

**Environmental Assessment
for
Buck Island Reef National Monument
Island-wide Rat Eradication**

St. Croix, U.S. Virgin Islands

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**United States Department of the Interior
National Park Service**

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I. PURPOSE AND NEED FOR ACTION

A. Need for Action

The exotic tree or roof rat population (*Rattus rattus*) on Buck Island Reef National Monument (BUIS) has become a significant threat to the natural resources, visitors, and the park's long range resource management programs. Of primary concern are the endangered hawksbill sea turtles, nests and hatchlings, the endangered brown pelican rookery, the least tern's nesting colony, native vegetation island-wide, visitor health and safety, and the eventual re-introduction of the endangered St. Croix ground lizard (*Ameiva polops*). Rat predation has reduced hawksbill turtle nesting success each season since 1994 and directly conflicts with endangered species protection and recovery goals. The least tern colony has failed as a direct result of rat predation on eggs and chicks for three seasons. Rats foraging for water have damaged flora island-wide threatening both native plant recovery and the restoration program for *lignumvitae*, a rare native tree. In order to prevent any potential threat for rat tick-borne relapsing fever, rats must be eliminated from all visitor use areas. For NPS to comply with U. S. Fish & Wildlife Service's Endangered Species Recovery Plan for the St. Croix Ground Lizard, rats must be removed from the Monument prior to their re-introduction to improve this species home range and ultimately their chances of survival in the Virgin Islands.

B. Background

People have accidentally or intentionally introduced hundreds of exotic species into natural communities and although many die out some persist and become pests. These exotic species disrupt complex native ecological communities, jeopardize endangered native plants and animals, and degrade native habitats. The National Park Service Organic Act (16 U.S.C. 1 et seq [1988], August 25, 1916, ch. 408, 39 Stat. 535) mandates the parks to "conserve the scenery and the natural and historic objects and the wild life therein...[to] leave them unimpaired for the enjoyment of future generations." Changes of natural communities from human actions in the parks, including invasion by exotic species, is contrary to the intentions of the Act. Additionally, the NPS Organic Act, especially 16 USC 3, authorizes the Secretary of the Interior to destroy animals that maybe detrimental to monuments; therefore comprehensive control of exotics and their effects in the NPS is therefore compulsory.

The impacts of commensal rodents on reptiles and other island flora and fauna, ranging from direct predation to reduction of habitat quality for other species, has been well documented (Campbell 1989). The eradication of exotic predators has been part of several long range natural resource management programs aimed at recovering the native flora and fauna on Buck Island Reef NM. Especially successful were the federal and territorial cooperative projects between the 1960's and mid-1980's to remove the mongoose (*Herpestes auropunctatus*). Impacts on endangered sea turtle nests declined dramatically after their removal. It is now more than 10 years since the "mongoose eradication" program ended and the exotic tree rat has taken their place predating and foraging on native fauna and flora.

In 1996, rats collected on Buck Island Reef were sent to the National Institute of Health Rocky Mountain Laboratory to determine if associated ticks carried the tick-borne fever (caused by a *Borrelia* spirochete bacteria). It had already been found in humans living in the Virgin Islands. The tick species responsible (*Ornithodoros puertoricensis*) for transmitting the spirochetes to humans was found on the rats collected on the island. Their presence on Buck Island Reef was an extension of their known range. Incidental contact between visitors and rats in the picnic areas may present a health threat. In theory, the risk of tick bites to humans on the island is low because of the nocturnal activity patterns of both rats and these ticks, and because no overnight lodging by humans is allowed. However, day visitors to the island have been harassed by rats and this could provide an opportunity for accidental contact between rat/ticks and visitors.

In February, 1998, park resource management requested a site visit by the U.S. Department of Agriculture's Animal Plant Health Inspection Service National Wildlife Research Center and their Division of Wildlife Service's biologists to assess damage by rats to the island's natural resources. Based on three nights of trapping, it was determined that rats were abundant during the sample period when compared to results from other Caribbean islands (Campbell 1989). It was evident that this sizeable rat population was impacting numerous natural resources and that the present rat population jeopardizes many of the parks proposed natural resource programs (Witmer 1998) from meeting its obligations to the Endangered Species Act of 1973 to provide for the recovery of endangered and threatened species.

Based on this study, plus the continued threat to endangered species and the increasing number of visitor complaints, we submitted a proposal for funding to eradicate the rats from the park. We were awarded the funds to conduct a two year rat eradication project beginning August 1999.

Our goals for the Buck Island Rat Eradication Project are:

1. Eradicate non-native tree or roof rats from Buck Island Reef National Monument.
2. Improve island-wide conditions for native flora and fauna's including endangered sea turtle nesting, brown pelican nesting, least tern nesting, and lignum vitae restoration.
3. Eliminate potential threat to visiting public from ticks (*Ornithodoros puertoricensis*) which carry relapsing fever (caused by a *Borrelia* spirochete bacteria) which have been found on the rats at BUIS (Witmer, 1998).
4. Provide safe and suitable habitat for re-introduction of St. Croix Ground Lizard.
5. Increase public and territorial conservation agencies' awareness to threats from exotic pest species.

C. Purpose and Need for the Environmental Assessment

The purpose of this document is to evaluate the short- and long-term environmental consequences of eradicating the non-native tree rats (*Rattus rattus*) from Buck Island Reef National Monument, St. Croix, Virgin Islands, a unit of the National Park System, United States Department of the Interior.

National Park Service (NPS) guidelines for compliance with the National Environmental Policy Act (NEPA) require an analysis of potential impacts from the proposed activity on the effected environment. This environmental assessment reviews those potential impacts and the actions that will be taken to prevent any and all environmental damage from the proposed rat eradication project.

II. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This section describes the alternatives that were analyzed in this environmental assessment. The alternatives are (a) no action, (b) continuous rodent control/suppression; © the proposed action - island-wide rat eradication; (d) other alternatives.

A. Alternative 1: No Action

Under the No Action Alternative no rat control would be done. Impacts of non-native tree rat would continue including predation on endangered and threatened species, damage to native flora and fauna, and disturbances by rats in visitor use areas. The non-native tree rat would continue to be part of the island's terrestrial ecosystem.

B. Alternative 2: Continuous Rodent Control/Suppression

Under this alternative, the National Park Service would initiate rat control work in the high priority areas (picnic areas and endangered/threatened species nesting areas) with currently approved techniques. This would involve use of registered rodenticides around the picnic areas and snap trapping at other sites. Snap trap lines would be established around sea turtle and least tern nesting areas. The park would initiate a "PACK IT IN, PACK IT OUT" policy for all visitor generated trash, and visitors would be responsible for taking all their food/picnic trash off the island. All trash receptacles would be removed from picnic areas. Control work would have to be conducted periodically throughout the year and would continue indefinitely because rats in out lying areas of the island would continuously replace all the animals removed by the trapping and baiting in the target areas. This method would only provide temporary and sporadic control of the rats, and not met the needs of the park resource management goals.

C. Alternative 3: The Proposed Action - Island-wide Rat Eradication

Under Alternative 3, the Proposed Action, the National Park Service (NPS) in cooperation with the U.S. Department of Agriculture's Animal Plant Health Inspection Service / Wildlife Services (WS) would conduct an island-wide rat eradication project using a combination of trapping and rodenticide on Buck Island Reef National Monument. Until only recently was the eradication of rats on islands the size of Buck Island Reef (176 acres) considered possible. Numerous types of rodenticides are available and have been successfully used for the management or eradication of commensal rodents. An anticoagulant type bait would be used because 1) they are effective in very low concentrations, 2) there is an antidote (vitamin K) to accidental poisoning, and 3) secondary hazards are lower than for more acute toxicants (Witmer,

1998). Most rodenticides are registered for use in or within 150 feet of man-made structures. Use of rodenticides on Buck Island Reef NM island wide would be through a section 24© of the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA).

Several chemicals were considered for use including brodifacoum and zinc phosphide, but diaphacione (Eaton's Bait Blocks Rodenticide) was selected due to the considerable existing data to support registration, its proven record in other similar projects, and low hazard to non-targets compared to more acute toxicants (Conry, 1994). Diphacione has been used extensively for rodent control since the 1960's and for several years in other island situations. There have been no reported cases of secondary poisoning for raptors and only a few cases of poisonings in mammals. On the Monument, the relatively low incidence of human activity along with the lack of avian predators and mammals on the island increase the safety margin even higher. No Domestic animals (dogs or cats) are allowed on the Monument so there is no threat of accidental poisoning of pets. Diaphacione also has proven to be an excellent choice for mongoose control, a secondary goal of this project.

