Web sites for nature restoration projects by Ministry of the Environment (MOE)

MOE Biodiversity Center of Japan
http://www.biodic.go.jp/saisei/index.html

Ministry of the Environment, Japan
http://www.env.go.jp/nature/saisei/law-saisei/index.html

Nature Restoration Projects in Japan

Towards Living in Harmony with the Natural Environment

Ministry of the Environment

Photo by Misao Okada

Ministry of the Environment

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Website: www.env.go.jp/


1 Kushiro Wetland (Hokkaido)


2 Sarobetsu (Hokkaido)


3 Ogasawara (Tokyo)

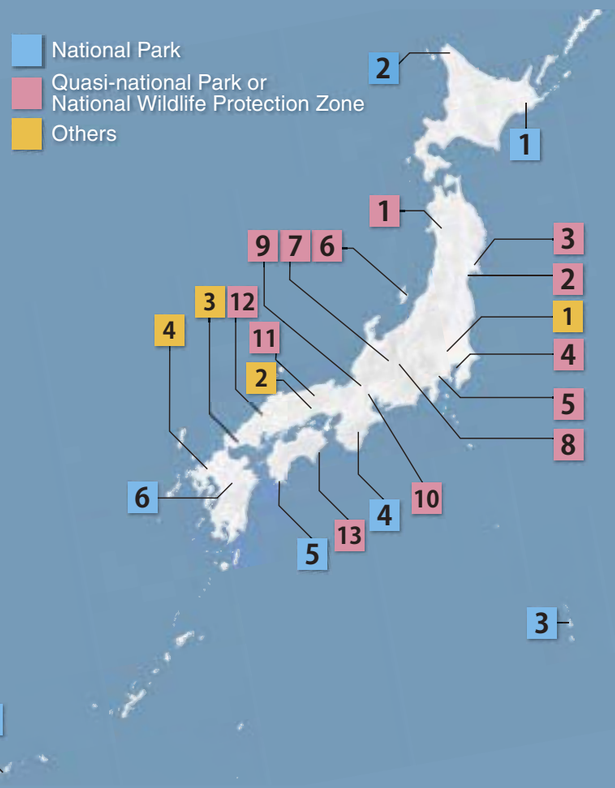

4 Odaigahara (Nara)


5 Tatsukushi (Kochi)

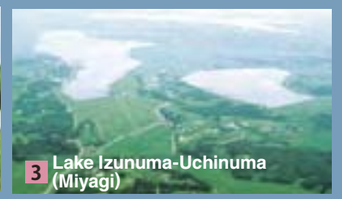

6 Aso (Kumamoto)


7 Sekisei Lagoon (Okinawa)


1 Mt. Moriyoshi Foothill (Akita)




2 Gamou Tidal Flat(Miyagi)


3 Lake Izunuma-Uchinuma (Miyagi)


4 Sanbanze (Chiba)


5 Tanzawa-Ooyama Region (Kanagawa)


6 Eastern Kosado (Niigata)


7 Utsukushigahara (Nagano)


8 Kirigamine (Nagano)


9 Lake Biwa (Shiga)


10 Mt. Ibukiyama (Shiga)


11 Mt. Hyonosen Foothill (Hyogo)


12 Yawata Wetlands (Hiroshima)


13 Takega-shima Island (Tokushima)


1 Kunugiyama (Saitama)


2 Harima Irrigation Ponds (Hyogo)


3 Fushino River Tidal Flats (Yamaguchi)


4 Kashibaru Wetlands (Saga)

Nature Restoration Projects in Japan

Towards Living in Harmony with the Natural Environment

In March 2002, as a guideline to balance humans and the natural environment, the “New National Biodiversity Strategy of Japan” was formulated. The Strategy specified “ecological restoration” as the major direction of measures to be promoted, together with “the promotion of conservation” and “sustainable resource use.”

In January 2003, the “Law for the Promotion of Nature Restoration” was enforced, and in April of that year, the Cabinet approved the “Basic Policy for Nature Restoration.” Afterward, various restoration efforts are underway across the nation.

This brochure compiles the descriptions of restoration projects sponsored by MOE and local governments, with an emphasis on their specific actions in order to expand the restoration opportunities further. We expect this brochure to be used by more communities for taking a first step in ecological restoration.

March 2007

Contents

How to carry out a Nature Restration Project

1 Project types eligible for the National Governmental funds

It is important that nature restoration projects are undertaken based on scientific knowledge and data, with sufficient preliminary assessment at ecosystem levels in cooperation of various entities.

Nature Restoration Project[*1]

National Park
Primary Sponsor : MOE
(Full funding by the Government)

Quasi-national Park
National Wildlife Protection Zone[※2]
Primary Sponsor : Municipal governments
(Projects funded by the Natural Environment Improvement Grant (up to 45% of the total project's cost))

Pre-implementation Assessment Planning → **Implementation**

*1 Restoration projects in areas outside national parks, quasi-national parks and national wildlife protection zones (referred to as the "other areas") were eligible for governmental funds between FY2002 and 2004. Since the establishment of Natural Environment Improvement Grant in FY2005, however, projects in other areas has been no longer eligible.

*2 New restoration projects that will be established from FY2006 onward within National Wildlife Protection Zones will be administered directly by the Government as part of national conservation measures.

2 Restoration Area

Restoration areas should be selected from the perspectives of ecosystem and biodiversity.

Areas Subject to Restoration

These are the areas in need of urgent restoration from ecological perspectives, specifically containing one of the following site categories:

- **Sites containing the area's representative ecosystem** — **such as habitats for rare, wildlife species** e.g., Kushiro Wetland, Ogasawara, and Eastern Kosado
- **Sites in need of restoration to conserve biological diversity** — **such as those facilitating habitat continuity** e.g., Oodaigahara, Mt. Moriyoshi Foothill, and Yawata Wetlands
- **Sites in need of restoration and where high effectiveness in restoration is expected** — **such as those of significant alterations and high public interest** e.g., Tatsukushi, Lake Izunuma -Uchinuma, and Sanbanze

3 Flow of a Restoration Project

The flow of a restoration project, from preliminary assessment, planning, implementation to post-implementation maintenance, is presented as follows:

Assessment Planning

In-depth assessment from ecosystem perspective
- Current ecosystem status
- Trend in local industries
- Historical site conditions • Others

Identifying restoration and management strategies
For example,
- Strategies for vegetation restoration
- Strategies for habitat improvement and maintenance
- Methods for post-implementation monitoring

Establishing an implementation plan*
- Areas subject to the restoration project
- Project's basic concepts
- Contents being restored by the project
- Directions of the post-restoration management
- Others

Implementation

Implementation

Examples of projects
- Vegetation restoration
- Habitat improvement

Examples of strategies
- Using native materials
- Construction by intensive man power

Monitoring Necessary Adjustments

End of Implementation

Maintenance

Maintenance
- Participation by volunteers • Monitoring
- Environmental learning
- Role-sharing with NPOs (Non-profit organizations) and others
- Public outreach • Others

A plan regarding to a nature restoration project, which is formulated by the project through consensus among an array of stakeholders based on ecosystem assessment and identified restoration and maintenance strategies.

Nature Restoration Project
Consensus building Coordination Participation
(local residents, NPOs, experts, municipal governments, and the National Government, etc.)

Kushiro Wetland

Designation:
Kushiro-shitsugen National Park
Location:
Kushiro City; Kushiro Town; Shibecha; and Tsurui, Hokkaido
Year Initiated: 2001

Kushiro Wetland Nature Restoration Committee (as of March 2009)

The Committee develops action plans and local projects to restore the Kushiro Wetland being drying out due to sediment input and other human disturbances.
Date Established: 15 Nov. 2003
Members: 121
Date Issued the Overall Plan: 31 Mar. 2005
Dates Issued Implementation Plans:
- 31 Jan. 2006 (Setsuri-Hororo and Minami-shibecha Projects sponsored by Hokkaido Regional Development Bureau (HRDB) and others)
- 28 Feb. 2006 (Takkobu Project, by MOE)
- 1 Aug. 2006 (Kayanuma Old River Channel Restoration Project, by River Sections, HRDB, and others)
- 1 Aug. 2006 (Kuchoro River Project, by River Sections, HRDB, and others)
- 6 Sep. 2007(Raibetsu Project, by HOKKAIDOU Regional Forest Office)

Japanese crane

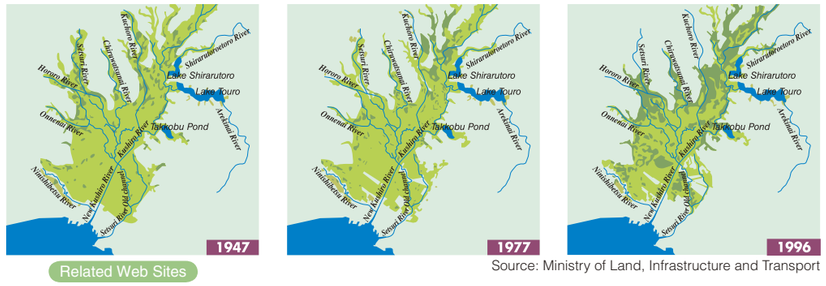
Marsh Jacob's ladder (*Polemonium caeruleum subsp. laxiflorum f. paludosum*)

Goal **Restore the wetland environment before 1980 (Year of the Ramsar listing)**

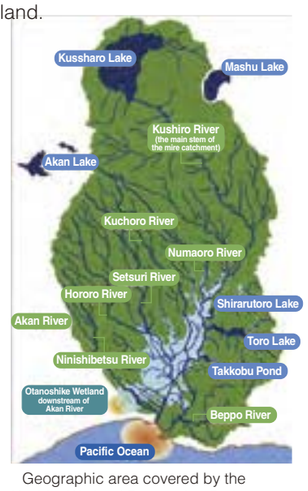
The Kushiro Wetland, over 19,000 ha, is the largest wetland in Japan, and partly (5,012 ha) became a national monument in 1967 and a Japan's first Ramsar site in 1980. In 1987 the larger area including adjacent upland (27,000 ha) was designated as the 28th, a newest national park. The expansive wetland catchment supports diverse, important wildlife, including native populations of the Japanese crane (*Grus japonensis*), Siberian salamander (*Salamandrella keyserlingii*), and Sakhalin taimen (*Hucho perryi*), as well as provides water storage, filtering function, flood control, and aesthetic and recreational opportunities.

As recent economic activities spread into the watershed, however, the wetland area was greatly reduced. Desiccation is also progressive with a rapid vegetation change from reed-sedge community to alder forest due to increasing sediment and nutrient inputs. For the last 50 years the wetland was lost by over 20 % of its original area (25,000 ha). Serious wetland loss and deterioration entailed the urgent need to restore the wetland and surroundings. Therefore, a committee of various groups, from local citizens, NGOs, experts, to the municipal governments and National Government, was established and is pursuing restoration of the Kushiro Wetland.

Changes in the wetland area



Source: Ministry of Land, Infrastructure and Transport



Geographic area covered by the Kushiro Wetland Restoration Project

Related Web Sites
Nature Restoration Project in Kushiro Shitsugen Wetland: http://www.kushiro.env.go.jp/saisei/english/top_e.html
Kushiro Wetland Nature Restoration Committee: http://www.kushiro-wetland.jp/

Approaches

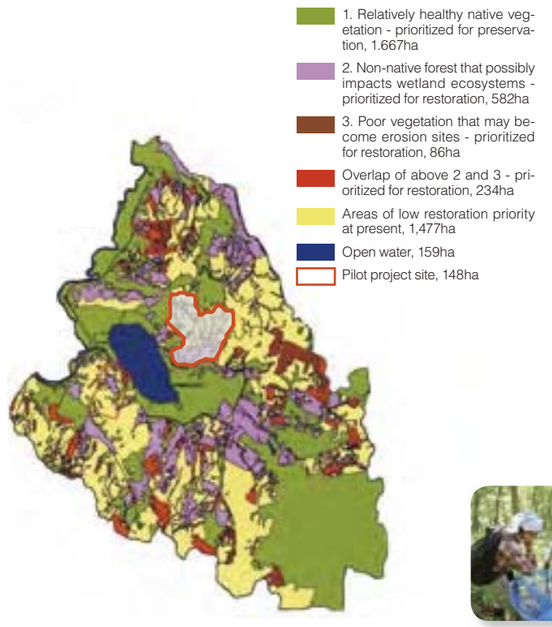
- Improve the watershed water storage capacity and erosion control function by preserving or restoring upland forests →①
- Restore historical wetlands from abandoned lands at the fringes of the Wetland →②

The Kushiro Wetland Restoration Committee defined the project boundary as the Kushiro River Catchment, a 250,000-ha area across five cities and towns. The committee then selected the areas of Hirosato, Takkobu, Touro-kayanuma, Kuchoro-hororo, and Onnenai-hokuto for pilot projects based on the amount of degradation to be addressed for mire conservation and whether they can serve as a restoration symbol. MOE is in a stage of implementation for Takkobu and design preparation for Hirosato and Onnenai-hokuto.

Locations of five pilot projects

① Takkobu Native Forest Restoration

Bare ground, bamboo-grass fields and non-native forest are prominent in the hills of Takkobu area, where soil erosion and runoff and lake sedimentation are the issues. In February 2006, native forest restoration was planned for a 148-ha upland containing 99-ha non-native forest of larch (Larix kaempferi) adjacent to the north side of Takkobu-numa Pond. This plan consists of the following three actions: 1) effectively remove the factors limiting seedling recruitment and growth of deciduous trees (e.g., bamboo grass cover, deer grazing), 2) minimize soil erosion along forest roads, and 3) develop and implement an experience-based environmental education program.



Classification of the Takkobu area for restoration

Sediment erosion control

Apply erosion control construction to erosion prone sites.

Native forest restoration

Examining effective methods for removing factors inhibiting deciduous seedlings establishment in monocultural forests.

