

U. S. FISH AND WILDLIFE SERVICE  
TRIP REPORTS FOR THE HAWAIIAN  
ISLANDS NATIONAL WILDLIFE REFUGE

compiled by

George H. Balazs

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Hawaiian Islands National Wildlife Refuge  
Trip Report  
September 2-17, 1971

effect of  
pesticides  
on seals?

LIBRARY OF  
GEORGE H. BALAZS Turtles p - Laysan  
last page - Nihoa baskets

Personnel

Eugene Kridler Wildlife Administrator, BSF&W, Kailua - Leader  
John L. Sincock Wildlife Research Biologist, BSF&W, Koloa, Kauai  
Erwin A. Bauer Author, Columbus, Ohio  
Dr. Kenneth S. Norris Vice-President, Oceanic Institute, Waimanalo, Hawaii  
Eric Laysan Schlemmer Honolulu, Hawaii

Itinerary

- Sept. 2 Depart Hickam AFB, Honolulu 7:30 AM via MAC aircraft.  
Arrive Midway NAS 10:00 AM
- Sept. 3 Depart Midway 8:30 AM via Navy helicopter. Arr. Kure  
Island State Refuge 9:15 AM. Depart Kure 12:00 Noon.  
Arrive Midway 12:45 PM.
- Sept. 4 Depart Midway via Coast Guard vessel BUTTONWOOD.
- Sept. 5 Arrive Lisianski Island, HINWR 8:45 AM. Depart 4:15 PM
- Sept. 6 Arrive Laysan Island 9:15. Camp on Laysan
- Sept. 11 Depart Laysan 4:45 PM
- Sept. 12 Arrive Gardner Pinnacles 2:30 PM. Depart 5:00 PM
- Sept. 13 Arrive French Frigate Shoals 9:15 AM. Depart 5:30 PM
- Sept. 14 Arrive Necker Island 9:00 AM. Depart 3:00 PM
- Sept. 15 Arrive Nihoa Island 1:00 PM. Depart 6:00 PM
- Sept. 16 Enroute Honolulu
- Sept. 17 Arrive Sand Island Coast Guard Base, Honolulu 1:30 AM

General

Purposes of the trip were (1) make the annual inspection and patrol of as many of the refuge islands as possible (2) continue investigations of the rare and endangered wildlife found on the refuge (3) offer Dr. Norris the opportunity to see the area since we expect him to be a strong supporter for its inclusion in the wilderness system,



(4) offer Mr. Bauer an opportunity to obtain material for his forthcoming book about wildlife islands of the world and (5) obtain historical data about Laysan Island from Mr. Schlemmer who was born and lived there many years ago.

Transportation to the refuge was via the Coast Guard bouy tender BUTTONWOOD which was captained by Lt. Cmdr. David Smith. Other officers included Lt. Stephen Yoder, Ens. Al Sarras, Ens. Robert Cosby and WO Dombrowski. Almost all our gear had been loaded on the ship on August 13 because it had to sail shortly thereafter to meet a navy tanker at Kure Island before it conducted its normal aid to navigations work at Midway. We then flew to Midway via MAC aircraft on September 2 to meet the ship there on September 4 and work the islands on its return voyage to Honolulu. Weather and seas were almost perfect, and the Coast Guard crew, as usual, was cooperative and cordial.

Aboard the flight to Midway was Captain Robert Roemer, the new Commanding Officer of Midway, and his family. Also aboard the plane were Captain Kenneth Rowell, chief of staff of Fleet Air Hawaii and Captain Parker Cooper, commanding officer of Barbers Point Naval Air Station. The opportunity was afforded me to not only renew acquaintances with these two officers who have been most helpful to us in providing air transportation for us but also to meet Captain Roemer and brief him on our program and establish a contact to continue receiving the fine logistic support by the Navy at Midway which enables us to fly to Pearl and Hermes Reef from there, and also general overall support and cooperation for protection of wildlife at Midway. Captain Robert Anderson, who is rotating back to a Mainland post, not only has been most cooperative as the commanding officer at Midway, but he has also been a very congenial host. We were glad to have another opportunity to discuss our program with the new commanding officer while Captain Anderson was still at Midway to provide good words for us.

On September 3, through the kindness of Lt. Cmdr. Michael Rij, the Midway chief helicopter pilot, we were flown to Kure Island by helicopter on one of its semiweekly logistics flights to the Coast Guard Station on that island. I acted as two sets of china which were destined for that station but were set aside in order to allow us all to make the flight. The commanding officer at Kure is Lt. (JG) Joel Greenberg. The main purpose of the Kure trip was to census the monk seal population there. Another purpose was to give the other members of the party an opportunity to see the atoll which none had seen before. Six animals were recorded on the main island, Green, while 30 were tallied loafing on the sand spit which is about 1/2 mile west of Green. No pups were noted. Norris saw one tagged seal on Green which he thought carried the number 167, but he was not sure of it.



At 8:30 AM we boarded the BUTTONWOOD and sailed from Midway at 9:15 AM. During the day Sincock and I sweltered in the No. 1 hold sorting our gear and selecting that needed to be taken ashore at Lisianski the following day.



## LISIANSKI ISLAND

The ship anchored on the west side of Lisianski about 4,750 yards offshore and in 37 feet of water. Right tangent reading 101.5° and left 078.5°. We all landed on the island about 8:45 AM via the No. 2 boat of the ship and then proceeded around the island in a counter clockwise direction censusing seals, tagging pups, and reading tags of those which had been tagged on previous trips. Turtles present were tagged, weighed and measured. Later I walked across the island to check status and relative abundance of some of the bird populations, but lack of time prevented any detailed observations. The extent of the Cenchrus infestation was also checked. In the early afternoon a party of officers and men of the ship came ashore to pick up glass fishing floats, take picture, swim, look at the wildlife and in general break up normal shipboard routine. All complained about the myraids of flies which swarmed about them - something we have accepted long ago as part of a summer and fall visit to this island. We had no opportunity to explore any of Neva Shoal to the south. The most western rock just north of the west channel is exposed after a wave breaks over it. Apparently this is the rock which shows on the chart as being exposed. We departed the island by 4:15 PM and 20 minutes later were aboard ship.

### Wildlife

Since most of the time was spent working on seals and turtles, bird populations are largely gross estimates and are as follows:

Albatross: None of either species was seen.

Wedge-tailed Shearwaters: 1/2 to 1 million. Birds were everywhere. Several burrows examined had small downy chicks with no feather tracts.

Bonin petrel: Although very few were seen, in the early evening prior to the departure of the ship, hundreds were seen swooping and flying towards the island.

Red-tailed Tropicbird: Common. Mid hundreds. Several chicks, almost fully grown were seen.

Frigate Bird: High hundreds. Many 3/4 to full grown young were still in the nests.

Sooty Tern: High hundred thousands. Birds were screaming everywhere. Young were almost fully fledged. Largest concentrations were in the interior.



Gray-backed Tern: Low hundreds. Several flying young noted.

Common Noddy Tern: High thousands. Eggs to flying young. Scattered over the island.

Hawaiian Noddy Tern: Low hundreds. None noted nesting in the iron-wood trees.

Fairy Tern: Low hundreds. Scattered about. No check for eggs or chicks was made.

Bristle-thighed Curlew: High tens. Scattered about the island, but most common along beaches.

Ruddy Turnstone: High tens. Mostly on beaches.

Wandering Tattler: 5-10. Usually on beaches.

#### Wildlife Management Studies

#### Hawaiian Monk Seal

A total of 119 seals were recorded. The sex and ages were recorded when possible. No especial effort was made in harassing the animals to determine sex. Those we left sleeping on their bellies or which humped into the water at our approach are listed as "unclassified". The following table shows results of the census.

#### Seal Census Lisianski Island September 5, 1971

Adult Male	26
Adult Female	18
Adult Unclassified	55
Subadult Male	4
Subadult Female	3
Pup Male	6
Pup Female	3
*Pup Unclassified	4
Total Seals	119

\*Not tagged but observed in water.



Seals Tagged  
Lisianski Island  
September 5, 1971

<u>Tag No.</u>	<u>Age</u>	<u>Sex</u>
1004	P	F
1005	P	M
1006	P	M
1007	P	F
1008	P	M
1009	P	M
1010	P	M
1011	P	F
1012	P	M

Returns of Seals Previously Tagged  
Lisianski Island  
September 5, 1971

<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Date Tagged</u>	<u>Island Tagged</u>	<u>Age</u>	<u>Sex</u>	<u>Previous Returns</u>
86	A	F	3/21/67	Lisianski	Y	F	1
332	SA	M	3/21/68	Lisianski	P	M	
529	A	M	9/16/66	Lisianski	SA	M	1
540	SA	F	9/19/66	Lisianski	P	F	1
*731	SA	F	6/4/69	Lisianski	P	F	
*733	SA	F	6/4/69	Lisianski	P	F	1
**836	SA	M	3/30/69	Lisianski	P	M	2

\*731 & 733, yellow tag affixed 6/4/69 but missing 9/5/71. Control tags only remain.

\*\*Tag No. 635 w/yellow tag affixed missing.



## Green Sea Turtle

Only 3 turtles were tagged, while one tagged previously was captured. Another large one escaped into the water before we could capture it. An additional 4 platter-sized ones were noted swimming offshore. No signs of nesting were noted.

### Turtles Tagged Lisianski Island September 5, 1971

<u>No.</u>	<u>Sex</u>	<u>CL</u>	<u>CW</u>	<u>PL</u>	<u>Thickness</u>	<u>Wt.</u>
1078	F	15.7	13.7	12.6	5.3	20 lbs.
1079	F	27.7	22.9	23.0	10.7	122
1081	F	17.2	13.8	14.4	6.4	30
*644	F	34.6	28.9	29.1	12.2	245

All measurements are on a straight line through use of calipers.

\*No. 644 tagged previously on Lisianski on September 26, 1967

## Vegetation

Sandbur (Cenchrus echinatus) is scattered all over the island, including much of the interior. There is no hope of control. Albatross chicks, especially, spread the seed on Tern Island at French Frigate Shoals and probably are the cause for much of the spread here. Chicks get so many seeds in their down that it is unpleasant to handle them. As they grow older and wander about, the down is replaced by feathers. Where it drops, a new infestation by this weed results.

The Scaevola is not as vigorous as that on Laysan, and apparently the stem mold continues to affect it.

There is only one palm tree standing on the east side. The trunk of the other has fallen since last September.

The bare area at the southeast corner is now covered by a luxuriant growth of Boerhavia.



## LAYSAN ISLAND

On September 6, the ship anchored in 47 feet of water about 900 yards offshore. Right tangent was  $162.5^{\circ}$  and the left was  $119.0^{\circ}$ . A landing was made via the northwest channel at 9:15 AM. I remained aboard ship to insure that all the gear needed was taken ashore. The last boatload arrived on the island at 11:00 AM. Camp was established in the usual place near the Coast and Geodetic Survey benchmark near the old ironwood tree. The weather was calm and sunny - ideal. Flies, as usual, were very abundant and were a source of some annoyance throughout the entire stay of 6 days. The ship left us at about noon and proceeded to French Frigate Shoals. It returned the morning of September 11. Shortly afterward camp was broken, and all the gear was taken aboard the ship. Several shore parties were sent ashore to enable the crew of the ship to see and photograph wildlife, swim, and gather up some of the innumerable glass fishing floats. I departed with the last boat at 4:45 PM after placing a 4 X 8 piece of  $3/4$  in. plywood over the well I had dug near the lagoon.

Priority was given to censusing seals and tagging pups, conducting the Laysan finch and teal counts, visiting a number of the sites with Schlemmer that had played a part in the guano digging operations there as well as his life as a boy when his family lived on Laysan many years ago. Seabird observations were cursory in nature and population figures are just educated guesses.

Schlemmer was able to locate the grave of his mother's first child, Adam, who was born on Laysan in 1896 but died a week later. The family came to live on Laysan in 1894 when his father took over as manager of the guano digging operations from a man named Spencer. Adam's grave was marked by a simple unlettered two-foot high slab of coral placed in an upright position. The grave was located near the northwest point of the island. Nearby were the unmarked graves of a young Japanese woman, wife of one of the diggers, who died there during childbirth as well as those of her infant and of two of the diggers shot there many years ago by Spencer during a mutiny. We marked the graves with two white crosses of 4" X 4" redwood which had been constructed for us in Kailua. One containing the name of Adam Schlemmer was erected over his grave, and the other over that of the young Japanese woman. Schlemmer was unsure of the exact location of the other two graves but said that they were nearby. Pictures were taken of him at the graves, and later I conducted a taped interview with him at the site.

The weather in general was warm and sunny. During the nights and occasionally during the days, brief but intense rain squalls occurred over the island. The maximum-minimum thermometer attached to the ironwood tree revealed that since last September, the minimum temperature recorded on the island had been  $48^{\circ}$  and the maximum  $90^{\circ}$ . During our stay there, the maximum temperature recorded was  $82^{\circ}$ , and a steady 5-10 knot northeast wind prevailed.



The lagoon guage read 0.74 ft. Marks on the guage indicated that it had risen to at least 1.08 ft. since last September. Apparently most of the increase occurred before the peak of the albatross nesting because there were not very many eggs windrowed along the shore. A very shallow skiff of water still seperated the small north part of the lagoon from the much larger southern portion. The very flat west shore glistened a very bright white, and an examination revealed it to be mainly a very thin sheet of a fibrous white algae overlaying the usual reddish mud. A quart of concentrated brine shrimp eggs and some water was collected for Dr. Maciolek of the Cooperative Fishery unit for possible seeding at Christmas Island. Whereas lush growths of Sesuvium usually carpet the mudflats as the water recedes, this year only very small and scattered growths existed. Sand now extends to the bow of the wreck of the Kaiyo Maru 25. The ship continues to be battered by heavy surf at the south end. The bottom is completely out and some of the stern is beginning to give way. We did not climb onto the wreck because of the pounding it was taking.

Schlemmer could not find the site of the fresh water wells. I dug a hole about 6 1/2 feet deep in the sand about one-third of the way down to the lagoon and almost directly east of the ironwood tree but was unable to find water. We then moved to a place about 4/5 of the way to the lagoon on the same line, and in a bunchgrass - morning glory plant association, I dug a hole about 4 1/2 feet deep and struck a coral hardpan. Digging a few inches further, resulted in a trickle of water. Within a few minutes a small hole about 2 feet in diameter was filled with about two inches of water. We tasted the water and found it to be fresh. A quart of this water was collected for later analysis in Honolulu. The site was marked with a tripod of 1/2-inch aluminum stakes flagged with orange surveyors' tape. Prior to departure from the island, the Captain, David Smith, and some other members of the crew of the BUTTONWOOD helped me carry the 4X8 ft. sheet of plywood (stumbling and falling through innumerable shearwater and petrel burrows enroute) to the well site and cover it. A sloping ramp was dug at the east side to enable any burrowing birds, which might tunnel under the plywood, to escape out of the hole.

All that remains of the pier which ran from the guano building is a 15-ft. 12"x12" piece of old timber about 100 yards (estimate) south of the ironwood tree. About 25 ft. south of the tree we found some slabs of guano piled two high. Schlemmer said that this was part of the foundation of the old storage building. We were unable to find much evidence of his home, the lighthouse, or any of the other buildings. He stated that he thought that the foundations for them were 8-10 ft. below the present surface. Apparently the drifting sands, resulting from the devegetation of the island by rabbits after 1915, buried what was left of the buildings. He said that they could never see the ocean beyond the east shore of the island from the area where we now camp on the west side near the ironwood tree.

fresh water



All that remains of the guano cart tracks which ran from the digging areas near the southwest corner of the lagoon to the guano building are some old and partially decayed ties in the large clear, sandswept area about halfway down the west side, a few thin and almost completely rusted pieces of track in the south part of the same area, and thin rusty flakes of metal. We were able to trace the course of the tracks from there to the site of the guano building. A short distance into the bunchgrass south of the blowout area, we found five bones which are all that remained of one of the two mules which hauled the carts way back when. These pieces of bone were collected for the refuge office. When Schlemmer and his father returned to the island in 1912, one of the mules which was still living was taken off the island by them and transported back to Honolulu.

Schlemmer said that the best grade of guano existed and had been dug at the north end of the lagoon. A small fresh water pond once existed at the northeast corner, but this apparently has been covered through the years by the drifting sands.

A short pier had once run from the guano building for a short distance over the water at the very south end of the channel. Other than the previously mentioned timber, no evidence of it exists today. I spent considerable time diving and checking the bottom over which it was supposed to have run, but with negative results. Three large anchors lie on the north side of the channel about 150 ft. from the beach. These were used to anchor the guano barges. Ships remained outside the channel.

The top of one of the two coconut trees at the southeast corner of the lagoon is gone, and the tree is dead. The top of the other is badly broken down as a result of red-footed boobies continually using the fronds as perches. Last September both trees were vigorous and had been bearing fruit. The grove at the northwest end of the lagoon now contains 13 trees. Several are about 3-4 ft. in height. Several of the larger trees bore a little fruit; however, some of the young fronds are also being broken down as a result of perching by boobies. There were 10 such birds sitting along one frond which was bending badly under their weight.

