U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE/NOAA FISHERIES
Pacific Islands Fisheries Science Center
2570 Dole St. • Honolulu, Hawaii 96822-2396
(808) 983-5300 • Fax: (808) 983-2902

CRUISE REPORT[1]

VESSEL: *Hi'ialakai*, Cruise HA-09-05

CRUISE PERIOD: July 24–August 2, 2009

AREA OF OPERATION: Main Hawaiian Islands (Fig. 1)

TYPE OF OPERATION: Recover oceanographic instruments and conduct diving operations and remote camera surveys in support of a Pacific Islands Fisheries Science Center (PIFSC) research study.

ITINERARY:

July 24 Embarked scientists Parrish, Boland, Rooney, Bare, Donham, Merritt, Williams, and Wagner. Departed Pearl Harbor 0800 for Waianae munitions dumping site to conduct a day-long mooring deployment cruise for NOAA's Ocean Service (NOS). NOS-sponsored staff disembarked the cruise via small craft, and the ship departed for the channel waters of the Maui complex to commence cruise HA-09-05.

July 25 Arrived in the channel waters of the Maui complex and began conducting operations to recover and redeploy the moorings and to do mixed gas diving surveys, remote camera surveys and other operations focused in areas of patches of deep *Leptoseris* sp. coral.

July 31 Donham and Merritt disembarked the cruise at Lahaina, Maui via small craft.

August 1 Completed operations and returned to Pearl Harbor, Oahu.

August 2 Arrived Pearl Harbor; all disembarked. End of cruise.

[1] PIFSC Cruise Report CR-09-016
Issued 30 October 2009

MISSIONS AND RESULTS:

A. Mixed-gas diving surveys.

Seven mixed gas dives were conducted, totaling nearly 3 hours of bottom time in the three scleratinian reef system identified on the contours off Maui (Table 1). The first reef system was made up of a branching reef primarily found along the 60-m contour. The second assemblage consisted of a mixture of the branching and *Leptoseris* sp. coral colonies at 70 m. The third reef system was comprised of an extensive coverage of *Leptoseris* sp. coral colonies at 80 m. On each of the dives, a 25-m video transect of the bottom was conducted, paired with a fish count. Specimens were collected for identification, genetic sampling, and evaluation of florescence.

B. Camera surveys.

Environment was appraised, using a live-feed video camera (TOAD), to survey the habitat of the contours between 50 and 150 m, and the area was searched for patches of mesophotic coral. Of particular interest was the *Leptoseris* sp., a coral species. Twenty-five camera deployments, conducted in the evening, covered more than 80 km of habitat (Fig. 2). The location of the dive sites were identified from the camera survey data.

C. Oceanographic Arrays

1. Two oceanographic arrays, deployed a year ago, were recovered (Table 3). One of the arrays was anchored in 83 m depth at the top edge of a *Leptoseris* sp. patch, and the other array was placed at 128 m depth on the floor of the solution basin, which was just below the bottom edge of the *Leptoseris* sp. coral patch. From the bottom up, each array had a 1200-lb lead anchor, 2 ORE Offshore shallow water release (ORE SWR) acoustic release systems, a seabird temperature recorder, a single-point Aanderra acoustic current meter, a Sonteck upward looking acoustic Doppler current profiler, and several onset thermographs situated every 10 m to the top of the 30-m array, which was held up with six floatation spheres. All instruments successfully downloaded.

2. Two smaller 10-m arrays were also recovered, one along a mid-depth (69 m) contour and the other one that was deeper (84 m). The array was comprised of a 50-lb concrete plug anchor, an ORE SWR release, an onset thermograph, and a Vemco receiver supported by a 10-inch floatation sphere. The array was deployed to record temperature and any visitation to the coral habitat by any large transient fish, which were tagged as part of other acoustic telemetry studies. All of the instruments successfully downloaded. The tag receivers detected visitation of sharks (i.e., Galapagos, tiger, and white sharks).

3. Three arrays were deployed on this cruise. Two of them were situated from the bottom up of a 250-lb lead anchor, 2 ORE SWR acoustic release systems,

a seabird temperature recorder, a single-point Aanderra acoustic current meter, a Vemco acoustic receiver and several onset thermographs every 10 m to the top of the
30-m array that was held up with two floatation spheres. One of these arrays was deployed in 68 m and the other in 55 m to record information on the shallower coral systems. A third 10-m mooring with a thermograph and a Vemco acoustic receiver was deployed in 72 m depth.

D. Conductivity-temperature-depth (CTD) operations.

A 24-hour CTD station was conducted in the solution basin where the *Leptoseris* sp. of coral was found around the edges. Casts were made every 2 hours to the full depth of the basin (130 m) (Table 4).

