Bayss

Groundfish and Shrimp Investigations

Annual Report

1973

by

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Fish Commission of Oregon
Research Division

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INTRODUCTION

This report covers the major field and office activities of Groundfish and Shrimp Investigations throughout the calendar year 1973.

PERSONNEL

Few changes were made during the report period. Bill Barss was promoted to Aquatic Biologist 2 in November 1973. Jack Robinson was granted educational leave to attend Oregon State University beginning in September 1973 and extending to June 1974.

Seasonal employees included Mark Lariviere (June-Sept.), at Astoria, and Greg Concannon (June-Sept.), at Charleston.

FLEET SUMMARY

Oregon's groundfish and shrimp fleet increased to 123 vessels (Table 1). Vessels fishing for groundfish decreased from 69 in 1972 to 67 in 1973. Shrimp boats increased from 68 in 1972 to 87 in 1973. Included were 23 double-rigged shrimp boats. Two vessels fished double net--single gear trawls. The latter type of gear consisted of two trawls towed with one set of otter doors. A "sled" between the two otter doors acts as an inner set of doors.

Oregon State University initiated testing of the Scottish pair seine in the Oregon groundfish fishery. This method employs the use of <u>two</u> vessels pulling one large seine.

REPORTS

Reports were prepared for the PMFC annual meeting held in November at Boise, Idaho. Reports were also prepared for the International Groundfish Technical Sub-Committee meeting held in June at Seattle, Washington.

The following reports were published:

Barss, William H. 1973. Report of cruise 73-1, Dover sole. Fish Commission of Oregon (processed).

_____. 1973. Report of cruise 73-8, Shrimp. Fish Commission of Oregon (processed).

Demory, Robert L. 1973. Report of cruise 73-4, Special. Fish Commission of Oregon (processed).

_____. 1973. Scales as a means of aging Dover sole (*Microstomus pacificus*). J. Fish. Res. Bd. Canada 29(11): 1647-1650.

Table 1. Vessels Landing Groundfish and Shrimp in Oregon by Port by Fishery, 1973.

Boat	Port of Landing						Fishery	
	A	G	N	C	P	B	S	G
Al-W 1/	-	-	-	x	-	-	x	-
Amak	-	-	-	x	⊗	-	x	x
Aquarius	-	-	-	x	x	⊗	x	x
Azalea 1/	-	-	-	x	-	-	x	-
Betty A	-	-	-	⊗	-	-	-	x
Big Clipper	-	-	-	⊗	-	-	x	-
Bonnie C	-	-	-	-	x	⊗	x	x
Bristol 1/	-	-	-	-	x	x	x	-
Cherokee	-	-	-	⊗	-	-	-	x
Cheryl Marie	-	-	-	⊗	-	-	x	-
Cap Elza 1-2/	-	x	-	-	-	-	x	-
Christopher M 2/	x	-	⊗	-	-	-	x	-
Christie	-	-	⊗	-	-	-	-	x
Captain Mark 2/	-	-	-	⊗	-	-	x	-
Cape Foulweather 2/	-	-	-	⊗	-	-	x	-
Cape Lookout 2/	-	-	-	⊗	-	-	x	-
Cape Fairwell 2/	⊗	-	-	-	-	-	x	-
Christina J.	-	-	-	⊗	-	-	x	x
Challenger 1/	x	-	-	-	-	-	-	x
Columbia	x	-	-	⊗	-	-	-	x
Coolidge II	⊗	-	-	-	-	-	x	x
Corsair 3/	-	-	-	⊗	-	-	x	-
Coral Sea	⊗	-	-	-	-	-	-	x
Cottree	-	-	⊗	-	-	-	x	-
Daphne 1/	-	-	-	-	x	x	x	-
Dare II	-	-	-	⊗	-	-	-	x
Defender	-	-	⊗	x	-	-	x	x
Destiny	-	-	⊗	-	-	-	-	x
Donna	-	-	-	-	-	⊗	x	-
Donna B	⊗	-	-	-	-	-	x	-
Elaine Dell	-	-	-	⊗	-	-	x	-
Empress	⊗	-	-	-	-	-	-	x
Estep	-	-	-	⊗	-	-	x	x
Flo-N	-	-	-	⊗	-	-	x	-
Frank F	-	-	-	⊗	-	-	x	-
Faymar	-	-	-	⊗	-	-	-	x
Fargo 2/	-	⊗	x	-	-	-	x	x
Frank Lowe 2/	-	-	-	-	⊗	-	x	-
Frances E 1/	-	-	-	x	-	-	x	-
Galway Bay 2/	-	-	⊗	-	-	-	x	-
Galaxy 1/	x	-	-	-	-	-	x	-
General Pershing 1/	-	-	-	-	-	x	x	-
Garnet	-	-	-	-	-	⊗	-	x
Georgia K	⊗	-	-	-	-	-	x	-
Harmony	-	-	-	⊗	-	-	-	x
Helen Louise	-	-	-	⊗	-	-	x	x
Intrepid	-	-	-	-	-	⊗	-	x
Irene Kay	-	-	-	-	-	⊗	-	x
Jaka-B 2/	-	-	⊗	-	-	-	x	-
Jeanoah 2/	-	-	⊗	-	-	-	x	x
Jefferson	-	-	-	-	-	⊗	-	x
Jennie F. Deker	⊗	-	-	-	-	-	-	x
Junior	-	-	-	⊗	-	-	-	x
Karen	-	-	-	x	-	⊗	x	x
Kangaroo	-	-	-	⊗	-	-	x	-
Karen Kelly 1/	-	-	-	x	x	-	x	-
Kathy Jo	⊗	-	-	-	-	-	x	x
Kanak 1/	-	-	-	x	x	-	x	-
Kincheloe	-	-	-	x	x	⊗	x	x
Kodiak	-	-	-	⊗	-	-	x	x
Lady Alice	⊗	-	-	-	-	-	x	x
Lillie	x	⊗	-	-	-	-	x	-
Margaret A 1/	x	-	-	-	-	-	-	x
Lituya	⊗	-	-	-	-	-	x	-
Mikado 1/	x	-	x	x	-	-	x	x
Marian F	⊗	-	-	-	-	-	-	x
Karlina Lori	⊗	-	-	-	-	-	-	x
Martle 2/	x	-	⊗	-	-	-	x	x
Margaret E	⊗	-	-	-	-	-	-	x
McKinley 1/	x	-	-	-	-	-	-	x
Midnight Sun	-	-	-	-	-	⊗	-	x
Mitkof	⊗	-	-	-	-	-	-	x

Table 1. (Continued)

