

# Conservation Management Plan for the Amami Islands Forest Ecosystem Reserve (Excerpts)

## Introduction

Many wild ecosystems and precious wildlife habitats still remain in national forests. As part of national forestry business, these precious forests are designated as protected forests and managed in accordance with the changes in the natural environment and also in accordance with the intention for the designation, and as necessary, vegetation restoration measures are implemented or protective fences are installed in order to appropriately conserve and manage the precious natural environment.

The Amami Islands, lying in a subtropical maritime climate, have a huge annual precipitation of 2,000 to 3,000 millimeters on average. In the islands, with poor water-retaining capacity, forests cover 66 percent of the total area, serving very effectively in the water conservation and forest disaster prevention functions. National forests there, covering six percent of Amami-oshima Island and about 15 percent of Tokuno-shima Island in total area, are composed of subtropical evergreen broad-leaved trees, such as suda (ita)-jii chinquapin (*Castanopsis sieboldii*), iju camellia (*Schima liukiensis Nakai*), isunoki witch hazel (*Distylium racemosum*), and Okinawa-urajirogashi oak (*Quercus miyagii*). Dotted with forests quite similar to primeval woods in terms of the combination of species found in the entire plant community there and quite valuable from the scientific standpoint, Kinsakubaru, Kamiya, Hatsuno, and Northern and Central Tokuno-shima Island were designated in March 2013 as a Forest Ecosystem Reserve after deliberation by the Amami Islands Forest Ecosystem Reserve Designation Committee, so that they would be conserved and preserved in an appropriate manner.

The Amami Islands belong to the Ryukyu Islands, which were recognized in 2003 by the Review Committee on Candidate Natural Sites for Nomination to the World Heritage List of Japan as one of the regions that are highly likely to satisfy criteria for registration and conditions of integrity set by the World Heritage Convention, as they have unique geological history in their relation with the continent, and hold a great diversity, especially in indigenous semitropical forest and coral reef ecosystems, offer wonderful scenery both on the land and in the sea, and are inhabited by endangered species. At a meeting held in January 2013, the Inter-Ministerial/Agency Co-ordination Committee for World Natural Heritage decided to enter "Amami-Ryukyu" in the World Heritage Tentative List of Japan as natural heritage. With a view to having the area carried on the World Natural Heritage Tentative List, the Science Committee for the Amami-Okinawa World Natural Heritage Candidate was set up in May 2013, and at the third meeting in December 2013, they selected four districts, Amami-oshima, Tokuno-shima, Northern Okinawa-to, and Iriomote-jima, as candidates for World Natural Heritage sites. With this, parties concerned are expected to address challenges that must be solved to get Amami-oshima and Tokuno-shima qualified for registration as a World Natural Heritage site.

For this area, it is feared that human activities and other factors may deteriorate natural environments, and coordination between conservation and usage must be facilitated with consensus built between stakeholders based on scientific grounds.

Against backdrops as stated above, this Conservation Management Plan has been prepared based on deliberation of the Conservation Management Review Committee as comprehensive guidance for implementing a series of initiatives in a systematic manner, making clear how national forests in the Amami Islands should be conserved and managed, with their distinctive features taken into consideration.

## **2. Basic Matters Related to Conservation and Management**

The Amami Islands Forest Ecosystem Reserves have been designated, as a part of national forest conservation and management activities, for the purpose of bequeathing their unique forest ecosystems. These designated reserves are divided into "Preservation Zones" and "Conservation and Utilization Zones." In Preservation Zones, forests must be left with no work done for them by humans, except for operations essential for conservation and rehabilitation. Conservation and Utilization Zones must serve as the buffer for Preservation Zones. The total area of Preservation Zones is 2,253 hectares, and the total area of Conservation and Utilization Zones is 2,567 hectares.

### **(1) Preservation Zones**

#### **( i ) Forest management**

In Preservation Zones, forest ecosystems must be preserved in a rigorous manner, and in principle left with no work done for them by humans, going through natural transition.

Note, however, the following actions can be taken notwithstanding the description above, when needed to maintain forest ecosystems:

- (A) Actions that are approved as being necessary for academic research, or other public welfare reasons, such as monitoring and use of biological genetic resources;
- (B) The following actions that are carried out as emergency measures:
  - (a) Extinction of forest fires, etc.; and
  - (b) Implementation of restoration measures after disasters such as large-scale forest collapse and mudslides;
- (C) Installation of signs and other similar objects;
- (D) Actions recognized based on scientific knowledge as necessary to conserve and/or restore indigenous biodiversity and forest ecosystems (Ex.: Actions carried out to lead artificial forests lying scattered in a Preservation Zone into becoming natural forests there)
- (E) Other actions that conform to relevant laws and ordinances

In addition, to rigorously preserve forest ecosystems, surveillance systems must be developed, while building cooperation with stakeholders.

