Final Environmental Assessment
Predator Control on Cocos Island, Guam

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LIST OF ACRONYMS AND ABBREVIATIONS

APHIS	Animal and Plant Health Inspection Service
BTS	Brown treesnake
CFR	Code of Federal Regulations
CI_	Cocos Island
CIR	Cocos Island Resort
CZMA	Coastal Zone Management Act
DNM	Dead Neonatal Mouse
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
GDOA	Guam Department of Agriculture
GDPR	Guam Department of Parks and Recreation
GDAWR	Guam Division of Aquatic and Wildlife Resources
GEPA	Guam Environmental Protection Agency
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NWRC	National Wildlife Research Center
SHA	Safe Harbor Agreement
T&E	Threatened and Endangered
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WS	Wildlife Services (USDA-APHIS program)

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Guam Department of Agriculture has embarked on a project to restore the Cocos Island (CI) ecosystem by removing non-native plants and animals. The project is cooperative in nature, utilizing expertise and resources from the U.S. Fish and Wildlife Service, the US. Department of Agriculture's (USDA) National Resource Conservation Service and the USDA Animal and Plant Health Inspection Service, Wildlife Services program (WS).

Guam Division of Aquatic and Wildlife Resources (GDAWR), Guam Department of Parks and Recreation, U.S. Fish and Wildlife Service (USFWS) and Cocos Island Resort (CIR) are working together on a proposed Safe Harbor Agreement (SHA) under Section 10(a) (1) (A) of the Endangered Species Act to enhance the habitat on CI in support of the establishment of federally-endangered Guam rails (*Gallirallus owstonii*) on the island. The goal of the proposed agreement is to establish six pairs of Guam rails on CI that fledge at least two clutches per year for the duration of the Safe Harbor Agreement.

The proposed Safe Harbor Agreement outlines the following management actions for habitat enhancement: eradication of rodents, reduction of monitor lizard populations, native forest regeneration/enhancement, and prevention/detection of incursions of brown treesnakes (BTS) and rodents onto CI. Objectives in the SHA include the monitoring of survivorship, habitat preference and nesting success of rails and the development and implementation of island quarantine procedures (i.e., Biosecurity Plan).

Cocos Island provides a rare opportunity for native flora and fauna recovery because it lacks ungulates and cats. However, high populations of rodents pose a risk of predation on Guam rail eggs and reduce the capability to detect and remove any incipient BTS population. Furthermore, high rodent densities can impact forest regeneration by directly consuming or damaging seeds, thereby reducing recruitment.

Wildlife Services is authorized by Federal law to manage wildlife that threaten natural resources, agriculture, and human health and safety. The Guam Division of Aquatic and Wildlife Resources has requested the assistance of the Wildlife Services program to assist with meeting some of the objectives of the Safe Harbor Agreement, specifically, eradicating rodents and controlling monitor lizards and BTS incursions.on Cocos Island.

1.2 Purpose

The purpose of this EA is to analyze the environmental effects of WS' proposed program and alternatives to predator control on Cocos Island.

Objectives The objectives of the proposed control program are to eradicate rodents and control monitor lizards and possible future BTS incursions on Cocos Island, Guam.

Decision to Be Made WS is the lead agency for this proposal and will make decisions based on this environmental analysis. The cooperating agencies have had input into the development of this EA (they have and who?). Based on the analysis contained in the EA, WS will answer these questions:

- How can WS and the cooperating agencies best respond to the need to provide a secure environment for the establishment of Guam rails through predator control and management techniques.
- What are the environmental concerns and consequences associated with each of the alternative strategies?
- Might the proposal have significant impacts and require the preparation of an Environmental Impact Statement

1.3 Need for Action

Introduced rodents have been responsible for an estimated 40-60% of all bird and reptile extinctions worldwide (Atkinson 1985). In addition, non-native rodents can have an adverse impact on island floral species (Campbell and Atkinson 1999, Smith et al. 2006), intertidal environments (Navarrete and Castilla 1993) and sea turtle nests and hatchlings (NMFS and USFWS 1998, Meier and Varnham 2004, Witmer et al. 2007, Caut et al. 2008). Numerous planned introduction/reintroduction of native species on oceanic islands have centered on the eradication of non-native mammals (Lovegrove et al. 2002, Bell 2002, McClelland 2002, Witmer et al. 2007). In order to successfully establish/re-establish a population of Guam rails onto Cocos Island (it is not known if rails were previously present on Cocos Island), predatory controls need to be implemented. This includes the eradication of rodents and possible suppression of monitor lizard (*Varanus indicus*) populations. Recent surveys and trapping for rodents on Cocos Island have only yielded one species of rodents: Polynesian rat (*Rattus exulans*) and two house mice (*Mus musculus*) which were hand caught by WS staff in the commensal setting (D. Vice, pers. comm.).

1.4 Biology

Polynesian rats are native to Southeast Asia, but currently occur throughout the central and western Pacific (Tobin 1994). Polynesian rats have slim bodies, pointed snouts, large ears and relatively small feet. Mature rats range from 11.5-15.0 cm long and can weigh from 40-80g. The tail is approximately the same length as the body and contains prominent fine scaly rings. Reproductive behavior is not known for this species on Guam, however, it seems to peak during the late summer months to mid-winter in Hawaii (Wirtz 1972). Females have an average of 4 litters per year, with a range of 3-6 young per litter. Captive Polynesian rats exhibited an average gestation period of 23 days. The life expectancy of wild rats is

less than 1 year. Polynesian rats are omnivorous, and thus eat a wide variety of foods, including plants, grasses, seeds and animal matter, to include bird eggs, hatchlings and small juvenile birds (Sugihara 1997).

Native to Central Asia, house mice can be found throughout the world in commensal settings (Timm 1994). The house mouse is small and slender, has a pointed nose, large ears and a nearly hairless tail with scale rings. Adult house mice range in length and weight from 14.0-19.0 cm and 11-22 g, respectively. Females may have from 5-10 litter per year, with an average of 5-6 young per litter and gestation periods of 19-21 days. Although house mice consume a variety of food items and generally prefer seeds and grain, recent studies have shown that they can have a significant impact on ground nesting bird populations (Cutbert and Hilton 2004, Wanless et al. 2007).

Monitor lizards range from Australia, New Guinea, Caroline Islands, Marshal Islands and Mariana Islands (McCoid et al. 1994). Monitor lizards on Guam can reach sizes of up to 58 cm (snout-vent length) and 2400g (Wikramanayake and Dryden 1988). McCoid (1993) reported captive females lay four eggs in a one week period. However, he also noted a road killed female that contained ten shelled eggs. Monitor diets include insects, birds and bird eggs, crabs, small mammals and other small lizards.

1.5 Location and Scope of Analysis

Location and Human Uses

Cocos Island is a 33.6-ha atoll-like island located 2.5 km southwest of Guam (Figure 1). The island is 1.93 km long and 0.15 km wide. The northeastern 24.8-ha of the island (approximately two-thirds) is privately owned and managed by CIR (Figure 2); a daytime only operation that primarily caters to tourists and limited local clients. Cocos Island Resort operations include aquatic recreational activities (e.g., parasailing, jet ski, introductory scuba and snorkeling), a restaurant, snack bar and go-cart rides. The numbers of visitors range from 50-400 daily, with a peak in arrivals around the summer months. The remaining 8.8-ha parcel is a park managed by Guam Department of Parks and Recreation (GDPR). GDPR requires permits for campers and although an average of two permits are issued per year, there is substantial unpermitted use, as reported by CIR staff.

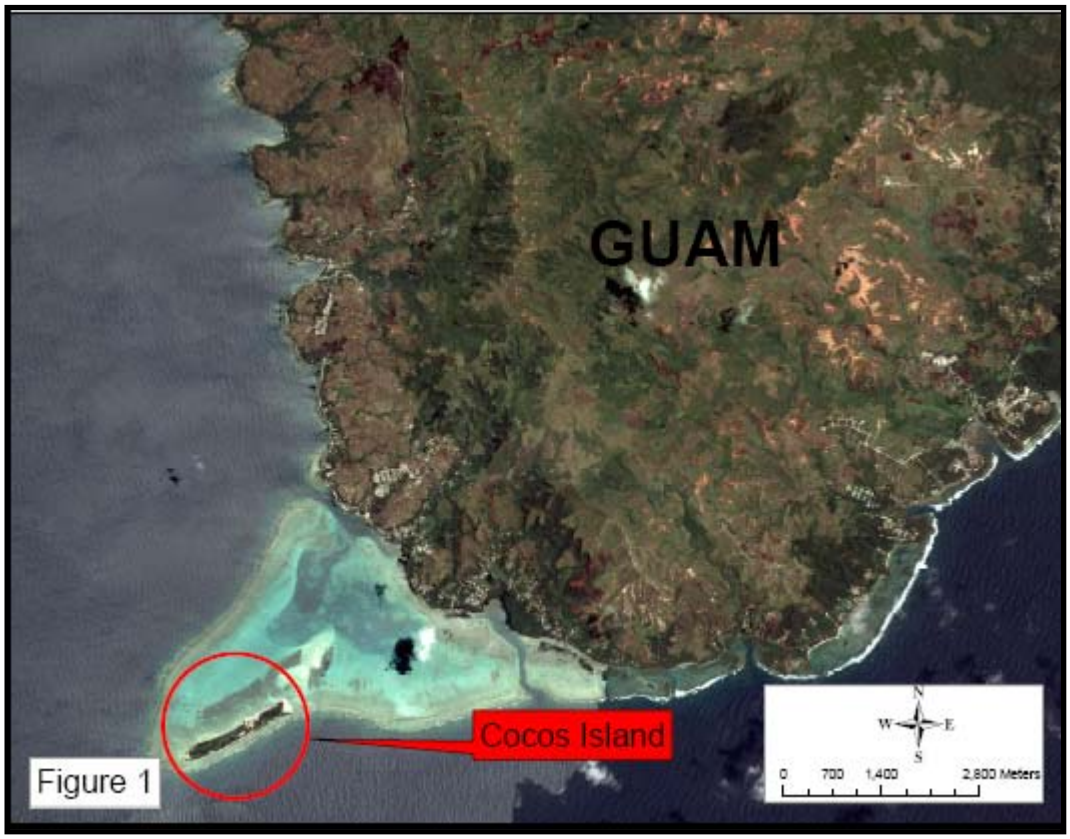

Figure 1

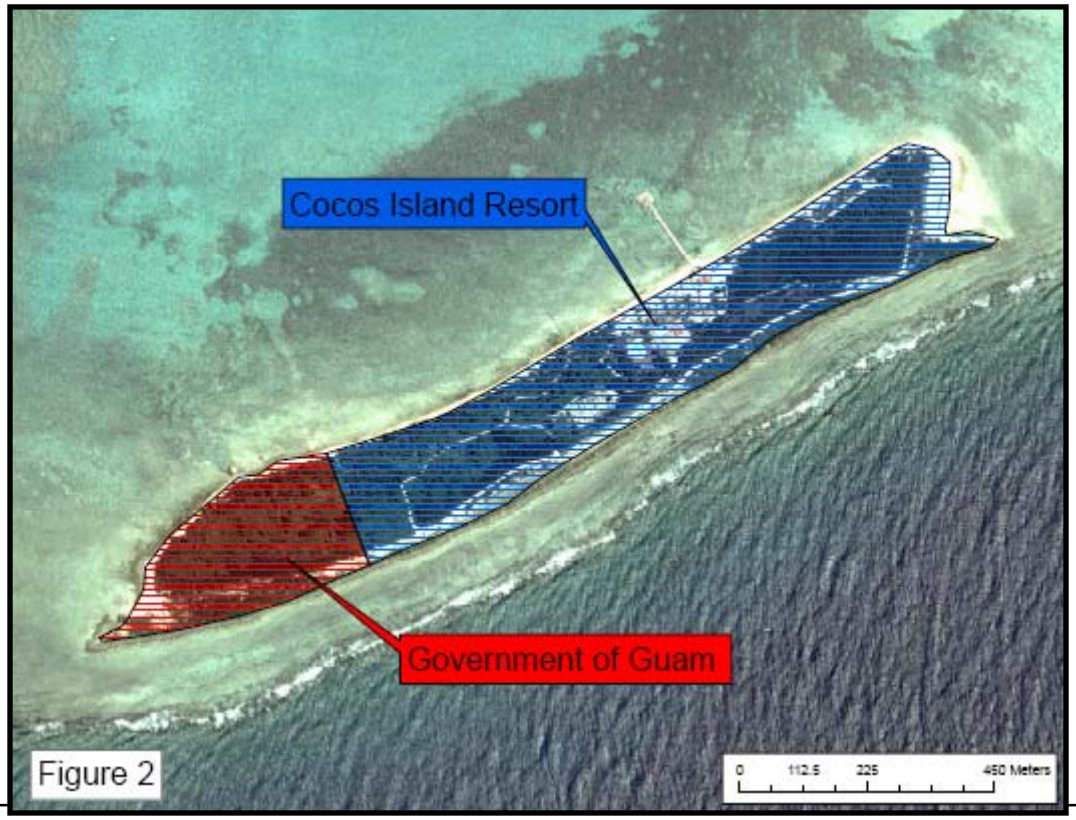

Figure 2

The Soils and Vegetation
Cocos Island substrate is described as Shioya loamy sand, which is deep to very deep, excessively drained soil found on coastal strands. The soil is mildly to moderately alkaline and its permeability is considered rapid. The vegetation on CI can be classified into the following types: Maintained resort/horticulture, *Casuarina* forest, *Pemphis* scrub, *Scaevola* scrub, and mixed strand forest. The *Casuarina* forest is dominated by *Casuarina equisetifolia*, with occurrences of mixed strand forest type species. The mixed strand forests type consists of *Cocos nucifera*, *Hernandia sonora*, *Guettarda speciosa*, *Merrilliodenron megacarpum*, *Morinda citrifolia*, *Intsia bijuga*, *Casuarina equisetifolia*, *Terminalia catappa*, *Tournefortia argentea*, *Carica papaya*, *Barringtonia asiatica*, *Hibiscus tiliaceus, Leucaena leucocephala* and *Thespesia populnea*.

Wildlife
Cocos Island supports breeding populations native wildlife species, including the locally endangered Micronesian starling (*Aplonis opaca*), native lizards, crustaceans and seabirds, and is a prime nesting site for federally threatened green (*Chelonia mydas*) sea turtles. Conversely, CI supports several non-native wildlife species, such as the Polynesian rat (*Rattus exulans*), monitor lizard (*Varanus indicus*) and possibly the house mouse (*Mus musculus*). Recent rodent trapping efforts have not detected other rat species (i.e., *Rattus rattus* and *Rattus norvegicus*) which are currently found on mainland Guam.

Scope
This EA analyzes the impacts of predator control on Cocos Island with the use of broadcast and bait station delivery of anticoagulant rodenticide bait and trapping. The EA also analyzes the impact of alternative methods of predatory control to include monitor lizard and BTS and current management methods (No Action Alternative).

1.6 Related Environmental Documents

ADC Programmatic Environmental Impact Statement (EIS). WS (formerly called Animal Damage Control (ADC)) issued a Final EIS on the national WS program (USDA 1997, revised). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

Brown Tree Snake Control Activities on Guam Environmental Assessment (EA). WS issued a Finding of No Significant Impact for BTS control activities on Guam (USDA 1996). Information on BTS control methods mentioned in the aforementioned EA has been incorporated into this EA.

Native Forest Birds of Guam and Rota of the Commonwealth of the Northern Mariana Islands Recovery Plan. United States Fish and Wildlife Service issued a final recovery plan which included the establishment of Guam rails in the wild on Guam as a recommended recovery action. The Safe Harbor

Agreement to establish rails on Cocos Island is intended to support the recovery action, and rodent control would be required to be successful.

1.7 Authority and Compliance

Based on agency relationships, missions, and legislative mandates, WS is the lead agency and decision maker for this EA, and therefore responsible for the EA's scope, content, and outcome. As cooperating agencies, the GDAWR and USFWS revise provided input to this EA and will provide advice and recommendations to the lead agency on when, where, and how predator control could be conducted.

