

Environmental Assessment
Invasive Species Eradication
for
Habitat Restoration
on
Tangik, Poa, and Sud Islands, Alaska

Lead Agency: U.S. Department of the Interior
Fish and Wildlife Service
Alaska Maritime National Wildlife Refuge
Homer, Alaska

Cooperating Agency: U.S. Department of Agriculture
Animal and Plant Health Inspection Services
Wildlife Services WA/AK Program
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Tufted Puffin



Rhinoceros Auklet

Cover photos courtesy of Steve Ebbert (Tufted Puffin) and
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Acronyms Used in this Document

| | |
|--------|---|
| AAC | Alaska Administrative Code |
| ADFG | Alaska Department of Fish and Game |
| AK | Alaska |
| AMNWR | Alaska Maritime National Wildlife Refuge |
| ANILCA | Alaska National Interest Lands Conservation Act |
| APHIS | Animal and Plant Health Inspection Service |
| ARPA | Archaeological Resources Protection Act |
| AS | Alaska Statutes |
| BGEPA | Bald and Golden Eagle Protection Act |
| CCP | Comprehensive Conservation Plan |
| CEQ | Council on Environmental Quality |
| DPS | Distinct Population Segment |
| EA | Environmental Assessment |
| ESA | Endangered Species Act |
| EO | Executive Order |
| FY | Fiscal Year |
| MBTA | Migratory Bird Treaty Act |
| MMPA | Marine Mammal Protection Act |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| NOAA | National Oceanic and Atmospheric Administration |
| NMFS | National Marine Fisheries Service |
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| WS | Wildlife Services |
| WWII | World War II |

Executive Summary

This Environmental Assessment evaluates the impacts of eradicating introduced European rabbits from Tangik and Poa Islands in the Aleutian Islands, Alaska, and introduced hoary marmots from Sud Island in the Barren Islands, Alaska (the Preferred Alternative) compared with a No Action Alternative. Rabbits and marmots have adversely modified native ecosystems on the islands where they have been introduced by disturbing and competing with burrow-nesting seabirds for nest sites and by altering native plant communities. Similar negative effects have been recorded on islands throughout the world where non-native species have caused serious ecological damage. Nevertheless, there are numerous examples, some in Alaska, of successful restoration of native island ecosystems by removing non-native species. Most Alaskan examples have occurred on Alaska Maritime National Wildlife Refuge which was created for the conservation (including restoration) of native biological diversity, particularly including seabirds and their habitats. The Refuge is proposing this action, to remove rabbits from Tangik and Poa Islands and marmots from Sud Island, to benefit burrow-nesting seabirds like tufted puffins, ancient murrelets, and rhinoceros auklets as well as native plant communities.

Chapter 1: Purpose and Need for Action

1.1 Background

Conservation of island ecosystems is a primary purpose of Alaska Maritime National Wildlife Refuge (hereafter AMNWR or “the Refuge”) which was created by The Alaska National Interest Lands Conservation Act of 1980 (ANILCA) by combining existing refuge lands and adding new areas that, as a network, provide for the conservation of 80% of Alaska’s seabird nesting colonies (USFWS 1988). Many islands that are now part of the Refuge historically had no native terrestrial mammals, but intentional and accidental introductions of non-native mammals occurred, mostly prior to or during World War II. As a result, there were negative impacts to native species of animals and plants on these Alaskan islands (USDA Bureau of Biological Survey 1938, Murie 1959, Hopkins 1967, Tikhmenev 1978, Bailey 1993), as there has been elsewhere in the world where similar introductions have occurred (Moors and Atkinson 1984, Donlan and Heneman 2007).

Restoration of natural biological diversity by removing introduced species and preventing additional accidental introductions is a major priority of the Refuge¹. The Refuge has identified islands where non-native mammals occur, documented impacts to native birds, conducted some eradications², and assessed benefits of eradication. The major focus of invasive species eradication programs on the Refuge until recently has been on non-native foxes, initially as part of the recovery program for the endangered Aleutian Cackling goose (*Branta hutchinsii leucopareia*) (Byrd 1998). As of 2009, foxes have been eradicated from more than 40 islands and native bird populations have subsequently increased (Byrd et al. 1994, Ebbert and Byrd 2002). Refuge management is now broadening its focus to remove other non-native species such as European rabbits (*Oryctolagus cuniculus*) and hoary marmots (*Marmota caligata*) to aid in the restoration of native island ecosystems.

Specifically, the Refuge is evaluating the environmental impacts of removing introduced European rabbits (*Oryctolagus cuniculus*) from Tangik and Poa Islands in the Aleutian Islands (Figures 1, 2) and hoary marmots from Sud Island in the Barren Islands, Alaska (Figures 1, 3).

1.2 Purpose of the Proposed Action

The Refuge is proposing the eradication of introduced European rabbits from Tangik and Poa Islands in the Aleutian Islands and hoary marmots from Sud Island in the Barren Islands, Alaska (hereafter referred to collectively as “the Islands”). The purpose of the Proposed Action is to restore native ecosystems on these islands. This Environmental Assessment (EA) is being conducted to evaluate the environmental impacts of the Proposed Action, and will be used by the USFWS to solicit public involvement and to determine if this eradication project would have an impact on the quality of the human environment³. This EA is part of the USFWS decision-

¹ Aggressive, coordinated intervention is often necessary to prevent incipient populations from spreading beyond the point where eradication is economically and logistically feasible (National Invasive Species Council 2001, 2003).

² Eradication, as opposed to control, is the desirable and possible outcome of operations against exotic mammals on islands. Parkes (1990, 1993), Bomford and O’Brien (1995) and Myers et al. (2000) have discussed eradication.

³ “Human environment”, as defined in CEQ Sec. 1508.14, shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.

making process in accordance with the National Environmental Policy Act (NEPA), as amended, and its implementing regulations, and the Comprehensive Conservation Plan (USFWS 1988) for the Refuge.

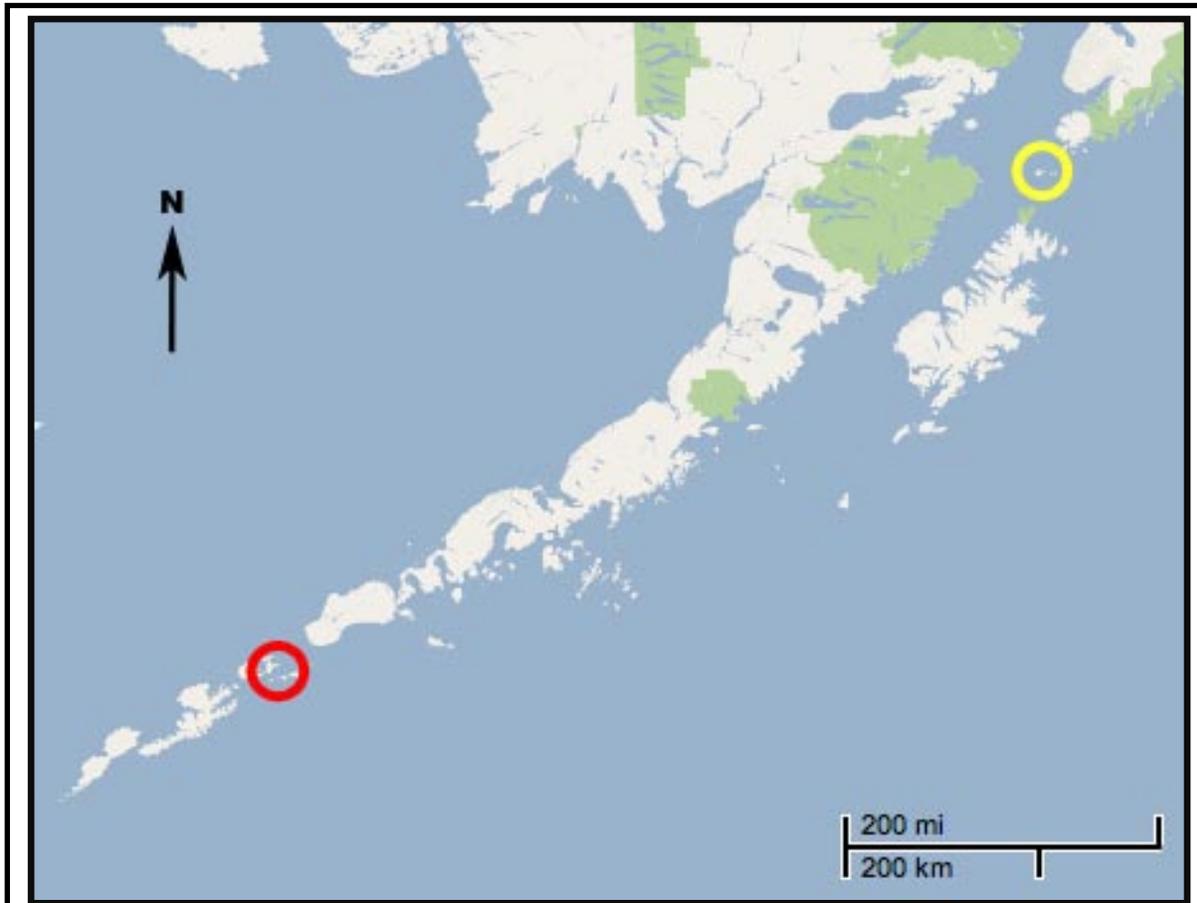


Figure 1. Southwest Alaska showing locations of Tangik and Poa Islands (red circle) in the Eastern Aleutian Islands and Sud Island (yellow circle) in the Barren Island Group. (Figure derived from Google Maps, 2009.)

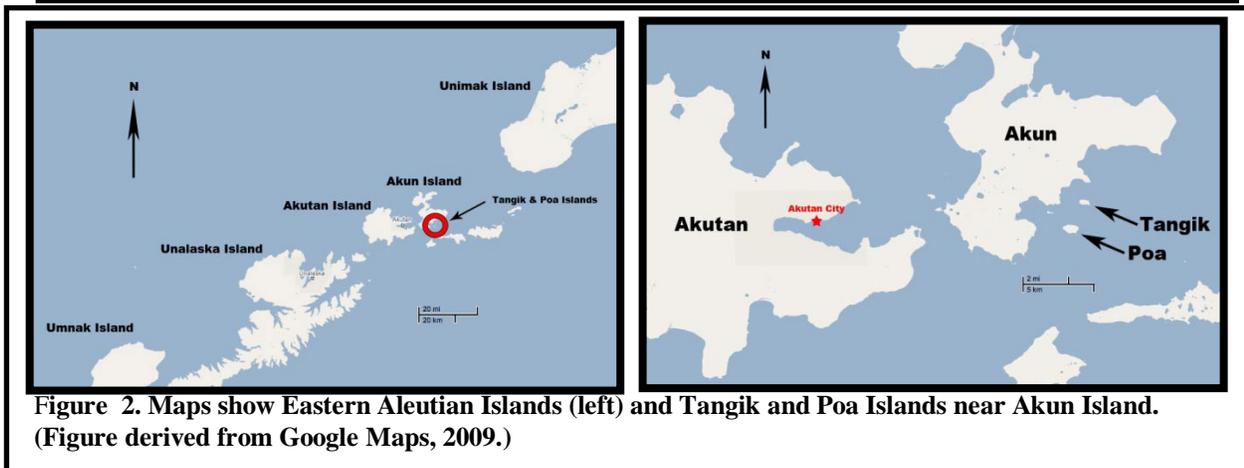


Figure 2. Maps show Eastern Aleutian Islands (left) and Tangik and Poa Islands near Akun Island. (Figure derived from Google Maps, 2009.)

