



**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE**

**Pacific Islands Fisheries Science Center
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CRUISE REPORT¹

VESSEL: NOAA Ship *Oscar Elton Sette*, Cruise SE-14-02

CRUISE PERIOD: April 5, 2014 to April 19, 2014

AREA OF OPERATION: Leeward Maui, Molokai, Lanai, and Kaho'olawe (Fig. 1).

TYPE OF OPERATIONS: Comparison of Fishery-independent Sampling Methods for main Hawaiian Islands Bottomfish

ITINERARY:

31 March -

04 April In-port mobilization of project.

31 March Northwest Fisheries Science Center (NWFSC) AUV Technicians Erica Fruh and Curt Whitmire embarked.

05 April 1200. Scientists Faith Knighton, Ben Richards, Erica Fruh, Curt Whitmire, Jeremy Taylor, Jeff Anderson, Bob Moffit, and Eric Mooney embarked.

1300. Start of project. Conducted (2) AUV gear trials using the boat-deck crane, test AUV communications and conducted an AUV general familiarization with scientists, deck crew and bridge officers in respective roles in sheltered conditions in Pearl Harbor (Fig. 2).

1630. Departed Pearl Harbor en route to Maui.

¹ PIFSC Cruise Report CR-14-002
Issued 16 November 2015

In conjunction with SE-14-02, PIFSC Mission Plan (MP-14-06) commenced. The R/V Huki Pono transited from Oahu to Maui for the BotCam part of this project with Operations Coordinator Jamie Barlow (PIFSC), Chris Demarke (UHM) and Stephen Matadobra (UH-MOP).

06-11 April Conduct coordinated BotCam surveys aboard the R/V *Huki Pono* (MP-14-06), Research Fishing aboard the R/V *Naomi K*, R/V *Imua* and R/V *RideOn* and AUV surveys aboard the NOAA Ship *Oscar Elton Sette* (Sette) in Maui, Molokai, Lanai, and Kaho'olawe coastal waters. Small boat transfers of Pacific Islands Fisheries Group (PIFG) Fisheries Observers and BotCam Technicians via SE-4 each morning and afternoon.

06 April AUV: 2 sampling grids/4 replicates
BotCam: 5 sampling grids/15 replicates
PIFG Research Fishing: 14 sampling grids

Evening CTD cast to test instrumentation and Survey Department training.

07 April AUV: 2 sampling grids/4 replicates
BotCam: 6 sampling grids/18 replicates
PIFG Research Fishing: 17 sampling grids

08 April AUV: 3 sampling grids/4 replicates
BotCam: 5 sampling grids/13 replicates
PIFG Research Fishing: 15 sampling grids

09 April AUV: 3 sampling grids/4 replicates
BotCam: 7 sampling grids/19 replicates
PIFG Research Fishing: 18 sampling grids

After completion of daily operations, Pacific Islands Fisheries Science Center (PIFSC) Science Advisor Ben Richards disembarked via small boat transfer on SE-4 to the R/V *Huki Pono* to Ma'alaea Harbor.

10 April Embarked NWFSC AUV Team Lead Elizabeth Clarke aboard the R/V *Huki Pono* at Ma'alaea Harbor, SE-4 small boat transfer to the Sette. Disembarked PIFG Fisheries Observer James Tanaka.

1200. AUV operations called-off. *Sette* transited to Kahului Harbor for potable freshwater. Research Fishing and BotCam operations remained on station off Lanai. Eric Mooney met ship at Kahului Harbor. Bob Moffit elected to stay aboard R/V *Imua* for the night.

1630. *Sette* arrived Kahului Harbor.

1930. *Sette* departed Kahului Harbor.

AUV: 1 sampling grid/2 replicates
BotCam: 8 sampling grids/16 replicates
PIFG Research Fishing: 17 sampling grids

11 April At the completion of ops, embarked PIFG Fisheries Observers Scott Eguchi.

AUV: 3 sampling grids/6 replicates
BotCam: 8 sampling grids/19 replicates
PIFG Research Fishing: 20 sampling grids

12 April Open House. Guests transferred by small boat (SE-4 and SE-2) to/from Lahaina Harbor to/from the *Sette*.

Embarked/disembarked Ben Richards for open-house participation.

PIFG and Maui Fishers (20 guests) cooperative research vessel captains, fisherman and their families came aboard the *Sette* to discuss research fishing, BotCam and AUV research.

