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REPORT OF ESTUARY SURVEYS
July-August 1972

Internal Report GS-73-1

Fish Commission of Oregon
Management and Research Division
Groundfish & Shrimp Investigations

GROUND FISH AND SHRIMP INVESTIGATIONS

Report of Estuary Surveys, July-August 1972

During July and August 1972, surveys for fin fish were conducted in selected Oregon estuaries. Objectives of the surveys were to determine occurrence and dispersion of fin fish, with particular emphasis on juvenile English sole, to try different means of capture, and to gain background information for a proposed program of estuary fin fish research (Appendix A).

English sole was chosen because it is an important commercial species. The animals may have a unique life history in that they may require a calm water habitat for rearing. Hatching occurs in the marine environment yet 0-age juveniles, after metamorphosis, have yet to be found outside the estuary in Oregon. Age 1+ juveniles, however, are abundant in shallow coastal waters. On the exposed Oregon coast, calm water habitat is limited to estuaries.

Three methods of capture were employed: try net (TN); push net (PN); and beach seine (BS). Try net tows were usually 5 to 10 minutes in length. Push nets hauls ranged from about 20 to 50 yards in length and were limited to depths less than three feet. Sets with the beach seine (4, 20, 125, and 180-foot in length) were used at suitable sites. A 22-foot square-stern dory, powered by a 40 h.p. outboard motor, was used to pull the try net. Horsepower was more than adequate.

There were 15 areas surveyed. English sole were found in 10 of these. The 3 areas where English sole were not found were Hunters Creek, Siltcoos River, and Tahkenitch Creek. The Winchuck and Pistol rivers were sampled, but conditions and gear were not conducive to worthwhile results. Weeds hampered efforts in the Winchuck and high winds made sampling impossible on the Pistol.

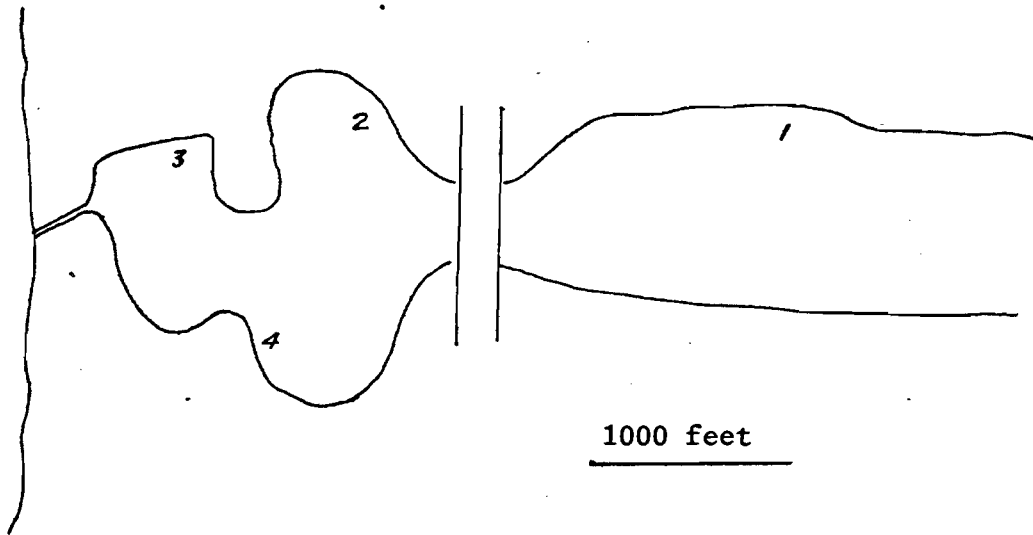
Catch data (numbers caught) by station and gear type is shown in Figures 1-13. Due to variations in gear and effort, these numbers should be used as qualitative measure only. Species occurrence is summarized in Table 1.

The 125-foot beach seine caught a greater variety of fish than either the try net or the push net - 15 species as opposed to 7 species. Other methods of capture for future work should be a two-boat mid-water trawl and perhaps a small purse seine.

Effort required to conduct the surveys amounted to 43 man-days for 18 days of work.

