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June 23, 2011

Cruise Report ***F/V Pacific Explorer Cruise 201101***

May 15th-June 5th, 2011

Project Title: Atka mackerel tag and release, Aleutian Islands, Alaska

SCIENTIFIC PURPOSE

The goal of our on-going tag release-recovery studies is to determine the efficacy of trawl exclusion zones as a management tool to maintain prey abundance/availability for Steller sea lions at local scales. Trawl exclusion zones were established around sea lion rookeries as a precautionary measure to protect critical sea lion habitat, including local populations of prey such as Atka mackerel. Localized fishing may affect Atka mackerel abundance and distribution near sea lion rookeries. Tagging experiments are being used to estimate abundance and movement between areas open and closed to the Atka mackerel fishery. A feasibility study was conducted in 1999 at Seguam Pass. In the years 2000 to 2002 approximately 30,000 tagged Atka mackerel were released in the Seguam Island area. In 2002 approximately 15,000 tags were released in the Tanaga Island area. In 2003 approximately 15,000 tagged fish were released around Amchitka Island. In 2006 approximately 8,000 fish were tagged and released at Kiska Island and 7,200 fish were tagged and release at Seguam Island. Recovery of tagged fish is supplied by the fishery and by chartered recovery cruises. The first objective of the F/V Pacific Explorer Cruise 201101 was to assess the local abundance and movement of Atka mackerel by tagging and releasing fish relative in the Central Aleutians (Tanaga Island and Petrel Bank) and at Seguam Pass. Approximately 8,500 fish were tagged and released at Seguam Pass, 9,000 at Tanaga Island and 10,000 at Petrel Bank. Secondary objectives included conducting a tag-mortality study and other biological projects such as collecting gonads and otoliths. The third objective was to characterize Atka mackerel habitat by taking oceanographic samples and conducting underwater camera tows at each area where fish were tagged and released.

ITINERARY AND ACTIVITIES

Date	Activity
May 15-16	Gear setup and drills in Dutch Harbor
May 17-18	Steaming to Seguam Pass
May 19-23	Tag release Seguam Pass
May 24	Steaming to Tanaga Island
May 25-28	Tag release Tanaga Island
May 30-June 2	Tag release Petrel Bank
June 3	Steaming to Dutch Harbor
June 5-6	Take down and shipping of gear

RESULTS

Tagged Atka mackerel

Table 1 shows the number of Atka mackerel tagged and released in each study area and each stratum within the study areas. Strata locations and trawl tows where Atka mackerel were caught for tagging are shown in Figures 1-3.

Table 1. Number of tagged fish by area and stratum.

Area	Stratum	# Tagged fish released
Seguam	1	1,624
	3	1,154
	4	5,804
Tanaga	1	5,820
	2	3,302
Petrel		9,977
Total		27,681

Haul locations and depths

Table 2 shows the latitude, longitude and depth of all successful trawl tows where Atka mackerel were caught for tagging at each study area. No Atka mackerel were caught during hauls 9, 11 and 21 due to minor gear problems. Haul locations are also shown in Figures 1-3.

Table 2. Locations of tag release hauls at each study area. Latitude and longitude are in decimal degrees.