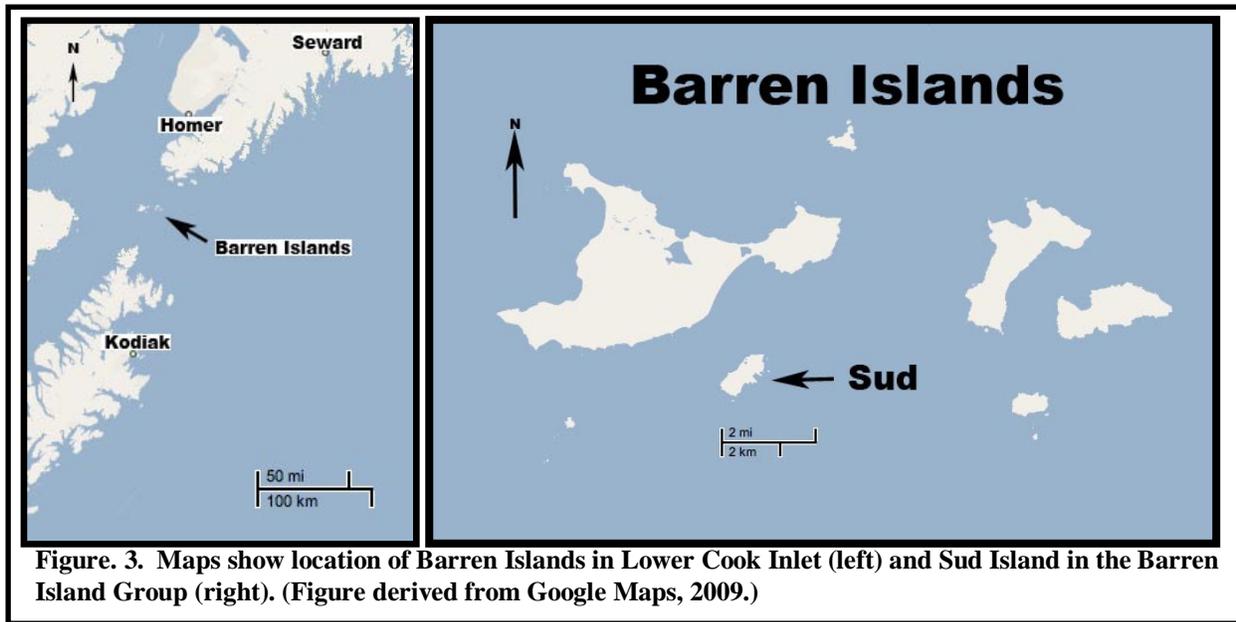


Figure 3. Maps show location of Barren Islands in Lower Cook Inlet (left) and Sud Island in the Barren Island Group (right). (Figure derived from Google Maps, 2009.)

1.3 Need for Action

Introduced non-native species are a leading cause of extinctions on islands worldwide (World Conservation Monitoring Centre 1992). Even if species are not completely extirpated, island ecosystems are often adversely modified from natural conditions. Islands within the Refuge provide examples of adverse modifications (Bailey 1993, Ebbert and Byrd 2002, Gibson and Byrd 2007). The introduction of non-native mammals greatly reduced breeding seabird populations (Murie 1959, Bailey 1993, Byrd 1998) and thereby affected entire ecosystems (Croll et al. 2005) in portions of the Refuge and elsewhere on islands in Alaska. Eradication of non-native species on a number of Refuge islands has resulted in at least partial recovery of natural biodiversity (Byrd et al. 1994) and elsewhere in the world (Ainley and Boekelheide 1990).

As indicated above, the Proposed Action is focused on the eradication of European rabbits and the hoary marmots on the Islands because they have adversely affected the ecosystems on the Islands where they have been introduced, and their removal is needed to allow native species to recover to more natural levels.

European rabbits was introduced on Tangik and Poa in approximately 1940 by a resident of Akutan Village (Darryl Pelkey, Akutan Village, pers. comm. 2009). Removal of introduced European rabbits is needed because there is well-documented evidence from around the world (this species has been introduced on more than 800 islands, Flux and Fullagar 1992) that they change native vegetation and reduce nesting habitat for seabirds and other species (Wetmore 1925, Christophersen and Caum 1931, Costin and Moore 1960, Watson 1961, Gillham 1963, Ainley and Lewis 1974, Aubry and West 1984, Smale and Owen 1990, Williams et al. 1995, Courchamp et al. 2000, Simeone and Bernal 2000).

Because rabbits prefer to use existing earthen burrows instead of digging new ones (Williams et al. 1995) they probably moved into nesting burrows of tufted puffins (*Fratercula cirrhata*) and possibly other species on Tangik and Poa Islands. As documented elsewhere, rabbits have reduced seabird populations through disturbance and displacement of nesting birds (Courchamp et al. 2000).

Like rabbits, introduced hoary marmots cause problems for native species on small islands. On Sud Island, after being introduced, they became overabundant and competed with native seabirds for nest sites, apparently nearly extirpating a breeding colony of rhinoceros auklets (*Cerorhinca monocerata*). This was the only known colony of rhinoceros auklets in the region.

Grazing by rabbits and marmots also has changed native plant communities directly. For example, the herbivores have targeted and dramatically changed the character of the landscape. These modifications to vegetation have likely not only adversely affected native plant communities, but have had indirect effects on seabirds by removed important cover from seabird burrow entrances, thereby increasing the chick mortality through exposure to predatory birds (Williams et al. 1995). Furthermore, reduction of vegetative cover coupled with digging by rabbits and marmots can increase erosion. Puffins and auklets are particularly susceptible to this type of disturbance which can cause nest abandonment (Rodway et al. 1996).

Non-native rabbits and marmots need to be removed from the ecosystems they have modified on the Islands to restore natural ecosystem functions.

1.4 Objectives and Expected Outcome

The objective of the Proposed Action is to eradicate European rabbits and hoary marmots from the Islands. The expected outcome of this action will be increased quality and availability of nesting burrows for seabirds and a subsequent increase in seabird populations as well as recovery of native vegetation communities through natural ecological processes (Courchamp et al. 2000, Bullock et al. 2002, Byrd et al. 2005, Donlan and Heneman 2007).

1.5 Scope of Analysis

The Proposed Action focuses on eradication of non-native introduced species (i.e., European rabbits and hoary marmots) from the Islands to facilitate restoration of habitat for seabirds, especially those species listed in Section 3.7 of this EA. Other actions that may occur in the future as a result of the Proposed Action will not be analyzed in this document. Effects of the action and methods proposed for use will be analyzed to select the better alternative. The USFWS is the lead agency for the development of this EA, and therefore responsible for the scope, analysis, and decisions made using this document.

1.6 Impacts

The following impacts were identified for more detailed analysis.

1. Efficacy of Eradication – Can the Proposed Action achieve the goal of eradication?

2. Impacts to Birds – What are the anticipated impacts on bird species?
3. Impacts to Non-target Mammal Populations - What are the anticipated impacts on non-target species?
4. Impacts to Threatened and Endangered Species – What are the anticipated impacts on Threatened and Endangered species?
5. Cultural Impacts – What are the anticipated impacts on cultural uses and heritage?

1.6.1 Impacts not Analyzed in Detail with Rationale

1.6.1.1 Effects of Action on Biodiversity

Eradication efforts would be conducted to allow for subsequent natural processes to restore natural biodiversity (i.e., natural vegetation and seabird colonies). All eradication actions would be conducted within the Refuge's mandate to conserve, enhance, and protect native wildlife populations and their habitats as per ANILCA. The quantity of rabbits and marmots removed from these Islands would not have any impact to worldwide populations of these species. In contrast, No Action would maintain the reduced population levels of breeding seabirds on the Islands and continue to maintain the modified plant communities due to unnatural herbivory on the Islands.

1.6.1.2 Effects on Recreation and Land Uses

Hunting, fishing, and other recreation are not documented but are currently allowed on Tangik, Poa, and Sud islands. The Islands are uninhabited, remote and access is difficult, therefore, human activity on the Islands is presumably rare. Historically some rabbits were taken from Tangik and Poa by people from Akutan, but this activity apparently has not been practiced recently. Hunting of marmots does occur elsewhere in the State, but not on the Islands. Although there will be an effect on rabbit or marmot hunting on the Islands after eradication, there will be no effect on other recreation or land uses in the future from the proposed action.

1.7 Laws and Regulations Governing Actions

The Proposed Action is authorized by Federal laws, regulations, policies, and the Presidential EO described below. USFWS will obtain all necessary permits and conduct any necessary consultations prior to conducting eradication activities. All take under permits will be reported in accordance with Federal or State laws.

1.7.1 U.S. Fish and Wildlife Service

The *Fish and Wildlife Act of 1956* (16 U.S.C. 742a-742j, not including 742 d-1, 70 Stat. 1119), as amended, provides general guidance which can be interpreted to include invasive species control that requires the Secretary of the Interior to take steps "required for the development, management, advancement, conservation, and protection of fish and wildlife resources."

The *National Wildlife Refuge System Administration Act of 1966* (16 U.S.C. 668dd-668ee) -- This Act, derived from sections 4 and 5 of Public Law 89-669 (October 15, 1966; 80 Stat. 927), constitutes an "organic act" for the National Wildlife Refuge System. It was recently amended by P.L. 105-57, "The National Wildlife Refuge System Improvement Act of 1997" (see below).

The *National Wildlife Refuge System Improvement Act of 1997* indicates in section 5, administering the system, "(4) in administering the System, the Secretary shall— (A) Provide for the conservation of fish, wildlife, and plants, and their habitats within the System; (B) ensure that the biological integrity, diversity, and environmental health of the System". This direction was clarified in 601 FW 3 (2001) the "Integrity policy" (see below).

The *USFWS policy for maintaining biological integrity and diversity and environmental health (601 FW 3, 2001)*, directs refuges to "prevent the introduction of invasive species, detect and control populations of invasive species, and provide for restoration of native species and habitat conditions in invaded ecosystems." 601 FW 3 further directs refuge managers to "develop integrated pest management strategies that incorporate the most effective combination of mechanical, chemical, biological, and cultural controls while considering the effects on environmental health."

