

MIDWAY ATOLL NATIONAL WILDLIFE REFUGE

Midway Atoll, Pacific Ocean

ANNUAL NARRATIVE REPORT

Calendar Year 1992



Sand Island, Midway Atoll

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

REVIEW AND APPROVALS

MIDWAY ATOLL NATIONAL WILDLIFE REFUGE

Midway Atoll, Pacific Ocean

ANNUAL NARRATIVE REPORT

Calendar Year 1992



Submitted by: Refuge Manager, Midway Atoll NWR

1/6/94

Date



Refuge Manager, Pacific/Remote Islands NWR Complex

1/21/94

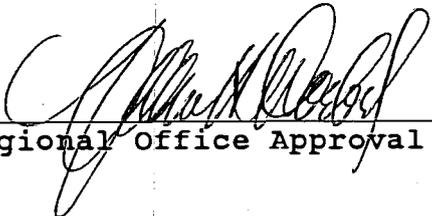
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Project Leader, Hawaiian and Pacific Islands NWR Complex

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Regional Office Approval

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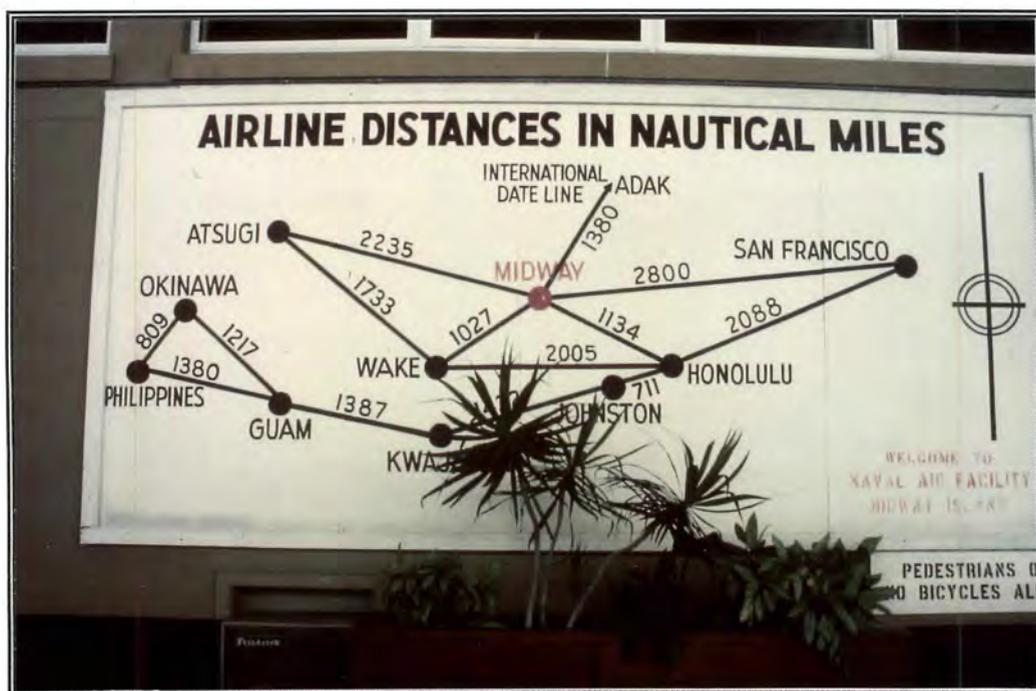
INTRODUCTION

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 88,550 acres of submerged lands (three 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 the conservation of endangered species, migratory birds, and other fish and wildlife. 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.

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 base contractor has a staff of 20-30 American supervisors and technicians. The remaining employees are third country nationals from Sri Lanka, Thailand and the Philippines.