Conyza still occupies some of the open spaces between the growths of bunchgrass in the higher portions of the west side, but it does not seem to have spread much since last September. All was in the late seed stage. Five large areas of Cenchrus echinatus (about 4-5 ft. in diameter) were found growing along both sides of the path from the vegetation line to the ironwood tree. Another smaller patch was also found about 20 ft. southeast of the C & G Survey marker. All were dug up, placed on ponchos so as not to spread the seed and cast into the ocean. Shortly thereafter they settled to the bottom. The ponchos and some old space blankets were placed over three of the sites and a light covering of sand shoveled over



effector seals! ?

them. This should discourage some growth by germinating seeds, but Dalapon, or a similar spray, should be taken along on the next trip to control this weed. It might be advisable to soak the plants and the sand with oil or similar material and burn the patches in order to destroy not only the plant but also the seed at or near the surface. This seed can be easily picked up in the down of young birds and transported to other areas as the birds move about and the down (and seed) falls off. One other infestation about 150 feet north-northwest of the camp site was also located and pulled up. All sites were marked with aluminum rod and flagged.

Several hundred yards of Pluchea on the northeast side of the lagoon had been killed by high waters of the lagoon within the past year. There are extensive growths of this plant, however, along the east and south sides. A 4 ft. high Messerschmidia bush struggles for existence about 300 yards south of the landing site. Birds roosting on it keep it broken down. Several Capparis plants were found just mauka of the Scaevola about 150 yards south of the ironwood. The Scaevola destroyed along the west shore by the winter storms of 1969 continues to make a satisfactory recovery. Portulaca oleraceae was very common throughout the bunch grass stands in the higher areas and was far more abundant in these areas than ever noted since 1964.

The refuge recognition sign partially destroyed by the same storms and reerected last September was down again, presumably by high winds. It is beyond repair, and a new one is needed.

Wildlife Observations

Laysan Albatross: A lone almost full grown, but starving chick was noted near the edge of the water about midway along the east shore the day after we landed. Several days later it was gone. Less than 200 carcasses littered the shores of the lagoon, indicating low chick mortality the past breeding season.

Black-footed Albatross: None noted. Only an occasional carcass was noted. Also an indication of a successful breeding season.

Wedge-tailed Shearwater: Population estimated to be over 1,000,000. Data Class C. Daytime populations were augmented considerably by birds coming in at dusk to roost and feed young. At this time there were birds all over the island moaning and caterwauling. This reached a crescendo at dawn, and the voices of thousands blended into a steady low oooooo which rose and fell. All chicks were in the small downy stage.

Christmas Island Shearwater: Population estimated to be in high hundreds. Data Class D. Birds were thinly scattered over much of the island. At least several dozen young with down still on the



nape of the necks were found. Some calling by adults took place at night near the camp site. The call is a little higher pitched than the wedge-tailed species. Several attempts were made to record their calls but with no success.

Bonin Petrel: Population estimate 2,000,000. Data Class C. None would be noted on the island during the day, but at dusk the air was filled with a mass of swirling, dipping, swooping birds. This was really noticeable when viewed from the west shore of the lagoon and as the clouds of birds were silhouetted against the fading light of western sky. Within a very short time birds were on the ground all over the more open areas of the island. Considerable digging activity took place during the night, and the birds made the sand fly behind them as they burrowed rapidly with their feet. The population estimate is considered to be conservative.

Bulwer's Petrel: Population estimated to be less than 100 birds. Data Class C. Eight almost completely feathered chicks were found in the nooks and crannies of the guano piles at the south end. Two others were found under small pieces of guano in the same area.

Sooty Storm Petrel: None found although a search was made of the area near the southwest part of the lagoon where they had been found in previous years.

Blue-faced Booby: An estimated 250 birds were on the island. Data Class C. Several very large partly feathered young were found along the shores of the lagoon. A few others were scattered along the higher reaches of the west and south beach.

Brown Booby: Estimated population about 10. Data class C. One adult with an all downy young was noted near the guano piles on the southwest corner. Another almost full grown chick was seen in the same area.

Red-footed Booby: Estimated population about 1,000. Data Class C. Most of these were adults which came to roost on the island at night. A few large downy chicks were still in the nest as were some very large young almost capable of flight.

Frigate Bird: Estimated population about 1,500. Data Class C. Most of these were birds returning to the island at night to roost. No attempt was made to census the nests with young, but there were at least 200-300. These occurred principally in the Scaevola on the perimeters of the island and also in such plants and that of Pluchea around the lagoon.

Red-tailed Tropic Bird: Population estimated in the high hundreds. Data Class D. Chicks as well as adults were scattered under the Scaevola around the island. Several adults incubating eggs were recorded.



Sooty Tern: Population estimated to be about 2,000,000. Data Class C. These birds were everywhere. Many young were flying. The growth stages of others ranged from those almost 3/4 grown to almost flight stage. At night many thousands came to roost.

Gray-backed Tern: Population estimated to be in very low hundreds. Data Class B. Most were found in the bunchgrass near the southwest part of the island. Some almost full grown to flying young were seen.

Common Noddy Tern: Mid-thousands. Data Class C. Nesting phenology ranged from eggs being incubated to flying young. Birds were scattered over much of the island.

Hawaiian Noddy Tern: Population estimated to be in low thousands. Data Class D. No nesting was noted. Several hundred roosted in the ironwood tree at night; others in the Scaevola around the perimeter of the island.

Fairy Tern: Population estimated to be in high hundreds. Data Class C. Eggs to flying young were seen.

Bristle-thighed Curlew: Population estimated to be about 200. Data Class B.

Golden Plover: Population estimated to be about 500. Data Class B. Surprisingly few birds were seen on the lagoon. Most were well along in their winter plumage although a few still retained considerable traces of their spring plumages.

Ruddy Turnstones: Population estimated at 4,000. Data Class B. Most all were seen busily feeding on invertebrates along the shallow shores of the lagoon.

Wandering Tattler: Population estimated to be about 250. Data Class B. Almost all were found with the turnstones along the shallow shores of the lagoon near its north end.

Other Shorebirds: None noted. This is surprising because usually a few sanderling occur at this time. Bauer thought he saw a yellowlegs, but identification is uncertain.

Pintail: Bauer said that he saw a female and took a picture of it. Schlemmer also said that he saw a large brown duck-like bird. Neither Sincock or I saw it although we carefully glassed the lagoon on a number of occasions.



## Wildlife Management Studies

### Hawaiian Monk Seal

The seal census was begun at 10:30 AM and was completed at 3:00 PM on September 7, by Sincock and me. Many animals were found in the vegetation along the beaches during the early part of the count but down near the edge of the water later as flies pester them unmercifully. No attempt was made to sex the animals if it meant disturbing them. All possible were checked for tags. Frequently some which were awake would either bark or growl at our approach or excitedly and laboriously hump into the water well ahead of us thereby awakening other animals.

Moult conditions were also recorded whenever possible. Animals which could be identified as pups of the year were tagged with a monel metal tag in the webbing of each rear flipper. These usually had a smooth gray coat, rather plump shape and a blunter than usual snout. Most were also easily approachable and would eye us curiously. Schlemmer told us that seals were very rarely seen on the island when he lived there years ago. Two partly decomposed bodies were found on the beach. The skulls were collected.

The following tables summarize the data collected:

#### Seal Census Laysan Island September 7, 1971

Adult Males	40
Adult Females	20
Adult Unclassified	120
Subadult Males	14
Subadult Females	13
Subadult Unclassified	15
Pup Males	6
Pup Females	7
Pup Unclassified	4
Total Seals	239



Moult Conditions of Seals  
Laysan Island  
September 7, 1971

	<u>Moulted</u>	<u>Not Molted</u>	<u>Moulting</u>	<u>Percent Sampled</u>
Adult Males	23	10	6	97.5
Adult Females	8	5	5	90.0
Adult Unclassified	37	22	32	75.8
Subadult Males	6	4	3	93.9
Subadult Females	2	7	3	92.3
Subadult Unclassified	2	4	1	46.7

Seals Tagged  
Laysan Island  
September 7, 1971

<u>Tag No.</u>	<u>Age</u>	<u>Sex</u>
A-1013	Pup	Male
1014	Pup	Female
1015	Pup	Female
1016	Pup	Female
1017	Pup	Female
1018	Pup	Male
1019	Pup	Female
1020	Pup	Male
1021	Pup	Male
1022	Pup	Male
1023	Pup	Female
1024	Pup	Male
1025	Pup	Female



Returns of Seals' Previously Tagged  
Laysan Island  
September 7, 1971

<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Date Tagged</u>	<u>Location</u>	<u>Age</u>	<u>Sex</u>	<u>Remarks</u>
A-60	A	M	3/19/67	Laysan	P	M	Moulted
A-120	SA	M	6/10/67	Laysan	P	M	Moulted
A-200	SA	M	9/21/67	Laysan	Y	M	Moulted, large animal
A-707	SA	F	6/2/69	Laysan	P	F	Moulting
A-931	SA	F	8/17/70	Laysan	P	F	Not moulted
A-940	SA	M	8/17/70	Laysan	P	M	Not moulted
A-941	SA	F	8/17/70	Laysan	P	F	Not moulted
A-942	SA	M	8/17/70	Laysan	P	M	Moulted
A-943	SA	M	8/17/70	Laysan	P	M	Not moulted
A-944	SA	F	8/17/70	Laysan	P	F	Not moulted
A-945	SA	M	8/17/70	Laysan	P	M	Moulting



## Laysan Teal

Because of the lack of enough experienced personnel, no beat out of the vegetation around the lagoon was conducted. Instead counts of ducks along the shores of the lagoon were made on September 6, 7, and 8, just shortly before sunset until the light became too poor to see well. Such counts we feel give a more accurate estimate during September than the beatouts. Counts of 149, 145 and 113 were obtained respectively. Thus we can safely assume that there are a minimum of 150 birds and possibly as many as 175 if one assumes that not all birds present were observed. During the time we were engaged in other activities on the island, singles, pairs or trios were occasionally flushed in various places, some near the beaches.

The count of 150 is heartening in view of the 44 seen last year when we estimated that about 75 were present.

On the nights of September 6, 7, and 8, attempts were made to catch some to check on the age ratios via the cloacal method. A full and very bright moon thwarted efforts the first two nights. Prior to its rising on September 8, a total of 12 were caught. Five had been banded previously. Of the 7 others, only 1 was an immature bird. The rest were adults. Birds would hide in the lush morning glory. We worked one such area, where 92 had been seen about an hour previous, with meagre results, and we were disappointed in results.

### Laysan Teal Returns

<u>Band No.</u>	<u>Age</u>	<u>Sex</u>	<u>Date</u>	<u>Date Banded</u>	<u>Age</u>	<u>Sex</u>
595-94626	A	M	9/8/71			
615-30615	A	F	9/8/71	9/23/64	A	F
615-30902	A	M	9/8/71	3/10/64	A	M
615-30937	A	M	9/8/71	3/10/64	A	M

### Laysan Teal Banding September 8, 1971

<u>Band Number</u>	<u>Age</u>	<u>Sex</u>
615-30684	A	F
615-30685	A	M
615-30686	A	F
615-30687	A	M
615-30688	A	F
615-30689	A	M
615-30690 - 98	Not Used	
615-30699	I	F



### Laysan Finch

On September 8, Sincock, Norris and I ran the 120 finch transects which are 100 yards long and 16 1/2 feet wide and are randomly distributed over the island. A total of 317 finch were recorded on transect. Last year only 199 were counted. Using the following simple ratio, a population of 10,774 is calculated for this year:

$$\frac{317(1971 \text{ count})}{199(1970 \text{ count})} = \frac{X(1971 \text{ population})}{6,764(\text{Calculated } 1970 \text{ population})}$$

$$\frac{317}{199} = \frac{X}{6,764}$$

$$10,774 = X$$

This needs refinement in order to obtain the range percentage wise at 95% C.L. and the probable population range in actual birds. This is calculated using the following formula:

$$s = \frac{n(\sum x^2) - (\sum x)^2}{n^2}$$

$$\overline{sx} = \frac{s}{\sqrt{n}}$$

$$95\% \text{ C.L.} = m \pm T \text{ value } .05 \times \overline{sx}$$

$$\pm \text{ percentage} = \text{mean divided in } T \text{ value } \times \overline{sx}$$

$n^2$  = number of transects squared

$n$  = number of transects

$\sum x^2$  = sum of individual transects squared

$(\sum x)^2$  = square total birds seen on total transect

$s$  = standard deviation

$\overline{sx}$  = standard error of mean

$\sqrt{n}$  = square root of number of transects (10.95)

$m$  = mean number of birds per transect ( $\frac{\text{birds}}{120}$ )

T value = for 120 is 1.98



Laysan Finch

$$\frac{\text{Number Observed}}{\text{Total Birds}} = \frac{\text{Sq. Yd. Sampled}}{\text{Sq. Yd. Total area}}$$

$$\frac{317}{\text{Total Birds}} = \frac{120 \times 16.5' \times 300'}{2,243,400}$$

$$\frac{317}{\text{Total Birds}} = \frac{66,000 \text{ yds.}}{2,243,400}$$

$$\text{Total Birds} = \frac{317 \times 2,243,400}{66,000}$$

$$\text{Total Birds} = \frac{711157800}{66,000}$$

$$\text{Total Birds} = 10,775$$

$$s = \sqrt{\frac{n(\sum x^2) - (\sum x)^2}{n^2}}$$

$$\sum x^2 = 1719$$

$$s = \sqrt{\frac{120(1719) - (317)^2}{(120)^2}}$$

$$\sum x = 317$$

$$s = \sqrt{\frac{206280 - 100489}{14400}}$$

$$n = 120$$

$$m = 2.642$$

$$s = \sqrt{\frac{105791}{14400}}$$

$$95\%CL = m \pm t.05 \times 0.2474$$

$$s = \sqrt{7.3466}$$

$$= 2.642 \pm 1.98 \times 0.2474$$

$$s = 2.7105$$

$$= 2.642 \pm 0.4899$$

$$= 2.642 \pm 18.54\%$$

$$\overline{sx} = \frac{s}{\sqrt{n}}$$

$$\text{Total Bird} = 10,775 \pm 1,998$$

$$\overline{sx} = \frac{2.7105}{10.9544}$$

$$\text{Total Bird} = 8,776 \text{ to } 12,772$$

$$\overline{sx} = 0.2474$$



Laysan Finch  
Transect Observations  
Laysan Island  
September 8, 1971

<u>Station</u>	<u>Observed</u>	<u>Station</u>	<u>Observed</u>	<u>Station</u>	<u>Observed</u>
1	4	41	1	81	2
2	2	42	2	82	1
3	4	43	0	83	5
4	2	44	1	84	6
5	3	45	3	85	4
6	2	46	0	86	2
7	7	47	1	87	0
8	3	48	2	88	5
9	0	49	1	89	5
10	0	50	1	90	15
11	2	51	2	91	0
12	1	52	0	92	2
13	1	53	5	93	1
14	3	54	3	94	1
15	6	55	3	95	6
16	0	56	1	96	2
17	1	57	6	97	4
18	6	58	1	98	1
19	1	59	0	99	2
20	0	60	2	100	1
21	4	61	1	101	5
22	0	62	1	102	4
23	0	63	4	103	0
24	1	64	3	104	3
25	0	65	2	105	3
26	0	66	11	106	0
27	0	67	6	107	6
28	0	68	3	108	1
29	1	69	4	109	3
30	5	70	2	110	4
31	7	71	8	111	2
32	1	72	3	112	0
33	1	73	0	113	0
34	1	74	2	114	4
35	2	75	4	115	2
36	3	76	4	116	1
37	1	77	2	117	1
38	11	78	9	118	1
39	6	79	0	119	1
40	12	80	0	120	3

Total: 317



As usual finch were found in every conceivable type of habitat except on the open sand beaches. Because of the relative absence of Sesuvium around the shores of the lagoon, fewer birds were seen in those areas. On six separate occasions begging was noted. Drooping and fluttering of wing, rapid chirping and pursuit of another bird while begging all the time indicated that some birds had been only recently fledged. A search of 50 clumps of Eragrostis in various areas revealed only 1 old nest. Finch like the shade of the ironwood tree, especially during the heat of the day. Birds were noted feeding on the leaves of Portulaca, Tribulus, and Sesuvium. When the patches of Cenchrus were torn up and removed, finch congregated in these areas and busily fed on the numerous seed heads exposed on the sand. At one time 18 were noted in an area of about two square yards. After rain squalls, they would be seen frequently probing the bases of Eragrostis clumps - presumably for drops of fresh water trapped there.

#### Green Sea Turtle

No turtles were seen on the beach except one reported by Schlemmer on September 10. On the afternoon of the same day, I found fresh tracks and 2 newly dug pits about 50 yards north of the northeast landing. Several old tracks but no pits were noted on September 7 near the southwest landing. Schlemmer reported that turtles were very common on the island when he lived there as a boy from 1903 - 08. According to him, the guano workers and his family did not bother the animals then, but only took one occasionally for its flesh.

5 years



## GARDNER PINNACLES

We arrived about 1:30 PM and anchor was set in 48 ft. of water about 150 yards off the west side of the main pinnacle. Shortly afterwards, Sincock, Norris and I landed on the west side in calm seas. The tide was out, and actually landing conditions would have been better had there been more height to the swells. The footing was rather slippery because we had to jump ashore in the surge zone. We all climbed to the top, and while the others looked about I collected rock samples from various parts of the island for the U. S. Geological Survey.

Only seven small patches of Portulaca were found on the east part of the main pinnacle. The rest of the island is bare. The top 2/3 is coated a dirty white by a thin layer of guano.

While handing the bag of rock samples to Sincock below me, I began to slide down the rock face and once more had to dive into the ocean. Swimming out to the rubber boat, I clambered aboard, and we headed in and took off Sincock and Norris. We then nosed the boat against the west face of the smaller of the two islands, and I was able to jump on it with no problems. After a few minutes looking it over, I jumped back into the rubber boat and we proceeded to the ship and were back aboard at 5:00 PM.

