

UPPER COOK INLET COMMERCIAL HERRING AND SMELT FISHERIES, 2001

Report for the Alaska Board of Fisheries

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Herring

The Upper Cook Inlet management area consists of that portion of Cook Inlet north of the latitude of Anchor Point (Figure 1). Commercial herring (*Clupea harengus pallasii*) fishing began in Upper Cook Inlet in 1973 with a modest harvest of bait-quality fish along the east side of the Central District and expanded in the late 1970's to include small-scale sac roe fisheries in Chinitna and Tuxedni bays along the west side (Table 1). All herring harvested in Upper Cook Inlet are taken during the sac-roe season (April 15 to June 30). Herring harvested in Chinitna Bay and Tuxedni Bay have been sold primarily for sac-roe, while most herring harvested from the east side are still utilized as bait.

Gillnets (set and drift) are the only legal herring gear in Upper Cook Inlet, except in Chinitna Bay where only set gillnets can be used. Mesh size in this fishery is restricted to at least 2.125 inches but no more than 2.5 inches. In the set gillnet fishery no net may exceed 35 fathoms (210 feet). Each set gillnet fisherman is allowed to operate a total of 105 fathoms of gear in the aggregate. In the drift gillnet fishery no net may exceed 150 fathoms. Historically few drift gillnets are used in these herring fisheries and most have generally been confined to Tuxedni Bay. Herring harvests along the east side are generally concentrated in the Clam Gulch area with very little effort north of the Kasilof River. Prior to the action taken at the 1992 Board of Fisheries (BOF) meeting, the herring fishery was open from April 15 to June 30 along the east side, seven days per week, 24 hours per day. Since 1982 this area had been closed by emergency order by the end of May each year, with harvests ranging from 6 tons in 1976 to 179 tons in 1986 (Table 1). In the west side fisheries, herring harvests are primarily from the Snug Harbor and Magnetic Island areas of Tuxedni Bay and Clam Cove and Camp Point in Chinitna Bay. Again, prior to the action taken at the 1992 BOF meeting, the west side herring fisheries were open from April 22 to June 30, seven days per week, 24 hours per day.

From 1980-1992 an average of 270 interim use permits per year were issued for the Cook Inlet

herring fishery, with 70 permits per year being fished for an average yearly gross earnings of \$125,000. Since the fishery reopened in 1998, the average yearly number of permits being issued fell to 49 with an average of 13 per year fishing, for an average yearly gross earnings of \$5,500 (Table 3). In the east-side herring fishery, the average number of permits fished from 1975-1992 was more than 30 (Table 3) and the average number of days the fishery was open was 57. Since reopening in 1998, the average number of permits fished each year is 13 and the average number of days the fishery is open is 9.

Herring fisheries management in Upper Cook Inlet is complicated by the glacial turbidity of the Inlet waters, which precludes the use of aerial surveys to determine stock strength. Therefore it is necessary to use the catch per unit of effort and age class composition from the commercial fishery to estimate stock strength. Beginning in the mid 1980's informal guideline harvest levels were established in each area. Estimates of stock status using catch per unit of effort and age class composition of the harvest were then used to adjust the guideline harvest level up or down in small increments to try and achieve a long-term harvest level that could be sustained in each area.

A trend of sharply decreasing herring abundance and a shift towards older age class herring was observed in Tuxedni Bay in 1991 (Table 4), resulting in the closure of this area by emergency order for the 1992 season. In Chinitna Bay and along the eastside beaches similar, although less severe trends began to materialize by the end of the 1992 season. As a result of these apparent declines, a department proposal to the BOF to open the Upper Cook Inlet herring fishery by emergency order only was submitted. This proposal passed and became regulation for the 1993 season, ending a long period with fixed opening dates of April 15 on the east side and April 22 on the west side of Cook Inlet. This action effectively closed this fishery until the herring stocks recovered to a level that could sustain modest harvests. The 1997 season was the fifth year of a total closure of the east side; Chinitna Bay and Tuxedni Bay remained closed through the 2001 season.