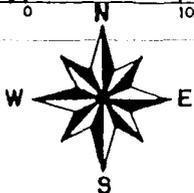
The Refuge provides nesting and roosting habitat for over a million seabirds of 15 species, wintering habitat for three common and other less common species of shorebirds, and marine habitat for a diverse assemblage of marine animals, including endangered Hawaiian monk seals, threatened green sea turtles 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.



Midway Atoll is located near the middle of the Pacific.
[MN, 9/92]

MIDWAY ISLANDS

1000 0 1000 2000 yds



SAND ISLAND

EASTERN ISLAND

SPIT ISLAND

Pacific Ocean

24'

22'

177° 20'

MIDWAY ATOLL NATIONAL WILDLIFE REFUGE

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A. HIGHLIGHTS

National Marine Fisheries Service initiated a Monk seal rehabilitation project on Midway (Section D.5).

A pilot study of contaminant uptake in Laysan and Black-footed albatrosses was initiated by SERE Group (Section D.5).

Refuge Manager position established and filled (Section E.1).

Wildlife Biologist Williamson received On-the-Spot award for technical assistance on the removal of a Loran "C" tower on Kure Island (Section E.7).

Refuge conducted albatross reproductive success study on Sand Island, Midway Atoll (Section G.5).

Burda Publications and ERA Film Produktion photographed wildlife of the refuge (Section H.1).

Honolulu TV stations KITV and KHON filmed footage on wildlife and recreational fishing (Section H.1).

Four-wheeled ATV arrived from Tern Island (Section I.8)

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. Heavy rains are common most winters providing an adequate supply of drinking water. In 1992, low rainfall required mixing of surface waters with brackish well waters. NAF Midway closed its weather station in 1991. Weather data will be collected in 1993 when the refuge installs a "Weather Wizard" kit.

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

The Navy covered an open waste oil pit with wire mesh after Refuge Staff identified it as a potential hazard to migratory birds. However, by the end of the year both the tank and cover were damaged leaving the pit uncovered. The pit and cover were scheduled for repairs in 1993.

5. Research and Investigations

MID-04-92 "Flight Range Estimates for Migrating Bristle-Thighed Curlews" Jeffrey S. Marks and Roland L. Redmond, Montana Cooperative Wildlife Research Unit, Univ. of Montana.

The objectives of the work at Midway were to obtain mensural data for use in estimating flight ranges based on a model from Pennycuick (1989), analyze fat content, study diurnal habitat use and estimate the population.

From April 23-30, 1992, Marks and Redmond, visited Midway. They found that virtually all of the curlews spend the day on Sand Island and communally roost at night on Spit Island. A population between 100 and 125 curlews was estimated during this period. Thirty-seven curlews were banded during two nights of trapping at Spit Island. Thirteen birds were also color banded. Three curlews were collected for fat analysis. Based on plumage wear and molt, it was determined that 33 of the captured curlews were older than three years.

MID-05-92 "Hawaiian Monk Seal Research" National Marine Fisheries Service

The objectives of this research were:

1. Monitor populations
2. Rehabilitate pups and subadults
3. Collect scats and spews

The major activity at Midway involved the NMFS Hawaiian Monk Seal rehabilitation project. The project had been located at Kure Island, but the closing of the Kure Loran Station required locating the project on Sand Island, Midway Atoll.

In April, a seal holding pen constructed of plastic and wire mesh was built near Rusty Bucket. The next month, four seals rehabilitated on Oahu were brought to Midway. Live reef fishes were released in the pen until the seals learned to feed on them. Seven more seals were rehabilitated in August. In October, nine seals were brought in directly from French Frigate Shoals for rehabilitation at Midway. These seals were fed Pacific herring and released. In November, four of the released seals died. Necropsies were performed, but cause of death could not be determined. Three of the seals brought to Midway in October were returned to Honolulu for further rehabilitation when the NMFS crew left the island. The last group of seals were not fed live reef fishes prior to release.



