

Appendices

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Appendix 1. Treaties, legislation, policies, national and international initiatives, and federal jurisdictions important to seabird conservation.

The U.S. Fish and Wildlife Service (Service) has the primary responsibility for the conservation and management of migratory birds, including seabirds. Several international treaties, domestic laws and Executive Orders have been enacted that provide protection for migratory birds and the Service is largely responsible for implementing the statutes, laws and regulations, derived from these. The most important pieces of legislation are: Migratory Bird Treaty Act, Fish and Wildlife Conservation Act, Endangered Species Act, and the National Wildlife Refuge System Administration and Improvement Acts. Each of these statutes is described briefly below.

There are also regional and national policies regarding management and monitoring of seabirds and national/international agreements and initiatives that guide Service activities. These, together with the roles and responsibilities of the Service and other federal agencies, for seabird management, are summarized in this appendix.

Treaties and Legislation

Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-718)

The Migratory Bird Treaty Act (MBTA) decreed that all migratory birds were fully protected and, unless permitted by regulation, it was unlawful to take, capture, kill or possess any migratory bird or their parts (including eggs, nests, and feathers). This Act is the domestic law that implements four international conventions (with Canada, Mexico, Japan and Russia) for the protection of shared migratory bird resources. A full list of the species covered and the regulations derived from the Act are contained in the Code of Federal Regulations, Title 50¹ (50 C.F.R.). The consequence of this legislation is a comprehensive program for migratory bird conservation including management across international borders, maintenance of healthy migratory bird populations, conservation of habitat, and restoration of depleted populations.

Fish and Wildlife Conservation Act of 1980, as amended (16 U.S.C. 2901-2911)

The Fish and Wildlife Conservation Act, commonly known as the “Nongame Act”, authorized federal assistance to the States for the development and

implementation of conservation plans for nongame fish and wildlife, and directed Federal agencies to conserve nongame species and their habitats. A 1988 amendment directed the Service to: 1. monitor and assess migratory nongame birds (including seabirds), 2. determine the effects of environmental changes and human activities, 3. identify birds of conservation concern that were likely to be candidates for endangered species listing and actions to prevent listing, and 4. report to Congress every five years. Amended again in 1989, the Service was further directed to identify lands and waters in the Western Hemisphere where protection, management, or acquisition would foster the conservation of migratory nongame birds.

Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544)

The Endangered Species Act (ESA) provides for the protection of plants and animals in danger of extinction throughout all or a significant portion of their range and the conservation of ecosystems upon which they depend. The ESA implements the United States’ commitment to several international treaties and conventions including: Migratory Bird Treaty; Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere; and the International Convention for the High Seas Fisheries of the North Pacific Ocean. Five seabirds that breed in this Region are listed under the ESA (Hawaiian Petrel, Newell’s Shearwater, California Brown Pelican, California Least Tern and Marbled Murrelet). A sixth species (Short-tailed Albatross), has not successfully bred in the U.S., but regularly visits the Hawaiian Islands and has attempted to breed (laid eggs) several times over the past 30 years at Midway Atoll.

National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668-668) and National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

The Administration Act established the National Wildlife Refuge (NWR) System and together with the National Wildlife Refuge System Improvement Act of 1997, ensures that the National Wildlife Refuges are managed as a national system of lands and waters for the protection and conservation of

national wildlife resources. The main components of the two Acts are a strong conservation mission statement for the NWR System; a requirement to maintain the biological integrity, diversity, and environmental health of the system; a process for determining compatible uses; recognition of the priority wildlife dependant recreational activities on refuges; and, comprehensive conservation planning requirements. Inventory and monitoring of the status and trends of wildlife populations is required on all refuges.

Other Acts, Treaties and Legislation

Several other Treaties, Conventions, Acts, Laws and Regulations have bearing on the conservation and management of seabirds, however, we will not discuss them in detail here. The Fish and Wildlife Act of 1956, as amended, established the Fish and Wildlife Service within the Department of the Interior and provides broad authority for the management, conservation, and protection of fish and wildlife resources. Other more narrowly focused laws include those governing oil spill response and damage assessment (e.g., Oil Pollution Act) and other maritime contaminant issues (e.g., Federal Water Pollution Control Act); regulation of commercial and sport fisheries (e.g., Magnuson-Stevens Fisheries Conservation and Management Act) including a moratorium of specific fisheries such as the high seas driftnet fisheries that was abolished, in part, due to significant incidental mortality of seabirds (High Seas Driftnet Fishing Moratorium Protection Act); management of coastal habitats where some seabirds nest (e.g., Coastal Zone Management Act and Fish and Wildlife Coordination Act); and, the management of introduced plants that degrade nesting habitat (e.g., Federal Noxious Weed Act). A more complete listing and summary of resource laws of interest to the Service can be found at <http://laws.fws.gov/lawsdigest/indx.html> and those more specific to migratory birds are summarized at <http://migratorybirds.fws.gov/intrnltr/treatlaw.html>.

Service Policy

Regional Marine Bird Policy

In 1985, the Service's Region One enacted a policy that recognized the international importance of this Region to the maintenance of healthy seabird populations in the Pacific Basin. The policy stated that the Service would implement to the fullest extent possible the Migratory Bird Treaty provisions that dealt specifically with marine birds: prohibiting take of birds and eggs, establishing sanctuaries, taking actions to preserve and enhance

the environment for birds, exchanging research data, and providing special protection to species and subspecies in need. The policy included directives to: 1. Utilize all available programs and divisions of the Service to maintain seabird populations, both on and off National Wildlife Refuge lands and waters, at or above current population levels, in their natural diversity and on native habitat throughout their range; 2. Work towards the establishment and active protection of colonies, roosts, loafing sites and adjacent waters as marine bird sanctuaries by private, local, state, or federal interests; 3. Encourage formulation of comprehensive land management plans, effective regulation of offshore oil and mineral development, and stringent tanker safety laws - to provide adequate protection for marine birds and their habitats; 4. Encourage appropriate research and surveys of marine birds and their ecosystems, especially long-term monitoring of populations and habitats and identification of species nearing threatened status; and, 5. Remove all introduced predators from marine bird colonies on all National Wildlife Refuges and encourage their removal from all other colonies.

Waterbird Bycatch Policy

In 2001, the Service established a national policy regarding bycatch of birds in fisheries operations. Substantial numbers of waterbirds (especially seabirds, but also waterfowl, shorebirds, and other related wading species) are killed annually in fisheries, making waterbird bycatch a serious conservation issue and a violation of the underlying tenets of the MBTA. The goal of the Service is the elimination of waterbird bycatch in fisheries. The Service will actively expand partnerships with Regional, national, and international organizations, States, tribes, industry, and environmental groups to meet this goal. The Service, in cooperation with interested parties, will aggressively promote public awareness of waterbird bycatch issues, and gather the scientific information to develop and provide guidelines for management, regulation, and compliance. The Service is drafting an Action Plan to implement this Policy.

National and International Agreements and Initiatives

International Plan of Action for the Reduction of Seabird Bycatch in Longline Fisheries (IPOA)

National Plan of Action for the Reduction of Seabird Bycatch in Longline Fisheries (NPOA)

In 1999, the Food and Agriculture Organization (FAO) of the United Nations, adopted the IPOA

to address concerns over the significant mortality of seabirds worldwide in connection with longline fisheries. This was in compliance with the Code of Conduct for Responsible Fisheries. The objective of the IPOA was to reduce the incidental catch of seabirds in longline fisheries. Each nation was to assess their own fisheries and those that determined they had a problem were to develop National Plans of Action. This plan would assess the magnitude of the problem, develop a prescription of mitigative measures, outline needed research and development, and direct education and outreach to address the problem. The Service and Department of State (DOS) worked with the NOAA- Fisheries to draft an NPOA for U.S. longline fisheries in 2001. An Interagency Seabird Working Group (ISWG), with representatives from NOAA-Fisheries, the Service, DOS, and the Fisheries Councils, was formed to guide implementation of the NPOA.