The *Alaska National Interest Lands Conservation Act of 1980 (ANILCA)* established the the Refuge in its current form. Section 303 (1) (b) established the following purposes (among others) for the establishment and future management of the Refuge: "*To conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to marine mammals, marine birds and other migratory birds, [and] the marine resources upon which they rely...*". This is the basis for proposing to restore natural diversity, particularly for marine birds (i.e., seabirds).

1.7.2 USDA APHIS Wildlife Services

Animal Damage Control Act (7 USC 426-426c). The Act of March 2, 1931 as amended (46 Stat. 1486; 7 U.S.C. 426-426c)], the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988 (Public law 100-102, Dec. 22, 1987, Stat. 1329-1331; 7 U.S.C. 426c) is the primary statutory authority for the APHIS-WS program which authorized APHIS-WS to reduce damage caused by wildlife in cooperation with other agencies. This guidance is implemented through Agreements for Control or other appropriate agreements (such as Memorandums of Understandings) which are established with government or private entities.

WS cooperates with both government and private entities. Before work is conducted, Agreements for Control or other appropriate agreements (such as Memorandums of Understandings) are in place, authorizing WS to access lands and implement agreed-upon control measures.

1.7.3 Alaska Department of Fish and Game (ADFG)

The Alaska Department of Fish and Game is responsible for the sustainability of fish and wildlife on all lands in Alaska, regardless of ownership, unless specifically superseded by federal law.

AS §16.05.255 authorizes the Board of Game to adopt regulations it considers advisable in accordance with AS §44.62 (Administrative Procedure Act) for the following actions relating to game:

(8) prohibiting the live capture, possession, transport, or release of native or exotic game or their eggs;

(12) regulating the activities of persons licensed to control nuisance wild birds and nuisance wild small mammals.

1.7.4 Executive Order (EO)

Presidential EO 13112 on Invasive Species⁴ (February 3, 1999) provides general guidance to federal agencies relative to invasive. Section 2(a)(2), states: “Each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law, subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them.”

1.7.5 Other Federal Laws

These laws, not already discussed above, are also applicable to the Proposed Action.

National Environmental Policy Act (NEPA), as amended. All federal actions are subject to NEPA (Public Law 91-190, 42 U.S.C. 4321 et seq.). USFWS follows Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500 et seq.) as a part of their decision-making process. These laws, regulations, and guidelines generally outline five activities to be accomplished as part of any project: public involvement, analysis, documentation, implementation, and monitoring.

Pursuant to NEPA and CEQ regulations, this EA documents the analysis of a proposed project, informs decision-makers and the public of alternatives capable of avoiding or

⁴ Executive Order 13112 defines “invasive species” as an alien species (a species that is not native with respect to a particular ecosystem) whose introduction does or is likely to cause economic or environmental harm or harm to human health.

minimizing adverse impacts, and serves as a decision-aiding mechanism to ensure that the policies and goals of NEPA are infused into USFWS actions. This EA was prepared by integrating as many of the natural and social sciences as warranted, based on the potential effects of the Proposed Action. The direct, indirect, and cumulative impacts of the Proposed Action are analyzed.

Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531-1544, 87 Stat. 884). Under ESA, all Federal agencies are charged with a responsibility to conserve endangered and threatened species and to utilize their authorities in furtherance of the purposes of the ESA (Sec.2(c)). Although no endangered species are being directly benefited by the proposed action, potential disturbance to listed species was evaluated.

Marine Mammal Protection Act (MMPA) of 1972, as amended. MMPA prohibits the taking of marine mammals. Under the MMPA, the USFWS is responsible for ensuring the protection of sea otters other species not found at the proposed action sites. The National Oceanic and Atmospheric Administration has responsibility for conservation of seals, and sea lions, and other species not found in the project areas. The MMPA prohibits the take and exploitation of any marine mammal without appropriate authorization, which may only be given by the USFWS or National Marine Fisheries Service depending upon species. As with endangered species potential disturbance was evaluated.

Migratory Bird Treaty Act (MBTA) of 1918, as amended. The MBTA provides the USFWS regulatory authority to protect species of birds that migrate outside the United States. The law prohibits any "take" of these species by private entities, except as permitted by the USFWS; therefore the USFWS issues permits. Restoration of seabird populations and their habitat complies with the protection of birds listed in several international treaties.

Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended (16 U.S.C. §§ 668-668d). The BGEPA prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions. Take includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. If compatible with the preservation of bald and golden eagles, the Secretary of the Interior may issue regulations authorizing the taking, possession and transportation of these eagles for the protection of wildlife and other purposes.

National Historic Preservation Act (NHPA) of 1966, as amended. The NHPA and its implementing regulations (CFR 36, 800) require Federal agencies to initiate the section 106 process if an agency determines that the agency's actions are undertakings as defined in Sec. 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties. If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, agency officials have no further obligations under section 106.

Archaeological Resources Protection Act (ARPA) of 1979, as amended, 16 USC 470. The United States passed the ARPA to regulate finds on Federal and Indian lands and to prevent looting and destruction of archeological resources.

1.7.6 Other Alaska State Laws and Policies

5 AAC §92.990(a) (73) – Effective September 13, 2007, defines Nuisance Wildlife. . Specifically subsection (B) states an animal that invades or comes to occupy a dwelling, vessel, vehicle, structure, or storage container; causes property damage, or is an invasive or introduced non-native species that poses immediate or long-term threats to human health, safety, or property or to native wildlife, wildlife health, or habitat.

5 ACC 92.029 (d) (1) – Rabbits (considered domestic animals by ADFG) that are released or escape confinement become “deleterious exotic wildlife”. Permits may be issued for such cases, including the Proposed Action.

1.8 Public Involvement

Some Members of the Akutan Native Corporation were contacted in the summer of 2009 regarding the potential of rabbit eradication on Tangik and Poa Islands. A press release was issued for the action proposed on Sud Island in November 2009 that resulted in a story in *Homer Tribune*. An email was sent to certain agency authorities introducing the proposed action as scoping for issues related to the project. No response was received. A draft version of this EA was circulated for comment to authorities, experts and administrators within the USFWS and ADFG. The EA was also released for a 30-day public comment period. The availability of this draft will be publicized through publication of notices and/or press releases in the *Dutch Harbor Fishermen*, *Anchorage Daily News*, *Kodiak Daily Mirror*, *Homer News*, and the *Homer Tribune*. Press releases will be made available for other media outlets, such as radio and television. Further, post cards or emails announcing the availability of the EA for review were sent to known interested parties. All forms of notification contained ways to obtain the EA, including a link to an electronic version, mailing addresses, and phone and fax information. Electronic and paper copies will be available through the Refuge.

Chapter 2: Alternatives

This Chapter consists of four parts: 1) description of alternatives considered and analyzed in detail, 2) description of proposed operations and methods, 3) mitigation measures and monitoring, and 4) alternatives, strategies, or methods considered but not analyzed in detail with the rationale. Two alternatives were recognized, developed, and analyzed in detail by USFWS. Eight additional methods, strategies or alternatives to reduce European rabbit and marmot damage on the Islands were considered but not analyzed in detail.

2.1 Alternative A: European Rabbits and Hoary Marmots will not be Eradicated from Tangik, Poa, and Sud Islands (No Action)

Analysis under the No Action alternative is required under NEPA (40 CFR 1502) and is consistent with CEQ (1981). Under this alternative, European rabbits and hoary marmots would not be eradicated from the Islands or managed in any manner. Other ongoing invasive species management programs in the Aleutians, including rat and fox eradication programs would be maintained based on previous Refuge management decisions.

2.2 Alternative B: Eradication of European Rabbits from Tangik and Poa Islands, and Hoary Marmots from Sud Island (Proposed Action)

2.2.1 Summary of Action

The Proposed Action is to eradicate non-native European rabbits and hoary marmots using mechanical capture methods and shooting. Eradication of rabbits from Tangik and Poa Islands and marmots from Sud Island would be conducted late winter through summer. Toxicants are not proposed for use on these projects.

2.2.2 Timing of Operations

Eradication efforts could begin as early as February on Tangik and Poa Islands, prior to tufted puffin arrival, and during May on Sud Island after marmots emerge from their winter dens. Timing would be somewhat dependent on weather and transportation availability to the Islands. The operation would occur on the Islands for approximately three months. Trapping would be discontinued on Tangik and Poa in the puffin colonies as puffins begin to nest. Trapping for hoary marmots may continue through August.

2.2.3 Description of Proposed Operations and Methods

The goal is to put every target individual at risk and remove target species faster than they reproduce (Bomford and O'Brien 1995, Broome et al. 2005). Field camps would be deployed on the Islands and eradication activities would begin immediately after camps are established. Professional wildlife specialists and Refuge biologists would use sight and sign to identify where target and non-target animals are still present on the Islands. Methods are determined effective when sightings and fresh sign are observed less frequently and capture rate declines. Eradication efforts would continue daily until the end

of the season or until eradication is deemed complete. Trappers will live on the islands for approximately three months. If not successful in one year, eradication operations may occur in more than one year.

Personnel would use methods in an adaptive manner to increase effectiveness based on weather, terrain, non-target species disturbance potential, and target species behavior. Carcasses will be disposed of in the ocean or buried on the islands. Methods proposed for use in the eradication of European rabbits and hoary marmots are:

2.2.3.1 Trapping

These methods are highly selective when applied by personnel who are trained to identify species, sign, and behavior. Traps and shooting techniques will minimize the likelihood that non-target species would be affected.

Leg-hold Traps. Leg-hold traps capture animals in sizes ranging from mink to bear, including rabbits and marmots. Leg-hold traps are placed in or near dens and trails and lure or bait could be used to attract target species. Leg-hold traps are nonlethal capture devices and captured non-target animals would be released when possible.

Body-grip Traps. Body-grip traps capture and kill target mammals. They would be placed in or near trails and burrows of animals and are activated when an animal moves through the frame-like trap body and dislodges the trigger. Body-grip traps are lethal traps.

Cage Traps. Wire box-style cage traps can be used for rabbits and marmots. Upon entry into the cage, the animal triggers the door to close and the animal is held until it is released or euthanized. Non-target species captured would be released.

Neck Snares. Neck snares are made of thin cable, formed into a loop, and set to capture a target animal by its neck. Snares are placed around burrows or in or near trails of mammals. Neck snares are lethal devices.

2.2.3.2 Shooting

Shotguns and rifles would be used to remove European rabbits and marmots from the Islands. Shooting is a highly species-specific method, because positive identification is made prior to shooting. All personnel would receive extensive firearms safety training to ensure shooting is conducted in a safe manner. Only steel shot would be used in shotguns during operational activities. Shooting on Tangik and Poa would be conducted primarily prior to puffin arrival. Should rabbits persist in the breeding colonies after puffin arrival, shooting would be conducted only during periods when puffins are not on the surface to avoid noise disturbance. A suppressed rifle would be available on each island for work around the puffin colonies after birds arrive if necessary.