The only non-target species we can determine that might have significant exposure to baits is the hermit crab. Dr. Earl Campbell with the USDA APHIS National Wildlife Research Center and other researchers familiar with this use pattern reported the concern is primarily one of baiting efficacy and not non-target hazards, as apparently the diaphacione has no effect on the crabs (Campbell, 1989). Efforts will be made to monitor and minimize this concern (i.e. elevation of baits, bait site selection, etc. as necessary). There are no listed species present expected to eat baits or dead rats.

Baiting Application Strategy

The baiting strategy is divided into three zones to deal with the complexity of the island topography - Public Picnic Areas (West Beach and Dietrich's), Shoreline Nesting Habitat / Beach Forest (sea turtles and seabirds), and Upland Tropical Dry Forest (pelican rookery and lignum vitae plantings) (Figure 1 and 2). Each area will be mapped out and a bait station grid pattern created for that area (Figure 3). Bait stations will be distributed over the grid spaced at 50 foot intervals in the picnic areas (Figure 3) and 150 foot intervals along the shoreline and in the upland areas. A pattern of trails will be established for bait placement and maintenance, similar to what was done for the mongoose trapping program of the 1980s (Figure 4). Trails which will be cut for upland bait-lines will be roped off and marked with "Trail Closed Signs" to caution visitors from walking off the hiking trail and onto the bait-lines. Trails will be hand cut with machete, thicker vegetation using weed-eater with metal blade, but only the necessary amount of vegetation will be cut back to allow for the passage of one person.

Baits will be placed in bait stations in areas of potential exposure to humans. Bait stations could be placed in trees or on the ground, and each station affixed to that location with either cable ties, wire, or stakes. This should prevent bait stations from moving either in high winds or heavy rains, and reduce any chance that it could be removed by a curious visitor. The stations are closed and locked so that even a small child can not reach inside to the bait. All bait stations will be numbered sequentially

and labeled "NPS Rat Program - Do Not Touch!" in both English and Spanish along with other labeling as might be required by the registration.

Prior to the start of baiting, a trap census similar to what was conducted in January 1998, will be conducted for three consecutive nights to establish a baseline population in all three zones. Snap-traps are placed along existing trail lines at West Beach, above Dietrich's Picnic area, and U.S. Coast Guard (USCG) tower trail (Figure 5). Traps are secured to the side of a tree about 10-20 inches above the ground surface with a trap placed every 50 feet along the trail. Traps are baited with a mixture of rolled oats and peanut butter and set just before sunset on each night of trapping. The traps are checked at one-hour intervals from 7pm to 10 pm. Trapped rats are labeled and bagged for later examination and the trap re-set. At the last check (10pm) of each night, the traps are sprung and left in place for the next night. Reflector tape on traps and pink flagging tape on a nearby tree or bush facilitate the location of traps at night. All traps are removed at the end after the last check on the third night. The following data is collected from the trapped rats - sex, age class, reproductive condition, size, weight, and overall condition (clean, healthy, malnourished, scarred, etc). Capture data will be adjusted for sprung traps to obtain trap success indices on a scale of 0-100 (Witmer, 1998).

Trap censuses will be repeated quarterly to monitor population change during the baiting program. Trap censuses will be continued along the three established trap points (West Beach, Dietrich's Picnic/South trail, and USCG tower) and at two additional areas along bait station trails. The location of these additional trap census areas will be determined after the bait station trails are established, but they will cover areas not yet surveyed- the northeast side and southeastern side of the island (Figure 5).

Once initiated, the baiting operation will require minimum 18 months to complete, possibly up to 2 years. Baiting will be the most intense during the dry season. After placement, baits will be checked and replaced as needed. Initially this would probably be every day for the first weeks, but would then drop to about once per week after the rat population is greatly reduced. Typically, baits are maintained for weeks after all consumption has virtually stopped to help assure that all rats have been eliminated (Witmer, 1998).

Bait stations will be maintained and trap censuses conducted by USDA/APHIS Wildlife Services (WS) field personnel who will be working on the project through an Interagency Agreement. Dead rats found in the public areas of the park will be recovered by the field personnel and buried on the island.

The program follows the NPS Integrated Pest Management approach and includes public education and public service announcements regarding the rats and their impacts on the islands natural resources, as well as, improved picnic area trash management, the initiation of a "PACK IT IN, PACK IT OUT" policy requiring all day use visitors to remove all their personal trash from the island, and the eventual removal of all trash receptacles from the Monument.

D. Other Alternatives

A number of other mechanical methods are available for rat control including cage traps and glueboards. None of these devices, by themselves, would be sufficiently effective in controlling rat damage on an island the size of Buck Island Reef NM. It would be extremely difficult to deploy sufficient numbers of cage traps or glue traps to achieve control. Cage traps are less efficient than snap traps and glue boards have mechanical and non-target problems associated with outdoor use.

"Second Generation" anticoagulants like brodifacoum are more potent than diphacionone, however, the rapid "one feed kill" effect can cause bait shyness. In order to achieve Alternative 3's goal of complete island-wide eradication we chose to use the less toxic, slower acting bait and continuing baiting for a longer period of time. This approach reduces both non-target hazards and bait shyness sometimes associated with the more acute toxicants.

III. AFFECTED ENVIRONMENT

A. Physical Environment

The location of the proposed action addressed by this Environmental Assessment is Buck Island Reef National Monument. The Monument is located six miles east of Christiansted, off the north shore of St. Croix, U.S. Virgin Islands. Buck Island Reef NM is administered by the National Park Service, U. S. Department of the Interior. The affected area is the 176 acre island including the beaches, shoreline, beach forest, and upland tropical dry forest habitats, as well as, the visitor day use facilities including the picnic areas and hiking trail (Appendix A).

Buck Island is 6000 feet long in an east-west direction, 2200 feet wide at its widest and rises in a single east-west ridge to an elevation of 340 feet. It covers a land area of about 176 acres, nine tenths of which are slopes steeper than 30 percent. The two low, sandy benches, one on the west end and the other, Dietrich's Point, on the south, possess recreational value as well as providing habitat for vegetation and wildlife. A fine beach of white coral sand, West Beach, extends for about 1000 feet on the southern side of the west bench. Otherwise the shore is gravelly or rocky falling steeply into the sea on the island's eastern two-thirds. A small, rain-fed salt pond is located along the south side of the island. Another fairly level area of about 10 acres is located on the west end of the island, north shore beach forest area. The wide open sandy beach changes in shape and size with seasonal sand transport.

B. Vegetation

Sea grape borders much of the beach and behind this is a low manchineel dominated forest mixed with other trees (watermampoo, manjack, and acacia). These species cover much of the two low beach forest areas. Buck Island is one of the few areas where a native manchineel forest still exists. Although it's sap and fruit are extremely poisonous it has not limited the recreational uses for this area. The manchineel forest

along the north and south shores of the island are also the primary nesting areas for the hawksbill turtle.

The steep slopes of the major portion of the island are covered with small trees and a low scrub. Species composition includes croton sp, purple sage, organ pipe and turk's cap cactus, sandy point orchid, agavi, turpentine, acacia, jamaican caper, and pigeon berry mixed with various native and exotic grasses. The exotic tamarind tree can be found in various parts of the island indicating prior human activities.

C. Wildlife, Endangered and Threatened

Buck Island Reef's wildlife is represented by numerous birds, lizards, various crabs, and nesting sea turtles. The salt pond behind Diedrich's Point, with its border of mangrove and sea grape (*coccoloba*), is frequented by herons, sand pipers, and stilts. During the early spring pairs of Bahama white-cheeked pintail ducks frequently nest on the upland slopes and ducklings have been observed leaving the beach for their first swim to the main island. Overall the island has a mixed bird population including the bananaquit, hummingbirds, seasonal warblers, grassquits, mangrove cuckoo, white crowned pigeon, ground dove, pearly-eyed thrasher, the elana and kingfisher. The northeastern slope of the island is an important rookery for the endangered brown pelican. Between 20 to 40 adults nest here between September and February. The cliff site below the rookery is also used by the magnificent frigate bird for roosting. No frigate bird nesting has ever been recorded. Seasonally a colony of between 20 to 80 least tern, a threatened species, nest on West Beach. The Monument's beaches provide the only nesting site for the least tern in St. Croix protected from vehicular access, uncontrolled visitor activities, and domestic pets. A few raptors have been seen foraging over Buck Island including the red-tailed hawk, the peregrine falcon, and the osprey. Only rarely has the osprey overwintered in the Virgin Islands.

Throughout the day a variety of small lizards and green anoles (*Anolis* species) can be seen in the beach forest vegetation. The more cryptic geckos and lizard species, including *Sphaerodactylus* species, can be found hiding under leaf litter or dead wood. Hermit crabs (*Coenobita clypeatus*) are found all along the shoreline. Ghost crabs (*Ocypode quadrata*) remain in their wet sand burrows at or above the high tide line. At least two genus of land crab (*Cardisoma* and *Ucides*) can be found in the low beach forest and higher elevations.