Waterbirds for the Americas Initiative and the North American Waterbird Conservation Plan

The Waterbird Conservation for the Americas Initiative (Waterbird Initiative), launched in 1998, is an international, broad-based, voluntary partnership dedicated to waterbird conservation, that complements the initiatives existing for other bird groups, specifically the North American Waterfowl Management Plan, Partners in Flight, and the national Shorebird Plans, all of which come together in the North American Bird Conservation Initiative (NABCI). *Waterbird Conservation for the Americas: North American Waterbird Conservation Plan* is one product of the Waterbird Initiative. The plan provides a broad scale framework for the conservation and management of 210 species of waterbirds, including seabirds, coastal waterbirds, wading birds, and marshbirds utilizing aquatic habitats throughout North America, Central America, the islands and pelagic waters of the Caribbean and western Atlantic, and the US Pacific Islands and pelagic north Pacific. Regional plans for seabirds of the California Current System and the tropical Pacific regions will soon be developed. The Service is involved in these planning processes and this Plan will provide much of the groundwork for the regional waterbird plans.

Roles and Responsibilities

U.S. Fish and Wildlife Service

The Service is the principal federal agency, in the United States, responsible for the protection and management of migratory birds, as described above. Within the Service, the different divisions

have defined, but often overlapping responsibilities concerning the conservation of seabirds.

The Division of Migratory Bird Management has the lead in implementing the Service's responsibilities with regards to migratory birds. This is most often accomplished in conjunction with national and international partners. The Division is entrusted to monitor and manage for healthy migratory bird populations and to ensure that these populations do not become threatened or endangered. Within the Service, the Division of Migratory Birds takes a broad scale approach to migratory bird conservation, managing bird populations throughout their range. Permits to allow the take and/or possession of migratory birds are administered out of this office. This Division has a small staff located in the Regional Office.

Ecological Services includes several key components: Endangered Species, Environmental Contaminants, and Habitat Conservation. Endangered Species has primary responsibility for those species listed under the ESA. Once a seabird is listed as threatened or endangered responsibility passes from the Division of Migratory Birds to Endangered Species. Currently there are six listed species in the Region. Responsibility for candidate species, species that have been petitioned for listing, and Birds of Conservation Concern (BCC) is shared by the two divisions and efforts are directed at alleviating threats and restoring populations, so that the species will not be listed. Endangered Species staff consult with other agencies on projects that might affect listed species and administer the permitting of endangered species take. Environmental Contaminants encompasses the Service's Damage Assessment and Spill Response Division. They are the primary Service contact in the event of oil or other hazardous substance spills and typically will represent the Service in the Incident Command System during a spill response. They also carry out contaminants investigations to identify and resolve or prevent contaminant impacts to seabirds and other wildlife. The Habitat and Conservation Branch includes the Coastal Program, Habitat Conservation, and Partnerships programs. Most personnel are located in the state Field Offices and local issues are usually handled at this level.

In addition to these broad responsibilities for seabirds throughout their respective ranges, the Service also has site specific management responsibilities associated with the National Wildlife Refuge (NWR) System. The largest seabird colonies

in the Pacific are located on NWRs and numerically, over 80% of the Region's seabirds nest on Refuge lands. The NWRs have responsibility to inventory and monitor seabird populations on their lands and to maintain and restore where appropriate, the biological integrity, diversity, and environmental health of the Refuges.

Other Federal Agencies

Several other federal agencies have land management responsibilities for seabird colony sites. Bureau of Land Management (BLM) administers the California Coastal National Monument (CCNM) that encompasses most of the islands and rocks off the California coast, not including the large islands in the California Bight (Channel Islands) or the National Wildlife Refuge Islands at Castle Rock and the Farallon Islands. The CCNM colonies are managed by BLM, in partnership with California Department of Fish and Game and California State Parks.

The National Park Service (NPS) manages three important islands in the northern Channel Islands of California: San Miguel, Santa Cruz (western portion), Santa Rosa, Anacapa, and Santa Barbara islands. These islands support important Ashy Storm-Petrel, Brown Pelican, and Xantus's Murrelet colonies. NPS also manages important seabird colonies at Pt. Reyes National Seashore and Golden Gate National Recreation Area. In the tropical Pacific Islands, the NWRs support the highest number and diversity of nesting seabirds, but National Parks are especially important for species nesting on the high volcanic islands such as Hawaiian Petrels, Newell's Shearwaters and possibly Band-rumped Storm-Petrels at Volcano NP, Hawaii and Haleakala NP, Maui. On American Samoa, National Parks on Tutuila and Ta'u provide habitat for Audubon's Shearwaters, Tahiti and Herald Petrels. Many of these high islands have suffered extensive habitat loss and are infested with introduced species. These National Parks often provide important habitat for seabird species that are listed under ESA.

Historically the Department of Defense (DOD) owned, leased or managed entire islands that support important seabird colonies. Many military islands have been closed over the past three decades and management has reverted to the Service or in some cases to the state (*e.g.*, Midway Naval Air Station and French Frigate Shoals Coast Guard Loran Station reverted to USFWS and Kure Atoll Coast Guard Loran Station reverted to the state of Hawaii). Other islands (*e.g.*, Wake Atoll, in the central Pacific, and San Clemente and San Nicolas islands, CA) have remained under DOD jurisdiction. Many of these islands have significant seabird resources. Other military bases, located along the mainland coast or on portions of large islands, provide important seabird habitat (*e.g.*, Marine Corps Base Hawaii (Kaneohe Bay) and Naval Base Coronado, CA). The missions and goals of these military installations are often at odds with seabird conservation but in many cases DOD provides considerable protection and management directed towards conservation and restoration of seabird populations.

National Oceanic and Atmospheric Administration (NOAA) Fisheries (*i.e.* National Marine Fisheries Service) and respective state, commonwealth, and territorial agencies, manage the fishery resources that piscivorous seabirds eat and marine habitats where they forage. In 2001, NOAA Fisheries staffed a position for a national seabird coordinator as well as identifying staff in each of its regions, science centers, and headquarter offices to address issues associated with seabird/fishery issues. These staff work in collaboration with regional representatives from the Service and the Department of State as part of an Interagency Seabird Working Group. NOAA's National Ocean Service addresses important responsibilities in conjunction with oil spill response through its Office of Response and Restoration (OR&R). OR&R is the focal point in NOAA for preventing, planning for, and responding to oil spills, releases of hazardous substances, and hazardous waste sites in coastal environments and restoring affected resources. OR&R protects and restores coastal resources through the application of science and technology. On behalf of the public, OR&R addresses environmental threats from catastrophic emergencies, to chronic releases, to vessel groundings in sanctuaries. The National Marine Sanctuary System is also a program of the National Ocean Service. National Marine Sanctuaries play an important role in the conservation of seabird resources.

1 Some of the seabirds that breed in the USPI (*e.g.*, Tahiti Petrel and Polynesian Storm-Petrel) are not listed in the 50 CFR but the family is included in the Mexican or Canadian conventions. Addition of these species is currently under review by the U.S. Solicitors office.

