United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307

July 24, 1979

Mr. George Balazs
Hawaii Institute of Marine Biology
Kaneohe, Hawaii 96744

Dear George:

Attached is the EIS concerning Tern Island, French Frigate Shoals as you have requested.

Maurice H. Taylor
Field Supervisor
Division of Ecological Services

Attachment

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

U.S. FWS RECEIVED
JUL 20 1979
HONOLULU
Hawaii Area Office

FISHERY SERVICES
Field Sup. 7-20
BW
NH
PK
CC

NEGATIVE DECLARATION

OF

SIGNIFICANT ENVIRONMENTAL IMPACT

FOR THE

DISESTABLISHMENT OF THE LORAN-A STATION

AT

FRENCH FRIGATE SHOALS

IN THE

HAWAIIAN ISLAND CHAIN

NEGATIVE DECLARATION

OF

SIGNIFICANT ENVIRONMENTAL IMPACT

FOR THE

DISESTABLISHMENT OF THE LORAN-A STATION

AT

FRENCH FRIGATE SHOALS

IN THE

HAWAIIAN ISLAND CHAIN

The following project has been thoroughly reviewed, and it has been determined that said project will have no foreseeable significant impact on the quality of the human environment.

Description: The Coast Guard proposes to disestablish the operation of the LORAN-A station at Tern Island, French Frigate Shoals, State of Hawaii. To accomplish this the following items are required:

(1) Reassignment of eighteen enlisted men and two offficers.

(2) Removal of miscellaneous equipment, spare parts and/or other such material deemed worth recovering, as directed by Coast Guard Supply Center Brooklyn and/or Commander Fourteenth Coast Guard District.

(3) Removal of all antennas and the towers and the disposal of two small buildings as recommended by the Real Property Board of Survey. Disposal of the resulting debris, pursuant to established procedures, to meet conditions agreed to with the U. S. Fish and Wildlife Service.

(4) The securing of the remaining buildings, mechanical equipment and other improvements, as required by the appropriate regulation, so as to maintain their operability for a period of three years.

(5) Reporting all remaining improvements to the General Service Administration as excess to the needs of the Coast Guard as recommended by the Real Property Board of Survey. It has been noted in the Board of Survey that the U. S. Fish and Wildlife Service, Department of the Interior, wants the said improvements located on the land that they control.

Summary of Environment Findings:

To determine the impact on the human environment of disestablishing the LORAN-A station at French Frigate Shoals, Hawaiian Islands National Wildlife Refuge, an environmental assessment was made. The assessment for this project, which is attached, shows no significant impact on the human environment resulting from the disestablishment of this LORAN station.

Two small buildings and all of the antennas will be removed as requested by the U. S. Fish and Wildlife Service. Burnable items to be removed will be burned on site. Non-burnable items to be disposed of will be buried onsite. During "clean-up" operations, coordination with the U. S. Fish and Wildlife Service will be maintained to minimize the impacts on the wildlife habitats. The remaining facilities and equipment will be secure in "as is" condition. Upon completion, the facility will be reported to the General Service Administration as excess to the needs of the Coast Guard. The U. S. Fish and Wildlife Service has indicated that it intends to maintain a monitoring station at French Frigate Shoals and want the improvements that are located there. The reduction of facilities at French Frigate Shoals will have a beneficial impact on wildlife by providing a larger area for wildlife habitats with fewer disruptions. There is no human population to be affected at French Frigate Shoals.

The alternative to this project is to allow the continued operation of this LORAN-A station. This is contrary to the National Navigation Plan and has therefore been rejected.

Conclusion:

As a result of the above findings, the proposed project is not considered a major Federal Action which will significantly affect the quality of the human environment. This document has been prepared as required by COMDTINST 16475.1.

22 March 79
DATE

J. L. Higham
J. L. HIGHAM, LTJG, USCGR
CGRU MSO HONOLULU for the Marine
Environmental Protection Branch

DATE

G. C. SICKS, LT, USCGR
Chief, Marine Environmental
Protection Branch

DATE

J. C. GUTHRIE, CAPT, USCG
Chief, Operations Division

DATE

E. B. HOLTZMAN, CAPT, USCG
Chief, Engineering Division

DATE

M. J. JACOBS, CDR, USCG
District Legal Officer

DATE

D. F. LAUTH, RADM, USCG
District Commander

Encl: (1) Environmental Assessment

ENVIRONMENTAL ASSESSMENT

FOR THE

DISESTABLISHMENT OF THE LORAN-A STATION

AT

FRENCH FRIGATE SHOALS

IN THE

HAWAIIAN ISLAND CHAIN

UNITED STATES COAST GUARD

FOURTEENTH COAST GUARD DISTRICT

HONOLULU, HAWAII

ENVIRONMENTAL IMPACT ASSESSMENT

FOR THE

DISESTABLISHMENT OF THE LORAN-A STATION

AT

FRENCH FRIGATE SHOALS

IN THE

HAWAIIAN ISLAND CHAIN

MARCH 1979

PREPARED BY:

J. L. Higham

J. L. HIGHAM, LTJG, USCGR
CGRU MSO Honolulu
for the Marine Environmental
Protection Branch

Approved by:

G. C. SICKS, LT, USCGR
Chief, Marine Environmental
Protection Branch

J. C. GUTHRIE, CAPT, USCG
Chief, Operations Division

M. J. JACOBS, CDR, USCG
District Legal Officer

R. D. WILLIAMS, CDR, USCG
District Comptroller

Approved by:

B. G. BURNS, CAPT, USCG
Chief, Marine Safety Division

E. B. HOLTZMAN, CAPT, USCG
Chief, Engineering Division

J. F. GREENE, CDR, USCG
Chief, Personnel Division

J. F. OTRANTO, CDR, USCG
District Planning Officer

I. SUMMARY

A. INTRODUCTION

The purpose of this assessment is to evaluate whether or not the disestablishment of the LORAN-A station at Tern Island French Frigate Shoals, State of Hawaii, constitutes a major federal action which significantly affects the human environment.

B. PROJECT DESCRIPTION

The disestablishment of the LORAN-A station at French Frigate Shoals requires the following major items:

1. Reassignment of all personnel assigned there, a total of eighteen enlisted men and two officers.
2. Removal of any miscellaneous equipment, spare parts, and/or other such material deemed worth recovering as directed by Coast Guard Supply Center Brooklyn and/or Commander Fourteenth Coast Guard District.
3. Removal of all antennas and towers and two small buildings as recommended by the Real Property Board of Survey. Disposal of the resulting debris to meet conditions agreed to with the U. S. Fish and Wildlife Service.
4. The securing of all remaining buildings, mechanical equipment and other improvements, as required by the appropriate regulations, so as to maintain their operability for a period of three years.
5. Reporting all remaining improvements to the General Services Administration as excess to the needs of the Coast Guard as recommended by the Real Property Board Of Survey.

C. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

The LORAN station at French Frigate Shoals is located on Tern Island, a largely artificially constructed island contained, for the most part, within steel sheet piling. The majority of the 56 acre island is used as a runway. The North side of the island is vulnerable to heavy seas. Metal and masonry debris has been used to protect the island from erosion. On the South side, approximately one acre is occupied by buildings and 15 acres by vegetation. French Frigate Shoals is part of the Hawaiian Islands National Wildlife Refuse (enclosure 2), and is the home or breeding ground for over 2000 birds (enclosure 3). It is also an area where numerous turtles and the endangered Hawaiian monk seal are found. It has a climate similar to the rest of the Hawaiian Chain.

2. Socio-Economic Environment

Since French Frigate Shoals is part of the Hawaiian Islands National Wildlife Refuge, travel to the atoll is restricted by the U. S. Fish and Wildlife Service. Only Coast Guard personnel live on the island. Normally, the only visitors are personnel from the U. S. Fish and Wildlife Service and various wildlife researchers.

D. THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

1. Physical Environment

Two small buildings will be removed to minimize the facilities that remain and to maximize open space for bird nesting habitat in accordance with the agreement with the U. S. Fish and Wildlife Service. Items to be removed that can be safely burned will be burned on site. Other nonburnable items to be removed will be buried on site. Although this may temporarily affect the surrounding environment (i.e. increased

air pollution, noise levels, and accidental destruction of some wildlife nests and specimens) in the longterm, we are assured by the U. S. Fish and Wildlife Service that it will have a beneficial impact (i.e. improved and enlarged wildlife habitat). Over the course of many years, the steel bulkhead will continue to corrode and may fail if not maintained or periodically replaced, resulting in a possible reduction in the total island acreage. Although this can be considered a significant impact on the surrounding physical environment of Tern Island it does not significantly affect the human environment.

2. Socio-Economic Environment

Due to the lack of any socio-environment on French Frigate Shoals there can be no significant impact in that area.

E. ALTERNATIVES

The only alternative considered was that of "no project," or in other words, continued operation of this LORAN-A station. Since this is contrary to the National Navigational Plan, it has been rejected.

F. CONCLUSIONS

The disestablishment of the LORAN-A station at French Frigate Shoals will not result in any significant impact on the human environment.

II INTRODUCTION

A. PURPOSE

The purpose of this assessment is to evaluate whether or not the disestablishment of the LORAN-A station at Tern Island, French Frigate Shoals, State of Hawaii constitutes a major federal action which significantly effects the human environment.

B. BACKGROUND

LORAN-A is a marine electronic navigation system that has provided service over most of the major shipping lanes in the Northern Hemisphere since the early 1940's, at which time the Hawaiian chain LORAN-A system was established. In the late 1950's a more accurate navigation system, LORAN-C was developed. By 1961 LORAN-C service was extended to provide navigational signals over much of the same service area as the LORAN-A chain.

The National Navigation Plan designates LORAN-C as the successor to LORAN-A and directs the discontinuance of LORAN-A service. The Coast Guard has proposed to discontinue LORAN-A service within the Hawaiian Chain on 30 June 1979.

III. PROJECT DESCRIPTION

This assessment evaluates the impact of the disestablishment of the LORAN-A station at French Frigate Shoals. The cooperative agreement, which is attached as enclosure (1), between the Coast Guard and the U. S. Fish and Wildlife Service requires that upon the cessation of use of Tern Island, the Coast Guard will restore the island to a condition mutually agreed upon by both agencies. The U. S. Fish and Wildlife Service has indicated its desire to maintain a monitoring station on Tern Island and has set forth a tentative plan for what it would like removed and what it would like to remain. The following items reflect the proposed requirements of its tentative plan and summarize the major items of work involved.

1. The eighteen (18) enlisted personnel and two (2) officers will be reassigned.

2. Miscellaneous equipment, spare parts and/or other items deemed worth recovering, as directed by Coast Guard Supply Center Brooklyn and/or Commander Fourteenth Coast Guard District, will be recovered and sent to Base Honolulu or other appropriate Coast Guard units.

3. All antennas, including the 129' aluminum tower, will be taken down. The tower removal will be coordinated with the U. S. Fish and Wildlife Service, so that the effect on wildlife can be minimized. Present plans also include the removal of two small buildings, (a storage building ("Sears Building") and the beach clubhouse). All building debris, rubbish, and other materials (such as empty fuel drums, abandoned equipment, etc.) will be disposed of as requested by U. S. Fish and Wildlife. Paper, wood debris, and other burnable items not worth recovering will be burned on site. Nonburnable scrap, such as the 129' aluminum tower will be buried on site.

4. The barracks, storage building, and signal power building, along with the tennis courts (water catchment system), water storage and treatment system, sewage disposal system, incinerator, generators and fuel oil tanks will be secured, as required by the appropriate regulations, so as to maintain their operability for a period of three years.

5. All remaining facilities will then be reported to the General Services Administration as excess to the needs of the Coast Guard, as recommended by the Real Property Board of Survey.

IV DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

French Frigate Shoals is a coral atoll approximately at the midpoint of the 1600 mile long Hawaiian archipelago as shown in Figure #1. The atoll consists of a crescent-shaped reef with 13 small named islands as shown in Figure #2. The Coast Guard LORAN station occupies the entire area of Tern Island at 25° 52'N, 166° 18'W, as shown in Figure #3. The Coast Guard has use of the land through a 1967 permit from the Bureau of Sport Fisheries and Wildlife, (now the U. S. Fish and Wildlife Service) of the Department of the Interior.

Tern Island is an artificial island constructed in 1942 on the site and general orientation of a small (about 10 acre) sand bar or island. The principle feature is a large steel sheet pile bulkhead enclosing a dredged and compacted coral runway 350 feet wide and 3100 feet long. The bulkhead and runway elevations are approximately four feet above mean sea level. Beaches have formed against the barrier of the bulkhead and vegetation has covered much of the accreted sand. The total area of the runway is approximately 25 acres. Buildings cover about one acre, and about 15 acres are covered by vegetation.

The climate of French Frigate Shoals is marine and tropical in nature. The mean annual temperature is 75°F with range from about 65° to 85°. The mean annual precipitation is approximately 45 inches/year with most rainfall occuring from December through March. The predominant wind averages 12 knots from the Northeast. During periods of "kona" weather, generally occurring from December through March, southerly winds frequently occur.

