

HAWAIIAN ISLANDS NWR  
NARRATIVE REPORT YEAR - 1967

Wildlife Administrator, Hawaiian Islands  
Refuge, Kailua, Oahu, Hawaii

April 15, 1968

Regional Supervisor, Division of  
Wildlife Refuges, Portland, Oregon

Narrative report

We were obviously pleased to receive a copy of your first narrative report which was submitted last month. The format is satisfactory, although we feel that in addition to being a trip report the narrative should relate public relations activities relating to the refuge which you have performed in Honolulu. There may be other refuge activities also which are worthy of reporting and which did not actually involve a trip to the refuge.

We wondered if you had forgotten that narrative reports are now prepared on an annual basis rather than three times a year as was the case several years back.

We regret your report that Canada fleabane has become well established on Laysan Island. This is the regrettable part of allowing outsiders to visit the refuge, especially the military. We sincerely hope that military activities will not continue as in the past.

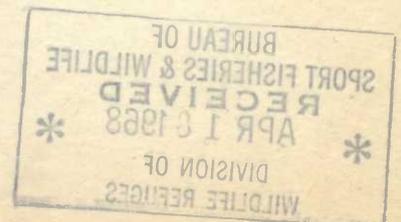
It is realized that a report of this type entails considerable effort. We do not know how to avoid this in view of the fact that most of the report contents are of scientific value. Without including this information, the trips to the refuge would have little value other than patrol. You did an excellent job of documenting the scientific findings and the supplements provided by Smithsonian are also a valuable part of the report.

It does not appear that NR forms would be applicable to this refuge.

Original signed by  
VERNON EKEDAHL

Vernon Ekedahl

cc:  
Central Office (RF)



CENTRAL OFFICE (RF)

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It does not appear that MR forms would be applicable to this refuge.

Original signed by  
VERNON BRADSHAW  
Vernon Bradshaw

BUREAU OF  
SPORT FISHERIES & WILDLIFE  
RECEIVED  
APR 18 1968  
DIVISION OF  
WILDLIFE REFUGES

cc: Central Office (11)

CENTRAL OFFICE (11)

KURE  
ISLAND  
MIDWAY  
ISLANDS

PEARL AND  
HERMES REEF

LISIANSKI  
ISLAND  
LAYSAN  
ISLAND

GARDNER  
PINNACLES

TERN  
ISLAND

FRENCH  
FRIGATE  
SHOALS

NECKER  
ISLAND

NIHOA  
ISLAND

HONOLULU OAHU

HAWAII

SCALE 0 50 100 150 200 250 MILES

HAWAIIAN ISLANDS  
NATIONAL WILDLIFE REFUGE

REFUGE ISLANDS UNDERSCORED

Hawaiian Islands National Wildlife Refuge

Kailua, Hawaii

Narrative Report

September 1 - December 31, 1967

Hawaiian Islands National Wildlife Refuge

Kailua, Hawaii

Narrative Report

September 1 - December 31, 1967

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Hawaiian Islands National Wildlife Refuge  
Kailua, Hawaii

Narrative Report for the Period September 1 to December 31, 1967

Roster of Permanent Personnel

Eugene Kridler . . . . .Refuge Manager

Roster of Cooperative Personnel

Robert Ballou . . . . . Wildlife Biologist  
John L. Sincock . . . . . Wildlife Biologist  
Ronald L. Walker . . . . . Wildlife Biologist

PREFACE

This report covers two separate trips made to the refuge. The first was made during the period September 10 through October 4, 1967. The second was taken during the period December 7 through December 21, 1967.

The September trip was the regular semiannual inspection-patrol trip taken each fall in conjunction with the regular aids-to-navigation voyage made by a U.S. Coast Guard buoy tender to French Frigate Shoals, Midway, Kure, and Johnson Islands. This agency has been extremely cooperative in providing logistic support for Bureau field parties to various islands of the refuge enroute. This occasions landing the field parties on islands, anchoring offshore for one to as much as four days until the party completes its work, then taking them off the island and proceeding to the next island or atoll where the process is repeated until as many of the refuge units are visited as time or surf allows. The Bureau party debarks at Midway and from here returns to Honolulu via Military Airlift Command aircraft.

Transportation this trip was aboard the U.S.C.G.C. BUTTONWOOD with Lt. Cmdr. Henry A. Haugen commanding.

The Bureau party consisted of the refuge manager, Robert Ballou, John L. Sincock, and Ronald L. Walker. Ballou is the Chief of the Section of Wildlife Biology for the Division of Wildlife Refuges, Washington, D.C.. The purpose for his travel was inspection and orientation. Sincock is a wildlife research biologist assigned in Hawaii to the rare and endangered wildlife species program for the Division of Wildlife Research. The refuge is within his scope of operations. This was also an orientation trip for him. Walker is a supervisory wildlife biologist for the Hawaii Division of Fish and Game, Honolulu. The Bureau has a contract with the Division to furnish one biologist as an assistant to the refuge manager on each trip to the refuge. Walker has made a number of such trips.

The trip itinerary was as follows:

<u>Area</u>	<u>Arrive</u>	<u>Depart</u>
Honolulu		September 10
Nihoa Island	September 13	September 14
Necker Island	September 15	September 15
French Frigate Shoals	September 16	September 19
Gardiner Pinnacles	September 20	September 20
Laysan Island	September 21	September 24
Lisianski Island	September 25	September 26
Pearl and Hermes Reef	September 27	September 29
Midway Atoll	September 30	October 4
Honolulu	October 4	

The December trip was a special trip made by the Coast Guard at the request of the Department of Defense. The purpose was of a classified nature. Permission to land upon the islands was received by Defense from the Director of the Bureau. The refuge manager accompanied the Coast Guard to insure compliance with Bureau regulations and restrictions and to provide technical assistance. The manager flew from Barbers Point Coast Guard Station, Honolulu via Coast Guard aircraft to Tern Island, French Frigate Shoals where the Coast Guard has a LORAN installation. Several days later the U.S.C.G.C. IRONWOOD, under the command of Lt. Cmdr. Robert Nielsen, arrived at French Frigate Shoals. From here the vessel proceeded to Laysan and Lisianski Islands thence returned to Sand Island Coast Guard Base, Sand Island, Honolulu, Hawaii.

The trip itinerary was as follows:

<u>Area</u>	<u>Arrive</u>	<u>Depart</u>
Honolulu		December 7
French Frigate Shoals	December 7	December 11
Laysan Island	December 13	December 13
Lisianski Island	December 14	December 19
Honolulu	December 21	

No actual landing was made on Lisianski Island because of gales, mountainous waves, and tremendous rollers.

September 10 through October 4, 1967

NIHOA ISLAND

## I. General

A. Weather Conditions.

Heavy south swells and a brisk southeast wind resulted in surf conditions too hazardous for a landing. On the next day the surf had moderated only slightly, but a landing via rubber raft was effected on the rock shelf at a point about 200 yards east of the base of East Palm Canyon. During the night hard rains fell. The following day the surf had worsened some, but the party was able to get off the island late that afternoon as planned without incident.

B. Habitat Conditions.

1. Water. The island looked rather dry the first day although there still were a number of seeps and small pools of standing water in protected places under the rocks in East Palm Canyon and at various places under the cliffs which rise above the rock ledge fringing the south shoreline. Nihoa finch were noted drinking from and bathing in them on a number of occasions.
2. Cover. In general the vegetation looked dry. Much of the Sida fallax in the upper slopes of East Palm Canyon appeared very dry and had no leaves. This may be normal for this time of the year. Cover appeared to be adequate.

## II WILDLIFE

A. Migratory Birds.

1. Seabirds. Time was too short to permit but a cursory examination of populations of these birds present. Efforts were spent instead running transects for estimating populations of the finch and millerbird. The following seabird observations were made:

Gray-backed Terns. No estimate made. They were common, especially at night, in the canyons. Most young seen were almost capable of flight.

Sooty Terns. A few adults, less than 25, and some flying immatures were observed overhead. Well over 99% of the populations present during the spring and summer were gone.

Common Noddy Terns. No estimate made. Common all over the island. Eggs to flying young were present, but most were in the downy chick stage.

Hawaiian Noddy Tern. Almost all of these birds frequent the innumerable holes in the sheer north face of the island. It is all but impossible to estimate numbers because of inaccessibility, but by rolling stones down the cliff, their presence can be checked. High hundreds, at least.

Blue-Gray Noddy. Common along the cliff faces. No eggs or chicks were observed although a number of accessible holes were checked where adults were roosting. Hundreds.

Fairy Tern. Common along the sheer north cliff face. One was noted incubating an egg. Hundreds.

Albatrosses. None seen.

Wedge-tailed Shearwater. Many thousands were present all over the island. Numbers increased tremendously at night as birds which had been out to sea fishing returned to the island to roost. About 5:00 a.m. we were awakened by the calling and caterwauling of thousands of these birds which blended into a low steady roar. It was a phenomenal experience. We never had heard it before even on Laysan Island where they are also present in the thousands during this time. Most of the chicks were in the large downy stage with many beginning to acquire primaries. No attempt was made to estimate numbers.

Christmas Island Shearwater. Probably about 10 adults. These were found near the top of Miller Peak. A almost fully feathered chick with a small amount of down on the neck was found on the west ridge of Miller Peak.

Bulwer's Petrel. Not very common. During the summer of 1966 (July) an estimated 250,000 were using the island for nesting. This trip we pulled 5-6 out of shallow holes in rocks covered with vegetation. Undoubtedly there were more, but no search was made. A few half-feathered young were found, but apparently most young had reached flight stage and left. During the night, a dead adult found at the top of East Palm Canyon had 35 cockroaches feeding on it.

Blue-faced Booby. Common. No estimate hazarded. Young with some down were present on Miller Flat.

Brown Booby. At least 100 were seen flying about, half of which were immatures. No nests noted.

Red-footed Booby. Abundant. Several thousand at least. No estimate made. Many chicks were noted in just about all growth stages.

Frigatebirds. No count made. At least 4-5 thousand. Many immatures flying. A few downy chicks were still present. These were present at the head of the several canyons.

Red-tailed Tropicbird. No count made. Common. Mostly adults. A few very large chicks were noted.

Bristle-thighed Curlew. Only one seen.

Golden Plover. About 20 observed in scattered locations at lower elevations.

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Ruddy Turnstone. A total of 75 recorded. These were found in scattered small flocks from sea level to the top of the saddle between the two peaks.

## 2. Other Birds.

Nihoa Finch. Numbers of these birds present were in the past based on almost pure speculation. This time an attempt was made to sample the island to get a more scientific estimate as well as to test out some methods for reliability. A survey consisting of two long routes totaling about 13,000 feet was run on September 13. The party of four men was split into two crews of two men each. One sampled the eastern half of the island and the other the western half. The transects ran from the top of the cliff just above the sea to the tops of Miller and Tanager Peaks and included ridges as well as canyons. (See map). Both the King flushing distance and the rod-wide belt transect methods were used. One man observed birds and estimated distances while the second recorded data and plotted observations on the map for distribution. At the same time, data were recorded for the millerbird. It was necessary to work slowly because of the thick brush of Sida and Chenopodium and the tendency of some birds to scuttle off without flying. The rod wide method was used also because it was felt that birds a distance of 8 feet on either side could be seen except in the thickest of cover. Under the latter circumstances, alternately stopping and moving but a few feet at a time would eventually result in being able to observe any bird hiding there.

The present survey does not permit estimates of confidence intervals. Inexact map scale also limits accuracy of the estimate. Use of the King method revealed an average observation distance of 12.04 feet. A total of 252 finch were observed. Calculations via this method reveal an estimated total population of 5,494 finch on the island of 156 acres.

Based on the 148 finches seen in the rod-wide belt transect, the island population of finch is calculated as 4,689 birds. This was close to the last Cloud Nine estimate of 4,500 in March, 1967.

To estimate variance, the number of finch seen along each 250 ft. segment were separately tabulated. Although not applicable to the estimate, 4,689 birds, the confidence interval of  $\pm 25.8\%$  at 95% confidence level indicates the possible variance if 49 segments were random transects.

Finches were found to be rather homogeneously distributed over the island and from just above sea level to the very top. There was some concentration around the water seeps in the rockier canyons.

During the March, 1968 trip, we plan to conduct individual transects that will permit estimates of confidence intervals and possible more refinements. This will hinge largely on whether sea conditions will permit us to land upon and stay long enough on the island to do this- one whole day- as well as the weather conditions experienced.

Nihoa Millerbird. As with the finch, estimates to date have been pure speculation and ranged from perhaps 50 to 300 birds. Dense brush, the habit of the bird to feed and skulk in under the brush, and lack of time for surveys prevented anything else. These birds were counted in conjunction with the finches on the transects just described. A total of 28 birds were seen; 19 were seen within the rod-wide transect which was in this case 12,500 ft. long. Calculations reveal an estimated population of 625 millerbirds.

Computed on a basis of all 28 birds seen at an average flushing distance of 8.68 feet, the estimate was 877 birds. This seems a little high, and we are inclined to be more conservative and for the present settle for the lower figure.

Based on variance in 250 segments, to the theoretical confidence interval would be  $\pm 47\%$ . If the transects were randomly distributed. A range of 330 to 920 birds would result.

To refine the estimates to  $\pm 20\%$  confidence interval would entail conducting 298 separate transects which in our opinion would be far more work than could be justified considering time and conditions to be encountered.

As with the finch, transects will be conducted in March for more refinement of data.

### III REFUGE DEVELOPMENT AND MAINTENANCE

- A. Physical Development. The large recognition sign erected at the central landing near the base of Miller Canyon was in good order. Small blue goose signs at each landing site and on Miller Flat were checked and in good condition.

### VI PUBLIC RELATIONS

- A. Recreational Uses. None. As a natural area, the island is restricted to only scientists on approved research projects. There were none.
- B. Refuge Visitors. None.

### VII OTHER ITEMS

- A. Items of Interest. Although we had rumors that a sport fishing party was to go to Nihoa late in the summer, we found no evidence that anyone had landed on the island.

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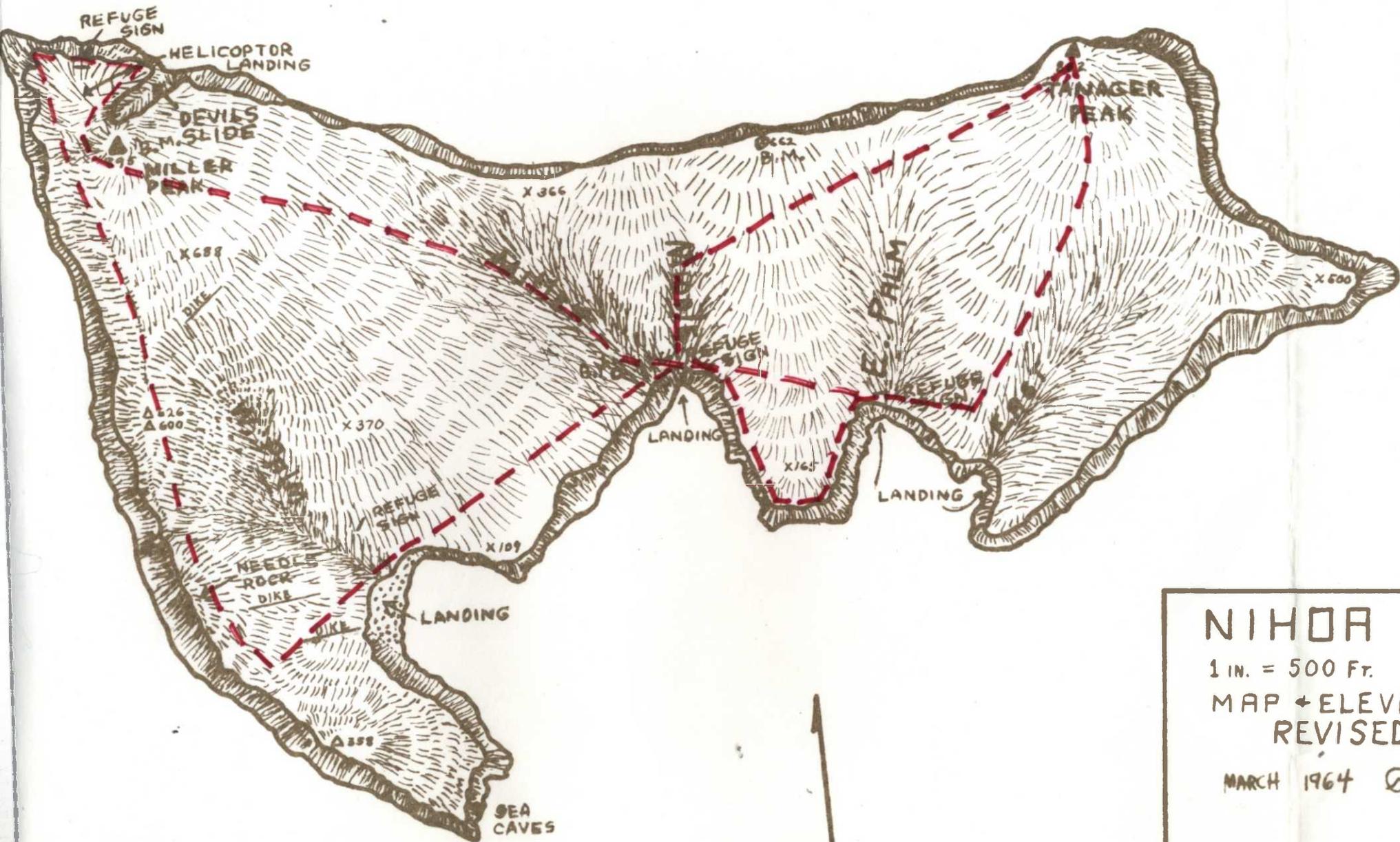
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# NIHOA IS.

1 in. = 500 Ft.

MAP + ELEVATIONS  
REVISED

MARCH 1964 G. S. Weller

N.  
(MAG.)

## NECKER ISLAND

9

### I GENERAL

A. Weather Conditions. Warm and clear the day we were on the island, A ten foot swell and powerful backsurge hampered landing by rubber raft propelled by paddles. Large waves occasionally breaking over the site livened things at times.

B. Habitat Conditions.

1. Water. There is no free water on the island.

2. Cover. As at Nihoa the island looked quite dry. The Chenopodium on the north facing slopes was thicker and more robust. We noticed no new plants on the island which has but five species.

### II WILDLIFE

A. Migratory Birds.

1. Seabirds. Since only a day was spent on the island, a good census of all species was not possible. Good estimates by species will be indicated in this report by the word "good" immediately after the name of the species.

Sooty Tern. Only about 100 birds (mostly adults) were left of the thousands which nest here in the spring and summer.

Gray-backed Tern. Good. Only 17/<sup>adults</sup>observed. We saw only 3 locals, and these were very large and almost able to fly.

Blue-gray Noddy. On the main part of the island we counted 135 and on Northwest Cape another 119. These are considered to be minimum figures because some of these birds nest and roost in the innumerable holes in the rocks on both the north and south cliffs which are all but inaccessible to us. One bird was found incubating an egg.

Common Noddy Tern. These birds were scattered all over the island. An estimated 9,000 or more adults were nesting. Of the total observed 8,200 were on the main part of the island and the remainder on Northwest Cape. 850 nests with small downy chicks were tallied, and 1,580 nests with one egg each were found on the main part, and an additional 25 chicks and 600 eggs on the cape. Nests were on bare rock, ground, in slight delevities in cliffs, and under brush.

Hawaiian Noddy Tern. No nests or eggs were found. A flock of about 150 adults were noted roosting on the extremen edge of the cape.

Fairy Tern. A total of 373 were tallied. Nests contained both eggs or downy young. As with the blue-gray noddy, this species inhabits holes in the faces of inaccessible cliffs so population figures are a minimum.

Bulwer's Petrel. Only one adult and one very large chick with a trace

of down still present on its head.

Wedge-tailed Shearwater. No attempt was made to census these birds which numbered in the hundreds; however, the population here was much lower than that present on Nihoa. Over 112 downy chicks were found during counts of other species. Also found were 8 eggs. Many of these birds nest in inaccessible holes in the rocky cliff-sides; others in shallow holes under thick growths of Chenopodium.

Red-tailed Tropicbird. No census was made of this species. Along the middle of the north cliff between Bowl Hill and the saddle between it and Summit Hill we saw 15 adults and 23 large almost fully feathered chicks. A few very small downy chicks were also recorded. A more thorough search of Northwest Cape revealed only 2 very large chicks.

Blue-faced Booby. Good. A total of 204 adults were seen all but 4 of which were on the main part of the island. Most were found on the tops and near the top of Summit and Flagpole Hills. Only 6 downy chicks were found. About 32 large flying immatures were recorded.

Brown Booby. Good. 13 adults, 10 flying immature, and 2 large chicks were seen. In addition we recorded 1 nest with 1 egg and 1 with 2 eggs. All were on the east side of the island near the top of Bowl Hill, except for the nests with the eggs which were on the north side of the cape about 2/3 of the way to the top.

