

Report on Hawaiian Monk Seal Survey on Ni'ihau Island, 2014

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Introduction:

On September 16, 2014, staff from NOAA Fisheries' Hawaiian Monk Seal Research Program (HMSRP) completed their second ever land-based survey of monk seals on the island of Ni'ihau. The survey took place at the end of *R/V Oscar Elton Sette* project SE 14-06. Permanent HMSRP staff, temporary field staff and two personnel representing the US Navy participated in the survey.

Two survey methods were utilized to cover the Ni'ihau and Lehua Rock coastlines. The first was a land-based survey via truck, horseback, and on foot that was conducted in areas accessible on land by three separate survey teams concurrently. Each land survey team included HMSRP personnel and Ni'ihau residents who served as guides (red, orange and green tracks; Figure 1). One land team also included US Navy representatives. The second survey method was by boat using *Sette* small boat SE-2 for Lehua Rock. The boat survey team was staffed only with HMSRP personnel and a *Sette* coxswain (blue track; Figure 1).

One portion of the coastline (yellow track; Figure 1) was not surveyed. This area is not accessible by foot and consists of sheer cliffs with little haulout area for seals. This area was surveyed by boat in September 2013, when 8 seals were observed hauled out along the coastline. This portion of the island proved to be very difficult for obtaining useful identifying information on any seals seen, due to rough sea conditions along the shore. Additionally, it was prohibitively time consuming for the ship to travel to that area of the coast in order to launch the small boat to do the survey. Therefore, it was determined that this area of the coast would not be covered for the 2014 survey. It will be considered for future survey efforts.

All teams conducted a census-type survey in which all individual seals encountered in the survey area were recorded. Size, sex, and any identifying information were collected. Land survey teams took photographs of seals whenever possible, while minimizing seal disturbance, to document any identifying marks including tags, scars, and applied or natural bleaches.

