U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Fisheries Science Center
1845 Wasp Blvd. Bldg. 176 □ Honolulu, Hawaii 96818-5007
(808) 725-5300

PROJECT REPORT[1]

VESSEL: *Oscar Elton Sette*, Project SE-16-01

PROJECT PERIOD: February 22 – April 13, 2016

AREA OF OPERATION: The operating area within the Samoa Archipelago included Rose Atoll, South Bank, East Bank, 2% Bank, and Tutuila, American Samoa and Upolu, Manono Island, and Savai'i, Independent Samoa (Figure 1).

TYPE OF OPERATION: The NOAA Ship *Oscar Elton Sette* (OES) was engaged as support for the NOAA Pacific Island Fisheries Science Center, Fisheries Research and Monitoring Division, Life History Program. Operations included deep-water bottomfishing and nightlight hook-and-line fishing from the OES, deep-water bottomfishing, spearfishing, coral bleaching surveys and sea grass surveys from small boats launched daily from the ship, midwater sampling using the ship Cobb trawl and IK trawl, and collection of oceanographic data using the ship CTD.

[1] PIFSC Project Report CR-16-001
Issued 30 June 2016.

ITINERARY:

22 Feb	Embarked ship crew departure from Pearl Harbor, commenced transit to Pago Pago Harbor, American Samoa.
23 Feb - 01 March	Transited from Pearl Harbor to Pago Pago, no scientific operations.
02 March	Arrived in Pago Pago, American Samoa.
03 March	Inported.
4 March	Embarked scientific party (Barlow, Delana, Ebisui, Giuseffi, Humphreys, Marsik, Pardee, O'Malley, Oram, Taylor, Wakefield) aboard in the morning. 0800 Breakfast and ship tour of American Samoa Office of Samoan Affairs VIPs. 1045 Departure from Pago Pago Harbor, began transit to NW side of Tutuila. Conducted drills during transit. 1500 Bottomfishing operations from OES. 1930 CTD test to 1000 m. 2140 IK trawl (1 hr).
5 March	Continued day and night operations on NW side of Tutuila. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small boats SE4 for near shore coral reef fish sampling and SE6 for deep-water bottomfish sampling. 1000 OES bottomfishing operations. 1045 Hydraulic issues forces end of OES bottomfishing operations for the day. 1540 SE4 recovered. 1620 SE6 recovered. 1803 IK trawl (1 hr). 2030-2400 Nightlight hook-and-line fishing targeting akule outside A'oloau Bay. Late evening transited to next fishing site off Tutuila.
6 March	Continued day and night operations on NW side of Tutuila. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small boats SE4 for near shore coral reef fish sampling and SE6 for deep-water bottomfish sampling. 1000 OES bottomfishing operations until 1545. 1600 SE4 recovered. 1620 SE6 recovered. 1803 IK trawl (1 hr). 2030-2400 Nightlight hook-and-line fishing targeting akule outside Fagatele Bay. Late evening transited to next fishing site off Tutuila.
7 March	Continued day and night operations on NW side of Tutuila. 0730 v Small-boat safety meeting. 0800 Launched small-boats SE4 for near shore coral reef fish sampling and SE6 for deep-water bottomfish sampling. 1000 OES commences bottomfishing operations until 1545. 1600 SE4 recovered. 1620 SE6 recovered.

1803 IK trawl (1 hr). 2030-2400 Nightlight hook-and-line fishing targeting akule outside Fagatele Bay. Late evening transited to next fishing site off Tutuila.

8 March — Continued day and night operations on NE side of Tutuila. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 for near shore coral reef fish sampling and SE6 for deep-water bottomfish sampling. 1000 OES bottomfishing operations until 1545. 1600 SE4 recovered. 1620 SE6 recovered. 1803 IK trawl (1 hr). 2030-2400 Nightlight hook-and-line fishing targeting akule outside Aoa Bay. Late evening transited to next fishing site off Tutuila.

9 March — Continued day and night operations on SW side of Tutuila. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 for near shore coral reef fish sampling and SE6 for deep-water bottomfish sampling. 1000 OES bottomfishing operations. 1100 OES ceased bottomfishing operations. 1105 IK trawl (1 hr). 1230 OES bottomfishing operations until 1400. 1430 SE4 recovered. 1620 SE6 recovered. 1630 OES bottomfishing operations until 1900 (fishing line caught around OES propeller). 2000-2330 Nightlight hook-and-line fishing targeting akule outside Leone Bay. Late evening transited to next fishing site off Tutuila.

10 March — Continued day and night operations at Tutuila. 0730 Small-boat safety meeting. 0800 launched small-boats SE6 with 2 divers to extract fishing line from propeller. Minimal line was found in propeller however divers noticed leaking shaft cooling plug that they repaired. 0920 Exchanged scientists with deck department on SE6 prior to deep-water bottomfish sampling, OES transited to area for near shore operations. 1000 Launched small-boat SE4 for nearshore coral reef fish sampling. 1000 OES commenced bottomfishing operations. 1040 OES bottomfishing operations until 1600. 1612 SE4 recovered. 1640 SE6 recovered. 1900 Transited to Tutuila lee to check for leaking coolant; none noticed. 1930 IK trawl (1 hr). 2130-2400 Nightlight hook-and-line fishing targeting akule outside Leone Bay. Late evening transited to next fishing site off Tutuila.

11 March — Continued day and night operations at Tutuila. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 for near shore coral reef fish sampling and SE6 for deep-water bottomfish sampling. 0830 During gurney fishing setup on OES a hydraulic leak was discovered and fixed by engineering. 1000 OES bottomfishing operations until 1300 when weekly drills conducted. 1500 OES bottomfishing operations until 1550. 1550 SE4 recovered. 1620 SE6 recovered.

1930 IK trawl (1 hr). 2140-2400 Nightlight hook-and-line fishing targeting akule outside Fagatele Bay. Late evening transited to Pago Pago Harbor.

12 March — No scientific operations. 0800 Small-boat safety meeting. 0820 Launched SE6 and SE4 to shuttle donated fish and personal to Pago Pago Harbor. 0840 Delivered 4 coolers of fish to Hope House Charity in American Samoa. 0845 Small-boat refueled via fuel drums. 1400 SE4 and SE6 recovered, embarked Nichols and Delana. OES transited to South Bank, American Samoa. 1700 OES arrived at South Bank. 1800 Tested CTD successfully.

13 March — Began scientific operations at American Samoa offshore banks. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 launched small-boats SE4 and SE6 for deep-water bottomfish sampling. 0900 OES bottomfishing operations until 1530. 1150 SE4 and SE6 dropped off fish at OES. 1540 SE4 recovered. 1620 SE6 recovered. 1800 CTD casted to 1000 m. 1930 Cobb trawl deployed but port winch trawl wired-out sensor malfunctions. Cobb trawl aborted. 2030 IK trawl (1 hr). Incident during IK trawl deployment resulted in irreparable damage to 0.5-mm mesh IK trawl net.

