Contaminated military sites on Refuges of southwestern Alaska

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Introduction

World War II era sign post on Amchitka Island, Alaska Maritime NWR. USFWS photo by Jordan Stout.

Alaska is not the pristine place that many people think it is. Although it is a young state (1959), it has had a surprisingly long history of activities resulting in contamination of its remotest areas. Military, mining, logging, fish processing, and oil/gas exploration and development represent the bulk of activities that have left debris and contamination of varying sorts. Of these, military activities represent one of the longest-term and geographically widespread contaminants-related issues in the state.

Military activities in Alaska started in earnest during WWII. The bombing of Dutch Harbor (June 1942) and the Japanese occupation of American soil at Attu and Kiska Islands (May 1943) sparked a massive buildup of military personnel, equipment and infrastructure throughout the state. As a result, remote areas like the Aleutian Islands, which had once supported only small native Aleut villages, were overrun with nearly 150,000 American troops. The military remained active in Alaska during the Cold War and continues to maintain a significant presence even today.

Seventy-seven million acres of land in Alaska are managed by the US Fish & Wildlife Service (USFWS) as National Wildlife Refuges (NWRs). When contaminated sites occur on NWR lands, assessments and cleanups are performed by the responsible party (RP). To do this properly, the RPs must coordinate with the USFWS to ensure that the resultant site conditions will be compatible with Refuge purposes, requirements and priorities and that land/resource management goals are met. As a land management agency responsible for such a large expanse of publicly-owned land in Alaska, the USFWS oversees a wide range of the RPs and types of active and abandoned contaminated sites.

Although today's military activities are concentrated near Anchorage and Fairbanks, dozens of active facilities are located in remote areas within or adjacent to NWR lands. In addition, there are abandoned WWII era sites across the state and a handful of sites slated for transfer to the Refuge system. Of the nearly 600 WWII sites, about 210 are planned for contaminant cleanups and nearly a third of those occur on NWR lands (see map). Many of these contaminated military sites pose significant challenges to USFWS staff when managing the resources with which they are entrusted. The examples presented here, Amchitka Island and Adak Island, are just two of them.

Cow carcass at an abandoned US Coast Guard Loran Station on Sitkinak Island, near Kodiak NWR. USFWS photo by Jordan Stout.

Refuges of Southwestern Alaska

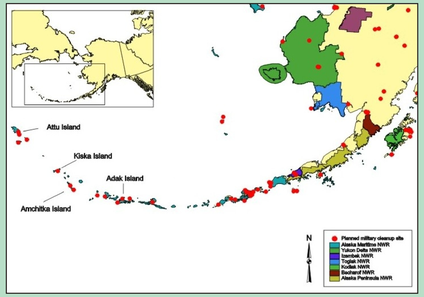
Of the 16 NWRs in Alaska, seven of them occur in southwestern Alaska, including the Yukon Delta, Togiak, Alaska Penninsula, Becharof, Izembek, Alaska Maritime and Kodiak NWRs.

Yukon Delta NWR: Originally established in 1929 by President Herbert Hoover (E.O. 5095), the Nunivak Island NWR served as a "preserve and breeding ground for native birds and wildgame and fur-bearing animals" and was later combined with the Clarence Rhode National Wildlife Range and the Hazen Bay NWR to become the Yukon Delta NWR under the Alaska National Interest Lands Conservation Act (ANILCA; P.L.O. 96-487) in 1980. It is comprised of 13.4 million acres, encompasses 42 Yupik Eskimo villages and contains 5 military cleanup sites within or near its boundaries.

Togiak NWR: Originally established in 1909 (P.L.O. 4583), the Cape Newenham Refuge "to protect and preserve [its] outstanding wildlife resources". It was later expanded to become the Togiak NWR under ANILCA and is comprised of 4.7 million acres, includes 1,500 miles of anadromous rivers and streams and contains 2 military cleanup sites within or near its boundaries.

Alaska Penninsula/Becharof NWR Complex: Originally established in 1980 under ANILCA, the Alaska Penninsula/Becharof NWR Complex is comprised of 5.5 million acres, of which 477,000 acres support the largest concentrations of brown bear in Alaska. It also contains 9 military cleanup sites within or near its boundaries.

Izembek NWR: Originally established in 1960 (P.L.O. 2216) as the Izembek National Wildlife Range as a "breeding ground and management area for all wildlife", it was later expanded and renamed the Izembek NWR under ANILCA. It is comprised of 315,00 acres, of which 300,000 are wilderness. It also contains 3 military cleanup sites within or near its boundaries.



Military cleanup sites currently planned in southwestern Alaska. Site information supplied by the US Army Corps of Engineers, Alaska District.