When the proposal to alter the herring fishery was submitted in 1992, the BOF was informed that this closure would be for a minimum of three years. However, the department delayed any reopening until 1998 to give the herring stocks one full spawning cycle of protection. After a five-year closure, the fishery reopened on the east side in 1998, and beginning in 1999 it was conducted under the Central District Herring Recovery Management Plan (CDHRMP). The primary change as a result of the new management plan involved restructuring the fishery to no more than two 30-hour periods per week, beginning on Mondays and Thursdays. The east side fishery was to occur only in the waters of the Upper Subdistrict and the season was shortened to the period from April 20 to May 20. In addition, all fishermen who wished to participate in the fishery were required to register by March 15 and also were required to report their harvest within 12 hours of the closure of each fishing period. The guideline harvest range for the fishery is 0 – 40 tons.

The results of the 1998 season were encouraging with a harvest of nearly 19.5 tons. Since reopening, the average yearly harvest has been approximately 14 tons; however, each year the majority of the harvest occurs on the last fishing period of the season. Age composition of scale samples have shown primarily 5- and 6-year-old fish, with very few herring older than 8 years (Tables 5 & 6). Moreover, department personnel have observed smaller herring, likely those less than 5 years old going through gillnets uncaught, providing anecdotal indication of recruitment in the future. No incidental harvest of chinook (*Oncorhynchus tshawytscha*) or sockeye (*Oncorhynchus nerka*) salmon has been observed, similarly harvests of Dolly Varden char (*Salvelinus malma Walbaum*) have been very minimal. Incidental harvests have also included Pacific Sandfish (*Trichodon trichodon*), Starry Flounder (*Platichthys stellatus*) and Spiny Dogfish (*Squalus acanthias*). These non-target fish are released, however, the rate of survival has not been estimated.

The CDHRMP plan also directs the department to allow a herring fishery in Chinitna Bay and

Tuxedni Bay if it has assessed the age composition and determined that a healthy stock structure exists (Table 6). The fishery may be reopened by emergency order and is to be managed in order to assure sustained yield. Similar to the fishery in the Upper Subdistrict, these fisheries would take place from April 20 to May 20 with two 30-hour periods per week. The guideline harvest range for Chinitna Bay is 0 – 40 tons and for Tuxedni Bay 0 – 50 tons.

Personal use herring fishing is also allowed in Cook Inlet. The season is from April 1 through May 31 in the Northern and Central Districts. Only gillnets may be used and may not exceed 20 feet in length and 2 inches in mesh size. Staff has no documentation of either the level of participation or harvest. A permit is not required nor is harvest data collected during the statewide harvest survey.

The Board has two proposals at this meeting that seek changes to the CDHRMP. Proposal 4 (submitted by the department) would change the registration deadline for participating in the fishery from March 15 to April 10 and would also repeal the sunset clause in the management plan. The proposed change in registration was in response to numerous fishermen finding it difficult to have their permit cards issued and returned to them by the March 15 deadline. The department is also asking the board to repeal the sunset clause in the CDHRMP as the fishery is managed under very conservative guidelines and current harvest rates are not threatening the health of this stock. Proposal 5 would amend the management plan to change the closing date for the fishery from May 20 to May 30. The department supports this proposal as there is a 40-ton harvest cap already in place. Furthermore, the CDHRMP requires fishermen to report their harvests within 24 hours after each fishery, which would allow an emergency order closure of the fishery if the cap was met before the mandatory closing date. Finally, since implementing the CDHRMP, the average yearly harvest has been 14 tons, which is only 28% of the current harvest cap.

Unless altered by the BOF at this meeting, plans for the 2002 season would be for a fishery similar to the 1999-2001 seasons along the east side of Cook Inlet. In addition, the department plans to reopen the Tuxedni Bay and Chinitna Bay herring fisheries in 2002 under the guidelines of the CDHRMP; these will be very conservative fisheries and effort is estimated to be minimal. A monitoring program will be conducted to assess age composition and to identify incidental harvest of other stocks.

Smelt Fisheries

Smelt returns to Upper Cook Inlet occur in many of the larger river systems, with particularly large returns to the Susitna River. Both longfin smelt (*Spirinchus thaleichthys*) and eulachon (*Thaleichthys pacificus*) are documented in Cook Inlet. Eulachon begin returning to spawning areas in Cook Inlet generally from mid May to mid June and return in quantities large enough to support commercial fisheries. Longfin smelt return to Cook Inlet in the fall of the year and are not likely to be targeted for commercial purposes due to much smaller numbers of fish.

Prior to 1998, the department had misinterpreted the regulations regarding legal gear for harvest of smelt to be gillnets only. However, statewide regulations (5AAC 39.105) allow for a wide variety of legal gear for harvest of this stock. Numerous people had contacted the department about using dipnets, but were mistakenly told this was not a legal gear type. Thus, there was very little commercial effort directed at harvesting eulachon during this time period.

