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# ALASKA'S RAT SPILL RESPONSE PROGRAM

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**Abstract:** The introduction of rodents on an island as a new predator usually interferes with natural island biodiversity, particularly on islands without any native mammalian predators. Many Alaskan islands, and most islands in the Aleutian Island region of the Alaska Maritime National Wildlife Refuge (AMNWR), are free of mammalian predators and are vulnerable to invasion by rodents. Rat introduction to islands can put ground-nesting birds, such as seabirds and endemic landbirds, at risk of extirpation. The refuge is also concerned about additional introductions of house mice. As far as we know, the introduction, or "spilling," of rats onto refuge islands from ships and cargo was accidental, but probably preventable. This paper is about preventing new rodent invasions, especially rats, on Alaskan islands from shipwrecks, and using our experience on AMNWR as a basis for recommendations about improvements in the future.

**Key Words:** Alaska islands, invasive species, rapid response, rodents, rodenticide, seabirds, ship, shipwreck.

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## INTRODUCTION

Rodents, such as Norway rats (*Rattus norvegicus*), have successfully invaded many areas outside their native range and became established throughout the world. In Alaska, rats are established on at least three mainland communities and three communities on Southeast Alaskan islands. Additionally rats breed on some islands in the Aleutian chain of islands. Most Aleutian Islands are part of the Alaska Maritime National Wildlife Refuge (AMNWR), which includes more than 2500 islands and 3.5 million acres. Currently, Norway rats are established on 11 large refuge islands and numerous associated smaller islets (Bailey 1993). Black rats (*Rattus rattus*) are known to occur on one Aleutian Island (Taylor and Brooks 1995).

There several pathways of invasion for rats to Alaskan islands. Rats can reach islands by climbing or swimming from ships, riding ashore in cargo, or escaping from shipwrecks. Rats can eventually reach nearby islets from infested islands by riding floating debris, crossing kelp bridges between islands, or swimming.

Rats invade ships in foreign harbors, United States (US) harbors, and some Alaskan ports. A few islands with refuge land have harbors (Shemya, Adak, Atka, Unalaska, Akutan, Popof, St Paul, St George) with facilities where ships can tie up, but of these, only the islands of Shemya, Adak, Atka, Unalaska and Akutan currently have breeding populations of rats. Additionally, off-refuge

Alaskan commercial harbors of Juneau, Ketchikan, Nome, Petersburg, and Sitka have breeding populations of Norway rats.

The Aleutian Islands are on the great circle shipping route, a favorite route of international ships traveling between the US west coast and Asia. An estimated 31,000 ships use the route annually (NUKA Research & Planning Group, LLC 2006), and some might carry rodents that could infest islands if wrecked on Alaskan shores. Norway rats have invaded one Aleutian Island (Rat Island), because of a shipwreck (Masterson and Brower 1948), and possibly rats invaded other islands from shipwrecks. Prior to World War II (WWII), Alaskan islands were likely invaded by rats from ships in harbors such as Kodiak, Akutan, Unalaska, Attu, and Atka, during the wooden ship days.

During WWII, islands were occupied by Japanese, Canadian and US troops. Rats might have first invaded these military outposts from cargo transported by planes or ships, or from ships directly. Among other islands, airstrips were built on Attu, Shemya, Amchitka, and Adak, and piers were built on Attu, Kiska, and Great Sitkin, where rats became established at this time. Kagalaska might have been invaded after rats became established on Adak Island, as happened on dozens of smaller islets near these large islands. In spite of introductions, rats have not become established on all refuge islands, but reasons why are unclear. The

threat of more refuge islands becoming infested with rats will exist as long as ships harboring rats steer towards or drift on rat-free islands when they are disabled.

AMNWR started working with the communities of the Pribilof Islands in 1993 to keep rodents from becoming established on the islands of St. Paul and St. George. AMNWR later developed a strategy for combating potential rat invasions resulting from shipwrecks. The immediate goal was to prepare for response to a potential “rat spill” from disabled ships to adjacent shorelines. A long-term goal is to maintain a multi-agency team that is trained, experienced, and supplied to prevent new infestations of rodents on islands. Specifically, the strategy is to coordinate with the US Coast Guard (USCG) to keep potentially infested ships from going aground on islands vulnerable to rat invasion. Potential actions include towing ships away from refuge islands and allowing the burning or sinking of distressed vessels. Many ships do not break up quickly when going aground, so boarding grounded vessels to inspect and kill rodents might be possible. Shorelines can be protected from escaping rats using traps and rodenticide bait.