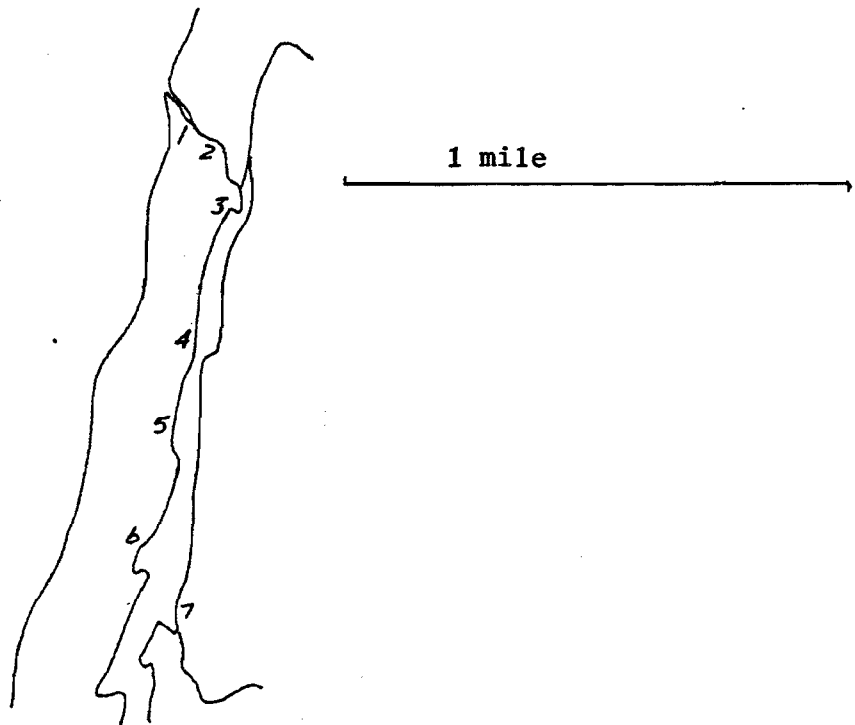
Fish Commission of Oregon
Management & Research Division
Robert L. Demory
Brent O. Forsberg
Michael J. Hosie
William H. Barss
June 27, 1973

Figure 1. Hunter Creek



Station number	1	2	3	4
Date	7/27	7/27	7/27	7/27
Gear type	BS	BS	BS	BS
Starry flounder			2	
Sculpins	1			2
Stickleback	100	400	300	1500

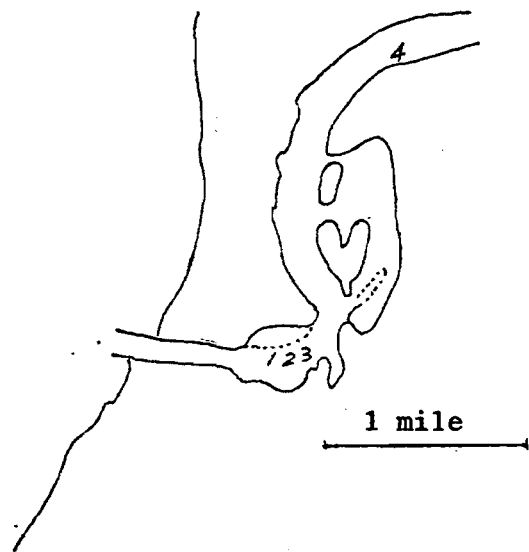
Figure 2. New River



Station number	1	2	3	4	5	6	7
Date	8/17	8/17	8/17	8/17	8/17	8/17	8/17
Gear type	BS	BS	BS	BS	BS	BS	BS
English sole				1			
Starry flounder	40	11	30	25	24	3	12
Sculpin	7	28	2		3	15	138
Shiner perch					1	6	
3-spined stickleback							1
Cutthroat trout				6			
Chinook salmon			73	636	4		
Herring				2	1000		
Surfsmelt				5			
Dungeness crab			12	80	5		
<i>Crago</i> spp.	P	P	P	P	P	P	P

P = present

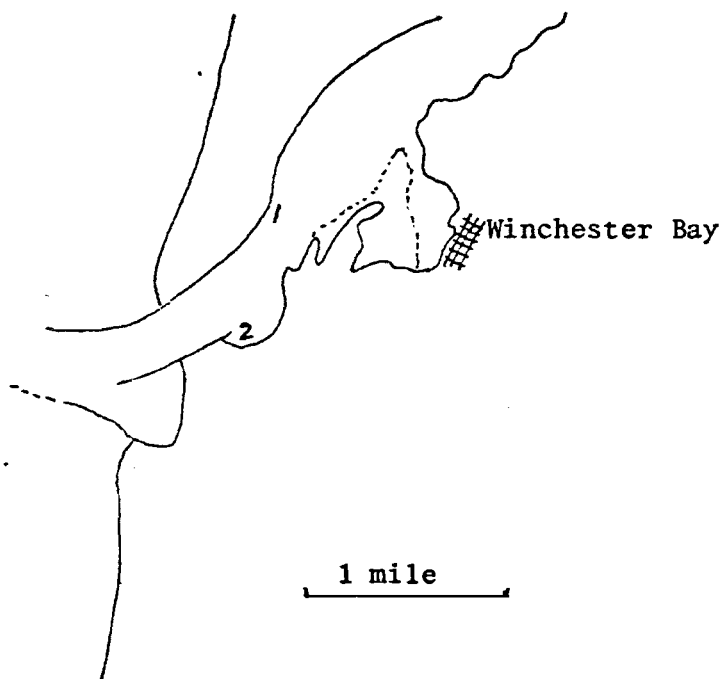
Figure 3. Coquille River



Station number	1	2	3	4
Date	8/1	8/1	7/28	7/28
Gear type	BS	BS	BS	BS
English sole			21	
Sand sole			9	
Starry flounder			14	3
Sculpin	3	3		3
Perch (spp. unknown)	8	48		
Pipe fish				
Chinook salmon			15	23
Herring			306	741
Surfsmelt		1	49	
Dungeness crab			200	
<i>Crago</i> spp.			P	P