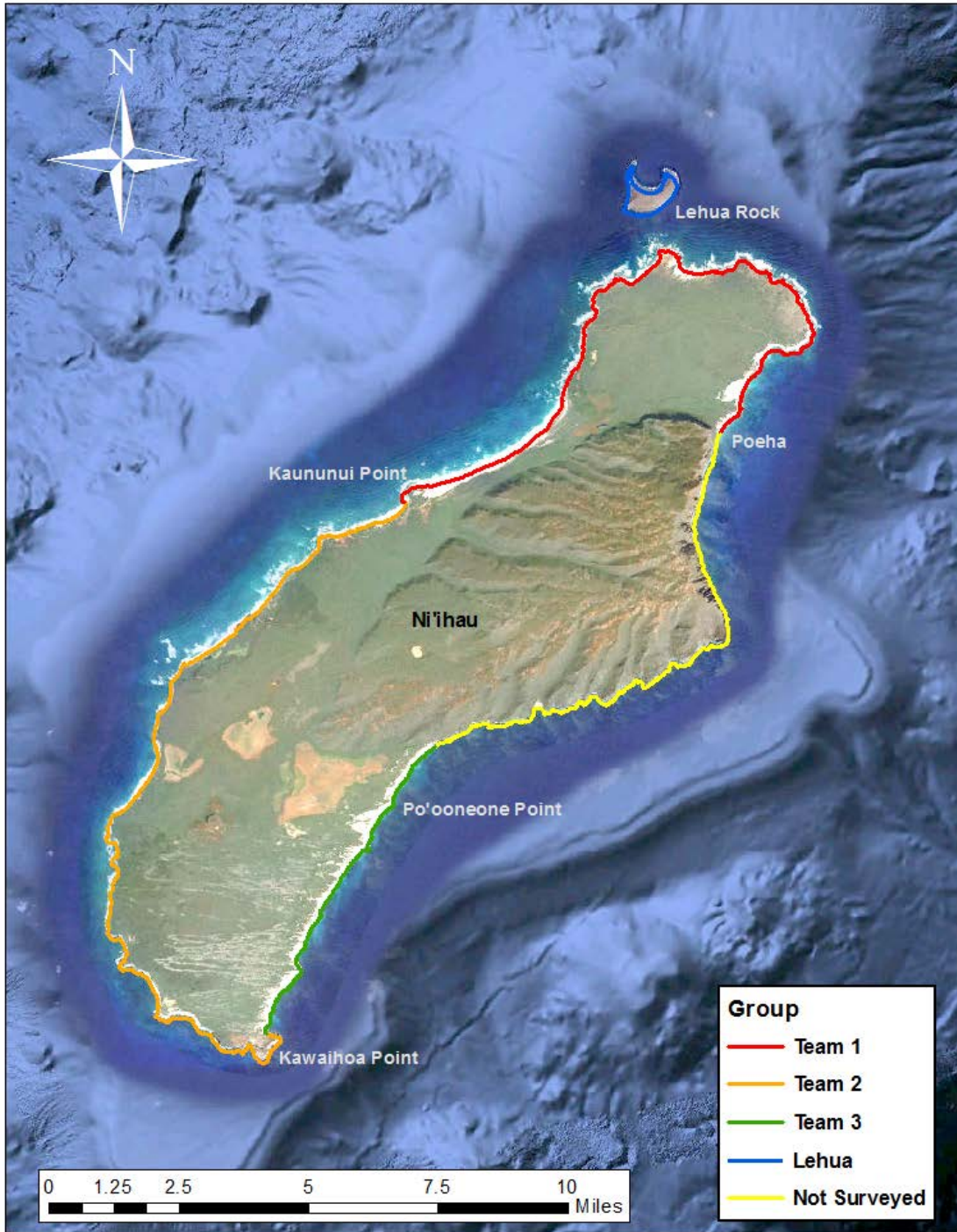


Figure 1: Survey areas of three land teams on Ni'ihau (red, orange, and green tracks) and Lehua Rock (blue track).

Itinerary:

- 0700** *Sette* launched SE2 with three land teams to meet Ni'ihau personnel near Kaununui Point.
0815 Land teams separated and transited to survey starting points.
0830 SE2 returned to the *Sette* and transited to Lehua Rock to launch Boat Team.
1100 Boat Team completed survey of Lehua Rock and returned to the ship.
1600 *Sette* Arrived near Kaununui and launched SE2 to recover land teams.
1700 Recovered SE2. Survey complete.

Survey Descriptions:

Land Team 1:

Personnel: Jessica Farrer, Jessica Lopez, Whitney Taylor

Survey Area: Poeha to Kaununui point (red track) surveyed east to west.

Approximate survey time: One hour transit via truck from boat drop off at Kaununui to Poeha to start survey. Survey was from 0915 to 1545 for a total of 6.5 hours (including 30 min lunch).

Transport: 4wd Jeep and by foot in areas inaccessible by truck.

Land Team 2:

Personnel: Ben Cook, Shawn Farry, Darren Roberts

Survey Area: Kaununui point to Kawaihoa Point (orange track) surveyed north to south

Approximate survey time: Survey was from Kaununui at 0830 to 1500 for a total of 6.5 hours.

Team 2 met up with team 3 and had a 1 hour for transport back to Kaununui.

Transport: 4wd (Korean war era) truck and by foot.

Land Team 3:

Personnel: Carrie McAtee

Guides: 2 Ni'ihau residents.

Survey Area: Po'oneone Point to Kawaihoa Point (green track) surveyed north to south.

Approximate survey time: 30 minutes transit to survey start. Survey was from 0900 to 1230 for a total of 3.5 hours.

Transport: Horseback for survey portion and jeep to and from meeting point.

Boat Team 1:

Personnel: Charles Littnan, Kirstie Yeager, Hoku Cody, Hope Ronco, Mills Dunlap (Coxswain)

Survey Area: Lehua Rock (blue track)

Approximate Survey time: SE2 was launched at 0900 and survey was conducted from 1000 to 1200 for a total of 2 hours. SE2 was recovered at 1300.

Transport: SE2 is a 16-ft Achilles inflatable boat with a 60-hp outboard engine.

Results:

A total of 60 seals were counted on Ni'ihau and 3 seals were counted on Lehua Rock. All seals counted were on land. This included 29 adult seals, 9 sub-adults, 5 juveniles, and 20 nursing or weaned pups (Table 1). All seals observed on Lehua were adults. The majority of seals ($n=30$) were seen by survey team 1 on the north side of the island followed by survey team 2 ($n=28$) on the southwest side of the island. Two seals were seen by survey team 3 (Table 2). The boat team surveying Lehua Rock observed 3 seals on the island with an additional 3-4 seals seen in the water (Table 2). Seals seen in the water were not included in these totals.

Three seals were identified by flipper tags. These seals were previously observed and/or tagged on the islands of Kauai and Oahu. A fourth seal was observed with a red flipper tag, but was not identifiable. One weaned monk seal pup was tagged with temple tags on both rear flippers as well as a subcutaneous Passive Integrated Transponder (PIT) tag on the dorsal posterior. This is the first time a Hawaiian monk seal has been tagged on Ni'ihau.

