5-7) Changes to Vegetation and Restoration

Techniques are been gradually developed for the each of the various environmental restoration requirements encountered across the country. In Ozegahara, for example, repeated trampling by hikers in to a degree far beyond the carrying capacity of the environment - stripped areas of the moorland of its vegetation. Since the situation was regarded as critical, and the natural restoration would take too long to take effect, a variety of plants species were managed to plant to accelerate the restoration process.

The swift destruction of vegetation and accompanying degradation of the natural habit is typically observed in volcanic eruptions. The sudden accumulation of ejecta and lava on the ground cancels the existing succession process of the vegetation which then has to rebuild itself for the beginning.

This phenomenon can be seen in all over Japan because of the numerous volcanoes throughout the country: Sakura Island, Mt. Fuji, Mt. Aso, Mt. Kirishima, Mt. Asama, Mt. Tokachi, Mt. Usu, Mt. Hugen, Mt. Toshima-komagatake, Mt. Showa-shinzan, etc. According to a study on the succession process on Mt. Toshima-komagatake that has been undergoing for more than 40 years, the succession in areas with no vegetation cover does not always follow a pattern from annual plants to perennial plants or from lichen, moss to higher plants. In fact, the reverse can happen: woody plants become established first, followed by lichen and moss. From this viewpoint, aerial dissemination of perennial and woody plants, such as wormwoods and alders, was carried out with helicopters on Mt. Usu covered with ejecta by the eruption.

In cases of human-induced disturbance on land, such as dam construction, restoration is undertaken with plant species that are effective in the early stages of planting: e.g. alders and locust tree. For poor land with little topsoil, it is important to cover the ground surface with such pioneer species even temporarily.

For coastal dunes and sandy beaches that been stripped of vegetation, the restoration of vegetation cover is carried out in a way similar to that mentioned above. Reestablishment of coastal forest stands however, also requires that the sand dunes be stabilised, and the restoration process beginning with the planting of pioneer species followed by the rest of the succession ‘set’ species. In Erimo Promontory, the coastal vegetation has been developed in this manner for about 50 years; as a result, the fish catch has increased fourfold.

There are many examples which indicate the increase in fish catch in coastal areas following reestablishment of inland forests. In Lake Akkeshi, known for its oysters, experienced a steady decline in oyster production as a result of a drop in the water temperature in spring after

forests were lost along the Bekanbeushi River that flows into the lake. However, production went back on the increase after the forests were re-established through a pilot reforestation programme in the upper watershed area. Although the reforestation programme itself was for a different purpose, it nevertheless contributed to the conservation of ecosystems outside its range.

The succession of vegetation is also affected by animal communities from migratory locusts in grasslands to large herbivores in forests. Deer and serow often cause serious damage to trees, especially in years when their main food source of bamboo grasses is covered after heavy snows. On one small island in Lake Toya, in Hokkaido the isolated deer population there progressively ate up into local extinction species after species plant on the island in order of palate preference. Now the only plants left are those not normally eaten by deer. There are also many examples of the association between vegetation and domestic animals, and the effect the latter can have on the former. Koshimizu Flower Moorland is a beautiful coastal moorland on the Okhotsk Coast. The present moorlands were actually created by the grazing action of horses and cattle raised there over the years. Recently however, the area was designated as Abashiri Quasi-national Park, and the domestic livestock were removed and the controlled burning that also took used to take place was also halted. The result was a gradual invasion of other grass species that began to dominate the original grassland plant community. As a consequence, starting in 1995 restoration measures were commenced, beginning with the reintroduction of controlled burning and grazing on an experimental basis. Recently, the grasslands are showing signs of gradual recovery to their original state

辻井 達一（1998）：生態系の退行、自然保護ハンドブック（沼田 眞 編）、朝倉書店

(5) Wildlife Conservation and Management in Japan 5-7) Changes to Vegetation and Restoration

Example of natural recovery of vegetation in 2m×2m plot at bare area in Oze wetland.