National Marine Fisheries Service rehabilitated Hawaiian Monk Seal pups and subadults at Sand Island, Midway Atoll. [MN-10/92]



The NOAA vessel TOWNSEND CROMWELL transported Hawaiian monk seal pups and subadults from French Frigate Shoals for rehabilitation at Midway. [MN-10/92]

MID-06-92 "Inshore Fish Survey" John Earle, Bishop Museum

This was a continuation of a project started in 1991. The primary objective of this work was to obtain underwater photographs and collect specimens of inshore fishes to complete a checklist of the fishes of Midway. This paper has been accepted for publication by Pacific Science in draft form. John Earle and five assistants spent a week on Midway in May.

MID-08-92 "A Pilot Study of Contaminant Uptake in Two Species of Albatross in the North Pacific Ocean James Ludwig, The SERE Group, Ltd

Chlorinated synthetic contaminants, particularly the planar chlorinated hydrocarbons (PCH), and certain insecticide residues have damaged wildlife in some regions. This research seeks to confirm the presence of PCH and other chlorinated contaminants in the pelagic albatrosses of Midway and to evaluate the presence of toxic effects in the young of these albatrosses. The objectives include measuring the rates of deformities and abnormalities in chicks, the variance in levels of the thyroxine and vitamin A biomarkers in chicks and adults and how these vary with contaminants and age in individuals.

Ludwig was on Midway from November 28 to December 17. He collected 51 abandoned Laysan eggs and 45 black-foot eggs. Blood sampling was more difficult than anticipated, but he eventually collected blood samples from 177 Laysans and 200 black-foots. Only three Laysans were collected for tissue samples. The refuge had stipulated that only terminally injured birds be sacrificed. Several thousand albatrosses were also banded.

E. ADMINISTRATION

1. Personnel

The following represents a four-year comparison of the on-board strength at Midway Atoll NWR.

Table 1. Number of Employees

	Permanent Full-Time	Permanent Part-Time	Term	Temporary	Total FTE
FY92	2	0	0	0.0	2.0
FY91	0	0	0	1.0*	1.0
FY90	0	0	0	0.5	0.5
FY89	0	0	0	0.5	0.5

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

Nishimoto filled the newly created Refuge Manager's position in May 1992. Williamson was previously responsible for the on-site administrative and biological programs of the refuge.

Name/Title	Series/Grade	EOD	Status
Michael L. Nishimoto Refuge Manager	GS-0485-09	05/04/92	PFT
Don A. Williamson Wildlife Biologist	GS-0486-09	09/23/90	PFT



Refuge Manager Nishimoto (L) and Wildlife Biologist Williamson (R). [DKM-5/92]

3. Other Manpower Programs

In July, Base Services, Inc. sponsored a beach clean-up of Sand Island removing netting, ropes, straps, plastic floats and other marine debris. Several clean-up crews consisting primarily of third country nationals participated. Besides removing hazardous debris, several thousand dead albatross fledglings were picked-up to reduce fly problems on the island.

4. Volunteer Program

Seven volunteers worked on the refuge in 1992. They assisted the staff through most of the year except September and October. Volunteer terms averaged 10 weeks.

Volunteers assisted the refuge staff with biological surveys and censuses, wildlife interpretation, preparing interpretive displays, monitoring of construction activities, rescuing trapped birds and other Refuge work.

5. Funding

The Refuge received approximately \$150,000 for FY-92. This included \$8,000 of MMS funding to replace a zodiac. An additional \$14,000 was received from the Navy at the end of the fiscal year for use in FY-93. Midway received 15% of total Pacific/Remote Island NWR Complex funding.

6. Safety

Standard safety procedures were implemented. Boating safety is of paramount importance at Midway. No safety problems occurred during the year.

7. Technical Assistance

Wildlife Biologist Williamson and Johnston Atoll NWR biologist Donna O'Daniel traveled to Kure Island to assist in the removal of a 675' Loran "C" tower. The project resulted in minimal impacts to the seabirds of Kure Island. Both biologists received On-the-Spot awards for their work.