Conducted AUV operations for open-house guests, completed 1 sampling grid/2 replicates.

After completion of daily operations PIFSC-JIMAR AUV Technician Jeremy Taylor embarked SE-4 at Lahaina Harbor to the *Sette*.

13-18 April Conducted and coordinated BotCam surveys aboard the R/V *Huki Pono* (MP-14-06), research fishing aboard the R/V *Naomi K*, R/V *Imua* and R/V *RideOn*, and AUV surveys aboard the *Sette* in Maui, Molokai, Lanai, and Kaho'olawe coastal waters. Small boat transfers of PIFG Fisheries Observers via SE-4 each morning and afternoon.

13 April AUV: 2 sampling grids/4 replicates
BotCam: 5 sampling grids/14 replicates
PIFG Research Fishing: 14 sampling grids

14 April AUV: 1 sampling grids/2 replicates
BotCam: 5 sampling grids/12 replicates
PIFG Research Fishing: 14 sampling grids

15 April AUV: 3 sampling grids/6 replicates
BotCam: 6 sampling grids/12 replicates
PIFG Research Fishing: 16 sampling grids

- 16 April Disembarked PIFG Fisheries Observer Scott Eguchi.
- AUV: 3 sampling grids/6 replicates
BotCam: 6 sampling grids/16 replicates
PIFG Research Fishing: 17 sampling grids
- 17 April Embarked PIFG Fisheries Observer Hunter Farr.
- AUV: 4 sampling grids/2 replicates
BotCam: 5 sampling grids/12 replicates
PIFG Research Fishing: 17 sampling grids
- 18 April Disembarked PIFG Fisheries Observer Hunter Farr.
- AUV: 3 sampling grids/6 replicates
BotCam: 9 sampling grids/19 replicates
PIFG Research Fishing: 18 sampling grids
- 19 April 0900. Arrived Pearl Harbor Fueling Pier.
1430. Disembarked Scientists Faith Knighton, Elizabeth Clarke, Erica Fruh, Curt Whitmire, Jeremy Taylor, Jeff Anderson, Bob Moffit, and Eric Mooney.
- R/V *Huki Pono* (MP-14-06) transited from Maui to Oahu.
- 19-22 April In-port demobilization of project.

MISSIONS AND

RESULTS: This research targeted sampling grid cells where density of Deep-7 bottomfish varies depending on habitat strata. Each sampling method (Research Fishing, BotCam and AUV) sub-sampled grid cells. Target areas were selected based on spatial surveys conducted during prior research projects and in-situ sampling. During SE-14-02 sampling followed a stratified-random sampling protocol, to begin testing an operational fishery-independent survey.

The scientific objectives of the project were to:

1. Research and develop methods to cross-compare or calibrate fishery-dependent (extractive) and fishery-independent (non-extractive) sampling methodologies for use in stock assessment.
2. Estimate size-structured abundance of Hawaii Deep-7 bottomfish using a variety of extractive and non-extractive methods including:
 - a. BotCam stationary stereo-video camera systems
 - b. SeaBED AUV
 - c. Research hook-and-line fishing

SE1402 was the pilot study for a full-scale, multi-gear fishery-independent survey for main Hawaiian Islands Bottomfish stocks. Hence, the survey methodology departed from prior surveys, which targeted areas of high bottomfish biomass, and employed a standardized, stratified random survey methodology across the local range of the stock.

All major scientific objectives were completed successfully. Target sampling levels were achieved for Research Fishing and BotCam (Table 1). Target sampling levels for all but the soft-bottom, mid-depth strata were achieved by the AUV. The lack of soft-bottom, mid-depth samples were due to a combination of weather conditions as well as equipment failure. The BotCam DVR used on-board the AUV suffered from intermittent write errors, during which time data was not recorded. This lack of reliability should be rectified as the MOUSS camera system comes on line and replaces the aging BotCam.

Ancillary objectives (ROV pilot training and EK60 calibration) were deemed a lower priority and were not completed.

Cumulative sampling totals include: 197 Research Fishing events; 74 sampling grids/183 replicates BotCam sampling events; and 3 gear trials, 18 sampling grids/36 replicates AUV sampling events (Tables 1-3, Fig. 3). A Research Fishing event represents 30 minutes of fishing time within a grid cell, which may be composed of multiple drift events. A BotCam event represents one to three 15-minute replicate deployments within each grid cell. An AUV event represents two replicate 500-meter transects within each grid cell.