As many as 37 varieties of vascular plants have been recorded as occurring on Tern Island at one time or another, most have been introduced by man. Currently only 18 of these species are found in any

significant quan y on the island. Of those, Be i Heeliatrop, pluchea and iron wood trees are the most dominant. Vegetation is limited to the areas on either side of the airstrip.

As many as 39 species of birds have been recorded as occurring on Tern Island at one time or another. Of these, the most numerous are the Laysan Albatross, Bonin Petrel, Sooty Tern, Red-Tailed Tropicbird and the Red-footed Booby. The bird population of Tern Island was recently surveyed to be in the order of 2000 birds (1,586 breeders and 480 nonbreeders). This is a relatively low density when compared to the densities on the other major uninhabited islands of the French Frigate Shoals. Other fauna found on Tern Island consists of a variety of insects, the Mourning Gecko, the Green Sea Turtle, and the Hawaiian Monk Seal.

The Coast Guard LORAN Station has three (3) major buildings, as follows: (1) Barracks and Galley Building, (2) Signal power Building, and (3) Storage Building and Shop complex. In addition there are three other small buildings (Sears Building, Beach Clubhouse and Boathouse), five large fuel oil tanks, a fuel dump, an incinerator, a water catchment system (tennis court), water storage tanks and treatment system, a sewage treatment system a coralpacked 3100 ft. runway, two small guyed antennas, one larger 129' guyed antenna and various other abandoned building floor slabs and old equipment. There is a large buried utility system throughout the island, including empty aviation fuel tanks which are left over from W. W. II.

B. Socio-Economic Environment

Tern Island is administered by the Coast Guard by permit from the U. S. Fish and Wildlife Service. The LORAN station is a self-contained unit for the 18 enlisted men and two officers assigned there.

All supplies are obtained through the Coast Guard Base Honolulu and delivered either by buoy tender or by air. Travel to French Frigate Shoals is restricted because it is part of the Hawaiian Islands Natioanl Wildlife Refuge set aside by Executive Order No. 1019, dated 3 February 1909. Therefore, the only other personnel allowed on the island are members of the U. S. Fish and Wildlife Service, or other authorized persons who may make occassional research field trips.

V. THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

A. PHYSICAL ENVIRONMENT

When this station is disestablished, two small unessential buildings will be removed, all antennas taken down and disposed of, some equipment removed and as much debris and rubbish removed as is practicable. Any concrete debris that must be disposed of can be used for shoreline protection, particularly along the damaged bulkhead. The two small buildings to be removed will be knocked down. Wood and paper debris and other burnable items to be removed will be burned onsite during weather conditions which will minimize the effect of the smoke on the wildlife. The scrap metal from the antenna tower and the small metal building to be removed, along with other debris which cannot be burned will be buried onsite to minimize dangers to birds and provide them with the maximum useable habitat. All unused portions of the island will be cleaned up and restored to a condition suitable for use as a bird habitat.

Of great concern is the affect this general "clean-up" will have on the bird nesting areas. Therefore, efforts will be made to protect the birds and their habitat. "Clean-up" work will be done in such a manner to minimize the number of birds affected by the work. The 129' aluminum tower will be removed in such a manner to minimize

damage to the area currently used as a bird habitat.

During the clean-up work there will be some short term adverse impacts on the bird habitats. These will be minimized as outlined in this section. The long term effect will be to provide a larger, more undisturbed area for the bird habitats which will result in a beneficial impact.

There is also a radio beacon transmitted by the LORAN station. It is used primarily as a "homing" beacon for aircraft destined for the station. It is turned on only upon request and is not considered to be vital for navigation.

B. Socio-Economic Environment

There is no significant socio-economic environment at French Frigate Shoals other than that provided by the CG men assigned there. Therefore, there will be no significant socio-economic environment remaining at French Frigate Shoals to be affected by the disestablishment of this LORAN station.

VI. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

During the "clean-up" period when the towers, two small buildings, junk piles and other excess equipment are being removed there will be some inevitable adverse impact to the wildlife, most specifically to the various species of birds, on the island. This will be short term effect and will be minimized by personnel involved in the "clean-up" being instructed to protect wildlife and their nests whenever possible. Once the clean-up is completed no further adverse impacts are expected to occur.

VII. ALTERNATIVES TO THE PROPOSED ACTION

The only alternative considered was that of "no project". This would mean the continued operation of the LORAN-A station at French Frigate Shoals.

Continued operation of this LORAN-A station is not required on the basis of its primary mission, (i.e. to provide a navigational system) and is contrary to the National Navigational Plan. Since it has been shown that the disestablishment would not result in any significant environmental impact, the continued operation of this station would not serve any environmental purpose. Therefore, this alternative was rejected.

VIII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Originally Tern Island was a small sand bar with little vegetation which did not afford much protection for wildlife. The U. S. Navy then enlarged the sand bar by dredging the lagoon, filling in the island and building a steel pile bulkhead around it for protection against erosion. The main purpose for these improvements was to make it large enough to serve as an airstrip during the war. Little vegetation or protection was provided for wildlife. As time passed vegetation grew, and wildlife flourished. However, the main purpose of the island was still and airstrip. Now the island is being returned to an almost "unmanned" island. This will enhance the use of the island as a wildlife refuge. The long-term productivity depends upon the future use of the island by the U. S. Fish and Wildlife Service. To some extent future uses of the island will also depend upon the life span of the existing steel sheet pile bulkhead, which protects the island from erosion.

IX. ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES THAT WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

There will be an irretrievable commitment of money, energy and manpower to accomplish the "clean-up" of Tern Island. However, the island and the majority of the facilities located there will remain and could be used for whatever need there may be in the future.

X. CONCLUSIONS

The disestablishment of the LORAN-A station at French Frigate Shoals will not result in any significant impact on the human environment.

