

MIDWAY ATOLL NATIONAL WILDLIFE REFUGE

Midway Atoll, Pacific Ocean

ANNUAL NARRATIVE REPORT

Calendar Year 1991



Midway Atoll

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

REVIEW AND APPROVALS

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Don Williamson 11/17/92
Submitted by: Wildlife Biologist Date

Don J. B. [Signature] 11/17/92
Refuge Manager, Pacific/Remote Islands NWR Complex Date

[Signature] 11/12/92
Project Leader, Hawaiian and Pacific Islands NWR Complex Date

[Signature] 12/7/92
Regional Office Approval Date



(1) Black-footed (l) and Laysan Albatross (r). (DKM)

INTRODUCTION

Midway Atoll National Wildlife Refuge (NWR) is located in the North Central Pacific Ocean at 28°12'N latitude and 177°22'W longitude. It is about 1150 miles west-northwest of Honolulu, Hawaii. As a U.S. possession, it is the only atoll in the Hawaiian Island chain not within the state of Hawaii. The Refuge covers approximately 77,000 acres of water (3 miles beyond the atoll reef) and has three flat coral islands totaling about 1,550 acres.

Midway Atoll NWR was created in April, 1988 by Cooperative Agreement between the Navy and the Fish and Wildlife Service. Midway Atoll NWR overlays the lands and waters of Naval Air Facility (NAF) Midway Islands. The Refuge was established for endangered species, migratory birds, and other fish and wildlife. The Navy retains primary jurisdiction for the atoll. The Commanding Officer of Naval Air Station Barbers Point on Oahu, Hawaii commands NAF Midway Islands through an on-site Officer-in-Charge (OIC). Base operations and maintenance are executed by a base contractor.

The Refuge provides nesting and roosting habitat for over a million seabirds of 15 species, wintering habitat for three common and other less common species of shorebirds, and marine habitat for a diverse assemblage of marine animals, including endangered Hawaiian monk seals, threatened green sea turtles and Hawaiian spinner dolphins. Midway has the world's largest Laysan albatross colony and the largest colonies of red-tailed tropicbirds, black noddies and white terns in the Northwestern Hawaiian Island chain. One or two non-breeding, endangered short-tailed albatrosses typically visit Midway Atoll during the albatross breeding season.

This document is the first annual narrative prepared since refuge establishment in 1988. Significant events occurring from 1988-1990 are discussed in this document.

MIDWAY ATOLL NATIONAL WILDLIFE REFUGE

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A. HIGHLIGHTS

Although Midway Atoll NWR was created in 1988, the first Refuge office opened in late 1990 (section I.8).

One Wildlife Biologist was assigned at Midway through 1991 (section E.1).

A joint (Service & Navy) Natural Resources Management Plan for Midway was signed in April, 1991 (section D.6).

A major activity of the Refuge entailed coordination on Navy sponsored activities at Naval Air Facility (NAF) Midway Islands. Identification of existing and potential environmental hazards was another notable endeavor (section E.8).

NAF Midway was listed for base realignment and downgrade began. The population of Midway was reduced by about one-third (section E.8). Further reductions continue.

Abandoned underground storage tank locations were verified and contents of certain tanks were sampled. Closure plans are being developed (section F.14).

Eleven of Midway's large antennae (major bird hazards) were removed as the NAF downgrade progressed. Preliminary investigations of abandoned underground storage tanks (USTs) were conducted (section F.15).

Introduced trees were removed from selected sites using Navy SeaBee labor. Beach cleanup of fishing nets and other hazardous items was conducted with volunteer labor on all three islands (section E.3).

For the first time ever, censuses of breeding pairs of albatrosses were conducted on Midway simultaneously with censuses on other Northwestern Hawaiian Islands (see G.5).

Two endangered short-tailed albatrosses frequented Midway during the breeding season (section G.2).

A front page Honolulu newspaper article featured Midway Atoll NWR and its natural resources. The Refuge also received national recognition on network television (section H.1).

B. CLIMATIC CONDITIONS

Midway Atoll has a semi-tropical, oceanic climate generally influenced by moderate northeasterly to easterly trade winds, although strong winds from any direction may occur throughout the year (Table 1). Heavy rains are common most winters.

TABLE 1. The mean temperature, actual precipitation and peak wind speed by month for 1991 and the historical mean (years) temperature and precipitation and record peak wind speeds by month for Midway ¹.

Month	<u>Mean Temperature</u> (F)		<u>Precipitation</u> (in)		<u>Peak Wind Speed</u> (mph)	
	1991	Historical	1991	Mean	1991	Record
January	66	65	6.0	4.9	45	67
February	64	66	3.2	3.8	47	63
March	68	66	2.5	3.2	32	58
April	71	68	1.0	2.3	27	60
May	73	72	1.4	2.5	23	42
June	78	76	1.4	2.5	30	47
July	NA	78	2.6	3.5	28	56
August	82	79	2.3	4.2	32	41
September	NA*	79	NA*	3.3	NA*	51
October	NA*	76	NA*	3.5	NA*	63
November	(72)*	72	(4.5)*	4.1	(42)*	52
December	(72)*	68	(3.0)*	4.1	(29)*	77

¹ source: NAF Midway BSI Weather Department weather data.

* 1991 data not available for these months due to closure of NAF Weather Department 10/01/91.

() 1990 data.

D. PLANNING

1. Master Plan

A comprehensive Natural Resources Management Plan for Naval Air Facility, Midway Island was prepared by the U.S. Fish and Wildlife Service, Hawaiian Islands NWR, Honolulu. The plan was approved by the Assistant Regional Director for Refuges and Wildlife Resources, Region 1 for the Service and the Head, Facilities Planning, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor for the Navy in April 1991. The plan provides a multiple-use program for the management, conservation, and protection of renewable natural resources including wildlife, fish, vegetation, shorelines, water and natural areas. Although not an official master plan, this document does serve to give direction for management of the Refuge over a ten year time period.