Alaska Maritime NWR: Originally established in 1913, the Aleutian Islands Reservation was established by President William Taft (E.O. 1733), "as a preserve and breeding ground for native birds, for the propagation of reindeer and furbearing animals, and for the encouragement and development of fisheries." It later became part of the Alaska Maritime NWR under ANILCA. It is comprised of 4.5 million acres, of which 2.6 million are wilderness, and supports15-30 million birds from 55 species and 75% of Alaska's seabirds. It also contains 34 military cleanup sites within or near its boundaries. Both Amchitka and Adak islands (see examples) occur on this Refuge.

Kodiak NWR: Originally established in 1941 by President Franklin D. Roosevelt (E.O. 8857) to protect the habitat of the brown bear and other wildlife, the Kodiak NWR was later expanded under ANILCA. It is now comprised of nearly 2 million acres and supports some of the world's highest brown bear population densities as well as up to two million seabirds. It also contains 7 known military cleanup sites within or near its boundaries.

Housing development at the Naval Air Station, Adak. USFWS photo by Sonce deVries.

Unexploded ordnance (.50 caliber projectiles) found on Adak Island. USFWS photo by Sonce deVries.

Drum dump on Adak Island. USFWS photo by Sonce deVries.

Unexploded ordnance (37 mm projectile cartridge casings) found on Adak Island. USFWS photo by Sonce deVries.

Example: Adak Island

Alaska Maritime NWR

Palisades landfill amongst the coastal bluffs of Adak Island. USFWS photo by Sonce deVries.

Background: Adak (150,000 acres) was occupied by US armed forces followed the bombing of Dutch Harbor and the Japanese invasion of Kiska and Attu Islands. At its peak, the military population on Adak was nearly 90,000 but was reduced to approximately 6,000 during the postwar years. In 1950, Adak was commissioned as a naval station and in 1994 was placed on the National Priorities (Superfund) List. The facility was operationally closed in 1997 under the Base Re-alignment and Closure (BRAC) Act of 1990 and will probably be transferred to a developing civilian community. However, contaminant cleanup will continue for several more years.

Contaminant issues: Some of the cleanup issues on Adak include chemicals, ordnance and a new civilian community. Chemicals in groundwater and soil include petroleum products, toxic metals and solid and hazardous wastes. Also, PCBs and DDT-related compounds have been found in green-winged teal, bald eagles, sea otters and mussels from Adak though the source for these compounds is not clear. 193 potential ordnance sites including practice ranges, defensive positions, minefields and storage & disposal areas were identified on Adak. Meanwhile, a new civilian community is trying to get established on the island, though the obvious concerns over chemical contamination and the unexploded ordnance have hindered the process.

Cleanup actions: Although much of the chemical contamination on Adak has been remediated, petroleum and ordnance contamination remain on-going issues. The Navy is remediating the remaining 7 petroleum sites. In addition, they have spent much time and money ($36 million and counting) trying to understand the extent of ordnance contamination on Adak using historic records, personal interviews, aerial photographs and on-the-ground geophysical surveys. Of 193 initial sites, at least 73 sites still require investigation or remediation. Ordnance items found to date include: napalm, mortars, artillery, grenades, practice mines and small munitions. The Navy continues to work closely with the State of Alaska, the EPA, the USFWS and Native groups to find the best methods for ordnance assessment and cleanup.

PCB-contaminated stream on Adak. USFWS photo by Sonce deVries.

Unexploded ordnance found at sample point near World War II encampment at Bird Cape, Amchitka. Items include fuzed 81 mm, 37 mm and .50 caliber projectiles. USFWS photo by Jordan Stout.

Heavy equipment mixing contaminated drilling muds near the Longshot surface ground zero site, Amchitka. USFWS photo by Jordan Stout.

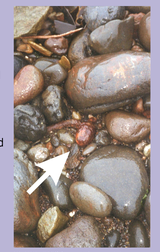
Example: Amchitka Island

Alaska Maritime NWR

Background: Amchitka Island (75,000 acres) became a forward fighter and bomber base in 1943 for the purpose of retaking the Japanese-held islands of Attu and Kiska. The facilities included living quarters, roads, runways and infrastructure to support the dozens of fighterplanes, bombers and 15,000 troops stationed there. Cold War Era activities on Amchitka included a White Alice Communications Site (1959-91) and underground nuclear testing including the Longshot (1965), Milrow (1969) and Cannikin Projects (1971). At nearly five megatons, the Cannikin blast was the largest underground nuclear test ever performed by the United States. In addition, a Relocatable Over The Horizon Radar (ROTHR) surveillance facility was operated on Amchitka from 1987 to 1993. The island has remained deserted since 1993 and no development (military or otherwise) is anticipated.

Rusted fuel drums near World War II encampment at Bird Cape, Amchitka Island. USFWS photo by Jordan Stout.