The only documented commercial harvest of eulachon occurred in 1978, 1980, 1998, & 1999, with catches of 300 pounds, 4,000 pounds, 18,900 pounds, and 100,000 pounds, respectively. The 1998-1999 harvest was taken in the Northern District just south of the Susitna River. At the 1998 BOF meeting, the commercial eulachon fishery was closed, but the regulation did not take effect until after the 1999 season. The only other harvests of eulachon in Upper Cook Inlet occur in the personal use dip net fishery in Turnagain Arm, with an annual catch of approximately

30,000 pounds; smaller quantities are taken primarily from the Kenai and Susitna rivers.

Primary commercial markets for eulachon are as food for human consumption, as bait for the sturgeon sport fishery in the Pacific Northwest, and as food for captive marine mammals. The BOF has two smelt (eulachon) proposals at this meeting. Proposal numbers 6 seeks to restore the use of personal use drift gillnets (20' or less) in the Kenai River, while Proposal 7 asks the BOF to create a commercial dipnet only fishery for smelt in Cook Inlet from the Chuit River to the Little Susitna River from May 1 to June 30.

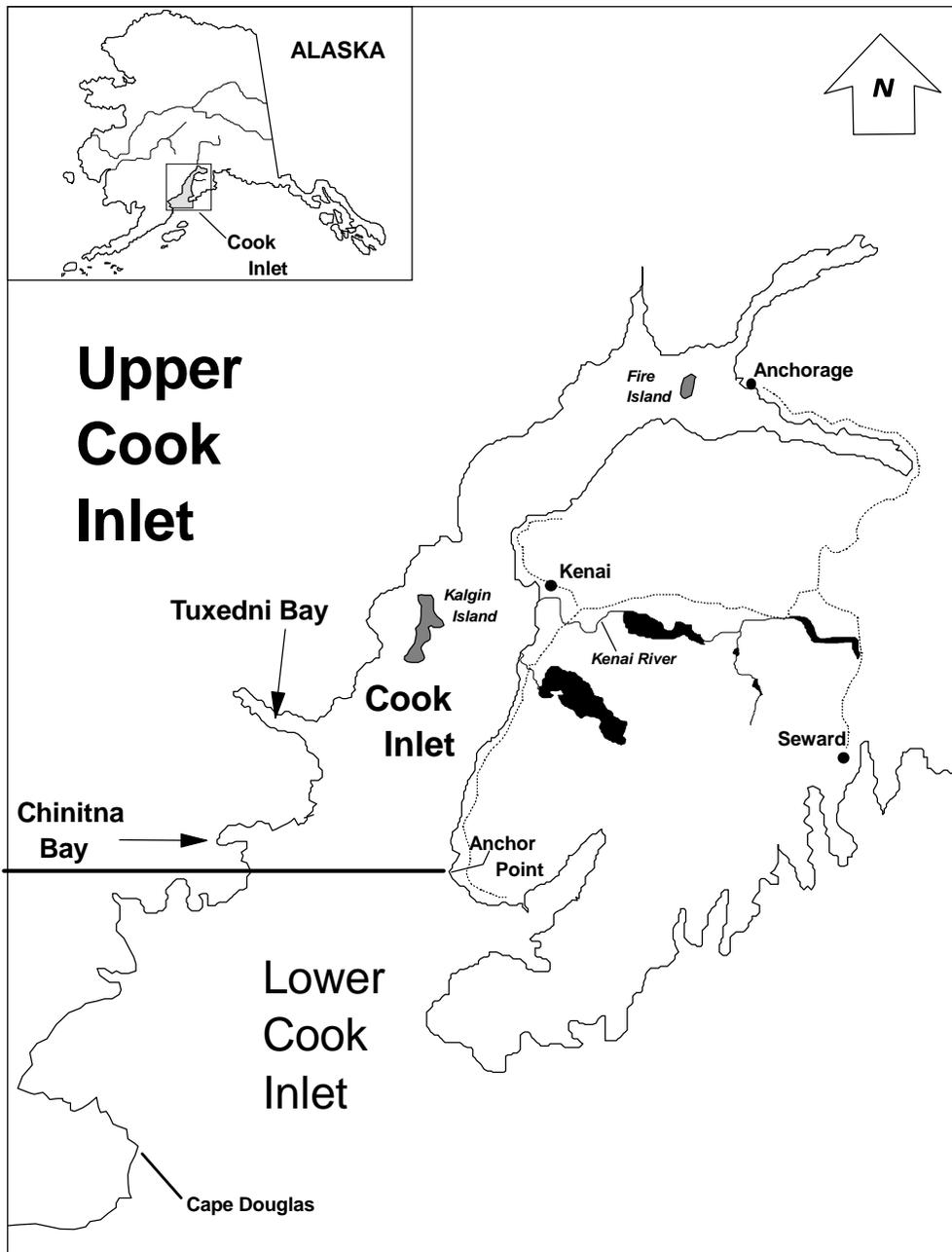


Figure 1. Location of Upper Cook Inlet commercial fishery management area.

Table 1. Commercial herring harvest by fishery, Upper Cook Inlet, 1973-2001.

Harvest (Tons)				
Year	Eastside	Chinitna Bay	Tuxedni Bay	Total
1973	13.8	-	-	13.8
1974	36.7	-	-	36.7
1975	6.2	-	-	6.2
1976	5.8	-	-	5.8
1977	17.3	-	-	17.3
1978	8.3	55.3	-	63.6
1979	67.3	96.2	24.8	188.3
1980	37.4	20	86.5	143.9
1981	86.2	50.5	84.9	221.6
1982	60.2	91.8	50.2	202.2