One challenge with shipwreck events is that they occur suddenly, and first response time is critical to successfully preventing island invasions. It is safe to assume the number of rodents reaching shore increases with time after a shipwreck. The scale of the response necessary to capture fleeing rats can quickly increase beyond the availability of personnel or resources.

The primary concern about shipwrecks is for protecting human safety and minimizing environmental damage from an oil spill. However, AMNWR has elevated the concern for potential rodent invasion from shipwrecks with the USCG and others. Response to the potential of rodents escaping from shipwrecks now has been integrated with AMNWR’s participation when disabled ships threaten refuge islands resources from oil spills. Rodent response training is concurrent with the larger, more formal oil spill response training.

## **REFUGE RAT SPILL RESPONSE**

The USCG has primary jurisdiction of management of disabled ships, regardless of location. Through the Coast Guard, the US Fish and Wildlife Service (USFWS) is notified of potential shipwrecks in Alaskan waters and near refuge islands.

The USFWS Alaska Region Oil Spill Coordinator, in Anchorage, is notified by the USCG when a ship in distress is likely to result in a shipwreck. If the ship is near refuge lands, or if it might travel on its own, be towed, or drift near refuge islands, the Coordinator notifies refuge staff. Using information available and first-hand knowledge of the resources at stake, refuge staff begin to evaluate the potential hazard of a rat invasion to refuge lands. Staff provide comments on proposed actions and concerns to the Coordinator, who is the refuge spokesperson to the USCG Incident Commander.

The refuge identifies the location of rat response supplies, notifies qualified staff able to respond to a potential rat spill, and plans logistics to get responders and supplies near the ship grounding. Initial rat spill kits are staged in several locations in Alaska (Adak, St. Paul, St. George, Unalaska, Homer, Anchorage and Juneau), including one first-response salvage ship. Additionally, the Alaska Department of Fish and Game maintains a rat spill response kit on Round Island State Wildlife Refuge. The refuge rat spill response strategy is compatible with a new State Rat Management Plan (draft in review).

Mobile spike camp kits are located in Adak, Homer, and Anchorage. Spike camp kits include basic camping and survival gear for two people to stay on-scene in remote Alaskan locations. The kits are designed as a starting point for outfitting a rat response headquarters. It does not preclude the necessity of transporting additional supplies, such as food and fuel, to the incident scene.

When a ship grounding on the refuge is imminent, refuge staff are deployed to the Incident Command Center, and refuge headquarter staff are dedicated to their support. On-the-scene assessment of the disabled ship and potential invasion points is critical to evaluating the risk of a potential rat spill. Access to the disabled ship often is difficult because of the hazardous environment, and priority always is given to human safety and a potential oil spill. Initial on-the-ground assessment of a potential rodent invasion usually occurs after ship grounding and later in the sequence of oil spill response.

The rat spill response issue is a concern with more than just islands within the Alaska Maritime National Wildlife Refuge. Worldwide, other islands have been invaded by rats from shipwrecks. The refuge recognizes opportunities to improve its Rat Spill Response strategy by examining the issue in a broader, world-wide context.

Near-misses of refuge islands are more common than actual groundings, but consultation between the USCG and the USFWS can reduce risk of groundings on sensitive islands by considering the impact of potential rat spills when evaluating response alternatives.

It is difficult for refuge staff to gain first-hand experience with implementing on-the-ground rat spill response. Since 1994, the refuge has responded on-the-ground to potential rat spills three times (on St. Paul Island in 1987, Chirikof Island in 2002, and Afognak Island in 2003). Since the refuge's rat spill program began, no ship known to have rats has wrecked on a rat-free refuge island.

However, logistic planning for response to potential rat spills has occurred numerous times. In 1997, the freighter Kuroshima ran aground on Unalaska Island, which already was infested with Norway rats. In 2004, the 738-foot Selendang Ayu, carrying soybeans, went aground and split apart on the same island. During July 2006, a 654-foot car carrier, the Cougar Ace, rolled onto its beam south of Adak Island and had to be towed to Dutch Harbor. In December 2006, another bulk grain carrier, the 534-foot Sea Honesty, developed engine problems in the Aleutians and was guided into Dutch Harbor for repairs. Each incident, regardless of how far the rat spill response progressed, provided a valuable experience for the people involved.

## **RAT RESPONSE REGULATORY ISSUES**

### **Personnel Training and Certification**

AMNWR is one of more than five hundred federal wildlife refuges administered by the USFWS. Relative to the size of the refuge, the refuge staff is small. Even if the entire permanent biological staff were trained, certified, and available during a shipwreck, the force would be small compared with the manpower used on the smallest successful island rat eradication. To help maintain an adequate pool of certified pesticide applicators, AMNWR, in cooperation with Alaska Department of Environmental Conservation (ADEC), has sponsored pesticide applicator training that leads to certification. The intent of this training is to qualify more than AMNWR field staff for the application of anticoagulant rodenticides if necessary during a shipwreck event.