E. Archival drop cameras.

Two archival drop cameras, put together by National Geographic Television CRITTERCAM, were deployed for a 24-hour period in the reef complex to record changes in the fish community over the crepuscular hours. The cameras did not surface at the scheduled time, and attempts to locate them on the surface with VHF tracking were not successful. At the end of the cruise, a couple of residents on the Island of Lanai called to inform us they had found the cameras washed up on Shipwreck Beach, and they were recovered. It is suspected that the corrosion link released well before the computer controlled scheduled release, and the camera had drifted well out of range before recovery was attempted.

SCIENTIFIC PERSONNEL:

Frank Parrish, Chief Scientist, Pacific Islands Fisheries Science Center (PIFSC), National Marine
Fisheries Service (NMFS)
Raymond Boland, Biologist, PIFSC, NMFS
John Rooney, Coastal Geologist, Joint Institute for Marine and Atmoshperic Research (JIMAR),
University of Hawaii (UH)
Daniel Merritt, Oceanographic engineer, JIMAR, UH
Alisha Bare, Research Assistant, University of Hawaii
Emily Donham, Research Assistant, University of Hawaii
Austin Williams, Student hire University of Hawaii
Daniel Wagner, Researcher University of Hawaii

Submitted by: _____
Frank Parrish
Chief Scientist

Approved by: _____, for
Samuel G. Pooley
Science Director
Pacific Islands Fisheries Science Center

Attachments

Table 1.--List of mixed gas dives conducted on cruise HA-09-05.

Date	Location	Divers	Depth (ft)	Bottom time
7/26/09	20° 46.688 156° 40.417	Parrish and Rooney	277	12
7/27/09	20° 48.753 156° 40.391	Rooney and Boland	197	25
7/28/09	20° 48.4332 156° 41.0658	Parrish and Boland	230	15
7/29/09	POSITION NEEDED	Boland and Rooney	220	20
7/30/09	20° 48.299 156° 40.143	Parrish and Rooney	227	20
7/31/09	20° 48.317 156° 40.774	Parrish and Boland	250	15
8/01/09	Unavailable	Boland and Lt. Ryan	190	25

Table 2.--Surveys conducted with the tethered live feed camera system (TOAD). Positions in decimal degrees.

Tow ID	Start Date (UTC)	Time On Bottom (UTC)	Bottom Time	Min Lon	Max Lon	Min Lat	Max Lat
Cruise Total	-	-	-	**156.5221095**	**156.7464357**	**20.7120985**	**20.8156223**
Maui				**156.5221095**	**156.7464357**	**20.7120985**	**20.8156223**
MAI08001	8/3/2008	18:47:00	2:52:26	156.5221095	156.5244911	20.7224505	20.7574545
MAI08002	8/4/2003	0:09:25	2:32:15	156.5584096	156.5696816	20.7648459	20.7758657
MAI08003	8/4/2008	6:19:30	2:00:33	156.5750680	156.5856839	20.7743002	20.7494010
MAI08004	8/4/2008	9:05:00	0:25:00	156.6101354	156.6105657	20.7690846	20.7623965
MAI08005	8/4/2008	11:47:48	1:00:59	156.6959958	156.7014322	20.7886921	20.7787320
MAI08006	8/4/2008	13:47:17	0:49:49	156.6872837	156.6860140	20.7966834	20.7851845
MAI08007	8/4/2008	19:07:50	1:26:20	156.6098707	156.6179396	20.7484769	20.7636669
MAI08008	8/4/2008	21:06:08	0:40:12	156.6300147	156.6364957	20.7682197	20.7733596
MAI08009	8/4/2008	23:17:40	0:28:32	156.6859619	156.6864636	20.7768086	20.7839312
MAI08010	8/5/2008	0:23:50	0:28:12	156.6601313	156.6673883	20.7830394	20.7875350
MAI08011	8/5/2008	1:54:06	0:58:59	156.6686120	156.6738295	20.7793126	20.7828031
MAI08012	8/5/2008	7:52:30	1:09:30	156.5921660	156.5885299	20.7534843	20.7384205
MAI08013	8/5/2008	11:37:48	0:18:02	156.6081343	156.6104669	20.7479858	20.7432008
MAI08014	8/5/2008	12:30:25	0:25:35	156.6344269	156.6356691	20.7574987	20.7510850
MAI08015	8/5/2008	13:49:15	0:44:02	156.6403988	156.6481016	20.7627395	20.7518663
MAI08016	8/5/2008	18:35:30	0:34:45	156.6485567	156.6534479	20.7596273	20.7648263
MAI08017	8/5/2008	19:43:50	0:38:48	156.6628560	156.6657722	20.7606207	20.7687148
MAI08018	8/5/2008	20:50:38	0:58:22	156.6702035	156.6806321	20.7551219	20.7647158
MAI08019	8/5/2008	22:51:51	0:21:39	156.6666876	156.6721556	20.7706345	20.7763884
MAI08020	8/5/2008	23:49:27	1:32:52	156.6734723	156.6876356	20.7736617	20.7871204
MAI08021	8/6/2008	2:17:10	0:35:05	156.6683458	156.6742697	20.7725781	20.7817427
MAI08022	8/6/2008	6:40:13	0:47:36	156.6397477	156.6551172	20.7516833	20.7500822