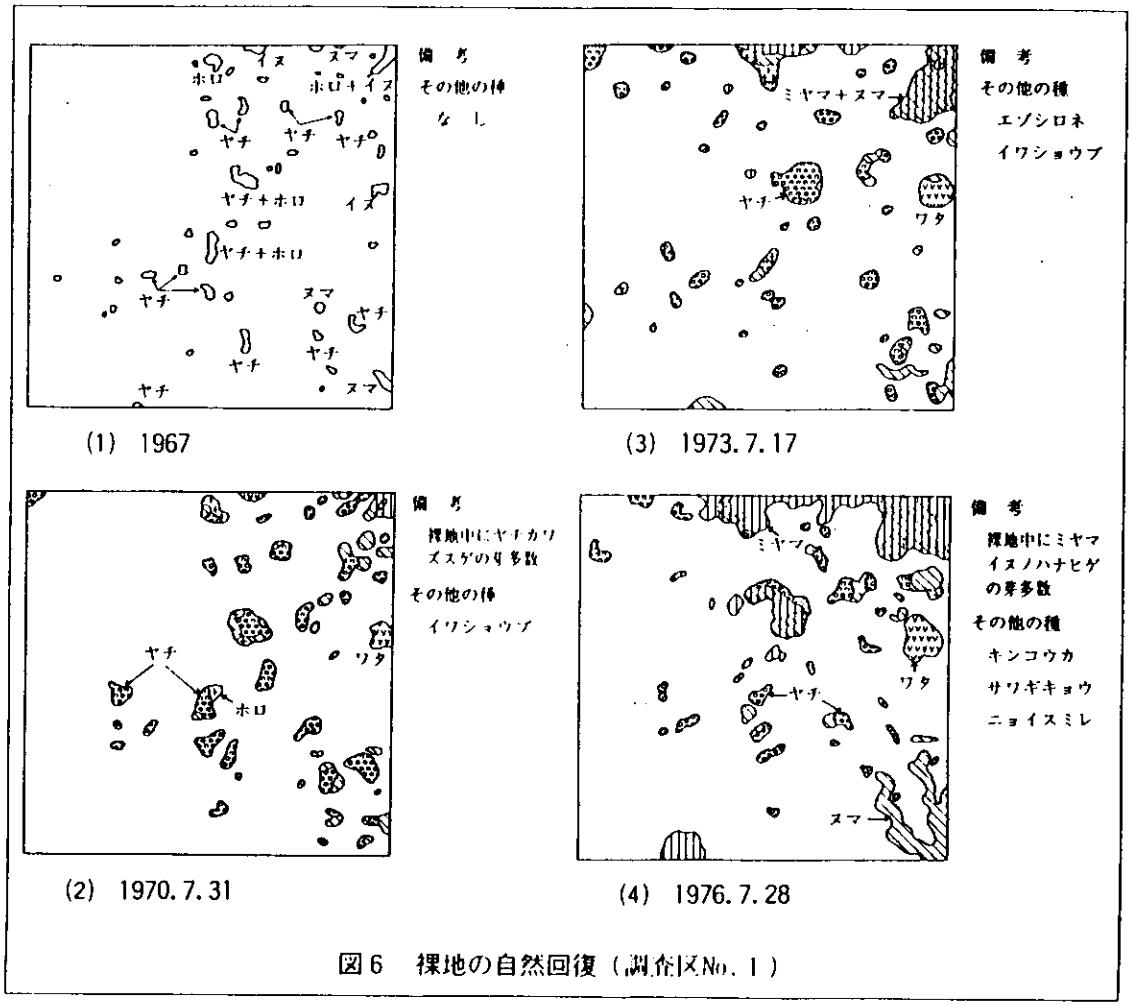


図6 裸地の自然回復（調査区No. 1）

The patches show growth of several grass species.
For ten years, recovery is not proceeding well.

菊地 慶四郎 他（1991）：永遠の尾瀬、自然とその保護、上毛新聞社

(5) Wildlife Conservation and Management in Japan

5-8) Damage by and Coexistence with Wild Animals

a) Effect on Human Livelihood by Wild Animals

There are not so many opportunities for us to encounter wild animals in everyday life. In farming and mountain villages, however, damage to farm and forest products by deer and monkeys are serious problems. This trend has been increasing to the extent causing declines in productivity and resulting abandonment of farmlands. Crop damage by deer and wild boars has been an on-going struggle for farmers ever since the human race took up agriculture. More recently there are records of systematic control measures for these animal pests during the Tokugawa (Edo) period (1603～1868). Nowadays, the relationship between people and these animals has become even more problematic because of the vastly expanded and varied use of the land by people.