Three endangered species of sea turtle nest on Buck Island Reef NM including the leatherback turtle (*Dermochelys coriacea*), green turtle (*Chelonia mydas*), and the hawksbill turtle (*Eretmochelys imbricata*). US Fish and Wildlife Service has identified Buck Island Reef as an index beach for hawksbill sea turtle recovery where on-going research is providing critical information toward species recovery goals in the Caribbean.

The non-native or exotic tree or roof rat (*Rattus rattus*) and mongoose (*Herpestes auropunctatus*) are the only mammals found on the island. These two exotic predators have severely altered the native flora and fauna, impacted threatened least tern and

endangered sea turtle nesting, eating eggs and hatchlings, and regularly disturbed visitor activities in the picnic areas.

D. Human and Cultural Resources

The original inhabitants of these islands, Taino, Arawak, and Carib Indians, probably visited the island but left no lasting sign of their presence. There are conch middens indicating the island may have been used as a pre-historic fish camp. The Spanish, English, Dutch, French, and Knights of Malta all attempted to establish themselves permanently on St. Croix. Denmark held St. Croix the longest, through prosperity and poverty, from 1733 until 1917. The island was owned by Mr. Dietrich's, the Clerk of the Danish Court, who had a small farm on the northern side of the island and a small cottage above the beach at West Beach. The Danes also maintained a light tower at the top of the island to warn ships away from the reef. In 1917, the Danish Islands were purchased by the United States. Buck Island was part of the public, government, or crown lands ceded to the United States. During the 1920's the island was leased for goat raising and the surrounding waters frequented by fishermen. Under the Act of Congress of June 22, 1936, the island was placed under control of the Government of the Virgin Islands with legal title remaining in the United States. The local government recognized recreation value and by ordinance in 1948, established the island as Buck Island Park. Appreciation of the island spread and by presidential proclamation on December 28, 1961, Buck Island Reef National Monument was established encompassing the island and its surrounding coral reefs.

E. Social Environment

Buck Island Reef NM is the largest area of its kind on St. Croix and fills an important recreational role for the community and island visitor. It is the number one tourist destination for the island of St. Croix; on average between 40,000 to 60,000 visitors come to the park each year either on private or park concession vessels. As a public use area Buck Island Reef is exposed to large and growing number of visitors for both the underwater experience, sailing and boating recreationist, as well as hiking and picnicking. Park management anticipates a return to pre-hurricane Hugo (1989) visitation levels, 60 to 80,000, by the year 2000. The bulk of the park's visitor activity occurs in the two picnic areas adjacent to the beaches. There are two ways to get to the park, either on a private vessel or with park concession operations who charge a fee. Park concession operations bring visitors to the island on either half- or full-day charters which include the boat trip to and from the island, snorkeling at the underwater trail and one to two hour visit on the island. Visitor activities include hiking the one overland trail, swimming off the beach, sunbathing, snorkeling any of the numerous shoreline reefs, or picnicking at one of the two picnic areas on the south side of the island. Barbeque grilling is a favorite past-time for the local visitor. Frequently visitors plan entire family gatherings at the park and spend the entire day at the beach cooking lunch and dinner.

IV. ENVIRONMENTAL CONSEQUENCES

A. Alternative 1: No Action

Under the No Action Alternative Buck Island Reef's terrestrial habitat would continue to decline under the foraging and predatory activities of the non-native tree rat (*Rattus rattus*). NPS would fail to comply with Endangered Species Act, 1973, as rats would continue to reduce the nest and hatch success of endangered sea turtles and brown pelicans, and threatened migratory sea birds. These species would continue to nest but rat predation would reduce their success thereby reducing their chances for recovery in the Virgin Islands. The island would continue to lose rare and endemic plants and trees through rat foraging damage and seed consumption. Rat activities further stress native flora especially during severe drought conditions when rat foraging is the most intense. The potential threat to visitors from a known vector of a "relapsing fever" would continue to be present. All planned ecological restoration projects including the re-introduction of the St. Croix Ground Lizard (*Ameiva polops*) and the native tropical hardwood tree, *lignum vitae*, would at best be partially successful or completely fail until the rats were eliminated.

The park would fail to implement preservation mandates embodied in the National Park Service's Organic Act, the park's enabling legislation, the General Management Plan, 1983, and the Resource Management Plan, 1985. All resource management programs working toward the ecological restoration of the Monument would fall short of their goal until the rats are removed. Finally Buck Island Reef NM would fail to meet the mandate set forth by the United States Congress to "preserve and protect the natural resources for future generations" of park visitors.

B. Alternative 2: Continuous Rat Control/Suppression

This alternative would require less resources during the initial year in terms of funding and personnel, however, the long-term cost in staff time and damage to the environment would be much higher due to the continuous nature of this alternative. Rat recruitment from uncontrolled areas of the island would require constant control work. While this approach may provide some relief to visitors using the picnic areas, it would not provide acceptable control of the damage to natural resources like the endangered plants and animals found on the island. Problems associated with the use of snap traps only in these areas include non-target species impact, trap shyness, and the labor intensive nature of the technique. Disturbance of vegetation for access trails island-wide would be less than Alternative 3 but only because it would be concentrated in the picnic areas and shoreline habitats, however, total impacts from constant control activity over time would probably be greater. While this alternative could be viewed as complying with some Federal Acts associated with protection of park resources, as long as rats are present on the island, the potential for resource losses would continue.

C. Alternative 3: Proposed Action - Island-wide Rat Eradication

An island-wide tree rat eradication project is proposed to begin August 1999. The NPS Resource Management and U. S. D. A / APHIS/ Wildlife Service biologists and field technicians would establish an extensive grid of trails all over the island. Rat bait stations would be established as well as several trap lines to monitor the population status. The rodenticide, diaphacione (Eaton's Bait Blocks Rodenticide), would be used to control and ultimately eliminate the non-native tree rat from the island. Diaphacione was considered because of its proven record in other similar projects and low hazard to non-targets compared to more acute toxicants (Conry, 1994). Bait stations could be placed on the ground or in trees as required by the terrain and they will be secured in place. Bait stations will be out of sight of visitors. The use of sealed and locking 'bait stations' will reduce the chance exposure of land birds, lizards, humans, and other potential non-target species to the bait by physically limiting access. Once rodents begin to succumb to the rodenticide, all corpses found in visitor use areas will be removed and buried on the island. Information on the program will be posted in all visitor access areas in English and Spanish, as well as, provided to concession companies and regularly announced by public radio and newspaper.

The benefits gained from the eradication of rats from Buck Island Reef NM include:

1. Increased sea turtle nesting success,
2. Increased brown pelican and least tern nesting success,
3. Improve conditions for lignum vitae restoration,
4. Elimination of the threat of tick born relapsing fever to visitors,
5. Improve the reproductive success of native plants by increasing survival of seeds and seedlings, therefore enhancing the population of dynamics native plant communities,
6. Safe habitat for re-introduction of St. Croix Ground Lizard providing necessary range extension of the species critical to the species survival and ultimately its recovery,
7. Recovery of terrestrial invertebrate biomass, which forms the prey base of many of the land birds and terrestrial reptiles, as well as the pollinators of some plant species,
8. Increase public and territorial conservation agencies' awareness to threats from exotic species.

V. COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

The proposed island-wide eradication of the non-native tree rat (*Rattus rattus*) from Buck Island Reef National Monument is a concept in keeping with the park's enabling legislation to "preserve this area of outstanding scientific, aesthetic and educational importance for the benefit and enjoyment of the people", and under the Historic Site and Monument Act of August 21, 1935 (49 Stat. 666; 16 U.S.C. 463) to protect the area to prevent further despoliation.

(a) **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)** - The rodenticide proposed for use diaphacione (ETON's bait block), is a general use product registered by the Environmental Protection Agency for use in and around man-made structures. In

order to use this product in the natural area at Buck Island Reef NM, the NPS and Wildlife Services has obtained a special 24© registration for the product through the Government of the Virgin Islands' Department of Planning and Natural Resources, Division of Environmental Protection. This permit is consistent with the FIFRA. The park has also obtained pesticide use approval through their Southeast Regional Integrated Pest Management Program (IPM) and the Washington IPM Office (Appendix E).

(b) **Endangered Species Act of 1973** - Buck Island Reef NM's north side brown pelican rookery has been designated critical habitat for this endangered species. In addition the Monument has been designated an index beach for the recovery of the endangered hawksbill sea turtle (*Eretmochelys imbricata*) by U. S. Fish & Wildlife Service. The island is also the proposed location for the re-introduction of the St. Croix Ground Lizard (*Ameiva polops*). In order to comply with the ESA of 1973 the park must protect endangered species and their habitats. Prior to conducting the proposed action the park and Wildlife Services conducted informal consultation with USFWS, Ecological Services, Boqueron, Puerto Rico, and has been approved for the proposed action in regard to the endangered species at the Monument.