1983	165.3	49.2	238.2	452.7
1984	117.5	90.6	159	367.1
1985	121.7	47.4	220.5	389.6
1986	178.9	111.1	191.9	481.9
1987	130.5	65.1	152.5	348.1
1988	50.7	23.4	14.1	88.2
1989	55.2	122.3	34.3	211.8
1990	55.4	55.9	16.1	127.4
1991	13.4	15.7	1.6	30.7
1992	24.7	10.4	-	35.1
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	-	-
1996	-	-	-	-
1997	-	-	-	-
1998	19.5	-	-	19.5
1999	10.4	-	-	10.4
2000	14.7	-	-	16.3
2001	10.4	-	-	10.4

Note: for years where fisheries were closed, harvest is reported as a dash.

Table 2. Number of permits issued and number fished in the Upper Cook Inlet herring fishery, 1980-2001.

Year	Permanent Permits Issued to Residents	Permanent Permits Issued to Non-res.	Total Permits Issued	Total Permits Fished
1980	268	268	282	50
1981	250	250	261	51
1982	261	261	273	54
1983	241	241	248	77
1984	229	229	235	80
1985	248	248	254	93
1986	250	250	254	105
1987	327	327	359	133
1988	374	374	389	121
1989	306	306	313	77
1990	283	283	290	97
1991	210	210	219	42
1992	155	155	157	25
1993	66	66	69	0
1994	44	44	45	0
1995	34	34	35	0
1996	23	23	24	0
1997	19	19	21	0
1998	63	63	64	15
1999	54	54	55	10
2000	41	41	42	13
2001	35	35	35	13

Table 3. Number of permits fished and number of days the fishery was open in the east-side herring fishery, 1973-2001

Year	Number of Permits Fished	Number of Days Open
1973		76
1974		76
1975	1	76
1976	2	76
1977	9	76
1978	21	76
1979	52	61
1980	26	56
1981	39	55
1982	31	55
1983	45	37
1984	40	47
1985	37	47
1986	34	47
1987	46	47
1988	42	43
1989	40	47
1990	41	46
1991	33	40
1992	16	47
1993	-	-
1994	-	-
1995	-	-
1996	-	-
1997	-	-
1998	15	10
1999	10	9
2000	13	9
2001	13	8

Note: from 1993-1997, the fishery was closed.