**SCIENTIFIC
PERSONNEL:**

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Knighton, Faith	Chief Scientist	4/05/14	4/19/14	Female	PIFSC	USA
Richards, Benjamin	Science Advisor	4/05/14 4/12/14	4/09/14 4/12/14	Male	PIFSC	USA
Barlow, Jamie ²	Operations Coordinator/BotCam Technician	N/A	N/A	Male	PIFSC	USA
Clarke, Elizabeth	AUV Team Lead	4/10/14	4/10/14	Female	NWFSC	USA
Fruh, Erica	AUV Technician	4/05/14	4/05/14	Female	NWFSC	USA
Whitmire, Curt	AUV Technician	4/05/14	4/05/14	Male	NWFSC	USA
Taylor, Jeremy	AUV Technician	4/12/14	4/12/14	Male	JIMAR	USA
Anderson, Jeff	AUV Technician	4/05/14	4/05/14	Male	JIMAR	USA
Ebisui, Eddie ¹	PIFG Fisheries Observer	N/A	N/A	Male	PIFG	USA
Moffit, Robert B ¹	PIFG Fisheries Observer	4/05/14	4/05/14	Male	PIFG	USA
Eguchi, Scott ¹	PIFG Fisheries Observer	4/11/14	4/11/14	Male	PIFG	USA
Tanaka, James ¹	PIFG Fisheries Observer	4/06/14	4/06/14	Male	PIFG	USA
Farr, Hunter ¹	PIFG Fisheries Observer	4/17/14	4/17/14	Male	PIFG	USA
Demarke, Chris ²	BotCam Technician	N/A	N/A	Male	UHM	USA
Mooney, Eric	BotCam/ROV Technician	4/05/14	4/05/14	Male	PIFSC	USA
Matadobra, Stephen ²	BotCam Technician	N/A	N/A	Male	UH-MOP	USA

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2014.05.30 10:20:18 -11'00'

Submitted by: _____
LT Faith O. Knighton, NOAA
Chief Scientist


Approved by:  _____
Michael Seki
Science Director
Pacific Islands Fisheries Science Center

Table 1.--SE -14-02 sampling effort. The number of sampling events (n) by each gear type (PIFG Research Fishing, BotCam, and AUV) per each grid cell.

Grid cells defined by habitat strata: H_H_D hard bottom, high slope, deep (300-400 m); H_H_M hard bottom, high slope, mid-depth (200-300 m); H_H_S hard bottom, high slope, shallow (75-200 m); H_L_D hard bottom, low slope, deep (300-400 m); H_L_M hard bottom, low slope, mid-depth (200-300 m); H_L_S hard bottom, low slope, shallow (75-200 m); S_D soft bottom, deep (300-400 m); S_M soft bottom, mid-depth (200-300 m); S_S soft bottom, shallow (75-200 m).

A Research Fishing event represents 30 minutes of fishing time within a grid cell, which may be composed of multiple drift events. A BotCam event represents one to three 15-minute replicate deployments within each grid cell. An AUV event represents two replicates of 150-meter transects within each grid cell.

Cell ID	Strata	Vessel	PIFG_Sample date	PIFG_n	BotCam_Sample date	BotCam_n	AUV_Sample date	AUV_n
11474	S_M	Naomi K	4/6/14	1		0		0
11538	H_L_S	Naomi K	4/11/14	1	4/11/14	1		0
11540	H_L_S	Naomi K	4/11/14	1	4/11/14	1		0
11576	S_M	Naomi K	4/6/14	1		0		0
11634	H_L_M	Naomi K	4/11/14	1	4/11/14	1		0
11671	H_H_M	Naomi K	4/6/14	1		0		0
11733	H_H_M	Naomi K	4/11/14	1	4/11/14	1		0
11839	H_H_M	Ride-On	4/11/14	1		0		0
11875	S_M	Naomi K	4/6/14	1		0		0
12056	H_H_M	Ride-On	4/11/14	1		0		0
12065	H_H_S	Naomi K	4/18/14	1		0		0
12096	H_H_M	Naomi K	4/16/14	1		0		0
12097	H_H_M	Naomi K	4/16/14	1		0		0
12101	H_H_M	Naomi K	4/16/14	1		0		0
12170	H_L_M	Ride-On	4/11/14	1		0		0
12171	H_H_M	Ride-On	4/11/14	1	4/11/14	1		0
12172	H_H_D	Ride-On	4/11/14	1	4/11/14	1		0
12174	H_H_M	Ride-On	4/11/14	1	4/11/14	1		0
12175	H_H_M	Ride-On	4/11/14	1	4/11/14	1		0
12177	H_H_D	Ride-On	4/11/14	1		0		0
12296	H_H_M	Naomi K	4/11/14	1		0		0
12298	H_H_M	Ride-On	4/17/14	1		0		0
12299	H_H_M	Ride-On	4/11/14	1	4/18/14	1		0
12417	H_L_D	Naomi K	4/18/14	1		0		0
12424	H_L_M	Naomi K	4/17/14	1	4/17/14	1		0
12674	H_L_S	Naomi K	4/17/14	1	4/17/14	1	4/6/14	1
12674	H_L_S			0	4/18/14	0		0

