Alaska Fisheries Science Center
Resource Ecology & Fisheries Management
7600 Sand Point Way NE, Bldg. 4
Seattle, WA 98115
December 11, 2003

Cruise Report
F/T Seafisher Cruise
SE200301 (5 – 31 October 2003)

Project Title: Atka mackerel tag recovery Amchitka Island and Seguam Pass, Aleutian Islands Alaska

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Scientific Purpose

The first 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. A feasibility study was conducted in 1999 at Seguam Pass. In summer 2000, approximately 8000 tagged Atka mackerel were released in Seguam Pass, and in 2001 approximately 1000 were released during a truncated cruise. In June-July 2002, ~ 21,000 fish were tagged in the Seguam Pass area, and ~ 14,520 were tagged near Tanaga Pass. In July 2003 approximately 14, 750 fish were tagged and released in the Amchitka Island area. Recovery of tagged fish is supplied by the fishery in the open area outside the trawl exclusion zone. Recoveries in the closed area are provided by chartered recovery cruises. To compare charter recoveries to fishery recoveries, the charter also provides recovery in the area open to fishing. 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, and catch composition are also collected for each haul during the tag recovery charter.

Personnel SE200301 (Leg 1, Amchitka, October 5 – 20)

Name	Sex/Natl.	Position	Organization
1. S. McDermott	F/USA	Field Party Chief	AFSC/S
2. K. Rand	F/USA	Watch Leader	AFSC/S
3. S. McKillip	M/USA	Fish Biologist	AFSC/S
4. A. Harvison	M/USA	Fish Biologist	AFSC/S

Personnel SE200301 (Leg 2, Seguam Pass, October 20 – 31)

Name	Sex/Natl.	Position	Organization
1. K. Rand	F/USA	Field Party Chief	AFSC/S
2. D. Cooper	M/USA	Watch Leader	AFSC/S
3. S. Neidetcher	F/USA	Fish. Biologist	AFSC/S
4. B. Baker	M/USA	Fish. Biologist	AFSC/S

Cruise Schedule and Activities SE200301

5 October	Board vessel @ 0900, Dutch Harbor, AK
5-8	Transit to Amchitka Island @ 1800
8-15	Recovery tows, Amchitka Island
15-17	Transit, offload, crew change Adak, AK
18-20	Finish Recovery tows, Amchitka Island
20-21	McDermott off in Adak, AK, transit to Seguam Pass
21-24	Recovery tows in Seguam Pass
24-25	Offload in Nazan Bay, AK
26-30	Recovery tows in Seguam Pass
30-31	Transit to Adak, AK
31	Offload vessel in Adak, AK

Summary of Results

Atka mackerel Recoveries

Total Atka mackerel catch by area

During the years 1999-2002 NMFS has released roughly 32,000 tags in Seguam Pass and 14,520 in Tanaga Pass in each of the strata shown in Figures 1 and 2. During 2003 roughly 14, 750 tags were released near Amchitka Island (no fish were tagged in Seguam Pass in 2003). This recovery charter recovered tagged fish in the Seguam Pass and Amchitka Island areas. Table 1 shows the distribution of tows among the strata near Amchitka Island and in Seguam Pass. A total of 54 tows were conducted near Amchitka Island and 41 tows were conducted in Seguam Pass. Table 2 shows the distribution of Atka mackerel catch by strata in both study areas. A total of 794 MT was caught near Amchitka Island, and 983 MT were caught in Seguam Pass.

Length-frequency distribution

Lengths of 150 fish per tow were measured for each tow in both study areas. Table 3 shows the total number of fish that were sexed and lengthed. Figure 3 illustrates the percent length frequency distributions for Atka mackerel during the release and recovery in Amchitka and only the recovery cruise in Seguam Pass. The length-frequency distribution of fish at Seguam Pass

was very similar for both sexes and unimodal at 35 cm. There seemed to be a greater proportion of large fish in the population with a small secondary mode at 43 cm. In Amchitka the length frequency distribution of fish during the recovery cruise was similar to that in Seguam with a unimodal distribution at 35 cm for males and 34 cm for females. There also seemed a greater proportion of larger fish in the population. The Amchitka tag recovery length-distribution in October was different from the length distribution during the tag release in July. During the tag release the fish were larger with a single mode at 42 cm for females and at 41 cm for males. There seemed to be a greater proportion of smaller fish during the release cruise. This change in length-frequency distribution suggests a seasonal movement, perhaps related to spawning, or a recruitment of young fish to the population. There has also been an interannual change in size distribution. The length-frequency distribution of Seguam fish caught during both tagging and recovery cruises in 2000 was uni-modal with a mean ~ 45 cm. The bimodal shape of the length-frequency distributions in 2001 and 2002 suggests an influx of younger fish perhaps due to strong recruitment. In 2003 the unimodal distribution of small fish again points to an influx of smaller fish in October toward the end of spawning season when the recovery cruise takes place.

