

Regional Information Report 1J07-04

2006 NSEI (Chatham Strait) Tagging Survey

by

Victoria O'Connell

and

Deidra Holum

March 2007

Alaska Department of Fish and Game

Division of Commercial Fisheries



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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative Code	AAC	fork length	FL
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid-eye-to-fork	MEF
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	mid-eye-to-tail-fork	METF
hectare	ha	at	@	standard length	SL
kilogram	kg	compass directions:		total length	TL
kilometer	km	east	E		
liter	L	north	N	Mathematics, statistics	
meter	m	south	S	<i>all standard mathematical signs, symbols and abbreviations</i>	
milliliter	mL	west	W	alternate hypothesis	H _A
millimeter	mm	copyright	©	base of natural logarithm	<i>e</i>
		corporate suffixes:		catch per unit effort	CPUE
		Company	Co.	coefficient of variation	CV
Weights and measures (English)		Corporation	Corp.	common test statistics	(F, t, χ^2 , etc.)
cubic feet per second	ft ³ /s	Incorporated	Inc.	confidence interval	CI
foot	ft	Limited	Ltd.	correlation coefficient	
gallon	gal	District of Columbia	D.C.	(multiple)	R
inch	in	et alii (and others)	et al.	correlation coefficient	
mile	mi	et cetera (and so forth)	etc.	(simple)	r
nautical mile	nmi	exempli gratia		covariance	cov
ounce	oz	(for example)	e.g.	degree (angular)	°
pound	lb	Federal Information Code	FIC	degrees of freedom	df
quart	qt	id est (that is)	i.e.	expected value	<i>E</i>
yard	yd	latitude or longitude	lat. or long.	greater than	>
		monetary symbols		greater than or equal to	≥
		(U.S.)	\$, ¢	harvest per unit effort	HPUE
		months (tables and figures): first three letters	Jan, ..., Dec	less than	<
Time and temperature		registered trademark	®	less than or equal to	≤
day	d	trademark	™	logarithm (natural)	ln
degrees Celsius	°C	United States (adjective)	U.S.	logarithm (base 10)	log
degrees Fahrenheit	°F	United States of America (noun)	USA	logarithm (specify base)	log ₂ , etc.
degrees kelvin	K	U.S.C.	United States Code	minute (angular)	'
hour	h	U.S. state	use two-letter abbreviations (e.g., AK, WA)	not significant	NS
minute	min			null hypothesis	H ₀
second	s			percent	%
				probability	P
Physics and chemistry				probability of a type I error (rejection of the null hypothesis when true)	α
all atomic symbols				probability of a type II error (acceptance of the null hypothesis when false)	β
alternating current	AC			second (angular)	"
ampere	A			standard deviation	SD
calorie	cal			standard error	SE
direct current	DC			variance	
hertz	Hz			population	Var
horsepower	hp			sample	var
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

REGIONAL INFORMATION REPORT NO. 1J07-04

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By
Victoria O'Connell
Alaska Department of Fish and Game, Division of Commercial Fisheries, Sitka
and
Deidra Holum
Alaska Department of Fish and Game, Division of Commercial Fisheries, Douglas

Alaska Department of Fish and Game
Division of Commercial Fisheries
Douglas, Alaska

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Victoria O'Connell,
Alaska Department of Fish and Game, Division of Commercial Fisheries,
304 Lake Street, Room 103, Sitka, AK, USA
and
Deidra Holum
Alaska Department of Fish and Game, Division of Commercial Fisheries,
802 3rd Street, Box 240020, Douglas, AK, USA

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ABSTRACT

The Alaska Department of Fish and Game (ADF&G) manages the Northern Southeast Inside (NSEI) Subdistrict sablefish (*Anoplopoma fimbria*) fishery in southeast Alaska. ADF&G uses mark/recapture methods and a Peterson estimate for estimating abundance of this resource (Seber 1982). In 2006 the *R/V Zoltoi* was used to set longlined pot gear to catch sablefish in NSEI and 6,075 sablefish were marked and released. This report summarizes methods and preliminary results of this survey.

Key words: Sablefish, NSEI, Chatham Strait, mark/recapture, tagging.

INTRODUCTION

The ADF&G uses longlined pot gear to capture sablefish for a mark/recapture study in the NSEI subdistrict of southeast Alaska. In 2006 the *R/V Zoltoi* was contracted to conduct this survey. The survey was conducted from June 1 through June 25.

The specific objectives of the survey were:

1. Capture in pots, tag, clip and release at least 5,000 fish greater than 550 mm in fork length
2. Capture in pots, clip, and release fish between 510 mm and 550 mm
3. Capture in pots, record lengths, and release unmarked fish less than 510 mm
4. Release fish in statistical areas 345803, 345731, 345702, 345701, 345631, 345603, and 335701 in proportion to the commercial fishery harvest in 2005 (Appendix A, Table 1).
5. Within a statistical area release marked fish throughout the area.
6. Record length, tag number and release latitude and longitude for each tagged fish.
7. Biologically sample from the first fish in a pot string and every 10th fish thereafter, regardless of size.

METHODS

Details of the survey operations are provided in the Standard Operating Procedures Manual (Appendix A).

SURVEY AREA

The survey area included the waters of Chatham Strait between 58°19' and 56°10' N latitude (Figure 1).

VESSEL

The vessel *R/V Zoltoi*, a 101' research vessel, was chartered to conduct the survey between June 1 and June 25, 2006. Contract costs were \$115,000 and included fuel, food, bait, and all fishing gear. The vessel crew and scientific staff are listed in Table 1.

GEAR

The pots used were 5-foot diameter cone sablefish pots and most were equipped with two opposing tunnels (Figure 2). A string of gear consisted of two ends with floating line with two 18" hard buoys followed by two large plastic buoy bags, 50 fathoms of line, a sash weight, buoy line equal to ~ 350 fm depending on set depth, a surge weight, 50 fm of line, and an anchor. The

groundline was configured with 40 beckets spaced at 50 fm intervals. The number of pots set per string varied from 25–45 with an average of 39 pots set per string.

BAIT

The bait mixture used was equal proportions of chopped squid and chopped herring. Generally, eight boxes of bait were used per set but the bait load varied somewhat with area and conditions.

TAGS

Sablefish were tagged dorsally using orange T-bar tags numbered between 018000–023352. Fish that were released marked (all released fish >500 mm) had the lower lobe of their caudal fin clipped (Appendix A, Figure 1).