### **NEPA and FIFRA**

The AMNWR has completed an Environmental Assessment (USFWS 1993) that satisfies the

National Environmental Policy Act. The EA includes federal action to respond to rat spills on refuge islands. Additionally, a strategic plan to protect island ecosystems in Alaska from the introduction of rodents, including shipwreck response, was prepared in 1995 (DeGange et. al 1995).

According to the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), pesticide products must be approved and registered by the US Environmental Protection Agency (EPA), and must be used according to the label approved by EPA. Section 18 of FIFRA authorizes EPA to allow states to use a pesticide for an unregistered use for a limited time if EPA determines that emergency conditions exist. Authorizations (commonly called emergency exemptions) are granted to state and federal agencies for a specific length of time to control emergency situations. In the past, AMNWR has satisfied FIFRA requirements under Sec. 18, Emergency Exemptions, for using pesticides during rat spills. Currently the refuge is in the process of renewing its Sec. 18 permit.

Pesticides products selected for use in rat spill responses must be approved by the Alaska Department of Environmental Conservation (ADEC). Pesticide regulations are not limited to their application, but also include requirements for transport, storage, disposal, and protection of workers.

In 2003, at the request of the refuge, HACO, Inc., (Madison, WI) manufacturer of Ramik Green (0.005% diphacimone) obtained a revised label (EPA Reg. No. 2393-498) under Section 24(c) of FIFRA for the use of Ramik Green to control Norway and black rats for wildlife conservation purposes on AMNWR. The label has provisions for using Ramik Green in bait stations and inside rodent burrows, both useful methods for preventing rodent invasions of islands from shipwrecks.

Recently a Federal Section 3 label was approved that is applicable to combat non-native rodents in Alaska shipwreck responses in Alaska: Diphacinone 50 Conservation (56228-35). According to this label, the anti-coagulant diphacinone bait may be applied on shore by aerial or hand-broadcast on the ground or in vegetation canopy, inside rodent burrows, and inside bait stations. On disabled vessels, baits may be placed in bait stations.

A Federal Section 3 label for another anti-coagulant bait, Brodifacoum 25 Conservation, is under consideration by EPA. The purpose of this registration is for conservation uses similar to the

Diphacinone 50 Conservation label. If the Brodifacoum 50 Conservation label is approved, it would be an important tool for shipwreck response, especially when invading rats may be resistant to first-generation rodenticides (such as diphacinone). Proposed application methods of Brodifacoum 25 Conservation, a second-generation anticoagulant, includes aerial and hand-broadcast, inside rodent burrows, and bait stations.

The US Department of Agriculture Wildlife Services National Wildlife Research Center and USFWS Pacific Islands Ecological Services coordinated these new agency registrations of rodenticides for control and eradication. The refuge supports these registrations for shipwreck, prevention, and eradication of invasive rodents and the re-registration of rodenticides useful for refuge applications.

Other formulations of rodenticides in Alaska are restricted to use around buildings and structures, which limits their applicability for shipwreck responses. However, these baits are useful for defending harbors and ships from rat infestation, which helps lower the risk of rat spills. EPA is evaluating the ecological risks with nine rodenticides, some of which are used in Alaska. EPA has proposed revising three of the nine rodenticide labels to make them restricted-use pesticides. Restricted-use pesticides can be applied only by certified users. Currently, these rodenticides can be purchased at home supply stores and other commercial outlets in Alaska and used according to the label directions by someone without a Pesticide Applicator's License. EPA also proposes requiring these rodenticides (and perhaps others) to be sold only in tamper-resistant bait stations. The ready availability of these rodenticides in urban stores reduces the need for harbor masters and boat owners to stockpile large amounts of pesticide in case of invasion of their facilities by rodents.

### **Pesticide Use Proposal**

USFWS policy requires a Pesticide Use Proposal (PUP) before any federal action involving the application of pesticides. The refuge requests a PUP annually in case it needs to apply a rodenticide.

### **Endangered Species**

The Endangered Species Act prohibits actions that have a negative impact on endangered species and their habitat. Under this statute, the USFWS must ensure that its pesticide use does not harm,

threaten, or endanger species or their habitats. Endangered species that occur on the refuge include Steller's sea lions (*Eumetopias jubatus*), sea otters (*Enhydra lutris*), and Steller's eiders (*Polysticta stelleri*). The refuge considers all potential shipwreck strategies (choice of toxicant, bait application method, traps, and bait and device placement) to prevent negative impact on endangered species.