2.2.3.3 Housing of Field Personnel

Personnel will live in tents on Sud and Tangik throughout the eradication operations. Provisions for an overnight camp will be cached on Poa Island for emergency use or eradication work after dark. The tents would not have permanent impacts to the environment and all gear and trash will be removed at the end of the project season. To help avoid disturbance to seabirds, camps would be placed in areas where they would not adversely affect native wildlife or habitat.

2.3 Mitigation Measures and Monitoring

Mitigation measures are features of an action that serve to prevent, reduce, or compensate for unwanted effects that otherwise might result from that action. Eradication of European rabbits and marmots from the Islands is anticipated to have long-term positive benefits for native seabirds. The Islands will be monitored during and after eradication activities to determine if management actions were effective at restoring native seabird populations.

2.3.1 Archaeological Mitigation

Project personnel will be briefed on archaeological locations and identification of archaeological and cultural resources that may be present on the Islands and instructed on how to avoid disturbing identified sites or sites that may be found.

2.3.2 Wildlife Mitigation Measures

There are no known native terrestrial mammals on the Islands. Native birds on the Islands are highly mobile and known to travel between nearby islands. This analysis evaluates potential adverse impacts to seabirds on the Islands that may occur as a result of the proposed action. The USFWS and Refuge and APHIS-WS personnel recognize the need to minimize disturbance and loss of breeding seabirds during this operation and this project is designed to ensure the protection of native birds and habitats.

Some losses may occur due to unintentional non-target take or disturbance. However, the USFWS and APHIS-WS have developed the proposed action to be as effective as possible while minimizing negative effects on all environmental resources. The Refuge is cooperating with APHIS-WS because it has the legal authority, expertise, and experience to conduct professional eradications in the most selective, effective, and humane way to accomplish program goals.

The seasonal timing (pre-breeding seasons on Tangik and Poa) of operational activities, conducting activities away from seabird colonies on Sud, and the use of mechanical methods and shooting are designed to minimize adverse affects to native seabirds. Other mitigation measures could be implemented depending on further consultation among project planners, results of further consideration of the Islands' ecosystem, public input, and the advice of scientific and technical experts.

2.3.3 Mitigating for Disturbance Risk

Overall, mitigation efforts to reduce impacts are summarized below:

- Personnel will be trained in species identification and disturbance avoidance strategies.
- Personnel will select the most species-specific method and application available to minimize disturbance.
- European rabbit trapping in the seabird colony will occur outside the seabird breeding season.
- Marmot trapping will not occur within a seabird colony when birds are present.
- Island camps will be located away from breeding colonies.
- Suppressed firearms will be used in situations where noise from gunshots would have a negative impact on non-target species.

Tangik and Poa Islands. The primary mitigation that would be incorporated into planning operations on these Islands is timing eradication to occur before the seabird breeding season. Should activities need to continue after the birds' arrival, trapping operations will be moved away from seabird colonies. If necessary, additional trapping and shooting strategies will be adapted to prevent or reduce adverse impact on non-target species including marine mammals.

Sud Island. Marmot eradication cannot begin until mid summer, after marmots emerge from their winter dens. Generally marmots were not observed near current breeding seabird colonies on Sud Island (S. Ebbert, Alaska Maritime NWR, pers. comm. 2009). This fact inherently keeps eradication methods away from seabird colonies. As on Tangik and Poa, if necessary, additional trapping and shooting strategies will be adapted to prevent or reduce adverse impact on non-target species.

2.3.4 Monitoring Project Efficacy and Ecosystem Response

USFWS will monitor the Islands during and after operations to assess eradication activities and effectiveness of eradication efforts. Teams will re-visit the Islands once a year for the two years following the project's completion. If any rabbits or marmots or fresh sign are found during visits, identical methods to those described above will be employed to complete the eradications. Monitoring will be designed for burrow-nesting seabirds on the Islands. Photographic plots will document the condition of vegetation during the year of eradication and before response to eradication. The potential environmental impacts of post-project monitoring will be within the impacts analyzed in this EA given that direct disturbance of seabird colonies will be avoided.

2.4 Alternatives or Methods Considered but not Analyzed in Detail

2.4.1 “Control” Populations to a Non-harmful Level

“Controlling” European rabbit or marmot populations to an extremely low-level presents several challenges to effective habitat restoration. Allowing European rabbits and marmots to persist on these Islands would still result in some level of habitat degradation and seabird disturbance which is contrary to the Refuge’s purposes and is not compatible with Refuge policy (601 FW 3), ANILCA or EO 13112. Further, the control to a non-harmful level would require increased funds to maintain an ongoing program of rabbit or marmot control and would be highly labor intensive considering the reproductive capabilities of these species.

The net conservation gain achievable by European rabbit or hoary marmot control, rather than complete eradication, is slight, yet the risks to non-target breeding seabirds may be the same as if no control or eradication were conducted. In addition, European rabbits and marmots will reproduce and quickly re-occupy areas where they were previously eliminated. Benefits to nesting seabirds would last only as long as population control is effective at keeping rabbit and marmot populations at a very low level. The maintenance of an ecologically harmful invasive species on the Islands is far more costly, less effective and would result in low conservation benefits to the Islands’ seabird breeding populations. Therefore, based on Refuge policy and mandates, EO, and analysis this strategy will not be implemented.

2.4.2 Utilizing Hunter Harvest

Hunter harvest of European rabbits and marmots would be difficult because eradication of the species requires persistence and dedication to successfully eradicate invasive species. The opportunity for hunters to harvest animals on the Islands is already available, yet rabbit and marmot hunting on the Islands is very slight or nonexistent. There has been no known recent hunting on the Islands and therefore no impacts to the non-native species present. Relying upon recreational hunting on a remote island to result in eradication, if there was interest, would not be effective.

2.4.3 Mesopredator Introduction

The introduction of a predator to control prey is unlikely to succeed and has poses considerable risks to native species on the Islands. This strategy was rejected because it is unlikely to result in the eradication of European rabbits or hoary marmots on the Islands, it would not eliminate impact on seabirds, and it would likely increase predation on seabirds. The “prudent predator” theory reduces likelihood of achieving prey eradication because, as it states, predators will take one prey species at an intermediate rate which results in preserving the food supply (Wilson 1978). Further, the introduction of a predator would establish another non-native, invasive species that would require removal from the islands at some point as per Refuge policy (601 FW 3), EO13112, and AS§16.05.255. Also,

transplanting of wildlife into new areas requires further study and approval from ADFG to determine the risk of unexpected impacts to wildlife.

2.4.4 Disease Introduction

Many European rabbit control programs include the use of biological agents to induce natural population reduction in European rabbits. The diseases myxomatosis and rabbit hemorrhagic disease are two diseases used in other countries that temporarily reduce populations but were not successful in eradicating rabbits without additional control methods. The estimated mortality rate from exposure to myxomatosis has been estimated at 40-60% (Williams et al. 1995). In addition, there is the risk introduced diseases may spread to native species elsewhere. There may be adverse impacts to non-target seabird populations, and there are no biologic agents demonstrated to be effective at controlling or eradicating marmots. At this time, there are no biological agents approved in the United States for control or eradication of rabbits or marmots. Introducing a biologic agent to the Refuge is not a method that will be used, or analyzed further.

2.4.5 Fertility Control

Fertility control has been used with limited success as a method of pest management in a few species. However, reproductive control methods have not been demonstrated to control or eradicate populations of prolific European rabbits or marmots. Only some members of a population need to be fertile to maintain a rabbit or marmot population. Since the objective is to eradicate European rabbits and hoary marmots on the Islands, the use of fertility control agents would not be satisfactory. Oral fertility control is temporary and variable in its effectiveness between individual animals, and complete multiple applications of anti-fertility baits on a remote island could be difficult. Impacts of experimental fertility control substances on non-target animals are unknown. This lack of data and inefficacy disqualifies the use of fertility control from further consideration (Tobin and Fall 2005).

2.4.6 Toxicants

There are no toxicants currently registered for use on European rabbits or hoary marmots in the State of Alaska. The use of toxicants would require registration and authorization from the Alaska Board of Game. Therefore the use of toxicants will not be considered further in this analysis.

2.4.7 Live Capture and Relocation of Non-native Target Animals.

Captured non-native target mammals could not be relocated to other locations on the Refuge, pursuant to Refuge policy and mandates (601 FW 3, Fish and Wildlife Act of 1956, EO 13112) or Alaska (AS §16.05.255). In addition, relocated animals can have poor survival rates in captivity, during transfer and at the release site (Rosatte and MacInnes 1989, Wright 1978, Frampton and Webb 1974). Relocating animals creates the risk of spreading parasites and diseases to previously uninfected areas. Further, the Islands are

remote and isolated from the mainland and facilities would need to be constructed on the Islands to house captured animals, including animal food and bedding materials. Therefore the strategy of live capturing and relocating non-native mammals from the Islands will not be considered further in this analysis.

2.4.8 Exclusionary Devices

Exclusionary devices (i.e., fencing, netting, or other physical barriers) have been successful at preventing wildlife access to protected resources/areas, especially if barriers are erected prior to animals establishing use of an area. Fencing small critical areas can sometimes prevent animals from entering; however rabbits and marmots are burrowing animals. It would be very difficult to create an effective barrier to prevent such burrowing on the Islands. Fencing, especially if installed with an underground skirt to prevent burrowing would be impractical on the Islands. Effective skirt installation would be expensive, difficult to safely install and would destroy ground cover in sensitive habitats along with potentially disturbing and interfering with seabirds for extended periods. Electrical fencing has proven effective in limited situations however; currently there are no proven designs to exclude rabbits or marmots under conditions present on the Islands. Therefore the strategy of excluding/fencing the non-native European rabbits and marmots on the Islands will not be considered further in this analysis.

Chapter 3: Affected Environment

3.1 Description of the Islands

3.1.1 Tangik and Poa Islands

Tangik (Figure 4) and Poa (Figure 5) are two small sister islands located in the Krenitzin Islands of the eastern Aleutian Islands. The islands are one nautical mile east of Akun Island, and 12 nautical miles east of Akutan Village on Akutan Island, Alaska (Figure 2). These two islands were used historically by the Aleut (Unanagan) people, but humans have not lived on the Islands for at least 50 years, since fox ranching in the early part of this century. There are no foxes on these islands today. Nearby Akutan Island is the nearest community (population 800).) and was originally used by fur traders as a port and storage for fur.



Figure 4. Tangik Island (photo taken from Poa Island) (Photo: Steve Ebbert, 2009)

Tangik has approximately 6,562 ft of shoreline, while Poa has 9,526 ft of shoreline. Tangik is 52 acres and 220 ft in elevation while Poa is 134 acres and 300 ft in elevation.

