FISHERIES MANAGEMENT AND DEVELOPMENT

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COMPLETION REPORT
to the State Planning Office
for the Period October 1, 1978-September 30, 1979

VOLUME II

Element A: Bottom Trawl Survey

Element B: Establishment of a Fisheries Data Base for Managing Maine's Commercial and Recreational Fisheries

Element C: Characterization of the Recreational Fisheries

Maine Department of Marine Resources
Fisheries Research Laboratory
[illegible]bay Harbor, Maine 04575
633-5572

Edited by: C. J. Walton

Project Manager: V. C. Anthony

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INTRODUCTION:

The Fisheries Management and Development Project of Maine's coastal zone program involved five project elements: (a) continuation of Maine's tagging and bottom trawl survey to expand the research data base in support of Maine finfish management interests; (b) the development of a program to establish a fisheries data base for stock assessments; (c) a characterization of Maine's recreational fisheries industry; (d) a characterization of shellfish resources and the shellfish industry; and (e) the development of a system to monitor fishing industry trends, industry economic status, and to supply economic data needs for industry management and development decisions.

The first two elements of this program have been coordinated with the work done by the National Marine Fisheries Service's Northeast Fisheries Center in Woods Hole, Massachusetts. The bottom trawl survey (Element A) is, in fact, a cooperative project with the state of Massachusetts and NMFS. Several meetings were held to plan surveys and to plan the analyses of the survey data. The establishment of the fisheries data base (Element B) was discussed with the Statistics and Market News Division of the National Marine Fisheries Service and the Assessment Division of Northeast Fisheries Center at Woods Hole. The research work for the first two project elements was designed to produce information that the State of Maine and the National Marine Fisheries Service needed for understanding the status of commercially harvested

stocks. This was an excellent example of how the coastal zone program and the National Marine Fisheries Service could work together. These two project elements have already indicated specific needs in data management.

Project elements (C) and (D) are a continuation of the work conducted by C.E. Maguire and summarized in a report entitled, "Towards a Fishery Strategy for Maine" which addressed the characterization of the finfish fisheries important to the State of Maine. The Governor's Advisory Committee on Coastal Development and Conservation (CCDC) reviewed this work and formulated recommendations for the state policy actions in fisheries development. It has been intended that the characterization of Maine's recreational fisheries and shellfish fisheries, when completed, would also lead to similar recommendations. This characterizational work suffered from the temporary nature of the funding from Coastal Zone in that hiring of qualified personnel for a short period of time was very difficult and some of the work was completed with less manpower than planned. Initiation of the project elements was also delayed until the memo of agreement was signed in the middle of January. Special problems were encountered with element (E) in an attempt to plan a system of collecting socio-economic information for the entire fishing industry through a contract.

This Coastal Zone research was planned and begun prior to the memorandum of December 12, 1978 from R.W. Knecht, the Assistant

Administrator for Coastal Zone Planning, to State Coastal Zone program managers which outlined the intent of the Coastal Zone Fisheries Assistance programs. That memorandum outlined four general coastal fishery assistance project areas as general guidance for the states in conducting their research. We agree with the areas as covered in the memo. This fisheries management and development project fortuitously addressed portions of project area 1 and portions of project area 2 cited in this document. Under project area 1 we addressed the habitat, fish stocks, economics, and community framework. Management was not addressed in this program. Under project area 2, Information and Data Collection, we addressed the state fisheries operational functions, characterization of state fishery groups and interactions in some detail.

Financial assistance for preparation of this document has been provided by the Coastal Zone Management Act of 1972, administered by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration. The five project elements have been conducted as part of the coastal program of the Maine State Planning Office in Augusta, Maine.

ELEMENT A: BOTTOM TRAWL SURVEY

by

C. J. Walton

Element A: BOTTOM TRAWL SURVEY

The bottom trawl survey was designed to sample demersal fish along the Maine coast under a standardized set of conditions. The results of the survey were summarized and have been incorporated into the biological data base that will be used to assess the conditions of the stocks. The 1979 survey was planned as a series of three cruises:

1. An inshore western Maine survey by the R/V Explorer that would cover the area between Saco Bay and Boothbay Harbor and was scheduled from April 17 to May 15.
2. A coastal survey by a chartered vessel the R/V Fishfinder, that would cover the coast from the Maine/New Hampshire border to the eastern portion of the state within the 60 fathom curve. This was conducted in June and July.
3. An offshore cruise by the R/V Challenge to be conducted as a combined shrimp and groundfish survey during August.

1. INSHORE GROUNDFISH SURVEY-R/V EXPLORER:

The survey was initiated on April 18 in Saco Bay. The R/V Explorer used a small otter trawl with 26 foot headrope and 32 foot footrope. Wings and body of the trawl were 1½ inch mesh and the cod

end was 1¼ inch mesh. The gear was rigged with 75 pound trawl doors and five inch mud rollers on the footrope.

The original survey plan covered 34 stations (Figure A-1) but almost half of these were abandoned because of unsuitable bottom conditions. All completed tows were of 30 minute duration. Catches were sorted by species and individual fish were measured; the total volume or weight of each species was recorded. Catch data have been coded and stored using the new computer terminal linked to the computer at the University of Maine at Orono.

After the first phase of this survey was completed in mid-May trawling operations were conducted in Sheepscot Bay. This area was selected because it has been an historically important spawning ground for some commercially important species. During this spring-summer segment of the survey eight demersal species in spawning condition were sampled. Weekly tows were made at the mouth of the Sheepscot River from mid-May until the first week in August. Data on weight or volume of individual species and surface and bottom water temperatures were recorded. Comparisons between this survey and the 1978 survey have not been completed but the Sheepscot Bay work demonstrated that, in 1979, there were more large cod than in 1978 but only a fraction of the silver hake recorded in the previous survey. The larger silver hake were rarely observed in the 1979 inshore work although they were fairly abundant offshore in deeper, and cooler water. Young haddock were

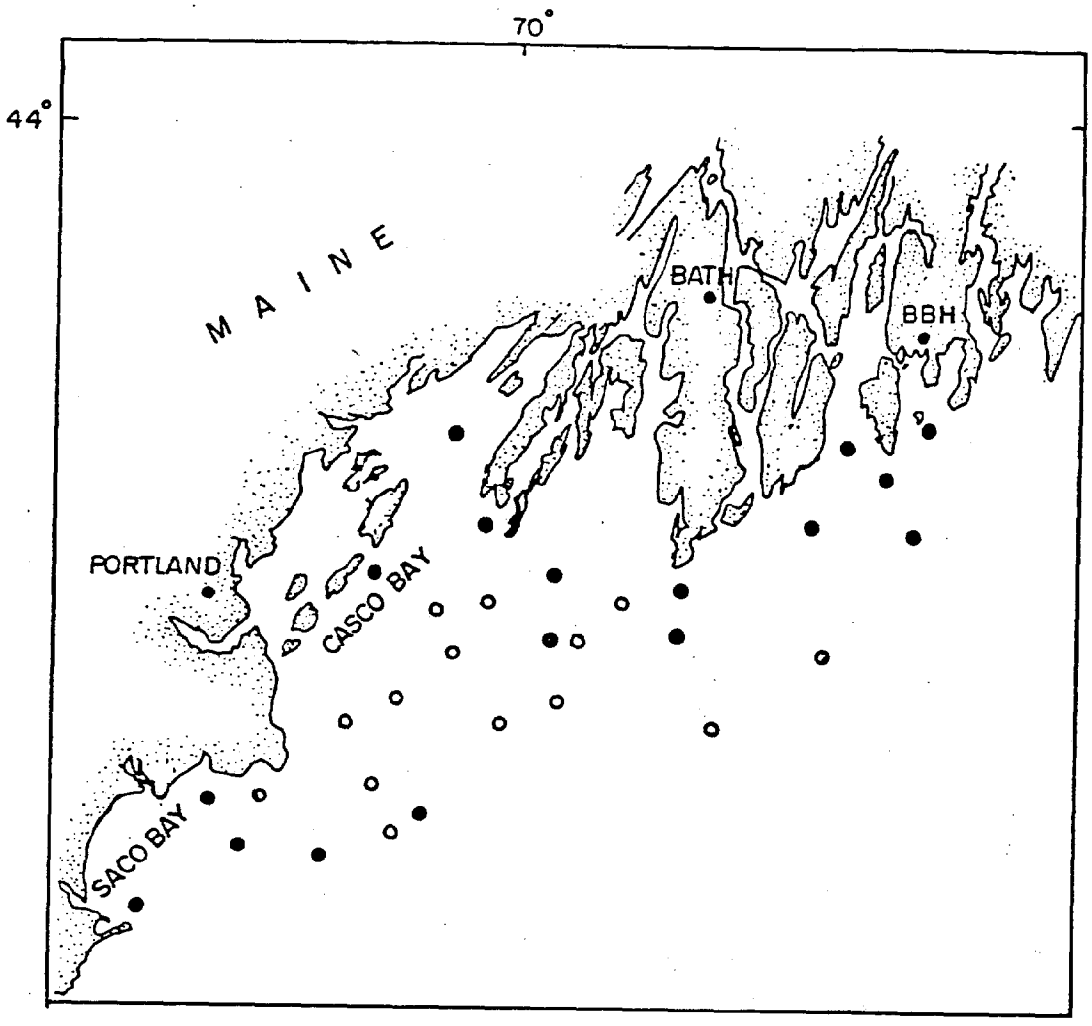


Figure A-1. R/V Explorer Inshore Survey: 1979. Solid circles indicate successful stations; half circles indicate locations where tows were made, but gear was damaged; open circles indicate locations where bottom conditions were too rough for towing.

taken near Sequin Island in 1978, but none were taken in 1979.

Tagging of groundfish was also conducted in this survey series since the 1978 tagging experiments yielded promising results. Approximately 1700 groundfish of 13 species were tagged aboard the R/V Explorer this year. A summary and comparison of the experimental tagging programs for the two years is presented in Table A-1.

2. MAINE COASTAL SURVEY-R/V FISHFINDER:

The coastal survey was conducted by the chartered R/V Fishfinder from May 30 to July 28. The R/V Fishfinder was chartered from the Washington County Vocational-Technical Institute. The survey was delayed more than a month due to problems in preparing the vessel for trawling. The WCVTI staff did an outstanding job in preparing the vessel for fishery research work and their assistance and cooperation was excellent. The trawl gear was a 50 x 70 URI High Rise bottom trawl with 4½ inch mesh, 54 thread, polypropylene netting. This net was rigged with 14-inch rollers on the footrope and a ½ inch mesh cod-end liner to capture juvenile fish.

Seventy two coastal sample stations were preselected (Figure A-2). These locations were chosen for complete coastal coverage and it was anticipated that a number of these would prove unsuitable for trawling. Each station location was searched for level towing bottom in a seaward direction until suitable conditions were found or search time had expired. Sixty of the stations were visited and 39 were successfully

TABLE A-1

Fish Tagged During Inshore Groundfish Surveys

By the R/V Explorer 1978-79

	1978		1979	
Species	Number Tagged	Number Returned	Number Tagged	Number Returned
Cod	572	22	764	17
Haddock	12	0	73	1
Yellowtail Flounder	17	1	71	2
Blackback Flounder	6	0	139	1
American Plaice	0	-	308	10
Grey Sole	0	-	7	0
Fourspot Flounder	0	-	4	0
Windowpane Flounder	0	-	5	0
Pollock	25	0	5	0
Red Hake	4	0	71	0
White Hake	3	0	56	1
Silver Hake	0	-	165	0
Butterfish	1	0	29	0
Mackerel	9	0	0	-
Halibut	1	1	0	-

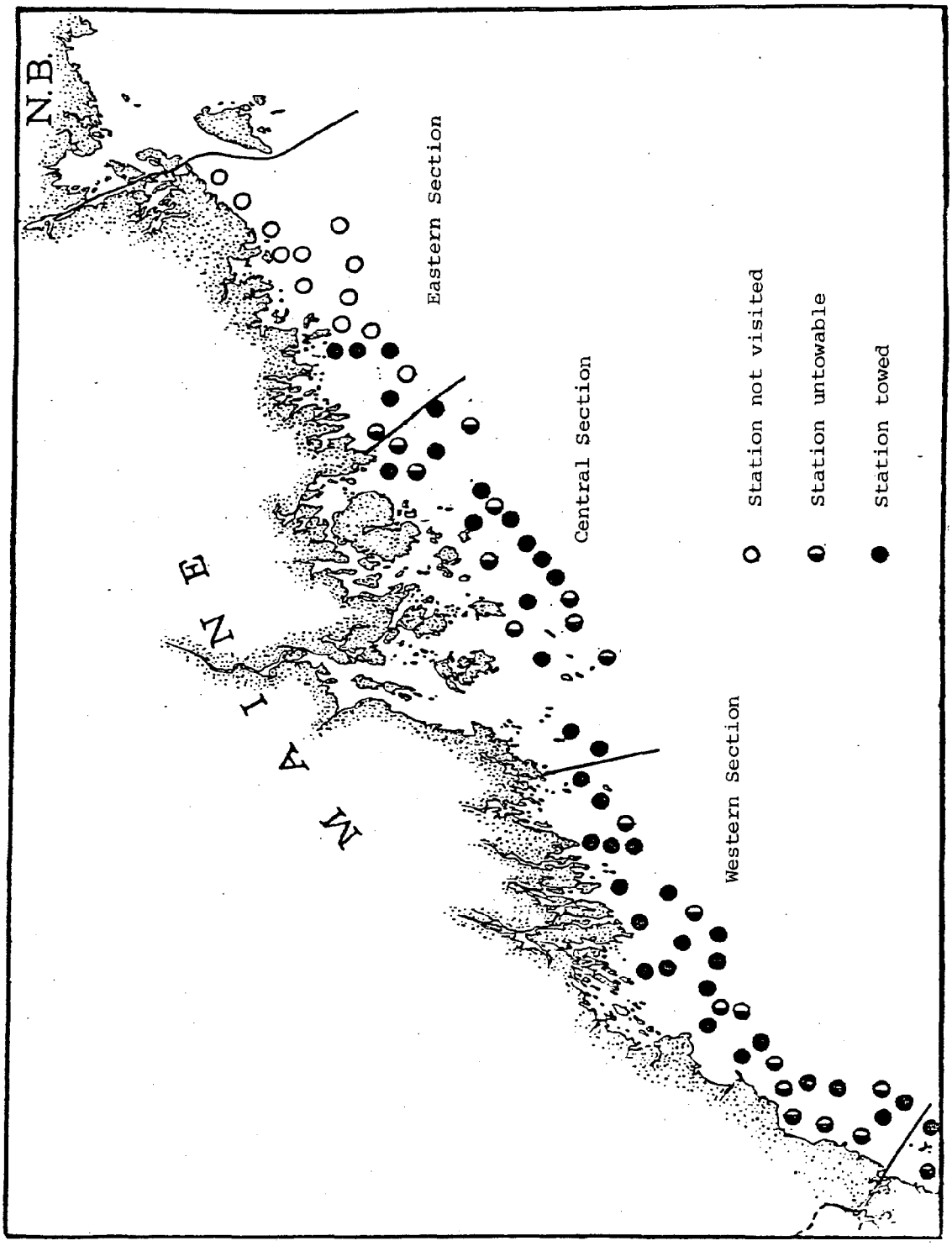


Figure A-2. Stations selected and completed on the 1979 Coastal Groundfish Survey.

towed. Equipment failure and persistent fog delayed the completion of the cruise in the area east of Jonesport and finally resulted in its termination when the main engine failed. The eastern section of the coast could not be sampled since the vessel was scheduled for other work after the engine was repaired.

This was an exploratory survey and the relatively large proportion of untowable areas was expected. This is the main reason that the NMFS has little information on fish abundance and distribution in the inshore areas of the Maine coast. Data on untowable bottom areas and survey charts were provided by NMFS and were used in planning this survey. This preliminary work pinpointed a number of suitable sampling areas and future surveys will utilize these stations. The sampling of the major fishing areas of the coast between Kittery and Jonesport was fairly complete (Figure A-2). Station data are summarized in Table A-2.

Tows were made for approximately 20 minutes at 3 knots, a bottom distance of roughly one mile. Tows of this length, although shorter than commercial fishing tows, were adequate to sample the demersal fish in the area. Catches were sorted by species, measured and weighed. Otoliths and scales were removed for age determinations (Table A-3). Stomachs from juvenile fish were removed and preserved in formalin for analysis by the food studies project at the Northeast Fisheries Center (NMFS). Temperature profiles were recorded by an XBT cast made at the end of each tow.

Table A-2. Station data for 1979 coastal bottom trawl survey-R/V Fishfinder

Station #	Section [a]	Latitude	Longitude	Depth [b]	Station #	Section [a]	Latitude	Longitude	Depth [b]
2	Western	42°52'	70°32'	276	30	Western	44°49'	69°28'	210
3	Western	43°03'	70°23'	266	32	Western	43°46'	69°22'	302
4	Western	43°04'	70°27'	259	33	Western	45°51'	69°16'	263
8	Western	43°12'	70°24'	256	34	Central	43°45'	69°17'	250
10	Western	43°15'	70°20'	276	35	Central	43°49'	69°06'	233
13	Western	43°24'	70°13'	276	36	Central	43°55'	68°46'	312
14	Western	43°25'	70°17'	194	40	Central	43°56'	68°36'	282
17	Western	43°29'	70°12'	210	42	Central	43°54'	68°31'	289
18	Western	43°31'	70°00'	338	43	Central	44°00'	68°28'	279
19	Western	43°30'	70°54'	410	45	Central	43°58'	68°19'	334
20	Western	43°29'	69°46'	433	46	Central	44°01'	68°14'	351
22	Western	43°37'	69°46'	265	47	Central	44°06'	68°17'	242
23	Western	43°39'	69°54'	135	49	Central	44°04'	68°07'	354
24	Western	43°30'	69°54'	150	51	Central	44°06'	68°01'	302
25	Western	44°42'	69°43'	89	53	Central	44°05'	67°54'	335
26	Western	44°41'	69°39'	279	55	Central	44°16'	68°07'	215
27	Western	44°43'	69°39'	187	57	Eastern	44°15'	67°51'	220
28	Western	43°41'	69°30'	348	59	Eastern	44°15'	67°59'	205
29	Western	43°43'	69°30'	330	61	Eastern	44°22'	67°39'	200
					62	Eastern	44°25'	67°45'	127

(a) Sections - refer to Figure A-2

(b) Mean depth in feet

Table A-3

1979 Spring bottom trawl survey age samples collected on the R/V Fishfinder

Species	Type of sample	Western Maine Stations 2-33			Central Maine Stations 34-55			Eastern Maine Stations 57-62		
		Male	Female	Unsexed	Male	Female	Unsexed	Male	Female	Unsexed
Cod	Otoliths	46	25	0	16	14	0	0	0	0
Haddock	Otoliths & scales	13	11	1	7	10	0	0	0	0
Pollock	Otoliths	1	0	0	1	0	0	0	0	0
Silver hake	Otoliths	62	74	3	21	31	0	8	13	0
White hake	Otoliths	44	57	0	13	23	0	3	9	0
Red hake	Otoliths	46	44	0	15	8	0	3	0	0
Halibut	Otoliths & scales	0	0	0	1	0	0	0	0	0
American plaice	Otoliths	11	7	67	5	2	27	0	0	5
Yellowtail	Scales	10	4	1	0	0	0	3	0	0
Blackback	Scales	12	13	0	1	1	14	0	0	18
Gray sole	Otoliths	15	12	37	5	4	25	4	1	6
Windowpane	-	0	0	0	0	0	0	0	0	0
Redfish	Otoliths	15	14	0	0	0	0	0	0	0
Cusk	Otoliths	0	0	1	0	1	0	0	0	0
		COLLECTED ON THE R/V EXPLORER								
Cod	Otoliths	0	0	32						
Gray sole	Otoliths	0	0	15						
Redfish	Otoliths	0	0	2						

Total catch was in excess of 7000 pounds representing 25 species. In terms of total weight, the American plaice or dab *(Hippoglossoides platessoides)* and cod *(Gadus morhua)* were the most abundant species in the catches. Data from the survey have been placed on computer tapes and some preliminary sorting and comparison programs have been run with these data.

Preliminary examination of the coastal survey data has revealed some interesting distributions of species by depth and by section of the coast (Tables A-4 and A-5). The highest catches of American dab *(Hippoglossoides platessoides)*, silver hake *(Merluccius bilinearis)*, blackback flounder *(Pseudopleuronectes americanus)*, red hake *(Urophycis chuss)* and cod *(Gadus morhua)*, in terms of numbers of fish per tow, were made in the western section of the coast. The central section produced the highest catch of gray sole *(Glyptocephalus cynoglossus)* and the eastern section the highest catch of white hake *(Urophycis tenuis)* and alewives *(Alosa pseudoharengus)*. The number of fish caught above and below the mean sampling depth gave some indication of the depth distribution of the eight most abundant species during the survey (Table A-5).

These summarized data do not completely describe the depth distributions of these species since there were some important sectional differences. Table A-6 summarizes the abundance of the eight principal species above and below the mean sampling depth for the three sections

TABLE A-4

1979 COASTAL BOTTOM TRAWL SURVEY
Mean number and percentage per tow by sections
for the eight most abundant species sampled.

	WESTERN SECTION[a]		CENTRAL SECTION[b]		EASTERN SECTION[c]	
Species	Mean Number	Percentage	Mean Number	Percentage	Mean Number	Percentage
American Dab	88	65	30	22	17	13
Silver Hake	55	48	25	22	34	30
White Hake	19	39	7	14	23	47
Gray Sole	10	29	22	65	2	6
Blackback	8	53	2	14	5	33
Red Hake	7	54	1	8	5	38
Cod	5	55	4	45	-	-
Alewife	1	13	3	38	4	50

a) Includes Station Numbers 1-33

b) Includes Station Numbers 34-51

c) Includes Station Numbers 53-62

TABLE A-5

1979 BOTTOM TRAWL SURVEY ABOARD THE FISHFINDER
Number and Percentage by Depth of the
Eight Most Abundant Species Caught

Species	% of total catches	Depth less than mean[a] Total Number	Percentage	Depth greater than mean Total Number	Percentage	Significant Difference X^2 test 95% level
American dab	41	1231	51%	1162	49%	Not significant
Silver hake	29	684	41%	977	59%	Significant
White hake	10	250	42%	345	58%	Significant
Gray sole	9	138	27%	364	73%	Significant
Black-back	4	212	93%	17	7%	Significant
Red hake	3	95	48%	104	52%	Not significant
Cod	3	120	71%	50	29%	Significant
Alewife	1	29	41%	41	59%	Not significant
Totals		2759		3060		Significant

a) Mean Depth of survey tow series was 264 ft. (44 fathoms)

TABLE A-6

1979 COASTAL BOTTOM TRAWL SURVEY
Mean number and percentage per tow by section and depth for the eight most abundant species sampled.

Species	WESTERN SECTION				CENTRAL SECTION				EASTERN SECTION(b)	
	Depth less than 264 ft.(a)	Percent	Depth greater than 264 ft.	Percent	Depth less than 264 ft.	Percent	Depth greater than 264 ft.	Percent	Depth less than 264 ft.	Percent
American dab	98	55	80	45	46	67	23	33	17	100
Silver Hake	40	37	67	63	37	66	19	34	34	100
White Hake	12	32	25	68	11	68	5	32	23	100
Gray Sole	5	28	13	72	20	47	23	53	2	100
Blackback	16	94	1	6	7	94	<1	6	5	100
Red Hake	7	50	7	50	2	50	2	50	5	100
Cod	9	82	2	18	8	73	3	27	-	-
Alewife	1	50	1	50	<1	10	4	90	4	100

a) 264 ft. was the mean depth of the stations towed by the Fishfinder.

b) Depths of all stations in Eastern Section were below the mean.

of the survey. The table does not provide depth comparisons for the eastern section because all tows were made in water less than the mean depth for the survey series. American dab were much more abundant in the western section of the coast and were distributed uniformly above and below the mean depth. Dabs in the central section were more abundant in shallower water. Silver hake and white hake were more abundant in deep water in the western section of the coast and in shallower water in the central section of the coast. Both species are migrating at this time of year and this may account for these sectional differences. Gray sole were more abundant in deep water in the western section but had a more even depth distribution in the central section. Blackback flounder and cod were more abundant in shallower water in both western and central sections and no depth distribution pattern could be discerned. Alewives appeared to be uniformly distributed above and below the mean depth in western Maine but they were more abundant in deep water in the central section and were taken at about the same rate (4 fish/tow) in shallow water in the eastern section of the coast.

3. OFFSHORE SUMMER CRUISE-R/V CHALLENGE:

This survey was not executed due to demands for the use of the R/V Challenge and the survey was limited to the collection of shrimp samples.

SUMMARY:

Assessment of the abundance and distribution of fish stocks is an essential prerequisite for the development of management strategies. The data provided by survey cruises, in which samples of fish are taken with standardized fishing methods, form a major component of the biological data base. Such information, when used with landings data, sea sampling results and biological information, provide a basic understanding of the status of the stocks and man's effect on them. Research surveys provide information on recruiting size groups and provide an unbiased sample of distribution not obtained from fishing vessels. Biological data, such as age and length composition of the stocks, feeding information, growth rates and fecundity indicate the current condition of the fish stocks and are essential components in models of stock dynamics and ecological interactions.

The most important information to be derived from survey work is that which can be derived from a series of such surveys. A survey, such as the one described here, provides a profile of the relative abundance and distribution of the fish stocks at one particular time of one year. The planned continuation of this survey series will provide a sequence of stock profiles through time and thus the survey data will

acquire a new dimension; when combined with information from the Massachusetts survey and the NMFS offshore survey these data can provide an understanding of species distributions in the Gulf of Maine. A series of annual surveys are necessary for predictive modeling of stock dynamics. The data derived from these surveys will provide better information for management.

ELEMENT B: ESTABLISHMENT OF A FISHERIES DATA BASE FOR MANAGING MAINE'S COMMERCIAL AND RECREATIONAL FISHERIES

by

V.C. Anthony
C.J. Walton
E.P. Creaser
D.B. Sampson

ELEMENT B. ESTABLISHMENT OF A FISHERIES DATA BASE FOR MANAGING MAINE'S COMMERCIAL AND RECREATIONAL FISHERIES:

INTRODUCTION:

Element B of the Coastal Zone Program comprised the first five tasks of a comprehensive plan to improve the fisheries data base for the management of Maine's marine resources. This was intended as a long term program and these planning segments form the outline for future work in this project. The second task, an evaluation of the existing program for the collection of landings data, demonstrated that the current system is inadequate because of understaffing and the relatively rapid growth and proliferation of the commercial and recreational fisheries during the last 20 years. This evaluation of current data collection programs is incomplete because the complexity and magnitude of the fisheries is greater than had been anticipated. The available information clearly demonstrate major sources of error for some fisheries but it has also suggested some reasonable corrective measures.

The next task, an evaluation of the NMFS logbook system, also disclosed some sources of potential error although appropriate corrective measures could not be clearly defined. The review and automation of the DMR licensing system (Task 4) was planned and accomplished.

Task 5, a survey of the fishing industry to determine landing patterns, encountered the problems which affected the evaluation of the landings data system; the magnitude and complexity of the fisheries were

far greater than had been anticipated. This unappreciated complexity has been a problem at all management levels since the study revealed that both the state and federal landings data collection systems and the federal permit system did not include a number of fishermen and dealers. The memorandum of agreement between the Department of Marine Resources and the Maine State Planning Office indicated that this task of the program would be an ongoing program that would not be completed until 1981. The first portion of this task, therefore, the identification of landing areas for some of the major fisheries, has been partially completed.

The sixth task, the identification of industry sectors where landings do not reflect catches, was also the first portion of an ongoing program. The first phase of this task was to begin the evaluation of catches and landings for day trip commercial and recreational vessels. This research started in the spring of 1979.

ELEMENT B-1.

The work program for this element was completed in the spring of 1979.

Element B-2. EVALUATE THE EXISTING PROGRAM FOR THE COLLECTION OF LANDINGS DATA.

Major fish and shellfish landings and their value are shown in Table B-1 for 1973-1978. These data are not catches but are an underestimate of landings of those fish and shellfish that are landed at Maine ports by commercial fishermen. Recreational catches or commercial catches that are handled privately from fishermen to restaurants, markets, tackle shops, and marinas, or that are sold locally on the highways are not included. It is believed that, on the average, NMFS port agents collect information on only about 75 percent of the landings from the 15 ports that they visit. Many ports are not visited, and the catch statistics are extremely inadequate for some species.