**( ii ) Forest use**

Preservation Zones may be used for acts regarded as necessary for public benefit reasons, such as academic research related to ecology investigation and use of biological genetic resources.

**(2) Conservation and Utilization Zone**

**( i ) Forest management**

Conservation and Utilization Zones must have roles to play as buffers to prevent any change in external environments from giving direct impact on forest ecosystems in a Preservation Zone.

In any forest in the Conservation and Utilization Zones, no forest operation should be performed for the purpose of timber production, provided, however, that cedar stands that should be conserved and managed in an integrated manner to preserve natural forests may undergo operations for growing multi-storied forests, among others, so that they will be transformed into natural forests in the future.

Note, however, the following actions can be taken notwithstanding the description above:

- (A) The same forest management procedures as applied to Preservation Zones;
- (B) Environmental education activities inside a forest that are approved as necessary;
- (C) Conservation works and other ancillary works that are necessary for national land conservation; and
- (D) Logging and removal of dead or damaged trees;

**( ii ) Forest use**

Conservation and Utilization Zones must in principle be used in the same manner as Preservation Zones, while they may be used for educational purposes in a manner relevant to their natural conditions to the extent that the purpose of their designation as Conservation of Utilization Zone may not be compromised. Facilities needed for such use may also be constructed or installed there.

**(3) Other national forests**

Specific Animal Habitat Protected Forests and other national forests lying adjacent to the Amami Islands Forest Ecosystem Reserve must be administered and managed with full attention paid to conservation and management of the Reserve, with the greatest possible effort exerted to conserve indigenous wildlife species and other natural conditions.

**(4) Forests along mountain streams**

The Islands, despite their relatively small water catchment areas, have mountain stream areas with riversides that are regularly inundated with frequent rains. Quite humid at all times there, indigenous and rare dwarf plant groups, such as kobano-amami-fuyuichigo strawberry (*Rubus amamianus var. minor Hatus*), amami-sumire violet (*Viola amamiana*), amami-katabami oxalis (*Oxalis exilis A.Cumm*), are specifically distributed and differentiated in those mountain stream areas. High humidity environment is always maintained in these areas, so that trees are covered with mosses, lichens, orchids, and vine plants in

high density. Along mountain streams, therefore, Preservation, and Conservation and Utilization Zones, as well as other national forests must all be administered with special care.

#### **(5) Approach to Forest Conservation and Management, and Important Matters**

The forest ecosystems in the Amami Islands cannot be protected without cooperation with people living there, tourists and other users of the forests, and agencies concerned, among others. Based on the approach to forest management and forest use as described above in (1) through (4), they must be administered in an adaptive manner through work for driving away alien species and regular monitoring to keep impact of human activities to the lowest possible level. With the long-term target set as turning the Islands into a place with rich forest ecosystems that foster biodiversity, which should include endemic species and other rare wildlife, policy measures necessary and relevant to features of each island must be implemented with cooperation with agencies concerned and other stakeholders.

Below are examples of issues that monitoring surveys and other operations should especially focus on:

- ( i ) Survey of forests and vegetation, etc. (tree census, vegetation survey, fixed-point photo shooting, etc.);
- ( ii ) Survey of habitation of wildlife (rare and/or endemic species, such as Amami-no-kurousagi hare, etc.);
- (iii) Survey of alien species (survey of state of invasion, evaluation of impact on rare species, prioritization between countermeasures);
- (iv) Survey of actual use (No. of users, ways of use, places used, etc.);
- ( v ) Survey of weather, etc. (temperature, humidity, etc.);

### **3. Specific Matters Related to Conservation and Management**

#### **(1) Common Approaches to Management and Usage for the Islands, and Important Matters**

Amami-oshima and Tokuno-shima are inhabited by many precious wildlife species, such as Amami-no-kurousagi hare, designated by the national government as Nationally Endangered Species of Wild Fauna or Flora and Special Natural Monuments, and Amami-togenezumi spiny rat (*Tokudaia osimensis*) and Tokuno-shima spiny rat (*Tokudaia osimensis*), both designated as Natural Monuments.

For some of the wildlife, it is feared that habitat conditions are deteriorating with illegal digging of rare orchids or other plants, poaching for insects, invasion into forests of goats, dogs, and cats that have gone wild (feral goats, dogs, and cats), and alien species, and traffic accidents that claim lives of Amami-no-kurousagi hares, frogs, and other animals prowling on the ground. It is also feared that in Kinsakubaru and some other areas, increased tourists and concentrated visits may end up with forest ecosystems being overused, and consequently deteriorated.