Boat	Port of Landing						Fishery	
	A	G	N	C	P	B	S	G
Mitoi 2/	x	-	⊗	-	-	-	x	-
Miss Yvonne 2/	-	⊗	x	-	-	-	x	-
Miss Connie 2/	-	-	⊗	x	-	-	x	-
Nel-Ron-Dic	-	-	-	⊗	-	-	x	-
Neptune 2/	-	-	⊗	-	-	-	x	x
Nestucca	⊗	-	-	-	-	-	x	x
New Mexico	⊗	-	-	-	-	-	-	x
Oregonian	-	-	⊗	-	-	-	-	x
Orion 3/	-	-	-	⊗	-	-	x	-
Overcast	-	-	-	⊗	-	-	x	-
Owners Pride 1-2/	-	x	-	-	-	-	-	x
Owners Joy 1-2/	x	-	-	-	-	-	x	-
Pacific Crier 1/	-	-	-	-	x	x	x	-
Pacific	-	-	-	⊗	-	-	-	x
Pacific Hustler	⊗	-	x	x	-	-	x	x
Pacific Queen	x	-	⊗	-	-	-	-	x
Panda	-	-	-	-	-	⊗	x	x
Pam Bay	-	-	-	-	-	⊗	x	x
Paul C 1/	-	-	-	-	x	x	x	-
Pelican	-	-	-	⊗	-	-	-	x
Pices	-	-	-	⊗	-	-	x	-
Ponderosa 2/	-	-	-	⊗	-	-	x	-
Quest 1/	-	-	-	-	x	x	x	-
Rainbow	x	-	⊗	-	-	-	x	x
Restless C	-	-	-	⊗	-	-	x	-
Rhoda Alice 2/	-	-	-	⊗	-	-	x	-

Boat	Port of Landing						Fishery	
	A	G	N	C	P	B	S	G
Rose Ann Hess	⊗	-	-	-	-	-	-	x
Ruth Ellen	-	-	⊗	-	-	-	x	x
Searcher I	-	-	-	⊗	-	-	x	-
Sea Runner	-	-	-	⊗	-	-	x	x
Sea 1/	-	-	-	x	-	-	x	-
Sea Breeze II	-	-	⊗	-	-	-	x	-
Silver Queen 1/	-	-	-	x	-	-	x	-
Shadow Dew	-	-	⊗	-	-	-	x	x
Sea Quest	x	-	⊗	-	-	-	x	-
Shaun 2/	-	-	⊗	x	-	-	x	-
Silver Seas 1/	-	-	-	-	-	x	x	-
Sunset 1/	-	-	-	x	-	-	x	-
Teddy Jo II	-	-	⊗	-	-	-	x	-
Theresa S 1/	-	-	-	-	-	x	x	x
Three Girls	-	-	-	-	-	⊗	x	-
Tom & Al 1/	x	-	-	-	-	-	-	x
Tonquin 1/	x	-	-	-	-	-	-	x
Tralee	⊗	-	-	-	-	-	-	x
Trask	⊗	-	-	-	-	-	-	x
Trego	-	-	⊗	-	-	x	x	-
Van Elliot 2/	-	-	-	-	-	⊗	x	-
Washington (Big)	⊗	-	-	-	-	-	-	x
Washington (Little)	-	-	-	⊗	-	-	x	x
Western	⊗	-	-	-	-	-	-	x
Wind Song	-	-	-	⊗	-	-	x	-
Zarembo II	x	-	⊗	-	-	-	-	x

1/ Out-of-state boat

2/ Double-rigged shrimp boat

3/ Double net, single-rigged shrimp boat

⊗ Home port

A = Astoria
G = Garibaldi
N = Newport
C = Charleston
P = Port Orford
B = Brookings

_____, and Louis B. Fredd. 1973. Investigation of the abundance and recruitment of bottomfish off Oregon: Estimated yields of Dover sole (*Microstomus pacificus*) in waters off northern Oregon-southern Washington. Completion Report July 1, 1970 to June 30, 1971. Fish Commission of Oregon (processed).

_____. and Jack G. Robinson. 1973. Resource surveys on the continental shelf off Oregon. Annual Report July 1, 1972 to June 30, 1973.

Lukas, Gerald. 1973. An evaluation of methods for determining movement of shrimp, Phase II: shrimp holding studies. Final Report July 1, 1970 to June, 1971. Fish Commission of Oregon (processed).

_____, and Michael Hosie. 1973. Investigation of the abundance and benthic distribution of pink shrimp, *Pandalus jordani*, off the northern Oregon coast. Final Report July 1, 1969 to June 30, 1970. Fish Commission of Oregon (processed).

Niska, Edwin L. 1973. Report of cruise 73-7, shrimp. Fish Commission of Oregon (processed).

Robinson, Jack G. 1973. Report of cruise 73-2, shrimp. Fish Commission of Oregon (processed).

_____. 1973. Report of cruise 73-6, shrimp. Fish Commission of Oregon (processed).

GROUNDFISH FISHERY

Landings

Annual Oregon landings from 1964 to 1973 by species are shown in Table 2. Table 3 presents the total catch for 1969-1973 by international statistical area (Figure 1), hours fished, and catch per hour. State-wide landings for 1973 were below the 10-year average. Rockfish landings declined substantially in 1973. English sole, petrale sole, sablefish, and lingcod landings increased. Dover sole, rex sole, starry flounder and Pacific cod, all showed substantial decreases. Pacific ocean perch landings in 1973 dropped to their lowest levels since inception of the fishery. Also falling to its lowest level in many years was the animal food catch.

Catch rates and total landings of Dover, English, and petrale sole and Pacific ocean perch for the period 1959-1973 are listed in Tables 4 through 7.

Market Sampling

Sampling effort in 1973 resulted in 13 English sole samples, 14 petrale sole samples, 35 Dover sole samples, 5 Pacific ocean perch samples, and 51 rockfish species composition samples. Four samples of yellowtail rockfish and 1 sample of canary rockfish were also taken.

Table 2. Yearly Oregon Trawl Landings from 1964 to 1973
(landings in thousands of pounds)

Species	Year										Mean
	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1963-73
English sole	1,562	1,678	3,537	2,304	2,306	1,716	1,884	1,799	2,196	2,371	2,135
Rock sole	0	4	18	8	51	25	5	122	2	tr.	24
Petrale sole	1,877	1,838	1,838	1,771	1,653	1,835	2,141	2,284	2,185	2,191	1,961
Dover sole	5,529	3,631	3,492	3,565	4,325	5,554	5,538	5,538	5,942	4,416	4,753
Rex sole	806	985	1,498	1,219	1,075	1,215	1,074	839	1,314	1,256	1,128
Starry flounder	528	410	477	277	454	251	426	485	439	339	409
Other flatfish	143	62	205	255	215	506	646	521	600	657	381
Pacific cod	200	194	628	430	385	47	78	483	1,069	453	397
Lingcod	736	852	993	1,067	1,526	1,084	945	1,281	1,349	1,999	1,183
Sablefish	183	130	68	67	56	135	111	240	403	838	223
Pac. Ocean perch	9,548	13,647	4,518	1,706	1,649	940	1,595	1,649	602	540	3,639
Other rockfish	4,147	4,121	5,069	4,061	4,253	5,101	3,515	3,404	4,057	3,553	4,129
Misc. species	32	23	12	8	31	4	17	28	36	63	26
Dogfish	0	1	0	0	2	tr.	17	4	tr.	tr.	2
Animal food	5,990	4,152	3,357	3,999	2,815	2,599	2,052	1,786	730	603	2,808
Reduction use 1/	-	1,498	79	18	49	45	0	0	0	0	169
Total	31,290	33,226	25,789	20,745	20,899	21,057	20,044	20,463	20,924	19,284	23,372
Total hours	31,312	29,254	23,676	20,183	24,456	25,692	27,587	28,644	29,206	28,243	26,825
Catch/hour	999	1,136	1,089	1,028	855	813	727	714	716	682	871

1/ New category introduced in 1965, previously included with miscellaneous fish.