8. Other Items

Ray Rauch, Project Leader, Hawaiian and Pacific Islands NWR Complex, visited the Refuge from July 19 to 23. This was his first visit to Midway and had arrived after visiting the Northwestern Hawaiian Islands Refuge via the NOAA ship Townsend Cromwell. Rauch was briefed on Midway issues and was given a tour of Sand Island. Rough seas prohibited inspections of Eastern or Spit islands.

On July 16, LCDR Gregory Edman departed Midway and was replaced by Lt. James Van de Voorde as Officer-in-Charge. Van de Voorde was previously NAF Midway Island's AROIC. Due to base realignment, his former position was assumed by Senior Chief Al Chaussee.



LCDR Gregory Edman departed Midway on July 20. He was replaced by Lt. James Van de Voorde. [MN-7/92]

Van de Voorde completed his Midway tour at the end of September. The Refuge presented him a plaque at his going away party for his interest and support of the refuge. He was replaced on November 19, when LCDR Michael Driggers arrived.

On June 26, residents of Midway learned that Base Services, Inc., the BOS contractor for the past 10 years, lost its bid to continue serving Midway. Piquini Management Corporation, an Alaska Native corporation, was selected as the new base operations support contractor. A transition period began in July amidst great animosity. On October 1, approximately 60 Base Services, Inc, workers left Midway.



Approximately 60 Base Services, Inc., employees departed Midway on October 1 after losing the base operations contract. [MN-10/92]

NAF Midway was listed for base realignment by the Base Closure Commission in 1993. 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 1992. By December, there were one Navy officer and six Chief Petty Officers.

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 a variety of marine life including seabirds, marine mammals, sea turtles, fishes and other marine organisms.



Approximately 500,000 breeding pairs of albatrosses inhabit Midway Atoll. [DAW-5/92]

3. Forests

Stands of introduced ironwood trees occur on both Sand and Eastern islands. Ironwoods were removed from Spit Island in 1991. Refuge staff continue to pull seeding to prevent this alien species from gaining a foothold. Native vegetation has responded nicely to this removal.

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 loss of open grassland habitat to thick brush and forests. The impact this will have on albatross populations is unclear.

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.

10. Pest Control

Rats (*Rattus* sp.) 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. The reduced populations of Bonin petrels and wedge-tailed shearwaters have been attributed to 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.

Since the initial infestation, the size of the rat population has varied proportionately with the level of control effort.

The Navy, through it's base contractor, has an ongoing program to control introduced rats in the inhabited portions of Sand Island using poison bait stations.

The Refuge has identified additional rat control and eradication as priority objectives, but does not have funding to undertake the work.

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.

The introduced ironwoods out-compete native shrub vegetation favored by ground nesting red-tailed tropicbirds, sooty and gray-backed terns and brown noddies. Funding was not available in 1992 to continue control efforts begun in 1991 on Sand Island.

14. Contaminants

DOD contractor personnel conducted a preliminary hazardous materials reconnaissance of NAF Midway. An Installation Restoration (IR) Work Plan was completed by the end of 1992.

15. Wildlife Hazards

Antennas of various sizes and shapes have created hazards for seabirds for decades. In July, the last of the antennas were removed from Sand Island. Electrical lines, however, still injure or kill a number of seabirds.

The base also has numerous fenced enclosures. Many of these enclosures allow albatross to land, but are not large enough to allow the birds to take flight and escape. Seawalls also block movement of fledglings to beaches where they remain trapped and die.

Open water treatment tanks trap albatrosses throughout the breeding season and particularly during the fledging period. Trapped birds were removed by Refuge personnel.

Street lights as well as lighting around buildings confuse nocturnal seabirds and especially fledgling Bonin petrels. The Refuge requested the Navy to reduce lights around the Hangar building which resulted in a reduction of stunned and dead petrels.