Collecting seeds by a seed trap.

An experimental forest restoration site in Takkobu. Plots for ground preparation treatment and control.

② Hirosato Wetland Restoration

Many of historical wetlands were lost in Hirosato by agricultural development, which now remain as abandoned farmlands and expanding alder forests. To recover wetland conditions before development, groundwater table and vegetation recovery after soil excavation are being monitored in a test area.

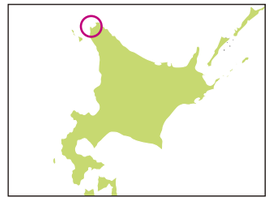
The experimental excavation site in the abandoned farmland

After excavating surface soil to raise the ground water table, wetland responses including changes in reed, sedge and other wetland vegetation are examined.

The experimental site for alder tree removal

This experiment investigates the effectiveness of cutting trunks and shoots in controlling the forest expansion and effects of alder control on the sphagnum moss community.

Sarobetsu



Designation:
Rishiri-Rebun-Sarobetsu National Park
Location:
Toyotomi and Horonobe Towns, Teshio-gun, Hokkaido
Year Initiated: 2002

Kami-sarobetsu Nature Restoration Committee (as of September 2009)

The Committee pursues restoration of wetlands in harmony with agriculture in Toyotomi Town, where the Sarobetsu Mire lies next to farmlands.
Date Established: 19 Jan. 2005
Number of members: 54
Date issued the Overall Plan: 2 Feb. 2006
Date issued Implementation Plans:
- 13 Jul. 2006 (Buffer zone and retention pond projects, sponsored by Agriculture Sections, HRDB, and others)
- 2 Jul. 2009 (Kami-sarobetsu Project, by MOE)

Goal

Raised bogs	Restore the historical wetland vegetation and area at the time of the national park designation (1974)
Penke-numa Pond	Prevent further sedimentation to keep the present conditions
Abandoned mined peatlands	Rehabilitate or create wetland vegetation by filling open water in old pits
Dune forests and lake	Reduce the lowering of water table to preserve the existing ecosystems

Sarobetsu Mire, originally a lagoon (Old Sarobetsu Lake) bounded by coastal sand dunes and Soya Hills, was formed by peat accumulation and the inflow of Old Teshio River and its tributaries. The Mire now develops the largest lowland raised bog in Japan. It is a unique ecosystem with various features: the expansive bog of Sphagnum moss and wild cranberry (*Vaccinium oxycoccus*); habitat for a species symbolizing the zoogeographic boundary between Sakhalin and Hokkaido, the viviparous lizard (*Lacerta vivipara*); staging sites for migratory birds; and breeding habitat for the Japanese crane.

As surrounding landuse changes, however, the Mire is gradually drying out with low water tables and ground subsidence, which has diminished the bog vegetation and caused the invasion of dwarf bamboo (*Sasa sp.*) and reed (*Phragmites australis*). Meanwhile, agricultural lands on marginal peatlands have greatly reduced their productivity because of flooding and excessive soil moisture. Restoration efforts are underway to address wetland loss and degradation while making a balance with agricultural activities.

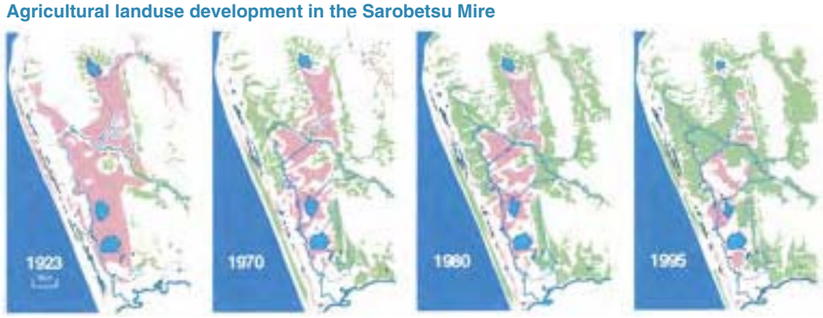
Bean goose (*Anser fabalis*)

Wild cranberry

Viviparous lizard

Japanese hyacinth (*Heloniopsis orientalis*)

Agricultural landuse development in the Sarobetsu Mire



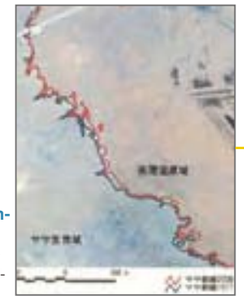
Related Web Sites
Sarobetsu Nature Restoration Project: http://sarobetsu.env.gr.jp/
Kami-sarobetsu Nature Restoration Committee: http://www.town.toyotomi.hokkaido.jp/web/PD_Cont.nsf/0/29CF809869F4D4D249256F88002F608D?OpenDocument

Approaches

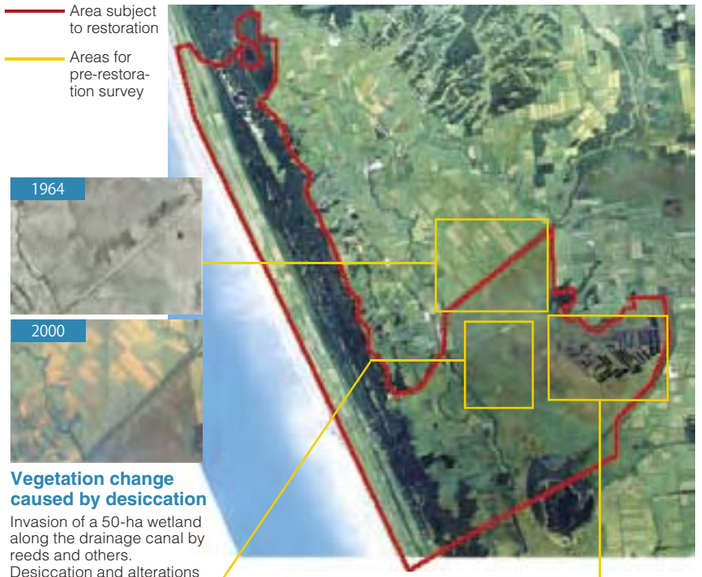
- Reduce the lowering of groundwater table →①
- Rehabilitate abandoned mined peatlands →②
- Install buffers along farmlands →③

Because farmlands and wetlands are strongly interrelated primarily through groundwater flow, restoration efforts should address sediment inflows to the wetlands while ensuring proper drainage in the farmlands. Increasing and stabilizing wetland water tables are also needed to prevent further wetland desiccation. A vegetation recovery test is underway by damming existing drainage ditches to raise wetland water tables.

Buffer installation at the boundary of farmlands is also in progress primarily by HRDB.



Expansion of dwarf-bamboo fields into the Mire
The expansion occurred by 20 to 50 m along the boundary for a 23-years period.



Vegetation change caused by desiccation
Invasion of a 50-ha wetland along the drainage canal by reeds and others. Desiccation and alterations of bog vegetation

Wetland degradation by peat mining
150ha wetlands were lost.

① Reducing water-table declines by damming drainage ditches

A wetland was sealed by dike construction along existing ditches to reduce water drainage, in order to prevent further desiccation. Groundwater tables and vegetation are being monitored.

Immediately after damming, at the outflow of Ochiai-numa Pond (the dike is 10.5-m long and 1.1-m high above the ditch bottom).

Two days later after damming. A large amount of overflow was generated by snowmelt flow.

② Rehabilitating wetland vegetation in abandoned mined peatlands

Natural re-vegetation has been observed in old mined peatlands, exhibiting a near raised-bog appearance with sphagnum moss cover that has developed over time. However, many of the other mined areas retain large open water and poor vegetation. Specific methods for rehabilitating or creating historical vegetation are being developed.

Sundew (*Drosera anglica*) growing on a floating peat

An abandoned mined peatland

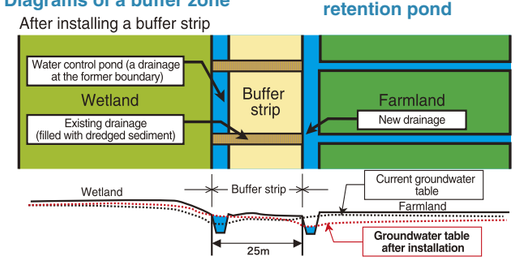
A close look of the mined peatland

③ Installing buffer zones along farmlands (by HRDB and others)

To prevent further wetland desiccation, buffer strips will be installed in the adjacent agricultural lands where might contribute to the declines of wetland water table. Soil erosion from the farmlands to streams will be ameliorated by properly managing retention ponds, which will be installed in the diked drainage ditches.

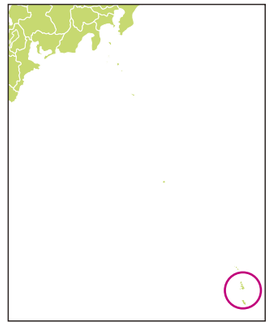
A graphic of sediment retention pond

Diagrams of a buffer zone



Project by HRDB, Town of Toyotomi, and Sarobetsu Farmers Association

Ogasawara



Designation:
Ogasawara National Park
Location:
Ogasawara, Tokyo
Year Initiated: 2002

Community Conference and Science Committee for Ogasawara Islands World Heritage Nomination

The Conference and Committee are developing a comprehensive plan for conservation and management of the entire islands, including alien species control, vegetation rehabilitation and more, with coordination and through consensus building among local stakeholders, related agencies and academic experts.


Dry scrub in Ani-jima Island


Wild azalea (*Rhododendron boninense*)


Ogasawara buzzard (*Buteo buteo toyoshimai*)

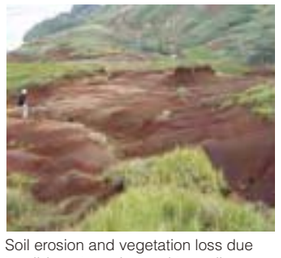
Goal **Restore the ecological health that allows indigenous evolution and transition, by creating a mechanism for coexistence between the Island people and the natural environments and assisting the natural recovery.**

Ogasawara National Park includes most part of the Ogasawara Islands, where large and small 30 islands, such as Chichi-jima and Haha-jima Islands, are spread southwards at the 1,000 km south of Tokyo. Located in the subtropical climate zone and isolated from the continent, the Park has academic value with unique islands ecosystems that support many endemic species including the Bonin flying fox (*Pteropus pselaphon*) and Munin-nobotan (*Melastoma tetramerum*). The Park also features a colorful underwater view with coral reefs and tropical fish.

In nearly all islands, however, human-induced colonization and expansion of non-native species are becoming serious, causing a crisis of the Islands native ecosystems and biodiversity. Therefore, the areas of disturbed ecosystem or reduced endemic species because of alien species were prioritized for immediate actions. Efforts for restoring the unique islands ecosystem are underway.

Invasion of alien species are threatening the survival of endemic and native species.


A green anole lizard (*Anolis carolinensis*) preying on rare insect species.


Soil erosion and vegetation loss due to wild goat grazing and trampling.


A forest with diminished biodiversity by the infestation of a non-native species, the Akagi (*Bischofia javanica*)

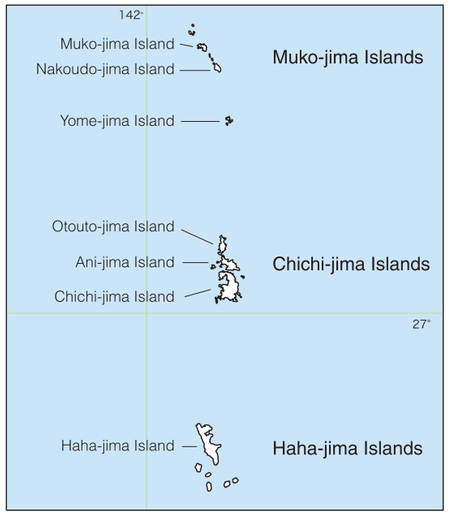
Related Web Sites
Ogasawara Nature Restoration Project: http://ogasawara-info.jp/saisei.html

Approaches

- Rehabilitate the native ecosystems disturbed by alien species →①②③
- Preserve the remnants of endemic and rare species in the oceanic islands →①②③
- Create a regional society co-inhabiting with the natural environment through ecological restoration →③

To recover healthy island ecosystems, strategies for reducing alien species impacts are being developed. Ongoing actions include alien species control and feasibility testing on the recovery of native species. Rule-making for sustainable resource use and other community efforts intend to create a regional society in harmony with the natural environments.


Cape Minami-zaki, Haha-jima Island



① Feasibility testing on alien species extermination

The Ogasawara Islands Ecosystem has experienced serious threats by introduced species; wild goat grazing and trampling have destroyed vegetation; and green anole predation has reduced rare insect species. After studying the ecology of these alien species, feasibility testing is being carried out to identify the techniques for effective control and restoration.


The experimental site that has been fenced to exclude wild goats for vegetation recovery in the Otouto-jima Island.


Newly developed adhesive trap for green anole lizards.

② Implementing alien species removal

Based on knowledge gained from the feasibility studies, alien species elimination programs were initiated - herbicide control of akagi trees, outcompeting the native flora in northern Haha-jima Island, began over a wide area; and trapping wild pigs and the bull frog (*Rana catesbeiana*) is underway for their complete removal from the Otouto Island.


Killing akagi trees by driving in herbicide soaked corks at the basal area


A cage trap to capture wild pigs


Traps for bull frogs

③ Developing a regional society that pursues alien species control

To keep alien seeds and other pests from spreading to other islands, travelers are required to check and scrub soil from shoes at docks. Local volunteers are working on the removal of alien plants.