Red-footed Booby. Very good. Recoded were 430 adults, 93 flying immatures, 59 chicks, 17 nests with 1 egg each and 17 newly constructed nests which contained no eggs as yet. Almost all are found in the Chenopodium on the north, west, and east slopes of the following hills; Bowl, Flagpole, and Summit.

Frigate Bird. Through a misunderstanding, no count was made of the nests. There was a total population of about 1,200 birds. Many half to almost full grown young were still in nests. These were to be found mainly in Chenopodium on the tops and slopes of the hills of the main part of the island. A few were located in small clumps of Sesbania located in scattered locations on the tops of the hills. No frigatebird nests are found on Northwest Cape which is almost devoid of vegetation.

#### D. Other Mammals.

Hawaiian monk seals. 15 were found sunning themselves on the rocky ledge on the Shark Bay side of the deep cut which separates Northwest Cape from the main part of the island. Age and sex ratios are as follows:

Adult male	2
Adult female	5
Yearling male	1
Yearling female	1
Adult unclassified	6

No tagged animals were found. After their initial disturbance while we checked for tags and sex, the animals returned to this spot to resume their resting and sunning while we busied ourselves elsewhere on the island.

#### F. Other Birds.

Ruddy Turnstone. We observed two flocks of 30 and 7 of these birds. No dyed or banded birds were seen. These birds usually frequent the rocky shelves just above the surge zone.

Golden Plover. \_ were seen scattered over the island.

Mockingbird. This species was recorded for the first time on this island. It is not, however, the first for the refuge. Woodside of the Hawaii Division of Fish and Game saw several on Tern Island of French Frigate Shoals a number of years ago. Two years ago one was collected by Amerson of the Smithsonian Institution on Tern Island. This species was introduced years ago on the main Hawaiian Islands and those recorded from the refuge apparently are strays from those islands.

All four members of the party saw this bird as it flew up about 50 ft. behind us on the north slope of Annexation Hill. The long tail with the outer white tail feathers, the white wing patches, gray coloration, and the undulating flight were all distinctive.

#### H. Reptiles.

Green Sea Turtles. 3 of these animals were sunning themselves near the turtles when we landed upon the island. All were turned for tagging, measuring and weighing. Some difficulty was experienced turning them because of the poor footing on the slippery rocks. We instigated a new method of measuring by use of calipers as well as that of taping the length and width of the shells by use of a steel measuring tape.

<u>No.</u>	<u>Sex</u>	<u>L (Cal.) W</u>	<u>L (Tape) W</u>	<u>Lbs.</u>	<u>Growths</u>
450	Female	33.8" x 24.8"	36.25" x 33.75"	200	None
636	Male	31.3" x 26.5"	33.50" x 31.50"	185	None
426	Female	30.3" x 24.1"	32.75" x 30.50"	155	None

No. 426 was tagged on this island on March 10, 1967. There was no significant growth of the shell during the intervening period.

TERN ISLAND

I GENERAL

- A. Weather. The weather during the entire period spent at French Frigate Shoals was warm and sunny with little wind. Rains during the summer were frequent enough to enable the water reservoirs maintained by the Coast Guard Loran Station there to keep the station complement of 20 men adequately supplied. No damaging storms had occurred during the summer.

II WILDLIFE

A. Migratory Birds.

1. Seabirds. Very little use is made of this island by wildlife. During the winter and spring albatross nest here in low numbers. There is a scattering of other species nesting here throughout the year, but just a handful. During our stay here, we found 9 large red-tailed tropicbird chicks completely feathered out, one small downy young wedge-tailed shearwater chick, and 1 dead adult Common noddy tern.

B. Other Birds.

Ruddy Turnstones. Only 3 seen.

Golden Plover. 3 seen.

Nihoa Finch. Only 5 remain of the 30 transplanted on this island in March, 1967. This experiment appears doomed to failure. A pair was seen feeding on Cenchrus seeds north of the radio building. The other 3 frequently are seen in front of the barracks-mess hall building. On a number of occasions during our stay there, we noticed them coming to drink water from the dripping water tap in front of the recreation building. All birds were banded. Thus there is no evidence that there was any reproduction during the summer. For what it is worth, discussions with Coast Guard personnel stationed there revealed that no nests had been found.

- D. Other Mammals. No seals were noted. Seal use is very low because of human disturbance.

H. Reptiles.

1. Green Sea Turtle. We saw none. Use is low; however, Coastguardsmen told us that several nests had hatched on the east end of the island this past summer.

III REFUGE DEVELOPMENT AND MAINTENANCE

- A. Physical Development. The large refuge recognition sign was erected on

the island in a prominent place in front of the buildings so that any and all persons landing on the island, usually by aircraft, would have to see it. Attempts to erect it on the March, 1966 trip were frustrated by the local commanding officer there at the time, a Lt. (jg) Archer, who insisted that the Bureau had no jurisdiction there. Rather than precipitate a needless argument there at the time, we decided to wait until the Coast Guard had formally recognized our primary jurisdiction through the now in effect cooperative agreement then erect the sign at the earliest convenient occasion. All major islands or island groups now have such sign on them at the most prominent landing site except Necker and Gardiner Pinnacles. One erected at Necker in September, 1966 was destroyed by a fierce winter storm. We never have been able to land at Gardiner Pinnacles to put the sign up there. This will be a major achievement. One could say that anyone who can land there deserves to be upon it for a while.

#### VII OTHER ITEMS

- A. Items of Interest. A discussion held several weeks ago with the officer in charge of the Loran station in the district revealed that eventually they plan to enlarge the runway on Tern Island to enable C-130's to land there for logistic purposes. At present this station is supplied weekly by Albatross amphibians which are long obsolete and for which they are having very much difficulty in obtaining parts. These planes will have to be phased out in the near future. They also plan to deepen and straighten the channel from the present ship anchorage to the island to accommodate buoy tenders so that they could dock against the island. The present channel can only accommodate small boats during relatively calm weather. The terms of the cooperative agreement specify that the Coast Guard shall have the use of the island for 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. They also plan to demolish the present old buildings there and erect new and better ones. The officer mentioned that provision could be made for quarters and possibly another room for Bureau personnel when at French Frigate Shoals for research purposes. If new buildings are constructed, we should make sure that such provisions are included. There is not a definite year set for the improvements, but we should be aware of their proposals and be in a position to act and comment upon them at the time.

TRIG ISLAND

13

I GENERAL

B. Habitat Conditions.

2. Cover. The island looked dry. Leaves of Eribulus were rolled up. The Boehavia, however, was blooming profusely. Photostations were recorded.

II WILDLIFE

A. Migratory Birds. No count made.

D. Other Mammals.

Hawaiian Monk Seal. The following seals were tallied:

2 adult male	4 subadult unclassified
7 adult female	1 pup
9 adult unclassified	

Notes were taken on the moult stages.

- H. Reptiles. On the first day we landed no turtles were found on the beaches. This is very unusual because Trig has in the past supported the largest populations in this atoll every time we visited it in March and September in previous trips. One dead adult bearing Tag No. 168 was found dead and on its back. This looked as if someone had landed on the island and flipped it. Coast Guardsmen on Tern Island denied landing there, but chance remarks dropped by several of them while we were there later indicated that some were going there to look for glass balls. The commanding officer there was told that landing upon them was not permitted because of wildlife disturbance and the possibilities of introducing weeds from Tern Island.

The next day when we returned to this island late in the afternoon, there were two turtles sunning themselves on the beach. These were sexed, measured, and tagged.

WHALE-SKATE ISLAND

I GENERAL

B. Habitat Conditions.

2. Cover. This island also looked dry. Vegetation conditions were similar to those found on Trig Island.

II WILDLIFE

A. Migratory Birds.

1. Seabirds.

Sooty Tern. Almost all of the breeding population had departed, and only 2 adults were noted flying overhead.

Common Noddy Tern. There were 275 adults present. Most were nesting birds. Of a total of 134 nests tallied, 126 contained a single egg and 18 contained small downy chicks. Nests were located in low grassy areas in the central part of the island.

Hawaiian Noddy Tern. About 270-280 adults were observed resting in small flocks mixed on the beaches with common noddies. No nests were seen.

Red-tailed Tropicbird. 2 large and completely feathered chicks were found under a clump of Messerschmidia.

Blue-faced Booby. Tallied were 1 adult, 17 flying immatures in first year plumage, and 9 large but downy chicks. These were scattered along both beaches by themselves. 1 dead unbanded chick was found.

Brown Booby. 1 adult was recorded incubating an egg in its nest.

Red-footed Booby. Recoded were 1 adult, 3 flying immatures in first year plumage, and 2 half-grown chicks in nests in the Messerschmidia.

Frigatebird. Tallied 85 adults, 3 flying immatures, and 81 chicks. The latter were 2/3 to 3/4 grown and in nests in clumps of Chenopodium in the central part of the island.

## 2. Shorebirds.

Golden Plover. 9 in winter plumage.

Ruddy Turnstone. 102 most of which were in winter plumage. No banded birds seen although all were checked.

Sanderling. 3 in their white and gray winter plumage.

Bristle-thighed Curlew. 3 seen.

## D. Other Mammals

Hawaiian Monk Seal. A seal census resulted in the following observations:

6 adult male	1 Subadult male	2 yearling male
4 adult female	1 Subadult female	6 yearling female
5 adult unclassified	1 Subadult unclassified	

Tagged were 2 yearling males, 6 yearling females, 1 subadult male, and 1 subadult unclassified. The latter was not sexed through oversight. Moulting stages were recorded.

5 animals tagged on previous trips were recorded. 3 had been tagged on this island and 2 on nearby Trig Island.

No abnormal conditions were noted.

## H. Reptiles.

15

Green Sea Turtle. None observed.

### EAST ISLAND

#### I GENERAL

## B. Habitat Conditions.

- Cover. The north end of the island has been eroded away for at least 50 or more yards, and the expanse of beach is gone. It was necessary to walk into the water to take one of the photostation pictures normally taken from the beach. Beaches come and go with the storms. The very large Chenopodium bush near the old concrete refrigerator (?) block is now gone; however, scattered within the old Coast Guard trash and fallen down Quonset huts are 8 smaller plants of this species, all of which were producing seed. As on the other islands, leaves of Tribulus plants were closed indicating stress from lack of water. Boerhavia was flourishing over the island.

### II WILDLIFE

## A. Migratory Birds.

### 1. Seabirds.

Sooty Tern. Noted 8 adults and 8 immatures flying about the island. These are probably the last of the breeding colony to migrate.

Common Noddy Tern. In the low grassy and herbaceous vegetation on the north end we tallied 104 nests with single eggs and 107 with chicks. Near the south end there were 14 nests with eggs and 10 with chicks. This indicates that the birds using this island are slightly ahead in breeding phenology than those on Whale-Skate but a few miles distant. Nests were located in Tribulus and Boerhavia. Recorded also were 430 adults most of which were on nests.

Red-tailed Tropicbird. 1 almost fully grown chick was found under the Messerschmidia clump at the south end.

Blue-faced Booby. Just 3 immatures capable of flight were found wandering around the beaches.

Red-footed Booby. Recorded were 5 adults, 1 flying immature in first year plumage, and 8 half-grown chicks in the Messerschmidia at the south end or small clumps of Chenopodium in the interior. Nights spent on the islands throughout the chain reveal that many adults and flying immatures return to the islands to roost at night. These thus are daytime counts.

Frigatebird. About 250 were soaring high above the island. No nests or chicks were found on the island. The old antenna poles are favored perches.

### 2. Shorebirds.

Golden Plover. 16 in winter plumage.

Ruddy Turnstone. 93 mostly in full winter plumage. No dyed or banded birds were seen.

Bristle-thighed Curlew. 2 noted on this island.

D. Other Mammals.

Hawaiian Monk Seal. A total of 10 were found.

7 adult female	1 yearling male
1 subadult male	
1 subadult female	

The two subadult animals and 1 adult female were tagged. Later another subadult male carrying tag No. 506 was recorded as it hauled up on the beach while we were there. This animal was tagged as a male pup on September 13, 1966 on Whale-Skate Island nearby. Molt data was taken.

No abnormal conditions were noted.

H. Reptiles

Green Sea Turtles. None observed.

GIN ISLAND

I GENERAL

B. Habitat Conditions.

2. Cover. Neither Gin or Little Gin Islands support any vegetation. Both are entirely sand. Shapes and sizes change continually because of storms and surf conditions. Little Gin is about half of what it was last year. We always experience trouble landing on these islands because of the strong surf and undertow.

II WILDLIFE

A. Migratory Birds.

None

d. Other Mammals.

Hawaiian Monk Seal. Only 4 animals were on the island.

1 adult male	1 adult unclassified	2 yearling female
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A yearling female was tagged. A yearling female tagged March 12, 1967 on East Island was recorded.

LITTLE GIN ISLAND

17

II WILDLIFE

A. Migratory Birds.

None.

D. Other Mammals.

Hawaiian Monk Seal. A total of 17 animals were loafing on the beaches just out of reach of the surf.

2 adult male	1 yearling male
3 adult female	1 yearling female
9 adult unclassified	1 unclassified yearling

The unclassified adults were those which escaped into the water before we could sex them. No animals were tagged nor were previously tagged animals seen.

GARDINER PINNACLES

## I GENERAL

No landing was attempted on this island. Conditions were reconnoitered at close distance by small boat, but the surf was much too rough to effect a safe landing. There is no beach or rock shelf upon which to land. Under very calm seas it is possible to nose a small boat against the steeply sloping side on the west where enough niches are present to permit hand and footholds when leaping from the boat as a swell carries it upwards. We have been able to land on this island once in seven trips.

## I GENERAL

A. Habitat Conditions.

1. Water. The level of the lagoon was down considerably from last March. Much of the north half was bare mud flat. However, it contained more water than it had in September, 1966. A gauge was installed in the water on the east side about midway between the north and south ends. This will give us relative level readings only since we have no idea where 0.00 elevation may be.
2. Cover. Sicyos, especially along the east side appeared quite dry indicating that this island like all the others in the refuge experienced a dry summer. The condition of most of the other plant species appeared normal. The Pluchea does not appear to have spread much since we first saw it in 1964. Tobacco is still scattered over the island, most of it on the west side. Conyza bonariensis, Canada fleabane, is becoming well established on the northwest part of the island. This plant presumably was introduced by the military during the time they camped on the island in 1963 during the HIRAN operations. The plant head is composed of innumerable seeds accompanied by much pappus and is admirably suited to be distributed by winds. The plant is found growing mainly in the sandy openings among the Eragrostis grass. Under the conditions we face on this island, it will be next to impossible to eradicate it. A patch 100 x 100 ft. wide was sprayed experimentally with a 5% solution of 2,4-D Weedazol on this trip. However, little hope was felt that it would be successful because the plant was mainly in the late flowering and early seed head stage. A check of the plot in December revealed little success. New plants were starting from seed present when the plot was sprayed.

A lone Chenopodium plant was found near the southeast corner of the food cache at the camp site on the west side. This was well watered by us with surplus water and when we broke camp preparatory to leaving the island. This plant had grown from seed planted there the past several years from some collected from French Frigate Shoals. At one time it was native to Laysan. Several plantings of seed gathered from other islands have been made the past few years with little success. Plans still are to gather seeds from other islands in the refuge and continue in efforts to reestablish it here.

## II WILDLIFE

A. Migratory Birds.

1. Seabirds. Since a party from the Pacific Program of the Smithsonian Institution conducting bird investigations on the refuge under a permit from the Bureau had preceded us by about two weeks, we made no attempt to census seabirds because they had. A copy of their report is attached to this one. The same pertains to shorebirds.

A review of their report reveals interesting information regarding interisland movements of many species. Population estimates for the more abundant species are rough, especially for those which nest in burrows and whose numbers swell tremendously as night as birds which have been out to sea foraging for food all day return to roost.

Losses by predation of Laysan finch on sooty tern eggs is a part of life out on Laysan; however, excessive losses which may be caused by movements of humans throughout a tern colony all the time while gathering information about numbers of nests, egg measurements, etc. poses the question whether such information is worth it all. Human activities interfere with those which are normal. A certain amount of disturbance is unavoidable, but judgement needs to be exercised as to what is excessive.

Disturbing also are statements that they engaged in intensive (sic) hunting of bird specimens throughout their entire stay on the island. Collections of unusual specimens may be warranted, but perhaps not the continual harassment of shorebirds which took place in their desire to collect dyed turnstones in order to obtain the bands. Here again a question is posed as to whether all this activity fits in with the concept of a natural area wildlife refuge.

Laysan Teal. Dissatisfaction with the reliability of previous census techniques resulted in two other methods being tried this trip. The first consisted of recording observations of ducks made while conducting the finch transects (detailed in the chapter on finch). This resulted in estimates lower than birds actually seen in the other method so it proved unuseable, i.e. 133 estimated with a confidence interval of plus or minus 65.5%.

The other method used was dividing the lagoon and shores into four parts through the use of poles and flags. Two counts were made; the first the evening of September 22 beginning about 6:00PM and lasting until too dark to distinguish birds, and the second was made on September 24 beginning about 6:45AM and lasting until ducks began leaving the lagoon and flying to drier and higher parts of the island.

During the evening count a total of 199 was seen, and during the morning count a total of 239 were observed.

Based on this, it was estimated that there were probably at least 300 and possibly 350 ducks on the island, assuming that we did not see them all. The morning count appears to be promising and will be used again in March with some refinement. However, thoughts are still being given to using other techniques. Possibly based on the Lincoln index.

Distribution of the birds during the counts are as follows:

<u>Evening of Sept. 22</u>		<u>Morning of Sept. 24</u>	
Northwest 1/4	45	Northwest 1/4	78
Northeast 1/4	93	Northeast 1/4	106
South 1/2	61	Southeast 1/4	15
	<u>199</u>	Southwest 1/4	<u>40</u>
			239

Of 48 birds checked for bands, 17 were carrying them. It is not possible to use the index because sporadic banding has occurred throughout the last ten years. It may be possible next fall to color band a number then the next day observe as many as possible of those seen during a count for the color bands.

A bright moon every night prevented us from capturing but a handful through the use of the usual headlamp and hand net technique so useful otherwise on dark nights. 13 new birds were banded and 7 returns obtained. Blood smears were taken analysis for possible disease. Of the recaptures, one adult male was banded in September 8, 1961 3 adult males and 1 adult female were banded on March 10, 1964, 1 adult male in September 19, 1964 and an adult female on March 21, 1967. Of the two captured by Smithsonian personnel one had been banded September 8, 1961 and the other March 10, 1964. So we know that some live as long as 6 years for sure.

Of the 13 banded, 6 were immatures and 7 were adults. Of the total 22 captured, 6 were immatures or roughly 30%.

Of the total captured, 12 were males and 8 were females. Expanded this would be 150 males per 100 females. Admittedly small for a sample, we could use sex ratio figures derived from two occasions when considerably more birds were captured and banded in one day. On March 10, 1964 a total of 99 birds were captured, and of these 58 were males and 41 females for a ratio of almost 144 males per 100 females. In September, 1961 of a total of 204 birds captured, the sex ratio was 163 males per 100 females. All then strongly suggests that there is a preponderance of males in the population both in the spring and fall.

Sex, even among immatures, was readily determined by the presence or lack of spotting on the bill. The bills of males being clear. Adult female bills were in many cases heavily mottled - similar to mallards. There are other sex and age differences in the plumage which will be taken up in the wildlife study outline. All immatures had notched tailfeathers at this time, but we checked both age and sex through the cloacal method.

During the day, many of the birds scattered about the island although most were to be found within several hundred yards of the lagoon shores. Usually 30-40, and sometimes more, were seen feeding loafing or feeding along the more open shores of the lagoon. A number of birds made good use of lodged growths of Cyperus for loafing sites along the southeast shore. Frequently we observed birds feeding on the thousands of brine flies which occur in heavy clouds on the surface of the water or on the feather edge of the muddy shoreline. The usual procedure was for a bird to lower its opened mouth so that the lower mandible was just above the surface of the ground then rapidly run ahead for 10-15 feet scooping up flies in the process. The process would then be repeated after varying intervals of time. Males appeared to be slightly warier than the females, but this is just a general observation.

### 3. Other Birds.

Laysan Finch. A total of 10 transects, each 50 ft. wide, were run from lagoon to beach at selected places all around the island. These were in areas almost identical to those run in March and September, 1966. Four men spaced at equal distances from each other counted birds about 12 feet on their right or left, depending on the direction. The big difference between this count and the previous ones was that the others were 100 ft. wide. This time, the transect was narrowed because it was felt that better visibility and accuracy would result, especially in the thicker vegetation.

A total of 311 finch were observed this time. The transect length was an estimated 13,930 feet. Estimated total finch on the island is 7,779., plus or minus 2,692. A 95% confidence interval of 34.6%. Confidence limits are 5,081 to 10,471.

