Cane Toad (*Rhinella marina*) Control Plan for the Yaeyama Region of Okinawa Prefecture[1]

Formulated on June 3, 2005
Revised on April 1, 2011
Naha Nature Conservation Office, Ministry of the Environment

1. Control objective

The Yaeyama Region is home to many endemic species, including Iriomote cat (*Prionailurus bengalensis iriomotensis*) found in Iriomote Island, and features a distinctive biota and unique island ecosystems developed as the result of the limited geographic space and the long-term isolation. These ecosystems are extremely vulnerable to human activity and alien species. Alien species control is therefore essential to their conservation.

Cane toads (*Rhinella marina*) are the subject of control under this plan. Efforts were initiated in FY 2001 to monitor this species on Iriomote Island and control them on Hatoma island. Since FY 2005, data on their status or on their invasion into islands in the Yaeyama Region has been gathered and island-specific measures implemented in accordance with a cane toad control plan. Based on these past efforts, we will promote cane toad control measures for each island as follows:

(1) Ishigaki Island

Since Ishigaki Island is a center of traffic and transportation in the Yaeyama Region, we will seek to disseminate the necessary knowledge and information to prevent toads spreading to outside areas. The effectiveness of control measures will be properly evaluated to reduce toad density.

(2) Iriomote Island and Yonaguni Island

[1] This plan was formulated by the Ministry of the Environment in accordance with the notice "Regarding the control of *bufo marinus* (cane toad)" from the Ministry of the Environment (Notice No. 54 of 2005 of the Ministry of the Environment) issued under the Invasive Alien Species Act (Article 11, paragraph 2).

These islands feature a rich natural environment that is home to many endemic species and must be kept free of cane toads. We will establish a proper monitoring system to achieve preventive control in the early stages in case of invasion.

(3) Other islands (Taketomi, Kohama, Kuroshima, Aragusuku, Hatoma, and Hateruma islands)
It appears possible to implement highly effective control measures since water bodies where cane toads can breed are limited. In this way, we will ensure that information on any cane toad discovered will be reported to a central point and prompt, proper action taken to achieve preventive control.

2. Controlled areas: Ishigaki City, Taketomi Town, and Yonaguni Town in Yaeyama County, Okinawa Prefecture

3. Period of control: From April 1, 2011, to March 31, 2016

4. Control methods

(1) Identify current status and other information
For Ishigaki Island, examine appropriate methods to identify the current status of cane toads; perform monitoring and identify density accordingly. For Taketomi, Kohama, Kuroshima, Aragusuku (comprising Kamiji and Shimoji islands), Hatoma, and Hateruma Islands, identify the location and environmental conditions for water catchment measures and other lentic water bodies that may serve as breeding grounds for cane toads.

(2) Examine actual damage
Seek to clarify the actual damage caused by cane toads to the native ecosystem, biodiversity, agriculture, forestry and fisheries, or human health.

(3) Identify invasion routes
Identify cane toad invasion routes within Ishigaki Island as well as from Ishigaki Island to other islands in the Yaeyama Region to prevent their spread to other areas within Ishigaki Island or to other islands.

(4) Establish monitoring and information systems

a. For Iriomote Island and Yonaguni Island, thoroughly control cane toads in the early stages of invasion by establishing a monitoring system to detect and capture any toads promptly upon invasion, based on the monitoring experience on Iriomote Island gained to date under the control plan.

b. On Taketomi, Kohama, Kuroshima, Aragusuku (comprising the Kamiji and Shimoji islands), Hatoma, and Hateruma Islands, suitable breeding grounds are found in limited lentic water bodies. Thus, perform periodic patrol inspections and establish information systems that any cane toads discovered by local residents will result in a prompt report and control measures.

(5) Capture

a. On Ishigaki Island, organize cane toad capture events that local volunteers participate in. Also, examine other effective capture programs and seek to establish a framework allowing enrolled local residents to capture cane toads throughout the year.
b. On the artificial land south of Ishigaki Island, capture any cane toads found in goods carried in by truck or other routes.
c. Strive to develop effective and efficient control techniques.

(6) Promote public awareness

a. Propagate information on control measures carried out under the control plan, including cane toad capture events, through printed matter and briefing sessions so that local residents will understand the significance of and cooperate with those measures.
b. Develop a learning program for cane toad control and have it incorporated into the education curriculum in cooperation with local schools.
c. To prevent human induced but unintentional invasion, establish and implement public awareness methods for informing and educating visitors, tourist agencies, carriers, and others.
d. Provide cane toads and their egg masses captured, destroyed, and stored, for use as teaching materials or samples for environmental or science education, academic research, and other such efforts.

5. Other

(1) Establish a cane toad control council

For this plan, establish a cane toad control council composed of academic expert, relevant administrative agencies, environmental conservation organizations, local residents, and so forth. This council will discuss and evaluate control measures based on scientific knowledge and local information, to implement effective control measures based on a local consensus.

(2) Review the control plan

This plan will be reviewed once every five years or so for appropriate implementation of cane toad control measures based on changes in natural and social conditions.