1.7.1 Authority of Federal and State agencies in invasive species management

Wildlife Services The WS program is the Federal agency authorized to manage wildlife that threaten natural resources, agriculture and human health and safety Program authority is found in the Act of March 2, 1931(46 Stat. 1468; 7 U.S.C.426-426b and 426c) as amended, and the Act of 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). WS is subject to the Endangered Species Act (ESA) which requires Federal agencies to use their authorities to conserve threatened and endangered (T&E) species. NEPA reference is restated below and not needed here.

Guam Division of Aquatic and Wildlife Resources
The Division of Aquatic and Wildlife Resources, Guam Department of Agriculture is responsible for the management of all aquatic and terrestrial resources for the people of the Territory of Guam.

U.S. Fish and Wildlife Service Regulations listing species found to be injurious under the Lacey Act are in 50 CFR, part 16. The USFWS is charged with implementation and enforcement of the ESA of 1973, as amended and with developing recovery plans for listed species. Safe Harbor Agreements are approved and administered by the USFWS and are voluntary agreements between the USFWS and cooperating non-Federal landowners. They are designed to benefit federally endangered and threatened species by giving landowners assurances that at no future time would the USFWS impose restrictions on their land as a result of conservation actions on their part. The USFWS cooperated with WS and GDAWR, by recommending measures to promote the recovery of T&E species. The USFWS also makes recommendations to avoid or minimize take of T&E species.

1.7.2 Compliance with Federal Laws and Executive Orders

Several Federal laws regulate wildlife damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate. The following Federal laws and executive orders are relevant to the actions considered in this EA and with the public review process:

National Environmental Policy Act NEPA requires that Federal actions be evaluated for environmental impacts, that these impacts be considered by the decision maker(s) prior to implementation, and that the public be informed. This EA has been prepared in compliance with NEPA (42 USC Section 4231, et seq.,); the President's Council for Environmental Quality Regulations, 40 CFR Section 1500 – 1508, APHIS NEPA Implementing Regulations, and WS NEPA policy.

Invasive Species (Executive Order 13112) The Invasive Species Executive Order (EO) directs Federal agencies to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health.

Coastal Zone Management Act. The Coastal Zone Management Act (CZMA) was enacted on October 27, 1972, to encourage coastal states, Great Lake States, and United States territories and commonwealths to develop comprehensive programs to manage and balance competing uses of and impacts to coastal resources. Federal consistency is the CZMA requirement where federal agency activities that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone must be consistent to the maximum extent practicable with the enforceable policies of a coastal state's federally approved coastal management program.

Endangered Species Act. It is Federal policy, under the ESA, that all Federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA (Sec.2(c)). Section 7 consultations with the USFWS are conducted to use the expertise of the USFWS to ensure that "any action authorized, funded, or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species. Each agency shall use the best scientific and commercial data available" (Sec. 7(a)(2))

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods integrated into any selected program as implemented by APHIS-WS or other cooperating agencies must be registered with and regulated by the EPA (FIFRA Section 3) and the Guam Department of Agriculture (GDOA), and used in compliance with labeling procedures and requirements. Section 18 of the FIFRA authorizes EPA to allow an unregistered use of a pesticide for a limited time if EPA determines that an emergency condition exists. The regulations governing Section 18 of FIFRA, define the term "Emergency

Condition" as an urgent, non-routine situation that requires the use of a pesticide(s). In addition, States have authority under Section 24(c) of FIFRA to add uses to EPA registered pesticides based on special local needs. The proposed action would be conducted under Section 3.

Animal Damage Control Act and the Rural Development, Agriculture, and Related Agencies Appropriations Act The Acts authorize and direct WS to reduce damage caused by wildlife in cooperation with other agencies.

Impacts on minority and low income persons or populations (Environmental Justice and Executive Order 12898) EO 12898 requires Federal agencies to make Environmental Justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low income persons or populations. All of WS activities are evaluated for their impact on the human environment and compliance with EO 12898 to ensure Environmental Justice.

Lacey Act (16 U.S.C. 3371 *et seq.*) The Lacey Act has implications for regulating introductions of invasive species. This law, administered by the Secretaries of the Interior, Commerce, and Agriculture, generally makes it unlawful for any person to import, export, transport, sell, receive, acquire, or purchase (or attempt to commit any such act) in interstate or foreign commerce any fish, wildlife, or plant taken, possessed, transported, or sold in violation of any Federal, tribal, State, or foreign law. *Id.* § 3372 (a)(1), (2), (4). Thus, while the statute does not substantively grant authority to regulate the importation, transportation, exportation, or possession of any species, violation of another Federal, State, tribal, or foreign law governing these activities would become a violation of Federal law and subject to particular civil and criminal penalties. See *id.* §§ 3373, 3374. The Secretaries of the Interior and Commerce have the authority to enforce laws involving fish and wildlife, while the Secretary of Agriculture has the authority to enforce laws involving plants.

National Historic Preservation Act (NHPA) of 1966 as amended (6 U.S.C. 470 et seq.) The NHPA requires: 1) federal agencies to evaluate the effects of any federal undertaking on cultural resources, 2) consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes or Native Hawaiians to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings.

Protection of Children from Environmental Health and Safety Risks (EO 13045). Children may suffer disproportionately from environmental health and safety risks, including their developmental physical

and mental status, for many reasons. EO 13045 stipulates that each Federal agency shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

1.7.3 Territory of Guam laws

Endangered Species Act of Guam The Endangered Species Act of Guam provides authorization for the protection and conservation of resident endangered or threatened species. The Act authorizes the Guam Department of Agriculture to annually promulgate a list of endangered species and to conduct research and management actions in cooperation with federal or other local agencies for the conservation, protection and enhancement of listed species. Guam Department of Agriculture is authorized to issue permits for actions that lead to the enhancement, conservation and survival of listed species.

Guam Pesticides Act Amended under P.L. 29-26, the Guam Pesticides Act authorizes the Guam Environmental Protection Agency (GEPA) to regulate the importation, production, sale, distribution, use and application of pesticides used on Guam that are registered with the U.S. EPA. The Act also authorizes GEPA to implement and enforce such regulations.

CHAPTER 2: DESCRIPTION OF ALTERNATIVES

2.1 Alternative 1 – Integrated Predator Control with Rodent Eradication via Trapping, Hand Broadcast of Diphacinone and if Necessary, Brodifacoum, and Brodifacoum Bait Stations, Monitor Lizard Control via Trapping and Shooting and BTS Control via Trapping and Toxicants (Preferred Alternative)

2.1.1 General Strategy

The proposed action is an integrated pest management approach wherein the most effective, selective and environmentally desirable method or combination of methods allowed under this alternative would be tailored to site-specific field conditions. Based on variables encountered in the field such as location, land use, vegetation type, and rodent infestation levels, the WS biologist would decide which of the allowable direct control methods, as well as technical assistance (advice or recommendations) would be most suitable.

2.1.2 Rodent trapping

Snap traps, sticky traps and cage traps would be used in and around the resort area prior to rodenticide use. In addition, rodent trapping would occur in places where rodenticides may pose a health hazard, such as food preparation areas. Traps would be set and checked daily.

2.1.3 Hand broadcast of diphacinone and if necessary, brodifacoum

Diphacinone bait would be hand broadcast throughout the forested areas on the island at an application rate of 13.8 kg/ha, in accordance with the directions specified on the label (Diphacinone 50 Conservation, USEPA Reg. No. 56228-35). The bait is a cereal-based pellet that contains 0.005% diphacinone and has been shown to be highly palatable to rodent species. The bait is dyed green to deter non-target birds from consuming the pellets. Broadcast would be accomplished by walking along transects and spreading the rodenticide at 10m marked intervals. WS would broadcast bait in two pulses, each approximately 5-7 days apart. In accordance with the approved label (Appendix B), follow-up baiting may be applied, as needed, in locations where rodent activity is detected. The bait will only be hand broadcast within the land areas, within 5m of the mean high tide mark.

WS staff will be trained on hand broadcast procedures and several practice runs would be staged, to ensure the proper sowage rate would be broadcast at each 10m interval. The amount of bait applied at each station would be

derived by calculating the following:

$$\frac{\text{(Application rate (g)/ 1 hectare X station size (100m}^2\text{))}}{\text{Mean mass of pellet (g)}} = \text{\# of pellets per 100m}^2$$

Once calculated, the number of pellets required for each 100m² will be placed in a plastic cup and the fill line (the line where bait reaches the lip of the cup) will be marked. This fill line will be used as a guide for baiters. Baiters would disperse the bait in the calibrated cups all around the marked station, and will make every effort to broadcast bait in a systematic manner such that bait is spread out within the 100m² around each station. This would be accomplished by breaking up each station into 4 imaginary quadrants and dispersing bait equally within each quadrant (see Figure 3).To further ensure proper sowage rate, random 1m² plots will be sampled on baited areas during baiting and bait pellets within plots will be counted. If there is major deviation from the approved sowage rate, the baiter will be informed to reduce/increase their sowage rate and/or broadcast dispersal methods.

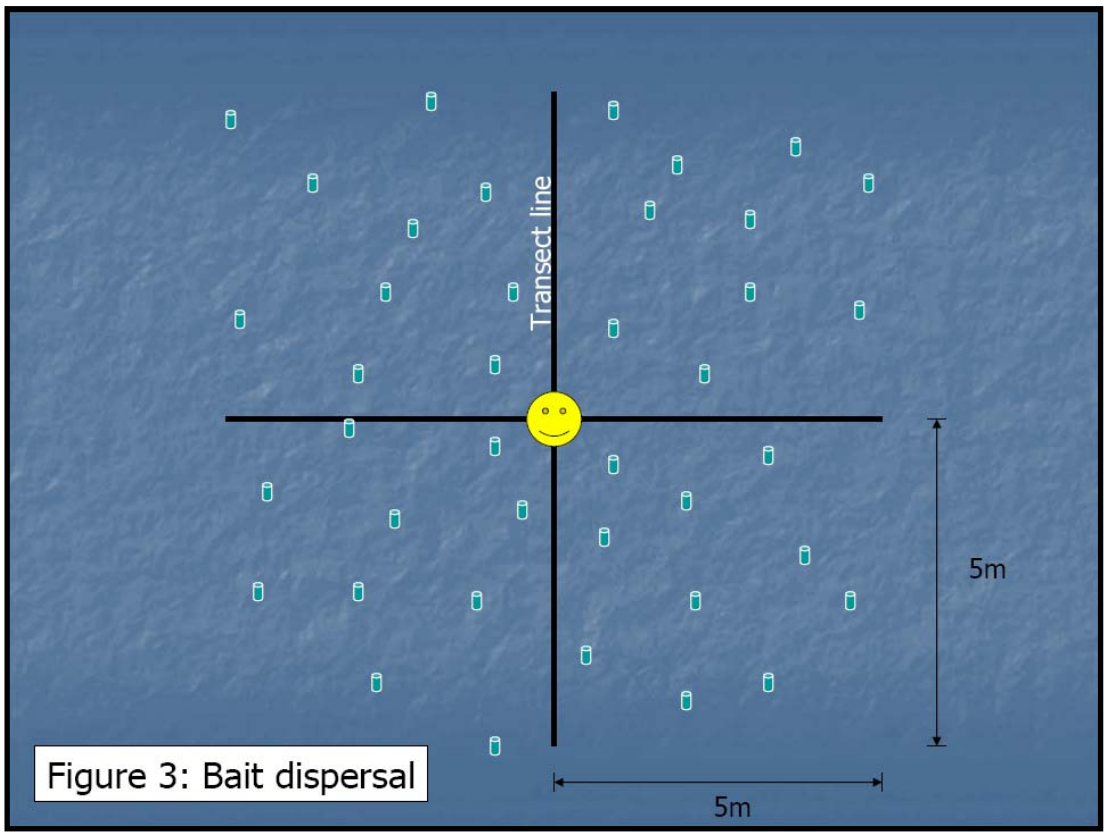

Figure 3: Bait dispersal

All baiting would be supervised by a licensed pesticide applicator. Bait will be handled in accordance with the approved label and WS Directive 2.401, which outlines the handling, storage, disposal and recordkeeping requirements for all pesticides used in WS operations (Appendix C). Leftover bait and bait containers will be removed from the island and disposed of properly.

In the event that eradication is not achieved, WS would hand broadcast brodifacoum bait in the same manner described above. However, only one baiting event would be required. WS is currently working with the USEPA to register brodifacoum bait for broadcast use on off shore islands. No brodifacoum bait would be broadcast until the product is registered by the USEPA. All label precautions would be followed.

2.1.3.1 Transects

Transect cutting throughout the forested areas on CI would be required. The 1m wide transects would be spaced 10m apart and run Northeast-Southwest. Cutting would be limited to trimming of trees and brush. No trees and/or saplings would be completely trimmed/killed. WS would work with Guam Division of Forestry and Soil Resources to identify species of concern, if any, to avoid during transect cutting process.

2.1.4 Bait Stations

Bait stations would be deployed in commensal settings around the immediate vicinity of the resort area at a spacing of 10m (see Figure 4). Stations would be baited with brodifacoum bait (Havoc Chunks, USEPA Reg. No. 61282-27) and refilled weekly according to labeled specifications (Appendix B).

Figure 4: Bait station grid

Bait stations consist of a Protecta© bait box (29.2cm x 30.5cm x 16.5cm) attached to the top of a bucket (paint pail) to exclude crabs (Figure 5). The modified bucket bait stations may be fitted with a plywood platform, and will be weighted down with rocks to prevent large coconut crabs (*Birgus latro*) and monitor lizards from toppling over the station.

Figure 5: Modified bait station

The modified bait stations would be set out every afternoon throughout the resort area, after CIR patrons have left the island (1600-1900). Bait stations would be removed and stored each subsequent morning, prior to the arrival of guests (0600-0900).

2.1.5 Carcass Removal

WS personnel would daily remove carcasses from the island at daybreak for the duration of the project. All carcasses would be transported off island and disposed of at the local landfill. Injured or near-death rodents would be humanely killed and removed.

2.1.6 Post Eradication Monitoring

Modified bucket-style tracking stations, wax indicator blocks and permanent bait stations would be utilized to monitor the island for sign of rodent incursions. The before-mentioned monitoring devices would be deployed in strategic locations around the island, or “hotspots”. Elsewhere, these

devices would be randomly placed and routinely rotated to ensure that island monitoring is accomplished. WS would inspect the devices on a weekly basis for rodent sign. In addition, WS would train CIR staff on how to detect rodent sign.

2.1.7 Monitor Lizard Control

Live traps and air rifles would be used to control monitor lizards. Live traps would be the method of choice and deployed throughout the island. Air rifles would be used in forested areas only if necessary. At the request of the Guam Department of Agriculture, live trapped monitor lizards would be relocated off Cocos Island to areas pre-determined by GDA. All animals that could not be relocated would be appropriately euthanized, removed off the island and disposed of at the local landfill.

2.1.8 Rodent and/or BTS Incursion Response

In the event of a confirmed detection of rodent or BTS presence on CI, WS would respond with the following control tools:

Rodent response would entail the exclusive use of modified bucket bait stations to exclude endangered Guam rails, if established on the island. Stations baited with diphacinone would be strategically deployed throughout the island, concentrating on the location of the rodent sighting. Tracking tunnels would be used concurrently to monitor rodent activity and would assist in determining when rodent control would cease.

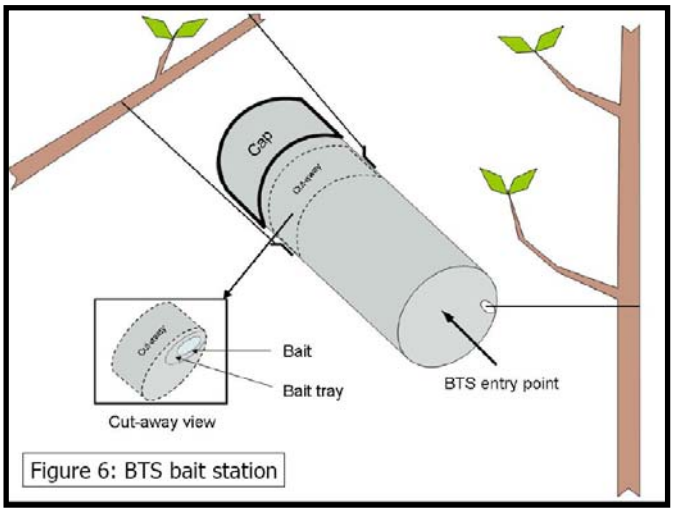

Figure 6: BTS bait station

BTS response will require the use of snake traps and bait station with acetaminophen for BTS control (USEPA Reg. No. 56228-34). Snake traps comprise a modified minnow trap, with a chambered dead mouse as an attractant. Bait stations are modified PVC pipes (5 cm x 30 cm) with a platform within the tubes that contains a dead neonatal mouse containing acetaminophen (Figure 6).