Scrubbing off mud from shoes


Eradication of alien plants by local volunteers

Odaigahara

Designation:
Yoshino-Kumano National Park
Location:
Kamikitayama and other villages, Yoshino-gun, Nara Prefecture
Year Initiated: 2002

Evaluation Committee for Odaigahara Nature Restoration Promotion Plan

The Committee is working on planning for restoration of the forest ecosystem that has extensively damaged due to multiple disturbances, such as typhoon windthrow, sika deer bark stripping, and increased visitors.

Goal **Preserve the existing forest ecosystem and restore the historical one that supported the healthy growth of young trees through natural regeneration before the 1960s**

Daija-gura rock

Spruce forest in Higashi-odai Subalpine coniferous forest, dominated by two rare species of Kinki District, the spruce and Nikko fir (*Abies homolepis*), and cool temperate deciduous forest, dominated by the oak, remain together in one large area.

The Odaigahara Forest features a plateau-like terrain that undulates with gentle slopes between elevations of 1,300 and 1,700 m. With the annual precipitation reaching 4,800 mm, it is one of the highest rainfall areas in Japan. Odaigahara is largely separated into two regions based on vegetation. In the Higashi-odai area, the dominant vegetation is subalpine coniferous forest, in which spruce (*Picea jezoensis var. hondoensis*) occurs close to its southern limit, whereas cool-temperate deciduous forest of the Japanese beech (*Fagus crenata*) and oak (*Quercus mongolica var. crispula*) in the Nishi-odai area. At the west of Odaigahara, continuous forests stretch to the Omine Mountain Range, exhibiting forest types similar to Odaigahara according to elevation.

The forest vegetation in Odaigahara, however, has experienced the combination of human and natural disturbances - a large number of trees fallen by typhoons were carried away in the 1960s, resulting in desiccation of the forest floors and expansion of bamboo fields (*Sasa nipponica*); human access to the forests has increased after roadway opening; and bark stripping by sika deer (*Cervus nippon*) has become serious. Consequently, the Odaigahara Forest has been deteriorated with progressive simplification of stand structure. Therefore, the recovery of connectivity with adjacent forests and restoration of the forest ecosystems are in progress.

Bark stripping by sika deer.

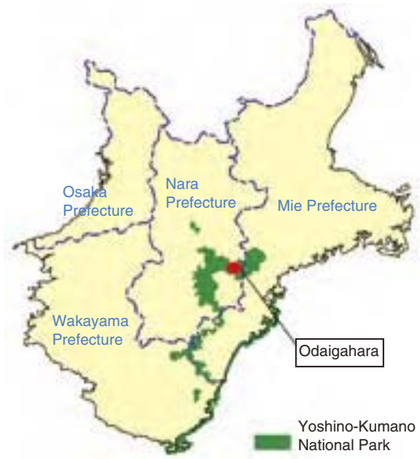
Increased public use by highway opening is one cause impacting the forest environment.

Related Web Sites
Odaigahara Nature Restoration Project:
http://kinki.env.go.jp/nature/odaigahara/odai_shizensaisei_mezasite.htm

Approaches

- Assist young stand development with appropriate techniques for the forest type →①②③
- Help the recovery of healthy sika deer populations
- Improve the quantity and quality of park use

Restoration of the Odaigahara forest ecosystem needs to address the changes in their surrounding environments, the connectivity with the surroundings, and improvement of the quantity and quality of park use. Preliminary efforts are underway, including feasibility testing on reducing bark-stripping damage and enhancing young stand development, and studies regard to a comprehensive park use management such as promotion of mass transit use.



Odaigahara Nature Restoration Promotion Plan

Approaches to preservation and restoration of forest ecosystems - specific techniques based on site resiliency

Site Resiliency	High	Medium	Low
Approaches	Preservation	Preservation + Restoration	More Active Restoration
Specific techniques under feasibility testing	Deer exclosure fencing	Deer exclosure fencing Bamboo-grass mowing Ground plowing	Deer exclosure fencing Bamboo-grass mowing Ground plowing Surface soil excavation Seeding

① Feasibility testing for forest ecosystem preservation and restoration

The effectiveness in stimulating young stand development is being tested. Various techniques, from fencing for deer exclosure; blocking strong sunlight by shade nets; mowing bamboo grass cover; plowing ground, to combinations of these were chosen based on the ability of natural recovery (site resilience) that were evaluated in consideration of forest cover type.

An experimental site for bamboo grass mowing.

Collecting data on environmental conditions and seed production.

② Fencing for deer exclosure

A larger area surrounding the area of high density population was entirely fenced to eliminate the impact of sika deer on the forest vegetation.

An exclosure fence

③ Wrapping individual trees with wire nets

In areas of urgent forest conservation, protection of individual trees from bark stripping has been implemented by wrapping them with wire nets.

Wrapping with a wire net

Tatsukushi

Goal **Preserve and restore the underwater view and marine ecosystems, primarily consisting of coral communities that have notably diminished in recent years**

Designation:
Ashizuri-Uwakai National Park
Location:
Tosashimizu, Kochi Prefecture
Year Initiated: 2003

Tatsukushi Nature Restoration Committee (as of March 2009)

The Committee is evaluating the restoration approaches: removal of mud sediments from the bay bottom and reduction of watershed runoffs.
Date Established: 9 Sept. 2006
Members: 69
Date Issued the Overall Plan: 28 Mar. 2008
Date issued Implementation Plans: In preparation

Entaku-midori-ishi (*Acropora solitaryensis*)

A damaged coral community

Tatsukushi Bay is located in southwestern Tosashimizu, Kochi, and includes a 49-ha area of four national marine park zones. The Bay is home to abundant marine species such as stony corals owing to the warm Kuroshio Current.

The coral communities are critical habitats for many creatures. Particularly, the Genus Pavona has a high academic value because of its large community size. The coastline towns are the major bases for exploring the Ashizuri-Uwakai National Park.

The coral communities, however, have diminished because of degraded water quality by the bay's development and the plague of predaceous species. Moreover, massive sediment inflow in the 2001 western Kochi flooding has caused the bay bottom sedimentation, killing many of the coral communities. The bay is still prone to turbid water due to locally deposited mud sediments and to watershed-scale sediment runoffs in high rainfall events. All of which have caused the coral communities and their marine environments to degrade, thereby deteriorating the underwater views. The Tatsukushi Project takes a watershed approach to restore the historical underwater views and ecosystems represented by the healthy reef-building coral communities.

High turbid water from the Nishino-kawa River (left) after rainfall, at the confluence to the Misaki River (right).

Poor understory vegetation in a Japanese cypress (*Chamaecyparis obtuse*) forest in the Nishino-kawa River watershed.

A slope failure site showing a lack of vegetation recovery in the Nishino-kawa River watershed.

Related Web Sites
Tatsukushi Nature Restoration Project: http://www.tatsukushi-saisei.com/top.html

Approaches

- Remove mud sediments accumulated in the Tatsukushi Bay →①
- Mitigate sediment sources in upstream watersheds.

The bay's excess sediments that limit coral growth should be eliminated by mitigating sediment sources in the upstream reaches, as well as by removing the deposits from the bay bottom. The current status of the coral communities, their surroundings and the bay watersheds has been studied, concurrently to a feasibility study on removing the bed sediments. Because watershed-scale community stewardship is vital, public outreach through information dissemination and environmental education has been promoted.

Mud sediments accumulated in the bay bottom.

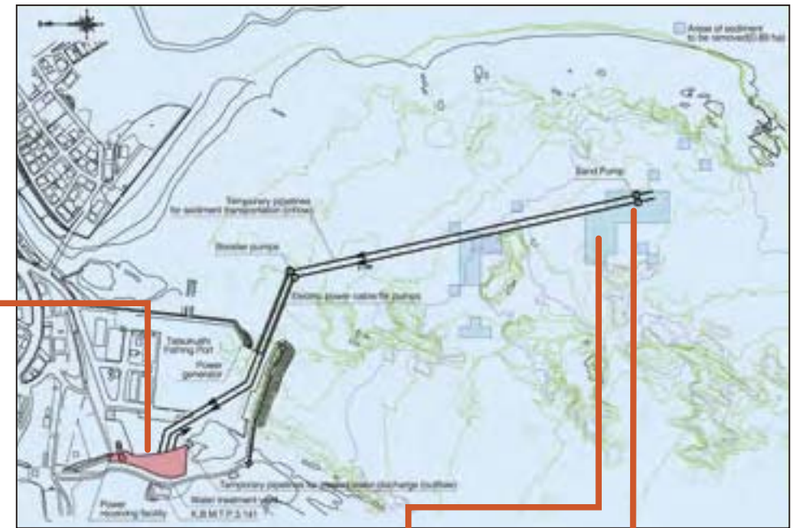
Transported large woods in the bay.

Watersheds draining to the Tatsukushi Bay.

① Removing the muddy bottom sediments

In areas of severe sedimentation, deposited mud sediments will be vacuumed using an underwater pump and discharged up to the treatment plant through a temporary bottom pipeline system. The sediments will be dewatered and properly disposed.

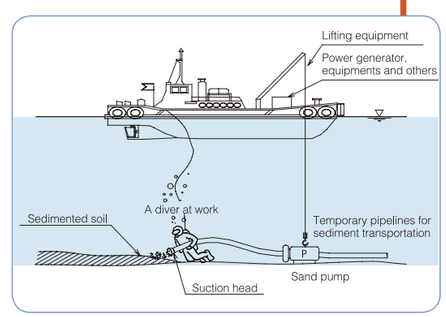
A design for sediment removal system



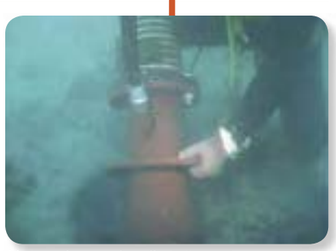
Water treatment plant

A small-sized crane and dredge pump

Estimating the amount of suspended silt using a flat plate, in monitoring before and after the sediment removal



Workboat operation



Vacuuming mud sediments

Aso

Goal **Preserve the highly diverse grassland ecosystem and landscape and realize the continuous management for their sustenance in collaboration among various entities**

(Photo by Norio Ootaki)

The Aso Grassland spreads in and outside of one of the world's largest calderas, with the caldera's reaching a size of 18 km east to west, 25 km south to north, and a perimeter of 100 km. The Grassland was formed by resource use during historic times, where volcanic activity constrained forest development. This historic grassland condition has sustained through grass harvest, cattle ranching, burning, and other human interventions, protecting the expansive grassland landscape and ecologically rich habitats for diverse plants and animals.

Maintaining the Grassland, however, is increasingly difficult because of changes in farming and life styles, livestock industry depression, aging and scarce successors in the farming populations, and other social and economic changes. As a result, the grassland landscape and ecosystem have been declined, marked with a loss or degradation of grass cover. Therefore, efforts are underway to restore the historic grassland environment that had been protected by a long-term proper management and to leave them to the future generations.

A grass field transforming to scrub forest after cessation of prescribed burning

Grassland management such as firebreak mowing is becoming difficult to continue for the aging communities.

Designation:
Aso-Kuju National Park
Location:
Minami-aso,Oguni,Minami-oguni,Ubuyama and Takamori, Aso-gun, Kumamoto Prefecture; Aso City, Kumamoto Prefecture
Year Initiated: 2003

Aso Grassland Restoration Committee (as of September 2009)

The Committee discusses necessary matters for promoting maintenance, preservation and restoration of the Aso Grassland.
Date Established: 2 Dec. 2005
Members: 131
Date Issued the Overall Plan: 7 Mar.2007
Date Issued the Implementation Plan:
● 4 Mar. 2009
(Aso Project, sponsored by MOE)

A late autumn scenery, stacks of grass.

Hanashinobu (*Polemonium kiushianum*, endangered, Category: IA)

Tsukushi-matsumoto (*Lychnis sieboldii*, endangered, Category: IB)

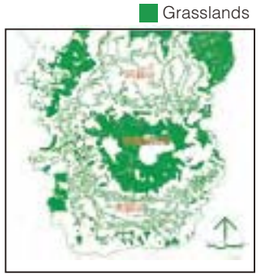
Ooruri-shijimi (*Shijimiaeoides divinus*, endangered, Category I)(Photo by Akinori Terasaki)

Changes in the area of Aso Grassland

Grasslands

In the late 1800s to early 1900s

In the 1940s



Present

Related Web Sites
Aso Nature Restoration Project: http://www.aso-sougen.com
Aso Grassland Restoration Committee: http://www.aso-sougen.com/kyougikai/

Approaches

- Help design and promote new management practices and tools →①②③
- Resume grassland management in abandoned fields →②
- Rehabilitate heavily destroyed or damaged grassland habitats →③

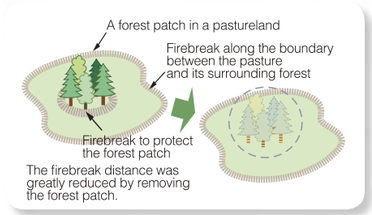
Aso Grassland is a secondary system sustained by the community activities. For its preservation and restoration, therefore, it is vital to continue pasture management operated mainly by the association of local ranchers. To that end, various actions are underway - promoting prescribed burning and firebreak construction with reduced workloads; helping begin cooperative practices with volunteers and NPOs; and restoring biodiversity by rehabilitating seriously degraded grassland habitats.

Fall harvesting (Photo by Norio Ootaki)

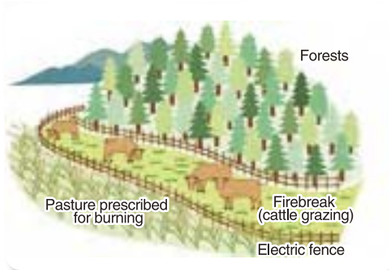
Field burning in spring

① Designing and promoting firebreak construction with reduced workloads

With a decline of harvesting and grazing activities, forest plantation has developed in patches, increasing the workload of firebreak construction. Field burning is now difficult to continue in many pasturelands. To help continue periodic fire, essential for grassland preservation, firebreak techniques with reduced workloads have been developed and promoted. The techniques include using grazed lines as firebreaks and reducing fireline distance by clearing small forest patches in pasturelands.