Appendix 2. List of U.S. Pacific Islands, USFWS Pacific Region

Island Name	Type	Archipelago	Group	Political Status	Administration	Special Status
Hawai`i		Hawai`i		State of Hawai`i	State of Hawai`i	
Hawai`i	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	State of Hawai`i	
Maui	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	State of Hawai`i	
Kaho`olawe	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	Kaho`olawe Commission	former military bomb range
Lana`i	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	State of Hawai`i	
Moloka`i	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	State of Hawai`i	
O`ahu	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	State of Hawai`i	
Kaua`i	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	State of Hawai`i	
Kaula	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	State of Hawai`i	State Seabird Sanctuary former military bomb range
Ni`ihau	Basalt Island	Hawai`i	main Hawaiian Islands	State of Hawai`i	State of Hawai`i; privately owned	
Nihoa	Basalt Island	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	USFWS	National Wildlife Refuge
Necker	Basalt Island	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	USFWS	National Wildlife Refuge
French Frigate Shoals <i>comprised of 10-12 sandy islets & 1 basalt pinnacle</i>	Atoll + Pinnacle	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	USFWS	National Wildlife Refuge; former
Gardner Pinnacles	Basalt Island	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	USFWS	National Wildlife Refuge
Maro Reef	Atoll-like reef	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	USFWS	National Wildlife Refuge
Laysan	Coral Island	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	USFWS	National Wildlife Refuge
Lisianski & Neva Shoal	Coral Island & atoll-like reef	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	USFWS	National Wildlife Refuge
Pearl and Hermes Reef <i>comprised of 7 islets</i>	Atoll	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	USFWS	National Wildlife Refuge
Kure <i>comprised of 4 islets</i>	Atoll	Hawai`i	leeward/northwestern Hawaiian Islands	State of Hawai`i	State of Hawai`i	State Seabird Sanctuary; former Coast Guard station

Appendix 2. List of U.S. Pacific Islands, USFWS Pacific Region (continued).

Island Name	Type	Archipelago	Group	Political Status	Administration	Special Status
Midway Atoll <i>comprised of 4 islets</i>	Atoll	Hawai`i	leeward/northwestern Hawaiian Islands	unincorporated unorganized insular area	USFWS	National Wildlife Refuge; former Naval Air Station
Johnston Island <i>comprised of 4 islets</i>	Atoll			unincorporated unorganized territory	jointly administered: USFWS & Defense Threat Reduction Agency	National Wildlife Refuge; military base
Wake Island <i>comprised of 3 islets</i>	Atoll	Marshall		unincorporated territory	Air Force/ Department of Interior	Air Force Base
Palmyra <i>comprised of 50+ islets</i>	Atoll	Line		incorporated territory	USFWS & The Nature Conservancy	National Wildlife Refuge; TNC Reserve
Kingman Reef	Atoll-like reef	Line			USFWS	National Wildlife Refuge
Jarvis Island	Coral Island	Line		possession	USFWS	National Wildlife Refuge
Baker Island	Coral Island	Phoenix		possession	USFWS	National Wildlife Refuge
Howland Island	Coral Island	Phoenix		possession	USFWS	National Wildlife Refuge
American Samoa		Samoa		unincorporated unorganized territory	American Samoa Government	
Tutuila	Basalt Island	Samoa			American Samoa Government	
Aunu`u	Basalt Island	Samoa			American Samoa Government	
Ta`u	Basalt Island	Samoa	Manua Islands		American Samoa Government	
Ofu	Basalt Island	Samoa	Manua Islands		American Samoa Government	
Olosega	Basalt Island	Samoa	Manua Islands		American Samoa Government	
Swains (<i>To`elau Lata Mai</i>)* Rose (<i>Nu`u Manu</i>)*	Coral Island Atoll	Tokelau Samoan			American Samoa Government USFWS	National Wildlife Refuge

* Samoan names for Swains Island and Rose Atoll

Appendix 2. List of U.S. Pacific Islands, USFWS Pacific Region (continued).

Island Name	Type	Archipelago	Group	Political Status	Administration	Special Status
Commonwealth Northern Mariana Islands (CNMI)		Mariana		commonwealth in political union with United States	CNMI Government	
Farallon de Pajaros	Basalt Island	Mariana			CNMI Government	
Maug	Basalt Island	Mariana			CNMI Government	seabird sanctuary
<i>comprised of 3 islands</i> Ascencion	Basalt Island	Mariana			CNMI Government	
Agrihan	Basalt Island	Mariana			CNMI Government	
Pagan	Basalt Island	Mariana			CNMI Government	
Alamagan	Basalt Island	Mariana			CNMI Government	
Guguan	Basalt Island	Mariana			CNMI Government	
Sarigan	Basalt Island	Mariana			CNMI Government	
Anatahan	Basalt Island	Mariana			CNMI Government	
Farallon de Medimilla	Limestone Island	Mariana			CNMI Government	military bomb range
Saipan	Limestone/ Basalt Islands	Mariana			CNMI Government	
Timian	Limestone Island	Mariana			CNMI Government	
Aguijan	Limestone Island	Mariana			CNMI Government	
Rota	Limestone/ Basalt Islands	Mariana			CNMI Government	
Guam	Limestone/ Basalt Islands	Mariana	unincorporated	organized territory	Guam Government	
Cocos	Coral Island	Mariana	Guam		Guam Government	

Appendix 3. National and International Significance of Breeding Seabird Populations in USFWS Pacific Region.

	Significance of Region 1 Populations					Official Status				
	global ¹	US ²	significant	manage-able	periph-eral	ESA ³	IUCN ⁴	BCC ⁵ -Nat.	BCC ⁵ -Reg.	BCC ⁵ -BCR
Order PROCELLARIIFORMES										
Family DIOMEDEIDAE										
Short-tailed Albatross	x	x			x	E	VU	x	x	5,32,67,68
Black-footed Albatross	x						VU			>95% of the global population breed in HI
Laysan Albatross	x									>95% of the global population breed in HI
Family PROCELLARIIDAE										
Hawaiian Petrel	x					E	VU			endemic to Hawaii
Herald Petrel		x					NT	x		68
Tahiti Petrel		x								68
Bonin Petrel	x									Global populations poorly known but it is likely that US supports $\geq 50\%$
Phoenix Petrel							VU	x	x	68
Bulwer's Petrel	x									Does not currently breed in US, but colonies in the Phoenix & Line groups are near US islands
Wedge-tailed Shearwater		x								largest colony in the Pacific on Nihoa, HI
Christmas Shearwater		x								
Newell's Shearwater	x					T	VU			67,68
Audubon's Shearwater				x						<i>Pa.newelli</i> endemic to Hawaii
Family HYDROBATIDAE										
Fork-tailed Storm-Petrel				x						
Leach's Storm-Petrel				x						
Ashy Storm-Petrel	x						NT	x	x	32
Band-rumped Storm-Petrel		x				C				67
Black Storm-Petrel		x								majority of the global population breed in CA
Tristram's Storm-Petrel		x					NT		x	67

Appendix 3. National and International Significance of Breeding Seabird Populations in USFWS Pacific Region (continued).

	Significance of Region 1 Populations				Official Status					
	global ¹	US ²	significant	manage-able	periph-eral	ESA ³	IUCN ⁴	BCC ⁵ -Nat.	BCC ⁵ -Reg.	BCC ⁵ -BCR
Polynesian Storm-Petrel		x					VU		x	68
Order PELECANIFORMES										
Family PHAETHONTIDAE										
White-tailed Tropicbird			x							large populations on main islands of HI & Samoa
Red-tailed Tropicbird		x								
Family SULIDAE										
Masked Booby			x							
Brown Booby			x							
Red-footed Booby			x							
Family PELECANIDAE										
Brown Pelican			x			E				total US population of western subsp in R1
Family PHALACROCORACIDAE										
Double-crested Cormorant			x							majority of western subspecies in R1
Brandt's Cormorant	x									75% of global population in R1
Pelagic Cormorant			x							significant % of southern subspecies in R1
Family FREGATIDAE										
Great Frigatebird		x								
Lesser Frigatebird		x								68
Order CHARADRIIFORMES										
Family LARIDAE										
Ring-billed Gull				x						
California Gull				x						large colonies in CA; important wintering population
Western Gull	x									estimate 55-85% of global population in R1

Appendix 3. National and International Significance of Breeding Seabird Populations in USFWS Pacific Region (continued).

