



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL MARINE FISHERIES SERVICE**  
**Pacific Islands Fisheries Science Center**  
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## **PROJECT REPORT**

**VESSEL:** NOAA Ship *Oscar Elton Sette*, Project SE 15-06

**PROJECT PERIOD:** The NOAA Ship *Oscar Sette* was engaged as support for NOAA Fisheries' Pacific Islands Fisheries Science Center (PIFSC), National Marine Fisheries Service (NMFS) project from September 6 to October 2 for a total of 27 sea days in the Papahānaumokuākea Marine National Monument (PMNM) and main Hawaiian Islands (MHI).

**AREA OF OPERATION:** The operating area included transit northwest along the main Hawaiian Islands and PMNM from Ford Island, Pearl Harbor, to Kure and southeast to Kona, Island of Hawaii, with Protected Species Division (PSD) operations including opportunistic Hawaiian monk seal surveys, field camp recovery, transport of Hawaiian monk seals, at Hawaiian Island, Ni'ihau Island, Nihoa Island, Necker Island, French Frigate Shoals (FFS), Laysan Island, Lisianski Island, Pearl and Hermes Reef (PHR), Midway Atoll, and Kure Atoll.

**TYPE OF OPERATION:**

- Deploy temporary camps at FFS, Laysan, Lisianski, and PHR.
- Field camp demobilization and gear recovery.
- Monk seal population surveys.
- Transport of seals between Ke Kai Ola (KKO) rehabilitation facility and NWHI.
- Conduct Unmanned Aircraft System (UAS) surveys.
- Deploy and recover temporary camp for Fisheries Wildlife Service (FWS) and American Bird Conservancy (ABC).
- Deliver supplies and personnel for DLNR (Department of Land and Natural Resources) at Kure Atoll.
- Deployment and recovery of HARP at PHR for CRP.
- Conduct CTD casts at 10 permanent CTD stations in NWHI.



## ITINERARY:

- 7 September **Ni'ihau:** 0700 Arrived at Ni'ihau Island. Launched SE-2 with Bohlander, Burns, Pike, Mercer, McAtee, Sullivan, Farry and Thompson to conduct monk seal survey. 0800 SE-2 returned to ship and ship transited to Lehua Rock. 0900 launched SE-2 with Matsuoka, Barcina, and Rogers to conduct survey of Lehua rock. 1000 Completed operations at Lehua Rock, recovered SE-2 and transited to pick up Ni'ihau shore team. 1430 Launched SE-2 to transport seal cage to shore. Recovered Thompson, Pike, Burns, and McAtee. Remainder of shore party assisted Ni'ihau personnel with transport of prematurely weaned pup to helicopter for transport to Kauai. 1630 SE-2 returned to Ni'ihau and recovered Bohlander, Sullivan, Farry, and Mercer. 1700 departed Ni'ihau en route to French Frigate Shoals.
- 8 September **Transit**
- 9 September **French Frigate Shoals:** 0800 arrival at French Frigate Shoals. Launched SE-4 with Sullivan, Thompson, McAtee and Matsuoka and SE-2 with Bohlander, Pike, Rogers, Mercer, Farry, Barcina, and Burns to conduct surveys for rehabilitation candidate seals. Disembarked Barcina, Burns, Farry, Matsuoka. Picked up 9 empty 50-gallon drums and 1 pallet tub turtle gear. 1500 SE-2 and SE-4 returned to ship with Bohlander, Pike, Rogers, Mercer, Sullivan, Thompson, and McAtee. Departed French Frigate Shoals en route to Honolulu. 1800 Conducted FFS CTD.
- 10 September **Transit** 0430 Conducted Mokumanamana CTD.
- 11 September **Transit**
- 12 September **Honolulu:** Arrived Pearl Harbor 0730 to F9 pier. Transferred gear and personnel. Disembarked 4: Mercer, Pike, Sullivan, Thompson. Embarked 17: Barbieri, Callan, Clausman, Farmer, Ferguson, Harris, Hess, Jacobs, Kaufman, Leroi, Littnan, Marino, Plentovich, Roberts, Ronco, Sweeney, Waters. Loaded 2 seals. Departed 1130 en route to Nihoa Island.
- 13 September **Nihoa:** Arrived Nihoa Island 1130. Launched SE-2 with shore team to conduct seal survey on main beach. Landing was too rough so SE-2 transited to West Ledge and deployed team to survey. After team was recovered, the landing spot for the main beach was re-evaluated but shore team was not deployed. 1500 SE-2 and shore party recovered and ship departed for FFS.
- 14 September **French Frigate Shoals:** 1645 arrival at French Frigate Shoals. FFS small boat Iwa met Sette to transfer rehabilitation candidate seal to ship. 1715 transfer complete and ship departed for Laysan Island.
- 15 September **Transit** 0030 Conducted Gardner Pinnacles CTD. 1230 conducted Maro Reef CTD.
- 16 September **Laysan:** Morning arrival at Laysan Island. Deployed SE-04 and SE-02 with seal team and UAS team. Conducted UAS operations and seal surveys on land. 1700 secured survey, recovered shore team.