Lobster landings, for example, are especially under-represented in the statistics. It is well known that the lobster landings tabulated by port agents at the dealer level have not been indicative of the total landings in recent years. Many lobsters are currently sold directly from fishermen to consumers, and in some cases the fishermen never sell their lobsters through dealers. Species that are nearly all sold through dealers are also underreported because some dealers are not checked by data collectors.

The Department of Marine Resources has estimated that 52 million pounds of lobster bait are used each year along the Maine coast in lobster fishing operations. Much of this bait is groundfish which is

TABLE B-1. TOTAL LANDINGS, TOTAL VALUE, AND PRICE/POUND FOR SPECIES OF FISH LANDED AT MAINE PORTS

Species	Thousands of Pounds (Whole) [a]						Thousands of Dollars						Cents/Pound (Whole) [a]					
	1973	1974	1975	1976	1977	1978	1973	1974	1975	1976	1977	1978	1973	1974	1975	1976	1977	1978
Lobsters	17,044	16,458	17,017	19,001	18,488	19,130	23,270	23,213	27,479	29,238	32,101	33,878	136.5	141.0	161.0	153.9	174.0	177.0
Clams	7,260	5,903	6,547	7,368	7,835	6,007	5,702	4,511	5,692	7,489	9,272	7,470	78.5	76.4	86.9	101.6	118.0	124.0
Shrimp	12,074	9,771	7,005	1,361	313		3,555	3,466	1,938	487	172		29.4	35.5	27.7	35.9	55.0	
Periwinkles	28	34	32	38	20	7	28	32	31	36	10	6	101.9	92.8	96.1	93.0	50.9	97.7
Sandworms [b]	465	401	365	340	360	365	1,060	950	863	812	1,000	1,075	228.0	237.0	236.0	239.0	278.0	295.0
Bloodworms [c]	195	173	197	130	97	89	1,745	1,570	1,779	1,256	1,314	1,165	197.0	202.0	234.0	201.0	228.0	198.0
Redfish	36,092	30,626	21,514	20,783	20,801	22,406	2,578	2,326	1,979	2,604	3,140	3,736	7.1	7.6	9.2	12.5	15.0	17.0
Scallops	804	445	1,594	629	395	908	1,472	723	3,012	1,352	755	2,246	183.1	162.5	189.0	214.8	191.0	247.0
Herring	37,229	47,398	38,247	70,233	73,050	66,895	1,080	1,793	1,423	3,053	3,545	3,782	2.9	3.8	3.7	4.3	5.0	6.0
Cod	4,035	4,004	5,595	6,367	9,126	10,767	498	544	910	1,429	1,974	2,261	12.3	13.6	16.3	22.4	22.0	21.0
Pollock	2,357	3,594	5,917	7,717	10,685	15,313	187	328	547	849	1,406	2,446	7.9	9.1	9.2	10.2	13.0	16.0
White Hake	2,140	3,778	4,559	5,524	6,544	6,683	191	266	365	601	744	905	8.9	7.0	8.0	10.9	11.0	14.0
Grey Sole	1,318	575	771	852	1,694	3,046	269	144	258	392	847	1,568	20.4	25.0	33.5	46.0	50.0	51.0
Whiting	5,517	2,869	1,198	408	255	1,161	299	175	72	29	17	108	5.4	6.1	6.0	7.0	7.0	9.0
Menhaden	6,936	10,149	13,958	17,553	3,290	6,960	144	155	195	300	71	174	2.1	1.5	1.4	1.7	2.0	2.0
Haddock	352	229	776	1,537	2,250	4,615	124	87	276	733	960	1,599	35.2	38.0	35.6	47.7	43.0	35.0
Dab	771	722	1,084	2,056	5,813	8,338	113	124	243	606	1,765	3,126	14.7	17.2	22.4	29.5	30.0	37.0
Mussels	440	308	612	1,203	2,113	2,796	116	83	198	344	680	670	26.4	26.9	32.4	28.6	32.0	24.0
Yellowtail	210	240	532	314	331	509	23	45	104	121	133	212	19.3	22.9	32.0	38.4	40.0	42.0
Blackback	120	197	325	388	428	723	33	45	126	108	124	263	15.9	18.7	23.6	27.7	29.0	36.0
Alewives	2,691	3,310	3,768	3,395	3,374	2,781	88	114	134	112	120	138	3.3	3.4	3.6	3.3	4.0	5.0
Swordfish	(=)	119	146	610	380	366	(-)	118	198	825	460	569	(-)	99.2	135.6	135.1	121.0	156.0
Cusk	578	632	801	862	1,000	1,338	61	76	104	147	163	228	10.6	12.1	13.0	17.0	16.0	17.0

a) All weights are for whole fish except clams, mussels (whole meats), and scallops (adductor muscle)

b) Calculated from DMR estimates of number of sandworms per pound (approximately 82 worms per pound).

c) Calculated from DMR estimates of number of bloodworms per pound (approximately 181 worms per pound).

unreported. Other types of bait are alewives in the spring period, herring when they become available and cheap, and redfish carcasses from the filleting plants. In recent years these sources of bait have become so expensive that some groundfish fishermen are making special trips to supply lobstermen with bait. The groundfish used for lobster bait are small and therefore, in terms of numbers, may be a significant proportion of the population. The severity of this underreporting is not known and in many cases cannot be estimated with any degree of confidence.

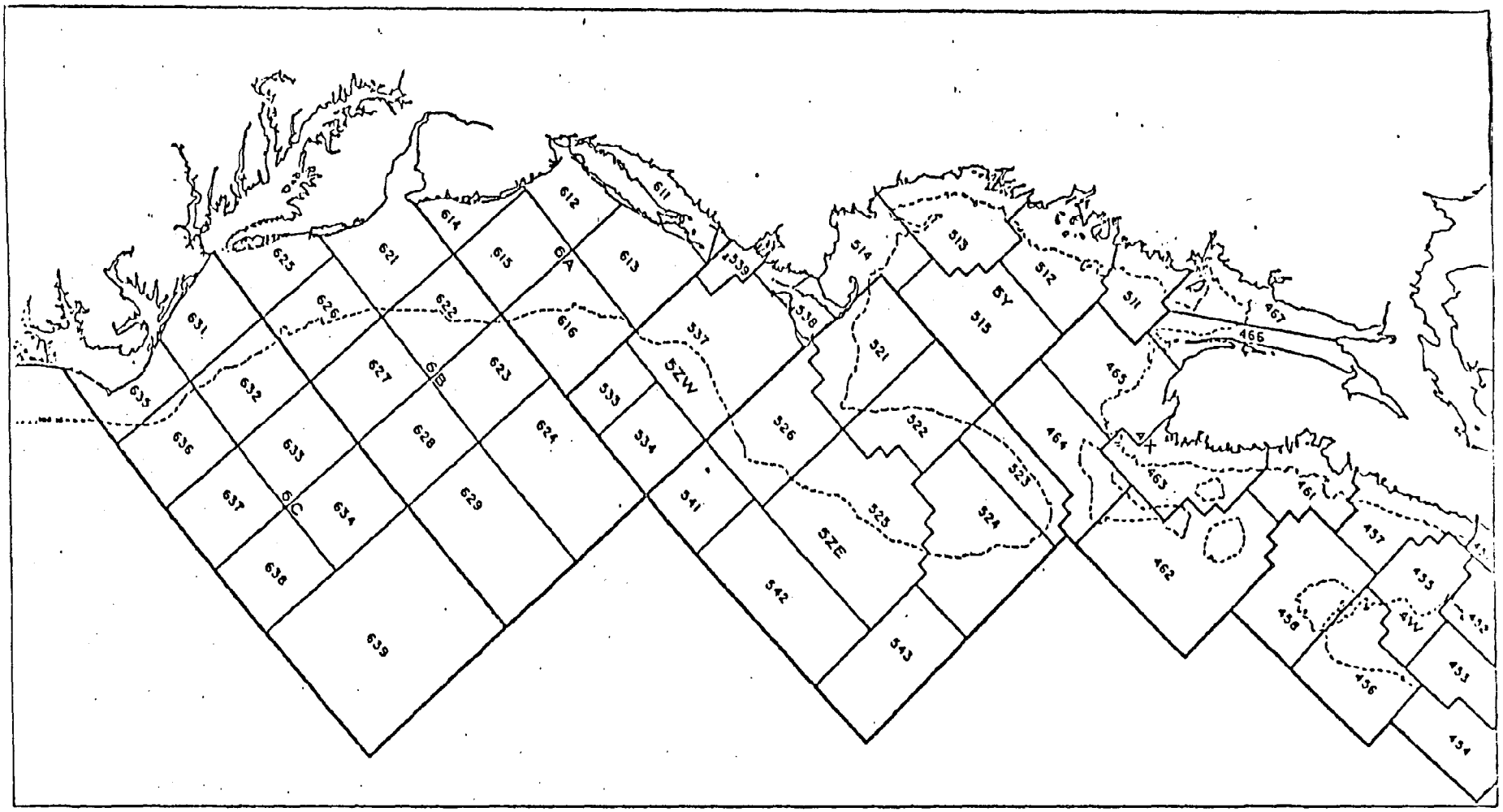
Another general problem in data collection is the timing and location of landings. Maine landings data have to be collected on a monthly basis. If a dealer or plant does not have its landings data up to date the landings for one month may be reported in the following month. These discrepancies are usually corrected in the annual summary but the monthly landings remain in error. The problem of catch location is a major one for some fisheries. Groundfish, in particular, may be caught in eastern Maine but landed in Portland. Table B-2 shows catch data from NMFS Statistical Area 511 (Figure B-1), as determined by prorating fisherman interview information to the total catches, compared with "Washington County landings." In cases in which the reported landings from Statistical Area 511 are greater than those reported in the Washington County landings, the difference is due to the fact that the fish are caught off Washington County, but are

Table B-2:

Catches (1000 lbs.) FROM STATISTICAL AREA 511 AND WASHINGTON COUNTY LANDINGS (1000 lbs.), 1974-1978

	1974				1975				1976				1977				1978			
	Distance from shore				Distance from shore				Distance from shore				Distance from shore				Distance from shore			
Species	0-3	3+	Total	Wash.Cty	0-3	3+	Total	Wash.Cty	0-3	3+	Total	Wash.Cty	0-3	3+	Total	Wash.Cty	0-3	3+	Total	Wash.
Alewives	239		239	239	710		710	710	481		481	481	251	251	251		257		257	243
Cod	78	103	181	91	98	208	306	114	78	44	122	91	36	41	77	42	161	19	180	181
Cusk		14	14		6	14	20	7		4	4			2	2		3	2	5	2
American eel				49				43				67				72	41		41	41
Blackback	8		8	8	26		26	26		2	2			1	1		10	1	11	7
Gray Sole	18	25	43	18	16	23	39	16		55	55			33	33		8	10	18	1
Yellowtail						1	1			.2	.2							.2	.2	<1
Dab	16	9	25	16	28	16	44	29		13	13			35	35		2	4	6	<1
Haddock	9	83	92	11	14	151	165	16		36	36		2	18	20	2	14	41	55	15
Red Hake						1	1													
White Hake	18	86		24	17	43	60	23	15	18	33	21	30	16	46	40	28	30	58	25
Atl. Halibut	1		1	1	4	1	5	4	1		1	1					12		12	14
Sea Herring	6,418		6,418	6,418	6,597		6,597	6,597	14,329		14,329	14,329	14,395		14,395	14,395	14,534		14,534	14,727
Mackerel						1	1		51		51	51					.2		.2	
Menhaden	22		22	22																
Redfish		110	110			322	322			76	76			58	58		1	23	24	
Pollock	10	226	236	11	19	190	209	22	17	33	50	19	4	18	22	5	260	28	288	258
Dogfish (UNC)									1											
Shark (UNC)																	1		1	1
Skates									1		1			1	1					
Smelt	3		3	3	12		12	12	20		20	20	17		17	17	19		19	19
Silver Hake																				
Wolffish	3	2	5	4		2	2			2	2							2	2	<1
Other fish		20	20																	
Rock Crab	11		11	11					38		38	46	23		23	23				
Lobsters	2,092		2,092	2,092	1,742		1,742	1,910	2,489		2,489	2,489	2,021		2,021	2,020	1,936		1,936	2,148
Shrimp	29		29	29	30		30	30												
Clam, soft	2,619		2,619	2,619	2,675		2,675	2,675	2,830		2,830	2,830	3,661		3,661	3,661	2,567		2,567	2,567
Conchs	2		2	2	3		3	3	8		8									
Mussels					22		22	22	17		17	17	76		76	76	378		378	378
Periwinkles	14		14	14	15		15	15	13		13	13	11		11	11	6		6	6
Scallops	96		96	96	195		195	195	102		102	102	109	14	123	123	107		107	107
Squid																	.2		.2	
Sea Urchins																				
Bloodworms	160		160	160	198		198	198	99		99	99	107		107	107	102		102	102
Sandworms	274		274	273	297		297	297	333		333	333	356		356	356	353		353	353

FIGURE B-1 NMFS Statistical Areas



landed in areas other than Washington County.

Landings data are frequently used as catches although, in some cases, they are quite different. The landings data for invertebrates (Table B-2), agree over the period examined (1974-78). There are considerable discrepancies for cod, gray sole, dab, haddock, white hake, redfish, and pollock. Of these species, only 60 percent of the cod caught in Statistical Area 511 was landed in Washington County. Of the other species, 19 percent of the gray sole, 37 percent of the dab, 12 percent of the haddock, 68 percent of the white hake, and 39 percent of the pollock were reportedly landed in Washington County. Of the redfish caught in Statistical Area 511 during 1974-78, there were no reported landings in Washington County. A weighted average of 35 percent of those seven species that were reported caught in Statistical Area 511 were actually landed in Washington County. The reported landings in Washington County and their value, therefore, should generally be increased by an overall factor of 2.9 for these species to approximate the catch of these fish taken in the Washington County area.

The National Marine Fisheries Service has announced that the Maine Landings Bulletin will be discontinued in 1980. This will require DMR to have on-line computer facilities to the NMFS catch data base but the data obtained will be more accurate in that they will reflect catches rather than landings. The data will be updated at least annually and preliminary monthly data will be destroyed.

Six men are responsible for the collection and compilation of Maine's fishery catch statistics. The area covered and duties performed by each is summarized as follows:

Name	Affiliation	Area Covered	Duties
Robert Morrill	N.M.F.S.	York County plus Portland	1. accumulates and checks finfish landings data from Portland wharves using weighout slips. 2. accumulates lobster data from dealers and stores for his entire area. 3. accumulates finfish landings data for York County using trucking slips. 4. performs some biological sampling at Portland wharves. 5. supplies information on vessel and gear loans.
Richard Barnard	N.M.F.S.	Cumberland Co. (assists Morrill in Portland) Sagadahoc, Lincoln to Friendship (Knox Co.)	1. collects landings data for all species landed at those dealers visited in his area.
Peter Marcoon	N.M.F.S.	Rockland and Port Clyde	1. collects redfish landings at Rockland. 2. performs biological sampling at Rockland and Port Clyde. 3. collects herring information from Rockland.
Kent Glover	D.M.R.	Knox Co. (excluding Friendship) Hancock and Washington Co.	1. collects landings data for all species landed at those dealers visited in his area.

Name	Affiliation	Area Covered	Duties
Lewis Lozier	D.M.R.	Statewide	1. coordinates the collection of herring landing data statewide. 2. codes data for computer processing. Maintains current catch and effort records in Maine's sardine fishery. 3. collects herring samples statewide.
Philip Wentworth	N.M.F.S.	Eastport and Lubec	1. obtains landings information on herring in the general area. 2. collects herring samples in eastern Maine. 3. assists in annual weir survey. 4. records herring imports

These personnel record much of the commercial landings data (from their numerous sources) on weighout slips (purchases from fishing vessels). One slip is retained by the dealer, one by the fisherman, one by the port agent, and one is coded and sent to Woods Hole. In some cases they are assisted indirectly by DMR. This is true in the case of soft clam and mussel landings (obtained from Dana Wallace, DMR), alewife landings (collected from fishermen reported to NMFS by Lewis Flagg, DMR) and in one case from the lobster landings obtained from six locations in Brunswick by DMR Marine Patrol Officers. An example of a completed weighout form is shown in Figure B-2.

In addition to weighout slips, the NMFS port agents attempt to obtain as many interviews as possible and to obtain length and age

Figure B-2: Completed Weighout Form

NOAA FORM 88-30 (1-75)

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

FORM APPROVED: O.M.B. NO. 41-R2596

PURCHASES FROM FISHING VESSELS (Northeast)

DEALER: National Seafoods					DATE: 4/4/74
NAME OF VESSEL:					VESSEL NUMBER: 25374
PORT CODE: 241	COUNTY CODE:	DATE SAILED: 4/1/74	DATE LANDED: 4/4/74	GEAR: 05	POUNDS: 521
DAYS ABSENT: 3	DAYS FISHED: 2.0	TRIPS	LOG/INTERVIEW: 1		DEPTH: 2
PROGRAM	FISHING ZONE: 3	A	B	C	D

SPECIES AND GRADE		CODE	POUNDS LANDED	PRICE PER POUND	SUBTOTAL DOLLARS	SUBTOTAL CENTS
COD	Large	0811	100		100	
	Market	0813				
	Scrod	0814				
CUSK		0960				
HADDOCK	Large	1470	500		300	
	Scrod	1475				
HAKE	Red	1520				
	White	1530	100		9	
OCEAN PERCH	(Red fish)	2400				
POLLOCK		2691				
WHITING	Round	5090				
	Dressed	5093				
WOLFISH (Catfish)		5120				
GREY SOLE	Large	1221				
	Small	1222				
LEMON SOLE		1201				
YELLOWTAIL	Large	1231				
	Small	1232				
BLACKBACK	Large	1202				
	Small	1203				
DAB	Large	1241				
	Small	1242				
FLUKE	Large	1210				
	Medium	1212				
	Small	1214				
BLUEFISH	Gutted	0232				
BUTTERFISH	Large	0510				
	Medium	0515				
	Small	0516				
HERRING, SEA		1685				
MACKEREL		2120				
SCUP	Large	3290				
	Medium	3292				
	Small	3293				
SEA BASS	Large	3351				
	Small	3355				
STRIPED BASS		4180				
TAUTOG		4380				
TILEFISH		4470				
SHRIMP		7360				
LOBSTER	Large	7274				
	Select	7273				
SCALLOPS, SEA		8009				
SQUID		8030				
OTHER FOR FOOD		5260				
OTHER FOR REDUCTION		5290				
		TOTAL	1000		409	

NOTE: Individual reports are confidential and only summary data are released.

samples of the catch. The interview is conducted with the captain or mate of the vessel to obtain additional information of fishing effort and the area of catch. Since the medium and large size vessels travel further from the home port, a greater effort is made to interview these vessels. Figure B-3 is an example of a NMFS interview record. Very few interviews are made in Maine at other than a few major ports due to logistical problems. The length of the coastline and the travel time generally preclude the collection of extensive interview and sample information.

Sampling is done to provide information on length, age and species composition. Table B-3 gives a summary breakdown for sampling by species. Five samples per market category, per month, per sampling area are required. For species not specifically identified in Table B-3 (excepting shellfish) a basic sampling of 100 from each market category per month should be taken and 25 specimens selected on a stratified basis for aging. In 1978 only three groundfish samples were collected in Maine. Management plans for groundfish for the Gulf of Maine generally contain no sampling information from Maine waters. The problems of data collection vary from species to species and a description of the details of data collection with suggested methods for improvement are given for some of these species.

LOBSTER:

Lobster landings (in pounds) are collected by DMR and NMFS port

Figure B-3. Otter Trawl Interview

NEW ENGLAND STATES
NATIONAL MARINE FISHERIES SERVICE
INTERVIEW RECORD — CONFIDENTIAL

VESSEL	DATE	PORT	GEAR
1. Jo Jo	2. 4/4/74	3. 241	4. 05

VESSEL CODE	DATE SAILED: TIME	DATE LANDED: TIME	STUDY VES.
5. 25374	6. 4/1/74 3 PM	7. 4/4/74 6AM	8.

MESH SIZE	TRIP TYPE	TIME LOST	DAYS AB	TOTAL HAUL	COLL.
9. 5.0"	10. 1	11. 0	12. 2.6	13. 1.6	14. 55

GROUND	GROUND	GROUND
15. Southeast Nausets 35 Fath		

AREA	POSITION	DEPTH	AREA	POSITION	DEPTH	AREA	POSITION	DEPTH
16. 521	17. 46912	18. 2035						

DY. & NT.	DAY ONLY	NT. ONLY	DY. & NT.	DAY ONLY	NT. ONLY	DY. & NT.	DAY ONLY	NT. ONLY
19. 2.0	20.	21.						

NO. TOW	DUR. TOW	TIME DAY	NO. TOW	DUR. TOW	TIME DAY	NO. TOW	DUR. TOW	TIME DAY
22. 020	23. 2.0	24. 3						

		25.		
COD, LARGE	0811		1.0	
COD, MKT.	0813			
COD, SCROD	0814			
HADDOCK LARGE	1470		.5	
HADDOCK SCROD	1475			
REDFISH	2400			
YELLOWTAIL	1230			
FLUKE	1219			
BLACK BACK	1200			
LM. SOLE	1201			
DAB	1240			
GRAY SOLE	1220			
WHITE, RND.	5090			
POLL. DRN.	2691			
HERRING	1685			
SHRIMP	7360			
SEA SCALLOP	8009			
UNC. FOOD	5260		.1	
UNC. REDUCT.	5290			
DISCARD	[illegible]		None	

Table B-3. Sampling requirements by species, number and type.

Species	Lengths	Scales	Otoliths
Blackback	100	25	--
Cod:			
Scrod	50	--	10
Market	100	--	20
Large/whole	100	--	20
Mixed	100	--	20
Cusk	100	--	20
Dab	100	25	--
Gray Sole	100	25	--
Haddock:			
Scrod	50	15	15
Large	100	20	20
Adult Sea Herring	100	--	30
Lobster	100	--	--
Mackerel	100	--	freeze 30 fish
			30
Pollock	100	20	--
Redfish	100 sexed	--	10
			10
River Herring:			
Alewife	100	--	20
Blueback			
Sea Scallops	200	--	--
Shad	100	25	25
Shrimp	50	--	--
Silver Hake	100 sexed	--	10
			10
Squid	50	--	--
Striped Bass	100	25	25
White Hake	100	25	25
Yellowtail	100 sexed	25	--
		25	

agents from sampling locations within their areas of responsibility. Additional information on the length-frequency and mean weight, sex, and number of culls and shedders in the commercial lobster catch is available by dealer, by county, by month and for the nine month sampling season (April-Dec.) for the years 1966-1979 in DMR lobster project records. These records also contain information on catch, effort, and catch/effort expressed as lbs/trap haul, numbers/trap haul, numbers/trap haul set-over-days, lbs/boat day, and lbs/man day.

PROBLEMS IN THE COLLECTION OF LOBSTER LANDINGS INFORMATION:

1. No landings are recorded for lobsters that are peddled or consumed by fishermen. The magnitude of these landings is unknown but is felt to be substantial and increasing in recent years.
2. Some lobster landing sites are not known to the port agents, although most of the landing sites are known and visited.
3. It is possible that some lobster landings are reported twice; this may occur in situations in which port agents collect landings data from facilities that buy lobsters from other dealers.

POSSIBLE IMPROVEMENTS:

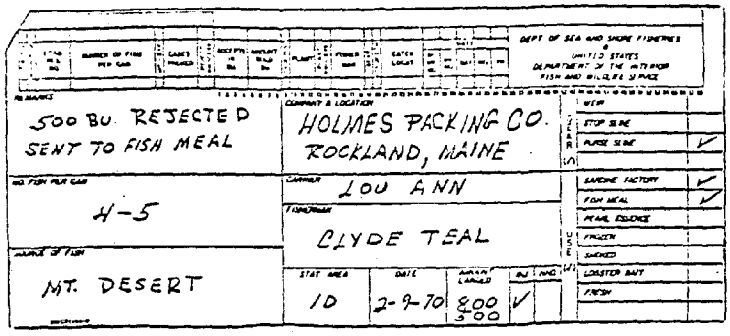
1. There should be a routine comparison of lobster data collection

sites visited by the DMR lobster research project and those sites visited by port agents.

2. A sampling program could estimate the amount of lobsters sold directly from fishermen to consumers by sampling individual lobster fishermen. Such data would be expensive and very difficult to collect since fishermen are reluctant to provide such data. The value of such data would be difficult to assess but this approach should be seriously considered.

HERRING:

Fishery inspectors of the Maine Department of Agriculture stationed at the sardine canneries provide the basic sardine catch data on two forms: an inspection slip and catch cards (Figure B-4). Each inspector fills out a daily inspection slip and an accompanying catch card for boat load of fish arriving at each sardine plant in his area. The inspection slips are sent to the Maine Department of Agriculture while the catch cards are sent directly to DMR at Boothbay Harbor. Every three weeks or so, the Department of Agriculture sends the daily inspection slips to Lewis Lozier at Boothbay Harbor. The catch cards supply the name of the sardine plant, the amount of fish landed at the plant either in bushels or hogsheads, the date of landings and type of fishing gear used, the fisherman's name, where the fish were caught, how the fish were utilized and average number of fish packed to the sardine can. Usually the fish were packed as sardines but there were times when



500 BU. REJECTED
SENT TO FISH MEAL

HOLMES PACKING CO.
ROCKLAND, MAINE

4-5

LOU ANN

CLYDE TEAL

MT. DESERT

STAT AREA	DATE	AMOUNT LANDED	ADJ WHG
10	2-9-70	800 500	✓

SARDINE FACTORY ✓
FISH MEAL ✓

SARDINE INSPECTOR'S DAILY REPORT Date 2-9-70

Name of Factory HOLMES PACKING CO. Town ROCKLAND

	LOT 1	LOT 2	LOT 3
Am't Fish Rec'd.	800 BU.	500 BU	
Source of Fish	MT DESERT	MT DESERT	
Time Fish Arrived	2:30 AM	11:00 AM	
Feed Examination	4% POKE	SOFT FISH (REJECTED)	
Other Examination			
Am't Fish Reject			
Disposition		FISH MEAL	
No. fish per Can	4-5		
Code Number	L 1117 - L2117		
Time in Brine	10 - 20 HOURS		
Sanitary Condition of Factory	FAIR		

Remarks LOT 1 PACKED 4-2-10-70

LOT 2 FISH MEAL

No. of cases	Code numbers	Type of can	How packed	Retort Time and Temperature
345	L1117	1/4 K L	SBO	240° - 30 MIN
341	L2117	"	"	"

No. of cases certified

Inspector

Figure B-4 Sardine catch card and both sides of a typical "inspection slip" showing sources of catch information from the Maine sardine fishery.

part or all of the catch landed was rejected for use as sardines and were sold for lobster bait or sent to a reduction plant. A daily inspection slip (required by the state) reported the condition of the herring, processing information and statistical data of the catch such as catch amount, numbers of fish packed per can and catch location.

Peter Marcoon collects landings information from fillet plants in Rockland and Philip Wentworth collects the landings from adult herring processing facilities in Eastport and Lubec. Lewis Lozier collects the landings information from freezing and filleting facilities in Boothbay Harbor and filleting facilities in Bath and Yarmouth. Herring imported into Maine are collected monthly at the custom offices. All the landings data are computerized at NMFS, Woods Hole, Massachusetts and can be retrieved by week, biweekly, gear, county, moonphase, and by area within a section (see Fig. B-5). Herring landings information is reported in *Maine Landings* by gear type, by county, and by month.

The landings data collected for herring are by far the most complete for any of Maine's fisheries. At least part of the reason for this stems from the fact that at least nine people are involved in the collection of this information in a cooperative program among Maine's Departments of Agriculture, Marine Resources, the sardine industry and NMFS.

PROBLEMS IN THE COLLECTION OF HERRING LANDINGS INFORMATION:

1. Herring obtained from both the stop seine and weir fisheries and sold as lobster bait are not recorded in the landings.