4. Compliance with Environmental and Cultural Resource Mandates

After prompting by the Refuge Biologist, the Navy conducted an informal Section 7 consultation with National Marine Fisheries Service (NMFS) in Honolulu about a proposal to detonate an unexploded WWII ordinance found in shallow water just off Sand Island, Midway. As a result, the Wildlife Biologist was designated as the on-site NMFS representative to ensure that proper precautions were taken to protect the endangered Hawaiian monk seal (*Monachus schauinslandi*) and the threatened green sea turtle (*Chelonia mydas*).

5. Research and Investigations

Research projects were conducted by graduate students from two universities:

MID-2-91 "Hawaiian Monk Seal Research" National Marine Fisheries Service

During 1991 National Marine Fisheries Service (NMFS) requested their first SUP for Midway. They had conducted informal work here in the years prior to Refuge establishment. The objectives for the 1991 work were:

1. Conduct regular censuses of seals and turtles.
2. Resight tagged seals.
3. Tag and measure weaned seal pups.
4. Temporarily mark seals (not including nursing pups).
5. Tag immature seals.
6. Collect fish for ciguatoxin assay.

NMFS was present intermittently during 1991. One trip was made in March, which included a member of the monk seal recovery team. Beaches were surveyed (especially the antenna debris on Eastern Island) for the suitability of the habitat for possible future introductions. The observer felt that although the antennas could pose some problem for seals that it wasn't a big enough problem to forestall introducing additional animals to the atoll. During this same visit, Refuge personnel were trained in census techniques and beaches were broken into sectors for data collections purposes.



(2) Old antenna debris on Eastern Island. (RJS)

Seven beach counts were conducted. The mean number of seals present was 5.1 excluding pups of the year. Two pups were born during the year. Both pups were tagged and measured after weaning. Midway seals were tagged in the flipper with red temple tags. The tags were coded with a Z followed by a two digit number. One subadult male was also tagged. Tags used on immature seals were inscribed with a single digit, followed by two alpha characters (e.g. 1AA, 1AB, etc.). Three seals were bleach marked.

MID-3-91 "Vegetation patterns and nesting seabirds at Midway NWR." Holly Freifeld - University of Oregon

Holly Freifeld of the Department of Geography at the University of Oregon at Eugene studied the distribution of nesting seabirds within the patterns of the mostly non-native vegetation on Sand Island (see also D.5).

MID-4-91 "Mite (*Epidermoptidae* spp.) infestation in Laysan albatross chicks (*Diomedea immutabilis*) on Midway Atoll: effects of infestation on morbidity and survivability." Kirsten von Kugelgen - U.C. Davis

Kirsten von Kugelgen from the School of Veterinary Medicine at the University of California (UC) at Davis conducted studies to determine the effects of differential mite infestation (if any) on Laysan albatross chicks in two habitat types and to identify the mite species infesting those chicks.

MID-5-91 "Sex differences in breeding frequency, chick provisioning, and desertion in Great Frigatebirds (*Fregata minor*)." John Gilardi - U.C. Davis

James Gilardi of the Department of Avian Sciences at UC - Davis studied the sex differences in breeding and chick rearing by great frigatebirds. Under a National Marine Fisheries Service permit (no. 745), Mr. Gilardi also performed population studies on the Hawaiian spinner dolphins (*Stenella longirostris*) using the waters of Midway Atoll NWR.

MID-6-91 "Inshore Fish Survey" John Randall, Bishop Museum

The primary objective of this work was to obtain underwater photographs of inshore fishes which are rare or too deep dwelling in the main Hawaiian Islands. The photographs will be used in a large book on all the shore fishes of the Hawaiian Islands.

John Randall and three assistants spent a week on Midway starting September 12. The result of the visit was a detailed checklist of the fish of Midway Atoll. The list also discussed the differences between Midway's fish fauna and that found in the main Hawaiian Islands.

E. ADMINISTRATION

1. Personnel



(3) Williamson recording data in albatross colony, Eastern Island. (DB)

Personnel

1. Don A. Williamson, Wildlife Biologist, GS-486-09, 9/23/90, term, converted to PFT 12/15/91

Midway Atoll NWR was administered by Duane K. McDermond, Pacific/Remote Islands NWR Complex Refuge Manager, in Honolulu and Don Williamson, Midway Atoll NWR Wildlife Biologist, at Midway.

During 1989 and 1990 the Refuge was staffed by a temporary seasonal biologist, Breck Tyler. Breck supervised volunteers in conducting wildlife surveys. He also produced a Natural Resources Management Plan funded by the Navy. Other short visits were made to the Refuge by Pacific/Remote Island Refuge Complex staff.

Number of Employees

	<u>Permanent</u>		<u>Term</u>	<u>Temporary</u>	<u>Total FTE</u>
	<u>Full-Time</u>	<u>Part-Time</u>			
FY91	0	0	1*	0	1
FY90	0	0	0	.5	.5
FY89	0	0	0	.5	.5

*NWR Office opened with 1 term position 11/23/90.

3. Other Manpower Programs

Reserve Navy Construction Battalion personnel (SeaBees) assisted the Wildlife Biologist with tree removal in a habitat rehabilitation project. The SeaBees, regular Navy personnel, and North American and third-country National contract workers were used in cleanup of fishing nets and other hazardous items washed up on Refuge beaches. The U.S. Coast Guard buoy tender SASSAFRASS visited the Refuge in June - July and assisted the Refuge staff by clearing coral reefs of fishing nets.



