Alaska Habitat Management Guide

Economic Overview of Fish and Wildlife

Volume I:

Commercial Fishing and Sportfishing

Produced by
State of Alaska Department of Fish and Game
Division of Habitat

Juneau, Alaska
1986

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Acknowledgements

This product is under the direction of the Commissioner of the Department of Fish and Game, Don W. Collinsworth, the Director of the Division of Habitat, Norman A. Cohen, and the Deputy Director, Bruce H. Baker.

Many individuals have been involved in the one-year production of this volume of the Habitat Management Guide. All narratives were reviewed first by project staff and distributed for departmentwide review. The names of reviewers and other contributors are compiled in appendix F.

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The process of developing the initial plan and procedures for this project involved a number of individuals who are not otherwise listed as authors and contributors. These include many staff within the Division of Habitat, as well as planners and research and management coordinators of other divisions. This group also includes all project team members and all ADF&G regional supervisors. Special mention should be made of the support from Alvin Ott, Richard Reed, Lance Trasky, and Carl Yanagawa, Regional Supervisors of the Division of Habitat for the Arctic and Interior, Southwest, Southwest and Western, and Southcentral regions, respectively. We would like to acknowledge Ronald Glass and Stephen Burgess for their compilation of initial data for some of the Southwest and Southcentral regional economics narratives. We would also like to acknowledge the many contributions of John A. Clark, who was the Director of the Division of Habitat until his death in 1985.

Introduction

Overview of the Habitat Management Guides

Background

Alaska is an immense and bountiful frontier, and until just recently it was all but inconceivable that we would ever need to worry about its capacity to sustain the wealth of fish and wildlife resources for which it is renowned. But the impetus of development has not abated, and the pressure to develop our lands and waters intensifies daily. Every year more lands in Alaska are being proposed for uses other than as wildlife habitat, especially around cities, towns, and villages. These proposed uses include logging, mining, hydroelectric projects, agriculture, settlement, geothermal development, and oil and gas leases, among others. As the number of proposals and plans for development continues to increase, so does the need to carefully and efficiently evaluate their possible effects upon species and habitats and to recommend viable managerial options to guarantee that our valuable fish and wildlife resources and habitats are adequately protected and maintained. By using appropriate planning and managerial techniques most of the potential for damage and loss of access for human use can be avoided.

One of the responsibilities of the Alaska Department of Fish and Game (ADF&G) is to assist land managers by recommending to them the best ways and means, based upon the best available data, for protecting local fish, wildlife, and habitats against adverse effects and impacts. Because many proposals and plans for development and land uses require a rapid response from the department, there may not be enough time for staff to actually study the specific area in which the proposed development is to occur. However, the department still needs to accumulate and assess a wide variety of information in order to prepare recommendations for managing habitat. Therefore, the department initiated the Alaska Habitat Management Guides (AHMG) project to prepare reports of the kinds of information upon which its recommendations must be founded in order to responsibly and rapidly address land and water use proposals made by land managers. These guides are a major undertaking and will be of inestimable value to the state in its efforts to avoid or mitigate adverse impacts to Alaska's great wealth of fish and wildlife.

Purpose

The Alaska Habitat Management Guides present the best available information on selected fish and wildlife species: mapping and discussing their geographical distribution; assessing their relative abundance; describing their life functions and habitat requirements; identifying the human uses made of them, including harvest patterns of rural communities; and describing their role in the state's economy. This last kind of information, because of the variety of values humans place upon fish and wildlife, is not easily derived. There are, however, several methods to

estimate some of the economic values associated with these resources, and such estimates have become particularly important in land use planning because many potentially conflicting uses must be evaluated in economic terms.

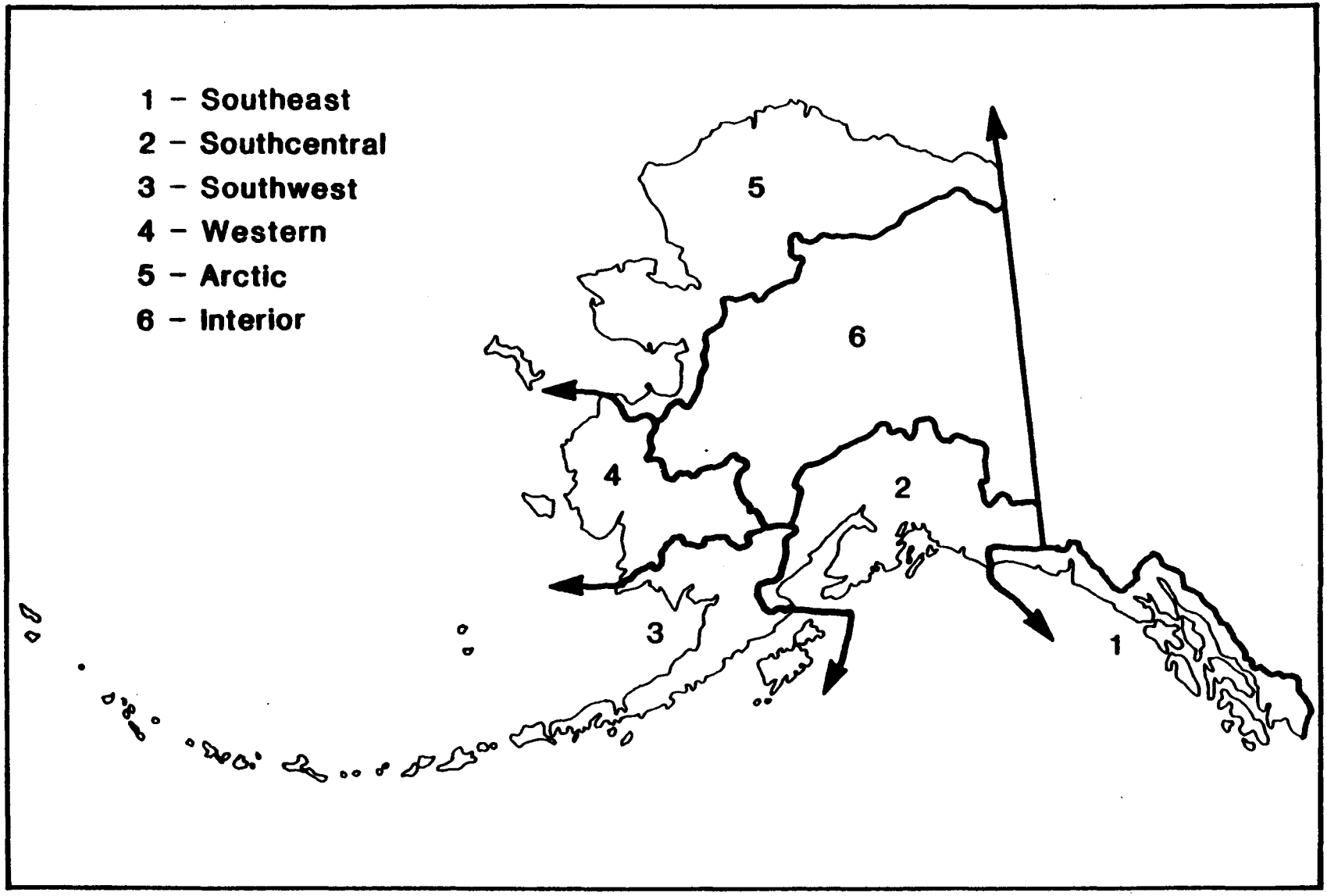
Essential to assessing what might happen to fish and wildlife if their habitats are altered is information about what effects or impacts are typically associated with particular kinds of developmental activities. The habitat management guides therefore also provide summaries of these known effects. This information, in conjunction with compiled life history information, will allow those concerned to estimate how sensitive a given species might be to a specific proposed activity - whether or not, and to what degree, the fish and wildlife are liable to be impacted. The guidance offered (a compilation of existing options for habitat management) is not site-specific. Rather, it is general information available to those who seek to avoid adverse impacts without placing undue restraints upon other land and water uses.

The completed guides coverage of fish and wildlife resources encompasses the Fish and Game Resource Management Regions established by the Joint Board of Fisheries and Game (map 1). These regions provide the most inclusive and consistent format for presenting information about fish and wildlife resources and relating it to management activities and data collection efforts within the department.

Applications

The choice of the term "guides" rather than "plans" for the reports is consistent with the largely advisory role of the department with respect to land management issues. The guides will provide the department as well as other state, federal, and private land managers with information necessary for the development of land and water use plans. Thus, the guides themselves are not land management plans and do not provide for the allocation or enhancement of fish and wildlife. Information included in a guide will be used by the department's staff in their involvement in the land use planning endeavors of various land managers. For specific land use planning efforts, the department joins with other agencies to recommend particular uses of Alaska's lands and waters, as for example in plans by the Department of Natural Resources (e.g., Susitna Area Plan, Tanana Basin Area Plan, Southeast Tidelands Area Plan). The public, by means of the public review that is an integral part of land management agencies' planning processes, then has an opportunity to evaluate any recommendations made by the ADF&G that are incorporated by the land-managing agency.

The guides have been designed to provide users with interrelated subject areas that can be applied to specific questions regarding habitat management. Each type of data will be presented in a separate volume, as indicated in figure 1. Material from the project's database can be used, for example, to correlate information on species' seasonal and geographic habitat use with the written and mapped information on known distribution and abundance. The narratives and maps regarding human uses of fish and



Map 1. The six regions of the Alaska Habitat Management Guides.

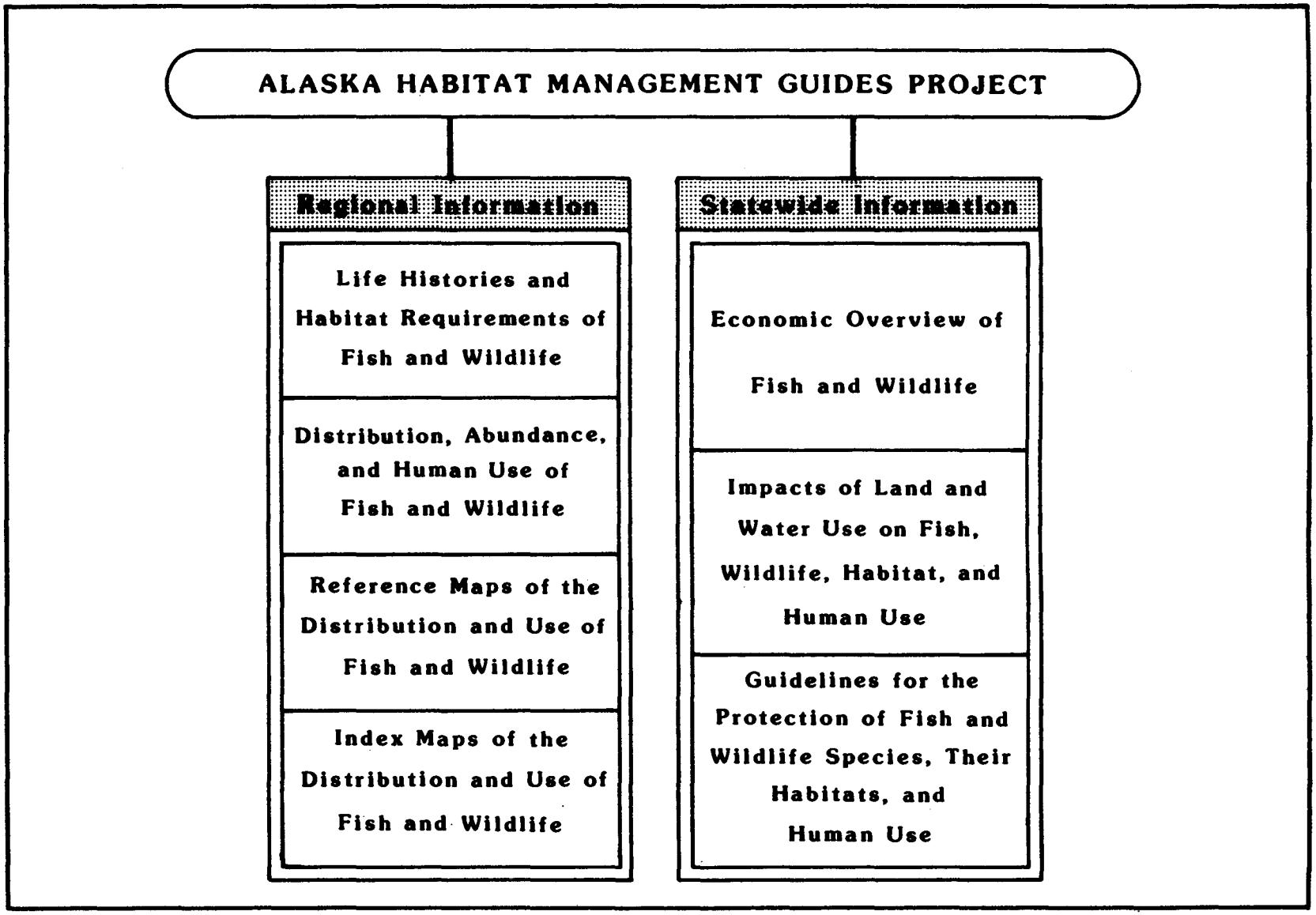


Figure 1. Types of narratives and maps produced by the Alaska Habitat Management Guides Project.

wildlife can be compared with abundance and distribution information to obtain an indication of the overall regional patterns of distribution, abundance, and human use for the species of interest. The specific information on habitat requirements also will relate directly to the information on impacts associated with land and water use. This in turn will form the basis for the development of habitat management guidance.

An additional purpose of this project is to identify gaps in the information available on species, human uses, and associated impacts. A particular species, for example, may be known to use certain habitats during certain seasons; yet information on the timing of these use patterns may be inadequate. In general, there is little documentation of impacts from land and water uses on species' habitats and on the human use of those species or on the economic values associated with the use of fish and wildlife resources.

To maintain their usefulness these habitat management guides are designed to be periodically updated as new research and habitat management options are reported to fill data gaps. Users of these guides are advised to consult with the appropriate species experts and area biologists, however, to check on the availability of more recent information.

Statewide Volumes

Besides this statewide volume detailing the life histories and habitat requirements of selected species of fish and wildlife, three other reports have been developed as statewide volumes, in which information is presented for statewide as well as for specific regional concerns. 1) The statewide volumes on impacts summarizes the effects of major types of developmental activities and land and water uses on fish and wildlife, their habitats, and their use by people. The activities discussed are those actually occurring in the state or expected to occur in the future. This survey of impacts is founded upon the most recent pertinent literature. 2) The statewide habitat management guidance volume is a synthesis of information regarding habitat management based upon the impacts literature. The following uses of land and water resources and types of development occur or are likely to occur in Alaska, and they are, therefore, addressed in the statewide impacts and/or guidance volumes:

- Oil and gas development
- Harbors and shoreline structures
- Water development
- Placer mining
- Strip and open pit mining
- Underground mining

- Seafood processing
- Silviculture and timber processing
- Transportation - road, rail, air
- Transmission corridors
- Grain and hay farming
- Pipelines
- Geothermal energy development
- Red meat and dairy farming
- Settlement
- Fire management
- Offshore prospecting and mining
- Commercial fishing

Finally, 3) a statewide economic volume provides an overview of the role of fish and wildlife resource use in the regional and state economies. Fish and wildlife are renewable resources whose uses have historically formed the basis for human economies throughout the state. Although fish and wildlife use still plays a critical role in economies throughout the state, the growing complexity of the Alaska economy makes the valuation of these uses increasingly difficult. The recent growth in the Alaska economy has resulted in an increasing divergence between market and nonmarket use of the state's natural resources. This is further compounded by growing urbanization, which is often centered around a large-scale project in contrast to more dispersed rural resource utilization.

As the plans for development continue to increase, the need to evaluate the tradeoffs involved with sometimes competing land uses is necessary. Because of the wide variety of values (some of which are infinite) people place upon fish and wildlife, the task of translating the "infinite value" of wild resources into the more restrictive terms of economic assessment is difficult at best. Its inherent difficulty is compounded by the circumstance that the data necessary for such an assessment are, with few exceptions, incomplete or unavailable at the present time. The economic data on commercial fisheries, for example, are relatively complete; and in those regions with significant commercial fisheries the dollar value of the fish resource can be fairly accurately estimated. For other regions and other resources, however, economic analysis must remain partial or tentative until a sound database exists. Continuing effort is being made by the department and by other agencies to compile such a comprehensive database in order to more accurately describe the great economic value of fish and wildlife to the people both within and outside the State of Alaska.

Regional Volumes

Narratives. Regional information on the distribution, abundance, and human uses of selected fish and wildlife species is available for each region of the state. The narrative volumes for the Southwest, Southcentral, Arctic, and Western and Interior regions provide the most current estimates of species' distribution and relative abundance and delineate the regional and subregional patterns, locations, and types of human uses of fish and wildlife resources. The narrative information for Southeast Alaska is organized somewhat differently: a brief summary of the distribution and abundance of selected species is presented within the Alaska Habitat Management Guide Reference Maps for the Southeast Region, and more detailed information on the human use of fish and wildlife is available in a Division of Habitat technical report entitled Human Use and Economic Overview of Selected Fish and Wildlife in Southeast Alaska.

Regional versions of this final Life History and Habitat Requirements of Fish and Wildlife volume were released with the publication of each regional database. Although these volumes contain much of the same information found in this final report, this compiled volume supercedes each of the earlier regional volumes.

Economic Overview of Fish and Wildlife

Alaska is currently confronted with a wide range of decisions about the use of resources that will influence activities in the state for years to come. Some of these decisions pertain to the allocation of resources among different user groups, such as fish harvested for commercial, sport, and subsistence purposes. These types of allocative decisions are generally made by the Boards of Fish and Game, based on relatively broad policies set by the Alaska State Constitution and state and federal statutes. Economic analyses have traditionally not entered into these allocative decisions. For the most part, the department has also minimized the use of economic analyses when managing fish and wildlife populations "for the maximum benefit of its people" (Alaska State Constitution, Article VII, Section 2) because these benefits cannot be expressed solely in financial terms. This is especially true given the range and complexity of allocative decisions in Alaska.

Allocative decisions regarding fish and wildlife are made primarily by those who are particularly interested in those resources. In contrast, land use planning decisions involve a variety of agencies with different perceptions of the values associated with using land primarily for fish and wildlife management. Land use planning decisions can limit and otherwise influence the options available for ADF&G managerial decisions. If a shopping mall, for example, is built in moose habitat, that specific habitat will no longer produce moose for any user group.

Planning decisions inevitably involve tradeoffs and compromises because the interested parties place different values on land and its resources.

Historically, the department's contribution to the planning process has consisted primarily of providing biological information to influence planning decisions "to maintain or enhance fish and wildlife population levels" (AS 16.05.020). In societies such as ours, however, with capitalist systems based on market economies, economic values have become the yardstick for measuring the value of competing uses. This would be appropriate, however, only if all the competing uses could be undertaken with the purpose of participating in the market economy. Problems arise in creating economic comparisons when some uses of the land and resources are not for the purpose of producing marketable goods. In practice, if the values of a particular interest group are difficult or impossible to express in economic terms, they are generally ignored by those evaluating the alternatives because such qualitative values are too difficult to incorporate into the analysis. Ultimately it is left to the political system to reconcile noneconomic and economic values.

Recognizing this shortcoming in conventional economic theory, economists have recently attempted to develop methods to measure the economic value of unpriced, or nonmarket, values. A variety of innovative techniques have been used to try to place nonmarket resource values (a day of deer hunting, for example) on a similar economic footing as market resource values (1,000 board feet of timber, for example). The advent of these new techniques can be both tempting and repellent to the biologist and the public. On the one hand, the ability to translate the obvious (though often intuitive) significant fish and wildlife values into an economic measure is a powerful attraction. On the other hand, biologists recoil at the thought that, once rendered in economic terms, fish and wildlife may begin to be valued only in those terms. That possibility is particularly worrisome because the new techniques generally produce economic figures that are merely approximations of value; no method has been developed that enables unpriced values and market-priced values to be compared exactly.

Given this set of circumstances, the question becomes how (or whether) to use economics in evaluating the importance of fish and wildlife resources. A number of important factors need to be considered regarding the economic values of fish and wildlife in Alaska. One is that relatively little information exists to compute economic values for fish and wildlife uses other than commercial fishing and possibly commercial furbearer harvesting. Studies need to be designed and implemented to make this information available, and a high level of economic sophistication is necessary for proper interpretation and application of newly acquired data. Also, unlike market-priced values, which are updated automatically by direct market transactions, unpriced values can be updated only by subsequent studies. Hence, accurate, useful information on many factors important for evaluation is not easily maintained.

Economic values of fish and wildlife are also extensively influenced by regulations and management objectives. Economics is the study of how people and society choose, with or without the use of money, to employ <u>scarce</u> resources and distribute them for consumption over time among various people and groups. Generally speaking, however, fish and wildlife populations have been managed to supply <u>abundant</u> resources, which indirectly results in

relatively low costs of harvesting these populations to the people of Alaska. This management objective prevents the short-term maximization of readily measurable economic values. For instance, rather than auction Alaska's unique hunting opportunities in a world hunting market to maximize the economic market potential of the resource, the state has shown a preference for allocating these opportunities to its residents. Clearly, management decisions that affect species abundance and allocation also affect their measurable economic values. Within this context, it is overly simplified and incorrect to make land use planning decisions strictly on the basis of comparing economic values of resources. It is important that the biologist and public understand both the potential of economics and its limitations as a tool in natural resources planning for the ADF&G and other agencies.

In consideration of these factors, these volumes have been written in terms of a fairly broad definition of economics to assist the biologist and manager in understanding and applying economic principles to the planning process. It is the purpose of this volume to indicate what information is available for economic analyses, to point out the limitations of that information, to use the available information for analyses, and to suggest ways of improving the economic database by listing additional useful information and how it could be collected. Appendices are also included that go beyond describing the source of economic data to explain some of the practical obstacles in applying these data in general and in Alaska in particular.

I. STATEWIDE OVERVIEW

A. Introduction

Alaska is well known for the immensity and the uniqueness of its terrain. By comparison, the vast oceans around Alaska may seem insignificant. Yet these productive waters have a unique geography of their own, and their living resources play a major role in the world's food supply (Natural Resources Consultants 1982).

The Pacific and Arctic oceans join to surround Alaska on three sides. From the southern Alaska/Canadian border, a forested archipelago stretches north and west to Yakutat and Icy Bay. From there, the Alaska coastline arches westerly past Prince William Sound to Cook Inlet, then curves southwest along the Alaska Peninsula and the Aleutian Islands, which mark the state's southernmost latitude. North of the Aleutians and the Alaska Peninsula is the Bering Sea, the world's largest semi-enclosed sea. Past the narrow Bering Strait separating Alaska and the USSR the Chukchi Sea broadens as the Alaska coastline continues northward beyond the Arctic Circle. Farther north, the sea coast turns east and faces the Arctic Ocean and the Beaufort Sea (ibid.).

Alaska's boundaries extend over 20 degrees in latitude, from 51° north to 71° north. Within these borders, Alaska's tidal coastline measures 33,907 statute miles, which equals 61% of the combined 53,672-mi tidal coastline of the 48 contiguous states. The continental shelf, generally described as that portion of the seabed that extends to the depth of 200 fathoms, totals about 550,000 mi^2, is equal to about 90% percent of Alaska's land area, and is equivalent to about 65% of the total continental shelf and slope off the United States. As a result of the diverse oceanic circulation patterns, vertical mixing and upwelling of nutrient-rich subsurface waters from the continental shelf and slope, the Alaska waters of the Pacific Ocean and the Bering Sea are among the most productive in the world (ibid.).

This productivity is illustrated by catch and value statistics for Alaska. During 1980, the total volume of fishery resources taken within the U.S. Fishery Conservation Zone (FCZ), including both foreign and domestic catches, was 4,935,198 metric tons. Of this total, 43% (2,073,531 metric tons) was harvested from the Alaska region. The total harvest taken by foreign nations operating in the entire U.S. FCZ was 1,631,021 metric tons. Approximately 93% of this total (1,511,583 metric tons) originated in Alaska. Seventeen percent of the entire United States domestic commercial harvest was harvested in Alaska waters. For the 1976 to 1980 period, 75-90% of the United States salmon catch, 50-60% of the crab catch, 25% of the shrimp catch, over 20 percent of the herring catch, and over 90% of the halibut catch originated in Alaska (ibid.).

Statewide ex-vessel values increased considerably from 1977 through 1982 as an increasing proportion of the U.S. FCZ harvest was caught

by domestic fishermen. Ex-vessel values increased from $351.4 million in 1977 to $652.9 million in 1979 and averaged $546,704.3 million for the 1977-1982 period (table 1). During the same years, seafood-harvesting employment also increased fairly steadily from an annual average employment of 6,333.7 persons in 1977 to 8,254.8 persons in 1982 and averaged 7,611.7 (table 1). The total number of individual persons employed in commercial fish harvesting each year, however, from 1977 through 1982 averaged 31,207 (table 1). July was the peak month of employment during the period 1977-1982, when on average 23,515 persons were employed (table 1). First wholesale value of seafood in Alaska also increased from $803.4 million in 1979 to $1.1 billion in 1982 (table 2).

All ex-vessel and first wholesale values of seafood in this volume are in nominal dollars, which means dollar values have not been adjusted for inflation. Adjusting these values to a base year (making all values in 1982 dollars, for example) would result in a less dramatic increase in these values.

B. Methods

1. Ex-vessel value. The data source for ex-vessel values is a special computer run from the Commercial Fisheries Entry Commission (CFEC). Ex-vessel value tables in this report present annual landing values by ADF&G fishery management area and census area of fishermen for the years 1975-1982. The designation of the census area of the fishermen is obtained from information on the CFEC permit file and reflects the permanent address used by permit holders on their limited entry or interim use fishing permits (see appendix B in this volume for information on CFEC data files). The census area designations are the 1980 Alaska census areas. This information provides an indication of the geographic distribution of ex-vessel earnings from a given fishery. A map of these census areas is included in appendix C in this volume. The relationship between census areas and ADF&G fishery management areas is illustrated on maps in appendix A.

   Ex-vessel values are the gross earning values to fishermen at the time fish are landed. This is an important factor to consider in land use planning or impact analyses because gross earnings (which include operating costs) cannot be validly compared to net earnings. Deriving net values for fish is very difficult because each gear operator is essentially a small business with varying operating costs. These costs vary considerably between geographic locations and temporally, depending on changes in such factors as insurance rates, gas or diesel fuel, and other types of costs. It is not within the scope of this project to attempt to estimate net earnings.

Table 1. Estimated Total Harvesting Employment and Total Ex-vessel Values* in the Fisheries of Alaska by Month and Year, 1977-82

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals**
1977													
Earnings	8,113.5	5,636.5	7,282.0	10,204.5	22,298.7	36,997.7	97,541.5	54,197.6	26,294.0	44,149.1	27,914.0	10,809.5	351,438.5
People	1,243	1,078	1,113	2,179	5,257	15,529	21,125	15,959	6,928	2,092	1,723	1,779	26,077
Annual average employment													6,333.7
1978													
Earnings	11,644.0	9,304.7	17,455.0	17,117.5	20,554.1	53,095.3	127,380.4	83,386.9	62,457.3	84,013.3	10,035.2	7,397.4	503,841.1
People	1,457	1,530	1,724	2,746	5,939	18,132	24,213	20,011	8,418	2,571	1,481	2,387	29,716
Annual average employment													7,467.4
1979													
Earnings	5,527.0	9,894.3	27,503.2	39,113.0	29,693.0	96,259.1	208,310.9	78,124.1	55,205.9	83,363.0	13,648.2	6,215.2	652,857.4
People	1,191	1,251	2,227	3,052	8,099	22,151	26,491	19,064	6,994	3,535	1,758	1,326	32,950
Annual average employment													8,094.9
1980													
Earnings	10,736.1	13,651.4	19,140.5	17,509.1	23,438.3	31,471.9	150,125.1	88,473.0	77,349.5	83,167.6	22,569.1	11,526.5	549,158.8
People	1,566	1,973	2,456	3,732	10,767	14,866	23,416	18,061	8,295	3,173	2,189	1,311	32,853
Annual average employment													7,650.3
1981													
Earnings	10,284.0	9,482.0	22,636.2	23,794.1	23,330.3	94,279.6	237,129.7	94,995.4	60,655.0	45,338.6	11,608.1	12,215.3	645,750.1
People	1,045	1,463	2,864	3,656	6,899	24,433	22,824	17,340	6,893	2,958	2,048	2,004	32,732
Annual average employment													7,868.9
1982													
Earnings	18,133.8	17,109.0	39,077.7	22,813.6	36,189.1	83,363.7	151,752.4	111,931.1	53,118.5	19,299.6	9,227.1	15,163.9	577,179.6
People	1,310	1,792	3,032	2,691	11,000	20,156	23,023	19,179	8,459	3,117	1,921	2,382	32,915
Annual average employment													8,254.8

Source: CFEC 1984.

* Ex-vessel values are in thousands of dollars and represent sales of total catch (Targeted + Incidental).

** The total column does not double-count gear operators.

Table 2. Statewide Production and Wholesale Value by Fishery and Year, 1979-83

Pounds and Value in Thousands

Year	Salmon		Other Finfish		Shellfish		Grand Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1979	120,877	353,836	51,940	84,323	59,525	365,241	232,343	803,401
1980	331,283	601,355	71,497	60,290	174,720	436,582	577,601	1,098,228
1981	413,037	779,560	93,538	81,977	125,141	380,165	631,717	1,241,702
1982	403,340	643,587	122,227	90,271	83,036	365,112	608,603	1,098,970
1983	445,679	726,408	162,582	140,992	65,272	238,127	673,532	1,105,527

Source: ADF&G 1980-84.

2. Fish-harvesting employment. This report uses two data sources for fish-harvesting employment information. One source is the Alaska Department of Labor (ADL), which has published a special report with fish-harvesting employment figures since 1977. The other data source is the CFEC. The basis for both data sources is ADF&G fish ticket records. The methods, reporting units, and results, however, differ for the two agencies and are discussed here.

The ADL estimates employment by counting the number of boat landings at fish-processing plants. This count includes all boats that actively fished, regardless of the time period used to fish. Fish ticket information includes a vessel license number, the area fished, date of catch, and the number and species of fish caught. Additionally, halibut catch data are available from the International Pacific Halibut Commission and are combined with the fish ticket data. To prevent a vessel that might make more than one landing in a time period from being counted more than once, the highest value catch is assigned to that vessel for the month, and only that catch is counted. The vessel license number is used to prevent double-counting of vessels (ADL 1985).

In contrast, the CFEC estimates of employment are based on entry permit (either limited or interim use permits) numbers on fish tickets, which is the number of gear operators rather than the number of vessels reporting landings. This methodology was developed because the vessel license records on the fish ticket file are poorly edited and many data entry errors exist (CFEC 1984). For fisheries that typically do not use commercial vessels, such as salmon set net and herring roe-on-kelp fisheries, the gear operator's permit number would have to be substituted into the fish ticket file, which further complicated the ADL estimation process. The entry permit number field on the fish ticket file, however, is well edited, and mistakes as a result of data entry errors are not a significant problem (ibid.).

Both the ADL and the CFEC use "crew factors" developed by the ADL to estimate the total number of persons employed by a particular fishing operation (table 3). The ADL derived these values from a statewide survey and consultation with fishing associations, government agencies, fisheries biologists, and individual fishermen (CFEC 1984). Crew factors include gear operators and crew but do not include tender and packing crews or on-shore fish-processing employment (ADL 1985).

Another significant difference in the two data sets is the reporting areas. The ADL developed the fish-harvesting data to fill a data gap in their standard employment statistics. Therefore, they aggregate harvesting employment into ADL standard labor areas (map 1). In contrast, the CFEC reports

Table 3. Crew Factors Used in Estimating Fish Harvesting Employment, 1980, 1981, 1982*

Species and Gear	Southeast	Prince William Sound	Cook Inlet	Kodiak	Aleutian Peninsula	Dutch Harbor	Bering Western Aleutians	Bristol Bay	Arctic Yukon/ Kuskokwim**
Salmon									
Purse seine	5.25	4.0	3.75	4.0	5.0	---	---	5.0	---
Drift gill net	1.75	1.25	2.0	---	---	---	---	2.5	2.0
Beach seine	---	3.0	3.0	3.5	2.0	---	---	---	---
Set gill net	2.0	2.0	2.0	2.5	2.0	---	---	2.25	---
Power troll	1.75	---	---	---	---	---	---	---	---
Hand troll	1.0	---	---	---	---	---	---	---	---
Traps	2.5	---	---	---	---	---	---	---	---
Fish wheel	---	---	---	---	---	---	---	---	1.0
Shellfish									
King crab pots	2.75	3.0	3.5	3.5	3.5	3.5	5.5	---	2.5
Dungeness pots	2.25	2.5	2.25	3.0	3.0	---	---	---	---
Tanner pots	2.75	3.25	3.25	3.25	3.75	3.5	5.5	---	---
Shrimp pots	2.25	2.0	2.0	2.0	2.0	2.0	---	---	---
Beam trawl	2.25	2.0	2.0	2.0	2.0	---	---	---	---
Otter trawl	3.0	3.0	2.5	3.75	3.5	3.5	4.5	---	---
Double otter	3.25	4.0	4.0	4.0	3.5	3.5	4.0	---	---
Scallops dredge	5.0	6.0	---	8.0	---	---	---	---	---
Clams dredge	---	---	8.0	8.0	---	---	---	---	---
Shovel	---	1.0	1.0	1.0	---	---	---	---	---
Halibut									
Licensed longline	4.0	3.5	3.5	3.5	4.3	4.3	4.3	---	---
Unlicensed longline	2.5	2.0	2.25	1.5	2.0	2.0	2.0	---	---
Power troll jigs	2.5	2.0	2.25	1.5	2.0	2.0	2.0	---	---
Hand troll	1.0	---	---	---	---	---	---	---	---
Bottomfish									
Longline	3.0	3.5	2.0	3.75	2.0	2.0	---	---	---
Otter trawl	3.0	3.0	3.0	3.75	4.0	4.0	4.3	---	---
Double otter	3.0	---	---	3.75	---	4.0	4.0	---	---
Beam trawl	2.25	---	---	---	2.0	---	4.0	---	---
Pots	---	---	---	---	---	---	---	---	---
Power troll jigs	2.5	2.0	2.25	1.5	2.25	---	---	---	---
Hand troll	1.0	---	---	---	---	---	---	---	---

(continued)

Table 3 (continued).

Species and Gear	Southeast	Prince William Sound	Cook Inlet	Kodiak	Aleutian Peninsula	Dutch Harbor	Bering Western Aleutians	Bristol Bay	Arctic Yukon/ Kuskokwim**
Sablefish/Blackcod									
Longline	4.0	3.5	---	4.0	---	---	---	---	---
Pots	2.75	---	---	3.5	---	3.5	---	---	---
Herring***									
Purse seine	5.5	4.0	3.75	4.0	4.0	3.5	3.75	4.25	---
Roe kelp	---	2.0	---	---	---	---	---	1.0	1.0
Set drift gill net	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Pair trawl	---	5.0	---	---	---	---	---	---	---

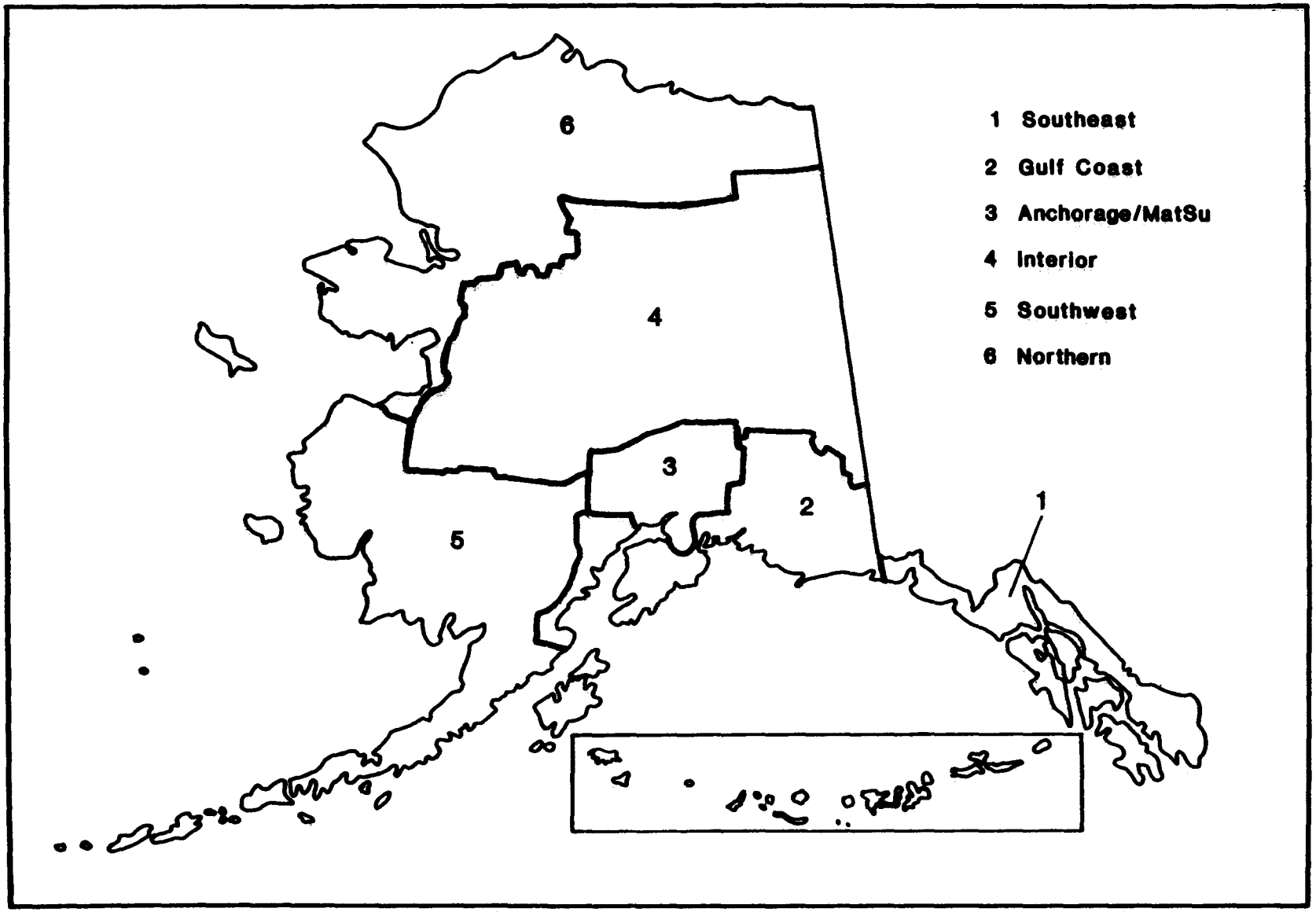
Source: ADL 1985.

--- means no data were available.

* Crew sizes not seasonally adjusted.

** Drift and set gill net combined for all species in the AYK (Northern) region.

*** Draft and set gill net combined for herring, all regions.



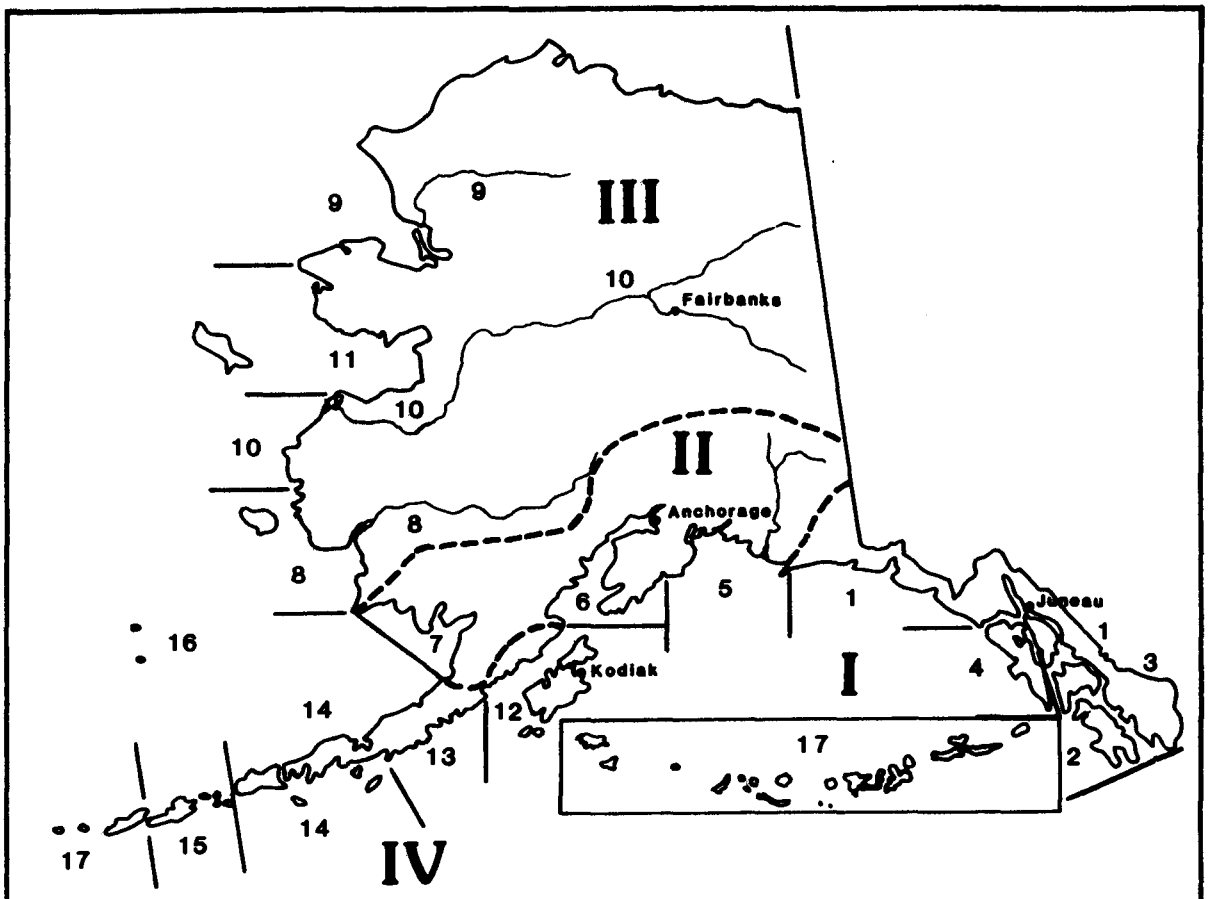
Map 1. Alaska Department of Labor Regional Labor Market Areas.

fish-harvesting employment by ADF&G fishery management areas, which method of reporting is more readily useful for ADF&G planning purposes.

This report initially used ADL data for employment estimates in the Southwest and Southcentral regions, but because of problems with reporting areas and the reliability of the data, it has used CFEC data for the Interior, Western, Arctic, and Southeast regions. For remote fisheries that do not use vessels, the ADL data were found to be fairly inaccurate. Time limitations on this project did not allow for the additional inclusion of CFEC employment data with the ADL data for the Southwest and Southcentral regions

3. First-wholesale value. All Division of Commercial Fisheries production information (product weight and wholesale values) summarizes production data listed in the Operator's Annual Reports (see appendix A). The initial processors of raw fish and shellfish caught in Alaska file one Operator's Annual Report for each processing facility and each management area in which the fish and shellfish were bought and/or processed. The ADF&G, Division of Commercial Fisheries, catch and production reports include only fish and shellfish processes within Alaska. The weights (pounds) reported for production are weights of finished products and do not include package weights. Production values (first-wholesale value) are estimated product values at the plant, prior to shipping. These are not market transaction price values but estimated values of inventories. Actual values may vary, depending on price changes at the actual time of sale. Therefore, first-wholesale values differ from ex-vessel values in that ex-vessel values are derived from actual fish ticket landing transactions.

   Production area boundaries do not correspond directly to fisheries management areas used to record catch information (see map 2). For example, in map 2, Bristol Bay is a production area for all fish and shellfish, but it is considered a specific management area only for the salmon and herring catches. Commercial fisheries businesses report production by region and area; however, they frequently ship fish intrastate or export them perior to processing. Thus, through fish ticket information, the catch and ex-vessel values might be recorded in one area and production reported in another area. Therefore, production values should not be expected to correlate directly with ex-vessel values. In spite of this, the geographic distribution of ex-vessel value and production value is roughly similar for most years.



Region I: Southeast
Areas: 1. Juneau and Yakutak
2. Ketchikan
3. Petersburg
4. Sitka

Region II: Central
Areas: 5. Prince William Sound
6. Cook Inlet
7. Bristol Bay (salmon and herring catch; all fish and shellfish production)

Region III: Arctic-Yukon-Kuskokwim (AYK)
Areas: 8. Kuskokwim
9. Kotzebue
10. Yukon
11. Norton Sound

Region IV: Western
Areas: 12. Kodiak
13. Chignik
14. Alaska Peninsula
15. Dutch Harbor
16. Bering Sea
17. Adak and Western Aleutians
7. Bristol Bay (fish other than salmon and herring catch; and shellfish catch)

Map 2. ADF&G, Division of Commercial Fisheries, regions and catch and production areas.

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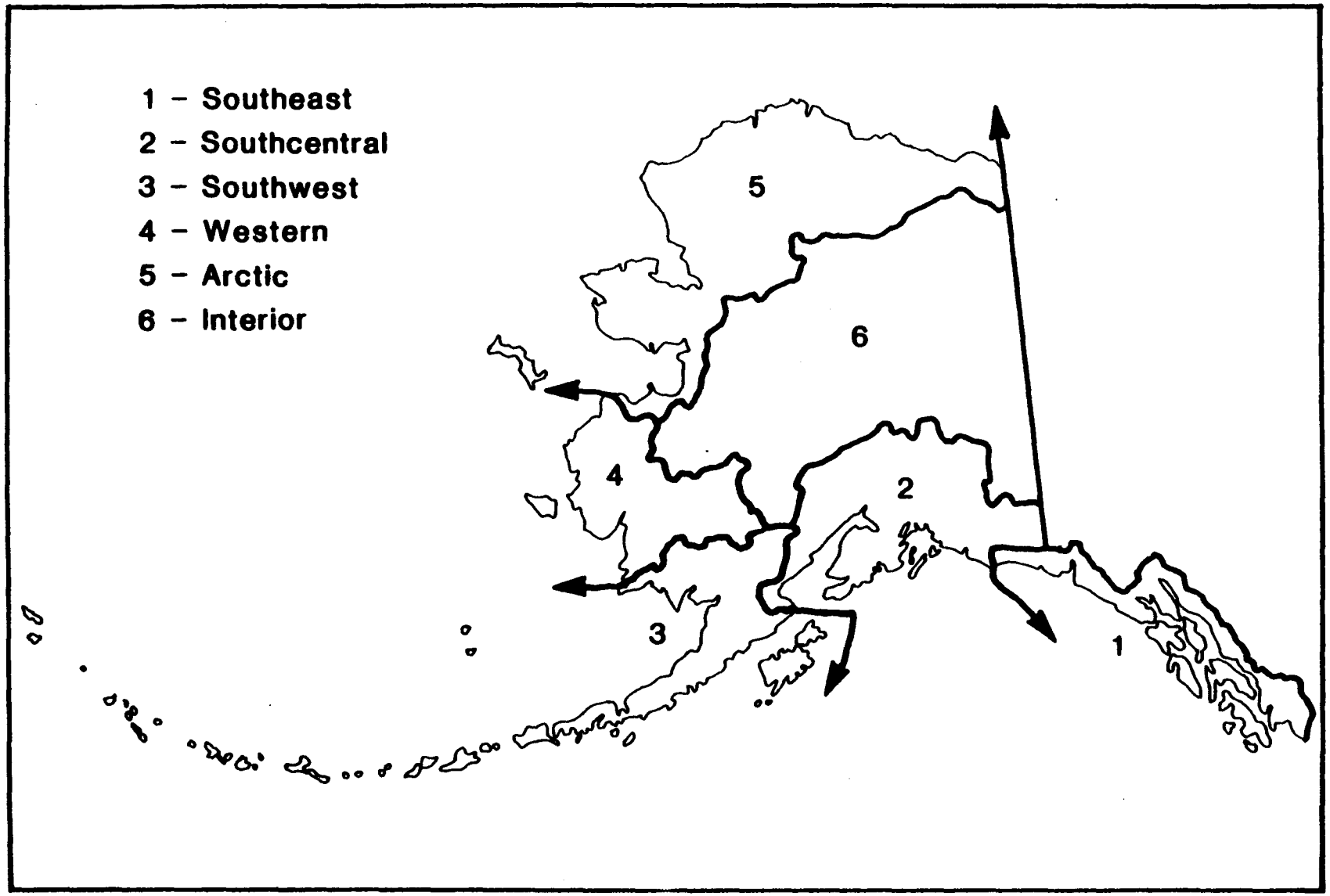
Commercial Fishing in the Southwest Region

I. INTRODUCTION

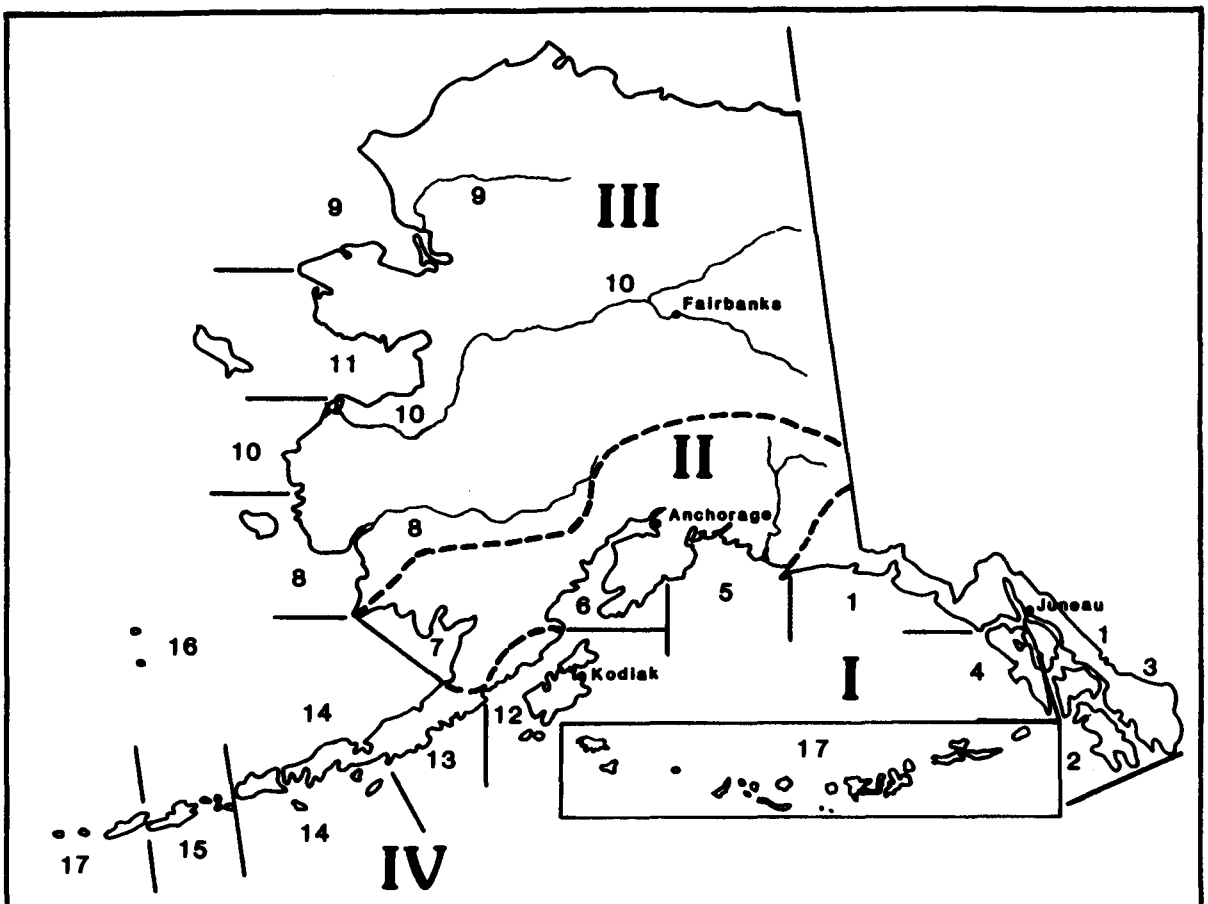
The Southwest Region supports a diversity of fisheries. Fishing effort has traditionally been directed towards a few high-value species groups such as salmon, crab, shrimp, halibut, and herring (Natural Resources Consultants 1982). In recent years (since 1981), effort directed toward the groundfish fisheries has increased, primarily in the form of joint ventures (ibid.). This commercial-fishing narrative covers ex-vessel harvest values by fishery management area and the census area of fishermen, fish-harvesting employment, and fish-and seafood-processing values, employment, and wages. The data source for ex-vessel values is a special computer run from the Commercial Fisheries Entry Commission (CFEC) (see appendix B for information on CFEC data files). The Alaska Department of Labor (ADL) is the data source for employment and seafood-processing wages (see appendix C for information on ADL data files).

In many of the tables that follow, a designation of "census area of fishermen" is used. This designation indicates the Alaska census area of residence (or "other USA") of the fishermen fishing a given management area as shown on the individual's fishing permit (either limited entry permit or interim use permit). This information indicates the geographic distribution of ex-vessel earnings from a given fishery. A map of census areas is included in appendix C of this volume. The relationship between census areas and ADF&G fishery management areas is illustrated on maps in appendix A. Of particular significance in the Southwest Region is the Dillingham census area, which includes a particularly large land area and most of the small communities of the Bristol Bay subregion, including the eastern Alaska Peninsula. (For more complete information, see appendices A, B, and C in this volume.)

One of the major obstacles in developing commercial fisheries economic narratives with information such as harvest ex-vessel values, first wholesale values, and employment numbers is the nonstandardization of "area" boundaries. This is a particularly difficult problem in the Southwest Region (map 1) because these boundaries, as defined by the Joint Board of Fisheries and Game during the formation of the six resource management regions of the state, do not correspond with the Division of Commercial Fish catch or production regions and subregions (which also contain some anomalies between the Western and Central regions regarding Bristol Bay data, see map 2), the CFEC areas or the ADL areas (see map 3).



Map 1. The six regions of the Alaska Habitat Management Guides.



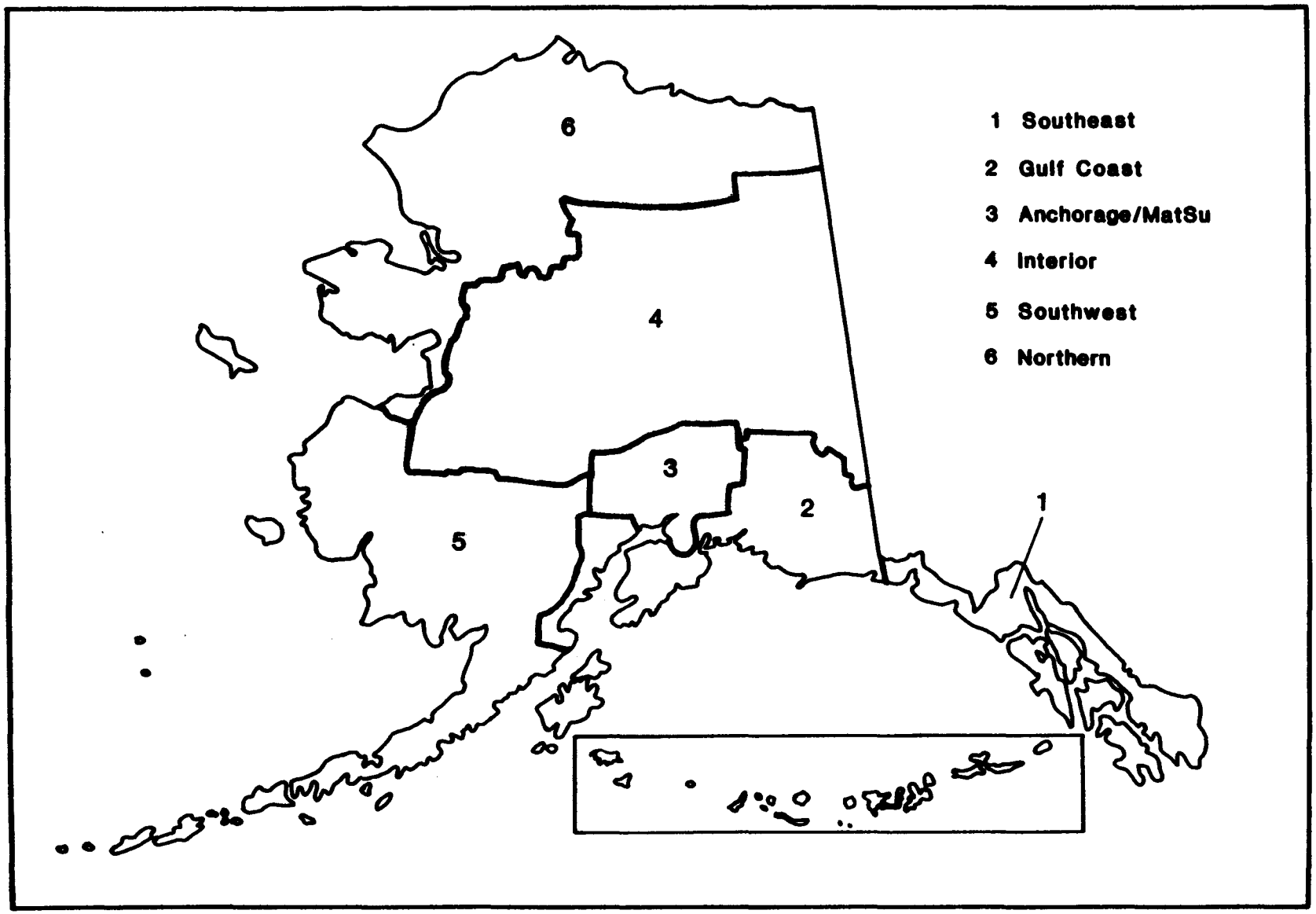
Region I: Southeast
Areas: 1. Juneau and Yakutak
2. Ketchikan
3. Petersburg
4. Sitka

Region II: Central
Areas: 5. Prince William Sound
6. Cook Inlet
7. Bristol Bay (salmon and herring catch; all fish and shellfish production)

Region III: Arctic-Yukon-Kuskokwim (AYK)
Areas: 8. Kuskokwim
9. Kotzebue
10. Yukon
11. Norton Sound

Region IV: Western
Areas: 12. Kodiak
13. Chignik
14. Alaska Peninsula
15. Dutch Harbor
16. Bering Sea
17. Adak and Western Aleutians
7. Bristol Bay (fish other than salmon and herring catch; and shellfish catch)

Map 2. ADF&G, Division of Commercial Fisheries, regions and catch and production areas.



Map 3. Alaska Department of Labor Regional Labor Market Areas.

A. Ex-vessel Value

1. Regional summary. In terms of the monetary value of commercial fishery harvests, Southwest Alaska is the leading region in the state (see table 1). During the period from 1977 to 1982, the value of the region's commercial fish harvest as a percentage of the state total ranged from 47.8% in 1978 to 72.4% in 1980. The average regional percentage for the period was 60.4.

   Commercial fish harvests in the Southwest Region have been dominated by salmon. Pink salmon, harvested primarily by seines, is most significant in the Kodiak Island area. Sockeye salmon, taken in the drift gill net fishery, dominates the harvest in Bristol Bay.

2. Ex-vessel value by management area. Table 2 presents the estimated ex-vessel value of commercial fishing harvests by ADF&G fishery management areas for the years 1975 to 1982. Direct comparisons of ex-vessel values between management areas are not appropriate because the combination of species groups included for each area is not consistent (see footnotes in table 2). Management area comparisons of ex-vessel values should be done only between the same species or species groups (for example, salmon harvest values in Kodiak and salmon harvest values in Bristol Bay) or between management areas with the same combination of species groups (e.g., Kodiak and Peninsula/Aleutians; see footnotes in table 2). However, despite comparison problems, table 2 does not contain duplicate values because discrete values for each management unit and fishery are combined to obtain the Southwest Region total.

   Table 2 illustrates ADF&G management area annual summaries and trends for the years 1975 to 1982. All areas show a strong upward trend in ex-vessel values peaking in the early 1980's. Ex-vessel gross earnings increased during this period because of a number of factors, including extended jurisdiction, which reduced the foreign interception of salmon stocks; high ex-vessel prices until 1981; the expansion of the sac roe herring fisheries; the income benefits of limited entry regulations; and increased effort and harvests in the shellfish fisheries. The 1982 decline in the regional total was largely due to lower salmon and herring prices and the declines in shellfish stocks and harvest. Despite the decline, however, the 1982 values were approximately 475% greater than 1975 values, and the 1981 values were about 550% above the 1975 values.

3. Ex-vessel value by species. The relative contribution of species groups to the overall ex-vessel value produced in the Southwest Region is shown in table 3.

Table 1. Comparison of Ex-vessel Value of All Commercial Fishery Harvests for Southwest Region and Statewide, 1977-82

Year	Southwest Region	State of Alaska	Southwest Region as a Percentage of State Total
1977	$218,124,324	$351,438,451	62.1%
1978	$239,152,354	$503,845,618	47.5%
1979	$352,675,396	$652,859,141	54.0%
1980	$397,671,996	$549,166,361	72.4%
1981	$417,008,493	$645,726,097	64.6%
1982	$355,261,648	$578,061,631	61.5%

Source: CFEC 1984.

Table 2. Estimated Ex-vessel Value ($) of Commercial Fisheries Harvests in Southwest Alaska by Fishery Management Area, 1975 to 1982

	Fishery Management Area								
Year	Kodiak[b]	Bristol Bay[c]	Bering Sea[d]	Chignik[e]	Peninsula-Aleutians[b]	Dutch Harbor[d]	Adak[d]	Western Aleutians[d]	Southwest Alaska Total[b]
1975	24,815,009	11,726,185	19,468,983	1,779,704	8,551,841	5,870,587	900,313	89,099	73,201,721
1976	44,806,690	22,107,401	48,451,852	5,486,251	17,069,977	7,598,675	178,200	94,138	145,793,184
1977	53,569,811	27,335,315	94,373,114	15,912,254	21,373,216	5,126,399	434,215	a	218,124,324
1978	75,161,366	58,076,573	41,689,100	17,908,690	33,284,710	10,918,745	2,113,170	a	239,152,354
1979	72,150,215	146,386,023	46,654,420	16,536,884	56,375,278	12,819,509	1,432,856	640,535	352,675,396
1980	79,394,743	205,471,898	45,651,020	8,419,156	41,792,741	16,173,550	768,888	---	397,671,996
1981	101,440,785	179,831,650	50,313,943	21,939,379	50,448,210	8,338,557	4,695,969	---	417,008,493
1982	95,109,237	95,042,737	70,384,967	14,973,563	53,933,652	10,895,656	14,921,836	---	355,261,648
Average									274,861,140

Source: CFEC 1984.

--- means no data were available.

a Not shown, to avoid disclosure of confidential information on individual fishermen.

b Includes ex-vessel values for salmon, herring, halibut, groundfish, and shellfish.

c Includes ex-vessel values for salmon, herring, shellfish.

d Includes ex-vessel values for shellfish, halibut, groundfish.

e Includes ex-vessel values for herring and salmon.

Table 3. Average Ex-vessel Value of Commercial Fishery Harvests in the Southwest Region by Species, 1975-82

Fishery*	Thousands of Dollars	% of Total
Salmon		
Chinook	3,462	1
Sockeye	86,266	29
Coho	3,660	1
Pink	20,946	7
Chum	10,378	3
Subtotal	124,712	41
Crabs		
King crab	110,937	37
Tanner crab	41,499	14
Dungeness crab	1,511	0.5
Misc.	331	-
Subtotal	154,278	51.5
Shrimp	9,864	3.5
Herring	4,343	1.5
Halibut	4,486	1.5
Groundfish	2,503	1
Total	300,186	100

Source: CFEC 1984.

* Average values for those fisheries not operating over the entire reporting period are nevertheless shown for purposes of comparison.

Salmon and crab accounted for approximately 93% of the average ex-vessel gross earnings during the period 1975 to 1982. Sockeye salmon and king crab alone made up about 66% of the region's commercial fisheries harvest values. The Bristol Bay sockeye fisheries are of major importance to the region.

More detailed annual data for the Southwest Region are found in subsequent sections of this chapter.

B. First Wholesale Value by Management Area

All Division of Commercial Fisheries production information (product weight and wholesale values) summarizes production data listed in the Operator's Annual Reports (see appendix A). The initial processors of raw fish and shellfish caught in Alaska file one Operator's Annual Report for each processing facility and each management area in which the fish and shellfish were bought and/or processed. The ADF&G, Division of Commercial Fisheries, catch and production reports include only fish and shellfish processed within Alaska. The weights (pounds) reported for production are weights of finished products and do not include package weights. Production values (first wholesale value) are estimated product values at the plant, prior to shipping. These are not market transaction price values but estimated values of inventories. Actual values may vary, depending on price changes at the actual time of sale. Therefore, first wholesale values differ from ex-vessel values in that ex-vessel values are derived from actual fish ticket landing transactions.

Table 4 presents first wholesale values for the period 1979 to 1983 by management area. It is very important to note that production information for a specific area may not correspond to the catch reported for that area.

Production area boundaries do not correspond directly to fisheries management areas used to record catch information (see map 2). For example, in map 2, Bristol Bay is a production area for all fish and shellfish, but it is considered a specific management area only for the salmon and herring catches. Commercial fisheries businesses report production by region and area; however, they frequently ship fish intrastate or export them prior to processing. Thus, through fish ticket information, the catch and ex-vessel values might be recorded in one area and production reported in another area. Therefore, production values should not be expected to correlate directly with ex-vessel values. In spite of this, the geographic distribution of ex-vessel value and production value is roughly similar for most years.

Table 4. Production and Wholesale Value by Fishery and Production Area (Pounds and Values in Thousands)

Area and Years	Salmon Lb	Salmon $	Other Finfish Lb	Other Finfish $	Shellfish Lb	Shellfish $	Total Lb	Total $
Bristol Bay								
1979	18,212	83,738	10,068	10,233	2,768	7,578	31,048	101,550
1980	74,661	141,749	18,761	9,499	n/a	n/a	93,422	151,248
1981	94,425	202,323	11,594	8,018	1,248	4,448	107,267	214,789
1982	79,993	139,163	33,950	17,112	860	2,742	111,803	159,016
1983	127,587	233,100	49,849	29,884	n/a	n/a	187,436	262,985
Average	80,976	160,015	24,844	14,949	1,625	4,923	106,195	177,918
Kodiak								
1979	11,568	44,235	8,209	18,927	18,020	62,558	37,797	125,721
1980	54,581	96,850	9,148	11,711	29,720	89,937	93,448	198,498
1981	67,806	118,773	15,774	21,596	29,130	107,837	112,710	248,207
1982	48,166	73,049	12,201	12,521	20,915	89,142	81,282	174,712
1983	42,237	67,915	17,270	22,690	17,166	49,773	76,673	140,378
Average	44,872	80,164	12,520	17,489	22,990	79,849	80,382	177,503
Chignik								
1979	7,075	16,322	21	70	2,627	4,656	9,724	21,049
1980	8,901	16,421	n/a	n/a	1,932	3,614	10,833	20,035
1981	10,889	22,221	297	279	1,389	3,066	12,575	25,567
1982	9,394	16,085	85	51	1,347	5,695	10,826	21,831
1983	11,949	21,618	204	285	1,776	4,339	13,929	26,242
Average	9,641	18,533	152	171	9,071	21,370	11,577	22,945
Alaska Peninsula								
1979	16,468	34,505	n/a	n/a	7,829	13,570	24,298	48,076
1980	38,635	76,349	484	412	12,617	30,732	51,737	107,493
1981	41,450	79,895	1,605	1,335	6,468	18,381	49,523	99,611
1982	39,518	62,567	5,241	3,233	4,530	19,438	49,290	85,238
1983	37,721	66,531	8,021	6,432	2,601	7,861	48,343	80,824
Average	34,758	63,969	3,838	2,853	6,809	17,996	44,638	84,248
Dutch Harbor								
1979	5,248	9,563	79	181	12,967	242,147	18,295	251,891
1980	8,802	16,356	1,946	661	99,106	233,491	109,854	250,508
1981	6,218	12,804	2,952	1,731	49,112	124,576	58,282	139,111
1982	6,991	11,056	11,344	7,396	21,727	74,418	40,062	92,870
1983	5,276	9,075	20,393	13,372	20,332	57,887	46,002	80,334
Average	5,562	11,771	7,343	4,668	40,649	146,503	54,499	162,943
Bering Sea								
1979	1,015	1,700	1,856	2,500	3,539	10,772	6,411	14,972
1980	n/a	n/a	2,990	3,571	20,247	49,336	23,237	52,907
1981	n/a	n/a	6,755	6,741	22,241	72,229	28,996	78,970
1982	157	332	2,790	1,823	16,154	114,148	19,101	116,304
1983	n/a	n/a	9,121	8,937	9,108	44,113	18,226	53,050
Average	586	1,016	4,702	4,714	14,258	58,120	19,194	63,241

(continued)

Table 4 (continued).

Area and Years	Salmon Lb	Salmon $	Other Finfish Lb	Other Finfish $	Shellfish Lb	Shellfish $	Total Lb	Total $
Adak and W. Aleutians								
1979	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1980	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1981	97	120	136	20	2,071	5,803	2,304	5,943
1982	589	949	n/a	n/a	1,858	13,050	2,447	13,999
1983	n/a	n/a	701	320	5,721	40,691	6,423	41,011
Average	343	535	419	170	3,217	19,848	3,725	20,318

Source: ADF&G 1979-84.

C. Employment

1. Fish-harvesting employment. Fish-harvesting employment is not included in the Statistical Quarterly employment data routinely collected by the ADL, because most fishermen are self-employed. Therefore, the ADL has produced a special report on commercal fisheries harvest employment since 1977 (see appendix C for further information). Although this information is not directly comparable to data from other industrial sectors because of variations in data collection techniques and definitions, it does provide an indication of the magnitude of fish-harvesting employment in the Southwest Region. Employment figures are reported in ADL areas that roughly correspond to Division of Commercial Fisheries management units or subregions (see map 3).

Table 5 and figure 1 present employment data for the Southwest Region for all reported fish species. This includes salmon, shellfish, halibut, groundfish, and herring caught by a variety of gear types. Monthly average employment figures are all 12-month averages; the shorter the season length, due to biological characteristics or fishery regulations, the less representative are the annual average figures in some aspects. Some fisheries (halibut and herring, for example) have restricted seasons because of increased participation and investment in more efficient boats and gear. This has resulted in shortened but intensified seasons with employment figures not readily comparable to traditional employment figures.

Table 6 and figure 2 show harvest employment for the Kodiak Management Area (salmon, herring, shellfish, groundfish, and halibut); table 7 and figure 3 show harvest employment for the Bristol Bay Management Area (salmon, shellfish, and herring); table 8 and figure 4 show harvest employment for the Bering Sea/Western Aleutians/Alaska Peninsula management areas (salmon, shellfish, herring, groundfish, and halibut).

The differences between monthly average (annualized) employment and peak July employment are notable, especially in the cases of the Bristol Bay and Kodiak areas. The Aleutian/Peninsula/Bering Sea (A/P/B) area is dominated by the crab fisheries, which provide employment in the Southwest Region over a 12-month period. The comparison of annualized employment figures among these three areas illustrates some of the problems involved with annualized figures. These areas have relatively comparable annual figures--Kodiak, 955; Peninsula/Aleutians/Bering Sea, 969; and Bristol Bay, 1,105. However, harvesting employment occurs in every month in Kodiak and the A/P/B areas whereas employment occurs primarily in five months in Bristol Bay, which has the highest annualized figure. Average July Bristol Bay employment is about 3.5

Table 5. Southwest Region Harvesting Employment from All Fish Species (Number of Persons)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	2,199	856	592	605	733	1,030	5,798	7,459	3,853	2,020	1,337	1,031	1,082
1978	2,688	859	842	978	1,066	1,597	7,519	8,913	5,358	2,086	1,474	863	716
1979	3,098	697	865	1,517	972	3,111	8,454	10,045	5,167	2,432	2,107	1,150	657
1980	3,185	1,114	1,427	1,530	1,302	3,274	5,293	10,463	5,976	3,169	2,362	1,503	816
1981	3,446	898	929	1,606	1,563	2,603	9,998	10,140	5,319	2,925	2,309	1,662	1,389
1982	3,553	1,254	1,387	1,739	1,246	3,545	9,208	10,205	6,210	3,611	1,696	1,135	1,723
Average	3,028	946	1,007	1,329	1,137	2,273	7,712	9,538	5,314	2,706	1,881	3,105	1,064

Source: ADL 1984.

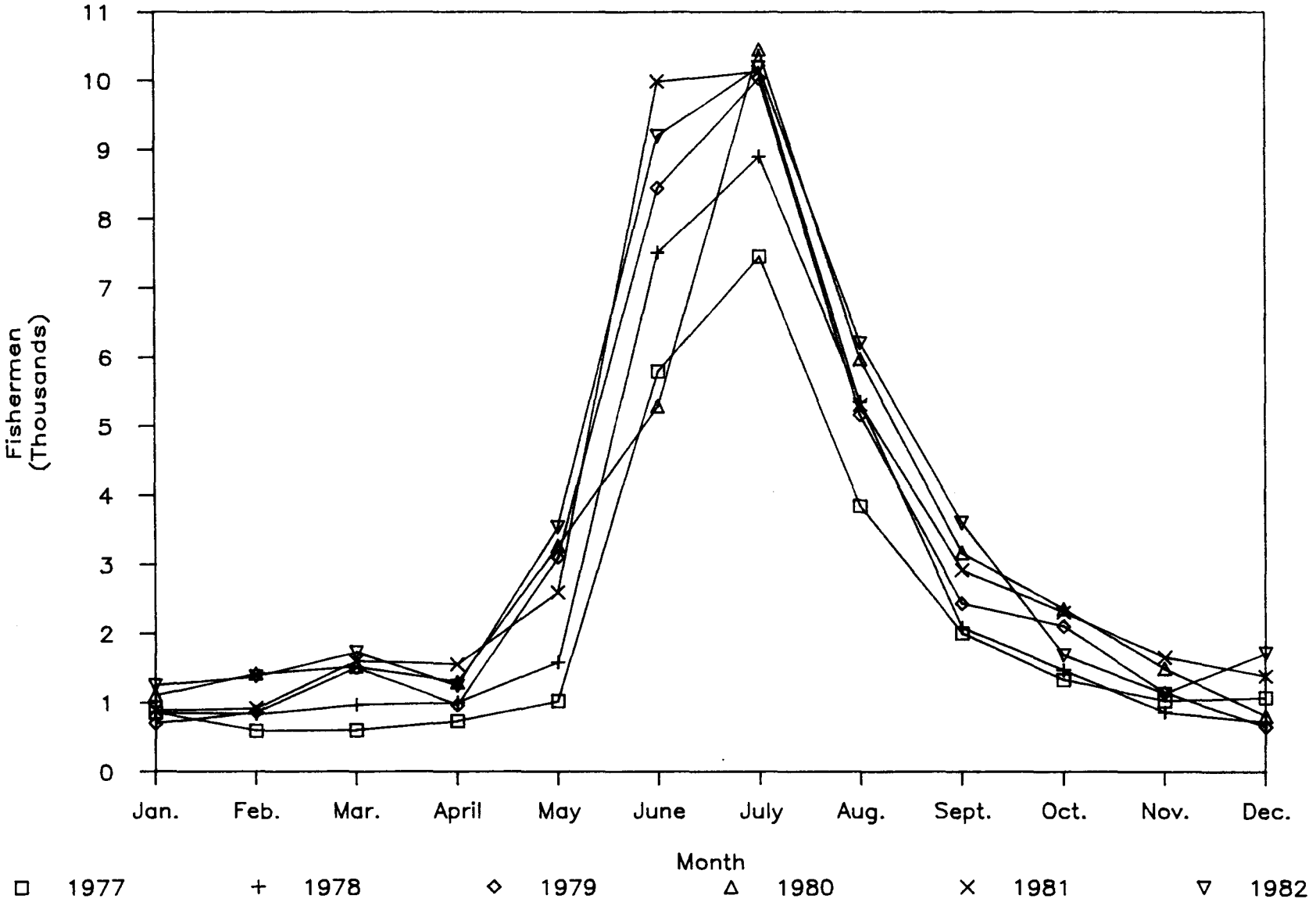


Figure 1. Southwest Region harvesting employment from all fish species (number of fishermen and crew).

Table 6. Kodiak Harvesting Employment from All Fish Species (Number of Persons)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	746	458	352	339	312	222	907	2,178	1,966	1,100	469	277	376
1978	924	554	476	496	369	393	1,551	2,503	2,474	888	572	380	382
1979	999	427	719	782	91	547	1,789	2,720	2,292	897	752	545	417
1980	906	800	781	571	136	777	682	2,494	2,243	900	773	459	257
1981	984	319	232	736	499	508	2,040	1,996	2,139	1,177	951	537	662
1982	1,169	685	700	873	484	1,052	2,159	2,011	2,377	1,634	990	304	760
Average	955	541	543	633	315	583	1,521	2,317	2,249	1,099	751	417	476

Source: ADL 1984.

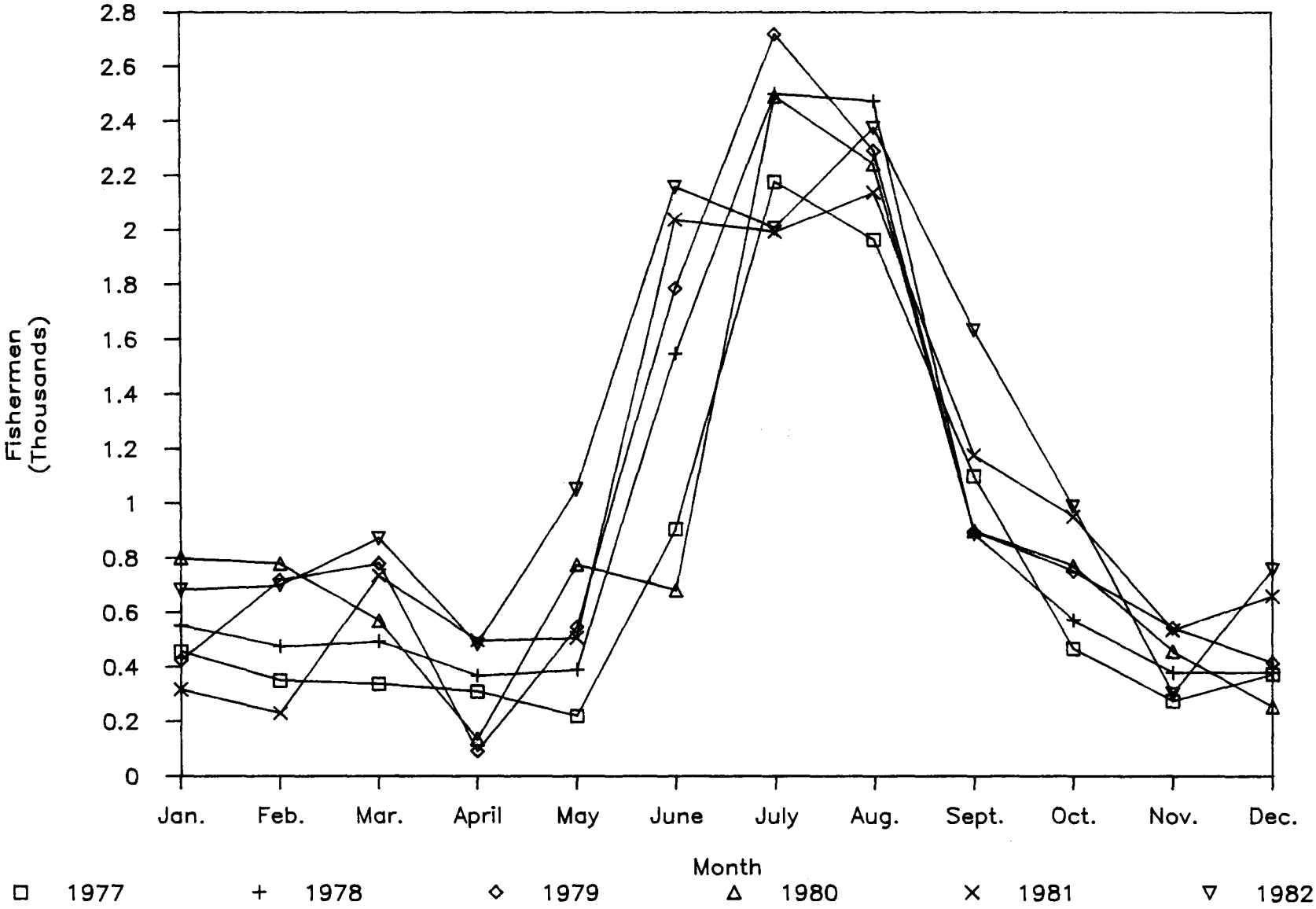


Figure 2. Kodiak harvesting employment from all fish species (number of fishermen and crew).

Table 7. Bristol Bay Harvesting Employment from All Fish Species (Number of Persons)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	729	4	2	0	2	142	3,600	4,111	724	151	0	5	7
1978	995	0	0	0	2	491	4,668	5,020	1,535	227	0	0	0
1979	1,208	0	0	2	5	1,823	5,414	5,742	1,329	186	0	0	0
1980	1,165	0	0	4	155	1,523	3,343	6,357	2,162	441	0	0	0
1981	1,260	0	0	14	27	1,065	6,075	6,366	1,537	35	0	0	0
1982	1,270	4	2	0	0	1,563	4,982	6,443	2,086	177	0	0	0
Average	1,105	1	0	3	32	847	4,680	5,673	1,562	203	0	1	1

Source: ADL 1984.

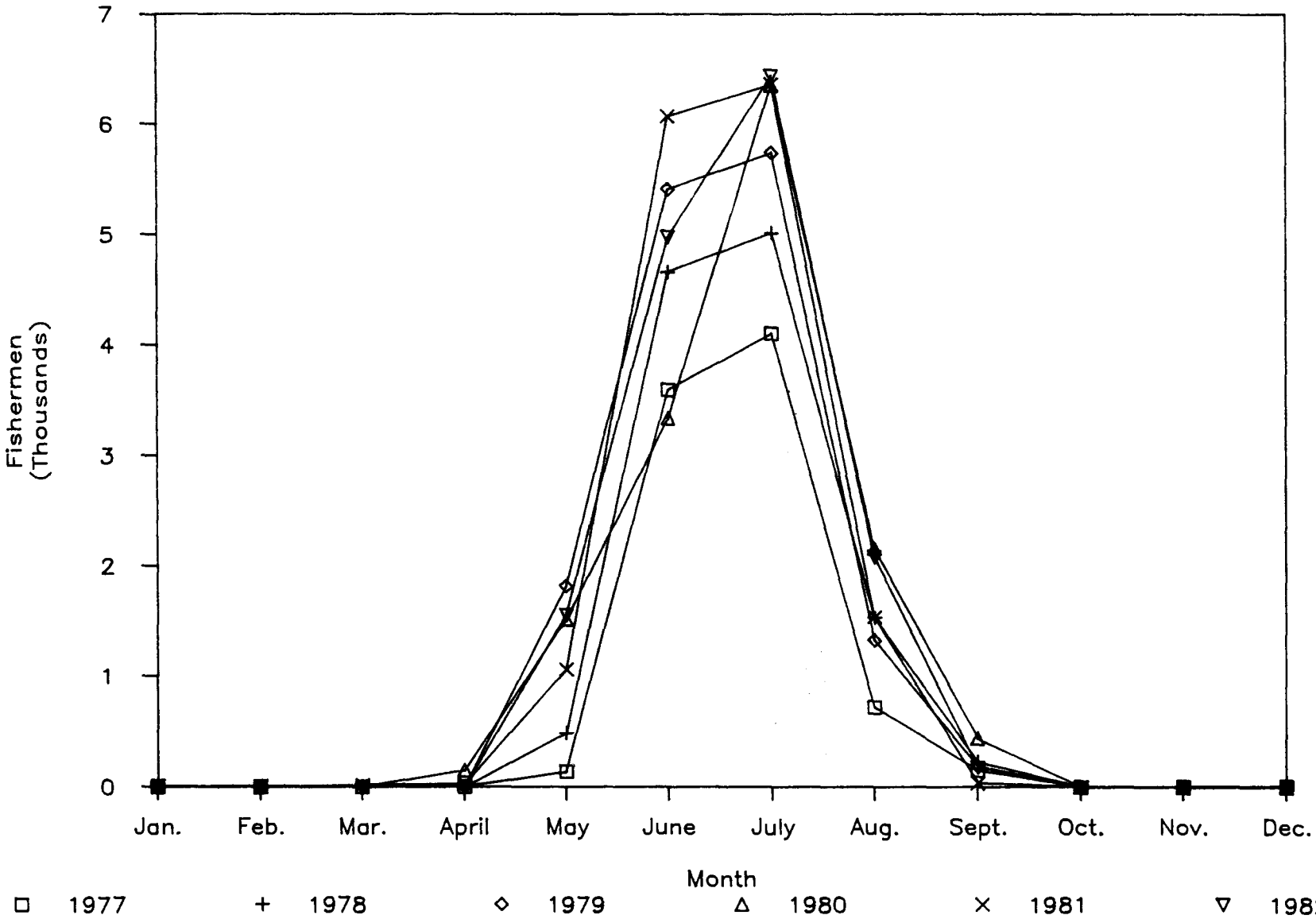


Figure 3. Bristol Bay harvesting employment from all fish species (number of fishermen and crew).

Table 8. Alaska Peninsula, Bering Sea, West. Aleutians Harvesting Employment for All Fish Species (Number of Persons)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	724	394	238	266	419	1,291	1,170	1,170	1,163	759	868	749	699
1978	769	305	366	482	635	1,300	1,390	1,390	1,349	971	902	483	334
1979	891	270	146	733	876	1,251	1,583	1,583	1,546	1,349	1,355	605	240
1980	1,114	314	646	955	1,011	1,268	1,612	1,612	1,571	1,828	1,589	1,044	559
1981	1,202	579	697	856	1,037	1,883	1,778	1,778	1,643	1,713	1,358	1,125	727
1982	1,114	569	687	866	762	2,067	1,751	1,751	1,747	1,800	706	831	963
Average	969	405	463	693	790	842	1,510	1,547	1,503	1,403	1,130	806	587

Source: ADL 1984.

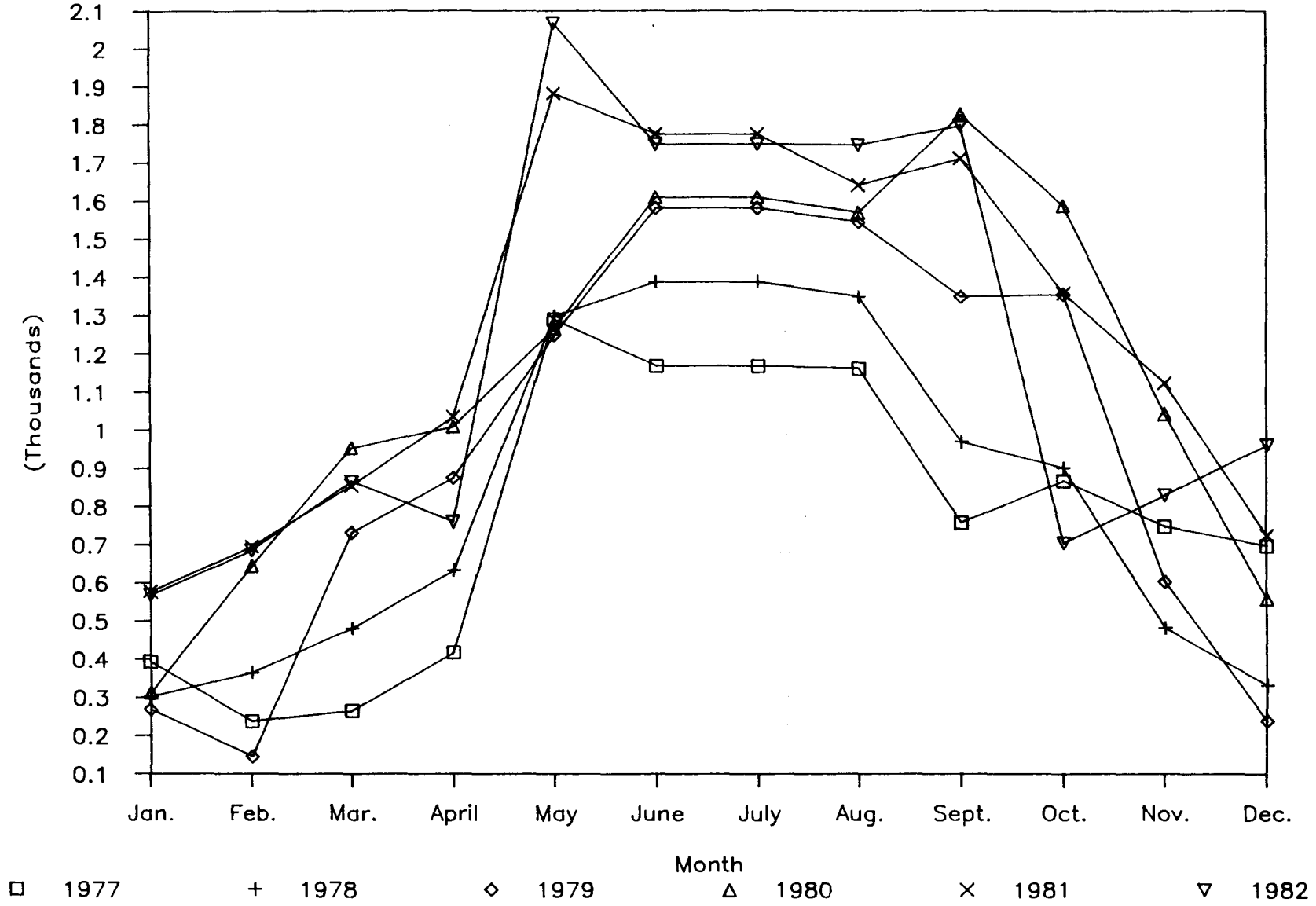


Figure 4. Alaska Peninsula/Bering Sea/Western Aleutians harvesting employment for all fish species (number of fishermen and crew).

times A/P/B July employment and about 2.5 times Kodiak July employment. For harvesting employment (and processing employment that follows), it is important that annualized figures not be viewed alone but in the context of peak figures, ex-vessel gross earnings, regional employment characteristics and options, and harvesting employment patterns among fisheries and subareas.

For the Southwest Region as a whole as well as for its ADL subareas, the overall harvesting employment trend for the period 1977 to 1982 was towards increases in monthly and annualized figures (see table 5). The exceptions to this were some decreases in 1982 winter shellfish harvesting employment due to reduced stocks. The peak July employment figure for the region was 10,463 in 1980. However, the 1980 average annual employment figure of 3,185 is below the 1982 regional annual figure of 3,553, which is the peak for the 1977-to-1982 period.

2. Fish- and seafood-processing employment. Information on fish- and seafood-processing employment is obtained from the ADL Statistical Quarterly data. For further information on this database, see appendix C in this volume. Fish-and seafood-processing data for the Southwest Region are presented in table 9 on an annual basis and in table 10 on a monthly basis. The figures shown constitute the number of jobs filled during the pay period containing the twelfth day of each month, not the number of employees. Processing employment is not broken down by species or species groups. Therefore, seafood-processing employment data are presented only in this regional commercial fish overview. However, processing for the most part corresponds to harvesting, so, on a monthly basis, processing employment can be roughly attributed to species groups. For instance, June, July, and August processing employment is mostly attributable to salmon, and September, October, and November employment can be attributed to shellfish.

Table 9 shows that peak processing employment occurred in 1979, with an average monthly employment of just under 4,000. This is average monthly employment, or employment for all months averaged for the entire year. After holding fairly constant over a three-year period, employment dropped in 1982 to 2,845 jobs, largely due to decreases in shellfish harvests and subsequent processing (ADL 1985).

Table 10 shows employment by month averaged over the five-year period 1978-1982, by subregion (defined by the ADL to roughly correspond to ADF&G management areas). As one would expect, seasonal patterns of processing employment follow harvest patterns. The month of peak employment for the Kodiak and Bristol Bay subregions is July; the peak month for the

Table 9. Average Monthly Fish- and Seafood-Processing Employment for Southwest Alaska, by Subregion, 1977 to 1982

Year	Jobs Filled			
	Aleutians	Bristol Bay	Kodiak	Total in Southwest Alaska
1977	1,130	264	1,573	2,967
1978	1,610	384	1,550	3,544
1979	1,739	665	1,585	3,989
1980	1,717	624	1,536	3,877
1981	1,684	699	1,414	3,797
1982	1,348	638	1,159	2,845

Source: ADL 1984.

Table 10. Five-Year Average Employment by Month in Fish and Seafood Processing for Southwest Alaska, by Subregion, 1978-82

Month	Average Employment by Month			
	Aleutians	Bristol Bay	Kodiak	Total No. of Jobs in Southwest Alaska
January	758	121	1,155	2,034
February	1,078	150	1,303	2,531
March	1,455	182	1,524	3,161
April	1,613	234	1,150	2,997
May	1,713	446	1,644	3,803
June	1,733	765	1,980	4,478
July	2,008	2,335	2,883	7,226
August	1,893	1,454	2,876	6,223
September	2,189	703	1,929	4,821
October	2,225	414	1,862	4,501
November	1,673	229	1,426	3,328
December	1,095	192	1,103	2,390
Annual averages	1,619	602	1,736	3,957

Source: ADL 1978-82.

Aleutian subregion is October. The high fall employment in the Aleutians is due to shellfish harvests, whereas Kodiak and Bristol Bay subregions are dominated by the salmon fisheries. Seasonal variations are greatest for the Bristol Bay area, which is dominated by the summer salmon fishery.

For the Southwest Region, the peak month for processing employment, based on the average of 1978 to 1982, is July with 7,226 jobs. The month of lowest employment is January, with 2,034 jobs.

3. Fish-and seafood-processing payrolls and monthly wages. Total annual payrolls and average monthly wages for fish and seafood processing are shown in table 11. Total annual payrolls for the region neared or exceeded $70 million per year during the three-year period 1979 to 1981. The decline in 1982 payrolls is probably related to reduced king crab production in the Aleutians and Kodiak subregions during that year (ADL 1985). Although peak years varied among the subregions, the highest growth rate over the six-year period, 1977 through 1982, occurred in the Bristol Bay area.

   Average monthly wages are also shown in table 11. Wages are consistently lowest in the Kodiak area. Wages in the Aleutians range from $1,211 per month to $1,577 per month during the reporting period. Wages in Bristol Bay ranged considerably higher: $1,803 to $2,483 over the 1977 to 1982 reporting period.

II. SALMON FISHERY

A. Regional Summary

1. Regional overview. Alaska's fisheries were federally managed from the late 1800's until Alaska statehood in 1959. Following statehood, the ADF&G has managed the salmon fishery. The Alaska salmon fishery became a limited entry fishery in 1974 when the Commercial Fisheries Entry Commission was established. Management of fisheries within three nautical miles from shore is the responsibility of the State of Alaska. The Magnuson Fishery Conservation and Management Act, implemented in 1977 and amended in 1980, provided for conservation and exclusive United States management of all fisheries within 200 nautical miles from shore, creating the Fishery Conservation Zone from 3 to 200 nautical miles from shore. The NPFMC is responsible for managing fisheries in this zone. The International North Pacific Fisheries Commission (INPFC), comprised of Canada, Japan, and the United States, recommends management

Table 11. Total Annual Payrolls and Average Monthly Wages in Seafood and Fish Processing, Southwest Alaska, by Subregion, 1977 to 1982

Region and Subregion*	1977		1978		1979		1980		1981		1982	
	Total Ann. Pay.	Avg. Month. Wage	Total Ann. Pay.	Avg. Month. Wage	Total Ann. Pay.	Avg. Month. Wage	Total Ann. Pay.	Avg. Month. Wage	Total Ann. Pay.	Avg. Month. Wage	Total Ann. Pay.	Avg. Month. Wage
Aleutians	16,943,825	1,250	23,400,129	1,211	29,594,275	1,418	31,479,241	1,528	29,244,622	1,497	25,502,461	1,577
Bristol Bay	5,711,389	1,803	8,408,534	1,825	14,433,464	1,809	15,759,476	2,105	19,084,615	2,275	19,010,659	2,483
Kodiak	19,544,857	807	21,929,666	1,179	24,040,076	1,264	22,559,664	1,224	21,764,103	1,283	18,076,129	1,300
Southwest Alaska total	42,200,071	1,185	53,738,329	1,264	68,067,815	1,422	69,798,381	1,500	70,093,340	1,538	62,589,249	

Source: ADL 1977-82.

* Subregions as defined by ADL to roughly correspond with ADF&G fisheries management areas.

procedures outside the United States and Canadian 200-nautical-mile zones.

The ADF&G manages the Southwest Region salmon fishery in five management areas: Kodiak, Chignik, Alaska Peninsula, Aleutian Islands, and Bristol Bay. In this economic narrative, the Alaska Peninsula and Aleutian Islands areas have been combined because of income disclosure considerations. ADF&G fishery management areas are used for management purposes (such as regulating season length). The Alaska salmon fisheries are an excellent example of how management scenarios (such as extended jurisdiction, limited entry, exclusive registration, etc.) can affect fisheries values; Alaska salmon values have changed considerably in the past 10 years as a result of the influence of these regulations. Therefore, all reported values should be viewed within the context of regulatory parameters. This narrative provides an overview of ex-vessel values, first wholesale value and harvesting employment, of the Southwest Region's commercial salmon fisheries. For more information on these fisheries and their regulations, see volume 2 of the Alaska Habitat Management Guide for the Southwest Region, Human Use section.

2. Ex-vessel value. The annual average ex-vessel value for salmon in the Southwest Region during the period 1975-1982 was $124,713,000. This value is shown by species and management area in table 12. Annual figures (shown in table 13) show an upward trend during the years covered; the total combined salmon ex-vessel value for 1981 exceeds the 1975 value by over ten-fold and is almost twice the annual average for the period. The high values for the years 1979 to 1981 can be attributed to strong runs, high ex-vessel prices (table 14), and the decrease in high seas interception of salmon stocks.

   Sockeye salmon is the dominant species regionally, accounting for 69% of the average annual combined salmon ex-vessel value; for the Bristol Bay Management Area, sockeye salmon account for 88% of the average annual combined salmon ex-vessel value. Pink salmon was approximately 17% of the combined regional salmon value. Pink salmon is dominant in the Kodiak Management Area, accounting for 61% of average ex-vessel value there. Pink salmon is also of major importance in the Alaska Peninsula-Aleutian Islands Management Area. Further comparisons can be made by a review of table 12.

3. First wholesale value. Information on salmon first wholesale value for the years 1979 through 1983 can be found in table 4 of section I of this narrative. Information by salmon species, product, and subregions are available for 1981 (table 15, this section). The total 1981 Southwest Region

Table 12. Average Ex-vessel Value of Commercial Salmon Harvests in the Southwest Region by Species and Fishery Management Area, 1975-82*

Species	Bristol Bay	Kodiak	Chignik	Peninsula/ Aleutian	Total
Chinook	3,022	19	41	381	3,462
Sockeye	60,732	4,611	10,183	10,740	86,266
Coho	1,231	715	506	1,208	3,660
Pink	1,235	13,385	1,174	5,152	20,946
Chum	2,747	3,179	847	3,605	10,378
Total	68,967	21,909	12,751	21,086	124,707

Source: CFEC 1984.

* Totals may not match other tables because of rounding.

Table 13. Ex-vessel Value of Combined Commercial Salmon Harvests for Southwest Alaska Fishery Management Areas, by Origin of Fishermen, 1975 to 1982

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Bristol Bay	Fairbanks North Star	98	72	64	253	967	448	965	660	441
	Bethel	435	1053	1398	2256	3189	2267	4196	1797	2074
	Dillingham	2836	7482	8144	18366	30652	10915	36605	21258	18282
	Bristol Bay	654	1209	1740	2875	8989	4574	6150	3972	3770
	Matanuska-Susitna	62	111	153	524	1304	944	1802	1453	794
	Anchorage	711	1344	1771	3980	12032	8066	12089	8578	6071
	Kenai Peninsula	130	198	290	714	3893	2902	3622	3447	1900
	Kodiak Island	186	190	338	518	1658	1077	2214	1364	943
	Valdez-Cordova	**	**	**	**	678	843	1340	897	506
	Juneau	62	47	99	185	1473	1346	1629	1322	771
	Wrangell-Petersburg	**	**	**	**	585	857	816	844	395
	Other Alaska*	136	169	154	551	1761	854	1358	1121	763
	Alaska	5366	11946	14220	30379	67181	45095	72788	46713	36711
	Other USA	6172	9874	12314	24635	71329	38726	59816	33459	32040
	Unknown	138	161	220	307	461	113	220	128	218
	Subtotal	11675	21980	26754	55321	138971	83933	132824	80300	68970
Chignik	Dillingham	636	1992	5564	6307	5244	2941	8151	6734	4696
	Anchorage	**	**	649	1130	960	530	1113	965	699
	Kenai Peninsula	86	457	1235	1428	1172	581	2013	1315	1036
	Kodiak Island	543	1624	4566	4597	4045	1933	5641	3038	3248
	Other Alaska*	**	**	1085	810	1177	405	1219	456	680
	Alaska	1372	4497	13099	14273	12598	6390	18137	12509	10359
	Other USA	408	989	2814	3265	3290	1349	3591	2332	2255
	Unknown	0	0	0	370	648	50	8	17	137
	Subtotal	1780	5486	15912	17909	16537	7789	21736	14858	12751
Kodiak	Anchorage	52	137	203	278	240	487	558	341	287
	Kenai Peninsula	196	736	1158	2265	1118	1942	1709	1021	1268
	Kodiak Island	3182	11313	12012	18765	15070	17116	21661	12090	13901
	Other Alaska*	116	270	159	370	391	363	511	281	308
	Alaska	3546	12457	13531	21678	16818	19908	24438	13732	15764
	Other USA	1371	6589	5333	8678	6125	7498	8229	5076	6112
	Unknown	0	79	8	1	154	26	28	13	39
	Subtotal	4917	19125	18873	30357	23098	27432	32695	18822	21915
Peninsula/ Aleutians	Aleutian Islands	985	4524	3885	11349	21440	16749	24928	20444	13038
	Kenai Peninsula	**	**	**	**	439	372	1003	1234	423
	Other Alaska*	**	**	**	**	1206	1082	1646	1976	885
	Alaska	1087	4706	4218	12236	23085	18203	27578	23654	14346
	Other USA	567	1709	1717	4165	12841	7881	12461	11829	6646
	Unknown	3	7	23	131	323	43	53	166	94
	Subtotal	1658	6422	5959	16532	36249	26127	40092	35649	21086
Total		20030	53013	67498	120120	214854	145281	227347	149629	124721

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 14. Southwest Ex-vessel Prices ($), 1975-82 by Species and Gear Type and Management Area

Mgt. Area/Gear Type	1975	1976	1977	1978	1979	1980	1981	1982
Kodiak								
Chinook								
Set gill net	0.50	0.63	1.15	0.92	1.27	1.01	0.95	1.12
Purse seine	0.50	0.50	1.09	1.14	1.16	1.01	1.92	0.96
Beach seine	0.50	0.50	1.09	0.98	1.21	1.01	1.07	0.96
Sockeye								
Set gill net	0.47	0.65	0.83	1.07	1.25	0.80	1.11	0.92
Purse seine	0.47	0.65	0.88	1.14	1.26	0.80	1.14	0.86
Beach seine	0.47	0.65	0.88	1.10	1.25	0.80	1.08	0.92
Coho								
Set gill net	0.53	0.50	0.74	0.75	0.99	0.55	0.60	0.46
Purse seine	0.53	0.50	0.65	0.91	0.94	0.69	0.82	0.78
Beach seine	0.53	0.50	0.65	0.97	0.95	0.72	0.79	0.79
Pink								
Set gill net	0.34	0.33	0.42	0.35	0.36	0.40	0.42	0.21
Purse seine	0.34	0.33	0.38	0.30	0.37	0.34	0.45	0.21
Beach seine	0.34	0.33	0.38	0.30	0.37	0.34	0.44	0.21
Chum								
Set gill net	0.28	0.29	0.50	0.37	0.56	0.46	0.48	0.32
Purse seine	0.28	0.29	0.52	0.41	0.51	0.51	0.54	0.36
Beach seine	0.28	0.29	0.52	0.41	0.45	0.46	0.52	0.20
Chignik								
Chinook								
Set gill net	---	---	0.79	---	---	---	---	---
Purse seine	0.50	0.75	0.89	1.67	1.40	1.33	1.43	1.11
Beach seine	---	0.75	0.89	---	---	---	---	---
Sockeye								
Set gill net	---	---	0.80	---	---	---	---	---
Purse seine	0.50	0.56	0.84	1.29	1.50	0.86	1.26	0.97
Beach seine	---	0.56	0.84	---	---	---	---	---
Coho								
Set gill net	---	---	0.68	---	---	---	---	---
Purse seine	0.47	0.48	0.67	0.84	0.98	0.62	0.79	0.75
Beach seine	---	0.48	0.67	---	---	---	---	---
Pink								
Set gill net	---	---	0.33	---	0.42	---	---	---
Purse seine	0.40	0.22	0.38	0.31	0.43	0.40	0.41	0.21
Beach seine	---	0.22	0.28	---	0.43	---	---	---
Chum								
Set gill net	---	---	0.35	---	0.75	---	---	---
Purse seine	0.35	0.21	0.40	0.58	0.75	0.47	0.52	0.44
Beach seine	---	0.21	0.40	---	0.75	---	---	---
Alaska Peninsula								
Chinook								
Draft gill net	0.50	0.53	0.85	0.78	1.17	1.21	1.17	1.07
Set gill net	0.50	0.53	0.85	0.78	1.17	1.21	1.29	1.17
Purse seine	0.50	0.49	0.75	0.92	1.09	1.21	1.38	1.22
Beach seiner	---	0.49	0.75	---	---	---	---	---
Fish trap	---	---	---	---	---	1.21	---	---

(continued)

Table 14 (continued).