14-15 March — Continued day and night operations at South Bank. Ship ET repaired winch wire-out sensor. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 and SE6 for deep-water bottomfish sampling. 0900 OES bottomfishing operations until 1530. 1115 SE4 and SE6 dropped off fish at OES. 1540 SE4 recovered. 1620 SE6 recovered. 1800 CTD casted to 1000 m. 2000 Cobb trawl (3 hrs).

16 March — Continued day and night operations at South Bank. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 and SE6 for deep-water bottomfish sampling. 0900 OES bottomfishing operations until 1530. 1115 SE4 and SE6 dropped off fish at OES. 1540 SE4 recovered. 1620 SE6 recovered. 1800 CTD casted to 1000 m. 2000 IK trawl instead of Cobb trawl due to too many deck department overtime hours. Late evening transited to next fishing site off Tutuila.

17 March — OES arrival at 2% Bank. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 and SE6 for deep-water bottomfish sampling. 0900 OES bottomfishing operations until 1150. 1220 SE6 recovered. 1550 SE4 recovered. 1730 CTD casted to 1000 m. 1900 Cobb trawl (3 hrs).

Note: 2% Bank was selected for bottomfish operations because SE12-01 reported working at that bank. During the day's operations, it was discovered that the OES was at a different banks than the one listed by SE12-01 as 2% Bank. Investigation revealed SE12-01 incorrectly listed 2% Bank rather than East Bank as the area of operations in the SE12-01 project report. Ship transited overnight to East Bank.

18 March — OES arrival at East Bank. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 and SE6 for deep-water bottomfish sampling. 0900 OES bottomfishing operations until 1530. 1610 SE4 recovered. 1640 SE6 recovered. 1730 CTD casted to 1000 m. 1900 Cobb trawl deployed but hydraulic control box malfunctions. Cobb trawl aborted. 2000 Replaced damaged IK trawl net then conducted IK trawl operations (3 hrs).

19 March — Continued day and night operations at East Bank. Engineering Department fixed faulty hydraulic control box. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 and SE6 for deep-water bottomfish sampling. 0900 OES bottomfishing operations until 1530. 1610 SE4 recovered. 1630 SE6 recovered. 1730 CTD casted to 1000 m. 1900 Cobb trawl (3 hrs.). Due to poor bottomfishing the OES transited overnight to South Bank.

20 March — OES arrival at South Bank. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 and SE6 for deep-water bottomfish sampling. 0900 OES bottomfishing operations until 1555. 1600 SE4 recovered. 1630 SE6 recovered. OES transited to Rose Atoll.

21 March — OES arrived at Rose Atoll. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 and SE6 for deep-water bottomfish sampling and SE2 for coral reef fish sampling. 0900 OES bottomfishing operations until 1530. 1550 SE2 recovered. 1610 SE4 recovered. 1630 SE6 recovered. 1730 CTD casted to 1000 m. 1900 Cobb trawl (3 hrs.).

22 March — Continued day and night operations at Rose Atoll. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small-boats SE4 and SE6 for deep-water bottomfish sampling and SE2 for coral reef fish sampling. 0900 OES bottomfishing operations until 1530. 1550 SE2 recovered. 1610 SE4 recovered. 1630 SE6 recovered. 1730 CTD casted to 1000 m. 1900 Cobb trawl (3 hrs.).

23 March	Continued day operations at Rose Atoll. 0500 OES bathymetry survey for bottomfishing sites. 0730 Small-boat safety meeting. 0800 Launched small boat SE6 for deep-water bottomfish sampling and SE4 and SE2 for coral reef fish sampling. 0900 OES bottomfishing operations until 1530. 11247 SE2 recovered. 1518 SE4 recovered. 1530 SE6 recovered. Transited to Pago Pago Harbor.
24 March.	0900 Arrived at Pago Pago Harbor. Disembarked Marisk, Nichols, Peck, Oram. Offload donated fish to Hope House Charity. 1500 Departed Pago Pago Harbor, began transit to Apia, American Samoa.
25 March	0930 Arrived at Apia Harbor on 25 March. 1000 met with MAF and MNRE (26 March WST) researchers to develop research schedule.
26 March – 29 March	In-port in Apia. (27 March – 30 March WST)
30 March	All scientific party aboard, embarked new scientists Allain, Bell, Falemai, (31 March WST) Kapur, Iene, Sapatu, disembark Wakefield. 0800 OES departed Apia Harbor and searched for offshore FAD Apia. 1200 weekly drills. 1300 OES bottomfishing operations until 1630. 1730 CTD casted to 1000 m. 1900 Cobb trawl (3 hrs.). OES overnight transited to NW Savai'i.
31 Mar	Day and night operations at Savai'i. 0730 Small-boat safety meeting. 0800 (1 April WST) launched small-boat SE6 for deep-water bottomfish sampling, SE4 for nearshore FAD Vaisala (missing) and Asau (present) work (locate, trolling, bottomfishing) and SE2 for coral reef fish sampling. 0900 OES bottomfishing operations until 1515. 1530 SE2 recovered. 1615 SE4 recovered. 1630 SE6 recovered. 1730 CTD casted to 1000 m. 1900 Cobb trawl (3 hrs.) OES overnight transited to SW Savai'i.
1 April	Continued day and night operations at Savai'i. 0730 Small-boat safety meeting. (2 April WST) 0800 launched small-boats SE6 for deep-water bottomfish sampling, SE4 for offshore FAD Sailailuaa work (locate, trolling, bottomfishing) and SE2 for coral reef fish sampling. 0900 OES bottomfishing operations until 1515. 1530 SE2 recovered. 1615 SE4 recovered. 1630 SE6 recovered. 1730 CTD cast to 1000 m. 1900 Cobb trawl deployed but starboard trawl winch wire-out sensor malfunctioned. Cobb trawl aborted. 2030 IK trawl (3 hrs). OES overnight transited to SE Savai'i.

2 April 0730 Small-boat safety meeting. Ship ET repairs winch wire-out sensor. 0800 (3 April WST) SE4 launched for crew transfer at Faleolo, Independent Samoa. Disembarked Falemai and Sapatu, embarked Kwan and Tagaloa. 0900 Recovered SE4, OES transited to SE Savai'i. 1000 Small-boat safety meeting. 0800 launched small-boats SE6 for deep-water bottomfish sampling, SE4 for offshore FAD Gataivai work (locate, trolling, bottomfishing) and SE2 for coral reef fish sampling. 0900 OES bottomfishing operations until 1550. 1230 SE2 developed engine trouble and recovered by OES. 1245 SE4 forced to halt operations and recovered by OES due to deck department overtime hour issue. 1615 SE4 recovered. 1630 SE6 recovered. 1730 CTD casted to 1000 m. 1900 Cobb trawl (3 hrs.) OES overnight transited to NE Savai'i.

3 April Continued day and night operations at Savai'i. 0730 Small-boat safety meeting. (4 April WST) 0800 launched small-boats SE6 for deep-water bottomfish sampling, SE4 for nearshore FAD Faga new (cut) and FAD Faga old (missing) work (locate, trolling, bottomfishing). 0900 OES bottomfishing operations until 1515. 1530 SE4 recovered. 1630 SE6 recovered. 1730 CTD casted to 1000 m. 1930 Cobb trawl deployed (3 hrs).