During the September, 1966 count (9 transects), a total of 601 finch were observed. The transect length was about 11,800 ft.. Estimated total finch using the island then would have been 8,879, plus or minus 5,416. A 95% confidence interval of 61%. Confidence limit

of 3,463 to 14,295.

During March, 1966 there were 9 transects each 100 ft. wide run for a total transect length of about 11,800 feet. At this time 648 finch were observed. A 95% confidence interval of 61% is calculated. Or, there were probably 9,573 finch using the island, plus or minus 4,066 for limits of 5,507 to 13,639. The lower figure hardly seemed reasonable because area-wise we did not sample close to 10% of the island yet we are calculated to have seen over 10% of the total finch.

The confidence limits are not acceptable to us, and we believe that 50 individual transects, 5 men each running 10, would reduce this to plus or minus 15%. Very acceptable. To reduce it to 10% would require 108 transects which is beyond capability considering the time and manpower involved.

During the March trip we will run the 50 transects which are based on modification of the previous ones.

Blood smears were taken from 20 birds after which they were banded and released. The smears will be inspected in the laboratory for possible presence of disease.

Fifteen birds were collected for studies regarding sex, plumages, food habits, anatomy, and age. Five were in bright plumage, five in intermediate, and five in dull plumage.

#### D. Other Mammals.

Hawaiian Monk Seal. As soon as camp is set up, the island is circumvented for the seal census. The results were as follows:

48 adult male	16 subadult male
32 adult female	11 subadult female
37 adult unclassified	9 subadult unclassified
11 yearling male	
15 yearling female	
2 yearling unclassified	

The total of 181 animals was the lowest recorded in all our 7 trips, the previous low being the 193 recorded in March, 1966. It is likely that activities of the Smithsonian Institution personnel on the island several weeks before our arrival caused some to leave because in checking their seal counts for Lisianski and Pearl and Hermes Reef ( we have no information about a count on Laysan if one was made) we note 22 less animals for our count on Lisianski and 18 less animals for Pearl and Hermes Reef. Most, but not all, animals will return to the beaches shortly after being molested. It may be that they just were not there this fall, but the refuge count as a whole is the lowest we ever had even though we had been able to visit every island except Gardiner Pinnacles this trip. In the future, any trips they schedule about the same time we have one scheduled will have to take place after ours if we expect to get comparable seal data.

We had not anticipated any problem and felt that the activities of both parties would dovetail in with one another. However, apparently not enough time had elapsed between visits to give some animals a chance to settle down. The other party must have been extremely active because we noted that seals on all islands were more wary than usual. Blue-faced boobies on Lisianski had been worked intensively, and it was obvious because they would almost invariably rush off squawking down the beach well ahead of us when we were making our seal census there. Usually a few can be counted on to do this, but not so many or so far ahead of this. This hampered our research on seals there because we frequently could not get close enough to seals to check age or sex, or tags, because they were awakened by the squawking and frightened boobies had hauled off into the water ahead of us.

A total of 24 animals, mostly yearlings and subadults, were tagged. This also disturbs their peace of mind, but it is necessary to begin accumulating data on movements, breeding age, annual breeding cycles, population dynamics, and other basic life history activities. Young animals react much less vigorously to tagging. Adults are too strong, and there is a far greater chance of being bitten through some mishap.

Another 14 animals previously tagged were recorded. All had been tagged as pups or yearlings in March and June, 10 in March. This suggests possible affinity of a natal island.

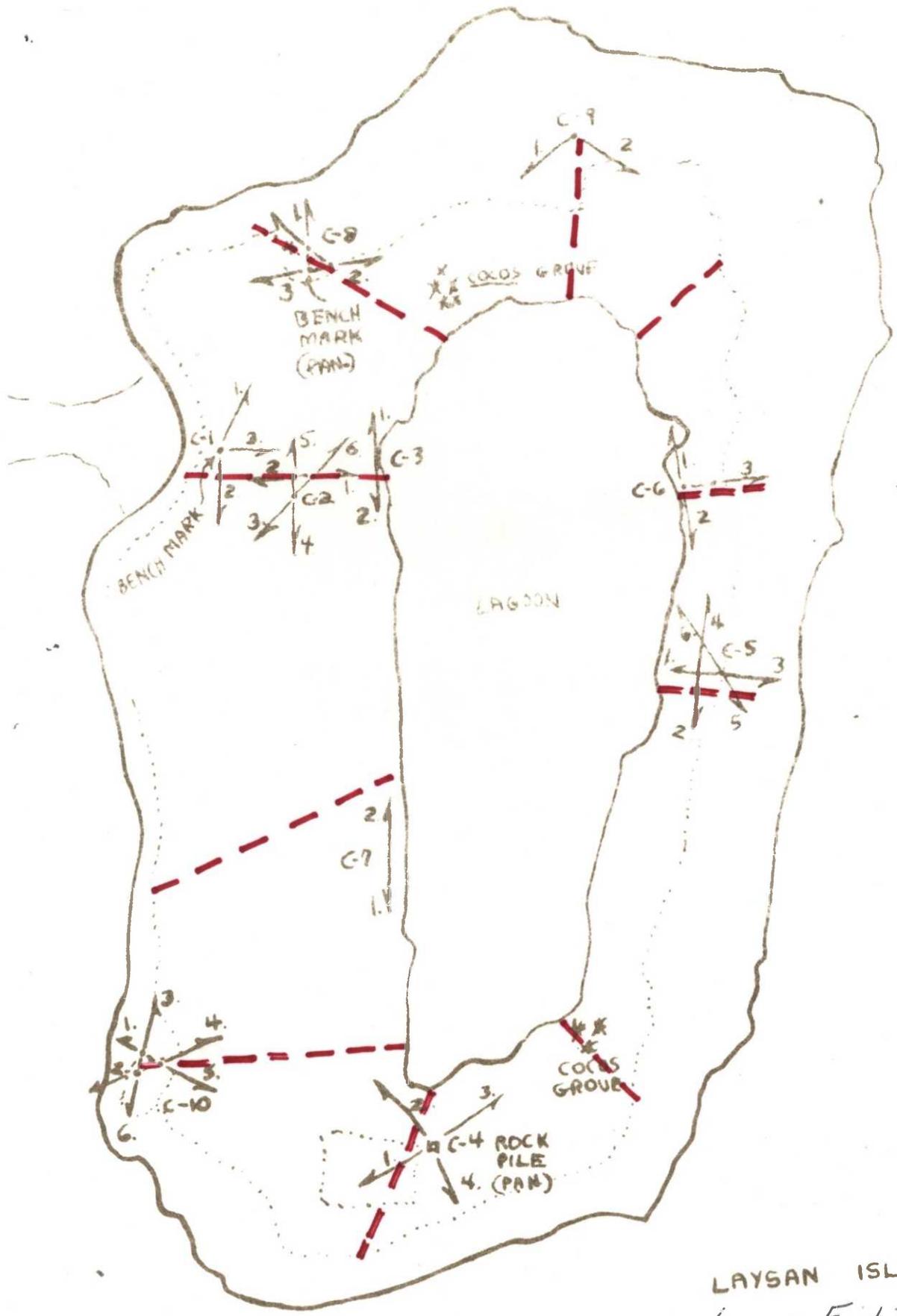
Almost all animals counted were sleeping or resting on the beaches just above the surf line. Apparently the millions of flies which are found on the island during the summer and fall months are bothersome. This has been noted by other investigators. No night count, however, was made on Laysan.

No dead seals were observed.

#### H. Reptiles.

Green sea turtle. Only one turtle was observed. It was tagged. Very few of these animals are seen on Laysan. This is interesting because Parson, in his book THE GREEN SEA TURTLE AND MAN, cites accounts made by whalers and other mariners visiting this island during the last century that turtles were very abundant on this island and offered a ready and welcome source of meat.

Skinks were common around the campsite.



LAYSAN ISLAND  
 Laysan Finch Transects

LISIANSKI ISLAND

## I GENERAL

A. Habitat Conditions.

2. Cover. The interior did not appear as lush as usual and plants were dry appearing. The black mold or rust on the Scaevola has killed off quite a bit of this plant in the interior and much of the growth around the perimeter of the island is affected. Apparently this has been going on for some years, but if it has ever been mentioned in the literature by others, we have no record of it.

Negative findings were experienced when a close check was made of plots planted with Chenopodium seed planted this past March which was obtained from East Island at French Frigate Shoals. This planting had been made before we discovered the next day a group of 25 plants of this species under the old ironwood tree at the south end of the island. Time did not allow us to check for these plants this trip.

## II WILDLIFE

A. Migratory Birds

1. Seabirds. Covered in the Smithsonian report. Of particular interest in their report is the possible Macgillivray's petrel collected by them. As yet we have no knowledge of a definite identification.

Banding activities by them reveal considerable intersiland movement of birds. Returns were obtained from Wake, Johnson, and Midway also.

The numbers of Bonin Petrel were tremendous and made a never to be forgotten sight as they began returning to the island in the early evening from their fishing activities at sea during the day. The air was a swirling mass of wheeling and dipping birds which had as a background an azure blue sky partly filled with billowing clouds tinted with pink and gold from a setting sun. Late at night these birds continually clawed and tried to climb up the sides of the tent as they were attracted by the light of our lantern inside.

2. Shorebirds. Of interest is the Mongolian Plover captured by Mr. Roger Clapp of the Smithsonian because it constitutes the first record of this species in the central Pacific. Another noteworthy record is the Semipalmated Plover shot by Mr. Charles Ely also of the Smithsonian. This is a first for the island and the second for the refuge.

A total of 68 Ruddy Turnstones, 28 Golden Plover, 1 Wandering Tattler, and 32 Bristle-thighed Curlews were banded by the Bureau party at night with the use of headlamps and hand nets.

5 turnstone and 4 curlew recoveries were made of previously banded birds. No recovery data is available yet.

D. Other Mammals.

Hawaiian Monk Seal. A total of 108 seals were counted the morning of the first day. Sex and age data are as follows:

33 adult male	2 subadult male	4 yearling male
26 adult female	3 subadult female	8 yearling female
25 adult unclassified	3 subadult unclassified	4 yearling unclassified

A total of 19 animals were tagged - 7 adults, 1 subadult, and 11 yearlings. Adults were tagged by slipping up on them from behind while they were sleeping then quickly affixing the tag to the rear flipper.

Four previously tagged animals were recorded. All had been tagged on Lisianski,; two in 1966 and others in 1967.

As at Laysan, almost all animals during the day were sleeping or resting on the beaches just beyond the water line. A count made during the night totaled 103 animals so there was little difference between daytime and nighttime use. Records were not kept of the locations of all the animals but of the 67 that were, 60 were hauled up into the vegetation and only 7 were on the beach. This strongly indicates that animals prefer the beaches during the day to avoid the swarms of houseflies active then. At night the seals haul up when the flies are inactive.

The following day while the island was again circumvented to reestablish vegetative photostations, count was kept of the seals. A total of 109 was obtained, most of which were back on the beaches.

No dead animals were found.

F. Reptiles.

Green Sea Turtles. Young, platter sized turtles are frequently seen on this island. This time was no exception. This is in contrast to Laysan where almost none are seen. About 8 of this size were observed, two of which were tagged, measured and weighed. Each weighed 25 lbs.. Altogether a total of 5 animals were tagged. One previously tagged animal was recorded, but we are unable to obtain the tagging data because the records cannot be located by persons who may have done this work.

PEARL AND HERMES REEFSOUTHEAST ISLAND

## I GENERAL

A. Habitat Conditions

1. Water. The two small tidal pools in the interior of the island appeared to be the same size as when the island was last visited in July of this year.
2. Cover. There appeared to be little noticeable change in the vegetation of this island from that observed at this time the previous year. It was not possible to observe the results of the herbicidal treatment last March of the mustard, Brassica spp. since this plant normally dries up and all but disappears by September.

## II WILDLIFE

A. Migratory Birds.

1. Seabirds. Covered in the Smithsonian report attached. By the time we arrived, almost all the Sooty Terns were gone.
2. Shorebirds. Very noteworthy in the Smithsonian reports is the Ruff collected on August 28. This is the third record for the species for the central Pacific and the first for Pearl and Hermes Reef.
3. Waterfowl.

Laysan Teal. Evidence found at the site of the nest which contained 6 eggs being incubated in July indicated that it was not successful. Little remained of the nest, and only a few pieces of egg shell plus one unhatched egg were to be found in the vicinity. Cause of loss could not be determined.

Only two birds, both banded, were to be found during the stay there. They were a pair. During the evening both flew into camp and observed our activities briefly before flying off again to land in the interior of the island.

Thus it appears that the experimental transplant may not be successful.

4. Other Birds.

Laysan Finch. A number of both banded and unbanded birds were seen throughout much of the larger part of the island and near the Eragrostis clumps on the smaller part. The unbanded birds were of a more richer brown color, and a number had shorter tails. Every clump of eragrostis on the entire island was searched

for nests. One nest was found with 2 eggs still being incubated and another two contained one nestling each. On July 4 we found 5 nests in the *Eragrostis* on the large part of the island and 1 with 3 eggs on the smaller part. Between May 28 and June 1 Mr. Robert DeLong of the Smithsonian found 3 nests with flattened **fims**, 9 new but empty additional nests, 1 nest with 4 eggs, 1 with 3 eggs, and 2 with 2 eggs each.

This plus the number of unbanded birds indicates that the transplant appears promising to date.

The extending nesting season, May through September, may not be normal when compared to that of Laysan. However, no search has ever been conducted for nests on the latter island at that time. We have never seen, or never heard about, bobtailed young being present on Laysan at that time. Does a species introduced into a new range breed more rapidly or for longer periods if it is successfully establishing itself.

Two methods were used to estimate the population of finches present. One involved a systematically covered completely by four men working back and forth slowly between strips running from shore to shore. A total of 48 birds were seen. 9 wore red plastic bands put on them at time of release last March, 14 carried blue bands, 17 were unbanded, and the other 17 could not be observed closely enough to see if they wore bands. All of us were certain that we had missed seeing some which hid. On two occasions a bird was seen to be scuttling through the grass and low herbaceous vegetation ahead of the counter. It was very difficult to follow its path and only by converging on it from several directions could it be forced out in an opening where it could be seen again. Several times they were almost stepped upon. Upon capture both were banded birds which were moulting primaries, several on each side, and appeared incapable of flight. This was very interesting because to our knowledge passerines when moulting are not supposed to be rendered flightless. Perhaps the birds were injured in such manner, possibly from windstorms, that we were unable to detect any injury. All this will be checked again next September for a possible repeat performance.

The other method used was a rod wide, 150 ft. long belt transect ~~method~~ run by one man. There were 24 of such transects plotted and selected on a system of random numbers. A total of 3 finches were seen. A calculated acreage of 1.63 acres was sampled. Dividing this into the 31.37 acres which is supposed to be the size of this island, a factor of 19.2 is obtained. Expanding the 3 birds seen by this factor results in an estimated population of 58 birds. This has not been subjected to statistical analysis. From general observations throughout the stay on this island, we felt that this might be on the low side regardless of the so-called "beatout" results.

#### B. Other Mammals.

Hawaiian Monk Seal. 11 animals were recorded, 1 of which was tagged.

3 adult male                      1 yearling female  
 3 adult female  
 4 adult unclassified

F. Reptiles.

Green Sea Turtle. When the island was first landed upon, there were no turtles present on the beach. This was the first time this has happened. At dusk the first day, however, one after another hauled up on the beach on the lagoon side near camp until 19 were present. 10 were captured, measured, and weighed. Three were males.

Weights ranged from 127 lbs. (female) to 247 lbs. (also a female)

Four were tagged. One was retagged on the other flipper because the original tag was hanging on precariously. There were 6 recoveries of previously banded animals. All had been banded on this island within the past 3 years.

The subspecies of the turtle in Hawaiian waters has never been determined. One important behavioral difference between it and the Atlantic subspecies is that it comes to land throughout the year to sun whereas the latter, according to the experts there, never does except to lay eggs. Presumably males of that subspecies never do come to land.

NORTH ISLAND

II WILDLIFE

B. Migratory Birds. See Smithsonian Report.

D. Other Mammals.

Hawaiian Monk Seal. A total of 29 were recorded. 6 were tagged of which 5 were yearlings. An adult female had been previously tagged on Southeast Island a year ago.

6 adult male                      2 yearling male                      1 subadult unclassified  
 9 adult female                      3 yearling female  
 6 adult unclassified              1 yearling unclassified

Considering its small size, this island supports a large number of these animals.

LITTLE NORTH ISLAND

II WILDLIFE

B. Migratory Birds. See Smithsonian Report. Apparently this is the island someone of their staff took upon himself to name Humphrey Island, presumably after his project leader. This should be corrected before they publish this in literature.

D. Other Mammals.

Hawaiian Monk Seal. A total of 23 animals were on this island which is almost all sanbar except for a few spots of Lepturus ( a grass) on the northern end. Three animals were tagged. There were no observations of previously tagged animals.

3 adult male	2 yearling female
11 adult female	1 yearling unclassified
4 adult unclassified	1 subadult unclassified

GRASS, SEAL, KITTELY ISLANDS AND MISCELLANEOUS SANDSPITS

I GENERAL

A. Habitat Conditions.

2. Cover. For purposes of this report, all these islands are being lumped together. The west halves of Seal and Grass are well vegetated with Sicyos, Solanum, Boerhavia, and Eragrostis. The eastern half of Grass is almost all sand while that of Seal is coral shelf and rubble. Kitterly has no vegetation and is all sand. Their configurations change slightly year to year as a result of surf action. Height, shape, and size of the sandbars inside the south reef between Grass and Southeast Island change significantly as a result of surf action. The one closest to Southeast is named Bird Island, then comes an unnamed sandspit (Called Planetree in 1964 for want of a name), and then Sand Island.

II WILDLIFE

A. Migratory Birds. See Smithsonian Report.

D. Other Mammals.

Hawaiian Monk Seal. A total of 45 animals were on these islands, and if we include all seen in a table for the reef, the grand total for Pearl and Hermes would be as below:

<u>Island</u>	<u>AM</u>	<u>AF</u>	<u>AU</u>	<u>SAU</u>	<u>YM</u>	<u>YF</u>	<u>YU</u>	<u>UU</u>	<u>Total</u>
Southeast	3	3	4		1				11
North	6	9	6	1	2	3	1		28
Little North	3	11	6	1		2	1		24
Bird								1	1
Sand								1	1
Grass	1	7	1				1		10
Seal	3	3	3				6		15
Kitterly	2	8	6	1	1				18
Totals	18	41	26	3	4	5	9	2	108

Smithsonian personnel had seen 130 about a month earlier.

Table 1. Summary of Monk Seals Observed and Tagged on Hawaiian Islands National Wildlife Refuge, September 13-29, 1967

<u>Island</u>	<u>AM</u>	<u>AF</u>	<u>AU</u>	<u>SAM</u>	<u>SAF</u>	<u>SAU</u>	<u>YM</u>	<u>YF</u>	<u>YU</u>	<u>UU</u>	<u>PUP</u>	<u>TAG</u>	<u>Totals</u>
Nihoa													0
Necker	2	5	6				1	1					15
FF Shoals													(82)
Trig	2	7	9	1	1	4					1	10	23
Whale	6	4	5	1	1	1	2	6	2			10	28
East		7		1	1		1					3	10
Gin	1		1				2						4
L. Gin	2	3	9				1	1	1				17
Tern													0
Gardiner													0
Laysan	48	32	37	16	11	9	11	15	2			24	181
Lisianski	33	26	25	2	3	3	4	8	4			19	108
P & H Reef													(108)
Southeast	3	3	4				1					1	11
North	6	9	6				1	2	3	1		6	28
L. North	3	11	6				1		2	1		3	24
Bird											1		1
Sand											1		1
Grass	1	5	1								2		7
Seal	3	3	3						6			2	15
Kittery	<u>3</u>	<u>8</u>	<u>3</u>	<u>   </u>	<u>   </u>	<u>2</u>	<u>1</u>	<u>   </u>	<u>   </u>	<u>   </u>	<u>   </u>	<u>3</u>	<u>17</u>
Totals	103	123	115	20	16	22	26	36	18	4	1	84	482

Trip Report for Period December 7 through 18, 1967

FRENCH FRIGATE SHOALS

TERN ISLAND

I GENERAL

- A. Weather Conditions. Frquent rain squalls and continual south and west winds averaging over 20 knots occurred during the period December 7-11. Coast Guardsmen at the Loran station on this island informed me that strong winds had been buffeting the area for the previous three weeks. The winds and rough waters of the lagoon prevented travel to the other islets of the atoll so no information was gathered from them this trip other than some from a helicopter flight.
- B. Habitat Conditions.
1. Water. Frequent rains aided all plant growth. Water stood in various places on the airplane runway while I was there. Personnel at the station no longer had any fresh water worries as their storage tanks were now almost full.
  2. Cover. In general, Tern Island could be classified as one big patch of exotic weeds. About the only endemic plant is the morningglory. The south side of the island from the main buildings at the west end to the antenna field about midisland supports primarily burrgrass (Cenchrus echinatus) and morningglory. The former is a pernicious weed. The spiny burrs attach themselves to the socks and all other articles of clothing and are a constant source of prickly annoyance to everyone. Scattered among the other plants are Messerchmidia (beach heliotrope) clumps of varying sizes from a foot to 7-8 feet. It was all in bloom. The morningglory was mostly in the late seed stage, but a few plants were blooming. Small spots of Lepturus repens were scattered throughout. One clumpf beach magnolia (Scaevola) occurs just east of the last storage building and on the beach. The remainder of the south shore contains stands of mostly morningglory, burrgrass, and beach heliotrope with occasional growths of Conyza, Fimbristylus, and Sonchus. The Coast Guard had sometime in the past planted six palm trees around their Loran equipment building, but these are only 3 feet high and do not appear to be making very rapid growth.

