leading researchers), the government is constructing networks to handle information about biodiversity in Japan.

It is important for countries to collect and organize information concerning biodiversity in formats that allow levels of biodiversity to be assessed, national biodiversity strategies to be formulated and regularly reviewed, and methods for the conservation and sustainable use of biodiversity to be studied. Developing nations in particular must improve their capabilities in taxonomy and related fields at the foundations of these faculties. To this end, Japan is cooperating with governments and relevant institutions in East and Southeast Asia to assist in making decisions regarding the conservation and sustainable use of biodiversity in those countries, and encouraging greater engagement in the East and Southeast Asia Biodiversity Inventory Initiative (ESABII) being set up to collect and catalog important endangered species information, such as population data, sponsor workshops on taxonomy, and conduct other ancillary activities.

Part 2 Action Plan

Preface

Part 2 systematically and comprehensively describes the specific measures and policies aimed at ensuring the conservation and sustainable use of biodiversity, in the form of the government's action plan up to around FY 2012. Since the measures and policies addressed here cover a wide range of areas, all are categorized and compiled for each area.

Chapter 1, "Measures and Policies for National Land Area" consists of two blocks. The first block specifies nationwide and other wide-area measures under the title of *Measures and Policies Based on Wide-Area Coordination*, which is divided into four sections: "Ecological networks," "Conservation of Priority Areas," "Nature Restoration" and "Agriculture, Forestry and Fisheries." The second block describes measures in line with the characteristics of individual regions under the title of *Regional Space Measures*, which is divided into five sections: "Forests," "Countryside and Satochi-Satoyama Areas," "Urban Areas," "Rivers and Wetland Areas" and "Coastal Areas and Marine Areas." Chapter 2, "Cross-Sectoral and Fundamental Measures and Policies," has eight sections: "Conservation and Management of Wildlife," "Sustainable Use of Genetic Resources," "Communication and Implementation," "International Approach," "Information Management and Technology Development," "Efforts against Global Warming," "Efforts to build a Sound Material-Cycle Society and Low-Carbon Society," and "Environmental Impact Assessment." In total, Part 2 has 17 sections.

The ministries and agencies concerned wrote about the respective sections for which they should be responsible, by way of a readable standard format indicating *Basic Concepts* at the beginning of each section, and describing *Current Situation and Challenges* and *Specific Measures and Policies* for each topic.

Specific measures and policies are itemized with the contents of measures and policies to be implemented, and the ministries and agencies in charge of implementation clearly indicated. Numerical targets are also set if possible so as to make descriptions more concrete.

Part 2 gives a total of about 720 specific measures and policies. In the process of implementing these measures and policies, the ministries and agencies concerned will enhance their cross-sectoral coordination efforts, as well as coordination with various other parties such as local public governments, private enterprises and NGOs to be involved in the measures and policies, while encouraging their voluntary efforts. In addition, with the goal of contributing to the conservation and sustainable use of biodiversity on a global scale, attention will be paid to ensure that Japan can show leadership in the international community in this field.

The measures and policies specified in Part 2 will be upgraded and enhanced if necessary, while considering changes in the circumstances surrounding biodiversity that may occur at home and abroad up to around FY 2012, as well as the progress made in implementing individual measures and policies, including the achievement of numerical targets, as identified through annual reviews.

The table below indicates the relationships between the sections of Part 2 and the four “basic strategies” (main directions for measures and policies to be focused on) shown in Part 1, Chapter 4, Section 2. Among the sections of Part 2, those marked with a circle are closely related to the respective basic strategies based on the descriptions of topics contained therein.

Chapter 1 Measures and Policies for National Land Area

[Part 2] [Part 1] Basic strategies	(Measures and Policies Based on Wide-Area Coordination)				(Regional Space Measures)				
	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
	Ecological Networks	Conservation of Priority Areas	Nature Restoration	Agriculture, Forestry and Fisheries	Forests	Countryside and Satoyama Areas	Urban Areas	Rivers and Wetland Areas	Coastal Areas and Marine Areas
(1) Mainstreaming biodiversity in our daily life				○					
(2) Rebuilding a sound relationship between humans and nature in local communities				○	○	○	○	○	○
(3) Securing linkages among forests, the countryside, rivers and the sea	○	○	○	○	○	○	○	○	○
(4) Taking action with a global perspective	○			○					

Chapter 2 Cross-Sectoral and Fundamental Measures and Policies

[Part 2] [Part 1] Basic strategies	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8
	Conservation and Management of Wildlife	Sustainable Use of Genetic Resources	Communication and Implementation	International Cooperation	Information Management and Technology Development	Efforts against Global Warming	Efforts to build a sound material cycle society and low-carbon society	Environmental Impact Assessment
(1) Mainstreaming biodiversity in our daily life			○		○		○	
(2) Rebuilding a sound relationship between humans and nature in local communities	○	○	○				○	○
(3) Securing linkages among forests, the countryside, rivers and the sea								○
(4) Taking action with a global perspective	○	○	○	○	○	○	○	

Chapter 1 Measures and Policies for National Land Area **(Measures and Policies Based on Wide-Area Coordination)**

Section 1 Ecological Networks **(Basic Concepts)**

In order to promote the stable survival of regional biota and the restoration of species with reduced populations, and achieve a country where biodiversity is secured for the future, we must organically link zones with natural environments subject to conservation or with exceptional natural conditions into ecological networks where habitats are connected together and properly distributed. This effort is expected to produce various effects, including not only the protection of wildlife habitats but also the provision of attractive landscapes and opportunities for interaction between humans and nature, mitigation of climate change, improvement of urban and water environments, and preservation of national land. In the context of species of wildlife adapting to climate and other environmental changes, paths for their movement and dispersal must also be secured to increase the probability of survival.

In forming an ecological network, we need to consider regional ecosystems, including those with virgin nature areas as the cores. Habitats in natural mountain areas, Satochi-Satoyama (secondary nature) and rural areas, urban areas, coastal areas and oceanic areas should be organically linked vertically and horizontally through rivers, roadside greenery and beaches.

White-fronted geese and other migratory birds fly across national borders. Bears move across prefectural borders. Frogs shuttle between forests and wetlands. Wildlife habitats and ranges of movement are thus very diverse. Therefore, a network should be considered for each species of wildlife at international, national, wide-area, prefectural, municipal and other levels. In this respect, the hierarchical relations between these levels, administrative units, and a geographical combination of river basins including coasts, mountains and hills should also be considered. In addition, preventing the spread of alien species should be taken into account, along with how best to secure an appropriate distance between wildlife and humans, in order to avoid damage caused by wildlife to the agriculture, forestry and fishery industries.

1 Promoting the formation of ecological networks **(Outline of Measures and Policies)**

Habitat clusters will be properly located and preserved as the core areas of ecological networks and their buffer zones with the outside world, in order to ease mutual impact. At the same time, ecological corridors will be secured to connect these wildlife habitats for enabling the dispersal and movement of wildlife, promoting

interaction between wildlife populations, and conserving species and genetic diversity. In this way, ecological networks will be formed. In a nationwide ecological system, for example, Satochi-Satoyama and country sides located between natural mountain regions and urban regions can serve as buffers to ease the impact that human activities in urban regions have on core areas of virgin nature. Well-managed Satochi-Satoyama and rural areas can not only contribute to forming fauna and flora specific to secondary nature but can also be considered appropriate buffer zones between wildlife habitats in deep forest areas and human residential areas, thereby helping to prevent damage in residential areas caused by wildlife.

The 21st-Century Environment Nation Strategy, the Basic Environment Plan, the National Land Plan and other measures have pointed to the significance of conserving and restoring nature through the formation of ecological networks.

Ecological networks should be formed at various levels, ranging from a nationwide natural environment conservation framework based on global or cross-border ecosystems to a wide area covering multiple prefectures and municipalities as familiar living areas. These networks should also be multilayered. Therefore, nationwide, wide-area, prefectural and municipal network schemes and plans should be interrelated, put into a hierarchical framework, and considered by using scientific knowledge. The relevant central government ministries and agencies should cooperate in conjunction with local governments, non-government organizations, business enterprises, and researchers in forming these networks at various levels.

1.1 Formation of ecological networks (Current Situation and Challenges)

We must develop methods of forming ecological networks, work out schemes and plans at various levels, and implement effective projects. For this purpose, the Exploratory Committee for National Ecological Network Initiative discussed the formation of a national-level ecological network in FY 2008. Some advanced regions have begun planning and implementing relevant projects.

In forming ecological networks, we must consider creating buffer zones to ease the reciprocal influence between nature and humans, including the influence of human activities on the core of virgin nature (human influences on nature) and damage caused by wildlife to farm products (natural influences on humans). We should also consider enhancing the continuity of ecosystems to prevent the spread of alien species.

A decline in wetlands for migratory birds, the division of habitats through development, and cross-river structures impeding the run of fish and other marine life may lead to the contraction and depletion of natural habitats, and less genetic diversity among the various populations, thereby posing problems for the conservation of biodiversity. More efforts are therefore required to address these problems.

(Specific Measures and Policies)

- The government will promote the formation of ecological networks at national, regional, prefectural, municipal and other levels by studying and considering methods of planning and achieving ecological networks, by assessing and examining the effects of existing networking measures and projects, providing local governments, wide-area councils, non-government organizations and other parties concerned with information for planning such networks, and enlightening them about such planning. (MLIT, MOE, MAFF)
- Given the importance of demonstrating specific pictures of ecological networks at wide-area and other levels, the relevant government ministries and agencies will closely cooperate in mapping such networks. (MOE, MLIT, MAFF)
- The government will discuss time schedules for plans and concepts related to ecological networks at various space levels to be materialized, along with efforts being put into practice. (MOE, MLIT, MAFF)
- In order to secure and conserve zones as cores of sufficiently wide and well-balanced ecological networks, the government will expand protected zones and improve their management under the measures cited in Chapter 1, Section 2, “Conservation of Priority Areas.” The forests that occupy two-thirds of the national land, based on the fact that most animals and plants live and grow there, will be organized and conserved as the base of ecological networks. The government will also attempt to build more finely tuned forest ecological networks by designating “green corridors” to link protected forests into networks, as well as improving protected forests along rivers and ridges. (MOE, MEXT, MAFF, MLIT)
- The government will position the formation of ecological networks and the significance thereof in the Green Basic Plan, river development plans and other plans, in order to enlighten the relevant project operators about the importance of such networks. Relevant measures will be implemented systematically. (MLIT, MAFF, MOE).
- By implementing the measures given in Chapter 1, Section 3, “Nature Restoration,” and Sections 4 to 9, and focusing on geological features such as a river basin, the relevant organizations will work together in a cross-sectional manner and proceed with comprehensive efforts to conserve, restore or create wildlife habitats in forests, farmlands, roads, parks and green spaces, coasts, ports and harbors, fishing ports and sea areas, and secure the continuity of these habitats via migratory routes arranged through improved artificial structures. (MOE, MLIT, MAFF)
- The government will proceed with international cooperation in enhancing ecological networks, such as: international networks of important habitats for migratory birds under the Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian - Australasian Flyway; important

coral reef networks under the International Coral Reef Initiative (ICRI); and networks of marine protected areas subject to international discussions regarding the conservation of migration paths for marine mammals, sea turtles and others that migrate long distances across state borders. (MOE) [Cited in Chapter 2, Section 4, 2.10, 3.1 and 3.2]

Section 2 Conservation of Priority Areas (Basic Concepts)

In order to conserve biodiversity, protected areas and other systems must be created for representative or typical ecosystems and priority areas as habitats reflecting regional biological characteristics for diverse species of wildlife. These systems must secure a sufficient size or scope, proper distribution and regulation, proper management standards, and mutual cooperation based on the characteristics of priority areas for conservation. Systems for designating priority areas for conservation include those that directly aim at conserving exceptional natural areas, including biodiversity. They also include those that aim at protecting cultural properties, conserving national land or creating living environments and contributing indirectly to conserving biodiversity. From the perspective of biodiversity, these systems are insufficient in terms of designation realities, regulations and management standards. Efforts will be made to allow the systems to work more effectively.

To this end, the government will designate and review protected areas based on scientific data so that priority ecosystems and habitats at various levels (ranging from national to regional) can work more effectively as core areas of national ecological networks. As for the national and quasi-national parks that cover a wide portion of the country including mountainous backbones in particular, the government will consider designation standards in view of changes in the natural environment and society, and review and redistribute these parks at the nationwide level. The government will also expand protection and management measures for specific types of ecosystems in areas designated for protection. For protected marine areas where government measures have lagged behind those for protected land areas, the government will utilize the newly established marine park area system, and promote proper protection and use in coordination with relevant organizations.

Some areas designated for protection under domestic law are registered (or cited) as internationally protected areas based on the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) and the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention). For the natural World Heritage sites in Japan, regional liaison councils comprised of relevant administrative agencies and local residents have been created, along with scientific committees consisting of experts on various areas, to form a consensus and implement conservation and management based on scientific knowledge. These actions are said to be Japan's pioneering efforts for protected areas. In particular, by referring to the case of the Sea Area Control Plan for the Shiretoko natural World Heritage site—where the conservation of marine biodiversity is being pursued with fishery resources principally maintained by the self-imposed controls of

local fishermen based on the concept of adaptive management—the government will consider regional consensus-based voluntary resource management efforts and biodiversity conservation measures in protected marine areas, to reconcile the protection of biodiversity with the multiple uses of biodiversity, including fisheries.

1 Conservation under the Nature Conservation Law

(Outline of Measures and Policies)

Conservation areas under the Nature Conservation Law include wilderness and nature conservation areas designated by the central government, and prefectural nature conservation areas designated by prefectural governments.

Wilderness conservation areas are those where nature conservation is particularly required, among areas that remain wild and are sufficiently wide. Under the principle of leaving the areas to natural succession, strict activity regulations and other measures are implemented for conservation.

Nature conservation areas are those where natural conservation is particularly required, among areas that are sufficiently wide. These include forests dominated by exceptional natural forests, exceptional riparian zones such as lakes, rivers, coasts and sea areas, areas having peculiar geographical or geological features, and wildlife habitats. In the areas designated for nature conservation, behavior regulations and conservation projects are being implemented systematically.

Prefectural nature conservation areas are those where nature conservation is particularly required, among areas in close proximity to nature conservation areas. Prefectural governments are responsible for the conservation of these areas.

These nature conservation areas are designed for maintaining the natural environment and are combined with natural parks and other natural environment conservation areas to form the core of national ecological networks, thereby playing a key role in conserving biodiversity.

As for the Nature Conservation Law, along with the Natural Parks Law, necessary measures were discussed based on the current status of law enforcement in 2008. Based on results of these discussions, the Natural Parks Law and the Nature Conservation Law were revised in June 2009. The protection of biodiversity was thus clarified in the stated purposes. The Marine Special Zone System to comprehensively protect both undersea and sea surface areas, and the Ecosystem Maintenance and Recovery Program to actively maintain and restore ecosystems based on the project plan were newly established.

1.1 Wilderness conservation areas and nature conservation areas

(Current Situation and Challenges)

As of March 2010, the government had designated five wilderness conservation

areas (totaling 5,631 ha) and 10 nature conservation areas (totaling 21,593 ha). These areas account for less than 0.1% of Japan's total land and cannot be described as large. The areas do not necessarily cover all exceptional natural environments.

In some of these areas, lower vegetation is eaten by deer, which might cause trouble in conservation of the natural environment, and the effects of global warming on ecosystems are also expected.

In response to the situation above and based on the latest knowledge as well as the Nature Conservation Law that was revised in 2009, the designation of new areas should be promoted from the perspective of conserving biodiversity in all of Japan's national land. As for the areas already designated as nature conservation areas, it is necessary to have better management, such as understanding the current status and changes of ecosystems, and implementing necessary countermeasures.

(Specific Measures and Policies)

- In order to promote the formation of national ecological networks, the government will review the locations and sizes of conservation areas from the perspective of nationwide biodiversity conservation, based on scientific knowledge including data from the nature conservation basic survey and other surveys, and on prefectural nature conservation area designations. As necessary, the government will proceed with efforts to designate new wilderness or nature conservation areas, or expand existing ones. As for nature conservation areas among other things, in response to the revision of the Nature Conservation Law, efforts will be made to designate new marine areas in order to improve marine area conservation policies. (MOE)
- Regarding areas that have been already designated, in response to the revision of the Nature Conservation Law, necessary measures will be discussed and implemented through research and evaluation of the current status of ecosystems in cooperation and coordination with the people involved. The government will also utilize the some research projects such as Monitoring Sites 1000 to monitor ecosystem changes, including those attributable to global warming, and accumulate necessary data. Moreover, the government will continuously check the conditions of conservation and use, set up signs, and enhance patrolling to properly manage conservation. (MOE)

1.2 Prefectural nature conservation areas

(Current Situation and Challenges)

As of March 2009, 537 prefectural nature conservation areas (totaling 76,403 ha) had been designated. In the two years between FY 2007 and 2008, two new prefectural nature conservation areas were designated.

These areas play a key role in securing regional biodiversity through the conservation of ecosystems peculiar to particular regions and habitats for rare species

of wildlife. These regional situations have yet to be grasped on a national basis. Their total size is limited to 0.2% of Japan's total land and cannot be described as large.

(Specific Measures and Policies)

- Since the conservation of natural environments with high naturalness at a regional level is very important for securing diverse ecosystems nationwide, the central government will cooperate with prefectural governments in grasping the situation of nature conservation in designated areas. (MOE)
- The government will provide advice regarding prefectural designation and the management of nature conservation areas as necessary. (MOE)

2 Natural parks

(Outline of Measures and Policies)

Natural parks under the Natural Parks Law are divided into three categories: national parks (29 parks, totaling 2,087,475 ha), quasi-national parks (56 parks, totaling 1,362,030 ha) and prefectural natural parks (312 parks, totaling 1,968,465 ha). (Area sizes are as of March 2010.)

National parks are representative of Japan's exceptional natural landscapes, while quasi-national parks offer landscapes of natural beauty. Both are designated by the Minister of the Environment. Prefectural natural parks represent exceptional prefectural natural landscapes and are designated by prefectural governors under relevant prefectural ordinances.

Natural parks are needed to play an active role as the backbone in order to conserve the biodiversity of our nation. In response to a growing need to improve measures for securing biodiversity in natural parks, the Natural Parks Law was revised in June 2009, and the phrase, "to contribute to securing biodiversity," was added. The Marine Park Zone System and an ecosystem maintenance and recovery program have also been newly established.

While many relevant parties have long cooperated in the management of natural parks as a zoning system in Japan, more proactive management has recently been required with respect to such problems as how to maintain secondary nature and wildlife's influence on ecosystems. Therefore, the government will undertake such efforts as designating marine park zones to promote the comprehensive conservation of both undersea and sea surface areas, operating an ecosystem maintenance/restoration business to maintain and restore ecosystems based on scientific data, and reorganizing the cooperation between various entities in their management operations.

Natural parks have also been utilized for such purposes as human interaction with nature and learning about the environment. In order to deepen public understanding about nature and promote the proper use thereof, the government will develop

opportunities for human interaction with nature and improve the quality of natural park use.

2.1 Designation of natural parks

(Current Situation and Challenges)

National parks and other natural parks are must proactively serve as the backbone for conserving biodiversity. As for mountainous areas extending along abundant natural forests and grasslands of the mountainous backbone, relatively large natural parks are designated to serve as the cores of ecological networks. In order to form nationwide ecological networks where habitats are properly linked and distributed, however, the natural park system must be combined with other measures and policies to play an even greater role in conserving biodiversity.

As for sea areas, marine park zones are designed for maintaining marine natural landscapes. However, these zones of national and quasi-national parks total only 4,057 ha (as of March 2010), accounting for just 0.0094% of Japan's territorial waters. As for marine areas, the government will strengthen its conservation of marine areas by expanding national parks and quasi-national parks, proactively designating important marine areas in the parks as marine parks zones, and promoting the proper management of these areas.

For natural parks, regulations on protection and utilization, and plans regarding enterprises are provided as park plans, on which activity regulations, the development of said facilities, and the enterprises to maintain and recover ecosystems are based. Park plans should therefore be reviewed about every five years, based on data from surveys and the monitoring of natural landscapes, wildlife and ecosystems, as well as on social changes.

(Specific Measures and Policies)

- Based on the natural environment, social conditions, and such changes as the diversification of landscape assessment, the government will consider standards for the selection of national and quasi-national parks, and review all national and quasi-national park designations by FY 2012. Based on that review, the government will realign and redistribute national and quasi-national parks. In the course of such reform, the government will give positive ratings to “evergreen broadleaf forests,” “Satochi-Satoyama areas” and “sea areas” as exceptional natural landscapes. (MOE)
- As for natural forests and natural grasslands (with a vegetation naturalness index of 9 or 10) having a very high degree of naturalness, the government will utilize other protected area systems with the direct objective of conserving the natural environment to gradually designate higher-priority areas as parks for protection, in

- a bid to subject sufficiently wide areas to protection over the long term. (MOE)
- The government will promote the protection of coastal marine areas with rich biodiversity, such as tidal flats, underwater forests and coral reefs not designated as underwater parks. The protection measures include newly designating such marine areas as marine park zones (also stipulated by the revised Natural Park Law) and other measures in considering the connection between marine currents, land areas and the distribution of tidal flats, underwater forests and coral reefs. The government will also review the species of marine life for which catching restrictions are designated. (MOE)
- The government will expand surveys and the monitoring of natural landscapes, wildlife and ecosystems, as well as utilize survey and monitoring data for reviewing park areas and plans about every five years, in order to promote fine-tuned park management. (MOE)
- The designation and proper management of prefectural natural parks as exceptional natural landscapes that represent the relevant regions by prefectural governments are important for conserving biodiversity and providing opportunities for human interaction with nature in areas familiar to the public. The government will continue to give necessary advice to prefectural governments on the designation and management of nature parks. (MOE)

2.2 Protection and management of natural parks

(Current Situation and Challenges)

Natural parks must play a positive role in protecting not only natural landscapes but also wildlife species and their habitats, from the perspective of conserving biodiversity.

Japan's natural parks have been managed as regional natural parks in cooperation with wide-ranging relevant parties. In order to promote positive management including nature restoration and the conservation of Satochi-Satoyama areas, however, natural park management systems must be reconstructed.

Information on the natural environment and other scientific data are still insufficient as a foundation for promoting natural park management. Systems have yet to be sufficiently developed for setting and assessing management standards based on scientific data, reviewing park areas and plans, and improving natural park management methods.

(Specific Measures and Policies)

- For the protection and management of national parks, since 2005 the government has appointed auxiliary rangers, in addition to park rangers for nature protection, to enhance park management operations including patrolling and monitoring, and

proceed with proper protection and management. (MOE)

- The government will promote the efforts of natural park guides and park volunteers to secure the appropriate use and conservation of natural parks. (MOE) [Cited in Chapter 2, Section 3, 3.1]
- Under the Special Programs to Engage the Public in Nature Conservation Activities in National Parks (Green Worker Programs), the government will implement natural environment protection activities including patrolling to prevent the illegal digging of alpine plants, restoring vegetation, and removing alien species, as well as improving management standards. (MOE)
- Under existing mountain environment sanitation and safety programs, the government will improve night soil and effluent treatment facilities at mountain huts and other facilities in natural parks. The government will also implement demonstration tests of night soil treatment technologies effective for mountain areas and provide appropriate information to disseminate those technologies. (MOE)
- In order to build attractive national parks in cooperation with many relevant parties, the government will consider systems and methods for facilitating cooperation between park management participants including the central and local governments, local residents, experts, business enterprises and NGOs, as well as reconstructing management systems for each national park. (MOE)
- In order to promote voluntary natural environment conservation and management activities by local residents and private-sector organizations well-versed in regional nature, the government will designate organizations with a certain management capacity as park management organizations and support their fine-tuned management, thereby meeting local realities. For parts of a park where the landscape or an ecosystem has deteriorated due to insufficient management by landowners, the government will encourage park management organizations to conclude landscape protection agreements with landowners to increase their operations for promoting landscape conservation and management in natural parks. (MOE)
- In areas where damage to vegetation caused by deer is seen at the cores of national parks, the government will adaptively implement such measures as installing vegetation protective fences and capturing deer to regulate deer populations by conducting the ecosystem management work set up by the revised Natural Parks Law, based on scientific data. (MOE) [Cited in Chapter 2, Section 1, 2.3]
- The government will implement capture and other programs to remove alien species that adversely affect ecosystems in national parks by conducting ecosystem management work. As for alien species that are likely to cause adverse effects, the government will work out species treatment guidelines to curtail the penetration or adverse effects of such species and consider risk assessment methods, as well as

imposing restrictions on the release of alien species in special protected areas. As for plant species used for the greening of slopes and other programs in national parks, the government will work out guidelines for the treatment of alien species in consideration of regional biodiversity to promote greening programs. (MOE)

- In parts of national parks where the natural environment has deteriorated or ecosystems have been divided, the government will promote nature restoration programs. (MOE)

2.3 Promoting the use of natural parks

(Current Situation and Challenges)

Natural parks are not only destinations for sightseeing trips but also places for human interaction with nature and learning about the environment. As rare places for citizens to interact with Japan's preserved nature and learn about natural mechanisms, national parks should enhance and expand their roles and functions.

Problems such as deteriorated vegetation or overuse have emerged on natural mountains, islands, plateaus, and in other areas that have virgin ecosystems. Efforts are thus necessary to improve the use of natural parks.

(Specific Measures and Policies)

- The government will implement nature observation programs and promote public awareness campaigns on natural environment conservation at natural parks having exceptional natural environments. The government will utilize brochures and Internet websites to publicize Japan's wonderful natural environment at home and abroad, as well as developing and providing information to deepen public understanding about the natural environment and their interaction with nature. (MOE) [Cited in Chapter 2, Section 3, 3.1]
- The government will promote learning and education about the environment, ecotourism and other programs in considering the implementation of qualitative improvements for the use of natural parks. (MOE) [Cited in Chapter 2, Section 3, 3.1]
- The government will consider and designate access control districts, and provide guidance on use under the Natural Parks Law and other measures, in order to disperse and balance the use of natural parks. (MOE) [Cited in Chapter 2, Section 3, 3.1]
- In order to prevent the destruction of vegetation and disturbance of wildlife habitats through a concentration of visitors and other forms of overuse at natural parks, the government will implement appropriate facility development, including the construction of boardwalks in wetlands and the installation of off-limits fences around alpine plant communities. (MOE) [Cited in Chapter 2, Section 3, 3.2]
- By supporting restrictions on privately owned cars at heavily trafficked parts of

national and quasi-national parks to ease the impact of traffic congestion and curb carbon dioxide emissions by such traffic, the government will promote natural park use by giving consideration to the natural environment. (MOE)

- The government will develop such facilities as information centers, mountain trails and picnic sites for communication with nature, in order to deepen people's understanding about nature and promote its proper use. It will also promote the introduction of universal designs to the public facilities in national parks for safe, comfortable use. (MOE)

2.4 Natural park development

(Current Situation and Challenges)

A total of about 600 million people visit national and quasi-national parks in Japan annually. Natural park programs have been implemented for these visitors to learn about and experience nature.

Regarding natural park development, the government must not only consider ways to conserve the natural environment but also regional development utilizing natural park resources, as well as implementing measures and policies to meet the public's need to interact with nature, and promoting the safe, comfortable use of natural parks.

The government's budget for natural parks projects (public projects) is now being reduced after reaching 17.6 billion yen in 2000, however, as the budget for public projects in general is being reevaluated. It was approximately 11 billion yen in 2009. In 2005, the roles of the central and local governments were clarified through the so-called 'Trinity' reform. As the subsidies for prefectural governments regarding national park projects have been abolished, the government is making efforts to build national parks through direct government projects, and promote park projects for quasi-national parks with support grants.

(Specific Measures and Policies)

- For national parks, the government will develop mountain climbing trails (through such measures as erecting signs, scour repair, and restoring vegetation), information facilities at major park entrances, and long nature trails that organically link together natural parks with exceptional natural environments and cultural properties in important areas from the standpoints of protection (e.g., first class special zones) and utilization (e.g., facility complex), as well as promoting the universal design of facilities for safe, comfortable use by everyone. The government will also promote human interaction with nature and expand facilities for providing information on nature. (MOE) [Cited in Chapter 2, Section 3, 3.2]
- As for the site of the former Nasu Imperial Villa in Nikko National Park, whose management was shifted from the Imperial Household Agency to MOE in March

2008, conservation and maintenance work will be promoted based on the ‘Conservation Project for the “Forest of Nasu (tentative name)” in Nikko National Park as prepared by MOE, toward the start of public use in the Greenery Month in 2011.

- At national park points where ecosystems have disappeared or been changed, the government will rejuvenate or restore forests, wetlands, tidal flats, seaweed beds and other areas of need. (MOE) [Cited in Chapter 2, Section 3, 3.2]
- For quasi-national parks, the government will provide natural environment development subsidies to support local government programs to take advantage of regional characteristics in order to develop places for human interaction with nature, as well as conserving and restoring natural environments. (MOE) [Cited in Chapter 2, Section 3, 3.2]

3 Wildlife protection areas

(Outline of Measures and Policies)

In order to protect wildlife and their habitats, the government has designated some areas as wildlife protection areas based on the Wildlife Protection and Appropriate Hunting Law. The government regulates the hunting of wildlife in these protected areas and designates particularly important portions as special protection areas with activity regulations, in order to conserve a variety of wildlife species and their habitats.

3.1 Wildlife protection areas [Cited in Chapter 2, Section 1, 2.1]

(Current Situation and Challenges)

Japan has 73 national wildlife protection areas, totaling 565,471 ha (as of March 2010), following an increase in the number of designated sites such as the wetlands of international importance as migratory bird habitats. In addition, there are 3,809 prefectural wildlife protection areas, totaling 3,081,904 ha (as of December 2009).

In wildlife protection areas, it is important to accurately grasp the conditions of wildlife populations through monitoring and surveys conducted for proper management. In recent years, the wildlife habitat environments in wildlife protection areas have deteriorated due to sediment inflow from surrounding areas or rapid increases in certain animal populations, thereby fueling a growing need for improving such environments in some protection areas. Therefore, the Wildlife Protection and Appropriate Hunting Law was amended in 2006 to launch conservation programs for improving habitat environments, such as improving the quality of lake water and installing facilities to prevent the intrusion of animals that adversely affect wildlife habitats in wildlife protection areas. In FY 2007, conservation programs were started in such national wildlife protection areas as Katano Kamoike and Manko.

(Specific Measures and Policies)

- The government will promote the designation of wildlife protection areas and special protection areas—core systems for wildlife protection—to secure wildlife habitats and help maintain, restore and improve regional biodiversity. In this respect, the government will try to better understand important wildlife habitats based on scientific knowledge about wildlife population conditions and habitat environments, and give priority to such important habitats in designating wildlife protection areas. In order to secure habitats for a wide diversity of wildlife species, the government will seek to designate areas that cover a variety of ecosystems and wildlife communities. For example, the government will try to designate important coastal and marine bird colonies as wildlife protection areas for promoting the conservation of coastal and marine areas. The government will also promote the designation of wildlife protection areas that are important from a national or international standpoint, in coordination with relevant organizations. (MOE)
- The government will secure international networks of migratory bird habitats and other ecological networks by designating bird migration grounds and other sites as wildlife protection areas in close connection with other relevant protection measures such as natural park management. (MOE)
- The government will properly manage wildlife protection areas by implementing such management operations as regular patrolling and wildlife inhabitation surveys, and promoting appropriate guidance on human use of the areas, public awareness campaigns on wildlife ecology, and the conservation and ~~development~~ maintenance of suitable environments for wildlife inhabitation, in order to ensure a harmonious coexistence between humans and wildlife. For national wildlife protection areas, in particular, the government will enhance the management of such areas based on master plans showing protection and management guidelines specified for each wildlife protection area. In case wildlife habitat environments deteriorate in wildlife protection areas, the government will construct facilities for breeding and feeding wildlife, facilities for improving the quality of lake water and other facilities, as well as erecting fences as necessary to prevent penetration by animals that adversely affect wildlife, in order to conserve and improve wildlife habitats. (MOE)

4 Natural habitat conservation areas

(Outline of Measures and Policies)

Natural habitat conservation areas are designated for the conservation of designated national endangered species under the Act on Conservation of Endangered Species of Wild Fauna and Flora. Within each natural habitat conservation area, particularly important areas are designated as management areas where permission is required for various activities, and others as surveillance areas where reports are

required on various activities. Habitat environments are conserved through such activity regulations.

4.1 Natural habitat conservation areas

(Current Situation and Challenges)

As of March 2010, the government had designated nine natural habitat conservation areas (totaling 885 ha) for seven national endangered species such as *Platypleura albivannata* and *Hynobius abei*.

Conservation guidelines have been set up for each natural habitat conservation area according to the ecological characteristics of designated species. Surveys must be expanded on the population conditions of designated species. Population conditions will have to be improved if such conditions clearly deteriorate with the intrusion of alien species.

(Specific Measures and Policies)

- Since habitats must be secured for the stable survival of endangered species of fauna and flora, the government will promote the designation of natural habitat conservation areas so as to give priority to areas where habitats are maintained in good condition, while coordinating closely with other protection measures such as wildlife protection areas and natural park systems as necessary. (MOE) [Cited in Chapter 2, Section1, 1.2]
- The government will properly manage natural habitat conservation areas, and try to maintain and improve habitat environments in accordance with the protection guidelines set for each area. It will also undertake efforts to grasp the life and growth of target species, and discuss a reevaluation of protection policies and zoning based on necessity. (MOE)[Cited in Chapter 2, Section 1, 1.2]

5 Places of scenic beauty, natural monuments, cultural landscapes

(Outline of Measures and Policies)

Places of scenic beauty and natural monuments are designated under the Cultural Properties Protection Law to protect places of scenic beauty that represent the value of Japan's diverse natural beauty and natural monuments commemorating natural spots of high scientific value as cultural properties. Such designation and protection have contributed much to conserving Japan's natural beauty and biodiversity. As well as the central government, local governments have designated many sites of scenic beauty and natural monuments under respective ordinances, thereby helping to conserve regional scenic landscapes and biodiversity.

The Law for the Protection of Cultural Properties (as amended in 2004) positions cultural landscapes as new cultural properties defined as "landscapes that have been

formed through local residents' styles of living or working and regional climate, and are indispensable for understanding Japanese people's styles of living or working." The law also provides that particularly important cultural landscapes among those protected by prefectural or municipal governments may be selected as "important cultural landscapes." The correct evaluation and proper protection of such cultural landscapes as rice terraces and Satoyama village mountains that have been nurtured in harmony with nature in the regions have led to sustainable regional development, thus contributing to the conservation of regional biodiversity.

5.1 Places of scenic beauty and natural monuments

5.1.1 Designation, conservation and management

(Current Situation and Challenges)

The designation of places of scenic beauty and natural monuments is based on "standards for the designation of special and non-special historic sites, places of scenic beauty and natural monuments." Places of scenic beauty include cultural sites that have been developed artificially, and natural places that originate from natural developments and have landscapes supported by history and culture. Natural places of scenic beauty are intended to include local climate, traditional land use, worship or recreation, in addition to long-known beautiful landscapes. Natural monuments include those that combine fauna and flora peculiar to Japan's nature with secondary nature created through cultural activities that have a long history. Japan's cultural property system is globally unique, in that human-nature relations are interpreted in a multifaceted way as cultural artifacts similar to other cultural properties. As of March 2010, 150 natural places of scenic beauty and 980 natural monuments had been designated.

In order to secure the proper protection of natural places of scenic beauty and natural monuments, the central government has regulated actions for changing the status quo and provided subsidies for local government conservation and management programs, including fact-finding surveys, the consideration of conservation measures, development of conservation and management plans, protection and proliferation of fauna and flora, management and restoration of plant communities, and purchases of designated sites.

While more than 80 years have passed since the natural monument designation system was launched, critics have pointed to various problems including biased designations, a failure to interpret fauna and flora as communities within a designation, and the absence of systematic protection. In order to address these problems and work out guidelines for expanded protection, the government has conducted survey research in cooperation with many experts since FY 1998. At the end of FY 2003, a report was prepared on how to improve the relevant protection system, while giving consideration to the conservation of biodiversity.

(Specific Measures and Policies)

- From the perspective of protecting cultural artifacts regarding human-nature relationships in Japan, the government will promote the designation of natural places of scenic beauty and natural monuments among unique landscapes and natural areas that could become the cores of regional landscape diversity or biodiversity. (MEXT)

5.1.2 Conservation and management plans and restoration/rejuvenation**(Current Situation and Challenges)**

In order to secure the effective, integrated conservation and management of places of scenic beauty and natural monuments, and their surroundings, a wide range of stakeholders should take part in working out a conservation and management plan to specify the direction of such conservation and management, concrete measures, and the sharing of burden for each place or monument. For natural places of scenic beauty and natural monuments that feature secondary nature, measures may be taken to avoid community shifts. In response to declines in fauna and flora populations designated as natural monuments in limited areas, and the inflow of alien species of plants and animals, local governments and other parties concerned may breed such species of natural monument freshwater fish as the kissing loach (*Leptobotina curta*), deep-bodied bitterling (*Acheilognathus longipinnis*), metropolitan bitterling (*Tanakia tanago*) and others at sites other than the original habitats, promote the project to return the white stork to the wild as a special natural monument, and remove alien species. These measures may achieve the proper recovery or restoration of endangered species when gradually and systematically implemented under conservation and management plans.

Promoting these efforts requires the involvement of various entities in the form of cooperation among the relevant organizations and participation by local residents. In this sense, support should be provided for the comprehensive promotion of measures, such as developing appropriate manuals and human resources, and constructing learning and breeding facilities.

(Specific Measures and Policies)

- In regions where places of scenic beauty or natural monuments have been designated, the central government will cooperate with local governments in their conservation efforts and provide subsidies for their programs, in order to conduct fact-finding surveys, develop conservation and management plans, and implement maintenance, management and restoration to conserve appropriate landscape diversity and biodiversity. (MEXT)

5.1.3 Utilization

(Current Situation and Challenges)

Between FY 1994 and FY 2000, the Agency for Cultural Affairs implemented model projects for the construction of learning and other facilities for local schools and communities to utilize familiar natural monuments for learning about the environment and community-building efforts, and provided subsidies for eight facilities.

Learning and education about the environment in schools and community education should be promoted to develop a framework for conserving the natural environment and biodiversity in regional communities. To this end, the central government will continue supporting the provision of learning opportunities utilizing natural monuments, in coordination with local governments.

(Specific Measures and Policies)

- The central government will cooperate with local governments, researchers and local residents in the proper utilization of natural monuments, and provide subsidies to fund local government programs for learning and education about the environment, and the development and public opening of natural monuments as regional resources. (MEXT)

5.2 Cultural landscapes

(Current Situation and Challenges)

In recent years, socioeconomic changes have led to the abandonment of Satoyama mountains and cultivated areas, adversely affecting the good interaction nurtured between humans and nature in regional communities. Depopulation has been seen in intermediate and mountainous areas. Regional styles of living and working have changed dramatically, making it difficult for regional communities to be maintained.

The cultural landscape protection system is designed to correctly assess and properly conserve and utilize cultural landscapes that have been nurtured through regional styles of living and working, and the local climate. As of March 2010, the government had designated 19 important cultural landscapes.

In order to conserve and utilize cultural landscapes, the central government has provided subsidies to fund local government programs for surveys, the preparation of conservation plans, development, and public awareness campaigns.

(Specific Measures and Policies)

- In order to protect cultural landscapes nurtured through human interaction with nature, the government will promote the designation of properly protected and important cultural landscapes as important cultural landscapes. (MEXT)
- In order to promote the conservation and utilization of cultural landscapes, the

government will provide subsidies to fund surveys, the preparation of cultural landscape conservation plans, and specific restoration projects in areas with important cultural landscapes. (MEXT)

- In order to promote public awareness campaigns on cultural landscapes, the government will provide subsidies to fund programs pertaining to study sessions, open lectures and workshops where local residents can participate. (MEXT)

6 Protected forests and protection forests

(Outline of Measures and Policies)

As for national forests that include virgin natural forests and wildlife habitats, the government has promoted the networking of protected forests into “green corridors” for conserving biodiversity. The government has also stepped up proper conservation and management by grasping accurate data about precious species of wildlife and protected forests, and taking such measures as restoring vegetation and installing protective fences as necessary.

National or private forests that must recharge water levels and provide other public functions are systematically designated as protection forests. In order to secure the functions of such forests according to their respective purposes, the government properly manages and conserves these forests through regulations on logging and changes in forest use.

6.1 Protected forests and protection forests

(Current Situation and Challenges)

“Protected forests” are national forests where virgin natural forests or habitats for precious species of wildlife are protected through management using natural succession. The government has designated such protected forests (841 forests, totaling 781,000 ha, as of April 2009) and networked protected forests into “green corridors” (24 corridors, totaling 509,000 ha, as of April 2009) for conserving biodiversity, while requesting the cooperation of owners of neighboring private forests.

The government must promote the designation of “protected forests” and “green corridors,” step up the proper conservation and management thereof by grasping accurate data about precious species of wildlife and protected forests, and take such measures as restoring vegetation and installing protective fences as necessary.

National or private forests that must recharge water levels and provide other public functions have been systematically designated as protection forests (11.91 million ha, as of the end of FY 2008) under the Forest Law. In order to secure the functions of protection forests according to their respective purposes, the government has properly managed and conserved these forests through regulations on logging and changes in forest use. In the future, the government should promote the systematic

designation of protection forests (planned at 12.69 million ha for the end of FY 2023) under the national forest plan, and implement the proper management and conservation thereof.

(Specific Measures and Policies)

- The government will continue to properly conserve and manage precious natural environments by implementing management using natural succession, restoring vegetation, installing protective fences as necessary in existing protected forests, and promoting the designation of new protected forests. (MAFF)
- In green corridors, the government will thin out artificial forests to develop feeding environments for precious species of wildlife and habitats for their prey, and conduct monitoring surveys to grasp forest conditions and wildlife living conditions. The government will also promote the designation of new green corridors to further secure the conservation of species and biodiversity. (MAFF)
- The government will systematically promote the designation of protection forests needed for recharging water levels, preventing soil spillage and other public functions, based on a plan to expand the total area of such forests to 12.69 million ha by the end of FY 2023. (MAFF)

7 Special green conservation areas, etc.

(Outline of Measures and Policies)

In urban regions, the government has conserved green spaces that form important natural environments for conserving biodiversity by designating green conservation areas and special green conservation areas under the Urban Green Space Conservation Law, and suburban green conservation areas and special suburban green conservation areas under the Law for the Conservation of Green Belts around the National Capital Region and the Law for the Development of Conservation Areas in the Kinki Region.

In city planning areas or quasi city planning areas, the government designates green conservation areas to properly conserve green spaces for preventing disorderly urbanization, pollution or disasters, and to secure a healthy living environment for local residents through harmonious land use.

In city planning areas, the government designates special green conservation areas where certain behaviors require permission (to conserve the good natural environments of green spaces that help prevent disorderly urbanization or disasters), and which are of traditional or cultural significance, feature exceptional landscapes, or are wildlife habitats for conservation.

The suburban green conservation area system is designed to subject certain activities to reporting and conserve green spaces with good natural environments in the suburbs of big cities in the greater Tokyo metropolitan area and the Kinki region, in

order to prevent disorderly urbanization, preserve urban living environments, and help conserve biodiversity. Within suburban green conservation areas, prefectural governments or local authorities designate in their city plans special suburban green conservation areas that feature particularly good natural environments and show far greater effects of greenery conservation efforts.

7.1 Special green conservation areas, etc.

(Current Situation and Challenges)

The designation covered 387 special green conservation areas (totaling 2,147 ha at the end of March 2009), 25 suburban green conservation areas (totaling 97,330 ha at the end of March 2010), and 26 special suburban green conservation areas (totaling 3,471 ha at the end of March 2009).

Some designated suburban green conservation areas where activities are regulated have failed to fully work as part of the infrastructure of diverse and sound ecosystems, as relevant landowners have fallen short of implementing sufficient management. Urban green spaces are not only the precious properties of urban residents but also wildlife habitats. The management of such areas should be shared between landowners, local governments and local residents, and eventually taken over by future generations. The Urban Green Space Conservation Law and related laws have established a management agreement system under which local governments or greenery management organizations conclude agreements with the owners of green spaces in special green conservation areas, in order to manage these green spaces in place of their owners. This system should be further utilized.

(Specific Measures and Policies)

- The government will provide appropriate subsidies to compensate for losses incurred due to activity regulations, land purchases, and the development of landslide preventive measures, as well as other facilities for conserving green spaces. It will also promote the designation of special green conservation areas and special suburban green conservation areas as the cores of urban wildlife habitats in order to secure biodiversity. (MLIT)
- In the greater Tokyo metropolitan area and the Kinki region, the government will consider designating areas for conservation as suburban green conservation areas based on knowledge obtained from the Grand Design of Urban Environment Infrastructure, in order to restore cities that utilize multifaceted functions shared with the natural environment. (MLIT) [Cited in Chapter 1, Section 7, 2.5]
- The government will try to utilize management agreements and other systems to ensure the good management of green spaces by diverse parties. (MLIT)

8 Ramsar sites

(Outline of Measures and Policies)

In order to promote implementation of the Ramsar Convention, which aims to promote the conservation of internationally important wetlands and the flora and fauna living there, and ensure the wise use of such wetlands, the government has begun designating wetlands of international importance as Ramsar sites, the conservation and wise use of these sites, and relevant public awareness campaigns.

8.1 Ramsar sites

(Current Situation and Challenges)

Four Japanese Ramsar sites (Kejonuma, Oyama Kamiike, Shimoike and Hyoko, including the mountain streams and marshes on Kume Island) were newly registered in 2008 when the 10th Meeting of the Conference of the Contracting Parties to the Ramsar Convention (COP10) took place. As of March 2010, Japan has 37 Ramsar sites, totaling 131,027 ha.

As for the Ramsar Convention, at the 7th Meeting of the Conference of the Contracting Parties to the Ramsar Convention held in 1999 and at the 9th Meeting of the Conference of the Contracting Parties held in 2005, it announced that the criteria for Wetlands of International Importance would be renewed and efforts made to help conserve biodiversity at a global level by widely accepting the registration of Wetlands of International Importance for the conservation of biodiversity as Ramsar sites.

The government should further promote the conservation and wise use of these Ramsar sites, and make efforts to register new Ramsar sites in Japan.

(Specific Measures and Policies)

- In addition to the wetlands considered for registration on the occasion of COP9 in 2005 but not yet registered, the government will try to register six more Ramsar sites in Japan by COP11 (planned for 2012) by targeting wetlands found to meet the criteria for identifying wetlands of international importance through new surveys based on the latest “Criteria for Wetlands of International Importance” and “Improvement of Biodiversity in Paddy Fields” adopted in COP10 held in 2008. (MOE) [Cited in Chapter 2, Section 4, 2.2]
- Following the decisions made by the COP, the government will promote comprehensive conservation and the wise use of wetlands by conducting monitoring surveys and developing information for Ramsar sites, restoring wetlands, providing environmental education, conducting relevant public awareness campaigns and taking other measures, in cooperation with relevant local governments, NGOs, experts and local residents. (MOE, MLIT) [Cited in Chapter 2, Section 4, 2.2]

9 World Heritage sites

(Outline of Measures and Policies)

The World Heritage list based on the World Heritage Convention for protecting the world's important heritage for all of mankind includes three Japanese natural World Heritage sites: Yakushima Island, the Shirakami Mountains, and Shiretoko (as of March 2010).

The sacred sites and pilgrimage routes in the Kii Mountain Range and the Iwami Ginzan Silver Mine and its cultural landscape (specified on the cultural World Heritage list) have been confirmed as having not only cultural value but also cultural landscapes, defined as “the combined works of nature and of man” in the Operational Guidelines for the Implementation of the World Heritage Convention.

The relevant organizations are internationally required to cooperate in conserving the acknowledged value of these World Heritage sites in the future.

9.1 Natural World Heritage sites

(Current Situation and Challenges)

The World Heritage list under the World Heritage Convention includes three Japanese natural World Heritage sites: the island of Yakushima (10,747 ha), the Shirakami Mountains (16,971 ha) and Shiretoko (71,103 ha). Japan is internationally required to conserve the acknowledged value of these World Heritage sites in the future. At each World Heritage site, the relevant administration and other organizations have formed a World Heritage area liaison committee, worked out a World Heritage area management plan, and promoted appropriate conservation. For Shiretoko and Yakushima, the government has created the World Heritage Area Scientific Council, comprised of experts working to conserve and manage World Heritage sites based on scientific knowledge.

As for the Ogasawara Islands and the Ryukyu Islands (covering the Tokara Islands and southern islands), which were considered along with Shiretoko by Japan's panel on World Heritage candidate sites in 2003, Japan is making efforts to solve such problems as the treatment of alien species, protection of endangered species, and expanded guarantees of protection.

Japan recommended the Ogasawara Islands as a World Heritage candidate site in January 2010, as measures have been secured to address the problems.

(Specific Measures and Policies)

- For the island of Yakushima, the Shirakami Mountains, and Shiretoko, the central government will conduct monitoring surveys and patrolling based on the World Heritage area management plans it made in cooperation and coordination with local governments and other relevant parties. The government will also promote the

proper conservation and management of these World Heritage sites under the Natural Parks Law, the Law for the Promotion of Nature Restoration, the Forest Ecosystem Protection Area System, and the Cultural Properties Protection Law. (MOE, MAFF, MEXT)

- As for the World Heritage area management plans, through liaison meetings with local bodies, the central government will promote management based on a consensus with local communities in cooperation and coordination with conservation management efforts driven by organizations, related municipalities and local bodies. The government will also collect information on forests and wild animals from visitors, and then build systems to reflect that information in its management by further promoting cooperative management with individual groups of citizens. (MOE, MAFF)
- Based on discussions at the World Heritage Committee, the government will build a monitoring setup and program to grasp the impact of global warming on World Heritage sites. (MOE, MAFF) [Cited in Chapter 2, Section 6, 1.1]
- At Shiretoko and Yakushima, the government will promote conservation and management based on scientific knowledge in line with recommendations made by the existing World Natural Heritage Site Scientific Council. (MOE, MAFF)
- For the Shirakami Mountains, the government will try to enhance the management system and strengthen adaptive conservation and management to monitoring results that are properly evaluated based on scientific knowledge about conservation and management measures for World Heritage sites. (MOE, MAFF)
- As for Shiretoko, the government will properly conserve the area's natural environment through integrated marine and ground management operations conducted in line with the Shiretoko World Natural Heritage Site Management Plan prepared in 2009, based on recommendations from protection status research conducted by the IUCN and World Heritage Conservation Center in 2008. (MOE, MAFF, MEXT, MLIT)
- Based on the Basic Plan on the Proper Use of the Apical Region of the Peninsula Zone of Shiretoko National Park adopted in December 2004 and the Basic Plan on the Proper Use of the Central Region of the Peninsula Zone of Shiretoko National Park formulated in September 2005, the government will disseminate suitable rules such as a guidance for the proper use of the apical region of the Shiretoko peninsula zone and a guidance for the proper use of the central region of the Shiretoko peninsula zone, impose necessary restrictions, and provide information and programs for the utilization of various natural and cultural resources, in order to disperse use and properly guide users. (MOE, MAFF)
- As for the Ogasawara Islands, which Japan listed in the tentative World Heritage list in January 2007 to show its intention to recommend the islands as a World Heritage

site in the future, the government decided to recommend listing the islands in the 2011 World Heritage list in January 2010, due to the visible achievements made regarding efforts to expand guarantees of protection, promote measures against alien species, and conserve rare species of wildlife in cooperation with relevant organizations. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 9, 1.5, and Chapter 2, Section 4, 2.4]

- As for conservation and management of the Ogasawara Islands, effective practices will be promoted by efforts in coordination and cooperation with various institutions. Such efforts include measures to deal with alien animals species such as the black rat (*Rattus rattus*) in Ogasawara National Park and alien plants species such as Akagi (*Bischofia javanica*) in the Forest Ecosystem Reserve for the Ogasawara Islands as well as strict enforcement of visitor rules in line with the Ogasawara Islands Management Plans. (MOE, MAFF)
- As for the Ryukyu Islands (covering the Tokara Islands and southern islands), Japan must expand its guarantees of protection for important areas, including the habitats for endangered species. Therefore, the government will analyze and assess the value of the islands as a natural World Heritage site and cooperate with local organizations in setting up and expanding protected zones. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 9, 1.5, and Chapter 2, Section 4, 2.4]
- The government will also promote ecotourism at existing natural World Heritage sites and candidate sites. (MOE)

10 Biosphere reserves

(Outline of Measures and Policies)

The Man and Biosphere (MAB) Program is one of the international joint programs of the United Nations Educational, Scientific and Cultural Organization (UNESCO), and aims at developing scientific bases for solving environmental problems. One of the most important pillars of the MAB Program is Biosphere Reserve Management.

Biosphere reserves are representative grounds and coastal reserves confirmed as providing value for conservation as well as scientific knowledge, skills and human values to support sustainable development under the MAB Program. This program seeks to combine biosphere reserves into international networks to promote the international sharing of information on the conservation of natural or managed ecosystems.

Biosphere reserves include strictly protected areas as their cores and nearby human activities, and cover such activities as scientific research, monitoring, education and training. The reserves are thus designed to provide models for the strict protection and harmonious coexistence of humans and nature, based on the activities of local communities and scientific knowledge.

The Japanese National Commission for UNESCO has given the domestic biosphere reserves the nickname, “UNESCO Eco Parks” to promote their dissemination.

10.1 Biosphere reserves

(Current Situation and Challenges)

UNESCO has designated four biosphere reserves in Japan: the island of Yakushima, Mount Odaigahara & Mount Omine, Mount Hakusan, and Shiga Highland.

In recent years, biosphere reserves have been increasingly used worldwide for “Education for Sustainable Development,” monitoring climate and other long-term global environment changes, as well as for scientific research.

(Specific Measures and Policies)

- As for the four designated biosphere reserve areas, the second edition of the “MAB Biosphere Reserve Catalog” was prepared in 2007, describing the present natural environment and biota situation, the impact of human activities, and related situations. The government will continue promoting its proper conservation and management, conducting monitoring surveys, and publishing monitoring survey results for use in the conservation and sustainable development of biodiversity. (MEXT, MOE)
- Based on global trends, the government will consider developing new measures and policies to take advantage of the biosphere reserves system, including selecting new biosphere reserve candidates. (MEXT, MOE) [Cited in Chapter 2, Section 4, 3.3]

11 Regions managed by independent local groups

(Outline of Measures and Policies)

In addition to the conservation of important areas as designated by legal systems, there are cases where local groups such as NGOs and fisheries cooperative associations are engaged in the conservation and management of specific regions. For example, an NGO obtains and manages an area of land to conserve an outstanding natural environment in the region as an asset and utilize it for local revitalization, or fisheries cooperative associations independently establish no-fishing areas to manage natural resources.

It is important to understand these efforts and discuss necessary measures for cooperation.

11.1 Regions managed by independent local groups

(Current Situation and Challenges)

Independent area management is expected to function as an effective measure for the conservation and sustainable utilization of the natural environment in a given area,

as well as management based on existing legal systems. Thus, such a natural environment should be utilized within the area based on the area's natural and social conditions, while learning from progressive approaches.

Some NGOs manage important bird habitats by reaching agreement with landowners and by purchasing land, and fisheries cooperative associations independently establish no-fishing areas to manage and monitor natural resources.

The possible advantages of these efforts include: the possibility of flexible, detailed management expected by the local groups involved, easy modification of rules for adaptive management, and unified management of watershed and coastal areas through appropriate combination with existing conservation area systems such as natural parks.

These areas are expected in the future to be widely utilized as part of an effective management method, along with conservation management stipulated by the legal systems.

(Specific Measures and Policies)

- Regarding cases where management areas have been set and managed based on agreements formed by the local groups involved such as NGOs and fisheries cooperative associations, the government will collect basic information, information on the formation of agreements, and methods of management, and discuss common problems and measures for coordination and cooperation among the related institutions. (MOE)
- Measures for marine protection areas in Japan will be discussed based on the Basic Ocean Policy Program. Independent regulations established by fishermen will be regarded as its core with reference to examples targeting both the conservation of marine biodiversity and the maintenance of fishery resources. Policies for ocean protection areas based on local agreements in pursuit of compatibility with diversified utilization such as fishery will also be discussed. (MOE, ministries and agencies concerned) [Cited in Chapter 1, Section 9, 1.2]

Section 3 Nature Restoration (Basic Concepts)

As well as the enhanced conservation of precious existing nature, the proactive restoration of nature lost in the past has become important for rejuvenating weakening ecosystems. In July 2001, the prime minister-led “Conference on the Creation of ‘Wa-no-kuni’ - An Eco-society through Partnership - in the 21st Century” issued a report recommending the promotion of nature restoration public works. In December 2001, recommendations by the Council for Regulatory Reform called for the promotion of nature restoration projects with the participation of various entities. In response to recommendations made by a committee for the conservation of the Kushiro Shitsugen river environment in March 2001, experts, NPOs and administrative organizations launched the Kushiro Shitsugen restoration project—Japan’s first nature restoration project in which various parties participated.

In response to such developments, the Second National Biodiversity Strategy of Japan (adopted in March 2002) positioned nature restoration as one of three directions for future measures and policies. Under the recognition that Japan should shift from the unilateral exploitation of natural resources or destruction of nature to the qualitative improvement of overall domestic ecosystems, depending on regional environmental potential, the relevant central government ministries and agencies, and various parties have launched joint nature restoration projects.

In order to comprehensively promote nature restoration measures and policies, the Law for the Promotion of Nature Restoration was enacted and took effect in January 2003. The law features three points: the objective of restoring lost or depleted ecosystems, the adoption of a bottom-up approach where regional panels work out schemes and plans, and the principle of adaptive management for nature restoration projects.

In response to enactment of the Law for the Promotion of Nature Restoration, the Cabinet decided on the Basic Policy for Nature Restoration in April 2003. Regional nature restoration committees (hereinafter referred to as ‘regional committees’) were inaugurated at various points including the Arakawa Taroemon district and Kushiro Shitsugen. As of March 2010, a total of 21 regional committees existed. Various ecosystems including forests, grasslands, Satochi-Satoyama areas, rivers, lakes, wetlands and coral reefs have become subject to nature restoration projects. As of March 2010, 21 regional committees had prepared comprehensive nature restoration schemes (hereinafter referred to as ‘comprehensive schemes’), indicating the overall directions of nature restoration including restoration objectives and target areas. Under these comprehensive schemes, the committees make nature restoration implementation plans (hereinafter referred to as ‘implementation plans’) that give details of specific

nature restoration projects. As of March 2010, 14 regional committees had produced 21 implementation plans. As eight years have passed since nature restoration was proposed under the Second National Biodiversity Strategy of Japan, the country has shifted from nature environment surveys and the preparation of comprehensive schemes to the production of specific implementation plans and full-fledged implementation of nature restoration projects for diverse ecosystems.

Based on the Law for the Promotion of Nature Restoration, the government has established the Nature Restoration Promotion Council (comprised of relevant administrative organizations) and the Nature Restoration Expert Committee, which gives advice for the council's liaison, coordination and recommendations on implementation plans. In October 2008, basic policies on nature restoration were revised based on opinions about the frameworks for restoration of nature expressed at experts' meetings on the restoration of nature, and the results of verifying the progress of enforcing the Law for the Promotion of Nature Restoration over the past five years. The major points of the revision are:

- (1) Effective promotion of efforts on nature restoration in natural areas
- (2) Reinforcement of the viewpoints of conserving ecosystems and eliminating deterioration factors; reinforcement of national/international viewpoints
- (3) Promotion of study and research

Based on the basic principles of the Law for the Promotion of Nature Restoration, including cooperation among various regional entities, respect for regional independence and secured transparency, implementation based on scientific knowledge, and the utilization of nature restoration for learning about the natural environment, the government should steadily proceed with its nature restoration efforts from a long-term perspective, in line with the progress made by projects, related surveys, development of schemes and plans, implementation of monitoring, and assessment and reform of projects. To promote nature restoration in the future, the government should improve technologies by accumulating cases of nature restoration, developing nature restoration from a wider-area viewpoint, supporting nature restoration operations by private sector organizations at private sites, and taking necessary measures to effectively promote nature restoration projects.

1 Steady implementation of measures for nature restoration

(Outline of Measures and Policies)

The government will steadily implement nature restoration projects through coordination between relevant central government ministries and agencies, and the participation and cooperation of various entities. At the same time, the government will accumulate technological knowledge through cases of nature restoration nationwide, to effectively promote nature restoration. In order to promote public understanding about

ongoing nature restoration projects and encourage various entities to participate in such projects, the government will implement public awareness campaigns for local residents and others regarding the need for nature restoration.

1.1 Steady implementation of measures for nature restoration and accumulation of technological knowledge

(Current Situation and Challenges)

The relevant administrative organizations have been implementing nature restoration at 144 sites (as of October 2006), including those for the above-mentioned regional committees. The Ministry of the Environment has been carrying out nature restoration projects under its direct control at seven national parks, including the restoration of wetlands in Kushiro Shitsugen and Sarobetsu, the forests in Odaigahara, the grasslands in Aso, and coral communities in Tatsukushi Bay and Sekisei Lagoon. The ministry has also provided subsidies for quasi-national parks and national wildlife protection areas to support local government nature restoration projects at 12 sites. Various entities—including relevant central government ministries and agencies, local governments, NGOs, experts and local residents—have been coordinating and cooperating with these projects. Since FY 2007, the ministry has implemented wildlife habitat improvement projects under its direct control at national wildlife protection areas and launched such projects for four sites including Miyajima Marsh.

Nature restoration projects have thus been implemented for various types of ecosystems. Nature restoration projects should be implemented adaptively, based on the characteristics of target ecosystems, natural resilience, sensitive ecosystem balances and scientific knowledge. At present, however, the technological knowledge accumulated remains insufficient. Therefore, we must develop various nature restoration techniques, including methods of taking advantage of natural resilience for nature restoration, in order to secure the autonomous survival of restored natural environments and implement nature restoration based on scientific knowledge, such as fine-tuned and careful measures kept in harmony with nature. These techniques also include adaptive management methods to monitor the implementation of nature restoration and scientifically evaluate monitoring results. It is important to conduct research and development on nature restoration technology in coordination with the implementation of nature restoration projects.

We should also pay attention to the following points in implementing nature restoration projects:

First, it is important to set the goal of a natural environment that can be sustained in good condition. We should set long- and short-term goals, while taking account of a natural environment's sustainability based on natural resilience and cycles. In this respect, we should position natural changes and disturbances as a genuine dynamic

mechanism regarding the maintenance of ecosystems.

Second, we should give priority to the conservation of existing nature and eliminate the fundamental factors behind the deterioration of natural ecosystems. Therefore, we should proceed with short-term stopgap measures that include preventing the extinction of specific species in limited areas, while considering and implementing basic measures based on an understanding of deterioration factors and their compound effects.

Third, nature restoration projects are expected to produce various effects including the conservation and restoration of natural environments, the protection of biodiversity, helping to conserve the global environment, and invigorating regional communities or economies. We should monitor and analyze these effects after nature restoration projects are implemented and properly assess relevant projects.

(Specific Measures and Policies)

- The government will steadily promote nature restoration projects, including such ongoing projects as the restoration of forests in Mt. Moriyoshi Heights, grasslands in Aso, Satoyama forests at Mt. Konoyama lowland forests at Mt. Kunugi, wetlands in Kushiro Shitsugen and Sarobetsu, tidal flats at the mouth of the Fushino River, and coral reefs in Sekisei Lagoon. (MOE, MAFF, MLIT)
- Through the steady promotion of nature restoration projects, the government will accumulate project implementation methods and adaptive management methods, based on the technological knowledge gained through implementing projects at various points. The government will then systematize these methods to accumulate technological knowledge on nature restoration. (MOE, MAFF, MLIT)
- In a bid to develop methods of properly assessing the expected effects of nature restoration projects, the government will consider how to assess nature restoration projects and establish relevant methods. (MOE)

1.2 Promotion of public awareness campaigns on nature restoration

(Current Situation and Challenges)

Since the approval of the 3rd National Biodiversity Strategy of Japan, two new committees—Lake Izunuma-Uchinuma Nature Restoration Committee and Kubokawa IHATOV Nature Restoration Committee—have been organized. As of March 2010, there are 21 committees organized in Japan.

In areas where nature restoration efforts are necessary, public awareness campaigns about current natural environment conditions and the significance of nature conservation and restoration must be implemented efficiently and effectively to help local residents, NGOs and other entities gain a better understanding of nature restoration projects and encourage their participation.

(Specific Measures and Policies)

- In areas where nature restoration efforts are necessary, the government will implement relevant public awareness campaigns through natural environment surveys, the preparation of nature observation handbooks, workshops on nature restoration, information services and environmental education. Through these campaigns, the government will seek to create eight more regional nature restoration committees by FY 2012. (MOE)

2 Promotion of new measures for nature restoration

(Outline of Measures and Policies)

Toward the promotion of new nature restoration efforts, the government will consider a grand design for national land (as viewed from the perspective of biodiversity), and implement nature restoration projects aimed at specifying the ecological network initiative from nationwide and wide-area perspectives. In efforts to encourage the participation and cooperation of various entities in nature restoration projects, the government will also consider how to best support nature restoration by private sector organizations at private sites.

2.1 Promotion of nature restoration based on nationwide and wide-area perspectives

(Current Situation and Challenges)

At present, regional nature restoration committees are inaugurated based on regional voluntary initiatives. The way has yet to be paved for nature restoration based on a nationwide or wide-area viewpoint. Therefore, it is important to strengthen the efforts with a wide-area view that includes a biodiversity network framework based on a grand design of national land from the perspective of biodiversity and basic policies on nature restoration, and to identify areas with greater nature restoration needs. It is also important to develop a mechanism for systematically implementing nature restoration projects through coordinating measures by relevant ministries and agencies.

(Specific Measures and Policies)

- The relevant central government ministries and agencies will cooperate in considering the directions and specific measures for nature restoration based on a nationwide or wide-area viewpoint, Japan's comprehensive biodiversity assessment and progress in the ecological network initiative, and then proceed with efforts to systematically implement nature restoration projects. (MOE, MAFF, MLIT)
- The government will put in order and analyze accumulated information, and then utilize comprehensive analysis for specifying areas with a greater need for nature restoration. (MOE, MAFF, MLIT)

2.2 Supporting nature restoration projects by private sector organizations at private sector sites

(Current Situation and Challenges)

Since nature restoration is implemented for wide areas from a long-term perspective, the participation and cooperation of various entities including regional private sector organizations and residents are indispensable. However, the administrative sector has played a leading role in implementing nature restoration projects. Eight private sector organizations serve as secretariats for regional nature restoration committees, and a growing number of private sector organizations are positively participating in such committees. In order to further promote the participation and cooperation of regional private sector organizations and residents, regional communities may have to create mechanisms to support voluntary and positive nature restoration by private sector organizations at private sector and other sites. Agreements and cooperation with private sector companies regarding nature restoration may be required, along with public and private financial support. Support may also be necessary for coordination with landowners.

(Specific Measures and Policies)

- The government will consider and implement more effective methods of supporting nature restoration by the private sector and other organizations at private sites. (MOE)

Section 4 Agriculture, Forestry and Fisheries (Basic Concepts)

The agriculture, forestry and fisheries sector implements essential operations for providing foods and living materials for human survival, and has played a key role in forming natural environments familiar to humans and allowing a variety of wildlife species to thrive in Japan.

The agriculture, forestry and fisheries sector can play a large role in conserving biodiversity in Japan. At the same time, the conservation of biodiversity is essential for maintenance and development of the agriculture, forestry and fisheries sector, and farming, forestry and fishing villages that provide safe, high-quality agricultural, forestry and fisheries products.

Indicating the close relationship between biodiversity and the agriculture, forestry and fisheries sector, our living essentials, including the rice, vegetables, fish and meat we eat every day, as well as lumber for the houses in which we live, are provided through the sector from rice paddies, forests and the sea.

Unlike other industries such as manufacturing, the agriculture, forestry and fisheries sector has benefited from nature by working with it, utilizing it and promoting natural cycles in an adaptive manner instead of conflicting with nature. The sector is based on a sound maintenance of biodiversity and natural material cycles.

Japan's has a land mass of 380,000 square kilometers extending north to south. Forests account for some 66% of the country's total area and farmlands for about 13%. In addition, Japan has a 4.47 million square-kilometer exclusive economic zone—the sixth largest in the world and 12 times as large as Japan's land mass. Agriculture, forestry and fisheries operations are conducted on land and in EEZ waters. Japanese fishermen also catch fish in the EEZ waters of other nations under bilateral agreements, as well as on the high seas.

Virgin natural forests in Japan are limited to remote mountainous backbones, peninsulas and isolated islands. Rice paddies, vegetable fields and other farmland, cedar and other artificial forests, Satoyama forests used to provide fuelwood and meadows, and grasslands occupy a large part of the country.

On this farmland, in artificial and Satoyama forests, grasslands, seaweed beds and tidal flats, human operations in the agriculture, forestry and fisheries sector and other industries have been stably ongoing over a long time in a manner deep-rooted in seasonal climates, taking advantage of knowledge and techniques that have been accumulated regionally.

The sector has thus formed and maintained unique regional landscapes and natural environments, providing precious habitats for a variety of wildlife species. Unique regional ecosystems have been formed and maintained, thereby contributing to

biodiversity.

At the same time, nature-rich farming, forestry and fishing villages nurtured under various unique regional cultures have been formed as places for productive operations of the agriculture, forestry and fisheries industries, and as places for humans to live in harmonious coexistence with various species of wildlife. In these villages, we see wildlife species such as red dragonflies in the autumn dusk and schools of killifish in streams, in addition to those useful for productive operations. Villages directly interact with these wildlife species.

The utilization of diverse genetic resources for the development of new crop varieties has contributed to development of the agriculture, forestry and fisheries industries, and can offer new potential.

Water quality has deteriorated, however, with the improper use of agricultural chemicals and fertilizers, farmland and channel developments pursuing economic efficiency, and household wastewater. Seaweed beds and tidal flats have declined with reclamation. Overfishing and the introduction of alien species have destroyed ecosystems. Human operations that have failed to consider the conservation of biodiversity have degraded wildlife habitats and seriously affected biodiversity.

In promoting the agriculture, forestry and fisheries sector over recent years, the government has given priority to sustainable agriculture and a production infrastructure that gives consideration to the environment. In the meantime, productive operations in the agriculture, forestry and fisheries industries have declined along with the depopulation of farming, forestry and fishing villages, and fewer people engaged in these operations, as economic activities have changed with shifts in lifestyle and other rapid social structure changes, and with economic activity reforms amid computerization and globalization. As the use of Satoyama forests has decreased and abandoned farmland increased, wildlife species that had been commonly seen in biodiversity-rich Satochi-Satoyama areas have decreased, along with more serious damage caused by wildlife.

We should interpret these conditions as warning signs for the development of the agriculture, forestry and fisheries sector that supports the lives of the people, and promote the conservation of biodiversity more powerfully in this sector under the following four basic policies:

[4 basic policies]

- (1) Promotion of agriculture, forestry and fisheries measures that give greater priority to the conservation of biodiversity

In order to meet the public or consumer demand for a stable supply of safe food, the government should promote sustainable agriculture, forestry and fisheries industries that maintain good production environments, including from the perspective of

conserving biodiversity. At the same time, the government should invigorate the farming, forestry and fishing villages that support the sustainability of these industries.

Therefore, the government will give greater priority to conserving biodiversity in promoting agriculture, forestry and fisheries measures, promote sustainable agriculture, forestry and fisheries industries that can enhance the quality of wildlife habitats, and invigorate farming, forestry and fishing villages.

(2) Promotion of public understanding about agriculture, forestry and fisheries, and biodiversity

As urbanization and industrialization have reduced human relationships with nature, all citizens from children to adults are keen to interact with various animals and plants, and bountiful nature. As Satochi-Satoyama areas where people can interact with various animals, plants, and bountiful nature are closely linked to agriculture, forestry and fisheries operations, it is important to gain full public understanding about the roles that the agriculture, forestry and fisheries sector play in conserving biodiversity.

Therefore, the government will promote efforts to deepen public understanding about the agriculture, forestry and fisheries sector, and biodiversity through their experiences and interactions with nature in farming, forestry and fishing villages, as well as education on foods.

(3) Promotion of efforts by various entities, taking advantage of original regional ideas

Activities have been implemented to reform regional agricultural production from the perspective of conserving biodiversity, including regional organic agriculture to restore the white stork and other rare species of wildlife, as well as the conservation of ponds as biotopes in farmland development.

Farmers, community associations and NPOs have taken part in regional community activities to conserve farmland and agricultural water, in order to provide rice paddy fish ladders and migratory bird feeding grounds for the conservation of ecosystems, and develop Satochi-Satoyama areas for reducing damage caused by wildlife. Business enterprises are creating forests as part of social contribution activities. Fishermen and NPOs are implementing forestation projects, as well as maintaining and managing seaweed beds and tidal flats to conserve fishing grounds. In various areas in Japan, wide-ranging biodiversity conservation efforts are helping to invigorate the agriculture, forestry and fisheries sector, as well as farming, forestry and fishing villages.

These wide-ranging biodiversity conservation efforts will become more effective if agriculture, forestry and fisheries workers engaged in productive operations participate in these efforts, in cooperation with various other entities, as undertakers of conserving

biodiversity.

Therefore, in a bid to support wide-ranging activities conducted by various entities including agriculture, forestry and fisheries workers, local residents, NPOs, private enterprises and local governments, the central government will review and support biodiversity conservation activities by utilizing original regional ideas or know-how and techniques accumulated in local communities. The government will thus comprehensively promote the conservation of biodiversity with the understanding and participation of a wide range of people.

(4) Contribution to global environmental conservation through agriculture, forestry and fisheries

Regarding global biodiversity, the Sixth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP6) in 2002 announced a commitment to achieving a significant reduction in the current rate of biodiversity loss by 2010. At present, however, the Secretariat of the Convention reports that biodiversity continues to deteriorate.

Globally, biodiversity has deteriorated due to such factors as deforestation caused by expanding farmland and illegal logging, and a reduction of seaweed beds and tidal flats. There are also concerns about the impact of global warming on ecosystems.

Recognizing that agricultural, forestry and fisheries product imports represent the utilization of biodiversity in foreign countries, the government will positively address the conservation of biodiversity by promoting the agriculture, forestry and fisheries industries, and forest conservation and management in Japan, in order to reduce Japan's impact on overseas biodiversity and help to conserve global biodiversity. At the same time, the government will undertake international cooperation that contributes to conserving biodiversity in the agriculture, forestry and fisheries sector, such as combating desertification and global warming.