4 April Continued day and night operations at Savai'i. 0730 Small-boat safety meeting. (5 April WST) 0800 launched small-boats SE6 for deep-water bottomfish sampling, SE4 for coral bleaching study at Puapua. 0900 OES bottomfishing operations until 1515. 1530 SE4 recovered. 1630 SE6 recovered. 1500 OES searched for FAD Leulumoega (missing). 1730 CTD casted to 1000 m. 1930 Cobb trawl deployed (3 hrs). During Cobb trawl set it was noticed that the port winch breakpads were worn thin. It was determined that the brake pad was too worn for future deep-water (> 150 m) Cobb trawl sets.

5 April Continued day and night operations at Savai'i. 0730 Small-boat safety meeting. (6 April WST) 0800 launched small-boats SE6 for deep-water bottomfish sampling, SE4 for coral bleaching study at Fatuvalu. 0900 OES bottomfishing operations until 1515. 1530 SE4 recovered. 1630 SE6 recovered. 1500 OES search for FAD Sale'aula (missing). 1730 CTD casted to 1000 m. 1930 Cobb trawl deployed (3 hrs).

6 April (7 April WST) 0730 Small-boat safety meeting. 0800 SE4 launched for crew transfer at Faleolo, Independent Samoa. Disembarked Kwan, embarked Harding, Malolo and Satoa. 0900 SE4 delivered Harding and Malolo to OES then conducted sea grass survey around Manono Island. OES transited to E Opolu. 1000 Launched SE6 for deep-water bottomfish sampling and SE2 for coral reef fish sampling. 1100 OES shallow-water bottomfishing until 1300. 1315 IK trawl (1 hr). 1500 SE2

recovered. 1600 SE4 recovered. 1630 SE6 recovered. 1730 CTD casted to 1000 m. 1930 Cobb trawl deployed (3 hrs).

7 April (8 April WST) Continued day and night operations at Upolu. 0730 Small-boat safety meeting. Decided weather was too rough for small-boat bottomfishing operations at that time. 0820 Launched small boat SE4 for nearshore FAD Matautu (missing) and FAD Samatau (missing) work (locate, trolling, bottomfishing). 0900 OES bottomfishing operations until 1515. 1100 Launched SE6 for deep-water bottomfishing sampling. 1540 SE4 recovered. 1600 SE6 recovered. 1730 CTD casted to 1000 m. 1930 Cobb trawl deployed (3 hrs).

8 April (9 April WST) Continued day and night operations at Upolu. 0600 OES searched for private FADs off Apia (none). 0730 Small-boat safety meeting. 0800 Launched small-boats SE6 for deep-water bottomfish sampling, SE4 for coral reef fish sampling and SE2 for coral bleaching study at Faleula. 0900 OES bottomfishing operations until 1315. 1330 SE2 recovered. 1400 SE4 recovered. 1415 SE6 recovered, OES transited to Apia Harbor. 1730 Secured at Apia Harbor. End of scientific operations.

9 April (10 April WST) In-port in Apia.

10 April (11 April WST) 0900 – 1600 Ship tours.

11 April (12 April WST) 0900 Offloaded fish for donation to local Independent Samoa charities. 1000 Post-cruise meetings at MAF and MNRE and ceremony for fish donations.

12 April (13 April WST) In-port in Apia.

13 April 1500 Departed Apia Harbor, transited to Pago Pago, American Samoa.

14 April (15 April) 0700 Small-boat safety meeting. 0730 Launched SE8, SE6, SE4 to transfer Humphreys, O'Malley, Pardee, and Taylor to Pago Pago.

MISSIONS AND RESULTS:

A. Conduct daylight bottomfish bio-sampling survey in the 50–400 m depth zone around the islands and at offshore seamounts to collect adult specimens of bottomfish species.

Bottomfish specimens will be processed to extract and preserve otoliths, gonads, and tissue samples for future life history studies. Sampling will take place from the *Sette* and at least one NOAA small boat.

1. Bottomfishing operations took place from SE6 (Steeltoe) – 26.5 fishing days, SE4 (Northwind) – 19 fishing days , and the OES – 28 fishing days. The small boats typically fished with one electric reel each and the OES usually fished 2 hydraulic gurneys each day. The OES generally concentrated fishing effort on the 180 – 274 m contour and SE6 and SE4 fished deeper (275 – 500 m) and steeper habitat.

2. Bottomfish fishing locations – Figures 2–6.

3. Biological samples (otoliths, gonads, and tissues) were extracted from 1137 fish. The number of fish sampled by species and location are in Table 1.

B. Conduct daylight snorkel spearfish sampling of select coral reef fish species (including *Chlorurus spilurus*) from a NOAA small boat in the shallow water at islands and atolls.

1. Spearfishing for *C. spilurus* was very successful with the number specified in the permits being obtained (Table 2). Otoliths and gonads where collected for laboratory analysis at the PIFSC.

2. The American Samoa Department of Marine and Wildlife Resources (DMWR) requested 50 fin clips each from *Myripristis berndti*, *Acanthurus lineatus* and *Scarus oviceps* at Rose Atoll and Samoa. A collection permit was required to sample these species in Independent Samoa and the PIFSC acquired it for DMWR. All *A. lineatus* requested samples were obtained in both locations, 50 *S. oviceps* samples were obtained from Samoa but the species was absent at Rose Atoll (*S. oviceps* generally are not found at atolls), and 9 *M. berndti* were collected at Rose Atoll. *M. berndti* requires a different sampling approach then the other two species therefore, they were not a primary target species.

   All fin clips were delivered to DMWR on 4/14/2016.

C. Conduct daylight snorkel surveys of coral reefs and water sampling from a NOAA small boat in the shallow water at islands and atolls.

1. The Samoa Ministry of Natural Resources and the Environment (MNRE), a cruise collaborator, requested coral bleaching surveys at Faleula, Upolu and Puapua and Fatuvalu, Savai'i. MNRE, Ministry of Agriculture and Fisheries (MAF), and NOAA/JIMAR staff participated in the surveys.

   Twenty-three sites were surveyed. Preliminary analysis by MNRE indicates:

   a) reef slope not as affected as the reef flat

b) slope – 10% bleached with 10% severity and 1° postilporis
c) reef flat – 20% bleached with 25% severity and 1° acropora
d) the 2015 bleaching event was more severe (60–70% bleached corals).
e) Samoa does not appear to be experiencing bleaching as severe as other places in the South Pacific (e.g., GBR) however, it is important to note that there is minor bleaching related to temperature.

2. The Samoa MNRE also requested a sea grass survey around Manono Island. SE4 towed a MNRE researcher at 1 kt. around the island. The researcher used hand signals to direct SE4 around the sea grass beds, which resulted in a very course outline of the sea grass beds (**FIG 6).** Preliminary analysis by MNRE indicate:

a) Confirmed 2 species of sea grass with the possible presence of a third species. Specimens were collected for genetic analysis.
b) the SW side of the island had greatest density (90% coverage) of *Syringodium isoetifolium* but less *Halophila ovalis*.
c) the SE side of the island had lowest density (2% coverage) but poor water visibility.
d) both species are found in shallow water but *S. isoetifolium* was less abundant in deeper water.
e) westernmost point of the island grass had cyanobacteria growing on leaves.