The north side beyond the runway which extends the full length of the island from east to west is compsed mainly of coral rubble dredged up when the island was enlarged and the runway constructed by the Navy during the early years of World War II. Along most of runway is a long belt of giant fleabane (Pluchea). That at the eastern end was mostly dead at the top. Scattered growths of Lepturus and Fimbristylus are found throughout. Opposite the station buildings are some small ironwood trees (Causerina). Near the gas dump are three which are about 6, 8, and 10 feet in height. Opposite the annetenna field are nine which are 1, 3, 4,4, 5,5, 10,10,10,10 feet in height.

## II WILDLIFE

A. Migratory Birds.1. Seabirds.

Laysan albatross. A total of 154 nests with eggs being incubated were counted. 120 of these were on the south shore, and the remainder along the north. Greatest numbers were found just north of the Loran equipment building to the old ham shack on the east end. Also found were two newly constructed nests which had no eggs.

Another 50 adults not occupied with incubation were recorded on the island. Some of these may have been mates of those on the nests. However, only one pair was noted dancing which probably indicates that most of the nonbreeders had not as yet arrived. One newly dead adult was found lying under a guywire in the antenna field.

Nesting material consisted of whatever vegetation happened to be nearest the site. Where morningglory predominated, the nests were constructed mainly of leaves of this plant. Where Lepturus or Cenchrus predominated, nests were mostly of this material.

Black-footed albatross. There were five active nests with eggs along the south side of the island. Two were among those of the Laysans in the antenna field and the other three scattered from there to the east end. Two active nests were located under the Pluchea on the north side. Other than the seven birds incubating, only one other one was seen. All albatross of both species were checked for bands, but none carried any.

Common Noddy Tern. None noted during the days, but on the night of December 7 three were observed roosting in a tall Messerschmidia bush.

Hawaiian Noddy Tern. Only one observed the night of December 7 in the ironwood trees at headquarters.

Fairy Tern. Eight pair were seen in the ironwood trees at headquarters during the night of December 7. This number remained relatively the same until I left.

2. Shorebirds.

Semipalmated Plover. On December 7 a bird of this species was closely observed on the beach at the east end. It was seen every other day I was on the island. Not having a shotgun, I was unable to collect the bird. Identification is certain. I have banded these birds in the West. The species has been collected elsewhere on the refuge the past year, but this makes the first record for French Frigate Shoals.

Golden Plover. 15 birds were seen at various times. All were in full winter plumage.

Ruddy Turnstone. A total of 57 were recorded. These are usually found feeding around the small areas of standing water on the runway or around the buildings. Leftover meat from meals is usually thrown into a shallow wooden container for the 3 dogs kept on the island as mascots. Plover and turnstones will hop onto the rims or into the container itself to feed on this meat. Frequently a piece is pulled out and pecked at continually by various birds until it is fully consumed by them.

Sanderling. 3 observed usually in company with the turnstones at headquarters. They participate in the meat eating.

3. Waterfowl. The badly decomposed remains of a male gadwall were found on the runway near the garbage dump. The plumage, was in fairly good condition so identification was certain. This species has been recorded in the main islands, but this constitutes the first record for the refuge.

#### 4. Other Birds.

Short-eared Owl. I received reports from station personnel that there was what appeared to be an owl on the east end of the island the past several days. On December 7 I flushed a short-eared owl four different times and had excellent views of it. As far as I know this is the first record from French Frigate Shoals. I was not surprised to see it because just about every year one or two of these birds are seen on Midway and Kure Islands much farther west.

Mockingbird. A Coastguardsman reported seeing what he thought was this species just before I arrived. I was unable to find it, however, during my stay although I searched repeatedly for it. A bird of this species was seen here a number of years ago by David Woodside of the Hawaiian Division of Fish and Game. One specimen was collected on this island on August 18, 1965 by Binion Amerson of the Smithsonian Institution.

Nihoa Finch. Only 3 birds of this species were recorded. All were banded birds. One was a male and the other two appeared to be females. Last September 5 were recorded. It appears that the experimental transplant to here will be a failure.

All 3 were seen feeding on burrgrass seeds and possibly insects in front of the headquarters building. Earlier the first day I observed the male and one of the females foraging in the first antenna field but I was unable to determine just what they were eating. These birds visit one of the dripping water taps near the recreation hall for drinking water. Plenty of other fresh water was available, however, in pools standing on the runway.

- D. Other Mammals. No Hawaiian monk seals were ever seen on Tern; however, on December 9 two Air Force helicopters operating from some ship nearby landed on the island and took the Coastguardsmen and myself on a flight around the atoll. They were very cooperative and took us as far down as Gin and Little Gin Islands. A count was made of

all the islands from the air.

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<u>Island</u>	<u>No. Seals</u>
Tern	0
Trig	7
Whale-Skate	8
East	5
Gin	7
Little Gin	5
Shark	<u>19</u>
Total	51

This is 31 less than we saw in September. No pups were noted.

H. Reptiles. No turtles were seen on any of the islands during the helicopter flight. While passing over Trig Island as we were about to land on Tern Island the first day, two had been noted on Trig. Coastguardsmen on Tern told me that several nests had hatched there during the late summer. These were on the very eastern end.

A. Migratory Birds (Addendum)

1. Seabirds.

Bonin Petrel. Data about this species was omitted when this category of birds was discussed on page 34. They are as follows: No petrels were noted during the day, but after dark I found 12 resting on the ground. Ten were caught and checked for presence of eggs in their body but with negative results. Another 5-6 were flying about. There were a number of freshly dug holes in the antenna fields, but I was unable to find any which contained eggs.

SHARK, TRIG, WHALE\*SKATE, LA PEROUSE, EAST, GIN, LITTLE GIN

All of these are being lumped together because of general observations made during the helicopter flight on December 9. None but fleeting impressions could be gathered in the very brief time as we flew over.

The 19 seal seen on Shark was surprising because this is just a sand spit a few square hundred yards.

On Trig Island a large number of Black-footed and Laysan albatrosses was noticed nesting. There were about a dozen Blue-faced boobies and perhaps 300-400 Common noddies there also. Vegetation appeared to be thriving and everything appeared normal.

On Whale-Skate there were an estimated 800-1,000 Black-footed albatross nesting. This estimate may be high because these birds were mixed up with frigatebirds and segregation was not possible. Another 100 or more frigatebirds were soaring high in the air over the helicopter.

Approximately 1,500 to 2,000 Common noddies flew off the island at the approach of the helicopter. Vegetation appeared normal, and everything appeared in order.

East Island contained large numbers of Laysan albatrosses and lesser numbers of Black-footed. Also observed were lesser numbers of Red-footed boobies and Common noddies. The sandspit on the north end of the island which was almost gone in September had built up again and extended out about 75 yards. Everything appeared in order from the air.

Gin Island only supported 10-12 Blue-faced boobies. No determination could be made about the presence of nests.

Little Gin Island contained a Black-footed albatross colony of close to 200 birds.

La Perouse Pinnacle was circled once. About 200 fairy terns flew off as we flew over. Noticed also were several Brown boobies and several hundred Hawaiian or Common noddies.

## LAYSAN ISLAND

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### I GENERAL

A. Weather Conditions. Westerly winds averaging 25 knots blew steadily throughout the trip from French Frigate Shoals. Strong westerly swells 10-15 feet in height were encountered throughout. Upon arrival at this island, we found that 30 foot combers were rolling through the opening in the reef on the northwest side where landings are usually made. It was necessary to land on the northeast side which was partially in the lee.

B. Habitat Conditions.

1. Water. Winter rains had caused the level of the interior lagoon to raise 0.8 ft. over what it had been last September. The gauge installed last trip does not give true elevation but just relative levels. Water extended about 10 feet into the belt of Juncus which lines much of the east shore of the lagoon. All the Sesuvium flats were covered, and the water was almost to the coconut tree grove on the northwest end. The strong west winds were causing the water levels to be slightly higher on the east side and much froth and foam was present (Note photograph). Apparently the rise in level had occurred principally before the albatross started nesting because only about 30 eggs were found floating along the east shore. Sometimes hundreds are destroyed if the rise occurs after nesting is in full swing.

2. Cover. Vegetation higher up on the east side appeared dry. Albatross had trampled some trails through the thinner growths of Scaevola along the beaches. Some morninglory (Ipomoea) was blooming, but no blooming was noted of Boerhavia or Tribulus. The two Messerschmidia plants just off the beach south of the northwest landing were thriving and in bloom. The smaller lone plant of this species north of the landing was not as robust. The lone Chenopodium plant noted near the campsite could not be found. Conyza was in the rosette stage. The plots experimentally sprayed with 2,4-D in September contained a number of such plants. These plants may have been the result of seeds germinating after the spraying and which were in the soil prior to this activity. Results are thus inconclusive. The remaining palms on the north and south were green and thriving. Last September the two on the south end looked sad.

### II WILDLIFE

A. Migratory Birds.

1. Seabirds. Since most of the time on the island was spent circumventing the beaches checking on seals and along the east shore of the lagoon surveying water levels, not much was left for anything else but receiving general impressions.

Laysan Albatross. Greatest nesting concentrations were around the shores of the lagoon, the north beach, and the bare area in the

southwest part of the island. Hundreds of other nests were scattered throughout the Eragrostis which occupies most of the upland areas. A number of birds along the east shore of the lagoon had constructed nests on the matted stands of Juncus. In some cases the ground underneath was covered with 2-3 inches of water. Several dozen nests in the more flattened vegetation had been deserted as water rose to their edges. In several sandy areas a number of birds had repeatedly built up their nests to escape the rising water. One such nest was approximately 10 inches high. Although no count was made, most of the birds on the island appeared to be nesters. Some dancing was observed but not much. Apparently many unpaired birds or paired nonbreeders had not as yet arrived.

Black-footed Albatross. Many thousand nesters were present. Concentrations were the broad and sandy beaches on the north and east shores. Few were found in the vegetation on the east side. The vegetation on the west side was not covered by me. Almost no egg desertion was noted.

Wedge-tailed Sheawater. None noted except for one dead immature found rolling in the surf and another wet and bedraggled immature also in the surf. This bird was carried up into the vegetation where it would have a chance to dry out. Whether this was a futile gesture is debatable, but such action was the good deed for the day.

Bonin Petrel. None seen except for an adult, nearly dead, rolling in the surf.

Common Noddy Tern. Several flocks of 75-100 birds each were noted resting on the beaches. Very few were found in the interior vegetation on the east side. On the northwest beach one attacked me as if it had a nest somewhere in the vegetation nearby but I was unable to find any after a short search.

Hawaiian Noddy Tern. This species was found in the Causerina tree near the campsite. A complete count of nests was not possible, but of 100 checked, 53 contained an egg, 5 had small downy chicks, and 42 had nothing although they were newly constructed or in the process of construction. Several very large chicks almost capable of flight were found under the tree. Large leaves of morninglory or Scaevola were used as nesting material.

Sooty Tern. One lone adult was noted calling while it flew by.

Fairy Tern. Fairly common along the beaches. There were three incubating eggs among the rocks on the southwest corner.

Red-tailed Tropicbird. Four adults were noted flying overhead. No checks could be made for possible nesters.

Blue-faced Booby. There were at least two hundred present. Both adults and flying immatures were observed. No nests were found along

the east shore of the lagoon or along the beaches.

Brown Booby. Two adults were seen on the north side and one on the south.

Red-footed Booby. At least 300 were on the island. The nesting cycle had not begun yet. A check of several favorite nesting sites yielded no evidence of nesting.

Frigatebird. Several thousand were present. Several known nesting sites were checked but no evidence of nesting was found. All age classes of flying birds were seen - many of which were brown-headed immatures.

## 2. Shorebirds.

Bristle-thighed Curlews. Seen singly wherever I walked. At least 100 were noted. There undoubtedly were many more in the interior of the island. These birds appeared fairly tame and could be closely approached, usually much closer than I've previously experienced.

Golden Plover. Scattered all along the beaches and the east side of the lagoon. Three hundred in one flock were at the south end of the lagoon. All were in full winter plumage. Inspections of flocks yielded no Black-bellied plover.

Ruddy Turnstones. Several thousand at least, most of which were on the shores of the lagoon. Many more must have been along the west shore of the lagoon which was partially exposed because of the wind action on the water levels.

Northern Phalarope. Two were seen at a distance of 20-25 feet in good light for at least 5 minutes. There was no doubt about identification of the species which occurs on the Lower Klamath Refuge in California by the thousands in August. This may constitute a record for the island. During March, 1967, I found a dead bird on Southeast Island of Pearl and Hermes Reef.

## 3. Waterfowl.

Laysan Teal. Seen here and there along the east side of the lagoon. No attempt was made to estimate numbers because of lack of time - an understatement.

## 4. Other Birds.

Laysan Finch. Very common everywhere. I observed at least 250 during my brief travel into the interior of the island.

## D. Other Mammals.

Hawaiian Monk Seal. The perimeter of the island was walked and seals inspected for tags when possible. No attempt was made to sex them except in cases where they were sleeping on their back and sex was readily apparent. The animals were disturbed as little as possible.

Sleeping animals were checked quietly for tags, and a total of 14 were so recorded. Most of the animals had not as yet moulted. None were seen which were actually moulting.

The total of 151 animals was the lowest I have ever recorded during the past four years. This and the corresponding lower number tallied at French Frigate Shoals means something, possibly movements to other islands or else foraging at sea preparatory to the pupping season soon to start in a few months - February.

23 adult male	18 subadult unclassified	26 yearling unclassified
22 adult female	2 yearling male	
52 adult unsexed	8 yearling female	

All the tagged animals with the exception of one, had been tagged as pups or yearlings on Laysan during the past year and a half. The exception was an adult female which had been tagged on Kittery Island, Pearl and Hermes Reef, last July.

#### H. Reptiles.

Green Sea Turtle. Six animals, all females, were found on the beaches. All were very tame and easily approached. Since I had no tags or tapes, they could not be tagged or measured. Three were very large, a shell length of about 34-36 inches (one about 42 inches), two had lengths of 20 inches, and one slightly smaller. Two animals bore tags. One had been tagged on Southeast Island at Pearl and Hermes Reef on March 21, 1965. The tagging data for the other never have been found. This tagging was done by someone from Hawaii Fish and Game at least 5 years ago when they used to visit the islands once in a while through a contract with the Bureau.

### VII OTHER ITEMS

- A. Items of Interest. This was the first time we have ever landed on the northeast side. The northwest side is preferable because it is possible to land a boat right on the beach, anchorage is good, and the west side is usually the lee side. Such was not the case this time. The landing craft grounded on the coral rock about 50 feet from the beach, and I and two Coastguardsmen swam and waded ashore with lines. The equipment and the remainder of the party were transferred from the landing craft to the beach by pulling the rubber raft back and forth. The landing craft had to back off into water deep enough to float it because it had only a thin plywood bottom which would have been ground to pieces had it remained on the rocks.

The resolution target was placed on the high beach just above this point with a minimum of effort. Only 4 albatross nests had to be moved. Suuposedly it is to be picked up in March providing the military follows through with their space plans.

LISIANSKI ISLANDI GENERAL

- A. Weather Conditions. Arrived at Lisianski the morning of December 14, but high winds and dangerous surf prevented a landing. During the period of the 15th through the 20th, the ship coursed back and forth at a speed of 1-2 knots waiting for the weather to moderate, but instead it grew steadily worse so no landing could have been made. Huge combers pounded the island from all sides. Swells on the open sea increased to 25-30 feet and northwest winds stayed between 30-40 knots with gusts up to 60 knots. The ship rolled, bucked, and tossed. Weather reports forecast continued gale conditions. The ship was forced to run before huge swells so that by the 18th, it was almost 250 miles south and slightly east of Lisianski. The 72 hour forecast was for similar conditions so on the 18th Coast Guard District Headquarters in Honolulu radioed the ship to return to Honolulu.

II WildlifeA. Migratory Birds.

1. Seabirds. Although no landing was effected a few bird observations were made while the ship was in the vicinity of the island. Black-footed Albatoss followed the ship constantly regardless of the wind or sea conditions. Off the island small numbers of Bonin Petrels and a few Wedge-tailed Shearwaters were noted flying to the island in the late afternoon.

VII OTHER ITEMS

- A. Items of Interest. The target was supposed to be in place by December 24; however, it is very likely that further delays in the cloak and dagger operation going on at the Pentagon will result in its being placed later, probably the March trip. Needless to say, just about everyone on the ship was happy that they did not have to try shooting the surf to do something for another military agency whose officers responsible for the project lack any knowledge of the difficulties involved in landing on these islands. Why the Pentagon types from the Wind Force did not contact the Bureau officer in charge of the refuge for information about jurisdiction, conditions on the islands, and conditions to be expected when trying the land on the islands when they were here in Honolulu probably can be laid to the penchant of the military mind to call everything secret.

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LS# 20

PRELIMINARY REPORT  
LAYSAN ISLAND

BY

Roger B. Clapp  
and  
Charles A. Ely

POBSP Personnel: Charles A. Ely (Biologist in Charge), Roger B. Clapp,  
David I. Hoff.

Supplementary Personnel: Ron Amerson, Ed King (USN)

Support Vessels: LT 2081, LT 2086, LT 2087

<u>Itinerary:</u>	1930	5 September	Field party arrives Laysan Island
	0730	11 September	Field party departs Laysan Island

Man-days Spent on Laysan: 17.4

4085 individuals of 15 species of birds were banded and 268 returns were obtained from 13 species (including 2 from turnstones and 1 from a curlew). A considerable number of accidental shorebirds were collected including 2 Baird's Sandpipers, a first record for the central Pacific. Two Lesser Yellowlegs, the first specimens from Laysan, one Semi-palmated Plover, a first record from Laysan, and two Pectoral Sandpipers, first specimens from Laysan, were also collected.

Black-footed Albatross  
Laysan Albatross

Population estimate ----- None seen

Carcasses of albatrosses that died during the previous season could be found over much of the island but they were not remarkably numerous and there seems to be no reason to assume that the colonies were less than normally successful. A number of band recoveries were obtained for both species.

Wedge-tailed Shearwater

Population estimate ----- 85,000(ad.)  
Banded ----- 371(ad.)  
Returned ----- 2  
Blood sampled ----- 25

Many of the Wedge-tailed Shearwaters had young, ranging from small downy to large downy in size but with most being assessed as medium downy young. Burrows were found over much of the island but appeared to be most dense in areas of open sand and Eragrostis as on the inner slope of the west side of the island. Burrow depths ranged from three feet or more in such habitat to as little as a foot deep in areas such as under the rocks at the southeast and south beaches.

Considerable numbers were present in roosting clubs which retained their identity throughout much of the day. Particularly large clubs were found in a small blowout near the northwest end of the lagoon, in the two blowouts near the southwest end of the island, and on the north beach (several hundred birds).

Although banding data are not presently available it seemed evident that there was a considerably larger proportion of dark phase birds on this island than on Lisianski. Only one or two dark phase birds were seen there while probably at least four or five were seen on Laysan by all party members combined. Nonetheless the proportion of dark phase birds in the Laysan population is certainly very small. Only one of the 371 (.3 percent) adults banded was a dark phase bird.

Christmas Shearwater

Population estimate ----- 2,000(ad.)  
Banded ----- 58(ad.)  
----- 23(yg.)  
----- 38 ??  
----- 119(total)  
Returned ----- 10

Christmas Shearwaters had young ranging from medium downy chicks to near fledging young with no trace of down still left on the contour plumage. By far the larger proportion (ca.80 percent) of all young were completely down-covered and would be usually classified as large downy young.

These birds were most easily found in burrows under large rocks on the southeast beach but were probably more abundant under the fringe of Scaevola from the west side of the island south around to the east beach. Numbers appeared to be definitely fewer in the vicinity of the northwest and north beaches and relatively few birds were found well into the

interior. A few pairs were found in heavy vegetation about 100 yards west of the west shore of the lagoon.

Bonin Petrel	Population estimate -----	75,000 (ad.)
	Banded -----	None
	Specimens collected -----	3

Bonin Petrels were numerous in the same habitat preferred by Wedge-tailed Shearwaters. No eggs were found in any of the burrows which for the most part were still being dug.