Bonin petrels were frequently stunned or killed when they became disoriented by lights and crashed into nearby buildings. [MN-6/92]

Due to careless driving, albatross chicks were frequently run over when vehicles attempted to drive through dense concentrations of chicks. The base contractor issued a letter cautioning drivers, but mortalities still occurred. The number of vehicle mortalities, however, have decreased over previous years.

Bird/aircraft strikes were common, particularly during the spring. The birds always lose, but several strikes a year cause enough damage to engines to ground aircraft until a replacement engine could be sent out.

Mowing of lawns, brush cutting and tree trimming often result in the disturbance, abandonment or destruction of eggs or chicks.

G. WILDLIFE

1. Wildlife Diversity

Many 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 alien species have often out competed native species.

However, some of these changes have not always resulted in loss or reduction in native species. 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 which provide prime nesting habitat. On the other hand, ironwood trees are not beneficial to other species such as red-tailed tropicbirds and Christmas shearwaters, because the ironwoods out-compete the favored nesting vegetation of these species.

The Refuge plans activities such as rat control and selective vegetation control to restore native diversity. In addition, National Marine Fisheries Service plans to augment the dwindling population of Hawaiian monk seals by rehabilitating French Frigate Shoals pups and subadults at Midway.

2. Endangered and/or Threatened Species

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

Midway's population of endangered Hawaiian monk seals (*Monachus schauinslandi*) has declined precipitously since the 1950's. A seal pup was born on Spit Island in March. Beginning in April, NMFS began rehabilitating monk seal pups from French Frigate Shoals. Approximately 20 seals were introduced. By the end of the year four of these had died.

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.

3. Waterfowl

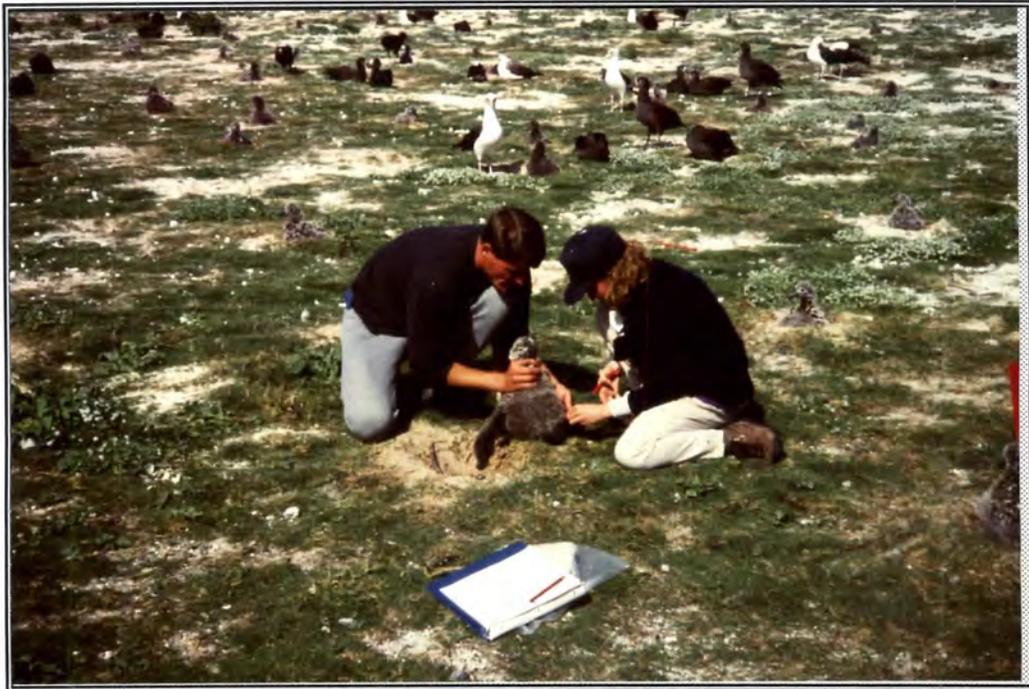
Waterfowl do not regularly migrate to or winter on Midway. However, each year birds get blown off course or lose their way and land on Midway. Greater scaup, northern pintail, northern shoveler, mallard, and green-winged teal were observed in protected marine waters or ephemeral ponds and catchments when freshwater levels were sufficient.