D. Conduct nighttime midwater trawl hauls each night while at offshore banks and seamounts and when not transiting. Cobb trawls will be conducted at the offshore locations of South Bank and 2% Bank in American Samoa and unspecified banks/seamounts in Independent Samoa. Cobb trawl operations will target successive depth zones of 175 m, 100 m, and 25 m trawling for 1h at each of these depth zones during each trawl operation. Surface Isaac Kid (IK) trawls from the mid-port side J-frame will be conducted at island locations (Tutuila, Rose Atoll, Upolu and Savai'i). Pelagic phase larvae and juveniles of the Deep-7 bottomfish species will be targeted; collected specimens will provide information on stock structure, distribution, transport, pelagic duration, and connectivity studies.

1. IK trawl midwater trawling took place around the island of Tutuila (9 nights) and when the Cobb trawl malfunctioned (3 nights). An additional IK trawl took place during the day when the OES was unable to work in bottomfishing depths due to being too far from small boat operations.

Trawl configuration specifics were 6' IK with 0.5-mm mesh. The majority of trawls was crepuscular and was typically 1 hour in duration (after net reached equilibrium) and targeted 10 m depth. Primary targets were eggs, larvae, and juvenile tuna and bottomfish species.

Surveys sampled 6 biomass categories: shore fishes, mesopelagic fishes, cephalopods, crustaceans, gelatinous zooplankton, and miscellaneous zooplankton/smaller organisms. After each tow, the entire catch was placed in a 5-gallon bucket, sorted in the wetlab using plastic trays, and weighed according to categories (Table 3). All reef, bottomfish, and

epipelagic fish larvae and juveniles were removed from each trawl haul and preserved in 95% ethanol. A subset of the catch (primarily gelatinous zooplankton, squid, and selected specimens such as cookie-cutter sharks) was frozen for later analysis.

2. Cobb trawl midwater trawling took place at South Bank, East Bank, and Rose Atoll, American Samoa and Upolu and Savai'i, Independent Samoa. Trawl configuration specifics were 1-mm plankton net and 1.5-mm mesh end with zipped canvas cod end. The majority of trawls was crepuscular, lasted 3 hours, and initially targeted 3 depths (175, 100, 25 m); later tows focused on single depths. Primary targets were the eggs, larvae, and juveniles of tuna and bottomfish species as well as tuna prey items.

   Surveys sampled 6 biomass categories: shore fishes, mesopelagic fishes, cephalopods, crustaceans, gelatinous zooplankton, and miscellaneous zooplankton/smaller organisms. After each tow, the entire catch was placed in a 5-gallon bucket, sorted in the WET lab using plastic trays, and weighed according to categories (Table 3). All reef, bottomfish, and epipelagic fish larvae and juveniles were removed from each trawl haul and preserved in 95% ethanol. A subset of the catch (primarily gelatinous zooplankton, squid, and selected specimens such as cookie-cutter sharks) was frozen for later analysis.

E. Drifting nightlight dip-netting and hook-and-line fishing operations targeting coastal pelagic fishes from the *Sette* port side longline pit will be conducted when weather and current conditions are calm. When permissible, these operations will be conducted after the first Cobb trawl or IK trawl operation of the night has been completed.

   Nightlight hook-and-line operations were conducted on 8 evenings around Tutuila. Specific sites were offshore of traditional *Atule mate* (atule) spawning runs: A'oloau, Fagasa, Aoa, Leone, Fagatele. Fishing was generally not very successful with a total of 36 fish being captured (highest single evening n = 14) (Table 4). Lack of catch may be attributable to the ship drifting too fast through the areas and difficulty finding schools of fish.

F. Collection of oceanographic data from routine conductivity, temperature, depth (CTD) casts, continuous acoustic doppler current profiler (ADCP), and thermosalinograph (TSG) measurements. CTD casts will be conducted once each night when not transiting at the location immediately prior to the start of the first midwater Cobb trawl of the evening. The CTD cast measurements will also include fluorometer measurements and laboratory determination of nutrients, chlorophyll and accessory pigment determinations from water samples collected from sample bottles mounted on the CTD rosette. This data will be used to assess the influence of the physical dynamics on the biological productivity in the region.

   A total of 19 successful CTD casts was conducted, all to a depth of 1000 m (Table 5). During all casts, profiles of temperature, conductivity, and dissolved oxygen were collected on redundant sensors. Profiles of fluorescence were collected by both an open WET Labs and pumped Seapoint fluorometer. Water samples were collected at 0, 50, 100, 200, 400 m depth.

The OES ADCP was inoperable during SE16-01.

G. Additional accomplishments

The MAF requested that the cruise search for, and if found, sample around government deployed fish aggregating devices (FADs). Location and status of FADs are in Table 6.

SCIENTIFIC PERSONNEL:

Joseph M. O'Malley, Chief Scientist, Pacific Islands Fisheries Science Center (PIFSC), National Marine Fisheries Service (NMFS)
Valerie Allain, Senior Fisheries Scientist, The Pacific Community (SPC)
Jamie Barlow, Biological Technician, PIFSC, NMFS
Lui Bell, Fisheries Officer, Samoa Ministry of Agriculture and Fisheries (MAF)
Ropate Delana, Student Volunteer, University of Hawaii, Joint Institute for Marine and Atmospheric Research (JIMAR)
Eddie Ebisui, Skilled Fisherman, JIMAR
Selau Falemai, Fisheries Assistant, MAF
Louise Guiseffi, Biological Technician, PIFSC, NMFS
Benjamin Harding, Program Assistant, U.S. Embassy in Samoa
Robert Humphreys, Supervisory Fisheries Biologist, PIFSC, NMFS
Fatutolo Iene, Fisheries Assistant, MAF
Maia Kapur, Student Volunteer, JIMAR
Samantha Kwan, Marine Conservation Officer, Samoa Ministry of Natural Resources and the Environment (MNRE)
Mamoe Malolo, Fisheries Officer, MAF
Michael Marsik, Fisheries Biologist, PIRO, NMFS
Ryan Nichols, Fisheries Biologist, PIFSC, NMFS
Cassie Pardee, Fisheries Biological Technician, JIMAR
Brian Peck, Refuge Manager, U.S. Fish and Wildlife Service
Maria Sapatu, Senior Fisheries Officer, MAF
Shaunalee Tagaloa, Fisheries Officer, MAF
Brett Taylor, Life History Biologist, JIMAR
Maria Satoa , Senior Marine Conservation Officer, MNRE
Corey Wakefield, Research Scientist, Western Australia Department of Fisheries

Submitted by: _____
Joseph O'Malley
Chief Scientist

Approved by: _____
Michael P. Seki, Ph.D.
Science Director
Pacific Islands Fisheries Science Center

Attachments

Table 1. Number of bottomfish samples processed for biological samples by targeted species and location.