### Wildlife Observations

Blue-faced Booby: Estimated 110. Class B data. Most nesting activity was on the upper 1/4 of the island.

Adults	100
Immatures	6
Chicks	2
Nests w/eggs	12

Brown Booby: Although an adult flew over the ship, none were seen on the island.

Frigate Bird: Estimated 1,000. Class B data. Although I counted only about 180 soaring above us while we were on the island, Sincock and Bauer estimated that 1,000 took to the air when the ship blew its whistle about 7:00 PM to call in some of the crew fishing nearby in the boat. No evidence of nesting was noted.

Red-tailed Tropic Bird: We saw none on the island, but when we were about 1,000 yards offshore, one flew past the ship.

Gray-backed Tern: Sincock saw an almost full grown chick.

Sooty Tern: None noted, however, some were heard calling shortly after the ship weighed anchor and set sail about 7:30 PM.



Fairy Tern: Six observed. Data class B. No nesting activity noted. A few others may have been on the cliff faces we did not explore.

Blue-gray Noddy Tern: Four adults seen. Data class B. These were on the south slope of the main peak and near the saddle. A few may have been present elsewhere on the island although none were noted.

Common Noddy Tern: Estimated 1,000. Data class C. Birds were scattered all over the island, mainly the upper one-half. Eggs being incubated to full fledged young were observed.

#### Hawaiian Monk Seal

Four were observed. One had hauled up on a small shelf at the cave on the west side of the main island, and the other three were sleeping on the shelf at the southeast corner of the small island.

#### Fish

The Coastguardsmen reported many ulua and sharks - a number of which were caught. The shark looked like the gray reef shark.

#### Vegetation

Five very small patches of Portulaca lutea were found about 2/3 of the way up the southeast face of the main peak.

#### Rock Samples

At the request of the Geological Survey, I collected a number of rock samples for paleomagnetic studies. The locations are as follows:

- Top of main peak
- North point of main peak about 3/4 way to top
- North point of main peak about 2/3 way to top
- East face of main peak about 3/4 way to top and under overhang
- West face of main peak about 3/4 way to top (no picture)
- Top of south peak
- Just above main landing



## FRENCH FRIGATE SHOALS

We anchored near the entrance to the northwest channel near Tern Island in 38 feet of water on September 13. The radar showed that the distance to the Loran tower on Tern Island was 3,050 ft. The tangent was 040.0° on the tower. We left the ship in the No. 1 boat at about 8:50 AM because the No. 2 boat was out of commission. About halfway to Tern Island, the No. 1 boat began to smoke badly, and after looking at the engine awhile, the crew decided to continue on to Tern where we landed at 9:15 AM. We went to the office to meet the present commanding officer of the Loran station, Lt(JG) Durrie Monsma. Discussions were held with him about wildlife in general, our plans to visit some of the other islets in the atoll, and ways and means of making sure that contractor personnel who will be working there early next year when the station is rehabilitated will adhere to all refuge regulations as well as whatever restrictions the Coast Guard will place on them. While so engaged, we received a report that the No. 1 boat was sinking, and upon going back to the dock, found the boat beached and full of water. It was bailed out and repaired enough to enable it to go back to the ship. The captain of the ship requested use of our rubber boat for work there. We replied in the affirmative since the station was loaning us their runabout to visit the other islets. We visited East and Whale Skate Islands, but only passed by Trig Island, and did not land there since the other members in the party wanted to return to Tern. We planned to return to Trig to inspect the island and allow Bauer and Norris an opportunity to do some diving there in order to get some orientation about the marine flora and fauna of the atoll. However, upon our return, Lt. Monsma informed us that it would be necessary for them to use the runabout to travel back and forth between the ship and Tern Island because both of the ship's boats were now inoperative.

### Wildlife

Other than censusing seals, few observations of wildlife other than of a cursory nature were made. On East Island most of the sooty terns had departed, and there were less than a thousand present, many of which were almost full grown chicks. Low numbers of red-footed booby, blue-faced booby, tropic birds, and frigate birds were there at the time. About 400-500 common noddies were nesting, and nests contained eggs to almost full grown young. Wedge-tailed shearwaters were common. No turtles were found. We checked the nest pits and found none hatching although several looked as if they had recently hatched.

There were no turtles on Whale Skate Island. Present were frigate birds, red-footed booby, blue-faced booby, tropic bird, common noddies and wedge-tailed shearwater. Many frigate bird chicks were still in the nest and most were 1/2 to almost 3/4 grown.



On Trig Island there was one large turtle which moved into the water at our approach. About 20 seals were basking on the north shore. I was unable to get a precise count of them.

Fairy terns, Hawaiian noddy terns, and several tropic birds were present on Tern Island. The most notable observation was the mockingbird which has been there throughout the summer. Monsma said that a turtle nest had just hatched the night before, and the crew had gathered up the young and transported them out into the lagoon a short distance before releasing them - principally to give them a chance to avoid predation by reef fish who wait offshore for such young at this time of the year.

### Wildlife Management Studies

#### Hawaiian Monk Seal

Time permitted a count of seals only on East and Whale Skate Islands. The data is as follows:

Populations and Moulting Conditions of Seals  
East and Whale Skate Islands  
French Frigate Shoals  
September 13, 1971

	<u>Moulted</u>	<u>Not Moulting</u>	<u>Moulting</u>	<u>Total</u>
<u>East Island</u>				
Adult Male		2		2
Adult Female		2	1	3
Adult Unclassified	1	2	3	6
Subadult Male			1	1
Subadult Unclassified		2		2
Pup Male				2
Pup Female				1
Total Seals				<u>17</u>
<u>Whale Skate Island</u>				
Adult Female	1	1	1	3
Adult Unclassified	6	3	4	13
Subadult Male	1	10		11
Subadult Female	1		1	2
Subadult Unclassified	2	8		10
Pup Male				1
Total Seals				<u>40</u>

The three pups were swimming just off the beach, but I was unable to catch them for tagging. One was very curious and swam almost up to me to look me over for a few minutes.



Returns of Previously Tagged Seals  
Whale Skate Island  
September 13, 1971

<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Date Tagged</u>	<u>Location</u>	<u>Age</u>	<u>Sex</u>	<u>Remarks</u>
766	SA	M	7/10/70	Round	P	M	Moulted
*796	SA	F	6/23/69	Whale Skate	P	F	Moulting
926	SA	U	7/13/70	Little Gin	P	M	Not Moulded
969	SA	M	5/16/71	Round	P	M	Not recorded

\*796 Tag and yellow tag missing. Only control tag remains.

There were three other tagged seals, but I was unable to read their numbers before they escaped into the water.

Nihoa Finch

A total of 9 birds were on Tern Island. Monsma said that two had been produced in a nest in the block pile east of the Loran building. Upon looking over the pile, we found another recent but empty nest. There are two birds which fly into and frequent the storeroom next to the kitchen.



## NECKER ISLAND

We arrived at Necker Island, September 14 and the ship anchored in 60 feet of water about 225 yards from the west side of the main part of the island after first circling the island closely. Right tangent  $147.5^\circ$  and left tangent  $081.5^\circ$ . We landed by rubber boat at 9:00 AM at the usual landing site with no trouble. Capt. Smith and Ens. Sarra came ashore with us. Bauer and Norris continued their photography, while Sincock and I censused the wildlife and pointed out the various Polynesian ruins to the officers. Sarra and I climbed down to the cave on the east end and also over to Bowl Cave. There was nothing unusual on the island. We departed at 3:00 PM and the captain had the ship completely circle the island at fairly close range to enable us to see the various slopes not normally seen while on the island and also to enable us to take photographs.

### Wildlife

Albatross: None seen

Wedge-tailed Shearwater: No estimate made although they were very common all over the higher parts of the island. All chicks were large but downy.

Bulwer's Petrel: No estimate made. No adults seen. We checked some holes and found chicks almost fully feathered except for large patches of down on the breast.

Bonin Petrel: None noted in the day but during early evening many were observed flying to the island.

Blue-faced Booby: Population estimate 200. Data Class A. There were 40 nestlings included. These birds as usual were most abundant on the tops of the hills, especially Flagpole and Summit. Nests contained chicks.

Red-footed Booby: Population estimate 425. Data Class A. 47 nests contained chicks, usually 1/2 grown. Chenopodium or Sesbania were favored nesting sites.

Brown Booby: Population estimated at 10. Data Class B. Four adults and 2 flying immatures were seen.

Frigate Bird: Population estimated at 2,000. Data Class B. There were a minimum of 478 nests containing 2/3 to almost full grown young. These were principally on the summits or near summits of the hills. Most of the adults were counted soaring far above the island.



Red-tailed Tropicbird: No estimate made. High tens. Most nest in holes of steep cliffs. All young seen were very large.

Common Noddy Tern: Population estimated at 50,000. Data Class C. The most abundant bird on the island and distributed all over it. Nests contained eggs to full grown young.

Blue-gray Noddy Tern: Estimated less than 50. No nests were found. Some birds were on Northwest Cape and others scattered along the cliffs near the top of the island.

Hawaiian Noddy Tern: No estimate made, but they were not too common. No nesting noted. Most of this species inhabited the hole ridden cliff sides.

Gray-backed Tern: No population estimate. No adults seen although a number of very large chicks were thinly scattered all over the island. Some were flying.

Fairy Tern: Population estimated at 400-500. Most inhabit the steep cliffs. We saw many when circling the island.

Sooty Tern: Population estimated at less than 100. Data Class B. Less than 5 adults were seen or heard. The others were all immatures and were scattered around Flagpole and Summit Hills.

Ruddy Turnstone: Less than 10.

#### Hawaiian Monk Seal

There were 16 adults, 12 of which were hauled up on the flat shelf on the Shark Bay side of the cut which separates the two parts of the island. None wore tags. Upon our approach they awakened and hustled into the water. The other four were on a ledge of Shark Bay below Summit Hill.

#### Green Sea Turtle

Two large females and one small platter sized turtle were hauled up on the rocks in the same place as the seals. None contained tags. Since we brought no tags ashore we left them go. One adult also was seen swimming near the landing before.



## NIHOA ISLAND

We anchored in 60 feet of calm water in Adam's Bay. Right tangent 072.5°, left 265.0° and about 400 yards offshore in the middle of the bay. Tangent readings do not seem correct, however, because such readings would have put us very close to Dog's Head Point. Sincock, Bauer, Norris and I landed with a rubber boat at a point about midway between East Palm and Miller Canyons. There was about a six foot swell. Schlemmer, Capt. Smith and Ens. Sarras came ashore on the second boatload. The thermometer near the sign had registered a low of 58 during the past year and a high of 80. At 2:00 PM this day it registered only 72 although it felt hotter. Sincock, Smith, Sarras and I climbed to the top of Miller Peak where I collected some pieces of old coral laid there many years ago presumably by the Polynesian inhabitants. The samples will be aged later by use of the Carbon 14 method. Bauer, Norris and Schlemmer remained near the bottom of the island taking pictures. Several boatloads of the crew (15+) came ashore later to see the island. We looked with no success for millerbird nests on the way up Miller Canyon. Then we dropped down to Miller Plateau (called Albatross Plateau by the Tanager Expedition of 1923) to look for millerbirds. Found at least 7 different individuals there. Attempts to take photographs were foiled by the habit of the bird to skulk and scuttle under the low brush and then quickly flit across an open area into bush again. The archeology and wildlife of the island was explained to the officers as we moved about it. There was a fair amount of water in a number of seeps in Miller and East Palm Canyons. I tasted the water at the big seep in Miller Canyon and found it to be extremely distasteful and bitter because it was so tainted by bird excreta. The palms in East Palm Valley were thriving, and I noticed a number (5-6) of very small plants started among the others. Many of the trees were flowering and a few contained large fruit. When we arrived back at the landing, everyone else except Norris and ourselves went back to the ship. Sincock and Norris then went back with the gear shortly thereafter and at about 4:00 PM Captain Smith, Sarras and I left the island. We returned to the ship, traded gasoline cans for the outboard, picked up Schlemmer, and then the four of us circled the island at very close range with the rubber boat. We decided not to go through the tunnel at the east end when we saw the south entrance contained a number of rocks which were awash. We putt-putted around the east end and moved almost into the northeast entrance of the same tunnel. It appeared navigable during calm seas. Looking up we were rather awed and impressed by the overhang of the massive cliffs above us. We proceeded along the north side and after checking both entrances of another small tunnel at the base of the middle of the island, chugged our way through it for about 30 feet, a "tunnel of love", came out, turned around, reversed our path and passed through it again.

The sheer west side cliffs also contain some tunnels at sea level. One cannot help but be impressed by the bulk of this



rocky island when he is on the water in a small boat at the base of the cliffs. There are many almost vertical dykes running from top to bottom on all three sides. One on the west side stood by itself as the pounding seas had eroded the softer rock away from it. We returned to the ship at 5:00 PM. Shortly after sundown, anchors were weighed and the captain sailed the ship around the island at about 1,000 yards before course was set for Honolulu.

### Wildlife

No attempt was made to census the island in view of the short time ashore. General observations revealed that there were no albatrosses or blue-gray noddy terns. A few red-footed booby nests contained eggs, while others had chicks of various ages, the peak nesting season was well over. Blue-faced boobies were mainly found on Miller Plateau. Many large (1/2 to almost fledged) frigatebird chicks were still in their nests. Several thousand adults soared high above the island. Almost fully grown Bulwer's petrel chicks were common in their burrows over much of those parts of the island we inspected. Several Christmas Island shearwaters were found about 50 feet below Millers Peak. Large tropic bird chicks were almost fully feathered which were seen several times. Almost fledged gray-backed terns were thinly scattered over the island. Common noddy terns were abundant (high thousands). Hawaiian noddy terns frequented the cliff faces in the low thousands. Wedge-tailed shearwater burrows were everywhere and occasionally calling was heard. Turnstones and plover were rare.

Of great interest was the female pintail seen near a very small puddle of water about 1/3 of the way up East Palm Canyon. The rotting carcass of a male pintail (probably 2-3 weeks dead) was found in the same puddle. The wing was collected. This is the first time that this species has been recorded on Nihoa.

Millerbirds: Several were seen in the brush flanking Miller Canyon. Another 7 were at Miller Plateau, and 2 others were observed in the trees in East Palm Canyon.

Nihoa Finch: Scattered and common everywhere. Several were seen eating the rind (or outer covering) of the Nihoa palm nuts.

### Hawaiian Monk Seal

One was observed sleeping on the sandy beach at Derby's landing.

### Green Sea Turtle

Two large animals were noted on a low rock at the base of the northwest cliff while another large one was seen several times swimming around the ship.

*Eugene Kridler*  
Eugene Kridler  
September 30, 1971



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Hawaiian Islands National Wildlife Refuge  
Trip Report  
French Frigate Shoals  
January 20, 1972

Personnel

David L. Olsen - Assistant Wildlife Administrator, Bureau of Sport Fisheries and Wildlife, Kailua, Hawaii

Itinerary

January 20 - Depart Honolulu via FAA DC-3 8:20 AM. Arrive Tern Island, French Frigate Shoals 12:05 PM. Depart Tern Island 2:12 PM, arrive Honolulu 5:25 PM.

Introduction

With the construction of the new facility at Tern Island on French Frigate Shoals, a sizable amount of heavy equipment will have to be stored on the island. Inasmuch as the majority of space on the island is taken up by the runway and a few buildings, storage space is at a premium. Some of the areas planned for stockpiling are presently being used by both Laysan and black-footed albatrosses for nesting. The primary purpose of this trip was to inspect the proposed stockpiling areas to determine how many birds may be affected. Recommendations were subsequently made to the staff at Tern Island. Some wildlife census work was also completed. A seal census was completed on most of the islets and the birds on Tern Island were censused.

Inspection of the proposed stockpiling site

As the bird population on Tern Island was being censused, special attention was given to the number of nesting albatross in the proposed stockpiling sites. These sites designated as area one and two, are shown in LORSTA French Frigate Shoals - Topographic map, which was included in the detailed plans of the station rehabilitation plan.

Six albatross were observed nesting in area one, the area located immediately west of the concrete slab and warehouse. Area two, the long strip running east of the warehouse and slab to the end of the island, provides nesting habitat for no more than 8 Laysan albatross.



Since only a few birds could be displaced by the stockpiling, it was recommended to Mr. Monsma, the Station commanding officer, that no eggs, chicks or adults be moved. Rather, the building materials should be placed around the few nests located in the proposed sites. Most of the albatrosses will probably have left by the time the bulk of the equipment arrives.

#### Wildlife Populations

**Black-footed Albatross** - Members of the crew at the LORAN Station reported that the first albatross eggs were laid on or about November 20. However, no chicks were noted. A total of 5 nests were observed and all were on the south side of the island. Approximately 15 others classified as "walkers" were also observed on the island.

**Laysan Albatross** - A total of 143 nests were observed. Only two were on the north side of the island. Approximately 45 "walkers" (birds defined as seeming to have no attachment to a nest) were also observed.

**Wedgetailed Shearwaters** - None observed

**Bonin Island Petrel** - None observed. No sign of initiation of nesting activity in the burrows.

**Red-tailed Tropicbird** - A single bird was observed flying over the island, however, none were seen on the island.

**Red-footed Booby** - None observed.

**Blue-faced Booby** - None observed.

**Brown Booby** - None observed.

**Ruddy Turnstones** - 125 birds observed.

**Sanderling** - 1 observed.

**Sooty Tern** - None observed.

**Common Noddy Tern** - None observed.

**Hawaiian Noddy Tern** - None observed.

**Fairy Tern** - None observed.

**Golden Plovers** - 5 observed.



Bristle Thighed Curlew - A single bird with a broken wing was observed on Tern Island. The bird appeared to be in good health and he could run like a pheasant. The tip of his wing was broken and it is doubtful if the bird can survive for too much longer.

