

Appendix L.

Best Management Practices for Visitors to Rose Atoll NWR

Best Management Practices (BMPs) for Rose Atoll NWR are in place to minimize the effects of visitors to the Refuge. They are designed to prevent the introduction of nonnative species and to minimize disturbance of wildlife. There are strict requirements for vessels to have their hulls cleaned and to be treated for insects, mice, and rats, and quarantines for all gear that will be brought to the Refuge to prevent the introduction of plants and insects. Additionally, the use of lights is minimized to prevent disturbing seabirds and sea turtles.

Quarantine Requirements:

Introduced species are a big threat to Rose Atoll. The introductions of rats (*Rattus exulans*), the scale insect (*Pulvinaria urbicola*), and multiple species of ants have caused severe damage to the native communities of Rose Atoll. Rats were successfully eradicated from Rose Atoll in 1992 at considerable expense. The scale insect has contributed to the drastic decline of the pu'a vai forest (*Pisonia grandis*) on Rose Island, and is tended by introduced ants. Other Pacific remote refuges have had various plant, insect, rodent, and other pest species introduced. In some cases, these pests have caused major changes to natural communities, greatly reduced the value of islands as seabird nesting sites, and have cost millions of dollars to control.

While the policies and practices outlined below may seem severe, they are required to prevent other introductions and must be followed. The Service has found them to be effective at preventing new introductions of invasive species on National Wildlife Refuges throughout the tropical Pacific. Remember: just one gravid female or one seed can be enough to introduce an unwanted species. "*An ounce of prevention can be worth millions of dollars in eradication.*"

Suitable Plastic Packing Container:

Packing containers must be constructed of smooth, durable plastic which can be easily cleaned and will not harbor seeds or insects. Corrugated plastic boxes such as mail totes are not acceptable. Packing containers may be re-used for multiple trips to Rose, but must be thoroughly cleaned before each trip.

Quarantine Inspections:

All personal gear, supplies, equipment, machinery, and vessels will be inspected for quarantine compliance by Service staff in Tutuila prior to departure for Rose Atoll.

Prohibited Items:

- Fresh fruits and vegetables, rooted plants, cuttings, flowers, and seeds;
- Soil, sand, and gravel;
- Animals; and
- Cardboard (paper and plastic cardboard harbors seeds and insects).

Regulated Items:

Food items have the potential to carry alien pests and are therefore selected, packed, and shipped with great care. Fresh fruits and vegetables are not allowed on Rose Island. Wood products often harbor seeds and insects. Therefore, only treated wood that has been painted or varnished may be taken to Rose. Wood items must be approved by the Refuge Manager.

Packing Procedures:

Ensure that the environment selected for packing has been well cleaned and free of seeds and insects. Keep packing containers closed as much as possible throughout the packing process so insects cannot crawl in before the containers have been securely closed. Quarantine procedures should be performed as close to the transportation date as possible to minimize the chances for pests to infect them.

Clothing and Soft Gear:

All persons going ashore on Rose Island or Sand Island must have NEW or ROSE-DEDICATED clothing and soft gear (including all footwear). This rule applies to anyone stepping on to dry land past the intertidal zone.

All clothing and soft gear must be **frozen for 48 hours** (including both new and Rose-dedicated).

Aquatic Gear:

All aquatic gear such as nets and traps must be Rose-dedicated and must not be used at other research sites.

Dive gear must be visually inspected for any algae or other marine life, soaked in fresh water for 24 hours, and then allowed to dry. Visual inspections should include inside pockets.

Alternatively, dive gear can be soaked in a bleach solution (1 cup bleach/5 gallon water) for a minimum of 5 minutes, and then rinsed in fresh water and allowed to dry.

Sensitive Equipment:

All sensitive gear (optical equipment, computers, satellite phones, and other electronic equipment) need not be frozen or fumigated, but must be thoroughly inspected and cleaned.

Straps for cameras and binoculars or other gear must be visually inspected for seeds and insects and frozen for 48 hours.

Non-Sensitive Equipment and Construction Materials:

All non-sensitive equipment, machinery and construction materials that are water resistant must be steam-cleaned or pressure-washed to ensure the removal of all dirt, insects, and seeds from external surfaces.

All non-water resistant items must be tented and fumigated to kill unwanted pests, or frozen for 48 hours.

Small boats must be thoroughly washed down, fumigated, and hulls carefully cleaned before transport to Rose Atoll NWR.