Species	Rose Atoll	2% Bank	East Bank	South Bank	Tutuila	Upolu	Savai'i	Total
Aphareus rutilans	1	3	23	31	17	13	17	105
Etelis carbunculus	55	9	38	50	13	4	9	178
Etelis coruscans	26	6	44	26	29	13	5	149
Etelis sp.	9	1	8	22			2	42
Paracaesio kusakarii		2	9	10	3			24
Paracaesio stonei			3	5		1		9
Paracaesio xanthura					2	1	1	4
Pristipomoides argyrogrammicus					6	1	7	14
Pristipomoides auricilla	13	3	52	35	19	4	20	146
Pristipomoides filamentosus	1	1	16	36			1	55
Pristipomoides flavipinnis	8	13	97	97	12	26	24	277
Pristipomoides multidens						1	4	5
Pristipomoides zonatus	9	7	15	21	24	14	36	126
Hyporthodus octofasciatus				3				3

Table 2. Number of coral reef fish samples processed for biological samples by species and location.

Species	Tutuila	Rose Atoll	Upolu	Savai'i
Chlorurus spilurus	100	100	50	50
Myripristis berndti	*	9	0	0
Acanthurus lineatus	*	50	25	25
Scarus oviceps	*	0	25	25

* = not requested by DMWR

Table 3. Location specifics and catch of IK and Cobb trawls during SE16-01.

						Target Depth			Mass (oz)					
US date	Net type	Latitude (°S)	Longitude (°W)	Depth (m)	Duration (hrs.)	Depth 1 (m)	Depth 2 (m)	Depth 3 (m)	Shore fish	Mesopelagic fish	Cephalopods	Crustaceans	Gelatinous zooplankton	Misc. zooplankton
3/4/2016	IK	14.1293	170.8546	3109	1	10								
3/5/2016	IK	14.2388	170.8177	685	1	10								
3/6/2016	IK	14.2269	170.7719	559	1	10								
3/7/2016	IK	14.2045	170.7969	2123	1	10								
3/8/2016	IK	14.1727	170.7885	2419	1	10								
3/9/2016	IK	14.3766	170.9047		1	10								
3/10/2016	IK	14.3716	170.8168	495	1	10								
3/11/2016	IK	14.3710	170.8390	472	1	10								
3/13/2016	IK	14.7288	170.6071	3356	1	10								
3/14/2016	Cobb	14.9614	170.6752	1900	3	175	100	25	0.5	4	0.5	0.75	4.5	0.3
3/15/2016	Cobb	15.0149	170.5948	2869	3	175	100	25	1	3.5	4.5	1	4	1
3/16/2016	IK	15.1374	170.5916	4788	3	175	100	25	1	0.5	1	1	5	10
3/17/2016	Cobb	14.6262	170.0174	2738	3	175	100	25	0.5	1.5	2.25	1	0.75	7.5
3/18/2016	IK	14.4283	170.1957	1996	3	175	100	25	0.5	0.5	0.5	0.5	3.5	6.5
3/19/2016	Cobb	14.4307	170.1673	1988	3	175	100	25	1	1	1	1	1	1
3/21/2016	Cobb	14.5510	168.0877		3	175	100	25	1	1	5	0.5	1	1
3/22/2016	Cobb	14.5312	168.2411	3160	3	100	25		1	5	7	0.5	1	0.5
3/30/2016	Cobb	13.6663	172.7475	1994	3	100			1	5	14.5	0.5	5	0.5
3/31/2016	Cobb	13.3361	172.5938	3392	3	25			3.5	0.5	2.5	0.5	0.5	0
4/1/2016	IK	14.0803	172.6369	3152	3	37.5	80	125						
4/2/2016	Cobb	14.0176	172.3777	1253	3	115			2	34	15	1	2	0.5
4/3/2016	Cobb	13.5067	172.9351	2405	3	115			2	38	42	1.5	11	0
4/4/2016	Cobb	13.4979	172.9698	2231	3	525			1.5	22	12	2.5	25	0.5
4/5/2016	Cobb	13.2798	172.4020	1866	3	38			15.5	1	6	4	14	0
4/6/2016	IK	13.8928	172.1673		1	1								
4/6/2016	Cobb	13.9381	172.3374	2787	3	50			15	2	14	5.5	10	0
4/7/2016	Cobb	14.0588	172.2960	2111	3	115			9.5	13.5	17.5	7	4	0

Table 4. Date, location and number of *Atule mate* (atule) captured and released during nightlight hook-and-line operations fishing operations.

Date	General location	Latitude (S)	Longitude (W)	number captured/released
03/05/16	Fagasa Bay	14.2767	170.7610	0
03/06/16	Massacre Bay	14.2557	170.7668	11
03/07/16	Massacre Bay	14.2555	170.7673	15
03/08/16	A'oloau Bay	14.2622	170.7825	7
03/09/16	Leone Bay	14.3453	170.8127	2
03/10/16	Fagatele Bay	14.3707	170.7662	0
03/11/16	Leone Bay	14.3475	170.8130	10
03/12/16	South Bank	14.8165	170.6518	1

Table 5. Date, location and bottom depth of 1000 meter depth CTD casts during SE16-01.

Date	Latitude (°S)	Longitude (°W)	Depth (m)
3/5/2016	14.1312	170.8808	3103.1
3/12/2016	14.7609	170.6507	2194.68
3/13/2016	14.8029	170.6162	1645.9
3/14/2016	14.9259	170.6811	1666.56
3/15/2016	14.9373	170.5944	1514.38
3/16/2016	14.5732	170.0191	1885.4
3/18/2016	14.4447	170.1809	2202.26
3/19/2016	14.4448	170.1774	2130.96
3/20/2016	14.5474	168.1142	
3/22/2016	14.5444	168.2129	2192.13
3/23/2016	13.6959	171.7512	1386.39
3/31/2016	13.3496	172.6094	3177.01
4/1/2016	14.0200	172.6506	2727.62
4/2/2016	13.9969	172.3950	1168.74
4/3/2016	13.5206	171.9486	2419.09
4/4/2016	13.5342	171.9639	2165.45
4/5/2016	13.2916	172.3925	1894.91
4/6/2016	13.9292	172.3212	2731.88
4/7/2016	13.0207	172.3082	2865.36

Table 6. Location of fish aggregating devices (FAD) deployed by Ministry of Agriculture and Fisheries. OES determined status by searching the area around the last known location.