Haul	Area	Starting Latitude N	Starting Longitude W	Starting Depth (m)	Ending Latitude N	Ending Longitude W	Ending Depth (m)
1	Seguam	52.04	171.82	135	52.07	171.82	143
2	Seguam	52.09	171.87	160	52.09	171.87	174
3	Seguam	52.09	171.87	150	52.09	171.87	142
4	Seguam	52.00	171.85	147	52.02	171.85	157
5	Seguam	51.97	171.91	134	51.99	171.91	109
6	Seguam	52.06	172.07	127	52.06	172.07	130
7	Seguam	52.24	172.76	132	52.24	172.76	132
8	Tanaga	51.66	178.29	145	51.69	178.29	114
10	Tanaga	51.69	178.26	97	51.67	178.26	99
12	Tanaga	51.57	178.41	117	51.59	178.41	123
13	Tanaga	51.59	178.47	107	51.60	178.47	107
14	Tanaga	51.64	178.29	168	51.69	178.29	128
15	Tanaga	51.70	178.26	119	51.68	178.26	96
16	Tanaga	51.59	178.22	155	51.61	178.22	106
17	Petrel	52.76	179.32	153	52.73	179.32	115
18	Petrel	52.72	179.36	115	52.69	179.36	119
19	Petrel	52.77	179.34	187	52.75	179.34	154
20	Petrel	52.67	179.36	104	52.70	179.36	116
22	Petrel	52.76	170.35	136	52.74	170.35	112
23	Petrel	52.66	179.36	119	52.69	179.36	122
24	Petrel	52.67	179.38	141	52.64	179.38	142
25	Petrel	52.63	179.39	101	52.65	179.39	107
26	Petrel	52.70	179.37	110	52.67	179.37	109
27	Petrel	52.76	179.35	139	52.74	179.35	116
28	Petrel	52.74	179.37	114	52.71	179.37	114

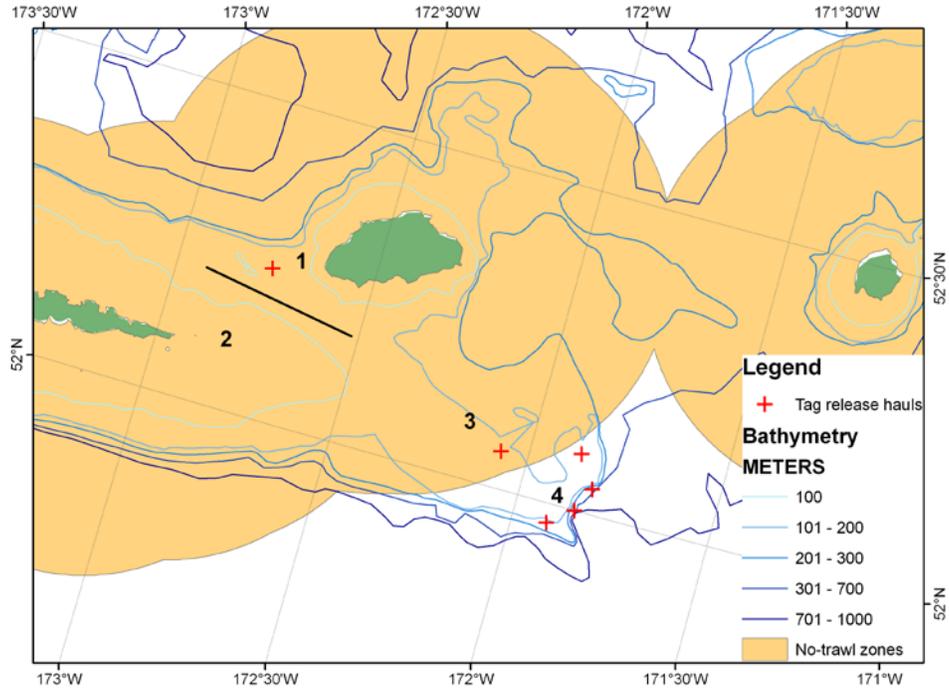


Figure 1. Strata numbers and tag release haul locations at Seguam Pass.