Nihoa Finch - Only 4 birds were observed and all were in the vicinity of the brick pile on the east side of the concrete slab warehouse. One was a banded adult male while the others were either females or young. There were probably other birds on the island, however, in the short time there no others were observed.

An aerial census of seals and turtles was taken. There were several small squalls in the area and a large cloud hung over Disappearing Island. We were, therefore, unable to make a complete aerial census of all the islets within the atoll. The data collected are presented in the following table.

<u>Island</u>	<u>Seals</u>	<u>Turtles</u>
Shark	18	
Tern		
Trig	4	3
Round	3	1
Mullet	3	
East	5	1
Little Gin	7	
Big Gin	3	
Total:	<u>43</u>	<u>5</u>



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HAWAIIAN ISLANDS NATIONAL WILDLIFE REFUGE  
Expedition Report  
Pearl & Hermes Reef  
March 11-18, 1973

Personnel

Eugene Kridler - Wildlife Administrator  
David L. Olsen - Assistant Wildlife Administrator

Itinerary

March 11 - Depart Kailua 9:00 AM. Arrive Hickam AFB at 10:00 AM and depart for Midway via MAC chartered flight. Arrived at Midway 3:20 PM. Overnight Midway.

March 12 - On Midway, reviewed Wildlife Management Plan for the Base and discussed same with Captain Roemer, Commanding Officer.

March 13 - Depart Midway 9:30 via Navy Hu-46 helicopter. Arrived Southeast Island, Pearl and Hermes Reef at 10:00 AM. Via helicopter visited remainder of islets within the atoll. Overnight camp on Southeast Island.

March 14 - Continue biological investigations on Southeast Island - Overnight camp on Southeast Island.

March 15 - Navy helicopters arrived at 10:30 AM. Visited again other small islets within atoll and returned to Midway 4:00 PM. Overnight Midway.

March 16 - Compiled field notes and worked on trip report. Overnight Midway.

March 17 - Cleaned and repacked equipment and camp gear - Overnight Midway.

March 18 - Departed Midway via MAC chartered Capitol Airlines. Arrived Honolulu 6:30 PM and passed Customs. Via Govt vehicle arrived Kailua 7:50 PM.

General

The original plan for the trip was to visit and work not only Pearl & Hermes Reef, but also Lisianski Island. The HU-34 Helicopters formerly stationed at Midway were too limited in range to allow us to fly to any units other than Pearl and Hermes Reef. The HU-46 helicopters now used there have a significantly greater carrying capacity and longer



range. Extra internal fuel tanks and stocking fuel beforehand at Pearl and Hermes enables these helicopters to make a round trip to Lisianski. Due to a combination of bad weather and malfunctions in one of the escort aircraft, the planned flight to Lisianski was cancelled. However, a visit was made to Pearl and Hermes Reef, and a considerable amount of biological data were collected. Work was accomplished on the following Wildlife Management Studies:

- a. Life History of the Hawaiian Monk Seal.
- b. Life History of the Green Sea Turtle.
- c. Life History of the Laysan Finch.
- d. Studies involving vegetation changes on the Hawaiian Islands Refuge.

Heavy rains drenched the party shortly after landing on March 13, but by afternoon they stopped. By late afternoon the following day the front passed and fair weather prevailed during the rest of the stay. The maximum temperature recorded since the last visit in September, 1972 was 88° while the minimum had been 46°. At 6:00 PM on March 13 the temperature was 68. During this trip the maximum was 76° and the minimum was 62°.

General observations revealed that the isthmus connecting Seal Island and Kittery Island is now about 42 yards wide at its narrowest. Sizes and shapes of other islands had not changed materially since the September visit. Scattered along the beaches of Seal and Kittery Islands were walnut-sized globules of oil.

#### Cooperation

Following through on the cooperative wildlife agreement the Bureau has with the Midway Naval Station, the second draft of the wildlife management plan for the Station was carefully reviewed and discussed with the station commander, Captain Robert Roemer. This document will be a permanent station plan which will provide guidance for succeeding commanders with respect to the wildlife management program on Midway. As usual Captain Roemer and member of his command were very cooperative. The station administration officer, Cmdr. Andy Patrick camped with us and proved a willing and able field companion. Cmdr. Van Spradley, station air operations officer and Lt. Cmdr. Michael Rij, senior helicopter pilot for the base, piloted the helicopter.

#### Wildlife Populations

Each of the small islets within the atoll were visited twice during the operation on Pearl and Hermes Reef, and bird populations were estimated



for each islet. Some counts were considered Class A data, or head counts while others were "educated guesses" because of time limitations. Data class figures are included with discussion of each species.

#### Sooty Terns - (6,000 Class C)

Sooty terns had just recently arrived on Pearl and Hermes Reef. Daytime populations on Southeast Island were estimated at 1,500 birds while toward dusk, up to 6,000 were observed as those fishing at sea returned to roost for the night. A few birds were settled on their breeding areas; however, most kept flying constantly over the island. No eggs or nests were found.

Approximately 275 more were also observed on Seal Island, but none were noted elsewhere.

#### Grey-backed Tern (300 Class B)

On Southeast Island approximately 110 birds were observed during the daylight hours and 6 newly established nests with eggs were noted. Active courtship activities were also seen. At night the population increased to approximately 300 birds.

A small colony was noted on Seal Island, and 7 nests with eggs were noted.

#### Common Noddy Terns (60 Class B)

At Southeast Island the population varied between 20 and 50 birds. Seven adults on eggs were recorded. Three nests and approximately 100 adults were observed on North Island.

#### Hawaiian Noddy Terns (50 Class B)

On Southeast Island the population was estimated to be between 30 and 50 birds. Seven nests with eggs were observed in tops of the Eragrostis on the west side of the islet. There was no increase in nighttime populations.

#### Fairy Terns (1,000 Class C)

Hundreds of Fairy terns were noted resting on the exposed reef to the north and east of North Island. Approximately 20 were observed on North Island. Two nests and 11 adults were noted on Southeast Island, while 2 nests and 6 adults were seen on Kittery Island.

#### Sooty Storm Petrels (500 adults - 150 chicks - Class C)

A total of 41 adults and 17 chicks were banded (682-97143 thru 200) on Southeast Island. Most of the chicks found appeared to be approximately 2 weeks old and were covered with dark gray down. Other adults were just beginning to nest but no eggs were noted in the newly constructed



burrows. A single chick and 2 dead adults were found on North Island. A single chick was found on Grass Island. Time did not permit us to investigate more than but a few burrows. Southeast Island may contain the largest nesting population of this species in the world.

Three previously banded petrels were recaptured. One (682-17560), was originally tagged during March 1972, while the other (662-05722) was originally banded on March 21, 1965. The number on the band of the second bird was almost completely worn away.

A bird carrying band number 262-20261 was also recaptured. This band was removed and band #682-97154 was placed on the bird.

#### Red-tailed Tropicbird (20 - Class B)

Four tropicbird nests with eggs were found on Southeast Island and 5 adults were noted on North Island. One limiting factor with respect to nesting success of this species is the availability of suitable nesting sites. In the past old barrels or boards were frequently selected by tropicbirds, however, most of this trash has either rusted away or been burned.

#### Blue-faced Booby (300-Class B)

Nesting Blue-faced boobies were noted on most islets. Most nests had either one or two eggs as shown below. None, however, were seen on Grass Island.

	<u>Islets</u>	<u>Nests</u>		<u>Total</u>	<u>ADULTS</u>	
		<u>1 egg</u>	<u>2 eggs</u>		<u>Day</u>	<u>Night</u>
	Southeast	11	12	23	50	100
	Kittery	2	9	11	50	
	Seal	9	3	12	50	
	North	<u>16</u>	<u>11</u>	<u>27</u>	<u>70</u>	
Total		<u>38</u>	<u>35</u>	<u>73</u>	<u>220</u>	

#### Red-footed Booby ( 160-B)

Red-footed boobies were only observed on Southeast Island, and the population varied from approximately 85 during the day to 130 adults and 30 immature at night. A total of 26 nests with eggs and 11 nests without eggs were observed. The old metal tower continued to serve as a preferred roosting site - about 65 were tallied there one night.



#### Black-footed Albatross (10,000 Class B)

Both species of albatrosses were found nesting on North, Southeast, Grass, Seal and Kittery Islands. A head count of black-footed chicks on Southeast Island turned up 1,658 on the East part of the island and 426 on the smaller western half, for a total of 2,084. As usual most were nesting along the perimeters of the islets, although a few were scattered about the interiors.

In an effort to determine the number of walkers per chick, a transect of 100 Laysan chicks was counted. This count revealed there were 62 sub-adults or walkers per 100 chicks. Assuming there were 2 parents per chick and 62 walkers per 100 chicks, and assuming the black-footed adult chick ratio is the same as Laysan, the estimated total of black-footed albatross population for Southeast Island was calculated to be 7,680 birds.

The estimated population for the other islets was 2,500 birds and the total atoll population was calculated to be 10,000.

#### Laysan Albatross (51,000 Class C)

Laysan albatross chicks were also head counted on Southeast Island. A total of 9,809 were recorded on the east portion of the islet and 1,189 on the western portion for a total of 11,098.

Again assuming 2 parents per chick and 62 walkers per 100 chicks the Laysan albatross population was calculated to be 39,176 birds, or rounded off, 39,200.

On Kittery Island 30 chicks and 35 adults were recorded.

Birds were not head counted on Grass, Seal or North Island, however, it was estimated that the population for the other islets was approximately 11,700 birds.

#### Wedge-tailed Shearwater (50 Class C)

Wedge-tails just recently arrived at Pearl and Hermes Reef. None were noted during the day and the nighttime population was estimated to be only 50 birds.

#### Christmas Island Shearwater (10 Class B)

Four pairs were observed on Southeast Island and two nests were seen, however, none contained eggs.

#### Bonin Island Petrels (200 Class C)

Bonin Island Petrels had just recently arrived at Pearl and Hermes Reef. A considerable amount of digging was observed but no nests with eggs were found. The estimated nighttime population was approximately 200.



Brant (1 Class A)

A Black brant was observed and photographed on Southeast Island. It was seen browsing on mustard and appeared to be in good health. This was the first record of a Black brant at Pearl & Hermes Reef and the second on the Hawaiian Islands Refuge. The other being collected at French Frigate Shoals in December 1970.

Sanderling (2 Class A)

Single birds were noted on Kittery and Southeast Islands.

Wandering Tattlers (2 Class A)

Two were seen on Seal Island.

Bristle Thighed Curlew (13 Class A)

Eleven were observed on Southeast Island and two on Seal Island.

Golden Plover 0

Usually this species is common at Pearl and Hermes Reef; however, none were observed on any of the islets during the trip.

Ruddy Turnstones (95 Class B)

Seventy turnstones were observed on Southeast Island, fifteen on North and ten on Seal.

WILDLIFE MANAGEMENT STUDIES

Laysan Finch Study

One-hundred random finch transects were conducted on Southeast Island on March 14. Thirty were run on the western, smaller portion of the Island while 70 were conducted on the east of the island. Each transect was 100 ft. long by 16.5 feet wide and the data are shown in Table 1. Using the standard method of calculating the finch population, the total finch count was calculated to be 729.

$$\text{Total birds} = \frac{\text{Number counted} \times \text{total area}}{\text{Area sampled}}$$

$$\text{Total birds} = \frac{88 \times 31.37 \text{ acres} = 2,760.5}{\frac{16.5 \times 100 \times 100}{43,560}} = 729$$



The main factor which may have contributed to the higher finch population was that vegetation on the island was very low and it was much easier to see birds this time than in former counts. Boerhavia was just beginning to emerge and Sicyos was barely evident. Setaria was not much higher than one or two inches. Although some of the Brassica had reached heights of 18-24 inches, most plants were less than 2-3 inches tall. The two high counts, Table 1, were located in Scaevola (15) and high Brassica (9). Regardless, it was evident that the finch population continues to thrive.

A total of 12 finch were observed on Seal Island.

Two nests, each containing three eggs, being incubated were found in Eragrostis clumps on the southwest part of Southeast Island. Another containing 3 eggs, also being incubated, was found on Seal Island, but none was found on Grass Island.

On March 14 a Hawaiian noddy tern was flushed from its nest constructed on top one of the Eragrostis clumps. 10-15 finch were scattered about this general area. Within a few seconds, one had flown to the top of the grass clump and shortly afterwards lit on the nest and pecked a small hole in the egg; however, it soon lost interest and flew back down to the ground and hopped away. Within a few minutes the tern returned to incubating the egg.

Finch were noted biting soft stems of Brassica (for moisture?). Others were noted hunting for food on undersides of leaves of various species of plants or foraging on the ground for seeds or insects. A number of times they were observed trying to crack the hard Tribulus seeds.

A total of 15 previously banded finch were recaptured and the data are shown in Table 2.



Table 1  
 Finch Transects  
 Southeast Island  
 March 14, 1973

<u>Transect No.</u>	<u>X</u>	<u>X<sup>2</sup></u>	<u>Transect No.</u>	<u>X</u>	<u>X<sup>2</sup></u>	<u>Transect No.</u>	<u>X</u>	<u>X<sup>2</sup></u>
1	0		34	0		67	2	4
2	0		35	0		68	2	4
3	0		36	0		69	1	1
4	0		37	0		70	0	
5	0		38	0		71	1	1
6	1	1	39	0		72	1	1
7	0		40	0		73	0	
8	0		41	0		74	0	
9	0		42	0		75	0	
10	1	1	43	0		76	0	
11	0		44	0		77	0	
12	2	4	45	0		78	0	
13	5	25	46	1	1	79	0	
14	1	1	47	3	9	80	0	
15	0		48	0		81	9	81
16	0		49	3	9	82	3	9
17	0		50	0		83	0	
18	0		51	0		84	0	
19	0		52	0		85	0	
20	4	16	53	0		86	0	
21	0		54	0		87	1	1
22	2	4	55	6	36	88	0	
23	3	9	56	1	1	89	0	
24	0		57	0		90	0	
25	0		58	0		91	0	
26	0		59	15	225	92	0	
27	6	36	60	0		93	0	
28	0		61	4	16	94	0	
29	0		62	0		95	1	1
30	0		63	0		96	0	
31	0		64	4	16	97	1	1
32	0		65	0		98	0	
33	1	1	66	0		99	3	9
						100	0	
							88	524

1-30 west side  
 31-50 east side of larger portion of island  
 50-100 west side of larger portion of island



Table 2

Finch Recapture Data  
 Southeast Island  
 March 14, 1973

<u>Band Number</u>	<u>Banded</u> <u>Date</u>	<u>Island</u>	<u>Age</u>	<u>Sex</u>	<u>Elapsed time</u> <u>(Mos.)</u>
61-171308	5/26/69	Southeast	L	M	46
310	"	"	L	M	46
311	"	"	HY	F	46
328	"	"	HY	F	46
337	"	"	A	M	46
411	2/11/69	"	A	F	49
437*	"	"	L	F	49
438	"	"	A	M	49
916	3/14/72	"	A	M	12
937	"	"	A	F	12
944	"	"	A	F	12
984	"	"	A	F	12
988	"	"	A	M	12
989	"	"	A	F	12
102-153712	6/27/72	"	A	M	9

\*recaptured on 5/29/69



### Hawaiian Monk Seal Studies

Seal census data were collected on both March 13 and 15 (Table 3). The count again indicated a declining seal population since this count was the lowest ever recorded for Pearl and Hermes Reef. Several of the high count censuses conducted during the earlier years were made during March (1964, 1965 and 1967) and some were incomplete. The cause for the very low count this year is unknown.

One female pup was tagged with number 1101 (Table 4). A total of 6 previously tagged animals were recorded (Table 4). Five of the 6 were originally tagged during 1967 and have not been observed since. This indicates that perhaps some animals may leave the area for several years. It also suggests that any given time there may be a significant number of animals at sea or away from the islands. However, it is also possible that due to the infrequency of our visits, we simply miss many tagged animals which are off in the water at the time.

One of the Navy pilots who periodically flies from Midway to Kure reported that there were 20 adults and 3 pups on the sand spit on Kure on March 16.



Table 3  
Seal Census Data  
Pearl and Hermes Reef  
March 14, 1973

	<u>Adults</u>			<u>Pup</u>		<u>Age</u>	<u>Total</u>
	<u>M</u>	<u>F</u>	<u>Unknown</u>	<u>M</u>	<u>F</u>	<u>Unknown</u>	
North	-	-	-	-	1	8	9
Little North						2	2
Southeast						6	6
Bird						3	3
Sandspits						1	1
Grass	1						1
Kittery	3	2	3				8
Seal	$\frac{2}{6}$	$\frac{1}{3}$	$\frac{1}{3}$			$\frac{1}{21}$	$\frac{4}{34}$
Totals	6	3	3	1		21	34

Table 4  
Seal Recapture Information  
Pearl and Hermes Reef

<u>Tag #</u>	<u>Original Location</u>	<u>Age</u>	<u>Date</u>	<u>No. Previous Returns</u>
A 128*	North	A	7/3/67	0
137	Southeast	Y	7/6/67	5
170	Kittery	A	7/8/67	4
A 180	Seal	A	7/10/67	3
292	Seal	A	9/28/67	0
1067	Seal	P	6/27/72	1

\*This animal had a newly born pup with her-Pup tagged #1101 F.