(c) **Migratory Bird Act of 1918** provides clear authority and direction for the proposed action.

(d) **Animal Damage Control Act of 1931** gives authority to eradicate injurious animals for the protection of birds and other wildlife.

(e) **Coastal Zone Act (16 U.S.C. 1451 et seq.)** "preserve, protect, develop and where possible to restore or enhance the resources of the Nation's coastal zones" supports the removal of an non-native pest species that is damage the coastal zone and the wildlife therein.

(f) **National Park Service Organic Act (16 U.S.C. 1 [1916] et seq.)** "to conserve the scenery and the natural and historic objects and wild life therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations."

(g) **General Management Plan, Buck Island Reef NM, 1983** - non-native pests such as the tree rat and mongoose are identified as a threat to native fauna and must be controlled.

VI. CONSULTATION AND COORDINATION WITH OTHERS

Personnel from the following agencies and organizations have been consulted or participated in the formulation of this proposal:

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NWRC Field Station, Amauula Road, Hilo, Hawaii 96721-5880

Natural Resources Conservation Service

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5030 Anchor Way, Gallows Bay, St. Croix, VI 00820-4692

Government of the Virgin Islands

Department of Planning & Natural Resources

Rafe Boulon, Endangered Species Coordinator
David Nellis, Wildlife Biologist
Division of Fish & Wildlife, 101 Estate Nazareth, St. Thomas, VI 00802

Toby Tobias, Fisheries Biologist
William Knowles, Biologist/Ornithologist
Lagoon Street Complex, Rm 203, Fredriksted, VI 00840

VII. PLANNING TEAM / PREPARERS

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Resource Management Specialist
Buck Island Reef National Monument
National Park Service
2100 Church Street, Kings Wharf #100
Christiansted, St. Croix, Virgin Islands 00820-4611

Frank Boyd
Biologist/State Coordinator
USDA/APHIS/ Wildlife Services
118 Extension Hall
Auburn University, Auburn, AL 36849-5656

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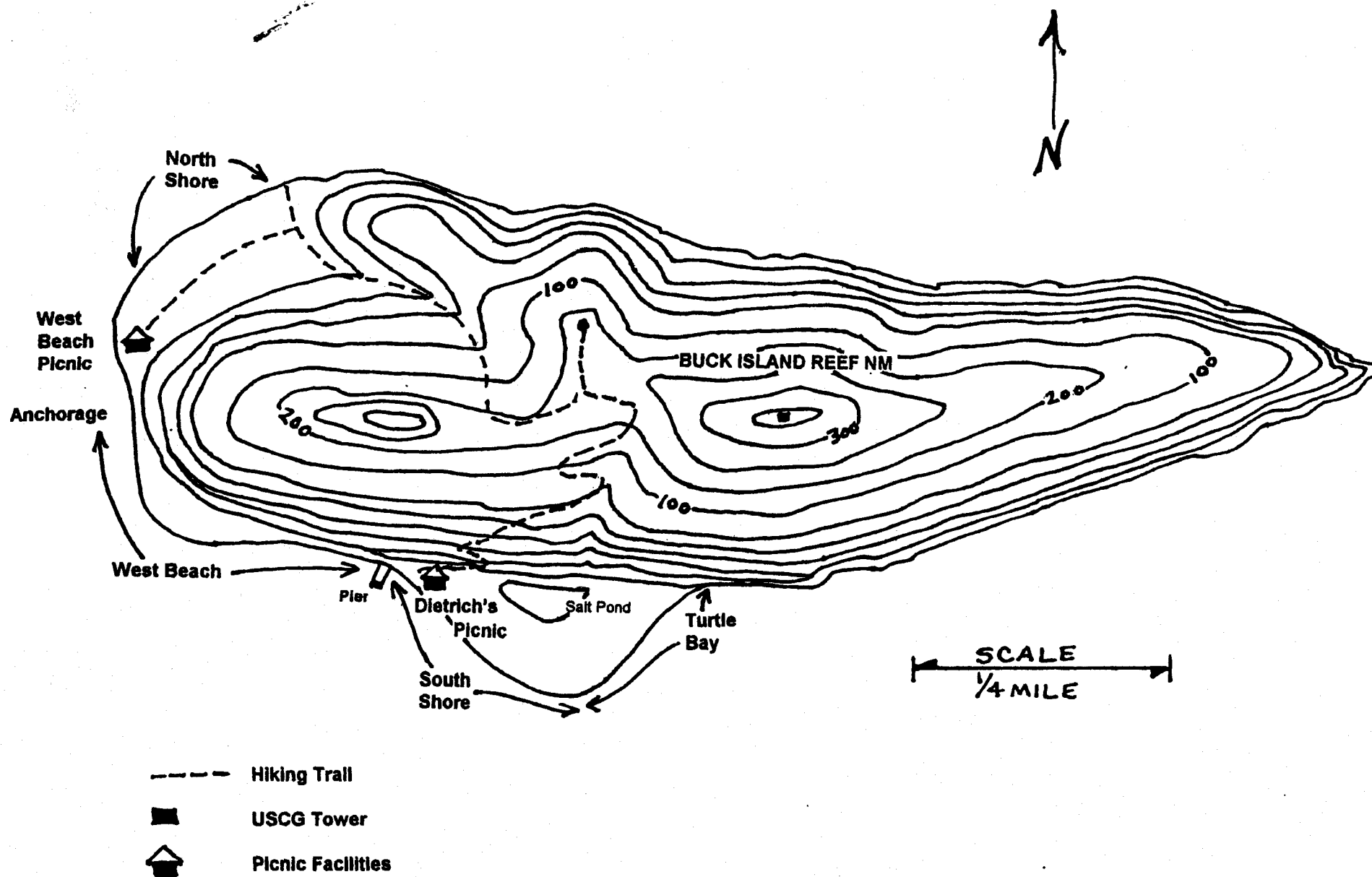
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Filename: RATEA.WPD

Figure 1. Topographical Map, Buck Island Reef NM, St. Croix, VI.





BUCK ISLAND REEF NM

Figure 3. Picnic Areas (West Beach and Dietrich's) Bait Distribution.