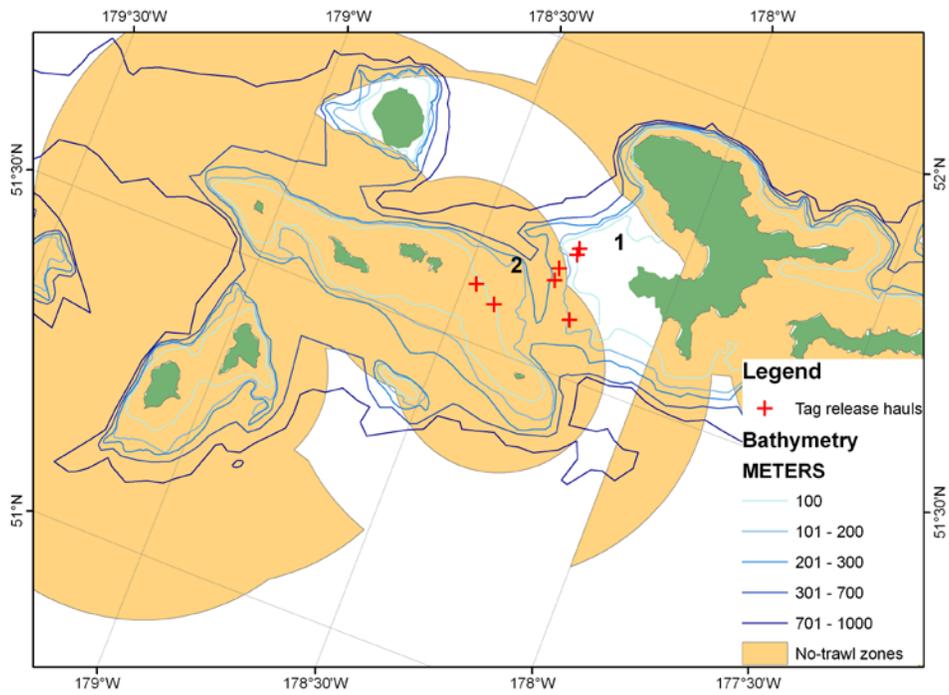


Figure 2. Strata numbers and tag release haul locations at Tanaga Island.

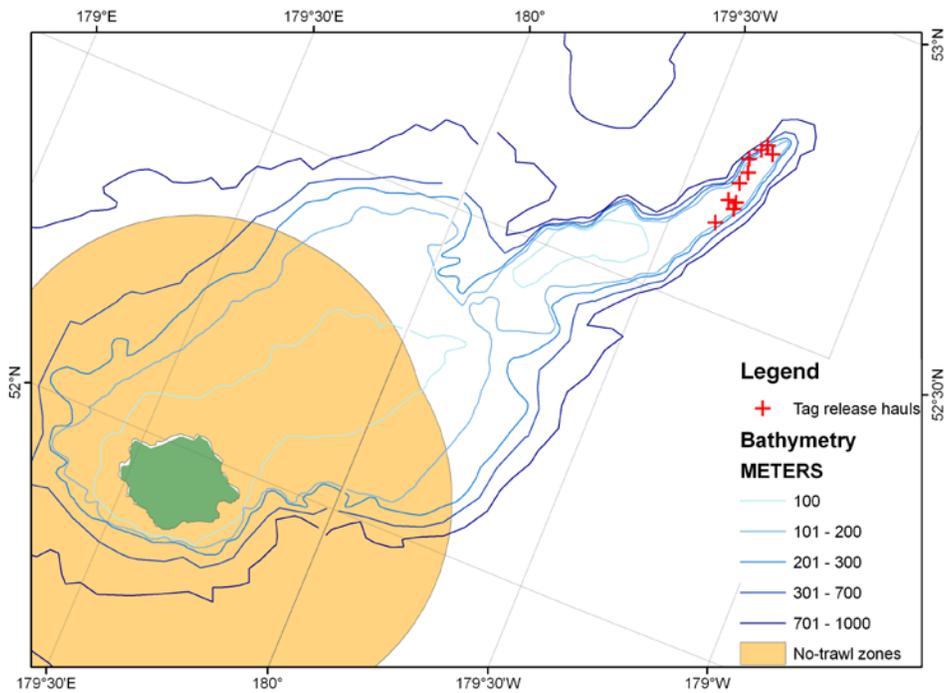


Figure 3. Tag release haul locations at Petrel Bank.

Camera tows

An underwater video camera was deployed near successful haul locations. The camera was lowered to near the bottom with an electric winch while the ship drifted. Camera tows lasted approximately 30 minutes and documented bottom type, and the presence of invertebrates and fish. Table 3 lists the locations of camera tows at each study area and Figures 4-6 show the locations on a map.

Table 3. Locations of camera tows at each study area. Latitude and longitude in decimal degrees.

