

Alaska Fisheries Science Center
Resource Ecology & Fisheries Management
7600 Sand Point Way NE, Bldg. 4
Seattle, WA 98115
March 1, 2012

Cruise Report
F/T Seafisher Cruise
SF201101 (August 13th – September 4th, 2011)

Project Title: Atka Mackerel Tag Recovery Seguam Pass, Tanaga Pass and Petrel Bank, Aleutian Islands Alaska

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Scientific Purpose

The objective of our 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. In 2011, NMFS closed area 543 as a precautionary measure to prevent impacts of fishing on Steller Sea lion prey fields. This study was originally intended to examine areas of Atka mackerel abundance in area 543 but was shifted to local population centers in areas open to the fishery in NMFS area 542 in order to avoid any impacts of tag recovery on the local Atka mackerel prey field in the areas closed to commercial fishing.

From 1999-2006 approximately 80,000 tagged fish were released during NMFS chartered tag release cruises near Seguam Pass, Tanaga Pass, Amchitka Island, and Kiska Island. In May to June of 2011 a cooperative venture between the North Pacific Fisheries Foundation and NMFS released approximately 8,500 fish near the Seguam Pass area, 9,000 fish at Tanaga Pass, and 10,000 at Petrel Bank. Recovery of tagged fish is supplied by the tag recovery cruise and augmented by the fishery in the open areas outside the trawl exclusion zones. Even though tags were released inside the closed areas, during the current recovery cruises in 2011, recoveries were not conducted inside the trawl exclusion zones to minimize potential negative impacts of Atka mackerel removal to the Steller sea lion prey fields inside the closed areas. Since 2006 NMFS has been working cooperatively with the North Pacific Fisheries Foundation to conduct

field work under a Memorandum of Agreement as a cooperative venture. Our tagging studies to date have focused on Atka mackerel movement and abundance in the presence of a fishery. In addition to the data gathered from the tag and release experiment, biological data such as stomachs, gonad samples, age structures, sexed length frequencies, genetics and catch composition are also collected for each haul during the tag recovery charter. The second objective of this study was to use catch composition data to estimate relative abundance indexes (CPUEs) for all major fish and invertebrate species present in the study areas. The third objective of this study was to characterize Atka mackerel habitat by conducting underwater camera tows at each area where fish were recaptured. In 2011 we conducted underwater camera tows in the areas of tag release and recovery to define bottom characteristics of areas with high abundance of Atka mackerel and also to develop methods for estimating indices of abundance of Atka mackerel and other SSL prey species with non-extractive methods such as camera tows.

Personnel SF201101

<u>Name</u>	<u>Sex/Natl.</u>	<u>Position</u>	<u>Organization</u>
1. S.McDermott	F/USA	Field Party Chief	AFSC
2. E. Conners	F/USA	Watch Leader	AFSC
3. Lynn Lee	F/USA	Fish Biologist	AFSC/Contractor
4. Tom Holland	M/USA	Fish Biologist	NPFF
5. Karen Keister	F/USA	Fish Biologist	NPFF
6. Ellen Seitz	F/USA	Fish Biologist	NPFF
7. Phil Dang	M/USA	Scientific Liaison	NPFF

AFSC = Alaska Fisheries Science Center
 NPFF = North Pacific Fisheries Foundation

Cruise Schedule and Activities SF201101

13 August	Board vessel @ 1200, Dutch Harbor, AK
13	Transit to Seguam Pass @ 10 pm
14-16	Recovery tows, Seguam Pass
16-17	Transit to Tanaga Pass
17- 19	Recovery tows, Tanaga Pass
20	Transit to Petrel Bank
20-23	Recovery tows, Petrel Bank
24	Transit to Adak Alaska, offload vessel
25-27	Continue recovery tows at Petrel Bank
28	Transit to Seguam Pass, recovery tows at Seguam Pass
29 –Sept 2	Recovery tows at Seguam Pass
Sept 3	Transit to Adak, offload vessel
Sept 4	Debark vessel

Summary of Results

During May/June 2011 NMFS released approximately 8,500 fish at Seguam Pass, 9,000 at Tanaga Island and 10,000 at Petrel Bank. The tag recovery effort in August/September 2011 was only conducted in areas open to the fishery, whereas tags were released in areas open and closed to the fishery. 4Of these we caught 770 mt at Seguam Pass, 365 mt at Tanaga Pass and 374 metric tons at Petrel Bank. Figures 1-3 show locations of tag release and recovery tows. Table 1 shows the number of tows, the total Atka mackerel catch, other species catch and grand total catch in each study area. The total catch of bycatch (species other than Atka mackerel) was 437 mt for a total of all species caught of 1,947 mt.