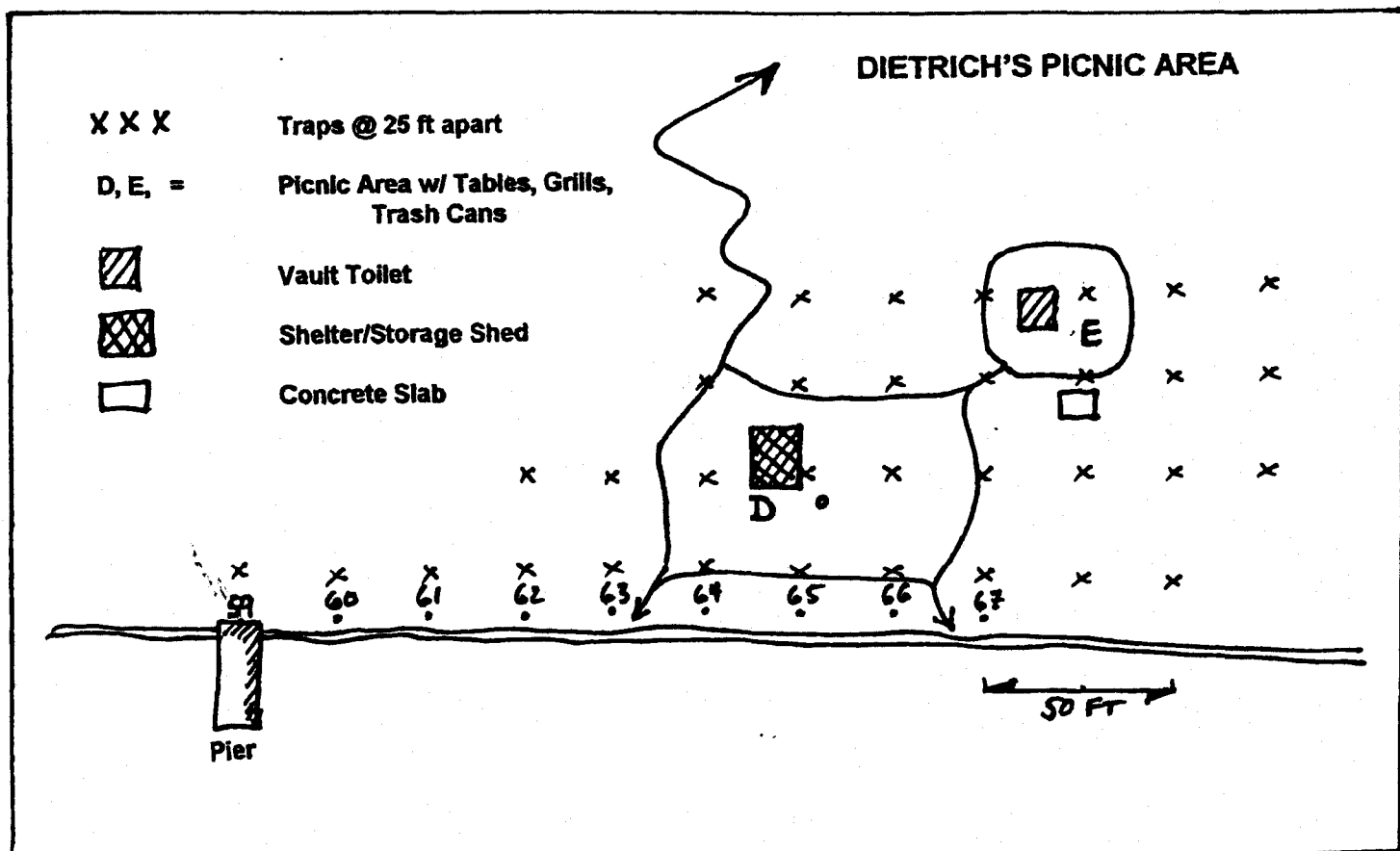
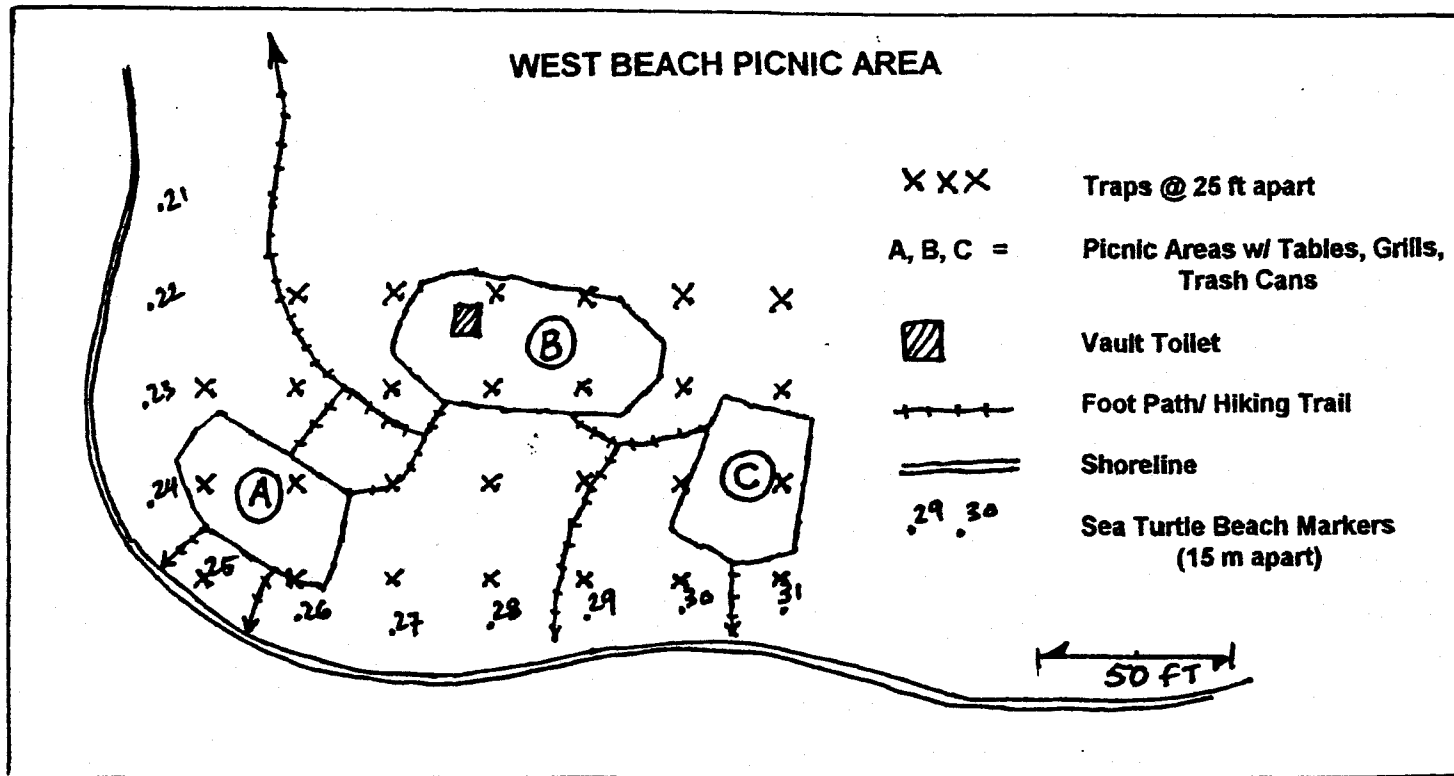
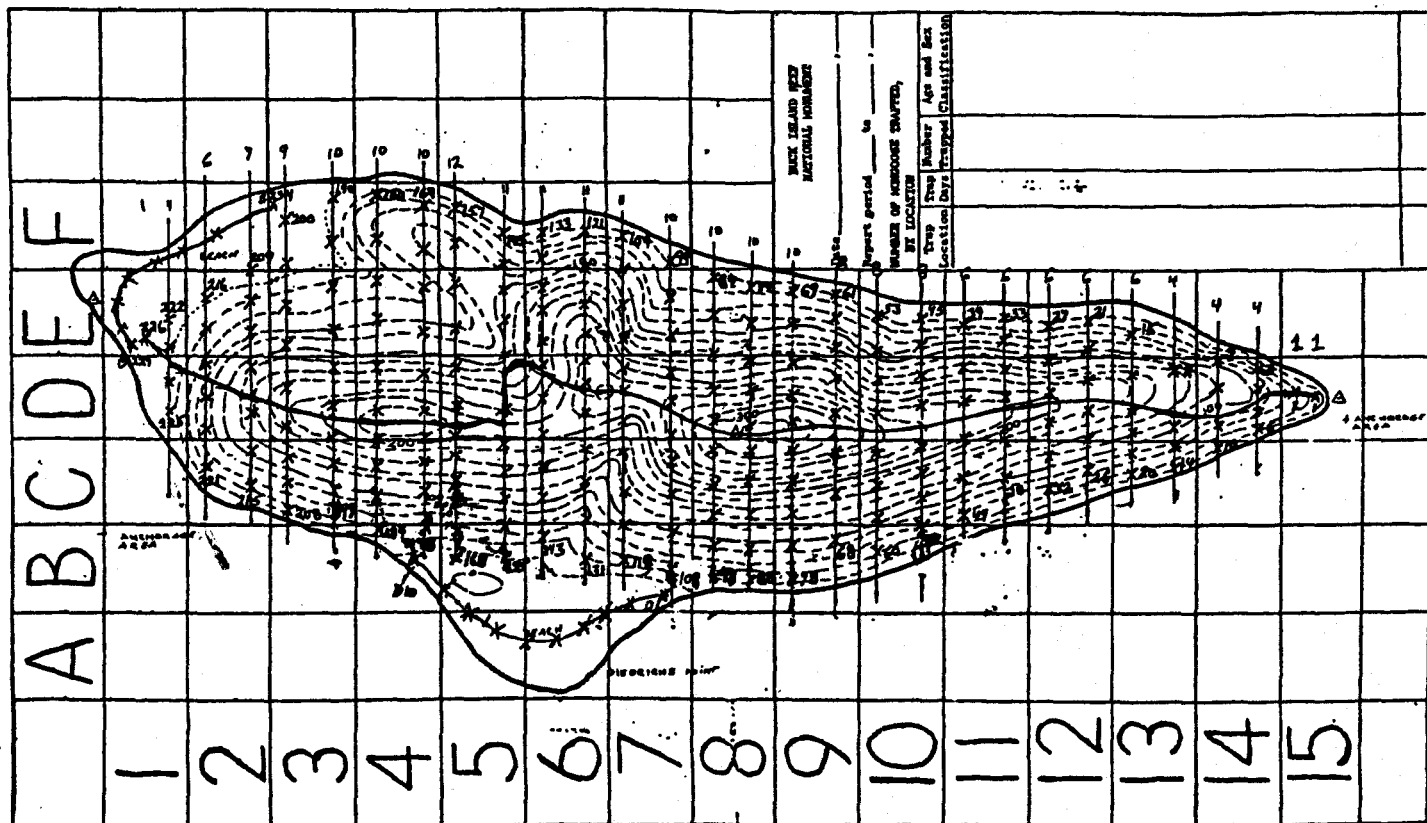
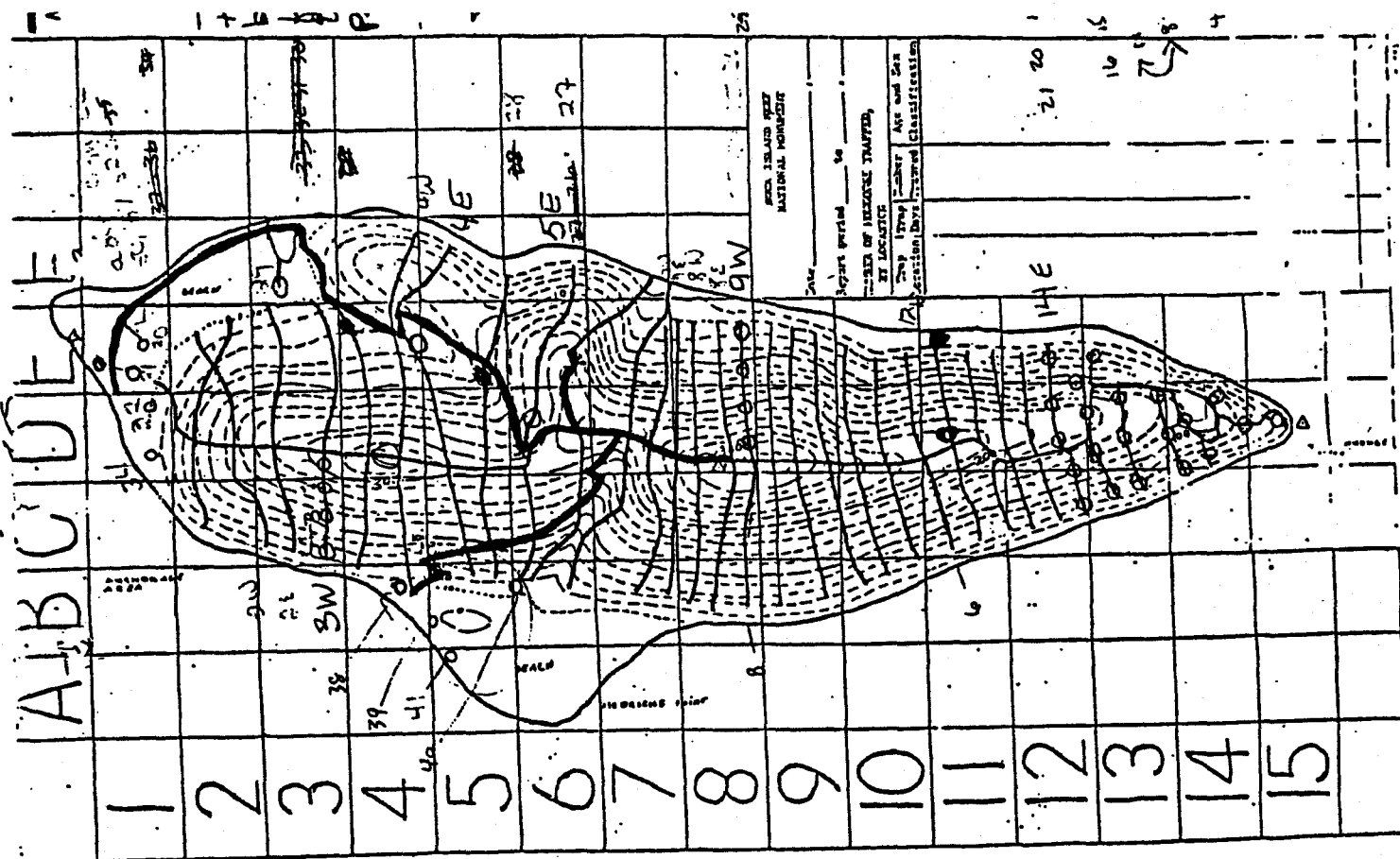
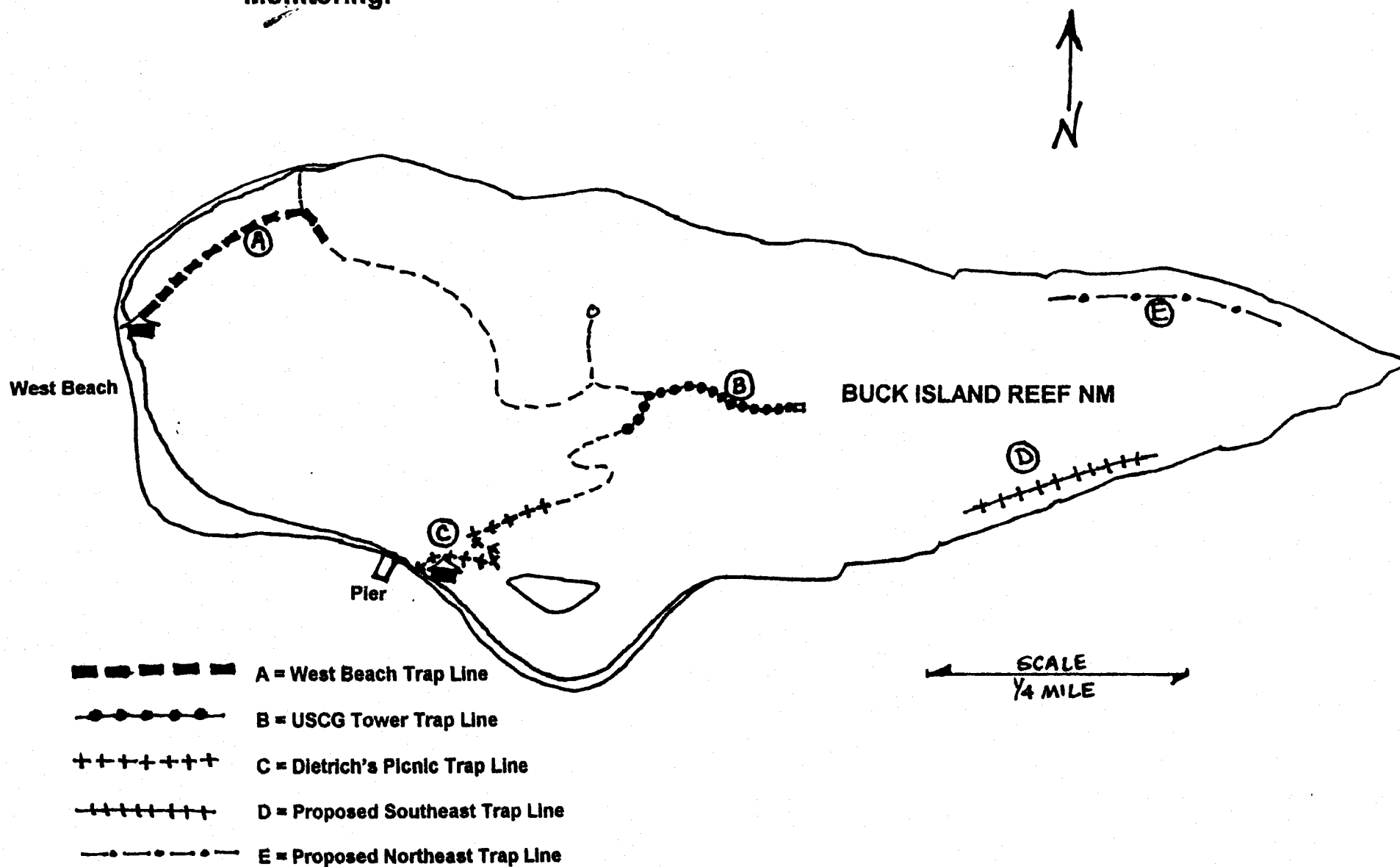


