

NOAA Pacific Islands Fisheries Science Center

Mission Report

Mission Number: MP-14-01

Operator-in-Charge: John Rooney

Chief Scientist: John Rooney

Small Boat ID/Type: R/V *AHI*—F2505

Mission Title: Nearshore bathymetry mapping around the island of Maui and TOAD optical data collection in the vicinity of Kaanapali–Kahekili, Maui.

Mission Area: Kahekili area and surrounding waters of Maui Island

Mission Dates: February 4–21, 2014

1. Objectives

The NOAA Pacific Islands Fisheries Science Center's Coral Reef Ecosystem Division (CRED), Benthic Habitat Mapping Team conducted an 18-day mission to acoustically and optically survey the seafloor around the island of Maui aboard the R/V *AHI* in support of benthic habitat mapping operations. Optical surveying with the TOAD camera sled system was limited to the Kaanapali–Kahekili priority area designated by the Hawaii Division of Aquatic Resources and NOAA Coral Reef Conservation Program. The primary objective of multibeam surveying was to fill gaps in that same area and then to fill gaps in more exposed coastal areas around Maui.

2. Schedule

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| Feb 4 | Rhonda Suka and John Rooney flew to Maui, retrieved a PIFSC pickup truck, the R/V <i>AHI</i> and other equipment from Young Brothers and stored equipment not being immediately used at the Hawaii Department of Land and Natural Resources (DLNR) yard in Wailuku. Launched the R/V <i>AHI</i> at Mala Wharf boat ramp and brought her into an available slip in Lahaina Harbor. Student assistant Gabriel Cohen flew in that evening. |
| Feb 5 | Performed maintenance on the R/V <i>AHI</i> 's trailer, picked up a new umbilical cable for the TOAD from a Federal Express office and prepared the cable for use. A Kellum Grip, used to connect the sled to the umbilical cable while distributing the strain, was not installed on the cable, so a grip was fabricated. Conducted launch and recovery training and testing while alongside the pier. The jury-rigged grip kept slipping so another version was fabricated |

- and tested. A single TOAD dive in the survey area was successfully completed and the R/V *AHI* was refueled.
- Feb 6 Replaced the switch on the R/V *AHI*'s 12V pothauler, which had stopped working several times the previous day. Started a TOAD dive but lost power to the TOAD shortly after reaching the seafloor. Problem was traced to water intrusion between the connectors on the new cable and the sled itself. Returned to the DLNR yard to retrieve equipment to try to get the TOAD system operational again.
- Feb 7 Faith Knighton arrived in the morning. Finished repair of TOAD system and switched out the pothauler with a spare, which seemed to improve but not completely fix problems with its stopping periodically during sled retrieval. Diesel generator would not start so a replacement starter was retrieved from spares in Wailuku, but the existing started finally started the generator just before the replacement arrived. Conducted a dive with the TOAD, but the jury-rigged Kellum Grip failed just before reaching the surface at the end of the dive. Received a call from a local technical diver contacted through mutual friends and he agreed to look for our sled on Feb. 9.
- Feb 8 Retrieved the CTD from Wailuku and prepared the R/V *AHI* for multibeam surveying. Began multibeam surveying to fill nearshore gaps in coverage as shallow as 11 m along the west Maui coast.
- Feb 9 Technical divers found, recovered, and returned the TOAD sled to us. After cleaning and inspecting the TOAD, it was tested and appeared fully functional. A third and significantly stronger grip was fabricated to secure the TOAD to the umbilical. After additional testing alongside the pier a data-collection dive in the survey site was successfully completed. Gabriel Cohen flew back to Oahu in the evening.
- Feb 10 – 12 Completed another of 32 TOAD dives, finishing all dives planned for the survey.
- Feb 13 Frances Lichowski and Jeremy Taylor flew to Maui in the morning and were shown around the DLNR yard and Mala Wharf and given a briefing about operations in and out of Lahaina Harbor. Lichowski and Rooney reviewed plans for the remainder of the mission which now shifted into multibeam surveying. TOAD equipment was demobilized off the R/V *AHI* while the CTD was brought back aboard. Lichowski and Taylor spent the rest of the day filling gaps in bathymetry coverage within the Kaanapali–Kahekili priority area. The rest of the team cleaned and returned TOAD gear to the DLNR yard and Suka and Rooney flew out that evening.
- Feb 14 Taylor and Lichowski surveyed to finish gap filling in the Kahekili priority site. Transited to Kahului, filling gaps along the way, and