1 Biodiversity in agriculture, forestry and fisheries

(Outline of Measures and Policies)

In developing agriculture, forestry and fisheries policies, the government has traditionally promoted the development of production infrastructure while giving consideration to sustainable agriculture and environmental conservation, and has stepped up efforts to conserve biodiversity under the national biodiversity strategy. In response to a review of the Basic Food, Agriculture and Farming Village Plan (in March 2005), the Basic Forest and Forestry Plan (in September 2006) and the Basic Fisheries Plan (in March 2007), and enactment of the Organic Agriculture Promotion Act (in December 2006), the Ministry of Agriculture, Forestry and Fisheries adopted its biodiversity strategy (in July 2007).

The strategy specifies problems and measures regarding biodiversity in the agriculture, forestry and fisheries industries. Based on that strategy, the Ministry plans to comprehensively promote the conservation of biodiversity by implementing new measures and policies, gaining the understanding and participation of a wide range of people, and reviewing and supporting efforts to conserve regional biodiversity.

In order to promote the conservation of biodiversity in the agriculture, forestry and fisheries sector, in line with the four basic policies above, the Ministry will proceed with the conservation of countryside and Satochi-Satoyama areas and forests, as well as Satoumi and other sea areas. Since such areas are closely interlinked, the conservation of biodiversity must cover forest, river and sea ecosystems. In this sense, the Ministry will support agricultural production emphasizing biodiversity in countryside and Satochi-Satoyama areas, as well as broadleaf tree planting by fishermen, designate and conserve fish-breeding forest reserves, and develop forests for conserving fishing grounds to positively conserve forest, river and marine biodiversity. The Ministry will also address the conservation and sustainable use of genetic resources, global environmental conservation in agriculture, forestry and fisheries, and development of biodiversity indicators in that sector.

1.1 Biodiversity in agriculture, forestry and fisheries (Current Situation and Challenges)

The agriculture, forestry and fisheries sector employs cycles involving various species of wildlife in nature and nurtures fauna and flora, based on biodiversity.

In farming, forestry and fishing villages, people engage in sustainable agriculture, forestry and fisheries operations, and interact with nature to produce bountiful biodiversity. Biodiversity must be conserved to maintain and develop such farming, forestry and fishing villages, thereby leaving a secure Japan for future generations.

Most land animals and plants live and grow in forests. While constantly changing along the time axis due to logging or natural disruption, forests generally secure various types of plants suitable for natural conditions particular to individual lands as well as individual geographical conditions through constant area expansion. As a result, forests at various developmental stages are maintained in good balance, thus contributing to ensuring biodiversity. It is therefore important to promote the proper management and conservation of forests.

It is necessary for different segments such as agriculture, forestry and fishery workers and consumers to obtain a better understanding of the relationship between agriculture, forestry and fishery and biodiversity, as this relationship may not be fully understood.

(Specific Measures and Policies)

○ Region-by-region conservation of biodiversity

In order to accurately address the circumstances surrounding biodiversity in the agriculture, forestry and fisheries sector, as well as in farming, forestry and fishing villages, the government will comprehensively promote the following biodiversity conservation measures. (MAFF)

(1) Conservation of countryside and Satoyama-Satochi areas (detailed in Chapter 1, Section 6)

(2) Conservation of forests (detailed in Chapter 1, Section 5)

(3) Conservation of Satoumi and other sea areas (detailed in “Fisheries in Satoumi and other sea areas” in Chapter 1, Section 9)

○ Promoting the conservation of biodiversity covering forests, rivers and seas

“Forests are the lover of seas.” Forests have functions for recharging water levels and preventing soil spillage, and contribute to biodiversity by providing seas containing nutrients, through rivers running through the countryside and Satochi-Satoyama areas, in order to grow seaweed and phytoplankton that live in Satoumi areas. Nutrients in the sea are conveyed to forests through salmon migrating upstream in rivers. The proper use of agricultural chemicals and fertilizers for agricultural production in countryside and Satochi-Satoyama areas can reduce the impact of human activities on biodiversity in Satoumi areas. Since forests, the countryside, Satochi-Satoyama areas and Satoumi areas are closely interlinked, the government will promote the conservation of biodiversity covering all ecosystems in forests, rivers and seas. (MAFF)

○ Conservation and sustainable utilization of genetic resources (detailed in Chapter 2, Sections 1-2)

The government will promote the conservation and sustainable use of useful genetic resources, and secure Japan’s biodiversity through regulations on genetically modified farm products. (MAFF)

○ Contributions to global environmental conservation in agriculture, forestry and fisheries (detailed in Chapter 2, Section 4)

The government will take advantage of Japan’s experience and knowledge at home and abroad to promote international cooperation for sustainable agriculture, forestry and fisheries industries, and positively contribute to global environmental conservation, including the prevention of desertification, sustainable use of water resources, and measures against global warming. (MAFF)

○ Development of biodiversity indicators in agriculture, forestry and fisheries (detailed in Chapter 2, Section 5)

The conservation of biodiversity, on which the agriculture, forestry and fisheries sector is based, is indispensable for a stable supply of safe, high-quality agricultural,

forestry and fisheries products to the people.

Even though biodiversity is considered in implementing the policies and measures for agriculture, forestry, and fisheries including sustainable agriculture, however, indicators have yet to be developed based on a scientific basis that can qualitatively grasp the effects. Since the development of such indicators is needed to effectively promote those policies and measures, the government will examine indicators based on scientific grounds and clarify the roles that agriculture, forestry, and fisheries play in biodiversity, in addition to promoting the deepening of national and international understanding. (MAFF)

- Facilitating an understanding of agriculture/forestry/fishery industries with a focus on conserving biodiversity

The government will boost understanding and willingness among farmers by introducing the life and growth of living creatures, the surrounding environment, and agricultural history in such cases as wet-rice cultivation where food production and the conservation of biodiversity are compatible. It will also facilitate a greater understanding of such efforts among citizens by using the “Living Creature Icons” that indicate agricultural/forestry/fishery products produced in an environment where focus is placed on conserving biodiversity. Moreover, it will publicize how Japanese agriculture/forestry/fishery industries are contributing to the conservation of biodiversity in and around Japan starting from COP10 as a good opportunity. (MAFF)
[Cited in Chapter 1, Section 6, 1.1, and Chapter 2, Section 3, 1.1]

(Regional Space Measures)**Section 5 Forests
(Basic Concepts)**

The life and growth of most genes and species of animals, plants and soil organisms on land depend on forests that account for two-thirds of Japan's total land. Forests constitute diverse complex ecosystems depending on location and weather conditions, and have become a key factor in the conservation of biodiversity. Forests absorb and store carbon dioxide to help prevent global warming. Forests also stabilize weather conditions, prevent soil runoffs, recharge water reserves, supply lumber as renewable resources, and store massive genetic resources. Forests represent an environmental and survival infrastructure that is indispensable for human beings. In Japan, forests fulfill the various needs of citizens, including environmental education and the promotion of health. Therefore, forests serve as places of healing and cultural infrastructure.

All wild species maintain their existence by adapting to various natural environments particular to individual areas. In addition to living creatures that require a primitive natural environment, there are living creatures that adapt to a secondary environment formed by such manmade disruptions as logging and natural disruptions such as strong winds. As for manmade disruptions, the forest industry that relies on the production capacity of forest ecosystems helps forests to exert their multiple functions, including the conservation of biodiversity through such operations as adequate planting, weeding and thinning. Lumber production with such efforts has less impact on the environment. The efficient use of lumber for long periods in multiple stages will help realize a sustainable society. As for natural disruptions, some plants grow under severe natural conditions, such as repeated volcanic eruptions. There are even some plants that need the collapse of surrounding tall trees due to flooding or typhoons in order to expand their habitats.

As for forest growth, forest management that considers a time axis entailing a long period is important. While a diversified environment is formed in the growth process from low shrubs to tall trees, the living environments for wild animals and plants, as well as biodiversity also change. As for the conservation of forest biodiversity, it is important to maintain an overall environment in good balance where diversified living creatures can live and grow by arranging various types of forests suitable for the area's natural conditions in a certain planar expansion. Growing healthy forests with improved resistance against disease, pests and damage due to wind and snow as the result of appropriate forest maintenance and developing forests of trees in different stages of growth through logging and planting in consideration of conserving animals, plants and ecosystems will lead to the conservation of biodiversity.

We must hand over our precious forests to future generations and allow forests to sustain multiple functions into the future. In this sense, the development of diverse and sound forests is important. Also important are promoting forest conservation and management, implementing forestry operations by giving consideration to biodiversity, invigorating mountain villages by training forestry workers and through exchanges between urban and rural communities, developing forests on the part of business corporations and NPOs, and expanding forest environmental education and public interaction with forests to deepen public understanding about the roles of forests and forestry, and the significance of proper lumber utilization. With the understanding and cooperation by a wide range of private citizens, the National Campaign for the Promotion of “Utsukushii Mori Zukuri” (i.e., creation of well-managed forests and nature-rich land for future generations) must be comprehensively promoted. As artificial forests developed after the war and other forest resources have become available for human utilization, we must promote the proper development and conservation of forests through such operations as thinning in a bid to revitalize forests and the forestry/lumber industry through the expanded utilization of forests.

National forests that account for 20% of Japan’s national land and 30% of Japan’s forests are located along remote mountainous backbones and water sources, and include a variety of forests ranging from virgin natural forests to artificial ones, playing important roles in conserving biodiversity and allowing citizens to enjoy affluent lives. National forest administration and management must be designed for allowing national forests to demonstrate public functions as “forests for citizens.” Virgin natural forests and forests with habitats for precious species of wildlife, which could be registered as natural World Heritage sites, should be designated as “protected forests” or “green corridors” for the protection and management of precious natural environments. Artificial forests should therefore be properly developed and conserved through the promotion of thinning and mixing of coniferous and broadleaf trees. At the same time, the public sector should coordinate and cooperate with citizen groups to take advantage of regional characteristics for the formation of forests and provide opportunities for public interaction with forests.

As a major importer of lumber, Japan should also contribute to the conservation of forest biodiversity on a global scale by providing assistance to overseas forest conservation and sustainable forest management.

In December 2008, MAFF established the Investigative Commission to Discuss Measures to Promote Conservation of Forest Biodiversity consisting of external experts for discussing “measures to promote the conservation and sustainable use of forest biodiversity,” in order to promote the proper maintenance and conservation of forests with the participation of various entities. Based on the results of discussions by the Investigative Commission as summarized in July 2009, MAFF will promote a greater

understanding of biodiversity among the general public, including people involved in forestry activities and the forest industry from now on. Aiming at the maintenance and sustainable use of forest biodiversity, MAFF will promote adaptive forest management by taking the uncertainty of forest biodiversity into consideration, while monitoring forest biodiversity. With the above efforts being promoted, it is important to comprehensively implement the measures described below.

1 Forests

(Outline of Measures and Policies)

Forests have multiple functions including the conservation of biodiversity and widely benefit citizens as a “green social infrastructure.” As the first commitment period (2008-2012) under the Kyoto Protocol for a reduction of greenhouse gas emissions has arrived, forest development has been increasingly expected to secure the absorption of more carbon dioxide. Forests are also expected to be useful for forest environmental education and forest therapy. The public needs for forests have become increasingly diverse.

[Promoting creation of diverse forests]

The Basic Plan for Forests and Forestry—compiled in September 2006 under the Forest and Forestry Basic Act—calls for classifying forests into three categories according to their respective priority functions, and promoting category-by-category forest development and conservation measures. The three categories are: “water and soil conservation forests” (with the water-recharging or mountain region disaster-preventing function), “human-nature symbiosis forests” (with living environment protection or health promotion and cultural functions), and “cyclic resource utilization forests” (for lumber production). Under the policy of rapidly developing more old-age artificial forests into diverse sound forests through thinning, mixing coniferous and broadleaf trees, planting broadleaf trees, and long-term felling over the next 100 years to sustain the multiple functions of forests (including the conservation of biodiversity) and meeting the diverse needs of society, the government is now promoting various measures through forestry planning and other systems.

At their meeting in February 2007, the Cabinet ministers concerned decided to promote the National Campaign for the Promotion of “Utsukushii Mori Zukuri” (i.e., creation of well-managed forests and nature-rich land for future generations) as a joint movement between the public and private sectors, based on the understanding and cooperation by a wide range of private citizens. The campaign calls for thinning a total forest area of 3.3 million ha over six years from 2007. It also pledges to (1) build a sound material-cycle society rich with greenery by promoting appropriate forest development including the utilization of lumber, (2) develop vigorous human resources and

communities supporting forests, and (3) encourage participation in forest development efforts by a wide range of parties, including urban residents and business corporations.

In proceeding with these forest development measures, the government will promote operations by giving consideration to the conservation of fauna and flora living in forests and ecosystems.

[Promoting the proper conservation and management of forests]

Forests that must demonstrate public functions are designated as protection forests to promote the regulation of cutting down trees and the diversion thereof, establishment of conservation facilities in wastelands, and improvement of forests losing functionality. To address forest damage caused by disease and insect pests, the government will promote accurate and efficient measures in cooperation and coordination with forest owners, local residents and relevant organizations, while considering damage details and regional conditions. To address forest damage caused by deer and other wildlife species, the government is promoting wide-area and effective measures based on damage and wildlife habitat conditions in coordination with wildlife protection and management measures. The government will also step up appropriate measures giving consideration to the harmonious coexistence of humans and the various species of wildlife.

[Invigorating mountain villages]

Japan's mountain villages are being depopulated and residents are aging. Living standards in such villages are still lower than those in urban regions. Therefore, mountain villages must be invigorated to implement the proper development and preservation of forests, and the conservation of biodiversity.

The government will therefore secure new forestry workers and promote exchanges between urban and rural communities and human settlements in mountain villages, in order to invigorate these villages.

[Forest development with public participation and the promotion of diverse forest uses]

The government will promote forest development with the participation of private citizens and diverse forest uses including forest environmental education by paving the way for business corporations, NPOs and other entities to participate in forest development, developing personnel and public awareness campaigns for the promotion of forest environmental education, and providing field and technical guidance for experience-based activities.

[Development of the forestry and lumber industry]

Proper forest development is necessary to allow forests to provide their multiple

functions, including the conservation of biodiversity. In this respect, it is important to ensure that the lumber supplied through appropriate production operations is ultimately used by consumers, and that the earnings from lumber sales are used to cover costs shouldered by forest owners and reinvested in the development and conservation of forests.

To this end, the government will proceed with structural reforms to reduce the costs for producing, distributing and processing materials, and develop systems for a stable supply of products offering good quality and performance. In this way, the government will expand the uses of domestically produced lumber for development of the forest and lumber industry.

[Promotion of national forest administration and management]

National forests are located at various points including along remote mountainous backbones and water sources, and in Satoyama areas. These forests are diverse, including Japan's three most beautiful forests of Aomori Hiba (*Hinokiasunaro*), Akita Sugi (Akita cedar tree) and Kiso Hinoki (cypress), as well as Yanase cedar forests, Hokkaido's mixed forests including Yeddo spruce and fir trees, forests in the Japan Alps, artificial forests where tree planting and maintenance have been implemented for more than 100 years, red pine wood on Mt. Higashiyama in Kyoto, firewood and other community-based forests, forests with ecosystems indigenous to the Ogasawara Islands, laurel forests in the Aya region of Kyushu, on the island of Yakushima and in the Shirakami-Sanchi Mountain Range registered as natural World Heritage sites, and virgin natural forests on Shiretoko Peninsula. These national forests play major roles in recharging water levels and preventing mountain disasters, and make great contributions to the conservation of Japan's biodiversity.

In recent years, public expectations for forests have become diversified. Forests are now expected to help prevent global warming and conserve biodiversity. Under the policy of allowing national forests to serve public functions as "forests for citizens" or the common assets of citizens, the government has administered and managed national forests based on diverse public opinion to ensure that everyone may enjoy an affluent life.

The basic plans regarding administrative management of national forest land were also revised in December 2008 to clearly stipulate the conservation of biodiversity in the basic policies of administrative management.

In administration and management, the government classifies national forests by priority functions into categories for different treatment, and bases its promotion of forest development and conservation on said classification. In order to respond to diverse problems and needs in coordination with privately owned forests along each river, the government also works to reach agreements among relevant parties and

enhances upstream-downstream cooperation.

Precious forests used for the protection of forest ecosystems, conservation of genetic resources, and preservation of plant communities will be designated as “protected forests” for special maintenance and conservation through monitoring and other operations. At the same time, “green corridors” will be set up to network protected forests in order to conserve species and genetic diversity, a more tailored forest ecosystem network will be formed by improving protected forests along rivers and ridges, and management operations will be promoted with attention given to the living environment for wild animals and plants.

The government will also cooperate with local communities in implementing the “Akaya Project,” the “Aya Laurel Forest Project” and other forest development projects by taking advantage of regional characteristics. It will also promote the diverse uses of forests through such measures as developing forests with the participation of private citizens and providing fields for forest environmental education.

At the same time, the government will support local activities through the “Forest Environmental Conservation Center” and other means to encourage a wide range of private citizens to participate in promoting the uses of forests.

[Promotion of sustainable forest management in the world]

As the promotion of “sustainable forest management” has been recognized as an important challenge for growing interests in global environmental problems in recent years, many countries are using the “criteria and indicators” of “sustainable forest management” as agreed upon through international processes for monitoring and assessing their respective forest conditions.

Given this trend, Japan must grasp sufficient data on non-commercial trees and biodiversity in its forest resources surveys. The government will thus promote unified methods of monitoring forest resources in order to collect and analyze data on lumber production, biodiversity, the carbon cycle, conservation of water resources and other data regarding international “criteria and indicators.”

In order to promote sustainable forest management in the world, the government will contribute to conserving global biodiversity by participating in international forums such as the United Nations Forum on Forests (UNFF), and promoting bilateral and multilateral cooperation.

1.1 Concepts of Developing Forests into Desirable Ones Meeting Priority Functions (Current Situation and Challenges)

All forests diversely contribute to the maintenance and improvement of people’s lives by serving multiple functions. Forests should therefore be developed and conserved to effectively achieve respective requirements.

Japan is a small country with high precipitation, and has a large population engaged in advanced economic and cultural activities. However, many forests must effectively provide multiple functions. The government must consequently promote more appropriate development and conservation of forests, while considering the priority functions in response to the natural conditions of forests and regional needs.

Japan's forests have quantitatively expanded as a result of positive postwar artificial forest development. In order to develop these artificial forests into desirable ones, the government must properly select forestry operations based on existing forest conditions, locations and public needs, and promote systematic forest development and conservation.

(Specific Measures and Policies)

- The government will specify three categories of desirable forests—"water and soil conservation forests," "human-nature symbiosis forests" and "cyclic resource utilization forests"—in the Basic Plan for Forests and Forestry, and promote forest development and conservation in pursuit of the respective desirable forms of forests through forestry planning and other systems. (MAFF)

The three categories of desirable forests are described as follows:

In desirable "water and soil conservation forests," some space should be secured between the trees to allow sufficient sunlight to reach and grow under-canopy vegetation. Fallen leaves and other organic substances should have been abundantly supplied into the soil. Under-canopy vegetation and tree roots should have grown deep and wide to hold soil. Sufficient fissures should have been formed in the soil to absorb and retain water. These forests should be capable of easily holding soil and recharging water levels. Moreover, forest conservation facilities should have been built as needed to prevent soil runoff or collapse.

Desirable "human-nature symbiosis forests" should include one having a virgin nature environment suitable for the inhabitation of precious species of wildlife, a forest where town streets, historic sites and scenic spots are united with a virgin nature environment to form pleasant landscapes and historic scenery, one that curtails noise and wind, and provides pleasure and security for human lives, a forest that is properly managed as a familiar place for human-nature interaction and provides people with recreational and learning opportunities, and one where facilities are developed for promoting health and conducting cultural and education activities as necessary.

Desirable "cyclic resource utilization forests" should have soil suitable for the growth of trees, include healthy trees useful as lumber, grow relatively faster than other forests, and be highly capable of absorbing carbon dioxide. These forests should be sufficiently wide and have appropriately developed infrastructure

including trails.

- The government will specify concepts of how to develop the three categories of forests into desirable ones, and promote forestry development and conservation through forestry planning and other systems based on such concepts. (MAFF)

The concepts of how to develop the three categories of desirable forests are described as follows:

In developing desirable “water and soil conservation forests,” forests should be left to age with bare land resulting from the cutting of trees being narrow and dispersed. At the same time, proper forest development and conservation should be based on the following concepts for specific forests:

In multi-storied forest development operations, existing trees in single-storied coniferous forests subject to careful operations with consideration given to the prevention of soil runoff or collapse should be left to age as upper-story trees. At the same time, thinning should be repeated for gradual renewal. Natural forces may be used to introduce broadleaf trees according to location conditions as well as social needs including the conservation of landscapes. In this way, broadleaf trees may be mixed with coniferous trees to develop multi-storied forests.

Natural forests subject to continuous management for water and soil conservation should be developed into multi-storied forests through partial planting and renewal assistance, quantitative tree adjustment and tending.

In developing sufficiently large, single-storied coniferous forests of relatively rapid growth that are located on mild slopes, proper tending and thinning should be implemented with consideration given to plane expansion and mosaic distribution. Felling intervals should also be extended for the development and management of single-storied forests.

Treeless land or deserted forests where planting is required for water-recharging and other functions should be developed into single-storied forests. After sufficient growth, these single-storied forests should be transformed into multi-storied forests as necessary over an extended period of time.

In natural forest management, renewal assistance and other operations may be implemented as needed for proper conservation and management of forests dependent on natural forces and which provide water-recharging and other functions.

The development of “human-nature symbiosis forests” should give basic priority to the conservation and creation of natural environments. At the same time, proper forest development and conservation should be based on the following concepts for specific forests:

In natural forest management, forests with excellent natural environments and landscapes, including important wildlife habitats for the conservation of virgin

nature and natural environments, should basically be left to natural succession. As necessary, vegetation should be restored for proper conservation and management.

In multi-storied forest development, broadleaf and coniferous trees should be mixed for suburban, Satoyama and remote forests that are subject to continuous development and management for making our daily lives pleasant and relaxed, and which serve as places for human-nature interaction and a harmonious coexistence with wildlife.

In single-storied forest development and management, appropriate tending and thinning should be basically implemented with consideration given to landscapes for single-storied coniferous forests of relatively rapid growth that are located in Satoyama areas and on mild slopes.

The development of desirable “cyclic resource utilization forests” should give basic priority to the efficient and stable supply of lumber. At the same time, proper forest development and conservation should be based on the following concepts for specific forests. Consideration should also be given to lumber production costs when selecting a method of development.

In multi-storied forest development and management, belt or zone thinning should be implemented to efficiently develop single-storied coniferous forests of relatively slow growth.

Natural forests subjected to continuous development and management, including broadleaf tree forests located between single-storied coniferous forests, should be developed into multi-storied forests with healthy large trees through renewal assistance and quantitative adjustment.

In single-storied forest development and management, proper tending and thinning should be basically implemented for single-storied coniferous forests that grow fast.

Natural forests surrounded by developed multi-storied and single-storied forests along mountain ridges or in valleys and which are dependent on natural forces for the maintenance of sound conditions should be properly conserved and managed through renewal assistance as necessary.

1.2 Promoting the development of diverse forests

(Current Situation and Challenges)

Under the previous Basic Plan for Forests and Forestry, some progress was seen in emergency thinning efforts. But there are many forests that cannot be expected to continuously and efficiently achieve their multiple inherent functions including the conservation of biodiversity. Unless appropriate operations are implemented, such forests may increase. Efforts remain limited for the development of multi-storied forests for maintaining and improving water-recharging, soil runoff prevention and other

public functions to help prevent forests from becoming bare land. This may be because diverse methods including low-cost ones to develop mixed or broadleaf tree forests, concepts of how to select forests for such development, and relevant technologies have failed to diffuse. The introduction or diffusion of efficient operation systems to promote the thinning and development of multi-storied forests has been insufficient. The development of relevant trail networks has also been insufficient. The distribution of trail networks has also failed to meet efficient operation systems.

As aged artificial forests are expected to increase in Japan, promoting the development of diverse forests to meet public needs is reaching a turning point. Japan is now required to efficiently and effectively promote thinning for sound forest growth and the development of diverse forests meeting location conditions and social needs, in order to allow all forests to continuously achieve their multiple inherent functions.

While thinning and other efforts are required for developing diverse forests, private citizens including urban residents must be involved in forest development through such measures as using wooden products.

(Specific Measures and Policies)

[Developing diverse forests through such measures expanding broadleaf tree forests and extending felling intervals]

- In order to promote the development of diverse forests through such measures as expanding broadleaf tree and mixed forests, and extending felling intervals, the government will propose methods of development to be selected by forest owners, systematically diffuse efficient operation know-how, form a consensus on accelerating efforts to develop diverse forests, and select forest development sites. While promoting and diffusing these efforts on a nationwide basis, the government will support efficient operations including belt or zone felling. In a bid to ease the burden of forest owners, the government will also try to diffuse and settle technologies for efficient and low-cost afforestation and tending. (MAFF)

[Efficient and effective implementation of operations]

- The government will develop, diffuse and settle low-cost, efficient operation systems combining forest trail networks with high-performance forestry equipment. (MAFF)
- The government will promote the proper combinations of forest trails and strip roads meeting natural conditions and specific operation systems planned for introduction. In particular, the government will try to harmonize forest trails with the surroundings in all phases including planning, design and construction. (MAFF)

[Securing regional activities for the appropriate implementation of forest development]

- In order to ensure that systematic and integrated forest operations are implemented

timely and appropriately, the government will support such regional activities as the “collection of forest information” needed by forestry business entities to intensify their forest operations and the “specification of operation implementation zones” necessary for forest owners to implement forest operations. (MAFF)

[Promotion of forest development through public sector involvement]

- In order to ensure public safety and security, municipal and prefectural governments will promote more intensified operations by forestry cooperatives and other business entities, and a more effective thinning of forests where owners and other parties concerned face difficulties in implementing proper development operations. For forests urgently needed to achieve public functions without being timely or properly developed even with local government support, the government will implement necessary development operations through forest conservation and other projects. The government will subsequently promote the expansion of mixed forests based on location conditions. (MAFF)
- The government will promptly promote forest renewal measures for vacant lots where no planting has been done after felling trees, while trying to prevent such lots from emerging. (MAFF)

[Research, technology development and diffusion]

- In order to ensure research, technology development and forest tree breeding for the future development of forests and the forestry and lumber industry, and systematically and effectively diffuse the achievements made, the government and related independent administrative agencies will efficiently and effectively promote research and technology development, while enhancing industry-academia-government cooperation involving prefectural testing and research institutions, universities, academic societies and business corporations, based on the “research and technology strategy for forests, forestry and lumber industry areas” and the “forest tree breeding strategy” that specify goals for the proper, efficient development and conservation of forests, and consequently enhance the lumber industry’s competitiveness. (MAFF)
- In order to transfer research and technology development achievements, promote integrated forest development and conservation in regional communities, and forestry production, the government will efficiently and effectively promote the diffusion of such achievements among regional forestry leaders and forestry entities engaged in intensifying operations through forestry diffusion guidance projects. (MAFF)

[Conservation and utilization of genetic resources]

- In order to secure excellent seeds as necessary, the government will implement production and distribution measures including the development of seed resources and improvement of seedling technologies. (MAFF)
- In order to properly develop and conserve forests in Japan for the future under the “forest tree breeding strategy” formulated in 2007, the government will steadily promote the development of seeds having desired genetic characteristics, seeds for national land conservation of water-recharging functions, and other new seeds meeting public needs, and then diffuse these new seeds. (MAFF)
- In order to conserve rare and precious forest tree genetic resources including endangered species, and secure and effectively utilize such resources as breeding materials for the development of new forest tree species, the government will collect, store and evaluate forest tree genetic resources, and manage and distribute relevant information. (MAFF)

[Financing social costs]

- Various resources are used for financing the social costs for developing water sources and forests, including general-purpose financial resources, environmental tax and surcharge revenues collected by the central and local governments, upstream-downstream cooperation funds, profit-sharing forest contracts, fees collected for forest space use, and volunteer activities. In a bid to allow forests to sustainably achieve their multiple inherent functions, the government will consider precisely selecting financial resources to meet regional conditions in view of socioeconomic situational changes while obtaining public understanding. (MAFF)

[Contributing to the prevention of global warming]

- In order to achieve the targeted absorption of 13 million tons of carbon dioxide by forests under the Kyoto Protocol Target Achievement Plan, the government will promote comprehensive efforts including the development of sound forests, proper management and conservation of protection forests and other forests, forest development with citizens’ participation, and the utilization of lumber and wood biomass in cooperation with local governments, forestry and lumber industry stakeholders, and private citizens. (MAFF) [Cited in Chapter 2, Section 6, 1.1]
- The government will positively participate in an international assessment of the roles that forests and lumber utilization serve in preventing global warming. (MAFF) [Cited in Chapter 2, Section 6, 1.1]

1.3 National Campaign for the Promotion of “Utsukushii Mori Zukuri”

(Current Situation and Challenges)

Forests have various public functions including the conservation of biodiversity, and it is important to properly develop and conserve forests that account for two-thirds of Japan’s total land area.

As mountain villages have lost vigor due to declining forest profitability in recent years, however, forests are feared to lose their public functions in the absence of thinning. In order to allow forests to achieve their public functions, artificial forests (accounting for 40% of Japan’s forests) should be properly thinned and developed into diverse forests including broadleaf tree forests.

Japan’s forest resources including those in artificial forests developed after the war are becoming available for utilization. Given the growing global demand for lumber, forests and forestry should be revitalized through development and conservation, including appropriate thinning and the expanded utilization of domestic lumber.

In promoting greater cooperation among relevant government ministries and agencies, it is thus important to facilitate the efforts of the National Movement for Fostering Beautiful Forests in Japan, in order to comprehensively promote the proper development and conservation of forests, utilization of domestically produced lumber, development of forestry workers and rural communities, and other efforts with the understanding and cooperation of wide-ranging entities.

(Specific Measures and Policies)

- The government will promote more intensified forestry operations through proposals to forest owners, the diffusion and settlement of lost-cost operation systems, a more efficient distribution of forest products, and larger-scale lumbering and processing operations to structurally reform lumber production and distribution systems for the stable provision of high-quality/high-performance products. (MAFF, relevant government ministries and agencies)
- The government will promote the utilization of lumber for housing, energy areas and public works, development of new products and technologies meeting consumer needs, creation and expansion of new markets giving priority to consumers, and diffusion of good uses of wood. (MAFF, relevant government ministries and agencies)
- The government will attempt to secure and develop people engaged in forest development and conservation by promoting the training of those interested in forest development and conservation, including those moving to rural communities in the so-called U, J or I turn. The government will also secure and develop forest development and conservation workers in coordination with efforts to encourage more retired workers to return to their hometowns. Moreover, the government will take forest management adjustment measures including the specification of borders

in line with promoting forest development and conservation. (MAFF, relevant government ministries and agencies)

- The government will attempt to invigorate mountain villages by conserving mountain village resources including excellent natural environments, culture and traditions, utilizing these resources to create new industries and attractive communities, and developing mountain village infrastructure and systems for accepting new residents. (MAFF, relevant government ministries and agencies)
- The government will encourage a wide range of people to participate in forest development and conservation by promoting voluntary forest development by business corporations, NPOs and urban residents, and enhancing public understanding about forests through forest environmental education, forest therapy, and the conservation and utilization of community-based forests. (MAFF, relevant government ministries and agencies)
- The government will promote proper forest development by forest owners and efficient regional forest development that links privately held communal forests and national forests. (MAFF, relevant government ministries and agencies)

1.4 Promotion of proper forest conservation and management

(Current Situation and Challenges)

Forests that must achieve water-recharging and public forest functions have been systematically designated as protection forests for conservation through appropriate measures, such as regulations on felling trees or the diversion thereof.

At the same time, mountain disasters will still occur due to such weather conditions as concentrated heavy rains. Local floods and droughts have been increasing due to widening precipitation gaps between wet and dry years.

Damage has been caused by widespread forest disease and such insect pests as the pine weevil and oak ambrosia beetle (*Platypus quercivorus*) in areas where such damage had not been seen. And any forest fire has the potential to cause serious damage to forests.

Forest conservation and management are becoming more important for ensuring public safety and security through the public functions of forests.

(Specific Measures and Policies)

- Forests that must achieve public functions will be systematically designated as protection forests (planned at 12.69 million ha at the end of FY 2023). In order to secure the sufficient conservation of functions provided by protection forests, the government will further promote the proper management of protection forests by developing a system for utilizing digital satellite pictures and other means for the

- efficient management of protection forest data and regulatory information. (MAFF)
- In order to prevent mountain disasters from being caused by heavy rains, earthquakes, volcanic eruptions, landslides and driftwood, and minimize the resultant damage to improve regional safety, the government will promote the establishment of forest conservation facilities. Protection forests that serve as important upstream dam water sources or water sources for communities will be properly conserved by promoting the maintenance and development of forests having soil with great water-absorbing and water-retaining capacity. (MAFF)
 - The government will further promote the prevention of forest diseases and insect pests, and introduce eradication measures including more intense efforts to eliminate pine weevils along the edges of damaged areas, the selection of priority pine forests for conservation, coordination with regional voluntary activities, and measures against oak ambrosia beetles (*Platypus quercivorus*). The government will also prevent forest fires to ensure proper forest conservation, and promote the development and diffusion of species that resist disease and insect pests. (MAFF)

1.5 Promotion of measures against damage caused by wildlife to forests

(Current Situation and Challenges)

The populations of deer, wild boar and other wildlife have generally increased in Japan due to less hunting pressure in the wake of fewer hunters and a declining death rate partially attributed to less snowfall and warmer winter weather conditions. The areas where such animals are distributed have also expanded as depopulation and aging residents in mountain villages have led to reduced human activities and more abandoned agricultural land. The damage to under-canopy vegetation caused by wildlife feeding, soil runoff due to trampling by animals, and other forms of damage caused by wildlife are feared to affect the multiple functions of forests. Effective countermeasures are therefore required.

(Specific Measures and Policies)

- Regarding the damage caused by wildlife to forests, the government will promote the installation of damage prevention facilities such as guard fences and tubes to prevent feeding damage, hunting to regulate population sizes, the development and diffusion of new forest-damage prevention and elimination technologies, and improved arrangements regarding wildlife surveillance, forest-damage prevention and elimination.(MAFF) [Cited in Chapter 2, Section 1, 2.3]
- While ensuring closer coordination with wildlife conservation and management measures, the government will implement wide-area effective measures against damage caused by wildlife in view of wildlife habitat conditions, and promote the development of broadleaf tree forests in a manner giving consideration to wildlife

habitats. (MAFF) [Cited in Chapter 2, Section 1, 2.3]

- In order to create communities that enable compartmentalization between residents and wildlife, as well as coexistence, in coordination with local bodies, NPOs and other entities, the government will promote in eight model areas throughout Japan such comprehensive measures as investigating inhabitation conditions and the situation of damage caused by wildlife in hinterland national forests, maintaining habitat environments, and managing wildlife populations. (MAFF) [Cited in Chapter 2, Section 5, 1.11, and Chapter 2, Section 1, 2.3, 2.4]

1.6 Securing and developing forestry workers, promoting exchanges between urban and mountain village communities, and new settlements in mountain villages

(Current Situation and Challenges)

About 90% of the villages located in mountains that account for 50% of Japan's national land area (designated as promoted mountain villages under the Act for Developing Mountain Villages) are in forests. Among the mainstay industries in these mountain villages, forestry is a primary industry. Production in these industries has contributed to maintaining regional vigor and forests have been routinely managed through operations by local residents, including the utilization of fuelwood or firewood.

The population living in mountain villages has remarkably declined since the high economic growth period. While Japan's population increased by 30% from 1965 to 2005, the population living in mountain villages plunged by 40%. In 2005, said population was limited to only 3.4% of Japan's total population. Forests owned by nonresidents accounted for a quarter of privately owned forests. While the population living in mountain villages has declined and aged, forest owners have moved out of villages nearby their forests.

Some forests have failed to be managed well due to a slump in forestry production. Such a situation is feared to adversely affect the capability of forests to achieve multiple functions. Therefore, Japan must now secure new forestry workers, promote exchanges between urban communities and mountain villages, and encourage the settlement of new people in these villages, in order to invigorate these villages.

(Specific Measures and Policies)

- The government will secure and develop new forestry workers by implementing the "Green Employment for Forestry Conservation Project" for young people willing to conserve and develop forests. (MAFF)
- The government will secure diverse employment opportunities by promoting the forestry and lumber industry as a primary industry, developing other industries utilizing wood biomass and other untapped resources, improving the production infrastructure for special forest products as precious sources of revenue for mountain

villages and homes, creating special product development and other new businesses (forestry and mountain businesses) by taking advantage of forest resources, and newly utilizing forest resources in cooperation with urban enterprises and mountain villages. (MAFF)

- The government will promote the development of a living infrastructure including agricultural water supply and sewage facilities, support for ambitious and initiative cooperation between urban communities and mountain villages, and the development of human resources to help invigorate mountain villages. (MAFF)
- The government will promote greater exchanges between urban areas and mountain villages through forest experiences based on the appeal of mountain villages, forest environmental education linked to educational organizations, and health plans that include the use of forests. (MAFF)

1.7 Forestry operations taking account of biodiversity

(Current Situation and Challenges)

Forestry entities engaged in forest development and conservation must consider the conservation of wildlife species and ecosystems in forests, as well as lumber production in implementing business operations. This is important for the conservation of forest biodiversity.

The Forest Planning System therefore provides guidelines and recommendations for operations that give consideration to the protection of precious species of wildlife under regional forest plans. Under the forest certification system where private-sector third parties assess and certify sustainable forest management, the conservation of biodiversity is a key condition for certification. In real business operations, diverse wildlife conservation efforts, including the establishment of protected tree zones, have been launched. These specific efforts should be diffused to promote forestry operations that take the conservation of biodiversity into account.

(Specific Measures and Policies)

- In order to secure the capability of forests to sustainably achieve multiple functions, the government will promote greater consideration given to the conservation of biodiversity in forestry business operations by properly implementing the Forest Planning System and introducing real efforts including the acquisition of forest certificates. (MAFF)

1.8 Promoting forest development with citizens' public participation and diverse uses of forests

(Current Situation and Challenges)

Public understanding about and the interest in forests have made certain progress

over the past years as business corporations, NPOs and other entities have activated forest development and environmental education, and as a growing number of citizens have utilized forests for health, cultural and educational activities. In order to encourage the entire society to support the development and conservation of forests with multiple functions, including the prevention of global warming and conservation of biodiversity, Japan should promote voluntary forest development with participation by a wide range of private citizens.

(Specific Measures and Policies)

- In order to encourage business corporations, NPOs and other entities to develop and conserve forests, the government will pave the way for their participation in forest development by preparing plans and proposals for specific operations, creating support systems, and collecting and providing field, technology and other information. (MAFF)
- In national forests, the government will promote the designation of “corporate forests” for development by business corporations as part of philanthropic activities, the establishment of “friendly forests” to provide opportunities for citizens willing to develop forests on their own, and the development of “wood culture-supporting forests” with public participation, in order to contribute to the inheritance of regional historic buildings and traditional culture. (MAFF)
- The government will further promote national tree-planting campaigns including nationwide tree-planting ceremonies and the Green Fund, as well as regional tree-planting campaigns mainly on Greenery Day (May 4) and in the Greenery Month (April 15 to May 14). (MAFF)
- The government will promote public awareness campaigns regarding the significance of forests for children as leaders of the next generation, building on regional Junior Green Clubs formed to develop children into people who love and conserve the greenery in nature, and have healthy and bright hearts. (MAFF)
- The government will promote the development of technologies for and public awareness campaigns about the proper conservation and management of giant and old tree forests, community-based forests, and other forests or trees familiar to citizens. (MAFF)

1.9 Expanding forest environmental education and human-forest interaction

(Current Situation and Challenges)

In modern society, there are fewer opportunities for people to experience or interact with forests or even learn about the uses of lumber in daily life. It is now important to provide a wide range of people including children with opportunities for forest environmental education and interaction with forests, in order to deepen public

understanding about and a greater interest in the multiple functions of forests, and the significance of forestry and lumber utilization through various experiences in forests.

(Specific Measures and Policies)

- The government will promote the development of personnel and public awareness campaigns for forest environmental education. (MAFF)
- At national forests, the government will promote the designation of “Yu-yu-no-mori” forests for school-sponsored, experience-based activities, the experience-based activities in forests and forestry offered by regional and district forest offices, and relevant information services and technical guidance. (MAFF)
- The government will widely publicize information about the multiple functions and existing conditions of forests through various media to deepen public understanding about and the interest in forests and forestry. (MAFF)

**1.10 Development of forestry and lumber industry based on expanded use of domestic lumber
(Current Situation and Challenges)**

Proper forest development is required for forests to serve multiple functions including the conservation of biodiversity. In this respect, it is important to ensure that lumber supplied through appropriate production operations is ultimately used by consumers, with the earnings from lumber sales being used to cover the costs shouldered by forest owners and reinvested in the development and conservation of forests. For Japan’s forestry and lumber industry that plays a key role in developing forests, the lumber demand structure has been changing due to more cedar, cypress and other resources being available for harvesting in Japan, price hikes for foreign lumber amid a recent rise in demand from China, and fluctuating foreign exchange rates. Overall, however, domestic lumber production, processing and distribution remain limited and dispersed. In particular, distribution including multiple stages tends to be inefficient and costly. The Japanese forest and lumber industry has been behind the curve on structural reform, failing to provide good-quality and good-performing wood products ubiquitously, stably and cheaply as required by users.

(Specific Measures and Policies)

- The government will promote the development of arrangements to produce domestic lumber at lower cost and stably provide that lumber through such measures as intensifying related operations. (MAFF)
- The government will promote larger-scale lumbering and processing, the development of products meeting consumer needs, and the enhancement of supply and sales strategies. (MAFF)
- The government will promote a strategic diffusion of products for various sales targets

such as business corporations and consumers, as well as the comprehensive utilization of wood biomass. (MAFF)

1.11 Promoting administration and management of national forests including protected forests and green corridors

(Current Situation and Challenges)

As for national forests, the Basic Plans regarding Administrative Management of National Forest Land were revised in December 2008 to clearly stipulate the conservation of biodiversity in the basic policies of administrative management. In the administration and management of national forests, the government is promoting the development and conservation of forests according to categorized functions, while always taking natural river basin characteristics into account and making efforts to conserve biodiversity based on these basic plans. Specifically, the government has left forests to natural succession, implemented positive thinning, raised the age at which trees can be cut down, carried out the mosaic distribution of various trees or mixed coniferous trees with broadleaf ones through repeated thinning and other measures, depending on specific forest conditions. Various measures have thus been adopted for national forest development and conservation. The government has also implemented model projects involving the cooperation of such parties as local residents and nature conservation groups for developing wildlife habitats and other forests, by taking advantage of local characteristics. Through such varied efforts, national forests have created diverse forest environments, demonstrated national land conservation functions, and served as habitats for various species of wildlife, thereby contributing to the conservation of biodiversity.

National forests include forests with excellent landscapes, those maintaining rich ecosystems as habitats for precious species of wildlife, and others that are combined with mountain streams to form sound environments. The government has designated virgin natural forests and important forests including precious wildlife habitats as “protected forests” for conservation and administration since the protected forest system was created in 1915. Protected forests now include the island of Yakushima, the Shirakami-Sanchi Mountain Range and Shiretoko Peninsula—all registered as natural World Heritage sites. As of April 2009, forests totaling 780,000 ha (about 10% of national forests) had been designated as protected forests, including those subject to conservation left to natural succession.

In wider-area and more effective efforts to protect forest ecosystems, the government launched the “Green Corridor” system in 2000 to form networks linking protected forests by securing migratory routes connecting wildlife habitats, in order to promote exchanges between wildlife populations and ensure species and genetic diversity. As of April 2009, green corridors totaled 510,000 ha. In FY 2006, the

government established the Eastern Chugoku Mountain Range Green Corridor (some 7,000 ha) linking national and privately owned forests. The government has also made efforts to protect precious species of wildlife living in national forests, including the collection of habitat data, and the maintenance and development of habitats. In efforts to properly conserve and administer national forests, the government has also implemented patrolling, cleaning, enlightening people about proper manners and other activities in cooperation with related agencies, volunteer organizations, local residents and other stakeholders.

As lumber production is the major function of forests having a direct relation with national life and contributes to regional industrial development and realizing a sound material-cycle society, and with lumber utilization being an effective measure to develop forests for absorbing carbon dioxide to help prevent global warming, the government has tried to sustainably and systematically provide lumber and other forest products under its basic policy of administering and managing national forests to secure their achievement of public functions. In particular, the government has provided lumber produced through the thinning of artificial forests developed just after the war and which have now become available for utilization. In a bid to inherit Japan's "wood culture," the government has also taken advantage of characteristically diverse national forests to systematically provide building materials for renovating cultural property, materials for traditional artwork, and other woods that privately owned forests cannot be expected to provide.

At the same time, the government has promoted the utilization of lumber from national forests for its own civil engineering works (including afforestation), and for government buildings and the interiors thereof.

As NPOs and other entities concerned have activated direct forest development activities, business corporations have begun to conduct forest development and conservation activities as part of corporate social responsibilities. "Forest environmental education" for people wishing to learn about the relationship between their life and the environment, and learning about forests, forestry and lumber through various forest experiences are therefore becoming increasingly important.

Given the fact that national forests are diverse ranging from forests with excellent natural environments to artificial ones and can meet the various needs of people seeking to interact with forests, the government has designated "recreational forests" that provide fields for forest development with public participation and forest environmental education, have excellent landscapes, and are suitable for forest bathing, observing nature and playing outdoor sports. The government has also used the 11 Forest Environmental Conservation Centers in Japan to support relevant activities by citizen groups. Government operations regarding national forests have thus been quite diverse.

In administering and managing national forests, the government should develop and conserve diverse sound forests, including mixtures of coniferous and broadleaf trees in order to conserve biodiversity and achieve other expected functions as public forests. The government should also promote the designation of protected forests and green corridors, proper conservation and administration through monitoring surveys, and patrol operations in cooperation with local residents. At the same time, the government should try to promote the sustainable and systematic provision of lumber and other forest products, the utilization of lumber, and fields for public interaction with forests, thereby allowing people to deepen their understanding about forests and feel familiar with forests.

(Specific Measures and Policies)

[Promoting proper development and conservation of national forests]

- In order to allow national forests to fully achieve their multiple functions, the government will promote diverse forest development operations including the systematic, efficient thinning and utilization of natural forces for introducing broadleaf trees into artificial coniferous forests through repeated thinning to result in mixed forests. (MAFF)
- As national forests are important for such purposes as national land conservation and the recharging of water levels, and as designated protection forests total 6.79 million ha (at the end of FY 2008), accounting for about 90% of national forests, the government will implement the proper conservation and administration of these forests to achieve the purposes for such designation. (MAFF)
- At protection forests that are particularly required to achieve national land conservation, water-recharging, living environment preservation and other public functions, the government will promote the construction of conservation facilities, improvement of function-losing forests, and other operations under the Forest Improvement and Conservation Works Master Plan. (MAFF)
- The government will promote model projects like the Akaya Project and the Aya Laurel Forest Project in cooperation with local residents and nature conservation groups for the conservation of regional natural environments. The Akaya Project aims to restore biodiversity and develop a sustainable regional society under an agreement between a regional council of local residents, nature conservation groups, and the Forestry Agency. The Aya Laurel Forest Project is designed to strictly protect Japan's largest virgin laurel forests and redevelop into laurel forests the secondary and artificial forests that divide existing natural laurel forests. (MAFF)
- The government will promote the development and conservation of community-based forests including red pine wood as the background of the cultural World Heritage site at Mt. Higashiyama in Kyoto, as well as broadleaf forests developed as fuelwood

forests in Kyushu. (MAFF)

- In order to create communities that enable compartmentalization between residents and wildlife as well as coexistence, in coordination with local bodies, NPOs and other entities, the government will promote such comprehensive measures in eight model areas throughout Japan as investigating the inhabitation conditions and situation of damage due to wildlife in hinterland national forests, maintaining habitat environments, and managing wildlife populations. (MAFF) [Cited in Chapter 2, Section 5, 1.5, and Chapter 2, Section 1, 2.3, 2.4]

[Maintaining and conserving national forests]

- National forests include many with virgin forest ecosystems and habitats for precious species of wildlife. For these forests subject to special conservation and administration, the government will promote a fine-tuned designation and reconsideration of protected forests in view of the distribution of precious species of wildlife. Protected forests are classified into seven categories according to such designation purposes as the protection of forest ecosystems, preservation of genetic resources, and conservation of alpine flora and other plant communities. In principle, protected forests are left to natural succession. In order to grasp the conditions of protected forests and promote proper conservation and administration after designation, the government will conduct monitoring surveys at protected forests nationwide. As part of conservation and administration operations, the government will properly implement such measures as installing guard fences to restore vegetation and prevent damage to vegetation caused by deer, in order to protect relevant species and maintain and conserve their habitats. (MAFF)
- The government will implement wider-area and more effective forest ecosystem protection measures, including the designation of “green corridors” networking protected forests. Also, a more tailored forest ecosystem network will be formed by improving protected forests along rivers and ridges, coupled with management operations being promoted with attention given to the living environments for wild animals and plants. Under the policy of securing balanced mixes of coniferous and broadleaf trees, and diversifying tree ages and canopy layers in green corridors, the government will implement operations by giving consideration to wildlife habitats, including the maintenance of excellent tree mixes and the positive preservation of broadleaf trees emerging naturally in artificial forests. The government will also conduct monitoring surveys to grasp the relations between forest conditions and wildlife habitats, and reflect such relations in its conservation and administration. If green corridors of sufficient size cannot be secured in national forests alone, the government will cooperate with the owners of forests neighboring the national forests as necessary, in designating sufficiently wide green corridors including both national

and privately owned forests. (MAFF)

- In order to promote the protection of precious species of wildlife, the government will patrol habitats for wildlife species given protection priority, survey forest protection and administration methods for maintaining and developing these habitats, establish specific forest handling policies, and implement the maintenance and development of these habitats.

In order to protect the Japanese bush spruce (*Picea maximowiczii*), an endangered species identified only on Mt. Yatsugatake and in the Minami Alps in Nagano Prefecture's Nanshin region, for example, the government is implementing protection and conservation operations, including the collection of grafts and the growing of young trees, in cooperation with relevant organizations.

In Hokkaido, the government has sponsored a panel of experts to work out a "policy for handling forests where the great black woodpecker lives" and will implement forest development and conservation based on that policy. (MAFF)

- In addition to routine inspections for preventing forest damage including that caused by disease, insects, wild animals, and forest fires, the government will conduct patrols to prevent hunting and other illegal acts in wildlife protection areas, and the illegal digging of alpine flora for protecting precious species of wildlife. (MAFF)
- In terms of natural world heritage, on Japan's Hundred Famous Mountains and in national forests where it is feared that too many visitors will adversely affect the vegetation there, private citizens selected as "green support staff" will implement effective fine-tuned conservation and administration operations, including patrol activities for curbing or preventing the artificial deterioration of vegetation and forest functions, and public awareness campaigns regarding proper manners. (MAFF)
- In order to properly maintain and conserve forests registered as natural World Heritage sites such as the Shirakami Mountains, proper management will be further promoted in coordination with individual citizens by introducing the Forest Information Collection Center, which collects information via cell phone from visitors when they encounter such abnormalities as damage to trees or logging. (MAFF)

[Promoting systematic and sustainable provision and utilization of forest products from national forests]

- Under the basic national forest administration and management policy aimed at maintaining and promoting public functions, the government will try to sustainably and systematically provide lumber and other products from national forests while giving sufficient consideration to the conservation of natural environments. (MAFF)
- At national forests, the government will promote the utilization of lumber for its own civil engineering works (including afforestation), and for government buildings and the interiors thereof. The government will also promote the utilization of lumber and

wood products for which both legality and sustainability have been identified. (MAFF)

[Providing national forest fields for public interaction with forests]

- The government will promote the designation of national forest fields as “friendly forests” for forest development to address people’s willingness to experience forest development on their own. (MAFF)
- The government will promote the designation of “corporate forests” where business corporations take advantage of the revenue-sharing system for forest development, in order to make social contributions, provide opportunities for educating their employees, and afford closer interaction with customers. (MAFF)
- In order to protect historically important wooden structures and wood culture like traditional artwork for inheritance by the next generation, the government will promote “forest creation to support wood culture” with public participation. (MAFF)
- The government will promote the designation of “Yu-yu-no-mori” forests where schools and relevant forest offices conclude agreements for experiences in nature and learning about nature. (MAFF)
- The government will promote refreshment measures for “recreational forests” that should be used as attractive fields meeting the needs of users. (MAFF)
- The Forest Environmental Conservation Centers will support the activities of people engaged in forest environmental education, and citizen groups engaged in nature restoration and biodiversity conservation activities. (MAFF)

1.12 Promoting the monitoring of forest resources

(Current Situation and Challenges)

In order to collect data regarding the “criteria and indicators” for sustainable forest management, and continuously grasp biodiversity and other forest conditions and their changes, the government launched its first five-year “forest resources monitoring survey” in FY 1999, covering some 15,700 fixed forest observation points every 4 kilometers throughout the nation. In the future, the government must continue to conduct this forest resources monitoring survey, and chronologically assess and analyze data from the second five-year survey ended in FY 2008 for utilization in regional forest plans and related planning.

(Specific Measures and Policies)

- At about 15,700 fixed observation points throughout the nation, the government will continuously survey site conditions, vegetation, sapless or lost trees, traces of wildlife inhabitation, disease, and damage caused by insects and wild animals. (MAFF)
[Cited in Chapter 2, Section 5, 2.7]

- Based on data from the first and second five-year forest resources monitoring surveys, the government will prepare its second national report on “criteria and indicators” of the Montreal Process in 2009, and promote sustainable forest management in Japan and the world. (MAFF) [Cited in Chapter 2, Section 5, 2.7]
- The government will develop methods of kinetic analysis of forests by using the forest resources monitoring survey data and space information data such as satellite photos and digital aerial photos. (MAFF)
- The government will attempt to implement the effective utilization of forest resources data, including the integrated handling of forest space data and forest resources monitoring survey results in the forest Geographic Information System (GIS). (MAFF) [Cited in Chapter 2, Section 5, 2.7]
- The government will consider the cross utilization of data from the forest resources monitoring surveys and other national surveys such as the National Survey on the Natural Environment and Monitoring Sites 1000. (MOE, MAFF, MLIT) [Cited in Chapter 2, Section 5, 2.7]

1.13 Promoting sustainable forest management in the world

(Current Situation and Challenges)

The world's forests, including tropical rain forests inhabited by many of the species on earth, have been rapidly declining and deteriorating due to a diversion to farmland, illegal logging, forest fires, and overgrazing. Between 2000 and 2005, forests declined by some 12.9 million ha annually. (On a net basis excluding reforestation areas, annual deforestation amounted to about 7.3 million ha, equivalent to one-fifth of Japan's national land.) Since such large-scale deforestation and forest degradation are major factors causing a global biodiversity crisis, Japan must promote cooperation in forest conservation and reforestation activities in developing regions, and actively participate in and contribute to international dialogue.

(Specific Measures and Policies)

- The government will positively participate in international forums including the United Nations Forum on Forests (UNFF) designed to promote the sustainable management of all types of forests. (MOFA, MAFF, MOE)
- The government will insist on the significance of illegal logging as a key factor behind deforestation and forest degradation at international forums to stimulate international efforts for addressing this problem. (MOFA, MAFF, MOE)
- The government will promote bilateral technical and financial assistance, as well as multilateral cooperation through international organizations for forest conservation and reforestation, and measures against illegal logging in developing countries. (MOFA, MOE, MAFF)

- After Canada had served as the secretariat of the Montreal Process since its inauguration, Japan has been the secretariat since January 2007. As the secretariat, Japan will demonstrate its leadership in establishing sustainable forest management in the world, and promote international efforts for formulating and applying “criteria and indicators” to grasp, analyze and evaluate the sustainability of forest management. (MAFF) [Cited in Chapter 2, Section 4, 3.4]
- The government will tackle technical cooperation regarding forest tree breeding to support sustainable forest management efforts, including the proper conservation and utilization of tropical rain forests, and the restoration of greenery in developing and other countries. (MAFF)

Section 6 Countryside and Satochi-Satoyama Areas (Basic Concepts)

Countryside and Satochi-Satoyama areas have paddy fields, water channels, reservoirs as well as coppices, groves, and protective trees and hedges around residences, thereby affording diverse environments that form a network, and with the help of ongoing agricultural or forestry operations, provide biologically rich spaces inhabited by diverse species of wild animals and plants.

In such countryside and Satochi-Satoyama areas where the natural environment is close to people due to human commitment and care, any inappropriate use of agricultural chemicals or fertilizers, as well as economy- and efficiency-oriented operations may impact biodiversity. And while some native animals and plants commonly seen in those areas in the past have been decreasing, certain other species have tended to expand their habitat ranges in recent years due to the reduced use of community-based forests or more farming land being abandoned in view of the shortage of manpower in agriculture and forestry. A resulting trend is that the damage caused by wild birds and animals on agricultural, forestry and fishery activities is getting more serious.

Given this situation, measures for improving or conserving the countryside and Satochi-Satoyama areas should be implemented with attention paid to promoting biodiversity-conscious agricultural activities, so that biodiversity will be conserved and people can have safe and good-quality foods, as well as a biologically rich environment. It is also necessary to promote measures to increase human interaction with wildlife and deepen public understanding of agriculture's potential influence on biodiversity, from the viewpoint that agriculture helps support the life of diverse living creatures, as well as providing food for humans, and therefore very important to vitalize agricultural or mountain villages.

In order to hand over countryside and Satochi-Satoyama areas to future generations in a way that maintains the capacity to provide safe, good-quality foods as well as a biologically rich environment, it is also essential to address various issues, such as promoting the vitalization of agriculture and forestry, regional vitalization, the conservation of biodiversity, and succession of culture, by using not only ancient wisdom fostered through a long history but also state-of-the-art biomass technology and collaborative efforts among all relevant organizations and citizens. In that process, it is also important to attain a social consensus based on scientific grounds.

1 Countryside and Satochi-Satoyama areas (Outline of Measures and Policies)

Countryside and Satochi-Satoyama areas play an important role in providing

habitats for diverse living creatures, as well as opportunities for human interaction with nature, in addition to supplying safe, good-quality foods to the public. In order to ensure perpetual conservation and the utilization of those rural areas into the future, the government will make efforts, in accordance with the “Basic Plan for Food, Agriculture and Rural Areas” (adopted by the Cabinet in March 2005 pursuant to the Food, Agriculture and Rural Areas Basic Act), to reduce the environmental load associated with agricultural activities, develop and secure necessary manpower for agriculture, promote the effective utilization of farmland, ensure the conservation and formation of a desirable agricultural environment in the process of infrastructural improvement, and vitalize agricultural areas by promoting exchanges between urban cities and agricultural villages. The government will also promote the vitalization of countryside and Satochi-Satoyama areas through the effective utilization of biomass, pursuant to the “Biomass Japan Comprehensive Strategy” (March 2006).

In targeting community-based forests that constitute recreation/relaxation spaces for people as well as a living environment, and which also provide essential habitats for wildlife, the government will also promote, in accordance with the “Basic Plan for Forest and Forestry” (decided upon by the Cabinet in September 2006, pursuant to the Forest and Forestry Basic Act), forest improvement activities aiming at a multifaceted utilization of forests, while ensuring the conservation of habitats for diverse living creatures in the course of promoting forestry. Forest therapy is one example of such multifaceted forest utilization. The government will also promote the development of human resources dedicated to conserving or restoring countryside and Satochi-Satoyama areas.

1.1 Ensuring enhanced focus on conserving biodiversity in promoting agricultural production (Current Situation and Challenges)

The appropriate operation of agricultural production would enable us to ensure the conservation of biodiversity and the desirable formation of landscapes. Conversely, the inappropriate use of agricultural chemicals or fertilizers could adversely affect the environment of countryside and Satochi-Satoyama areas and the biodiversity there, and even harm the fishery environment by deteriorating the quality of river water. Therefore, it is necessary to promote environment-friendly agriculture, such as organic farming, with enhanced focus on conserving biodiversity in countryside and Satochi-Satoyama areas, and introduce the viewpoint of harmony with wildlife in the course of promoting agricultural activities.

(Specific Measures and Policies)

- It is important to ensure the appropriate use of such agricultural production tools as agricultural chemicals and fertilizers, and the government will promote education

and ensure compliance by farmers with a code of agricultural practices that everyone engaged in agriculture is supposed to observe for environmental conservation. (MAFF)

- As only registered agricultural chemicals can be used, registration is made based upon strict examinations of toxicity, water-polluting level, potential impact on aquatic plants and animals, persistency, etc. Also prescribed is a safe use standard for respective registered chemicals to avoid adverse effects on the environment. The government will ensure the appropriate use of agricultural chemicals by requiring users to observe said standard. (MAFF)
- In accordance with the Agricultural Chemicals Regulation Law, the government will establish the Standards to Withhold Registration for Prevention of Damages to Aquatic Animals and Plants for each agricultural chemical. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- The government will establish methods of risk assessment and the management of agricultural chemicals to mitigate impacts on terrestrial ecosystems. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- In order to conserve and secure the biodiversity in farmlands and surrounding environments, the government will develop methods of evaluating the impact of agricultural chemicals on biodiversity. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- The government will promote the introduction of sustainable agricultural production practices that are intended to integrally promote composting-based soil cultivation and the reduced use of chemical fertilizers and agricultural chemicals. As part of advanced measures, the government will seek to reduce the regional aggregate use of chemical fertilizers and agricultural chemicals, such as by targeting a 50% reduction. (MAFF) [Cited in Chapter 2, Section 7, 1]
- The government will promote organic farming—where the rule is to avoid using any chemical fertilizers and agricultural chemicals—and attempt to significantly reduce the environmental load imposed by agricultural activities, as well as support the life of diverse living creatures. As part of this effort, the government will promote technological development for organic farming, improve education and guidance for farmers, and seek to raise consumer understanding of and interest in organic farming. Thus, the government aims at environmental improvements that would facilitate the active implementation of organic agriculture on the part of farmers. (MAFF) [Cited in Chapter 2, Section 7, 1]
- The targeted number for registration among Eco Farmers, who collectively work on preparing soil and reducing the use of chemical fertilizers and synthetic agricultural chemicals, is set at 200,000 cases by the end of 2009 (versus 191,846 cases as of September 2009), and registration will be continuously promoted. In order to support such efforts, Eco Farmers throughout Japan will cooperate to deepen mutual

education by exchanging advanced technologies and experiences, and promote networking to increase understanding among consumer groups and others. (MAFF)

- Along with the above-mentioned efforts toward promoting biodiversity-conscious agricultural production, the introduction of Good Agricultural Practices (GAP) would be effective in securing the supply of safe and good-quality agricultural produce. GAP constitutes a cycle of process management consisting of work to determine check items throughout the entire range of agricultural activities, including the appropriate and timely use of agricultural chemicals or fertilizers, conducting farmwork by following the respective check items, keeping records, reviewing and evaluating records, identifying any improvements necessary and taking corrective action. To enhance efforts and improve the activities, the government will prepare guidelines on the common platform of GAP. (MAFF)
- The government will collect examples of farming and management methods to create and maintain a rice paddy environment suitable for the habitats of wildlife, and publicize the results at such international settings as COP10 and the 11th Meeting of the Conference of the Contracting Parties to the Ramsar Convention, as well as to general citizens for promoting the dissemination and establishment of such efforts. (MAFF, MOE) [Cited in Chapter 2, Section 4, 1.3]
- Facilitating better understanding of agriculture/forestry/fishery industries with focus on conserving biodiversity

The government will boost understanding and willingness among farmers by introducing the life and growth of living creatures, the surrounding environment, and agricultural history in cases such as wet-rice cultivation where food production and the conservation of biodiversity are compatible; it will also facilitate better understanding of such efforts among citizens by utilizing the “Living Creature Icons” that indicate agriculture/forestry/fishery products produced in an environment where focus is placed on conserving biodiversity. The government will also publicize how Japanese agriculture/forestry/fishery industries are contributing to the conservation of biodiversity in and around Japan starting from COP10 as a good opportunity. (MAFF) [Cited in Chapter 1, Section 4, 1.1, and Chapter 2, Section 3, 1.1]

1.2 Promoting soil cultivation, fertilization and pest/weed control with enhanced focus on conserving biodiversity

(Current Situation and Challenges)

A lack of soil cultivation, inappropriate fertilization or the improper use of agricultural chemicals could degrade soil quality or soil fertility, thereby exposing local ecosystems to disruption due to adverse effects on soil microbes or indigenous natural enemies, or possibly hampering sustainable production. Therefore, it is important to

encourage farmers to promote soil cultivation, introduce efficient and effective fertilization, and make pest/weed control efforts, so as to ensure biodiversity-conscious agricultural production.

(Specific Measures and Policies)

- As part of efforts to promote appropriate soil cultivation and fertilization, the government will promote the use of compost derived from livestock excreta or food refuse through enhanced cooperation between farming and the stock-raising business, as well as more rational fertilization based on the diagnosis of soil and crops, while paying attention to fertilizing elements included in such organic substances as compost, with the aim to maintain or improve soil fertility by maintaining or improving such biological features of soil as the population or diversity of soil microbes. (MAFF)
- The level of soil microbes has much to do with soil fertility, the outbreak or control of soil disease and soil damage, and the material cycle of soil. In order to promote the utilization of soil microbes for agricultural production, the government will promote the development of fundamental technologies to analyze the functions and other aspects of such microbes. (MAFF)
- The government will promote efforts to ensure good control of pests or weeds in a way that manages related factors, as well as Integrated Pest Management (IPM) which aims to combine diverse control methods and timely materialize optimal control by using data or information on estimated or predictable outbreaks of pest infestation, or employing field observations. The government will also encourage farmers to use agricultural chemicals possibly having less impact on natural enemies. Through these measures, the government will promote pest/weed control in a way that pays enhanced attention to conserving biodiversity, including the diversity of soil microbes and indigenous natural enemies, in the agricultural production environment. (MAFF)
- There are a variety of agricultural techniques friendly to living creatures, such as the winter flooding of paddy fields. The government will collect information on those techniques as well as successful regional efforts, and make such information available to farmers. (MAFF)
- The government will promote the widespread utilization of the above-mentioned agricultural techniques that put enhanced focus on conserving biodiversity. (MAFF)

1.3 Promoting the improvement and conservation of Satochi-Satoyama areas to mitigate crop damage caused by wild birds and animals

(Current Situation and Challenges)

The many wild animals that live in Satochi-Satoyama areas play an important role

in ecosystems. Those animals closely interact with our daily lives in the form of essential resources used by humans. At the same time, agricultural villages have a long history of suffering crop damage caused by wild boars; the banks and fences set up by farmers illustrate this ongoing struggle and efforts to protect their harvests from wild animals.

The recent tendency seen in Satochi-Satoyama areas can be characterized by reduced human activities, more agricultural lands being abandoned, fewer hunters, and less snowfall—all of which tend to encourage the expanded habitat ranges of wildlife. As a result, the crop damage caused by wild animals such as wild boars, deer and monkeys has become more serious. In addition, alien species such as raccoons not only cause damage to agricultural, forestry and marine products, but also threaten the ecosystems of Satochi-Satoyama areas.

Wild animals may hide amid bushes or other unseen places near agricultural land prior to attacking crops. Therefore, it is important to promote the segregation of human and wild animal habitats, and efforts to prevent crop damage by wild birds or animals should be made in a comprehensive way that covers the management of habitat environments as well as population control. In view of the ongoing implementation of measures to prevent crop damage, it is also important to regard captured birds and animals as local resources for utilization.

In addition to the efforts described above, the Act on Special Measures for the Prevention of Damage due to Wildlife (Wildlife Damage Prevention Special Measures Act) was enacted in February 2008, as an attempt to promote a comprehensive and effective approach to preventing agricultural and fishery damage caused by wildlife.

(Specific Measures and Policies)

- As part of efforts to improve and conserve Satochi-Satoyama areas, the government will promote bush cutting in areas close to farmland. It will also ensure that close attention is paid to the respective proportions of conifers and broadleaf trees planted in forests for improving and conserving forests in a way that also protects the habitat environments for wildlife. (MAFF, MOE)
- Based on the damage prevention plan created by local municipalities in accordance with the Wildlife Damage Prevention Special Measures Act, comprehensive support will be provided for measures to manage habitat environments by improving Satochi-Satoyama areas where compartmentalization between residents and wildlife is promoted, measures for population control by capturing wildlife and improving the facilities to treat and process captured wildlife, and such damage preventive measures as installing fences. (MAFF)

1.4 Promoting the conservation of networks of ecosystems and water environments including paddy fields, water channels and reservoirs

(Current Situation and Challenges)

Rural waterfront environments including paddy fields, water channels and reservoirs form organic networks of water and ecosystems. For example, crucians inhabiting small rivers migrate upstream during spawning season, then appear in paddy fields and agricultural channels to deposit eggs with waterweed in the shallows. Thus, these waters constitute habitat environments for a variety of wildlife that use the waters in diverse ways according to their respective life history. Such networks of water and ecosystems are conserved through such human activities as production, maintenance and management by farmers or local residents, and therefore contribute greatly to the conservation of biodiversity.

At the same time, rural waterfront environments including paddy fields and water channels should also be properly maintained or renewed to improve farming production efficiency or ensure disaster prevention; therefore, it is important to pay close attention to conserving biodiversity when modifying or renewing agricultural land.

(Specific Measures and Policies)

- The government will create and improve “water corridors” as part of a network of water and ecosystems that not only links forests and the ocean through rivers, but also continuously links rivers, paddy fields, water channels, reservoirs and villages. The government will designate the indigenous species to be conserved based on the status of local ecosystems and a wide field of vision covering all areas of the region concerned. By obtaining the understanding and participation of local residents, the government will systematically promote infrastructural improvements in a way that pays close attention to the life history and migration routes of respective designated species, and also provide assistance for biodiversity-conscious production or maintenance activities. (MAFF)

1.5 Utilization and conservation of the agricultural environment, and promoting agriculture through effective utilization of regional resources

(Current Situation and Challenges)

The agricultural environment constitutes an environment that is maintained through such human activities as farming. Promoting agriculture in rural areas is important from the standpoint of manifesting the multifaceted functions of rural areas, such as the conservation of rich nature and biodiversity, as well as good landscapes.

In reality, however, the functions of rural villages have been weakening due to depopulation, a rapidly aging population, and more non-farmer residents, and it is feared that said multifaceted functions could deteriorate accordingly. It is therefore

necessary to implement corrective measures based on an understanding of said recent trends.

(Specific Measures and Policies)

- The government will provide assistance to rural mountainous areas, with the aim to support the ongoing operation of agricultural production, prevent any further increase in abandoned farmland, and secure the multifaceted functions of those rural areas. It will also assist the region-wide, effectively combined efforts of local residents, as well as advanced agricultural activities from the standpoints of appropriate conservation and improved quality of agricultural resources and environments, such as farmland and agricultural water. Public assistance will also be given to NPO activities dedicated to the conservation of terraced paddy fields or nature restoration. In order to facilitate those activities, the government will promote education to raise public understanding about those NPO activities, and also provide assistance to groundwork activities being jointly promoted by local residents, companies and the government to take voluntary actions for improving the local environment. (MAFF)
- The government will make efforts to raise public understanding regarding the contributions of agriculture and farm villages to biodiversity. It will also promote exchanges between urban areas and farm villages through green ecotourism, and also encourage people to settle in rural areas. Moreover, the government will try to create attractive exchange centers and promote assistance to such facilities that will make effective use of regional resources. (MAFF)
- The government seeks to increase the number of visitors to green ecotourism facilities. During FY 2006, the number of overnight guests totaled 7.95 million persons, a number which the government aims to increase to 8.8 million by FY 2009. (MAFF)

1.6 Promoting the creation of spaces where humans can interact with nature including rare wild species

(Current Situation and Challenges)

In the ‘good old days,’ the Japanese crested ibis and white stork used to be commonly observed in rural villages and coexisted with human beings. However, those birds have since disappeared as a consequence of artificial impacts on their habitat environment as typified by excessive hunting, the deforestation of wetlands, fewer nesting trees, and less feed due to the use of agricultural chemicals. Today, regional efforts are underway to return artificially incubated white stork and Japanese crested ibis to the wild. And since Japan is a country having many stopover points for migratory birds, it is important to improve and conserve desirable rural environments, such as paddy fields, in order to perpetually maintain habitats for those birds into the future.

To this end, the government has been promoting the winter flooding of paddy fields

as a measure to secure feeding grounds for migratory birds during winter, as well as the improvement of fish ladders to secure a continuity of paths used by wildlife to travel between water channels and paddy fields. Moreover, the government has been promoting organic farming and other environment-friendly agricultural practices. Children benefit from these efforts and use waterfront environments such as paddy fields and water channels as places of learning or as playgrounds.

These measures help protect the habitat environments of extremely rare species such as the white stork and Japanese crested ibis, facilitate the regional expansion of habitat ranges for diverse living creatures, as well as greater interaction between those creatures and local residents, ultimately leading to the conservation of biodiversity throughout the country. It is therefore important to evaluate and assist such regional measures.

Despite the promotion of such advanced measures, however, the deteriorated habitat environments of indigenous wild species can be seen in many countryside and Satochi-Satoyama areas due to the reduced use of community-based forests and more farmland being abandoned because of a shortage of manpower in agriculture and forestry, thereby making it necessary to take immediate action. In order to ensure the proper conservation and utilization of countryside and Satochi-Satoyama areas in the future, a diverse range of stakeholders must participate to help to ensure the necessary conservation and utilization.