Length-frequency distribution

Approximately 100 fish were randomly collected, sexed and lengthed per haul in all study areas for a total of 6805 lengths collected (Table 2). Figure 4 illustrates the percent length frequency distributions for Atka mackerel in each study area by sex. Figure 5 summarizes the percent length frequencies for all areas. In all three areas, males dominated the population, with 75% males in Seguam pass, 72% males at Tanaga and 61% percent males at Petrel bank. The fish at Seguam pass were the largest with a mean length of 40.5 cm, in Tanaga fish were slightly smaller with an average of 38.4 cm, and fish were dramatically smaller at Petrel bank with an average of 29.7 cm, a 10 cm difference from Seguam pass.

Wild tag recoveries

A total of 110 wild tags were recovered on the F/V Seafisher research charter, all of which were tagged and released during the 2011 tag release charter. Tag recoveries are summarized by area and strata in Table 5. ‘Wild tagged’ fish are fish that have been tagged and released during a tag release cruise as opposed to tagged fish that were seeded into the catch already on board during the tag recovery cruise to obtain the tag reporting rate (see below).

Tag reporting rate

Reporting rate is defined as the proportion of tagged fish caught by the vessel that are actually found and reported. To determine tag reporting rate, scientists tagged 10 Atka mackerel per haul and distributed them randomly throughout the catch. Seeded tagged fish appeared identical to wild tagged fish and could only be distinguished by their tag number. This was done for all hauls during the cruise. These seeded tagged fish were recovered in the factory by the vessel and scientific crew. The tag reporting rate is summarized in Table 5. Tag reporting rates were approximately 97.5% for single tagged fish and 99% for double tagged fish.

Biological samples

Table 2 summarizes the biological samples taken from Atka mackerel during the tag recovery cruise. Gonads, stomachs and otoliths were randomly collected from 10 fish (5 females and 5 males) from almost every tow for a total of 490 biological samples collected. During this cruise we recorded males in spawning color separately to identify spawning habitat.

Species Catch Composition

Although the focus of the tag recovery cruise was to catch Atka mackerel, 107 other species were caught during the hauls in each of the study areas (Table 6). The most abundant bycatch species were Northern rockfish (137 mt), Pacific Ocean perch (102 mt), and Pacific cod (98 mt). 96% of the catch was distributed among the eight most abundant species in the catch. The total catch of all species is summarized in Table 6. There were 75 species identified in the catches of which the weight was less than one mt.

Underwater Camera tows

During this cruise we conducted 14 underwater camera tows to examine bottom habitat, observe nest guarding, and establish methods for estimating relative fish abundance with non-extractive methods. The camera used was a towed single analog video camera with 2 lights (Figures 5 and 6). The camera had direct feed through a cable and the camera pictures could be directly observed from the vessel.

We attempted to tow the camera in approximately the same locations where we conducted tag recovery tows with the nets. For the most part we were able to drift over the locations of the net tows either before or after the tows were conducted. We were able to conduct 5 camera tows at Seguam pass, 3 camera tows at Tanaga Island, and 6 camera tows at Petrel bank. Locations of the camera tows are illustrated in Figure 7.