RESULTS

SCHEDULE

The *Zoltoi* left Sitka on June 1 and made the first gear set that day. Most days the vessel set 2 strings of gear and hauled the strings set the previous day (Table 2). The vessel worked central Chatham and then moved north before returning to the middle portion of Chatham. On June 7, mechanical problems developed with the autopilot and generator and the vessel went to Petersburg for parts and repair. After the repairs were completed the vessel then fished in Frederick Sound (335701) from June 9 through June 12 before returning to central Chatham. Thereafter the *Zoltoi* worked south finishing the survey in statistical area 345603 on July 25.

SET INFORMATION

Set locations and detail are listed in Table 2. A total of 1533 pots were deployed in 42 sets. The sets were made in depths from 181 to 391 fm. Soak time averaged 18 hours 19 minutes and ranged from 7 hours to 22.5 hours. Haul time averaged 2 hours 5 minutes and ranged from 1 hour 20 minutes to 4 hours 50 minutes. All deployed pots were successfully recovered.

CATCH AND TAGGING INFORMATION

Fourteen different species or groups of fish were caught (Table 3). The survey catch by species and set is presented in Table 4. Sablefish were the dominant species followed by arrowtooth (*Atheresthes stomias*), halibut (*Hippoglossus stenolepis*), dover sole (*Microstomus pacificus*), and brown crab (*Lithodes aequispina*). A total of 8,935 individual fish or shellfish were caught, 7,262 of those were sablefish (Table 3).

The detail regarding sablefish disposition is shown in Table 4. Of the 7,262 sablefish caught: 5,325 were tagged with an external tag, clipped, and released; 750 were clipped only and released (no tags); 523 were sacrificed as biological samples; 320 were shook due to fatal wounds; 249 were less than 510 mm and therefore released without a clip or tag; and 92 fish, which had been previously tagged, were released with their original tag.

Tagging goals by statistical area (Appendix A, Table 1) were nearly met in all areas but Frederick Sound (Table 5). Tags were distributed consistent with the approximate abundance of the population, based on percent of harvest by statistical area (Figure 3). Fish between 510 and 550 mm were more common in 345701 as were fish less than 510 mm (Table 5). Sand flea predation was most often noted north of Sitkoh Bay.

BIOLOGICAL SAMPLES

Fork length was taken on 7,260 sablefish. Length varied from 440 mm to 1030 mm with an average length of 637 mm (Figure 4). Sablefish that were either clipped (510-550 mm) or tagged and clipped (>550 mm) had an average length of 641 mm (Figure 5).

Every 10th fish was sampled for length, weight, sex, maturity and otoliths. A total of 523 sablefish were sampled and they had an average length of 638 mm (Figure 6). Females were larger than males with an average length of 657 mm (largest mode at 680 mm) compared to an average male length of 615 mm (largest mode at 610 mm) (Figure 7). Females accounted for 46% of the sampled fish and 6% of the females and 16% of the males were immature.

REFERENCES CITED

Seber, G.A.F. 1982. The estimation of animal abundance, *second edition*. McMillan Publishing Co., New York.

Table 1.—Crew and scientific staff, 2006 NSEI Tag Survey.

Name	Position	Affiliation	Leg
John Jorgenson	Skipper	R/V Zoltoi	both
Mark Deardorff	Engineer	R/V Zoltoi	both
Mark Fenner	Mate	R/V Zoltoi	both
Justin Frances	Chef	R/V Zoltoi	both
Deidra Holum	Survey Leader	ADF&G	both
Beverly Richardson	scientific staff	ADF&G	one
Kamala Carroll	scientific staff	ADF&G	one
Cleo Brylinsky	scientific staff	ADF&G	two
Rebecca Knight	scientific staff	ADF&G	two

Table 2.—Set location and detail information, 2006 NSEI tagging survey.

Set	Area	Start		End			Hours				Depth (fm)								
		Lat Deg	Min	Long Deg	Min	Lat Deg	Min	Long Deg	Min	Date	Time Set	Soak time	Haul time	Hauled	# Pots	Start	End	Avg	Substrate
1	345701	57	27.83	134	41.02	57	26.32	134	43.34	6/1/06	16:45	17.67	4.83	Opposite	45	271	316	291	Mud/Gravel
2	345731	57	36.91	134	50.01	57	35.42	134	47.37	6/1/06	19:30	23.78	3.72	Same	45	327	327	319	Mud/Clay
3	345701	57	22.95	134	40.23	57	23.94	134	43.13	6/2/06	17:30	19.50	2.42	Opposite	40	332	330	318	Mud/Gravel
4	345731	57	42.58	134	45.88	57	44.37	134	47.17	6/3/06	6:30	12.17	2	Same	30	291	289	289	Mud/Gravel
5	345803	58	3.37	134	55.75	58	1.40	134	54.34	6/4/06	12:15	7.00	1.75	Same	40	334	304	304	Mud
6	345803	58	8.70	134	54.96	58	10.29	134	56.65	6/4/06	10:20	9.67	1.58	Opposite	40	356	331	354	Mud
7	345803	58	17.05	134	1.21	58	18.64	134	59.10	6/5/06	12:01	7.98	1.75	Opposite	15	326	319	326	Mud/Soft
8	345731	57	51.97	134	46.50	57	54.18	134	46.47	6/5/06	13:30	18.50	1.5	Opposite	20	263	277	266	Mud
9	345731	57	47.06	134	52.95	57	48.81	134	50.51	6/5/06	15:00	21.83	2.42	Opposite	24	289	294	289	Mud
10	345731	57	39.94	134	46.98	57	41.43	134	46.28	6/6/06	11:50	18.58	1.25	Opposite	25	277	295	306	Mud/Gravel
11	345731	57	30.51	134	44.61	57	32.16	134	42.03	6/6/06	17:40	15.33	1.33	Opposite	25	309	320	316	Mud
12	335701	57	11.85	134	49.40	57	13.23	134	52.85	6/9/06	20:15	10.08	1.75	Opposite	40	246	254	255	Mixed
13	335701	57	15.36	134	46.27	57	13.63	134	43.33	6/10/06	9:40	6.00	1.67	Same	40	211	203	199	Mud
14	335701	57	13.18	134	55.78	57	11.59	134	53.06	6/10/06	11:10	18.33	1.75	Same	40	186	225	209	Mud
15	345702	57	3.32	134	13.26	57	5.27	134	10.86	6/10/06	20:00	15.00	1.75	Same	40	197	187	187	Mud/Soft
16	345702	56	57.26	134	21.80	56	58.53	134	17.48	6/11/06	10:20	21.00	1.67	Opposite	40	189	182	188	Mud
17	345702	57	0.31	134	18.56	56	59.03	134	22.59	6/11/06	15:00	18.50	2	Same	40	188	189	192	Mud/Soft
18	345631	56	58.40	134	41.61	56	56.56	134	39.69	6/12/06	14:05	21.08	1.33	Opposite	40	338	342	340	Mud
19	345701	57	6.01	134	42.19	57	4.09	134	40.88	6/12/06	15:55	12.08	1.83	Opposite	40	356	352	355	Mud/Soft
20	345701	57	12.57	134	46.64	57	10.67	134	44.65	6/13/06	7:40	22.83	3.08	Same	40	322	335	334	Mud/Soft
21	345701	57	18.44	134	43.10	57	16.60	134	41.28	6/13/06	15:45	20.50	2.25	Same	40	339	363	372	Rock
22	345701	57	13.91	134	47.86	57	12.59	134	45.03	6/14/06	11:15	19.25	2.67	Same	40	328	340	330	Mud
23	345701	57	20.66	134	40.83	57	22.57	134	38.85	6/14/06	16:00	20.00	1.75	Opposite	40	345	356	343	Mud
24	345701	57	8.70	134	44.67	57	10.38	134	46.39	6/15/06	10:20	20.83	2.83	Opposite	40	338	327	333	Mud
25	345701	57	3.61	134	42.67	57	5.25	134	44.80	6/15/06	16:50	19.17	3	Opposite	40	359	342	353	Mud