Mgt. Area/Gear Type	1975	1976	1977	1978	1979	1980	1981	1982
Sockeye								
Drift gill net	0.47	0.34	0.63	0.76	1.17	0.44	0.89	0.89
Set gill net	0.47	0.34	0.63	0.76	1.17	0.53	1.02	0.88
Purse seiner	0.47	0.52	0.70	0.80	1.09	0.37	0.88	0.87
Beach seine	---	0.52	0.70	---	---	---	---	---
Fish trap	---	---	---	---	---	0.37	---	---
Coho								
Drift gill net	0.42	0.47	0.61	0.74	1.02	0.48	0.72	0.74
Set gill net	0.42	0.47	0.61	0.74	1.02	0.48	0.73	0.71
Purse seine	0.42	0.47	0.61	0.72	0.76	0.49	0.71	0.72
Beach seine	---	0.47	0.61	---	---	---	---	---
Pink								
Drift gill net	0.30	0.27	0.33	0.38	0.41	0.39	0.61	0.16
Set gill net	0.30	0.27	0.33	0.38	0.41	0.48	0.42	0.13
Purse seine	0.30	0.27	0.20	0.31	0.38	0.26	0.61	0.15
Beach seine	---	0.27	0.20	---	---	---	---	---
Fish trap	---	---	---	---	---	0.39	---	---
Chum								
Drift gill net	0.25	0.34	0.40	0.49	0.63	0.44	0.45	0.44
Set gill net	0.25	0.34	0.35	0.49	0.63	0.26	0.44	0.46
Purse seine	0.25	0.26	0.40	0.47	0.51	0.33	0.45	0.45
Beach seine	---	0.26	0.40	---	---	---	---	---
Fish trap	---	---	---	---	---	0.33	---	---
Bristol Bay								
Chinook								
Drift gill net	0.40	0.49	0.75	0.72	1.02	1.00	1.21	1.23
Set gill net	0.40	0.49	0.75	0.72	1.00	1.00	1.21	1.23
Purse seine	---	---	---	---	---	1.00	---	---
Beach seine	---	---	---	---	---	1.00	---	---
Fish trap	---	---	---	---	---	1.00	---	---
Sockeye								
Drift gill net	0.40	0.56	0.60	0.73	1.03	0.57	0.77	0.69
Set gill net	0.40	0.56	0.60	0.73	1.03	0.57	0.77	0.69
Purse seine	---	---	0.57	---	---	0.57	---	---
Beach seine	---	---	0.53	---	---	0.57	---	---
Fish trap	---	---	---	---	---	0.57	---	---
Coho								
Drift gill net	0.38	0.41	0.59	0.78	1.05	0.57	0.70	0.75
Set gill net	0.38	0.41	0.65	0.78	1.05	0.57	0.70	0.75
Purse seine	---	---	---	---	---	0.57	---	---
Beach seine	---	---	0.59	---	---	0.57	---	---
Fish trap	---	---	---	---	---	0.57	---	---
Pink								
Drift gill net	0.28	0.31	0.36	0.33	0.38	0.25	0.30	0.22
Set gill net	0.28	0.31	0.36	0.33	0.38	0.25	0.30	0.22
Fish trap	---	---	---	---	---	0.25	---	---
Purse seine	---	---	0.21	---	---	---	---	---
Chum								
Drift gill net	0.30	0.32	0.40	0.40	0.50	0.34	0.41	0.35
Set gill net	0.30	0.32	0.40	0.40	0.53	0.34	0.41	0.35
Purse seine	---	---	0.46	---	---	0.34	---	---
Beach seine	---	---	0.36	---	---	0.34	---	---
Fish trap	---	---	---	---	---	0.34	---	---

Source: CFEC 1982.

--- means no data were available.

Table 15. Wholesale Value of Processed Salmon Products by Species for Southwest Alaska, by Subregions, 1981

Region and Subregions	Product	Species	Value in Dollars
Bristol Bay	Bait	Sockeye salmon	578
	Roe	All	19,531,394
	Sections	Chum salmon	438,099
	Whole	Chinook salmon	8,762,604
		Chum salmon	6,224,234
		Coho salmon	1,669,440
		Pink salmon	3,834
		Sockeye salmon	166,131,166
Subregion total	All	All	202,761,349
Aleutians	Bait	All (roe)	22,673
	Roe	All	1,653,445
	Whole	Chinook salmon	554,520
		Chum salmon	1,992,967
		Coho	87,258
		Pink salmon	3,779,257
		Sockeye salmon	4,868,066
Subregion total	All	All	12,948,186
Kodiak	Roe	All	14,986,103
	Whole	Chinook salmon	107,024
		Chum salmon	11,602,919
		Coho salmon	1,329,473
		Pink salmon	48,938,925
		Sockeye salmon	41,809,060
Subregion total	All	All	118,773,504
Southwest Alaska	Bait	All	23,251
	Roe	All	36,170,942
	Sections	Chum salmon	438,099
	Whole	Chinook salmon	9,414,148
		Chum salmon	19,820,120
		Coho salmon	3,086,171
		Pink salmon	52,722,016
		Sockeye salmon	212,808,292
Region total	All	All	334,483,039

Source: ADF&G 1984a.

salmon first wholesale value was $334,483,039. Sockeye (red) salmon accounted for 64% of the region total. Pink salmon contributed 16% of the region total. Salmon roe was 11% of the 1981 total first wholesale value. Fisheries values can change abruptly as a consequence of a variety of biological, physical, social, economic, and/or management factors. Therefore, one year of data should only be viewed in the context of relative product types and values.

4. Harvesting employment. Employment in Southwest Alaska in the commercial salmon fisheries seasonally coincides with the salmon-spawning runs. Table 16 and figure 5 present data on harvest employment in the salmon fisheries for the Southwest Region by ADL subareas Kodiak, Bristol Bay, and Alaska Peninsula-Aleutian Islands (see section I of this narrative and map 3 for a discussion of ADL subareas). For more information on ADL and commercial fish-harvesting employment, see appendix C in this volume.

   Salmon-harvesting employment in the Southwest Region occurs primarily in May to September, with July being the peak month. Average July employment for the region was 8,885 for the years 1977 through 1982. The peak July employment was in 1980 when 9,756 fishermen and crew were employed salmon fishing. A comparison of tables 5 and 16 reveals that the average annualized (monthly) salmon employment was approximately 58% of the region's average annual commercial fish-harvesting employment. However, it was about 93% of the average July employment for the region for 1977 to 1982.

   The salmon-harvesting employment trend for the region and subregions for the period 1977 to 1982 in terms of annual averages and monthly figures has been an increase in seafood-harvesting employment figures. The exception to this is employment in the Kodiak subregion, where July and August employment have declined since 1979. The Bristol Bay Management Area accounts for approximately 64% of the Southwest Region's peak salmon-harvesting employment. The Kodiak Management Area contributes 22% and the Alaska Peninsula/ Aleutian Islands areas account for 14% of the period's peak salmon-harvesting employment (tables 16, 22-24).

B. Fishery Management Areas Summaries

Although the Southwest Region is managed by the ADF&G Commercial Fish Division, in five management areas, this economic narrative combines the Alaska Peninsula and Aleutian Islands areas for reasons of ex-vessel value disclosure regulations. Therefore, the Southwest Region is defined by four fishery management areas: Bristol Bay, Chignik, Kodiak, and the Alaska Peninsula/Aleutian Islands. Table 12 provides a comprehensive overview of the

Table 16. Southwest Region Salmon-Harvesting Employment (Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	1,344	4	2	0	2	20	4,945	6,931	3,547	693	6	6	7
1978	1,718	0	0	0	0	154	6,771	8,287	4,808	585	0	0	0
1979	1,869	0	0	0	0	264	7,621	9,166	4,783	583	0	0	0
1980	1,656	0	0	0	0	189	4,417	9,756	5,576	1,121	0	0	0
1981	1,986	0	0	0	0	253	8,580	9,662	4,746	585	0	0	0
1982	1,987	0	0	0	0	65	7,784	9,508	5,332	1,157	8	0	0
Average	1,760	1	0	0	0	158	6,686	8,885	4,799	787	2	1	1

Source: ADL 1984.

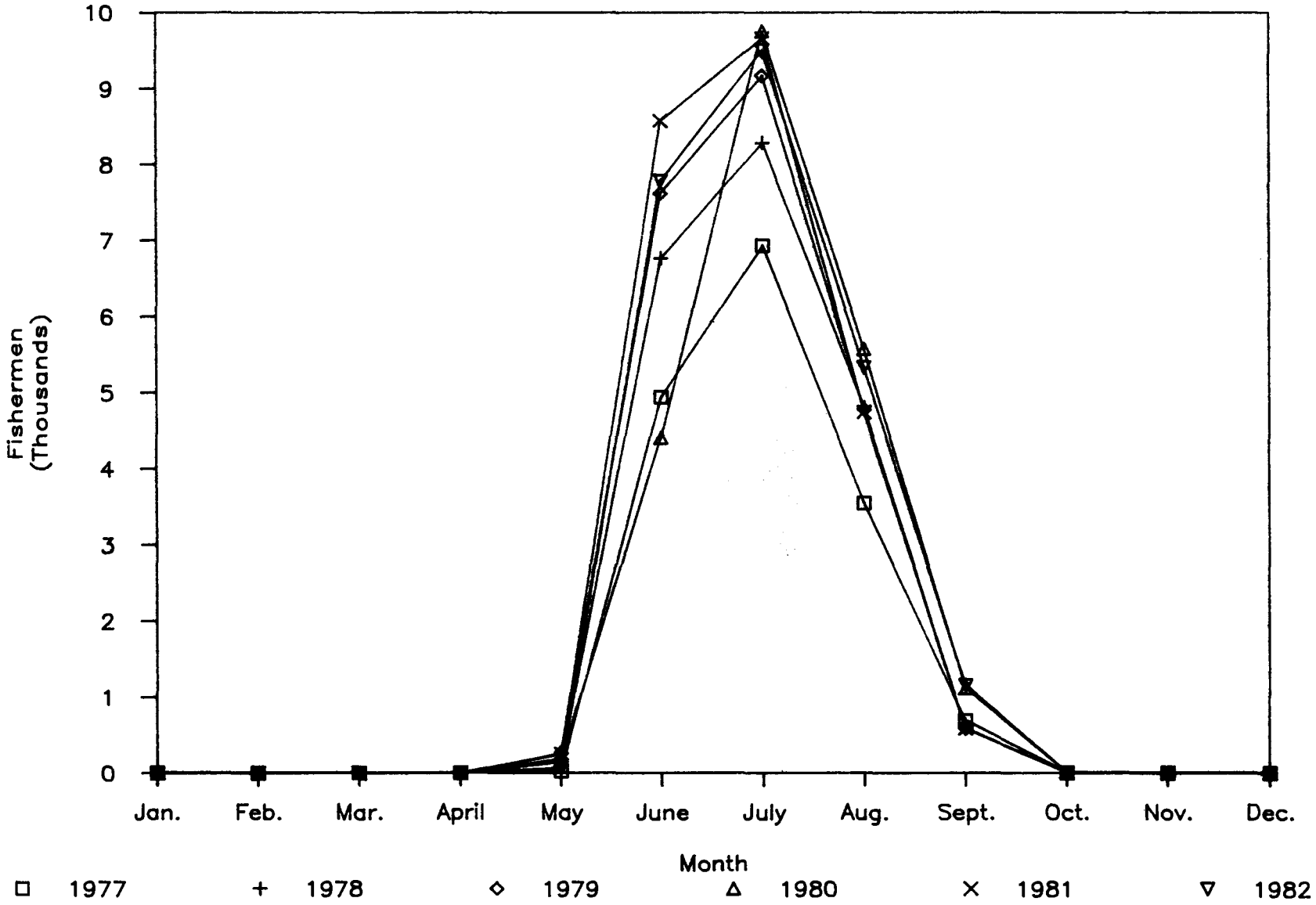


Figure 5. Southwest Region salmon harvesting employment (number of fishermen and crew).

ex-vessel values of commercial salmon harvests for these management areas. As shown in this table, the Bristol Bay Management Area generally accounts for approximately 50% of the region's combined salmon ex-vessel values; the Chignik area accounts for approximately 10%; and the remaining 30% is approximately divided between the Alaska Peninsula/Aleutian Islands and Kodiak areas. Table 13, however, shows that ex-vessel values increased more rapidly in the Kodiak area while those in the Peninsula/Aleutian area increased less rapidly but surpassed the Kodiak values in 1979, 1981, and 1982 because of the significant increase in harvest of higher priced sockeye salmon as compared to pink salmon in Kodiak. In the Bristol Bay Fishery Management Area, fishermen from at least 12 Alaska census areas fished the area. Of these census areas, Dillingham received the largest income from the Bristol Bay salmon fisheries during the period 1975 to 1982, with ex-vessel values ranging from $2.8 million in 1975 to $36.6 million in 1981; the average annual Dillingham census area ex-vessel gross income for the period 1975 to 1982 was $18.3 million (note that the Dillingham census area includes a particularly large land area and most of the small communities of the Bristol Bay subregion, including both sides of the northern/eastern portion of the Alaska Peninsula). Tables 17-21 contain a more detailed breakdown of harvest values by species, management area, and census area.

1. Bristol Bay Management Area:

   a. Species harvest and value summaries. Salmon may be commercially harvested in Bristol Bay by drift gill nets and set gill nets. Maximum gill net vessel length is 32 ft overall. Bristol Bay is world-renowned for sockeye salmon production. Management and harvest of the Bristol Bay stocks has been complicated and impacted by the Japanese high seas fishery; this has decreased since the 1976 Magnuson Fishery Conservation and Management Act (effective March, 1977) which minimizes the interception of Bristol Bay salmon. The sockeye salmon catch constituted 86% of the total commercial harvest ex-vessel value from 1973 through 1982; pink salmon made up 8% of the total number harvested; and coho, chums, and chinook salmon accounted for 3%, 2%, and 1%, respectively (table 12).

      Sockeye salmon harvests for the period 1975 through 1982 ranged from a low of approximately $10.7 million in 1975 to a high of $129.1 million in 1979 (table 17). The Naknek-Kvichak and Nushagak districts are the most productive in the area.

      Pink salmon are the second most numerous species in even years, but odd-year production is very low. No significant odd-year run has occurred since 1918. Pink salmon

Table 17. Ex-vessel Value of Commercial Sockeye Salmon Harvest for Southwest Alaska Fishery Management Areas, by Origin of Fishermen, 1975 to 1982

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Bristol Bay	Bethel	370	721	731	1675	2624	1876	3487	1329	1602
	Dillingham	2289	5042	4210	12105	25642	17238	32005	16731	14408
	Bristol Bay	616	967	1418	2391	8714	4266	5871	3624	3483
	Matanuska-Susitna	57	71	89	357	1162	821	1579	1113	656
	Anchorage	681	1081	1400	3217	11264	7453	11260	7584	5493
	Kenai Peninsula	127	178	258	602	3746	2694	3442	3138	1773
	Kodiak Island	184	164	289	388	1567	975	2044	1147	845
	Juneau	61	45	79	161	1402	1236	1565	1196	718
	Other Alaska*	275	238	206	783	3841	2792	4226	3187	1943
	Alaska	4659	8508	8680	21679	59963	39350	65480	39048	30921
	Other USA	5907	8533	10389	21130	68744	36375	56340	29569	29623
	Unknown	135	135	142	232	433	100	212	120	188
	Subtotal	10702	17175	19211	43040	129139	75824	122031	68737	60732
Chignik	Dillingham	485	1771	4957	5615	3671	2045	6692	5493	3841
	Kenai Peninsula	75	376	1169	1296	728	328	1456	781	776
	Kodiak Island	410	1424	4171	4174	2850	1104	4149	2334	2577
	Other Alaska*	88	347	1579	1617	1497	577	1813	891	1051
	Alaska	1058	3918	11876	12702	8746	4055	14110	9498	8246
	Other USA	329	877	2612	3003	2577	883	2888	1464	1829
	Unknown	0	0	0	358	438	46	7	17	108
	Subtotal	1387	4795	14488	16063	11760	4984	17006	10979	10183
Kodiak	Kenai Peninsula	3	69	131	582	160	136	523	308	239
	Kodiak Island	252	1412	1970	4620	2767	1440	4782	3902	2643
	Other Alaska*	13	38	48	126	164	110	321	343	145
	Alaska	268	1519	2149	5327	3091	1687	5626	4552	3027
	Other USA	121	1101	1507	2385	1703	1126	2769	1879	1574
	Unknown	0	17	6	1	42	1	9	1	10
	Subtotal	389	2637	3661	7713	4836	2814	8404	6432	4611
Peninsula/ Aleutians	Aleutian Islands	699	1074	1805	3217	9536	5817	11119	9817	5386
	Other Alaska*	62	75	174	403	1074	597	1675	1871	741
	Alaska	761	1148	1979	3621	10610	6414	12794	11688	6127
	Other USA	495	1013	1360	2869	10104	4155	8591	7852	4555
	Unknown	1	4	9	113	206	6	51	76	58
	Subtotal	1257	2165	3348	6602	20920	10575	21435	19616	10740
Total		13734	26772	40708	73419	166656	94197	168876	105764	86266

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

Table 18. Ex-vessel Value of Commercial Pink Salmon Harvest for Southwest Alaska Fishery Management Areas, by Origin of Fishermen, 1975 to 1982

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Bristol Bay	Bethel	0	37	0	125	0	69	1	24	32
	Dillingham	0	454	2	2589	3	852	6	424	541
	Bristol Bay	0	83	0	315	0	127	0	47	72
	Matanuska-Susitna	0	17	**	110	**	51	0	103	35
	Anchorage	0	73	0	403	0	187	0	75	92
	Kenai Peninsula	**	8	**	75	0	75	0	13	21
	Kodiak Island	**	12	**	84	0	40	0	42	22
	Other Alaska*	**	17	0	108	**	88	0	34	31
	Alaska	0	701	3	3808	4	1488	7	762	847
	Other USA	0	400	7	1649	3	662	0	351	384
	Unknown	0	3	0	22	0	6	0	0	4
	Subtotal	1	1103	10	5480	7	2156	8	1113	1235
Chignik	Dillingham	30	107	356	405	1024	409	533	146	376
	Kenai Peninsula	1	42	39	83	265	120	210	80	105
	Kodiak Island	50	118	289	246	763	491	597	105	333
	Valdez-Cordova	3	37	52	85	168	77	108	63	74
	Other Alaska*	1	18	56	110	223	109	121	36	84
	Alaska	87	324	792	928	2444	1207	1569	430	972
	Other USA	17	61	134	137	434	245	276	168	184
	Unknown	0	0	0	7	128	2	0	0	17
	Subtotal	104	385	926	1071	3005	1454	1845	598	1174
Kodiak	Anchorage	49	123	134	186	194	394	319	125	190
	Kenai Peninsula	185	533	637	1398	854	1344	751	400	763
	Kodiak Island	2712	8559	6386	11747	10444	12119	11924	3544	8429
	Other Alaska*	101	219	91	235	220	260	270	47	180
	Alaska	3046	9434	7248	13565	11712	14117	13265	4116	9563
	Other USA	1194	5061	2711	5690	3883	5557	4293	2003	3799
	Unknown	0	58	1	0	93	17	18	1	24
	Subtotal	4240	14552	9960	19254	15688	19691	17576	6121	13385
Peninsula/ Aleutians	Aleutian Islands	66	2581	1107	5751	8323	6808	6622	3143	4300
	Other Alaska*	1	23	15	96	51	280	281	66	102
	Alaska	67	2604	1122	5847	8375	7088	6903	3209	4402
	Other USA	2	178	39	584	1308	1954	1269	560	737
	Unknown	1	0	0	3	69	33	0	0	13
	Subtotal	71	2782	1161	6434	9752	9076	8172	3768	5152
Total		4416	18822	12056	32239	28453	32377	27601	11600	20946

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 19. Ex-vessel Value of Commercial Chum Salmon Harvest for Southwest Alaska Fishery Management Areas, by Origin of Fishermen, 1975 to 1982

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Bristol Bay	Bethel	47	234	514	260	233	191	268	41	223
	Dillingham	309	1453	2379	1742	1629	1328	1806	434	1385
	Bristol Bay	27	132	225	88	99	75	144	32	103
	Matanuska-Susitna	4	19	48	33	54	39	73	10	35
	Anchorage	22	155	271	173	224	178	301	75	175
	Other Alaska*	15	73	138	86	112	150	204	87	108
	Alaska	424	2065	3575	2381	2351	1960	2796	678	2029
	Other USA	181	731	1171	821	650	694	1225	178	706
	Unknown	2	17	37	24	8	2	3	1	12
	Subtotal	607	2814	4783	3226	3009	2656	4025	857	2747
Chignik	Dillingham	24	41	194	197	308	294	745	401	275
	Kenai Peninsula	1	23	21	39	90	87	289	250	100
	Kodiak Island	16	44	83	140	291	227	771	326	237
	Other Alaska*	6	15	35	106	138	98	205	149	94
	Alaska	47	123	334	483	827	705	2011	1126	707
	Other USA	15	19	41	86	156	124	322	306	134
	Unknown	0	0	0	2	51	1	0	0	7
	Subtotal	62	142	375	571	1034	830	2332	1432	847
Kodiak	Anchorage	2	8	45	47	15	52	97	59	40
	Kenai Peninsula	7	132	377	272	81	446	418	209	243
	Kodiak Island	114	1259	3516	2060	1007	2961	4273	2752	2243
	Other Alaska*	3	19	42	45	24	23	44	8	26
	Alaska	126	1417	3981	2424	1126	3483	4832	3028	2552
	Other USA	53	405	1094	540	330	688	1056	831	625
	Unknown	0	4	1	0	7	4	0	0	2
	Subtotal	180	1826	5076	2964	1464	4174	5888	3859	3179
Peninsula/ Aleutians	Aleutian Islands	147	781	834	2005	1627	3262	5751	5674	2510
	Other Alaska*	5	43	44	87	62	265	404	589	187
	Alaska	152	824	877	2091	1689	3527	6155	6263	2697
	Other USA	60	490	258	490	425	1185	1948	2336	899
	Unknown	1	1	14	8	26	1	2	17	9
	Subtotal	213	1316	1150	2589	2140	4713	8105	8617	3605
Total		1061	6098	11384	9350	7647	12373	20350	14764	10378

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

Table 20. Ex-vessel Value of Commercial Coho Salmon Harvest for Southwest Alaska Fishery Management Areas, by Origin of Fishermen, 1975 to 1982

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Bristol Bay	Bethel	3	1	7	4	79	45	18	103	32
	Dillingham	135	68	405	418	1617	869	604	1625	718
	Bristol Bay	2	0	9	5	61	21	37	133	34
	Anchorage	1	1	11	29	200	101	128	328	100
	Other Alaska*	2	1	10	30	175	128	240	352	117
	Alaska	144	71	443	486	2131	1164	1026	2542	1001
	Other USA	8	10	55	71	267	247	367	788	226
	Unknown	0	0	16	1	10	2	5	0	4
	Subtotal	151	81	514	558	2407	1413	1398	3330	1231
Chignik	Dillingham	94	64	51	60	230	167	149	650	183
	Kenai Peninsula	9	14	5	9	88	45	56	202	54
	Kodiak Island	66	32	15	19	134	104	102	265	92
	Other Alaska*	7	6	10	16	108	69	77	278	71
	Alaska	175	117	81	105	560	385	383	1394	400
	Other USA	45	25	24	25	119	92	94	389	102
	Unknown	0	0	0	3	32	1	0	0	4
	Subtotal	220	142	105	133	711	478	478	1783	506
Kodiak	Kenai Peninsula	0	2	10	12	22	14	13	104	22
	Kodiak Island	104	79	132	316	827	568	664	1877	571
	Other Alaska*	0	1	2	8	12	10	17	40	11
	Alaska	105	82	144	336	861	592	694	2020	604
	Other USA	3	20	15	42	196	125	102	358	108
	Unknown	0	0	0	0	12	4	0	11	3
	Subtotal	108	103	160	379	1068	720	796	2390	715
Peninsula/ Aleutians	Dillingham	19	**	46	**	151	91	30	201	85
	Aleutian Islands	62	58	103	322	1814	640	1129	1477	701
	Other Alaska*	11	**	10	**	40	74	93	210	56
	Alaska	92	84	159	447	2005	805	1252	1888	841
	Other USA	8	12	37	177	910	447	450	834	359
	Unknown	0	2	0	8	7	3	0	42	8
	Subtotal	100	97	196	632	2922	1255	1702	2764	1208
Total		579	421	974	1701	7108	3867	4374	10266	3661

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 21. Ex-vessel Value of Commercial Chinook Salmon Harvest for Southwest Alaska Fishery Management Areas, by Origin of Fishermen, 1975 to 1982

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Bristol Bay	Bethel	15	60	146	192	254	86	423	301	185
	Dillingham	102	466	1147	1512	1745	629	2185	2044	1229
	Bristol Bay	8	26	88	77	114	85	99	135	79
	Matanuska-Susitna	1	4	14	22	44	17	97	136	42
	Anchorage	7	35	88	158	343	147	399	516	212
	Kenai Peninsula	0	2	11	16	70	60	66	216	55
	Kodiak Island	0	2	14	12	49	24	84	79	33
	Other Alaska*	5	6	13	35	96	83	125	256	77
	Alaska	138	601	1519	2025	2716	1132	3479	3682	1912
	Other USA	75	200	692	965	1665	748	1883	2574	1100
	Unknown	1	6	25	28	11	3	1	7	10
	Subtotal	214	808	2236	3018	4392	1884	5362	6262	3022
Kodiak	Kodiak Island	0	4	6	20	19	6	18	9	10
	Other Alaska*	0	0	1	3	2	1	4	2	2
	Alaska	1	5	8	23	20	7	21	11	12
	Other USA	0	2	6	21	13	2	9	5	7
Peninsula/ Aleutians	Dillingham	**	**	43	171	249	135	153	224	124
	Aleutina Islands	10	30	37	53	140	222	308	333	142
	Other Alaska*	**	**	1	6	17	12	13	49	**
	Alaska	15	46	81	230	406	368	474	606	278
	Other USA	3	16	23	45	93	140	204	247	96
	Unknown	0	0	0	0	14	1	0	31	6
	Subtotal	18	62	104	275	514	509	678	884	381
Total		240	898	2373	3407	4966	2445	6144	7229	3463

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

are mainly harvested in the Nushagak District. The annual even-year average pink salmon ex-vessel value for the Bristol Bay Management Area from 1975 through 1982 was $2.5 million (table 18).

Chum salmon harvest is incidental to that of the sockeye fishery. Catches have increased significantly since 1976, averaging $2.7 million annually (table 19).

Chinook salmon are less numerous than pink or chum salmon, but their size makes them more valuable to the fishery (Middleton 1983). Coho salmon arrive too late in the season and in too few numbers to keep canneries in the area operating after the sockeye season. Consequently, the importance of coho to the commercial salmon fishery of Bristol Bay is low.

b. Ex-vessel values. Over the eight-year period 1975 through 1982, the Bristol Bay Management Area accounted for 55% of the annual average ex-vessel earnings from the region's salmon fisheries, averaging about $69 million per year (table 12). Harvest and ex-vessel values could have reached an all time record in 1980, but the season was interrupted by a price dispute. The following year, 1981, however, did set a harvest record, but total ex-vessel value was lower because of lower prices.

Residents of other states earned 46% of the total ex-vessel values and averaged about $32 million per year (table 13). Out-of-state fishermen had greater earnings than Alaska residents in 1975 and 1977. Nearly one half of the in-state average annual ex-vessel value was taken by fishermen from the Dillingham census area. Of the total harvest revenues received by Alaskans, 68% can be attributed to fishermen from the Southwest Region; approximately 20% was earned by fishermen from the Southcentral Region.

c. Harvesting employment. Salmon harvesting employment figures for 1977 through 1982 in the Bristol Bay Management Area are shown in table 22 and figure 6. Salmon-harvesting employment predominantly occurred during June, July, and August. The peak month was July; the average July employment for the period was 5,670. July employment has steadily increased throughout the period. The peak July was in 1982, when 6,443 fishermen and crew were employed (table 22). The average monthly employment figure for the years 1977 to 1982 was 1,004 fishermen and crew.

Table 22. Bristol Bay Salmon-Harvesting Employment (Number of Fishermen and Crew)

Year	Monthly Average	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	714	4	2	0	2	20	3,579	4,111	724	151	0	5	7
1978	964	0	0	0	0	138	4,646	5,020	1,535	227	0	0	0
1979	1,074	0	0	0	0	245	5,403	5,726	1,324	185	0	0	0
1980	939	0	0	0	0	167	3,343	6,357	2,158	437	0	0	0
1981	1,187	0	0	0	0	231	6,075	6,364	1,535	35	0	0	0
1982	1,143	0	0	0	0	38	4,982	6,443	2,084	177	0	0	0
Average	1,004	1	0	0	0	140	4,671	5,670	1,560	202	0	1	1

Source: ADL 1984.

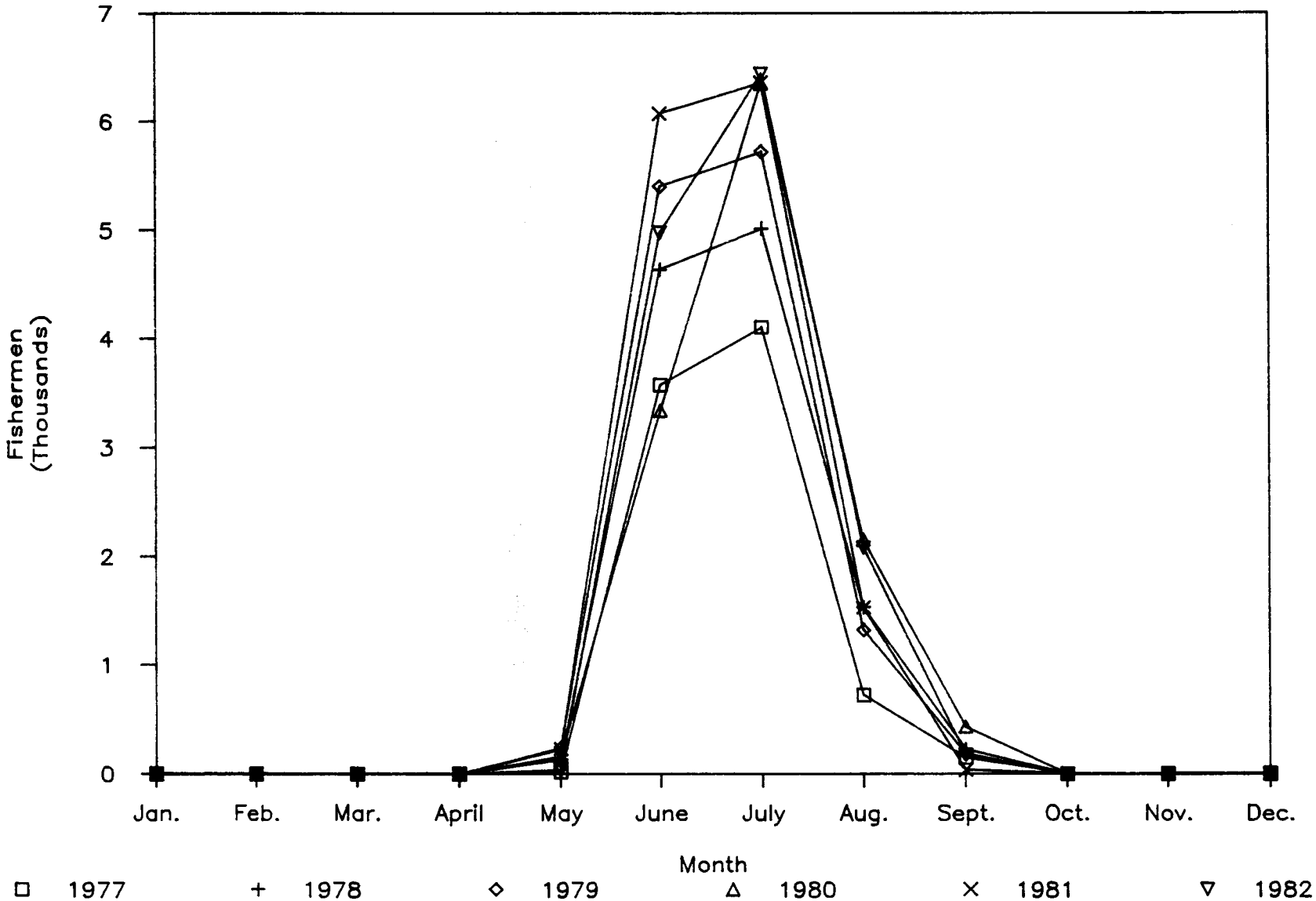


Figure 6. Bristol Bay salmon harvesting employment (number of fishermen and crew).

2. Chignik Management Area:

a. Species harvest and value summaries. Salmon may be taken commercially in the Chignik Management Area by purse seine or hand purse seine. Sockeye salmon accounted for 80% of the commercial salmon harvest ex-vessel value in the Chignik area from 1975 through 1982; pink salmon made up 9% of the value; chum salmon accounted for 7%, coho salmon for 4% and chinook salmon less than 1% (table 12).

Sockeye salmon are the most important salmon species in the Chignik area. The fishery began in 1888. The average annual sockeye salmon harvest value from 1975 through 1982 was $10.2 million (table 17).

Pinks are second to sockeye salmon in commercial importance in the Chignik Management Area. The average annual pink salmon harvest value (1975-1982) was $1.2 million (table 18).

Chum salmon catches are incidental to the pink salmon harvest in Chignik (ADF&G 1977a). The average annual harvest value (1975-1982) was $847,000 (table 19).

The Chignik River system produces most of the coho salmon harvested by the commercial fishery. The average annual harvest (1975-1982) was $506,000 (table 20). Chinook salmon are harvested incidentally to other species and are of minor commercial importance. The average annual harvest value (1975-1982) was $41,000 (table 21).

b. Ex-vessel value. Table 13 shows a combined average ex-vessel value of salmon harvests for the Chignik area of about $12.8 million for the period 1975-1982. The greatest proportion of the average annual ex-vessel earnings were received by fishermen from the Dillingham census area (37%). Fishermen from the Dillingham census area earned an increasingly greater proportion of earnings during the period. Kodiak Island fishermen earned 25% of the period's ex-vessel values. Alaska fishermen earned 81% of the ex-vessel values. During the period, Alaska fishermen as a whole earned proportionally more in the Chignik Management Area, and nonresident fishermen earned proportionally less (table 13).

c. Harvesting employment. Employment data for Chignik are included under the Peninsula/Aleutians subregion (table 23, fig. 7). Salmon harvesting employment for the period 1977 through 1982 occurred in May, June,

Table 23. Alaska Peninsula, Western Aleutians, Bering Sea Salmon-Harvesting Employment (Number of Fishermen and Crew)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	227	0	0	0	0	0	763	915	916	131	0	0	0
1978	276	0	0	0	0	16	881	1,108	1,131	167	0	0	0
1979	307	0	0	0	0	19	920	1,263	1,315	165	0	0	0
1980	342	0	0	0	0	22	817	1,420	1,424	424	0	0	0
1981	385	0	0	0	0	22	1,372	1,448	1,437	340	0	0	0
1982	413	0	0	0	0	27	1,513	1,486	1,452	469	0	0	0
Average	325	0	0	0	0	18	1,044	1,273	1,279	283	0	0	0

Source: ADL 1984.

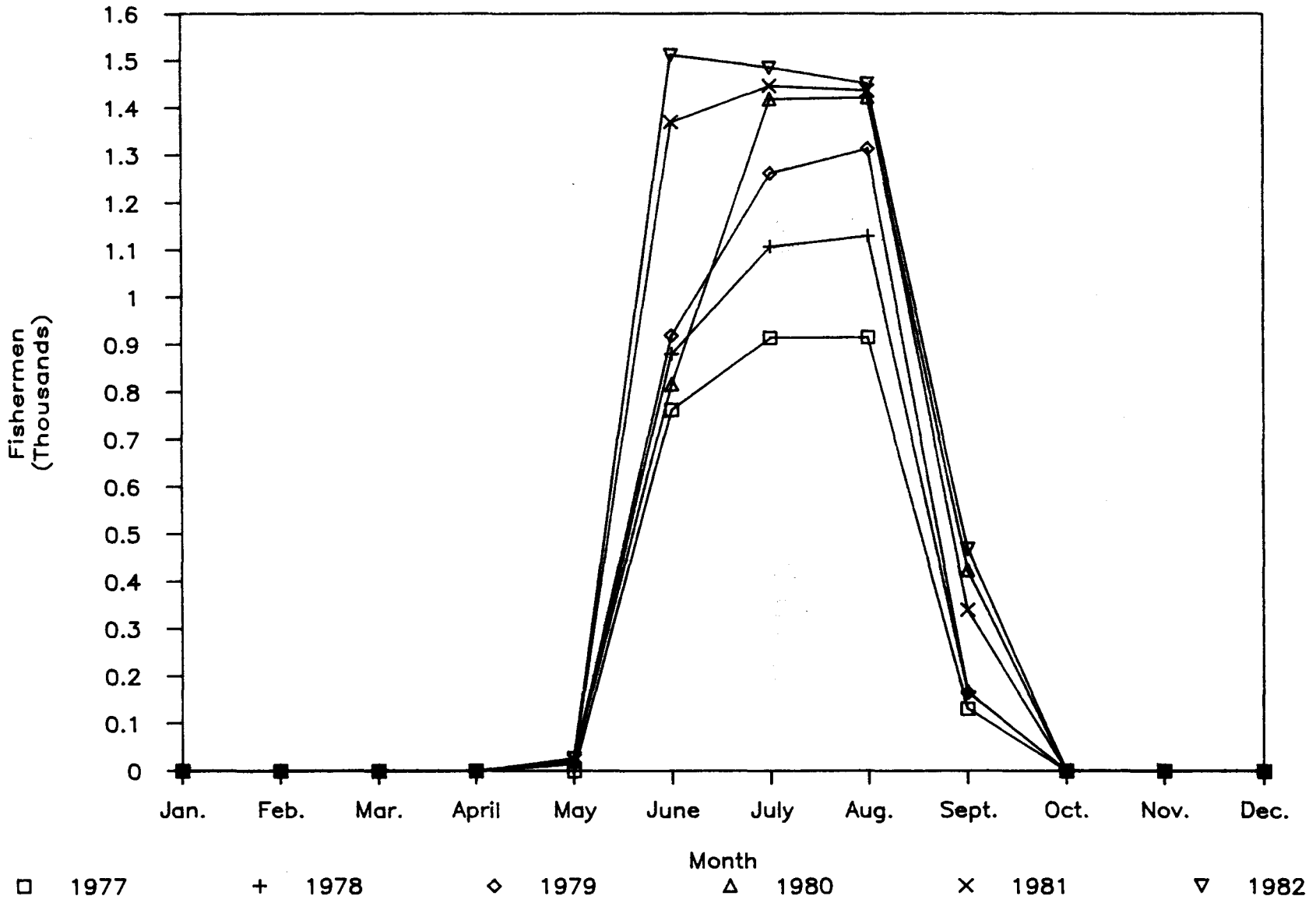


Figure 7. Alaska Peninsula/Bering Sea/Western Aleutian salmon harvesting employment (number of fishermen and crew).

July, August, and September. The peak months were July and August.

The annual July and August averages for the period were 1,273 and 1,279, respectively. The annual average for June was 1,044. The average annualized (or monthly) employment was 325. Harvesting employment figures have steadily increased for each month with salmon employment. Peak employment was spread over a two-month period (July and August), in contrast to the more concentrated one-month peak shown by Bristol Bay (see table 22).

3. Kodiak Management Area:

a. Species harvest and value summaries. Salmon may be taken commercially in the Kodiak Management Area by purse seines and beach seines and set gill nets. Pink salmon constituted 61% of the commercial salmon harvest ex-vessel value in the Kodiak Management Area from 1975 through 1982; chum salmon accounted for 15% of the value; sockeye salmon for 21%, and coho and chinook salmon 3% and 0.1%, respectively (table 12).

Pink salmon are the main salmon species harvested in Kodiak, and about 90% of them are taken by purse seine. During the period 1975 through 1982, the average pink harvest value was approximately $13.4 million. From 1934 to 1959, the odd-year cycle dominated the Kodiak pink fishery. In 1960, the even-year cycle began to improve, with a catch of 6.7 million pinks. The odd-year cycle declined slowly until 1967, when the nadir was reached with a catch of less than 200,000 fish. The 1980 harvest of 17.3 million fish valued at $19.7 million was the largest on record (ADF&G 1982b).

In Kodiak, sockeye salmon was the principal species harvested in the early 1900's. Overfishing depleted stocks, and now it is the second or third most abundant species. The Karluk River was at one time one of the most productive sockeye systems in the world. The reported catch of 1901 was almost 4 million fish (ibid.).

Chum salmon are usually second to pink in the Kodiak catch. In Kodiak, chum salmon are becoming an increasingly more important species. Catches in 1971, 1981, and 1982 set new records for the Kodiak chum fishery (ibid.).

Kodiak catches of coho salmon are incidental to other species. Since 1978, the effort on coho has increased dramatically, and the catch is three to seven times

higher than the average (Manthey, pers comm.). Coho may have been underharvested in some areas. The 1982 catch set a record of 343,000 coho valued at $2.4 million (ADF&G 1982b).

Few chinook are harvested in the Kodiak area, and those caught are usually incidental to the early sockeye fisheries.

b. Ex-vessel value. The ex-vessel values in the Kodiak Management Area for the period 1975 through 1982 varied with the strength of the pink salmon run, which exhibits an even-year cycle. The exception to this was in 1981, when a peak management area harvest occurred. Table 13 shows an average ex-vessel value of $21.9 million for the period 1975 to 1982, with the largest share (63%) going to fishermen resident in the Kodiak Island census area. Most of the remaining value is earned by out-of-state fishermen (28%) and fishermen from the Kenai Peninsula census area (6%).

c. Harvesting employment. Table 24 and figure 8 present salmon harvesting employment in the Kodiak Management Area from 1977 through 1982. Employment occured primarily in June, July, and August, with a two-month peak in July and August, which is similar to the Chignik and Alaska Peninsula area salmon employment. Salmon harvesting employment for the period has tended to decrease. The average monthly employment figure for the period was 432. The average peak-month (August) employment was 1,960 fishermen and crew.

4. Alaska Peninsula-Aleutian Islands management areas:

a. Alaska Peninsula species harvest summary. On both the north and south sides of the peninsula, salmon may be taken commercially by set gill nets, drift gill nets, purse seine, and hand purse seine. There are significant differences in fisheries on the north and south sides of the peninsula.

The harvest of sockeye salmon increased for both the North and South Peninsula in 1978. Sockeye salmon are the main species harvested on the North Peninsula and the second most numerous on the South Peninsula. However, even in the south they may be the most important commercial salmon species in as much as the value of the South Peninsula sockeye catch during years when large numbers are taken is much more than any other species (Shaul, pers. comm.).

Table 24. Kodiak Salmon-Harvesting Employment (Number of Fishermen and Crew)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	403	0	0	0	0	0	603	1,905	1,907	411	6	0	0
1978	478	0	0	0	0	0	1,244	2,159	2,142	191	0	0	0
1979	488	0	0	0	0	0	1,298	2,177	2,144	233	0	0	0
1980	375	0	0	0	0	0	257	1,979	1,994	260	0	0	0
1981	414	0	0	0	0	0	1,133	1,850	1,774	210	0	0	0
1982	431	0	0	0	0	0	1,289	1,579	1,796	511	8	0	0
Average	432	0	0	0	0	0	971	1,941	1,960	303	2	0	0

Source: ADL 1984.

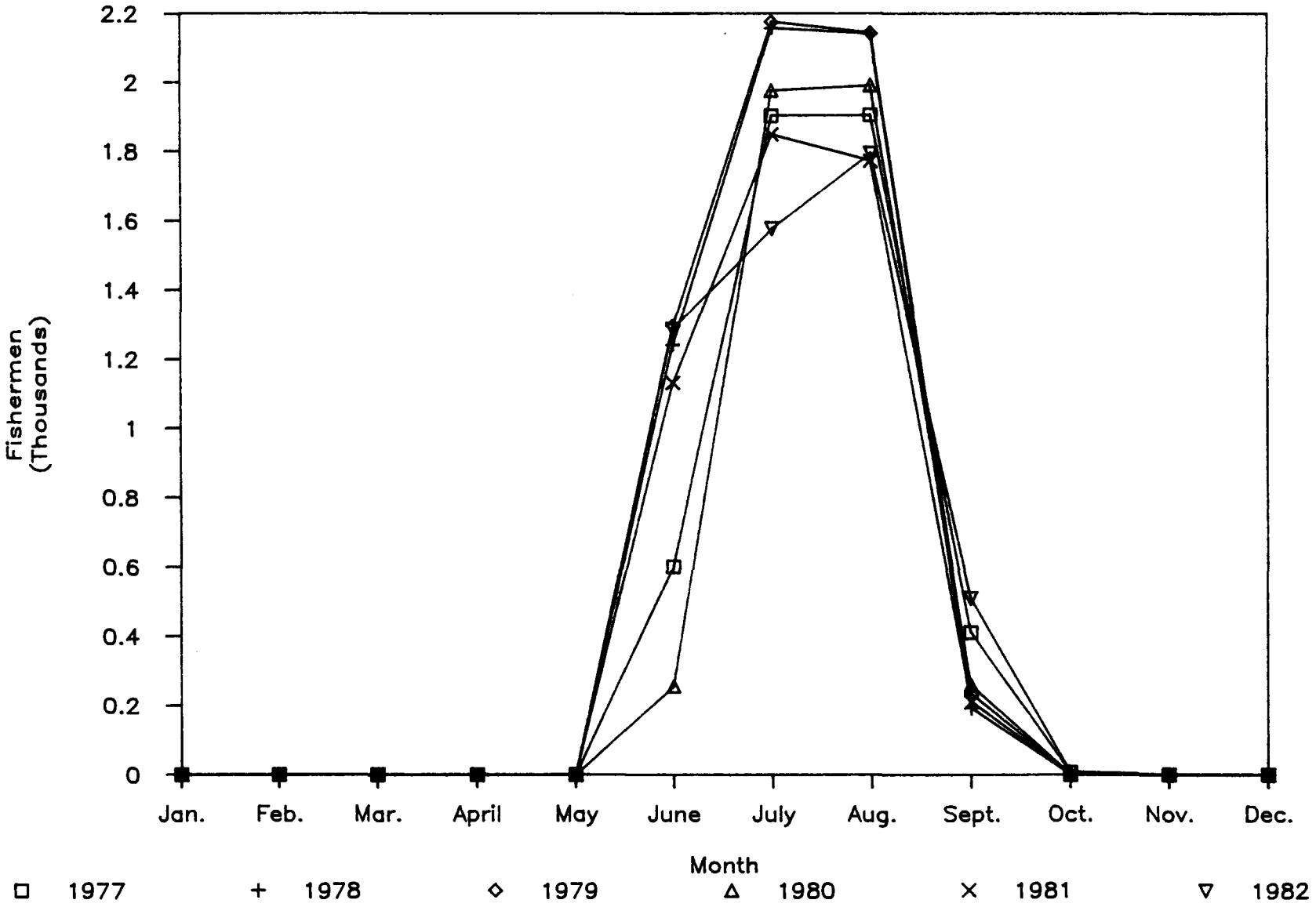


Figure 8. Kodiak salmon harvesting employment (number of fishermen and crew).

Pink salmon are not abundant on the North Peninsula, and there is little fishing effort for them. On the South Peninsula, pinks are the major species harvested and since 1975 have contributed over half of the entire South Peninsula salmon harvest (in terms of harvest quantity).

Chum salmon systems occur on both the North and South Peninsula. The 1981 North Peninsula chum salmon harvest was 331,000 fish, and the runs were strong but down from the unusually large returns of 1980 and 1981 (ADF&G 1981b).

Coho salmon are harvested along the North Peninsula, mainly at Nelson Lagoon. Coho salmon runs on the South Peninsula are scattered and very small. The 1982 North Peninsula coho salmon harvest was 238,000 fish, the fourth consecutive record (ADF&G 1982c).

Chinook salmon spawn along the North Peninsula but not along the South. The fishery for chinook salmon on the Alaska Peninsula is very minor.

b. Aleutian Islands species harvest summary. Pink salmon are by far the most important commercial salmon species in the Aleutians. Salmon may be taken in the Aleutians by purse seine, hand purse seine, and beach seine. Most of the catch is taken by hand purse seine, with some taken by beach seine (Shaul, pers. comm.).

Pink salmon are the most important salmon species in the Aleutian area and are all caught in the Unalaska District. There was essentially no pink fishery from 1973 through 1978, either because fishing was more attractive elsewhere or because no markets were available for salmon in the Aleutians. Even-year pink salmon runs dominate at Unalaska, where 2.6 million were harvested in 1980 and 1.4 million in 1982. Strong even-year runs attract South Peninsula purse seine fishermen to the Unalaska area (ADF&G 1982c).

Sockeye salmon are the second most important commercial species in the area. Sockeyes are also harvested exclusively at Unalaska. Harvests have ranged from 1,800 fish in 1978 to a high of 19,400 fish in 1975. Chum salmon runs in the Aleutians show no potential for becoming significant (ADF&G 1977a). Peak chum harvest was 6,600 fish in 1981. Coho are found in a few streams on Unalaska Island. Coho harvest is insignificant. Chinook do not spawn in the Aleutians.

c. Ex-vessel value. As shown in table 13, average ex-vessel value of the salmon harvest from the Alaska Peninsula and Aleutian Islands management areas from 1975 through 1982 was approximately $21.1 million. A high percentage (62%) was earned by fishermen resident in the Aleutian Islands census area. Approximately 68% of the period's harvest value was earned by Alaska fishermen (table 13). However, this overall percentage was slightly below some of the earlier years of the period. Ex-vessel values in these areas have increased during the period, from $1.7 million in 1975 to $40.0 million in 1981.

Sockeye salmon contributed 51% of the combined management areas' harvest values for the period 1975 through 1982. Pink, chum, coho, and king salmon contributed 24%, 17%, 6%, and 2% of the combined areas value, respectively.

d. Harvesting employment. The ADL combines the Chignik, Alaska Peninsula, and Aleutian Islands areas for deter mining seafood-harvesting employment. See the Chignik Management Area harvesting employment discussion in this section for this information.

III. SHELLFISH FISHERY

A. Regional Overview

An economic overview of the Southwest Region's commercial shellfish fisheries (king, Tanner, Dungeness, and Korean horse-tail crab, shrimp, and scallop) is presented in this section. The first part of the narrative presents harvest by species group on a regionwide basis. This is followed by a discussion of harvest values by management areas. Within the Southwest Region are found all or part of six ADF&G king crab statistical areas, which include the Kodiak, Alaska Peninsula, Dutch Harbor, Adak, and Bristol Bay areas and the Bering Sea Area. ADF&G Tanner crab Statistical Area J is divided into six districts, which include the Kodiak, South Peninsula, Eastern Aleutians, Western Aleutians, Bering Sea, and Chignik districts. Shrimp Statistical Area J districts include Kodiak, Chignik, South Peninsula, North Peninsula, and Aleutians. Dungeness crab districts include Kodiak, Alaska Peninsula, Aleutian, and North Peninsula. Maps of each of these species groups' management areas are included in appendix A of this volume.

Ex-vessel values (fishermen's gross earnings) in this volume were provided by the CFEC through a special computer run. To calculate ex-vessel values, the CFEC develops estimated ex-vessel seafood

prices (see appendix B for more information) by areas, which they refer to as pricing areas. When this request was done, ex-vessel values were inadvertantly sorted into CFEC pricing areas rather than ADF&G management areas. For most regions and species groups this is not a problem because pricing areas and management areas coincide, and the ex-vessel value of the reported harvest by pricing area matches the harvest by management area. For the Southwest Region, however, this method of sorting results in Tanner, Dungeness, and Korean horsetail crab, scallop, and shrimp ex-vessel values being organized into CFEC pricing areas (or king crab statistical areas) rather than into their own districts. Unfortunately, time does not allow this discrepancy to be remedied for this report. Therefore, rather than presenting Tanner crab, Dungeness crab, Korean horsetail crab, scallop, and shrimp ex-vessel values on an ADF&G district basis, this report presents them by CFEC pricing areas, which are equivalent to king crab statistical areas. This method of presentation indicates the distribution of harvest values, if not the value of specific harvests. The background information in the commercial shellfish Human Use sections of volume 2 of the Alaska Habitat Management Guide for the Southwest Region and appendix A map information in this economic volume provide further clarification for interpreting harvest areas and values. It should also be noted that all Bering Sea shellfish harvest values are included in this narrative although portions of the Bering Sea extend beyond the Southwest Region.

ADF&G fishery management areas are used for fishery management purposes (such as regulating season length) that can affect ex-vessel gross earnings. Therefore, all reported earnings should be viewed within the context of regulatory parameters. (See the commercial shellfish Human Use sections in volume 2 of the Alaska Habitat Management Guide for the Southwest Region for a more detailed discussion on harvest background and regulations.)

B. Ex-vessel Value by Species Group and Management or Pricing Area

1. All species summary. Over the eight-year period 1975 to 1982, the total ex-vessel value of the shellfish harvest to fishermen in Southwest Alaska averaged approximately $144 million (table 25). During this time, king crab accounted for slightly over two-thirds of the total ex-vessel value of all shellfish. The peak year was 1980, when shellfish harvests in the region yielded approximately $243 million in ex-vessel earnings (CFEC 1984, see tables 26-31 for subtotals).

2. King crab regional summary. The Southwest Region king crab fishery had average ex-vessel earnings of nearly $111 million during the 1975 to 1982 period, with the peak years occurring between 1978 and 1981 (table 26). Total value of the harvest reached its all-time high of $172 million in 1980. The low

Table 25. Average Ex-vessel Values of Commercial Shellfish Harvests in the Southwest Region, by Species and Fishery Management Area, 1975-82

Thousands of Dollars

Species	Adak	Bering Sea**	Bristol Bay***	Dutch Harbor	Kodiak	Peninsula Aleutians	Total
King crab	2,155	27,212	75,290	8,177	22,977	3,340	139,151
Tanner crab	218	22,729	*	487	12,713	5,351	41,498
Dungeness crab	*	*	*	5	1,428	78	1,511
Horsehair crab	*	657	*	*	*	*	657
Total crab	2,373	50,598	75,290	8,669	37,118	8,769	182,817
Shrimp	*	*	*	476	5,288	4,099	9,863
Scallops	*	*	*	52	1,226	187	1,465
Grand total	2,373	50,598	75,290	9,197	43,632	13,055	194,145

Source: CFEC 1984.

* None or trace amounts.

** Extends beyond the Southwest Region.

*** Five-year average, 1978-82.

Table 26. Ex-vessel Value of Commercial King Crab Harvest for Southwest Alaska Fishery Management Areas, by Origin of Fishermen, 1975 to 1982

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
	Alaska	199	38	**	**	222	83	264	1673	329
	Other USA	723	166	**	**	654	290	2572	7761	1649
Adak	Unknown	67	31	0	0	158	0	0	1311	196
	Subtotal	900	166	**	1182	1033	373	2836	10745	2155
Bering	Aleutian Islands	2083	5299	8721	1504	1318	1138	1341	2114	2940
Sea***	Kenai Peninsula	1521	2638	4157	**	**	**	**	1012	1300
	Kodiak Island	911	6356	10543	1746	**	**	537	1542	2826
	Other Alaska*	421	428	1687	**	**	**	**	503	412
	Alaska	4936	14721	25108	3820	2112	1798	2157	5171	7478
	Other USA	13132	27627	48718	8616	7367	9548	13432	26910	19419
	Unknown	172	1283	151	452	300	148	10	4	315
	Subtotal	18239	43631	73978	12889	9779	11494	15599	32085	27212
Bristol Bay	Aleutian Islands	0	0	0	9343	7718	7467	2159	327	3377
	Kenai Peninsula	0	0	0	2262	2249	3063	**	**	1093
	Kodiak Island	0	0	0	16218	12070	17235	**	**	5943
	Wrangell-Petersburg	0	0	0	**	**	1502	691	**	776
	Other Alaska*	0	0	0	**	**	1543	446	0	336
	Alaska	0	0	0	29882	24507	30809	6103	892	11524
	Other USA	0	0	0	75301	70858	85748	36414	6961	34410
	Unknown	0	0	0	1730	5742	1304	171	29	1122
	Subtotal	0	0	0	106914	101107	117860	42688	7882	75290[a]
Dutch Harbor	Aleutian Islands	1084	1415	758	1642	1704	2131	837	704	1284
	Kenai Peninsula	**	**	398	**	732	725	379	101	353
	Kodiak Island	227	339	**	**	**	863	199	**	289
	Valdez-Cordova	0	0	0	0	0	948	**	**	136
	Other Alaska*	**	**	**	**	**	473	**	**	216
	Alaska	1712	2323	1540	2184	2788	5140	1619	871	2272
	Other USA	3898	4426	2295	6074	8037	9659	2373	2265	4879
	Unknown	109	362	166	413	135	260	3208	3561	1027
	Subtotal	5719	7112	4001	8672	10960	15058	7200	6697	8177
Kodiak	Kenai Peninsula	**	413	329	518	1015	802	820	696	583
	Kodiak Island	8930	10924	16500	17014	15855	20825	40752	29364	20021
	Other Alaska*	**	412	153	504	359	210	1038	485	424
	Alaska	9235	11749	16982	18035	17229	21838	42610	30545	21028
	Other USA	1315	704	1167	1156	1003	**	2154	3005	**
	Unknown	295	93	32	456	437	**	925	2308	**
	Subtotal	10845	12546	18181	19647	18669	22384	45689	35857	22977
	Aleutian Islands	856	409	689	3566	3801	2763	4346	4931	2670
	Unknown	346	155	94	218	1275	1624	966	683	670
Peninsula/ Aleutians	Subtotal	1202	564	783	3784	5076	4387	5312	5614	3340
Total		36994	64088	96945	153087	146624	171556	119323	98880	110937[b]

Source: CFEC 1984.

a Five-year average.

b Contain seven-year average for Bristol Bay.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

*** Extends beyond Southwest Region.

year over the eight-year period was in 1975, when the catch brought less than $37 million to fishermen.

Productivity of the Southwest Alaska statistical areas for king crab varies considerably from year to year. Over the eight-year period, Bristol Bay had the highest average returns ($47.1 million per year, eight-year average or $75.3 million per year, five year average) even though no harvest revenues were reported until 1978. The average reached this level primarily as a result of harvests over a three-year period (1978 to 1980), which yielded in excess of $101 million per year. However, the Bristol Bay fishery crashed in 1982. In that year, total gross earnings to fishermen from king crab harvests in Bristol Bay were $7.9 million, compared to $35.9 million from Kodiak, which was the leading statistical area in 1982.

Overall, more than half of the gross earnings from king crab harvests have been taken by fishermen from other states; that is, over the eight-year period, 55.9% of the harvest gross earnings went to fishermen from states other than Alaska (see table 26). Alaska fishermen received a high proportion of the king crab gross earnings from only the Kodiak and Alaska Peninsula/Aleutian Islands statistical areas. Among Alaska fishermen, most of the king crab harvest earnings were received by fishermen with residences in the Aleutian Islands and Kodiak Island census areas.

a. Kodiak Statistical Area. The king crab fishery began as an exploratory effort by salmon fishermen in 1936; however, catches were small during the early years (ADF&G 1982b). The fishery development period began in 1950 and peaked in 1966. After 1966, catches dropped; the fishery was closed by emergency order in February 1969. Harvests remained low until 1974-1976; effort has increased in the fishery despite exclusive registration and the progressive shortening of seasons. The abundance of Kodiak king crab stocks has radically declined. Ex-vessel gross earnings increased in the 1975 to 1981 period through the expansion of the fishery to offshore areas and the increase in number of vessels (ibid.). However, harvest gross earnings declined in 1981, reflecting decreased stocks and regulation to protect abundance.

   King crab ex-vessel gross earnings averaged approximately $23 million for the period 1975 to 1982, and was approximately two-thirds of the shellfish gross earnings in the Kodiak Statistical Area (table 25). Most of these earnings went to fishermen from the Kodiak Island census area (table 26).

b. Alaska Peninsula Statistical Area. King crab fishing in the Alaska Peninsula Area began in 1947. Trawl gear was used extensively until 1961, when it was prohibited. The average annual ex-vessel gross earnings from 1975 to 1982 was approximately $3.3 million. Ex-vessel values were primarily earned by fishermen from the Aleutian Islands census area (approximately 80%).

c. Dutch Harbor Statistical Area. The Dutch Harbor king crab fishery began in 1961. Harvest began to reach signficant proportions in 1964 and peaked in 1966. A sharp decline followed several years of increasing harvests; 1977 was a marked low in the fishery (see table 26). Harvests subsequently increased as a result of increased effort and exploitation of previously unfished populations. In 1981, harvest decreased to one-third the pounds and one-half the value of that of the previous year's. The average annual ex-vessel earnings from 1975 to 1982 were about $8.2 million. The most (57%) of the harvest by Alaskans was by fishermen from the Aleutian Islands census area (table 26). Roughly half of the harvest values are earned by fishermen from other states.

d. Adak Statistical Area. The Adak king crab fishery began in 1961, when four vessels harvested 2 million pounds. The fishery expanded rapidly until the 1973-1974, season when catches declined abruptly; the red king crab fishery was closed during the 1976-1977 season. The 1982 harvest gross earnings of $10.7 million resulted from a historically high peak effort of fishing vessels (ADF&G 1983). During the 1975 to 1982 period, most of the areas earnings went to out-of-state fishermen (table 26).

e. Bering Sea Statistical Area. Up until 1980, the Bering Sea king crab district included what is now the Bristol Bay Area. In 1980, separate harvest records began to be kept for Bristol Bay. The Bering Sea is now made up of the Pribilof and Northern districts. Only the Pribilof District is in the Southwest Region, but this narrative includes figures from the whole Bering Sea Area. Bering Sea crab fisheries were limited to the catches in Bristol Bay until 1973. That year, a fishery began for blue king crab in the Pribilof District. Blue king crab fishing spread to the north near St. Matthew and St. Lawrence islands in 1977; red king crab fishing also began in Norton Sound in 1977.

The majority of king crab ex-vessel gross earnings go to non-Alaska fisheremen (see table 26). Over the eight-year period, 1975 through 1982, 71% of the average

annual ex-vessel value went to out-of-state fishermen. The portion of ex-vessel values earned by Alaska fishermen decreased over the period from a peak of 34% in 1976 to a low of 14% in 1981. Alaska earnings went primarily to fishermen from the Aleutian Islands, Kodiak Island, and Kenai Peninsula census areas.

f. Bristol Bay Statistical Area. The commercial harvest of king crab in the eastern Bering Sea was initiated in 1930 by the Japanese. The Japanese fished the area until 1939, then discontinued until 1953. The United States conducted an exploratory fishery in 1940. However, United States effort was erratic until 1970, when domestic effort in the Bering Sea increased, as the stocks in the Gulf of Alaska became heavily exploited. The USSR entered the fishery in 1959 (Otto 1981). In the early 1970's, foreign harvests decreased partly, as a result of declining stocks and partly a result of agreements that limited harvest size and fishing gear (Bakkala et al. 1976). Domestic harvest peaked in 1980 at about $117.9 million in ex-vessel gross earnings (see table 26). However, the fishery crashed the following year; only $7.9 million was earned by fishermen in 1982. Approximately 65% of the ex-vessel gross earnings in the Bristol Bay king crab fishery during the period 1978 to 1982 went to fishermen outside Alaska (see table 26).

3. Tanner crab regional summary. In most areas in the Southwest Region, the first commercial exploitation of Tanner crab was incidental to harvest of king crab. A fishery directed at the Tanner crab by foreign fleets began in the Bering Sea in 1964. The first domestic harvest of Tanner crab occurred in the Kodiak Area in 1967. Interest in Tanner crab has since increased as a consequence of better market conditions and the declining availability of the king crab resource. Over 80% of the statewide Tanner crab harvest has occurred in the Southwest Region.

The average annual ex-vessel value of Tanner crab from the Southwest Region to fishermen, as shown in table 27, increased from $5.2 million in 1975 to $68.9 million in 1982. Over this period, the average annual value for this species was $41.5 million. Over one-half of the total gross earnings were from the Bering Sea pricing area, which extends beyond the Southwest Region. (See appendix A for maps of the crab management areas under discussion.) The Bering Sea has been the leading area in Tanner crab earnings since 1977, reaching its highest level in 1979, with $34.9 million. The Kodiak pricing area has consistently had the second highest gross earnings in the region, which averaged $12.7 million during the eight-year period.

Tanner crab gross earnings were fairly equally divided between fishermen from Alaska and other states. However, fishermen from the Kodiak census area received most of the harvest earnings from the Kodiak pricing area. Overall, most of the ex-vessel gross earnings going to Alaska fishermen from Southwest Alaska Tanner crab fisheries were taken by operators from the Aleutian Islands and Kodiak Island census areas (CFEC 1984; see table 27).

a. Kodiak Area (CFEC pricing). As mentioned above, the Tanner crab fishery developed in the Kodiak Area as incidental catch to the king crab fishery. However, by the 1972 season, exploitation of Tanner crab was established as the dominate winter and spring shellfish fishery (ADF&G 1983). During this period, short king crab seasons, favorable Tanner crab marketing conditions, and increased ex-vessel prices resulted in the expansion of the fishery. The discovery and harvest of large untapped offshore stocks established Tanner crab as a principal winter-spring fishery providing fishermen with an earning potential similar to the king crab fishery (NPFMC 1981).

   Tanner crab ex-vessel gross earnings in the Kodiak Area averaged $12.7 million annually from 1975 to 1982. This was approximately one-third of the shellfish ex-vessel earnings in the area. Almost all (96%) of the area's Tanner crab gross earnings throughout the period went to fishermen from the Kodiak Island census area (see table 27).

b. Dutch Harbor Area (CFEC pricing). See the shellfish Human Use sections in volume 2 of the Alaska Habitat Management Guide for the Southwest Region for background information on the Tanner crab fishery in this area. Ex-vessel values during the period 1975 to 1982 were relatively low as compared to the Kodiak and Bering Sea areas. The Dutch Harbor Area accounted for approximately 1% of the Southwest region's ex-vessel values for the period. However, approximately half of the landing values were earned by Aleutian Islands census area fishermen (table 27).

c. Alaska Peninsula Area (CFEC pricing). See the shellfish Human Use sections in volume 2 of the Alaska Habitat Management Guide for the Southwest Region for background information on the Tanner crab fishery in this area. There was an upward trend in harvest values in the Alaska Peninsula Area during 1975 to 1982; peak harvest values occurred in 1979, with landings worth $8.5 million. Approximately, 75% of the earnings went to Alaska fishermen. About 59 and 36% of the Alaska values

Table 27. Ex-vessel Value of Commercial Tanner Crab Harvest for Southwest Alaska CFEC Pricing Areas, by Origin of Fishermen, 1975 to 1982

CFEC Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Adak	Alaska	0	**	0	**	**	26	0	101	22
	Other USA	**	**	0	**	**	150	147	1112	196
	Subtotal	**	**	0	97	103	175	147	1213	218
Bering Sea***	Aleutian Islands	52	190	1457	4619	5043	2865	1099	3808	2391
	Kenai Peninsula	**	248	**	576	**	483	598	1008	457
	Kodiak Island	**	**	2656	1593	2701	2192	1480	**	1367
	Other Alaska*	0	**	**	974	**	400	808	**	396
	Alaska	115	628	4666	7762	8404	5940	3985	5392	4612
	Other USA	799	3563	15046	19959	26312	25491	24657	27591	17927
	Unknown	0	50	0	14	222	793	425	20	190
	Subtotal	914	4242	19713	27735	34938	32223	29066	33003	22729
Dutch Harbor	Aleutian Islands	**	**	284	647	239	**	103	**	241
	Other Alaska*	0	**	34	171	209	**	11	**	66
	Alaska	65	**	317	818	**	248	114	442	307
	Other USA	40	**	104	236	**	299	56	500	179
	Unknown	0	0	0	12	0	0	0	0	2
	Subtotal	**	**	422	1066	634	547	170	942	487
Kodiak	Kenai Peninsula	**	**	**	**	1278	193	**	300	253
	Kodiak Island	2520	4731	8765	15921	17442	12415	9162	23098	11757
	Other Alaska*	**	**	**	**	***	310	**	521	220
	Alaska	2589	4770	8930	16560	**	12918	**	23919	12229
	Other USA	**	**	**	**	**	**	**	1637	374
	Unknown	**	**	**	**	**	**	**	131	110
	Subtotal	3094	5019	9053	16695	19632	13171	9356	25687	12713
Peninsula/ Aleutians	Dillingham	0	**	**	**	**	**	**	235	152
	Aleutian Islands	503	1501	2042	2627	3890	3924	1590	3755	2479
	Kodiak Island	**	986	**	1207	2295	2512	1879	1803	1488
	Other Alaska*	**	**	0	**	**	**	**	153	69
	Alaska	704	2625	3163	4076	6490	6716	3779	5945	4187
	Other USA	482	702	770	1036	1954	1614	170	1982	1089
	Unknown	11	24	11	175	30	4	223	123	75
	Subtotal	1197	3350	3944	5288	8473	8334	4172	8050	5351
Total		5215	12727	33132	50881	63780	54452	42910	68895	41499

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

*** Extends beyond Southwest Region.

were earned by fishermen from the Aleutian Islands and Kodiak Island census areas, respectively (table 27).

d. Adak Area (CFEC pricing). See the shellfish Human Use sections in volume 2 of the Alaska Habitat Management Guide for the Southwest Region for background information on the Tanner crab fishery in this area. Ex-vessel values in the Adak pricing area account for approximately 1% of the region's Tanner crab harvest values. Harvest was inconsistent until 1978. Most of the increasing harvest values were earned by fishermen from other states (table 27).

e. Bering Sea Area (CFEC pricing). Foreign and domestic crab fleets were originally attracted to the Bering Sea by the availability of the larger and more valuable king crab. With development of markets and processing techniques, Tanner crab became a target species (Somerton 1981). Between 1953 and 1964, Japanese and Soviet fleets caught Tanner crab as incidental harvest to king crab and groundfish trawl fisheries. In 1964, when foreign fleets were at their peak, negotiations restricted foreign king crab harvest quotas and encouraged the exploitation of Tanner crab as a substitute. By 1969, the direct foreign harvest of Tanner crab required the imposition of harvest quotas; foreign harvest was gradually decreased as domestic harvest increased. In 1981, foreign fishing was eliminated because of increased participation by American fishermen. Presently, all directed Tanner crab harvests are by American vessels (Armstrong et al. n.d.).

The Bering Sea Area accounted for approximately 55% of the Southwest Region's average ex-vessel values for the period 1975 to 1982. Approximately 75% of the Bering Sea ex-vessel values were earned by non-Alaska fishermen; Alaska earnings went primarily to fishermen from the Aleutian Islands and Kodiak Island census areas (see table 27).

4. Dungeness crab regional summary. The first Dungeness catches in the Southwest Region occurred in the Kodiak Area in 1962. Since then, the fishery has gradually developed throughout the region. Interest in Dungeness crab, however, has not been as intense as that directed toward other shellfish species. The harvest of Dungeness crab is more dependent on market demand and the status of other shellfish fisheries than on the abundance of the species.

The Dungeness crab fishery in Southwest Alaska is relatively small and has averaged less than $2 million in gross earnings

to fishermen during the period 1975 to 1982 (table 28). However, the trend has been an increase in ex-vessel values. Peak years were 1981 and 1982, with ex-vessel harvests valued at over $4 million. Approximately 95% of the Dungeness crab earnings came from the Kodiak Area; the remainder came from the Alaska Peninsula-Aleutian Islands areas. Most of these earnings were taken by Alaska fishermen, principally from the Kodiak Island census area (CFEC 1984 and table 28).

a. Kodiak Area (CFEC pricing). As mentioned above, Dungeness crab was first harvested in the Kodiak area in 1962. Harvest levels increased steadily until the early 1970's, when the fishery declined because of biological factors. In the mid 1970s, the Dungeness crab market was low, and fishing effort was directed at other more lucrative shellfish fisheries. In recent years, the decline in king and Tanner crab harvests, as well as better market conditons, has stimulated interest in the fishery. Most of the Dungeness crab harvested in the Southwest Region has been taken in the Kodiak Area (95%) by Kodiak Island census area fishermen (CFEC 1984).

b. Alaska Peninsula and Aleutian Islands areas (CFEC pricing). Dungeness crab were first harvested from this area in 1968. Harvest effort depends upon market demand, which has been low. Therefore, effort has been sporadic. Harvest has occurred during only three years since the inception of the fishery in 1978. However, the poor king crab production of recent years may provide the incentive for expansion of the fishery. Harvests have primarily been by Alaska fishermen from the Kodiak Island census area. This area accounts for approximately 5% of the region's 1975 to 1982 Dungeness ex-vessel values.

5. Shrimp regional summary. Commercial exploitation of shrimp in the Southwest Region began in the Kodiak Area in 1959. Harvest in the region increased steadily. About 77% of the statewide shrimp harvest is from the Southwest Region (ADF&G 1982b). However, the Southwest stocks are presently in a depressed condition, which is reflected in the decline in ex-vessel gross earnings after 1980 (table 29).

Ex-vessel values of shrimp harvests in Southwest Alaska averaged $9.9 million during the years 1975 to 1982 (table 29). The peak years were from 1976 to 1980, the latter having the highest recorded total earnings of about $14.2 million. Since then, the value of the shrimp harvest in the region has declined substantially. Shrimp harvest earnings in the Alaska Peninsula and Aleutian Islands Area were higher than in the Kodiak area during the 1976 to 1979 time period but then decreased in 1980. Most of the harvest

Table 28. Ex-vessel Value of Commercial Dungeness Crab Harvest for Southwest Alaska CFEC Pricing Areas, by Origin of Fishermen, 1975 to 1982

CFEC Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Dutch Harbor	Subtotal	1	0	0	10	1	0	0	24	5
Kodiak	Kenai Peninsula	0	0	0	0	**	**	363	475	109
	Kodiak Island	308	**	**	92	719	837	2764	1850	903
	Other Alaska*	**	**	0	**	**	**	0	**	6
	Alaska	**	**	**	702	**	872	3127	**	1019
	Other USA	**	0	0	**	**	**	1035	1379	410
	Unknown	8	0	**	1	3	1	0	18	4
	Subtotal	384	25	34	912	982	1206	4162	3721	1428
Peninsula/Aleut	Kodiak Island	0	0	0	0	**	0	**	306	*
	Other Alaska*	0	0	0	0	**	0	**	103	22
	Alaska	0	0	0	0	69	0	**	409	60
	Other USA	0	0	0	0	0	0	**	**	18
	Subtotal	0	0	0	0	69	0	26	530	78
Total		385	25	34	922	1052	1206	4187	4275	1511

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld becsue of nondisclosure regulations.

Table 29. Ex-vessel Value of Commercial Shrimp Harvest for Southwest Alaska CFEC Pricing Areas, by Origin of Fishermen, 1975 to 1982

CFEC Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Dutch Harbor										
	Alaska	53	71	263	388	124	176	148	19	158
	Other USA	**	182	**	**	619	**	**	**	306
	Unknown	**	39	**	**	0	**	**	**	12
	Subtotal	63	312	552	993	742	533	543	68	476
Kodiak										
	Alaska	2959	3567	3869	2957	3843	7759	4593	3106	4082
	Other USA	930	1558	886	683	**	3402	850	682	1170
	Unknown	42	42	27	65	**	81	5	14	37
	Subtotal	3930	5168	4781	3705	4230	11242	5448	3803	5288
Peninsula/Aleut										
	Kodiak Island	635	2570	5027	3483	3718	1109	0	0	2068
	Other Alaska*	1108	1048	1411	1166	669	251	0	0	707
	Alaska	1743	3617	6439	4649	4387	1360	0	0	2774
	Other USA	1662	1842	2087	1779	1592	944	0	0	1238
	Unknown	61	154	95	122	163	95	0	0	86
	Subtotal	3466	5613	8621	6550	6142	2399	0	0	4099
Total		7459	11093	13954	11254	11115	14174	5990	3871	9864

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** information withheld because of nondisclosure regulations.

values from the region (98%) were received by Alaska fishermen.

a. Kodiak Area (CFEC pricing). Shrimp were first harvested in the Kodiak Area in 1959. The introduction of mechanical peelers to process the catch and good market conditions led to the rapid development of the fishery. However, the Kodiak area harvest declined steadily after 1971 because of low stock abundance. In 1980, however, ex-vessel gross earnings reached about $11.2 million as a result of increased fishing effort. Over the eight-year period 1975 to 1982 the Kodiak Area accounted for a consistently high proportion (54% on average) of the harvest value, for an annual average of about $5.3 million (table 29).

b. Dutch Harbor Area (CFEC pricing). See the shellfish Human Use sections in volume 2 of the Alaska Habitat Management Guide for the Southwest Region for background on the shrimp fishery in this area. The average harvest for the years 1975 to 1982 was approximately $476,000. Sixty-four percent of this value was earned by fishermen, from other states. The remainder went to Alaska fishermen primarily from the Kodiak Island census area. Peak harvest occurred in 1978, when ex-vessel values reached $993,000 (table 29).

c. Alaska Peninsula and Aleutian Islands Area (CFEC pricing). See the shellfish Human Use sections, in volume 2 of the Alaska Habitat Management Guide for the Southwest Region for background on the shrimp fishery in this area. During the period 1975 to 1980, this area produced in excess of approximately $2.4 million in shrimp ex-vessel values. The peak year occurred in 1977, when the harvest was valued at over $8.6 million (table 29).

6. Scallops. Since 1980, when scallops were first reported separately from other shellfish, the ex-vessel gross earnings to fishermen have exceeded $1.3 million each year and reached over $2.6 million in 1982 (table 30). Most scallop harvesting has historically occurred in the Kodiak Area, although an essentially new fishery was developed in the Alaska Peninsula/Aleutian Islands Area in 1982 that yielded $748,000 in earnings. Harvest revenues have varied from year-to-year with respect to the proportion taken by Alaska fishermen as compared to those from other states. Approximately half of the ex-vessel values were earned by Alaska fishermen (table 30).

7. Korean horsehair crab regional summary. A small fishery for Korean horsehair crab also exists in the Bering Sea

Table 30. Ex-vessel Value of Commercial Scallop Harvest for Southwest Alaska CFEC Pricing Areas, by Origin of Fishermen, 1975 to 1982

CFEC Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1979	1980	1981	1982	Avg.
Dutch Harbor						
	Kenai Peninsula	0	0	**	**	30
	Kodiak Island	0	0	**	**	20
	Alaska	0	0	**	197	50
	Other USA	0	0	**	**	2
	Subtotal	0	0	**	208	52
Kodiak	Kenai Peninsula	**	**	438	**	279
	Kodiak Island	**	**	114	891	263
	Valdez-Cordova	**	**	**	**	14
	Alaska	69	567	**	994	555
	Other USA	0	**	1264	**	655
	Unknown	0	**	0	**	16
	Subtotal	69	1322	1855	1659	1226
Total		69	1322	1855	2615	1465

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 31. Ex-vessel Value of Commercial Korean Horsehair Harvest for Southwest Alaska CFEC Pricing Areas, by Origin of Fishermen, 1975 to 1982

CFEC Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1979	1980	1981	1982	Avg.
Bering Sea***	Aleutian Islands	**	**	58	64	32
	Other Alaska*	**	**	9	**	3
	Alaska	**	4	68	**	35
	Other USA	**	110	1536	726	593
	Unknown	0	12	104	0	29
	Subtotal	3	126	1708	791	657

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

*** Extends beyond Southwest Region.

(table 31). Initial harvests were recorded in 1979 and averaged $875,000 per year over the three years from 1980 through 1982. The peak year was 1981, when harvest values reached $1.7 million. A large proportion (approximately 94% of the 1979 to 1982 average) of gross earnings from the horsehair crab fishery were taken by out-of-state fishermen (table 7).

C. Harvesting Employment

ADL commercial fish-harvesting employment information does not differentiate employment by shellfish species. Therefore, this discussion is for all shellfish species groups combined. For the years 1977 to 1982, annual average monthly employment in shellfish harvesting in Southwest Alaska increased steadily and reached a peak of 1,181 in 1981 (see table 32 and fig. 9). Employment estimates are based upon surveys of vessels at their point of landing and not upon fishing locations. Because there are no shore-based shellfish processors in the Bristol Bay area (no landings were made in that area), no employment data are shown.

1. Regional summary. Shellfish-harvesting occurs throughout the year with peak months occurring in September, October, and November and March and April (fall and spring). Although employment fluctuates throughout the year, it is relatively more stable than other commercial fishing activities. The 12-month average for the years 1977 through 1982 is 985. The more consistent fishing participation in the shellfish fisheries makes this annualized figure more reliable than employment figures for fisheries that are very intense but of short duration. The months with the lowest shellfish-harvesting employment levels for the region are May, June, July, and August (the latter three in particular). These months correspond with the peak seasonal effort in the sac roe herring and salmon fisheries.

   The ADL reports shellfish-harvesting employment for the Southwest Region for the Kodiak Area (table 33, fig. 10), the Alaska Peninsula, Western Aleutians, and Bering Sea area. The latter three are reported together (table 34, fig. 11). These are ADL areas; see the Introduction of this narrative (section I) for a map and explanation of ADL fish-harvesting employment areas.

2. Kodiak Area (ADL area). Shellfish-harvesting employment in the Kodiak area occurs during every month of the year. Peak employment, however, occurs in January, February, March, September, and October. The predominant trend has been increasing employment in all months of the year. The average annual employment for the period 1977 to 1982 was 399, with a range of 279 (1977) to 562 (1982). Peak employment was 1,087 for the period, which occurred in September 1982 (table 33).

Table 32. Southwest Region Shellfish-Harvesting Employment (Number of Fishermen and Crew)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	733	848	586	585	685	595	507	242	213	1,238	1,223	1,013	1,063
1978	803	855	838	954	947	671	403	649	312	1,406	1,435	831	696
1979	936	733	841	1,463	910	699	368	338	237	1,797	2,088	942	649
1980	1,131	1,071	1,390	1,450	1,097	866	459	340	256	2,026	2,343	1,493	698
1981	1,181	874	883	1,534	1,346	880	391	327	331	2,295	2,283	1,652	1,360
1982	1,126	1,208	1,328	1,639	1,059	709	696	507	324	2,327	1,606	764	1,317
Average	985	932	974	1,271	1,007	737	471	401	279	1,848	1,830	1,116	964

Source: ADL 1984.

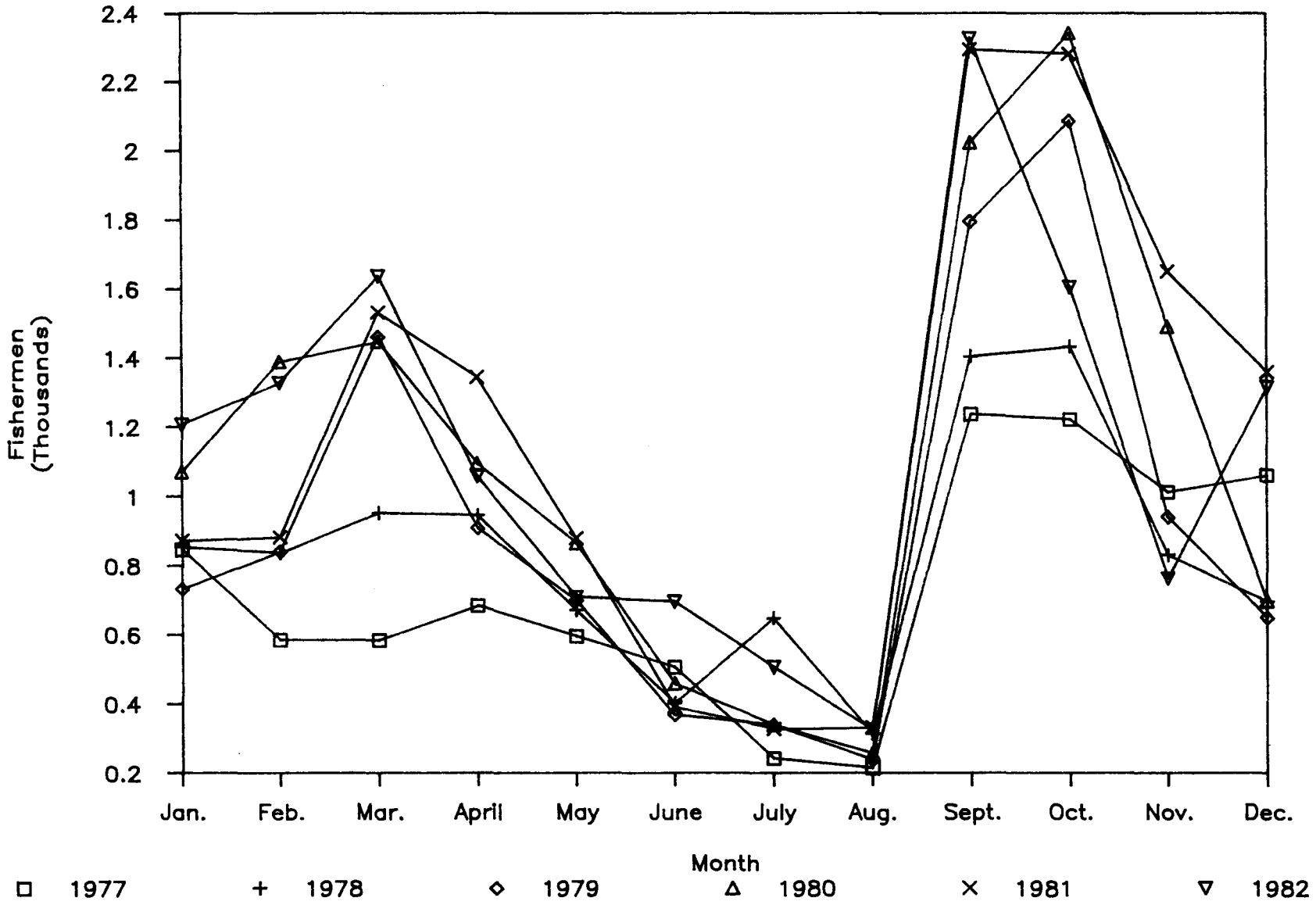


Figure 9. Southwest Region shellfish harvesting employment (number of fishermen and crew).

Table 33. Kodiak Shellfish Harvesting Employment (Number of Fishermen and Crew)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	279	454	348	323	300	24	22	47	39	685	463	273	368
1978	339	550	472	476	329	63	33	53	132	677	558	360	362
1979	385	463	699	746	67	28	92	66	128	664	752	341	409
1980	394	770	754	529	103	25	35	169	239	630	767	457	247
1981	437	299	213	709	343	68	73	134	312	948	951	533	650
1982	562	666	666	839	355	88	317	393	306	1,087	974	293	737
Average	399	534	525	604	250	49	95	144	193	782	744	376	462

Source: ADL 1984.

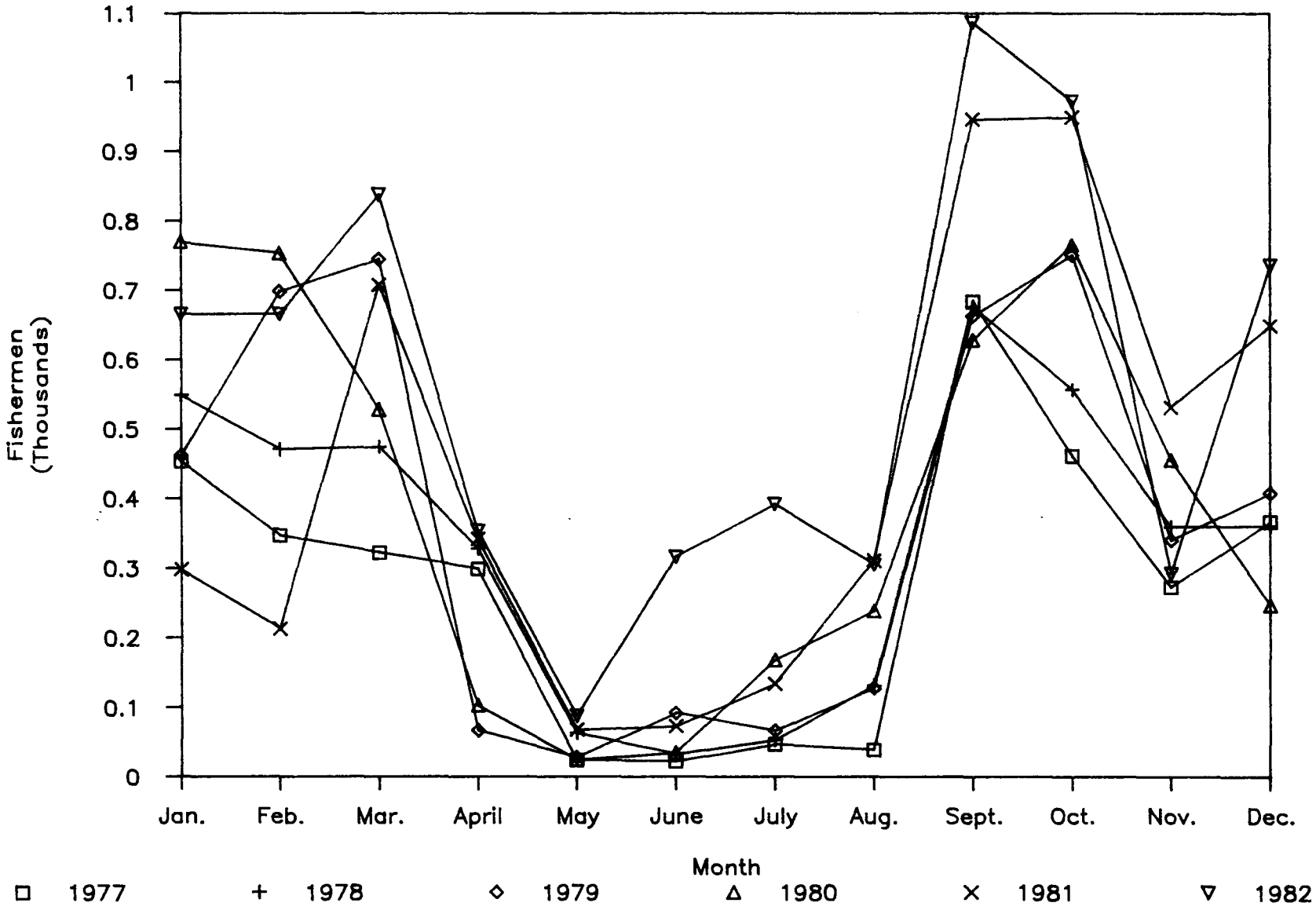


Figure 10. Kodiak shellfish harvesting employment (number of fishermen and crew).

Table 34. Alaska Peninsula, Western Aleutians, and Bering Sea Shellfish-Harvesting Employment (Number of Fishermen and Crew)

Year	Monthly Average	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	454	394	238	262	385	571	485	195	174	553	760	740	695
1978	464	305	366	478	618	608	370	596	180	729	877	471	334
1979	551	270	142	717	843	671	276	272	109	1,133	1,336	601	240
1980	737	301	616	921	994	841	424	171	17	1,396	1,576	1,036	451
1981	744	575	670	825	1,003	812	318	193	19	1,347	1,332	1,119	710
1982	564	542	662	800	704	621	379	114	18	1,240	632	471	580
Average	586	398	449	667	758	687	375	257	86	1,066	1,086	740	502

Source: ADL 1984.

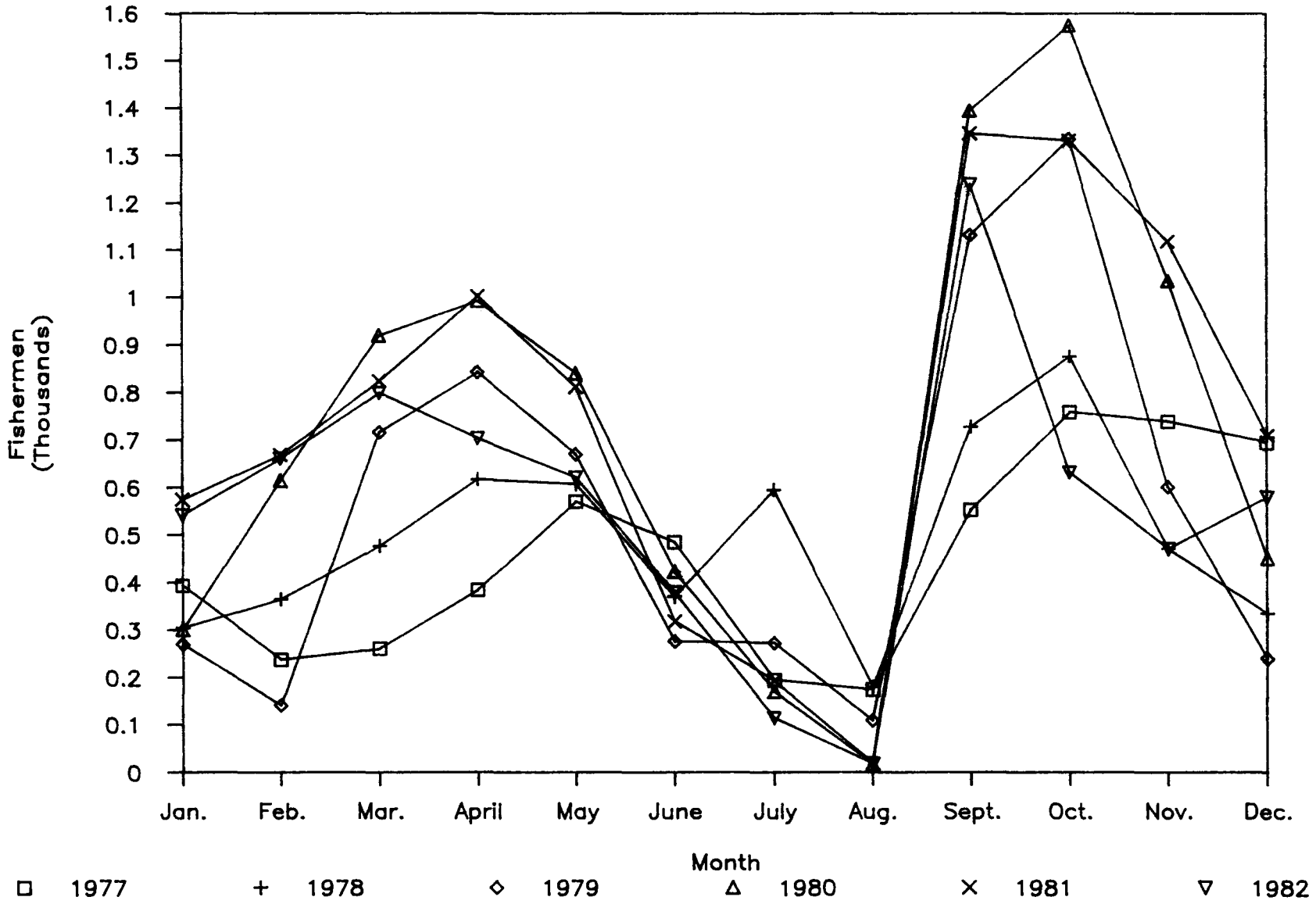


Figure 11. Alaska Peninsula/Western Aleutians/Bering Sea shellfish harvesting employment (number of fishermen and crew).

3. Peninsula, West Aleutians, and Bering Sea areas (ADL area). Peak employment occurs in this area in September and October and in March, April, and May. The month with least shellfish-harvesting employment is August. Average annual employment for the period 1977 to 1982 was 586, with a range of 86 (August) to 1,086 (October) (table 34). The trend has been an increase in employment until 1982, when a decrease occurred due to decreases in stock abundance.

D. First Wholesale Value

In 1981, the total first wholesale value of shellfish processed in Southwest Alaska was $238.9 million (table 35). Of the total processed shellfish value, about $135 million (56.6%) was from king crab (table 35). There was also substantial processing of shrimp ($25.8 million) and Tanner crab ($64.3 million). Most of the shellfish processing within the region occurred in the Aleutians and Kodiak subregions. These subregions are defined as areas by the ADF&G Division of Commercial Fisheries for production data.

The total value of king crab processed in the Aleutian Islands subregion was $73.6 million in 1981. Processed Tanner crab was valued at $51.7 million. Together, these two species accounted for 96% of the total value of processed shellfish in the Aleutians. However, there were also $3.7 million of horsehair crab and $1.4 million of shrimp products processed that year.

Within the Kodiak subregion, the value of processed king crab was $61.2 million, followed by shrimp ($24.4 million) and Tanner crab ($12.4 million). Smaller quantities of Dungeness crab and scallops were also processed in the subregion.

IV. COMMERCIAL HERRING FISHERY

A. Regional Overview

This section provides a brief economic overview of the Southwest Region's herring fisheries. Information on herring products and gear types, income and employment, is covered. These data are presented for the region as a whole and by ADF&G fishery management area. (For additional information see the Pacific herring Human Use section in Volume 2 of the Alaska Habitat Management Guide for the Southwest Region.)

A large high seas fishery for food herring was conducted by Japan and the USSR until the implementation of the U.S. Fishery Conservation and Management Act in 1977. Economic information on these fisheries is not discussed in this report. (For information on the high seas fishery, see NPFMC 1981.)

Table 35. First Wholesale Value ($) of Shellfish Products by Species for Southwest Alaska by Production Subregions, 1981

Subregion	Species	Product	$
Bristol Bay	King crab	Meat	436,022
	Tanner crab	Meat	54,710
		Sections	252,969
	Subregion total		743,701
Dutch Harbor/ Aleutians	King crab	Meat	5,366,629
		Sections	67,123,654
		Whole	1,140,929
	King crab subtotal		73,631,212
	Tanner crab	Sections	51,657,429
	Horsehair crab	Sections	604,012
		Whole	3,127,872
	Horsehair crab subtotal		3,731,884
	Shrimp	Whole	1,356,815
	Subregion total		130,377,400
Kodiak	King crab	Meat	2,290,482
		Sections	58,366,818
		Whole	547,149
	King crab subtotal		61,204,449
	Tanner crab	Meat	843,711
		Sections	10,578,883
		Whole	941,876
	Tanner crab subtotal		12,364,470
	Dungeness crab	Meat	530,227
		Sections	3,494,399
		Whole	3,758,649
	Dungeness subtotal		7,783,275
	Shrimp		24,405,705
	Scallop		2,065,130
	Subregion total		107,823,030

(continued)

Table 35 (continued).

Southwest Region	Species	Product	($)
	King crab	Meat	8,093,133
		Sections	125,490,472
		Whole	1,688,078
	King crab subtotal		135,271,683
	Tanner crab	Meat	898,421
		Sections	62,489,281
		Whole	941,876
	Tanner crab subtotal		64,329,578
	Dungeness crab	Meat	530,227
		Sections	3,494,399
		Whole	3,758,649
	Dungeness crab subtotal		7,783,275
	Shrimp		25,782,581
	Scallops		2,065,130
	Region total		238,944,131

Source: ADF&G 1984a.

The Southwest Region has supported herring fisheries since the early 1900's. The first reported harvest was from the Kodiak area in 1912. Another domestic fishery developed off Unalaska Island in 1928. Foreign fleets harvested herring in the southeastern Bering Sea beginning in the late 1950's. Although effort and interest had declined in most of these fisheries by the mid 1960's because of declining stocks, new herring markets caused a resurgence of activity in the mid 1970s.

1. Fisheries and products. Early harvests were primarily directed toward packed or salted food or fertilizer products. Currently, herring are sold for sac roe, food, and bait, but the Japanese interest in sac roe dominates the herring market.

    a. Sac roe fishery. Herring harvested for sac roe are taken during spring months as they move inshore from open areas to bays and estuaries to spawn. The sac roe fishery is conducted in coastal waters of the region, principally in bays and estuaries; the fishery targets the gravid, spawn-run female. Herring school and mill in the vicinity of their coastal spawning grounds, which makes them particularly susceptible to commercial harvest.

        Both purse seine and gill net fishing gear are used, although productivity differs widely. Hemming et al. (1978) estimate maximum gill net productivity at 10 tons per day, with an average of 2 tons per day for the entire season. Purse seining, on the other hand, is extremely efficient with single hauls of 100 tons or more of fish not uncommon. The use of purse seine gear also allows the fish to be held and tested to determine roe maturity and content. Mature roe content of less than about 6-8% of total weight results in the use of the herring for food/bait, which has a much lower ex-vessel price; sac roe ex-vessel price per pound is also adjusted according to the roe content. Therefore, value per landing can vary considerably.

    b. Roe-on-kelp fishery. After schooling and milling in inland waters, herring move into estuarine, lagoon, and other protected areas to spawn. Milt is broadcast by the males, and eggs are extruded by the females. The very sticky eggs adhere to aquatic vegetation. "Kelpers" walk the beach areas at low tide picking up or raking kelp (Fucus spp.) with the attached roe into containers. This delicacy is salted and marketed as is, primarily in Japan. This fishery requires little entry investment and is primarily conducted by local residents. For the years covered by these data, the only

commercial spawn-on-kelp fishery in the Southwest Region was located in the Bristol Bay Management Area.

c. Food/bait fishery. The fishing of herring in non-spawning condition usually occurs in the fall or winter months. The catches are sold for food or bait. Frequently, "green" herring are harvested during the sac roe herring fishery (green herring have eggs that are not ripe) and are also marketed as bait or food. However, this is considered incidental harvest. Spawn-run herring are thin-bodied, low in body fat, and generally not in optimal condition for consumption. In past years, the herring food/bait fishery has been small, with many operators supplying bait to the Alaska crab fleet (Lebida et al. 1984).

2. Ex-vessel value. Detailed information on income to fishermen has become available with the establishment of the Commercial Fisheries Entry Commission (CFEC) database (see appendix B). Table 36 shows the ex-vessel harvest values of combined herring products by management area for the Southwest Region from 1977 to 1982. The total value grew from approximately $700,000 to $8,157,000 in the seven-year period shown, with a peak of $9,864,000 in 1979. From 1977 to 1979, ex-vessel values (gross income) increased dramatically ($70,000 to $9,864,864) as a result of the increased participation of fishermen in the Bristol Bay and Kodiak area fisheries and increased ex-vessel prices generated by a strong export market.

Table 37 shows harvest ex-vessel values by product for the years 1975 to 1982. The value of Southwest herring fisheries increased dramatically in 1978 with the development of the sac roe fisheries. From 1978 to 1981, the ex-vessel value of the region's sac roe fisheries accounted for approximately 90% of herring gross earnings.

Ex-vessel prices per pound for the sac roe and food/bait herring fisheries are shown in tables 38 and 39, respectively. During the years 1977 to 1982, the prices for herring sac roe varied dramatically with market influences. These prices reflect averages; prices vary in all areas, based on the roe content of individual landings. Prices peaked in 1979 in the Kodiak and Bristol Bay management areas. Although, they were newer and generally had lower total harvests, the Chignik and Alaska Peninsula areas showed the highest prices in 1980 and 1981; the Chignik management area had the highest price in 1982 also. The food/bait ex-vessel prices also varied considerably. Generally, the prices for food/bait are approximately half the sac roe prices.

Table 36. Ex-vessel Value of Combined Commercial Herring Harvest for Southwest Alaska, by Management Area, 1977-82*

Management Area	Estimated Ex-vessel Value in Thousands of Dollars						
	1977	1978	1979	1980	1981	1982	Avg.
Bristol Bay (Togiak)	542	2,891	7,336	3,740	4,481	6,195	4,198
Chignik	0	0	0	630	204	114	158
Kodiak	158	428	2,521	1,556	779	637	1,013
Peninsula/ Aleutian	0	0	7	381	654	1,211	375
Total	700	3,319	9,864	6,307	6,118	8,157	5,744

Source: CFEC 1984.

* Products include sac roe herring, food/bait herring, and roe-on-kelp.

Table 37. Ex-vessel Value of Commercial Food/bait, Roe-on-Kelp, and Sac Roe Herring Harvests in the Southwest Region for 1975-82

	Estimated Ex-vessel Value in Thousands of Dollars								
Product	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Sac roe	---	---	---	2,967	9,489	5,789	5,718	6,506	6,094
Food/bait	5	*	605	102	200	235	197	1,453	400
Roe-on-kelp	120	249	95	250	176	284	203	196	197
Total	125	249**	700	3,319	9,865	6,308	6,118	8,155	4,355**

Source: CFEC 1984, ADF&G 1984.

--- means no data were available.

* Information withheld because of nondisclosure regulations.