Species Catch Composition

Although the focus of the tag recovery was to catch Atka mackerel, other species besides Atka mackerel were caught during the tows (Tables 4 and 5). The most abundant were Northern rockfish, Pacific cod, Pacific ocean perch and Walleye Pollock near Amchitka Island and in Seguam Pass.

Wild tag recoveries

87 'wild tagged' Atka mackerel were caught near Amchitka Island, and 17 were caught in Seguam Pass. 'Wild tagged' fish are fish that have been tagged during a previous tag release cruise as opposed to tagged fish that were seeded into the catch during the recovery cruise to obtain the tag recovery rate (see below).

Tag recovery rate

Recovery rate is defined as the proportion of tagged fish caught by the vessel in a single haul that are actually found and reported. To determine this, the scientific personnel in the factory tagged 20 Atka mackerel and distributed them randomly throughout the catch, this was done for all hauls during this cruise. Two different colors of tags have been used to tag fish over the course of three years in Seguam Pass (pink and red), therefore 10 fish were tagged with each color for the seeding of the catch at Seguam Pass. Only pink tags were used at Amchitka Island in the 2003 release event, therefore only pink tags were used for the seeding of the catch in the Amchitka Island area. These "seeded" tagged fish were recovered in the factory by the vessel and scientific crew. Tables 6 and 7 show the recovery rates in all areas. Recovery rates were high, ranging from 90% to 100%, depending on tag color and area.

Biological samples

Table 3 summarizes the biological samples taken from Atka mackerel during the recovery cruises. Gonads, stomachs and otoliths were collected from 10 fish (5 females and 5 males) from almost every tow.

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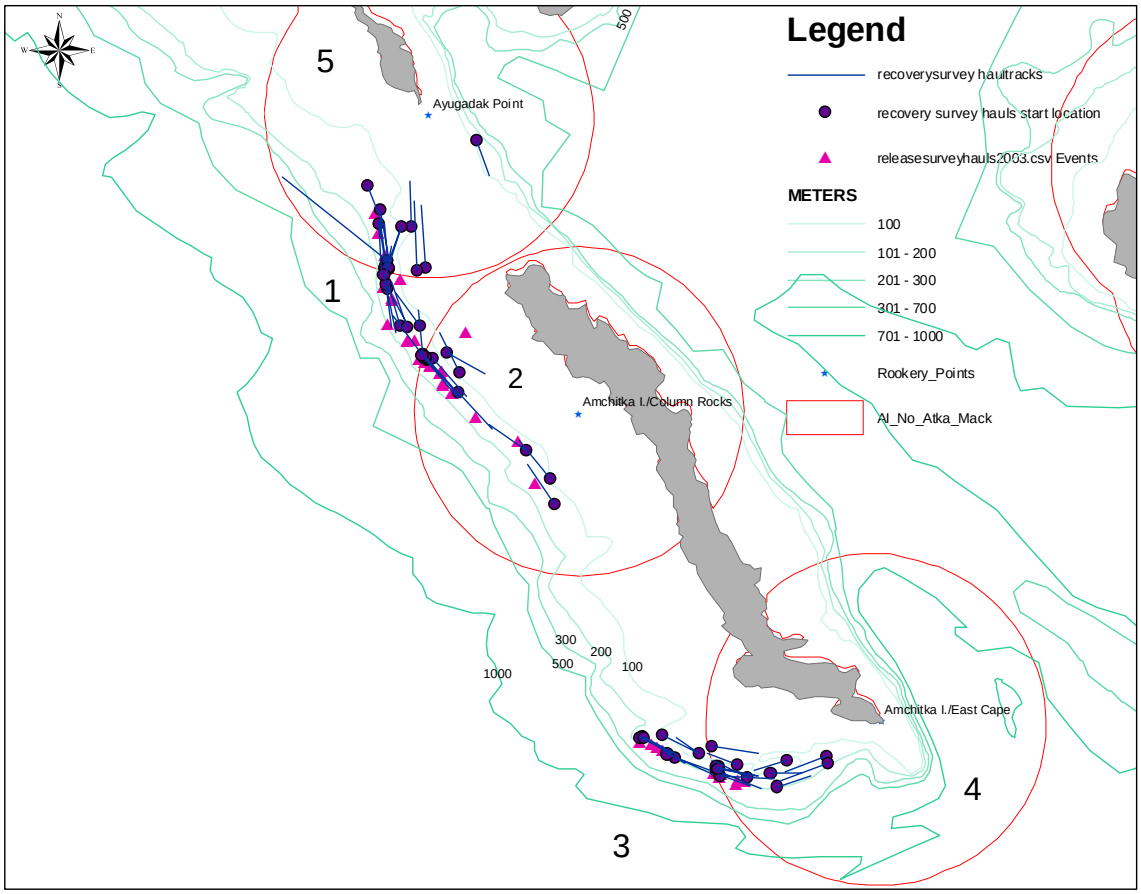