-continued-

Table 2.—continued Page 2 of 2.

Set	Area	Start			End			Hours				Depth (fm)							
		Lat Deg	Min	Long Deg	Min	Lat Deg	Min	Long Deg	Min	Date	Time Set	Soak time	Haul time	Hauled	# Pots	Start	End	Avg	Substrate
25	345701	57	3.61	134	42.67	57	5.25	134	44.80	6/15/06	16:50	19.17	3	Opposite	40	359	342	353	Mud
26	345701	57	1.79	134	42.10	57	3.72	134	40.49	6/16/06	11:30	19.25	3.5	Opposite	40	349	350	355	Mud/Clay
27	345631	56	53.19	134	34.44	56	54.77	134	36.52	6/16/06	17:20	20.67	2.75	Opposite	40	357	358	363	Mud
28	345702	56	55.54	134	26.21	56	57.18	134	22.78	6/17/06	12:30	19.00	2	Same	40	181	188	182	Mud/Hard
29	345702	56	58.60	134	16.65	56	59.36	134	12.77	6/17/06	18:25	18.33	1.75	Opposite	40	188	218	203	Mud
30	345631	56	52.87	134	33.49	56	52.07	134	36.75	6/18/06	10:40	20.67	1.92	Same	40	363	369	369	Mud
31	345631	56	47.97	134	33.92	56	47.61	134	37.21	6/18/06	16:45	19.58	1.75	Opposite	40	397	391	395	Mud
32	345631	56	44.58	134	32.09	56	46.36	134	30.76	6/19/06	11:00	20.00	1.75	Opposite	40	388	374	381	Mud
33	345631	56	41.36	134	36.40	56	42.88	134	34.15	6/19/06	15:45	19.08	1.67	Opposite	40	374	380	376	Mud
34	345631	56	45.08	134	36.87	56	46.53	134	34.59	6/20/06	10:00	21.17	1.5	Same	40	402	397	393	Mud
35	345631	56	37.12	134	33.24	56	38.77	134	35.01	6/20/06	13:35	21.75	1.75	Opposite	40	353	350	351	Mud
36	345631	56	36.96	134	28.84	56	38.65	134	30.65	6/21/06	10:35	21.33	1.58	Opposite	40	316	373	335	Mud/Gravel
37	345631	56	30.57	134	33.36	56	32.24	134	31.73	6/21/06	14:40	21.50	1.83	Opposite	40	296	354	322	Mud
38	345631	56	33.99	134	30.25	56	35.63	134	32.07	6/22/06	10:55	20.08	2.17	Opposite	40	346	352	355	Mud
39	345631	56	35.10	134	34.95	56	33.32	134	32.96	6/22/06	15:25	20.92	1.67	Same	40	314	329	320	Mud/Hard
40	345603	56	25.92	134	35.01	56	27.90	134	36.44	6/23/06	11:15	20.67	2.25	Same	32	323	319	321	Mud
41	345603	56	21.61	134	26.69	56	20.25	134	29.07	6/23/06	15:45	22.75	2.42	Same	12	396	360	393	Mud
42	345603	56	10.59	134	26.96	56	12.53	134	28.09	6/24/06	13:00	18.33	1.92	Opposite	20	336	370	353	Mixed

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Table 3.—Species caught during 2006 NSEI tagging survey.

Common Name	Scientific name
Sablefish	<i>Anoplopoma fimbria</i>
Rougheye rockfish	<i>Sebastes aleutianus</i>
Shortraker rockfish	<i>S. borealis</i>
Redbanded rockfish	<i>S. babcocki</i>
Pacific sleeper shark	<i>Somniosus pacificus</i>
Tanner crab	<i>Chionoecetes bairdi</i>
Brown king crab	<i>Lithodes aequispina</i>
Lingcod	<i>Ophiodon elongatus</i>
Sculpin (unid)	Cottidae
Arrowtooth flounder	<i>Atheresthes stomias</i>
Halibut	<i>Hippoglossus stenolepis</i>
Dover sole	<i>Microstomus pacificus</i>
Shortspine Thornyhead	<i>Sebastolobus alascanus</i>
Pacific cod	<i>Gadus macrocephalus</i>

Table 4.—Species catch by set, 2006 NSEI tagging survey.