Figure 4. Island-wide Trail System and Trap Distribution for Mongoose Eradication Program, 1980, Buck Island Reef NM.



SCALE
1/4 MILE

Figure 5. Map of Trap Census Locations, 1998, and Locations of 2 Additional Trap Census Locations for Rat Population Monitoring.





United States Department of the Interior

FISH AND WILDLIFE SERVICE

Boqueron Field Office
P.O. Box 491
Boqueron, Puerto Rico 00622



May 7, 1999

Ms. Zandy Hillis-Starr
Resource Management Division
National Park Service
Buck Island Reef National Monument
2100 Church Street, Kings Wharf #100
Christiansted, St. Croix, U.S. Virgin Islands 00820-4611

Re: Rat Eradication Program
Buck Island Reef National Monument
St. Croix, USVI

Dear Ms. Hillis-Starr:

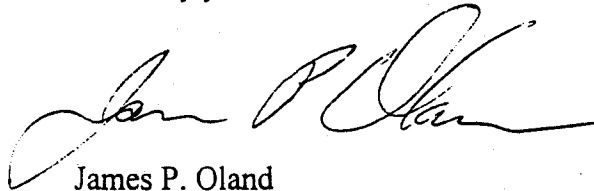
This responds to your request of April 12, 1999, for our concurrence with your rat eradication program which proposes the following objectives, as specified in your letter:

1. Remove exotic roof rats from Buck Island Reef National Monument.
2. Improve island-wide conditions for native flora and fauna's including endangered sea turtle nesting, least tern nesting, and *ligum vitae* restoration.
3. Eliminate potential threat to visiting public.
4. Provide safe and suitable habitat for re-introduction of St. Croix Ground Lizard.
5. Increase public and territorial conservation agencies' awareness to threats from exotic species.