FAD	Latitude (°S)	Longitude (°W)	Type	Status
Apia	13.708	171.750	offshore	missing
Vaisala	13.502	172.678	nearshore	missing
Asau	13.497	172.632	nearshore	present
Sailailua	13.724	172.669	offshore	missing
Gataivai	13.887	172.321	offshore	missing
Faga old	13.644	172.176	nearshore	missing
Faga new	13.651	172.175	nearshore	missing
Leulumoega	13.592	171.980	offshore	missing
Sale'aula	13.032	172.308	offshore	missing
Matautu	13.920	172.052	nearshore	missing
Samatau	13.917	172.060	nearshore	missing

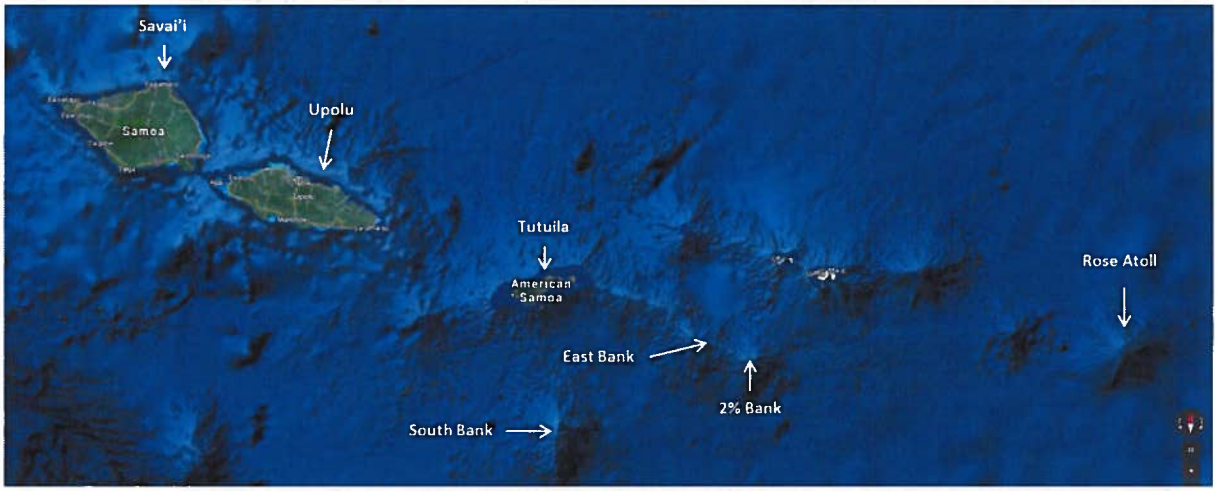

Figure 1. Operational area of SE16-01.

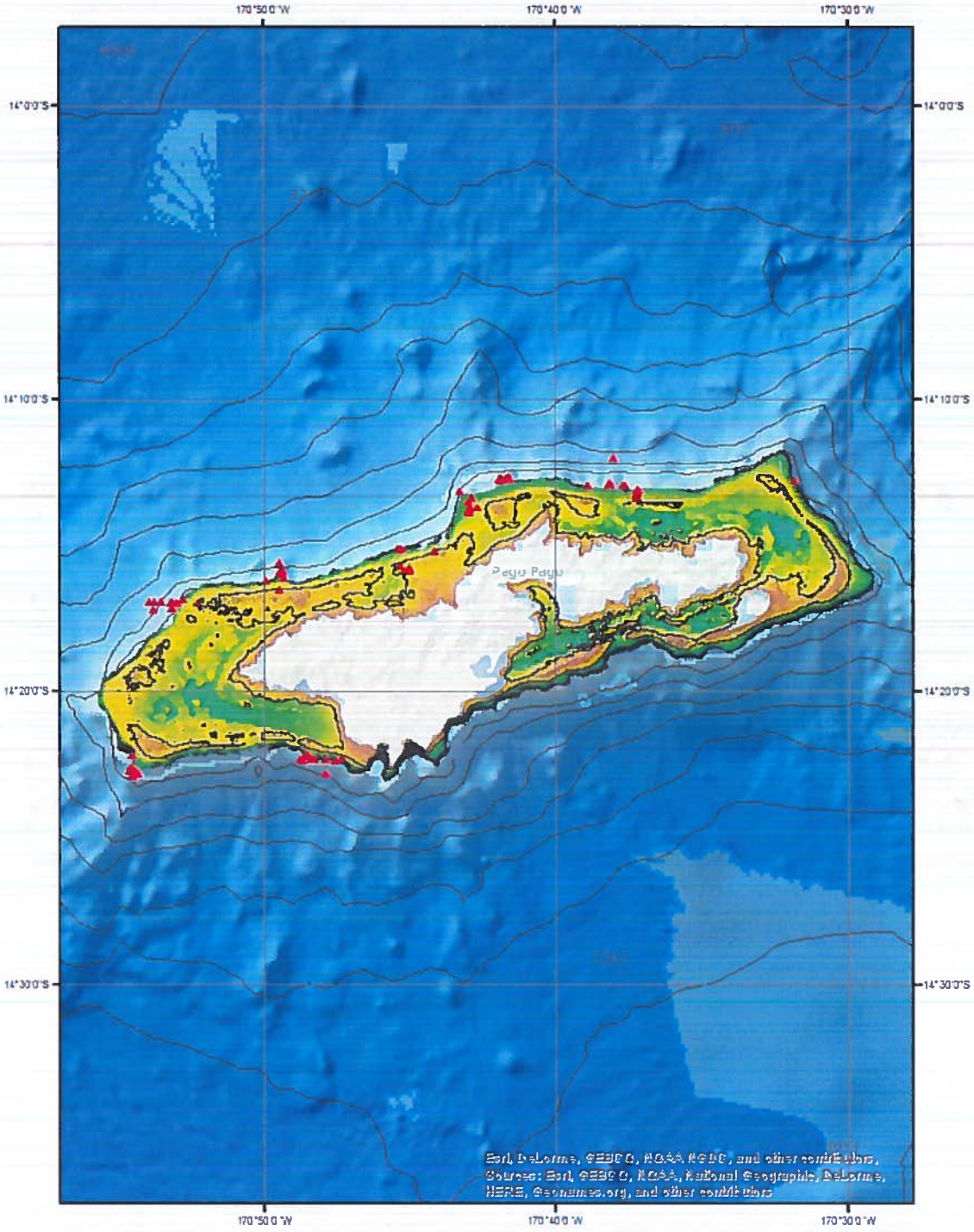

Figure 2. Bottomfishing location at Tutuila, American Samoa.