- 17 September **Laysan:** 0800 deployed SE-04 with seal team and UAS team. Conducted seal surveys and UAS operations on land. Disembarked 3: Farmer, McAtee, and Plentovich. 1630 secured operations, recovered shore team, and departed en route to Lisianski Island.
- 18 September **Lisianski:** 0800 arrived at Lisianski Island. Deployed SE-02 and SE-04 with seal team and UAS team. Assessed island for hurricane damage and status of gear. All was as the field staff left it with no sign of damage. Disembarked 2: Callan and Ronco. Conducted seal surveys and UAS ops on land. 1700 secured operations and recovered shore team.
- 19 September **Lisianski:** 0800 Deployed SE-02 and SE-04 with seal team and UAS team. Conducted seal surveys and UAS ops on land. Loaded all camp gear. Embarked 2: Callan and Ronco. 1700 secured operations, recovered shore team and departed en route to PHR.
- 20 September **PHR:** Morning arrival at PHR. Deployed SE-04 with seal team and Hexacopter team to Southeast Island. Assessed island for hurricane damage and status of gear. Disembarked 3: Harris, Hess, Roberts and offloaded one 5-m inflatable Zodiac. Offloaded 2 seals to shore pen on Southeast Island. Deployed Puma team on SE-04 to do flights over Maze area and North Island. Conducted seal surveys and UAS ops on land and from SE-4 in maze. 1500 secured operations and recovered shore team. 1730 Recovered PHR HARP and deployed a new HARP for CRP. 1900 departed en route to Midway Atoll.
- 21 September **Midway:** 0830 arrival at Midway cargo pier. Deployed SE-04 to conduct survey of Eastern Island and shore team to conduct seal survey of Sand Island. Disembarked 8: Clausman, Ferguson, Jacobs, Littnan, Leroi, Marino, Sweeney, Waters. Embarked 10: Dunn, Hebert, McAtee, McPheeters, Opie, Potter, Robinson, Sullivan-Haskins, Swatland, Vanderlip. Offloaded 350 gallons of gasoline in seven 55-gallon drums. Offloaded 20-ft container. 1800 departed cargo pier and Midway en route to Kure Atoll.
- 22 September **Kure:** Morning arrival at Kure Atoll. Launched SE-02 and SE-04, commenced offload of DLNR supplies. Loaded DLNR and NMFS camp supplies. Collected one seals for rehabilitation. Disembarked 7: Opie, Dunn, Hebert, McPheeters, Potter, Sullivan-Haskins, Vanderlip. Embarked 9: Hopkins, Jardine, Klemme, Leach, Little, Meggett, Nimz, Saunter, Worcester. 1900 departed Kure en route to Midway Atoll.
- 23 September **Midway:** 0830 arrival at Midway cargo pier. Deployed SE-04 to conduct survey of Eastern Island and shore team to conduct seal survey of Sand Island. Disembarked 7: Hopkins, Jardine, Klemme, Little, Meggett, Saunter, Worcester and offloaded DLNR buckets. 1800 departed en route to PHR.
- 24 September **PHR:** Morning arrival at PHR. Launched SE-04 and SE-02; demobilized camp and loaded equipment and supplies including one 5-meter inflatable boat, and one 5.5-meter RHIB. Embarked 3: Roberts, Hess, and Harris. 1330 departed en route to Laysan Island.