Table 3. Total Oregon Trawl Landings (by area fished), Calculated Hours Fished, and Catch Per Hour by International Statistical Areas for 1969-73.

International Statistical Area		Year 1969	1970	1971	1972	1973	Mean 1969-73
5-A/5-B	Pounds	655,000	60,000	753,000	0	0	293,600
	Hours	502	60	531	0	0	219
	Lbs/Hr	1,305	1,000	1,418	-	-	1,340
3-D	Pounds	162,000	224,000	88,000	0	0	94,800
	Hours	118	223	51	0	0	78
	Lbs/Hr	1,373	1,004	1,725	-	-	1,215
3-C	Pounds	66,000	1,080,000	749,000	112,000	80,000	417,400
	Hours	55	375	340	82	40	178
	Lbs/Hr	1,200	2,880	2,203	1,365	2,000	2,345
3-B	Pounds	565,000	1,028,000	828,000	1,231,000	664,000	863,200
	Hours	722	1,375	1,023	1,568	727	1,083
	Lbs/Hr.	783	748	809	785	913	797
3-A	Pounds	9,925,000	8,628,000	7,703,000	9,101,000	8,000,000	8,671,400
	Hours	12,087	11,125	10,151	10,031	9,636	10,616
	Lbs/Hr	821	776	759	903	830	817
2-C	Pounds	1,719,000	1,625,000	1,546,000	1,633,000	2,593,000	1,823,200
	Hours	2,575	2,770	3,362	3,362	3,098	4,044
	Lbs/Hr	668	587	460	527	641	575
2-B	Pounds	5,868,000	6,012,000	7,329,000	7,736,000	6,230,000	6,635,000
	Hours	5,905	8,409	9,478	11,229	9,064	8,817
	Lbs/Hr	994	715	773	689	687	753
2-A	Pounds	1,762,000	1,012,000	1,153,000	760,000	1,132,000	1,163,800
	Hours	2,875	2,229	2,663	2,019	3,112	2,580
	Lbs/Hr	613	454	433	376	364	451
1-C	Pounds	335,000	375,000	314,000	351,000	585,000	392,000
	Hours	853	1,021	965	1,129	1,620	1,118
	Lbs/Hr	393	367	325	311	361	351

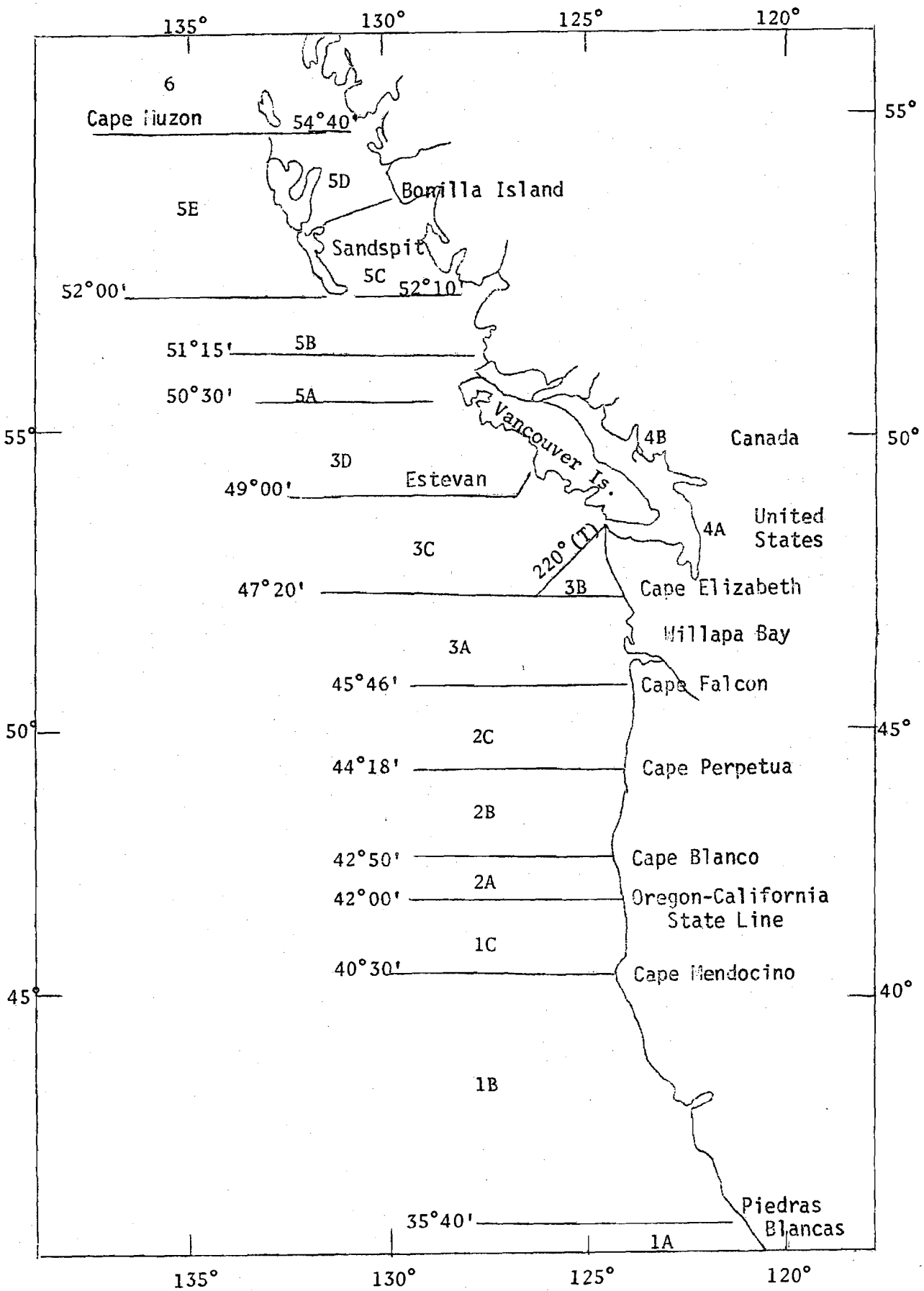

Figure 1. Chart of Pacific Coast Showing International Statistical Areas

Table 4. Total Pounds Landed and Pounds Per Hour Per Significant Landing by International Statistical Area for Dover Sole, 1959-73 (catch in thousands of pounds)