Set	Sablefish	Arrowtooth	Halibut	Dover sole	Brown crab	Rougheye	Pacific cod	Shortspine Thornyhead	Shorthead	Redbanded	Pacific sleeper	Tanner crab	Lingcod	Sculpin	Total
1	551	8	5	1				3							568
2	193		2												195
3	314		4												318
4	240	5	4	1											250
5	222	12	6												240
6	185	7		2											194
7	120	1	1												122
8	260		4												264
9	189		2	4											
10	87	3	1	2											93
11	88		2												
12	30	110	53	1		13		3		1				196	210
13	27	28	54		1										110
14	4	81	41			10	10			1			1	90	150
15	9	18	3	2	44	6	4		3	3					92
16	11	26	22		1	4	7								
17	16	21	12	2	42	3	8	1	1						106
18	78	8	3	15	2			3							109
19	171	16	6	15	1			2						71	211
20	315		2	2				1							320
21	37	1		4				2							
22	301	10	5	4				1							321

-Continued-

Table 4.—continued Page 2 of 2.

Set	Sablefish	Arrowtooth	Halibut	Dover sole	Brown crab	Rougheye	Pacific cod	Shortspine Thorynhead	Shortraker	Redbanded	Pacific sleeper	Tanner crab	Lingcod	Sculpin	Total
23	135		1	2											138
24	351	2	2					2							357
25	366	7	3	10	7			2							395
26	392	2	3	15	1			1				2			416
27	278	8	2	15						1					304
28	47	33	9	2	7	17	31		2						148
29	28	66	25	5	4	13	2	2							145
30	207	28	7	40				2							284
31	130	18	7	22				1							178
32	105	8		8	1										122
33	172	19	12	33	1			1		1					239
34	159	12	4	22				1		1					199
35	170	31	9	10	5			5				1			231
36	154	4	1	4	2										165
37	195	42	23	9	2			2							273
38	231	14	2	4				3							254
39	140	21	26	5	7			1	1						201
40	231	23	5	2	1										262
41	175	9		2											186
42	148	11	3	3											165
Total	7,262	713	376	268	129	66	62	39	7	4	4	3	1	1	8,935

Table 5.—Numbers of sablefish marked, released, sampled or discarded, by set, 2006 NSEI tagging survey.

Set	Retained	Released			Fish Previously Marked			Discarded		Total
	Bio. Sample	<510 mm	Clipped (510-550 mm)	Tagged and clipped (>550mm)	Clipped	ADF&G tag	Other agency	Sandfleas	Other	
1	34	62	113	326		8		4	4	551
2	13	1	4	123		1		51		193
3	24	5	10	244		3		28		314
4	18		9	207		2		4		240
5	15	9	25	170		1	1		1	222
6	14	2	4	161		1		2	1	185
7	11		2	106					1	120
8	13	33	79	124				11		260
9	8	3	15	109		1		52	1	189
10	5		1	43			1	37		86
11	4	1	5	41		1		36		88
12	1			29						30
13	2	1	5	19						27
14				4						4
15	1			8						9
16	1		1	9						11
17	2			14						16
18	7		5	65		1				78
19	11	16	37	105		2				171
20	19	18	74	184		6		14		315
21	4			32		1				37
22	19	9	40	219		1		13		301

-Continued-

Table 5.—continued Page 2 of 2.

Set	Bio. sample	Released			Fish Previously Marked			Discarded		Total
		<510 mm	Clipped (510-550 mm)	Tagged and clipped (>550mm)	Clipped	ADF&G tag	Other agency	Sandfleas	Other	
23	11		3	110		2		9		135
24	23	22	60	220				26		351
25	22	29	75	237		1		2		366
26	26	24	66	263	2	8		1	2	392
27	24	1	8	239		2		2	2	278
28	5		1	41						47
29	2	1	3	21			1			28
30	18		5	175		5			4	207
31	8	2	4	111		4		1		130
32	10		1	93		1				105
33	14	3	10	140		5				172
34	12		3	140		2			2	159
35	12	5	19	123		10			1	170
36	14		1	139						154
37	16		4	172		2		1		195
38	20		1	206		3			1	231
39	13		3	123					1	140
40	19	1	9	190		9			3	231
41	13	1	33	120		6			2	175
42	15		12	120		1				148
		249	750	5,325	2	90	3	294	26	7,262

Table 6.—Marking goals by statistical area and actual number of marked fish released, 2006 NSEI tagging survey.

Statistical Area	% of 2005 catch	Goal	Tagged	Clipped only	< 510 mm
335701	2.2	124	52	5	1
345603	7.42	427	430	54	2
345631	32.2	1854	1726	64	11
345701	34.2	1967	1940	478	185
345702	5.5	317	93	5	1
345731	11.4	655	647	113	38
345803	7.05	406	437	31	11