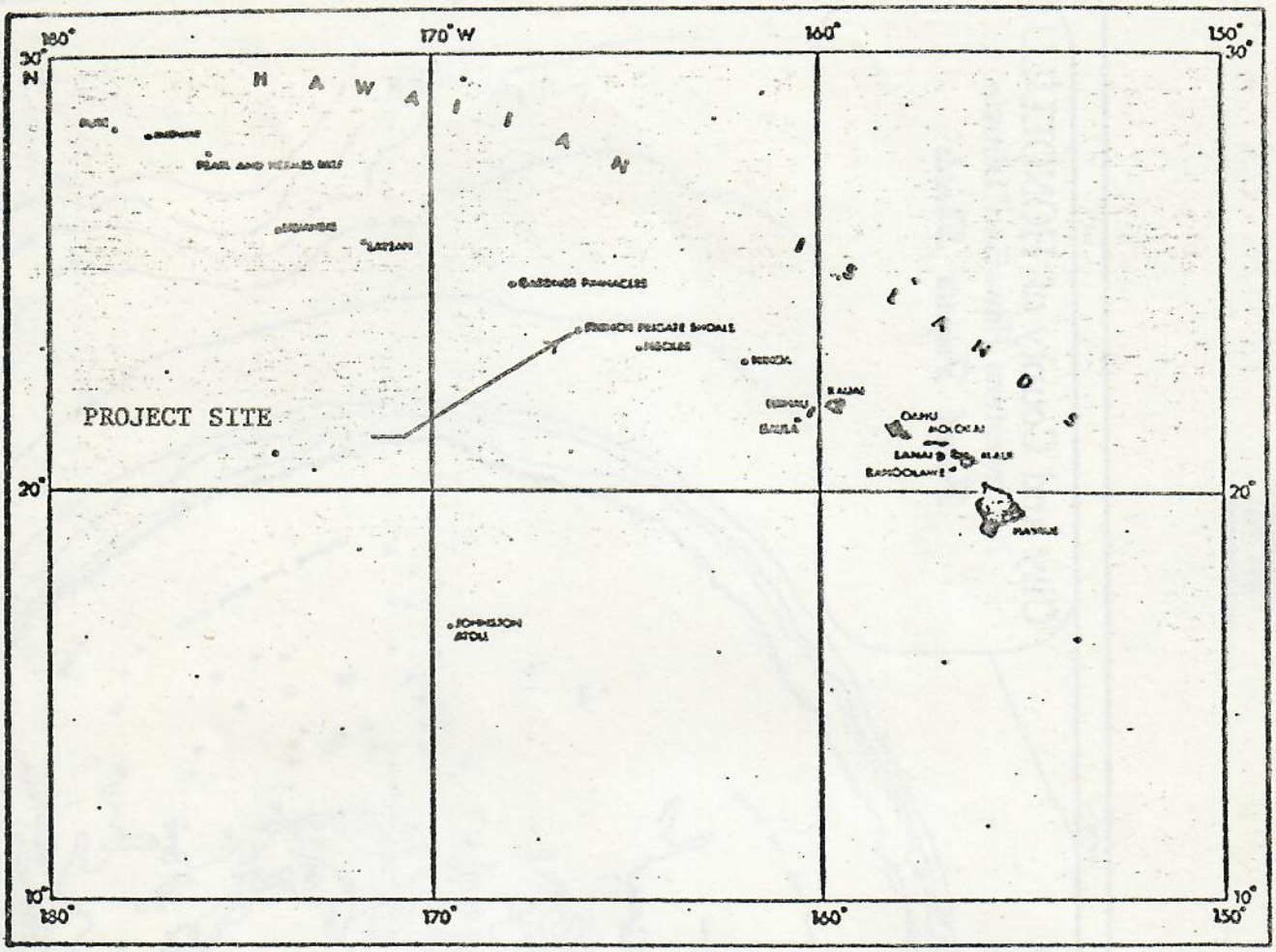


Figure 1. The Hawaiian Islands.

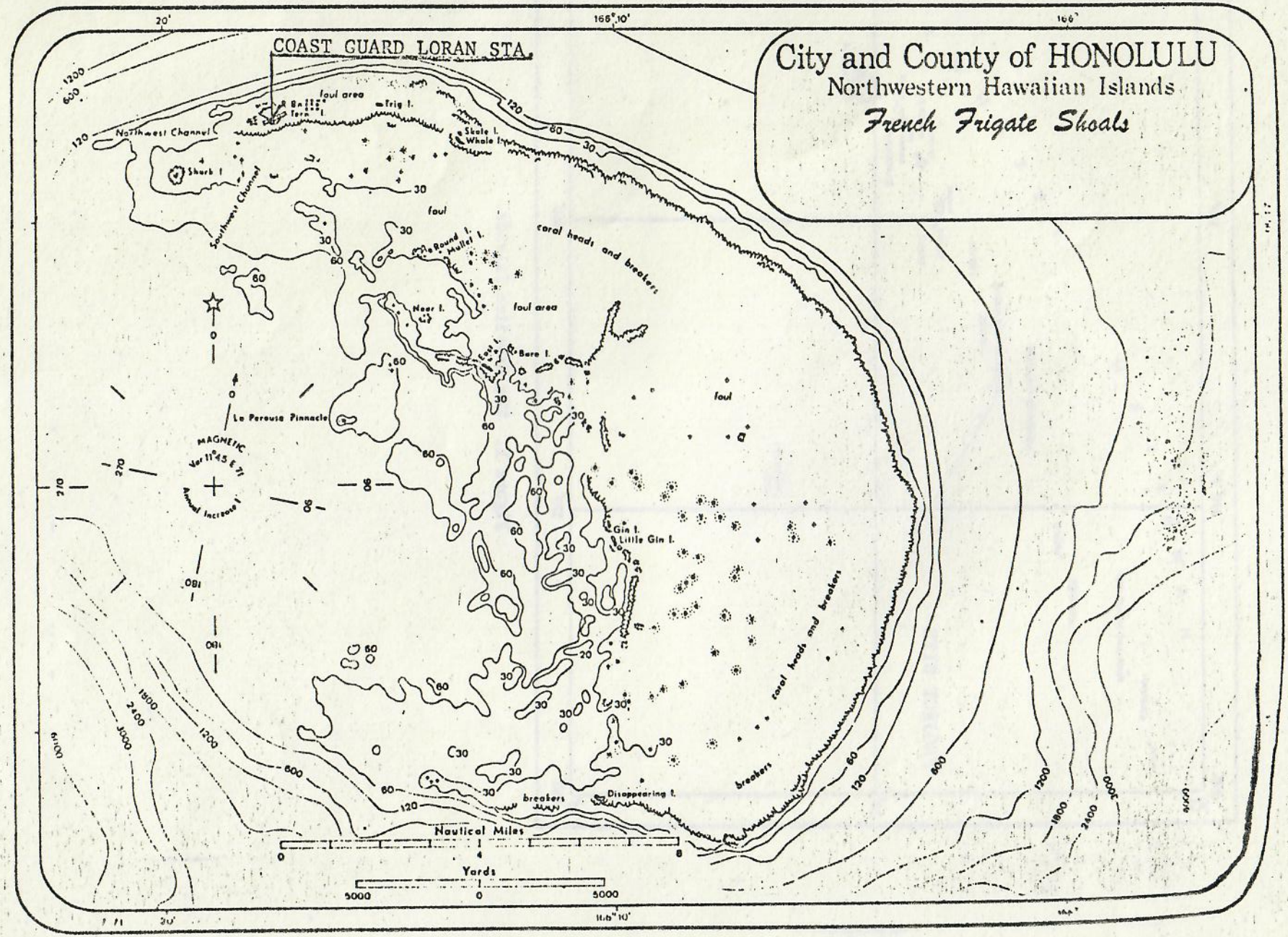
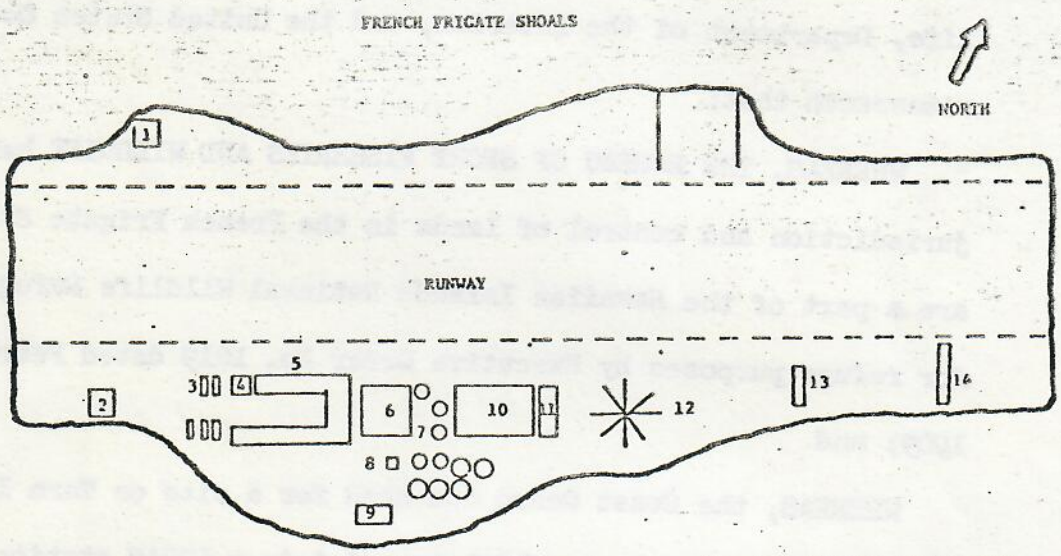