** Partial value because of nondisclosure regulations.

Table 38. Herring Sac Roe Ex-vessel Prices ($) Per Pound

Mgt. Area/ Gear Type	1977	1978	1979	1980	1981	1982
Kodiak						
Purse seine	0.16	0.38	0.69	0.31	0.20	0.28
Drift gill net	---	0.38	0.82	0.34	0.20	0.28
Beach seine	---	---	0.71	0.29	---	---
Set gill net	---	---	0.80	0.34	---	---
Chignik						
Purse seine	---	---	---	0.54	0.23	0.30
Gill net	---	---	---	0.25	---	---
Alaska Peninsula						
Purse seine	---	---	0.35	0.42	0.34	0.25
Gill net	---	---	---	---	0.32	---
Bristol Bay						
Purse seine	---	0.17	0.33	0.10	0.17	0.17
Drift gill net	---	0.17	0.33	0.10	0.17	0.13
Set gill net	---	0.17	0.33	0.10	0.17	0.13
Beach seine	---	---	0.33	0.11	0.17	---
Roe-on-kelp*	---	0.36	0.60	0.50	0.67	0.73

Source: CFEC 1982, ADF&G 1984b.

--- means no data were available.

Table 39. Herring Food/Bait Ex-vessel Prices ($) Per Pound

Mgt. Area/ Gear Type	1975	1976	1977	1978	1979	1980	1981	1982
Kodiak								
Purse seine	0.05	0.05	0.23	0.17	0.25	0.15	0.19	0.19
Drift gill net	---	---	---	0.17	---	0.15	0.19	0.19
Beach seine	---	---	---	---	0.20	0.15	---	---
Set gill net	---	---	---	0.17	---	0.15	0.19	---
Chignik								
No prices listed								
Alaska Peninsula								
Purse seine	---	---	---	---	---	---	0.11	0.10
Bristol Bay								
Purse seine	0.04	---	0.08	---	0.11	0.03	0.12	0.15
Drift gill net	0.04	---	0.08	---	0.11	0.03	0.12	0.15
Set gill net	---	---	0.08	---	0.11	0.03	0.12	0.15

Source: CFEC 1982.

--- means no data were available.

The distribution of income from these fisheries is shown in table 47 by residency of fishermen (census area). Note that the roe-on-kelp gross earnings are not included in table 47. Although these figures (see table 48) are relatively small, the Bristol Bay roe-on-kelp fishery is local, with gross earnings going to local residents.

The following approximate percentages can be drawn from the data in tables 47-50:

- Of ex-vessel earnings from the roe herring and food/bait fisheries, 50% goes to fishermen with residencies in the Southwest Region.
- Forty percent of income goes to fishermen resident in Kodiak Island and the Kenai census areas.
- Eleven percent of income goes to fishermen resident in Dillingham, Bristol Bay, and the Aleutian Islands census areas.
- Thirty-four percent of income goes to out-of-state fishermen

The rapid increase in herring ex-vessel gross earnings can be attributed to a strong Pacific rim market (Japan, in particular). This market demand was unmet by traditional suppliers because of a number of factors, which include reduction in foreign fishing by the Federal Conservation and Management Act of 1976 (implemented in March 1977) and the decline in western Bering Sea, north Atlantic, and British Columbia herring stocks. This provided the opportunity for U.S. fishermen, many of them salmon fishermen, to significantly expand their participation in the Southwest Region's herring fisheries. This rapid increase in participation is an example of the commercial fishing sector's ability to move into new profitable fisheries.

Several factors contribute to this expansion capability in addition to the overall driving force of a strong export market. These include the timing of the herring fisheries in April, May, and early June, just prior to and in the same general vicinity as the salmon fisheries, which minimizes mobilization costs. Also, the same purse seine and gill net techniques are effective for both fisheries. Herring nets with smaller mesh are the only required gear adjustment; this makes investment costs to salmon fishermen relatively low.

3. Employment. The ADL produces a special report on fish-harvesting employment (see appendix C). Employment information on the harvest sector of the commercial herring fishery is derived from fish ticket data on the number of

vessels operating, the number of landings, and the average number of crew required to operate the vessel or equipment involved (ADL 1983). Table 40 and figure 12 show regionwide numbers employed (captain and crew) during the period 1977-1982. No data are available for the trawl fishery. Most sac roe herring employment occurs in May. Average employment during the month of May for 1977 to 1982 was 1,286; the peak was in May 1979 when 1,960 people were employed and when herring prices were very high. Comparison with employment for all species in the region indicates that this peak precedes peak employment opportunities in the salmon fisheries (ibid.).

Employment data on the processing sector of the commercial herring fishery are not available. Data provided by ADL are by industrial sector and do not differentiate by species.

B. Management Area Summaries

The Southwest Region is made up of five ADF&G Division of Commercial Fish, herring management areas: Kodiak, Chignik, North Peninsula, South Peninsula-Aleutian Islands, and Bristol Bay. In this narrative, the North Peninsula, and South Peninsula-Aleutian Islands are combined because of disclosure regulations. In the sections that follow, background information, employment, and income in the herring fisheries will be discussed for these management areas.

1. Kodiak Management Area:

a. Harvest summary. Commercial harvest of herring in the Kodiak area began in 1912. During the early history of the fishery, herring were utilized for meal, oil, pickling, dry salting, and halibut bait. In the early 1960s, however, market conditions for meal and oil became unprofitable and no commercial harvest occurred. In the late 1970s, the Japanese market for roe herring initiated interest in the development of this fishery. Though the bait fishery was also reinstated, the sac roe fishery dominates the Kodiak Area herring fishery.

The Kodiak Area sac roe herring fishery began sporadically as a purse seine fishery in 1964. Gill net and trawl gear joined this fishery for the first time in 1978 (Manthey et al. 1981). However, the use of trawl gear was outlawed for the sac roe fishery in 1981. The fishery occurs in numerous bays and isolated coastal locations around Kodiak Island, and the stocks fished are relatively small.

An important recent trend in this fishery has been the dramatic increase in the number of fishing units

Table 40. Southwest Region Herring-Harvesting Employment (Number of Fishermen and Crew, All Products)

Year	Monthly Average	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	19	0	0	0	0	162	59	0	0	0	0	0	0
1978	46	0	0	0	6	453	32	0	0	4	2	0	0
1979	168	0	0	2	5	1,960	29	16	9	1	0	0	0
1980	183	0	0	4	155	1,926	98	6	6	6	0	0	0
1981	140	0	0	14	167	1,416	72	2	6	2	0	0	0
1982	168	4	4	0	110	1,797	70	0	30	4	0	0	0
Average	121	1	1	3	74	1,286	60	1	9	3	0	0	0

Source: ADL 1984.

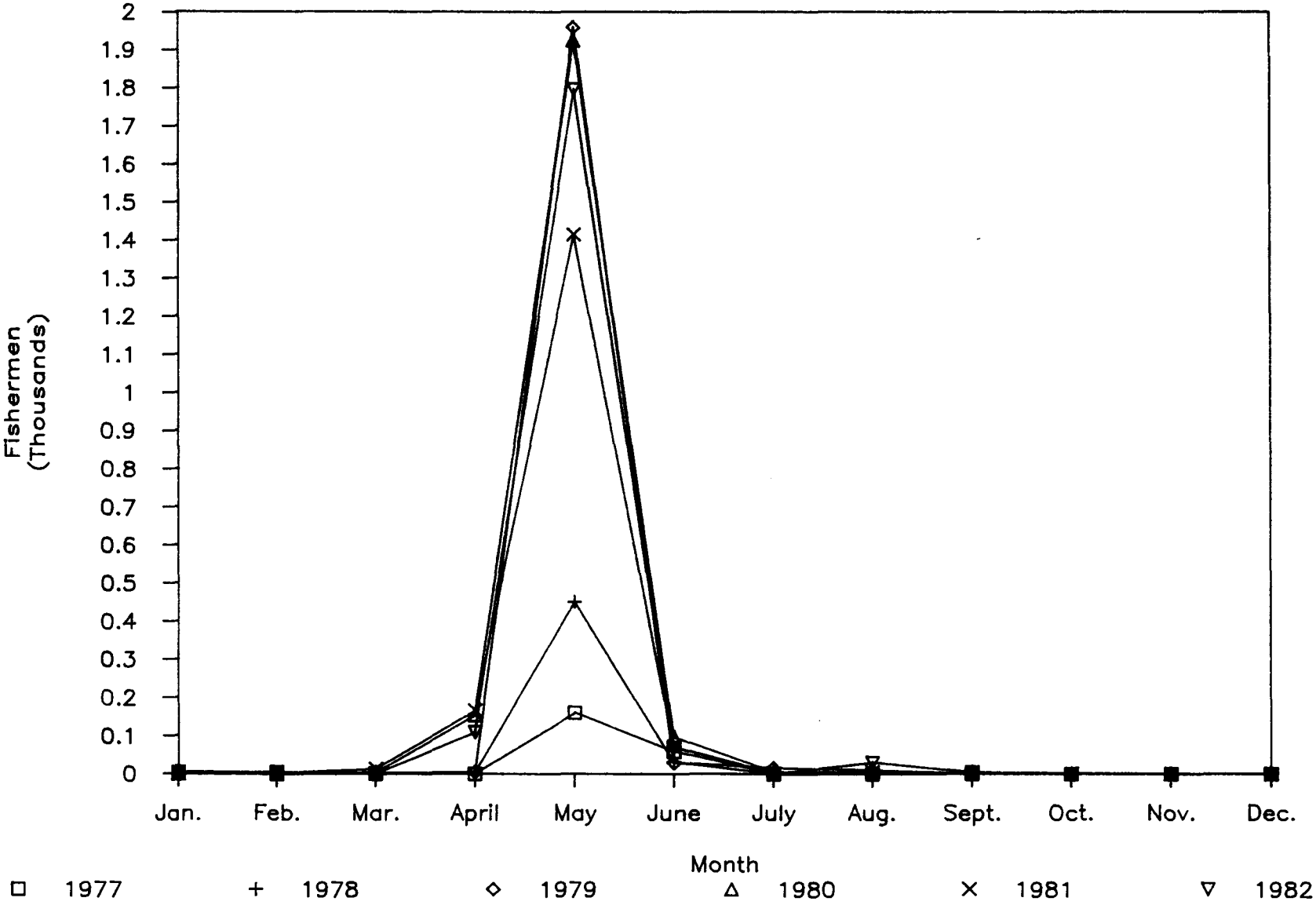


Figure 12. Southwest Region herring harvesting employment (number of fishermen and crew).

(fishermen/operators) since 1978, which has caused concern for adequate recruitment into stocks that have been at depressed levels since the mid 1970s (Malloy 1984, Manthey et al. 1981). This increase in fishermen was due to several factors. With entry into the herring fisheries limited in Southeast Alaska and Prince William Sound during the late 1970's, fishermen were attracted to the Kodiak Area. The price for sac roe also reached record levels in the late 1970's because of the reduction in west coast herring stocks. Kodiak roe herring product prices are generally higher than prices elsewhere (Manthey, pers. comm.). In addition, fishermen anticipated limited entry regulations in the Kodiak Area and sought to establish a fishing history to qualify for a limited entry permit.

The Alaska Board of Fisheries was formally petitioned by Kodiak fishermen to limit entry into the Kodiak roe herring fishery and to terminate the period for qualifying for a permit in 1980. During 1982, the CFEC recommended that the fishery be limited to 87 purse seine and 121 gill net entry permits based on recent years of participation. By 1984, however, participation had decreased to 42 purse seiners and 65 gill-netters. This decrease resulted from the termination of the permit qualification period, the low revenues experienced by many operators unfamiliar with Kodiak waters, and the weakening sac roe markets (Manthey, pers. comm.).

b. Ex-vessel value. Information on the distribution of income from the Kodiak sac roe and food/bait herring fisheries is shown in table 47. Income in the food/bait and sac roe herring fisheries is earned primarily (about 85%) by fishermen from the Kodiak Island census area. Approximately 95% of the ex-vessel values are earned by Alaska fishermen; almost all of these are from the Southwest Region. Table 41 summarizes ex-vessel value for the Kodiak Area sac roe herring fishery by gear type during the period 1979 to 1984.

Forty-two purse seine vessels and 65 gill-netters operated during 1984 for average gross earnings of $34,214 and $6,415, respectively (table 42). Seiners had an average of 3.9 deliveries and gill-netters had an average of 4.4 deliveries. Average roe recovery exceeded 10%; the total ex-vessel value of the 1984 fishery was $1.9 million (Malloy 1984).

Average crew size for Kodiak herring is four persons for purse seiners and two persons for gill-netters (ADL 1983). Based on a standard 40% share to the boat and

Table 41. Ex-vessel Value of Kodiak Area Herring Sac Roe Harvests by Gear Type in Thousands of Dollars, 1979-84

Kodiak Mgt. Area	1979	1980	1981	1982	1983	1984
Purse seine	2,185	1,377	1,137	801	1,352	1,437
Gill net	416	280	395	182	377	417
Total*	2,602	1,658	1,533	984	1,730	1,854

Source: Malloy 1984.

* Totals do not add because of rounding.

Table 42. Estimated Average Gross Earnings ($) in the Kodiak Management Area, Sac Roe Herring Fishery, 1979-84

Kodiak Mgt. Area	Seiner	Gill Netter
Average earnings per boat	34,214	6,415
Boat share of 40%	13,686	2,566
Crew share of 60%	20,528	3,849
Gross earnings per crew member	5,132	1,924

Source: Malloy 1984, ADL 1983, Hemming et al. 1978.

60% share to the crew (Hemming et al. 1978), individual incomes from the sac roe fishery in 1984 can be estimated (see table 42).

c. Harvesting employment. Employment data on the harvesting sector of the Kodiak Area herring fisheries (except trawl fisheries) are presented in table 43 and figure 13. As with the rest of the region, sac roe herring employment occurs predominantly in May. The average Kodiak Area May herring employment accounted for 22% of the region's average May herring employment for the years 1977 to 1982. However, Kodiak employment peaked in 1980, whereas the peak for the region was in 1979. The Kodiak Management Area sac roe herring fishery accounts for over 50% of the region's April and June herring employment and all of the April herring harvesting employment in 1982 (see tables 40, 43, 44, and 46). Employment data on the processing sector of the herring fisheries are not available at this time.

2. Chignik Management Area:

a. Harvest summary. Although the Chignik Management Area herring fishery is relatively small, the earliest reported catches date back to the early 1900's. The fishery supported a small saltery until the late 1930's. Commercial harvest was reinitiated in 1980 in response to Japanese demand for sac roe (Hicks 1984). The Chignik herring fishery uses purse seine gear and is pursued primarily by local fishermen and fishermen in transit to fishing grounds farther westward (ibid.).

b. Ex-vessel value. Ex-vessel values for the period 1980-1982 for the Chignik Area sac roe fishery by residence of fisherman are shown in table 47. For the years 1980 to 1982, over 75% of the ex-vessel gross earnings went to fishermen from the Southwest Region. Peak harvest occurred in 1980, when 630 metric tons were harvested by 24 vessels for ex-vessel earnings of approximately $630,000 or about $26,240 per vessel. Effort peaked in 1981 at 33 vessels earning $204,000 or about $6,200 per vessel. Only eight vessels operated in 1982 with ex-vessel earnings of about $114,000 or $14,250 per vessel. For the years 1980 to 1982, average earnings per vessel were lowest in 1981, the year of highest participation.

c. Harvesting employment. Estimates of the number of fishermen employed in the sac roe fishery are based upon a standard crew size of four for a purse seiner (the only gear type used during the period covered) (ADL 1983). The ADL combines the Alaska Peninsula and

Table 43. Kodiak Herring-Harvesting Employment (Except Trawl Fisheries, Number of Fishermen and Crew), All Products, 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	4	0	0	0	0	40	8	0	0	0	0	0	0
1978	14	0	0	0	4	100	10	0	0	4	2	0	0
1979	33	0	0	0	0	382	18	0	0	0	0	0	0
1980	51	0	0	0	0	522	86	2	2	2	0	0	0
1981	50	0	0	0	140	424	26	0	0	2	0	0	0
1982	33	0	0	0	110	240	46	0	0	0	0	0	0
Average	31	0	0	0	42	285	32	0	1	1	0	0	0

Source: ADL 1984.

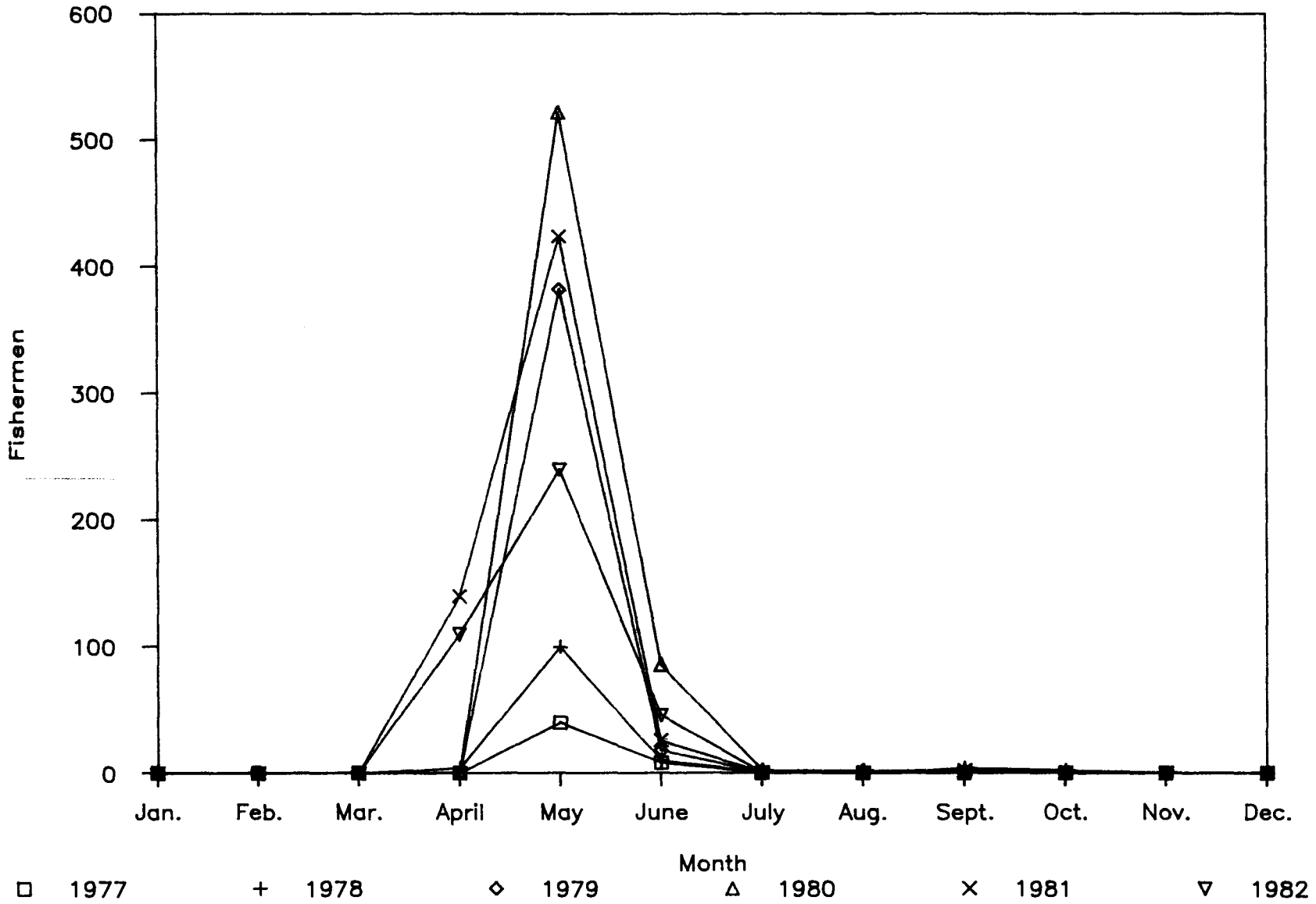


Figure 13. Kodiak herring harvesting employment (except trawl fisheries) (number of fishermen and crew).

Aleutian Islands areas for employment estimates of the commercial fishing harvesting sector. See table 44 and figure 14 for these data. No employment occurred until 1980; it increased abruptly in 1981 and then declined in 1982. May is the peak month for sac roe harvesting. However, some food/bait harvest occurred in August, September, and January in 1982.

3. Alaska Peninsula-Aleutian Islands Management Area:

a. Harvest summary. No sac roe herring fisheries exist in the Aleutian Islands portion of the Alaska Peninsula-Aleutian Islands Management Area, even though the food/bait fisheries have been actively redeveloped. The food/bait fishery occurs in August and September in the Unalaska area. This Eastern Aleutians fishery was historically significant for food fish from 1928 until 1945, when the fishery ceased because of changing market conditions.

The South Peninsula sac roe and food/bait fishery began in 1979. The North Peninsula sac roe fisheries began in 1982. In the past, vessels destined for the Togiak spring herring fishery in Bristol Bay explored for herring. However, until 1982, no harvestable amount of herring and fishing effort occurred simultaneously. As with the Chignik Area fisheries, these initial harvests appear to be a product of the initiative of fishermen to explore new fishing grounds. As shown in table 47, these fishermen are primarily from the Kodiak Island census area. Fishing effort increased from six vessels in 1980 to 40 vessels in 1981, but has since declined (ADF&G 1982a).

b. Ex-vessel value. Ex-vessel values for the Peninsula/Aleutians are shown in table 47. Approximately 65% of the ex-vessel gross earnings in 1980 and 1981 was earned by fishermen from the Kodiak Island census area. This decreased to approximately 35% in 1982 with the increase in out-of-state fishermen, who earned about 65% of the area's gross earnings.

c. Harvesting employment. As with other sac roe herring fisheries, four crewmen are assumed necessary to operate purse seine vessels used in this area (harvest has only occurred using purse seine gear). The ADL combines the Alaska Peninsula and Aleutian Islands areas for commercial fisheries harvesting employment estimates. See the Chignik Management Area employment section for a discussion of harvesting employment.

Table 44. Alaska Peninsula, Western Aleutians, Bering Sea Herring-Harvesting Employment (Fishermen and Crew, All Products), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	5	0	0	0	0	48	12	4	0	0	0	0	0
1981	17	0	0	0	0	158	46	0	4	0	0	0	0
1982	8	4	0	0	0	32	24	0	28	4	0	0	0
Average	10	1	0	0	0	79	27	1	11	1	0	0	0

Source: ADL 1984.

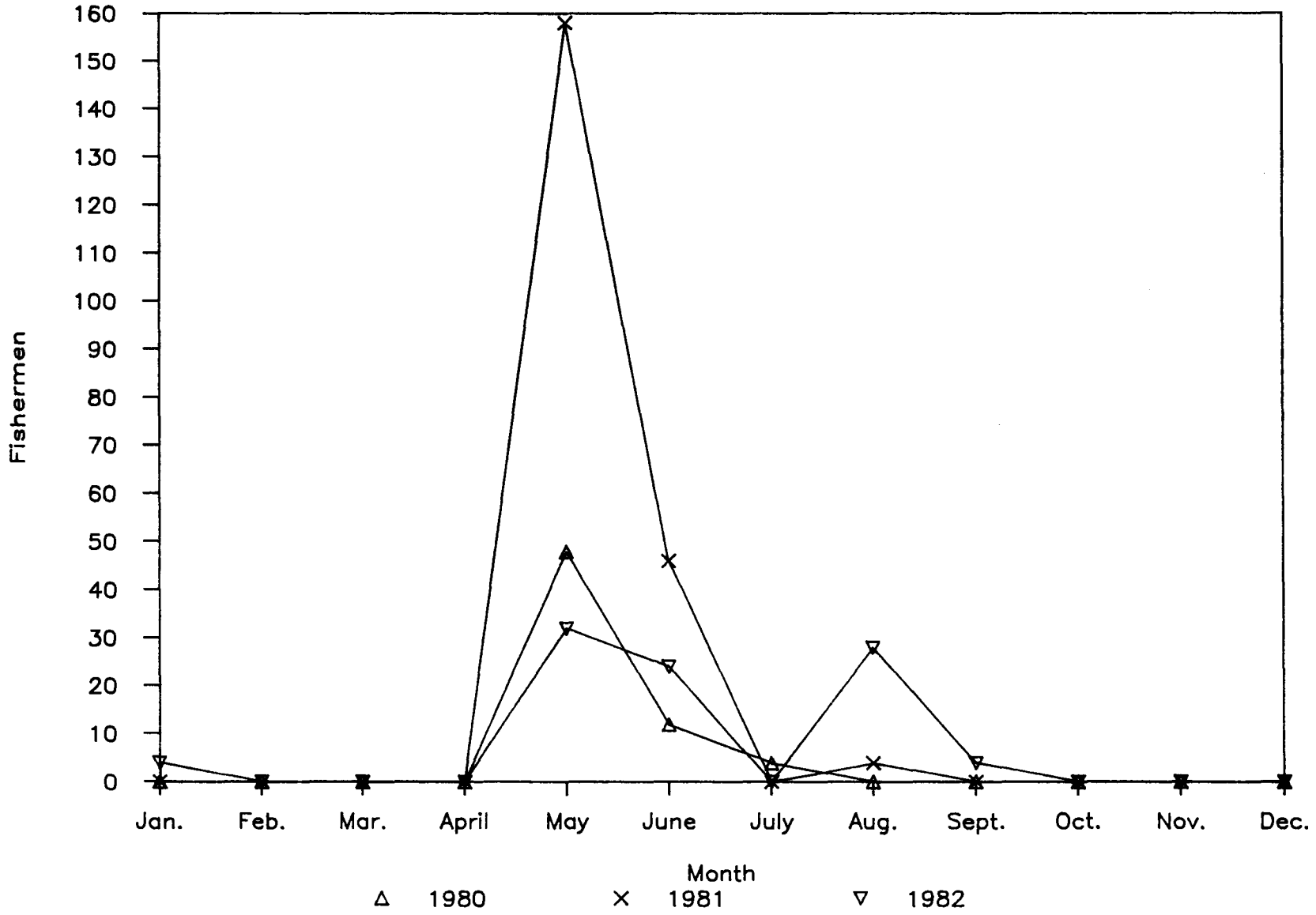


Figure 14. Alaska Peninsula/Western Aleutians/Bering Sea herring harvesting employment (number of fishermen and crew).

4. Bristol Bay Management Area (Togiak District):

a. Harvest summary. The first large-scale commercial herring fishery in the southeastern Bering Sea began in 1928. Similarly to other early herring fisheries targeted at food herring, it ceased in 1946 because of poor market conditions. Soviet and Japanese fleets fished herring in the western Bering Sea area until the establishment of the Fishery Conservation and Management Act of 1976 (effective March 1977), which limited foreign harvests. In 1980, herring was declared a prohibited species, with only incidental foreign catch allowed (AHMG 1985).

Domestic herring fisheries resumed in Bristol Bay during the late 1960s to obtain herring sac roe and herring spawn-on-kelp products. However, effort was low until 1977, when harvest increased dramatically in response to the Japanese market for sac roe. The Bristol Bay sac roe fishery was transformed in 1977 from a small, gill-net-based local fishery producing an average of 55 metric tons annually from 1967 to 1976 (Barton et al. 1977) to a fishery that in 1983 produced 24,486 metric tons (Lebida 1984). Currently, the Bristol Bay Area supports the largest sac roe herring fishery in the state and contributed 43% of the statewide harvest during the 1982 season.

The rapid growth of the Bristol Bay sac roe herring fishery has been controversial because the number of local resident fishermen (primarily gill-netters) directly benefitting from the fishery has not been significant because of the lack of guaranteed markets available to gill-netters. Most gill-netters in the 1977, 1978, and 1980 seasons could not locate stable markets from participating processors. In the 1979 season, however, gill-netters did exceptionally well in the fishery, because of several unusual circumstances. Spring came two weeks early, resulting in an early spawn. The herring stocks had already broken into smaller schools and moved into shallow water for spawning before the commercial fleet arrived. Because many of the purse seiners were unable to make large sets, the local processors were receptive to taking gill-netted herring (Golia n.d.).

Local gill-netters have had difficulty in securing confirmed markets with participating processors. Processors generally prefer contracting with purse seiners because their deliveries of large loads can be more efficiently handled during peak harvesting periods (ibid.).

Bristol Bay also supports a herring spawn-on-kelp fishery which began in 1968. Interest and harvest in the fishery gradually increased in response to the Japanese market for roe products. Peak harvest valued at $284,000 occurred in 1983 (table 48). Peak employment occurred in 1984, 407,000 pounds were harvested by 240 kelpers for an estimated ex-vessel value of $203,000.

The Bristol Bay herring fisheries present a number of risks to a commercial operation, which include runs that are of short duration, an area that is remote from transportation and processing support, and adverse weather that regularly halts operations. However, several factors contribute to the success of the fishery's rapid expansion (Hemming et al. 1978):

- High prices commanded by sac roe in the Japanese market
- The willingness of Japanese industry to share technical information
- Exclusive arrangements between fishermen and processors that reduce risks and allow effective sharing of "front end" costs
- The introduction of purse seine fishing gear that is highly efficient and allows testing of the maturity of the roe in each catch and subsequent release of the fish if maturity is not satisfactory

b. Ex-vessel value. Ex-vessel values for the Bristol Bay Management Area food/bait and sac roe herring fisheries are shown in table 47. Average ex-vessel value of this fishery over the six-year period 1977 to 1982 was approximately $4.0 million, ranging from $447,000 in 1977 to $6.0 million in 1982. In 1983 (not shown in table 47), ex-vessel values reached approximately $10.5 million (Lebida 1984). Bristol Bay Management Area ex-vessel earnings have been distributed to more than eight Alaska census areas, as well as to out-of-state. During the years 1977 to 1982, the Kodiak Island census area accounted for about 37% of the Alaska average ex-vessel gross earnings. The Dillingham and Bristol Bay census areas account for about 14% of the 1977 to 1982 average annual ex-vessel gross earnings. Approximately 77% of the Alaska and 52% of the total ex-vessel values, respectively, are earned by Southwest Region fishermen. The trend during the period was for non-Alaska fishermen to receive an increasing proportion of ex-vessel gross earnings.

Current area herring regulations specify additional fishing time for gill-netters (three times that given purse seiners) when openings are less than 24 hours (see 5AAC 27.865.6.2). Individual incomes may be estimated in the same fashion as was done for fishermen in the Kodiak Area except that different crew factors have been derived for the Togiak herring fishery. ADL (1983) suggested 3.5 crew per seiner and 2.25 crew per gill-netter be used for Togiak. With a 40% share to the boat and a 60% share to the crew, and assuming 4.4 landings per seiner and 3.9 landings per gill-netter, annual average earnings for purse seiners are $42,100, with an average crew share of $7,200. These estimates are summarized in table 45. These earnings are similar to those in the Kodiak and Chignik management areas.

Table 48 shows gross earnings in the roe-on-kelp fishery. Although the distribution of this income is not shown in this table, most of the income is earned by local residents in the Bristol Bay and Dillingham census areas. These ex-vessel values have increased considerably from $95,000 in 1978 to $284,000 in 1983.

c. Harvesting employment. Estimates of the numbers of fishermen and crew directly employed in the Bristol Bay Management Area sac roe and food/bait herring fishery are shown in table 46 and figure 15. Similarly to other management areas in the region, most of the employment and effort directed at sac roe occurs in May. Average employment for May from 1977 to 1982 was 961. However, the years 1979, 1980, and 1982 had markedly higher employment figures. The average Bristol Bay Management Area sac roe herring May employment (1977-1982) accounts for approximately 75% of the region's sac roe employment. Roe-on-kelp harvest employment is included in table 46, but comparison with Bristol Bay management reports indicates that these (ADL) figures are underestimates. Table 48 provides the best source of roe-on-kelp harvest employment.

Employment statistics in tendering and processing herring are not available and are difficult to estimate. Processing of sac roe herring is labor-intensive in that each fish is "popped" by hand; i.e., after curing, each fish is decapitated, then carefully shaken to loosen the roe, which then falls out. It is important not to break the skein if full market value is expected. Although some American processors have processed small packs of sac roe, the preferred arrangement is to sell the product in the round.

Table 45. Estimated Average Earnings for Fishermen in the Togiak District Sac Roe Herring Fisheries, 1978-84

Togiak Mgt. Area	Seiner	Gill Netter
Average earnings per boat	42,100	6,300
Boat share (40%)	16,840	2,500
Crew share (60%)	25,260	3,780
Gross earnings per crew member	7,217	1,680

Source: Malloy 1984, ADL 1983, Hemming et al. 1978.

Table 46. Bristol Bay Herring-Harvesting Employment (Number of Fishermen and Crew, Food/Bait and Sac Roe Fisheries)

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	15	0	0	0	0	122	51	0	0	0	0	0	0
1978	32	0	0	0	2	353	22	0	0	0	0	0	0
1979	135	0	0	2	5	1,578	11	16	5	1	0	0	0
1980	127	0	0	4	155	1,356	0	0	4	4	0	0	0
1981	73	0	0	14	27	834	0	2	2	0	0	0	0
1982	127	0	0	0	0	1,525	0	0	2	0	0	0	0
Average	85	0	0	3	32	961	14	3	2	1	0	0	0

Source: ADL 1984.

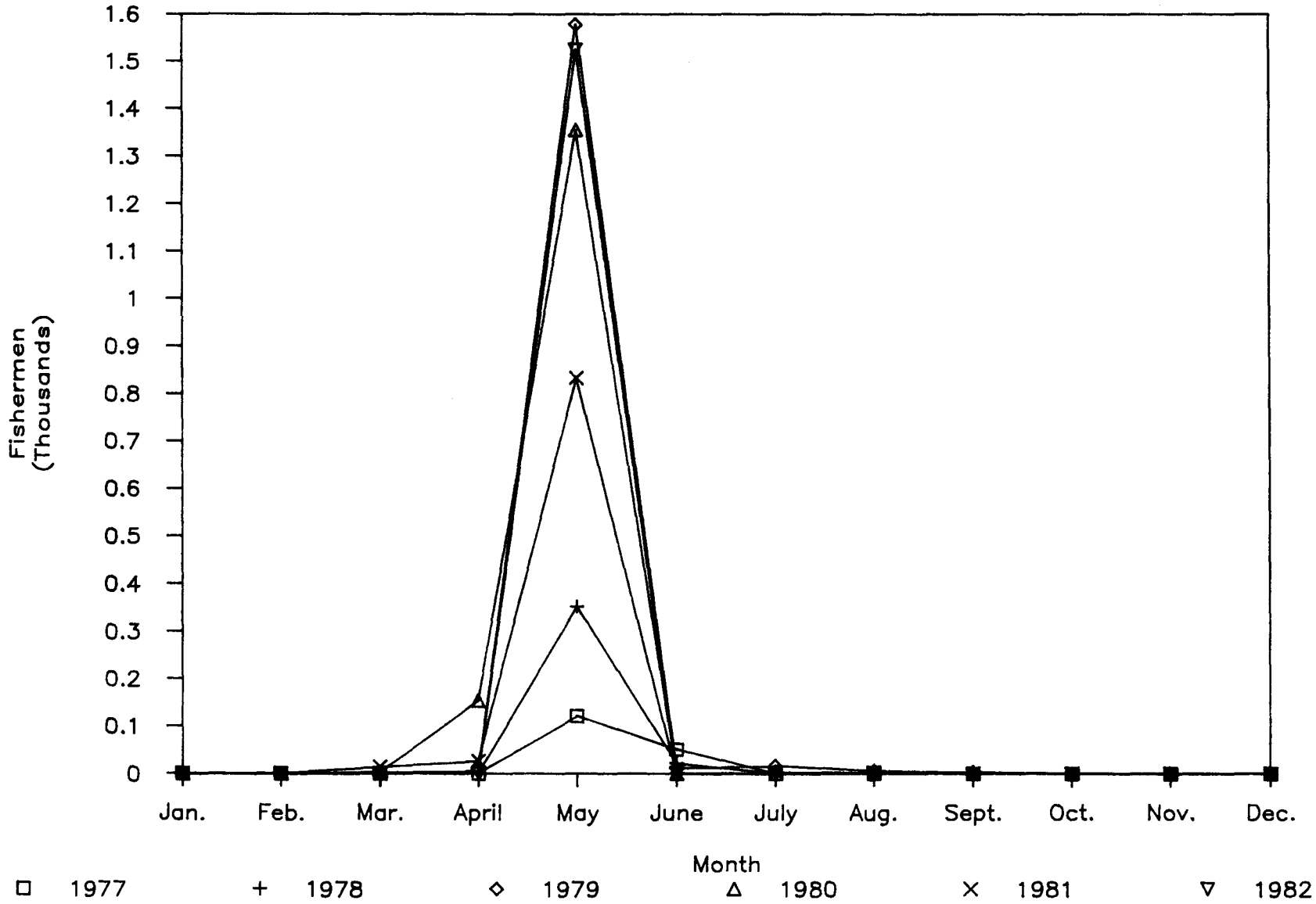


Figure 15. Bristol Bay herring harvesting employment (number of fishermen and crew).

Table 47. Ex-vessel Value of Commercial Food/Bait and Sac Roe Herring Harvest for Southwest Alaska Fishery Management Areas, by Origin of Fishermen, 1977-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1977	1978	1979	1980	1981	1982	Avg.
Bristol Bay (Togiak)	Dillingham	3	45	558	74	310	456	241
	Bristol Bay	**	61	374	10	56	127	**
	Aleutian Islands	0	0	149	142	**	118	**
	Anchorage	**	20	218	140	103	197	**
	Kenai Peninsula	215	806	1102	777	1073	1297	878
	Kodiak Island	70	1201	1234	942	1254	1297	1000
	Valdez-Cordova	0	**	145	41	129	102	**
	Wrangell-Petersburg	30	16	338	98	15	167	111
	Other Alaska*	**	**	293	148	**	238	**
	Alaska	326	2207	4412	2372	3008	4000	2721
	Other USA	117	419	2722	1010	1232	1964	1244
	Unknown	4	15	26	74	38	35	32
	Subtotal	447	2641	7160	3456	4278	5999	3997
Chignik	Dillingham	0	0	0	**	107	76	**
	Kenai Peninsula	0	0	0	**	0	0	**
	Kodiak Island	0	0	0	302	88	**	**
	Alaska	0	0	0	486	**	**	**
	Other USA	0	0	0	144	**	**	**
	Subtotal	0	0	0	630	204	114	158
Kodiak	Kenai Peninsula	**	**	**	86	73	**	85
	Kodiak Island	**	**	2114	1260	650	596	855
	Other Alaska*	0	0	**	71	7	**	15
	Alaska	158	372	**	1417	730	**	**
	Other USA	0	51	**	129	49	**	**
	Unknown	0	4	**	10	0	**	**
	Subtotal	158	428	2521	1556	779	637	1013
Peninsula/ Aleutians	Kodiak Island	0	0	0	**	443	**	**
	Other Alaska*	0	0	0	**	50	**	**
	Alaska	0	0	0	381	492	441	219
	Other USA	0	0	0	0	161	770	155
	Unknown	0	0	7	0	0	0	1
	Subtotal	0	0	7	381	654	1211	375
Total		605	3069	9688	6024	5915	7961	5544

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 48. Ex-vessel Value of Commercial Roe-on-kelp Herring Harvest for Southwest Alaska Fishery Management Areas, 1978-84

Fishery Mgt. Area	1978	1979	1980	1981	1982	1983	1984*	Avg.
Bristol Bay (Togiak)								
No. fishermen	160	100	78	111	124	131	240	135
Price/pound ($)	0.36	0.60	0.50	0.67	0.73	1.03	0.50	0.63
Pounds (1,000s)	330	415	190	371	241	275	407	318
Harvest value (1,000 $)	120	249	95	250	176	284	203	196

Source: ADF&G 1984b.

* Preliminary.

Table 49. Ex-vessel Value of Commercial Food/Bait Herring Harvest for Southwest Alaska (All Management Areas Combined), by Origin of Fishermen, 1975 to 1982

Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kenai Peninsula	0	0	232	0	24	43	0	99	50
Kodiak Island	**	**	211	**	61	86	**	159	**
Other Alaska*	**	0	41	0	26	65	**	166	**
Alaska	**	**	483	**	110	194	**	424	**
Other USA	**	0	117	**	81	40	**	1,029	**
Unknown	0	0	4	**	8	1	0	0	**
Total	5	**	605	102	200	235	197	1,453	350

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 50. Ex-vessel Value of Commercial Herring Sac Roe Harvest for Southwest Alaska (All Management Areas Combined), by Origin of Fishermen, 1978 to 1982

Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars					
	1978	1979	1980	1981	1982	Avg.
Dillingham	45	556	111	419	525	373
Bristol Bay	61	371	10	55	124	124
Aleutian Islands	0	144	142	**	110	**
Anchorage	20	222	145	107	191	137
Kenai Peninsula	807	1,375	1,095	1,154	1,226	1,131
Kodiak Island	1,478	3,287	2,669	2,380	2,054	2,374
Valdex-Cordova	**	145	60	137	99	**
Juneau	**	54	63	**	75	**
Wrangell-Petersburg	16	338	81	14	166	139
Ketchikan Gateway	**	181	39	**	64	**
Other Alaska*	**	48	47	15	86	**

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

V. HALIBUT FISHERY

A. Regional Overview

The International Pacific Halibut Commission (IPHC), originally called the International Fisheries Commission, was established in 1923 by a convention between Canada and the United States (IPHC 1978). The halibut commission has jurisdiction over the Canadian and United States sport and commercial halibut fisheries but has no jurisdiction over foreign fisheries.

Prior to 1977, restrictions on foreign fishing for halibut were achieved through separate agreements between the United States and the foreign nations involved. Since the 1977 implementation of the Magnuson Fishery Conservation and Management Act, halibut has been an unallocated species that must be avoided by United States and foreign groundfish fleets within the 200-mi fishery conservation zone (NPFMC 1983a).

United States fishermen began halibut fishing in the Bering Sea in 1928, but development of the fishery was slow. To encourage fishing in the Bering Sea, beginning in 1958, the season was opened one month earlier than in the Gulf of Alaska. This, plus the Japanese entry into the fishery, led to harvests above maximum sustained yield. Despite area and time regulations on the fishery, catches continue to decline, mainly because of large incidental catches of halibut in the foreign trawl fisheries (IPHC 1978).

Since the 1970s, more small boats have joined the halibut fleet; the majority of them have come from the salmon fleet. The size of the Alaska halibut fleet increased 36% from 1977 to 1981 (Anonymous 1983a). This growth has resulted in increased fishing pressure on stocks and catch limits of halibut being caught in increasingly short periods of time (Natural Resources Consultants 1982). In 1983, the NPFMC approved a plan for a three year-moratorium on the halibut fishery, but this plan was not approved by the federal Office of Management and Budget and was dropped (Anonymous 1983a). However, the NPFMC will pursue consideration of other management alternatives for the fishery (NPFMC 1983b). Commercial fishing for halibut is restricted to hook and line gear; most halibut are taken with longline gear.

A local halibut fishery is currently being developed by residents of the Pribilof and Nelson islands (NPFMC 1984, Cullenberg 1984). The villagers from these communities do not have access to any viable commercial fisheries other than halibut (NPFMC 1984), and the sale of halibut contributes money to the cash-poor economies of the area (Cullenberg 1984). Despite efforts by the NPFMC to discourage participation by nonlocals in this fishery, large boats from outside the area still harvest a large part of the catch

limits from IPHC Regulatory Area 4C, which includes the Pribilof and Nelson islands (NPFMC 1984, Anonymous 1983d).

The Gulf of Alaska halibut fishery takes place in the summer months. In the 1960s, the commercial season was about six months long. However, as in other parts of the state, the season has progressively become shorter; the season is now limited to three approximately seven-day-long openings, which occur between May and September. The Bering Sea quota is usually reached or exceeded by the end of August (McCaughran 1983). Although these short openings are biologically necessary to maintain populations, they are somewhat inefficient economically. The fleet tends to overcapitalize in order to compete for the limited resource; the shortened and intensified fish-harvesting period requires processors of halibut to accommodate peak periods by increasing processing capacity, which is then less fully utilized between peaks; and fresh halibut, which brings a higher price than frozen, is available to the fresh seafood market for only a short period each year (IPHC 1983).

For more background information on the Southwest Region's halibut fisheries, see the Pacific halibut Human Use section in volume 2 of the Alaska Habitat Management Guide for the Southwest Region.

B. Ex-vessel Value

1. Background. When the CFEC develops ex-vessel prices, fish ticket landing values are aggregated from statistical areas into CFEC pricing areas. This is done so prices can be derived on an accurate geographical basis without the areas being so small as to be confusing. Through this process, IPHC halibut fish ticket value information originally in IPHC statistical areas (a total of 29 areas in the Southwest Region) are translated into five halibut pricing areas (which correspond to ADF&G king crab management areas or districts). Because of this process, halibut ex-vessel values are reported in this economic narrative in the following areas: Kodiak, Dutch Harbor, Adak, Peninsula, and Bering Sea (which extends beyond the Southwest Region) (Dinneford, pers. comm.). This also means that ex-vessel values ($) do not correspond directly with the harvest (pounds) reported in the Pacific halibut Human Use section mentioned above. However, the maps in appendix A and the halibut Human Use section illustrate area boundaries and discuss the significance of particular fishing areas, respectively.

2. Average value summary. The average ex-vessel value of this fishery for the period 1975-1982 was approximately $4.5 million (table 51). The Kodiak area accounted for 51% of the average annual value. The Alaska Peninsula area accounted for 21% of that figure for the period.

Table 52 provides a more detailed breakdown of ex-vessel values for the same period. Considerable variability is shown in the yearly totals (range: $1.2-$7.9 million). These fluctuations are largely due to variations in ex-vessel prices at ports along the west coast. In 1977, 1978, 1981, and 1982, Kodiak led all ports on the Pacific coast for pounds of harvest; Prince Rupert, British Columbia, was the leading port in 1979 and 1980 (IPHC 1981). Generally speaking, halibut ex-vessel prices are lower in more northern and western ports. The difference between southern and northern prices tends to be magnified in years of peak high or low prices; this results in more of the fish harvested in northern areas being delivered to more southern ports. For larger fresh-market fish, the price difference is even greater than that for the frozen market (ibid.).

In 1979, approximately half the 1978 total number of pounds were harvested in the Southwest Region, but record ex-vessel prices ($2.31/lb) resulted in a relatively high total value of harvest (IPHC 1980). In 1980, ex-vessel prices dropped to an average price of $0.99 with a price of $0.89 in Kodiak and $1.14 in Washington (table 53). This resulted in the increased delivery of halibut to more southern ports; Seattle became the leading United States port for the first time since 1969 (IPHC 1981). Thus, port-of-landing and Southwest Region total ex-vessel values are sensitive to ex-vessel prices.

During the period 1977 to 1982, the percentage of ex-vessel values earned by Alaska fishermen increased in all areas. Since 1981, Alaska fishermen have taken more than one-half of the ex-vessel value of the Alaska halibut harvest.

3. Pricing area summary. Despite a wide range of values ($0.5-$4.6 million), Kodiak has consistently led all other areas in Southwest Alaska in ex-vessel value of the commercial halibut harvest since 1977, accounting for an average of 51% (table 52). In 1975 to 1977, the Alaska Peninsula was relatively comparable to Kodiak Area harvests. However, since 1978, the Alaska Peninsula value has declined. In 1982, the ex-vessel value returned to 1977 levels; this was accompanied by an increase in Alaska earnings. Ex-vessel values in the Dutch Harbor area remained consistently low throughout the period, with the exception of a dramatic increase in 1982. Approximately, 66% of the 1982 Dutch Harbor Area ex-vessel values were earned by out-of-state fishermen. Ex-vessel values in the Bering Sea Area during the 1975 to 1982 period ranged from $316,000 in 1975 to $1,811,000 in 1979. Most earnings have consistently gone to out-of-state fishermen, though in 1981 and 1982 Alaska fishermen earned approximately one-third of the ex-vessel values. The value of the Adak Area harvest increased from

Table 51. Average Ex-vessel Value and Percentage of Total of Commercial Halibut Harvests in the Southwest Region, by CFEC Pricing Area, 1975-82

Thousands of Dollars(%)					
Adak	Bering Sea*	Dutch Harbor	Kodiak	Peninsula	Total
323(7)	750(17)	159(4)	2,291(51)	963(21)	4,486

Source: CFEC 1984.

* Extends beyond Southwest Region.

Table 52. Ex-vessel Value of Commercial Halibut Harvest for Southwest Alaska CFEC Pricing Areas, by Origin of Fishermen, 1975 to 1982

CFEC Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Adak										
	Subtotal	0	25	477	843	818	221	199	0	323
Bering Sea***	Aleutian Islands	0	0	27	**	**	9	86	48	**
	Ketchikan Gateway	0	0	**	**	**	**	**	0	**
	Other Alaska*	0	0	**	**	113	**	**	56	**
	Alaska	0	0	177	**	238	33	207	104	**
	Other USA	0	0	265	**	1443	310	592	300	**
	Unknown	316	579	240	**	130	1	0	0	**
	Subtotal	316	579	682	1060	1811	345	799	404	750
Dutch Harbor	Alaska	0	0	**	**	8	0	**	252	**
	Other USA	0	0	**	**	0	**	**	616	**
	Unknown	78	70	**	0	0	0	0	63	**
	Subtotal	78	70	144	9	8	**	32	930	**
Kodiak	Kenai Peninsula	0	0	65	**	77	9	58	673	**
	Kodiak Island	0	0	413	314	832	301	1165	2096	640
	Other Alaska*	0	0	146	**	44	15	42	212	**
	Alaska	0	0	625	570	953	325	1265	2981	840
	Other USA	0	0	1349	2140	1254	123	445	1484	849
	Unknown	1199	2701	357	266	9	108	80	96	602
	Subtotal	1199	2701	2331	2976	2217	556	1790	4560	2291
Peninsula/ Aleutians	Aleutian Islands	0	0	119	46	61	17	6	153	50
	Kodiak Island	0	0	46	**	0	0	**	438	**
	Other Alaska*	0	0	262	**	51	**	**	484	**
	Alaska	0	0	427	80	111	**	**	1074	**
	Other USA	0	0	704	814	143	**	**	808	**
	Unknown	1008	1095	914	147	3	**	0	172	**
	Subtotal	1008	1095	2044	1041	257	120	88	2054	963
Total		2601	4470	5678	5930	5111	1246	2907	7949	4486

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

*** Extends beyond Southwest Region.

Table 53. Average Ex-vessel Price in Dollars (U.S.) Per Pound Paid for Halibut, by Port and Fishing Period, 1980

Port	Bering Sea Spring	May-June	July	Aug.	Bering Sea Fall	Sept.	Oct.-Nov.	Season Avg.
Seattle	---	1.12	1.15	1.37	1.30	1.15	---	1.14
Bellingham	---	1.10	1.16	---	1.22	---	---	1.11
Ketchikan	---	0.90	---	---	---	---	---	0.90
Petersburg	---	0.90	---	---	---	---	---	0.90
Kodiak	0.80	0.90	0.90	---	0.90	0.92	---	0.89
Unalaska	0.60	0.81	0.94	---	0.85	---	---	0.85
Vancouver	---	1.01	1.15	1.29	---	1.28	1.30	1.17
Prince Rupert	---	0.93	1.01	1.10	---	1.23	1.28	1.01

Source: IPHC 1981.

--- means no data were available.

1975 to 1979 (peaking in 1978) and then declined to zero in 1982. This summary gives an indication of the "volatility" of the Pacific coast halibut fishery.

C. First Wholesale Value

Data for processed halibut products for Southwest Alaska are available only for 1981 because a special computer run by the ADF&G, Division of Commercial Fisheries, Computer Services section did a special computer run by production subregions by species groups for that year. The total value of processed products was $5,628,332. Ninety-four percent of the processing value, or $5,282,926, occurred in the Kodiak subregion, with the remainder in the Dutch Harbor/Aleutians subregion ($345,406).

Halibut first-wholesale values are usually reported under the category "other finfish" in the ADF&G, Division of Commercial Fisheries annual catch and production report.

D. Harvesting Employment

Commercial fish-harvesting employment figures are derived by the ADL from data collected at the point of landing where vessels are delivering fish for processing. The areas shown are labor market study areas established by the ADL and do not necessarily correspond to the residence of fishermen or the area fished. Table 54 and figure 16 present harvest employment in the halibut fishery for the Southwest Region by month for the period 1977 to 1982. Although monthly employment figures vary from year-to-year, average annualized employment figures have remained fairly stable, ranging from 91 fishermen and crews in 1980 to 110 fishermen and crews in 1979, with the exception of a large jump in participation in 1982 (182). This increase in participation was probably due to the moratorium in the fishery, which required fishermen to be grandfathered in during the years 1980 to 1982. Another trend in the fishery has been an increase in participation in the spring fishery and a decrease in the fall fishery. Spring ex-vessel prices are generally higher, which can account for the shift in participation.

Fish-harvesting employment figures in the Kodiak area (ADL) for the years 1977 through 1982 are presented in table 55 and figure 17. June was the primary month of halibut-harvesting employment. The trend has been an increase in June employment figures with a peak of 787 in 1981. The June average over the period was 416.

Halibut-harvesting employment in the Alaska Peninsula/Aleutian Islands/Bering Sea area (ADL) is shown in table 56 and figure 18. The primary month of halibut-harvesting employment in this area was August. The trend has been for increase in August employment, peaking in 1982 at 199. The average August figure for the period was 116. Over the period, halibut employment has occurred in all months of the year except December.

Table 54. Southwest Region Halibut-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	97	0	0	0	34	249	317	280	81	75	108	9	0
1978	108	0	0	0	17	299	313	347	230	79	17	4	0
1979	110	0	0	0	17	152	436	517	126	39	19	4	0
1980	91	0	0	0	4	285	315	361	130	4	2	0	0
1981	99	0	0	0	0	0	888	91	186	22	0	0	4
1982	182	4	4	0	0	914	603	143	474	48	0	0	0
Average	115	1	1	0	12	317	479	290	205	45	24	3	1

Source: ADL 1984.

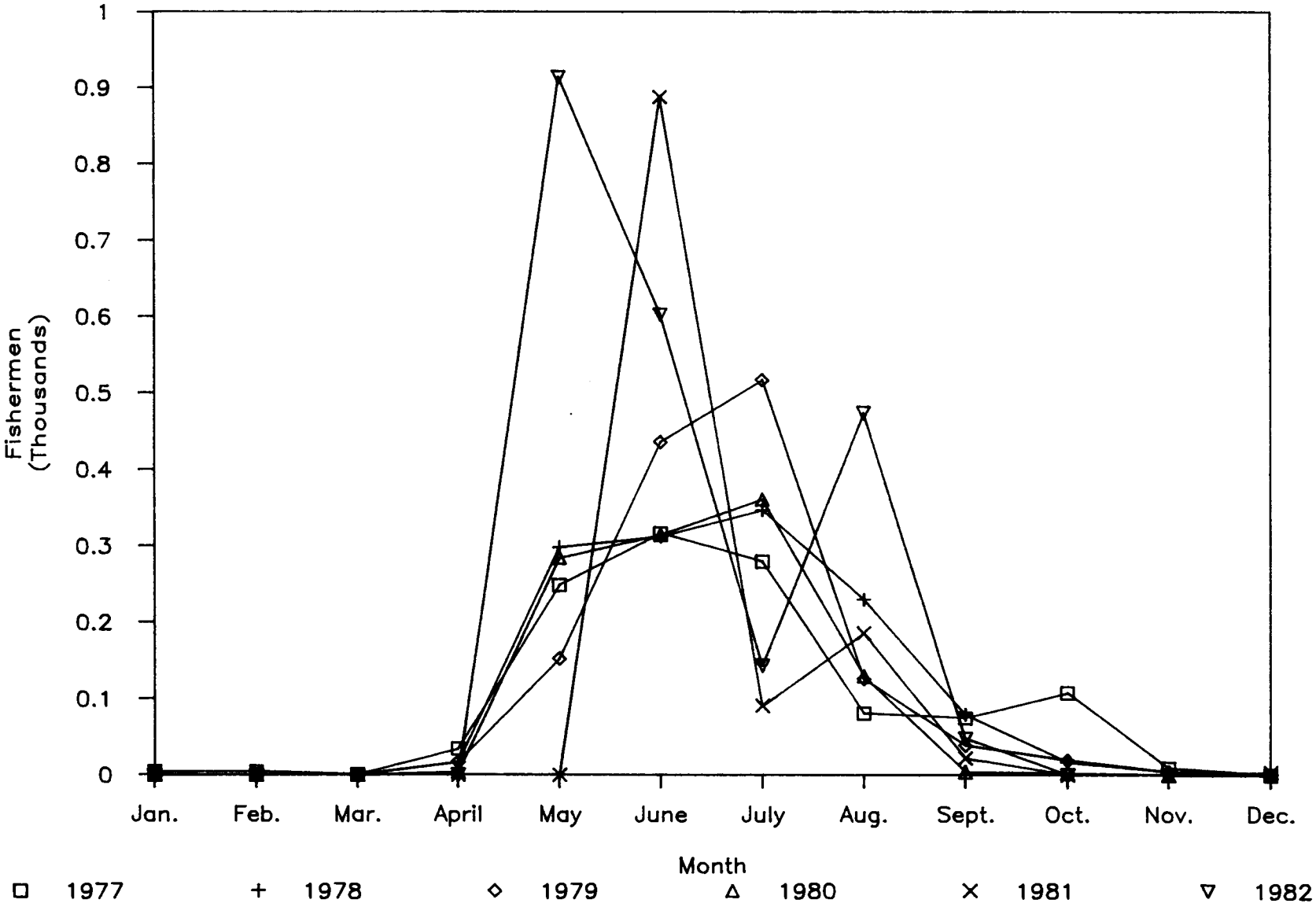


Figure 16. Southwest Region halibut harvesting employment (number of fishermen and crew).

Table 55. Kodiak Halibut-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	56	0	0	0	0	154	274	222	12	0	0	0	0
1978	80	0	0	0	0	214	264	291	196	4	0	0	0
1979	80	0	0	0	0	105	381	469	4	0	0	0	0
1980	72	0	0	0	0	226	300	344	0	0	2	0	0
1981	71	0	0	0	0	0	787	0	47	13	0	0	4
1982	125	0	0	0	0	698	488	35	275	9	0	0	0
Average	81	0	0	0	0	233	416	227	89	4	0	0	1

Source: ADL 1984.

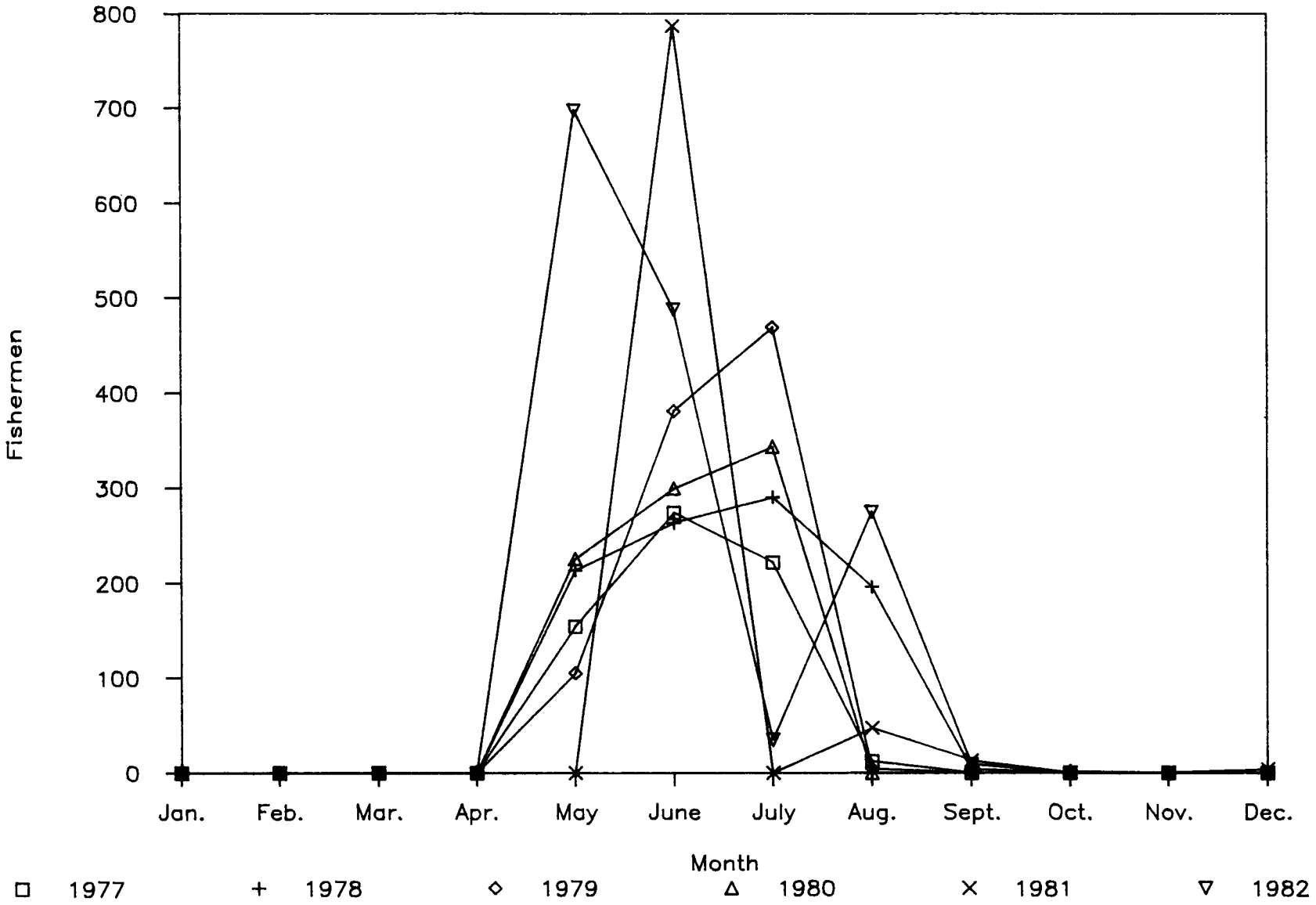


Figure 17. Kodiak halibut-harvesting employment (number of fishermen and crew).

Table 56. Alaska Peninsula, Western Aleutians, Bering Sea Halibut-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	41	0	0	0	34	95	43	58	69	75	108	9	0
1978	28	0	0	0	17	85	49	56	34	75	17	4	0
1979	30	0	0	0	17	47	55	48	122	39	19	4	0
1980	19	0	0	0	4	59	15	17	130	4	0	0	0
1981	28	0	0	0	0	0	101	91	139	9	0	0	0
1982	57	4	4	0	0	216	115	108	199	39	0	0	0
Average	34	1	1	0	12	84	63	63	116	40	24	3	0

Source: ADL 1984.

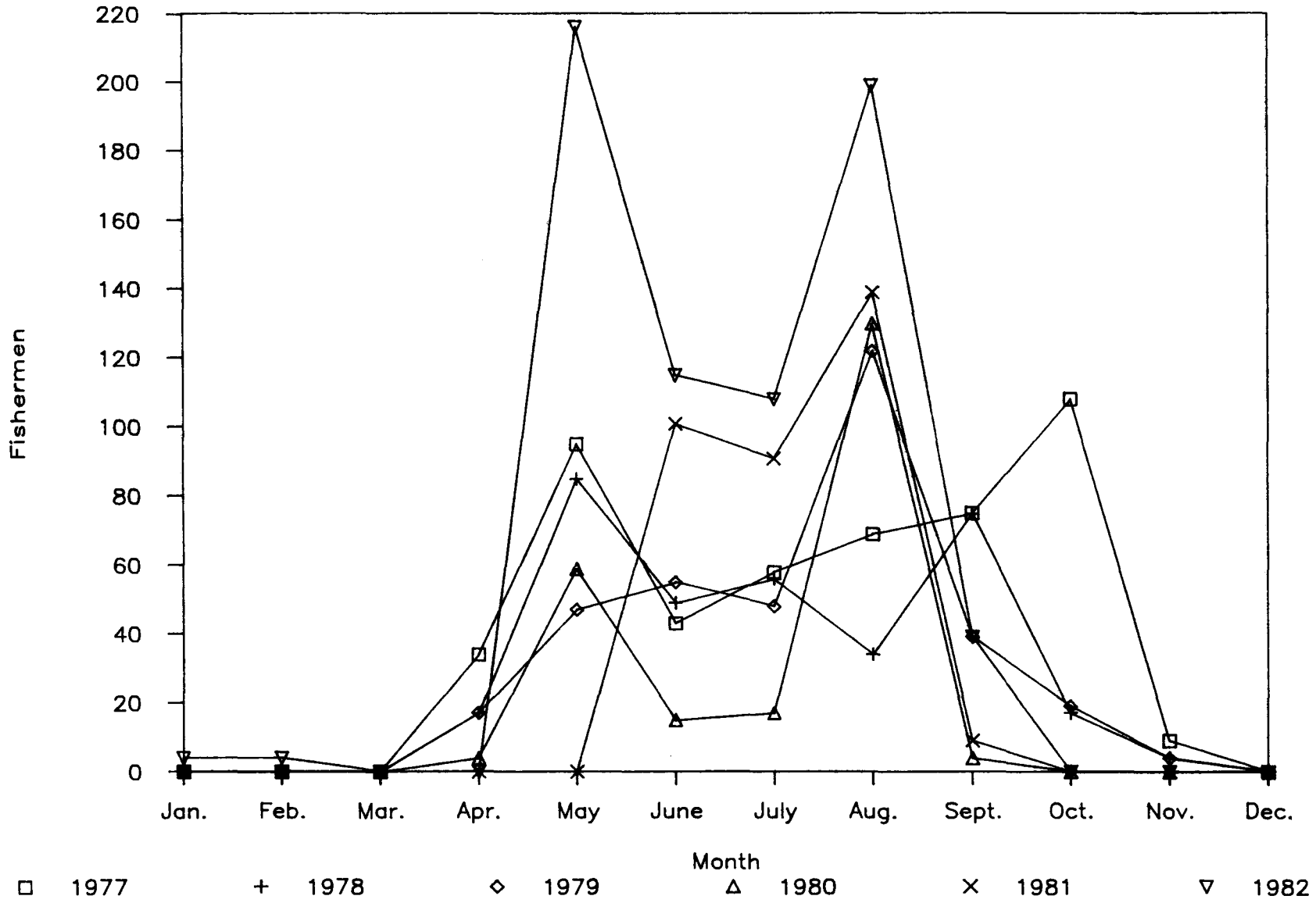


Figure 18. Alaska Peninsula/Western Aleutians/Bering Sea halibut harvesting employment (number of fishermen and crew).

VI. GROUNDFISH FISHERY

A. Regional Summary

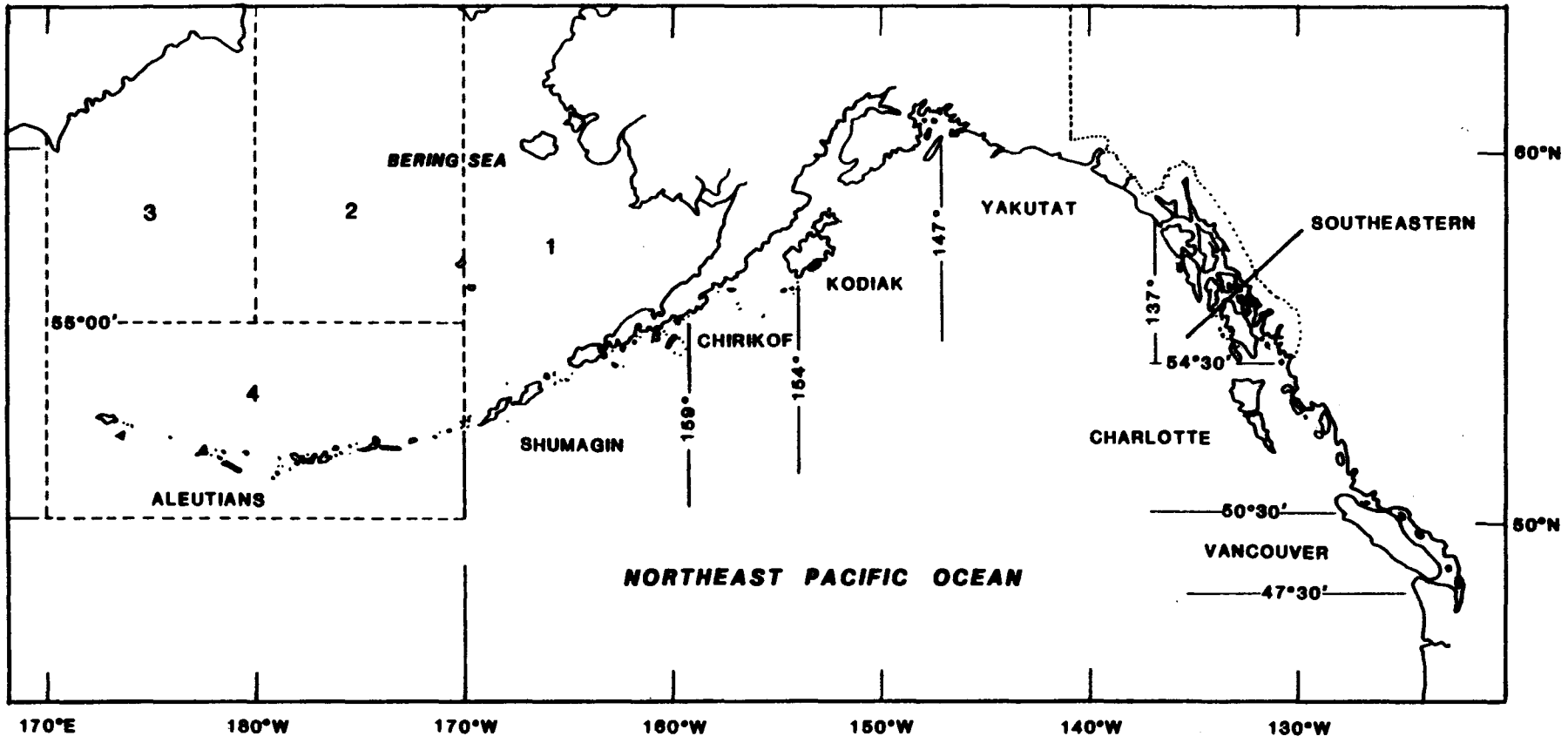
The Magnuson Fishery Conservation and Management Act, implemented in 1977, provides for the conservation and exclusive United States management of all fisheries resources within the U.S. Fishery Conservation Zone (FCZ) (3 to 200 nautical miles from shore). Map 4 shows the groundfish statistical areas in the Gulf of Alaska and Bering Sea. For more information on management area and boundaries, see appendix A in this volume.

As a result of this act, management plans for the marine fisheries of Alaska within the FCZ are developed by the North Pacific Fishery Management Council (NPFMC). The objectives of the NPFMC's groundfish management plans for the Gulf of Alaska and the Bering Sea/Aleutian Islands area are as follows:

1. To provide for the rational and optimal biological and socioeconomic use of the resource;
2. to protect halibut;
3. to provide for the orderly development of domestic groundfish fisheries consistent with 1 and 2 at the expense of foreign participation;
4. to provide for foreign fisheries consistent with 1, 2, and 3, and;
5. in the Gulf of Alaska, for sablefish only, to manage the entire gulf to benefit the domestic fishery (NPFMC 1983a).

Groundfish exploitation in the Gulf of Alaska and the Bering Sea has long been dominated by foreign fishing vessels. In the postwar era, Japan in 1954 and the USSR in 1959 began extensive Bering Sea fisheries targeting on yellowfin sole. This resource was apparently overharvested because stocks declined drastically in the early 1960's (Morris 1981). Following the decline of yellowfin sole, Japan and the USSR turned to walleye pollock as their target species in the Bering Sea (ibid.). In the Gulf of Alaska, first the USSR in 1962 and then Japan in 1963 began large-scale fisheries targeting on Pacific ocean perch. By 1965, perch stocks had begun to decline, probably as a result of overfishing. As these stocks declined, fishing effort in the Gulf of Alaska expanded to include pollock, sablefish, flounders, and Atka mackerel (OCS Socioeconomic Studies 1980).

Domestic groundfish fisheries have never been conducted on the same scale as foreign ventures, though cod and sablefish have historically been harvested by United States fleets in Alaska waters. Since the passage of the Magnuson Fishery Conservation and Management Act in 1977, however, domestic interest in the groundfish industry has increased. Joint-venture fisheries, which involve American trawlers delivering groundfish catches to foreign processing vessels, have been the fastest-growing domestic groundfish strategy in recent years (Natural Resources Consultants 1982).



Map 4. Statistical areas for groundfish in the Gulf of Alaska and Bering Sea.

Table 57. Ex-vessel Value of Domestic Commercial Groundfish Harvest for Southwest Alaska (All Management Areas Combined), by Origin of Fishermen, 1975-82

Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Aleutian Islands	0	0	**	**	**	308	184	361	**
Kodiak Island	**	**	**	**	537	383	483	955	**
Other Alaska*	**	**	0	0	**	259	131	23	**
Alaska	**	96	**	**	754	951	799	1,340	**
Other USA	**	28	**	**	610	897	4,709	8,704	**
Unknown	**	4	**	**	0	190	57	54	**
Total	42	128	188	611	1,364	2,037	5,565	10,098	2,504

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Management of groundfish is complicated by the fact that no one species can be managed independently of others occurring with it. Interception of nontarget species by fisheries directed towards other species may be unavoidable and may have a significant effect on the nontarget species population. A strong example of this is the incidental catch of juvenile halibut in the foreign groundfish trawl fishery. Most of the regulatory measures pertaining to foreign groundfish fisheries in the eastern Bering Sea and the Aleutians and in the Gulf of Alaska were implemented in an effort to prevent large incidental catches of halibut stocks as well as to prevent gear conflicts between foreign mobile gear (trawls) and domestic fixed gear (crab pots and halibut set lines) (NPFMC 1978, 1979).

After the passage of the Magnuson Fishery Conservation and Management Act, future prospects for the development of the domestic groundfish industry received a great deal of attention (Natural Resources Consultants 1982). Industry growth, however, has not occurred as rapidly as forecasted because rapid rises in energy costs combined with inflation and high interest rates invalidated the assumptions upon which the forecasted industry growth rates had been based (ibid.). These market conditions have not been conducive to domestic processors' financial involvement in the development of the groundfish industry. United States laws and trade policies are structured so that the costs of American vessel construction and foreign fishing gear and equipment to American fishermen are maximized while duties on imported white fish (groundfish) products are low (ibid.). This results in the domestic fishermen being less competitive in the industry and domestic whitefish markets being more accessible to foreign fishermen.

In the Gulf of Alaska, the only significant joint-venture activity has been in Shelikof Strait, where spawning pollock have been harvested (ADF&G 1982c). In the Bering Sea and Aleutian area, joint ventures have targeted on yellowfin sole, pollock, cod, and Atka mackerel (Natural Resources Consultants 1982, ADF&G 1982c). The decline in the crab fisheries has caused a large number of crabber/trawlers to compete for a limited number of joint-venture opportunities. This competition has led to lower prices being paid by foreign buyers (Natural Resources Consultants 1982).

B. Ex-vessel Values

Ex-vessel values in this groundfish section include only domestic landing values. Catch values to United States fishermen from joint-venture activities and payments by foreign countries for the harvest of groundfish within the FCZ are also not included. Therefore, these ex-vessel values are only a relatively small portion of the value of Alaska groundfish resources in the Southwest Region. All Bering Sea ex-vessel values are included in the Southwest Region total.

Domestic ex-vessel values increased approximately 240-fold from 1975 through 1982 (table 57). Ex-vessel values tended to double annually from 1978 through 1982. The largest increases occurred in the early

1980's, when harvests of crab declined. An increasing proportion of the ex-vessel values were earned by out-of-state fishermen (table 57).

C. Groundfish-Harvesting Employment

Table 58 and figure 19 show groundfish-harvesting employment in the Southwest Region for the years 1977-1982. The average annual number of fishermen and crew employed increased almost tenfold, from 7 persons in 1975 to 66 persons in 1982. Harvesting employment occurred during every month of the year in 1981 and 1982 and was relatively stable from month to month (table 58).

Table 58. Southwest Region Groundfish-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Annual Average	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	7	4	4	20	12	4	0	8	17	4	0	4	8
1978	15	4	4	24	36	20	0	0	8	12	20	28	20
1979	17	8	24	52	40	36	0	8	12	12	0	4	8
1980	24	33	57	76	45	8	4	0	8	12	17	10	18
1981	40	24	46	58	50	50	67	58	50	21	26	10	25
1982	66	94	81	75	40	47	55	60	77	100	51	38	68
Average	28	20	31	55	43	30	19	19	20	23	24	24	31

Source: ADL 1984.

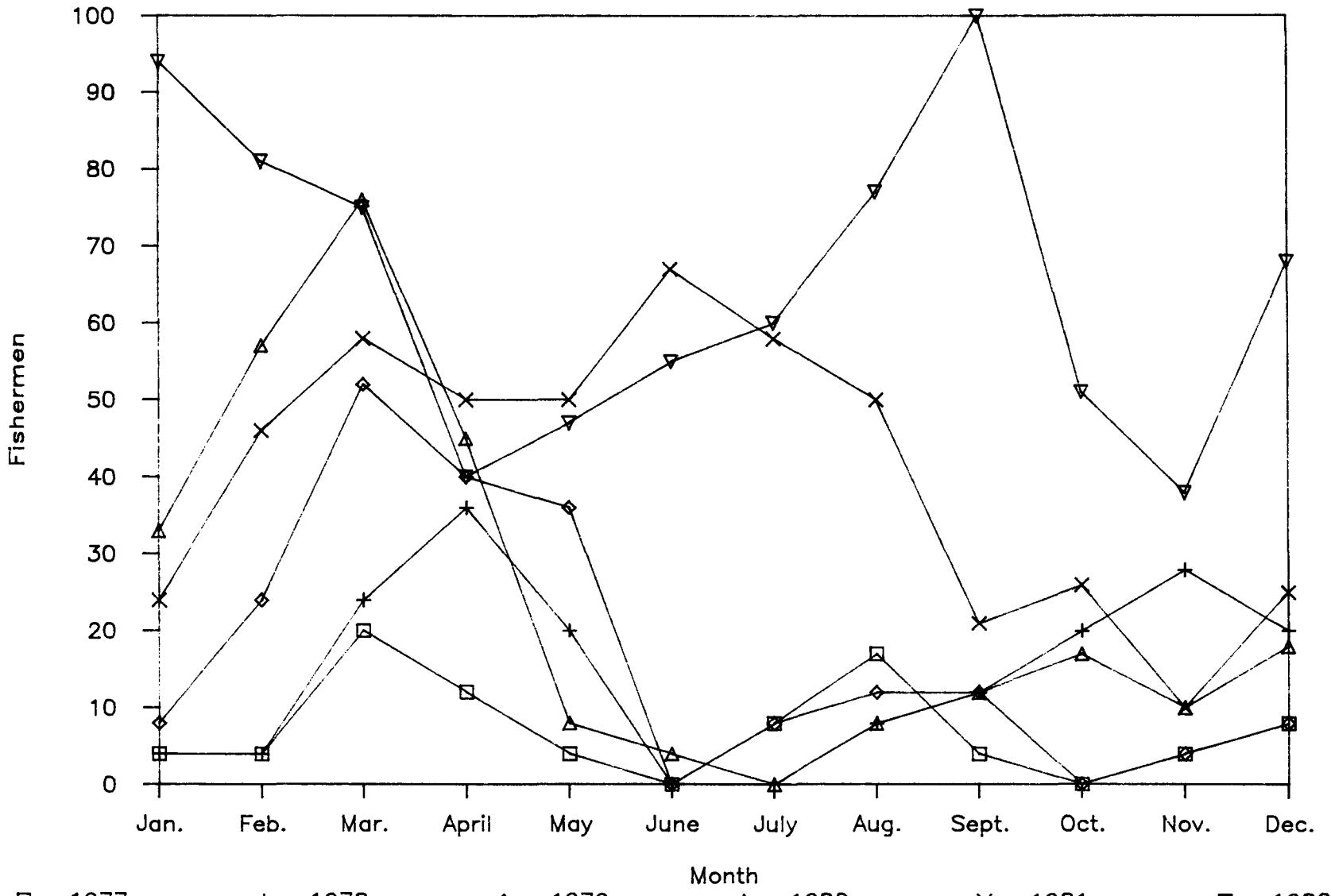


Figure 19. Southwest Region groundfish-harvesting employment (number of fishermen and crew) (ADL 1984).

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Commercial Fishing in the Southcentral Region

I. INTRODUCTION

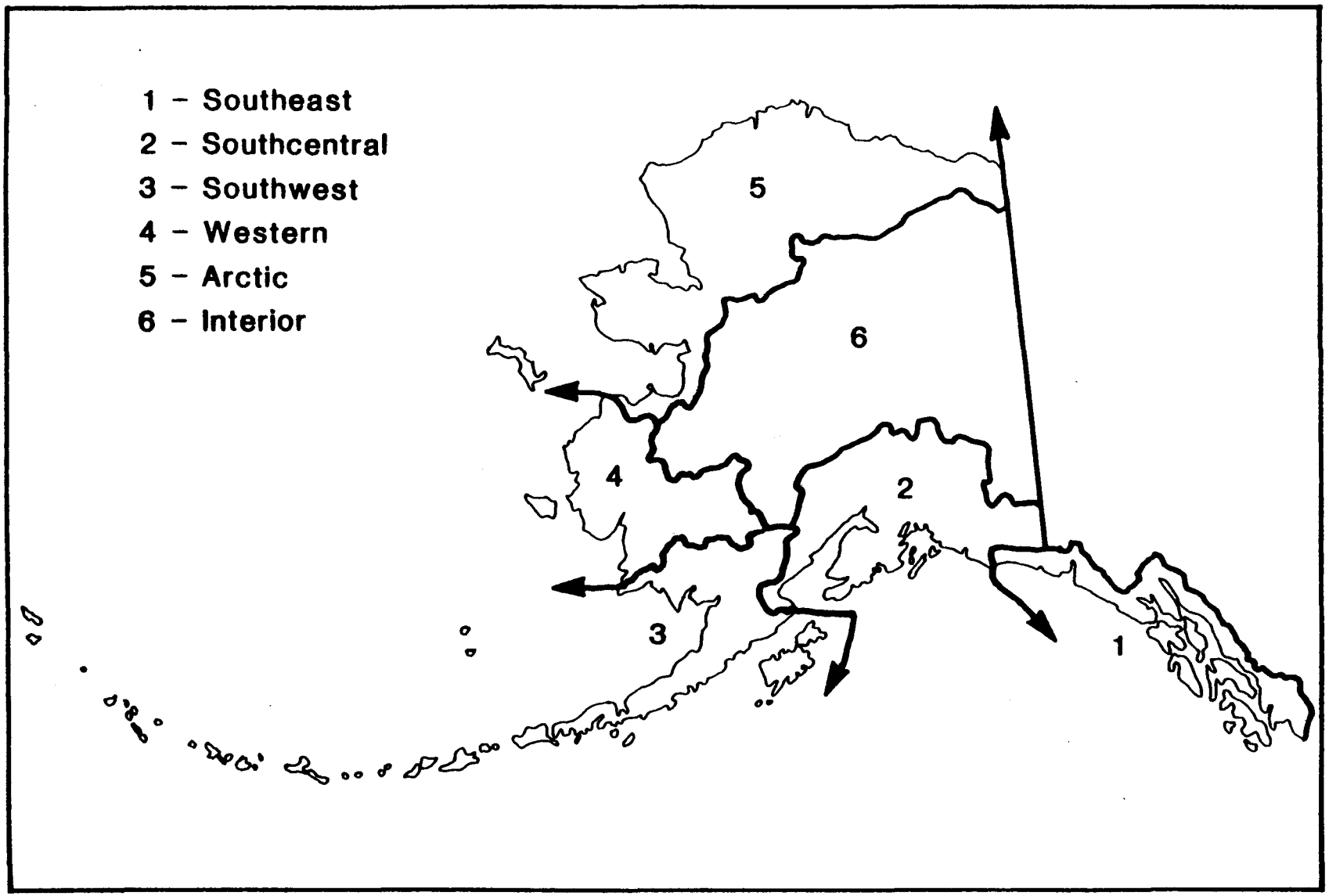
The Southcentral Region supports a diversity of fisheries. As in the Southwest Region, fisheries in the Southcentral Region have traditionally been directed towards a few high-value species groups such as salmon, crab, shrimp, halibut, and herring. This commercial fishing narrative covers ex-vessel harvest values by fishery management area and census area of fishermen, fish-harvesting employment, and fish and seafood-processing values, employment, and wages in these fisheries. Effort and harvest of groundfish have increased in the Southcentral Region. The data source for ex-vessel values is a special computer run from the Commercial Fisheries Entry Commission (CFEC) (see appendix B for information on CFEC data files). The Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries, is the source of first wholesale values (see appendix A. for information on the Division of Commercial Fisheries data files). The Alaska Department of Labor (ADL) is the data source for employment and seafood-processing wages (see appendix C for information on ADL data files).

The fairly distinct geographic characteristic of the Southcentral Region makes commercial fisheries analysis much less complex than for other regions in the state where catch, production, and employment area boundaries are inconsistent. Cook Inlet and Prince William Sound are natural geographic areas for which data have been collected relatively consistently. Therefore, comparisons over time or between these areas are meaningful with little, if any, adjustment (maps 1, 2, and 3).

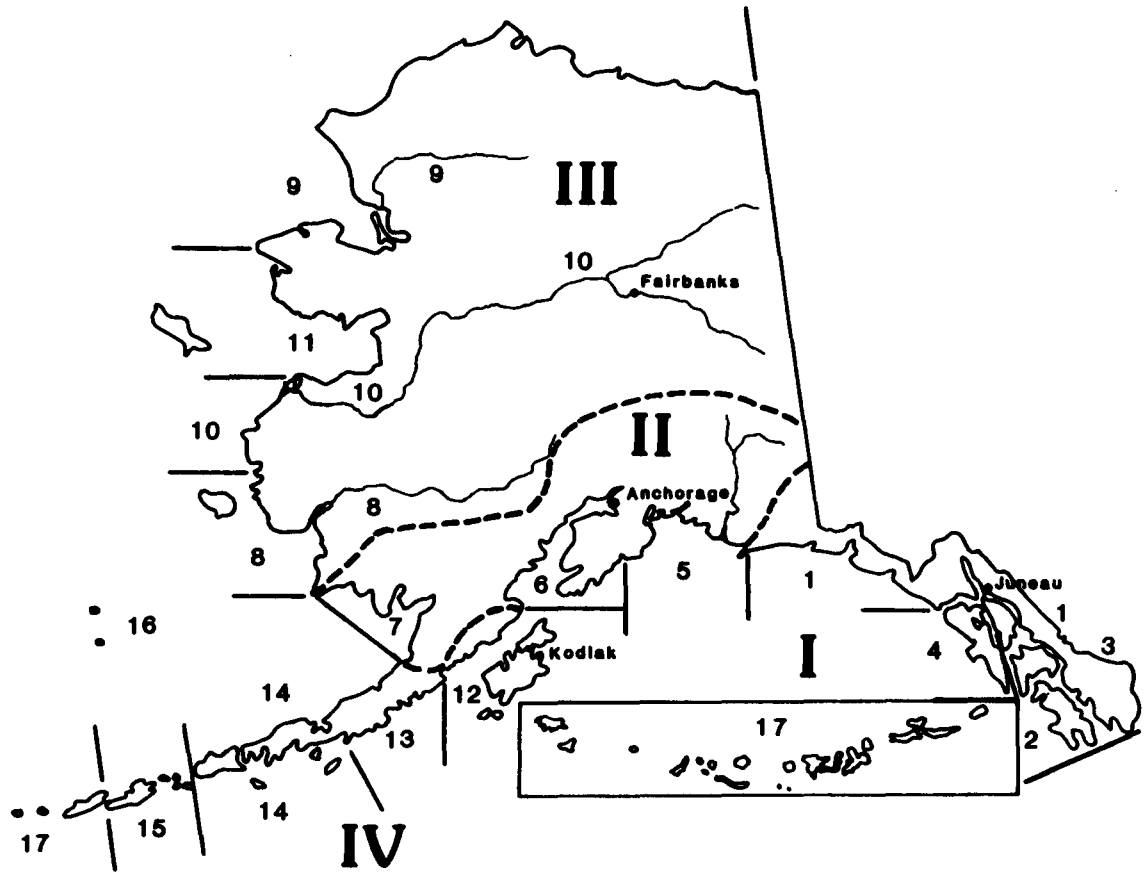
As with other regions, however, thorough economic analysis for habitat planning depends on information such as identifying the land base, or habitat, that produced the fish, where the fish was harvested, where the fisherman who harvested it resides, where the fish was landed, what was the value of the landing, and where it was processed. For the Southcentral Region, most of this information is available. The major and critical obstacle in this process is stock separation and fish nursery and rearing area data that link commercial fish values with fishery production information so that regional planning trade-offs can be more readily identified.

A. Ex-vessel Values

1. Regional summary. During the years 1977-1982, commercial fisheries ex-vessel values in the Southcentral Region averaged $83.7 million, with a range from $59.0 million in



Map 1. The six regions of the Alaska Habitat Management Guides.



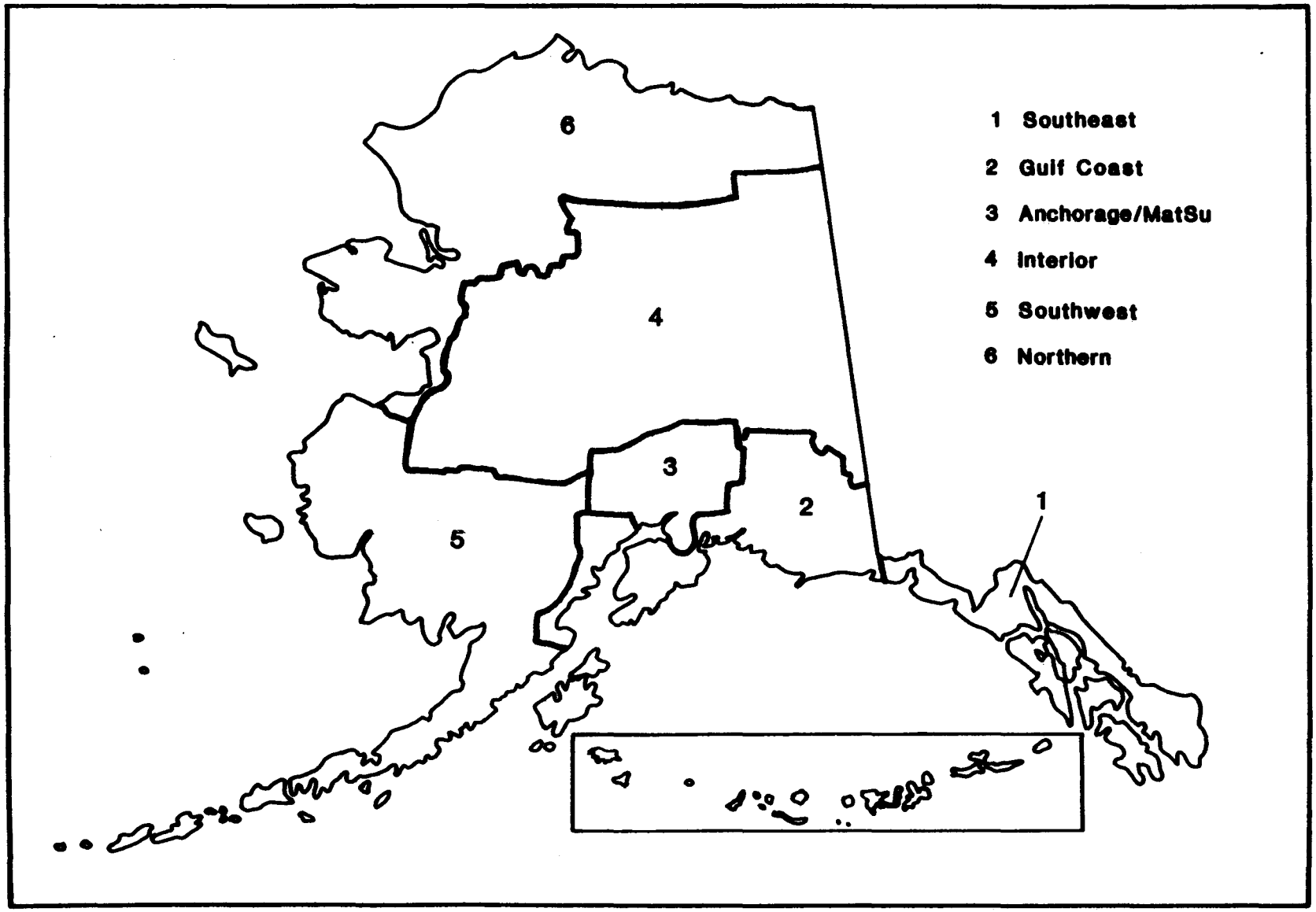
Region I: Southeast
Areas: 1. Juneau and Yakutak
2. Ketchikan
3. Petersburg
4. Sitka

Region II: Central
Areas: 5. Prince William Sound
6. Cook Inlet
7. Bristol Bay (salmon and herring catch; all fish and shellfish production)

Region III: Arctic-Yukon-Kuskokwim (AYK)
Areas: 8. Kuskokwim
9. Kotzebue
10. Yukon
11. Norton Sound

Region IV: Western
Areas: 12. Kodiak
13. Chignik
14. Alaska Peninsula
7. Bristol Bay (fish other than salmon and herring catch; and shellfish catch)
15. Dutch Harbor
16. Bering Sea
17. Adak and Western Aleutians

Map 2. ADF&G, Division of Commercial Fisheries, regions and catch and production areas.



Map 3. Alaska Department of Labor Regional Labor Market Areas.

1977 to $116.4 million in 1981 (table 1). As a percentage of the statewide harvest values, the Southcentral Region accounted for approximately 15.5% of the 1977 to 1982 ex-vessel values. On an annual basis, these percentages ranged from 12% in 1980 to 19% in 1982. The low in 1980 can in part be attributed to low salmon ex-vessel prices per pound that significantly affected Southcentral Region salmon values (tables 2 and 14). The increased percentage in 1981 and 1982 resulted from the relative increase of all species groups' ex-vessel values while, simultaneously, Southwest Region harvest values decreased significantly because of decreases in shellfish harvest values (the Southwest Region accounts for most of Alaska's commercial fisheries values).

For the years 1975-1982, salmon contributed 70% of the total ex-vessel value in the Southcentral Region; shellfish contributed 16%; herring contributed 5%; and halibut contributed 9%. Sockeye and pink salmon accounted for approximately 75% of the region's salmon ex-vessel values and 52% of the region's commercial fisheries ex-vessel values (27% and 25%, respectively). Tanner crab accounted for 41% of the region's shellfish ex-vessel values and approximately 7% of the region's commercial fish harvesting values. Shrimp accounted for 27% of the region's shellfish harvest values and 4% of the region's commercial fisheries harvesting values.

2. Ex-vessel value by management area. Within the Southcentral Region, Prince William Sound (PWS) accounted for approximately 50% of the fisheries ex-vessel values (on average) for the years 1975 through 1982 (table 3). For the years 1979 through 1981, the proportion of ex-vessel values from PWS was even greater; in 1979, PWS contributed 58% of the region's harvest values. During the years 1975-1982, ex-vessel values in PWS increased more than sixfold from $11.4 million in 1975 to $70.4 million in 1981. Harvesting values grew in all the major fisheries, with salmon and shellfish having the largest gains. Salmon harvests averaged $27.2 million, with a range from $7.8 million in 1975 to $57.5 million in 1981 (table 3). Shellfish harvest values averaged $3.4 million, with a range from $1.2 million in 1975 to $6.2 million in 1982. Herring values significantly increased from $770,000 in 1976 to $7.3 million in 1979 and averaged $3.2 million for the period.

The value of halibut landings did not have as dramatic an increase, ranging from $1.1 million in 1977 to $3.9 million in 1979. The reason for this is that prices most significantly affected changes in halibut ex-vessel values; harvest quantities and the resource remained relatively constant. On the other hand, salmon harvest values were influenced by increases in both prices and harvest levels.

Table 1. Comparison of the Ex-vessel Value($) of Commercial Fishery* Harvest for Southcentral Region and Statewide, 1977-82

Year	Southcentral Region	State of Alaska	Southcentral Region as a Percentage of State total
1977	58,980,000	351,438,451	17%
1978	68,763,000	503,845,618	14%
1979	86,033,000	652,859,141	13%
1980	63,552,000	549,166,361	12%
1981	116,395,000	645,726,097	18%
1982	108,451,000	578,061,631	19%

Source: CFEC 1984.

* Includes salmon, shellfish, herring, and halibut.

Table 2. Value of Commercial Fisheries Harvest for Southcentral Alaska, 1975-1982

	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.*
Salmon	16,115	29,900	44,339	49,041	56,029	39,945	83,464	80,993	49,978
Shellfish	3,770	7,194	7,064	10,063	11,262	16,284	19,393	15,982	11,434
Herring	1,419	1,719	2,502	1,819	7,989	3,245	6,320	3,751	3,595
Halibut	4,584	5,850	5,075	7,840	10,753	4,078	7,218	7,725	6,640
Total	25,888	44,663	58,980	68,763	86,033	63,552	116,395	108,451	71,591

Source: CFEC 1984.

* Totals may not add due to rounding.

Table 3. Value of Commercial Fisheries Harvest for Southcentral Alaska by Area, 1975-1982

	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
PWS									
Salmon	7,799	15,513	19,717	14,094	35,095	25,379	57,479	42,469	27,193
Shellfish	1,234	1,515	1,697	3,615	4,533	4,813	3,702	6,194	3,418
Herring	1,087	770	1,024	1,569	7,252	3,187	6,217	3,664	3,222
Halibut	1,309	1,577	1,075	1,866	3,871	2,024	2,975	2,438	2,142
subtotal	11,429	19,375	23,513	21,144	50,751	35,403	70,373	54,765	35,975
% of total	47.8	43.4	39.9	30.7	58.3	55.7	60.5	50.5	50.1
Cook Inlet									
Salmon	8,316	14,387	24,623	34,947	20,935	14,566	25,985	38,524	22,785
Shellfish	2,543	5,679	5,369	6,447	6,729	11,473	15,691	9,789	8,016
Herring	332	949	1,478	250	737	58	103	87	508
Halibut	3,274	4,274	4,000	5,974	6,882	2,054	4,243	5,287	4,498
Subtotal	14,465	25,289	35,470	47,618	36,370	28,151	46,022	53,687	35,807
% of total	52.2	56.6	60.1	69.3	41.7	44.3	39.5	49.5	49.9
Total*	23,894	44,664	58,983	68,762	87,121	63,554	116,395	108,452	71,782

Source: CFEC 1984.

* Totals may not match other tables because of differences in rounding.

The latter increased dramatically because salmon stocks increased as a result of regulatory changes (such as limited entry and actions against high seas interception of salmon).

Alaska fishermen earned approximately 75% of the PWS salmon ex-vessel values for the years 1977 to 1982, 80% of herring ex-vessel values, and 65% of halibut ex-vessel values. The proportion of Alaska earnings tended generally to increase in the PWS salmon fishery. The proportion of Alaska earnings tended to vary in the halibut fishery but generally increased in the later years. The proportion of out-of-state fishermen earnings increased in both the PWS sac roe herring and roe-on-kelp fisheries. Over 85% of the king and Tanner crab and razor clam and 70% of the Dungeness crab PWS harvest values were earned by fishermen from the Kenai Peninsula Census Area; 65% of the PWS shrimp harvest values were earned by Alaska fishermen. Earning trends are not discernible on the Southcentral Region shellfish ex-vessel value table (see the shellfish section, table 23).

Within the Southcentral Region, Cook Inlet fisheries ex-vessel values accounted for 50% of the 1975 through 1982 values (on average) (table 3). However, the proportion of Cook Inlet's share of landing values decreased slightly over the time period. This can in part be attributed to the closing of the Lower Cook Inlet (LCI) sac roe herring fishery in 1980, which resulted in a significant decrease in herring harvesting values. The ex-vessel value of the salmon also did not increase as dramatically as in the PWS salmon fishery (table 3). This was because sockeye salmon make up a larger proportion of the PWS harvest; sockeye prices remained relatively stable from 1980 through 1982; and harvest levels of sockeye and pink salmon increased dramatically in PWS. The average value of salmon landings was $22.8 million, with a range from $8.3 million in 1975 to $38.5 million in 1982. Shellfish ex-vessel values averaged $8.0 million, with a range from $2.5 million in 1975 to $15.9 million in 1981. Halibut landings averaged $4.5 million, with a range from $3.3 million in 1975 to $6.9 million in 1979. Similarly to PWS halibut, halibut ex-vessel values in Cook Inlet were more influenced by market condition than by significant changes in fisheries regulations.

Alaska fishermen earned approximately 78% of Cook Inlet salmon ex-vessel values, over 80% of shellfish values, 90% of herring values, and 53% of halibut values (see tables 10, 23, 28, 33). The percentage of Alaska fishermen's earnings in the Cook Inlet halibut fishery increased over the time period 1977-1982 (see table 33). Alaska earnings in the herring fishery were consistently high (see table 28). The percentage of Alaska fishermen's earnings in the Cook Inlet salmon fisheries tended to increase (see table 10).

B. First Wholesale Value

All Division of Commercial Fisheries production information (product weight and wholesale values) summarizes production data listed in the Operator's Annual Reports (see appendix A.). The initial processors of raw fish and shellfish caught in Alaska file one Operator's Annual Report for each processing facility and each management area in which the fish and shellfish were procured and/or processed. The ADF&G Division of Commercial Fisheries, catch and production reports include only fish and shellfish processed within Alaska. The weights (pounds) reported for production are weights of finished products and do not include package weights. Production values (first wholesale value) are estimated product values at the plant, prior to shipping. These are not market transaction price values but estimated values of inventories. Actual values may vary, depending on price changes at the time of sale. Therefore, production (first wholesale) values differ from ex-vessel values in that ex-vessel values are derived from actual fish ticket landing transactions.

Table 4 presents these values for the period 1979-1983 by management area. It is very important to note that production information for a specific area may not correspond to the catch reported for that area. Production area boundaries do not correspond directly to fisheries management areas used to record catch information (see map 2). Commercial fisheries businesses report production by region and area; however, they frequently ship fish intrastate or export them prior to processing. Thus, through fish ticket information, the catch and ex-vessel values might be recorded in one area while production is reported in another area. So, production values should not be expected to correlate directly with ex-vessel values. In the Southcentral Region, production values may also be increased by fish harvested in Bristol Bay but transported to the Cook Inlet area for processing. In spite of this, the geographic distribution of ex-vessel value and production value is roughly similar for most years.

C. Employment

1. Fish-harvesting employment. For the period 1977 to 1982, fish-harvesting employment occurred in every month. July was the peak month, when an average of 4,869 fishermen and crew were employed. However, substantial employment also occurred in May, June, and August. The peak months of harvesting employment generally correspond to the salmon harvesting season; salmon harvesting accounts for 83% of the 1977-1982 July harvesting employment (table 5, fig. 1). June employment was primarily in salmon (59%) and halibut (38%)

Table 4. Southcentral Region Finfish and Shellfish Production Summary in Thousands of Pounds and Dollars, 1979-83

	Salmon		Other Finfish		Shellfish		Total	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
1979								
PWS	6,692	18,198	1,918	4,089	3,090	5,305	11,701	27,585
Cook Inlet	18,600	64,000	6,012	16,587	6,760	14,399	31,372	94,987
Southcentral Region	25,292	82,190	7,930	20,676	10,850	19,704	43,073	122,572
1980								
PWS	31,351.9	49,385.7	4,791.3	3,693.7	3,228.2	7,109.8	39,371.4	60,189.2
Cook Inlet	45,394.7	80,238.3	13,165.9	12,343.5	6,374.3	16,874.0	64,934.9	109,455.8
Southcentral Region	76,746.6	129,624.0	17,957.2	16,037.2	9,602.5	23,983.8	104,306.3	169,645.0
1981								
PWS	55,233	95,181	11,309	7,736	2,983	14,031	69,525	116,947
Cook Inlet	50,947	96,168	14,114	10,592	4,663	13,925	69,724	120,686
Southcentral Region	106,180	191,349	25,423	18,328	7,646	27,956	139,249	237,633
1982								
PWS	52,016	72,591	7,176	4,994	1,501	3,620	60,693	81,205
Cook Inlet	71,813	120,874	11,923	13,995	5,006	17,583	88,742	152,452
Southcentral Region	123,829	193,465	19,099	18,989	6,507	21,203	149,435	233,657
1983								
PWS	38,480	59,199	4,042	4,663	1,199	3,248	43,721	67,110
Cook Inlet	60,475	104,615	9,161	13,351	2,610	9,099	72,247	127,066
Southcentral Region	98,955	163,814	13,203	18,014	3,809	12,347	115,968	194,176

Source: ADF&G 1979-84.

Table 5. Southcentral Region Fish-Harvesting Employment for All Species (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	1,263	206	247	248	607	1,535	2,989	4,661	3,173	738	210	165	382
1978	1,510	398	337	323	621	1,857	3,350	5,064	4,261	967	308	190	441
1979	1,669	365	176	231	784	1,707	5,057	6,174	4,027	735	246	182	341
1980	1,377	282	221	239	981	2,000	2,826	4,860	3,659	733	207	246	269
1981	1,508	252	292	271	1,033	918	6,104	4,231	3,668	727	207	152	239
1982	1,578	201	212	226	658	3,589	4,018	4,224	3,949	1,014	238	251	353
Average	1,484	284	248	256	781	1,934	4,057	4,869	3,790	819	236	198	338

Source: ADL 1984.