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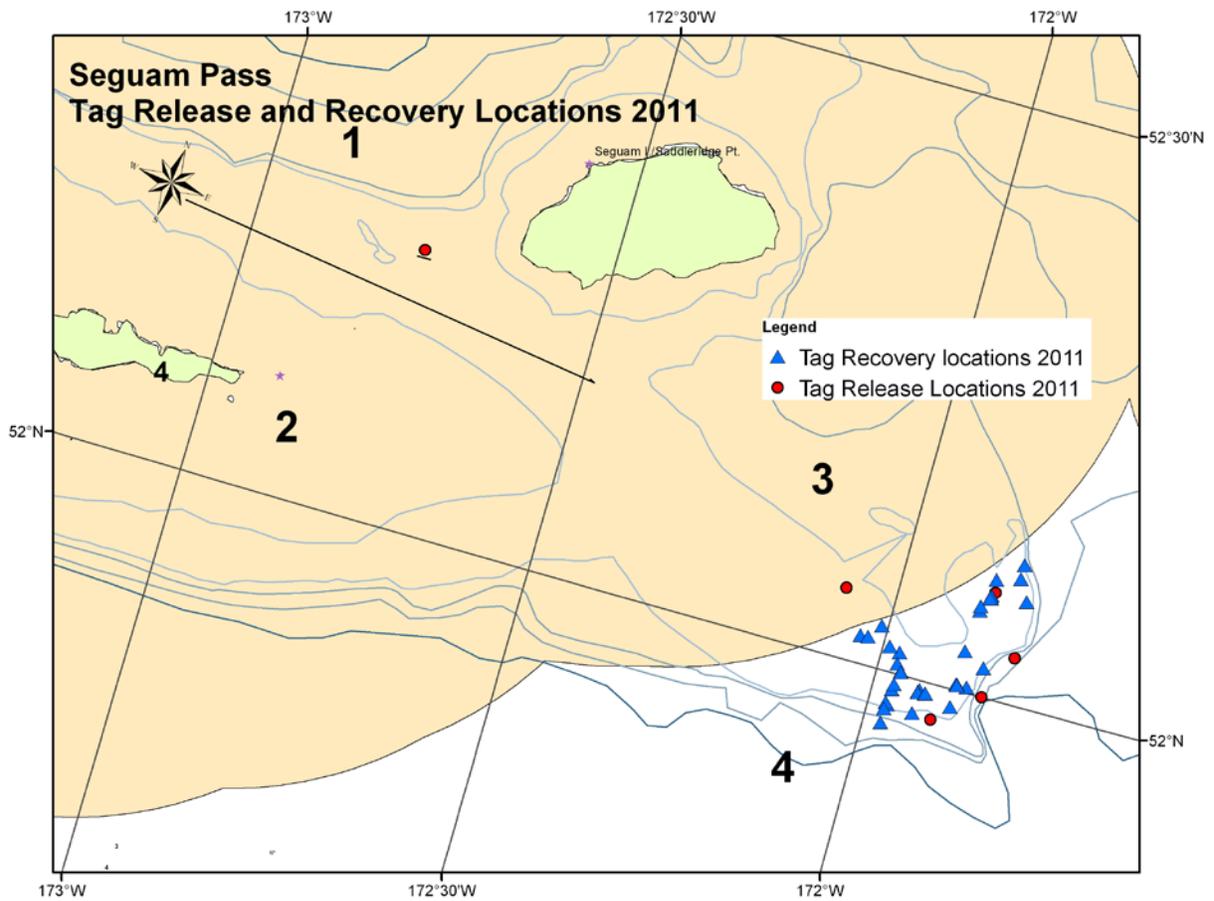


Figure 1. Tag release and recovery haul locations near Seguam Pass. Strata 1, 2 and 3 are inside the trawl exclusion zone and stratum 4 is outside the trawl exclusion zone. 10 tags were recovered at Seguam pass in 2011.