Removing small forest patches



Grazed firebreak

② Beginning burning practice with volunteers

Grassland areas after cessation of burning are becoming brushy, diminishing the historic landscape and biodiversity. There is also a risk of erosion-associated hazards. To restore the healthy conditions of abandoned fields, firebreak construction and burning were resumed in cooperation of local community and volunteer groups. Prior to the implementation, all parties singed an agreement in continuing maintenance work.

Before beginning prescribed fires and maintenance.

After the fires

③ Rehabilitating wetlands and adjacent forest environment

Small wetlands scattered in the Grassland exhibit a high biodiversity. However, the diminished rangeland maintenance and increased forest plantation have altered wetland conditions. Restoration of original habitat conditions for wetland plants and animals is underway. Cedar trees that were crowded and tall because of insufficient cares were cut down to improve the light condition in the wetlands. The downed trees were used to build contour terraces to mitigate soil runoff into the wetlands.

A slope around a wetland after clearing plantation trees.

Contour log terraces for erosion control.

Sekisei Lagoon

Designation:
Iriomote-Ishigaki National Park
Location: Ishigaki, Okinawa Prefecture; Taketomi, Yaeyama-gun, Okinawa Prefecture
Year Initiated: 2002

Sekisei Lagoon Nature Restoration Committee (as of March 2009)

The Committee works on restoration of coral reef ecosystems by reducing red clay erosion and other negative environmental impacts on corals and rehabilitating coral communities, as well as preservation of high quality coral reefs.
Date Established: 27 Feb. 2006
Members: 80
Date Issued the Overall Plan: 1 Sep. 2007
Date Issued the Implementation Plan:
● 13 Jun .2008
(Project, sponsored by MOE)

Giant manta (*Manta birostris*)

Clown anemone fish (*Amphiprion ocellaris*)

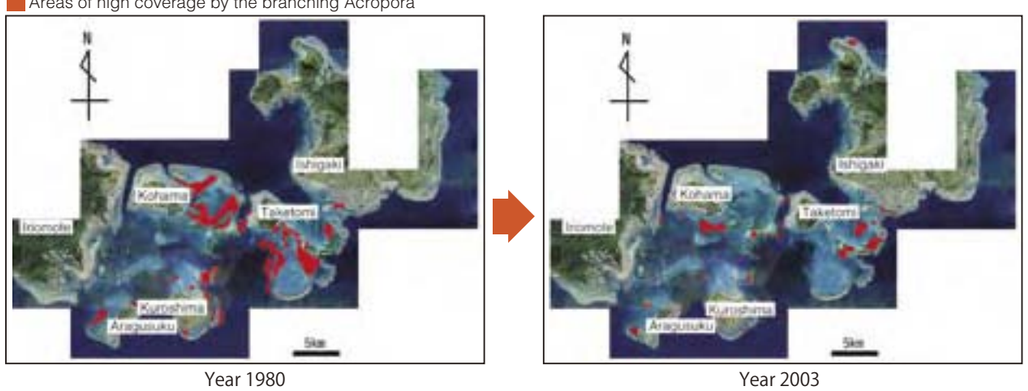
Goal

Long-term Goal: Restore the rich coral reef ecosystem that existed at the time of park designation in 1972
Short-term Goal: Eliminate the negative environmental impacts on corals to stop further degradation

Sekisei Lagoon, located between Ishigaki and Iriomote of Yaeyama Islands, is the largest coral reef sea in Japan and was designated as the Iriomote National Park in 1972. The Yaeyama sea including the Lagoon is highly diverse in coral reef communities, with more than 360 reef-building coral species. Such a high-latitude sea supporting a large number of coral species is extremely invaluable in Japan and the world. The sea also greatly contributes to the regional economy by providing various opportunities for resource use from diving to fisheries.

However, corals in the Lagoon have extensively diminished since park designation because of various reasons: terrestrial runoffs of red clay and wastewater; coral bleaching due to high water temperatures; and outbreaks of the predatory crown-of-thorns starfish (*Acanthaster planci*). Initial efforts have been made to reduce terrestrial runoffs to help the natural recovery of coral ecosystem health. Studies on coral distribution and techniques for reef rehabilitation are also in progress.

A decline of corals in Sekisei Lagoon
Areas of high coverage by the branching Acropora



Year 1980 Year 2003

Related Web Sites
Sekisei Lagoon Portal Web Site:http://sekiseisyouko.com/szn/

Approaches

- Rehabilitate coral communities by inducing settlement of larvae that are developed in synchronous spawning and by culturing the settled larvae for transplantation →①
- Reduce terrestrial runoffs

Reef rehabilitation and studies on regeneration dynamics and diversity are underway based on the promotion plan, “Sekisei Lagoon Nature Restoration Master Plan.” In the sites where natural recovery is limited because of poor larvae supply or insufficient juvenile recruitment, manufactured settlement devices are used. To promote sustainable fisheries and recreations in the Lagoon, social studies, outreach program development, and web site construction to disseminate information have been implemented.

Restoration Area

Predation damage by the outbreak of crown-of-thorns starfish

Corals in the Yaeyama area were utterly destroyed by the 1980s outbreak. Although reefs are in the gradual recovery, a field survey in 2003 found increasing populations of crown-of-thorns starfish in the Lagoon.

Coral bleaching due to elevated sea temperatures

Coral bleaching is the whitening of corals by the loss of zooxanthellae residing within corals because of stresses from extremely low or high sea temperatures. If zooxanthellae loss is prolonged, the coral host eventually dies.

Red clay and other terrestrial runoffs

Turbid-water runoffs from uplands to the sea occur in heavy rains, accumulating fine-grained sediments in the sea bottom, which in turn disturbs corals.

① Rehabilitating coral communities – constructing substrates for larvae settlement

Settlement devices, with each forming like a spinning top, are placed on the sea floor before synchronous spawning. After rearing juveniles on the devices for 1.5 to 2 years, coral-bearing devices are transplanted to rehabilitation sites. This method using settlement devices has the following advantages: existing coral communities remain undisturbed; various species can be simultaneously re-established; large-scale restoration can be done; and a standard protocol can be developed. In 2006 about 73,000 settlement devices were installed at five sites in the Lagoon.

Settlememt devices

Installing settlement devices on the sea floor prior to synchronous spawning

Selecting coral-bearing devices

Implanting the devices to the sea bed

Coral colonies grown on a settlement device

Leaders in Nature Restoration interview

Nature restoration is an undertaking with participation and creativity by various community groups, including NPOs and local residents. New leaders who work on local restoration efforts are found across the country.

Yawata Wetlands

Kids grow by learning their natural environments

Katsunobu Shirakawa
(Staff, Geihoku Natural Museum)

We focus on environmental education as well as field survey and analyses. Children experience the natural wonder by learning about rare species and the history of wetlands and grasslands in the fields. Children are motivated further to work on plant and animal studies and related creative activities. Their parents surprise to see how much they can grow. From kids to adults, local people can recognize the importance of natural environment. We will extend restoration activities in collaboration with local schools and other community groups, expecting new leaders of the next generations to continue post-restoration management.

Aso

Safe food supply is our commitment

Naomi Kamakura
(Employee, Agricultural Cooperative Corporation Kario Ranch)

I chose cattle production as my career because I love cows and Aso. I everyday take care of cows and calves in the ranch on the northern rim of Mt. Aso. I'm happy to see calves are born and grow up. Healthy grasslands to raise healthy cows are essential for supplying safe foods to consumers. Grassland use and management are becoming difficult because of aging and declines of farming populations, so I consider the sustainable management leads to restoration of the grassland. I'd like to work on revitalizing livestock farming such that takes advantage of this extensive grassland.

Eastern Kosado

Restore habitat for Japanese crested ibis by the whole local community efforts

Tsuyoshi Takano
(Chairperson, Council for Wild Japanese Crested Ibis Recovery Program)

I've continued activities for restoring wild ibis, taking over the will of my father, who continued feeding ibis. Now, many farmers, NPOs, grade schools and companies are working on habitat improvement such as biotope construction and low-chemical farming. Those days when ibis birds flew over in the wild were the happy period of spiritual richness for the local community. It is necessary to balance between agriculture and the natural environment to restore the life of those days. It will take time to involve the whole local society in the stewardship of the neighborhood environment, but I will extend the wild ibis restoration through my activities such as visiting lectures.

Tatsukushi

I wanna be the ocean's 'Hanasaka Jiisan*'

Shuzo Takeba
(President, Tatsukushi Tourist Boat Corporation)

I have lived with ocean life since my childhood. I could say what raised me was the sea of Tatsukushi with abundant corals and fish. Facing to the polluted ocean and damaged corals, I have worked on cleaning the ocean and removing crown-of-thorns starfish with divers of my friend. I believe my mission is to continue these activities for all my life to restore the once-beautiful ocean. Lately, I'm working with a local elementary school to introduce kids the joy and wonder of the Tatsukushi sea. I let the school kids, locally grown but who don't know about the ocean, to experience the underwater park using glass-bottom boats.

*The Old Man Who Made Trees Blossom

Kushiro Wetland

Establishing nature restoration in citizens' daily lives

Hisashi Shinsyo
(Chief, Kushiro International Wetland Center)

For restoration of the Kushiro Wetland, it is necessary to reduce negative impacts of the 250,000-ha watershed. To that end, citizens need to reconsider and change their lifestyles. As one step, it is vital to aware their daily life activities may be able to contribute to nature restoration. We stimulate to develop numerous restoration activities and are working on linking these individual activities, hoping them to grow into a larger social movement. My dream is that citizen groups will take a leadership in the project' s promotion and management and that nature restoration becomes established in citizens' daily lives.

Point 1.

Establish a mechanism for coalition and collaboration

The keys to advancing a restoration project are the participation of various local groups and individuals and cooperation among them. Each district working on a project has established a committee or other public forums consisting of various entities, to strengthen a common understanding in restoration goals and direction. Each project also has created opportunities to engage local residents, such as field survey, design meeting and other events. In this way, all projects seek to advance restoration as a local community effort.

Fushino River Tidal Flats

Using feasibility testing as an opportunity for cooperation among industrial, academic, governmental and private sectors

In the Fushino River Tidal Flat Project, a wide array of activities is underway in cooperation among local residents associated with forests, rivers and oceans in the watershed, NPOs, academic experts, and related agencies, with a common goal of improving the natural environment being degraded and human life. Feasibility testing on tidal flat restoration plays an important role in promoting public participation as well as in data accumulation.

In the tidal flat tillage experiment in fall 2006, about 100 volunteers worked on plowing. They then experienced field observation with expert instructions and were served with clam dishes by fisheries cooperative women's groups. Thus, various entities have participated through what they can do, strengthening their alliance and collaboration.

Plowing by volunteers

Field observation in the tidal flat

Aso

Moving toward the preservation of rangeland environments by local agricultural industries

Community-based assessment and planning

Most of the Aso grassland is community-owned, used and managed by local villages and livestock farming unions. Sustainable use and management by these local agricultural groups are evitable for restoration of the historical grassland. MOE is supporting them to develop "Implementation Plan for Preservation of the Rangeland Environment". The Plan is a guideline for local agricultural groups to take the initiative in managing their rangeland while identifying the needs of support by volunteers and the governments. So far, planning is taken place in four pasture districts. Promoting planning activity in more districts in Aso will build a system of coalition and corporation between local communities and the governments.

Union members themselves conduct field survey on the ecological and management status and discuss about the future direction of pastureland use and management. This affords a good opportunity to rediscover the importance of rich pasture environments and their current situations.

Field survey by the members of farmers unions

Planning with a pasture map.

Distribution of farm products labeled with 'grassland restoration'

Farm products using grassland resources such as grass compost are labeled with 'grassland restoration' and distributed in the market. This effort connects between the Aso Grassland and consumers to engage a wide array of individuals into grassland restoration.

Agricultural products labeled with 'grassland restoration'

Promoting restoration of the Aso Grassland at a sales event

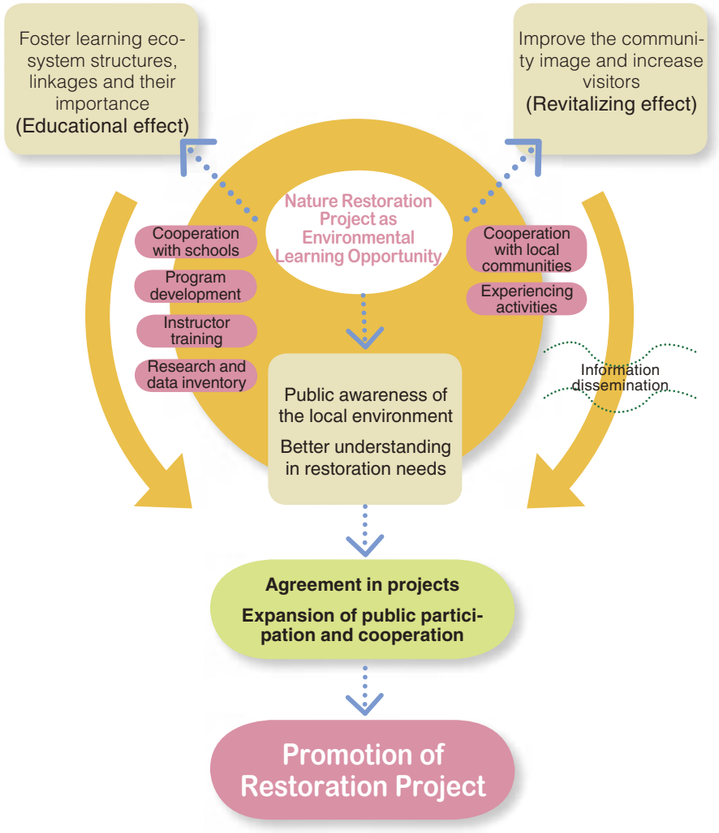
Strategy to Promote Nature Restoration Project

Point 2.