These petrels left the island well before daybreak and the departure of the Wedge-tailed Shearwaters.

Bulwer's Petrel	Population estimate -----	1,600
	Banded -----	14 (ad.)
	-----	68 (yg.)
	-----	41 (??) *
	-----	123 (total)
	Returned -----	None

Bulwer's Petrels were most abundant in the rocks at the southwest end of the island and were considerably less numerous in the rocky areas of the south beach. Nest burrows under the rocks ranged from less than a foot in depth to more than four feet.

Most of the Bulwer's Petrels observed were young with probably less than 10 percent of the birds seen having been adults. Four banded nestlings were assessed as to the degree that they had approached fledging (See TABLE 1) with the results indicating that most young had either lost all or most down.

These figures may be somewhat biased since the larger chicks were often found roosting on top of the rocks at night and were thus more conspicuous than the mostly-down covered chicks which roosted in or near the mouths of their burrows. Despite such bias it appears evident that the Laysan Bulwer's Petrels are very near the end of their breeding season.

\* Age unrecorded but probably young birds. The first few downless immatures were confused with adults until the differences in plumage wear, color, and molt were noted.

TABLE 1. Development of Young Bulwer's Petrels on Laysan Island, September 1967.

Degree to which young were covered with down.	Number of young in category	Percent of yg. in category
Young completely down covered	1	2.5%
Young more than 90% down covered (mostly birds with forehead, lores, and other parts of head clear of down)	6	15.0%
Young between 50 and 90% down covered (usually with most of head and some part of breast clear of down)	6	15.0%
Young between 10 and 50% down covered (usually with patches of down under the throat, on the rump and under rear part of underparts)	2	5.0%
Young more than 90% clear of down (traces of down occurring as wisps on the back of the nape or under the throat or as a thin ring of down around the throat, or as wisps on rump or flanks.	5	12.5%
Young completely free of down.	20	50.0%

Red-tailed Tropicbird

Population estimate -----	1,500
Nests with eggs ----- less than	5%
Nests with small downy young --ca.	5%
Nests with large downy young --ca.	10%
Nests with immatures -----ca.	80-85%
Banded -----	90 (ad.)
-----	117 (yg.)
-----	207 (total)
Returned -----	2

Red-tailed Tropicbirds nested primarily in the Scaevola perimeter around the island but small numbers also nested in the rocks at the southwest corner of the island. Breeding birds nested semi-colonially in groups of about three to five pairs in large clumps of Scaevola and with gaps of about 30 or 40 yards between nesting groups. They were considerably more abundant on the central west, northwest, north and east sides of the island than they were on the south and southeast sides.

Blue-faced Booby

Population estimate -----	500
Nests with eggs -----	None
Nests with small young -----	None
Nests with large downy young -----	2
Estimated # of dependent immatures ca.	100
Number of birds in clubs -----ca.	250
Banded -----	8(ad.)
Returned -----	84(ad.)
-----	2(subad.)
-----	86(total)

Blue-faced Boobies on Laysan appeared to be more advanced in their breeding cycle than were the Blue-faced Boobies on Lisianski. Only two large downy chicks were found, one at the northeast corner of the lagoon; the other (which had lost most of its down) in the perimeter of vegetation bordering the east beach. Many of the boobies were still caring for dependent immatures.

Most of these still active breeders were found in small cuts into Scaevola and in sandy openings among the Eragrostis. These birds were concentrated along the south and east sides of the island. Several roosting pairs of adults (4 or 5) were found in open sandy areas above the Scaevola fringe on the west side of the island but none of these birds were tending dependent immatures. A single male was seen skypointing on the east side of the island.

About 30 Blue-faced Boobies were present about the lagoon, particularly on the west and south margins, and about four pair were present on the sandy margins of the northern pond. Their stage of breeding did not seem to be any different from the boobies observed on the south and east perimeters.

Three clubs were observed on the night of 10 September when the entire perimeter of the island was circled. A club of 22 boobies was found in a blowout on the edge of the southwest beach; about 50 birds were present in a club on the open sand of the south beach (about 45 birds has been found here on the night of 6 September) and about 175 were present in a club high on the southeast beach near the margin of vegetation. A very high proportion of these birds (better than 90 percent) appeared to be in fully adult plumage and a relatively small proportion (not as many as half) had been previously banded by the POBSP.

At least six interisland returns were obtained: four from Lisianski, and two from Johnston.

Brown Booby	Population estimate -----	ca.	20
	Nests with eggs -----		none
	Nests with small downy young ---		none
	Nests with large downy young ---		4
	Number of immatures seen -----		3
	Banded -----		none
	Returned -----		5

Brown Boobies were very scarce on Laysan and only two small concentrations of birds were found, both on the edge of the Scaevola perimeter on the midwestern side of the island. The first area, containing two large downy young and an immature that was probably still dependent, was in a small clearing in squash on the uppermost border of the Scaevola. The other concentration, not more than a 100 yards further south of the first, was located in a small clearing in Scaevola near the lower border of the fringe. It contained a large downy young and two immatures, both of the latter still probably dependent.

In addition a single large downy chick was seen on the east side of the island, again within the Scaevola perimeter. Two adults were seen

roosting together in the Scaevola on the northwest perimeter and on 7 September 11 were seen roosting on a flat rock just off the west beach south of camp.

Red-footed Booby	Population estimate -----	2,000
	Nests with eggs -----	none
	Nests with small downy young -	None
	Est. # of nests with large downy young -----	ca. 30
	Est. # of dependent immatures"	80 (non-flying)
	" " " " "	200 (flying)
	Banded -----	55 (ad.)
	-----	3 (subad.)
	-----	58 (total)
	Returned -----	84 (ad.)
	-----	5 (subad.)
	-----	89 (total)
	Blood-sampled -----	25

Red-footed Boobies were found in the Scaevola around the perimeter of the island and roosting in bushes in the interior but their distribution on the island was not uniform. They were decidedly more abundant in the Scaevola of the eastern and northeastern perimeters and in the extensive growth of Pluchea at the northwest corner of the lagoon than in other areas. Small numbers of birds (ca. 20-30) also roosted in the northern palm trees and a notable proportion of these birds (80 percent or more) were fledged immatures or subadults.

Breeding was almost completely finished for the season with most breeding birds tending dependent immatures that had little or no trace of down left on the plumage.

No dark phase or intermediate phase adults were seen.

At least 14 interisland returns were obtained: 5 from French Frigate Shoals, 5 from Lisianski, and 3 from Johnston, and 1 from Pearl and Hermes Reef.

Great Frigatebird	Population estimate -----	3,000
	Nests with eggs -----	none
	Nests with small downy young -	1
	Nests with large downy young or large young -----	ca. 500
	Banded -----	17 (ad.)
	-----	8 (subad.)
	-----	25 (total)
	Returned -----	1
	Blood-sampled -----	25

Great Frigatebirds were found in much the same areas as were the Red-footed Boobies but appeared to be somewhat more numerous. The stage of breeding ranged from large downy young to young that had lost most of their down.

The frigatebirds nested in small semi-colonial groups of from about

three to 29 pairs with the smaller groupings being encountered more frequently. These nests were often in the same bushes that were being used for nesting by Red-footed Boobies but on the whole appeared to be found more on the outside of the perimeter vegetation than did the nests of the Red-footed Boobies.

It was noted here as on Lisianski that the nonbreeding adults seemed to form relatively pure roosting aggregations by sex. Small groups consisting of about 8-10 males would be found roosting some distance away from similar groupings of females. White-headed subadults roosted with both types of groups.

Sooty Tern	Population estimate -----	60,000
	Banded -----	1,425 (ad.)
	-----	200 (yg.)
	-----	1,625 (total)
	Returned -----	43
	Blood sampled -----	25 (ad.)

Sooty Terns were particularly abundant on the upper slopes of the west side of the island in areas of fairly open sand and Eragrostis but could also be found in other areas such as the perimeter of the northern pond and near the Pluchea on the northeast corner of the island. A surprisingly large proportion of the birds were apparently without young and may have been returning to the island only as a response to the relatively few chicks present. No marked evidence of Sooty Tern chick mortality was found but the number of birds on the ground seemed to be far in excess of the number needed to account for the number of young present. In some areas, such as the open sand bordering the vegetation of the east perimeter, large flocks of several hundred to a thousand adults would be down and roosting at night with no trace of young or immature birds among them.

The young ranged in size from about 3/4 grown to fully fledged young but the smaller chicks were decidedly more common -- much more common than they were on Lisianski which appeared to have had an earlier breeding season this year.

In one instance an adult Sooty Tern was found on the southwest beach perched only a few feet from a large, starving Gray-backed Tern chick which was vigorously soliciting food. The Sooty Tern followed the Gray-back chick as it moved about a small sandy area in the rocks but was startled and flew before it could be determined whether the tern was indeed acting as a foster parent for the Gray-backed Tern. In any case, the Sooty Tern had evidently alighted in response to the presence of the Gray-back chick since no Sooty Terns were breeding in this area.

Molt data were taken on the primaries of 25 adults. Twenty-one (92%) were not molting. Three of the other four had primary molt scores ranging from 2-6 ( $\bar{x}$ :4.3). The fourth bird had lost the right P10 but not the left.

Gray-backed Tern	Population estimate -----	ca. 40
	Number of eggs -----	none
	Number of small young -----	none
	Number of large young -----	ca. 10
	Banded -----	none
	Returned -----	none
	Specimens collected -----	1

Only a very few Gray-backed Terns were still present on the island, most of them having been found on the perimeter of the beach side of the Scaevola on the west side of the island. Some of the chicks were still being fed by adults but most were starving.

Brown Noddy	Population estimate -----	10,000
	Number of nests with eggs -----c:	10
	Number of nests with small yg.---c:	50
	Number of large young -----c.	200
	Banded -----	953 (adults)
	-----	235 (immatures)
	-----	1 (young)
	-----	1189 (total)
	Returned -----	none

Brown Noddies were found roosting in Scaevola around most of the island perimeter. The nesting season was, if anything, more advanced than on Lisianski with only a very small number of birds with young that could not yet fly. Some of the flying young (immatures) were evidently still dependent since they were often seen soliciting food from one or two adults perched nearby.

Most nesting occurred in the interior of the island or around the lagoon with a few scattered pairs nesting elsewhere.

Molt data were taken on 20 newly banded adults. All had fully feathered brood patches and 19 (95%) were molting in the primaries, the remaining bird not yet having begun to molt. Primary molt was quite uniform for the entire sample with most birds molting in the 2nd primary. Primary molt scores ranged from 0-33 with a mean of 15.1.

Black Noddy	Population estimate -----	2,000
	Number of nests with eggs -----	none
	Number of nests with small yg.---	none
	Number of nests with large yg.---	none
	Banded -----	126 (117 ad.; 9 imm.)
	Returned -----	3

Black Noddies on Laysan had clearly completed their breeding season and, judging from molt data taken on them, had finished breeding some weeks ahead of the Brown Noddies. Most were found roosting in groups in the Scaevola, particularly on the west side of the island, and a fairly large number (perhaps several hundred birds) roosted in the Casuarina behind camp.

Molt data were taken on 14 newly banded birds and two returns, mostly from birds roosting in the Casuarina tree. Seven birds had all new primaries. Judging from the consistency of speckled crowns in these birds and clear crowns in the molting birds, it seems likely that all the birds with speckled crowns were recently fledged immatures.

Molt was quite uniform in the nine molting birds. Eight of the nine had a primary molt score in the range from 72 through 86 but one exceptional

bird had a molt score of 42.

Two of 129 Black Noddies handled showed instances of partial albinism in the flight feathers. In one bird the distalmost left secondary was pure white (both web and vane); in the other three outer primaries on each wing were largely white. In at least the inner feathers the area near the shaft and the aftershaft was pigmented.

A single interisland return (from French Frigate Shoals) was recaptured.

White Tern	Population estimate -----	800
	Sample nest count results -----	
	Nests with eggs -----	5 (33.3%)
	Nests with small downy chicks ----	1 (6.7%)
	Nests with medium downy chicks ---	4 (26.7%)
	Nests with large downy chicks ----	3 (20.0%)
	Nests near fledging young -----	2 (13.3%)
	Banded -----	189 (ad.)
	-----	10 (yg.)
	-----	199 (total)
	Returned -----	15
	Specimens collected -----	4

White Terns were found around the entire perimeter of Scaevola and in the rocks at the southwest and south beaches but were most common in the latter area and roosted in the palm trees at the north end of the lagoon and small numbers were breeding in the rock pile above the southeast corner of the lagoon.

The sample nest count gave a surprisingly high proportion of nests with eggs but this count may have been somewhat biased by the greater conspicuousness of the incubating adults as compared with the lesser conspicuousness of the smaller, cryptically colored young. It seemed evident that in different parts of the islands birds were in different stages of breeding. The terns in the more northwesterly of the southwest rocks had mostly large and medium sized chicks while the terns breeding on the rocks of the south and east beaches (and on the interior rock pile) were mostly on eggs.

To test this conjecture, these terns were handled in two non-overlapping areas on successive nights, the 9th and 10th of September, and their brood patch condition was tabulated. On the 9th terns were checked on the southwest beach and that part of the south beach adjacent to the large rock wall. On the 10th areas of the south beach, south of the wall, and of the east beach were checked.

Of 23 White Terns handled in the former area 6 (26.1%) had bare brood patches; 13 (56.5%) had refeathering brood patches, and 4 (17.3%) had fully feathered brood patches. Of 35 birds handled in the latter area 14 (43.8%) had bare brood patches; 13 (40.6%) had refeathering brood patches and 5 (15.6%) had fully feathered brood patches.

These data appear to support the earlier impression, e.g., that birds on the south and east sides of the island were relatively earlier in

their nesting cycles than those on the southwest side of the island. This difference may be related to nest choice preferences of White Terns. On the whole, the rocks of the south west side of the island are rather taller, larger, and more numerous than those on the south and east sides of the island.

Height of the egg above the nearest level substrate (in inches) for five nests was 3, 12, 13, 13, and 17 inches and measurements of the eggs (measured with direct reading dial calipers to the nearest mm) were 42.2 x 32.5, 41.2 x 30.4, 41.8 x 31.3, 40.7 x 32.2, 41.5 x 32.0.

Laysan Teal	Estimated population -----	300-400
	Returned -----	9

Laysan Teal were as usual most abundant around the central lagoon and the small pond to the north of it. In this area they were more common around the north end of the lagoon, around the north pond (where 91 were counted at dusk on 5 September) and on the west shore of the lagoon. A few birds were also seen in other areas of the island. An adult was returned (575-94203) on the larger south blowout on 9 September and another adult was returned (615-30945) in the Ipomea on the east beach on the following night.

These birds were far more conspicuous at night than in the daytime when only four or five birds often could be seen. During the day the birds were seen probably most frequently walking among or on the thick mats of Cyprus bordering the lagoon.

A number of teal were seen with young of the year. One female was captured with two young that were just molting in their primary feathers. From a comparison of the adult with the young a relatively easy method of determining juveniles was discovered. The young of the year have a muddy grey-brown iris while that of the adult is a rich chocolate brown. Young of the year also are more finely marked on the breast than the adults but this character is not as easy to discern as the iris color (and the typical notching of the tail feathers found in most juvenal ducks).

Laysan Finch	Estimated population -----	several thousand
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Laysan Finches were abundant over most of the island but appeared to be somewhat more so in areas of dense Ipomea growth near the lagoon and in the Pluchea on the east side of the lagoon. No evidence of breeding was found but several birds, possibly young of the year, were seen soliciting food from other finches.

#### Shorebirds

On Laysan, unlike Lisianski, almost all shorebirds were seen in the interior of the island. The only species that was seen more regularly and in greater numbers on the outer beaches was the Bristle-thighed Curlew. Population estimates given below are for the largest single number present on the island during any one day of our stay on the island. Numbers present appeared to vary from day to day and appeared to be considerably fewer about the third day on the island -- possibly because migrants had continued on

south to other islands --possibly because intensive hunting of accidentals and red-rumped turnstones had driven other birds to roost on the slopes of the island by day.

Golden Plover	Population estimate -----	1,200
	Banded -----	10

Most of the Golden Plovers observed were seen on the wide mud flats of the west side of the lagoon. When not feeding these birds often formed discrete flocks of up to several hundred birds that roosted well back from the margin of the lagoon. Often a few Ruddy Turnstones would roost with these flocks, but, on the whole, such flocks would be considered relatively "pure" aggregations of Golden Plovers rather than mixed flocks.

The only other area on the island where the plovers could be found in large flocks was on the large sandy blowout at the southwestern end of the island.

When feeding in the lagoon, the plovers and tattlers, longer legged birds, tended to feed and roost further out into the lagoon than did the relatively shorter legged turnstones, which occasionally waded out into the water up to their breasts.

Ruddy Turnstone	Population estimate -----	5,000
	Banded -----	11
	Returned -----	2
	Specimens collected -----	2

Ruddy Turnstones were abundant in much the same areas as were the Golden Plovers with the exceptions noted above. In addition the turnstones were present in large numbers all the way from the northwest corner of the lagoon where the mud-flats were the widest, all the way down the west shore, to the southwest corner where much foam had been piled up against the shore by the wind. The margin of the lagoon where the water of the lagoon met the mud appeared to be particularly attractive to these birds.

The turnstones, like the plovers, often frequented the blowouts on the southwest end of the island in large numbers.

We do not know where most of the birds spent the night. A few turnstones could be flushed from the shores of the lagoon but by no means was the number present there at night as large as during the day. Other individual birds were found roosting in the vegetation of the slopes of the island and as many as perhaps 15 birds could be found at one time roosting on the rock wall at the south end of the island. It is possible that the population disperses over most of the vegetated area at night to roost. This explanation is not entirely satisfactory but does account for the absence of flocks at night.

One red-rumped turnstone was found along the southwest shore of the lagoon and was fresh enough to skin. It seems likely that this bird may have been one shot at earlier by one of the members of the survey party.

Almost certainly no less than three more red-rumped turnstones were

present on the island. The west shore of the lagoon was hunted for these birds almost every day and on several occasions (including the one when the red-rumped turnstone was found dead) counts of red-rumped birds were made (with allowances made for the possibility of sighting the same bird twice). These counts along the shore usually resulted in sightings of at least two and often three red-rumped turnstones. Three were seen often enough at widely spaced distances after the dead bird was collected so that it seems likely that three birds were present on Laysan at the time of our departure. Two of the three turnstones had very vivid red-rumps; the third, a considerably more faded one.

Single red-rumped birds were also seen in the flocks on the larger southwestern blowout and on the sandy areas between the northern pond and the large northeastern clump of Pluchea.

Wandering Tattler	Population estimate -----	250
	Banded -----	1

Like the preceding two species, Wandering Tattlers were most common in the central lagoon although small numbers were also seen in the rocky areas of the southwest shore of the island. As with the Ruddy Turnstones, the tattlers were fairly evenly distributed along the entire west shore of the lagoon. They reached a point of maximum concentration in shallow waters bordering the sand spit near the northwest-middle edge of the lagoon. In this area as many as 30 or 40 tattlers could be seen at one time in company with a hundred or more plovers.

Sanderling	Population estimate -----	5
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These birds were usually seen singly but a maximum count of 4 or 5 birds was obtained on one day. These birds were often hidden by the large flock of Ruddy Turnstone with which they closely associated but enough were seen along the margin of the shore so that it seems apparent that they fed there regularly. They were most frequently observed along the shores of the sand spit. Typically one or two of these birds could be found there on any visit to the lagoon and it was here that the maximum number seen at one time was recorded.

Bristle-thighed Curlew	Population estimate -----	100
	Banded -----	13
	Returned -----	1

Bristle-thighed Curlews were the only shorebird on Laysan that were at all common on the outer beaches. A flock of 43 was seen on the south beach by Ely on 7 September and at least 20 birds roosted there on the night of the 10th. Curlews were also found around the lagoon but they were never very numerous. Most were seen as individuals, pairs, or occasionally trios. Some were seen foraging on the mud-flats at the northwest corner but most of the curlews seemed to prefer to remain in or around the thick reed beds.

Molt data were taken on 13 birds banded 10 September. Nine of 12 captured on Laysan (67%) were not molting in the primaries whereas only 2 of 7 checked on Lisianski were not molting in the primaries (29%).

Primary molt scores of the three birds molting in the primaries were 6, 6, and 80.

Semipalmated Plover	Population estimate -----	1
	Specimens collected -----	1

A single Semipalmated Plover was first seen in the late afternoon of 5 September on the mud-flats at the northwest end of the lagoon. At this time the bird was feeding with Ruddy Turnstones.

The following day this bird was seen in the morning as it fed solitarily around the margins of the small muddy pond adjacent to the north end of the lagoon. It was collected later in the day by Clapp as the plover fed on the muddy margin of the northwestern shore of the lagoon. This specimen constitutes the first record for Laysan Island.