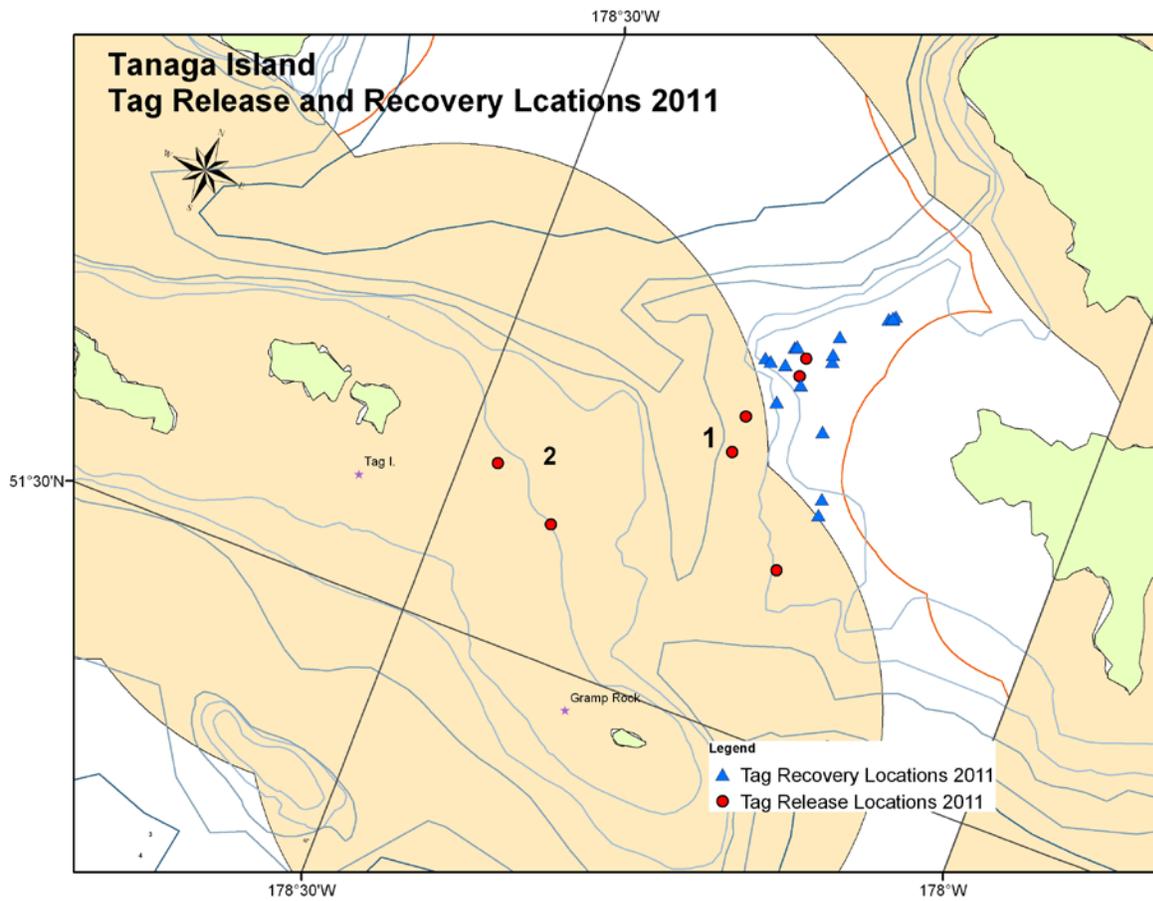


Figure 2. Tag release and recovery haul locations near Tanaga Island. Stratum 1 is outside the trawl exclusion zone, stratum 2 is inside the trawl exclusion zone. 86 tags were recovered in stratum 1 during the 2011 Atka mackerel tag recovery cruise.

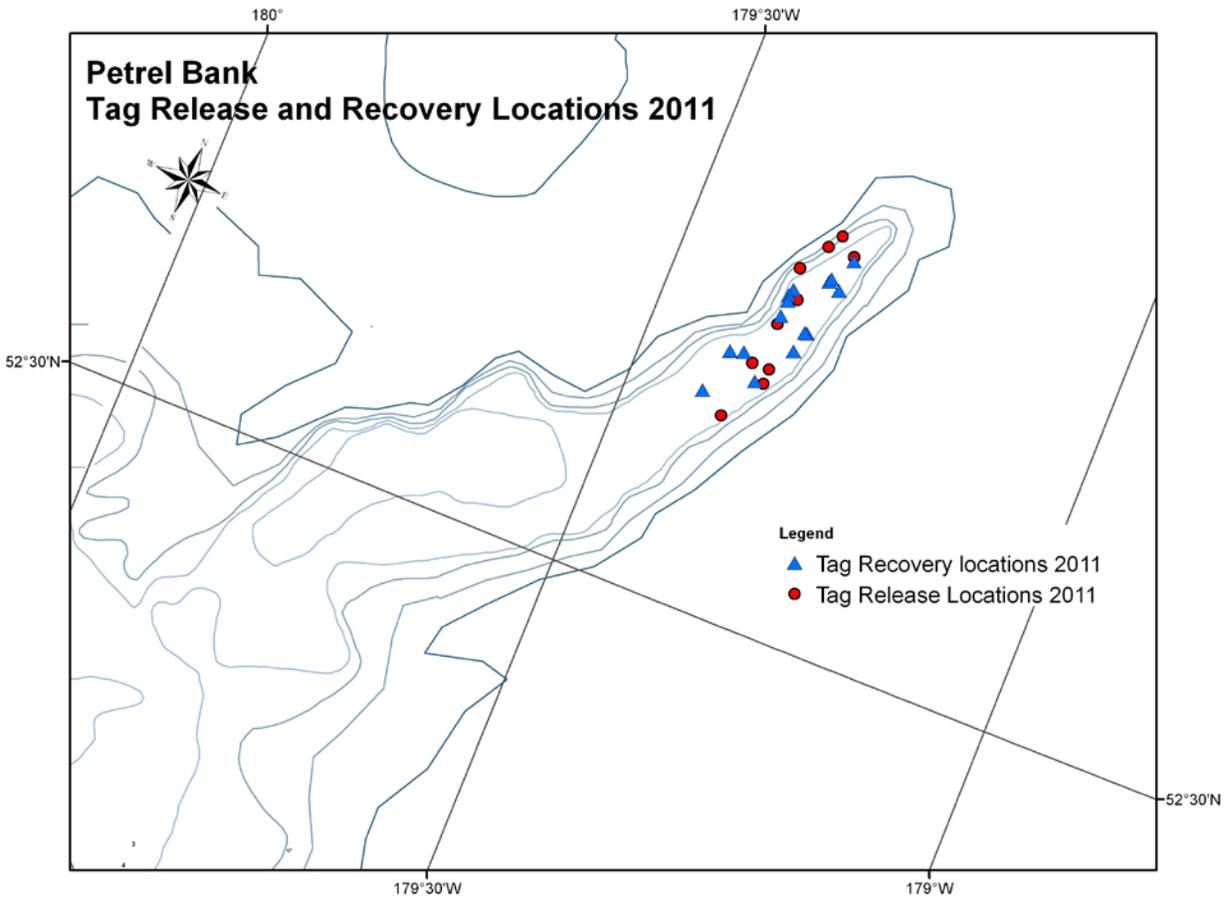
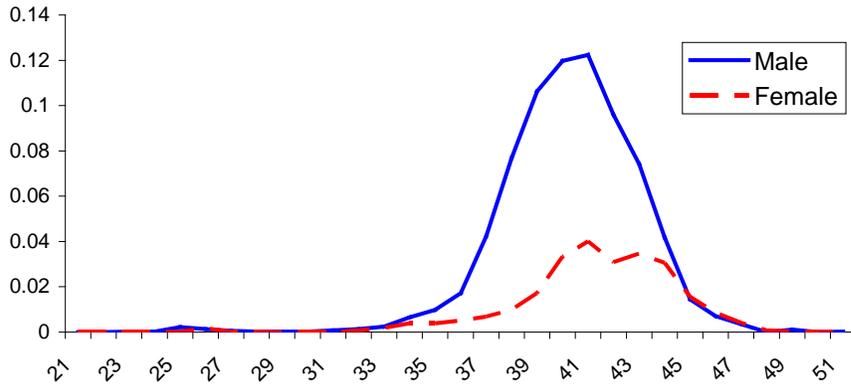
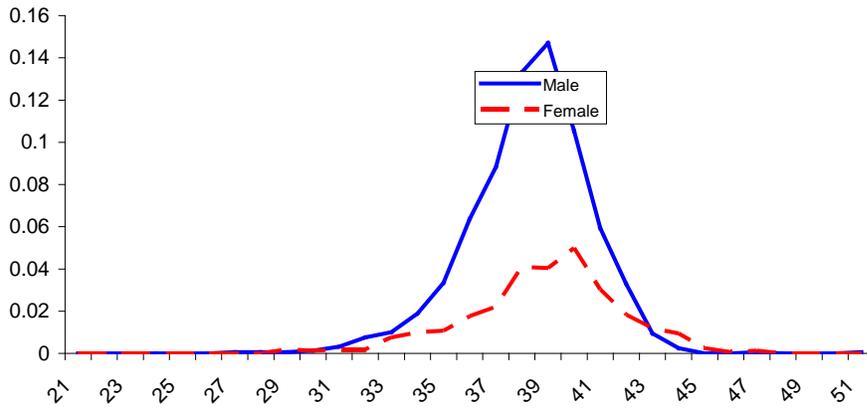