Use a restoration project as an opportunity of environmental learning

To expand restoration activities, the restoration needs must be understood and agreed by local and non-local people. Using restoration sites for environmental education is effective in increasing public awareness. Disseminating such educational activities further facilitates better understanding and engages a broad range of individuals and groups.

Being appropriate for learning ecosystem structures, linkages and their importance, restoration projects have been used as part of school education. Moreover, projects are expected to revitalize local communities, by providing opportunities for exchange among local and non-local people.



Encouraging public participation, with primary efforts on environmental learning —Kushiro Wetland

Kushiro Wetland Ecosystem Restoration Committee invited citizen-based wetland restoration activities, to stimulate public participation and environmental education in accordance with “Action Plan for Promotion of Nature Restoration” (formulated in June 2005). The Committee is supporting the applicant groups by disseminating the group’s event schedule and activities on the web site and community magazines to call for citizen participation to the applicant activities. The Committee also permits the groups to use the Project’ s logo. A wide array of restoration activities, from environmental learning, research to music concerts, has been registered as the citizen-based activities, expanding the wave of wetland restoration.

Left: a brochure of “Action Plan for Promotion of Nature Restoration”
Right: a flyer of inviting restoration activities

Citizen-based activities that have been approved by the Committee include a local high school research on water quality improvement using wetland plants, public forums for environmental education, and NPOs field observation tours. The Committee disseminate information about their activities as ‘Wonder-green-da Projects”

High-school students have contributed to water quality improvement

Wetland field observation organized by NPOs

Learning about the grassland condition through assistance in maintenance work —Aso

Aso Grassland Project has offered an environmental learning program for students and the general public. Participants can learn the wonder of the Grassland that has been sustained by the community living, and its current status and issues by working with pastureland unions for maintenance work such as field burning and firebreak construction. This program has been operated in collaboration with local educational organizations.

Giving a hand for grass harvest

Sogen Shimbun for Kids

Preparing materials for teaching about the Grassland
To promote environmental learning, calendars, texts and newsletter for kids, ‘Sogen Shinbun’, by which local children can learn about the grassland environment, are distributed mainly to local grade schools.

Grassland calendar

Implementing a year-round learning program in cooperation with local people —Tatsukushi

The Tatsukushi Project has implemented a year-round learning program, ‘Get to know about your hometown ocean’, for fifth-grade students as a school curriculum. The course is designed in partnerships with parents, local residents and experts, who also take part as instructors. A variety of lectures and outdoor experiences, such as underwater observation from glass-bottom boats and learning about corals, have been carried out.

Observing the Tatsukushi Sea from a glass-bottom boat

‘Talking about corals’ in a class

Thinking about the community’s future in ‘Kid’s Workshop’ —Sarobetsu

To engage the next generations - children and young people- to the restoration activities, ‘Kid’s Workshop’ has been hosted. After exchanging opinions with local farmers and conservation and tourist groups and experiencing field observation, children think of what the natural environment, farming, tourist and life will look like ten years later.

Wetland survey

Organizing survey data

Training local teachers for the education program —Sekisei Lagoon

An environmental education program, named ‘Junior Park Ranger Project’, has been implemented as a school curriculum since 2002. In this program children attend coral survey and workshops. The Sekisei Lagoon Project therefore sponsors study groups for local teachers to develop instructors for the program.

Snorkeling for coral survey

A study group for teachers

Primary Sponsor: Akita Prefecture

Forest Restoration

Mt. Moriyoshi Foothill

Designation:
Mt. Moriyoshi National Wildlife Protection Zone
Location:
Kita-akita, Akita Prefecture
Year Initiated: 2004

Mt. Moriyoshi Foothill Nature Restoration Committee (as of March 2009)

The Committee is working on returning the artificial grassland to the historical deciduous forest and preserving it together with its surrounding natural environment.
Date Established: 19 Jul. 2005
Members: 21
Date Issued the Overall Plan: 31 Mar. 2006
Date Issued the Implementation Plan:
- 20 Oct. 2006 (Mt. Moriyoshi Foothill Project, sponsored by Akita Prefecture)

Grass fields in the restoration site

Goal **Restore the historical beech forest habitat that existed before its conversion to grassland in the1960s in order to expand habitat for the black woodpecker**

The Mt. Moriyoshi Foothill range has an expansive mixture of deciduous forests dominated by beech and coniferous forests of the Japanese cedar (*Cryptomeria japonica*), Japanese arbor vitae (*Thuja standishii*) and Kitagoyo (*Pinus parviflora var. pentaphylla*). The Foothill is one of the few breeding sites for the black woodpecker, Dryocopus martius, and partly was designated as a special zone of national wildlife protection zone.

Since the 1960s, however, about 490 ha of the beech forest has been converted to pasture fields, diminishing the wildlife habitat to fragmented small patches. Restoration of beech-dominant deciduous forest was begun for wildlife habitat enhancement and stable breeding of an indicator species of rich nature, the black woodpecker. The project will be pursued by re-creating an expansive forest that is connected via forest corridors to its nearby forest conservation area.

Explanatory notes

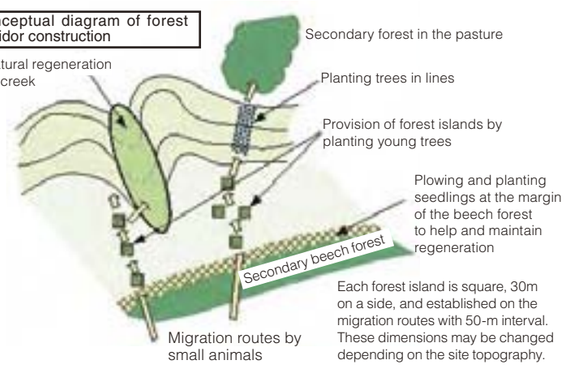
Transitional area from old-growth to secondary forest	Candidate sites for tree nursery
Re-planting area	Pastures
Facilities owned by MOE	Restoration area

Approaches

- Re-plant trees in areas suitable for establishment of young trees →①
- Enhance under-canopy development of young stands →②

Beech and other deciduous young trees will be planted in lines and islands. In the future, the replanted trees will become reproductive, initiating forest regeneration and development. This first effort aims at connecting the isolated forest patches that serve as corridors in habitat connectivity.

Conceptual diagram of forest corridor construction



① Re-planting in areas suitable for young tree establishment

Deciduous trees will be planted in selected areas based on evaluation of substrate conditions for young tree establishment. Seedlings and seeds will be collected at nearby forests for preserving local genetic resources.

② Re-planting in areas suitable for young tree establishment

In sites around reproductive beech trees that are tall and located at forest margins and where natural regeneration is highly possible, spraying soil improving agents and plowing will be applied. This soil preparation will ensure the soil amount and softness suitable for emergence of seeds carried by birds or winds and subsequent seedling growth.

A work for regeneration enhancement

Monitoring for performance evaluation

Establishment rates and growth of planted trees, the presence of animal damage and emergence of new seedlings will be monitored. The cause of killed trees will also be sought. This monitoring will be conducted to assess the performance of tree planting and regeneration enhancement.

The results can be used to improve restoration techniques and to refine the project design.

Related Web Sites

Mt. Moriyoshi Foothill Nature Restoration Project: http://www.pref.akita.lg.jp/mizutomidori/

Primary Sponsor: Miyagi Prefecture

Tidal Flat Restoration

Gamou Tidal Flat

Designation:
Gamou Special Zone of Sendai-kaihin National Wildlife Protection Zone
Location:
Sendai, Miyagi Prefecture
Year Initiated: 2002

Gamou Tidal Flat Nature Restoration Committee (as of March 2009)

The Committee conducts preservation and restoration of tidal flat habitats that are vital as stopover sites for plovers and sand pipers and abundance of benthic organisms.
Date Established: 19 Jun. 2005
Members: 24
Date Issued the Overall Plan: 16 Sept. 2006
Date Issued the ImplementationPlan:
- 29 Mar. 2008 (Gamou Tidal Flat Project, sponsored by Miyagi Prefecture)

Brent goose

Goal **Preserve healthy wetland habitats for migratory birds of upper-trophic level species and create opportunities for conservation, education and sharing of communication and information among various groups by properly allocating the area for resource use**

Gamou Tidal Flat has been artificially created through construction of the Sendai Port and river engineering work. It is an estuary where freshwater mixes with seawater, providing internationally important staging, breeding and wintering habitats for migratory birds. It is also vital as a most southern wintering site for the brent goose (*Branta bernicla*).

Lately, however, the Tidal Flat is becoming shallower and more sandy due to sand transport from the ocean. Tidal flat area has also been reduced because of retarded water flow. Various efforts are underway to restore healthy habitats for the biological community with migratory birds as key species and to avoid further human-related alterations.

The original Gamou Tidal Flat

Restoration area. The tidal flat area was reduced, compared to that in 1975.

Approaches

- Preserve and restore tidal flat habitat supporting diverse creatures →②③
- Restore hydrographic conditions maintaining the wetland habitat →②③
- Preserve and restore beach habitat →①
- Promote environmental conservation and education and create opportunities for communication among stakeholders →①

Rules for proper use of the tidal flat and beach are being developed while taking actions to preserve and restore tidal flat habitat and to mitigate sand transport into the Tidal Flat.

① Making rules for recreational use

Recreational use plans and guidelines are being developed according to the type of activities, such as marine sports (e.g., surfing) and harvesting (e.g., fishing).

② Sand transport control and channel dredging

Storm-wave overtopping has carried sand into the Tidal Flat, altering the muddy substrate to sandy. The lagoon area is also becoming shallower. It is now difficult to ensure effective water circulation. To preserve and rehabilitate tidal flat and to mitigate water flow regime, sand transport control and channel dredging is being planned.

③ Improvement of the existing flow control levee

The existing flow control weir at the inlet of the river flow has been degraded, making hydraulic control difficult. Rehabilitation of the weir is being planned to enable the water circulation to be adjusted.

Related Web Sites

Gamou Tidal Flat Nature Restoration Project: http://www.pref.miyagi.jp/sizenhogo/sizen/saisei-hp/top.htm

Primary Sponsor: Miyagi Prefecture

Preservation and Restoration of Lake Ecosystem

Lake Izunuma-Uchinuma

Designation:
Izunuma Special Protection Zone of National Izunuma Wildlife Protection Zone
Location: Tome and Kurihara, Miyagi Prefecture
Year Initiated: 2006

Lake Izunuma-Uchinuma Nature Restoration Committee (as of March 2009)

This project aims to restore lake ecosystems that can support a variety of organisms, from waterfowls, migratory birds, to native fish and mussels, and a wetland environment in harmony with local people's life. Restoration strategies under planning include managing aquatic vegetation and breeding and transferring native fish.
Date Established: 7 Sep. 2008
Members: 39
Date Issued the Overall Plan: In preparation

The greater white-fronted goose (*Anser albifrons*)

Goal **Restore rich aquatic plant communities and the historic wetland environment and landscape that supported waterfowls and native fish.**

Lake Izunuma-Uchinuma are two freshwater lakes that lie in a cropland of northern Miyagi, with a total area of 390 ha. The lakes are important wintering sites for geese, swans and other migratory birds because they are rarely frozen even in midwinter. The lakes were registered under the Ramsar Convention in 1985. They serve as irrigation and flood-water retention ponds.

However, prolonged inundation occurred in heavy rainfalls of Year 1970 and 1971, resulting in a drastic change of the lake landscape. Emergent and floating aquatic plants sharply declined, and so did shrimps and ducks dependent on these plants. Therefore, this project aims at restoration of a natural environment favorable for the ecosystem with migratory birds being top trophic level species.

A flock of geese arriving at the lake

Approaches

- Manage aquatic vegetation →①
- Grow and transplant emergent and submersed plants →②
- Breed and transfer native fish and mussels →③

Lake Izunuma-Uchinuma are semi-natural lakes, which have long been closely associated with the daily living of local residents. It is of concern to sustain the lake environment that allows the coexistence of people and the wildlife and it always has. The project is in the process of conducting pre-restoration assessment and identifying specific restoration methods.

① Managing aquatic vegetation

Dead vegetation of reeds and lotus, expanding in growing seasons in the lakes, will be removed to facilitate the expansion of emergent and submersed plant cover.

A cluster of lotus plants

② Growing and transplanting emergent and submersed plants

Lotus and reed coverage has recently recovered, but particularly the manchurian wild rice (*Zizania latifolia*) is far from the recovery because of combination of a loss of the extensive original habitat due to sedimentation and feeding pressure by swans. Native species in the retarded recovery – the emergent (e.g., manchurian wild rice), submersed (e.g., hornwort, *Ceratophyllum demersum*; Kuromo, *Hydrilla verticillata*) floating-leaved (e.g., pondweed, *Potamogeton distinctus*; pygmy water lily, *Nymphaea tetragona*) - will be grown from lakebed seed banks in a nursery and transplanted into the lakes.

Planting manchurian wild rice

③ Breeding and transferring native fish and mussels

Since 1996 small native fish such as bitterling fish (Subfamily *Acheilognathinae*) have sharply declined due to predation by rapidly increasing the largemouth bass (*Micropterus salmoides*). To enhance native fish population, the native freshwater bitterling such as Zenitanago (*Acheilognathus typus*) and Unionid mussels (*Sinanodonta woodiana*; *Unio douglasiae nipponensis*; *Cristaria plicata*) will be grown in a biotope and released into the lakes.