Bear number and habitats are declining in some areas because of increasing conflict with people. Capture and control of harmful birds and mammals have been implemented, however while the total number of problem animals caught has increased, so has the damage to crops. This indicates that much more effective measures for coexistence between conservation of wildlife and the agricultural and forestry communities need to be developed.

b) Case 1: Sika deer

At present, sika deer are animals causing the heaviest damage to agriculture and forestry. Deer damage n Tochigi Prefecture, mainly to forestry, is rapidly increasing. The deer are also ravaging the natural vegetation in Oku-Nikko, the core area of Nikko National Park. As a result, Tochigi Prefecture has established a conservation and management plan for sika deer aimed at coexistence between deer and people. The plan consists of three main objectives: to restore the balance in the natural ecosystem, to secure stability of agriculture and forestry operations, and to secure habitats for deer. The conservation measures taken are capture to maintain the population density at appropriate levels and monitoring surveys to determine the population dynamics, distribution, habitat condition, nutrition status and damage to vegetation. The survey results will reflect the effectiveness of the countermeasures.

In severe stricken areas, it is generally most important to base the implementation of deer management on ecological surveys of the population to determine their population, distribution, home ranges, habitats and damage to vegetation. Once the management objectives are established on the results of these surveys population control can be conducted by fencing, hunting or controlling the harmful animals.

c) Case 2: Asian black bear

Black bears have long been controlled by hunting and controlling the harmful animals because of such actions as scraping the bark off trees and other damage to forest products, and harm to people. As a result, in western Japan the population has shrunk in size and become endangered. The population in the Western Chugoku Mountains is around 250-300, and Hiroshima Prefecture is working towards coexistence between people and black bears by means of the following:

- Environmental restoration through reforestation of broadleaf trees in remote habitats;
- Establishment of facilities such as electric fences to prevent the damage;
- Maintenance of the population size by driving captured individuals to remote habitats;
- Public awareness activities directed at the local people.

It is necessary to the measures to conserve the local populations and prevent the damage by each area since the situations of damage and the population sizes are different even within the Western Japan.

Both the level and type of damage varies from area to area, even within western Japan, and thus management approaches for the conservation of black bear populations must be carefully examined area by area.

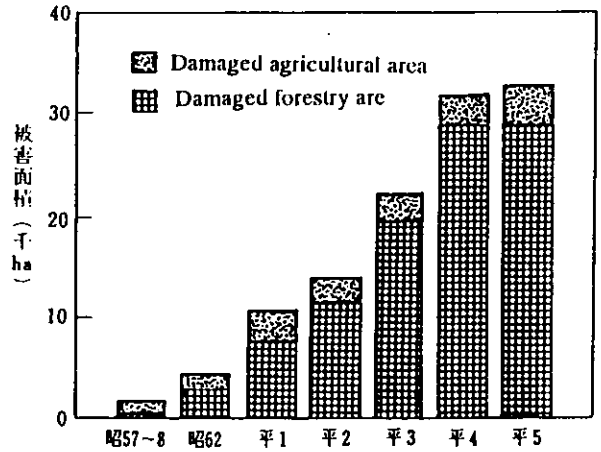
d) Coexistence with Wildlife

In conclusion, to examine the measures for coexistence of people and wild animals, it is important to understand the impact of wildlife populations on human existence as well as the animal population status, distribution, habitat condition and the ecology of the wildlife species. All these require a large amount of toil and long term monitoring if conservation efforts are to succeed

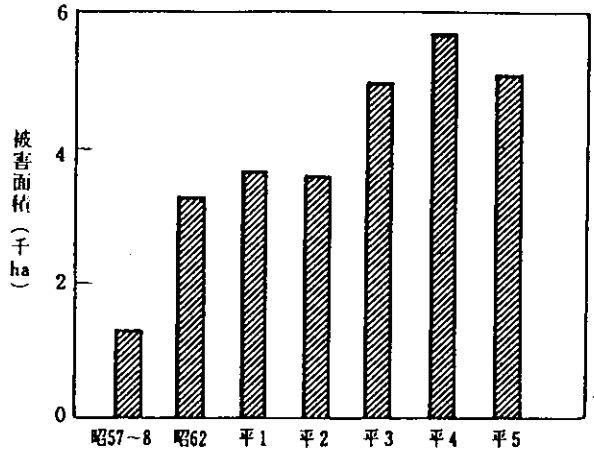
自然保護年鑑刊行会（1996）：野生鳥獣との共存のために今何が必要か？、自然と共に生きる時代を目指して 自然保護年鑑４、日生社