12692	S_S	Ride-On	4/16/14	1		0		0
12773	S_D	Ride-On	4/18/14	1		0		0
12787	H_H_D	Imua	4/18/14	1		0		0
12803	H_L_S	Naomi K	4/17/14	1	4/17/14	0	4/6/14	1
12803	H_L_S			0	4/18/14	1		0
12811	H_L_S	Ride-On	4/6/14	1		0		0
12826	H_L_S	Ride-On	4/16/14	1	4/16/14	1		0
12827	H_L_S	Ride-On	4/16/14	1	4/16/14	1		0
12926	S_M	Naomi K	4/18/14	1		0		0
12942	S_S	Ride-On	4/6/14	1		0		0
12966	H_L_S	Naomi K	4/16/14	1	4/16/14	1		0
13064	S_M	Imua	4/18/14	1		0		0
13086	S_S	Ride-On	4/6/14	1	4/6/14	1	4/16/14	1
13097	H_L_S	Ride-On	4/16/14	1		0		0
13192	H_H_D	Ride-On	4/18/14	1		0		0
13196	H_H_M	Ride-On	4/17/14	1		0		0
13203	S_M	Imua	4/18/14	1		0		0
13310	S_D	Ride-On	4/18/14	1		0		0
13323	H_H_D	Ride-On	4/18/14	1		0		0
13331	S_D	Imua	4/18/14	1		0		0
13333	S_D	Imua	4/18/14	1		0		0
13358	H_L_S	Imua	4/17/14	1		0		0
13371	H_L_S	Imua	4/16/14	1	4/16/14	1		0
13447	H_H_M	Ride-On	4/17/14	1		0		0
13457	H_L_M	Naomi K	4/17/14	1		0		0
13474	H_L_M	Ride-On	4/6/14	1	4/6/14	1	4/16/14	1
13483	H_L_M	Ride-On	4/16/14	1		0		0
13495	H_L_S	Naomi K	4/16/14	1		0		0
13534	S_D	Ride-On	4/10/14	1		0		0
13565	H_L_M	Ride-On	4/17/14	1		0		0
13581	H_H_M	Naomi K	4/17/14	1		0		0
13597	H_H_S	Ride-On	4/6/14	1	4/6/14	1	4/16/14	1
13604	H_L_S	Imua	4/6/14	1	4/6/14	0		0
13604	H_L_S			0	4/17/14	1		0
13606	H_L_M	Ride-On	4/16/14	1		0		0
13726	H_H_M	Imua	4/6/14	1	4/6/14	1		0
13731	H_L_M	Ride-On	4/6/14	1		0		0
13816	H_L_D	Ride-On	4/18/14	1		0		0
13843	H_L_M	Naomi K	4/17/14	1	4/18/14	1	4/18/14	1
13861	H_L_S	Imua	4/16/14	1		0		0
13951	H_L_M	Naomi K	4/18/14	1		0		0
13963	H_L_M	Naomi K	4/17/14	1	4/18/14	1	4/18/14	1