- 25 September **Laysan:** 1500 arrived at Laysan. Demobilized camp and loaded equipment and supplies using SE-4, SE-2, and Aquarius. Embarked 2: Farmer and Plentovich. 1900 departed en route to FFS.
- 26 September **Transit**
- 27 September **FFS:** 0800 arrived at FFS. Launched SE-4 and demobilized camp and loaded equipment and supplies, including one 17-ft Boston Whaler and one 6-meter RHIB. Collected 2 seals for rehabilitation. Embarked 4: Barcina, Burns, Farry, and Matsuoka. 1500 departed en route to Mokumanamana.
- 28 September **Mokumanamana:** 0800 Arrived at Mokumanamana. Assessed conditions and determined that winds and swell were too high to launch SE-2 and land on the island safely. 0900 departed the area en route to Honolulu.
- 29 September **Transit**
- 30 September **Oahu:** 0800 Launched FRB to disembark 2 ship's crew. 0930 Departed en route to Kona.
- 1 October **Kona:** 0800 arrival at Honokohau Harbor. Deployed SE-4 and seal team with rehab seals to meet seal team on shore. Disembarked 3: Barbieri, Kaufman, and Swatland. 1000 Departed en route to Pearl Harbor.
- 2 October **Pearl Harbor.** 0900 Arrived at Pearl Harbor. Disembarked 17: Barcina, Bohlander, Burns, Callan, Farry, Farmer, Harris, Hess, Leach, Matsuoka, McAtee, Nimz, Plentovich, Robinson, Rogers, Ronco, and Roberts. End of cruise.

## **MISSION:**

The main objectives and results for SE 15-06 were:

1. **Monk seal camp demobilization and temporarily deploy camps:**  
Monk seal field camps were demobilized at Kure Atoll. Temporary camps were established at French Frigate Shoals, Laysan Island and Pearl and Hermes Reef. Supplies from previously-picked-up camp at Lisianski Island were recovered. Supplies and personnel were transported by SE 15-06 for DLNR to and from Kure Atoll.
2. **Conduct monk seal beach surveys at Ni'ihau, Nihoa, and Mokumanamana Islands:**  
A successful survey was conducted at Ni'ihau Island. Unfortunately conditions were not conducive to landing at Nihoa and Mokumanamana Islands. At Nihoa Island the landing too much surge occurred and time ran short. The beach was also completely eroded with no sand and only rocks visible. At Mokumanamana Island the wind and swell were too high to launch boats or land on the island safely.
3. **Transport Hawaiian monk seals between a rehabilitation facility in Kona on the Island of Hawaii and sites within the NWHI:**

Two weaned pups (DG02 and DG10) were transported from Ke Kai Ola (KKO; a rehabilitation facility in Kona on the Island of Hawaii) to Honolulu where they embarked the ship to return to the NWHI. DG02 and DG10 were transported to PHR and released. Three seals (2 weaned pups and 1 juvenile) from FFS, 2 weaned pups from Lisianski, and 1 weaned pup from Kure Atoll were collected and transported to KKO at the end of the project.

Table 1: Seals transported between Ke Kai Ola (KKO) rehabilitation facility and NWHI.

<u>Seal ID</u>	<u>Name</u>	<u>Size</u>	<u>Sex</u>	<u>Source Site</u>	<u>Date Embarked</u>	<u>Destination Site</u>	<u>Date Disembarked</u>
DG02	Pearl	W	F	KKO (via Honolulu)	9/12/2015	PHR	9/20/2015
DG10	Hermes	W	M	KKO (via Honolulu)	9/12/2015	PHR	9/20/2015
AG18	Ama'ama	W	F	FFS	9/14/2015	KKO (via Midway flight)	9/21/2015
LG06	Puka	W	F	Lisianski	9/18/2015	KKO (via Midway flight)	9/21/2015
LG36	Neva	W	F	Lisianski	9/19/2015	KKO	10/1/2015
KG56	Ena'ena	W	F	Kure	9/22/2015	KKO	10/1/2015
AG36	Mahina	W	F	FFS	9/27/2015	KKO	10/1/2015
Y70F	Mo'o	J1	F	FFS	9/27/2015	KKO	10/1/2015