Year of Landing	Area of Catch																		Annual Landing	Mean C/E
	1-C		2-A		2-B		2-C		3-A		3-B		3-C		3-D		5-A-B			
	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E		
1959	0	-	0	-	2,279	528	360	275	1,853	423	51	245	0	-	0	-	0	-	4,543	445
1960	2	na	3	na	2,326	412	534	262	2,220	369	94	336	27	204	2	na	0	-	5,208	369
1961	0	-	7	307	1,944	405	259	183	1,743	349	101	242	0	-	0	-	0	-	4,054	348
1962	5	956	98	60	1,937	440	478	246	1,893	345	41	289	3	81	0	-	0	-	4,455	326
1963	1	58	34	94	2,241	430	501	250	2,472	332	90	181	6	na	0	-	0	-	5,345	344
1964	29	na	163	126	2,281	555	722	232	2,210	316	90	312	31	306	0	-	3	na	5,529	346
1965	98	305	177	337	1,242	408	598	304	1,471	384	29	310	9	153	7	na	0	-	3,631	368
1966	82	382	270	473	1,069	379	346	247	1,683	448	6	na	37	na	0	-	0	-	3,493	394
1967	87	376	56	326	1,532	572	235	260	1,563	364	89	377	2	na	0	-	1	na	3,565	418
1968	177	457	178	480	1,985	649	261	271	1,532	315	140	213	1	na	1	na	50	352	4,325	414
1969	119	333	770	458	2,968	625	115	200	1,537	334	33	333	2	na	1	na	9	na	5,554	459
1970	135	235	359	240	3,257	477	138	126	1,534	328	91	336	3	na	19	348	2	na	5,538	370
1971	48	169	405	235	3,574	538	161	368	1,249	344	45	241	52	na	0	-	4	na	5,538	439
1972	142	156	276	229	3,642	479	116	471	1,720	400	46	151	tr.	na	0	-	0	-	5,942	408
1973	202	245	411	289	2,645	392	69	204	1,045	412	44	na	0	-	0	-	0	-	4,416	368

Table 5. Total Pounds Landed and Pounds Per Hour Per Significant Landing by International Statistical Area for English Sole, 1959-73 (catch in thousands of pounds)

Year of Landing	Area of Catch																		Annual Landing	Mean C/E
	1-C		2-A		2-B		2-C		3-A		3-B		3-C		3-D		5-A-B			
	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E		
1959	0	-	0	-	107	218	41	103	1,363	363	104	300	0	-	0	-	0	-	1,615	324
1960	0	-	0	-	234	284	380	179	1,627	368	198	372	3	na	12	na	0	-	2,454	309
1961	0	-	17	359	187	213	111	160	1,236	274	188	320	0	-	0	-	0	-	1,789	259
1962	11	203	80	83	496	386	241	183	1,411	278	57	391	0	-	0	-	0	-	2,296	260
1963	6	63	37	74	255	214	307	252	1,251	259	90	401	2	na	0	-	0	-	1,948	241
1964	34	124	115	99	124	132	309	233	904	301	64	389	12	141	0	-	0	-	1,562	225
1965	32	189	93	195	150	195	397	174	960	381	34	435	12	na	0	-	0	-	1,678	265
1966	74	273	75	279	455	460	406	212	2,424	503	86	590	18	252	0	-	0	-	3,538	417
1967	91	446	34	269	342	272	310	198	1,237	354	290	533	0	-	0	-	0	-	2,304	321
1968	102	434	57	317	280	240	293	207	993	280	615	268	0	-	1	na	19	359	2,360	265
1969	42	111	202	171	156	335	247	198	948	251	119	409	1	na	0	-	1	na	1,716	233
1970	41	107	97	141	444	262	255	225	746	248	291	324	6	na	3	na	1	na	1,884	240
1971	66	111	165	138	528	276	325	220	632	214	74	225	9	na	0	-	0	-	1,799	214
1972	47	84	134	117	764	231	416	308	721	351	113	295	1	na	0	-	0	-	2,196	249
1973	119	140	224	128	708	193	558	246	670	261	92	241	0	-	0	-	0	-	2,371	206

Table 6. Total Pounds Landed and Pounds Per Hour Per Significant Landing by International Statistical Area for Petrale Sole, 1959-73 (catch in thousands of pounds)

Year of Landing	Area of Catch																		Annual Landing	Mean C/E
	1-C		2-A		2-B		2-C		3-A		3-B		3-C		3-D		5-A-B			
	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E		
1959	0	-	0	-	538	330	187	600	528	291	22	na	0	-	0	-	0	-	1,275	334
1960	0	-	6	na	646	396	494	302	936	297	50	na	5	na	6	na	0	-	2,143	323
1961	0	-	8	120	315	135	511	344	919	239	54	162	31	na	0	-	0	-	1,838	243
1962	4	na	37	na	623	220	594	276	1,321	297	27	271	0	-	0	-	0	-	2,606	269
1963	11	108	26	82	534	234	321	195	1,361	246	39	226	3	na	0	-	0	-	2,295	228
1964	19	60	65	209	271	169	379	298	1,091	242	39	106	13	na	tr.	na	0	-	1,877	222
1965	27	183	53	243	369	214	644	243	683	300	9	na	52	536	0	-	0	-	1,838	257
1966	31	127	33	169	239	219	449	224	1,048	283	7	na	29	na	0	-	1	na	1,837	249
1967	25	na	18	133	213	129	365	215	1,061	300	80	na	7	na	0	1	2	na	1,771	237
1968	31	136	33	205	241	352	350	174	801	228	142	na	1	na	16	136	28	na	1,653	220
1969	37	61	283	308	319	370	234	336	930	257	28	na	1	na	0	-	3	na	1,835	269
1970	36	92	266	284	583	259	269	317	849	231	108	154	19	na	11	na	0	-	2,141	240
1971	43	47	195	173	419	327	168	263	1,193	237	119	233	28	na	0	-	8	na	2,284	240
1972	16	na	82	166	600	373	219	259	1,002	228	246	287	20	na	0	-	0	-	2,185	262
1973	30	18	85	63	485	294	501	449	912	331	174	587	4	na	0	-	0	-	2,191	251

Table 7. Total Pounds Landed and Pounds Per Hour Per Significant Landing by International Statistical Area for Pacific Ocean Perch, 1959-73 (catch in thousands of pounds)