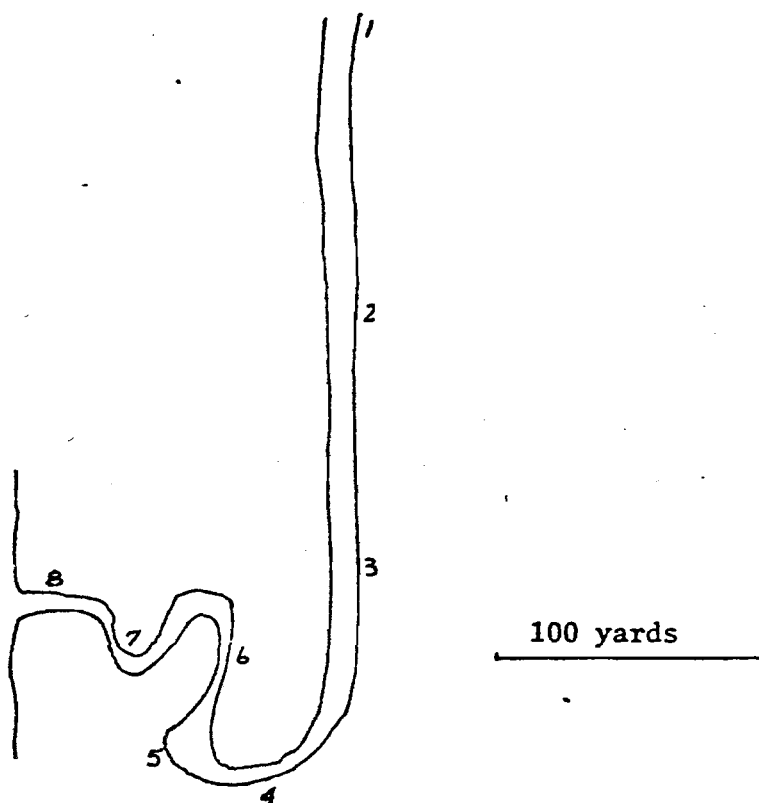
P = present

Figure 4. Winchester Bay



Station number	1	2
Date	6/21	6/21
Gear type	BS	BS
English sole	46	3
Sand sole		3
Starry flounder	31	16
Shiner perch	52	9
Red-tail perch		43
Silver perch		6
Walleye perch		1
Sculpin	13	
Kelp greenling		1
Tomcod		6
Chinook salmon	1	14
Coho salmon		4
Shad		8
Herring		32
Surfsmelt	2	587
Dungeness crab		7

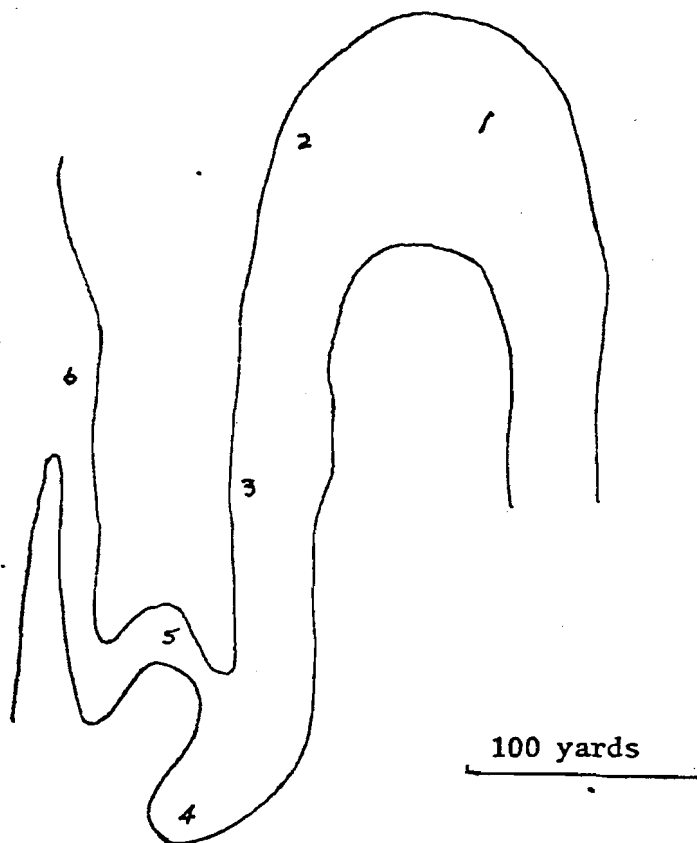
Figure 5. Tahkentich Creek



Station number	1	2	3	4	5	6	7	8
Date	7/18	7/18	7/18	7/18	7/18	7/18	7/18	7/18
Gear type	BS	BS	BS	BS	BS	BS	BS	BS
Starry flounder		1	10	7				
Sculpins	P	P	12	P	P	P	P	
Stickleback			6					