Figure 3. Tag release and recovery haul locations near Petrel Bank. 24 tags were recovered during the 2011 Atka mackerel tag recovery cruise.

Length Distribution at Seguam Pass 2011



Length Distribution at Tanaga Pass 2011



Length Distribution at Petrel Bank 2011

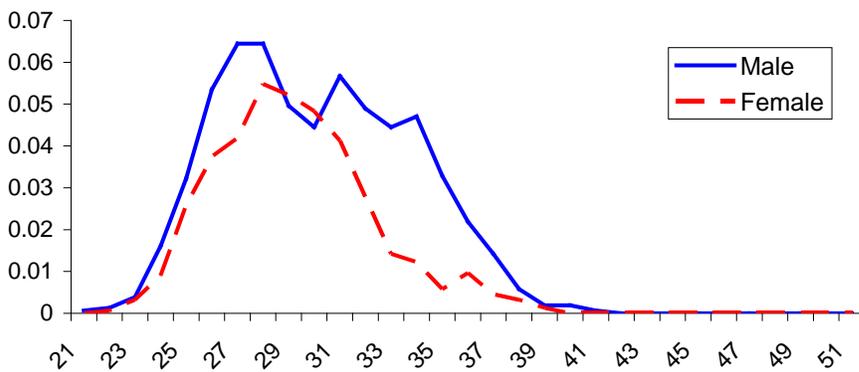


Figure 4: Length frequency distribution by sex in each study area.