Table 4. Age Composition (by percentage) of commercially harvested herring in Upper Cook Inlet, 1982-1992

Tuxedni Bay											
Age	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
3	0.4	0.0	3.7	0.0	0.8	0.3	0	0.0	0		
4	1.1	4.8	19.2	0.9	11.5	21.6	15.7	2.2	1.0	0.6	
5	10.2	10.2	18.4	9.6	30.0	7.8	74.0	50.6	12.3	11.3	
6	27.0	25.1	30.1	44.0	30.3	24.5	2.8	40.7	55.4	29.7	
7	33.2	27.6	14.5	15.3	13.3	19.6	2.8	3.2	27.0	44.8	
8	23.7	20.5	9.2	17.7	7.7	12.6	1.5	2.0	3.3	11.6	
9	4.4	11.8	5.0	12.6	6.4	3.3	1.8	0.5	1.1	1.5	
10						6.0	0.5	0.7	0.3	0.3	
11+						4.2	0.9			0.0	

Chinitna Bay											
Age	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
2					1.1			0			0
3	0	0	0.3	0	0.4	1.7		0			0
4	0.5	9.5	17	2.3	20.6	21.2	7.4	1.5	1	2.8	4.3
5	10.5	13.7	20.3	12.7	34.7	5.4	58.3	28.3	16	10.1	7.8
6	32	39.3	34	32	22.4	30.5	6	49.8	37	27.3	13.8
7	23.3	20.1	13.7	17.6	10.5	18.1	13.4	6.5	36.1	40.6	19
8	27.4	14	10.1	9.3	6.1	13.3	7.7	7.3	4.2	13.5	25.9
9	6.4	3.4	4.6	16.1	4.3	4	6.2	3.9	4	2.8	23.3
10	0					4.2	0.5	1.9	1.1	2.3	1.7
11	0					1.7	0.2	0.7	1.3	0.3	2.6
12							0.2	0.1	0.3	0.3	1.7

Eastside											
Age	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
3	0		0.4	0		0.8		0.2		0.7	0.5
4	0	2.9	12.9	0.5		13.4	3.6	5.9	1.3	0	0
5	12.2	7.3	11.6	7.5		7.6	30	31.4	14	9	2.7
6	28.6	52.8	50.3	29.4		9.7	10.9	31.1	32.4	34.3	19.6
7	34.1	22.3	14.3	14.6		22.7	12.7	9.3	37	37	38
8	16.4	10.5	7.9	38.7		28.6	12.7	6.6	7.1	13.8	27.7
9	8.6	4.2	2.5	9.3		6.7	14.5	7.6	3.2	1.4	8.7
10	0					7.1	5.5	3.9	3	2.1	1.6
11	0					3.4	10	2.7	2.1	1	0.5
12								1.2	0.3	0.3	0
13									0.3	0.3	0.5

Table 5. Age, sex, and size distribution of Pacific herring sampled by gillnet in Upper Cook Inlet, 1998-2001

2001	Age (Years)	Numbers of Fish			Total	Total	Weight			Length		
Sample Region		No. Male	No. Female	Total			Mean (g)	SD	No. Weighed	Mean (mm)	SD	No. Measured
East Side	3	2	1	3	1.5%	108	11.2	3	201	6.4	3	
	4	5	7	12	5.8%	121	19.6	12	209	8.6	12	
	5	15	27	42	20.4%	150	21.3	42	222	9.0	42	
	6	26	20	46	22.3%	168	17.1	46	231	8.5	46	
	7	28	28	56	27.2%	181	18.9	56	237	7.8	56	
	8	19	16	35	17.0%	186	28.2	35	238	8.4	35	
	9	4	6	10	4.9%	219	31.8	10	248	5.7	10	
	10	2	0	2	1.0%	227	0.0	2	251	0.0	2	
Sample Total		101	105	206	100%	171		206	232		206	
Sex Composition		49.0%	51.0%									
2000	Age (Years)	Numbers of Fish			Total	Percent	Weight			Length		
Sample Region		No. Male	No. Female	Total			Mean (g)	SD	No. Weighed	Mean (mm)	SD	No. Measured
East Side	3				0.0%							
	4	6	18	24	2.0%	130	22.6	24	218	16.1	24	
	5	54	40	94	7.9%	145	30.2	92	232	14.6	94	
	6	164	156	320	26.8%	150	25.8	274	236	12.7	320	
	7	202	234	436	36.5%	157	27.1	408	238	13.9	436	
	8	106	98	204	17.1%	164	29.2	190	242	13.0	204	
	9	36	48	84	7.0%	170	23.5	82	246	11.8	84	
	10	16	14	30	2.5%	180	42.8	30	248	19.7	30	
	11	0	2	2	0.2%	236	0.0	2	132	0.0	2	
Sample Total		584	610	1,194		157		1,102	238		1,194	
Sex Composition		48.9%	51.1%	100%								

Table 5. Page 2 of 2.