(Specific Measures and Policies)

- The government will promote the environmental improvement of countryside and Satochi-Satoyama areas, by creating spaces for people to interact with nature, while reaching a consensus on the conservation of biodiversity and promoting infrastructural improvements for conserving biodiversity. (MAFF) [Cited in Chapter 2, Section 3, 3.2]
- In order to facilitate the implementation of measures for conserving biodiversity, the government will further promote regional education activities to raise public understanding about agriculture, forestry, fishery and biodiversity, while promoting the introduction of such environment-friendly agriculture as organic farming, providing assistance to farmers to facilitate their efforts in establishing or introducing biodiversity-conscious farming technologies, and increasing opportunities for people to interact with nature through the use of rural water environments including paddy fields and water channels as places for people to learn about wildlife or as playgrounds. (MAFF)
- It is known that agricultural activities in urban and surrounding areas play an important role in providing diverse benefits, in addition to providing fresh foods to urban residents. These benefits include maintaining the natural environment and

landscapes with water, green and nature-rich spaces, enriching the private lives of people, and creating opportunities for all generations—from small children to adults—to experience hands-on farming or interact with wildlife. In this light, the government will promote urban agriculture and the creation of spaces where people can interact with wildlife. (MAFF) [Cited in Chapter 2, Section 3, 3.2]

- The government will improve or enhance implementation of the “Survey of Organisms Living around Paddy Fields” intended to obtain information on the environment and wildlife in rural areas. Here, rural water environments including paddy fields and water channels are regarded as learning places and playgrounds for people. (MAFF, MOE) [Cited in Chapter 2, Section 3, 3.1]
- Based on the progress achieved by the model project (from FY 2004 to FY 2007) for the conservation and restoration of Satochi-Satoyama areas, as well as discussions by the Investigative Commission for Conservation and Utilization of Satochi-Satoyama areas, the government will develop an “Action Plan for Conservation and Utilization of Satochi-Satoyama areas (tentative name)” to further develop campaigns for the conservation and utilization of Satochi-Satoyama areas nationwide. (MOE)
- In order to learn from activities for the conservation and utilization of Satochi-Satoyama areas nationwide, the government will research and analyze Satochi-Satoyama areas where unique efforts are being made, and then introduce those efforts to the public as Satochi-Satoyama areas that should be handed down for future generations. In order to address problems in efforts made in individual areas, the government will offer technological support such as advice and know-how provided by seminars and instructors, while promoting utilization of the “Guidelines for Development of Action Plan for Conservation and Utilization of Satochi-Satoyama areas” (formulated in 2007).
- The government seeks new effective methods of utilizing Satochi-Satoyama areas by implementing regional experimental programs for environmental education, ecotourism, and the use of eulalia grass or timber obtained from forest-thinning for biomass. The government will also establish a framework for an effective, sustainable utilization of common resources shared by diverse stakeholders, including urban residents and companies. (MOE, MEXT, MAFF, MLIT) [Cited in Chapter 2, Section 7, 1]
- As part of efforts to develop human resources dedicated to the conservation or restoration of Satochi-Satoyama areas, the government will provide information on groups or places engaged in conservation/restoration activities, register and dispatch specialists in the field of ecosystem management to Satochi-Satoyama areas, and provide those specialists with technical training. (MOE)
- In nationwide dissemination of the concept for the conservation and utilization of Satochi-Satoyama areas, the government makes efforts to raise public awareness on

prevention of any acts which adversely affect the natural environment of wildlife due to illegal dumping of waste, etc., and also strengthens the networks for information exchange and cooperation with local government, etc., toward prevention of illegal dumping of waste. (MOE)

1.7 Promoting the improvement, conservation and utilization of grasslands

(Current Situation and Challenges)

Grasslands constitute precious ecosystems and provide habitats for diverse fauna and flora. Grasslands generally have an indigenous environment managed by human beings for pasturing or grazing purposes, and have the functions of conserving ecosystems and genetic resources, and protecting wildlife and biodiversity. For example, there are habitats of rare plants such as *Polemonium kiushianum* and *Echinops setifer*, as well as rare butterflies such as *Shijimiaeoides divinus asonis* in the grasslands of the Aso-Kuju Highlands, and such human activities as pasturing, grazing and agriculture make it possible to conserve those habitats.

At the same time, grasslands provide a foundation of feed self-sufficiency based on the material cycle from soil and grass to livestock, thereby helping to improve food self-sufficiency, use land more effectively, establish sound material-cycle stock farming and maintain the sustainable production of livestock products, as well as sustainable operation of the livestock business. It is therefore important to continue ensuring the proper maintenance and management of grasslands.

(Specific Measures and Policies)

The government will assist collaborative efforts among producers and village-wide efforts to promote pasturage to maintain the productivity and functions of grasslands, as well as activities to improve and conserve grasslands. (MAFF)

In order to realize harmony between human society and nature through efforts to secure biodiversity in grasslands, the government will implement the following measures in the Aso Highlands: (1) conservation and restoration of the grassland environment to provide habitats for diverse animals and plants, and (2) promotion of environmental education on grasslands to develop public understanding of and interest in protecting grasslands. And for the purpose of improving land utilization and land management from the standpoint of conserving pastures, the government will promote measures for improving, conserving and utilizing grasslands. (MOE, MAFF)

1.8 Promoting activities to improve, conserve and utilize community-based forests

(Current Situation and Challenges)

A variety of wild animals and plants inhabit community-based forests. A moderate amount of human activities, such as forestry production, the use of firewood and charcoal, and gleaning by local residents supports those habitats. Thus,

community-based forests make significant contributions to the conservation of biodiversity. And given the proximity of community-based forests to where people live, those forests are expected to help create more opportunities for people to interact with nature or study nature.

In reality, however, community-based forests are being utilized less and less due to a declining human population in recent years, rapidly aging residents in mountain villages, and changing lifestyles,. It is therefore necessary to encourage diverse parties to promote efforts for improving community-based forests.

(Specific Measures and Policies)

- The government will ensure the conservation of habitat environments for diverse wild species in the course of promoting forestry. (MAFF)
- The government will promote forest improvement based on participation of the general public, including collaborative activities among local residents, volunteers and NPOs. Those activities include planting, weeding, thinning, and facility improvements aimed at the multipurpose utilization of community-based forests. (MAFF)
- The government seeks to raise public understanding about the significance of activities to improve community-based forests. To this end, the government will make efforts to increase opportunities for people to interact with forests, raise public awareness and understanding about conserving biodiversity, foster an attitude to seek a desirable coexistence with nature, provide assistance for volunteer groups dedicated to forest improvement, and promote more exchanges between urban cities and mountain villages. (MAFF)

Section 7 Urban Areas

(Basic Concepts)

In cities typified by the concentrated dense use of land and many burdens on the environment, the habitats of organisms are limited to spaces having a natural environment with lush water and greenery. While we have thus far tried to conserve and create these spaces by setting urban parks or designating Special Green Conservation Areas, privately owned green spaces have decreased every year due to urban development. We need to implement more appropriate conservation, restoration, creation and management of these spaces in order to conserve the biodiversity in cities.

To do so, from the perspective of building of an ecological network, we must consider the role of each space, such as areas to provide a core habitat of organisms, conserve and rehabilitate habitats, expand the distribution thereof, corridors to connect these areas, and buffer zones where these spaces can stably survive.

And in the future situation of depopulation and a rapidly aging society, it is preferable to aim at Eco Compact Cities created by concentrating city functions, the convenience afforded by efficient traffic terminals etc., and improved energy efficiency. In that case, we need to conserve, restore and create green spaces contributing to the formation of a framework and the segmentation of cities.

For conservation, restoration, creation and management of the natural environment contributing to the conservation of biodiversity, comprehensive and systematic measures are being promoted depending on urban forms and modes of the natural environment, following the Master Plan for City Planning Areas and the Master Plan for Greenery—comprehensive city plans positioning the future outlines of water and greenery.

Definite descriptions are given for closely connected cities like those in the Tokyo metropolitan area or the Kinki region, and the conservation of green spaces in suburban areas is being promoted by designating suburban Green Conservation Areas and building water and greenery networks based on a broader view through the creation of natural environments with cooperation for projects to build urban parks, roads, rivers and sewage lines. Also in the unit of one city, the building of water and greenery networks inside the city is being promoted around a core of urban parks, green spaces guaranteed for permanence, roadside greenery, watersides, water channels, terrace cliff greenery, district forests or homestead woodlands.

As it is important to maintain and raise the quality of these conserved, rehabilitated and created natural environments in order to help conserve biodiversity, approaches on how to properly use, disseminate and manage afforestation plants rooted in local areas are also being promoted.

The participation of various major entities is also important for ongoing efforts to conserve, restore, create and manage natural environments, and consequently promoted through enlightenment activities.

1 Formulating comprehensive plans on the conservation, restoration, creation and management of green space

(Outline of Measures and Policies)

In cities, green spaces having various functions and scales will be distributed, such as homestead greenery, agricultural areas, the trees and hedges in residential regions, as well as green public spaces like urban parks. A natural environment contributing to the conservation of biodiversity can be retained by systematically viewing and handling these green spaces in organic coordination. And for the conservation, restoration and creation of green spaces, it is essential to develop systematic and well-scheduled measures to treat the promotion and conservation of greening as part of a public-private sector partnership, based on the setting of urban parks, the greening of such public

facilities as roads, rivers and harbors, and conserving greenery through such systems as Special Green Conservation Areas, scenic zones, productive green areas, and the Conservation System of Civic Green Spaces. Therefore, “the Urban Green Space Conservation Act” prescribes municipal governments (which are closest to the lives of local residents and properly recognize local situations) as the main entities responsible for formulating a Master Plan for Greenery—a comprehensive plan regarding the conservation, restoration and creation of green spaces.

The Master Plan for Greenery specifies that municipal governments set goals for the conservation and greening of green spaces, and formulate promotional measures with regard to the proper conservation and greening of green spaces in their own areas.

1.1 Master Plan for Greenery (Current Situation and Challenges)

The number of municipal governments who formulate Master Plans for Greenery has been steadily increasing since the institutionalization thereof in 1994. As of March 2009, such plans have been formulated in about 643 municipal governments nationwide, including all cities having populations of 400,000 or more.

The Master Plan for Greenery is clearly regarded as one promoting the conservation and greening of urban green spaces including urban parks, and clarifies the concept of setting urban parks as the main means to retain greenery in cities, by adding policies for setting urban parks disposed by local public authorities to the mentioned contents of the plan due to revision of the Urban Green Space Conservation Act in 2004. And we are attempting to more appropriately retain the natural environments in cities by adjusting Master Plans for Greenery in harmony with associated plans, such as maintaining a balance with scenery plans based on the Scenery Law, while thus far attempting to adapt Master Plans for Greenery to the Basic Environment Plan and the Municipal Master Plan for city planning..

We should take actions to reflect the opinions of residents by holding public hearings, for example, on ways to formulate and review Master Plans for Greenery. In addition to reaching a consensus within the administrative bodies for realizing desirable natural environments in cities, we can expect better comprehension, a sense of participation, and greater interest in the approaches to conserving, restoring and creating greenery by various main entities including local residents.

It is necessary to continue comprehensively developing Master Plans for Greenery by considering various environmental issues, such as the mitigation of global warming and urban heat islands, and conserving biodiversity in order to realize city structures that can live with nature and impose much less environmental impact in the future. When formulating these plans, it is also necessary to retain the quality of greenery and pay attention to greenery organic coupling by saving the amount of greenery and

realizing ecological networks.

(Specific Measures and Policies)

- The government encourages the municipal governments yet to formulate Master Plans for Greenery to do so. At the same time, plans that have already been kept for a certain period should be revised, depending on changes in social conditions. (MLIT)
- In order to realize Master Plans for Greenery, the government will continue promoting the greening and conservation of green spaces. (MLIT)
- The government will also prepare guidelines on proper planning to develop basic plans for greenery in line with the conservation of biodiversity in consideration of various space levels. (MLIT)

2 Promoting measures for the conservation, restoration, creation and management of green space and waterside areas

(Outline of Measures and Policies)

For the conservation, restoration, creation and management of green spaces in cities, indicators that focus on the functions of various green spaces are being formulated in the Intensive Development Plan of Social Capital (2008-2012) formulated in 2008. In particular, the indicators related to the conservation of biodiversity demonstrate that the retained amount of public spaces for water and greenery in urban areas, and the developed amount of parks and green spaces help to conserve and create natural environments contributing to the conservation and creation of favorable natural environment in urban areas. The goal for the retained amount of public spaces for water and greenery during the period of the plan is to achieve a 10% increase in such spaces (compared to FY 2007) that are systematically guaranteed for permanence, mainly consisting of natural environments (forests, grasslands or water surfaces) in urban areas. And parks and green spaces that contribute to the conservation and creation of favorable natural environments in urban areas will be increased by 2,100 ha during the period of the plan. The building of water and greenery networks in urban areas is also being promoted based on the Master Plans for Greenery or scenery plans in cities where greenery and open spaces need to be developed, such as cities located within the three major metropolitan areas, and by comprehensively supporting the development of urban parks, conservation projects in historic cities, and green spaces, as well as the development of facilities for opening civic green spaces to the public.

From the perspective of building ecological networks in cities, core green spaces are being conserved and central large urban parks developed based on the Master Plans for Greenery. The conservation of roads and urban parks serving as corridors connecting these spaces is also being promoted, as well as the greening of public spaces and green spaces on private lands to serve as buffer zones.

2.1 Development of urban parks, etc.

(Current Situation and Challenges)

Urban parks have various functions such as forming the habitats of wild organisms and spaces for interacting with nature. “The Urban Park Law” promotes the development of urban parks to help conserve biodiversity, and one of its aims is focus on protecting forests that are habitats of fauna and flora. As of the end of March 2009, 114,990 ha of 96,808 urban parks nationwide are already developed and under management.

In national government parks, the conservation, restoration and creation of habitats for fauna and flora in cooperation with citizens are helping to create environments in which to coexist with living organisms. In Hitachi Seaside Park—where a precious swamp environment in the “Sawada Spring Wetland” is being restored—invasive alien species are being strictly controlled for the stable conservation of precious ecosystems such as that of *Lefua echigonia* (an endangered species). And at the Echigo Hillside National Government Park and, Asuka and Heijo Palace Historical National Government Park, and Heijo Palace, the development of Satoyama environments is actively being promoted by the thinning of thickets and weeding of bottom weeds with the participation of citizens, in order to restore beautiful Satoyama environments. As a result, wildflowers like gold-banded lilies can now be seen on the grounds of forests. In Showa Kinen Park, greenery is being restored on the grounds of a former American military base. In developing this area, the species of organisms in the park were increased about threefold for birds (23 species in 17 families to 71 species in 32 families) and about tenfold for insects (77 species in 36 families to 800 species in 184 families) compared to those in 1978 when this area was part of an American military base, thanks to developments in which various natural environments like thickets, biotopes and waterside spaces for waterfowl habitats were created and maintained, such as weeding for organisms for the purpose of protection, and increasing *Taraxacum* *Platycarpum* and Ladies’s tresses.

We also take advantage of the characteristics of urban parks as spaces for interaction with nearby natural environments in cities to actively conserve the habitat environments of organisms, by conserving tidal flats and wetlands, including Yatsu-Higata (a wetland registered under “the Ramsar Convention”), which have various biota including rare species and endemic species, creating forests for conserving the habitats of insects, and creating waterside spaces for organisms. In particular, good natural environmental infrastructures that help to conserve biodiversity are being developed by restoring and creating tidal flats, wetlands and forests in such areas as landfill sites and large lands reformed from former factory sites where natural environments should be actively created. In the Asahata Green Space in Shizuoka City, an action plan for nature restoration operations has been prepared by the Nature

Restoration Committee based on the Nature Restoration Law in association with local public authorities, NGOs and MLIT. The conservation, restoration and utilization of natural environments in urban parks are also being promoted to include the rivers there.

In order to promote the formation of ecosystem networks in cities, a large-scale habitat that can function as a core must be secured.

(Specific Measures and Policies)

- The government will enhance the multiphase functions of urban greening botanical gardens and environmental interaction parks as bases of “greenery” activities, by enhancing networks between the bases including national government parks. (MLIT)
- Good natural environmental infrastructures that help to conserve biodiversity will be developed by restoring and creating tidal flats, wetlands and forests in such areas as landfill sites and large lands reformed from former factory sites where natural environments should be actively created. (MLIT)
- In order to promote the building of water and greenery networks in urban areas, the government will also support the development of urban parks and conservation projects for green spaces implemented by municipal governments. (MLIT) [Cited in Chapter 2, Section 7, 2.4 and 2.5]

2.2 Consideration of conserving biodiversity in road improvement

(Current Situation and Challenges)

Greening is being implemented along the slopes of roads, in planting zones, and along center dividers by planting trees to help create good scenery and absorb carbon dioxide, as well as to conserve biodiversity. And approaches that consider biodiversity are being promoted by adopting a construction method that uses local seeds and seedlings (produced based on common types with the gene pool in each local area among indigenes) for creating biotopes and greening the slopes of roads.

(Specific Measures and Policies)

- Along with conducting a detailed investigation and collecting data regarding the natural environment, the government selects routes that helps conserve rich nature as necessary, and adopts the structures that avoid any drastic alternation of landform and vegetation based on the knowledge acquired. (MLIT) [Cited in Chapter 2, Section 8, 2.2]
- In order to avoid habitat fragmentation and conserve the environment for plants growth, the government develops ecosystem-friendly roads by installing road crossing structures for animals and traffic signs that call driver’s attention to animals. (MLIT) [Cited in Chapter 2, Section 8, 2.2]

- Embankment walls generated in road construction will be replanted with existing tree stock or the vegetation most suitable for the local environment, such as climate and soil, in order to restore a state as natural as possible. (MLIT) [Cited in Chapter 2, Section 8, 2.2]
- Depending on the area, the government is proactive in forming habitats through a carefully crafted selection of species for planting considering the current status of the surrounding natural environment in the event of road development. (MLIT) [Cited in Chapter 2, Section 8, 2.2]

2.3 Conservation of biodiversity in sewage works

(Current Situation and Challenges)

The rates of achieving environmental quality standards for water pollution are low for lakes and enclosed water areas. To improve the quality of water, advanced treatment, improvements in combined sewage systems (where sewage and rainwater are discharged via the same pipe, with untreated sewage possibly being discharged into public water areas when rainfall exceeds a certain level), and the measurement of non-point sources (i.e., measures against non-point pollutants discharged from urban areas into public water areas in case of rainfall) must be promoted. As of the end of March 2009, sewerage facilities cover about 73% of the population, with advanced wastewater treatment to create a better water environment operating at a rate of approximately 27%, and the rate of improving combined sewage systems at about 30%.

Due to ongoing urbanization, however, areas where rainfall does not penetrate into the ground are expanding, while the amount of rainfall penetrating into the ground and the number of springs are decreasing, resulting in lower than normal flow rates for rivers and water channels in urban areas. Therefore, efforts aimed at efficiently using treated sewage water—positioned as a precious water source in urban areas—must be further promoted.

The facility space of sewage systems must also be used for creating habitats for various living organisms. In order to give eco-friendly considerations, the impact that sewage systems exert on ecosystems must be comprehensively examined.

(Specific Measures and Policies)

- The government will conserve and create waterfronts by establishing Saseragi watercourses and reusing treated sewage water, in addition to sewage facilities or open-space storm sewers that are important open spaces in overpopulated urban areas, thereby providing living space for living organisms in urban areas. (MLIT)
- In water areas where ecosystems must be considered, the government will promote the examination of friendly discharge (a form of water discharge involving natural purification, a reservoir and the penetration of treated sewage water that considers

the ecology of the area in which water is discharged, in terms of water quality, water temperature, and the prevention of foaming). (MLIT)

- Not limited to conserving the water quality in public water areas by constructing sewage facilities, the government will also promote water quality improvements in collaboration with river projects under “emergency action plans for improving the water environment,” advanced treatment at sewage plants, improvements in combined sewer systems that help prevent eutrophication in lakes and enclosed seawater areas, and non-point measures. (MLIT)
- The government will promote projects with an eye towards constructing sound water circulation systems from a wide-area viewpoint, including the reuse of treated sewage water and rainwater, and discharge control by storing penetrating rainwater. (MLIT) [Cited in Chapter 2, Section 7, 1]
- From planning and construction to the management and operation of sewage systems, the government will collect extensive know-how from government agencies, industry and academia in Japan to promote international cooperation, in order to disseminate sustainable sewage systems overseas. (MLIT)

2.4 Green Conservation Areas and Special Green Conservation Areas (Current Situation and Challenges)

The system of Green Conservation Areas was newly established in 2004 through revision of the Act for Urban Green Spaces. While attempting to harmonize with a certain level of land usage, this system is intended to properly conserve the natural environment of green spaces requiring conservation, in order to prevent disorderly urbanization, pollution and disasters, as well as to secure healthy living environments for regional residents in city planning areas or quasi city planning areas. Based on the fact that maintaining and managing Satochi-Satoyama areas in suburban areas, and restoring nature in areas surrounding metropolitan areas have become pressing issues, the system targets the conservation of green spaces from a wide-area viewpoint, by approving a certain level of land usage with more lenient controls than in Special Green Conservation Areas.

Special Green Conservation Areas are green areas that help prevent disorderly urbanization, pollution and disasters, those having traditional or cultural significance, those offering excellent scenic beauty or landscapes, or those to be conserved as habitats for fauna and flora, for which good environments are conserved by imposing a freeze through controls on such activities as constructing new buildings, logging wood and bamboo (requiring the prefectural governor’s permission), compensation resulting from regulated activities, and land purchases. As of the end of March 2009, 2,147 ha in 387 regions nationwide have been specified as Special Green Conservation Areas.

These Special Green Conservation Areas have recently encountered the problems of

insufficient management by landowners and inadequate functions as sound natural environments. Green spaces in urban areas are the precious property of urban residents and a valuable basis of habitation for various living organisms, thereby requiring management not only by landowners but also the cooperation of local governments and local residents, so that these spaces can be left for the next generation. The management contract system (such as under the Urban Green Space Conservation Law) is one where the local government or a green space managing organization concludes a contract with a landowner to properly manage and conserve green space such as a Special Green Conservation Area on behalf of the landowner, and thus promotes the proper management and conservation of green spaces.

(Specific Measures and Policies)

- In addition to providing support for compensation resulting from regulated activities, land purchases, and the construction of facilities needed to conserve green spaces, such as a facility to prevent landslides, the government will promote the designation of Special Green Conservation Areas from the standpoint of securing biodiversity. (MLIT)
- To conserve such natural environments as Satochi-Satoyama areas in suburban areas that help conserve biodiversity, the government will promote the designation of Green Conservation Areas. (MLIT)
- For favorable green space management by various entities, the government will have those entities use systems that promote proper green space management such as under the management contract system. (MLIT) [Cited in Chapter 1, Section 2, 7.1]
- To promote water and greenery networking in urban areas, the government will support the construction and maintenance of urban parks, and conservation of green space implemented by local governments. (MLIT)

2.5 Suburban Green Space Conservation Areas and Suburban Green Space Special Conservation Areas

(Current Situation and Challenges)

The system of Suburban Green Space Conservation Areas is intended to conserve green spaces with good nature in suburban areas of the Tokyo metropolitan area and the Kinki region, in order to prevent disorderly urbanization and conserve living environments in urban areas under the “Act to Preserve Suburban Green Zones in the National Capital Region” and the “Act for the Development of Conservation Areas in Kinki Region.” It imposes the obligation to report certain activities, such as the construction of new buildings and structures, reconstruction, and additions to buildings, and helps conserve biodiversity through the conservation of green spaces.

These areas refer to forests within a suburban development in the Tokyo

metropolitan area or within a conservation area in the Kinki region, and denote relatively large areas in terms of a regional area level as designated by the Minister of Land, Infrastructure, Transport and Tourism.. The districts that urgently require green space conservation due to a particularly good natural environment in a given region are specified by the prefecture as a Suburban Green Space Special Conservation Areas in city planning. There is a system where a local governmental body can conclude a management agreement with a landowner to manage the land on behalf of the landowner. This system contributes to the proper management and conservation of suburban green space.

A comprehensive review of the natural environment was conducted in the Tokyo metropolitan area and the Kinki region based on urban renaissance projects (with a third project being decided in December 2001). The “Grand Design on Urban Environment Infrastructure in Tokyo Metropolitan Area” (in March 2004) and the “Grand Design on Urban Environment Infrastructure in Kinki Region” (in August 2006) were subsequently formulated. It is thus necessary to properly conserve, restore and create natural environments based on these designs.

As of March 2010, 15,861 ha in the Tokyo metropolitan area and 81,469 ha in the Kinki region have been specified as Suburban Green Space Conservation Areas, and 775 ha in the Tokyo metropolitan area and 2,697 ha in the Kinki region have been specified as Suburban Green Space Special Conservation Areas (as of the end of March 2009).

(Specific Measures and Policies)

- In addition to providing appropriate support for compensation resulting from regulated activities, land purchases, and the construction of facilities necessary to conserve green space, such as a facility to prevent landslides, the government will promote the designation of Suburban Green Space Conservation Areas from the standpoint of securing biodiversity. (MLIT)
- In order to promote urban restoration by utilizing multiple functions possessed by the natural environment in the Tokyo metropolitan area and the Kinki region, the government will promote an examination to designate the regions positioned for conservation as Suburban Green Space Conservation Areas based on knowledge obtained from the respective “Grand Designs on Urban Environment Infrastructure” as necessary. (MLIT) [Cited in Chapter 1, Section 2, 7.1]
- In Suburban Green Space Conservation Areas, there are activities having various purposes that include biodiversity. The government will promote the proper management and conservation of suburban green space in coordination with different entities, by utilizing the management agreement system as well as regulations on activities. (MLIT)

- To promote water and greenery networking in urban areas, the government will support the construction and maintenance of urban parks, and conservation of green space implemented by local governments. (MLIT) [Cited in Chapter 2, Section 7, 2.1 and 2.4]

2.6 Historic landscape preservation districts and special historic landscape preservation areas (Current Situation and Challenges)

The historic landscape preservation districts are based on a system to conserve green spaces in the cities of Kamakura, Zushi, Kyoto, Nara, Tenri, Kashihara, Sakurai, and Otsu, the town of Ikaruga, and the village of Asuka with historically important status as past political and cultural centers of Japan, as natural environments combined with buildings or ancient ruins having significance in Japanese history (under the “Special Measures Law for the Preservation of Historic Landscape in Ancient Capitals”), and help to conserve the habitat environments for living organisms through conservation of the natural environment.

The specified historic landscape preservation districts—where green space is being conserved with a sound natural environment by imposing an obligation to report certain activities such as the construction of new buildings—totaled 20,083 ha as of the end of March 2009 (including first class and second class specified historic landscape preservation districts in the village of Asuka). The specified special historic landscape preservation areas—where green space is being conserved with a sound environment by imposing a freeze by taking such measures as compensation resulting from regulated activities and land purchases under a permission system for certain activities—totaled 8,832 ha in 60 regions as of the end of March 2009.

The lands purchased by local governmental bodies are managed from the standpoint of preserving historical natural features. Such management will contribute to biodiversity that includes the conservation of habitat environments. There are also examples of such management by various entities such as private citizens and corporations.

(Specific Measures and Policies)

- In order to preserve historical natural features, the government will give support for compensation resulting from regulations enforced by local governments, land purchases and the construction of new facilities. (MLIT)
- To form a water and greenery network in urban areas, the government will support the construction and maintenance of urban parks, and the conservation of historical natural features in historic cities by local governments. (MLIT)

2.7 Scenic districts

(Current Situation and Challenges)

Scenic districts are among the regional districts prescribed in city planning for the purpose of maintaining scenic beauty in urban areas. Local governments can designate land that falls under one of the following categories as a district requiring the maintenance of scenic beauty to conserve an urban environment for planning land use in an urban area.

a. Forest or places with extensive woodland (including urban areas) that form good natural landscapes

b. Waterside areas (including surfaces), agricultural land or other land where citizens can feel at home as their native land, and which form good natural landscapes

Within a scenic district, prefectural ordinances control the construction of new buildings, creation of residential areas, logging of wood and bamboo, and the deposition of soil, rock and waste according to standards prescribed in an ordinance (Cabinet Order Specifying Standards for the Enactment of Prefectural and Municipal Ordinances for Landscape District Zoning). Permission of the prefectural governor is required to conduct the activities prescribed in the ordinance .

As of the end of March 2009, about 169,595 ha nationwide have been specified as scenic districts.

(Specific Measures and Policies)

- Scenic districts maintain and create sound natural environments such as forests and waterside areas, and provide habitats for living organisms in urban areas. The government will therefore attempt to properly operate systems and promote measures for designation. (MLIT)

2.8 Civic green space

(Current Situation and Challenges)

Civic green space refers to land, artificial ground or a building of at least 300 m² in size within a city planning area or quasi city planning area, for which the landowner and local government or green space managing organization concluded a contract, and which is managed for a certain period (of at least five years) as green space (civic green space) to be used by citizens based on the contract. Civic green space secures nearby green space for local residents to interact with nature and a habitat for living organisms.

At the end of March 2009, about 80 ha at 145 locations nationwide are set and managed as civic green spaces.

(Specific Measures and Policies)

- The government will positively use the system of civic green space not only for conserving existing green space such as flatland forests and premises forests, but also for artificial ground and the premises of buildings to promote the conservation, restoration and creation of habitats for living organisms in urban areas. (MLIT)

2.9 Urban productive land districts**(Current Situation and Challenges)**

Urban productive land districts are regional districts prescribed in city planning for the purpose of contributing to the formation of sound urban environments by systematically conserving agricultural land having excellent greening functions in urbanized areas. A district such as a block of agricultural land that is very effective in securing a good living environment and preventing pollution or disasters, or conserving an urban environment harmonized with agriculture, forestry or fisheries can be designated.

Within an urban productive land district, permission of the city, town or village mayor is required for constructing a new building. Only certain activities necessary to conduct agriculture, forestry or fishery, and which are judged as not deteriorating the living environment, can be granted permission.

As of the end of March 2008, about 14,454 ha in 64,741 regions nationwide have been specified as urban productive land districts.

(Specific Measures and Policies)

- Agricultural land can also be evaluated as a habitat environment for living organisms in urban areas, and the government will try to properly operate the system of urban productive land districts in the future. (MLIT)

2.10 Conservation of premises forests and coppices**(Current Situation and Challenges)**

The greenery around residential areas left in urban areas such as premises forests have been lost due to inheritance tax and developments. Various conservation policies must therefore be taken based on the various intentions of greenery owners, including the prevention of residential areas from being segmented.

In addition to the systems described thus far regarding forests of which conservation by the entire community is acknowledged to be necessary among the premises forests and coppices in urban areas, designation as “preserved trees” or a “preserved forest” is possible based on the “Law concerning Preservation of Trees for Conservation of Scenic Beauty of Cities.” And in addition to the “greening agreement” under the “Act for Urban Green Spaces” and the systems concerning green conservation

(including the ordinances and guidelines of local governments), the conservation of green space is being promoted and habitat environments for living organisms are being conserved by using various donation systems and the taxation system.

The green space in urban areas such as premises forests are disappearing, however, due to inheritance tax and urban development, and conserving the greenery paid in kind and large government-owned lands poses a current challenge.

(Specific Measures and Policies)

- By promoting the use of Green Conservation Areas and the Civic Green Space System, the government will try to conserve even relatively small green spaces such as premises forests left in urban areas, while properly coping with the intentions of landowners. (MLIT)

**2.11 Creating greenery on privately-owned lands and promoting greening rooftops/greenery on walls
(Current Situation and Challenges)**

For forming ecological networks in urban areas, it is considered possible to conserve habitat environments for living organisms, even in an urban area where buildings are clustered, by effectively creating spaces with water and greenery at various places including rooftops and walls, which play a role in connecting key green spaces. Through the positive implementation of green rooftops and walls nationwide, a total of 242 ha and 24 ha have been established from 2000 to 2008 (according to MLIT's survey), respectively, for alleviating the heat-island phenomenon and securing living space for insects and birds in the cities.

To promote greening in urban areas, greening areas can be specified in city planning areas based on the "Act for Urban Green Spaces," to control the minimum green coverage rate on the premises of a large building. A greening area is specified for an area lacking green space necessary to form a sound urban environment and where greening within the premises of buildings must be promoted, thereby helping to create habitat environments for living organisms in urban areas. As of the end of July 2009, two cities (two sites) have been designated as greening areas.

The Authorization System for Greening Facility Development Plans based on the "Act for Urban Green Spaces" is a system where city, town and village mayors authorize greening facility development plans for establishing greening facilities on building rooftops and in open and other outdoor spaces, with preferential measures for fixed property tax being taken on greening facilities and extended to the end of FY 2010. As of March 2009, 24 locations nationwide have been authorized to develop greening facility development plans.

(Specific Measures and Policies)

- The greening area system and Authorization System for Greening Facility Development Plans are effective in promoting the greening of private lands, and the government will disseminate those systems. (MLIT)
- Concerning greening rooftops and greenery on walls, the government will make efforts to gauge the effects by collecting empirical data on the degree of contribution to global warming by measuring alleviation of the heat-island phenomenon in cities and the effect on habitat environments for living organisms. (MLIT) [Cited in Chapter 2, Section 6, 1.1, and Chapter 2, Section 7, 1]

3 Raising public awareness of the conservation, restoration, creation and management of green space

(Outline of Measures and Policies)

To enhance greenery in urban areas, awareness-raising activities and national campaigns must be conducted. Today, as solutions to global warming and securing biodiversity pose significant challenges, the government must positively develop activities to raise public awareness. In addition to promoting nationwide awareness-raising events such as greenery protection meetings and urban greening fairs, various kinds of opportunities will be created to enjoy greenery in national government parks, which serve as the bases for awareness-raising and national campaigns, and will function as a park green space network. Thus, the activities to conserve, restore and create greenery by various entities will be promoted.

3.1 Raising public awareness of greenery**(Current Situation and Challenges)**

To promote the conservation, restoration and creation of greenery, “greenery protection meetings,” “urban greening fairs,” commendations for contributions at “greenery protection meetings,” commendations for contributions to city greening and improvement, conservation, and beautification campaigns for urban parks, other commendations related to the conservation, restoration and creation of greenery are held during the Greenery Month (from April 15 to May 14) and the City Greening Month (the month of October). Through these activities, efforts are being made to raise awareness and enhance the consciousness of a wide range of people about urban greening, and promote the creation of a comfortable living environment with rich greenery, thereby promoting the conservation and creation of habitat environments for living organisms in urban areas.

By evaluating the management of green space by companies from many viewpoints using the Social and Environmental Green Evaluation System (SEGES), efforts are being made to enhance the willingness to conduct greening activities and strengthen

measures. As of the end of July 2009, 24 sites (regions) have been authorized.

To foster and secure wide-ranging human resources to support national campaigns for greening through these awareness-raising activities and encourage various activities by various entities, focus on publicity is considered necessary in parallel with enhancing the support systems.

(Specific Measures and Policies)

- The government will hold greenery protection meetings at national government parks or urban parks all over Japan to further raise public awareness of greenery. (MLIT)
- To encourage the efforts of companies by evaluating green-related measures in development projects, and by authorizing and commending excellent examples, the government will promote the dissemination of the green evaluation system in urban development. (MLIT)
- The government will create greenery contributing to the creation of habitat environments for living organisms in urban areas, by positively supporting regional groups that practice greening activities in their private projects for supporting seedlings and equipment necessary to create greenery. (MLIT)

3.2 Raising public awareness of conserving biodiversity in sewage systems

(Current Situation and Challenges)

In line with more sewage systems being established, the quantity of water collected by sewage systems is increasing each year, thereby expanding the role that sewage systems play in water and material circulation systems, including the management of urban water circulation and pollution load discharged into public water areas. Such a role played by sewage systems is not widely recognized, however, given the lack of opportunities to see these systems in action. Once the public understands the fact that discharged pollution load is purified by sewage systems, there will be greater public awareness about improvements in water quality, and later about improvements made to ecosystems and environments.

It is therefore necessary in the future to deepen understanding of the sewage system by local residents, and make the system so that the entire community practices ways to improve water quality. These actions will increase the interest of residents and make the conservation of regional ecosystems possible.

(Specific Measures and Policies)

- In collaboration with regional residents, educators, and NPOs, the government will positively provide information and try to deepen understanding by local residents of the roles of sewage treatment facilities as places to create habitats for various ecosystems. (MLIT)

Section 8 Rivers and Wetland Areas

(Basic Concepts)

The wetlands of land areas including rivers, lakes and marshlands are nurturing the rich ecosystems of Japan as habitats for various living organisms, with water, soil, grass and trees indispensable for supporting the life of living things. Almost all flatlands in Japan were formed by river floods, and various fauna and flora living there are closely linked with rivers. Substances such as nutrient salts are circulated between land and marine areas through river waters flowing into bays and by fish migrating upstream. Thus, rivers serve as upstream corridors in the country's level ecosystems that link ecosystem factors—forests, plains, low flat lands and coastal areas, in addition to playing a major role in forming the ecosystems of individual river-basin areas as the axis of a water circulation system that includes regional spring water and groundwater.

Rivers have also been involved with people's lives from ancient times as a cause of natural disasters including floods, however, and our ancestors constantly battled raging waters and made efforts to control rivers for use. It may be said that the current status of rivers is the result of such interaction between nature and human activities, and that rivers have fostered cultural and natural features unique to regions. For example, flood wetlands that existed with rivers have been transformed into agricultural land used by people, thereby forming habitats for various living organisms in close connection with rivers.

In river administration efforts after the World War II, however, river repairs were promoted by rapidly and effectively coping with floods by using modern technology to protect human life and property against frequent natural disasters, and the lack of consideration for the habitats of living organisms and the regional landscapes of rivers and wetlands in such project methods as three-sided concrete lining and the straightening of river channels cannot be denied.

Under the circumstances, we have seen “nature-oriented river management” to conserve or create beautiful natural landscapes in addition to giving consideration to the sound habitat environments of living organisms that rivers originally possessed, followed by the Census of Rivers and Riparian Areas to grasp the habitation situation of living organisms being initiated in succession beginning in 1990. Later in 1997, the River Law was revised, with “improvement and conservation of river environments” being added to its objectives. In 2002, nature restoration projects were established for restoring the natural environment in rivers. Moreover, the Review Committee on Nature-oriented River Management was established to verify the status of managing nature-oriented rivers and examine future direction for nature-oriented river management, and it later proposed the “development for nature-oriented river management” in 2006. Accordingly, in the same year, the “Basic Policy for

Nature-oriented River Management” was decided to newly develop the management of nature-oriented rivers, and subsequently been promoted as a universal theme of river creation to conserve or create environments for the life, growth and breeding of living organisms* that rivers originally possessed, as well as various river landscapes.

Nature-oriented river management should target all river administration activities ranging from surveys to construction, maintenance and management, in order to conserve and create habitat environments for living organisms that rivers originally possessed, as well as various river landscapes, by putting the working of the entire river natural environment into perspective and considering harmony with regional life, history and culture. As the fundamentals of implementation, the courses of action are as follows: 1) In addition to using the characteristics and mechanisms of nature as much as possible, an entire river should be put into perspective when creating it; 2) As well as conserving and creating habitat environments for living organisms, the life, history and culture of the region should be connected with the creation of a river; and 3) Comprehensive river management including research, planning, design, construction, maintenance and management should be put into perspective when creating a river.

Based on such courses of action, the restoration of nature such as gravel riversides and wetlands, and securing the continuity of rivers, mountain streams, migration of coastal animals, drifting sands and clear waters will be promoted all together.

1 Conserving and restoring the habitat environments of living organisms (Outline of Measures and Policies)

In efforts to conserve and restore rivers and wetlands, the sound habitat environments of living organisms must remain unaltered as much as possible, while securing the safety of local residents from floods and wind damage, and keeping any unavoidable alteration to a minimum, along with efforts made to restore a good river environment. In places where humans have greatly altered a river environment, efforts must be made to restore the original sound river environment as much as possible.

To conserve the biodiversity in and along rivers, it is important to conserve environmental conditions unique to rivers including flood plains, such as disturbances caused by flooding and the dynamism of fluctuating flows, in addition to conserving sound habitat space for living organisms.

For example, if these disturbances do not reach such river plants as *Potentilla Chinesis*, *Artemisia Capillaris*, *Aster Kantoensis* and *Anaphalis Margaritacea* var. *Yedoensis* that grow in sandy soil and along gravel riversides frequently disturbed by floods due to leveling of the flow rate and sinking of the riverbed, other plants will become predominant and result in exchanged clusters of plants. Thus, it is necessary to conserve the habitat environments of fauna and flora dependent on the environment

unique to rivers.

The dynamism in rivers is also important when considering the continuity of rivers and river-basin areas. For example, many kinds of fish in downstream river-basin areas migrate with a rise in river water levels due to flooding from a river to wetlands in river-basin areas and then spawn, with fry growing up there and returning to the river. In the beginning, many low flatlands in Japan were the floodplains of rivers, and wetlands existing inside and outside the river areas consequently formed precious habitat environments for living organisms. Therefore, in order to secure biodiversity, the continuity inside and outside rivers must be secured, with adjustments made with the surrounding area where land is used. What has been done recently, for example, includes the restoration of wetlands as practiced when forming the area surrounding a flood control area (i.e., the Matsuura River) and measures taken against sand inflow into wetlands (i.e., the Kushiro River).

River environment management will also be promoted based on the use status of rivers in a region, in order to promote continuity in upstream/downstream directions and that in river-basin and coastal areas, and properly conserve river environments in collaboration with the parties concerned in the river-basin area. Detailed examination will also be promoted to clarify the targets of constructing and conserving river environments.

As stated above, promoting nature-oriented river management not only promotes the conservation of specific rare species but also the conservation and restoration of habitats for various living organisms that rivers originally possessed.

In mountains and mountain streams, erosion control projects to protect human life and property will be promoted while conserving biodiversity.

1.1 Nature-oriented river management (Current Situation and Challenges)

Nature-oriented river management targets all river administration activities from surveys to construction, maintenance and management, in order to conserve and create habitat environments for living organisms that rivers originally possessed, as well as various river landscapes, by putting the working of the entire river natural environment into perspective and considering harmony with regional life, history and culture. As fundamentals for implementation, in addition to using the characteristics and mechanisms of nature as much as possible, the courses of action should be as follows:

- An entire river should be put into perspective when creating it;
- Not only the conservation and creation of habitat environments for living organisms, but also the life, history and culture of the region should be connected with creation of a river;

- All river management activities including research, planning, design, construction, maintenance and management should be put into perspective when creating a river.

(Specific Measures and Policies)

- Extended construction under direct control or by subsidies for nature-oriented river management have totaled about 3,500 km (by the end of FY 2006), and the government will promote a new phase of nature-oriented river management. (MLIT)
- To solve the river management problems seen thus far, the government will implement the following measures and policies: (MLIT)
 - Compiling existing knowledge about nature-oriented river management
 - Implementing technical support for nature-oriented river management
 - Establishing an evaluation system for nature-oriented river management
 - Reexamining the implementation system of nature-oriented river management
 - Establishing a system for positive public participation and for various collaborations
 - Disseminating nature-oriented river management
 - Developing human resources to promote nature-oriented river management.
- To improve the entire level of river management, the government will take the following courses of action: (MLIT)
 - Improving the planning and design technology for nature-oriented river management
 - Improving river management skills for nature-oriented river management
 - Establishing a method of monitoring river environments and a method of setting targets for river management
 - Scientific elucidation of the environmental response to alterations

1.2 Nature restoration projects

(Current Situation and Challenges)

Although wetlands only occupy a limited percentage of Japan's total land area, the threatened species dependent on wetland environments extracted in accordance with the Red Data Book total 33 kinds of birds and 290 kinds of vascular plants (about 36% of threatened bird species and about 17% of threatened plant species), thereby confirming the important role of wetlands in conserving biodiversity.

In the wetland areas in Japan, the total area of rivers and wetlands in areas adjacent to rivers account for about 80% of the total wetland area. How to conserve and restore these wetlands existing in connection with rivers poses a major challenge.

Due to various impacts, gravel riversides—an original feature of rivers—have become sandbanks (that are normally dry but overflow with water in case of flooding),

and later evolved into groves. Thus, there is a growing need for nature restoration projects to restore such riverside areas.

(Specific Measures and Policies)

- To restore lost sound nature environments in rivers, etc., the government will focus and concentrate conducting nature restoration projects for rivers in regions of particularly strong national or regional interest. (MLIT)
- In planning and implementing projects, the government will decide an implementation plan by obtaining wide-ranging and positive collaboration of NGOs, related organizations and experts in the region, thereby promoting projects with the consensus of a wide range of people in the region based on scientific knowledge as much as possible. (MLIT)
- The government will incorporate adaptive management for checking the response of nature, and provide feedback when necessary in many projects. (MLIT)
- The government will also pay attention to the above points to complete the projects currently underway, such as the restoration of a wetland environment (Kushiro River), restoration of a river mouth and tidal flats (Mukawa, Arakawa and Kiso Sansen), restoration of a meandering river (Kushiro River), restoration of a lakeshore environment (Kasumigaura), and restoration of a gravel riverside (Tama River). (MLIT)

1.3 Securing the continuity in rivers and wetlands

1.3.1 Securing the continuity in upstream and downstream areas of rivers

(Current Situation and Challenges)

Securing continuity in upstream and downstream areas of a river remains an important issue for conserving habitat environments for living organisms in rivers. Since 1991, the Ministry of Land, Infrastructure, Transport and Tourism has been implementing the “Model Project for Creating Rivers That Fish Can Easily Ascend” to rebuild facilities for crossing rivers, such as sluices, groundsills, dams and erosion control dams, to construct and improve fish ladders, secure the flow rate of fish ladders, and secure riverside vegetation around the facilities.

The number of facilities rebuilt or reformed by FY 2008 totaled 250, and the length of rivers where the movement of fish was enabled by such construction totaled 846 km, thereby greatly contributing to improvements in river continuity.

(Specific Measures and Policies)

- The government will enhance measures to establish fish ladders for facilities that have divided rivers into upstream and downstream areas. The government will also make efforts to create a wide area of rivers in which fish can live, including facilities

that divide rivers, by constructing and improving habitat environments for living organisms—the places for spawning, growing and feeding. (MLIT)

1.3.2 Securing the continuity of rivers and river basins

(Current Situation and Challenges)

Due to lower riverbed levels caused by river repair work and the construction of water gates and sluiceways, many cases have been observed where there is a large gap between a river and its connecting channel in the river-basin area or between a river and its tributaries. There are also cases where continuity has been cut between a channel of the river-basin area and wetlands or paddy fields. As a result, aquatic life that depends on moving between rivers and river-basin areas is decreasing.

(Specific Measures and Policies)

- The related organizations will collaborate to improve continuity for an entire river-basin area (“Ecological Network”) by making efforts to secure the continuity of water areas between rivers and channels, ponds, mires, and the paddy fields of river-basin areas, solving the differences between rivers and inflow/outflow water channels by establishing fish ladders and notches, and restoring the nature of tributaries by reducing sandbanks. (MLIT, MAFF, MOE)

1.4 Environmental consideration in dam construction

(Current Situation and Challenges)

In implementing dam projects, environmental research is conducted beforehand to fully grasp the living and breeding environment of living organisms, and then examining the impact dam projects would exert on the environment. From the planning stage of a project, measures for environmental conservation are taken to avoid, reduce or compensate for the impact on living and breeding environments of various living organisms as much as possible, by changing the locations on a mountain from which rocks for dam construction are extracted and changing alternative roads, establishing a facility to change sluice gates, giving consideration to operation plans, restoring woodland around the construction facility site, and protecting and maintaining biotopes. Thus, the natural environment is taken into consideration. In addition, environmental research is conducted during construction and after starting service to grasp the degree of a project’s influence and the effects of environmental conservation measures.

(Specific Measures and Policies)

- When implementing a dam project from its planning stage, the government will conduct careful examination by paying sufficient attention to the natural environment. Moreover, by taking such environmental conservation measures as

conducting environmental research and environmental impact assessment beforehand, it will try to avoid and reduce the impact on the inhabitation, growth and breeding environments of various living organisms as much as possible. The government will also try to reflect the results of environmental research in dam project plans and environmental impact assessments. (MLIT) [Cited in Chapter 2, Section 8, 2.1]

- The government will promote environmental conservation in the region and interaction between upstream and downstream areas of the basin, based on a vision of developing water sources to advance conservation of the natural environment as pertaining to water sources. (MLIT)

1.5 Consideration of the environment in preventing landslide disasters involving mountain streams and slopes

(Current Situation and Challenges)

Erosion control projects are intended to protect human life and property from landslide disasters caused by such conditions as Japan's high precipitation, landform, rainfall among the world's heaviest, and the urbanization of mountain and hillside areas, in addition to restoring greenery in wasteland. The projects are implemented throughout Japan from the wasteland at headwater points to the slopes behind houses in the cities. In constructing facilities related to erosion control, efficiency and other necessary matters for conserving the environment and landscape are fully considered, while conserving the nature environments and biodiversity in the mountains and mountain streams, and promoting erosion control projects to protect human life and property from landslide disasters.

(Specific Measures and Policies)

[Creating and Conserving Greenery in Wasteland and on Slopes]

- The government will establish woodlands as green belts on the mountain slopes around urban areas and promote greening projects to establish woodlands in wasteland, thereby enhancing safety against landslide disasters, in parallel with contributing to the conservation of good landscapes by conserving, restoring and creating biotope spaces. The government also will promote measures to stop sediment runoff from slopes by restoring river-basin wasteland in Satochi-Satoyama areas, and contribute to conservation of the natural environment and biodiversity. (MLIT)

[Creating Mountain Stream Space with Abundant Water and Greenery]

- To improve the living environment, accessibility to water, and recovery of ecosystems by securing good green land and waterside space in mountain streams in regions with excellent natural and social environments, the government will promote erosion

control projects for mountain streams with abundant water and greenery. (MLIT)

[Creating Mountain Stream Space for Protection Against Frequent Landslides]

- In addition to preventing harmful landslides to protect human life and property from landslide disasters in case of torrential rains, and conserving the continuity of mountain stream environments in normal times and the living organism habitat environments formed by sand drift, the government will promote the establishment of permeable erosion control dams or make existing erosion control dams permeable by considering the prevention of bank erosion. (MLIT)

1.6 Comprehensive landslide control from mountains to seashores

(Current Situation and Challenges)

Japan has a large quantity of sand drift due to its topographical and geographical features. This drifting sand was qualitatively or quantitatively prevented by cutting off the sand drift from upstream to downstream areas. The sands drifting along riverbeds and mountain streams, and the streams of sand drifting along the coastlines have dramatically changed, with coastal erosion being recently observed nationwide. This phenomenon has resulted in impacts on river and coastline environments.

(Specific Measures and Policies)

- The government will promote technical development to address sand drift in rivers and mountain streams, the supply of river sand, and the use of drifting sands in coastal areas as well as dredged sand. Based on the environment and use status of rivers and coastal areas, the government will also work on comprehensive sand management from mountains to seashores in collaboration with related organizations. (MLIT, MAFF)
- The government will promote the establishment of permeable erosion control dams that can quantitatively and qualitatively discharge sand appropriately to downstream areas or make existing erosion control dams permeable, while controlling production and trapping the soil and sand that cause downstream damage. By combining various types of measures such as controlling the quantity of sand drifting into dam reservoirs, establishing sediment dams in areas directly upstream of reservoirs, conducting the artificial removal of sediment in reservoirs, and installing sand discharge pipes and sand discharge gates, the government will promote landslide prevention measures with life cycle costs taken into consideration, thereby maintaining the function of dams as long as possible, and securing safety and environmental protection by properly supplying soil and sand to downstream areas. (MLIT)
- The government will collect existing data on the status of past sand drifts, conduct a

monitoring survey on the dynamic mechanism governing the quantity and quality of sand, make a soundness assessment of sand drifting through mountain streams, rivers and along seashores by analyzing the survey results, and then make predictions by using a model that simulates sediment and sand drift in which drifting sand can be traced and changes in landform assumed. The government will also examine and evaluate more effective technologies. (MAFF, MLIT)

1.7 Designation and conservation of wetlands

(Current Situation and Challenges)

Since wetlands play an important role as habitats for aquatic life, water birds, and many other forms of life, the registration criteria for Ramsar wetlands that focused on the population of water birds at the beginning of the Ramsar Convention has been changed to criteria focusing on important wetlands to conserve biodiversity, including species other than water birds that depend on wetlands. The Convention targets various types of wetlands ranging from shallow sea areas and coral reefs to artificial wetlands including paddy fields. In the future, implementation of the Convention must be promoted by making efforts to conserve wetlands.

In light of the decisions made at the Conferences of the Parties to the Convention and due to the growing need to conserve wetlands in Japan, the Ministry of the Environment has conducted research to select important wetlands in accordance with the selection criteria used for Ramsar wetlands registration. Based on the opinions of experts, 500 wetlands in Japan including marshlands, rivers, lakes, tidal flats, seaweed beds, mangrove forests and coral reefs have been selected as “500 Important Wetlands.” Among these, only 34.6% have been designated as protection areas such as national and quasi-national parks and national wildlife protection areas, and more protection areas must be added in the future as necessary. In addition, it is important to employ not only the regulatory method of specifying protection areas but also various methods of conserving wetlands, such as collaboration between the central government and local authorities, as well as with regional residents and NGOs.

When examining concrete measures for wetland conservation, it is important to build a consensus in society from the standpoint of a wide surrounding area including river-basin areas and a network based on the migration of living organisms, and the function of wetlands, while promoting the use of land surrounding wetlands that is closely linked to maintenance of the wetland environment, forest management and water flow, the outflow and drifting of sand, and water quality.

(Specific Measures and Policies)

- The government will reexamine the assessment method used by the Comprehensive Review Project for National and Quasi-National Parks (from FY 2007) also from the

perspective of conserving biodiversity, and promote an examination of characteristic wetlands and wetlands with excellent landscapes, including groups of springs, groups of reservoirs, and natural areas with clear streams, to determine whether there are areas valuable enough to be designated as national and quasi-national parks. (MOE)

- For the wetlands in Kushiro and Sarobetsu where aridification caused by the inflow of sediment and invasive alien species are exerting serious impact on national parks, the government will conserve and restore wetland ecosystems by implementing nature restoration projects. (MOE, MLIT, MAFF)
- For the regions designated as necessary protection areas among the “500 Important Wetlands,” the government will further collect information for conservation and promote conservation by designating the regions as national wildlife protection areas or as part of natural parks, or by registration as Ramsar wetlands, thereby obtaining the understanding of the regions concerned. (MOE)
- For wetlands considered important habitats for migratory water birds, the government will make efforts for conservation and raising the awareness of regional residents by building and maintaining networks among the wetlands. (MOE)
- By using some research projects such as Monitoring Sites 1000, the government will grasp changes in wetland ecosystems and the status of conservation. (MOE)

1.8 Conservation of fishing grounds in inland water areas [Cited in Chapter 1, Section 9, 2.9]

(Current Situation and Challenges)

Inland water areas such as rivers and lakes are essential for peoples' lives, since such waters are places of fish production and culture, and create opportunities for people to interact with nature through such recreational activities as fishing and outdoor sports. These days, however, in addition to deteriorated habitats for aquatic plants and animals, feeding damage caused by alien fish such as the largemouth bass (*Micropterus salmoides*) and by common cormorants, and the spread of cold water disease in Ayu, harsh environments surrounding inland water fisheries and aquaculture are resulting. To cope with these issues, it is important to further enhance the conservation of inland water biodiversity.

(Specific Measures and Policies)

- By cultivating fishing grounds and using paddy fields and water channels, the government will improve the habitat environments of aquatic animals and plants such as the common carp, crucians, eels, and common reed grass. (MAFF)
- By taking a wide-area perspective including the perspective of conserving biodiversity, the government will promote the effective exclusion of alien fish and the protective control of common cormorants to prevent feeding damage, and take measures against

such diseases as cold water disease in Ayu and Koi herpes virus. (MAFF)

- By establishing places for spawning, building larvae culture facilities and releasing larvae, the government will promote efforts to increase resources with consideration given to biodiversity, mainly by local fishermen, and thereby promote the conservation of biodiversity in inland waters. (MAFF)

1.9 Measures against alien species in rivers and wetlands

(Current Situation and Challenges)

With rivers, not only does the environment differ from the headwater point to the mouth of a river or from inside the water (via the waterside) to the riverside, it also differs in intermingled places having physically different environments due to small differences in landform or the frequency of flooding. Such a variety of environments provides diverse habitats for various living organisms. Invasive alien species exert a great impact on native species, causing genetic abnormalities in native species by cross breeding and damaging the ecosystems unique to rivers, thereby possibly deteriorating the quality of those river ecosystems.

The environments of lakes and rivers can be considered isolated in a wide area, and in that sense, are relatively similar to the environment of islands. In particular, native species that can live only in lakes and rivers are vulnerable to invasive alien species.

The “Research Committee on Negative Effects of Alien Species and Countermeasures thereof” consisting of academics and experts has therefore formulated “Measures for Invasive Species in Rivers (draft)” (2001), “Basic Idea and Examples of Alien Species Control Measures in Rivers” (2003) compiling basic information on alien species and citing examples of measures taken throughout Japan, and “Basic Idea and Examples of Alien Species Control Measures in Rivers (revised edition)” (2008), which are referenced at many sites. These documents cite examples to describe the concept of countermeasures against invasive alien species as follows:

- (1) Publicity and awareness-raising to obtain understanding and cooperation on invasive alien species
- (2) Preventive measures to prevent an infestation or introduction of invasive alien species
- (3) Countermeasures against existing invasive alien species
- (4) Promotion of research and surveys to accumulate knowledge and technology necessary as measures against invasive alien species

(Specific Measures and Policies)

- The recent, rapid expansion of the distribution of invasive alien species has become a major problem in some rivers. The government will continue taking measures against invasive alien species in rivers, in addition to promoting researches and

surveys on foreign vegetation and fish, and examining effective measures. (MLIT, MOE)

2 Improvement of water environments

(Outline of Measures and Policies)

The water quality of rivers exerts a great impact on the habitat environments of living organisms not only in rivers but also in sea areas. Therefore, efforts are being made to secure appropriate water quantity and quality in rivers. Rivers also have distinct features in terms of dynamism—disturbances caused by floods and fluctuating flow—and in the natural environment formed under such environments. When thinking about a river environment, it is also important to consider fluctuations in flow in addition to how much water is actually flowing.

Until today, we have focused on conserving water quality based on the environmental water quality standard for protecting human health and conserving the living environment, and on securing a certain flow rate as a normal flow rate. Environmental quality standards for water pollution will also be set, achieved and maintained for conserving aquatic life. In addition to securing a certain flow rate, what kinds of fluctuations in flow will be seen in rivers entail an important point of view, and measures for this point must be examined and promoted.

2.1 Improvement of water quality in rivers and lakes

2.1.1 Setting and achieving water quality targets by considering aquatic life

(Current Situation and Challenges)

The environmental water quality standard for conserving aquatic life included zinc in its target items in November 2003, and established the types of water areas for which to specify standard values depending on the habitat status and situation of spawning aquatic life in each public water area (for rivers and lakes: Living organism A, Special living organism A, Living organism B, Special living organism B), in order to designate the type of individual water areas.

Four water areas were designated (Kitakami River, Tama River, Yamato River and Yoshino River) by type for the first time in November 2007, with stricter effluent standard values being set for zinc based on the Water Pollution Control Act (enforced in December 2006). Moreover, 17 and 11 water areas were designated by type in March and November 2009, respectively.

Future issues include examining the type designation for remaining water areas (10 rivers and lakes, and 9 sea areas) in succession, and considering the establishment of new environmental quality standards for water pollution as pertaining to materials other than zinc.

According to the environmental water quality standard established for conserving

aquatic life, necessary environmental management measures and policies such as effluent control must be properly implemented to maintain and achieve the standard, as well as constantly monitoring achievement of said standard.

In March 2005, “Indicators for Future River Water Quality Management (draft)” (revised in March 2009) to evaluate rivers from various perspectives were formulated and set to evaluate the habitat environments of living organisms in rivers based on the inhabitation conditions of aquatic life from the perspective of “securing rich ecosystems.”

(Specific Measures and Policies)

- Concerning water areas for which the government has yet to designate a type, the government will collect and organize information on the water areas, submit it for deliberation by the Special Committee for the Type Designation of Environmental Standards for the Conservation of Aquatic Life, and then examine each area in succession for its type designation. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- Four water areas have been designated by type for the environmental quality standards established for water pollution to conserve aquatic life as of November 2007, and 40 more water areas are targeted for type designation by the end of FY 2011. (MOE)
- By announcing “Prefectural Standards for Water Category Designation” (in June 2006), the government will disseminate matters related to prefectural standards for water category designation. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- The government will review necessary scientific knowledge on substances considered to be highly toxic, and promote toxicity assessment. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- In accordance with the environmental water quality standard established for conserving aquatic life, the government will implement necessary environmental management measures and policies to maintain and achieve such settings as those for effluent control, and always monitor achievement of the environmental water quality standard in public waters. (MOE) [Cited in Chapter 2, Section 1, 3.2]
- Based on the “Indicators for Future River Water Quality Management (draft)” (revised in March 2009), the government will conduct research from the perspective of “securing rich ecosystems” as an environmental indicator for the life, growth and breeding of living organisms in rivers. (MLIT)

2.1.2 Measures for water purification

(Current Situation and Challenges)

The results of monitoring water quality in public waters in FY 2008 revealed long-term improvement in achieving the environmental quality standards for BOD

(biochemical oxygen demand) and COD (chemical oxygen demand) in public waters at 92.3% in rivers. Conversely, the achievement rates in enclosed water areas remained low, without any significant improvement at 76.4% in sea areas and 53.0% in lakes. Based on the Law Concerning Special Measures for Conservation of Lake Water Quality, plans for conserving the quality of lake water have been formulated for designated lakes and the pollutant load shows a declining trend, thanks to various measures such as the construction of sewage systems. Although improved water quality is observed in some lakes such as Lake Inba, many lakes failed to achieve the environmental water quality standard, and measures to conserve the water quality of lakes must be further strengthened, including the introduction of sewage treatment facilities with advanced treatment.

In addition to the quantity and quality of water, various environmental problems in lakes have recently arisen, such less waterside vegetation and fewer endemic fish species.

Regarding the water purification measures for rivers, the Ministry of Land, Infrastructure, Transport and Tourism is implementing the “introduction of purification water,” “dredging,” “construction of direct purification facilities” and “clean watercourse construction.” The “introduction of purification water” will apply to clean river water and sewage water after advanced treatment for rivers having low flow rates and pollution, and for lakes. This represents one of the most effective water purification measures taken since water quality was directly improved by dilution in polluted water areas, and significant effects have been observed at Teganuma in Chiba Prefecture. “Dredging” refers to dredging the bottom sediment that causes offensive odor and eutrophication through the dissolution of nutrients, and is implemented in enclosed water areas such as Lake Kasumigaura and in polluted urban rivers.

Regarding the methods of “direct purification,” vegetation purification and soil purification that employ absorption by aquatic plants or soil are utilized in addition to the contact oxidation method, where a water tank is filled with contact media such as gravel, then water is run through the tank to deposit pollutants in the tank for decomposition by microorganisms. “Clean watercourse construction” refers to creating a flow of clean water for a river commonly used as a water source, by setting a new low watercourse within the river channel to separate the polluted water of tributaries flowing into the river from water of the main river, purifying the polluted water as necessary, and then combining the clean water downstream. This has already been implemented in the Edo River that flows between Tokyo and Chiba Prefecture, proving very effective in improving the quality of the headwaters of Tokyo and Chiba Prefecture.

(Specific Measures and Policies)

- The government will continue its efforts regarding the treatment of night soil and

domestic effluent by employing sewage systems and Johkasou (individual waste water treatment facilities by secondary treatment) . It will also take measures to improve water quality, including the introduction of sewage treatment facilities with advanced treatment, improvement of combined sewage systems, as well as measures to control non-point source pollution. (MOE, MLIT, MAFF)

- The government will implement measures against water pollution by taking the measures against non-point pollutants (effluent control) in agricultural land and cities, using the System for Conservation of the Lakeshore Environment, and controlling the pollution load imposed by newly built and existing factories, and other commercial facilities. (MOE, MAFF)
- The government will promote further improvement of Gappei-shori-Johkasou (treating both kitchen and toilet waste) by taking such measures as the conversion of Tandoku-shori-Johkasou (only treat toilet waste). (MOE)
- As for the water quality of lakes, despite a lower inflowing pollutant load, no notable improvement of water quality has been observed. The government will make efforts to analyze water pollution mechanisms to promote more effective and efficient measures. (MOE)
- In addition to ongoing water purification measures for rivers, the government will formulate an action plan (emergency action program to improve the water environment) for the quantity and quality of water, in order to focus on improving water quality with regard to heavily polluted rivers, lakes or dam reservoirs that deteriorate living environments or exert a great impact on the water supply, for the purpose of comprehensively, urgently and intensively implementing water environment improvement projects by local municipalities that positively address the issue of improving water quality, the party managing a river, the party managing a sewage system, and with related organizations all working together. (MLIT)
- Examples of returning sweetfish due to an improved habitat environment for living organisms (as seen in the Uji River, a tributary of Niyodo River), and examples where tourism resources were newly created by waterside restoration in cities (as seen at Matsue-Horikawa in Matsue City) have been reported at 30 locations targeted by the first plan (Clear Streams Renaissance 21) for FY 2000, as a result of improved water quality. For FY 2001 and FY 2002, 34 locations were selected for the rivers targeted by the second plan (Clear Streams Renaissance II), and the government will continue to positively promote the plan in collaboration with related parties. (MLIT)
- As measures to reduce the pollutant load of agricultural sewage drainage discharged into rivers and lakes, the government will promote the construction of water purification facilities within channels and circular irrigation systems that reduce the pollutant load by reusing agricultural wastewater, and by the absorption of pollutants in growing paddy rice and denitrification in paddy fields. (MAFF)

- In addition to conventional water conservation measures targeting the lakes where efforts to improve the quality of water have recently proved ineffective, the government will take new trial measures from FY 2007 in Lake Kasumigaura and Lake Inbanuma to restore the connection between the natural environments of lakes and regions, conserve and restore ecosystems, and make efforts for improving water quality. (MLIT)
- To improve the water quality of enclosed water areas, the government will adjust water levels and restore waterside ecotone at lakes, and comprehensively promote the improvement of water quality in lakes and dam reservoirs. (MLIT)
- The government will continue implementing conservation measures for groundwater by banning the permeation of effluents into the ground, restricting the pumping of groundwater, monitoring and promoting the construction of rainwater filtering facilities. It will also take measures to promote conservation and restoration activities regarding regional groundwater and springs. (MLIT, MOE)

2.1.3 Measures to conserve the water quality of dam reservoirs

(Current Situation and Challenges)

”Cold water discharge,” “prolonged muddy water” and “eutrophication” can be pointed out as problems regarding the water quality of dam reservoirs. In addition to addressing these problems and conserving and improving the water quality of dam reservoirs, the government is implementing various measures to avoid or reduce the impact downstream.

As for cold water discharge, if a dam forming thermal stratification in summer discharges cold water in the lower layer of the reservoir, the discharged water is colder than water flowing into the reservoir, and that difference may affect agricultural products and river ecosystems.

Prolonged muddy water is a phenomenon whereby a dam’s discharged water remains muddy for a long time, and which occurs when a large quantity of soil and sand consisting of small-diameter particles flows into the reservoir along with floodwater, resulting in muddy water remaining in the reservoir.

Concerning eutrophication, stagnant water remaining in the reservoir for many days coupled with a heavy pollutant load flowing into the reservoir from the river-basin area will result in an abnormal growth of phytoplankton in the reservoir, deterioration of the landscape, and an offensive odor.

(Specific Measures and Policies)

- As a measure against cold water discharge, the government will establish a facility to change sluice gates so that the depth at which water in the reservoir is discharged can be selected, thus enabling selection of the layer of water having roughly the same

temperature as that of inflowing water. (MLIT)

- For prolonged muddy water, the government will try to shorten the period of muddy water discharge by constructing a facility to change sluice gates so that the water layer with an appropriate density of mud can be selected, and establishing and operating a clear water bypass through which low-density water flowing into the reservoir at the end of a flood stage can bypass the reservoir and flow directly downstream. (MLIT)
- As a measure for eutrophication, the government will establish and operate such facilities as an aeration circulation device that blows air into a reservoir to mix water at the bottom and surface, and lower the water temperature and cause water convection, in order to control the growth of plankton. (MLIT, MAFF)

2.2 Securing clear streams in rivers

2.2.1 Setting normal flow rates

(Current Situation and Challenges)

The Basic Policy for River Development (or basic policy for river development from a long-term perspective) prescribes the specification of items concerning the flow rate necessary to maintain the normal function of flowing water (normal flow rate). As the flow rate to be secured in case of a water shortage, the normal flow rate is set by examining a flow rate that can satisfy both the flow rate necessary to maintain the conditions of habitats for fauna and flora, local landscape, and the cleanliness of flowing water (maintenance flow rate), and the flow rate necessary for using the flowing water (utilization flow rate).

(Specific Measures and Policies)

- With Class A rivers, the basic policy has been formulated for all 109 river systems as of FY 2008, and normal flow rates have been set for 95 of those river systems, and are used as the basis of judgment for approving new water use rights and the foundation for supplementary flow rates from dam facilities. To secure normal flow rates, the government will also examine the effective use of such existing facilities as dams, and the rationalization of water usage. (MLIT)

2.2.2 Restoring clear streams by solving low water zones caused by hydroelectric power generation

(Current Situation and Challenges)

In hydroelectric power generation, the bypassing of water used for power generation from water intake to the power plant causes a low water zone where the river flow is remarkably low. Within such a zone, problems regarding the habitat environments for living organisms may arise from the perspectives of flow continuity

and the conservation of water quality.

Power generation guidelines were established in 1988 and efforts have been made to restore clear streams in the low water zone caused by power generation. Within the low water zone extending a total distance of about 9,700 km and including 1,571 hydraulic power stations along Class A rivers, about two-thirds of the streams have been improved.

(Specific Measures and Policies)

- As an example of restoring clear streams, trial water was discharged to prevent a rise in water temperature in summer with consideration given to the upstream migration of salmon in a midstream area of the Shinano River; as a result, the effect of the upstream migration of salmon has been confirmed. In the future, the government will make efforts to restore the clear streams of low water zones caused by hydroelectric power generation at such opportunities as renewing water use rights. (MLIT)

2.2.3 Restoring clear streams in channels by conveying environmental water

(Current Situation and Challenges)

Clear streams left in regional water channels are spaces for people to relax, play and communicate. These spaces also provide precious habitats for living organisms. However, due to changes in water usage, clear streams that flow in rivers or channels near the people have been lost in many regions.

(Specific Measures and Policies)

- The introduction of purification water was previously examined and implemented in various regions. The sources and water quality of purified sewage, stored rainwater and groundwater have also been researched in seven model regions nationwide from 2005. Based on the results, the recovery time of normal flow rates, the construction of channels to improve water quality, and an examination of measures for maintenance, management and use have been promoted, and the “Guidebook for Developing Waterfront in Urban Areas” was published in February 2009. In addition, the “Handling of Permission to Use the Rights of Water on Environmental Water” (March 2006) clarifies the standard related to handling under the River Law and which is necessary when conveying and using river water as environmental water, thereby raising expectations for restoring clear streams depending on regional characteristics. (MLIT)
- By using agricultural irrigation facilities and conveying environmental water, the government will support regional efforts to restore clear streams. (MAFF)

2.3 Improvement of river environments by flexible management tests on dams

(Current Situation and Challenges)

The construction of dams has affected the habitat environments of aquatic life such as fish in terms of a lower flow rate in downstream rivers or even a leveled flow rate as seen with some dams. To conserve the river environment downstream of dams, flexible management tests were initiated in FY 1997 and conducted at 20 dams in FY 2008.

For a multi-purpose dam having flood control as one of its purposes, space is secured during the flood season by lowering the water level of a reservoir for flood control. The flexible management test determines the temporary reserve of flowing water in a flood control capacity and, by using such a water reserve, attempts to restore clear streams and improve flow conditions in downstream rivers by releasing the water. One precondition is that flood control capacity can be safely and securely ensured by releasing water when a flood is expected based on weather forecasts.

(Specific Measures and Policies)

- The government will promote measures for improving river environments by conducting flexible management tests at dams and advancing examination of how water is released to make it more effective. (MLIT)

3 Coordination and collaboration with residents

(Outline of Measures and Policies)

Rivers are natural public property that foster various living organisms and support ecosystems unique to a region, and considered “regional common and public property” to be protected and nurtured by not only the party managing the river but also by regional residents through activities conducted in river-basin areas. There has recently been a growing sentiment to use rivers for creating communities as spaces where nature can be directly experienced. Under the ideology for realizing better rivers through collective collaboration regional residents and governments must have a common understanding that “rivers are regional common and public property.” With the revision of the River Law in 1997, a procedure was adopted to take measures after consulting with experts as necessary and reflect the opinions of concerned residents when making river construction plans. The Ministry of Land, Infrastructure, Transport and Tourism is promoting measures for rivers in collaboration with many citizens’ groups by sharing roles in the stages of formulating a plan, implementing a project, and management after implementing the project.

(Current Situation and Challenges)

Since rivers are “regional common and public property,” it is important to not only reflect the opinions of residents in formulating river construction plans but also to

engage in positive involvement with rivers on a daily basis.

In line with the growing desire of regional residents to participate in citizen's activities and the heightened momentum to formulate an independent regional society with distinctive characteristics, society has greater expectations regarding the activities of citizens' groups. Also with rivers, citizens' groups have become more active in various fields including environmental conservation and activities for creating towns utilizing rivers.

Under such momentum, the government is also making efforts for rivers by constructing biotopes and restoring waterside vegetation in collaboration with citizens' groups.

(Specific Measures and Policies)

- The government will continue its efforts in environment conservation activities in collaboration with residents for restoring nature and creating towns that utilize rivers. (MLIT)

4 Environmental education and hands-on nature experience using rivers

(Outline of Measures and Policies)

Unique and naturally vibrant rivers are the basis of many people's lives. Nearby rivers offer excellent conditions for us to learn about nature and conduct activities, and environmental education and hands-on nature experience have recently become popular. Practical experience is necessary to foster a willingness to conduct activities aimed at ensuring the coexistence of human beings and nature, and nurture the ability to solve environmental issues. To promote environmental education and hands-on nature experiences, the government is developing various measures in collaboration with citizens' groups.

4.1 Children's Waterfront Rediscovery Project

(Current Situation and Challenges)

The Ministry of Land, Infrastructure, Transport and Tourism, the Ministry of Education, Culture, Sports, Science and Technology, and the Ministry of the Environment are cooperating to promote the "Children's Waterfront Rediscovery Project." To enhance the hands-on experience of regional children, the "Children's Waterfront Council"—consisting of the party managing the river, board of education members and citizens' groups—was established, and waterfronts suitable as playgrounds and for the nature experience of children have been registered as "Children's Waterfronts," thereby promoting hands-on nature experience in rivers with this project. The project also supports hands-on experience involving the use of rivers, by lending equipment and materials necessary for waterfront hands-on experience and

providing various kinds of useful information about waterfront activities. As of FY 2008, 282 locations have been registered and various activities conducted in regions throughout Japan.

Through coordination and collaboration within the regions, the relationship between children and waterfronts has also been considered, with a plan being drawn up for a waterfront school project making use of regional characteristics. When river construction is necessary based on the plan, construction will be conducted for improving accessibility to riverbanks (e.g., making bank slopes milder, constructing riverbanks where children can approach the waterfront), restoring rapids, and eliminating any abyss or stagnation, so as to make the waterfront accessible for children to enjoy nature, while maintaining the natural status as much as possible.

Among waterfront school projects, there is one example where children selected the type of waterfront they wanted and construction was undertaken from viewpoint of the children. Another example is where a citizen's group invited children to visit rivers.