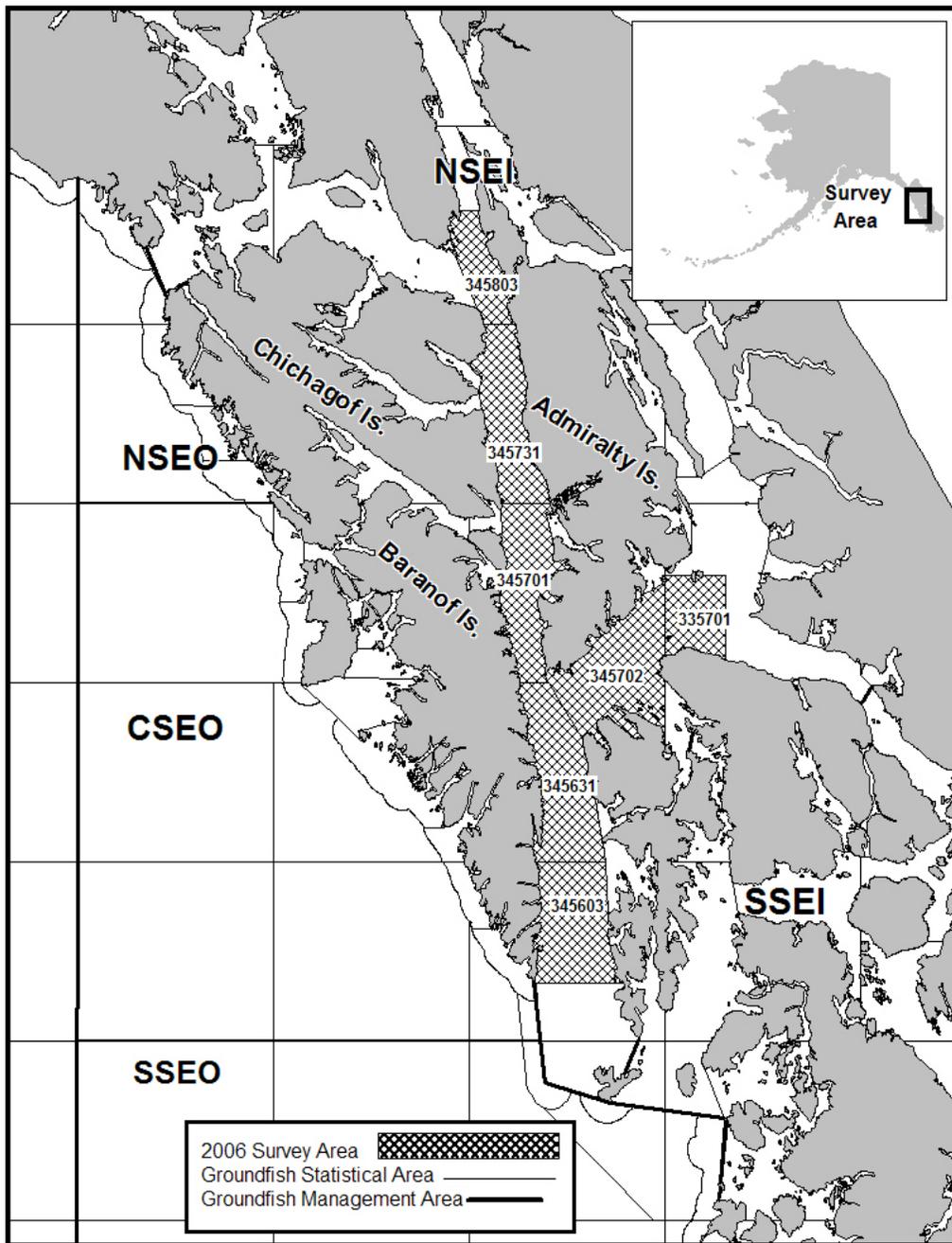


Figure 1.—Survey area for 2006 NSEI sablefish tagging survey.



Figure 2.—Groundfish conical pot gear used to capture sablefish, 2006 NSEI tagging survey.

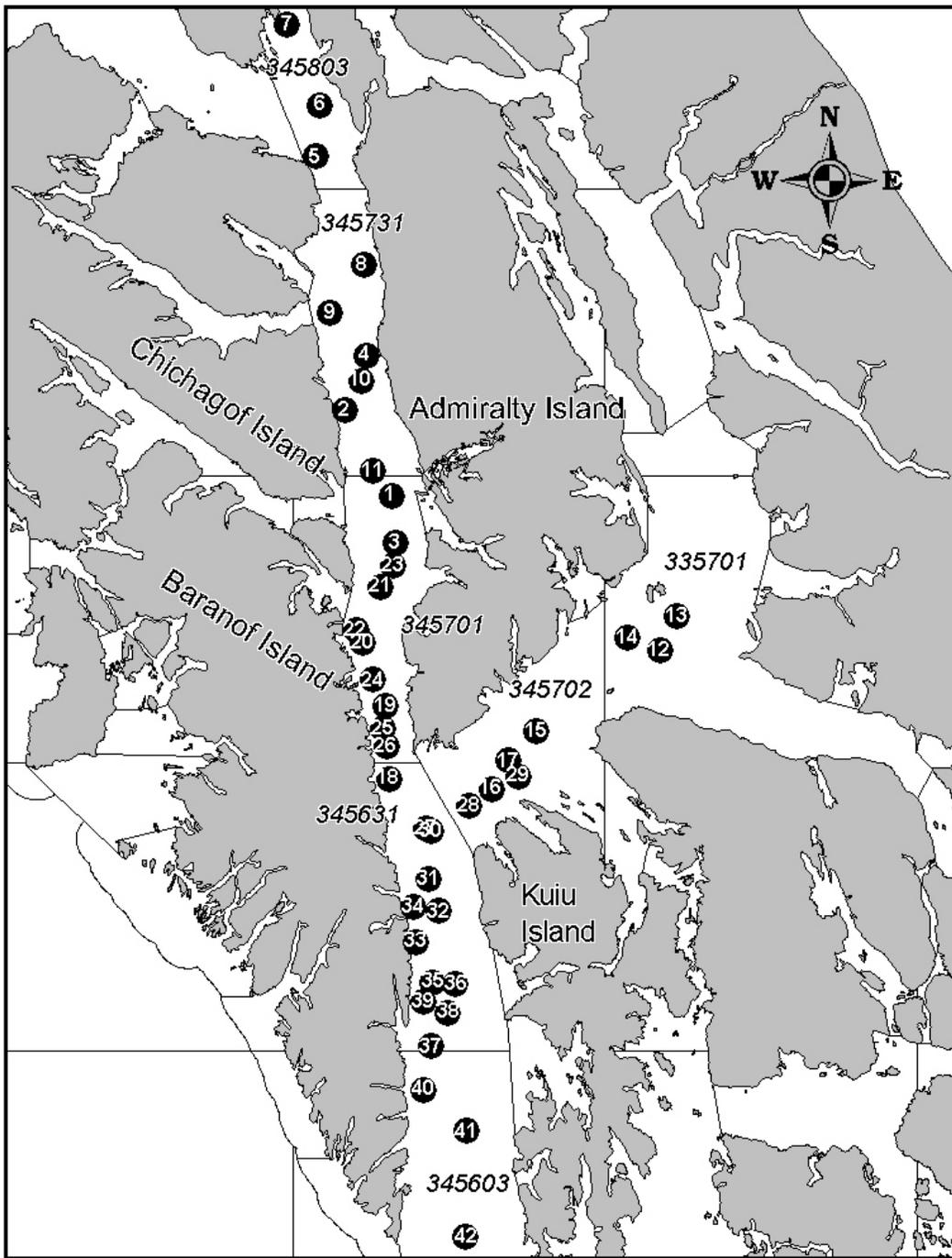


Figure 3.—Set locations for 2006 NSEI sablefish tagging survey.