Haul	Area	Starting Latitude N	Starting Longitude W	Starting Depth (m)	Ending Latitude N	Ending Longitude W	Ending Depth (m)
1003	Seguam	52.11	171.85	154	52.10	171.87	170
1004	Seguam	52.02	171.86	139	52.02	171.87	153
1005	Seguam	51.98	171.92	116	51.97	171.93	147
1006	Seguam	52.07	172.08	130	52.05	172.08	110
1007	Seguam	52.24	172.75	132	52.24	172.76	132
1012	Tanaga	51.57	178.67	114	51.57	178.39	106
1013	Tanaga	51.60	178.46	106	51.59	178.46	99
1014	Tanaga	51.69	178.29	106	51.69	178.29	104
1015	Tanaga	51.68	178.27	100	51.69	178.26	95
1016	Tanaga	51.61	178.23	109	51.60	178.22	130
1018	Petrel	52.69	179.35	120	52.69	179.35	122
1019	Petrel	52.75	179.34	145	52.75	179.34	200
1020	Petrel	52.67	179.39	111	52.67	179.38	109
1022	Petrel	52.70	179.37	114	52.71	179.36	106
1026	Petrel	52.67	179.37	120	52.67	179.36	131
1027	Petrel	52.74	179.34	139	52.74	179.33	116
1028	Petrel	52.72	179.37	125	52.72	179.36	111

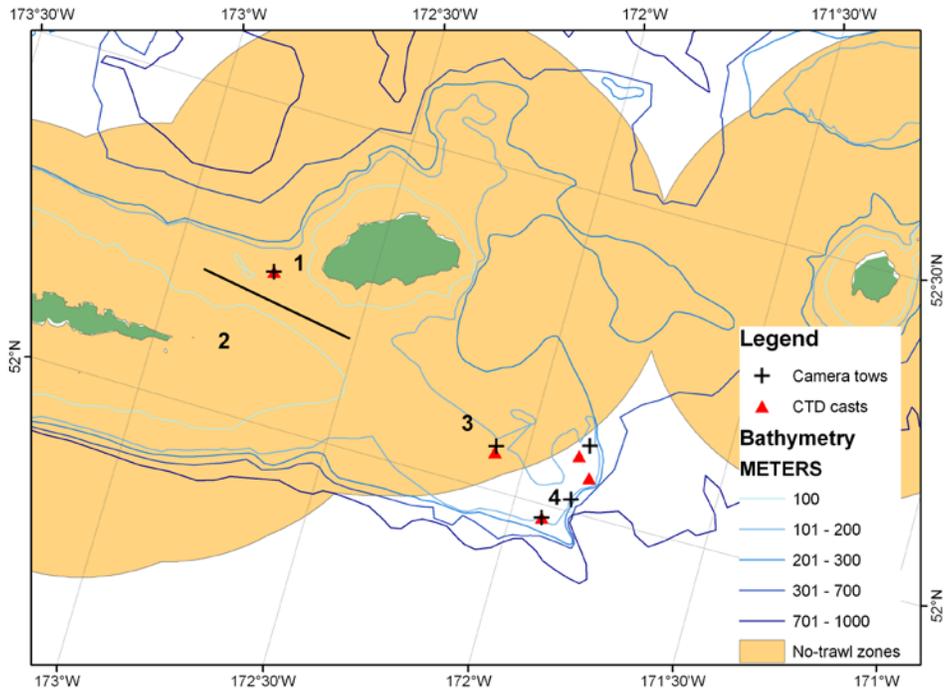


Figure 4. Camera tow and CTD cast locations at Seguam Pass.