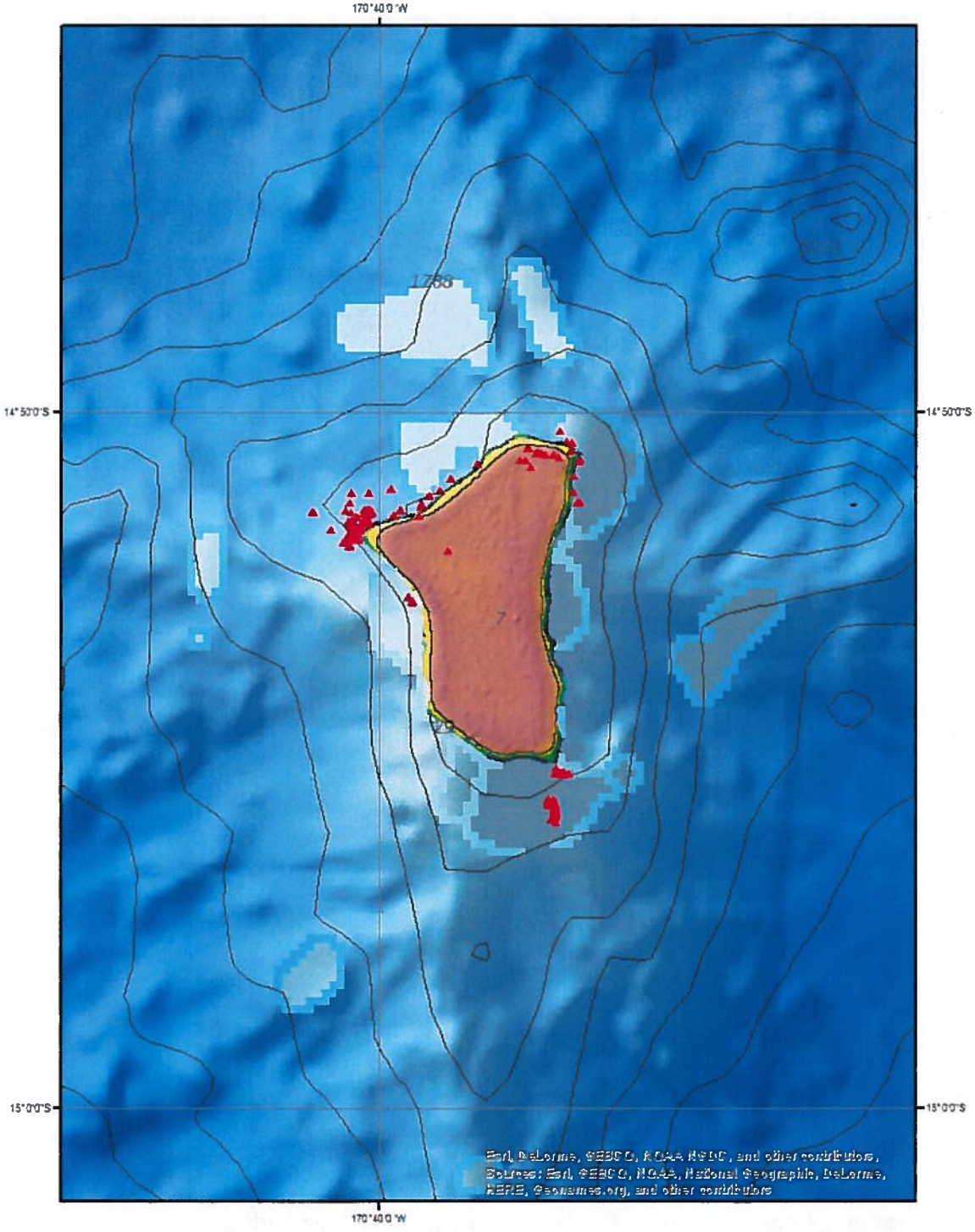

Figure 3. Bottomfishing locations at South Bank, American Samoa.

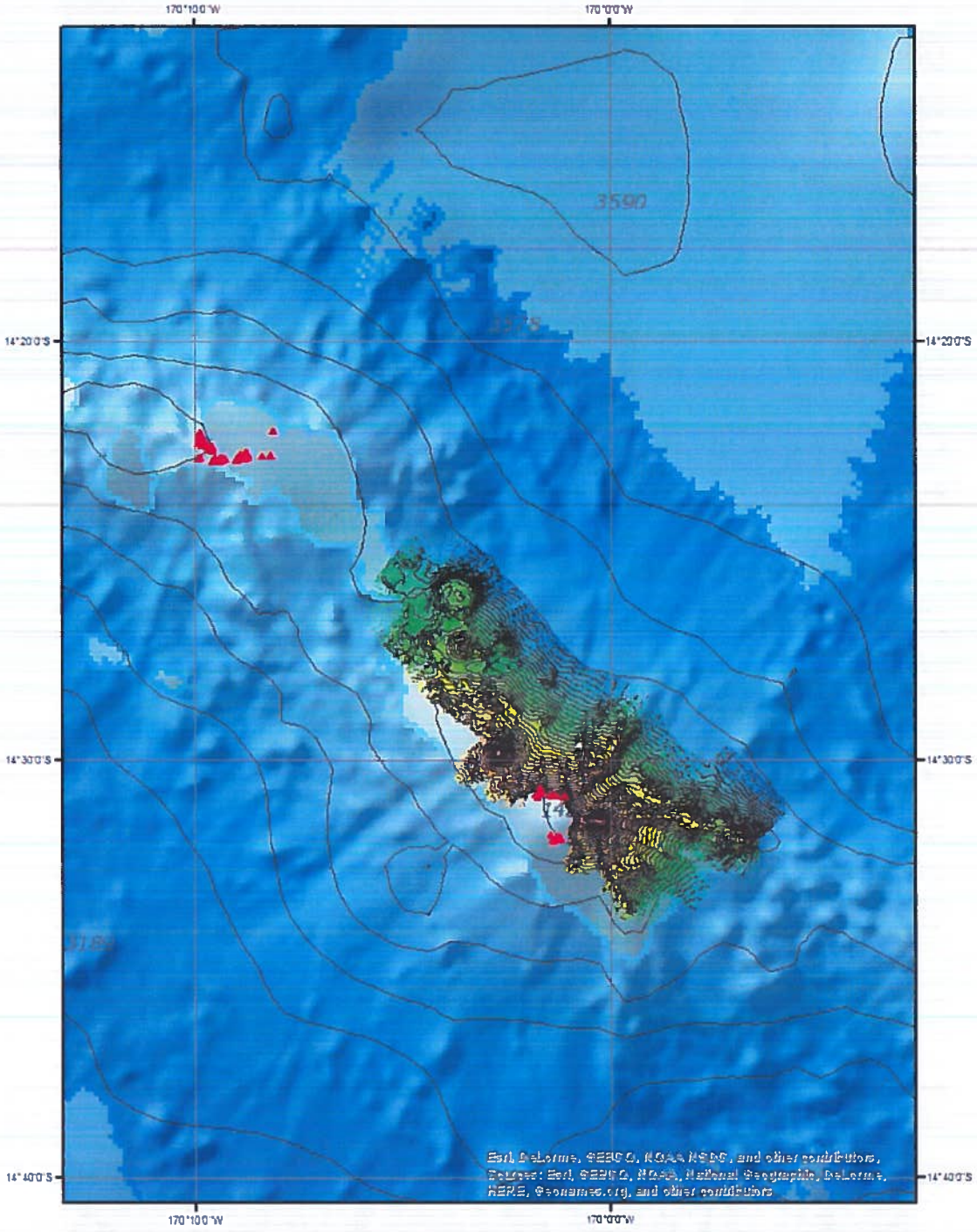

Figure 4. Bottomfishing locations at East and 2% Bank, American Samoa.