(Specific Measures and Policies)

- To expand the opportunities for children to enjoy hands-on experience and engage in environmental learning using rivers, and enhance the hands-on experience of regional children, the government will continue to promote the “Children’s Waterfront Rediscovery Project” along with the “training of instructors” who can teach children about the natural environment and dangers of rivers. (MLIT, MEXT, MOE) [Cited in Chapter 2, Section 3, 3.1 and 4.2]

4.2 Promoting hand-on nature experience by citizens’ groups using rivers

(Current Situation and Challenges)

Rivers offer the charm to attract people, but also pose dangers. Therefore, a “river instructor” possessing the necessary knowledge and rich experience regarding rivers is required for people to safely enjoy rivers.

There are many citizens’ groups throughout Japan that engage in various activities in and along rivers as the field of activity, and positively practice environmental learning and hands-on nature experience. The style of activities varies: some groups focus on region-oriented activities while others focus on exchanges with other groups or wide-area activities. A nationwide council has also been established, and lectures on instructor training, waterfront safety lessons for children, and nationwide conferences to learn from rivers are being held in various regions in Japan.

People’s sensitivity can be heightened when the citizens’ groups in various regions invite not only children but also older generations to visit rivers, and promote rich hands-on nature experience set in rivers, including the activities described above.

At the same time, as more people are enjoying hands-on nature experience using

rivers, there seems to be no end to water accidents. It is important to keep in mind that although interacting with nature may be comfortable and gives us energy to live, it may also be dangerous.

The study group on the use of rivers based on the nature of rivers as possible places of danger and on how security should be formulated as its proposal in 2000: “To enjoy a river by knowing its danger.” It describes that free use and self-responsibility are the basic principles concerning the use of rivers, although the daily provision of information must be improved in order for people to engage in appropriate behavior, thus ensuring personal safety.

(Specific Measures and Policies)

- In collaboration with citizens’ groups and councils nationwide, the government is comprehensively developing all kinds of activities to support and promote hands-on experience in rivers in line with the times. In particular, the government will promote the “training of instructors” to foster instructors who correctly understand the dangers of rivers and have the skills to teach “waterfront safety lessons for children” where children can learn basic knowledge about crisis management through hands-on experience, from the perspective of securing one’s own security, and “awareness-raising activities” to confirm the significance of hands-on experience in rivers, and provide a place for people engaged in riverside activities nationwide to develop exchanges. (MLIT)
- The Ministry of Land, Infrastructure, Transport and Tourism is providing real-time information on rainfall, water levels in rivers, and other data via the Internet and mobile devices. To prevent river water accidents caused by a sharp rise in water level, the government will formulate an action plan of measures and the promotion thereof in collaboration with related organizations, and raise awareness by issuing flyers on the safe use of rivers. (MLIT)

4.3 Kodomo hotaranger (child firefly ranger)

(Current Situation and Challenges)

The light of fireflies at night has been appreciated as original Japanese scenery for a long time. Even though such scenery has been lost in many regions, people have expanded activities to restore the lost fireflies and protect the remaining ones.

The Ministry of the Environment has named children “kodomo hotaranger,” who will lead the next generation in terms of conserving water environments through fireflies, and from FY 2004 has invited examples of children’s activities, with the Minister commending the leading and unique activities in Japan.

This provides a good opportunity for children to strengthen their interest in conserving water environments, as well as improving their own understanding and

thinking by contact with familiar rivers through fireflies.

Representative examples of their activities are: making a firefly habitation map, studying the creation of living environments for fireflies, and having contact with people in the community.

We chose one elementary school, one junior high school, and one group to receive the Minister of the Environment prize, two elementary schools and one junior high school to receive the excellence prize, one group to receive the special prize, and one group to receive the encouragement prize from among 41 groups, and then held an awards ceremony and received activity reports in FY 2008.

(Specific Measures and Policies)

- The government will continue to promote kodomo hotaranger activities by commending remarkable activities and holding activity report meetings, so that examples of these activities lead to further interest and participation in water environment conservation activities in various regions. (MOE)

5 Survey and research on river environments

(Outline of Measures and Policies)

To contribute to the construction and conservation of good river environments, various kinds of research and surveys including the Census of Rivers and Riparian Areas, river ecology scholarly research, and work at the Aqua Restoration Research Center that has world's largest experimental channel (about 800 m length) are being conducted in collaboration with experts and various organizations.

5.1 Census of Rivers and Riparian Areas

(Current Situation and Challenges)

With the start of “nature-oriented river management” in 1990, the Ministry of Land, Infrastructure, Transport and Tourism is conducting the “Census of Rivers and Riparian Areas” for periodically monitoring the inhabitation conditions of living organisms in rivers and dam reservoirs, in order to grasp basic information on natural river environments.

So far, with 109 Class A rivers, 166 Class B rivers and 105 dam reservoirs managed by the central government or Japan Water Agency (JWA; an Incorporated Administrative Agency), research has been conducted on the habitat status of fish, benthic life-forms, plants, birds, amphibia, reptiles, mammals and land insects, on rapids and abyss, and on the status of rivers in waterside areas. A survey on living organisms has been promoted to complete one cycle in about five years, with three cycles of the survey having been completed by FY 2005.

The Census of Rivers and Riparian Areas is characterized as follows:

- It is a nationwide overall survey where data quality is managed by using a unified survey time, cycle, and method throughout Japan.
- It is a periodic, ongoing and unified survey on rivers and dams nationwide.
- Regarding the survey content, data quality is sufficiently managed by: 1) a scholarly adviser to support each river, and 2) a screening committee consisting of scholars to check species.
- A survey manual and a list of living organisms have been prepared to maintain the level of the survey.
- It collects data for analysis regarding information accumulated on what type of living organism was living in what kind of physical environment. It also includes data useful for actual river management, such as the conservation and restoration of river environments.

The results of the Census of Rivers and Riparian Areas are used to make river environment information maps. A river environment information map shows the status of riverbeds and vegetation where the checked living organisms, habitat environments and the living history of living organisms are organized in a drawing in an easy-to-understand manner, in order to properly grasp necessary information on river environments when constructing and managing rivers. River environment information maps are expected to be very useful in making and managing river construction plans. By using a map with a river improvement construction drawing, for example, the impact that construction for improvement would exert on the environment can be understood.

The past Census of Rivers and Riparian Areas also targeted checking the types of living organisms at the census points, in order to determine what kinds of living organisms live in each river. Now that three cycles of research have been completed, roughly understanding the biota living in each river has progressed substantially. A so-called target-oriented census is now required, and may offer clues to solving the environmental problems of each river, in addition to implementing a fixed-point ongoing census.

(Specific Measures and Policies)

- The government will promote the formulation of environmental information maps to easily grasp environmental characteristics as a whole, any distinctive places, and important habitat environments from information obtained from the Census of Rivers and Riparian Areas, and use it for the construction and management of rivers. (MLIT)
- The government will promote the computerization of survey results and the use of GIS to immediately grasp all information collected by nationwide Censuses of Rivers

and Riparian Areas, in order to dramatically reduce the time needed to understand the analysis of nationwide distribution and chronological trends, enable multi-faceted analysis of river environments, promptly cope with information disclosure, thereby ensuring more practical and efficient organization, analysis and use of the huge volume of data obtained by the Census of Rivers and Riparian Areas, and providing that information to the public. The government will also promote mutual use with other nationwide research data such as that obtained by the National Survey on the Natural Environment. (MLIT, MOE, MAFF) [Cited in Chapter 2, Section 5, 2.8]

- The government revised the manual for the Census of Rivers and Riparian Areas in March 2007, so that among the basic census, a round of research on fish and benthic life-forms should be conducted about every five years, and a round of research on plants, birds, amphibia, reptiles, mammals and land insects should be conducted about every 10 years. The government has also adopted a “theme survey” to collect basic information that must be intensively and urgently grasped, and a “monitoring survey” that is implemented with the cooperation of citizens’ groups in river-basin areas to deepen people’s interest and understanding concerning waterside environments. In the future, the government will promote an enhanced census according to the revised manual. (MLIT)

5.2 River ecology scholarly research

(Current Situation and Challenges)

Knowledge about natural river environments remains insufficient, thereby requiring more information to be accumulated and more academic research conducted. To promote comprehensive academic research on river environments, the Ministry of Land, Infrastructure, Transport and Tourism has been conducting river ecology scholarly research ever since FY 1995.

Specific fields are set for this research, with the following themes being promoted by university researchers in the fields of biology, ecology and river engineering, and by researchers at the National Institute for Land and Infrastructure Management, Ministry of Land, Infrastructure, Transport and Tourism, and at the Public Works Research Institute. Research reports are prepared based on the results of field research.

- (1) Understanding the response of rivers to historical changes in river-basin areas and river structures
- (2) Typifying habitats and clarifying mechanisms of formation, and maintaining ecological functions
- (3) Clarifying the structure and functions of river ecology, and the roles of living organisms for rivers, by clarifying existing quantities of living organisms, the structure of species, biological diversity, material circulation, and energy flow

(assuming the environmental capacity of rivers by using this information)

- (4) Clarifying the influences of natural impact that rivers originally had, such as the disturbances of floods and water shortages, and of human impacts such managing the flow rate of river channels and inflow of substances
- (5) Introducing methods of conserving and restoring river environments, and grasping and evaluating the effects thereof
- (6) Compiling the results of (1) to (5) above and examining how river management should be based on an ecological viewpoint

(Specific Measures and Policies)

- As for field research, six rivers have been used: the Tama River (having a relatively stable flow status), the Chikuma River (having large fluctuations in flow rate), the Kizu River (having a large quantity of sand drift and where beautiful sandbars are formed), the Kita River (which underwent large-scale repairs under a special emergency project for river disasters), the Shibetsu River (for which a river channel was made to meander again by creating a nature-restoration type of river), and the Iwaki River (having a vast field of reeds and a brackish area at its mouth). The government will promote joint research in the future based on fieldwork. (MLIT)

5.3 Aqua Restoration Research Center

(Current Situation and Challenges)

The Aqua Restoration Research Center of the Public Works Research Institute was established in the city of Kakamigahara in Gifu Prefecture for conducting basic and applied research on the conservation and restoration of natural environments in rivers and lakes, and widely disseminating the results.

To conduct research on the technical issue of securing sound habitat environments for living organisms while securing safety against floods, the Aqua Restoration Research Center has established three water channels (each being 800 m in length), making it the world's largest experimental water channel facility, in addition to six experimental ponds. The facilities are almost the same size as the scale of the real ones, and conditions that are difficult to control with real rivers, such as the river configuration, vitality of flora, and quantities of flow and soil supplied, can be artificially controlled so that experiments can be conducted under conditions similar to those of a real river.

Among the experimental rivers, one is almost straight and has an embankment at a part of the river. The other two were constructed in the same shape consisting of meandering zones, flood channels and stagnant zones. The purpose of the experiments is to verify the hypothesis obtained from real rivers. Experiments will be conducted by changing the river configuration, flora vitality, and the quantities of flow and soil

supplied, and then comparing the response from aquatic life between rivers or zones.

The major purposes of research conducted by the Aqua Restoration Research Center are as follows:

- To evaluate the creation of rivers with multiple natural elements and the technological developments regarding river creation,
- To devise methods of evaluating and setting the quantities of flow and soil supplied, and
- To develop conservation/restoration technology for lakeshore zones

In practice, the relationship between rapids/abyss and the life, growth and breeding conditions of riverside flora and aquatic life, relationship between the frequency of floods in stagnant zones/pools and the life cycles of fish, and effects that the quantities of flow and soil supplied exert on riverbed environments, etc. are studied in collaboration with researchers in various fields.

(Specific Measures and Policies)

- Until today, much research and many studies have been conducted on the habitats of fish. The results obtained are reflected in river course planning and riverside design when creating rivers with multiple natural elements. As for research and studies regarding the quantities of flow and soil supplied, basic investigations are mainly conducted on the living status of attached algae and benthic life-forms. The results obtained are utilized as basic information to develop practical measures, such as setting normal quantities of flow and soil reduction. Research results are tentatively publicized in a comprehensible manner as part of efforts to train river engineers and promote environmental education. (MLIT)

5.4 Aquatic Life Survey

(Current Situation and Challenges)

The Ministry of the Environment and the Ministry of Land, Infrastructure, Transport and Tourism have both been conducting the “Aquatic Life Survey” ever since 1984 to monitor the degrees of river “cleanliness” and “dirtiness” based on the aquatic life in rivers, with the participation of elementary schools, junior high schools, senior high schools, and the general public.

The inhabitation conditions of aquatic life in rivers such as the stonefly and Japanese freshwater crab reflect the water quality, which can be judged by using such aquatic life as indicators. Such a water quality survey is easy for the general public to understand, requires no expensive equipment, and anyone can participate. Contacting familiar nature via such surveys is a good opportunity to promote interest in natural environments.

The Aquatic Life Survey evaluates water quality at four levels by using 30 species

among the aquatic life in rivers, in terms of the following indicators: (1) widespread distribution in Japan, (2) easy to classify, and (3) highly indicative of water quality.

In FY 2008, 75,938 participants in 2,079 participating groups collected aquatic life at 3,302 survey points. The identification and classification results of indicator species were classified as: I (clean water: 58%), II (a little dirty water: 27%), III (dirty water: 11%), and IV (very dirty water: 3%), and no major changes have been observed since FY 2003.

(Specific Measures and Policies)

- As an opportunity for promoting interest in river environments among the general public, the government will continue conducting aquatic life surveys in collaboration with residents. (MLIT, MOE) [Cited in Chapter 2, Section 3, 3.1]

Section 9 Coastal Areas and Oceanic Areas (Basic Concepts)

Fauna and flora specific to such landforms as sand dunes and cliffs can be seen along the complex coastlines of the Japanese archipelago. In the neritic zone, land areas, inland water areas and sea areas are in contact and interact with each other, and along with the distribution of seaweed beds, tidal flats, underwater forests and coral reefs, these areas provide diverse inhabitation and growth environments for the breeding, spawning, growth and feeding of various kinds of marine life.

Marine life around the Japanese archipelago is quite diverse from that elsewhere in the world, and influenced by quite diverse oceanic structures such as the Japan Sea—long isolated in history—and the Japan Trench that reaches a maximum depth of nearly 10,000 meters, cold and warm currents of water, and the remote life-forms provided by those currents.

Such coastal/oceanic areas with high biological productivity are rich fishing grounds that support our lives by providing fishery products and supporting fisheries as an industry. Especially in coastal areas, the seas (where high productivity and rich biodiversity have been conserved by modifications made while maintaining harmony with natural ecosystems) are known as Satoumi areas, and must be properly maintained. The fisheries in coastal/oceanic areas are later described in “2. Fisheries in Satoumi and Oceanic Areas.”

Beaches form an excellent natural landscape combined with land area as seen in white beaches and green pines, and are used for recreation. Beaches are therefore important from the perspective of interacting with and appreciating nature.

In Japan where population and industries are concentrated along coastal flatlands, heavy environmental burdens are imposed on coastal areas. In postwar economic development, sandy beaches, tidal flats and the seaweed beds in coastal areas were lost in exchange for a richer and safer life, and contact between human beings and the sea has become tenuous compared to the past. When red tide and oxygen-deficient water mass (blue tide) occur due to changing conditions in the circulation of materials caused by various human activities, there is a drastic decrease in biodiversity. The oceans are interconnected and require special care regarding the fact that environmental change in a limited space affects the populations of living organisms over a wide area.

Influenced by developments and climate change, the ecosystems in such coastal areas still tend to decrease and deteriorate nationwide, making it necessary to take measures to better conserve and restore already lost sandy beaches, tidal flats and seaweed beds. As for coasts with sandy beaches or rocks backed by a concentrated population and assets, it is important to simultaneously secure the safety of life by taking disaster prevention measures and conserving the environment.

With regard to migratory birds and sea turtles that use Japan's coasts while migrating long distances beyond national boundaries, and marine mammals including whales and fish, it is important to take measures to conserve their habitats not only from a domestic perspective but also from wide-area and international perspectives, and with the cooperation and collaboration of each country concerned.

In the Basic Act on Ocean Policy established in April 2007, the importance of conserving marine biodiversity is described as the first basic principle—"Harmonization of the Development and Use of Oceans with Conservation of the Marine Environment"—among its six marine policies. In March 2008, the Basic Plan on Ocean Policy based on said Act was devised. It specifies efforts to secure marine biodiversity as measures to be taken. The ministries and agencies concerned need to promote coastal and oceanic policies in further cooperation based on the Basic Act on Ocean Policy and the Basic Plan on Ocean Policy.

1 Comprehensive conservation of biodiversity in coastal areas and oceanic areas (Outline of Measures and Policies)

Policies for conserving the ocean environment including the conservation of marine biodiversity must be promoted based on the Basic Act on Ocean Policy and the Basic Plan on Ocean Policy. For sea areas that are particularly important for conserving biodiversity, such as tidal flats, seaweed beds and coral reefs, protected areas such as national parks will be enhanced as needed based on adjustments made with related organizations.

The collection and preparation of basic data necessary to make and implement conservation measures must also be enhanced in the future. At that time, information must be prepared more efficiently by further strengthening the collaboration among the ministries and agencies concerned, by sharing information about coasts, ports, fishing ports and oceans as collected by each ministry and agency concerned.

1.1 Conservation of oceanic biodiversity based on scientific knowledge (Current Situation and Challenges)

The Basic Act on Ocean Policy, which passed the Diet in April 2007, prescribes the promotion of policies and measures for conserving marine environments including the biodiversity therein, in line with trends in international discussions at the United Nations Convention on the Law of the Sea and the Convention on Biological Diversity, in addition to making efforts for conducting necessary research and providing information to formulate and implement those policies and measures. At COP8 held in March 2006, the major topic of discussion was the conservation of marine biodiversity, including the integrated management of ocean and coastal areas, and the sustainable use of genetic resources on the high seas.

There is insufficient data in Japan, however, to form the basis of conservation policies on oceanic biodiversity, including the inhabitation conditions of marine life. Such information must be collected and prepared in the future to promote scientific conservation policies. In promoting such policies, it is also important to comprehensively consider the relationship between the vast ocean and land areas, and what the use of marine resources should be, depending on the purpose.

(Specific Measures and Policies)

- In addition to enhancing natural environment data by continuing monitoring research on the biota of neritic ecosystems in seaweed beds, tidal flats and coral reefs, the government will collect and prepare various kinds of information on the biodiversity of marine life, primarily on the habitation status of marine life within Japan's exclusive zone of 200 nautical miles. (MOE)
- Sea currents, climatic conditions and geographical conditions shall be used to divide marine ecosystems into regional divisions. The initial focus will be on areas considered important habitats or breeding grounds for wildlife, such as mudflats, sea grass beds, coral reefs and other divisions having distinctive and typical characteristics. Important marine areas will then be chosen based on priority in terms of their importance for biodiversity. The conservation status of biologically significant marine areas will be considered along with the degree of necessity to conserve specific areas, and based on this, the extent of marine areas in need of stronger conservation measures will be determined. (MOE)
- In order to comprehensively promote the conservation of marine biodiversity based on available information about marine biodiversity, the government will formulate its marine biodiversity conservation strategy, analyze factors that endanger biologically significant marine areas, and consider necessary measures. (MOE)
- In order to comprehensively promote the conservation of biodiversity for the entire ocean including coastal areas, the government will promote the basic establishment of scientific data on important ecosystems and marine life in the ocean in collaboration with the ministries concerned. (MOE, relevant government ministries and agencies)

1.2 Protected areas to conserve marine biodiversity

(Current Situation and Challenges)

Marine protected areas are the targets of policies for conserving global biodiversity. In practice, the World Summit on Sustainable Development (WSSD, 2002) included in its plan of implementation the establishment by 2012 of marine protected areas consistent with international law and based on scientific information, including representative networks, time limits for the protection of nursery grounds, and periods.

In addition, COP4 (1998) adopted the Programme of work on marine and coastal biological diversity, and at its 7th meeting (in 2004) set 2012 as the time limit for establishing a network of marine protected areas . Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction by the UN General Assembly. The committee has been convened twice thus far, in 2006 and 2008.

The Japanese government clarified its basic policies of marine protected areas in the Basic Plan on Ocean Policy formulated in March 2008, and will promote the setting of such areas. At the same time, the current situation involving the designation of neritic zones, such as seaweed beds, tidal flats and coral reefs (i.e., neritic ecosystems important for conserving marine biodiversity) as part of national and quasi-national parks and national wildlife protection areas reveals that 40 to 50% of seaweed beds and coral reefs have been thus designated. However, virtually all were designated as an “ordinary zone of national and quasi-national parks,” where regulation is not very strict, and only 10% of the tidal flats have been designated. With neritic ecosystems, there is less area due to developments, and quality is rapidly deteriorating due to a greater environmental burden imposed by the inflow of soil and sand, and nutritive salts from land areas. Therefore, this requires more restoration and conservation. For that purpose, important marine areas such as national parks shall be proactively designated as marine park areas to expand protection areas. Efforts will be made for marine conservation and restoration under integrated coastal management combined with land areas, including eliminating the sources of soil, sand and nutritive salts.

To enjoy the blessings of oceans enjoying a rich natural ocean environment in the future as well, it is important to improve public understanding and interest concerning sea areas that are important for conserving biodiversity. It is also necessary to examine how to properly conserve and use sea areas, and promote the raising of awareness regarding the use of sea areas.

(Specific Measures and Policies)

- In accordance with the Basic Plan on Ocean Policy, the government will clarify the status of establishing marine protected areas in Japan, and make efforts to promote said establishment based on the Convention on Biological Diversity and other international pacts, in coordination with relevant government ministries and agencies. Then in consideration of the importance of networking, by referring to the comprehensive sea area control plan for the Shiretoko natural World Heritage site, where the conservation of biodiversity in sea areas is being pursued, while fishery resources are maintained principally under various laws and regulations, and by the self-imposed controls of local fishermen based on the concept of adaptive

management, the government will examine how marine areas should be protected in reconciling the conservation of biodiversity and multiple uses based on agreement within the local community. (MOE, relevant government ministries and agencies) [Cited in Chapter 1, Section 2, 11.1]

- From the perspective of conserving biodiversity, the government will reexamine methods of evaluating excellent sea areas through the Diversified Evaluation Project on National and Quasi-National Parks (from FY 2007). Also by making adjustments with the organizations concerned, the government will first consider connecting the distribution of core areas (e.g., sea grass beds, mudflats, coral reefs) for conserving biodiversity with sea currents and land areas, and then promote the designation/rearrangement of national and quasi-national parks, and designation of marine park zones. For these marine park zones, it will designate the species targeted for capture control to promote conservation based on necessity. (MOE)
- The government will control crown-of-thorns starfish and restore coral communities in sea areas of the national parks where coral reef ecosystems are deteriorating with coral breaching and the proliferation of crown-of-thorns starfish. For sandy beaches where sea turtles lay eggs, the government will positively conserve and restore marine ecosystems and make management efforts, through such activities as cleaning beaches and monitoring spawning at national parks. (MOE)
- The government will positively hold nature observation programs in the coastal areas of national parks, examine what the proper conservation and use of sea areas of national parks should be, provide necessary information through pamphlets and websites, and thereby promote awareness training for using sea areas. (MOE)
- To eliminate sources of soil and sand, and pollutants that adversely affect natural landscapes, while conserving biodiversity in the sea areas of national parks, the government will examine necessary measures by adjusting and collaborating with related organizations. (MOE, relevant government ministries and agencies)
- The government will try to designate wildlife protection areas and special protected areas to include various ecosystems and various types of biological groups, from the standpoint of securing habitat environments for various wild animals. As one such effort, by trying to designate the breeding areas of seabirds in coastal and oceanic areas as protection areas, the government will promote conservation of the natural environment in coastal and oceanic areas. For national wildlife protection areas, the government will promote the designation of regions considered important for wildlife protection from a nationwide or international perspective, by making adjustments with related organizations. (MOE)

1.3 Conservation and restoration of seaweed beds and tidal flats

(Current Situation and Challenges)

Seaweed beds—communities of sea grass such as eel grass and of seaweed such as kelp, *Ecklonia cava* and *Sargassum fulvellum*—and tidal flats where fine soil and sand carried by rivers accumulate are places for the breeding, spawning, growth and feeding for many kinds of marine life. For example, tidal flats developed in inner bays are home to a remarkable quantity and variety of small animals, and thus important feeding places for various coastal fish and shorebirds.

These wetlands in neritic zones may be playing an important role, regardless of size, when the larvae of shellfish, crustaceans and fish move and disperse. Therefore, it is necessary to know the mutual connection between such wetlands and the forming of networks based on scientific knowledge, and attempt to conserve any remaining seaweed beds and tidal flats. It is also important to know the current status of pollution by chemical substances, and take measures to restore any functions lost in the past.

(Specific Measures and Policies)

- By using some research projects such as the National Survey on the Natural Environment and Monitoring Sites 1000, the government will promote the preparation of information on seaweed beds and tidal flats for use in formulating policy for the conservation thereof. (MOE)
- Through the implementation of policies described in “1.2 Protected Areas to Conserve Marine Biodiversity,” the government will conserve seaweed beds and tidal flats. (MOE)
- The government is restoring tidal flats at the Gamo Tidal Flat in Miyagi Prefecture. In addition, it will promote the nature restoration of tidal flats in national and quasi-national parks and national wildlife protection areas. (MOE)
- In parallel with promoting the conservation and formation of seaweed beds and tidal flats by using a method depending on the sea area environment, the government will have various parties (mainly fishermen) promote controls on living organisms feeding on seaweed, as well as conducting maintenance and management activities to secure genetic diversity and local endemism such as the dispersion/transplanting of seaweed and bivalves, and the cultivation of fishing grounds. By March 2012, about 5,000 ha will be prepared for conserving and restoring seaweed beds and tidal flats. (MAFF) [Cited in Chapter 1, Section 9, 2.1]
- The government will effectively use dredged sand generated by the construction of ports and harbors, and promote the restoration of tidal flats and seaweed beds, and the backfilling of large pits. (MLIT) [Cited in Chapter 1, Section 9, 4.1]
- For the deteriorated growth environments for aquatic plants and animals caused by domestic effluent, the government will make efforts to reduce the burden of water

quality from the land through such facilities as community sewerage systems. (MAFF) [Cited in Chapter 1, Section 9, 2.1]

- For the adverse effects on fisheries caused by increasing amounts of marine litter, in addition to promoting voluntary activities on the part of fishermen and NPOs, such as cleaning beaches and rivers, and planting activities, the government will promote such measures as collecting and disposing of marine litter, and developing and disseminating recycling technology for fishery-related materials. (MAFF) [Cited in Chapter 1, Section 9, 2.1]
- The government will strengthen its system to observe the generation of red tide and oxygen-deficient water mass to prevent fishery damage. (MAFF) [Cited in Chapter 1, Section 9, 2.1]
- The government will remove sediment to help recover the use of about 250,000 ha of fishing grounds by March 2012. (MAFF) [Cited in Chapter 1, Section 9, 2.1]

1.4 Conservation and restoration of coral reefs

(Current Situation and Challenges)

The coral reefs in subtropical water areas are said to have ecosystems as diverse as those of tropical rain forests, and many kinds of marine life including fish abundantly live and grow there. These are places for the spawning and feeding of marine resources, the growth of fish larvae, and also a resource for tourism including diving and other recreational activities. Coral reefs also serve as a breakwater to curb violent waves crashing in from the vast ocean.

The destruction of coral reefs is progressing worldwide. The 2008 report published by the Global Coral Reef Monitoring Network (GCRMN) points out that 20% of the world's coral reefs have been lost and estimates that a further 15% is likely to be lost in one or two decades, and another 20% faces the danger of extinction in two to four decades. In subtropical sea areas such as those around Okinawa in Japan and such tropical sea areas as the Palau Islands, the area of coral distribution is decreasing, raising concerns about the effects on aquatic plants and animals. Coral reef ecosystems must therefore be immediately restored and recovered. This destruction is caused by the impact of human activities such as an inflow of red soil and coastal development, coral breaching influenced by high water temperatures, damage caused by such natural enemies as the crown-of-thorns starfish, and such diseases as the White Syndrome of unknown cause, by which coral organism become necrotic in strips. There are also concerns about coral breaching occurring more frequently in the future, especially due to global warming.

At the general meeting of the “International Coral Reef Initiative (ICRI)”—an international framework aiming at conserving the ecosystems of coral reefs and related coastal areas—held in April 2007 in Tokyo, the “Resolution on Coral Reefs and Climate

Change” and “Recommendation on Developing Marine Protected Area (coral reef) Network” were adopted.

Based on these developments, the International Coral Reef Marine Protected Area Network Meeting / 4th ICRI East Asia Regional Workshop were convened in November 2008 in Tokyo. The workshop reached agreement to formulate ICRI East Asia Regional Strategy on Marine Protected Area.

(Specific Measures and Policies)

- Based on existing guidelines and the status of activities, the government will formulate the Action Plan To conserve Coral Reef Ecosystems in Japan regarding the issues of designating protected areas, styles of conservation and restoration, measures against disease and rules for use, and related monitoring to promote the conservation and restoration of coral reef ecosystems and the sustainable use thereof in cooperation with various entities. (MOE)
- The “Working Group of Coral Reef Ecosystem Conservation (tentative name)” will be convened to continuously share information on various conservation programs and the efforts made for sustainable use, cite excellent examples that contribute to the local economy, and discuss appropriate evaluation criteria to better understand coral reef ecosystems and associated socioeconomic transitions. (MOE)
- By using some research projects such as the National Survey on the Natural Environment and Monitoring Sites 1000, the government will promote the preparation of information on coral reefs. (MOE)
- By implementing the policies described in “1.2 Protected Areas to Conserve Marine Biodiversity,” the government will conserve coral reefs. (MOE)
- The government is implementing the natural restoration of coral communities at the Sekisei Lagoon in Okinawa Prefecture, Tatsukushi in Kochi Prefecture, and Takegashima in Tokushima Prefecture. In addition, the government will promote the nature restoration of coral communities in natural parks. (MOE)
- To prevent the inflow of red soil from agricultural land in Okinawa Prefecture and on the Amami Islands, the government will promote repair work to revise land slope angles and construct sand basins. (MAFF)
- To prevent erosion at the origins of red soil in Okinawa, the government will determine the status of red soil erosion, examine the technology to prevent erosion, and have the River Basin Council conduct awareness-raising activities, and thereby implement research and survey projects. (Cabinet Office)
- Based on the resolution by the ICRI on coral reefs and climate change, the government will examine adaptive measures for climate change such as research to improve the resilience of coral reefs against climate change and better support for activities. (MOE) [Cited in Chapter 2, Section 6, 1.1]

- By targeting Okinotori Island, where the growth conditions for coral reef are difficult and the loss coral is a real concern, the government will determine the current status, examine larval culture technology, and formulate guidelines for coral cultivation methods, and thereby develop technology concerning coral cultivation that can be widely applied to other sea areas. (MAFF)

1.5 Conservation of island ecosystems

(Current Situation and Challenges)

Japan's land mass consists of the four major islands of Hokkaido, Honshu, Shikoku and Kyushu, and more than 3,000 smaller islands. The ecosystems on islands have been formed within a limited geographical space isolated from the outside world for a long time, and maintained a delicate balance of ecosystem elements. These ecosystems have unique biota with many endemic species, and are quite vulnerable to human activities and the impact caused by invasive alien species.

More than half of the 47 species (as of March 2010) for which Conservation Programs are currently run based on the Act on the Conservation of Endangered Species of Wild Fauna and Flora are living and growing on islands, and many of these species are designated as threatened species.

In conserving island ecosystems, the above characteristics must be taken into account to conserve threatened species and implement measures against invasive alien species, etc.

(Specific Measures and Policies)

- Regarding the species for which Conservation Programs are run based on the Act on the Conservation of Endangered Species of Wild Fauna and Flora, the government will enhance measures to establish populations bred in captivity for a return to the wild for the Japanese crested ibis and Tsushima cat, and starting in FY 2009, will launch full-fledged measures for the captive breeding of the Okinawa rail (*Gallirallus okinawae*), thereby enhancing and strengthening the programmes. (MOE)
- The government will continue to conserve habitats on remote islands that are considered important breeding areas for seabirds, such as Rishiri Island and Teuri Island of Hokkaido, and the Nanatsujima Islands of Ishikawa Prefecture. (MOE)
- For species on the latest Red List specified as ones having very high priority for protection, the government will collect detailed information and take appropriate measures according to existing conditions, including measures based on the Act on the Conservation of Endangered Species of Wild Fauna and Flora. (MOE)
- Among the threatened species of wild fauna and flora unique to Japan, mainly those

living on islands where there are concerns about deteriorated habitats or in Satochi-Satoyama areas, the government will conduct an overall investigation of living conditions and emergency measures. In addition, for the programmes for protection and breeding currently practiced for 47 species, an overall inspection and evaluation on implementation will be made, and effective programme promotion examined. (MOE) [Cited in Chapter 2, Section 1, 1.2]

- In the Ogasawara Islands, the government is conserving the endemic species and rare species left on oceanic islands, as well as unique ecosystems, and rehabilitating the ecosystems disturbed by alien species. In addition, the government will promote nature restoration projects for island ecosystems in nature parks unique to oceanic islands. (MOE)
- Mainly in priority areas that play an important role in nature conservation, such as the habitats of endangered species, national parks and protected forests, the government will promote alien species control projects, including one for the small Indian mongoose that threatens rare species on the island of Amami-Oshima. Here, the government aims to eliminate this animal by FY 2014. (MOE, MAFF) [Cited in Chapter 2, Section 1, 3.1]
- The government will continue to remove foreign plants such as *Rudbeckia laciniata* on Rishiri Island and Rebun Island. (MOE)
- The government will establish and implement measures for preventing invasive alien species from adversely affecting island areas having indigenous ecosystems, such as the Ogasawara Islands and the Nansei Islands. (MOE, MAFF) [Cited in Chapter 2, Section 1, 3.1]
- Japan added the Ogasawara Islands to the provisional list of World Heritage sites in January 2007 with the intention to recommend these islands in the future. As the government confirmed that certain progress was made in measures to expand guarantees of protection, measures against alien species, and the conservation of rare wildlife species in cooperation with relevant organizations, it will recommend these islands as a candidate World Heritage site in January 2010, so as to include the islands on the list of World Heritage sites by 2011. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1, and Chapter 2, Section 4, 2.4]
- As for the Ryukyu Islands (covering the Tokara Islands and southern islands), Japan must expand its guarantees of protection for important areas, including the habitats for endangered species. Therefore, the government will analyze and assess the value of the islands as a natural World Heritage site, and cooperate with local organizations in setting up and expanding protected zones. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1, and Chapter 2, Section 4, 2.4]

1.6 Protection and management of marine life

(Current Situation and Challenges)

Maintaining a good ocean environment, including the ecosystems where aquatic wildlife live, is also very important for the sound development of fishery. Therefore, it is important not only to protect rare aquatic wildlife but also to cope with the problem posed by the mass generation of large jellyfish that are damaging fishery production due to an ecosystem imbalance.

(Specific Measures and Policies)

- In addition to conducting a variety of ongoing research such as Monitoring Sites 1000 to collect information on wide-ranging oceanic ecosystems, including the habitats of sea turtles, seabirds and sea mammals, the government will promote measures for the proper conservation of oceanic life based on such scientific data. (MOE, MAFF)
- The government will accumulate and enrich scientific findings on rare aquatic wildlife from the perspective of maintaining sound ecosystems through the protection of aquatic wildlife, and develop proper methods of conservation and management. (MAFF) [Cited in Chapter 1, Section 9, 2.7]
- For the problem of bycatch involving sharks, sea turtles and even seabirds, the government will promote impact assessments of this problem, and try to reduce bycatch incidents by developing proper technology to prevent it, improving technologies, and disseminating and enhancing awareness among fishermen. (MAFF) [Cited in Chapter 1, Section 9, 2.7]
- In preventing fishery damage caused by sea lions (a rare species), the government will promote measures to prevent such damage by considering biodiversity based on scientific knowledge such as the migrating number of sea lions. (MAFF) [Cited in Chapter 1, Section 9, 2.8]
- The government will determine the actual predation situation involving useful marine resources by such large animals as whales, and promote measures to alleviate this influence based on scientific knowledge. (MAFF) [Cited in Chapter 1, Section 9, 2.8]

2 Fisheries in Satoumi and oceanic areas

(Outline of Measures and Policies)

Japan is an archipelago stretching south to north with complex coastlines. It is surrounded by sea and has the world's sixth largest exclusive economic zone. Its surrounding sea areas have many points where warm and cold currents converge, making the areas highly productive fishing grounds with bountiful biodiversity.

Fishery is an environment-dependent industry that relies on the blessings of bountiful seas; therefore, it is necessary to maintain sound ecosystems to support

productivity in this industry, thereby making the conservation of biodiversity very important. The coastal areas of our country are closely associated with human activities, with shellfish and seaweed having been collected for a long time. The seas where high productivity and rich biodiversity have been conserved by modification, while maintaining harmony with natural ecosystems are known as Satoumi areas, and must be properly conserved.

The sustainable use of marine resources, on the other hand, is possible from offshore to the high seas through proper resource management. It is therefore important to undertake the proper conservation and sustainable use of marine resources on a scientific basis through such frameworks as regional fishery management organizations.

It is also necessary to provide a stable supply of marine products that will serve a vital role in Japanese eating habits for many years to come, and promote the establishment of vigorous fishery activities and vitalized fishing villages, through the conservation of Satoumi areas and oceans.

Based on the Basic Plan for Fisheries decided by the Cabinet in March 2007, the government will promote efforts to increase and cultivate aquatic plants and animals, conserve and improve their habitats, establish a more solid basis for fishery, and engage in the comprehensive development of fishing villages.

Also prescribed in the Basic Act on Ocean Policy promulgated in April 2007 are the basic concepts of harmonizing the development and use of the ocean, and conserving the ocean environment, and that of securing marine biodiversity and conserving other good ocean environments as the basis of human survival. The government will conserve Satoumi areas and oceans based on these concepts.

2.1 Promoting the conservation of seaweed beds and tidal flats as important fishery environments

(Current Situation and Challenges)

To realize highly productive and sound Satoumi areas with abundant biodiversity, the conservation of seaweed beds and tidal flats is an important issue. Seaweed beds are also called “sea forests” where eel grass and kelp flourish. Tidal flats are places where people can play in water, and where many migratory birds come for feeding and resting. Coastal areas including the above are the living and spawning places for various kinds of living things including fish, and significantly contribute to the conservation of biodiversity through a water purification function that eliminates organic substances, nitrogen, phosphorus, etc. contained in domestic effluent from land areas in the process of filtration by shellfish, retention by algae, and removal by birds and fish. In subtropical water areas, coral reefs are places for the spawning, feeding and growth of fish larvae used as fishery resources.

Given the coastal developments and land reclamation projects undertaken during the period of high economic growth, however, seaweed beds and tidal flats have been drastically reduced. In addition, the feeding damage caused by herbivorous fish is leaving barren grounds—meaning a significant deterioration of seaweed beds nationwide—while longheaded eagle rays that feed on bivalves have increased in tidal flats and are raising concerns over the capability to maintain sound ecosystems. Therefore, to realize sustainable fishery production, fishing ground environments including seaweed beds and tidal flats must be conserved.

(Specific Measures and Policies)

- In parallel with promoting the conservation and formation of seaweed beds and tidal flats by using a method depending on the sea area environment, the government will have various parties (mainly fishermen) promote controls on living organisms that feed on seaweed, and conduct maintenance and management activities to secure genetic diversity, and local endemism such as the dispersion/transplanting of seaweed/bivalves and the cultivation of fishing grounds. By March 2012, about 5,000 ha will have been prepared for conserving and restoring seaweed beds and tidal flats. (MAFF) [Cited in Chapter 1, Section 9, 1.3]
- Regarding the deteriorated growth environments for aquatic plants and animals caused by domestic effluent, the government will make efforts to reduce the burden of water quality from the land through such facilities as community sewerage systems. (MAFF) [Cited in Chapter 1, Section 9, 1.3]
- For the adverse effects on fisheries caused by increasing amounts of marine litter, in addition to promoting voluntary activities conducted by fishermen and NPOs, such as cleaning beaches and rivers, and planting activities, the government will promote such measures as collecting and disposing of marine litter, as well as developing and disseminating recycling technology for fishery-related materials. (MAFF) [Cited in Chapter 1, Section 9, 1.3]
- The government will strengthen its system to observe the generation of red tide and oxygen-deficient water mass to prevent fishery damage. (MAFF) [Cited in Chapter 1, Section 9, 1.3]
- The government will remove sediment to help recover the use of about 250,000 ha of fishing grounds by March 2012. (MAFF) [Cited in Chapter 1, Section 9, 1.3]

2.2 Promoting fishery infrastructure projects by considering biodiversity

(Current Situation and Challenges)

Fishing ports and fishing grounds are not the only basis for fishery production but also greatly contribute to the formation of highly-productive environments as places for the spawning and growth of fish larvae for oceanic life by creating quiet water areas.

Therefore, fishing ports and fishing grounds that take biodiversity into consideration must be established.

(Specific Measures and Policies)

- In promoting a fishery infrastructure project, the government will fully consider the impact on the natural environment at the site of implementation and examine the use of various natural materials at each stage of planning, design, and construction. The government will also try to determine the impact by conducting monitoring as much as possible and promoting the establishment of fishing ports and fishing grounds, for which consideration is given to natural environments including biodiversity. By March 2012, the government will prepare about 75,000 ha of fish reefs and farms, and remove sediment from about 250,000 ha, thereby helping to recover fishing grounds. (MAFF)
- To promote powerful producing centers, the government will focus on constructing necessary facilities for the hygienic control of fishing products to be handled at distribution centers and the core producing centers. In establishing fishing ports, the government will try to minimize changes in the surrounding natural environments. In implementing projects, the government will construct fishing port facilities by adopting a construction method which includes the building of structures that can serve as habitats for fish and shellfish, such as a sea wall where seaweed beds are formed, and places for aquatic plants and animals to live and breed, and will prepare beaches to alleviate the impact on natural environments, thereby positively promoting the creation of fishing ports that harmonize with the surrounding natural environment. (MAFF)
- The government will also strengthen measures for conserving the water quality in water areas surrounding a fishing port, by constructing a fishing community effluent treatment facility as a measure to alleviate the burden of sewage water inflow into water areas surrounding a fishing port, and removing the sludge at fishing ports. Specifically, the government will improve the effluent treatment ratio to 60% of the total population in fishing communities by March 2012. (MAFF)

2.3 Promoting the conservation and use of fishing villages by using regional resources

(Current Situation and Challenges)

Fishing villages not only function to serve the fishing industry but also have multi-faceted functions such as forming good natural environments and landscapes, inheriting traditional culture in the region, and providing a comfortable space for people. These villages are also places where the importance of nature can be learned. The environment of fishing villages must therefore be properly conserved and used.

(Specific Measures and Policies)

- In addition to promoting the creation of fishing villages that use charming regional resources including rich biodiversity, the government will deepen public understanding and interest in the fishing industry and fishing villages by promoting exchanges between cities and fishing villages through hands-on experience and interaction with nature, and promoting the settlement of new residents, thereby invigorating fishing villages. (MAFF) [Cited in Chapter 2, Section 3, 3.1]
- The government will also promote the conserving and forming of good fishing village landscapes accessible by people, and the inheriting of historical and cultural heritage. (MAFF) [Cited in Chapter 2, Section 3, 3.2]

2.4 Promoting the conservation and management of marine resources by considering biodiversity

(Current Situation and Challenges)

The sustainable use of marine resources is possible. The proper conservation and management of marine resources is a responsibility imposed on coastal countries by the UN Convention on the Law of the Sea and also important from the standpoints of securing a stable supply of fishing products for the nation and conserving biodiversity.

While international objections have been raised over the bycatch of sharks, sea turtles and even seabirds, and against tuna longline fishing and trawl fishery on the high seas due to fishery's influence on biodiversity in abyssal seas, discussions under the Convention on Biological Diversity are underway to establish marine protection areas on the high seas, as well as moves to manage living marine resources under the control of international trade by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington Convention). It is therefore important to continue advocating the proper conservation and sustainable use of marine resources on a scientific basis in view of conserving biodiversity.

(Specific Measures and Policies)

- The government will conduct a variety of research on marine resources aboard research ships to grasp the trend of resources, promote the assessment thereof, and then publish the results. (MAFF)
- Concerning the sustainable use and management of highly migratory fish including tuna (of which stock conditions are a source of concern), the government will establish conservation and management measures on a scientific basis, and strive to eliminate IUU (illegal, unreported and unregulated) fishing activities through regional fishery management organizations and by fully recognizing Japan's position in terms of the production and consumption of fish. (MAFF)
- The government will also make efforts to internationally establish the conservation

and sustainable use of whales based on scientific research. (MAFF)

- The government will promote fishery management by considering ecosystems, setting fishing prohibition periods and protection water areas for protecting resources, and promoting measures to avoid the bycatch problem by using tori-poles and circle hooks. The government will also show scientifically that the conservation of biodiversity and sustainable use of marine life are compatible through these fishery activities, and attempt to form an appropriate international consensus. (MAFF)
- Japan will proactively contribute to the sustainable use of fishery resources, prevent the bycatch problem, and other efforts by maintaining or increasing the annual number of bilateral and multilateral fishery agreements at 47 or higher. (MAFF)

2.5 Further promoting resource management and introducing a post-resource recovery plan (Current Situation and Challenges)

A recent evaluation found that about half of the marine resources from water areas surrounding Japan are deemed low, thus making it necessary to strengthen resource management and the recovery of lost resources.

(Specific Measures and Policies)

- The government has set Total Allowable Catch (TAC) limits for major types of fish since 1997. From 2002, the government has been promoting a resource recovery plan as the policy to comprehensively promote 1) less total allowable efforts to reduce the number of fishing boats and fishing days for fish resources that urgently require recovery, and fewer types of fishery that target such fish, 2) the release of larvae, and 3) measures to improve fishing ground environments. In addition to such ongoing promotion, the government will promote the introduction of a “post-resource recovery plan” for resources for which recovery targets have been achieved, and promote stable maintenance of the levels and rational use of fish resources based on the common view of the parties concerned. (MAFF)
- The government will also promote measures by the private sector for the fishery eco-label that indicates marine products captured by a method giving consideration to ecosystems and the sustainability of resources. (MAFF)

2.6 Breeding by considering biodiversity and sustainable aquaculture production (Current Situation and Challenges)

The marine resources in water areas surrounding Japan have recently been found to be at a low overall level, thus making it necessary to recover and increase these resources by developing policies for breeding and culture (e.g., releasing larvae, sea surface culture). Thus, considering the conservation of biodiversity is important in implementing such efforts.

(Specific Measures and Policies)

- In formulating release plans and producing/releasing seeds, the government will promote increases in harmony with the environment and ecosystems by considering the impact on genetic diversity and phylogenetic groups. (MAFF)
- For the aquaculture industry, the government will promote plans for improving regionally independent aquacultural fishing grounds to realize sustainable aquaculture production that does not deteriorate fishing ground environments. (MAFF) [Cited in Chapter 2, Section 7, 1]
- The government will establish aquaculture technology that combines the aquaculture of fish and seashells with that of seaweed to enable a stable circulation of carbon and nitrogen, and promote the development of feed with low environmental load. (MAFF) [Cited in Chapter 2, Section 7, 1]
- The government will implement a salmon and trout aquaculture project in harmony with ecosystems of the North Pacific by conserving the characteristics of living things and the diversity of species, as well as enhancing technologies used for the artificial release of larvae compatible with natural fish and considering river ecosystems and their surroundings, thereby promoting the salmon and trout aquaculture project. (MAFF)
- The government will also increase the percentage of products produced from sea surfaces applicable to the fishing ground improvement program among all products produced by sea surface culture from 60% in 2006 to 70% by 2011. (MAFF)

2.7 Promoting the conservation of biodiversity by considering the conservation and maintenance of rare living organisms

(Current Situation and Challenges)

Maintaining a good ocean environment and the ecosystems where aquatic wildlife flourishes are also very important for the sound development of fishery.

(Specific Measures and Policies)

- The government will accumulate and enrich scientific findings on rare aquatic wildlife from the perspective of maintaining sound ecosystems through the protection of aquatic wildlife, and develop methods of proper conservation and management. (MAFF) [Cited in Chapter 1, Section 9, 1.6]
- For the problem of bycatch involving sharks, sea turtles and even seabirds, the government will promote impact assessment of the problem, and try to reduce bycatch incidents by developing proper technology to prevent it, improving technologies, and disseminating and enhancing awareness among fishermen. (MAFF) [Cited in Chapter 1, Section 9, 1.6]

2.8 Promoting preventive measures against fishery damage by wildlife

(Current Situation and Challenges)

It has been pointed out that the mass generation of wildlife such as large jellyfish that inflicts major damage to fishery production is caused by changes in the habitats of living organisms resulting from marine pollution and the overfishing of marine resources. There are also concerns about fishery damage due to feeding by foreign fish, common cormorants, and sea lions, as well as imbalanced ecosystems that adversely affect biodiversity. Therefore, it is important to promote measures to prevent fishery damage caused by wildlife based on scientific knowledge, in order to properly conserve biodiversity.

(Specific Measures and Policies)

- The government will prevent the adverse effects of environmental change on fishery and take appropriate measures such as the effective exclusion of foreign fish and protective control of common cormorants to prevent feeding damage, while keeping the conservation of biodiversity in mind. (MAFF)
- In preventing fishery damage caused by sea lions (a rare species), the government will promote measures to prevent such damage by considering biodiversity based on scientific knowledge such as the migrating number of sea lions. (MAFF) [Cited in Chapter 1, Section 9, 1.6]
- The government will determine the actual predation situation of useful marine resources by such large animals as whales, and promote measures to alleviate this impact based on scientific knowledge. (MAFF) [Cited in Chapter 1, Section 9, 1.6]

2.9 Promoting inland water fishery by considering biodiversity [Cited in Chapter 1, Section 8, 1.8]

(Current Situation and Challenges)

Inland water areas such as rivers and lakes are essential for peoples' lives, since such waters are places of fish production and culture, and create opportunities for people to interact with nature through such recreational activities as fishing and outdoor sports. These days, however, in addition to deteriorated habitats for aquatic plants and animals, feeding damage caused by alien fish such as the largemouth bass (*Micropterus salmoides*) and by common cormorants, and the spread of cold water disease in Ayu, harsh environments surrounding inland water fisheries and aquaculture are resulting. To cope with these issues, it is important to further enhance the conservation of inland water biodiversity.

(Specific Measures and Policies)

- By cultivating fishing grounds and using paddy fields and water channels, the

government will improve the habitat environments of aquatic animals and plants such as the common carp, crucians, eels, and common reed grass. (MAFF)

- Taking a wide-area perspective including the perspective of conserving biodiversity, the government will promote the effective exclusion of foreign fish and protective control of common cormorants to prevent feeding damage, and measures against such diseases as cold water disease in Ayu and Koi herpes virus.

(MAFF)

- By establishing places for spawning and larvae culture facilities, and releasing larvae, the government will promote efforts to increase resources by considering the conservation of biodiversity by local people (mainly fishermen), and thereby conserve the biodiversity of inland waters. (MAFF)

3 Coastal environments

(Outline of Measures and Policies)

Coastal areas are where land and sea areas converge and provide living organisms a variety of habitat environments such as sandy beaches, cliffs and tidal flats. Depending on the peculiar environment, many kinds of unique living organisms exist in such areas which form a part of excellent natural landscapes, including places noted for scenic beauty with white beaches, green pines and nature parks, and thus represent a precious natural environment. In Japan—a country having a relatively small total land area—the population, property and infrastructure are concentrated in areas near the coast, and seacoasts in Japan are vulnerable to tsunami, high wave, and erosion disasters. Coastal areas with beaches play an important role in not only protecting human life and nearby assets against these threats, but also as places for various usages including regional festivals and events, sea bathing, sports and hands-on experience. Coastal areas are needed for a variety of uses, and at the same time, are easily influenced by various human activities.

3.1 Conserving, restoring and creating the coastal environment

(Current Situation and Challenges)

Given the development of coastal areas, natural beaches and precious natural environments have recently declined. Because less soil and sand are being supplied to beaches, beach erosion is worsening due to such factors as the imbalance of sand inflow and outflow to and from beach areas. Sandy beaches are important habitats for living organisms, function as seawater purifiers, and represent an important element of a scenic coastal landscape from which white sands and green pines are disappearing. Some beach environments have already been lost due to contamination and motor traffic.

In addition to conserving the ecosystems of beaches, beaches that protect the areas

behind against the threat of tsunami, high wave, and coastal erosion disasters must be established, in order to contribute to a safe and active regional society, and thereby raise public awareness about environmental problems by imparting a spiritual richness.

Based on such a background, the Seacoast Law was partially revised in 1999, and two purposes—“environment” and “use”—were added to the previous “protection.” The “Basic Policy for Coastal Conservation” was formulated in 2000 as a result of this revision, and prescribes as its basic concept “to hand down beautiful, safe and lively coasts to the next generation as public property.” It also prescribes that comprehensive and harmonious measures be taken for coastal conservation to protect seacoasts against hazards, improve and conserve the coastal environment, and promote the proper use of coasts by the public.

Based on this concept, the government has promoted measures of the Eco Coast Program, which takes ecosystems and natural landscapes into account. However, there are many issues to be addressed in the future, including trade-offs among the three purposes of the Seacoast Law—protection, environment, and use—and the lack of technical knowledge for upgrading seacoasts with the natural environment taken into account.

Concerning the upgrading and management of seacoasts in the future, in addition to responding to the needs for protection and proper use, it is necessary to pass onto future generations a seacoast environment where diverse flora and fauna live and grow.

Marine litter including that from abroad has recently had a serious impact on beaches in Japan, such as disturbing the local environment and landscape, as well as the ecosystems there. In order to promote the appropriate disposal of marine litter and reduce its generation to deal with the situation, the “Law for the Promotion of Marine Litter Disposal” was approved by the Diet. The Law clearly states the basic policies regarding measures against marine litter, describes the responsibilities of the central and local governments, companies and citizens, and stipulates provisions to promote measures against marine litter. It is necessary to promote such measures in accordance with the Law from now on.

(Specific Measures and Policies)

[Promoting the Creation of Beaches in Harmony with Nature]

- Aiming to achieve the harmonious protection and use of the environment—the purposes of the Seacoast Law—the government will promote “the creation of beaches in harmony with nature” in an attempt to conserve and restore the seacoast environment based on regional seacoast characteristics, in collaboration with river management and based on agreement among the people concerned in the region. (MLIT)

[Conserving and Restoring Sandy Beaches, and Creating Beaches]

- The government will take measures against coastal erosion by artificial beach

nourishment, submerged breakwaters and artificial reefs, and will conserve and restore sandy beaches, thereby promoting the creation of comfortable spaces where people can interact with nature. (MAFF, MLIT)

- With the “Creation of Beaches” project, the government will restore beautiful beaches by employing the material-cycle method that avoids the impact of man-made structures on the environment as much as possible, by diverting the sand accumulated at the mouths of rivers, in river channels and behind dams, in sand-trap facilities, fishing ports and harbors, and that accumulated along the seacoast to parts where the seacoast is eroded (sand by-pass). Moreover, the government will take efficient and effective measures against coastline erosion, in parallel with conserving the nature environment and landscapes. (MAFF, MLIT)

[Conserving and Upgrading the Seacoast Environment]

- For beaches that are important habitats for such marine life as sea turtles and horseshoe crabs (*Tachypleus tridentatus*), and such wild birds such as little terns and laughing thrushes (*Garrulax canorus*), and the beaches essential for harmony with natural landscapes, the government will devise the arrangement and structure of facilities, conserve sandy beaches, and thereby promote the Eco Coast Project intended to form beaches in harmony with the natural environment. (MAFF, MLIT)
- The government will also protect the beaches where sea turtles lay eggs and the communities of coastal flora rarely disturbed by humans, by discussing the expansion of protection areas through designation as national and quasi-national parks, and specifying zones in special areas where vehicles and horses are not permitted to enter without special permission, based on the Natural Park Law. (MOE)

[Area-type Protection Method]

- In constructing coastal conservation facilities, the government will further promote the change from the “line-type protection method,” which protects coastlines just by using banks and wave suppressors, to “area-type protection method,” which combines offshore facilities and sandy beaches, and is excellent not only in terms of protection but also in terms of the environment and usage as pertaining to the restoration of sandy beaches and improved access to beaches. (MAFF, MLIT)

[Considerations on Use and Interaction with Nature]

- To make beaches easy to use by all Japanese people in order to interact with nature, the government will improve accessibility to beaches and promote collaboration with various policies implemented at beaches and surrounding areas. (Project to recover seas and forests with bountiful nature: “Recovery of White Beaches and Green Pines”). (MAFF, MLIT)

[Anti-Litter Measures and the Participation of Residents]

- Law for the Promotion of Marine Litter Disposal was approved by the Diet in July 2009 in order to promote the appropriate disposal of marine litter and reduce its generation. The government will formulate national basic policies based on the Law and comprehensively promote measures against marine litter. (MOE)
- In regard to anti-litter measures and the cleaning of beaches, the government will promote both in cooperation with regional residents, volunteers and NGOs, and make efforts to enhance awareness-raising activities to improve morals to avoid a deteriorated coastal environment due to disorderly use and garbage dumping. Moreover, in collaboration with such regional residents, the government will implement beach protection activities and enhance environmental education. With the Eco Coast Project, the government will promote environmental conservation measures in the future to cope with environmental issues unique to a region, by bringing the public and private sectors together, along with the participation of residents and NGOs from the planning stage. (MAFF, MLIT)
- Large amounts of marine litter will be responsible for inhibiting the functions of beach conservation facilities by reducing wave suppression function of beach banks and sandy beaches, or by disturbing the tide prevention function of water gates. The government will promote treatment under an emergency program for disposing of large amounts of driftwood and other drifting waste due to disasters. (MAFF, MLIT)
- To examine surveys on the status of marine litter and measures based on regional characteristics, the government is conducting model surveys for reducing marine litter in Japan. The government will classify marine litter, assume a drift stream and its origin, in addition to monitoring effective and efficient methods of cleaning and disposal, including the effective ways of volunteers' participation, and the status of driftage coming ashore at the beaches concerned. It will also analyze the mechanism of driftage coming ashore, and examine the efficient frequency and effective methods of cleaning. In addition to holding various study group meetings, the government will also exchange opinions with NGOs for incorporation in promoting collaboration among the people concerned and examining effective measures. The government is also supporting municipalities that treat driftage coming ashore outside the coastal protection area. (MOE)
- Through subsidies for the local Green New Deal Fund set up by prefectural governments, the government support efforts for collecting, disposing and taking preventive measures against marine litter based on regional plans made by prefectural governments
- For the beaches within national parks, the government will conduct cleaning work and remove driftage coming ashore under the Green Worker Project and in cooperation with local residents. (MOE)

[Promoting Research and Surveys]

- To realize high-quality beaches that are safe and in harmony with nature, the government will collect and organize basic information on beaches, and promote research and surveys with related research institutions on wide-area coastal erosion and the construction of beach conservation facilities that take the natural environment including ecosystems into consideration. The government will also make efforts so that the parties concerned have a common awareness about the coastal environment to be conserved. For example, the ministries and agencies responsible for beaches will determine the influence and effects that beach conservation facilities exert on the natural environment including ecosystems, in addition to research and examination on beach construction giving consideration to ecosystems based on the concept of creating beaches in harmony with nature. (MAFF, MLIT)
- As The changes in weather and oceanic phenomena and the long-term rises in sea level due to global warming are concerns, there are possibilities of the serious impacts on coastal regions, such as the escalation of the coastal erosion, the increase of territory below sea level, the greater damage caused by storm surges, and the habitat changes of marine lives. For these reasons, the government monitors tide levels and ocean waves, and will promote examination as necessary to cope with their changes. (MAFF, MLIT) [Cited in Chapter 2, Section 5, 3.5, and Chapter 2, Section 6, 1.1]
- Through these various policies and measures, the government will continue its efforts to secure biodiversity on beaches and along seacoasts. (MAFF, MLIT, MOE)

4 Port environment**(Outline of Measures and Policies)**

With regard to ports, in 2005 the Environment Division of the Port Sub-Committee of the Council for Transport Policy compiled the “Greening of Port/Harbor Administration (Port Environmental Development Projects),” a report on the basic direction of future port environment policy. This report views the development and use of ports, and the conservation, restoration and creation of environments as the wheels of a vehicle that drives the promotion of “Greening of Port/Harbor Administration.” Based on this idea, and in addition to conserving, restoring and creating tidal flats and seaweed beds, the government should comprehensively create good marine environments through improved water quality by dredging sediment and preparing at ports a green belt—a habitat for various living organisms and an important place for local residents to interact with nature.

As concrete measures to improve the water quality in coastal areas, the report prescribes various functions of tidal flats that need to be evaluated and important tidal

flats to be conserved as much as possible from the perspectives of conserving ecosystems, natural purification capability, contributions to the fishing industry, effects of disaster prevention, and positively restoring tidal flats where required.

4.1 Conserving, restoring and creating port environments

(Current Situation and Challenges)

Conservation and restoration projects for tidal flats and shallow waters have been conducted nationwide until today. In the restored tidal flats at Mikawa Bay and Onomichi-itozaki Port, for example, water quality has been improved and the effect of increasing living organisms confirmed.

In enclosed water areas such as Tokyo Bay and Osaka Bay, however, achievement of the COD standard remains low, with red tide and blue tide being generated. In the three major bays of Japan and in the Seto Inland Sea, large pits are left scattered on the seabed by extracting sand for reclamation work and making aggregate concrete, and have become places to generate oxygen-deficient water mass that causes blue tide. To address these problems, covering the sand, filling the large pits and developing tidal flats must be promoted through more effective use of dredged soil by separating sand (by particle diameter) and using recycled materials. Moreover, the only living organisms seen attached to the many vertical walls are those that can inhabit those walls. Therefore, the conservation of biodiversity must also be considered with regard to structure as much as possible, such as by using mildly sloping sea walls, for example, in addition to restoring and creating tidal flats, shallow waters and beaches.

(Specific Measures and Policies)

- The government will promote the dredging of organic bottom sediment accumulated on the seabed. (MLIT)
- The government will effectively use dredged sand generated by the construction of ports and harbors, and promote the restoration of tidal flats and seaweed beds, and the backfilling of large pits. (MLIT) [Cited in Chapter 1, Section 9, 1.3]
- The government will conduct experiments for on-site verification of using recycled material to create tidal flats. (MLIT)
- The government will examine methods of adjusting quality, as well as supply and demand regarding wide-area dredged sand. (MLIT)
- The government will promote at ports the creation of green belts that will provide the habitats for various kinds of living organisms and offer important places where local residents can interact with nature. (MLIT)
- Along with measures against degradation, the government will promote the introduction of port and harbor structures with functions added, in order to live in harmony with living creatures. (MLIT)

5 Measures against marine pollution

(Outline of Measures and Policies)

As part of measures to conserve the marine environment and prevent marine pollution resulting from oil, hazardous chemical substances and other waste discharged from ships are controlled by the Law Relating to the Prevention of Marine Pollution and Maritime Disaster (Prevention of Marine Pollution Law)—the domestic law under “Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL73/78).” In order to prevent marine ecosystems from being disturbed by foreign species transported in the ballast water of ships, in 2004 the International Maritime Organization (IMO) adopted the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM) to solve the problem. Work is now underway to enforce the Convention, and Japan will continue contributing to the necessary work.

In heavily polluted sea areas, water purification measures will be promoted by removing a major cause of pollution—the sludge or soft mud containing organic bottom sediment on the seabed.

Enclosed water areas also exert great impact on coastal biodiversity because when water quality deteriorates due to such geographical factors as seawater not circulating or such social factors as a concentration of population and industry, a concentrated pollution load consequently results. Improvement of the water environment in the area concerned will therefore be targeted.

5.1 Measures against pollution caused by marine activities

(Current Situation and Challenges)

As part of the load imposed on the marine environment by marine activities involving ships, there are problems of sea pollution resulting from oil and chemical substances spilled from ships, waste produced by onboard activities, and discharged effluent. And it is indicated that there is a risk of invasive aquatic organisms getting into a ship’s ballast water, being carried to distant locations, discharged along with ballast water, and then settling there, thereby disturbing local ecosystems, such as by reducing endemic species.

(Specific Measures and Policies)

- The government will continue to actively participate in discussions at the International Maritime Organization (IMO), in preparing for enactment of the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 (BWM). (MLIT, MOE, MOFA) [Cited in Chapter 2, Section 4, 2.9]
- For ratification of the Convention, the government will promote examination of the

preparations to ratify the Convention at an early stage, by collecting information on environmental influences caused by ballast water, and collecting and analyzing basic information on technology used to treat ballast water. (MOE, MLIT) [Cited in Chapter 2, Section 4, 2.9]

- The government will improve Coastal Environment Sensitivity Index Maps that can deal with an outflux of oil and other harmful liquid substances, and renew the maps by adopting the groups of targeted living creatures (fish and benthic life) and biological zoning (mudflats and sea grass beds) based on the shift in land utilization along the coast. (MOE) [Cited in Chapter 2, Section 4, 2.5]
- The Aquatic Bird Rescue Training Center will conduct ongoing seminars for local government workers to prepare and promptly deal with temporal large-scale contamination of aquatic birds in an area exposed to oil pollution caused by an accident. (MOE) [Cited in Chapter 2, Section 1, 2.6, and Chapter 2, Section 4, 2.5]

5.2 Measures to purify water in sea areas

(Current Situation and Challenges)

Japan's high economic growth that began in 1950s raised the living standard of Japanese people, along with the development of industries and science. At the same time, it entailed a huge consumption of resources and resulted in industrial or domestic effluent flowing into sea areas via rivers, thereby deteriorating the coastal environment in inner bays and causing a rapid increase in sea pollution. This sea pollution resulted in the accumulation of sludge and water pollution in some sea areas, thus inhibiting the use of coastal areas and also exerting a major impact on the habitats of living organisms in coastal areas.

(Specific Measures and Policies)

- The government will implement water purification measures in sea areas, such as removing sludge—a major cause of pollution—in highly polluted sea areas, as well as covering and removing stranded ships. (MLIT)

5.3 Conserving the water environment in enclosed coastal seas

(Current Situation and Challenges)

With regard to the water environmental conservation of enclosed coastal seas, heavy pollution has largely been resolved, but oxygen-deficient water masses are still being generated in some sea areas, thereby disturbing the use of water, as well as the life and growth of aquatic life-forms. Moreover, the loss of tidal flats and seaweed beds result in deteriorated habitats for living organisms. Consequently, ecosystems including those of fishing resources are also deteriorating.

For Tokyo Bay, Ise Bay and the Seto Inland Sea, where there are concentrations of

population and industry, Reduction of Total Pollution Load for improved water quality have been made six times since 1979, thereby improving the water environment. However, oxygen-deficient water mass and red tide are still being generated even now, and improving the water environment alone is insufficient. Therefore, it is necessary to examine more effective measures to improve the water environment of enclosed water areas, as well as clarifying the mechanism of pollution in enclosed water areas.

Targeting rejuvenation of the seas—the third decision (made in December 2001) regarding the urban renaissance project—the ministries and agencies concerned and related local governments collaborated to formulate the “Action Plan for the Rehabilitation of Tokyo Bay,” “Action Plan for the Rehabilitation of Osaka Bay” and “Action Plan for the Rehabilitation of Ise Bay,” and are promoting various policies to reduce the pollution load from land areas, in order to improve and monitor the environment in sea areas. And in accordance with the environmental action plan of the Ministry of Land, Infrastructure, Transport and Tourism (June 2004), the Action Plan for the Rehabilitation of Hiroshima Bay was also formulated, with measures based on this plan being promoted. A future issue is to develop a project for rejuvenating sea areas nationwide, as well as other enclosed water areas that need improved water quality.

The Ariake Sea and the Yatsushiro Sea, which have huge tidal flats and large tide ranges, are also home to unique ecosystems and many endemic species, but recently have experienced problems involving the generation of oxygen-deficient water mass and red tide, and a reduction in fish and shellfish. Therefore, conserving the marine environment and recovering the biological resources in both sea areas pose urgent issues.

(Specific Measures and Policies)

- The government supports model activities addressing environmental conservation and human coexistence within coastal sea areas in partnership with local governments. The government also publishes manuals on how to create “Satoumi” and conveys information about the concept of “Satoumi” not only inside Japan but also to other Asian countries. (MOE)
- For Tokyo Bay, Ise Bay and the Seto Inland Sea, the government will steadily implement the sixth Reduction of Total Pollution Load for improved water quality, with the target year being FY 2009. It will also conduct research on the mechanism of pollution that affected by outer seawater, and formulate mid- and long-term visions with setting long-term targets for each sea to comprehensively promote measures to improve the environments of enclosed coastal seas in the future. (MOE)
- In order to improve the water quality in enclosed coastal seas, the government will promote measures to reduce the influx of pollutants, and conserve and restore tidal

flats. (MLIT)

- Targeting “rejuvenation of the seas”—the third decision regarding the urban renaissance project—the government will promote various policies based on the “Action Plan for the Rehabilitation of Tokyo Bay,” “Action Plan for the Rehabilitation of Osaka Bay” and “Action Plan for the Rehabilitation of Ise Bay.” And based on the “Action Plan for the Rehabilitation of Hiroshima Bay,” the government will also promote various policies and develop projects for rejuvenating sea areas nationwide. As for other enclosed coastal seas that need improved water quality, it will also monitor progress of the plan, make efforts for steady implementation, and review the plan as needed. (Cabinet Office, MLIT, MAFF, METI, MOE)
- Based on the committee report submitted in December 2006 by the Ariake Sea and Yatsushiro Sea Comprehensive Investigation and Evaluation Committee, the government will make efforts to devise methods of improving the environment by utilizing such ecosystem functions as the purification capacity of bivalves, in order to promote the conservation and restoration of the marine environment and ecosystems for regeneration. (MOE)

Chapter 2 Cross-Sectoral and Fundamental Measures and Policies

Section 1 Conservation and Management of Wildlife (Basic Concepts)

It is estimated that more than 90,000 species of wildlife are known to live in Japan. Wildlife is an important part of biodiversity. Wildlife is also indispensable for rich human life and cultural activities, as people enjoy the blessings of wildlife in the form of such resources as food and medicine, and the existence of wildlife enriches the personal lives of people.

For the conservation of wildlife, we must be fully and constantly aware of endangered species. From this perspective, the “Red List” (listing species of wildlife threatened with extinction) has been established. As far as vertebrates are concerned, Japan has already lost at least 21 wild species including the Japanese wolf and the Bonin wood pigeon (*Columba versicolor*). Lost species can never be restored. It is our responsibility to protect wildlife against extinction and conserve them as the nation’s common assets to be handed over to the next generation. It is also important to make efforts to recover the populations of individual threatened species so that such species can be removed from or downlisted (to a lower rank of extinction risk) in the Red List, as well as preventing any new entries to the Red List.

Despite ongoing efforts to conserve wildlife in recent years, the number of threatened species has tended to increase, partly due to deteriorated habitat environments in island areas including the Ogasawara Islands and the Nannsei Islands, as well as fewer nature restoration and management activities in Satochi-Satoyama areas. In areas known as so-called “hot spots” where these endangered species are concentrated, it is important not only to focus on individual species but also to promote the conservation and restoration of biodiversity in all areas in cooperation with the local people involved. Regarding conservation measures, the principal effort should be placed on *in situ* conservation measures, but it is also important to secure *ex situ* populations as an option for conservation, and in this light, breeding projects involving some critically threatened species in captivity have been launched, with the ultimate goal being to return such species to the wild.

With a trend toward more threatened species on the one hand, and growing friction between humans and wildlife on the other, we can see specific species of wildlife causing more damage to agricultural, forestry and fishery activities, as well as to ecosystems, and those species appear to be increasing in number and expanding their habitat ranges. In order to manage the trouble caused by specific species of wildlife, we must promote comprehensive and systematic measures, such as environmental management of their habitats, damage prevention measures and population control through joint efforts

involving all relevant parties.

In order to establish a desirable relationship between humans and wildlife based on the long-lasting survival of diverse wild species ranging from rare species to commonly observable species in respective regions, it is important to promote the proper protection and management of wildlife based on understanding the significance of interaction between humans and wildlife, instead of a one-way approach from humans to wildlife. And to prevent our agricultural, forestry and fishery activities from being damaged by growing populations of specific species, and also prevent declines in wildlife populations and possible extinction, protection and management measures must be flexibly improved or enhanced through constant understanding and the analysis of inhabitation and growth conditions, and through the use of accumulated scientific knowledge, assuming that such conditions are subject to continual and spatial change. For the proper protection and management of wildlife, it is also necessary to implement appropriate management measures not only for target species but also for invasive alien species and pet animals that could disturb ecosystems and affect wildlife habitats. Non-biological elements such as chemical substances have the potential to disturb ecosystems as well. For example, we already know the effects of DDT on birds, as suggested in *The Silent Spring* published in the U.S. in 1962, and the effects of tributyltin on shellfish as detected in Japan. In order to prevent such adverse effects on ecosystems from occurring, we will implement measures to deal with non-biological elements including chemical substances.

1 Protection of threatened species

(Outline of Measures and Policies)

Wildlife species constitute an important factor in biodiversity, and it is our responsibility to prevent their extinction. In order to conserve wildlife, it is important to know accurately and specifically which species are endangered. We therefore established the “Red List” (listing species threatened with extinction) and released it to the public to deepen public understanding about threatened species.

In accordance with the Act on Conservation of Endangered Species of Wild Fauna and Flora (ACES), the “national endangered species of wild fauna and flora” have been designated to prohibit the capture or transfer of those designated species, and properly protect their habitats. In addition, targeting critically endangered species, for which extra measures are apparently necessary to promote breeding or habitat improvements, “Conservation programs defined by the Act” are being planned and implemented.

In order to protect those species for which survival is considered difficult only through *in situ* conservation measures, “*ex situ* conservation” measures are also being promoted for artificially raising or breeding such species outside their natural habitats, as in a zoological or botanical garden, with the ultimate goal being to return the species

to the wild, while at the same time restoring their natural habitats.

1.1 Red List

(Current Situation and Challenges)

Work on the second revision of the Red List began during FY 2002, and the list was reviewed based on the latest knowledge regarding inhabitation conditions and environmental changes affecting wildlife living in Japan. The revised Red List, composed of ten taxonomical groups, was published by August 2007.

As for the environment surrounding wildlife and their constantly changing populations, it is necessary to continue reviewing the Red List on a regular basis, constantly collect relevant information, and make efforts to raise and expand public awareness and understanding of the Red List.