14081	H_L_M	Imua	4/6/14	1	4/17/14	1	4/18/14	1
14200	H_L_M	Ride-On	4/17/14	1	4/18/14	1	4/18/14	1
14216	S_S	Imua	4/16/14	1	4/16/14	1		0
14259	S_D	Ride-On	4/10/14	1		0		0
14268	H_L_M	Ride-On	4/10/14	1		0		0
14293	H_H_M	Naomi K	4/9/14	1		0		0
14324	H_L_M	Imua	4/6/14	1	4/18/14	1	4/17/14	0
14325	H_H_M	Naomi K	4/18/14	1	4/18/14	1	4/17/14	0
14336	H_L_S	Imua	4/16/14	1		0		0
14394	H_H_M	Naomi K	4/10/14	1	4/10/14	1		0
14425	H_L_D	Ride-On	4/18/14	1		0		0
14465	S_S	Naomi K	4/16/14	1	4/16/14	1		0
14505	H_L_D	Imua	4/10/14	1	4/10/14	1		0
14522	H_H_M	Naomi K	4/10/14	1		0		0
14554	H_H_M	Ride-On	4/7/14	1		0		0
14562	H_L_M	Ride-On	4/17/14	1		0		0
14573	S_M	Naomi K	4/18/14	1	4/17/14	1	4/17/14	0
14574	H_H_M			0	4/18/14	1	4/17/14	0
14624	H_L_D	Imua	4/10/14	1		0		0
14641	H_L_M	Ride-On	4/10/14	1		0		0
14648	H_L_M	Naomi K	4/10/14	1	4/10/14	1		0
14661	S_M	Imua	4/11/14	1		0		0
14685	H_H_M	Ride-On	4/7/14	1		0		0
14699	S_M	Ride-On	4/18/14	1	4/17/14	1		0
14717	H_L_S	Imua	4/16/14	1		0		0
14752	H_L_D	Imua	4/10/14	1		0		0
14754	H_L_M	Imua	4/11/14	1		0		0
14766	H_L_M	Imua	4/10/14	1	4/10/14	1		0
14772	H_L_M	Ride-On	4/10/14	1		0		0
14778	H_L_M	Ride-On	4/10/14	1		0	4/11/14	0
14802	H_L_M	Naomi K	4/7/14	1		0		0
14836	H_L_S	Imua	4/17/14	1		0		0
14901	H_L_M	Ride-On	4/10/14	1		0		0
14908	H_L_M	Naomi K	4/10/14	1	4/10/14	1	4/11/14	0
14922	H_H_M	Naomi K	4/9/14	1		0		0
14924	H_L_M	Naomi K	4/9/14	1		0		0
14925	H_L_M	Naomi K	4/9/14	1		0		0
14931	H_H_M	Naomi K	4/7/14	1	4/9/14	1		0
14969	H_L_S	Imua	4/17/14	1		0		0
15016	H_L_S	Imua	4/10/14	1		0		0
15036	H_L_M	Naomi K	4/10/14	1	4/10/14	1	4/11/14	0
15059	H_H_S	Naomi K	4/9/14	1	4/9/14	1		0

15075	H_H_S	Ride-On	4/7/14	1		0	0
15094	H_H_S	Imua	4/17/14	1		0	0
15195	H_L_M	Naomi K	4/7/14	1		0	0
15197	H_L_M	Ride-On	4/9/14	1		0	0
15205	H_L_S	Ride-On	4/7/14	1		0	0
15305	H_L_M	Naomi K	4/14/14	1		0	0
15309	H_L_M	Naomi K	4/14/14	1		0	0
15324	S_M	Naomi K	4/7/14	1		0	0
15326	H_H_M	Ride-On	4/9/14	1		0	0
15327	H_H_M	Ride-On	4/9/14	1		0	0
15436	H_L_M	Ride-On	4/14/14	1		0	0
15443	H_L_S	Ride-On	4/14/14	1		0	0
15453	S_M	Naomi K	4/9/14	1	4/9/14	1	0
15456	H_H_M	Naomi K	4/7/14	1		0	0
15569	H_L_S	Ride-On	4/14/14	1		0	0
15575	H_L_S	Ride-On	4/14/14	1		0	0
15585	H_L_M	Naomi K	4/9/14	1	4/9/14	1	0
15693	H_L_S	Imua	4/11/14	1	4/10/14	1	0
15696	H_L_M	Imua	4/11/14	1	4/14/14	1	0
15697	H_H_M	Imua	4/11/14	1	4/14/14	1	4/10/14
15723	H_H_S	Imua	4/7/14	1		0	0
15730	H_H_S	Ride-On	4/7/14	1	4/7/14	1	0
15825	H_L_S	Imua	4/11/14	1	4/14/14	1	0
15834	H_L_S	Naomi K	4/14/14	1		0	0
15838	H_L_S	Naomi K	4/15/14	1		0	0
15840	H_H_S	Naomi K	4/13/14	1		0	0
15849	H_H_M	Ride-On	4/9/14	1		0	0
15856	H_H_S	Imua	4/7/14	1	4/7/14	1	0
15860	H_H_S	Ride-On	4/7/14	1	4/7/14	1	0
15861	H_L_S	Imua	4/8/14	1		0	0
15962	H_L_S	Naomi K	4/14/14	1		0	0
15968	H_H_S	Naomi K	4/13/14	1		0	0
16081	H_L_S	Ride-On	4/15/14	1		0	0
16083	H_L_S	Naomi K	4/15/14	1		0	0
16097	H_H_S	Naomi K	4/8/14	1		0	0
16193	H_L_S	Ride-On	4/15/14	1		0	0
16197	H_L_S	Naomi K	4/13/14	1		0	0
16200	H_H_S	Ride-On	4/9/14	1		0	0
16305	H_H_S	Ride-On	4/9/14	1		0	0
16306	H_L_S	Imua	4/9/14	1		0	0
16314	H_H_S	Naomi K	4/8/14	1		0	0
16322	H_L_S	Imua	4/7/14	1		0	0