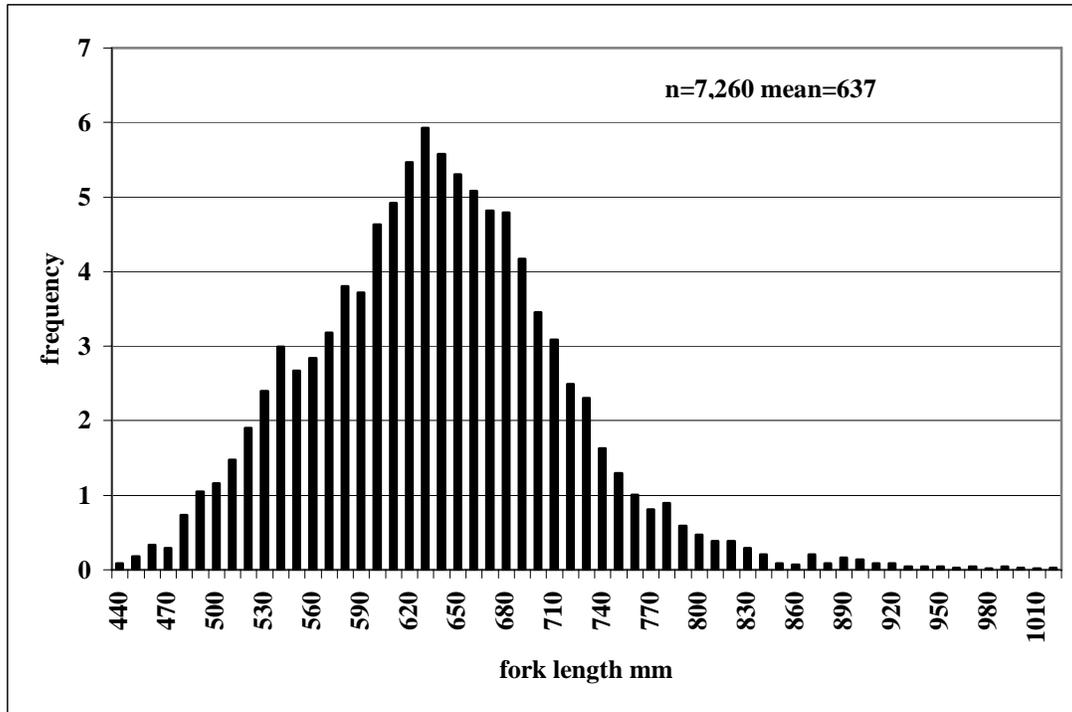


Figure 4.—Length frequency distribution for all sablefish captured, 2006 NSEI tagging survey.

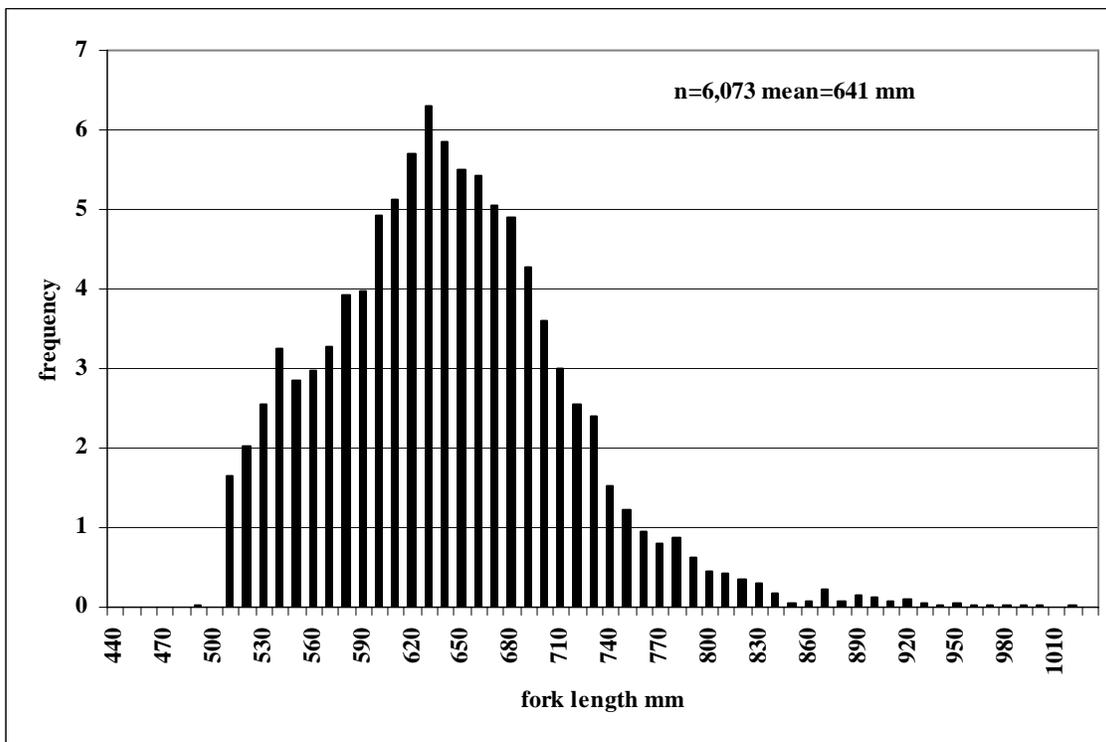


Figure 5.—Length frequency distribution for marked and released sablefish, 2006 NSEI tagging survey.