(4) Williamson instructing volunteer workers before beach cleanup activities on Eastern Island. (SB)



(5) Coast Guard assists with clearing nets from coral reefs. (DAW)

4. Volunteer Program

Midway's first volunteer biologist arrived in December 1990 for five weeks. Two more volunteers completed stays of 10 weeks at Midway in 1991. An additional two arrived in December 1991 for stays of 15 and 18 weeks. Two volunteers worked for one week in December on a special project.

The three graduate student researchers (see d.5) also provided volunteer labor in exchange for Service support in conjunction with their research projects.

Volunteers assisted the Refuge Biologist with biological surveys and censuses, vegetative mapping, environmental cleanup, habitat rehabilitation projects, interpretive displays and other Refuge work. All reported satisfaction with their stays. One went immediately into temporary refuge work at another remote Pacific island. Another decided to pursue graduate school in wildlife after his experiences here.

A total of 1680 hours of volunteer labor were contributed. The program cost \$5,500 to administer.

5. Funding

The Refuge received \$100,000 for operations and maintenance from the Pacific/Remote Islands NWR Complex during FY91. This was the first year that Midway had a dedicated budget.

The Navy provided \$27,000 in 1989 for production of a Natural Resources Management Plan. This no year money was used during FY89 and FY90 to hire a seasonal biologist, who produced the plan while working at Midway.

6. Safety

Standard safety procedures were implemented as a part of refuge start up. Boating safety is of paramount importance at Midway. No safety problems occurred during the year.

8. Other Items

Midway Atoll National Wildlife Refuge was created in April, 1988 and the first permanent Refuge office opened on Sand Island on November 23, 1990. Although various research and management activities were conducted at Midway during previous decades, establishment of the office provided the Service's first full-time presence.

Major responsibilities of the on-site Refuge biologist included: inventorying and monitoring wildlife populations; advising and coordinating with the Navy personnel and contractors on environmental and Refuge concerns; providing interpretive and environmental information to Midway residents and visitors; seeking correction of hazardous situations; liaison and coordinating with visiting researchers; facilitating photo-journalistic endeavors that increase the public's awareness of the Refuge; and directing a volunteer program.

The Refuge Biologist routinely monitored on-going operations, maintenance and construction activities of the Naval Air Facility and it's contractors and advised as how to avoid or limit impacts to fish and wildlife resources. He coordinated on environmental investigations and provided information and recommendations, as appropriate.

NAF Midway was listed for base realignment by the Base Closure Commission. Realignment resulted in a down scaling of base operations, infrastructure, and personnel. The population of Midway was reduced from about 300 military and civilian contract personnel and spouses in the fall of 1990 to a little over 200 by the end of 1991. Further personnel reductions continue. Infrastructure changes are detailed in later sections of this report.

F. HABITAT MANAGEMENT

1. General

The lands of Midway Atoll NWR provide roosting and breeding habitat for tropical seabirds, migration and wintering grounds for shorebirds, haulout and pupping beaches for monk seals and basking areas for sea turtles. The expansive marine environment included in the Refuge provides habitat for an unknown amount of marine life including seabirds, marine mammals, sea turtles, finfish and other marine organisms.

Vegetative types for Sand Island were mapped by Holly Freifeld, graduate student researcher/volunteer see also Section D.5).

3. Forests

Stands of ironwood trees were removed from Spit Island and parts of Sand Island in April 1991 (see also F.10).



(6) Ironwood tree stump in naupaka stand, Sand Island.
(DAW)

5. Grasslands

Lawns and open areas cleared of brush and dense trees by base contractor personnel through mowing and brushing operations were heavily used by nesting albatrosses. Reduced mowing and brushing operations, as envisioned in the base downgrade, will result in lose of open grassland habitat to thick brush and forests.



(7) Base contract lawn mowers, Sand Island, NAF Midway.
(SAM)

6. Other Habitats

Abandoned fishing nets and other entanglement hazards for seals and turtles were removed from beaches, coral heads, piers and pilings in the Refuge's marine waters. Because of the difficulty in moving the larger nets, many were burned in place.



(8) Navy SeaBees cleaning beaches, Eastern Island.
(DAW)

10. Pest Control

Rats (*Rattus rattus*) were introduced to Midway in the early 1940's. Rats are a serious concern on Midway from two perspectives. The rats prey directly on the eggs and chicks of several seabird species. Bulwer's petrels are thought to have been extirpated by rats on Midway, and populations of Bonin petrels and wedge-tailed shearwaters are significantly depressed as a result of rat predation.

Rats are also herbivorous and have made major impacts on native vegetation. Because native vegetation is so important for many seabird species, they have taken a double hit.



(9) Healthy beach naupaka (*Scaevola sericea*). (DKM)



(10) Beach naupaka showing effects of rat herbivory.
(DKM)

Since the initial infestation, the size of the rat population has varied proportionately with the level of control effort. The Navy, through its base contractor, has an ongoing program to control introduced rats (*Rattus rattus*) in the inhabited portions of Sand Island using poison bait stations.

Animal Damage Control conducted a population survey of rats throughout the atoll in 1988. The survey showed that rat numbers were low in areas receiving control, but could be high in areas directly adjacent to these areas.

The base contractor may also conduct spot spraying to control mosquitoes and flies. Buildings are periodically treated to control cockroaches.

Exotic ironwood trees were removed from Spit Island and selected portions of Sand Island in the spring of 1991 as part of a native vegetation rehabilitation project.