Figure 1: Stratum locations and tag-release and recovery haul locations near Amchitka Island. Area 2 , 4 and 5 are inside the trawl exclusion zones, areas 1 and 3 are outside the trawl exclusion zone.

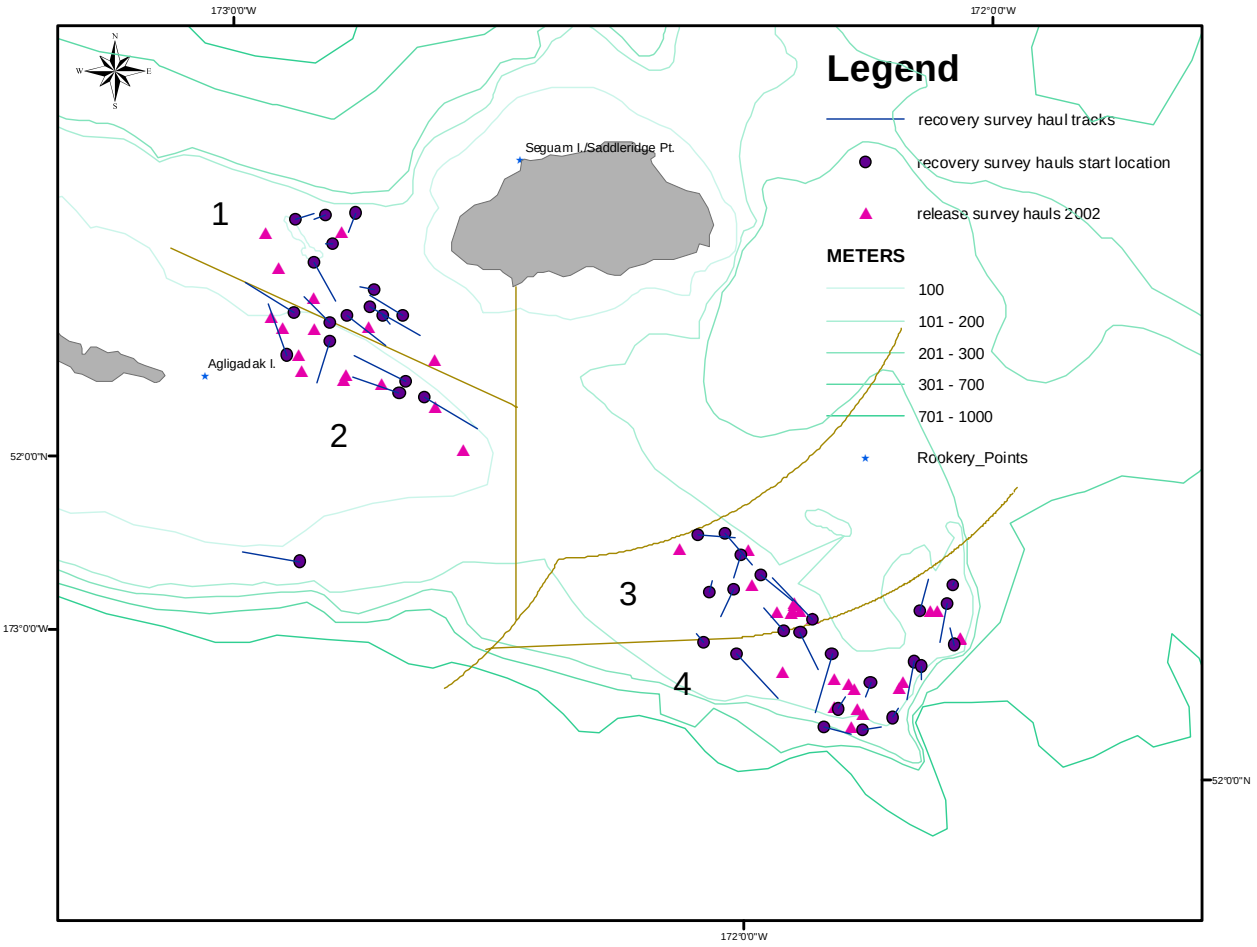

Figure 2. Strata locations and tag-release and recovery haul locations in Seguam Pass. Strata 1, 2 and 3 are inside the trawl exclusion zone, stratum 4 is outside the trawl exclusion zone. Tag release haul locations are from the 2002 tag-release survey (no tags were released in 2003).

