

Phase 2 Mongoose Control Plan for the Northern Part of Okinawa Island (FY 2013 to 2022)¹

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1. Subject of control

Small Asian Mongoose (*Herpestes javanicus*)

* The subject will change to the small Indian mongoose (*Herpestes auropunctatus*) following the revision of the relevant Cabinet Order; hereinafter referred to as "mongoose."

2. Controlled area

Northern part of Okinawa Island, Okinawa Prefecture

The "complete elimination area" in which efforts will be made to completely eliminate mongooses is the area north of the first northward migration prevention fence installed along the line running from Shioya, Ogimi Village through Fukuji Dam and Lake Fukugami to Odomari Bridge (the Shioya-Fukuji line; the "SF line" hereinafter). The area lying between the SF line and the second northward migration prevention fence installed along the line running from Shioya, Ogimi Village to Taira, Higashi Village (the Shioya-Taira line; the "ST line" hereinafter) is set as the "buffer zone" to block mongoose invasion from areas south of the ST line. Furthermore, neighboring areas south of the ST line where capture and other work are carried out to curb mongoose invasion into the areas north of the ST line are defined as the "controlled density areas." Areas south of the controlled density areas, including the City of Nago, will be defined, if necessary, as the "test areas" where capture and other work will be undertaken on a preliminary basis.

The complete elimination area, buffer zone, controlled density areas, and test areas together constitute a "control area."

¹ This plan was established by the Ministry of the Environment and Okinawa Prefecture in accordance with the notice "Regarding the control of small Indian mongooses" from the Ministry of Agriculture, Forestry and Fisheries and the Ministry of the Environment (Notice No.10 of 2005 of the Ministry of Agriculture, Forestry and Fisheries and the Ministry of the Environment) issued under the Invasive Alien Species Act (Article 11, paragraph 2).

Figure 1. Mongoose control area map (omitted)

3. Period of control

From April 1, 2013, to March 31, 2023

4. Background

Mongoose prey on Okinawa rails (*Gallirallus okinawae*), Okinawa spiny rats (*Takudaia muenninki*), and other native species, threatening the existence of endemic endangered wild animals of the northern part (called "Yambaru") of Okinawa Island. Removal programs were launched by Okinawa prefectural government in FY 2000 and by the Ministry of the Environment in FY 2001. Pursuant to the Invasive Alien Species Act enacted in FY 2005, a 10-year control plan leading up to FY 2014 was developed and control programs implemented accordingly. Intensive capture work and other measures undertaken so far have led to remarkable reductions in mongoose populations and density, as well as to a reduced distribution range. As the mongoose population has decreased, we have confirmed Okinawa rails and Ryukyu long-haired rat (*Diplothrix legata*) across more areas and in greater numbers. The Phase 1 control program was highly successful, as discussed above, but complete elimination from the northern part of Okinawa Island has not been achieved as of FY 2014 (Attachment 1; omitted).

Based on the evaluation of the control measures undertaken so far, we developed a Phase 2 mongoose control plan for the northern part of Okinawa Island ("Plan" hereinafter).

The control of mongooses from the northern part of Okinawa Island is regarded as a key program under and a progress indicator of the National Biodiversity Strategy of Japan 2012-2020 (Cabinet Decision in September 2012) and the Okinawa prefectural government's "Okinawa Strategy for Biodiversity" (established in March 2013). Therefore, the achievement of the objectives under this Plan is essential to these biodiversity strategies.

5. Control objective

The Plan objective is to achieve the complete elimination of mongooses from the complete elimination area, an area north of the first northward migration prevention fence installed along the SF line, by FY 2022, and to prevent the re-invasion of mongooses into this area, thereby recovering and maintaining the ecosystem of the Yambaru area, which features a unique endemic biota and many rare species, and eliminating the impact of mongooses on the ecosystem and minimizing long-term control costs.

6. Control system

This Plan will be implemented jointly by the Ministry of the Environment and Okinawa prefectural government in their respective roles. They will implement joint control measures, determining the division of work for each fiscal year, securing coordination between respective mongoose control programs, and sharing information. Trapping and monitoring will be performed systematically by the organized structure known as Yambaru mongoose busters (mongoose control specialists engaged since 2008; "mongoose busters" hereinafter) and other specialists.

In addition, dogs to detect mongooses ("detection dogs" hereinafter) will be retained and trained in cooperation with handlers (detection dog trainers).