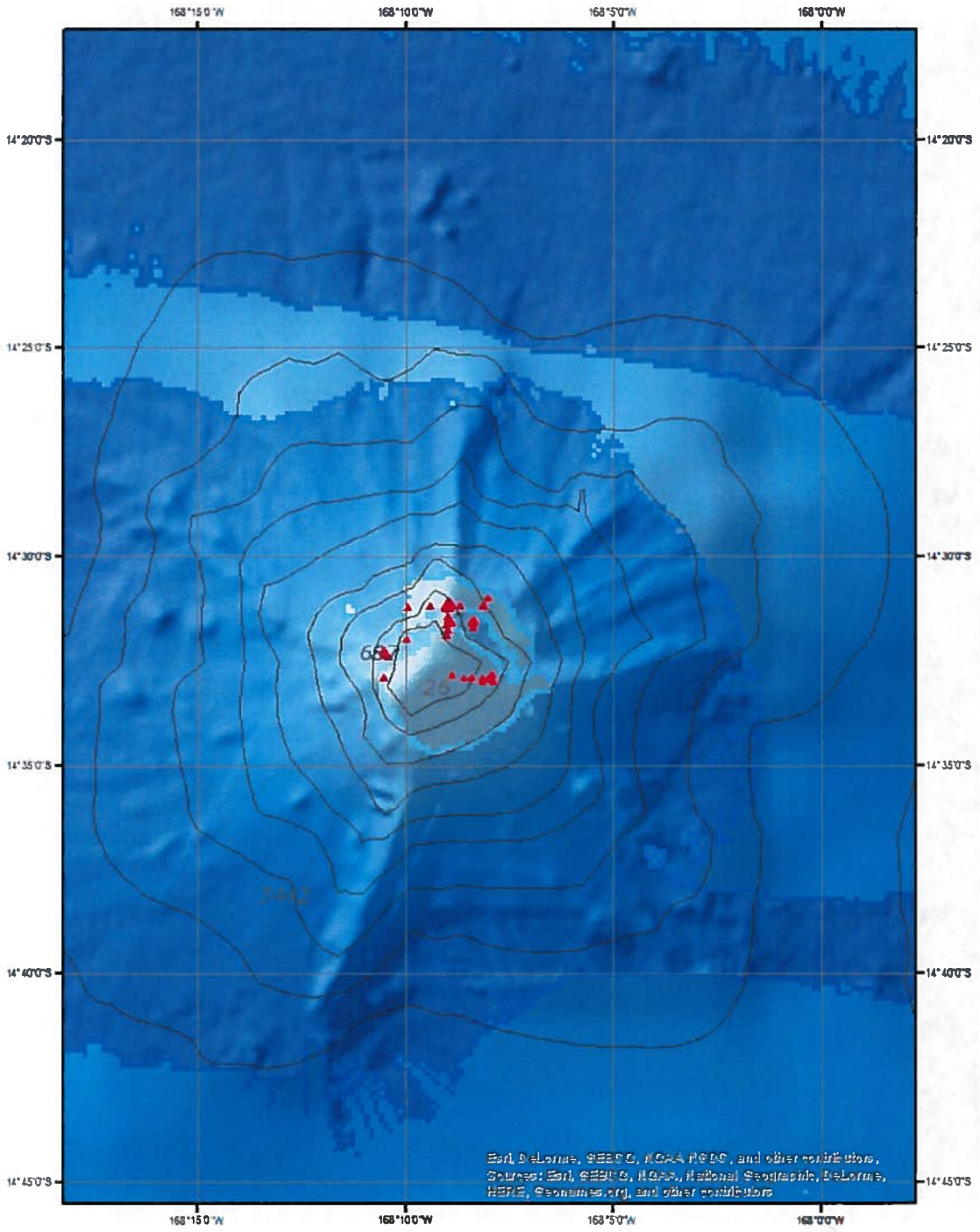

Figure 5. Bottomfishing locations at Rose Atoll, American Samoa.

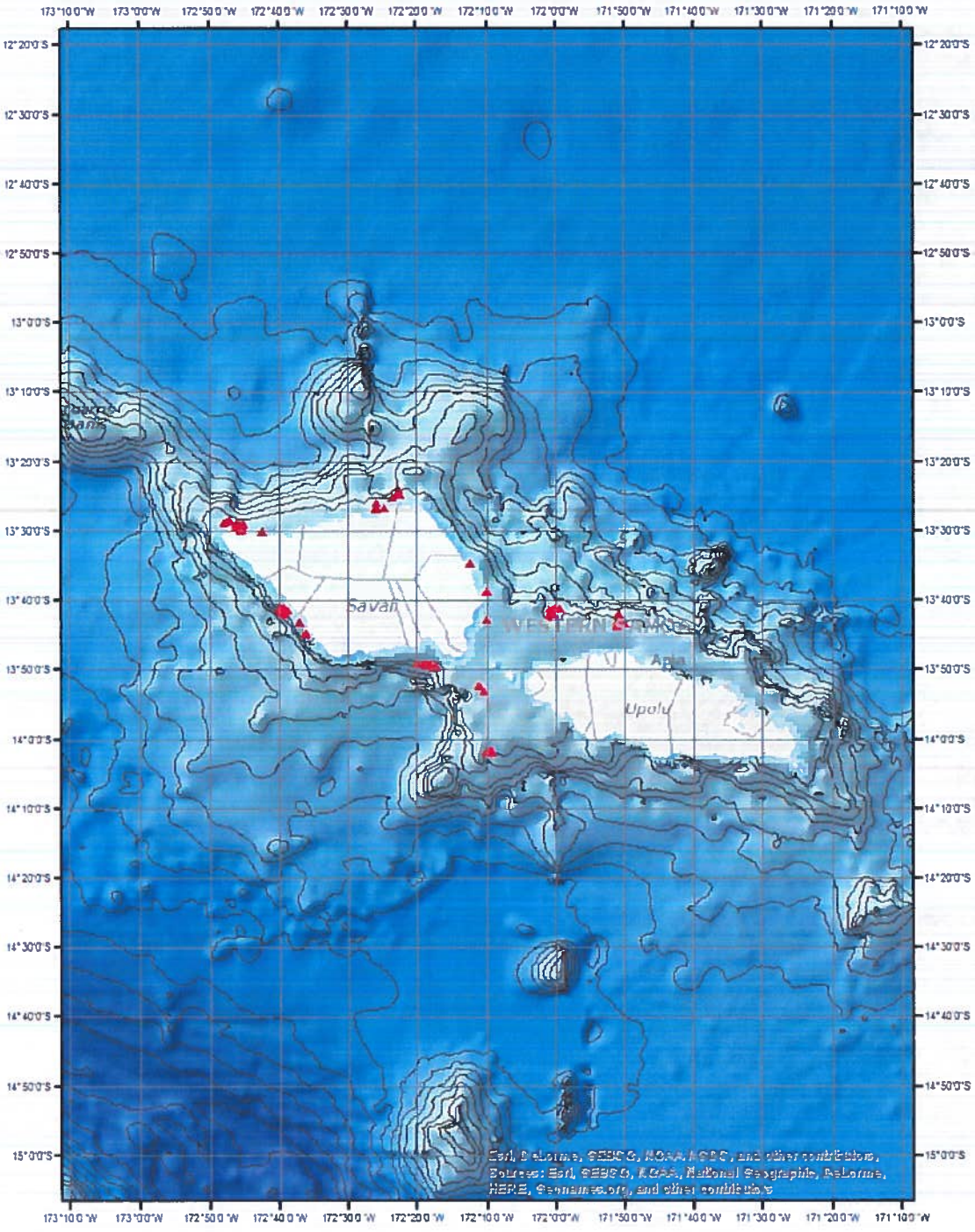

Figure 6. Bottomfishing locations at Upolu and Savai'i, Independent Samoa.