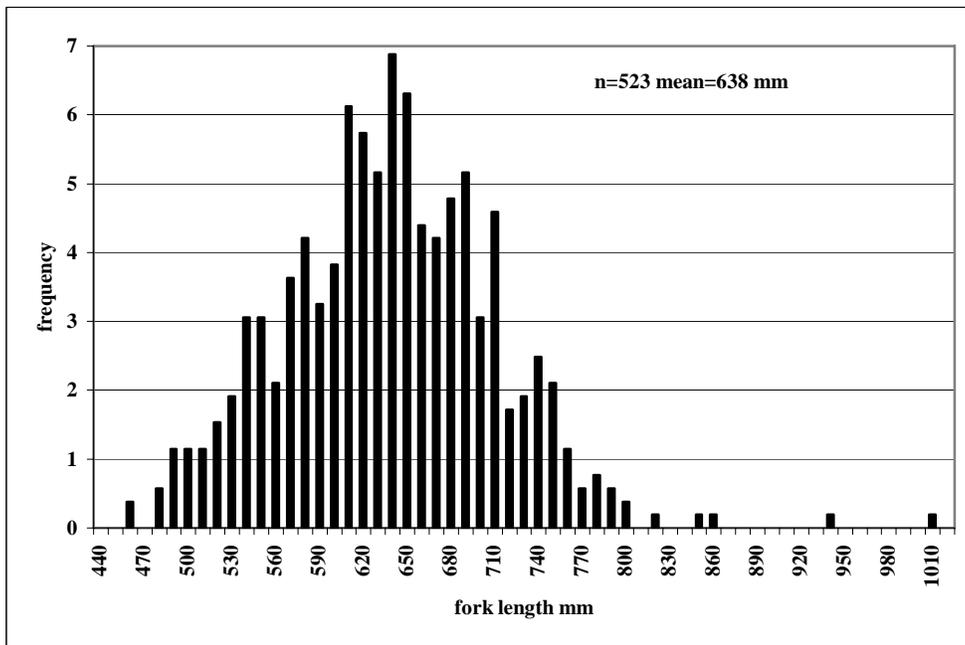


Figure 6.—Sablefish length frequency distribution for biological samples, 2006 NSEI tagging survey.

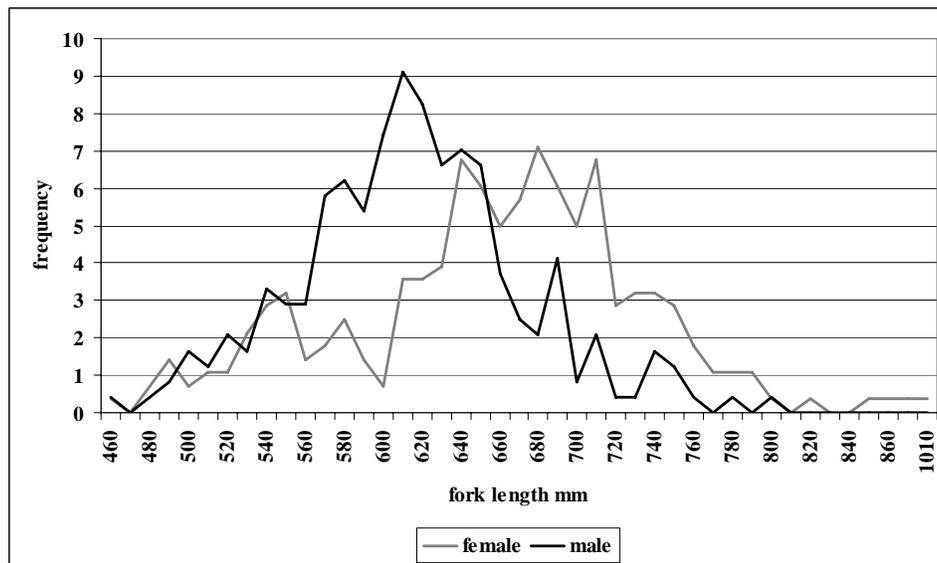


Figure 7.—Sablefish length frequency distributions for biological samples, by sex, 2006 NSEI tagging survey.

APPENDIX

Appendix A.—2006 NSEI (Chatham) Pot Survey Standard Operating Procedures and Sampling Rationale

General Objective: Capture in pots, clip fish greater than 500 mm, tag fish greater than 550 mm (fish greater than 550 mm will be double marked) and release, distributed geographically among statistical areas 345803, 345731, 345702, 345701, 345631, 345603, and 335701 roughly in proportion to the 2005 commercial catch from those statistical areas. This year additional emphasis will be placed on spreading sets out throughout each statistical area, recognizing that the number of marked fish may be lower than previous years. Collect AWL samples and data from pot-caught sablefish.

Methods

For all fish greater than 500 cm, clip the outer 1/3 of the *lower (i.e. ventral) lobe* of the caudal (tail) fin using a straight (i.e. not ragged) clip (Fig. 1). Please avoid clipping the tail in a manner that makes it difficult for port samplers to distinguish if the tail has been clipped. Most importantly, all marked fish should have the same lobe clipped.

In addition to clipping the tail, tag each fish greater than 550 mm with an external, “T-bar” tag at the base of the dorsal fin (Fig. 1).

Measure and record length (**to the nearest centimeter; record in millimeters by adding a zero**), tag number (for those tagged) and release latitude and longitude (i.e. latitude and longitude of the set) of each fish marked.

For previously-tagged fish (regardless of the year tagged), measure the length of the fish, record the tag number (e.g. in “Comments” section) and re-release the fish if in good health (even if it’s a fish “randomly” selected to sample for ageing; in that case, select the next fish for age sampling). Please do not re-tag any fish that already has a tag, regardless of the year of tagging.

Biologically sample (collect age structures (otoliths), length (**to the nearest cm; record in millimeters by adding a zero**), sex and maturity samples) from the first fish in a pot string and every 10th fish thereafter. The goal is to provide a representative sample of **all** pot-caught fish, so, unlike those fish marked and released, there should be **no size restrictions on biologically—sampled fish.**

The biological sampling rate is set based on an expectation that we will capture enough fish to tag 5,000. Even if the target tagging goal changes as the survey is in progress, keep the biological sampling rate the same. This is to keep the sampling rate consistent across geographical areas.

Sampling plan

The goal this year is to not only spread out tags among statistical areas, but also within statistical areas. Spreading out sampling within statistical areas has been a goal in past years, but more emphasis will be placed on it this year at the likely expense of marking fewer fish.

Practically, the difference this year is we will avoid making more than one set at the same location unless we are risking marking less than 3500 fish.

Geographically apportion the marked sablefish among NSEI statistical areas approximately in proportion to the 2005 catch as indicated in Table 1. **Table 1. refers to the number of fish double-marked (those greater than 550 mm that receive external tags in addition to the tail clip).** We will be marking more fish (those that receive only tail clips in addition to those double marked) than

referred to in Table 1. The apportionment of sample sizes among statistical areas is not inviolate. In general just try to achieve the apportionment outlined in Table 1.

Given the number of fish we have caught in the past and accounting for the decreased number of fish we may catch without overlapping set locations, we expect a reasonable goal is to tag (double mark) 5,000 fish (the total number of clipped fish will be greater than this). This goal may initially need to be adjusted after seeing the results of tagging in 345731 and towards the end of the survey depending on the number of tags you've achieved in each statistical area.