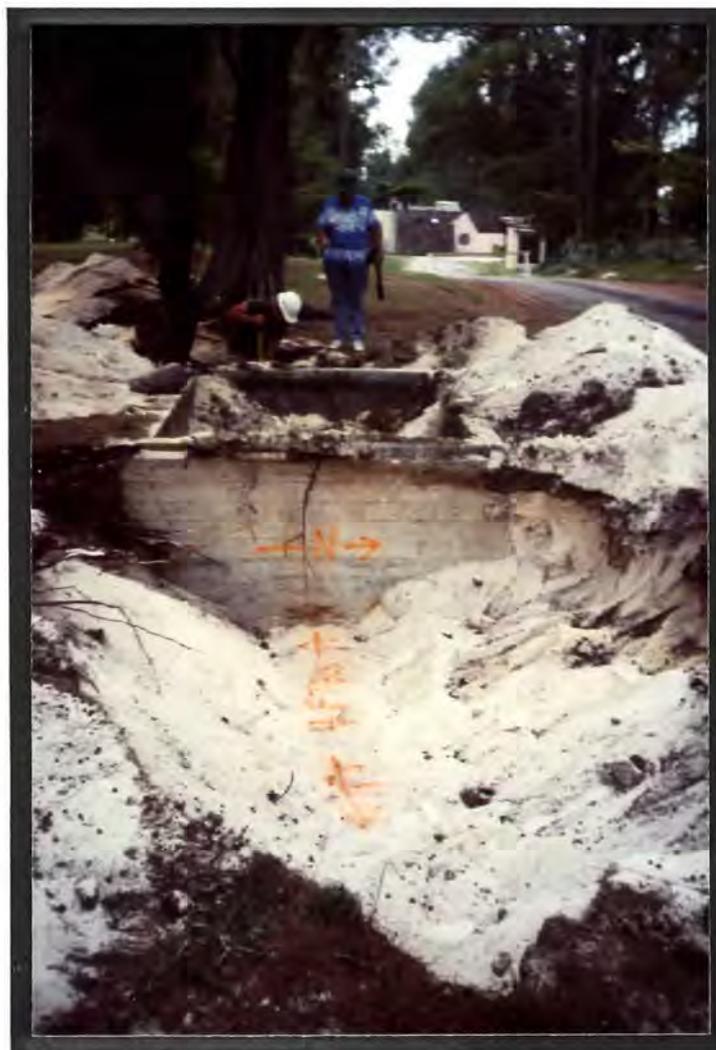
(11) Ironwood tree removal by Navy SeaBees, Spit Island.
(DKM)

The introduced ironwoods out-compete native shrub vegetation favored by ground nesting red-tailed tropicbirds, sooty and gray-backed terns and brown noddies. In the summer of 1991, a small colony of sooty terns relocated to the recently cleared area of Spit Island for nesting.

14. Contaminants

DOD contractor personnel conducted a preliminary hazardous materials reconnaissance of NAF Midway. An Installation Restoration (IR) study is intended.

Preliminary field investigations of abandoned underground storage tanks (USTs) were conducted by Department of Defense (DOD) contractors. About 100 abandoned USTs, most of WWII vintage, were identified on Sand Island for the study. Tank locations were verified through electromagnetic means. Certain tanks were excavated and contents sampled. Closure plans and time tables for identified UST's are to be developed by DOD contractors. Removal of the UST's would cause extensive impact to seabirds and their habitat.



(12) Underground Storage Tank
Investigations, Sand Island.
(DAW)

15. Wildlife Hazards

Antennas of various sizes and shapes have created hazards for seabirds for decades. Albatross prefer the open grassy area that are provided by the antenna fields. So in one way the antennas have been a boon to nesting albatrosses and at the same time have killed thousands of them over the years.



(13) Laysan and black-foot albatross colony in antenna field, Sand Island. (DAW)



(14) Laysan albatross hanging in NAF antenna, Sand Island. (DAW)

Eleven of Midway's twelve communication and navigation antennae (deadly to birds) were removed from Sand Island as the NAF downgrade progressed (see section F.1 also).



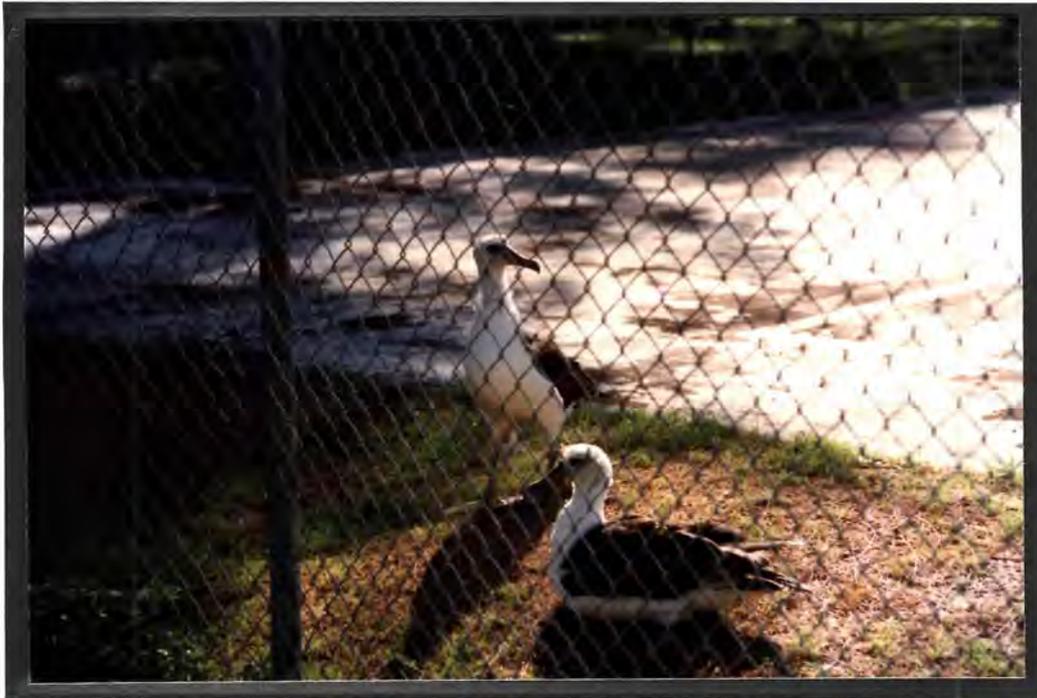
(15) Removal of antenna, Sand Island.
(DAW)

