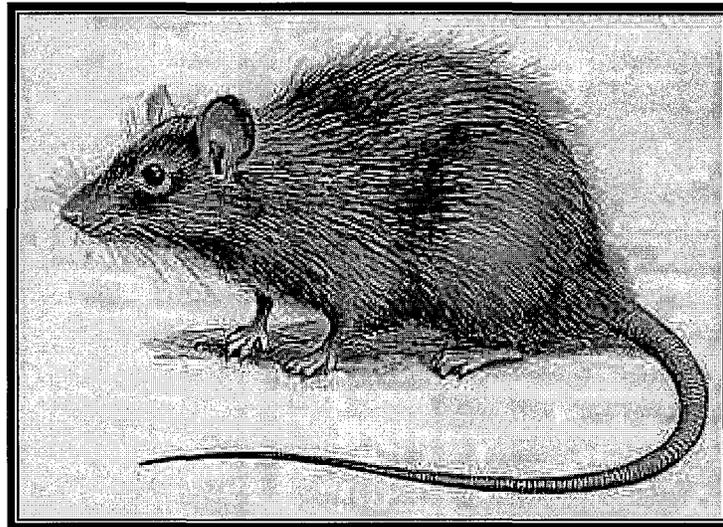


ENVIRONMENTAL IMPACT ASSESSMENT

Rat Eradication Program Sandy Cay, British Virgin Islands

November 2002

(Revised June 2003)



PREPARED BY:

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INTRODUCTION

The Island Resources Foundation (IRF) will shortly undertake a rat eradication and monitoring program for Sandy Cay, a 14 acre, privately owned, uninhabited island in the British Virgin Islands (see Figure 1). This effort is the first of its kind in the British Virgin Islands and is part of a new IRF program initiative on invasive species management. The purpose of this document is to report on our anticipation and evaluation of the possible short- and long-term environmental consequences of the proposed effort in order to minimize any risk elements.

BACKGROUND AND NEED FOR ACTION

In 2000, Island Resources Foundation carried out an ecosystem characterization for Sandy Cay. At that time, only one rat was reported by visiting investigators. A follow-up trapping effort in 2001 by an IRF team comprising Chris Thomas and Jean-Pierre Bacle captured about half a dozen rats during a single night on the island. An investigative overnight visit to Sandy Cay by Mr. Bacle, Dr. Christopher Howell (IRF) and consultant Karen Varnham in July 2002 concluded that the island had acquired a significant population of black or tree rats, *Rattus rattus* and that the presence of rats is undoubtedly having a negative effect on the ecosystem of Sandy Cay.

Our field research suggests that Sandy Cay's rats are living up to their reputation as highly omnivorous and opportunistic feeders, and that there are signs of rats exploiting a wide range of food sources on the islands. Chewed crab shells were found in many localities, and a high proportion of seed of the abundant Nothing Nut tree, *Cassine xylocarpa* was found with rat tooth marks, both on the ground and on the plant. Tree branches with burrowing beetle larva inside were found chewed open by rats seeking access to the edible larvae inside. Such longitudinal incisions were often several inches long as the rats pursued their quarry by chewing open the "chamber" to catch and remove the larva with skill. Rats gnaw to keep their incisor teeth sharp and worn down, as these teeth grow over 5 inches a year. This gnawing causes considerable damage to the vegetation.