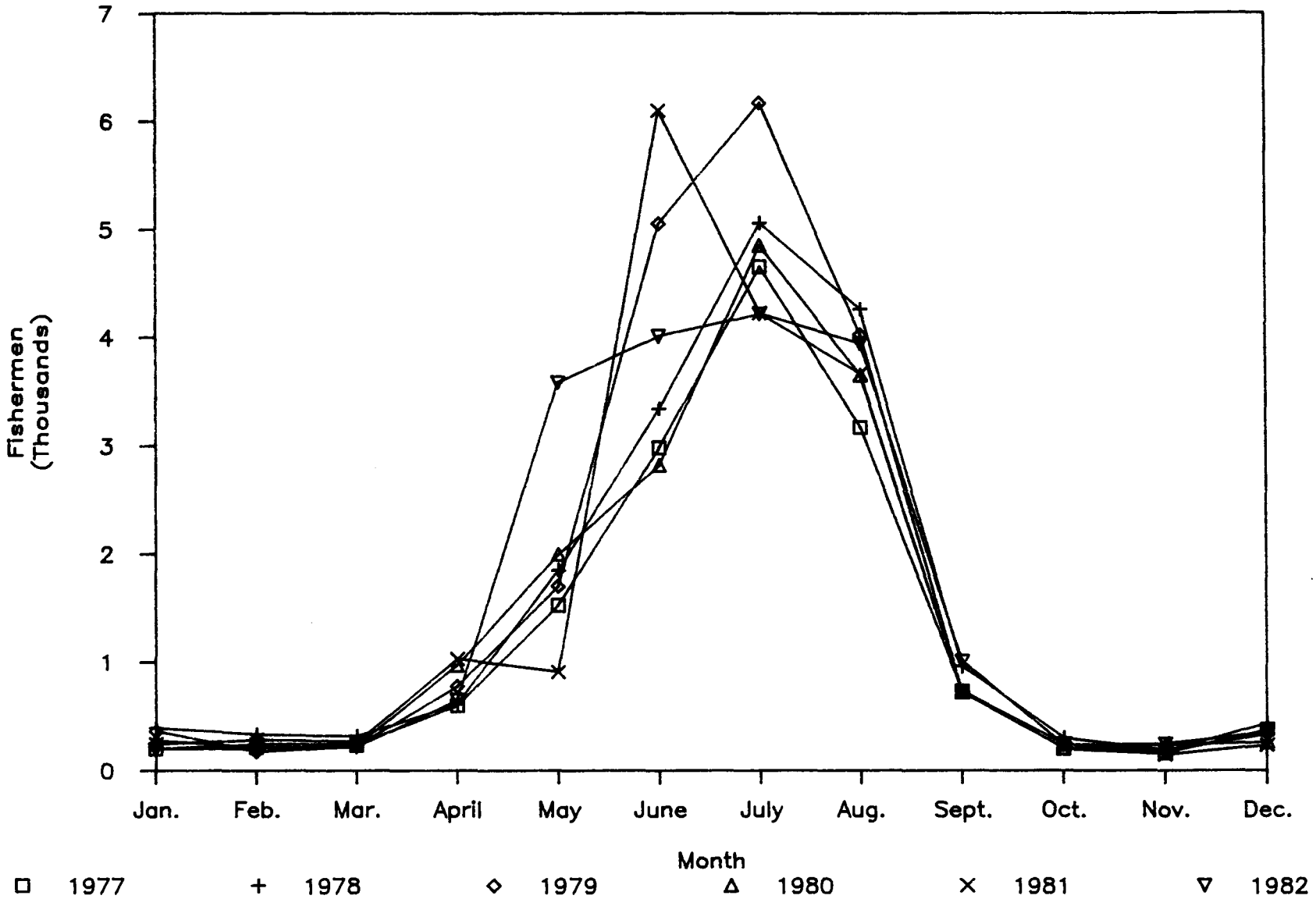


Figure 1. Southcentral Region fish-harvesting employment from all fish species (number of fishermen and crew).

harvesting. April employment was mostly (71%) in herring harvesting. Employment during the fall and winter months (October through March) was almost entirely in shellfish harvesting.

The monthly average harvesting employment for the years 1977-1982 was 1,484 fishermen and crew (table 5, fig. 1). These numbers ranged from 1,263 in 1977 to 1,669 in 1979. The trend in employment has generally been an increase, with a peak in 1979, because of exceptionally high ex-vessel prices, and a drop in 1980 as a result of exceptionally low ex-vessel prices (table 14).

The peak month of fish-harvesting employment for the years 1977-1982 in PWS was July, when an average of 1,423 fishermen and crew were employed (table 6, fig. 2). However, June and August also had significant employment, with 1,210 and 1,315 fishermen and crew, respectively. PWS accounted for 29% of the region's peak July harvesting employment. The majority of PWS May, June, July, and August employment (55%, 70%, 89%, and 95%) was in salmon harvesting. April employment was mostly (81%) in herring harvesting. Halibut harvesting occurred in May, June, and July. Shellfish harvesting employment occurred in all months of the year throughout the period, with the principal months being December though April. The PWS monthly average harvesting employment for 1977-1982 was 541 fishermen and crew. These numbers increased fairly steadily throughout the period, with the exception of 1980. As mentioned above, the 1980 drop in harvesting employment was probably due in part to exceptionally low ex-vessel prices.

Although peak fish-harvesting employment had a relatively wide plateau in PWS, Cook Inlet had a more distinct July peak for the years 1977-1982 (table 7, fig. 3). Cook Inlet harvesting employment tended to be more concentrated in the summer months (May through August) as compared to PWS. The average July employment was 3,446 fishermen and crew. The July number tended to decrease over the time period, whereas June numbers increased and August numbers were fairly stable. Cook Inlet July and August harvesting employment was primarily (81% and 86%) in salmon harvesting. June employment was in salmon (54%) and halibut (43%) harvesting. Halibut also contributed 74% of fish-harvesting employment in May. Herring harvesting almost exclusively occurred in May, contributing 16% of harvesting employment. Cook Inlet shellfish-harvesting employment also occurred in every month from 1977 to 1982 at a fairly consistent monthly level.

The average monthly number of fishermen and crew employed harvesting fish in Cook Inlet was 945 from 1977 through 1982. This was approximately 64% of the Southcentral Region's

Table 6. Prince William Sound Fish-Harvesting Employment for All Species (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	448	59	81	84	477	743	1,168	1,377	878	287	39	66	112
1978	484	133	136	144	513	691	850	1,283	1,178	410	144	137	171
1979	569	172	144	165	700	731	1,402	1,565	1,323	405	44	71	103
1980	517	110	141	158	901	727	663	1,415	1,372	457	74	95	76
1981	615	80	83	111	835	647	2,128	1,429	1,473	432	44	42	66
1982	612	56	89	111	542	1,395	1,049	1,469	1,668	608	91	130	131
Average	541	102	112	129	661	822	1,210	1,423	1,315	433	73	90	110

Source: ADL 1984.

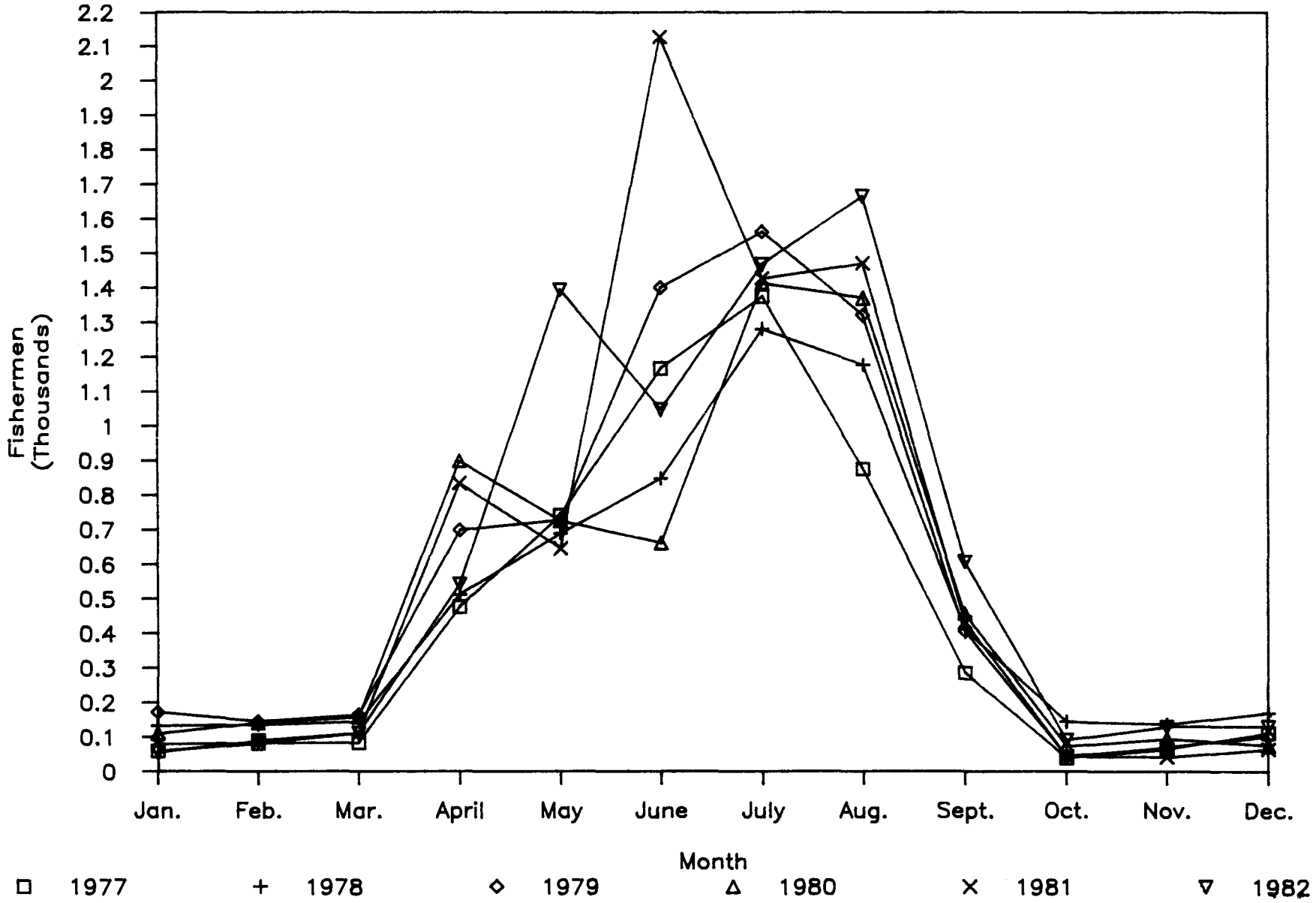


Figure 2. Prince William Sound fish-harvesting employment from all fish species (number of fishermen and crew).

Table 7. Cook Inlet Fish-Harvesting Employment for All Fish Species (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	817	147	166	164	130	792	1,821	3,284	2,295	451	171	99	270
1978	1,028	265	201	179	108	1,166	2,500	3,781	3,083	557	164	53	270
1979	1,100	193	32	66	84	976	3,655	4,609	2,704	330	202	111	238
1980	863	172	80	81	80	1,273	2,163	3,445	2,287	276	133	151	193
1981	896	172	209	160	198	271	3,976	2,802	2,195	295	163	110	173
1982	967	145	123	115	116	2,194	2,969	2,755	2,281	406	147	121	222
Average	945	182	135	128	119	1,112	2,847	3,446	2,474	386	163	108	228

Source: ADL 1984.

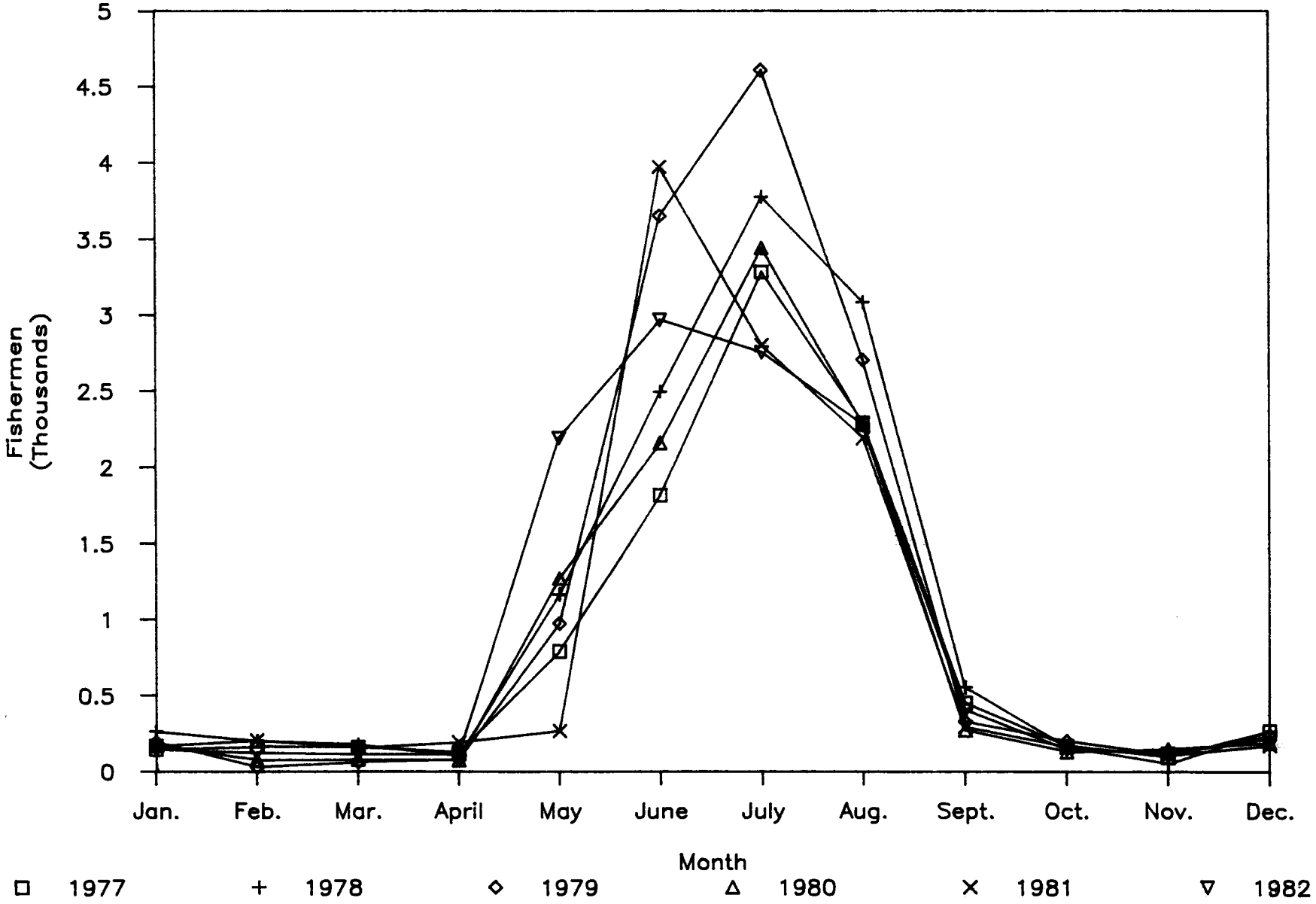


Figure 3. Cook Inlet fish-harvesting employment from all fish species (number of fishermen and crew).

fish-harvesting employment. Although Cook Inlet accounted for 64% of the harvesting employment, it contributed 49% of the ex-vessel harvest values. This could in part be the result of the greater percentage of PWS harvests being by purse seines, which are more efficient than gill nets, the primary gear type used in Cook Inlet.

2. Fish-and seafood-processing employment. Table 8 shows fish-and-seafood processing employment for Southcentral Alaska by ADL census areas and subareas. Processing employment fairly consistently increased in all areas and in the region as a whole during the years 1977-1981. In 1982, however, employment dropped for all areas, with the exception of the Anchorage Borough. This can be partially attributed to the decrease in shellfish harvesting in the Southwest Region (ADL 1985) because a portion of the Southwest shellfish harvest is processed in the Southcentral Region.

   Table 9 provides information on annual payroll and average monthly wages in fish and seafood processing in the Southcentral Region by ADL census areas and subareas for the years 1977-1982. Regional annual payrolls and average monthly wages generally increased until 1982, when they dropped. Monthly wages were consistently highest in the Cordova area and continued to increase despite the drop in employment numbers in 1982 (table 9). In 1982, Cordova area monthly wages were three times that of the Kenai-Cook Inlet area (table 9).

II. SALMON FISHERY

A. Regional Summary

1. Regional overview. The Southcentral Region includes the Prince William Sound (PWS), Upper Cook Inlet (UCI), and Lower Cook Inlet (LCI) commercial fisheries management areas (maps 4 and 5). Because of disclosure regulations, this economic narrative combines the LCI and UCI management areas; the combined area is referred to as Cook Inlet.

   The U.S. Fish and Wildlife Service (USFWS) regulated Alaska's fisheries from the late 1880's through 1959. After statehood was granted in 1959, the Alaska Department of Fish and Game (ADF&G) managed the salmon fishery. The Alaska salmon fishery became a limited entry fishery in 1974 after the Commercial Fisheries Entry Commission was established. Management and regulation of fisheries within 3 mi of shore is the responsibility of the ADF&G. The federal government has managed all fisheries from 3 to 200 mi from shore since 1977, when the Magnuson Fishery Conservation and Management Act was passed. Federal management is administered by the North Pacific Fisheries Management Council. See the Human

Table 8. Fish-and Seafood-Processing Employment for Southcentral Alaska, by Census Area and Subareas, 1977-82

Census Area* and Subareas**	1977		1978		1979		1980		1981		1982	
	Total Annual Employ.	Average Monthly Employ.	Total Annual Employ.	Average Monthly Employ.	Total Annual Employ.	Average Monthly Employ.	Total Annual Employ.	Average Monthly Employ.	Total Annual Employ.	Average Monthly Employ.	Total Annual Employ.	Average Monthly Employ.
Kenai-Cook Inlet**	4,829	402	5,485	457	7,491	624	7,916	660	10,029	836	5,992	499
Anchorage Borough*	1,146	95	1,280	107	2,739	228	1,528	127	2,926	244	3,248	270
Matanuska-Susitna*	---	---	---	---	---	---	xx	xx	xx	xx	xx	xx
Seward**	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
Valdez-Chitina-Whittier**	xx	xx	---	---	---	---	---	---	xx	xx	xx	xx
Cordova-McCarthy**	3,213	268	3,058	255	3,884	324	3,266	272	4,158	346	2,952	246
Southcentral Alaska total	13,482	1,122	14,657	1,222	19,213	1,601	19,019	1,585	20,351	1,696	16,010	1,333

Source: ADL 1982, 1981, 1980, 1979, 1978, 1977 as compiled.

--- indicates no activity.

xx Nondisclosable because of confidentiality.

* ADL census area.

** ADL census subarea.

Table 9. Total Annual Payrolls and Average Monthly Wages in Seafood and Fish Processing for Southcentral Alaska, by Census Division, 1977-82

Census Area* and Subareas**	1977		1978		1979		1980		1981		1982	
	Total Annual Payroll	Average Monthly Wage	Total Annual Payroll	Average Monthly Wage	Total Annual Payroll	Average Monthly Wage	Total Annual Payroll	Average Monthly Wage	Total Annual Payroll	Average Monthly Wage	Total Annual Payroll	Average Monthly Wage
Kenai-Cook Inlet**	4,188,478	867	5,273,212	961	7,208,602	962	7,072,319	893	9,243,131	922	4,452,056	743
Anchorage Borough*	xxx	xxx	1,146,058	895	2,531,642	924	1,829,080	1,197	3,120,703	1,067	3,199,280	985
Matanuska-Susitna*	---	---	---	---	---	---	xxx	xxx	xxx	xxx	xxx	xxx
Seward**	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Valdez-Chitina-Whittier**	xxx	xxx	---	---	---	---	---	---	xxx	xxx	xxx	xxx
Cordova-McCarthy**	3,784,748	1,178	3,949,283	1,291	5,900,584	1,519	6,143,211	1,881	8,090,789	1,946	6,734,383	2,281
Southcentral Alaska total	12,032,032	892	13,863,511	946	19,923,738	1,037	18,235,235	959	23,537,262	1,157	18,039,348	1,127

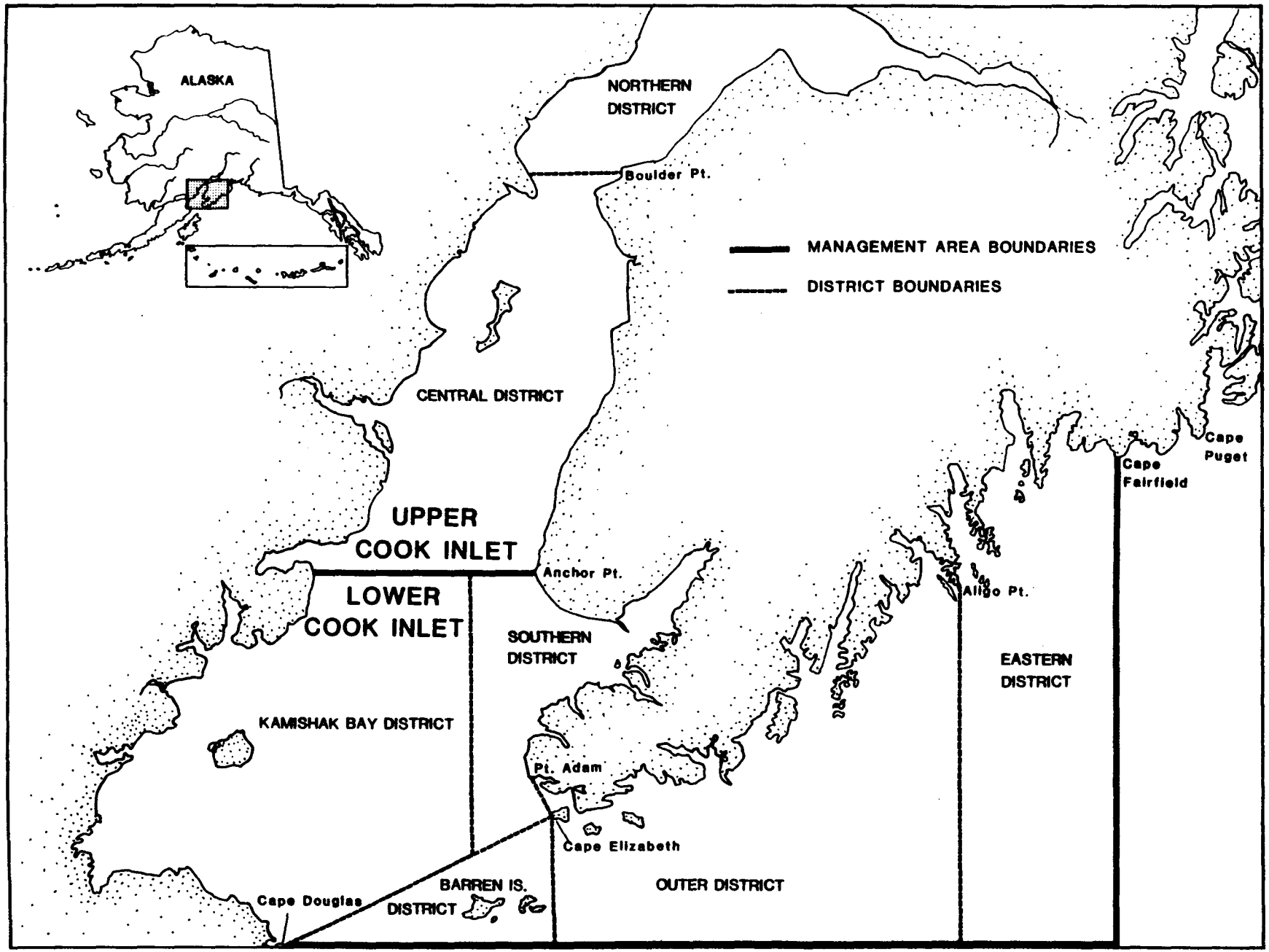
Source: ADL, Research and Analysis Section, Juneau. By special request, June, 1984, includes four standard industrial classification codes: 2,091 canned and cured fish and seafood; 2,092 fish or frozen packaged fish and seafood; 4,222 refrigerated warehousing; 5,146 wholesale trade.

--- indicates no activity.

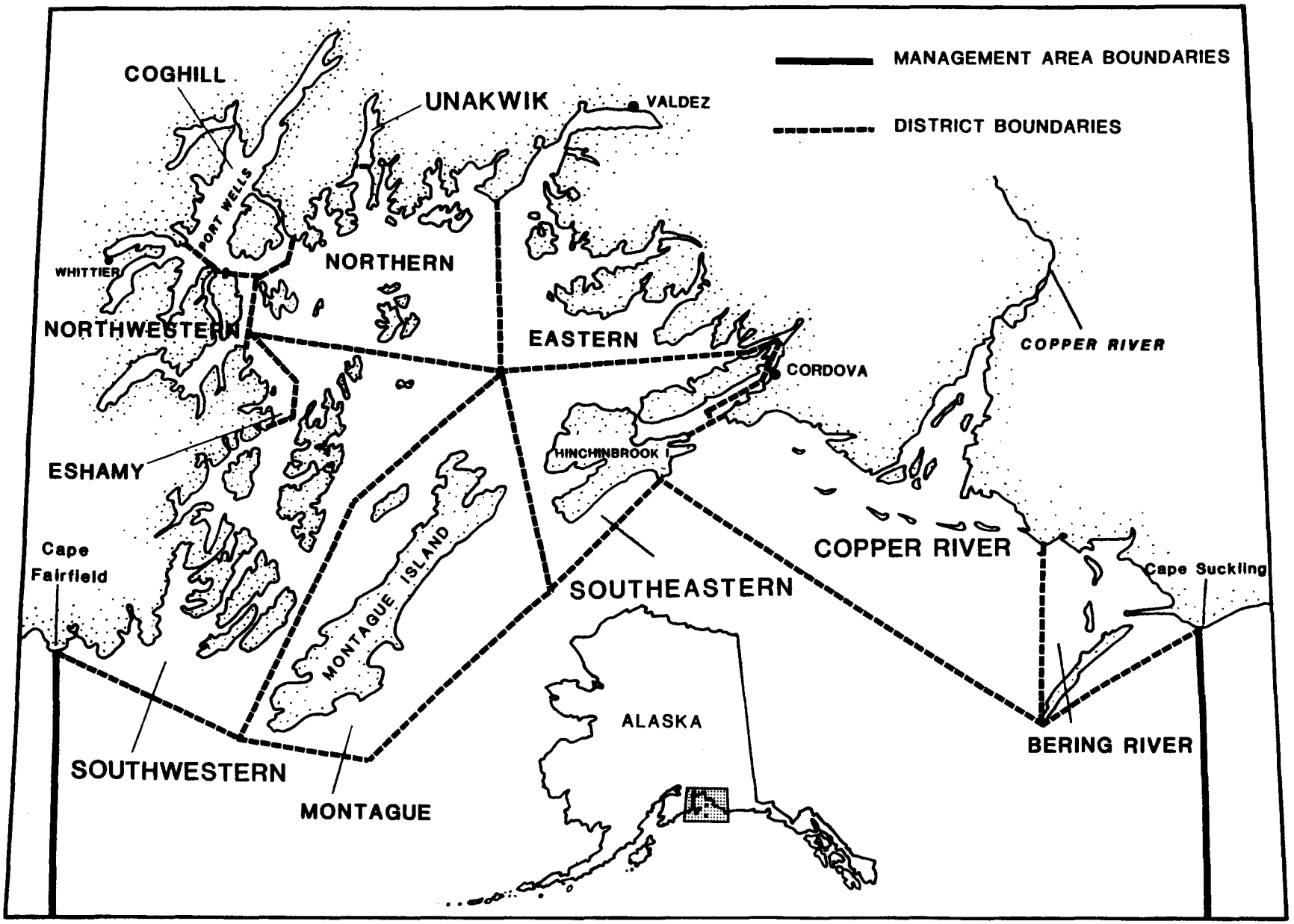
xxx Nondisclosable because of confidentiality.

* ADL census area.

** ADL census subarea.



M-- 4. Salmon fishing districts of the UCI and LCI gement areas (ADF&G 1983a).



Map 5. Salmon commercial fishing districts of the PWS Management Area (ADF&G 1983a).

Use portion of volume 2 of the Alaska Habitat Management Guide for the Southcentral Region, commercial harvest of salmon section, for further information on management, regulations, and harvest levels, because all of these factors greatly influence harvest values.

2. Ex-vessel values. All five salmon species are harvested commercially in the Southcentral Region. Salmon ex-vessel values have steadily increased from $16.1 million in 1975 to $81.0 million in 1982. The peak year of this period was 1981 when the region's ex-vessel salmon harvest reached $83.5 million (table 10). Ex-vessel values have steadily increased in both Cook Inlet and PWS. Generally speaking, average ex-vessel values have been divided fairly equally between the two areas; for the period, the average annual ex-vessel value was $22.8 million in Cook Inlet and $27.2 in PWS. Annual values vary considerably, depending on particular run strengths and harvest levels (table 10a). The dominant species are sockeye and pink salmon, which have composed about 17% and 69% of the total harvest (pounds), respectively. Sockeye and pink salmon, however, accounted for 39% and 36%, respectively, of the ex-vessel harvest value (table 11). Purse seines, drift gill nets, and set gill nets are primarily used in the region (ADF&G 1983a). About 78% of the 2,248 permanent limited entry permits issued for the region up to 1983 are owned by Alaska residents (CFEC 1984). Effort throughout the region is gauged by the number of permits issued, and because fishermen with permits may harvest all species, it is difficult to determine the number of fishermen targeting on a particular species.

3. Seafood-harvesting employment. Salmon-harvesting employment in the Southcentral Region occurs primarily in May through September (table 12, fig. 4). Peak salmon harvesting employment occurred in July from 1977 to 1982. However, substantial employment also occurred in June and August. The average July employment for the period was 4,061 fishermen and crew; the range was from 3,677 in 1980, when ex-vessel prices were relatively low, to 4,452 in 1979, when ex-vessel prices were high. The monthly average for the period was 902, with a range of 770 in 1980 to 1,016 in 1979. Approximately two-thirds of the salmon-harvesting employment in the region occurred in Cook Inlet, and the other third occurred in PWS. However, almost all of the May salmon-harvesting employment occurred in PWS. Salmon employment numbers tended to increase in PWS over the 1977-1982 period, whereas they decreased in Cook Inlet.

   Average annual employment figures are all 12 month averages; the shorter the season length as a result of biological characteristics or fishery regulations, the less representative are the monthly average figures in some

Table 10. Value of Commercial Combined Salmon Harvest for Southcentral Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Cook Inlet	Matanuska-Susitna	175	226	227	546	538	456	588	832	448
	Anchorage	1,205	2,343	3,960	5,273	2,948	2,541	4,705	5,458	3,554
	Kenai Peninsula	4,512	7,223	14,176	19,782	13,704	8,522	16,354	23,130	13,425
	Kodiak Island	10	6	78	86	77	64	355	135	102
	Other Alaska*	155	209	297	467	130	86	113	150	201
	Alaska	6,058	10,007	18,737	26,154	17,396	11,669	22,115	29,705	17,730
	Other USA	2,162	4,140	5,687	8,713	3,493	2,826	3,824	8,805	4,956
	Unknown	96	239	199	81	46	71	46	13	99
	Subtotal	8,316	14,387	24,623	34,947	20,935	14,566	25,985	38,524	22,785
PWS	Anchorage	81	176	352	248	836	637	1,373	1,743	681
	Kenai Peninsula	289	591	887	530	2,414	1,873	5,146	5,981	2,214
	Valdez-Cordova	5,151	10,197	13,013	9,927	23,570	16,794	34,934	23,082	17,084
	Other Alaska*	54	371	264	168	306	634	1,497	710	500
	Alaska	5,575	11,335	14,516	10,872	27,127	19,938	42,949	31,516	20,479
	Other USA	2,115	4,137	5,150	3,216	7,839	5,293	14,523	10,951	6,653
	Unknown	109	40	51	5	129	148	7	2	61
	Subtotal	7,799	15,513	19,717	14,094	35,095	25,379	57,479	42,469	27,193
Total		16,115	29,900	44,339	49,041	56,029	39,945	83,464	80,993	49,978

Source: CFEC 1984.

* Further breakdown withheld because of non-disclosure regulations.

Table 10a. Southcentral Commercial Salmon Harvest, 1974-1983

Mgt. Area	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
UCI										
Sockeye	497,160	678,736	1,664,131	2,052,509	2,621,667	924,415	1,573,637	1,439,235	3,237,321	5,003,070
Chum	398,153	950,981	469,806	1,233,731	571,959	650,357	390,810	833,549	1,412,885	1,124,781
Coho	199,883	221,547	268,565	192,591	219,360	265,166	271,378	485,148	775,581	520,834
Pink	483,977	335,629	1,256,743	553,917	1,689,098	72,982	1,786,430	127,161	788,698	73,555
Chinook	6,586	4,773	10,867	14,792	17,302	13,738	13,795	12,240	20,636	20,396
Total all species	1,585,759	2,191,166	3,670,112	4,047,540	5,119,386	1,926,658	4,036,050	2,897,333	6,235,121	6,742,636
LCI										
Sockeye	27,428	28,142	58,159	101,597	156,404	64,417	69,442	110,255	131,320	184,641
Chum	19,210	24,409	50,822	145,778	73,518	223,028	73,492	339,053	197,987	192,319
Coho	6,514	6,277	3,216	3,232	6,529	12,250	14,505	10,778	46,892	11,375
Pink	50,601	1,153,721	136,445	1,292,153	352,561	2,986,534	889,703	3,276,223	551,522	927,451
Chinook	182	144	450	217	1,747	1,238	424	1,086	1,066	873
Total all species	103,935	1,212,693	249,092	1,542,977	590,759	3,287,467	1,047,566	3,737,395	928,787	1,316,659
PWS										
Sockeye	741,840	546,937	1,008,912	943,944	505,509	369,583	208,724	786,470	2,362,328	903,313
Chum	89,210	101,286	370,657	573,166	489,771	349,615	482,214	1,888,822	1,336,877	1,048,092
Coho	76,041	83,806	160,494	179,417	312,930	315,774	337,123	397,163	623,877	362,408
Pink	458,619	4,453,041	3,022,426	4,536,459	2,917,499	15,615,810	14,161,023	20,558,304	20,403,423	14,128,340
Chinook	20,591	22,325	32,716	22,864	30,435	20,078	8,643	20,783	47,871	51,677
Total all species	1,386,301	5,207,395	4,595,205	6,255,850	4,256,144	16,670,860	15,197,727	23,651,542	24,774,376	16,493,830

Source: ADF&G 1982c, 1983c.

Table 11. Ex-vessel Value($) of Salmon Harvests for Southcentral Alaska by Species, 1975-82

	Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Chinook	461	1,627	1,556	1,875	1,564	793	1,331	2,544	1,469
Coho	1,339	1,983	2,288	4,521	4,923	4,094	6,242	9,337	4,341
Sockeye	4,610	15,362	21,567	32,047	12,385	9,482	18,340	41,332	19,391
Pink	6,697	7,201	10,110	6,299	30,184	21,745	43,914	16,727	17,859
Chum	3,009	3,728	8,816	4,296	6,972	3,832	13,635	11,051	6,917
Total	16,116	29,901	44,337	49,038	56,028	39,945	83,462	80,991	49,977

Source: CFEC 1984.

Table 12. Southcentral Region Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	848	0	0	0	0	469	2,185	4,105	2,905	514	0	0	0
1978	918	0	0	0	0	480	2,229	4,195	3,450	659	50	0	0
1979	1,016	0	0	0	0	450	3,078	4,452	3,711	495	0	0	0
1980	770	0	0	0	0	195	1,520	3,677	3,355	489	0	0	0
1981	949	0	0	0	0	521	3,137	4,012	3,308	415	0	0	0
1982	908	0	0	0	0	584	2,149	3,923	3,568	669	0	0	0
Average	902	0	0	0	0	450	2,383	4,061	3,383	540	8	0	0

Source: ADL 1984.

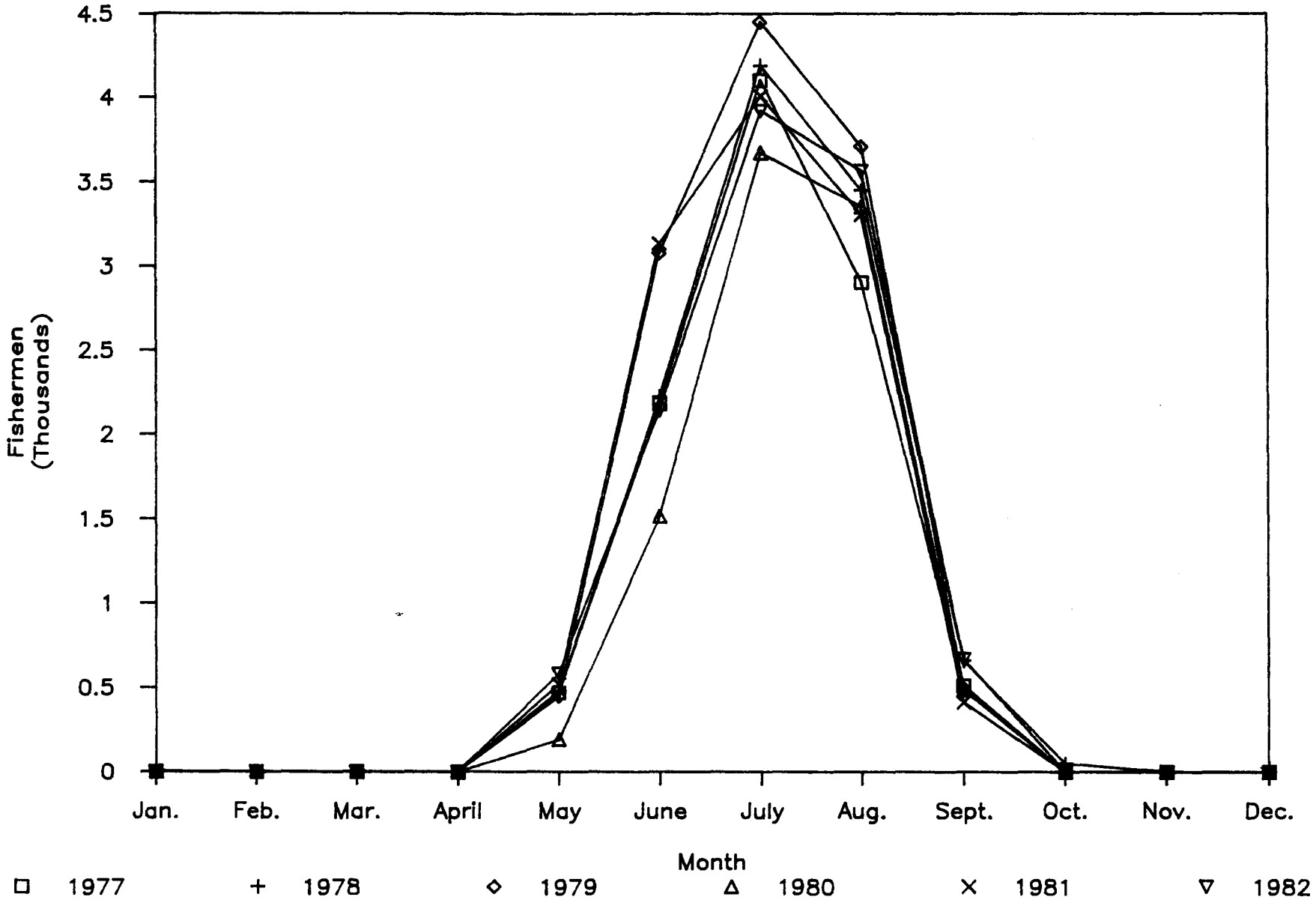


Figure 4. Southcentral Region salmon-harvesting employment (fishermen and crew).

aspects. Some fisheries have restricted seasons because increased investment in harvest capacity has made them very efficient. These shortened but intensified seasons are not readily comparable to traditional employment figures. Without information on the participation patterns between fisheries, monthly figures are also incomplete information. However, despite these problems, harvesting employment figures give an indication of participation rates.

4. First wholesale value. See the Southcentral Region Commercial Fisheries Overview section for salmon first wholesale value information.

B. Fishery Management Area Summaries

1. Prince William Sound Management Area:

a. All species harvesting summary. All five species of salmon are commercially harvested in the 11 districts of the Prince William Sound Management Area. Pink salmon are by far the dominant species, making up 87% of the commercial harvest (pounds). Sockeye, chum, and coho follow at 6, 5, and 2%, respectively (ADF&G 1983c). Chinook account for less than 2% of the harvest. However, in terms of harvest ex-vessel values these species account for 55, 22, 10, 10, and 4%, respectively. A total of 822 limited entry salmon permits have been issued for PWS; 74% are held by Alaska residents. There are 533 drift gill net permits, 259 purse seine permits, and 30 set net permits.

Pink salmon are the most abundant and economically important salmon species in PWS. Most pinks are harvested by purse seine. Long-term averages show somewhat stronger runs during odd years, but even-year runs are periodically strong (ADF&G 1978b).

Sockeye salmon were the most important commercial species in PWS before 1916, when they were surpassed by pinks. Interest in chum salmon has accompanied the development of the pink salmon fishery (PWSRPT 1984). One of the three chum salmon runs each season coincides with the main pink salmon run into PWS in early August (ADF&G 1978b).

Coho and chinook salmon are primarily harvested by drift gill nets in the Copper River District and also the Bering River District (for coho).

b. Ex-vessel value. The PWS combined salmon ex-vessel values increased from $7.8 million in 1975 to $42.5

Table 13. Ex-vessel Value($) of Commercial Salmon Harvests in Prince William Sound, by Species, 1975-82

	Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Chinook	394	1,346	1,024	1,151	910	368	895	1,754	980
Coho	470	1,150	1,340	3,087	3,154	3,131	3,541	4,966	2,605
Sockeye	1,873	6,414	7,536	4,348	3,664	1,218	6,467	15,373	5,862
Pink	4,879	5,119	7,620	3,768	25,701	18,663	38,379	15,905	15,004
Chum	184	1,484	2,196	1,740	1,666	2,000	8,195	4,471	2,742
Total	7,799	15,513	19,717	14,094	35,095	25,379	57,479	42,469	27,193

Source: CFEC 1984.

million in 1982 (tables 10 and 13). The peak year during the period was 1981, when the salmon harvest was valued at $57.5 million. Ex-vessel prices per pound were quite high, which accounts for these values (table 14). The average annual value for the period was $27.2 million. Alaska fishermen from the Southcentral Region harvested 73% of this average annual ex-vessel value; other Alaska residents accounted for 2% of the harvest value. The remainder was earned by out-of-state fishermen, who increased their relative proportion of the harvest in 1981 and 1982 (table 10).

(1) Chinook salmon. Most of the chinook salmon caught commercially in the Prince William Sound Management Area originate in the Copper River district. Of the average of 27,980 king salmon caught every year (1974 to 1983), most of these originate from this river (ADF&G 1985). Most are caught by drift gill net.

Tables 13 and 15 summarize the ex-vessel value received by fishermen for chinook salmon from 1975 through 1982. The average value shown of $980,000 represents 4% of the 1975-1982 average annual value of salmon harvested in the Prince William Sound Management Area (table 13). Approximately, 66% of the chinook salmon ex-vessel value was earned by fishermen from the Valdez-Cordova census area. This percentage was fairly stable over the 1975-1982 period. Alaska fishermen received 73% of the 1975 to 1982 average annual ex-vessel values; 27% was earned by out-of-state fishermen.

(2) Coho salmon. The 1975 through 1982 ex-vessel values for coho salmon are shown in tables 13 and 16. As mentioned previously, coho salmon accounted for 10% of the period's average annual ex-vessel values (table 13). Coho salmon ex-vessel values steadily increased from $470,000 in 1975 to $5.0 million in 1982 (which is almost twice the average of $2.6 million). Lower prices made 1980 the only exception to the upward trend (table 5). The increase in ex-vessel values was largely due to increases in harvest levels. As with chinook and sockeye salmon, the value received by commercial fishermen for coho salmon is primarily derived from harvest of the Copper and Bering river stocks. The 10-yr average harvest of 278,312 coho salmon taken from these stocks, with 5,750 fish harvested from other areas in PWS (ADF&G 1985).

Fishermen from the Valdez-Cordova census area earned 64% of coho salmon ex-vessel values. Out-of-state fishermen earned 24% of ex-vessel values; the remainder (12%) was earned by Alaska fishermen primarily from the Kenai Peninsula Census Area.

(3) Sockeye salmon. The 1975-1982 Prince William Sound Management Area sockeye salmon ex-vessel values are shown in tables 13 and 17. The average annual salmon ex-vessel value of approximately $5.9 million was exceeded only by the value of pink salmon ($15 million); sockeye salmon account for 22% of the value of salmon harvested in the area. Sockeye salmon ex-vessel values increased from $1.9 million in 1975 to $15.4 million in 1982. This increase in values was due to an overall increase in harvest levels (pounds) by a factor of three. However, harvest levels varied considerably between years. Ex-vessel values for 1980 are relatively low because of decreased harvest levels and a relatively low ex-vessel fish price per pound (table 14). As with chinook salmon, a high percentage (61%) of the sockeye salmon harvested in PWS originates in the Copper River District. The Bering River is also an important source of sockeye salmon (ADF&G 1985).

Fishermen from the Valdez-Cordova Census Area earned most of this value (60%); out-of-state fishermen earned 29% of ex-vessel values. The remainder was primarily earned by fishermen in other Southcentral Region census areas (table 17).

(4) Pink salmon. Pink salmon strongly dominate the PWS salmon fisheries. The 10-yr average catch (1974-1983) of 10.2 million fish represents 85% of the total average area harvest of 11.8 million fish. These fish are taken primarily by purse seine in districts outside of the Copper-Bering River area (ADF&G 1985).

The average ex-vessel value of pink salmon (1975-1982) was $15 million (tables 13 and 18). This value represents 55% of the average value of the all salmon fisheries in the PWS area. Run strength in PWS is dominated by odd years. However, returns are also significant in even years. The range of ex-vessel values was $3.8 million in 1978 to $38.4 million in 1981. The odd-year average for the fishery was approximately $19.1 million, which is 28% greater than the 8-yr

Table 14. Southcentral Region Salmon Ex-vessel Prices Per Pound (in Dollars) by Fishery Management Areas, 1975-82

	1975	1976	1977	1978	1979	1980	1981	1982
Prince William Sound								
Chinook								
Purse seine	0.68	0.72	1.29	1.42	1.07	1.48	1.58	1.38
Beach seine	---	0.72	1.29	---	---	---	---	---
Drift gill net	0.68	1.47	1.60	1.41	1.78	1.48	1.67	1.41
Set gill net	---	1.47	1.25	---	---	---	---	---
Power troll	---	1.45	1.60	---	---	---	---	---
Fish trap	0.68	---	---	---	---	---	---	---
Coho								
Purse seine	0.16	0.27	0.38	1.08	0.73	0.39	0.90	0.79
Beach seine	---	0.27	0.38	---	---	---	---	---
Drift gill net	0.63	0.72	0.70	1.05	1.10	0.95	0.86	0.83
Set gill net	---	0.72	0.70	---	---	0.95	---	---
Power troll	---	0.70	0.70	---	---	---	---	---
Fish trap	0.16	---	---	---	---	---	---	---
Sockeye								
Purse seine	0.49	0.95	0.98	1.09	1.40	0.85	1.29	1.14
Beach seine	---	0.95	0.98	---	---	---	---	---
Drift gill net	0.49	0.92	1.07	1.22	1.40	0.85	1.29	0.92
Set gill net	---	---	0.85	---	1.40	0.85	---	---
Pink								
Purse seine	0.30	0.40	0.37	0.36	0.45	0.39	0.44	0.22
Beach seine	---	0.40	0.37	0.35	0.45	---	---	---
Drift gill net	0.30	0.42	0.38	0.35	0.44	0.39	0.44	0.23
Set gill net	---	0.42	0.38	---	0.44	0.39	---	---
Chum								
Purse seine	0.25	0.44	0.41	0.42	0.53	0.50	0.50	0.37
Beach seine	---	0.44	0.41	---	0.53	---	---	---
Drift gill net	0.25	0.45	0.46	0.40	0.53	0.50	0.50	0.37
Set gill net	---	0.45	0.46	---	0.53	0.50	---	---
Cook Inlet								
Chinook								
Purse seine	0.70	0.62	0.87	0.99	1.49	1.15	1.25	1.25
Beach seine	---	0.62	0.87	---	---	1.15	---	1.27
Drift gill net	0.54	0.92	1.26	1.16	1.63	1.15	1.46	1.27
Set gill net	0.54	0.92	1.26	1.16	1.63	1.15	1.46	---
Hand troll	0.69	0.92	1.91	---	---	---	---	3.05
Coho								
Purse seine	0.55	0.60	0.50	0.97	0.85	0.58	0.75	0.67
Beach seine	---	0.60	0.50	---	0.85	0.58	---	---
Drift gill net	0.54	0.61	0.72	0.99	0.98	0.58	0.83	0.72
Set gill net	0.54	0.61	0.72	0.99	0.98	0.58	0.83	0.72
Hand troll	0.68	0.61	0.72	0.99	--	0.90	---	0.72
Sockeye								
Purse seine	0.62	0.76	0.86	1.30	1.66	0.85	---	---
Beach seine	---	0.76	0.86	---	1.66	0.85	---	---
Drift gill net	0.63	0.76	0.87	1.32	1.41	0.85	1.20	1.10
Set gill net	0.63	0.76	0.87	1.32	1.41	0.85	1.20	1.10
Hand troll	---	0.76	0.87	---	---	0.85	---	---

(continued)

Table 14 (continued).

	1975	1976	1977	1978	1979	1980	1981	1982
Pink								
Purse seine	0.36	0.37	0.35	0.30	0.43	0.34	0.44	0.15
Beach seine	---	0.37	0.35	---	0.43	0.34	---	---
Drift gill net	0.35	0.37	0.39	0.34	0.34	0.34	0.38	0.18
Set gill net	0.35	0.37	0.39	0.34	0.34	0.34	0.38	0.18
Hand troll	---	0.37	0.39	---	---	---	0.43	---
Chum								
Purse seine	0.44	0.45	0.45	0.54	0.60	0.54	0.47	0.42
Beach seine	---	0.45	0.45	---	0.60	0.54	---	---
Drift gill net	0.41	0.54	0.61	0.51	0.88	0.54	0.65	0.49
Set gill net	0.41	0.54	0.61	0.51	0.88	0.54	0.65	0.49
Hand troll	---	0.54	0.61	---	---	0.54	---	---

Source: CFEC 1982.

--- means no data were available.

Table 15. Value of Commercial Chinook Salmon Harvest for Southcentral Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Cook Inlet	Matanuska-Susitna	1	5	4	33	32	21	9	35	18
	Anchorage	13	61	102	136	134	91	91	176	100
	Kenai Peninsula	42	180	308	468	424	278	285	503	311
	Other Alaska*	1	2	8	4	6	3	2	3	4
	Alaska	57	248	422	640	597	393	386	718	433
	Other USA	9	28	108	83	57	33	49	71	55
	Unknown	1	4	2	1	0	0	1	0	1
	Subtotal	67	281	532	724	654	425	436	790	489
PWS	Anchorage	11	22	19	20	22	10	30	79	26
	Kenai Peninsula	8	34	16	35	49	**	53	81	**
	Valdez-Cordova	257	895	677	776	609	265	534	1,153	646
	Other Alaska*	3	8	5	6	3	**	9	22	**
	Alaska	279	958	718	836	683	277	626	1,335	714
	Other USA	112	380	300	314	224	90	269	418	263
	Unknown	3	8	7	0	3	0	0	0	3
	Subtotal	394	1,346	1,024	1,151	910	368	895	1,754	980
Total		461	1,626	1,556	1,875	1,563	793	1,331	2,544	1,469

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 16. Value of Commercial Coho Salmon Harvest for Southcentral Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Cook Inlet	Matanuska-Susitna	44	31	24	62	104	49	116	181	76
	Anchorage	155	207	163	383	415	288	799	912	415
	Kenai Peninsula	462	418	525	791	971	475	1,311	2,512	933
	Other Alaska*	20	9	11	14	18	9	24	39	18
	Alaska	681	665	722	1,249	1,509	822	2,251	3,644	1,443
	Other USA	174	151	214	178	254	135	440	723	284
	Unknown	14	17	12	7	6	7	9	5	10
	Subtotal	869	833	948	1,434	1,769	963	2,701	4,371	1,736
PWS	Kenai Peninsula	0	35	69	161	276	305	414	469	216
	Valdez-Cordova	334	812	960	2,259	1,987	1,908	2,034	3,007	1,663
	Other Alaska*	4	11	30	60	143	118	195	216	97
	Alaska	338	859	1,059	2,481	2,406	2,331	2,643	3,692	1,976
	Other USA	128	290	281	607	749	800	897	1,274	628
	Unknown	4	1	0	0	0	0	0	0	1
	Subtotal	470	1,150	1,340	3,087	3,154	3,131	3,541	4,966	2,605
Total		1,339	1,983	2,288	4,522	4,923	4,094	6,241	9,337	4,341

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

Table 17. Value of Commercial Sockeye Salmon Harvest for Southcentral Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Cook Inlet	Matanuska-Susitna	73	115	162	382	321	272	360	482	271
	Anchorage	455	1,390	2,610	3,889	1,547	1,337	2,570	3,454	2,157
	Kenai Peninsula	1,315	4,374	7,578	15,633	4,943	4,833	6,783	15,672	7,641
	Kodiak Island	8	4	44	71	43	42	42	94	43
	Other Alaska*	67	139	179	396	70	53	72	92	134
	Alaska	1,917	6,022	10,573	20,371	6,924	6,537	9,828	19,794	10,246
	Other USA	788	2,771	3,353	7,263	1,772	1,684	2,019	6,158	3,226
	Unknown	33	155	106	65	24	43	25	8	57
	Subtotal	2,737	8,948	14,031	27,699	8,721	8,264	11,873	25,959	13,529
PWS	Anchorage	23	53	137	88	125	90	246	729	186
	Kenai Peninsula	29	217	288	166	385	138	593	1,207	378
	Valdez-Cordova	1,258	4,146	4,734	2,834	2,070	665	3,814	8,743	3,533
	Other Alaska*	18	69	65	36	30	17	54	117	51
	Alaska	1,329	4,484	5,224	3,124	2,610	910	4,707	10,796	4,148
	Other USA	515	1,899	2,275	1,222	1,050	302	1,753	4,577	1,699
	Unknown	30	31	36	2	4	6	6	0	14
	Subtotal	1,873	6,414	7,536	4,348	3,664	1,218	6,467	15,373	5,862
Total		4,611	15,363	21,567	32,047	12,384	9,418	18,340	41,332	19,391

Source: CFEC 1984.

* Further breakdown withheld due to non-disclosure regulations.

Table 18. Value of Commercial Pink Salmon Harvest for Southcentral Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Cook Inlet	Matanuska-Susitna	10	28	10	34	4	81	10	12	24
	Anchorage	213	393	209	516	247	613	461	103	344
	Kenai Peninsula	1,478	1,169	2,065	1,448	4,177	1,874	4,778	610	2,200
	Kodiak Island	0	1	3	3	0	10	190	1	26
	Other Alaska*	14	23	15	18	6	15	8	5	13
	Alaska	1,715	1,613	2,302	2,019	4,435	2,593	5,447	731	2,607
	Other USA	98	441	182	509	48	480	87	91	242
	Unknown	5	28	6	4	0	9	0	0	7
	Subtotal	1,818	2,082	2,490	2,531	4,483	3,082	5,535	822	2,855
PWS	Anchorage	41	68	114	61	466	341	751	511	294
	Kenai Peninsula	246	251	439	115	1,612	1,367	3,608	2,758	1,299
	Valdez-Cordova	3,180	3,361	5,170	2,773	17,884	12,570	23,371	8,412	9,590
	Other Alaska*	31	224	138	92	247	536	1,118	435	352
	Alaska	3,498	3,905	5,861	3,041	20,208	14,814	28,848	121	11,536
	Other USA	1,312	1,214	1,755	724	5,374	3,712	9,531	3,789	3,427
	Unknown	68	0	4	2	119	137	0	0	41
	Subtotal	4,879	5,119	7,620	3,768	25,701	18,663	38,379	15,905	14,004
Total		6,697	7,201	10,111	6,299	30,185	21,744	43,914	16,727	17,860

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

year average (table 14). High ex-vessel values in 1979 and 1981 were influenced by high prices per pound (table 14). Pink salmon prices per pound dropped in 1982 to a low for the 1975 to 1982 period.

Fishermen from the Valdez-Cordova Census Area received 64% of the 1975-1982 harvest ex-vessel earnings. Fishermen from the Kenai Peninsula Census Area earned 9%. Alaska fishermen earned 77%; out-of-state fishermen earned 23% (table 18).

(5) Chum salmon. Chum salmon originate in different streams from those in which chinook, sockeye, and coho originate. Only about 4,800 fish (1974-1983 average) were contributed by the Copper-Bering river systems; the vast majority (99.3%) came from elsewhere in the sound (ADF&G 1985).

The average ex-vessel value of chum salmon harvests from 1975 to 1982 was appoximately $2.7 million, which was 10% of PWS salmon ex-vessel values for the period (table 13). The range of values was from $184,000 in 1975 to $8.2 million in 1981 (table 19). The high value in 1981 was the result of a large harvest and a relatively high ex-vessel price per pound (table 14). Prices dropped in 1982, which in part accounts for the reduced value in that year.

As with other salmon fisheries, fishermen who reside in the Valdez-Cordova census area earned a high percentage (60%) of the average annual ex-vessel value of the chum fishery. Alaska fishermen, primarily from the Southcentral Region, earned 77% of the period's ex-vessel values, and out-of-state fishermen earned 23% (table 19).

c. PWS salmon-harvesting employment. Salmon-harvesting employment occurred primarily in May through September. Rather than in a single peak month, employment peaked in both July and August, with August employment steadily increasing throughout the period 1977 to 1982 (table 20, fig. 5). Average July and August employment was 1,260 and 1,249, respectively. The range of July employment was 1,112 in 1978 to 1,401 in 1982; the August range was 847 in 1977 to 1,578 in 1982. Unlike that of the region as a whole, harvest employment in PWS peaked in 1982 (rather than in 1979) because of the large 1982 sockeye salmon harvest. Unlike pink salmon prices, sockeye prices remained relatively high in 1982. June harvest employment in PWS exhibited an odd-year cycle

Table 19. Value of Commercial Chum Salmon Harvest for Southcentral Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Cook Inlet	Matanuska-Susitna	48	47	26	35	77	32	92	123	60
	Anchorage	371	293	876	349	602	212	783	813	537
	Kenai Peninsula	1,215	1,082	3,700	1,441	3,188	1,062	3,196	3,831	2,339
	Kodiak Island	**	0	27	6	24	9	108	23	**
	Other Alaska*	**	37	88	42	39	10	22	28	**
	Alaska	1,689	1,459	4,717	1,873	3,929	1,325	4,201	4,817	3,001
	Other USA	1,093	749	1,830	680	1,362	495	1,229	1,762	1,150
	Unknown	43	36	73	4	15	12	10	1	24
	Subtotal	2,825	2,244	6,620	2,556	5,306	1,832	5,440	6,580	4,175
PWS	Anchorage	2	24	51	31	86	79	151	224	81
	Kenai Peninsula	6	54	75	52	93	62	478	1,466	286
	Valdez-Cordova	121	983	1,472	1,285	1,020	1,386	5,179	1,766	1,652
	Other Alaska*	2	68	56	22	20	79	316	120	85
	Alaska	131	1,129	1,654	1,391	1,220	1,606	6,124	3,577	2,104
	Other USA	48	35	539	349	443	389	2,072	892	636
	Unknown	4	0	3	0	3	5	0	2	2
	Subtotal	184	1,484	2,196	1,740	1,666	2,000	8,195	4,471	2,742
Total		3,008	3,727	8,816	4,296	6,972	3,832	13,635	11,051	6,917

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 20. Prince William Sound Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	321	0	0	0	0	469	1,040	1,264	847	237	0	0	0
1978	300	0	0	0	0	480	583	1,112	1,037	345	42	0	0
1979	366	0	0	0	0	450	1,075	1,243	1,287	340	0	0	0
1980	275	0	0	0	0	193	206	1,161	1,320	414	0	0	0
1981	432	0	0	0	0	521	1,499	1,376	1,424	363	0	0	0
1982	396	0	0	0	0	584	671	1,401	1,578	522	0	0	0
Average	348	0	0	0	0	450	846	1,260	1,249	370	7	0	0

Source: ADL 1984.

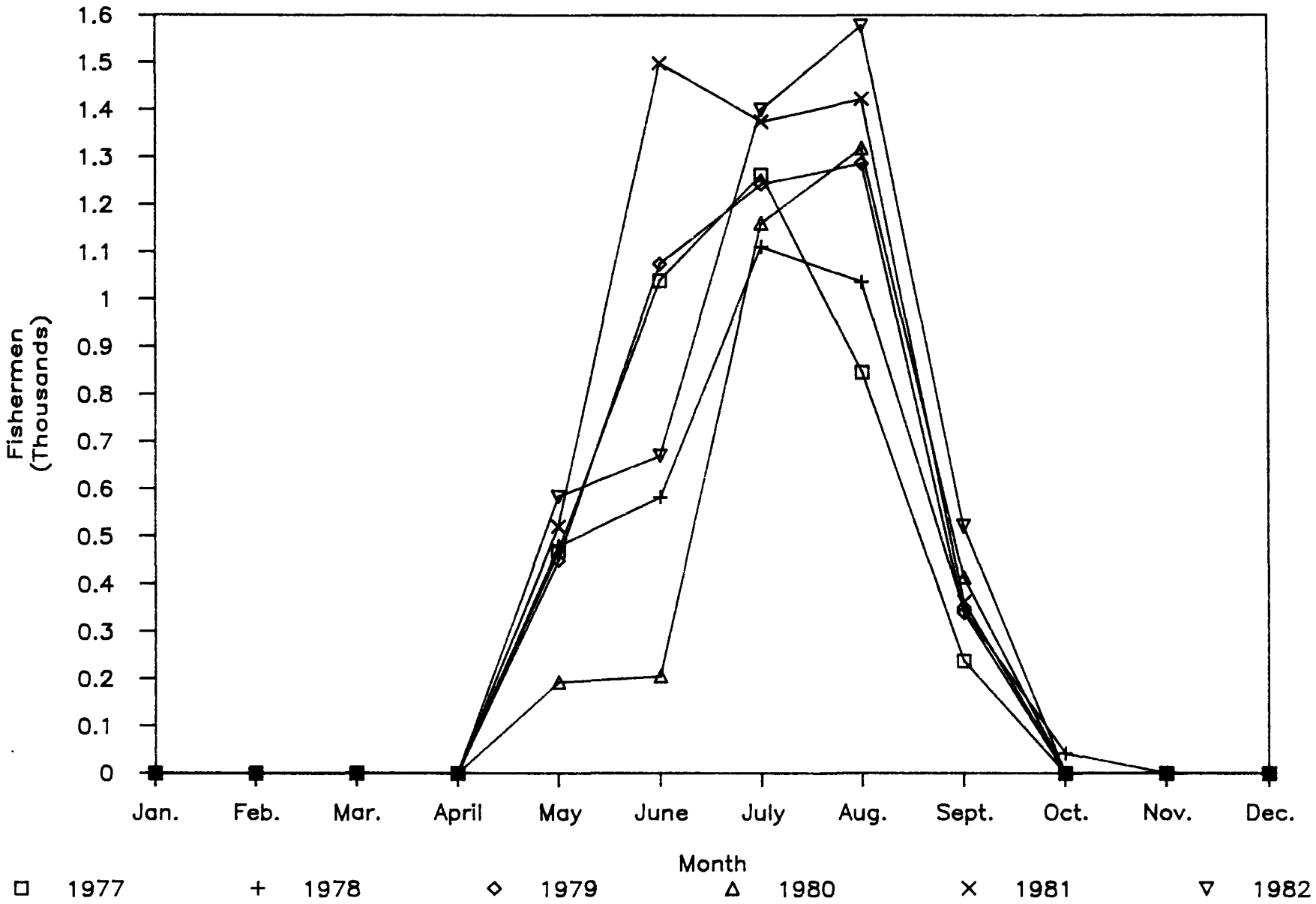


Figure 5. Prince William Sound salmon-harvesting employment (number of fishermen and crew).

reflecting the pink salmon cycle. Average monthly employment for the years 1977-1982 was 348, with a range of 275 in 1980 and 432 in 1981.

2. Cook Inlet management areas:

   a. All-species harvest summary. Although harvest ex-vessel values are presented for Cook Inlet as a whole, this background section provides information for the UCI and the LCI management areas separately.

      UCI is the primary salmon-producing portion of Cook Inlet, providing about 80% of the total Cook Inlet catch since 1960. About 5% of Alaska's commercial salmon harvest is from UCI. UCI fisheries harvest five species of Pacific salmon as they migrate to their streams of origin. Major salmon-producing systems are the Kenai, Kasilof, Big, Crescent, Susitna, and Chakachatna/McArthur rivers. Mixed stocks and mixed species of salmon mingle in Cook Inlet at about the same time, hindering stock-specific management of the commercial fishery (Rowell and Middleton 1985).

      In addition to the stock management problems is one of allocation. Commercial fishermen, recreational fishermen, and subsistence fishermen all utilize the UCI salmon resource. Meeting the needs of these user groups and maintaining adequate salmon population levels creates extremely complex management strategies. (For information on management plans, see the salmon Human Use section in volume 2 of the Alaska Habitat Management Guide for the Southcentral Region.)

      In Cook Inlet, there is no breakdown by gear type for UCI and LCI. However, because of geography and salmon migration patterns, drift net and set net gear have proven more suitable for the UCI area, whereas purse seines are primarily used in LCI. In 1983, 1,376 permanent limited entry permits had been issued for all of Cook Inlet. Of these, 78 were for purse seine, 555 for drift gill net, and 743 for set gill net. About 84% of the permits were issued to Alaska residents.

      Sockeye salmon are the most important species in UCI because they are the most numerous and have the highest value per pound. Catches have remained relatively stable since statehood. Most of the sockeye salmon harvest (94%) occurs in the Central District of the management area, where the greatest exploitation is by the drift net fleet.

Pink salmon runs are strongest in even years in UCI. The even-year commercial harvest accounts for 53% of the entire Cook Inlet catch. About 76% of the catch is taken in the Central District. Although pink salmon are the second most numerous species in UCI, drift net fishermen will usually not pursue them until the sockeye and chum salmon runs have passed their peaks. The drift fishery takes an average of 36% of the UCI pink harvest (Rowell and Middleton 1985).

Chum salmon are the third most numerous salmon species in UCI and have composed 24% of the total UCI salmon harvest since statehood. Most of the chum salmon harvest occurs in the Central District. About 85% of the catch has consistently been harvested by the drift gill net fleet in the Central District.

Coho salmon is the fourth-ranking species in the commercial catch. Most of these are taken in the Central District, where drift and set gill nets in 1983 accounted for 64 and 26% of the harvest, respectively.

Although chinook salmon are the least numerous salmon species in UCI, they are an important component of the commercial fishery. Over 90% of the Cook Inlet chinook harvest is from UCI. Beginning in 1962, the opening of the commercial fishing season in UCI was delayed six weeks to protect early season chinook runs migrating to rivers in UCI.

The Lower Cook Inlet Management Area is comprised of all waters west of Cape Fairfield, north of Cape Douglas, and south of Anchor Point. LCI is characterized by numerous small bays and lagoons fed by short coastal streams. The area lends itself well to stock-specific terminal area fisheries (Middleton 1981). Hand purse seines may be used in all fishing districts of the managment area. Power seining is prohibited. Harvest by set nets is permitted only along very restricted beach areas in the Southern District. Drift gill netting is not permitted in LCI (ADF&G 1983b).

Pink salmon dominate the harvest in LCI, accounting for 83% of the area's total catch. Purse seiners take 98% of the catch. Almost 40% of the LCI pink salmon harvest occurs in the Southern District. Pink salmon runs are strongest in odd years in LCI.

Chum salmon are the second most important species in LCI, accounting for about 10% of the area's catch since 1974. Production of LCI chum salmon has been building since 1979.

Sockeye, coho, and chinook salmon are of lesser importance in LCI. Chinook salmon catches are incidental to harvest of other species. Coho salmon are targeted by purse seiners, but they account for less than 1% of the LCI salmon catch.

b. Ex-vessel values. The combined salmon average annual ex-vessel values for the years 1975-1982 was approximately $22.8 million (tables 10 and 21). These values increased from approximately $8.3 million in 1975 to $38.5 million in 1982. Ex-vessel values increased because of increased harvests and ex-vessel prices. Relatively low prices for all species resulted in a decrease in 1980 ex-vessel values (tables 10 and 14). Fishermen from the Kenai Peninsula Census Area earned 59% of the Cook Inlet harvest values. Alaska fishermen earned 78%, and out-of-state fishermen earned 22% of ex-vessel values (table 10).

(1) Chinook salmon. The commercial catch of chinook (king) salmon in Cook Inlet is dominated by the Upper Cook Inlet drift and set gill net fisheries, where the average annual harvest (1954 through 1983) was 19,679 fish (Ruesch and Browning 1984). Only trace amounts appear in the Lower Cook Inlet fisheries, where the 30-yr average harvest was 389 fish (Schroeder and Kyle 1984).

Tables 15 and 21 show the annual ex-vessel value of chinook salmon harvests for the Cook Inlet Management Area for 1975-1982. The average ex-vessel value of $489,000 was 2% of all Cook Inlet salmon ex-vessel values for the period ($22.8 million). Values ranged from $67,000 in 1975 to $790,000 in 1982. The high 1979 values resulted from high ex-vessel prices per pound; prices dropped to 1978 levels in 1980 (table 14).

Fishermen from the Kenai Peninsula Census Area earned 64% of Cook Inlet chinook salmon average ex-vessel values. Fishermen from the Anchorage Borough earned 20%; Alaskan fishermen earned 89% of the average ex-vessel value of chinook salmon. The remaining 11% was earned by out-of-state fishermen (table 15).

Although chinook salmon constitute only 0.49% of the average salmon harvest (pounds) from Cook Inlet (20,068 of 4,057,452 fish, 1954-1983 average), the average ex-vessel value was 2% of the total. Large fish and high prices per pound (table 14) combine to make chinook far more valuable per fish than

Table 21. Ex-vessel Value ($) of Commercial Salmon Harvests in Cook Inlet by Species, 1975-82

	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Chinook	67	281	532	724	654	425	436	790	489
Coho	869	833	948	1,434	1,769	963	2,701	4,371	1,736
Sockeye	2,737	8,948	14,031	27,699	8,721	8,264	11,873	25,959	13,529
Pink	1,818	2,082	2,490	2,531	4,483	3,082	5,535	822	2,855
Chum	2,825	2,244	6,620	2,556	5,306	1,832	5,440	6,580	4,175
Total*	8,316	14,388	24,621	34,944	20,933	14,566	25,985	38,522	22,785

Source: CFEC 1984.

* Totals may not match other tables due to differences in rounding.

other species. For example, in 1982, 21,702 king salmon were harvested commercially in Cook Inlet for an ex-vessel value of $790,000, or about $36.40 per fish. In contrast, during the same year, approximately 1,340,000 pink salmon were harvested for an ex-vessel value of $822,000 or $.61 per fish (in 1982, chinook salmon prices were high and pink salmon prices were low).

(2) Coho salmon. Coho salmon ex-vessel value information is presented in tables 16 and 21. Coho salmon account for 8% of the average annual Cook Inlet salmon ex-vessel values (table 21). Harvest values ranged from $833,000 in 1976 to $4.4 million in 1982. Ex-vessel values have generally increased except for 1980, which was in part due to low ex-vessel prices. The 1982 Cook Inlet coho harvest was a record in terms of number of fish and value. As with chinook and sockeye salmon, nearly all coho salmon were taken in UCI; an average of 257,111 of the Cook Inlet total of 264,441 coho salmon were harvested in UCI (97%) from 1954 to 1983 (Ruesch and Browning 1984).

Fishermen from the Kenai Peninsula Census Area earned 54% of the average 1975-1982 ex-vessel values. Fishermen from the Anchorage Borough earned 24%. All Alaska fishermen earned 83%, whereas out-of-state fishermen earned 17% (table 16).

(3) Sockeye salmon. Sockeye salmon dominate the ex-vessel values of Cook Inlet Management Area salmon, with an average annual value of $13.5 million. This value constituted 59% of the ex-vessel value of the combined salmon harvests in the area from 1975 through 1982. However, harvest values ranged from $2.7 million in 1975 to $27.7 million in 1978. Harvest levels (pounds) from 1976 through 1982 showed an erratic but upward trend. Harvest in 1979 dropped, which accounts for the low ex-vessel values. Although harvests increased in 1980, a substantial ex-vessel price per pound drop resulted in relatively low ex-vessel values that year also (table 14). Tables 17 and 21 summarize ex-vessel values for the commercial sockeye harvest for this period.

Cook Inlet sockeye salmon prices are influenced by the negotiated Bristol Bay sockeye price and the run strength. The Cook Inlet fishery usually occurs approximately one-and-a-half weeks after the

Bristol Bay fishery; a strong run in Bristol Bay can lower the sockeye salmon price in Cook Inlet. However, Cook Inlet sockeye salmon prices are generally higher than Bristol Bay prices because Cook Inlet fish are closer to processors. The quality is better as well because there are fewer fish to handle and the transportation distance is less (Hilsinger, pers. comm.). As with chinook salmon, 96% (1,314,394 of 1,368,598 fish) of the 1954 to 1983 average sockeye harvest occurred in the UCI fishery unit (Ruesch and Browning 1984).

Fishermen from the Kenai Peninsula Census Area earned 56% of the average annual sockeye salmon ex-vessel values from 1975 through 1982. Anchorage Borough fishermen earned 16% of harvest values. Alaska fishermen earned 76% overall; out-of-state fishermen earned most of the remaining 24% (table 17).

(4) Pink salmon. Pink salmon are plentiful in the Cook Inlet salmon fishery and dominate the LCI fishery. Eighty percent of the 30-yr average (1954 through 1983) total LCI salmon catch of 930,244 fish consisted of 736,797 pink salmon (Schroder and Kyle 1984). Pink salmon also play a major role in the UCI salmon fishery. Pink salmon runs exhibit a dominant odd-year cycle in LCI, whereas UCI has a dominant even-year cycle.

Average annual pink salmon ex-vessel values account for 13% of Cook Inlet salmon ex-vessel values for the period 1975-1982. Ex-vessel values ranged from $1.8 million in 1975 to $5.5 million in 1981 (table 21). In 1982, the combination of a relatively low harvest even year UCI run, a low harvest of an even year run in LCI, and very low ex-vessel pink salmon ex-vessel prices (partly as a result of the botulism scare) resulted in a drastic decline in ex-vessel earnings. The average ex-vessel value for the odd years was $3.6 million, which is 25% more than the eight-year pink salmon average. The odd years also had a steady increase in harvest values.

Fishermen from the Kenai Peninsula Census Area earned 77% of the period's harvest values. In the year of peak harvest value, 1981, Kenai Peninsula fishermen earned 86% of Cook Inlet pink salmon harvest values. In odd years, Kenai Peninsula fishermen earned a greater percentage of the harvest values than in even years; this same

pattern was true for all Alaska fishermen in odd years. Over the eight-year period, out-of-state fishermen earned 8% of harvest values, although their percentages were higher in even years (table 18).

(5) Chum salmon. Catch statistics (1954 through 1983) show average harvests of 657,222 chum in the UCI fishery of a total of 788,746 harvested in Cook Inlet (83%). As with chinook, sockeye, and coho salmon, UCI strongly dominates the chum salmon fishery (Ruesch and Browning 1984).

Chum salmon harvests accounted for 18% of all Cook Inlet salmon harvest from 1975 through 1982 (tables 19 and 21). Harvest values were somewhat erratic, ranging from $1.8 million in 1980 to $6.6 million in 1977 and averaging $4.2 million for the period. Harvest levels and ex-vessel harvest prices tended to be higher in odd years from 1977 through 1981, which accounts for these relatively higher values (tables 14, 19, 21 and see the Alaska Habitat Management Guide for the Southcentral Region, salmon Human Use section).

As with other Cook Inlet salmon species, most of the ex-vessel value (56%) was earned by fishermen from the Kenai Peninsula Census Area. Alaska fishermen earned 72% of the harvest values, and out-of-state fishermen earned 28% (table 19).

c. Cook Inlet salmon-harvesting employment. Salmon-harvesting employment in Cook Inlet occurred primarily in June, July, August, and September (table 22, fig. 6). The peak month was July, but substantial employment also occurred in June and August. The average July employment for 1977 to 1982 was 2,801, with a range of 2,516 in 1980 to 3,209 in 1979. The average monthly employment for the period was 554. Harvesting employment numbers in Cook Inlet tended to be more influenced by ex-vessel prices than PWS employment was.

III. SHELLFISH FISHERY

A. Regional Overview

1. All-species summary. Dungeness, Tanner, and king crab, shrimp, and razor clams are all commercially harvested in the Southcentral Region. This shellfish section discusses each species group on a regional and management area basis. Crab

Table 22. Cook Inlet Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	527	0	0	0	0	0	1,145	2,841	2,058	277	0	0	0
1978	622	0	0	0	0	0	1,646	3,083	2,413	314	8	0	0
1979	650	0	0	0	0	0	2,003	3,209	2,424	155	0	0	0
1980	495	0	0	0	0	0	1,314	2,516	2,035	75	0	0	0
1981	518	0	0	0	0	0	1,638	2,636	1,884	52	0	0	0
1982	511	0	0	0	0	0	1,478	2,522	1,990	147	0	0	0
Average	554	0	0	0	0	0	1,537	2,801	2,134	170	1	0	0

Source: ADL 1984.

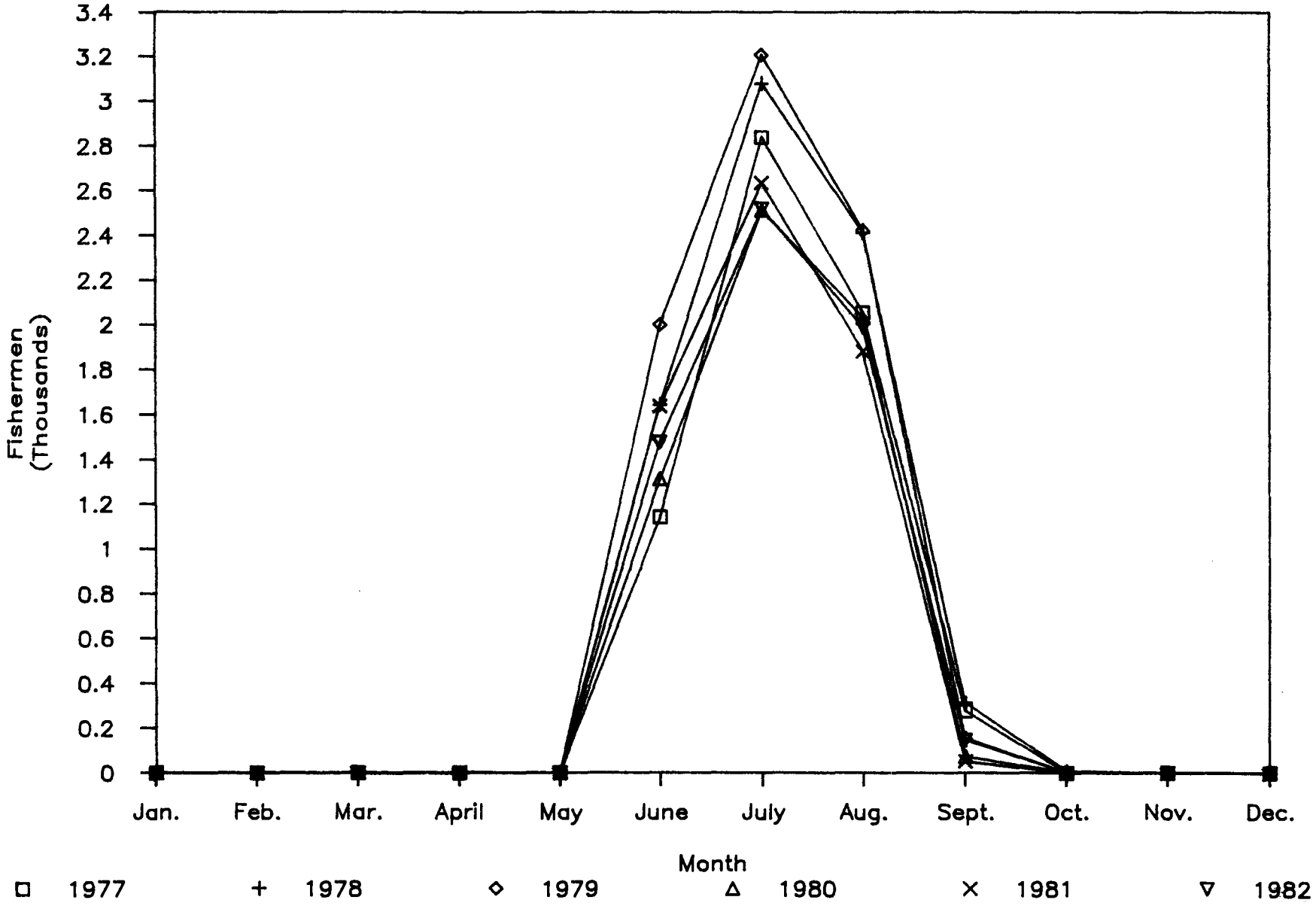


Figure 6. Cook Inlet salmon-harvesting employment (number of fishermen and crew).

and shrimp commercial fishing occurs in the Lower Cook Inlet (LCI) and the Prince William Sound (PWS) management areas. In terms of ex-vessel value, the most important commercial species groups are Tanner and king crabs and shrimp. Dungeness crab and razor clam harvests have generally increased in value during the years 1975 to 1982. Management authority varies considerably for each species and between harvest areas. Details of management and regulatory policies can be found in the Human Use sections of volume 2 of the Alaska Habitat Management Guide for the Southcentral Region.

2. Regional ex-vessel value. Commercial shellfish harvests in Southcentral Alaska averaged $11.4 million annually for the years 1975-1982 (table 23). Values ranged widely, however, from a low of $3.7 million in 1975 to $19.4 million in 1981. Although commercial shellfish generally grew in value over the time period, it was not as valuable as shellfish in other regions (such as Southwest and Western Alaska). Southcentral harvest and participation levels tended to be relatively more influenced by markets and periods of high ex-vessel prices (table 27).

3. Regional shellfish-harvesting employment. Shellfish-harvesting employment is for all species groups combined (Tanner, king, and Dungeness crab, shrimp, and razor clam) (table 24, fig. 7). Harvesting employment occurred during all months for the years 1977-1982. The peak month of employment was December, followed by August. All months, however, had a relatively consistent number of fishermen and crew employed as compared to more seasonal fisheries such as salmon, halibut, and herring. Harvesting employment generally decreased in summer (May, June, and July) until 1981 and 1982, when it approached the monthly average. The average monthly employment increased over the time period, with a peak of 255 in 1982; the 1977-1982 monthly average was 226. Employment patterns are greatly influenced by fishery regulations and the seasons they set; for this information see the shellfish Human Use sections in volume 2 of the AHMG for the Southcentral Region.

   a. PWS shellfish-harvesting employment. Shellfish-harvesting employment occurred in every month during the years 1977-1982 in PWS (table 25, fig. 8). The peak months of employment were April and March (121 and 116 average, respectively), but January, February, and December also had relatively high employment numbers. The monthly average for the period was 77, with a range of 49 in 1977 to 93 in 1979.

   b. Lower Cook Inlet shellfish-harvesting employment. As in PWS and the region as a whole, shellfish-harvesting employment occurred in every month in LCI from 1977-1982

Table 23. Ex-vessel Value of Commercial Shellfish Harvests for Southcentral Alaska by Fishery, Fishery Management Area, and Origin of Fishermen, 1975-82

Fishery	Fishery Mgt. Area	Census Area of Fishermen*	Ex-vessel Value in Thousands of Dollars								
			1975	1976	1977	1978	1979	1980	1981	1982	Avg.
King crab	Cook Inlet	a	1,183	3,518	2,169	1,821	1,281	1,947	2,284	2,933	2,142
	PWS	b	24	11	98	136	112	53	52	530	127
	Total		1,207	3,529	2,267	1,957	1,393	2,000	2,336	3,462	2,269
Tanner crab	Cook Inlet	a	693	1,246	2,147	2,568	2,881	2,705	2,177	4,547	2,371
	PWS	b	702	1,200	984	2,042	3,832	3,242	2,034	4,462	2,312
	Total		1,396	2,447	3,131	4,610	6,713	5,947	4,211	9,009	4,683
Dungenss crab	Cook Inlet	a	171	63	30	802	1,505	933	1,342	620	683
	PWS	c	466	102	221	1,335	424	304	977	554	548
	Total		637	165	251	2,138	1,929	1,236	2,319	1,174	1,231
Shrimp	Cook Inlet	a	496	852	1,023	1,210	983	5,790	9,645	1,474	2,684
	PWS	d	34	201	392	72	152	1,210	616	633	414
	Total		530	1,053	1,415	1,282	1,135	6,999	10,261	2,107	3,098
Razor clam	Cook Inlet	e	**	**	**	46	79	98	243	215	136
	PWS	b	**	**	**	30	13	4	23	15	17
	Total		**	**	**	76	92	102	266	230	153
Total Cook Inlet			2,543	5,679	5,369	6,447	6,729	11,473	15,691	9,789	8,016
Total PWS			1,226	1,514	1,695	3,615	4,533	4,813	3,702	6,194	3,418
Total			3,770	7,194	7,064	10,063	11,262	16,284	19,393	15,982	11,434

Source: CFEC 1984.

* Exact breakdown withheld because of nondisclosure regulations; average breakdown indicated as follows:
a Greater than 80%, Kenai Peninsula.
b Greater than 85%, Valdez-Cordova.
c Greater than 70%, Valdez-Cordova.
d 25% Valdez-Cordova, 40% Other Alaska.
e 45% Kenai Peninsula, 43% Other USA.

** Low, nondisclosable harvests.

Table 24. Southcentral Region Shellfish-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	195	203	244	235	202	95	17	23	196	224	210	161	379
1978	243	385	316	307	206	163	62	69	303	308	225	257	412
1979	220	341	154	219	250	207	74	101	308	236	240	174	331
1980	196	266	236	201	221	91	96	123	285	213	157	201	263
1981	244	249	294	249	216	296	166	211	360	302	207	143	234
1982	255	192	201	217	215	245	212	291	359	311	230	239	347
Average	226	273	241	238	218	183	105	136	302	266	212	179	328

Source: ADL 1984.

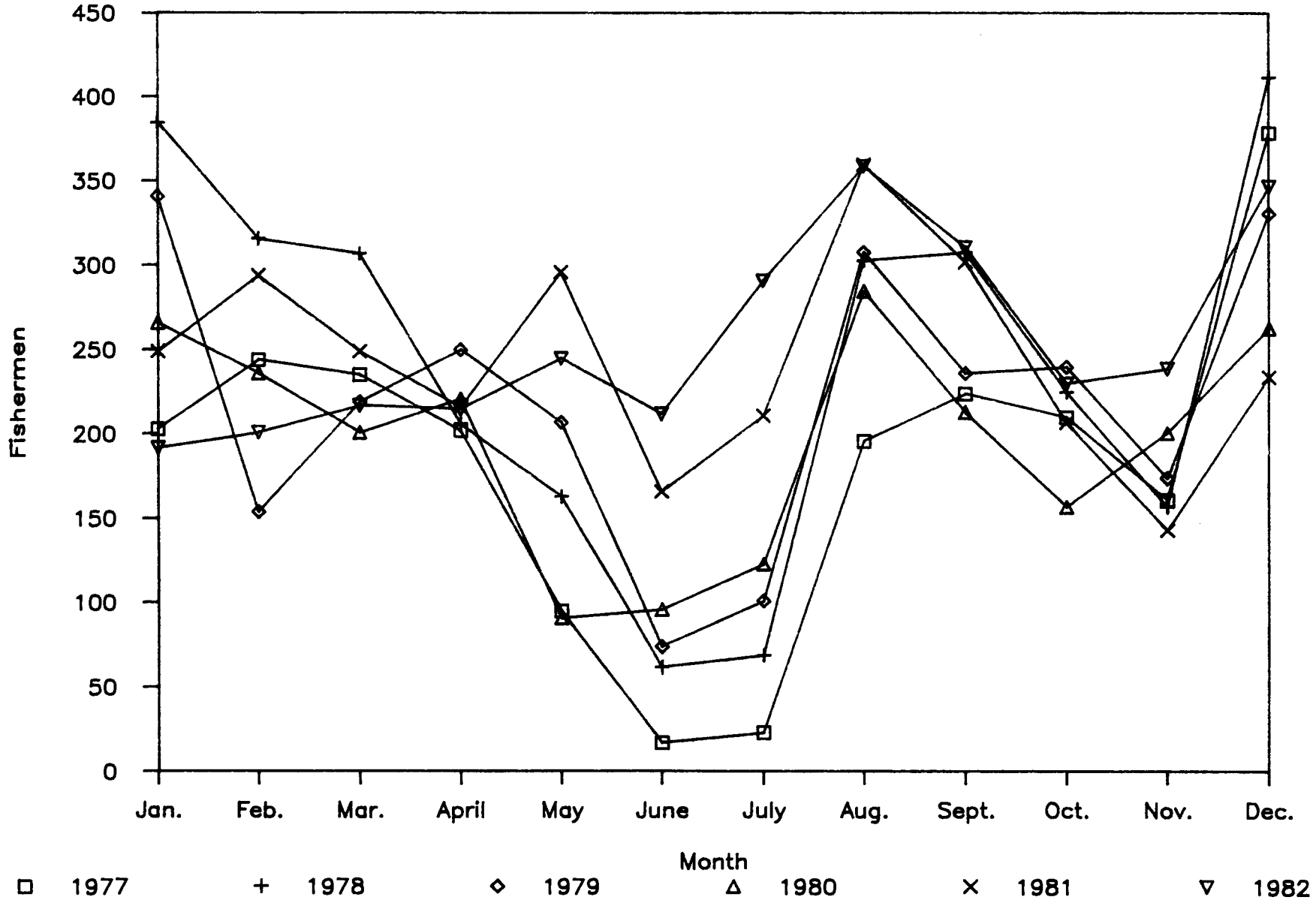


Figure 7. Southcentral Region shellfish-harvesting employment (number of fishermen and crew).

Table 25. PWS Shellfish-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	49	56	78	81	72	28	4	3	12	50	39	62	109
1978	87	120	115	128	100	92	28	30	30	65	69	104	142
1979	93	148	122	153	168	127	49	38	28	65	40	63	96
1980	77	94	156	126	143	21	29	28	44	23	26	57	73
1981	71	77	90	105	124	122	46	49	9	59	44	38	61
1982	84	47	80	102	117	102	46	60	68	58	83	120	125
Average	77	90	107	116	121	82	34	35	39	53	50	74	101

Source: ADL 1984.

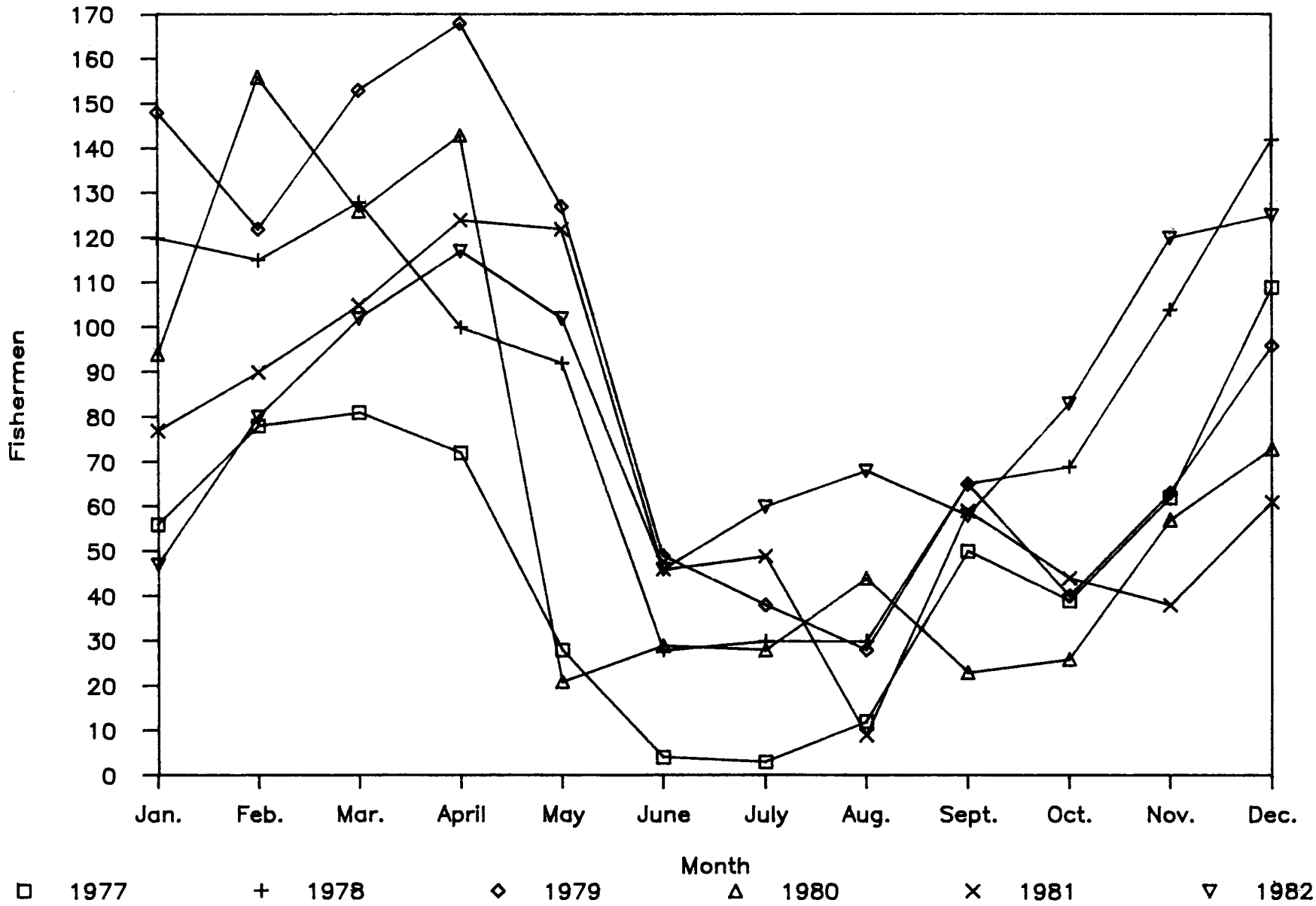


Figure 8. Prince William Sound shellfish-harvesting employment (number of fishermen and crew).

(table 26, fig. 9). But unlike in PWS, the peak month in LCI was August, when an average of 263 fishermen and crew were employed. Employment numbers were highest in fall and winter but were also fairly consistent during spring and summer. The average monthly employment for the period was 149. Cook Inlet accounted for approximately 66% of the Southcentral Region's shellfish harvesting employment.

B. Dungeness Crab

1. Regional summary. The harvest of Dungeness crab was first documented in the Southcentral Region in the early 1900's. Similarly to the Dungeness crab fisheries in the Southwest Region, the Southcentral fishery has been strongly influenced by West Coast market conditions. In past years, good fishing seasons in Washington, Oregon, and California have made it economically impractical for Alaska fishermen to compete in Dungeness crab major markets. Therefore, historical catch data are not always a reliable indicator of stock abundance or the economic potential of the fishery.

2. Regional ex-vessel value. The average annual ex-vessel value for the region was $1.2 million during the years 1975-1982. The range of values was from $165,000 in 1976 to $2.3 million in 1981 (table 23). Over 75% of these values were earned by fishermen from the Kenai Peninsula and Valdez-Cordova census areas.

3. Prince William Sound (PWS) Management Area. Until the expansion of the Tanner crab fishery in the mid 1970's, the Dungeness crab fishery was the major crab fishery in PWS (ADF&G 1978b). Harvests of Dungeness crabs have been documented since 1950. Market conditions have determined harvest levels throughout the history of the fishery. Harvest levels decreased within 5 yr after the 1964 earthquake because of the loss of habitat or a prolonged downward trend in the life cycle of the Dungeness crab (ADF&G 1979b). The PWS harvests increased again in the late 1970's.

   From 1975 through 1982, Dungeness harvests have averaged $548,000 annually (table 23). Values have ranged from $102,000 in 1976 to $1.3 million in 1978. Harvest quantities (pounds) and values generally increased over the 1975-1982 period. Especially high harvest levels in 1978 and 1981 account for the relatively high ex-vessel values for those years. Over 70% of these ex-vessel values have been earned by fishermen from the Valdez-Cordova Census Area.

4. Lower Cook Inlet (LCI) Management Area. Dungeness crabs in the Cook Inlet Management Area have been harvested

Table 26. Cook Inlet Shellfish-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	135	147	166	154	130	67	13	20	184	174	171	99	270
1978	157	265	201	179	106	71	43	39	273	243	156	53	270
1979	128	193	32	66	82	80	25	63	280	171	200	111	235
1980	128	172	80	75	78	70	67	95	241	190	131	144	190
1981	173	172	204	144	92	174	120	162	311	243	163	105	173
1982	171	145	121	115	98	143	166	231	291	253	147	119	222
Average	149	182	134	122	98	101	71	102	263	212	161	105	227

Source: ADL 1984.

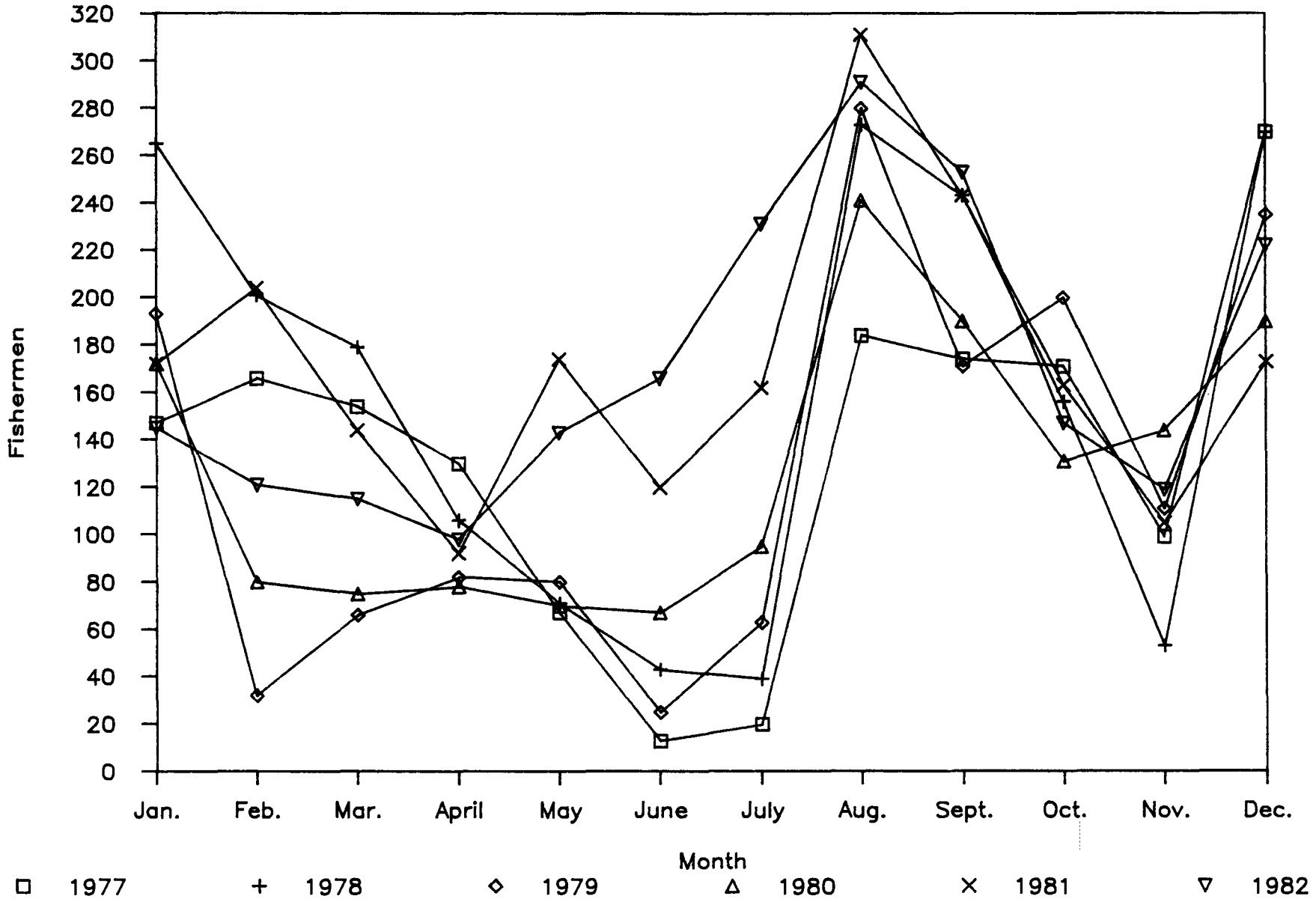


Figure 9. Cook Inlet shellfish-harvesting employment (number of fishermen and crew).

Table 27. Shellfish Estimated Ex-vessel Prices ($/lb), 1977-82

Mgt. Area/Species	1977	1978	1979	1980	1981	1982
PWS						
Pot gear to 50 ft	.30	.65	.65	.44	.65	.74
Dungeness crab	1.11	1.43	1.27	1.00	1.56	3.74
King crab	.34	.41	.58	.55	.76	1.45
Tanner crab	.75	1.00	1.00	.70	.81	.97
Razor clams						
Shrimp						
Single otter trawl	.15	.16	.23	.36	.29	.29
Pot gear to 50 ft	3.00	1.93	1.93	3.12	4.25	3.00
Beam trawl	0.35	0.16	0.23	0.36	0.29	0.29
Cook Inlet						
Pot gear to 50 ft						
Dungeness crab	.40	.66	.74	.50	.72	.75
King crab	1.07	1.43	.96	1.00	1.31	3.47
Tanner crab	.38	.46	.56	.56	.74	1.64
Razor clams	---	1.00	.55	.70	.50	.46
Shrimp						
Otter trawl	.14	.16	.23	.29	.27	.33
Pot	.79	.16	.23	.90	1.83	.99
Beam trawl	.14	.16	.23	.29	.27	.33

Source: CFEC 1982.

--- means no data were available.

intermittently since the the early 1900's. As with the PWS Dungeness crab fishery, harvests have been more related to market conditions than to stock size. However, LCI crabs are relatively larger than other West Coast stocks. Therefore, LCI crabs sell well in the whole crab market, primarily in the Pacific Northwest (Davis 1981). Though Dungeness crab harvests were first reported in the 1920's, the fishery did not become a stable annual fishery until 1961. In recent years, poor king and Tanner crab fisheries have contributed to the increase in Dungeness harvests (ADF&G 1983d).

From 1975 through 1982, Dungeness crab ex-vessel values in LCI have averaged $683,000 annually (table 23). These values range from $30,000 in 1977 to $1.5 million in 1979. Harvest (pounds) and effort have generally increased in the fishery during the period; harvest quantity and value peaked in 1979, and effort peaked in 1982. Over 80% of LCI ex-vessel values were earned by fishermen from the Kenai Peninsula Census Area.

C. King Crab

1. Regional summary. The king crab harvest in the Southcentral Region has been very small relative to historical catches from other areas of the state. King crabs were first taken in the Cook Inlet area in the 1930's. Fisheries in both the Cook Inlet and PWS areas did not achieve steady production until the 1950's. A record harvest for the region of 8.6 million pounds occurred during the 1962-1963 season. Since then, harvests have declined to an annual average of about 2.5 million pounds. The Cook Inlet fishery has dominated the Southcentral Region harvest, contributing about 98% of the harvest (pounds) since 1973. Cook Inlet has been closed to commercial and subsistence harvest of king crab since the 1983 season (Merritt, pers. comm.).

2. Regional ex-vessel value. For the years 1975-1982, the average annual king crab ex-vessel value was $2.3 million (table 23). Values ranged from $1.2 million in 1975 to $3.5 million in 1976 and 1982. Approximately 94% of the harvest value was from Cook Inlet. Fishermen from the Kenai Peninsula and Cordova-Valdez census areas earned approximately 85% of the region's king crab ex-vessel values from 1975 through 1982.

3. Prince William Sound Management Area. The commercial king crab fishery in PWS was initiated in 1959 with the processing of approximately 31,000 lb of crab by a family operation. In 1960, increased exploration and participation resulted in a harvest of about 247,000 lb. The fishery remained small during the early years, with only five or fewer vessels

fishing to satisfy the local fresh product market. In 1968, however, with the dramatic increase in king crab prices, harvest and participation increased (Pirtle 1970). Still, the PWS fishery has remained small in comparison with other king crab fisheries in the state (Kimker 1982). Catches since 1975 have fluctuated and tend to reflect ex-vessel prices per pound rather than changes in stock abundance; this was especially true in 1982, when the harvest increased because of a jump in prices.

King crab ex-vessel values average $127,000 for the years 1975-1982, with a range from $11,000 in 1976 to $530,000 in 1982. Over 85% of these ex-vessel values were earned by fishermen from the Valdez-Cordova Census Area (table 23).