Table 1: Seals observed on Ni'ihau and Lehua islands classified by size and sex.

	Female	Male	Unknown	Total
Adult	9	7	13	29
Sub-adult	3	2	4	9
Juvenile	1	2	2	5
Pup	2	7	11	20
Total				63

Table 2: Seals observed on Ni'ihau and Lehua islands classified by survey team.

	Method	Seals
Land team 1	truck and foot	30
Land team 2	truck and foot	28
Land team 3	horseback	2
Boat team 1	Boat (SE2)	3
Total		63

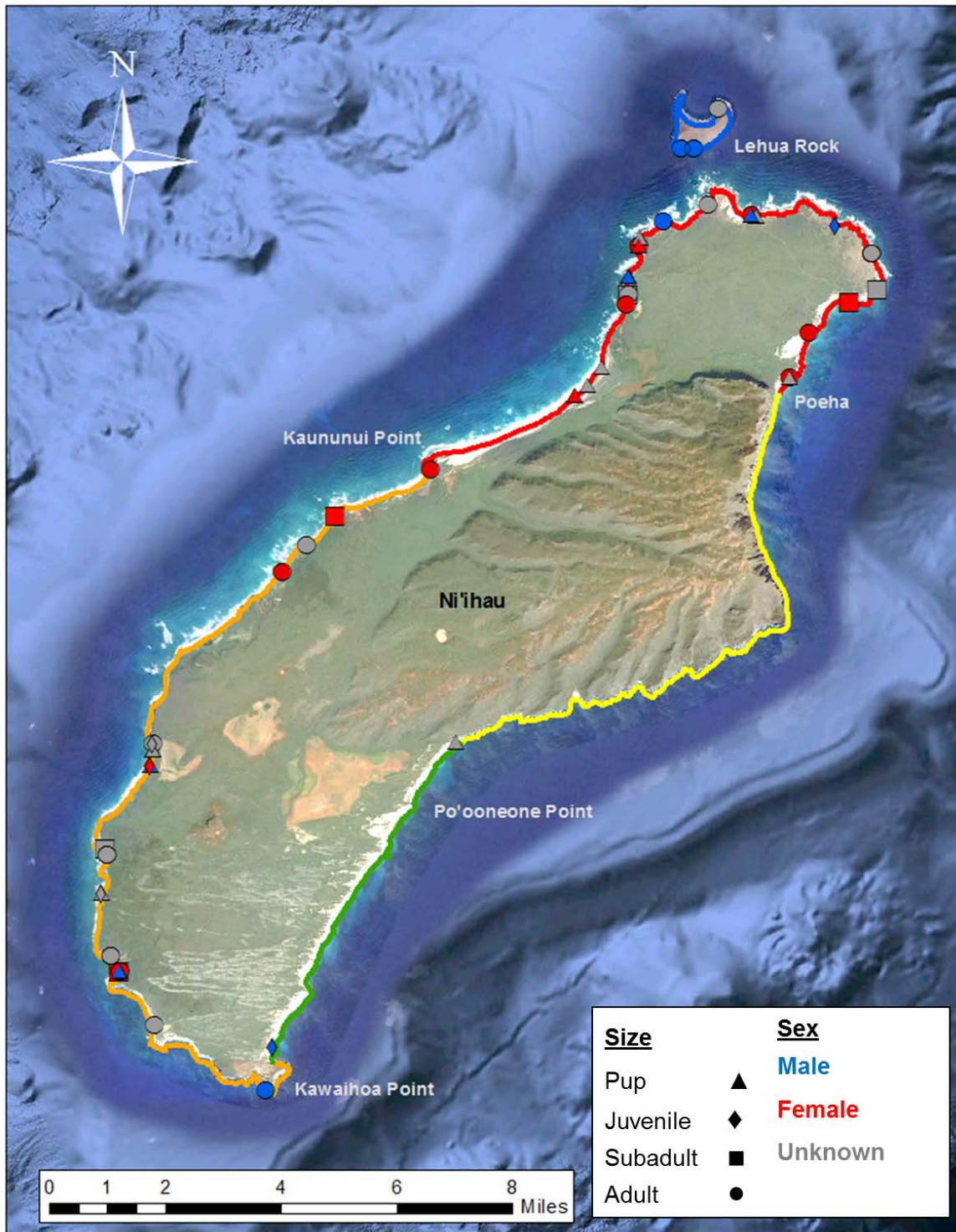


Figure 2: Locations and age/sex class of seals sighted during the survey.