Much of the land in the Krenitzin Island group is not Refuge property, but owned by the Akutan Corporation. Tangik and Poa Islands are currently being considered for trade to the Refuge by the Corporation. It is expected that the land trade will be final

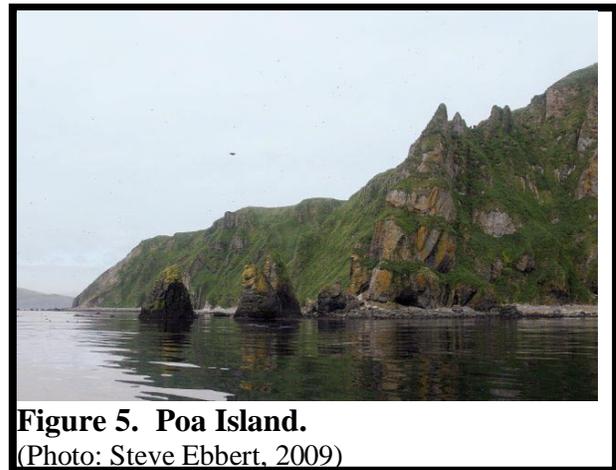


Figure 5. Poa Island.
(Photo: Steve Ebbert, 2009)

before the eradication begins. If the trade is not final then, the USFWS will request permission from the Akutan Corporation to conduct activities on the islands. No work will be conducted without necessary permissions from landowners. Any potential effects of the land exchange are not subject to NEPA and will not be discussed in this EA.

3.1.2 Sud Island

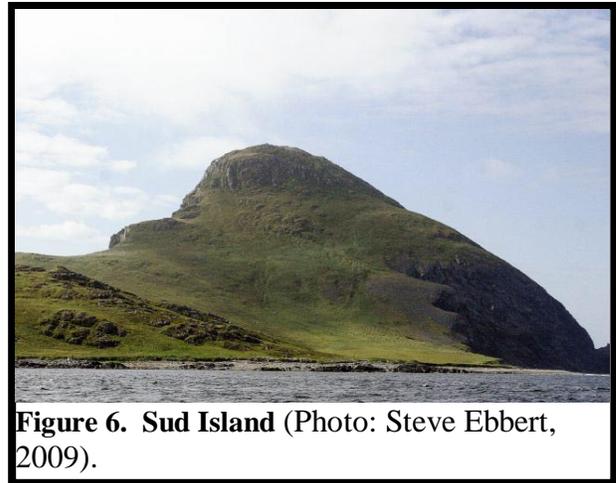
Sud Island is part of the Barren Islands and is located at the southern entrance to Cook Inlet between Afognak Island and the Kenai Peninsula (Figure 6). There are seven named islands in the group. Sud Island is approximately 275 acres, with the highest elevation being approximately 890 feet at the southwestern end. It is 60 nautical miles southwest of Homer, AK (US Dept Commerce 2009). There are remnants of wooden barracks and a collapsed

automatic weather station on the island. The weather station was established in February of 1945 and operated by the U.S. Navy for a short time, but nobody has lived on the island as far as we know since that time.

3.2 Climate

3.2.1 Tangik and Poa Islands

The climate is primarily marine-influenced and is characterized by generally overcast skies, frequent and often severe storms driven by the Aleutian low-pressure system (Rodionov et al. 2005) and high winds. Summers are characterized by widespread fog and about 50 inches of precipitation. Winters are characterized by gusty winds, storms, and about 70 inches of precipitation, including snow. Snow accumulations are highly variable among years, but blowing snow causing “white-out” conditions occurs from November through March. Winter lasts 6-9 months and frost can be expected every month except July and August. Summer temperatures average 48° F and winter temperatures average 34° F; minimum temperatures seldom reach below 10° F.



3.2.2 Sud Island

Sud, located in the Gulf of Alaska, has a moderate climate similar to Kodiak, with mild winters, cool summers, and heavy precipitation. Kodiak’s average annual precipitation is 56.71 inches. The mean wind velocity in the Barren Islands is considerably higher than Kodiak, where winds average only 10.1 mph. The mean annual temperature for Kodiak is 40° F, with the first frost usually in September or October and “winter” usually lasting through mid May.

3.3 Terrestrial Vegetation

3.3.1 Tangik and Poa Islands

Terrestrial plant communities in the Aleutians are classified as “maritime tundra” (Amundsen 1977) or, more recently, “oceanic boreal heath” (Talbot et al. 1999). Aleutian vegetation lacks trees, being characterized by less than 6.5 ft tall plants dominated by grasses, forbs, and dwarf shrubs. The primary grass occurring inland on Poa and Tangik Islands is *Calamagrostis*, while *Leymus* is restricted to a narrow coastal fringe (G.V. Byrd, Alaska Maritime NWR, pers. comm. 2009). Nysewander et al. (1982) indicated that most of the vegetation on Poa Island had been heavily grazed by rabbits, and they also noted rabbits had affected vegetation on Tangik Island. In 2007, a subjective comparison of vegetation these islands with nearby “Puffin Island” which does not have rabbits suggested much more lush vegetation on the rabbit-free island (J. C. Williams, Alaska Maritime National Wildlife Refuge, pers. comm. 2009).

3.3.2 Sud Island

Vegetation on the Barren Islands is principally grasses and sedges (Bailey 1976) with several genera of grasses and forbs present (Manuwal and Manuwal 1979). Hoary marmots select for seeds and flowers, consume large amounts of foliage and also eat berries, roots, mosses, and lichens. Burrowing and feeding marmots can modify abundance and growth rates of plants. Del Moral (1984) documented impacts of Olympic marmots (*Marmota olympus*) on species richness, equitability, percent vegetation cover, and shifts in species composition. Semenov (2001) reported vegetation in the core area of black-capped marmot (*Marmota camtschatica*) home range differed qualitatively and quantitatively from the peripheral zone and from marmot-free tundra.

On Sud Island, the impact of chronic grazing marmots is particularly apparent the ridge on the eastern side of the island. This area appears more heavily impacted by marmot grazing than the 800 ft mountain on the western side, where marmots seemed scarce. From there, vegetated slopes descend sharply from cliffs down to the sea.

3.4 Freshwater

On all three islands, numerous small streams form during spring melt and heavy rains, but most do not contain water perennially. None of the three islands has a stream that typically enters the ocean above ground.

3.4.1 Tangik and Poa Islands

Tangik has no ponds. Poa has one small pond that can go dry part of the year,

3.4.2 Sud Island

Sud has six ponds at the northeast end of the island of various sizes.

3.5 Terrestrial Mammals

3.5.1 Tangik and Poa Islands

There are no native terrestrial mammals on Tangik and Poa Islands. Introduced European rabbit is the only terrestrial mammal present. Rabbits were particularly dense along the upper edge of the cliffs on both islands in a strip including the sea facing slopes and bluff fringe. They also were found in coastal house pits, and inland especially along drainages. In the interior, rabbits occupied warrens consisting of inter-connected earthen burrows. No population estimate is available for the islands but each certainly has at least hundreds.

3.5.2 Sud Island

There are no native terrestrial mammals on Sud Island. Introduced hoary marmots are the only terrestrial mammals found there. Marmot dens were found in grassy patches that contrast with surrounding tundra and could be seen from 245 ft or more. Typically, a gradient of grazing intensity was observable around the dens. Usually marmots make repeated movements between foraging areas and their burrows. Trails, or runways, typically led from a burrow system to a rock used as a lookout and for sunning. Foraging areas did not have well-defined trails, but were within sight of one or more lookout positions. Information gathered from marmots in their native range suggests that hoary marmots forage in areas not far from their burrow. In August 2009, hoary marmots seemed most abundant along the eastern ridge of the island and just above the coastal bench on the eastern side of the island. Marmot sign was sparse on the peak of Sud Island and around the only cluster of ponds on the island. In August, marmots were most active during the warmest time of the day and early evening.

3.6 Marine Mammals and River Otters

3.6.1 Tangik and Poa Islands

Endangered Steller sea lions (*Eumetopias jubatus*) are not known to have regular haul-out sites on Tangik or Poa islands, but since breeding rookeries occur about 17 nautical away on both Akun and Akutan Islands (NMFS 2007), animals may occasionally haul-out on Tangik and Poa.

Tangik and Poa are within the range of threatened southwestern population of northern sea otters (*Enhydra lutris*), and it is likely that a few otters occur in near-shore marine waters. Three animals were seen at Poa in 1980 (Nysewander et al. 1982).

Harbor seals (*Phoca vitulina*) occur in the vicinity of these islands but it is not known if they currently haul-out on the beaches of either Tangik or Poa. In 1980, 33 were seen at Poa (Nysewander et al. 1982) but none were noted during a brief survey in 2007 (G.V. Byrd, Alaska Maritime NWR, pers. comm. 2009).

River otters (*Lontra canadensis*) do not occur at Tangik or Poa islands, nor anywhere in the Aleutian Islands west of Unimak Island (Murie 1959).

3.6.2 Sud Island

Sud Island does not have an endangered Steller sea lion rookery, but animals may occasionally haul-out, because Sugarloaf Island (next to Sud) has the second largest sea lion rookery in the region.

Sea otters are fairly common along the coastline of Sud. In the mid 1970s, more than 70 otters were counted (Bailey 1976), but Dippel and Nyswander (1992) counted only 15-17 in 1989-1990 following the Exxon Valdez oil spill. This population is not listed as threatened.

Harbor seals are fairly common on Sud Island. Bailey (1976) mentions a report of 250 animals, and S.E. Ebbert (Alaska Maritime NWR, pers. comm. 2009) recorded about 130 hauled-out on a point exposed at low tide on the eastern side of the island.

At Sud, river otters were not found in the mid-1970s (Bailey 1976), but Boersma et al. (1980) indicated otters were probably a recent arrival. River otter sign was observed on the sandy beach on the northwest side of the island in August 2009. The trails around the cluster of ponds near the beach appeared different than marmot trails elsewhere on the island, and could also be used by river otters. Freshwater may be an attractant for otters and encourages movement on the island.

3.7 Birds

3.7.1 Tangik and Poa Islands

Although only brief summer surveys have been conducted on Tangik and Poa, 20 species of birds have been recorded (Table 1).