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. 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. Since the census was conducted at three colonies and two refuges, data will be analyzed by the Honolulu Complex staff. Reproductive success studies of both albatross species were started on Sand Island in late 1991 and concluded in July 1992. A report will be prepared in 1993.



Laysan albatross chick. [DAW-3/91]



Laysan albatross chicks at our reproductive success plots were banded. [DAW-3/92]



Albatross fledgling prepared to leave Eastern Island, Midway Atoll. [MN-7/92]

Wedge-tailed shearwater burrows, located where a large antenna was scheduled to be removed, were censused in July and checked again in late October. Fledging success was not determined due to workload constraints.

The Refuge monitored the number of stunned wedge-tailed shearwaters and Bonin Petrels around the Hangar at Sand Island from June 1 to November 5. The site was checked about five times per week. The data was used to demonstrate the impact of lights surrounding the Hangar building.

Red-tailed tropicbird reproductive success was monitored at the hazardous materials storage site near Frigate Point from June 26 to October 31. Nests were checked weekly. The study was used to determine whether or not reconstruction of a fence at the site had any impact on reproduction. Data from the construction site and two control sites were collected.

A census of black noddies on Sand Island was conducted in April. However, they experienced low productivity. Accurate reproductive rates were difficult to measure due to high nest sites.

Surveys of red-footed booby and great frigatebird nesting activity on Eastern Island were conducted. Population censuses were not conducted for other seabird species in 1992.

Common, non-breeding, migratory shorebird species that wintered at Midway were the bristle-thighed curlew, lesser golden plover, ruddy turnstone and wandering tattler.

A total of 15 species of seabirds bred on Midway Atoll in 1992; 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	LOCATIONS		
	Spit	Sand	Eastern
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</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

6. Raptors

Short-eared owls were infrequently sighted on Sand Island. An osprey was observed from time to time throughout the year. This bird was always pursued by a flock of several hundred white terns.

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.

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.

11. Fisheries Resources

Approximately 49 families, represented by predominantly 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 collections to occur at Midway was of inshore (reef) fishes by the staff of Bishop Museum, Honolulu, HI; and abandoned albatross eggs and three Laysan albatrosses by James Ludwig. (see also Section D.5).

15. Animal Control

Base Services Incorporated and Piguniq Management Corp. (base contractors) 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 benefit burrow nesting petrels and arboreal nesting terns and noddies.

There was a total of 51 bird strikes involving five species. Most of the strikes occurred from March through May.

Historically, Bird AirStrike Hazards (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

The SERE Group banded several thousand adult albatrosses in the fall. The Refuge banded albatrosses as part of our reproductive success study.

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 was estimated at about 200 by January, 1992. A maximum of eight Navy personnel were stationed at NAF Midway. The base contract work force 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. The cargo ship American Condor arrived in March and again in September. The Green Wave also arrived in March. In December, Midway was resupplied by the Pembina. The fuel ship, Sealift Antarctic, arrived in August. While on liberty an intoxicated crewman became disoriented in an abandoned section of the Midway Mall. Unable to locate an exit, he punched through one of the windows and severed several arteries in his forearm. He staggered to the refuge office for medical assistance where the staff performed first aid until the arrival of an ambulance. By the time he arrived at the clinic, the patient had lost about two pints of blood. He was stabilized and then evacuated via a Coast Guard C-130. Before administering first aid, one should recognize that

medical information such as blood borne diseases of a victim is proprietary in some states and will not be released to rescuers.