Zenitanago

Related Web Sites

Lake Izunuma-Uchinuma Nature Restration Project:
http://www.pref.miyagi.jp/sizenhogo/sizen/izunuma-saisei/00%20top.htm
Lake Izunuma-Uchinuma Nature Restration Committee:
http://www.pref.miyagi.jp/sizenhogo/sizen/izunuma-saisei/04%20kyougikai.htm

Primary Sponsor: Chiba Prefecture

Tidal Flat and Shallow Water Restoration

Sanbanze

Designation:
Proposed for National Wildlife Protection Zone
Location:
Urayasu; Ichikawa; Funabashi; and Narashino, Chiba Prefecture
Year Initiated: 2002

Sanbanze Restoration Council

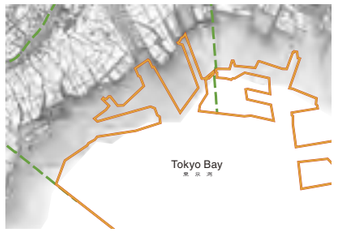
The Council pursues restoration and preservation of the natural environment and the sea to enjoy by the local residents, in order to protect the important remnant wildlife in the Tokyo Bay.

Dunlin (*Calidris alpina*)

Goal **Restoration of Biodiversity; Restoration of the Continuity of Sea and Land; Restoration of Environmental Sustainability and Recoverability; Restoration of Fishery Productivity; and Establishment of a Close Relationship between Man and Nature**

Sanbanze is a 1,800ha area of combined tidal flat and shallow sea area, which survives at the mouth of Edo-gawa Canal in the inner shore of the Tokyo Bay. The modern shape, enclosed by filled grounds on three sides, was formed by land reclamation of the inner Tokyo Bay between the 1960s and 1970s. Sanbanze harbors numerous phyllodocid snails, clams (e.g., the Manila clam, *Ruditapes hilippinarum*), and fish (e.g., gobies and flatfish) and is a stopover site by the colonies of the greater scaup (*Aythya marila mariloides*), plovers and sand pipers.

The tidal flat and shallow water habitat, however, have been progressively deteriorated by landfill, ground subsidence, and the migration of 'blue tide' (oxygen-depleted water upwelling) due to eutrophication by wastewater inputs. In order to protect the valuable, remnant wildlife of Sanbanze in the Tokyo Bay, efforts for protection and restoration of healthy habitat conditions and the sea for the local residents to enjoy are in progress.



Change in the coastline
The coastline in 1945. The red solid and green dashed lines denote the coastline in 1998 and the city boundary, respectively.

Approaches

- Re-establish estuarine conditions in the Gyotoku marsh and expand tidal flat area →①
- Enhance the linkage between Sanbanze and Gyotoku Marsh →①②

To restore the Sanbanze ecosystem by re-establishing biological diversity and the connectivity between sea and land, various studies for enhancing the creation of blackish water habitat with a wide range of salinity, expansion of tidal flat habitat and rehabilitation of a tidal marsh are being conducted. To effectively use the study results, database construction and documentation of monitoring protocols are underway.

① Restoring estuarine conditions and expanding tidal flat in Gyotoku Marsh

An adjacent but nearly disconnected marsh, the Gyotoku Marsh, will be rehabilitated as a tidal blackish marsh that is linked to the Sanbanze shallow water, by stimulating tidal flushing, filling deep areas, and enhancing freshwater inflow. Ongoing efforts include studies on improvement of an existing flow control gate and on effects of freshwater flow enhancement on the marsh water quality.

Schematic diagram of the restored Sanbanze in the future

② Conducting environmental monitoring at Sanbanze

To evaluate medium- to long-term variations in the biological community and its environment of Sanbanze, periodic surveys are being conducted to collect various data, such as the basin morphology, water quality, substrate, benthos, fish, algae, attached organisms, and avian species.

Related Web Sites

Sanbanze Restoration Plan: http://www.pref.chiba.lg.jp/syozoku/b_soukei/sanbanze/index-e.html

Primary Sponsor: Kanagawa Prefecture

Tanzawa-Ooyama Region Comprehensive Ecosystem Restoration

Tanzawa-Ooyama Region

Designation:
Tanzawa-Ooyama Quasi-national Park
Location: Sagamihara, Yamakita, Matsuda, Hadano, Atsugi, Isehara, Aikawa, and Kiyokawa, Kanagawa Prefecture
Year Initiated: 2004

Tanzawa-Ooyama Nature Restoration Committee

Beech tree dieback, diminished understory vegetation, and the adverse effects of park overuse are serious. The Committee analyzes the relationships among wildlife, human and the environments to further preservation and restoration of Tanzawa natural environments

Japanese black bear
(Photo by Yoshimori Yamaguchi)

Goal **Restore Tanzawa-Ooyama Region with viable nature and people**

Tanzawa-Ooyama Quasi-national Park contains a series of mountains, including one of the Japanese Hundred Mountains, Mt. Tanzawa, and Mt. Hinokiboramaru, popular for blossoms of the goyotsutsuji (*Rhododendron quinquefolium*). While located near Tokyo, the park retains rich natural environment with old-growth beech forests and large mammals such as the Japanese black bear (*Ursus thibetanus japonicus*) and sika deer. The park also attracts three million visitors every year and is the reservoir watershed for Kanagawa Prefecture.

In the forest habitat, however, human-associated influences and damages are becoming apparent – a combination of air pollution and other factors caused the dieback of beech trees; deer overgrazing diminished forest vegetation; and human trampling increased soil exposure. Beginning with monitoring the natural environment and evaluation of past conservation actions, the linkage among organisms, man and their environments will be investigated to move forward to conservation and restoration of the park environment.

Bark stripping by deer

Deteriorated beech trees

Diminished forest floor vegetation

Degraded mountain trail

Approaches

- Restore rare plants and animals →①
- Preserve healthy forest and streams at the watershed scale →②
- Create a recycling-oriented society that depends on local natural resources →③
- Construct an information system accessible by prefecture residents →④

In addition to environmental monitoring and evaluation of past conservation actions, the relationships among organisms, humans and their environments will be surveyed and analyzed. Creation of a recycle-oriented society that depends on local natural resources will be pursued in cooperation with local residents, NPOs and industries.

Related Web Sites
e-Tanzawa (Tanzawa Natural Environment Information Station):
http://www.e-tanzawa.jp

① Conducting biological assessment

A restoration goal(s) will be identified with an emphasis on conservation of rare species and biological diversity. An array of biological communities has been surveyed in detail to characterize the current status and issues in order to nail down the species to be protected, areas of priority protection, and conservation strategies.

A tower for beech tree survey

② Site survey for water and soil restoration

This assessment focuses on ozone concentration, water discharge and quality, a long-term change of slope failure location, and amount of soil erosion in order to determine areas that are suitable for beech forest restoration, soil conservation techniques and the strategies for comprehensive watershed conservation.

③ Survey for regional community revitalization

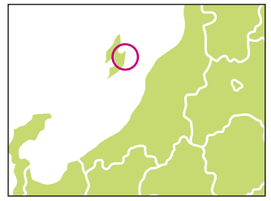
Information on regional resources, industries and cultures are being organized and analyzed to identify the current status and issues. Action plans for revitalizing the region will be developed in cooperation with various stakeholder groups.

④ Information infrastructure

Information of the natural environment, obtained by various investigations, was compiled to a GIS database, the "Tanzawa Natural Environment Information Station". This station is being used for comprehensive evaluation of ecological conditions.

Primary Sponsor: Niigata Prefecture

Habitat Restoration and Preservation for Japanese Crested Ibis



Eastern Kosado

Designation:
National Eastern Kosado Wildlife Protection Area
Location: Eastern Kosado, Sado, Niigata Prefecture
Year Initiated: 2006

Council for Creation of the Island of Human-Ibis Harmony

Prior to captive bird release, the Council works on habitat improvement. Wetland restoration to create foraging sites has been implemented.

A Japanese crested ibis named 'Yu-yu'

Goal **Restore the natural environment (foraging, nesting and roosting habitats) that allows the recovery of the wild Japanese crested ibis**

The eastern Kosado region once supported the last wild Japanese crested ibis (Nipponia nippon). While the region has been a Special Protection Zone of National Wildlife Protection Area since 1982, the historical foraging, nesting and roosting habitats, maintained by the regional farming, have diminished. Aging of farmers and seeking for efficient farming resulted in more terraced rice paddies to be abandoned. Community-managed forests have been degraded through insufficient forest cares. To assist the return of the wild ibis, various efforts for restoring the historical habitat in harmony with the regional society are in progress, such as restoring wetland habitat as feeding sites and establishing a mechanism to promote the collaboration among diverse actors.

Captive-bred birds in the Sado Japanese Crested Ibis Conservation Center

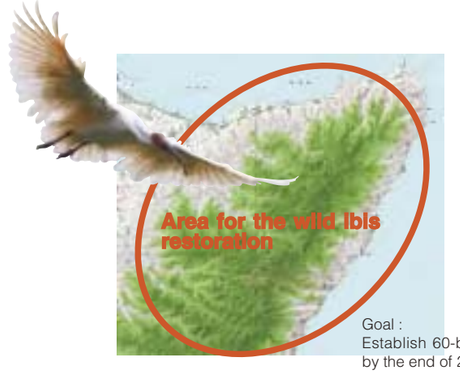
Pine forest dieback and insufficient forest management have diminished nesting habitat.

Rice paddy cultivation has been abandoned, reducing wetland habitats.

Approaches

- Improve various habitat types including wetlands that serve as year-round foraging grounds
- Establish a mechanism of cooperation among local residents, NGOs and other stakeholders →②

To secure foraging sites, most important for restoring wild ibis, habitat improvement has been initiated. Efforts to establish a mechanism of cooperation among various stakeholders are underway to preserve the habitats in the future.



Goal :
Establish 60-birds wild populations by the end of 2015

① Improving wetland habitat to provide foraging grounds

Prior to captive-bird release, wetlands (biotopes) that can support loaches and other aquatic prey species are being created to secure foraging habitats. Monitoring will be conducted to evaluate the effectiveness in creating foraging habitat.

② Establishing a mechanism of cooperation among local residents, NGOs and other private groups

To preserve the restored habitats for years to come, a mechanism of collaboration among the organizations is being developed through their coalition and information sharing.

Primary Sponsor: Nagano Prefecture

Grassland Restoration

Utsukushigahara

Designation:
Yatsugatake-Chushinkogen Quasi-national Park
Location:
Matsumoto; Ueda; Nagawa, Nagano Prefecture
Year Initiated: 2005

Utsukushigahara Nature Conservation Council

The issue is diminished native subalpine vegetation by the re-vegetation with non-native forage species and infestation of dwarf bamboo. The Council works on preservation and restoration of the native grassland ecosystem.

Goal Restore the historical subalpine grassland that existed before its conversion to hay fields in the 1950s, in part of the Utsukushigahara Highland

The gunbaizuru (*Veronica onoei*) that survives in a hay field.

Utsukushigahara, located on a plateau at 2,000 m high, is home to about 80 subalpine plant species. An expanse of the native grass fields had been developed in the Highland long time ago through cattle grazing and grass harvesting. However, such traditional native grassland has been deprived due to re-vegetation with non-native forage plants and invasion of the dwarf bamboo (*Sasa kurilensis*) and woody species. The Utsukushigahara native grassland is ecologically valuable because of its scarcity as a subalpine grassland ecosystem and its biological diversity, and therefore its conservation is important. While working on restoring native subalpine vegetation, a management program is being developed to sustain the grassland ecosystem.

A native species, the fireweed (*Epilobium angustifolium*), sporadically occurs among dwarf bamboos.

Approaches

- Work with volunteers to restore subalpine grassland vegetation →①②③

Site selection and development of an implementation plan are underway along with opinions by Utsukushigahara Nature Conservation Council, while restoration techniques are being studied by Nagano Environmental Conservation Research Institute. Ongoing field works include removing non-native hay grass and dwarf bamboo and fencing to protect subalpine vegetation from grazing and trampling by cows and humans.

① Preventing surface soil erosion

In the sites where cattle or human trampling have destroyed subalpine cover, plastic sheeting and other erosion control have been implemented to prevent topsoil erosion and to create soil conditions suitable for sprouting from native seed bank and of wind-dispersed seeds.

② Removing bamboo grasses and alien plants

To enhance native plant emergence from seed bank, the Council and volunteers are working together to remove non-native grasses and dwarf bamboos. At the same time, locally adapted restoration methods are being identified based on the monitoring data on emergence and growth of native vegetation.

Non-native grass removal by volunteers

③ Installing fences

After soil preparation and weed control, the sites were fenced in two rows to prevent cow grazing (the right fence) and human access (the left fence).

A zone reserved for vegetation recovery and fences for livestock exclosure and human access control

Primary Sponsor: Nagano Prefecture

Grassland Restoration

Kirigamine

Designation:
Yatsugatake-Chushin Kogen Quasi-national Park
Location:
Suwa, Chino, Shimosuwa Cities, Nagano Prefecture
Year Initiated: 2008

Kirigamine Nature Conservation Council

The concerns are wetland desiccation, forest expansion and Sika deer impact on plants of recent years. This project intends to preserve and restore the Kirigamine's diverse natural environment consisting of semi-natural grasslands, wetlands and forests.

Goal Restore the Kirigamine Grassland's diverse natural environment in the 1950s

Nikko-kisuge (*Hemerocallis dumortieri var. esculenta*)

Kirigamine-hiougi-ayame (*Iris setosa var. hondoensis*)

Kirigamine-touhiren (*Saussurea sp.*)

Korin-ka (*Senecio flammeus*)

Kirigamine Grassland is a semi-natural grassland ecosystem stretching at an altitude from 1,500 to 1,900m. Containing patches of three raised bogs, including a national natural monument Yashimagahara Wetland, and primeval forests, called 'juso', the grassland system provides habitats for rare plant species, such as Kirigamine-hiougi-ayame, Kirigamine-asahiran (Eleorchis japonica var. conformis), and Hozaki-shimotsuke (Spiraea salicifolia). It had been used as hay fields until the 1950s. However, spreading use of chemical fertilizers, mechanized farming, and other reasons changed its role. In 1964 the grassland was designated as a part of Yatsugatake-Chushin Kogen Quasi-national Park, which promoted recreational use as a park with outstanding scenic values. Since then the grassland system has evolved into a tourist spot.