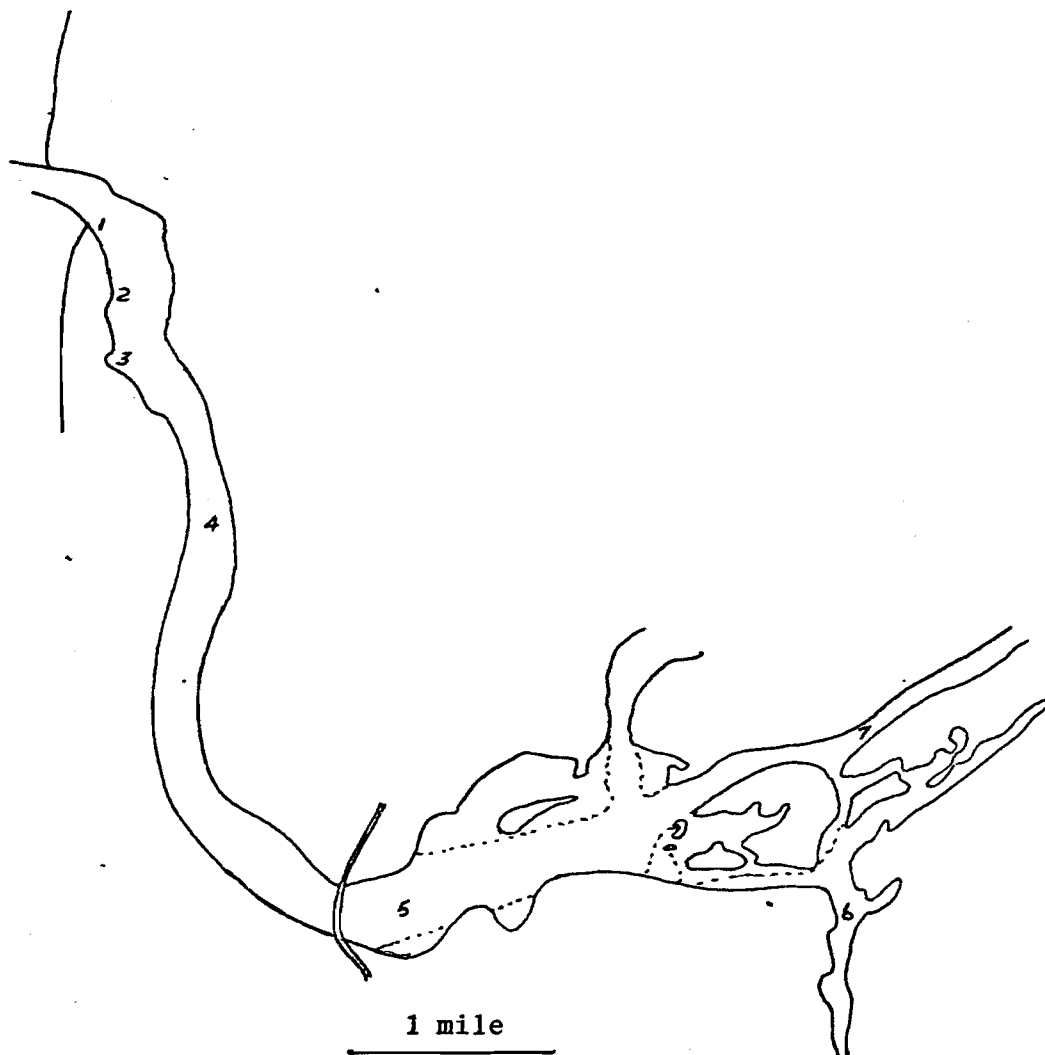
P = present

Figure 6. Siltcoos River



Station number	1	2	3	4	5	6
Date	7/20	7/20	7/20	7/20	7/20	7/20
Gear type	BS	BS	BS	BS	BS	BS
Starry flounder	6	7	10	32	32	
Sculpins	206		15			4