3.7.1.1 Seabirds

The most common species breeding on these islands is the tufted puffin. In fact, the eastern Aleutian Islands are a particularly important region for nesting tufted puffins (Piatt and Kataysky 2002), and other burrow-nesting seabirds (Gibson and Byrd 2007). The only estimate of tufted puffins and other burrow-nesting seabird breeding populations on Tangik and Poa was made in 1980 by Nysewander et al. (1982) as follows: tufted puffin (thousands of pairs on each island), fork-tailed and Leach's storm-petrels (a few thousand pairs on each island), and ancient murrelets (*Synthliboramphus antiquus*) (at least several hundred on each island). Surface-nesting glaucous-winged gulls (*Larus glaucescens*) numbered several hundred on Tangik and more than 1,000 on Poa. The same species were present in similar relative abundances in 2007 (G.V. Byrd, Alaska Maritime NWR, pers. comm. 2009). Three species of cormorants nest or roost on cliffs of both islands in low numbers (less than 50 in total), and both islands also have crevice

Table 1. Species Documented on Tangik and Poa Islands (Nysewander et al. 1982, G.V. Byrd, USFWS, unpubl. data).

| Common Name | Scientific Name |
|--------------------------|----------------------------------|
| Birds | |
| Fork-tailed Storm-Petrel | <i>Oceanodroma furcata</i> |
| Leach's Storm-Petrel | <i>Oceanodroma leuchoa</i> |
| Double-crested Cormorant | <i>Phalacrocorax auritus</i> |
| Pelagic Cormorant | <i>Phalacrocorax pelagicus</i> |
| Red-faced Cormorant | <i>Phalacrocorax urile</i> |
| Bald Eagle | <i>Haliaeetus leucocephalus</i> |
| Golden Eagle | <i>Aquila chrysaetos</i> |
| Peregrine Falcon | <i>Falco peregrinus</i> |
| Black Oystercatcher | <i>Haematopus bachmani</i> |
| Glaucous-winged Gull | <i>Larus glaucescens</i> |
| Pigeon Guillemot | <i>Cephus columba</i> |
| Ancient Murrelet | <i>Synthliboramphus antiquus</i> |
| Whiskered Auklet | <i>Aethia pygmaea</i> |
| Tufted Puffin | <i>Fratercula cirrhata</i> |
| Horned Puffin | <i>Fratercula corniculata</i> |
| Common Raven | <i>Corvus corax</i> |
| Winter Wren | <i>Troglodytes troglodytes</i> |
| Savannah Sparrow | <i>Passerculus sandwichensis</i> |
| Song Sparrow | <i>Melospiza melodia</i> |
| Gray-crowned Rosy Finch | <i>Leucosticte tephrocotis</i> |
| Mammals | |
| Sea Otter | <i>Enhydra lutris</i> |
| Harbor Seal | <i>Phoca vitulina</i> |
| Steller Sea Lion | <i>Eumatopias jubatus</i> |
| European Rabbit | <i>Oryctolagus cuniculus</i> |

nesting seabirds like pigeon guillemots (*Cepphus columba*) (up to several hundred on the two islands combined), whiskered auklets (*Aethia pygmaea*) (probably less than 100 on each island), and horned puffins (*Fratercula corniculata*) (a few dozen on each island). Most of these seabirds arrive at nesting sites in the eastern Aleutians in May June, and incubation is underway for most species by late May to mid-June (Gibson and Byrd 2007).

3.7.1.2 Shorebirds

The only shorebird recorded is black oystercatcher (*Haematopus bachmani*) which nests on island beaches, at least on Poa where Nysewander et al. (1982) recorded more than 30 birds in 1980. Oystercatchers lay eggs typically by late May or early June (Gibson and Byrd 2007).

3.7.1.3 Birds of Prey

Although several bald eagles (*Haliaeetus leucocephalus*) were found on both islands and one golden eagle (*Aquila chrysaetos*) was seen (only on Tangik), eagle nests were not noted on the islands. A pair of peregrine falcons (*Falco peregrines*) (was noted on Tangik in 1980 (Nysewander et al. 1982).

3.7.1.4 Waterfowl

Threatened Steller's eiders (*Polysticta stelleri*) winter in near-shore marine waters in this region, as do several other species of non-listed seaducks (Gibson and Byrd 2007), but it is not known whether they occur near Tangik and Poa. In any case, seaducks are mostly present in winter and do typically occur on land in the project area. We saw no evidence of nesting by any species of waterfowl

3.7.1.5 Landbirds

Perching birds include common ravens (*Corvus corax*) and four species of songbirds (Table 1). If ravens breed on Tangik or Poa (and it is not known if they do) they would likely build nests on inaccessible ledges on sea cliffs. Winter wrens (*Troglodytes troglodytes*) and rosy finches (*Leucosticte tephrocotis*) probably nest in rock crevices on sea cliffs, and savannah sparrows (*Passerculus sandwichensis*) and song sparrows (*Melospiza melodia*) nest in vegetation on the surface of the islands (Gibson and Byrd 2007). All these species except savannah sparrow are probably year around residents on the islands. Some of the resident landbirds begin nesting in May.

3.7.2 Sud Island

At least 23 species of birds have been recorded at Sud Island, during a few brief surveys (Table 2).

3.7.2.1 Seabirds

The most common breeding species historically were burrow-nesters: fork-tailed storm-petrel (*Oceanodroma furcata*) (an estimated 5,000), tufted puffin (1,000) and rhinoceros auklet (750) (Manuwal 1980). The rhinoceros auklet colony on Sud, is one of only three known breeding colonies for this species in the northern Gulf of Alaska region (Sowls et al. 1978, Dippel and Nysewander 2002), and it has declined from an estimated 750 pairs (Manuwal 1980) to only a few pairs by 2009 when S. Ebbert and L. Slater (Alaska Maritime NWR, pers. comm. 2009) estimated only about 20 burrows left. This marked decline in the use of the island by rhinoceros auklets is likely the result of the presence of non-native marmots.

According to Manuwal (1980) three species of cormorants nest or roost on cliffs on the islands in low numbers (probably less than 50), and crevice nesting seabirds like pigeon guillemots (about 25), parakeet auklet (*Aethia psittacula*) (a few), and horned puffins (several hundred) also occur.

3.7.2.2 Shorebirds

The only shorebird known to breed on Sud is black oystercatcher which nests on island beaches beginning in late May or early June. Western sandpipers (*Calidris mauri*) and dowitchers (*Limnodromus sp.*) occur during migration in May and probably August.

3.7.2.3 Birds of Prey

Bailey (1976) recorded one adult and one immature bald eagle on Sud and he also saw a single peregrine falcon.

3.7.2.4 Waterfowl

Although harlequin ducks (*Histrionicus histrionicus*) and mergansers (*Mergus sp.*) (species not determined) were recorded, no nesting is suspected on Sud.

Table 2. Species Documented on Sud Island
(Bailey 1976, Manuwal 1980, Baird 1980)

| Common Name | Scientific Name |
|----------------------------|----------------------------------|
| Birds | |
| Harlequin Duck | <i>Histrionicus histrionicus</i> |
| Merganser | <i>Mergus sp.</i> |
| Rock Ptarmigan | <i>Lagopus muta</i> |
| Forked-tailed Storm Petrel | <i>Oceanodroma furcata</i> |
| Double-crested Cormorant | <i>Phalacrocorax auritus</i> |
| Pelagic Cormorant | <i>Phalacrocorax pelagicus</i> |
| Red-faced Cormorant | <i>Phalacrocorax urile</i> |
| Bald Eagle | <i>Haliaeetus leucocephalus</i> |
| Gyrfalcon | <i>Falco rusticolus</i> |
| Peregrine Falcon | <i>Falco peregrinus</i> |
| Black Oystercatcher | <i>Haematopus bachmani</i> |
| Western Sandpiper | <i>Calidris mauri</i> |
| Dowitcher | <i>Limnodromus sp.</i> |
| Glaucous-winged Gull | <i>Larus glaucescens</i> |
| Pigeon Guillemot | <i>Cephus columba</i> |
| Parakeet Auklet | <i>Aethia psittacula</i> |
| Rhinoceros Auklet | <i>Cerorhinca monocerata</i> |
| Horned Puffin | <i>Fratercula corniculata</i> |
| Tufted Puffin | <i>Fratercula cirrhata</i> |
| Common Raven | <i>Corvus corax</i> |
| Water Pipit | <i>Anthus spinoletta</i> |
| Savannah Sparrow | <i>Passerculus sandwichensis</i> |
| Golden-crowned Sparrow | <i>Zonotrichia atricapilla</i> |
| Mammals | |
| River (land) Otter | <i>Lontra canadensis</i> |
| Steller Sea Lion | <i>Eumetopias jubatus</i> |
| Harbor Seal | <i>Phoca vitulina</i> |
| Sea Otter | <i>Enhydra lutris</i> |
| Hoary Marmot | <i>Marmota caligata</i> |

3.7.2.5 Landbirds

Rock ptarmigan (*Lagopus muta*) have been recorded on Sud, but it is not know if any nest. However, low numbers of songbirds, including four species (Table 2) nest in the vegetation on the surface of the island or in rock crevices (winter wren) beginning in May or early June.

3.8 Cultural Uses

3.8.1 Tangik and Poa Islands

At least one prehistoric settlement is reported on each island, their size and age is unknown. Historically, puffins and their eggs have been harvested by Alaska Natives for food and use as clothing. Hides were used in clothing, while feathers and colorful bills were used in ceremonial attire. This use has significantly decreased today, but harvest is still allowed for Alaska Natives. As burrowers rabbits and marmots cause damage by mixing deposits, exposing artifacts and breaking down surface features.

3.8.2 Sud Island

The government stocking of marmots on the island was possibly for commercial use or for the benefit of personnel manning the station. There are no known current or historical cultural uses of Sud Island and no known prehistoric settlements on Sud Island. Around 20 February, 1945, the US Naval Air Station on Kodiak Island installed an “Automatic Weather Station” on the island. The “War Department Technical Manual TM 11-2406” “Meteorological Station AN/TMQ-1” describes the equipment and layout of the equipment. The equipment would fit in a standard 1-1/2 or 2-1/2 ton cargo truck. There is currently no equipment on the island, aside from a broken tower and parts of a collapsed radio building on the mountain top. Remnants of one or more wooden buildings also occur in the tundra near the ponds.

Chapter 4 Environmental Consequences

4.1 Introduction

The purpose of this chapter is to describe and disclose the effects of the proposed action and alternatives.

4.2 Evaluation of Alternatives Analyzed in Detail

This Section analyzes the environmental consequences of the proposed action in detail against the Alternative analyzed in detail to evaluate real or potential impacts (Table 3). Each major environmental impact is evaluated under each alternative and the direct, indirect and cumulative impacts are analyzed where applicable. Impacts are evaluated relative to context and intensity (USDA 1997). The following factors were considered under each alternative in evaluating impacts listed in Section 1.6:

Likelihood of impact – will the action result in an impact or; is the chance of impact so small as to discount effects?

Duration and frequency of the impact – is the action seasonal, temporary, ongoing, etc.?

Magnitude of impact – is it likely that the magnitude of impact will cause significant impacts to the quality of the human environment?

Geographic extent – are the impacts expected to be local or far-reaching?