The snake traps and bait stations are hung on existing vegetation approximately 1.5m above the ground would be systematically placed throughout the island. Snake trap captures and bait tube take would determine the duration of control efforts.

2.2 Alternative 2 – Integrated Predator Control with Rodent eradication via Trapping, Brodifacoum Hand Broadcast and Bait Stations, Monitor Lizard control via Trapping and Shooting and BTS Control via Trapping and Toxicants

2.2.1 Rodent Trapping

Rodent trapping would be accomplished in the same manner described in Alternative 1.

2.2.2 Hand Broadcast of Anticoagulant Bait

Brodifacoum bait would be hand broadcast in the same manner as diphacinone described in Alternative 1 except that bait would be broadcast at an application rate of 18kg/ha and there would be only one broadcast event. WS is currently working with the USEPA to register brodifacoum bait for broadcast use on off shore islands. No brodifacoum bait would be broadcast until the product is registered by the USEPA.

2.2.2.1 Habitat Alteration

Transects would be established in the same manner described in Alternative 1.

2.2.3 Bait Stations

Bait stations would be deployed in the same manner described in Alternative 1.

2.2.4 Carcass removal

Carcasses would be removed in the same manner described in Alternative 1.

2.2.5 Post Eradication Monitoring

Monitoring would be accomplished in the same manner described in Alternative 1.

2.2.6 Monitor Lizard Control

Monitor lizards would be controlled in the same manner described in Alternative 1.

2.2.7 Rodent and/or BTS Incursion Response

Response to rodent or BTS incursions would be preformed in the same manner described in Alternative 1.

2.3 Alternative 3 - Current Program (No Action Alternative)

Under this alternative, WS would not change the status quo nor preclude the initiation of control actions in most areas by state or county agencies or individual landowners or individuals. No action, in this case, means limited Federal action, which is consistent with the CEQ's definition and requirement for a "no action" alternative. Under the "no action alternative", the Federal lead agency, WS, would not take any *additional* action to control or eradicate the rodents on Cocos Island. Rodent depredation on native flora and fauna would continue and GDAWR/USFWS plans for reintroducing the Guam rail would be seriously impacted.

2.4. Alternatives Considered but Not Assessed In Detail

2.4.1 Biological Control

Biological control remedies require careful long term study to ensure that control organisms do not cause unintended consequences to nontarget species or become a problem themselves.

Biological control, if implemented would be designed for control only and is not appropriate in this phase of the control and eradication plan. It is highly unlikely that WS would be involved in any biological control implementation. This option is not feasible at this time.

2.4.2 Mechanical Control

Rodent control would only include the use of snap traps, sticky (glue) traps and live traps. Traps would be baited at a predetermined saturation rate throughout the island. Captured rodents would be humanely killed, removed from the island and disposed of at a local landfill. This option is not feasible due to the high amount of man-hours required to sustain control operations for a lengthy period of time and the limited resources allocated to this project. Furthermore, the use of traps would increase the likelihood of failure, as not all rodents will enter traps and eradication programs must target all animals.

CHAPTER 3 - ISSUES IMPORTANT TO THE ANALYSIS OF IMPACTS

3.1 Issues Driving the Analysis

The following issues are used to drive the analysis in Chapter 4, Environmental Consequences. Each major issue will be evaluated under each alternative and the direct, indirect and cumulative impacts will be estimated where applicable. The cooperating agencies determined through interagency consultation and through initial public involvement that the following issues should be considered in the decision making process for this EA to help compare the impacts of the various alternatives management strategies.

- How effective might the various alternatives be in eradicating rodents? How do they compare in meeting the objectives of the proposal? What is the likelihood that rodents return after eradication has been accomplished? Can the program reach all areas where infestations occur? Relative program efficacy is used in addition to the environmental issues to help the public and decision maker compare the merits of the alternatives and determined which alternative would be most likely to meet the objectives of the proposal.

- What potential non-target impacts could occur from implementing predator control? Could the proposal affect threatened and endangered species or other sensitive species? Could it affect other non-target animals?

- What effects would control actions have on vegetation in the different targeted locations: introduced and indigenous plant communities found in the resort and natural areas?

- What effects would predator control have on health and human safety? Would the rodenticides used impact human health?

- What are the economic impacts of the various alternatives?

- What social values may be affected? How do members of the public feel about rodent eradication actions?

3.2 Issues Not Analyzed in Detail with Rationale

The actions discussed in this EA involve no construction, therefore the following resource values are either not affected, or are not expected to be significantly affected by any of the alternatives analyzed: geology, minerals, flood plains, and prime and unique farmlands. There are no significant irreversible or irretrievable commitments of resources. These resources will not be analyzed further.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions on the rodent eradication operational objectives identified in Chapter 1 and alternatives described in Chapter 2. This chapter uses the issues identified in Chapter 3 as the evaluation criteria. Each of the issues will be analyzed for its environmental consequences under each alternative.

Each identified major issue will be evaluated under each alternative and the direct, indirect and cumulative impacts will be estimated where applicable. NEPA describes the elements that determine whether or not an impact is "significant." Significance is dependent upon the context and intensity of the impact. The following factors were considered to evaluate the significance of the impacts on the human environment that relate to context and intensity (adapted from USDA 1997, revised for this proposal).

- magnitude of the impact (size, number, or relative amount of impact) (intensity)
- duration and frequency of the impact (temporary, seasonal impact, year round or ongoing) (intensity);
- likelihood of the impact (intensity);
- geographic extent; how widespread the program impact might be (intensity); and the legal status of a species that may be affected by the action (context)

4.1 Alternative 1 – Integrated Predator Control with Rodent Eradication via Trapping, Hand Broadcast of Diphacinone and if Necessary, Brodifacoum, and Brodifacoum Bait Stations, Monitor Lizard Control via Trapping and Shooting and BTS Control via Trapping and Toxicants (Preferred Action)

4.1.1. Effectiveness

Rodent eradication

Anticoagulant rodenticides are vitamin-K antagonists that disrupt normal blood-clotting mechanisms and induce capillary damage (Pelfrene 1991). Death results from hemorrhaging, and exposed animals generally exhibit weakness prior to death. Anticoagulants are grouped into two classes: first-generation (warfarin, chlorophacinone, diphacinone) and second generation (brodifacoum, bromadiolone, difethialone) compounds. First-generation anticoagulants are less acutely toxic and more rapidly metabolized and excreted, therefore multiple feedings are required for general population control (U.S.EPA 2004). Conversely, second-generation anticoagulants are more acutely toxic than the first-generation anticoagulants and are retained much longer in the body tissues of target animals.

Toxicant delivery strategies include bait stations, hand broadcast and aerial broadcast (Thomas and Taylor 2002). Cromarty et al. (2002) described three “pre-conditions” for successful rodent eradication: 1) all animals must

be put at risk by the eradication technique, 2) target animals must be killed at a rate exceeding their rate of increase at all densities and 3) immigration must be zero. Alternative 1 addresses these “pre-conditions”:

1) WS would incorporate a hand broadcast and bait station delivery program to ensure that all rodents are put at risk by making bait available throughout the island. The proposed action incorporates an eradication strategy that addresses both Polynesian rats and house mice. Successful rat and mice eradications have utilized bait station spacing of 50m and 25-50m, respectively (Clapperton 2006). However, Bramley (1999) suggested that 20-25m spacing may be necessary for Polynesian rats and Moro (2001) noted that 10m spacing may be more effective for mice. Targeting the mice population with a 10m spacing strategy would also impact rats. Transects on CI would be spaced 10m apart and the bait would be hand broadcast at 10m intervals along the transects. In non-broadcast areas, bait stations would also be spaced 10m apart.

2) The WS strategy will ensure that bait is readily available to all rodents in all inhabited areas for an extended period of time and should result in rodent mortality that exceed their fecundity.

3) WS has developed a “Biosecurity Plan” which outlines procedures and protocols to prevent incursions of unwanted invasive species. One of the goals of the Biosecurity Plan is to prevent incursions of other *Rattus* species (currently found on Guam) onto CI.

Although extremely effective at attacking rodents, second-generation anticoagulants are also highly toxic to non-target animals (Eason and Spurr 1995, Eason and Murphy 2001). First-generation anticoagulants have been used in rodent eradication programs when non-target animal loss is a great concern (Witmer et al. 2007).

Due to the concern with the highly toxic second-generation anticoagulants, research has been conducted in Hawaii to determine the efficacy of broadcast methodologies with diphacinone to control rodents in forested areas. Hand broadcast of diphacinone within two, 4ha plots yielded 100% kill of Polynesian rats, black rats and Norway rats (Lindsey and Forbes 2000). Spurr et al. (2003) broadcast 50 ppm diphacinone (Ramik Green ©) onto a 45.5ha forested area in Hawaii which resulted in the death of 100% of radio-collared rats within one week of the bait application. In a laboratory setting, 100% of wild caught Polynesian rats died after being fed bait containing 50ppm diphacinone over 8 days (Swift 1998).

Island eradications were successful when using bait stations containing diphacinone in Mexico (Donlan et al. 2002) and the U.S. Virgin Islands (Witmer et al. 2007). Although hand broadcast of diphacinone has never been used to achieve a successful island rodent eradication, the results from research in Hawaii indicate that this method can be highly effective and similar results can be expected. All baiting would occur in the dry season,

when rodent populations are reduced and food stressed, thus making the bait more palatable, increasing competition for the bait (Howald et al. 2007) and increasing the toxic affect of the rodenticide.

WS would use modified bucket tracking stations, wax indicator blocks and permanent bait stations throughout the island to monitor for eradication success. These devices have been used in other rodent eradications to determine rat presence on islands (Buckelew et al. 2005, Wegmann et al. 2007).

If eradication is not successful with the use of diphacinone, WS would conduct a follow-up hand broadcast of brodifacoum bait. Brodifacoum has been used in over 85% of successful rodent eradications worldwide (Howald et al. 2007), due to its high toxicity and persistence. Although this second generation anticoagulant is extremely effective at killing rodents, it also presents challenges if non-target species are present.

Monitor lizard control
Strategically placed live traps can control monitor lizards effectively. Effective bait includes cat or dog food, or any animal matter, as they are carnivorous (Dryden 1965). Opportunistic shooting with air rifles can provide an additional control tool, although it is not quite as effective as trapping.

Rodent reinvasion response
Modified bait stations would be deployed around rodent re-infestation sites to target initial populations before reestablishment occurs. As mentioned above, bait stations have been used to eradicate rodents in Mexico (Donlan et al. 2003) and modified bait stations (to exclude crabs) in the Virgin Islands (Witmer et al. 2007).

Brown treesnake incursion response
Wildlife Services, through its research and operation components, has found that acetaminophen deployed in a dead neo-natal mouse (DNM) is an effective toxicant for BTS (Savarie et al. 2000, Johnston et al. 2002). The use of acetaminophen as a toxicant for BTS has been approved by the EPA (EPA Reg. No. 56228-34) and is recommended as an environmentally safe toxicant for BTS rapid response programs (Colvin et al. 2005) Informal studies indicate that the DNM is especially attractive to smaller snakes. The traps currently used by WS typically catch BTS with an average SVL $\geq$ 900mm, whereas data collected in field trials shows BTS with an average SVL < 830mm. By integrating toxicants and trapping efforts WS can impact a greater portion of the BTS population providing immediate benefits to current areas of operation (Savarie et al. 2001).

Acetaminophen deployed as a toxicant, is in the form of an 80mg tablet that is manually or mechanically inserted into a DNM. This bait is then placed in a horizontal or vertical PVC tube and baits are changed twice a week, with old DNM carcass removed from the site in a plastic bag to be disposed of according to EPA regulations Bait station designs that minimize non-target entry while effectively targeting snakes would be used.

4.1.2. Impact on Non-target Species

Rodent eradication

The impact of anticoagulant rodenticides on non-target species has been well documented, as many rodent eradication programs have occurred in the presence of other non-target species, some considered locally rare or endangered (Garcia et al. 2002, Merton et al. 2002). Non-target uptake can be classified into the following categories: primary (direct exposure/uptake of poison) and secondary (consumption/exposure to primary). Exposure risk can be further classified based on the type of anticoagulant used, first (e.g., diphacinone) or second generation (e.g., brodifacoum). Eason and Spurr (1995) commented that the risk associated with primary and secondary poisoning is greater with second generation anticoagulants as opposed to first generation anticoagulants. Diphacinone would be delivered via hand broadcast into forested areas and if necessary, brodifacoum, if approved, would be used as well. Brodifacoum would be delivered via exclusionary bait stations within the resort area.

Invertebrates

Based upon their studies on placebo cereal-based bait consumption by invertebrates, Spurr and Drew (1999) concluded that pest control programs are unlikely to have any long-term negative impacts on invertebrate populations. Shirer (1992) suggested that due to their different blood clotting mechanisms, it is highly unlikely that invertebrates would be affected by brodifacoum. Morgan et al. (1996) reported swift metabolization of the poison by invertebrates in New Zealand. Given the fact that diphacinone is considered much less toxic than brodifacoum, direct invertebrate loss is highly unlikely. Coconut crabs, land crabs (*Cardisoma carnifex*), and numerous hermit crab species (*Coenobita* spp.) occur on CI. All three crab groups are known to consume bait, however, the anticoagulants do not affect crabs because of their physiologically different digestive system (Pain et al. 2000). The highly toxic brodifacoum would be delivered via modified bucket bait station, which would reduce invertebrate access to the bait. Furthermore, the bait stations would be deployed during nighttime hours, for a maximum of 14 hours thereby further limiting invertebrate exposure to the poison. However, if diphacinone baiting does not result in eradication, brodifacoum would be broadcast (pending label approval and per label restrictions), thereby increasing the exposure of invertebrates to the poison. The risk to invertebrates would be extremely low due to the low toxicity levels of the proposed rodenticides to invertebrates.

Birds

Although anticoagulants are considered to be non-toxic to invertebrates (Eason and Spurr 1995), there is at risk to insectivorous non-target species due to the residues of the poison found in live invertebrates (Morgan et al. 1996, Ogilvie et al. 1997). Most rodent eradication programs are intended to reduce predation on avian

species. However, avian species are more susceptible to the effects of anticoagulant poisoning programs than other species, due to both primary and secondary exposure (Ogilvie et al. 1997, Dowding et al. 1999). Eason and Spurr (1995) suggested that secondary poisoning of birds is only likely when rodents are a major part of that particular bird's diet. Table 1 lists the resident birds on CI and their respective diets. Rodents are not a major part of any of the resident birds' diets. Examples of rodent pest control and eradication programs have resulted in positive effects on bird populations include: increased pigeon nesting success in New Zealand (Innes et al. 2004),) significantly improved survival rate in stitchbirds and saddlebacks (Empson and Miskelly 1999). Although some birds may succumb via primary or secondary poisoning, the overall benefit of the rodent eradication program clearly outweighs the short term loss (Empson and Miskelly 1999).

Shorebirds can be sighted on CI during the wintering months (e.g., Pacific golden plovers (*Pluvialis fulva*), ruddy turnstones (*Arenaria interpres*), wandering tattlers (*Heteroscelus incanus*), and whimbrels (*Numenius phaeopus*)) but occur in very low numbers (D. Vice, pers. comm.). Their diet primarily consists of invertebrates residing along the intertidal zone (Hayman et. al. 1986). While no baiting would be conducted along the intertidal zone, crabs and other invertebrates can consume the bait, travel to the intertidal areas and thus become exposed to shorebird predation. Most or all of the project would occur during the dry season when shoebirds are less likely to be present. Due to the low numbers of shorebirds that use CI, the application of most bait during the dry season, and the baiting application occurring away from shorebird feeding sites, the risk to shorebirds is expected to be low.