(Specific Measures and Policies)

- The government will revise the Red List again by the end of 2012, and make efforts to raise and expand public awareness and understanding of the Red List, by making necessary changes to the species listed, including any change of rank, deletion or addition, based on examining the range of species to be assessed and the latest data concerning inhabitation conditions, probability of extinction, and other factors. (MOE)
- The government will also revise the Red Data Book (which summarizes inhabitation conditions, etc. as compiled from the Red List) to include the latest information on inhabitation conditions, etc. shortly after the Red List is revised, and make efforts to raise and expand public awareness and understanding of the Red List. (MOE)
- In order to ensure the proper implementation of protection measures, especially for endangered species shown on the Red List, the government will establish cooperation with relevant administrative organizations, local governments, public organizations and specialists, in order to conduct the ongoing monitoring of inhabitation conditions and environments. (MOE)

1.2 Conserving the designated endangered species of wild fauna and flora

(Current Situation and Challenges)

In accordance with the ACES, a total of 82 species are designated as the “national endangered species of wild fauna and flora” (hereinafter referred to as “national endangered species”) including the albatross, Japanese crested ibis, and Tsushima cat (as of March 2010). Of those designated national endangered species, 47 species are subject to Conservation Programs, under which projects for breeding and improved habitats are being carried out.

Regarding the natural habitat conservation areas, there are a total of nine

designated areas (as of March 2010) with an aggregate area of 885 hectares, covering seven national endangered species such as *Platypleura albivannata* and *Hynobius abei*. Each area has its own conservation guidelines depending on the ecological characteristics of the species concerned, but some improvements are considered necessary, including improved surveys on the inhabitation conditions of national endangered species and the introduction of rehabilitation measures in case the invasion of invasive alien species is discovered.

The Red List includes a total of 3,155 species of wildlife threatened with extinction (as of March 2010). Of those listed species, some have benefited from conservation measures to improve their inhabitation conditions, while others face a growing danger of extinction due to the impact of invasive alien species or environmental changes of their habitats. The risk of extinction is expected to increase for many species, including those losing genetic diversity as global warming progresses. For species suffering rapid declines in population and areas where endangered species are concentrated—both of which have high priority for protection—it is necessary to collect detailed information and implement proper measures to address the problems concerned, including measures provided by the ACES. For example, dugongs have been targeted and surveys on their inhabitation conditions conducted, along with efforts being promoted to establish coexistence with fishermen.

(Specific Measures and Policies)

- Based on reevaluation of the Red List, the government will determine the status of endangered species, analyze the factors of declining populations, and clarify necessary measures to improve the status according to the species concerned. (MOE)
- The government will evaluate the effects of such protection measures as regulating the capture of wildlife through designation as national endangered species based on the ACES, the designation of habitat protection areas, and implementation of conservation programs protection by conducting protection/breeding operations. The government will also discuss future plans and take necessary measures based on the result of the evaluation of the progress of implementing ACES, by promoting said plans and measures having recognized the effects, or analyzing various factors to clarify effective conservation measures according to species when sufficient effects are not obtained. (MOE)
- Of those species designated as being in danger of extinction under the revised Red List, the government will select those considered to be critically endangered on the grounds of significant loss of population due to human activities of a degree that threatens the survival of such species, thereby requiring some legal action including restrictions. The government will designate such species as the national endangered species of wild fauna and flora under the ACES. Specifically, targeted

- species that are supposed to be preferentially designated as national endangered species include the vertebrate species categorized in Category IA (meaning the highest level of danger of extinction), and vascular plants and insects categorized in Category I (meaning critically endangered or endangered) and those of declining population mainly attributed to capture or collecting pressure). The government plans to newly designate about five species as national endangered species. (MOE)
- In targeting those endangered species of wild fauna and flora indigenous to Japan, the government will conduct a comprehensive review of their inhabitation conditions, etc. In particular, intensive examinations and measures will be implemented for species living in island areas or Satochi-Satoyama areas where habitat environments are expected to become worse. The government will also review and evaluate ongoing Conservation Programs defined by the ACES, which apply to 47 species, for the purpose of improving the content and efficiency of the programs. (MOE) [Cited in Chapter 1, Section 9, 1.5]
 - The Conservation Programs above will be also newly planned and applied to national endangered species whose survival is considered unlikely without conducting extra projects to promote breeding and improve habitats based on scientific knowledge, in addition to the removal or mitigation of adverse factors that threaten the species. (MOE, MAFF, MLIT and MEXT)
 - Since it is essential to secure habitats for threatened wildlife to ensure their stable survival, the government will designate more habitats for national endangered species as natural habitat conservation areas, with a focus on places having well-maintained environments and in a way that seeks any necessary tie-ups with other protection programs for national wildlife protection areas and natural parks. (MOE) [Cited in Chapter 1, Section 2, 4.1]
 - The government will ensure the proper management of natural habitat conservation areas in accordance with conservation guidelines prescribed for respective areas, and also promote the maintenance and improvement of habitat environments in those areas. It will also make efforts to understand the life and growth of targeted species, and discuss a reevaluation of protection guidelines and zoning based on necessity. (MOE) [Cited in Chapter 1, Section 2, 4.1]
 - The government will promote the conservation and restoration of priority areas selected through a comprehensive assessment of biodiversity (biodiversity hot spots) in ways that promote discussions on the prioritized designation of protection areas and establish intra-governmental cooperation and joint efforts with local governments, NGOs and private enterprises to the maximum extent possible, and by implementing diverse programs, including those for nature restoration, the conservation and restoration of Satochi-Satoyama areas, the protection and breeding of rare species, protection and management of specific birds and animals,

and the elimination or prevention of invasive alien species. (MOE) [Cited in Chapter 2, Section 5, 1.2]

- By using some research projects such as Monitoring Sites 1000, the government will conduct monitoring activities focused on the status of endangered species of wild fauna and flora inhabiting such areas as alpine zones and coastal areas, which are considered vulnerable to the effects of global warming. (MOE) [Cited in Chapter 2, Section 5, 2.2, and Chapter 2, Section 6, 1.1]
- The government will protect the inhabitation environments of rare species in “protected forests” and make efforts to improve the environment of “green corridors” by creating good feeding environments for endangered wildlife through the thinning of forest plantations and introduction of projects to improve the inhabitation environments for other animals as prey for said wildlife. The government will also conduct monitoring surveys to understand the conditions of forests and inhabitation conditions of wildlife there. In targeting species in need of priority protection, the government will promote surveys on inhabitation conditions, as well as enhancing efforts to maintain and improve their inhabitation environments. (MAFF)
- The government will provide necessary support for conserving rare plants as the progress of conserving plants in Japan is reviewed in response to the Global Strategy for Plant Conservation that was adapted at COP6 2002 where NGOs consisting of various entities such as citizens and researchers played major roles. (MOE)
- As for endangered birds of prey, to conserve favorable habitat environment, the government will promote such efforts such revising the Methods of Protection on Birds of Prey, a protection guideline for the golden eagle, mountain hawk-eagle (*Spizaetus nipalensis*) and northern goshawk (*Accipiter gentilis*).
- In targeting dugongs, the government will continue to promote monitoring surveys on their inhabitation environment and efforts to establish coexistence with fishermen. (MOE)

1.3 *Ex situ* conservation

(Current Situation and Challenges)

Conservation measures with *ex situ* breeding have been promoted targeting such critically threatened species as the Japanese crested ibis, Tsushima cat and Okinawa rail for which survival is considered unlikely only through *in situ* conservation measures.

At the same time, deliberations on a desirable systematic implementation of those *ex situ* conservation measures have been made since FY 2007, with the aim of clarifying basic concepts of how to promote *ex situ* conservation in Japan, and secure the effective and efficient promotion of measures, as well as necessary coordination for each measure. In 2008, the government formulated the “Basic Policies concerning regarding *ex situ*

conservation of endangered wild animals species of wild Fauna and Flora in Japan.” In addition, a model project has been launched for establishing *ex situ* conservation techniques, based on the results of said deliberations.

For implementing *ex situ* conservation measures, wide-ranging participation involving local public bodies, diverse research institutes and private organizations is essential, where zoological and botanical gardens in particular play the central role.

For example, the Japanese Association of Zoos and Aquariums organizes the Species Survival Committee to manage a studbook and control the transfer breeding animals, and has attained significant achievements regarding the breeding of animals in captivity.

The Japan Association of Botanical Gardens sets the goal of “collecting and conserving storing 50% of endangered plants by 2012” in response to the Global Strategy for Plant Conservation (GSPC) adopted by COP6 held in 2002. The Association has also established a network to collect and conserve endangered plants by designating a nationwide “National Network of Botanic Gardens for the Conservation of Plant Diversity.” Each core garden has the mission of collecting and conserving endangered plants in its own region, and promoting regional efforts in cooperation with local public bodies and institutions of education.

The Association also organized the Committee for the Conservation of Plant Diversity to promote a project for compiling a database on those endangered plants being conserved by each botanical garden. This project has made significant achievements and is highly evaluated worldwide as a globally adaptable model project.

In order to promote *ex situ* conservation measures, it is necessary to continue improving breeding techniques and basic knowledge on *ex situ* conservation, while further enhancing combined *in situ-ex situ* measures including efforts for making technical improvements, collecting information on returning animals and plants to the wild, and improving their inhabitation environments.

In March 2010, during the course of rehabilitation for release into the wild at the Sado Japanese Crested Ibis Conservation Center, nine crested ibis were attacked and killed by martens. In order to prevent such a tragedy from ever occurring again, *ex situ* conservation measures must be promoted under safe circumstances by inspecting and improving facilities, and strengthening the control systems.

(Specific Measures and Policies)

- In enhanced cooperation with relevant parties such as zoological and botanical gardens, insect museums and research institutions, the government will strengthen its efforts for *ex situ* conservation for endangered wild species whose survival is considered unlikely only through *in situ* conservation measures. At the same time, *ex situ* conservation efforts will be enforced by introducing a model project to establish

- ex situ* conservation techniques and collect information targeting those species in need of high-priority protection. (MOE, relevant government ministries and agencies)
- As for the Japanese crested ibis, the government has promoted breeding projects by breeding a couple of ibises presented by the Chinese government in 1999, with the aim of increasing the population in captivity. As some progress was observed in the efforts, the government is planning to return these birds to the wild in their former habitat on Sadogashima in Niigata Prefecture, once a good inhabitation environment is prepared there. The government began efforts for initial release of ibis to the wild in 2008. The second test release conducted in 2009 introduced the method of “soft release” whereby ibises are released from temporary cages in which they were kept for a certain period, in order for the birds to acclimate to the surrounding environment, associate with, and act as part of the group. The released ibises are monitored to accumulate scientific knowledge. The government will continue these efforts with the goal of settling about a population of about 60 birds in the eastern part of the Kosado area (on the island of Sadogashima) by around 2015. The government will also promote cooperation with the Chinese government to protect crested ibis based on the “Japan-China Joint Crested Ibis Protection Plan” signed in 2003. (MAFF, MLIT, MOE)
 - In targeting the Tsushima cat, the government will promote dispersion of the population in captivity as well as breeding, in cooperation with the Japanese Association of Zoos and Aquariums and respective zoos, with the aim of securing a sustainable population in captivity having desirable genetic diversity. And based on the “basic plan for a return to the wild” established in fiscal 2004, the government will also enhance preparations for returning Tsushima cats to the wild, with adaptation training planned to be started in 2011. (MOE)
 - In targeting the Okinawa rail, the government will launch a full-fledged project for *ex situ* breeding during FY 2009, in order to establish techniques, understand ecological characteristics, and secure a certain population in captivity. (MOE)
 - The cause of the fatal accident involving ibises killed by martens intruding into the rehabilitation facility in March 2010 shall be fully investigated. In efforts to promote *ex situ* conservation of rare wild animals, the government will do its best to inspect and improve the breeding facilities, strengthen the control systems, and provide a safe environment for breeding animals in captivation and rehabilitation for a return to the wild, in order to prevent the intrusion of enemies from outside and infection due to disease-causing agents. (MOE)
 - In targeting plants in danger of extinction, the government is now conducting a cultivation project using a greenhouse, etc. at Shinjuku Gyoen National Garden in Tokyo. The government plans to further enhance this project, with the aim of promoting the genealogical conservation, protection, breeding and exhibition of

endangered plants. (MOE)

- As for plants, the practice of collecting and preserving seeds in order to avoid the risk of fewer seeds and loss of genetic diversity within the species is generally effective. Shinjuku Gyoen National Garden will play a major role in organizing the system to preserve seeds and promote the preservation of seeds of endangered plants in cooperation with the Japan Association of Botanical Gardens and certain botanical gardens. (MOE)

2 Management of wildlife (wild birds and animals)

(Outline of Measures and Policies)

Based on the “Basic Guidelines for the Implementation of Wildlife Management Projects” established by the central government and the wildlife protection programs established by each prefectural governor in accordance with those guidelines, comprehensive protection projects will be implemented, including the designation of wildlife protection areas, surveys on inhabitation conditions, conservation and improvement of habitat environments, hunting regulations, and educational activities. In combination with the related measures, we will make efforts to enhance wildlife protection and management.

In particular, more areas will be designated as wildlife protection areas with proper management measures being promoted there. Regarding those designated areas where the inhabitation environment has worsened, conservation programs will be introduced for environmental improvement as necessary.

The protection and management of wildlife should be implemented scientifically and systematically based on the knowledge of inhabitation conditions. Therefore, surveys and research on inhabitation conditions will be promoted and appropriate hunting regulations will be enforced.

The populations of some species such as deer and wild boar have been rapidly increasing, while others, including a certain species of bear indigenous to specific regions of western Japan, can be characterized by a small population. Regarding the expanding species such as deer and wild boar, population control measures will be introduced based on a scientific, systematic and comprehensive assessment, with the aim of avoiding friction (typified by agricultural, forestry and fishery damage) between wildlife and human activities. At the same time, systematic management measures will be promoted regarding said bears in regions of western Japan by using the protected area system, while implementing measures to conserve their inhabitation environment. Moreover, measures will be introduced in areas affected by damage to vegetation caused by deer in core areas of national parks.

Based on the fact that hunting serves a vital role in appropriate control over the protection and management of wildlife, more hunters will be secured as part of the

manpower engaged in wildlife management. At the same time, management to ensure appropriate hunting such as preventing illegal hunting will be promoted. The relief system for wildlife will also be improved in cooperation with local governments.

2.1 Wildlife protection areas [Cited in Chapter 1, Section 2, 3.1]

(Current Situation and Challenges)

Japan has 73 national wildlife protection areas totaling 565,471 ha (as of March 2010), following an increase in the number of designated sites, such as wetlands of international importance as migratory bird habitats. There are also 3,809 prefectural wildlife protection areas totaling 3,081,904 ha (as of December 2009).

In wildlife protection areas, it is important to accurately grasp wildlife population conditions through monitoring and other surveys to ensure proper management. In recent years, the wildlife habitat environments in wildlife protection areas have deteriorated due to sediment inflow from surrounding areas or rapid increases in certain animal populations. Therefore, the Wildlife Protection and Appropriate Hunting Law was amended in 2006 to launch conservation programs for improving habitat environments, including the improvement of lake water quality and the installation of facilities to prevent the intrusion of animals affecting wildlife habitats in wildlife protection areas. Since FY 2007, conservation programs have been implemented in such national wildlife protection such as Katano Kamoike and Manko.

(Specific Measures and Policies)

- The government will promote the designation of wildlife protection areas and special protection areas (representing a core system for wildlife protection) to secure wildlife habitats and contribute to maintaining, restoring and improving regional biodiversity. In this respect, the government will try to grasp important wildlife habitats based on scientific knowledge about wildlife population conditions and habitat environments, and give priority to such important habitats in designating wildlife protection areas. In order to secure habitats for a wide diversity of wildlife species, the government will designate areas covering a variety of ecosystems and wildlife communities. For example, the government will designate important coastal and marine bird colonies as wildlife protection areas to promote the conservation of coastal and marine environments. The government will also promote the designation of wildlife protection areas considered important from a national or international perspective, in coordination with relevant organizations. (MOE)
- The government will secure international networks of migratory bird habitats and other ecological networks by designating bird migration grounds and similar sites as wildlife protection areas in close connection with other relevant protection measures

such as natural park management. (MOE)

- The government will properly manage wildlife protection areas by implementing management operations such as regular patrolling and wildlife inhabitation surveys, and promoting appropriate guidance on human use of the areas, public awareness campaigns on wildlife ecology and conservation, and the development of suitable environments for wildlife inhabitation, in order to ensure a harmonious coexistence between humans and wildlife. The government will particularly enhance the management of national wildlife protection areas based on master plans indicating protection and management guidelines designated for each wildlife protection area. In case wildlife habitat environments deteriorate in wildlife protection areas, the government will construct wildlife breeding and feeding facilities, remove accumulated mud facilities to improve the quality of lake water, and similar facilities, and erect fences to prevent the intrusion of animals that adversely affect wildlife as necessary to conserve, develop and improve wildlife habitats. (MOE)

2.2 Regulations on the capture of wildlife

(Current Situation and Challenges)

In Japan, comprehensive management measures are implemented pursuant to the Wildlife Protection and Appropriate Hunting Law, including the protection of wildlife, population control and management of inhabitation environments, for the purpose of establishing an appropriate relationship between humans and diverse birds and animals, and maintaining biological diversity.

With regards to hunting, which is not only a means to acquire resources or a hobby, but also significant for wildlife population control, restrictions are applied to hunting season and methods of capture for preventing any danger linked to hunting activities. The number of species that hunters are permitted to capture is also legally limited to 49 (29 for birds and 20 for animals), thereby reflecting the inhabitation conditions and harmfulness of each species. And as part of wildlife protection measures, some areas are designated as temporary game preserve areas to enable the recovery of wildlife populations reduced by hunting.

In order to promote those management measures and ensure proper hunting practices, the position of “wildlife protection leader” (a part-time prefectural employee) has been established for controlling hunting and providing guidance for wildlife protection (with a total of 3,188 wildlife protection leaders as of FY 2006).

In recent years, the populations of certain wild species, particularly deer and wild boar, have dramatically increased in certain regions, causing serious damage to agricultural, forestry and fishery activities, as well as to ecosystems. At the same time, there are fewer hunters, who serve a vital role in controlling wildlife populations. And due to the deteriorating inhabitation environments for wildlife, fewer migratory birds

than before are being observed and some regions are experiencing declining populations of wildlife.

Based on the situation described above, hunting regulations prescribed by the Wildlife Protection and Appropriate Hunting Law were reviewed, and the Law was consequently revised in 2006 to further promote wildlife protection measures while utilizing hunting for the appropriate management of wildlife. The revised Law introduces the hunter approval system, with exceptions applied to temporary game preserve areas, certain hunting equipment prohibited areas, and hunting licenses for nets and traps.

Enforcement regulations for the Wildlife Protection and Appropriate Hunting Law were also revised in 2007 to essentially prohibit the use of steel traps for hunting, strengthen regulations on the structure of binding ropes, revise the list of game species to include the great cormorant whose habitat range has been expanding, lift a ban on the capture of female deer, and introduce a ban on the capture of Japanese quails whose habitat range has tended to decrease.

(Specific Measures and Policies)

- For the purpose of maintaining the appropriate populations of wildlife, the hunter approval system will be utilized to control the number of hunters active in specific hunting zones, in order to further promote wildlife protection. (MOE)
- The government will adopt the rules of exceptions applied to temporary game preserve areas, permitting hunters to capture designated species such as deer and wild boar, in order to effectively promote population control through hunting. (MOE)
- The hunting license previously required for nets and traps has been divided into two separate licenses for nets and traps, respectively, for allowing farmers suffering agricultural damage caused by wildlife to capture such wildlife by themselves using trapping devices. By utilizing this new licensing scheme, the government will secure more manpower for wildlife management. (MOE, MAFF)
- Through efforts to ensure that hunters observe hunting regulations, the government will ensure the proper use of trapping devices to prevent any mistaken capture and hunting-associated danger. (MOE)
- By monitoring the inhabitation conditions of game species, the government will review the list of game species on a regular basis. (MOE)
- In order to promote the efficient and effective prevention of wildlife damage, the government will properly select and deploy wildlife protection leaders, and systematically train them for improved performance. (MOE)

2.3 Scientific and systematic management

(Current Situation and Challenges)

Some wild species are causing serious damage to our agricultural, forestry and fishery activities, and to ecosystems as well. For example, deer, wild boar and other wildlife with significantly expanded populations and habitat ranges have been seen consuming agricultural produce or destroying rare plants. During FY 2008, wildlife damaged about 100,000 hectares of farmland, representing a total loss of about 19.9 billion yen.

We also need to pay attention to specific decreasing species such as bears in the western Chugoku region and the Shikoku region, having small populations and only being observed in limited, isolated areas. Thus, maintaining sound local population levels for such species poses a challenge.

The expanding distribution of deer habitats and rapid increases in deer populations have led to deteriorated natural vegetation in national parks due to deer consuming such vegetation, making it necessary to implement the proper management of deer in order to protect ecosystems and landscapes.

To this end, it is important to introduce scientific and systematic management efforts through a well-balanced and careful introduction of measures for population control, inhabitation environment management, and damage prevention, pursuant to the Specified Wildlife Management Plan (hereinafter referred to as the “specified plan”).

As of November 2009, a total of 107 specified plans designed by respective prefectural governors are being implemented in 46 prefectures by targeting deer, bears, wild boars, serows, monkeys and great cormorants. Since the targets are living wild creatures, their inhabitation and other conditions are changing day by day, thus making it very difficult to measure the expectable effects of the plans. Therefore, it is important to constantly monitor wildlife populations, inhabitation environments, damage prevention measures, and the results thereof, in order to flexibly reflect those results in the plans.

As for birds and animals that are distributed or migrate over a broad area across prefectural borders, it is effective to promote measures based on guidelines that clearly prescribe the orientation of wide-area protection and management in cooperation with the administrative bodies and organizations involved. As for great cormorants, 10 prefectures in the Kanto region and 15 prefectures in central Japan and the Kinki region have organized wide-area councils and formulated wide-area guidelines. Similar efforts are also being promoted for the Japanese black bear (*Selenarctos thibetanus*) and sika deer (*Cervus nippon*).

At the same time, hunters who serve a vital role in controlling wildlife have been decreasing over the past 30 years from a peak of 530,000 hunters in 1975 down to 200,000 in 2005. In order to train those engaged in wildlife protection and control, the

government will conduct seminars for employees from prefectural and municipal bodies. Specialists possessing a high degree of knowledge and experience regarding wildlife protection and control have been registered since 2008, along with the Manpower Registration Project for Wildlife Protection and Control being organized to provide information about these specialists.

In addition to these efforts based on the Wildlife Protection and Hunting Law, the Wildlife Damage Prevention Special Measures Act was formulated in February 2008 to deal with the serious damage caused to agricultural and fishery products. Based on the Act, municipal governments will formulate damage prevention plans and promote such efforts as habitat environment management, damage prevention measures, and population control. These efforts are also being supported by the central government.

The damage caused by crows can be divided into agricultural damage and the disturbance to people's living environment in urban areas. The friction between crows and humans in urban areas is mainly typified by crows tearing apart garbage.

(Specific Measures and Policies)

- The government will promote the effective and efficient monitoring of wildlife inhabitation conditions, the development of human resources to secure core workers dedicated to wildlife management, wildlife population control, setting up buffer zones to protect inhabitation environments, and damage prevention efforts by installing fences or cleaning up crop residue. At the same time, the government will offer assistance for the efforts of local communities. (MOE, MAFF)
- In targeting such species such as deer and wild boar having significantly expanded populations and habitat ranges, and which cause damage to agricultural, forestry and fishery activities, and disturb ecosystems, the government will scientifically and systematically implement measures under the specified plans, including population control through hunting, installing damage prevention facilities, and improving inhabitation environments. It will also promote the utilization of wildlife as a local resource by supporting the construction of processing plants for captured wildlife. (MOE, MAFF)
- In targeting those species that travel over a wide area ranging over multiple prefectures, such as the great cormorant and bear, the central government will strengthen cooperation with related prefectural governments by establishing councils to formulate wide-area management guidelines to be reflected in each prefecture's specified plan. The government will also introduce damage prevention measures based on understanding the inhabitation conditions of local populations. Moreover, it will ensure consistency among the wildlife management measures implemented by respective prefectures. (MOE, MAFF, MLIT)
- In order to create communities that enable compartmentalization between residents

and wildlife as well as coexistence, in cooperation with local bodies, NPOs and other entities, MAFF will promote comprehensive measures in eight model areas around Japan, such as investigating inhabitation conditions and the situation of damage caused by wildlife in hinterland national forests, maintaining habitat environments, and managing wildlife populations. (MAFF)[Cited in Chapter 1, Section 5, 1.5, 1.11, and Chapter 2, Section 5, 2.4]

- In areas where a bad influence on ecosystem and landscape such as vegetation damage caused by deer is seen at the cores of such national parks as Minami Alps National Park and Kirishima-Yaku National Park, the government will work out protection and management plans based on scientific data, and adaptively implement such measures as installing vegetation protection fences and capturing deer for adjusting local deer populations. [Cited in Chapter 1, Section 2, 2.2]
- The government will promote education and publicity activities to address damage caused by crows in our living environment. For example, the government recommends the use of lids or covers for garbage containers. (MOE)
- The government will promote the establishment of specified plans by considering the opinions of relevant parties. It will also utilize the revised manual on technical matters to support specified plans in order to facilitate smooth implementation. The government seeks to increase the number of established specified plans to 170 by 2012. (MOE)
- For the purpose of securing human resources dedicated to wildlife management measures and solving wildlife damage problems, the government will further promote seminars for employees from local governmental bodies and projects to train hunters. It will also establish the specialist registration system, by which experts possessing special knowledge and skills in the field of wildlife management will be registered and effectively utilized. (MOE, MAFF)
- In 2006, the Wildlife Protection and Appropriate Hunting Law was revised to separate the hunting license for nets and traps into two licenses for nets and traps, respectively. Based on this revision, the government encourages farmers suffering crop damage by wildlife to capture the damage-causing species by themselves using trapping devices. (MOE, MAFF)
- Since hunting serves a vital role in controlling wildlife populations to a certain degree, the government will secure and utilize hunters contributing to wildlife management. It will also promote the proper management of hunting activities by implementing measures to prevent the danger associated with hunting and promote the effective utilization of captured wildlife. (MOE, MAFF)
- In response to Japan's aging agricultural forestry and fishery population and fewer hunters, the government will promote organizing the Troops for prevention of damage due to wildlife for making efforts on damage prevention measures in the

whole local area. nationwide(MOE, MAFF)

- Regarding the wildlife damage to forests, the government will promote the installation of such damage prevention facilities as guard fences and tubes to prevent feeding damage, hunting for adjusting wildlife populations, the development and diffusion of new wildlife prevention and elimination technologies, improved wildlife monitoring, and arrangements for prevention and elimination.(MAFF) [Cited in Chapter 1, Section 5, 1.5]
- While ensuring further coordination with wildlife conservation and management measures, the government will implement wide-area effective measures against wildlife damage in view of wildlife habitat conditions and promote the development of broadleaf tree forests in a manner giving consideration to wildlife habitats. (MAFF) [Cited in Chapter 1, Section 5, 1.5]
- In promoting the measures described above, the government will ensure coordination with other relevant policy measures and seek combined effects.

2.4 Survey and research on wildlife inhabitation conditions

(Current Situation and Challenges)

As part of the National Survey on the Natural Environment, surveys on the distribution of major species of wildlife have been conducted to roughly understand the overall inhabitation conditions of wildlife.

In promoting scientific and systematic wildlife management, it is important to understand the regional status as specifically as possible through information and data on wildlife habitats, populations and the increasing or decreasing trends thereof, inhabitation environments, ecological conditions, etc.

(Specific Measures and Policies)

- The government will continue to conduct the National Survey on the Natural Environment, and also promote the collection of information and understanding of the nationwide inhabitation conditions of major species of wildlife as part of the survey project. With the aim to promote carefully designed management measures, especially for deer, bear and wildlife that have significant impacts on ecosystems or our agricultural, forestry and fishery activities, the government will promote intensive surveys on such specified wildlife to estimate nationwide populations and understand the increasing or decreasing trends thereof in a way that allows for quick comprehension of the latest trends. (MOE) [Cited in Chapter 2, Section 5, 2.1]
- The government will utilize the reports on captured game species submitted by licensed hunters or those possessing hunting permits, in order to compile mesh data on location. (MOE)
- The government will promote database improvement by utilizing GIS (Geographic

Information System). (MOE)

- In targeting those wild species causing damage to agricultural produce or ecosystems, the government will promote research and studies concerning population control methods, methodologies to comprehend populations and population density, and damage prevention techniques, in order to prevent further damage expected from those species and promote the appropriate control of such wildlife. (MOE, MAFF)
- As part of efforts to promote the protection of migratory birds, the government will continue to conduct banding surveys at bird observation stations and a national census on geese, ducks and swans to comprehend the status of their inhabitation environments in tidal flats or lakes. In the Monitoring Sites 1000 project—part of a comprehensive ecosystem monitoring system—the government will conduct monitoring surveys on major stopover points for such waterfowl as geese and ducks, as well as such shorebirds as the sandpiper and plover. Those surveys and research concerning wildlife management will be implemented effectively in collaboration with private organizations, etc. (MOE)
- In order to create communities that enable compartmentalization between residents and wildlife as well as coexistence, in coordination with local bodies, NPOs and other entities, MAFF will promote comprehensive measures in eight model areas around Japan, such as investigating inhabitation conditions and the situation of damage caused by wildlife in hinterland national forests, maintaining habitat environments, and managing wildlife populations. (MAFF) [Cited in Chapter 1, Section 5, 1.5, 1.11, and Chapter 2, Section 1, 2.3]

2.5 Prevention of illegal hunting

(Current Situation and Challenges)

The list of wild species for which the public is permitted to catch and keep as pets has been gradually downsized, and currently only one species—the Japanese white-eye—is on the list, where only one bird may be caught and kept per household. However, many illegal hunting incidents have been reported, making it necessary to deliberate on the need for existing permission system.

No import certificate is required for imported birds. Therefore, there are many cases of birds being hunted illegally in Japan and kept as pets, but falsely reported as being imported. In response to that situation, the revised Wildlife Protection and Appropriate Hunting Law enforced in 2006 has introduced a rule dictating that pet owners of any of the designated 21 species specified by an ordinance of the Ministry of the Environment must put on leg band issued by MOE on each imported bird, including the Japanese white-eye and the blue-and-white flycatcher often found to have been hunted illegally in Japan. It is also necessary to continuously strengthen monitoring of the illegal hunting of birds not permitted for the public to catch.

(Specific Measures and Policies)

- In accordance with the “Basic Guidelines for the Implementation of Wildlife Management Projects” established in 2007, the government will ensure the proper enforcement of rules on hunting methods and hunting zones as applied to certain pets. (MOE)
- With the effective utilization of wildlife protection leaders as well as cooperation with police, local governments, NPOs, authorities, and civic groups dedicated to protecting nature, the government will enforce controls on illegal hunting and illegal breeding. (MOE)
- The government will deliberate on the need for the existing hunting permission system as applied to certain pets, by considering the current situation. (MOE)

2.6 Relief system for wildlife

(Current Situation and Challenges)

It is feared that harmful substances such as lead released into a natural environment by humans could damage wildlife habitats. Lead-poisoned Steller's sea eagles and white-tailed eagles have been captured for protection in Hokkaido. The number of such species peaked at 26 in 1998, and then recently dropped to just a few. Lead-poisoning cases among large birds of prey are on the decline. The use of lead bullets for hunting is prohibited or limited by the Wildlife Protection and Hunting Law, and Designated Hunting Method Prohibition Zones have been introduced. Based on these measures, zones restricting the use of lead shotgun pellets have been designated in 46 prefectures (as of April 2009).

In cooperation with local governments and private organizations, the relief system for rescuing or rehabilitating sick or injured wildlife will be improved by deliberating on the designation of target species.

The Training Center for Waterfowl Rescue, Ministry of the Environment, provides oil spill contingency training programs for the employees of local governments and others, in order to be well-prepared for any oil pollution accident could injure a large number of wildlife in a short period of time, and ready for taking quick actions in affected areas.

(Specific Measures and Policies)

- By examining rescued wildlife, the government will make efforts to understand the causes and impacts on wildlife of lead and other harmful substances released into the natural environment, and designate more areas as zones where lead shot hunting is restricted under the system of designated hunting prohibited areas pursuant to the Wildlife Protection and Appropriate Hunting Law, as part of efforts to protect waterfowl and large raptorial birds from lead poisoning. The government will also

ensure that hunters are strictly instructed not to leave behind the carcasses of hunted wildlife. (MOE)

- In cooperation with local government and private organizations, the central government will continue making efforts to improve the wildlife relief system, such as for the rescue and rehabilitation of sick or injured wildlife, while deliberating on the designation of target species. (MOE)
- The Training Center for Waterfowl Rescue, Ministry of the Environment, will continue providing oil spill contingency training programs for the employees of local governments and others, in order to be well-prepared for any oil pollution accident that could injure a large number of oil-contaminated waterfowl in a short period of time, and ready for taking quick actions in affected areas. (MOE) [Cited in Chapter 1, Section 9, 5.1, and Chapter 2, Section 4, 2.5]

2.7 Raising public awareness

(Current Situation and Challenges)

In areas where local residents or tourists lack a sufficient understanding about wildlife, we often see excessive feeding, the improper disposal of food waste or unattended agricultural crops, which could invite such problems as wildlife depending on people to feed them and wildlife intruding into the sphere of people's lives. Such phenomena could lead to people's living environment or agricultural, forestry or fishery activities being damaged, which in turn could adversely affect our efforts to protect ecosystems and wildlife.

(Specific Measures and Policies)

- The understanding and cooperation of local residents are essential to ensure the proper management of wildlife, as well as the need for local residents to voluntarily participate in management measures. Therefore, the government will promote education and publicity activities including instructions and guidance for improving and expanding public awareness about the proper relationship between humans and wildlife. Those activities include creating opportunities for people to interact with wildlife, holding seminars on conserving the natural environment, and teaching facts about the adverse impacts of excessive feeding and damage caused by wildlife to ecosystems and agricultural, forestry or fishery activities. (MOE, MAFF)
- Cooperation between the central and local governments, research institutes and private organizations is essential to promoting the proper management of wildlife, and the government will ensure that such cooperation will be increased and improved. (MOE, MAFF)

2.8 Avian influenza

(Current Situation and Challenges)

Since around 2002, highly pathogenic avian influenza (HPAI) has been repeatedly detected in wild birds worldwide. And in 2005, more than 5,000 bar-headed geese were found dead and confirmed to be infected with HPAI virus at Qinghai Lake in China's Qinghai Province.

In Japan, highly pathogenic avian influenza (HPAI) has been detected in the following wild birds:

- Jungle crows (in March and April 2004, in Kyoto and Osaka Prefectures)
- Mountain hawk-eagle (*Spizaetus nipalensis*) (in January 2007, in Kumamoto Prefecture)
- Whooper swans (in April and May 2008, in Hokkaido, Aomori and Akita Prefectures)

Based on the circumstances described above, the government compiled the "Technical Manual for prefectural bureaus regarding highly pathogenic avian influenza (HPAI) in wild birds" in September 2008, and promoted monitoring of the virus in cooperation with prefectural governments.

This virus was not detected from any of the specimens inspected during October 2008 and May 2009 based on this manual, covering a total of 13,528 droppings of wild and migratory birds.

(Specific Measures and Policies)

- By considering the opinions of experts suggesting that wild birds including migratory birds could be helping to spread of HPAI virus, the government will monitor migratory bird feces and dead birds to examine possible infection by the HPAI virus. The monitoring results will be utilized for taking domestic measures for protecting wildlife and clarifying the infection routes of HPAI virus. (MOE)
- In the event of any outbreak of HPAI, the government will immediately dispatch public workers and experts to the affected site to inspect the status of viral infection by capturing wild birds to determine whether the virus has spread among wild birds including migratory birds. (MOE)
- In order to strengthen cooperation with nearby nations, the government will dispatch specialists to South Korea and Russia to collect and summarize information about avian influenza in those nations. (MOE)
- The government will promote efforts to clarify the migration routes of migratory birds. (MOE)
- The government will also promote awareness about zoonosis infectious diseases such as avian influenza that could infect both humans and animals, and also strengthen surveillance efforts including collecting information from prefectural governments. (MOE)

3 Coping with factors causing disturbance to ecosystems

(Outline of Measures and Policies)

In 2005, the Invasive Alien Species Act was enacted as part of measures to control alien species that disturb ecosystems. Under the Act, import restrictions and controls are placed on designated species. We are seeking solutions to the issue of adverse effects caused by alien species in areas having indigenous ecosystems such as island areas, as well as the issue of invasive alien species unintentionally introduced into the country as a consequence not being detected in adhering to imported materials, animals or plants.

The Cartagena Protocol on Biosafety to the Convention on Biological Diversity (adopted in 2000) came into force in Japan, when the domestic law titled the “Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms (Cartagena Act)” for implementing the protocol was enforced in 2004. In accordance with this act, efforts to secure biodiversity have been promoted, such as assessing the risk of living modified organisms (LMOs) preliminarily to avoid adverse effects on biodiversity. We will continue making such efforts for proper enforcement of the act by utilizing the latest knowledge.

We also need to pay attention to the potential impacts of such non-biological factors as chemical substances or artificial light on ecosystems. Regarding the measures for handling chemical substances from the perspective of conserving ecosystems, significant progress has been made by introducing new rules. For example, the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. was revised in 2003, with the toxicity of each specified chemical substance to flora and fauna being evaluated. A water environmental quality standard has also introduced criteria concerning the conservation of aquatic organisms. It is necessary to continue to promote such measures.

3.1 Alien species and living modified organisms (LMOs)

Through enforcement of the Invasive Alien Species Act, a total of 97 types have been designated as Invasive Alien Species (IAS) as of February 2010. As a result, certain progress has been observed regarding the status of restricted importing or breeding of IAS that has adverse effects on ecosystems.

We have been promoting projects for controlling IAS in priority areas that play an important role in nature conservation, such as control of the small Indian mongoose on the island of Amami-Oshima and in the Yanbaru region of the main island of Okinawa where endemic rare species such as the Amami rabbit and Okinawa rail live. These measures have achieved some positive results, but such impact mitigation measures must be continually implemented. Regarding countermeasures against raccoons and the largemouth bass, control methods are being established for use by local governments. Moreover, new control methods are also being developed to improve the

effectiveness of controlling the largemouth bass. Efforts to raise public awareness about the proper handling of alien species including pets, and promoting a better understanding of the issues posed by alien species are also being made through the use of websites.

As for countermeasures against alien species in areas having indigenous ecosystems such as islands, the Natural Parks Law and the Nature Conservation Law were revised in June 2009 to strengthen regulation over the release of animals and plants that could cause damage to ecosystems. Alien species such as wild boars and goats on the Ogasawara Islands and fleaworts in national parks are now being eliminated.

Regarding imported plants used for greening, the relevant ministries and agencies are making joint efforts to clarify related problems for ensuring the proper use of such plants without damaging biodiversity in the area concerned. It is thus necessary to continue collecting information on potential impacts, in order to determine future directions.

Diverse river environments provide habitats for a variety of living creatures. Rivers are important places for conserving biodiversity, as there are many indigenous species which have unique characteristics adapting to river environments. It is therefore important to address the issue of invasive alien species in rivers, and in this light, we have established the “Plan for the Implementation of Alien Species Control Measures in Rivers (Draft)” (2001), as well as the “Basic Idea and Examples of Alien Species Control Measures in Rivers” (2003) and “Basic Idea and Examples of Alien Species Control Measures in Rivers (Revised Edition)” (2008)—both of which summarize basic information on invasive alien species and cite examples of measures introduced nationwide. These documents are used as reference materials by the local authorities directly responsible for implementing the measures.

Given the increased trade activities and exchanges with foreign countries, there are more opportunities for invasive alien species to unintentionally enter the country as a consequence of collateral entry together with imported materials, for example. It is therefore necessary to establish measures to prevent such entry of invasive alien species and prevent them from adversely affecting domestic ecosystems. For example, ballast water discharged from ships is one possible pathway for the entry of aquatic invasive alien species, which could proliferate and destroy ecosystems in oceanic or coastal areas or damage fishery activities. In this regard, the International Convention for the Control and Management of Ships’ Ballast Water and Sediments (Ballast Water Convention) was adopted by the International Maritime Organization (IMO) in February 2004. It is necessary for Japan to assist efforts for the effectuation of this Convention.

Through proper enforcement of the Cartagena Act, efforts to prevent the adverse

effects of LMOs on biodiversity have been promoted, including the introduction of preliminary risk assessment of LMOs. The Cartagena Act had been in force for five years as of 2009, and The Sub-committee on Genetically Modified Organisms of the Central Environment Council of the Central Environment Council examined the state of implementing that act. The results showed that the legal framework requires no modification, and that improvements should be discussed regarding methods of implementation and sharing information. In response to these examination results regarding the state of implementation of the act, the government will examine information used in assessment in fields where experience in risk assessment on biodiversity has been accumulated. Since various gene recombination technologies have been developed and are in the process of utilization, it is necessary to discuss reliable methods of assessing the risk on biodiversity preliminarily based on the latest knowledge.

Public awareness of the Cartagena Act and an understanding of LMOs are also insufficient, as unapproved genetically-modified aquarium fish were seen in the domestic market, for instance. Therefore, it is necessary to promote education and publicity activities by utilizing websites and providing information to relevant organizations.

(Specific Measures and Policies)

[IAS Invasive alien species]

- Through proper enforcement of the Invasive Alien Species Act, which provides for restrictions on the importing and breeding of designated invasive alien species, the government will ensure prevention of their adverse effects on agricultural, forestry and fishery activities, and ecosystems, and also promote raising public awareness about the handling of alien species. (MOE, MAFF, MEXT)
- The year 2010 marks five years since the Invasive Alien Species Act was enacted. The government will review the state of implementation and will take necessary measures as required. (MOE, MAFF)
- Mainly in priority areas that play an important role in conserving nature, such as the habitats of endangered species, national parks and protected forests, the government will promote alien species control projects, including one for the small Indian mongoose that threatens rare species on the island of Amami-Oshima. The government plans to eliminate the mongoose there by FY 2014. The government will also study control methods for respective invasive alien species, including raccoons and the largemouth bass, so that effective methods can be employed in control projects carried out by local governments. (MOE, MAFF) [Cited in Chapter 1, Section 9, 1.5]
- The government will support local efforts backed by the Biodiversity Conservation

Promotion Support Project, and implement Special Conservation Activities for Commercial Use of National Parks and Natural Environment (Green Worker Project) in national parks to promote effective measures against alien species. (MOE)

- The government will develop effective methods of controlling invasive alien fish with the goal of preventing fishery damage. (MAFF)
- The government will establish and implement measures for preventing invasive alien species from adversely affecting island areas having indigenous ecosystems, such as the Ogasawara Islands and the Nansei Islands. (MOE, MAFF) [Cited in Chapter 1, Section 9, 1.5]
- The government will promote deliberations on the desirable management of invasive alien plants used for greening, by establishing a basic management policy on alien plants used for greening in national parks and urban parks, as well as on the slopes along roads. (MOE, MAFF, MLIT)
- The government will collect data on the impacts on ecosystems by invasive alien plants such as alien grass used for greening. With the aim of promoting the use of native species for greening, the government will also promote fact-finding surveys on the genetic diversity of native plants used for greening. (MOE)
- The recent and rapid expansion of the habitat ranges of such invasive alien species as bur cucumber in rivers poses a serious problem in some rivers. The government will further promote countermeasures against invasive alien species in rivers as well as research on invasive alien plants and fish, in order to establish effective measures. (MLIT)
- The government will establish and implement invasion prevention measures such as preparing a manual for identifying such alien species for preventing the impacts of alien species like the insects, unintentionally introduced into the country, adhering to an imported material, animal or plant. (MOE)
- As for alien species introduced from other areas within Japan, the government will promote proper implementation of the Natural Parks Law and Nature Conservation Law, prevention measures in important areas for conserving biodiversity, and the proper management of animals for breeding purposes. (MOE)
- A study on the impact of *Batrachochytrium dendrobatidis* on ecosystems in Japan identified this fungus (pathogen), taken from amphibians in the wild, having various DNA haplotypes. No deaths of amphibians in the wild caused by *B.dendrobatidis* were confirmed, however. The government will publicize and disseminate information about alien species unintentionally introduced into the country, along with these results by utilizing websites. (MOE)
- Japan will continue to actively participate in discussions at the International Maritime Organization (IMO) toward the effectuation of the Ballast Water Convention. (MLIT, MOE, MOFA) [Cited in Chapter 1, Section 9, 5.1, and Chapter 2, Section 4, 2.9]

[LMOs]

- Through proper enforcement of the Cartagena Act, the government will promote efforts to secure biodiversity and prevent LMOs from adversely affecting biodiversity. (MOF, MEXT, MHLW, MAFF, METI, MOE)
- The government will promote the accumulation of scientific knowledge contributive to effective enforcement of the Cartagena Act, and develop an effective method of assessing the risk on biodiversity based on the latest knowledge. (MOF, MEXT, MHLW, MAFF, METI, MOE)
- The government will promote education and publicity regarding the Cartagena Act and public understanding of LMOs, by utilizing websites to disclose information on the content and status of enforcement of the act, and relevant scientific knowledge. (MOF, MEXT, MHLW, MAFF, METI, MOE)

3.2 Non-biological factors including chemical substances**(Current Situation and Challenges)**

The Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. mandates that each specified chemical substance must be evaluated regarding its toxicity to flora and fauna when taking the impact on ecosystems into consideration, in addition to the conventional perspective of protecting human health. In order to prevent adverse effects on humans, flora and fauna by implementing comprehensive chemical controls, measures for safety assessment of chemicals were revised in amending the law in May 2009. In the PRTR Act, the government selected target substances in considering the impact on ecosystems, and has taken such measures as Pollutant Release and Transfer Register (PRTR) and Material Safety Data Sheet (MSDS). In November 2008, target substances were reviewed based on new information regarding the hazards of chemical substances and other information. The primary issues are proper implementation of these laws and promotion of measures against chemical substances, from the standpoint of properly investigating, evaluating and managing the impact of various chemicals on ecosystems.

In the meanwhile, it has been pointed out that abnormal reproductive functions of wildlife observed in various places in the world could be associated with exposure to chemical substances and the endocrine-disrupting effects of chemical substances has been highlighted as the mechanisms causing such abnormality. It is important to be aware of any occurrence of an extraordinary event associated with wildlife, including endocrine disruption, during the course of promoting sound management of chemicals with a view to protecting ecosystems.

As part of the environmental quality standards for water pollution pursuant to the Basic Environment Law, water quality standards for the conservation of aquatic organisms are established under the scheme of the water category determined

according to the inhabitation conditions of aquatic organisms in each water area classified as “Organism A,” “Organism B,” etc. based on such criteria as the inhabitation conditions of aquatic organisms (e.g., water quality, water temperature) and conditions of their egg-laying sites. Standard values are established (for each category) and the work to classify each water area is underway. In November 2003, the standard for total zinc (zinc and its compounds) was established, and in November 2007, the classifications of four water areas were made for the first time. A stricter emission standard for zinc was also introduced under the Water Pollution Prevention Law (since December 2006). The remaining water areas (10 rivers and lakes, and 9 sea areas) must be classified in succession, and water quality standards regarding chemical substances following zinc need to be established.

In accordance with water quality standards established for the conservation of aquatic organisms, environmental management measures should also be established to maintain or reach standard values. It is also necessary to monitor public waters regularly to check compliance with environmental quality standards.

We constantly assess river environments to confirm the status of dioxins designated under the Law Concerning Special Measures against Dioxins as substances suspected of causing endocrine disruption (i.e., endocrine-disrupting chemicals).

With regard to agricultural chemicals from the perspective of conserving ecosystems, the Standards to Withhold Registration for Prevention of Damages to Aquatic Animals and Plants were revised and enacted in April 2005 for agricultural chemicals under the Agricultural Chemicals Regulation Law. The revised standards have been enhanced, mandating that risk assessment be conducted for algae, crustaceans and fish, unlike the previous standard under which only the toxicity to fish was assessed. It is necessary to ensure that revised standards are set for each agricultural chemical, with the scope of ecological risk assessment and management also being expanded to cover terrestrial ecosystems.

In order to raise public awareness of light pollution and promote control measures, the “Guidelines for Light Pollution” have been established to promote education for local governments, businesses and citizens. The Guidelines explain the impacts of artificial light on diverse living organisms including photopositive species such as moths, photonegative species such as fireflies, and nocturnal species including nocturnal mammals, and also describe the basic policy on control measures.

(Specific Measures and Policies)

- Based on the revised Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. enacted in May 2009, manufacturers and importers who deal with any kind of chemical substance in amounts exceeding a certain volume shall be required each year to report the quantities manufactured and imported during the

previous year. They shall also be required to submit hazard information as necessary. Through these measures, The government will steadily evaluate the safety of chemicals in considering the effects on ecosystems. The government will also develop a preliminary testing method for birds in order to identify any danger of long-term toxicity in predator animals at higher trophic level, as well as Quantitative Structure-Activity Relationships (QSARs) used to predict ecotoxicity based on chemical structural formulas and physical/chemical properties. (MOE)

- From the standpoints of promoting improved voluntary management of chemical substances by manufacturers and preventing any impediments in environment protection, the government will aggregate and publish the released volumes of chemical substances that may be hazardous to human health and ecosystems, and the volumes of those transferred from manufacturers. (MOE, METI)
- The government conducts surveys to determine the persistency of chemical substances in diverse media including surface water, bottom sediment, aquatic wildlife (bivalves, fish and birds) and air, and will continue conducting initial environmental risk assessments to screen chemical substances that may pose relatively high environmental risks, including from the standpoint of ecological impact. As of February 2010, a total of 250 chemical substances have been subjected to initial environmental risk assessment from the standpoint of ecological impact. (MOE, MAFF)
- As part of efforts to address the issue of endocrine-disrupting effects of chemical substances, the government will promote field surveys undertaken by specialists and basic studies to understand related mechanisms. It will also contribute to international standardization of OECD test guidelines on an ongoing basis. The government will also promote continuous wildlife observation by supporting existing regional activities such as nature observation activities. (MOE)
- Regarding the water quality standard for the conservation of aquatic organisms, the government will collect and organize information on water areas for which it has yet to designate a type, submit that data for deliberations by the Special Committee for the Type Designation of Environmental Standards for the Conservation of Aquatic Life, and examine the areas for designating a type. (MOE) [Cited in Chapter 1, Section 8, 2.1.1]
- By announcing “Prefectural Standards for Water Category Designation” (June 2006), the government will disseminate matters related to prefectural standards for water category designation. (MOE) [Cited in Chapter 1, Section 8, 2.1.1]
- Regarding the water quality standard for the conservation of aquatic organisms, the government will review necessary scientific knowledge about substances considered highly toxic and promote toxicity assessment. (MOE) [Cited in Chapter 1, Section 8, 2.1.1]

- In accordance with the settings established by the environmental water quality standard for conserving aquatic life, the government will implement necessary environmental management measures and policies to maintain and achieve the settings such as for effluent control, and will always monitor compliance with said environmental water quality standard in public waters. (MOE) [Cited in Chapter 1, Section 8, 2.1.1]
- In targeting the dioxins designated as substances suspected of causing endocrine-disrupting effects under the Law Concerning Special Measures against Dioxins, the government will continue to conduct monitoring surveys on each dioxin in accordance with the “Monitoring Results of Endocrine Disruptors in a Water Environment” (December 2002) and the “Manual for Monitoring of Dioxins in Rivers and Lakes (draft).” It will also promote measures for bottom sediment in polluted rivers, in accordance with the “Basic Policy on Control of Dioxins in Bottom Sediment” (July 2007), the “Technical Report on Control of Dioxins in Bottom Sediment (Draft)” (April 2007), and the “Manual for countermeasures for dioxins in bottom sediment of rivers/lakes and marshes (draft).” (revised in April 2008).
- In accordance with the Agricultural Chemicals Regulation Law, the government will establish the Standards to Withhold Registration for Prevention of Damages to Aquatic Animals and Plants for each agricultural chemical. (MOE) [Cited in Chapter 1, Section 6, 1.1]
- The government will establish methods of risk assessment and management of agricultural chemicals to mitigate impacts on terrestrial ecosystems. (MOE) [Cited in Chapter 1, Section 6, 1.1]
- In order to conserve and secure biodiversity in farmland and the surrounding environments, The government will develop methods of evaluating impacts of agricultural chemicals on biodiversity . (MOE) [Cited in Chapter 1, Section 6, 1.1]
- The government will promote efforts to raise public awareness of the Guidelines for Light Pollution so that proper measures pursuant to the guidelines will be implemented. (MOE)
- Since the contents of the Guidelines for Light Pollution are to be reviewed and revised as necessary to reflect any progress made in lighting technologies, the government will periodically review the guidelines for further improvement. (MOE)

4 Welfare and proper management of animals

(Outline of Measures and Policies)

From the perspective of how pets influence biodiversity, it is important to ensure the proper management of pets to avoid adversely affecting native ecosystems when pets interact with the natural environment. Also, the breeding of wild animals that are not domesticated should be restricted, because it is generally difficult to keep such

animals in a way that respects their instincts, behavior, physiology and ecology. Moreover, the attitude toward protecting animals—basically meaning that we should never kill, hurt or torture animals, and give them proper care while respecting their behavior—contributes to developing in people such feelings as a respect for life and friendship toward realizing a harmonious society between animals and humans, as well as conserving biodiversity.

The Act on Welfare and Management of Animals was revised in 2005 to clarify the responsibility of the Minister of the Environment to establish fundamental principles for comprehensively promoting measures for the welfare and management of animals, as well as to introduce new rules including a registration system for businesses that handle animals such as pet shops, a nationwide unification of restrictions on the breeding of specified (dangerous) animals, and special considerations for using animals in scientific projects.

The Act on Ensuring of Safety of Pet Animals Feed was enacted in 2009, establishing controls on the manufacture, import and sales of pet feed to protect the health of pet animals and contribute to animal care.

In accordance with these Acts and the basic guidelines established in 2006, we will ensure the comprehensive implementation of measures for the appropriate welfare and proper management of animals.

4.1 Promoting the appropriate care of pets

(Current Situation and Challenges)

There has been growing public interest in such pets as dogs and cats recently in Japan, and about 40% of Japan's total population keeps a pet (as of 2008). Under this situation, certain problems have emerged, such as the improper management of pets by immoral pet shops or irresponsible pet owners, as well as adverse impacts on natural ecosystems by abandoned or escaped animals that become wild and prey on native species.

Although the number of dogs and cats seized and taken into custody at prefectural or municipal facilities of designated or core cities has declined significantly, it still remains at about 340,000 animals a year (as of fiscal 2007), of which about 89% are eventually destroyed. It is hoped that such a deplorable situation will be addressed.

(Specific Measures and Policies)

- The government will make efforts to disseminate the importance of properly caring for pet animals with knowledge regarding the value of life, and attention given to the physiology, habits and biology of the pet. The government will inform citizens about such prohibited acts as abandoning pets and cruelty to animals. It will also request businesses that handle animals to install a signboard and give customers sufficient

information about the characteristics and condition of animals for sale, with the aim of further ensuring appropriate business operation. As for lab animals and animals used for breeding purposes, the Act shall be adequately implemented and promoted in terms of preventing such animals from escaping. (MOE)

- The government seeks to reduce the number of dogs and cats taken into custody at prefectural facilities, etc. from about 420,000 in FY 2004 to about half that number by 2017, through efforts to promote spaying and neutering for curtailing excessive population growth, and encourage people to take lifelong care of their pets and not carelessly decide to keep a pet. The government also seeks to reduce the ratio of seized animals that are destroyed, through encouraging efforts to find new owners. (MOE)

4.2 Promoting ownership identification

(Current Situation and Challenges)

Implementing measures to identify the owners of pets would help prevent stolen or stray pets, as well as the number of pets that are abandoned, lost or escaped, since such measures would clarify the responsibilities of pet owners and enhance their attitude as pet owners. However, as of the end of FY 2008, only about 54% of all dog owners and 32% of cat owners in the country have been identified. And among the many stray pets being seized one after another, many are assumed to be abandoned or to have escaped from unknown owners.

(Specific Measures and policies)

- The government seeks to double the number of identified dog and cat owners by FY 2017 from the numbers in FY 2003 (33% of dog owners, 18% of cat owners) through efforts for raising public understanding regarding the need for ownership identification. In cooperation with local governments and relevant organizations, the central government will also improve the infrastructure for ownership identification, through the unified data management of pet owners and the proliferation of ownership identification technologies, especially implanted microchips and the deployment of microchip readers. (MOE)

4.3 Comprehensive educational measures

(Current Situation and Challenges)

In order to promote the proper welfare and management of animals, it is important to secure widespread public understanding and knowledge about the significance of preventing cruelty to animals and ensuring proper care such as feeding, since such understanding currently remains insufficient. It has been pointed out that contact with animals and the experience of taking good care of a pet can help develop in people such

feelings as a respect for life and friendship. In this regard, it is necessary to take advantage of various opportunities to promote education and publicity in cooperation with the central and local governments, veterinarian associations, industrial organizations, groups dedicated to animal welfare, and consumer groups.

(Specific Measures and Policies)

- The central and local governments will cooperate with relevant organizations to conduct various educational and publicity activities concerning the appropriate welfare, proper management and health of animals, and the safety of pet foods, including the “Be-kind-to-animals Week” program, seminars on the proper care of pets, and the distribution of various informative or publicity materials, etc. The government will also promote the development of regional human resources such as those devoted to animal protection. Moreover, it will conduct a variety of research on an ongoing basis regarding the raising and breeding of animals, and make use of the research results in formulating measures and raising awareness about the proper care of animals. (MOE)

Section 2 Sustainable Use of Genetic Resources (Basic Concepts)

In everyday living, we depend on various bioresources in diverse ways, including the use of crops and marine resources for food, wood for building or furniture materials, cotton and wool for clothing fibers, as well as crude drugs in the medical field, natural pigments in the industrial field, and coal in the energy field. Given the recent progress made in biotechnology, the usefulness and value of bioresources have also been enhanced, such as benefiting us from the mass production of pharmaceutical products such as human insulin and the development of pest-resistant corn.

The use of alternative resources such as bioethanol and biomass plastics to replace petroleum products has also been promoted. Bioresources are also known as being useful for environmental conservation. For example, microorganisms and plants are effectively used to restore the environment (through bioremediation and phytoremediation), and living creatures surviving under extreme conditions such as a deep seafloor have been found to have a novel function of purifying the environment. Thus, attention is being paid to the importance of exploring, cultivating and preserving bioresources.

Due to the global trend of climate change, deteriorated environmental conditions through human development activities, the rapid destruction of tropical rain forests and accelerating desertification, we see diverse genetic resources being depleted or facing a crisis of extinction. Under such circumstances, it is getting increasingly important to collect and conserve genetic resources as the source of useful bioresources, hand those resources over to the next generation and ensure sustainable use. Thanks to the progress made in science and technology including biotechnology, biodiversity now offers greater potential, possibly enabling the development of new pharmaceutical products or foods essential to the survival of humankind or addressing environmental problems on planet Earth. In order to maximize such potential and maintain it for a long time in the future, ecological diversity, biological diversity and genetic diversity should be respectively maintained, and the sustainable use of bioresources promoted, by considering the potential impacts of biotechnology on biological diversity as well as the risk factors affecting safety.

With regard to the diversity of genetic resources, not only its usefulness for the economy but also its significant role in forming a local unique climate for our cultural assets should be well understood. In Japan, for example, there are various kinds of locally produced *miso* that uses *koji* (mold used as a starter for fermentation in sake and soy sauce production) indigenous to specific regions. In other words, the efforts being made to conserve diverse genetic resources not limited to those useful for our economy today can be interpreted as efforts to hand over various possibilities for utilizing genetic resources to future generations.

How to secure fair and balanced accessibility to genetic resources, and share consequential benefits are being discussed at the Conferences of the Parties to the Convention on Biological Diversity and other conferences. It is important to secure steady access to genetic resources and share benefits (Access and Benefit-Sharing: ABS), in order to conserve biodiversity and ensure its sustainable use.

1 Use and conservation of genetic resources

(Outline of Measures and Policies)

Through various efforts, we already use genetic resources in such fields as medical care and food production to commercialize diverse products. Such efforts include the genome project of deciphering the base sequence of genomes for diverse living creatures, as well as projects for isolating useful genes to clarify their functions and developing technology to use those genes. The genetic resources of animals and plants adaptable to diverse environments are essential for developing novel varieties resistant to pests or environmental stress. Through the use of science and technology including biotechnology, genetic resources are all the more contributive to solving various problems in the fields of food, environment and energy. Collecting and accumulating genetic information and knowledge about their functions are thus important to promote research for such solutions.

It is also possible, however, that releasing genetically modified organisms (GMOs) into the natural environment will adversely affect biodiversity, making it necessary to assess preliminary impact and other effects in accordance with the Cartagena Law.

It is important to raise public understanding about the usefulness of biotechnology and the need to secure safety, in order to promote the sustainable use of bioresources. As general consumers have become more concerned about the safety of food and environmental protection, it is even more important to ensure public understanding. Therefore, it is essential to promote active educational and publicity activities, such as releasing scientific knowledge on the impact of biotechnology on biodiversity and the risk factors affecting safety.

It has been decided to complete the procedures for formulating and negotiating an international framework for ABS as soon as possible before COP10 is convened in Nagoya, Aichi Prefecture, in October 2010.

Discussions are now underway among the nations involved in accordance with the Convention on Biological Diversity. As the host country of COP10, Japan must exhibit leadership to promote discussions.

In order to contribute to the conservation of biodiversity and its sustainable use, the Japanese government, in cooperation with relevant government ministries and agencies, will formulate a framework that secures easy access to genetic resources, and contributes to a fair and balanced distribution of benefits from using such resources,

based on the utilization status of genetic resources at a global level.

As for the use of genetically modified organisms, the main agenda of COP-MOP5, which will be held prior to COP10, concerns the rules and procedures regarding liability and redress for damage resulting from transboundary movement of living modified organisms. Japan will join the deliberations as chair to the meeting and work to ensure that the end result is something that all the countries, each with their own stances on the issue of genetically modified organisms, may implement.

1.1 Use of genetic resources

1.1.1 Use of genetic resources in the medical field

(Current Situation and Challenges)

Today, quite a few pharmaceutical products in the market are based on gene recombination technology. It is thus necessary to secure good quality, efficacy and safety of these products, like other general pharmaceutical products. The Ministry of Health, Labour and Welfare is now testing the safety of recombinant organisms and the quality of final products, preventing the dissemination thereof when any pharmaceutical products are produced based on gene recombination technology, and promoting measures to secure the efficacy, safety and good quality of those pharmaceutical products.

(Specific Measures and Policies)

- The government will continue making efforts to prevent the release of GMOs into the natural environment and secure the quality, efficacy and safety of pharmaceutical products derived from gene recombination technology. (MHLW)
- The Research Center for Medicinal Plant Resources, National Institute of Biomedical Innovation (a MHLW-affiliated organization) actively collects and conserves medicinal plants, and also implements various research projects, including research on technologies needed for cultivating or breeding medicinal plants, chemical and biological evaluations of the effective ingredients in medicinal plants and foreign-born phytogenic resources to realize utilization in Japan, as well as research on the tissue culture of medicinal plants. (MHLW)

1.1.2 Use of genetic resources in the fields of agriculture, forestry and fishery

(Current Situation and Challenges)

In Japan, various genome sequencing projects have been conducted targeting plants, animals and insects, along with projects to isolate useful genes and clarify their functions, and develop technology to utilize those genes. In particular, Japan takes the initiative in promoting genome research on rice, thereby helping to establish the groundwork to support other research activities for crops including major grain crops. A

genome sequencing project conducted by an international consortium was successfully completed in 2004, resulting in full sequencing of the rice genome (about a 370-megabase genome sequence). Japan has contributed about 55% to all sequencing work. Regarding the projects to isolate useful genes and clarify their functions, about 120 genes have been successfully isolated (as of the end of March 2009) and identified as having useful functions in agricultural solutions, such as enhancing resistance to rice blast disease.

It is necessary to further promote projects to isolate useful genes and clarify their functions, and also utilize project achievements effectively to promote the breeding of completely new crop varieties that could help solve problems in the fields of food, environment and energy, and also create new businesses. For example, such varieties are expected to offer super high yields (thereby reducing production costs), higher resistance to pests (allowing us to stop using agricultural chemicals), and could be usable as energy resources. It is also necessary to ensure the sustainable use of genetic resources that are important constituents of biodiversity.

(Specific Measures and Policies)

- The government will promote projects for isolating genes that could be used to solve existing problems in the fields of food, environment and energy, as well as projects for identifying the genetic map locations of those genes and analyzing their functions. (MAFF)
- The government will promote the development of technology to maximize the use of isolated useful genes by controlling their functions. For example, the government seeks novel technologies that would make it possible to inject a gene into a desired location on a chromosome, control the expression of injected genes, or transform such crops as sorghum usable into biomass. (MAFF)
- The government will promote projects to identify and analyze agriculturally useful genetic characteristics, use such those needed to develop novel crops with super high yields or environmental resistance, for instance, thereby helping to solve existing problems in the fields of food, environment and energy. It also seeks to establish technologies for producing useful substances by using the genomic information of animals or insects, and for creating new businesses. (MAFF)
- Regarding genetic resources useful for agricultural, forestry and fishery activities, the government will promote the use of such resources for research or technology development through industry-academia-government collaboration. (MAFF)

1.1.3 Use of genetic resources for foods

(Current Situation and Challenges)

Foods and food additives derived from recombinant DNA technology (hereinafter

“genetically modified foods” or “GMFs”) must meet standards prescribed by the Food Sanitation Law, and since April 2001, GMFs have been examined for safety as a legal requirement. Accordingly, any GMF or food using GMF as an ingredient may not be imported or marketed in Japan unless officially certified through a safety examination without problems. As of March 2010, a total of 108 items of foods (including soybeans and corn) and 14 additives have undergone safety examination in Japan and been confirmed as having no adverse effects on the health of human beings from the current scientific point of view.

(Specific Measures and Policies)

- The government will continue to have relevant organizations assess the safety of GMFs from time to time, and also revise assessment methods as needed to respond to the progress made in gene recombination technology. (MHLW)
- In order to secure the safety of GMFs, the government will continue making efforts to establish reliable testing methods to detect GMFs, and also promote surveys and studies on the safety assessment results of foreign-developed GMOs. (MHLW)
- For the FAO/WHO-Joint Food Standard Plan (by the Codex Ad Hoc Intergovernmental Task Force on Foods Derived from Biotechnology), deliberations were made on the safety assessment policy for foods derived from genetically modified animals or nutrition/health-conscious genetically modified plants, and for imported foods containing minute quantities of genetically modified plants approved by the exporting country’s authority, but not by the importing country’s authority. Thus, guidelines for assessing the safety of foods derived from genetically modified animals were adapted by the 2009 Codex session. (MHLW)

1.1.4 Use of genetic resources in industrial fields

(Current Situation and Challenges)

With growing concerns over the environmental impact of soaring oil prices and emissions of greenhouse gases such as carbon dioxide, we seek environmentally sound manufacturing and waste treatment practices that could be achieved by developing technology using bioresources of low environmental load. That’s why we are working to establish an environment-friendly, recycle-oriented industrial system by developing fundamental technologies by using the biological functions of genetic resources.

(Specific Measures and Policies)

- The government will promote the development of phytogenic industrial materials and fundamental technologies to produce useful substances such as high value-added protein, and establish the infrastructure for manufacturing based on phytogenic functions. (METI)

- The government will develop a highly efficient process for manufacturing useful substances by using microorganisms and fundamental technologies for biological reactions. At the same time, it will promote improvements in environmentally-sound techniques for the biological treatment of effluents and wastes by using microorganisms. (METI)

1.1.5 Use of genetic resources for research

(Current Situation and Challenges)

Genetic resources are used for research and development projects in the fields of life sciences. Those genetic resources include mice and genetic samples used in animal experiments, as well as human or animal genes and standardized test samples of cells used to analyze genetic or biological functions. Properly collecting and conserving genetic resources for availability in research activities is essential for promoting research and development in the fields of life sciences.

Following successful completion of the project for sequencing the human genome in April 2003 and with the recent rapid progress made in other sequencing projects on diverse organisms, international competition in post-genome research is intensifying, thus making the importance of genetic resources even more significant.

(Specific Measures and Policies)

- In the National Bio Resource Project that began in 2002, based on the Third-Period Science and Technology Basic Plan (adapted by the Cabinet in March 2006) intended to raise the level of our country's intellectual fundamentals to among the highest in the world by 2010, and on an international perspective, the government will make efforts to organize systems to continuously collect, store and provide information on strategically important genetic resources that need to be organized. (MEXT)

1.2 Conservation of genetic resources

1.2.1 Conservation of genetic resources in the medical field

(Current Situation and Challenges)

Medicinal plants are precious assets that our ancestors found in the natural world and passed onto to us. Given the wide variety of plants in the world, it is believed that many species with potential medicinal value have yet to be found. It is therefore necessary to collect and conserve medicinal plants, and accumulate knowledge thereof, for effectively use when necessary and also to pass on such plants to future generations.

Genetic information and the genetic resources of animals and pathogenic microbes are also important for therapeutic research.

(Specific Measures and Policies)

- The National Institute of Biomedical Innovation (NIBIO) includes its Gene Bank, Cell Bank, Small Experimental Animals Bank, the Research Center for Medicinal Plant Resources and the Tsukuba Primate Research Center. NIBIO will continue providing bioresources to researchers, in cooperation with the Japan Health Sciences Foundation (HS Foundation). (MHLW)
- As a master bank, NIBIO collects and standardizes bioresources, prepares stocks and delivers samples to the HS Foundation, which then cultures and delivers samples to research institutes by taking necessary procedures. NIBIO's Gene Bank collects the DNA of the crab-eating monkey—a model primate for human diseases—as a research resource, and provides that DNA to researchers. NIBIO's Cell Bank collects the cell cultures of mice, etc., for standardization (i.e., verifying purity and quality by testing for microbial contaminations and cross-culture contamination), and then provides those cultures to researchers. NIBIO's Small Experimental Animals Bank actively collects and keeps test animals including novel disease-model animals, while ensuring the maintenance of strains and a stable supply of these bioresources, and also releasing relevant information. NIBIO will continue supplying such bioresources to researchers. (MHLW)
- From the perspective of the sustainable use of medicinal plants, NIBIO's Research Center for Medicinal Plant Resources is dedicated to conserving genetic resources through the low-temperature preservation of seeds. In order to collect and secure the genetic resources of medicinal plants, the Research Center also sends a list of seeds to foreign botanical gardens and research institutes (395 organizations in 61 countries worldwide as of FY 2008), and promotes seed exchange as required. (MHLW)
- The National Institute of Infectious Diseases (NIID) will continue promoting the collection and conservation of pathogenic microbes required for monitoring and researching infectious diseases, and information exchanges with relevant research institutes inside and outside the country. (MHLW)

1.2.2 Conservation of genetic resources in the fields of agriculture, forestry and fishery

(Current Situation and Challenges)

Today, through such human development activities as reckless tropical deforestation and agricultural modernization, biological genetic resources are facing an increased danger of extinction. The Convention on Biological Diversity also reaffirms that states have sovereign rights over their own genetic resources, consequently making it difficult for us to collect genetic resources from abroad, including in developing countries. Under such circumstances, from the perspective of conserving biodiversity, it is important to collect, conserve and hand over rare genetic resources to the next generation, while promoting effective utilization.

In this light, the Ministry of Agriculture, Forestry and Fisheries launched the Genebank Project in 1985. The National Institute of Agrobiological Sciences (NIAS) is now positioned as the central bank (in the fields of plants, animals and microorganisms), under which sub banks (consisting of five independent administrative institutions) are engaged in search, collection, classification, identification, characteristics assessment, multiplication and conservation operations regarding genetic resources inside and outside the country. In the forestry and fishery fields, operations are being managed by the Forestry and Forest Products Research Institute (FFPRI) and the Fisheries Research Agency (FRA). Thus, Genebank operations in the fields of plants, animals, microorganisms, DNA, forest trees and fishery are underway. Through the project, the banks now have a huge collection of genetic resources, including 240,000 phytogenic accessions in the fields of food and agriculture, and the entire collection under this project is among the world's largest. Those genetic resources are distributed as research samples to researchers, with information on collected and conserved resources being made available; thus, the project greatly contributes to the development of new crop varieties. We are planning to further promote this Genebank Project, by collecting and receiving more genetic resources to improve our intellectual infrastructure to support research and development activities in biotechnology and related pursuits.

(Specific Measures and Policies)

- The government will enhance efforts to collect, conserve and characterize genetic resources to be provided to breeders, develop new varieties, seek improved efficiency in conservation by using cryopreservation technology, and promote assistance for research activities by distributing research materials. (MAFF)
- In response to growing demand for the protection of forests for landscapes, the government will promote the collection and conservation of forest genetic resources, and the development of new tree varieties in order to secure good and necessary seeds and seedlings. (MAFF)
- The government aims to increase the collection of phytogenic resources, from 240,000 (as of the end of FY 2006) to 250,000 (by FY 2010). (MAFF)
- As part of the Genebank Project, the government will conduct international collaborative research projects for conserving diversity and ensuring the proper use of genetic resources in developing countries having a high risk of genetic erosion. It will also contribute to conserving biodiversity through financial support for FAO and JICA projects. (MAFF, MOFA)

1.2.3 Efforts in the fields of science and technology

(Current Situation and Challenges)

The proper conservation and use of biological genetic resources are essential to

promoting and developing life sciences research. This is clearly explained in the report titled “Strategic Promotion of Science and Technology Policy - Life Science Field” (issued in March 2006 by the Council for Science and Technology Policy). We will promote strategic improvements in collecting biological genetic resources, in order to establish the world’s best collection by 2010 and promote its effective utilization.

(Specific Measures and Policies)

- In the National BioResource Project, among bioresources such as lab animals (e.g., mice) and various cells, the government will make efforts to organize systems to continuously collect, store and provide bioresources whose organization is strategically important. (MEXT)
- The Center for Genetic Resource Information, National Institute of Genetics, Research Organization of Information and Systems, will continue making efforts to improve a database on the locations of wide-ranging, diverse genetic resources. The RIKEN BioResource Center was also established. Moreover, the “National Bio Resource Project” was started by MEXT in 2001 to make ongoing efforts to improve the systems for collecting, conserving and making bioresources available, including experimental mouse and thale cress models, microorganisms, genetic materials and cultured cells. (MEXT)
- As part of efforts for the “National Bio Resource Project” conducted by MEXT, the government will improve the systems for collecting, conserving and making available the cultures of microorganisms used in basic research and genes at the world highest level. (MEXT)

1.2.4 Conservation of genetic resources in the environmental field [Cited in Chapter 2, Section 4, 3.5]

(Current Situation and Challenges)

In preparing for any environmental problems arising in the future, it is essential to properly conserve the current global environmental status and promote the systematic collection and accumulation of environmental samples (e.g., soil, biological specimens), since such preparations would allow us to better analyze or evaluate such samples in the future when more advanced technologies make it possible. It is also important to pay attention to endangered wildlife as the list of endangered species is constantly expanding due to an increasingly contaminated environment or climate change, and we will conserve their cells and genetic information, while striving to restore extinct species in the future when more advanced technologies make it possible.