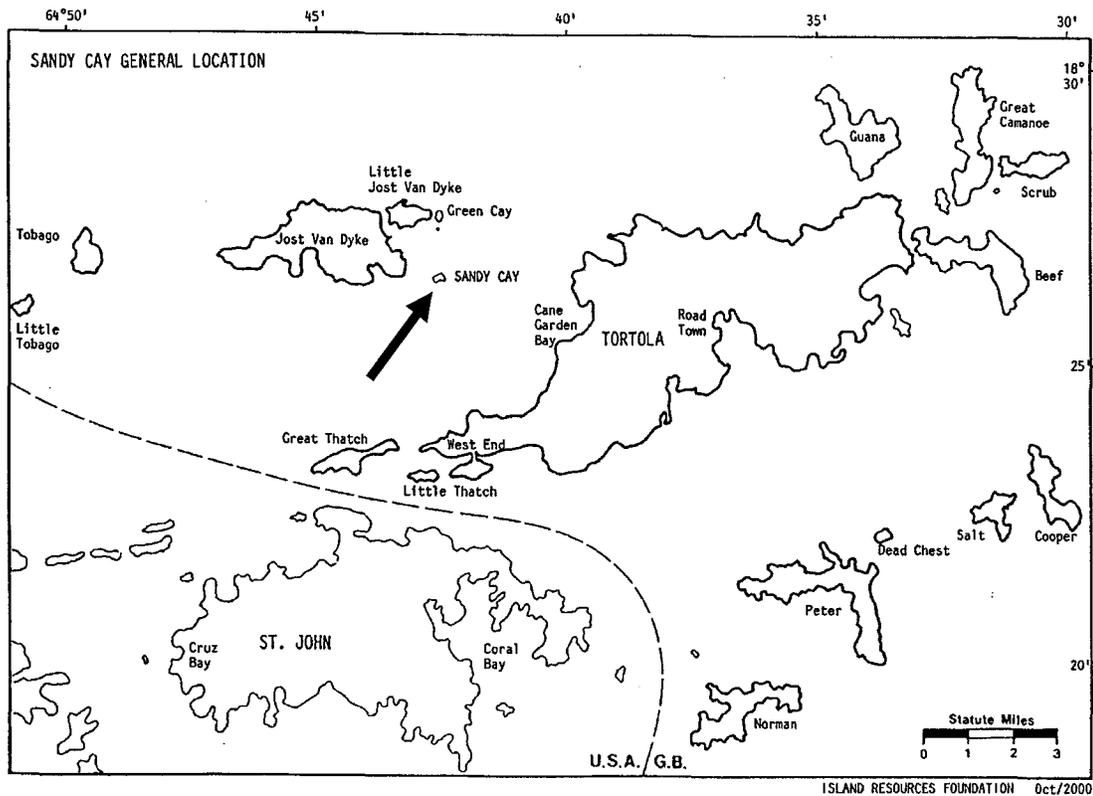


Figure 1. Location of Sandy Cay, British Virgin Islands.

Black rats are known to be excellent climbers and have no difficulty reaching almost all parts of the vegetation on Sandy Cay, even on the rocky cliffs where the seabirds nest. They are known to eat invertebrates, lizard and bird eggs and young, as well as almost all edible parts of plants including seed, flowers and growing tips.

Rats pose a significant threat to the native species and long-term resource management of the island. The eradication of rats from Sandy Cay is an achievable and highly desirable goal. The island's small size (14 acres) and the relative ease of access to most parts of the cay make it a reasonable candidate for a rat eradication program. The Sandy Cay bird population is potentially at risk, and therefore time is of the essence.

ENVIRONMENTAL IMPACTS

The purpose of this environmental assessment is to evaluate the possible impacts of the eradication and post-eradication monitoring program, which has four sequential phases:

- 1) Planning and Mobilization,
- 2) Setting up the baiting grid,
- 3) Poisoning phase, and
- 4) Post-eradication monitoring phase.

PHASE I – Planning and Mobilization

Investigators will review extant literature on rat eradication efforts deploying rodenticide bait. See the list of references at the end of this report, which have been selected as specific to islands. A complete set of these reports is available for review at the Island Systems Environmental Information Centre maintained by IRF and the H. Lavity Stoutt Community College (HLSCC) at 123 Main Street, Road Town, Tortola.

Environmental Impacts

Mobilization will have some minor adverse influence on the cay as there has been a general rule of no overnight visitors or campers allowed on the island. However, it will be necessary to have a project research team camp on the island for approximately three weeks for reasons of efficiency and security. Caution will need to be exercised regarding the siting of any campsite and the careful removal of any and all evidence of the team's scheduled presence on the cay. Ideally, a temporary mooring should be installed, and all trash must be removed (not buried).