Pectoral Sandpiper	Population -----	2
	Specimens collected -----	2

Two specimens of Pectoral Sandpiper were collected on the morning of 6 September. One was collected by Ely at the southeastern end. The other was collected by Clapp as it stood solitarily on the sandy-grassy margin south of the north pond.

Lesser Yellowlegs	Population -----	2
	Specimens collected on 5 September-	2

A Lesser Yellowlegs was first seen at dusk as it roosted among Wandering Tattlers in the shallow water at the northwestern corner of the lagoon. The following day two specimens were collected by Clapp. One was shot as it stood in shallow water in the northern pond; the other was shot in shallow water near the northwestern end of the lagoon. Both were roosting solitarily when shot and both were considerably less wary than the species of shorebirds usually frequenting the island.

Baird's (?) Sandpiper	Population -----	2
	Specimens collected -----	2

Two peep, tentatively identified by Ely as Baird's Sandpipers, were collected 6 September by Clapp. Both birds were shot as they foraged on the northwestern margin of the lagoon and neither was particularly wary. For the most part these birds foraged apart from the flocks of plovers and turnstones but when flushed occasionally flew with flocks of turnstones. On several occasions they fed and flew with the Semipalmated Plover.

If Ely's identification is correct, these specimens constitute the first record for Laysan and for the central Pacific.

Peep sp?	Population -----	2
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An unidentified peep was first seen on the morning of 8 September; two, apparently the same species, were seen the following day; and one was seen

on 10 September. These birds were exceptionally wary and despite intensive efforts could not be collected or approached closely enough for careful observation. They were brownish above, white below, with a faint wing stripe and white showing prominently to either side of the base of the tail. They appeared to be somewhat less than half the size of Ruddy Turnstones.

Unlike the Baird's Sandpipers, these peep associated closely with flocks of Ruddy Turnstones. In only one instance was one of these birds seen feeding solitarily. They were seen only on the mud-flats or in the shallow margin of the northwestern end of the lagoon but evidently spent time in other areas since they were absent from this area on several occasions when the shorebird flocks were carefully searched for them.

#### REPTILES

Snake-eyed Skink

Specimens collected ----- 3

Snake-eyed skinks were fairly abundant over most of the western half of the island. (The east side was not checked). They appeared to be particularly abundant in the open-sand-Eragrostis association at the top of the ridge behind the Casuarina tree and in low Ipomea growth a few hundred yards back from the lagoon. They were far more wary than those which have been captured on the southern islands and large individuals appeared to be somewhat larger than large individuals from the southern islands populations.

LS# 20

PRELIMINARY REPORT  
LISIANSKI ISLAND

by  
Roger B. Clapp  
and  
Charles A. Ely

POBSP Personnel: Charles A. Ely (Biologist in Charge), Roger B. Clapp,  
David I. Hoff

Supplementary Personnel: Ron Amerson (USN)

Support Vessels: LT 2081, LT 2086, LT 2087

Itinerary: 1130 31 August Field party arrives Lisianski Island  
0730 5 September Field party departs Lisianski Island

Man-days Spent on Lisianski: 13.6

During our stay on Lisianski we banded 3,456 birds of 16 species, among them 1,507 Brown Noddies, 150 Ruddy Turnstones, and 49 Bristle-thighed Curlews. Three-hundred thirty-five returns were obtained from 10 species (including 2 returns of Alaska-banded turnstones). Overall 78 of the 312 returns (25%) for which we know island of banding were interisland birds. In some species a surprisingly high proportion of interisland returns was obtained. Thirty-seven of 86\* (43%) of Red-footed Booby returns were from other island as were 6 of 7 (86%) Great Frigatebird returns; 3 of 4 (75%) Black Noddy returns; and 6 of 13 (46%) Sooty Tern returns.

Three accidentals were collected, two of which (a Mongolian Plover and a Macgillivray's Petrel) are first records for the central Pacific and one of which (Semipalmated Plover) is the second record for the Hawaiian Leeward Islands.

\* Includes only those returns for which island of banding origin was known at the time of report writing.



to either of us. The bird was seen in an open sandy area bordered with Eragrostis at the northwest corner of the island in an area where Bonin Petrels were common and was collected by hand. At first the bird was thought to be a melanistic Bonin Petrel but comparison of the specimen with several Bonin Petrels collected on the island made it quite clear that another species was involved. The unidentified petrel is slightly larger than a Bonin Petrel and has a uniformly dark-brown plumage (except for the throat which seems slightly lighter). Its bill is slightly longer than that of the Bonin Petrels and is considerably deeper. The color of the feet was a pinkish-flesh with the outer toe and web dusky brown whereas the entire tip of the foot is black in the Bonin Petrel.

Upon the specimens return to Washington, it was identified by G. E. Watson as Bulweria macgillivrayi rather than Bulweria fallax, since it appeared more probable that the bird had wandered from Fiji than from the Indian Ocean. The present specimen, if its identity can be established without doubt, is only the second known specimen of Macgillivray's Petrel and is the first known adult. The type is a fledging male that was taken on Ngau Island, Fiji in October 1855.

Bulwer's Petrel	Population estimate -----	1 seen
	Specimens collected -----	1

On 4 September Ely collected a Bulwer's Petrel that he found sitting alone on a narrow sandy beach on the east side of the island north of camp. A few rocks, completely covered with Scaevola, and a large log were nearby but no burrow was found.

Red-tailed Tropicbird	Population estimate -----	800 (adults)
	Sample nest count results: (128 nests)	
	Nests/egg -----	4 (3%)
	Nests/small downy young -----	16 (13%)
	Nests/medium sized or large downy young -----	50 (39%)
	Nests/dependent immatures -----	58 (45%)
Banded	-----	58 (adults)
	-----	108 (young)
	-----	166 (total)
Returned	-----	2 (adults)

Red-tailed Tropicbirds could be found in most parts of the island but they exhibited distinct tendencies towards denser numbers in some areas. Considerably higher densities of nesting birds were found in the Scaevola of the northeast and north perimeters and in the Scaevola behind camp on the east side of the island. Individuals were found nesting in the center of the island under thick Ipomea -- growth so dense that a nest would not be found unless the tropicbird called out when disturbed.

This species was often chased by female frigatebirds but none of the dozen or so chases observed was successful (from the frigatebird's point of view). This may be because the tropicbird's defense in such chases was to climb higher and higher in the air apparently escaping the frigatebirds through better climbing ability (though tropicbirds in level flight did not seem capable of as great a speed as the frigatebirds.)

Numbers of tropicbirds flying over the island in "courtship display" seemed pronouncedly greater during the middle of the day.

Blue-faced Booby

Population estimate -----	800
Number of birds in clubs -----c.	350
Nests/eggs or downy young -----	none
Estimated # dependent immatures -c.	200
Banded -----	90 (adults)
-----	26 (subadults)
-----	98 (immatures)
-----	<u>214</u> (total)
Returned -----	184 (adults)
-----	9 (subadults)
-----	11 (immatures)
-----	<u>204</u> (total)
Blood-sampled -----	12 (adults)
-----	1 (subadults)
-----	12 (immatures)
-----	<u>25</u> (total)

Four or five clubs were present on the island. The largest, containing about 200 birds, was located on the south tip of the island. Most of the birds in this club (and in the other clubs) appeared to have fully adult plumage but a small proportion were subadults. Two independent immatures (the only ones seen in clubs) and an adult Brown Booby were also seen in this club.

Another small club of about 15-20 birds was present on the sandy southeast beach and a club of about 40 birds was seen several times on the southwest beach. A club of about 100 birds was present on the north beach one night. Another night two clubs each containing about 60 birds were seen at the northwest tip of the island.

We frequently observed small roosting aggregations of about 8 to 10 birds on the beaches particularly those of the north, northwest, and west sides of the island. Most of these aggregations had roughly the number of immatures (dependent?) that would account for the number of adults present. We suspect that such aggregations represent a stage of the breeding cycle intermediate between territory holding and use of club areas as roosting grounds.

Eleven Great Frigatebird chases of Blue-faced Boobies were tabulated on the evening of 3 September. In every instance the chase was initiated by a female frigatebird but some subadults (white-headed birds) occasionally entered into the chases. In seven of 11 chases only one frigatebird chased. The other four chases were by 2 females, 3 females and 1 subadult, and by 1 female and 1 subadult. About equal numbers of male and female Blue-faced Boobies (5 males, 6 females) were chased but only 2 of ten chases resulted in regurgitation of food by the boobies. (In one instance one booby regurgitated three times).

Only those boobies that continued to climb in flight were successfully preyed upon by the frigatebirds. The rest quickly escaped further persecution by alighting on the beach. The triggering mechanism for these chases may well be the relative "heaviness" of flight of the boobies.

Boobies which left the ground and flew easily were seldom pursued by the frigatebirds, while those which appeared to have difficulty in taking flight were almost invariably pursued.

Data on island of banding were available for 193 of the 204 Blue-faced Boobies returned. One-hundred seventy-one of the 193 (89%) had been banded on Lisianski; the rest on other islands. Twelve of the 22 (55%) interisland boobies were banded on Laysan; 4 (18%) were banded on French Frigate Shoals; 3 (14%) were banded on Pearl and Hermes; 2 (9%) were banded on Kure; and 1 (5%) was banded on Johnston.

Brown Booby	Population estimate -----	40
	Nests/1 egg -----	1
	Nests/large downy young -----	4
	Number dependent immatures observed --	2
	Banded -----	29 (adults)
	-----	3 (immatures)
	large downy chick -----	4
	-----	<u>36</u> (total)
	Returned -----	4 (adults)

The nest count figures given above are considered to be very close to the actual totals for the island since many hours were spent making nest counts of the interior of the island with the result that very few nests could have been overlooked.

The breeding birds were found in two low, Ipomea-covered openings in the Scaevola on the south-central and southwestern interior portions of the island. Other adults were found roosting near the breeding areas and a few (about four) were found roosting in the Scaevola above the west beach. In addition a single male was seen roosting by himself above the cutbank at the southeast end of the island and one adult roosted regularly with the club of Blue-faced Boobies at the south point of the island.

The sex ratio of 32 of the 33 adult Brown Boobies handled was strongly biased in favor of females. Twenty-one of the 32 adults (66%) were females. Since we believe that we handled over 90% of the Brown Boobies present on the island, this datum suggests some sex-segregated difference in behavior.

One of the Brown Boobies handled (an adult male) was marked with an orange streamer.

Red-footed Booby	Population estimate -----	1500 to 2000
	Sample nest count results:	
	Nests/eggs -----	None
	Nests/small downy young -----	None
	Nests/large downy young -----	14
	Number of dependent immatures -- c.	400
	Banded -----	262 (adults)
	-----	63 (subadults)
	-----	71 (immatures)
	-----	<u>396</u> (total)
	Returned -----	57 (adults)
	-----	33 (subadults)
	-----	None (immatures)
	-----	90 (total)

Red-footed Booby (cont'd)

Blood-sampled -----	11 (adults)
-----	13 (subadults)
-----	1 (immature)
-----	<u>25 (total)</u>

For the first three nights of our visit all birds handled by one bander were captured, so far as was possible, in a non-discriminatory manner; i.e., the first bird reached in a roosting group was captured, the nearest bird to it was captured next, and so on. No particular attempt was made to concentrate on capturing subadults and birds with bands were not preferentially captured. It was hoped that the resultant data might give a more accurate representation of the proportion of different age groups in the population than normal banding and recapturing methods which usually bias the data upward in favor of subadults.

Of 150 birds handled in such fashion, 80% were fully adult plumaged birds, 17% were subadults, and 3% were independent immatures. One dark-phase or intermediate phase adult was seen on the island by both Ely and Clapp.

Ely also made a number of comparative counts in different areas of the island. On the northwest part of the island he counted 118 adults (96%) and 15 immatures (4%); on the northeast part he counted 47 adults (84%), 8 subadults (14%), and 1 immature (2%). Twelve adults (75%) and four immatures (25%) were counted in the west central Messerschmidia tree.

Thirty-seven of the 86 returns (43%) whose place of origin was known at the time of report-writing were originally banded on other islands. Twelve of the 37 (32%) interisland returns were from Johnston; 7 (19%) were from Kure; 7 (19%) were from French Frigate Shoals; 5 (14%) were from Laysan; and two returns each (2%) were from Wake, Midway, and Pearl and Hermes Reef.

Great Frigatebird

Population estimate -----c.	1000
Sample nest count results: (12 nests)	
Nests/egg -----	None
Nests/small downy young -----	1
Nests/medium downy young -----	1
Nests/large or dependent young -----	10
Estimated # dependent immatures -----	?
Banded -----	123 (adults)
-----	26 (subadults)
-----	2 (immatures)
-----	None (nestlings)
	<u>151</u> (total)
Returned -----	3 (adults)
-----	4 (subadults)
	<u>7</u> (total)
Blood-sampled -----	20 (adults)
-----	5 (subadults)
-----	<u>25</u> (total)

Great Frigatebirds were found roosting and nesting on Scaevola

wherever it occurred on the island but appeared to be somewhat more common at the southeast and northeast corners of the island. Ely noted that non-breeding birds were roosting in groups segregated by sex. One small group (about 4 to 10 birds) would be entirely composed of adult males, while another small group, a short distance away, would be composed solely of adult females. A similar sexual segregation was noted on Laysan.

He also noted that females appeared to be far more numerous than males. Of 93 adults handled, 68 (73%) were females. This bias is probably a real phenomenon since no age class appeared to be more wary than another and Ely made no particular effort to obtain one age-class in preference to another.

Twenty-nine of 224 (11%) roosting Great Frigates handled were sub-adults and 2 (1%) were immatures.

Six of the seven Great Frigatebirds returned were banded on other islands. Three had been banded on French Frigate Shoals; 2 were banded on Kure; and 1 was banded on Pearl and Hermes.

Sooty Tern	Population estimate -----c.	15000
	Banded -----	197 (adults)
	Returned -----	15 (adults)

Sooty Terns were nesting throughout much of the east-central interior of the island, particularly in sand-Eragrostis associations but also in areas where Ipomea had covered the ground. Most of the birds were with large chicks but a very few of the young were flying. A comparison of the stage of nesting on Lisianski with that on Pearl and Hermes suggests that the Lisianski population is about two weeks behind the one on Pearl and Hermes.

Six of the 13 returns (46%) for which we knew the island of banding were banded on other islands. Two were banded on Laysan, and one each was banded on French Frigate Shoals, Oahu, and Johnston. We have no explanation for this anomalously large proportion of interisland birds.

Gray-backed Tern	Population estimate -----c.	20
	Number of young -----c.	10
	Specimens collected -----	2

The Gray-backed Tern nesting cycle on Lisianski was essentially finished with only a few starving chicks still remaining on the island. About five of these young were found in the northern interior near a group of nesting Red-footed Boobies and Great Frigatebirds. About five more young were found in a clearing at the southwest interior of the island near the area utilized for nesting by one of the small groups of Brown Boobies. Very few adults were seen. It seems likely that most of the young still on the island have been abandoned by their parents.

Brown Noddy	Population estimate -----c.	10000
	Estimated # nests/eggs -----	None?
	Estimated # small downy chicks ---c.	100

Brown Noddy (cont'd)

Estimated # large chicks -----c.	1000
Estimated # dependent immatures ----c.	2000
Banded -----	1381 (adults)
-----	126 (young)
-----	1507 (total)
Returned -----	1 (adults)

Nonbreeding Brown Noddies were commonly found in several areas on Lisianski. During the day small flocks of from 10 to 50 birds roosted on the beaches of the island, particularly those of the west and north sides. At night many could be found roosting individually or in small groups in Scaevola above the beach crest, particularly on the south, west, and north sides. During the day scattered individuals and young roosted under the Scaevola or under overhanging tufts of Eragrostis. Other small groups of roosting birds were found in or under the low Scaevola in the interior of the island.

Breeding birds were found in the same areas but breeding seemed to be somewhat more concentrated on the northwest, west, and southwest perimeters of the island. Most of the young birds were either fledged or near-fledging but a great many of them were still dependent on the adults for food (or at least regularly begged it from them).

On the nights of September 3-4, a Johnston streamered Brown Noddy was flushed from its roost in Scaevola above the northwest beach where it roosted with two other Brown Noddies and a small group of Black Noddies. It was not seen again. The only return obtained was a bird that had been banded on Kure.

Black Noddy	Population estimate -----	1000
	Number nests with eggs or young -----	None
	Banded -----	196 (adults)
	Returned -----	6 (adults)

Nonbreeding Black Noddies were seen in smaller numbers than Brown Noddies in most areas where the two species roosted together. An occasional Black Noddy or small group of Black Noddies was seen roosting on the beaches or rocks with the Brown Noddies and both species were regularly seen roosting together in the Scaevola along the island perimeter. The Black Noddies were decidedly more numerous in the higher Scaevola on the west side of the island (from the Fish and Wildlife sign south to the southwest corner) and in the Scaevola on the southeast corner than in other areas. About 50 of these noddies roosted in each of the three clumps of Casuarina. One of the birds handled was a partial albino (712-50080). Both of the innermost right tertials were white or partially white. The innermost tertial was pure white with a white vane while the feather next to it was mostly white with an elliptical dull grey-brown center.

Seventeen Black Noddies were examined to determine stage of molt in the primaries. Two (12%) had fresh primaries, one (6%) had not yet begun to molt, and the rest (76%) had some primaries in active molt. Twelve of the 13 molting birds showed a normal proximal-distal molt progression but one, (923-19192 - a bird banded as an adult on Whale-Skate, French Frigate Shoals in August 1966) had a discontinuity in the left wing and an

apparently normal molt in the right wing.

The PMS scores obtained for the Lisianski Black Noddies clearly indicated that they had finished their nesting cycles some time before the birds on Laysan. The range of PMS scores and mean score for 13 birds in active molt on Lisianski was 20-94 and 57 whereas the range of scores and mean score for 9 in active molt on Laysan was 42-86 and 75. When all birds examined for molt on the two islands are included in the total (including birds that had finished or not yet begun molt) the resulting mean PM scores are 59 for Lisianski (n:16) and 86 for Laysan (n:16).

On 4 September a Johnston streamered Black Noddy was captured as it roosted solitarily about two feet up in Scaevola at the south end of the island. Two other returns were also interisland movements. One had been banded on Pearl and Hermes, the other on French Frigate Shoals.

White Tern	Population estimate -----c.	250	
	Banded -----	73	(adults)
	-----	9	(young)
	-----	82	(total)
	Returned -----	4	(adults)

White Terns on Lisianski were decidedly less numerous than on Laysan and fewer active nests were found. The stage of breeding ranged from eggs to fledged immatures but very large young (and presumably - undetected immatures) were apparently considerably more common than eggs or downy young. Although fewer nests were found on Lisianski the proportion of adults (or putative adults) with bare brood patches was decidedly higher than on Laysan. Thirteen of 21 (62%) White Terns handled by one observer on Lisianski had bare brood patches whereas only 20 of 55 (36%) handled on Laysan had bare brood patches.

The White Terns roosted in both the high Scaevola on the west, south, and southeast sides of the island and in the low Scaevola of the island interior as well as in the three groups of Casuarina trees. The number of these terns roosting in the Casuarinas was no greater than the numbers roosting in a similar volume of high Scaevola. Only four terns were observed in the southernmost Casuarina and not more than ten roosted in the other two Casuarina clumps. Maximum densities of roosting birds appeared to be in the high Scaevola of the east and southeast sides of the island.

Five nests were found: 1 with an egg in Scaevola south of camp, and four with young from large-downy to stub-tailed juveniles. At least five other dependent or flying immatures were banded.

At 0030 1 September evidence of nocturnal feeding by this species was observed. Two adults perched together on the peripheral Scaevola of the east beach both held freshly caught food in their beaks. One tern held a small (about two-inch) fish while the other held a four-inch squid which, after some difficulty, it finally managed to swallow.

#### Shorebirds

Most of a very abundant shorebird population was found around the beaches. Except for the Bristle-thighed Curlews and for shorebirds

roosting nocturnally, relatively few were observed inland. Occasionally mixed flocks of turnstones and plovers (up to about 40 birds) were flushed from more open areas in the sand - Eragrostis association, particularly in the northwestern and northeastern sectors of the interior.

The turnstone and plover flocks were so large and so numerous that no very accurate population count could be made. Nonetheless, a shore count was made the afternoon of 31 August in which the island was circled twice. The resulting estimates, while not as accurate as direct counts, are probably much more reliable than most visual estimates.

Golden Plover	Population estimate -----	450
	Banded -----	14

Golden Plovers were found around the entire beach perimeter in ones, twos, and (for the most part) small flocks. They were considerably more abundant on the north, west, and south beaches than they were on the east beach. The largest flock seen on the east beach contained about 10 to 15 birds but at least eight flocks of 20 birds or more were seen on the other beaches.

Two major roosting concentrations were found during the shorebird census. The first, a mixed flock of turnstones and plovers roosting in an area of low grass above the crest of the north beach, contained at least 75 plovers. The second, a nearly pure flock of plovers that was roosting on the broad sandy beach at the south point, contained at least 200 plovers.