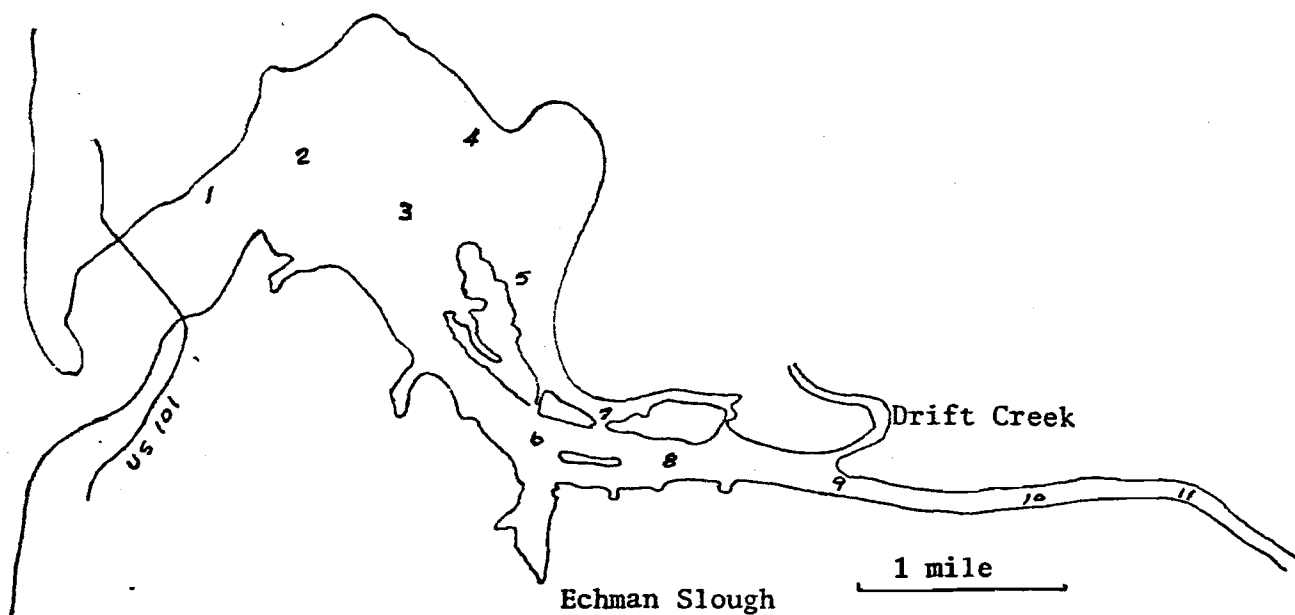
Figure 7. Siuslaw River



Station number	1	2	3	4	5	6	7
Date	8/15	8/15	8/15	8/23	8/23	8/23	8/23
Gear type	BS	BS	BS	TN	TN	TN	TN
English sole		3		3	12		9
Sand sole				3			
Starry flounder					1	12	1
Smelt	1	P	P				
Sculpin			2	3	3		2
Shiner perch			4			4	
Stickleback		5	1				
Dungeness crab				6	6	4	

P = present

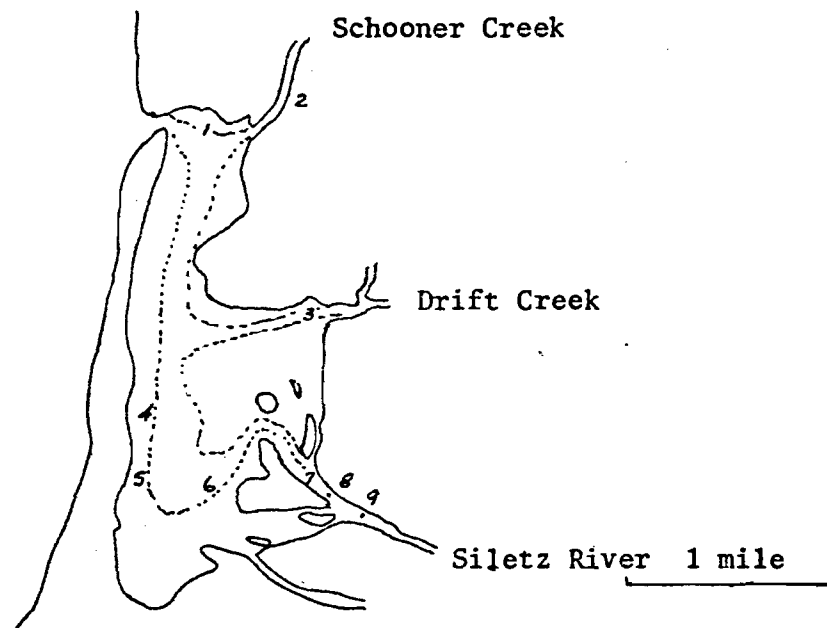
Figure 8. Alsea River



Station number	1	2	3	4	5	6	7	8	9	10	11
Date	7/6	7/6	7/6	8/7	8/7	7/6	8/7	7/6	7/6	7/6	7/6
Gear type	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
English sole	10	11	13	4	37	4	12				
Sand sole	9	10								3	
Pacific sanddab				1							
Starry flounder		1	3	2	6	10	65	1	2	8	12
Lingcod		1									
Sculpin	3	4	2	1	6	5	28	2	1		11
Shiner perch				1	10				2	1	7
Dungeness crab	17	2	6	2	35	5	122		5	3	
<i>Crago</i> spp.	12	4	9	P	P	7	P				