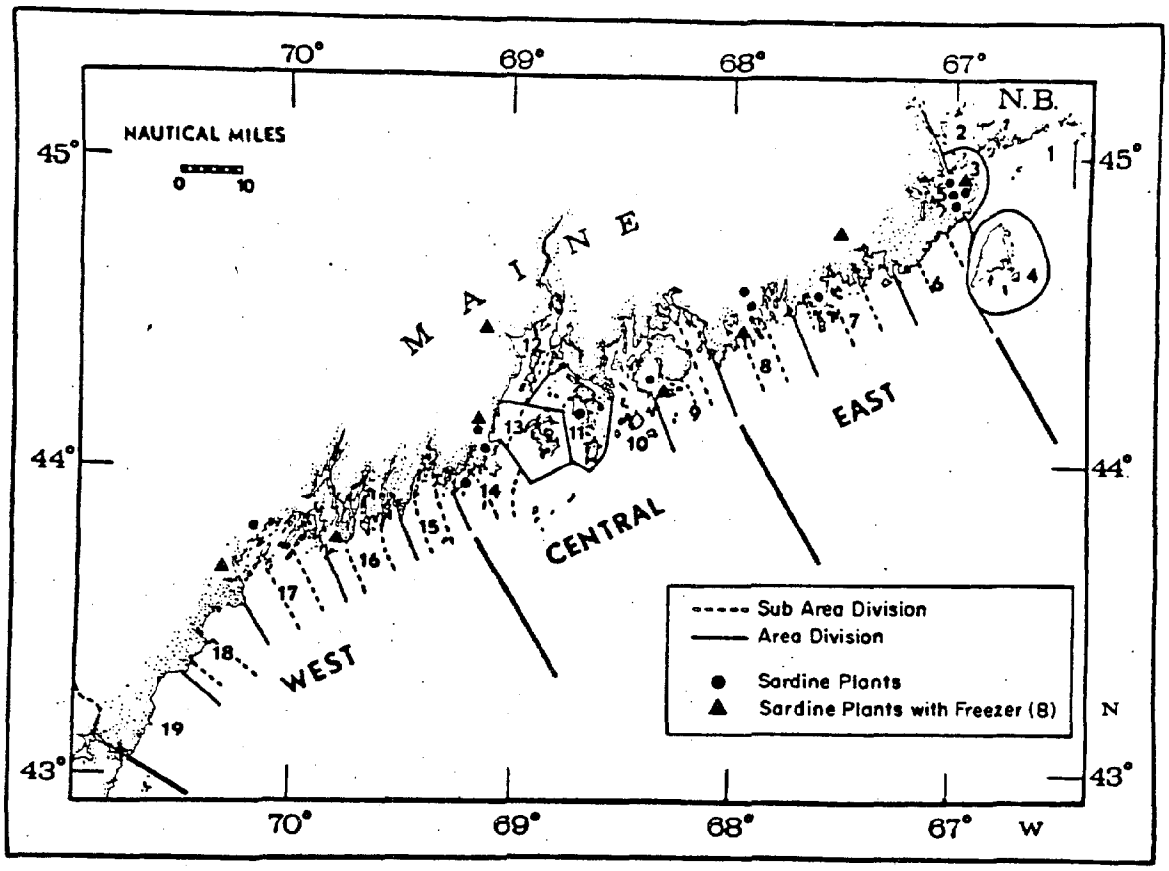


Figure B-5 Statistical sub-areas, areas and sections of the Maine coast used in reporting catch and biological information concerned with herring fisheries. The location of sardine plants with and without sampling freezers is shown for 1969.

2. When sardine abundance is high, catches are underreported.

Sampling of the Maine sardine fishery for disease, growth, age, racial characteristics, etc. began on a limited basis in 1960. In 1963, an intense sampling program was begun as chest type freezer (22 cubic foot) were installed in eight sardine plants along the Maine coast (Figure B-5) for sampling purposes. An effort was made to collect a minimum of two samples every two weeks from each subarea or 84 samples every two weeks along the Maine coast during the fishing season. State fishery inspectors (Maine Department of Agriculture, Division of Inspection) which were on duty at each sardine cannery took a sample of approximately 100 fish from each carrier as the sardines were unloaded at the cannery. Sample boxes were provided (Fig. B-6) with space allotted for the desired information about each sample on the cover. The inspector provided the information on the cover of the sample box and placed the samples in the freezer. Approximately every two weeks the samples were collected and returned to the Boothbay Harbor laboratory. The following types of data were then taken from each sample from 1963 to 1973:

(1) Age information—year class, month of life, year of life

(2) Lengths—total and head (to nearest mm)

(3) Body weight (to 1/10th of a gram)

(4) Meristic counts—vertebrate, pectoral and dorsal fin rays

(5) Fecundity—egg number, gonad weight (nearest gram), maturity stage

OK

Sample No. 438 Amount Caught 875 lb. Fisherman RALPH BYERS Area 9E

Plant ADDISON PACKING Co. Carrier CONTINENTAL Inspector K. G. HASKELL

Year 64 Month 08 Day 31 Week No. 3518 Location WINTER HARBOR 26078

Fish No.	Otolith: Year Class	Otolith: M. of Life	Otolith: Y. of Life	Lengths: Total MM	Lengths: Head MM	Body Wgt. MG	Meristics: Vert.	Meristics: R.P.	Meristics: D.	Meristics: Anal	Disease: Cat.	Disease: Nem.	Disease: Fungus	Disease: Plg.	Disease: Myxo.	Fecundity: Ja	Fecundity: Maturity	Fecundity: Gon. Wt.	Fecundity: Egg No.	Load Ref. No.	Program	Fish No.
001	62	0	23	2	179	36	0464	55	18	20	0	0	0	1	3	1	0	0	0000000	8438	1	001
002					181	36	0411	55	18	20					3							002
003					198	38	0620	55	18	20					2							003
004					173	34	0352	55	18	20					2							004
005					187	37	0464	55	19	19					3							005
006					181	36	0410	56	18	19					3							006
007					172	33	0361	55	18	20					3							007
008					181	36	0400	56	19	20					2							008
009					179	36	0393	56	18	19					3							009
010					169	34	0342	55	18	19					3							010
011																						011

U. S. BUREAU OF COMMERCIAL FISHERIES
BIOLOGICAL LABORATORY
BOOTHBAY HARBOR, MAINE
Phone No. 3 or 77

AMT. OF HERRING LANDED 1050 bu. DATE Sept 20-67

SARDINE PLANT Holmes Pkg. PLANT LOC. Rockland

FISHERMAN Clyde Teal EXACT CATCH LOC. Metinic

CARRIER Lou Ann INSPECTOR Carlton Cheney Sr.

Figure B-6 . Biological herring sample coding form (upper figure) used for recording data from herring samples and cover of sample box (lower figure) as provided to sardine inspectors for sampling purposes.

(6) Sex

(7) Disease and parasites—counts of cestodes and nematodes, presence or absence of fungus, pigment spot and myxosporidian

From 1973 to the present, length, weight, otoliths for aging, sex, and stage of maturity were recorded. In 1978, 421 samples were processed in Maine and 540 were processed through October of 1979. The present sampling system is adequate for most types of management needs.

SOFT-SHELL CLAMS AND MUSSELS:

Soft-shell clam and mussel landings are compiled by DMR and the DMR and NMFS port agents collect the landings information from DMR records at Hallowell. Since 1964, all shellfish dealers have been required by law to submit monthly purchase records listing the number of diggers, the number of bushels dug, and the area dug during each day when purchases were made. The total number of bushels are then accumulated for each town and reported by county, by month, and year in the DMR records. Port agents collect the value information (price/bushel) from various sources including dealers and the warden reports.

PROBLEM AREAS:

1. Some dealers occasionally do not list the towns where the clams are dug.
2. The diggers may not report accurate digging locations to the dealers.

3. The landings data for the western part of the state are incomplete because an unknown number of bushels are peddled or sold directly to markets and restaurants without passing through a dealer. The problem is not as serious in the eastern part of the state because of the lack of outlets.
4. The reliability of the information regarding number of diggers and number of bushels reported, is not checked.
5. No attempt is made to estimate the landings of "mess diggers."
6. The MDMR has been informed by dealers in Washington County that the mussel landings are greatly underestimated.
7. There has been a problem in recording Casco Bay mussel landings. For instance, during 1978, 33,781 bushels of mussels were recorded for the month of June when the entire area was closed because of PSP. Some of the apparent errors have originated within the DMR data recording and compilation system.

POSSIBLE IMPROVEMENTS:

1. Some additional field personnel could be used to check the accuracy of the landings data. DMR personnel presently being used to check shucking houses could assist with this matter by interviewing diggers

independently of the dealer's record.

2. An automated printout system for dealer's landings would be of value.
3. The monthly record of a dealer's purchases lacks value information. This information could be easily recorded with the daily entry if a space for recording the information were available on the form.
4. Catch/effort information for the soft-shell clam and mussel fishery are available from the dealer reports in the form of bushels/digger/day (by town), but this information has never been compiled for analysis.

MARINE WORMS:

Kent Glover and Richard Barnard collect marine worm landings information each month at all dealer locations between Wiscasset and Jonesport. Dealer listings are reviewed annually from DMR license applications. The landings are collected in numbers and converted into and reported in *Maine Landings* as pounds.

Additional information on the length frequency and mean length, weight, sex, and condition of the commercial bloodworm and sandworm catch is available by dealer, by county, by month, and for the six-month sampling period (April-Sept.) for the years 1973-1976 in DMR records. These records also contain information on catch, effort, and catch/effort in the form of numbers dug/tide, numbers dug/hr., pounds

dug/tide, and pounds dug/hour by county (Lincoln, Hancock, Washington) and coastwide by month and six-month period.

PROBLEM AREAS:

1. It is known that several dealers do not always give accurate information for *Maine Landings* and occasionally the monthly count for a dealer may be off by 10,000-20,000 worms. A significant problem is reporting the landings in the correct month. If the dealer does not keep his records up to date the worm landings may be recorded as having occurred in the following month.
2. The conversion factors used to convert numbers into pounds in *Maine Landings* have been erroneous since their inception. One dealer has informed DMR that he aided in the originial error by selecting the longest worms possible to make up a pound. The degree of error involved is shown as follows:

The conversion factor used in *Maine Landings*	The actual value derived through a random sampling of the commercial catch			
	1973	1974	1975	1976
44/lbs. (bloodworms)	219/lb.	191/lb.	172/lb.	171/lb.
40/lbs. (sandworms)	83/lb.	82/lb.	78/lb.	86/lb.

3. There are no collections of landings data from the western

portion of the state where locally dug worms are sold at some bait and tackle shops, marinas, and used on headboats.

4. Sometimes there are errors in the value of the worms reported. These errors occur when a variable price is paid for worms of different sizes. This information is difficult for the dealer to document.
5. Occasionally, no information is recorded from new dealers because their operations have not been discovered by the port agent. This problem is usually corrected promptly although dealers have been known to operate for several years unknown to the port agents.
6. It is generally not known by the port agent if the landings recorded by a dealer include the landings of his supplemental buyers. This results in double counting and recording of data from the wrong area.

Other problems associated with possible future attempts by DMR to sample marine worms (for catch, effort, and size information) at commercial landing sites are discussed in greater detail in Element B-5.

POSSIBLE IMPROVEMENTS:

1. The landings data could be improved if the State issued a dealers record book that could be filled out during each low tide buying period. Voluntary dealer input would

be required to design such a book.

2. The landings should be reported in numbers and new conversion factors should be used to convert numbers to pounds (if it is felt that information of this nature is still essential).
3. The port agents should review the DMR list of licensed marine worm dealers more frequently or the DMR should routinely send a current list of licensed marine worm dealers to the port agents.

REDFISH:

The majority of the redfish landings data are collected from two large processors by NMFS port agents in Portland and Rockland. Incidental catches are also recorded from many other ports.

PROBLEMS IN THE COLLECTION OF REDFISH LANDINGS INFORMATION:

The large commercial landings at the two large processors comprise the greater portion of the catch but some redfish are landed at small processors and sold directly from the fish counters as fresh fish. These small landings probably go unreported.

ALEWIVES:

Since 1974, towns with alewife runs have been required to keep landings information. The selectmen in each town supply Lewis Flagg (DMR) with the name of each run foreman. These names are reported to

port agents who then collect the monthly landings information through interviews or mailings.

PROBLEM AREAS:

1. The data are collected on a watershed basis and presented in *Maine Landings* by county. The most useful reporting form for these data would probably be on the watershed basis.
2. Alewives and blueback herring landings data are lumped together.
3. Alewife data are collected in bushels and reported in pounds. Some run foremen report their catch to the data collectors in bushels and others convert bushels to pounds using their own conversion factors. Some conversion factors are 70 lbs/bushel and others are 80 lbs/bushel.
4. Apparently some non-reporting exists at the St. George River and Nequasset runs; some bait sold to fishermen is not recorded.
5. A number of problems occur in the reporting of monthly data. Sometimes fish caught in May and June are reported for July and August. April landings are often estimates based on past experience which are then "adjusted" in the final *Maine Landings*. Most of the data available are from the river fisheries but landings are frequently reported

in months when these fisheries are not operating. There is an expanding inshore industrial fishery for alewives and blueback herring and these landings are not recorded but may be lumped as fish for reduction.

OTHER FINFISH:

Finfish landings are collected by DMR and NMFS port agents from locations reported within their individual areas of responsibility. At each location, the port agents record the finfish landings for each vessel trip reported on federal weighout slips by the dealer. Most of the landings data collected from York County (approx. 95%) are obtained from the sales slips from 3 trucking firms. The port agents believe that they record about 75% of the fish landings for the 15 ports they visit. All landings data are collected monthly and accumulated by vessel size, by gear used, by gear size (in some cases), by species, by species size (where applicable) and by county, and recorded in *Maine Landings*.

PROBLEMS IN THE COLLECTION OF FINFISH LANDINGS INFORMATION:

1. The port agents collect landings data in 15 ports and there are undoubtedly numerous other sites where fish are landed but where no information is collected. There is some evidence for this since a list of 29 facilities visited by port agents does not correspond with: 1) a list of finfish dealers who have received dealer logbooks; 2) a list of

wholesale fish dealers recorded from the telephone directory and 3) DMR licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finifish unloading facilities.

2. At certain facilities where the port agents collect landings data, the major facility may also have supplemental buying stations. In some cases it is not known if the landings at the supplemental buying stations are reported with those of the major facility.

3. The data collected are landings, not catches, and generally the data are used as catches. For some species, the catch within the water of a county are twice the reported landings in that county. For example, the reported landings of herring in Washington County in 1978 was 14.7 million pounds whereas the catch as determined from the catch cards was 28.2 million pounds. For this species the differences between landings and catch are well known; for other species they are not.

Numerous other problems associated with possible future attempts by DMR to sample finfish (for catch, effort, and size information) at commercial landing facilities, are discussed in greater detail in Element B-5.

PERIWINKLES:

The names and locations of people and facilities dealing with periwinkles have been obtained either directly or indirectly from the most recent listing of DMR licensed wholesale seafood dealers and processors and from the DMR shellfish records. This list is included in Table B-12 along with collection sites visited by port agents. Most of the reported landings are from Washington County.

PROBLEM AREAS:

1. Landings data are incomplete. In Washington County, landings have been obtained from only 2 of 18 known dealers. Telephone interviews suggest that, in fact, most of the shellfish dealers in Washington County buy and sell periwinkles. Telephone interviews indicated that two Jonesport dealers purchased 60 thousand pounds of meats in 1977. Reported 1977 Maine landings were 11 thousand pounds of meats for the county based on two dealers, one in Lubec and one in Eastport. The combined total 1977 landings therefore, of these four dealers were 71 thousand pounds of meats. If we conservatively assume that these four dealers buy as many periwinkles as the remaining 14 dealers combined, the total 1977 harvest would have been 140 thousand pounds of meats; 13 times the reported landings.

MACKEREL:

Atlantic mackerel, in addition to being an important commercial species, is an important species in the recreational catch along the Middle Atlantic and Northeast coasts of the U.S. During the past 15 years, it has been among the dozen most important species of fishes to anglers, especially to anglers fishing from party and charter boats. In Maine and the Canadian Maritimes, large numbers of mackerel are caught from docks and floats or in skiffs close to shore.

In nationwide surveys and in a survey of the Northeast, mackerel ranked 12th, 7th, 3rd, and 7th in 1960, 1965, 1970, and 1974, respectively, in total weight of recreational catches from Virginia through Maine. The catches of mackerel are not known for any of the recreational fisheries and the commercial catch data are questionable.

ELEMENT B-3. EVALUATION OF THE NATIONAL MARINE FISHERIES SERVICE LOGBOOK SYSTEM.

The mandatory logbook system of the National Marine Fisheries Service, scheduled for implementation on October 1, 1979, has the potential to become our most important resource of commercial catch data. Our reviews and investigations tend to show, however, that this potential may not be realized immediately, owing for the most part to fisherman attitudes and enforcement problems. We have attended two formal conferences with NMFS and the New England States on the logbook system, and many problems of implementation, enforcement, completeness of requirements, data compilation, and data accessing remain to be resolved. At the first of these meetings, a permanent Statistical-Technical Committee was appointed. This committee, to which we have assigned a DMR scientist, is a working group composed of member-scientist from NMFS and the New England States. The committee met again on May 10, 1979, to address such practical problems as data sharing and standardization of processing methods. The committee put together a Fishery Statistics-Data Collection Program outline (Table B-4) which is being used to describe the data collection system in each state for coordination purposes. Thus, even if the logbook is not of immediate use in improving the data collection system, the problems of implementing a logbook system have produced a new look at the overall problem which is a significant step forward.

Table B-4 Fishery Statistics Data Collection Program Outline

FISHERY STATISTICS

DATA COLLECTION PROGRAMS

I. Specific Data Collection Program Name

- A. General Description of Program
  - 1. Authorization for Collection (known conflicts)
    - a. Enforcement regulations
  - 2. Methods of Collecting Data
- B. Purpose (Intended) - Use of data, objectives of management programs and how the data will be utilized to achieve objectives and enforcing existing regulations.
- C. Types of Reporting Tools and Coverage
  - 1. Type 1
    - a. geographical
    - b. frequency
    - c. identification (who) - major vs. minor contributions
  - 2. Type 2
    - a. others which fit your program or needs
- D. Flow of Data
  - 1. Identify Point to Point(s)
  - 2. Product Output(s) - Summary reports, publication(s)
- E. Data Items Collected
- F. Existing Automatic Data Processing
  - 1. Formats and Flow Diagrams
  - 2. Access Potentials and Restrictions
- G. Funding/Resource Required to Support Current Programs
  - 1. Personnel
  - 2. Equipment and Supplies
  - 3. A.D.P. Processing
- H. Problems
  - 1. Data Exchange/Data Access
  - 2. Limitations
    - a. Redundancy within Program
    - b. Overlap with other Programs
    - c. Others

II. Coordination with:

- A. Other State Programs
- B. National Marine Fisheries Service
- C. Regional Councils
- D. State-Federal Program or Other Federal Agencies

III. Data Need Yet Not Currently Collected

IV. Known Access to Data by Outside Groups/Constituencies

V. Need Non-existing Resources for Further Program Development (all aspects)

In this contract segment of our coastal zone program, we were going to evaluate the logbook system against an improved port sampling system. This was planned when the logbooks were to be in place on April 15, 1979. With the postponement of mandatory logbooks until October 1, this comparison could not be accomplished in this contract segment.

The primary intent of the National Marine Fisheries Service mandatory logbook reporting system is to collect catch and effort information and to accumulate a data base for the assessment of the condition of the fish stocks in accordance with the Fishery Conservation and Management Act of 1976 (Public Law 94-265).

The use of logbook reporting under the FCMA originated with a mandatory requirement for all permitted vessels fishing for groundfish in March, 1977. This was a carryover from ICNAF and even the same forms were used. On November 8, 1977, the NEFMC Regulatory Measures Committee met in Peabody for the purpose of designing and implementing uniform regulations that would be a basis for future management plans. Among the items discussed was a uniform logbook report form that would be useful and recognizable all along the Atlantic, Gulf of Mexico and Caribbean fishing areas. On February 16-17, 1978, the Committee met again in Crystal City, Virginia where a sub-committee made recommendations for the substance of the logbook reports. NMFS was requested to put together a model based on these findings. On May 22, 1978, a Committee

meeting was scheduled for Peabody. Representatives of the Regulatory Measures Committees of the Mid-Atlantic, South Atlantic, Gulf of Mexico and Caribbean Fishery Management Councils were invited to participate and all did so. The only two items on the agenda were review and adoption of common vessel logbooks and common dealer logbooks for all finfish. The drafts provided for comment were constructively criticised. As a result, the report forms were completely redesigned and on June 9, 1978, were sent by mail to all members as well as the Northeast Fisheries Center for comment. Substantial constructive comments were received and changes made in the forms. Sample vessel report forms were then distributed to port agents to circulate among the captains of fishing vessels for their comments. Some of these were of a constructive nature and further changes were incorporated. Further meetings were held with the Statistics Branch and the NEFC, who had the responsibility for processing the material and would be major users. In October, samples of the forms were provided to the Executive Director of the New England Council, who in turn distributed to all Council members for comment and suggestions for change. Minor changes were made right up to the day that the material was sent to the printers.

The logbooks for finfish fishing vessels and finfish dealers and processors were delivered from the printers in late March and early April. On April 16, NMFS started mailing, by certified mail, two copies of the appropriate logbooks, along with cover letters to all

holders of commercial fishing permits in the groundfish and herring fisheries, and to all dealers and processors that had been identified as first purchasers by the states or the NMFS Statistics Branch. The cover letter included the information that meetings would be scheduled in the near future to discuss any problems they might have with the report forms. A notice of the meeting schedule was mailed to all permit holders, dealers and processors who received logbooks. Notices were also sent to the media mailing list. Thirteen meetings were then held from May 7 to June 29 from Maine to New Jersey.

All of the meetings were conducted by outlining the purpose of the reports, clarifying some possible problem areas, and then asking who had problems with the vessel report form. People were specifically asked to comment on the format of the report forms as well as problems they anticipated in complying with the reporting requirements. As a result of these meetings, it became obvious that some administrative accomodations were necessary to make the system operate effectively with a minimum amount of industry disruption. The vessel report format apparently did not require major changes at the time, but could be improved in the next printing. Clarifying some of the instructions is one obvious necessary change. The dealer/processor report form was another matter entirely. It will be necessary to make some major changes in the present form and probably two and perhaps three separate forms will be necessary to meet the particular needs of all industry segments. A task force of industry-government people was put together

to accomplish this.

The question of enforcement use of the logbook data is a serious one. The log reports could be an effective law enforcement tool and would improve the efficiency of enforcement. The log reports required of the 100 plus gross registered ton vessels and others since 1977 have been used for enforcement with little apparent hardship on the fishermen. However, it has been agreed that the enforcement use of the new vessel log reports for groundfish will be restricted to the requirement to report and that the reports must be accurate. This is a departure from enforcement policy in other fisheries (such as herring and surf clams) where the present reporting system could be used for enforcement.

The concern with the confidentiality of the information provided in the log reports is based on several factors. The need to protect industry information from competitors is prevalent in some cases, while in others the availability of information to the Internal Revenue Service is questioned. Some people feel that availability to enforcement agents violates the confidentiality of the information. The first two concerns will be covered by regulations issued by the Secretary of Commerce in compliance with Section 303(d) of the FCMA. It would then require a court order to release the information except in aggregate or summary form. Since the log report form mandate cannot be met without enforcement agent participation, the opinion that this violates confidentiality can only be answered by the fact that the agents are

covered by the same strong confidentiality statutes as other federal employees and will not operate in violation of the Secretary's regulations under the FCMA, or any other applicable regulation or statute. Probably only through several years of practice will industry concerns in this area be lessened. More specifically, NMFS has agreed to accept records of fishing location by chart area so exact fishing locations would not be available at all. This accommodation appeared to satisfy the most often mentioned concern with reporting by vessels. [Much of the above was taken from a report on the logbook informational meetings by Dick Seamans to the Chairmen of the Atlantic Groundfish and Atlantic Herring Oversight Committees].

While NMFS has recognized many of the problems with the logbooks and made many changes, many problems still exist and are listed below. It should be remembered, however, that no new system like a logbook system can be suitable for all and the implementation of such a system could be held up for years in attempts to recognize everyones concerns. The logbook report program was originally envisioned as a dynamic one, subject to change as necessary to afford the industry the opportunity to provide the best data available as a basis for management decisions. To proceed now seems appropriate to DMR given that changes will occur as we go along.

LOGBOOK PROBLEM AREAS:

A. The poor design of the mandatory logbook system:

1. Port agents routinely using the weighout forms (Purchases from Fishing Vessels - see Fig. B-2) believe there is no valid reason for changing the format; most of the features were already in the desirable form and all that was needed was a code number.
2. The old weighout slips were routinely used as receipts by the dealers. The dealers are now very concerned that the logbook forms cannot be used conveniently as receipts.
3. The logbook is large, unwieldy, and does not resemble any standard business form.
4. The new fishing vessel and processor's records require (see Fig. B-7) a record of the fishermen's permit numbers. The processors believe that this will result in additional book-keeping for them.
5. The weighout form presently in use has a place for the value entry (price/lb). The new fishing vessel records do not have any such entry and the value entry is reported on the processor's record. There is, therefore, no way to check the price that the processor said he paid the fisherman against the fisherman's reported landed value.
6. There is no way to compare the areas fished between the old and new forms. The data are currently recorded by statistical area but in the new log, it is proposed that this information will

Figure B-7: The proposed vessel and dealer log books

FISHING VESSEL RECORD (FINFISH)

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

NEW ENGLAND

Page ☐ of ☐

PERMIT NO	VESSEL NAME	CAPTAIN	Gear: Type	Gear: Size	Mesh: Inside Size	Crew

DATE SAILED (M D)	DATE LANDED (M D)	Hours Fished	PORT LANDED	State	PRIMARY BUYER: Name	No.	Trip Number

Area	Gear or Trawl	Loran Bearing or Chart Location	Depth Range (Use Fathoms)	Time Period	COD	HADDOCK	YELLOWTAIL	POLLOCK	OTHER FLOUNDER	WHITING				

ORIGINAL: RETAIN IN BOOK

PROCESSOR'S RECORD (Finfish) New England / Mid-Atlantic

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

DEALER NAME	NO.	VESSEL NAME	PERMIT NO.	DATE LANDED	DATE PURCHASED

Species name	Code	Pounds	¢/lb	Species name	Code	Pounds	¢/lb	Species name	Code	Pounds	¢/lb
Bluefish	0 2 3 2			Flounder, yellowtail: rg.	1 2 3 1			Whiting: round	5 0 8 0		
Butterfish: rg.	0 5 1 0			" " sm.	1 2 3 2			" dressed	5 0 8 3		
" med.	0 5 1 5			Haddock: rg.	1 4 7 0			Wolffish	5 1 2 0		
" sm.	0 5 1 6			" scrod	1 4 7 5			Loligo Squid			
Cod: rg.	0 8 1 1			Hake, red	1 5 2 0			Illex Squid			
" market	0 8 1 3			" white	1 5 3 0			Northern Shrimp			
" scrod	0 8 1 4			Herring, sea	1 6 8 5			Lobster			
Cusk	0 9 6 0			Mackerel	2 1 2 0						
Flounder, blackback: rg.	1 2 0 2			Ocean perch	2 4 0 0						
" " sm.	1 2 0 3			Pollock	2 6 0 1						
" dab: rg.	1 2 4 1			Scup: rg.	3 2 9 0						
" " sm.	1 2 4 2			" med.	3 2 9 2						
" fluke: rg.	1 2 1 0			" sm.	3 2 9 3						
" " med.	1 2 1 2			Sea bass: rg.	3 3 5 1						
" " sm.	1 2 1 4			" sm.	3 3 5 5						
" winter sole	1 2 0 1			Striped bass	4 1 8 0						
" grey sole: rg.	1 2 2 1			Tautog	4 3 8 0			Other food fish	5 2 6 0		
" " sm.	1 2 2 3			Tilefish	4 4 7 0			Other production fish	5 2 9 0		

ORIGINAL: RETAIN IN BOOK

be reported by degree squares.

7. There are no places for totals on either the fishing vessel or the processor's record. Most of the dealers add the catch by pounds and value on the weighout forms and mistakes can be backchecked. The lack of space for totals on the new logbooks makes this difficult.
8. There is no space on the processor record to indicate where the fish were landed. The importance of this information is that some dealers buy in several towns and some fishermen sell in several towns or to several dealers in the same town.
9. They type of boat or gear used does not appear on the processor's record of landings from a particular boat.
10. There are spaces for only 5 digits on the processor's record. Redfish and herring catches are frequently in six digits.
11. The port agents will be using the logbook forms most frequently but they will be receiving the fourth copy which is usually illegible.
12. State and federal personnel who are familiar with the use of four-carbon weighout slips believe that the type of carbon used in the new logbooks will deteriorate with age, and under most operating conditions aboard small vessels, they will be totally illegible because of damp conditions.
13. Secretaries working in the dealers offices may have difficulty applying enough pressure to produce a fourth legible copy.