Length Distribution in all study areas in 2011

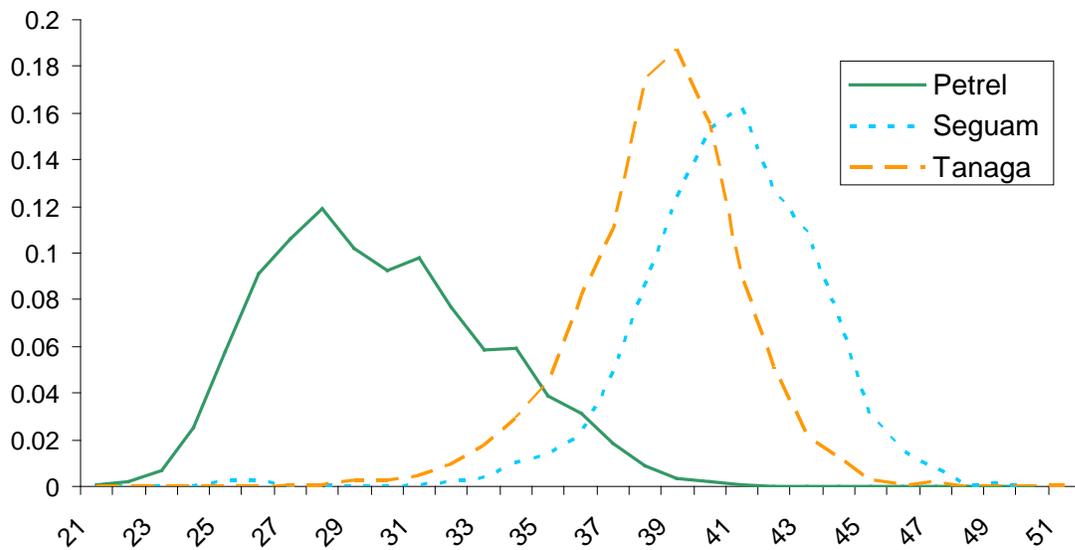


Figure 5: Length distribution both sexes combined for all three study area. Seguam Pass is in blue stippled, Tanaga pass in orange large stippled, and Petrel bank in the green solid line.



Figure 5: Underwater camera operation on board the Seafisher (Phil Dang observing live video image with video goggles while operating the winch).



Figure 6: Underwater camera retrieval. The camera wire hangs from a block that is attached to the ship's crane, the camera electronic box is attached to the winch on deck.

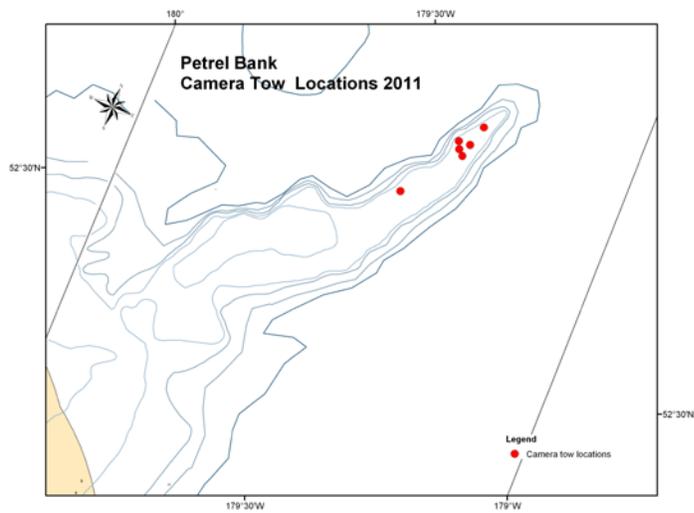
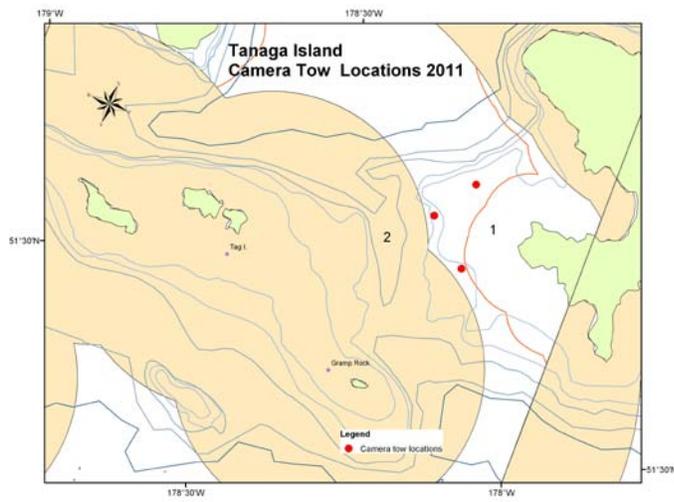
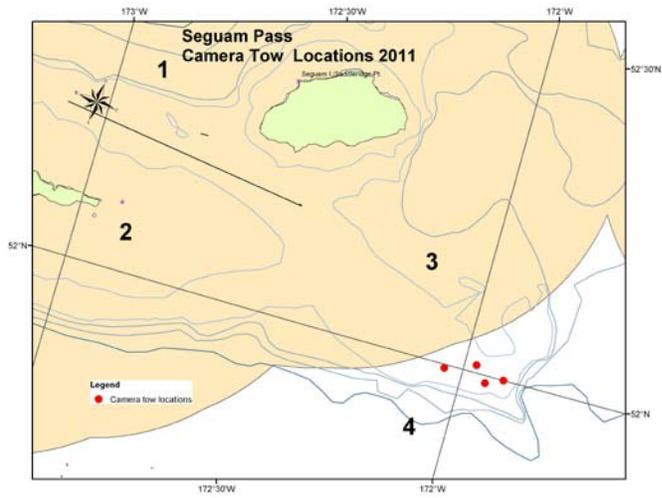


Figure 7: Camera tow locations in the three study areas.