The genetic resources of plants can be preserved in the form of seeds. Shinjuku Gyoen National Garden will preserve the seeds of endangered plants. The Garden will preserve varieties that include the orchid that was bred there, and other traditional

ones such as cherries and chrysanthemums handed down from the era when it was still called Koshitsu Gyochi. It is thus necessary to strengthen efforts to utilize accumulated knowledge and breeding technology in and around Japan.

The endangered birds in Japan include the Japanese crane and other raptorial species considered the same species or subspecies of those birds having relatively large populations living in the eastern part of Eurasia. Establishing cooperative relationships with countries providing habitats for those species would contribute to conserving and breeding those endangered birds in Japan. Moreover, many endangered birds living in Japan have a wide habitat range extending to East Asia and Eurasia; therefore, it is necessary to establish international networks for long-term conservation of their cells and genes.

(Specific Measures and Policies)

- The government will promote the collection of reproductive cells, archaeocytes and somatic cells of endangered species listed on the Red List managed by the Ministry of the Environment, with the aim to conserve 2,500 cell samples of endangered species in five years by conserving 500 each year and analyzing the DNA of important species in five years, starting from FY 2008. It also aims to conserve 50 samples of endangered algae in five years by conserving ten samples each year. (MOE)
- Shinjuku Gyoen National Garden will preserve the seeds of endangered plants. It will also preserve plants with historical value, and deliberate on a framework for summarizing and sharing the accumulated knowledge and breeding technology. (MOE)
- Regarding the super-low temperature preservation technology that is almost established in Japan, the government will promote examination of whether this technology can be used in Siberia where many birds nest during summer, with the aim of establishing international standardization for this technology. (MOE)

2 Use and conservation of microbial resources

(Outline of Measures and Policies)

We have a long history of using microorganisms, although invisible to the naked eye. This usage is widespread, ranging from the use of lactic acid bacteria or yeast for the production of such fermented foods as cheese, alcohol beverages, *miso*, and soy sauce, to use as an ingredient of pharmaceutical products or an agent to dissolve pollutants. Thus, microbial resources are essential to ensuring safe and secure human life.

In order to promote research activities for ensuring such utilization of useful genetic resources, it is becoming increasingly important to collect and accumulate knowledge about biological genetic information and functions. As part of these efforts, we are working on the systematic collection, conservation, distribution and management of genetic resources including microorganisms.

2.1 Use of microbial resources

(Current Situation and Challenges)

Japanese companies who develop pharmaceutical products, cosmetics, and other products derived from genetic resources such as microorganisms face difficulties in pursuing R&D projects efficiently, due to unclear procedures for acquiring genetic resources in foreign countries, as well as regulations imposed by certain resource-possessing countries.

Product development projects usually begin with a search of unknown things, followed by surveys and research work, and seldom does a project successfully reach the final stage of actually using a desired value. It also takes a long time and considerable cost to pursue a development project, and generally involves great risks. Therefore, strict regulations on resource acquisition activities imposed by resource-possessing countries tend to diminish the aggressive attitude of companies toward acquiring and utilizing genetic resources.

Some major scientific achievements in the 21st century are expected to possibly come from the bio fields. The bio industry has the potential to afford some desirable changes to our living and industrial structure, as well as being an important and attractive industry. Genetic resources constitute the basis of the bio industry, and Japanese companies want to properly and actively use such resources in expanding their business, but said circumstances hamper that desire. This situation is not actually beneficial to resource-possessing countries either, given the lost opportunity to obtain profits otherwise expected from genetic resources. Thus, we fear that the current situation is a disadvantage to both resource-possessing countries and user countries.

In this light, the Japanese government must promote measures to create a desirable environment for securing benefits for both resource-possessing countries and user countries, by encouraging Japanese companies and researchers to earn the trust of resource-possessing countries, and build good relationships with them through sufficient understanding of the objective of “fair and equitable sharing of benefits” under the Convention on Biological Diversity, so that Japan can acquire and use genetic resources smoothly and consistently. Regarding the Convention’s objective of “fair and equitable sharing of the benefits arising out of the utilization of genetic resources,” it is expected that operations regarding the formulation of an international framework and related negotiations be completed as soon as possible by the time of the 10th meeting of the Conference of the Parties to the Convention. Japan considers it important to build an international framework based on cooperative relationships it has nurtured thus far with countries possessing genetic resources.

(Specific Measures and Policies)

- The National Institute of Technology and Evaluation will, by implementing joint

international programs with resource-possessing countries, promote a transfer of technology to those countries and provide Japanese companies with opportunities to utilize overseas microbial resources, for the purpose of promoting the “sustainable use” of those resources. (METI)

- The National Institute of Technology and Evaluation has been promoting bilateral programs for the conservation and sustainable use of microbial resources in six countries—Indonesia (2002), Vietnam (2004), Myanmar (2004), Thailand (2005), China (2005) and Mongolia (2006). The programs aim at building a relationship of trust with not only governments but also the national research institutes of respective countries, and promoting documentation for the conservation and use of microbial resources. Through those programs, Japan will provide Japanese companies with opportunities to use genetic resources by ensuring an access route to resource-possessing countries and by transferring and using genetic resources based on agreements with those countries. (METI)
- As part of multilateral cooperation programs pursued by the National Institute of Technology and Evaluation, the Asian consortium consisting of 12 countries, including Japan, South Korea, China, and Indonesia was established (in 2004) for promoting the conservation and use of microbial resources. Through the network of genetic resource centers in the respective countries, the government will further promote the development of human resources and shared management of conserved genetic resources. (METI)
- The National Institute of Genetics, Research Organization of Information and Systems, RIKEN BioResource Center, and laboratories at national universities are collecting, preserving and providing microorganisms for basic research. Since 2002 the “National Bio Resource Project” conducted by MEXT has focused on six kinds of microorganism resources important for basic research, improved its core base, promoted collection, preservation, and provision operations, and improved the database and related information for utilization.

2.2 Conservation of microbial resources

(Current Situation and Challenges)

Microbial resources are considered important biological resources due to their diversity and widespread use. While European countries and the U.S. have worked on improving microbial resource libraries from early on, Japan lagged behind in establishing a shared system for the widespread use of microbial resources, despite its long history of using microorganisms for food products, since efforts for collecting resources had largely been made separately by individual organizations focused on their own interests. To address this situation, we are working to improve our microbial resource library (mainly at public organizations) through efforts to gather and

centralize scattered collections for promoting the industrial use of microorganisms.

In the fields of agriculture, forestry and fishery, the Ministry of Agriculture, Forestry and Fisheries has been pursuing the Genebank project since 1985, in which the National Institute of Agrobiological Sciences (NIAS) supervises collaborative operations pursued by individual laboratories. Later, NIAS became an independent administrative institution and has continued this work under the name of the “NIAS Genebank Project.” The Forestry and Forest Products Research Institute (FFPRI) and the Fisheries Research Agency (FRA) are also separately managing operations focusing on forestry and fishery, respectively, to promote the systematic collection, conservation and distribution of genetic resources.

In cases where it is physically difficult to integrate collections into one library at a single organization, it is still necessary to establish a network and shared databases to make it possible for individual organizations to easily obtain necessary resources from libraries inside and outside the country. For example, we have created a database of microorganisms having special significance to agriculture, forestry and fishery, and which contains information on collected, conserved and characteristic-assessed microorganisms consisting of microbes harmful to crops (plant pathogenic microbes) as well as microbes for foods such as fungus, yeast, lactic acid bacteria and *Bacillus natto*. This information is made available through our website, allowing users full-time access, and we also distribute the information to users. In particular, the library of plant pathogenic microbes contains rare, valuable species and is widely used in many research activities, including basic research on classification, identification, and genetic analysis, as well as applied research on diagnosing crop disease, developing pest control methods, agricultural chemicals, etc., and also helps to make agricultural production technologies in Japan more sophisticated. We also collect, conserve, distribute and assess the characteristics of microbial resources having special significance to fishery, including food-poisoning bacteria, marine microorganisms, pathogenic bacteria and virus of aquatic organisms.

For industrial fields, the Biological Resource Center was established under the National Institute of Technology and Evaluation in 2002 as the core institution engaged in collecting and conserving biological genetic resources such as microorganisms. The Center collects and updates information on classification, base sequence and genetic functions, and provides the information together with samples to users. The Center has established a library of unknown genetic and microbial resources, for the purpose of promoting the industrial use of those resources.

(Specific Measures and Policies)

- The government will develop effective methods of conserving microbial resources useful for agriculture, forestry, fishery and industrial activities, and promote the

scientific analysis thereof for classification and identification. It will also promote infrastructural improvements contributive to R&D activities or the industrial use of resources, through enhanced efforts to collect, conserve and assess the characteristics of genetic resources, distribute research materials, and update information. (METI, MAFF)

- For the purpose of promoting collaboration among microbial gene resources centers in Japan, 243 domestic organizations (as of August 2009) have jointly created an online catalogue and been promoting networking. (METI, MEXT, MAFF)
- As of FY 2008, the National Institute of Technology and Evaluation has a total of about 53,000 strains of microorganisms and 56,000 DNA clones derived from microorganisms, which are made available to researchers and industries. (METI)
- The National Institute of Agrobiological Sciences will improve its library of microbial resources by increasing its collection from 24,000 (as of the end of FY 2006) to 25,000 items (by FY 2010). (MAFF)

3 Use of biomass

(Outline of Measures and Policies)

Biomass is derived from organic matter converted from water (inorganic matter) and carbon dioxide through photosynthesis in plants. Biomass refers to not only phytogenic matter but also the excreta of plant-eating animals and food dregs as well. The use of biomass is a part of the carbon cycle in the atmosphere, and therefore does not release any extra carbon dioxide into the atmosphere, unlike petroleum and coal. Since biomass will not become depleted if used wisely, it can be a sustainable, recyclable resource.

The use of biomass would help to (1) prevent global warming, (2) create a material-cycle society, (3) diversify energy resources, (4) develop new strategic industries having competitive strength by developing technologies for the use of biomass, and (5) vitalize the agriculture, forestry and fishery industries as well as related areas, by creating new business opportunities for industries engaged in the energy business, the supply of industrial products, and related areas.

When focusing on the relation to biodiversity in Japan, the use of biomass through the proper management of ecosystems (such as thinning artificial forests, managing community-based forests, and grass control in waterside areas and secondary grasslands) would contribute to conserving rich biological diversity. Moreover, biofuels derived from cellulose biomass, such as rice straw or fuel crops, would not conflict with much food supply, and such use of biomass would help preserve farmland and ultimately contribute to conserving biodiversity. Using biomass in a way that takes advantage of untapped resources or wastes would also help promote the effective use of biological resources. On the other hand, we need to pay attention to the impact on

biodiversity caused by the destruction of rain forests in certain countries and the increase of the food competition due to the use of biofuels from abroad.

The Japanese government established its “Biomass Japan Comprehensive Strategy” during a Cabinet meeting held in December 2002. Later in March 2006, this strategy was revised in response to changing circumstances concerning the use of biomass, such as revelations regarding the pressing need for introducing effective global warming countermeasures. In June 2009, the “Biomass Utilization Promotion Basic Law” was enacted to comprehensively and systematically implement measures promoting the use of biomass, thereby further promoting use.

Also in July 2009, in order to expand the use of non-fossil energy sources including biomass, the “Act on the Promotion of the Use of Nonfossil Energy Sources and effective use of fossil energy Source Materials by Energy Suppliers” (the Act on the Sophistication of Energy Supply Structure) was enacted to enhance systematic efforts of energy suppliers (of electricity, gas, oil, etc.).

3.1 Promoting regional use of biomass in the form of Biomass Town areas, etc.

(Current Situation and Challenges)

Regarding the availability and usage rate of biomass in Japan (based on existing data to our knowledge as of March 2009), waste-derived biomass (including excreta of animals, sludge, black liquor generated from pulp production, wastepaper, food waste, waste wood from construction work or sawmills) amounted to about 300 million tons, with 74% thereof being utilized (where we seek an increase to 80% by 2010); untapped biomass amounted to about 22 million tons, with 17% being utilized (where we seek an increase to 25% by 2010).

Since biomass is based on organisms, it can be found not “widely” but “thinly.” In order to promote the use of biomass, it is important to understand its characteristics and establish regional systems affording an efficient, dispersed use of biomass in the form of products or energy. Therefore, we have been promoting the “Biomass Town” project, in which municipal governments play the central role in establishing regional comprehensive systems for using biomass in close cooperation with relevant local entities. (“Biomass Town” refers to areas where promoting the use of biomass is planned, with the goal of achieving usage rates of 90% and 40% in terms of carbon equivalent value for waste-derived biomass and untapped biomass, respectively.) In March 2009, the government compiled the Biomass Town Acceleration Strategy, practical measures to realize the Biomass Town framework, and its further dissemination. We aim to increase the number of “Biomass Town” areas to around 300 by 2010. (As of the end of February 2010, there were 237 Biomass Town areas.)

We will also promote the use of waste-derived biomass for municipal wastewater treatment processes.

Under the Act on the Sophistication of Energy Supply Structure enacted in July 2009, the government must also promote systematic efforts on the part of energy providers to expand the use of non-fossil energy sources including biomass.

(Specific Measures and Policies)

- Through the joint efforts of relevant ministries and agencies, the government will publicize the Biomass Town Concept, to steadily increase Biomass Town areas. (CO, MIC, MEXT, MAFF, METI, MLIT, MOE)
- The government will promote integrated improvement of the Biomass Town Concept and the development of biomass conversion facilities, biomass user facilities and related facilities, and assist in regional voluntary efforts and original ideas. (MAFF)
- By using the Subsidy for Promoting the Creation of a Sound Material-Cycle Society, the government will increase or improve facilities that convert waste-derived biomass into fertilizer, livestock feed or methane, etc. (MOE)
- The government will promote the use of sludge generated by wastewater treatment as biomass. (MLIT)
- Based on the Act on the Sophistication of Energy Supply Structure enacted in July 2009, the government will enhance systematic efforts on the part of energy suppliers to expand the use of biomass and other non-fossil energy sources including biomass. (METI) [Cited in Chapter 2, Section 6, 1.1]

3.2 Promoting the domestic production of biofuels

(Current Situation and Challenges)

In February 2007, seven relevant government ministries (Cabinet Office, MIC, MEXT, MAFF, METI, MLIT and MOE) clarified existing problems that must be solved to extensively increase the domestic production of biofuels derived from biomass, created a work schedule for technology development programs to be implemented, and submitted it to the Prime Minister. This work schedule shows a tentative policy for biofuels production, including the use of inexpensive raw materials such as saccharine materials (e.g., sugar cane, sugar syrup) and starchy materials (e.g., out-of-standard wheat) as well as wastes, coupled with charges for collected waste treatment, and the need to pay attention to the compatibility of food and feed supply. The work schedule also indicates mid-term and long-term plans for promoting the use of untapped resources such as rice straw, cellulose materials such as waste wood generated from forest-thinning work, and fuel crops not applicable to competition in food and feed supply.

In October 2008, the Agriculture, Forestry and Fishery Bio Energy Act was enacted to support the ongoing, sound development of the agriculture, forestry and fishery industries, and the diversification of energy sources by using biofuels derived from

those industries.

In order to promote the use of domestic biofuels based on the Act, the costs of producing, collecting and transporting raw materials, and the production costs of biofuels must be drastically reduced. We must also improve systems and infrastructure to facilitate the use of biofuels, improve energy output-input ratios from the perspective of lifecycle, introduce CO₂ output-input strategies to various policy measures, and promote public understanding of biofuels.

(Specific Measures and Policies)

- In FY 2007, a large-scale biofuel demonstration project was introduced, covering the entire process from materials procurement and production to utilization. The government aims to increase biofuel production for reaching annual production of 50,000 kiloliters by FY 2011. (MAFF)
- Also in FY 2007, the government began developing technology for the high-efficiency production of ethanol through breeding, the low-cost cultivation of fuel crops, and use of non-food materials such as rice straw or wood biomass. And since FY 2008, the government has been promoting a large project to establish consistent technology ranging from the collection and conveyance of soft cellulosic materials such as rice straw, to the production and utilization of biofuels, and will develop technology for the low-cost, high-efficiency production of biofuels. (MAFF)
- The government will develop technology to produce cellulose-derived ethanol, which would not consume food supply based on the Biofuel Technology Innovation Plan for technological development of biofuels. The government seeks the comprehensive use of biomass resources, even beyond the scope of biofuel production, by promoting the development of technology for producing general-purpose chemical products from cellulose-derived biomass, as well as producing propanol and butanol. (METI)
- Starting in FY 2007, the government has steadily promoted on Miyako Island and in the Tokyo metropolitan area a large-scale demonstration project for gasoline containing 3% bioethanol (E3) through intragovernmental joint efforts. It is also assisting projects to build domestic biofuel production facilities that use waste wood generated from construction work.
- The government is conducting verification programs necessary for facilitating the practical use of gasoline containing 10% bioethanol (E10) from FY 2009. (MOE)
- By using the Subsidy for Promoting the Creation of Sound Material-Cycle Society, the government will increase or improve the municipal facilities that convert waste-derived biomass to biodiesel etc. (MOE)

Section 3 Communication and Implementation (Basic Concepts)

The materially affluent living we enjoy today is based on mass production and mass consumption, and this lifestyle is a major element that threatens biological diversity. Another major threat to biodiversity is the lack of people's awareness and knowledge, as few are aware of the significant role that biodiversity plays in supporting our living, as well as fewer opportunities for people to obtain basic knowledge about the biological world.

Each of us must therefore understand the importance of handing over rich biodiversity to future generations, by not continuing to pursue convenience and material affluence as we do today. It is also important for each one of us to act on our own initiative and review our own lifestyle.

In order to promote voluntary efforts among people, public awareness of the significance of the conservation and sustainable use of biodiversity must be raised and expanded. To this end, communication, environmental education and learning should be aggressively promoted. It is important to share the following activities among people to reach out to individuals: activities to "touch" biodiversity such as breeding or observing living creatures; activities to "protect" biodiversity such as participating in local nature preservation activities or eating seasonal/local foods; and activities to "talk about" biodiversity such as discussing the crisis of biodiversity. At the same time, it is important to provide people with not only basic knowledge but also opportunities for direct contact with nature. In Japan, people now have fewer opportunities to interact with nature due to the progress of urbanization and industrialization. Increasing the opportunities for people to interact with nature would allow them to recognize our position as human beings as being a constituent of natural ecosystems, as well as recognizing the blessings of biodiversity, thereby deepening their understanding of harmony with nature.

Biodiversity cannot be conserved only through the efforts of the government . It is essential that common understanding be reached among the central and local governments, companies, NGOs and citizens, with all parties concerned making a voluntary commitment in diverse ways through collaboration and cooperation. In response to adapting the decision made on private sector engagement, the 9th meeting of the Conference of the Parties (COP9) held in Germany in 2008 launched the Business and Biodiversity Initiative to strengthen company involvement in assisting the German government to reach its goal. A total of 34 companies including nine from Japan signed the Leadership Declaration that promises the implementation of efforts contributing to reaching the goal. Such a tendency shows that more private companies are promoting voluntary efforts as part of their corporate social responsibilities (CSR), in order to help

conserve biodiversity. And actively promoting economic measures such as through financial support and the development of human resources must be actively promoted to significantly advance such a movement.

The Basic Act on Biodiversity stipulates the responsibilities of the central government, as well as those of local bodies, companies, citizens, and the private sector. It also clarifies that the government's basic policies shall include measures to promote projects in consideration of biodiversity, cooperation and coordination with various entities, voluntary activities, and understanding among citizens.

As mentioned before, the importance of biodiversity shall become part of common sense for local governments, companies, citizens and various other entities, and thus reflected in their behavior. In other words, the government will promote measures for individual entities in order to make biodiversity mainstream.

Interaction with nature as described above is believed to help people restore their humanity, contribute to the sound growth of children, and also help us make correct decisions or engage in proper behavior in addressing environmental issues. At the same time, people's contact with nature should be made within the scope of the sustainable use of the natural environment.

1 Communication and public involvement

(Outline of Measures and Policies)

Communication about the conservation and sustainable use of biodiversity must be promoted in order to deepen public understanding of the significance of biodiversity, the national strategy on biodiversity, and existing conditions concerning biodiversity in Japan as clarified by an overall evaluation of biodiversity, and encourage people to take specific actions. And to promote the participation of diverse parties including local governments, companies, NGOs and citizens, the participation expected by each party must also be clarified in detail, with a mechanism established to promote information sharing and collaboration among diverse parties that include local educational organizations, and encourage relevant stakeholders to take effective measures.

At the same time, many suggest that the general public finds it difficult to understand the significance and positioning of "biodiversity" in our living, given the abstract nature of the term. As for defining "biodiversity" in terms of how it relates to our lives, it means not only a wide variety of diverse living creatures but also "flourishing living" thanks to biological diversity and "lively regionality" where both local citizens and indigenous creatures enjoy a lively life.

Japan will host COP10 in the year 2010, which happens to be the International Year of Biodiversity as designated by the United Nations. Therefore, the significance of biodiversity is expected to be dramatically raised and the interest in international trends regarding biodiversity dramatically boosted under the banner of "Biodiversity is

Life. Biodiversity is our Life”. Consequently, the year 2010 marks a great opportunity to raise public awareness about the significance of biodiversity in a way that covers all generations including children. It is thus necessary to clarify the “vision of the future society where people live in harmony with nature” so that people can have positive, happy impressions about the future, learn specifically about their positioning in nature, and find new ways of involvement. To this end, we will promote the “Our Life on Biodiversity Project” intended to assist diverse parties in making voluntary efforts to promote biodiversity-related measures, with the participation of many citizens and organizations.

1.1 Promoting communication and public involvement (Current Situation and Challenges)

We have been promoting communication and publicity through various activities including commemorative events on the International Day for Biological Diversity (May 22), exhibitions at the Biodiversity Center of Japan, campaigns, distributing brochures, and using the Internet. Based on the results of a questionnaire survey conducted by the Cabinet Office in 2009, 36.4% of the Japanese people have heard of the term “biodiversity.” When compared to the results of a questionnaire survey conducted by the Ministry of the Environment in 2004 when 30.2% of the Japanese people had heard of “biodiversity,” a 6.2% increase was achieved. However, public recognition of the word “biodiversity” remains low. It is therefore necessary to create more opportunities for people to consider or recognize biodiversity in their living so that we may hand over our nature-rich lands to future generations.

The Basic Act on Biodiversity enacted in June 2008 stipulates the responsibilities of local bodies, companies, citizens, and the private sector. It also clarifies that the government’s basic policies shall include measures to promote projects in consideration of biodiversity, with the cooperation and coordination of various entities, voluntary activities, and understanding among citizens. To this end, we will make efforts to raise public understanding about the significance of biodiversity by using easy-to-understand language and also promote various measures in all social strata by establishing a partnership between the public and private sectors. It is important to encourage diverse parties, including not only the central government but also local governments, private businesses including companies, NGOs and citizens, to make voluntary efforts for the conservation and sustainable use of biodiversity a part of their duties or daily activities. It is also necessary to establish a mechanism for promoting collaboration with those parties and create opportunities for the general public to learn about the significance of biodiversity through personal experience and participation.

With those objectives in mind, we will aggressively promote the following

measures under the “Our Life on Biodiversity Project” as part of preparations for COP10 to be held in Japan in 2010.

As part of the project, the government will make efforts to disseminate, publicize and promote the use of Guidelines for Private Sector Engagement in Biodiversity (released in August 2009), guidelines for companies to voluntarily conduct activities in consideration of biodiversity, as well as the Guide to the Local Biodiversity Strategies (released in September 2009)—a handbook promoting the formulation of local biodiversity strategies by local governments.

(Specific Measures and Policies)

- As an opportunity for discussion among those from the public and private sectors that include the central and local governments, financial circles, media, NGOs, and other experts, the National Committee for IYB will be formed to boost social awareness about biodiversity, and strongly promote cooperation among various entities and their individual efforts. (MOE)
- In order to widely expand public awareness of the significance of biodiversity and instill such an attitude in daily living or corporate activities, the government will promote publicity activities through tie-ups with various programs. It will also hold events to increase the general public's interest in biodiversity. (MOE)
- Japan will host COP10 in the year 2010, which happens to be the International Year of Biodiversity designated by the United Nations. The government will boost social awareness of biodiversity by organizing various events on the International Day for Biological Diversity (May 22) and on other occasions. (MOE)
- The government will further boost public awareness of biodiversity by disseminating the catch phrase “For All the Life on Earth”, verbal communication that expresses biodiversity in a simpler, comprehensible manner, along with a logo mark. (MOE)
- To publicize diverse information about biodiversity to the general public, the government will promote and strengthen activities of the “Life on the Earth” supporters club consisting of celebrities, by adding more members. (MOE)
- The government will publicize itemized lists of efforts made to conserve biodiversity in daily life and contribute to its sustainable use, so that measures will be introduced to society and respective stakeholders can promote their own initiatives. (MOE)
- For nurturing “smart consumers” who pay attention to biodiversity, the government will provide information regarding guidelines for judging biodiversity-conscious products when citizens purchase and select products and services in daily consumption activities, and on the impact of their behavior on biodiversity. (MOE)
- The government will compile a Biodiversity White Paper clearly describing the state of biodiversity and the measures it has taken for conserving biodiversity and its

- sustainable use. It will then submit said paper to the Diet and hold nationwide meetings for the public dissemination thereof. (MOE)
- Based on the results of a poll conducted by the Cabinet Office in FY 2009, 36% of the Japanese people “know the meaning” or “do not know but have heard” of the term “biodiversity.” The government seeks to raise this level of awareness to reach or exceed 50% by the end of FY 2011. (MOE)
 - Based on the results of a poll conducted by the Cabinet Office in FY 2009, 20% of the Japanese people “know the content” or “do not know but have heard” of the term “national biodiversity strategy.” The government seeks to raise this level of awareness to reach or exceed 30% by the end of FY 2011. (MOE)
 - As for how many times the term “biodiversity” appears in newspapers, the major newspapers (*Asahi*, *Mainichi* and *Yomiuri*) used this term a total of 736 times during FY 2008. The government aims to increase this to 1,000 times by the end of FY 2011. (MOE)
 - In order for local governments to autonomously establish or implement appropriate original measures, including initiatives suitable for the natural and social environments in their areas, programs pursuant to national strategies, and regional guidelines applied to the activities of local companies and citizens, the government will make efforts to disseminate the “Handbook for Local Biodiversity Strategies” and publicize actual local efforts and cite examples through its webpage. As of March 2010, six prefectures (13%) of Japan have formulated local biodiversity strategies. The goal is for all prefectures (100%) to have begun formulating such strategies by COP11 (in 2012). (MOE)
 - The government will assess guidelines for prefectural and municipal governments to efficiently formulate local strategies that focus on the space units at various levels such as river-basin areas. (MOE)
 - The government will disseminate and publicize Guidelines for Private Sector Engagement in Biodiversity for wide-ranging entities that include companies, citizens, NGOs and local bodies, and encourage companies to promote and utilize said guidelines. It will also publicize the guidelines overseas to publicize efforts in other countries. (MOE) [Cited in Chapter 2, Section 3, 2.1]
 - The government will discuss frameworks in which to raise incentives for companies regarding efforts taken in consideration of biodiversity, such as a system for companies to make commitments for taking action in consideration of biodiversity, such as a “business and biodiversity initiative.” (MOE)
 - The government will boost understanding and willingness among farmers by introducing the life and growth of living creatures, the surrounding environment, and agricultural history in cases such as wet-rice cultivation where food production and the conservation of biodiversity are compatible; it will also facilitate understanding of

such efforts among citizens by using the “Living Creature Icons” that identify agricultural/forestry/fishery products produced in an environment emphasizing the conservation of biodiversity. the government will also publicize how Japanese agriculture, forestry and fishery industries are contributing to the conservation of biodiversity in and around Japan, from the start of COP10 as a good opportunity. (MAFF) [Cited in Chapter 1, Section 4, 1.1 and Chapter 1, Section 6, 1.1]

- The government will participate in environment-related exhibitions throughout Japan to encourage participating and visiting businesses to promote business activities that focus on biodiversity, educate visiting citizens about the importance of consumer awareness of biodiversity, and provide them with information on corporate activities to invigorate business activities focusing on biodiversity. (MOE)
- The government will deliberate on effective mechanisms that would promote the voluntary actions of diverse parties, such as efforts to promote agriculture, forestry and fishery for helping to conserve biodiversity. (MOE, MAFF)
- For the purpose of assisting partnership-based efforts among diverse parties, the government will collect and provide necessary information, and offer opportunities for meeting and communication, by using the Global Environmental Outreach Center and the Regional Environmental Partnership Offices as the basis. (MOE) [Cited in Chapter 1, Section 3, 4.2]
- The government will securely provide information for private organizations that take actions, landowners, companies, local governments and others involved, and assess systems to promote efforts for conserving biodiversity in cooperation with local entities such as systems serving the needs of those concerned. (MOE, MAFF, METI)
- As for areas where the natural environment was maintained and preserved through various human approaches to nature, the government will assess measures to continuously promote conservation activities for the natural environment based on appropriate maintenance/management methods rooted in the local community, in cooperation with governments, local citizens, farmers, fishermen, NGOs, landowners, companies and other various entities. (MOE, MAFF)
- For deepening public interest in and recognizing the significance of biodiversity, the government will conduct a survey to collect extensive information on local natural phenomena attributable to global warming, the state of wildlife distribution, and related topics in cooperation with various relevant organizations and experts, and with citizens’ participation. The survey results will be released to the public. It will also deliberate on introducing a system for monitoring local wildlife. (MOE) [Cited in Chapter 2, Section 5, 2.1, and Chapter 2, Section 6, 1.1]
- In order to enhance the performance of rivers as habitats for diverse living creatures, the government will hear the opinions of local citizens and reflect those opinions in river improvement plans. It will also promote cooperation and collaboration with

civic groups in such diverse activities as those for improving biotopes, restoring riverside vegetation, and embodying the appeal of rivers in town development plans. (MLIT)

- By implementing the measures described below in “2. Economic measures,” “3. Interaction with nature,” “4. Education and learning” and “5. Development of human resources,” the government will promote voluntary actions by and cooperation among diverse parties, including local governments, private businesses including companies, NGOs and citizens. (MOE, MEXT, MAFF, MLIT)

2 Economic measures

(Outline of Measures and Policies)

Economic measures are intended to make achieving policy goals possible by giving certain economic incentives to respective stakeholders, thereby encouraging them to take certain beneficial actions in terms of economic rationality. Thus, economic measures help integrate both environmental and financial factors that are essential for realizing a sustainable society. Administrative measures in this field include subsidies, grants-in-aid, and tax incentives.

2.1 Economic measures

(Current Situation and Challenges)

Economic measures to promote the voluntary efforts of diverse parties in the field of biodiversity include subsidies and grants-in-aid provided by the central government, tax incentives, the use of foundations, goodwill fund-raising and financial contributions by civic groups or businesses, as well as a forest environment tax to be collected by local governments. Moreover, certification systems for environment-friendly products or economic activities also stand on an economy-oriented mechanism. MOE launched the Biodiversity Conservation Promotion Project in 2008 to grant subsidies to various local entities for efforts to conserve and restore biodiversity. In 2009, subsidies were granted to 26 groups nationwide.

Other measures include compiling and providing appropriate information regarding efforts to conserve biodiversity, and such incentives as the preferential treatment of corporate investments, intended to encourage companies to introduce biodiversity-conscious projects.

The government will also disseminate, publicize and promote use of the Guidelines for Private Sector Engagement in Biodiversity (published on August 20, 2009)—guidelines for companies to voluntarily conduct activities in consideration of biodiversity.

(Specific Measures and Policies)

- In order to grasp the relationship between biodiversity loss on a global scale and economic cost the government will cooperate with the Economics of Ecosystems and Biodiversity (TEEB) and promote an analysis of biodiversity's economical value, the economic loss accompanied by loss of biodiversity, and the cost required for effective conservation. And based on the results of such research and trends in international discussions, it will also initiate discussion on what kinds of policy options are possible. (MOE) [Cited in Chapter 2 Section 4, 1. 1, and Chapter 2, Section 5, 1.2, 3.1]
- The government seeks to promote voluntary efforts by the private sector, such as introducing certification systems for environment-friendly products or economic activities, in hopes that such voluntary efforts will become widespread in the field of biodiversity. To this end, it will collect various information including examples of foreign countries. (MOE)
- The government will disseminate and publicize Guidelines for Private Sector Engagement in Biodiversity for wide-ranging entities including companies, citizens, NGOs and local bodies, and encourage companies to promote and utilize said guidelines. It will also publicize the guidelines overseas in order to publicize efforts in other countries. (MOE) [Cited in Chapter 2, Section 3, 1.1]
- The government will discuss measures to organize excellent real estate markets conscious of energy saving, low carbonization and biodiversity as recognized and appreciated by investors and other entities concerned, and promote ongoing investment therein. (MLIT)

[Subsidy, grant-in-aid, etc.]

- The government will support efforts by local communities to conduct activities for conserving and restoring biodiversity, and efforts to prepare comprehensive plans. These efforts include conserving rare wild fauna and flora, conserving and managing wildlife, measures for invasive alien species, and conserving and restoring important areas playing key roles in the ecological network. (MOE)
- The government will promote regional development programs by using financial support applicable to urban park development, green zone maintenance and greening projects, as well as subsidies for improving the natural environment. (MLIT, MAFF, MOE)

[Assistance through the use of foundations]

- The government will assist private sector groups in implementing activities for environmental conservation through the use of the “Japan Fund for Global Environment,” “Children’s waterfront rediscovery project” and “Forest Fund for Green and Water.” (MOE, MLIT, MAFF)

[Tax incentives]

- There are such tax incentives as the preferential treatment of financial contributions to designated public interest corporations engaged in activities to conserve the natural environment including biodiversity, and special tax exemptions applied to income tax, corporate tax or local tax imposed on specific zones of designated areas such as natural parks and protection forests. (MOE, MAFF)

[Compensation]

- We have the Natural Parks Law, the Urban Green Space Conservation Law, and other laws that prescribe the protection of areas contributive to the conservation of biodiversity, and those laws provide for compensation applicable to landowners who suffer a loss caused by regulations. With regard to designated green conservation areas such as natural parks, the government may purchase private land. (MOE, MLIT)

[Financial contributions by citizens]

- The government will promote publicity, education and other measures to promote the effective use of goodwill financial contributions made by private citizens or companies for conserving biodiversity. Those measures include the National Trust Movement intended to use financial contributions made by citizens to purchase nature-rich private lands for land management pertaining to nature conservation, and greening projects conducted by the Greenery by Golfers Group. (MOE)
- The National Land Afforestation Promotion Organization and prefectural afforestation promotion committees have been promoting the “green feather fund movement” under the Law concerning the Promotion of Forest Development through the Green Fund, to utilize funds for protecting forests and promoting greening. (MAFF)

3 Interaction with nature**(Outline of Measures and Policies)**

The government promotes efforts to increase opportunities for people’s interaction with nature through various events such as nature observation programs. Special focus is also placed on children, as opportunities for “hands-on” nature experience at an early age are believed to increase children’s love of nature and help develop an intellectual interest in biodiversity, as well as an attitude toward conserving nature, ultimately leading to their sound growth as human beings. It also provides information by using the Internet.

To ensure conservation of the natural environment—one principle of the

Ecotourism Promotion Law—the government will ensure proper ecotourism operations by paying attention to biodiversity, introducing natural environment monitoring practices, securing the conservation of natural tourism resources, and establishing rules for tourists to observe. It will also promote publicity and education through efforts to accumulate know-how and the sharing of information, and increase areas dedicated to conserving nature.

3.1 Promoting people's interaction with nature

(Current Situation and Challenges)

Although nature observation events and other “be-friendly-to-nature” programs are held nationwide from time to time, opportunities for interacting with nature have yet to be made widespread among the general public. People apparently seek such opportunities, which in reality are rather difficult for people to realize, partly because parents have less contact with nature and consequently cannot provide substantial nature experiences for their children or teach ways of interacting with nature. Accessible places for hands-on nature experience as well as information about such places are also insufficient. Correcting such a situation requires the development of programs that provide children with an opportunity to play in nature, and deepen their interest in and understanding of nature. It is also necessary to develop human resources to support such programs, and through the joint efforts of diverse parties provide information on where such programs are available. The government is already promoting such efforts in cooperation with NGOs, but must further enhance efforts, jointly with various organizations, in diverse fields covering not only primitive nature but also urban nature close to citizens.

In the meanwhile, there are such problems as the adverse effects of tourism on the natural environment, despite the goal of promoting interaction between people and nature. Under such circumstances, the Ecotourism Promotion Law was enacted in April 2008, followed by Cabinet approval of the act on the promotion of eco-tourism in June 2008. These measures make it necessary to promote a wide and substantial acknowledgement of ecotourism in coordination with relevant government ministries and agencies, and promote the appropriate implementation of ecotourism by achieving a consensus with local citizens.

(Specific Measures and Policies)

[Cross-regional efforts]

- Based on guidelines for coordination among ministries as compiled by the “Project Team regarding Coexistence/Exchange between Cities and Farming/Fishing Villages,” the government will promote the “Project for Children to Experience Life in Farming/Fishing Villages – Promotion of Experience of Life in Nature for 1.2 Million

Children,” a program intended to promote long stays of about a week in farming and fishing villages where elementary school children can experience local life. It will also aim to conduct this project in 23,000 schools nationwide (1.2 million children in each grade) and make preparations within five years from now for having those villages accept these school children. (MIC, MEXT, MAFF, MOE) [Cited in Chapter 2, Section 3, 4.2]

- The government will train youth as trainers for nature experience activities on long stays, and promote experience-oriented activities under various themes intended for youth. (MEXT)
- The National Institution for Youth Education will promote nature experience activities for youth by providing youth with opportunities for experience-oriented activities at national youth education facilities, fostering instructors, and supporting experience-oriented activities organized by private groups. (MEXT)

[Measures for natural parks, etc.]

- The government will implement nature observation programs and promote public awareness campaigns on conserving the natural environment at natural parks that have exceptional natural environments. It will also utilize brochures and Internet websites to publicize Japan’s wonderful natural environment at home and abroad, and develop and provide information to deepen public understanding about the natural environment and people’s interaction with nature. The government will organize stamp rally where participants stop at the visitor centers in national parks to familiarize themselves with nature and learn about biodiversity. It aims to have a total of 1 million participants from 2010 to 2012. (MOE) [Cited in Chapter 1, Section 2, 2.3]
- The government will promote learning and education about the environment, ecotourism and other programs for considering and implementing qualitative improvements to the use of natural parks. It also aims to increase the number of accesses to the website called “Ecotour Comprehensive,” which introduces government efforts regarding ecotourism, and provides tour programs and accommodation information, from 831,208 in FY 2006 to 1,250,000 in FY 2012. [Cited in Chapter 1, Section 2, 2.3]
- The government will consider and implement the designation of access control districts, and provide guidance on use under the Natural Parks Law and other measures, to disperse and level out the use of natural parks. (MOE) [Cited in Chapter 1, Section 2, 2.3]
- In targeting children, the government will promote programs to provide hands-on experience to appreciate nature with the five senses during after-school hours or operate learn-through-experience programs such as long-term rural stays in

agricultural, fishing or mountain villages, or trial experience as a park ranger engaged in nature protection at a national park. Such experiences involving contact with nature, ranging from primitive nature to accessible nature, would allow children to learn about the blessings of nature and acquire diverse knowledge about the relationship between nature and humans, and lead to their sound growth as human beings. The government aims to increase the number of youth participants in the park ranger program from 840 in FY 2005 to 1,300 by FY 2010. (MEXT, MAFF, MLIT, MOE) [Cited in Chapter 2, Section 3, 4.2]

- By promoting people's participation in volunteering activities at parks as natural park guides and park volunteers, the government seeks to ensure the proper use of natural parks and improve nature conservation activities. (MOE) [Cited in Chapter 1, Section 2, 2.2]
- Through diverse events including "Greenery Month," "Get-to-know Nature Movement" and "National Nature Trails Walking Month," the government will conduct various activities nationwide to provide people with opportunities to observe and appreciate nature. It will also provide information on the Internet about facilities and events involving interaction with nature. Through such measures, the government will further increase opportunities for people to have contact with nature. (MOE, MLIT)
- On the website called "Internet Nature Information System," which provides extensive information on nature including national parks, the government will improve, review and update content, thereby helping to promote people's interaction with nature. (MOE)

[Measures for forests]

- The government will promote "Forest Kids Club Activities" intended to provide children with introductory learning opportunities through hands-on experience in a forest. At the same time, it will promote the improvement of forests and relevant facilities that can be used in educational programs for children, develop human resources necessary for those programs, and also promote the improvement and utilization of school forests. Thus, the government will accept more educational programs to take place in forests and also publicize forest education. (MAFF, MEXT) [Cited in Chapter 2, Section 3, 3.2]
- The government will promote activities of the "All Japan Junior Green Friends Federation" organized for developing children's love of nature, an attitude for conserving nature, and sound and cheerful mentality. (MAFF)
- By utilizing the "*Yuyu-no-mori*" program and other educational programs to take place in national forests, the government will promote education about the forest environment. (MAFF)

[Measures for rural areas and Satochi-Satoyama areas]

- The government will improve or enhance implementation of “Research on Organisms Living in Paddy Fields” intended to obtain information on the environment and wildlife in rural areas. Here, rural water environments including paddy fields and water channels are regarded as learning places for people and playgrounds for children. (MAFF, MOE) [Cited in Chapter 1, Section 6, 1.6 and 4.2]
- In targeting national government parks having the Satochi-Satoyama environment with rich biodiversity, the government will continue promoting efforts to improve and conserve the environment by inviting citizens to participate in those efforts. It will also provide firsthand learning programs for studying the precious natural environment of those parks, as well as the history and culture of surrounding areas. Thus, the government seeks to promote the effective use of such an environment as the center for promoting regional efforts to ensure local citizens’ environment-friendly behavior toward creating a sustainable material-cycle society of low environmental load. (MLIT)

[Measures for cities]

- The government uses urban parks to conduct various educational programs on the environment based on hands-on experience to learn about the ecology of living creatures and nature’s mechanisms there, in cooperation with local NPOs and schools. It will continue to promote the training of volunteers engaged in those educational programs, as well as create new programs. (MLIT)
- In order to extensively publicize the important role of sewerage, including its functions in managing the water cycle in cities and controlling the pollution load of effluents discharged into public waters, the government will promote the sharing of information between sewage treatment service managers and local citizens. It will also ensure that, through environmental education, the role of sewerage and its contribution to conserving diverse ecosystems are clearly known among the public, so that children will correctly understand the sewage system and the role of sewerage in river basins. The government will also create opportunities for children to visit sewage treatment facilities. Those facilities will be effectively used as places of learning for children. (MLIT)
- Vast green areas in the national gardens located in midtown areas (such as the Outer Garden of the Imperial Palace, Shinjuku Gyoen, and Kyoto Gyoen) could be conveniently used for environmental education. All such national gardens have certain historical remnants or cultural assets, and are therefore suitable for history studies. The government will take advantage of those existing natural environments and cultural background to promote environmental education. In particular, it will utilize natural resources to offer new environment education

programs by using the “Mother and Child Forest,” etc. (MOE)

[Measures for rivers]

- With the aim of promoting children’s hands-on experience in and along rivers, MLIT, MEXT and MOE, in cooperation with local teachers, municipalities and private organizations, will promote the “Children’s Waterfront Rediscovery Project” that encourages the registration of suitable waterside areas and the usage of such areas by children. [Cited in Chapter 1, Section 8, 4.1, and Chapter 2, Section 3, 4.2]
- In order to promote environmental education for children, the government will actively offer assistance to educational programs that utilize rivers, and publicize such programs over the Internet. (MLIT)
- The government believes that river water surveys using local residents as an index will give people an opportunity to discover their immediate natural environment, thereby raising their awareness of environmental issues. For this reason, it will continue participatory aquatic life surveys. [Cited in Chapter 1, Section 8, 5.4]

[Measures for fishing villages]

- In addition to promoting the creation of fishing villages that use charming regional resources including rich biodiversity, the government will deepen people’s understanding and interest in the fishing industry and fishing villages by promoting exchanges between cities and fishing villages through hands-on experience and contact with nature, and encouraging the settlement of new residents, and thereby invigorate fishing villages. (MAFF) [Cited in Chapter 1, Section 9, 2.3]

[Measures for ports]

- In cooperation with local authorities and NPOs, the national government will conduct the “Coastal Nature School” program nationwide to provide hands-on nature experience and environmental education by utilizing a coastal natural environment. (MLIT)

[Promoting ecotourism]

- The act on the promotion of eco-tourism was enacted in April 2008, followed by Cabinet approval of the basic policy on promotion of eco-tourism in June 2008. During the first five years after enacting such legislation, the government will support areas where ecotourism is promoted. It will also support the formulation of a “general framework” based on applicable laws, in order to review attractions specific to each region and create energetic, sustainable local communities. (MOE, METI, MEXT, MAFF)

- Based on the act on the promotion of eco-tourism, the Ecotourism Promotion Council organized by relevant government ministries and agencies will implement liaison and coordination to comprehensively and effectively promote ecotourism. (MOE, METI, MEXT, MAFF)
- The government will give awards to regions or organizations which have made remarkable efforts in practicing Ecotourism and also hold ecotourism seminars nationwide, in order to accumulate know-how and share information about the use and conservation of regional natural resources. (MOE)
- By operating a website that provides information on eco-tours for diverse tourists, the government will make domestic tour information available and newly establish English pages to publicize the appeal of Japan's beautiful nature to the world. (MOE)
- As part of efforts to increase people's interaction with nature and raise public understanding of nature's mechanisms, the government will improve waterside footpaths and promote environment-conscious tourism. (MLIT)

[Promoting green tourism]

- With the aim of increasing opportunities for people to experience rural life firsthand through "green tourism" (intended to provide people with a relaxing vacation in a nature-rich agricultural, mountain or fishing village), the government will continue promoting the development of human resources as instructors, escort staff (regional guide), and coordinators for planning and making arrangements. (MAFF)
- Through the use of websites, the government will provide urban citizens with information on green tourism, rural villages, tour programs for hands-on agriculture, forestry or fishery experience, and rural private homes. It will also offer opportunities for people to learn about agricultural, mountain or fishing villages through the use of diverse media or "green tourism fairs" to be held in cities. (MAFF)

3.2 Providing opportunities for interaction with nature

(Current Situation and Challenges)

The government will promote the use of the natural environment for increasing people's interaction with nature. The natural environment includes "natural parks" (where people can interact with indigenous nature and learn about nature's mechanisms), "forests" (that can be used for environmental education contributive to people's enhanced understanding of and interest in the multifaceted functions of forests, and the significance of forestry or uses of wood), "rural areas," "Satochi-Satoyama areas" and "fishing villages" (where people can learn about the relationship between business and nature), "urban parks" (which offer an accessible

natural environment affording safe use), and “water areas such as rivers, ports and coastlines” (that are close to people and support people’s living). It is necessary to ensure that the natural environment is used in a way that secures the safety and comfort of citizens, as well as satisfying their needs. It is also important to ensure proper use of the natural environment so that vegetation or habitats won’t be depleted or destroyed.

Taking a walk along a long-distance nature trail that connects diverse natural environments such as a forest, river, coastal area, rural scenery and townscape, as well as historical and cultural resources, would provide the opportunity to appreciate diverse ecosystems and natural/cultural landscapes. The nationwide network of long-distance nature trails we have today can be converted to a total length of 26,000 kilometers, and it is hoped that those nature trails will be utilized more effectively as a tool to increase opportunities for people to learn firsthand and deepen understanding about the multiple facets of biodiversity.

(Specific Measures and Policies)

[Measures for natural parks, etc.]

- For national parks, the government will develop mountain climbing trails (through such measures as installing signs, scour repair, and restoring vegetation) and information facilities at major park entrances to promote safe and appropriate mountain visits in important conservation areas such as special protection zones and class I special zones, as well as in important areas for visitors such as group facility areas. It will also promote the use of universal design at facilities in facility complexes for visitors with different backgrounds, in order to ensure safe and comfortable use of the facilities. The government will also develop long-distance nature trails that organically link natural parks with exceptional natural environments and cultural properties. (MOE) [Cited in Chapter 1, Section 2, 2.4]
- As areas where ecosystems have disappeared or changed in national parks, the government will rejuvenate or restore forests, wetlands, tidal flats, seaweed beds, etc. (MOE) [Cited in Chapter 1, Section 2, 2.4]
- For quasi-national parks, the government will provide grant for supporting local government to support local government programs that take advantage of regional characteristics to develop places for communication with nature, and conserve and restore natural environments. (MOE) [Cited in Chapter 1, Section 2, 2.4]
- In order to prevent the destruction of vegetation and disturbances to wildlife habitats due to a concentration of visitors and other forms of overuse at natural parks, the government will provide appropriate facilities, including the construction of boardwalks in wetlands and installation of off-limits fences in alpine plant communities. (MOE) [Cited in Chapter 1, Section 2, 2.3]

[Measures for forests]

- The government will promote the improvement of forests and relevant facilities that can be used for educational programs for children, develop human resources necessary for those programs, and also promote the improvement and utilization of school forests. It will thus accept more educational programs to take place in a forest and also publicize forest education. [Cited in Chapter 2, Section 3, 3.1]

[Measures for rural areas and Satochi-Satoyama areas]

- The government will promote the environmental improvement of countryside and Satochi-Satoyama areas, by creating spaces for people to interact with nature, while forming a consensus on conserving biodiversity and promoting infrastructural improvements for conserving biodiversity. (MAFF) [Cited in Chapter 1, Section 6, 1.6]
- The government will promote urban agriculture and the creation of spaces for people to interact with wildlife. (MAFF) [Cited in Chapter 1, Section 6, 1.6]

[Measures for urban areas]

- The government will promote facility improvements by targeting learning centers where people can acquire hands-on nature experience or study natural ecosystems, facilities for protecting and breeding animals or plants within zoos and botanical gardens, urban greening botanical gardens with an activity center for environmental education, and urban parks including environment contact parks. (MLIT)
- The government will promote the use of green areas other than those inside parks. These areas include open green zones including spaces made available to citizens pursuant to a municipal ordinance. The aim here is to create opportunities for environmental education. (MLIT)

[Measures for fishing villages]

- The government will promote the conservation and formation of good fishing village landscapes approachable by people, and the inheritance of historical and cultural heritage. (MAFF) [Cited in Chapter 1, Section 9, 2.3]

[Measures for rivers]

- The government will avoid altering rivers as much as possible to conserve and create a desirable habitat environment and diverse river views, while securing the safety of rivers in terms of flood control. Even when identifying any necessity to alter a river, the government ensures that such alteration will be minimized, with natural characteristics and mechanisms being maintained to the maximum degree possible, so as to ensure “multiple nature-type river creation” for enabling restoration of a

desirable natural environment. (MLIT)

- The government will organize a council consisting of a river management authority, local government, educational organizations and civic groups to promote regional joint efforts to utilize rivers for creating recreational and educational opportunities for children. This council will focus on improving riverside facilities and river structures (“Waterfront School Project”), including waterfront facilities, rapids, deep pools and little streams. (MLIT)
- Through joint efforts with municipalities, the government will establish regional networks dedicated to forming attractive, lively riverside areas, provide places for human interaction with nature based on the effective utilization of rivers, local characteristics, and other natural environments, and develop the waterfront as the regional activity center. (MLIT)
- Any necessary river improvement will be made integrally with regional development in a way that ensures conservation of the natural environment and harmony with the natural, historical and social environments of surrounding areas, with the aim of creating desirable “landmark” waterfront zones. (MLIT)
- In targeting rivers located in central urban districts such as metropolitan areas and their surrounding areas, the government will implement river improvement projects in a way that ensures integral improvement of the waterfront environment and biodiversity, only upon determining an immediate need to undertake such projects and a strong need for riverfront improvement, along with benefits expected from such integral riverfront improvement for the surrounding urban districts based on their status quo. (MLIT)
- In targeting mountain streams located in areas having excellent natural and social environments, the government will promote soil erosion control projects with focus on conserving water and greenery. The aim here is to improve a living environment by securing green zones and waterfront spaces, or restore a desirable environment for streams by ensuring harmony with the regional environment, through efforts to improve the landscape or accessibility to riparian areas, and recover ecosystems. (MLIT)
- In targeting forest areas that help to maintain or strengthen the flood control function of levees, the government will promote improvement measures in a way that ensures the conservation and creation of natural ecosystems, and effective utilization of forests for such recreational activities such as hiking, nature appreciation and hands-on nature experience. (MLIT)

[Measures for ports]

- For promoting people’s effective utilization of the natural environment of ports, thereby deepening their understanding of the significance of such a natural

environment, the government is improving bay areas that can be used by local authorities, NPOs, etc. to provide educational programs on nature and society. (MLIT)

[Measures for coastlines]

- In an effort to improve coastline facilities for seashore conservation, the government will promote area protection as necessary, including the development of such facilities as gently inclined walker-friendly coastline dikes, and the improvement of sandy beaches based on the life and growth conditions of fauna and flora in the area. It also seeks to promote better accessibility to beaches and user-friendliness, so that citizens can more easily enjoy experiences in nature. (MAFF, MLIT)

[Long-distance nature trails]

- Regarding the project to forge long-distance nature trails, much time has passed since the project plan was initially established for each trail, making the initial plan no longer suitable for the present situation, as some trails have been divided into sections due to a disaster, urban development, advent of a new means of public transport or other attractive resources that have changed people's needs. Therefore, the government will review the plan to make it better suited to actual regional conditions, and also steadily promote the improvement of each trail to raise the level of appeal for users, with the help of ordinary projects and grant for supporting local government. (MOE)

4 Education and learning

(Outline of Measures and Policies)

In December 2006, the Fundamental Law of Education was revised to newly express, as one of the five objectives of education, the aim of “fostering an attitude toward respect for life, nature protection and dedication to environmental conservation.”

The basic principles of environmental education and the responsibilities of respective stakeholders are specified in the “Law concerning the Enhancement of Willingness for Environmental Conservation and Promotion of Environmental Education” (the “Law for Environmental Conservation Activities and Promotion of Environmental Education”). In September 2004, basic guidelines for promoting environmental education were established under the Law.

The United Nations Decade of Education for Sustainable Development (ESD) commenced in 2005 as proposed by Japan. Since then, respective countries throughout the world have been promoting measures to meet their regional needs. As one of the advanced countries responsible for taking the initiative in promoting environmental

conservation, Japan must further promote such measures as education contributive to comprehensive environmental and socioeconomic development, and also carry forward personnel strategies to secure human resources for participating in efforts to establish a sustainable society. One challenge we face in Japan is a lack of specialists who could lead environmental education and the development of human resources. To pursue such measures, establishing intragovernmental cooperation and cooperation among the government and other relevant parties such as NGOs, universities and research institutes is very important.

In its report titled “Becoming a Leading Environmental Nation in the 21st Century” established by Cabinet members in June 2007, the government explains its strategy for developing human resources to help create “a society in harmony with nature,” “low carbon society” and “sound material-cycle society,” and clarifies its plan titled “21st Century Environmental Education Initiatives—to provide Environmental Education for Anyone, Anywhere, and at Any Time,” which states that diverse and lifelong high-quality environmental education programs should be prepared and provided to families, schools, communities and companies.

4.1 School education

(Current Situation and Challenges)

At schools, it is quite important to deepen children’s understanding of the environment including biodiversity, and nurture their attitude toward taking voluntary actions to protect the environment.

Schools have been providing environmental education through the entire curriculum in a way that integrates with social studies, science, comprehensive study, and moral education. New official guidelines for teaching in schools suggest that teaching about environmental issues should be promoted in each subject including science. The government continues to ensure that environmental education will be promoted at schools in accordance with the aims of the revised Fundamental Law of Education.

(Specific Measures and Policies)

[Improving contents of education]

- Japan will participate in the “Global Learning and Observations to Benefit the Environment Program (GLOBE Program)” initiated by the United States, and designate GLOBE participating schools. (MEXT)
- The government will hold events for promoting environmental learning to publicize excellent examples of environmental education practices nationwide and provide opportunities of information exchanges. (MEXT)
- The government seeks up-to-date methods of environmental education in response to

changing social needs, including those demanded by the “United Nations Decade of Education for Sustainable Development (ESD),” and will conduct surveys and research necessary for facilitating such efforts. (MEXT)

- The government will promote a variety of programs to provide hands-on nature experience including rural long-stay programs.
- The government will improve school facilities in a way that ensures low environmental load and co-existing with nature, and utilize such improved facilities for environmental education. (MEXT, MAFF, METI, MOE)

[Improving the ability of teachers]

- In targeting community members and teachers dedicated to environmental conservation activities, the government will hold seminars for environmental education and basic training courses for environmental educators. (MEXT, MOE) [Cited in Chapter 2, Section 3, 5.1]
- In targeting the supervisors of prefectural boards of education and teachers, the government will provide training with the goal of improving their ability as environmental educators at school. (MEXT) [Cited in Chapter 2, Section 3, 5.1]
- The government is creating a teachers’ guidebook that explains the meaning and role of environmental education in schools, and also shows practical examples of teaching. (MEXT, MOE)

4.2 Measures to be implemented outside schools and lifelong education

(Current Situation and Challenges)

Although the attitude of citizens toward environmental conservation appears to be improving, such an attitude is not necessarily linked with specific actions. Therefore, the government must provide high-quality, action-inspiring environmental education programs to anyone from young children to adults. By implementing the “21st Century Environmental Education Initiatives—to provide Environmental Education for Anyone, Anywhere, and at Any Time” and other programs, the government plans to provide better environmental education not only at schools but also at museums and other social education facilities. It also seeks to create opportunities for people to have hands-on nature experience in agricultural villages, forests, waterfront areas, and beaches or to experience the wisdom of enjoying an environment-friendly lifestyle through cultural studies. Through such measures, the government seeks a diversification of environmental education programs involving learning about biodiversity, so that all members of society, including families, schools, communities and companies can receive lifelong high-quality environmental education.

(Specific Measures and Policies)

- As part of social education measures, the government will promote volunteer activities to be conducted by local residents, and provide assistance for regional efforts to promote learning about environmental issues and other regional problems. (MEXT)
- In targeting zoos, botanical gardens, aquariums and natural museums, the government will continue promoting facility improvements to assist diverse learning activities, with the aim of improving the functions of museums as places to stir people's intellectual interest and spirit of discovery. (MEXT)
- The government will promote the use of natural monuments for environmental education and improve facilities for such use, while providing continuous assistance to local governments in promoting learning activities through the use of natural monuments. (MEXT)
- In targeting children, the government will promote programs to provide hands-on experience for appreciating nature with the five senses during after-school hours or by operating learn-through-experience programs, such as long-term rural stays in agricultural, fishing or mountain villages, or trial experience as a park ranger engaged in nature protection at a national park. Such experience in having contact with nature, ranging from primitive nature to accessible nature, would allow children to learn about the blessings of nature and acquire diverse knowledge concerning the relationship between nature and humankind, and would lead to their sound growth as human beings. (MEXT, MAFF, MLIT, MOE) [Cited in Chapter 2, Section 3, 3.1]
- In line with the policy on intragovernmental collaborative actions established by the "Project Team on Complementarities and Interrelationships between Urban and Rural Areas," the government will conduct the "Project for Promoting Children's Hands-on Activities in the Rural, Mountainous or Fishing Villages" to provide elementary school children with the opportunity to experience rural life firsthand through one-week stays in an agricultural, mountain or fishing village. For the next five years, it will make preparations for accepting participants in the project, and seek the participation of 23,000 schools nationwide (1.2 million students per grade). (MIC, MEXT, MAFF, MOE) [Cited in Chapter 2, Section 3, 3.1]
- The government will implement the project of "Junior Eco-Club" to assist children's voluntary learning and activities for environmental conservation. (MOE)
- The government will improve its database on environmental education and learning programs, collect relevant information on knowledge, places, tools and examples concerning environmental education and learning, and make such information available to diverse parties. (MOE)
- The government will seek to disseminate community-based ESD nationwide by searching, visualizing and sharing good local ESD practices and training human resources that can promote cooperation among the persons involved in ESD. (MOE)

- The government will promote the creation of environmental education tools for after-school learning activities, and provide after-school environmental education in cooperation with diverse local organizations. (MOE)
- For the purpose of assisting diverse parties in establishing partnerships with other parties, the government will collect and provide necessary information, and create opportunities for exchanges, with those activities being managed by the Global Environmental Partnership Plaza and the Environmental Partnership Office for Local Environment. (MOE) [Cited in Chapter 2, Section 3, 1.1]
- With the aim of promoting children's hands-on experience in and along rivers, MLIT, MEXT and MOE, in cooperation with local teachers, municipalities and private organizations, will promote the "Children's Waterfront Rediscovery Project" that encourages the registration of suitable waterside areas and the usage of such areas by children. (MLIT) [Cited in Chapter 1, Section 8, 4.1, and Chapter 2, Section 3, 3.1]
- The government will further promote efforts for conserving biodiversity in local areas by using the waterside environment for education and play, such as research on creatures living in rice paddies and water paths to expand occasions on which to familiarize oneself with nature, and promote activities to deepen recognition of the agriculture, forestry and fishery industries, as well as biodiversity. (MAFF) [Cited in Chapter 1, Section 6, 1.6, and Chapter 2, Section 3, 3.1]

5 Development of human resources

(Outline of Measures and Policies)

For realizing the conservation and sustainable use of biodiversity, we are in desperate need of specialists having expertise in this field or the ability to teach the significance of biodiversity to the public. And in all fields, it is important to develop human resources dedicated to promoting the environmental friendliness of socioeconomic systems including corporate activities. It is also important to secure and develop manpower that could publicize Japan's environmental efforts to the world, employ the use of Japan's achievements in such international initiatives as the Convention on Biological Diversity, or collect and convey the latest knowledge. It is believed that such human resources could be developed quite effectively when promoted in collaboration with diverse parties including universities and NPOs, as such collaborative efforts have actually been increasing. In this way, the government will promote the training and collaboration of diverse parties as part of strategies for developing human resources, and also aims to use registration systems for personnel strategies.

5.1 Development of human resources

(Current Situation and Challenges)

In order to develop human resources contributive to the conservation and

sustainable use of biodiversity, it is necessary, needless to say, to provide each citizen with opportunities to gain experience or achieve good results by participating in environmental protection activities; it is also necessary to promote professional education at institutions of higher education, on-site training or practical learning, participation in international meetings, practical experience at international organizations, and cooperation with private sectors such as NGOs, all of which are already in progress. More than 90% of Japanese universities offer classes on subjects relevant to the environment, such as “the environment and humankind” and “socioecology.”

(Specific Measures and Policies)

- The government will train park volunteers at national parks nationwide to raise public awareness of nature protection. (MOE)
- The government will organize nationwide training seminars at such places as nature schools to foster human resources who can serve as professional instructors at nature schools and guides for eco-tours. (MOE)
- The government will assist in operating “coastal expert training courses (coastal area ecotourism instructor training seminars)” intended to develop instructors for seaside activities or environmental education, and designed for men and women at least 18 years old. It is planned that such seminars will be held in major cities nationwide in cooperation with local authorities, educational organizations and NPOs. (MLIT)
- In targeting community members and teachers dedicated to environmental conservation activities, the government will hold seminars for basic environmental education and training courses for environmental educators. (MEXT, MOE) [Cited in Chapter 2, Section 3, 4.1]
- In targeting the supervisors of prefectural boards of education and teachers, the government will provide training with the aim of improving their ability as environmental educators at schools. (MEXT) [Cited in Chapter 2, Section 3, 4.1]
- The government will promote the utilization of human resources having expertise and experience in the field of environmental conservation by registering them as “Environmental counselors.” (MOE)
- The government will register privately operated programs intended to foster or accredit specialists in the field of environmental conservation or environmental education, where such programs are supposed to satisfy certain criteria for official registration. It will also promote the wide utilization of registered programs. (MOE)
- The government will promote developing environmental leaders in higher education. To this end, it will assist, through establishing a Government-Industry-Academia Consortiums, the development of higher education environmental leadership training programs with a Vision for Environmental Leadership Initiatives for Asian

Sustainability (Environmental Leadership Vision) (MOE)

- In order to assume leadership in the field of biodiversity, the government will send delegates to international meetings relevant to the Convention on Biological Diversity, with the aim of finding, supporting and fostering Japanese experts in the field of biodiversity. (MOE, MOFA) [Chapter 2, Section 4, 1.1]
- The government will foster and provide assistance to instructors engaged in forest improvement activities and specialists dedicated to promoting forest environmental education. (MAFF)

Section 4 International Cooperation (Basic Concepts)

The conservation and sustainable use of biodiversity is not an issue for just one country but a common issue for all human beings. Therefore, it is necessary to use our country's ability to actively promote measures proportional to its status in international society.

Many developing countries have natural environments that are important for the global conservation of biodiversity. Many such countries face difficulties in properly conserving biodiversity, however, due to their socioeconomic and technical problems, such population growth, expanding economic activities and deep poverty. Since many local communities depend on biodiversity (biological resources) as the basis of livelihoods, the loss of biodiversity in developing countries leads to poverty and environmental deterioration. It is therefore important for all of international society to promote the conservation and sustainable use of biodiversity in developing countries.

In encouraging international efforts, it is necessary not only to be actively involved in various treaties and international programs related to biodiversity, and support developing countries, but also to develop the domestic basis for smoothly implementing these international efforts and promote the activities of local governments or the private sector. At the same time, appropriate environmental considerations must be given to cooperation including ODA and overseas business activities.

COP10 is scheduled to be held in Nagoya, Aichi Prefecture, in 2010, which is the target year for "The 2010 Biodiversity Target" (of achieving by 2010 a significant reduction in the current rate of biodiversity loss) of the Convention on Biological Diversity, and also designated as the United Nation's "International Year of Biodiversity." By taking the opportunity of COP10, Japan must further promote active efforts at home and abroad from a global perspective, and demonstrate international leadership in the field of biodiversity.

1 Japan's international leadership and coordination with Asian and other neighboring countries (Outline of Measures and Policies)

Under the "Convention on Biological Diversity" (adopted in 1992), various decisions and recommendations are made at the Conference of the Parties to the Convention on Biological Diversity (COP) and the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). For example, at COP8 held in 2006, decisions were adopted on individual targets toward achieving "The 2010 Biodiversity Target" and participation of the private sector in the Convention. As a contracting party to the Convention (concluded in 1993), Japan must also implement measures based on these

decisions and recommendations.

By utilizing its standing as the host country of COP10 in 2010, Japan will contribute to discussions for setting new world targets after 2010 (post-2010 targets) to be adopted at COP10, in addition to making positive efforts domestically and internationally, including a comprehensive assessment of biodiversity.

1.1 Hosting the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (COP10) and setting new world targets

(Current Situation and Challenges)

COP10 will be held in 2010 in Nagoya, Aichi Prefecture. COP-MOP5 of the Cartagena Protocol on Biosafety formulated under the Convention on Biological Diversity will also be held along with COP10. The year 2010 also happens to be the Target Year 2010 for the Biodiversity Treaty that stipulates a “substantial slowdown of the loss of biodiversity by 2010.” COP10 will assess the status of achievement through the efforts made, and adopt new strategic project conventions that include the post-2010 targets. The 2010 Biodiversity Target has significance as the first global goal, but faces certain problems, such as some individual targets lacking details or specifics, and subjective, practical methods not being established to assess conditions. The post-2010 targets are expected to be specific, action-oriented ones. Other important topics on the agenda include Access and Benefit-Sharing (ABS) and “liability and redress for damage resulting from transboundary movement of living modified organisms(LMOs)” under the Cartagena Protocol on Biosafety. As the host country, Japan is responsible for overseeing accepted practices, and as a global leader, ensuring that the conference is successful. And as the host of COP, Japan also bears responsibility for leading efforts to conserve global biodiversity.

The level of recognition in Japan is low, however, regarding the status of discussions, decisions and recommendations made at the Convention on Biological Diversity, the Conference of the Parties (COP), and the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), including the “2010 Biodiversity Target,” thereby requiring further outreach and communication.

In addition to efforts made in preparing for COP10 in 2010, Japan must more positively promote efforts on the part of international society in the field of biodiversity through a dialogue with various entities.

(Specific Measures and Policies)

- In addition to making future efforts to enhance domestic measures based on decisions and recommendations made at the Convention and other meetings, through participation in meetings related to the Convention (such as COP, SBSTTA and various working groups), the government will contribute to global conservation and

the sustainable use of biodiversity by promoting the establishment of an effective international framework and recommending that other parties implement the decisions made at the Convention. (MOFA, MOE, METI, MAFF)

- The government will widely communicate the status of discussions, and the content of main decisions and recommendations made at COP and SBSTTA via the Internet and other media, thereby disseminating biodiversity and the Convention on Biological Diversity to the public for encouraging public cooperation in implementing actions recommended by the Convention. (MOE)
- To assume leadership in the field of biodiversity, the government will support and dispatch domestic experts in the field of biodiversity to meetings related to the Convention. (MOE, MOFA) [Cited in Chapter 2, Section 3, 5.1]
- The government will enhance collaboration with local authorities (e.g., NGOs, enterprises, neighboring authorities, supporting executive committees) with an eye toward COP10. (MOE, MOFA, MAFF)
- To more effectively promote measures for conserving biodiversity in the Asia-Pacific region, the government will exchange information on the biodiversity of each country to enhance regional collaboration. (MOE, MOFA)
- In order to contribute to the adoption of new strategic convention projects that include the post-2010 targets, the government will exchange opinions with the people concerned from broader areas and present long-/mid-/short-term goals for Japan, indicators to measure the progress toward achieving the goals, and ideas regarding the post-2010 targets about practical methods of achieving individual targets, in order to lead discussions at COP10. (MOE, MOFA, relevant government ministries and agencies)
- The government will keep the world informed about COP10 to demonstrate the essence of Japan and Asia. It will also help set the next world targets, and based on the outcome of COP10, make efforts in cooperation with the Asia-Pacific region beyond COP10. (MOE, MOFA)
- To grasp the economic significance of the global loss of biodiversity, the government will support analysis of the economic value of biodiversity, costs stemming from the loss of biodiversity, and costs required for effective conservation. (MOE) [Cited in Chapter 2, Section 3, 2.1, and Chapter 2, Section 5, 1.2, 3.1]
- The government will publicize advanced efforts made by Japan such as protection/management systems that function in cooperation with various local entities at national parks, as well as sustainable agriculture, forestry and fishery industries. (MOE, MAFF)
- The government will promote necessary international cooperation to help developing countries achieve the post-2010 targets. (MOFA, MOE)

1.2 Implementing the comprehensive assessment of biodiversity by each country

(Current Situation and Challenges)

At COP8 in 2006, measures to achieve the 2010 Biodiversity Target were discussed, and it was decided to urge the parties to develop their own national and regional targets and relative indicators, and incorporate those targets and indicators into national biodiversity strategies.

As for the methods of comprehensive assessment of biodiversity, there are global-scale assessments such as Millennium Ecosystem Assessment (MA) and Global Biodiversity Outlook (GBO), but there is no method of comprehensively analyzing and assessing the status and trends of biodiversity in Japan. This is considered one reason why it is difficult for Japanese people to understand the status of biodiversity and its actual influence on familiar and real life.

Japan needs to understand how to achieve its targets in order to fulfill its responsibility as a party to the Convention on Biological Diversity, with an eye toward the so-called “2010 Biodiversity Target” (“a significant reduction in the current rate of biodiversity loss by 2010”) adopted at the 6th meeting of the Conference of the Parties to the Convention on Biological Diversity (COP6) in 2002. Through further assessment of overall biodiversity, Japan must establish methods of comprehensive assessment regarding the present status of biodiversity in Japan. The government must also evaluate the current status and trend of biodiversity in Japan, share the information with citizens and utilize it for reevaluating practical measures and national strategies for biodiversity. And based on the comprehensive assessment results, Japan as the host country of COP10 in 2010 must also demonstrate international leadership by urging the comprehensive assessment of biodiversity by various foreign countries.

(Specific Measures and Policies)

- The government will implement comprehensive assessment of biodiversity with the participation of many experts, summarize it in a way easy to understand, and publish it. (MOE) [Cited in Chapter 2, Section 5, 1.1]
- The government will publish the comprehensive assessment results of biodiversity at COP10, and call for implementation of the comprehensive assessment of biodiversity by other countries at the national level. Particularly for the Asia-Pacific region, it will also lend technical support and will transfer its experience. (MOE) [Cited in Chapter 2, Section 5, 1.1]

1.3 Proposal and announcement of the SATOYAMA Initiative

(Current Situation and Challenges)

There are certain regions in the world where a variety of regionally specific ecosystems are either progressively deteriorating or have been lost due to damaging

agricultural activities, excessive logging and abandoned logging areas, and too much grazing by livestock without considering the weather, soil and hydraulic conditions of the local area or which exceed the recuperative strength of nature, given the main priority placed on short-term productivity in socioeconomic activities. The resulting loss of global biodiversity not only leads to a loss of biodiversity in Japan (such as fewer migratory birds) but also exerts a big impact on the lives of people in Japan, which depends on overseas biodiversity for the major proportion of such resources as food and lumber. This problem is being exacerbated by the effects of abnormal weather associated with climate change on crops, as well as skyrocketing grain prices.

In building a sustainable society, it is therefore essential for Japan and all of international society to promote building a society in harmony with nature through the sustainable and cyclical use of natural resources based on the potential of regional environments, in addition to building a low-carbon society and a sound material-cycle society.

Japan has the wisdom and tradition of not only using nature wisely but also collaborating with it, as well as protecting and fostering nature, as seen in Satochi-Satoyama areas (rural landscapes formed by the sustainable use of natural resources). In various regions of the world including Asia, there are traditional methods and social systems for using natural resources in a harmonious coexistence with nature. By restoring, further developing, and using such wisdom and tradition in our time, along with a fusion of current scientific knowledge, we must realize a society in harmony with nature that accommodates natural and social conditions in various regions of the world. In accordance with the long-term goal of creating a society capable of functioning in harmony with nature, the government will promote efforts for the sustainable use and management of natural resources in secondary natural areas that are widely distributed in the world, and formed and managed under the influence of human activities, such as those in the agriculture, forestry and fishery industries. Termed the “SATOYAMA Initiative,” Japan will present these ideas to the international community and use COP10 as an opportunity to seek the support and participation of diverse entities, and develop an international partnership. Promoting the Initiative on a global scale will thus help solve some of the problems mentioned above.

Establishing the sustainable use of biodiversity is an important theme commonly shared by both developed and developing nations in international discussions regarding biodiversity, such as the Conference of the Parties to the Convention on Biological Diversity, and considered contributive to solving these problems.

The government will also improve the stability of ecosystems against regional climate change to contribute to the stable provision of food and fuels, thereby improving human welfare in the long run.