P = present

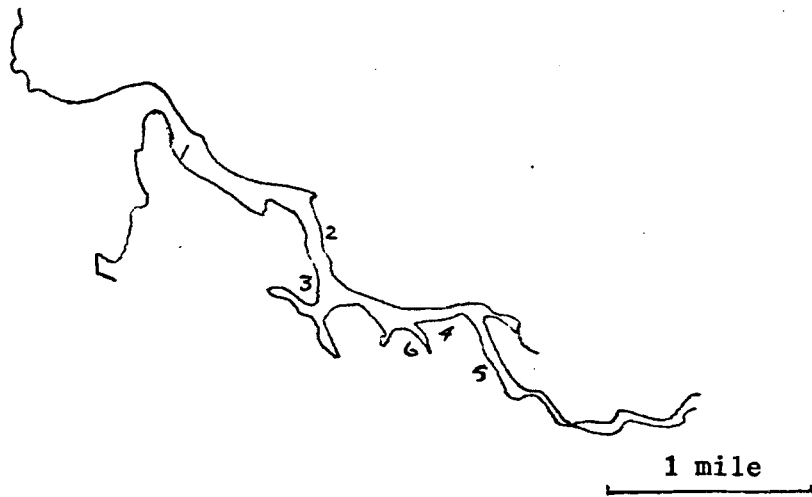
Figure 9. Siletz River



Station number	1	2*	3	4	5	6	7*	8	9*
Date	8/15	8/15	8/15	7/10	7/10	7/10	7/10	8/15	7/10
Gear type	TN	TN	TN	TN	TN	TN	TN	TN	TN
English sole	37			15	8				
Sand sole	1								
Starry flounder	5	11	17	9	4	3		7	17
Lingcod	4							1	
Kelp greenling	4								
Saddleback gunnel			2					2	2
Shiner perch			15	11		5			15
Sculpin			13	4		3		5	13
Dungeness crab				10				12	
<i>Crago</i> spp.	20	20	15				2	6	15

* = Snag

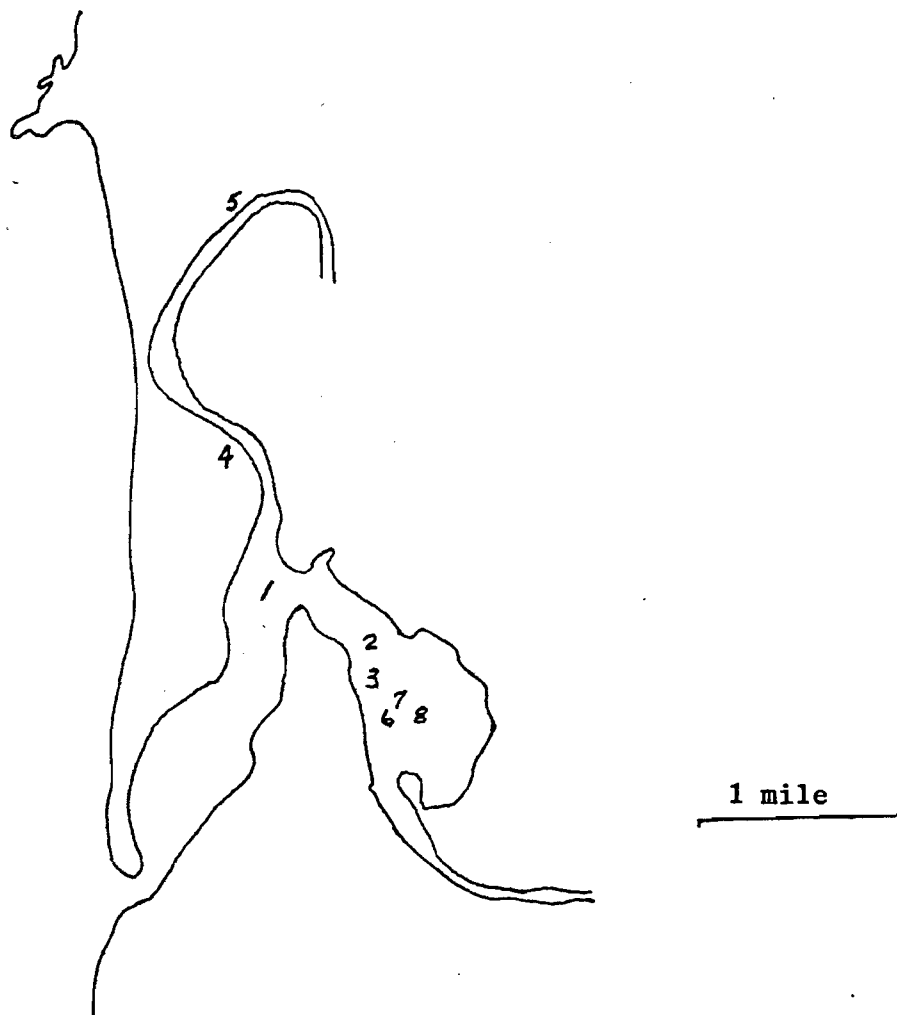
Figure 10. Salmon River



Station number	1	2	3	4*	5	6
Date	7/24	7/24	7/24	7/24		
Gear type	TN	TN	TN	TN	TN	TN
English sole	12		3			
Starry flounder					3	2
Sculpin	2		3		17	8
Saddleback gunnel					1	
Dungeness crab						2
<i>Crago</i> spp.	20		15			