COAST GUARD LORAN STA.
City and County of HONOLULU
Northwestern Hawaiian Islands
French Frigate Shoals
Northwest Channel
Southwest Channel
foul area
Trig I.
Shark I.
State I.
Whale I.
foul
coral heads and breakers
Round I.
Mullet I.
Noer I.
Bare I.
La Perouse Pinnacle
MAGNETIC
Var 11°45 E 21
Annual Increase 1
Gin I.
Little Gin I.
breakers
Disappearing I.
Nautical Miles
Yards
5000
0
5000

FIGURE 2



1. University of Hawaii
2. Boat House
3. Fuel Oil Storage Tanks
4. Garage
5. Barracks-Subsistence Bldg
6. Recreation Court
7. Fresh Water Tanks
8. Pump House
9. Playboy Club
10. Signal Power Bldg
11. Old Signal-Power Building
12. Loran-A Transmitting Antenna
13. Storage Building
14. Gasoline Storage Area

TERN ISLAND

FRENCH FRIGATE SHOALS

FIGURE 3

COOPERATIVE AGREEMENT

BETWEEN

BUREAU OF SPORT FISHERIES AND WILDLIFE

AND

THE UNITED STATES COAST GUARD

THIS AGREEMENT, made and entered into this first day of March, 1967, between the Bureau of Sport Fisheries and Wildlife, Department of the Interior, and the United States Coast Guard, witnesseth that:

WHEREAS, THE BUREAU OF SPORT FISHERIES AND WILDLIFE has sole jurisdiction and control of lands in the French Frigate Shoals which are a part of the Hawaiian Islands National Wildlife Refuge set aside for refuge purposes by Executive Order No. 1019 dated February 3, 1909; and

WHEREAS, the Coast Guard has need for a site on Tern Island of French Frigate Shoals on which to maintain a LORAN station,

NOW, THEREFORE, it is mutually understood and agreed by and between the parties hereto that the Bureau of Sport Fisheries and Wildlife hereby grants permission to the Coast Guard to use and occupy the aforesaid Tern Island for a Loran or other aids to navigation, effective on acceptance hereof by the United States Coast Guard, under the following provisions and conditions:

1. The use of Tern Island shall be limited to the operation of Loran and other aids to navigation and the improvement or enlargement

of these facilities as deemed necessary by the Coast Guard, with the right of ingress and egress thereto.

2. This agreement shall terminate 20 years after effective date, or after six months non-use, and may be terminated on 30 days written notice by the Coast Guard. This permit may be extended by mutual agreement by the parties hereto.

3. Upon cessation of the use, the Coast Guard will promptly notify the Bureau and remove such improvements as mutually agreed upon. The Coast Guard may remove all structures or other property placed on the island by that agency and restore the site to its original condition or to a condition satisfactory to the Bureau.

4. Permission to use Tern Island by other agencies or persons will be granted only with the mutual consent of both the Bureau and the Coast Guard.

IN WITNESS WHEREOF, the Bureau of Sport Fisheries and Wildlife and the United States Coast Guard have through their respective officials hereinafter affixed their signatures.

U. S. DEPARTMENT OF THE INTERIOR
Bureau of Sport Fisheries and Wildlife

Date: FEB 2 1 1967

Regional Director

UNITED STATES COAST GUARD

Date: MAR 1 1967

E. P. CHESTER, JR.
Chief of Staff

Executive Order

It is hereby ordered that the following islets and reefs, namely: Cure Island, Pearl and Hermes Reef, Lysianski or Pell Island, Laysan Island, Mary Reef, Dowsetts Reef, Gardiner Island, Two Brothers Reef, French Frigate Shoal, Necker Island, Frost Shoal and Bird Island, situated in the Pacific Ocean at and near the extreme western extension of the Hawaiian archipelago between latitudes twenty-three degrees and twenty-nine degrees north, and longitudes one hundred and sixty degrees and one hundred and eighty degrees west from Greenwich, and located within the area segregated by the broken lines shown upon the diagram hereto attached and made a part of this order, are hereby reserved and set apart, subject to valid existing rights, for the use of the Department of Agriculture as a preserve and breeding ground for native birds. It is unlawful for any person to hunt, trap, capture, wilfully disturb, or kill any bird of any kind whatever, or take the eggs of such birds within the limits of this reservation except under such rules and regulations as may be prescribed from time to time by the Secretary of Agriculture. Warning is expressly given to all persons not to commit any of the acts herein enumerated and which are prohibited by law.