4. Cook Inlet Management Area. The earliest recorded effort directed toward king crab in Cook Inlet occurred in 1937; commercial fishing remained at a low level through the mid 1940's. During the 1950's and 1960's, harvest quantities and areas expanded. From 1971 to 1977, harvests averaged 4.3 million pounds annually but declined to 1.5 million pounds in 1977 because of reduced king crab abundance. King crab commercial and subsistence harvests have been closed in Cook Inlet since 1983 (Merritt, pers. comm.).

   For the period 1975-1982, king crab ex-vessel values averaged $2.1 million annually (table 23). These values ranged from $1.2 million in 1975 to $3.5 million in 1976. The 1976 peak value was a result of an increase in ex-vessel prices. Over 85% of the king crab ex-vessel values was earned by Valdez-Cordova Census Area fishermen.

D. Tanner Crab

1. Regional summary. A consistent Tanner crab (Chionoecetes bairdi) fishery was established in the Southcentral Region in 1968. Initial harvest quantities fluctuated and were incidental to the king crab fishery. The peak harvest (21.5 million pounds) was taken during the 1972-1973 season and was primarily a result of the record harvest in PWS (Kimker 1983). Though PWS has historically supported a larger harvest than Cook Inlet, both areas have experienced a decrease in population and harvest levels since the 1978-1979 season; the 1983 harvest was the lowest regional Tanner crab harvest since the early 1970's.

2. Regional ex-vessel values. The annual average ex-vessel value for the years 1975-1982 was $4.7 million (table 23). Ex-vessel values ranged from $1.4 million in 1975 to $9.0 million in 1982. Southcentral Tanner crab ex-vessel values were primarily (about 85%) earned by fishermen from the Kenai

Peninsula and the Valdez-Cordova census areas. This was the result of the establishment of "superexclusive registration" areas in PWS and LCI. A vessel or gear registered for a superexclusive Tanner crab area may not be used to take Tanner crab in any other registration area during that registration year. A vessel or gear registered for a nonexclusive registration area may not fish in a superexclusive registration area during the registration year (ADF&G 1984). Exclusive registration areas were established primarily for economic reasons. The Southcentral Region shellfish fleet was mainly composed of small vessels that could not compete successfully with a large, mobile fleet (NPFMC 1981).

3. Prince William Sound Management Area. The commercial fishery for Tanner crab in PWS began in 1968 with a harvest of 1.2 million pounds. The fishery peaked in 1973 with a harvest of 13.9 million pounds. Catches have fluctuated since then and declined steadily since 1978. Harvest declines have been attributed to the past harvest of small crabs (smaller than the current minimum size limit) (Kimker 1978).

   The average annual PWS Tanner crab ex-vessel value for the years 1975-1982 was $2.3 million, with a range of $702,000 in 1975 to $4.5 million in 1982 (table 23). Harvest values generally increased over the period. Fishermen from the Valdez-Cordova Census Area earned over 85% of the ex-vessel values.

4. Cook Inlet Management Area. Initial harvests of Tanner crab in LCI were incidental to those of king crab during the king crab season. The first reported harvest of Tanner crab in LCI was in 1962 (ADF&G 1978a). Tanner crab harvest did not occur again until 1968. The fishery gradually developed in response to an increase in price and demand for Tanner crab during the early 1970's (Kyle 1984). Harvests peaked in 1973 but have steadily declined since because of decreased stock abundance.

   Ex-vessel values in LCI averaged $2.4 million for the period 1975-1982 (table 23). Values ranged from $693,000 in 1975 to $4.5 million in 1982. Similarly to PWS, despite decreasing harvests, ex-vessel values generally increased because of strong markets and demand for Tanner crab. Fishermen from the Kenai Peninsula Census Area earned over 80% of LCI ex-vessel values.

E. Razor Clams

1. Regional summary. A commercial razor clam fishery in Alaska began in 1916 on razor clam beds near Cordova. These clam

beds were soon overharvested, and the harvest declined by 1920. The discovery of additional beds in Cook Inlet, the Alaska Peninsula, and Kodiak areas caused the Alaska clam pack to increase again in the 1920's (Orth et al. 1975).

Production increased, and by 1932 Alaska produced more than half of the entire Pacific Coast pack of clams (ibid.). The high cost of harvest and production of clams in Alaska, combined with competition from dredge-harvested east coast clams, caused a significant decline in the clam harvest in the 1950's (ibid.). In 1954, the U.S. Food and Drug Administration (FDA) withdrew its endorsement as a result of paralytic shellfish poisoning (PSP) problems with hardshell clam stocks (Schink et al. 1983). This, combined with poor market conditions and the destruction of commercially important beaches by the 1964 earthquake, completed the decline of razor clam harvest in Alaska.

In 1975, Alaska was recertified by the FDA; three beaches in Alaska are certified free of PSP and approved for harvest. Two of these are in the Southcentral Region: one in Cook Inlet and one in PWS. Clams are also harvested on unapproved beaches for crab bait (Orth et al. 1975). Clams are also harvested by sport fishermen, especially on the east beaches of Cook Inlet. Since 1959, all east beaches south of Kenai have been closed to commercial harvest (ADF&G 1979a) because of increased effort in the personal-use fishery. The most intensively used beach in this area is at Clam Gulch. Almost all razor clam harvest is by hand digging with shovels.

2. Regional ex-vessel values. From 1975 through 1977, razor clam ex-vessel values were intermittent, relatively low, and nondisclosable. Therefore, table 23 shows harvest values for 1978-1982. The average annual ex-vessel value for 1978 to 1982 was $153,000. Harvest values ranged from $76,000 in 1978 to $266,000 in 1981. Harvest values generally increased over the five-year period. Approximately, 65% of the harvest values were earned by Southcentral Region fishermen.

3. Prince William Sound Management Area. During the early 1960's, major processing in the Cordova area ceased and subsequent years' harvests have been used for bait (ADF&G 1978b). Razor clam beds in Orca Inlet, which have easy access from Cordova, received heavy use, especially in 1978, when the demand for razor clams for bait resulted in high clam prices (ADF&G 1979b). Because of a decline in abundance, the Orcas Inlet area has been closed to commercial harvest since 1981 (ADF&G 1982b). Since then, all commercial harvest has come from the Copper River-Controller Bay area (ADF&G 1982b, 1983a).

The average annual PWS razor clam ex-vessel value for the years 1978 through 1982 was $17,000 (table 23). Values ranged from $4,000 in 1980 to $30,000 in 1978. As mentioned above, the 1978 peak was a consequence of high clam prices resulting from the demand for clam bait for the Dungeness crab fishery. Fishermen from the Valdez-Cordova Census Area earned over 85% of the ex-vessel values.

3. Cook Inlet Management Area. Most of the commercial razor clam harvest in Alaska now takes place on Cook Inlet west-side beaches. Razor clam harvest has recently increased, with the additional approval of beaches by the FDA (ADF&G 1982a).

   The average annual Cook Inlet razor clam ex-vessel value for the years 1978 through 1982 was $136,000 (table 23). Harvest values ranged from $46,000 in 1978 to $243,000 in 1981. Harvest values generally increased over the period. Fishermen from the Kenai Peninsula Census Area earned 45% of the harvest values, and out-of-state fishermen earned 43% (the origins of the remaining 12% were unknown.).

F. Shrimp

1. Regional summary. Pandalid shrimp management in the Southcentral Region is defined by the PWS and LCI management areas; no commercial harvest occurs in UCI. Commercial shrimp harvest occurs by trawling and pot fishing. Shrimp harvests in the Southcentral Region have changed considerably with the development of the fishery since 1974. LCI harvests have dominated the region's fishery, with a total of 51.2 million pounds harvested between 1974 and 1983, while PWS harvests were 3.5 million pounds for the same period (ADF&G 1983e, Kimker 1984).

2. Regional ex-vessel values. The regionwide annual average ex-vessel value for the years 1975-1982 was $3.1 million (table 23). Harvest values ranged from $530,000 in 1975 to $10.3 million in 1981. Harvest quantities (pounds) and values generally increased over the time period. The peak 1981 value was partially due to relatively high ex-vessel prices, whereas the drop in 1982 was due to a price decline. Harvest quantities did not vary considerably between these years. Approximately, 65% of the period's harvest values were earned by fishermen from the Southcentral Region.

3. PWS Management Area. The shrimp fishery in PWS is a relatively new fishery that has increased in importance since the late 1970's as a result of higher market demands. Until 1981, the fishery occurred continuously throughout the year.

Effort during the 1970's was quite variable because of low market demand.

The shrimp pot fishery concentrates on the spot shrimp and coonstripe shrimp (Middleton 1981). The spot shrimp is the largest of the two species and is targeted because of its higher market value. In 1982, the spot shrimp accounted for 96% of the total pot shrimp harvest. The remainder of the harvest was coonstripe shrimp, with incidental harvest of pink shrimp. The shrimp trawl fishery primarily exploits pink shrimp. In 1983, 99% of the trawl shrimp harvest was pink shrimp (Kimker 1984).

Harvest and effort have increased dramatically in the shrimp pot fishery since 1977. Nine vessels operated in 1977; by 1983, 71 vessels fished with pots. Trawl vessel effort has remained fairly low, with 4 to 13 vessels operating between 1978 and 1983. Most of the commercial harvest was delivered to Seward, Whittier, or Valdez; small amounts were taken to Cordova or outside Alaska (Kimker 1984).

The average annual PWS shrimp ex-vessel value for the years 1975-1982 was $414,000, with a range of $34,000 in 1975 to $1.2 million in 1980 (table 23). Harvest quantities generally increased from 1975 to 1980. Harvest values fluctuated, however, because of changes in market conditions and ex-vessel prices. Harvest in 1981 declined to one-third the 1980 level but rebounded in 1982. The reduction in 1982 prices resulted in 1982 harvests being of similar value to the smaller 1981 harvest. Fishermen from the Valdez-Cordova Census Area earned 25% of ex-vessel values, and other Alaska fishermen earned 40%.

4. LCI Management Area. Commercial shrimp harvests for the years 1975-1982 averaged $2.7 million in ex-vessel value. Harvest values ranged from $496,000 in 1975 to $9.6 million in 1981. Shrimp harvest in Cook Inlet accounted for 87% of the region's commercial shrimp harvest for the period. Fishermen from the Kenai Peninsula Census Area earned over 80% of the ex-vessel values.

IV. HERRING FISHERY

A. Regional Overview

Herring fisheries began in the Southcentral Region in the early 1900's. Originally, herring were salt-cured for food and used for halibut bait, but in the 1930's the emphasis changed and most herring were rendered into oil or fertilizer at reduction plants. The plants closed in the 1960's, and food/bait fisheries again

dominated the herring fishery until Japanese interest in herring roe sparked development of the sac roe fisheries in the early 1970's. Now food/bait, sac roe, and spawn-on-seaweed (or roe-on-kelp) herring fisheries exist in the region. Purse seines, gill nets, and trawls are permitted in the fisheries, as well as hand harvesting of roe-on-kelp. For further information on Pacific herring products and markets, see the Southwest Region herring section in this volume.

Southcentral Region herring fisheries are managed by the ADF&G in the Prince William Sound (PWS), Lower Cook Inlet (LCI), and Upper Cook Inlet (UCI) management areas. For disclosure reasons, the UCI and LCI are combined as the Cook Inlet area in this overview. For further information on herring regulation and management see the Human Use section of the Alaska Habitat Management Guide, Southcentral Region, volume 2, Commercial Harvest of Pacific Herring.

The Southcentral sac roe fishery takes place in the spring when herring mill in bays and estuaries just prior to spawning. The spawn-on-seaweed fishery follows later in the spring. Herring for food/bait are caught in nonspawning condition during the fall and winter months.

1. Regional ex-vessel values. Combined commercial herring harvests averaged $3.6 million annually for the years 1975-1982 (table 28). These values ranged from $1.4 million in 1975 to $8.0 million in 1979. The 1979 peak values can be attributed in part to exceptionally high sac roe ex-vessel prices for that year (table 29). The Prince William Sound Management Area accounted for 94% of the food/bait, 84% of the sac roe, and all of the region's roe-on-kelp harvest values. The majority of the ex-vessel harvest values were earned by Alaska fishermen from the Southcentral Region.

2. Regional herring-harvesting employment. The majority of Southcentral herring-harvesting employment occurred in April and May; April was the peak month of employment (table 30, fig. 10). The average April employment for the years 1977-1982 was 556 fishermen and crew; the average May employment was 237. April and May employment was in the sac roe and roe-on-kelp fisheries (ADL 1984). Most (97%) of the April harvesting employment occurred in PWS, and most (76%) of the May employment occurred in Cook Inlet (tables 31 and 32). The food/bait fisheries account for a lower level of employment in the fall and winter months. The monthly average herring-harvesting employment for 1977-1982 was 72 fishermen and crew (table 30).

Table 28. Ex-vessel Value of Commercial Herring Harvests for Southcentral Alaska by Fishery, Fishery Management Area, and Origin of Fishermen, 1975-82

Fishery	Fishery Mgt. Area	Census Area of Fishermen*	Estimated Ex-vessel Value in Thousands of Dollars								
			1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Food/bait	Cook Inlet	a	---	---	---	24	30	14	9	31	22
	PWS	b	---	---	---	397	252	481	316	224	334
	Total		---	---	---	420	282	495	325	255	355
Sac roe	Cook Inlet	Kenai Peninsula	282	661	985	185	576	37	59	52	354
		Other Alaska*	34	197	250	29	97	1	22	4	80
		Alaska	316	858	1,235	214	673	43	82	57	435
		Other USA	**	**	242	9	24	0	12	0	49
		Unknown	**	**	0	4	10	0	0	0	2
		Subtotal	332	949	1,478	227	707	43	94	57	486
	PWS	Kenai Peninsula	233	171	317	283	2,399	872	1,741	857	859
		Valdez-Cordova	112	185	279	419	2,474	829	2,139	1,054	937
		Other Alaska*	115	63	75	202	1,115	240	1,115	485	426
		Alaska	459	417	699	903	5,988	1,942	4,995	2,396	2,225
		Other USA	24	33	68	98	562	136	715	555	274
		Unknown	5	0	0	0	71	4	31	0	14
		Subtotal	487	450	736	1,002	6,621	2,081	5,741	2,951	2,509
	Total		919	1,399	2,214	1,229	7,328	2,125	5,835	3,007	2,995

(continued)

Table 28 (continued).

Fishery	Fishery Mgt. Area	Census Area of Fishermen*	Estimated Ex-vessel Value in Thousands of Dollars								
			1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Roe-on-kelp	PWS	Anchorage	33	38	49	14	85	111	20	58	51
		Kenai Peninsula	130	50	31	16	17	80	6	38	46
		Valdez-Cordova	349	168	64	48	82	176	70	181	142
		Other Alaska*	6	2	21	0	9	29	15	44	16
		Alaska	519	259	165	78	193	397	110	322	255
		Other USA	71	58	108	81	180	218	49	168	117
		Unknown	11	3	15	10	5	9	0	0	7
	Total		600	320	288	170	379	625	160	489	379
	Total		1,419	1,719	2,502	1,819	7,989	3,245	6,320	3,751	3,595

Source: CFEC 1984.

--- means no data were available.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Average breakdown indicated as follows:
a 92% Kenai Peninsula, 7% Other Alaska.
b 80% Valdez-Cordova, 5% Kenai Peninsula, 9% Kodiak Island.

Table 29. Southcentral Herring Estimated Ex-vessel Prices ($.lb), 1975-82

Area and Gear Type	1975	1976	1977	1978	1979	1980	1981	1982
Prince William Sound								
Food/bait								
Purse seine	---	0.05	---	0.19	0.15	0.15	0.13	0.14
Drift gill net	---	0.05	---	---	---	---	---	---
Sac Roe								
Purse seine	0.04	0.09	0.16	0.36	0.80	0.17	0.21	0.19
Drift gill net	---	0.09	0.14	0.36	---	0.17	0.21	0.35
Set gill net	---	---	---	0.36	---	0.17	0.21	0.35
Cook Inlet								
Food/bait								
Purse seine	0.04	0.10	0.23	0.22	0.21	---	---	---
Drift gill net	---	---	0.22	0.22	0.21	---	0.13	0.22
Set gill net	0.04	0.06	0.17	0.22	0.21	0.20	0.13	0.22
Sac roe								
Purse seine	0.06	0.10	---	0.25	0.73	---	---	---
Drift gill net	---	0.10	---	0.25	0.73	0.20	0.25	0.21
Set gill net	---	0.10	---	0.25	0.73	0.20	0.25	0.21

Source: CFEC 1982.

--- means no data were available.

Table 30. Southcentral Region Herring-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	62	0	0	0	398	340	4	0	0	0	0	4	0
1978	71	10	15	10	412	224	82	0	0	0	33	33	29
1979	82	24	10	0	528	403	10	0	0	0	6	8	0
1980	82	0	24	0	766	86	2	0	4	14	46	38	0
1981	75	0	0	0	802	86	0	2	0	10	0	0	0
1982	62	0	0	0	428	282	2	0	0	24	4	0	0
Average	72	6	8	1	556	237	17	0	1	8	15	14	5

Source: ADL 1984.

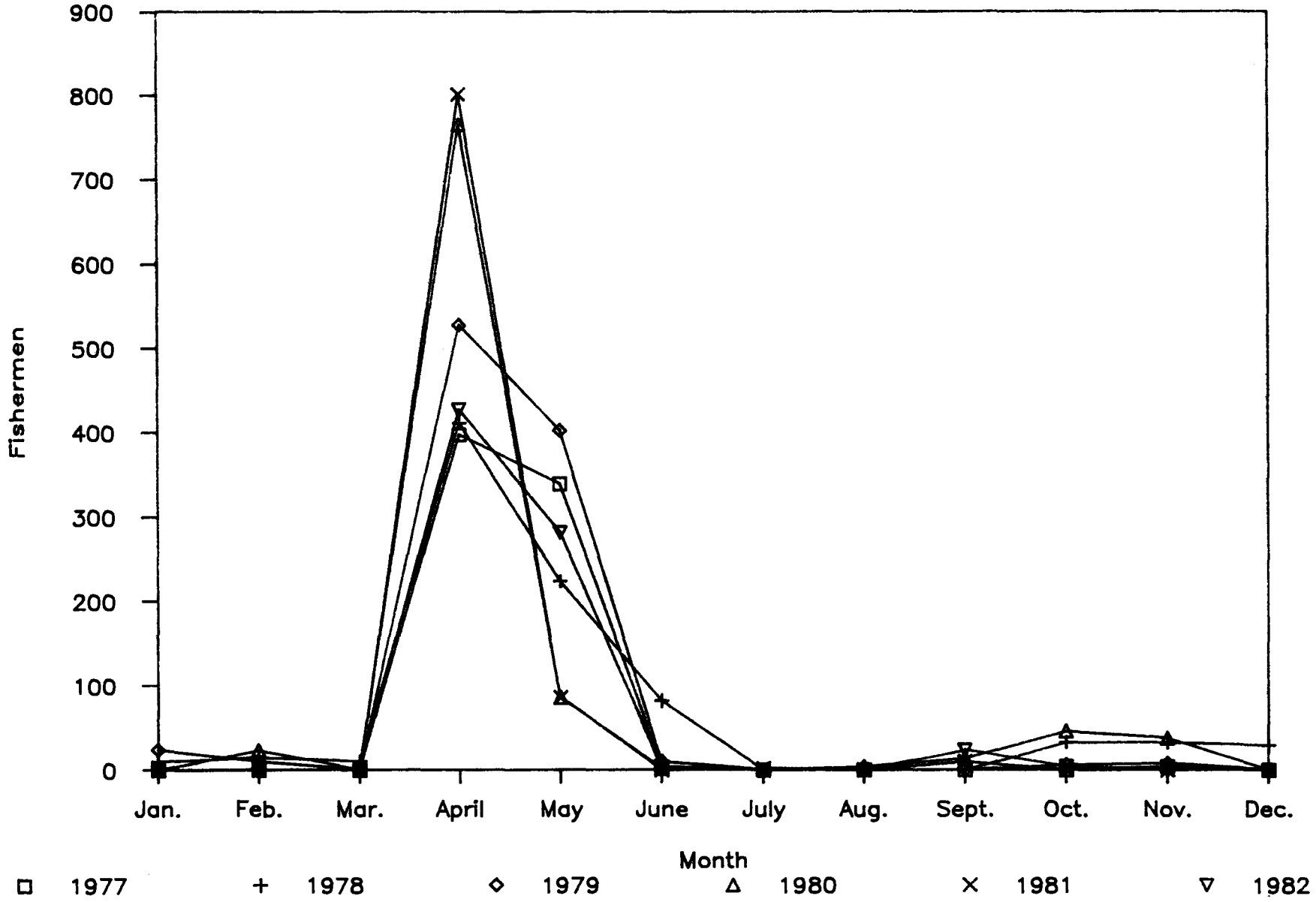


Figure 10. Southcentral Region herring-harvesting employment (number of fishermen and crew).

B. Management Area Summaries

1. Prince William Sound Management Area

a. Harvest summary. The commercial herring fishery in PWS began in 1913 and followed the pattern of the region as a whole, beginning as a food/bait fishery, then moving through the era of reduction plants, back to bait, and finally to a combination food/bait, sac roe, and roe-on-kelp (both natural and pound) fisheries.

The herring pound fishery in the PWS area is the newest of the recognized four fisheries that target on herring or herring spawn-on-kelp. The recent development of the pound culture of herring eggs on kelp has been an outgrowth of the wild spawn-on-kelp fishery that first occurred in 1969. The impetus behind the development of the pound type fishery has been the desire to eliminate some uncertainties surrounding the wild seaweed fishery. The pound technique, first practiced in British Columbia, involves confinement of mature herring in a small enclosure (pound) along with carefully selected seaweed hung from lines in the enclosure to force the herring to deposit eggs on the seaweed (ADF&G 1983a).

The PWS sac roe fishery is limited entry. Purse seines, gill nets, and trawls are used in the sac roe and food/bait fisheries. Only harvest by hand is allowed in roe-on-kelp fisheries.

b. PWS ex-vessel value. The combined average value of PWS herring fisheries for the years 1975-1982 was $3.2 million (table 28). Sac roe herring comprised 78% of the combined total harvest value, whereas food/bait accounted for 10% and roe-on-kelp for 12%. The average food/bait harvest value for the years 1978 to 1982 was $334,000. Fishermen from the Valdez-Cordova Census Area earned 80% of the food/bait ex-vessel values; Kenai Peninsula and Kodiak Island census areas' fishermen earned 5 and 9%, respectively. A relatively small food/bait harvest occurred in 1975-1977, but because of a change in the food/bait and sac roe herring fishery codes, harvest values were not accurately differentiated in those years. A new herring fishery code for sac roe was added in 1977 to separate food/bait and sac roe harvests. The data for the years 1978-1982 in PWS may include sac roe with the food/bait ex-vessel values.

The annual average sac roe herring ex-vessel values for the years 1975-1982 was $2.5 million, with a range of $450,000 in 1976 to $6.6 million in 1979. Fishermen from the Valdez-Cordova Census Area earned 37% of the

period's ex-vessel values; Kenai Peninsula fishermen earned 34%. Alaska fishermen as a whole earned 89% of the harvest values.

The annual average roe-on-kelp ex-vessel value for the years 1975-1982 was $379,000, with a range of $160,000 in 1981 to $625,000 in 1980 (table 28). Values in table 28 are combined wild roe-on-kelp and pound roe-on-kelp values. The pound fishery was initiated in 1980. For the years 1980-1982, the pound fishery accounted for 7% of the roe-on-kelp commercial harvest. In the wild roe-on-kelp fishery, harvest quantities and values tended to fluctuate with the number of kelpers permitted for the fishery. Harvest quantities ranged from approximately one-half to one-and-a-half metric tons per kelper (ADF&G 1983a). Fishermen from the Valdez-Cordova Census Area earned 37% of the ex-vessel values. Kenai Peninsula fishermen earned 12%, and Anchorage Borough fishermen earned 13%. All Alaska fishermen earned 67%, and out-of-state fishermen earned 31%. This is unlike the Bristol Bay roe-on-kelp fishery, where almost all ex-vessel values were earned by local Alaska fishermen.

c. PWS herring-harvesting employment. Herring-harvesting employment in PWS occurred primarily in April during the years 1977-1982 (table 31, fig. 11). The average April employment for the period was 537 fishermen and crew, with a range from 10 in 1978 to 764 in 1980. A smaller number of fishermen were also employed in the fall and winter in the food/bait fishery. The PWS monthly average for 1977-1982 was 56 fishermen and crew.

2. Cook Inlet management areas:

a. Harvest summary. UCI consists of all Gulf of Alaska waters north of Anchor Point (ADF&G 1984a). Commercial herring fishing began in UCI in 1973 as a set gill net fishery. The Central District of the UCI accounts for 99% of the herring catch. Only gill nets are used in UCI. The fishery is not limited entry but is open by regulation.

LCI is bounded by Cape Fairfield on the east, Cape Douglas on the south, and Anchor Point on the north. Herring were first fished commercially in LCI in 1914 using gill net gear. Purse seines were introduced in 1923. Most of the early harvests were pickled and salted for human consumption. A small percentage of the harvest was marketed as bait. The record harvest of 19.3 million pounds (29% of the statewide harvest) occurred in 1925 in the Kachemak Bay fishery. Thereafter, harvest levels decreased because of apparent

Table 31. PWS Herring-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	43	0	0	0	398	110	0	0	0	0	0	4	0
1978	52	10	15	10	10	4	82	0	0	0	33	33	29
1979	54	24	10	0	526	66	0	0	0	0	4	8	0
1980	75	0	24	0	764	12	0	0	0	14	46	38	0
1981	60	0	0	0	716	0	0	0	0	10	0	0	0
1982	49	0	0	0	410	148	0	0	0	24	4	0	0
Average	56	6	10	2	537	57	14	0	0	10	15	14	5

Source: ADL 1984.

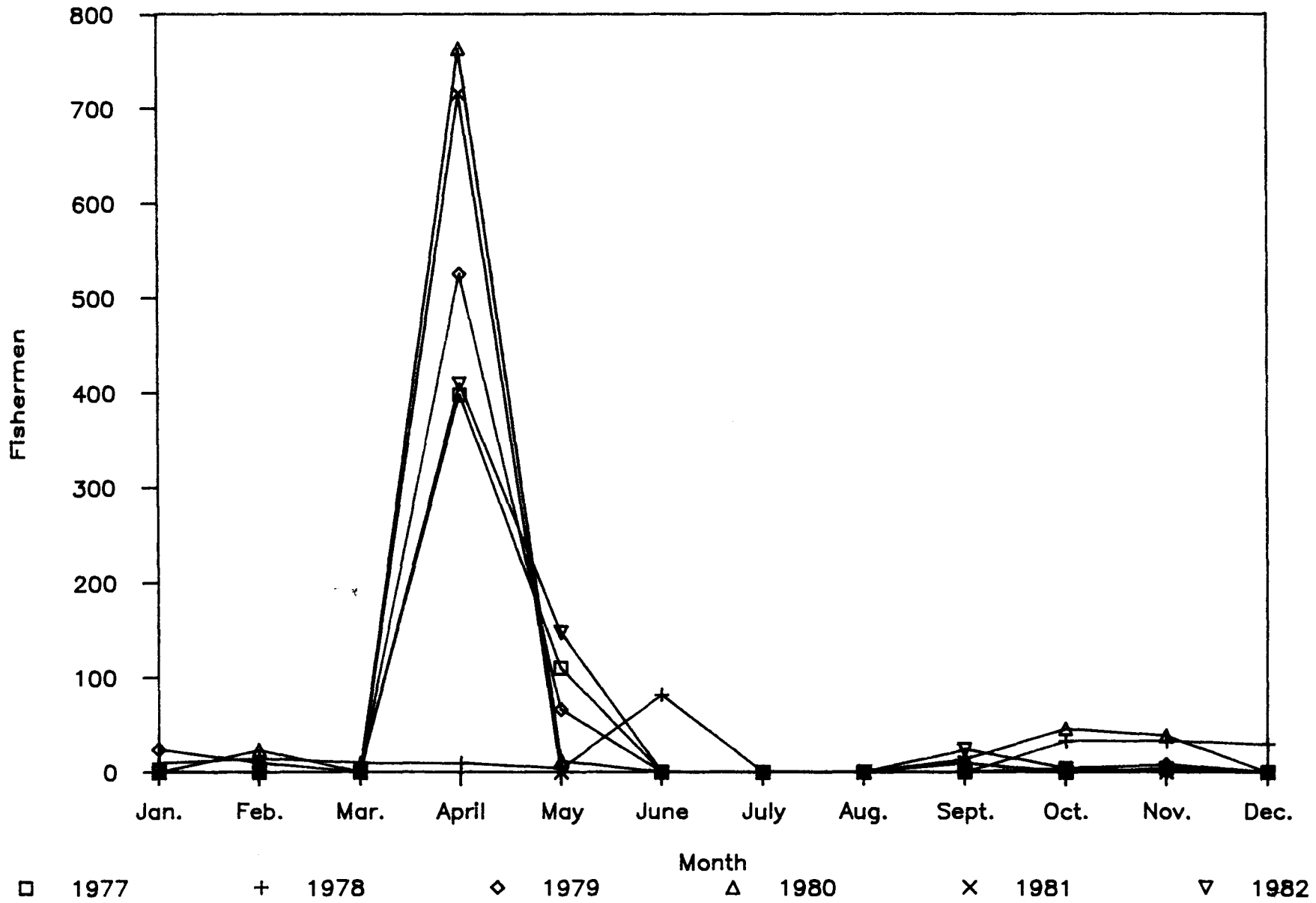


Figure 11. Prince William Sound herring-harvesting employment (number of fishermen and crew).

stock depletion (Rounsefell 1930). In the following years, fishing throughout LCI was sporadic, with the effort shifting between the districts. In 1969, the fishery expanded to accommodate the sac roe market (ADF&G 1974). Catches peaked in 1976, followed by a steady decline. The LCI herring fishery has been closed since 1980 because of low herring populations (Middleton and Rowell 1984). The LCI purse seine sac roe fishery is limited to entry. By 1982, 69 permits for herring, mostly held by local residents, had been issued (CFEC 1983).

b. Cook Inlet ex-vessel values. For the years 1975-1982, combined Cook Inlet herring harvest values accounted for 14% of the Southcentral Region's herring ex-vessel values (table 28). Sac roe herring harvests comprised 95% of Cook Inlet's herring ex-vessel values during those years. Because of herring coding discrepancies, as described for PWS above, harvest values for 1975-1977 in Cook Inlet have been attributed to sac roe. Some food/bait harvest probably did occur even if it was only incidental harvest of unripe herring. The average annual food/bait ex-vessel value for Cook Inlet from 1978 through 1982 was $22,000. Food/bait ex-vessel values ranged from $9,000 in 1981 to $31,000 in 1982. Fishermen from the Kenai Peninsula Census Area earned 92% of the food/bait ex-vessel values, and other Alaska fishermen earned 7%.

Cook Inlet sac roe herring harvests averaged $486,000 annually from 1975 through 1982. These values ranged from a low of $43,000 in 1980 to $1.5 million in 1977. The drop in values in 1980 was a consequence of the closure of the LCI fishery to protect stock abundance. Although harvest quantities were higher in 1976 than in 1977, ex-vessel prices were higher in 1977 (table 29). Fishermen from the Kenai Peninsula Census Area earned 73% of the period's harvest values. Fishermen from other areas in Alaska earned 16% of the harvest values. For the years 1975 - 1978, "other Alaska" was predominantly Anchorage Borough census area fishermen; for 1979-1982, "other Alaska" was predominantly Kodiak Island Census Area fishermen. Alaska fishermen as a whole earned 90% of Cook Inlet sac roe herring values, and out-of-state fishermen earned 10%. No commercial roe-on-kelp herring fishery occurred in Cook Inlet.

c. Cook Inlet herring-harvesting employment. Cook Inlet commercial herring-harvesting employment predominantly occurred in May for the years 1977-1982 (table 32, fig. 12). The average May employment for these years was 180 fishermen and crew. Unlike PWS, very little

Table 32. Cook Inlet Herring-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	19	0	0	0	0	230	4	0	0	0	0	0	0
1978	19	0	0	0	2	220	0	0	0	0	0	0	0
1979	29	0	0	0	2	337	10	0	0	0	2	0	0
1980	7	0	0	0	2	74	2	0	0	0	0	0	0
1981	15	0	0	0	86	86	0	2	0	0	0	0	0
1982	13	0	0	0	18	134	2	0	0	0	0	0	0
Average	17	0	0	0	18	180	3	0	0	0	0	0	0

Source: ADL 1984.

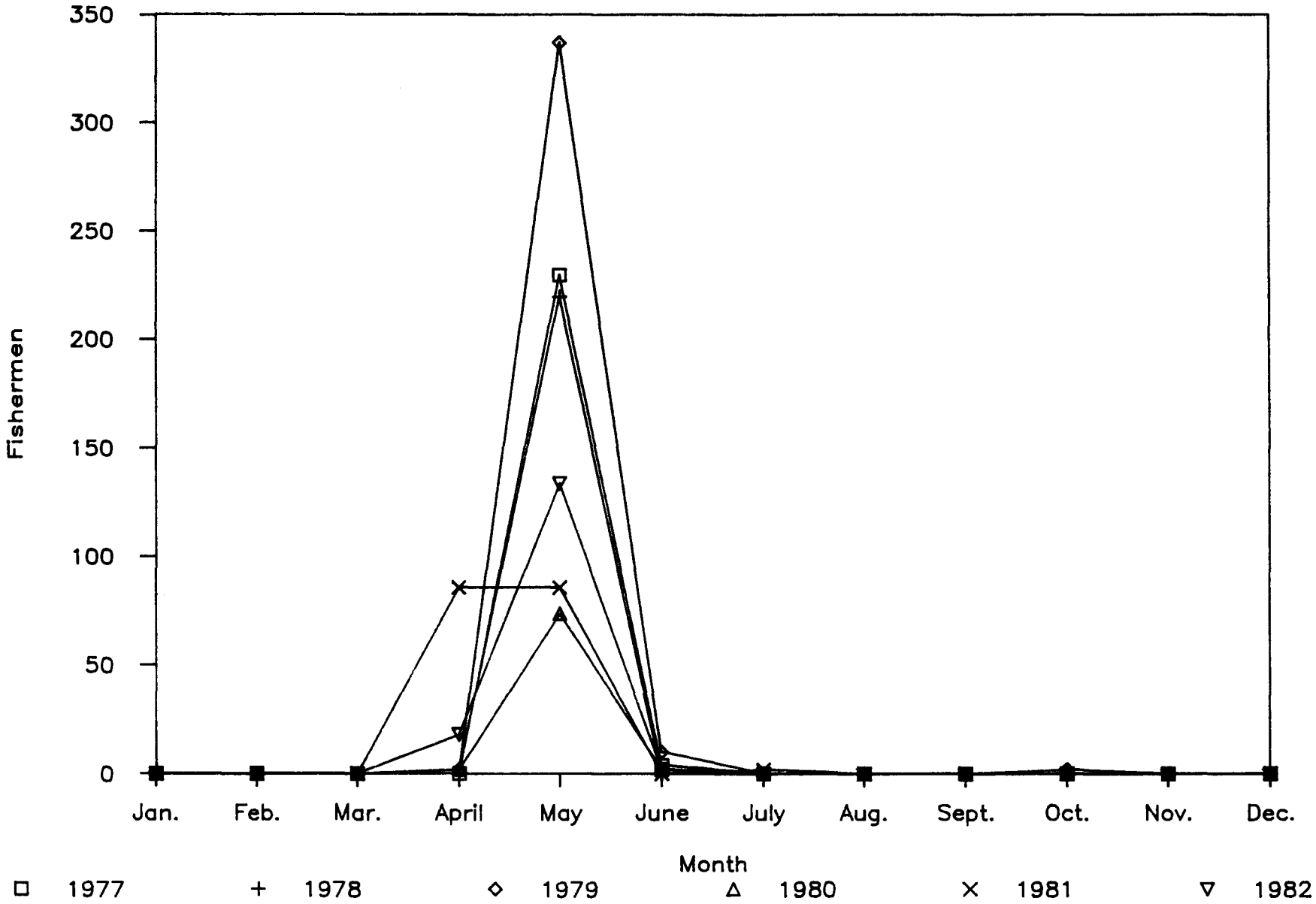


Figure 12. Cook Inlet herring-harvesting employment (number of fishermen and crew).

herring-harvesting employment occurred in months other than April and May. The monthly average for 1977-1982 was 17 fishermen and crew.

V. HALIBUT FISHERY

A. Regional Summary

1. Regional overview. The Southcentral Region halibut grounds covered in this guide are included in the International Pacific Halibut Commission (IPHC) Regulatory Area 3A. The Gulf of Alaska is divided into a series of statistical areas, each approximately 60 mi wide. The deep sea halibut fishery in the Gulf of Alaska began in 1923. However, harvests steadily declined until 1931 (Natural Resources Consultants 1982). For the first few decades, the halibut fleet was made up mostly of 50-to-80-ft halibut schooners, but as conservation measures improved halibut abundance, small vessels, particularly salmon trollers and gill-netters, joined the fleet (IPHC 1978).

   Commercial fishing for halibut is restricted to hook and line gear. Most fishing is by longline. The halibut season in the Gulf of Alaska takes place in the summer months. In the 1960's, the commercial season was about six months long but has become progressively shorter because of increased effort and efficiency in the fishery. The fishing season in 1984 in the area from Cape Spencer to Cape Trinity was open for only four days in May and one day in August.

   The IPHC was established in 1923 and has jurisdiction over the United States and Canadian halibut fisheries (both sport and commercial) in the North Pacific but no jurisdiction over foreign fisheries (IPHC 1978, Skud 1976). In 1982, the North Pacific Fisheries Management Council (NPFMC) was granted regulatory authority over halibut fishing in United States waters up to 200 nautical miles from shore, but its regulations may not conflict with those of the IPHC (Miller and Larson 1984). For more information on the Southcentral Region commercial halibut fisheries, see the Alaska Habitat Management Guides, Southcentral Region, volume 2, Human Use section. For a more extensive discussion on the Alaska halibut fisheries, see the Southwest Region halibut economic section in this volume.

2. Ex-vessel values. Table 33 presents the halibut ex-vessel values for the years 1977-1982. Values ranged from $4.1 million in 1980 to $10.8 million in 1979, with an average of $7.1 million. The high 1979 value can in part be attributed to high ex-vessel prices, whereas 1980 low values resulted

Table 33. Ex-vessel Value of Commercial Halibut Harvest for Southcentral Alaska Fishery Management Areas, by Origin of Fishermen, 1977-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars						
		1977	1978	1979	1980	1981	1982	6-yr. Avg.
Cook Inlet	Anchorage	116	167	438	109	249	274	226
	Kenai Peninsula	1,029	1,175	2,091	853	1,369	1,540	1,343
	Kodiak Island	138	42	71	49	352	303	179
	Wrangell-Petersburg	401	662	777	238	814	708	600
	Other Alaska*	153	248	108	48	166	427	192
	Alaska	1,837	2,294	3,484	1,298	2,950	3,253	2,519
	Other USA	1,175	2,623	3,026	658	1,232	1,959	1,780
	Unknown	988	1,057	371	97	61	76	442
	Subtotal	4,000	5,974	6,882	2,054	4,243	5,287	4,741
PWS	Anchorage	39	116	202	50	105	121	106
	Kenai Peninsula	196	243	548	286	334	329	323
	Valdez-Cordova	61	42	102	255	359	302	187
	Sitka	**	**	**	184	693	393	**
	Wrangell-Petersburg	191	243	923	593	570	420	490
	Other Alaska*	**	**	**	115	301	184	**
	Alaska	585	869	2,190	1,481	2,362	1,749	1,539
	Other USA	290	773	1,661	475	579	574	725
	Unknown	200	224	21	67	33	116	110
	Subtotal	1,075	1,866	3,871	2,024	2,975	2,438	2,375
Total		5,075	7,840	10,753	4,078	7,218	7,725	7,116

Source: CFEC 1984.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

from low prices (table 34). The Southcentral Region's harvest in pounds was actually greater in 1980 than in 1979 (IPHC 1982). Cook Inlet harvests accounted for approximately two-thirds of the region's ex-vessel values. Overall, Alaska fishermen earned 57% of the harvest values, and out-of-state fishermen earned 35% (the remaining 8% was earned by fishermen of unknown residency). Alaska fishermen in PWS earned a greater percentage (65%) of harvest values than fishermen with Alaska residency in Cook Inlet (53%).

3. Halibut-harvesting employment. Halibut-harvesting employment in the Southcentral Region in the years 1977-1982 occurred primarily in May, June, and July (table 35, fig. 13). Because of the short duration of fishing openings, which are set by regulation, the employment numbers and periods contain discontinuities. Despite these irregularities, employment primarily occurred in June, with an average June employment of 1,546 fishermen and crew. The June range was 783 in 1977 to 2,788 in 1981. May and July also had significant employment numbers. The monthly halibut employment for the period was 279, but out of regulatory context this is a fairly meaningless figure. Cook Inlet accounted for approximately 80% of the 1977-1982 Southcentral Region halibut-harvesting employment, but it contributed only 67% of the harvest value.

B. Fishery Area Summaries

1. Prince William Sound Area:

a. Harvest summary. In PWS, a major halibut fishing ground is located off Hinchenbrook Island and another south of Montague Island (OCS Socioeconomic Studies Program 1980). The largest halibut catches in the Southcentral Region are reported from IPHC Statistical Area 250, which includes Portlock Bank, and from other statistical areas that contain the 200-m shelf break (the "100 fathom edge").

b. Ex-vessel values. Table 33 summarizes the ex-vessel value of halibut harvested in the PWS area. Six-year average ex-vessel values (1977-1982) reached approximately $2.4 million dollars. Values ranged from $1.1 million in 1977 to $3.9 million in 1979. Harvest levels have generally increased in the PWS area over the 1977-1982 period; the peak in 1979 was a result of exceptionally high ex-vessel prices (table 34). Alaska fishermen earned 65% of the period's ex-vessel values. However, in contrast to the salmon fisheries, fishermen from the Valdez-Cordova Census Area earned only 8% of these values. Sitka and Wrangell-Petersburg census area fishermen earned approximately 33%, and Kenai Peninsula

Table 34. Annual Halibut Landings, Ex-vessel Price, and Value (U.S. Dollars), 1929-82

Year	Catch (Thousands of Pounds)	Price (Dollars/ Pound)	Value (Thousands of Dollars)	Year	Catch (Thousands of Pounds)	Price (Dollars/ Pound)	Value (Thousands of Dollars)
1929	56,928	.12	6,831				
1930	49,492	.10	4,949	1960	71,605	.16	11,457
1931	44,220	.07	3,095	1961	69,274	.21	14,548
1932	44,454	.04	1,778	1962	74,862	.30	22,459
1933	46,795	.06	2,808	1963	71,237	.21	14,960
1934	47,546	.06	2,853	1964	59,784	.23	13,750
1935	47,343	.07	3,314	1965	63,176	.32	20,216
1936	48,923	.08	3,914	1966	62,016	.34	21,085
1937	49,539	.08	3,963	1967	55,222	.23	12,701
1938	49,553	.07	3,469	1968	48,594	.23	11,177
1939	50,903	.07	3,563	1969	58,275	.38	22,144
1940	53,381	.09	4,804	1970	54,938	.37	20,327
1941	52,231	.10	5,223	1971	46,654	.32	14,929
1942	50,388	.15	7,558	1972	42,884	.64	27,446
1943	53,699	.19	10,203	1973	31,740	.74	23,488
1944	53,435	.15	8,015	1974	21,306	.70	14,914
1945	53,395	.15	8,009	1975	27,616	.89	24,578
1946	60,266	.17	10,245	1976	27,535	1.26	34,694
1947	55,700	.17	9,469	1977	21,868	1.31	28,647
1948	55,564	.17	9,446	1978	21,988	1.70	37,380
1949	55,025	.17	9,354	1979	22,532	2.13	48,080
1950	57,234	.23	13,164	1980	21,866	.99	21,647
1951	56,045	.17	9,528	1981	25,732	1.02	26,247
1952	62,262	.19	11,830	1982	29,019	1.09	31,573
1953	59,837	.15	8,976				
1954	70,583	.17	11,999				
1955	57,521	.14	8,053				
1956	66,588	.22	14,649				
1957	60,854	.17	10,345				
1958	64,508	.21	13,547				
1959	71,204	.19	13,529				

Source: IPHC 1983.

Table 35. Southcentral Region Halibut-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	167	0	0	0	0	0	783	529	64	0	0	0	0
1978	271	0	0	0	0	983	974	793	508	0	0	0	0
1979	345	0	0	0	0	643	1,889	1,611	0	0	0	0	0
1980	312	0	0	0	0	1,483	1,198	1,058	4	0	0	0	0
1981	233	0	0	0	0	0	2,788	0	0	0	0	4	0
1982	343	0	0	0	0	2,469	1,644	0	0	4	0	0	0
Average	279	0	0	0	0	1,035	1,546	665	96	1	0	1	0

Source: ADL 1984.

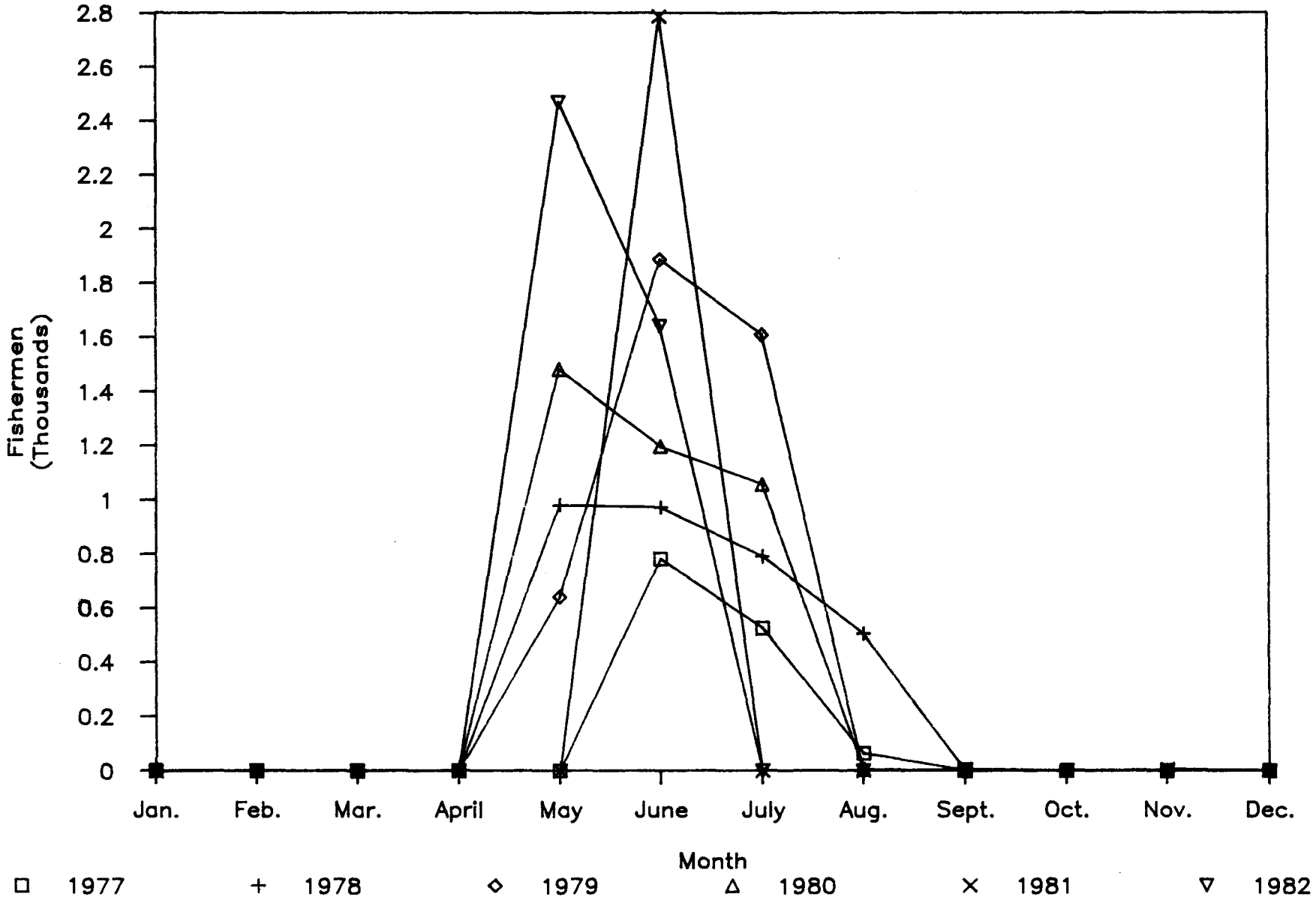


Figure 13. Southcentral Region halibut-harvesting employment (number of fishermen and crew).

Census Area fishermen earned approximately 14%. The major halibut port in the Southcentral Region during this period was Seward, which probably accounts for the greater proportion of Kenai Peninsula Census Area fishermen as opposed to Valdez-Cordova Census Area fishermen. Out-of-state fishermen earned 31% of the period's average ex-vessel values.

c. PWS halibut-harvesting employment. Similarly to the region as a whole, PWS halibut-harvesting employment primarily occurred in May, June, and July, with June being the peak month (table 36, fig.14). Average June employment for the years 1977-1982 was 314, with a range of 124 in 1977 to 576 in 1981. The average monthly employment for the period was 56, which again must be viewed in the regulatory context.

2. Cook Inlet Area:

a. Harvest summary. Pacific halibut are fished commercially in all areas of Cook Inlet south of Kalgin Island. No large halibut vessels fish in Cook Inlet itself, and none of the large halibut boats that fish in the Gulf of Alaska are based in Cook Inlet ports. Ninilchik, Homer, and Soldotna are the main halibut landing ports for the small boats that fish in lower Cook Inlet (BLM 1976).

b. Ex-vessel value. The ex-vessel value of the harvest of halibut in the Cook Inlet area averaged $4.7 million for the period 1977 through 1982, or about twice that of PWS (table 33). These values ranged from $2.1 million in 1979 to $6.9 million in 1980. The trend in harvest levels (pounds) has generally been an increase, with the exception of 1979 and 1980, when quantities were lower. Because of high prices, 1979 ex-vessel values were a peak for the period (table 34). As mentioned in the Southwest Region halibut section in this volume, relatively higher prices in more southern ports tends to result in fish being delivered to these ports during periods with greater price differentials (table 37). Therefore, some of the reduction in 1979 and 1980 ex-vessel harvests and values could be a result of the transportation of fish to other areas to be landed.

Fishermen from the Kenai Peninsula Census Area earned 28% of the 1977-1982 average ex-vessel values. Wrangell-Petersburg Census Area fishermen earned 13% of the period's gross earnings. Alaska fishermen as a whole earned 53% of ex-vessel values, and out-of-state fishermen earned 38% (the remaining 9% was earned by fishermen of unknown residency).

Table 36. Prince William Sound Halibut-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	32	0	0	0	0	136	124	106	11	0	0	0	0
1978	42	0	0	0	0	108	157	137	111	0	0	0	0
1979	54	0	0	0	0	84	278	280	0	0	0	0	0
1980	84	0	0	0	0	356	421	226	0	0	0	0	0
1981	49	0	0	0	0	0	576	0	0	0	0	0	0
1982	74	0	0	0	0	558	328	0	0	0	0	4	0
Average	56	0	0	0	0	207	314	125	20	0	0	1	0

Source: ADL 1984.

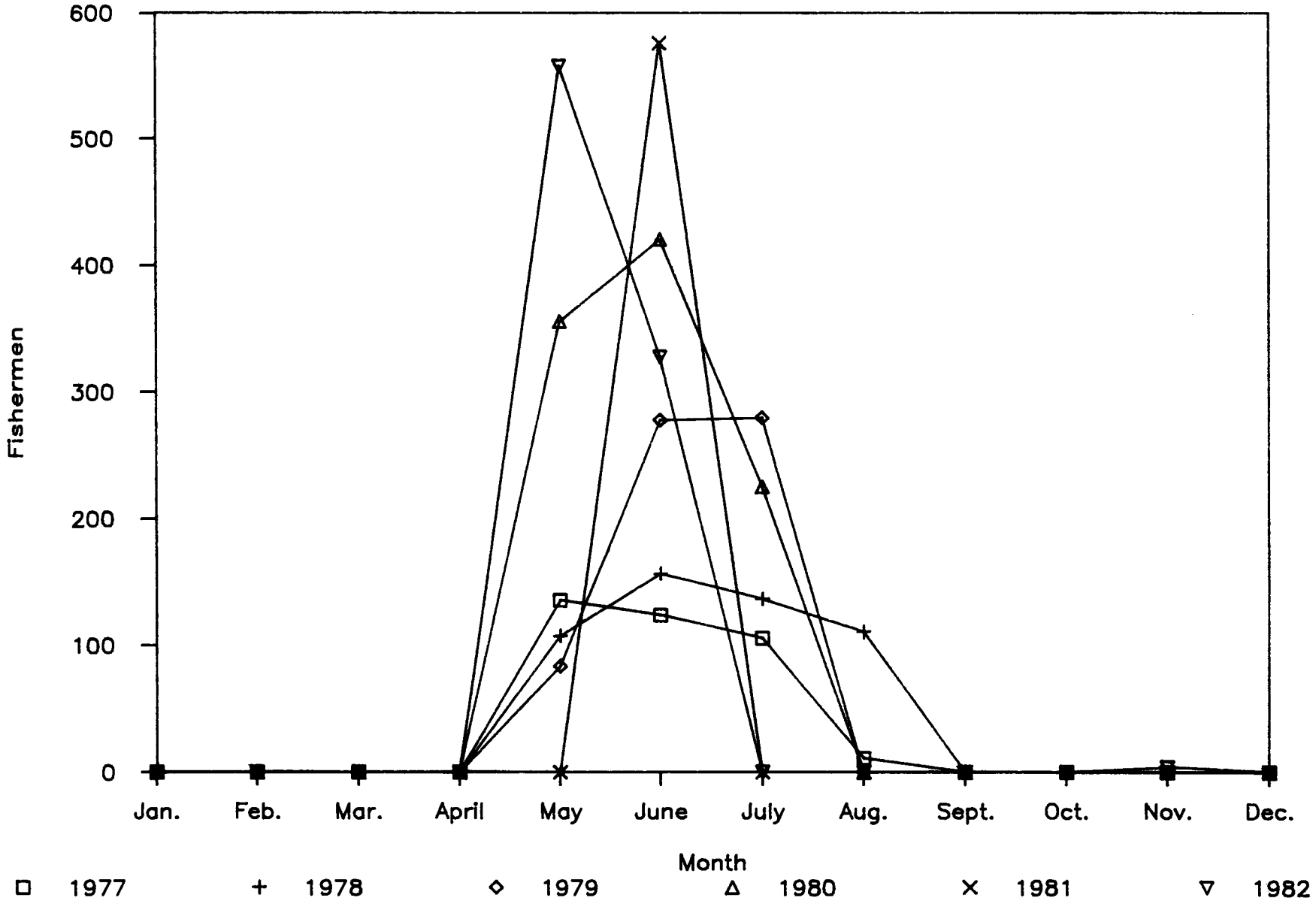


Figure 14. Prince William Sound halibut-harvesting employment (number of fishermen and crew).

Table 37. Average Ex-vessel Prices Paid for Halibut, by Port and Fishing Period, 1980 (U.S. Dollars)

Port	Bering Sea Spring	May-June	July	Aug.	Bering Sea Fall	Sept.	Oct.-Nov.	Season Average
Seattle	---	1.12	1.15	1.37	1.30	1.15	---	1.14
Bellingham	---	1.10	1.16	---	1.22	---	---	1.11
Ketchikan	---	0.90	---	---	---	---	---	0.90
Petersburg	---	0.90	---	---	---	---	---	0.90
Kodiak	0.80	0.90	0.90	---	0.90	0.92	---	0.89
Unalaska	0.60	0.81	0.94	---	0.85	---	---	0.85
Vancouver	---	1.01	1.15	1.29	---	1.28	1.30	1.17
Prince Rupert	---	0.93	1.01	1.10	---	1.23	1.28	1.01
Coastwide Average	0.78	0.94	1.01	1.22	0.95	1.19	1.30	0.99

Source: IPHC 1981.

--- means no data were available.

c. Cook Inlet halibut-harvesting employment. Similarly to the region as a whole, Cook Inlet halibut-harvesting employment primarily occurred in May, June, and July, with June being the peak month (table 38, fig. 15). Average June employment for the years 1977 to 1982 was 1,546, with a range of 783 in 1977 to 2,788 in 1981. The average monthly employment for the period was 279, which again must be viewed in the regulatory context. It is unclear why Cook Inlet accounted for 80% of harvest employment but 67% of harvest values, especially because the ADL used the same crew factor for each area.

VI. GROUNDFISH FISHERY

A. Regional Summary

Commercially harvested groundfish species within the 200-mi limit in the Gulf of Alaska are all managed by the North Pacific Fishery Management Council (NPFMC). Ex-vessel values and employment information in this narrative are for all groundfish species combined. Domestic groundfish catches in the Southcentral Region are reported for the Lower Cook Inlet (LCI) Management Area and the Prince William Sound (PWS) Management Area (map 6).

Fishing effort in domestic groundfish fisheries in Prince William Sound and Cook Inlet has been low. Groundfish exploitation in the Gulf of Alaska has long been dominated by foreign fishing vessels. In Cook Inlet, targeted landings normally account for only 25% of annual groundfish harvests (Morrison 1984). The remainder are caught incidentally in LCI longline halibut fisheries, Cook Inlet Tanner and king crab pot fisheries, and the Kachemak Bay trawl fishery. These fish may be discarded, used immediately as hanging bait while the boats are still on the grounds, sold to the canneries to be used as hanging bait, or marketed for human consumption (Blackburn et al. 1983).

Targeted landings account for approximately 80% of yearly groundfish harvests in PWS (Morrison 1984). The major targeted groundfish fisheries consist of a trawl fishery in Orca Bay supplying hanging bait to the Tanner crab fleet, a longline fishery in the Knight Island Passage area that catches lingcod, rockfish, and sablefish, and a growing sablefish offshore fishery in the waters east of Middleton Island (Blackburn et al. 1983).

B. Ex-vessel Values

Although ex-vessel values of domestic groundfish harvests increased considerably during the years 1975-1982, values remained relatively low compared to other commercial fisheries in the

Table 38. Cook Inlet Halibut-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	136	0	0	0	0	495	659	423	53	0	0	0	0
1978	229	0	0	0	0	875	817	656	397	0	0	0	0
1979	292	0	0	0	0	559	1,611	1,331	0	0	0	0	0
1980	229	0	0	0	0	1,127	777	832	4	0	0	0	0
1981	184	0	0	0	0	0	2,212	0	0	0	0	0	0
1982	270	0	0	0	0	1,911	1,316	0	0	4	0	0	0
Average	223	0	0	0	0	828	1,232	54	76	1	0	0	0

Source: ADL 1984.

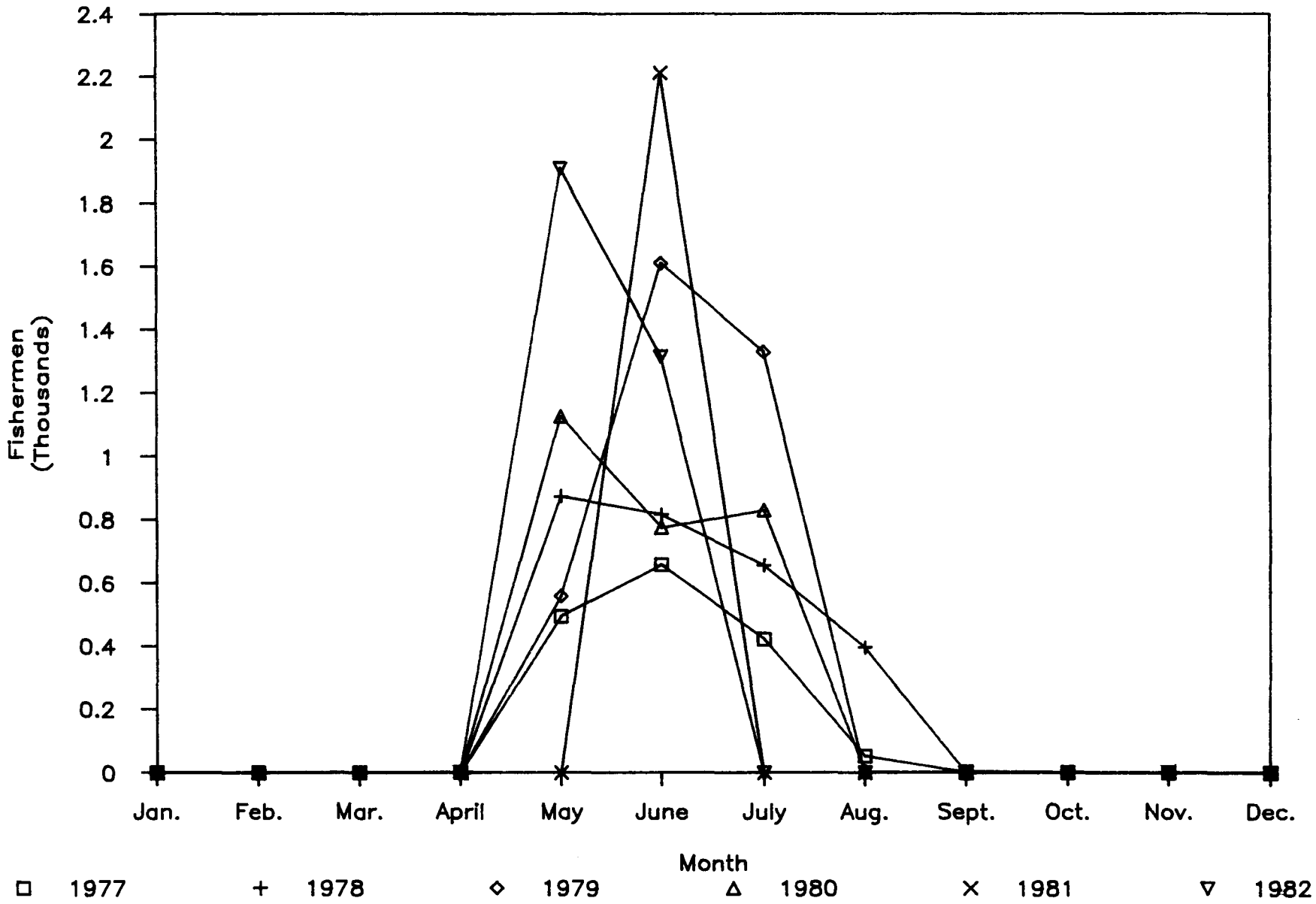
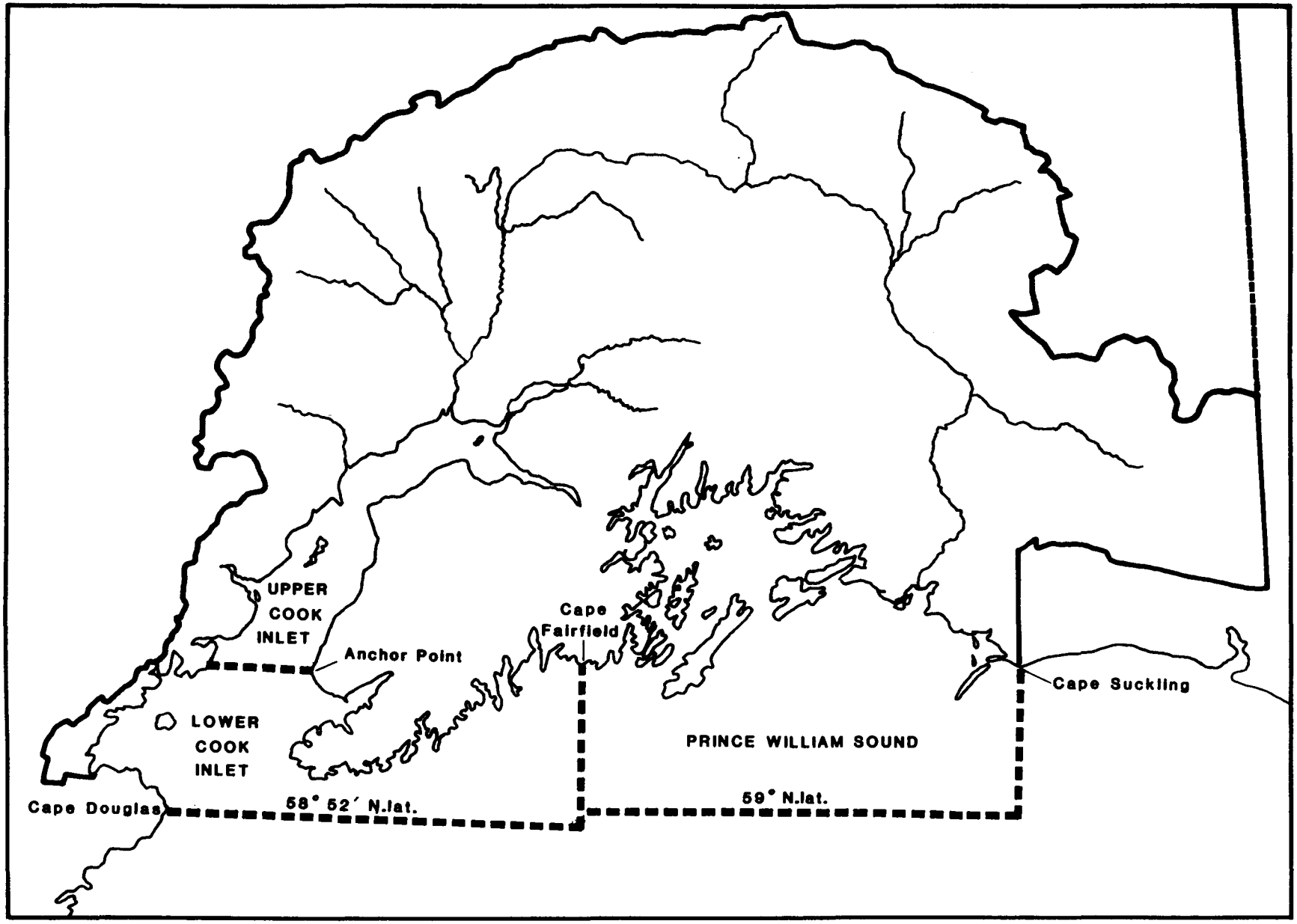


Figure 15. Cook Inlet halibut-harvesting employment (number of fishermen and crew).



Map 6. Management areas used in this report to present domestic groundfish harvests (ADF&G 1984).

region. Ex-vessel values in Cook Inlet increased from $1,000 in 1975 to $37,000 in 1982 and averaged $24,000 for the period (table 39). Approximately 80% of the Cook Inlet ex-vessel values were earned by fishermen form the Kenai Peninsula Census Area (table 39).

Ex-vessel values in Prince William Sound increased from $4,000 in 1975 to $125,000 in 1982 and averaged $51,000 (table 39). Approximately 45% of the Prince William Sound ex-vessel values were earned by fishermen from the Valdez-Cordova Census Area; another 33% of the earnings went to other Alaskan fishermen. The remaining 22% were earned by out-of-state fishermen. Ex-vessel values for the region as a whole increased from $5,000 in 1975 to $162,000 in 1982 and averaged $75,000.

C. Groundfish-Harvesting Employment

Commercial groundfish-harvesting employment in the Southcentral Region increased during the years 1977-1982 but remained fairly low (table 40, figure 16). Harvesting employment, however, was relatively stable throughout the year from 1980 through 1982 (table 40).

Table 39. Ex-vessel Value of Domestic* Groundfish Harvests for Southcentral Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen**	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Cook Inlet	a	1	1	2	13	28	32	81	37	24
PWS	b	4	27	25	30	80	37	80	125	51
Total		5	28	26	43	108	69	161	162	75

Source: CFEC 1984.

* Values limited to harvest landed in Alaska/based shore plants.

** Exact breakdown withheld due to nondisclosure regulations; average breakdown indicated as follows:

a 80% Kenai Peninsula

b 45% Valdez-Cordova, 33% Other Alaska.

Table 40. Southcentral Region Groundfish-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Annual Average	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	3	3	3	3	7	0	0	4	8	0	0	0	3
1978	3	3	6	6	3	7	0	0	0	0	0	0	0
1979	6	0	12	12	6	0	6	10	8	4	0	0	10
1980	9	6	3	22	7	11	10	2	11	13	4	7	6
1981	9	3	8	22	25	15	13	6	0	0	0	65	5
1982	7	9	11	9	15	9	11	6	4	2	0	6	6
Average	6	4	7	12	11	7	7	6	5	3	1	3	5

Source: ADL 1984.

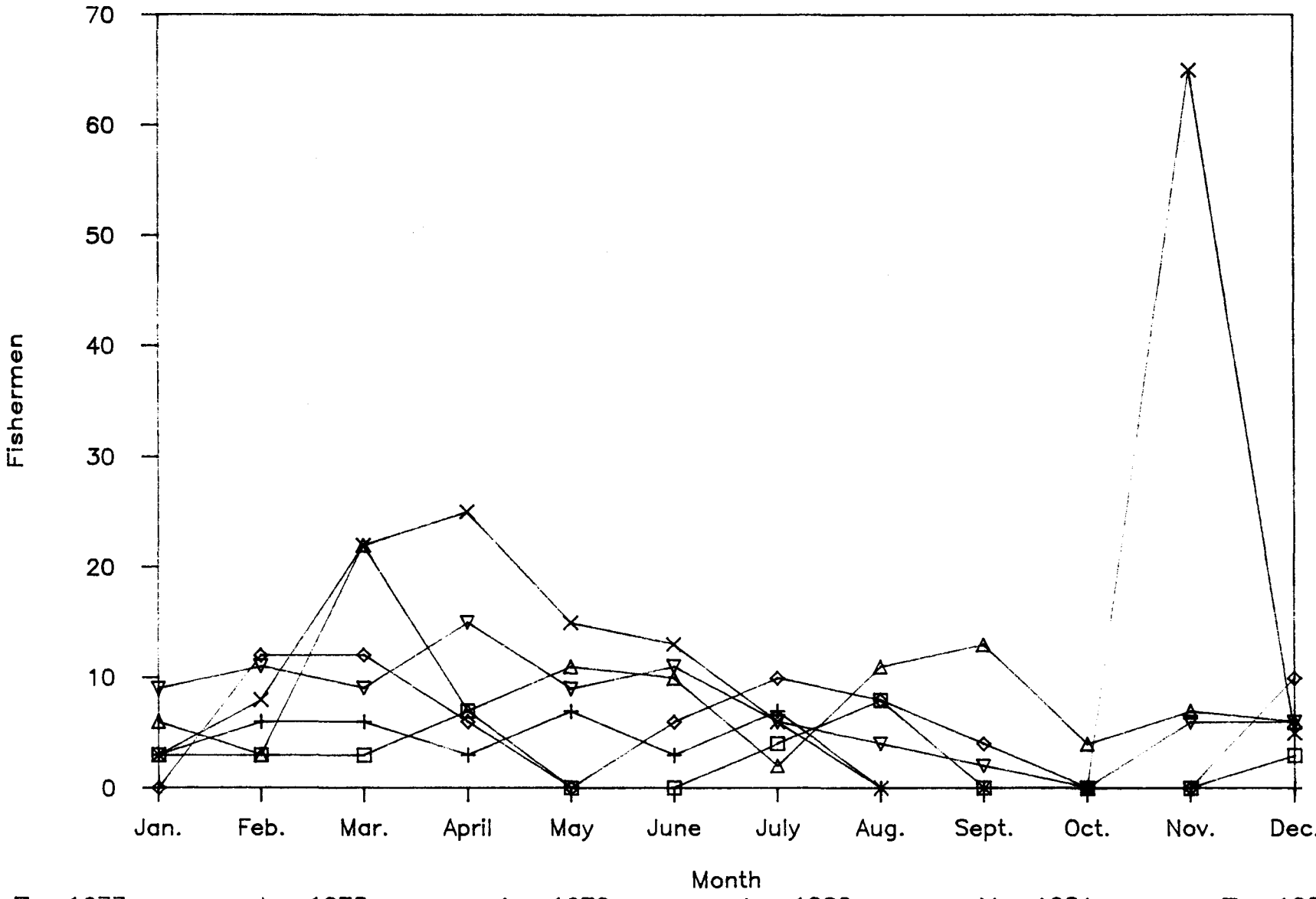


Figure 16. Southcentral Region groundfish-harvesting employment (number of fishermen and crew) (ADL 1984).

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Commercial and Subsistence Fishing in the Western and Interior Regions

I. INTRODUCTION

The Western and Interior regions include the entire Yukon and Kuskokwim drainages and coastal waters extending from the latitude of Cape Newenham north to the latitude of Canal Point Light (map 1). This narrative provides background information on subsistence and commercial fishing, ex-vessel value, harvesting employment, and first-wholesale value of the salmon, herring, and halibut fisheries in these regions.

A. Ex-vessel Value

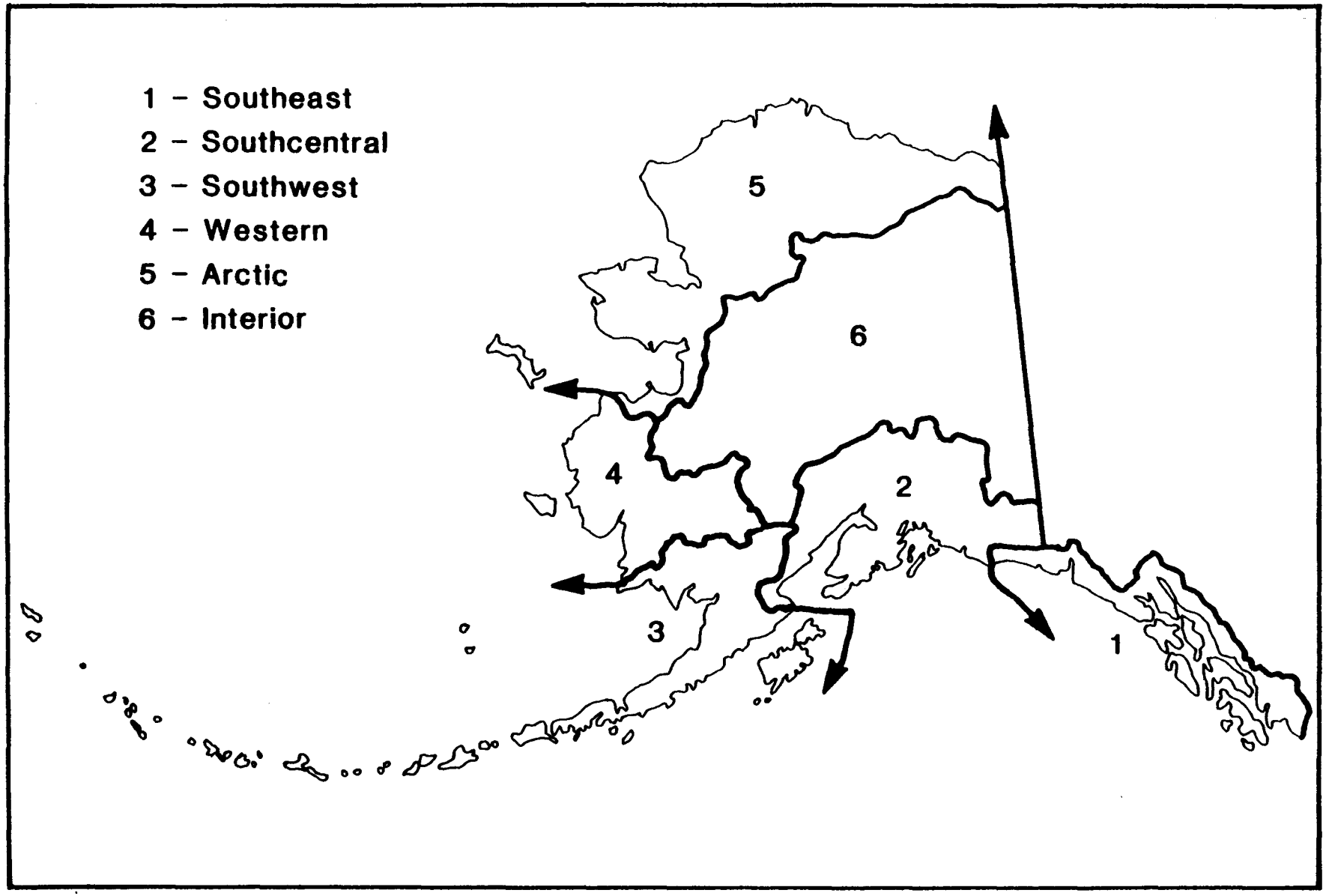
Ex-vessel values are the commercial landing values to fishermen received from processors who purchase the fish. Salmon and herring commercial ex-vessel values for the Western and Interior regions are presented in table 1. Combined ex-vessel values in these fisheries increased from approximately $2.6 million in 1975 to $14.4 million in 1981. The average harvest value for the period 1975 to 1982 was $9.0 million. Approximately 96% of the regions' salmon harvest values was earned by fishermen who are residents of the Western or Interior regions (table 5). In contrast, 57% of the herring ex-vessel values were earned by fishermen from census areas in the regions (table 25).

B. Salmon- and Herring- Commercial- Harvesting Employment

Commercial salmon- and herring-harvesting employment in the Western and Interior regions for the years 1977-1982 occurred during the months of May, June, July, August, and September (table 2). Herring employment was primarily in May (table 28), whereas salmon employment occurred primarily during the remaining months (table 6). June was peak month of fish-harvesting employment, when, on average, 3,221 fishermen and crew were employed (table 2). Salmon employment levels were relatively consistent because the salmon fisheries have been limited to entry since the mid 1970's. Increases in fish-harvesting employment were primarily from the development and expansion of the commercial herring fisheries.

C. First-Wholesale Value

All Division of Commercial Fisheries production information (product weight and wholesale values) summarizes production data listed in the Operator's Annual Reports (see appendix A). The initial processors of raw fish and shellfish caught in Alaska file one Operator's Annual Report for each processing facility and each management area in which the fish and shellfish were bought and/or processed. The ADF&G, Division of Commercial Fisheries, catch and production reports include only fish and shellfish processed within Alaska. The weights (pounds) reported for production are weights of



Map 1. The six regions of the Alaska Habitat Management Guides.

Table 1. Ex-vessel Value (in Thousands of Dollars) for Salmon and Herring Harvests in the Western and Interior Regions, 1975-82

	1975	1976	1977	1978	1979	1980	1981	1982	Average
Salmon	2,614	4,361	8,146	7,514	11,730	8,818	13,083	10,587	8,361
Herring	---	---	---	---	264	403	1,320	704	672
Total	2,647	4,361	8,146	7,514	11,990	9,221	14,403	11,291	9,033

Source: CFEC 1984a.

--- means no data were available.

Table 2. Salmon and Herring Commercial Harvesting Employment in the Western and Interior Regions, 1977-82

Year	May	June	July	Aug.	Sept.
1977	0	3,056	3,041	2,878	97
1978	0	3,438	3,330	3,115	274
1979	198	3,539	3,426	3,289	272
1980	842	3,035	2,704	2,567	281
1981	946	3,037	2,834	2,594	300
1982	464	3,220	3,003	2,616	141
Average	408	3,221	3,056	2,843	228

Source: CFEC 1984b.

finished products and do not include package weights. Production values (first wholesale value) are estimated product values at the plant, prior to shipping. These are not market transaction price values but estimated values of inventories. Actual values may vary, depending on prices changes at the actual time of sale. Therefore, first wholesale values differ from ex-vessel values in that ex-vessel values are derived from actual fish ticket landing transactions.

Information on first-wholesale values is presented in table 3. The regions' production areas are defined by the ADF&G, Division of Commercial Fisheries, as the Yukon and Kuskokwim areas. "Other finfish" is primarily herring (and some halibut, whitefish, and burbot). From comparison of the salmon ex-vessel values (table 1) with the first-wholesale values, it appears that a significant portion of the regions' commercial harvest is processed outside the Western and Interior regions (because the ex-vessel values are higher than the first-wholesale values, which usually is not the case).

It is very important to note that production information for a specific area may not correspond to the catch reported for that area.

Production area boundaries do not correspond directly to fisheries management areas used to record catch information (see map 2). For example, in map 2, Bristol Bay is a production area for all fish and shellfish, but it is considered a specific management area only for the salmon and herring catches. Commercial fisheries businesses report production by region and area; however, they frequently ship fish intrastate or export them prior to processing. Thus, through fish ticket information, the catch and ex-vessel values might be recorded in one area and production reported in another area. Therefore, production values should not be expected to correlate directly with ex-vessel values. In spite of this, the geographic distribution of ex-vessel value and production value is roughly similar for most years.

II. SALMON FISHERY

A. Regional Summary

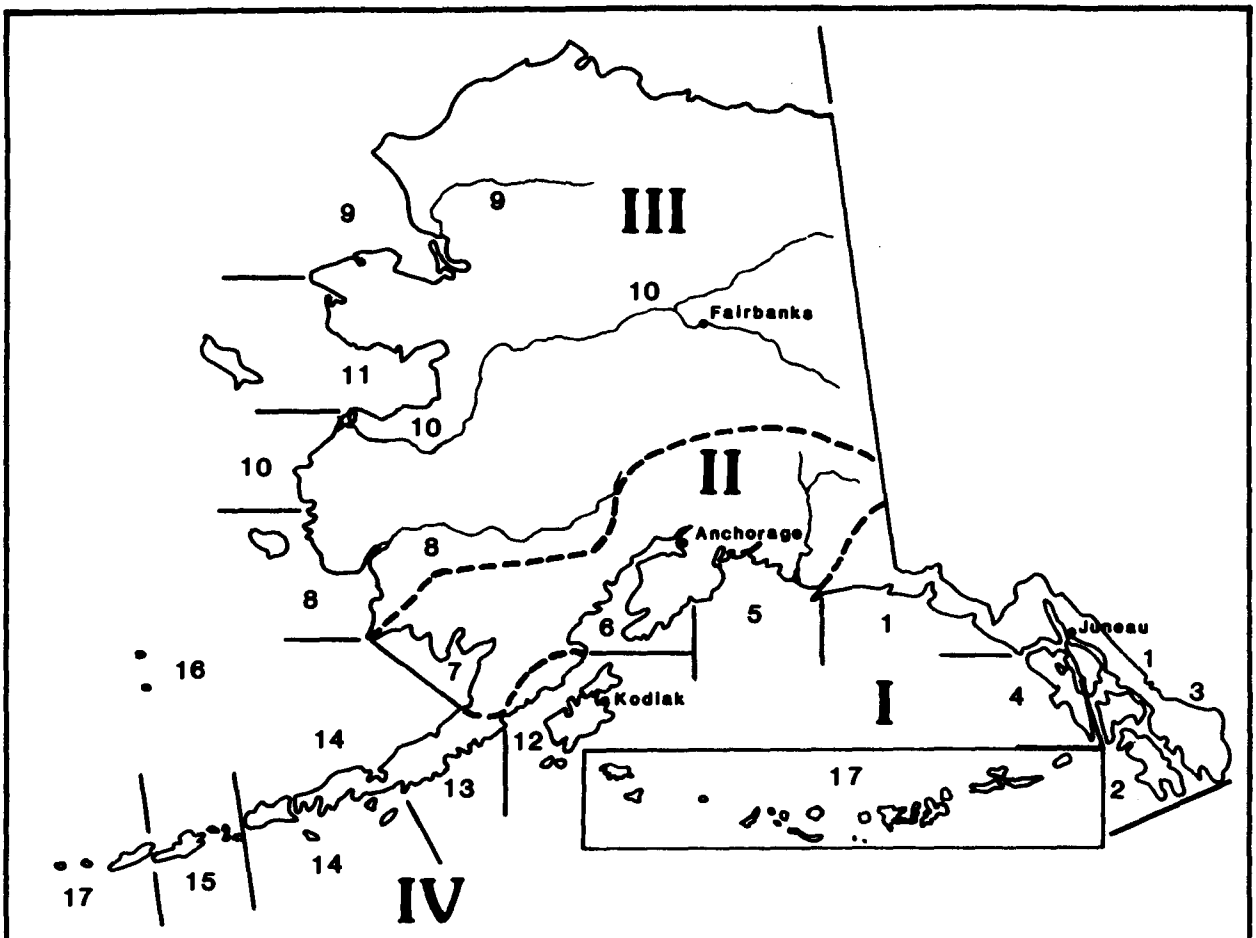
Two commercial salmon fishing management areas have been established in the Western and Interior regions, the Kuskokwim and Yukon manage ment areas. These management areas encompass the entire freshwater drainages of the Yukon and Kuskokwim rivers and coastal waters extending from the latitude of Cape Newenham north to the latitude of Canal Point Light. Information in this narrative is organized by management area. Ex-vessel values in the Yukon Management Area are presented for the Lower Yukon (Districts 1, 2, and 3) and the Upper Yukon (Districts 4, 5, and 6) (these are referred to as subareas) in addition to ex-vessel values for the total area.

Table 3. Production (in Pounds) and Wholesale Values (in Thousands of $) by Fishery and Production Area, 1979-83

	Salmon		Other Finfish		Shellfish		Total	
Area/Years	Lb.	$	Lb.	$	Lb.	$	Lb.	$
Kuskokwim								
1979	1,120	2,676	43	456	---	---	1,163	3,132
1980	2,318	3,854	1,120	563	---	---	3,438	4,417
1981	4,165	6,303	4,629	2,803	---	---	8,794	9,107
1982	5,354	8,276	1,441	793	---	---	6,794	9,069
1983	4,112	6,281	3,705	2,621	---	---	7,817	8,902
Average	3,414	5,478	2,188	1,447	---	---	5,601	6,925
Yukon								
1979	4,265	7,018	---	---	---	---	4,265	7,018
1980	6,953	10,647	2	1	---	---	6,955	10,648
1981	6,072	10,656	3	5	28	359	6,103	11,019
1982	3,015	6,277	12	7	---	---	3,027	6,284
1983	3,629	6,782	7	6	---	---	3,636	6,787
Average	4,787	8,276	6	5	28	359	4,797	8,351

Source: ADF&G 1980, 1981, 1982, 1983, and 1984.

--- means no data were available.



Region I: Southeast
Areas: 1. Juneau and Yakutak
2. Ketchikan
3. Petersburg
4. Sitka

Region II: Central
Areas: 5. Prince William Sound
6. Cook Inlet
7. Bristol Bay (salmon and herring catch; all fish and shellfish production)

Region III: Arctic-Yukon-Kuskokwim (AYK)
Areas: 8. Kuskokwim
9. Kotzebue
10. Yukon
11. Norton Sound

Region IV: Western
Areas: 12. Kodiak
13. Chignik
14. Alaska Peninsula
15. Dutch Harbor
16. Bering Sea
17. Adak and Western Aleutians
7. Bristol Bay (fish other than salmon and herring catch; and shellfish catch)

Map 2. ADF&G, Division of Commercial Fisheries, regions and catch and production areas.

Five species of salmon are harvested in the regions. Chum, chinook, and coho salmon dominate both the commercial and subsistence harvests. The Yukon and Kuskokwim rivers' chinook salmon, the Kuskokwim River's coho salmon, and the Yukon River's fall and summer chum salmon are highly prized species that are sold in a growing export market (Pope 1981). A significant portion of the salmon harvested in these management areas is for personal consumption, more than in any other area of Western or Arctic Alaska. Combined reported commercial and subsistence harvest of salmon between 1975 and 1984 has ranged from 1.9 million fish in 1976 to 3.3 million fish in 1984 and averaged 2.7 million fish annually. Approximately 23% of the 1984 harvest was by the subsistence fishery. Because of the availability of both commercial and subsistence harvest data, both aspects of the fishery are presented in this section. Economic values, however, are presented for only the commercial fishery. (See the statewide subsistence economic overview section for a discussion of subsistence harvest quantities, values, and methodologies.)

Primarily set and drift gill nets are used to harvest salmon in the Western and Interior regions' subsistence and commercial fisheries. In addition, fish wheels are used for subsistence and commercial harvests of salmon on the upper Yukon River (ADF&G 1985b). Details of harvests, management, and other aspects of the commercial and subsistence fisheries can be found in the Human Use section of the Alaska Habitat Management Guide for the Western and Interior regions.

B. Ex-vessel Value

Commercial salmon ex-vessel values for the period 1975 through 1982 in the Western and Interior regions increased from $2.6 million in 1975 to a peak of $13.1 million in 1981. The average ex-vessel value for the period was $8.4 million (table 4). Chinook salmon commercial harvests accounted for approximately 40% of the average harvest value, and coho, sockeye, and chum salmon comprised 16, 2, and 40%, respectively. The remaining 2% was earnings from salmon roe. Pink salmon accounted for less than 1% of the regions' combined salmon ex-vessel values. Approximately 96% of the ex-vessel values were earned by fishermen who were residents of census areas in the Western and Interior regions (table 5). This figure is similar to that of the commercial salmon fishery in the Arctic Region, where 95% of the ex-vessel values were earned by fishermen who are residents of census areas in that region (table 13).

C. Salmon-Harvesting Employment

The Western and Interior regions salmon-harvesting employment for the years 1977-1982 in numbers of fishermen and crew is presented in table 6 and fig. 1. The peak month of employment was June throughout the entire period; the date of chinook salmon peak harvest for the Kuskokwim and Lower Yukon areas is approximately mid-to-late June (Huttenen 1984, 1985; McBride et al. 1983; Buklis and Wilcock 1984, 1985; Geiger, pers. comm.). June employment

Table 4. Ex-vessel Value of Commercial Salmon Harvest for the Western and Interior Regions, by Species, 1975-82

Species	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Average
Chinook	845	1,972	3,349	2,738	3,686	4,003	5,707	4,717	3,377
Sockeye	29	61	81	55	136	91	434	336	153
Coho	176	373	1,602	866	2,379	1,477	1,225	2,346	1,305
Pink	1	54	1	71	0	14	0	1	18
Chum	1,596	1,900	3,114	3,785	5,528	2,860	5,243	2,626	3,331
Roe	---	---	---	---	---	375	467	564	469*
Total	2,647	4,361	8,146	7,514	11,730	8,818	13,083	10,587	8,361

Source: CFEC 1984a.

--- means no data were available.

* Three-year average.

Table 5. Ex-vessel Value of Commercial Combined Salmon Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1975 to 1982

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kuskokwim	Bethel	672	1439	3846	2371	4347	2853	3622	4289	2930
	Other Alaska*	**	**	**	**	11	10	13	20	8
	Alaska	**	**	**	**	4358	2863	3636	4308	2938
	Other USA	**	**	**	**	0	0	0	13a	2
	Unknown	**	**	**	**	25	14	16	14	58
	Subtotal	779	1548	4012	2395	4383	2877	3652	4335	2998
Lower Yukon	Nome	70	116	96	125	177	205	354	186	166
	Yukon-Koyukuk	17	25	33	84	208	148	222	109	106
	Wade Hampton	1292	1813	3402	3831	5845	4404	7138	4717	4055
	Anchorage	**	**	29	51	91	78	112	86	58
	Other Alaska*	**	**	41	31	96	85	195	223	88
	Alaska	1402	1983	3601	4122	6417	4920	8020	5321	4473
	Other USA	**	**	**	**	**	**	**	**	5
	Unknown	**	**	**	**	**	**	**	**	109
	Subtotal	1560	2306	3646	4227	6481	4989	8139	5351	4588
Upper Yukon	Yukon-Koyukuk	256	391	393	800	754	867	1123	800	673
	Fairbanks North Star	35	24	53	42	87	56	**	**	63
	Other Alaska*	0	13	35	50	20	9	**	**	23
	Alaska	292	428	481	892	861	933	1286	901	759
	Unknown	16	79	7	0	5	19	6	0	17
	Subtotal	308	507	488	892	866	952	1292	901	776
Total		2647	4361	8146	7514	11730	8818	13083	10587	8361

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 6. Western and Interior Regions Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	756	0	0	0	0	0	3,056	3,041	2,878	97	0	0	0
1978	846	0	0	0	0	0	3,438	3,330	3,115	274	0	0	0
1979	947	0	0	0	0	0	3,514	3,426	3,289	272	0	0	0
1980	796	0	0	0	0	104	2,939	2,704	2,567	281	0	0	0
1981	749	0	0	0	0	224	3,035	2,834	2,594	300	0	0	0
1982	734	0	0	0	0	0	3,044	3,003	2,616	141	0	0	0
Avg.	805	0	0	0	0	55	3,171	3,056	2,843	228	0	0	0

Source: CFEC 1984b.

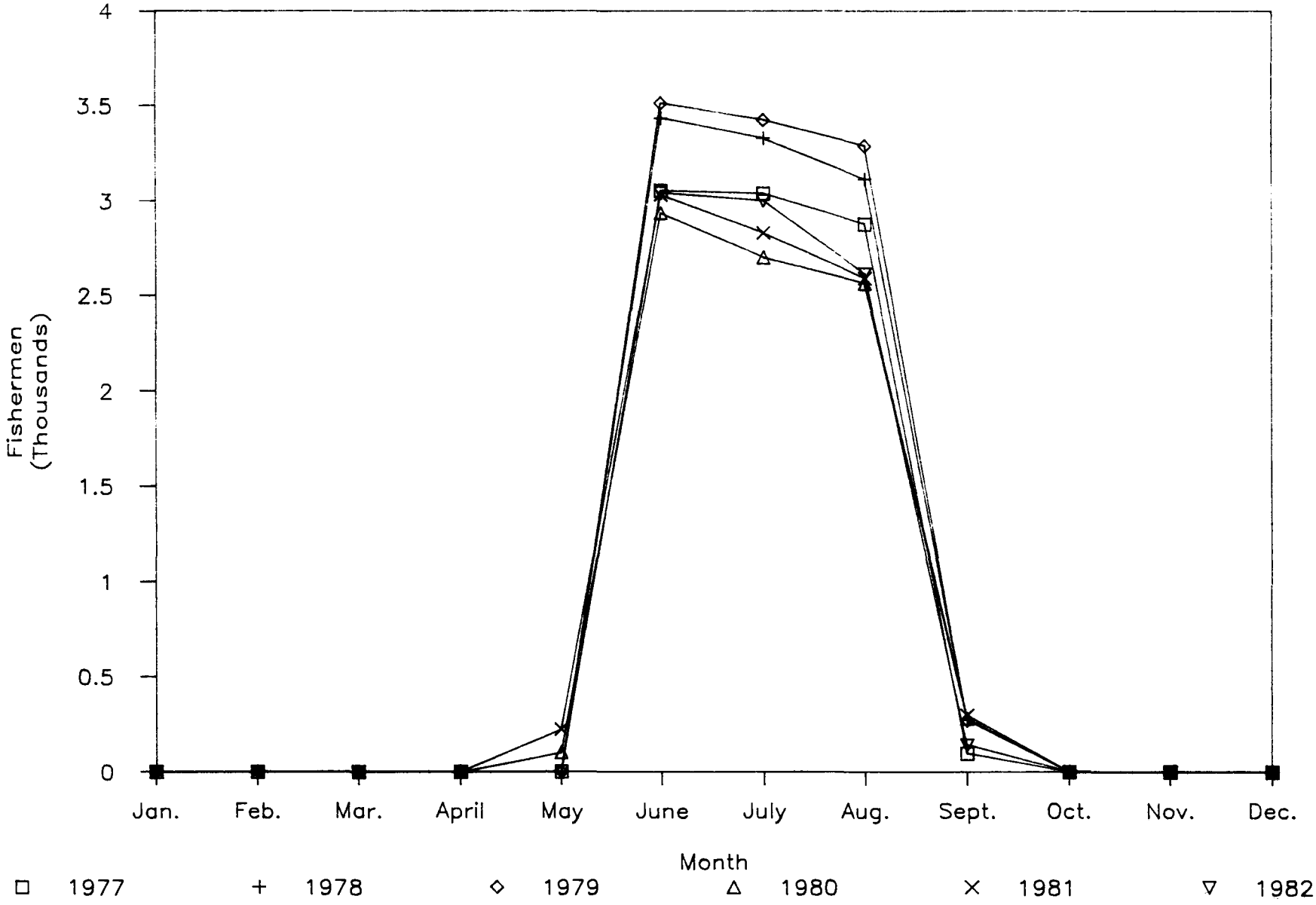


Figure 1. Yukon-Kuskokwim salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

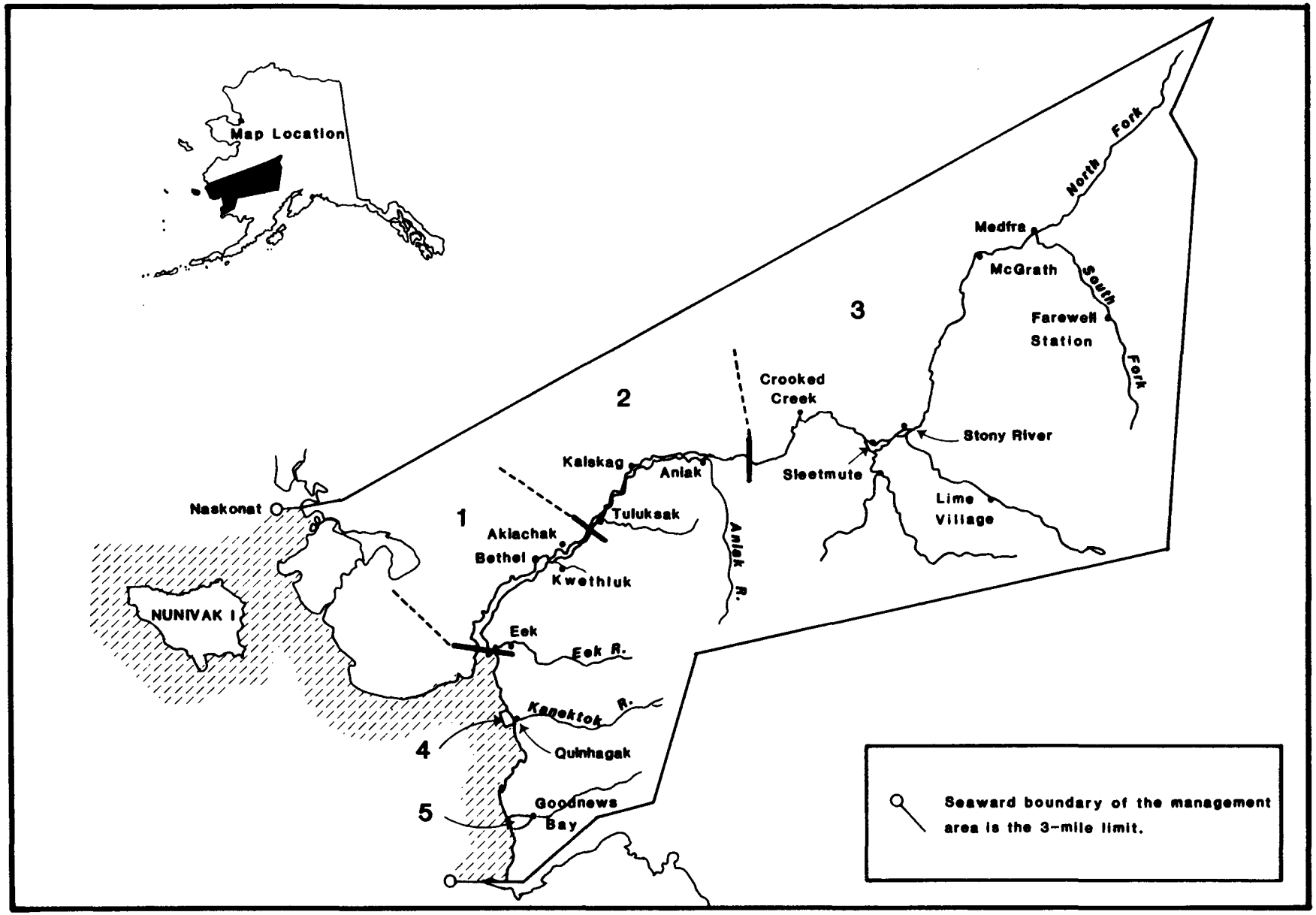
ranged from 2,939 fishermen and crew in 1980 (when salmon ex-vessel prices per pound were exceptionally low) (table 11) to 3,514 fishermen and crew in 1979 (when salmon ex-vessel values per pound were high table 11). July salmon-harvesting employment for the period was only slightly below June employment, with an average of 3,056 and a range of 2,704 to 3,416 fishermen and crew employed for the period 1977-1982 (table 6). Peak chum salmon harvests in the regions are approximately late June to mid July (ibid.).

Salmon-harvesting employment in the Yukon and Kuskokwim management areas for these years was approximately 80% of Bristol Bay salmon-harvesting employment and over double the Kodiak salmon-harvesting employment. Compared to Bristol Bay and Kodiak salmon-harvesting employment, Yukon and Kuskokwim area residents earn a larger percentage of harvest values. Salmon harvesting provides a significant level of income and employment in the area.

D. Management Area Summaries

1. Kuskokwim Management Area. The Kuskokwim Area consists of all Alaska waters between the latitude of the westernmost point of the Naskonat Peninsula and the latitude of the southernmost tip of Cape Newenham, including the waters surrounding Nunivak and St. Matthews islands (map 3) (ADF&G 1985b). Salmon in the Kuskokwim Area are harvested for both subsistence and commercial use. Combined harvest of all species reached a peak of 1.7 million fish during 1984 (tables 7 and 8). For the years 1975-1984, the commercial harvest of salmon averaged 76% of the total salmon harvest, and the subsistence fishery accounted for the remaining 24%. Table 9 presents average weights of salmon by species to convert figures on landings in number of fish to pounds of fish.

   a. Commercial fishery. The Kuskokwim Area commercial fishery is the oldest commercial salmon fishery in the combined Arctic, Western, and Interior regions, with catches reported as early as 1913. Most of the commercial harvest is taken by drift gill nets, although set gill nets are also used. For many years, small commercial mild-cure operations were conducted in or near the Kuskokwim Bay, while the fishery in the Kuskokwim River remained undeveloped (ADF&G 1978a). A commercial fishery developed in the 1930s near McGrath for the sale of dried salmon for dog food. This fishery declined as the use of dog teams declined in the Kuskokwim Area (ibid.). Documentation of the commercial fishery was poor before 1961 (ADF&G 1975). The commercial fishery became more established in the Kuskokwim Bay area in 1968. The fishery, however, was sporadic because of inconsistent processing capacity and inclement weather decreasing the efficiency of the small vessel fleet (ADF&G 1984a). The market and resultant harvest levels, however, have stabilized during recent years (ibid.).



Map 3. Salmon commercial fishing districts of the Kuskokwim Management Area (ADF&G 1984a).

Table 7. Commercial Harvest of Salmon in Numbers of Fish for the Kuskokwim Area, by Species and by Year, 1975-84

Species	Fishing Season 1975	1976	1977	1978	1979	1980	1981	1982	1983[a]	1984[a]
Chinook	28,278	49,262	58,256	63,194	53,314	48,242	79,816	79,816	93,676	74,014
Coho	111,763	112,130	263,727	247,271	678,683	327,908	278,587	567,451	249,018	830,191
Sockeye	18,036	14,636	18,621	13,734	39,463	41,853	105,940	97,716	90,834	81,349
Pink	963	39,998	434	61,968	574	29,503	463	18,259	379	23,902
Chum	225,156	231,877	298,959	282,044	297,167	542,531	485,635	325,471	306,554	488,715
Area total	384,196	447,903	639,997	668,211	699,201	1,071,931	950,002	1,088,713	740,461	1,498,171

Source: ADF&G 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1984a, 1984b.

a Preliminary data.

Table 8. Subsistence Harvest of Salmon in Numbers of Fish in the Kuskokwim Management Area, by Species and by Year, 1975-84

Species	Fishing Season									
	1975[a]	1976[a]	1977[a]	1978[a]	1979[a]	1980[a]	1981[a]	1982[a]	1983[a]	1984[a]
Chinook	50,740	60,335	57,925	38,209	57,286	61,981	63,640	61,341	71,924[c]	60,944[c]
Coho[d]	b	b	12,703	12,437	27,179	47,335	27,251	45,171	7,589[c]	15,116[c]
Chum[e]	180,429	231,150	203,397	125,052	163,048	167,164	159,681	194,976	202,151[c]	151,409[c]
Area total	231,169	291,485	273,525	175,698	247,513	278,269	251,572	301,488	176,396[c]	237,830[c]

Source: ADF&G 1975, 1976, 1977, 1978b, 1979, 1980, 1981, 1982, 1984a, 1984b.

a Data expanded from survey results.

b No survey performed.

c Preliminary data.

d Surveys normally conducted while fishery in progress; these are minimum figures.

e Includes small numbers of chinook, sockeye, and pink salmon.

Table 9. Average Weights of Salmon by Species, Area, and Year, 1975-83

Area/Species	1975	1976	1977	1978	1979	1980	1981	1982	1983
Kuskokwim									
Chinook	17.0	17.0	22.7	24.2	16.6	14.1	17.8	19.3	18.8
Coho	8.3	7.8	7.8	7.1	7.9	6.9	6.4	7.3	6.8
Sockeye	7.2	6.7	8.3	6.5	6.9	6.7	7.2	7.2	6.8
Chum	6.8	7.0	7.3	8.9	7.0	6.4	7.5	7.3	7.4
Pink	3.0	3.5	3.9	3.9	3.9	3.6	3.5	3.6	3.5
Yukon									
Chinook	21.9	21.4	23.4	23.3	20.5	22.3	24.6	22.6	19.7
Coho	7.0	6.7	7.7	7.1	7.3	6.4	6.7	6.6	6.5
Sockeye	---	8.0	---	---	7.4	---	---	---	---
Chum	6.6	6.9	7.1	7.0	7.3	6.8	7.6	7.2	7.3
Pink	7.0	3.0	3.0	3.0	---	---	---	---	---

Source: ADF&G 1976-84; Fransisco, pers. comm.