14. Processors are not required to send a copy of their new log entries to the port agents. The port agent only has the right to inspect the log.

15. Many of the fish and some of the size categories used in Maine are not listed on the logbook. The processor will therefore have to complete more paperwork because he will be required to write the fish names in the blank spaces provided.

16. The processor must send in the completed dealer log sheet within 48 hours of the end of the fishing week. Many dealers ship to New York and Baltimore on consignment and have no information on prices that they, and consequently the fishermen, will be paid until the fish are sold. Three or four days may be required to truck and sell the fish and receive payment in the mail.

17. One dealer sends copies of his sales slips (collected from between 50 and 90 fishermen) to the Portland port agent four times per week. This port agent extracts the York County and Portland area landings from the sales slips, transfers the information to weighout slips, tabulates the landings, and then mails the remainder of the sales slips to Rockland where another port agent performs a similar service for his area of responsibility. The mandatory nature of the processor's logbook record and the time requirements involved, may

necessitate that this dealer employ two additional people.

B. A deterioration in the quality of landings data.

1. Fishermen may be reluctant to record accurate information about the areas fished in the logbooks when they know that the quotas do not apply equally to all areas (for instance, the coast of Maine within the 3 mile limit has no fishing restrictions and has, therefore, been designated by some as a "free" fishing zone).
2. Fishermen are not going to record accurate information about the amount of fish landed, or the species taken, in logbooks when they know that accurate information will result in "filling the quota" sooner.
3. The DMR field sampler informs us that it takes twice as much time to collect half as much data using the new logbook form.

C. A deterioration in communication between fisheries managers, data collectors, biological samplers and fishermen.

1. It is desirable to have an agent checking the collected data through personal contacts with Maine fishermen and dealers. It is unlikely that, initially, the quality of information obtained from a mandatory logbook system will approach that obtained from personal contacts. In addition, an agent on the wharf can find and correct a reporting problem as it occurs

whereas the same problem might go undetected in the logbook system.

2. Under the present system of data collection, there is no relationship between data collection and biological sampling on the one hand and law enforcement on the other. This division is desirable for the continued collection of reliable information. Accurate information cannot be collected when the fishermen are scrutinized by law enforcement personnel. The proposed mandatory logbook system initially dictated that the data collectors were closely involved with law enforcement. This initial problem has been corrected by recent legislation which assures the confidential nature of logbook information as it applies to federal fishing violations, there is little to prevent state marine law enforcement personnel from convicting fishermen with their own logbook records.
3. The fishermen are required by law to supply information to NMFS regarding their catch and effort but there is no stated plan for the NMFS to send any information back to the fishermen.
4. Fishermen who have willingly provided catch data in the past are increasingly reluctant to continue this practice and they spend a great deal of the vessel interview time complaining to the sampler about the new logbook systems.

D. Miscellaneous problems encountered.

1. The port agents have been notified by some fishermen that, once the mandatory logbook system goes into effect, they will receive no more cooperation from the fishing industry.
2. Past experience with logbooks in New Bedford indicates that a logbook system is inoperable.
3. Fishermen with small operations report that they cannot afford the additional time and manpower required to keep logbook records. Some businesses are able to cope with the additional costs of hiring personnel to fill out government forms but many in the New England fishing industry cannot do this.

The numerous logbook problems anticipated by the state and federal personnel that were interviewed suggest that there is no reason to believe that the proposed logbook system will yield much useful management data in the immediate future. In other fisheries and other areas, however, the system has been very useful. As data demands increase, a logbook system seems the only feasible answer. In the long term it is hoped that New England fishermen will come to realize the value of their data and provide the information needed for proper assessment and management.

Element B-4. REVIEW AND AUTOMATE DMR LICENSING AND PERMIT SYSTEM

The current DMR licensing system, with the exception of lobster and crab licensing, is a manual system with limited retrieval capabilities. License applications sent to the DMR Hallowell Office are inspected for completeness and assigned a license number, an official license is typed and mailed to the applicant, and the application is manually filed. Any information on file is thus available only if manually retrieved.

The Department currently issues 21 types of licenses or permits using 21 types of license or permit applications. There are a total of 121 questions on the application of which 98 appear on, at most, two different types of applications. Only two of the questions appear on all 21 types of applications. Responses to 30 of 121 application questions are used to complete the 21 different licenses. A given license form requires, at most, responses to 11 different application questions.

Automation of the DMR licensing system in its present form would have required an unnecessarily complicated system that would have been difficult to develop and expensive to operate. It was decided to consolidate the existing application forms into two basic formats. Sample form are presented in Figures B-8 through B-9.

With the contracted assistance of the State of Maine Central Computer Services (CCS) a prototype automated system for lobster and crab licensing was developed. Under this system, which was operational

FIGURE B-8. APPLICATION FORM FOR HARVESTING LICENSE

☐ NEW ☐ RENEWAL

☐ Lobster & Crab

☐ Commercial Shellfish

☐ Marine Worm Diggers

☐ Commercial Fishing Single Operator

☐ Commercial Fishing w/ Crew

☐ Nonresident Commercial Fishing

☐ Sea Moss

☐ Nonresident Sea Moss

☐ Scallop

FAILURE TO FILL OUT OR ANSWER ALL OF THE QUESTIONS WILL DELAY LICENSING

Fill out, sign and return with proper fee to the Department of Marine Resources,
Hallowell State House Annex
Augusta, Maine 04333

APPLICATION FOR HARVESTER LICENSE

I hereby apply for a Marine Resources Harvester License for the year ending December 31, 19___, and certify that I am eligible to hold such license.

Name_____ Address_____
Individual person only Street and Number

_____ Legal Residence_____
City or Town State Zip Code

Date of Birth_____ Weight_____ Height_____

HAVE YOU HELD A LOBSTER AND CRAB FISHING LICENSE WITHIN THE PAST 3 YEARS, IF SO GIVE NUMBER_____

If under 18 years of age, give Father's or Guardian's Legal Residence_____

Next preceding the date of this application, how long have you been a legal resident of Maine?_____

Boat Name and Maine Registration # or Document #_____ Homeport_____

If Lobster and Crab License PLEASE STATE BUOY COLOR_____

Are you a Lobster and Crab Sternman? Yes____ No_____

Tel. No._____

Under Title 12, Section 6306 signature of applicant authorizes inspection by law enforcement officers.

_____ _____
Date Signature

All checks and money orders should be made Payable to the Maine State Treasurer.
NOTE: After Sept 30 the license fee is ½ for the remainder of the Calender Year.
Application on its face indicates compliance with statutory criteria.
INFORMATION ON REVERSE SIDE MUST BE COMPLETELY ANSWERED.

QUESTIONS MUST BE COMPLETELY ANSWERED. ANY FALSE STATEMENT OF MISREPRESENTATION WILL RESULT IN REVOCATION OF LICENSE AND PROSECUTION IN COURT.

NEW APPLICANTS AND PERSONS WHO HAVE NOT HELD A LICENSE IN THE PAST 3 YEARS.
(Juvenile applicants must have Parent or Legal Guardian fill out and sign this section)

1. Indicate the period(s) during which you have been a legal resident (domiciliary of the State of Maine.)
_____
2. During any period indicated in response to question #1 were you present in Maine only or primarily during the summer months? YES____ NO____
3. If you moved to Maine in the last year, on what date did you begin your domicile in Maine? _____
4. Are you registered to vote in the State of Maine? YES____ NO____
5. Did you file a Maine Income Tax this year? YES____ NO____ If NO explain why?_____
_____
6. Do you hold a Maine Driver's License? YES____ NO____
7. Do you have a Motor Vehicle registered in Maine? YES____ NO____
8. Do you have a Watercraft registered in Maine? YES____ NO____

_____ _____
(Date) (signed)

(RESEARCH SURVEY SUPPLEMENT)

1. Number of months harvesting last year:_____
2. If a boat will be used in the harvesting operation, complete the following:
   a) Boat length:_____ b) Boat tonnage:_____ c) Boat engine horsepower:_____
   d) Boat equipped with: Chart Type Depth Recorder_____Radio Telephone_____Hydraulic Pot Hauler_____
   Loran C_____Scanning Sonar_____
3. If renewing a Lobster and Crab License, state number of lobster traps fished last year:_____
4. If renewing a Commercial Shellfish License, complete the following:
   a) Average number of bushels of shellfish dug per day last year:_____
   b) Kinds of shellfish taken last year: Clams_____ Mussels_____ Quahogs_____
   c) Shellfish were taken from what towns:_____, _____, _____
   _____, _____, _____, _____, _____
5. If renewing a Marine Worm Diggers License, kind(s) of marine worms dug last year:
   Bloodworms_____ Sandworms_____
6. If Commercial Fishing License application, complete the following:
   a) Type(s) of gear to be fished: Fish Trap _____ Weir_____ Gill Net _____ Purse Seine _____
   Stop Seine _____ Otter Trawl _____ Midwater Trawl _____
   Pair Trawl _____ Tub Trawl _____ Other, Specify _____
   b) Fixed gear (Fish Trap or Weir) to be located in the Town(s) of: _____, _____
   _____, _____, _____, _____, _____

FIGURE B-9. APPLICATION FORM FOR DEALER LICENSING

☐ NEW ☐ RENEWAL

FAILURE TO FILL OUT OR ANSWER ALL OF THE QUESTIONS WILL DELAY LICENSING.

☐ Wholesale Seafood

☐ Wholesale Seafood Supplemental

☐ Retail Seafood

☐ Lobster Transportation

☐ Lobster Trans. Supplemental

☐ Shellfish Transportation

☐ Shellfish Trans. Supplemental

☐ Lobster Meat Permit

☐ Marine Worm Dealer

☐ Marine Worm Dealer Supplemental

☐ Wholesale Crawfish

☐ Retail Crawfish

☐ Crawfish Supplemental

Fill out, sign and return with proper fee to the Department of Marine Resources,
Hallowell State House Annex
Augusta, Maine 04333

APPLICATION FOR DEALERS LICENSE
(Submit separate application for each additional supplemental license.)

Application is hereby made for a Marine Resources Dealer License for the year ending December 31, 19___. License to be issued in the name of:

NAME _____
(Print) (Partnership or Firm, if such

ADDRESS _____
Street and Number City or Town County State Zip Code

_____ _____
Location of Business If doing business from or on a vehicle describe below;

Tel. No. _____

DESCRIPTION OF VEHICLE

_____
Make Year Registration # Model

_____
Engine No. Color If leased vehicle, give company name

HAVE YOU HELD A DEALERS LICENSE WITHIN THE PAST 3 YEARS? IF YES GIVE TYPE AND NUMBER

_____ _____ _____ _____

Under Title 12, Section 6306 signature of applicant authorizes inspection by law enforcement officers.

_____ By _____
(Date) Signature of the owner or an Authorized Official of Firm

NOTE: 1. All checks and money orders should be made Payable to the Maine State Treasurer.
2. After Sept. 30 the license fee is ½ for the remainder of the Calendar year.
3. New Marine Worm Dealer applicants must furnish proof of six months legal residency.
4. Application on its face indicates compliance with statutory criteria.
INFORMATION ON REVERSE SIDE MUST BE COMPLETELY ANSWERED.

(RESEARCH SURVEY SUPPLEMENT)

1. If applying for either Wholesale Seafood, Wholesale Seafood Supplemental, or Retail Seafood License, complete the following:

Seafood(s) handled at the establishment for which this application is being made:

Clams _____, Quahogs _____, Mussels _____ Shrimp_____,

Crabs _____, Lobsters _____, Herring (Sardines)_____,

Finfish _____, Others _____

2. If applying for either Wholesale Seafood or Wholesale Seafood Supplemental License, complete the following:

Will seafood be processed at the establishment for which this application is being made? YES___ NO___

If Yes, what will be produced? Canned Products _____, Frozen Products_____,

Smoked Products _____, Fresh Products _____.

Fish Meal _____, Other, Specify_____

Number of employees at the establishment for which this application is being made: _____

3. If applying for a Retail Seafood License, type of business establishment:

Hotel _____, Restaurant _____, Roadside Stand _____, Store or Market _____

in January 1979, incoming lobster and crab license applications were assigned license and town code numbers at the DMR Hallowell office and then taken to CCS where certain items of information from the applications were keypunched for storage on magnetic tape. The licenses were machine printed at CCS and then returned to the DMR Hallowell office for distribution. Nine different types of summary reports could be generated by an information retrieval system ("Easytrieve") for use by DMR research and law enforcement personnel.

A major drawback of this prototype system was the excessive time required for the processing of incoming applications; about one week. Under the manual system a license could be immediately processed and issued to applicants waiting at the DMR Hallowell office.

Rather than expanding the CCS prototype automated licensing system to include the 20 other types of DMR licenses, the Department investigated the feasibility of using a small in-house computer system to accomplish the goals of an automated licensing system. The Department has decided to lease the following equipment from International Business Machines: one IBM Office System 6/420, and one IBM Office System 6/440.

This equipment will be used by the DMR Hallowell personnel for numerous clerical duties, including the test processing of reports; generation of form letters and mailing lists; and the printing of license forms, storage and retrieval of license application information,

and the generation of a wide variety of reports based on the stored license application information. This equipment will allow the Department's Hallowell staff to immediately process and issue licenses, and to supply the warden service and the research personnel with up-to-date license information as required.

The Office System 6/420 was scheduled for installation in Hallowell in September, 1979.

Element B-5. SURVEY THE FISHING INDUSTRY TO DETERMINE LANDING PATTERNS BY SPECIES, AREA AND TIME.

This survey of the landing patterns in the Maine commercial fisheries was initiated as the planning phase for an improved landings data collection system and a port sampling program. Landing patterns in the commercial fisheries are complex and change continuously and the current data collection system is inadequate for tracking these changes. The emphasis of this task has been to establish where the harvests of selected commercial species are landed so that data collection and sampling strategies can be formulated.

The data in this report are preliminary findings since detailed dealer interviews have not been conducted. Dealer listings are incomplete for some species and some fisheries have not been examined. These omissions will be corrected by port agents when the new landings data collection system becomes operational. Some consideration has been given to the potential problems involved in a sampling program.

FINFISH:

The following sources of information concerning the finfish harvest landing areas have been reviewed:

a. We have established which DMR marine patrol officer is responsible for each port. Planning or implementing a sampling program will require that the correct marine patrol officer be contacted to

obtain assistance in locating the landing facilities with a port. This listing is now available in DMR files.

b. Landing wharves have been recorded for each port discussed in Volumes 1 and 2 of the Maine Department of Transportation document entitled, Maine Port Development Study (1977)."

c. Some information on groundfish unloading facilities has been obtained from field sampling personnel. The locations of new groundfish unloading facilities are routinely recorded by the lobster sampling crew.

d. The NMFS and DMR port agents have supplied us with a list of facilities where they routinely collect finfish landing data. This information is available in DMR files.

e. Mr. W. Mills (N.E. Regional Office, NMFS, Gloucester, Mass.) has supplied us with a list of all Maine finfish dealers who have been supplied with dealer logbooks. This list is available in DMR files.

f. Wholesale fish dealer listings were recorded from the yellow pages of all 1978 Maine telephone directories.

g. DMR licensed wholesale seafood dealers and processors were contacted by telephone and those who buy their fish directly from commercial finfish boats or operate facilities where commercial finfish boats unload their catch were documented. This survey is incomplete but 22 dealers who

purchase fish directly from the fishermen, and 20 dealers who operate unloading facilities have been located. Information on wholesale seafood dealers and processors is available on file at DMR.

h. A wealth of information regarding finfish landing areas was available from Sherman Thompson (Kennebunkport, Maine 04046). At the peak of the season his trucking firm handles and transports finfish from 130-140 boats in western Maine from York County to Port Clyde. Sherman Thompson has also recently become involved with processing fish.

Information concerning unloading facilities provided by all sources are compared in Table B-5. These data sources probably do not give a complete picture of the unloading facilities along the Maine coast but they should be used for planning a detailed survey of all finfish landing facilities. An interview questionnaire (Figure B-10) has been designed to collect information on when and how the finfish harvest is landed. The questionnaire could be used in a detailed survey of commercial landing facilities.

A COMMERCIAL FINFISH PORT SAMPLING PROGRAM:

DMR will probably be involved in a commercial finfish port sampling program to collect catch, effort, and biological information. The vessel interview time involved in such a program can be reduced by eliminating redundant questions. Information on horsepower, type of

TABLE B-5. FINFISH DEALER LISTING

FINFISH DEALERS (York County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Ken Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing).
Sherm Thompson Denise Dee, Inc. RFD #2, Box 867 Kennebunkport, Me. 04046 967-3064	Sherman Thompson Box 867 Kennebunkport, Me. 04046 967-3064	Sherman Thompson Wholesale Fish Division of Denise Dee, Inc. Mills Road Kennebunkport, Me. 04046 967-3064	Sherman Thompson Denise Dee, Inc. Kennebunkport, Me. 04046 967-3604 (buys directly from boats at local wharves in Saco, Cape Ellis, Biddeford Pool, Perkins Cove)
Southern Maine Fisheries, Inc. Rt. 236 Eliot, Maine 03903 439-1700	Southern Maine Fisheries, Inc. Rt. 236 Eliot, Maine 03903 439-1700	Southern Maine Fisheries, Inc. Rt. 236 Eliot, Maine 03903 439-1700	Southern Maine Fisheries, Inc. Rt. 236 Eliot, Maine 03903 439-1700 (buys direct from boats)
T.G. Tobey Fish Co. Kittery, Maine 03904 439-2750	T.G. Tobey Fish Co. Kittery, Maine 03904 439-2750		

TABLE B-5. (continued)

FINFISH DEALERS (York County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
		York Beach Fish Market York Beach, Me. 03910 363-2763 (buys from both boats and dealers)	York Beach Fish Market 29 Railroad Avenue York Beach, Me. 03910 363-2763 (buys directly from boats and other dealers)
			Fletcher's Neck Lobster Pound Main Street Biddeford Pool, Maine 04006 283-3724 (buys directly from boats in Biddeford Pool)
			Robert J. Preble & Sons, Inc. Fishers Lane, RFD #2 Kennebunkport, Me. 04046 967-3477 or 967-4620 (buys directly from boats at local wharves)

TABLE B-5. (continued)

FINFISH DEALERS (York & Cumberland Counties)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
			Finast Kind Fish and Produce Market RFD #2, Box 42 York, Maine 03909 363-5000 (sometimes buys directly from a small dragger in York Harbor)
		CUMBERLAND COUNTY	
Pine State By-Products 169 Front Street S. Portland, Me. 04106 799-5571	Pine State By-Products 169 Front Street S. Portland, Me. 04106 799-5571		Pine State By-Products 169 Front Street S. Portland, Maine 04106 799-5571 (occasionally commercial finfish boats unload at this facility-generally buys from fishermen at other wharves).

TABLE B-5. (continued)

FINFISH DEALERS (Cumberland County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory yellow pages).	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
R & S Seafoods Co. 46 Custom House Wharf Portland, Me. 04101 773-5720	R & S Seafoods Co. 46 Custom House Wharf Portland, Me. 04101 773-5720	R & S Seafoods Co. 47 Custom House Wharf Portland, Me. 04101 773-5720	R & S Seafoods Co. 46 Custom House Wharf Portland, Maine 04101 773-5720 (commercial finfish boats unload at this facility)
Atlantic Fisheries, Co., Inc. 1 Canal Plaza Portland, Me. 773-0757		Atlantic Fisheries Co., Inc. 1 Canal Plaza Portland, Me. 773-0757	
Willard & Daggett Fish Co. 15 Central Wharf Portland, Me. 04101 772-0161	Willard & Daggett Fish Co. 15 Central Wharf Portland, Me. 04101 772-0161	Willard & Daggett Fish Co. 15 Central Wharf Portland, Me. 04101 772-0161	Willard & Daggett Fish Co. 15 Central Wharf Portland, Maine 04101 772-0161 (commercial finfish boats unload at this facility)

TABLE B-5. (continued)

FINFISH DEALERS (Cumberland County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
United Fish Co. 35 Union Wharf Portland, Me. 04101 772-8478	United Fish Co. 35 Union Wharf Portland, Me. 04101 772-8478	United Fish Co. 35 Union Wharf Portland, Me. 04101 772-8478	United Fish Co. 35 Union Wharf Portland, Maine 04101 772-8478 (commercial finfish boats unload at this facility)
Kasbay Fish Co. P.O. Box 306 DS Portland, Me. 04101 772-3780	Kasbay Fish Co. Brown's Wharf Portland, Me. 04101 (2 of these listed?)		
Coastal Fisheries 329 Commercial St. Portland, Me. 04101 772-8333	Coastal Fisheries Cumberland Cold Storage Building Portland, Me. 04101 772-8333	Coastal Fisheries 329 Commercial St. Portland, Me. 04101 772-8333	
Gulf of Maine, Inc. Deales Wharf 8 Adlaide Street Portland, Maine 772-1957			

TABLE B-5. (continued)

FINFISH DEALERS (Cumberland County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
Maine Fisheries Corp P.O. Box 1300 Portland, Me. 04101 774-2674	Maine Fisheries Corp Holyoke Wharf Portland, Me. 04101	Maine Fisheries Corp Holyoke Wharf Portland, Me. 04101 773-9155	Maine Fisheries Corp P.O. Box 1300 Portland, Me. 04101 774-2674 (commercial finfish boats unload at this facility)
Pioneer Fish Co. 52 Brown's Wharf Portland, Maine 774-7452			
Great Eastern Lobster & Fish Co. RFD #2 Ely Codding & C. Talbot Brunswick, Me. 04011 725-8021	Great Eastern Lobster & Fish Co. RFD #2 Ely Codding & C. Talbot Brunswick, Me. 04011 725-8021	Great Eastern Lobster & Fish Co. RFD #2 Ely Codding & C. Talbot Brunswick, Me. 04011 725-8021	

TABLE B-5. (continued)

FINFISH DEALERS (Cumberland County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
	Atlantic Seafood (retail) 237 Commercial St. Portland, Me. 04101 772-3076	Atlantic Seafood of Maine 237 Commercial St. Portland, Me. 04101 772-3076	Atlantic Seafood 237 Commercial Street Portland, Maine 04101 772-3076 (commercial finfish boats unload at this facility)
	Charles Saunders (Not on WSFDPL) Cundys Harbor, Me. 04011		
	Kelly Fish Co. (Not on WSFDPL) Widgery Wharf Portland, Me. 04101		
	Paul Bayley Seafoods, 258 Pine Point Rd. Scarborough, Me. 04074 883-4581		Paul F. Bayley 258 Pine Point Road Scarborough, Maine 04074 883-4581 (buys directly from boats at other wharves)

TABLE B-5. (continued)

FINFISH DEALERS (Cumberland County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
	Commercial Street Fish Market (wholesale) 237 Commercial Street Portland, Me. 04101 772-4341		
		Cape Shore Variety & Fish Market 537 Shore Road Cape Elizabeth, Me. 799-7018 (buys direct from boats)	Cape Shore Variety & Fish 537 Shore Road Cape Elizabeth, Me. 04107 799-7018 (buys direct from boats)
		Jeff's Maine Lobster Co. 378 W. Commercial St. Portland, Me. 04102 772-0153 (buys direct from boats)	Jeff's Maine Lobster Co. 378 W. Commercial Street Portland, Maine 04102 772-0153 (buys direct from boats)

TABLE B-5. (continued)

FINFISH DEALERS (Cumberland County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
		Joe's Fish House 889 Brighton Ave. Portland, Me. 772-4024 (occasionally buys from boats, mostly other dealers)	
			Fathoms East Seafoods 355 Commercial Street Portland, Maine 04111 773-2553 (buys directly from small fishermen at Cape Elizabeth)
			P.J. Merrill Seafood, Inc. 681 Forest Avenue Portland, Maine 04103 773-1321 or 775-2523 (buys direct from boats at a local wharf)

TABLE B-5. (continued)

FINFISH DEALERS (Cumberland & Sagadahoc Counties)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979 Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
			Seven Seas Fisheries & Dist. P.O. Box 129 Downtown Station Portland, Maine 774-8328 (buys direct from boats at local wharf)
			Holden Seafood 74 Elm Street Portland, Maine 04101 772-9065 (buys direct from boats at local wharf)
SAGADAHOC COUNTY			
Small Point Pound Small Point, Me. 04567 389-2222	Small Point Pound Small Point, Me. 04567 389-2222		Small Point Pound 42 Front Street Bath, Maine 04530 443-2101 or 389-2222 (commercial finfish boats unload at this facility)

TABLE B-5. (continued)

FINFISH DEALERS (Sagadahoc County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing).
Robert York Westpoint, Me. 04565 443-2929	Robert York Westpoint, Me. 04565 443-2929	York's Wharf Westpoint, Me. 04565 443-2929	Robert York Westpoint, Me. 04565 443-2929 (commercial finfish boats unload at this facility)
Seaside Lobster & Fish Co. Westpoint, Me. 04565 389-1819	Seaside Lobster & Fish Co. Westpoint, Me. 04565 389-1819	Seaside Lobster & Fish Co. Westpoint, Me. 04565 389-1819	Seaside Lobster & Fish Co. Westpoint, Maine 04565 389-1819 (commercial finfish boats unload at this facility)
	Sebasco Wharf, Inc. Sebasco Estates, Maine 04565 389-2756		
	Thibodeau's Seafood Market Five Islands, Me. 04546 371-2220		Thibodeau's Seafoods Five Islands, Maine 04546 371-2220 (commercial finfish boats unload at this facility)

TABLE B-5. (continued)

FINFISH DEALERS (Lincoln County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
Boothbay Region Fish & Cold Storage Atlantic Avenue Boothbay Harbor, Maine 04538 633-4913	Boothbay Region Fish & Cold Storage Atlantic Avenue Boothbay Harbor, Maine 04538 633-4913	Boothbay Region Fish & Cold Storage Atlantic Avenue Boothbay Harbor, Maine 04538 633-2044	Boothbay Region Fish & Cold Storage Atlantic Avenue Boothbay Harbor, Maine 04538 633-4913 or 633-2044 (commercial finfish boats unload at this facility)
Brown Brothers N. Atlantic Fisheries, Ltd. 87 Atlantic Avenue Boothbay Harbor, Maine 04538 633-2022	Brown Brothers N. Atlantic Fisheries, Ltd. 87 Atlantic Avenue Boothbay Harbor, Maine 04538 633-2022	Brown Brothers N. Atlantic Fisheries, Ltd. 87 Atlantic Avenue Boothbay Harbor, Maine 04538 633-2022	
	Broken Anchor Fish Market Townsend Avenue Boothbay Harbor, Maine 04538 633-2932		Broken Anchor Fish Market Townsend Avenue Boothbay Harbor, Maine 04538 633-2932 (buys directly from a dragger at Robinson's Wharf)

TABLE B-5. (continued)

FINFISH DEALERS (Lincoln County)

Finfish Dealers where landings are recorded by port samplers, Maine 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979 Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
	Boothbay Region Lobsterman's Co-op Atlantic Avenue Boothbay Harbor, Maine 04538 633-4900 Don Wotton 633-5160		
	McLellans Seafood Rt. 27 Boothbay, Maine 04537 633-5189	McLellans Seafood Wiscasset Road Boothbay, Maine 04537 633-5189	
	Lee Reilly (Not on WSDPL) New Harbor, Me. 04554		

TABLE B-5. (continued)

FINFISH DEALERS (Lincoln County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
			Clarks Cove Fish Co. Farrin's Wharf-Main Street S. Bristol, Maine 04568 644-8200 (commercial finfish boats unload for this facility at Jone's Wharf near bridge at S. Bristol)
			New Harbor Co-op P.O. Box 125 Bristol, Maine 04544 677-2791 (commercial finfish boats unload at this facility for all local buyers)
			S. Bristol Fishermen's Co-op S. Bristol, Maine 04568 644-8528 (commercial finfish boats unload at this facility)

TABLE B-5. (continued)

FINFISH DEALERS (Knox County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979 Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
Francis Morris Morris Variety Box 235 Port Clyde, Me 04855 372-6659	Morris Variety Store Box 235 Port Clyde, Me. 04855 372-6659		
Cod End Fish Co. Box 115 Tenants Harbor, Maine 04860 372-6659	Cod End Fish Co. Box 115 Tenants Harbor, Maine 04860 372-6659		
	Pine Tree Packing Port Clyde, Me. 04855 372-6720		
	Atwood Brothers, Inc. Tenants Harbor, Me. 04860 372-6331		

TABLE B-5. (continued)

FINFISH DEALERS (Knox County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
	Port Clyde Fisherman's Co-op Box 102 Port Clyde, Maine 04855 372-8922		
	Port Clyde Foods, Inc. Winter Street Rockland, Maine 04841 594-4413 (plants also in Stonington, Yarmouth)	Port Clyde Foods, Inc. 50 Tilson Avenue Rockland, Maine 04841 594-4413	
	Port Clyde General Store Port Clyde, Maine 04855 (Not on WSFDPL)		
	Ayers Fish Market 43 Main Street Camden, Maine 04843		

TABLE B-5. (continued)

FINFISH DEALERS (Knox County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
	William Atwood Spruce Head, Me. 04859 596-6019	William Atwood Spruce Head, Me. 04859 596-6019	
	P.K. Reed & Son Owls Head, Me. 04854 594-4606	P.K. Reed & Son Owls Head, Me. 04854 594-4606	
Stinson Canning Co, Atlantic Avenue Rockland, Me. 04841 594-9595	Stinson Canning Co. Atlantic Avenue Rockland, Me. 04841 594-9595	Stinson Canning Co. Atlantic Avenue Rockland, Me. 04841 594-9595	
Edward L. Black Seafood P.O. Box 44 Tenants Harbor, Maine 04860 372-8116	Edward L. Black Seafood P.O. Box 44 Tenants Harbor, Maine 04860 372-8116		

TABLE B-5. (continued)

FINFISH DEALERS (Knox County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Branard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979 Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
F.J. O'Hara & Sons Tilson Avenue Rockland, Maine 04841 594-4444	F.J. O'Hara & Sons Tilson Avenue Rockland, Me. 04841 594-4444	F.J. O'Hara & Sons Tilson Avenue Rockland, Me. 04841 594-4444	F.J. O'Hara & Sons Tilson Avenue Rockland, Me. 04841 594-4444 (O'Hara's own commercial finfish boats unload at this facility)
Dragnet Seafood P.O. Box 9 Thomaston, Me. 04861 354-2209	Dragnet Seafood P.O. Box 9 Thomaston, Me. 04861 354-2209		Dragnet Seafood P.O. Box 9 Thomaston, Me. 04861 354-2209 (buys direct from boats)
Frederick Christianson Oyster River Road Warren, Maine	Frederick Christianson Oyster River Road Warren, Maine		
Jackson North Atlantic Products Commercial Street Rockland, Me. 04841 594-5084 (buys from both boats and dealers)		Jackson North Atlantic Products Commercial Street Rockland, Me. 04841 594-5084 (buys from both boats and dealers)	Jackson North Atlantic Products Pearl Street, P.O. Box 146 Rockland, Maine 04841 594-5084 (buys directly from boats)

TABLE B-5. (continued)

FINFISH DEALERS (Knox & Waldo Counties)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory. (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)

Wendell Reed
Friendship, Maine 04547
354-6611 or 832-4053
(commercial finfish boats may be unloading at this facility now).