In addition to apportioning fish among the statistical areas, as prescribed in Table 1., attempt to tag and release fish throughout each statistical area. That is, within a statistical area, depending upon the orientation of the area (i.e. north-south or east west trending), try to tag and release at least some of that statistical area's target number over the latitudinal (north-south trending) or longitudinal (east-west trending) range of the statistical area. Once you tag the approximate quota for a statistical area, move to the next area. However, don't quit tagging in the middle of processing a set, if you achieve your quota some time during the haulback of that set. If you achieve your quota for a particular statistical area some time during the haulback of one set (i.e. Let's call it Set A), and still have another set in the water in the same statistical area, (Set B) you should release all of the fish in the second set (Set B) and move on to the next statistical area. Try to avoid this possible situation, by anticipating (to the best of your ability... I know may be difficult), whether you'll probably meet your quota in the middle of one set, and don't make an additional set beyond the one in which you'll probably make your quota. If for example you're, 25-50 fish shy of the "quota for a particular statistical area, move on to the next statistical area without making another set in the statistical area in which you're shy 25-50 fish. It's not worth making that additional set if you're just 25-50 fish shy of your quota.

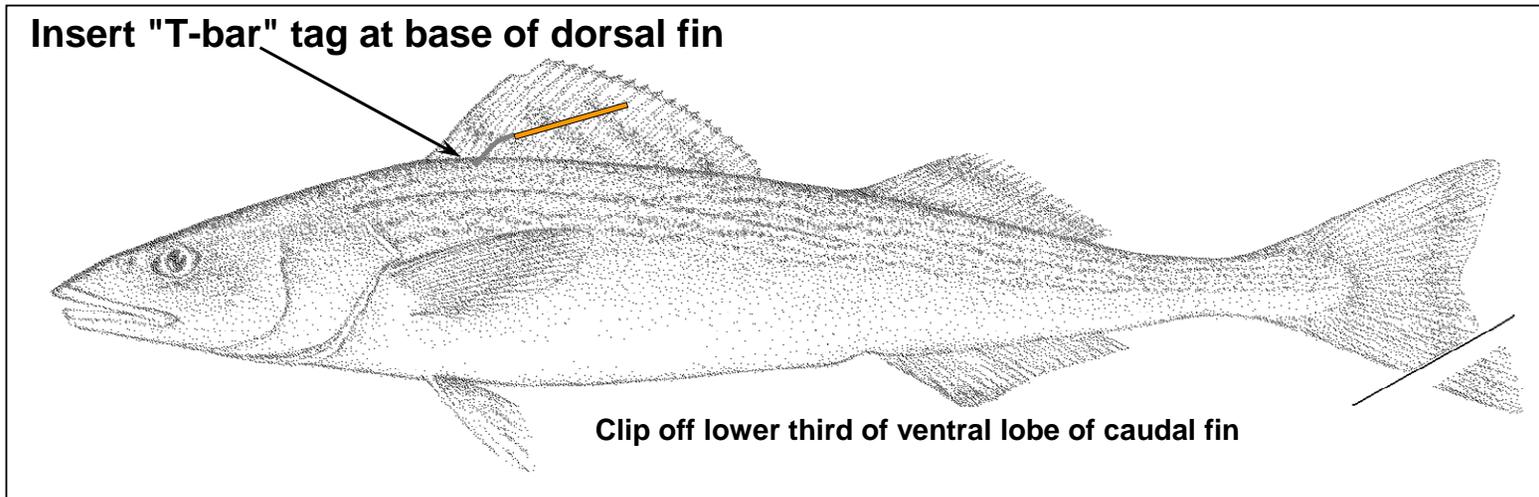
Statistical area 345803 may be an exception to our goal of not overlapping sets. In statistical area 345803, the abundance of sand fleas in northern areas limits our success of catching healthy fish and also often results in marking a much higher proportion of small fish (because the large fish are more susceptible to damage from sand fleas). In the past, we have had difficulty catching our goal number of fish in this statistical area even with overlapping sets. So, in statistical area 345803 the goal will be to make non-overlapping sets in the southern portion of the statistical area (going as far north as possible while avoiding "hot bottom"). If necessary, overlap sets in an attempt to reach the target number of fish. In other words, in this case the goal of spreading the number of fish among statistical areas takes precedence over spreading them out within the statistical area.

In statistical area 345702 we have also had trouble reaching our target number of fish in the past. If after making sets within that statistical area it is again difficult to reach that goal, making a set in statistical area 335701 near the border of 345702 is acceptable, unless you have already tagged twice the sampling goal for statistical area 335701.

Because the target number of fish in 335701 will be low, if you reach three times the sampling goal (approximately 6% of the total number of tags) during the middle of a set, discontinue sampling and dump the fish from the remainder of the pots on the set.

Please try to avoid fishing on top of established set locations for the annual longline survey.

In statistical area 345603 try to make at least one set as far south as 56 °10' (i.e. decimal 56.17; approx. latitude of Cape Ommaney). This request is based on weather permitting, etc.



NSEI Tagging Survey *Figure 1*. Configuration and locations of marks on sablefish double-marked in NSEI, 2006.

NSEI Tagging Survey *Table 1*. 2006 NSEI Chatham proportion of fish to tag by statistical area for a given number of tags

Stat Area	2005 Commercial Landings Rnd Lbs.	Est. proportion of 2005 catch	3500 Fish	4000 Fish	4500 Fish	5000 Fish	5250 Fish	5500 Fish	5750 Fish	6000 Fish	6500 Fish	7000 Fish	7500 Fish
335701	43,748	2.16%	76	86	97	108	114	119	124	130	141	151	162
345603	150,392	7.43%	260	297	334	371	390	409	427	446	483	520	557
345631	652,474	32.24%	1128	1290	1451	1612	1693	1773	1854	1934	2096	2257	2418
345701	692,475	34.22%	1197	1369	1540	1711	1796	1882	1967	2053	2224	2395	2566
345702	111,431	5.51%	193	220	248	275	289	303	317	330	358	386	413
345731	230,542	11.39%	399	456	513	570	598	626	655	684	740	797	854
345803	142,749	7.05%	247	282	317	353	370	388	406	423	458	494	529
355801	743	negligible											
355830	1,577	negligible											
Grand Total	2,026,131	100.00%	3500	4000	4500	5000	5250	5500	5750	6000	6500	7000	7500