To preserve precious forest ecosystems in Amami-oshima and Tokuno-shima, work must be done in cooperation with organizations concerned to limit impact of human activities on them to the lowest possible

level by performing regular monitoring of impact of alien species and utilization, so that any findings will be evaluated and reviewed to implement necessary measures ("adaptive administration"). For other important issues, such as eradication of exotic animals, appropriate husbandry of reared animals, and countermeasures against illegal digging and poaching of rare orchids and insects, cooperation must be built between relevant administrative agencies, landowners, and residents to carry out enhanced surveillance, monitoring of rare species, and other appropriate solutions under the prefectural ordinance for protection of rare species or other regulations.

Around the tops of Mt. Yuwan-dake, Mt. Amagi-dake, and Mt. Inokawa-dake lies vegetation similar to the mist forest, serving as important habitat for rare plants. As these environments may be sensitive to climate change, shifts in vegetation and weather conditions must be monitored over years to take measures for adaptation when necessary.

When used for tourism, areas that expect a large number of visitors must be surveyed to recognize current conditions for preventing excessive use from giving damage to precious natural environments, and taking necessary measures in cooperation with agencies concerned and other stakeholders.

Specific measures must be planned and implemented based on the policy of the Conservation Management Plan, in coordination with agencies concerned.

## **(2) Points to Note on Management and Use in Individual Islands**

### **( i ) Amami-oshima**

In Amami-oshima, the Forest Ecosystem Reserve is composed of three small stretches of land, Kinsakubaru, Kamiya, and Hatsuno, separated between them and surrounded by private forests. They are relatively easy to access from urban areas, with forest roads running through each of them down the middle. That leads to worries about excessive use of the Reserve for tourism that may burden natural environments there, and illegal digging and/or poaching of rare species, such as orchids and other plants, and insects. To address these potential problems, effort must be exerted to enhance monitoring surveys and surveillance activities in cooperation with agencies concerned, and conduct public relations and awareness raising activities for local people and other stakeholders. Artificial forests of cedar and stands of Ryukyu-matsu pine must be surveyed to recognize the state of vegetation transition and take appropriate measures when necessary.

### **( ii ) Tokuno-shima**

In Tokuno-shima, the Forest Ecosystem Reserve is composed of two stretches of land, Northern and Middle Tokuno-shima, separated between them and surrounded by private forests, with sugar cane fields and other sites lying close to them at some parts. Both have forest roads going through them, but vastness of the stretches leaves some parts less accessible or conspicuous. The forests are inhabited by many endemic and rare species, such as Amamino-kurousagi hare, and it is feared that illegal digging and poaching of rare species, illegal dumping, and other acts may give harmful impact on the forest ecosystems. To address these potential problems, effort must be exerted to enhance monitoring surveys and surveillance activities

in cooperation with agencies concerned, and conduct public relations and awareness raising activities for local people and other stakeholders.

#### **4. Specific Challenges for Forest Conservation and Management**

##### **(1) Issues Related to Management**

##### **( i ) Protection of Rare and Endemic Species**

For Amami-oshima and Tokuno-shima, what is important is measures to address illegal digging of rare orchids or other plants, poaching for insects, invasion into forests of goats, dogs, and cats that have gone wild (feral goats, dogs, and cats), and alien species, and traffic accidents that claim lives of Amami-no-kurousagi hares, frogs, and other animals prowling on the ground. For that purpose, effort must be exerted to conserve and manage forest environments, so that rare and endemic species will continue living and growing there, and patrol and monitoring surveys must be conducted to recognize habitat conditions and the current state of forests, and measures must be taken for protection and conservation when necessary. As measures to prevent illegal digging and poaching, a legal framework of regulation has been built with local ordinances with a view to enhanced deterrent. Further effort must be taken for raising awareness of compliance, facilitating detection and reporting of illegal acts, and enhancing the setup for surveillance and crackdown in cooperation with agencies concerned and other stakeholders.