Miller's Lobster Co., Inc.
Luther S. Miller
Star Route 33
Spruce Head, Maine 04859
594-7406
(commercial finfish boats unload at this facility)

WALDO COUNTY

Superior Shellfish, Inc.
Searsport, Me. 04974
548-2448

David Allyn
(Not on WSFDPL)
Searsport Lobster, Inc.
RFD #1
Lincolnville, Me. 04849

TABLE B-5. (continued)

FINFISH DEALERS (Hancock County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
Stonington Lobster Co-op India Point Road Stonington, Me. 04681 367-2286	Stonington Lobtser Co-op India Point Road Stonington, Me. 04681 367-2286		Stonington Lobster Co-op India Point Road Stonington, Me. 04681 367-2286 (commercial finfish boats unload at this facility)
C.H. Rich Co. Bass Harbor, Me. 04653 244-3485	C.H. Rich Co. Bass Harbor, Me. 04653 244-3485		C.H. Rich Co. Bass Harbor, Me. 04653 244-3485 (2 commercial finfish boats-1 gillnetter, 1 dragger-unload at this facility)
H.R. Beal & Son, Inc. Clark Point Road Southwest Harbor, Maine 04679 244-3202	H.R. Beal & Son, Inc. Clark Point Road Southwest Harbor, Maine 04679 244-3202	H.R. Beal & Son, Inc. Clark Point Road Southwest Harbor, Maine 04679 244-7178	H.R. Beal & Son, Inc. Clark Point Road Southwest Harbor, Maine 04679 244-3202 or 244-7178 (commercial finfish boats unload at this facility)

TABLE B-5. (continued)

FINFISH DEALERS (Hancock County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
Winter Harbor Co-op Winter Harbor, Me. 04693 963-5857	Winter Harbor Co-op Winter Harbor, Me. 04693 963-5857		Winter Harbor Co-op Winter Harbor, Me. 04693 963-5857
Stinson Packing Co. Prospect Harbor, 04669 963-7331	Stinson Packing Co. Prospect Harbor, 04669 963-7331		
	A.W. Pettegrew & Sons, Inc. Southwest Harbor, Me. 04679 244-3158		

TABLE B-5. (continued)

FINFISH DEALERS (Hancock & Washington Counties)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory. (1978 directory, yellow pages)	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing)
			Frederick H. Arsenault Box 1002 Southwest Harbor, Me. 04679 244-7345 (buys direct from boats)
		WASHINGTON COUNTY	
Kelly Fish Co. (Not on WSFDPL) Box 67 Columbia Falls, Me. 04623 483-2214	Erik Kelly Shellfish Co. Jonesport, Me. 04649		Kelly Shellfish & Co. Box 67 Columbia Falls, Maine 04623 483-2214 (commercial finfish boats unload at this facility)
Walter Calder 5 Capen Avenue Eastport, Maine 853-4067			
James Salisbury Milbridge, Me. 546-2603			

TABLE B-5. (continued)

FINFISH DEALERS (Washington County)

Finfish Dealers where landings are recorded by port samplers, May 1979. Kent Glover, Dick Barnard, Bob Morrill, Peter Marckoon	Dealer logbooks issued to the following Groundfish Dealers, May 1979. Bill Mills (Gloucester)	Wholesale Fish Dealers from Telephone Directory. (1978 directory, yellow pages).	Licensed wholesale seafood dealers and processors who either purchase fish directly from the boats or operate finfish unloading facilities. (May 1979, not a complete listing).
	U.S.A. Fish Inc. P.O. Box 31 Lubec, Maine 04652		
	Beals-Jonesport Co-op Jonesport, Me. 04649 497-2020		
	Kelly Seafood (Not on WSFDPL) Jonesport, Me. 04649		
	McCurdy Fish Co. (Not on WSFDPL) Water Street Lubec, Maine 04652		
			Neil C. Corbett Lobsters Cutler, Maine 04626 259-7761 (occasionally commercial finfish boats unload at this facility for inconsistent buyers)

FIGURE B-10. The Interview for Groundfish Unloading Facilities.

Dealer Interview

Date_____

1. Name of unloading place_____Town_____.

2. Wholesale seafood dealer or processor license issued to whom at above unloading facility._____

3. Is this the only unloading facility you operate? Yes___No_____

4. Name of person(s) to contact regarding departure and arrival of vessels.

   Name_____Tel. No._____

   Name_____Tel. No._____

   Name_____Tel. No._____

5. How large a boat can this facility handle (length, tonnage, draft)?

   _____

   _____

6. Can boats unload here at any stage of the tide? Yes____No_____

7. Does the number of boats unloading at this facility change with the season?

   Explain_____

8. What is the maximum number of boats unloading at this facility on a given day?

   _____

9. Do all days of the week have equal fishing and unloading activity?

   _____

FIGURE B-10. (continued)

10. Is there more than one period during the year when activity (unloading fish) is high at this facility?

    Explain_____

11. Do the boats that unload their fish here fish for several species at once or one species at a time?

    _____

12. Do the boats that unload here fish in one general area for all species or in a particular area for a particular species?

    _____

13. Do the boats unload their entire catch at this facility or do they unload at more than 1 unloading facility for a given fishing trip?

    _____

14. Fish landed at this facility are caught by which of the following methods? (Circle those that apply).

draggers	purse seiners
gillnetters (surface - bottom)	pair trawlers
longliners (surface - bottom)	weir
fish traps (surface - bottom)	stop seine

15. Do you make radio contact with the boats so that you known when they will arrive at the facility for unloading? Yes____No_____

    Comments_____

16. How many hours in advance do you know whan a boat will be arriving for unloading?

    _____

17. If we called you from BBH, would you give us an ETA for a commercial boat so we could send a sampling crew up to sample landings? Yes___No___Comments_____

    _____

FIGURE B-10. (continued)

18. What time do the boats arrive for unloading?

draggers_____	purse seiners_____
gillnetters_____	pair trawlers_____
longliners_____	weir_____
fish traps_____	stop seine_____

19. Do the boats unload as soon as they come in?_____

20. Can the facility unload more than one boat at a time?_____

21. How are the boats unloaded? Describe_____

_____

22. Is there any order in which different species of fish are unloaded?

_____

23. How long does it usually take to unload?_____

24. Could I obtain the total landings of the boat sampled from your records?

_____

25. Could I obtain the total landings of the boat sampled during the weigh out?

_____

26. During what months are the following species of fish landed at this facility?

FIGURE B-10. (continued)

Species	J	F	M	A	M	J	J	A	S	O	N	D
haddock												
pollock												
cod												
hake - white												
red												
silver												
flounder - dab												
grey sole												
yellowtail												
blackback (lemon sole)												
halibut												
herring												
redfish												
swordfish												
angler												
cusk												
mackerel												
dogfish												
butterfish												
alewive												
shad												
menhaden												
tuna												
other												

27. Which species above are sorted by size?_____

28. Are any of the fish landed here used for reduction?_____

_____

29. What is landed at this faciltiy besides fish? (squid, shrimp, mussels, scallops, etc.)

_____

30. Roughly what % of the catch/boat is "shack?"_____

_____

FIGURE B-10. (continued)

31. Ask for the locations of other buying locations in the vicinity.

_____

32. Record groundfish tows_____

_____

_____

engine, gross and net tonnage, length, breadth, depth, hull construction, where and when built, etc., have been obtained by DMR for all documented commercial fishing vessels with home ports in the New England coastal states. These data were supplied by Ms. E.P. Fischer (Chief, Records and Publications Branch, Merchant Vessel Documentations Division, U.S. Coast Guard, Washington, D.C. area code 202-426-2233).

DMR has also obtained a computer listing of state registered and/or federally documented Maine vessels which possess federal fishing permits for bluefin tuna (commercial, incidental, recreational), groundfish (commercial, incidental, recreational), Atlantic herring (commercial, incidental, transport), surf clam/ocean quahog (commercial), and ocean quahog (commercial). All commercial groundfish permits have been sorted, accumulated, and listed alphabetically by town. The number of boats possessing permits for each federally controlled fishery, are also included in an alphabetical listing of towns. This information will indicate the proportion of the catch in fisheries requiring federal permits that is actually caught by vessels possessing those permits.

The following sampling problems are anticipated in a planned DMR finfish sampling program:

1. Direct communications with the manager of each unloading facility will be required to establish vessel arrival times. This is essential to avoid a long waiting period for the sampling crew.

2. At many unloading facilities, the catch may be unloaded from the boat directly into trucks. In this situation it may be difficult to sample the catch.
3. Some of the boats may unload at more than one town or they may unload at up to four different places within one town. Unloading at two wharves is a common practice. This may complicate sampling procedures.
4. There will always be doubt as to the reliability of data on the location of the fishing activity (loran bearings). This is particularly true when a quota system is in effect.
5. When trip limits have been imposed, some vessels have circumvented the problem by reporting the catch for two trips instead of one.
6. The landings patterns for the commercial fishery will change with time and with the addition of restrictions.
7. Many of the boats will arrive and unload between four p.m. and midnight. This will require night sampling with its accompanying problems.
8. Otoliths for aging have to be collected by either removing the fish heads or mutilation; objectionable practices so far as the fishermen are concerned since they may reduce the value of the fish.
9. In some cases, the catch may not be sorted (e.g., several

species of flounder may be lumped). Sorting these fish will delay the sampling procedures.

10. The collection of biological samples from the processors is worthwhile only if we know where the fish were caught; information that may not be available.
11. This may be an inappropriate time to initiate a program because of the recent conflicts between fishery managers and the fishermen.
12. Landings may not be weighed at some pickup points and it may be necessary to obtain hail weights from fishermen's sales receipts which are usually returned two to three days after loading.
13. Wholesale fish brokers may provide some sampling problems since they may have no fixed place of business and frequently arrange for direct pickup from the boats at any convenient location.

In view of some of the problems anticipated in sampling large vessels at the major ports of Rockland and Portland (3, 4, and 5 above) and because NMFS personnel have reportedly (a) established good rapport with the fishermen in these ports, (b) developed solutions to some of the problems above, (c) developed sampling schemes for these ports, the best way to coordinate our sampling plans with the NMFS would be to confine our sampling to vessels fishing within the 3 mile limit and

landing their catch at all ports except Rockland and Portland. Such an arrangement is satisfactory to the NMFS and there is some evidence to suggest that small vessels in small ports would not object to our sampling and interviewing.

SOFT CLAMS AND MUSSELS:

The most complete source of information on where the clam and mussel harvest is landed may be obtained from DMR's list of persons and firms possessing current Maine Interstate Shellfish Certificates (Table B-6). The major clam harvesting season extends from April through October. During this period clam diggers bring their catch directly to the buyer or they may land the clams by boat at a wharf where they are sold directly for truck transport. Wholesale fish and shellfish brokers may be involved in some of these transactions.

A COMMERCIAL SHELLFISH SAMPLING PROGRAM:

A commercial shellfish sampling program to collect catch/effort (bushels dug/hour) and size information may be implemented by the DMR. Commercial sampling information, such as numbers of diggers selling to a buyer on a given day, the numbers of bushels sold, and the area or towns where the clams were dug, can be checked for accuracy against the mandatory dealer records submitted to DMR.

Depuration plants are licensed by DMR to purchase clams dug from selected areas closed because of bacterial pollution. These commercial

TABLE B-6.

Persons or Firms Holding Maine Interstate Shellfish Certificates
(Arranged alphabetically by County, Town, and Holder)

Name	Address	Certificate Number	Number of Vehicles
Androscoggin County			
Beals, Beatrice A.	Lisbon Falls	63 SP	1
Cumberland County			
Moody, Derald L.	Brunswick	176 SS	
*New England Products	Brunswick	139 RS	1
Purington, Bruce G.	Brunswick	283 SS	
Chebeague Is. Seafood	Chebeague Island (Weagle's)	167 SP	2
Portland Clam Co.	Freeport	9 SP	1
*Allen's Seafood	Harpswell	101 SS	
*Best Pack Seafood, Inc.	Portland	75 SS	2
*Willard Daggett Fish	Portland	50 SS	1
Fathom's East Seafood	Portland	205 SP	
Gene Temple Fisheries	Portland	312 RS	
*Harbor Fish Market	Portland	233 SS	1
Holden Seafoods	Portland	310 SS	
New Meadows Lobster	Portland	234 RS	1
Old Port Clam Co., Inc.	Portland	279 SP	1
P.J. Merrill Seafood, Inc.	Portland	122 SS	3
Bayley, Paul F.	Scarboro	23 SP	
Lothrop, E.A.	Scarboro	92 SP	
Northeast Clam Co.	Scarboro	296 SP	1
Pine Point Seafood Prod.	Scarboro	169 SP	
Scarboro Clam Co.	Scarboro (Wm. Bayley)	140 SP	2
Thurlow's Shellfish	Scarboro	11 SS	
Prindall, Edmond T.	South Harpswell	285 SP	
W. Bennett Clam Shop	Topsham	251 SP	1

*Handles some mussels

TABLE B-6. (continued)

Name	Address	Certificate Number	Number of Vehicles
Hancock County			
Tibbetts, Henry, Sr.	Bar Harbor	70 SP	
Rich, C.H., Inc.	Bass Harbor	61 SP	
Maine Coast Oyster Corp.	Blue Hill (Mark Richmond)	186 SS	1
Brooklin Shellfish	Brooklin (Philip Wood)	198 SS	
Blake, William D.	Brooksville	41 SP	
Jeff's Lobster Pool	Bucksport	264 SS	2
*Hardy, Douglas A. Sr.	Deer Isle	78 SS	3
Heanssler, Curtis	Deer Isle	14 SS	2
Maine Shellfish Co.	Ellsworth	100 SP	16
Downeast Sea Shell Assoc.	Hancock	13 SP	
**Tidal Falls Lobster Pd.	Hancock	291 SS	
Boynton Shellfish (Harold)	Lamoine	149 SP	
Down East Clam Co.	Lamoine	287 RS	3
Chase, Marie T.	No. Brooklin	174 SP	1
Sorrento Lobster & Fish. Co.	Sorrento	303 RS	1
Carole's Ocean Products	So. Gouldsboro	248 SP	1
Gouldsboro Enterprises	So. Gouldsboro	40 SP	
Maine Coast Seafood	So. Gouldsboro	298 SS	1
Stanley's Seafood	So. Gouldsboro	161 SP	
*A.W. Pettegrew & Sons, Inc.	Southwest Harbor	82 RS	3
Fred's Fresh Fish	Southwest Harbor	118 RS	2
Klausky, Joseph	Southwest Harbor	22 RS	1
Lunt, R.D.	Southwest Harbor	27 SS	
MDI Shellfish Co.	Southwest Harbor (David Smith)	125 SP	
Carter, Mrs. Ralph	Stonington	128 SP	
Colwell Bros., Inc.	Stonington	275 SS	
Conary, L. Clyde	Stonington	15 RS	1
Davis, Edward	Stonington	311 SS	
Joyce, Eugene	Stonington	97 SP	
Lobster Transport of Maine	Stonington	212 SS	1

*Handles some mussels **Mussels only

TABLE B-6. (continued)

Name	Address	Certificate Number	Number of Vehicles
Hancock County (continued)			
*Stonington Lobster Co-op	Stonington	163 SS	2
Winter Harbor Co-op	Winter Harbor	294 SS	
Bickford, Clyde L.	Vinalhaven	93 SS	
Kennebec County			
Brownies Seafood	Augusta	46 SS	3
Knox County			
*Crute, Karl S., Sr.	Cushing	29 SS	1
*H & W Seafood Co.	Cushing	120 RS	1
Sheila's Shanty	Friendship	288 SP	1
Morris, Francis	Port Clyde	5 SS	2
*McLoon Lobster Co.	Rockland	28 SS	2
*Rockville Seafood	Rockland	199 RS	1
*Seafoods of Maine	Rockland	102 RS	
Graffam Bros.	Rockport	32 SS	4
Independent Seafood Co.	St. George (Wm. Barker)	44 RS	1
J & S Seafood	St. George	280 SS	1
Island Clam Co.	Spruce Head	130 RS	
Miller's Lobster Co., Inc.	St. George	230 SS	1
*Wm. Atwood Lobster	Spruce Head	217 RS	3
Edward L. Black Seafood	Tenants Harbor	295 RS	2
Elliott Seafood Co.	Thomaston (Stanley Elliott)	80 RS	1
Maine Clam Shell	Thomaston (Miriam Taylor)	180 SP	1
*Maine Mussel Co., Inc.	Warren	111 SS	1
*Butch's Live Lobster Sales	Washington	282 RS	

*Handles some mussels

TABLE B-6. (continued)

Name	Address	Certificate Number	Number of Vehicles
Lincoln County			
Annapolis Bristol Co.	So. Bristol (Robert Emmett)	268 SS	2
*Cousin's Seafood	Boothbay	34 RS	
*Mill Cove Lobster Pound	Boothbay	7 SS	10
Peasley, Aubrey A.	Boothbay	20 SS	
Robert MacFarland Seafood	Boothbay	16 SP	2
*Wimpy & Sons Trucking	Boothbay (Winthrop Bailey)	209 RS	1
*Boothbay Region Fish & Cold Storage	Boothbay Harbor	246 SS	
Lusty Lobster, Inc.	Bremen	53 SP	4
**Abandoned Farms	Damariscotta	166 SS	
Elliott's Shellfish	Damariscotta (Wayne Elliott)	205 SP	
Creamer, Bruce	Newcastle	146 SP	
Creamer's Lobster Pound	No. Edgecomb	65 SS	
Dodge Cove Marine Farm	Newcastle	213 SS	
*Maine Mariculture Products	So. Bristol (Ken Gray)	274 SS	1
***Maritec (oysters only)	So. Bristol	218 SS	1
The Clamhod	Waldoboro (Ken Fowler)	215 SP	
*Medomak Mussel Co.	Waldoboro	306 SS	1
Murphy's Shellfish (John)	Waldoboro	223 SP	2
*J & P Clam Co.	Waldoboro (J. Sleeper)	12 SS	1
Smith, Clayton G.	Waldoboro	150 SP	1
Waltz, Kenneth E., Sr.	Waldoboro	155 SP	1
***Maine Mooring Oyster Co., Inc.	Walpole	290 SS	
**Great Eastern Mussel Farm	Wiscasset	309 SS	1
Green, George L.	Wiscasset	305 RS	
Penobscot County			
McLaughlin's Seafood	Bangor	254 SS	1
Cap Morrills, Inc.	Brewer	154 SS	1
Whaling City Seafoods, Inc.	Brewer	299 SS	

*Handles some mussels **Mussels only ***Oysters only

TABLE B-6. (continued)

Name	Address	Certificate Number	Number of Vehicles
Sagadahoc County			
*Gilmore's Seafood	Bath	253 SS	
Plants Seafood	Bath	99SS	
*Sebasco Wharf, Inc.	Seabsco Estates	182 SS	3
Somerset County			
Mid-State Seafood Wholesales	Hartland	273 SS	3
Waldo County			
*Hemenway Lobster	Lincolnville (Wm. Hemenway)	187 SS	
Superior Shellfish, Inc.	Searsport	208 SP	2
Grant, Levi	Stockton Springs	177 SP	
Pomeroy, Joe	Stockton Springs	106 SP	1
Pomeroy, Virginia	Searsport	170 SP	1
Washington County			
Addison Seafood	Addison	259 SP	1
*Eastern Harbor Lobster Sales, Inc.	Addison	144 RS	6
Smith, William H.	Addison (Rowley, Mass.)	64 SP	
*Carver's Shellfish	Beals	60 SP	1
**Bucks Harbor Lobster Co.	Bucks Harbor	293 SS	1
*Bucks Harbor Seafood	Bucks Harbor	43 SP	2
Thurlow's Shellfish	Bucks Harbor (Alfred Polk)	284 SS	
**Kelly's Shellfish	Columbia Falls	247 SS	1
Cutler Clam Co.	Cutler (Alice Porter for J. Eaton, N.H.)	109 SS	
Clossey, Marilyn	Dennysville	39 SS	1

*Handles some mussels **Mussels only

TABLE B-6. (continued)

Name	Address	Certificate Number	Number of Vehicles
Washington County (continued)			
Call, Robert	Harrington	276 SS	
C.D. Jedrey Clam Co.	Harrington	81 SP	1
K & F Shellfish	Harrington	272 SS	2
Marshville Clam Co.	Harrington (Chester Slicer)	226 SS	2
Fish, C.E. Co.	Jonesboro	18 SP	3
Andy's Seafood	Jonesport	42 SP	3
Gray's Shellfish (Maurice)	Jonesport	17 SP	2
**Hardin, William A.	Jonesport	278 SS	
**Jonesport Shellfish	Jonesport (Milton Beal)	133 SS	1
Keller, William F.	Jonesport	49 SS	
**O. W. & B. S. Look Co., Inc.	Jonesport	301 SS	
O. W. Look & Son	Jonesport	51 RS	3
**Montagna Corp.	Jonesport (Ralph Smith)	292 SS	
**Sawyer's Cove Seafood	Jonesport	300 SS	2
Beal, Nehemiah E.	Milbridge	126 SP	1
**Petit Manan Fisheries	Milbridge	308 SS	2
Sybil's Seafood (Cecil Hall)	Milbridge	189 SP	
Two Pals Fish Co.	Milbridge	116 SS	2
Wallaces Seafood (Lester)	Milbridge	231 SS	1
Wallace Bros. (James)	No. Lubec	124 SS	2
Pembroke Clam Co.	Pembroke	85 SS	4
Look Family Inc.	So. Addison	31 SP	
MacLean Seafood	Steuben	265 SS	1
Robinson, R.W. & Sons	Steuben	90 SP	
Stanwood, Arthur C.	Steuben	86 SP	1
Steuben Shellfish	Steuben	229 SP	
**Eastern Mussel	No. Sullivan (Philip Barter)	201 SS	1
Look, A.M. Canning Co.	Whiting-E. Machias	25 SP	2

*Handles some mussels **Mussels only

TABLE B-6. (continued)

Name	Address	Certificate Number	Number of Vehicles
York County			
Spinney Creek Oyster Co.	Eliot (Ian Walker)	271 SS	
*Port Lobster Co., Inc.	Kennebunkport	241 SS	3
Robert J. Preble & Sons	Kennebunkport	256 SS	5
*Shackford & Gooch	Kennebunkport	240 SS	
Seafood Center of Maine	Arundel	148 SS	1
*Crawford Lobster Co.	Kittery Point (Geo. Noble)	8 SS	2
*Sanford Seafood Center	Sanford	304 SS	
Nuss, David	York Beach	164 RS	1
Saltwater Farm, Inc.	York Harbor	714 RS	1

SP - Shucker-packers are shellfish dealers who shuck and pack shellfish. A shucker-packer may act as a shellstock shipper or reshipper.

SS - Shellstock shippers are shellfish dealers who grow, depuration harvest, buy and/or sell shellstock. Shellstock shippers may purchase and sell shucked shellfish obtained from a certified shellfish dealer. Shucked shellfish shall not be repacked, but must be sold in original container.

RS - Reshippers are shellfish dealers who trans-ship certified shellstock or shucked shellfish from a certified shellfish dealer to other dealers or to final consumer. Reshippers are not authorized to shuck or repack shucked shellfish, buy from harvesters, or harvest for sale and/or transport under their certification.

cleansing plants are closely monitored by DMR and the clams are all taken from known locations. This situation is a unique opportunity to compare population estimates developed from field surveys with production levels and biological sample data derived from sampling at these depuration plants.

The following sampling problems are anticipated in a future sampling program for shellfish:

1. No licensing information presently exists that directly indicates which buyers purchase their clams from diggers. This information is contained within two of the three categories listed under Maine Interstate Shellfish Certification; shell stock shippers (SS) and shucker-packers (SP). An interview or telephone survey would be required to establish this information.
2. The DMR shellfish sampling program will have no major problems at those facilities where diggers transport their own clams to the buyer. Sampling and data collection will be difficult to schedule at those locations where diggers bring their clams to a wharf by boat and then sell them directly to a trucker.
3. A problem exists in that with more than 150 buying locations along the coast, even with a maximum of ten random sampling days per month for the seven major buying months (April-October), individual towns (requesting catch, effort, and size information

for their individual management plans) might receive scanty sampling information for dealers sampled within that town.

4. Diggers may not accurately report digging locations to the samplers.

MARINE WORMS:

The locations of dealer facilities where marine worms are purchased directly from the diggers may be obtained from DMR records (Marine Worm Dealer License Applications). The supplemental buying locations of these worm dealers have been located through telephone interviews. The 1979 list of dealers and supplemental buyers is included in this report (Table B-7) along with a similar listing compiled by port agents (Table B-8).

The worm digging season generally extends from April through September. Marine worm diggers sell their catches at the dealer's packing cellars. Harvesting is conducted only at low tide and the worms are usually sold shortly after low tide (i.e., sales are conducted from one half hour to five hours after mean low water on any given day). When market demand is high and there are two low tides during the daylight hours, the packing cellars will purchase worms twice on that day although the harvest from the evening tide may be held for shipping the following morning. Sampling of the catch must be conducted rapidly since packing and shipping operations are geared for a rapid turnover of this highly perishable product.

TABLE B-7.