	Significance of Region 1 Populations				Official Status						
	global ¹	US ²	significant	manageable	peripheral	ESA ³	IUCN ⁴	BCC ⁵ -Nat.		BCC ⁵ -Reg.	BCC ⁵ -BCR
Glaucous-winged Gull				x	x		NT	x	x	32	peripheral breeder; important wintering population
Heermann's Gull			x								total US population of western subspp in R1
Gull-billed Tern			x							5	hemispherically important numbers
Caspian Tern				x							
Royal Tern					x						
Elegant Tern		x					NT	x		32	10% of the global population in R1
Arctic Tern										5	BCC in BCR 5 but peripheral in R1
Forster's Tern		x		x							range expansion (Clapp et al. 1993)
Little Tern			x			E					total US population of western subspp in R1
Least Tern											>65% of the global population may breed in R1
Gray-backed Tern	x										range expansion to Samoa
Bridled Tern					x						globally important colonies
Sooty Tern			x								estimate 10-25% of global population in R1
Brown Noddy			x								<i>A.m. melanogenys</i> endemic to Hawaii
Black Noddy		x									
Blue-gray Noddy		x							x	67,68	
White Tern		x									
Black Skimmer				x				x		32	
Family ALCIDAE											
Common Murre			x								>98% <i>U.a. californica</i> breed in R1
Pigeon Guillemot			x								distinct subspecies in OR & CA
Marbled Murrelet			x			T	VU				ESA listed in CA, OR, and WA

Appendix 3. National and International Significance of Breeding Seabird Populations in USFWS Pacific Region (continued).

	Significance of Region 1 Populations					Official Status				
	global ¹	US ²	significant	manage-able	periph-eral	ESA ³	IUCN ⁴	BCC ⁵ -Nat.	BCC ⁵ -Reg.	BCC ⁵ -BCR
Xantus's Murrelet		x				P	VU	x	x	32
Ancient Murrelet					x					
Cassin's Auklet				x						32
Rhinoceros Auklet			x							
Tufted Puffin				x						

¹ >50% of the global population breed in Region 1 (R1).

² Entire US population breeds in Region 1.

³ Endangered Species Act Listing status: E-endangered; T-threatened; C-candidate; P-petitioned

⁴ IUCN rankings: 3 categories for threatened species: CR-critically endangered; EN-endangered; VU-Vulnerable; 3 categories for species at lower risk: CD-conservation dependant; NT-near threatened; LC-least concern.

⁵ BCC = Birds of Conservation Concern (USFWS 2002); Indicates a species listed at the national, regional, or BCR level (including a list of the BCRs.)
BCR = Bird Conservation Region.

Appendix 4. Subspecies of seabirds breeding in USFWS Pacific Region.

Scientific Name	Common Name	WA	OR	CA	HI	USPI	# Sub species	Subspecies that breed in Region 1 - Range (From Clements 2000)
Order PROCELLARIIFORMES								
Family DIOMEDEIDAE								
<i>Phoebastria albatrus</i>	Short-tailed Albatross				b		0	
<i>Phoebastria nigripes</i>	Black-footed Albatross				B		0	
<i>Phoebastria immutabilis</i>	Laysan Albatross				B		0	
Family PROCELLARIIDAE								
<i>Pterodroma sandwicensis</i>	Hawaiian Petrel				B		0	
<i>Pterodroma arminjoniana</i>	Herald Petrel				B		2	<i>Pa. heraldica</i> - Raine I., Tonga & French Polynesia to Easter I.
<i>Pterodroma rostrata</i>	Tahiti Petrel				B		3	<i>Pr. rostrata</i> - Marquesas & Society; confined to tropical Pacific
<i>Pterodroma hypoleuca</i>	Bonin Petrel				B		0	
<i>Pterodroma alba</i>	Phoenix Petrel					Ex	0	possibly occurred historically on U.S. Line & Phoenix islands
<i>Bulweria bulwerii</i>	Bulwer's Petrel				B		0	
<i>Puffinus pacificus</i>	Wedge-tailed Shearwater				B	B	0	
<i>Puffinus nativitatis</i>	Christmas Shearwater				B	B	0	
<i>Puffinus auricularis newelli</i>	Newell's Shearwater				B		2	<i>Pa. newelli</i> - Hawaii endemic
<i>Puffinus lherminieri</i>	Audubon's Shearwater					B	9	<i>Pl. dichrous</i> - islands throughout cent Pacific, Samoa to Marquesas
Family HYDROBATIDAE								
<i>Oceanodroma furcata</i>	Fork-tailed Storm-Petrel	B	B	B			2	<i>O.f. plumbea</i> - islands off s AK to n CA
<i>Oceanodroma leucorhoa</i>	Leach's Storm-Petrel	B	B	B			5	<i>O.l. leucorhoa</i> - n Atlantic; Japan to Aleutians & islands off n MX
<i>Oceanodroma homochroa</i>	Ashy Storm-Petrel			B			0	
<i>Oceanodroma castro</i>	Band-rumped Storm-Petrel				B		0	
<i>Oceanodroma melania</i>	Black Storm-Petrel			B			0	
<i>Oceanodroma tristrami</i>	Tristram's Storm-Petrel				B		0	
<i>Nesofregatta fuliginosa</i>	Polynesian Storm-Petrel					B	0	

Appendix 4. Subspecies of seabirds breeding in USFWS Pacific Region (continued).

Scientific Name	Common Name	WA	OR	CA	HI	USPI	# Sub species	Subspecies that breed in Region 1 - Range (From Clements 2000)
Order PELECANIFORMES								
Family PHAETHONTIDAE								
<i>Phaethon lepturus</i>	White-tailed Tropicbird				B	B	6	<i>Pl. dorothea</i> - islands in tropical w Pacific (HI to New Caladonia)
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird				B	B	3	<i>Pr. melanorhynchos</i> - tropical Pacific
Family SULIDAE								
<i>Sula dactylatra</i>	Masked Booby				B	B	5	<i>S.d. personata</i> - islands in cent & w Pacific to islands off w Australia
<i>Sula leucogaster</i>	Brown Booby				B	B	4	<i>S.l. plotus</i> - cent Pacific to Indian O and Red Sea
<i>Sula sula</i>	Red-footed Booby				B	B	3	<i>S.s. rubripes</i> - islands in tropical Pacific & Indian O
Family PELECANIDAE								
<i>Pelecanus occidentalis</i>	Brown Pelican			B			5	<i>P.o. californicus</i> - CA and islands off Baja & in Gulf of CA, MX
Family PHALACROCORACIDAE								
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	B	B	B			4	<i>Pa. albociliatus</i> - sw BC to Gulf of CA
<i>Phalacrocorax penicillatus</i>	Brandt's Cormorant	B	B	B			0	
<i>Phalacrocorax pelagicus</i>	Pelagic Cormorant	B	B	B			2	<i>Pp. resplendens</i> - sw BC to s Baja
Family FREGATIDAE								
<i>Fregata minor</i>	Great Frigatebird				B	B	5	<i>F.m. palmerstoni</i> - islands in w and cent Pacific
<i>Fregata ariel</i>	Lesser Frigatebird				B	B	3	<i>F.a. ariel</i> - islands in Indian O & Pacific

Appendix 4. Subspecies of seabirds breeding in USFWS Pacific Region (continued).