##### **( ii ) Measures to control alien species**

In Amami-oshima and Tokuno-shima, several exotic plants (trees and bamboos) - shinaabura-giri paulownia (*Vernicia cordata*), sennenboku palm (*Cordyline fruticosa*), futomomo myrtle (*Myrtaceae*), kusunoki camphor tree (*Cinnamomum camphora*), and horaichiku bamboo (*Bambusa multiplex*) — are identified. Many alien herbs are also identified there, and some of them - America-hamaguruma creeping-oxeyes (*phagneticola trilobata*), ookinkei-giku tickseed (*Coreopsis lanceolata*), botan-ukikusa water lettuce (*Pistia stratiotes*), and hotei-aoi water hyacinth (*Eichhornia crassipes*) - are designated as Specified or Monitored Foreign Organisms. Among introduced animals identified there are furi mongoose (*Herpestes auropunctatus*), inoshishi wild boar (*Sus scrofa*), feral goat, dog, and cat, suppon soft-shelled turtle (*Pelodiscus sinensis*), ushi-gaeru frog (*Rana catesbeiana*), and haiirogoke-gumo widow spider (*Latrodectus geometricus*).

In the Forest Ecosystem Reserve, most of the alien plants have so far invaded only into gaps or other places altered by humans, such as those along forest roads, with only a few having taken hold inside forests. Measures to control alien species must be implemented with a view to reducing their impact on native species. For that purpose, surveillance must be conducted in cooperation with agencies concerned to keep watch on further invasion into natural environments. For species that have already come and settled, measures to eradicate them, or to control in some other way, must be carried out according to the order of priority set between them based on their impact on natural environments and ecosystem services.

Eradication or any other solution must be carried out with a well-defined, realistic target set for it, while reviews must also be performed along the process to verify its effectiveness. Care must also be paid to the possibility that eradication of a specific alien species might cause increases of others.

To prevent people from bringing any alien species into the Forest Ecosystem Reserve or other places in the course of their activities, intentionally or by accident, public relations and awareness raising activities must also be performed in cooperation with agencies concerned.

### **(iii) Treatment of artificial cedar forests**

The Amami Islands Forest Ecosystem Reserve has about 130 hectares of artificial cedar forests lying in it. To restore them into natural vegetation, forest management, which should also include maintenance of habitat environments for rare wildlife, must be implemented for the Reserve, which, for that purpose, must be divided into, for instance, areas shown below, with locations of the forests, composition of tree species, geographic distribution of rare wildlife, expected time frame needed for restoration, and other relevant factors taken into account in a comprehensive manner:

- (A) Area of forests that should be restored through forest operations; and
- (B) Area of forests that should be left going through natural transition;

Specific ways of restoration must in principle be picked out among methods that make the best of the potential nature itself has for restoration, instead of artificial sowing or planting. When restoration is difficult to achieve in such a manner, some appropriate measures must be considered to facilitate restoration.

A restoration method adopted for each area must be reviewed in model districts for that purpose by examining transition of vegetation after operations, habitation of endangered species, and other conditions. For the review, experts must be consulted.

### **(iv) Measures to control pests**

Pine weevils, which harm Ryukyu-matsu pine trees, must be eradicated, or trees damaged by the insect must be cut down, or other necessary measures must be taken to prevent damage from further spreading and/or damaged trees from helping cause other disasters. Once such steps are completed, damaged sites must be left going through natural transition, while monitoring surveys or other inspections must be carried out for places inhabited by rare species which it is feared have been impacted by the damage or those conspicuously invaded by alien species as a result of the damage, to take additional measures for them when necessary. Monitoring surveys or other inspections must also be carried out on damage caused by other pests, such as kashino-nagakikuimushi wood borer (*Platypus quercivorus*) to take action when necessary.

### **(v) Conservation of water resources**

The Amami Islands, despite frequent typhoons passing through and a large amount of precipitation, are poor in water-retaining capacity, which makes the Forest Ecosystem Reserve all the more important for functions it has to perform in water conservation and forest disaster prevention. Islands characteristically

give the highest priority to conservation of water resources, and for Amami as well, forests lying around rivers must be included in initiatives to be carried out for that purpose.

## **(2) Issues Related to Usage**

The Amami Islands Forest Ecosystem Reserve is used for many activities, including recreation, environmental education, commerce, research and survey, and regional development and succession of tradition. Impact of the usage on indigenous ecosystems there must be mitigated with measures that should be adopted and implemented in cooperation with agencies concerned to keep a good balance between usage and protection. Especially great care must be paid when the Reserve is used for environmental education, research and survey, and regional development and succession of tradition, among others, to avoid any harmful impact on rare wildlife species or forest ecosystems.

### **( i ) Usage by ordinary people**

From the viewpoint of mitigating impact on natural environments and securing safety, tourists and other ordinary people coming there to climb a mountain or for any other purpose must use designated pathways only, which must be a public road or other land under the control of an identified administrator, with lease or other necessary procedures completed for that purpose.

### **( ii ) Usage for research and survey**

Researchers and any other people who would like to enter a forest there for research or survey must file an Application for Entrance into National Forests and other necessary documents for permission before going there, and once allowed to, they must in principle go on pathways only up to the destination, and conduct research and survey according to conditions with which the permission has been granted.