MARINE WORM DEALERS - 1979

Bishko, Leonard	Gouldsboro Bait	S. Gouldsboro	963-2203
Crowley, Keith		Addison	497-5498
Mathews, Merrill		Milbridge	----
DeRapps, Richard	Mid-State Bait	Hancock	422-3426 or 422-3998
Dorr, Warren	Warren Dorr, Jr. Bait	Addison	483-2361
Dorr, George		Hancock	----
Everett, Stetson	Eastern Bait	Hancock	422-6822
Fairservice, Stan	Fairservice Bait	Wiscasset	882-7758 or 882-5081
Flye, Ivan	Maine Bait	Newcastle	563-3000
Flye, Irene	Maine Bait	Hancock	667-5209
Hagan, Cliff		W. Jonesport	497-2814 or 497-2183
Hammond, Frank	Hammond Bait	Wiscasset	882-7343
Harden, William	B & J Bait	Jonesport	497-2814 or 497-2183
Lewis, Harlen		Boothbay	633-3517
Peaslee, Aubrey	L & A Bait	Boothbay	633-4604
Peaslee, Fred	S & P Bait	Wiscasset	882-6246
Peaslee, Steve		Blue Hill	374-5054
Peterson, Charles		Harrington	483-2398
Wanser, Abe		Milbridge	546-2464 or
Greeley, Oscar		Sullivan	546-7822
Wanser, Randy	Wiscasset Bait	Wiscasset	882-7473
Wright, William	Wiscasset Bait	Addison	483-2217

Digger and Shipper the Same

Lounder, John	(digs and ships own worms)	Lamoine	667-2019
Trukel, William	(digs and ships own worms, winter smelt bait only)	Newcastle	563-3593

Worm Transport Only

Alley, Maynard	worm transport only	Jonesport	497-2467
Call, Fred	worm transport only	Harrington	483-4588
Norton, Woodrow	worm transport only	Addison	483-4441
Smith, William	worm transport only	Addison	483-4441

TABLE B-7. (continued)

Tackle Shops

Adams, Gary	buys from other dealers and 1 or 2 diggers	Kittery	439-2700
Beaudreau, Charles	buys from other dealers and 1 or 2 diggers	Brunswick	729-1308
Berounsky, Frances	buys from other dealers	Eliot	439-9515
Bugler, Ian	buys from a digger	Bath	389-2222
Guy, Robert	buys from other dealers	York Beach	363-3666
Hardy, Dennis	buys from 1 digger	Wells	646-9087
Walsh, John	buys from other dealers	Kennebunkport	967-4622 or 967-3523
Wormwood, Colin	buys from other dealers	Saco	934-2051

Winter Smelt Bait Only

Eddy, James	smelt bait buys from other dealers and diggers	Dresden	----
Hyde, Jude	smelt bait buys from a digger	Topsham	725-6929
McKenney, Raymond	smelt bait buys from a digger	Bowdoinham	666-3203
Quintal, Morris	smelt bait buys from 1 digger	Randolph	582-3386
Temple, Edgar	smelt bait buys from other dealers and diggers	Bowdoinham	666-5568
Tome, John	smelt bait buys from diggers	Bowdoinham	666-5568
Wallentine, Bernard	smelt bait buys from other dealers and diggers	Bowdoinham	666-5945
Webb, Robert	smelt bait buys from 1 digger	Randolph	582-4254

TABLE B-8

Marine Worm Dealers
May 1979

Dealers known to both DMR and port agents		Dealers known to DMR but not to port agents	
Ivan Flye	-Newcastle	William Harden	-Jonesport
Aubrey Peaslee	-Boothbay	Charles Peterson	-Harrington
Harlan Lewis	-Boothbay		
Frank Hammond	-Wiscasset		
Fred Peaslee	-Wiscasset		
Stanley Fairservice	-Wiscasset		
Steve Peaslee	-Blue Hill		
Irene Flye	-Hancock (Ivan Flye Reports)		
Stetson Everett	-Hancock		
Richard DeRapps	-Hancock		
Leonard Bishko	-S. Gouldsboro		
Warren Dorr, Jr.	-Addison		
Bill Wright	-Addison		
Keith Crowley	-Addison		
Cliff Hagan	-W. Jonesport		
Abe Wanser	-Milbridge } possibility of inaccurate		
Oscar Greeley	-Sullivan } reporting by dealer		
Randy Wanser	-Wiscasset } dealer will give no information at all		

The sampling procedures, number of dealers sampled and the amount of information to be collected must be appropriate for the management research being conducted; the collection of such data is expensive because of the coastwide distribution of dealer buying locations and the irregular hours of operation.

The potential sampling problems are as follows:

1. Individual diggers may combine worms dug on two successive tides into one lot or they may sell worms for other diggers.
2. Diggers usually harvest only one species although, in the eastern portion of the state, sandworm diggers frequently take bloodworms.
3. Dealers frequently mix lots of worms before packing and biological data should be obtained by sampling digger's catches rather than worms packed for shipping.
4. Diggers usually do not give accurate interview information concerning the areas that were dug.
5. Diggers tend to arrive at the cellars in groups and it is usually impractical to sample all of them; a random sampling or selected sampling fraction should be used.
6. Lengths and weights of worms cannot be directly compared since they are passive osmoregulators and their size is determined by the water salinity in the area where they are dug. Salinities are variable from area to area and day to day and

worms should be acclimated to a standardized salinity before they are measured.

7. Worms should be anesthetized before measuring their lengths.
8. The sampler must routinely check the total number of worms dug and reported with the total for which the digger was paid. On occasion, the two totals do not agree because of culling, miscounts or other sources of error.
9. It is not possible to count the numbers of cull worms rejected by the digger. In most cases, the information obtained on culls are the diggers' estimates.

LOBSTERS:

DMR's present commercial lobster sampling program was started in 1966. At that time every lobster dealer on the coast of Maine was located and interviewed to provide the information necessary to establish a sampling program for the collection of catch, effort, and size data. The resulting list of dealers (who consistently purchase lobsters from five or more boats) has been continually updated since that time. DMR's most recent list of lobster dealers and a comparable list compiled by port agents are presented in Table B-9.

Port agents collect landings data from the dealer weighout or sales slips. This system is fairly efficient but a number of dealers are not visited by the port agents. There appears to be no reasonably efficient method for obtaining data on the recreational lobster catch.

TABLE B-9.

LOBSTER DEALERS, June 1979

Dealers sampled by both DMR and by port agents	Dealers sampled by DMR but not by port agents	Dealers sampled by port agents but not by DMR
Bernard Zahn Bremen	Bristol Lobster Company Boothbay Harbor	Gilmore's Seafood Mkt. Bath (buys from other dealers)
Lusty Lobster Bremen	Ward and Sons Inc. South Harpswell	
Mid-Coast Lobster	Bibber Lobster Company South Harpswell	Great Eastern Lobster & Fish Cundys Harbor (buys from other dealers)
Muscongus Bay Lobster Round Pond	Harbor Fish Market Portland	
New Harbor Co-op New Harbor	Best Packed Seafood Portland	William Wood Cushing
Small Brothers New Harbor	Whitewater Co-op Portland	
Farrin South Bristol	Fathoms East Seafood Portland	Francis Morris Port Clyde
Marshall Macfarland South Bristol	John Olson Cushing	
Co-op South Bristol	Seacoast Lobster Tenants Harbor	Owls Head Lobster Co. Owls Head (buys from other dealers)
Mill Cove Lobster Boothbay Harbor	Bay State Lobster Spruce Head	
Robinson's Wharf Boothbay Harbor	Jordan's Market Rockland	
Boothbay Region Fish & Cold Storage Boothbay Harbor	City Boat Landing Belfast	
Boothbay Region Fishermen's Co-op Boothbay Harbor	Eddie Ausplin Matinicus	Bi-Right Lobster Belfast

TABLE B-9. (continued)

Dealers sampled by both DMR and by port agents	Dealer sampled by DMR but not by port agents	Dealers sampled by port agents but not by DMR
Thibodeau's Seafoods Five Islands	Basil Heanssler Deer Isle	Young's Lobster Belfast (buys from less than 5 boats)
Sebasco Wharf Phippsburg	Irving Lunt Frenchboro, Long Island	
Robert York Westpoint	Bryant Lobster Pound Steuben	Lorenzo Creamer (buys from other dealers)
Seaside Lobster & Fish Company Phippsburg	M & M Lobster Pound Milbridge	
Small Point Lobster Pound, Inc. Small Point	Woodard and Beal Beals Island	MacGregor's Lobster Pound Gouldsboro (buys from less than 5 boats)
Henry Allen South Harpswell	Bachman Lobster Pound Beals Island	
Interstate Lobster South Harpswell	Elmer Beal Beals Island	Black Duck Lobster (family affair)
Days Crab Shop Yarmouth	Wallace Brothers Fish & Produce Lubec	
Peter Darling Brunswick	R.E. Morrison Kittery	Barney's Cove Lobster Beals
Sid Watson Brunswick	Fred Gagne Biddeford Pool	
Webber and Sons, Inc. Brunswick	Lusty Lobster Company Portland	Walter Calder Eastport
Bob Wattle Brunswick		
Glen Johnson Brunswick		Maine Crabmeat Portland (buys from other dealers)
Charles Cook Brunswick		

TABLE B-9. (continued)

Dealers sampled by both DMR and by port agents	Dealers sampled by DMR but not by port agents	Dealers sampled by port agents but not by DMR
Win Reed Friendship		Cape Shore Variety Cape Elizabeth (buys from less than 5 boats)
Robert's Lobster Friendship		Finast Kind Lobster Cape Neddick
Wallace's Shellfish Friendship		Preble Fish Company Cape Porpoise
Simmons Lobster Company Friendship		
Youngs Lobster Cushing		Noonan's Lobster Hut Cape Porpoise (buys from less than 5 boats)
Port Clyde Co-op Port Clyde		
Gary Davis Port Clyde		
Art's Lobster Tenants Harbor		
Atwood Brothers St. George		
Spruce Head Co-op Spruce Head		
Wm. Atwood Spruce Head		
P.K. Reed Owls Head		
C.L. Bickford Vinalhaven		
Buddy Colson (Bennett) Vinalhaven		

TABLE B-9. (continued)

Dealers sampled by both DMR and by port agents	Dealers sampled by DMR but not by port agents	Dealers sampled by port agents but not by DMR
Vinalhaven Co-op Vinalhaven		
James Brown North Haven		
Gene Eaton Deer Isle		
Curtis Heanssler Deer Isle		
Wm. Fifield Stonington		
Stonington Co-op 1-2 Stonington		
Colwell Brothers Stonington		
Duryea Lobster Company Stonington		
Damon's Lobster Bernard		
Thurston Company Bernard		
C.H. Rich Bass Harbor		
Swans Island Co-op Swans Island		
Atwood Lobster Co. (Kents Wharf) Swans Island		
R.D. Lunt Southwest Harbor		

TABLE B-9. (continued)

Dealers sampled by both DMR and by port agents	Dealers sampled by DMR but not by port agents	Dealers sampled by port agents but not by DMR
R.H. Beal & Son Southwest Harbor		
Cranberry Isle Co-op Islesford		
Tidal Falls Lobster Hancock		
Sorrento Lobster & Fish Co. (Creamers) Sorrento		
Gouldsboro Enterprises (Bishko) Gouldsboro		
Winter Harbor Co-op Winter Harbor		
Lee Chipman Bunker Harbor		
Eddie Ausplin (Prospect Harbor Lobster Co,) Prospect Harbor		
Corea Co-op Corea		
Arnie Francis Corea		
Jasper Wyman Milbridge		
Willard Kelley Milbridge		
Arnie Francis Milbridge		

TABLE B-9. (continued)

Dealers sampled by both DMR and by port agents	Dealers sampled by DMR but not by port agents	Dealers sampled by port agents but not by DMR
Smith & West Lobster Co.		
Milbridge		
Ocean Look		
South Addison		
Jean Smith		
Jonesport		
Jonesport Co-op		
Jonesport		
O.W. Look		
Jonesport		
Bert Look		
Jonesport		
Urguhart Lobster Co.		
Bucks Harbor		
Bucks Harbor Co-op		
Bucks Harbor		
Neil Corbett		
Cutler		
Anthony Look		
Cutler		
New Meadows Lobster		
Portland		
Coastal Fisheries		
Portland		
Bayley's Pine Point Lobster Co,		
Old Orchard		
David Thurlow		
Old Orchard		

TABLE B-9. (continued)

Dealers sampled by both DMR and by port agents	Dealers sampled by DMR but not by port agents	Dealers sampled by port agents but not by DMR
Pine Point Fisherman's Co-op Old Orchard		
Crawford Lobster Company Kittery		
Chauncey Creek Lobster Kittery Point		
Cape Neddick Lobster Pound Cape Neddick		
Saltwater Farms York Harbor		
V & A Lobster Company York Harbor		
Shackford & Gooch Kennebunkport		
Port Lobster Company Kennebunkport		
Cape Porpoise Co-op Cape Porpoise		
Eaton's Lobster Cape Porpoise		
Harry Emmons Cape Porpoise		
Mike Supper Cape Porpoise		
George Norwood Camp Ellis		

ALEWIVES:

During 1979, alewife landings were collected from the dedicated (local or town managed) runs listed by town in Table B-10). All existing and potential alewife runs listed by county and town for the State of Maine are available in DMR files. With some local variations, the fishery generally begins around the last week in April and extends through May into the second week of June.

Individual towns are responsible for the management of dedicated runs by whatever means they choose. Some towns place the runs up for bids. Others allow any town resident to obtain a given quantity of fish from the run. Some towns hire a manager to oversee the fishery.

HERRING:

A complete listing of canning, smoking, and filleting plants where herring are landed and processed in Maine are presented in Table B-11. An adequate sampling program is in operation at this time and the collection of data in this fishery need not be addressed at this time.

REDFISH:

Commercial redfish landings are reported primarily from two processing facilities:

Maine Fisheries Corporation	F.J. O'Hara and Sons
P.O. Box 1300	Tilson Avenue
Portland, Maine 04101	Rockland, Maine 04841
774-2674	594-4444

Based upon the 1977-1978 redfish landings it appears as though

TABLE B-10

Dedicated Alewife Runs - 1979

Alna
- Sheepscot River

Arrowsic
- Sewell Pond Outlet

Bath, W. Bath, Phippsburg
- Winnegance R. (Bath, W. Bath, Phippsburg)
- Center Pd (Phippsburg)
- New Meadows R. (W. Bath)
- Whiskeag Stream (Bath)

Bristol
- Pemaquid River

Cherryfield
- Narraguagus River

Columbia Falls
- Pleasant River

E. Machias
- E. Machias River

Franklin
- Card Mill Stream (Donnell Pd)

Gouldsboro
- Prospect Hbr. Stream
- W. Bay Stream
- Jones Stream

Jefferson
- Dyer R.

Kennebunk
- Kennebunk River

Mt. Desert
- Lone Pd.

Newcastle, Nobleboro
- Damariscotta (Newcastle, Nobleboro)
- Sherman Lake (Newcastle)

Orland
- Orland River

Pembroke
- Pennamaquan River

Penobscot
- Winslow Stream (Wight Pd)

Perry
- Boyden Stream

Steuben
- Tunk Stream

Sullivan
- Flanders Stream

Surry
- Patten Pond Stream

Tremont
- Seal Cove Brook

South Berwick
- Great Works River

Waldoboro
- Medomak River

Warren
- St. George River

Woolwich
- Nequasset Brook

Table B-11 Canning, Smoking, Filleting Plants for Herring

Portland
Kasbay - Lippman (herring fillet)

S. Portland
Pine State By-Products (fish meal from waste or soured fish including trash fish)

Yarmouth
Royal River - Zwecker (herring fillet)

Boothbay Harbor
North Atlantic Fisheries (small herring fillet, packed groundfish, tuna)
Boothbay Harbor Freezer (frozen groundfish, frozen herring-bait)

Bath
Bath Canning - Stinson (sardines and herring fillets)

Rockland
Holmes Pkg. (sardines)
North Lubec Canning - Lawrence Family (sardines)
Port Clyde Pkg. (sardines)
Stinson (herring and groundfish fillet)
Seapro Inc. (fish meal from sardine waste and soured fish)

Belfast
Belfast Canning - Stinson (sardines)

Stonington
Port Clyde Pkg. (sardines)

Southwest Harbor
Stinson (sardines)

Prospect Harbor
Stinson (sardines)

Milbridge
L. Ray (sardines)
Jasper Wyman (owned by Hollis Wyman) (sardines)

Machiasport
Machiasport Canning (owned by L. Ray) (sardines)

Lubec

Booth Fisheries (sardines)
R. J. Peacock (sardines)
USA Fish (herring fillets)
Arthur McCurdy Fish (smoked herring)

Eastport

Holmes - Mose Pike (sardines)
Mearl - Dave Turner - (fish meal and pearl essence)
(scales used for luminescence in buttons and jewelry)

redfish landings are more or less stable throughout the year except for a slight decrease during winter.

PERIWINKLES:

This fishery is mentioned here because it is so badly underestimated. The names and locations of people and facilities dealing with periwinkles may be obtained from the list of DMR licensed wholesale seafood dealers and processors. This list is inlcuded in Table B-12 along with collection sites visited by port agents.

OTHER COMMERCIALLY IMPORTANT SPECIES:

Although some additional information regarding where, when and how the landings of scallops, sea urchins, shrimp, squid, bluebacks, shad, and eels has been collected, this information is presently very incomplete.

TABLE B-12.

PERIWINKLE DEALERS

Locations where port agents collect landings information

Coles Express
Rt. 1
Baring, Maine
454-2566
(transports periwinkles for the following dealers):

1. George Mallock (major shipper)
   177 Water Street
   Eastport, Maine

2. Sherman Kelley (major shipper)
   Lubec, Maine
   733-2017

Mill Cove Lobster Pound
Boothbay Harbor, Me. 04538
633-3340

Other known periwinkle landings sites

Atlantic Fisheries Co.
Ltd.
One Canal Plaza
Portland, Maine 04112
773-0757

Clark's Cove Fish Co.
Farrin's Wharf
Main Street
So. Bristol, Me. 04568
644-8200

Agnes K. Taylor & family
Backshoe Road
Beals, Maine 04611
497-2083

Maine Sea Products
RFD #2
Lubec, Maine 04652
733-4671

Intertidal Harvesters
Main Street
Jonesport, Maine 04649
497-5757

Sawyer Cove Seafoods
RFD #1
Campground Road
Jonesport, Me. 04649

Mr. Sheldon Ashby
Pembroke Clam Company
Pembroke, Maine
726-4260

Mr. O.L. Carver
Carver Seafood
Beals, Maine
497-5477

TABLE B-12. (continued)

Locations where port agents collect landings information	Other known periwinkle landings sites
	Mr. Rick Cove Cove's Seafood Jonesport, Maine
	Mr. Gordon Kelley Lubec, Maine
	Penny Beals Jonesport, Maine
	Andy's Seafood Jonesport-Beals, Maine (major shipper)
	Mr. Ralph Smith Jonesport-Beals, Maine
	Mr. Douglas Hardy Deer Isle, Maine
	Mr. Dennis Look Addison, Maine
	Winthrop Bailey D/B/A Wimpy & Sons Trucking Pension Ridge Road Boothbay, Maine 04537 633-3700 (transports periwinkles for the following 2 Jonesport dealers): 1. BO-C Products Jonesport, Me. 04649 497-2111 or 2119 2. William Keller Box 274 Jonesport, Me. 04649 497-2098

Element B-6. DETERMINE INDUSTRY SECTORS WHERE LANDINGS DO NOT REFLECT CATCHES:

The establishment of the fisheries data base requires the evaluation of the relationship between catches and landings for the species taken by the fisheries. Economic factors operate continuously to change the patterns of discarding and this evaluation is an ongoing task. Fish that have little or no market value may be discarded at sea or sold as bait or for reduction into fishmeal or pet food. In most cases, the fish discarded at sea are not identified or recorded and the portion of catches sold for bait or reduction are not identified by species and weight. Discards of some species (e.g., small silver hake, shrimp, flat fishes) have been significant at times and thus the landings have not been proportional to the mortality rates associated with fishing activities. Discards or sales of fish for reduction may comprise a major portion of the harvest of some species and should be documented.

A sea sampling program to collect catch data aboard commercial and recreational fishing vessels was started in the spring of 1979. The Department of Marine Resources employed two sea samplers through the Massachusetts Audubon Society intern program. The DMR sea sampling program concentrated on sampling aboard day trip vessels involved in the demersal fisheries during the first eight months. Available data for catches, effort and discards from these vessels are particularly inadequate for the Gulf of Maine fisheries. This fishery was also

selected for sampling because of the opportunity for comparing data with the information from the bottom trawl survey (Element A).

Data were recorded on a standard form (Figure B-11) adapted from the NOAA sampling program format (Figure B-12). Information from these trip sheets was then coded and stored using the DMR computer terminal linked to the University of Maine's computer at Orono. Catches were estimated by volume or weight for the major species and fish were sampled for the recording of biological data for age and growth studies. Length-frequency data were recorded on aluminum punch strips mounted on a measuring board. Discards and/or fish for bait or reduction were recorded by weight or volume and were also sampled. Data on gear, fishing areas, depths and time fished were recorded.

In the day trip fishery the fishermen may not know how many pounds of each market species he took until he is paid by the buyer. Thus, in most cases, it is not possible to check estimated catches with the reported landed weights on the day the catch is landed. This will entail some problems in the finalized sea sampling program since it will often be necessary to contact the fisherman two or more days after the trip for verification of the landed weights of the catch. Verification of the hail estimates will eventually be completed by the port agents when this expanded program is operational. In all sample trips the captain's estimate has been used for recording the catch of the major species. In one instance, verification of the hail upon landing was possible and

VESSEL NAME		GEAR				MESH SIZE	
TRIP NO.	SAILED DATE	TIME	LANDED DATE	TIME	PORT		
TOWS	DATE	TIME	DATE	TIME	DATE	TIME	DATE TIME
DEPTH IN FATHOMS							
POSITION	FROM TO		FROM TO		FROM TO		FROM TO
TOTAL TIME OF SET	HRS.	MIN.	HRS.	MIN.	HRS.	MIN.	HRS. MIN.
MARKET FISH							
	TOTAL HAIL / TOW						
DISCARDS							
	TOTAL DISCARD						
COMMENTS							

Figure B-11. DMR Sea Sampling Trip Record Sheet

VESSEL NAME | GEAR | MESH SIZE (STRETCH)

TRIP NO. | SAILED-DATE/TIME | LANDED-DATE/TIME

WATCH	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
POSITION WHILE FISHING								
DEPTH FISHED IN FATHOMS								
NUMBER OF TOWS PER WATCH								
TOTAL TIME NET ON BOTTOM	HRS.	MIN.	HRS.	MIN.	HRS.	MIN.	HRS.	MIN.
BREAKDOWN BY SPECIES — MARKET FISH — HADDOCK — LARGE (LBS.)								
BREAKDOWN BY SPECIES — MARKET FISH — HADDOCK — SCROD (LBS.)								
BREAKDOWN BY SPECIES — MARKET FISH — YELLOWTAIL (LBS.)								
BREAKDOWN BY SPECIES — MARKET FISH — OTHERS (LBS.)								
TOTAL HAUL PER TOW								
BREAKDOWN BY SPECIES — ESTIMATED DISCARDS — HADDOCK (BU.)								
BREAKDOWN BY SPECIES — ESTIMATED DISCARDS — YELLOWTAIL (BU.)								
BREAKDOWN BY SPECIES — ESTIMATED DISCARDS — OTHERS (BU.)								
TOTAL DISCARD								

COMMENTS

Figure B-12. NMFS Sea Sampling Trip Record Sheet

the captain's estimates for the hail were very accurate.

The sea sampling program collected data on demersal fishing by Maine vessels at 62 locations along the coast (Table B-13). These vessels sailed from ports between York Harbor and Stonington and fished a variety of fishing grounds within 50 miles of the coast (Figure B-13). Otter trawls (46 tows) were the most commonly sampled gear followed by gill nets (12 overnight sets) and party boats (4 trips). All of these stations were fished by day trip vessels except stations 25 through 34 which were fished by one vessel on a single five day trip.

The sea sample data have not been analyzed. Catches for some species in the demersal fisheries are enormously variable within gear categories, this is partially due to directed fishing for specific species by some vessels. Length measurements of representative samples from the catches and discards were recorded at sea (Table B-14). These data will be used to develop estimates of the age distributions of the species taken in the commercial catches. The analysis of data collected from different vessels (e.g., gillnetters vs. otter trawls) will be quite complex because of the differences in the types of fishing efforts. The length-frequency data must also be evaluated to correct for gear selectivity. The collection and computer storage of data from this program will be continued but the analyses of these data will be postponed until additional data have been collected.

TABLE B-13. STATION DATA FOR 1979 SEA SAMPLING PROGRAM

Station #	Gear Type	Station Position Latitude	Station Position Longitude	Mean Depth (feet)	Station #	Gear Type	Station Position Latitude	Station Position Longitude	Mean Depth (feet)
1	Otter Trawl	43°52'	70°14'	276	17	Otter Trawl	43°26'	70°17'	180
2	Otter Trawl	43°25'	70°12'	300	18	Otter Trawl	43°19'	70°15'	312
3	Gill Net	43°19'	70°14'	240	19	Otter Trawl	43°53'	68°44'	292
4	Gill Net	43°20'	70°13'	270	20	Otter Trawl	43°45'	69°05'	276
5	Gill Net	43°18'	70°17'	288	21	Otter Trawl	43°48'	69°07'	246
6	Gill Net	43°20'	70°15'	270	22	Otter Trawl	43°44'	69°45'	90
7	Otter Trawl	43°38'	69°27'	252	23	Otter Trawl	43°48'	69°24'	90
8	Otter Trawl	43°45'	69°21'	288	24	Otter Trawl	43°48'	69°24'	90
9	Otter Trawl	43°48'	69°25'	228	25	Otter Trawl	43°19'	69°10'	510
10	Otter Trawl	43°48'	69°24'	252	26	Otter Trawl	43°20'	69°13'	528
11	Otter Trawl	43°48'	69°22'	260	27	Otter Trawl	43°21'	69°14'	528
12	Otter Trawl	43°48'	69°20'	252	28	Otter Trawl	43°16'	69°09'	576
13	Gill Net	43°40'	68°43'	360	29	Otter Trawl	43°12'	68°60'	534
14	Gill Net	43°40'	68°43'	360	30	Otter Trawl	43°17'	68°56'	506
15	Gill Net	43°40'	68°43'	360	31	Otter Trawl	43°01'	68°57'	516
16	Otter Trawl	43°26'	70°17'	204	32	Otter Trawl	43°13'	68°53'	528

Table B-13 (continued)

Station #	Gear Type	Station Position Latitude	Longitude	Mean Depth (feet)	Station #	Gear Type	Station Positon Latitude	Longitude	Mean Depth (feet)
33	Otter Trawl	43°12'	69°01'	510	60	Otter Trawl	43°51'	69°17'	180
34	Otter Trawl	43°11'	68°51'	582	61	Otter Trawl	43°51'	69°17'	189
35	Otter Trawl	43°24'	69°04'	456	62	Otter Trawl	43°51'	69°17'	165
36	Otter Trawl	43°29'	68°59'	432	63	Otter Trawl	43°45'	69°42'	90
37	Otter Trawl	43°43'	69°02'	471	64	Otter Trawl	43°45'	69°42'	90
50	Otter Trawl[a]	43°31'	69°33'	420	65	Otter Trawl	43°45'	69°42'	90
51	Otter Trawl[a]	43°48'	69°26'	420	66	Party Boat	43°33'	70°07'	105
52	Otter Trawl[a]	43°49'	69°42'	180	67	Gill Net	43°09'	70°01'	270
53	Otter Trawl[a]	43°49'	69°42'	180	68	Gill Net	43°08'	70°00'	252
54	Otter Trawl	43°46'	69°41'	200	69	Party Boat	43°55'	68°55'	225
55	Otter Trawl	43°31'	69°33'	480	70	Party Boat	43°05'	70°33'	135
56	Otter Trawl	43°23'	69°37'	480	71	Party Boat	43°06'	70°33'	98
57	Otter Trawl	43°31'	69°35'	420	72	Gill Net	43°10'	70°02'	192
58	Otter Trawl	43°46'	69°23'	240	73	Gill Net	43°08'	70°04'	180
59	Otter Trawl	43°47'	69°22'	240	74	Gill Net	43°10'	70°01'	180

a) Vessel rigged with a shrimp net

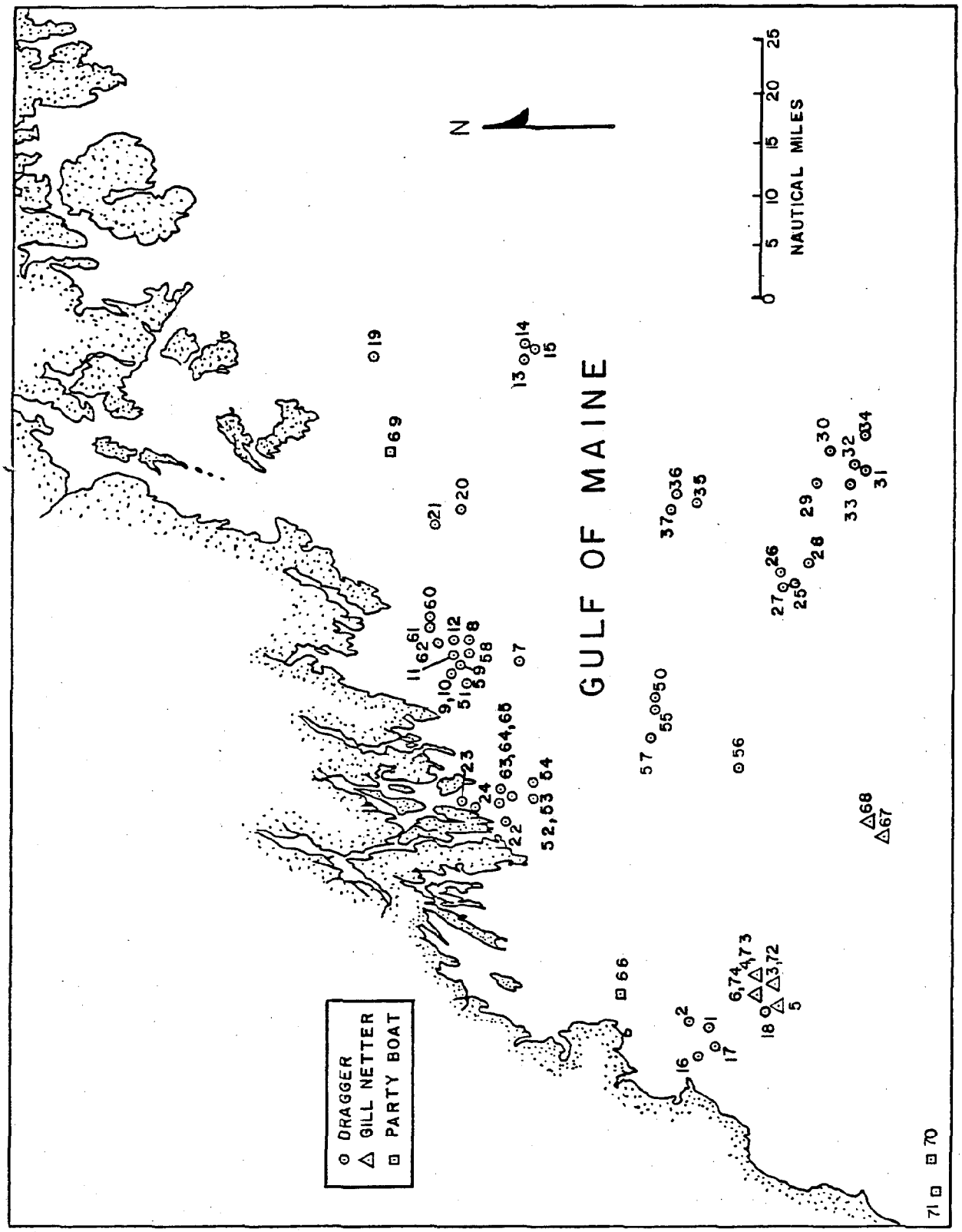


Figure B-13. Sea Sampling Stations - 1979

TABLE B-14

NUMBER OF LENGTH MEASUREMENTS TAKEN BY THE SEA SAMPLING PROGRAM: STATIONS 1-74.