Commercial Ships and Private Sailing and Motor Vessel Quarantine:

Ship owners or captains will ensure that ships are free of rats, insects, seeds, and all other alien species prior to departing for Rose Atoll. They will ensure that rodent bait stations containing rodenticide and traps have been placed on the ship and barge decks and holds throughout their voyage to Rose as well as throughout the duration of the stay within the Refuge.

Ship owners or captains will notify the Refuge Manager at least 5 working days prior to a vessel departing for Rose Atoll in order to arrange a quarantine inspection. The inspection will be scheduled as close to the departure date as possible.

Ship owners or captains will ensure that all ships entering Rose Atoll have had their hulls cleaned of fouling marine organisms. The ships must depart for Rose Atoll within 14 days of having had the hulls cleaned. All ship hulls must be re-cleaned should the vessel return to a port for greater than 14 days before returning to Rose Atoll. The Refuge Manager must be notified prior to cleaning the hull, in order to observe the cleaning and inspect the hull.

No discharge of ballast water, grey water, sewage (blackwater), or waste of any kind will be allowed by any vessel within 12 nautical miles of Rose Atoll.

Minimizing Disturbance of Wildlife

Seabirds:

Most seabirds exhibit insular tameness, which is behavior characterized by a lack of the wariness you might observe in birds living in areas with terrestrial predators. Because of this, it sometimes appears by their actions as if humans pose no problems for them. In fact there are a number of potentially serious consequences every time a seabird colony is entered, even by experienced researchers.

Mechanical – At most seabird colonies in the central Pacific you will see birds nesting on three different levels; under the ground, on the surface, and in the shrubs and trees. At many times of the year it is difficult to walk in some parts of the colony without stepping on eggs or caving in the burrows of the petrels and shearwaters. Chicks of several of the tern species hide in vegetation so you should be careful about setting your foot where you cannot see the surface of the ground. Ground-nesting gogosina (grey-backed terns) and gogo (brown noddies) are often affected by your activities because they are very timid and nest in open areas that may be travel pathways. If you have occasion to have to walk in burrow areas you must be prepared to rescue a shearwater or petrel by digging if you accidentally cave in its home. Special care should be taken never to leave string or line anywhere in the colony. Seabirds have an uncanny ability to find it and get tangled in any material of this kind.

Thermal – Eggs and small chicks of all the species live a precarious life on the edge of thermal disaster. The attendance pattern of adults reflects this with eggs and tiny chicks rarely left unattended. Great care and attention must be given to avoid keeping a bird off its egg or chick for more than a few minutes. Keep this in mind if you must spend more than 3 or 4 minutes in any area. This is an issue when it is hot as well as when it is cool and wet. When first approaching a site look for any nests or adults flushed from an inconspicuous nest and plan your work to minimize the time parents are kept away from eggs or chicks.

Biological – In some colonies, one species may learn to take advantage of human disturbance to prey upon others. Atafa (frigatebirds) will take chicks and steal nest material from booby nests and other frigatebird nests when the owners of the nest are frightened off by human disturbance. Unattended eggs of ground-nesting species are often eaten by shorebirds such as ruddy turnstones.

When first arriving at the landing area, a careful reconnaissance of existing ground nests in the area of the proposed camp should be made by a person familiar with the behavior of brown noddies and brown boobies. Campsite locations of tents and the cooking area should be chosen to avoid causing any modification of the behavior of incubating or brooding seabirds. Proximity of camp activity to active ground nests will result in a nest failure if the adult bird is too frightened to return and protect the egg or chick from temperature extremes or to feed the chick.

It is also important to be careful with lights when camping. Lights should be kept to a minimum, and should not be pointed into nesting colonies or into trees where birds are nesting. Bright lights can temporarily blind and disorient birds, and cause them to flush. This can cause the bird to hurt itself by falling from the nest or flying into trees, or cause eggs to be broken.

Turtles:

Hawksbill turtles occur in the Refuge, but have not been seen nesting. I'a sa (green turtles) mate and nest on Rose Atoll August–February. Turtles nesting on Rose Island have been known to dig as many as five nest pits before depositing their eggs. To avoid scaring nesting turtles away, lights in camp should be minimized, and red lights should be used August–February.

Land Crabs:

The shells of marine mollusks are abundant on the beaches of Rose Atoll but almost every one of them is already being used by the land crabs resident there. Even the tiniest shells often have young crabs in them so shell collecting is not permitted while visiting Rose.