### Studies of the Green Sea Turtle

A total of 11 turtles were turned during our stay at Pearl and Hermes Reef. Four were newly tagged and the remainder were animals that had been tagged previously (Table 5).

### Studies Involving Vegetative Changes

The Eragrostis on Seal Island did not appear as lush or as abundant as formerly. Much of Southeast Island was covered with low mats of Tribulus in flower and much less so by Boerhavia. Setaria was very low and was almost absent at this time. Most of the Eragrostis has disappeared from the northeast part of the island, and this plant is now mainly limited to about 15-20 clumps on the southwest part. Most of the Brassica was very low in height, Sanchus was scattered about near the recognition sign. The general overall impression of the vegetation of the islands was that growth was retarded when compared to former years.



Table 5  
Turtle Data  
March 15, 1973  
Tagging Data

Tag	Sex	Plastron Length	Carapace		Thickness	Weight
			Straight Length	Curved Length		
1060	F	29 3/4	34 1/4	29 1/2	13.5	not taken
1053	F	31	37 1/4	28 1/4	14 1/8	275
1054	F	28 3/8	35 1/2	27 1/2	13 3/4	230
1055	M	27 3/4	34 7/8	27 3/8	12 3/8	210

TURTLE RECAPTURE DATA  
March 15, 1973

Tagging Date	Data Tag	Sex	Plastron Length	Carapace		Thickness	Weight	Location	
				Straight Length	Curved Length				
(1) 9/26/66	137	M			35	32 1/2	210	North	
(2) 3/15/73	137	M	27 3/4	35	26	37 5/8	35	13 3/4	North
9/22/66	139	F			28	26 1/2			North
3/15/73	139	M	26 1/4	31 3/8	25 1/2	33 1/2	32	11 3/4	North
3/15/73	T205 (cant find original tag data)	M	28 3/4	36.8	28 1/4	not taken	12.5		S/East
4/71	988	F	27.0	32.9	25	36	32 1/2	12.2	180 S/E
3/15/73	988	F	25 5/8	31 3/8	25 1/4	33 7/8	30 1/2	11 1/2	155 North
3/15/73	1052	F	25 1/8	30 1/2	25 3/4	31 7/8	30 5/8	11 1/4	135 S/East
9/16/64	1069*	F				25	23		S/East
3/15/73	1069	F	22 1/4	28 1/4	25 5/8	30 1/2	n/t	10 1/2	95 S/East

\* Hawaii Division of Fish & Game TAG

(1) First date is tagging data

(2) Second date is recovery data

same turtle	4/13/70	T15	M	26.9	32.2	24.2	34	32 1/2	12.2	180	South East
	< 3/15/73	868		22 3/4	32 3/4	23 7/8	34 7/8	30 1/2	11 1/2	155	North
different turtle	6/21/69	868		15 1/2	19	15 1/2	20	18	8"	35	Midway



Table 3  
Green Sea Turtle Tagging Data  
Pearl and Hermes Reef  
December 14-15, 1970

Tag	Sex	Location	Plastron Length	Carapace Length	Width	Thickness	Round Measurements	Weight
927	M	North Is.	27.4	30.1	26.3	10.1	35 X 32	175
928	M	North Is.	27.4	33.3	26.5	11.1	35 1/4 X 33	185
929	M	North Is.	27.8	33.0	28.5	12.3	35 1/4 X 35 1/4	210
930	M	North Is.	26.7	33.3	27.1	11.3	35 1/4 X 34	180
931	F	North Is.	26.4	32.0	25.3	12.1	34 1/2 X 32	170
932	M	North Is.	28.2	34.7	27.4	12.1	36 X 35 1/4	210
933	M	North Is.	26.1	33.0	26.7	11.3	35 1/4 X 33 1/2	175
934*	M	Southeast	26.3	32.3	26.6	11.2	34 X 32 5/8	180
935	F	Southeast	25.3	31.4	24.2	12.4	35 3/8 X 30 1/4	155
936	M	Southeast	27.1	33.0	25.7	10.7	34 X 31	160
937	F	Southeast	24.5	29.7	22.1	10.3	31 1/2 X 28 1/2	125
938	F	Southeast	29.1	35.3	27.2	14.2	38 3/4 X 35 1/2	250
939	F	Southeast	19.1	23.6	19.0	8.6	24 3/4 X 22 1/2	60

\* 934 originally tagged on 9/24/66 with tag # 161 - old tag removed and replaced by tag # 934.

$$8 \sigma + 4 = 12$$

$$5 \sigma + 3 = 8$$



Table 4  
Turtle Recapture Data  
Pearl and Hermes Reef  
December 14-15, 1970

Tag	Sex	Location	Plastron			Carapace			Round Measurements	Weight	Date
			Length	Length	Width	Thickness	Length	Width			
130	F	North	25.5	31.1	25.4	12.3		34 1/2 X 33 31 1/2 X 29 1/2	155	12/14/70 9/20/66	
* 161	M	Southeast Southeast	26.3	32.3	26.6	11.2		34 X 32 5/8 34 X 33	180	12/15/70 9/24/66	
448	M	Southeast	27.7	35.2	26.2	12.2		37 X 32 1/2 38 1/2 X 35 1/2	195	12/15/70 3/21/67	
881	M	North	26.2	33.3	24.3	10.8		34 3/4 X 31	155	12/14/70	
	M	North	26.1	33.0	24.2	12.0		34 1/2 X 30 7/8	174	3/31/69	
882	F	North	27.5	34.7	27.3	13.3		37 3/4 X 34 3/4	225	12/14/70	
	F	North	27.0	33.6	26.9	12.2		36 1/2 X 34	208	3/31/69	
898	M	Southeast	27.0	32.2	23.9	12.2		34 1/2 X 31	155	12/15/70	
	M	Southeast	27.5	32.0	23.6	12.1		34 1/2 X 31	165	9/17/69	
1042	M	Southeast	27.3	33.0	26.3	12.4		35 1/2 X 33	180	12/15/70	
	F	Southeast	26.2	31.8	25.1	13.3		35.0 X 32.5	180	4/1/69	
	F	Southeast						33 1/2 X 30 1/2		3/3/64	

\* Tag # 161 not securely fastened - removed and replaced with Tag # 934.



### Green Sea Turtle

Complete turtle census data were obtained on all islets within the atoll (table 7). Three turtles were newly tagged on Southeast Island (table 8) while 8 other previously tagged turtles were checked (table 9). Due to a lack of time we were unable to take a complete set of measurements on all of these animals.

Table 7

#### Turtle Census Data

<u>Location</u>	<u>Number</u>
Little North	1
North Island	12
Seal Island	0
Kittery Island	0
Grass Island	0
Southeast Island	7
Total	<u>20</u>

Table 8

#### Turtle Tagging Data

<u>Tag</u>	<u>Sex</u>	<u>Location</u>	<u>Plastron</u>		<u>Carapace</u>		<u>Thickness</u>	<u>Round Measurements</u>	<u>Weight</u>
			<u>Length</u>	<u>Width</u>	<u>Length</u>	<u>Width</u>			
326	M	Southeast	27.8	27.3	32.1	27.9	12.9	34X33 1/8	210
327	M	Southeast	25.4	25.3	35.4	31.1	11.5	34X33 1/8	169
328	F	Southeast	31.85	30.3	38.4	31.9	14.7	41 $\frac{1}{2}$ X39 $\frac{1}{2}$	325



Table 9

## Turtle Return Data

Tag	Location	Plastron		Carapace		Thickness	Round Measurements	Weight
		Length	Width	Length	Width			
161	Southeast	26.3	25.3	31.6	26.4	11.2	34½X33	176
164	Southeast	28.8	27.2	35.1	29.1	11.7	37X36½	202
443	North Island	Unable to remeasure turtle - possible old streamer in tag						
868	Southeast	26.9	23.7	32.2	24.2	11.0	34X31	150
879	North Island	Unable to remeasure turtle						
885	North Island	Unable to remeasure turtle						
666	Little North	Unable to remeasure turtle - white plastic streamer in good shape						
1059	Southeast	29.3	28.4	35.7	28.4	14.1	36X38¼	250

## Laysan Finch

One hundred random Laysan finch transects were made on Southeast Island. Thirty were completed on the west part of the island while 70 were completed on the larger end of the island. Each transect was 100' long by 16' wide. On transect, 19 unbanded and 3 banded birds were counted.

$$\text{Total Birds} = \frac{\text{Number counted} \times \text{Total area}}{\text{Area sampled}}$$

$$\text{Total Birds} = \frac{22 \times 31.37}{\frac{(16 \times 100 \times 100)}{43,560}} = \frac{690}{3.67} = 188$$

Efforts were made to capture previously banded finch. Table 10 lists these recaptured birds and their dates originally banded. From these few band returns and from others in past trips it appears that there is a rapid population turnover in finch on Southeast Island.



Table 3

Temperature and Precipitation Data  
Hawaiian Islands National Wildlife Refuge

Month	Midway			French Frigate Shoals			Lihue, Kauai		
	High	Low	Prec	High	Low	Prec	High	Low	Prec
JAN	71	56	1.81	78	59	2.14	78	50	4.97
FEB	77	56	1.34	80	61	4.20	81	62	1.94
MAR	74	57	1.90	80	58	1.48	78	58	1.75
APR	79	61	.80	88	63	.90	83	62	1.52
MAY	83	67	.53	85	63	1.11	85	64	2.80
JUN	83	67	.51	83	67	.67	89	67	.57
JUL	88	70	1.80	89	63	1.25	88	70	1.47
AUG	85	69	7.39	88	64	2.68	86	72	.83
SEP	85	69	3.11	88	60	2.29	86	69	1.49
OCT	86	65	2.37	88	63	2.74	85	63	3.15
NOV	80	63	6.00	88	62	3.90	83	64	7.45
DEC	79	60	<u>1.98</u>	89	50	<u>3.30</u>	84	60	<u>5.91</u>
Extreme	88	56		89	50		88	50	
Total prec:			29.54			26.66			33.85



## V. FIELD INVESTIGATIONS OR APPLIED RESEARCH

Wildlife Management Studies: One of the primary objectives of our trips is to collect biological information relating to the endangered species found on the refuge. Six of the eight studies listed below concern such species. Complete data on each of these studies is collected and reported in detail in the trip reports which are completed after each expedition. The following reports briefly summarize the yearly activities in each wildlife management study.

1. Populations and movements of the Hawaiian monk seal on the Hawaiian Islands National Wildlife Refuge.

Seal census, tagging and return data are summarized in tables 4, 5, and 6. It is difficult to summarize the census data since only rarely are we able to visit all islands on a single trip. If one takes the highest count from each of the islands throughout the year, we find a total of 679 animals. As evidenced by some of our detailed observations on the individual islands, the number of animals found on the beach is simply a percentage of the total seal population. What percent, we do not know. This method, however, may be the best index method of determining trends in seal populations.

Since there is no known method of determining age in monk seals, tagging is confined principally to pups and yearlings. As the tagging program continues we will then have a known age class with which to work. Problems are still being encountered in our tagging program. The pups are relatively easy to handle, but during subsequent years, the tags become more difficult to read since they become partially concealed in the web of the skin on the rear flipper. Likewise, when the animals are adults they may tip the scales at up to 700 lbs and they are impossible to restrain. Use of drugs has been considered but discarded. The animals are usually at the edge of the water and would swim out to sea before the drug took effect. Drowning or shark predation would easily then occur. We resorted to adding a yellow nylon cattle neck tag to the metal tag on the rear flipper. A duplicate numbered metal tag less the plastic one was used as a control on the other flipper. The yellow tag can be easily read, however, several animals have been seen with flippers bitten off thereby raising questions as to whether the tags may be acting as fishing lures. It is also possible that the wobbling motion of the yellow tag caused by swimming eventually results in it being pulled out of the flipper.

During the year, we tried a new method of freeze branding on seals. Freon 22 in small containers was used with a special spray type nozzle attachment and the spray was directed in a small line at the back of the pups. A symbol numbering system was used. Only a few animals were so marked, and those will have to be



Table 4  
Seal Census Data - 1969

<u>Date</u>	<u>Necker</u>	<u>French Frigate</u>	<u>Gardner</u>	<u>Laysan</u>	<u>Lisianski</u>	<u>Pearl and Hermes</u>
FEB 10						<u>153</u>
MAR 22	<u>20</u>					
MAR 27				183	<u>130</u>	62
MAY 26						100
JUN 1-4			<u>6</u>	<u>211</u>	127	
AUG 22-SEP		<u>159</u>				
SEP 9				147		
SEP 11-17						119
NOV 11-14				74	65	

Underlined figures - total of peak counts for all islands - 679

Table 5  
Newly tagged seals - 1969

<u>Date</u>	<u>French Frigate</u>	<u>Laysan</u>	<u>Lisianski</u>	<u>Pearl and Hermes</u>
FEB 10				9
MAR 27		38	18	
MAY 26				15
JUN	39	25	14	8
AUG 22-SEP	4			
SEP 9		2		
SEP 11-17	—	—	—	<u>5</u>
Total Tagged	43	65	32	37

Total animals tagged during 1969 - 176



Table 6  
 Monk Seal  
 Tag Returns Recorded during 1969

<u>Date</u>	<u>French Frigate</u>	<u>Laysan</u>	<u>Lisianski</u>	<u>Pearl and Hermes</u>
FEB 10				21
MAR 27		12	4	11
MAY 26				15
JUN	9	29	12	
AUG 22	21			
NOV 11		4	4	
SEP 9-17		9		14

Total tag returns during 1969 - 165



observed again to determine the effectiveness of the technique. Even if the method is successful, it is extremely time consuming, and since the animals have to be completely restrained only pups can be marked.

## 2. Populations and movements of the green sea turtle on the Hawaiian Islands National Wildlife Refuge.

Turtle census, tagging and return data are presented in tables 7, 8, and 9. A total of 39 turtles was tagged during the year. In addition 25 previously tagged animals were recaptured (table 9). The heaviest turtle tipped the scales at 305 lbs.

No problems have been encountered relating to tagging of turtles. The tags hold well and once an animal has been flipped, (not always so easy to do) the tag can be easily read. Weighing each turtle and taking 6 measurements on a strong and bulky animal is a time consuming job and data on sexes and weights are accumulating slowly. Most of the animals tagged and measured have been of the larger or older age class (100 lbs and over). Tag return data from this group of animals seems to suggest that the growth rate is extremely slow. Needed are additional data from the smaller animals (20-50 lb. class).

The State has no closed season on turtles and there are no restrictions on the numbers or size which can be taken. Hotels offer turtle meat on their menus and as the tourist industry grows, the demand for turtle will also increase. Coupled with this, there is a growing take by skin divers.

## 3. Populations and life history of the Nihoa millerbird on Nihoa Island, Hawaiian Islands National Wildlife Refuge.

John Sincock, research biologist from Kauai, and Ernest Kosaka, Division of Fish and Game spent 11 days on Nihoa during the last of May and the first part of June. Census figures were obtained by counting all birds in each of 50, 250ft. random transects. Two counts were conducted 6 days apart. On May 30, the population was estimated at 498 plus or minus 57.6% and on June 6 the estimate was 493 plus or minus 42.3%. Sincock indicated that although the confidence limits were extremely high, our present method is considered the best way of determining millerbird populations on Nihoa (table 10).



Table 7

## Turtle Census Data 1969

<u>Dates</u>	<u>Necker</u>	<u>French Frigate</u>	<u>Laysan</u>	<u>Lisianski</u>	<u>Pearl and Hermes</u>
FEB 10					15
MAR 22-27	<u>4</u>	1	2	9	
MAY 26-JUN 1			3	<u>15</u>	<u>14</u>
SEP 11-17		<u>12</u>			<u>27</u>
NOV 11-14			<u>4</u>	12	

Total of peak counts for the islands (underlined) - 62

Table 8

## Turtle Tagging Data - Summary 1969

<u>Dates</u>	<u>Necker</u>	<u>French Frigate</u>	<u>Laysan</u>	<u>Lisianski</u>	<u>Pearl and Hermes</u>
MAR 22-27	1	1	2	9	12
MAY 26					2
SEP 9	—	—	—	—	<u>12</u>
Total	1	1	2	9	26

Total of 39 animals tagged during 1969

Table 9

## Turtle Tag Return Data - 1969

<u>Dates</u>	<u>Lisianski</u>	<u>Pearl and Hermes</u>
FEB 10		9
MAR 22-27	2	
MAY 26		6
SEP 9	—	<u>8</u>
Total	2	23

Total tag returns during 1969 - 25



## Laysan finches

Estimated population 100

Finch were observed over the entire island. They seemed to favor the cover provided by Scaevola and Eragrostis. The Eragrostis was searched and we found the following signs of nesting by finches.

- 1 empty nest Eragrostis 1 ft. high
- 1 old nest " " " "
- 1 " " " 8 in. high
- 1 active nest with 2 downy young
  - 1 egg Eragrostis 2 ft. high
  - female carried yellow plastic band and FWS band #30-194547
  - male in the area carried a red plastic band
- 1 active nest with 2 eggs 1 ft. from ground
  - female carried a yellow plastic band

Thirty-three finches were banded with FWS bands and orange plastic leg bands. During the course of the banding the following band returns were recorded.

30-194544	M	yellow plastic band	3/23/68	Pearl & Hermes Reef
547	F	" " "	3/23/68	"
61-171530	M	red " "	3/21/67	"
572	F	blue " "	3/21/67	"
564	F	" " "	3/21/67	"
589	F	" " "	3/21/67	"
596	M	" " "	3/21/67	"

The birds also utilized the old rusting barrels on the east end of the island. However, no nests were found in the area. Time did not permit any detailed census but enough survived the winter to insure a good breeding population.