Species	Dragger	Number of Stations	Gill Netter	Number of Stations	Party Boat	Number of Stations
Cod	244	11	28	2	43	4
Haddock	104	8		1		1
Pollock			106	4		
American plaice	647	13	78	4		
White Hake	2	1			6	1
Red Hake	8	3			15	1
Shad	1	1	18	1		
Goosefish	31	5				
Sea Raven	23	5				
Ocean Pout	5	2				
L.H. Sculpin	34	5				
Thorny Skate	16	5				
Silver Hake	17	2	51	4	6	1
Sea Herring			9	2		
Redfish	1	1	2	1	5	2
Winter Flounder	317	7				
Witch Flounder	197	7				
Halibut	1	1				
Wolfish	1	1				
Yellowtail Flounder	122	4				
Sand Flounder	7	1				
Little Skate	1	1				
Big Skate	1	1				
Lumpfish	3	1				
Mackerel			57	2	5	3
Cusk			18	1		

ELEMENT C: A CHARACTERIZATION OF THE MARINE RECREATIONAL FISHERIES OF MAINE

by

C.J. Walton

Element C: CHARACTERIZATION OF THE RECREATIONAL FISHERIES

I. INTRODUCTION:

The marine recreational fisheries of Maine have not been perceived by fishery managers to be of major economic significance in comparison with the commercial fisheries. This orientation has been sustained by the paucity of data on these fisheries and the lack of a clearly defined public sector associated with the recreational fisheries (the participants are not licensed and the associated support industries cannot be readily identified). There are no statutory responsibilities for oversight of these recreational fisheries vested in any state agency. One important need for the management of the recreational fisheries is a definitive statement of policy at the state level.

The Fisheries Conservation and Management Act of 1976 (FCMA) requires that recreational fishing be considered in the computation of optimum yields and that allowable catches be divided between commercial and recreational fisheries. These provisions will ultimately result in the development of recreational fishery management policies at both the state and federal levels of government. State management policy will probably encompass a number of species and fisheries that are not managed by the FCMA and it is reasonable and prudent for the state to plan for the management of all marine, anadromous and estuarine species which support a recreational fishery.

There are 63 marine species associated with recreational fisheries

in Maine (Table C-1). There are directed fisheries of some significance involving 26 of these species. Some of these are mixed species fisheries such as the mackerel-harbor pollock fishery and the groundfishery for cod, pollock, cusk, haddock, and hakes. There are inadequate data on catch, effort and stock abundance for most species in the Maine fisheries.

The majority of these fisheries have no significant effect on the abundance of the resources and management to control fishing mortality is not necessary at this time. Atlantic salmon, brook trout, brown trout and shad require management because they occur in relatively small populations. Striped bass, cod and bluefin tuna may also require management because of excessive fishing mortality.

The initial phase of management, after the formulation of a state management policy, will be limited to the collection of descriptive statistics for at least the more important fisheries. One objective of this characterization will be the identification of current and potential problem areas as a guide to selecting fisheries for future management research. This planning document is not intended as a catalogue of our lack of knowledge of these fisheries but as a first attempt to define the data needed for future management decisions.

II. ECONOMIC PROFILES:

There are four major user groups in the Maine recreational fisheries: party boat fisheries; charter boat fisheries; private boat fisheries and the shore based fishery. These arbitrary groupings are based on fishing

TABLE C-1 SPECIES INVOLVED IN MAINE RECREATIONAL FISHERIES

Species	Fishery
Blue shark, *Prionace glauca*	Directed
Spiny dogfish, *Squalus acanthiaus*	Incidental
Barn-door skate, *Raja laevis*	Incidental
Big skate, *Raja ocellata*	Incidental
Little skate, *Raja erinacea*	Incidental
Thorny skate, *Raja radiata*	Incidental
Porbeagle shark, *Lamna nasus*	Directed
Alewife, *Alosa pseudoharengus*	Directed bait & non-consumptive
Blueback herring, *Alosa aestivalis*	Directed bait & non-consumptive
Shad, *Alosa sapidissima*	Directed
Menhaden, *Brevoortia tyrannus*	Directed bait
Brown trout, *Salmo trutta*	Directed
Brook trout, *Salvelinus fontinalis*	Directed
Salmon, *Salmo salar*	Directed
Smelt, *Osmerus mordax*	Directed
Eel, *Anguilla rostrata*	Directed and bait
Common mummichog, *Fundulus heteroclitus*	Directed bait
Coho salmon, *Oncorhynchus kisutch*	Directed
Silver hake, *Merluccius bilinearis*	Incidental (?)
Cod, *Gadus morhua*	Directed
Tomcod, *Microgadus tomcod*	Directed
Haddock, *Melanogrammus aeglefinus*	Directed
Pollock, *Pollachius virens*	Directed
White hake, *Urophycis tenuis*	Incidental (?)
Squirrel (Red) hake, *Urophycis chuss*	Incidental (?)
Cusk, *Brosme brosme*	Incidental (?)
Spotted hake, *Urophycis regius*	Incidental
Blue hake, *Antimora rostrata*	Incidental
Halibut, *Hippoglossus hippoglossus*	Directed
Summer flounder, *Paralichthys dentatus*	Directed (?)
Winter flounder, *Pseudopleuronectes americanus*	Directed
Mackerel, *Scomber scombrus*	Directed & bait
Tuna, *Thunnus thynnus*	Directed
Bluefish, *Pomatomus saltatrix*	Directed
Striped bass, *Morone saxatilis*	Directed
White perch, *Morone americana*	Directed
Grubby, *Myoxocephalus aeneus*	Incidental
Longhorn sculpin, *Myoxocephalus octodecemspinosus*	Incidental
Sea raven, *Hemitripterus americanus*	Incidental
Cunner, *Tautogolabrus adspersus*	Directed
Sand launce, *Ammodytes americanus*	Directed bait

TABLE C-1 (continued)

Species	Fishery
Wolffish, *Anarhlichas lupus*	Incidental
Ocean pout, *Macrozoarces americanus*	Incidental
Goosefish, *Lophius americanus*	Incidental
Invertebrates	
Lobster, *Homarus americanus*	Directed
Jonah crab, *Cancer borealis*	Incidental (?)
Rock crab, *Cancer irroratus*	Incidental (?)
Horseshoe crab, *Limulus polyphemus*	Directed bait
Blue mussel, *Mytilus edulis*	Directed
Soft-shell clam, *Mya arenaria*	Directed and bait
Hen clam, *Spisula solidissima*	Directed and bait
Moon snail, *Polinices heros*	Directed
Periwinkle, *Littorina littorina*	Directed
Green crab, *Carcinides meanas*	Directed bait
Sandworms, *Nereis virens*	Directed bait
Bloodworms, *Glycera dibranchiata*	Directed bait
White worm, *Nephtys bucera*	Directed bait
Ocean quahogs, *Arctica islandica*	Directed (?)
Scallops, *Placopecten magellanicus*	Directed
Sand shrimp, *Crangon septimspinosus*	Directed bait
Sea urchins, *Strongylocentrotus droebachiensis*	Directed
Short-finned squid, *Illex illecebrosus*	Directed and bait
Long-finned squid, *Loligo pealei*	Directed and bait

activities and do not define a specific group of anglers since an individual may participate in more than one of these fisheries.

PARTY BOAT FISHERY

This fishery is conducted from boats which sail with a relatively fixed schedule and carry anglers at a fixed rate. Vessels usually carry more than six fishermen and operate from May through October. There are a number of surveys which have estimated the number of party boats operating in Maine and they are in agreement only when one summary cites another. The best estimate of the number of party boats, derived from available data, is 39 vessels with an average capacity of 37 fishermen. Total direct employment in the Maine party boat industry (estimated from data in Nicholson and Ruais, 1979) is 91 crew members with estimated annual total wages of approximately $390,000. Summarization of available data suggests that the average fee for a party boat trip in Maine is now about $15.50 and these party boats average 82 day trips/year with an estimated mean of 28 fishermen per trip for a total annual direct expenditure of approximately $1.4 million. These estimates do no include related costs such as travel, parking fees, landed value of the catch, etc. McConnell and Nicholson (1978) estimated annual revenues for party boats at $36,000 for those carrying 41 to 70 fishermen and $23,000 for those carrying 40 or fewer passengers. Application of these estimates to the Maine party boat fleet yields an estimated annual revenue of $1.1 million. These data are subjective but

the party boat fleet in Maine probably has gross annual revenues of between 1.1 and 1.4 million dollars.

Centaur Management Consultants (1977) estimated multiplier impacts of the charter and party boat fishery in New England. The best estimate of the economic impact of the Maine party boat fishery derived from these data are shown in Table C-2. The economic value of the Maine party boat fishery is approximately 2.48 million dollars in 1979 excluding the landed value of the catch and induced multiplier effects.

Table C-2. Economic Impacts of the Maine Party Boat Fishery

Sales:	$1,250,000
Value Added:	$ 750,000
Wages, Salaries:	$ 390,000
Employment (person years):	$ 50
Annual Capital Expenditures:	$ 87,000
Total:	2,477,000

CHARTER BOAT FISHERY

Maine charter boats typically carry fewer than six passengers and tend to seek gamefish such as tuna, shark, bluefish and striped bass. Available data suggest that there are approximately 26 operating charter boats in Maine (Centaur, 1977). All surveys examined have seriously underestimated the number of charter boats operating in Maine waters

since those listed have a scheduled sailing routine, a public docking area and a Coast Guard license. The majority of the small boats operating as charter vessels do not have Coast Guard licenses and operate on an irregular schedule. There are probably 150 charter fishing boats operating along the coast at this time. These are mostly private vessels operated on weekends or by reservation and fishing for bluefish, striped bass or groundfish. A considerable number of lobster boats also conduct tuna and mackerel trips when the opportunity arises.

New England charter boats reportedly fish an average of 70 days/year and carry about five passengers per trip (Centaur, 1977). These estimates are probably too high for Maine charter boats and a more appropriate estimate would be 55 days/year with a 3.5 passenger average. Fishermen pay at a higher rate in the charter boat fishery, and for the 26 licensed vessels, costs probably average $65/man for day trips.

The available data on the Maine charter boat fishery are inaccurate but the fishery probably provides part-time employment for at least 150 individuals during the year. Subjective estimates of gross revenue and economic impacts are presented in Table C-3 (computed from data by Centaur, 1977). Collection of data on the charter boat fishery is difficult because a large portion of the vessels are unlicensed, make unscheduled trips, and produce unreported income.

Table C-3. Estimated Economic Impact of the Maine Charter Boat Fishery

Sales:	$ 900,000
Value Added:	$ 540,000
Wages and Salaries:	$ 260,000
Employment:	$ 150 (total)
Annual Capital Expenditures:	$ 62,500
Total:	$1,762,500

PRIVATE BOAT FISHERY

Bromberg (1973) estimated that there were 15,084 private recreational boats that fished in salt water in Maine that year. The Coast Guard (U.S.C.G., Annual Boating Statistics) estimated that there were 50,552 private recreational boats in Maine during 1953 and this had increased to 110,790 by 1977. Bromberg (ibid) reported that the Coast Guard data were probably underestimates. These data suggest that the private boat recreational fishery in Maine coastal waters could involve as many as 33,000 boats in 1977. Bromberg (ibid) estimated that these boats tended to fish in bays and rivers about as much as they fished in the open ocean.

The major target species for Maine recreational boaters are bluefish and mackerel in the open ocean and bluefish, mackerel and striped bass in bays and rivers. Bromberg's data indicates that 86% of these boats were less than 26 feet in length and therefore the majority

of the fishery probably takes place within the state's territorial waters. The fishery operates from May through October and is distributed coastwide with heaviest activity near population centers.

The economic impact of the private recreational boat fishery is difficult to assess but some estimates may be derived from the available data. Bromberg's (ibid) data indicate that 6.9% of the private recreational fishing boats in the northeast operate in Maine waters. Centaur Management Consultants (1977) estimated the economic impacts of marine recreational fishing in the northeast and those items associated with the recreational boat fishery may be reduced by 93.1% to yield estimates of the economic value for Maine presented in Table C-4. These estimates are based on data from 1975 and do not include landed value of the catch, data on the lobster boat fishery or expenditures for travel, food and lodgings.

Table C-4. Estimated Economic Impact of the Maine Private Boat Fishery

Sales:	$16,700,000
Value Added:	$ 4,882,000
Wages and Salaries:	$ 2,334,000
Employment:	$ 296
Annual Capital Expenditures:	$ 240,000
Total:	$24,156,000

Data on the private boat fishery in Maine are inadequate. The social and economic impacts of management cannot be assessed for this sector of the fisheries. Available data suggest a fishery of great economic importance to this state and additional information on the privately-owned and rental boat fisheries is necessary before management restrictions are employed.

SHORE FISHERIES

The shore based fisheries of Maine provide recreation for a greater number of people than all of the boat fisheries combined. Fishing occurs throughout most of the year and participation usually peaks during the summer months. Information on these fisheries is totally inadequate and virtually all estimates of the number of participants are far too low. The difficulties in assessing these fisheries are obvious: the fishermen are scattered along more than 3000 miles of shoreline, they are opportunisitic and mobile and may fish at any hour of the day or night.

There are no data suitable for estimation of the numbers of shore based anglers fishing in Maine. The Department of Marine Resources is currently working with NMFS and a private consulting firm on an intercept survey of the recreational fisheries. The results of this work will be useful in the evaluation of the shore based fisheries but the errors about the estimates will be fairly high because of the small number of samples. The shore fisheries probably have three to five times more

participants than the boat fisheries although individual expenditures for goods and seines are much lower. The economic impact of the shore based fisheries in Maine is probably equal to that of the combined boat fisheries; something on the order of $28,000,000 each year.

III. SOCIAL PROFILE:

A sociological profile of marine recreational fishermen in Maine cannot be outlined at this time since there are no adequate data. There is an obvious tendency for the boat fisheries to be prosecuted by the more affluent whereas the shore fishermen tend to have lower average incomes. The angler tends to participate in a fishery by choice and is not entirely constrained by income; therefore, the affluent may be observed fishing from shore and the unemployed might fish from a boat purchased on credit.

Inflationary trends have blurred the distinctions between recreational and commercial fishing within the past decade. Rod-caught bluefin tuna, taken in a fishery traditionally perceived as a sport for the affluent, are routinely sold to defray expenses. Sale of fish taken in the recreational fisheries has become socially acceptable in recent years although it had been considered unsportsmanlike for generations.

Recreational fishing is a significant component of the Maine tourist industry and provides employment for a number of middle and lower income families. Most of the individuals operating charter and party boats have other jobs and consider employment in the seasonal

recreational fisheries as a refreshing change. Employment in the summer charter boat fishery appears to be especially attractive to school teachers.

The majority of the resident marine sport fishermen live within 25 miles of the coast and come from all social and economic strata. There are no unique social or demographic characteristics exhibited by saltwater sport fishermen aside from the observation that they usually live within an hour's drive of a coastal fishing area.

IV. PROBLEM AREAS:

SHORE FISHERIES

A major problem of the shore based recreational fisheries of Maine is access to the shoreline. At least 96% of Maine's coastline is privately owned and, for the most part, closed to the public. Increasingly stringent federal safety regulations have resulted in the closure of many commercial docks, wharves and piers and has increased the usage of public access areas.

Coastal state parks are closed to a significant segment of the fishing public, those participating in the striped bass and bluefish fisheries conducted at night, on the peculiar assumption that legitimate public access should only occur during daylight hours. An increasing number of shore fishermen have switched to small boats because of these access problems but the increasing costs of boat ownership and operation have limited this trend.

BOAT FISHERIES

The decline in the striped bass stocks has resulted in a sharp reduction in the number of small boats (<26 ft) operating in coastal waters. This, in turn, has reduced marina business and a number of marginal operations have gone out of business. This has, in turn, reduced the availability of fuel and services along the coast; for example, the lower Kennebec River had five full-time marinas offering fuel and supplies during 1974; there is only one part-time fuel dock operating today. The interactive effects of one fishery on another are not well known but this is obviously a case in which the collapse of a resource has adversely affected several other fisheries.

GENERAL PROBLEMS

Some species harvested by the recreational fisheries are declining or are at low levels of abundance; these include: striped bass, bluefin tuna, cod, Atlantic salmon, brown trout and brook trout. The recent declines in abundance of striped bass and bluefin tuna have had an obvious impact in the sport fishery, this may also be the case for cod and the party boat industry although this is not clear because several other species are involved.

Licensing of marine recreational fishermen will probably be implemented within the next decade. Licensing has been proposed as a reasonable method of enumerating recreational fishermen although a

significant proportion of the anglers in some fisheries (e.g., juveniles in the pollock-mackerel fishery) would not be licensed. Marine recreational fishermen are, in general, opposed to licensing (Stroud, 1978). Implementation of a license or permit system would adversely affect the charter and party boat industry, especially with respect to non-resident tourists, and therefore, this segment of the marine fishing industry is opposed to recreational licensing. Licensing is not, at the moment, considered to be a serious problem although it could become a hotly debated political issue in the future.

V. DESCRIPTION OF THE FISHERIES

ANADROMOUS SPECIES:

Atlantic Salmon; *Salmo salar*

This species supports an intensive recreational fishery in a number of rivers in Maine. Catch and effort (salmon permits) data are collected and compiled by the Atlantic Sea Run Salmon Commission and management authority for this species is vested in this Commission. Research, management and regulation of this species is more complete than for any other anadromous species.

The Atlantic salmon fishery is primarily limited to rivers but there is a small directed estuarine fishery for black salmon in the spring. Directed fishing for Atlantic salmon requires a permit and is, therefore, regulated. Occasional salmon are caught by fishermen seeking

other species although this harvest is probably not significant. This species is vulnerable to coastal and estuarine weirs and gill nets although future commercial-recreational fishery conflicts may not be a significant problem since this salmon is managed solely as a recreational species. Spawning run access problems associated with commercial alewife fisheries are usually resolved through the Department of Marine Resources.

The taking of salmon is limited to fly fishing only and this tends to limit participation in the fishery. The catch in 1978 was 821 fish, the largest harvest since 1958. Current estimated economic value for a salmon is $500 and therefore, the value of the catch was $410,000. Estimates of economic value for salmon, and the annual harvest for the past two decades, suggest that the salmon enhancement program has an unacceptable benefit-cost ratio. Economic value is only one of the social, economic and political factors that must be evaluated in the management process for this fishery.

Striped Bass; *Morone saxatilis*

The most rapidly changing of the major recreational fisheries. This species spawns in the Chesapeake Bay area and migrates into Maine coastal waters. The fishery is conducted coastwide from May through October with June, July and August as the peak months. The fihsery developed rapidly during 1958-1974 and sustained a relatively large number of participants. In York and Cumberland counties, a considerable

support industry (bait and tackle shops, marinas, guides and charter boats) developed during the 1960's.

Catch per unit effort was relatively high and this attracted a considerable number of non-resident anglers, especially from Massachusetts, New Jersey and Pennsylvania. This had a considerable effect on motels, campgrounds, and the local tourist industry in a number of areas. Between 1963 and 1972 striped bass fishing derbies and tournaments proliferated and, at the peak of this activity, anglers could participate in one or more of these events every weekend through the most active months of the fishery.

A succession of poor year classes started about 1967 and these effects were apparent in the fishery by 1971. Collapse of these migrant stocks started with the very poor year classes after 1969 and recruitment failure became apparent in the Maine fishery by 1974. The only available data on catch and effort estimates during this period came from Otto's (1971) survey of the shore based fishery from Kennebunk to Port Clyde. This survey did not sample the extensive boat fishery in this area and overlooked a number of favored shore fishing locations. The study provided estimates of effort for a portion of the recreational fishery on the order of 176,000 angler hours in 1969 and 114,000 angler hours in 1970. The estimated harvests during those years were 23,500 and 6,500 fish, respectively. In view of the limitations of this survey it is reasonable to assume that the actual effort levels were about twice

the estimated quantities for the area covered.

The traditional fishery has been heaviest from Penobscot Bay to Kittery and has concentrated on rivers and estuaries. Casco Bay is not heavily fished from shore but there is a small boat fishery of unknown magnitude. East of Penobscot Bay striped bass fishing is associated with centers of population rather than corresponding to the distribution of the fish. During the 1960's an estimated 80% of the active striped bass fishermen in the state were residents. The fishery has declined dramatically since the mid-60's and data from the two surviving striped bass fishing clubs have indicated that the number of active resident striped bass fishermen in the area from Kittery to the Kennebec River has declined to 10% of the 1965-66 level. This species is also harvested by skindivers and is considered a desirable trophy; spearfishing activity is heaviest from Kittery to Cape Elizabeth, moderate in the Casco Bay-Kennebec River area, and fairly light east of the Kennebec.

The major problems of this resource are overfishing, pesticide contamination, and the destruction of tide marsh nursery areas. These factors are primarily operating outside the New England area and management by the state can only address the overfishing issue. There are no catch, effort or abundance data for this species. There is no ban on commercial fishing for this species in Maine, but landings are seldom reported. Fish sold in Maine are usually marketed in Boston or New York. Because of the markedly reduced catch and effort in Maine,

no immediate effort restrictions can be justified for biological reasons although they may be implemented as a part of the cooperative state-federal management program.

Smelt; *Osmerus mordax*

The smelt supports an extensive recreational fishery with a longer season that any other species. The major fisheries are the winter (December through mid-March) ice fishery and the spring dipnet fishery. Some directed hook and line fishing occurs throughout the open water season but it is not significant in comparison with the two major fisheries. Smelt are year round coastal residents of Maine and the fishery is sustained by local spawning populations.

Some catch-effort data are available for the winter ice fishery (Flagg, 1972) and data for the winter of 1968-69 provided estimates of 36,570 man days of fishing and a catch of 200,700 lbs. of smelt. No data are available on catch and effort in the spring dipnet fishery, although the landings are probably equal to the winter harvest.

The fishery is relatively stable and the resource is in general not overharvested. Landings data are inaccurate and the fisheries for smelt typify the modern marine recreational fishery in which there are no universal distinctions between recreational and commercial harvesting. Sport fishermen frequently sell their surplus catch through local, and unreported, outlets. Many sport anglers utilize rented smelt camps during the winter ice fishery and defray the expenses be selling all or

part of the catch.

There are no major problems with this resource and its management at this time. This is one of the few fisheries in which there is no immediate potential for a major commercial-recreational fishery conflict. This situation could change rapidly if abundance declines.

Current regulations are inadequate for short-term management. Data oc catch and effort are inadequate (except for the mid-coastal winter fishery); data on stock abundance (except for Kennebec watershed) are also inadequate. Existing management policies appear to be adequate so long as the abundance of this species remains at current levels.

Shad; *Alosa sapidissima*

Angling for shad in Maine is primarily limited to stream fishing for them during the spring (May-June) spawning run. The Narraguagus River supports a modest (approximately 200 fish/year) fishery. Runs in the Nonesuch, Kennebunk, Eastern, Cathance, Sheepscot, East Machias, Dennys and some tributaries of the St. Croix are small and directed sport fishing for shad is almost non-existent.

The fishery will probably expand slowly, if at all, in the next decade because of the small size of the spawning stocks. Major problems of the fishery include: a lack of suitable spawning area in Maine rivers and streams (partly due to lack of fishways that will pass shad); commercial harvesting of shad in the spring river fisheries for alewives; and an expanding coastal industrial fishery.

Management of shad resources is shared by the Department of Marine Resources and the Department of Inland Fisheries and Wildlife. Programs include fishway construction, surveys to determine distribution of spawning stocks, some work on management of shad spawning runs in streams that have commercial alewife fisheries and some stocking work for spawning run restoration.

Data on recreational catches are available for at least one stock (Narraguagus) but no information is available on effort, commercial harvests or stock abundance. Restoration and management of this species is a long-term process. This is not a major recreational fishery.

Coho Salmon; *Oncorhynchus kisutch*

This species has been introduced in New Hampshire and the only directed fishery for coho salmon is in the Kittery area where a number of fishermen troll in Great Bay and tidal areas of the Piscataqua River. The fishery has created some market for specialized tackle and lures in the Kittery area and a reasonable estimate of resident fishermen who prosecute a directed coho salmon fishery would be about 100. Few non-resident anglers appear to participate in a directed Maine fishery for coho. The fish have been taken as incidental catches, usually by mackerel fishermen, as far east as Penobscot Bay. The coho is frequently confused with Atlantic salmon by fishermen and some inevitable misapprehensions about regulations and permits for Atlantic salmon appear to plague the coho sport fishery. Many fishermen who take coho do not

have an Atlantic salmon permit and therefore, are hesitant about reporting or discussing their catches. No data on landings or effort estimates are available.

The coho salmon has a great potential for introduction in Maine and could sustain an inshore and estuarine fishery of considerable economic and social importance. Traditional preferences for Atlantic salmon and the magnitude of the investment in time and funds for Atlantic salmon restoration suggest that the introduction of coho salmon in Maine is probably politically unacceptable within the next decade.

White Perch; *Morone americana*

This anadromous species is widely distributed in rivers and estuaries along the Maine coast. It supports a significant recreational fishery in fresh water but there is little directed fishing for them in tidal waters. White perch spawning stocks in Maine coastal waters are scattered and tend to fluctuate from year to year. Probably fewer than 100 anglers regularly fish for this species. No data are available on catch, effort or stock abundance.

Brook Trout; *Salvelinus fontinalis*

This freshwater species is widely distributed along the Maine coast because a portion of the population in many streams tends to overwinter in saltwater. Some of these sea-run fish remain in tidal water and provide a modest sport fishery.