1999	Age (Years)	Numbers of Fish			Percent	Weight			Length		
Sample Region		No. Male	No. Female	Total		Mean (g)	SD	No. Weighed	Mean (mm)	SD	No. Measured
East Side	3	1	0	1	0.2%	99	0.0	1	211	0.0	1
	4	7	13	20	4.8%	123	11.3	20	219	6.4	20
	5	37	68	105	25.0%	143	18.2	105	231	9.8	105
	6	62	111	173	41.2%	153	18.8	173	237	8.6	173
	7	33	43	76	18.1%	160	23.0	76	238	9.9	76
	8	10	25	35	8.3%	176	26.5	35	248	10.0	35
	9	4	5	9	2.1%	195	12.2	9	255	4.5	9
	10	0	1	1	0.2%	222	0.0	1	259	0.0	1
Sample Total		153	266	419		154		419	236		419
Sex Composition		36.5%	63.5%	100%							
1998	Age (Years)	Numbers of Fish			Percent	Weight			Length		
Sample Region		No. Male	No. Female	Total		Mean (g)	SD	No. Weighed	Mean (mm)	SD	No. Measured
East Side	3	0	0	0	0.0%						
	4	2	7	9	1.3%	122	7.8	9	215	4.2	9
	5	60	116	176	24.9%	143	16.1	176	229	7.6	176
	6	105	225	330	46.7%	155	18.5	330	234	8.6	330
	7	36	54	90	12.7%	176	20.2	90	244	7.2	90
	8	31	57	88	12.5%	184	23.3	88	247	8.6	88
	9	6	5	11	1.6%	187	28.7	11	246	6.4	11
	10	0	1	1	0.1%	194	0.0	1	254	0.0	1
11	1	0	1	0.1%	186	0.0	1	255	0.0	1	
Sample Total		241	465	706		159		706	236		706
Sex Composition		34.1%	65.9%	100%							

Table 6. Age, sex, and size distribution of Pacific herring sampled by gillnet in Chinitna Bay and Tuxedni Bay, Upper Cook Inlet, 2001.

Sample Region	Age	Numbers of Fish						Percent of Total	Weight			Length		
		Imm Male	Ripe Female	Spawnd Female	Spawnd Unknown	Total	Mean (g)		SD	No. Weighed	Mean (mm)	SD	No. Measured	
Chinitna Bay	3	1	0	2	0	0	3	0.7%	102	18.8	3	202.0	1.2	3
	4	14	0	35	0	0	49	12.0%	135	13.9	49	218.0	8.6	49
	5	92	0	135	2	0	229	56.3%	148	142.4	229	224.0	8.0	229
	6	22	0	8	14	0	44	10.8%	160	95.2	44	235.1	10.5	44
	7	26	0	10	15	0	51	12.5%	169	92.5	51	241.6	7.5	51
	8	14	0	3	9	0	26	6.4%	184	99.5	26	245.2	8.4	26
	9	2	0	1	1	0	4	1.0%	240	152.2	4	252.0	6.0	4
	10	1	0	0	0	0	1	0.2%	182	0.0	1	251.0	0.0	1
Sample Total		172	0	194	41	0	407	100%	153		407	228.2		407
Sex Composition		42.3%		47.7%	10.1%									

Table 6. Page 2 of 2.

Sample Region	Age	Numbers of Fish						Percent of Total	Weight			Length		
		Imm Male	Ripe Female	Spawnd Female	Unknown	Total	Mean (g)		SD	No. Weighed	Mean (mm)	SD	No. Measured	
Tuxedni Bay	3	0	0	2	0	0	2	0.8%	124	2.1	2	202	1.4	2
	4	1	0	12	0	1	35	14.1%	135	20.1	35	221	10.2	35
	5	31	0	21	0	0	52	20.9%	151	19.4	52	229	10.9	52
	6	35	0	25	0	0	57	22.9%	168	24.5	57	236	10.1	68
	7	38	0	19	0	0	56	22.5%	180	25.1	56	243	9.4	37
	8	21	0	17	0	0	24	9.6%	200	27.6	24	252	9.2	21
	9	11	0	5	0	0	16	6.4%	196	25.2	16	254	5.6	9
	10	6	0	1	0	0	5	2.0%	191	28.4	5	248	18.4	4
	11	2	0	1	0	0	2	0.8%	198	5.7	2	251	0.0	1
Sample Total		145	0	103	0	1	249	100%	167		247	236		250
Sex Composition		57.4%		41.0%			0.4%							

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