Scientific Name	Common Name	WA	OR	CA	HI	USPI	# Sub species	Subspecies that breed in Region 1 - Range (From Clements 2000)
Order CHARADRIIFORMES								
Family LARIDAE								
<i>Larus delawarensis</i>	Ring-billed Gull	B	B				0	
<i>Larus californicus</i>	California Gull			B			2	<i>L.c. californicus</i> - e WA to WY and CA.
<i>Larus occidentalis</i>	Western Gull	B	B	B			2	<i>L.o. occidentalis</i> - BC to Monterey; <i>L.o. wymani</i> - Monterey to Baja
<i>Larus glaucescens</i>	Glaucous-winged Gull	B	B				0	
<i>Larus heermanni</i>	Heermann's Gull			B			0	
<i>Sterna nilotica</i>	Gull-billed Tern			B			6	<i>S.n. vanrossemi</i> - So CA to n Baja and nw MX
<i>Sterna caspia</i>	Caspian Tern	B	B	B			0	
<i>Sterna macrura</i>	Royal Tern			B			2	<i>S.m. macrura</i> - coastal US to w Indies, Guianas, Brazil
<i>Sterna elegans</i>	Elegant Tern			B			0	
<i>Sterna paradisaea</i>	Arctic Tern	B					0	
<i>Sterna forsteri</i>	Forster's Tern			B			0	
<i>Sterna albifrons</i>	Little Tern				B	B	6	<i>S.a. sinensis</i> - w Pacific; recent expansion to CNMI & HI
<i>Sterna antillarum browni</i>	California Least Tern			B			3	<i>S.a. browni</i> - So CA to Baja & w MX
<i>Sterna lunata</i>	Gray-backed Tern				B	B	0	
<i>Sterna anaethetus</i>	Bridled Tern					B?	6	<i>S.a. anaethetus</i> - Ryukyu Is, Taiwan, Philippines, Indonesia & Australia. Recent expansion to Samoa
<i>Sterna fuscata</i>	Sooty Tern				B	B	8	<i>S.f. oahuensis</i> - Bonin Is to HI & s Pacific
<i>Anous stolidus</i>	Brown Noddy				B	B	5	<i>A.s. pileatus</i> - Seychelles & Madagascar to Australia, Polynesia & HI.
<i>Anous minutus</i>	Black Noddy				B	B	7	<i>A.m. melanogenys</i> - Hawaii; <i>A.m. marcusi</i> - Wake & CNMI?; <i>A.m. minutus</i> - Samoa, Line & Phoenix

Appendix 4. Subspecies of seabirds breeding in USFWS Pacific Region (continued).

Scientific Name	Common Name	WA	OR	CA	HI	USPI	# Sub species	Subspecies that breed in Region 1 - Range (From Clements 2000)
<i>Procelsterna cerulea</i>	Blue-gray Noddy				B	B	5	<i>P.c. sacratilis</i> - Marcus I. & n Marshalls to nw HI
<i>Gygis alba</i>	White Tern				B	B	4	<i>G.a. alba</i> - Caroline I. To HI, Clipperton, Cocos & s Atlantic islands
<i>Rynchops niger</i>	Black Skimmer			B			3	<i>R.n. niger</i> - coastal US and MX
Family ALCIDAE								
<i>Uria aalge</i>	Common Murre	B	B	B			5	<i>U.a. californica</i> - n WA to s CA
<i>Cephus columba</i>	Pigeon Guillemot	B	B	B			5	<i>C.c. eureka</i> - OR & CA; <i>C.c. adianta</i> - cent Aleutians to WA
<i>Brachyramphus marmoratus</i>	Marbled Murrelet	B	B	B			0	
<i>Synthliboramphus hypoleucis</i>	Xantus' Murrelet			B			2	<i>S.h. scrippsi</i> - Channel I and islands off w coast of Baja
<i>Synthliboramphus antiquus</i>	Ancient Murrelet	B					2	<i>S.a. antiquus</i> - e Asia, Aleutians, s AK & BC
<i>Ptychoramphus aleuticus</i>	Cassin's Auklet	B	B	B			2	<i>Pa. aleuticus</i> - Aleutians & AK to n Baja
<i>Cerorhinca monocerata</i>	Rhinoceros Auklet	B	B	B			0	
<i>Fratercula cirrhata</i>	Tufted Puffin	B	B	B			0	

B = breeding; B? = breeding suspected but not documented; b = unsuccessful breeding attempts; Ex = extirpated breeder.

Appendix 5. List of common and scientific names.

Birds

Ancient Murrelet	<i>Synthliboramphus antiquus</i>
Arctic Tern	<i>Sterna paradisaea</i>
Ashy Storm-Petrel	<i>Oceanodroma homochroa</i>
Audubon's Shearwater	<i>Puffinus lherminieri</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Band-rumped Storm-Petrel	<i>Oceanodroma castro</i>
Barn Owl	<i>Tyto alba</i>
Beck's Petrel	<i>Pterodroma</i>
Black Skimmer	<i>Rhynchops niger</i>
Black Noddy	<i>Anous minutus</i>
Black Tern	<i>Chlidonias niger</i>
Black Storm-Petrel	<i>Oceanodroma melania</i>
Black Oystercatcher	<i>Haematopus bachmani</i>
Black-footed Albatross	<i>Phoebastria nigripes</i>
Black-legged Kittiwake	<i>Rissa tridactyla</i>
Black-vented Shearwater	<i>Puffinus opisthomelas</i>
Blue Noddy	<i>Procelsterna cerulea</i>
Bonaparte's Gull	<i>Larus philadelphia</i>
Bonin Petrel	<i>Pterodroma hypoleuca</i>
Brandt's Cormorant	<i>Phalacrocorax penicillatusg</i>
Bristle-thighed Curlew	<i>Numenius tahitiensis</i>
Brown Pelican	<i>Pelecanus occidentalis</i>
Brown Booby	<i>Sula leucogaster</i>
Brown Noddy	<i>Anous stolidus</i>
Bulwer's Petrel	<i>Bulweria bulwerii</i>
Burrowing Owl	<i>Athene cunicularia</i>
California Brown Pelican	<i>Pelecanus occidentalis californicus</i>
California Least Tern	<i>Sterna antillarum browni</i>
California Gull	<i>Larus californicus</i>
Caspian Tern	<i>Sterna caspia</i>
Cassin's Auklet	<i>Ptychoramphus aleuticus</i>
Cattle Egret	<i>Bubulcus ibis</i>
Christmas Shearwater	<i>Puffinus nativitatis</i>
Common Murre	<i>Uria aalge</i>
Craveri's Murrelet	<i>Synthliboramphus craveri</i>
Dark-rumped Petrel	<i>Pterodroma phaeopygia sandwichensis</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>

Appendix 5. List of common and scientific names (continued).