## REPTILES

## Green Sea Turtles

Little north	2 unid			Total
				2
North island	4 unid	6 M	1 F	11
Southeast	2 unid			2
				<hr/>
Total	8	6	1	15



The seas surrounding La Perouse were the most interesting of all the islands. Live coral was present on most of the rocky ledges. Deep valleys and caves were common in the area between the two islands. No sharks were sighted in the area.

Miscellaneous

Two small Coast Guard boats approached the Mahi late in the afternoon of May 31. The commanding officer of the Coast Guard Loran Station on Tern Island, Lt (JG) Henry Cofrin, and his crew boarded the Mahi and dined with the crew. Olsen discussed the cooperative agreement which the Bureau has with the Coast Guard governing their use of Tern Island. Mr. Cofrin indicated that he had not had the opportunity to read it since he had only recently been assigned to Tern Island. Discussion revealed that him and his personnel had visited other islands in the atoll several times for the purpose of picking up glass ball fish net floats which are prized as objects of curio in Hawaii. Olsen notified Cofrin that entry on these islands was prohibited, and he suggested in a diplomatic way that Coast Guard personnel read the cooperative agreement and familiarize themselves with its conditions. However, if they wished to gather data for us on wildlife, we could authorize entry under special conditions. A table of desired information was given as well as our office address to where the data would be sent. Lt. Cofrin seemed most willing to cooperate. We depend on the Coast Guard for transportation to the islands as well as facilities, messing, and berthing support while we are conducting our surveys at French Frigate Shoals. Support which they have gladly given us.

During the course of conversation, Lt. Cofrin mentioned that their supply ship KUKUI had been there recently. He also mentioned seeing approximately 25 turtles on Whale-Skate Island that afternoon.

While the scientific party was visiting La Perouse, the crew of the Mahi caught two large ulua (jack cravelle) where the ship was anchored outside the refuge boundary. One fish weighed 110 lbs. while the other tipped the scales at 100 lbs..



LAYSAN ISLANDGeneral

Winds were from the northeast and landing conditions were excellent. The MAHI anchored approximately one-half mile from the west shore and a six man party landed on the island on June 2. It took approximately five hours for the party to walk around the island tagging and checking seals and turtles.

Olsen, McVay and Eathan spent the night on the island while the remainder of the party returned to the ship.

The water gauge in the lagoon read 1.55 ft.

Wildlife Populations

No effort was made to conduct surveys other than those necessary for wildlife management studies since this work had been completed on the previous trip.

Wildlife Management Studies

## 1. Laysan Teal

A late evening lagoon count was conducted on the evening of June 2 between 7:15 and 8:30 PM. The lagoon was relatively calm and it appeared that most of the birds were feeding and loafing along the edge of the water. The water level in the lagoon was down almost a foot since March, thus the birds were well away from the vegetation line and could easily be counted. Eighty-five birds were censused. This appeared to be an excellent count.

Most of the birds appeared to be in pairs but no broods were observed. A day old duckling was picked up along the shoreline by one of the members of the party on June 3. From a cursory examination, the cause of death could not be determined.

## 2. Green Sea Turtle

Censused three turtles in our tour around the island. We didn't carry tagging and measuring equipment for turtles, thus none were tagged.

## 3. Hawaiian Monk Seal

A total seal census for Laysan Island is shown in the following table.



May-June 69

LISIANSKI ISLAND

General

A single day was spent on Lisianski. Weather conditions were excellent and the rather long three mile trip from the anchored MAHI to the shore was negotiated in approximately one hour.

The party traveled around the shoreline counting and tagging seals and turtles.

Wildlife Populations

No wildlife population surveys were conducted since this work had been completed on previous trips.

Wildlife Management Studies

1. Green Sea Turtles

A total of 13 turtles were observed around the beaches of Lisianski. Three were approximately 150 lbs., while the remaining were small, in the 25 - 50 lbs. class. None were tagged and no previously tagged turtles were observed.

2. Hawaiian Monk Seals

The seal census for Lisianski Island is shown below.

	Adults	Sub adults	Pups	Others	Total
On beach	93	5	3		101
Tagged			14		14
Retraps				12	12
Totals	93	5	17	12	127



Table II Necker Wildlife Populations cont.

Species	Population	Class Data	Comments
Noddy terns (common)	25	C	
Hawaiian tern	500	B	approx. 80% on eggs
Fairy terns	500	C	150 birds were actually counted. The figure of 500 was estimated on basis of representative cliff nesting areas which could not be censused. Eggs to almost fully fledged young.
Blue grey noddy	750	C	head count showed 375 birds. Total estimate based on other available nesting habitat. Most incubating eggs.
Ruddy turnstones	2	A	

Wildlife Management Studies

## 1. Populations and Movements of the Hawaiian Monk Seal

Due to the rugged shoreline of Necker Island, the area has never supported high seal populations; however, during the past several years there appears to be an increase in the number of animals using this island. Twenty seals were observed at the junction of Northwest Cape and the mainland in Shark Bay. The sex-age breakdown of the animals observed was as follows:  
7 adult males, 1 sub-adult male, 4 pregnant females, 2 sub-adult females, 6 unknown.

This was the highest seal count ever recorded on Necker Island. No pupping has been observed here, however.

## 2. Life History and Management Studies of the Green Sea Turtle

Four green sea turtles were observed in the same area where the seals were present. One was tagged No. 794; its weight was 135 lbs.

## 3. Habitat Studies of the islands of existing or potential value to rare and endangered wildlife of the Hawaiian Islands National Wildlife Refuge

Sincock and Kridler cover type mapped the island. Approximately 50% of the island is not vegetated due to the rocky terrain and lack of soil. Of the vegetation present approximately 95% was Chenopodium. Only five species of plants grow on Necker. No new ones were found on this trip.



2. Populations and Movements of the Hawaiian Monk Seal

Although no seals were observed on Tern Island, discussion with CPO Leud revealed that personnel from the station visited some of the smaller islands on March 22 and reported seeing 2 pups on Whale Skate and 4 pups on East Island.

3. Populations and Movement of the Green Sea Turtle

While diving near the Shark Pier area, Olsen captured a turtle which was subsequently tagged and released.

# 736 original 6/14/68  
again taken 7/23/73

Operation and Maintenance

The refuge recognition sign at Tern Island appears to be in good condition. There were no indications that personnel at the station had been molesting wildlife.

GARDNER PINNACLES

Because of the rough seas encountered it was decided not to even visit the vicinity of Gardner since it would be impossible to make a landing.



Habitat Studies

The Chenopodium plant established just south of the camping site seems to be thriving and producing seed. This plant is the sole result of a number of efforts during the last eight years to reestablish the species on the island.

A single large plant of Cenchrus was found along the path from the landing site to the campsite. It was pulled and thrown into the ocean.

Photostation pictures were taken in Kodacolor.

The Green Sea Turtle

On the afternoon of March 26, the party traveled around the shoreline of Laysan counting and tagging the turtles they observed. Two were observed and tagged (No. 797 weighed 35 lbs., while No. 798 weighed 32 lbs.)

No tag returns were noted.

While diving with members of the Coast Guard party, Olsen observed a group of 6 turtles in water approximately 20 ft. off, near the cut in the reef. An observation such as this suggests that many more turtles are present in the water around these islands than ever show themselves hauling up on the beach.

Operations and Maintenance

The large resolution canvas tarpaulins placed on the north end of the island were observed and photographed. Heavy winds had pulled some of the shorter stakes up and it was predicted that after another severe storm, parts of the canvas will begin to tear up and scatter around the island.

These tarps were to be picked up by the military a few months after placement. To date no effort has been made to have the tarps removed. Practices such as these should make us more cautious about granting special use permits to military on Refuge islands.



Seals Tagged March 30, 1969, Lisianski Island

<u>Yellow Plastic</u>	<u>Metal Lap.</u>	<u>Other</u>	<u>Sex</u>	<u>Age</u>
A626	Same	826	M	1-2 yr.
A627	"	827	F	B.P. ca. 3 weeks
A628	"	828	F	" " newborn, umb. present
A629	"	829	F	G.P. newly weaned, no mother
A630	"	830	M	" " with mother
A631	"	831	M	B.P. ca 1 week
A632	"	832	F	" " newborn
A633	"	833	F	" " "
A634	"	834	F	" " "
A635	"	835	M	" " "
A636	"	836	M	" " "
A637	"	837	F	G.P. near weaning ca 6 weeks; weight 185 lbs.
None	638	838	F	G.P. weaned, no mother
A639	Same	839	M	B.P. ca 4-5 weeks
A641	"	841	M	Yrl.
800	A640	840	F	"
A642	Same	842	M	"
A643	"	843	F	B.P. newborn

## 2. The Green Sea Turtle

A total of nine turtles were tagged on Lisianski Island (Table IX). Six measurements, using calipers and steel tape were taken on each animal. The animals were also weighed. Only tag numbers and weights were listed in Table IX, since the other measurements taken have been recorded in the turtle banding card file.

Table IX

Turtle Tagging Lisianski Island March 26, 1969

<u>Tag No.</u>	<u>Weight</u>	<u>Sex</u>
A476	125	F
A493	80	F
A494 ENT. NO. 15	110	F
A495	47	F
799	160	M
876	180	M
877	140	F
878 ENT. NO. 15	185	M
601	34	F

why so  
confusing?

and

Retap 7/23/73



Two tag returns were recorded.

Number 64D was originally tagged on Lisianski on 9/25/67 and at that time weighed 155 lbs. When weighed he tipped the scales at 145. The loss in weight should probably be attributed to an error in reading the scale. The carapace length and plastron width each grew .1 inch, while the animal's length (round) grew almost 6 inches.

The animal tagged number 644 was banded on Lisianski on 9/26/67, however, he was not weighed at the time of tagging. His carapace length (round) grew  $\frac{1}{2}$  inch, while the width of the carapace grew 1 inch.

The growth rate of these larger sized turtles is extremely slow.

### 3. Habitat Studies

Kodacolor photographs were taken at each photostation. Some station markers are becoming overgrown with Scaevola. At other stations, the bamboo poles placed as markers were down on the ground, presumably as a result of winds or collisions by birds.

A patch of Cenchrus was noted in the area approximately 100 yards south of the coconut trees. As the specimen was not collected, it could not be determined if this was the native species or of a species which might have been introduced.

One of the coconut trees had lost its top, probably during one of the winter storms. Thus, the remaining is a single coconut tree on Lisianski Island.

Of interest was the lack of Sycios anywhere, especially since it was so abundant on Laysan. Most of the interior is covered with Eragrostis, Ipomea and Scaevola. A check under the south Causerina tree revealed that the Chenopodium is thriving and slowly spreading. The patch now occupies all of the area under the tree canopy, a distance of roughly 25 ft. in diameter.



Table XI

## Seal Count Pearl and Hermes Reef

	Southeast Island	North Island	Total
Adults			
Males	6	3	9
Females	4	7	11
Unknown	4	6	10
Subadults			
Males	3	1	4
Females	9	1	10
Unknown	1	2	3
Pups		3	3
Dead animals	2	1 female	3
Tagged animals	8	1	9
Totals	37	25	62

Table XII

## Pearl and Hermes Reef Seal Tag Returns

## Original Tag Information

Tag No.	Date Tagged	Location	Age	Location of Return
A92	3/21/67	Southeast	yrl.	North Island
A99	3/22/67	Seal Island	pup	" "
A 98	3/21/67	Grass Island	subadult	Southeast Island
A141	7/ 7/67	Southeast I.		" "
A248	9/22/67	Southeast I.		" "
A279	9/27/67	Little North		North Island
A298	3/18/68	Laysan		Southeast Island
A364	2/10/69	Southeast I.		" "
A366	2/10/69	Southeast I.		" "
A371	2/11/69	Southeast I.		" "
567	9/22/66	Southeast I.	adult	" "

## 2. The Green Sea Turtle

Green sea turtles were seen at almost every hour of the day on the beach on the north side of Southeast Island. A total of 12 were newly banded and another nine previously tagged animals were checked (Table XIV).

Large growth, similar to cysts, were noted on the necks of two turtles.



These growths were surgically removed, and although the turtles bled profusely for a few minutes it appeared that the cuts would eventually heal up.

When the turtle tagging program began, only a few measurements were taken, thus, in attempting to compare the measurements and weights taken during this trip, we find that only a few of the measurements are actually comparable. After reviewing the data in Table XIV, it appears that some of the shells on the animals may actually become smaller. Even in the animals where increase in size was recorded, the increase was only slight.

These are some of the first tag returns we have had and they simply show us how little we know about growth rates or ages in turtles. We should begin to at least get some trend information as we continue to get tag returns.

Table XIII

## Turtle Tagging Pearl and Hermes Reef

Tag No.	Sex	Weight	Location
879	F	96	North Island
880	M	174	" "
881	M	174	" "
882	F	208	" "
883	M	230	" "
884	M	260	" "
885	M	187	" "
ENT. No. 886	F	est 100	Little North
887	M	" 135	" "
888	F	" 225	" "
889	F	265	Southeast Island
890	F	40	" "

Table XIV

## Turtle Tag Returns Pearl and Hermes Reef

Tag No.	Original Tagging		Length (R)	Wt.	Tag Returns		
	Date	Location			Length	Wt.	Location
102	4/1/66	Southeast	28 $\frac{1}{2}$		29.6	145	
105	4/1/66	"	39		37.7	305	Southeast
158	9/23/66	"	35		34.0	195	"
439	3/21/67	"	36		37	235	"
646	9/27/67	Little No.	36 $\frac{1}{4}$	202	36	215	"
1042	3/13/64	Southeast	33 $\frac{1}{2}$		35	180	"
1059	9/16/64	"	36		38 $\frac{3}{8}$	255	"
1068	9/16/64	"	37 $\frac{1}{2}$		35	285	"
1102	3/21/65	"	34 $\frac{3}{4}$		32.8	225	"



The following tags were affixed to pups:

<u>Metal No.</u>	<u>Nylon No.</u>	<u>Metal Control No.</u>	<u>Location</u>	<u>Date</u>	<u>Age</u>	<u>Sex</u>
652	652	None	Little North	5/26/69	Pup	F
653	653	"	North	"	"	M
654	654	"	"	"	"	M
655	655	"	"	"	"	M
656	656	"	"	"	"	M
657	657	"	"	"	"	M
658	658	"	"	"	"	M
659	659	"	"	"	"	F
660	660	"	"	"	"	F
661	661	"	"	"	"	M
662	662	"	"	"	"	F
663	663	"	Seal	"	"	F
664	664	"	"	"	"	M
665	665**	"	Kittery	"	"	F
667	667	667	Southeast	"	"	M

\* Nylon 665 destroyed. Owing to time limitation, all animals but <sup>those</sup> ~~that~~ tagged on Southeast Island were single banded and did not have control tags attached. Control bands were then destroyed to prevent future confusions.

The sex ratio of banded pups was 60 males: 40 females. The pup tagged on Southeast Island had been born that morning.

Green Sea Turtle Six turtles were observed on North Island during the seal census but were not tagged because of lack of time. None were seen on any of the other islands except at Southeast. Of the 8 which came up on the beach during our stay there, 6 had been tagged previously (all on Southeast) while 2 were newly tagged. Data for the new tagging are as follows:

Tag No.	Date	Straight Line (Inches)				Round Measure (Inches)		Sex
		Carapace		Plastron		Length	Width	
		Length	Width	Thick	Length			
891	5/26/69	32.9	25.6	11.4	26.8	34½	30½	Male
892	5/26/69	34.2	28.8	16.0	29.9	38 3/4	37	Female



Data on turtles observed on Southeast Island in May, 1969 which had been tagged in previous years.

Tag No.	Date Obs'd.	Sex	Calliper Meas. (Inches)			Tape			Tape			
			Carapace Length	Plastron Width	Thick	Carapace Length	Plastron Width	Thick	Carapace Length	Plastron Width	Thick	
103	5/22/69	F	36.1	29.2	15.7	31.4	40.7	34.0	4/1/66	Southeast	41.5	37.0
104	5/26/69	F	31.3	26.0	11.8	25.5	34.7	32.0	4/1/66	"	32.0	30.5
109	"	M	32.8	26.0	11.9	26.5	37.2	32.0	"	"	35.2	32.0
119	5/27/69	F	32.3	24.2	11.4	25.3	34.0	32.5	9/20/66	"	34.5	32.0
165	5/29/69	F	32.3	25.8	12.6	25.9	36.2	30.8	9/24/66	"	Not taken	
445	"	F	31.2	25.6	12.8	25.3	32.8	30.9	3/21/67	"	32.5	30.5

Straight line measurements by use of large callipers has proven superior to measurements over the back of the carapace with a tape measure. Measurements are more precise and not subject to individual error by person taking measurement. Frequently when using the tape, animal was crawling away and measurements were taken in haste.