Table 1. *Haul numbers, Atka mackerel catch and other catch*

Strata	Stratum	No. of Tows	Atka mackerel catch (mt)	Other Species (mt)	Total catch (mt)	% Atka mackerel in catch
Seguam Pass	4	41	770	238	1008	76 %
Tanaga Pass	1	17	366	108	473	77%
Petrel Bank	1	15	374	91	465	80%
Total		73	1510	437	1947	77%

Table 2. *Total number of Atka mackerel biological samples collected*

Samples Collected	Seguam Pass	Tanaga Pass	Petrel Bank	Total
Gonads	231	129	130	490
Stomachs	231	129	130	490
Otoliths	231	129	130	490
Lengths	3668	1585	1552	6805

Table 3: *Mean length, sex ratio and length count of Atka mackerel by sex for each area*

	Seguam			Tanaga			Petrel			Total
	Male	Female	Combined	Male	Female	Combined	Male	Female	Combined	
Mean Length	40.27	41.29	40.52	38.28	38.84	38.44	30.12	29.23	29.77	37.59
Sex ratio	75%	25%		72%	28%		61%	39%		
Count	2,749	919	3,668	1,140	445	1,585	942	610	1,552	6,805

Table 4. *Wild Tag recoveries by strata for each area*

Area	Numbers recovered	Numbers released	Moved inside to outside
	(same Stratum)		
Seguam Pass	10	5,804	0
Tanaga Pass	86	5,820	0
Petrel Bank	24	9,977	
Total	120	21,601	

Table 5. *Tag reporting rate for all areas*

Tags	Number released	Number recovered	Percent recovered
Single Pink Tag	639	617	96.5%
Double Pink Tag	71	70	98.6%

Table 6. Total catch of 108 species caught at Seguam Pass, Tanaga Pass and Petrel Bank in metric tons (MT). A value of “0” indicates that species was not found in hauls in that area.

SPECIES_NAME	Seguam	Tanaga	Petrel	Total
Total Catch	1011.27	473.02	466.85	1951.15
Atka mackerel	770.25	365.54	374.02	1509.80
Pacific ocean perch	77.34	1.34	22.90	101.57
northern rockfish	60.86	27.40	49.08	137.34
Pacific cod	38.28	52.07	7.97	98.32
light dusky rockfish	14.21	2.71	<1 MT	17.85
whiteblotched skate	11.67	<1 MT	0.00	11.84
Pacific halibut	10.55	1.69	0.00	12.23
Alaska skate	5.33	<1 MT	<1 MT	5.95
yellow Irish lord	3.06	2.26	<1 MT	5.33
arrowtooth flounder	2.60	<1 MT	<1 MT	3.72
prowfish	2.33	1.74	1.88	5.94
bigmouth sculpin	2.26	0.0	<1 MT	2.58
Kamchatka flounder	1.83	2.30	1.72	5.85
northern rock sole	1.80	2.86	<1 MT	4.73
harlequin rockfish	1.62	<1 MT	<1 MT	1.66
Aleutian skate	1.48	<1 MT	<1 MT	1.92
Sponge pieces	1.27	3.10	<1 MT	4.45
sponge unident.	<1 MT	5.80	<1 MT	6.76
darkfin sculpin	<1 MT	<1 MT	<1 MT	1.27
sea urchin unident.	<1 MT	<1 MT	<1 MT	<1 MT
sea anemone unident.	<1 MT	<1 MT	0.00	<1 MT
starfish unident.	<1 MT	<1 MT	<1 MT	<1 MT
rougheye rockfish	<1 MT	<1 MT	<1 MT	<1 MT
basketstarfish unident.	<1 MT	<1 MT	<1 MT	<1 MT
octocoral unident.	<1 MT	<1 MT	<1 MT	<1 MT
sablefish	<1 MT	0.00	0.00	<1 MT
black rockfish	<1 MT	<1 MT	0.00	<1 MT
chum salmon	<1 MT	<1 MT	<1 MT	<1 MT
longfin Irish lord	<1 MT	<1 MT	<1 MT	<1 MT
coral unident.	<1 MT	<1 MT	<1 MT	<1 MT
Greenland turbot	<1 MT	0.00	2.53	2.61
Bering skate	<1 MT	0.00	<1 MT	<1 MT
searcher	<1 MT	<1 MT	<1 MT	<1 MT
Pacific spiny lumpsucker	<1 MT	<1 MT	<1 MT	<1 MT
ronquil unident.	<1 MT	<1 MT	<1 MT	<1 MT
walleye pollock	<1 MT	<1 MT	3.20	3.24
seaweed	<1 MT	<1 MT	<1 MT	<1 MT
king salmon	<1 MT	0.00	0.00	<1 MT
brown king crab	<1 MT	0.00	<1 MT	<1 MT
garbage	<1 MT	<1 MT	<1 MT	<1 MT
shrimp unident.	<1 MT	<1 MT	<1 MT	<1 MT
squid unident.	<1 MT	<1 MT	<1 MT	<1 MT
giant grenadier	<1 MT	0.00	<1 MT	<1 MT
anthozoa	<1 MT	<1 MT	<1 MT	<1 MT
rock	<1 MT	<1 MT	<1 MT	<1 MT
hookear sculpin	<1 MT	0.00	0.00	<1 MT