Species	Common Name	Diet
Aplonis opaca guami	Micronesian starling (native)	Fruit, seeds and insects; prefers plant material to animal matter; strictly arboreal[1]
Ixobrychus sinensis	Yellow bittern (native)	Invertebrates, small fish, small reptiles[1]
Streptopelia bitorquata	Philippine turtle dove (introduced)	Seeds and small fruit [2]
Passer montanus	Eurasian tree sparrow (introduced)	Seeds, plant material and insects[3]
Gygis alba	White/fairy tern (native)	Fish[4]
Anous minutus	Black noddy (native)	Fish[4]
Anous stolidus	Brown noddy (native)	Fish[4]
Egretta sacra	Reef heron (native)	Fish[4]
1 Jenkins 1983, 2 Conry 1987, 3 Harrison, 4 del Hoyo et. al. 1996		

Table 1. Resident birds of Cocos Island and their diets.

Forest birds could be affected if directly or indirectly exposed to bait. The proposed action contains measures to reduce risks by limiting exposure with short duration baiting. In addition, WS would be using an intermittent "pulse baiting" methodology which is likely to be less hazardous to secondary non-target species (Eason and Spurr 1995).

Furthermore, the bait would be dyed green, which has been shown to be a deterrent color to birds (Day and Mathews 1999, Hartley et. al. 1999). Bait stations would be deployed in the CIR area, where the tree sparrows are concentrated. Bait stations would limit the access of non-target species to the bait. Although the resident Micronesian starlings and yellow bitterns are known to consume insects, any losses due to secondary poisoning would be rapidly made up by recruitment of new individuals into the population, as has been documented in other avian species exposed to rodent control programs (Taylor and Thomas 1993, Eason and Spurr 1995, Empson and Miskelly 1999, Dowding et. al. 1999). Therefore, the risk to forest bird populations would be low.

Sea turtles

Threatened green sea turtles are known to nest on Cocos Island shores (GDAWR 2001). The NMFS and USFWS (1998) have documented the Polyneisan rat as a threat to turtle nests throughout the Pacific and depredation of sea turtle eggs and hatchlings by rodents has been recorded elsewhere on oceanic islands (the Caribbean Sea (Witmer et al. 2007), Indonesia (Meier and Varnham 2004) and South Pacific (Caut et al. 2008)). Thus, it is likely that rodents depredate on turtle eggs and hatchlings on Cocos Island. The method of hand broadcast mentioned in Section 2.1.2 would not allow bait to be broadcast near the water and no bait would be made available in the water column and impact sea turtles. Furthermore, 99% of the diet of adult green sea turtles is algae and seagrasses (Forbes 1994), thus sea turtles are highly unlikely to consume the bait. In a letter dated November 1, 2007 (Appendix A), the USFWS stated that the proposed project would not be likely to adversely affect sea turtles that use Cocos Island and that the proposal would likely benefit sea turtle nests and young by reducing predation.

Fishes

Numerous species of reef fishes occur in the waters around CI. It is unlikely that fish would be exposed to the bait, as the eradication program is terrestrially based. Bait would not be broadcast within five meters of the mean high water mark and would be applied during the dry season to reduce the risk of runoff. Empson and Miskelly (1999) studied the possible consumption of bait by reef fishes on Kapiti Island in New Zealand by broadcasting placebo bait directly into the ocean. They found that several species of reef fishes consumed the bait, although most bait disintegrated in the ocean environment within 15 minutes. More recently on Lehua Island, Hawaii, research showed that reef fish there were not interested in rodent bait that enter the water column (USFWS, unpublished data). Due to the weather resistant formulation of Diphacinone 50 Conservation, unconsumed bait would likely persist on the ocean floor and disintegrate over time due to wave action and currents (J. Eisemann, pers. comm.). If brodifacoum broadcast is necessary, it is expected to persist in the same manner. Risk to fishes would thus be low due to the low

probability of exposure to the rodenticide.

Lizards

Lizard surveys are currently being conducted on CI by GDAWR, and initial results revealed the presence of the native tide pool skink (*Emoia atrocostata*), Micronesian gecko (*Perochius ateles*), Oceanic gecko (*Gehyra oceanica*) and blue-tailed skink (*Emoia caerulocauda*), and non-naitve green anolis (*Anolis carolinensis*), curious brown skink (*Carlia fusca*).and monitor lizard (P. Petkov, pers. comm.).

Several lizard species have been known to consume anticoagulant bait during rodent eradication programs with some lethal results (Merton 1987, Merton et al. 2002, Thorson et al. 2000). However, the overall potential risk to lizards is considered low since the blood coagulation chemistry of lizards is different than that of mammals (Merton 1987, Orutea and Ramos 2001). In addition, studies have shown that rodent removal caused an increase in lizard populations (Towns and Daugherty 1994) and islands with rats (in particular, Polynesian rats) have fewer lizards than those without rats (Whitaker 1973).

Monitor lizard control

Non-target animals caught in live monitor traps would be released, with the exception of rodents. Live traps would be checked daily therefore any trapped non-targets animals would not remain in the traps for over 24 hours.

Rodent reinvasion response

In the event that endangered Guam rails are established on Cocos Island and rodent re-invasion is detected, WS would use the modified exclusionary bait station. These bait stations have been designed to exclude birds and small mammals. The risk of Guam rail exposure to the bait is minimal however, WS would need to enter Section 7 consultation with the USFWS before proceeding.

Brown treesnake incursion response

BTS bait stations have been designed in part to exclude non-target animals. Avery et al. (2004) found the horizontal bait stations designs to be successful at excluding a majority of fish crows. Because CI is primarily inhabited and visited by sea birds that are piscavores, interest in acetaminophen/DNM bait by theses species would be negligible and any migratory shorebirds focus on invertebrates. Additional any bait stations used would under the forest canopy or away from the shore line reducing access to theses birds. The forest-dwelling Micronesian Starling is also present on CI and is considered omnivorous, but the majority of its diet is vegetable matter (Jenkins 1983). These food preferences may preclude interest in the DNM bait, although starling behavior around bait stations has not been fully studied. Due to the design of the delivery device and the diets of non target animals, the proposed BTS incursion response, if needed, would not be likely to negatively affect non-target species.

If reintroduced, the risk posed by the BTS baiting to Guam rails would be low because the rail is a ground dwelling bird and bait stations are suspended approximately 1.5 m above ground. Bait could, in theory, fall out due to the station being shook or shifted from high winds or animals. However, the bait tray is a concave design which secures the bait and bait stations are secured in a manner which limits its movement. The proposed action includes requirements for maintaining bait stations to prevent bait from dropping. The current standard is to remove old baits from an area and dispose of them in appropriate waste receptacles. If a brown treesnake incursion response is needed to protect Guam rails, WS would enter into a Section 7 consultation with the USFWS before proceeding to ensure that the proposal would not jeopardize the continued existence of the Guam rail. The proposal would be expected to benefit the rail by removing a predatory species.

In order to address concerns of potential deliberate or incidental uptake by native, endangered birds on Guam studies were conducted on surrogated birds to look at the toxicity effects of acetaminophen. Northern bobwhite (*Colinus Virginianus*), mallards (*Anas platyrhynchos*), and fish crows (*Corvus ossifragus*) have been used in experiments to determine the lethal dose and responses to bait (Avery et al. 2004, Miller 2002a and 2002b). In the studies involving the quail and mallard no deaths occurred with only minor weight loss observed at the higher doses. Further experiments with the fish crows also indicated that behavior may preclude native crows from ingesting acetaminophen should they show interest in DNM baits. The fish crows, when presented with a pill-laden DNM, removed the pill, while tearing the DNM into small edible pieces (Avery et al. 2004).

Johnston et al. (2002) speculated that many non-targets would be relatively unaffected by ingesting acetaminophen or may show limited to no interest in the baits. However, of the four non-targets present on CI: rodents, monitor lizards, and crabs only one showed a likelihood of being affected by acetaminophen: the house mouse (Johnston et al. 2002). As these species would be considered a target in a general control program to protect the introduced Guam rails any losses to acetaminophen would be considered beneficial.

4.1.3. Impacts on Vegetation

Transect cutting would impact the vegetated areas on Cocos Island. WS would work with the Guam Division of Forestry and Soil Resources to identify any species of concern (i.e., *Cycas micronesica* and *Heritiera longipetiolata*) that may be impacted by transect cutting, although none were present during a survey conducted by Neubauer and Neubauer (1981). These trees or other vegetation of concern, if any, would be avoided and no live trees would be completely trimmed or removed. Anticoagulants do not pose any deleterious impact to plants. Rodents have been implicated in the demise of native forest resources throughout the world (Towns et al. 2006). Eradications on other oceanic islands have resulted in an increase tree recruitment (Campbell and Atkinson 2002, Campbell 2002). Therefore, the

removal of rodents would be expected to increase the reproductive capacity of native plant species on CI, thereby enhancing the overall ecology of the island.

4.1.4 Impact on Human Health and Safety

Eradication
The greatest risk is to WS staff however, they would be required to wear appropriate personal protective equipment (PPE) when applying the bait via hand broadcast or bait stations and would be supervised by a licensed pesticide applicator. PPE includes: long pants, long sleeved shirt, gloves and shoes with socks in accordance with label requirements to safeguard worker safety. Rodenticide use would be supervised by licensed pesticide applicators (WS staff) and all directions on the labels will be strictly adhered to.

Local residents consume coconut and land crabs. Captured coconut and land crabs are fed (primarily coconut) for at least 1 week prior to consumption, to purge their digestive system. In addition, normal practice is that crabs are thoroughly washed and scrubbed prior to preparation. Whole small hermit crabs or their parts are used by local fisherman as bait on their hooks.

Diphacinone was used as an anti-clotting medication for humans in the 1950's and 1960's and no deaths have been reported since that time for either use as a human pharmaceutical or as a rodenticide (Eisemann and Swift 2006). Eisemann and Swift (2006) reviewed the literature and further evaluated risks to humans and other non-target organisms from indirect exposure including intake of contaminated food and water. They found that the greatest human health hazard is to pregnant women drinking untreated stream water, however, the risk was found to be low, even under the most conservative risk scenarios.

The U.S. Environmental Protection Agency (USEPA 1998) noted that there is a high risk of secondary poisoning to mammals and to a lesser extent to birds that feed on rodents killed from diphacinone and brodifacoum. USEPA (1998) further noted that the risk from brodifacoum was more acutely toxic and more persistent in animal tissues than diphacinone. Tanner et al. (2004) found diphacinone residue in coconut crab tissues after feeding bait and diphacinone poisoned rats to coconut crabs and although no recommendation for safe levels of consumption were given, Eisemann and Swift (2006) indicated that the residues in crab tissues were much lower than the residues used for risk quotients. Thus, risk from eating crabs was negligible. Pain et al. (2000) found no brodifacoum, the much more toxic second generation anticoagulant, residue in crab tissues 30 days after exposure.

WS would work with GDAWR to ensure that the public is adequately informed about the eradication program and the use of anticoagulant rodenticides in its eradication strategy. This would include the use of public

service announcements, village meetings and posted signs on CI and along the Merizo pier. Post application protocols include conspicuously labeling and securing all toxicant delivery devices, and cordoning off the forested area where bait would be hand broadcast. WS would hold informational meetings with CIR staff to inform them about the eradication project and the hazards with handling the bait. Furthermore, CIR would inform guests about the project, the dangers of tampering with the bait and to stay clear of the treated forested areas.

To err on the side of caution, WS would not apply bait without a moratorium on any crab collection on CI during and for 60 days post broadcast or bait station application of rodenticides. WS would work with GDAWR, the agency that has the authority to implement a moratorium on crab harvest. In addition, GDAWR has agreed that it would implement a public information campaign that educates citizens and CIR staff and contractors about the rodent eradication efforts and the possible affects of consuming exposed crabs. Furthermore, baiting would occur in the dry season, when crab activity is relatively low and consumption of bait would be minimal (H-C. Liu, pers. comm.).

WS, in consultation with GEPA, would sample soil, ground water, ocean water, crabs and possibly reef fish for 3 months post broadcast application to determine the presence, if any, of rodenticide residues. Findings would be made available to the Merizo Mayor's office for residents to view.

With all of these precautions, no harmful effects on public health and safety would be expected.

Rodent reinvasion response

Bait stations are designed to deter human tampering. All bait stations would be conspicuously marked with signage indicating the hazards associated with tampering with the bait stations. CIR staff have agreed to inform their patrons about the bait stations and their use. WS would work cooperatively with GDAWR to inform the general public about bait station use and their hazards. Therefore, no harmful effects on public health and safety are expected from the use of bait stations if needed for a reinvasion response.

Monitor lizard control

Trapping for monitor lizards would not pose serious harm to humans coming in contact with them. All traps would be conspicuously labeled and tampering with them would likely cause minor abrasions and contusions. Opportunistic shooting of monitor lizards would occur in the forested areas away from the resort area and beachside areas where resort patrons may be present. WS staff are National Rifle Association certified in the safe operation of all firearms (air rifles are considered firearms) and would ensure that their operations would not cause harm to human health and safety. Therefore, methods used to control monitor lizards would not be a human health or safety hazard.

Brown treesnake incursion response

BTS bait contains 80 mg of acetaminophen, which is approximately 1/5 of the recommended dose for adults. Consumption of excessive amounts of acetaminophen can have deleterious effects. However, since acetaminophen would be present in carrion (DNM) and the bait is inserted into a delivery device designed to exclude non-target species, it is highly unlikely that humans would be exposed. Furthermore, all delivery devices would be clearly marked to deter human tampering

4.1.5 Impact on Ecology and Environment

Eisemann and Swift (2006) found that acute risks to aquatic and terrestrial non-target species were minimal, with the exception of some bird species found in Hawaii. Ogilvie et al. (1997) found no anticoagulant residue in soil and water samples taken 2, 12 and 34 days after an aerial application of the poison on Lady Alice Island, New Zealand. Morgan et al. (1996) reported no residues as well, after 30 day on Red Mercury Island, New Zealand.

In accordance with Section 106 of the National Historic Preservation Act, WS has made the determination that the planned predator control would have no affect on CI cultural resources (see Appendix A). Predator control operations would not involve any digging and no historic properties are located on CI.

Rodent eradication programs have benefited the ecology of other oceanic islands by: 1) increasing native floral diversity (Campbell and Atkinson 1999, 2000), 2) reducing/eliminating predation on native avian species (Taylor et al. 2000) and lizards (Whitaker 1973, Towns 1991), and 3) reducing predation on aquatic intertidal species (Navarrete and Castilla 1993).

The USFWS and GDAWR have agreed that predator control on CI would benefit existing flora and fauna (see Appendix A). Furthermore, rodent eradication would facilitate the planned introduction/reintroduction of other extirpated avian species.

4.1.6 Social and Economic Impacts

The proposed action may possibly have an indirect benefit to tourism if the natural environment is enhanced and overall ecological recovery is achieved. WS also acknowledges that some people are opposed to any form of lethal control of wildlife, regardless of the status of the species (native or non-native), however, the proposed action would have an overall beneficial effect on the socioeconomic environment. CIR patrons may be restricted from accessing some areas of the island during baiting. However, this would be short term and only in limited areas.

Crab harvest on the island will be suspended for the duration of the baiting period and 60 days thereafter. Although coconut and land crabs exist on CI, their numbers are relatively small and according to interviews with local residents and CIR staff, harvest is infrequent and minimal. Furthermore, Cocos Island comprises of approximately 0.04% of the total land area of the

island of Guam, where crabs can also be found. The moratorium on CI crab harvest would be short term and have a negligible effect on total crab harvest in Guam.