Tow ID	Start Date (UTC)	Time On Bottom (UTC)	Bottom Time	Min Lon	Max Lon	Min Lat	Max Lat
MAI08023	8/7/2008	0:42:40	0:56:35	156.7120828	156.7165316	20.8065674	20.8156223
MAI08024	8/7/2008	2:05:30	0:34:00	156.7031632	156.7081976	20.7907337	20.7946430
MAI08025	8/7/2008	6:41:30	0:37:00	156.6287166	156.6330761	20.7224474	20.7260820
MAI08026	8/7/2008	8:12:25	0:26:13	156.6652034	156.6689353	20.7442661	20.7448277
MAI08027	8/7/2008	9:16:38	0:33:22	156.6797331	156.6847713	20.7252603	20.7266425
MAI08028	8/7/2008	18:48:40	1:00:15	156.5722506	156.5780525	20.7120985	20.7236453
MAI08029	8/7/2008	21:11:21	0:10:46	156.7448248	156.7464357	20.7262636	20.7630384
MAI08030	8/7/2008	0:00:00	0:00:00	156.6545623	156.6546409	20.7397937	20.7448898

Table 3.--Positions in decimal degrees of recovered instruments and deployed instruments.

Recovered Instruments	Longitude	Latitude
ADCP Array “John”	156.67361667	20.77813333
ADCP Array “Frank”	156.67068333	20.77161667
Acoustic Receiver “Tele 1”	156.66898333	20.77315000
Acoustic Receiver “Tele 2”	156.68441667	20.80721667
Deployed Instruments		
Current meter “Dan”	156.6815300	20.809360
Current meter “Ray”	156.6497000	20.806000
Vemco mooring	156.6863333	20.798333

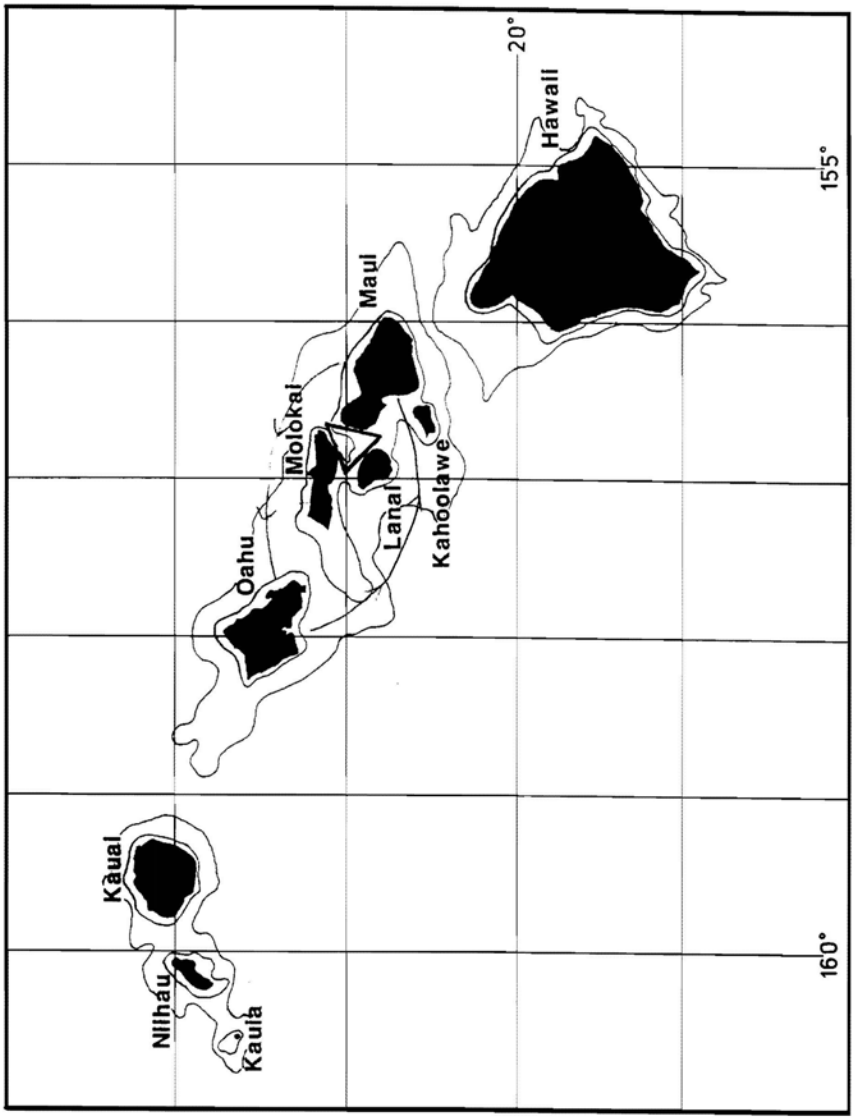

Figure 1.--Track of the NOAA Ship Hi'ialakai cruise HA-09-05, July 24 to August 2, 2009.