- from Nakalene Point southeast to Kahului Harbor. Knighton worked on field logistics.
- Feb15 Taylor worked on field logistics and data processing. Knighton and Lichowski surveyed near Kahului Harbor due to weather constraints, until a generator failure forced them to return to the harbor at 1400. Team spent rest of the day on boat maintenance, generator repair, and data processing.
- Feb16 Taylor and Knighton surveyed from the harbor eastwards towards Pauwela Pt. Lichowski worked on data processing and field logistics.
- Feb17 Knighton worked on field logistics and data processing. Taylor and Lichowski surveyed between Kahului Harbor and Pauwela Pt.
- Feb18 Lichowski and Knighton continued surveying between Kahului Harbor and Pauwela Point; followed by surveying the western harbor approaches between Makawana Point and Kahului Harbor. Taylor worked on data processing and field logistics.
- Feb19 Knighton and Taylor surveyed between Kahului Harbor and Pawela Pt. Lichowski worked on data processing and field logistics.
- Feb20 Taylor and Lichowski survey gaps between Makawana Pt. and Kahului Harbor to finish filling the gap between multibeam and LiDAR data sets. Team recovered boat at the end of the day, cleaned and packed survey gear and delivered one truck load to Young Brothers. Continued processing newly collected data.
- Feb21 Team packed remaining gear and delivered gear, R/V *AHI*, and pickup truck to Young Brothers and completed paperwork for return shipment. Packed up remote office. Lichowski, Taylor, and Knighton flew to Oahu. End of mission.

3. Field Party

Name	Role	Organization
John Rooney	Chief Scientist/Vessel Operator-in-Charge	JIMAR
Frances Lichowski	Alternate Vessel Operator-in-Charge	JIMAR
Jeremy Taylor	Vessel coxswain and multibeam surveyor	JIMAR
Rhonda Suka	Optical and multibeam surveying	JIMAR
Faith Knighton	Vessel coxswain	NOAA Corps
Gabriel Cohen	Optical surveying	UH

4. Results

A total of 35 camera sled dives were conducted (Figure 1), completing all planned dives required as per a stratified random sampling plan. The plan accounted for previously collected data and distributed the survey locations evenly between 9 different geographic areas and depth bins. A new strobe light that was tested and adjusted during SB-13-25 worked well and enabled the digital still camera on the TOAD to consistently acquire

classifiable imagery. Perhaps as much as 90% of the photos, collected every 10 seconds during TOAD dives, are in focus. Although the strobe appears to play an important role in this improvement, calm conditions during surveying that minimized oscillations of the camera sled above the seafloor also helped the quality of the still imagery. On previous missions only about 10% of the photos were in focus enough to be able to identify living cover and substrate type.

The second half of the mission was dedicated to filling gaps in an existing synthesis of high-resolution bathymetry acquired from both multibeam echosounders and bathymetric LiDAR data in coral reef ecosystem waters around Maui (Figure 2). Data were first collected using the Reson 8101ER multibeam on the R/V *AHI*, in the Kaanapali–Kahekili Priority Area to meet milestone requirements. From there surveying continued, heading north along the coast of West Maui, around the northern tip of the island and down to Kahalui Harbor. Surveying continued both to the east and west of Kahalui Harbor (Figure 3).

5. Attachments

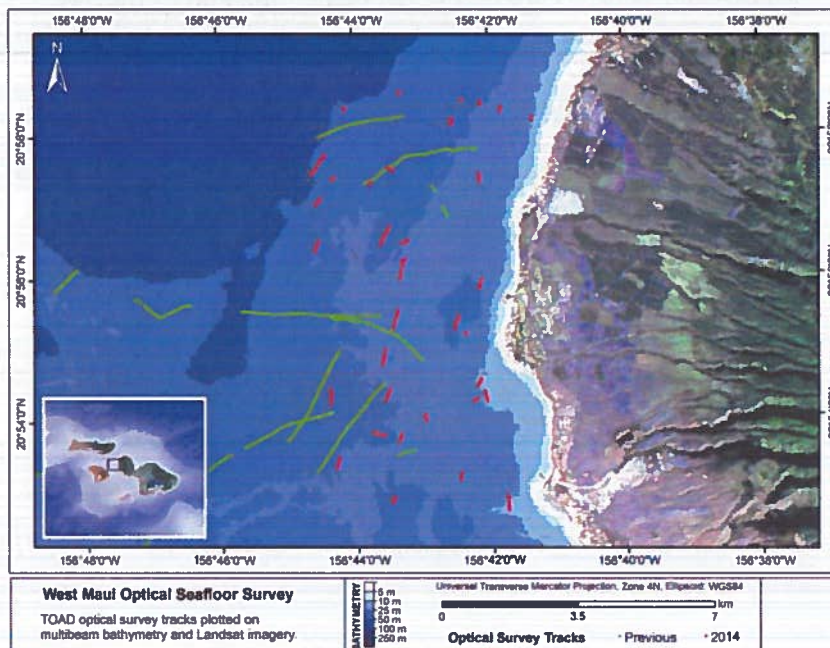


Figure 1. Map of optical data collected off the West Maui study site. Green tracks indicate the tracks of data previously collected, mostly by remotely operated vehicle (ROV). Red lines indicate TOAD tracks from the present survey.