4.2 Alternative 2 – Integrated Predator Control with Rodent Eradication via Trapping, Hand Broadcast of Brodifacoum and Brodifacoum Bait Stations, Monitor Lizard Control via Trapping and Shooting and BTS Control via Trapping and Toxicants

4.2.1 Effectiveness

Rodent eradication
Brodifacoum has been shown to be by far the most widely used, particularly in New Zealand (Howald et al. 2007) and perhaps effective rodenticide in rodent eradication programs worldwide because of its higher toxicity and persistence. The ability of this second generation coagulant to kill rats after a single dose makes it highly desirable for rodent eradication programs (Eason and Spurr 1995, Eason et al. 2002). However, the increased effectiveness of this rodenticide also increases the risk of non-target poisoning. WS is currently working with the USEPA on a label for the broadcast of brodifacoum on off shore islands.

Monitor lizard control
Effectiveness is similar to those described in Section 4.1.1.

Rodent reinvasion response
Effectiveness is similar to those described in Section 4.1.1.

Brown treesnake incursion response
Effectiveness is similar to those described in Section 4.1.1.

4.2.2 Impacts on Non-target Animals

Rodent control
Impact to non-target animals would be greater than that described in Section 4.1.2 because of the highly toxic attributes of brodifacoum.

Birds
Brodifacoum is classed as highly toxic to birds by the USEPA and toxic effects in birds can be induced after a single feeding, whereas multiple feedings of diphacinone are required. Numerous eradication projects with brodifacoum have resulted in the loss of non-target forest birds (Dowding et al. 1990, Howald et al. 1999), through both primary and secondary exposure (Eason and Spurr 1995). Although many of these bird populations later rebounded and increased in overall numbers, concern remains for those eradication projects that involve rare or protected bird species.

Invertebrates, Sea turtles, Fishes and Lizards
Impacts to these animals are similar to those described in Section 4.1.2. However, due to the higher toxicity and persistence of brodifacoum, the risk of non-target loss of these animals is greater than diphacinone.

Monitor lizard control
Impacts to non-target animals are similar to those described in Section 4.1.2.

Rodent reinvasion response
Impacts to non-target animals are similar to those described in Section 4.1.2.

Brown treesnake incursion response
Impacts to non-target animals are similar to those described in Section 4.1.2.

4.2.3 Impacts on Vegetation

The impact of rodent control activities on vegetation would be similar to the affects described in Section 4.1.3.

4.2.4 Impacts on Human Health and Safety

Due to the increased toxicity of brodifacoum, it can be surmised that increased risk to human health and safety would occur over that described in Section 4.1.4. With the precautions taken as described in Section 4.1.4, including the 60-day moratorium on crab collection and public education and notification, WS does not expect that this alternative would negatively affect public health, although the risks would be higher than the proposed alternative due to the higher level of toxicity from brodifacoum.

4.2.5 Impacts on Ecology and Environment

The impact of integrated predator control activities on the ecology and environment is similar to that described in Section 4.1.5, but would be expected to be greater due to the higher toxicity of brodifacoum.

4.2.6 Social - Economic Impacts

The Socio-Economic impact of integrated predator control activities are expected to be similar to those described in Section 4.1.5.

4.3 Alternative 3 – No Action

4.3.1. Effectiveness

Under the “no action alternative”, WS would not take any *additional* action to control predators on CI. Rodents and monitor lizards would continue to have detrimental impacts to CI biota. Incursions of BTS would not be addressed.

4.3.2. Impacts on Non-target Animals

WS would have no non-target impacts since it would not implement control actions under this alternative.

4.3.3. Impacts on Vegetation

WS would not affect vegetation under this alternative.

4.3.4. Impacts on Human Health and Safety

Without the Federal program there would be no potential for WS to negatively affect public health and safety. WS would provide no additional benefit to public health.

4.3.5. Impacts on Ecology and Environment

Without a Federal control program, WS would not conduct predator control measures on CI. Resident bird populations would likely continue to be exposed to non-native predatory pressure. Detection of incipient BTS populations would continue to be problematic and the proposed plan to introduce/reintroduce native bird populations would be jeopardized due to the currently high rodent populations.

4.3.6 Social and Economic Impacts

WS would have no impact on social values or economic resources under this alternative.

4.4 Cumulative Impacts

The U.S. Coast Guard has recently completed remedial operation to remove and treat polychlorinated biphenyl (PCB) soil found at the old Long Range Navigation (LORAN) station. The LORAN station was in operation on Cocos Island from 1944-1963, and only several structures remain: three above-ground storage tanks and a small building. Initial investigations in 2005 detected concentrated amounts of PCB in soil, sediment, surface, sub-surface and biota (fish) samples (USCG 2005). These results led to a fish consumption advisory in late 2005 for the water in and around Cocos Island and the remediation of the contaminated soil. The operation removed approximately 300 cubic yards of contaminated soil from the site.

The proposed Safe Harbor Agreement would introduce Guam rails after predator control activities were completed. Actions proposed under the SHA include forest enhancement, lizard surveys, and post-release monitoring of rails. Plans for CI forest enhancement include removal of invasive plants and outplanting of native species. Elimination of invasive plants, such as *Operculina ventricosa, Wedelia trilobata* and *Leucaena leucocephala*, would be accomplished by manually removing

the plants by cutting, weeding and herbicides (D. Limtiaco, personal communication). Existing native trees would be pruned and thinned to increase typhoon resistance. Outplantings of native species would be systematically accomplished throughout the island. This would involve minimal digging of small pits for the plants. GDA would coordinate with the Guam Historic Preservation Office for all digging/excavation activities.

The cumulative impacts of the Proposed Action, USCG remedial actions and the proposed SHA activities would have an overall benefit to the ecosystem of CI. The application of anticoagulant rodenticides would not further exacerbate the PCB problem, as rodenticides are not carcinogenic and do not persist in the environment like PCBs. The Proposed Action would benefit forest enhancement activities by suppressing rodent predation on plant seeds and fruit, thereby increasing tree recruitment. Rail survivorship should improve with predator control. USCG remedial investigations require minimal disturbance to soil and sediment for sampling purposes. The removal of hazardous substances from the island would have a positive impact on the CI ecosystem.

4.5 Monitoring

The WS program would actively monitor the effects of its programs to determine if the effects fall within projected results. When program environmental effects are substantially different than projected, or if new environmental issues arise, new information becomes available, the regulatory framework changes, or a new reasonable alternative that should be considered is identified, the WS may determine that additional NEPA compliance measures are necessary.

Any predator control program resulting from this EA would be monitored in three different ways:

1. Management Information System (MIS). A primary record keeping system established by WS is the MIS. The MIS would estimate the target animals taken, any non-target animals affected, and methods used. Review of the MIS facilitates a determination of whether or not program impacts would fall within levels determined through this EA.

2.NEPA Monitoring and Review. It is WS policy to review all NEPA documents to determine if they are still valid or if substantial changes warrant additional NEPA compliance. WS routinely reports on its findings to the Federal decision maker to ensure that NEPA compliance is up-to-date.

3.Adaptive Management: WS, in collaboration with NWRC and its cooperating agencies would continue to collect information on non-target impacts and program efficacy. New information would be considered against the selected alternative to determine if program changes are warranted. Substantial program changes may warrant additional NEPA compliance and public involvement.

4.6 Conclusions

The action proposed by this environmental assessment is the implementation of an Integrated Pest Management approach to control predators on Cocos Island, Guam. No significant negative impacts would be expected from the implementation of this proposal. The proposed action is intended to provide benefit to CI's native ecosystem and pave the way for the introduction of an extirpated avian species.

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APPENDIX A

Agency Correspondence

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services

Guam District Office

233 Pangelinan Way
Barrigada, GU. 96913

Tel: (671) 635-4400
Fax: (671) 635-4401

Subject: Section 7 Informal Consultation for Proposed Rodent Eradication on Cocos Island, Guam

Date: November 1, 2007

To: Mr. Patrick Leonard, Field Supervisor
US Fish and Wildlife Service
Pacific Island Fish and Wildlife Office
300 Ala Moana Blvd., Room 3-122
P.O. Box 50088
Honolulu, HI 96817

Mr. Leonard:

USDA Wildlife Services has been contracted by the Guam Department of Agriculture (GDOA) to plan and implement a rodent eradication program for Cocos Island, Guam. Rodent eradication is part of GDOA's overall plan to enhance the habitat on the island in support of the establishment of federally-endangered Guam rails (*Gallirallus owstonii*) on the island. Wildlife Services is currently drafting an Environmental Assessment for the proposed activities, in accordance with the National Environmental Policy Act.

Cocos Island provides a rare opportunity for native flora and fauna recovery because it lacks ungulates and cats. However, high populations of rodents pose a risk of predation on Guam rail eggs and reduce the capability to detect and remove any incipient BTS population. Furthermore, high rodent densities can impact forest regeneration by directly consuming or damaging seeds, thereby reducing recruitment.

The proposed rodent eradication program will involve use of diphacinone and brodifacoum, U.S. Environmental Protection Agency (USEPA) registered anticoagulant rodenticides, via hand broadcast and bait stations to eradicate non-native Polynesian rats (*Rattus exulans*) and house mice (*Mus musculus*). Hand broadcast of the bait will require cutting of transects throughout the forested areas of Cocos Island. The bait will be spread out along established transects in accordance with USEPA regulations. The bait stations comprise of commercially available toxicant delivery boxes attached on top of 2-1/2 gallon buckets (to exclude crabs), and will be positioned in strategic locations throughout the Cocos Island Resort area. All baiting will be completed prior to rail introduction efforts; any follow-up baiting, necessitated by rodent detections post-eradication, will be completed using rail-proof bait stations.

Threatened green and hawksbill sea turtles are known to nest on the island. Sea turtles

are highly unlikely to consume the bait because of their dietary preference and the method of bait distribution proposed is terrestrially-based and therefore no bait will be made available in the water column. Disturbance to possible sea turtle nests will be avoided by coordinating all baiting activities with the Guam Division of Aquatic and Wildlife Resources, who are currently monitoring nesting activity on the island. Rodent eradication will enhance the reproductive success of nesting turtles by eliminating rodent predation of nests and hatchlings (listed as a primary threat in the Recovery Plan for U.S. Pacific Populations of the Green Sea Turtle). As a result, we have concluded the proposed activity will have no effect on green or hawksbill sea turtles. The draft Environmental Assessment will include a discussion on possible risks to sea turtles and the steps taken to alleviate those risks. No other federally-listed species are known to occur on Cocos Island.

In accordance with Section 7 of the Endangered Species Act, we request to enter into informal consultation with your office for the project. If you have any questions regarding this project, please contact Mr. Dana T. Lujan, Supervisory Wildlife Biologist at 635-4400, or via email at dana.t.lujan@aphis.usda.gov.

Sincerely,

Daniel S. Vice
Assistant State Director
HI/GU/Pacific Islands

cc: Guam Division of Aquatic and Wildlife Resources

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2008-I-0037

DEC 03 2007

Mr. Daniel S. Vice
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services
Guam District Office
233 Pangelinan Way
Barrigada, Guam 96913

Subject: Informal Section 7 Consultation for Proposed Rodent Eradication on Cocos Island, Guam

Dear Mr. Vice:

This letter is in response to your November 1, 2007, letter requesting informal section 7 consultation regarding the proposed Rodent Eradication on Cocos Island, Guam (proposed project). We received your letter on November 5, 2007. At issue the potential effects of the proposed project on the threatened green sea turtle (*Chelonia mydas*) and the endangered hawksbill sea turtle (*Eretmochelys imbricate*) (collectively referred to as sea turtles). This response is in accordance with section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), as amended (Act).

We used the following in our review of the proposed project: (1) your November 1, 2007, letter requesting section 7 consultation; (2) additional information received via electronic mail (email) on November 2, and November 27, 2007; and (3) other information available to us.

Project Description

Cocos Island is a small island (approximately 100 acres) located about one mile off of the southern tip of Guam. The proposed rodent eradication program will involve the use of diphacinone or brodifacoum rodenticides, both are or will be registered via the U.S. Environmental Protection Agency (EPA) as rodenticides prior to use. The rodenticides will be hand broadcast and placed at bait stations across all habitats, including forested and beach

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habitats, to eradicate non-native Polynesian rats (*Rattus exulans*) and house mice (*Mus musculus*) on Cocos Island. Hand broadcast of the rodenticides will require cutting of transects throughout the forested areas of Cocos Island. No vegetation will be removed from the beach or within 5 meters of the forest edge along beaches. The rodenticides will be spread out along established transects in accordance with EPA regulations. All bait will be broadcast 5 meters inland from the mean high water mark. Rodenticides will not be broadcast where sea turtle nests are located to avoid trampling. Hand broadcast of rodenticides will occur in five pulses, consisting of one day each week for five weeks. Hand broadcast is anticipated to begin approximately February or March 2008, as this is the dry season when rodent food resources are low and rodents would be more attracted to the bait.

Bait stations will be made of commercially available toxicant delivery boxes attached on top of 2.5 gallon buckets (in order to exclude coconut crabs), and will be positioned in strategic locations throughout the Cocos Island Resort Area. Bait stations will be set up during the late afternoon (4:00 to 6:00 pm) and searched, collected, and stored each morning (6:00 am to 9:00 am). Bait stations will be set for approximately two months, beginning in February or March 2008.

Conservation Measures
The following conservation measures proposed in the consultation request letter and emails to the Service will offset project impacts and avoid effects to the listed species reviewed in this informal consultation. Conservation measures are considered part of the project description and must be implemented or consultation may need to be re-initiated.

1) All work will be conducted during daylight hours.

2) All Wildlife Services staff received basic turtle nesting training from Guam Division of Aquatic and Wildlife Resources (DAWR) in 2007, and a short refresher course will be provided to staff assigned to the project prior to implementation.

3) Disturbance to possible sea turtle nests will be avoided by coordinating all activities with DAWR. Wildlife Services will contact DAWR to determine where any active turtle nests are located. All nests will be avoided and will not be walked over, trampled, or have bait placed on or near the nest.

4) Wildlife Services will immediately report any possible nest activity (crawls/false crawls) to DAWR each day.

5) All rodenticide bait will be broadcast 5 meters inland from the mean high water mark and all baiting will be completed during the dry season. This will prevent rodenticide from coming in contact with coastal waters.

Species Affected
Sea turtle biology is summarized from recovery plans and webpages developed by the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) (NMFS and USFWS 1998a, 1998b; NMFS 2007a; 2007b) and references within. Sea turtles are highly migratory, globally distributed, and generally found in tropical and subtropical waters along

continental coasts and islands between 30° North and 30° South. The geographic range of sea turtles include the Caribbean Sea, Atlantic, Pacific, and Indian Oceans and associated bodies of water. Sea turtles have been sighted near Guam and Cocos Island during all months of the year (Lujan Pers. Comm. 2007).

Green Sea Turtle
Adult green sea turtles use the near-shore environment for foraging on marine vegetation (algae and/or sea grass), lying motionless on the ocean bottom to "rest" or possibly to avoid predators, being groomed by fishes to remove ectoparasites and courtship and copulation in waters proximal to nesting beaches. Females use oceanic beaches for nesting and return to coastal feeding areas (which could be thousands of kilometers away) after laying their eggs. After hatching, juvenile green sea turtles migrate to the open ocean. Adults of both sexes also use the pelagic environment when they periodically migrate between their resident foraging pastures and distant breeding sites. Green turtles greater than 30 to 35 centimeters have a nearly exclusive herbivorous diet consisting of selected macroalgae and sea grasses. The diets of post-hatchlings and juveniles living in pelagic habitats appear to be entirely carnivorous (e.g., invertebrates and fish eggs), but records are only known from the occasional turtles encountered.

Hawksbill Sea Turtle
Hawksbill sea turtles commonly use healthy coral reefs using the ledges and caves of coral reefs for shelter and resting. Where coral reefs are absent they use mangrove habitats. Females use oceanic beaches for nesting and return to the water after laying their eggs. After hatching, juvenile hawksbill sea turtles migrate to open ocean and use floating algal mats in the Atlantic Ocean. Juvenile behaviour in the open Pacific Ocean is unknown. Juveniles feed primarily at the surface. Once they reach a size of 38 centimetres, they begin to feed primarily on items associated with coral reefs (sponges, other invertebrates, and algae).