7. Subsidiary objectives and action items

To achieve the Plan objectives, we set subsidiary objectives and action items as follows (Attachment 2 for the overall timeline).

(1) Objectives for complete elimination

Objective 1: Completely eliminate mongooses from the complete elimination area (Attachment 3 for more information; omitted).

Action 1-1. To achieve local eradication from one area to another and to move toward complete elimination, the complete elimination area is divided into eight eradication work areas, based on physical borders, such as rivers and dam lakes. Eradication work will begin from the eradication work area I (north), where current mongoose density is low.

Figure 2. Eradication work areas (omitted)

Action 1-2. Based on the results of trapping and monitoring in each eradication work area, we will (i) reduce mongoose density; (ii) eliminate survivors; (iii) confirm eradication; (iv) implement follow-up measures; and (v) keep the area free of mongooses.

Objective 2: Prevent re-invasion from areas south of the SF line.

Action 2-1. To minimize the risk of mongoose re-invasion from the buffer zone into the complete elimination area, we will perform intensive capture and monitoring in neighboring areas north of the SF line.

Action 2-2. To prevent northward invasion across the SF line, we will maintain a powerful capture pressure in the buffer zone.

Action 2-3. To reduce as much as possible opportunities for mongooses to invade into the buffer zone, we will perform capture work in the area on the south side along the ST line (controlled density areas) and reduce those approaching the ST line.

Action 2-4. Re-invasion prevention efforts in the buffer zone as well as in the area north of the SF line and the area south of the ST line must be continued, even after complete elimination from areas north of the SF line is achieved. Specific actions, including those for controlling alien snakes, will be examined and determined by FY 2022.

Objective 3: Recover the population and distribution range of native species.

Action 3-1: Evaluate recovery status based on changes in population density and distribution range of rare species by analyzing data from rare species recovery surveys, monitoring by mongoose busters, rare species by-catch, and other protection and recovery program surveys.

Action 3-2: Continuously accumulate data on rare species caught in mongoose traps to assess the latest by-catch risks. A review committee will discuss by-catch risks and countermeasures and modify the types of traps used, the time and place of trapping, and so forth to manage by-catch risk and consequently promote the recovery of population density and distribution range of rare species.

Action 3-3: Even after the complete elimination of mongooses is achieved, we will continue monitoring surveys other than by-catch information for a certain period to evaluate the recovery status of native species.

(2) Objective for effective control

Objective 4: Enhance the effectiveness of programs through the development and improvement of control techniques and methods.

Action 4-1: In cooperation with universities, research institutes, and business enterprises, we will develop new control techniques and methods, including more effective mongoose traps that at the same time are less likely to catch rare species and new baits and poisons; new monitoring techniques with high detection accuracy; and low-cost migration block fences that are easily installed to maintain the mongoose-free status of local areas.

Action 4-2: Introduce new techniques and methods developed or improved as above proven effective through demonstration tests.

Objective 5: Promote public awareness through various media so that the general public, including the local residents, will understand the significance of and cooperate in the control project.

Action 5-1: Periodically provide local residents with information and opportunities for exchanging opinions on project details, progress, and so forth, via publication, newsletters, briefing sessions, and exhibitions at the Yambaru Wildlife Conservation Center.

Action 5-2: Provide information on capture results, the recovery status of native species, and other project achievements through press releases and websites of the Ministry of the Environment and Okinawa prefectural government at appropriate times each year. We will also print and distribute brochures, posters, and other literature periodically, depending on the progress of the project, to inform and gain the cooperation of the citizens of Okinawa Prefecture and other regions.

Action 5-3: Provide information on project status and achievements in an intelligible way for progress evaluations under the National Biodiversity Strategy and Okinawa prefectural government's local biodiversity strategy.

Objective 6: Periodically evaluate the status and achievements of the control project and make necessary improvements.

Action 6-1: Establish a review committee and hold meetings twice a year to evaluate project achievements and progress by objective standards and identify aspects that need to be improved; modify the Phase 2 control plan based on committee evaluations and proposed improvements to enhance project effectiveness.

Action 6-2: Based on the committee's evaluations and proposed improvements, we will develop a project implementation plan for each fiscal year and execute the project accordingly.

Action 6-3: To completely eliminate mongooses, we must employ adaptive management measures appropriate to their population status and local conditions; therefore, we will review this Plan in the fifth year of the Plan (FY 2017) or whenever necessary based on the committee's discussions.