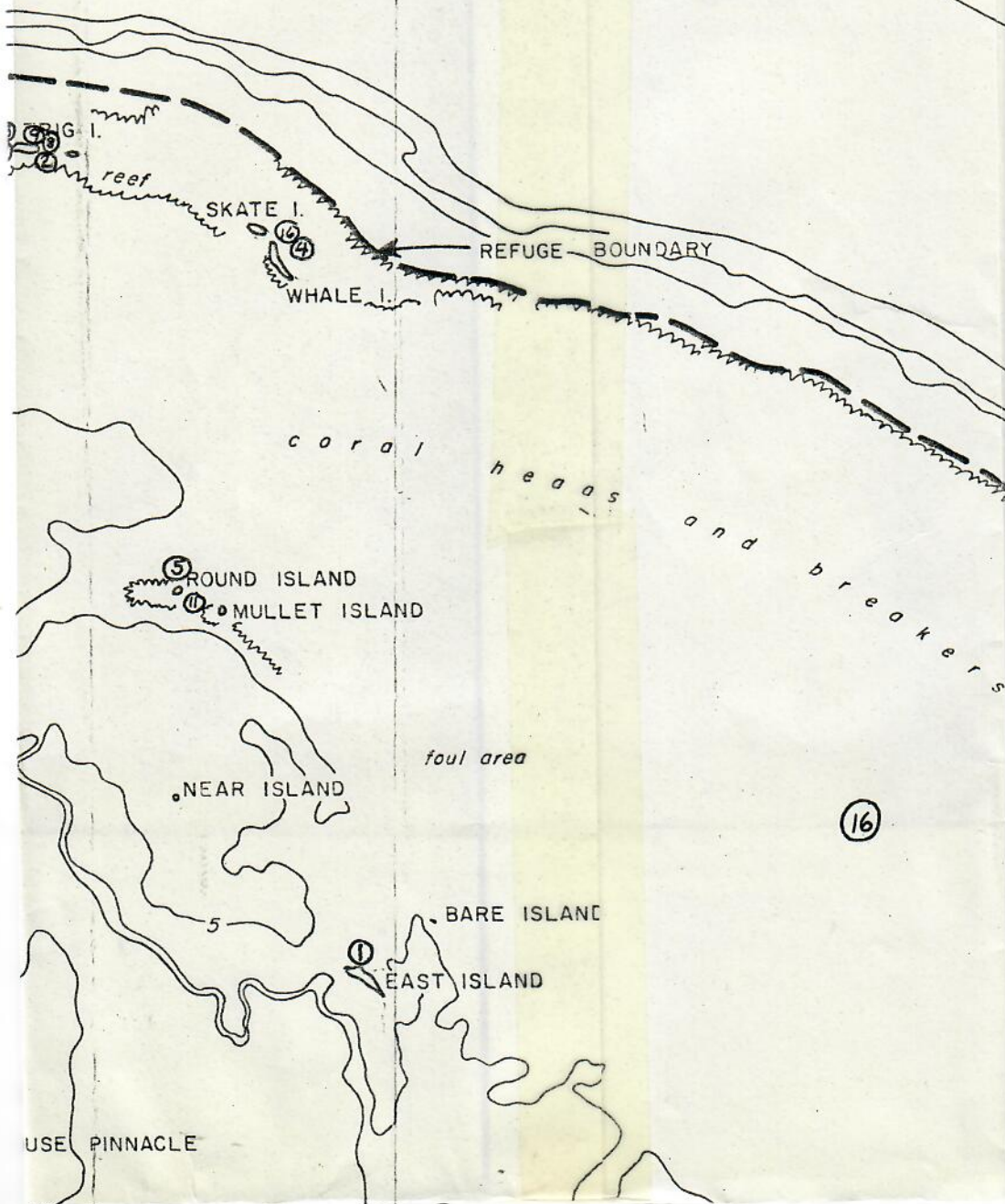
# N ISLANDS NATIONAL WILDLIFE

HAWAII

15'

166° 10'

## LOCATIONS BRIGATE SHOALS SEPTEMBER 1969



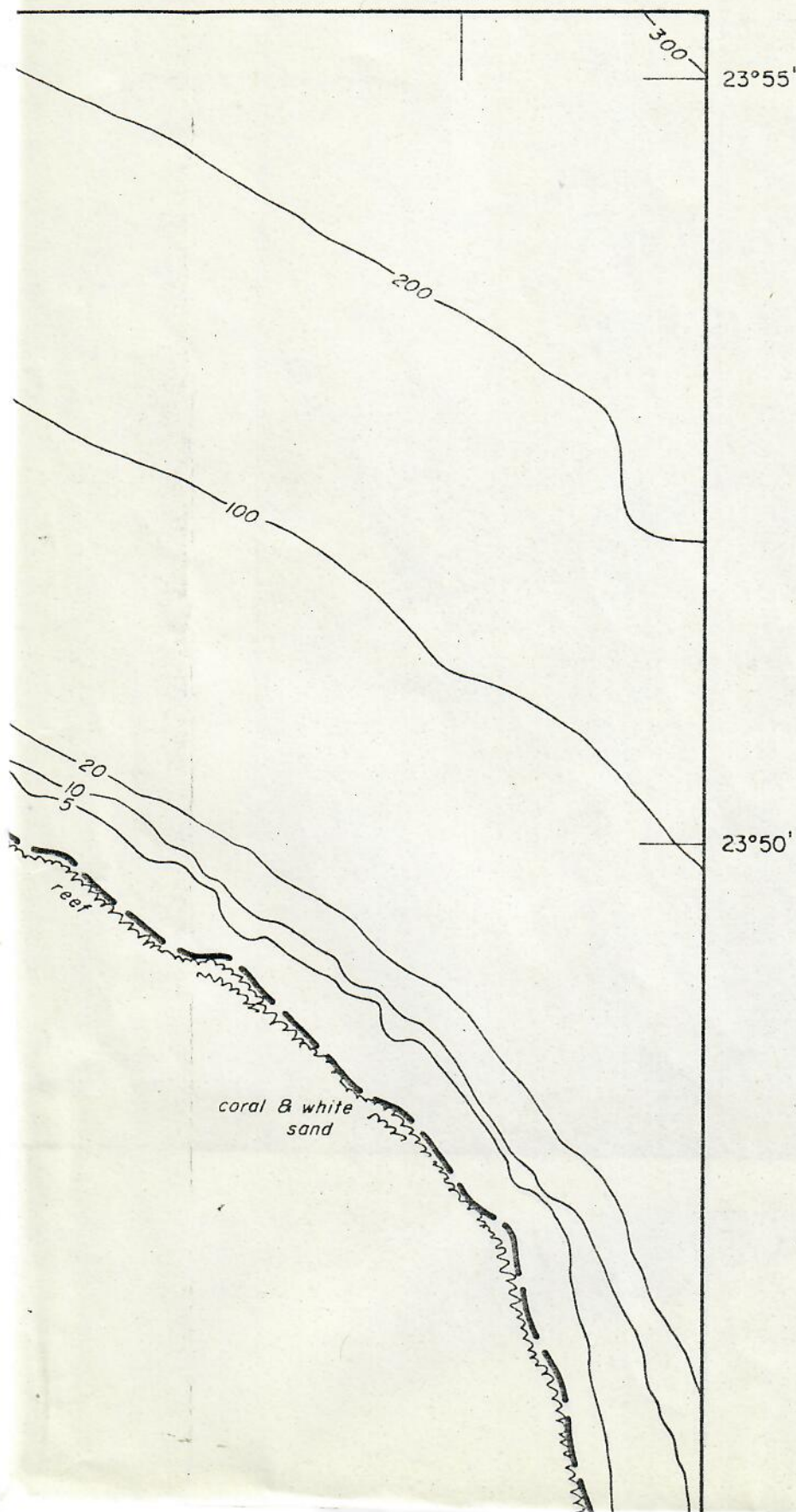


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FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE  
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9/2 15 Shark Island  
9/3 16 "T" Reef and Whale Skate  
9/5 17 Trig Island

23°45'

white sand

P A

23°40'

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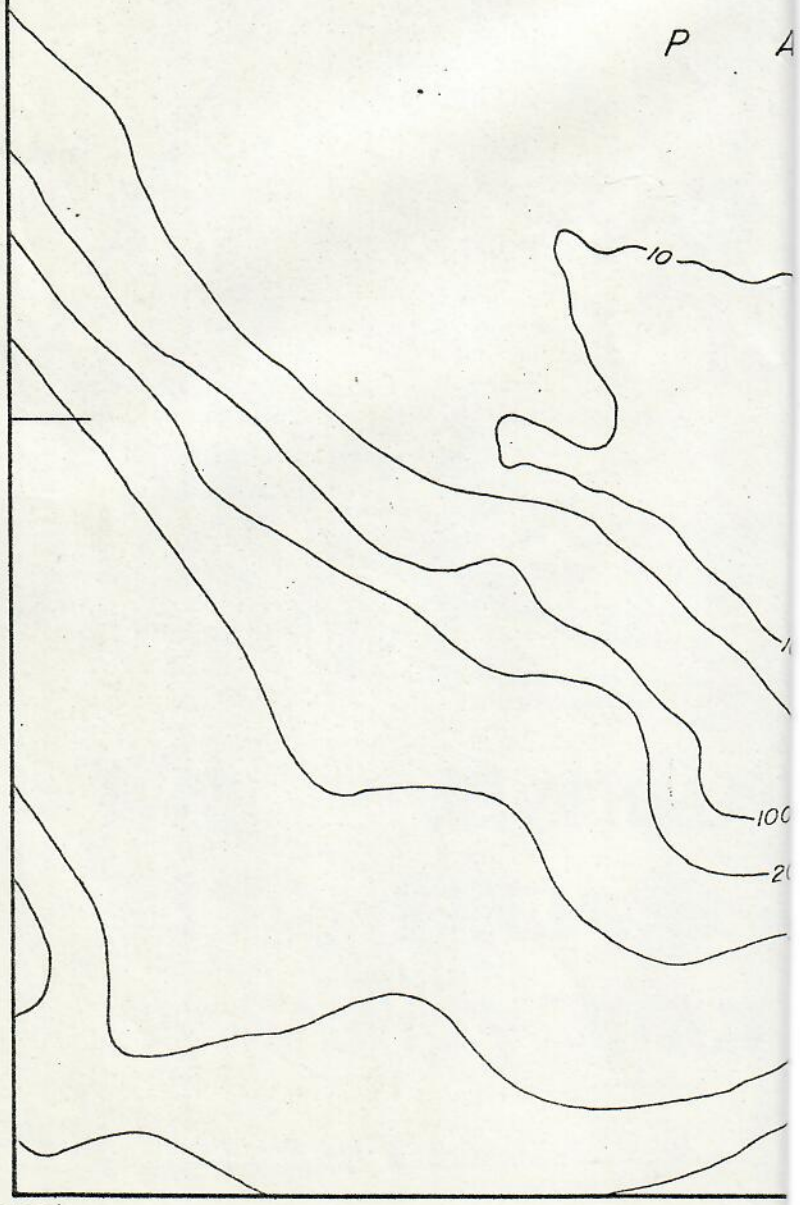
COMPILED IN THE DIVISION OF ENGINEERING  
FROM SURVEYS BY C. & G.S.

PORTLAND, OREGON

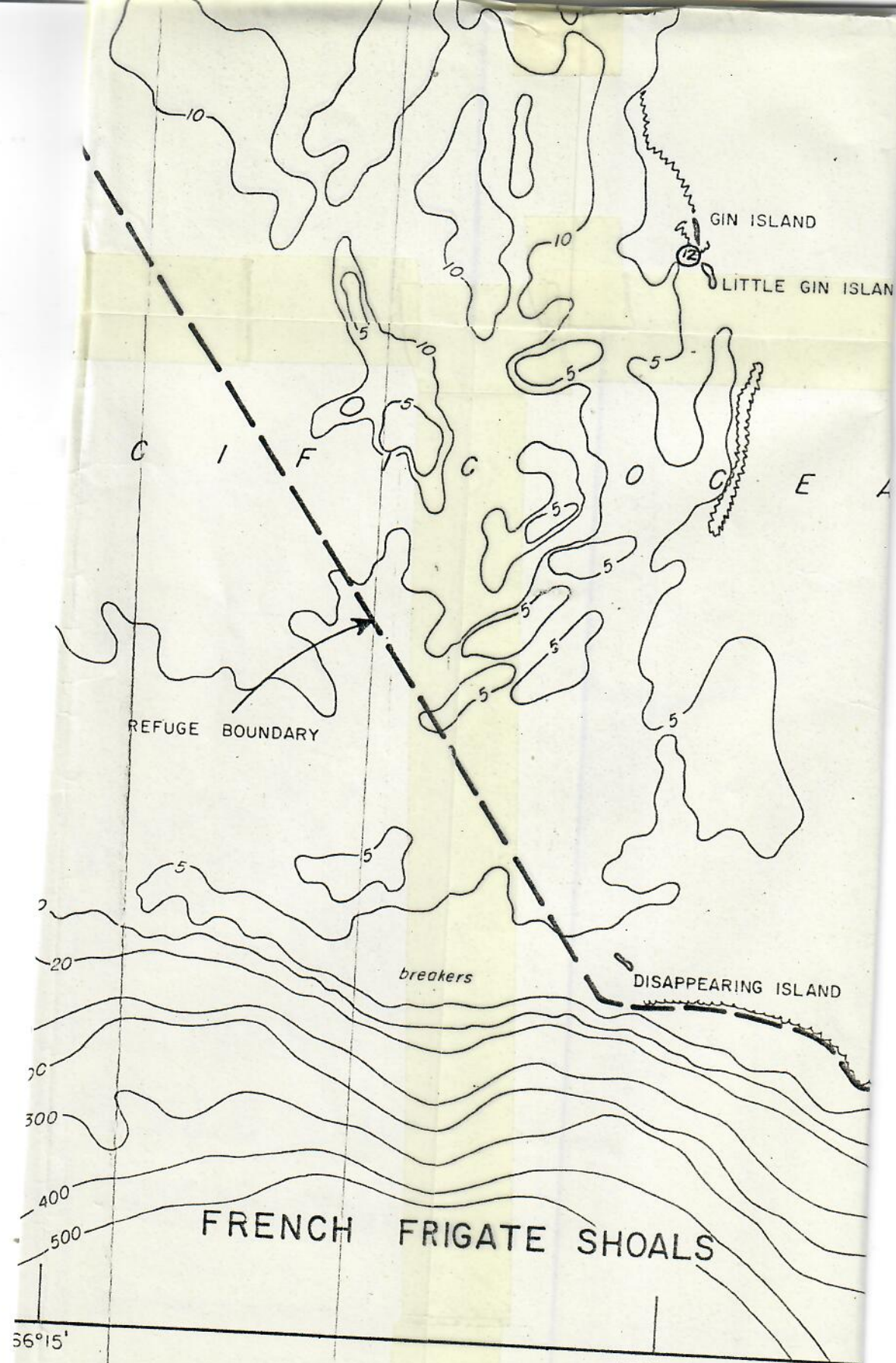
NOVEMBER 1967

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GIN ISLAND

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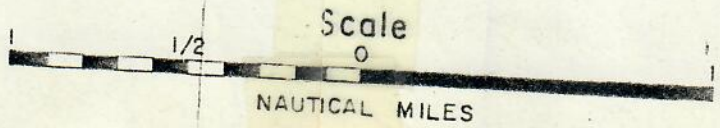
breakers

DISAPPEARING ISLAND

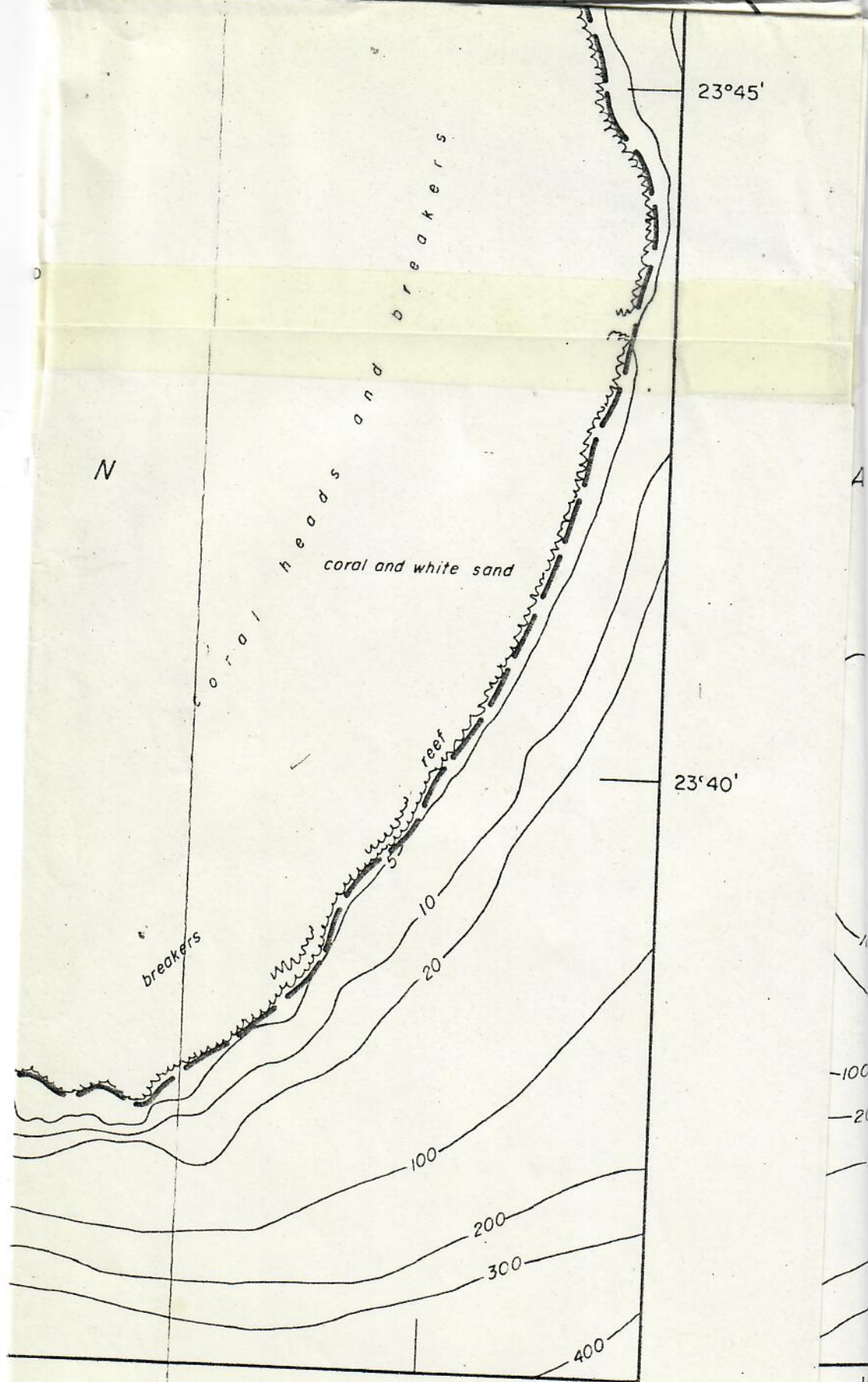
FRENCH FRIGATE SHOALS

56°15'

166°10'







6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

TOWNSHIP  
DIAGRAM



MEAN  
DECLINATION  
1967



## WILDLIFE MANAGEMENT STUDIES

Studies of Hawaiian Monk Seal

An aerial census of the seal population was conducted on July 9th. (Table 2). Several of the islands were circled thus the count of total seal population is considered reliable.