Summary
Sea turtles will likely be nesting on Cocos Island during the implementation of the proposed project. Generally, reptiles are considered at low risk of poisoning by brodifacoum (Hoare and Hare 2006) though it is toxic to all vertebrates that eat the bait (Eason and Spurr 1995). Diphacinone is not as toxic to non-target animals as brodifacoum and during a rat eradication no non-target species were observed to be affected by diphacinone (Witmer et al 2007). However, no specific studies have been conducted on toxicity of either product on sea turtles. It is highly unlikely that adult sea turtles will consume the rodenticides because of their dietary preferences and their feeding behaviour in coastal areas. Bait will be broadcast so that it doesn't enter the ocean and mimic a food item for juvenile turtles.

APHIS employees will coordinate with DAWR regarding nest locations and will be trained in recognizing and avoiding nests, so it is highly unlikely that nests will be affected.

The proposed project will eradicate non-native rats and mice from Cocos Island. Rats are known predators on sea turtle eggs and hatchlings (NMFS and USFWS 1998a, 1998b). After a rat eradication on Buck Island Reef National Monument in the Caribbean, no depredation of endangered sea turtle nests occurred (Whitmer et al. 2007). Eradicating rats from Cocos Island should provide a benefit to sea turtles by reducing predation pressures and increasing the chances for successful hatching and initial migration to the ocean.

Based on the biology of the species, the proposed project description and the implementation of the conservation measures within, the project as proposed may affect but is not likely to adversely affect the green sea turtle or the hawksbill sea turtle. All delivery of rodenticide by hand broadcast or bait station will be in accordance with the EPA approved label and delivery is anticipated to be completed by May 2008. We request that you provide the Service with a summary of your preventative measures to ensure that rodents are not accidentally re-introduced to Cocos Island. If rodents are accidentally re-introduced, then additional treatments are warranted. Please contact this office to determine if re-initiation of consultation will be necessary for additional treatments.

Therefore, unless the project description changes or new information reveals effects of the proposed action that may impact listed species in a manner or to an extent not considered, or a new species or critical habitat is designated that may be affected by the proposed action, no further action pursuant to the Act is necessary. Please provide the Service with a summary report regarding implementation of the proposed project. If you have questions regarding this letter, please contact Holly Herod, Fish and Wildlife Biologist, at 808-792-9400.

Sincerely,

Christa Russell

for Patrick Leonard
Field Supervisor

Cc: Tino Aquon, Guam Division of Aquatic and Wildlife Resources

Literature Cited

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Whitmer, G.W., F. Boyd, Z. Hillis-Starr. 2007. The successful eradication of introduced roof rates (*Rattus rattus*) from Buck Island using diphacinone, followed by an irruption of house mice (*Mus musculus*). Wildlife Research 34(2): 108-115.

Personal Communications

Lujan, D.T. 2007. Email exchange between Mr. Lujan (APHIS-WS) and Ms. Holly Herod (Service) regarding the use of Cocos Island for sea turtle nesting. November 2, 2007 and November 27, 2007.

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services

Guam District Office

233 Pangelinan Way
Barrigada, GU. 96913

Tel: (671) 635-4400
Fax: (671) 635-4401

Subject: Cocos Island Rodent Eradication

Date: January 23, 2008

To: Lynda B. Aguon,
Guam Historic Preservation Officer
Guam Department of Parks and Recreation
Historic Resources Division
490 Chalan Palayso
Agana Heights, Guam 96910

Ms. Aguon,

In accordance with Section 106 of the National Historic Preservation Act, the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Guam District Office would like to enter consultation with your office regarding proposed rodent eradication on Cocos Island, Guam.

USDA Wildlife Services is pursuing this project in coordination with the Guam Department of Agriculture, U.S. Fish and Wildlife Service and Cocos Island Resort. The above mentioned entities are working toward enhancing the Cocos Island habitat to improve conditions for existing wildlife and the planned introduction of endangered Guam rails.

The proposed rodent eradication program will involve use of diphacinone and brodifacoum, U.S. Environmental Protection Agency (USEPA) registered anticoagulant rodenticides, via hand broadcast and bait stations to eradicate non-native Polynesian rats (*Rattus exulan*s) and house mice (*Mus musculus*). Hand broadcast of the bait will require cutting of transects throughout the forested areas of Cocos Island. The bait will be spread out along the transects in accordance with USEPA regulations. The bait stations comprise of commercially available toxicant delivery boxes attached on top of 2-1/2 gallon buckets (to exclude crabs), and will be positioned in strategic locations throughout the Cocos Island Resort area. The entire baiting and eradication program will not involve any digging or disturbance of the substrate.

My agency is currently drafting an Environmental Assessment for the proposed activities, in accordance with the National Environmental Policy Act. Once completed, your office will be given the draft for review. We have communicated with your Territorial Archaeologist, Vic April, on this proposed action and based on the non-intrusive nature of this project,

we have made the determination of “No Historic Properties Affected”. We request your concurrence with our “No Historic Properties Affected” determination. If you have any questions regarding this project, please contact Mr. Dana T. Lujan, Supervisory Wildlife Biologist at 635-4400, or via email at dana.t.lujan@aphis.usda.gov.

Sincerely,

Craig S. Clark
Assistant State Director, Acting
HI/GU/Pacific Islands

cc: Guam Division of Aquatic and Wildlife Resources

United States
Department of
Agriculture

Animal and
Plant Health
Inspection
Service

Wildlife
Services

Guam District Office

233 Pangelinan Way
Barrigada, GU. 96913

Tel: (671) 635-4400
Fax: (671) 635-4401

Subject: Cocos Island Rodent Eradication

Date: January 7, 2008

To: Evangeline Lujan, Administrator
Guam Coastal Management Program
Bureau of Statistics and Plans
P.O. Box 2950
Hagatna, Guam 96932

Mrs. Lujan,

Attached are the completed forms required for the Coastal Zone Management Act, Public Law 95-583, as amended in P.L. 94-37 and Federal Consistency Regulation 15 CFR Part 930, for the proposed eradication of rodents from Cocos Island, Guam. The project is a collaborative effort between the Guam Division of Aquatic and Wildlife and USDA Wildlife Service.

Rodent eradication on oceanic islands has been accomplished worldwide with the use of anticoagulant rodenticides. The basic methodology is to broadcast the rodenticide throughout the infested area, thereby ensuring that all available rodent habitat is treated. To accomplish this, USDA Wildlife Services will establish transects throughout the forested areas of the island and hand broadcast diphacinone in accordance with USEPA regulations. In addition, bait stations will be used in the resort areas (commensal setting) and baited with brodifacoum. All baiting will be terrestrially based and no bait will be broadcast into or within 5m of the mean high tide mark.

USDA Wildlife Services has prepared a Draft Environmental Assessment for this project and the document contains more detailed information about the proposed eradication activities.

If you have any questions regarding this project, please contact Dana T. Lujan, Supervisory Wildlife Biologist at 635-4400 or dana.t.lujan@aphis.usda.gov.

Sincerely,

Craig Clark
Assistant State Director, Acting
HI/GU/Pacific Islands

cc: Guam Division of Aquatic and Wildlife Resources

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GUAM COASTAL MANAGEMENT PROGRAM
ASSESSMENT FORMAT

DATE OF APPLICATION: January 2008

NAME OF APPLICANT: United States Department of Agriculture, Animal Plant Health Inspection Service, Wildlife Services

ADDRESS: 233 Pangelinan Way, Barrigada, Guam 96913

TELEPHONE No.635-4400 FAX No.635-4401

Email Address:dana.t.lujan@aphis.usda.gov

TITLE OF PROPOSED PROJECT: Rodent Eradication on Cocos Island

COMPLETE FOLLOWING PAGES

FOR BUREAU OF STATISTICS AND PLANS ONLY:

DATE APPLICATION RECEIVED:_____

OCRM NOTIFIED:_____LC. AGENCY NOTIFIED:_____

APPLICANT NOTIFIED:_____PUBLIC NOTICE GIVEN:_____

OTHER AGENCY REVIEW REQUESTED:_____

_____

_____

DETERMINATION:
( ) CONSISTENT ( ) NON-CONSISTENT ( ) FURTHER INFORMATION REQUESTED

OCRM NOTIFIED:_____LIC. AGENCY NOTIFIED_____

APPLICANT NOTIFIED:_____

ACTION LOG: 1._____

2._____

3._____

4._____

5._____

6._____

DATE REVIEW COMPLETED:_____

GUAM COASTAL MANAGEMENT PROGRAM
ASSESSMENT FORMAT

DEVELOPMENT POLICIES (DP):

DP1. Shore Area Development

Intent: To ensure environmental and aesthetic compatibility of shore area land uses.

Policy: Only those uses shall be located within the Seashore Reserve which:

- enhance, are compatible with or do not generally detract from the surrounding coastal area's aesthetic and environmental quality and beach accessibility: or
- can demonstrate dependence on such a location and the lack of feasible alternative sites.

Discussion: *There will be no direct effect on shore area lands due to predator control on Cocos Island. USDA plans to use anticoagulant rodenticides (diphacinone and brodifacoum) to eradicate non-native rodents. Application of the rodenticide will comply with U.S. EPA requirements for pesticide handling and use. The proposed project would not result in any new development within the Seashore Reserve.*

DP2. Urban Development

Intent: To cluster high impact uses such that coherent community design, function, infrastructure support and environmental compatibility are assured.

Policy: Commercial, multi-family, industrial and resort-hotel zone uses and uses requiring high levels of support facilities shall be concentrated within appropriate zone as outlined on the Guam Zoning Code.

Discussion: *The proposed project does not involve construction of any structures, buildings or dwellings.*

DP3. Rural Development

Intent: To provide a development pattern compatible with environmental and infrastructure support suitability and which can permit traditional lifestyle patterns to continue to the extent practicable.

Policy: Rural districts shall be designated in which only low density residential and agricultural uses will be acceptable. Minimum lot size for these uses should be one-half acre until adequate infrastructure including functional sewering is provided.

Discussion: *The proposed project does not involve construction of any structures, buildings or dwellings.*

DP4. Major Facility Siting

Intent: To include the national interest in analyzing the siting proposals for major utilities, fuel and transport facilities.

Policy: In evaluating the consistency of proposed major facilities with the goals, policies, and standards of the Comprehensive Development and Coastal Management Plans, Guam shall recognize the national interest in the siting of such facilities, including those associated with electric power production and transmission, petroleum refining and transmission, port and air installations, solid waste disposal, sewage treatment, and major reservoir sites.

Discussion: *The proposed project does not involve construction or siting of major utilities, fuel or transport facilities.*

DP 5. Hazardous Areas

Intent: Development in hazardous areas will be governed by the degree of hazard and the land use regulations.

Policy: Identified hazardous lands, including flood plains, erosion-prone areas, air installation's crash and sound zones and major fault lines shall be developed only to the extent that such development does not pose unreasonable risks to the health, safety or welfare of the people of Guam, and complies with the land use regulations.

Discussion: *The proposed project does not involve construction of any structures, buildings or dwellings.*

DP 6. Housing

Intent: To promote efficient community design placed where the resources can support it.

Policy: The government shall encourage efficient design of residential areas, restrict such development in areas highly susceptible to natural and manmade hazards, and recognize the limitations of the island's resources to support historical patterns of residential development.

Discussion: *The proposed project does not involve construction or siting of housing or residential areas.*

DP 7. Transportation

Intent: To provide transportation systems while protecting potentially impacted resources.

Policy: Guam shall develop an efficient and safe transportation system, while limiting adverse environmental impacts on primary aquifers, beaches, estuaries, coral reefs and other coastal resources.

Discussion: *The proposed project does not involve construction or siting of roads.*

DP 8. <u>Erosion and Siltation</u>

Intent: To control development where erosion and siltation damage is likely to occur.

Policy: Development shall be limited in areas of 15% or greater slope by requiring strict compliance with erosion, sedimentation, and land use regulations, as well as other related land use guidelines for such areas.

Discussion: *The proposed project does not involve construction of any structures, buildings or dwellings.*

RESOURCES POLICIES (RP):

RP1. <u>Air Quality</u>

Intent: To control activities to insure good air quality.

Policy: All activities and uses shall comply with all local air pollution regulations and all appropriate Federal air quality standards in order to ensure the maintenance of Guam's relatively high air quality.

Discussion: *Rodenticide bait will be hand broadcast in the forested areas of Cocos Island by Wildlife Service personnel wearing appropriate Personal Protective Equipment and in accordance with U.S. EPA requirements. The proposed project does not pose a threat to Guam's air quality.*

RP2. <u>Water Quality</u>

Intent: To control activities that may degrade Guam's drinking, recreational, and ecologically sensitive waters.

Policy: Safe drinking water shall be assured and aquatic recreation sites shall be protected through the regulation of uses and discharges that pose a pollution threat to Guam's waters, particularly in estuaries, reef and aquifer areas.

Discussion: *Rodenticide bait will be hand broadcast in the forested areas of Cocos Island by Wildlife Service personnel in accordance with U.S. EPA requirements. The U.S. EPA has reported that the potential for anticoagulants to reach ground water is low (U.S. EPA R.E.D. Facts, 1998, EPA-738-F-98-004). Other studies have indicated no anticoagulant residues in water samples taken after broadcast*

application (Ogilvie et. al. 1997, New Zealand Journal of Ecology 21:195-197; Morgan and Wright, 1996, Science for Conservation No. 38, New Zealand Department of Conservation).

RP3. <u>Fragile Areas</u>

Intent: To protect significant cultural areas, and natural marine and terrestrial wildlife and plant habitats.

Policy: Development in the following types of fragile areas including Guam's Marine Protected Areas (MPA) shall be regulated to protect their unique character.

- historical and archeological sites
- wildlife habitats
- pristine marine and terrestrial communities
- limestone forests
- ravine forests
- mangrove stands and other wetlands
- coral reefs

Discussion: *Historical and Archaeological sites – the proposed action does not involve any digging or ground disturbance, thus no Historic or Archaeological Sites will be affected.*

Wildlife habitats, limestone forests and terrestrial communities – the proposed project is being conducted in coordination with the U.S. Fish and Wildlife Service and Guam Division of Aquatic and Wildlife Resources. The eradication of rodents will enhance the Cocos Island ecosystem by reducing predation on resident birds and plant species.

Pristine marine communities, ravine forests, mangrove and other wetlands, and coral reefs – The proposed action is terrestrially based, and measures will be taken by USDA to prevent the inadvertent broadcast of anticoagulants into the shoreline and marine areas.

RP4. <u>Living Marine Resources</u>

Intent: To protect marine resources in Guam's waters.

Policy: All living resources within the waters of Guam, particularly fish, shall be protected from over harvesting and, in the case of corals, sea turtles and marine mammals, from any taking whatsoever.

Discussion: *The proposed is terrestrially based, and measures will be taken by USDA to prevent the inadvertent broadcast of anticoagulants into the shoreline and marine areas.*

RP5. <u>Visual Quality</u>

Intent: To protect the quality of Guam's natural scenic beauty

Policy: Preservation and enhancement of, and respect for the island's scenic resources shall be encouraged through increased enforcement of and compliance with sign, litter, zoning, subdivision, building and related land-use laws. Visually objectionable uses shall be located to the maximum extent practicable so as not to degrade significant views from scenic overlooks, highways and trails.

Discussion: *The proposed project does not involve construction of any structures, buildings or dwellings.*

RP6. <u>Recreation Areas</u>

Intent: To encourage environmentally compatible recreational development.

Policy: The Government of Guam shall encourage development of varied types of recreational facilities located and maintained so as to be compatible with the surrounding environment and land uses, adequately serve community centers and urban areas and protect beaches and such passive recreational areas as wildlife, marine conservation and marine protected areas, scenic overlooks, parks, and historical sites.

Developments, activities and uses shall comply with the Guam Recreational Water Use Management Plan (RWUMP).

Discussion: *The proposed project does not involve construction of any structures, buildings or dwellings.*

RP7. <u>Public Access</u>

Intent: To ensure the right of public access.

Policy: The public's right of unrestricted access shall be ensured to all non-federally owned beach areas and all Guam recreation areas, parks, scenic overlooks, designated conservation areas and their public lands. Agreements shall be encouraged with the owners of private and federal property for the provision of releasable access to and use of resources of public nature located on such land.