Year of Landing	Area of Catch																		Annual Landing	Mean C/E
	1-C		2-A		2-B		2-C		3-A		3-B		3-C		3-D		5-A-B			
	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E	Catch	C/E		
1959	0	-	0	-	446	376	1,435	823	587	587	4	na	0	-	0	-	0	-	2,472	628
1960	0	-	0	-	141	261	1,154	623	1,053	734	130	933	141	1,067	115	na	0	-	2,734	640
1961	0	-	0	-	408	554	2,165	692	1,968	774	28	268	0	-	0	-	0	-	4,569	702
1962	0	-	1	57	449	455	2,534	608	2,772	682	33	1,413	0	-	0	-	0	-	5,789	625
1963	0	-	2	589	931	537	3,610	1,009	3,267	630	167	429	5	na	0	-	0	-	7,982	733
1964	0	-	1	na	2,505	835	3,755	1,000	2,310	574	829	744	62	392	0	-	86	1,089	9,548	787
1965	0	-	tr	-	1,956	909	8,847	1,544	2,681	806	30	690	133	375	13	324	0	-	13,660	1,173
1966	0	-	21	na	420	926	2,177	922	1,132	1,221	22	na	138	605	0	-	608	4,780	4,518	1,092
1967	0	-	0	-	247	402	1,032	747	324	826	16	na	6	na	0	-	31	529	1,706	663
1968	0	-	0	-	170	423	450	320	120	353	55	1,129	2	na	1	na	851	1,095	1,649	553
1969	4	na	23	214	218	278	335	477	46	323	0	-	9	na	9	na	296	740	940	430
1970	0	-	tr	-	127	308	416	418	73	195	2	na	901	3,481	64	996	12	196	1,595	735
1971	0	-	30	252	419	351	212	182	221	933	6	na	443	1,533	10	na	308	822	1,649	488
1972	tr	-	8	na	232	219	220	331	141	440	1	na	0	-	0	-	0	-	602	290
1973	2	na	5	na	224	368	130	323	178	377	0	-	1	na	0	-	0	-	540	359

The age frequency and sample size for English, petrale, and Dover sole, by sex and area of catch, are listed in Tables 8 through 10 for 1973.

Animal Food Fishery

This phase of the investigation is to determine the species composition of whole fishes landed as animal food. A total of 10 species composition samples were taken. Landings for 1969 through 1973 are listed in Table 11 by species.

Investigation of trawl-caught fishes landed as mink food in 1973 showed a clear continuation of the decline of this fishery. The failing American market caused by influx of imported furs from Asia and Europe continued its decline, with resultant effects on the fishery. Sanddab, arrowtooth flounder, English sole, Dover sole and rex sole were the most numerous species found in minkfood landings in the order listed.

Tagging Studies

A total of 221 Dover sole were tagged between Cape Blanco and Coos Bay in March 1973. A total of 975 sablefish were tagged during September and October. Tagging occurred between the Columbia River and Yaquina Bay. Returned fish will provide information on stock movement and possibly on stock identification.

Recoveries from the above and several prior tagging studies are treated individually below.

Dover Sole, May 1964. During this period, 2,697 Dover sole were tagged and released from 47 to 200 fathoms southwest of the Columbia River. A total of 672 tags had been recovered through December 31, 1973.

Lingcod, September-November 1969. A total of 58 lingcod were tagged off the Columbia River in 32-35 fathoms. A total of 12 tags had been recovered through December 31, 1973.

Dover Sole, January, March, December 1970. A total of 661 Dover sole were tagged off Coos Bay in deep water (to 250 fathoms). A total of 51 tags had been recovered through December 31, 1973.

Dover Sole, July-August 1971. A total of 1,016 fish were tagged southwest of Coos Bay in 60-150 fathoms. A total of 76 tags had been recovered through December 31, 1973.

Lingcod, September 1971. Twenty-nine lingcod were tagged off the Columbia River in 36-108 fathoms. A total of 2 tags were recovered through December 31, 1973.

Dover Sole, February-April 1972. A total of 449 fish were tagged off Cape Arago in 180-280 fathoms. Eighty-one tags were recovered through December 31, 1973.

Table 8. Age Frequency of English Sole by Area of Catch and Sex in 1973

	Area 3-A		Area 2-B	
	♂	♀	♂	♀
Age	N	N	N	N
1				
2				
3	6	44	5	49
4	9	119	10	84
5	2	187	12	129
6	3	107	6	72
7	5	93	6	54
8	8	44	5	22
9	4	24	0	16
10	9	8	2	7
11	4	7	2	3
12	5	2	2	7
13	4	1	3	3
14	1		1	
15	1			
16+	1		1	
Unk	1	1		
Total	63	637	55	446
Mean Age	8.19	5.66	6.69	5.57

Table 9. Age Frequency of Petrale Sole by Area of Catch and Sex in 1973.

	Area 3-A		Area 2-B	
	♂	♀	♂	♀
Age	N	N	N	N
1				
2				
3	3	13		1
4	12	54	9	8
5	51	128	31	19
6	90	102	46	23
7	80	120	56	38
8	34	72	48	33
9	19	41	27	21
10	7	36	14	19
11	5	15	18	15
12	2	17	10	22
13	1	8	10	8
14		7	1	9
15	1	4	1	5
16+	2	7	1	4
Unk	6	9	1	2
Total	313	633	273	227
Mean Age	6.73	7.05	7.79	8.80

Table 10. Age Frequency of Dover Sole by Area of Catch and Sex in 1973.

Age	Area 3-A ♂ N	Area 3-A ♀ N	Area 2-B ♂ N	Area 2-B ♀ N	Area 2-A ♂ N	Area 2-A ♀ N
1						
2						
3						
4			1	1		1
5	2	7	1	20	1	2
6	17	50	20	71	6	46
7	36	88	27	106	24	95
8	39	96	38	99	19	85
9	53	89	48	81	19	61
10	46	49	59	70	8	37
11	36	55	46	57	11	21
12	22	39	50	40	3	14
13	17	29	16	39	2	14
14	16	25	15	22	1	9
15	9	13	8	17		6
16	1	11	3	15		5
17	1	8	2	8		1
18	4	11	1	6	1	4
19	1	7		1		1
20		3	1	3		
21		4				
-						
Unknown	1	15	6	2	2	1
Total	301	599	342	658	97	403
Mean Age	9.92	9.92	10.14	9.50	8.71	8.80

Table 11. Yearly Oregon Animal Food Landings from 1969 to 1973. (Landings in Thousands of Pounds).

Species	1969	1970	1971	1972	1973	Average
Arrowtooth flounder	923	425	534	258	103	449
Rockfish	46	18	63	4	13	29
Pacific cod	0	0	0	8	tr.	2
Butter sole	47	105	56	1	18	45
Starry flounder	42	147	9	21	8	45
Skate	254	104	21	14	23	83
English sole	571	512	228	128	81	304
Dover sole	107	90	45	42	67	70
Rex sole	185	257	114	46	62	133
Sanddab	229	223	244	119	115	186
Petrale sole	55	52	82	10	13	42
Hake	1	0	0	8	8	3
Sablefish	49	41	126	17	8	48
Miscellaneous	80	50	64	10	75	56
Unspecified 1/	10	28	200	44	9	58
Total	2,599	2,052	1,786	730	603	1,553

1/ Not sampled.

tr. = Less than 500.

SHRIMP FISHERY

Landings

During 1973, the shrimp fishery reflected a strong market and biological conditions last seen in 1964. In 1973 the very strong 1970 year class (3 years old) contributed strongly to the catch all year. As a result, catches of these large shrimp were very good and a record fishery ensued. These factors, along with the increased fishing power of additional Gulf double-rigged trawl boats (6 in 1971, 10 in 1972, and 23 in 1973) led to a record catch of 24,516,375 pounds (table 12). This catch was 18% greater than the 1972 record, and 94% greater than the 1967-1972 mean of 12,623,500 pounds. Fishermen received 18-22¢ per pound for their landings in 1973 (vs. 13-16¢ in 1972).