- Conducted trials of Unmanned Aircraft Systems (UAS; Puma and multi-copter platforms) at French Frigate Shoals, Laysan Island, Lisianski Island, and Pearl and Hermes Reef:

**Platforms used:** Puma (fixed-wing) and APH-22 (hexacopter)

**Locations:** Laysan Island (2 days), Lisianski Island (2 d), and Pearl and Hermes Reef (1 d)

**Total Missions** (estimated): Puma 10. Hexacopter 16.

**Total Flight Time** (estimated): Puma 15 hrs, Hexacopter 5 hrs 20 min.

**Bird Interactions:** Bird strikes: 0, Bird touches: 0

### **Disturbance or Other Interactions:**

*Puma* - For land-based launches birds tended to flush when the propeller revved up. But once aloft there was little disturbance. Some birds gave chase (mostly fairy terns). Birds lost interest during long flights. During boat launches and over-water flights, there was virtually no bird activity at all.

*Hexacopter* - During launches birds flushed. Generally, it was noddies when the copter reached 60–100 ft. Most of the time birds settled in less than 1 minute.

While in the air there was some interest by a variety of species (but never frigates) but birds would move away once they got within a couple of feet. Fairy terns tended to be the boldest.

Surprisingly little interest to either platform by boobies and frigate birds.

Monk seals showed no response to *Puma*. Some seals looked around when hexacopter was overhead and operating below 100 feet. However, no seals moved away or entered water.

### **Imagery**

The new super gimbal camera on the *Puma* was MUCH better than prior year's system. Locking it in nadir position and taking high-resolution photos of the islands should make very nice maps for USFWS. Also better at detecting things in the water so good potential for marine debris. The video camera was also pretty good.

The hexacopter looks like it will be a good tool for monk seal work. Also produced some great images of Southeast Island at PHR so could also be used to map islands, particularly smaller ones.

### **Missions**

*Puma*: All originally planned flights were not completed due to time constraints and technical delays but we did get complete high-resolution images of Laysan. We also did 3D mapping with light detection and ranging (LIDAR) for both Laysan and Lisianski. The video camera was tested to see if it would be more useful to USFWS for their bird and plant work. The high-resolution camera was used for flying over the maze and north reef at Pearl and Hermes. There was much better penetration into the water and with proper conditions could be used for debris detection.

*Hexacopter*: We mostly did our disturbance work with seals and mapped one island. All flights were successful.

### **Data Summary**

The bird and seal disturbance data will be summarized in the next month or two.

*Puma*: Aerovironment will work with the *Puma* data to stitch together complete maps of the islands. They will also process some of the lidar data to show what can be done. We will be working with outside partners to process all the data and are hoping for maps in the next month.

*Hexacopter*: Images are in hand and a map of Southeast Island will be stitched together soon.

5. Deploy and recover a temporary camp for the US Fish and Wildlife Service (FWS) and American Bird Conservancy (ABC) Nihoa Miller Bird (NIMI) program on Laysan Island:  
FWS and ABC personnel were successfully deployed to Laysan on September 17. However, due to the threat of Tropical Storm Malia, they, along with one HMSRP person were removed from the island by the m/v Kahana on September 19. These three personnel were transported to Midway on September 21. The HMSRP person re-embarked the Sette there and the two NIMI personnel returned to Laysan on the Kahana and re-embarked the Sette on September 25.
6. Deliver and recover supplies to Kure Atoll for the Department of Forestry and Wildlife (DOFAW), Department of Land and Natural Resources (DLNR), State of Hawaii:  
Seven DLNR personnel were transported from Midway to Kure and another 7 were transported from Kure back to Midway along with approximately 600 buckets, pallet tubs, water jugs, and other large equipment. The entire camp was changed out by SE 15-06. The offload/loading took approximately 11 hours to complete. It is recommended that in the future, for a full DLNR camp switch, more than one day at Kure and an additional container on deck would be needed.
7. Deploy and recover a High-frequency Acoustic Recording Package (HARP) at PHR:  
SE 15-06 supported the PSD Cetacean Research Program by recovering and deploying a High-frequency Acoustic Recording Package (HARP) at Pearl and Hermes Reef.
8. Opportunistic CTDs casts:  
Shipboard CTD casts were conducted successfully at 8 out of 10 historical sites during transits between islands. CTDs were conducted to a depth of 500 m at 10 permanent CTD cast stations at Nihoa, Necker, French Frigate Shoals, Gardner Pinnacles, Maro Reef, Laysan Island, Lisianski Island, and Pearl and Hermes Reef. The CTDs were not conducted at Midway Atoll, and Kure Atoll due to time constraints after other higher priority operations were completed.