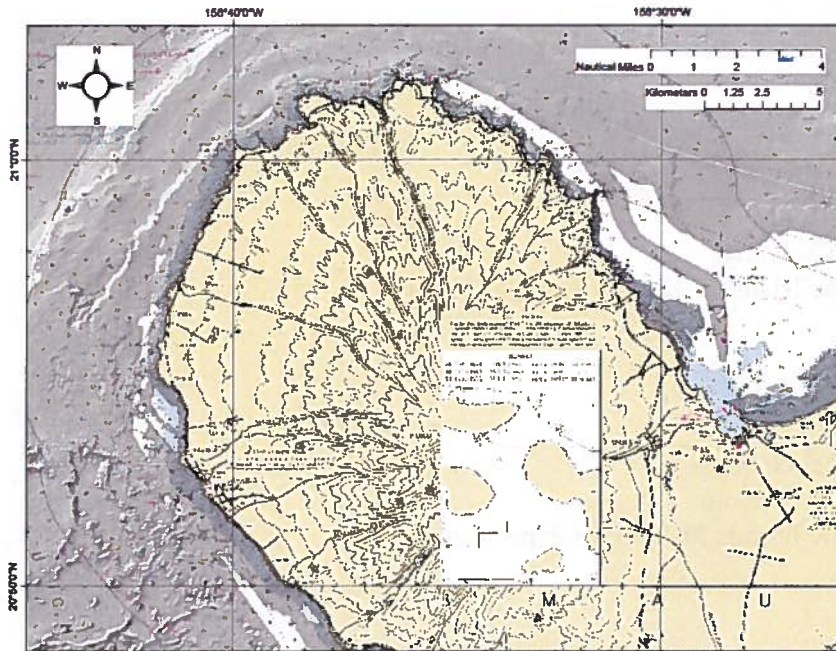


Figure 2. Gaps in coverage of previously collected high-resolution bathymetry collected by bathymetric LiDAR and multibeam echosounder.

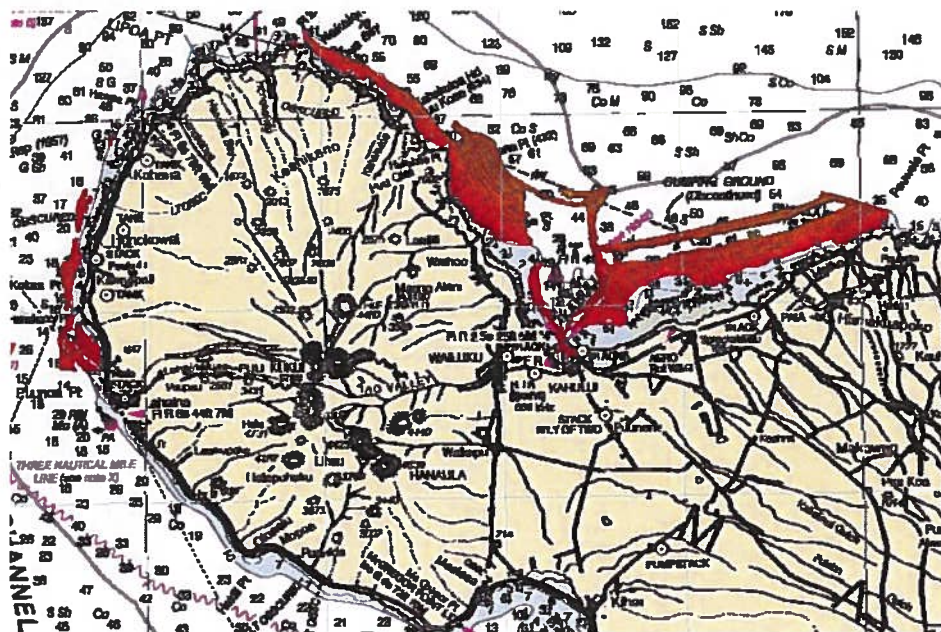
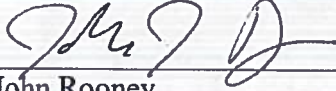
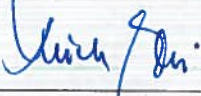



Figure 3. Screen grab of multibeam data collected during MP-14-01, shown as brown areas overlain on a nautical chart.

6. Approvals

Submitted by:  12 Mar. 2014
John Rooney
Chief Scientist
Pacific Islands Fisheries Science Center
Date

Approved by:  6/2/14
 Samuel G. Rooley
Science Director
Pacific Islands Fisheries Science Center
Date