(5) Wildlife Conservation and Management in Japan 5-8) Damage by and Coexistence with Wild Animals

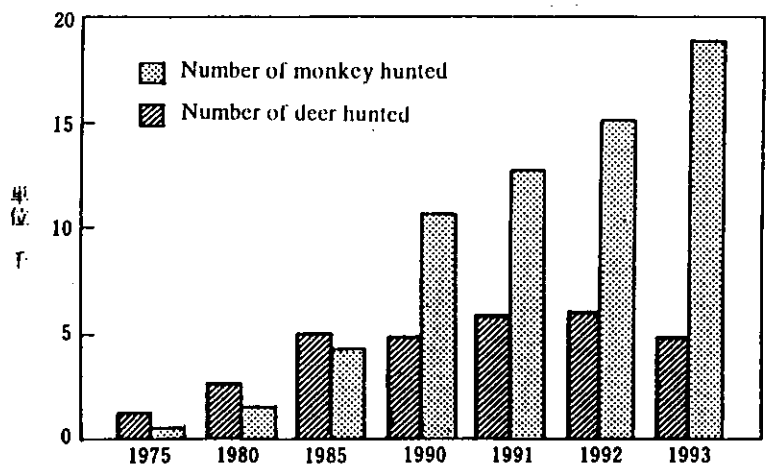
Agricultural and Forestry Damages by Deer



Agricultural Damages by Monkey



Pest (Problem Animal) Control of Deer and Monkey



自然保護年鑑刊行会（1996）：野生鳥獣との共存のために今何が必要か？、自然と共に生きる時代を目指して 自然保護年鑑４、日生社

(5) Wildlife Conservation and Management in Japan

5-9) Experiment by Local Government: Conservation and Management Plan for Yezo Deer in the Eastern Hokkaido

The Yezo deer, a subspecies of sika deer inhabiting Hokkaido, was once endangered by heavy snows and overhunting. Recently, thanks to conservation measures and favourable changes in their habitat, have not only increased in number but are expanding their range. As a result, damage to agriculture and forestry has also risen rapidly, and the amount of damage in 1996 totalled over JP¥ 5.0 billion, of which JP¥ 4.2 billion was in the Eastern Hokkaido alone. Damage to natural ecosystems has also been extensive, in the form of scraping the bark off trees.

To alleviate these impacts, in June 1997 Hokkaido established the Comprehensive Deer Management Project to promote comprehensive and proper measures for deer conservation and management, including prevention of the damage to agriculture and forestry. The project committee subsequently produced the Eastern Hokkaido Deer Management Plan to indicate the basic concepts and implementation measures for the management of the deer population.

a) Population Management - Basic Concept

Yezo deer are known to have a tendency to rapidly increase under a combination of protected status and a habitat in good condition, and yet suffer rapid losses when heavy snows or other phenomena strike. In order to establish a stable population to avoid the risk of toppling off the brink into extinction, a target number for the population has been established by means of a ’population index 7, a relative figure derived through population figures obtained from a range of studies. In this index, the population size in 1994 (est. 120,000) is set as a population index of 100, which is used as the standard. The index is then used to determine the numerical trend and to correspondingly adjust the numbers animals to be captured through a feedback system. Three levels of population index and four levels of management measures are set; one level of the measures is implemented in accordance with a level of the index adopted for a year.

b) The three Levels of Population Index

1) Critical threshold (5%)

Population index 5 (6,000 head): this level is more than 1,000 head, which is the IUCN standard for endangered species, and incorporates a calculation of the probability of heavy snows.

2) Outbreak threshold (50%)

Population index 50 (60,000 head): this is the level at which the number may increase

dramatically.

3) Optimum level (25%)

Population index 25 (30,000 head): this is the optimum level at which for managing the population. The number is lower than the level at which the population explodes out of hand (outbreak level), and yet high enough so as prevent the population from crashing below the minimum threshold in the event of sudden changes in the environment, such as climatic fluctuations

c) The Four Levels of Management Measures

1) Emergency culling

In the cases when the most recent population index is greater than the outbreak level, culling, with emphasis on females is actively carried out to maintain the index below the outbreak level. The period for applying this measure is limited to about three years to avoid over-culling.

2) Gradual population reduction

In cases when the previous year's snowfall is at normal level and the most recent population index is over the target level, intensive culling with emphasis on females is carried out.