16391	H_L_S	Imua	4/15/14	1		0		0
16393	H_L_S	Imua	4/15/14	1		0		0
16407	H_L_S	Naomi K	4/15/14	1		0		0
16410	H_H_S	Imua	4/9/14	1		0		0
16415	H_H_S	Imua	4/9/14	1	4/9/14	1	4/8/14	1
16418	H_H_S	Ride-On	4/8/14	1		0		0
16419	H_H_S	Ride-On	4/8/14	1		0		0
16506	H_L_S	Ride-On	4/13/14	1	4/13/14	1		0
16514	H_L_S	Imua	4/15/14	1		0		0
16518	H_H_S	Imua	4/9/14	1	4/9/14	1	4/8/14	1
16525	H_H_S	Imua	4/8/14	1		0		0
16527	H_H_S	Naomi K	4/8/14	1		0		0
16612	H_H_S	Imua	4/15/14	1		0		0
16618	H_H_S	Imua	4/9/14	1	4/9/14	1	4/8/14	1
16629	H_L_S	Imua	4/7/14	1	4/7/14	1	4/9/14	1
16707	H_L_S	Imua	4/13/14	1		0		0
16709	H_L_S	Naomi K	4/15/14	1		0		0
16716	H_H_S	Imua	4/15/14	1		0		0
16719	H_H_S	Ride-On	4/8/14	1	4/8/14	1		0
16722	H_L_S	Naomi K	4/8/14	1		0		0
16726	H_L_S	Imua	4/8/14	1		0		0
16798	H_L_S	Ride-On	4/13/14	1		0		0
16805	H_L_S	Imua	4/14/14	1		0		0
16819	H_L_S	Ride-On	4/8/14	1	4/8/14	1		0
16822	H_L_S	Naomi K	4/8/14	1		0		0
16824	H_L_S	Naomi K	4/8/14	1	4/8/14	1	4/7/14	1
16907	H_L_S	Imua	4/14/14	1		0		0
16915	H_L_S	Ride-On	4/13/14	1	4/13/14	1		0
16920	H_H_S	Naomi K	4/7/14	1	4/7/14	1	4/9/14	1
16920	H_H_S	Ride-On	4/15/14	1		0		0
16925	S_S	Ride-On	4/8/14	1	4/8/14	1	4/7/14	1
17002	H_H_S	Ride-On	4/13/14	1	4/15/14	1		0
17007	H_L_S	Imua	4/13/14	1	4/14/14	1	4/15/14	1
17011	H_L_S	Naomi K	4/15/14	1	4/15/14	1		0
17014	H_H_S	Ride-On	4/15/14	1	4/15/14	1		0
17016	H_L_S	Naomi K	4/7/14	1	4/7/14	1	4/9/14	1
17092	H_L_S	Ride-On	4/13/14	1		0		0
17096	H_L_S	Ride-On	4/13/14	1	4/15/14	1		0
17102	H_L_S	Ride-On	4/14/14	1		0	4/15/14	1
17106	H_H_S	Imua	4/14/14	1		0		0
17106	H_H_S	Naomi K	4/15/14	1		0		0
17117	H_L_S	Imua	4/8/14	1	4/15/14	1		0