This reservation to be known as the Hawaiian Islands Reservation.

THEODORE ROOSEVELT

THE WHITE HOUSE,
February 3, 1909.

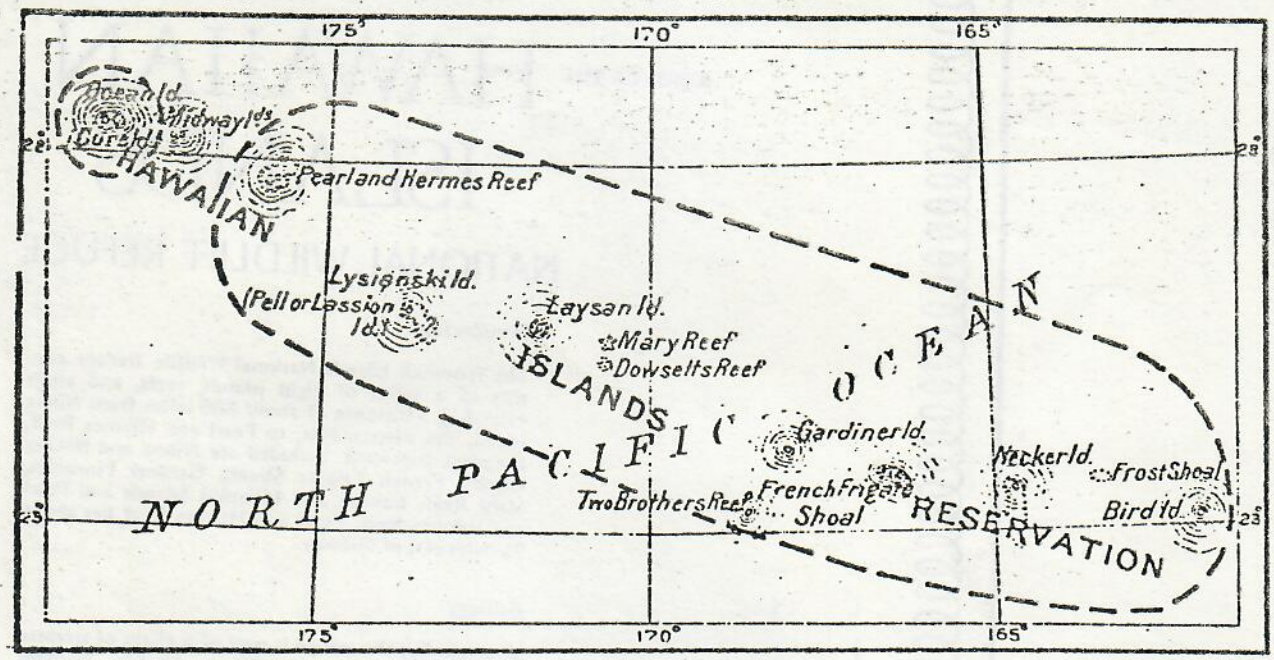
[No. 1019.]

HAWAIIAN ISLANDS RESERVATION

For Protection of Native Birds

TERRITORY OF HAWAII

Embracing the islets and reefs segregated by the broken lines and designated "Hawaiian Islands Reservation"



DEPARTMENT OF THE INTERIOR

GENERAL LAND OFFICE

Fred Dennett, Commissioner

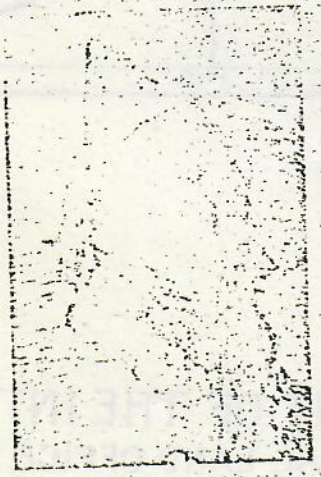
BIRDS OF THE

HAWAIIAN ISLANDS

NATIONAL WILDLIFE REFUGE

Introduction

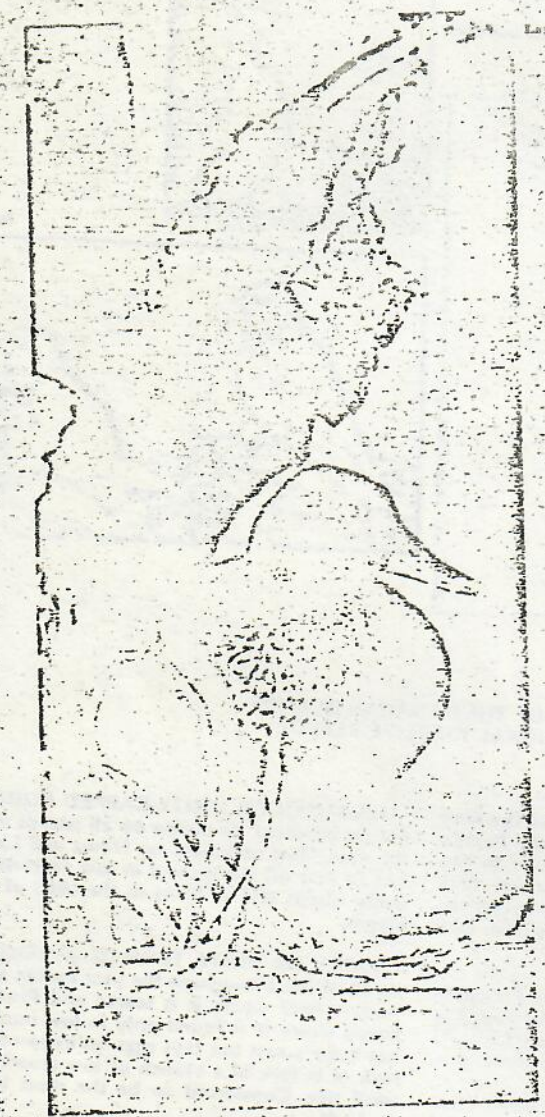
The Hawaiian Islands National Wildlife Refuge consists of a series of eight islands, reefs, and atolls extending a distance of about 800 miles from Nihoa Island, the easternmost, to Pearl and Hermes Reef, the most westward. Included are Nihoa and Necker Islands, French Frigate Shoals, Gardner Pinnacles, Maro Reef, Laysan and Lisianski Islands and Pearl and Hermes Reef. Pearl and Hermes Reef lies about 95 miles east of Midway.