Elegant Tern	<i>Sterna elegans</i>
Fork-tailed Storm-Petrel	<i>Oceanodroma furcata</i>
Forster's Tern	<i>Sterna forsteri</i>
Galapagos Storm-Petrel	<i>Oceanodroma tethys</i>
Glaucous-winged Gull	<i>Larus hyperboreus</i>
Gray-backed Tern	<i>Sterna lunata</i>
Great Frigatebird	<i>Fregata minor</i>
Gull-billed Tern	<i>Sterna nilotica</i>
Hawaiian Petrel	<i>Pterodroma phaeopygia</i>
Heermann's Gull	<i>Larus heermanni</i>
Herald Petrel	<i>Pterodroma arminjoniana</i>
Herring Gull	<i>Larus argentatus</i>
Horned Puffin	<i>Fratercula corniculata</i>
Indian Myna	<i>Acridotheres tristis</i>
Juan Fernandez Petrel	<i>Pterodroma externa</i>
Laysan Albatross	<i>Phoebastria immutabilis</i>
Leach's Storm-Petrel	<i>Oceanodroma leucorhoa</i>
Least Tern	<i>Sterna antillarum</i>
Lesser Frigatebird	<i>Fregata ariel</i>
Little Tern	<i>Sterna albifrons</i>
Long-billed Murrelet	<i>Brachyramphus perdix</i>
Manx Shearwater	<i>Puffinus puffinus</i>
Marbled Murrelet	<i>Brachyramphus marmoratus</i>
Masked Booby	<i>Sula dactylatra</i>
Mew Gull	<i>Larus canus</i>
Newell's Shearwater	<i>Puffinus auricularis newelli</i>
Northern Fulmar	<i>Fulmarus glacialis</i>
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Phoenix Petrel	<i>Pterodroma alba</i>
Pigeon Guillemot	<i>Cephus columba</i>
Polynesian Storm-Petrel	<i>Nesofregatta fuliginosa</i>
Pueo (Hawaiian Owl)	<i>Asio flammeus sandwichensis</i>
Red-footed Booby	<i>Sula sula</i>
Red-tailed Tropicbird	<i>Phaethon rubricauda</i>
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Royal Tern	<i>Sterna maxima</i>
Ruddy Turnstone	<i>Arenaria interpres</i>

Appendix 5. List of common and scientific names (continued).

Short-tailed Shearwater	<i>Puffinus tenuirostris</i>
Short-tailed Albatross	<i>Phoebastria albatrus</i>
Snowy Plover	<i>Charadrius alexandrinus</i>
Sooty Shearwater	<i>Puffinus griseus</i>
Sooty Tern	<i>Sterna fuscata</i>
Tahiti Petrel	<i>Pterodroma rostrata</i>
Townsend's Shearwater	<i>Puffinus auricularis</i>
Tristram's Storm-Petrel	<i>Oceanodroma tristrami</i>
Tufted Puffin	<i>Fratercula cirrhata</i>
Wedge-tailed Shearwater	<i>Puffinus pacificus</i>
Western Gull	<i>Larus occidentalis</i>
Western Gull-billed Tern	<i>Sterna nilotica vanrossemi</i>
White Tern	<i>Gygis alba</i>
White-tailed Tropicbird	<i>Phaethon lepturus</i>
Xantus's Murrelet	<i>Synthliboramphus hypoleucus</i>

Mammals

Asian ship rat	<i>Rattus tanezumi</i>
black or ship rat	<i>Rattus rattus</i>
cat	<i>Felis catus</i>
deer mice	<i>Peromyscus maniculatus</i>
dog	<i>Canis familiaris</i>
feral goat	<i>Capra hircus</i>
feral pig	<i>Sus scrofa</i>
gray fox	<i>Urocyon cinereoargenteus</i>
house mouse	<i>Mus musculus</i>
Indian mongoose	<i>Herpestes auropunctatus</i>
island fox	<i>Urocyon littoralis</i>
Norway rat	<i>Rattus norvegicus</i>
Pacific or Polynesian rat	<i>Rattus exulans</i>
rabbit (old world)	<i>Oryctolagus cuniculus</i>
red fox	<i>Vulpes vulpes</i>

Reptiles and Amphibians

brown tree snake	<i>Boiga irregularis</i>
monitor lizards	<i>Varanus indicus</i>

Fish

anchovy	Engraulidae
balloonfish	<i>Lagocephalus lagocephalus</i>

Appendix 5. List of common and scientific names (continued).

blacksmith	<i>Chromis punctipinnis</i>
California grunion	<i>Leuresthes tenuis</i>
California halfbeak	<i>Hyporhamphus rosae</i>
California killifish	<i>Fundulus parvipinnis</i>
chum salmon	<i>Oncorhynchus keta</i>
deepbody anchovy	<i>Anchoa compressa</i>
dolphinfish	<i>Coryphaena</i> spp.
flyingfish	Exocoetidae
goatfish	Mullidae
halfbeak	Hemiramphidae
hatchetfishes	Sternoptychidae
herring	Clupeidae
herring	<i>Clupea pallasii</i>
jack	<i>Caranx</i> spp.
jack mackerel	<i>Trachurus symmetricus</i>
jacksmelt	<i>Atherinopsis californiensis</i>
lanternfishes	Myctophidae
mackerel scad	<i>Decapterus</i> spp.
midshipman	<i>Porichthys</i> spp.
northern anchovy	<i>Engraulis mordax</i>
Pacific saury	<i>Cololabis saira</i>
Pacific sardine	<i>Sardinops sagax</i>
Pacific whiting	<i>Merluccius productus</i>
rockfish	<i>Sebastes</i> spp.
sandlance	<i>Ammodytes</i> spp.
saury	<i>Cololabis</i> spp.
shiner perch	<i>Cymatogaster aggregata</i>
skipjack tuna	<i>Katsuwonus pelamis</i>
slough anchovy	<i>Anchoa delicatissima</i>
spotted cusk eel	<i>Chilara taylori</i>
squirrelfish	Holocentridae
staghorn sculpin	<i>Leptocottus armatus</i>
surfperch	Embiotocidae
swordfish	Xiphiidae
topsmelt	<i>Antherinops affinis</i>
truncated sungish	<i>Ranzania laevis</i>
white croaker	<i>Genyonemus lineatus</i>
yellowfin tuna	<i>Thunnus albacares</i>

Appendix 5. List of common and scientific names (continued).

Invertebrates

flying squid	Ommastrephidae
gooseneck barnacles	<i>Lepas spp.</i>
pelagic red crab	<i>Pleuroncodes</i>
sea-striders	<i>Halobates spp.</i>
wind sailor	<i>Veleva veleva</i>

Plants

begger's tick	<i>Bidens spp.</i>
bufflegrass	<i>Cenchrus ciliaris</i>
bunchgrass	<i>Eragrostis spp.</i>
coast sandalwood	<i>Santalum ellipticum</i>
European beachgrass	<i>Ammophila arenaria</i>
golden crown-beard	<i>Verbesina encelioides</i>
hottentot fig or ice plant	<i>Carpobrotus edulis</i>
ironwood	<i>Casuarina equisetifolia</i>
`ohia	<i>Metrosideros polymorpha</i>
New Zealand spinach	<i>Tetragonia tetragonioides</i>
pu'avai or Pisonia	<i>Pisonia grandis</i>
sandbur	<i>Cenchrus echinatus</i>
sandalwood	<i>Santalum spp.</i>
sea-fig or iceplant	<i>Carpobrotus chilensis</i>
`uluhe fern	<i>Dicranopteris linearis</i>
wild mustard	<i>Brassica campestris</i>

Appendix 6. Invasive species that affect seabirds in USFWS Pacific Region.

Alien Species	Key Seabirds Affected	Island	Success/Failure of Control	
Rats Prey on eggs, chicks, & adults of all breeding seabirds but especially the ground nesting petrels, shearwaters, storm-petrels, terns, and alcids. Also destroy vegetation that provides seabird nesting habitat and at some locations can affect seabird predator cycles. <i>R. rattus</i> , <i>R. norvegicus</i> , <i>R. exulans</i> , <i>R. tanezumi</i> is	ashy storm-petrel & Xantus's murrelet in CA, OR, WA	Anacapa, CA San Miguel, CA Santa Catalina, CA San Clemente, CA	complete eradication complete eradication	
	Bonin petrels, Christmas shearwaters at Midway	Midway, HI Howland, USPI	complete eradication complete eradication	
	petrels, shearwaters, storm-petrels in HI and USPI	Palmyra, USPI Baker, USPI	planning eradication complete eradication	
	noddies, terns, shearwaters in CNMI	Kure, HI Lehua, HI Kaula, HI	complete eradication planning eradication	
		Rose, Am. Samoa Wake, USPI	complete eradication limited control	
		Hawaii-main islands	limited site specific control	
		Samoa-main island Marianas-all islands Guam		
	House Mouse Prey primarily on the eggs and potentially small chicks of small petrels, storm-petrels, and Xantus's murrelets. Also destroy vegetation that provides nesting habitat and at some locations can affect seabird predator cycles. <i>Mus musculus</i>	Ashy Storm-Petrel	Farallon, CA	eradication planned
		Tristram's Storm-Petrel, Bulwer's Petrel	Lisianski, HI	complete eradication
		Tristram's Storm-Petrel, Bulwer's Petrel	Midway, HI	eradication planned
		Bulwer's Petrel	Johnston, USPI	
		Polynesian Storm-Petrel, Bulwer's Petrel	Baker, USPI	

Appendix 6. Invasive species that affect seabirds in USFWS Pacific Region (continued).