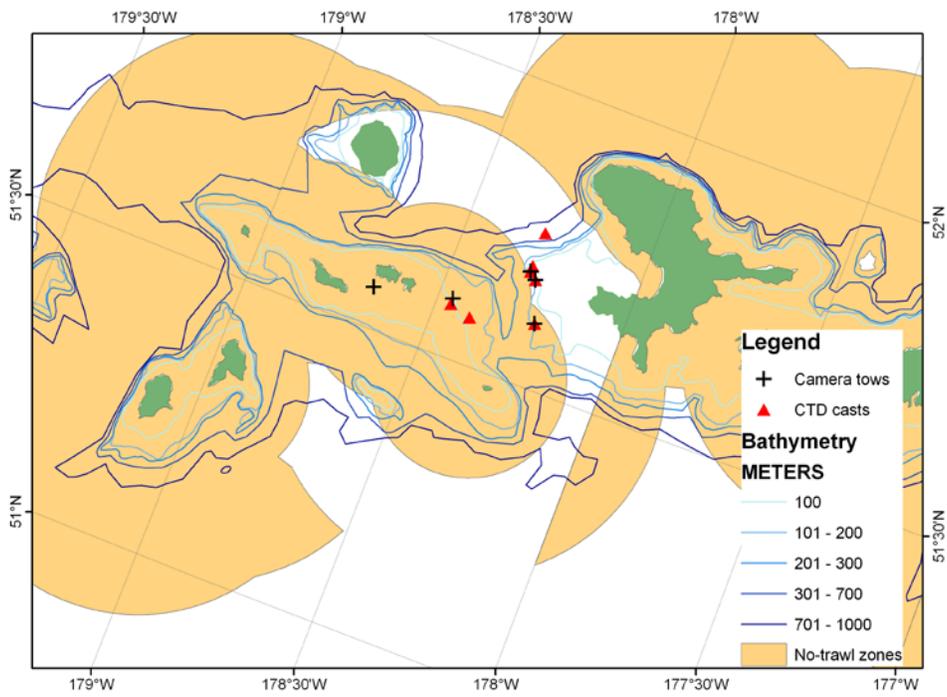


Figure 5. Camera tow and CTD cast locations at Tanaga Island.

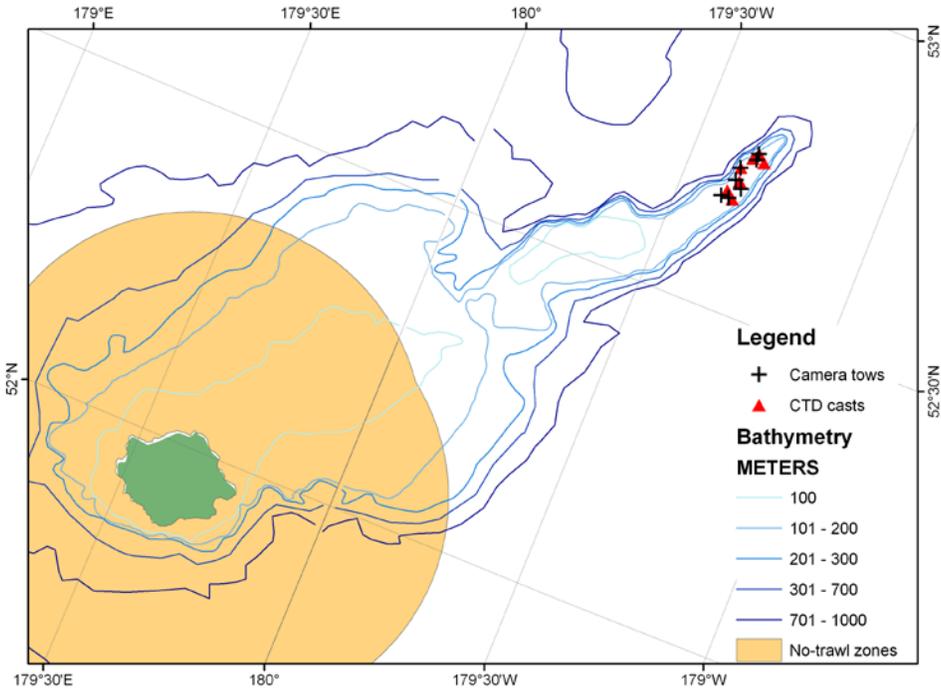


Figure 6. Camera tow and CTD cast locations at Petrel Bank.