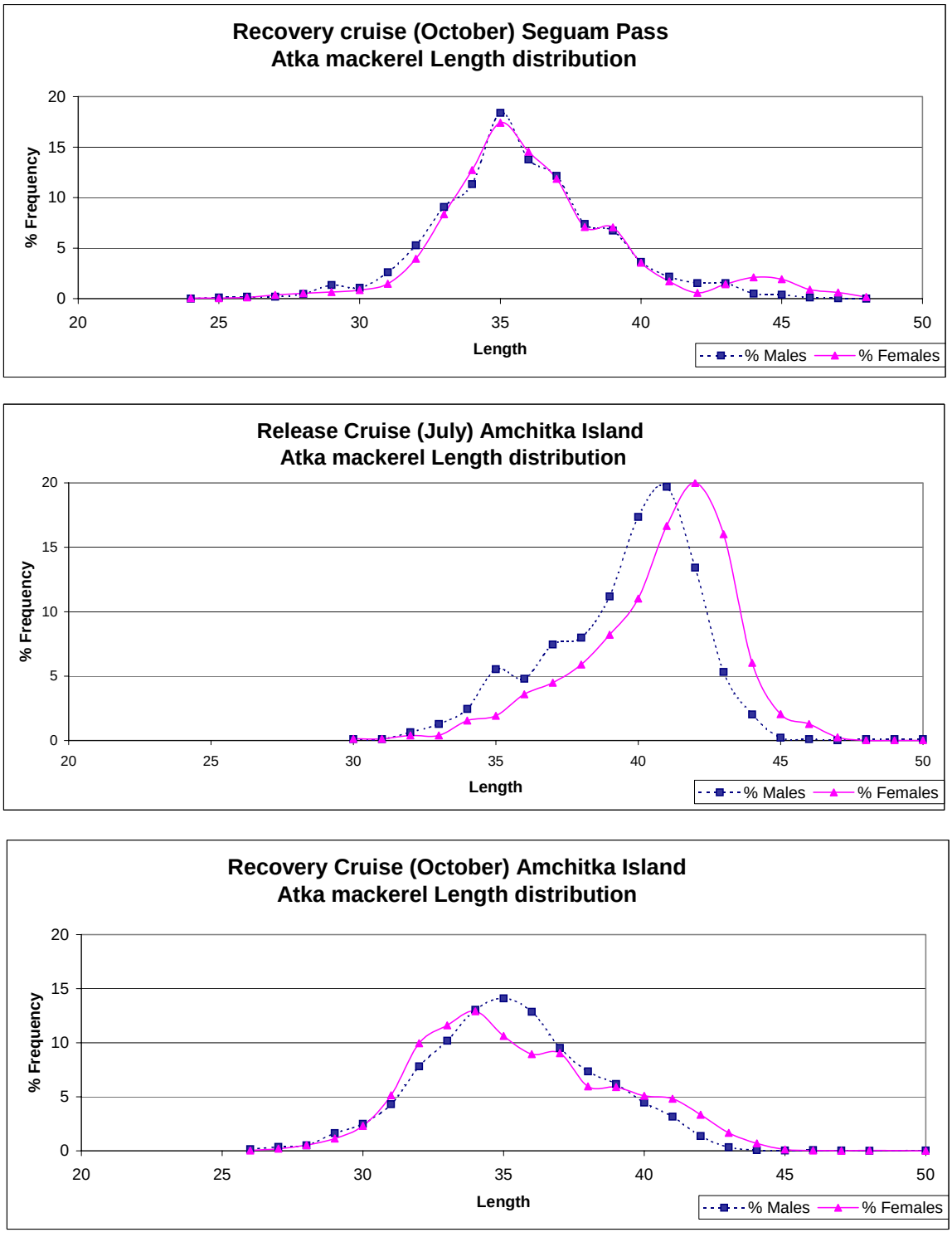

Figure 3: Percent length frequency distributions by sex for Atka mackerel during the recovery cruise in 2003 at Seguam Pass and the release and recovery cruise in 2003 in the Amchitka Island area.

Table 1. Tows per strata

Strata	1	2	3	4	5
Amchitka Island	8	10	8	14	14
Seguam Pass	11	6	10	14	N/A

Table 2. Atka Mackerel catch per strata

Strata	1	2	3	4	5
Amchitka Island in MT	90.29	50.98	141.60	242.85	268.76
Seguam Pass in MT	360.72	31.485	227.67	363.24	N/A

Table 3. Total number of biological samples collected

Samples Collected	Amchitka Island	Seguam Pass
Gonads	417	358
Stomachs	417	358
Otoliths	417	358
Lengths	7417	5068

Table 4. Total catch by species at Amchitka Island (in MT)

SPECIES	MT
Atka mackerel	794.487
arrowtooth flounder	0.246
chum salmon	0.020
dark dusky rockfish	0.040
dusky rockfish unident.	0.056
flathead sole	0.013
Greenland turbot	0.048
harlequin rockfish	0.259
Kamchatka flounder	0.242
light dusky rockfish	0.795
northern rockfish	240.052
Pacific cod	55.649
Pacific halibut	0.275
Pacific ocean perch	85.581
prowfish	1.461
redstripe rockfish	0.005
rex sole	0.011
rock sole sp.	1.546
rougheye rockfish	0.381
skate unident.	1.108
squid unident.	0.113
walleye pollock	10.521
*Other	9.130