In the past, a dozen open pits were death traps for nesting seabirds. Biologist Williamson spent many hours working with the base contractor to cover these entrapment hazards.



(16) Uncovered pit with the bones and carcasses of past victims. (DKM)

The base also has numerous fenced enclosures. Many of these enclosures allow albatross to land, but aren't large enough to allow the birds to take flight and escape. Biologist Williamson encouraged removal of unneeded fences, and was successful in several cases.



(17) Albatross trapped by fenced enclosure. (BT)

G. WILDLIFE

1. Wildlife Diversity

Midway, and other islands within the Pacific/Remote Islands NWR Complex, are managed with the intent of restoring them as much as possible to their pre-human floral and faunal diversity. Currently Midway is probably far more diverse than pre-human occupation. This is due to the introduction of many plants, animals, and insects. These introductions have had significant effects on the native flora and fauna. Overall these introductions are not positive in our view of diversity, because native diversity is decreased by being out competed by alien species.

However, some of these changes have not always resulted in loss or even reduction in a species population. For example: the black noddy and white tern populations are probably significantly above those of pre-human habitation. This is due to the introduction of ironwood trees. On the other hand, ironwood trees are not beneficial to other species such as red-tailed tropicbirds and Christmas shearwaters.



(18) White tern nest in ironwood. (DKM)

Management of the Refuge, while moving towards restoration of habitats and native species will have to consider these dilemmas.

The Refuge plans activities such as rat control and vegetation control to restore native diversity. In addition, National Marine Fisheries Service plans to augment the dwindling population of Hawaiian monk seals with excess animals from other Refuge locations in the Northwestern Hawaiian Islands.

2. Endangered and/or Threatened Species

Two non-breeding, endangered, short-tailed albatrosses (*Diomedea albatrus*) frequented Sand Island during the 1990-91 and 1991-92 breeding seasons. Both of these rare birds were known-age individuals banded with plastic leg bands (white 000 & yellow 015) by Dr. Hasegawa of Toho University, Chiba, Japan.



(19) Banded short-tailed albatross "000 white", Sand Island. (DAW)

Midway's population of endangered Hawaiian monk seals (*Monachus schauinslandi*) has declined precipitously since the 1950's. An estimated 20 seals regularly used Midway's beaches in 1991. Three seal births occurred on Spit Island but one died at birth or was still-borne. One of three captive pups died at Midway while in transit from Laysan Island, Northwestern Hawaiian Islands to Honolulu. The transit seals were part of a National Marine Fisheries Service program to rehabilitate underweight pups and to rebuild depleted populations (see also Section D.5).



(20) Karen Lombard, NMFS volunteer, wets monk seal pups.
(DAW)

Immature and subadult threatened green sea turtles (*Chelonia mydas*) were common in Midway's waters. Adults are less common. There are no historic records of turtles nesting at Midway. One adult with large tumorous growths frequented the inner harbor during the winter of 1990-91. This was the first recorded tumorous turtle at Midway.



(21) Green sea turtle with fibropapilloma tumors at Sand Island. (DAW)

A fresh shark-killed leatherback turtle (*Dermochelys coriacea*) was found awash at Frigate Point on Sand Island in January.

3. Waterfowl

Waterfowl do not regularly migrate to or overwinter on Midway. However, each year birds get blown off course or lose their way and land on Midway. Oftentimes, these are Eurasian species. Greater scaup, northern pintail, northern shoveler, mallard, American widgeon and green-winged teal were observed in protected marine waters or ephemeral ponds and catchments when freshwater levels were sufficient. An endangered Aleutian Canada goose overwintered at Midway in 1990-91. The bird, with a plastic leg band (yellow D-45), reportedly was banded in August, 1990 at Buldir Island in the Alaska Maritime NWR.

5. Shorebirds, Gulls, Terns and Allied Species

Midway has the world's largest colony of breeding Laysan albatrosses. Estimates, based on partial counts and sample plots in December 1991 through January 1992, are for about 430,000 breeding pairs on the three Midway islands. Actual counts of over 19,750 breeding pairs of black-footed albatrosses were also made. These censuses were coordinated with similar efforts occurring on two other Northwestern Hawaiian Islands to give first-time, simultaneous estimates

for about 75% of world's Laysan albatross population. Reproductive success studies of both albatross species were started on Sand Island in late 1991.



(22) Mixed colony of Laysan and black-footed albatross.
(DAW)



(23) Midway not only has the largest Laysan albatross colony in the world, but also the largest albatross. (DKM)

A total of 15 species of seabirds bred on Midway Atoll in 1991; nine on Sand Island, twelve on Eastern Island and four on Spit Island (Table 2).

TABLE 2. Seabird species breeding at Midway Atoll in 1991.