Alien Species	Key Seabirds Affected	Island	Success/Failure of Control
Cat Prey on eggs, chicks, & adults of all breeding seabirds, especially the ground nesting petrels, shearwaters, storm-petrels, frigatebirds, boobies, gulls, terns, and alcids. Able to take much larger prey than rats. <i>Felis catus</i>	noddies, terns	Sarigan, CNMI	ongoing control
	red-footed boobies	Rota, CNMI	virtually extirpated
	brown noddies	Saipan, CNMI	complete eradication
	ground nesting seabirds	San Clemente, CA	
	ground nesting seabirds	San Nicolas, CA	complete eradication
	Cassin's auklet, Xantus's Murrelet	Santa Barbara, CA	complete eradication; recovery of Xantus's Murrelet
	ground nesting seabirds	Santa Catalina, CA	
	ground nesting seabirds	San Miguel, CA	complete eradication
	ground nesting seabirds	Santa Cruz, CA	complete eradication
	ground nesting seabirds	Anacapa, CA	complete eradication
	ground nesting seabirds	Jarvis Island	complete eradication; recovery of small birds; Audubon shearwater and Polynesian storm-petrel colonize.
	ground nesting seabirds	Baker, USPI	complete eradication
ground nesting seabirds	Howland, USPI	complete eradication return of BGNO, GBTE, BRNO; shearwater colonize	
ground nesting seabirds	Wake, USPI	eradication in progress	
Dog Prey on eggs, chicks, & adults of all breeding seabirds but especially the ground nesting albatross, boobies, terns, and gulls. <i>Canis familiaris</i>	albatross, boobies	Main Islands Hawaii	Limited control at specific locations
	terns, petrels	Main islands Samoa	
		Guam	
		CNMI	
Red Fox Prey on eggs, chicks, & adults of all breeding seabirds but especially the ground nesting cormorants, alcids, gulls and terns. <i>Vulpes vulpes</i>	Cormorants, gulls, auklets	Bandon area rocks, OR	Control planned
	Terns	San Francisco Bay, CA	Ongoing control
	Terns	San Diego Bay, CA	Ongoing control
	Terns	Bolsa Chica/Seal Beach, CA	Ongoing control
Mongoose <i>Herpestes javanicus</i>	Newell's shearwater, Hawaiian petrel	Main islands Hawaii except Kauai	

Appendix 6. Invasive species that affect seabirds in USFWS Pacific Region (continued).

Alien Species	Key Seabirds Affected	Island	Success/Failure of Control
Pig Prey on eggs, chicks, & adults of breeding seabirds but especially the ground nesting petrels & shearwaters. Also destroy vegetation that effects seabird nesting habitat. <i>Sus scrofa</i>	ground nesting seabirds	Santa Cruz, CA	eradication planned
		Santa Rosa, CA	complete eradication
		Santa Barbara, CA	complete eradication
		Santa Catalina, CA	
		San Miguel, CA	complete eradication
	Newell’s Shearwaters	main Hawaiian Is	controlled in specific locations
	ground nesting seabirds	Am. Samoa (except Rose)	
	ground nesting seabirds	Marianas	
Common Myna Taste aversion program at Kilauea Pt. NWR <i>Acridotheres tristis</i>	Black & Brown Noddies, White Tern Wedge-tailed Shearwater	Midway Atoll	
		Main HI islands	Control program at Kilauea Pt., Kauai
Barn Owl <i>Tito alba</i>	Shearwaters, Petrels, Storm-Petrels	Hawaiian Islands	
Cattle Egret <i>Bubulcus ibis</i>	Terns and Red-footed boobies	Lehua, HI	control planned
	Terns	Midway, HI main Hawaiian Islands	eradication planned
Goat judas goat program, successful <i>Capra hircus</i>	general landscape effects	San Clemente I.	complete eradication
Rabbits & Hares Consume vegetation that provides seabird nesting habitat. In worst case scenario will completely denude island of all vegetation. Affects all nesting seabirds but especially those that nest on or under vegetation. <i>Oryctolagus cuniculus</i> , <i>Lepus europaeus</i>	all breeding seabirds	Laysan, HI	complete eradication
	all breeding seabirds		
	Xantus’s murrelets		
	Tufted puffin, rhinoceros auklet		
		Lisianski, HI	complete eradication
		Pearl & Hermes, HI	complete eradication
		Lehua, HI	eradication planned
	Santa Barbara, CA	complete eradication	
	Farallon, CA	complete eradication	
	Protection, WA		
Monitor Lizard <i>Varanus salvator</i>	Red-footed booby	Rota	
	Brown noddy		
	Sooty Tern		
		Saipan	
		Cocos, Guam	

Appendix 6. Invasive species that affect seabirds in USFWS Pacific Region (continued).

Alien Species	Key Seabirds Affected	Island	Success/Failure of Control
Brown Tree Snake <i>Boiga irregularis</i> Research underway to develop novel means of controlling or eradicating this predator.	Brown noddy Wedge-tailed shearwater, brown booby	Saipan	
		Guam	control program ongoing
Ants Many species of ants have become established on seabird colonies but the effects on seabirds are poorly understood. Numerous species. <i>Pheidole megacephala</i>	may affect seabirds, terns, shearwaters and boobies	Kure, HI	
		Wake, USPI	
Scale Insects These insects are causing the loss of the native <i>Pisonia</i> forests at Rose and Palmyra and infecting native shrub vegetation at Kure. <i>Pluvinnaria urbicola</i>	Tree nesting seabirds especially Red-footed Boobies, Black Noddies and White Terns	Rose Atoll, American Samoa	
		Palmyra, USPI Kure, HI	research in progress
Grasshoppers invasive species that can almost completely defoliate Nihoa during population explosions.	unknown	Nihoa, HI	
Mosquito Mosquitoes are vectors for avian pox and avian malaria that affect some species of seabirds. Numerous species	Albatross, red-tailed tropicbird Newell's shearwaters	Midway, HI	
		Baker, USPI Main islands Hawaii	died out naturally
New Zealand Spinach <i>Tetragonia tetragonioides</i>	Ashy storm-petrel, Cassin's auklet	Farallon, CA	ongoing control program
		Ano Nuevo, CA	

Appendix 6. Invasive species that affect seabirds in USFWS Pacific Region (continued).