3) Gradual population increase

In cases when the previous year's snowfall is at normal levels and the most recent population index is below the target level, low intensity culling with emphasis on males is carried out.

4) Hunting ban

In cases when the most recent population index is lower than the minimum tolerable level, a prohibition is placed on hunting and control measures are minimised to induce the number to rise. Years immediately following heavy snows, the need to ban hunting is examined taking into account the trend of the index up to the previous year. The population trend up to the preceding year are examined to determine the need or otherwise for imposing a ban on hunting.

d) Management of the Population

The current population index in the Eastern Hokkaido mostly exceeds the outbreak level and emergency measures are being taken for a three-year period three years to reduce the number to below the outbreak level. Once this is achieved, the target level will be maintained by adjusting the number to be culled, according to the index at the time.

e) Research and Monitoring

Research to determine the population index is indispensable for the successful

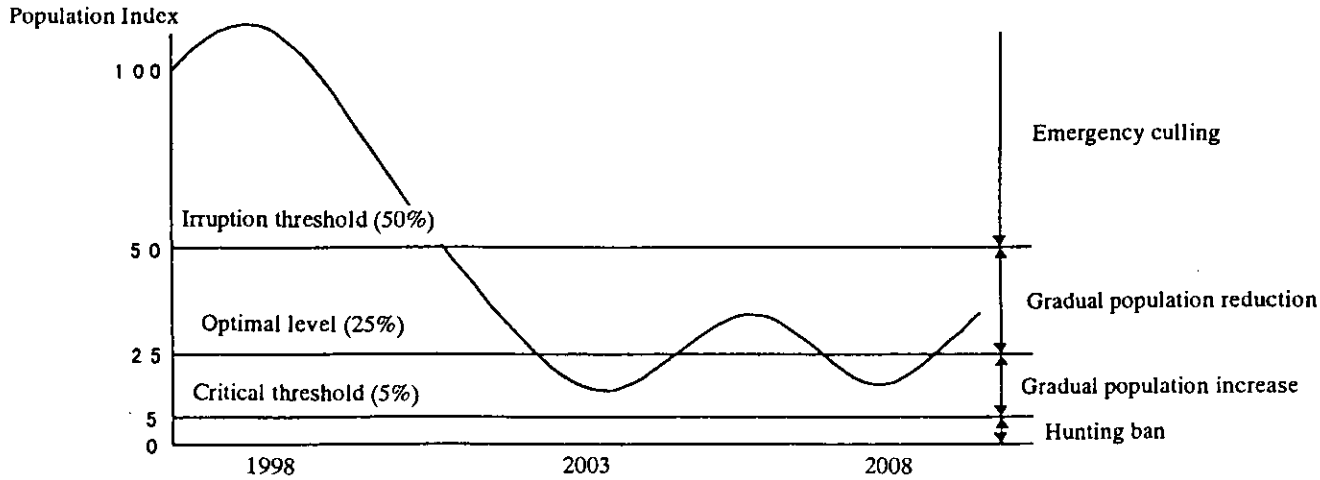
implementation of the management plan, and the impact on the population caused by hunting as well as the control measures themselves also needs to be monitored. Studies are also conducted so as to gain an understanding of the life history and habitat condition, the age composition, breeding condition, seasonal migration and habitat preferences.

f) Other

In 1997 and 1998, Steller's and white-tailed sea eagles, both endangered species, were discovered found dead by lead poisoning, after having fed on stray bullets bullet fragments left inside the remains of deer left behind by hunters. To prevent these incidents from reoccurring are to encourage hunters to bury the remains underground or bring them back to garbage stations since established in major hunting areas.

高橋 洋記（1998）：道東地区エゾシカ保護管理計画について、野生生物保護行政、野生生物保護行政研究会

(5) Wildlife Conservation and Management in Japan 5-9) Experiment by Local Government: Conservation and Management Plan for Yezo Deer in the Eastern Hokkaido



Schema of Population Management

Changes of Population Index

Population Index	1990	1991	1992	1993	1994	1995	1996	1997
Helicopter census				100			133	108
Right census			68	100	72	115	127	101
Number of hunted animal	68	71	91	100	112	144	141	
observation record	53	44	66	100	83	121	112	
Amount of crop damage	59	71	83	100	100	122	151	
Railway accident	46	71	64	100	109	106	178	

高橋 洋記（1998）：道東地区エゾシカ保護管理計画について、野生生物保護行政、野生生物保護行政研究会