Japan is also providing such forms of cooperation as offering necessary advice and data on the “Sub-global Assessment (SGA) of Satoyama and Satoumi in Japan” being advocated and examined by the United Nations University Institute of Advanced Studies under the framework of Millennium Ecosystem Assessment (MA), and with the results to be announced at COP10. The resolution X.31 “Enhancing biodiversity in rice paddies as wetland systems” that was jointly proposed by the Japanese and Korean governments, and adopted at the 10th Meeting of the Conference of the Contracting Parties to the Ramsar Convention held in 2008, urges the parties to promote research on creatures living in rice paddies, exchange information, and identify and introduce agricultural and water management methods that will improve biodiversity. As rice paddies are important elements of Satochi-Satoyama areas, cooperative efforts with the “SATOYAMA Initiative” are highly expected.

Japan will thus promote measures for the SATOYAMA Initiative while cooperating with other related international activities.

(Specific Measures and Policies)

- Focusing on Satochi-Satoyama areas, the government will rebuild systems to harmonize with nature by fusing past wisdom with modern technology based on the wisdom and tradition of living in harmony with nature as reflected in Japan’s view of nature and its socioeconomic systems. In addition to such methods established in Japan, the government will also collect and analyze the existing state of the sustainable use of natural resources worldwide, compile global ideals for the sustainable use and management of natural resources according to the potential of individual regions, and present guidelines to realize these ideals. The government named this activity the “SATOYAMA Initiative” and will widely call for participation in the international framework based on this principle, and propose it at COP10. (MOE) [Cited in Chapter 2, Section 7, 1]
- In cooperation with international organizations and individual countries, the government will establish an international framework—the “SATOYAMA International Partnership (tentative name)” —to effectively promote the “SATOYAMA Initiative” and widely call for participation under the framework at COP10 as a great opportunity. (MOE)
- The government will collect examples of farming and management methods to create and maintain a paddies environment suitable for wildlife habitats, and publicize the results at such international settings as COP10 and the 11th Meeting of the Conference of the Contracting Parties to the Ramsar Convention, and to the general public for disseminating and establishing its efforts. (MOE) [Cited in Chapter 1, Section 6, 1.1]

1.4 Proposal and announcement of the Asian National Park Initiative

(Current Situation and Challenges)

Many people, especially in Asia, often live in a close relationship with nature, thereby raising the common issues of collaborating and building a consensus with regional residents. In certain national parks in Southeast Asia, however, there is friction between local residents and park managers. In some cases, parks are not prepared to receive visitors and often have few users, resulting in not much regional benefit being passed on.

Japan has adopted a zoning system and built up a mechanism to coexist with regional society, while leaving beautiful nature for the future, thereby offering an effective method for other regions in Asia.

There is no framework for the management authorities of national parks or other protected areas in Asia to exchange information on each country's management method or build a system to accept users from foreign countries. It is thus necessary to build such a system to improve the management level and reduce the loss of biodiversity by obtaining the consent of local residents.

To accomplish the above, the Japanese type of national park system will be announced to the world.

(Specific Measures and Policies)

- Concerning national parks and other reserves in each Asian country, especially those in East Asia and Southeast Asia, the government calls the framework—under which to collect the management methods of Japanese-type national parks and advanced examples of each Asian country, mutually share and transmit information, achieve technical cooperation in conservation and management, improve the level of conservation and management of each country's national parks, and build a system to receive users—the “Asian National Park Initiative,” and will propose and convey it to Asian countries at international conferences and workshops. At the time, such existing frameworks as the IUCN World Commission on Protected Areas, East Asia Meeting will also be used. In this way, the government will contribute to the conservation of biodiversity and the sustainable development of regional societies. (MOE)

1.5 Cooperation related to information on protecting biodiversity in the Asia-Pacific region

(Current Situation and Challenges)

The G8 (in Kobe) in May 2008 adopted the “Kobe Call for Action for Biodiversity” that stipulates the “Strengthening of Science for Biodiversity Monitoring.” It formulated an agreement on international cooperation regarding the monitoring, assessment and information sharing of biodiversity through strengthened cooperation

among existing organizations that focus on the research and monitoring of biodiversity. The G8 Environment Ministers' Meeting in 2009 (Syracuse, Italy) adopted the "Charter of Syracuse on Biodiversity" regarding biodiversity. In the declaration, as part of "Science, Research and Policies," participating nations agreed to support cooperation among countries, relevant international organizations, research institutes and NGOs to further global monitoring of biodiversity based on effective networking of existing monitoring schemes. As this fact indicates, strengthening the efforts for global information sharing in biodiversity conservation is an urgent task.

As an effort mainly participated by researchers, the Group on Earth Observations Biodiversity Observation Network (GEO BON)—a framework to integrate the globally promoted monitoring of ecosystems and biodiversity—was established in 2008. In response, the Japanese Committee of GEO BON (JBON) was organized in May 2009, followed by the Asia-Pacific Biodiversity Observation Network (AP BON) in July 2009 to promote networking biodiversity observation activities in Japan in cooperation between related governments and research institutions.

In the Asia-Pacific region that is closely linked to Japan socioeconomically and in terms of environmental conservation, and where any loss of biodiversity raises concerns given the region's rapid economic growth expected in the future, international efforts are needed regarding information on conserving biodiversity in cooperation with each country and with related organizations.

(Specific Measures and Policies)

- The government will cooperate in developing such existing information basis on global biodiversity as the Global Biodiversity Information Facility (GBIF), an international platform for scientific information on biodiversity, GEO BON, and International Long Term Ecological Research (ILTER). (MOE)
- In cooperation with other existing international programs such as GBIF and GEO BON, the government will strongly support the building of biodiversity monitoring network in the Asia-Pacific region. (MOE)
- The government will coordinate and cooperate with JBON organized by key researchers in May 2009 to promote the networking of biodiversity information in Japan. (MOE)
- The government will promote the East and Southeast Asia Biodiversity Information Initiative (ESABII) that gathers and compiles necessary information such as the living status of endangered species, and organizes training seminars on taxonomy in cooperation with relevant nations and organizations to support decision making regarding the conservation and sustainable use in East and Southeast Asian nations. (MOE)

2 Implementing other conventions related to the Convention on Biological Diversity (Outline of Measures and Policies)

By strengthening the cooperation with various conventions related to biodiversity such as described below, efforts for conserving biodiversity and its sustainable use must be made from a global perspective.

2.1 Cartagena Protocol

(Current Situation and Challenges)

The Cartagena Protocol prescribes, based on the Convention on Biological Diversity, the international framework for importing and exporting living modified organisms(LMOs) to prevent the adverse effects on the conservation and sustainable use of biodiversity. Japan ratified concluded it in 2003. In February 2004, its domestic law “the Cartagena Act“ was enforced, ensuring appropriate and smooth implementation of the Cartagena Protocol by taking measures to control the use of LMOs based on the Cartagena Act

COP-MOP5 will be convened in Japan in 2010. The agenda includes the rules and procedures regarding “liability and redress for damage resulting from transboundary movement of LMOs “.

(Specific Measures and Policies)

- Through appropriate enforcement of the Cartagena Act, the government will promote the appropriate and smooth implementation of the Cartagena Protocol. (MOF, MEXT, MHLW, MAFF, METI, MOE)
- Through the Conference of the Parties serving as the Meeting of the Parties to the Cartagena Protocol, the government will participate in the process of considering the measures necessary to effectively implement the Protocol. As for rules and procedures regarding liability and redress on the main agenda for COP-MOP5, Japan (the host country) will participate in process to obtain practicable results for individual countries having various standpoints regarding LMOs. (MOFA, MOF, MEXT, MHLW, MAFF, METI, MOE)

2.2 Ramsar Convention

(Current Situation and Challenges)

The Ramsar Convention (adopted in 1971) aims to promote the conservation and wise use of wetlands that are internationally important habitats for wild fauna and flora, including waterfowl and the fauna and flora living there. Japan ~~Convention~~ became a party to convention in 1980. In 2008, Japan newly designated four important wetlands as Ramsar sites based on the Convention. As of March 2010, Ramsar sites in Japan cover 131,027 ha at 37 sites. In the future, the conservation and wise use of

wetlands in Japan must be further promoted based on decisions made at the Conference of the Contracting Parties to the Convention. Moreover, measures must be implemented to enhance biodiversity in rice paddies and conserve wetlands in the Asia-Pacific region where the destruction of wetland ecosystems has been progressing in recent years.

(Specific Measures and Policies)

- In addition to the wetlands being considered but not yet registered on the occasion of COP9 in 2005, among those found to meet the criteria for identifying wetlands of international importance through new surveys based on the latest “Criteria for identifying Wetlands of International Importance” and “Enhancing of Biodiversity in Rice Paddies as wetland systems” passed at the COP10 in 2008, the government will try to register six more Ramsar sites in Japan by COP11 (planned for 2012). MOE [Cited in Chapter 1, Section 2, 8.1]
- Following the decisions made by the COP to the Ramsar Convention, the government will promote the comprehensive conservation and wise use of wetlands by conducting monitoring surveys and developing information for Ramsar sites, restoring wetlands, providing environmental education, conducting relevant public awareness campaigns and taking other measures, in cooperation with relevant local governments, NGOs, experts and local residents. (MOE, MLIT) [Cited in Chapter 1, Section 2, 8.1]
- Internationally, particularly in the Asia-Pacific region that encompasses the migratory routes of waterbirds flying to Japan, the government will cooperate in promoting implementation of the Convention and wetland conservation, by conducting surveys on the status of wetlands, supporting the selection of candidate sites for Ramsar designation, and raising awareness. (MOE, MOFA)

2.3 CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)

(Current Situation and Challenges)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, adopted in 1973) targets the protection of endangered species by regulating international trade in wild fauna and flora; Japan became a party to the Convention in 1980. Based on the Convention, Japan controls the import and export of the species listed in Appendices I, II and III, in accordance with the “Foreign Exchange and Foreign Trade Law” and its related regulations.

The species listed in Appendix I of the CITES are also subject to internal trade regulation regarding the transfer of ownership and/or the right of possession, etc, under the “Act on Conservation of Endangered Species of Wild Fauna and Flora.” Thus, implementation of the CITES is being promoted by proper application of related domestic legislation. However, illegal trade involving species listed in the CITES

Appendices is still being detected today, thus requiring further enhancement of effective controls.

(Specific Measures and Policies)

- The ministries and the organizations concerned will continue collaborating and cooperating to prevent and disclose illegal acts. They will also cooperate with CITES to reduce illegal trade, including that conducted via the Internet, under the CITES. (MOF, METI, MAFF, MOE, National Police Agency, MOFA)
- Based on evaluation of implementation of Act on Conservation of Endangered Species of Wild Fauna and Flora, the government will discuss future efforts and take necessary measures. (MOE)
- As for protecting wild animals and plants, the government will deal with the Conference of the Parties to CITES in order to take measures from the perspective of sustainable use that can harmonize the use of resources and conservation of ecosystems and the environment based on scientific information. (MOFA, MOE, MAFF, METI)

2.4 World Heritage Convention

(Current Situation and Challenges)

The World Heritage Convention (adopted in 1972) targets the protection of World Heritage properties considered important for all of humankind; Japan became a party to the Convention in 1992. Based on the Convention, three sites in Japan—Shiretoko, Shirakami-Sanchi, Yakushima—have been listed in the World Heritage List as natural World Heritage sites.

Also listed in the World Heritage List are such cultural World Heritage properties as “Sacred Sites and Pilgrimage Routes in the Kii Mountain Range” and “Iwami Ginzan Silver Mine and its Cultural Landscape,” as the values thereof were recognized as Cultural Landscapes defined in “The Operational Guidelines for the Implementation of the World Heritage Convention” as “combined works of nature and of man.”

The proper conservation of these World Heritage sites will be promoted, as well as preparing conditions for recommending and describing new natural heritage sites. Support for developing countries is also expected.

(Specific Measures and Policies)

- Concerning Shiretoko, Shirakami-Sanchi and Yakushima listed in the World Heritage List, the government will promote proper conservation. Japan will properly deal with regular reports that Asia-Pacific nations are obligated to make from 2010 to 2012 concerning the World Heritage sites in each nation. (MOE, MAFF, MEXT, MOFA)
- With regard to the “Ogasawara Islands” listed in January 2007 in the World Heritage

Tentative List, indicating the government's intention to recommend the islands in the future, the government has confirmed some visible achievement in enhancing the measures to secure conservation, measures for foreign species, and efforts to conserve rare species, all of which have been promoted in cooperation with the organizations concerned. And the government recommended the islands in January 2010 for listing in the World Heritage List in 2011. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1, and Chapter 1, Section 9, 1.5]

- Regarding the “Ryukyu islands (targeted part of the Nansei Islands and south of the Tokara Islands),” since measures to secure conservation must be enhanced for such important areas as the habitats of threatened species, the government will analyze and evaluate its value as a natural World Heritage site and make efforts to enhance its reserve setting in cooperation with the region. (MOE, MAFF, MEXT) [Cited in Chapter 1, Section 2, 9.1, and Chapter 1, Section 9, 1.5]
- Through regular reports on World Heritage sites, we will share our experience in conserving our World Heritage sites with other member nations (mainly in the Asia-Pacific region) to help improve the quality of conserving and managing World Heritage sites in individual countries. (MOE, MAFF, MEXT, MOFA)

2.5 International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention)

(Current Situation and Challenges)

The “International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC Convention, adopted in 1990)” targets the establishment of an international cooperation system to cope with large-scale oil spill incidents; Japan became a party to the Convention in 1995. In 2007, Japan also signed the “Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol),” which expanded the scope of pollutants to include hazardous and noxious substances other than oil. To deal with the OPRC Convention and OPRC-HNS Protocol, Japan has formulated the Japanese National Contingency Plan for Oil Pollution Preparedness and Response (National Contingency Plan). The National Contingency Plan prescribes that an information map regarding natural and social conditions influenced by oil spill incidents in coastal areas should be developed and proper measures taken to ensure proper wildlife relief, wildlife impact assessment, and the provision of information.

With regard to the map of vulnerable costal areas, although the system to prepare for oil spill incidents has already been established, the vulnerable costal environment map must be enhanced and properly managed in the future, since hazardous liquid substances have been targeted by the National Contingency Plan under the OPRC-HNS Protocol, and the coastal terrain of various regions is being changed due to reclamation

projects, for example. And based on the National Contingency Plan, a system must be established to properly provide wildlife relief and conduct impact assessment.

(Specific Measures and Policies)

- The government will enhance the map of vulnerable costal areas to cope with spill incidents involving hazardous liquid substances other than oil, and update the vulnerable area map by including target groups of living organisms (e.g., fish, benthic life) and ecological classifications (e.g., tidelands, seaweed beds) based on the changing use of coastal land. (MOE) [Cited in Chapter 1, Section 9, 5.1]
- The Aquatic Bird Rescue Training Center will continue conducting seminars for personnel from local government bodies to prepare for and promptly deal with temporal large-scale contamination of aquatic birds in areas where oil pollution is caused by an accident. (MOE) [Cited in Chapter 1, Section 9, 5.1, and Chapter 2, Section 1, 2.6]

2.6 Antarctic Treaty

(Current Situation and Challenges)

“The Antarctic Treaty (adopted in 1959)” prescribes such matters as the freedom and international cooperation of scientific research, and the renunciation of claims to territorial sovereignty in areas south of 60° south latitude; Japan became a party to the Treaty in 1960. Antarctica features ecosystems that include very rare and unique species such as the Ross’s seal. Each party to the Treaty must observe what is prescribed therein, as well as the “Protocol on Environmental Protection to the Antarctic Treaty (adopted in 1991, enacted in 1998, and hereinafter “the Protocol”),” and people involved in research expeditions and tours are given guidance, thereby protecting Antarctica’s environment and ecosystems. Japan has formulated the Protocol’s domestic counterpart law—“Law Relating to Protection of the Environment in Antarctica”—and is positively engaged in protecting the environment in Antarctica.

Rules such as those in the Protocol are examined as necessary at the annual Antarctic Treaty Consultative Meeting to conserve the unique value of Antarctica.

Japan not only observes international agreements decided upon at Antarctic Treaty Consultative Meetings and other such meetings, but also provides information and makes proposals to maintain the unique value of Antarctica, and further promote protection of Antarctica’s environment in cooperation with other countries and international organizations.

Surveys and research are also needed in the future, since the diversity, ecology, physiology and the genetic properties of organisms living on the Antarctic ice shelf and its surrounding area are largely unexplained.

(Specific Measures and Policies)

- In the Antarctica Environmental Monitoring Technology Guideline Project, the government will devise guidelines for the method of monitoring at Showa Base and have periodic environmental monitoring conducted by the Japan Antarctica Research Expedition. (MOE, MEXT)
- The inspection of another country's base—a first for Japan—will be made as part of mutual checking of the status of observing the Treaty by the parties thereto. The results will be reported at the Antarctic Treaty Consultative Meeting, along with proposals being made as needed on a better system for the Antarctic Treaty, including inspections. (MOFA, MOE, MEXT)
- Japan's Antarctic Observation Project (originally launched in 1956) has been conducting research and surveys on the ecosystems and biota of Antarctic marine and land life. The government will clarify the polar environment and genetic characteristics by using various methods focusing on genetic analysis. (MEXT)

2.7 United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa

(Current Situation and Challenges)

The “United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD, adopted in 1994)” prescribes that the countries and regions influenced by desertification formulate and implement action plans to combat desertification, and that developed countries support such measures. Japan became a party to the Convention in 1998.

According to a report (1991) by the United Nations Environment Programme (UNEP), the total area influenced by desertification covers about 25% of the earth's total land area (about 3.6 billion ha) and affects about one-sixth of the world's total population. The issue of desertification not only has a big impact on biodiversity but is also closely related to such global environmental problems as global warming, thereby requiring measures regarding those issues as well.

Climatic and human causes are factors behind desertification. As climatic causes, droughts and acidification that are occurring more frequently due to global warming can be pointed out. As human causes, deforestation due to grazing, cultivation and the extraction of fuelwood can be pointed out. Moreover, as the background behind human causes, there are such socioeconomic and political factors as poverty, population growth, and ongoing development of the market economy.

Based on the Convention, Japan is also making efforts as a developing country to prevent desertification by focusing on support for developing countries.

(Specific Measures and Policies)

- As a developed country party of UNCCD, Japan will help combat desertification in developing countries experiencing serious droughts and/or desertification through measures including ODA. (MOFA, MOE, MAFF) [Cited in Chapter 2, Section 6, 1.1]
- The government will examine methods of comprehensively conserving and managing natural resources, and conduct research and surveys. It will also provide scientific knowledge acquired by those methods at the Conference of the parties to the Convention and at meetings of subsidiary bodies, and positively address the world's desertification problem. (MOFA, MOE, MAFF) [Cited in Chapter 2, Section 6, 1.1]

2.8 Bilateral Conventions and Agreements for the Protection of Migratory Birds

(Current Situation and Challenges)

Based on the “Convention between the Government of Japan and the Government of the United States of America for the Protection of Migratory Birds and Birds in Danger of Extinction, and Their Environment” (enacted in 1974), the “Convention between the Government of Japan and the Government of the Russian Federation for the Protection of Migratory Birds and Birds in Danger of Extinction, and Their Environment” (enacted in 1988), the “Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction, and Their Environment” (JAMBA, enacted in 1981), and the “Agreement between the Government of Japan and the Government of the People’s Republic of China for the Protection of Migratory Birds, and Their Environment” (JCMBA, enacted in 1981), Japan is implementing measures to protect migratory birds and their habitat environments, including research on migratory birds passing between the countries, information exchange, restrictions on capture, and the establishment of protected areas. Furthermore, the trade in species of birds in danger of extinction is controlled in Japan based on the “Law for the Conservation of Endangered Species of Wild Fauna and Flora.”

(Specific Measures and Policies)

- The government will conduct bilateral joint studies on the species, prioritizing such rare species as the Short-tailed albatross, Steller’s sea eagle and Saunders’ gull, for which ecological clarification and conservation are absolutely necessary. (MOE)
- While cooperation with Korea to protect migratory birds is progressing in accordance with the “Agreement between the Government of Japan and the Government of the Republic of Korea on Cooperation in the Field of Environmental Protection (enacted in 1993),” the government will make preparations for negotiations on a bilateral convention or agreement with the Republic of Korea for migratory birds. (MOE, MOFA)
- For migratory birds and their habitats in the Asia-Pacific region, the government will examine the need for a framework of bilateral cooperation with other Asia-Pacific

countries, and the need for a multilateral agreement on providing a framework for long-term conservation. (MOE, MOFA)

2.9 International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM)

(Current Situation and Challenges)

The International Convention for the Control and Management of Ships' Ballast Water and Sediments (adopted in 2004) aims at coping with the negative effects on ecosystems caused by aquatic organisms entering the ballast water of ships, being carried to distant places, and then discharged in a place other than their primary habitats. The Convention makes it mandatory to meet the standard of organism's number in discharging ballast water from ships,, as a provisional step, to change ballast water in broad ocean areas. Guidelines prescribing technical matters in implementing the Convention have been adopted,, with said system being developed.

As one of the world's major maritime and shipbuilding nations, Japan has to date contributed positively to adoption of the Convention. In the future, work to promote effectuation of the Convention and the proper exercise of duties under the Convention should be promoted, including the development of technology to effectively treat aquatic organisms in ballast water and the examination of necessary domestic systems.

(Specific Measures and Policies)

- For ratification of the Convention, the government will promote an examination of preparations to ratify the Convention at an early stage, by collecting information on environmental effects caused by ballast water, and collecting and analyzing basic information on technology used to treat ballast water. (MOE, MLIT) [Cited in Chapter 1, Section 9, 5.1]
- The government will continue to actively participate in discussions at IMO, including the formulation of guidelines for implementing the Convention. (MLIT, MOE, MOFA) [Cited in Chapter 1, Section 9, 5.1, and Chapter 2, Section 1, 3.1]
- The government will contribute to early enactment of the Convention by promoting development of the ballast water management system. (MLIT)

2.10 CMS

(Current Situation and Challenges)

Under the "Convention on the Conservation of Migratory Species of Wild Animals (CMS)," (adopted in 1979), it is prohibited to capture the migratory species of wild animals that are threatened with extinction and listed in Appendix I of the Convention. In order to conserve the species listed in Appendix II, Multilateral Agreements and Memoranda of Understanding (MoU) have also been concluded for migratory waterbirds, seals, bats, sea turtles, and other animals. Under these agreements,

conservation and management plans have been developed, habitats conserved and restored, surveys and research conducted, and awareness raised regarding this issue. Japan has not ratified the Convention, since we have different views on the animals for which capture is prohibited by the Convention.

(Specific Measures and Policies)

- The government will steadily implement bilateral treaties and agreements for migratory birds, the Ramsar Convention, and CITES, which Japan has already ratified. It also seeks to conserve endangered migratory species of wild animals by examining the need to deal with the Convention (including agreements and MoUs) through efforts to collect information by exchanging opinions with the countries and organizations concerned at international conferences regarding this Convention, based on the trend in international engagements concerning this Convention. (MOE, MOFA) [Cited in Chapter 1, Section 1, 1.1, and Chapter 2, Section 4, 3.1, 3.2]

2.11 International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)

(Current Situation and Challenges)

The “International Treaty on Plant Genetic Resources for Food and Agriculture” (tentative name) (adopted in 2001) aims to achieve the conservation and sustainable use of plant genetic resources for food and agriculture, by creating a “multilateral system” to effectively provide plant genetic resources to users and share those resources in a fair and equitable way, as well as the benefits arising from using these resources.

This Treaty has significance in promoting the conservation and sustainable use of plant genetic resources for food and agriculture, although several issues remain to be solved, such as undecided details of its implementation and its unclear relation with intellectual property rights.

(Specific Measures and Policies)

- The government will continue examining how to handle this Treaty, in light of international trends regarding this Treaty, the relation with existing international treaties, and the measures necessary to implement it in Japan. (MOFA, MAFF, METI)

2.12 United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol

(Current Situation and Challenges)

The ultimate objective of the “United Nations Framework Convention on Climate Change” (adopted in 1992) is “to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent anthropogenic interference with the

climate system.” The Convention also prescribes that “such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, ensure that food production is not threatened, and enable economic development to proceed in a sustainable manner.” Furthermore, the Intergovernmental Panel on Climate Change (IPCC) has pointed out that ongoing global warming might adversely affect biodiversity.

The Kyoto Protocol (enacted in 2005) was adopted at the 3rd Conference of the Parties to the UNFCCC in 1997 (in Kyoto), and prescribes a legally binding commitment on the part of each developed country to reduce greenhouse gas emissions. Japan must reduce its greenhouse gas emissions by 6% below levels in the standard year (1990; but 1995 for three gases such as CFC’s substitute) during the period from 2008 to 2012. However, current emissions (in FY 2007) are 9.0% above the levels of the standard year, thereby requiring additional steady measures in all areas to achieve a 6% reduction.

The “Action Plan for Low Carbon Society” decided by the Cabinet in July 2008 stated that not only the major economies but all countries in the world need to address the issue toward creating a low-carbon society and reduce the global emissions of greenhouse gases by at least half by 2050, and that Japan also will reduce its emissions by 60 to 80% of current levels by 2050 as a long-term goal. In September 2009, Japan presented its mid-term goal of a 25% reduction compared to 1990 levels by 2010 on the condition that all major countries agree on a fair, effective international framework and proactive goals. At the end of January 2010, Japan submitted its intention to accept the Copenhagen Accord that was compiled at the 15th session of the Conference of Parties to the United Nations Framework Convention on Climate Change in December 2009, and its reduction targets based on the Accord.

(Specific Measures and Policies)

- To achieve its commitment to achieve a 6% reduction during the first commitment period (2008 to 2012) under the Kyoto Protocol, Japan will promote measures based on the Kyoto Protocol Target Achievement Plan (entirely revised), which was approved in a Cabinet meeting in March 2008. (All government ministries and agencies) [Cited in Chapter 2, Section 6, 1.1, and Chapter 2, Section 7, 1]
- In order to encourage more countries agree to the Copenhagen Accord compiled at the 15th session of the Conference of Parties to the United Nations Framework Convention on Climate Change in December 2009, and submit reduction targets and action plans, Japan will work with individual countries and exercise international leadership toward the adoption of a comprehensive, single legal document that establishes a fair, effective international framework, under which all major countries shall participate based on the Accord. (MOFA , MOE, METI) [Cited in Chapter 2, Section 6, 1.1, and Chapter 2, Section 7, 1]

3 Implementing international programs

(Outline of Measures and Policies)

To effectively promote the conservation and sustainable use of biodiversity, various types of international cooperation are necessary, such as bilateral and multilateral cooperation, cooperation among developed countries, and cooperation among developing countries. It is also important for Japan to positively participate in these international programs either directly or through various international organizations.

Japan should play important roles in various programs, particularly in the Asia-Pacific region. Japan will positively participate and cooperate in activities including international monitoring to determine existing conditions related to the important components of biodiversity such as tropical forests, coral reefs, wetlands and the habitats of migratory birds, related research and surveys, conservation efforts, and collaboration to share information on the conservation of biodiversity as obtained from those activities.

3.1 Conservation of migratory waterbirds in the Asia-Pacific region

(Current Situation and Challenges)

The “Asia-Pacific Migratory Waterbird Conservation Strategy” was adopted in 1996 under the leadership of Japan and Australia as an international framework to conserve migratory waterbirds and their habitats in the Asia-Pacific region. Implementation of this strategy has been promoted in collaboration with governments of the countries concerned, international organizations, NGOs and experts, and flyway site networks have been established for shorebirds, cranes and Anatidae (i.e., bird family that includes ducks, geese and swans). International cooperation among flyway site networks has been implemented, including information exchange and research/surveys conducted on the conservation of migratory birds and their habitats .

In 2006, with expiration of the strategy, the “Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian - Australasian Flyway (Partnership for the East Asian - Australasian Flyway)” was established to further promote international cooperation for the conservation of migratory waterbirds and their habitats. Japan has 27 wetlands (under 29 local authorities) participating in the flyway network based on the partnership. The flyway site networks address all migratory waterbirds in the region. In the future, the flyway site networks must be expanded and improved internationally to promote activities for raising awareness and conservation at the sites of flyway networks.

(Specific Measures and Policies)

- The government will promote such activities as raising awareness, research and surveys, training, and exchanging information at sites participating in flyway

networks. (MOE)

- The government will take measures to expand the partnership and flyway site networks. (MOE) [Cited in Chapter 1, Section 1, 1.1, and Chapter 2, Section 4, 2.10 and 3.2]
- As for species that include such rare species as Saunders's Gull (*Larus saundersis*) and the Black-faced Spoonbill (*Platalea minor*) that migrate between China and Republic of Korea over the Yellow Sea and to Japan, and urgently require conservation, Japan will promote information-sharing with China and Republic of Korea. (MOE)

3.2 International Coral Reef Initiative (ICRI)

(Current Situation and Challenges)

As one of the few developed countries having coral reefs, Japan has been promoting, in cooperation with other countries concerned, the International Coral Reef Initiative (ICRI)—an international framework established in 1994 for conserving coral reefs and related ecosystems (such as mangroves and seaweed beds). Coral reefs are facing various threats stemming from human activities including extraction as a resource, reclamation, pollution, loss of topsoil, tourism, and rising seawater temperatures in line with climate change. Global-scale conservation must therefore be continued into the future.

In practice, the future issues are to designate important coral reef ecosystems to be preserved as marine protection areas and form a network, urgently examine measures to cope with the impact of climate change and marine acidification, and promote international discussions to conserve mangroves as closely related to the conservation of coral reefs by using such methods as reducing the inflow of soil and sand from the land.

(Specific Measures and Policies)

- Japan will continue promoting the conservation of international coral reef ecosystems by participating in the ICRI and the International Tropical Marine Ecosystems Management Symposium (ITMEMS). (MOE)
- The government will upgrade its database of marine protected areas that contribute to the formation of the marine protected area network, particularly in the Asia-Oceania region. It will also organize a regional ICRI conference, formulate a network strategy for important coral reefs mainly in the East Asian region in 2010, and try to strengthen and improve the coral reef reserve network based on the strategy in cooperation with the nations concerned. (MOE) [Cited in Chapter 1, Section 1, 1.1, and Chapter 2, Section 10, 3.1]
- Through the “International Coral Reef Research and Monitoring Center (in Ishigaki City, Okinawa),” the government will transmit information on Japan’s research and

conservation related to coral reefs. It will also cooperate in promoting the research and educational functions of the “Palau International Coral Reef Center”—a base in the Micronesia region that Japan helped to establish. (MOE)

3.3 Man and Biosphere (MAB) Program

(Current Situation and Challenges)

The Man and Biosphere (MAB) Program was inaugurated in 1970 as an international cooperation program of the United Nations Educational, Scientific and Cultural Organization (UNESCO). This program is intended to develop a scientific basis for solving environmental problems, and one of its important pillars is the “biosphere reserve” which has three functions: the conservation of biodiversity, logistical support, and sustainable development. As of May 2009, 553 locations in 107 countries have been designated as biosphere reserves. In Japan, four areas—the island of Yakushima, Mount Odaigahara and Mount Omine, Mount Hakusan, and Shiga Highland—have been designated as biosphere reserves by UNESCO. The Japanese National Commission for UNESCO calls the biosphere reserves “UNESCO Eco Parks” to promote public awareness.

(Specific Measures and Policies)

- From 2002, Japan has been donating funds for the Japanese Funds-in-Trust for the Promotion of Science for Sustainable Development (renamed the Japanese Funds-in-Trust for Solution of Global Issues in FY 2007), and positively supporting network activities in biosphere reserves in the Asia-Pacific region through the dispatch and cooperation of university researchers. Through the Japanese Funds-in-Trust for the Capacity-building of Human Resources, Japan has been supporting the development of human resources in this field in the Asia-Pacific region, and now also supports the establishment of biosphere reserves in Eastern Europe. (MEXT, MOFA)
- Based on the worldwide trend, the government will examine the development of new policies to use the mechanism of biosphere reserves, such as selecting new candidate sites for the reserves. (MEXT, MOE) [Cited in Chapter 1, Section 2, 10.1]

3.4 Sustainable forest management and measures to prevent illegal logging

(Current Situation and Challenges)

Forest ecosystems are very important for conserving biodiversity, but deforestation and forest degradation continuing to occur in the world. To prevent deforestation, it is important to ensure the implementation of sustainable forest management. For this reason, international conferences such as the United Nations Forum on Forests (UNFF), and such multilateral efforts as the International Tropical Timber Organization (ITTO)

and the Asia Forest Partnership (AFP), in addition to many bilateral efforts, have been underway. Japan is positively participating in these international efforts, along with making positive efforts to promote sustainable forest management through activities that include measures against illegal logging, the restoration of wastelands, and planting of trees.

In line with the international trend to promote sustainable forest management, the one measure being promoted worldwide in various regions with the cooperation of each country concerned is the development of “criteria and indicators” to scientifically and objectively grasp and assess the sustainability of forest management, as prescribed in “Agenda 21” (1992)—an action plan for sustainable development decided by the United Nations Conference on Environment and Development. Nine major international processes are now underway in the world. These major processes include the ITTO criteria and indicators for the tropical timber member countries of the “International Tropical Timber Organization (ITTO),” the “Pan European Forest Process” involving European countries with temperate forests, and the “Montreal Process” involving countries having temperate forests other than European countries and Japan. The criteria and indicators of the Montreal Process consist of seven criteria including the “conservation of biological diversity” and “maintenance of forest ecosystem health and vitality,” as well as indicators to practically measure and describe those criteria. These methods can be used to determine whether the handling of a forest is heading in a sustainable direction, by periodically collecting data along with the indicators for each country and region, and grasping, analyzing and evaluating changes.

Aiming to achieve a good balance between sustainable forest management and conserving biodiversity in the timber production forests in tropical areas, ITTO formulated “ITTO/IUCN guidelines for the conservation and sustainable use of biodiversity in tropical timber production forests” in 2008. Our task for the future is disseminating those guidelines for use in actual forest management.

Based on the principle that illegally logged timber should not be used, in “Japan’s Climate Change Initiative” published for the Gleneagles G8 Summit held in July 2005 in Scotland, the Japanese government also announced its intention to introduce measures to ensure the procurement of legally verified and sustainable wood and wood products under the Green Purchasing Law.

To that end, in February 2006 the basic policy for the Green Purchasing Law, which prescribes the designated items and evaluation criteria for eco-friendly goods to be procured by the government, was revised. What was included as evaluation criteria is that the raw timber material used for public construction (such as wood, laminated lumber and plywood) as well as that for paper, stationery and office furniture should be logged in a legal manner according to laws regarding forests in the country of origin. The government formulated and publicized a guideline to verify the legality and

sustainability of wood and wood products, and also translated the guideline into six languages for wide dissemination in other timber-producing countries.

Further promoting sustainable forest management thus requires proactive participation in and contribution to these measures.

(Specific Measures and Policies)

- Based on the “Guideline for verification on the legality and sustainability of wood and wood products” formulated in 2006, the government will make efforts so that wood and wood products verified by forest certification and other means are available not only for the central government but also for local governments, private companies, and general consumers. (MAFF)
- Through the “Asia Forest Partnership (AFP)” jointly proposed by Japan and Indonesia, and inaugurated at the World Summit on Sustainable Development, the government will pursue such activities as measures to contain forest reduction and deterioration, expand forest areas, and work against illegal logging, thereby promoting sustainable forest management. (MAFF, MOE, MOFA)
- By actively participating in international policy dialogue, the government will play a positive role in international society in cooperation with the countries concerned to promote sustainable forest management, including taking measures against illegal logging with a view toward conserving biodiversity in the world’s forest resources and mitigating global warming. (MAFF, MOE, MOFA) [Cited in Chapter 2, Section 6, 1.1]
- The government will conduct research on regions facing illegal logging issues and on the impact of illegal logging on forest reduction, global warming and biodiversity, and propose at international conferences new policies for reducing deforestation and conserving biodiversity. (MOE) [Cited in Chapter 2, Section 6, 1.1]
- After Canada had served as secretariat of the Montreal Process from its inauguration, Japan has been the secretariat since January 2007. As such, Japan will demonstrate its leadership in establishing sustainable forest management in the world, and promote international efforts for formulating and applying “criteria and indicators” to grasp, analyze and evaluate the sustainability of forest management. (MAFF) [Cited in Chapter 1, Section 5, 1.13]
- In order to promote the dissemination and application of “ITTO/IUCN guidelines for the conservation and sustainable use of biodiversity in tropical timber production forests” formulated by ITTO in 2008, the government will support activities promoting those guidelines at COP10. (MOFA, MAFF)
- Japan donated 10 million dollars in 2008 to the Forest Carbon Partnership Facility (FCPF) launched by the World Bank, in order to develop the methodology of reducing greenhouse gas emissions by conserving forests. The government will actively contribute to supporting the enhancement of FCPF’s capabilities, such as reducing

and monitoring deforestation in developing countries. (MOF, MOE, MAFF, MOFA) [Cited in Chapter 2, Section 6, 1.1]

- The government will make efforts for basic research and the development of technology to promote measures for preventing global warming, such as sustainable forest management in developing countries and Reducing Emissions from Deforestation and Forest Degradation (REDD). (MOFA, MAFF) [Cited in Chapter 2, Section 4, 4.4, and Chapter 2, Section 6, 1.1]

3.5 Environmental Specimen Time Capsule Program [Cited in Chapter 2, Section 2, 1.2.4]

(Current Situation and Challenges)

To prepare for a time in the future when environmental issues become obvious, it is very important to properly preserve the current global environment, in order to make future analysis and evaluation when technology advances. For this purpose, this program is intended to systematically collect and accumulate environmental samples of soil and living organisms. Given the fact that more wildlife species are facing the risk of extinction due to environmental contamination and environmental changes, information on the cells and genes of threatened species is stored for a time in the future when extinct forms of life can possibly be restored by newly developed technology.

The threatened birds in Japan include species that are similar to or considered a subspecies of those with relatively large populations living in East Eurasia, such as Red-crowned cranes and birds of prey. Building cooperative relationships with the countries where these species live will greatly contribute to the protection and breeding of threatened birds in Japan. Moreover, the habitats of many threatened birds in Japan extend to East Asia and Eurasia, making it is necessary to build an international network concerning the long-term storage of cells and genes.

(Specific Measures and Policies)

- The government will collect the reproductive cells, initial cells, and somatic cells of threatened species on the Red List of the Ministry of the Environment, and target the preservation of cell samples of 2,500 kinds of threatened species in five years from FY 2008, by preserving 500 each year and analyzing the DNA of important species. For aquatic plants, it will target the preservation of 10 kinds of threatened algae samples per year, thereby targeting the individual conservation of 50 kinds in five years. (MOE)
- Shinjuku Gyoen National Garden will preserve the seeds of endangered plants. It will also preserve plants with historical value, and deliberate on a framework for summarizing and sharing to be applied in the country and overseas the accumulated knowledge and breeding technology. (MOE)
- Given the possibility of applying ultralow temperature preservation technology now

being established in Japan, the government will conduct research in Siberia, the summer nesting site for many kinds of birds, and examine international standardization. (MOE)

3.6 Critical Ecosystem Partnership Fund (CEPF)

(Current Situation and Challenges)

The Critical Ecosystem Partnership Fund (CEPF) was established in 2000 by Conservation International (CI) and the Global Environment Facility (GEF) to support organizations that implement activities to protect biodiversity hot spots (areas selected as having the richest biologically yet are the most endangered) in developing countries. From its establishment to March 2009, the Fund has provided grants totaling more than 113 million dollars to about 1000 projects for conserving biodiversity at 18 biodiversity hot spots.

Japan has contributed to the partnership by providing funds and formulating support policies ever since June 2002 when it first expressed a desire to participate in the fund at the final preparatory conference of the World Summit on Sustainable Development (WSSD, 2002).

(Specific Measures and Policies)

- In July 2007, the CEPF Donor Council decided to extend cooperation for conserving biodiversity in the target areas including newly selected regions, and Japan will examine the support of efforts for conserving biodiversity hot spots in developing countries supported by the CEPF. (MOF, MOE)

3.7 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

(Current Situation and Challenges)

Discussions have been promoted under the United Nations Environment Programme (UNEP) to formulate Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), an intergovernmental framework for evaluating trends in biodiversity and linking experts worldwide via an international network.

IPBES is expected to play an important role in accumulating knowledge about biodiversity and forming international agreements by providing a scientific foundation for government legislation just like the Intergovernmental Panel on Climate Change (IPCC) does in the “United Nations Framework Convention on Climate Change.” Japan will also proactively contribute to such efforts.

(Specific Measures and Policies)

- In order to promote the use of scientific knowledge in the policy-making process and strengthen the interface between science and governmental policies, the government will be proactively involved in international discussions regarding the formulation of IPBES—known as a biodiversity version of IPCC—and help make it an effective, efficient framework backed by scientific grounds. (MOE)

3.8 Establishment of an information system for biodiversity**3.8.1 Global Taxonomy Initiative (GTI)****(Current Situation and Challenges)**

Accurate data on species as components of various ecosystems are necessary for conserving biodiversity, but CBD COP2 (1995) pointed out the overwhelming lack of taxonomists who could conduct related research. CBD COP6 (2002) adopted an Programme of Work for the “Global Taxonomy Initiative (GTI),” the cross-cutting issue of which is advancing taxonomy for implementing the Convention on Biological Diversity, and under which each country has been making efforts to foster taxonomists and share taxonomic information.

Japan held a highly evaluated GTI workshop in 2002. However, efforts must be further promoted.

(Specific Measures and Policies)

- The government will attempt to advance taxonomic researches by contributing to regional projects in Asia and Oceania regions. It will also try to improve access to various kinds of information on taxonomy by developing a taxonomic database and improving the management of species specimens, thereby helping to understand the actual conditions of species in the world. Moreover, the government will promote the organizational capacity building for taxonomic researches in developing countries of the region. (MOE, MEXT)

3.8.2 Clearing-House Mechanism (CHM) for biodiversity information**(Current Situation and Challenges)**

In accordance with the strategic plan for the Clearing-House Mechanism (CHM) adopted in COP5 (2002), the activities have been taken to enhance each country's policies and measures for the conservation and sustainable use of biodiversity, by exchanging and sharing various kinds of information on the biodiversity of each country.

The Biodiversity Clearing-House Mechanism is a system used to search and grasp, on a cross-cutting basis, various kinds of information on biodiversity possessed by many groups and individuals, such as governments, universities, museums and researchers,

and enable the promotion of exchanges and circulation of information among such parties. Based on Article 17 (Exchange of Information) and Article 18 (Technical and Scientific Cooperation) of the Convention on Biological Diversity, Japan initiated operation of the Clearing-House Mechanism in July 2004 and is steadily expanding its data as seen in the registration of about 900 metadata items (information on information sources necessary to search and grasp the locations of data) as of September 2009. The current issue for further enhancing usage is how to expand participation.

(Specific Measures and Policies)

- Regarding the Clearing-House Mechanism (CHM) for Biodiversity Information, the government will strengthen efforts to greatly enrich the registered metadata qualitatively and quantitatively, and increase metadata registration to about 1600 items by March 2012, thereby promoting metadata enhancement and information exchange at home and abroad. (MOE) [Cited in Chapter 2, Section 5, 2.4]
- For making metadata easily used for all users, the government will simplify the access to target information and enable access to the provided information from abroad, and thereby strengthen international transmission of information on natural environment. (MOE) [Cited in Chapter 2, Section 5, 2.4]
- Based on the strategic plan for the CHM, the government will attempt to accumulate information by promoting researches and surveys in Japan, and positively promote information exchange with each country from the standpoint of support for developing countries. It will also inform researchers about the biodiversity information system, promote its usage, and increase the number of data providers. Moreover, the government will ensure mutual collaboration among various information systems and increase the quantity of information available for users. (MOE)
- The government will also positively exchange information in the future at various international conferences held by international organizations including the United Nations Environment Programme (UNEP), United Nations Food and Agriculture Organization (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), and Organisation for Economic Co-operation and Development (OECD), and promote the exchange of research and survey information based on bilateral treaties and cooperation in bilateral science and technology. (MOE)

3.8.3 Global Biodiversity Information Facility (GBIF)

(Current Situation and Challenges)

The Global Biodiversity Information Facility (GBIF) was inaugurated in March 2001 in accordance with discussions by the Committee for Scientific and Technological

Policy (CSTP) of the Organization for Economic Co-operation and Development (OECD), for the purpose of accumulating data on biodiversity and using it in the world. GBIF plays the most important role in operations for sharing taxonomic data information which is one of the measures under GTI.

Japan has also established the “Inter-Ministerial/Agency Co-ordination Committee for GBIF” that examines what efforts are to be made in the country in collaboration with each ministry and agency concerned. Japan serves as vice chair of the GBIF Governing Board, thus positively participating in such activities as donating funds (of the world’s second largest amount after the United States) through the Ministry of Education, Culture, Sports, Science and Technology. The “GBIF Japan Science Committee” has also been established for domestic experts conducting researches and deliberations from scientific and technical viewpoints.

With regard to establishing and operating a base for domestic databases, one was established at the Research Organization of Information and Systems in 2004 to provide specimen data in Japan. The National Museum of Nature and Science also established a base in 2005 in cooperation with domestic natural history museums that conduct researches and surveys on the characteristics of regional biodiversity, and collect and store specimens, and has provided specimen data ever since that time. In addition, GTI Japan node is transmitting data to the GBIF network as a data provider for GBIF. As of February 2010, over 190 million items of data provided by 316 providers are made available by GBIF.

(Specific Measures and Policies)

- To positively promote GBIF activities in the future based on discussions by the GBIF Japan Science Committee, the government will build a biodiversity database at the Institute for Bioinformatics Research and Development whose website contains published information on the status of GBIF activities in Japan. Thus, further collaboration with GBIF will be made in the future. (MOFA, MEXT, Cabinet Office, METI, MAFF, MOE) [Cited in Chapter 2, Section 5, 2.6]

3.9 Acid Deposition Monitoring Network in East Asia (EANET)

(Current Situation and Challenges)

The Acid Deposition Monitoring Network in East Asia (EANET), proposed by Japan as a framework for regional cooperation to prevent the adverse effects of acid deposition on ecosystems in East Asia (where recent and rapid industrialization and urbanization are underway), began regular operation in January 2001 and now has 13 East Asian countries participating. EANET employs a common method to monitor the wet and dry deposition of so-called “acid rain,” as well as its impact on ecosystems (in soil, vegetation and inland water areas), collects, analyzes and evaluates high-quality data based on

quality assurance and quality control, and conducts surveys and research on acid deposition. Thus, EANET promotes international efforts and a common understanding among participating countries regarding the status of acid deposition. Through EANET, Japan provides technical assistance to developing countries participating in EANET, such as dispatching technical missions and organizing workshops, thereby helping to build greater capabilities in monitoring technology and other areas.

In Europe and North America, the adverse effects of acid deposition have been observed on the ecosystems in forests, soil, lakes and reservoirs. There are also concerns that acid deposition may have a serious impact in the near future on rapidly industrializing and urbanizing East Asia.

(Specific Measures and Policies)

- The government will continue grasping the adverse effects of acid rain on ecosystems at an early stage, and promote the study of its mechanism. It also promotes EANET activities to prevent the adverse effects of acid rain in East Asia. (MOE)

3.10 Measures for the Northwest Pacific Region

(Current Situation and Challenges)

For the environmental conservation of enclosed international water areas, the United Nations Environment Programme (UNEP) has been promoting environmental cooperation through “Regional Sea Grant Programs” in various regions in the world. In the sea areas surrounding Japan, four countries—Japan, China, Korea and Russia—adopted the “Northwest Pacific Action Plan (NOWPAP)” in 1994 to conserve the marine environment of the Japan Sea and the Yellow Sea. A Regional Activity Center (RAC) is located in each country to assume responsibility for implementing each project of NOWPAP and promoting activities. In Japan, the “Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC)” has been established.

To effectively use and manage the coastal environment surrounding Japan, the NOWPAP member countries should make efforts in cooperation with each other.

(Specific Measures and Policies)

- ○ Japan is one of the two host countries of the RCU (Regional Coordination Unit, established in Toyama and Busan), the secretariat of NOWPAP. At the same time, mainly through the support for CEARAC, the government will construct a marine environment monitoring system that employs remote sensing technology and conduct environmental impact research in an attempt to improve the conservation of biodiversity from the perspective of environmental contamination in the sea. (MOE)

- ○ With NOWPAP, the conservation of biodiversity will be improved by promoting measures against the problem of garbage in the sea as one pillar of new activities, and measures concerning the integrated management of rivers and coastal areas to address marine pollution caused by land areas. (MOE)

3.11 Global Invasive Species Programme (GISP)

(Current Situation and Challenges)

The Global Invasive Species Programme (GISP) is jointly managed by four organizations: the Commonwealth Agricultural Bureaux International (CAB-International), an intergovernmental organization that provides information on agriculture and bioscience; the International Union for Conservation of Nature and Natural Resources (IUCN); the Nature Conservancy, a conservation group in the United States; and the South African National Biodiversity Institute (SANBI). GISP intends to make a list of measures against invasive species by collecting specimens and examining the best prevention and management plan. Until now, GISP has made the issues posed by invasive species, a strategy to address invasive species, samples for the best prevention and management, and a provisional database.

(Specific Measures and Policies)

- The government will examine cooperation for GISP. (MOE)

3.12 Group on Earth Observations (GEO)

(Current Situation and Challenges)

At the G8 Summit held in Evian, France, in June 2003, the importance of earth observation was emphasized from the standpoint of balancing environmental protection and economic development, in addition to an agreement on holding a ministerial meeting on earth observation. To that end, earth observation summits have been held three times, with the “Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan” (hereinafter the “10-Year Implementation Plan”) being approved in February 2005.

The pillars of the “10-Year Implementation Plan” are (1) building a system within 10 years to comprehensively observe the earth in collaboration with various observation systems such as satellite and earth surface observation, (2) clarifying the purposes, concrete approaches and methods of GEOSS for nine societal benefit areas (disasters, health, energy, climate, water, weather, ecosystems, agriculture, biodiversity), and (3) establishing an international framework to promote the “10-Year Implementation Plan.”

Group on Earth Observations (GEO) was established through the efforts of many countries that approved the “10-Year Implementation Plan.” GEO holds workshops for

developing capabilities related to GEOSS, and also makes annual work plans to implement the “10-Year Implementation Plan,” with group countries and organizations participating in GEO by practicing tasks along with these work plans to achieve the targets of the “10-Year Implementation Plan” based on the voluntary contributions of each country and organization. A total of 102 subtasks classified under 42 tasks have been registered in the “Work Plan 2009 - 2011,” and Japan is implementing 49 subtasks as a leading, contributing organization.

At the G8 L'Aquila Summit held in Italy in July 2009, the G8 nations agreed to support ongoing operations for the development of GEOSS. As a result, there is also growing anticipation about the construction of GEOSS from the standpoint of coping with global environmental issues including biodiversity.

The Group on Earth Observations Biodiversity Observation Network (GEO BON) was established in 2008 for the areas of biodiversity and ecosystems. In response, the Japanese Committee of GEO BON (JBON) was organized in May 2009, followed by the Asia-Pacific Biodiversity Observation Network (AP BON) in July 2009, to promote networking biodiversity observation activities in Japan in cooperation with the governments and research institutions concerned.

(Specific Measures and Policies)

- The government will positively support GEO in the future with an eye towards the future international framework on earth observations, and promote earth observation to contribute to GEOSS construction. (MEXT)
- In cooperation and coordination with GEO BON, the government will strongly support the building of a network for monitoring biodiversity in the Asia-Pacific region. (MOE)

4 Cooperation for developing countries

(Outline of Measures and Policies)

The Official Development Assistance (ODA) Charter decided by the Cabinet in August 2003 was set up with “pursuing environmental conservation and development in tandem” as one of its four principles of ODA implementation, while positioning “addressing global issues” as a priority issue. In the “Environmental Conservation Initiative for Sustainable Development (EcoISD)” announced in 2002, “conservation of the natural environment” was positioned as one of its priority areas.

Based on these policies including the Initiative, the government will positively contribute to conserving global biodiversity through the conservation and sustainable use of biodiversity in developing countries.

In practice, the government lends positive support in various aspects of drafting, formulating and implementing plans on the conservation and sustainable use of

biodiversity, fostering human resources, and preparing facilities. It also supports the conservation and management of nature reserves, forest conservation, prevention of desertification, research, prevention of the impact of climate change on biodiversity, and natural resources management, in an effort to conserve and sustainably use biodiversity and contribute to worldwide conservation of biodiversity in cooperation with developing countries.

4.1 Cooperation for capacity building for environmental issues

(Current Situation and Challenges)

Because socioeconomic and technical problems including population growth, expanded economic activities and poverty, together with environmental problems are global issues, many countries face difficulties in properly conserving biodiversity by themselves. The capacity building to handle environmental matters must therefore be practiced comprehensively.

(Specific Measures and Policies)

- To enhance the comprehensive capacity of organizations and people to deal with problems concerning the environment, the government will promote the development of human resources in developing countries, including building the capacities of environment-related technologies, as well as extending cooperation for institution-building and providing equipment. (MOFA)
- To help developing countries develop their own capacities, the government will select projects for extending its cooperation from a long-term perspective, promote cooperation with particular importance given to the participation of stakeholders, both in the decision-making process for setting priorities and in implementing target projects, engage in joint efforts to enhance implementation capability, and promote environmental education to raise awareness about environmental problems. (MOFA)

4.2 Considerations for the environment

(Current Situation and Challenges)

Even though developing countries have a substantial need for assistance in the environmental sector, they tend to put higher priority on development projects; consequently, local needs in the environmental sector are not reflected in specific project proposals. Therefore, the government will promote giving incentives for environmental conservation.

(Specific Measures and Policies)

- The government will promote giving incentives for environmental conservation and raising environmental awareness, through a policy dialogue, various forums, and

other appropriate cooperation schemes. (MOFA)

- The government will support projects in which appropriate environmental considerations are fully taken into account, in order to promote the integration of economic growth, poverty reduction and environmental conservation by incorporating environmental considerations into all development plans and individual projects, and address the environmental problems in developing countries. (MOFA)

4.3 Promoting cooperation under a comprehensive framework

(Current Situation and Challenges)

Japan's experience in overcoming environmental problems and its valuable know-how on coping with biodiversity issues, and building an administrative system and society in harmony with nature have been accumulated by a broad range of entities, including local governments and enterprises. Based on this standpoint, the government will effectively promote international cooperation by collaborating with these entities and using Japan's scientific technology in monitoring, data analysis and counter-approaches.

(Specific Measures and Policies)

- The government will promote cooperation by positively promoting collaboration with other forms of cooperation in these fields, among international organizations, local authorities, the private sector, NGOs and others. (MOFA)
- In order to solve regional and global environmental problems, the government will cooperate in this field based on broad and comprehensive frameworks that effectively synthesize various methods of cooperation. One example would be combining cooperation where support measures are provided intensively in one particular place with that provided for wider regions. (MOFA)
- The government will more effectively and efficiently promote international cooperation in environmental fields including biodiversity based on EcoISD, in view of the needs in developing countries, the trends of international society regarding biodiversity, such global issues as climate change, and thereby more effectively and efficiently promote international cooperation in environmental fields including biodiversity. (MOFA)
- The government will promote, in cooperation with the ODA, international cooperative research aimed at practical measures based on the needs of developing countries, and applicable to global problems in the environment field including the area of biodiversity, in order to acquire new information that will contribute to solving these problems, improve the standards of scientific technology, foster human resources in developing countries, and improve their problem-solving capabilities. (MOFA, MEXT)

4.4 Contributions for global environment conservation in the fields of agriculture, forestry and fisheries

(Current Situation and Challenges)

To achieve higher production and income amid population growth and poverty, developing countries were forced to engage in resource-stripping production activities including excessive cultivation or grazing. As a result, land and water resources have been degraded, and environmental problems such as desertification have occurred on a global scale, thereby raising concerns about the deterioration of biodiversity. These global environmental problems are threats to the survival of individual human beings beyond national borders, and international society must therefore cooperatively cope with those problems.

The world's forests are rapidly decreasing and deteriorating due to the conversion of forests into agricultural land, illegal logging, wildfires and excessive grazing, especially in tropical rain forests where a diverse variety of many species on earth live. Each year from 2000 to 2005, about 12.9 million ha (about 7.3 million ha or equivalent to one-fifth of Japan's total land area, excluding increases afforded by afforestation) of forests were lost. Such a large-scale reduction of forests is one major factor causing a crisis in global biodiversity, and cooperation must be promoted for conserving and creating forests in developing countries.

Marine resources are sustainable, and the proper conservation and management of marine resources are responsibilities imposed on coastal states by the UN Convention on the Law of the Sea. Marine resources are also important from the standpoints of securing for the nation a stable supply of fishery products and conserving biodiversity.

While there are negative international opinions against the bycatch problem involving sharks, sea turtles and even sea birds, and against tuna longline fishing and trawl fishery on the high seas because of fishery's impact on biodiversity in abyssal seas, the Convention on Biological Diversity made moves to establish marine protection areas on the high seas, coupled with efforts to manage living marine resources under international trade controls imposed by the Washington Convention, thereby demonstrating the importance of continued support for developing countries not only from the perspective of conserving biodiversity but also from that of ensuring the conservation and sustainable use of living marine resources on a scientific basis.

(Specific Measures and Policies)

- By using Japan's experience and knowledge at home and abroad, the government will promote international cooperation for sustainable agriculture, forestry and fisheries, and positively contribute to global environmental conservation efforts such as preventing desertification, ensuring the sustainable use of water resources, and measures to address global warming. (MOFA, MAFF) [Cited in Chapter 2, Section 6,

1.1]

- As bilateral cooperation, the government will implement technical cooperation via JICA and promote sustainable forest management in developing countries. (MOFA, MAFF)
- As multilateral cooperation, the government will promote projects aimed at promoting sustainable forest management, such as measures against illegal logging in developing countries, by funding the United Nations Food and Agriculture Organization (FAO) and the International Tropical Timber Organization (ITTO). (MOFA, MAFF)
- The government will conduct basic research and technical development to promote sustainable forest management in developing countries, and measures to prevent global warming such as REDD. (MOFA, MAFF) [Cited in Chapter 2, Section 4, 3.4, and Chapter 2, Section 6, 1.1]
- As multilateral cooperation in fisheries, the government will promote projects aimed at promoting international resources management and fishing village development for sustainable fisheries, by funding the United Nations Food and Agriculture Organization (FAO) and the Southeast Asian Fisheries Development Center (SEAFDEC). (MAFF)

Section 5 Information Management and Technology Development (Basic Concepts)

The conservation of biodiversity first requires understanding its current status and recognizing its deterioration as early as possible, and then based on these factors, extracting various issues, in addition to specifying the objects to conserve and examining various policies including the planning of appropriate conservation measures. To accurately know from a nationwide standpoint the current status of the natural environment and the changes in temporal sequence and in space, it is necessary to collect scientific and objective natural environment data, and promote the preparation thereof, together with existing theses and reports, to be used by various users for various purposes. In conducting such research and preparing information for making the collection of information effective and sharing that information, it is necessary to build and enhance a network with experts in various areas, properly exchange information and cooperate with related ministries and agencies, local prefectural governments and NGOs, and let local residents and volunteers participate in implementation. Moreover, the collected and prepared information must be provided to the public in a way that is easy to understand by using IT technology and a system for distributing that information. The Convention on Biological Diversity points out the importance of an international exchange of information, and from the perspective of conserving global biodiversity, international information exchange is essential as well as exchanging information within Japan.

It is also important to implement policies based on scientific knowledge and conduct diverse research and technical development necessary to promote the activities to conserve regional biodiversity.

1 Comprehensive assessment of biodiversity (Outline of Measures and Policies)

To grasp the situation and tendency of changes in biodiversity, scientific and objective information must be comprehensively analyzed and assessed. Therefore, to gauge the socioeconomic effects that conserving biodiversity would bring about in living and business activities, our country's biodiversity needs must be comprehensively evaluated and analyzed, including an evaluation of ecosystem services that biodiversity provides. Through such assessment, the public can be informed of the status of biodiversity and the need for conservation in an easily comprehensible way, along with political issues having high priority being clarified, thereby effectively developing measures and policies.

Given the intricate relations among various factors, the impact on biodiversity gradually appears over a relatively long time. Such a time gap is one reason for the

weak sense of crisis among people, making it difficult to initiate conservation activities. In the field of biodiversity, a long-term view beyond generations—what impact present policy decisions would have on future biodiversity and human life—is essential. In a comprehensive assessment of biodiversity, future predictions will therefore be made by providing several different scenarios. It is thus important for every citizen to share the present and future status of biodiversity through such a comprehensive evaluation of biodiversity, and be consciousness of conserving biodiversity for future generations.

1.1 Implementing a comprehensive assessment of biodiversity

(Current Situation and Challenges)

The Millennium Ecosystem Assessment (MA) and Global Biodiversity Outlook (GBO) are examples of worldwide comprehensive assessments of biodiversity, but there is none that comprehensively analyzes and assesses the current status and trend of biodiversity in Japan. This was considered one factor why the Japanese people find it difficult to feel familiar with the status of biodiversity and its impact on daily living. In order to fulfill the responsibility of Parties to the Convention on Biological Diversity regarding the “2010 Biodiversity Target”—achieving by 2010 a significant reduction in the current rate of biodiversity loss at global, regional and national levels to help alleviate poverty and benefit all life on Earth—which was adopted at COP6 in 2002, Japan must grasp its status of achieving that target. By comprehensively assessing biodiversity on an ongoing basis, Japan needs to establish a method of comprehensively assessing biodiversity in Japan, assess the status and trend of biodiversity in Japan, and share that information with the general public in a comprehensible manner. Based on the results of a general assessment, Japan, as the host country of COP10 in 2010, needs to urge various foreign countries to implement a comprehensive assessment of biodiversity and thereby demonstrate its international leadership.

(Specific Measures and Policies)

- The government will implement a comprehensive assessment of biodiversity with the participation of many experts, summarize it in a way easy to understand, and publish it. (MOE) [Cited in Chapter 2, Section 4, 1.2]
- The government will present results of its comprehensive assessment of biodiversity at COP10, and urge other countries to implement a comprehensive assessment of biodiversity at a national level. It will offer technological support and the transfer of experience to the Asia-Pacific region in particular. (MOE) [Cited in Chapter 2, Section 4, 1.2]

1.2 Development of biodiversity indicators

(Current Situation and Challenges)

As indicators for promoting efforts in the field of conserving biodiversity in Japan's Third Basic Environment Plan, nine indicators (including trial indicators) such as the "degree of human disturbance of vegetation in the nature conservation basic survey" have been presented. Indicators that are easier to understand for grasping the status of changes in biodiversity and the effects of various policies must be developed to assess efforts and improve measures. For that purpose, examining the collaboration with TEEB (the so-called Stern Review on biodiversity) and easy to understand expressions other than values, such as mapping the status of a biodiversity crisis and selecting hot spots, must be promoted.

(Specific Measures and Policies)

- Through a comprehensive assessment of biodiversity, the government will examine, in collaboration with the ministries concerned, a method of properly grasping the status of changes in biodiversity and the effects of various policies. (MOE)
- The government will work on formulating important indicators for assessing progress toward achieving the goals to prevent the loss of biodiversity in the nation. (MOE)
- To grasp the relationship between loss of biodiversity on a global scale and economic loss, the government will cooperate with TEEB to promote analysis of the economic value of biodiversity, economic loss accompanied by the loss of biodiversity, and the necessary cost of effective conservation. Based on the analysis results and the trend of international discussions, it will initiate discussions on possible policy options. (MOE) [Cited in Chapter 2, Section 3, 2.1, Chapter 2, Section 4, 1.1, and Chapter 2, Section 5, 3.1]
- The government will designate such areas as islands where endangered species are concentrated as hot spots, cooperate with the local persons concerned, and promote discussions on systems and methods of conserving and restoring not only individual species but biodiversity in an entire area. (MOE) [Cited in Chapter 2, Section 1, 1.2]

1.3 Development of biodiversity indicators in the fields of agriculture, forestry and fisheries

(Current Situation and Challenges)

In the fields of agriculture, forestry and fisheries, the technologies and basic data for properly managing ecosystems formed through agriculture, forestry and fisheries from the standpoint of living in harmony with nature, including new Satoyama management technology, a method of assuming specific areas where insects may live, and technology for maintaining fish habitat environments in channels that form rapids, abysses and cays have already been obtained to date. These resources have been used for policies and measures related to considerations on biodiversity, such as conservation

activities, the use of Satoyama forests, and the network between water and an ecosystem.

Although biodiversity is taken into consideration in implementing policies and measures for agriculture, forestry and fisheries including sustainable agriculture, indicators based on a scientific basis that can qualitatively grasp the effects thereof have yet to be developed. Such development is therefore necessary to effectively promote those policies and measures.

(Specific Measures and Policies)

- By researching what kinds of organisms live in paddy fields, forests, seaweed beds and tidal flats, and using basic data obtained in the past on the characteristics of biota unique to ecosystems formed by agriculture, forestry and fisheries, and related research methods, the government will examine indicators based on scientific grounds to grasp the positive and negative impacts of agriculture, forestry and fisheries on biodiversity, the biodiversity indicators for effectively promoting related policies and measures, and clarify the roles that agriculture, forestry and fisheries play as pertaining to biodiversity, in addition to promoting deeper national and international understanding. (MAFF)

2 Promoting survey and information management

(Outline of Measures and Policies)

To grasp the current status of biodiversity in Japan and promote its sustainable use, the National Survey on the Natural Environment based on the “Nature Conservation Law” will be conducted on an ongoing basis to advance proper understanding of the current situation and changes related to biodiversity in Japan. Moreover, a comprehensive ecosystem monitoring system that covers the effects of global warming will be established for continuously monitoring the situation of ecosystems and biodiversity in Japan, and enhancing preventive conservation measures in combination with scientific prediction techniques.

Efforts will be made to create inventories of wildlife—the most basic information for to grasping the status of biodiversity—and prepare information on samples in cooperation with related organizations in Japan and abroad.

The establishment of said system will be promoted for enhancing surveys and research conducted on the conservation of biodiversity, and information on the natural environment, including enhancement of the Biodiversity Center of Japan (under MOE) and collaboration among relevant ministries, agencies and organizations.

The information obtained must be made widely open to the public and shared to ensure use for conserving biodiversity. Efforts will be made to expand and improve the convenience of providing and publishing the information by using information and

communications technology.

2.1 Promoting national and other surveys on the natural environment

(Current Situation and Challenges)

To develop and strengthen basic information about Japan's natural environment, a system must be established to collect and provide appropriate information corresponding to the needs in policies and measures according to the changes of social and natural conditions, such as constructing a system to collect wide-ranging information and promote awareness-raising with the participation of various entities including the general public, and conducting prioritized researches such as the distribution and changes in fauna and flora populations considered important for conserving biodiversity. Moreover, data must be provided more quickly to understand the population size and density of medium-size to large mammals, of which past data has been scarce, as well as accumulating data on Satoyama, coastal and oceanic areas.

(Specific Measures and Policies)

- The government will continue conducting the National Survey on the Natural Environment first conducted in 1973, and monitoring the current conditions of biodiversity and its changes in land areas, while trying to provide the data more quickly. Regarding the 1:25,000 scale vegetation map as a basic information map of the natural environment in land areas are now covered by the vegetation map (as of March 2010). It will also promote early development to cover all of Japan, targeting about 60% of land areas by March 2012. (MOE)
- In addition to continuously collecting information on the distributions of fauna and flora in Japan, the government will promote, in collaboration with the ministries concerned, the collection of data on the natural environment in Japan's marine areas in which basic biota information has not comparatively been collected rather than that in terrestrial areas. (MOE, relevant ministries and agencies)
- The government will conduct a citizen-based survey with the participation of various entities including research institutions, private organizations and experts, in addition to the general public, which aims to collect the information observed in familiar natural environments, including changes in the distribution of wildlife caused by global warming, so as to enhance public awareness for biodiversity conservation in Japan. It will also build a system to widely collect data on natural environment. (MOE) [Cited in Chapter 2, Section 3, 1.1, and Chapter 2, Section 6, 1.1]
- To promote detailed protection and management policies for wild birds and such mammals as deers and bears that have a big impact on ecosystems, agriculture, forestry and fisheries in Japan, the government will promote the collection of

information on habitats and populations by focusing on such particular wild animals, conducting researches on population density and population size estimations, and detecting those changes over a long time. (MOE) [Cited in Chapter 2, Section 1, 2.4]

2.2 Comprehensive ecosystem monitoring system

(Current Situation and Challenges)

Monitoring Sites 1000 has been promoting long-term ecosystem monitoring of ecosystems in Japan (i.e., forests, satoyama, inland waters, coastal areas) by establishing about 1,000 monitoring sites with the participation of scientists, local experts and NGOs. Results of Monitoring Sites 1000 have been provided for various policies and measures for biodiversity conservation. However, to concretely detect the impacts on ecosystems by global warming, a recent issue of growing concern, it is necessary to develop and establish a more comprehensive monitoring system from a global perspective, in addition to develop an integrated widely analyzing and quickly providing system of data and information. Such development and establishment includes ongoing surveys on ecosystems such as in alpine zones where the impact of global warming is remarkable, more detailed monitoring of the relation between physical/chemical factors including weather conditions and biological factors, and the introduction of remote sensing technology using aerial photos and artificial satellites. In order to link this project to the concrete conservation policies in each area, close collaboration and cooperation with related local governments are necessary in terms of sharing information on researches and those results.

(Specific Measures and Policies)

- As a part of the “Comprehensive Ecosystem Monitoring System,” the government will conduct ongoing surveys in the Monitoring Sites 1000 project to more precisely grasp the status of changes in ecosystems, such as in alpine zones where the impact of global warming will be clearly evident. (MOE) [Cited in Chapter 2, Section 1, 1.2, and Chapter 2, Section 6, 1.1]
- The government will conduct wide-ranged ecosystem monitoring by using remote sensing technology, strengthen collaboration among various ministries and agencies for sharing and mutually using data, provide data more quickly, so as to promote to build a comprehensive monitoring system for natural environment in Japan. (MOE)
- For said monitoring, the government will build a system to effectively and continuously conduct researches with the participation and cooperation of various entities including experts, NGOs, volunteers and local governments, and accumulate and provide collected data and information on natural environment and provide analyzed results as needed, thereby promoting use of the policies and measures for biodiversity conservation. (MOE)

- The government will collaborate and share information not only in Japan but also with the countries and organizations abroad concerned, and contribute to improve the information basis (such as GEO and BON) concerning global biodiversity. (MOE)

2.3 Development of wildlife inventories and information on specimens

(Current Situation and Challenges)

A wildlife inventory that includes a list of wild fauna and flora living in a certain region, and various kinds of information on the distribution and living status thereof is considered indispensable for developing a plan to conserve biodiversity. In preparing the inventory in Japan including information on wildlife, however, there is insufficient basic information on distribution and living status, resulting in some taxa being left out without being developed. Therefore, such inventories must be promptly developed in cooperation with international projects and considering compatibility of information, together with the systematic classification and storage of information, samples and documents on wildlife that form the basis of a wildlife inventory.

(Specific Measures and Policies)

- By strengthening the cooperation between governments and academia, and in cooperation with international projects such as the Global Taxonomy Initiative (GTI), Species 2000, and Global Biodiversity Information Facility (GBIF), the government will promote the development and publication of inventories of wild fauna and flora. It will also systematically collect and share the information on specimens and data on wild fauna and flora that form the basis for wildlife inventories. (MOE, MEXT)
- The government will strengthen the collection, maintenance and management of specimens of living organisms and materials on biodiversity, by the Biodiversity Center of Japan. (MOE)

2.4 Providing and publishing natural environment information

(Current Situation and Challenges)

In line with the progress being made in information and communications technology, natural environment information is now being computerized and data that use GIS (Geographic Information System) are being generated and provided for the public. Based on current conditions, a wide variety of information on the natural environment must be made easier to use and understand by all users.

Concerning the Clearing-House Mechanism (to promote and facilitate information exchange on biodiversity) in accordance with Article 17 (Exchange of Information) and Article 18 (Technical and Scientific Cooperation) of the Convention on Biological Diversity, Japan has steadily increased the amounts of data after commencing system operation in July 2004, and about 900 metadata items (information on information sources necessary to search and identify the locations of data) have been registered (as

of September 2009). For further expanded usage in the future, increasing the number of data items is a challenge to be addressed.

(Specific Measures and Policies)

- The government will further computerize natural environment information collected by conducting various researches and surveys, improve and strengthen the provision of information through the Japan Integrated Biodiversity Information System (J-IBIS), and thereby promote information disclosure for domestic and abroad via the Internet. It will also focus on developing and providing data by using WebGIS, which enables various kinds of natural environment information developed by various entities to be compiled and analyzed on the Net, and on enhancing a function that enables diverse analyses of data including other statistics. (MOE, relevant government ministries and agencies)
- With regard to the Clearing-House Mechanism (CHM) for Biodiversity Data, the government will strengthen efforts to greatly enrich registered metadata qualitatively and quantitatively, increase the number of items registered to about 1600 by March 2012, and thereby promote enhancement and information exchange of metadata at domestic and abroad. (MOE) [Cited in Chapter 2, Section 4, 3.8.2]
- For making metadata easy to use by all users, the government will simplify the accessing of target information and enable access from abroad to the information provided, thereby strengthening the international transmission of natural environment information. (MOE) [Cited in Chapter 2, Section 4, 3.8.2]

2.5 Development of a base and establishing a system for biodiversity information

(Current Situation and Challenges)

The Biodiversity Center of Japan (under MOE)—established in 1998 as the core informational base for the conservation of biodiversity in Japan—has conducted National Surveys on the Natural Environment and operated the Japan Integrated Biodiversity Information System. Such efforts to qualitatively and quantitatively enhance information will be further strengthened in the future for evaluating species and ecosystems, and implementing appropriate measures based on the evaluation results. Moreover, an extensive network centered on the Biodiversity Center of Japan must be built to promote the mutual use and sharing of biodiversity information possessed by various entities, such as the ministries concerned, local governments, research institutes, museums, NGOs, experts and citizens. In addition, an information system necessary for conserving global biodiversity in collaboration with related organizations in various foreign countries including those in the Asia-Pacific region, together with raising awareness on the opportunistic occasion of holding COP10 in Japan in 2010, must also be promoted.