A famous view is that Nikko-kisuge (Zenteika) decorates the grassland like a yellow carpet. However, the species habitat area is gradually diminishing with alterations of grassland plants and forest expansion. In recent years, influences of Sika deer (Cervus nippon) on plants and further ecosystem alterations are also noted. Therefore, restoration measures under planning include fencing to protect valuable plants and other communities and monitoring the effectiveness of protection fence based on deer tracking data.

Approaches

- Protect vegetation by fencing →①
- Track Sika deer movement →②
- Monitor effectiveness of protection fence →③

For grazing control, electric and other types of fences were experimentally installed. By determining Sika deer movement and grazing damage, effective protection methods will be identified to develop restoration strategies.

① Protecting vegetation by fence installation

Electric and other types of fences are installed as a pilot study, aiming for protection of valuable remnant vegetation.

Protected vegetation zone and fence installation

② Studying Sika deer movement

Attaching transmitters on Sika deer, track survey to monitor diurnal and nocturnal movement will be conducted. This survey also investigates deer visits at the exclosure sites, using night spotlight census.

Telemetry survey

③ Examining fencing effectiveness

Based on results of deer tracking survey, more effective ways of fence layout and other details will be examined.

Related Web Sites

Kirigamine Natural Environment Preservation Council：http://www.pref.nagano.jp/xtihou/suwa/seikatsu/future/future.htm

Primary Sponsor: Shiga Prefecture

Reed Colonies and Lagoon Restoration

Lake Biwa

Designation:
Biwa-ko Quasi-national Park
Location: Nagahama and Kohoku, Shiga Prefecture
Year Initiated: 2002

Council for Native Reed Colonies Restoration at Lake Biwa Northern Region

The Council focuses on restoration of notably diminished reed beds within the context of the shoreline landscape that integrates biological communities and their habitats.

Hayazaki Lagoon Restoration Planning Committee

The Committee works on restoration of severely reduced lagoon habitats due to landuse development to recover various lagoon functions.

Goal **Restore the native reed and lagoon habitats that existed in the 1950s**

Vast reed colonies along the shore and the former lagoons comprised the indigenous landscape of Lake Biwa. These landscape elements were also environmentally valuable, providing critical habitats to plants and animals and functions of erosion and water quality control to the coastal areas.

Growing human activity and changing lifestyle, however, have accelerated land reclamation of the historical lagoons and declines in reed covers and riparian forests, degrading the amount and quality of the lakeshore ecosystem. Considering a comprehensive improvement of the shoreline landscape and wildlife habitat, restoration activities are in progress to leave the scenic Lake Biwa for future generations.

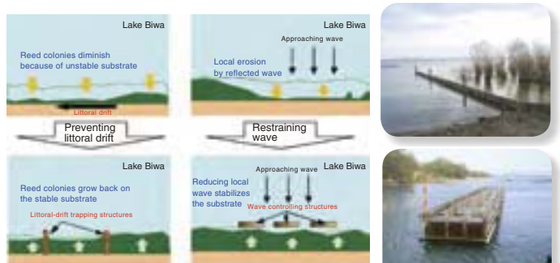
Approaches

- Restore native reed colonies in the northern region →①
- Restore the Hayazaki Lagoon →②

Native reed colonies in Lake Biwa can be sustained with a sensitive balance of the lake ecosystem. Sediment movement on the lakebed is one cause that declined the reed colonies. At Nagahama and Kohoku in the northern region, therefore, efforts to restore reed colonies have been made by assisting the natural recovery. In the former Hayazaki Lagoon, converted to a 89-ha upland in 1970, feasibility testing of re-inundation has been carried out to restore the original lagoon habitats.

① Preventing surface soil erosion

Pile piers made of wooden walls and jetties will be installed to stabilize the lakebed sediment.



A groin (above) and jetty (below)

② Experimentally flooding the Hayazaki reclaimed land

To test the feasibility of the Lagoon restoration, 17 ha of the drained land has been experimentally flooded since November 2001, and the recovery of lagoon ecosystems has been monitored. Currently, the site shows a recovery of healthy habitats for plants and animals such as the whistling swan (*Cygnus columbianus*).

Whistling swans

Hayazaki reclamation project in August 2003

Transformation of the Hayazaki Lagoon. Land reclamation occurred between 1963 and 1970

Related Web Sites

Council for Native Reed Colonies Restoration at Lake Biwa Northern Region：http://www.pref.shiga.jp/kakuka/d/shizenhogo/yoshi_kyougikai/

Primary Sponsor: Shiga Prefecture

Mountain Grassland Restoration

Mt. Ibukiyama

Designation:
Biwako Quasi-national Park
Location:
Maibara City, Shiga Prefecture
Year Initiated: 2008

Mt. Ibukiyama Nature Restoration Council

To restore the degrading Mt. Ibukiyama's mountain grassland (flower meadows), the Council is developing a locally-driven program. All local stakeholders work together for vegetation management, by removing shrub and alien species and establishing rules for resource use.

Ko-ibuki-azami (*Cirsium confertissimum*)

Goal **Restore the Early 1970s mountain grassland (flower meadows)**

Ruri-toranoo (*Pseudolysimachion subsessile*)

Ibuki-toranoo (*Pseudolysimachion subsessile var. ibukiense*)

Mt. Ibukiyama is a 1,377m altitude mountain that rises on the border of Shiga and Gifu Prefectures. Being a treasury of plant life, the mountain nurtures about 1,300 species among 2,300 in Shiga. The mountaintop area develops flower meadows, supporting nine endemic species, including Ruri-toranoo and Koibuki-azami, and many other alpine and sub-alpine species, such as Ibuki-toranoo and Sankayo (Diphylleia grayi). This meadow area is designated as a national place of scenic beauty. The mountain slope between the trail's third to eighth stages has been used as hay fields. However, along with changes in the agricultural production and lifestyles, such agricultural landuse has declined. Mt. Kirigamine is now a tourist spot where about 0.3-million people a year visit using a highway completed in 1965 or hiking trails from the foothill.

Since 1990s the mountain grassland has shown some alterations. From the summit area and hiking trails, non-native dandelions (Taraxacum officinale) and hay grasses have invaded into the grassland, causing declines of native dandelions (Taraxacum sp.) and other endemic species. Shrub and Japanese pampas grass (Miscanthus sinensis) are also overgrowing, owing to diminished grass harvesting. Therefore, a preservation and restoration mechanism has been developed, which ensures proper resource use by tourists and others as well as controls alien species and vegetation change.

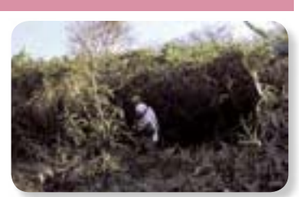
Approaches

- Remove shrub, alien species and other undesired plants to rehabilitate the mountain grassland (flower meadows) →①②③
- Ensure proper resource use and establish rule →③④

In Mt. Ibukiyama, private groups and other interests have engaged in restoration, by removing dwarf bamboo, Japanese pampas grass, shrub and alien species and by other activities. Along with these efforts, other strategies under planning include field verification of rare plant distribution and fence installation to prevent alien species overgrowth.

① Controlling vegetation change by removing unwanted plants

To control dwarf bamboo (Sasa kurilensis), Japanese pampas grass and other weeds infesting the former hay field, a mountain grassland rehabilitation program is being developed. In this program, local private groups take the initiative in mowing grasses and sowing herb seeds.



Mowing dwarf bamboo.

② Removing non-native dandelions and other alien species

The Council is planning weed control such as removing non-native dandelions and other alien species spreading by hikers and tourists.

Non-native dandelions infested the mountaintop area.

③ Fencing to deter human passage

Alien plants can invade and spread from hikers footprints. Therefore, together with specifying areas available for tourists and other users, fence construction to prevent alien species overgrowth and other weed control measures are being developed.

④ Establishing rules for park use

The Council is planning management strategies such as conducting patrol to prevent trampling and digging meadow plants, and setting rules for resource use.

Related Web Sites

Mt. Ibukiyama Nature Restoration Council：http://www.pref.shiga.jp/d/shizenkankyo/ibukiyama/index.html

Primary Sponsor: Hyogo Prefecture

Forest, Grassland and Wetland Restoration

Mt. Hyonosen Foothill

Designation:
Hyonosen-Ushiroyama-Nagisan Quasi-national Park
Location:
Yabu; Kami and Shin-onsen, Mikata-gun, Hyogo Prefecture
Year Initiated: 2004

Mt. Hyonosen Area Preservation and Restoration Working Committee

The Committee works on various activities to promote public outreach, education and communication, as well as on preservation and restoration of wetlands, pampas grasslands, and other invaluable ecosystems.

The Usuiro-hyomon-modoki (*Melitaea protomedia protomedi*)

Goal **Preserve the magnificent and sensitive natural communities of Mt. Hyonosen and its surroundings and restore the pre-damaged conditions.**

Japanese cedar plantation

A desiccated wetland

A reduced community of the bog bean (*Menyanthes trifoliate*)

Invasion of shrub trees into Oonuma Pond

The Mt. Hyonosen Foothill range, consisting of Mt. Hyonosen in the center and its surrounding chain of 1,000-m high mountains, features various natural habitats, from wetlands of northern subalpine plants, such as sedge (*Carex limosa*) and gentian (*Gentiana triflora var. japonica*), and grasslands of the Japanese pampas grass (*Miscanthus sinensis*) that support rare species of the Usuiro-hyomon-modoki butterfly (*Melitaea protomedia protomedia*) and the anemone (*Pulsatilla cernua*).

However, Oonuma Pond and other wetlands have been desiccated and invaded by shrub trees, degrading the wetland plant communities. Although the pampas grassland around Mt. Hachibuse has retained owing to mowing for skiing ground maintenance, rare species are only limitedly distributed. Efforts to restore and preserve the Mt. Hyonosen ecosystems were initiated with prohibiting overexploitation of rare species and studying effective strategies in sustaining the grassland communities.

Approaches

- Return cedar plantations to native beech forests →①
- Restore pampas grasslands →②
- Restore the wetland environment degraded by the invasion of shrub trees →③

Baseline data collection about the wetlands and pampas grasslands and its analyses are in progress. Other ongoing actions include monitoring the current status, feasibility testing on beech forest restoration and pampas grassland management.

① Feasibility testing on beech forest restoration

A cedar plantation was experimentally logged in a strip to examine the recovery of beech forest. The logged strip was re-planted with beech seedlings or seeded. The seedlings are covered with nets to prevent hare grazing.

Feasibility testing on beech forest restoration

② Identifying a management strategy for pampas grasslands

Traditional management had sustained the pampas grassland in the Ueyama Highland. However, because of recent cessation of mowing and other practices, Bamboo grass and shrub trees have invaded into the grassland. Currently, the effectiveness of mowing and cutting in preserving the pampas grassland is being tested.

Removing bamboo grass

③ Removing invaded shrubs in the wetland

As an initial effort for wetland restoration, the Japanese holly (*Ilex crenata*) and other shrub species were removed to secure light for the growth of wetland plants.

Working on shrub tree removal

Related Web Sites

Ueyama Foothill Eco-Museum：http://www.ueyamakogen-eco.net/

Primary Sponsor: Hiroshima Prefecture

Wetland Restoration

Yawata Wetlands

Designation:
Nishichugoku-sanchi Quasi-national Park
Location:
Kitahiroshima, Yamagata-gun, Hiroshima Prefecture
Year Initiated: 2003

Yawata Wetlands Nature Restoration Committee (as of March 2009)

The Committee pursues wetland restoration at Yawata Wetlands in Mt. Garyu foothill.
Date Established: 7 Nov. 2003
Members: 31
Date Issued the Overall Plan: 31 Mar. 2006
Date Issued the Implementation Plan:
● 30 Oct. 2006 (Yawata Wetlands Project, sponsored by Hiroshima Prefecture)

Channelized concrete canal in the wetlands

Goal **Restore the original wetland ecosystem that existed in the 1950s before pastureland development**

(Photo by Hiroshima Prefectural Forestry Research Center)

Wild iris

The silver-studded blue (*Plebejus argus micrargus*)

The Yawata area forms a valley in northeastern Hiroshima Prefecture, surrounded by 1,000-m high mountains at an elevation of 800 m. The area contains a number of scattered poor fens, represented by the numagaya (*Moliniopsis japonica*) – maazami (*Cirsium sieboldii*) community. The wetlands also support important wild populations of the iris (*Iris laevigata*).

Wetland habitats for unique communities, however, show various degradations - progressive desiccation associated with drainage structures for pasture development and road construction; and subsequent invasion of woody species, such as the Japanese red pine (*Pinus densiflora*) and Japanese holly. To preserve and restore the wetland ecosystems, a restoration plan was developed, and actions are underway.

Approaches

- Remove man-made alterations during pasture development

The Yawata Project features improvement of hydrology; rehabilitation of wetland vegetation by controlling undesirable species; and preservation of the existing wetlands. The restoration area will be classified into zones of construction types based on degradation such as the absence of wetland plants. For each zone, clearing surrounding woods, removing the drainage canal, installing water-level control levees, and other specific actions will be prescribed.

A (Current status) Zones of a completely or nearly devoid of wetland vegetation
(Actions) Removing trees and alien species; installing irrigation canals
B (Current status) Zones of remaining wetland plant coverage
(Actions) Clearing trees; filling existing drainage ditches
C (Actions) Restoring floods by constructing dams
D (Current status) Zones of feasibility testing
(Actions) Monitoring for feasibility testing
E (Current status) Zones of intact wetland vegetation
(Actions) Preserving the wetland conditions

① Removing the concrete canal

Stream water and wetland groundwater levels will be increased by demolishing the canal and back-filling the dredged streambed.