--- means no data were available.

In 1976, 831 limited entry permits were issued in the area. In 1984, 813 of those were renewed, and 774 permits were fished (Schultz, pers. comm.). Ninety-eight percent of all Kuskokwim entry permit holders are residents of the area (ADF&G 1984a).

Chum salmon made up 42%, coho salmon 36%, chinook salmon 14%, sockeye salmon 6.4%, and pink salmon less than 2% of the commercial salmon harvest in the Kuskokwim Area from 1975 through 1984 (table 7). Harvest of chinook salmon has occurred since statehood and tended to increase from 1975 through 1984 (table 7) (ADF&G 1984a). Commercial harvest for chum salmon was initiated in 1971 because of apparent reduction in subsistence use of this species and assurances that the spawning populations of chum salmon in the Kuskokwim River were of sufficient size to support the fishery (ADF&G 1982). Commercial harvest of coho salmon have tended to increase from 1975 through 1984 (table 7).

b. Subsistence fishery. The subsistence salmon fishery in this area is one of the most important in the state (ADF&G 1984a, 1985a) and is second in size of harvest only to the Yukon Area. The first recorded subsistence harvests were in 1922 (Pennoyer et al. 1965). Today the value of the subsistence fishery to local people remains as great as the dollar value realized from the commercial fishery (ADF&G 1984a). In order of magnitude, the primary species harvested are chum (67%), chinook (23%), and coho (8%). Subsistence catches of pink and sockeye salmon are very small and have usually been included in the chum salmon harvest figures (table 8).

c. Ex-vessel value. The combined salmon ex-vessel values for the years 1975-1982 in the Kuskokwim Area showed an overall increasing trend (table 5). Ex-vessel values ranged from $779,000 in 1975 to $4.4 million in 1979, with an average of $3.0 million (table 5). Approximately 99% of the average ex-vessel values were earned by fishermen from the Bethel Census Area (table 5). Chinook, coho, sockeye, and chum salmon accounted for 29, 41, 5, and 25% of the commercial harvest value, respectively (table 10).

Chinook salmon values also showed an increasing trend, with a range from $246,000 in 1975 to $1.4 million in 1977 and an average of $866,000 (table 10). The peak chinook salmon ex-vessel value in 1977 was largely a result of an unusually high ex-vessel price per pound (table 11). On the average, approximately 97% of the chinook salmon ex-vessel values during the period 1975-1982 were earned by Bethel Census Area fishermen (table 12).

Between 1975 and 1982, sockeye salmon ex-vessel values also tended to increase in the Kuskokwim Management Area,

Table 10. Ex-vessel Value of Commercial Salmon Harvest for the Kuskokwim Management Area by Species, 1975-82

Species	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Chinook	246	630	1,417	843	863	461	1,210	1,256	866
Coho	172	358	1,439	756	2,283	1,457	1,124	2,189	1,222
Sockeye	29	61	81	55	136	91	434	336	153
Chum	331	445	1,074	670	1,100	839	881	554	737
Pink	1	54	1	71	0	14	0	1	18
Total	779	1,548	4,012	2,395	4,383	2,877	3,652	4,335	2,998

Source: CFEC 1984a.

Table 11. Estimated Average Annual Ex-vessel Prices by Species and Area, 1975-84

Area	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Kuskokwim										
Chinook	.50	.71	1.11	.54	.87	.57	.86	.83	.62	.90
Coho	.20	.43	.74	.44	.96	.64	.62	.53	.40	.64
Sockeye	.24	.63	.58	.62	.51	.31	.57	.49	.51	.58
Chum	.22	.28	.50	.32	.54	.23	.24	.24	.32	.29
Pink	.22	.38	.56	.30	.13	.13	.12	.01	.05	.08
Lower Yukon										
Chinook	.42	.71	.84	.82	1.08	1.04	1.16	1.26	1.40	1.51
Coho	.21	.43	.55	.59	.85	.36	.64	.65	.33	.51
Sockeye	---	.63	---	.50	.55	---	.39	---	---	---
Chum	.20	.28	.41	.38	.61	.24	.40	.42	.33	.28
Pink	.12	.38	---	.11	.45	.39	---	---	---	---
Upper Yukon										
Chinook	.60	.71	1.03	.82	1.08	.85	1.16	1.00	.55	.95
Coho			.42	.59	.84	.29	.64	.65	.31	.24
Sockeye	.63	---	.63	.50	.55	---	---	---	---	---
Chum	.17	.28	.23	.27	.61	.25	.22	.29	.20	.
Pink	---	.38	---	.11	.45	.39	---	---	---	-
Roe	---	---	---	2.19	3.83	2.44	2.30	3.50	1.66	1.7

Source: CFEC 1985.

--- means no data were available.

Table 12. Ex-vessel Value of Commercial Chinook Salmon Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kuskokwim	Bethel	212	583	1334	831	854	457	1201	1238	839
	Other Alaska*	**	**	**	**	3	1	5	6	2
	Alaska	**	**	**	**	856	457	1206	1243	841
	Other USA	**	**	**	**	0	0	0	**	1
	Unknown	**	**	**	**	7	4	5	**	25
	Subtotal	246	630	1417	843	863	461	1210	1256	866
Lower Yukon	Nome	20	67	48	63	53	155	216	125	93
	Yukon-Koyukuk	9	16	17	42	49	89	103	84	51
	Wade Hampton	478	989	1686	1640	2514	2992	3706	2881	2111
	Other Alaska*	6	13	37	26	63	102	168	191	76
	Alaska	513	1085	1788	1771	2679	3339	4193	3280	2331
	Other USA	**	**	**	**	**	**	**	**	2
	Unknown	**	**	**	**	**	**	**	**	61
	Subtotal	564	1280	1803	1822	2709	3399	4272	3301	2394
Upper Yukon	Yukon-Koyukuk	23	39	90	48	89	119	187	114	88
	Other Alaska*	8	13	36	25	25	21	38	45	26
	Alaska	31	51	126	73	114	139	225	160	115
	Unknown	4	11	3	0	0	4	0	0	3
	Subtotal	35	62	129	73	114	143	225	160	118
Total		845	1972	3349	2738	3686	4003	5707	4717	3377

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

from $29,000 in 1975 to $434,000 in 1981, with an average value of $153,000; on the average, 99% of the value was earned by Bethel Census Area fishermen (table 13). Sockeye salmon ex-vessel prices per pound were relatively stable from 1975 through 1984 (table 11).

Coho salmon ex-vessel values during the period 1975 through 1982 ranged from $172,000 in 1975 to $2.3 million in 1979 (table 14); ex-vessel prices per pound peaked for coho salmon in 1979 (table 11). On the average, Bethel Census Area fishermen earned approximately 99% of the average $1.2 million in harvest earnings (table 14).

Chum salmon ex-vessel values ranged from $331,000 in 1975 to $1.1 million in 1979, with an average of $737,000 for the years 1975-1982 (table 15). Chum salmon ex-vessel prices per pound peaked in 1979 but overall were fairly stable for the years 1975-1982 (table 11). On the average, Bethel Census Area fishermen earned approximately 97% of the harvest values (table 15).

Pink salmon accounted for less than 1% of the Kuskokwim area's ex-vessel values and averaged $18,000; 100% of the value was earned by Bethel Census Area fishermen (table 16).

d. Salmon-harvesting employment. For the years 1977-1982, commercial salmon-harvesting employment in the Kuskokwim Area occurred during the months of June, July, August, and September; June was the peak month of employment, with an average of 1,594 fishermen and crew employed (table 17, fig. 2). June employment showed a decreasing trend for the period and ranged from 1,403 fishermen and crew in 1980 to 1,778 fishermen and crew in 1979. The month of August, which was only slightly below June employment levels, showed similar trends.

Participation in the commercial salmon fishery has grown significantly since statehood as fishermen and rural communities have been making the transition from subsistence to more mixed subsistence-cash-based economies (ADF&G 1984a). The use of highly mobile nylon drift gill nets has also improved the efficiency of the fleet. Improvement of processing and tendering facilities in the Kuskokwim Area has also contributed to the expansion of the fishery (ibid.). Fishermen participation levels in the lower Kuskokwim River and Quinhagak portions of the management area have also increased as a result of their close proximity to population centers and liberal harvest goals. This is in contrast to more relatively remote portions of the management area that have smaller allowable harvest levels (ibid.).

Table 13. Ex-vessel Value of Commercial Sockeye Salmon Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kuskokwim	Bethel	27	60	80	55	134	91	428	333	151
	Other Alaska*	0	0	0	0	0	0	0	1	0
	Alaska	27	60	80	55	134	91	428	334	151
	Other USA	0	0	0	0	0	0	**	**	0
	Unknown	3	1	1	0	2	0	**	**	2
	Subtotal	29	61	81	55	136	91	434	336	153
Total		29	61	81	55	136	91	434	336	153

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 14. Ex-vessel Value of Commercial Coho Salmon Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kuskokwim	Bethel	153	331	1394	752	2270	1448	1115	2167	1204
	Other Alaska*	0	0	**	**	**	**	6	12	4
	Alaska	153	331	**	**	**	**	1121	2179	1207
	Other USA	0	0	**	**	**	**	0	**	1
	Unknown	18	27	**	**	**	**	3	**	14
	Subtotal	172	358	1439	756	2283	1457	1124	2189	1222
Lower Yukon	Wade Hampton	3	10	147	90	81	16	85	117	69
	Other Alaska*	0	1	9	6	7	1	7	8	5
	Alaska	3	10	156	96	88	17	92	125	73
	Unknown	0	1	3	2	1	0	0	1	1
	Subtotal	4	11	159	97	89	17	92	126	75
Upper Yukon	Yukon-Koyukuk	**	2	3	**	5	2	6	26	7
	Other Alaska*	**	2	1	**	1	0	2	4	1
	Alaska	0	3	4	12	7	2	8	30	8
	Subtotal	0	4	4	12	7	2	8	30	8
Total		176	373	1602	866	2379	1477	1225	2346	1305

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 15. Ex-vessel Value of Commercial Chum Salmon Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kuskokwim	Bethel	280	414	1037	663	1089	829	876	550	717
	Other Alaska*	**	**	**	**	4	5	2	2	2
	Alaska	**	**	**	**	1093	834	879	552	719
	Unknown	**	**	**	**	8	4	2	2	17
	Subtotal	331	445	1074	670	1100	839	881	554	737
Lower Yukon	Nome	50	48	44	58	120	49	133	59	70
	Yukon-Koyukuk	8	8	13	41	159	59	118	25	54
	Wade Hampton	811	815	1569	2102	3250	1395	3342	1720	1875
	Other Alaska*	17	16	31	54	121	60	137	112	68
	Alaska	886	887	1657	2255	3650	1563	3730	1916	2068
	Other USA	**	**	**	**	**	**	**	**	3
	Unknown	**	**	**	**	**	**	**	**	47
	Subtotal	992	1014	1684	2308	3683	1573	3770	1923	2118
Upper Yukon	Yukon-Koyukuk	233	351	300	740	659	407	486	121	412
	Fairbanks N Star	27	12	**	22	67	**	**	28	39
	Other Alaska*	0	10	**	45	14	**	**	0	13
	Alaska	261	373	351	807	740	447	588	149	465
	Unknown	12	68	5	0	5	0	4	0	12
	Subtotal	273	441	356	807	745	448	592	149	476
Total		1596	1900	3114	3785	5528	2860	5243	2626	3331

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 16. Ex-vessel Value of Commercial Pink Salmon Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kuskokwim	Bethel	1	52	1	71	0	14	0	1	17
	Alaska	1	52	1	71	0	14	0	1	17
	Unknown	0	2	0	0	0	0	0	0	0
	Subtotal	1	54	1	71	0	14	0	1	18
Total		1	54	1	71	0	14	0	1	18

Source: CFEC 1984a.

Table 17. Kuskokwim Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	389	0	0	0	0	0	1,625	1,460	1,585	0	0	0	0
1978	437	0	0	0	0	0	1,748	1,643	1,695	160	0	0	0
1979	446	0	0	0	0	0	1,778	1,673	1,748	158	0	0	0
1980	361	0	0	0	0	0	1,403	1,277	1,430	218	0	0	0
1981	385	0	0	0	0	0	1,520	1,361	1,480	260	0	0	0
1982	373	0	0	0	0	0	1,489	1,464	1,445	78	0	0	0
Average	401						1,595	1,480	1,564	146			

Source: CFEC 1984b.

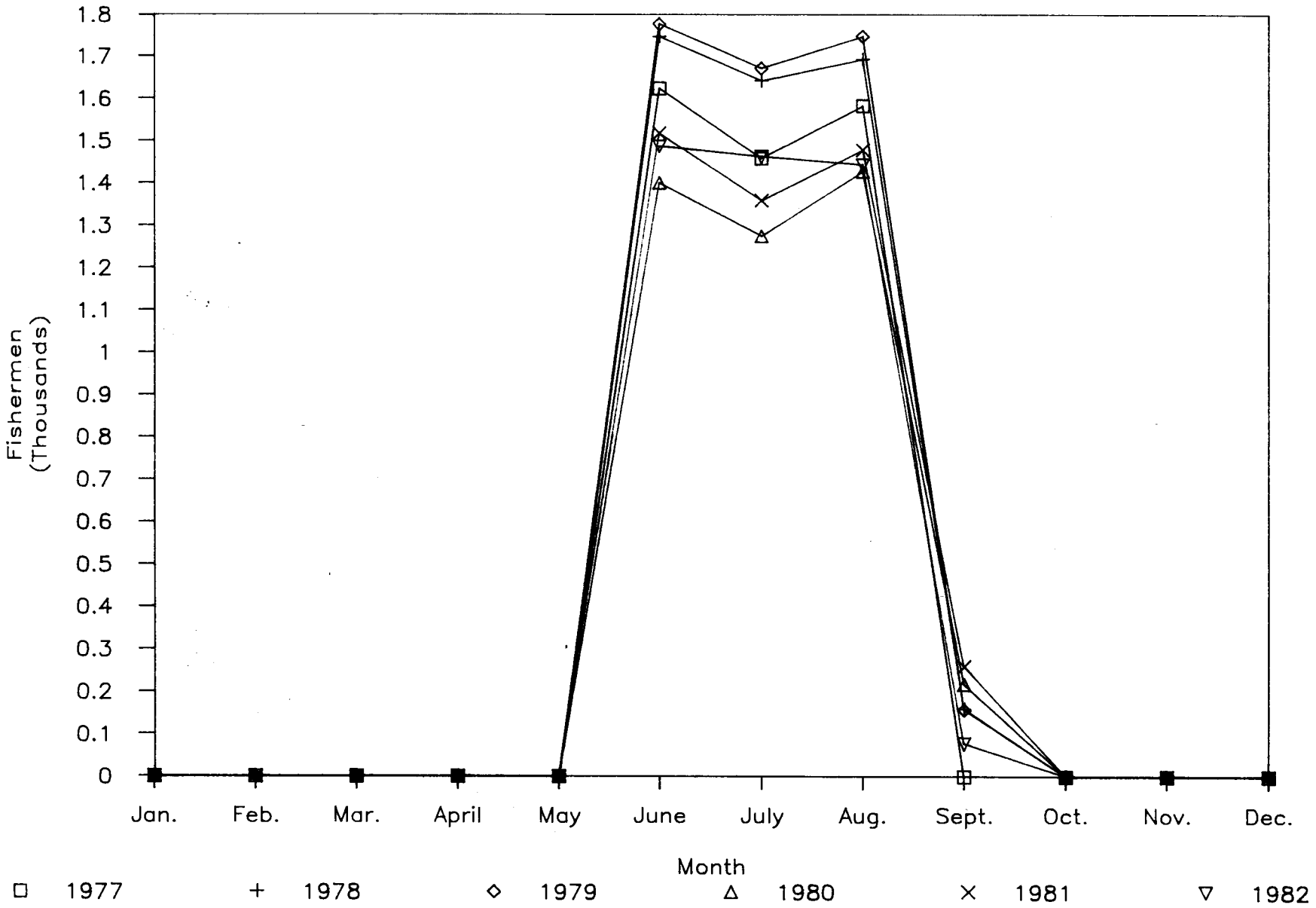


Figure 2. Kuskokwim salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

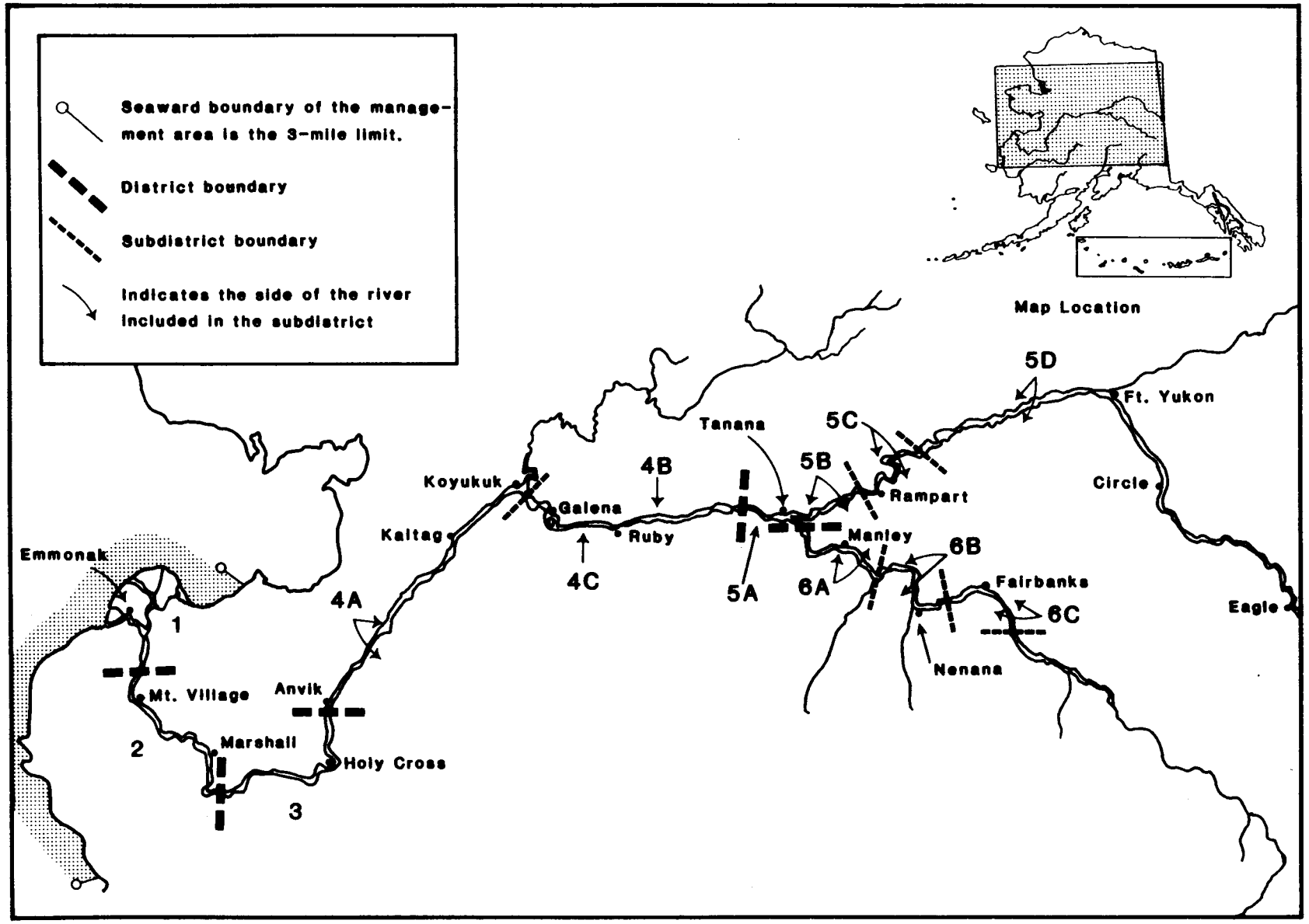
2. Yukon Management Area. The Yukon Management Area includes all waters of the Yukon River and its tributary streams in Alaska and all coastal waters between the latitude of Canal Point Light southward to the latitude of the westernmost tip of the Naskonat Peninsula (map 4). The river originates in British Columbia and flows over 2,300 miles to the Bering Sea (ADF&G 1984c). Subsistence and commercial fishing for salmon occurs along the length of the Yukon River. The primary harvested species are chinook, coho, and chum salmon, although limited numbers of sockeye and pink salmon are also present in the lower portion of the river. Although commercial and subsistence fishing activity extends across the border into Canada, most of the harvest is taken in the Alaska portion of the drainage.

In this section, commercial harvest ex-vessel values and employment are presented by subareas referred to as the Upper Yukon (Districts 4, 5, and 6) and Lower Yukon (Districts 1, 2, and 3).

a. Commercial fishery. The first commercial harvest of salmon in the Alaska portion of the Yukon River was reported in 1918. Relatively large catches of chinook, coho, and chum salmon were harvested during the first four years of the fishery (ADF&G 1984c). The emphasis on the upriver subsistence fishery resulted in the closure of the commercial fishery at the mouth of the river from 1925 through 1931 (ibid.). The commercial fishery targeting chinook salmon resumed in 1932 with less effort, and chinook salmon was the only species harvested on a sustained basis prior to 1959 (ibid.).

Major interest in the commercial fishery on the Yukon River has developed since 1961. Until recently, all commercial harvest was taken in the river delta portion of the Yukon River. In recent years, upper river commercial fishing has increased; it has been necessary to restrict harvests in the lower river to allow enough salmon upriver for fishing and spawning (Pope 1981). This recent expansion of the commercial salmon fisheries in Alaska has enabled many area residents to obtain cash income when other employment has been intermittent or nonexistent. Most of the commercial fishermen operating in the fishery and the processing plant workers are resident Eskimo and Athabaskan Indians. Most of the catch is processed as a fresh/frozen product (YTC 1985). Upper Yukon chinook and chum salmon eggs are considered among the finest in the world (Dinneford, pers. comm.) and command a very high ex-vessel price per pound (table 11).

The commercial fishery accounted for about 75% of the total salmon harvest in the Alaska portion of the Yukon area from 1975 through 1984. Currently, about 700 gill net permits (drift and set net combined) are issued



Map 4. Salmon commercial fishing districts and subdistricts of the Yukon Management Area (ADF&G 1984c).

annually for the Lower Yukon Subarea. About 75 set gill net permits and 170 fish wheel permits are issued for the Upper Yukon Subarea (ibid.).

Chum salmon made up about 87% of the commercial salmon harvest quantity in the Alaska portion of the Yukon area from 1975 through 1984. Chinook salmon accounted for about 11% and coho salmon for 2% of the commercial harvest in that period. Sockeye salmon are uncommon in the Yukon River, and pink salmon spawn in the lower portions of the drainage. Pink salmon are available on even-numbered years, but there is presently no market for them (Bergstrom, pers. comm.). Neither sockeye nor pink salmon harvests are significant in the commercial fishery (table 18) (YTC 1985).

b. Subsistence fishery. Based on the size of the reported harvest, the subsistence salmon fishery in the Alaska portion of the Yukon River drainage is the largest fishery of its kind in Alaska. About 10,000 to 15,000 Native and fewer non-Native people reside in 45 small remote communities scattered throughout the drainage. Most of these people are dependent to varying degrees upon the fishery resource for their livelihood. Chinook salmon are used almost exclusively for human consumption, whereas chum salmon are also fed to sled dogs (ibid.).

During the 1984 season, one or more members of 1,064 fishing families operated about 790 gill net and 170 fish wheel units for subsistence harvest of salmon. Often, the same fishermen take salmon for both commercial and subsistence purposes while using the same units of gear (ibid.).

Chum salmon make up about 86% of the total subsistence harvest for all salmon species in the drainage. Chinook salmon account for about 7% and coho salmon for 4% of the subsistence harvest. Sockeye and pink salmon make up the remainder (table 19).

c. Canadian fishery. Both commercial and subsistence salmon fisheries exist in the Canadian portion of the Yukon River drainage. The commercial harvest increased steadily between 1976 and 1984. It now accounts for about 1% of the commercial catch of the entire drainage (table 18). As many as 6,000 Canadian Natives rely on the subsistence fishery of the Yukon. A non-Native subsistence fishery also exists in Canada (YTC 1985).

d. Ex-vessel value. Between 1975 and 1982 ex-vessel values for the Yukon Management Area increased from approximately $1.9 million in 1975 to $9.4 million in 1981. The average ex-vessel value for the period was $5.6 million (table 20). The same increasing trend is evident when the

Table 18. Commercial Harvest of Salmon in Numbers of Fish in the Yukon River Management Area, by Subarea, Species, and by Year, 1975-84

Subarea/ Species	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Lower Yukon										
Chinook	60,077	83,114	90,602	94,846	121,523	145,626	149,310	116,191	142,792	114,407
Coho	2,488	4,081	37,577	23,053	14,219	7,489	21,396	29,381	7,152	73,157
Chum	732,901	513,509	559,346	839,456	812,190	948,967	1,255,267	635,826	933,890	686,677
Lower Yukon subtotal	795,466[a]	600,745[a]	687,525[a]	957,356[a]	947,939[a]	1,102,082	1,425,973	781,398	1,083,834	874,241
Upper Yukon										
Chinook	3,761	4,662	6,155	4,322	6,150	8,359	8,708	7,453	5,118	5,497
Coho	58	1,103	1,286	3,099	2,946	1,256	2,284	7,795	6,168	8,783
Chum[b]	252,403	243,775	233,515	449,153	327,072	273,072	218,122	49,785	113,587	110,152
Upper Yukon subtotal	256,222	249,540	240,956	456,574	336,168	282,687	229,114	65,033	124,873	124,432
Total Alaska catch	1,051,688	850,285	928,481	1,413,930	1,284,107	1,384,769	1,655,087	846,431	1,208,707	998,673
Canada	5,500	4,500	8,710	6,331	15,259	18,500	23,853	19,952	39,017	32,817
Yukon drainage total	1,057,188	854,785	937,191	1,420,261	1,299,366	1,403,269	1,678,940	866,383	1,247,724	1,031,490

Source: ADF&G 1984c, YTC 1985.

a Catch figures include number of pink and sockeye salmon (less than 300 fish).

b Upper Yukon chum totals are fish sold in the round; does not include roe sales.

Table 19. Subsistence Harvest of Salmon in Numbers of Fish in the Yukon River Management Area, by Subarea, Species, and by Year, 1975-84

Subarea/ Species	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984[a]
Lower Yukon										
Chinook	6,762	7,041	4,977	13,112	10,410	12,126	9,863	7,779	20,238	16,151
Coho	---	---	7,151	1,963	4,328	6,700	8,015	22,096	10,579	13,817
Chum	54,985	65,543	62,581	58,203	79,584	61,783	68,655	86,016	88,705	98,794
Lower Yukon subtotal	61,747	72,584	74,709	73,278	94,322	80,609	86,533	115,891	119,522	114,945
Upper Yukon										
Chinook	6,104	10,765	12,604	17,185	20,595	30,598	19,827	20,379	29,240	26,238
Coho	---	---	9,182	5,824	5,466	13,458	13,213	13,798	13,316	35,119
Chum	231,894	195,547	196,026	241,688	359,741	403,430	249,292	343,744	368,506	355,371
Upper Yukon subtotal	237,998	206,312	217,812	264,697	385,802	447,486	282,332	377,921	411,062	381,609
Total Alaska catch	299,745	278,896	292,521	337,875	480,065	528,095	368,865	493,812	530,584	496,554
Canada	21,100	5,725	11,296	9,116	17,200	27,764	16,737	13,047	9,125	12,445
Yukon drainage total	320,845	284,621	303,817	346,961	497,265	555,859	385,602	506,859	539,709	508,999

Source: ADF&G 1984c; YTC 1985; Geiger, pers. comm.

a Preliminary data.

Table 20. Ex-vessel Value of Commercial Salmon Harvest for the Yukon Management Area by, Subarea and Species, 1975-82[a]

	Estimated Ex-vessel Value in Thousands of Dollars								
Subarea/Species	1975	1976	1977	1978	1979	1980	1981	1982	Average
Lower Yukon									
Chinook	564	1,280	1,803	1,822	2,709	3,399	4,272	3,301	2,394
Coho	4	11	159	97	89	17	92	126	75
Chum	992	1,014	1,684	2,308	3,683	1,573	3,770	1,923	2,118
Subtotal	1,560	2,306	3,646	4,227	6,481	4,989	8,139*	5,35	4,588
Upper Yukon									
Chinook	35	62	129	73	114	143	225	160	118
Coho	0	4	4	12	7	2	8	30	8
Chum	273	441	356	807	745	448	592	149	476
Roe	0	0	0	0	0	359	467	562	463**
Subtotal	308	507	488	892	866	952	1,292	901	776
Area total	1,868	2,794	4,134	5,119	7,347	5,941	9,431	6,252	5,653

Source: CFEC 1984a.

* Contains $5,000 for salmon roe.

** Three-year average.

a Yukon area management reports indicate estimated ex-vessel values for the same period ranged from $1.8 million in 1975 to $10.1 million in 1982 and averaged $6.3 million (Anderson, pers. comm.).

ex-vessel value is divided into the Upper and Lower Yukon subareas.

Ex-vessel values during the period 1975 through 1982 in the Lower Yukon increased from $1.6 million in 1975 to $8.1 million in 1981, with an average of $4.6 million (table 20). Chinook salmon averaged for 52% of the Lower Yukon ex-vessel value for the same period. Chum and coho salmon averaged for 46 and 2%, respectively. A relatively small amount of salmon roe was sold in 1981 (table 20). Approximately 88% of the total salmon harvest values was earned by fishermen from the Wade Hampton Census Area (table 5). Fishermen from the Nome Census Area earned 4%, and Yukon-Koyukuk Census Area fishermen earned 2% of the Lower Yukon ex-vessel values. Anchorage Census Area fishermen earned 1%; the remaining 2% went to other Alaska fishermen, who were primarily from the Southcentral Region. The proportion of earnings to Southcentral Region fishermen increased over the time period 1975-1982. Fishermen from outside Alaska earned less than 1% (table 5).

Ex-vessel values in the Upper Yukon increased from $308,000 in 1975 to $1.3 million in 1981, with an average value of $776,000 (table 20) for the period 1975 through 1982. Chum salmon accounted for 61% of the values during the same period. Chinook and coho salmon and salmon roe accounted for 15, 1, and 22%, respectively. Chinook salmon values peaked in 1981, primarily as a result of an especially high ex-vessel price per pound (table 11) and because the harvest quantity was also high (table 18). Chum salmon ex-vessel value peaked in 1979 because of an unusually high ex-vessel value price per pound (table 11). The 1982 drop in chum ex-vessel value was because of a decrease in catch (table 18).

Fishermen from the Yukon-Koyukuk Census Area earned 87% of the 1975 to 1982 Upper Yukon total salmon harvest ex-vessel values (table 5). Fairbanks North Star Borough fishermen earned 8%; other Alaska fishermen (primarily from the Southcentral Region) earned the remaining 5% (table 5). Approximately 95% of the salmon roe ex-vessel values were earned by fishermen from the Yukon-Koyukuk Census Area (table 21).

e. Salmon-harvesting employment. Salmon-harvesting employment in the Yukon Management Area for the years 1977-1982 is presented for the Lower Yukon (table 22, fig. 3) and the Upper Yukon (table 23, fig. 4). Salmon commercial harvesting employment occurred in May, June, July, and August in the Lower Yukon; the peak month was June. The number of fishermen and crew harvesting salmon in June ranged from 1,382 in 1981 to 1,598 in 1979. The peak of the chinook salmon harvest in the Lower Yukon is

Table 21. Ex-vessel Value of Commercial Salmon Roe Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.[a]
Kuskokwim	Bethel	0	0	0	**	**	14	2	**	4
	Subtotal	0	0	0	**	**	14	2	**	4
Upper Yukon	Yukon-Koyukuk	0	0	0	0	0	340	445	539	331
	Other Alaska*	0	0	0	0	0	4	24	23	12
	Alaska	0	0	0	0	2	344	469	562	343
	Unknown	0	0	0	0	0	16	2	0	5
	Subtotal	0	0	0	0	2	360	471	562	348
Total		0	0	0	0	2	375	474	564	352

Source: Base information obtained from CFEC 1984a.

a Four-year average.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 22. Lower Yukon Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	334	0	0	0	0	0	1,425	1,380	1,208	0	0	0	0
1978	362	0	0	0	0	0	1,558	1,470	1,315	0	0	0	0
1979	382	0	0	0	0	0	1,598	1,563	1,420	0	0	0	0
1980	317	0	0	0	0	104	1,432	1,241	1,023	0	0	0	0
1981	327	0	0	0	0	224	1,382	1,312	1,002	0	0	0	0
1982	332	0	0	0	0	0	1,501	1,363	1,123	0	0	0	0
Average	342	0	0	0	0	55	1,483	1,388	1,182	0	0	0	0

Source: CFEC 1984b.

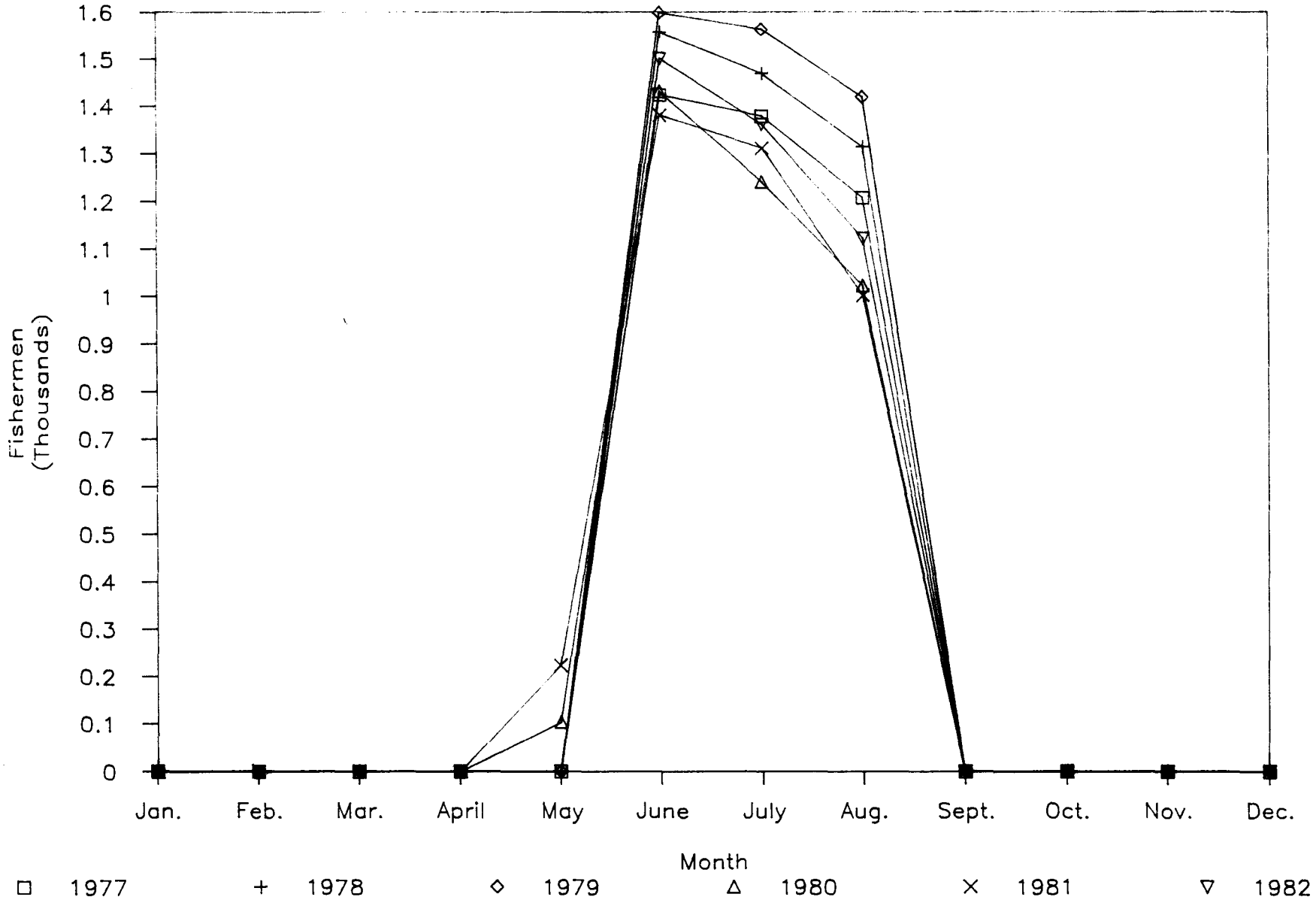


Figure 3. Lower Yukon salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

Table 23. Upper Yukon Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	32	0	0	0	0	0	6	201	85	97	0	0	0
1978	47	0	0	0	0	0	132	217	105	114	0	0	0
1979	47	0	0	0	0	0	138	190	121	114	0	0	0
1980	39	0	0	0	0	0	104	186	114	63	0	0	0
1981	37	0	0	0	0	0	133	161	112	40	0	0	0
1982	28	0	0	0	0	0	54	176	48	63	0	0	0
Average	39	0	0	0	0	0	96	189	98	82	0	0	0

Source: CFEC 1984b.

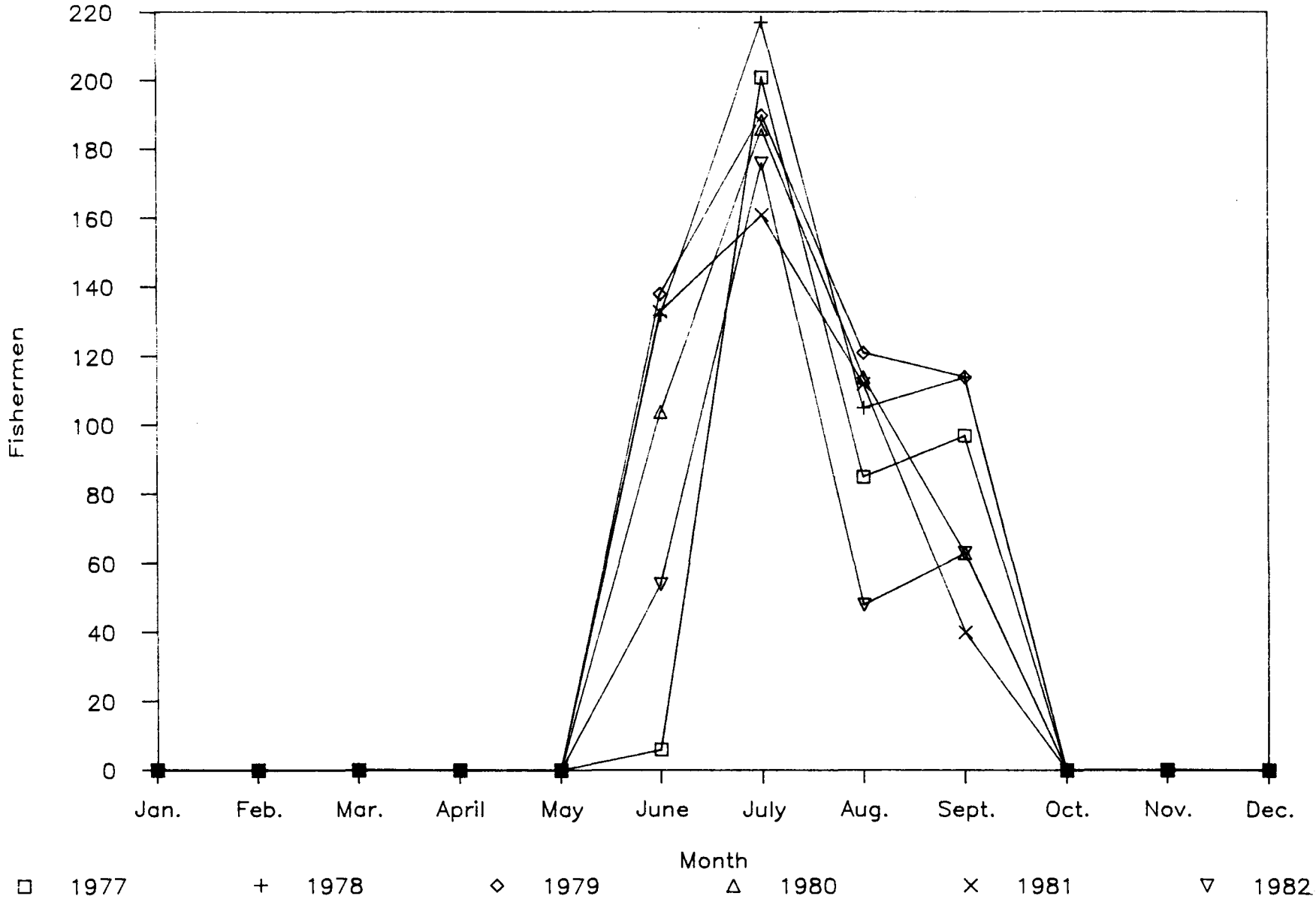


Figure 4. Upper Yukon salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

approximately mid-to-late June (McBride et al. 1983; Buklis and Wilcock 1984, 1985; Geiger, pers. comm.). June Lower Yukon employment averaged 1,483 fishermen and crew for the years 1977-1982 (table 22). July employment ranged from 1,241 in 1980 to 1,563 in 1979, with an average of 1,388; the peak of the summer chum salmon harvest occurs in July (McBride et al. 1983; Buklis and Wilcock 1984, 1985). August employment ranged from 1,002 in 1981 to 1,420 in 1979, with an average of 1,182; the peak of the fall chum salmon harvest occurs in August (ibid.). May salmon-harvesting employment was relatively small and occurred only in 1980 and 1981 (table 22).

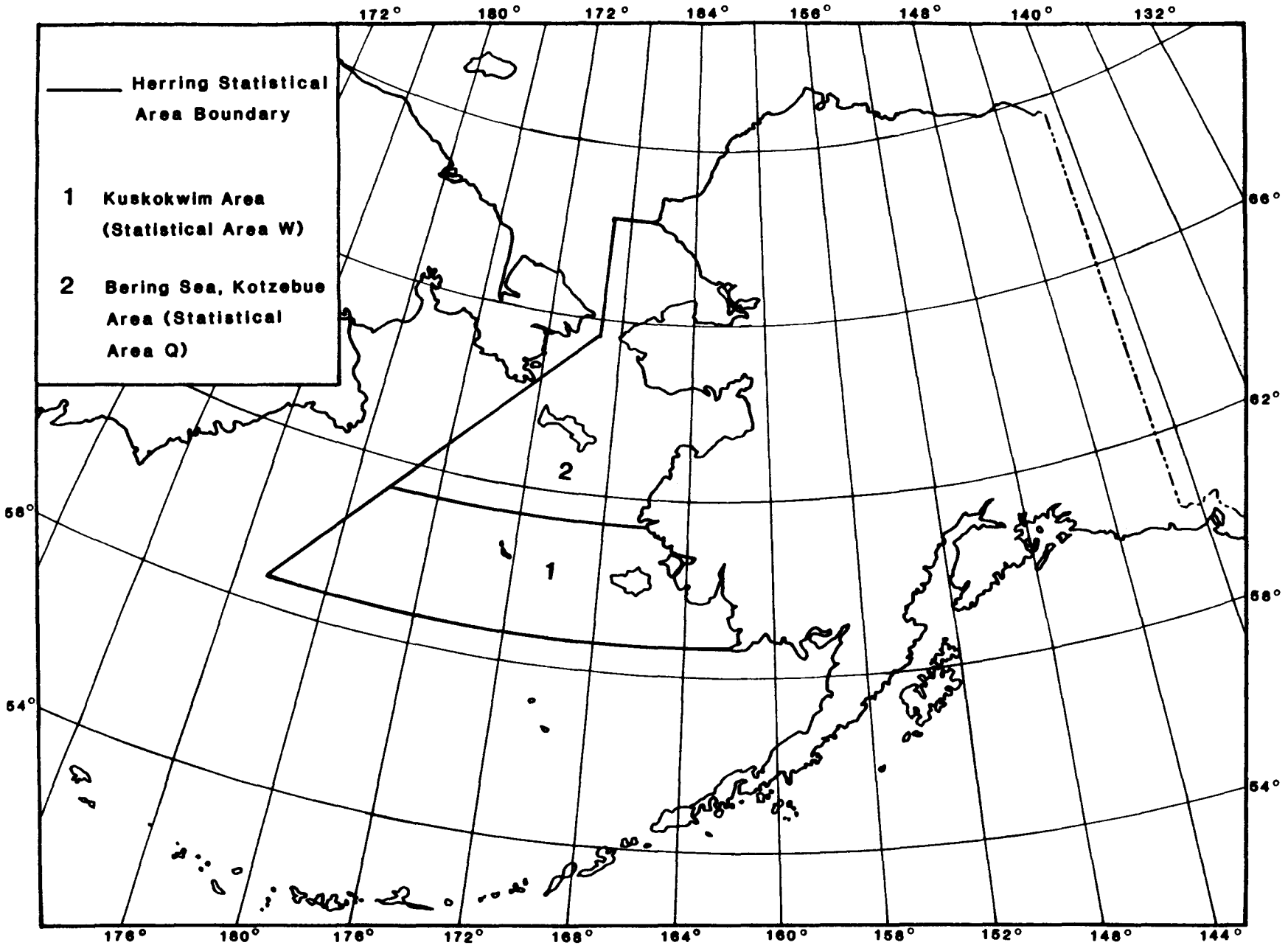
Upper Yukon commercial harvesting employment was much lower than employment in the Lower Yukon during the years 1977-1982 (table 23). July was the peak month of employment, ranging from 161 fishermen and crew in 1981 to 217 in 1978. The average July employment for the period was 189 fishermen and crew. June and August employments were similar and averaged 96 and 98 for the period. September employment averaged 82 fishermen and crew (table 23). The peak of the chinook salmon run in the Upper Yukon occurs in late June and July; the peak of the summer chum salmon run occurs in July; and the peak of the fall chum salmon run occurs in August and September (McBride et al. 1983; Buklis and Wilcock 1984, 1985; Geiger, pers. comm.).

III. PACIFIC HERRING FISHERY

A. Regional Overview

Through the 1984 season, the Western Region encompassed Herring Statistical Area W (map 5). This area, which is known as the Kuskokwim Area, has as its southern boundary a line extending west from Cape Newenham and as its northern boundary a line extending west from Dall Point (ADF&G 1985c). The Western Region also includes a portion of Statistical Area Q, or the Bering Sea, Kotzebue Area (map 5). Statistical Area Q has as its southern boundary a line extending west from Dall Point and as its northern boundary a line extending west from Point Hope. The International Dateline forms the western boundary of Statistical Areas Q and W (ibid.). In this section, Statistical Area W is referred to as the Kuskokwim Area, and Statistical Area Q is referred to as the Lower Yukon Area. For more information on Pacific herring harvests in the Western Region, see the Human Use section in volume 2 of the Alaska Habitat Management Guide for the Western and Interior regions.

Subsistence use of herring in the Western Region appears to have occurred at least as early as 2,000 years ago (Hemming et al. 1978). Currently, villages located on the Yukon-Kuskokwim delta exhibit the greatest dependence upon herring for subsistence purposes in the State of Alaska (ibid.). Surveys have been conducted since 1975 to estimate subsistence harvests. These estimates, though minimal



Map 5. Herring statistical area boundaries (ADF&G 1985e).

because not all families are surveyed, indicate a peak subsistence harvest of up to 102.5 metric tons taken during the 1979 fishery (table 24).

Commercial herring fishing in the Western Region is a relatively recent development, commencing in the late 1970's in some parts of the region and in the 1980's in other parts. Development of the fishery is in response to the growth of the oriental sac roe markets. Catches have grown from a low of 259 metric tons in 1978 to a peak of 4,272 metric tons in 1985 (table 25). Participation has varied from a low of 102 permits fished in 1979 to a high of 429 permits fished in 1985 (table 25). Herring may be harvested only with gill nets in the Western Region.

B. Ex-vessel Value

Herring ex-vessel value information for the Western Region is available for the years 1979-1982 (table 26). Food/bait harvests and ex-vessel values (table 27) were primarily incidental to the sac roe herring harvests. Sac roe herring harvests ex-vessel values ranged from $264,000 in 1979 to $1.3 million in 1981 and averaged $658,000 (table 26). The peak harvest value in 1981 was primarily from increased harvest levels (table 24) rather than from increased ex-vessel price per pound (table 28). Approximately 57% of the ex-vessel value was earned by fishermen from the Bethel and Wade Hampton census areas. Fishermen from census areas in the Southcentral, Southwest, and Southeast regions earned approximately 17% of the ex-vessel values (CFEC 1984a). Out-of-state fishermen earned 26% of the average 1979-1982 ex-vessel values (table 26).

C. Commercial Herring-Harvesting Employment

Commercial herring-harvesting employment in the Western Region occurred in May and June in the years 1979-1982 (table 29). The peak month was May; employment ranged from 198 fishermen and crew in 1979 to 738 fishermen and crew in 1980 (table 29). The average May employment was 531 fishermen and crew for the years 1979-1982.

D. Management Area Summaries

1. Kuskokwim Management Area. Statistical Area W, the Kuskokwim Area, includes the Security Cove, Goodnews, Nelson Island,and Nunivak districts (ADF&G 1985c). In 1985, Security Cove became a separate Statistical Area S, and Nelson-Nunivak became Statistical Area N (Francisco, pers. comm.). Commercial herring fishing in the Nelson-Nunivak districts began in 1985. Therefore, this narrative, which covers the years 1975-1982, includes only ex-vessel values of harvests in the Security Cove and Goodnews districts and refers to them as the Kuskokwim Management Area. Commercial herring harvesting began in the Security Cove District in 1978 and was initiated in the Goodnews Bay District in 1979. Harvest quantities are presented in table 25 (ADF&G 1986).

Table 24. Subsistence Harvest of Pacific Herring in Metric Tons in the Western Region, 1975-84

Area	Fishing Season									
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Nelson Island harvest	80.8	61.2	74.0	78.5	85.0	88.9	58.0	75.4	85.0	a
No. fishing families	109	42	90	83	54	70	93	65	43	a
Yukon-Kuskokwim delta harvest	2.5	13.5	3.1	4.1	17.5	21.3	12.2	21.5	8.3	9.9
No. fishing families	34	49	39	29	106	80	45	64	37	46
Total subsistence harvest	83.3	74.7	77.1	82.6	102.5	110.2	70.2	96.9	93.3	---
Total no. fishing families	143	91	129	112	160	150	138	129	80	---

Source: Lebida et al. 1984

--- means no data were available.

a Not surveyed.

Table 25. Commercial Harvest of Pacific Herring in Metric Tons and Effort in Numbers of Permits for the Western Region, by District and by Year, 1978-85

Fishing District	Fishing Season							
	1978	1979	1980	1981	1982	1983	1984	1985
Security Cove								
Harvest	259	385	632	1,064	737	973	295	703
Effort	---	61	175	113	107	94	38	107
Goodnews Bay								
Harvest	---	82	406	596	441	395	605	724
Effort	---	41	165	175	84	84	130	83
Nelson Island								
Harvest	---	---	---	---	---	---	---	977
Effort	---	---	---	---	---	---	---	143
Nunivak Island								
Harvest	---	---	---	---	---	---	---	358
Effort	---	---	---	---	---	---	---	37
Cape Romanzof								
Harvest	---	---	554	653	596	740	1,075	1,178
Effort	---	---	69	111	75	63	66	75
Total regional harvest	259	467	1,592	2,313	1,774	2,108	1,975	3,940

Source: Lebida et al. 1984, Geiger 1985, Francisco 1985, Schultz 1985.

Table 26. Ex-vessel Value of Commercial Roe Herring Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1979-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1979	1980	1981	1982	Avg.
Kuskokwim	Bethel	101	87	744	157	272
	Wrangell-Petersburg	0	22	61	43	32
	Other Alaska*	64	55	95	52	66
	Alaska	165	164	900	253	370
	Other USA	89	81	195	143	128
	Unknown	11	0	3	0	4
	Subtotal	264	245	1099	396	500
Lower Yukon	Wade Hampton	0	57	128	216	100
	Other Alaska*	0	8	27	9	12
	Alaska	0	65	155	225	112
	Other USA	0	87	58	36	46
	Unknown	0	0	3	1	2
	Subtotal	0	152	216	262	158
Total		264	397	1315	658	658

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

Table 27. Ex-vessel Value of Commercial Food/Bait Herring Harvest for Western and Interior Alaska Fishery Management Areas, by Origin of Fishermen, 1979-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1979	1980	1981	1982	Avg.
Kuskokwim	Bethel	0	2	4	16	6
	Other Alaska*	0	2	0	16	4
	Alaska	0	4	5	32	10
	Other USA	0	2	1	13	4
	Unknown	0	0	0	1	0
	Subtotal	0	6	5	46	14
Total		0	6	5	46	14

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

Table 28. Commercial Herring Ex-vessel Price per Pound in the Western Region, by Management Area, 1979-82

Area	1979	1980	1981	1982
Kuskokwim				
Sac roe gill net	0.27	0.16	0.15	0.17
Lower Yukon				
Sac roe gill net	0.27	0.13	0.15	0.20

Source: CFEC 1985.

Subsistence harvest in the Security Cove-Goodnews districts is very small and therefore is not monitored. In the Nelson-Nunivak districts, subsistence harvests averaged about 76 metric tons annually from 1975 through 1984 (Lebida et al. 1984).

a. Ex-vessel value. Ex-vessel values for the Kuskokwim Management Area are available from 1979 through 1982. The harvest values ranged from $245,000 in 1980 to $1.1 million in 1981, with an average value of $500,000 (table 26). Fishermen from the Bethel Census Area earned 54% of the 1979-1982 ex-vessel values; fishermen from the Wrangell-Petersburg Census Area earned 6% (table 26). Other Alaska fishermen, from a variety of census areas in the Southcentral, Southwest, and Southeast regions (CFEC 1984a), earned 13% of the management area's ex-vessel harvest values (table 26).

b. Commercial herring-harvesting employment. Herring-harvesting employment in the Kuskokwim Management Area occurred during the months of May and June from 1979 through 1982 (table 29). May was the primary month of employment; the number of fishermen and crew employed ranged from 198 in 1979 to 634 in 1980, with an average of 409 (table 29). June employment occurred in 1979 and 1982 and averaged 101 fishermen and crew.

2. Lower Yukon Management Area. In the Cape Romanzof District, which is referred to as the Lower Yukon Subarea in this narrative. On the Yukon-Kuskokwim delta, the villages of Hooper Bay, Chevak, and Scammon Bay have a long tradition of subsistence use of herring and herring roe-on-kelp (Hemming et al. 1978). These villages have been surveyed annually since 1975. Results of these surveys indicate that an average of 11.4 metric tons are harvested annually (1975-1984) (table 24). A peak harvest of 21.5 metric tons was taken by 64 families in 1982. Subsistence surveys are believed to reflect harvest trends, and reported catches represent minimum figures because all fishermen cannot be contacted (Lebida et al. 1984).

The Cape Romanzof fishery is one of the most recently developed commercial herring sac roe fisheries along the eastern Bering Sea coast. First landings were reported in 1980, when 69 permit holders harvested about 554 metric tons; harvests have steadily increased since then (table 25). Implementation of exclusive and superexclusive registration policies, beginning in 1982, has increased the success of local fishermen in the fishery. During the 1980 season, local fishermen accounted for about 40% of the harvest (Regnart and Kingsbury 1980). In 1984, local fishermen accounted for about 99.8% of the harvest (Lebida et. al. 1984). In 1985, the percentage dropped somewhat to 94.1% (Geiger 1985). Cape Romanzof fishermen caught 54 and 33% of the Western Region's commercial herring harvest in 1984 and 1985, respectively.

Table 29. Commercial Herring-Harvesting Employment (Number of Fishermen and Crew) in the Kuskokwim and Lower Yukon Management Areas, 1979-82

Area/Year	May	June
Kuskokwim		
1979	198	25
1980	634	0
1981	498	0
1982	306	176
Average	409	101
Lower Yukon		
1979	a	a
1980	104	96
1981	224	2
1982	158	0
Average	162	33
Western Region total		
1979	198	25
1980	738	96
1981	722	2
1982	464	176
Average	531	75

Source: CFEC 1984b.

a No fishery during 1979.

a. Ex-vessel value. Commercial ex-vessel values in the Lower Yukon/Cape Romanzof area ranged from $152,000 in 1980 to $262,000 in 1982 and averaged $158,000 for the period (table 26). Approximately 63% of the average 1980 to 1982 ex-vessel value was earned by fishermen from the Wade Hampton Census Area (table 26). The percentage of earnings to Wade Hampton fishermen increased from 38% in 1980 to 82% in 1982 (table 26) and is a reflection of the effects of exclusive and superexclusive registration. Earnings to out-of-state fishermen decreased from 57% in 1980 to 14% in 1982 (table 26).

b. Commercial herring-harvesting employment. Commercial-herring harvesting employment in the Cape Romanzof/Lower Yukon area occurred in May and June during the years 1980 to 1982 (table 29). May employment averaged 162 fishermen and crew for the years 1980 to 1982 and ranged from 104 fishermen and crew in 1980 to 224 fishermen and crew in 1981 (table 29).

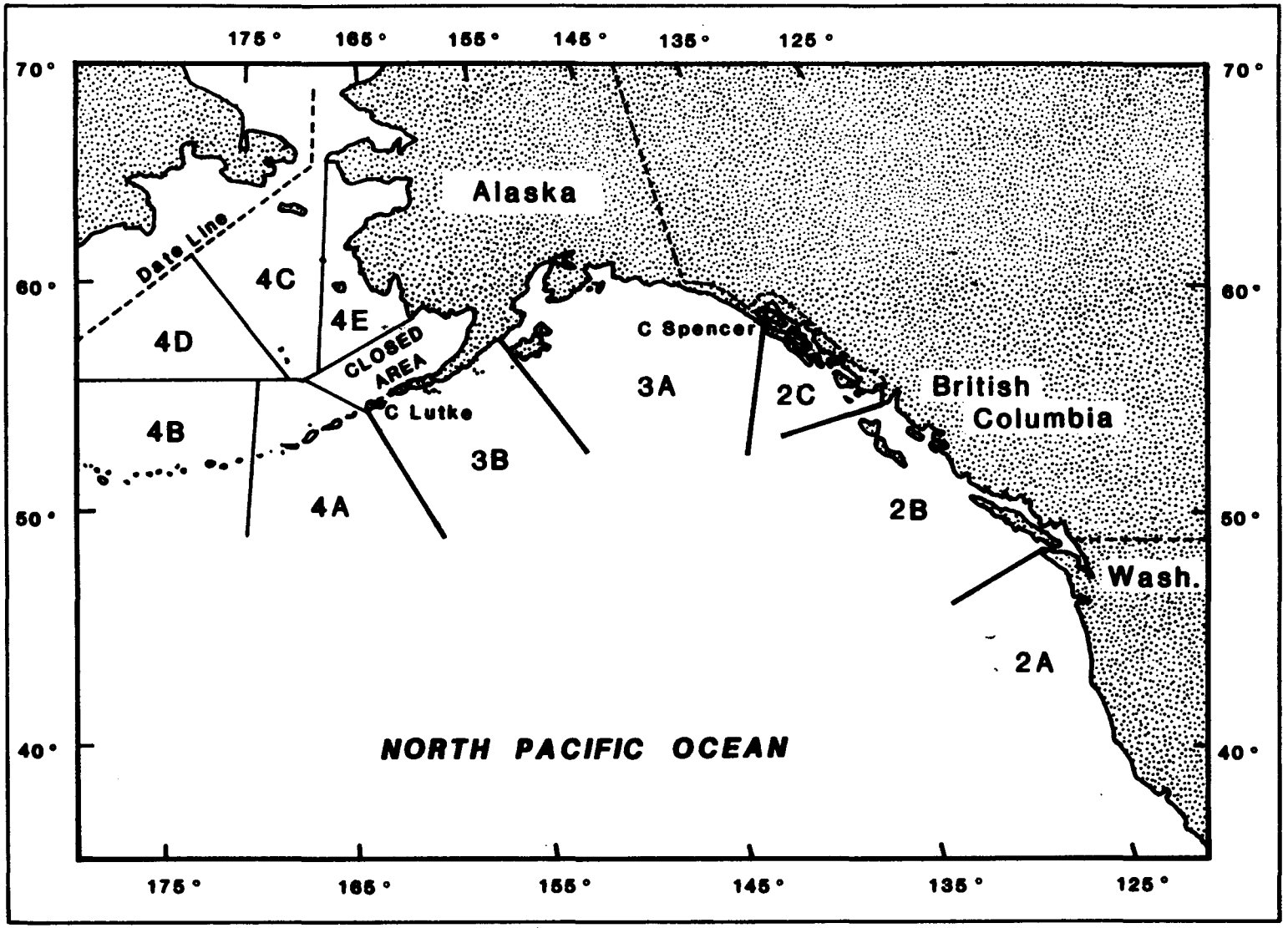
IV. COMMERCIAL HALIBUT FISHERY

A. Regional Overview

The halibut fishery in the Western Region corresponds to regulatory Area 4E established by the IPHC in 1984. Area 4E includes all waters in the Bering Sea north of the closed area, east of longitude 168°W, and south of Cape Prince of Wales (map 6) (IPHC 1985). Ex-vessel values for halibut in the Bering Sea are presented in the Commercial Fishing in the Southwest Region section in this volume. The Bering Sea, however, extends beyond the Southwest Region. This Western Region narrative provides information on background, harvest, and ex-vessel prices per pound for the commercial halibut fishery. This information enables the calculation of halibut ex-vessel values for the Western Region. It should be noted, however, that figures calculated for the Western Region should not be added to halibut ex-vessel values for the Southwest Region because this would be double-counting. Details of harvests, management, and other aspects of the Bering Sea halibut fishery can be found in the Human Use section of the Alaska Habitat Management Guide for the Western and Interior regions.

Halibut fishing in the Bering Sea did not occur until 1930. Development of the Bering Sea fishery was slow because of the area's distance from home ports, poor weather conditions, and the small size of the halibut stocks. In addition, fishing in the Gulf of Alaska was profitable, giving little reason for the fleet to consider major expansion of their operation into the Bering Sea area (Best 1981). A few boats fished the Bering Sea from 1930 to 1934. After a few years it was discontinued but resumed in 1952.

To attract fishermen to the Bering Sea, the opening date was scheduled one month earlier than that of the Gulf of Alaska (ibid.).



Map 6. Regulatory areas for the Pacific halibut fishery, 1984 (IPHC 1984b).

Harvest levels responded to this change, reaching 3,321 metric tons (dressed weight) in 1962 (Best 1981, Myhre et al. 1977). Until this date, harvests in the Bering Sea had been equally divided between the United States and Canadian vessels (Myhre et al. 1977); the Japanese were allowed to enter the fishery in 1963 (Best 1981). Harvests peaked in 1963 at 3,300 metric tons dressed weight. Japan withdrew from the fishery after 1964, and Canada ceased operations in 1979 with the development of the Canadian domestic halibut fishery (Best 1981). Catches from 1975 through 1984 were slightly higher than the previous decade, averaging about 375 metric tons annually (table 30). The Bering Sea catch was about 3% of the total North Pacific harvest over the period. Ex-vessel prices per pound for the years 1975-1982 are presented in table 31.

The Nelson Island halibut fishery is the only small local fishery in the Western Region for which information is available. The commercial fishery began in 1982, when 35 fishermen harvested three metric tons. The next year, 42 fishermen caught seven metric tons (NPFMC 1984). Harvest is primarily by longline according to IPHC records because gear operators use a longline license (IPHC 1984c). Many local villagers, however, have traditionally caught halibut by jigging with line dropped from a wooden spool (Cullenberg 1984).

Table 30. Commercial Harvest Data (in Metric Tons Dressed Weight) for Halibut Taken from the North Pacific Ocean and From the Bering Sea, 1975-84

Area	Subarea	Fishing Season 1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Bering Sea[a]											
	4A	1	15	9	20	1	7	21	7	78	50
	4B	121	86	122	94	57	74	209	68	176	41
	4C	20	20	58	34	93	43	121	108	240	478
	4D	96	117	119	150	282	59	78	36	167	202
	4E[b]	---	---	---	---	---	---	---	3.7	16.0	15.9
Bering Sea (Area 4) total		238	238	308	298	433	183	429	189	661	771
North Pacific total 2A through 4E		12,526	12,489	9,919	9,973	10,220	9,918	11,671	13,157	17,410	2,039

Source: Myhre et al. 1977; IPHC 1977, 1978a, 1979, 1981, 1982a, 1983a; Quinn, pers. comm.; ADF&G 1984d.

--- means no data were available.

a Harvest data from subarea are not comparable from year to year because of changes in subarea boundaries.

b Area 4E as defined in IPHC (1984).

Table 31. Estimated Ex-vessel Price per Pound for Commercial Halibut Landings, 1975-1984*

1975	0.89
1976	1.26
1977	1.31
1978	1.70
1979	2.13
1980	0.99
1981	1.02
1982	1.09
1983	1.13
1984	0.75

Source: IPHC 1985.

--- mean no data were available.

* These are average prices; price can vary considerably by port and date of landing.

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Commercial and Subsistence Fishing in the Arctic Region

I. INTRODUCTION

This section presents information on the commercial and subsistence harvest of salmon, herring, and king crab in the Arctic Region (map 1). Alaska state law allows commercial fishermen to retain a portion of their commercial harvest for personal use. Commercial fishermen, however, cannot harvest fish during subsistence openings. Because of the overlap between the subsistence and commercial harvesting of fish and the relatively complete subsistence fishing database in the Arctic Region, both aspects of harvesting are included in this narrative.

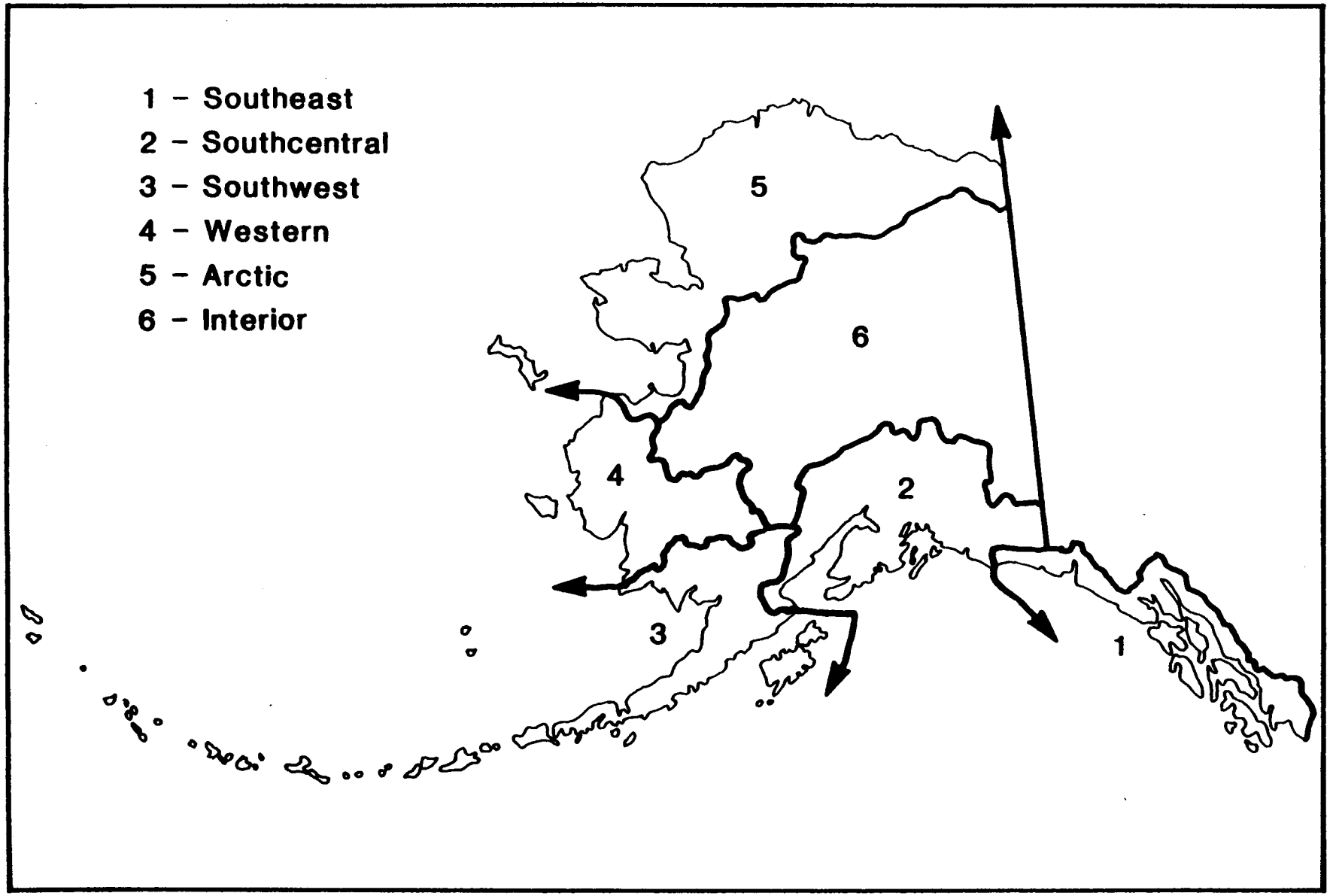
This is not, however, an exhaustive coverage of subsistence fishing in the region. (For more information, see the sections on Human Use, Commercial Fishing, and Subsistence and Other Local Use of Resources in volume 2 of the Alaska Habitat Management Guide for the Arctic Region.)

Subsistence harvest of salmon, herring, and king crab has traditionally occurred in the Arctic Region and is very important to local residents. Commercial harvests are relatively recent because of the region's inaccessibility, lack of processing facilities, and lower abundance of higher valued species. Since 1975, however, salmon and herring ex-vessel values in the region have generally increased (table 1).

A. Ex-vessel Values

Ex-vessel values for the salmon and herring fisheries are presented in table 1. As mentioned above, ex-vessel values in these fisheries have generally increased from 1975 through 1982. Salmon ex-vessel values ranged from $734,000 in 1976 to $4.2 million in 1981, with an average of $2.1 million (table 1). Despite incomplete data, it is apparent that herring ex-vessel values have increased dramatically, from $773,000 in 1979 to $1.3 million in 1981, with an average of $1.0 million (table 1).

Ex-vessel values in the Arctic Region salmon fisheries from 1975 through 1982 were earned primarily (95%) by fishermen who were residents of the region (table 13). In contrast, only 34% of the Arctic Region average sac roe herring ex-vessel value during the period was earned by fishermen who were residents of the region; the remainder was earned by fishermen from other Alaska regions and out-of-state fishermen (table 29). Eighty-four percent of the roe-on-kelp ex-vessel values were earned by residents of the Arctic Region (table 31).



Map 1. The six regions of the Alaska Habitat Management Guides.

Table 1. Ex-vessel Value ($) of Commercial Salmon and Herring in the Arctic Region, 1975-82

Species	Estimated Ex-vessel Value in Thousands of Dollars								
	1975[a]	1976[a]	1977[a]	1978[a]	1979	1980	1981	1982	Avg.
Salmon	1,726	734	1,619	1,289	1,935	2,192	4,202	3,210	2,113
Herring	---	---	---	---	773*	765*	1,347*	1,174	1,015
Total	1,726	734	1,619	1,289	2,708	2,957	5,549	4,384	2,620[b]

Source: CFEC 1984a.

--- means no data were available.

* Does not include food/bait because of nondisclosure regulations.

a Values for salmon only.

b Underestimate because of incomplete data.

B. First-Wholesale Value

All Division of Commercial Fisheries production information (product weight and wholesale values) summarizes production data listed in the Operator's Annual Reports (see Appendix A.1). The initial processors of raw fish and shellfish caught in Alaska file one Operator's Annual Report for each processing facility and each management area in which the fish and shellfish were bought and/or processed. The ADF&G, Division of Commercial Fisheries, catch and production reports include only fish and shellfish processed within Alaska. The weights (pounds) reported for production are weights of finished products and do not include package weights. Production values (first wholesale value) are estimated product value at the plant, prior to shipping. These are not market transaction price values but estimated values of inventories. Actual values may vary, depending on price changes at the actual time of sale. Therefore, first wholesale values differ from ex-vessel values in that ex-vessel values are derived from actual fish ticket landing transactions.

Table 2 presents information on the first-wholesale value of finfish and shellfish in the Norton Sound and Kotzebue Sound areas of the Arctic Region (map 2).

It is very important to note that production information for a specific area may not correspond to the catch reported for that area.

Production area boundaries do not correspond directly to fisheries management areas used to record catch information (see map 2). For example, in map 2, Bristol Bay is a production area for all fish and shellfish, but it is considered a specific management area only for the salmon and herring catches. Commercial fisheries businesses report production by region and area; however, they frequently ship fish intrastate or export them prior to processing. Thus, through fish ticket information, the catch and ex-vessel values might be recorded in one area and production reported in another area. Therefore, production values should not be expected to correlate directly with ex-vessel values. In spite of this, the geographic distribution of ex-vessel value and production value is roughly similar for most years.

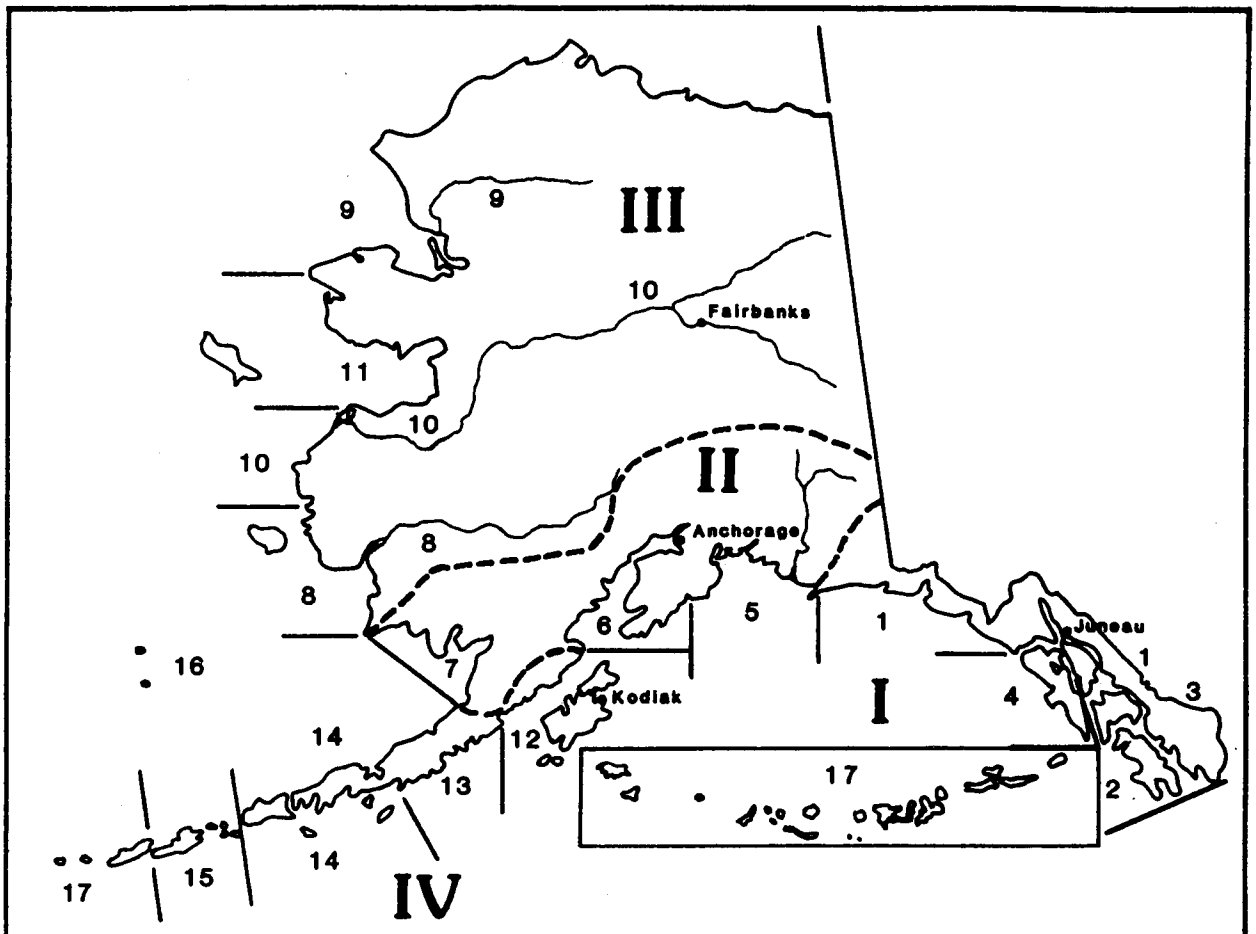
"Other finfish" is primarily herring; shellfish in the Norton Sound area is primarily king crab. From comparison of ex-vessel values and first-wholesale values for the areas, it appears that a relatively large proportion of the harvest in the region was processed outside the region. This is indicated by the first-wholesale value being lower than ex-vessel values for a particular management area in some years. Despite the processing of harvests outside the region, the average first-wholesale value from 1979 through 1983 was approximately $7.1 million (table 2).

Table 2. Production and First-Wholesale Value by Fishery and Production Area, 1979-83

Area and Years	Salmon		Other Finfish		Shellfish		Total	
	Lb	$	Lb	$	Lb	$	Lb	$
Norton Sound								
1979	1,440	1,947	703	395	261	760	2,404	3,105
1980	521	867	1,587	1,048	77	500	2,185	2,414
1981	---	---	2,594	2,096	295	1,851	2,889	3,947
1982	1,246	1,707	7,879	4,277	335	1,954	9,460	7,939
1983	781	838	8,165	5,033	798	6,138	9,745	12,008
Average	997	1,340	4,186	2,570	353	2,241	5,337	5,883
Kotzebue								
1979	---	---	---	---	---	---	---	---
1980	5	29	---	---	---	---	5	29
1981	1,941	2,621	17	21	---	---	1,958	2,641
1982	418	962	---	---	---	---	418	962
1983	1,326	1,147	---	---	---	---	1,326	1,147
Average	923	1,190	17	21	---	---	927	1,195

Source: ADF&G 1980-84.

--- means no data were available.



Region I: Southeast
Areas: 1. Juneau and Yakutak
2. Ketchikan
3. Petersburg
4. Sitka

Region II: Central
Areas: 5. Prince William Sound
6. Cook Inlet
7. Bristol Bay (salmon and herring catch; all fish and shellfish production)

Region III: Arctic-Yukon-Kuskokwim (AYK)
Areas: 8. Kuskokwim
9. Kotzebue
10. Yukon
11. Norton Sound

Region IV: Western
Areas: 12. Kodiak
13. Chignik
14. Alaska Peninsula
7. Bristol Bay (fish other than salmon and herring catch; and shellfish catch)
15. Dutch Harbor
16. Bering Sea
17. Adak and Western Aleutians

Map 2. ADF&G, Division of Commercial Fisheries, regions and catch and production areas.

C. Fish- and Seafood-Harvesting Employment

Information on commercial fish-harvesting employment for salmon and herring for the years 1977-1982 is presented in table 3 and figure 1. Data on commercial king-crab-harvesting employment are incomplete and not included. Data in table 3 indicate that commercial fishing employment levels in the Arctic Region have been growing during the time period under consideration. The peak month of employment was July, with an average of 779 fishermen and crew employed. Employment in June, however, steadily increased to a peak of 919 fishermen and crew employed in 1982. May employment was initiated in 1979 as a result of the herring fisheries.

II. SALMON FISHERY

A. Regional Summary

1. Regional overview. Within the Arctic Region are two commercial fisheries management areas, the Norton Sound-Port Clarence Area and the Kotzebue-Northern Area. The Norton Sound-Port Clarence Area includes all waters of Alaska between the latitude of the westernmost tip of Cape Prince of Wales and the latitude of Canal Point Light, including the waters of Alaska surrounding St. Lawrence Island and those waters draining into the Bering Sea. The Kotzebue-Northern Area includes all waters of Alaska north of the latitude of the westernmost tip of Cape Prince of Wales and west of 141° west longitude, including those waters draining into the Chukchi Sea and the Arctic Ocean (map 3) (ADF&G 1985b).

   Commercial fishing for salmon in the Kotzebue-Northern Area is restricted to the Kotzebue District, which is the area north of Cape Prince of Wales and south of Point Hope (map 3) (ibid.). Information in this narrative is organized by fishery management area. Because no commercial fishing occurs north of Point Hope in the Northern District (with the exception of some small freshwater fisheries on the Colville River near Point Barrow), information for the Kotzebue-Northern Area corresponds to harvests in the Kotzebue District only.

   Commercial harvest of salmon in the Arctic Region has occurred periodically since about 1914. Participation has been steady since the 1960's, although harvest levels are heavily dependent upon market demand and the processing capacity in the area. Regionwide commercial harvests of salmon during the period 1974-1984 ranged from 352,766 salmon in 1976 to 1.1 million salmon in 1981 and averaged about 640,606 per year (ADF&G 1984a; ADF&G 1985a; Bigler, pers. comm.) (table 4). Table 5 shows average weight of salmon by

Table 3. Arctic Region Salmon and Herring Harvesting Employment (Fishermen and Crew), 1977-82

Year	12-Month Average	May	June	July	Aug.	Sept.
1977	151	0	270	893	650	0
1978	181	0	400	903	753	113
1979	169	206	515	838	473	0
1980	184	462	564	623	560	0
1981	193	708	323	716	564	0
1982	193	0	919	703	645	42
Average	179	229	458	779	608	26

Source: CFEC 1984b.

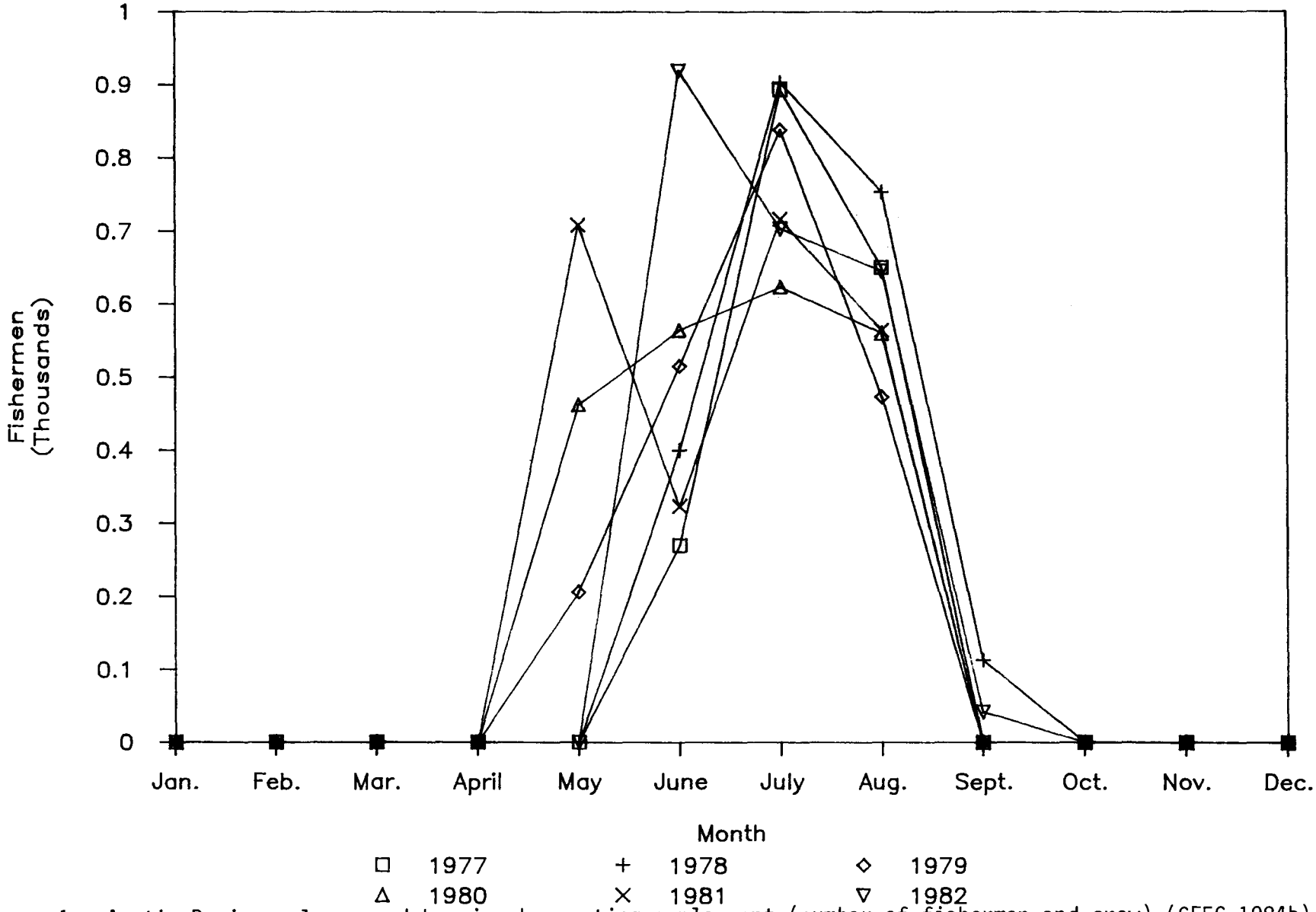
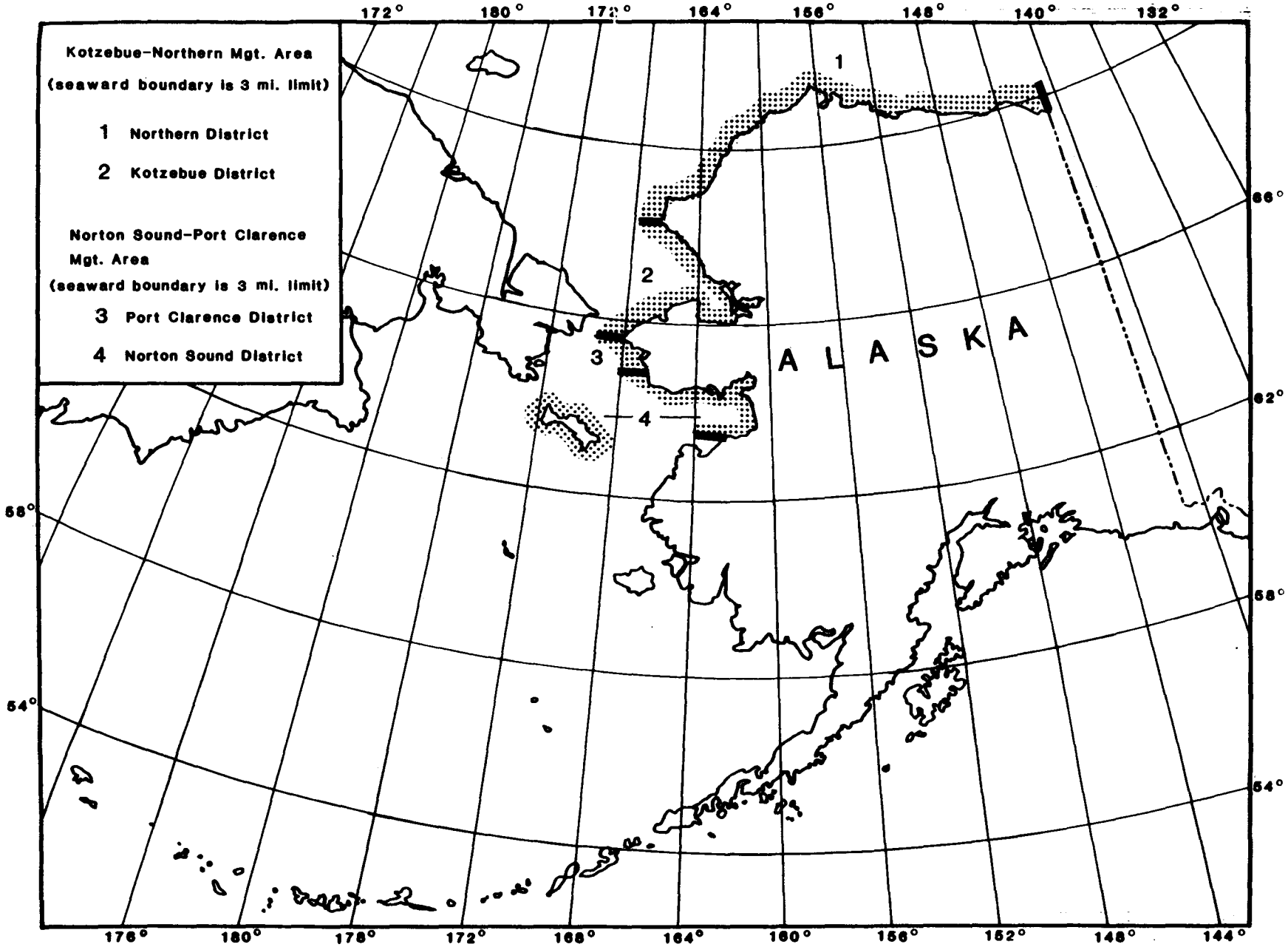


Figure 1. Arctic Region salmon- and herring-harvesting employment (number of fishermen and crew) (CFEC 1984b).



Map 3. Commercial salmon fisheries management areas and districts of the Arctic Region (ADF&G 1985b).

Table 4. Commercial Salmon Harvest in Numbers of Fish in the Arctic Region by Species and by Year, 1975-84

Species	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984[a]
Kotzebue										
Chinook	---	3	10	146	227	223	79	67	121	107
Sockeye	0	0	0	0	0	0	0	0	0	0
Coho	0	0	0	0	0	0	0	0	0	0
Pink	---	47	11	6,980	693	1,537	156	2	114	0
Chum	533,000	159,656	192,506	111,533	141,539	366,453	677,453	415,741	175,648	320,206
District total	533,000	159,706	192,527	118,590	142,459	368,213	677,663	415,810	175,883	320,313
Norton Sound										
Chinook	2,392	2,243	4,500	9,819	10,666	6,311	7,929	5,892	10,308	8,455
Coho	4,593	6,934	3,690	7,335	31,438	29,841	31,562	91,690	49,735	67,875
Sockeye	2	11	5	12	57	39	56	10	27	6
Chum	212,485	95,956	200,455	189,279	140,789	180,792	169,708	183,335	319,437	146,442
Pink	32,388	87,916	48,675	325,503	167,411	227,352	232,499	230,281	76,913	119,381
District total	251,048	193,060	257,325	531,948	350,361	444,335	441,734	511,208	456,420	342,159
Region total	804,048	352,766	449,852	650,538	492,820	812,548	1,119,367	927,018	632,303	662,472

Source: ADF&G 1984a; ADF&G 1985a; Bigler, pers. comm.

--- means no data were available.

Table 5. Average Weight (pounds) of Salmon, by Species and Area, Arctic Region, 1975-83

Area and Species	1975	1976	1977	1978	1979	1980	1981	1982	1983
Norton Sound									
Chinook	10.8	15.3	22.8	22.3	21.4	21.4	20.7	16.5	17.4
Coho	7.3	7.2	7.7	6.9	8.0	6.7	6.7	7.1	7.1
Sockeye	13.5	7.0	7.0	7.0	5.1	7.8	7.1	6.5	---
Chum	6.4	7.0	7.1	7.3	7.2	7.1	7.6	7.3	7.4
Pink	2.9	3.1	3.4	3.6	3.6	3.1	3.1	2.9	3.6
Kotzebue									
Chinook	---	25.3	26.9	19.3	15.5	12.9	21.1	15.1	16.9
Coho	---	---	---	---	---	---	---	---	---
Sockeye	---	---	---	---	---	3.0	---	---	---
Chum	8.6	8.9	9.6	9.1	8.7	8.6	9.1	9.2	9.4
Pink	7.8	2.7	2.7	2.7	4.1	3.8	4.0	3.5	3.5

Source: ADF&G 1975-84.

--- means no data were available.

species and area for the Arctic Region to enable conversion of harvest in number of fish to pounds of fish for the commercial and subsistence fisheries. As of 1983, a total of 420 commercial fisheries entry permits have been issued for the salmon fisheries. Set gill nets are the chief gear type for commercial salmon harvest in the Arctic Region.

Five species of Pacific salmon are found in the region. Chum salmon and pink salmon are most numerous and dominate both the commercial and subsistence fisheries. Subsistence use of salmon in the Arctic Region is important to local residents. Harvests, determined from surveys and interviews, in the last 10 years reached a peak of 127,738 fish in 1982 (ADF&G 1984a). Because of the close association between the commercial and subsistence fisheries in the Arctic Region, both are covered in this narrative. Details of harvests and other aspects of these fisheries can be found in the Alaska Habitat Management Guide for the Arctic Region, Human Use section.

2. Ex-vessel value. All five species of Pacific salmon indigenous to North America are commercially harvested in the Arctic Region. Salmon ex-vessel values have generally increased in the region from 1975 to 1982. Pink salmon runs are larger in even years, and chum salmon runs are larger in odd years. This affects the ex-vessel harvest values accordingly. During the years 1975-1982, the combined salmon ex-vessel values ranged from a low of $734,000 in 1976 to a high of $4.2 million in 1981 (table 6). The Arctic Region salmon fishery ex-vessel value is dominated by chum salmon, which accounted for approximately 86% of the average 1975-1982 estimated ex-vessel value (table 6). Chinook, coho, and pink salmon accounted for 5, 5, and 4%, respectively, of the period's ex-vessel value of the commercial harvest (table 6). Over 95% of the Arctic Region commercial salmon harvest ex-vessel values were earned by fishermen who were residents of the region (table 13); this is the highest percentage of any region in the state.

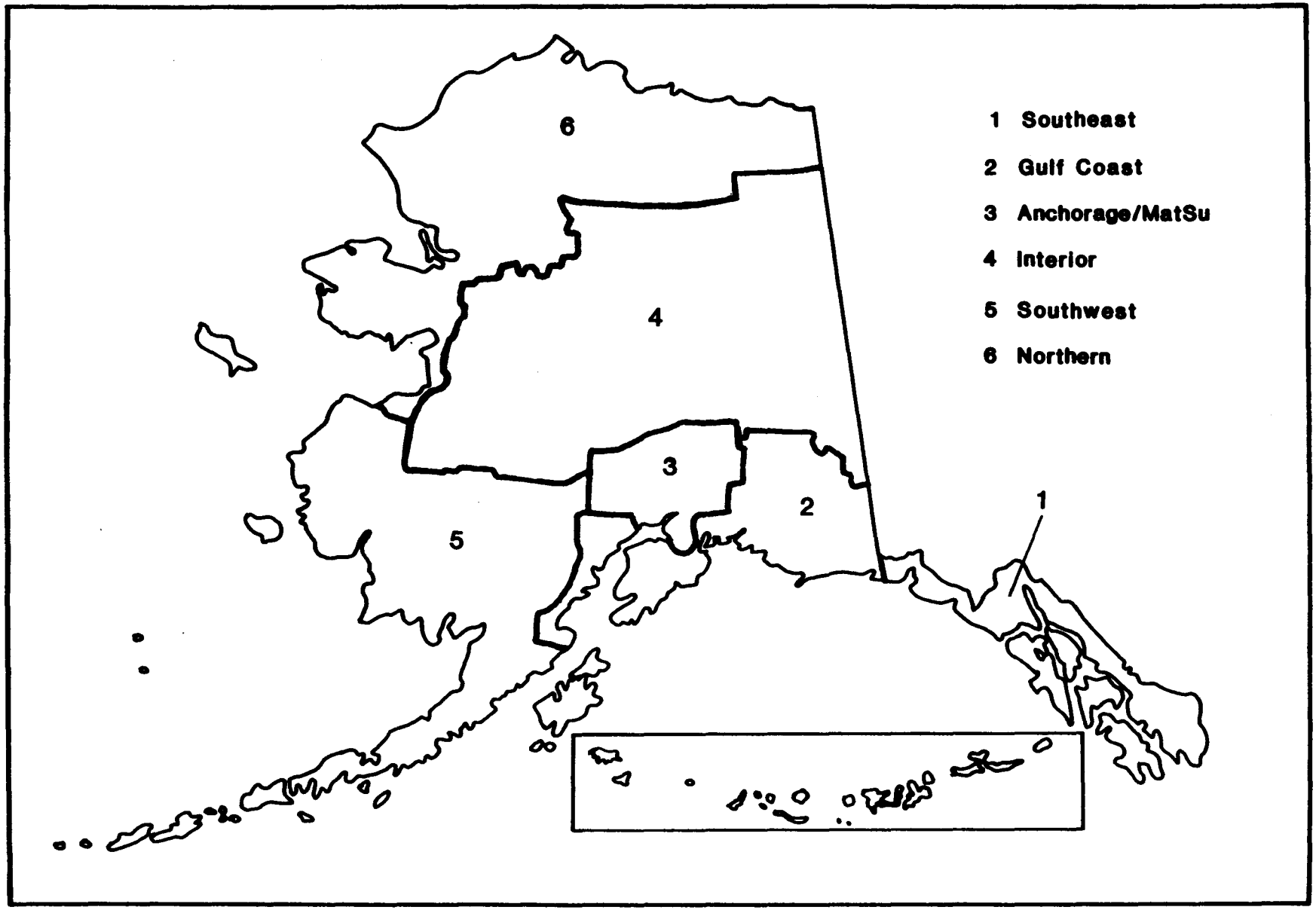
3. Fish-harvesting employment. For the years 1977-1980, salmon-harvesting employment data from the Alaska Department of Labor (ADL) are available only for the Northern labor market area (map 4). This ADL area encompasses the Kotzebue, Norton Sound, Kuskokwim, and Lower Yukon fishery management areas. Beginning in 1981, fish-harvesting employment data are available for Kotzebue and Norton Sound and for Kuskokwim and Lower Yukon. The more recent areas were divided to more closely relate to ADL labor market and 1980 census areas rather than to the ADF&G's fishery management areas. Therefore, these employment numbers do not closely correspond to the harvest values. Despite the change in the database, employment data are presented for the Northern area (which is

Table 6. Ex-vessel Value of Salmon Harvests for the Arctic Region, 1975-82

Species	Estimated Ex-Vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Salmon									
Chinook	10	24	52	180	219	102	207	108	113
Coho	5	21	11	19	166	128	130	371	107
Sockeye	---	---	---	---	---	---	---	---	---
Pink	12	104	28	215	97	51	92	80	85
Chum	1,698	584	1,527	874	1,452	1,909	3,772	2,649	1,808
Total	1,726	734	1,619	1,289	1,935	2,192	4,202	3,210	2,113

Source: CFEC 1984a.

--- means no data were available.



Map 4. Alaska Department of Labor Regional Labor Market Areas.

the Arctic and Interior and Western regions) for the years 1977-1982.

Commercial fish-harvesting employment data are also available from the Commercial Fisheries Entry Commission (CFEC). This database was more recently developed (1984) and uses a different methodology (see the statewide commercial fishing section in this volume for information on methods and data development). The CFEC data, however, link employment information to ADF&G fishery management areas and are therefore more useful for the Arctic and Interior and Western regions. Both employment databases are presented in this section for consistency because ADL fishery employment data have been used in other regions of the state.

Salmon-harvesting employment (number of fishermen and crew) in the Northern area (ADL) occurred in June, July, August, and September, with the summer months having the greatest concentration of employment (table 7, fig. 2). July was the peak month but did not vary considerably from June and August. In each year, 1977-1982, employment in the months of June, July, and August generally increased. July employment increased from 2,841 people in 1977 to 3,525 people in 1982. September employment was more steady but did not exhibit any recognizable trends. Average July employment for the period was 3,160 fishermen and crew, with a peak of 3,525 in 1982.

The CFEC database indicates that salmon harvesting in the Arctic Region occurred in June, July, August, and September during the years 1977 through 1982 (table 8, fig. 3). July was the peak month of employment in all years, with an average of 779 and a peak of 903 fishermen and crew employed in 1978 (table 8). June commercial salmon-harvesting employment in the Arctic Region occurred in Norton Sound throughout the entire six-year period (tables 8 and 25). These employment numbers solely reflect effort in the commercial fishery and do not take into consideration subsistence fishing effort, which provides a substantial portion of the economic livelihood in the region.

B. Fishery Management Area Summaries

1. Kotzebue Management Area:

a. Harvest and ex-vessel value summaries. Commercial salmon fishing is restricted to the Kotzebue District and first occurred there between 1914 and 1918. The commercial fishery was dormant until 1962, when it resumed and grew to an average harvest of about 347,000 fish per year between 1975 and 1984 (table 9) (ADF&G 1984c). Chum salmon are the principal species

Table 7. Northern Area (ADL) Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	June	July	Aug.	Sept.
1977	680	2,453	2,841	2,534	88
1978	733	2,734	3,027	2,744	293
1979	738	2,793	3,017	2,833	211
1980	778	3,014	3,159	2,893	270
1981	825	3,200	3,392	3,020	289
1982	821	3,047	3,525	3,101	179
Average	763	2,874	3,160	2,854	222

Source: ADL 1983, 1985.

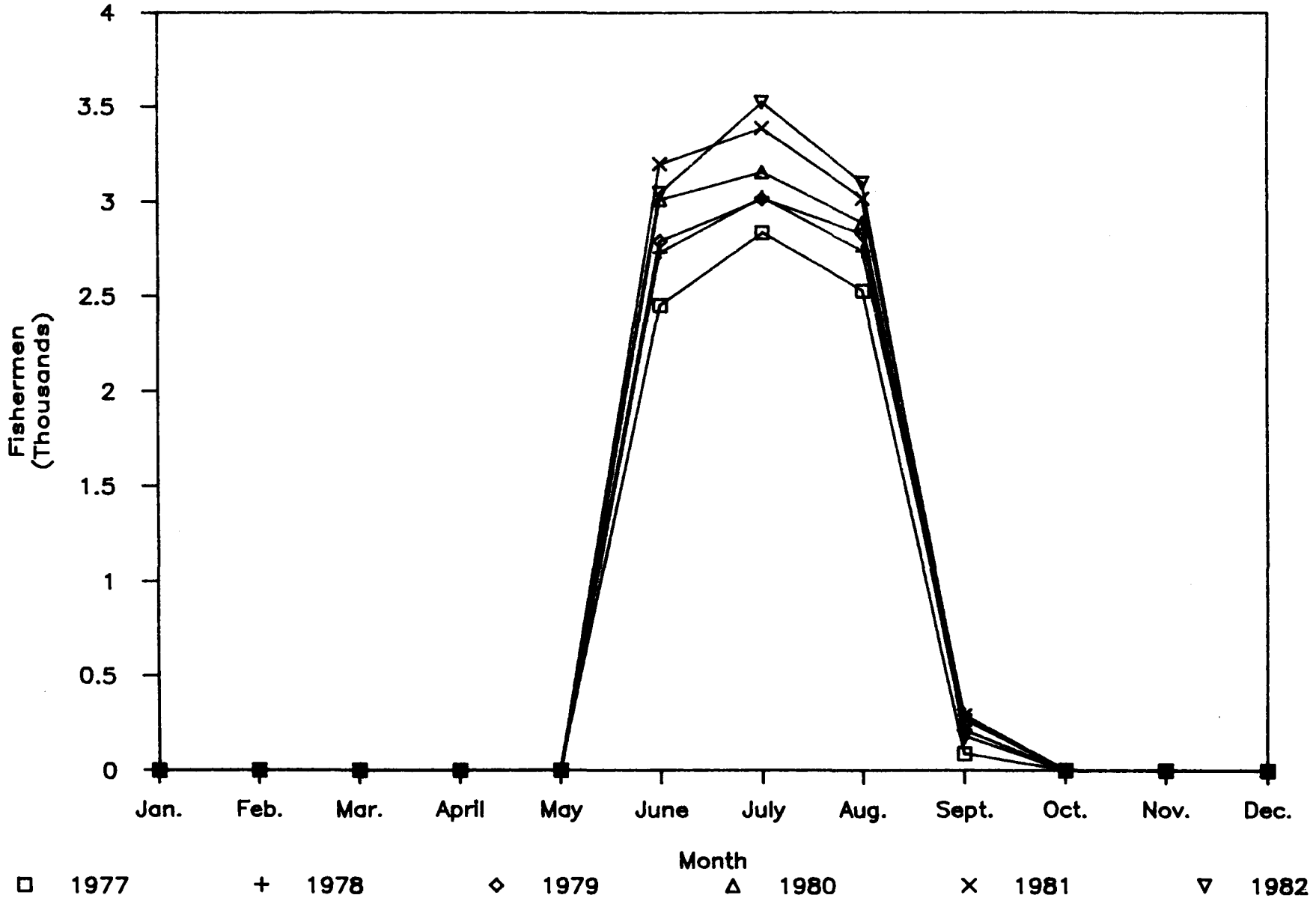


Figure 2. Northern Alaska (ADL) salmon-harvesting employment (number of fishermen and crew) (ADL 1984).

Table 8. Arctic Region Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	June	July	Aug.	Sept.
1977	151	270	893	650	0
1978	181	400	903	753	113
1979	145	428	838	473	0
1980	123	288	623	560	0
1981	134	323	716	564	0
1982	141	302	703	645	42
Average	148	335	779	608	26

Source: CFEC 1984b.