It is essential to minimize the effect on vegetation of trail cutting for bait emplacement. Guidance by the professional vegetation manager for Sandy Cay would be desirable.

Routine visitors to Sandy Cay may be disturbed to discover a rat eradication project underway. Explanatory handouts should be prepared for distribution (and warning) to visiting yachtsmen and other recreational visitors.

PHASE II – Setting up the Baiting Grid

This activity involves cutting a series of narrow trails in order to facilitate bait placement across the whole surface of the island (Figure #2). A grid spacing of 30 meters is planned and would involve cutting a series of narrow trails running north-south, 30 meters apart hence creating a network of bait points in a 30 x 30m grid pattern. A further line of bait points will be placed at closer intervals around the vegetation perimeter of the island, as rats on small islands spend more time foraging around the strand line. The effort will involve about 15 person days. Trails will be marked with removable plastic surveying tape.

Environmental Impacts

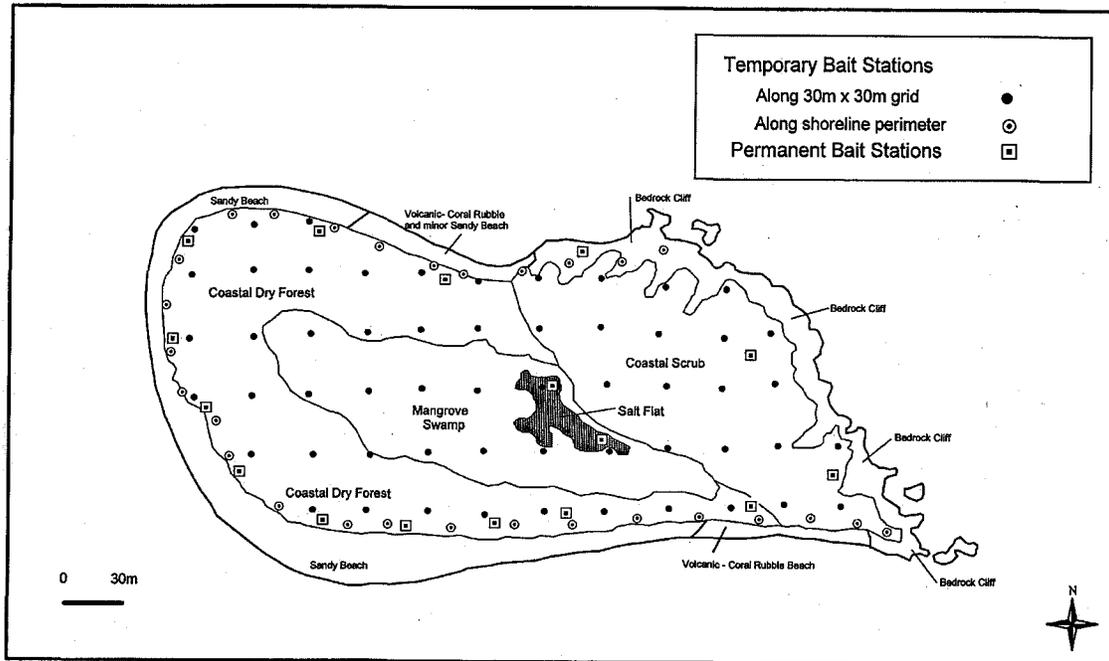
The environmental impacts will be minimal in the short term. The cutting of trails will be kept to a strict minimum, only wide enough for one person to move down the trail. The ends of the trails and where cut trails intersect the existing nature trail will be disguised to prevent tourists from using them. Experience on other Caribbean islands shows that such trails become overgrown within a year, often much less depending on rainfall.

The field crew working during this phase will be carefully directed to avoid unnecessary trail clearing. Cuttings will be dispersed along the undergrowth away from the nature trail. Following the setting up of the grid, all material related to the field crew's activities will be removed from the island.