### **Alaska Board of Game and Alaska Department of Fish and Game**

Currently, the USFWS has permission from the Alaska Board of Game to use rodenticides to take non-native rodents on refuge lands. Subsequently, the Alaska Department of Fish and Game authorized a Wildlife Nuisance Permit so refuge employees may take non-native rodents on islands within AMNWR. Under Alaska regulations, both authorities are necessary to use pesticides to kill wildlife, including rats, within the State.

### **Other State Requirements**

Ultimately, states have primary responsibility for pesticides used within state borders. Individuals applying restricted-use pesticides must be certified pesticide applicators by ADEC. Certification is also a condition of the Sec. 18 Exemption granted to the refuge to apply baits in a shipwreck response.

A permit from ADEC is required to aerially apply pesticides by helicopter or aircraft within the State of Alaska. In the past, none of the pesticides proposed for use in shipwreck response has been registered in Alaska for aerial application. However, the recent label approved by EPA for Diphacinone 50 Conservation allows aerial broadcast applications. Aerial application likely is not feasible during or soon after a shipwreck because of the planning and resources necessary for an aerial operation. However, if aerial application is practical, the refuge may, at that time, pursue a permit through the ADEC.

Unlike applying pesticides, shooting or trapping rats does not require ADEC certification. However, a state hunting or trapping license is required to shoot or trap wildlife, including rats, in Alaska. However, refuge employees are allowed to take non-native rodents on refuge lands without a sporting license under the authority of the Wildlife Nuisance Permit.

## **RECOMMENDATIONS**

### **Federally-Coordinated Rapid Response Team**

Increased roles for state and federal agencies are needed to facilitate and coordinate the response of federal or international rapid response teams. Federal coordination is needed for a Rapid Response Team for rat spills in the US, similar to rapid response teams called for by the National Aquatic Invasive Species Act. Team members would participate in training internationally, and provide training to state, local, tribal rapid responders. A multi-agency Alaskan team would specialize in rat-spill response in Alaskan waters. For shipwrecks potentially involving refuge lands or trust resources, response would initially be coordinated in Anchorage by the USFWS, and the refuge would be engaged as first-responders.

### **Training**

A workshop was conducted in 2004 to evaluate the refuge's invasive rodent program, and shipwreck response training was included. During that meeting, and subsequent refuge-sponsored and multi-agency rat spill workshops, participants worked through a rat spill scenario. These sessions always provided insights about how to best respond to shipwrecks and prevent rat spills. The refuge continues to provide rat spill response training. Rat response drills, modeled after oil spill response drills, would provide additional practice at integrating different aspects of shipwreck response.

### **Building Rat Spill Response Capacity with Island Eradication**

Rat invasions from shipwrecks could be treated as small-scale island eradications. If there is a predictable limit to range expansion after invasion, it may be possible to treat only a portion of large islands soon after invasion. The restoration of a refuge island in the Aleutians by eradicating Norway rats is a goal of AMNWR and its partners. This project will help AMNWR gain first-hand experience using rodenticide on a larger scale than its harbor prevention program.

The island rat eradication project currently proposed by AMNWR would rely upon the aerial broadcast of brodifacoum rodenticide pellets. Aerial dispersal of rodenticide bait is currently not approved in Alaska, and it is not the first approach that would be considered in shipwreck response. Aerial broadcast is a practical method to treat large areas for the protection of islands soon after

shipwrecks, and it may become an important option if other prevention techniques fail.

In cooperation with The Nature Conservancy and Island Conservation, the refuge is in the planning stage for an eradication of rats from a 2,779 ha (6,861 ac) island by aerial broadcast, potentially as early as late summer 2008, and it would be the first aerial broadcast of rodenticide in Alaska. If successful, the project will demonstrate this method can be applied within the constraints of weather, non-target concerns, and the logistic challenges of Alaska.

Some issues are similar between an eradication of rats on islands after they are established, and prevention of rodents escaping from a shipwreck from becoming established on refuge islands. For example, disturbance to endangered species such as sea lions, sea otters, and Steller's eiders must be minimized, and these animals must be prevented access to areas treated for rats. Impacts of control operations on non-target native wildlife must be considered. As the refuge works through these issues for island rat eradication, we prepare ourselves to better resolve the same obstacles during a large-scale rat response.

If the restoration of Rat Island to rat-free status is successful, then other, larger islands in the Aleutians might be restored to productive sea bird habitat using similar methods if funding becomes available.

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