At night many Golden Plovers were found roosting inland, usually solitarily. They were often found under low, partially dead Scaevola and in the sand-Eragrostis association. At night they appeared to be most common in the little clearings in Scaevola and grass above the beach crests, particularly those of the south, southwest, and northwest beaches.

No plovers in full breeding plumage were observed but many still retained patches of black on the belly and some appeared to have attained full winter plumage.

Five birds examined for stage of primary molt were all molting. The range and mean of primary molt scores for these birds was 62-92 and 74.

Semipalmated Plover	Population -----	1
	Specimens collected -----	1

On 4 September Ely shot a Semipalmated Plover at the north end of the island. When first seen, the plover was feeding along the flat, rocky shoreline. It was later flushed from both sandy and rocky beaches. This specimen constitutes the first record for Lisianski and the second from the Hawaiian Leeward Islands as a whole.

Mongolian Plover	Population -----	1
	Specimens collected -----	1

At 0400 on 4 September Clapp collected by hand a shorebird which is

apparently the above species. The bird was roosting solitarily on the wave-sculpted rocks of the northeast corner of the island. The specimen constitutes the first record for Lisianski and for the central Pacific as a whole.

Ruddy Turnstone	Population estimate -----	1700
	Banded -----	150
	Returns -----	2
	Minimum # of red-rumped birds seen ----	2

Ruddy Turnstones, like the Golden Plovers, were considerably more common on the north, west, and south beaches than on the east beach. It was very difficult to get estimates of flock sizes since the number of turnstones was so great that it was often hard to tell where one flock began and another left off. Visible portions of the west beach often gave the impression of a continuous band of turnstones down the beach.

Flock sizes were decidedly larger where the beach was wider (with the exception of the southeast beach where relatively few turnstones were seen). At least 150 turnstones were present in one flock at the north end of Lisianski where the concentration of 75 plovers was observed; at least 200 were on the broad point of the southwest beach; and from four to five hundred roosted on the sandy south point.

Red-rumped turnstones were seen four times during the island circuit on 31 August and one or two were observed daily during the rest of our stay. It is very possible that some of the sightings made on 31 August represent birds seen more than once. It is certain, however, that no less than two different red-rumped turnstones were seen, since both a bird (or birds) with somewhat dull-faded red-rumps and a bird (or birds) with brilliant red-rumps were observed. Two returns of Alaska-banded turnstones were made.

Nocturnal roosting turnstones, like the plovers, were found roosting both inland and in clearings in grass and Scaevola on the beach crests. The turnstones, however, appeared to be considerably less numerous in the interior and more numerous on the beach crests than the plovers. The largest numbers of roosting birds found at night were found roosting on the wave-washed rocks of the northeast corner of the island. As many as forty or fifty turnstones were found roosting in this area in one night. In these rocks the turnstones very clearly preferred to hunch down in the sculpted hollows rather than perching on the projecting portions of rock.

Plumages of the birds ranged from very drab, apparently full winter plumage to full breeding plumage.

Sixteen banded birds were examined for molt in the primaries. Eleven of the 16 (69%) were molting; 3 (19%) had fresh primaries; and 1 (6%) had not yet begun to molt.

Wandering Tattler	Population estimate -----	20
	Banded -----	3

Wandering Tattlers were evenly distributed around the beach perimeter appearing to occur as frequently on the east beach as on the other beaches.

No flocks of this species were observed during our stay on the island and all birds observed were either seen singly or with another tattler. At night an occasional tattler was flushed from the edge of the water or from the rocks at the northeast end of the island but relatively few of this species were seen at night.

Bristle-thighed Curlew	Population estimate -----	100
	Banded -----	49

Curlews were found around the entire beach perimeter and on the crests of the beaches but were noticeably more abundant on the north, west, and southwest perimeters. A considerable proportion (at least half) of the curlews seen on the shorebird count were found above the beach crests in partially open areas in the vegetation. At night this species was most frequently seen in such open areas but were also commonly observed in the interior of the island.

Most of the curlews were observed individually, in pairs, or in small groups of from three to five birds but larger flocks were occasionally encountered. The largest flocks seen during the shorebird count were composed of 8, 9, (on the north beach); 10 (on the northeast beach) and 30 curlews (on and above the northwest beach). Both by day and night curlews were considerably more abundant at the northwest corner of the island where there was a wide partially grass-covered area above the beach and where openings in the Eragrostis were numerous.

Five of seven (71%) curlews examined for molt were molting in the primaries. The range and mean of primary molt scores for the five molting birds was 14 to 78 and 20.

Sanderling	Population estimate -----	3
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Sanderlings were seen only along the beach perimeter. They were occasionally seen on the east side of the island but appeared to prefer the sand margins bordering the water on the west and southwest beaches. They usually associated closely with one another and with the Ruddy Turnstones. All Sanderlings seen were in white winter plumage.

-----  
Hawaiian Monk Seal

A beach count of the seals was made at noon on 2 September by Hoff. One-hundred forty-one were counted: 60 adults for which the sex was not recorded; 59 adult males; 12 adult females; and 10 pups.

Green Sea Turtle

Data on this species are not now available.

LS# 20

PRELIMINARY REPORT  
PEARL AND HERMES REEF

by  
Roger B. Clapp  
and  
Charles A. Ely

POBSP Personnel: Charles A. Ely (Biologist in Charge), Roger B. Clapp,  
David I. Hoff.

Supplementary Personnel: Corpsman Wrangel

Support Vessels: LT 2081, LT 2086, LT 2087

<u>Itinerary:</u>	0830	28 August	Clapp, Ely, and Hoff arrive Southeast Island.
	0845	29 August	Ely, Hoff depart Southeast Island.
	1200 - 1300	29 August	Ely surveys Humphrey Island.
	1400 - 0815	29-30 August	Ely surveys North Island.
	1300	29 August	Clapp departs Southeast Island.
	1245 - 1315	29 August	Hoff surveys (Sand) Island.
	1330 - 1400	29 August	Clapp and Hoff survey (Bird) and Planetree Islands.
	1415 - 1530	29 August	Clapp and Hoff survey Grass Island.
	1600 - 1630	29 August	Clapp and Hoff survey Kittery Island.
	1630 - 1730	29 August	Clapp and Hoff survey Seal Island.
	1945	29 August	Clapp and Hoff return to Southeast.
	0930	30 August	Clapp and Hoff depart Southeast.

Little  
North

Man-days Spent on Islands of Pearl and Hermes Reef: 5.4

During our short stay on Pearl and Hermes Reef 359 individuals of 8 species were banded and 60 returns were obtained from 11 species. All islands were visited (or observed from very nearby) but the length of our visits to Seal and Grass were so brief that data on procellariiform breeding is scanty. Of particular note are: the recovery of two Alaskan turnstones found dead on Southeast; the collection of what is believed to be a Ruff (the third record for the central Pacific); and what appears to be unusually late breeding in Brown Noddies.

TABLE 1.

## Population Totals for the Entire Atoll

Species	# of flying birds	# of breeding birds	Est. % of breeding birds with eggs	Est. % of breeding birds with yg.	Islands on which found breeding
Laysan Albatross <sup>1</sup>					
Wedge-tailed Shearwater <sup>2</sup>	c. 16,000	<4,000	none	100 %	Southeast, North <sup>3</sup>
Christmas Shearwater	20	???	????	????	-----
Bonin Petrel	c. 1,000	none	none	none	Southeast
Red-tailed Tropicbird	c. 50	c. 50(?)	none	100 %	Southeast, North <sup>3</sup>
Blue-faced Booby	c. 350	c. 80	5 %	95 %	SE, N. Bird, Seal, Grass, Kittery, Humphrey
Brown Booby	c. 95	c. 70	20 %	80 %	Southeast
Red-footed Booby	c. 85	c. 22	none	100 %	Southeast, North
Great Frigatebird	c. 250	c. 130	none	100 %	Southeast, Grass
Sooty Tern	c. 500	c. 200	none	c. 100 %	North Southeast,
Gray-backed Tern	c. 70	c. 70	none	100 %	Southeast, Grass, Seal
Brown Noddy	c. 3,400	c. 2,000	33 %	67 %	Southeast, Grass, Seal, North
Black Noddy	c. 4,300	20	50 %	50 %	Southeast, Grass, Seal, North
White Tern	11				Grass, Humphrey, North
Golden Plover	c. 125				Southeast, Seal, North, Humphrey
Noddy Turnstone	c. 670				Southeast, Seal, North, Grass, Humphrey
Wandering Tattler	c. 20				Southeast, North, Seal
Bristle-thighed Curlew	31				Southeast, Humphrey
Sanderling	6-7				Southeast, Grass, Seal
Ruff	1				Southeast

1. Only one young bird seen. 2. Southeast and North Islands only. 3. Probably also breed on Grass and Seal. 4. Islands on which seen are listed for the shorebird species.

Laysan Albatross  
North Island

Population count----- 1 (young)  
Return ----- 1

One starving young bird that had been previously banded was seen in the center of the island. No adults or other young were seen on or near any of the other islands.

Wedge-tailed Shearwater

Southeast Island

Population estimate -----	8,000 (adults)
Estimated # of young -----	less than 1,000
Banded -----	56 (+5 re-banded)
Returned -----	6 (including those re-banded)

Wedge-tailed Shearwaters were by far the most abundant species on Southeast Island. Many were found in and outside burrows in the Sesuvium flats in the center of the eastern half of the island but there were probably as many more in areas of heavier vegetation. Some nested on the western half of the island but we got the distinct impression that this species was less abundant there.

Very few young were seen and all that were seen were medium-sized downy young. A large proportion of the burrows did not contain young. In one instance 10 of 11 burrows which had adults sitting in the burrow mouth or near the entrance had no contents. It seems apparent that only a relatively small proportion of the breeding population has nested successfully this year.

A very high proportion of the adult birds were light phase. All 62 adults handled were light phase birds.

Grass Island

Population estimate ----- none made.

Only one adult Wedge-tail was seen during our diurnal visit to Grass Island. The bird was sitting above ground near the perimeter of the heavier vegetation but flushed when approached. Twenty-five burrows were checked for contents, but none held any eggs or young. Seventy-five percent of the burrows were more than three feet deep. Many of the burrows were either caved-in or apparently had been abandoned in the early stages of digging.

Seal Island

Population estimate ----- none made.

No Wedge-tails were seen during our diurnal visit to Seal Island but the number of burrows present suggested that the island may have been used as a breeding station. None of the five or six burrows investigated held any contents.

North Island

Population estimate -----	7,000-8,000
Estimated # of young -----	1,000-2,000
Banded -----	none
Returned -----	9

As on Southeast a large proportion of the burrows held no contents. Six of 10 examined were empty or held rotten eggs. The remaining four burrows held medium sized downy young which appeared to be about the same age as those seen on Southeast. Most of the burrows were under dense Solanum or Sicyos or beneath Eragrostis.

Three hundred birds examined for returns were all light phase birds. No dark phase birds were seen on the island.

No Wedge-tailed Shearwaters were seen on any of the other islands.

Christmas Shearwater

Southeast Island Population estimate ----- 20 (adults)

Not more than seven or eight individual Christmas Shearwaters were seen during our visit. Two were found in brushy Solanum near the easternmost point of the island and two others were found in a sand-Tribulus association near the northwesternmost point of Southeast. Four or five others were seen departing from the island on the morning of 30 August. Neither of the burrows near the two pairs found on the ground contained either young or eggs.

No Christmas Shearwaters were seen on any of the other islands.

Bonin Petrel

Southeast Island Population estimate ----- c.-1,000 (?)  
Returned ----- 1

Bonin Petrels were not very common on Southeast. They possibly reached their peak abundance in the area of dense Eragrostis west of the central depression and on that edge of the depression. None of the burrows checked held either young or eggs. Most birds were rather inactive (apparently pre-courting and pre-nest digging).

None were seen on any of the other islands.

Bulwer's Petrel

None were seen on any of the islands, even though a considerable amount of time was spent on Southeast checking likely areas for burrows.

Red-tailed Tropicbird

<u>Southeast Island</u>	Population estimate -----	30 (adults)
	Sample nest count -----	10 occupied nests
	Nests/egg -----	1
	Nests/recently hatched young -----	0
	Nests/small downy young -----	0
	Nests/large downy young -----	3
	Nests/dependent immatures -----	6
	Banded -----	9 (adults)
	-----	9 (young)
	-----	18 (total)
	Returned -----	2

Maximum concentrations of breeding birds were found in the oil drums and in the thick growth of Eragrostis west of the Sesuvium depression. Some four pair nested on the pile of drums nearest camp; one pair nested in the other pile of drums, and at least five pair nested in thick Eragrostis.

Grass Island Two Red-tailed Tropicbirds were seen in "courtship display" over

the more heavily vegetated part of Grass Island. No nests were found but they could have easily been overlooked in the thick vegetation.

Seal Island Two adult Red-tailed Tropicbirds were seen flying over Seal Island. No nests were found.

Humphrey Island Two Red-tailed Tropicbirds flew over Humphrey Island but no nests or previously used nest-sites were found despite a careful search. The birds were probably from the nearby population on North Island.

<u>North Island</u>	Population estimate -----	30 (adults)
	Sample nest count results:	
	Nests/large downy young -----	1
	Nests/dependent immatures -----	9
	Banded -----	17
	Returned -----	1

Most nesting birds were either under clumps of Eragrostis at the NE end of the island or under Solanum and Eragrostis near the center of the north part of the island. Most of the birds on the island had apparently finished breeding. Six of seven adults handled were not near chicks or eggs. A maximum of 14 were seen displaying over the island at one time.

None were seen on or over any of the other islands.

Blue-faced Booby

<u>Southeast Island</u>	Population estimate -----	15 (flying birds)
	Nest count results:	
	Nests with small downy young --	none
	Nests with large downy young --	2
	Number of dependent immatures -	2
	Banded -----	6 (total)
	-----	2 (subadults)
	-----	2 (immatures)
	-----	2 (nestlings)
	Returned -----	3

Most of the Blue-faced Boobies were found around the edge of the lagoon and on the rock ledge near the mouth of the lagoon. One of the downy young, however, was on the crest of the southeast beach. No clubs were seen during our stay on the island.

Bird Island

Population count ----- 9

Four adults, four subadults, and one dependent immature were seen on Bird Island on the afternoon of 29 August.

Sand Island

Population count ----- 3

Three adult Blue-faced Boobies were seen on the island, all evidently utilizing the island as a temporary roosting site.

Grass Island

Population estimate ----- 2 (adults)

No adult Blue-faced Boobies were seen on Grass Island, but a dependant immature

was seen at the top of the southwest beach crest.

Kittery Island Population estimate ----- 25  
Number of dependent immatures -----c. 5

Fourteen adult Blue-faced Boobies were counted on Kittery during our brief survey. About eight of them were in a small club on the tip of the island nearest Seal Island. Ten immatures were present, some of them still obviously dependent on the adults for food.

Seal Island Population estimate ----- 50 (flying birds)  
Nest count results:  
Nests with large downy young ---- 10  
Number of dependent immatures---- 2

All the Blue-faced Boobies observed on Seal Island were seen on the barren reef-ward half of the island surrounding the tidal pool. When we first arrived at the island we counted 37 boobies in a club at the south-east end of the barren half of the island. Many of these birds were adults but some were independent immatures.

Most of the immatures on the island were independent. Eight of ten counted after the club was flushed by Navy personnel were capable of flight.

North Island Population estimate ----- 40 (adults)  
Estimated # of immatures ----- 20  
Banded ----- 12 (immatures)  
Returned ----- 3 (adults)

About 15 immatures, many of them still dependent, were present on the island during the day and more arrived after dark. They were most abundant along the beach of the west side of the island.

Humphrey Island ? Population estimate ----- 200  
Nest count results:  
Nests with 2 eggs ----- 2  
Nests with small downy young - 1  
Nests with medium downy young- 1  
Nests with large downy young - 4  
Nests with large dependent young 2  
Banded ----- 2 (adults)  
----- 1 (immature)  
----- 7 (young)  
----- 10 (total)

*No such Island  
Must mean Little North*

All Blue-faced Boobies seen on the island were on the southern third and on the spit that extends westward from the island. At dusk a club of about 150 birds formed on the island.

One Blue-faced Booby returned on Pearl and Hermes Reef was an inter-island bird. It (757-26182) had been banded on East Island, French Frigate Shoals in July 1966.

Brown Booby

Southeast Island

Population estimate -----	90
Nest count results:	
Nests with 1 or 2 eggs -----	7
Nests with 1 naked young -----	2
Nests with 1 small downy young-	3
Nests with 1 large downy young-	10
Number of large dependent young	12
Banded -----	11 (adults)
-----	11 (immatures)
-----	22 (young)
-----	44 (total)
Returned -----	6
Blood-sampled -----	13 (adults)
-----	12 (immatures)
-----	25 (total)

Most of the Brown Boobies were nesting in medium dense vegetation (chiefly Setaria, Tribulus, and Solanum) on the southern half of the eastern portion of the island. A few nests were found on other parts of the island including one nest with a large young on a rock spit extending westward into the lagoon from the western half of the island. One of the Brown Boobies was found incubating its own egg and one of an albatross from the preceding breeding season.

The primary area of roosting concentration was on the exposed rocks seaward from the rock ledge at the mouth of the lagoon. As many as 16 boobies, both adults and immatures, were roosting here during the day. Other smaller roosting concentrations were found on the oil drums both during the day and at night when numbers roosting there as much as doubled. One Brown Booby utilized the tower as a nocturnal roost.

North Island

One adult roosted on "Clapp Rock" at dusk. None were seen on the island during the day.

No Brown Boobies were seen on any of the other islands.

Red-footed Booby

Southeast Island

Population estimate -----	75 (flying birds)
Nest count results:	
Nests with large downy young	1
Number of large dependent "	9
Banded -----	5 (adults)
-----	6 (subadults)
-----	2 (immatures)
-----	7 (nestlings)
-----	20 (total)
Returned -----	17

Most of the Red-footed Boobies were nesting inland from the large

tank on the southwestern quarter of the eastern half of the island. All nests observed were in Solanum and were within two feet of the ground.

The number of birds on the island increased at night as immatures and subadults arrived. The most favored roosting area for these birds was the tower on which no less than 34 Red-footed Boobies (at least 20 of them subadults) were counted one night. A smaller number roosted in the clumps of Scaevola and on the oil drums.

Two of the 17 returns were interisland birds. One (737-45332) had been banded on Kure in October 1963; the other (757-28129) had been banded on Laysan in the same month. Both of these birds were roosting white-phase adults.

#### Seal Island

A single immature perched in heavy vegetation was the only Red-footed Booby seen on Seal Island. Judging from its plumage and the ease with which it took flight the bird was probably independent of parental care.

#### North Island

Population estimate -----	6 (flying birds)
Nest count results:	
Nests with large downy young ----	1
Banded -----	1 (subadult)
-----	2 (immatures)
-----	1 (nestling)
-----	<u>4</u> (total)

No adults were seen on North Island during the day. The single occupied nest was found in a Scaevola bush on the west side of the island. Two immatures that roosted in this bush by day were joined by a subadult during the evening.

No Red-footed Boobies were seen on any of the other islands.

#### Great Frigatebird

##### Southeast Island

Population estimate -----	100 (flying birds)
Nest count results:	
Nests with large downy young ----	31
Banded -----	8
Returned -----	2

The Great Frigatebirds nested in the same areas as did the Red-footed Boobies and all nests, like those of the boobies, were within two feet of the ground and built in Solanum.

The number of free-flying frigatebirds increased considerably at night when many came into the island to roost. Most of these birds in contradistinction to the Red-footed Boobies roosted on the oil drums rather than on the tower. Others roosted in the Scaevola along the crest of the south beach.

#### Grass Island

Population estimate -----	40+ (flying birds)
Nest count results:	
Nests with large downy young ---	20

No adult Great Frigatebirds were seen on Grass Island but 20 as yet unfledged young were found in nests in the dense vegetation at the top of the island. These young were all about the same size and apparently the same age as those seen on Southeast and North. The young were still downy on the throat, breast, and above the folded wings but almost all of them had molted in some of the reddish brown head feathers and all had well developed wings, tails, and scapulars.

North Island

Population estimate -----	100 (flying birds)
Nest count results:	
Nests with large downy young 14	
Banded -----	6 (adults)
-----	2 (subadults)
-----	1 (immature)
-----	1 (unknown)
-----	10 (total)
Returned -----	1

All Great Frigatebird nests seen on North Island were in Solanum and all were within a foot of the ground. One group of five nests was near the east central portion of the island and another group of nine nests was in the west central portion.

At dusk at least 81 birds were counted and several others were seen roosting on "Clapp Rock".

Kittery Island

A single adult female that was roosting on the Fish and Wildlife sign was the only frigatebird seen on Kittery.