<p>Ironwood Dense forest habitat on low islands and atolls supports lower densities of surface and burrow nesting species and higher densities of tree nesting terns. <i>Casuarina equisetifolia</i></p>	<p>Albatross, Bonin petrel, tropicbird</p>	<p>Midway, HI Wake, USPI</p>	<p>near eradication Eastern Is, Midway</p>
<p>Alien Species</p>	<p>Key Seabirds Affected</p>	<p>Island</p>	<p>Success/Failure of Control</p>
<p>Sandbur Alters the habitat by reducing the vertical structure of the vegetation thereby eliminating species that nest under vegetation and provides less binding structure to the soil thereby limiting burrow nesters. <i>Cenchrus echinatus</i></p>	<p>Petrels, shearwaters & tropicbirds</p>	<p>Laysan, HI French Frigate Shoal, HI Lisianski, HI Pearl & Hermes, HI Kure, HI</p>	<p>control ongoing; near eradication control ongoing; near eradication limited control limited control</p>
<p>Golden crown-beard <i>Verbesina encelioides</i></p>	<p>all breeding birds but especially ground nesting boobies and albatross</p>	<p>Midway, HI Pearl & Hermes, HI Kure, HI</p>	
<p>European beachgrass <i>Ammophila arenaria</i></p>	<p>Least tern</p>	<p>Pt. Mugu</p>	<p>ongoing control program</p>
<p>Knot Grass Limits nesting habitat for species that prefer open habitat. <i>Digitaria</i> spp.</p>	<p>Sooty tern ground-nesting birds, especially boobies and terns.</p>	<p>Johnston, USPI Howland Island, USPI</p>	

Appendix 7. List of seabird species abbreviations (alpha codes) from Patuxent Wildlife Research Center, Bird Banding Lab, USGS.

Common Name	Alpha Code	Common Name	Alpha Code
Short-tailed Albatross.....	STAL	Great Frigatebird	GRFR
Black-footed Albatross	BFAL	Lesser Frigatebird	LEFR
Laysan Albatross.....	LAAL	Glaucous-winged Gull	GWGU
Audubon’s Shearwater	AUSH	Western Gull.....	WEGU
Little Shearwater	LISH	California Gull.....	CAGU
Newell’s Shearwater.....	NESH	Unidentified Gull	UNGU
Sooty Shearwater.....	SOSH	Ring-billed Gull.....	RBGU
Flesh-footed Shearwater.....	FFSH	Heermann’s Gull.....	HEEG
Short-tailed Shearwater.....	SHOS	Gull-billed Tern.....	GBTE
Wedge-tailed Shearwater	WTSH	Caspian Tern.....	CATE
Christmas Shearwater.....	CHSH	Royal Tern.....	ROYT
Hawaiian Petrel	HAPE	Elegant Tern	ELTE
Dark-rumped Petrel.....	DRPE	Forster’s Tern	FOTE
Phoenix Petrel.....	PHPE	Arctic Tern	ARTE
Bonin Petrel	BOPE	Least Tern	LETE
Bulwer’s Petrel	BUPE	Little Tern	LITE
Fork-tailed Storm-Petrel.....	FTSP	Sooty Tern	SOTE
Leach’s Storm-Petrel.....	LHSP	Bridled Tern.....	BRTE
Band-rumped Storm-Petrel.....	BANP	Gray-backed Tern.....	GRAT
Black Storm-Petrel	BLSP	Brown Noddy.....	BRNO
Tristram’s Storm-Petrel	TRSP	Black Noddy.....	BLNO
Ashy Storm-Petrel	ASSP	Blue-gray Noddy	
Polynesian Storm-Petrel		(Blue Noddy).....	BGNO
(=White-throated Storm-Petrel)	WHSP	White Tern	WHITE
White-tailed Tropicbird	WTTR	Black Skimmer	BLSK
Red-tailed Tropicbird.....	RTTR	Tufted Puffin	TUPU
Masked Booby	MABO	Rhinoceros Auklet.....	RHAU
Brown Booby.....	BRBO	Cassin’s Auklet	CAAU
Red-footed Booby.....	RFBO	Ancient Murrelet.....	ANMU
Double-crested Cormorant	DCCO	Marbled Murrelet.....	MAMU
Brandt’s Cormorant.....	BRAC	Xantus’s Murrelet	XAMU
Pelagic Cormorant	PECO	Pigeon Guillemot	PIGU
Brown Pelican	BRPE	Common Murre	COMU

Appendix 8. List of abbreviations and acronyms.

ac	acre
AES	USFWS, Ecological Services Program
BCC	Birds of Conservation Concern (USFWS 2002)
BCR	Bird Conservation Region
BCR 67	Hawaiian Islands Bird Conservation Region
BCR 68	U. S. Pacific Islands Bird Conservation Region
C	Candidate for threatened or endangered status
CA	California
CCS	California Current System
CDFG	California Department of Fish and Game
CNMI	Commonwealth of the Northern Mariana Islands
CR	Critically Endangered (IUCN status category)
d	day
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DLNR	Department of Land and Natural Resources, State of Hawaii
DMBM	Division of Migratory Bird Management, Washington DC
DOD	Department of Defense
DOF	Department of Forestry
DOFAW	Hawaii Division of Forestry and Wildlife
E	Endangered
EC	USFWS, Division of Environmental Contaminants
EEZ	Exclusive Economic Zone
EN	Endangered (IUCN status category)
ENSO	El Nino/Southern Oscillation
ESA	Endangered Species Act
FAO	Food and Agriculture Organization
FDM	Farallon de Medinilla, CNMI
FMP	Fisheries Management Plan
FPS	Fully Protected Species (CA category)
FWO	USFWS Fish and Wildlife Office
ha	hectare
HC	High Concern (NAWCP rank-national/regional)
HI	Hawaii OR Highly Imperiled (NAWCP rank-national/regional)
HMS	Highly Migratory Species
HDAR	Hawaii Division of Aquatic Resources
INRMP	Integrated Resources Management Plan
IPOA-Seabirds	International Plan of Action for the Reduction of Seabird Bycatch in Longline Fisheries
IUCN	The World Conservation Union (International Union for the Conservation of Nature)
km	kilometer
LC	Low Concern (NAWCP rank-national/regional)
LE	USFWS, Division of Law Enforcement
LR/nt	Lower Risk/near threatened (IUCN status category: see also NT)
LOF	List of Fisheries (NOAA)
MBHP	USFWS, Division of Migratory Birds and Habitat Programs
MBTA	Migratory Bird Treaty Act

Appendix 8. List of abbreviations and acronyms (continued).

m	meter
MC	Moderate Concern (NAWCP rank-national/regional)
mi	mile
MMPA	Marine Mammal Protection Act
MX	Mexico
NAWCP	North American Waterbird Conservation Plan
NBII	National Biological Information Infrastructure
nm	nautical mile
NCR	Not Currently at Risk (NAWCP rank-national/regional)
NMFS	National Marine Fisheries Service (NOAA-Fisheries)
NMS	National Marine Sanctuary
NOAA	National Oceanographic and Atmospheric Administration
NP	National Park
NPOA-Seabirds	National Plan of Action for the Reduction of Seabird Bycatch in Longline Fisheries
NPS	National Park Service
NT	Near Threatened (IUCN status category: see also LR/nt)
NWHI	Northwestern Hawaiian Islands
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
ODFW	Oregon Department of Fish and Wildlife
OR	Oregon
OSPR	Oil Spill Protection and Response
PAH	poly-aromatic hydrocarbons
PAH	Polycyclic aromatic hydrocarbons
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyls
PDO	Pacific Decadal Oscillation
POBSP	Pacific Ocean Biological Survey Program
POP	persistent organic pollutants
PRBO	Point Reyes Bird Observatory
Service	U.S. Fish and Wildlife Service
S or SS	Sensitive Species (state)
SC	Species of Concern
SM	State Monitor (WA category)
T	Threatened
TE	USFWS, Division of Endangered Species
TNC	The Nature Conservancy
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USPI	U.S. Pacific Islands
VU	Vulnerable (IUCN status category)
WA	Washington
WDFW	Washington Department of Fish and Wildlife
WNV	West Nile Virus

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