BREEDING SEABIRDS	BREEDING ISLAND(S)		
	Sand	Eastern	Spit
Laysan Albatross (<i>Diomedea immutabilis</i>)	yes	yes	yes
Black-footed Albatross (<i>Diomedea nigripes</i>)	yes	yes	no
Bonin Petrel (<i>Pterodroma hypoleuca</i>)	yes	no	no
Wedge-tailed Shearwater (<i>Puffinus pacificus</i>)	yes	yes	no
Christmas Shearwater (<i>Puffinus nativitatis</i>)	no	yes	no
Red-tailed Tropicbird (<i>Phaethon rubricauda</i>)	yes	yes	yes
White-tailed Tropicbird (<i>Phaethon lepturus</i>)	yes	no	no
Masked Booby (<i>Sula dactylatra</i>)	no	yes	no
Red-footed Booby (<i>Sula sula</i>)	no	yes	no
Great Frigatebird (<i>Fregata minor</i>)	no	yes	no
Brown Noddy (<i>Anous stolidus</i>)	yes	yes	no
Black Noddy (<i>Anous tenuirostris min.</i>)	yes	no	no
Sooty Tern (<i>Sterna fuscata</i>)	no	yes	yes
Grey-backed Tern (<i>Sterna lunata</i>)	no	yes	yes
White Tern (<i>Gygis alba</i>)	yes	yes	no

Surveys of red-footed booby and great frigatebird nesting activity on Eastern Island were conducted. Mapping of Bonin petrel nest burrows by density on Sand Island was completed.

Population censuses were not conducted for other seabird species in 1991. Nonbreeding seabird species occurring in very low numbers at Midway included the short-tailed albatross (2), brown booby (4), little shearwater (1); and least tern (2).

Common, nonbreeding, migratory shorebird species that overwintered at Midway were the bristle-thighed curlew, lesser golden plover, ruddy turnstone and wandering tattler. The curlew population was at least 100. No population estimates were made for other shorebirds.

Shorebird species infrequently observed in very low numbers at Midway included the sharp-tailed sandpiper (2), semipalmated plover (1), common snipe and (1); and gray-tailed tattler (1).

6. Raptors

Five short-eared owls were sighted on Sand Island in December. A northern harrier was seen on Spit and Sand Islands in the fall of 1990. A merlin was sighted on Sand Island in November and December 1991. An osprey apparently overwintered at Midway or infrequently returned there throughout the winter of 1991-92.

7. Other Migratory Birds

Another very rare species for the Hawaiian Islands was the pelagic cormorant (1) which died soon after first being sighted at Midway.

9. Marine Mammals

An estimated 200-250 Hawaiian spinner dolphins inhabit the marine waters of Midway Atoll. The dolphins tended to rest in the shallow waters of the lagoon during the day and foraged in deeper outside waters at night. An estimated 20 Hawaiian monk seals regularly used the beaches and marine waters. Two seal pups were born and one apparently stillborn on Spit Island in late December 1990. One small dead whale, tentatively identified as a pygmy sperm whale, was stranded on Eastern Island.

10. Other Resident Wildlife

Midway's only terrestrial breeding bird species were the introduced common canary and myna. Introduced rats and mice were also present.



(24) Canaries introduced to Midway.

11. Fisheries Resources

Approximately 49 families, represented by predominantly by reef fishes, are associated with Midway Atoll. Additional pelagic fish species occur in deeper waters within and outside the atoll.

14. Scientific Collection

The only scientific collection to occur at Midway was of inshore (reef) fishes by staff of Bishop Museum, Honolulu, HI (see also Section D.5).

15. Animal Control

Base Services Incorporated (base contractor) used bait stations to control rat populations in and near occupied areas of the NAF on Sand Island. While designed for the welfare of the human population, these measures apparently benefit burrow nesting petrels and arboreal nesting terns and noddies, which breed only on Sand Island.



(23) Typical rat bait station. (BT)

Bird strikes killing at least 23 birds of 3 species were reported with 14 aircraft landing or taking off at NAF Midway in 1991. Although a bird aircraft strike hazard (BASH) reporting system for the military was in place, damage to departing aircraft was not usually reported back to NAF Midway unless the plane returned because of danger. Reported damage to arriving aircraft included engines and fuselage parts that had to be replaced.

Historically, BASH was a major issue at Midway. In the 1950's and 60's this resulted in the killing of thousands of albatross. Although a BASH still exists, the Navy has not requested any assistance in alleviating the problem. Aircraft traffic at Midway is much reduced since the 1960's.

16. Marking and Banding

Limited banding of birds occurred at Midway in 1991. Most near-fledging greater frigatebird (34) and a few red-tailed tropicbird (8) chicks were banded. One black-footed albatross adult with worn a band was rebanded. Two monk seal pups were tagged as were four green sea turtles.

H. PUBLIC USE

1. General

There is no "public" access as such. The base has restricted access and base clearance must be acquired before arrival. Residents must be employed or be a spouse of an employee at the facility. Visitors are allowed for particular endeavors or, in some cases, aircraft layovers and emergency ship repairs. The population of Midway decreased from about 300 in the fall of 1990 to about 200 by January, 1992. A maximum of 11 Navy personnel were stationed at NAF Midway. The base contract workforce consisted mostly of third-country Nationals from Sri Lanka, Thailand and the Philippines with U.S. citizen managers and supervisors.

Midway is regularly supplied by a weekly Military Air Command (Air Force) C-141 cargo plane which carries passengers, mail, perishable goods and high priority cargo. Other supplies and equipment are brought via cargo ships about every 3-9 months.