Discussion: *A moratorium on the collection of terrestrial crab species (hermit, land and coconut crabs) will be required. The rodenticide to be used does not harm crabs, however, human consumption and/or use of crabs may lead to secondary poisoning. USDA will work with the Guam Division of Aquatic and Wildlife Resources to educate the public about the proposed activities and the risks associated with exposure to the rodenticide.*

RP8. <u>Agricultural Lands</u>

Intent: To stop urban types of development on agricultural land.

Policy:	Critical agricultural land shall be preserved and maintained for agricultural use.
Discussion:	*The proposed project does not involve construction of any structures, buildings or dwellings.*

APPENDIX B

Rodenticide Labels

ENVIRONMENTAL HAZARDS

This product is toxic to mammals and birds. Predatory and scavenging mammals and birds might be poisoned if they feed upon animals that have eaten bait.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.
STORAGE: Store only in original closed container in a cool, dry place inaccessible to children and pets. Store separately from fertilizer and away from products with strong odors which may contaminate the bait and reduce acceptability. Spillage should be carefully swept up and collected for disposal.
PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.
PLASTIC CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

READ THIS LABEL: Read this entire label and follow all use directions and use precautions.

IMPORTANT: Do not expose children or pets to this product. Take all appropriate steps to limit exposure to and impacts on nontarget species, especially those for which special conservation efforts are planned or ongoing. To help to prevent accidents:

1. Store product not in use in a location out of reach of children and pets.
2. Apply bait only as specified on this label and in strict accordance with the "USE **RESTRICTIONS**:" and "**APPLICATION DIRECTIONS**:". For applications involving bait stations, the bait stations must be tamper-resistant. The bait stations must deny access to bait compartments by children, pets, and other non-target species larger in body size than the type(s) of rats or mice being targeted by the bait program. Lock and secure bait stations, as necessary, to exclude such nontarget species. In locations where captive or feral livestock occur, either remove and exclude such animals from the application site prior to treatment or make sure that the bait stations used are capable of denying them access to bait compartments, and
3. Dispose of product container, and unused, spoiled and unconsumed bait as specified on this label.

USE RESTRICTIONS: This product may be used only to control or eradicate Norway rats (Rattus norvegicus), roof rats (Rattus rattus), Polynesian rats (Rattus exulans), house mice (Mus musculus) or other types of invasive rodents for conservation purposes on islands, grounded vessels or vessels in peril of grounding. This product may be applied only using bait stations, burrow baiting, canopy baiting or aerial and ground broadcast application techniques.

This product is to be used for the protection of State or Federally-listed Threatened or Endangered Species or other species determined to require special protection.

Do not apply this product to food or feed.

Treated areas must be posted with warning signs appropriate to the current rodent control project.

(DIRECTIONS FOR USE continued on right panel of this label)

RESTRICTED USE PESTICIDE

DUE TO HAZARDS TO NON-TARGET SPECIES

For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicators certification.

For use by or in cooperation with government conservation agencies.

Diphacinone-50: Pelleted Rodenticide Bait for Conservation Purposes

Fish Flavored, Weather-resistant Rodenticide for Control or Eradication of Invasive Rodents on Islands or Vessels for Conservation Purposes

ACTIVE INGREDIENT:
Diphacinone: (2-Diphenylacetyl-1,3-Indandione)…… 0.005%
INERT INGREDIENTS:…… 99.995%
TOTAL…… 100.000%

KEEP OUT OF REACH OF CHILDREN

CAUTION

PRECAUTIONARY STATEMENTS

HAZARD TO HUMANS AND DOMESTIC ANIMALS

Caution: Keep away from humans, domestic animals and pets. If swallowed, this material may reduce the clotting ability of the blood and cause bleeding. Wear protective gloves when applying or loading bait. With a detergent and hot water, wash all implements used for applying bait. Do not use these implements for mixing, holding or transferring food or feed.

FIRST AID

Have label with you when obtaining treatment advice.

If swallowed	• Call a poison control center, doctor, or 1-800-222-1222 immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center, doctor, or 1-800-222-1222 immediately for treatment advice.

- **Note to Physician**: If ingested, administer Vitamin K_1, intramuscularly or orally as indicated in bishydroxycoumarin overdose. Repeat as necessary based on monitoring of prothrombin times.

For a medical emergency involving this product, call 1-800-222-1222.

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
4700 River Road, Unit 149
Riverdale, MD 20737-1237
EPA Reg. No 56228-35
EPA Est. No. 61282-WI-1

Net Contents: 50 lbs. (22.68 Kg)

DIRECTIONS FOR USE

(continued from left panel)

APPLICATION DIRECTIONS:

Bait Stations: Tamper-resistant bait stations must be used when applying this product on grounded vessels or vessels in peril of grounding or when used in areas of human habitation. See Item 2) under "**IMPORTANT**:" regarding the performance characteristics needed for tamper-resistant bait stations. To bait rats: Apply 4 to 16 ounces (113 to 454 grams) of bait per placement. Space placements at intervals of 5 to 50 meters. Placements should be made in a grid over the area for which rodent control is desired. To bait mice: Apply 0.25 to 0.5 ounces (7 to 14 grams) of bait per placement. Space placements at intervals of 2 to 4 meters. Placements should be made in a grid over the area for which rodent control is desired. Larger placements (up to 2 ounces) may be needed at points of very high mouse activity. For both rat and mouse baiting: Maintain an uninterrupted supply of fresh bait for at least 15 days or until signs of rodent activity cease. Where a continuous source of infestation is present, permanent bait stations may be established and bait replenished as needed.

Burrow-baiting: Place bait in burrows only if this can be done in a way that minimizes potential for ejection of bait and exposure of bait to seed-eating birds and other non-target species. To bait rats: place 3 to 4 ounces (85 to 113 g) of bait inside each burrow entrance. Baits used in burrows may be applied in piles or in cloth or resealable plastic bags. The bags should be knotted or otherwise sealed to avoid spillage and holes should be made in plastic bags to allow the bait odor to escape. To bait mice: place approximately 0.25 ounces (7 grams) of bait in each active burrow. For both rat and mouse baiting: place one such bag or placement in each active burrow opening and push bag into burrow far enough so that its presence can barely be seen. Do not plug burrows. Flag treated burrows and inspect them frequently, daily if possible. Maintain an uninterrupted supply of bait for at least 15 days or until rodent activity ceases. Remove bait from burrows if there is evidence that bags are ejected.

Canopy Baiting (bait placement in the canopy of trees and shrubs): In areas where sufficient food and cover are available to harbor populations of rodents in canopies of trees and shrubs, canopy baiting should be included in the baiting strategy. Approximately 4 to 7 ounces (113 g to 200 g) of bait should be placed in a cloth or resealable plastic bag. The bags should be knotted or otherwise sealed to avoid spillage and holes should be made in plastic bags to allow the bait odor to escape. Using long poles (or other devices) or by hand, bait filled bags should be placed in the canopy of trees or shrubs. Baits should be placed in the canopy at intervals of 50 meters or less, depending upon the level of rodent infestation in these habitats. In some vegetation types, bait stations may need to be used to ensure bait will stay in the canopy.

Aerial and Ground Broadcast: Broadcast applications are prohibited on vessels or in areas of human habitation. Broadcast bait pellets by helicopter or manually at a rate of 10 to 12.5 lbs. of bait per acre (11.1 to 13.8 kg/ha) per treatment. Make a second broadcast application typically 5 to 7 days after the first application, depending upon local weather conditions, at a rate no higher than 12.5 lbs. (13.8 g/ha) of bait per acre. In situations where weather or logistics only allow one bait application, a single application may be made at a rate no higher than 20.0 lbs. bait per acre (22.5 kg/ha).

Aerial (helicopter) applications may not be made in winds higher than 35 mph (30 knots). Pilot in command has final authority for determining safe flying conditions. However, aerial applications will be terminated when the following conditions are met:

- Windspeed in excess of 25 knots with an evaluation of the terrain and impact of the wind conditions and not to exceed a steady wind velocity of 30 knots.

If rat activity persists after broadcast application, set up and maintain tamper-resistant bait stations or apply bait directly to rodent burrows in areas where rodents remain active. If terrain does not permit use of bait station or burrow baiting, continue with broadcast baiting, limiting such treatments to areas where active signs of rats are seen. Maintain treatments for as long as rodent activity is evident in the area and rodents appear to be accepting bait.

For all methods of baiting, monitor the baited area periodically and, using gloves, collect and dispose of any dead animals and spilled bait properly. Dead animals and spilled bait may be buried on site if the depth of burial makes excavation by nontarget animals extremely unlikely.

HAVOC® CHUNKS Kills Rats and Mice

ALL-WEATHER RODENTICIDE

Second Generation Anticoagulant. Kills Warfarin-Resistant Norway Rats and House Mice. Rodents may consume a lethal dose in a single-night's feeding, with the first dead rodents appearing four or five days after feeding begins.

ACTIVE INGREDIENT:
Brodifacoum -
3-[3-(4'-bromo-[1,1'-biphenyl]-4-yl)-1,2,3,4-tetrahydro-1-naphthalenyl]-4-hydroxy-2H-1-benzopyran-2-one.....0.005%
INERT INGREDIENTS:.....99.995%
Total 100.000%

EPA Reg. No. 61282-27 EPA Est. No. 61282-WI-1

KEEP OUT OF REACH OF CHILDREN

CAUTION

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Keep away from humans, domestic animals and pets. May be harmful or fatal if swallowed. Wash thoroughly with soap and water after handling bait.

FIRST AID	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	
If swallowed	• Call a poison control center, doctor or **1-800-498-5743** immediately for treatment advice. • Have a person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor.

NOTE TO PHYSICIAN OR VETERINARIAN

This product may reduce the clotting ability of the blood and cause hemorrhaging. If poisoning occurs, intramuscular and oral administrations of vitamin K_1 are indicated as in poisoning from overdose of bishydroxycoumarin. For human cases, vitamin K_1 is antidotal at doses of 10-20 mg (**not** mg/kg). For animal cases, vitamin K_1 is antidotal at 2-5 mg/kg. Repeated doses may need to be given up to 2 weeks (based on monitoring of prothrombin times). In severe cases, blood transfusions may be necessary.

ENVIRONMENTAL HAZARDS

This product is toxic to fish, birds and wildlife. This product can pose a secondary hazard to birds of prey and mammals. Do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

READ THIS LABEL: Read this entire label and follow all use directions and use precautions.

IMPORTANT: Do not expose children, pets, or other nontarget animals to rodenticides. To help to prevent accidents:

1. Store product not in use in a location out of reach of children and pets.
2. Apply bait in location out of reach of children, pets, domestic animals and nontarget wildlife, or in tamper-resistant bait stations. These stations must be resistant to destruction by dogs and by children under six years of age, and must be used in a manner that prevents such children from reaching into bait compartments and obtaining bait. If bait can be shaken from stations when they are lifted, units must be secured or otherwise immobilized. Even stronger bait stations are needed in areas open to hoofed livestock, raccoons, bears, or other potentially destructive animals, or in areas prone to vandalism.
3. Dispose of product container, and unused, spoiled, and unconsumed bait as specified on this label.

USE RESTRICTIONS: This product may be used to control Norway rats, roof rats, and house mice in and around homes; and in and around industrial, commercial, agricultural and public buildings, and similar man-made structures. Havoc Chunks may also be used in transport vehicles (ships, trains, aircraft) and in and around related port and terminal buildings. Do not place bait in areas where there is a possibility of contaminating food or surfaces that come in direct contact with food. Do not broadcast bait.

SELECTION OF TREATMENT AREAS: Determine areas where rats and/or mice will most likely find and consume the bait. Generally, these areas are along walls, by gnawed openings, in or beside burrows, in corners and concealed places between floors and walls, or in locations where rodents or their signs have been observed. Remove as much food as possible.

APPLICATION DIRECTIONS:

Norway and Roof Rats: Apply 4 to 16 Havoc Chunks per placement. Space placement at intervals of 15 - 30 feet in infested areas. Maintain an uninterrupted supply of fresh bait for 10 days or until fresh signs of rat activity no longer are apparent.*

*For the 8-oz. size: The amount of bait contained in this package would not be expected to kill more than two to eight rats.

House mice: Use one Havoc Chunk per placement. Space placements at intervals of 8 to 12 feet. Two chunks may be needed at points of very high mouse activity. Maintain an uninterrupted supply of fresh bait for 15 days or until signs of mouse activity cease.

Rats and Mice: Replace contaminated or spoiled bait immediately. Collect and dispose of all dead rodents and leftover bait properly. To discourage reinfestation, limit sources of rodent food, water, and harborage as much as possible. Where a continuous source of infestation is present, maintain permanent bait stations and replenish toxic bait as needed.

This specimen label is intended for use only as a guide in providing general information regarding the directions, warning and cautions associated with the use of this product. As with any rodenticide, always follow the label instructions on the package before using.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

STORAGE: Store in original container only, in a dry place inaccessible to children and pets.
PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of onsite or at an approved waste disposal facility.
CONTAINER DISPOSAL: Commercial Use: Do not reuse empty container except for holding additional Havoc Chunks rodenticide. Dispose of empty container in a sanitary landfill or by incineration or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. **Household Use: If empty:** Do not reuse empty container. Place in trash or offer for recycling if available. **If partly filled:** Call your local solid waste agency for disposal instructions. Never place unused product down any indoor or outdoor drain.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

Manufacturer and Seller warrant that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. This warranty does not extend to the use of this product contrary to label instructions, or under abnormal conditions or under conditions not reasonably foreseeable to or beyond the control of Seller or Manufacturer, and Buyer and User assume the risk of any such use.
MANUFACTURER AND SELLER MAKE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.
In no event shall Manufacturer or Seller be liable for any incidental, consequential or special damages resulting from the use or handling of this product. THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF MANUFACTURER AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF THE MANUFACTURER OR SELLER, THE REPLACEMENT OF THE PRODUCT.
Manufacturer and Seller offer this product, and Buyer and User accept it, subject to the foregoing Conditions of Sale and Limitations of Warranty and Liability, which may not be modified except by written agreement signed by a duly authorized representative of Manufacturer.

For non-emergency (e.g., current product information) call:
1-800-621-8829

Manufactured By:
HACCO, Inc.
110 Hopkins Drive
Randolph, WI 53956

Havoc® is a trademark of a SYNGENTA Group Company

Code (NE.NT)
Item Nos. 116376, 116377, 116378

This specimen label is intended for use only as a guide in providing general information regarding the directions, warning and cautions associated with the use of this product. As with any rodenticide, always follow the label instructions on the package before using.

APPENDIX C

WS Directive 2.401
Pesticide Use

United States Department of Agriculture
Animal and Plant Health Inspection Service

WS Directive

2.401 02/17/04

PESTICIDE USE

1. PURPOSE

To provide guidelines for storage, disposal, recordkeeping requirements, and the safe and effective use of pesticides in the WS program.

2. REPLACEMENT HIGHLIGHTS

This directive replaces WS Directive 2.401 dated 3/26/93.

3. POLICY

WS activities must be in compliance with all Federal, State, and local laws and regulations pertaining to pesticide applications, including certification requirements before using, transporting, shipping, disposing, supervising, or recommending the use of restricted use pesticides. Pesticides used or recommended by WS personnel must be registered by the U.S. Environmental Protection Agency (EPA) and the appropriate State regulatory agency.

WS personnel have responsibility for all aspects of control operations involving WS restricted use pesticides having label language which specifies "for use only by USDA personnel... or persons under their direct supervision." While non-WS persons may be involved in various phases of operations using these pesticides, the actual application will be conducted only by WS certified applicators. Furthermore, pesticides displaying WS restriction-specific labels, and all derived chemical products, will not be transferred or otherwise released to non-WS personnel. This restriction does not preclude or limit reimbursement to WS for any cost of materials or services provided by WS involving these pesticides.

Pesticide use, storage, and disposal will conform to label instructions and other applicable regulations and laws. Before using any pesticide, WS personnel will be trained in its proper and safe use.

WS personnel will not conduct operational activities on private property where other persons are known to be using the same or a similar pesticide(s) intended for control of the same target species. WS equipment, materials, and warning signs will be promptly removed from the area if such use is discovered. WS will notify the property owner or manager of this action.

Material Safety Data Sheets (MSDS) and labels for each pesticide used by WS must be provided to all WS personnel and other potential users.