Seal Island

About 10 Great Frigatebirds, most of them subadults, were seen roosting on the rocky barren ledges near the tidal area on the west end of the island. No evidence of a current breeding population was found.

No frigatebirds were seen on any of the other islands.

Sooty Tern

Southeast Island

Population estimate -----	500 (adults)
Estimated # of young -----	200
Banded -----	25
Returned -----	1

Many of the Sooty Tern chicks on Southeast were fledged but some dependent young still being fed by the parents were also present. On the whole the Southeast Sooty Tern colony seemed to be closer to having completed the nesting cycle than were the colonies on Laysan and Lisianski Islands. The two areas in which young were most numerous were in the tall Eragrostis west of the central depression and in low Setaria behind the Fish and Wildlife sign on the northwest corner of the eastern half of the island. Others, both adults and young, were seen near the booby

colony at night.

The single return obtained was an adult captured in a colony with large chicks. It (753-24199) had been banded on Johnston Atoll in August or September, 1963.

### North Island

No Sooty Terns were seen on North Island but several flew over the island during the late afternoon and evening. None were seen on any of the other islands. (The small population on Seal Island evidently has completed its nesting cycle and departed from the island.)

### Gray-backed Tern

#### Southeast Island

Population estimate ----- 50 (flying birds)  
Estimated # of young ----- 25

Most of the Gray-backed Terns were in two small colonies in the Lepturus surrounding the Sesuvium, especially the southeast site. Most chicks, from short-tailed large young to flying immatures, were in the Tribulus zone near the northwest beach. Only a relatively few adults were seen.

#### Grass Island

Population estimate ----- 10 (flying birds)  
Estimated # of young ----- 7-10 (all but one fledged)

No adult Gray-backed Terns were seen during our visit to Grass but a number of young birds were seen. Four or five fledged immatures were sitting on or flying over the north beach of the island; one recently fledged chick was seen sitting in low grass, Tribulus and Solanum; and a single large but unfledged chick was seen six feet above the beach crest on the west side of the island.

#### Seal Island

Population estimate ----- 10 (flying birds)  
Estimated # of young ----- 4-5 (fledged)

One adult was seen perched on the ground near the south end of the vegetated portion of the island. Several flying immatures were also seen.

No Gray-backed Terns were seen on any of the other islands.

### Brown Noddy

#### Southeast Island

Population estimate ----- 2,000 (flying birds)  
Estimated # of nests with eggs 200  
Estimated # of dependent young 600  
Sample nest count results:  
# of nests/eggs ----- 40  
# of nests/young ----- 18  
Blood sampled ----- 25  
Banded ----- 26 (adults)  
----- 3 (immatures)  
----- 29 (total)

Brown Noddies were found breeding in considerably greater numbers than might be expected for this time of year. A surprisingly large proportion of the breeding population was still on eggs. If these birds were not individuals reneesting after a disaster earlier in the nesting season it would seem apparent that the nesting cycle on Southeast is considerably later than on either Laysan or Lisianski (at least in 1967).

One area which contained a particularly high proportion of Brown Noddy nests was a patch of nearly pure Cyanodon on the top of the ridge at the northwest corner of the central depression. Many other Brown Noddy nests were found in the Tribulus and Lepturus areas south and east of the central depression.

On the eastern half of the island most nests were under Tribulus and Lepturus with a few on Solanum; on the western half most were under Tribulus or mustard. One on this latter half was found on Boerhavia. There were many more half grown and larger young on the western half of the island than on the eastern half and many old and rotten eggs were found scattered through the Tribulus.

Color phases of 15 small downy chicks were recorded. Twelve (80 %) were black; 2 (13%) were intermediate; and 1 (7%) was white.

Grass Island

Population estimate -----	400 (flying birds)
Estimated # of nests with eggs	11
Estimated # of unfledged young	11
Sample nest count results:	
Nests with egg -----	10 (50%)
Nests with small downy young --	4 (20%)
Nests with near-fledging young --	6 (30%)

Two small nesting concentrations were found, one in a Tribulus-Solanum-Boerhavia area of short, sparse grass, Tribulus, and Boerhavia near the northwest end of the island. In the first area were found 2 small downy young, 2 near fledging young, 1 recently fledged young and 7 nests with eggs. In the second area were found 2 small downy young, 4 near-fledging young, and 3 nests with eggs.

Considerable numbers of nonbreeding noddies also roosted on the island. An estimated 75 noddies, including both adults and fledged immatures, roosted in two small flocks on the northwest beach and many small flocks of noddies roosted on the exposed rock reefs at the west end of the island.

Seal Island

Population estimate -----	250 (flying birds)
Estimated # nests with eggs ---	6
Estimated # unfledged young ---	12
Sample nest count results:	
Nests with egg -----	2 (29%)
Nests with small downy young-	3 (43%)
Nests with near-fledging young	2 (29%)

The Brown Noddies on Seal nested mostly in low Tribulus bordering



west of the central depression.

A very large number roosted on the island. Almost every Scaevola bush present was completely covered with flocks of this species. Another flock of about 800-1000 birds roosted in low grass near the Scaevola at the top of the south beach crest.

Although quite a few of these birds were banded (3 of 30 in one flock scanned with glasses had bands) the Black Noddies were extremely wary and difficult to catch.

Grass Island Population estimate ----- 50 (flying birds)

A roosting flock of about 40 noddies was seen on the ground in the northwest grassy section of the island and a few others were seen roosting with Brown Noddies. No evidence of breeding was found.

Seal Island Population estimate ----- 150 (flying birds)

A flock of about 150 noddies roosted on the open beach towards the end of the reef. No evidence of nesting was found.

North Island Population estimate ----- c. 1100 (flying birds)  
Returned ----- 1

Large numbers were observed roosting on the beach and in the taller vegetation. Flocks of from 20 to 350 birds were seen along the beaches during the shorebird census.

One nest was found that was believed to be that of this species. It was located about one foot off the ground in a clump of Eragrostis.

#### White Tern

Southeast Island Four in one group, flew over camp shortly after we landed on the 28th.

#### Grass Island

Three White Terns flew over the island during our visit. We found no evidence of breeding here or on the three other islands where they were seen.

#### Humphrey Island

Two were seen sitting on a small rock near the center of the island. Later these birds flew towards North Island.

#### North Island

Two were seen flying over the island later in the afternoon of the 29th.

Laysan Finch

Southeast Island Population estimate ----- >50 + <100

The Laysan Finch has evidently become well established on Southeast Island. None of the first five finches seen were banded, suggesting that the first season's nesting was quite successful (all adults having been banded at the time of introduction). No active nests were found but four or five old nests were found in the thick Eragrostis at the west end of the central depression and a number of bob-tailed young were seen.

These birds occurred over the entire eastern half of the island but seemed to be more abundant towards the northwest corner of that half and in the heavy growth of Eragrostis. A small number (less than 10) were also seen on the western half of the island in the heavier growth in its northeast portion. The western half of Southeast as yet contains less than 10 percent of the total population. On several occasions these birds were seen eating Eragrostis seeds and Boerhavia heads. None were seen on any of the other islands.

Laysan Teal

Southeast Island Population estimate ----- 2-3

Only a few Laysan Teal were seen on Southeast and none were seen on any of the other islands. One bird was seen fairly regularly at the western edge of the westernmost pool. On two successive nights a pair of these teal flew down the beach towards the east point (where the camp was erected), alighted on the shore or in the lagoon and walked into camp.

Shorebirds

Golden Plover

<u>Southeast Island</u>	Population estimate -----c.	100
<u>Seal Island</u>	Population estimate -----e.	10
<u>Humphrey Island</u>	Population count -----	1
<u>North Island</u>	Population estimate -----c.	10

Golden Plovers were relatively abundant only on Southeast where they foraged in the Sesuvium depression and in the less dense grass and Tribulus areas. The only ones seen on Seal were a group of seven and a single individual, both of them observed flying with flocks of Ruddy Turnstones.

Ruddy Turnstone

<u>Southeast Island</u>	Population estimate -----c.	500
	Recovered -----	2
<u>Grass Island</u>	Population estimate -----c.	30
<u>Seal Island</u>	Population estimate -----c.	65
<u>Humphrey Island</u>	Population count -----	10
<u>North Island</u>	Population estimate -----c.	60

Ruddy Turnstones were the most abundant shorebird on the atoll. On Southeast flocks of 60 or 70 birds were frequently flushed from the rocky

outcroppings near the entrance to the lagoon and fairly large numbers (c.30) fed on the tidal pools in the central depression. Smaller numbers and flocks of from about 10 to 30 birds were also found along the beaches. Most of the vegetated interior was not used for foraging to any great extent but areas of low Tribulus on the western end of the island frequently had upwards of 50 birds roosting and foraging on them.

On Grass Island two small flocks of 13 and 18 birds were seen flying around the island.

Most of the turnstones on Seal Island were seen in a large flock of about 50 birds that was scared up from the tidal pools by Naval personnel. Almost all of these birds flew out to the rocky outcroppings bordering the reef in this area.

A flock of 10 birds was seen on the beach at Humphrey Island.

Fifty-one turnstones were counted on North Island.

No less than five red-rumped turnstones were present on the atoll, four of them on Southeast Island, one of them on North. Two, found on Southeast, were carcasses that still had maggots feeding on them. One of these birds (733-10282) had been banded on St. George Island Alaska on August 4, 1966 and had been rehandled there on August 1, 1967. The other (1103-02294) was banded on St. George on August 18, 1967.

In addition, a bright red-rumped bird was seen on Southeast throughout our stay and another was seen with a green streamer but with no red rump. The red-rumped bird seen on several occasions on the 29th on North is almost surely another bird since one was being seen on Southeast simultaneously.

EXECUTIVE SUMMARY

1967.11.16

Wandering Tattler

<u>Southeast Island</u>	Population estimate -----	10-15
<u>Seal Island</u>	Population estimate -----	6
<u>North Island</u>	Population estimate -----	3

On all three islands where they were seen, the Wandering Tattlers clearly preferred to forage on the rocky outcroppings or at the edge of the water. The maximum number seen at any one time on Southeast was four birds seen along the shores of the lagoon but isolated individuals or pairs of birds were often encountered along the beach perimeter. None were seen inland.

Sanderling

<u>Southeast Island</u>	Population estimate -----	2-3
<u>Grass Island</u>	Population count -----	2
<u>Seal Island</u>	Population count -----	2

Two or three Sanderlings were present throughout our stay on Southeast. They were seen most frequently along the sandy north beach but one was observed at least once along the east shore of the lagoon. Only one

was seen inland - a bird seen on the 28th that was foraging in the easternmost section of the small tidal pools. At least one of these birds still was largely dark above. The two seen on Seal were scared up from the tidal pool. As on other islands these birds were seen to associate more readily with turnstones than any other species.

#### Bristle-thighed Curlew

<u>Southeast Island</u>	Population estimate .....	c. 30
<u>Humphrey Island</u>	Population count .....	1

Most of the curlews were generally seen in one flock which at its maximum was seen to contain 22 birds. The area of open flats near the large tank on the southeast corner of the lagoon and the rocky ledge opposite it were very clearly favored by these birds. Isolated individuals were frequently observed throughout the interior and groups of up to four or five birds frequented the largest of the tidal pools.

The single bird seen at Humphrey Island was flying over the island.

#### Ruff

<u>Southeast Island</u>	Population count .....	1
	Specimens collected .....	1

This bird was first seen on the morning of the 28th on the largest mud-flat tidal pool. It was feeding with several Ruddy Turnstones but after it flushed landed solitarily in a thick patch of Bermuda grass. It flushed once more, landing in Tribulus and was collected the third time it took flight.

This bird is the third of its species that has been collected in the central Pacific. It has not been previously recorded from Pearl and Hermes Reef.

#### Mammals

Counts of Hawaiian Monk Seals for the various islands are as follows:

Southeast Island: 15 - 12 adults and 3 yearlings.

Planetree: 1 -- apparently an adult, hauled out on the sand.

Bird Island: 6 -- 5 adults and one pup; four of the adults female-the other unknown.

Grass Island: 19 -- 16 adults and three pups; 8 adults were males; 7 females; 1 undetermined.

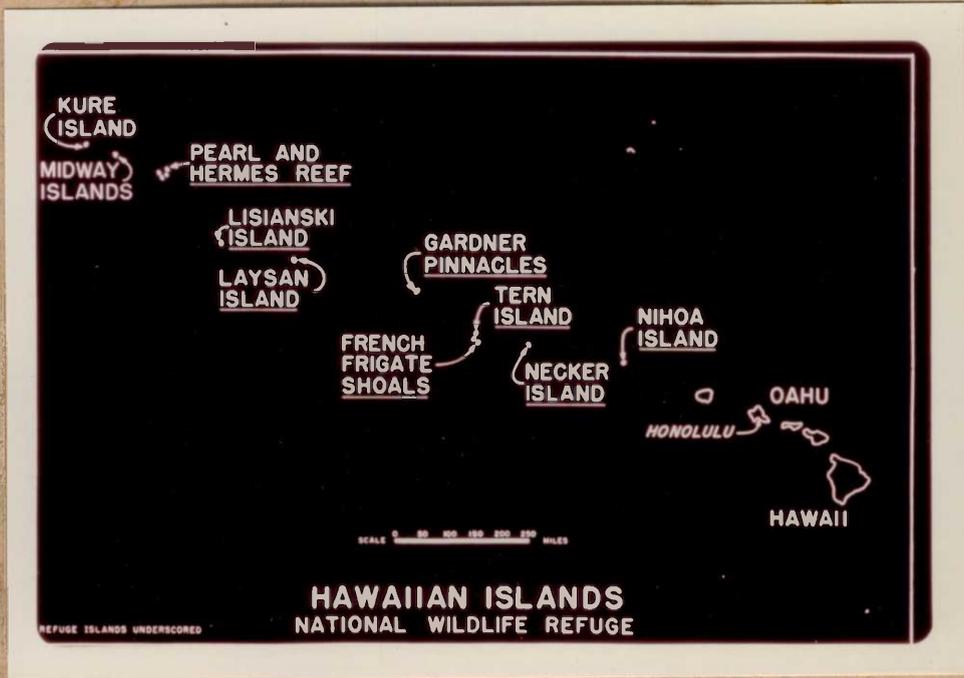
Kittery Island: 26 -- 16 adults (6 males; 7 females; 3 undetermined); 10 pups.

Seal Island: 7 -- 4 adults (3 males; 1 female); 3 pups.

Little North

Rumpley Island: 20 -- hauled up on beach; 12 large; 4 small (yearlings?)  
4 pups.

North Island: 32 -- 15 large; 6 small (yearlings?) and 11 unrecorded.





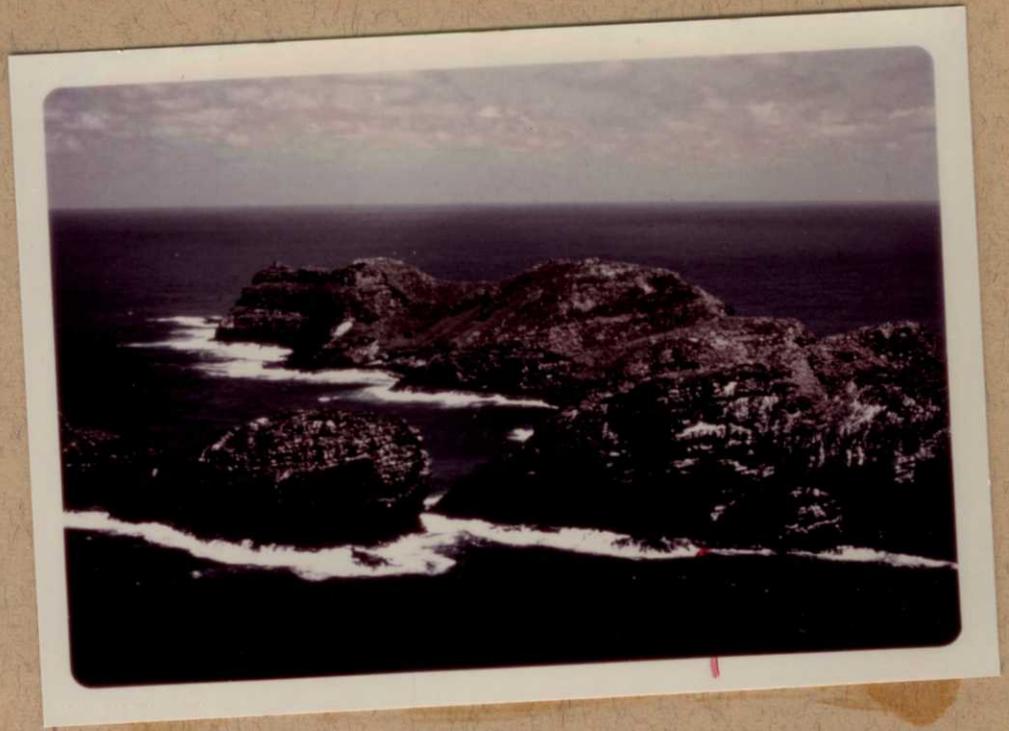
Hoisting camping gear up the cliff to the camp site and out of the way of the booming surf. Most of the times the landings must be made on the rock shelf below East Palm Canyon. The nearest flat place which will accommodate a man and his sleeping bag is 300 feet up the canyon on an ancient Polynesian house platform. Nihoa Island.



Nihoa Island. These archaic Polynesian home and garden terraces are over 700 years old and are considered to be among the best preserved ruins in the Hawaiian Islands. Archeologists estimate that perhaps 150 people may have lived on this island at one time.



Necker Island. Boobies perch on part of ancient Polynesian temple. These temples very closely resemble the ancient ones of Tahiti and give strong evidence that the early day Hawaiians may have come from Tahiti. They are excellent examples of Hawaiian culture before the thirteenth century.



Necker Island. Over 260 feet high. There are no beaches. Arrow points to landing site when seas are calm, which is not too often. Nimbleness and a cool head are required to land here.



Necker Island. After tagging and measuring, the 250 lb. green sea turtle is weighed by dragging it into the tarp, roping the tarp to the scales then with a grunt hoisting all. Crude but effective and dictated by circumstances. Strong boys are Ronald Wlaker of Hawaii Fish and Game and Robert Ballou of Central Office.



500 lb. bomb found on Necker Island. Military flyboys bombed and strafed island for target practise in past years. Before and Air Force HIRAN team could land on the island in 1963, it had to be deduded.



Bob Ballou stands in a bomb crater immediately adjacent to 700-year old Hawaiian temple. Necker Island.



Lowering the refuge Boston Whaler into the sea for use at French Frigate Shoals. This is always a touchy operation in a rolling sea as the boat swings and sways. This gives the refuge manager a few gray hairs. This type of boat is very seaworthy even in open seas.



Wildlife Research Biologist John Sincock takes blood smear from foot of Wedge-tailed Shearwater chick for disease investigations. Chick kept biting his hand and took a blood sample itself. These birds are present by the thousands on most islands during the late summer.



Putting the finishing touches to the refuge recognition sign just erected on Tern Island, French Frigate Shoals. This is a reminder to Coastguardsmen and all other persons who may land there that the Bureau has primary jurisdiction. In the not too distant past some shavetail commanding officers there didn't believe it and tried to give us a hard time about it.



Now that the sign is up, the boys prepare for the inevitable "vanity" pictures to prove they were there. Bob Ballou, John Sincock, and Ronald Walker.



Fairy Tern. Photograph by Robert Ballou. This bird is claimed to be the most beautiful of seabirds. The color of the sky in the original picture was a much truer blue.



Red-footed Booby and chick. The nest is in a low Solanum bush. These birds have a vicious bite, and the saw-edged bill readily draws bloods from careless hands.



Refuge Manager Kridler sneaking up on sleeping monk seal to tag it. Over 250 of these animals have been tagged the past two years. Southeast Island, Pearl and Hermes Reef.



Adult seal wakes up with a start and bellows as tag is clinched. A split second later the pliers flew off in one direction, Kridler in another, and the seal into the surf.



Coconut palms planted in 1958 thrive on the north end of the interior lagoon on Laysan Island. Some are bearing nuts. Laysan finches concentrate in these trees, presumably to feed on insects. September, 1967.



Laysan Island, December, 1967. Black-footed and Laysan Albatrosses nesting on the east beach. All black spots are nesting albatross.



Laysan Island, December, 1967. Nesting Laysan Albatross along the east shore of the interior lagoon. This species nests all over the island but shows some preference for lagoon shores.



Winter rains cause level of lagoon to rise. If albatross start nesting before most of the storms occur in late November, many of the nests will be lost through flooding. These birds continued to build up their nests as the water rose. Some were 10 inches high. If waters continue rising, they will desert.



Pox-like lesion on an immature Red-tailed Tropicbird on Midway Island, September, 1 967. Of 182 immatures and adults examined in selected areas on the island, 10 affected immatures were found.



Another example of a tumor. The Wildlife Disease Laboratory at Patuxent advised that histologically it appeared to be avian pox, but they were unable to isolate the virus. Pox among seabirds is unusual.