(26) Cargo ship AMERICAN CONDOR at dock, Sand Island.
(DAW)

In order to expand the public's knowledge of Midway Atoll NWR, photo-journalistic and video endeavors were encouraged. A week-long visit by a reporter and photographer resulted in a front-page feature article in a Honolulu newspaper on Midway Atoll NWR and it's's natural resources. Filming by NBC

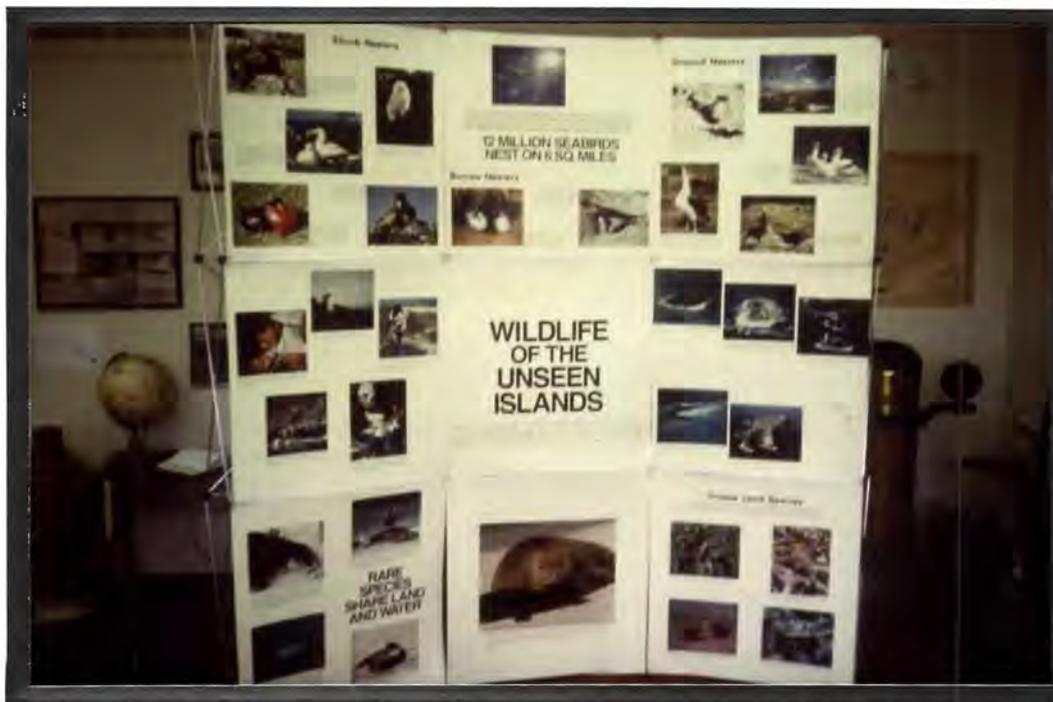
television news concerned with the 50th anniversary of the bombing of Pearl Harbor and ancillary attack on Midway resulted in national recognition of the Refuge.

6. Interpretive Exhibits/Demonstrations

An interim display of seabirds of Sand Island, Midway was developed for use in the temporary dining hall.

7. Other Interpretive Programs

The Refuge office was located in the unstaffed NAF Museum. Thus, visitors could visit the museum only when the office was open. The Refuge office opened for two hours per week outside of normal NAF working hours to facilitate visitation. A pictorial exhibit of the seabird and other natural resources of the Northwestern Hawaiian Islands, along with other Refuge and natural history information, was displayed in the joint office and museum.



(27) Northwestern Hawaiian Island portable pictorial display. (DAW)

8. Hunting

Hunting is not allowed at NAF Midway. Firearms are prohibited.

9. Fishing

Recreational fishing is a popular activity at Midway atoll. Finfish are caught by hand line, pole and line, and throw net. Spear fishing is not allowed at NAF Midway. Because of the danger of ciguatera poisoning, the consumption of finfish caught inside the reef is forbidden. The recreational take of finfish is not otherwise regulated at Midway since it lies outside of state jurisdictional boundaries. As weather and seas allow, fishing parties use base recreational boats to troll outside the reef for pelagic fish species, such as tunas (ahi and aku) and wahoo (ono), which have not been found to be ciguatoxic. An attempt was made to quantify the use of Midway's marine waters by recreational boaters through a questionnaire. The voluntary program, initiated in the 1991 summer season, provided questionnaires to individuals filing a boating float plan with Base Security before their trip. Little information was obtained due to low participation.

10. Trapping

Lobster trapping and free-hand capture by snorkelers and divers were allowed at NAF Midway. Although not quantified, the take of lobsters was popular with local residents. Lobsters were considered safe for consumption. No trapping of other wildlife was allowed.

11. Wildlife Observation

The ability of the public to participate in wildlife observation was limited at Midway due to the controlled access onto the military installation. In addition, visitation to the uninhabited islands was further restricted by the Officer-in-Charge (OIC) and Refuge staff. Island residents and visitors were able to observe nine species of seabirds nesting on the inhabited island (Sand). Monk seals and sea turtles were occasionally observed on the beaches or in the nearby waters. This use was not quantified.

14. Picnicking

One picnic pavilion was located at the recreational beach on the north side of Sand Island. This site was regularly used by residents and visitors for cookouts during warm spring and summer days and evenings.

16. Other Non-Wildlife Related Recreation

Other non-wildlife recreational pursuits included motorboating, sailing, wind surfing, snorkeling, diving, beach combing, and beach volleyball. Equipment for the above was provided at nominal charges by base recreational services. These activities were not regulated by the Refuge unless conflicts with fish or wildlife are determined to exist.