*Includes: cusk-eel unident., eelpout unident., fish unident., greenling unident., grenadier unident., horsehair crab, invertebrate unident., irish lord, kelp unident., lumpsucker unident., misc organic, non-biological material, octopus unident., poacher unident., ronquil unident., sculpin unident., searcher, snailfish unident., unsorted shab.

Table 5. Total catch by species at Seguam Pass (in MT)

SPECIES	MT
Atka mackerel	983.117
arrowtooth flounder	1.40
chum salmon	0.030
Greenland turbot	0.471
harlequin rockfish	0.014
Kamchatka flounder	0.092
light dusky rockfish	0.861
northern rockfish	13.661
Pacific cod	21.059
Pacific halibut	1.041
Pacific ocean perch	10.682
prowfish	0.190
redstripe rockfish	0.003
rock sole sp.	0.741
rougheye rockfish	0.011
sablefish	0.056
skate unident.	1.146
squid unident.	0.012
walleye pollock	10.298
*Other	3.810

* Includes: basketstarfish unident., bigmouth sculpin, blackfin sculpin, blotched snailfish, cusk-eel unident., darkfin sculpin, eelpout unident., invertebrate unident., irish lord, jellyfish unident., lumpsucker unident., misc. inorganic, non-biological material, octopus unident, pacific spiny lumpsucker, poacher unident., rock, sculpin unident., searcher, snailfish unident., sponge unident., starfish unident., unsorted shab, yellow irish lord.

Table 6. Tag recovery rate at Amchitka Island

Tags	Amchitka Island
Single Pink Tag	95.4%
Double Pink Tag	98.0%

Table 7. Tag recovery rate in Seguam Pass

Tags	Seguam Pass
Single Pink Tag	95.3%
Double Pink Tag	100%
Red Single Tag	90%
Double Red Tag	100%