SPECIES_NAME	Seguam	Tanaga	Petrel	Total
green sea urchin	<1 MT	<1 MT	0.00	<1 MT
southern rock sole	<1 MT	0.00	0.00	<1 MT
fish eggs unident.	<1 MT	0.00	<1 MT	<1 MT
Henricia sp.	<1 MT	0.00	0.00	<1 MT
northern sculpin	<1 MT	0.00	0.00	<1 MT
nudibranch unident.	<1 MT	<1 MT	<1 MT	<1 MT
rock jingle	<1 MT	<1 MT	<1 MT	<1 MT
scissortail sculpin	<1 MT	<1 MT	0.00	<1 MT
barnacle unident.	<1 MT	<1 MT	0.00	<1 MT
fuzzy crab	<1 MT	<1 MT	0.00	<1 MT
stamphia coccinea	<1 MT	0.00	0.00	<1 MT
sponge sculpin	<1 MT	0.00	<1 MT	<1 MT
fourhorn poacher	<1 MT	<1 MT	0.00	<1 MT
red Irish lord	<1 MT	0.00	0.00	<1 MT
Anthomastus sp	<1 MT	0.00	0.00	<1 MT
octopus unident.	<1 MT	<1 MT	0.00	<1 MT
red bat star	<1 MT	0.00	0.00	<1 MT
spectacled sculpin	<1 MT	0.00	<1 MT	<1 MT
roughskin sculpin	<1 MT	0.00	0.00	<1 MT
sculptured shirmp	<1 MT	0.00	0.00	<1 MT
Solaster sp.	<1 MT	0.00	0.00	<1 MT
scaled crab	<1 MT	<1 MT	<1 MT	<1 MT
sea cucumber unident.	<1 MT	<1 MT	<1 MT	<1 MT
yellow leafy sponge	<1 MT	0.00	0.00	<1 MT
jellyfish unident.	<1 MT	0.00	0.00	<1 MT
spiny red seastar	<1 MT	<1 MT	<1 MT	<1 MT
snailfish unident.	<1 MT	<1 MT	<1 MT	<1 MT
blotched snailfish	<1 MT	0.00	0.00	<1 MT
bubblegum coral	<1 MT	<1 MT	0.00	<1 MT
sculpin unident.	<1 MT	0.00	<1 MT	<1 MT
Alaska ronquil	<1 MT	0.00	0.00	<1 MT
rhinoceros crab	<1 MT	<1 MT	0.00	<1 MT
orange bat star	<1 MT	0.00	0.00	<1 MT
snail unident.	<1 MT	<1 MT	<1 MT	<1 MT
snail shell	<1 MT	<1 MT	<1 MT	<1 MT
soft coral unident.	<1 MT	0.00	0.00	<1 MT
prickleback unident.	<1 MT	0.00	0.00	<1 MT
sea grape	<1 MT	0.00	0.00	<1 MT
Plumarella sp.	<1 MT	0.00	0.00	<1 MT
sanguine sea star	<1 MT	0.00	0.00	<1 MT
fragile seastar	<1 MT	0.00	0.00	<1 MT
tunicate unident.	<1 MT	0.00	0.00	<1 MT
Decorator crab	<1 MT	0.00	0.00	<1 MT
champagne flute hydroid	<1 MT	0.00	0.00	<1 MT
Pteraster sp.	<1 MT	0.00	0.00	<1 MT
crab shell	<1 MT	0.00	0.00	<1 MT
Lophaster sp.	<1 MT	0.00	0.00	<1 MT
golden king crab	0	0.00	<1 MT	<1 MT
limpet unident.	0	0.00	<1 MT	<1 MT
Fusitriton oregonensis	0	0.00	<1 MT	<1 MT

SPECIES_NAME	Seguam	Tanaga	Petrel	Total
great sculpin	0	<1 MT	0.00	<1 MT
greenling unident.	0	<1 MT	0.00	<1 MT
invertebrate unident.	0	<1 MT	0.00	<1 MT
kelp greenling	0	<1 MT	0.00	<1 MT
leister sculpin	0	<1 MT	0.00	<1 MT
mussel unident.	0	<1 MT	0.00	<1 MT
rose sea star	0	<1 MT	0.00	<1 MT
scallop unident.	0	<1 MT	0.00	<1 MT
scapula sponge	0	<1 MT	0.00	<1 MT
sea peach	0	<1 MT	0.00	<1 MT