We concur that the types of activities described in your letter and the eradication plan attached, will not adversely affect endangered or threatened species present at the monument. Should additional information on listed or proposed species become available, this determination may be reconsidered.

Our comments are provided in accordance with the Endangered Species Act (Act) of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). If you have any questions regarding this letter, please contact Marelisa Rivera of this office at 787-851-7297 x 31.

Sincerely yours,

A handwritten signature in black ink, appearing to read "James P. Oland". The signature is fluid and cursive, with a large initial "J" and "P".

James P. Oland
Field Supervisor

mtr

JUN- 9-99 WED 10:19
JUN- 9-99 WED 9:38

FISH AND WILDLIFE STT
DFW STX

FAX NO. 8097753972
FAX NO. 09

P.01
P.01



GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
LAGOON STREET COMPLEX, ROOM 203, FREDERIKSTED
ST. CROIX, U.S. VIRGIN ISLANDS 00840
(340) 772-1355 OFFICE (340) 772-3227 FAX

9 June, 1999

MEMORANDUM

TO: Zandy Hillis-Starr, NPS
THRU: Barbara Kojis, Director DFW *Barbara Kojis*
FROM: William Knowles, DFW Wildlife Biologist III *William Knowles*
RE: Rat eradication, Buck Island Reef National Monument

The Division of Fish and Wildlife supports the National Park Service Plan to eradicate rats from Buck Island Reef National Monument. The removal of rats has the potential to improve nesting success for Hawksbill Turtles and Least Terns. The proposed protocol and products will minimize potential impacts. Clearly the benefits are much greater than the costs.

Buck Island Reef National Monument
Terrestrial Species List

Family	Rat Impact	Common Name	Genus / species	Habitat	Status
Reptiles		Cotton Ginner Gecko	Sphaerodactylus beattyi	All habitats	Native
		Dwarf Gecko	Sphaerodactylus macrolepis	All habitats	Native
		Green Anole	Anolis sp.	All habitats	Native
	Y	Green Turtle	Chelonia mydas	Shoreline	Threatened
	Y	Hawksbill Sea Turtle	Eretmochelys imbricata	Shoreline	Endangered
		House Gecko	Hemidactylus mabouia	Under litter/debris	Native
		Leatherback Turtle	Dermochelys coriacea	Open Beach	Endangered
	Y	St. Croix Ground Lizard	Ameiva polops	Shoreline Veg	Endangered
Invertebrates	Y	Ghost Crab	Ocypode quadrata	Shoreline Veg	Native
		Great Land Crab	Cardisoma guanhumi	All habitats	Native
	Y	Hermit Crab (Soldier)	Coenobita clypeatus	Shoreline	Native
		Mangrove Land Crab	Ucides cordatus	Shoreline/mangrove	Native
		Sally-lightfoot Crab	Grapsus grapsus	Shoreline reef	Native
		Whelk	Cittarium pica	Shoreline reef	Native
Birds	Y	Bahama Duck	Anas bahamensis	Saltpond/cliffs	Native
		Bananaquit	Coereba flaveola	All habitats	Native
		Belted Kingfisher	Megasceryle alcyon	Shoreline/forest	Native
		Black-bellied Plover	Squatarola squatarola	Shoreline	Seasonal
		Black-faced Grassquit	Tiarus bicolor	All habitats	Native
		Black-necked Stilt	Himantopus mexicanus	Shoreline	Native
		Black-whiskered vireo	Vireo altiloquus	Uplands forest	Native
		Brown booby	Sula leucogaster	off shore buoys	Native
	Y	Brown Pelican	Pelecanus occidentalis	NE upland rookery	Endangered
		Caribbean Elaenia	Elaenia martinica	Uplands	Native
		Chuck-will's widow (Night Jar)	Caprimulgus carolinensis	Uplands/forest	Native
		Emerald-throated Hummingbird	Sericotus holosericeus	All habitats	Native
		Gray Kingbird	Tyrannus dominicensis	Upland forest	Native
	Y	Ground Dove	Columbaigallina passerina	Upland forest	Native
		Killdeer	Charadrius vociferus	Shoreline	Native
	Y	Least Tern	Sterna antillarum	Open Beach	Threatened
		Lesser Yellowlegs	Tringa flavipes	Shoreline	Native
		Little Blue Heron	Florida caerulea	Shoreline, saltpond	Native
		Magnificent Frigate Bird	Fregata magnificens	North cliff faces	Native
		Mangrove Cuckoo	Coccyzus minor	Uplands	Native
	Y	Mourning Dove	Zenaida macroura	All habitats	Native
		Osprey	Pandion haliaetus	Shoreline, cliffs	Seasonal
		Oyster Catcher	Haematopus palliatus	Shoreline	Native
		Pearly-eyed Thrasher	Margarops fuscatus	All habitats	Native
		Peregrine Falcon	Falco peregrinus	All habitats	Seasonal
		Red-tailed Hawk	Buteo jamaicensis	All habitats	Native
		Royal Tern	Sterna maxima	Shoreline	Native
		Ruddy Turnstone	Arenaria interpres	Shoreline	Native
		Smooth-billed Ani	Crotophaga ani	Upland Forest	Native
		Spotted Sandpiper	Actitis macularia	Shoreline	Native
	Y	White-crowned Pigeon	Columba leucocphala	Beach forest	Native
		Wilson's Plover	Charadrius wilsonia	Shoreline	Native

Buck Island Reef National Monument
Terrestrial Species List

Family	Rat Impact	Common Name	Genus / species	Habitat	Status
Birds (cont.)		Yellow Warbler	Dendroica petechia	Upland forest	Native
		Yellow-crown Night Heron	Nycticorax violaceus	Shoreline	Native
		Zenaida Dove	Zenaida aurita	Uplands	Native
Plants		Acacia	Acacia tortuosa	All habitats	Native
		Bi-color shrub	Croton discolor	Upland slopes	Native
		Black mangrove	Avicennia germinans	Salt pond	Native
		Bromeliad, air plant	Tillandsia utriculata	Upland forest	Native
		Bromeliad, exotic	Bromelia pinguin	Beach forest	Exotic
		Buttonwood	Conocarpus erecta	Salt pond	Native
		Century Plant	Agave missionum/ eggersiana	Upland	Native
		Christmas bush	Euphorbia leucocephala	All habitats	Native
		Coconut palm	Coco nucifera	Shoreline	Exotic
		Dogwood, Fish poison	Piscidia carthaginensis	Upland forest	Native
	Y	Ficus, short leaf fig	Ficus citrifolia	All habitats	Native
		Frangipani	Plumeria alba	Uplands	Native
		Ginger Thomas	Tecoma stans	Uplands/trail edge	Native
		Guinea grass	Panicum maximum	Open uplands	Exotic
		Half flower, waxy bush	Erithalis fruticosa	Shoreline, Beach	Native
		Inkberry bush	Randia aculeata	Upland forest	Native
		Ironwood	Krugiodendrom ferreum	Upland forest	Native
	Y	Jamaican caper	Capparis cynophallophora	Upland	Native
		Kinep	Melicoccus bijugatus	Picnic area	Exotic
	Y	Lignumvitae tree	Guaiacum officinale	All forested areas	Endangered
	Y	Limber caper	Capparis flexuosa	Upland	Native
		Manchineel	Hippomane mancinella	Beach forest	Native
	Y	Manjack, Geiger-tree	Cordia rickseckeri	All habitats	Native
		Needle bush	Suriana maritima	Shoreline, Beach	Native
		Nicker Bean	Caesalpinhi crista	shoreline/b. forest	Native
	Y	Organpipe cactus	Pilosocereus royenii	Shoreline-Uplands	Native
	Y	Pigeon-berry	Bourreria succulenta	Uplands	Native
	Y	Pink cedar	Tabebuia heterophylla	Uplands	Native
	Y	Prickly pear cactus	Opuntia repens	Uplands	Native
		Purple sage	Lantana involucrae	All habitats	Native
		Purslane	Portulaca oleracea	Shoreline	Native
		Samydia	Samydia dodecandra	Uplands	Native
	Y	Sandy Point Orchid	Eidendurm bifidum	Uplands	Rare Native
		Sea Grape	Coccolobia uvifera	Beach Forest	Native
		Sea grape, native	Coccoloba microstachya	Salt pond	Rare/Native
		Seaside maho	Hibiscus tiliaceus	Shoreline	Native
		Shrub thicket	Croton rigidus	Uplands	Native
	Y	Cotorro	Adelia ricinells	Uplands/forest	Native
		Stinging bush	Malpighia pallens	Upland slopes	Endangered
		Stinging nettle, vine	Tragia volubilis	Uplands/trail edge	Native
		Tamarind	Tamarindus indica	B. forest/uplands	Exotic
		Tan Tan	Leucaena glauca	Open Uplands	Exotic
		Thicket, dense	Cordia stenophylla	Uplands	Native
	Y	Turk's cap cactus	Melocactus intortus	Shoreline/Uplands	Native
		Turpentine	Bursera simaruba	Uplands	Native

Buck Island Reef National Monument
Terrestrial Species List

Family	Rat Impact	Common Name	Genus / species	Habitat	Status
Plants (cont.)	Y	Water mampoo	Pisonia subcordata	All elevations	Native
		White mangrove	Laguncularia racemosa	Salt pond	Native
		White manjack	Calyptrocordia alba	Uplands	Native
		Yellow prickly, sticky bush	Zanthoxylum monophyllum	All habitats	Native
Mammals					
		Mongoose	Herpestes auropunctatus	All habitats	Exotic
		Tree or Roof Rat	Rattus rattus	All habitats	Exotic

APPENDIX D. Standard Bait Box Design.