Geology

Geologically, the refuge is part of a chain of tremendous underwater peaks. Nihoa, Necker, Gardner Pinnacles and La Perouse Pinnacle at French Frigate Shoals are the cores of the old volcanic cones. Absence of beaches and sheer cliffs of basalt, dropping into the ocean, are typical of these islands. Laysan and Lisianski Islands are low, flat sandy islands surrounded by submerged coral reefs. French Frigate Shoals and Pearl and Hermes Reef are typical Pacific atolls. Maro Reef has only one small rock protruding a few feet above the surface of the ocean. Pearl and Hermes Reef is a circular atoll almost 47 miles in circumference. Located within its fringing reef are seven small sandy islands. French Frigate Shoals is a crescent-shaped atoll with a lagoon containing eight similar islands. Laysan, comprising some 1,100 acres, is the largest of the refuge islands.

ENCLOSURE (3)



Climate

The climate is mild with temperatures seldom reaching as high as 90 or lower than 50 degrees Fahrenheit. Precipitation varies between 26 and 29 inches per year. Occasionally, however, severe Pacific storms with waves of over 30 feet buffet the islands. Although these storms do not affect the rocky islands greatly, the low, sandy islands may suffer considerable damage from erosion and the loss of vegetation, undoubtedly with adverse effects on nesting populations of sea birds.

Bird Life

Most of the species of birds which utilize the refuge are pelagic seabirds, and this is the only national wildlife refuge in the nation where most of these species nest.

Located near the center of the North Pacific Ocean the refuge islands are visited by many species of birds considered as stragglers. Several Asiatic species are listed in the appended list of accidentals.

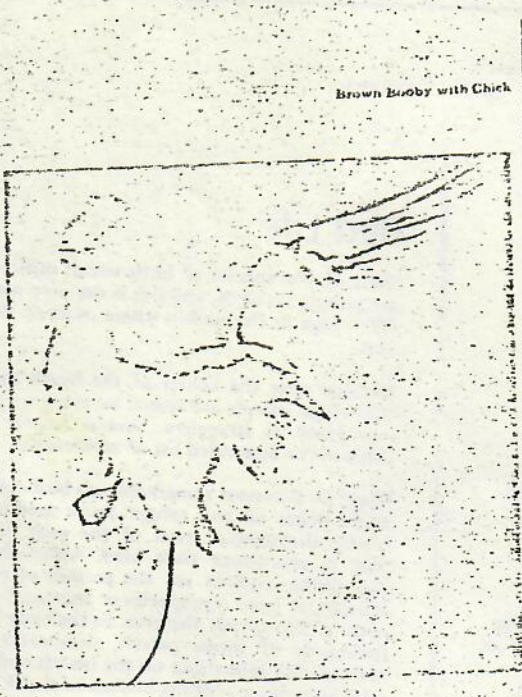
Some of the most remarkable sea bird colonies in the world occur on this refuge. Some species utilize the islands throughout most of the year. Others come only to reproduce their kind. Although the winter and spring months are the periods of peak nesting activity, at least one species or another may be found nesting throughout the year. In the early spring many thousands of terns, petrels, shearwaters and other such species join those on the islands and the air over each becomes a whirling bedlam of shrieking birds.

These bird populations are extremely difficult to estimate because many nest in burrows which honeycomb the islands. Populations are increased manifold by birds which return at night to roost on the islands after having spent the day at sea searching for food.

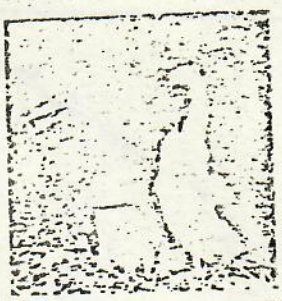
The refuge is home to four kinds of birds found nowhere else in the world. These are the Nihoa Millerbird and Nihoa Finch which are restricted to Nihoa Island, and the Laysan Teal and Laysan Finch which are confined to Laysan Island. A small population of the latter species exists now also on Southeast Island at Pearl and Hermes Reef as a result of an experimental transplant of a few from Laysan Island. Because of man's interference with nature on Laysan Island many years ago, three species of birds endemic only to that island became extinct. These were the Laysan millerbird, honeycreeper and rail.

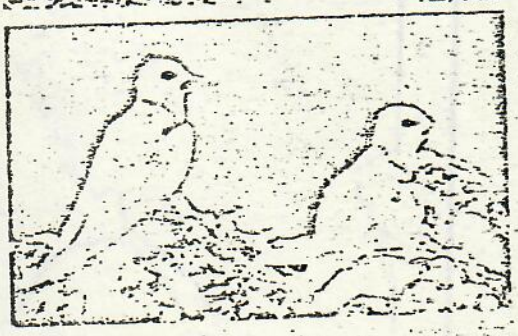
The precarious status of the birds, fragile ecology of these small islands which can be easily upset by too much human activity, and the dangerous landing conditions to be encountered, preclude general public use. All major units of the refuge have been designated as national research natural areas, and at present only scientists on approved research projects are permitted entry.

Refuge headquarters is located at 337 Uluniu Street, Kailua, Hawaii 96734. Inquiry about the bird life on the refuge, including accidentals, may be directed to that office.



Brown Booby with Chick





Fairy Terns

BIRDS OF THE HAWAIIAN ISLANDS NATIONAL WILDLIFE REFUGE

SOOTY TERN *(Sterna fuscata)* One of the most abundant species on all the refuge islands. Populations on Laysan may number between one to two million. Absent during late fall and early winter. Peak of nesting during the spring. Nests in dense colonies with some nests being less than 6 inches from each other.

GRAY-BACKED TERN *(Sterna lunata)* Present in large numbers on all islands most of the year, but scarce in the fall. Most abundant on Laysan, Lisianski and Nihoa. Much less abundant than the sooty tern.

BLUE-GRAY NODDY TERN *(Procelsterna cerulea)* A resident in the high hundreds on Nihoa and Necker. Has been recorded on Gardner Pinnacles and Lisianski. More common in the spring. Nests in holes and crevices in the cliffs. The smallest of all the terns found on the refuge.

COMMON OR BROWN NODDY TERN *(Anous stolidus)* Abundant on all refuge islands throughout most of the year, especially in the summer. Highest concentrations on Nihoa, Necker and Laysan. Nests on the ground on all islands.