Biology and Stock Status

Work continued on monitoring the biology and stock status of major shrimp stocks off Oregon. The landings at Astoria, Newport, Winchester Bay and Coos Bay were routinely sampled for age, sex, maturity, and average size. Brookings and Port Orford landings were irregularly sampled. Monthly length-frequency distribution by sex for the two major production areas, northern Oregon and Coos Bay, are shown in Figures 2 and 3. Also shown on Figures 2-3 are monthly average count in numbers per pound. The 1972 and 1970 year classes (Ages 1 and 3) dominated 1973 catches by number. By weight, the 1970 (age 3) year class was dominant.

Stock status appeared to be healthy through December 31, 1973. Results of the September 1973 survey cruises showed the shrimp stocks to be holding up well under the increased effort and catch since 1971. The midpoint biomass estimates in the Coos Bay and northern Oregon beds are summarized below:

	Area	
Year	Coos Bay	Northern Oregon
1971	9,029,000 lbs.	13,155,000 lbs.
1972	13,184,000 lbs.	13,027,000 lbs.
1973	13,426,000 lbs.	15,272,000 lbs.

In spite of greatly increased fishing pressure, biomass in these areas actually increased slightly in 1973 over 1972 and 1971. Age composition of survey catches was similar to those shown in Tables 2 and 3 for September.

Catch (combined) and catch per unit effort (by vessel type) by month and PMFC shrimp area (Figure 4) are tabulated in Table 12.

Catch per unit effort was good in 1973 in most areas fished by Oregon vessels. The north-central and Coos Bay areas bore most of the brunt of effort and catch in 1973.

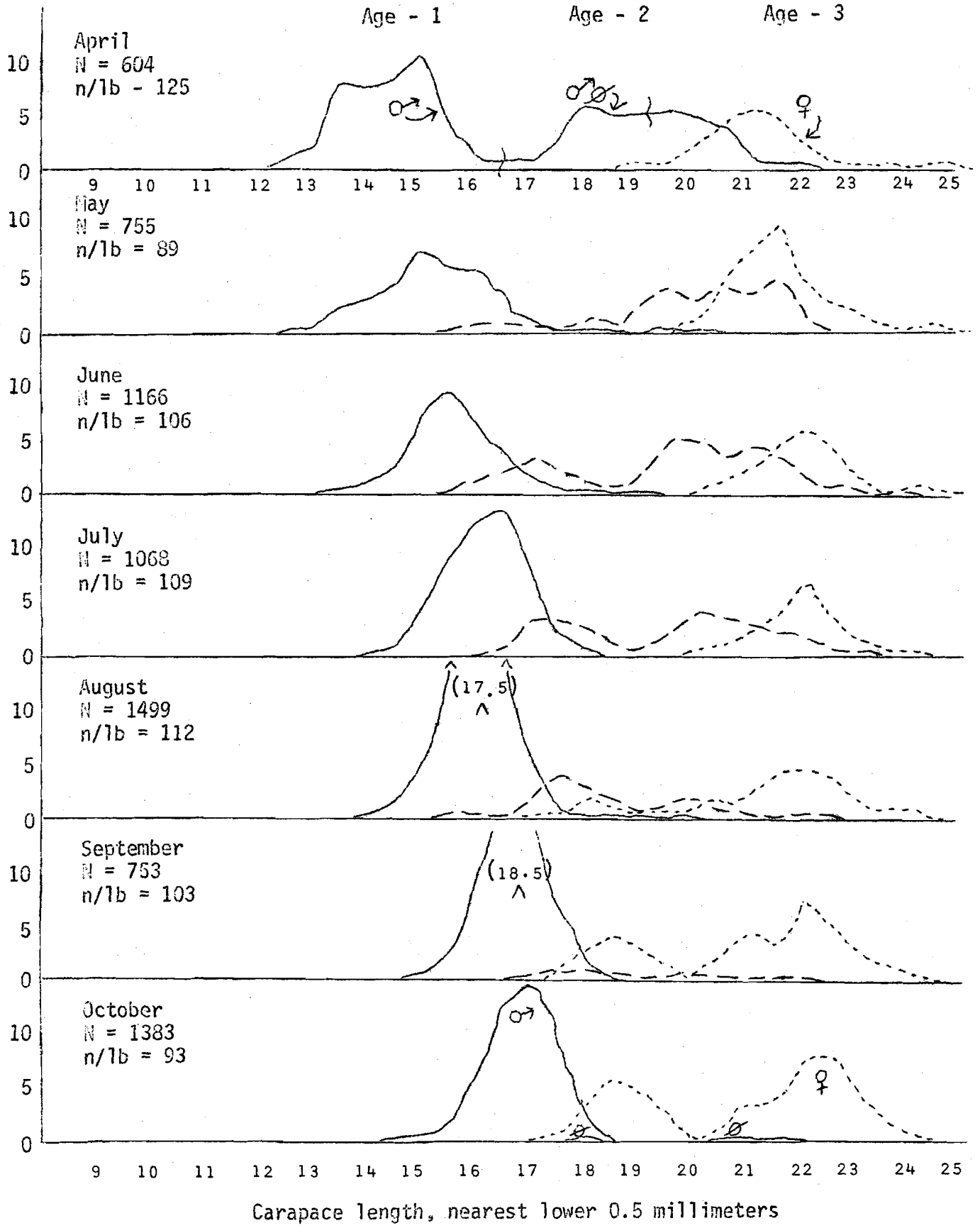

Figure 2. Monthly Length-Frequency Composition by Sex of Shrimp caught off Coos Bay (Area 2B) in 1973.