② Improving stream flow to more natural forms

Existing straightened stream channel will be modified to have a meandering form similar to the historical one, to create diverse in-stream habitat while ensuring erosion control by stabilizing the riverbanks and bed.

③ Damming stream flow

To increase the area of inundation and reduce streambed slope, stream water surface and wetland groundwater will be elevated by damming stream flow. This will also benefit water resource use and disaster control.

④ Installing irrigation canals

Irrigation canals for directing water from the dams will be constructed to enhance the wetness of the restoration zones.

⑤ Improving road ditches for habitat mitigation

Existing drainage ditches and culverts will be modified to allow animal migration across and along the road.

⑥ Clearing woody and alien species

Invaded trees and alien species will be removed.

Related Web Sites

Yawata Wetlands Nature Restoration Project:http://www.pref.hiroshima.lg.jp/eco/j/yawata/index.htm

Primary Sponsor: Tokushima Prefecture

Coral Community Restoration

Takega-shima Island

Designation:
Muroto-Anankaigan Quasi-national Park
Location:
Kaiyo, Kaifu-gun, Tokushima Prefecture
Year Initiated: 2003

Takegashima Island Marine Park Nature Restoration Committee (as of March 2009)

The Committee takes actions for recovering the coastline ecosystem with corals as a key community.
Date Established: 9 Sept. 2005
Members: 54
Date Issued the Overall Plan: 31 Mar. 2006
Date Issued the Implementation Plan: In preparation

Restoration area

Goal **Restore the natural environment that can sustain healthy populations of the green acropora (Acropora tumida)**


Turbid water with suspended silt


Coral bleaching

Takegashima Island and its surrounding sea are located between Tokushima and Kochi Prefectures and affected by the branch of the Kuroshio Current. The area was designated as a marine park (Awa-takegashima Marine Park) in 1972 because of its high seawater clarity and scenic underwater views decorated with biological communities such as a large colony of vividly green acropora corals and the lettuce coral (*Pavona decussata*).

Existing offshore breakwaters calm the bay water but reduce water exchange between the sea and bay. This, combined with diminished water clarity, has impaired the quality of the marine park. Based on the overall plan for coral community restoration, actions are underway in mountains, rivers, and the sea.

Approaches

- Improve the marine environment in and around the marine park →①
- Identify the ecology of the green acropora →②
- Ameliorate terrestrial runoffs
- Revitalize the regional fishery in harmony with the marine park

To achieve the restoration goal, planned or ongoing actions include establishing a technique for breeding and rearing the green acropora; improving shoreline hydrographic conditions by modifying existing breakwater structures; and implementing watershed-scale restoration such as assisting proper thinning in forest plantations.

① Improving hydrographic conditions by modifying the breakwater levees

The levees at the bay inlet have lowered current velocity and ocean-bay water exchange, adversely affecting the marine ecosystems represented by coral communities. To mitigate this situation, levee modification is being designed.


An existing breakwater levee

② Identifying the ecology of the green acropora

This project is now developing a technique for culturing the green acropora near Takegashima Island. In 2006, eggs were successfully collected for the first time in Tokushima Prefecture. The eggs were grown to larvae in the Kuroshio Biological Research Foundation, Kochi Prefecture, which were then transferred to and reared in the sea.


The green acropora egg mass in a collecting device

Related Web Sites
Takegashima Marine Park Nature Restoration Project: http://www.takegashima.jp/

Primary Sponsor: Saitama Prefecture

Lowland Forest Restoration

Kunugiyama

Designation:
None
Location:
Kawagoe; Tokorozawa; Sayama; and Miyoshi, Saitama Prefecture
Year Initiated: 2002

Kunugiyama Area Nature Restoration Committee (as of March 2009)

The Committee aims at leaving the historical, cultural and environmental values of a Musashino lowland forest, 'Kunugiyama Area', which encompasses the municipalities of Kawagoe, Tokorozawa, Sayama and Miyoshi, to the future ages.
Date Established: 6 Nov. 2004
Members: 66
Date Issued the Overall Plan: 12 Mar. 2005
Date Issued the Implementation Plan: In preparation

Goal **Restore the historical lowland forest that had been nurtured in association with human activities in Musashino before the high economic growth period**

The Kunugiyama Forest, within a 30-km range of Tokyo, is a large green space that retains a scenic 'sato-yama' (community-managed forests) landscape of the historical Musashino region. However, the problems are degrading forest management and environment, such as declined agricultural use, urban sprawl, and too many waste facilities. Efforts to restore secondary forests are underway to pass along the historical, cultural and environmental values of the Musashino lowland forests to the future ages.

Approaches

- Demolish a waste treatment facility
- Restore forest vegetation by transplanting seedlings and root stocks
- Rehabilitate degraded coppice woodlands



Removed the waste treatment facility and implemented seedling planting after three years


A model project for coppice forest restoration

Primary Sponsor: Hyogo Prefecture

Riparian Ecosystem Recovery

Harima Irrigation Ponds

Designation:
None
Location: Ono; Kasai; and Kato, Hyogo Prefecture
Year Initiated: 2004

Study Group for Harima Irrigation Ponds Preservation and Restoration Implementation Planning (as of March 2009)

The Group aims at preservation and restoration of viable pond habitats that nurture Bekkotonbo dragonfly and attract a variety of creatures.

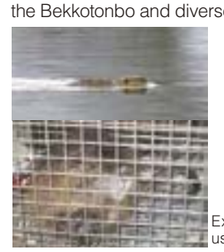

Bekkotonbo dragonfly

Goal **Preserve and restore viable pond habitats for the Bekkotonbo dragonfly and a variety of creature.**

The Harima Irrigation Ponds harbors rare and rich biological communities, including the Bekkotonbo (*Libellula Angelina*) with an extremely limited distribution across Japan. However, the pond ecosystem has been diminished because of decrease of irrigation ponds, reduced water quality, invasion of alien species, and a change in the pond management. To resolve these issues, restoration efforts are in progress toward the preservation and recovery of viable pond habitats for the Bekkotonbo and diverse organisms.

Approaches

- Rehabilitate emergent species vegetation by removing lotus and reducing dense reed covers
- Control water levels – dewatering the ponds in winter to extirpate nutrias and black bass and to improve water quality
- Install box traps to extirpate nutria


Extirpating nutrias using box traps

Related Web Sites
Kunugiyama Nature Restoration Project: http://www.pref.saitama.lg.jp/A09/BD00/kunugiyama/index.html
Kunugiyama Area Nature Restoration Committee: http://www.pref.saitama.lg.jp/A09/BD00/kunugiyama/kyougikai/index.html

Primary Sponsor: Yamaguchi Prefecture

Tidal Flat Restoration

Fushino River Tidal Flats

Designation:
None
Location:
Yamaguchi, Yamaguchi Prefecture
Year Initiated: 2002

Fushino River Estuary and Tidal Flats Nature Restoration Committee (as of March 2009)

The Committee works on restoration and maintenance of Fushino River estuarine and tidal flat habitats.
Date Established: 1 Aug. 2004
Members: 57
Date Issued the Overall Plan: 31 Mar. 2005
Date Issued the Implementation Plan: In preparation

Goal **Restore 'sato-umi', a shoreline habitat where people can enjoy natural resources in a sustainable way through continuous proper management**

The Tidal Flats, downstream of the Fushino River, is a stopover site for migratory birds flying to various destinations and is listed in the Japan's 500 Important Wetlands. It is also home to the threatened horseshoe crab (*Tachypleus tridentatus*), all of which makes the area as a country's critical estuarine habitat.

The Tidal Flats, however, has experienced various alterations - suspended silt inflow; oyster overpopulation due to enrichment of the estuarine water; mud flat compaction because of less frequent clam dredging; and a marked decline of eelgrass (*Zostera marina*) beds. Towards restoration and preservation of the Fushino River Estuary and Tidal Flats, various efforts are in progress.

Approaches

- Improve the substrate environment by crushing oyster shells and modifying sediment texture
- Establish a mechanism for the sustainable tidal flat management

Shell crushing and plowing in the areas of high density of oyster shells

Plowing in the sandy areas


Horseshoe crab


Plowing and sand addition method


Shell crushing and plowing method


Working on parallel ridge tillage


Fencing with thick bamboos

Primary Sponsor: Saga Prefecture

Wetland Restoration

Kashibaru Wetlands

Designation:
None
Location:
Karatsu, Saga Prefecture
Year Initiated: 2002

Kashibaru Wetlands Nature Restoration Committee (as of March 2009)

The Committee works on returning the altered wetland environment due to natural transition to the healthy one.
Date Established: 4 Jul. 2004
Members: 36
Date Issued the Overall Plan: 26 Jan. 2005
Date Issued the Implementation Plan:
- 31 Mar. 2005 (Kashibaru Wetland Area, sponsored by Saga Prefecture)

Goal **Restore the wetland vegetation that existed in the late 1950s and re-establish a healthy relationship between human activity and the environment**


Bekkotonbo dragonfly

Kashibaru Wetlands has an area of 120-ha and is the bounty of important wetland plants and insects, where continuous management has controlled the vegetation's natural. However, the Wetlands has suffered a reduction of open water area and conversion to uplands because of being bisected by the road constructed in 1971 and cessation of field burning and sphagnum moss (*Sphagnum palustre*) harvest. Therefore, wetland restoration is in progress to return the wetland environment under alterations, such as the infestation of a few plant species and accumulation of dead plants, to the traditional one.

Approaches

- Removing vegetation in a step-by-step approach
- Removing invaded shrub trees
- Relocating the road that bisects the wetland (under consideration)


Accumulation of sphagnum moss is converting the wetlands to uplands


Dredging and vegetation removal were implemented


Increased open water has restored diverse vegetation

Areas for restoration

Related Web Sites

Fushino River Estuary and Tidal Flats Nature Restoration Committee: : http://eco.pref.yamaguchi.lg.jp/fushino/index.html

Overview of the Law for the Promotion of Nature Restoration

The Law for the Promotion of Nature Restoration specifies the basic principles of nature restoration, the responsibilities of restoration participants, and other necessary matters for the promotion of nature restoration. The Law intends to comprehensively promote measures related to nature restoration, to realize a society in harmony with the natural environment through the assured protection of biodiversity, and to contribute to the conservation of the global environment.

1 Definitions of Nature Restoration

Nature restoration means the conservation, restoration or creation, and the maintenance of the conditions of the natural environments with the participation of various actors in the local community, from concerned governmental agencies, concerned municipal governments, local residents, NPOs to experts, with the objective of recovering the ecosystems and other natural environments that have been damaged or destroyed in the past.

Conservation

Activity of proactively maintaining the conditions of existing healthy natural environments.

Restoration

Activity of recovering the natural environment in areas where it has been damaged or destroyed.

Creation

Activity of recovering the native ecosystem in areas where most of the natural environment has been lost, like in large cities, by constructing large green spaces.

Maintenance

Activity of monitoring the condition of the restored natural environment and providing the necessary management in order to maintain the condition for a long period.

2 Basic Principles of Nature Restoration

Preserve biological diversity

- Nature restoration should be undertaken properly for the purposes of maintaining and passing on a sound and bountiful natural environment to future generations, realizing a society in harmony with nature through the protection of biodiversity, and contributing to the conservation of the global environment.

Promote participation and cooperation of various local groups

- Nature restoration should be conducted with the cooperation among various actors in the local community, in a voluntary and active manner. Efforts should be made to ensure transparency.

Implement science-based project

- Nature restoration should be conducted based upon scientific knowledge, taking into account characteristics of the natural environment in the area and the delicate balance of the ecosystem, as well as nature's ability to recover.

Use adaptive management

- Nature restoration should be undertaken in such a way that, even after a restoration project has begun, the state of nature restoration are monitored, the monitoring results are assessed scientifically, and the assessment results are reflected in the project.

Promote environmental learning

- In view of the importance of public understanding in conservation, arrangements should be made to utilize the nature restoration as a venue for natural environmental learning as it is implemented.

3 Flow of a nature restoration project in accordance with the Law for the Promotion of Nature Restoration

Basic Policy for Nature Restoration
Basic guidelines for comprehensively promoting measures concerning nature restoration
⇒ Formulated by the Government
The Minister of the Environment drafts a policy in consultation with the Minister of Agriculture, Forestry and Fisheries, and the Minister of Land, Infrastructure and Transport. The draft is then approved by the Cabinet. (The approved policy is renewed approximately every five years.)

Community-based Project

Call for restoration by an organizer (e.g., local governments and NPOs)

Operation of a nature restoration committee
- Organizing a committee
- Formulating an overall plan for a restoration project (by Committee)
- Discussion for drafting an implementation plan (by Committee)

Participation ← local residents, NPOs, individuals with specialized knowledge of the natural environment, land owners, concerned municipal governments, concerned governmental agencies

Coordination

① Implementation Plan Partner 1 (Ministry of xxx)
② Implementation Plan Partner 2 (Town of ooo)
③ Implementation Plan Partner 3 (NPO)

Submit to ⇄ Advice

Minister and Governor

Opinion ⇄ Hearing

Dissemination

Committee of Nature Restoration Experts

Opinion

Nature Restoration Promotion Conference
Communication and coordination to promote nature restoration (organized by related administrative agencies)

Communication and Coordination

Implementation of Nature Restoration Projects (by Partners)

Monitoring
Translating monitoring results into the adjustment

Three ministries, MOE, Ministry of Agriculture, Forestry & Fisheries, and Ministry of Land, Infrastructure & Transport, together are in charge of the Law for the Promotion of Nature Restoration.