17. Law Enforcement

Refuge staff had no law enforcement authority and base law enforcement duties were vested in the Officer-in-Charge and carried out by the base contractor security personnel. As a result of potentially severe punishments (probable loss of job and deportation from Midway), violations of wildlife regulations by island residents were rare. Most incidents were identified with transients associated with ships or planes. One serious event was the killing of three incubating albatross. The suspect returned to his carrier enroute to operation "Desert Storm" before the crime was discovered. No follow-up action was taken by the Navy or Service Law Enforcement after the war. Another incident involved the willful destruction of 122 albatross eggs when the only transients on the island were Service employees and volunteers. No suspect was identified and the culprit was never apprehended.

I. EQUIPMENT AND FACILITIES

8. Other

The Service's primary facility was the Refuge office located in the one-room NAF Museum at the Midway "Mall". It opened November 23, 1990. The office consisted of approximately 182 ft² of corner space in the museum and a separate storage room with about 112 ft². The NAF Museum was not staffed by Navy or contractor personnel. It was open to visitors only when Service staff were at the Refuge office. The museum also served as a Service visitor center with natural history displays for island residents and visitors.



(28) Refuge office and NAF museum in the Midway Mall.
(PH)

The Service had no housing facilities on Midway. Permanent and transient personnel were berthed in the bachelor officer quarters barracks. Attempts were made to acquire a vacant AT&T duplex for refuge staff to no avail.

The Service had a refurbished electric golf cart type vehicle, four bicycles and one tricycle for transportation on Sand Island. The Refuge also had a 16-foot inflatable Avon raft with a 25 hp Evinrude outboard engine for transportation between islands. The boat was stored outside on it's trailer while ancillary equipment was kept in lockers located in indoor space shared with the Navy's recreational divers.

J. OTHER ITEMS

1. Cooperative Programs

The refuge overlays an active Navy installation, thus the entire site is managed cooperatively with the military and it's contractors. Refuge personnel monitor base projects, programs and situations for potential to impact fish and wild-life resources, making recommendations to avoid, reduce or otherwise mitigate impacts. Since almost all unpaved areas

provide nesting habitat for some species of seabirds, most outdoor projects and activities have potential for some impact. One large project conducted by the Navy SeaBees was the pouring of an 18" thick airplane-tiedown pad which involved setting up a mixing plant and trucking the cement across the island.



(29) SeaBee cement mixing plant, cement trucks, and nesting albatross, Sand Island. (DAW)

4. Credits

This narrative was written by Don A. Williamson and reviewed by Duane K. McDermond.

photos: SB Steve Barclay, FWS
 DB Dave Barna, Navy (SeaBee Reserves)
 PH Phyllis Ha, FWS
 SAM Sally A. Marston, FWS
 DKM Duane K. McDermond, FWS
 RJS Rob J. Shallenberger, FWS
 MJS Marilyn J. Sigman, FWS
 BT Breck Tyler, Biologist
 DAW Don A. Williamson, FWS

K. FEEDBACK

Refuge Fact Sheet

Date: November 1991

Refuge: Midway Atoll National Wildlife Refuge

Date Established: April 1988

Acreage: 78,720 total: 1,549 emerged and 77,171 submerged

Refuge Staff: Wildlife Biologist

Legislative District: Not included under the jurisdictional authority of any state or territory

Location: Midway Atoll is located approximately 1,150 miles northwest of Honolulu

Mandates: The Refuge was established for migratory birds and endangered species

Land Status:

Administrative responsibility for this Refuge is shared by the U.S. Navy and the Service. Operational control of the Refuge will be by the Navy. The Service manages marine and wildlife resources.

Policy Direction:

A wildlife management plan has been completed by the Service for the Navy and is the guiding document for management of the Refuge.

Landscape Characteristics:

The islands of Midway Atoll provide terrestrial habitat for monk seals and green turtles, and nesting space for nearly a half-million seabirds of 15 species. Fish and Wildlife resources have been impacted by the long history of human occupation. Human disturbance has radically diminished seal populations and affected turtle use of the islands for basking and nesting. Conversion of seabird nesting habitat for runway development and housing; introduction of exotic plants, rats, birds, and insects; placement of antennas and lights; and direct control to reduce bird aircraft strike hazards have all impacted wildlife populations. Maintenance of island facilities continue to conflict with wildlife on the islands.

Public Use:

The Navy controls general public use. The Service permits wildlife oriented public use by researchers, film makers, photographers, and journalists. Navy operations are currently scaling down. The permanent human population is around 250 civilian and military personnel. Occasionally, the population rises above this when vessels or aircraft visit. These personnel come in close contact with resident wildlife, often resulting in human/wildlife conflicts, especially related to endangered species (monk seals) as well as albatross and burrowing seabirds.

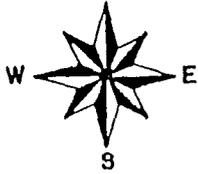
Issues/Needs:

1. Staffing of Overlay Refuge
2. Interpretation and Education for Midway personnel and visitors
3. Endangered species monitoring
4. Migratory bird monitoring
5. Monitoring effects of disease, contaminants, and rat effects on wildlife resources
6. Technical assistance to Navy to ensure construction/maintenance projects are planned to have minimum impact on wildlife resources
7. Rat control/eradication
8. Debris/contaminant cleanup
 - a. Eastern Island antennas, runways, buildings
 - b. Underground and above ground storage tanks on both islands
 - c. Other hazardous contaminants yet to be identified
9. Base realignment and its potential effects on wildlife

Prepared by: Ken McDermond

MIDWAY ISLANDS

1000 0 1000 2000 yds



SAND ISLAND

EASTERN ISLAND

SPIT ISLAND

Pacific Ocean

14'

28°
12' N

177°
24'

22'

177°
20'