Legal status of a species – are there species that may be impacted that have special protections, regardless of the other levels of impact?

4.3 Alternative A – European Rabbits and Hoary Marmots will not be Eradicated from Tangik, Poa, and Sud Islands (No Action)

Under the No Action Alternative, European rabbits and marmots would persist on the Islands, subject to the natural processes of the Islands' ecosystem. European rabbit and marmot population levels on the Refuge likely fluctuate within and between years.

As a direct result of European rabbits and marmots remaining on the Islands, habitat availability and quality for native seabirds would not be restored and would continue to degrade. The adverse impacts that non-native rabbits and marmots have on the Islands' native seabirds and other species, for which the Refuge was established, would continue under the No Action alternative.

Adoption of the No Action alternative does not meet the objectives of this project, the Refuge's policies and mandates (See Section 1.7 and 4.3 of this EA), or guidance provided in EO 13112. USFWS's policy for maintaining biological integrity, diversity, and environmental health guides the Refuge's management priorities. Refuge policy directs managers to: "Restore lost or severely degraded elements of integrity, diversity, [and] environmental health..."; "favor management that restores or mimics natural ecosystem processes or functions to achieve refuge

purpose(s)...”; and “strive to prevent the further loss of natural biological features and processes; i.e., biological integrity.” The ongoing negative impacts of European rabbits and marmots on the environmental health and natural biological processes of the Islands make them a candidate for USFWS action under 601 FW 3, ANILCA, and EO 13112.

4.3.1 Efficacy of Eradication

Under this alternative, there would be no eradication of European rabbits or marmots from Poa, Tangik, or Sud Islands. Without human eradication measures, it is likely that these non-native species would persist on the Islands, therefore this alternative would not be effective at restoring natural habitats, increasing breeding seabird populations, or reaching the goal of eradication of non-native rabbits and marmots.

4.3.2 Impacts to Birds

As there would be no eradication conducted on the Islands, the impact of the No Action alternative would be continued degradation of natural habitats and seabird populations on the Islands. This alternative may further reduce seabird nesting opportunities and put the Refuge in conflict with its mandate to preserve natural biodiversity (ANILCA, and EO 13112).

4.3.3 Impacts to Non-target Mammal Populations

Without the implementation of eradication actions, the proposed methods would not have any impacts to any mammals, target or non-target.

4.3.4 Impacts to Threatened and Endangered Species

Without the implementation of eradication actions, the proposed methods would not have any impacts to any threatened or endangered species.

4.3.5 Cultural Impacts

Without eradication of European rabbits on Tangik and Poa, there would likely be a decrease in the availability of tufted puffins and their eggs available for harvest by Alaska Natives. It's likely the presence of rabbits is causing impacts to the sites as the rabbits burrow - mixing and confusing the archaeological contexts, exposing artifacts and destroying surface indications of the features.

4.4 Alternative B: Eradication of European Rabbits from Tangik and Poa Islands and Hoary Marmots from Sud Island (Proposed Action).

The Proposed Action is to eradicate European rabbits and hoary marmots for the benefit of the Islands' natural biodiversity and breeding seabird colonies. Island ecosystems have responded quickly and dramatically after invasive species eradications. In the Aleutians, the eradication of introduced foxes led to major recovery of island bird populations (Ebbert and Byrd 2002).

Seabird colonies on some islands grew four- to five-fold after foxes were eradicated (Byrd et al. 1994), and the Aleutian cackling goose recovered from an estimated population of less than 800 birds in the late 1970's to a population of more than 100,000 throughout the Aleutians (Byrd 1998). The removal of rabbits and marmots would likely be followed by an increase in breeding seabirds on the Islands. European rabbit and marmot eradication will aid in restoring the Islands' natural vegetation, which is currently being negatively impacted by the rabbits and marmots.

4.4.1 Efficacy of Eradication

Island ecosystems provide a unique opportunity for invasive species management and natural ecosystem restoration, because it is possible to completely and permanently eliminate the effects of the non-native species. Eradication of non-native rabbits from islands has been successful elsewhere (Chapuis 2004, Micol and Jouventin 2002, Priddel et al. 2000, Merton 1987). No documentation was found of any attempted eradication of marmots on an island. Marmot eradication, as proposed, would use similar methods to the proposed rabbit eradication. However, because tufted puffins and marmots do not inhabit areas together on Sud Island, there is not the added constraint to complete eradication on cliffs and slopes prior to puffin nesting. This should increase the likelihood of eradication success on Sud Island.

We anticipate the eradication of European rabbits and marmots would result in the restoration of plant and animal communities and ecosystem processes on the Islands (as described in more detail below). There are many methods available to reduce rabbits, marmots, or other terrestrial mammal populations. However, for this project, the USFWS is proposing to use only mechanical methods and shooting. We believe that given the size of the Islands, the efficacy of proposed methods, and the species to be eradicated that the project will successfully restore natural diversity. These methods are outlined in Section 2.2.

4.4.2 Impacts on Vegetation

4.4.2.1 Tangik and Poa Islands

As indicated above, European rabbits appear to have modified the vegetation on Tangik and Poa. It is likely that vegetation will recover to its former, more lush condition after eradication of rabbits. Also, some species that may have been particularly targeted by rabbits may recover to former levels of abundance.

4.4.2.2 Sud Island

Marmots have almost certainly modified the vegetation on the island (Semenov et al. 2001, Semenov et al. 2003). Vegetation being targeted by marmots will likely recover to more natural abundance and distribution following removal of marmots.

4.4.3 Impacts on Terrestrial Mammals

4.4.3.1 Tangik and Poa Islands

Non-native rabbits would be completely removed from these Islands, returning the Islands to a terrestrial mammal free and more natural, pristine state.

4.4.3.2 Sud Island

Non-native marmots would be completely removed from these Islands, returning the Islands to a terrestrial mammal free and more natural, pristine state.

4.4.4 Impacts on Marine Mammals and River Otters

4.4.4.1 Tangik and Poa Islands

As indicated above, endangered Steller sea lions do not breed or have persistent haul-out sites on Tangik or Poa. Nevertheless, if an animal is seen hauled-out on the Islands during the operation, it will not be disturbed. The actual eradication work will take place away from the beaches; therefore it is unlikely that any Steller sea lions would suffer injury or potential injury as a result of methods described in the Proposed Action. Therefore, this analysis concludes that implementation of rabbit and marmot eradication activities as described in the Proposed Action would have no effect on Steller sea lions on an individual or population level.

Similarly, disturbance to threatened sea otters or harbor seals observed on island beaches will be avoided, and the eradication of rabbits (which takes place more inland) is not likely to have any effects on seals.

Threatened sea otters, sea lions, or harbor seals may be encountered in nearshore marine waters during occasional small boat trips between islands, but boat operators will make every effort to observe marine mammals in the water far ahead of the boat and give them as wide a berth as possible. Operators follow the guidelines issued by the USFWS for sea otters to avoid these types of adverse effects. These findings will be confirmed in an informal Section 7 consultation (E. Lance, USFWS, Pers. Comm. 2010).

4.4.4.2 Sud Island

For endangered Steller sea lions, neither breeding rookeries nor persistent haul-out sites are known on Sud, but since Sugarloaf is nearby, sea lions may occasionally occur on island beaches. If any sea lions are observed, care will be taken to avoid disturbance from personnel conducting the marmot eradication. The eradication efforts will take place away from beaches on the island, so there is no need for frequent visits to beaches sea lions might potentially use.

Similarly if sea otters or harbor seals are observed on beaches, these areas will be avoided by project personnel to avoid disturbance. Therefore, the eradication of marmots is not likely to affect marine mammals. These findings will be confirmed in an informal Section 7 consultation (E. Lance, USFWS, Pers. Comm. 2010).

River otters may traverse some areas where marmots are found, particularly near the wetlands Sud. Nonetheless, it would be highly unlikely for otters to be captured in these sets, but if this happened, live river otters would be released. If any captures occur, they will be reported to ADFG as required.

4.4.5 Impacts on Seabirds

The eradication efforts conducted on the Islands would occur away from nesting seabirds when they are occupying nesting colonies. Therefore, the Proposed Action would not result in any measurable adverse effects. Instead, the action would have beneficial effects to seabirds on the Islands (see details below).

The eradication efforts would result in reduced disturbance of nesting seabirds and increased vegetative cover by reducing grazing by rabbits and marmots, both beneficial to nesting seabirds. Similar removals elsewhere have resulted in restoration of seabird populations. For example, eradication of European rabbits from the Farallon Islands, off the coast of San Francisco, California, resulted in the return of nesting rhinoceros auklets after they had been absent for more than a century (Donlan and Heneman 2007). Because those auklets now occupy known rabbit burrows, there is little doubt that the removal of rabbits has contributed to the auklets' recovery. Furthermore, an increase in populations of nesting tufted puffins also occurred after rabbits were removed (Ainley and Boekelheide 1990).

4.4.5.1 Tangik and Poa Islands

Seasonal timing and careful placement of capture devices to specifically target rabbits and avoidance of trapping in the primary seabird nesting areas when they are present are the primary mitigation measures (Chapter 2) that will be used to avoid unintended take of seabirds in rabbit trapping operations. All trapping in burrow-nesting seabird colonies will be completed before breeders begin to attend nesting burrows in May. Gulls are likely to be concentrated on beaches during the early part of the trapping period, and trapping will be completed in gull nesting colony areas before gulls occupy nest sites. Crevice-nesting and cliff ledge nesting seabirds uses areas not likely used by rabbits. Therefore they will not be affected by the eradication operations.

Puffins, and other burrow-nesting seabirds such as storm-petrels and ancient murrelets, are highly susceptible to disturbance, particularly early in the nesting period, and this can result in egg/nest desertion (Rodway et al. 1996).

Rabbits are particularly aggressive in establishing new burrows. An illustration is the impact of European rabbits on burrowing bettongs (*Bettongia lesueur*), an Australian mammal that is known to be "exceedingly pugnacious" and similar in size to the

rabbits. In this study, female rabbits evicted bettongs' from their burrows, and one bettong died with deep scratches to its hindquarters after it was evicted (Williams et al. 1995). Rabbits interacting directly with seabird eggs are documented elsewhere (Brown 1974) and one or more of these types of disturbance may be causing nesting failures on Tangik and Poa. It is also likely that rabbits have taken over former puffin nesting sites.

Use of existing rabbit burrows by tufted puffins and other burrow-nesting seabirds on Tangik and Poa and improved nesting success due to removal of disturbance is expected when European rabbits are eradicated from the Islands.

4.4.5.2 Sud Island

Since the remnant rhinoceros auklet colony on Sud Island is located near the top of steep sea cliffs (S. Ebbert, Alaska Maritime NWR, pers. comm. 2009), traps set for marmots would not be in the immediate vicinity of auklet nesting areas so auklets are not at risk from marmot capture devices. Furthermore traps would be set specifically for marmots in marmot burrows, along trails, around rocks or logs used for look-outs or along approaches to bait. Selective placement of traps to capture marmots is the key to eliminating or reducing non-target take.