NAF Midway is used to refuel a variety of ships and aircraft. The USS Quillet was the only Navy ship that visited Midway in 1992. However, two Korean Navy destroyers refueled here enroute to a joint military exercise in the Pacific. Several Coast Guard vessels including the Sassafras, Munro and Boutwell docked at Midway. A variety of aircraft refueled at Midway, including a single engine plane that made an unauthorized landing. No one knew about this flight until the aircraft had already landed.



Korean navy sailors were given liberty at Midway. [MN-9/92]

In order to expand the public's knowledge of Midway Atoll NWR, photo-journalistic and video endeavors were encouraged. In January, writer Christoph Stopka and photographer, Mark Greenberg of Burda Publications arrived to prepare a nature article on Midway for German news-weekly magazine Bunte. A companion video piece will show on Burda TV (German). A German film company, ERA Film Produktion, and photographers Hans Schweiger and Ernst Arendt spent two 5-week periods on Midway in February and June. They were here to film a documentary on Midway's albatrosses. In May, Honolulu TV station KITV brought a news crew to Midway to film a piece for their Hawaii Wildlife news segment. Honolulu's KHON TV station also brought their Let's Go Fishing crew to put on a sports fishing show on Midway. The show also included wildlife of Midway.

6. Interpretive Exhibits/Demonstrations

A display of seabirds of Sand Island, Midway was moved from the old dining hall to the Midway Museum.

7. Other Interpretive Programs

The Refuge Office/Visitors Center, located at the NAF Museum was opened two hours per week outside of normal NAF working hours to facilitate visitation. We also made special arrangements to keep the Visitors Center open for visiting ship or air crews and passengers. A pictorial exhibit of the seabirds of Midway along with other Refuge and natural history information, and video tapes were displayed in the joint office and museum.

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, aku and kawakawa) and wahoo (ono), which have not been found to be ciguatoxic.



Residents return with a good catch of Kawakawa (*Euthynnus affinis*) and Ono or Wahoo (*Acanthocybium solandri*) from outside the reef. [MN-9/92]

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.



Korean navy vessels refueled at Midway on their way to a joint military exercise in the Pacific. [MN-9/92]

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 motor boating, 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 were 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. The base contractor formerly employed a security force, but these positions were abolished as part of the base realignment. In December, FWS Special Agent Carroll Cox met with the Officer-in-Charge and Project Manager to inform them of wildlife laws and coordinate procedures for wildlife violations.

Generally, deliberate violations of wildlife regulations by island residents are rare due to severe punishments (probable loss of job and deportation from Midway). Bird mortalities by vehicle frequently occur when albatross chicks become mobile in the spring and summer. However, most violations of wildlife regulations were identified with transients associated with ships or planes.

I. EQUIPMENT AND FACILITIES

5. Communications Systems

The Refuge depends on the Navy's Autovon telephone system for communications. The entire island depends on a single line and consequently the refuge had a terrible time communicating with the Complex office in Honolulu. Telephone communication was also available through the AT&T International line, but the FTS2000 card cannot be used with this system.

6. Computer Systems

We have one 286 computer and a dot matrix printer. The computer is used by the Wildlife biologist for data management and word processing. We received a used computer from the RO in December, but due to poor packing it was damaged during shipping and could not be repaired.

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.

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, six bicycles one four-wheeler and one tricycle for transportation on Sand Island. The Refuge also had a 16-foot inflatable Zodiac 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. In August, the Navy transferred a 16-foot Boston Whaler to the Refuge. It originally was owned by the U.S. Coast Guard at Kure Island. The vessel had been involved in a boating accident and did not have engine or counsel.

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.

The Refuge received \$14,000 from the Navy's Legacy Program for FY92 to control rats on the refuge. A plan will be developed with assistance from Animal Damage Control personnel in FY93. Actual eradication/control efforts are planned for the fall of 1994.

4. Credits

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

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