Impressions and Considerations for Future Surveys:

Ni'ihau personnel are essential in navigating the island and completing surveys in an efficient manner. The guides were very knowledgeable about the area surveyed, where seals were likely to be, and where they had been in the recent past. They were able to identify areas that would be higher in seal numbers where more survey time would be needed.

Personnel:

Team 1 had a total of 5 personnel (3-HMSRP and 2-US Navy) divided into two groups working simultaneously, leap frogging each other with the use of the truck in order to get to all of the areas where the shoreline was not directly visible from the road. In many areas the beach was visible from the road. This number of personnel is more than would be necessary for future survey efforts; however, the US Navy representatives were being trained by HMSRP personnel during the survey. This area of coastline had the majority of all seals, as well as the majority of nursing and weaned pups. Therefore, it is recommended that Team 1 consist of a minimum of at three trained personnel, particularly if there are opportunities to flipper tag or bleach mark individuals.

Team 2 had three HMSRP personnel working simultaneously, leap frogging in the same way as Team 1. This area of coast is very rugged and demands a high level of fitness and endurance. Due to the long distance, difficult terrain, and high number of seals observed, it is recommended that a minimum of three trained people are used to survey this area.

Team 3 consisted of one HMSRP person surveying via horseback. One trained person is sufficient.

Seals are frequently seen on Lehua rock when surveys are done. Therefore, it should be surveyed when possible. When conditions permit, personnel can go from the small boat to shore to assess and get more information about seals sighted. Therefore, boat teams should consist of

personnel who are trained in seal survey protocols and also comfortable in boats and in the water.

Survey gear:

Due to the relative lack of information and photographs of Ni'ihau seals, it is very important that all seals be photographed from all possible angles during surveys. Additionally, it is very important to document any identifying marks, both natural and applied, in order to match individuals to those previously identified on Ni'ihau or other islands. Therefore, a high resolution digital camera and binoculars are both essential equipment.

In addition to survey equipment, it is recommended that either more time or more teams be added to the survey to allow more time to be spent with each seal or seal group to maximize photo documentation of as many aspects of a seal as possible. Seals may move or shift position over time, revealing identifying scars, marks or tags. Given resources and personnel, the most plausible option would be to allow for a 2-day survey of the entire island of Ni'ihau.

Recommendations for future surveys:

- *Use of handheld GPS devices.* Seal locations were determined by marking locations on a printed map. It is recommended for future surveys that seal locations be determined with the use of handheld GPS units to get the most accurate information.
- *Equip with disentanglement tools.* A number of areas, including the southwest side and the east side of the island had high concentrations of debris. Disentanglement tools are recommended for these areas in future surveys.
- *Increase identification of individual seals.* Counts of seals can be useful for characterizing general trends in abundance and distribution. However, obtaining individual identities of seals when conducting surveys yields vastly more valuable information, such as:

- Improved estimates of total abundance in the main Hawaiian Islands (MHI) by ensuring individual seals are not double counted when adding up all seals seen on all islands;
- Information about seal movement patterns among islands. Information on the proportion of seals that use multiple islands and the rate at which they move among islands helps to identify the most important habitat for resting, foraging, pupping, etc. Movement information also helps us better predict how disease outbreaks might spread and thereby helps inform our disease mitigation strategies.
- Survival and reproductive rates are critical for monitoring how the population is doing; these are often leading indicators of change in population abundance. Estimating these rates most effectively requires resighting individuals throughout their lives.
- Translocations and other actions (like de-hooking and rehabilitation) occur regularly in the MHI. Resighting individuals after such efforts allows us to assess short- and long-term efficacy of these measures.

We recommended that either surveys are extended or more teams be added to the survey to allow more time to be spent with each seal or seal group to maximize photo documentation. Seals may move or shift position over time revealing identifying scars, marks or tags. It is very important to document any identifying marks, both natural and applied, in order to match individuals to those previously identified on Ni'ihau or other islands. There will be cost and logistical issues that need to be considered prior to extended surveys or adding staff. Another potential option to consider would be to allow for a 2-day survey of the entire island of Ni'ihau.

Beach counts can be a useful index to compare population trends between current and historical records. We might want to consider using two survey methods at different times of the year. We could use aerial or ground surveys to do a beach count (how many seals are hauled out in one day) and use fine scale, slower surveys that focus on photo-identification, marking and tagging seals to help with refining our population estimates and improving our understanding of trends and welfare of the monk seal population on Ni'ihau.