Biological samples

Otoliths, gonads and stomachs were collected from 5 males and 5 females from every successful haul. In addition, gonad maturity state was assessed visually and male color code was recorded (1: Males same color as females, 2: Males yellow, but not in full nest guarding coloration, 3: Males in full nest guarding coloration.). Samples were taken from a total of 220 fish. Males were either immature or developing (maturity codes 1 and 2). Females were either immature or had yolked ovaries (maturity codes 1 and 2).

Length frequency

In order to examine any bias in the length selection of the tagged fish, it was necessary to obtain length frequencies from the total catch. In addition, male color code was recorded for all lengthed fish. Approximately 100 fish (not tagged) were sacrificed from each haul to determine sex and length for a total of 2,049 fish.

Species catch and composition estimates

Since the focus of this study was to tag and release wild fish it was essential to handle the fish as delicately as possible. Therefore we did not weigh the codend to get total catch weight since this would have resulted in high fish mortality due to the pressure on the fish in the codend while hanging from a scale. In addition, species composition was not estimated during this cruise for each haul. The estimates of Atka mackerel and bycatch species captured during this study presented here are therefore based on species composition data from tag recovery cruises in the

same study areas that were made in previous years. We assumed that catch size was on the average 1.5 mt with the catch of the entire cruise totaling 42 mt. Catch sizes for this study and total catch estimates are based on the following assumptions:

- Average numbers tagged release per haul: 1000 Atka mackerel.
- Average number retained for length frequencies and biological samples: 250
- Additional Atka mackerel captured in haul (30% of retained Atka mackerel): 375
- Total Atka mackerel caught per haul: 1625
- Total weight of Atka mackerel caught per haul (700 g per fish): 1138 kg.
- Total bycatch of other species
(30% based on previous Atka mackerel tag recovery cruises): 341 kg
- Total average estimated weight per haul: 1480 kg (or roughly 1.5 mt)
- The estimated species catches per haul and for the total of 28 hauls are detailed in Table 4:

Species	% of total catch	Weight per haul (mt)	Total catch (mt)
Atka mackerel	70%	1.05	29.4
Northern Rockfish	18%	0.27	7.56
Pacific Cod	6%	0.09	2.52
Pacific Ocean Perch	4.8%	0.072	2.016
Pollock	0.24%	0.0036	0.1008
Other species	0.96%	0.0144	0.4032
Total Catch	100%	1.5	42

Mortality study

For each haul approximately 10 randomly selected fish were placed into tanks to assess mortality rate following capture, handling, and tagging. Experiments were conducted where fish were kept for at least 48 hours. Five experiments were conducted over the course of the cruise. Of the 265 fish participating in the experiments, a total of 16 died, for a mortality rate of 6%.

Oceanography

Temperature, salinity and depth data were collected with a calibrated Seabird SBE19*plus* SEACAT profiler deployed at tagging haul locations (Table 5 and Figures 4-6). Temperature-depth data were also collected with a Seabird SBE39 microbathythermograph (MBT) mounted on the net.

Table 5. Locations of CTD casts. Position and bottom depth when CTD reached maximum depth (approx. 10 m off bottom). Latitude and longitude are in decimal degrees.

Cast	Area	Latitude N	Longitude W	Bottom Depth (m)
1	Seguam	52.06	171.83	128
3	Seguam	52.09	171.87	172
5	Seguam	51.98	171.92	126
6	Seguam	52.06	172.08	130
7	Seguam	52.24	172.75	132
8	Tanaga	51.69	178.29	108
10	Tanaga	51.70	178.29	98
12	Tanaga	51.58	178.40	125
13	Tanaga	51.59	178.46	107
14	Tanaga	51.76	178.29	99
15	Tanaga	51.68	178.27	100
16	Tanaga	51.61	178.23	129
17	Petrel Bank	52.74	179.32	120
18	Petrel Bank	52.70	179.36	122
19	Petrel Bank	52.75	179.34	135
20	Petrel Bank	52.68	179.38	115
22	Petrel Bank	52.74	179.35	114
26	Petrel Bank	52.67	179.36	143
27	Petrel Bank	52.75	179.34	142
28	Petrel Bank	52.72	179.37	113