## **SCIENTIFIC PERSONNEL:**

1. Barbieri, Michelle, Veterinarian, Pacific Islands Fisheries Science Center (PIFSC), National Marine Fisheries Service (NMFS)
2. Barcina, Keelan, JIMAR volunteer, Joint Institute for Marine and Atmospheric Research (JIMAR), University of Hawaii (UH)
3. Bohlander, Jessica, Field Research Supervisor and Chief Scientist, JIMAR, UH
4. Burns, Michael, Biological Response and Logistics Technician, JIMAR, UH
5. Callan, Sarah, JIMAR Volunteer, JIMAR, UH
6. Clausman, Matthew, Collaborator, Aerovironment (AV)
7. Dunn, Noel, DLNR Volunteer, Department for Land and Natural Resources (DLNR), State of Hawaii (SOH)
8. Farmer, Chris, Hawaiian Bird Science Coordinator, American Bird Conservancy (ABC)
9. Farry, Shawn, Biological Research Technician, JIMAR, UH
10. Ferguson, John, Collaborator, AV
11. Harris, Jacob, JIMAR volunteer, JIMAR, UH
12. Hebert, Coryan, DLNR volunteer, DLNR, SOH
13. Hess, Megan, Biological research assistant, JIMAR, UH
14. Hopkins, John, DLNR volunteer, DLNR, SOH
15. Jacobs, Todd, Deputy Superintendent for Operations, Office of National Marine Sanctuaries (ONMS)
16. Jardine, Jon Erik, DLNR volunteer, DLNR, SOH
17. Kaufman, Angela, veterinary technician, JIMAR, UH
18. Klemme, Mikal, DLNR volunteer, DLNR, SOH
19. Leach, Laurina, JIMAR volunteer, JIMAR, UH
20. Leroi, Donald, Collaborator, Aerial Imaging Solutions
21. Little, Nicole, DLNR volunteer, DLNR, SOH
22. Littnan, Charles, Lead Scientist, PIFSC, NMFS
23. Marino, Michael, UAS Mission Commander, NOAA Corps
24. Matsuoka, Koa, Biological Research Assistant, JIMAR, UH
25. McAtee, Carrie, Biological Research Technician, JIMAR, UH
26. McPheeters, Martha, DLNR volunteer, DLNR, SOH
27. Meggett, Tara, DLNR volunteer, DLNR, SOH
28. Nimz, Ilana, Biological Research Technician, JIMAR, UH
29. Opie, Eryn, DLNR Technician, DLNR, SOH
30. Pike, Dianne, Collaborator, Monk Seal Foundation
31. Plentovich, Sheldon, Coastal Program Coordinator, US Fish and Wildlife Service (FWS)
32. Potter, Ryan, DLNR volunteer, DLNR, SOH
33. Roberts, Darren, Biological Research Technician, JIMAR, UH
34. Robinson, Stacie, Research Ecologists, PIFSC, NMFS
35. Rogers, Kim, Collaborator, Kauai Monk seal Hui
36. Ronco, Hope, Biological Research Technician, JIMAR, UH
37. Saunter, Matthew, DLNR biological technician, DLNR, SOH
38. Sullivan-Haskins, Andrew, DLNR volunteer, DLNR, SOH

39. Swatland, David, Deputy Superintendent, ONMS
40. Sweeney, Kathryn, Collaborator, National Marine Mammal Laboratory, NMFS
41. Thomson, Jamie, Response Coordinator, NMFS
42. Waters, Kristoffer, Collaborator, AV
43. Worcester, Naomi, DLNR biological technician, DLNR, SOH

Submitted by:   
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