Storm-petrels would not be susceptible to capture devices because of their small size, and other burrow-nesting seabirds

As indicated in Chapter 3, marmots apparently are responsible for the near extirpation of rhinoceros auklets on Sud, and according to Boersma and Silva (2001) fork-tailed storm-petrels may also have been adversely affected by marmots. The interactions between birds and marmots could be direct disturbance, and/or competition for burrows.

4.4.6 Impacts on Birds of Prey

4.4.6.1 Tangik and Poa Islands

In the Aleutians, peregrine falcons depend largely on seabirds for food, which they obtain mainly by hunting live birds at colonies or on seabird foraging areas in near-shore marine waters (Gibson and Byrd 2007). Falcons are not at risk from the Proposed Action because of their feeding strategy (e.g., they are not subject to getting caught in rabbit traps) and their nests are on isolated cliffs not accessible to disturbance by personnel.

If any eagles nest on the Islands, nests likely will be on sea cliffs or sea stacks (Gibson and Byrd 2007) and nesting areas will be avoided by personnel; therefore minimal disturbance would occur. Further, personnel will not use carrion bait for eradication efforts that might attract eagles to trap sites.

4.4.6.2 Sud Island

For similar reasons listed for Tangik and Poa, peregrine falcons and bald eagles would not be affected by the eradication efforts for marmots on Sud.

4.4.7 Impacts on Shorebirds

4.4.7.1 Tangik and Poa Islands

Trapping will not occur in black oystercatcher nesting areas on beaches, and if territorial pairs are encountered during any field operations, field personnel would subsequently avoid these areas. Therefore, the Proposed Action would not result in any measurable effect to oystercatchers on the Islands.

4.4.7.2 Sud Island

Due to similar trapping approaches at Sud as at Tangik and Poa, oystercatchers would not be adversely affected by the Proposed Action. Migrant shorebirds likely will not be present during the timing of operational activities, but even if they were, they are very unlikely to be affected by operations.

4.4.8 Impact on Landbirds

4.4.8.1 Tangik and Poa Islands

Ravens may be attracted to rabbits in traps, but the traps activated by a rabbit would no longer be a threat to catch ravens. Ravens can be released from live traps, such as leg-hold traps and cage traps, and snares and body-gripping traps are unlikely to capture ravens. Carrion bait, which is attractive to ravens, will not be used during this operation.

Ravens likely scavenge rabbits and marmots on the Islands, so there may be some reduced prey abundance after rabbits are removed. Nevertheless this change is unlikely to result in any noticeable effect on ravens, because the species is adept at adjusting to changes in food availability (Boarman and Heinrich 1999). Ravens occur throughout the Aleutian Islands where no rabbits are present (Gibson and Byrd 2007).

Capture of passerines is not expected with eradication devices set for rabbits. Some individual passerines may be flushed during project activities; however these temporary disturbances are not expected to have adverse effects to the individuals or species. European rabbit eradication from Tangik and Poa Islands will likely result in expansion of tall vegetation thereby, increasing breeding habitat for song sparrows (Gibson and Byrd 2007). Therefore, there is no reasonable risk for adverse effects on other passerines that would be associated with the Proposed Action.

4.4.8.2 Sud Island

Similar to Tangik and Poa, ravens on Sud could be attracted to non-native mammals in traps, but the traps would no longer be a threat to capture ravens. Likewise, other landbirds would be affected similarly to Tangik and Poa after the marmots are eradicated.

4.5 Cultural Impacts

Temporary shelters will be used on Tangik and Poa Islands and on Sud Island, and they will be removed the eradication operation. No artifacts, historic objects, or human remains will be disturbed or removed during the project. The Proposed Action would not adversely affect any cultural resources found on the Islands. Removing burrowing animals will benefit the protection of archaeological remains. Burrowing churns the soil and would disrupt or damage any artifacts and expose them to other damaging factors. (D. Corbett, USFWS, Pers. Com, 2010).

4.6 Cumulative Impacts

USFWS has considered the localized impacts of the Proposed Actions in the analysis above. There will be no adverse impacts to any of the native bird or mammal populations in the area. While there may be unintentional mortality, there would be no adverse impact to the population on a local, regional, or any larger scale. USFWS has further considered the Proposed Action in conjunction with local fishing operations, recreational activities, native and subsistence activities, other Refuge management activities, and larger scale implications for the human environment and concludes that there will be no adverse cumulative impacts on the human environment from the Proposed Action. In the long term, the increase in seabird nesting habitat and removal of two non-native species from island communities will have a beneficial impact on local, regional, and worldwide biodiversity.

4.7 Conclusion

Based on the analysis, USFWS does not believe that the Proposed Action is likely to adversely affect any portion of the human environment. Conversely, the Proposed Action is anticipated to increase breeding and nesting opportunities for seabirds and restore natural habitat as mandated by USFWS policy. The Proposed Action provides the least intrusive operational activities while providing the most practical and cost-effective means for restoring natural biodiversity on Tangik, Poa and Sud islands.

Table 3. Summary of Impacts

| | Alternative A (No Action) | Alternative B (Proposed Action) |
|--|---|---|
| Efficacy of Eradication | Rabbits and marmots would persist on the Islands, subject to natural processes of the Islands. No eradication actions would occur. | Proposed Action is anticipated to be effective in eradicating rabbits and marmots on the Islands |
| Impacts to Birds | Continued degradation of natural habitats and seabirds populations on the Islands. | There is no reasonable risk for adverse effects to any birds analyzed under the Proposed Action, and beneficial to several species of seabirds. |
| Impacts to Non-target Mammals | The No Action alternative would have no impact on any mammal populations. | There is no reasonable risk for adverse effects to any non-target mammals analyzed under the Proposed Action. |
| Impacts to Threatened or Endangered Mammals | The No Action alternative would have no effect (no impact) on any threatened or endangered mammals | The Proposed Action would have no adverse effects on listed species found in the project area. |
| Cultural Impacts | Degradation of the sites by burrowing animals would continue- decreasing the integrity and scientific and humanistic values of the sites. | Benefit to the sites by removing a source of damage. Net beneficial effect on historical or cultural resources. |

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Appendix: Evaluation of the Effects on Subsistence Uses and Needs

Alaska Maritime National Wildlife Refuge Evaluation of the Effects on Subsistence Uses and Needs (ANILCA Section 810 Evaluation)

The U.S. Fish and Wildlife Service, acting for the Secretary, is required by Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) to evaluate the effects on subsistence uses and needs in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands on national wildlife refuges in Alaska. The evaluation of effects of this proposed action or use on subsistence uses and needs is documented below. If this evaluation concludes a finding that the proposed action would result in significant restriction to subsistence uses, and we wish to proceed, we must initiate further procedural requirements of Section 810.

Proposed Action/Use:

Tangik and Poa Islands are each one mile offshore the eastern shore of Akun Island, in the Eastern Aleutian Islands, Alaska. Sud Island is in the Barren Islands north of the Kodiak archipelago and south of the Kenai Peninsula.

European rabbits (*Oryctolagus cuniculus*) were introduced to Tangik and Poa Islands by a resident of Akutan Village in 1940. Hoary marmots (*Marmota caligata*) were stocked on Sud Island by the Alaska Game Commission in 1930. Island populations of both species have expanded and are found throughout their respective islands. These burrowing, grazing species have caused adverse impacts to natural species on the island, including nesting seabirds. The purpose of the proposed action is to eradicate introduced, non-native European rabbits and hoary marmots from Tangik, Poa and Sud islands. This will facilitate the restoration of the natural island ecosystem and improve habitat quality for native species such as ancient murrelets, tufted puffins, and rhinoceros auklets.

To accomplish the proposed action, Alaska Maritime NWR has contracted with USDA APHIS Wildlife Services to conduct the eradications. The rabbit eradication is scheduled to be initiated in the spring of 2010, and the marmot eradication is scheduled to begin in May 2010. A more thorough description of the project including maps of the project area can be found in the *Environmental Assessment, Invasive Species Eradication for Habitat Restoration of Tangik, Poa and Sud Islands, Alaska* (USFWS 2010).

Evaluation:

1. Subsistence Resources, Uses and Needs in the Affected Area:

In the Aleutians, residents have traditionally made use of the following types of resources: marine resources, including fish, (salmon, halibut, cod, etc.); marine mammals (Stellar sea lions, sea otters and harbor seals); intertidal resources such as sea urchins, razor clams, butter clams,

cockles, mussels, and chitons, crab and shrimp. Plants harvested include berries (blueberries, salmonberries, mossberries, strawberries, and lingonberries), wild celery (*Angelica lucida*), wild rice (*Fritillaria camschatcensis*) giant kelp, and fiddlehead ferns. Birds are harvested, including ducks, geese, and ptarmigan. Eggs are collected primarily from gull colonies, although mallard, merganser, puffin, and murre eggs are also collected, depending on the location.

2. Effect of Proposed Action or Use on Subsistence Uses and Needs.

The proposed action should have no effect on subsistence uses or needs. Tangik, Poa, and Sud Islands are uninhabited. Sud Island is not known to have been used for subsistence purposes.

3. Availability of other lands for the purpose sought to be achieved.

The goal of the proposed project is to restore the natural diversity of species and habitats to these three islands. Therefore, no other lands can be used to achieve the purpose.

4. Alternatives which would reduce or eliminate the proposed action from lands needed for subsistence purposes.

There is no way to accommodate the proposed action other than to conduct eradications on Tangik, Poa and Sud Islands. If successful, the project is expected to restore some traditional resources for potential future subsistence use.

Finding:

Based on review and evaluation of information indicated above and in the supporting references indicated below, I have determined that the proposed action will not result in a significant restriction of subsistence uses. The islands intended for restoration have not been used for subsistence purposes. If successful, the proposed action has the potential to restore populations of traditional subsistence resources.

Agency Decision:

A finding of no significant restriction in subsistence uses completes the Section 810 requirements. The proposed action or use may be authorized.

Supporting References:

Alaska Policy Manual, U.S. Fish and Wildlife Service

Alaska Maritime National Wildlife Refuge, Final Comprehensive Conservation Plan, Environmental Impact Statement, Wilderness Review. Record of Decision signed August 26, 1988.

Alaska National Interest Lands Conservation Act (ANILCA), 1980.

Service Manual - Region 7, U.S. Fish and Wildlife Service

Subsistence Management for Federal Public Lands in Alaska, Final., 1992

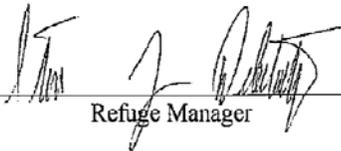
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Signature:



Refuge Manager

1-8-10

Date