17204	H_L_S	Ride-On	4/15/14	1	4/8/14	1		0
17285	H_L_S	Ride-On	4/13/14	1	4/13/14	1	4/15/14	1
17444	H_H_S	Naomi K	4/13/14	1	4/13/14	1		0
17515	H_H_S	Naomi K	4/13/14	1	4/13/14	1		0
17725	H_L_S	Imua	4/14/14	1	4/14/14	1		0
17871	H_L_S	Imua	4/14/14	1	4/15/14	1	4/14/14	1

Table 2. Tally of sampling effort, based on target number (n), % of total sampling and % remaining that were not sampled per each gear method (PIFG Research Fishing, BotCam and AUV).

PIFG						
Strata	Samples	target n	remaining	% of total	Target %	% of Target %
<i>Total</i>	197	216	19			
H_H_D	5	5	0	3%	2%	110%
H_H_M	30	29	-1	15%	13%	113%
H_H_S	34	44	10	17%	20%	85%
H_L_D	6	7	1	3%	3%	94%
H_L_M	36	46	10	18%	21%	86%
H_L_S	63	62	-1	32%	29%	111%
S_D	6	5	-1	3%	2%	132%
S_M	11	10	-1	6%	5%	121%
S_S	6	8	2	3%	4%	82%

BotCam						
Strata	Samples	target n	remaining	% of total	Target %	% of Target %
<i>Total</i>	73	72	-1			
H_H_D	1	0	-1	1%	0%	-
H_H_M	11	10	-1	15%	14%	108%
H_H_S	14	15	1	19%	21%	92%
H_L_D	1	0	-1	1%	0%	-
H_L_M	14	16	2	19%	22%	86%
H_L_S	25	21	-4	34%	29%	117%
S_D	0	0	0	0%	0%	-
S_M	3	5	2	4%	7%	59%
S_S	4	5	1	5%	7%	79%

AUV						
Strata	Samples	target n	remaining	% of total	Target %	% of Target %
Total	22	30	8			
H_H_D	0	0	0	0%	0%	-
H_H_M	1	4	3	5%	14%	33%
H_H_S	5	6	1	23%	21%	109%
H_L_D	0	0	0	0%	0%	-
H_L_M	5	7	2	23%	22%	102%
H_L_S	9	9	0	41%	29%	140%
S_D	0	0	0	0%	0%	-
S_M	0	2	2	0%	7%	0%
S_S	2	2	0	9%	7%	131%