HAWAIIAN OR WHITE-CAPPED NODDY TERN *(Anous minutus)* Common on all islands throughout the year. Most abundant on Nihoa and Laysan. Prefers to nest off the ground in low vegetation on the sandy islands and in holes in the cliffs of the rocky islands.

FAIRY OR WHITE TERN *(Gygis alba)* Common on all islands throughout the year except at Pearl and Hermes Reef where it is scarce and French Frigate Shoals where it is found only in low numbers. Does not build a nest but lays eggs on exposed surface of rock or in fork of a branch of low growing brush or small tree. Considered to be the most beautiful of sea birds.

BLACK-FOOTED ALBATROSS *(Diomedea nigripes)* Abundant on all islands during the nesting season from early November to early July. Usually absent from August to late October. Most roam the north Pacific for the first 4-5 years of their life before returning to land to pair and eventually nest which usually is in their seventh year. Most abundant on Laysan where populations may reach 50,000. Preferred nesting areas are the beaches of these islands.

BLUE-FACED BOOBY *(Sula dactylatra)* The largest of the three species of boobies found on the refuge, this species is common to all islands. It is most abundant on Laysan and Lisianski. Nesting may occur throughout most of the year but takes place mainly between February and April. The outer beaches of the low sandy islands and the exposed ridges of the high rocky islands are preferred nesting sites. Males have a high pitched squeak, while females possess a hoarse squawk.

BROWN BOOBY *(Sula leucogaster)* Found in low numbers on most of the refuge islands. Most common on Southeast Island at Pearl and Hermes Reef — less than 100 pair. The wariest and smallest of the three booby species. Usually lays two eggs in the nest which is placed on the ground.

RED-FOOTED BOOBY *(Sula rubripes)* Nests throughout most of the year on all islands, although the peak occurs during the spring. Almost non-existent in the early fall. Most abundant on Nihoa, Necker, Laysan and Lisianski. Several thousand nesting pairs occur on Nihoa. Nests usually contain but one egg and are constructed in low vegetation off the ground.

FRIGATE BIRD *(Fregata minor)* Present throughout the year on all islands although some wandering may take place. Most abundant on Nihoa where populations may be in the mid-thousands. Somewhat less abundant on Laysan, Lisianski and Necker. Frequently observed soaring on wide-spread wings high above the islands. Robs other birds of their freshly taken fish.

LAYSAN TEAL *(Anas laysanensis)* Endemic to Laysan Island. Although the population was once down to 7 birds, it has since recovered. Populations have fluctuated in recent years from 100 to 600 from unknown causes. Primary source of food are the brine flies which coat the shores of the saline interior lagoon.

AMERICAN WIDGEON *(Mareca americana)* A regular straggler each fall and winter at Laysan. Populations usually number less than 10.

SHOVELER *(Spatula clypeata)* Regular winter visitor at Laysan. Usually found in very low numbers.

PINTAIL *(Anas acuta)* Regular visitor at Laysan. Usually found in very low numbers.

SHARP-TAILED SANDPIPER *(Erolia acuminata)* A straggler in low numbers. Most commonly observed around the lagoon at Laysan.

SANDERLING *(Crocethia alba)* Uncommon in low numbers on Laysan. Occasionally found on the other sandy islands.

WANDERING TATTLER *(Heteroscelus incanum)* Scattered invididuals found throughout the year on all islands, except Laysan, where they are common.

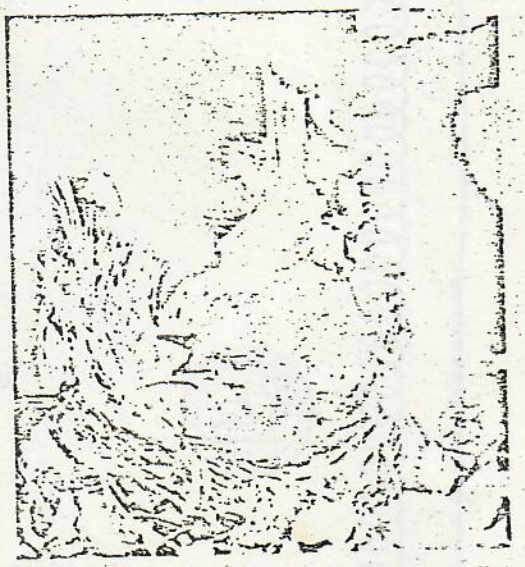
BRISTLE-THIGHED CURLEW *(Numenius tahitiensis)* Found on all islands during fall, winter and spring in very low numbers. Most common on Laysan and Lisianski. Uncommon on the high islands of Nihoa and Necker.

GOLDEN PLOVER *(Pluvialis dominica)* Present during fall, winter and spring on all islands in low numbers. Most abundant on Laysan where 900 may occur during these seasons.

LAYSAN FINCH *(Psittirostra cantans)* Endemic to Laysan Island. During recent years populations have varied from 7,000 to 11,000 birds. A member of the unique family of Hawaiian honeycreepers *(Dreponiidae)*. A small population now exists on Southeast Island, Pearl and Hermes Reef as a result of a transplant from Laysan.

NIHOA FINCH *(Psittirostra ultima)* Endemic to Nihoa Island. During recent years, populations have varied from 2,300 to 5,000 birds. Considered by some ornithologists to be a race of the Laysan finch.

NIHOA MILLERBIRD *(Acrocephalus kingii)* This old world warbler is endemic to Nihoa Island. During recent years populations have varied between 300 and 600. It was unknown to science until 1923 when a scientific expedition to that island discovered it. The first recorded nest was found in 1962.



Nihoa Millerbird on Nest

LIST OF ACCIDENTALS

(Those birds which have been recorded no more than 5 times)

Horned Puffin
Black-legged Kittiwake
Northern Fulmar
Glaucous Gull
Glaucous-winged Gull
Western Gull
Herring Gull
Ring-billed Gull
Franklin's Gull
Bonaparte's Gull
Sooty Shearwater
Herald Petrel
Murphy's Petrel
Red-billed Tropicbird
Pelagic Cormorant
Mallard
Gadwall
Green-winged Teal
Bufflehead
Harlequin Duck
American Coot
Red Phalarope
Northern Phalarope
Common Snipe
Knot
Pectoral Sandpiper
Dunlin
Semipalmated Sandpiper
Ruff
Marbled Godwit
Bar-tailed Godwit
Greater Yellowlegs
Lesser Yellowlegs
Semi-palmated Plover
Black-bellied Plover
Short-eared Owl
Peregrine Falcon
Mockingbird

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

R.L. 211 K-1 7/21/71