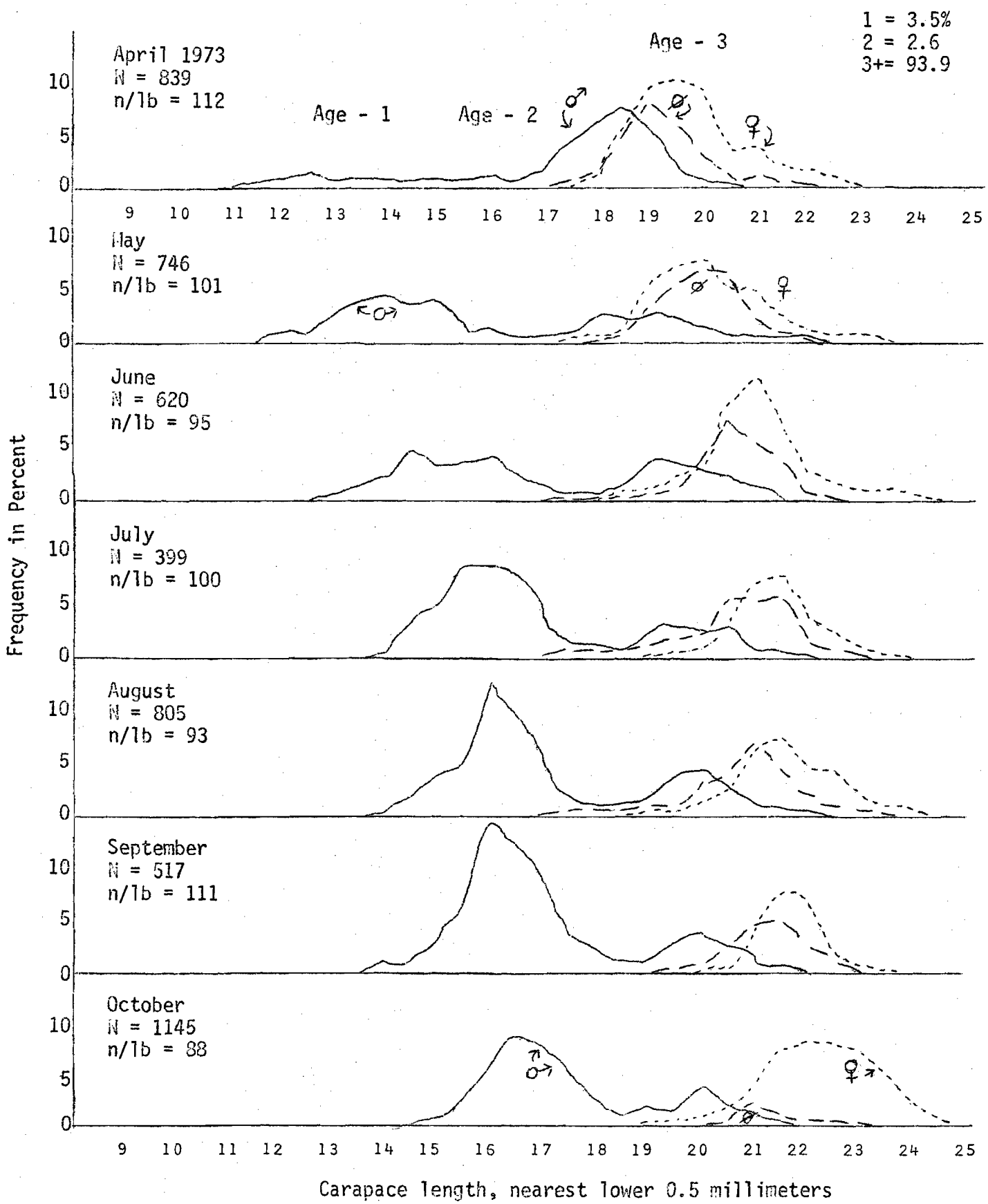

Figure 3. Monthly Length-Frequency Composition by Sex of Shrimp Caught off Northern Oregon (Area 2C) in 1973.

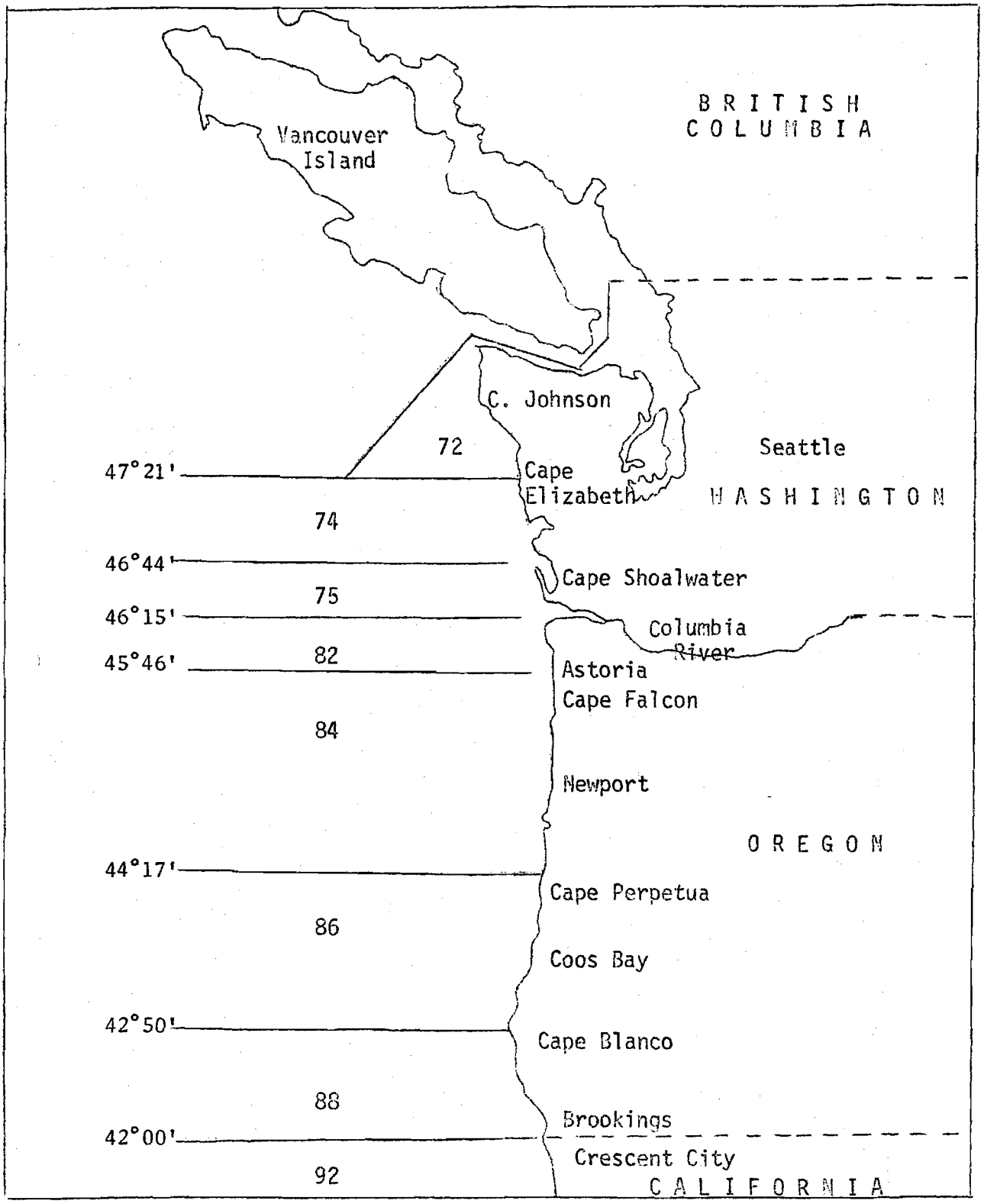

Figure 4. Pacific Marine Fisheries Commission Shrimp Statistical Areas, Washington, Oregon, and California.

Table 12. Oregon 1973 Monthly Shrimp Catch and Catch-per-effort by Statistical Area for Single and Double-rigged Vessels.