Figure 1.--Track of the NOAA Ship *Hi'ialakai* cruise HA-09-05, July 24-August 2, 2009.

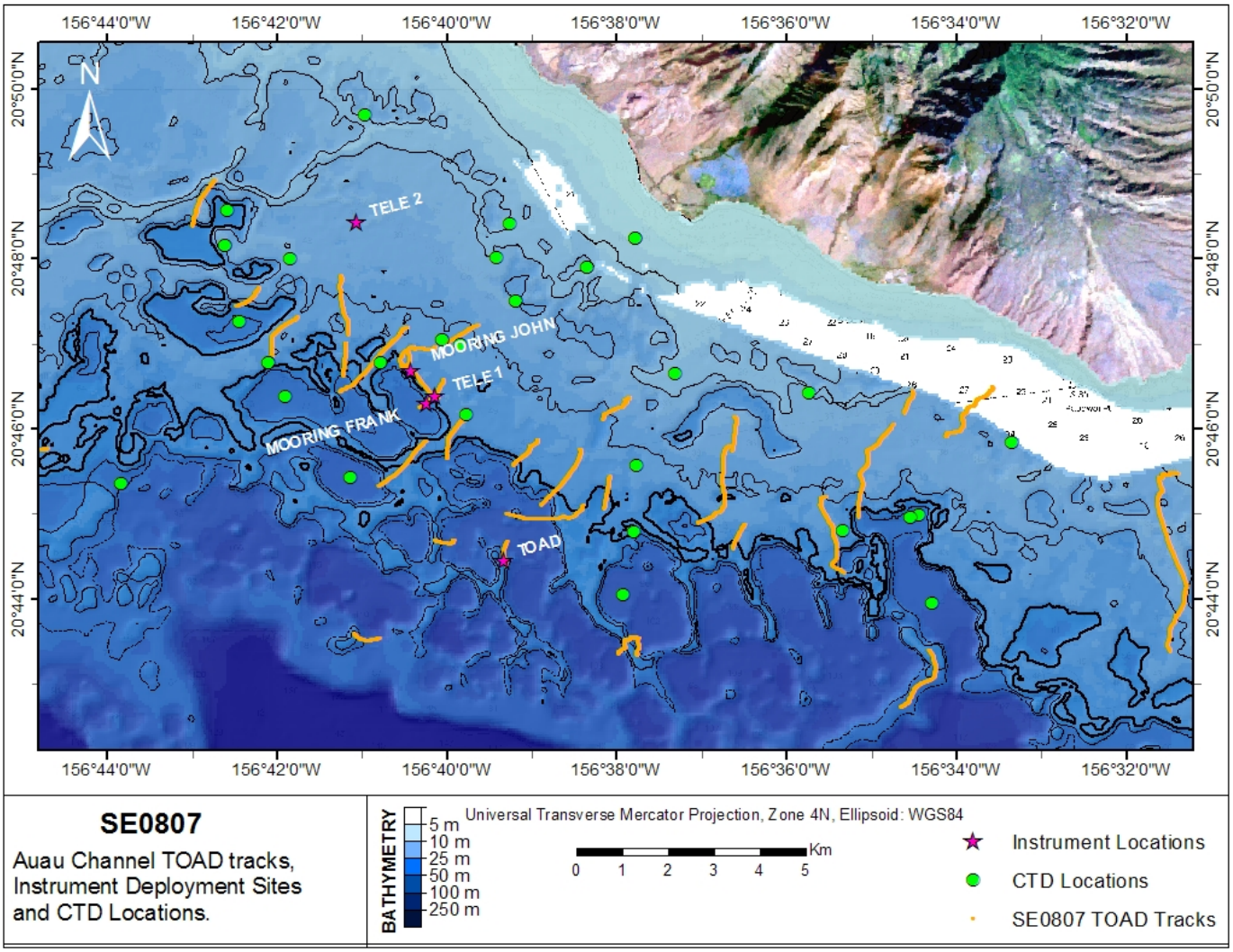

Figure 2.--Plot of the operations conducted on *Hi'ialakai* cruise HA-09-05 for the Maui portion of the cruise.