PHASE III – Poisoning

Rodenticide bait will be placed at every bait points along the 30m x 30m grid pattern. About 30kg of bait will be required for this phase. The bait poison will consist of small wax blocks (20g) containing 0.005% brodifacoum, an anticoagulant used in the majority of successful rat eradication programs. Poisoned rats customarily retreat to their burrows or nests and bleed to death through internal hemorrhaging. Brodifacoum is highly effective at small doses. Typically a rodent ingests a fatal dose, often at a single feeding, and will die within 4-5 days. Poisoning will commence immediately following the completion of the grid and will continue for three weeks. This will involve daily checks and bait replacement for the first two weeks followed by checks every two or three days for the next week.

Figure #2: Sandy Cay Rat Eradication Project / Location of Bait Stations



Prepared by: J.P. Bacle, Island Resources Foundation, November 2002

Environmental Impacts

Environmental impacts associated with the poisoning phase will be minimal. Risks to non-target species on the island have consistently proven to be small. There are no native mammals on Sandy Cay. Birds and, to a far lesser extent, lizards are also susceptible to brodifacoum. The risk of non-target poisoning is reduced by the fact that the bait is formulated in a solid wax block, so no resident birds or lizards are likely to consume it directly. There may be a risk to species that might scavenge the corpses of poisoned rats, but the only such species seen on Sandy Cay is the Laughing Gull, *Larus atricilla*. The Laughing Gull is generally common from April to September and becomes irregular during the remainder of the year. To minimize this small risk, all rat carcasses found above ground, customarily a very limited number, will be promptly removed and incinerated.

Invertebrates are physiologically unaffected by brodifacoum, and the majority of species are unlikely to attempt to consume the rodenticide. However, the island supports a high population of hermit crabs, *Coenobita spp.* and past experience indicates that they are capable of consuming large amounts of rat bait. While crabs (like all invertebrates) are unaffected by this particular toxin, they may consume most or all of the rodenticide before the rats have had the opportunity to find it. For this reason, bait will be carefully positioned at each site and monitored to minimize exposure to hermit crabs. For instance, poison baits can be suspended from a lower branch by a nylon string or placed on a small can or short stake above ground. Because the crabs rapidly learn the location of bait points and cluster around them in large numbers, such bait points can also be shifted by a few meters on a daily basis.

Brodifacoum is highly susceptible to degradation by soil bacteria, such that any bait getting into the ecosystem would be broken down into its inert components within a year. There are no freshwater streams or pools on Sandy Cay to be affected by the toxin. It is possible that some of the toxin will eventually enter the surrounding seawater via the faeces of crabs, but the amounts will be small. Brodifacoum is not soluble. Plants and fungi are not susceptible to brodifacoum.

There is a rare possibility that a visiting boat might bring a dog to the island, which may be at risk of secondary poisoning through eating dead or dying rats. Warning signs will be displayed on the island near the boat-landing site for the duration of the poisoning phase.

Following the successful poisoning phase, all material left over—bait, string, wire and flagging tape—will be collected and removed from the island. Trails will be plugged with brush and fronds cleared from the main sightseeing trail.

PHASE IV – Post-eradication Monitoring Phase

Following the successful eradication of rats, a network of 16 permanent bait stations will be set up primarily around the perimeter of the island, especially in the coastline vegetation where rats are most likely to first reach and land on the island, probably from boats landing at the south-westerly beach area (Figure #2). We do know that rats can swim—often in clusters—long distances, from island to island. They could easily arrive anywhere along the rocky eastern end of Sandy Cay, and bait stations should therefore encompass the entire perimeter of the cay.

The bait stations, lockable heavy plastic structures, will be filled with a reservoir of poison bait. Each station, hidden in the coastal bush, will be checked every four to six weeks for signs of rat activity—tooth marks in the bait, or droppings.

Environmental Impacts

There should be no significant adverse environmental impacts associated with the monitoring phase. All permanent stations will be raised above ground, out reach of crabs, by fixing them to the top of empty gallon paint cans. The bottoms of the cans will be fastened into the ground for stability. The tamper-proof permanent rat stations are designed to allow the rats to feed inside the station and ensure that bait placed in the holding chamber of the station remains inside the container.

Useful References Regarding Rat Eradication, Specific to Insular Systems

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