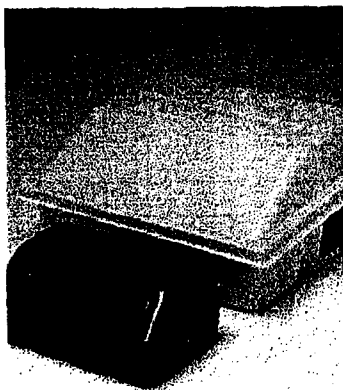
With the new liner, service time is reduced. PCOs can clean and re-bait PROTECTA LP easily, especially when the bait station is nailed or staked down for security. A pull-tab makes it easy to lift out the liner which can be cleaned for reuse, or it can be disposed of properly and a new one inserted.

The liner keeps PROTECTA LP looking clean and professionally tended.

PROTECTA LP liners, now available, are sold separately.

Visit our [October 1997](#) newsletter and read more about the PROTECTA LP Plastic Liner.

Rodent Baiters



RODENT BAITERS for rats and mice are rigid plastic bait stations designed to hold liquid or dry bait. They fit flush against the wall allowing easy entry for rodents.

Buttons on the base of RODENT BAITERS allow air to pass under the station, keeping moisture condensation away from the bait.

RODENT BAITERS for rats have an automatic lock back and nylon securities for the front. They are available in black or high visibility USDA blue. The baiters measure 9" x 8" x 4-1/2" high.

RODENT BAITERS for mice have a snap-lock top and feature retaining bars in the base to accommodate tracking powder. They are made of sturdy black plastic and measure 6" x 4" x 2-1/8" high.

Handy service labels are available for RODENT BAITERS. The pressure-sensitive labels come in rolls of 100.

[Contrac](#) ♦ [Ditrac](#) ♦ [Final](#) ♦ [Liqua-Tox II](#) ♦ [Quintox](#)
Trapper



[[Home](#) | [Talk to Us](#) | [PestWeb](#)]

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The National Park Service

Integrated Pest Management System

USER: 'IPM BUIS'

Main View	Browse Proposals	Create Proposal	Search by Pest	Modify Defaults	Reports	Help
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IPM Proposal	IPM Proposal	IPM Proposal
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Status:

Not Reviewed

Official:

Chris Ferguson

Date:

// 8-26-99
(MM/DD/YYYY)

Have SERO IPM Coordinator
phone approval // Conditional SERO Approval

Proposal Number:

BUIS-1999-001

Central Office:

Southeast Region

State:

PR

RMP Number:

Pest 1:

RATS

Pest 2:

MONGOOSE

Pest 3:

Select Pest #3

Type:

Rodenticide

Herbicide:

Select a Herbicide Type

* Please enter either a Product or an EPA Number. (Do not enter both!)

Product:

ALL WEATHER BAIT BLOCKS RODENTICIDE, 56-42

EPA Number:

56-42, ALL WEATHER BAIT BLOCKS RODENTICIDE

Manufacturer:

J.T. EATON

Purpose:

Endangered species

Active Ingredients

	Code	Name	Conc
1	DIPHAC	2-DIPHENYLACETYL-1,3-INDANDIONE; DIPHACINONE	0.00010
2			0.00000
3			0.00000
4			0.00000

Method:

Bait

Site 1:

PICNIC GROUNDS

Site 2:

FOREST

Start Month:

August

End Month:

December

** Please enter either the approximate number of acres or square feet to treat. (Do not enter both!)*

Acres To Be Treated:	176.0000
Sq. Feet To Be Treated:	7666560.0000

Is the mgt. zone pesticide will be applied to cultural?	N
Is the mgt. zone pesticide will be applied to natural?	Y
Is the mgt. zone pesticide will be applied to special?	Y
Is the mgt. zone pesticide will be applied to developed?	N
Are any of the pests to be managed exotic species?	Y
Will multiple applications be required during the year?	Y
Was the application of the pesticide approved last year?	N
Is the product classified by EPA as "restricted user"?	N
Is there potential impact on Threatened/Endangered species?	N
Will the pesticide be applied to a body of water?	N
Does the park monitor population trends of the pest(s)?	Y
Is there an established population threshold?	Y
Have non-chemical control methods been attempted?	Y
Year of Last Approved IPM Plan:	pending
IPM Contact:	Zandy Hillis-Starr
Coord. With:	same
Phone:	340-773-1460, ext 35
Coord. Phone:	

Total Lbs. Active 1 Applied	Total Lbs. Active 2 Applied	Total Lbs. Active 3 Applied	Total Lbs. Active 4 Applied
0.0000	0.0000	0.0000	0.0000

Notes/Memo:

BUIS has received NRPP funding to conduct island-wide rat eradication project beginning FY1999. Project will be conducted through IAA with USDA/Wildlife Services. Rat population status has been established and trends will be monitored throughout project. Special EPA 24c registration has been obtained to use this product in conservation zone (beach forest, upland forest/shrubland) in order to eradicate rats from the island and protect a large number of T&E species and native plants.

national park service

17 August 1999

Buck Island Reef National Monument is one of St. Croix's most beautiful natural areas. It is home to many delicate native plant and animal species, including endangered sea turtles, brown pelicans, threatened migratory shorebirds, and rare species of cactus. Each year thousands of local and off-island visitors come to Buck Island Reef to enjoy the white sand beaches and snorkel on the underwater trail through the elkhorn coral barrier reef.

Over the last several years Buck Island Reef has been devastated by several natural events. Hurricane Hugo in 1989 and then hurricanes Luis / Marilyn in 1995 damaged the island's vegetation and coral reef. Reduced annual rainfall has stressed the native trees and shrubs which are slowly recovering from past hurricane damage. Many of these events are beyond our control, but there is one very damaging activity that we can eliminate -- the non-native rat.

Tree rats are not native to the Virgin Islands. They were accidentally introduced to the West Indies and have no natural predators. On offshore islands rats can become so numerous they can devastate both plant and animal populations. At Buck Island Reef NM, rats have become not only a problem to our visitors in the picnic areas, but their foraging activities are impacting ground nesting shorebirds, sea turtle nests and hatchlings, and many small trees and shrubs. Beginning in 1995, the park's Division of Resource Management started trapping and baiting rats in and around the picnic areas with some success. However, the problem is island-wide and requires a major eradication program.

This month, the park will begin the Buck Island Rat Eradication Program. For the next two years the park will be working with U.S.D.A. / Animal Plant Health Inspection Service's Division of Wildlife Services to trap and bait the rats all over Buck Island Reef NM. We will begin baiting the picnic areas, West Beach and Dietrich's Point, the last week of August. Over the next several months we will extend our baiting program to the entire island. A team of wildlife biologist/pest control specialists will be monitoring the success of the baiting on a daily basis.

In order for this project to be a success we need to ask all visitors to the park to help us with the rat problem. Keep all food items inside containers. Do not leave any food out on the picnic tables unattended. The rats are not afraid of you and will take advantage of any food items not carefully attended. Do not throw any food items in the bushes. And beginning this month -- We are requesting that any food and resulting trash be taken back off the island. We are initiating a "PACK IT IN, PACK IT OUT" Policy at Buck Island Reef National Monument. With your assistance we can make the park a clean and safe island for everyone.

We will keep our visitors informed on the development of the Rat Project and what to expect. All visitors to the Monument are requested to respect and avoid any rat trap or bait station they may find near the picnic areas. Do not touch any rat traps or cages. We hope to reduce the immediate threat of rats in the picnic areas quickly, but ask our visitors for patience in eliminating the problem. We have been advised that island-wide control is possible, but will take years to accomplish.

If you have any questions please contact the National Park Service, 773-1460, extension 22 or 35, Monday to Friday, 8:00 am - 5:00 pm.