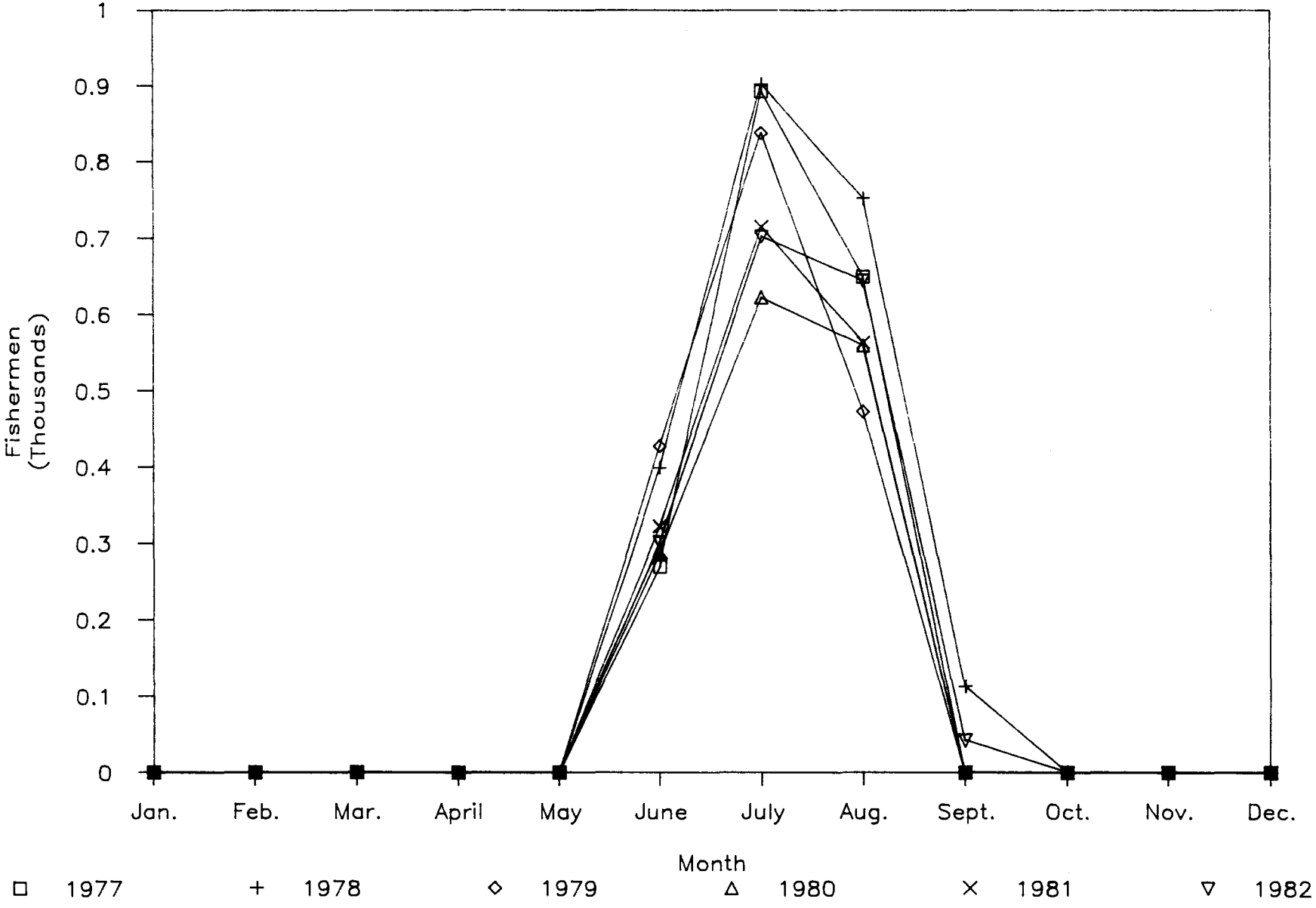


Figure 3. Arctic Region salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

Table 9. Commercial Salmon Harvest in Numbers of Fish in the Kotzebue Sound District, by Species and by Year, 1975-84

Species	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984[a]
Salmon										
Chinook	---	3	10	146	227	223	79	67	121	107
Sockeye	0	0	0	0	0	0	0	0	0	0
Coho	0	0	0	0	0	0	0	0	0	0
Pink	---	47	11	6,980	693	1,537	156	2	114	0
Chum	533,000	159,656	192,506	111,533	141,539	366,453	677,428	415,741	175,648	320,206
District total	553,000	159,706	192,527	118,590	142,459	368,213	677,663	415,810	175,883	320,313

Source: ADF&G 1985a; Bigler, pers. comm.

--- means no data were available.

a Preliminary data.

harvested. Pink and chinook salmon are harvested only incidentally to chums. Pink salmon are generally not sought in the commercial fishery because of their poor quality upon reaching the fishing grounds (Bigler, pers. comm.). However, some commercial openings for pink salmon have occurred for Japanese harvests (Lean, pers. comm.). No commercial harvest of coho and sockeye salmon has been reported. Commercial gear is restricted to set gill nets in the Kotzebue District (ADF&G 1985b). By 1983, 219 limited entry permits had been issued for the Kotzebue salmon fishery (CFEC 1983).

Subsistence fishing for salmon has historically been an important activity for the Eskimo population in the Kotzebue District (ADF&G 1983a). Currently, subsistence fishermen use set gill nets and beach seines (ibid.). Subsistence harvests, which have been recorded since 1962, peaked in 1982 at 30,133 fish (table 10) (ADF&G 1984a). Chum salmon also dominate the subsistence fishery. The documented harvest of all species shows that catches of pink, sockeye, coho, and chinook salmon comprise less than 2% of the total subsistence harvest.

Statewide provisions allow commercial fishermen to retain fish for their personal use from their legally harvested commercial fish catch. Commercial fishermen may not harvest salmon for subsistence purposes during weekly fishing closures. Persons not holding a valid commercial fishing licence may take salmon for subsistence purposes at any time (ADF&G 1985b).

b. Ex-vessel value. Chum salmon accounted for almost 100% of the ex-vessel value of commercial salmon harvests in the Kotzebue Management Area from 1975 through 1982 (table 11). The chum salmon runs in the area exhibit an odd-year cycle, which is reflected in the harvest levels and values. Combined salmon ex-vessel values increased by approximately 150% from 1975 ($1.4 million) to 1981 ($3.4 million). Harvest of chum salmon in 1975 was large in terms of number of fish, but the price per pound was relatively low (table 12). The 1981 commercial harvest was the largest during the period 1975-1982; 1981 chum salmon prices per pound were also relatively high. This combination resulted in the 1981 peak ex-vessel value.

Approximately 96% of the combined salmon ex-vessel value for the years 1975-1982 was earned by fishermen from the Kobuk Census Area (table 13). The proportion of earnings that went to fishermen from other areas in Alaska was small throughout the period but increased in 1981 and 1982 (5% in 1982). Out-of-state fishermen

Table 10. Subsistence Salmon Harvest in Numbers of Fish in the Kotzebue Sound District, by Species and by Year, 1975-84

Species	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984[a]
Salmon										
Chinook	---	---	---	---	---	---	---	---	2	21
Sockeye	---	---	---	---	---	---	---	---	1	1
Coho	---	---	---	---	---	---	---	---	121[a]	18
Pink	---	---	---	---	---	---	---	---	213	125
Chum	27,605	15,765	9,752	12,864	14,605	10,635	17,766	30,133	10,287	15,508
District total	27,605	15,765	9,752	12,864	14,605	10,635	17,706	30,133	10,624	15,673

Source: ADF&G 1984a; Bigler, pers. comm.

--- means no data were available.

a Species identification not confirmed.

Table 11. Ex-vessel Value of Salmon Harvests by Species and by Year for the Kotzebue Management Area, 1975-82

Species	Estimated Ex-Vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Salmon									
Chinook	0	0	0	2	3	2	2	1	1
Coho	---	---	---	---	---	---	---	---	---
Sockeye	---	---	---	---	---	---	---	---	---
Pink	0	0	0	5	1	1	0	0	1
Chum	1,367	396	1,071	374	1,051	1,611	3,438	2,138	1,431
Total*	1,367	397	1,072	381	1,055	1,615	3,440	2,140	1,433

Source: CFEC 1984a.

--- means no data are available.

* Totals may not add up, because of computer rounding.

Table 12. Estimated Ex-vessel Price Per Pound for Salmon Species in the Kotzebue Fishing Management Area, 1975-84

Location	Species	Estimated Ex-vessel Price Per Pound in Dollars									
		1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Kotzebue	Chinook Set gill net	---	.71	.95	.79	.90	.57	1.25	1.00	1.09	1.20
	Coho	---	.43	.55	.38	.50	---	---	---	---	---
	Sockeye	---	.63	---	.45	.47	.26	.26	---	---	---
	Chum	.28	.28	.58	.37	.85	.51	.56	.56	.27	.43
	Pink	---	.38	.41	.17	.25	.09	.15	.12	.25	---

Source: CFEC 1985.

--- means no data were available.

Table 13. Ex-vessel Value of Commercial Combined Salmon Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kotzebue	Kobuk	1282	374	1049	373	1034	1575	3329	2017	1379
	Other Alaska*	35	7	16	4	14	21	83	105	36
	Alaska	1317	381	1065	377	1049	1596	3412	2122	1415
	Other USA	**	0	0	0	0	**	**	**	7
	Unknown	**	16	7	4	6	**	**	**	11
	Subtotal	1367	397	1072	381	1055	1615	3440	2140	1433
Norton Sound	Nome	317	233	525	894	855	547	725	989	636
	Other Alaska*	**	**	**	**	23	18	36	80	21
	Alaska	**	**	**	**	878	565	761	1068	657
	Other USA	**	**	**	**	0	**	0	**	3
	Unknown	**	**	**	**	1	**	1	**	20
	Subtotal	359	337	547	908	880	577	762	1070	680
Total		1726	734	1619	1289	1935	2192	4202	3210	2113

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

earned less than 1% of the earnings in the management area. Ex-vessel values by species and census areas are presented in tables 14-18. Table 18 provides ex-vessel values for freshwater fish harvest. These value are relatively low and provided for information only.

c. Kotzebue Management Area salmon-harvesting employment. Kotzebue commercial salmon-harvesting employment occurred primarily in July and August during the years 1977-1982; commercial harvests also occurred in September in 1978 (table 19). Harvesting employment tended to be slightly higher during August, with an average of 439 and a peak of 515 fishermen and crew for the period.

2. Norton Sound-Port Clarence Management Area:

a. Harvest and ex-vessel value summaries. There are two fishery management districts in this management area. Commercial salmon harvest occurs only in the Norton Sound District, which consists of all waters between the latitudes of Canal Point Light on the south and Cape Douglas on the north. The only commercial fishery for salmon held in the Port Clarence District occurred in July of 1966 (ADF&G 1966, ADF&G 1984a). A favorable market in Japan and a good price per pound attracted fishermen from the Teller area that year. Chum salmon made up over 82% of the commercial harvest quantity that year. Pink salmon made up about 10% and sockeye about 8% of the 1966 harvest. The small runs of salmon in the Port Clarence District are not large enough to support both the subsistence fishery and a commercial fishery, so the latter has been closed since 1966 (table 20) (ADF&G 1984a).

Five species of Pacific salmon are harvested in the Norton Sound commercial fishery, which began in 1961. Harvest in the early years focused on chinook and coho, which were frozen and flown to Anchorage for further processing. The concurrent pink and chum salmon harvest was purchased and processed by an American freezer ship. Historically, commercial fishing levels have been a reflection of the available tendering and processing facilities, which until recently were limited. Better processing and tendering facilities have increased harvests and made the fishery more consistent in recent years (ADF&G 1984b). During the 1984 season, six domestic processors bought fish on the grounds. A joint venture and two Japanese freezer ships were also allowed to operate in the area (Eggers 1985).

Table 14. Ex-vessel Value of Commercial Chinook Salmon Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kotzebue	Other Alaska*	0	0	0	2	3	1	2	1	1
	Unknown	0	0	0	1	0	0	0	0	0
	Subtotal	0	0	0	2	3	2	2	1	1
Norton Sound	Nome	10	13	51	173	207	94	188	97	104
	Other Alaska*	0	0	0	**	**	**	17	9	5
	Alaska	10	13	51	**	**	**	205	107	109
	Other USA	0	0	0	**	**	**	0	0	0
	Unknown	1	11	0	**	**	**	0	0	2
	Subtotal	10	24	52	178	216	100	205	107	112
Total		10	24	52	180	219	102	207	108	113

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 15. Ex-vessel Value of Commercial Coho Salmon Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Norton Sound	Nome	5	20	11	19	158	122	118	337	99
	Other Alaska*	0	**	0	**	**	**	12	34	7
	Alaska	5	**	11	**	**	**	130	371	106
	Other USA	0	**	0	**	**	**	0	0	0
	Unknown	0	**	0	**	**	**	0	0	0
	Subtotal	5	21	11	19	166	128	130	371	107
Total		5	21	11	19	166	128	130	371	107

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 16. Ex-vessel Value of Commercial Pink Salmon Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kotzebue	Kobuk	0	0	0	5	1	1	0	0	1
	Alaska	0	0	0	5	1	1	0	0	1
	Subtotal	0	0	0	5	1	1	0	0	1
Norton Sound	Nome	10	76	28	207	94	47	90	68	78
	Other Alaska*	**	0	0	**	2	3	2	12	3
	Alaska	**	76	28	**	96	50	92	80	80
	Unknown	**	28	0	**	0	0	0	0	4
	Subtotal	12	104	28	210	96	50	92	80	84
Total		12	104	28	215	97	51	92	80	85

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 17. Ex-vessel Value of Commercial Chum Salmon Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kotzebue	Kobuk	1282	374	1049	367	1031	1571	3327	2015	1377
	Other Alaska*	35	7	16	4	14	21	83	105	35
	Alaska	1317	381	1065	371	1045	1592	3410	2120	1412
	Other USA	**	0	0	0	0	**	**	**	7
	Unknown	**	16	7	3	6	**	**	**	11
	Subtotal	1367	396	1071	374	1051	1611	3438	2138	1431
Norton Sound	Nome	292	124	435	495	394	284	329	486	355
	Other Alaska*	**	**	**	**	6	7	4	24	6
	Alaska	**	**	**	**	400	290	333	510	361
	Other USA	**	**	**	**	0	**	0	0	3
	Unknown	**	**	**	**	0	**	1	1	14
	Subtotal	331	188	456	500	401	298	334	511	377
Total		1698	584	1527	874	1452	1909	3772	2649	1808

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 18. Ex-vessel Value of Commercial Freshwater Fish Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Kotzebue	Kobuk	0	0	2	2	4	3	1	4	2
Norton Sound	Nome	0	1	1	0	0	0	0	0	0
Total		0	1	3	2	4	3	1	4	2

Source: CFEC 1984a.

Table 19. Kotzebue Fishery Management Area Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	July	Aug.	Sept.
1977	83	478	515	0
1978	91	478	500	113
1979	73	425	448	0
1980	56	302	365	0
1981	64	378	386	0
1982	62	388	418	0
Average	72	408	439	19

Source: CFEC 1984b.

Table 20. Subsistence Salmon Harvest in Numbers of Fish in the Port Clarence District, by Species and by Year, 1975-84

	Estimated Ex-vessel Value in Thousands of Dollars									
Species	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984[a]
Salmon										
Chinook	0	7	---	1	0	7	8	23	17	---
Sockeye	244	291	---	392	320	3,195	255	405	261	---
Coho	5	20	---	0	35	5	110	100	---	---
Pink	743	436	---	7,783	741	3,170	765	4,345	615	---
Chum	1,589	6,026	---	705	1,658	1,715	5,845	684	299	---
District total	2,581	6,780	5,910	8,881	2,720	8,092	6,983	5,557	1,192	---

Source: ADF&G 1984a.

--- means no data were available.

a No surveys conducted.

The Norton Sound commercial salmon fishery is now dominated by the harvest of chum and pink salmon. The chum salmon harvest accounted for an average of 49% of Norton Sound's total salmon harvest quantity between 1975 and 1984 (table 21). Pink salmon accounted for about 40% of the catch during the same period. The harvest of coho salmon has made up about 9% of the total Norton Sound commercial salmon catch. Chinook salmon harvests are around 2% of the total (ADF&G 1984a). Sockeye salmon production is minimal in Norton Sound (ibid.). Commercial gear is restricted to set gill nets in Norton Sound. By 1983, 201 limited entry permits had been issued to salmon fishermen in Norton Sound (CFEC 1983). An average of 168 permits were fished from 1979 to 1983 (Schwarz and Lean 1984).

Subsistence harvest of salmon in Norton Sound has been significant, with reported harvests reaching 93,422 fish during the 1980 season (table 22, ADF&G 1984a). The primary species harvested, in order of magnitude, are pink, chum, and coho salmon. Harvests of chinook and sockeye salmon are small. The proportion of chinook salmon in the subsistence or commercial harvest appears to be somewhat sensitive to the ex-vessel price per pound of chinook salmon, especially in years with a marked change in price (tables 23 and 24).

b. Ex-vessel value. Combined commercial salmon ex-vessel values increased from approximately $359,000 in 1975 to $1.1 million in 1982. The average for the eight-year period was approximately $680,000. The majority of the harvest values (55%) was for chum salmon. Chinook and coho salmon each accounted for 16% of the harvest values, and pink salmon accounted for 12% (table 24).

The average chinook salmon ex-vessel value for the period was over 10 times the 1975 chinook ex-vessel value. This was caused by both a significant increase in the quantity of harvest (table 21) and the approximate tripling of the ex-vessel price per pound for Norton Sound chinooks (table 23). Harvest values for coho salmon increased even more dramatically, from $5,000 in 1975 to $371,000 in 1982. This also resulted from an approximate tenfold increase in harvest quantity (table 21) and threefold increase in ex-vessel price per pound (table 23). Pink salmon harvest quantities varied considerably over the eight-year period, but the trend was generally upward (table 21). The increase in harvest values was primarily a result of increases in harvests because pink salmon prices per pound were generally lower (especially in real terms because prices are in nominal dollars) in the later years (1980-1982)

Table 21. Commercial Salmon Harvest in Numbers of Fish in the Norton Sound District, by Species and by Year, 1975-84

Species	Year									
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984[a]
Salmon										
Chinook	2,392	2,243	4,500	9,819	10,666	6,311	7,929	5,892	10,308	8,455
Coho	4,593	6,934	3,690	7,335	31,438	29,841	31,562	91,690	49,735	67,875
Sockeye	2	11	5	12	57	39	56	10	27	6
Chum	212,485	95,956	200,455	189,279	140,789	180,792	169,708	183,335	319,437	146,442
Pink	32,388	87,916	48,675	325,503	167,411	227,352	232,499	230,281	76,913	119,381
District total	251,048	193,060	257,325	531,948	350,361	444,335	441,734	511,208	456,420	342,159

Source: ADF&G 1984a.

Table 22. Subsistence Salmon Harvest in Numbers of Fish in the Norton Sound District, by Species and by Year, 1975-84

Species	Year									
	1975	1976	1977	1978	1979	1980	1981	1982	1983[c]	1984[c]
Salmon										
Chinook	186	203	846	1,211	741	1,397	959	1,011	1,942	1,733
Coho	192	1,004	2,530	3,206	8,625	8,625	12,006	15,963	8,799	8,300
Chum	8,124	7,718	26,607	12,257	11,975	19,622	28,181	16,095	11,492	8,191
Pink	15,803	18,047	14,496	35,281	25,247	63,778	28,741	55,424	21,894	34,470
District total	24,305[a]	26,973	44,479	51,955	46,450	93,422	68,745[b]	92,048	44,213	52,711

Source: ADF&G 1984a.

a Includes 11 recorded sockeye salmon in all subdistricts.

b Includes 38 recorded sockeye salmon in all subdistricts.

c Data incomplete.

Table 23. Estimated Ex-vessel Price ($) Per Pound for Salmon Species in the Norton Sound Fishery Management Area, 1975-84

Area and Species	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Norton Sound										
Chinook										
Set gill net	.40	.71	.50	.80	.93	.74	1.25	1.10	1.00	1.20
Drift gill net	---	---	---	---	.93	---	---	---	---	---
Coho										
Set gill net	.16	.43	.38	.38	.66	.63	.62	.57	.39	.48
Drift gill net	---	---	---	---	.66	---	---	---	---	---
Sockeye										
Set gill net	.30	.63	.45	.45	.40	.26	.26	.57	---	---
Drift gill net	---	---	---	---	.40	---	---	---	---	---
Chum										
Set gill net	.24	.28	.32	.36	.40	.23	.26	.38	.26	.24
Drift gill net	---	---	---	---	.40	---	---	---	---	---
Pink										
Set gill net	.13	.38	.17	.18	.16	.07	.13	.12	.12	.11

Source: CFEC 1985.

--- means no data were available.

Table 24. Ex-vessel Value of Salmon Harvests for the Norton Sound Management Area, 1975-82

Species	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Salmon									
Chinook	10	24	52	178	216	100	205	107	112
Coho	5	21	11	19	166	128	130	371	107
Sockeye	---	---	---	---	---	---	---	---	---
Pink	12	104	28	210	96	50	92	80	84
Chum	331	188	456	500	401	298	334	511	377
Total	359	337	547	908	880	577	762	1,070	680

Source: CFEC 1984a.

--- means no data were available.

(table 23). Chum salmon harvest quantities, ex-vessel values, and ex-vessel prices per pound remained relatively consistent from 1975 through 1982 (tables 21, 23, and 24); variations in ex-vessel values and harvest quantities were primarily the result of natural run cycles.

Approximately 94% of the Norton Sound salmon ex-vessel values from 1975 through 1982 were earned by fishermen from the Nome Census Area (table 13). Fishermen from other parts of Alaska, primarily the Southcentral Region, earned approximately 3% of the period's ex-vessel gross earnings; their proportion of earnings increased over the period. Out-of-state fishermen earned less than 1% of the 1975-1982 average ex-vessel values.

c. Norton Sound Management Area salmon-harvesting employment. Norton Sound commercial salmon harvesting occurred primarily in June, July, and August during the years 1977-1982; harvesting employment occurred in September in 1982 (table 25, fig. 4). July was the peak month of employment for the six-year period, with an average of 371 and peak of 425 fishermen and crew employed. Norton Sound accounted for 100% of the June, 48% of the July, and 28% of the August commercial salmon-harvesting employment in the Arctic Region for the years 1977-1982 (tables 3, 19, and 25).

III. PACIFIC HERRING FISHERY

A. Regional Summary

The Bering Sea, Kotzebue Area, or Herring Statistical Area Q, consists of the area extending west from Dall Point north to a line extending west from Point Hope, and its western boundary is the international date line in the Bering and Chukchi seas (ADF&G 1985c). Within the Arctic Region are located the Norton Sound, Port Clarence, and Kotzebue districts. The former two are in the Norton Sound Management Area, and the latter is in the Kotzebue Management Area. For more information regarding management boundaries and jurisdiction, see the Commercial Harvest of Pacific Herring section in volume 2 of the Alaska Habitat Management Guide for the Arctic Region.

The Arctic Region, which once supported one of the earliest Alaska fisheries, currently supports commercial food/bait, sac roe, and spawn-on-seaweed herring fisheries. Interest in these commercial fisheries increased in 1979, largely as a result of increased Japanese demand for sac roe products (ADF&G 1984b) and higher sac

Table 25. Norton Sound Salmon-Harvesting Employment (Numbers of Fishermen and Crew), 1977-1982

Year	12-Month Average	June	July	Aug.	Sept.
1977	68	270	415	135	0
1978	90	400	425	253	0
1979	72	428	413	25	0
1980	67	288	321	195	0
1981	70	323	338	178	0
1982	74	302	315	227	42
Average	74	335	371	169	7

Source: CFEC 1984b.

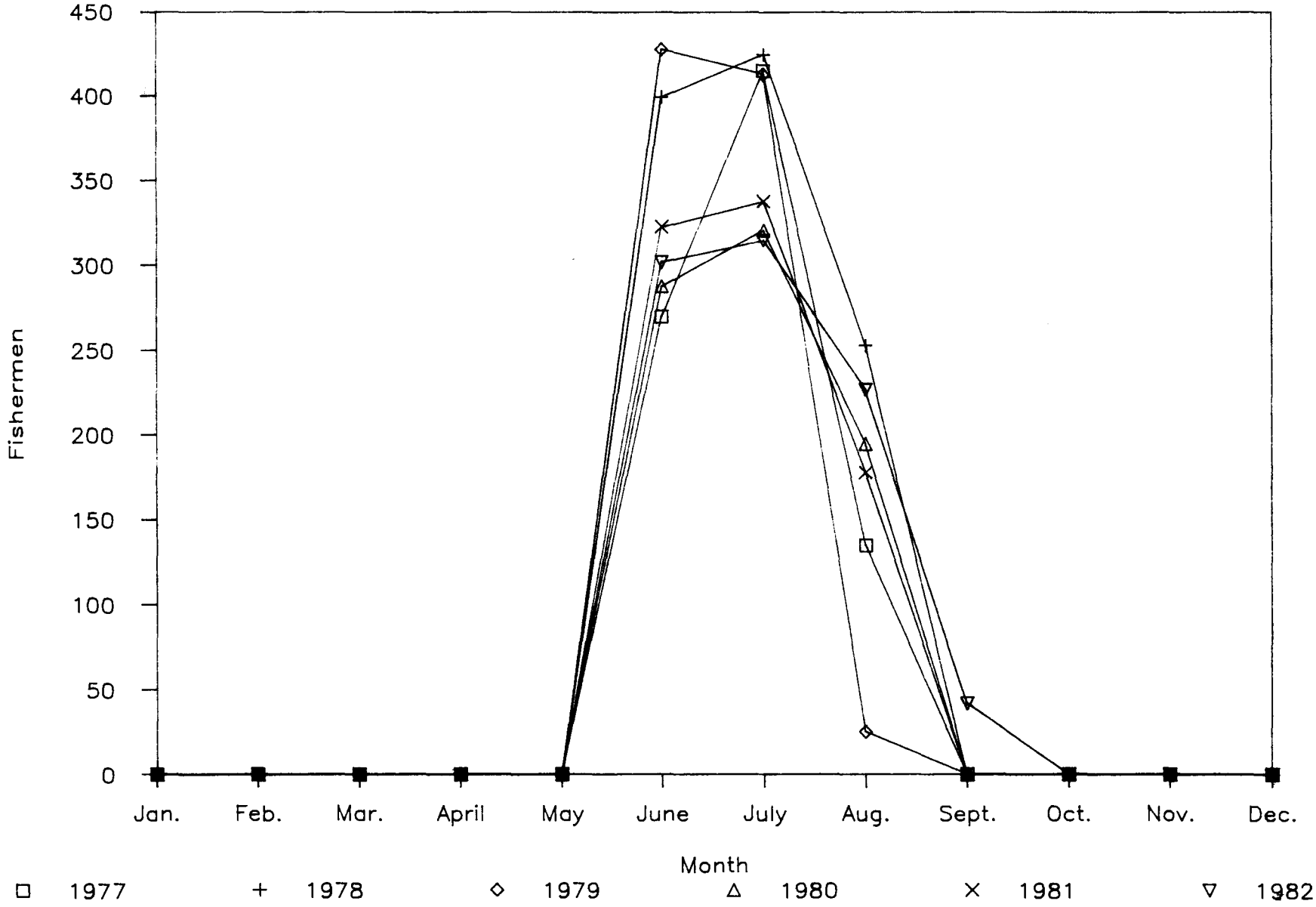


Figure 4. Norton Sound salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

roe ex-vessel prices (table 26). Since then (until 1984, when the fishery was discontinued), the Arctic Region harvest has accounted for about 13% of the entire herring harvest in the eastern Bering Sea. As in other regions, the food/bait fishery generally targets on herring in nonspawning condition during fall and winter months. Sac roe and spawn-on-seaweed harvests occur during spring months. Unripe herring, however, may be processed into food/bait during the sac roe season. Both the sac roe and spawn-on-kelp commercial fisheries occur in and are limited to the Norton Sound District of the region. Although active subsistence fisheries exist, the Kotzebue Sound and Port Clarence districts have yet to be commercially exploited. Two major obstacles to developing a commercial fishery in the Port Clarence or Kotzebue districts are high transportation costs and large incidental catches of unmarketable fish (Whitmore and Bergstrom 1983).

B. Norton Sound Fishery Management Area

1. Harvest summary. Documented subsistence harvest of herring by coastal residents in the Norton Sound Area dates back to the 1800's. A small commercial fishery by domestic fishermen for salt-cured or pickled food products began in 1909. Commercial harvests averaged 137.9 metric tons from 1916 to 1941. As foreign competition increased, the marketability of herring decreased, and the fishery ceased in 1942 (ADF&G 1982). The domestic commercial sac roe fishery resumed in 1964, but effort was intermittent through 1974 (ADF&G 1984). The Japanese gill net fleet began fishing the Norton Sound Area in the mid 1970's until foreign harvest was prohibited for the 1977 season with the implementation of the Fisheries Conservation Management Act.

   The domestic harvest continued and increased dramatically from 14 metric tons in 1978 to 1,173 metric tons in 1979 (table 27). As mentioned above, this increase was a result of increased Japanese demand. Harvest quantities have increased since 1979 with a peak in 1983 of 4,156 metric tons taken by 272 vessels (or fishermen, not including crew). Effort has ranged from 11 vessels in 1978 to 332 vessels in 1981 (table 27). In 1984, 199 fishermen took part. Only one vessel has participated in the recently authorized food/bait fishery (ADF&G 1983). Peak participation in the spawn-on-seaweed fishery was 44 pickers in 1982 (table 28).

   Herring may be harvested only by gill net and beach seine in the Norton Sound Management Area (ADF&G 1985c). The spring fishery opens on April 15 and closes by June 30, although closure usually comes earlier by emergency order (Lebida et al. 1984). The fall fishery is open from September 1 through November 15.

Table 26. Norton Sound Fishery Management Area, Commercial Herring Ex-vessel Prices ($) Per Poun 1975-83

Area and Species	1975	1976	1977	1978	1979	1980	1981	1982	1983
Herring Sac Roe									
Beach seine	---	---	---	---	0.32	0.13	0.16	0.14	0.17
Set gill net	---	---	---	0.17*	0.32	0.13	0.16	0.14	0.17
Herring food/bait									
Gill net	---	---	0.07	---	0.10	0.03	0.03	0.15	0.03
Herring Roe-on-kelp	---	---	0.40	0.55*	0.60*	1.40	0.67*	0.93	1.03*

Source: CFEC 1985, ADF&G 1984b.

--- means no data was available.

* Bristol Bay prices to provide esimtate only of missing Norton Sound data.

Table 27. Commercial Harvest of Pacific Herring in Metric Tons and Effort in Number of Vessels for the Norton Sound District, 1976-84[a]

	1976	1977	1978	1979	1980	1981	1982	1983	1984
Harvest	7.7	9.5	14.0	1,173.0	2,224.6	3,956.1	3,567.0	4,156.0	3,240.0
Effort	---	---	11	67	294	332	237	272	199

Source: ADF&G 1984a, Lebida et al. 1984.

--- means no data were available.

a Includes herring harvested for both sac roe and bait product.

Table 28. Commercial Harvest of Herring Spawn on Seaweed in Metric Tons and Effort in Number of Pickers in the Norton Sound Management Area, 1977-84

	1977	1978	1979	1980	1981	1982	1983	1984
Harvest	Trace	4.0	12.0	22.0	47.0[a]	35.0	26.5[b]	20.5[c]
Effort	---	9	19	20	22	44	35	32

Source: ADF&G 1984a, Lebida et al. 1984.

--- means no data were available.

a Includes about five metric tons of wastage.

b Includes about 1.5 metric tons of wastage.

c Includes about 3.0 metric tons of spawn on Macrocystis (spp.).

Norton Sound supports one of three spawn-on-seaweed fisheries in the state. A major concern in the Norton Sound Area is the rate of aquatic vegetation regeneration. Norton Sound has more severe winters, steeper intertidal areas, less species diversity, and a smaller tidal range than Bristol Bay (location of another commercial spawn-on-seaweed fishery in the state). A regulation adopted by the Alaska Board of Fisheries during the winter of 1984 closed the Norton Sound commercial spawn-on-kelp fishery to conserve the limited kelp resource and to help increase future recruitments into the herring population (ADF&G 1985d).

2. Ex-vessel value. Ex-vessel value data (CFEC) for the commercial herring food/bait, sac roe, and roe-on-kelp fisheries are presented in tables 29-31. Information from ADF&G fisheries management reports indicate that the CFEC data are incomplete, with data missing for harvests from 1976 to 1978. For the available data, however, sac roe herring harvest values ranged from $763,000 in 1979 to $1.3 million in 1981; the average sac roe ex-vessel value for the years 1979-1982 was $948,000 (table 29). Food/bait ex-vessel values are presented in table 30; these values are for the most part relatively small and incidental to the sac roe fishery.

   Approximately 34% of the sac roe gross earnings went to fishermen from the Nome census area; another 15 and 7% went to the Kodiak Island and the Wrangell-Petersburg census areas, respectively (table 29). Approximately 18% was earned by "other Alaska" fishermen, who came from a variety of census areas in the Western, Southwest, Southcentral, and Southeast regions. Fishermen from out-of-state earned approximately 26% of the ex-vessel values. These earnings patterns are in marked contrast to those in the salmon fisheries and most likely result from the fact that the commercial herring fishery has not come under limited entry regulation.

   CFEC roe-on-kelp ex-vessel values for the years 1979-1982 are presented in table 31. Ex-vessel values range from $10,000 in 1979 to $159,000 in 1980. As with the sac roe CFEC data, these roe-on-kelp data are incomplete and may be somewhat inaccurate. The available data do indicate that approximately 84% of roe-on-kelp ex-vessel values were earned by fishermen from the Nome Census Area (table 31).

3. Herring-harvesting employment. Norton Sound herring-harvesting effort and employment information is available from three sources, the ADL, CFEC, and ADF&G management area reports. The CFEC and ADF&G information is presented in this section. The CFEC data are based on the number of permit holders and the crew factor appropriate for the particular

Table 29. Ex-vessel Value of Commercial Sac Roe Herring Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1979-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Norton Sound	Nome	---	---	---	---	221	328	414	315	320
	Kodiak Island	---	---	---	---	413	29	104	24	142
	Wrangell-Petersburg	---	---	---	---	14	57	73	134	70
	Other Alaska*	---	---	---	---	84	117	260	215	170
	Alaska	---	---	---	---	732	531	852	688	700
	Other USA	---	---	---	---	32	72	475	388	242
	Unknown	---	---	---	---	0	3	2	18	6
	Subtotal	---	---	---	---	763	606	1329	1094	948
Total		---	---	---	---	763	606	1329	1094	948

Source: CFEC 1984a.

--- means no data were available.

* Further breakdown withheld because of nondisclosure regulations.

Table 30. Ex-vessel Value of Commercial Food/Bait Herring Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1979-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Norton Sound	Alaska	---	---	---	---	**	**	**	3	2
	Other USA	---	---	---	---	**	**	**	5	2
	Subtotal	---	---	---	---	**	**	**	8	4
Total		---	---	---	---	**	**	**	8	4

Source: CFEC 1984a.

--- means no data were available.

** Information withheld because of nondisclosure regulations.

Table 31. Ex-vessel Value of Commercial Herring Roe/Kelp Harvest for Arctic Alaska Fishery Management Areas, by Origin of Fishermen, 1979-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Norton Sound	Nome	---	---	---	---	10	131	14	64	54
	Other Alaska*	---	---	---	---	0	**	**	8	6
	Alaska	---	---	---	---	10	**	**	72	60
	Other USA	---	---	---	---	0	**	**	0	4
	Subtotal	---	---	---	---	10	159	18	70	64
Total		---	---	---	---	10	159	18	72	64

Source: CFEC 1984a.

--- means no data was available.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

gear type (see the statewide commercial fisheries section in this economic volume for more information). The ADF&G data are in tables and provide the number of vessels, in the case of sac roe and food/bait, or the number of permit holders, in the case of roe-on-kelp. The CFEC and ADF&G employment numbers are fairly consistent, with the exception of 1979 where vessel numbers (ADF&G) are approximately equal to fishermen and crew numbers (CFEC). Fishermen and crew numbers should be approximately 2.25 times the vessel numbers (ADL 1983b).

Despite these data problems, it is apparent that commercial herring harvesting occurred primarily in May and June during the years 1979-1982. May was the principal month, with an average 344 fishermen and crew employed (table 32). An average of 260 fishermen and crew were employed in June for the years 1979 to 1982. The level of employment and participation appears to be increasing dramatically in the roe herring fisheries (table 32).

IV. ARCTIC AND WESTERN REGION COMMERCIAL AND SUBSISTENCE KING CRAB

A. Regional Overview

The Bering Sea Statistical Area for king crab (map 5) is separated into the Pribilof and Northern districts. Within the Northern District are three sections: Norton Sound, St. Lawrence Island, and St. Matthew Island. The first two sections are located within the Arctic Region. The St. Matthew Island Section occurs in the Western Region. In order to correspond with the narrative and data in the Human Use section of volume 2 of the Alaska Habitat Management Guide, this narrative presents information for the Norton Sound Section and combines information for the St. Lawrence and St. Matthew islands sections. Details of fishery regulation, management, and harvests can be found in the Human Use section.

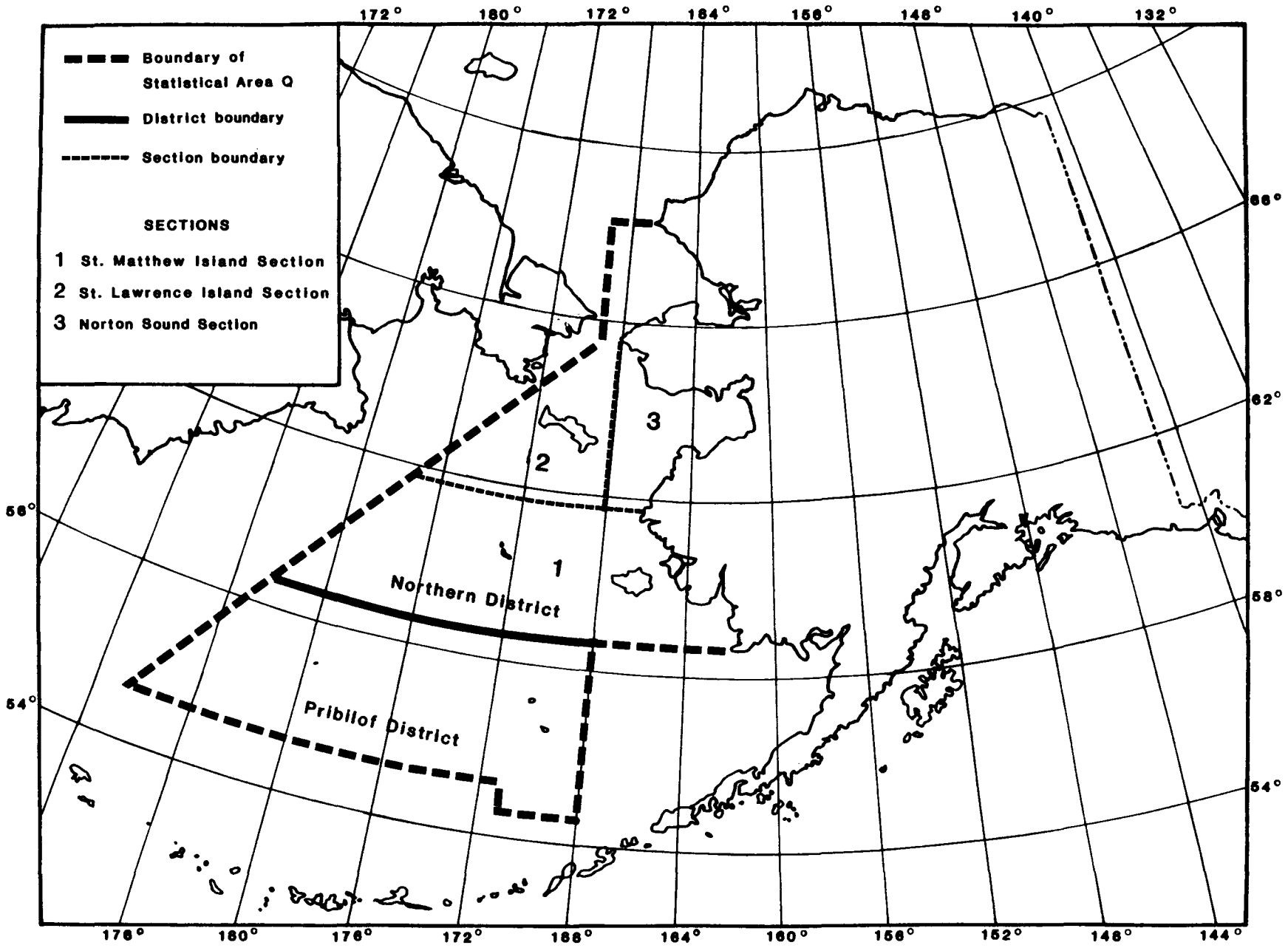
All Bering Sea shellfish ex-vessel values have been included in the Southwest Region commercial fisheries economic narratives. However, some of the Bering Sea ex-vessel values are attributable to fisheries in the Arctic and Western regions. Therefore, this narrative provides information on harvest levels and ex-vessel prices per pound so that the regional importance of the king crab fisheries can be determined. <u>It should be noted, however, that any ex-vessel values calculated from these data should not be added to ex-vessel values from the Southwest Region, as this would be double-counting</u>.

Three species of king crab, red, blue, and brown, are of commercial interest. Red king crab was originally targeted by fishermen, but with declines in the populations of red king crab, harvest of blue and brown king crabs increased. The Japanese

Table 32. Norton Sound Herring-Harvesting Employment (Fishermen and Crew), 1977-82

Year	12-Month Average	May	June	July	August
1977	0	0	0	0	0
1978	0	0	0	0	0
1979	24	206	87	0	0
1980	67	462	336	0	0
1981	59	708	0	0	0
1982	51	0	617	0	0
Average	50	344	260	0	0

Source: CFEC 1984b.



Map 5. King crab fishing districts and sections of Statistical Area Q (ADF&G 1984).

initiated the king crab fishery in the eastern Bering Sea in 1930 but discontinued fishing after 1939 (Miyahara 1954). In 1940 and 1941, the United States initiated an exploratory fishery, but ignorance of Japanese canning techniques and a healthy salmon fishery provided little incentive to the winter fishery (Gray et al. 1965). American fishermen and processors were late entries to the fishery.

From 1948 through 1957, American trawlers fished for king crab and groundfish in the Bering Sea; king crab was the target species (NPFMC 1980). The Japanese reentered the fishery in 1953, and the USSR started crabbing in 1959 (Otto 1981). The combined harvest of these two countries peaked in 1964 with approximately 9 million crabs. Domestic fishermen also increased their effort in the Bering Sea crab fisheries as stocks in the Gulf of Alaska became heavily exploited. In the early 1970's, the combined domestic, Japanese, and Soviet harvest declined to less than one-half the peak years of 1962-1964. Following declines in harvest levels, the Soviets left the fishery in 1971 and the Japanese in 1975. The king crab fishery of the eastern Bering Sea has been a domestic effort since the mid 1970's.

B. Norton Sound Section

The only shellfish fishery in Norton Sound is for red king crab (Paralithodes camtshatica). Blue king crab (P. platypus) and Tanner crab (Chionoecetes opilio) also occur in the region but are seldom caught by commercial or subsistence fishermen (ADF&G 1983a). The commercial harvest of king crab in Norton Sound is relatively new, and Norton Sound crab production is relatively small compared to the rest of the eastern Bering Sea. The smaller crabs of Norton Sound frequently may be more costly to harvest and bring a lower price per pound to fishermen than in other Bering Sea areas (Powell et al. 1983).

Both a summer and winter fishery occur. The summer fishery began in 1977 as an exploratory fishery (Powell et al. 1983). Seven vessels participated the first year; effort increased to a peak of 36 vessels in 1981. Harvest has fluctuated from 230,000 lb to over 2.9 million pounds (table 33). The crab catch per pot has declined from a high of 64 in 1978 to 6 in 1982 as a result of declining crab abundance (ADF&G 1983a). The summer season extends from August 1 through the first few days of September.

The winter fishery lasts from mid November to mid May. It is small and conducted mainly by Nome residents fishing through the ice (Otto 1981). Peak effort and harvest was the first year of the fishery in 1978; 37 fishermen caught 27,000 lb. Effort and harvest have since fallen to a low of eight fishermen and 2,400 lb in 1984 (table 33).

Table 33. Commercial Harvest in Thousands of Pounds and Effort for King Crab Fisheries in the Norton Sound Section of the Northern District of the Bering Sea, 1977-84

Fishing Section Fishery and Species	1977	1978	1979	1980	1981	1982	1983	1984
Norton Sound								
Summer red catch	520	2,100	2,900	1,200	1,400	230	370	390
Effort[a]	7	8	34	9	36	11	23	8
Winter red catch[c]	0	27	[d]	0.66[d]	0	[e]	1.51[e]	2.4
Effort[b]		37	1	1	0	1	5	8
Management area total catch	520	2,127	2,900	1,200.66	1,400	230	371.51	392.4

Source: Schwarz and Lean 1985.

a Number of vessels.

b Number of fishermen.

c Winter catch, reported as number of crabs; therefore numbers multiplied by 2.8 lb per crab, the average crab weight during the 1984 summery fishery.

d Harvest combined for 1979 and 1980 to protect confidentiality.

e Harvest combined for 1982 and 1983 to protect confidentiality.

The subsistence fishery for king crab in Norton Sound has also traditionally occurred during the winter months, with the nearshore ice packs serving as access to the fishing grounds; access is by foot and snowmachine. Participants are both Natives and non-Natives of varying lifestyles and incomes (Regnart 1978). The fishery occurs from December to May. Harvest levels since 1977, based on permits issued and returned, exceed those of the winter commercial fishery and produce up to 35,000 lb and average 14,500 lb per year (5,200 crabs) (table 34) (ADF&G 1984d).

1. Ex-vessel values. Ex-vessel value data by census area of fishermen for the Bering Sea are included in Southwest Region shellfish ex-vessel value tables. Table 35, however, presents ex-vessel price per pound information, which can be used with harvest quantities from table 33 to estimate ex-vessel values for the area. As stated previously, these values should not be combined with Bering Sea ex-vessel values because this would be double counting.

2. King crab commercial harvesting employment. Norton Sound commercial king crab harvesting employment information is available from ADF&G area management reports (table 33), the CFEC, and the ADL. Information from the CFEC and ADL, however, is incomplete. Therefore, the only available data are those presented in table 33. To estimate employment based on the number of vessels, a crew factor is used to determine the number of fishermen and crew employed. An AYK king crab crew factor has not been developed by the ADL or CFEC, but based on other areas a factor of 3.5 is probably reasonable for making estimates. This estimate applies to the "summer fishery," however; no ice-fishing crew factor has been developed.

C. St. Matthew and St. Lawrence Islands Sections

The St. Matthew Island Section of the Northern District consists of all waters between the latitudes of Cape Newenham on the south and Cape Romanzof on the north. The St. Lawrence Island Section lies west of 168° west longitude and between the latitudes of Cape Romanzof on the south and Cape Prince of Wales on the north (map 4). Blue, brown, and red king crabs have been harvested in these sections. The commercial fishery began in 1977 near St. Matthew Island, concentrating on blue king crab. Peak harvest and effort was during the 1983 season, when 164 vessels brought in nearly 9.5 million pounds. An additional 13 vessels fished in the St. Lawrence Island area. In 1984, an apparent decline in the crab population lowered the harvest to less than 4 million pounds (table 36).

Because stocks are thinly distributed outside the Norton Sound Section, red king crab has been harvested only incidentally to blue king crab in the St. Matthew-St. Lawrence islands sections.

Table 34. Subsistence Harvest in Number of Pounds of Red King Crab in Norton Sound and Effort in Number of Fishermen, 1978-84

	1978	1979	1980	1981	1982	1983	1984[a]
Harvest[b]	35,016	627	596	1,008	3,606	29,209	31,416
Effort	149	38	9	23	54	85	143

Source: ADF&G 1984a, Schwarz and Lean 1985.

a Figures reflect the number of crabs removed and kept.

b Figures are number of crabs as reported, multiplied by 2.8 lb, the average weight per crab harvested in the 1984 summer fishery.

Table 35. Norton Sound Red King Crab Ex-vessel Price ($) Per Pound, 1977-82

Red King Crab	1977	1978	1979	1980	1981	1982
Pot gear to 50 ft[a]	0.75	1.24	0.97*	0.92*	1.29*	2.02

Source: CFEC 1985.

a Harvesting using pots on vessels up to 50 ft in length.

* Bering Sea prices for approximate estimates of Norton Sound red king crab prices.

The only reported harvest of brown king crab in the Northern District was during the 1983 season, when 22 vessels caught 193,500 lb. No effort or landings of brown king crab have since been reported (ADF&G 1985e; Griffin, pers. comm.) (table 36).

In the St. Matthew Island Section, male red and blue king crabs may be taken during September. In the St. Lawrence Island Section, the season lasts through August and the first few days of September. Male brown king crab may be taken all year long under a permit issued by the commissioner of the ADF&G (ADF&G 1984d).

1. Ex-vessel values. Ex-vessel values for the combined St. Matthew and St. Lawrence areas can be calculated using the ex-vessel prices per pound in table 35 and the harvest quantities in table 36. As mentioned previously, values calculated in this manner are already contained in the Southwest Region tables presenting the shellfish ex-vessel value.

2. King-crab-harvesting employment. No commercial king-crab-harvesting employment data are available for this specific area. Table 36, however, presents data on the number of vessels in the fisheries. These vessel numbers can be multiplied by a crew factor of 5.5 (ADL 1985) to estimate the number of fishermen and crew employed.

Table 36. Commercial Harvest in Thousands of Pounds and Effort in Number of Vessels for King Crab Fisheries of the St. Matthew and St. Lawrence Islands Sections of the Northern District, 1977-84

King Crab Species		Fishing Section	Fishing Season 1977	1978	1979	1980	1981	1982	1983	1984
Blue	Catch	St. Matthew Is.	1,202.1	1,984.3	210.9	219.8	4,627.8	8,844.8	9,454.3	3,764.6
		St. Lawrence Is.	0	0	0	0	0	0	52.6	0
	Total		1,202.1	1,984.3	210.9	219.8	4,627.8	8,844.8	9,506.9	3,764.6
	Effort	St. Matthew Is.	10[b]	22[b]	18[b]	2[b]	31[b]	96[b]	164[b]	90[b]
		St. Lawrence Is.	0	0	0	0	0	0	13	0
Brown	Catch		0	0	0	0	0	0	193.5[c]	0
	Effort		0	0	0	0	0	0	22	0
Red	Catch[a]		543.0	2,007.9	3,024.2	353.7	64.0	3.7	1.6	0
	Effort[b]		---	---	---	---	---	---	---	---
Combined section and species catch			1,745.1	3,992.2	3,235.1	573.5	4,691.8	8,848.5	9,702.0	3,764.6

Source: ADF&G 1983a, 1985c.

--- means no data were available.

a Harvest is incidental to the targeted blue king crab. Catches from 1977 through 1979 include the Norton Sound Section. Data from 1980 through 1984 is for the St. Matthew Section only.

b Because harvest is incidental, effort is by the same vessels reporting blue king crab catches in St. Matthew Section.

c Catch reported from southern portion of St. Matthew Section.

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COMMERCIAL FISHING IN THE SOUTHEAST REGION

I. INTRODUCTION

A. Regional Summary

The fishery within the 3-mi limit is managed by the State of Alaska and from 3 to 200 mi off shore by the National Marine Fisheries Service. Management is directed by joint policy developed by the Alaska Board of Fisheries and the North Pacific Fisheries Management Council. The regulations established are implemented by the ADF&G. The southeast Region is shown in map 1.

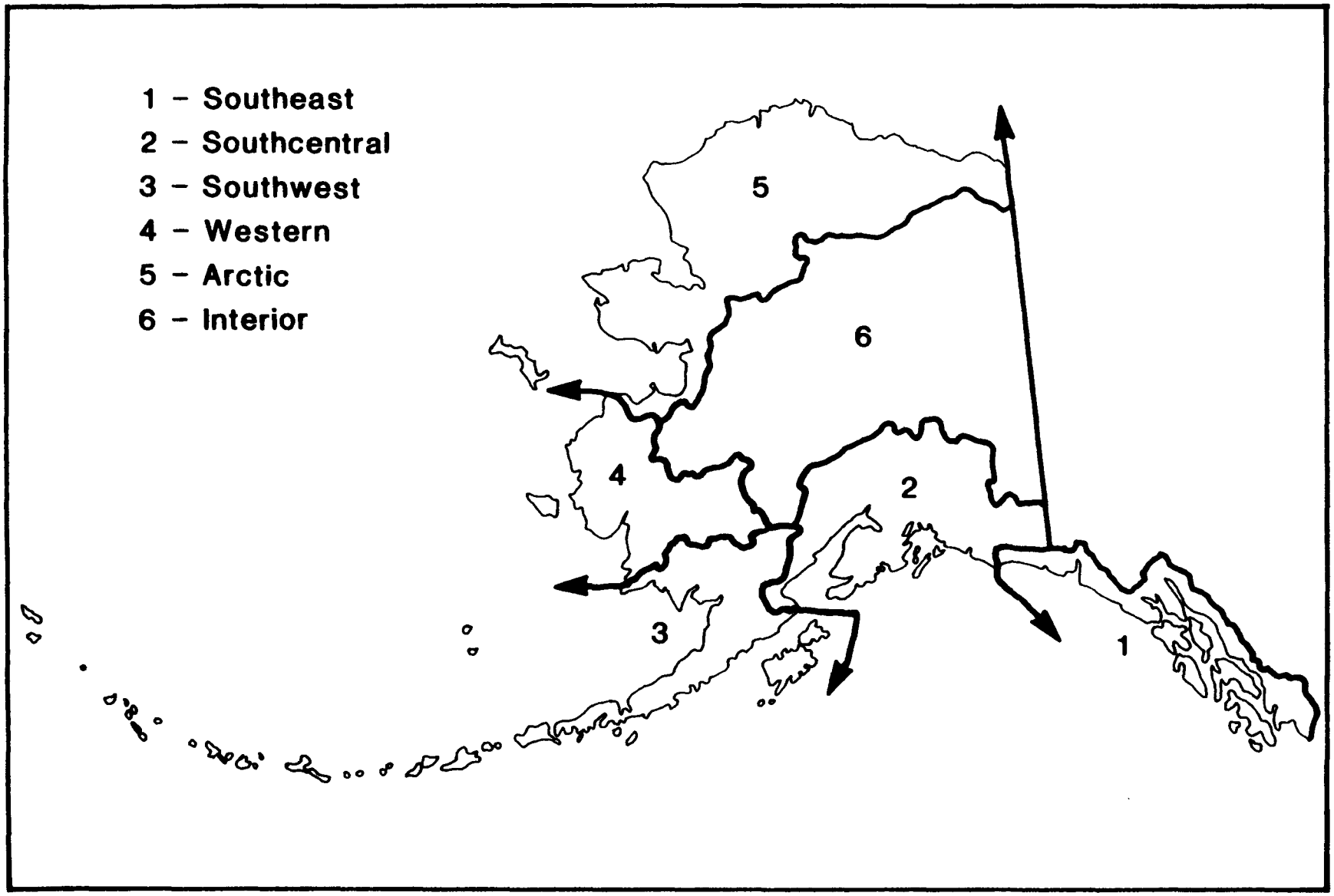
B. Ex-vessel Value

Table 1 presents ex-vessel value information for the salmon, herring, shellfish, halibut, and groundfish fisheries in the Southeast Region for the years 1975-1982. The overall trend in most of the fisheries was an increase in ex-vessel values. Despite the peak in halibut harvesting values in 1979 as a result of exceptionally high ex-vessel price per pound, the halibut fishery values tended to oscilate on a relatively stable trend line. The salmon, herring, shellfish, and groundfish fisheries, in contrast, showed some dramatic increases in ex-vessel values. These increases were in part a result of expansion in effort (in the cases of herring, shellfish, and groundfish) and improvement in stocks as a result of changes in regulations, management, and physical conditions (such as weather and ocean survival). This latter point is responsible for the significant increase in salmon harvest values.

The regional ex-vessel values ranged from $24.9 million in 1975 to $98.2 million in 1982 and averaged $68.2 million for the 1975-1982 period (table 1). For more information on ex-vessel values, see the following sections on specific fisheries.

C. First-Wholesale Value

First-wholesale values for fisheries in the Southeast Region for the years 1979-1983 are presented in table 2. First-wholesale values are also available for prior years, but these are in a significantly different format and are not directly comparable to the 1979-1983 figures. For more information on prior years' values, contact the Computer Services Section, Division of Commercial Fisheries.



Map 1. The six regions of the Alaska Habitat Management Guides.

Table 1. Ex-vessel Value of Salmon, Herring, Shellfish, Halibut, Sablefish, Groundfish Commercial Fisheries in the Southeast Region, 1975-82

	Estimated Ex-vessel Value in Thousands of Dollars								
	1975	1976	1977	1978	1979	1980	1981	1982	Average
Salmon	15,573	31,656	54,882	63,825	62,679	58,743	69,820	67,107	53,036
Herring	604	1,387	1,337	2,399	12,926	2,618	4,462	5,305	3,880
King crab	217	285	384	819	815	787	1,469	3,896	1,084
Tanner crab	431	861	1,265	1,209	1,800	2,212	2,262	4,838	1,860
Dungeness crab	627	439	116	1,613	1,652	692	3,945	6,385	1,934
Shrimp	94	137	219	488	457	1,200	866	774	530
Scallops	168	306	35	0	1	984	1,927	576	500
Halibut	6,401	8,225	4,721	7,681	13,656	4,922	6,066	5,933	7,201
Sablefish	771	705	1,233	1,801	3,712	1,479	1,100	3,023	1,728
Groundfish	62	100	256	483	530	370	303	399	313
Total	24,948	44,101	64,448	80,318	98,228	74,007	92,220	98,236	72,066

Source: CFEC 1984a.

Table 2. Production and Wholesale Value in the Southeast Region and Subareas, 1979-83

(Pounds and Values in Thousands)

Year	Subarea	Salmon		Other Finfish		Shellfish		Grand Total	
		Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1979									
	Juneau	5,342	10,235	3,007	4,100	151	195	8,500	14,531
	Ketchikan	8,358	18,556	4,091	4,089	64	142	12,515	22,788
	Petersburg	9,000	22,434	9,700	14,513	846	2,417	19,547	39,365
	Sitka	6,469	18,708	6,230	8,178	596	738	13,296	27,624
	Region total	29,170	69,934	23,029	30,881	1,659	3,493	53,859	104,309
1980									
	Juneau	7,550	12,528	2,669	2,797	353	527	10,571	15,852
	Ketchikan	28,303	49,284	1,684	1,648	201	435	30,189	51,367
	Petersburg	17,499	30,671	8,222	6,896	787	3,272	26,507	40,838
	Sitka	5,907	16,126	4,928	5,446	79	757	10,913	22,330
	Region total	59,259	108,609	17,502	16,787	1,420	4,990	78,180	130,387
1981									
	Juneau & Yakutat	14,789	25,314	2,496	2,498	2,205	4,216	19,490	32,028
	Ketchikan	28,103	47,022	2,645	1,381	125	390	30,873	48,792
	Petersburg & Wrangell	24,326	43,900	8,680	7,731	1,318	5,290	34,324	56,922
	Sitka	6,575	16,258	7,937	7,394	1,866	3,762	16,379	27,415
	Region total	73,793	132,494	21,759	19,005	5,514	13,658	101,066	165,157
1982									
	Juneau & Yakutat	23,906	28,859	3,802	3,474	3,025	6,246	30,733	38,579
	Ketchikan	31,182	44,568	3,117	2,305	117	423	34,416	47,296
	Petersburg & Wrangell	24,487	36,117	10,232	8,375	3,041	8,222	37,761	52,715
	Sitka	8,094	20,154	11,034	9,914	2,621	8,431	21,749	38,499
	Region total	87,670	129,699	28,185	24,069	8,083	23,322	124,659	177,090
1983									
	Juneau & Yakutat	26,118	36,093	5,562	5,930	1,333	3,824	33,013	45,847
	Ketchikan	35,661	49,842	5,644	5,003	195	647	41,500	55,492
	Petersburg & Wrangell	28,785	42,022	6,543	7,721	1,320	6,726	36,648	56,469
	Sitka	11,542	21,350	14,192	14,744	1,110	3,780	26,844	39,874
	Region total	102,105	149,308	31,941	33,397	3,959	14,977	138,005	197,683

Source: ADF&G 1980-84.

For the years 1979-1983 the first wholesale value of commercial fisheries in the Southeast Region increased steadily from approximately $104 million to $198 million (table 2). The annual values are presented by the subareas Juneau, Petersburg, Ketchikan, and Sitka, which are the major processing towns in the region, and the Division of Commercial Fisheries production subareas (map 2).

D. Commercial Fish-Harvesting Employment

Commercial fish-harvesting employment in the Southeast Region for all fish species for the years 1977-1982 is presented in table 3 and figure 1. Although harvesting employment clearly peaks during the summer months as a result of salmon-harvesting employment, employment occurred during every month of every year (table 3). The average monthly employment for 1977-1982 was 2,115 persons. August was the peak month of employment. August employment ranged from 5,026 fishermen and crew in 1981 to 6,668 fishermen and crew in 1978 (table 3).

II. SALMON FISHERY

A. Historical Background

Long before the European discovery of Southeast Alaska, it supported one of the heaviest concentrations of aboriginal populations found in the western hemisphere north of the areas of highest civilization in Mexico and Central America. This high aboriginal population and culture arose upon an ample natural resource base, part of which was the abundant salmon populations (Rogers et al. 1980).

In 1878 (following Russian settlement in 1804 and the sale of Russian Alaska to the United States in 1867), the first salmon canneries in Alaska were erected at Klawock and Sitka, and within eight years canneries were operating in all areas of the region. The size of the canned salmon pack continued to expand rapidly; the peak was reached in the 1941 season. In 1878, the first gold-mining camp in Alaska also came into existence at Windham Bay. Discoveries extended throughout the region, and production continued until World War II caused the closing of the large operations in 1944. Significant values were realized from other natural resources, but canned salmon and gold were the economic lifeblood of Southeast Alaska from the 1880's until the early 1950's (ibid.).

During the period 1906 through 1957, a total of 6,489,480 fine ounces of gold were produced by the region's lode mines, and 107,543,175 standard cases (48 1-lb cans) of canned salmon came from the region's canneries. Converting these quantities to 1957 prices (average 1957 wholesale price for canned salmon), the value

Table 3. Southeast Region Harvesting Employment for All Fish Species (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	1,883	180	197	179	635	2,563	3,417	5,139	5,535	3,946	396	245	161
1978	2,176	188	180	181	871	2,266	3,573	6,248	6,668	4,939	442	357	166
1979	2,212	112	154	369	895	2,554	5,398	6,696	5,707	3,303	830	244	282
1980	2,177	179	233	546	999	4,655	3,507	5,367	5,509	4,240	400	317	172
1981	2,021	323	364	898	787	1,654	5,906	4,955	5,026	3,168	564	302	304
1982	2,219	269	309	949	678	4,747	3,472	5,168	5,226	3,659	1,184	463	504
Average	2,115	209	240	520	811	3,073	4,212	5,602	5,612	3,876	636	321	265

Source: ADL 1984.

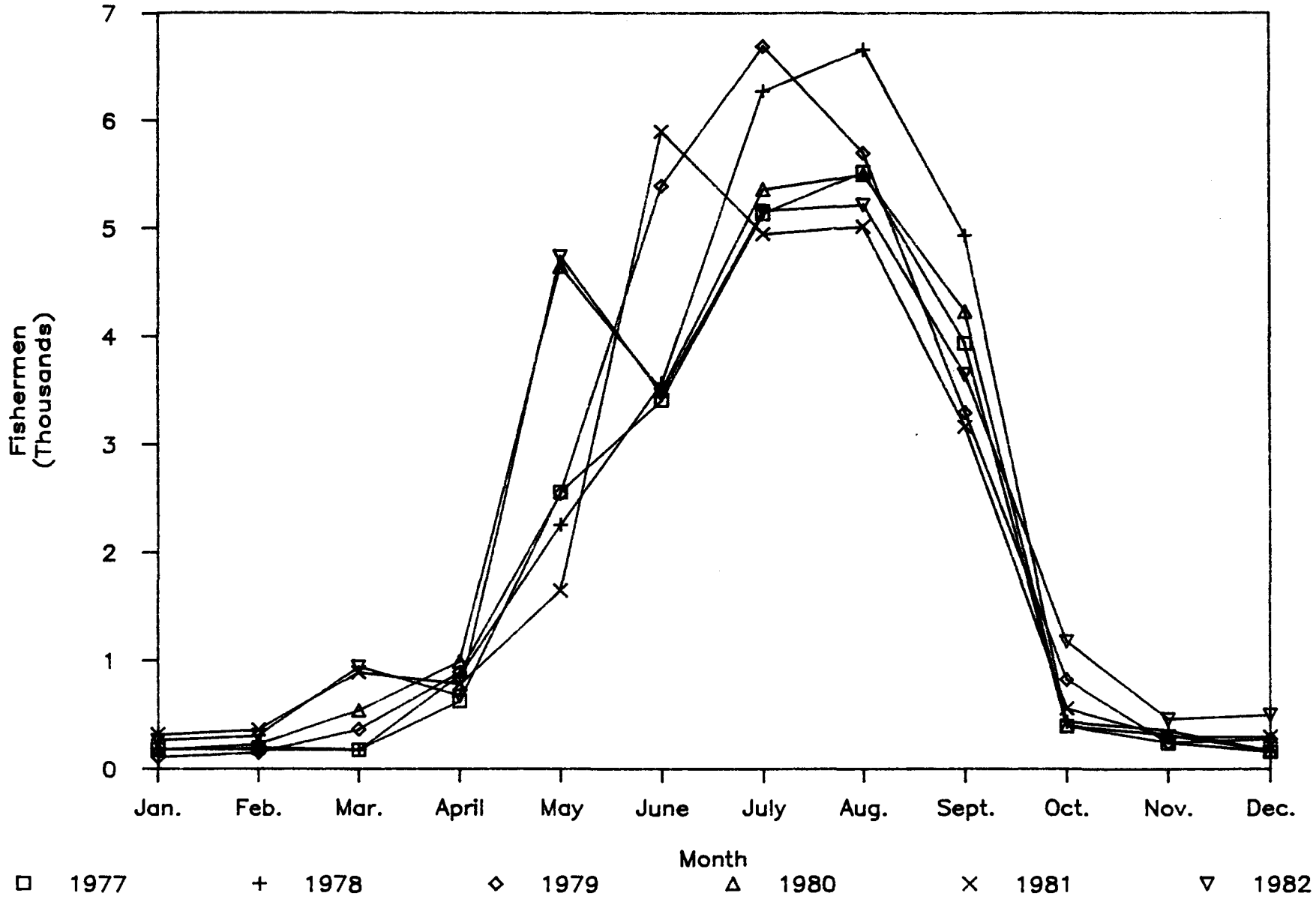


Figure 1. Southeast Region fish-harvesting employment (number of fishermen and crew) (ADL 1984).

of the products of the lode gold mines was $227,131,738, and the value of the salmon canneries was $2,446,600,000 (more than 10 times the value of gold at 1957 prices) (ibid.). Salmon fishing continues to play an important role in the economy of Southeast Alaska.

B. Regional Overview

In the Southeast Region, salmon are managed in the Southeastern Alaska and Yakutat management areas. The Southeastern Alaska Management Area includes all waters of Alaska between Cape Fairweather and Dixon Entrance; the Yakutat Management Area includes all waters of Alaska between the longitude of Cape Suckling (143 53'W) and a line projecting southwest from the westernmost tip of Cape Fairweather (ADF&G 1985d).

The Southeast Region's salmon fisheries encompass five Pacific salmon species, which are produced in over 2,500 salmon spawning streams. Presently, purse seine, drift gill net, and troll are the only commercial gear types permitted for harvesting salmon in the northern southeast area (NSRPT 1985). In addition to these gear types in the Southern Southeast Area, fish traps are permitted on Annette Island. The latter fishery, however, is not under state management. Salmon may be taken only by set gill net and troll gear in the Yakutat Management Area (ADF&G 1985d).

Under limited entry, there have been about 420 purse seine, 490 drift gill net, 980 power troll, 2,140 hand troll (NSRPT 1985), and 160 set gill net permits issued in the Southeast Region (ADF&G 1984a). Most of the power troll fleet fishes in northern Southeast for at least part of the season's openings. Hand trollers tend to fish more locally; about two-thirds of them are residents of northern Southeast. In recent years, the purse seine fishery has taken the bulk of the catch in numbers of fish (mostly pink salmon) and in catch value. However, in northern Southeast (unlike Southeast as a whole) the troll fishery has yielded the highest catch value, followed by purse seine (NSRPT 1985). Set gillnetting in the Yakutat Management Area is primarily a terminal fishery, where nets are placed near or directly in river and stream mouths. Interceptive set gill net fisheries occur only in Yakutat Bay (ADF&G 1984a). The troll fishery is primarily an interceptive fishery where the harvests are of mixed origins (ibid.); purse seine fisheries are terminal or interceptive, depending on the specific area (NSRPT 1985).

C. Ex-vessel Value

For the Southeast Region as a whole, the combined salmon ex-vessel value for the years 1975-1982 ranged from $15.6 million in 1975 to $69.8 million in 1981, with an average of $53.0 million (table 4).

Table 4. Ex-vessel Value of Commercial Combined Salmon Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Skagway-Ykt-Angoon	950	1696	3500	3863	3949	3254	4478	3578	3159
	Haines	638	1818	1878	1482	2240	1305	1492	2255	1639
	Juneau	1158	2712	4084	5121	6486	4215	4769	4935	4185
	Sitka	927	2138	3558	3769	4632	3137	4290	3991	3305
	Wrangell-Petersburg	2507	4762	9130	8958	9733	8431	10931	9430	7985
	Pr of W/Outer Ktkn	1301	2706	3999	4456	4371	4300	5232	4606	3871
	Ketchikan Gateway	2072	3361	6387	7312	7232	7267	7520	7423	6072
	Other Alaska*	96	217	172	524	474	420	510	421	354
	Alaska	9649	19410	32709	35484	39117	32328	39220	36640	30570
	Other USA	5056	10090	17991	22835	18087	21722	25912	24888	18323
	Unknown	216	795	986	1128	1254	1286	1105	1558	1041
	Subtotal	14922	30295	51686	59448	58457	55337	66237	63085	49933
Yakutat	Skagway-Ykt-Angoon	449	928	1829	2370	2629	2082	2409	2248	1868
	Juneau	**	**	149	403	297	406	339	419	259
	Sitka	24	65	233	274	261	112	195	265	179
	Wrangell-Petersburg	**	**	128	149	104	71	63	59	74
	Other Alaska*	15	37	174	202	200	97	102	151	122
	Alaska	503	1084	2512	3398	3491	2769	3108	3142	2501
	Other USA	148	277	669	968	719	629	473	875	595
	Unknown	0	1	15	12	13	9	2	4	7
	Subtotal	651	1362	3196	4378	4222	3406	3583	4022	3102
Total		15573	31656	54882	63825	62679	58743	69820	67107	53036

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Ex-vessel values for chinook, coho, sockeye, pink, and chum salmon accounted for 17, 21, 13, 36, and 12% of the average 1975-1982 ex-vessel values (table 5). The breakdown of earnings by species is shown in tables 6 through 10.

Approximately 62% of the Southeast Region's combined salmon ex-vessel values was earned by fishermen from census areas in the Southeast Region. Alaska fishermen as a whole earned 62% (Alaska fishermen from other Alaska regions earned less than 1% of the average ex-vessel values). Out-of-state fishermen earned 36% of the average 1975-1982 harvest values; the remaining 2% went to fishermen of unknown residency (table 4). The commercial harvest quantities for the years 1970 through 1985 are presented in table 11.

D. Salmon-Harvesting Employment

Salmon-harvesting employment in the Southeast Region occurred during every month during the years 1977-1982 (table 12 and fig. 2). Harvesting employment during the winter months can be attributed to the troll fishery (CFEC 1984b). The months of July and August were the peak months of employment, when an average 5,120 and 5,419 fishermen and crew, respectively, were employed (table 12). Because of limited entry regulations, employment levels were relatively consistent during the years 1977-1982. Changes in employment were primarily a reflection of changes in ex-vessel prices per pound (table 13) that influenced levels of effort. The monthly average number of fishermen and crew employed for the period 1977-1982 was 1,616 (table 12).

E. Fishery Management Area Summaries

1. Southeastern Fishery Management Area:

a. Ex-vessel value. The combined salmon Southeastern Fishery Management Area ex-vessel value for the years 1975-1982 ranged from $14.9 million in 1975 to $66.2 million in 1981 (table 4). The average value for the period was $49.9 million (table 4). The overall trend in ex-vessel values was strongly upward. Harvest values in all years except 1975 and 1976 were above (in most cases well above) the average (table 4). Chinook, coho, sockeye, pink, and chum salmon accounted for 17, 21, 11, 38, and 13%, respectively, of the average 1975-1982 ex-vessel value (table 14). Pink salmon clearly dominated the harvest quantity (table 11), but because of its lower price per pound (table 13) the harvest value was not in proportion to catch.

Table 5. Ex-vessel Value of Commercial Salmon Harvest for Southeast Alaska, by Species, 1975-82

	Estimated Ex-vessel Value in Thousands of Dollars								
Species	1975	1976	1977	1978	1979	1980	1981	1982	Average
Chinook	3,580	4,633	8,098	12,108	12,319	10,441	10,358	12,383	9,240
Coho	2,290	7,642	10,903	15,091	16,790	8,387	11,883	17,580	11,321
Sockeye	931	3,168	7,233	7,220	9,737	5,774	8,564	10,950	6,697
Pink	5,045	9,084	23,884	22,567	15,903	22,888	34,240	19,154	19,095
Chum	3,727	7,130	4,696	6,565	7,540	11,106	4,572	6,913	6,531
Total	15,573	31,656	54,882	63,825	62,679	58,743	69,820	67,107	53,036

Source: CFEC 1984a.

Table 6. Ex-vessel Value of Commercial Chinook Salmon Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Skagway-Ykt-Angoon	292	532	932	1108	1212	1170	1160	1148	944
	Haines	46	69	44	81	111	79	55	66	69
	Juneau	247	390	766	1333	1419	1369	1121	1026	959
	Sitka	431	657	1217	1909	1867	1521	1450	1557	1326
	Wrangell-Petersburg	589	701	998	1687	1321	1331	1439	1846	1239
	Pr of W/Outer Ktkn	243	303	519	757	730	471	657	902	573
	Ketchikan Gateway	575	596	716	1194	1512	951	1093	1190	978
	Other Alaska*	18	33	32	121	158	111	119	91	85
	Alaska	2440	3280	5224	8189	8331	7004	7095	7826	6174
	Other USA	1052	1200	1894	2755	3038	2386	2516	3554	2299
	Unknown	23	18	23	31	133	71	127	119	68
	Subtotal	3514	4498	7141	10974	11502	9461	9738	11500	8541
Yakutat	Skagway-Ykt-Angoon	26	63	190	242	254	306	177	261	190
	Juneau	**	**	72	179	115	198	138	212	116
	Sitka	10	12	96	76	84	41	50	63	54
	Wrangell-Petersburg	**	**	120	106	66	63	35	39	55
	Other Alaska*	**	**	104	84	64	26	6	27	39
	Alaska	41	104	581	688	584	634	406	602	455
	Other USA	24	31	377	445	231	343	214	279	243
	Unknown	0	0	0	1	2	3	0	3	1
	Subtotal	65	135	958	1134	817	980	620	883	699
Total		3580	4633	8098	12108	12319	10441	10358	12383	9240

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 7. Ex-vessel Value of Commercial Coho Salmon Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Skagway-Ykt-Angoon	74	682	855	1471	1392	478	1069	1472	937
	Haines	94	225	256	225	145	110	178	223	182
	Juneau	218	1074	1584	2169	1985	766	1268	1786	1356
	Sitka	83	974	763	1029	1442	605	824	1504	903
	Wrangell-Petersburg	329	1318	1892	2335	2493	1150	1739	2473	1716
	Pr of W/Outer Ktkn	212	480	843	917	1494	705	996	1297	868
	Ketchikan Gateway	416	780	1462	1683	2297	1239	1395	2116	1423
	Other Alaska*	11	60	48	120	148	86	98	136	88
	Alaska	1436	5593	7703	9949	11395	5140	7567	11006	7474
	Other USA	611	1637	2283	3111	3700	2031	2786	4776	2617
	Unknown	30	46	77	83	207	48	37	93	78
	Subtotal	2077	7276	10063	13143	15302	7219	10390	15876	10168
Yakutat	Skagway-Ykt-Angoon	183	314	683	1328	1053	837	1094	950	805
	Juneau	**	**	17	175	102	107	103	171	85
	Sitka	**	**	22	87	80	34	98	148	60
	Other Alaska*	7	9	41	137	146	51	86	136	77
	Alaska	194	334	764	1728	1381	1030	1382	1405	1027
	Other USA	19	32	70	220	101	136	111	299	123
	Unknown	0	0	5	1	7	2	0	1	2
	Subtotal	213	366	840	1948	1488	1168	1493	1704	1152
Total		2290	7642	10903	15091	16790	8387	11883	17580	11321

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 8. Ex-vessel Value of Commercial Sockeye Salmon Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Skagway-Ykt-Angoon	**	**	44	65	28	59	63	41	39
	Haines	58	466	891	730	1234	421	662	1224	711
	Juneau	107	306	634	616	1392	518	534	993	638
	Sitka	13	51	82	108	114	70	81	155	84
	Wrangell-Petersburg	108	329	1033	900	982	884	1326	1449	876
	Pr of W/Outer Ktkn	45	131	502	424	504	312	583	350	356
	Ketchikan Gateway	55	213	671	686	765	479	765	862	562
	Other Alaska*	**	**	41	51	56	32	91	83	47
	Alaska	396	1521	3896	3580	5074	2776	4105	5157	3313
	Other USA	260	837	1958	2299	2773	2016	3104	3911	2145
	Unknown	5	23	142	125	231	73	198	507	163
	Subtotal	660	2381	5997	6004	8078	4864	7407	9575	5621
Yakutat	Skagway-Ykt-Angoon	145	503	832	751	1119	661	870	1007	736
	Juneau	**	**	53	40	72	**	87	**	51
	Sitka	12	44	112	109	94	35	45	52	63
	Other Alaska*	**	**	34	16	18	**	32	**	17
	Alaska	172	587	1031	916	1303	795	1034	1099	867
	Other USA	99	200	197	290	352	112	122	275	206
	Unknown	0	1	8	10	4	4	2	1	4
	Subtotal	271	787	1236	1216	1659	910	1157	1375	1076
Total		931	3168	7233	7220	9737	5774	8564	10950	6697

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 9. Ex-vessel Value of Commercial Pink Salmon Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Skagway-Ykt-Angoon	380	268	1588	1007	964	714	1802	784	938
	Haines	3	4	235	14	46	212	252	32	100
	Juneau	142	110	664	491	814	642	1337	580	597
	Sitka	309	288	1385	570	745	554	1692	626	771
	Wrangell-Petersburg	904	1366	4478	3252	3547	2877	5605	2843	3109
	Pr of W/Outer Ktkn	509	1214	1744	1882	1196	2201	2743	1481	1622
	Ketchikan Gateway	545	945	2807	2695	1699	3154	3749	2460	2257
	Other Alaska*	39	61	36	192	79	140	179	76	100
	Alaska	2832	4257	12936	10104	9091	10493	17360	8883	9494
	Other USA	1978	4109	10143	11636	6059	11258	16005	9584	8846
	Unknown	146	677	682	799	572	919	632	675	638
	Subtotal	4956	9043	23761	22539	15721	22670	33997	19141	18978
Yakutat	Skagway-Ykt-Angoon	89	35	111	20	168	193	226	9	106
	Other Alaska*	0	5	5	7	11	24	12	1	8
	Alaska	89	41	116	27	179	217	237	11	114
	Other USA	0	0	5	2	2	1	6	2	2
	Unknown	0	0	2	0	0	0	0	0	0
	Subtotal	89	41	122	29	181	217	243	13	117
Total		5045	9084	23884	22567	15903	22888	34240	19154	19095

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

Table 10. Ex-Vessel Value of Commercial Chum Salmon Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Skagway-Ykt-Angoon	198	210	81	175	302	817	350	115	281
	Haines	437	1054	452	430	701	481	343	708	576
	Juneau	444	832	436	451	797	894	474	533	608
	Sitka	92	168	111	130	407	369	224	134	204
	Wrangell-Petersburg	578	1048	709	741	1322	2169	779	798	1018
	Pr of W/Outer Ktkn	293	578	376	459	428	606	244	570	444
	Ketchikan Gateway	480	828	714	1028	934	1426	508	792	839
	Other Alaska*	24	42	16	37	28	49	19	33	31
	Alaska	2545	4760	2895	3451	4919	6811	2941	3683	4001
	Other USA	1156	2307	1701	2986	2448	3993	1462	3034	2386
	Unknown	13	30	61	90	109	175	109	163	94
	Subtotal	3714	7096	4657	6528	7476	10980	4512	6880	6480
Yakutat	Skagway-Ykt-Angoon	5	14	13	24	27	83	38	15	27
	Other Alaska*	2	5	7	4	5	6	3	1	4
	Alaska	7	19	20	28	32	89	41	16	32
	Other USA	5	15	20	8	31	37	20	18	19
	Subtotal	13	34	40	36	64	126	60	34	51
Total		3727	7130	4696	6565	7540	11106	4572	6913	6531

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

Table 11. Southeast Alaska Annual Commercial Salmon Harvest in Numbers of Fish by Species, 1970-85

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	322,370	667,909	758,911	10,657,293	2,446,110	14,852,593
1971	333,997	623,269	914,423	9,344,830	1,946,105	13,162,624
1972	286,834	916,720	1,508,677	12,399,807	2,942,311	18,054,349
1973	343,834	1,011,595	836,400	6,455,488	1,832,215	10,479,532
1974	346,570	687,422	1,276,941	4,888,711	1,684,315	8,883,959
1975	300,707	245,191	424,657	4,026,520	686,615	5,683,690
1976	241,803	595,259	821,801	5,329,598	1,030,877	8,019,338
1977	285,220	1,085,143	943,138	13,843,562	738,723	16,895,786
1978	401,424	786,449	1,714,508	21,243,378	868,963	25,014,722
1979	367,618	1,073,869	1,278,742	10,977,908	888,276	14,586,413
1980	323,296	1,120,416	1,136,685	14,478,306	1,651,407	18,710,110
1981	271,891	1,079,630	1,407,734	18,967,833	849,821	22,576,909
1982	299,531	1,493,585	2,137,826	24,248,533	1,351,553	29,531,028
1983	292,445	1,568,912	1,989,112	37,511,248	1,195,603	42,557,320
1984	269,161	1,212,985	1,920,930	24,593,490	3,602,334	31,598,900
1985	252,995	1,849,153	2,539,360	50,987,791	3,262,032	58,891,331
Average 1970 to 1984	312,447	944,557	1,271,366	14,597,767	1,581,015	18,707,152

Source: ADF&G 1985a.

* Most recent year's data are preliminary.

Table 12. Southeast Region Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	1,518	48	67	96	318	1,258	2,609	4,609	5,202	3,650	200	99	55
1978	1,857	57	43	82	409	1,405	3,122	5,974	6,318	4,399	269	138	70
1979	1,678	38	27	74	476	1,525	2,986	5,459	5,702	3,120	542	128	62
1980	1,598	29	41	97	379	1,414	2,907	4,930	5,310	3,815	136	95	25
1981	1,464	17	47	181	265	1,381	2,651	4,842	4,959	2,894	197	104	84
1982	1,577	25	75	184	307	1,167	2,704	4,905	5,017	3,392	859	185	107
Average	1,616	69	50	119	359	1,358	2,833	5,120	5,419	3,545	367	125	67

Source: CFEC 1984b.

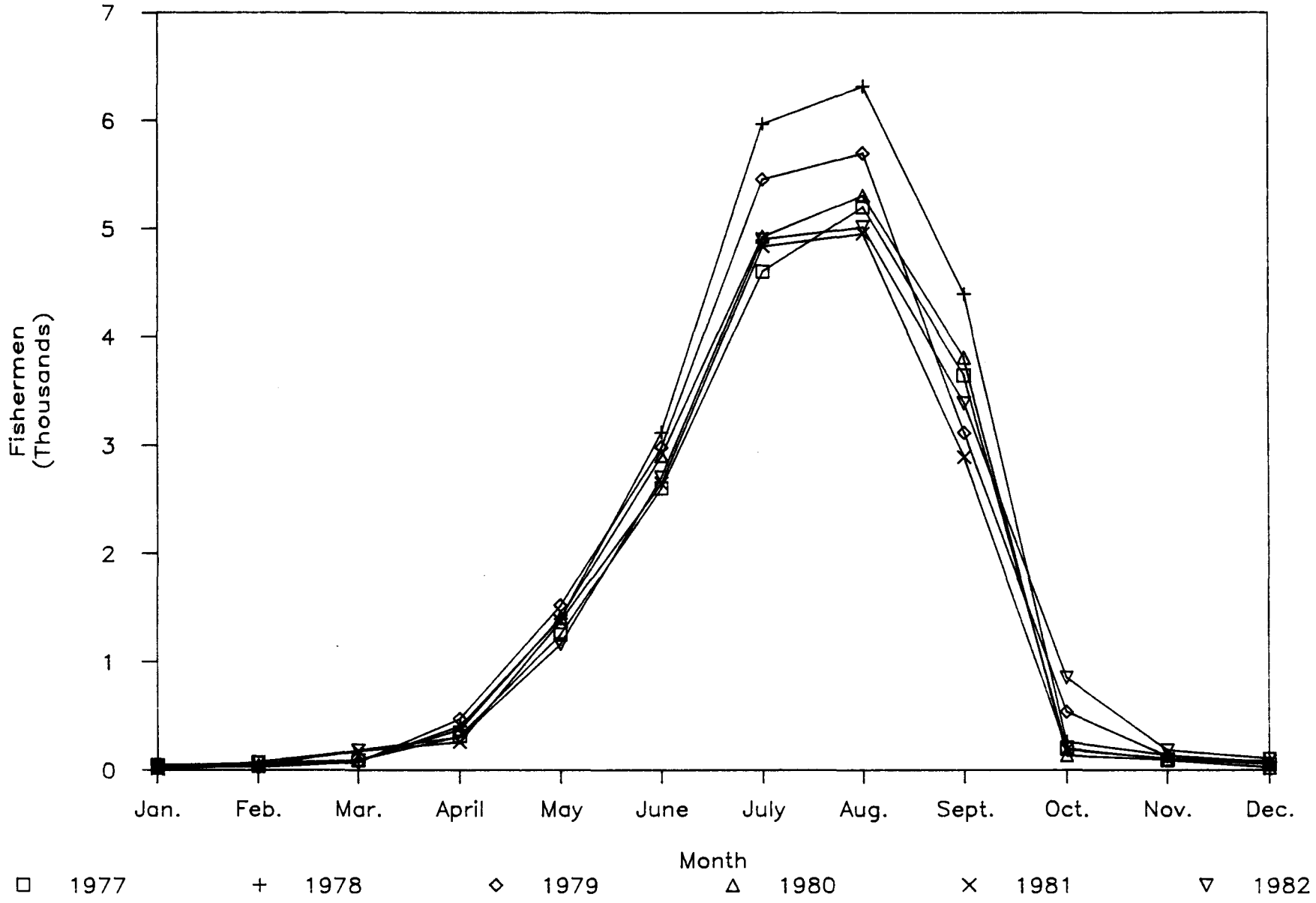


Figure 2. Southeast Region salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

Table 13. Estimated Ex-vessel Price per Pound for Salmon in the Southeast Region, by Species and Gea Type, 1975-84

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Chinook										
Power troll	0.96	1.68	2.01	2.05	2.42	2.17	2.43	2.84	1.96	2.95
Hand troll	0.96	1.68	2.01	2.05	2.42	2.17	2.40	2.69	1.96	2.95
Purse seine	0.64	1.17	1.30	1.36	1.31	1.52	1.87	1.76	1.08	1.22
Drift gill net	0.73	1.41	1.23	0.88	1.34	1.07	1.20	2.06	0.65	0.96
Set gill net	0.64	1.25	1.10	1.17	1.34	1.07	1.58	1.48	0.63	1.05
Coho										
Power troll	0.74	1.55	1.65	1.52	2.31	1.18	1.31	1.40	0.84	1.66
Hand troll	0.74	1.55	1.65	1.52	2.31	1.18	1.31	1.40	0.84	1.66
Purse seine	0.49	0.97	1.13	1.11	1.36	0.70	0.69	0.88	0.38	0.95
Drift gill net	0.88	1.14	1.06	1.26	1.48	0.86	0.91	0.80	0.53	1.09
Set gill net	0.59	0.70	0.76	1.00	1.20	0.86	0.85	0.57	0.58	0.82
Sockeye										
Power troll	0.52	0.76	0.91	1.30	1.44	0.94	1.18	1.34	0.94	1.37
Hand troll	0.52	0.76	0.91	1.30	1.44	0.94	1.28	1.32	0.94	1.47
Purse seine	0.59	0.75	0.86	1.40	1.36	0.77	1.29	1.10	0.83	1.17
Drift gill net	0.64	0.85	1.02	1.41	1.45	0.86	1.29	1.13	0.86	1.1
Set gill net	0.59	0.90	0.96	1.33	1.45	0.86	1.18	0.95	0.71	1.00
Pink										
Power troll	0.51	0.55	0.51	0.42	0.73	0.55	0.55	0.37	0.31	0.47
Hand troll	0.51	0.55	0.51	0.42	0.73	0.55	0.56	0.36	0.31	0.47
Purse seine	0.30	0.39	0.35	0.32	0.34	0.40	0.44	0.24	0.25	0.25
Drift gill net	0.38	0.42	0.51	0.32	0.30	0.41	0.43	0.20	0.24	0.25
Set gill net	0.30	0.35	0.35	0.19	0.30	0.41	0.46	0.22	0.15	0.20
Chum										
Power troll	0.41	0.62	0.72	0.72	0.93	0.85	0.63	0.80	0.57	0.83
Hand troll	0.41	0.62	0.72	0.72	0.93	0.85	0.66	0.71	0.57	0.83
Purse seine	0.53	0.46	0.58	0.76	0.82	0.68	0.49	0.47	0.35	0.44
Drift gill net	0.80	0.80	0.63	0.87	0.96	0.67	0.55	0.49	0.40	0.48
Set gill net	0.39	0.45	0.44	0.51	0.96	0.67	0.57	0.53	0.22	0.31

Source: CFEC 1985.

Table 14. Ex-vessel Value of Commercial Salmon Harvest for the Southeastern Fishery Management Area, by Species, 1975-82

	Estimated Ex-vessel Value in Thousands of Dollars								
Species	1975	1976	1977	1978	1979	1980	1981	1982	Average
Chinook	3,514	4,498	7,141	10,974	11,502	9,461	9,738	11,500	8,541
Coho	2,077	7,276	10,063	13,143	15,302	7,219	10,390	15,876	10,168
Sockeye	660	2,381	5,997	6,004	8,078	4,864	7,407	9,575	5,621
Pink	4,956	9,043	23,761	22,539	15,721	22,670	33,997	19,141	18,978
Chum	3,714	7,096	4,657	6,528	7,476	10,980	4,512	6,880	6,480
Total	14,922	30,295	51,686	59,448	58,457	55,337	66,237	63,085	49,933

Source: CFEC 1984a.

The Southeastern Fishery Management Area dominates the Southeast Region's salmon fishery, accounting for 94% of the 1975-1982 ex-vessel values (table 4). Therefore, ex-vessel values and earnings in this management area are very similar to those of the region as a whole. Approximately 61% of the ex-vessel values from 1975 through 1982 were earned by fishermen who were residents of census areas in the Southeast Region. Other Alaska fishermen, primarily from Southcentral and Southwest Alaska, earned about 1% of the period's harvest values. Out-of-state fishermen earned 37%, and fishermen from unknown residency earned 2% of the harvest values (table 4).

b. Salmon-harvesting employment. Commercial salmon-harvesting employment in the Southeastern Fishery Management Area occurred during every month during the years 1977-1982 (table 15 and fig. 3). The months with the highest levels of employment were May, June, July, August, and September. On average, the peak month for the area was August, when an average of 5,142 fishermen and crew were employed (1977-1982) (table 15). The average monthly employment for the years 1977-1982 was 1,525 fishermen and crew; the peak month of employment was August 1979, when 6,042 fishermen and crew were employed (table 15).

2. Yakutat Fishery Management Area

a. Ex-vessel value. Commercial ex-vessel value for all salmon species in the Yakutat Fishery Management Area for the years 1975-1982 ranged from $651,000 in 1975 to $4.4 million in 1978 and averaged $3.1 million (table 4). Chinook, coho, sockeye, pink, and chum salmon accounted for 23, 37, 35, 4, and 1% of the average harvest values (tables 16, 6-10). The Yakutat set gill net harvest quantity for the years 1970-1984 is presented in table 17. Because the troll fishery is managed for the region as a whole, the Yakutat troll harvest quantities are included in the Southeast Region total harvest figures.

Approximately 77% of the ex-vessel values were earned by fishermen who were residents of census areas in the Southeast Region (table 4). Out-of-state fishermen earned 19% of the 1975-1982 ex-vessel values; the remaining 4% was earned by fishermen of unknown residency (table 4).

b. Salmon-harvesting employment. Commercial salmon-harvesting employment in the Yakutat Area occurred during the months of June, July, August, and September during

Table 15. Southeastern Fishery Management Area Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	1,433	48	67	96	318	1,258	2,353	4,335	4,954	3,414	200	99	55
1978	1,765	57	43	82	409	1,405	2,852	5,686	6,042	4,127	269	138	70
1979	1,584	38	27	74	476	1,525	2,732	5,151	5,420	2,836	542	128	62
1980	1,506	29	41	97	379	1,414	2,653	4,646	5,012	3,541	136	95	25
1981	1,372	17	47	181	265	1,381	2,365	4,536	4,679	2,602	197	104	84
1982	1,487	25	75	184	307	1,167	2,444	4,635	4,740	3,112	859	185	107
Average	1,525	69	50	119	359	1,358	2,566	4,832	5,142	3,272	367	125	67

Source: CFEC 1984b.

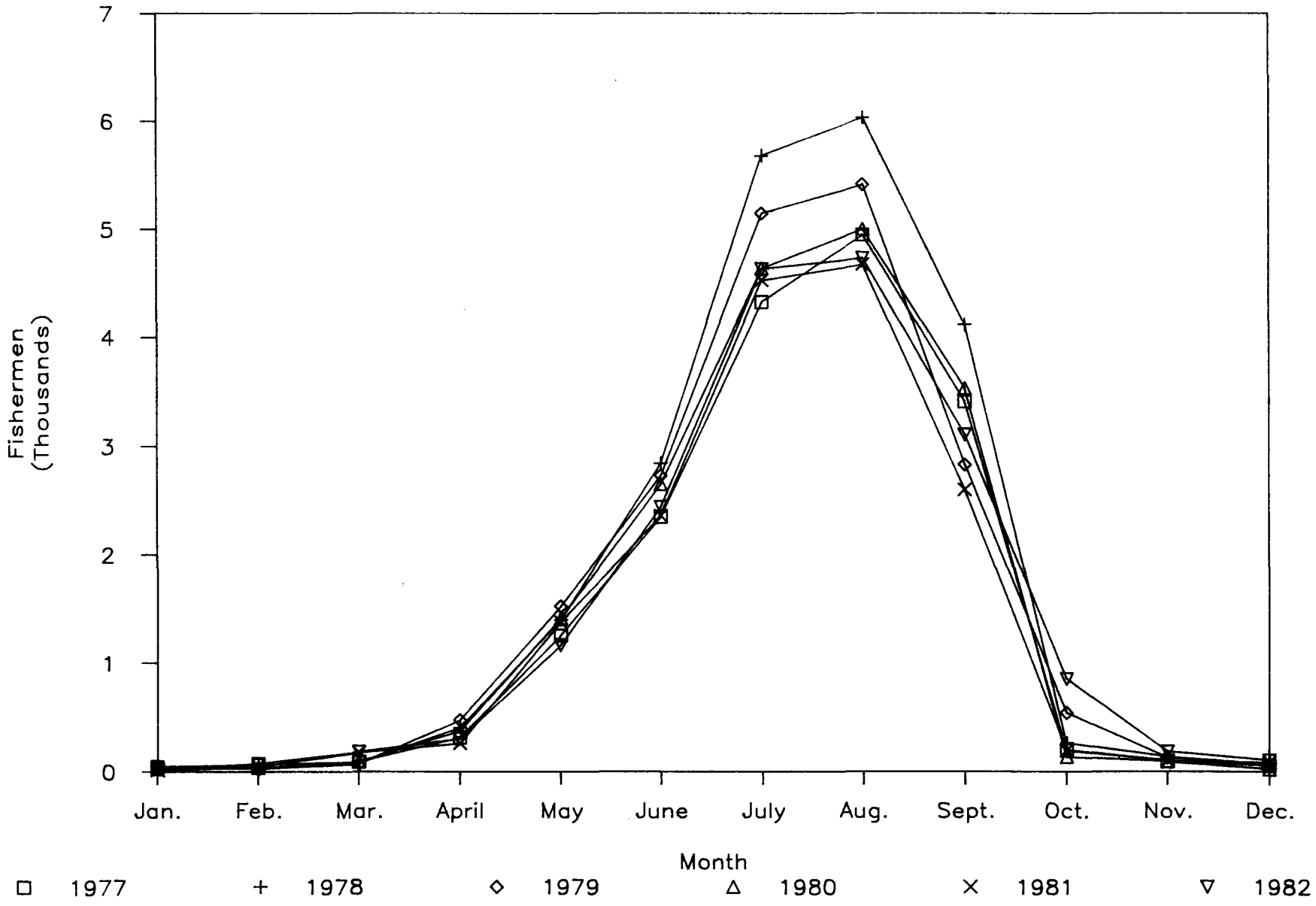


Figure 3. Southeastern Management Area salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

Table 16. Ex-vessel Value of Commercial Salmon Harvest for the Yakutat Fishery Management Area, by Species, 1975-82

	Estimated Ex-vessel Value in Thousands of Dollars								
Species	1975	1976	1977	1978	1979	1980	1981	1982	Average
Chinook	65	135	958	1,134	817	980	620	883	699
Coho	213	366	840	1,948	1,488	1,168	1,493	1,704	1,152
Sockeye	271	787	1,236	1,216	1,659	910	1,157	1,375	1,076
Pink	89	41	122	29	181	217	243	13	117
Chum	13	34	40	36	64	126	60	34	51
Total	651	1,362	3,196	4,378	4,222	3,406	3,583	4,022	3,102

Source: CFEC 1984a.

Table 17. Yakutat Fishery Management Area Annual Commercial Set Gill Net* Harvest in Numbers of Fish by Species, 1970-84

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	2,272	112,169	29,748	3,555	7,093	154,837
1971	1,945	129,206	37,420	79,973	4,986	253,530
1972	2,376	131,484	45,704	2,903	8,290	190,757
1973	2,733	128,412	41,213	16,998	8,995	198,351
1974	2,214	82,413	77,556	4,248	4,185	170,616
1975	2,224	73,260	37,403	80,043	3,761	196,691
1976	1,830	130,176	51,743	28,492	7,746	219,987
1977	2,549	185,377	92,228	75,504	8,651	364,309
1978	3,057	128,811	137,408	30,522	6,181	305,979
1979	4,297	165,053	95,873	152,053	7,399	424,675
1980	2,800	159,152	118,077	141,998	20,151	442,178
1981	2,069	149,573	132,127	133,763	10,633	428,165
1982	1,456	212,368	148,994	9,886	6,305	379,009
1983	949	133,278	81,298	25,319	10,437	251,281
1984	1,062	103,174	194,466	20,100	32,163	350,965
1985**	1,029	233,371	193,522	16,107	12,291	456,320
Average 1970-1984	2,256	134,927	88,084	53,690	9,798	288,755

Source: ADF&G 1985a.

* Legal gear for the Yakutat Area is set gill net and troll. Troll harvest figures are included in the Southeast Region harvest totals.

** Most recent year's figures are preliminary.

the years 1977-1982 (table 18, fig. 4). Harvesting employment was relatively even during those four months of the year, with July showing only slightly more employment. July employment ranged from 274 fishermen and crew in 1975 to 308 fishermen and crew in 1979 and averaged 288 for the years 1975-1982 (table 18).

III. PACIFIC HERRING COMMERCIAL FISHERY

A. Regional Overview

The first recorded statistics for Pacific herring harvest occurred in 1878 (Barry 1974). Most of the catch from the 1890's to the 1960's was used to supply herring for reduction to meal and oil (ADF&G 1982). Herring harvested for bait first appeared in the harvest statistics in 1906, with 831 tons marketed (Barry 1974). The average amount harvested for bait from 1910 to 1973 was 2,635 tons or about 11% of the total harvest (ibid.). The sac roe fishery has developed in recent years in response to Japanese demand for herring sac roe; it has accounted for 56% of the total harvest from 1971 through 1984, with an annual catch of 4,070 tons (derived from ADF&G 1984b). Table 19 provides information on sac roe and food/bait harvests in the Southeast Region for the years 1975-1984.

In the Southeast Region, the commercial herring fishery is regulated by fish districts, using seasons and quotas as the principle management tools. Quotas are managed by emergency orders for separate stocks and are based on harvesting a percentage (10 to 20%) of each major stock, using available data on total biomass, age and growth analysis, and spawning success (Blankenbeckler 1977, Blankenbeckler and Larson 1981). Harvest is allowed only on stocks that exceed certain threshold levels. Individual stocks are presently managed so that they are exposed to only one type of commercial fishery, either sac roe or food and bait (Blankenbeckler and Larson 1981).

The food/bait fishery is mainly a winter fishery that utilizes the entire fish for bait or food (as opposed to the sac roe fishery, where only the roe is consumed as food). Prior to the 1978-1979 season, this fishery was open from October through February, and numerous stocks were harvested (Blankenbeckler 1975, Bergman 1983). Since that time, the winter fishery has been restricted to certain areas where information indicates that harvestable amounts of overwintering mature herring are present (ADF&G 1980). Although this fishery is open to other gear types, the harvest is taken primarily by purse seiners.

A second type of bait fishery is the fresh-bait pound. This fishery usually requires a purse seiner to capture the herring and

Table 18. Yakutat Fishery Management Area Salmon-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	84.5	0	0	0	0	0	256	274	248	236	0	0	0
1978	92.2	0	0	0	0	0	270	288	276	272	0	0	0
1979	95.7	0	0	0	0	0	274	308	282	284	0	0	0
1980	92.5	0	0	0	0	0	254	284	298	274	0	0	0
1981	97.0	0	0	0	0	0	286	306	280	292	0	0	0
1982	91.3	0	0	0	0	0	260	270	276	280	0	0	0
Average	92.2	0	0	0	0	0	267	288	277	273	0	0	0

Source: CFEC 1984b.

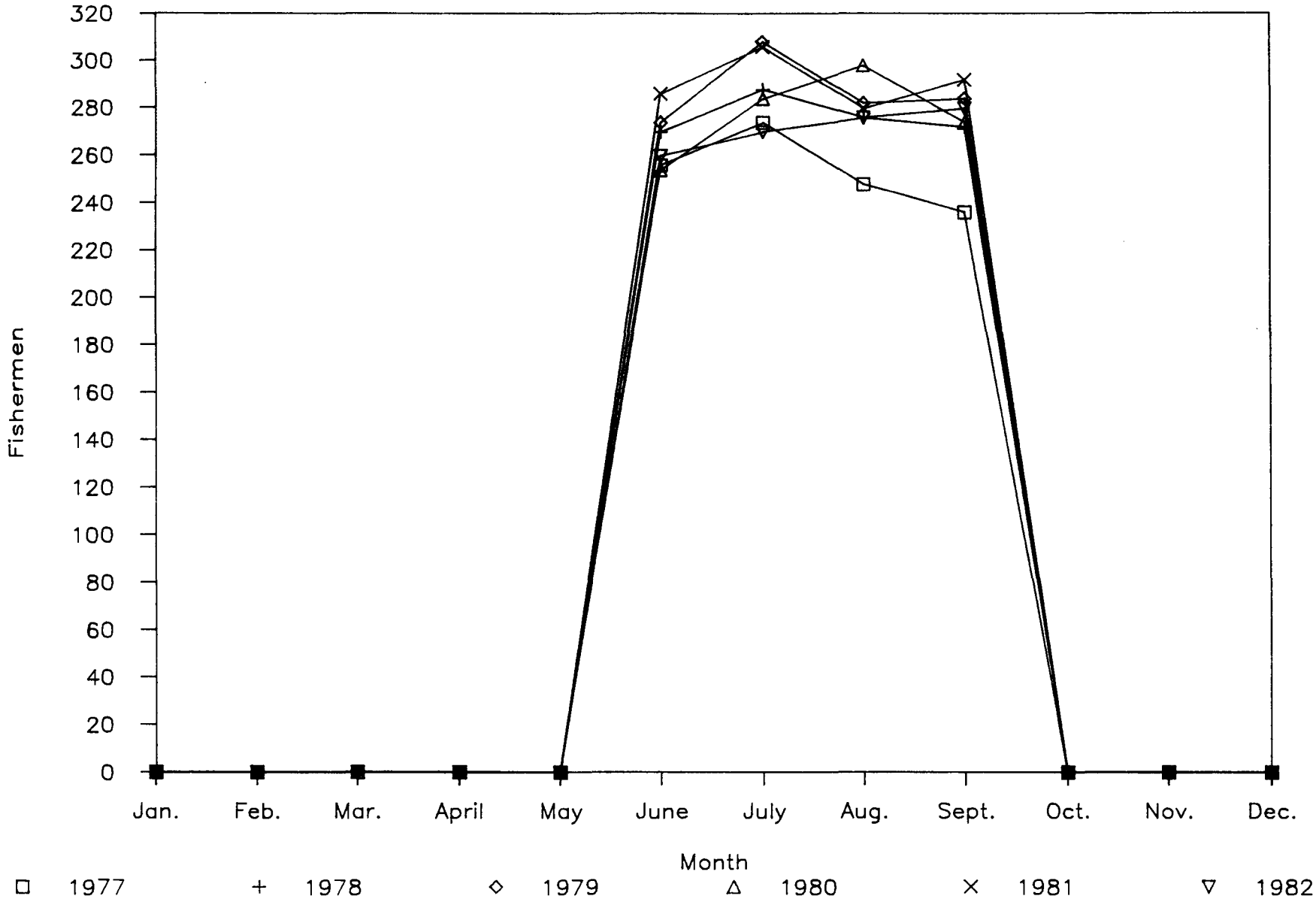


Figure 4. Yakutat Management Area salmon-harvesting employment (number of fishermen and crew) (CFEC 1984b).

move them to the pound, although sometimes leads are used to guide the fish into the pound as they move along the shore (Bergmann 1983). The pound is typically a rectangular log enclosure with net or wire mesh suspended from it, and the fish are held there and sold to individual fishermen (ibid.). From 1978 to 1984, the yearly fresh-bait pound harvest averaged around 50 tons (Bergmann 1983; ADF&G 1983, 1984b).