Plan time-line

| Control objective: | | Achieve the complete elimination of mongooses from the complete elimination area, an area north of the first northward migration prevention fence installed along the SF line, by fiscal 2022, and to prevent the re-invasion of mongooses into this area, thereby recovering and maintaining the ecosystem of the Yambaru area, which features a unique endemic biota and many rare species, and eliminating the impact of mongooses on the ecosystem and minimizing long-term control costs. | | | | | | | | | |
|--|--|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Fiscal year | | H25 2013 | H26 2014 | H27 2015 | H28 2016 | H29 2017 | H30 2018 | H31 2019 | H32 2020 | H33 2021 | H34 2022 |
| Objective 1: Completely eliminate mongooses from the complete elimination area | | | | | | | | | | | |
| Action 1-1: Divide the complete elimination area into eight eradication work areas and achieve local eradication in each area toward complete elimination, starting from the northernmost area. | | | | | | | | | | | |
| Action 1-2: Divide eradication work area into five stages based on mongoose population density, and implement the control measures for each area accordingly. | | | | | | | | | | | |
| Objective 2: Prevent re-invasion from areas south of the SF line. | | | | | | | | | | | |
| Action 2-1: To minimize the risk of mongoose re-invasion from the buffer zone into the complete elimination area, perform intensive capture and monitoring in areas north of the SF line. | | | | | | | | | | | |
| Action 2-2: To prevent northward invasion across the SF line, maintain a powerful capture pressure in the buffer zone. | | | | | | | | | | | |
| Action 2-3: To reduce as much as possible opportunities for mongooses to invade into the buffer zone, perform capture work in areas south of the ST line and reduce those approaching the ST line. | | | | | | | | | | | |
| Action 2-4: Continue re-invasion prevention efforts in the areas north of the SF line, buffer zone, and south of the ST line, after complete elimination is achieved. Specific actions, including those for controlling alien snakes, will be examined and determined by fiscal 2022. | | | | | | | | | | | |
| Objective 3: Recover the population and distribution range of native species. | | | | | | | | | | | |
| Action 3-1: Evaluate the recovery status from changes in the population density and distribution range of rare species, by analyzing data from rare species surveys. | | | | | | | | | | | |
| Action 3-2: Accumulate rare species by-catch data and assess the latest by-catch risks. A review committee will discuss by-catch risks and countermeasures and modify the types of traps used, the time for trapping, etc., to manage the by-catch risk for recovery of rare species. | | | | | | | | | | | |
| Action 3-3: Even after the complete elimination of mongooses is achieved, continue monitoring surveys other than by-catch information for a certain period to evaluate the recovery status of native species. | | | | | | | | | | | |
| Objective 4: Enhance the programs effectiveness through the development and improvement of control techniques and methods. | | | | | | | | | | | |
| Action 4-1: In cooperation with universities, research institutes, and business enterprises, develop new control techniques and methods, including more effective mongoose traps that at the same time are less likely to catch rare species, new baits and poisons; new monitoring techniques with high detection accuracy; and low-cost, easy-to-install migration block fences. | | | | | | | | | | | |
| Action 4-2: Introduce new techniques and methods developed or improved as above proven effective through demonstration tests. | | | | | | | | | | | |
| Objective 5: Raise awareness through various media so that the general public, including the local residents, will understand the significance of and cooperate in the control project. | | | | | | | | | | | |
| Action 5-1: Provide the local residents with project progress information periodically. | | | | | | | | | | | |
| Action 5-2: Announce project achievements via the press releases, websites, and print and distribute brochures periodically for public information. | | | | | | | | | | | |
| Action 5-3: Provide information on project status and achievements in an intelligible way as part of progress evaluations under the National Biodiversity Strategy and Okinawa prefectural government's local biodiversity strategy. | | | | | | | | | | | |
| Objective 6: Periodically evaluate the status and achievements of the control project and make necessary improvements. | | | | | | | | | | | |
| Action 6-1: Hold review committee meetings twice a year to evaluate project achievements and progress and identify what needs to be improved. Based on the committee discussion, modify the phase-2 control plan so that the project will be carried out more effectively. | | | | | | | | | | | |
| Action 6-2: Based on the committee's evaluations and proposed improvements, we will develop a project implementation plan for each fiscal year and execute the project accordingly. | | | | | | | | | | | |
| Action 6-3: Review this Plan in fiscal 2017 and whenever necessary based on the committee's discussions and in light of other issues. | | | | | | | | | | | |