(Specific Measures and Policies)

- To promote “research,” “information,” “awareness-raising” and the “collection of specimens and materials” regarding biodiversity in Japan, the government will improve and strengthen the organization and functions of the Biodiversity Center of Japan as a core foothold. In order to qualitatively and quantitatively evaluate the impacts of global warming on biodiversity and the ecosystems in Japan, and take appropriate measures, it will also promote the Comprehensive Ecosystem Monitoring System in addition to the National Survey on the Natural Environment. In order for the ministries concerned, local governments, research institutions, museums, NGOs, experts and citizens to be able to use the information on biodiversity possessed by these respective entities for their policies and activities, the Biodiversity Center of Japan will be the core to promote building network for the mutual use and sharing of said information. The government will contribute to international projects for promoting the global conservation of biodiversity, collaborate and share information with the countries concerned and organizations abroad, and enhance the necessary system for these measures. (MOE)
- The government will strengthen measures to promote the computerization, mutual usage and publication of information on biodiversity acquired by various entities, including the ministries concerned, local governments, universities, private organizations, research institutions and museums. It will also strengthen information exchange, collaboration and exchanges, and the network for natural environment information, particularly through the Working Group on Natural Environment Information Collaboration among Ministries and Agencies established in 2004, and various liaison organs such as the Network of Organizations for Research on Nature Conservation. (MOE, MLIT, MAFF, MEXT)
- There are about 23,000 data items registered in the library database at the Biodiversity Center of Japan as of March 2010. The government will continue making efforts to enhance the number and content of registered data items. (MOE)

2.6 Global Biodiversity Information Facility (GBIF)**(Current Situation and Challenges)**

The Global Biodiversity Information Facility (GBIF) was inaugurated in March 2001, in collaboration with the Japan Integrated Biodiversity Information System (J-BIS), Species 2000, and the Global Taxonomy Initiative (GTI), for the purpose of accumulating data on the biodiversity of each country for the entire world to use. Consequently, existing data is expected to become available on the network so that more than 90% of the scientific names of all scientifically known living organisms can be accessed via the Internet within 10 years.

The “Liaison Committee of GBIF-related Ministries” for closer collaboration among

the ministries has been established to expedite deliberations by the ministries concerned and experts in Japan, and examine our country's policy on the GBIF and measures to take within Japan. The "GBIF Japan Science Committee" under which domestic experts conduct researches and deliberations from the perspective of science and technology has also been established, so that the Ministry of Education, Culture, Sports, Science and Technology can now promote Japan's participation in the GBIF through the Japan Science and Technology Agency.

(Specific Measures and Policies)

- To positively promote GBIF activities in the future based on discussions by the GBIF Japan Science Committee, the government will build a biodiversity database at the Institute for Bioinformatics Research and Development, whose website contains published information on the status of GBIF activities in Japan. Thus, collaboration with the GBIF will be made in the future. (MOFA, MEXT, Cabinet Office, METI, MAFF, MOE) (MOFA, MEXT, Cabinet Office, METI, MAFF, MOE) [Cited in Chapter 2, Section 4, 3.8.3]

2.7 Promoting the monitoring of forests

(Current Situation and Challenges)

Japan participates in the Montreal Process that objectively grasps and evaluates the sustainability of forest management in each country, with 11 Pacific Rim countries located in temperate and subarctic zones. Based on the seven criteria of the Montreal Process, such as the "conservation of biological diversity" and "maintenance of forest ecosystem health and vitality," for the purpose of grasping the status and changes of forest including biodiversity on an ongoing basis, 15,700 permanent observation plots have been set in forests throughout Japan, and the "forest resources monitoring survey" (having a five-year cycle) has been conducted since 1999. In the future, in addition to continuing the forest resources monitoring survey, an evaluation and analysis of research results and the reflection thereof in establishing regional forest plans are needed.

Regarding virgin natural forests and forests where precious wild fauna and flora live within the national forests, seven types of forests at 841 locations (totaling about 781,000 ha) have been set up as forest reserves as of April 2009, and 24 locations (totaling about 0.51 million ha) have been set up as green corridors or networks formed by connecting several forest reserves, and play important roles in conserving biodiversity. To grasp the status of such forests after being established and use this information for proper conservation and management, monitoring research will be conducted with such proper measures as restoring vegetation being taken, depending on the situation.

(Specific Measures and Policies)

- Regarding about 15,700 permanent observation plots in Japan, the government will conduct research on site conditions, vegetation, dead and withered trees, traces of living birds and animals, pests and mammalian pests on an ongoing basis. (MAFF) [Cited in Chapter 1, Section 5, 1.12]
- The government will publicize results up to the second forest resources monitoring survey and based on those results, publish Japan's "2nd Country Report 2009" in accordance with the Montreal Process, and promote sustainable forest management in Japan and worldwide. (MAFF) [Cited in Chapter 1, Section 5, 1.12]
- The government will handle forest space data and the results of the forest resources monitoring survey on the forest GIS in an integrated manner, thereby using forest resource information effectively. (MAFF) [Cited in Chapter 1, Section 5, 1.12]
- Concerning forest reserves, the government will promote monitoring surveys on the current status of forests and vegetation, wildlife habitats, and the status of use by the people entering forests to grasp the status after setting up and promoting conservation and management depending on that status. (MAFF)
- Concerning green corridors, the government will promote monitoring surveys such as research on forest stand structure and the inhabitation conditions of wildlife to grasp the status of forests, and the actual living and breeding status of wildlife. (MAFF)
- In establishing an information system that uses the Geographic Information System, the government will examine the mutual usage of information with other nationwide research such as the National Survey on the Natural Environment and Monitoring Sites 1000. (MAFF, MOE) [Cited in Chapter 1, Section 5, 1.12]

2.8 Developing information for river environments**(Current Situation and Challenges)**

To grasp basic information about the natural environment at rivers and dams, the "Census of Rivers and Riparian Areas" that periodically surveys the inhabitation and growth conditions of living organisms in rivers and dam reservoirs has been implemented. This Census has been conducted for 109 first-class water systems and 166 second-class water systems nationwide. The inhabitation conditions of fish, benthic animals, plants, birds, amphibians, reptiles, mammals and land insects, and such river conditions as rapids, abysses and riversides are surveyed.

To use the information on river environments such as the inhabitation and growth conditions of living organisms that was obtained by the Census of Rivers and Riparian Areas for policies and academic activities the information must be linked with geographical information and comprehensively collated; therefore, the river environment GIS is now being established. Moreover, the information is planned to be disclosed to many researchers and the general public, and to enable usage for

environmental learning.

(Specific Measures and Policies)

- The government will conduct the river environment census to complete a round of research on fish and benthic animals in about five years and research on other wildlife in about 10 years, and collect information on nationwide river environments, together with grasping nationwide trends and regional characteristics as pertaining to the inhabitation and growth conditions of living organisms. (MLIT)
- The government will continue preparing and disclosing information by using the river environment GIS. It will also promote mutual usage with other nationwide research data such as that obtained by the National Survey on the Natural Environment. (MLIT, MOE) [Cited in Chapter 1, Section 8, 5.1]

2.9 Constructing a marine environmental databases

(Current Situation and Challenges)

The steady collection, accumulation, analysis and publication of environmental data are indispensable for systematically and effectively conserving, restoring and creating a natural environment for which improved water quality and ecological networks are taken into consideration,. Therefore, databases in which to synthetically collect, accumulate, analyze and publish environmental data possessed by the government and port authorities for each enclosed water area are now being constructed.

Various entities such as administrative organizations, research institutions and the private sector have registered environmental data regarding six marine areas including three major bays, the Ariake Sea, and the Yatsushiro Sea, and many sharable marine environmental databases have been constructed to date. Thus, accumulating the data in each database poses a future issue to be addressed.

(Specific Measures and Policies)

- The government will accumulate data and enhance the content of marine environmental databases. (MLIT)

2.10 Operation of the Japan Oceanographic Data Center

(Current Situation and Challenges)

To effectively use the marine data of various domestic and foreign organizations, such as the comprehensive marine data bank of Japan, the Japan Oceanographic Data Center (JODC) has been collecting, managing and providing various marine data and information in an integrated manner. In 1985, JODC established the “marine organisms data management system” intended to manage data on marine organisms

(mainly plankton). The “marine organisms data management system” consists of two databases. One is the “JODC Taxonomic Code of Marine Organisms,” which contains a coded set of marine organisms based on the taxonomic system. The other is the “Marine Organisms Observation Data,” which contains observation data provided by marine research institutions.

(Specific Measures and Policies)

- The government will promote the accumulation of data on marine environments and marine organisms at the Japan Oceanographic Data Center, and further strengthen collaboration within the government. (MLIT)

2.11 Developing information for the natural environment at national parks

(Current Situation and Challenges)

Information on the natural environment used to manage national parks is not well prepared. It is therefore necessary to collect and compile scientific information that will become the basis of management, and properly reflect that information in the management of national parks.

(Specific Measures and Policies)

- The government will collect scientific information necessary for the management of national parks with the cooperation of related administrative organizations, researchers and regional experts, and promote the proper management of national parks based on such information. (MOE)

3 Promoting research and development of technology

(Outline of Measures and Policies)

In the “Field-specific Promotional Strategy” (decided by the Council for Science and Technology Policy in March 2006) that was formulated based on the “Third Science and Technology Basic Plan” (decided by the Cabinet in March 2006), and which the government is supposed to promote intensively in the five-year period from FY 2006 to FY 2010, “realizing the sustainable conservation and use of ecosystems” and “realizing the effective use of biological resources by using technology to use biomass originated in Japan” are described as individual policy targets to be achieved. In the field of technical research on ecological management for the conservation and use of ecosystems, four programs—“Clarification and evaluation of the structure and function of ecosystems,” “Clarification of factors preventing sustainability in the use of biological resources and assessment of impact,” “Adaptive management technology for conservation and restoration of ecosystems,” and “Social technology for sustainable use of biological resources”—have been set up to strengthen cooperation in domestic research on

biodiversity and ecosystems. Regarding the latter use of biomass, the need for sustainable system technology to use regional biomass is described.

The Basic Act on Biodiversity stipulates the government shall take measures to facilitate research and development in order to promote science technology regarding biodiversity.

Based on these points, the policies described below will be implemented.

3.1 Studies in the environmental field

(Current Situation and Challenges)

[Global Environment Conservation Research Fund]

As for the Global Environment Conservation Research Fund, the total experiment and research expenses for environmental conservation implemented by research institutions of the related ministries are budgeted as a lump sum by the Ministry of the Environment. The overall adjustment for experiments and research regarding national environmental conservation will be made through distribution of the fund. Research is needed to clarify the existence of biodiversity and its maintenance mechanism, devise methods of conservation both inside and outside the habitats necessary to prevent the extinction of rare species, and develop technology for artificial breeding.

[Global Environmental Research Fund]

The Global Environmental Research Fund is a competitive research fund system used to promote research that can contribute to solving global environmental issues. “Ecosystem conservation and restoration in a wide area” is one of its four targeted research fields, and targets research on the loss of biodiversity (including ecosystem disturbances) on a global level and over a wide area level (such as East Asia), in addition to addressing such issues as the destruction of tropical rain forests and desertification.

With biodiversity, the status of disturbance to ecosystems by alien species has been recognized and a method of assessing the risks of invasive species proposed, along with the development of concrete methods as measures to prevent invasive species. From the standpoint of changes in biodiversity caused by environmental change, research has also been conducted on evaluating the vulnerability of subalpine and alpine zones. At present, research is being conducted on methods and technology to alleviate the impact on biodiversity by foreign species already distributed in wide areas, the impact of climate change on biodiversity, and adaptive measures for addressing those impacts. As future issues, it is necessary to conduct research on promoting cooperation for measures against global warming and measures for conserving biodiversity, as well as research on comprehensive analysis for assessing and making predictions about biodiversity.

[Environmental Research and Technology Development Promotion Fund]

The Environmental Research and Technology Development Promotion Fund is a competitive research fund system used to promote environmental research and technology development by supporting excellent proposals from among those widely collected from government, industry and academia. One targeted research field is the “natural environment,” which requires research on symbiotic technology for use in cities and river basins in Japan.

[Research on environmental economic policies]

In order to create a society where both environment and economy can progress and develop, the government began research in 2009 for the strategic implementation of environmental policies that focus on both the environment and economy.

The loss of biodiversity and ecosystem services caused by economic globalization is a globally common problem. With the TEEB project headed by Germany now underway, Japan must deliberate about policy based on an analysis of the relation between ecosystem services and economic activities, with coordination and cooperation with the TEEB project in mind.

[Fund for Biodiversity-related technology development promotion project]

In order to further promote policies regarding the conservation of biodiversity and its sustainable use, the Fund for Biodiversity-related technology development promotion project was started in 2009 to promote the development of technology, research and studies on applications necessary for conserving biodiversity.

The studies targeted for the fund shall be directly related to urgent policy concerns regarding the conservation of biodiversity and its sustainable use, require a relatively short development period, and result in technology that is directly applicable to policies of the central and local governments.

(Specific Measures and Policies)

- Through the Global Environment Conservation Research Fund, “Clarification of the ecosystem deterioration mechanism of floodplains by using rare bivalves and fish as models, and urgency assessment regarding nature restoration” and “Research on technology for reproduction on land where endangered plants coexist with native ecosystems including humans, by using *Cypripedium marcanthum* var. *rebunense* as a model” will be implemented. (MOE)
- Through the Global Environmental Research Fund, “Research on the impact of foreign species on biodiversity and its mitigation, taking a vulnerable oceanic island as a model case,” “Research on sustainable management of tropical wood production forests, combined with carbon storage and economic effect of conserving biodiversity,”

and “Forest zones against climate change – the loss of diversity in alpine ecotone and clarification of its mechanism” will be implemented. (MOE)

- Through the Environmental Technology Development Promotion Fund, “Comprehensive environmental research aiming at nature restoration in Lake Mikata by using eels and cyprinoid fish as indicators,” and “Research on developing a method of estimating bear populations” will be implemented. (MOE)
- As for studies on environmental economic policies, as part of research regarding biodiversity in 2009, “Research on policy options aimed at sustainable use of ecosystem services through internalization of economic values” will be implemented. The government will promote analyses on the economic value of biodiversity, cost accompanied by the loss of biodiversity, and cost required for effective conservation. (MOE) [Cited in Chapter 2, Section 3, 2.1, Chapter 2, Section 4, 1.1, and Chapter 2, Section 5, 1.2]
- Through the Fund for Biodiversity-related technology development promotion project, “Development of a behavior tracking system for wild animals and birds in forest environment” and “Development of effective, efficient control technology for medium-sized mammals as invasive alien species (raccoon and Javan mongoose)” will be implemented. (MOE)

3.2 Technology development for the conservation and maintenance of forests

(Current Situation and Challenges)

To realize the sustainable multi-faceted functions of forests, the conservation of biodiversity and sustainable use of its components are important. At the same time, the biodiversity in forests must be conserved from a genetic approach, such as by developing new varieties of forest trees to address the need for diverse breeding, and securing forest tree genetic resources necessary for various kinds of scientific research.

(Specific Measures and Policies)

- The Forestry and Forest Products Research Institute (MAFF) will take the lead in developing technology to alleviate the impact caused by foreign species on endemic ecosystems, technology to conserve endemic species and rare species, and technology to alleviate forest damage by plant pests in a wide area requiring urgent measures.
- The government will research the situation of DNA analysis and gene disturbance to obtain basic information necessary for the genetic management of broadleaf forests. (MAFF)

3.3 Research on rivers

(Current Situation and Challenges)

The Aqua Restoration Research Center, which boasts of the world’s largest

experimental channel at about 800 m in length, has been conducting basic and applied research on conserving and restoring the natural environment in rivers, lakes and reservoirs, and applying the results thereof in cooperation with researchers in various fields.

In collaboration with researchers in the fields of biology, ecology and river engineering, the National Institute for Land and Infrastructure Management also conducts research on better understanding rivers from an ecological viewpoint, and investigates ideal river conditions by using certain rivers as concrete fieldwork sites.

(Specific Measures and Policies)

- The government will promote and use research conducted at the Aqua Restoration Research Center. (MLIT)
- The government will promote river ecological research on the Chikuma River, Kizu River, Kita River, Shibetsu River and Iwaki River as the sites of research, analyze past research results, and promote the organization of and analysis of the academic results obtained. (MLIT)

3.4 Research on ports and harbors

(Current Situation and Challenges)

Given the growing public interest in natural environments with abundant ecosystems, there are also needs for more harmony between humankind and nature to achieve sustainable development, and the creation of better environments when creating and maintaining ports and harbors.

(Specific Measures and Policies)

- By using the world largest tidal flat tank (Mesocosm), the government will promote research on living organisms that naturally settle and live in the tank, and on the circulation of oxygen, nitrogen and phosphorus. (MLIT)
- The government will also promote wide-ranging research on living organisms from bacteria to birds at existing natural tidal flats, artificial tidal flats, and seaweed beds. (MLIT)
- Based on the basic data obtained, the government will promote research to maintain the abundant biodiversity of coastal areas, while developing an ecosystem model of coastal areas. (MLIT)

3.5 Research on coasts

(Current Situation and Challenges)

To realize high-quality coasts that are safe and harmonizing with nature, in addition to collecting and organizing basic information on coasts, research on coastal

erosion in a wide area and research on the construction of environment (including ecosystem) friendly coastal conservation facilities will be promoted with related research institutions. All parties concerned must also make efforts to have common awareness about the coastal environment to be conserved.

(Specific Measures and Policies)

- In addition to grasping the influence and effects that coastal conservation facilities would exert on the natural environment including ecosystems, the government will research and examine the creation of beaches by considering the ecosystems based on beaches created in harmony with nature. (MLIT, MAFF)
- Changes in weather and oceanic phenomena due to global warming and long-term rises in sea level are valid concerns, and the serious impacts of aggravated coastal erosion, more Zero-Meter Zones, greater damage caused by high tides, and changes in the habitats of living organisms are also concerns for beaches. For these reasons, the government will monitor tide levels and ocean waves, and promote examination as needed to cope with those changes. (MAFF, MLIT) [Cited in Chapter 1, Section 9, 3.1, and Chapter 2, Section 6, 1.1]

Section 6 Efforts against Global Warming (Basic Concepts)

Increases in global warming may exert serious impact on the vulnerable ecosystems on islands, along coasts, in subalpine and alpine zones, and in arid areas, and thereby pose a higher expected risk of extinction for many species. At the same time, seawater acidification with higher concentrations of carbon dioxide in the air has also been pointed out. With regard to coral reefs, an increase of about 1 to 3°C in the sea surface temperature is predicted cause coral bleaching and extinction in wide areas. Agriculture, forestry and fisheries, and the biodiversity in urban areas may also be negatively impacted. Moreover, global warming is expected to have a big impact on the social economy in terms of food and human life, and on living organisms that can transmit infectious diseases and which are affected by changes in biodiversity.

For these reasons, the impacts of global warming on biodiversity must be well understood and adaptive measures pursued to reduce global warming and its effects.

1 Mitigation of global warming and adaptation to its effects from the perspective of biodiversity (Outline of Measures and Policies)

Measures to conserve biodiversity will be promoted based on the fact that conserving the sound ecosystems of forests, grasslands, wetlands such as peaty marshes, and in soil containing a large amount of carbon will inhibit the release of greenhouse gases and contribute to the mitigation of global warming. Forests function as an effective source of absorbing greenhouse gases in mitigating global warming, in addition to their function to conserve biodiversity. Therefore, maintaining and conserving forests will be promoted for exerting such functions to the fullest extent. Moreover, vegetation-derived biomass resulting from ecosystem management for the conservation of rich biodiversity, including the thinning of artificial forests, control of secondary forests, mowing along the waterside and grazing in secondary grasslands, will be used extensively as an alternative energy source instead of fossil fuels. This will also help revitalize local industry.

It is important to study how to adapt to the impact of global warming before that impact becomes an urgent issue in many parts of the country. In addition to upgraded monitoring of the impact of global warming, adaptation measures will also be examined from the perspective of conserving biodiversity, such as what an ecological network highly adaptive to environmental changes including climate change should be, and the key points for conserving and restoring a sound ecosystem.

1.1 Mitigation of global warming and adaptation to its impact from the standpoint of biodiversity

(Current Situation and Challenges)

Regarding global warming, the Kyoto Protocol enacted in 2005 and related actions are already under way at home and abroad. Moreover, the Fourth Assessment Report in 2007 of the Intergovernmental Panel on Climate Change (IPCC) revealed that biosystems have already been affected by global warming and biodiversity will be more significantly impacted as global warming progresses in the future. Thus, scientific knowledge about global warming has been accumulated. COP9 in 2008 decided that the Framework Convention on Climate Change and the Convention on Biological Diversity shall mutually cooperate, with a group of experts being established to offer advice about activities under the Framework Convention on Climate Change. Practical measures for these resolutions are now being discussed by experts in individual countries. The “Charter of Syracuse on Biodiversity” regarding biodiversity adopted at the G8 L'Aquila Summit held in Italy in July 2009 concluded that synergistic policies shall be formulated in considering contributions to biodiversity and ecosystems for the adaption and mitigation of climate change at regional, national and global levels, and that each country shall proactively work on the adaptation of natural ecosystems and managed ecosystems to climate change.

In June 2008, the Ministry of the Environment also assessed the impact and fragility of global warming in Japan and developing countries, organized basic ideas behind adaptation policies, and compiled a report titled “Wise adaptation to climate change” that describes specific directions of future impact and adaptation studies.

Based on these circumstances, the government must take appropriate measures to mitigate global warming, and grasp the impact of global warming on biodiversity in order to take effective and efficient measures.

(Specific Measures and Policies)

[Mitigation measures]

- In order to encourage more countries agree to the Copenhagen Accord compiled at the 15th session of the Conference of Parties to the United Nations Framework Convention on Climate Change in December 2009, and submit reduction targets and action plans, Japan will work with individual countries and wield its leadership toward the adoption of a comprehensive, single legal document that consists of a fair, effective international framework under which all major countries shall participate based on the Copenhagen Accord. (MOFA, MOE, METI) [Cited in Chapter 2, Section 4, 2.12, and Chapter 2, Section 7, 1]
- To meet its commitment to a 6% reduction during the first commitment period (2008 to 2012) of the Kyoto Protocol, the government will promote comprehensive

measures based on the Kyoto Protocol Target Achievement Plan (entirely revised), which was approved at a Cabinet meeting in March 2008. (All government ministries and agencies) [Cited in Chapter 2, Section 4, 2.12]

- Based on the anti-global warming strategy of the Ministry of Agriculture, Forestry and Fisheries (formulated in June 2007), the government will promote measures to prevent global warming in the fields of agriculture, forestry and fisheries, including forest sink measures, biomass usage, energy saving measures for protected horticulture, agricultural machinery and fishing boats, and reduce the amount of fertilizer applied by promoting sustainable agriculture. (MAFF)
- In national parks with an excellent natural environment, the emission of greenhouse gases from ecosystems shall be inhibited by properly conserving the components of the natural environment, including forests, grasslands, peat marshes and other wetlands, and soil that stores a large amount of carbon. (MOE) [Cited in Chapter 2, Section 7, 1]
- To secure 1.3 million t-C (tons of carbon)—the targeted forest absorption in the Kyoto Protocol Target Achievement Plan—the government will further promote comprehensive measures including the maintenance of sound forests, proper management and conservation of protection forests, forest creation with the participation of citizens, and promote the use of timber and wood biomass in cooperation with the various entities concerned, such as government, local authorities, people engaged in the forestry and wood industry, and the general public. (MAFF) [Cited in Chapter 1, Section 5, 1.2]
- Biomass, which is characterized by emitting carbon dioxide absorbed from the air through photosynthesis when burned without increasing carbon dioxide in the air, helps prevent global warming when used as an alternative source of energy and in products derived from fossil resources. The government will promote such use. (Cabinet Office, MIC, MEXT, MAFF, METI, MLIT, MOE) [Cited in Chapter 2, Section 7.1]
- Based on the Act on the Sophistication of Energy Supply Structure enacted in July 2009, the government will promote systematic efforts among energy suppliers to expand the use of non-fossil fuel energy sources such as biomass. (METI) [Cited in Chapter 2, Section 2, 3.1]
- Concerning greening rooftops and greenery on walls, the government will make efforts to grasp the effects thereof by collecting empirical data on the degree of contribution to global warming based on measuring alleviation of the heat island phenomenon in cities and the effects on habitat environments for living organisms. (MLIT) [Cited in Chapter 1, Section 7, 2.11, and Chapter 2, Section 7, 1]
- To alleviate the heat island phenomenon, the government will promote such measures as greening rooftops, greenery on walls, and highly reflective painting. (MOE) [Cited

in Chapter 2, Section 7, 1]

- By using Japan's experience and knowledge gained at home and abroad, the government will promote international cooperation for sustainable agriculture, forestry and fisheries, and positively contribute to global environmental conservation by preventing desertification, promoting the sustainable use of water resources, and taking measures to address global warming. (MAFF) [Cited in Chapter 2, Section 4, 4.4]
- The government will conduct basic research and technical development to promote sustainable forest management in developing countries, and take such measures as REDD to prevent global warming. (MAFF) [Cited in Chapter 2, Section 4, 3.4 and 4.4]
- The government will be proactive in international examinations regarding the assessment of roles played by forests and wood usage in preventing global warming. (MAFF) [Cited in Chapter 1, Section 5, 1.2]
- Through active participation in international political talks, the government will play a positive role in international society in cooperation with the countries concerned to conserve biodiversity protected by the world's forest resources and prevent global warming, with an eye towards promoting sustainable forest management, including measures against illegal logging. (MAFF, MOE, MOFA) [Cited in Chapter 2, Section 4, 3.4]
- The government will conduct research on regions having illegal logging problems and on the impact illegal logging would have on reducing forests, advancing global warming, and loss of biodiversity, and propose new policies for deforestation control and the conservation of biodiversity at international conferences. (MOE) [Cited in Chapter 2, Section 4, 3.4]
- Japan donated 10 million dollars in 2008 to the Forest Carbon Partnership Facility (FCPF) established by the World Bank to support developing countries that are working to reduce greenhouse gas emissions by conserving forests. The government will positively contribute to deforestation control in developing countries, help upgrade their monitoring capabilities, and undertake other efforts. (MOF, MOE, MAFF, MOFA) [Cited in Chapter 2, Section 4, 3.4]
- Accidents known as 'bird strikes' where rare birds such as the White-tailed eagle fly into wind power plants are hampering wildlife protection and the promotion of wind power. The government will make efforts to develop technology for reducing the risk of bird strikes on wind power plants to achieve a good balance between wildlife protection and the promotion of wind power. (MOE) [Cited in Chapter 2, Section 7, 1]

[Monitoring and adaptive measures]

- In efforts to ensure adaptation to climate change under the Framework Convention on Climate Change, the government will deepen understanding regarding ecosystem

functions and promote the sharing of knowledge about measures for conserving ecosystems. (MOE)

- As a part of the "Comprehensive Ecosystem Monitoring System," the government will conduct ongoing surveys in the project of "Monitoring Sites 1000" to more precisely grasp the status of changes in Japan's typical ecosystems such as in alpine zones where the impact of global warming will be clearly evident. Based on the results of such research including on the effects of global warming, it will also conduct, from the perspective of conserving biodiversity, its own necessary studies on adaptive measures, such as clarifying how an ecosystem network should be in order to be more adaptable to environmental changes such as climate change, as well as reviewing the points to keep in mind for conserving and restoring ecosystems. (MOE) [Cited in Chapter 2, Section 1, 1.2, and Chapter 2, Section 6, 1.1]
- Based on discussions at the World Heritage Committee, the government will build a monitoring setup and program to grasp the impact of global warming on World Heritage sites. (MOE, MAFF) [Cited in Chapter 1, Section 2, 9.1]
- As for Shiretoko World Natural Heritage Area, the government will conduct monitoring to grasp the impact of climate change on ecosystems and biodiversity, such as changes in the marine environment and alpine vegetation in the heritage area, and discuss and implement measures to adapt to climate change, including reducing environmental impact such as the damage caused by Ezo deer feeding on plants. (MOE, MAFF)
- The government will conduct a citizen-based survey that calls for the collection of information observed in familiar natural environments, including changes in the distribution of wildlife caused by global warming, with the participation of various entities including research institutions, private organizations and experts, in addition to the general public, and thereby enhance public awareness about conserving biodiversity in Japan. It will also build a system to collect wide-ranging natural environment data. (MOE) [Cited in Chapter 2, Section 3, 1.1, and Chapter 2, Section 5, 2.1]
- In order to secure migratory or dispersal routes for wildlife in case of such environmental changes as global warming, the government will promote the forming of an ecosystem network. (MOE, MLIT, MAFF)
- Based on the resolution by the ICRI on coral reefs and climate change, the government will examine adaptive measures for climate change, such as research to improve coral reef resilience against climate change and the support of activities. (MOE) [Cited in Chapter 1 Section 9 1.4]
- Regarding the expanded distribution of living organisms caused by global warming that results in harmful effects on human health and the living environment (such as more mosquitoes transmitting infectious diseases), the government will promote

appropriate monitoring and surveys, and examine methods of comprehensive extermination. (MOE)

- Changes in weather and oceanic phenomena due to global warming and long-term rises in sea level are valid concerns, and the serious impacts of aggravated coastal erosion, expanded flood-prone, low-rise areas, greater damage caused by high tides, and changes in the habitats of living organisms are also concerns for beaches. For these reasons, the government will monitor tide levels and ocean waves, and promote examination as needed to cope with those changes. (MAFF, MLIT) [Cited in Chapter 1, Section 9, 3.1, and Chapter 2, Section 5, 3.5]
- Based on the anti-global warming strategy of the Ministry of Agriculture, Forestry and Fisheries (formulated in June 2007), the government will make efforts for developing and disseminating such adaptive measures as the development of heat-tolerant breeds, to cope with the unavoidable effects of global warming on agriculture, forestry and fisheries in the future. (MAFF)
- As a developed country party to the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, the government will support efforts to combat desertification in developing countries experiencing a serious drought and/or desertification through ODA and other aid. (MOFA, MOE, MAFF) [Cited in Chapter 2, Section 4, 2.7]
- The government will examine methods of comprehensively conserving and managing natural resources, and conduct research and surveys. It will also present the scientific knowledge obtained by those methods at the Conference of the parties to the Convention and at the meetings of subsidiary bodies, and positively address the desertification problem in the world. (MOFA, MOE, MAFF) [Cited in Chapter 2, Section 4, 2.7]
- The government will organize information regarding assessment of the impact of global warming in fields that include natural ecosystems, food, aquatic environments, water resources, disaster prevention, coastal cities, health, citizens' life and urban life. Based on that information, the government will formulate adaptation guidelines that stipulate the basic notions of adaptation in Japan, cross-field precautions on formulating and implementing measures, and the roles of individual entities in order to promote the measures being taken by relevant government ministries and agencies, and local governments. (MOE)

Section 7 Efforts to build a sound material-cycle society and low-carbon society (Basic Concepts)

The biosphere—the basis of our existence—is organized in the circulation of such substances as water and the earth’s atmosphere. In the biosphere, plants create organic substances via photosynthesis using solar energy, then plants are consumed by animals, and substances further evolve in terms of form and move among living creatures and the environment as animals travel through migration and diffusion. The substances consisting of dead creatures decompose and become part of the soil, or are released as inorganic substances into the atmosphere. Biodiversity maintained by such ceaseless circulation between life and substances on earth provides us with various blessings in our daily life.

Our society is shifting from one based on the sustainable use of resources supported by the old type of circulating substances to a so-called mass production/consumption/disposal society where huge amounts of resources such as fossil fuels are taken from nature, a large volume of products is produced and consumed, and an enormous quantity of waste is discarded into nature. The large volume of greenhouse gases emitted into the atmosphere results in climate change, and may waste effective resources on the earth and inhibit the healthy circulation of substances. In addition, the growing demand for resources due to increases in population and economic growth in developing countries accelerates the intense competition to acquire natural resources, thereby resulting in land corruption. When adding the problem of climate change, the biodiversity that supports the basis of life for all living creatures is being depleted on a large scale.

Under such circumstances, we need to understand that a sustainable society can be created by maintaining sound natural circulation as part of the larger circulation of the earth, the only place we have to live, and handing it down for future generations. It is important to view the creation of a “symbiotic society” as part of creating a “circulatory society” and a “low-carbon society” for that purpose.

In response to what is described above, the government will support the global goal to reduce the emissions of greenhouse gases in the world by at least half by 2050. Japan is targeting an 80% reduction in its greenhouse gas emissions, in order to realize a low-carbon society worthy of worldwide praise. The government will conserve forests, grasslands and wetlands where huge masses of carbon are trapped, and promote such comprehensive efforts as the use of biomass obtained from natural resources for creating a low-carbon society based on a new relationship between humans and nature.

Through all levels of socioeconomic activities that include the collection of resources, production, distribution, consumption and disposal, efforts will be made to reduce the amount of waste generated by using resource-saving technologies, along with

recyclable resources being used to minimize the collection of resources in the future, thereby helping to form a circulatory society that can reduce adverse impacts on the natural environment.

1 Promoting efforts toward forming a symbiotic, circulatory, low carbon society

(Outline of Measures and Policies)

In order to maintain the sound circulation of life and substances, and mitigate global warming, it is important to promote comprehensive efforts toward forming a symbiotic, circulative, low carbon society by understanding the relation between the issues of biodiversity, curtailing the consumption of natural resources, reducing environmental impact, and global warming.

By conserving forests, grasslands and peat marshes that are important for absorbing carbon dioxide in national parks, the government will conserve biodiversity and mitigate global warming.

In order to prevent the loss of living environments accompanied by the collection of resources and secure the proper circulation of substances in nature, not only focusing on the short-term productivity and production efficiency of resources, but also considering the impact on biodiversity, the government will develop alternative materials for such unrestorable resources found in nature as fossil fuels and mineral resources among natural resources, promote the efficient use thereof, and control the amounts used. As for resources to be newly collected from nature, the government will promote their long-term use. It will also promote the reuse of used resources as recyclable energy and store energy to reduce the amount of final waste disposal.

As for using recyclable resources in the nature, it is necessary to promote sustainable use by not only focusing on short-term productivity and the production efficiency of resources, but also to consider the impact on biodiversity. With this viewpoint in mind, the government will promote the use of biomass based on the Biomass Nippon Comprehensive Strategy (decided by the Cabinet in March 2006), the Fundamental Law for Promotion of Biomass Utilization (legislation No. 52, 2009), appropriate improvement and conservation of forests, and the proactive use of wood.

The government will promote agriculture, forestry and fishery industries that focus on environmental conservation, such as environment-conserving agriculture using less chemical fertilizers and pesticides, and a sustainable aquaculture industry that helps improve the fishery environment. It will also promote the use of previously unused natural resources such as rainwater and recycled water in cities, rice straw in rural areas, and vegetation-derived resources generated by the utilization and management of Satochi-Satoyama areas.

(Current Situation and Challenges)

In Satochi-Satoyama areas once utilized as the production sites for sustainable resources, the living and growth environments for living creatures particular to Satochi-Satoyama areas have deteriorated due to less use and inadequate workforce for management resulting from a declining population, rapidly aging workers, and drastic changes in industrial structure and lifestyle. For this reason, it is necessary to construct a framework to continuously manage and use Satochi-Satoyama areas. Satochi-Satoyama areas are also expected to contribute as the production sites for biomass resources that promote a low-carbon society.

Accompanied by such socioeconomic activities as procuring resources, substances other than targeted resources could be procured and discarded as waste. Efforts to reduce a wider collection of resources from nature and promoting the circulatory use of resources lead to a reduced the Total Material Requirement (TMR).

For example, reports on illegal logging, a reduction of habitats for wild animals and plants, water pollution, salt pollution, and health damage in residents have accompanied the excavation of metals such as rare metals used for electronics parts.

The percentage of metals accumulated in a so-called “urban mines” such as for domestic electronics parts may only, account for a few percent or up to dozens of percent, depending on the kind of metal. It is therefore necessary to collect metals such as rare metals from used products for conserving a sustainable natural environment and life environment. Garbage will ultimately be discarded for landfill at the final waste disposal site. There are several methods of constructing final waste disposal sites, such as land reclamation in the mountains or on the plains and marine reclamation in tidal flats and coastal areas. No method, however, can reduce impact on the environment to zero. Thus, the service life of existing disposal sites must be prolonged by reducing the amounts of final waste disposal and minimizing the construction of new disposal sites.

(Specific Measures and Policies)

- Measures for new utilization of Satochi-Satoyama areas will be discussed through practical, experimental efforts in local areas, such as through environment education and ecotourism, and the use of biomass such as waste wood and *susuki* (Japanese silver grass). The government will also formulate a framework for various entities such as urban residents and companies to share Satochi-Satoyama areas as common land (commons) for sustainable use. (MOE, MEXT, MAFF, MLIT) [Cited in Chapter 1, Section 1, 1.6]
- By setting Satochi-Satoyama areas at the center, and making use of the wisdom and tradition of symbiosis as reflected in our view of nature and socioeconomic systems, the government will reconstruct a symbiotic system that has also adopted modern wisdom and technology. In addition to such methods established in Japan, the

government will collect and analyze the state of sustainable use of natural resources that exist around the globe, summarize the globally-shared ideals for the sustainable use and management of natural resources according to the potential possessed by individual regions, and present guidelines to realize these ideals. The government named this activity the “SATOYAMA Initiative” and will call for wide participation under the international framework based on this principle, and propose it at COP10. (MOE) [Cited in Chapter 2, Section 4, 1.3]

- In national parks with an excellent natural environment, greenhouse gas emissions from ecosystems shall be curtailed by properly conserving components of the natural environment, including forests, grasslands, peat marshes and other wetlands, and soil that stores large amounts of carbon. (MOE) [Cited in Chapter 2, Section 6, 1.1]
- Accidents known as ‘bird strikes’ where rare birds such as the White-tailed eagle fly into wind power plants are hampering wildlife protection and the promotion of wind power. The government will make efforts to develop technology for reducing the risk of bird strikes on wind power plants to achieve a good balance between wildlife protection and the promotion of wind power. (MOE) [Cited in Chapter 2, Section 6, 1.1]
- In order to encourage more countries agree to the Copenhagen Accord compiled at the 15th session of the Conference of Parties to the United Nations Framework Convention on Climate Change in December 2009, and submit reduction targets and action plans, Japan will work with individual countries and wield its leadership toward adoption of a comprehensive, single legal document that consists of a fair, effective international framework under which all major countries shall participate based on the Copenhagen Accord. (MOFA, MOE, METI) [Cited in Chapter 2, Section 4, 2.12, and Chapter 2, Section 6, 1.1]
- To meet its commitment to a 6% reduction during the first commitment period (2008 to 2012) of the Kyoto Protocol, the government will promote comprehensive measures based on the Kyoto Protocol Target Achievement Plan (entirely revised), which was approved at a Cabinet meeting in March 2008. (All government ministries and agencies) [Cited in Chapter 2, Section 4, 2.12, and Chapter 2, Section 6, 1.1]
- Biomass absorbs carbon dioxide from the atmosphere through photosynthesis, and releases it when burned. Thus it will not increase the carbon dioxide released into the atmosphere. Because using biomass having such characteristics as a substitute for fossil resource-derived energy and products will help prevent global warming, the government will promote the use of biomass. (Cabinet Office, MIC, MEXT, MAFF, METI, MLIT, MOE) [Cited in Chapter 2, Section 6, 1.1]
- As for rooftop gardening and greening on wall, the government will collect more empirical data regarding the degree of its contribution to the issue of global warming by measuring the mitigation effect on the urban heat island phenomenon and the

effects on the living and growth environments of living creatures, thereby better understanding these effects. (MLIT) [Cited in Chapter 2, Section 6, 1.1]

- To mitigate the heat island phenomenon, the government will promote technologies for rooftop gardening, greening on walls, and highly reflective paint. (MOE) [Cited in Chapter 2, Section 6, 1.1]
- In order to prevent the destruction of nature accompanied by the collection of resources, the government will establish an appropriate and effective recycling system for rare metals. The government will expand target areas for the model project of collecting small, used electric appliances, and further discuss efficient, effective methods of collection. The government will also grasp the actual volume of rare metals contained in the small, used electric appliances collected, evaluate hazardous levels regarding the recycling of small, used electric appliances, and discuss the proper processing thereof. The government will promote the "research and development of buildings with new structural systems using innovative structural materials," the "development of a highly efficient collection system for rare metals" in order to develop products with a longer service life or improved designs, and manufacturing technologies for easy-to-recycle products. The government will also promote "the Elements Strategy Project and the Development Project on Rare Metals Substitution" in order to develop substitute materials for rare metals and technologies to reduce the use of rare metals. (MOE, MEXT, METI)
- Sewage can be considered a kind of urban mines that contains useful, rare resources. The government will promote efforts for collecting and recycling such resources in cooperation with the users concerned. (MLIT)
- Aiming at reducing the amount of resources newly collected from the nature, the government will further promote such efforts as implementing the project for promoting excellent houses for long-term use in order to establish a stock of high-quality housing that can be used for a long time. (MLIT)
- In order to promote the use of biomass, the government will make efforts for measures regarding biomass as described in Part 2, Chapter 2, Section 2, 3 ("Use of biomass"), accelerate the use of biomass based on the Biomass Nippon Comprehensive Strategy (decided by the Cabinet in March 2006), and the Biomass Utilization Promotion Basic Law (legislation No. 52, 2009), and promote the regional use of biomass in the form of Biomass Towns, as well as the domestic production of biofuels. (Cabinet Office, MIC, MEXT, MAFF, METI, MLIT, MOE) [Cited in Chapter 2, Section 2, 3]
- The government will promote the use of biomass based on its characteristics: sludge generated in sewage treatment can be made into solid fuel as an alternative to fossil fuels; biogas generated in methane fermentation can be used as fuel for natural gas cars. (MLIT)
- The biochemical conversion of food waste, especially treatment with methane

fermentation using microorganisms such as methanogen can be an effective measure for food waste that will inevitably result despite all efforts to prevent food from being discarded as waste. The government will grant the “Subsidy to promote formation of a circulatory society” to municipal governments running methane gasification facilities that conduct such treatment in order to promote the formation of a circulatory society. The ratio of issuance of the subsidy has increased from one-third to one-half since 2005, in order to intensively support efforts. Since 2007, the combined method of using a methane gasification facility and an incineration plant to deal with refuse, as well as the residue of methane fermentation, has been included in the ratio (one-half) of issuance of the subsidy. The government will widely disseminate a construction manual for methane gasification facilities (methane generated from food waste) formulated in January 2008, in order to provide necessary information and support municipal governments considering the construction of methane gasification facilities. (MOE)

- The government will promote the introduction of sustainable agricultural production practices intended to integrally promote composting-based soil cultivation and less use of chemical fertilizers and agricultural chemicals. As part of advanced measures, it seeks to reduce the regional aggregate use of chemical fertilizers and agricultural chemicals. For example, a 50% reduction will be targeted. (MAFF) [Cited in Chapter 1, Section 6, 1.1]
- The government will promote organic farming—where is a rule to avoid any chemical fertilizers and agricultural chemicals—to significantly reduce the environmental load imposed by agricultural activities, and contribute to the life of diverse living creatures. As part of these efforts, it will promote technological development for organic farming, improve education and guidance for farmers, and raise consumer understanding of and interest in organic farming. Thus, the government targets environmental improvements that would facilitate the active implementation of organic agriculture by farmers. (MAFF) [Cited in Chapter 1, Section 6, 1.1]
- For the aquaculture industry, the government will promote the formulation of fishing ground improvement plans to improve regionally independent aquacultural fishing grounds, in order to realize sustainable aquaculture production that does not adversely affect the fishing ground environment. (MAFF) [Cited in Chapter 1, Section 9, 2.6]
- The government will establish aquaculture technology that combines the aquaculture of fish and seashells with that of seaweed to enable the stable material circulation of carbon and nitrogen, and promote the development of feed with low environmental load. (MAFF) [Cited in Chapter 1, Section 9, 2.6]
- The government will promote projects with an eye towards constructing a sound water circulation system from a wide-area viewpoint, including the reuse of treated

sewage water and rainwater, and discharge control by the penetration of rainwater into storage. (MLIT) [Cited in Chapter 1, Section 7, 2.3]

Section 8 Environmental Impact Assessments (Basic Concepts)

For the conservation of biodiversity, it is quite essential to consider conservation of the environment beforehand when formulating and implementing policies and projects of the central government and other parties. Therefore, when planning and implementing central government policies that are deemed to influence the environment, examination and consideration from the standpoint of environmental conservation is necessary. When implementing development projects, it is necessary to survey, predict and assess the environmental impact and, based on the results, take conservation of the environment into consideration under the Environmental Impact Assessment Law (enforced in June 1999) and related legislation.

The “Environmental Impact Assessment Law” prescribes that, regarding large-scale projects that could have a serious impact on the environment, the proponent undertaking such a project must assess the environmental impact of the project in advance by surveying, predicting and assessing its likely impact, and then reflect the results of such environmental impact assessments in determining the content of the project, thereby giving proper consideration to environmental conservation.

The “Basic Guidelines” that prescribe basic matters common to all types of projects on practical methods of assessing environmental impact based on said Law also prescribe the need to select the items and methods of environmental impact assessment in an appropriate manner based on the characteristics of the relevant project and related area. With regard to the “protection of biodiversity and orderly conservation of the natural environment” and “rich and harmonious contact between people and nature” pointed out as categories for assessment items, proponents are requested to give consideration for a better environment in their projects, including not only such valuable matters as from academic excellent landscapes and important fauna and flora from academic or scarcity-value viewpoints, but also contact with nature close at hand and familiar living organisms that characterize a regional ecosystem. With regard to measures for protecting the environment, it is prescribed that, rather than taking compensatory mitigation by creating an equal environment to the one that would be lost by the project, avoiding and reducing environmental impact itself should be given priority for examination.

As nearly all prefectures and ordinance-designated cities have their own environmental impact assessment ordinances, proper environmental considerations should be given based on regional conditions.

The ideas behind strategic environmental assessment to incorporate environmental considerations into formulating and implementing policies and plans to establish frameworks for planning and implementing individual projects (under superordinate

plans) should be realized, with examination to establish a system for this strategic environmental assessment being promoted.

1 Environmental Impact Assessment

(Outline of Measures and Policies)

In implementing each project, the Minister of the Environment will give opinions on the Environmental Impact Assessment Statement as necessary. Upon the completion of formal procedures, appropriate follow-up must be done for projects identified in the Minister's opinions and follow-up surveys conducted.

The situation of enforcing the Environmental Impact Assessment Law and the ideal system for evaluating environmental impact in the future were also summarized in February 2010 as "the Vision of the Environmental Impact Assessment System" (a report submitted by the Central Environment Council). The report recommends the introduction of certain procedures into the current law, such a strategic environment assessment procedure and adding wind power generation projects to designated-by-law projects. The government will develop its required measures including revisions to the Environmental Impact Assessment Law, based on this report. The Basic Guidelines will be examined and the system enhanced. The methods of reasonably conducting surveys, prediction and assessment, and measures for protecting the environment are to be examined on an ongoing basis, with practical information and technical support necessary for environmental impact assessment being continuously provided. The method of promoting communication among people engaged in environmental impact assessment is also to be examined.

1.1 Enhancement of Environmental Impact Assessment

(Current Situation and Challenges)

There were 179 projects following the procedure of environmental impact assessment under the Environmental Impact Assessment Law (i.e., projects for which the procedure either has been completed or is in progress) as of the end of March 2009. After the procedure, each project enters the construction stage and then the service stage. Each time, proper consideration concerning environmental conservation must be given based on the Environmental Impact Assessment Statement.

For better environmental impact assessments in the future, in addition to examining the situation regarding enforcement of the law, it is necessary to review technical methods on an ongoing basis to examine the function of the "scoping document concerning environmental impact assessment" for using it to the fullest extent, and develop a method of promoting communication among people engaged in environmental impact assessment.

(Specific Measures and Policies)

- For the implementation of each project, the government will state its opinion on the “scoping document Environmental Impact Assessment statement as necessary, for environmental impact assessment to be properly and smoothly implemented, and appropriate consideration on environmental conservation to be given based also on the standpoints of “protection of biodiversity and orderly conservation of the natural environment” and “rich and harmonious contact between people and nature.” (MOE)
- After the process of environmental impact assessment has been completed, the government will properly follow up the projects for which the Minister of the Environment has stated his/her opinion and the ones for which ex-post research is to be conducted. (MOE, relevant government ministries and agencies)
- Based on the "The Vision of the Environmental Impact Assessment System" (a report submitted by the Central Environment Council in February 2010), the government will develop its required measures including revisions to the Environmental Impact Assessment Law, such as introducing a strategic environment assessment procedure and adding wind power generation projects to designated-by-law projects. (MOE)
- The appropriateness of the Basic Guidelines always needs to be examined. The government will adequately grasp the situation of implementation after the previous examination (March 2005), implement examination based on recent scientific knowledge and the implementation status of environmental impact assessment, and thereby enhance the system. (MOE)
- With regard to the methods of predicting and assessing environmental impact, and the measures for protecting the environment, including avoiding, reducing or compensating for mitigation, the government will improve technical and systematic methods by continuously examining the analysis of impact actually caused by implementing various projects, for example, as well as factors not well known in the past. (MOE)
- The government will continuously provide technical support and information necessary to implement environmental impact assessment for citizens, NGOs, corporations, local governments and other entities concerned via the Internet and other media. (MOE)
- The government will examine a method of promoting wide-ranging and effective communication among those concerned with environmental impact assessment. (MOE)

1.2 Introduction of Strategic Environmental Assessment

(Current Situation and Challenges)

Based on Japan's Third Basic Environment Plan (April 2006), Guidelines for the Introduction of Strategic Environmental Assessment (SEA Guidelines) were formulated

in March 2007 by the Advisory Body to the Environmental Policy Bureau of the Ministry of the Environment on Strategic Environmental Assessment of academics and experts. SEA Guidelines describe common procedures and assessment methods in an effort to avoid or reduce serious environmental impact caused by implementing a project, by measuring significant environmental impact, comparatively assessing the environmental aspects of alternatives, summarizing the items to consider for the environment, and reflecting those items in examining the plan at an early stage before starting the project, for the superordinate plans at the stage of examining location, size, etc.

Related efforts have also been developing for public works, as seen in the disclosure of information in the related planning process and the presentation of guidelines for citizens' participation.

In order to secure the transparency and fairness of public projects for roads, rivers, airports, ports and harbors formulated at an earlier framing stage prior to the planning stage, the government devised the "planning process in the Conceptual making stage of public works" in April 2008. As for final waste disposal sites, it compiled the "Guideline for Introduction of Strategic Environmental Assessment for final waste disposal site (draft)" in March 2009.

The first strategic environmental assessment based on these guidelines was implemented in 2008.

As "the Vision of the Environmental Impact Assessment System" (a report submitted by the Central Environment Council in February 2010) states the need to institutionalize strategic environmental assessment, the government will develop its required measures including revisions to the Environmental Impact Assessment Law, based on this report.

(Specific Measures and Policies)

- As "the Vision of the Environmental Impact Assessment System" (a report submitted by the Central Environment Council in February 2010) states the need for proactive introduction of strategic environmental assessment, the government will develop its required measures including revisions to the Environmental Impact Assessment Law, based on this report. (MOE)
- The government will examine implementation and accumulate implementation samples based on the existing SEA Guidelines until a law concerning environmental assessment is enacted. (MOE, relevant government ministries and agencies)
- The government will provide information on SEA Guidelines until a law concerning environmental assessment is enacted, and organize a method for local governments to compile and provide regional environmental information. (MOE)
- The government will promote the examination of strategic environmental assessment

for making decisions on superior plans and policies. (MOE)

2 Other major efforts to reduce environmental impact

(Outline of Measures and Policies)

Based on the Environmental Impact Assessment Law and other laws, environmental conservation will be considered in implementing public works. Moreover, “Environmental Action Plan 2008” of the Ministry of Land, Infrastructure and Transport (July 2008) and “Technical Guidelines on the Research Plan and Design for Implementation of Projects that Consider Harmony with Environment” (March 2006) that describe environmental considerations for land improvement projects, have been formulated to reduce environmental impact in the implementation of public works.

Concerning Japan’s Official Development Assistance (ODA) projects, the Ministry of Foreign Affairs has formulated the “Guidelines for Environmental Considerations” (September 2003), in considering environments for the projects.

2.1 Environmental considerations in dam construction

(Current Situation and Challenges)

In implementing a dam project, environmental research is conducted beforehand to fully grasp the living and breeding environment of living organisms, as well as examining the impact dam projects would exert on the environment. From the planning stage of the project, measures for environmental conservation are taken to avoid, reduce or compensate for the impact on living and breeding environments of various living organisms as much as possible, by changing the locations on a mountain from which rocks are extracted for dam construction or using an alternative road, establishing a facility to change sluice gates, giving consideration to operational plans, restoring woodland at the construction facility site, and protecting and maintaining biotopes. Thus, the natural environment is taken into consideration. Furthermore, during construction and after starting service, environment research is conducted to grasp the degree of the project’s influence and the effect of environmental conservation measures.

(Specific Measures and Policies)

- When implementing a dam project, the government will conduct a careful examination by paying sufficient attention to the natural environment from the planning stage. And by taking environmental conservation measures such as conducting environmental research and environmental impact assessment beforehand, the government will try to avoid or reduce impact on the living and growth environments of various living organisms as much as possible. It will also make efforts to reflect the survey results after placing the dam in service into future dam project planning and impact assessments. (MLIT) [Cited in Chapter 1, Section 8, 1.4]

2.2 Measures to alleviate environmental impacts of road projects

(Current Situation and Challenges)

In implementing a project to construct roads, detailed research on natural environment is conducted at an early stage of planning and designing a road, and with the route selected in harmony with rich nature as much as possible. Measures that take ecosystems into account are promoted, such as selecting a structure to avoid major changes in terrain and vegetation, constructing fences to prevent animals from entering the road area or a crossway for animals to cross the road safely against vehicular traffic, and providing environmental compensation for damaged habitats that are changed by road construction. More Efforts are devoted in addition to introducing a road planning process in which citizens can participate at the planning stage.

(Specific Measures and Policies)

- In implementing a road project, the government will consider the following points to promote measures that take ecosystems into account. (MLIT) [Cited in Chapter 1, Section 7, 2.2]
 - (1) The government will conduct detailed research and accumulate data on the natural environment. Based on the data obtained, it will make efforts to select a route that can conserve rich nature and adopt a structure to avoid major changes in terrain and vegetation as necessary.
 - (2) From the standpoint of avoiding fragmentation of the habitats of animals and conserving the growth environment for plants, the government will make efforts to construct roads taking ecosystems into consideration, such as constructing crossways for animals and erecting signs calling attention to animals in the area.
 - (3) With regard to the slopes of embankments generated by road construction, the government will restore the slopes as close to their natural status as possible through revegetation using vegetation that best matches the natural weather and soil conditions of the region, including the use of existing infrastructure.
 - (4) For road construction in certain regions, the government will make positive efforts concerning formation of the living and growth environments for fauna and flora, by selecting the types of plants for planting with consideration given to the surrounding natural environment.

2.3 Environmental considerations in ODA projects

(Current Situation and Challenges)

As for the implementation of the governmental official development assistance (ODA) projects, the Japan International Cooperation Agency (JICA) established the “JICA Guidelines for Environmental and Social Considerations” (April 2004 version) and is promoting such environmental considerations in implementing projects as

avoiding or minimizing environmental impact including that from the standpoint of biodiversity. As JICA and JBIC were integrated into the new JICA in October 2008, the guidelines for environmental and social considerations are now being unified. Specific contents are also being discussed by the “Expert Panel on JICA’s new guidelines for environmental and social considerations”

(Specific Measures and Policies)

- The government will inform ODA recipient countries of its serious attitude on environmental considerations through discussions on aid with developing countries and on various other opportunities. It will also take notice of the environment in every step of adoption, implementation and assessment of a project. (MOF)
- JICA as an agency that coordinates development assistance will further promote efforts to formulate “New JICA Guidelines for Environmental and Social Considerations,” as well as formulating and implementing projects based on appropriate environmental and social considerations. (MOF)

Basic Act on Biodiversity (Act No. 58 of June 6, 2008)

Contents

- Chapter I General Provisions (Article 1 - Article 10)
- Chapter II Biodiversity Strategy (Article 11 - Article 13)
- Chapter III Basic Policies
 - Section 1 Policies of the National Government (Article 14 - Article 26)
 - Section 2 Policies of Local Governments (Article 27)
- Supplementary Provisions

Since the creation of life, organisms have evolved adjusting themselves to various environments through a several billion-year history. There are now diversified organisms on the earth, and a diversified ecosystem has been formed through interaction with natural components of the environment surrounding organisms, including air, water, and soil.

Human beings are living through enjoying benefits from biodiversity. Biodiversity thus serves as a basis of the survival of human beings. In addition, biodiversity, as the particular assets of each region, also supports the diversity of unique regional culture.

On the other hand, biodiversity is facing serious crises, including extinction of species and destruction of ecosystems due to development and other activities by human beings, deterioration of satoyama (managed woodlands or grasslands near human settlements), etc. due to reduced human activities along with changes in socioeconomic conditions and disturbance of ecosystems, etc. by alien species, etc. In addition, climate changes, including global warming, which are recently rapidly advancing, have exceeded the speed at which species and ecosystem can adjust themselves, and are thus likely to have serious impacts, including extinction of many species. Therefore, it has become a major challenge, from the perspective of conservation of biodiversity, to make efforts to prevent global warming.

Seen from a global standpoint, biodiversity has been significantly damaged, including decrease and deterioration in forests and decrease in marine biological resources due to overexploitation. Taking into consideration that the Japanese economy and society are carried on in a close mutual dependence relation with other countries, it is important for Japan to play a leading role in the international community to ensure biodiversity.

We are responsible for ensuring biodiversity, which is a common property of all human beings, and for carrying it on to the next generation so that human beings can continue enjoying benefits therefrom in the future. Now is the time to mark a first step toward realizing a sustainable society, in which human beings can continue enjoying benefits from biodiversity in the future, while comprehensively promoting policies to ensure biodiversity and avoiding or minimizing impacts on biodiversity.

This Act is established here with the aim of clarifying the fundamental principles for conservation and sustainable use of biodiversity and thereby indicating the direction thereof and promoting related policies in a comprehensive and planned manner.

Chapter I General Provisions

(Purpose)

Article 1 The purpose of this Act is to set fundamental principles for conservation and sustainable use of biodiversity in line with the basic principle of the Environment Basic Act (Act No. 91 of 1993), to clarify the responsibility of the government, local governments, businesses, citizens and private bodies, and to promote policies for conservation and sustainable use of biodiversity in a comprehensive and planned manner by developing the National Biodiversity Strategy and prescribing other matters that serve as a basis of policies for conservation and sustainable use of biodiversity, thereby conserving rich biodiversity, and to aim at realizing a society in coexistence with nature where human beings can continue enjoying benefits therefrom in the future and to contribute to conserving the global environment.

(Definitions)

Article 2 (1) The term "biodiversity" as used in this Act shall mean the existence of various ecosystems and the existence of various differences between species or within species.

(2) The term "sustainable use" as used in this Act shall mean using the components of biodiversity by a method that does not cause long-term decrease in organisms and other

components of biodiversity and benefits from biodiversity (hereinafter referred to as "sustainable method") to ensure that current and future-generation human beings can enjoy benefits from biodiversity and that biodiversity, which is a basis of the survival of human beings, will be maintained in the future.

(Fundamental Principles)

- Article 3 (1) Conservation of biodiversity shall be carried out for the purpose of ensuring that conservation of endangered wildlife species, etc. is aimed at and that the diversified natural environment is conserved according to the natural and social conditions of the region, taking into consideration that maintenance of sound and bountiful nature is indispensable for conservation of biodiversity.
- (2) Use of biodiversity shall be carried out for the purpose of using national land and natural resources by a sustainable method to ensure that impacts on biodiversity are avoided or minimized, taking into consideration that biodiversity has been damaged along with changes in socioeconomic activities and that use of natural resources is likely to have an impact on biodiversity in Japan and abroad.
- (3) Conservation and sustainable use of biodiversity shall be carried out for the purpose of making responses by a preventive method in which biodiversity is conserved while endeavoring to enrich scientific knowledge and by an adaptive method in which the state of biodiversity is monitored even after project, etc. is started, scientific evaluations are made on the monitoring results and the evaluation results are reflected on said project, etc., taking into consideration that biodiversity is based on a subtle balance and involves many phenomena that have yet to be scientifically explained and that it is difficult to regenerate biodiversity once it is damaged.
- (4) Conservation and sustainable use of biodiversity shall be carried out for the purpose of endeavoring for conservation and regeneration of ecosystems, etc. from a long-term standpoint, taking into consideration that biodiversity continuously brings many benefits over the long term.
- (5) Conservation and sustainable use of biodiversity shall be carried out based on the understanding that global warming is likely to have a serious impact on biodiversity and that conservation and sustainable use of biodiversity contributes to prevention of global warming, etc.

(Responsibility of the Government)

- Article 4 The government shall be responsible for formulating and implementing basic and comprehensive policies for conservation and sustainable use of biodiversity with the purport of the fundamental principles for conservation and sustainable use of biodiversity prescribed in the preceding Article (hereinafter referred to as the "fundamental principles").

(Responsibility of Local Governments)

- Article 5 Local governments shall be responsible for formulating and implementing, with the purport of the fundamental principles, policies pursuant to the government's policies and other policies according to the natural and social conditions of their areas with regard to conservation and sustainable use of biodiversity.

(Responsibility of Businesses)

- Article 6 Businesses shall, in conducting their business activities, endeavor to reduce impacts on biodiversity and to achieve sustainable use by gaining an understanding of impacts of their business activities on biodiversity and by conducting biodiversity-friendly business activities while aiming at coordination with other businesses and other persons concerned, with the purport of the fundamental principles.

(Responsibility of Citizens and Private Bodies)

- Article 7 (1) Citizens shall, with the purport of the fundamental principles, recognize the importance of biodiversity and endeavor to reduce impacts on biodiversity and to achieve sustainable use by handling alien species in an appropriate manner and choosing biodiversity-friendly goods or services in their daily life.
- (2) Citizens and private bodies shall, with the purport of the fundamental principles, make voluntary efforts for conservation and sustainable use of biodiversity and endeavor to

cooperate for other persons' efforts for conservation and sustainable use of biodiversity.

(Legislative Measures, etc.)

Article 8 The government shall take legislative, financial or tax measures or any other measures that are necessary to implement policies for conservation and sustainable use of biodiversity.

(Considerations to Organic Coordination of Policies)

Article 9 When implementing policies for conservation and sustainable use of biodiversity, necessary considerations shall be given so as to ensure the mutual organic coordination of prevention of global warming, creation of a sound material-cycle society and other policies for conservation of the environment, taking into consideration matters such as that global warming is likely to have a serious impact on biodiversity.

(Annual Report, etc.)

Article 10 (1) The government shall submit every year to the Diet a report on the state of biodiversity and policies which the government has implemented for conservation and sustainable use of biodiversity.

(2) The government shall, every year, prepare a document clarifying policies it intends to implement in consideration of the state of biodiversity pertaining to the report set forth in the preceding paragraph, and submit it to the Diet.

Chapter II Biodiversity Strategy

(Formulation, etc. of the National Biodiversity Strategy)

Article 11 (1) The government shall set a basic plan for conservation and sustainable use of biodiversity (hereinafter referred to as the "National Biodiversity Strategy") for the purpose of promoting policies for conservation and sustainable use of biodiversity in a comprehensive and planned manner.

(2) The National Biodiversity Strategy shall provide for the following matters:

- (i) Basic principle for policies for conservation and sustainable use of biodiversity;
- (ii) Targets for conservation and sustainable use of biodiversity;
- (iii) Policies which the government should implement in a comprehensive and planned manner with regard to conservation and sustainable use of biodiversity;
- (iv) In addition to what is listed in the preceding three items, necessary matters to promote policies for conservation and sustainable use of biodiversity in a comprehensive and planned manner.

(3) The Minister of the Environment shall prepare a draft of the National Biodiversity Strategy and seek a cabinet decision.

(4) When the Minister of the Environment intends to prepare a draft of the National Biodiversity Strategy pursuant to the provision of the preceding paragraph, he/she shall, in advance, take necessary measures to reflect citizens' opinions by means of the Internet or by any other appropriate methods, and hear the opinions of the Central Environment Council.

(5) When a cabinet decision under the provision of paragraph (3) has been made, the Minister of the Environment shall make public the National Biodiversity Strategy without delay.

(6) The provisions of the preceding three paragraphs shall apply mutatis mutandis to changes to the National Biodiversity Strategy.

(Relationships between the National Biodiversity Strategy and Other National Plans)

Article 12 (1) The National Biodiversity Strategy shall be formulated based on the Basic Environment Plan prescribed in Article 15(1) of the Environment Basic Law (simply referred to as the "Basic Environment Plan" in the next paragraph).

(2) National plans other than the Basic Environment Plan and the National Biodiversity Strategy shall be based on the National Biodiversity Strategy with regard to conservation and sustainable use of biodiversity.

(Formulation, etc. of Regional Biodiversity Strategy)

Article 13 (1) Prefectures and municipalities shall endeavor to independently or jointly set a basic plan on conservation and sustainable use of biodiversity within their areas (hereinafter referred to as "regional biodiversity strategy") based on the National Biodiversity Strategy.

(2) A regional biodiversity strategy shall provide for the following matters:

- (i) The area covered by the regional biodiversity strategy;
 - (ii) Targets for conservation and sustainable use of biodiversity within the relevant area;
 - (iii) Policies that should be implemented in a comprehensive and planned manner with regard to conservation and sustainable use of biodiversity within the relevant area;
 - (iv) In addition to what is listed in the preceding three items, necessary matters to promote policies for conservation and sustainable use of biodiversity in a comprehensive and planned manner.
- (3) When prefectures and municipalities have formulated a regional biodiversity strategy, they shall, without delay, make it public and send a copy of the regional biodiversity strategy to the Minister of the Environment.
- (4) The provision of the preceding paragraph shall apply *mutatis mutandis* to changes to a regional biodiversity strategy.

Chapter III Basic Policies

Section 1 Policies of the National Government

(Conservation of Regional Biodiversity)

- Article 14** (1) The government shall, for the purpose of conservation of the biodiversity of endemic organisms, conserve regions that are found to be important in terms of conservation of biodiversity, including those having natural characteristics that represent the natural environment of Japan and those that are important as habitats of diversified organisms, regenerate any ecosystem that has been damaged in the past and take other necessary measures.
- (2) The government shall, for the purpose of conservation of *satochi* and *satoyama* (rural landscapes), etc. where a unique ecosystem has been maintained through agriculture, forestry and fisheries and other human activities, establish a mechanism to continuously conserve such regions according to the natural and social conditions of the regions and take other necessary measures.
- (3) The government shall take necessary measures to conserve regions that are found to be important in terms of conservation of biodiversity in an integrated fashion, ensuring inter-regional migration of organisms and other organic connections.

(Conservation, etc. of Diversity of Wildlife Species)

- Article 15** (1) The government shall, for the purpose of conservation of diversity of wildlife species, gain an understanding of and evaluate the inhabitation status of wildlife, and conserve the habitat, regulate capture, etc. and transfer, etc., and carry out projects for protection and multiplication and take other necessary measures, according to the likelihood of extinction and other situations that wildlife species are in now.
- (2) Where there is a risk that wildlife causes damages pertaining to the living environment or agriculture, forestry and fisheries, the government shall conserve the habitat, prevent damages, manage population and take other necessary measures.

(Prevention of Damages by Alien Species, etc.)

- Article 16** (1) With regard to alien species, living modified organisms, etc. that are likely to cause damages pertaining to the ecosystem, the government shall regulate or prevent their raising, etc. or use, etc. and take other necessary measures.
- (2) With regard to chemical substances that are likely to cause damages pertaining to the ecosystem, the government shall regulate their manufacture, etc. and take other necessary measures.

(Promotion of Appropriate Use, etc. of National Land and Natural Resources)

- Article 17** The government shall, taking into consideration that promotion of sustainable use is indispensable for sound development of the local community, take necessary measures to ensure that appropriate use or management of national land with consideration given to prevent regional ecosystems from being damaged and appropriate use or management of natural resources with consideration given to prevent natural resources from significantly decreasing are promoted in a comprehensive and planned manner, according to the national and social conditions of the region.

(Promotion of Rational Use of Biological Resources)

Article 18 The government shall, taking into consideration the usefulness of biological resources, promote research and technology development for effective utilization of biological resources, and collection and systematic preservation of biological resources, and take other necessary measures, for the purpose of promoting rational use of biological resources in agriculture, forestry and fisheries, industries or other fields, giving consideration to biodiversity.

(Promotion of Biodiversity-Friendly Business Activities)

Article 19 (1) The government shall take necessary measures to promote use of biodiversity-friendly raw materials, ecotourism, organic agriculture and other efforts to reduce the impact of business activities on biodiversity.

(2) The government shall disclose information on considerations to biodiversity pertaining to business activities, improve understanding of the importance of biodiversity-friendly consumption life and take other necessary measures, to ensure that biodiversity-friendly business activities are promoted as citizens choose biodiversity-friendly goods or services.

(Promotion of Policies that Contribute to Prevention, etc. of Global Warming)

Article 20 The government shall, taking into consideration that conservation and sustainable use of biodiversity contribute to prevention, etc. of global warming, conserve forests, satoyama (managed woodlands or grasslands near human settlements), grassland, wetland, etc. which absorb and fix much carbon dioxide, promote the use of biomass to ensure that necessary management to conserve biodiversity, including thinning and grass collection, is promoted, and take other necessary measures.

(Coordination and Cooperation among Diversified Actors and Promotion, etc. of Voluntary Activities)

Article 21 (1) The government shall, for the purpose of properly formulating and implementing policies for conservation and sustainable use of biodiversity, aim at strengthening mutual coordination among relevant ministries and agencies, and endeavor to coordinate and cooperate with diversified bodies, including local governments, businesses, citizens, private bodies and persons who have expert knowledge about conservation and sustainable use of biodiversity.

(2) The government shall, for the purpose of reflecting public opinion on formulation of policies for conservation and sustainable use of biodiversity and ensuring fairness and transparency of the process thereof, ask for the opinions of diversified bodies, including businesses, private bodies and persons who have expert knowledge about conservation and sustainable use of biodiversity, and aim at utilization, etc. of a mechanism to form policies after sufficiently considering such opinions.

(3) The government shall take necessary measures to ensure that activities to acquire, maintain and conserve land that is important in terms of conservation of biodiversity and other voluntary activities for conservation and sustainable use of biodiversity, which are conducted by businesses, citizens or private bodies, are promoted.

(Promotion of Surveys, etc.)

Article 22 (1) The government shall, for the purpose of properly formulating and implementing policies for conservation and sustainable use of biodiversity, implement surveys on biodiversity, including understanding and monitoring, etc. of the status of biodiversity, and establish necessary systems for the surveys, collect materials, including samples and systematically preserve them, and provide information and take other necessary measures.

(2) The government shall, for the purpose of comprehensively evaluating the status of biodiversity and its benefits, develop appropriate indicators and take other necessary measures.

(Promotion of Science and Technology)

Article 23 The government shall, for the purpose of promoting science and technology relating to biodiversity, gain an understanding of the characteristics of wildlife species, promote research and development, including clarification of a structure of ecosystem and disseminate the results thereof, develop a system for test and research, train researchers and take other necessary measures.

(Improvement of Public Understanding)

Article 24 The government shall take necessary measures to improve public understanding of biodiversity by promoting education relating to biodiversity in school education and social education, developing human resources with expert knowledge or experience, enriching public relations activities, providing places and opportunities to interact with nature and conducting other activities.

(Promotion of Environmental Impact Assessment Pertaining to Biodiversity at the Stage of Planning Project Plans, etc.)

Article 25 The government shall, taking into consideration that it is important to give considerations at an early stage in advance of implementation of projects that have an impact on biodiversity, since biodiversity is based on maintenance of a subtle balance and it is difficult to regenerate biodiversity once it is damaged, take necessary measures, in consideration of the characteristics of projects, to promote project operators, etc. that conduct projects that are likely to have an impact on biodiversity to survey, predict or assess impact of the projects on biodiversity from the stage of planning the projects to the stage of their implementation and to give proper consideration to conservation of biodiversity pertaining to the projects based on the results.

(Ensuring of International Coordination and Promotion of International Cooperation)

Article 26 The government shall, taking into consideration that conservation and sustainable use of biodiversity is an important issue in terms of conservation of the global environment, proactively participate in international efforts based on the Convention on Biological Diversity, etc. and ensure other international coordination, and carry out technical cooperation for conservation and sustainable use of biodiversity, and take other necessary measures to promote international cooperation.

Section 2 Policies of Local Governments

Article 27 Local governments shall implement policies pursuant to the policies of the government prescribed in the preceding Section and other policies for conservation and sustainable use of biodiversity according to the natural and social conditions of their areas, aiming at comprehensive and planned promotion of these policies.

Supplementary Provisions (Effective Date)

Article 1 This Act shall come into force as from the date of promulgation.

(Review of the Enforcement Status of the Related Laws)

Article 2 The government shall, for the purpose of achieving the purpose of this Act, review the enforcement status of laws pertaining to conservation of endangered wildlife species, conservation and regeneration of the natural environment, including forests, satoyama (managed woodlands or grasslands near human settlements), agricultural land, wetland, tidal flats, rivers and lakes, or conservation of other biodiversity, and take necessary measures based on the results of the review.

(Partial Revision of the Environment Basic Law)

Article 3 A part of the Environment Basic Law shall be revised as follows:

The phrase "and the Act on Asbestos Health Damage Relief (Act No. 4 of 2006)" in Article 41(2)(iii) shall be revised to "the Act on Asbestos Health Damage Relief (Act No. 4 of 2006) and the Basic Act on Biodiversity (Act No. 58 of 2008)."

The National Biodiversity Strategy of Japan 2010

This is an unofficial translation.

Reliance may only be placed upon the official Japanese version.

Published by Ministry of the Environment
1-2-2 Kasumigaseki Chiyoda-ku Tokyo, JAPAN
TEL: +81-3-3581-3351
FAX: +81-3-3591-3228



Front cover: **Minowa, Kanasugi, Mikawashima** by Utagawa Hiroshige 1850's

Utagawa Hiroshige (1797-1858) was an ukiyo-e artist who lived in the late Edo period. He created many prints of scenery depicting the nature and how it changes from season to season, famous landscapes, and ordinary people going about their lives. Hiroshige's works were brought to the Western world, where his bold compositions and use of indigo ("Hiroshige blue") is thought to have influenced Western artists. *Minowa, Kanasugi, Mikawashima* is a print from his well-known One Hundred Famous Views of Edo series. It features two cranes visiting the paddies and marshes around a flood plain near modern-day Tokyo's Nippori district, a farmer working the paddies, and rows of houses in the distance. Edo (modern-day Tokyo) was already one of the largest cities in the world by Hiroshige's time, yet people still depended on and lived in harmony with many organisms for their livelihoods. This awareness helped give rise to forms of arts and culture popular among common people, such as ukiyo-e, that depicted such scene (Ota Memorial Museum of Art)



The National Biodiversity Strategy of Japan 2010
March 16, 2010 Cabinet Decision
Published by Ministry of the Environment, Japan
E-mail NBSAP@env.go.jp

Cover design: Kazuhiro Osakabe (brahman Co., Ltd.)