* = Snag

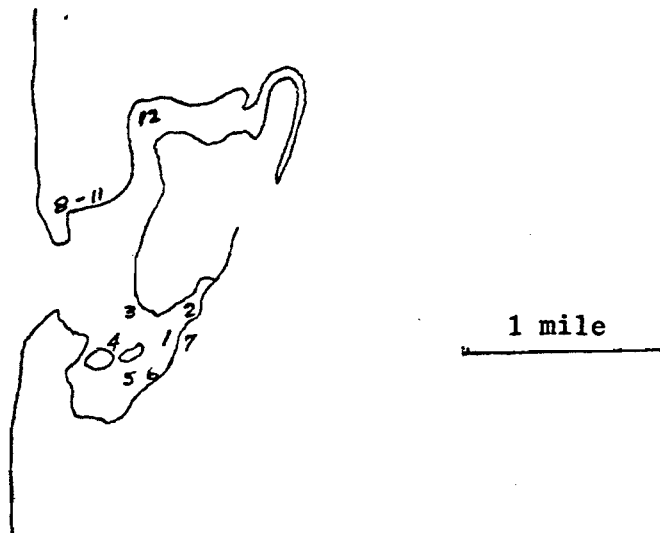
Figure 11. Nestucca Bay



Station number	1	2	3	4	5	6	7	8
Date	8/4	8/4	8/4	8/4	8/4	8/4	8/4	8/4
Gear type	TN	TN	TN	TN	TN	PN	PN	PN
English sole	40	5	32	31				
Sand sole				2				
Starry flounder	4	5	2	16	4			
Sculpin	13	1	2	32	21			
Shiner perch				1	10			
Dungeness crab	3	10	6	48				
<i>Crango</i> spp.	12							P

P = present

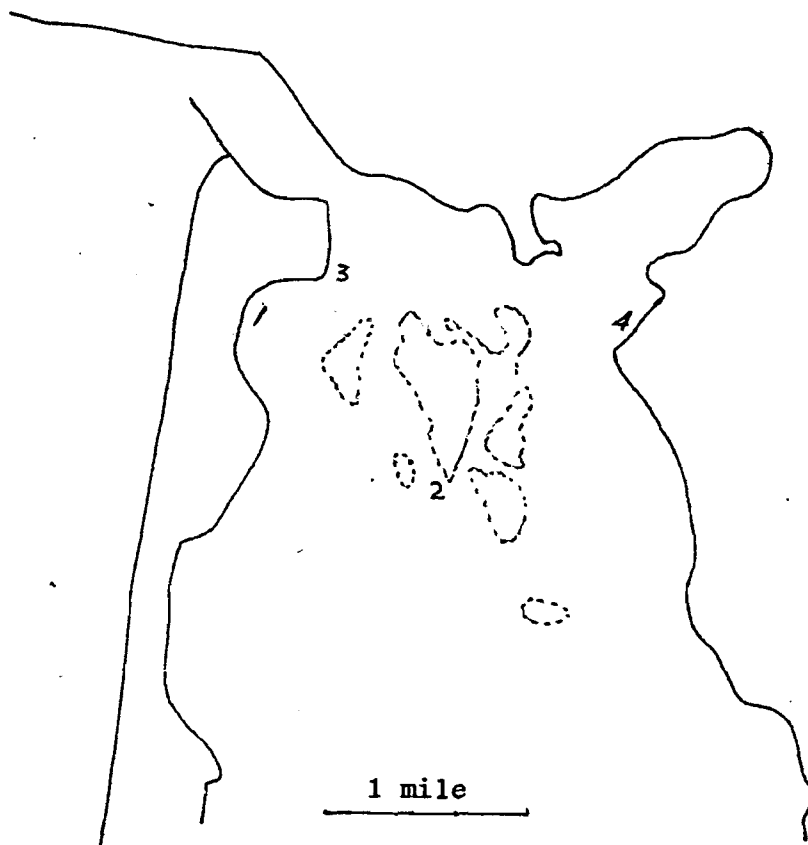
Figure 12. Sand Lake



Station number	1	2	3*	4	5	6	7	8	9	10	11	12
Date	7/25	7/25	7/25	7/25	7/25	7/25	7/25	7/25	7/25	7/25	7/25	7/25
Gear type	TN	TN	TN	PN	PN	PN	PN	PN	PN	PN	PN	PN
English sole	1	7			1		1	14				
Sculpin	4	2		5				5				2
Saddleback gunnel				18								2
Dungeness crab	1	3										
Shore crab				40			1					21
<i>Crango</i> spp.		2										

* = Net sanded in

Figure 13. Tillamook Bay



Station number	1	2	3	4
Date	7/11	7/11	7/11	7/11
Gear type	BS	BS	BS	BS
English sole	15	109	93	22
Lingcod		1		6
Sculpin	3	46	17	6
Shiner perch		1	2	27
Striped surfperch				17
3-spined stickleback			3	15
Tubesnout				1
Bay pipefish				1
Snake prickleback				1
Saddleback gunnel				7
Cutthroat trout		1		
Herring	1		71	
Anchovy	1			
Surfsmelt	342			
Top smelt		2		
Dungeness crab	3	1	10	2
<i>Crago</i> spp.		18	6	