Pesticides must be stored in a locked or secured box, building, or vehicle when not in use. Warning signs or symbols required by Federal, State, and local laws and regulations must be displayed in the appropriate locations. Pesticides must be used in accordance with the Wildlife Services Standards for Storing Pesticides (See Attachment 1).

All unusable pesticides and by-products will be handled in a manner prescribed by the State Director (SD) and in accordance with EPA procedures. SD's are responsible for establishing proper accounting, monitoring, and recordkeeping procedures for all pesticides used in their program.

4. RECORDKEEPING REQUIREMENTS

Minimum recordkeeping for federally registered restricted use pesticides require that the following information must be recorded within 30 days following the pesticide application and be kept on file for at least 2 years [Note: State pesticide regulatory agencies may require additional recordkeeping and enforce longer retention dates]:

a. The brand or product name, and the EPA registration number of the restricted use pesticide that was applied;

b. The total amount of the restricted use pesticide applied;

c. The location of the application, the size of the area treated, and the crop, commodity, stored product, or site to which a restricted use pesticide was applied;

d. The month, day, and year when the restricted use pesticide application occurred; and,

e. The name and certification number of the certified applicator who applied or who supervised the application of the restricted use pesticide.

An inventory record will be maintained for pesticides utilizing the Control Materials Inventory Tracking System (CMITS). Records will be evaluated by Headquarters staff and with periodic spot checks by a designated official.

Any toxic or adverse human effect which occurs to WS personnel, cooperators, or public involving the use, storage, or disposal of any pesticide registered by USDA, APHIS is to be immediately reported to the SD and Director. The Director will report the incident and submit specifics to the Director of Environmental Services, APHIS, as appropriate. An adverse human effect is defined by EPA as an incident in which a person suffers an adverse physiological or behavioral effect (other than local

damage to or irritation of the skin or eye of the type commonly associated with dermal or ocular exposure when the label provides adequate notice of such a hazard).

Additionally, WS personnel are required to report any knowledge of adverse incidents involving APHIS registered products. An adverse incident has occurred if a person or nontarget organism is exposed to and/or has an adverse effect from a pesticide.

5. REFERENCES

Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 et seq.), as amended

Food, Agriculture, Conservation, and Trade Act of 1990 (FACT Act)

National Environmental Policy Act (Public Law 91-190, 42 U.S.C 4321 et seq.)

40 CFR Part 153.75 - Toxic or Adverse Effect Incident Reports, (a)(1)(i) through (iii)

Federal Register Vol. 58, No. 67 p. 19014

Deputy Administrator

Distribution: **Originating Office:**

February 10, 2004

STANDARD FOR STORING PESTICIDES
WILDLIFE SERVICES

INTRODUCTION

The purpose of this Standard is to provide for the safe storage of pesticides, identify appropriate waste disposal methods, provide a safe worksite for employees, and to appropriately define a pesticide inventory and its contents.

DEFINITIONS

The following definitions are used in this Standard. It is important to know these definitions to understand applicability and scope of this Standard.

Material Safety Data Sheet (MSDS). A document that describes the pesticide content and specifications, hazardous properties, disposal, and safety information.

Pesticide Container. Any drum, bag, bottle, pressurized container, or other closed vessel containing a pesticide.

Pesticide Inventory. A pesticide inventory is a written record containing the following information for each pesticides being stored, regardless of quantity:

- Name of pesticide,
- EPA registration number,
- Quantity transferred, used, disposed of, and
- Beginning and ending balance.

Pesticide Storage Cabinet/Box. A WS-approved storage cabinet or box for the sole purpose of storing pesticide containers.

Pesticide Storage Site. A site approved by WS for overnight storage of general and restricted use pesticides.

Ready Supply. A quantity of pesticide sufficient to complete a project, concurrent projects, or to conduct up to a week of work. However, when an employee is required to travel an extensive distance to pickup the pesticide from a central storage/distribution facility, or when there are other extenuating circumstances, the supervisor can extend the ready supply rule to a longer period.

Restricted-Use Pesticide. Pesticides classified for restricted use under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) in 40 CFR, Part 152.175.

Secondary Containment. Any container or device that prevents a release of pesticide material into the environment when the primary container fails.

Worksite. For the purpose of these guidelines, a worksite is defined as an office, warehouse, residence or other ground location where employees are assigned to base their work from. Restrictions on pesticide storage at residential sites apply (See **Residential Storage Sites** below).

GENERAL STORAGE REQUIREMENTS

The following requirements are of a general nature and apply to all pesticide storage sites. All pesticides must be stored:

- In full compliance with State and EPA pesticide label requirements.
- In closed containers, at WS-approved worksites.
- So that only employees approved by the State Director, Field Station Leader, or their designee, will have access to pesticides.
- Separate from food and personal contact items such as clothing, linens, furniture, animal feeds, and animal health products.
- To minimize contact with moisture, excessive heat, or freeze/thaw cycles. (These conditions can affect the container integrity and product stability.)
- In secondary containment to contain pesticide spills into the environment. Examples of secondary containment for liquids include polyethylene-lined tubs, dikes, curbing, and double-walled tanks. The pesticide cabinet will provide secondary containment for nonliquids in a pesticide storage cabinet/box and/or in a central storage/distribution facility.
- To prevent theft. Unattended pesticides must be locked at all times to prevent theft or unauthorized use. Pesticides must not be left in motel rooms or other unsecured locations. **Immediately notify the supervisor if a theft or loss occurs**.
- With an up-to-date (current) pesticide inventory available, to emergency responders, auditors, and other authorized persons.
- In a manner to segregate any incompatible pesticides.
- In each office or warehouse where pesticides are stored will have an up to date Occupant Emergency Plan (GSA Form 3415)

Banned or unapproved pesticides will not be used or stored at any WS facility. Refer to the section Waste Disposal for appropriate disposal procedures.

Pesticide Containers. All pesticide containers will be:

- Properly labeled (legible FIFRA label on the outside of the container) and labels must not be removed from original container.
- Free from rust and leaks.
- Appropriately stored in a pesticide cabinet/box and/or at a central storage/distribution facility.

Pesticide Cabinets and Boxes. The WS-approved pesticide cabinets and boxes must be:

- Made of metal, hard high-density plastic, or of another non-combustible material of substantial construction to minimize the risk of a break-in.
- Fire and weather resistant with sturdy hinges, locks, and hasps.
- Clearly labeled to depict the hazard, e.g., "Danger – Poison" with a skull and cross bones.
- Stored where adequate fire extinguisher and spill containment (if applicable) and collection materials will be readily available.
- Dedicated to pesticide storage only.

Central Storage/Distribution Facilities. These facilities are generally located at State, district, or field offices, and/or affiliated warehouse buildings. Access to pesticides should be limited to one or two designated persons who are responsible for distribution, inventory and recordkeeping, and disposal under FIFRA, and when applicable, under the Resource Conservation and Recovery Act (RCRA). The following requirements apply:

- Storage will be in a locked pesticide storage cabinet constructed of noncombustible materials or a dedicated room appropriately ventilated.
- Smoking is prohibited in all storage areas containing pesticides and "No Smoking" signs will be conspicuously posted at all entrances to storage areas.

- A fire extinguisher and spill kit (if applicable) must be located within 30 feet of storage area.
- If pesticide transfer operations will be performed, e.g., from one container to another container, personal protective equipment and the availability of an emergency eyewash system (permanent or portable) or a shower should be considered, dependent on the nature of the potential exposure.
- The most recent pesticide inventory, Material Safety Data Sheets (MSDS), and emergency response information or contact phone numbers will be maintained and readily available on-site.

Residential Storage Sites. When it is necessary for authorized employees to store small quantities of pesticides at their residences, the storage area at a residential location is classified as a worksite, and all the aforementioned general storage, pesticide container, pesticide cabinet, and inventory requirements apply. In addition, the following will apply:

- Storage and storage area must be authorized by the State Director in writing.
- Storage will be inside an approved, locked pesticide storage cabinet or box.
- Pesticides must be inaccessible to family members and visitors at all times.
- Pesticides will not be stored inside of residences. An attached garage is not considered inside the residence.
- If an employee's residence is located at a community dwelling, e.g., apartment complex, condominium, etc., an approved alternative site must be obtained.

TRANSPORTATION OF PESTICIDES AND OVERNIGHT STORAGE IN A VEHICLE

A "ready supply" of pesticides may be transported and/or stored overnight onboard government-owned vehicles or personal vehicles authorized for official use by the State Director. The following will apply:

- Pesticides must be in an approved, locked storage box kept inside the vehicle, or in a locked storage box kept in a substantial locked tool box (or equivalent) which is permanently attached to the vehicle except for large quantities of bagged grain baits. Large quantities of bagged grain baits may be transported outside a pesticide storage box, but may not be left unattended. Overnight storage of bagged grain bait must be in an approved pesticide storage cabinet/box, as necessary. Bagged grain baits can be temporarily stored in a vehicle as long as the truck bed or trailer is enclosed and locked, and the baits are covered to protect them from public view.
- The vehicle must be locked when unattended.
- Highly toxic or inhalation hazard pesticides, e.g., aluminum phosphide will not be carried or stored in the passenger compartment of a vehicle.
- Pesticide labels and Material Safety Data Sheets (MSDSs) will be transported with pesticides at all times.

If an employee's residence is located at a community dwelling, e.g., apartment complex, condominium, etc., an approved alternative storage site must be identified.

TRAINING

Facilities storing pesticides will have a required training program for all employees who handle pesticides. The training will be based on the review of current MSDS(s), labels, and other available information. Training must include storage requirements, personal protective equipment, emergency procedures including appropriate notification, and proper waste disposal.

A Hazard Communication Program will be implemented and maintained for each pesticide storage worksite. (Refer to APHIS Safety and Health Manual, Chapter 10, Section 8, Hazard Communication and OSHA regulation 29 CFR 1910.1200, Hazard Communication.)

INSPECTIONS

Inspections using the APHIS Safety Inspection Checklist, APHIS Form 256-5, are required a minimum of twice annually at all central storage/ distribution facilities where pesticides are stored. For overnight residential and vehicle storage sites, a less time-consuming and easily performed self-inspection checklist is authorized (Enclosure 1). Employees who conduct self-inspections at vehicle storage and residential sites (two/year minimum) will forward the inspection reports to the State Director/Field Station leader and retain copies for their files.

The State Director/Field Station Leader will verify the accuracy of the self-inspection checklists and APHIS Safety Inspection Checklists (APHIS Form 256-5) and take appropriate action to correct deficiencies.

EMERGENCY PROCEDURES

Facilities storing pesticides will have adequate emergency response procedures to include emergency evacuation plans, emergency contact phone numbers, and adequate emergency equipment such as fire extinguishers, spill kits, and personal protective equipment as needed. Actions and appropriate notifications must be consistent with the pesticide stored and the hazard potential. Additional information can be obtained from the APHIS Safety Health and Employee Wellness Branch by calling 301-734-5577.

The local fire department should be notified of pesticide materials stored at WS worksites, especially if there are no flammable or explosive materials are being stored at the site. Placement of appropriate NFPA red/blue/yellow (fire/health/reactivity) diamond signs should be utilized on storage cabinets or on the outside doors of storage buildings to identify potential hazards to the emergency response personnel. State and city ordinances may be more restrictive and may need to be followed.

WASTE DISPOSAL

Pesticide-contaminated materials must be disposed of or decontaminated in accordance with appropriate Federal, State, and local regulations as specified by the manufacturer's instructions. The Safety, Health, and Employee Wellness Branch (SHEWB) have established GSA Blanket Purchases Agreements with hazardous waste disposal firms for use by APHIS field offices. Contact SHEWB at 301-734-5577 to arrange a pickup and to request funding. Funding assistance may be available from the Environmental Protection Program Delivery account.

Enclosure 1

Wildlife Service
Self-Inspection Checklist
Pesticide Storage Site

Inspector _____ Telephone Number _____ Date _____

Residential Site Location _____, or

License Plate No. for Storage Vehicle _____; Government Vehicle ___ Private Vehicle ___

Pesticide Chemical Storage	YES	NO	N/A
1. Are pesticides stored in approved storage cabinets/boxes?			
2. Are storage cabinets and boxes kept locked?			
3. Are storage areas appropriately ventilated?			
4. Are provisions made for minimizing moisture absorption, overheating or freezing?			
5. Is an up-to-date pesticide inventory maintained at the site?			
6. Are pesticide containers labeled?			
7. Do written emergency procedures exist?			
8. Is personal protective equipment available?			
9. Is a fire extinguisher available (within 30 ft.)?			
10. Has the local fire department been provided the necessary information?			
11. Are MSDS's and pesticide labels available on location?			
12. Have you received training?			
13. Is a first aid kit available?			
14. Are a minimum of two inspections annually conducted on this site?			
15. Do pesticide storage and recordkeeping comply with State requirements?			
16. Are pesticides separate from food, personal contact items, and animal feed?			
17. Is applicator's certification up-to-date?			
18. Are pesticide storage cabinets and boxes in good condition?			
19. Has smoking been prohibited in pesticide storage areas and are signs posted?			
20. Is storage area located at a residence?			
21. Is storage area in a community dwelling, e.g., apartment, etc.?			
22. Are pesticides available to family members or visitors?			

I certify that the above-mentioned information is correct and valid.

_____ _____
Inspector's Signature *Date*

_____ _____
State Director/Field Station Leader or Designee *Date*

Please complete the above self-inspection checklist twice annually in January and July, and submit it to your State Director/Field Station Leader. Retain a copy for your files.

APPENDIX D

Public Comments

Public Comment Period

The pre-decision Environmental Assessment was released for public comment on January 28, 2008 and the deadline for comment submittal was March 1.

Written Comments

WS received 2 written comments within the allotted comment period. The first submittal focused on the establishment of endangered Guam rails onto Cocos Island. Therefore, we did not consider it as part of this Environmental Assessment since this comment refers to the Safe Harbors Agreement and is not a decision before Wildlife Services. This commenter also felt that birds and other non-target species would be affected by the use of rodenticides. These issues were addressed in the EA under Section 4.1.2

The second submittal was a series of petitions with signatures. However, only three of the four versions applied to the preferred alternative or scope of this EA. We believe that many of the individuals who signed the petition were given incorrect information regarding the project. Subsequent discussions with several individuals who signed the petitions suggest this to be true. WS recognizes that some residents continue to oppose the use of rodenticides to eradicate rodents. WS has addressed the issue of traditional harvest of crabs in Section 4.1.6. The petitions noted a preference for a non-lethal alternative using traps to capture rodents. The alternative was considered in Section 2.4 but rejected from detailed analysis because it was considered to be impractical and not effective to achieve eradication island wide.

Public Meetings

Guam Department of Agriculture held four public meetings in February and March to educate the public about the proposed habitat enhancement and Guam rail establishment onto Cocos Island. Copies of the Draft EA were made available at the meetings. WS representatives presented the facts regarding the proposed rodenticide and the risk of impacts to crabs, birds, fish, sea turtles, lizards, ground water, soil and humans. Several residents voiced their concerns over the use of rodenticides to eradicate rodents and the possible impacts to other fauna in and around the island. Some suggested the use of traps to eradicate rodents. Environmental monitoring was suggested (soil, water sampling). One individual passed around flyers that presented inaccurate information about the possible impacts of the proposed action.

Several residents were concerned with the presence of PCBs on Cocos Island and how the use of rodenticides would further exacerbate the problems associated with it. WS explained that anticoagulants are not carcinogenic, as are PCBs, and their persistence in the environment is limited and short lived The impact of the project on the traditional harvest of crabs on the island was also a concern, however, harvest of crabs on the island is very limited.

Many residents believed that the establishment of Guam rails would lead to a "Federal takeover" of the island which would limit access to the island, and suggested that rails be released elsewhere. WS did not address this issue, as it was not within the scope of this EA.

WS believes that misinformation was distributed to members of the public before the meetings which lead to public opposition and the petitions against the project. One-on-one conversations with numerous opponents alleviated most of their concerns. While WS informed meeting participants of the opportunity to review and comment on the EA, only one comment letter was actually submitted on the proposal based on the public review phase of the environmental assessment. The petitions did not reference the EA or provide information other than a stated preference against the project.