Figures

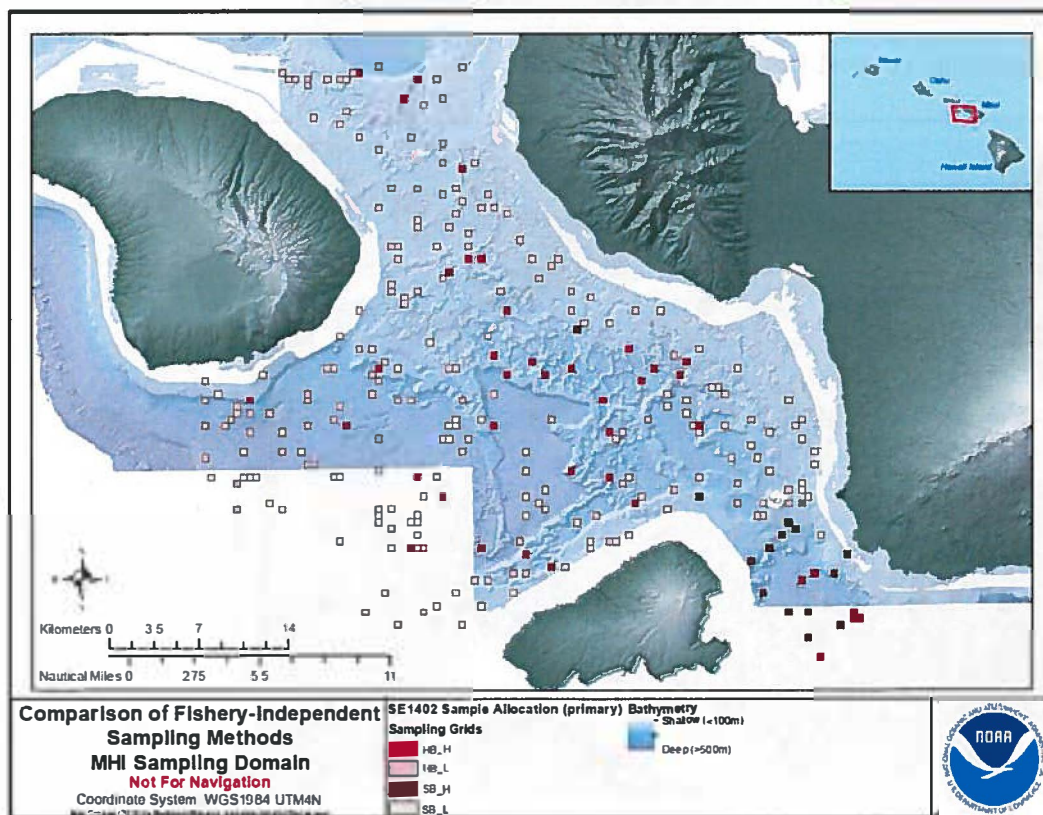


Figure 1. SE-14-02 Sample allocation map. Sampling grids followed a stratified-random protocol, based on bathymetric data, strata and slope.



Figure 2. AUV gear trials in Pearl Harbor, 05-April.

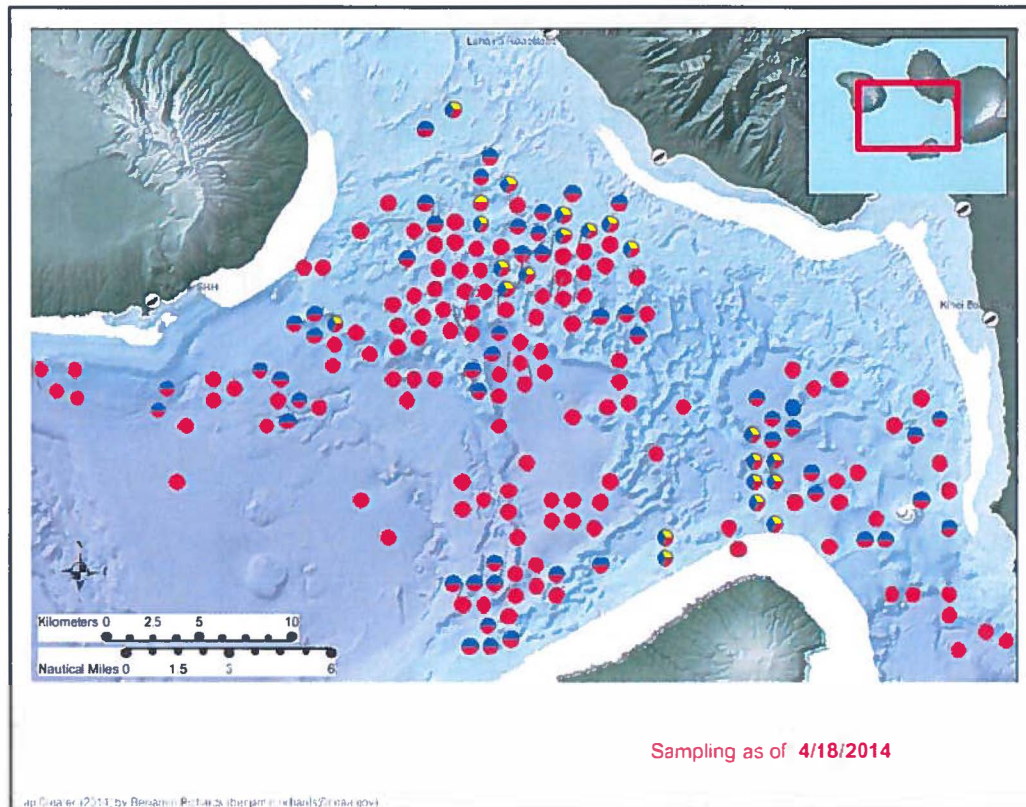


Figure 3. SE-14-02 sampling effort completed.
 AUV: 3 gear trials; 18 sampling grids/ 36 replicates (yellow dots)
 BotCam: 74 sampling grids/ 183 replicates (blue dots)
 PIFG Research Fishing: 197 sampling grids (red dots)