### **( iii ) Usage for forest environment education**

Those who would like to enter a forest there for forest environment education must file an Application for Entrance into National Forests and other necessary documents for permission before going there, and once allowed to doing so, they must go on pathways only. In Conservation and Utilization Zones, however, they may use routes other than pathways, only when circumstances compel it, according to conditions for the permission. (In Preservation Zones, they are not allowed to go out of pathways.)

### **( iv ) Usage for regional development and succession of tradition**

Entrance into forests for regional development and succession of tradition, including hunting, is allowed in principle only when they are located in a Conservation and Utilization Zone, and those allowed to enter must, despite no specific route designated for them, act according to conditions with which the permission has been granted.

Those entering a forest for hunting or other similar purposes must file a Forest Entrance Notification, and carry a Receipt for it in their vehicle or in other appropriate manners. Those who would like to enter a forest for regional development and succession of tradition other than hunting must file an Application for



Entrance into National Forests and other necessary documents for permission, and may go there only when successfully permitted to.

**(v) Entrance into forests in case of emergency**

No restriction is placed on routes used to enter forests in case of emergency, such as searching for victims of an accident.

**(vi) Others**

Bonfires are prohibited in the entire area of the Forest Ecosystem Reserve. However, stoves or other burners that use no naked flame on the ground may be used only in places with no surface vegetation or fallen leaves piled on the ground, and therefore there is no fear of a forest fire occurring.

## **5. Promotion Systems**

**(1) Review Committee**

Issues related to implementation or review of the Conservation Management Plan for the Amami Islands Forest Ecosystem Reserve must be deliberated by the Review Committee for Conservation Management of the Amami Islands Forest Ecosystem Reserve, set up according to the Guidelines for the Establishment of the Review Committee for Conservation Management of the Amami Islands Forest Ecosystem Reserve.

**(2) Monitoring Survey and Patrol**

For conservation of forest ecosystems, monitoring surveys, patrols, and other necessary activities must be conducted in a systematic manner. Plans for monitoring surveys and other activities, and their findings, must be reviewed by panels of experts or other relevant persons, so that conservation and management will be performed in an appropriate manner. Monitoring surveys and other activities must be conducted in cooperation with agencies concerned, research organizations, and volunteers, among others, and/or in other productive ways, and data and information obtained there must be shared and stored in an appropriate manner to keep them available into the future.

Among other tasks that must also be performed in cooperation with agencies concerned and other stakeholders are patrol for examining the state of habitation of Amamino-kurousagi hares and other rare wildlife species, maintenance and improvement of their habitat environments, and patrol for preventing illegal digging of rare species.

**(3) Public Relations and Awareness Raising**

For collecting and managing a range of data, and making available outlines of survey results, achievements of initiatives, and other information for ordinary people to raise their awareness, work must be performed, as part of public relation, to install signs and markings, issue PR magazines, carry the information on websites, and provide forest environment education or other opportunities in cooperation with agencies concerned and other stakeholders.

Information about locations of rare species must be managed in an appropriate manner for preventing illegal digging and/or poaching by, for instance, keeping it secret in principle.

**(4) Cooperation with Agencies Concerned, Volunteers, and Other Stakeholders**

Conservation and management of the Forest Ecosystem Reserve requires cooperation with government agencies concerned, research institutions, local organizations, and other stakeholders as an essential element. Closer cooperation must be developed with them, and volunteers must also be offered opportunities to play active roles in, for instance, patrols to guard wildlife species.

Cooperation must be offered to the Council for Promotion of Ecotourism in the Amami Islands in their effort to build and promote an Eco-tour Guide Qualification System they are preparing.

**(5) Alignment with the World Heritage Conservation and Management Plan**

Now that Amami-oshima and Tokuno-shima are listed as a World Natural Heritage candidate site, measures for conservation and management of the islands are being considered. They must be implemented in coordination with this Plan, as well as the Convention on Biological Diversity (Aichi Targets), the Montreal Process, and other international frameworks, and in cooperation with agencies concerned.

## **6. Others**

**(1) Continuity to be secured between forest ecosystems**

In the Amami Islands, national forests are each small in size, lying scattered, and one of the challenges to be addressed for the islands is securing continuity between forest ecosystems there. For that purpose, coordination must be promoted between national forests in Preservation Zones and private forests lying adjacent to them in forest conservation management. Specific Animal Habitat Protected Forests surrounded by private forests which turn out to have been managed at a level similar to that of Forest Ecosystem Reserves must be designated as Forest Ecosystem Reserves after prescribed procedures for designation have been completed.