Month	1/	Statistical Area 92	88-S	88-N	86	84	82	75	74	Total
April	C	0	326,831	140,129	1,846,505	1,424,656	0	0	75,622	3,813,743
	c/e 1	-	625	1,112	844	699	-	-	705	
	c/e 2	-	623	-	791	876	-	-	686	
May	C	921	177,408	466,332	1,310,780	2,693,235	76,576	0	35,927	4,761,179
	c/e 1	132	520	1,521	541	751	858	-	678	
	c/e 2	-	1,033	2,589	722	1,069	2,610	-	-	
June	C	0	503	485,018	1,695,887	1,494,390	1,315	0	447,913	4,125,026
	c/e 1	-	63	1,186	654	505	263	-	803	
	c/e 2	-	-	-	897	710	-	-	582	
July	C	0	244,944	267,321	2,385,182	1,413,143	0	2,211	761,238	5,074,039
	c/e 1	-	619	1,123	666	502	-	442	666	
	c/e 2	-	-	-	927	766	-	-	827	
August	C	0	46,923	368,919	2,135,703	1,188,714	18,618	103,803	430,567	4,293,247
	c/e 1	-	268	918	556	661	-	386	779	
	c/e 2	-	-	-	825	666	980	702	147	
Sept.	C	0	5,652	418,516	982,644	266,174	1,392	2,732	13,013	1,690,123
	c/e 1	-	353	934	498	380	50	182	383	
	c/e 2	-	-	-	612	465	-	-	-	
October	C	0	0	94,490	400,676	185,590	8,017	5,189	65,056	759,018
	c/e 1	-	-	936	426	806	65	649	781	
	c/e 2	-	-	-	531	490	466	-	378	
Total	C	921	802,261	2,240,725	10,757,377	8,665,902	105,918	113,935	1,829,336	24,516,375
	C 2/	0	89,067	38,833	3,228,591	5,947,776	40,333	35,800	84,419	9,464,819
	c/e 1	132	549	1,098	627	617	489	383	722	
	c/e 2	-	810	2,589	778	795	1,061	702	356	

1/ C = Landed catch by all types of vessels; c/e 1 = Catch per hour by single-rig vessels; c/e 2 = Catch per hour by double=rig vessels.

2/ C = Landed catch by double-rig vessels; included in C, all columns.

International Fisheries

Groundfish and Shrimp Investigations has a three-point program involving international fisheries: (1) monitoring of foreign fleets, (2) coordination and exchange of information with fishery agencies in Canada, Japan, and the U.S.S.R., and (3) preparation of materials for use by the U.S. Department of State in unilateral negotiations with the U.S.S.R., Japan, and Canada.

Table 13 lists the average number of foreign vessels observed off the Oregon and Washington coasts in 1973.

Meetings Attended

During 1973 staff personnel attended 29 meetings concerned with west coast fisheries (Table 14).

Table 13. Average Number of Foreign Fishing Vessels Observed off the Oregon and Washington Coast by Country of Origin by Month During 1973.

Month	USSR	Japan	East German	Polish	Total
Oregon					
January	0	T	0	0	T
February	0	T	0	0	T
March	0	0	0	0	0
April	0	1	0	0	1
May	34	T	0	0	34
June	44	0	0	0	44
July	25	1	0	0	26
August	43	0	1	0	44
September	41	0	T	T	41
October	26	0	T	T	26
November	0	0	0	0	0
December	0	0	0	0	0
Shim-Months	213	2	1	T	216
Monthly Average	17.75	0.17	0.08	-	18.00
Washington					
January	0	0	0	0	0
February	T	T	0	0	T
March	T	1	0	0	1
April	0	T	0	0	T
May	12	T	0	0	12
June	7	0	0	0	7
July	4	1	0	0	5
August	1	2	T	0	3
September	2	0	0	0	2
October	0	0	0	T	T
November	0	3	0	0	3
December	0	0	0	0	0
Ship-Months	26	7	T	T	33
Monthly Average	2.17	0.58	-	-	2.75

Table 13. (Continued)

Month	Oregon-Washington				
	USSR	Japan	East German	Polish	Total
January	0	T	0	0	T
February	T	T	0	0	T
March	T	1	0	0	1
April	0	1	0	0	1
May	46	T	0	0	46
June	51	0	0	0	51
July	29	2	0	0	31
August	44	2	1	0	47
September	43	0	T	T	43
October	26	0	T	T	26
November	0	3	0	0	3
December	0	0	0	0	0
Total Ship-Months	239	9	1	T	249
Monthly Average	19.91	0.75	0.08	-	20.75

T = <0.5

Table 14. Meetings Attended by Groundfish and Shrimp Personnel in 1973.

Meeting	Location	Date	Remarks
Town Hall	Brookings	1/15/73	FCO, NMFS, OSU
Town Hall	Coos Bay	1/16/73	FCO, NMFS, OSU
Town Hall	Newport	1/17/73	FCO, NMFS, OSU
Town Hall	Tillamook & Astoria	1/18/73	FCO, NMFS, OSU
American Fisheries Society	Corvallis	1/25-26/73	Annual Meeting
Surveillance Committee	Seattle	1/30/73	NMFS Ad hoc Committee
FAO Conference	Vancouver, B.C.	2/12-17/73	Fishery Management & Development
Research & Development	Clackamas	3/30/73	NMFS Review Team
Pacific Fisheries Biologists	Harrison Springs, B.C.	3/21-23/73	Annual Meeting
PMFC	Juneau	3/26-28/73	Groundfish Committee
Shrimp Statistics Workshop	Menlo Park	3/27-28/73	FCO, NMFS, CDF&G
Survey Techniques Workshop	Seattle	5/3/73	FCO, NMFS, WDF, Canada
Staff Meeting	Bend	5/22-24/73	Biennial Meeting
NORFISH	Seattle	6/19/73	Coordination Meeting
International Groundfish Committee	Seattle	6/20-22/73	Technical Sub-Committee
US-USSR	Port Angeles	7/20/73	Meeting with Soviet Fleet Commander
International Groundfish Committee	Nanaimo, B.C.	8/13-14/73	P.O.P. Working Group
US-USSR	Seattle	8/16-17/73	Cooperative Research Planning
US-USSR	Port Angeles	9/19/73	Meeting with Soviet Fleet Commander
INPFC	Seattle	9/24-25/73	U.S. Section Meeting

Table 14. (Continued)

Meeting	Location	Date	Remarks
INPFC	Tokyo, Japan	10/23-11/6/73	Annual Meeting
International Groundfish Committee	Boise	11/12-13/73	Annual Meeting
PMFC	Boise	11/13-15/73	Annual Meeting
Town Hall	Tillamook	11/16/73	FCO, NMFS, OSU
Town Hall	Astoria	11/26/73	FCO, NMFS, OSU
Town Hall	Coos Bay	11/27/73	FCO, NMFS, OSU
Town Hall	Brookings	11/28/73	FCO, NMFS, OSU
Town Hall	Newport	11/29/73	FCO, NMFS, OSU
Program Leaders	Clackamus	12/18/73	Operations and Planning