Table (2)

## Aerial Census

<u>Island</u>	<u>Seals</u>	<u>Turtles</u>
Disappearing	38	
Big Gin	5	1
Little Gin	12	1
East	13	33
Whale Skate	37	6
Trig	24	
Shark	19	3
Round	<u>18</u>	—
Total:	166	44

A total of 54 seal pups were tagged (Table 3). All were double tagged with identically numbered monel tags, with a single tag on each flipper. Numbers 928 and 929 were singly tagged. Sexing was accomplished by rectal examination.

Eleven previously tagged animals were observed during our stay at French Frigate Shoals. Of the 39 pups tagged during 1969 on French Frigate, only 4 were observed during this period. This again indicates that there is either a tremendous mortality rate in pups or that they depart from their natal island after the first year.

In cooperation with Dr. J. Causey Whitlow, Department of Physiology, School of Medicine, University of Hawaii, temperatures were taken rectally on two seal pups. The first, number 918, a young male with an estimated weight of 50 lbs., had a temperature of 97.6. The second, a two week old pup weighing approximately 35 lbs. had a temperature of 98.2. This is somewhat different from the temperatures recorded on the seal pup on Midway during June. Additional samples will have to be taken. *3 minutes*

Seal tag return data is incorporated in table 4.



## Studies of the Green Sea Turtle

A total of 45 green sea turtles were measured and tagged (table 5). All except one were females. Some nesting pits were still being dug. All measurements except weights were recorded. This speeded up our tagging a great deal.

Turtle pits were noted on all the islands visited and an attempt was made to count all of this year's pits (table 6). These data are not too reliable for determining whether or not a pit has been dug this year or whether it contains eggs. To check on some pits, approximately ten which appeared to be fresh were excavated but no eggs were found. We were also attempting to determine the average number of eggs per pit to see if there is any difference between those of refuge animals and what researchers have found elsewhere. When one follows the trail of a female as she crawls on to the island and begins her search for a place to deposit eggs, it becomes increasingly difficult to understand the female psychology of the turtle. Often they crawl up above the surf line, dig a pit, cover it up, crawl 20 yards, dig a half a pit, crawl 30 yards and dig another pit. Pits may be dug but no eggs are deposited in them. Pits are dug over those of other turtles - sometimes scattering the eggs previously laid. A turtle may crawl all over an island and return to the sea without digging a pit. We have yet found no reliable way of estimating the number of green sea turtles produced on refuge islands in the brief time we have been able to spend there. Until a better method of obtaining this information can be found, the turtle pit count data will have to be used as a very rough index. To adequately determine the nesting population for a particular year would entail stationing someone at French Frigate Shoals throughout the entire nesting season.

During our aerial census of the islets on July 9th, we observed 33 turtles on East Island. After tagging 22 on July 10th, we visited the island on the 13th, and found only 5 animals present. No previously tagged turtles were again observed during the week. We have as yet no way of knowing whether a turtle which we tag has already laid her eggs or is about to lay or for that matter, may just be basking on the beach - a trait of the green sea turtle in the Pacific. Most laying, however, occurs at night.

While diving near the north side of Whale Skate, we observed approximately 20 turtle eggs which had been dropped and then probably eaten by fish. We wondered whether this was a dump or the result of our activities on the island. In 1968 animals which we had tagged and numbered during the day were observed laying eggs that same night.



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1970

Table (5)  
TURTLE TAGGING DATA  
French Frigate Shoals

Date	Tag#	Sex	Plastron Length	Carapace Width	Thickness	Carapace Length	Round Measurement	Location
7/9/70	351	F	20.7	19.6	10.8	25.7	28X24 1/2	Tern Island
7/10	352	F	27.2	25.2	13.9	34.0	37X32	East Island
7/10	353	F	29.3	28.0	14.3	36.3	38 3/4X35 1/2	" "
7/10	354	F	27.1	27.0	13.8	34.3	37 1/4X33 3/4	" "
7/10	355	F	29.8	27.0	14.6	35.0	37 3/8X36 7/8	" "
7/10	356	F	27.9	27.1	12.1	35.3	37 3/4X33	" " <i>taken 10/20/70</i>
7/10	357	F	27.8	26.6	13.3	34.2	36 1/4X33	" " <i>1/2 tag</i>
7/10	358	F	29.5	27.3	13.2	36.0	39 3/4X36	" "
7/10	359	F	27.5	27.1	13.2	34.2	36 1/4X33 3/4	" "
7/10	360	F	29	28.2	13.4	35.4	38 1/4X36 1/2	" " <i>Plastron Nov 10/70</i>
7/10	361	F	30.8	28.4	14.5	37.5	42X39 1/2	" "
7/10	362	F	30.3	27.5	13.4	36.3	39 1/2X35 1/4	" "
7/10	363	F	30.4	29.3	13.6	36.0	35 3/8X36	" "
7/10	364	F	29.6	27.3	13.4	36.3	39 1/4X34 1/4	" "
7/10	365	F	30.8	28.4	12.7	36.3	39 3/8X35 1/4	" "
7/10	366	F	27.2	23.8	13.6	32.2	35X31 3/4	" "
7/10	367	F	32.1	29.4	15.9	36.4	40 1/2X39 1/2	" "
7/10	368	F	29.4	26.9	15.5	36.0	39 1/8X34 3/8	" " <i>taken 10/20/70</i>
7/10	369	F	30.4	28.4	14.0	36.4	40X35	" "
10	370	F	26.8	26.1	11.9	32.8	35 1/8X30 7/8	" " <i>Caught off Hoole Summer 1973</i>
7/10	371	F	27.8	28.9	13.6	35.3	38 1/8X36	" "
7/10	372	F	28.2	26.8	13.8	35.2	37 3/4X33 5/8	" "
7/10	373	F	29.0	27.6	13.4	35.6	38 3/4X35 3/8	" " <i>taken 10/20/70</i>
7/10	374	F	24.5	23.9	11.6	29.5	32X29 1/2	Round Island
7/11	375	F	29.5	27.9	12.1	35.9	38 1/2X33 3/4	Trig Island
7/11	376	F	28.9	26.9	13.0	35.2	38 1/8X35	Whale Skate
7/11	377	F	29.4	27.0	14.9	36.2	40 1/2X35 1/8	" "
7/11	378	F	28.9	27.2	14.5	36.0	39X36	" "
7/11	379	F	27.9	25.9	14.9	35.5	38 1/2X36	" "
7/11	380	F	29.3	28.9	13.8	35.3	38X38 1/2	" "
7/11	381	F	30.9	28.1	15.3	36.3	39 1/4X35 1/4	" "
7/11	382	F	28.3	27.6	14.5	35.2	38 1/8X36 5/8	" "
7/11	383	F	28.5	26.9	14.2			
7/12	384	F	28.9	27.3	12.4	36	39 1/8X34	" "
7/12	385	F	28.0	27.3	11.9	34.5	36 1/4X33 5/8	" "
7/13	386	F	28.9	28.9	15.7	35.6	37 3/8X35 1/2	Little Gin
7/13	387	Destroyed						
7/13	388	F	29.0	27.6	15.4	35.6	40X36 5/8	East Island
7/13	389	F	29.0	26.8	13.2	36.8	40 1/8X35 1/2	" "
7/13	390	F	30.3	26.3	13.6	35.8	38 3/8X35 1/8	" "
7/13	391	F	30.4	29.1	13.9	37.3	40 1/2X36	" "
7/14	392	M	27.2	26.8	11.0	34.1	36 7/8X32	" "
7/15	393	F	29.4	27.1	12.8	36.1	39 1/8X34 1/2	Whale Skate
7/15	394	F	28.1	27.0	13.7	34.6	37X34	" "
7/15	395	F	29.2	26.5	14.3	35.4	38 1/2X35 1/8	" "
7/15	396	F	32.1	28.8	14.0	38.1	42 1/8X37 5/8	" "
7/15	397	F	29.6	26.4	14.4	34.8	37 1/8X35 1/8	" "

(over)



Table (2)  
TURTLE TAGGING DATA  
French Frigate Shoals

Date	Tag	Sex	Position	Carapace	Width	Throat	Length
1	Taken Kawai	10/27/71	Wellington				
2	1970 taken	Nov 10					
3	Taken Oahu	Nov 15					
4	Caught off Honolulu	Summer 1973					
5	Retrap	6/73					
6	Taken Oahu	9/3/71	antone				
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Table (6)

Turtle Pits  
French Frigate Shoals

Big Gin	22
Little Gin	109
East	
Whale Skate	<u>123</u>
Total:	



NIHOA

LIBRARY OF  
GEORGE H. BALAZS

HINWR  
Field Trip Report August 1970

15, 1970  
Aug

Nihoa Millerbird:

Estimated population:  $304 \pm 57.06\%$  at 95% C.L. Range: 134 to 477

A survey similar to that for the finch was run for this species. A total of 10 birds were recorded on transects. Another 12 were observed off transect. The location of these plus others seen off transect were marked on aerial photos of the island. Five of these were noted on Miller Plateau.

A similar survey conducted on May 30, 1969 indicated a population of  $498 \pm 57.5\%$  at 95% C.L. Thus the surveys, if valid, show a drop of both this species and the finch since last year. At that time 15 birds were seen on transect. This latter count was conducted by two men. One variable encountered each trip when five men are used is that usually two men are conducting the transects for the first time and the ability to spot these secretive birds in heavy but low vegetation varies.

Although efforts were made to find nests, none were found.

Hawaiian Monk Seal:

Two were noted basking on the beach at Derby's Landing.

Green Sea Turtle:

A small (30-50 lbs. estimated size) turtle was noted swimming adjacent to the sandy beach at Derby's Landing.

Vegetative Studies:

The island was very dry, and the usual small seeps in the canyons were almost nonexistent. The stands of Sida were very dry and defoliated in some areas. The Cenchrus patch just east of the camp site at the base of Miller Canyon is spreading. Most plants were dry. The infrequency of visits will make control very difficult since the plants should be sprayed with a herbicide at least once a month during the growing season for several years to get plants which have germinated from seed in the interim. One answer may be treatment of the affected area with a pre-emergent chemical.



# LAYSAN

A total of 10 seals were observed which had been tagged on previous trips. Examination of tagging data revealed several interesting things.

An adult, no. MS 54, had been tagged on Laysan as a pup female on June 26, 1957 by personnel of the Hawaii Division of Fish and Game when they had visited the island then. This animal was observed on this trip August 17, over 13 years later. As far as we can determine, this is the oldest documented age for an individual of this species. Also interesting is the fact that this was the first time it was observed since being tagged.

Another animal, No. 804, was tagged as a pup on Laysan on March 26, 1969. At that time it was double tagged and experimentally marked on its back via the freeze branding technique. No evidence of the brand was apparent.

Six animals which had been double tagged carried only one tag when recorded on this trip. Double tags which had been affixed consisted of a monel metal tag on one flipper and a combination metal-yellow nylon tag on the other flipper. The tag lost was the combination metal-nylon one. This problem had been noted on previous trips and the loss was considered to be of such magnitude that this method of marking was discarded. Now animals are double tagged only with the metal tags.

## Recovery Data of Seals Tagged on Previous Trips

<u>Tag #</u>	<u>Age</u>	<u>Date Observed</u>	<u>Island</u>	<u>Date Tagged</u>	<u>Island</u>	<u>Age</u>	<u>Sex</u>	<u>Prev. Returns</u>
51	SA	3/17/70	Laysan	3/19/67	Laysan	Y	M	1
MS 54	A	3/17/70	Laysan	6/26/57	Laysan	F		0
199	SA	3/17/70	Laysan	9/21/67	Laysan	SA	M	2
200	SA	3/17/70	Laysan	9/21/67	Laysan	Y	M	2
**378	SA	3/17/70	Laysan	9/5/68	Laysan	P	M	0
**705	SA	3/17/70	Laysan	6/2/69	Laysan	P	M	0
**716	SA	3/17/70	Laysan	6/2/69	Laysan	P	F	0
!A*804	SA	3/17/70	Laysan	3/26/69	Laysan	P	M	0
**813	SA	3/17/70	Laysan	3/26/69	Laysan	Y	F	1
**825	SA	3/17/70	Laysan	3/26/69	Laysan	SA	M	2

! : Freeze branded

\*\* : Double tagged - only 1 tag left at return observation.

## Green Sea Turtle:

Two turtles were observed. One carried a Hawaii Fish and Game Tag, No. 1011. Incomplete records of the Division reveal that this animal was probably tagged in February - March, 1963 by Ray Kramer of the Division when he participated in a Pacific Project, Smithsonian Institution field trip to some of the refuge islands.



# Lisianski

The following previously tagged seals were observed:

Tag #	Return Date	Age	Location	Tagging		Sex	Loc.	# Prev. Rec.
				Date	Age			
A71	8/21/70	SA	Lisianski	3/21/67	Y	F	Lisianski	1
A72	8/21/70	SA	Lisianski	3/21/67	Y	M	Lisianski	0
A78	8/21/70	SA	Lisianski	3/21/67	P	F	Lisianski	2
A229	8/21/70	SA	Lisianski	9/25/67	Y	M	Lisianski	0
A245	8/21/70	?	Lisianski	9/25/67	Y	M	Lisianski	1
A318	8/21/70	SA	Lisianski	3/20/68	P	F	Lisianski	1
*A827	8/21/70	SA	Lisianski	3/30/69	P	F	Lisianski	1
*A834	8/21/70	SA	Lisianski	3/30/69	P	F	Lisianski	0
*A836	8/21/70	SA	Lisianski	3/30/69	P	M	Lisianski	1
*A841	8/21/70	SA	Lisianski	3/30/69	Y	M	Lisianski	0

\* Animals double tagged but only 1 tag remained at time of return observation.

## Green Sea Turtle:

While conducting our seal count, a total of 8 turtles were tagged. In addition four small turtles under 20 pounds and one large turtle approximately 200 pounds were observed swimming just offshore. Turtle tagging data is incorporated in the following table.

<u>Number</u>	<u>Sex</u>	<u>CL</u>	<u>CW</u>	<u>PL</u>	<u>T</u>	<u>Round</u>
398	F	17.6	15.2	14.0	6.9	18 3/4 X 17 3/4
399	F	15.5	12.5	12.6	5.6	16 X 14 1/2
400	F	16.1	13.3	12.7	6.2	17 X 15 1/4
924	F	16.8	13.5	14.1	6.2	17 3/4 X 16
925	F	16.5	13.1	13.1	6.1	17 X 15 3/4
998	F	17.1	14.5	14.2	6.5	18 1/2 X 17 1/2
999	F	17.3	14.3	14.1	6.5	18 X 16 1/2
1000	F	17.1	13.6	13.3	6.1	18 X 15 3/4



Table 2  
Seal Recapture Information  
Pearl and Hermes Reef  
December 14, 1970

<u>Tag No.</u>	<u>Location</u>	<u>Age</u>	<u>Tag Date</u>	<u>Age</u>	<u>Sex</u>	<u>Location</u>	<u># Previous Returns</u>
A99	North	SA	3/22/67	P	F	Seal	2
A104	North		5/28/67	F	F	Seal	1
A140	North	Y	7/6/67	Y	F	Southeast	2
A142	Southeast	SA	7/7/67	SA	F	Southeast	2
A170	Kittery		7/8/67	A	M	Kittery	2
A278	North		9/22/67	Y	M	North	1
A283	Southeast	SA	9/27/67	Y	F	Little North	2
A338	Southeast	SA	3/22/68	Y	M	Southeast	2
A546	Grass	A	9/20/66	A	F	Southeast	1
A565	Southeast		9/22/66	P	F	North	1

#### Green Sea Turtle

A total of 19 turtles were measured and weighed on North and Southeast Islands. Twelve were tagged for the first time and their weights ranged from 60 to 210 pounds (Table 3). Seven turtles were originally tagged at Pearl and Hermes Reef and again recaptured there (Table 4). One was originally tagged during 1964 and this animal only reflected approximately 2 inches of shell growth in over 6 years. Some animals showed a weight gain while others stayed the same and one animal lost weight.

Two large growths totaling approximately 4 pounds were surgically removed from one animal. They have been frozen and retained for examination.