Some larger rivers have large sea-run trout populations that can

sustain heavy fishing pressure. In small coastal streams sea-run brook trout populations are small and slow to recover from heavy fishing. The fish tend to remain close to the streams and the fishermen are secretive and very reluctant to discuss the fishery. The fishery is primarily confined to the spring months although some fish are taken through the summer and early fall.

There are no data on these fisheries and only a few of the streams that support a fishery have been indentified. There are probably fewer than 200 active sea-run brook trout fishermen in the state and the majority of them are residents.

The abundance of sea-run trout may be influenced by upstream stocking by the Department of Inland Fisheries and Wildlife since stocked fish frequently move downstream. The fishery will probably remain stable within the next decade and no significant changes are expected. Management of these stocks is not needed at this time since the existing state freshwater regulations provide some protection against overharvesting.

Brown Trout; *Salmo trutta*

The fishery for sea-run brown trout is much smaller than that for brook trout since this species is not as common in coastal streams. Fishermen are, for the most part, those who participate in the sea-run brook trout and Atlantic salmon fisheries. There are a number of areas that have positively been identified as supporting sea-run brown trout

fisheries although there are no data on catch or effort.

As in the sea-run brook trout fishery there are no data on catch, effort or abundance of the fish. Watershed stocking of this species probably increases the numbers of sea-run fish in the estuaries. Sea-run brook and brown trout fisheries are probably far more extensive than anticipated although they are not of major social and economic importance. No management of sea-run brown trout fisheries is necessary at this time although stocking to maintain fisheries in some selected coastal streams is justifiable.

Alewife; *Alosa pseudoharengus*

Blueback Herring; *A. aestivalis*

Both species are taken during their spring spawning run, and the subsequent return to salt water, for bait in the striped bass recreational fishery. This spring (May, June) recreational fishery is primarily centered west of Penobscot Bay and usually harvests stocks not utilized in commercial fisheries. The fishery is usually small and there are probably fewer than 200 participants annually and they catch an estimated 200 bushels of alewives and bluebacks each year. The striped bass fishery has declined and, as a result, fewer than 50 fishermen participate in this harvest at present.

These species also support a nonconsumptive recreational activity since the spring spawning runs are a popular phenomenon for "fish watching" by individuals and school groups. A few anglers fish for

these species, usually with fly fishing gear, each spring but this is a very small fishery, probably less than 30 people statewide. A larger fishery is prosecuted by juveniles who snag the fish for sport and this activity probably involves several hundred individuals each spring. These two species are managed by the Department of Marine Resources as a commercial fishery resource and no recreational controls are necessary.

CATADROMOUS SPECIES:

American Eel; *Anguilla rostrata*

The eel fisheries of Maine are primarily commercial although recreational fisheries involving spearing, hook and line and trapping do occur. A portion of the commercial fisheries take eels as bait for the striped bass and bluefish recreational fisheries. The spring elver fishery has some recreational aspects although it is considered as a commercial fishery since the entire catch is sold.

A number of resident and non-resident fishermen operated eel pots in tidal rivers and estuaries to take eels for bait and for home consumption. This practice is widespread although most of the eels harvested east of Penobscot Bay are entirely for home consumption. Eel trapping for striped bass bait occurs in almost every coastal river from Kittery to Rockland. A number of coastal freshwater ponds are also trapped for this purpose. There is a modest local market (Kittery to Rockland) for live trapped eels that are sold to sport fishermen

through local bait and tackle shops. These markets are associated with population centers near the York, Saco, New Meadows and Kennebec Rivers. There is a modest hook and line fishery prosecuted in many coastal rivers of the state. Winter eel spearing, once a popular pasttime, is almost non-existent today. No data are available on catch, effort or the number of participants in the recreational eel fisheries. Regulation of the recreational fishery is not necessary at this time.

INSHORE SPECIES:

Common Mackerel; *Scomber scombrus*

Chub Mackerel; *Pneumatophorus colias*

The common mackerel and the chub mackerel are practically identical and both occur in the recreational fishery catch along the Maine coast. Chub mackerel comprise a small proportion of the catch from Kittery to Casco Bay and are seldom taken east of Boothbay Harbor. The mackerel fishery is conducted from June through early October although effort declines markedly in early September.

Mackerel fishing is conducted coastwide via a large array of small boats. A few charter and party boats conduct mackerel fishing trips and a number of commercial fishing vessels, especially lobster boats, derive income from unscheduled mackerel fishing trips. There are no data on these vessels, especially those conducting unscheduled trips, and the operators are seldom Coast Guard licensed to carry passengers for hire.

The largest fishery is shore based and almost every accessible wharf, float and pier along the entire coast is used for mackerel fishing through July and August. The majority of these anglers are juveniles and a considerable portion are non-residents. The economic impact of the fishery as a tourist attraction is significant in coastal communities and even drug stores and restaurants sell mackerel fishing tackle.

There are no current data on catch, effort or economic impacts of this fishery in Maine. Duel (1977) estimated from a questionnaire study, that the Maine recreational catch of mackerel in 1974 was approximately 591,000 pounds although the standard error of this estimate was quite large. Baird and Dow (1966) reported that mackerel comprised 12.3% of the species enumerated in creel censuses of Maine marine recreational anglers between 1960 and 1964. The shore based recreational fishery for mackerel also takes harbor pollock and thus the estimation of effort and the assessment of economic impact attributable solely to mackerel cannot be made. This species is managed by the Mid-Atlantic Regional Fisheries Council under the FCMA and better data on the recreational fishery will be required to assess the impact of regional management on the Maine fisheries for mackerel.

Winter Flounder; *Pseudopleuronectes americanus*

The winter (or blackback) flounder fishery in Maine is a widespread seasonal activity dominated by resident fishermen. The bulk of the

fishery is prosecuted by an inshore small boat fishery conducted during the summer months. This species is a year-round inshore resident along the coast although the sport fishery is limited to warm weather months. Bridge and pier fishing for flounder is also widespread.

This is primarily a directed fishery since terminal tackle and methods used for flounder do not take many other species except for a few harbor pollock and sculpins. This is a bait fishery and clams, mussels and marine worms are usually collected by the anglers or purchased locally. This fishery accounts for a considerable portion of the small boat rental business conducted at some ports.

Baird and Dow (1966) estimated that winter flounder accounted for 8% of the total creel census catch from 1960 through 1964. Intercept surveys are likely to underestimate the magnitude of this fishery since much of it is conducted by a small boat fishery of privately owned vessels with no defined landing sites.

There are no current available data on catch or effort for this fishery. Duel (1977) estimated that the recreational catch of winter flounder in Maine for 1974 was in excess of 400,000 pounds.

There are no records of party or charter boats that participate in a directed fishery for flounders although some of the smaller day charter vessels (less than six passengers) may occasionally engage in the fishery. This species is also harvested commercially by the groundfish fleet. There appears to be little potential for recreational-

commercial conflicts in resource utilization of this species. There are no adequate data on recreational catch or effort for this species.

Tomcod; *Microgadus tomcod*

This inshore gadoid, often known locally as frostfish, supports a modest inshore fishery. They can be taken year round in estuaries and bays and feed readily on bits of clam, mussel or marine worm. The fishery is primarily hook and line and is prosecuted all along the Maine coast. Some tomcod are taken in the smelt fishery, especially in the fall, but there is a directed fishery for them, especially in late fall and early spring. This directed fishery appears to be limited to residents and is usually most active at seasons when marine recreational fishing is minimal. Fishing is entirely for home consumption and few, if any, of these fish are sold.

Most coastal areas have a few dedicated local tomcod fishermen for each stream or inlet in the area and the fishery is not publicized. There are no data on catch or effort for this fishery and the stocks appear to be adequate to sustain this level of fishing pressure indefinitely. There are no available data on abundance but, autumn spawning concentrations have been observed by DMR personnel in the Royal and Sheepscot Rivers and are preseumed to occur in other coastal estuaries. This is an inshore species of little current commercial interest in Maine and will not be a priority species for management under the FCMA.

DEMERSAL SPECIES:

Pollock; *Pollachius virens*

There are two distinct pollock fisheries in Maine. The major one is a mixed fishery for harbor pollock and mackerel that is prosecuted from shore or small boats. Larger pollock are taken by party, charter and private boats fishing off shore.

The fishery runs from late May through October although peak fishing activity occurs from June through August. Baird and Dow (1966) reported that pollock ranked third in cumulative abundance in creel censuses conducted annually between 1960 and 1964 and comprised 18.6% of all marine fish species in the survey. Adult pollock are found throughout the Gulf of Maine although the juveniles concentrate in the inshore waters from Cape Cod to the Bay of Fundy and the Maine coast appears to have the only significant fishery for juveniles. Two year old pollock comprise the bulk of the inshore catch. A few larger pollock are taken in May in the inshore fishery. The majority of the fish are taken in bays and harbors by anglers fishing from piers.

Data on the pollock fisheries are sparse and must be treated with caution. Duel (1973) reported that the 1970 recreational harvest of pollock in the North Atlantic area was 5,584,000 pounds and indicated that 62% of the catch was taken in inshore waters. These data exclude catch by persons under 12 years of age and those who spent less than $7.50 on fishing in the survey year, thus eliminating a significant portion of the participants in the Maine shore-based juvenile fishery.

Adult pollock are a major component of the catch in the party and charter boat fishery. Duel (1977) estimated the recreational catch at 208,000 pounds in 1974.

No current data are available on catch or effort in this fishery. This species will be managed under the FCMA and data on the recreational fishery will be needed to assess the impact of regional management.

Cod; *Gadus morhua*

Cod are the primary species sought by the Maine party boat fishery and are also harvested by a segment of the charter boat fleet. Bromberg (1973) estimated that Maine had 10,056 private recreational fishing boats that fished in the open ocean during the preceding year. This estimate suggests that a large number of privately owned vessels fish for demersal species in Maine waters although there are no estimates of the effort directed towards cod. The fishery is conducted along the entire coast and extends from April through early October.

Cod are available inshore during the spring and fall and tend to move offshore and into deeper water in the summer months. The fishery is primarily boat oriented although there is a small shore fishery along the beaches from York to Cape Elizabeth in the early spring and fall. Nicholson and Ruais (1979) reported that the estimated Gulf of Maine charter boat cod catch in 1978 was 1,277,500 pounds. Cod are managed under the FCMA and data on the recreational fishery will be needed to evaluate the effects of regional management on Maine's

recreational fisheries. The best available estimates of recreational harvests suggest that 25% of the total cod landings are taken by recreational fishermen. DMR's cod tagging work during 1978-79 demonstrated a 26% tag return from sport fishermen.

Haddock; *Melanogrammus aeglefinus*

The recreational fishery for this species is essentially described for cod. There is little directed shore fishing activity for haddock and catches in Maine are negligible. Nicholson and Ruais (1979) reported that the estimated charter boat catch of haddock for the 1978 Gulf of Maine fishery was 109,980 pounds. Total estimated catch for party boats was 501,020 pounds. No recent data on the Maine private boat fisheries for haddock are available although this fishery was expanding rapidly in the late 60's.

The haddock fishery in Maine waters extends from April through November although heaviest activity occurs from June through September and the largest catches are taken in August and September. The fishery is almost entirely boat oriented and is largely a mixed fishery since haddock are taken along with cod and pollock. A portion of the haddock taken by anglers in the private boat fishery are sold locally because of the relatively high prices paid for this species.

Haddock are managed under the FCMA and data on the Maine recreational fishery should be collected since the only significant recreational fishery for haddock occurs is the Gulf of Maine.

Silver Hake; *Merluccius bilinearis*

This species is abundant in Maine waters during the summer months and is the object of a commercial fishery from July through October. Silver hake exhibit a seasonal spring and fall migration pattern and these movements are especially obvious along the southern Maine coast.

The silver hake is taken in the commercial demersal fisheries but is not a major recreational target species, and there is little directed fishing for hake by Maine charter and party boats. The magnitude of the recreational catch is unknown. This species supports a major recreational fishery in mid-Atlantic waters.

White Hake; *Urophycis tenuis*

Red Hake; *U. chuss*

These two hakes are taken in the recreational boat fishery although they are poor fighters. The red hake is commonly taken from Kittery to Boothbay Harbor and the white hake is taken along the entire coast. There are no directed fisheries for these species and they are a small, but consistent, portion of the recreational demersal fish catch. There are no data on the recreational catch of hakes in Maine and the fishery will probably remain relatively static unless the abundance of the more desirable species such as cod and haddock declines markedly. Red hake provide an extensive recreational fishery off Long Island and New Jersey in the spring and therefore have the potential for a recreational fishery in Maine.

Halibut; *Hippoglossus hippoglossus*

Halibut are an incidental catch in the party and charter boat fishery but also support a directed private boat fishery in Maine. This is a scarce, though very desirable, groundfish species which appears to be increasing in abundance. The directed fishery starts in May and extends well into the fall. The preferred fishing grounds are the deeper inshore gravel and sand bottom areas.

Baird and Dow (1966) reported that halibut comprised about 5% of the catch in creel censuses between 1960 and 1964. A considerable portion of the larger halibut taken in the fishery are sold although the smaller specimens are taken for home consumption. There are no data on catch or effort in the recreational fisheries and regulation of these fisheries is not necessary at this time.

OTHER DEMERSAL SPECIES:

Incidental catches of cusk *(Brosme brosme)*; wolffish *(Anarhichas lupus)*; ocean pout *(Macrozoarces americanus)*; dogfish *(Squalus acanthias)* and anglers *(Lophius americanus)* are taken in the recreational demersal fisheries. These are not major species and there are no data on catches for the Maine fisheries.

PELAGIC SPECIES:

Bluefin Tuna; *Thunnus thynnus*

Bluefin tuna are a desirable species and support a sizable big game

fishery in Maine. The fishery extends from June through September although July and August are the peak months. There are three basic types of fishing in Maine coastal waters: the harpoon fishery, prosecuted by charter and private boats; a handline fishery prosecuted by a few charter boats, private boats and lobstermen; and the rod and reel fishery conducted by charter and private boats. All three fisheries are directed at adult bluefin tuna. Tuna tournaments are important economic attractions in some Maine coastal towns such as Bailey Island and Boothbay Harbor, although participation is declining because of the decrease in catch in recent years. There is, during some years, a small rod and reel fishery for school bluefins in the York county area. This fishery is usually active near Boon Island and the Isles of Shoals and harvests small numbers of three to five year olds. There are no current data on this fishery and no young tuna have been harvested in this area in recent years.

Data on catches of bluefin tuna are collected by NMFS through a permit and catch reporting system. This is a relatively new program and a number of anglers who fish for tuna probably do not have a permit. Data on catch, effort and stock abundance are adequate for management at this time.

Bluefish; *Pomatomus saltatrix*

The bluefish sport fishery in Maine has expanded tremendously since 1972 and is probably one of the more important coastal recreational

fisheries at this time. The abundance of bluefish in Maine is quite variable from year to year and population peaks are usually associated with the presence of menhaden *(Brevoortia tyrannus)* along the coast. The fishery is most active from late June through September each year and is usually confined to coastal waters west of Penobscot Bay.

There is a large private boat fishery for bluefish that extends from Kennebunkport to Boothbay Harbor. The surf fishery is distributed from Rockland to Kittery. Bluefish have, in part, compensated for the collapse of the striped bass fishery in Maine and lures and tackle for bluefishing are a major retail business for tackle shops and sporting goods stores in western Maine. There is a pronounced distributional relationship between bluefish and mackerel; marked increases in the abundance of bluefish in inshore areas are invariably associated with a decline in mackerel catches. The inshore bluefish and mackerel fisheries frequently exhibit alternating cycles. There are no data on catch and effort for this fishery. Management regulations for this species are not necessary at this time.

Blue Shark; *Prionace glauca*

Porbeagle Shark; *Lamna nasus*

The recreational shark fishery in Maine has expanded markedly in recent years and is prosecuted by charter and private boats. Blue sharks and porbeagles are commonly taken by charter boats when bluefin tuna are not available and there is a growing directed fishery for

sharks. The bulk of the fishery is conducted with rod and reel although some sharks are taken by harpoon from party boats. Catches are frequently sold through local markets although prices paid to the fishermen are comparatively low. Some landings are for home consumption. There are no data on catch and effort in the fishery. No regulatory measures are needed at this time.

MISCELLANEOUS FISHERIES:

Cunner; *Tautogolabrus adspersus*

Shore fishery concentrated in rocky areas and off jetties and piers. A small fishery, usually limited to juveniles and of little economic significance. Cunner fishing appears to be a tourist attraction in the more popular resort areas.

Dogfish; *Squalus acanthias*

The dogfish is usually considered a pest by party boat and shore fishermen. There is a small directed sport fishery for dogfish in western Maine but it is of little economic importance.

Swordfish; *Xiphias gladius*

No directed fishery although specimens are occasionally harpooned by charter boats and private vessels.

Skates; Family Rajidae

Skates are an incidental catch in the shore fisheries and are usually considered a nuisance. Some directed fishing for them occurs

in York and Cumberland counties. No data available on catches.

Mummichog; *Fundulus heteroclitus*

This species is used as a sport fishing bait and is seined and trapped in tidal waters all along the coast. Heaviest fishing occurs in the fall when they are collected for bait for freshwater ice fishing. There are approximately 65 commercial bait dealers in the state who seine mummichogs and a large number of sport fishermen seine their own bait. No data are available on the number of participants in this fishery although a minimal estimate would be about 1000 people statewide. No information on abundance of the species or harvest rates although competition in the fall fishery is severe and many tide marsh areas are "fished out" by early November.

The number of bait dealers in the state appears to be declining slowly and management of this fishery is probably not necessary.

Atlantic Sturgeon; *Acipenser oxyrhynchus*

Shortnose Sturgeon; *A. brevirostrum*

Sturgeon are occasionally taken in the striped bass fishery in the Kennebec and Sheepscot estuaries. There is no significant directed fishery for sturgeon in Maine. Some data on catch and abundance for the Kennebec River are available. The shortnose sturgeon is an endangered species and the taking of them should be regulated by Maine laws. Atlantic sturgeon do not appear to be overfished at this time.

INVERTEBRATES:

Softshell Clams; *Mya arenaria*

Recreational digging of softshell clams occurs along the entire coast and is usually confined to those areas open to commercial digging. The majority of the harvest is used for home consumption although some are used for bait and a portion of the recreational harvest is sold commercially. The majority of recreational diggers are limited by local regulations, or their ability to dig, to harvesting less than one bushel per day. Selling of recreational catches is illegal unless the digger is appropriately licensed, but these fishermen are opportunistic and any harvest in excess of their immediate personal needs could be readily sold.

There are no adequate catch or effort data in this fishery. Hurst (personal communication) estimates that the recreational clam harvest is approximately 10% of the reported landings. This estimate may be conservative; a survey of Brunswick, Yarmouth and Falmouth, towns which sell recreational clam permits, indicated that 632 (72.6%) of the 870 clam permits issued in 1979 were for recreational digging. Some coastal communities have adequate records on recreational and commercial digging permits although these data have not been collected and summarized.

Data are available on the distribution of the resource and there are some estimates of abundance for surveyed harvesting areas. Maine clams exhibit a variety of growth rates and there are no recent adequate

data on growth, yield, or ecological relationships which could be used for management. Major problems of the recreational clam fishery are pollution, paralytic shellfish poisoning and public access to harvesting areas.

Blue Mussel; *Mytilus edulis*

The recreational harvesting of blue mussels is a small fishery with a larger proportion of non-resident participants than the clam fishery. No data are available on catch effort or the number of participants. A large number of seasonal residents who own or rent coastal property where mussels are found gather mussels for home consumption at least twice during their stay. E. Mitchell (personal communication) has indicated that recreational harvesting of mussels by seasonal residents has been increasing during the past five years. The major potential problem in management of the recreational fishery for mussels is the danger of paralytic shellfish poisoning (PSP). DMR's PSP monitoring program has been successful in protecting public health in this fishery although the recreational harvesting of mussels is increasing and the monitoring program may have to be expanded. The recreational fishery is not adversely affecting abundance and restrictions on this fishery is not necessary at this time. Most of the mussels eaten in Maine are taken by the recreational fishery and commercial harvesting for sale within the state is relatively insignificant.

Scallop; *Placopecten magellanicus*

The recreational scallop fishery in Maine is primarily limited to skin and SCUBA divers. The open season extends from November 1 to April 15. Recreational harvesters are unlicensed and have a daily limit of two bushels of whole scallops or four quarts of meats. There is a small boat fishery which employs scallop drags. Water temperature and weather conditions limit fishing effort and most of the scallops are harvested in November, December and April.

The recreational fishery is distributed from Casco Bay to Mt. Desert Island with a few divers in the Kittery area and some harvesting east of Schoodic Point. Casco Bay does not have large populations of scallops although fishery effort is relatively high because of its proximity to Portland. There are no data on catch or effort in this recreational fishery. The best subjective estimate of the fishery would be approximately 200 divers with an annual harvest of two to four quarts of scallop meats per diver per year. Regulation of the recreational scallop fishery for management purposes is not warranted at this time.

Lobster; *Homarus americanus*

This fishery is currently limited to the taking of lobsters by conventional lobster traps. All lobster harvesting requires a license but no distinctions are made between recreational and commercial fishing. This is a fishery in which commercial and recreational

harvesting cannot be separated because many of the recreational harvesters sell their catch.

Thomas (unpublished data) estimated that 27.7% of the lobster license applicants in 1979 fished fewer than 100 traps. This suggests that roughly 2,327 lobstermen in Maine fished fewer than 100 traps in 1979. There are no data to indicate how many of these lobstermen were primarily motivated by the recreational aspects of the fishery. Assuming that all lobstermen who fish primarily for home consumption have fewer than 100 traps, the data on commercial catch of lobsters by fishermen having fewer than 100 traps suggest that approximately 20% of the total number of licensed lobstermen do not regularly sell their catch through dealers. Some of these lobstermen may sell a part of their catch to neighbors or friends but fishermen who trap lobsters primarily for home consumption may hold up to 20% of the licenses issued in 1979 (approximately 1700 fishermen). Inferences about the recreational lobster fishery may be drawn from data collected by the DMR lobster research program but these are probably inadequate for appropriate regulation of the recreational fishery.

Bloodworms; *Glycera dibranchiata*

Sandworms; *Nereis virens*

These species are commercially harvested from Portland to the Canadian border and are sold as a sportfishing bait along the Atlantic and Pacific coasts. The commercial harvest of bloodworms in Maine

decreased by more than 50% between 1975 and 1978, reflecting, in large measure, a decline in demand due to the collapse of the Atlantic coast striped bass stocks (Walton, 1978, unpublished data). Sandworms are used as bait for a number of species and the harvest has not declined dramatically during the same period. There has also been a decline in abundance of bloodworms in the southern part of the state, especially in the Sheepscot estuary. There is little information on the retail sales of these species to sportfishermen in Maine. Creaser (personal communication) has identified 11 retail dealers who sell marine worms to sport fishermen and party boats in Maine; this list is incomplete and there are a number of retailers that are not listed.

Sport fishermen frequently dig their own bait and no license is necessary for possession of up to 125 worms. This is probably a modest fishery and many anglers, especially in the smelt fishery, purchase worms from local dealers. There are no data on recreational fishery consumption of these species in Maine. It is not necessary to regulate harvesting of worms by sport fishermen since this sue of the resource has no significant effect on commercial abundance.

A fishery for "white worms," *Nephtys bucera* exists in the Scarboro-Wells area and harvests the worms for striped bass fishing. This fishery is unique to Maine and has declined with the decline of the striped bass population although there were as many as a hundred active diggers during the early 60's. No regulation to prevent overfishing is necessary at

this time.

Surf Clams; *Spisula solidissima*

This is a modest fishery that extends from Boothbay Harbor to Kittery with the greatest level of activity between Scarboro and Kittery. Harvesting is conducted by raking, picking the beach after storms and by harvesting them from surf lines in cold weather. The harvest is entirely for home consumption and has little effect on the stocks. There are probably less than 200 participants in the fishery each year and regulation is not necessary.

Long-Finned Squid; *Loligo pealei*

Short-Finned Squid; *Illex illecebrosus*

Both species occur in Maine coastal waters and are harvested by a small sport fishery. Primary uses are for home consumption and bait. Most squid sold as bait in Maine are purchased from commercial fishermen. The fishery operates from June through September and attracts fewer than 50 fishermen although it is increasing. Catches are small and no regulation of the fishery is desirable or necessary.

OTHER INVERTEBRATES:

The recreational harvesting of other invertebrate species is opportunistic and probably insignificant. Species involved include: Sea urchins, *Strongylocentrotus droebachiensis*; moon snails, *Polinices heros*; periwinkles, *Littorina littorea*; lugworms, *Arencola marina*; rock

crab, *Cancer irroratus* and Jonah crab, *Cancer borealis*

VI. CONCLUSIONS:

Public sector demand for recreational fisheries research and management programs will increase during the next decade. The state should allocate funds and manpower, through the Department of Marine Resources, for the preliminary evaluation of some of the marine recreational fisheries of Maine. Priority for these evaluations should be given to species which will be managed under the FCMA (i.e., cod, pollock, mackerel and haddock); species which may be managed jointly with other states (i.e., striped bass, lobster) and those with small or declining populations (i.e., Atlantic salmon, shad, sea-run trouts).

There is no adequate data base, at present, for assessing the recreational fisheries for most marine species with the exception of Atlantic salmon and some smelt populations. There are, as a consequence, no means for the evaluation of management plans, strategies and regulations for these species. Marine recreational fishermen participate in a diverse array of fisheries and the collection of data is an expensive and labor intensive task. This is probably the major reason for the scarcity of data on Maine's marine recreational fisheries.

The allocation of funds and manpower for the evaluation of some priority fisheries will require decisions on the nature of the data to be collected. Current management planning concepts and, in some cases, allocations to fishermen are founded on comparative economics and

traditional social rights to harvest the resource. The ultimate data base for the evaluation of any single or multispecies fishery will, therefore, be a synthesis of biological and economic information. Table C-5 provides a heuristic outline of the array of bioeconomic data requirements and the frequency of collection or compilation which will satisfy most of the projected needs for planning, implementing and monitoring recreational fishery management programs (adapted from Cato et al, 1979). Each species constitutes a special case and specific situations must be considered in planning data collection programs. Most fishery management programs can be conducted with only a portion of the information catalogued in Table C-5 but the entire array has been presented as a general planning guide.

Table C-5 Data Requirements for the Development and Monitoring of Recreational Fishery Management Plans

Data Required	Frequency
I. Economic Raw Data Base:	
A. Production Statistics:	
1. Catch and landings	
a. estimates by pounds and species - recreational - commercial	Annual and Monthly
b. size distribution of the fish - recreational - commercial	Annual and Monthly
2. Effort:	
a. Boats (charter, party, and private) - number - type - size by width, length, tonnage - classification by motor size - area(s) operated - operator and crew - trip frequency	Annual
b. other vehicles (auto, snowmobile, ATV) - type - size - number - trip frequency	Annual
c. Fishermen - number - frequency of participation - monthly and annual fishing rate - species - resident - nonresident	Annual and Monthly
3. Correlation of catch, landings and effort	Annual

Table C-5 (continued)

Data Required	Frequency
B. Market Information - Employment:	
1. Number of participants: - wholesalers - retailers - tackleshops - bait dealers - marinas - launching facilities - service facilities - motels, hotels - campgrounds - restaurants - processors (buying recreational catches) - retailers (selling recreational catches) - boat builders - recreational boat sellers.	Annual
2. Employment vessel operators, charter skippers, guides	Annual
C. Market Information - Prices:	
1. Fishermen level: (for catches sold) - prices received from wholesalers - prices received from retailers - prices received from consumers Proxy measures for recreational fishing	Annual
2. Wholesale level: (goods sold to suppliers of fishermen) - prices received from retailers - prices received from consumers	Annual
3. Retail level: - Volume of sales to fishermen	
4. Value of imports and exports: - purchase of fishermens gear from outside state - purchase of fishermens supplies and gear instate	

Table C-5 (continued)

Data Required	Frequency
II. Analyzed Data Needs:	
A. Production:	
1. cost and return budget for each major fishery by gear type and participant group.	Every 5 years
2. industry and firm production and cost functions.	(Annual?)
B. Consumption and Demand:	
1. demand equations by major recreational fisheries (may have to use proxy measures)	Every 5 years
C. Marketing:	
1. Product flow descriptions	5 years
2. Descriptions of marketing and processing	
3. Analysis of data base	
D. Economic Profiles of Fishermen - resident (by fishery) - nonresident (by fishery)	5 years
E. Economic impact of user groups:	5 years

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