Special projects

Specimens were collected at the request of other scientists. One request was for the collection of Orca prey species for a chemical ecology study of the prey of fish-eating killer whales in the Aleutian Islands. Six fish (three males and three females) of the following species were collected and frozen for this request: Atka mackerel, walleye pollock, Greenland turbot, arrowtooth flounder, Pacific cod, Pacific halibut, and rockfish spp. (northern rockfish, Pacific ocean perch and dusky rockfish). The second request was to collect small and large Atka mackerel in NMFS statistical area 542 to analyze caloric content for Steller sea lion prey study analysis. 15 large (> 30 cm) and 15 small (< 30 cm) males and females were collected and frozen for this request.

Short-tailed Albatross sightings

Adult and sub-adult Short-tailed Albatross were seen opportunistically, usually during camera tows. The age and number of the albatross were recorded, along with the date, time and location. See Table 6 and Figure 7.

Table 6. Location of opportunistic sightings of Short-tailed Albatross.

Date	Time (local)	Latitude N	Longitude W	Individuals Observed
5/20/2011	1140	52.06	171.82	3 adults, 2 sub-adults
5/21/2011	1654	52.09	171.87	1 adult, 1 sub-adult
5/22/2011	1520	51.98	171.92	2 adults, 1 sub-adult
5/23/2011	1000	52.06	172.06	1 adult, 2 sub-adults
5/29/2011	1845	53.37	177.40	1 adult

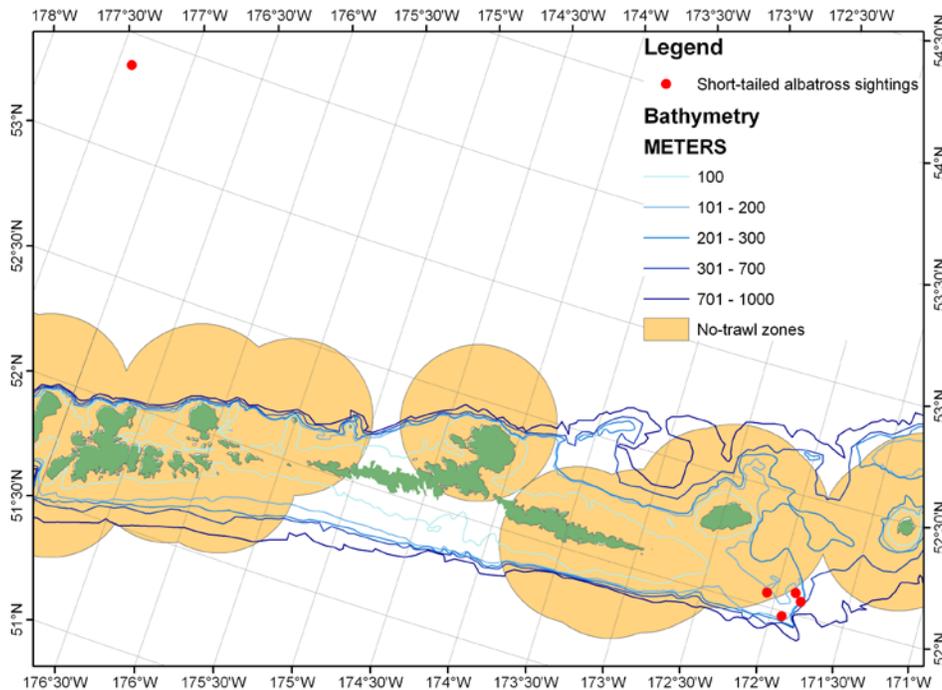


Figure 7. Locations of opportunistic sightings of Short-tailed Albatross.

SCIENTIFIC STAFF

<u>Name</u>	<u>Sex/Natl.</u>	<u>Position</u>
1. Susanne McDermott	F/USA	Field Party Chief
2. Peter Munro	M/USA	Deck Boss
3. Elizabeth Logerwell	F/USA	Data Boss
4. Lynn Lee	M/USA	Scientist
5. Joe Collins	F/USA	Scientist/Camera Operator
6. Nicole Greene	M/USA	Student Intern

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