Contaminant issues: There are nearly 75 contaminated sites on Amchitka and three responsible parties (Corps, Navy and DOE) conducting assessment and cleanup work. Some of the cleanup issues include chemicals, ordnance, contaminated drilling muds and radionuclides. Chemicals in groundwater and soil include petroleum products as well as solid and hazardous wastes. Sewage sludges in the sewage lagoon contain polychlorinated biphenyls (PCBs) at levels up to 463 ppm. Also, DDT-related compounds have been found in peregrine falcons, bald eagles and sea otters from Amchitka though the source for these compounds is not clear. Thirty-nine potential ordnance sites including practice ranges, defensive positions and storage and disposal areas have also been found on Amchitka. The underground nuclear testing program on Amchitka produced well over 100,000 cubic yards (cy) of drilling muds contaminated with chromium, diesel fuel and PCBs. About 40,000 cy of these drilling muds were contained within open reserve pits, many of which attracted waterfowl and had been known to fail, spilling contaminated drilling muds into adjacent wetlands and stream reaches. The nuclear testing program also produced radionuclides, some of which (tritium) were released during the Longshot blast and some of which may be released to the biosphere in the coming millennia. The timing, location and extent of future releases of other, more persistent radionuclides are currently unknown.



World War II MK2 fragmentation grenade in Amchitka's intertidal zone. USFWS photo by Jordan Stout.

Cleanup actions: Up to 200 people were on the island from April to September, 2001 performing cleanup activities at a cost of >$20 million. The Navy demolished 60 abandoned structures and facilities; removed 47 fuel storage tanks; treated 2,500 cy of petroleum-contaminated soils; and remediated the sewage lagoon by shipping 2,000 cy of PCB-contaminated sludges off-island for incineration. The Corps used historic records, computer-aided aerial photographic interpretation techniques and on-the-ground geophysical surveys to understand the nature and extent of the ordnance contamination on Amchitka. To date, ordnance items found include: napalm; 60 and 81 mm mortars; grenades; anti-personnel mines; 4, 20, 100, 250 and 500 pound bombs or casings; incendiary bomblets; 20, 37, 90 and 155 mm projectiles; and various smaller items. The DOE closed 12 drilling mud pits, an underground storage tank and is currently developing a groundwater model and long-term marine monitoring program for Amchitka to address potential radionculide-related contamination issues.

Five megaton Spartan nuclear warhead poised for lowering into the Cannikin shot cavity more than one mile below the surface ground zero, Amchitka. Department of Energy photo.

Drilling mud disposal pits contaminated with diesel, metals and PCBs, Amchitka. USFWS photo by Jordan Stout.

Excavation of napalm canisters from a disposal area. USFWS photo by Doris Alcorn.

Some Trust Resources at Risk

Refuge lands
- Soils
- Sediments
- Ground & surface waters

Mammals
- Sea otters (a candidate species)
- Pacific walrus
- Bear
- Moose
- Caribou

Birds
- Migratory birds
- Seabirds
- Bald eagles

Fish
- Five salmon species
- Other freshwater and anadromous species

Alaskan sea otter (Enhydra lutris). USFWS photo.

Alaskan bald eagle (Haliaeetus leucocephalus). Cordova, AK. USFWS photo by Tim Bowman.

Threatened & Endangered species
- Steller's eider
- Spectacled eider
- Short-tailed Albatross

Cultural resources
- Archeological sites
- WWII sites
- Cold War Era sites

Prehistoric dig site on Buldir Island, Alaska Maritime NWR. USFWS photo by Carol Fritz.

Male and female spectacled eiders (Somateria fischeri) on the wing, Yukon Delta NWR. USGS photo by Paul Flint.

Conclusion

Amchitka and Adak islands are just two examples of the many contaminated military sites that occur on Alaska NWRs. There are many more contaminated sites (military and otherwise) on or near Refuge lands and the list seems to grow every year. For instance, the Army Corps is continually finding and evaluating old military sites all over Alaska. Furthermore, the US Coast Guard and the FAA plan to excess many properties to the USFWS in the near future. Comprehensive inventories of contaminated sites affecting each of Alaska's National Wildlife Refuges are now being assembled. Once completed, a systematic approach can be used to deal with these sites in a prioritized fashion .

Abandoned US Coast Guard LORAN station on Sitkinak Island, near Kodiak NWR. USFWS photo by Jordan Stout.

Although the task to deal with contaminants on these and future sites seems daunting, many partnerships between responsible parties, regulatory agencies, Native organizations and other USFWS divisions have developed along the way and have worked well. The USFWS has learned to require site cleanups before accepting transferred properties. This proactive approach still requires significant oversight by USFWS personnel prior to transfer; however, the resources with which they are entrusted benefit greatly.

Alaska is an astoundingly beautiful place and seems untouched in many ways. However, in reality, Alaska is not the unspoiled wilderness that most people envision. Helping to return contaminated sites on Refuges to a more natural and healthy state is a major goal of the USFWS. With diligence and dedication, this goal is attainable.

Danger sign posted at the Palisades Landfill on Adak Island, Alaska Maritime NWR. USFWS photo by John Martin.

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