Table 1. Species Occurrence in Estuaries

	Hunter	New River	Coquille River	Winchester Bay	Tahkenitch Creek	Siltcoos River	Siuslaw River	Alsea River	Siletz River	Salmon River	Nestucca Bay	Sand Lake	Tillamook Bay
1. English sole		X	X	X			X	X	X	X	X	X	X
2. Sand sole			X	X			X	X	X		X		
3. Pacific sanddab								X					
4. Starry flounder	X	X	X	X	X	X	X	X	X	X	X		
5. Shiner perch		X	X	X			X	X	X		X		X
6. Redtail perch				X									
7. Silver perch				X									
8. Walleye perch				X									
9. Striped surfperch													X
10. Sculpin	X	X	X	X	X	X	X	X	X	X	X	X	X
11. Kelp greenling				X					X				
12. Tomcod				X									
13. Shad				X									
14. Herring		X	X	X									X
15. Smelt		X	X	X			X						X
16. Anchovie													X
17. Stickleback	X	X			X		X						X
18. Lingcod								X	X				X
19. Saddleback Gunnel									X	X		X	X
20. Snakeblenny													X
21. Bay pipefish													X
22. Chinook salmon	X	X	X										
23. Coho salmon			X										
24. Cutthroat trout	X												X
25. Dungeness crab		X	X	X			X	X	X	X	X	X	X
26. Crago sp.		X	X					X	X	X	X	X	X
27. Shore crab												X	

Table 1. Species Occurrence in Estuaries

GROUND FISH AND SHRIMP INVESTIGATIONS

- Project Title:** Estuary fin fish research with emphasis on juvenile English sole, *Parophrys vetulus*.
- Personnel:** Groundfish and Shrimp Investigations staff.
- Cooperators:** Shellfish and Pelagic Fish Investigations.
Coastal Rivers Investigations.
- Purpose:** Determine the importance of estuaries as rearing areas for juvenile fin fish with particular emphasis on English sole.
- Objectives:**
- (1) Determine which estuaries provide rearing for juvenile English sole.
 - (2) Determine distribution of juvenile English sole within each estuary.
 - (3) Make preliminary estimates of biomass (numbers) for each estuary.
 - (4) Determine input of estuary stocks to ocean stocks.
 - a. Direct contribution
 - b. Distribution of juveniles once recruited to the ocean environment.
- Duration:** Objectives can be grouped into short term-long term studies.
- A. Short term studies
1. For objective (1), 30 days including a summary report.
 2. For objective (2), 90-115 days, field work plus 60-90 days for reporting.
 3. For objective (3), data base from objective (2). Allow 90 days for reporting.
- B. Long term studies
1. For objective (4), allow 2 months for tagging plus 8-10 years for tag recovery. Allow 1 year for analysis and reporting.
- In summary, allow 10 years for a comprehensive study.
- Justification:** English sole ranks second in landings of flatfishes off Oregon. At present, we know that four estuaries (Columbia River, Yaquina, Alsea and Coos Bay) provide rearing area for 0 group English sole. The importance of estuary rearing potential is unknown, but vitally needed. Coastal and state planning bodies must be informed of the dependence of juvenile English sole on the estuary.

Review of Previous Work: Westerheim (1955) provided the first published account of occurrence of juvenile sole in an Oregon estuary (Yaquina Bay). Subsequent work by the Environmental Protection Agency elaborated on Westrheim's work and determined the occurrence and distribution of 0 group fish between March 1967 and November 1968.

Work by Fish Commission personnel documented the occurrence of 0 group English sole in Alsea Bay in May 1971. Occurrence and distribution in Coos Bay was documented in 1970.

The idea that estuaries may be important, if not necessary to English sole stocks off Oregon, was the discrepancy between length frequency distributions as shown by Westrheim from Yaquina Bay and those from the ocean environment as shown by Demory (1971). The striking feature between the two studies is the complete lack of 0 group fish in the ocean environment. There is one complicating factor. The surf zone, that is from depths of about 3-feet to 30-feet, has not been successfully sampled. Capture of 0 group English sole in the surf with a push net has not been productive^{1/}. Near shore sampling with small mesh trawls has not been accomplished inside of 5-fathoms. Unless 0 group English sole can be caught in the near shore (surf) zone, we must conclude that for stocks of English sole reared in Oregon, the estuary is the only rearing area.

Methods & Materials:

Materials required are a dory with motor, sounder, push net, trawl, ATV, thermometer and water bottle for salinity samples.

Methods - To satisfy objective (1) occurrence can easily be determined by push net. To satisfy objective (2) would require systematic sampling to determine distribution. To satisfy objective (3) would require the data base from the second objective. An alternative method for estimating abundance would be marking and recapture of marked and unmarked fish. A method for marking 0 group flatfish by latex injection is available. To satisfy objective (4) would require massive tagging of 0 group fish just prior to emigration from the estuary in September and October. ^{2/}

1/ The net is effective in the estuary, however.

2/ An experiment is presently underway investigating the feasibility of using FD-67 anchor tags on juvenile English sole with a mean length of 11.2 cm.

Costs:

No new funds.

Reports:

Results will be summarized and reported by the
Groundfish research staff (Demory, Forsberg, Hosie).