Two other types of commercial harvests connected with herring have occurred in recent years in Southeast Alaska. One fishery is a frozen-tray-pack pound that was created in 1979. This harvest has generated relatively little interest, however. Only 50 tons were harvested from 1979 to 1982 (Bergmann 1983), and no processors participated in the fishery in the 1982 to 1983 and 1983 to 1984 seasons (ADF&G 1983, 1984b).

There has been a limited harvest of Macrocystis kelp in Southeast Alaska. This kelp is harvested in the spring and transported mainly by boat to Prince William Sound, where it is used as a substrate for the commercial herring roe-on-kelp fisheries (ADF&G 1984b). Prior to 1984, the demand for kelp was minimal, with less than 15 tons harvested annually (ibid.). In 1984, the demand rose sharply, with 84 permits being issued for the taking of 232 tons and an actual harvest of about 61 tons (ibid.).

B. Ex-vessel Value

Herring ex-vessel values in the Southeast Region have exceeded $1 million dollars annually for the years 1976-1982 (most of the period for which ex-vessel values are available). Sac roe herring harvest levels and values increased considerably during those years (tables 19 and 20), while food/bait harvests and pounds tended to decrease (tables 19 and 21). Sac roe ex-vessel values increased from $415,000 in 1975 to $4.8 million in 1982, with an average value of $3.5 million (table 20). Sac roe herring values peaked in 1979, primarily as a result of an exceptionally high ex-vessel price per pound (table 22). Most Alaska herring sac roe is exported to Japan. The price per pound for fishermen in Alaska is largely dependent on the British Columbia and western continental United States harvest levels and the extent to which they satisfy Japanese demand. The 1979 ex-vessel price per pound in the Southeastern Statistical Area sac roe fishery was caused by the decline in British Columbia herring stocks and harvests.

From 1978 through 1982, 80% of the herring sac roe ex-vessel values was earned by Alaska fishermen, and all of these were from census areas in the Southeast Region (table 20). ("Other Alaska" in this table is made up only of Southeast Region census areas [CFEC 1984a].) Out-of-state fishermen earned 14% of the 1978 to 1982 ex-vessel values; the remaining 5% was earned by fishermen from unknown residency (table 20). Census area information for

Table 19. Pacific Herring Harvests in Tons for the Sac Roe and Food/Bait Fisheries in Southeast Alaska, 1975-84

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Sac roe	2,075	2,254	2,231	2,029	3,047	6,500	6,722	7,193	8,713	8,411
Food/bait	6,023	6,395	3,822	4,496	6,157	1,866	1,908	2,689	318	2,656
Total	8,098	8,649	6,053	6,525	9,204	8,366	8,630	9,882	9,031	11,067

Source: ADF&G 1985a.

Table 20. Ex-vessel Value of Commercial Roe Pacific Herring Harvest for Southeast Alaska Fishery Management Area, by Origin of Fishermen, 1978-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975[a]	1976[a]	1977[a]	1978	1979	1980	1981	1982	Avg.[b]
Southeastern	Sitka	---	---	---	139[b]	704	261	355	214	335
	Wrangell-Petersburg	---	---	---	1124	5241	985	1818	1903	2214
	Ketchikan Gateway	---	---	---	192	2571	616	569	694	928
	Other Alaska*	---	---	---	144	727	276	836	896	576
	Alaska	---	---	---	1599	9244	2138	3577	3707	4053
	Other USA	---	---	---	238	1557	402	511	1036	749
	Unknown	---	---	---	33	1173	77	1	105	278
Total		415	631	1562	1870	11974	2617	4089	4847	3500

Source: CFEC 1984a, CFEC 1985, ADF&G 1985a.

--- means no data were available.

* Further breakdown withheld because of nondisclosure regulations.

a 1975-1977 ex-vessel values were calculated from harvest figures computed from Region I, Div. Commer. Fish., staff reports and CFEC estimated ex-vessel prices per pound.

b Averages for census areas are 1978 through 1982 only; the subtotal and total averages are for 1975-1982.

Table 21. Ex-vessel Value of Commercial Food/Bait Pacific Herring Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975[a]	1976[a]	1977[a]	1978	1979	1980	1981	1982	Avg.[b]
Southeastern	Wrangell-Petersburg	---	---	---	178	436	*	133	94	171
	Ketchikan Gateway	---	---	---	238	327	0	80	100	149
	Other Alaska*	---	---	---	*	188	*	129	221	113
	Alaska	---	---	---	444	951	12	341	415	433
	Other USA	---	---	---	0	0	*	*	*	5
	Unknown	---	---	---	85	0	*	*	*	17
	Subtotal	482	512	459	529	951	12	346	437	466
Yakutat	Ketchikan Gateway	0	0	0	0	0	0	*	*	3
	Alaska	0	0	0	0	0	0	*	*	3
	Unknown	0	0	0	0	0	0	*	*	2
	Subtotal	0	0	0	0	0	0	26	19	6
Total		482	512	459	529	951	12	372	456	472

Source: CFEC 1984a, 1985; ADF&G 1985a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

a 1975 to 1977 ex-vessel values were calculated from harvest figures computed from Region I, Div. Commer. Fish., staff reports and CFEC estimated ex-vessel prices per pound.

b Averages for census areas include 1978-1982 only; the subtotal and total averages are for 1975-1982.

Table 22. Estimated Ex-vessel Price ($) per Pound for Pacific Herring in Southeast Alaska, 1975-83

Herring Product	1975	1976	1977	1978	1979	1980	1981	1982	1983
Sac roe	0.10	0.14	0.35	0.52	1.11	0.21	0.30	0.32	0.47
Food/bait	0.04	0.04	0.06	0.06	0.20	0.14	0.08	0.10	---

Source: CFEC 1985.

--- means no data were available.

the years 1975-1977 is unclear because of changes in food/bait and sac roe fish-ticket coding. It is discernable, however, that 86% of the combined sac roe and food/bait harvest for the years 1975-1978 was earned by Alaska fishermen and that all of these were from census areas in the Southeast Region; 10% was earned by out-of-state fishermen, and the remaining 4% were from unknown residency (CFEC 1984a).

Food/bait herring ex-vessel values averaged $472,000 for the years 1975-1982 and ranged from $12,000 in 1980 to $951,000 in 1979 (table 21). For the years 1978-1982, Alaska fishermen earned 95% of the harvest values (table 21), and all of them were from census areas in the Southeast Region (CFEC 1984a). Out-of-state fishermen earned 1% of the 1978-1982 ex-vessel values, and fishermen of unknown residency earned 4% (table 21).

C. Herring-Harvesting Employment

Commercial herring-harvesting employment in the Southeast Region is presented in table 23 and figure 5. The food/bait herring fishery occurs in the winter, or the months of October through February (table 23). The sac roe fishery primarily occurs on herring in spawning condition during the spring, or March through May. March and April were the peak months of sac roe herring-harvesting employment during the years 1977-1982; the average March and April employment was 226 and 258, respectively, fishermen and crew (table 23).

IV. SHELLFISH FISHERY

A. Regional Overview

The largest management boundaries for the regulation of fisheries in the Southeast Region is the statistical area. For the shellfish fisheries, one statistical area, Statistical Area A, comprises all the inshore and offshore waters of the Southeast Region. Statistical Area A has as its western boundary the longitude of Cape Suckling (143°53'W), as its southern boundary the International Boundary at Dixon Entrance, and as its seaward boundary the 400 fathom depth contour. (See the shellfish statistical areas map in appendix A. for more information on management area boundaries.)

Although the Southeast Region shellfish fisheries management area is Statistical Area A by regulation, for practical purposes Statistical Area A of the shellfish fishery is managed in two areas, referred to as the Southeastern Alaska Area and the Yakutat Area. Commercial harvesting information in the Southeast Region human use narratives is presented by these subareas. Commercial harvest quantities for these two areas and ex-vessel values,

Table 23. Employment in the Commercial Harvest of Pacific Herring in Southeast Alaska (Number of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	50	55	50	10	229	113	0	0	0	0	77	48	33
1978	56	50	44	11	355	127	0	0	0	0	0	77	6
1979	58	0	50	178	280	74	0	0	0	0	94	0	77
1980	44	0	0	214	308	0	0	0	0	0	0	0	0
1981	76	105	66	450	279	0	0	0	0	0	11	6	0
1982	63	83	0	500	99	6	0	0	0	0	0	66	0
Average	59	49	35	226	258	53	0	0	0	0	30	33	19

Source: ADL 1984.

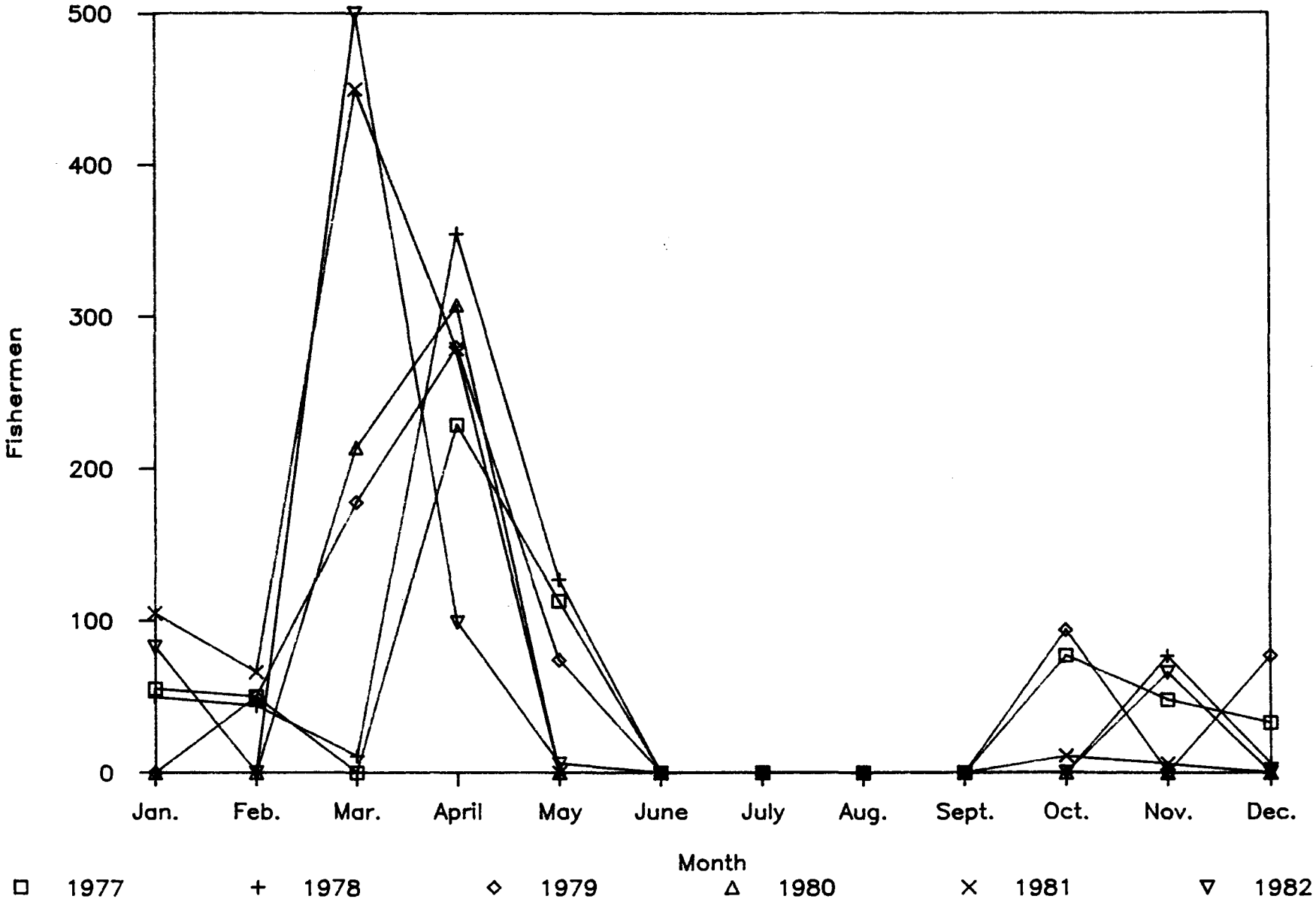


Figure 5. Southeast Region herring-harvesting employment (number of fishermen and crew) (ADL 1984).

however, are presented in this narrative for the total regulatory Statistical Area A because ex-vessel values are available with this breakdown. At the winter 1986 Board of Fish meeting, regulations were adopted that divide the Southeast shellfish area officially into two statistical areas.

B. Commercial Shellfish-Harvesting Employment

Commercial combined shellfish-harvesting employment (in numbers of fishermen and crew) in the Southeast Region occurred during every month of the year from 1977 through 1982 (table 24, fig. 6). Harvesting employment was relatively stable throughout the year but at somewhat higher levels during the months of September through April (table 24). The decrease in summer employment was likely a result of a shift in effort to the salmon fisheries. The monthly average of fishermen and crew employed for the years 1977-1982 was 112. The monthly averages for those years, however, increased steadily; the 1982 monthly average was almost double the average for the period (table 24).

C. Dungeness Crab

1. Regional overview. The Dungeness crab is the most widespread crab species in the Southeast Region that is utilized extensively as both a commercial and a noncommercial food source. The commercial Dungeness crab fishery in the Southeast Region is managed primarily on the basis of a minimum size limit and the taking of males only (Imamura 1986). Minimum size limits are set above the size-of-maturity to allow males a chance to mate before they can be legally harvested (ibid.). Dungeness crab may be taken only by pots, ring nets, or diving gear (ADF&G 1985b). Historically, the market demand for Alaska Dungeness crab has been inversely related to the availability of crab in Washington, Oregon, and California (ibid.).

   From the early 1930's through 1955, regulations closed the season for two to four months during the summer in an effort to prohibit fishing during the molting season (Imamura 1986). From the late 1950's to 1968 the commercial season was opened all year (ibid.). Since then, various closures were implemented in certain areas during certain periods from March to September. In 1985, the season was closed in the latter half of August and all of September (ibid.). Most of the Dungeness crab harvest generally occurs from June to October, although some fishing occurs during the rest of the year.

2. Harvest summary and ex-vessel values. Since 1960, commercial Dungeness crab harvests have averaged about 3 million pounds (table 25). Since the 1980-1981 season the average has been

Table 24. Southeast Shellfish-Harvesting Employment (Numbers of Fishermen and Crew), 1977-82

Year	Monthly Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	41	65	65	68	53	24	12	8	11	22	50	58	56
1978	56	62	75	68	63	32	39	44	37	46	68	75	71
1979	71	62	61	71	77	58	59	57	48	72	105	102	131
1980	145	131	145	156	178	59	61	87	201	305	155	129	114
1981	155	146	167	145	178	80	126	139	110	113	5	166	199
1982	204	138	175	175	182	56	261	254	227	186	268	174	346
Average	112	101	115	114	122	52	93	98	106	124	109	117	153

Source: ADL 1984.

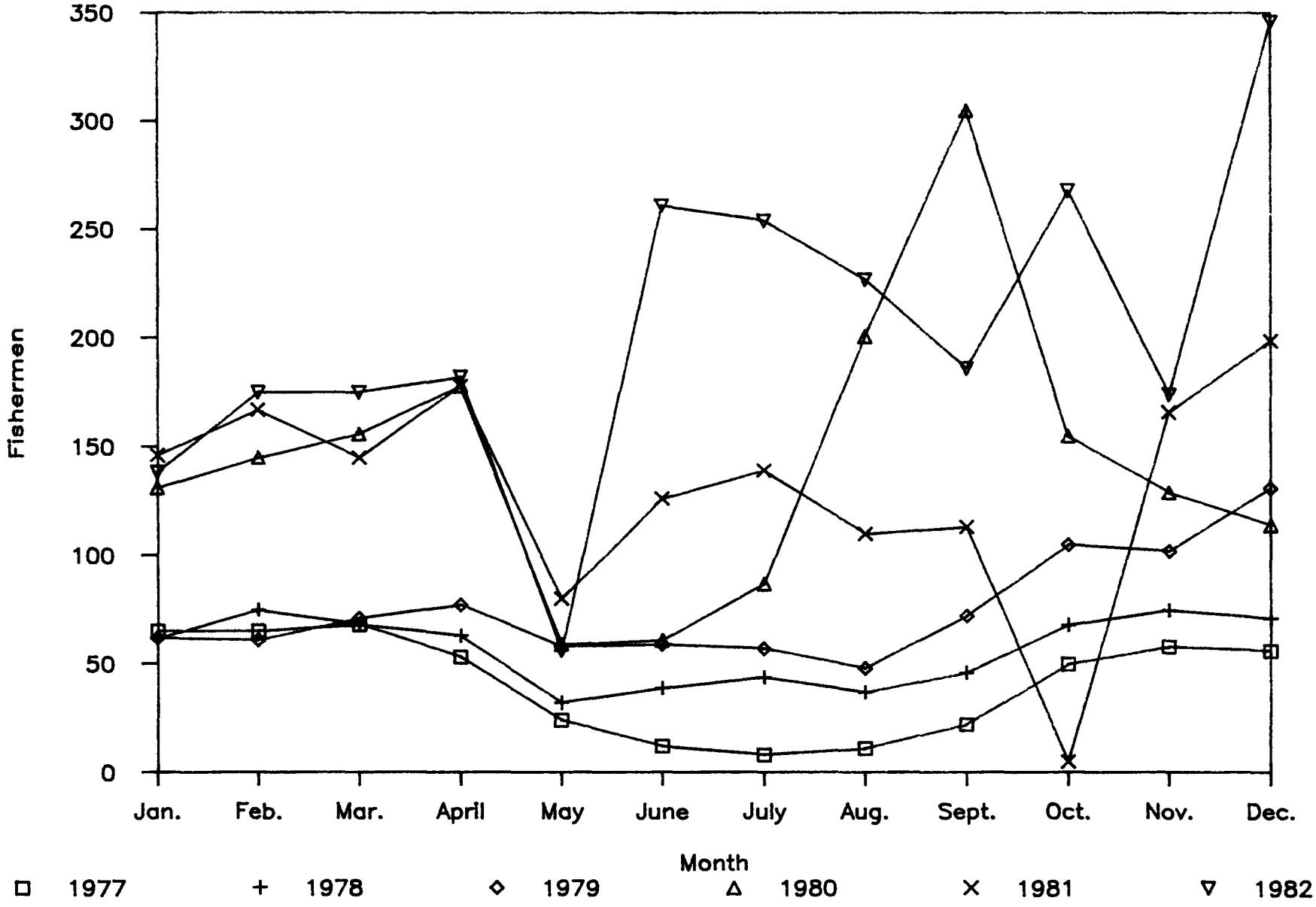


Figure 6. Southeast Region shellfish-harvesting employment (number of fishermen and crew) (ADL 1984).

Table 25. Southeast Region (Statistical Area A) Commercial Dungeness Crab Harvests in Pounds, 1961 through 1985-86

Year/Season	Harvest	No. of Vessels
1960	1,993,167	---
1961	1,695,000	---
1962	3,922,990	---
1963	4,679,660	---
1964	4,633,240	---
1965	3,302,673	---
1966	2,496,177	---
1967	4,064,616	---
1968	3,996,809	---
1969-70	2,356,508	31
1970-71	2,290,113	31
1971-72	1,663,479	31
1972-73	2,590,161	42
1973-74	3,095,926	63
1974-75	1,745,241	62
1975-76	1,191,647	48
1976-77	1,019,647	23
1977-78	255,328	13
1978-79	2,554,263	35
1979-80	2,193,426	51
1980-81	1,397,926	24
1981-82	5,985,785	71
1982-83	8,810,325	136
1983-84	4,626,346	193
1984-85	2,586,065	182
1985-86[a]	2,536,702	219

Source: Imamura 1986.

--- means no data were available.

a Most recent year's data should be considered preliminary.

4.3 million pounds. The number of vessels fishing during the period 1969-1970 to 1980-1981 ranged from 13 to 63. By 1985-1986, the number had risen to 219.

Commercial harvest ex-vessel values for the years 1975-1982 ranged from $116,000 in 1977 to $6.4 million in 1982; the average harvest value for the period was $1.9 million (table 26). As in other areas of the state, the demand and ex-vessel value of Dungeness crab is inversely related to the availability of crab in Washington, Oregon, and California (Imamura 1986).

Approximately 27% of the 1975-1982 ex-vessel values was earned by fishermen who are residents of census areas in the Southeast Region (table 26). Fishermen from the Valdez-Cordova Census Area earned 14% of the period's ex-vessel values. Alaska fishermen as a whole earned approximately 47% of the 1975-1982 values (the other 6% of the Alaska values were earned by fishermen from a combination of Southcentral and Southeast regional census areas). Out-of-state fishermen earned 53% of the Southeast Region 1975-1982 Dungeness harvest values (table 26). Out-of-state harvest values and participation appear to be especially influenced by market factors; out-of-state portions of earning generally tended to increase during more recent years (table 26).

3. Dungeness crab harvesting employment. Commercial harvesting employment for the years 1977-1982 steadily increased in the Southeast Region (table 27, fig. 7). The primary months of employment were June through December, with a lesser amount of employment occurring in January and February. Employment increased dramatically in 1981 and 1982. The peak month of employment was July 1982, when 220 fishermen and crew were employed. July was the peak month throughout the period, with an average of 78 persons employed (table 27).

D. Tanner Crab

1. Regional overview. The chief species of Tanner crab utilized by humans in the Southeast Region is Chionocetes bairdi. The management of the commercial Tanner crab fisheries is based on the establishment of guideline harvest levels, retention of only male crabs with carapace widths exceeding 5.5 inches, and timing the seasons to avoid sensitive molting and mating periods (Imamura 1986). Guideline harvest levels are based on past historical catches (ibid.). Tanner crab may be harvested commercially only by pots and ring nets (ADF&G 1985b). Historically, the commercial harvest has occurred primarily during January through April (Imamura 1986). However, since 1981-1982, the Tanner crab season has been restricted to one or two months during the winter (ibid.).

Table 26. Ex-vessel Value of Commercial Dungeness Crab Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Valdez-Cordova	**	**	**	**	237	293	**	**	262
	Skagway-Ykt-Angoon	80	84	**	38	**	**	237	373	106
	Juneau	43	**	**	**	**	**	173	506	106
	Wrangell-Petersburg	132	47	39	209	172	168	845	885	312
	Other Alaska*	**	50	27	40	126	79	**	457	121
	Alaska	397	322	116	558	614	548	1861	2834	906
	Other USA	211	**	0	1049	1022	**	2057	3536	1017
	Unknown	19	**	0	5	16	**	26	15	11
Total		627	438	116	1613	1652	692	3944	6385	1933

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 27. Commercial Dungeness Crab Harvesting Employment (Number of Fishermen and Crew) in Southeast Alaska, 1977-82

Year	Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	5	3	3	0	0	0	3	3	7	9	13	11	3
1978	17	6	7	0	0	0	31	42	41	22	28	17	10
1979	21	6	6	3	0	0	46	60	36	32	32	23	17
1980	26	6	3	0	0	0	33	39	32	25	19	19	19
1981	47	17	3	3	0	0	94	103	84	71	77	50	54
1982	87	23	26	6	0	0	215	220	183	117	99	74	82
Avearage	34	10	8	2	0	0	70	78	64	46	45	32	31

Source: CFEC 1984b.

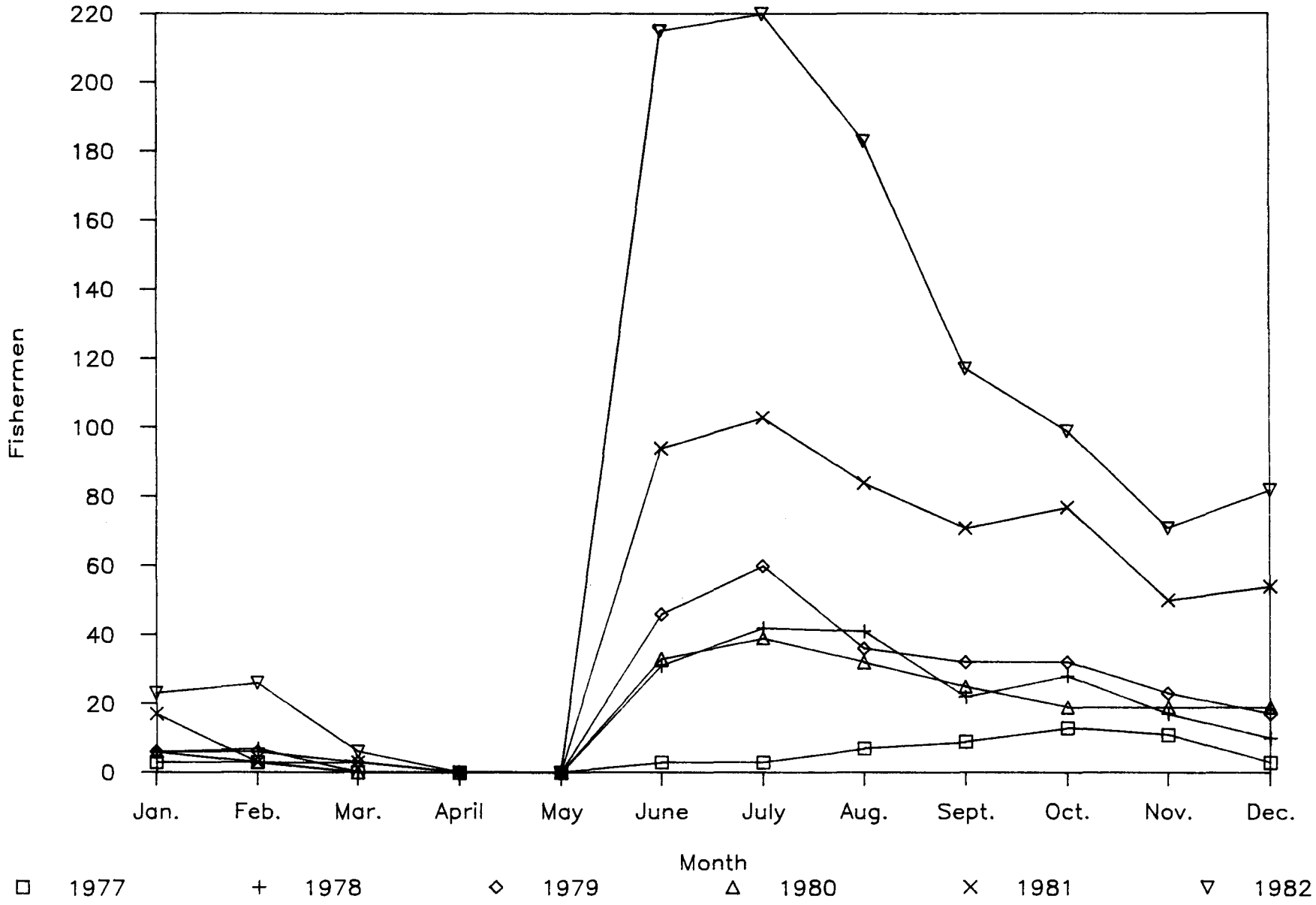


Figure 7. Southeast Region Dungeness crab-harvesting employment (number of fishermen and crew) (CFEC 1984b).

2. Harvest summary and ex-vessel value. The Tanner crab fishery in the Southeast Region began in the early 1960's and intensified in the 1970's (Imamura 1986) (table 28). This fishery produced an annual harvest of 2.7 million pounds since the 1972-1973 season and involved an average of 58 vessels. The number of vessels rose to between 79 and 102 during the period 1982-1985. Currently, the fishery is largely dependent on recruitment-sized males (Imamura 1986).

   Tanner crab ex-vessel values in the Southeast Region ranged from $430,000 in 1975 to $4.8 million in 1982, more than a tenfold increase (table 29). The average ex-vessel value for the period was $1.9 million. Fishermen from census areas in the Southeast Region earned approximately 72% of the period's ex-vessel values (table 29). Alaska fishermen as a whole earned 86% of the ex-vessel values (the "other Alaska" 14% was earned by fishermen from a variety of Southeast and Southcentral regional census areas). Out-of-state fishermen earned 11% of the 1975-1982 ex-vessel values (2% was unknown); their portion of ex-vessel earnings tended to increase in recent years, with the exception of 1982 (table 29).

3. Tanner crab harvesting employment. Tanner crab commercial harvesting employment in the years 1977-1982 primarily occurred during the months of September through May (table 30, fig. 8). Overall, March tended to be the peak month of employment, with a range of 54 persons in 1977 to 157 persons in 1982 and an average of 95 persons for the period (table 30). The highest month for the period was December 1982, when 256 fishermen and crew were employed (table 30).

E. King Crab

1. Regional overview. Within the Southeast Region, three species of king crab are found that are utilized both commercially and noncommercially by humans: red king, blue king, and brown king crab. The management objectives of the commercial king crab fishery, as established by the Board of Fisheries, are to establish a stable harvest to the degree practical, to maintain stocks comprised of various age classes of legal-size crabs, to monitor stocks annually, to provide closures during sensitive life stages, and to manage stocks conservatively where information is lacking (Koeneman 1986c).

   King crab in the Southeast Region may be harvested commercially only by pots and ring nets (ADF&G 1985b). The minimum carapace width is 7 inches for red and brown crab and 6.5 inches for blue king crab. Only males may be commercially harvested. Since 1972, the fishing of red and blue king

Table 28. Southeast Region (Statistical Area A) Commercial Tanner Crab Harvest in Pounds, 1961 through 1984-85

Year/Season	Harvest	No. of Vessels
1961	6,800	---
1962	7,820	---
1963	---	---
1964	13,940	---
1965	---	---
1966	---	---
1967	2,733	---
1968	109,220	---
1968-69	223,045	33
1969-70	660,037	31
1970-71	166,618	12
1971-72	656,661	25
1972-73	1,823,189	44
1973-74	3,182,030	55
1974-75	2,846,503	54
1975-76	3,882,401	31
1976-77	3,506,831	37
1977-78	3,083,797	38
1978-79	3,154,735	48
1979-80	4,210,336	56
1980-81	2,489,000	60
1981-82	2,917,927	50
1982-83	1,155,787	102
1983-84	1,592,334	103
1984-85[a]	1,159,699	79

Source: Imamura 1986.

--- means no data were available.

a Most recent year's data should be considered preliminary.

Table 29. Ex-vessel Value of Commercial Tanner Crab Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeast	Skagway-Ykt-Angoon	**	**	237	371	451	430	167	856	335
	Juneau	**	**	219	269	308	308	841	1642	464
	Wrangell-Petersburg	**	**	366	370	434	548	648	1629	535
	Other Alaska*	148	337	295	88	450	518	154	163	269
	Alaska	295	767	1117	1097	1643	1804	1809	4290	1603
	Other USA	133	**	**	**	**	402	367	396	198
	Unknown	2	**	**	**	**	6	86	152	58
Total		430	861	1264	1209	1799	2212	2261	4837	1859

Source: Base information obtained from CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 30. Commercial Tanner Crab Harvesting Employment (Number of Fishermen and Crew) in Southeast Alaska, 1977-82

Year	Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	21	13	38	54	46	15	0	0	0	3	20	30	30
1978	30	34	58	60	62	26	3	0	0	13	26	38	34
1979	34	42	46	64	70	38	0	0	0	22	38	42	48
1980	48	55	106	110	102	22	0	0	0	33	50	55	58
1981	44	72	118	127	99	17	3	0	0	0	0	0	94
1982	64	93	129	157	121	14	0	0	0	0	0	0	256
Average	40	52	83	95	83	22	1	0	0	12	22	28	87

Source: CFEC 1984a.

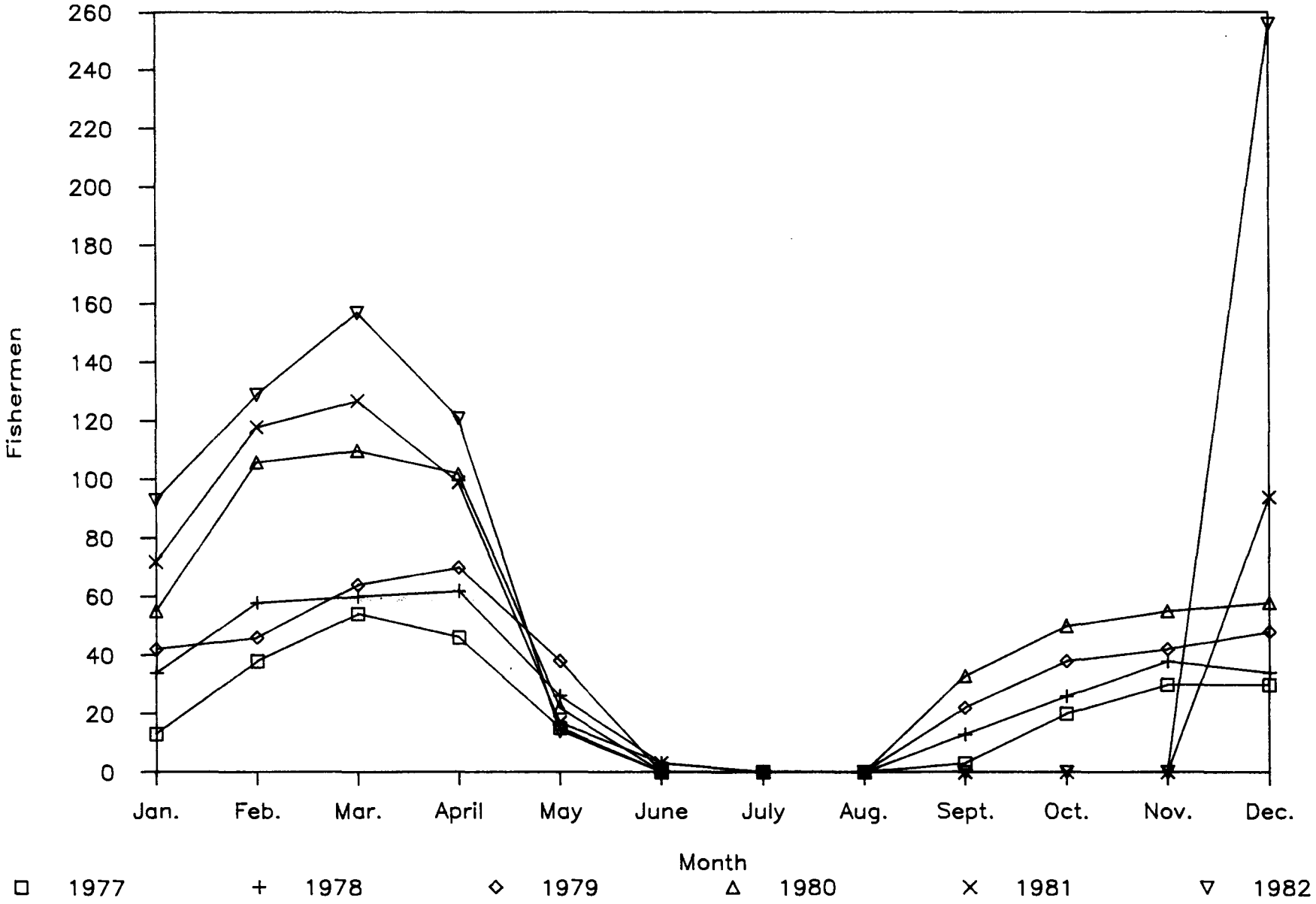


Figure 8. Southeast Region Tanner crab-harvesting employment (number of fishermen and crew) (CFEC 1984b).

crabs has been largely restricted to the months of September to January, with limited blue king crab fishing in February (Koeneman 1986c). This season provides protection during the congregation period, the molting and mating season, and the growth season and allows harvesting during maximum shell fullness (ibid.). Increasing fishing pressure has resulted in increasingly restrictive seasons on red king crab, culminating with a complete closure in the 1985-1986 season.

2. Harvest summary and ex-vessel value. Commercial king crab fishing in the Southeast Region was first documented when a small harvest occurred in the Petersburg-Wrangell area in 1960 (Koeneman 1986c). From 1961 through 1967, regulations allowed a male-only harvest, with a minimum legal carapace width of 6.5 inches and no closed season (ibid.). During this time, harvests averaged 1.1 million pounds from less than 10 vessels (ibid.).

   By 1970, the minimum legal carapace width was raised to seven inches and an overall quota of 1.5 million pounds was provided (ibid.). In 1971, separate red, blue, and brown king crab fisheries were established, with the adoption of distinct seasons and quotas (ibid.).

   Since the 1970-1971 season, the harvest of red and blue king crabs in the Southeast Region has averaged 436,000 lb, taken by an average of 35 vessels (table 31). Red king crab is the target species, and small quantities of blue crab are taken incidentally. Exploratory blue king crab fisheries have been allowed in certain locations beginning with the 1983-1984 season (Koeneman 1986c). Red king crab fishing was closed during the 1985-1986 season because of declining stocks (ibid.).

   Brown king crab harvests have averaged approximately 340,000 lb since the 1970-1971 season (table 31). Five to 10 vessels participated in the fishery during the 1970's, and the number of vessels rose to 64 in 1984-1985. Harvests of brown king crab have increased dramatically since the 1979-1980 season (table 31).

   King crab ex-vessel values in the Southeast Region increased fairly steadily from $217,000 in 1975 to $3.9 million in 1982; the average value for the period was $1.1 million (table 32). Almost the entire ex-vessel value (96%) for the period was earned by fishermen from census areas in the Southeast Region (table 32) (CFEC 1984a). Ex-vessel values increased considerably in the late 1970's and again in the early 1980's (table 32), which could, in part, be a result of the declines in Gulf of Alaska and Bering Sea king crab harvests.

Table 31 Southeast Region (Statistical Area A) Commercial King Crab Harvest in Pounds, 1960 through 1984-85

Year	Red and Blue King Crabs	Brown King Crab	Total King Crab
1960	---	---	3,424
1961	---	---	429,600
1962	---	---	1,289,550
1963	---	---	1,112,200
1964	---	---	820,530
1965	---	---	579,300
1966	---	---	105,899
1968	---	---	2,199,772
1969	---	---	1,899,930
1969-70	1,438,226	359,567	1,797,833
1970-71	221,369	181,142	402,538
1971-72	391,623	372,933	764,556
1972-73	476,761	265,310	742,071
1973-74	640,369	179,520	819,889
1974-75	537,189	34,451	571,640
1975-76	346,341	68,429	414,770
1976-77	335,714	71,475	407,189
1977-78	241,220	81,746	322,966
1978-79	443,794	37,324	481,118
1979-80	672,734	46,551	719,285
1980-81	520,134	660,172	1,186,206
1981-82	530,134	622,666	1,153,127
1982-83	451,999	806,637	1,258,636
1983-84	303,916	996,887	1,300,803
1984-85	249,046	805,332	1,099,378

Source: Koeneman 1986c.

--- means no data were available.

Table 32. Ex-vessel Value of Commercial King Crab Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeast	Juneau	**	**	10b	34	108	105	200	504	122
	Wrangell-Petersburg	121	191	254	503	595	567	1021	2915	771
	Other Alaska*	**	**	110	244	80	104	167	341	148
	Alaska	201	267	374	781	783	776	1389	3761	1041
	Other USA	**	0	0	**	**	**	**	70	26
	Unknown	**	18	10	**	**	**	**	65	16
	Subtotal	217	284	384	819	814	787	1468	3896	1084
Total		217	284	384	819	814	787	1468	3896	1084

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

3. King crab harvesting employment. King crab commercial harvesting also increased fairly steadily during the years 1977-1982 (table 33, fig. 9). Harvesting employment during the years 1977-1979 occurred primarily during September through April. From 1980 through 1982, however, employment became more year-round. October has generally been the peak month of employment, averaging 75 persons and ranging from 13 in 1977 to 157 in 1982 (table 33).

F. Human Use of Shrimp

1. Regional overview. Four species of shrimp are commonly utilized in the Southeast Region: pink, sidestripe, coonstripe, and spot. A very limited commercial catch of humpy shrimp has also occurred during some years (ADF&G 1985b). The commercial shrimp harvest is separated into three distinct fisheries: beam trawl, pot, and otter trawl (Koeneman 1986b). Commercial ex-vessel values, however, are available for the shrimp fishery only as a whole and are presented as such.

The beam trawl shrimp fishery began in Southeast Alaska about 1915, when fishing was initiated in Thomas Bay (District 10). The primary species taken are pink and sidestripe shrimp, with incidental catches of coonstripe, spot, and humpy shrimp (ibid.).

Until its decline in the 1960's, the annual beam trawl harvest averaged 3.5 million pounds, with a range of 1.7 to 7.6 million pounds (Koeneman 1986a). From 1969-1970 to 1984-1985, harvests averaged 1.1 million pounds (table 34). The 1985-1986 harvest through January 1986 totaled just over 390,000 lb. This extremely low harvest level was mainly attributed to the loss of production facilities when the Alaska Glacier Seafood plant in Petersburg burned down in February 1985 and a Wrangell processor subsequently closed production (ibid.).

In the past, when shrimp were hand-picked, over 20 processors operated in Thomas Bay (Koeneman 1986d). More recently, there have been three seafood plants with shrimp production facilities utilizing mechanical picking machines together with some handpicking of the larger shrimp (Koeneman 1986b). During the 30-year period from 1955 through 1984-1985, an average of 15 vessels/year participated in the beam trawl fishery in Southeast Alaska, with a range of 8 to 23 (table 34).

The shrimp beam trawl fishery tends to be a year-round fishery, except for recent closures during the spring egg-

Table 33. Commercial King Crab Harvesting Employment (Number of Fishermen and Crew) in Southeast Alaska, 1977-82

Year	Average	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	12	40	18	10	3	3	0	0	0	3	13	18	23
1978	17	35	28	13	10	0	0	0	0	20	25	43	33
1979	30	40	13	10	13	3	0	0	3	53	71	83	70
1980	30	3	6	17	22	6	3	6	0	58	74	75	72
1981	35	39	39	36	17	3	3	3	3	3	108	102	69
1982	54	14	31	58	42	20	39	28	20	39	157	75	129
Average	30	29	23	24	18	6	8	6	4	29	75	66	66

Source: CFEC 1984b.

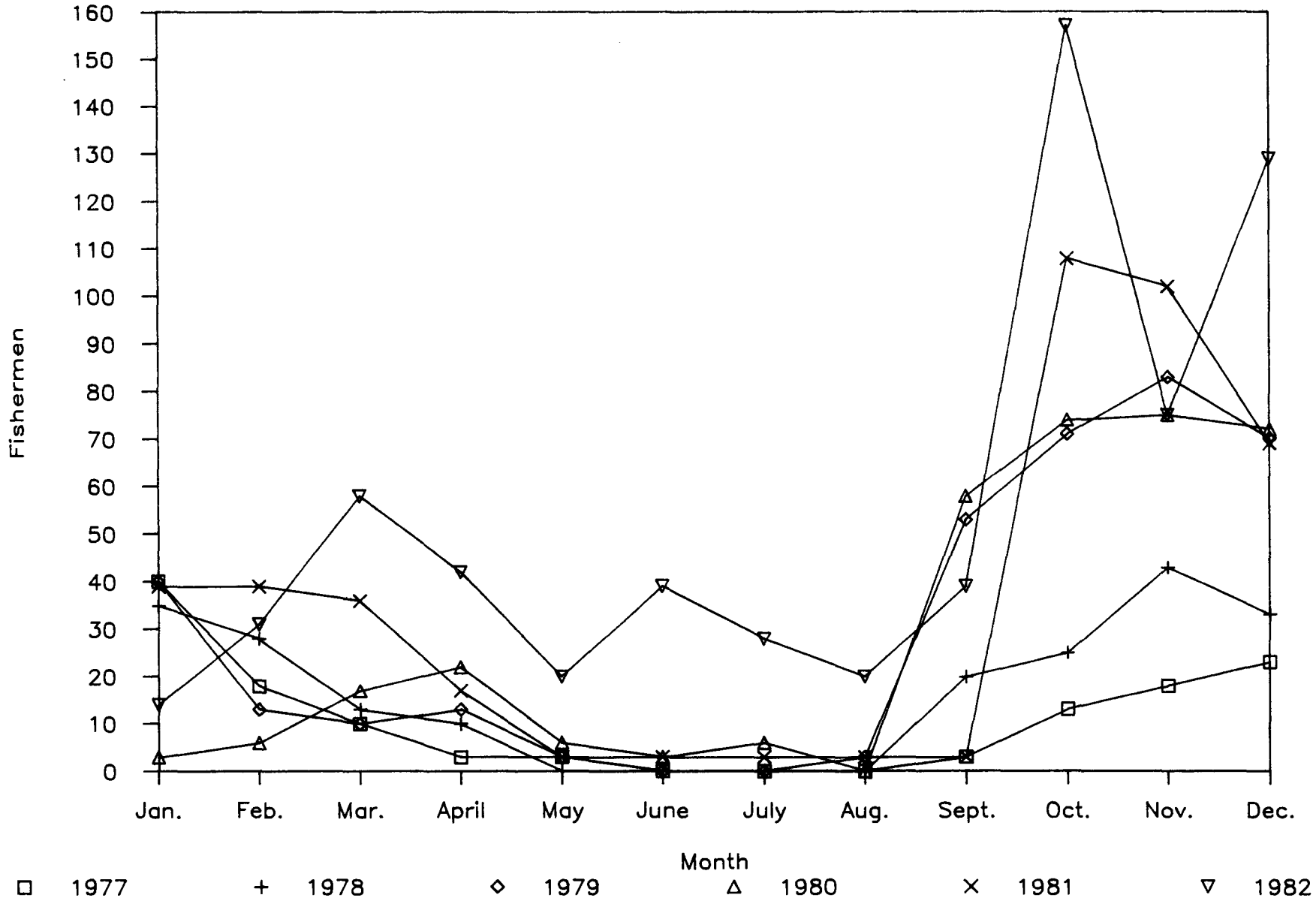


Figure 9. Southeast Region king crab-harvesting employment (number of fishermen and crew) (CFEC 1984b).

Table 34. Southeast Region (Statistical Area A) Commercial Shrimp Beam Trawl Harvests in Pounds, 1955 through 1984-85

Year	Harvest	No. of Vessels
1955	1,777,122	15
1956	3,301,598	15
1957	2,350,449	10
1958	7,605,871	14
1959	5,518,843	22
1960	3,343,373	21
1961	4,212,300	20
1962	3,884,050	22
1963	3,110,340	20
1964	2,793,101	13
1965	2,941,429	13
1966	3,784,597	14
1967	2,203,717	13
1968	2,003,753	12
1969-70	1,840,727	10
1970-71	824,800	8
1971-72	1,045,300	8
1972-73	955,900	9
1973-74	763,000	8
1974-75	1,205,600	10
1975-76	983,700	10
1976-77	770,600	14
1977-78	947,626	11
1978-79	1,021,030	10
1979-80	952,906	17
1980-81	843,737	18
1981-82	918,975	19
1982-83	1,397,026	18
1983-84	1,766,148	17
1984-85	1,213,456	23

Source: Koeneman 1986b.

hatch. The highest catches traditionally occur from May through August.

The pot shrimp fishery targets on the larger spot shrimp (ibid.), with harvests of coonstripe shrimp in certain locals, Lituya Bay, e.g. (Koeneman 1986d). Other species are taken incidentally. Until recently, effort and harvests from year to year have been inconsistent with the fishery, serving mainly as a source of supplementary income for most vessel owners (Koeneman 1986d). Annual harvests since 1962 have averaged 21,000 lb of whole shrimp and, since 1978, have increased steadily to over 200,000 lb (table 35). The number of permits fished have similarly increased from less than 10 prior to 1979 to 118 and 106 in 1984 and 1985, respectively. Like the beam trawl fishery, the shrimp pot fishery tends to be a year-round fishery, with monthly effort varying from year to year.

The first significant otter trawl landings for shrimp were reported in 1975-1976 (Koeneman 1986b). The effort peaked in 1980-1981, with catches of 2.1 million pounds by 22 vessels (table 36). Harvests and the number of vessels fishing have been inconsistent (ibid.).

2. Ex-vessel value. Ex-vessel values in the commercial shrimp fishery in the Southeast Region increased from $93,000 in 1975 to $1.2 million in 1980; the average harvest value for the years 1975-1982 was $529,000 (table 37). The peak value in 1980 resulted from both a relatively high ex-vessel price per pound (table 38) and a very large harvest quantity in the shrimp trawl fishery (table 34).

   Fishermen from the Wrangell-Petersburg Census Area earned approximately 54% of the 1975-1982 ex-vessel values (table 37). Fishermen from other Alaska areas (primarily census areas in the Southeast and Southwest regions) earned 16% of the period's harvest values. Out-of-state fishermen earned 25% of the ex-vessel values; the remaining 5% was by people of unknown residency (table 37).

3. Commercial shrimp-harvesting employment. Shrimp harvesting employment occurred in every month of the year during the years 1977-1982 (table 39, fig. 10). Overall, employment levels increased during these years. Employment tended to be fairly stable throughout the year (as opposed to having marked months of peak employment), with a slight increase during the months of July through December. The average month shrimp harvesting employment for 1982 was 43 persons (table 39).

Table 35. Southeast Region (Statistical Area A) Commercial Shrimp Pot Fishery Harvests in Pounds, 1962-85

Year	Harvest	No. of Permits Fished
1962	488	---
1963	686	---
1964	3,669	---
1965	0	---
1966	400	---
1967	38,900	---
1968	38,209	---
1969	40,196	5
1970	32,833	5
1971	12,071	4
1972	27,317	7
1973	5,028	1
1974	15,954	5
1975	5,841	5
1976	12,451	6
1977	19,185	7
1978	28,202	9
1979	23,505	10
1980	63,095	26
1981	87,282	34
1982	174,593	52
1983	289,964	87
1984	255,884	118
1985[a]	232,649	106

Source: Koeneman 1986b.

--- means no data were available.

a Most recent year's data should be considered preliminary.

Table 36. Southeast Region (Statistical Area A) Commercial Shrimp Otter Trawl Fishery Harvest in Pounds, 1976-77 through 1985-86

Season	Catch in Pounds	No. of Landings	Pounds Per Landing	No. of Vessels
1976-77	185,755	6	30,959	2
1977-78	0	0	0	0
1978-79	0	0	0	0
1979-80	56,500	2	28,250	2
1980-81[a]	2,136,966	38	56,236	22
1981-82	36,365	4	9,091	3
1982-83	127,912	6	21,318	6
1983-84	416,190	10	41,619	4
1984-85	97,774	2	48,887	1
1985-86[b]	0	0	0	0

Source: Koeneman 1986b.

a Catch includes 450,000 lb reported out of Yakutat Bay in August and September but not reported via fish tickets.

b Includes reported harvest through January 1986.

Table 37. Ex-vessel Value of Commercial Shrimp Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeast	Wrangell-Petersburg	81	80	149	461	404	579	222	306	285
	Other Alaska*	12	49	39	19	16	217	143	189	86
	Alaska	93	129	188	479	420	797	366	496	371
	Other USA	0	**	**	0	**	374	352	268	133
	Unknown	0	**	**	8	**	28	149	11	25
	Subtotal	93	137	218	488	457	1199	866	774	529
Total		93	137	218	488	457	1199	866	774	529

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 38. Estimated Ex-vessel Price ($) Per Pound for Selected Shellfish in the Southeast Region, 1977-82

Species/Gear	1977	1978	1979	1980	1981	1982
Shrimp						
Pink						
Pot gear to 50 ft	0.15	0.43	0.34	---	0.19	0.20
Beam trawl	0.15	0.43	0.34	0.29	0.19	0.20
Sidestripe						
Pot gear to 50 ft	2.89	---	1.26	2.93	1.00	3.49
Beam trawl	0.75	0.88	1.26	2.93	1.00	1.90
Coonstripe						
Pot gear to 50 ft	2.89	---	---	2.93	2.50	3.49
Beam trawl	0.75	---	1.26	1.11	---	1.90
Spot						
Pot gear to 50 ft	2.89	0.88	1.26	2.93	3.50	3.49
Beam trawl	0.75	---	1.26	2.93	3.50	3.49
Crab						
King (Petersburg)						
Pot gear to 50 ft (red and blue)	1.19	1.57	0.92	1.06	1.35	2.52
Brown	1.19	1.54	0.92	0.97	1.08	2.80
Tanner						
Pot gear to 50 ft	0.32	0.44	0.55	0.53	1.02	1.37
Dungeness						
Pot gear to 50 ft	0.45	0.64	0.53	0.50	0.60	0.68
Scallops						
Dredge	1.55	---	---	3.65	4.15	2.54

Source: CFEC 1985

--- means no data were available.

Table 39. Commercial Shrimp Harvesting Employment (Number of Fisheries and Crew) in Southeast Alaska, 1977-82

Year	Average	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	9	17	8	6	6	14	10	6	8	6	15	6	8
1978	11	13	6	3	3	15	15	6	6	11	13	13	15
1979	13	8	8	3	6	16	17	6	13	11	13	19	24
1980	38	36	39	18	18	47	42	27	49	49	62	31	19
1981	32	20	22	17	26	37	31	43	24	33	44	30	47
1982	43	28	33	31	39	21	39	46	46	62	44	50	61
Average	24	20	19	13	16	25	26	22	24	29	32	25	29

Source: CFEC 1984b.

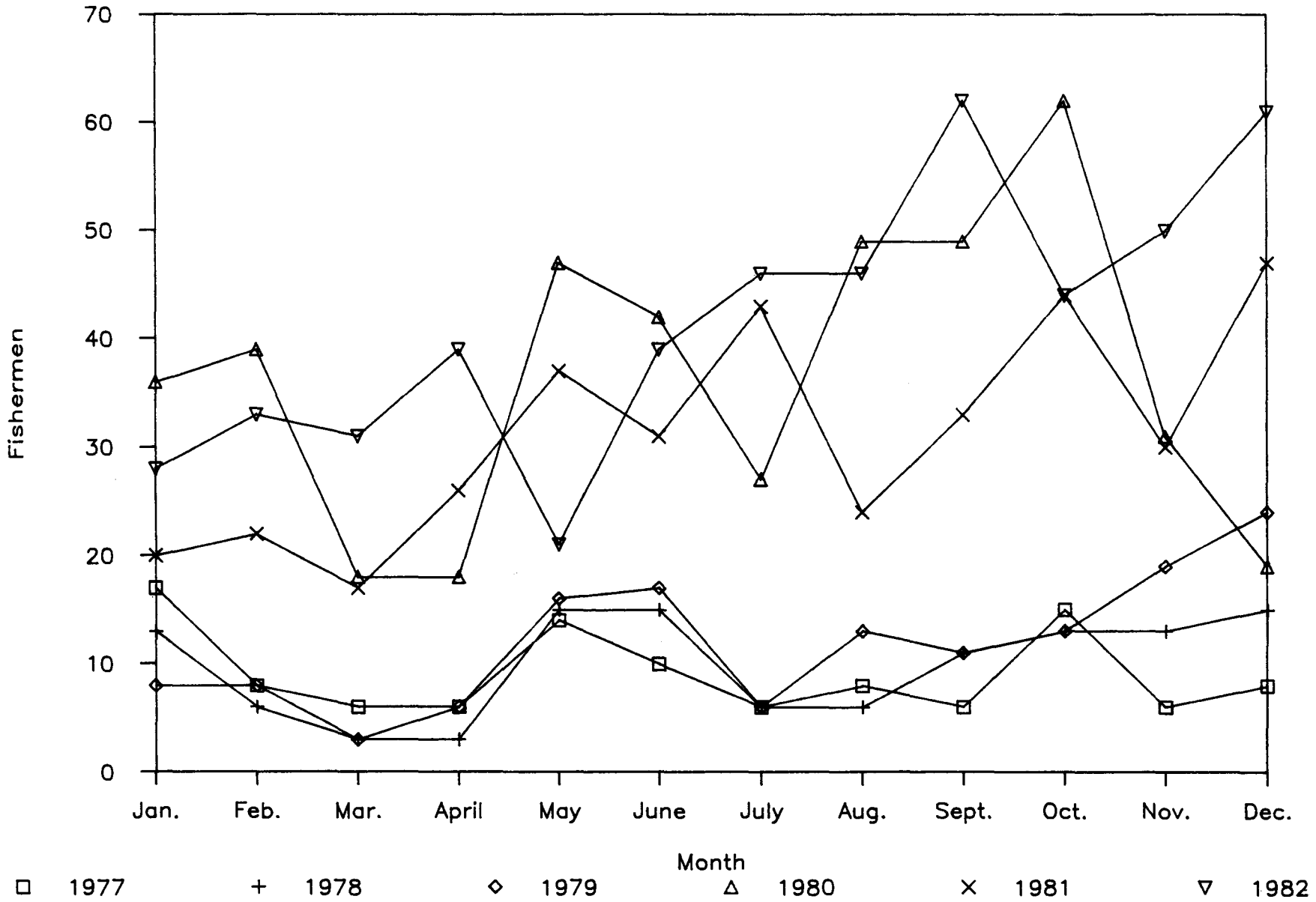


Figure 10. Southeast Region shrimp-harvesting employment (number of fishermen and crew) (CFEC 1984b).

G. Human Use of Scallops

1. Regional overview. The commercial fishery of the weathervane scallop, Pactinopectin caurinus, exists in offshore waters in the northern portion of the Southeast Region. Harvest levels have flucuated from highs of over 0.8 million pounds in 1968 and 1969 to lows of less than 25,000 lb, with an average of about 220,000 lb (table 40). The number of vessels fishing have ranged from 0 to 14, with an average of 4.4 (table 40). Koeneman (1986a) felt that the recent low harvests may be indicative of currently depressed stocks following periods of significant harvest. Scallops may be taken only with scallop dredges having rings with inside diameters of four inches or more (ADF&G 1985c). In the Southeast Region, there is no closed season on commercial harvest of scallops (ibid.).

2. Ex-vessel value. Scallop ex-vessel values fluctuated considerably during the years 1975-1982, ranging from zero to $1.9 million (table 41). Commercial harvest values in the Southeastern Area occurred only in 1981 and 1982; commercial harvests occurred in the Yakutat area in 1975 through 1977. Ex-vessel values in the Southeastern Area were primarily earned by fishermen from the Kenai Peninsula, Kodiak Island, and Valdez-Cordova census areas. The Yakutat Area ex-vessel values were earned primarily by Kenai Peninsula Census Area fishermen (table 41).

H. Abalone

1. Regional overview. The pinto, or northern, abalone, Haliotis Kamtschatkana, which inhabits coastal areas influenced by ocean swells, is utilized both commercially and noncommercially in the Southeast Region (Koeneman 1986a).

Abalone harvests during 1964-1985 are shown in table 42. These data show a relatively low harvest averaging under 10,000 pounds during the period 1964-1976, with a dramatic increase to an average harvest of about 190,000 lb during the period 1978-1985. There has been concern that this level of commercial harvest is not sustainable; hence, current guidelines call for a maximum harvest of 58,000 lb (Koeneman 1986a, ADF&G 1985c).

The estimated number of operators during 1976 to 1985 ranged from 26 to 49, with an average of 38 (table 42). Abalone may be taken commercially by diving gear and abalone iron (ADF&G 1985c). During extremely low tides, they may be picked by hand; however, most commercial harvest is in subtidal areas (Koeneman 1986a). In the 1985-1986 season, the minimum size limit was 3 3/4 inches at the greatest diameter of the shell (ADF&G 1985c).

Table 40. Southeast Alaska (Statistical Area A) Weathervane Scallop Harvest in Pounds, 1968-85

Year	Harvest	No. of Vessels
1968	927,795	11
1969	837,087	14
1970	22,726	2
1971	84,948	3
1972	128,241	4
1973	173,700	4
1974	356,493	2
1975	139,022	4
1976	189,543	2
1977	22,121	2
1978	0	0
1979	20,146	2
1980	261,517	6
1981	445,934	11
1982	210,554	7
1983	800	1
1984	74,010	2
1985[a]	21,496	3

Source: Koeneman 1986a.

a Recent year's data should be considered preliminary.

Table 41. Ex-vessel Value of Commercial Scallop Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982
Southeast	a	0	0	0	0	0	983	1927	576
Yakutat	b	167	305	**	0	0	0	0	0
Total		167	305	**	0	0	983	1927	576

Source: CFEC 1984a.

** Information withheld because of nondisclosure regulations.

a Primarily Kenai Peninsula, Kodiak Island, and Valdez-Cordova.

b Primarily Kenai Peninsula.

Table 42. Southeast Region (Statistical Area A) Commercial Abalone Harvests in Pounds, 1964-85

Year	Harvest[b]	No. of Operators[c]
1964	3,000	---
1965	1,000	---
1966	3,000	---
1967	6,511	---
1968	0	---
1969	0	---
1970	1,100	---
1971	923	---
1972	2,610	---
1973	2,813	---
1974	16,339	---
1975	8,497	---
1976	601	---
1977	13,894	43
1978	181,295	37
1979	357,369	39
1980	247,188	43
1981	369,224	42
1982	113,284	49
1983	46,804	40
1984[d]	117,243	26
1985[d]	74,254	27

Source: Koeneman 1986a.

--- means no data were available.

a Pounds are expressed as the weight of the entire abalone, including the shell (i.e., "round pound").

b The harvest data are from Koeneman 1986a.

c The data for the years 1977-84 are from Koeneman 1985. The datum for the year 1985 is from Botelho 1986. The number of operators for the years 1980-82 is based on the total number of ADF&G permits issued during the 1980-81 to 1982-83 abalone fishing seasons (Koeneman 1985).

d Most recent year's data should be considered preliminary.

In the early years of the fishery, commercial abalone fishing occurred throughout the year. In 1979-1980 and 1980-1981, the season lasted between 9 and 10 months (Koeneman 1986a). Since then, fishing has been restricted to about one to five months, beginning in the fall (ibid.). In 1985-1986, the season in District 13 began on November 1 and closed on December 18 by emergency order (ibid.).

2. Ex-vessel value. Ex-vessel values of miscellaneous shellfish in the Southeast Region are primarily from harvest of abalone but also include octopus, goeduck, and sea urchins. The proportion of each species group may vary from year to year, depending on market demand, regulations, and population levels. Within this category, however, ex-vessel values ranged from $9,000 in 1976 to $447,000 in 1981. The average ex-vessel value for the years 1975-1982 was $229,000 (table 43).

   Approximately 69% of the 1975-1982 ex-vessel values were earned by Alaska fishermen; 67% of the period's harvest values were earned by fishermen who were residents of census areas in the Southeast Region. Out-of-state fishermen earned 28% of the miscellaneous shellfish values (table 43); these were probably abalone fishermen.

V. PACIFIC HALIBUT FISHERY

A. Regional Overview

The Pacific halibut fishery is one of the oldest on the Pacific coast. It began in the late 1800's in the inside waters of Washington and British Columbia and subsequently expanded westward and northward in ocean waters until it reached the Bering Sea in 1928. The fishery has been unique in that United States and Canadian participants had reciprocal landing and fishing priviledges (permission to catch fish in the other nation's waters and land fish at the other nation's ports) that fostered the joint development of the fishery. Reciprocal fishing agreements were terminated in 1981, but reciprocal landing privileges continue. Termination of the reciprocal fishing agreement leaves a larger proportion of the traditional share and potential yield of the fishery available to United States fishermen because halibut stocks are larger off the Alaska coast than off the British Columbia coast (Oswald 1981).

International Pacific Halibut Commission (IPHC) Area 2C which includes the portion of the Southeast Region up to Cape Spencer (see map 1 in this section and the halibut maps in appendix A. in this volume), has been an important contributor to halibut production in the past. The Yakutat Area is included in Area 3A.

Table 43. Ex-vessel Value of Commercial Miscellaneous Shellfish Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Sitka	**	**	13	75	85	27	19	25	31
	Ketchikan Gateway	**	**	**	**	149	237	247	70	92
	Other Alaska*	**	**	**	**	24	32	72	123	36
	Alaska	22	9	19	106	257	296	338	218	158
	Other USA	0	0	1	141	127	120	94	23	63
	Unknown	0	0	0	13	26	7	16	0	8
	Subtotal	23	9	19	260	411	423	447	242	229
Total		23	9	19	260	411	423	447	242	229

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

During the period 1975-1979, Area 2C accounted for an average annual harvest (United States and Canada combined) of 5.0 millions pounds of halibut. This was 46% of the combined catch by United States and Canada from the IPHC Area 2 and 21% of the combined catch of Pacific halibut from all United States and Canadian waters (Oswald 1981).

During the 1970's within the Southeast Region, Petersburg has received the largest landings of halibut. During the same period, Sitka's relative harvest proportion, which ranked second in the Southeast Region, remained stable, whereas harvest landings of halibut in Juneau and Ketchikan have diminished (ibid.). During 1982, 1983, and 1984, however, Sitka ranked third in total pounds of landings by port on the west coast (IPHC 1983, 1984, 1985).

During the recent period of declining abundance and harvests of halibut, there has been a substantial increase in the size of the fishing fleet. This has resulted in the compression of landings into a shorter and shorter period of time (Oswald 1981). Days of fishing in the Southeast Region (Area 2C) steadily declined from 10 days in 1980 to 3 days in 1984 (IPHC 1981, 1982, 1983, 1984, 1985).

The influx of United States vessels into the halibut fishery has been stimulated by high prices received for halibut (table 44), the relative ease of shifting from salmon gear to halibut longline, and the fact that other fisheries, especially salmon, limit the number of participants. In contrast to the growth of the United States fleet, the Canadian fleet has diminished as a result of regulations (Oswald 1981).

B. Ex-vessel Value

The commercial ex-vessel value of Pacific halibut for Area 2C from 1975 through 1982 ranged from $4.7 million in 1977 to $13.7 million in 1979 (table 44). The average for the period was $7.2 million. The variation in values can be in part attributed to changes in harvest quantities (table 46) and ex-vessel prices per pound (table 44). Historically, ex-vessel prices per pound tend to be higher in more southerly westcoast ports (table 47).

Because of changes in the coding of halibut fish tickets, no fisherman residency information is available for 1975 and 1976, and the years 1977-1982 have a relatively high proportion of earnings in the "unknown" residency category (table 45). Approximately 86% of the 1975 to 1982 average ex-vessel values of fishermen from known residency were earned by Alaska fishermen (table 44); 85% of the known residency ex-vessel values were earned by fishermen from Southeast Alaska census areas. Out-of-state fishermen earned 14% of the known residency values. The relative proportion of out-of-state earnings was fairly stable (table 45).

Table 44. Estimated Average West Coast Ex-vessel Price per Pound for Commercial Pacific Halibut Landings, 1975-84*

Year	Price
1975	0.89
1976	1.26
1977	1.31
1978	1.70
1979	2.13
1980	0.99
1981	1.02
1982	1.09
1983	1.13
1984	0.75

Source: IPHC 1985.

* These are average prices; price can vary considerably by port and data of landing.

Table 45. Ex-Vessel Value of Commercial Pacific Halibut Harvest for Southeast Alaska, IPHC Area 2C, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Skagway-Ykt-Angoon	0	0	288	522	1513	592	789	633	542
	Haines	0	0	48	114	352	169	222	169	134
	Juneau	0	0	370	778	1464	714	928	798	631
	Sitka	0	0	667	1132	1393	635	848	845	690
	Wrangell-Petersburg	0	0	1522	2727	4940	1379	1798	1747	1764
	Pr of W/Outer Ktkn	0	0	348	486	581	124	228	199	246
	Ketchikan Gateway	0	0	337	294	710	164	274	275	257
	Other Alaska*	0	0	29	53	102	46	38	32	38
	Alaska	0	0	3608	6106	11056	3824	5125	4699	4302
	Other USA	0	0	596	1027	1733	718	865	890	729
	Unknown	6401	8225	517	548	868	380	76	344	2170
Total		6401	8225	4721	7681	13656	4922	6066	5933	7201

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

Table 46. Commercial Pacific Halibut Harvest in the Southeast Region (IPHC Regulatory Area 2C) 1 Thousands of Pounds, 1975-84

Region	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Area 2C										
United States	6,033	5,174	2,660	3,409	4,366	3,238	4,010	3,500	6,398	5,847
Canada	670b	593	526	907	164	---	---	---	---	---
Total	6,703	5,767	3,186	4,316	4,530	3,238	4,010	3,500	6,398	5,847

Source: IPHC 1977, 1978, 1979, 1980, 1985.

--- means no data were available.

* Contains a relatively minor quantity of harvest from Area 2A.

Table 47. Halibut Price Per Pound (U.S. Dollars) by Region, 1980-84

Region	1980	1981	1982	1983	1984
Washington-Oregon	1.128	1.166	1.265	1.402	0.954
So. British Columbia	1.159	1.155	1.117	1.391	0.851
No. British Columbia	0.994	1.043	0.979	1.199	0.774
Southeastern Alaska	0.898	0.957	1.054	1.045	0.652
Central Alaska	0.896	0.968	1.060	1.088	0.710
Coastwide average	0.991	1.019	1.088	1.134	0.749
Average received by:					
Canadian fishermen	1.079	1.108	1.105	1.317	0.834
United States fishermen	0.944	0.944	1.084	1.104	0.728

Source: IPHC 1985.

C. Commercial Halibut-Harvesting Employment

Halibut-harvesting employment declined from a period of five months in 1977 to a period of one month in 1981 during the years 1977-1982 (table 48, fig. 11). In the more recent years, harvesting employment occurred in May and June. For the years 1977-1982, May employment ranged from 751 fishermen and crew in 1978 to 3,686 fishermen and crew in 1982 and averaged 1,653 (table 48).

VI. GROUNDFISH FISHERY

A. Regional Overview

The Southeast Region encompasses all waters surrounding the Alexander Archipelago from Dixon Entrance on the south and along the outer coast northwest to Cape Suckling. Groundfish in the Southwest Region are managed in a statistical area called Southeastern. See map 9 in appendix A. in this volume for information on groundfish management areas.

Within the region, the Southeastern Groundfish Project (ADF&G, Div. Commer. Fish.) is responsible for management of the groundfish resources in Alaska waters and provides catch information and other resource data from the adjacent Fisheries Conservation Zone (FCZ) to the North Pacific Fisheries Management Council (NPFMC) and the National Marine Fisheries Service (NMFS). The State of Alaska is involved in the management of groundfish in the FCZ through participation of the Gulf of Alaska Groundfish Plan Team and joint federal/state management of the offshore sablefish and rockfish fisheries (ADF&G 1985a).

The primary groundfish fisheries in the region include sablefish, rockfish, starry flounder, and Pacific cod. Sablefish, by regulation, are fished with either longline or pot gear in Southeast Regional state waters and, although no gear restrictions are applied in federal waters, longline gear has been the dominant gear in that fishery. Pot gear harvested nearly one-third of the offshore harvest during 1985. This, however, was the first time that substantial pot effort has occurred in the offshore fishery. Rockfish are harvested with longlines, jigging machines, and to a lesser extent, trawls. Flounder are harvested exclusively by trawl gear. Incidental landings of rockfish, Pacific cod, and lingcod occur in the salmon troll and halibut longline fisheries. Rockfish are also landed in the sablefish fisheries. Several species of sole are landed in the directed flounder trawl fishery and are included in the flounder catch totals for the region (ADF&G 1985a).

Table 48. Southeast Region Halibut-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	243	0	0	0	0	1,238	938	703	499	293	0	0	0
1978	284	0	0	0	0	751	584	670	704	693	0	0	0
1979	446	0	0	0	0	913	2,758	1,677	0	0	0	0	0
1980	352	0	0	0	0	3,328	512	394	0	0	0	0	0
1981	295	0	0	0	0	0	3,551	0	0	0	0	0	0
1982	348	0	0	0	0	3,686	482	0	8	0	0	0	0
Average	328	0	0	0	0	1,653	1,471	574	202	164	0	0	0

Source: ADL 1985.

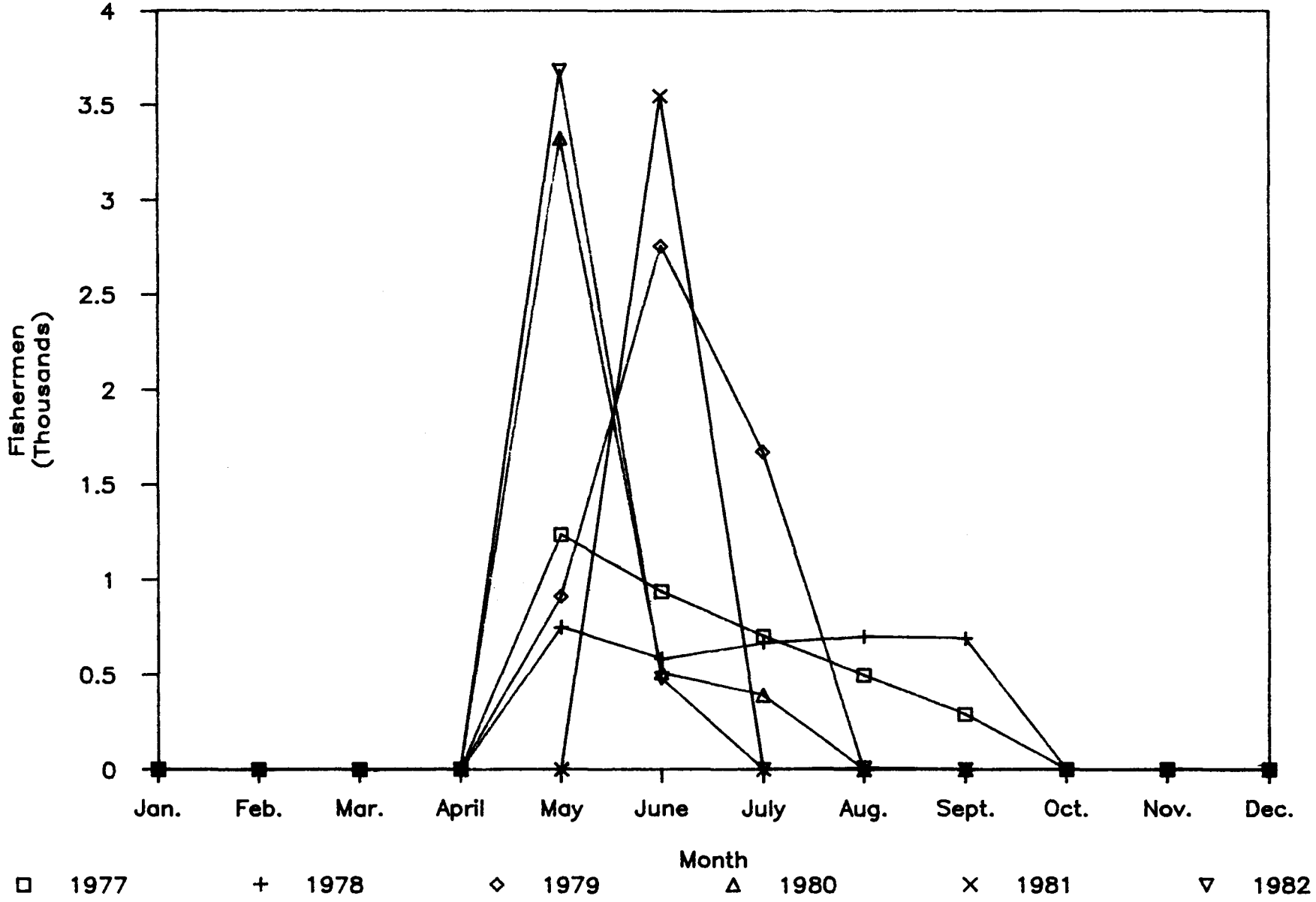


Figure 11. Southeast Region halibut-harvesting employment (number of fishermen and crew) (ADL 1984).

Pollock trawl fisheries averaged nearly 1 million pounds from 1976 through 1980 and have been minimal since 1981 because of the lack of a local market; no landings have been reported since 1983. The flounder trawl fisheries have continued on a reduced scale, with a slight increase in effort during the 1983-1984 season. Most trawl-caught fish were delivered to ports outside the state during the first part of 1984. Virtually all flatfish landed during the 1984-1985 season, however, were processed within the region (ibid.).

Nearly all Pacific cod and flounder caught in the Southeast Region are harvested in Alaska waters. Sablefish landings from Alaska waters have varied from 98% of the total region catch in 1973 to 25% in 1984 and 27% in 1985. The reduction in Alaska waters harvest is a result of continued expansion of effort in the FCZ and not a reduction in Alaska waters landings. Rockfish are harvested in state and federal waters, with an approximately even distribution between the two jurisdictions (ibid.).

B. Ex-vessel Value

Average recent year landings and ex-vessel values for major groundfish species are presented in table 49. Tables 50 and 51 provide ex-vessel values by census area of fishermen for the years 1975-1982. Values in tables 50 and 51 are for domestic fisheries and therefore do not include values of joint ventures and foreign fisheries. Because of the rapid expansion of the groundfish fisheries and the potential value of domestic expansion into fisheries being utilized by foreign fishermen, these tables undoubtedly are underestimates of the value of the groundfish resource.

Ex-vessel values in the Southeast Region sablefish fishery generally increased during the years 1975-1985 (tables 49 and 50). During that period, ex-vessel values ranged from $705,000 in 1976 to $8.5 million in 1985. The 1975-1982 average ex-vessel value was $7.1 million (table 50). Fishermen who were residents of census areas in the Southeast Region earned approximately 68% of the 1975-1982 average ex-vessel values (table 50). Fishermen from the Southcentral and Southwestern regions earned about 1% of the harvest values. Out-of-state fishermen earned 28% of the sablefish harvest values in the region. The remaining 3% was earned by fishermen of unknown residency.

Ex-vessel values in the domestic groundfish fisheries in the Southeast Region also generally increased during the years 1975-1982 (table 51). Ex-vessel values ranged from $62,000 in 1975 to $530,000 in 1979 and averaged $313,000 (table 51). Fishermen who were residents of Southeast Region census areas earned approximately 72% of the 1975-1982 ex-vessel values; fishermen from other Alaska census areas earned 2% of the harvest

Table 49. Southeast Region Commercial Harvest and Value of Groundfish Species, 1984-85

Species	Mean Catch (Thousands of Pound)	Years of Landing	1984 Catch in (Thousands of Pounds)	1984 Ex-vessel Price Per Pound	1984 Value in (Thousands of Dollars	1985[a] Catch in Thousands of Pounds)	1985 Ex-vessel Price Per Pound	1985 Value in Thousands of Dollars
Sablefish[b]	3,246.9	16	7,104.4	.65	4,617.9	8,544.6	1.00	8,544.6
Flounder[c]	569.9	13	461.0	.22	101.4	280.0	.25	70.0
Rockfish[b]	578.9	16	1,773.0	.50	886.5	1,500.0	.55	825.0
Pacific cod	114.9	16	76.3	.35	26.7	112.8	.40	45.1
Lingcod	77.4	16	174.7	.40	69.9	120.0	.45	54.0
Totals	4,588.0		9,589.4		5,702.4	10,556.5		9,538.7

Source: ADF&G 1985a.

a Preliminary (through October 15).

b Dressed weight; other species are round weight.

c By season; i.e., 1984 is the 1983-84 season. Starry flounder comprise 98% of the landings.

Table 50. Ex-vessel Value of Commercial Sablefish Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars								
		1975	1976	1977	1978	1979	1980	1981	1982	Avg.
Southeastern	Skagway-Ykt-Angoon	89	75	56	356	285	222	179	298	195
	Juneau	56	78	161	174	375	230	140	449	208
	Sitka	76	111	377	303	394	219	271	430	273
	Wrangell-Petersburg	225	180	200	349	880	264	173	555	353
	Ketchikan Gateway	58	45	66	102	317	64	**	**	122
	Other Alaska*	6	12	61	2	85	53	**	**	32
	Alaska	510	502	922	1286	2335	1052	821	2038	1183
	Other USA	82	180	308	501	1281	425	232	860	484
	Unknown	179	23	3	14	95	2	47	125	61
Total		771	705	1233	1801	3712	1479	1100	3023	1728

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

** Information withheld because of nondisclosure regulations.

Table 51. Ex-vessel Value of Commercial Domestic Groundfish Harvest for Southeast Alaska Fishery Management Areas, by Origin of Fishermen, 1975-82

Fishery Mgt. Area	Census Area of Fishermen	Estimated Ex-vessel Value in Thousands of Dollars 1975	1976	1977	1978	1979	1980	1981	1982	Avg
Southeastern	Skagway-Ykt-Angoon	5	3	2	5	8	3	12	26	8
	Juneau	4	10	15	41	33	29	10	7	19
	Sitka	10	15	18	17	52	40	50	105	39
	Wrangell-Petersburg	21	45	162	322	225	192	34	48	131
	Pr of W/Outer Ktkn	5	6	5	14	11	3	5	4	7
	Ketchikan Gateway	1	4	9	10	62	6	31	49	21
	Other Alaska*	0	1	2	6	11	5	7	7	5
	Alaska	47	84	214	415	403	278	149	247	230
	Other USA	10	14	42	66	124	88	115	134	74
	Unknown	6	2	0	2	3	4	39	18	9
Total		62	100	256	483	530	370	303	399	313

Source: CFEC 1984a.

* Further breakdown withheld because of nondisclosure regulations.

Table 52. Southeast Region Sablefish-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	24	2	2	2	7	2	43	31	29	89	58	22	2
1978	27	0	0	2	22	21	40	28	19	43	96	52	2
1979	61	0	2	10	41	108	39	48	163	187	115	11	2
1980	76	10	14	31	115	60	84	111	127	163	104	88	12
1981	58	12	16	12	52	128	23	76	60	176	103	19	12
1982	59	0	8	8	48	12	132	179	107	171	28	12	8
Average	51	6	7	11	48	55	60	79	84	138	84	34	6

Source: ADL 1985.

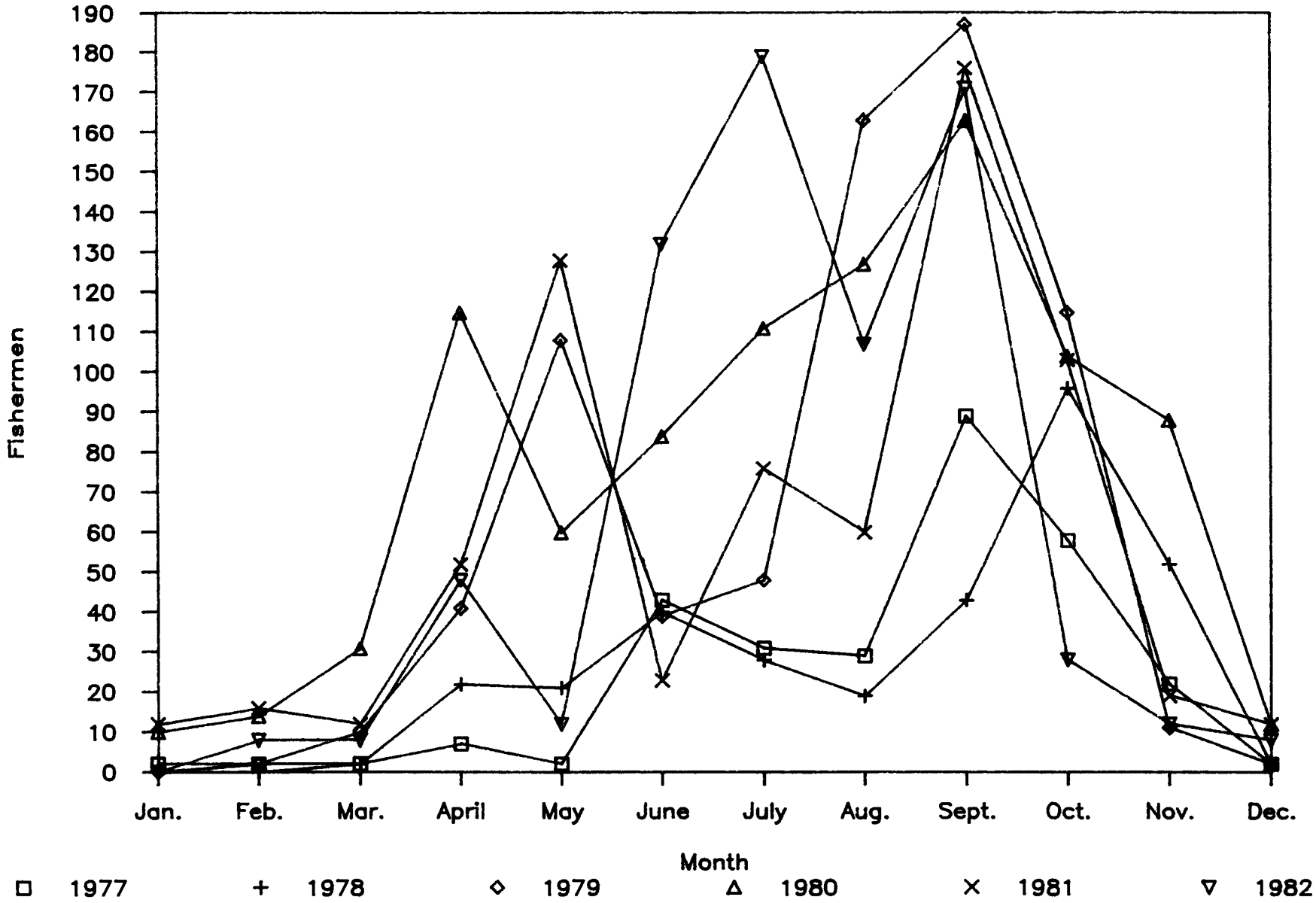


Figure 12. Southeast Region sablefish-harvesting employment (number of fishermen and crew) (ADL 1984).

Table 53. Southeast Region Groundfish-Harvesting Employment (Number of Fishermen and Crew), 1977-82

Year	12-Month Average	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1977	11	10	11	11	20	10	6	6	4	2	10	20	16
1978	13	16	18	17	24	19	8	2	4	8	13	14	17
1979	17	13	16	37	24	13	16	12	16	5	22	9	13
1980	29	14	33	48	28	27	49	47	34	15	12	6	21
1981	33	24	39	39	41	45	51	42	34	26	24	9	10
1982	28	15	33	42	24	9	23	30	28	18	33	30	45
Average	22	15	25	32	27	21	26	23	20	12	19	15	20

Source: ADL 1985.

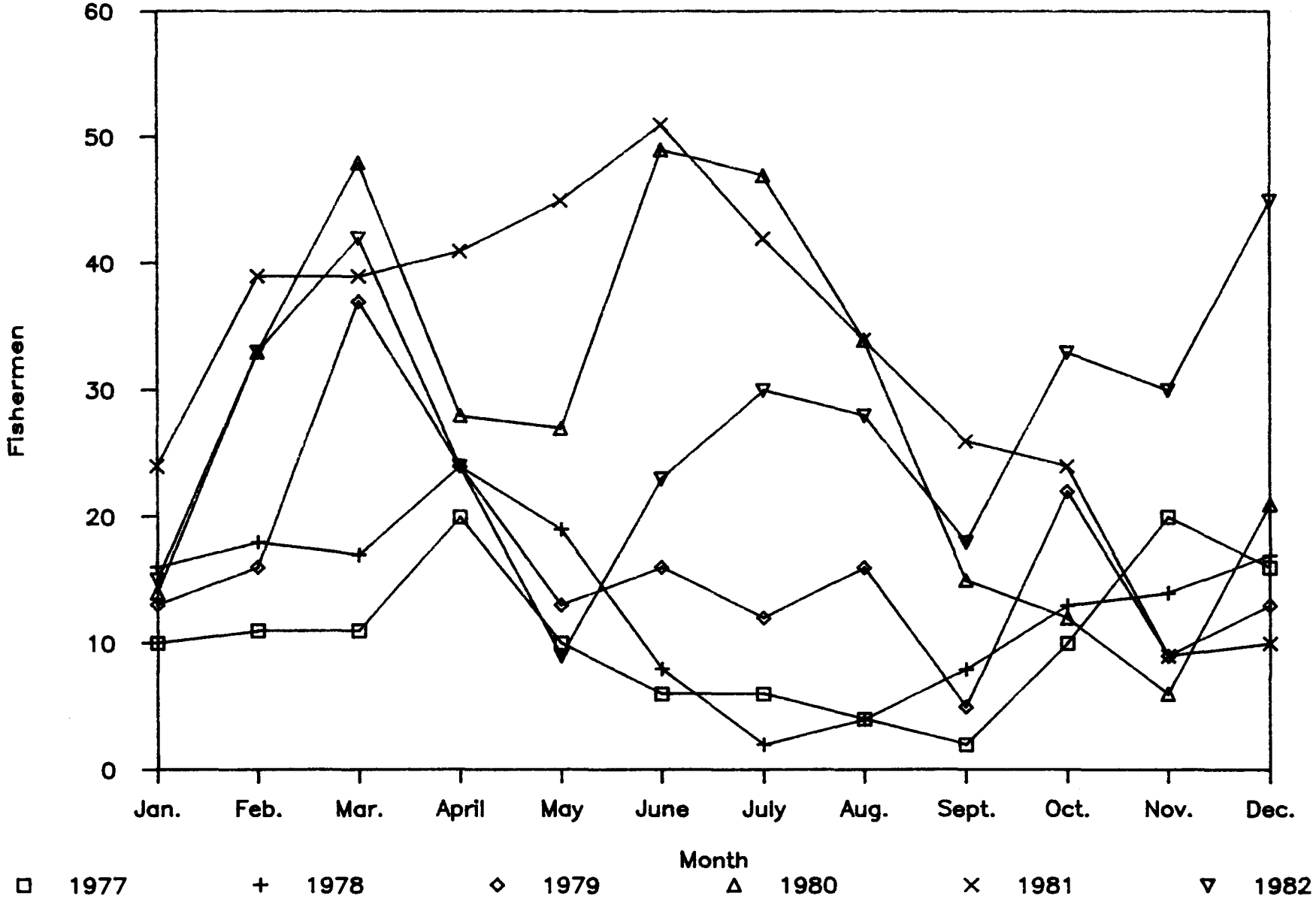


Figure 13. Southeast Region groundfish-harvesting employment (number of fishermen and crew) (ADL 1984).

values, whereas out-of-state fishermen earned 24% (the remaining 2% were from unknown origin) (table 51).

C. Harvesting Employment

Tables 52 and 53 and figures 12 and 13 present information on sablefish-and groundfish-harvesting employment in the Southeast Region during the years 1977-1982. Sablefish-harvesting employment occurred in almost all months during the 1977-1982 period. Given the significant increases in ex-vessel values since 1982 (table 49), it is likely that these relatively outdated harvest employment figures seriously underestimate employment since 1982.

This situation is probably also true for the groundfish fisheries, where ex-vessel values have also increased (table 49). In the groundfish fisheries, harvesting employment occurred during every month from 1977 through 1982 (table 53). Harvest employment levels generally increased during the period. Employment was fairly stable from month to month, rather than occurring in a short seasonal peak (table 53).

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I. STATEWIDE OVERVIEW

A. Introduction

There are two basic economic benefits that result from the sport fish resource - economic impact and economic value. An economic impact is the answer to the question: "What is the economic activity generated by the use of the resource?" Economic value is the answer to the question: "How much value do people place on the resource?" Although these two benefits are distinct, they are not entirely inseparable. Neither benefit is more important as an economic concept than the other, but instead they answer two distinct questions (Rockland 1985).

Each of these economic benefit questions is important for different reasons. Regional economic impacts are important to state and local government officials because these impacts result in jobs, income, and tax receipts. In contrast, economic value is the value people place on the resource and is certainly important to those people who value the fishing experience and the fish stock as a component of the experience (ibid.). Economic value is also a concept with increasingly greater application in fisheries management for balancing alternative uses of fish, water, and land resource.

Recognizing the high value and economic importance of sportfishing in Alaska, the ADF&G, Division of Sport Fish, began conducting angler economic surveys in the mid 1960's. These surveys were conducted on individual streams and directed at specific management considerations. The surveys were also used to test and improve economic survey methodology to be used in larger, more extensive surveys. Table 1 lists the surveys that have been conducted. For specific information from these surveys, contact the Division of Sport Fish, Sport Fish Research and Technical Services, Anchorage.

Two surveys of the sport fish guiding industry in the Southwest Region have also been conducted by the ADF&G. One was of guides in the Bristol Bay-Kuskokwim Bay area conducted in 1982 as part of the Bristol Bay area plan. Another sport fish guide survey was done in 1984 for Kodiak and Aleutian islands guiding operations. The results of these two surveys are presented in this volume as part of the narrative on sportfishing in the Southwest Region. A study for the Bristol Bay CRSA is presently in final stages (Bristol Bay Commercial Recreation Service Providers Study) and should be referred to when available for more current information. Two angler surveys were also conducted in the Southeast Region

Table 1. Economic Surveys Conducted by ADF&G Division of Sport Fish

Survey	Region	Date Conducted
Peter's/Martin Creek King Salmon	Southcentral	1983
Lake Creek King Salmon	Southcentral	1983
Willow Creek King Salmon	Southcentral	1983
Talkeetna River King Salmon	Southcentral	1983
Russian River Red Salmon	Southcentral	1981
Willow Creek Pink Salmon	Southcentral	1980
Gulkana River Sportfish	Southcentral	1983
Little Susitna River King Salmon	Southcentral	1983
Talachulitna River King Salmon	Southcentral	1983
Kepler-Bradley Sportfishing	Southcentral	1983
Quartz Lake Sportfishing	Interior	1983
Caswell Creek King Salmon	Southcentral	1983
Deshka River King Salmon	Southcentral	1983
Buskin River Sportfish	Southwest	1983
Karluk River Sportfish	Southwest	1983
Montana Creek King Salmon	Southcentral	1983
Kenai River King Salmon	Southcentral	1986

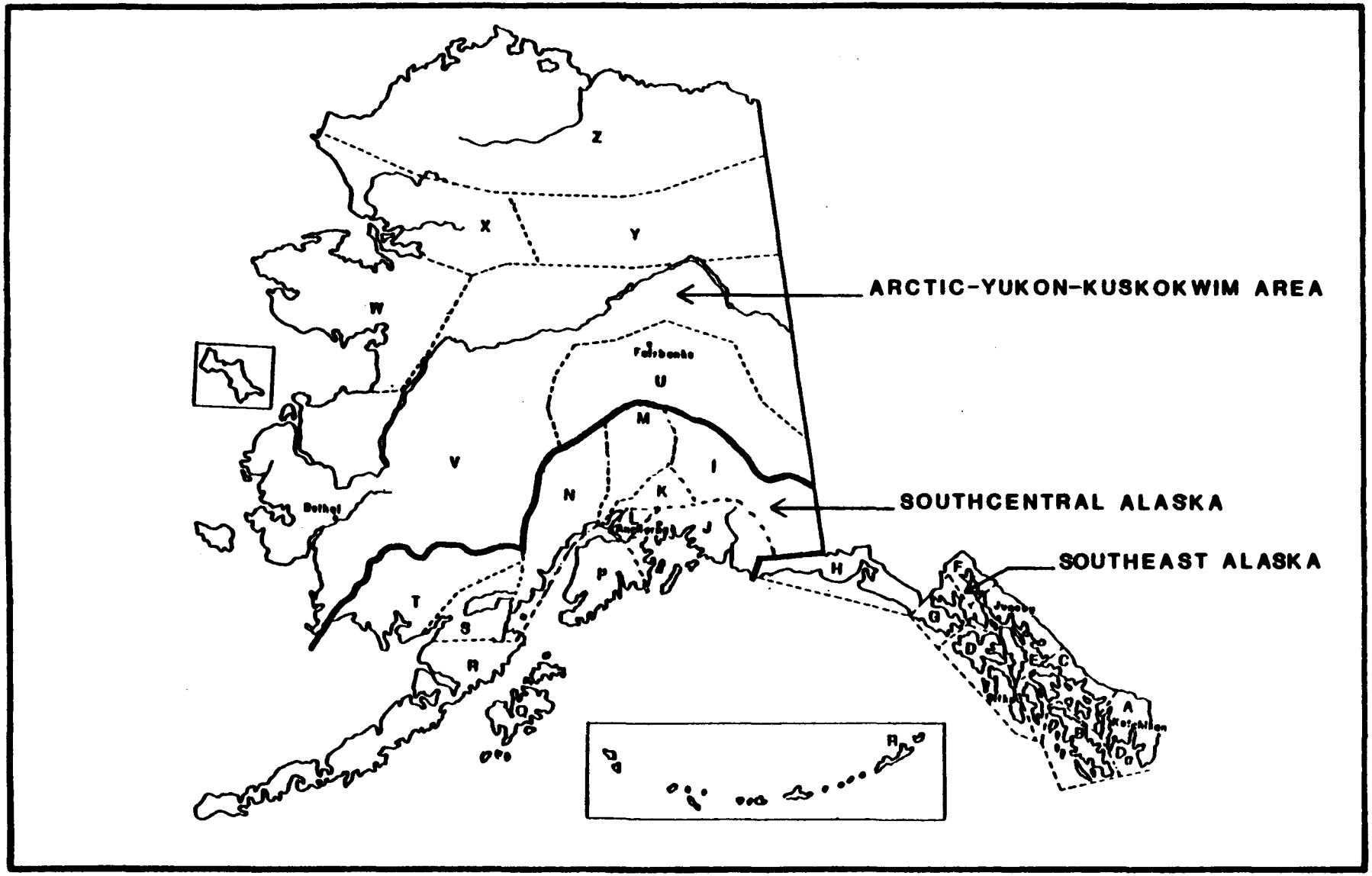
that contained questions regarding user attitudes and expenditures. The results of these surveys are presented with the Southeast Regional information.

The Division of Sport Fish has contracted an extensive study to determine the economic value and importance of sportfishing in the Southcentral Region. This project will also provide information regarding economic methodologies for future research. Also in progress is a contract to determine the economic value and impact of sportfishing in the Juneau area of Southeast Alaska. Both the Southcentral and Juneau final reports are scheduled for completion in February 1987, with a draft report due November 1986. The Division of Sport Fish can be contacted for these reports after these dates. An economic study of sportfishing in the Southeast Region is planned for the 1987 season. Because of these extensive economic evaluation efforts presently underway by the Division of Sport Fish and the lack of other available economic data, this section is necessarily limited in scope.

Detailed tabulations of annual effort and harvest by region, area, species, and fishery for 1977 through 1983 can be found in Mills (1979-1984). Regional summaries of those data (based on sport fish survey areas [map 1]) for selected species are included in this economic volume because for some regions of the state no economic information is available and harvest and effort data are the only indicators of economic values and impacts from sport fisheries. Presentation of these data, however, are not consistent between regions. For regions where extensive economic surveys have been conducted or are in progress (such as the Southcentral Region), little harvest and effort information is provided, and the reader is instead referred to the appropriate economic studies. In contrast, no economic information is available for the Western, Interior, and Arctic regions, so harvest and effort information are instead more extensively summarized. It is important to note that harvest figures record only those fish caught and kept, not those caught and released. Catch and release is a common practice in Alaska, and the importance of some recreational fisheries may be underestimated if only harvest figures are relied on for information. For a more extensive presentation of harvest and effort data, see the Alaska Habitat Management Guides regional Human Use sport fish sections.

B. Management Background

With the granting of statehood in 1959, the ADF&G, Division of Sport Fish, assumed management control of the sport fish resources. Initially, state management was limited to simply accumulating basic information on the fishery resources because sportfishing was viewed as a minor factor in the context of



Map 1. Division of Sport Fish postal survey regions and areas.

managing commercially harvested species. But the growth of the human population and development of the state brought an increase in the number and size of user groups. Recreational fisheries have grown tremendously since statehood and now play a significant role in total fisheries management (Mills 1983).

Management has become increasingly concerned with areas and fish stocks that may be endangered by overharvest (ADF&G 1985). Bag limits and gear restrictions were instituted, and regulations now address access to and development near recreational fisheries (Andrews n.d.). New fisheries were developed, and management of some fisheries was directed to providing quality recreational fishing with high esthetic, social, and psychological values designed for different user groups. For instance, instead of managing solely for a maximum yield (number of fish available for harvest), the ADF&G also manages some areas specifically for trophy-sized fish (ADF&G 1985). These management changes have been made in response to public demand for quality recreational fishing opportunities.

Prior to 1977, no detailed statistics were kept on sport fish harvest for most areas of the state. The sport harvest estimates that do exist for those years are based on area sport fish biologists' personal observations and knowledge as well as some creel census data. These data should be considered minimum estimates, subjective, and limited in total scope (Mills 1983 and pers. comm.). Beginning in 1977, the ADF&G, Division of Sport Fish, began an annual postal survey combined with creel censuses to obtain better information on the effort and harvest of major Alaska sport-caught species by area and fishery (Mills 1983).

II. SPORTFISHING IN THE SOUTHWEST REGION

A. Regional Overview

The Southwest Region accounts for about 10% of the sport fish effort (angler-days fished) in Alaska and only about 5% of the statewide sport fish harvest (Mills 1983). In major areas of the Southwest Region, the sportfishing effort more than doubled overall between 1977 and 1983. The number of angler-days grew steadily from 79,000 in 1977 to more than 165,000 in 1983 (table 2, fig. 1). Kodiak regularly accounted for more than half of both the angler-days and the total combined species harvest in the region each year (ibid). Saltwater sportfishing made up between 40 and 50% of the sportfishing effort in Kodiak waters and is increasing in importance. No other area of the region has as large a saltwater sport fishery as Kodiak. The sportfishing effort in the Naknek and Nushagak drainages increased by more than 120% from 1977 to 1983.

Table 2. Southwest Region Sportfishing Effort* and Percentage by Area,** 1977-83

Area Fished	1977		1978		1979		1980		1981		1982		1983	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Kodiak (Q)														
Saltwater total	14,957	18.9	19,063	23.6	23,124	23.1	27,646	22.7	29,857	23.4	41,113	27.8	40,217	24.3
Freshwater total	26,606	33.7	25,439	31.5	35,921	35.9	37,261	30.7	36,582	28.6	40,125	27.1	46,237	27.9
Subtotal	41,563	52.6	44,502	55.1	59,045	59.0	64,907	53.4	66,439	52.0	81,238	54.9	86,454	52.2
Naknek drainages-Alaska Peninsula (R)														
Saltwater total	0	0	0	0	0	0	0	0	11,828	9.3	9,075	6.1	8,035	4.9
Freshwater total	17,007	21.5	18,824	23.3	19,115	19.1	30,257	24.9	27,403	21.5	29,070	19.7	30,430	18.4
Subtotal	17,007	21.5	18,824	23.3	19,115	19.1	30,257	24.9	39,231	30.8	38,145	25.8	38,465	23.3
Kvichak River drainages (S)														
Saltwater total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freshwater total	12,227	15.5	8,854	10.9	13,031	13.0	14,451	11.9	12,939	10.1	16,754	11.3	22,263	13.5
Subtotal	12,227	15.5	8,854	10.9	13,031	13.0	14,451	11.9	12,939	10.1	16,754	11.3	22,263	13.5
Nushagak (T)														
Saltwater total	0	0	0	0	0	0	0	0	0	0	0	0	445	0.3
Freshwater total	8,244	10.4	8,659	10.7	8,835	8.9	11,867	9.8	9,045	7.1	11,839	8.0	17,833	10.8
Subtotal	8,244	10.4	8,659	10.7	8,835	8.9	11,867	9.8	9,045	7.1	11,839	8.0	18,278	11.1
Saltwater total	14,957	18.9	19,063	23.6	23,124	23.1	27,646	22.7	41,685	32.7	50,188	33.9	48,697	29.4
Freshwater total	64,084	81.1	61,776	76.4	76,902	76.9	93,836	77.3	85,969	67.3	97,788	66.1	116,763	70.6
Grandtotal	79,041	100.0	80,839	100.0	100,026	100.0	121,482	100.0	127,654	100.0	147,976	100.0	165,460	100.0

Sources: Mills 1979-84.

* Effort is the number of days spent sportfishing, where any portion of a day fished is counted as one whole day, or angler-day.

** ADF&G sport fish harvest study postal survey areas.

*** The number of angler-days represents the effort by both residents and nonresidents for all species combined (not just selected species).

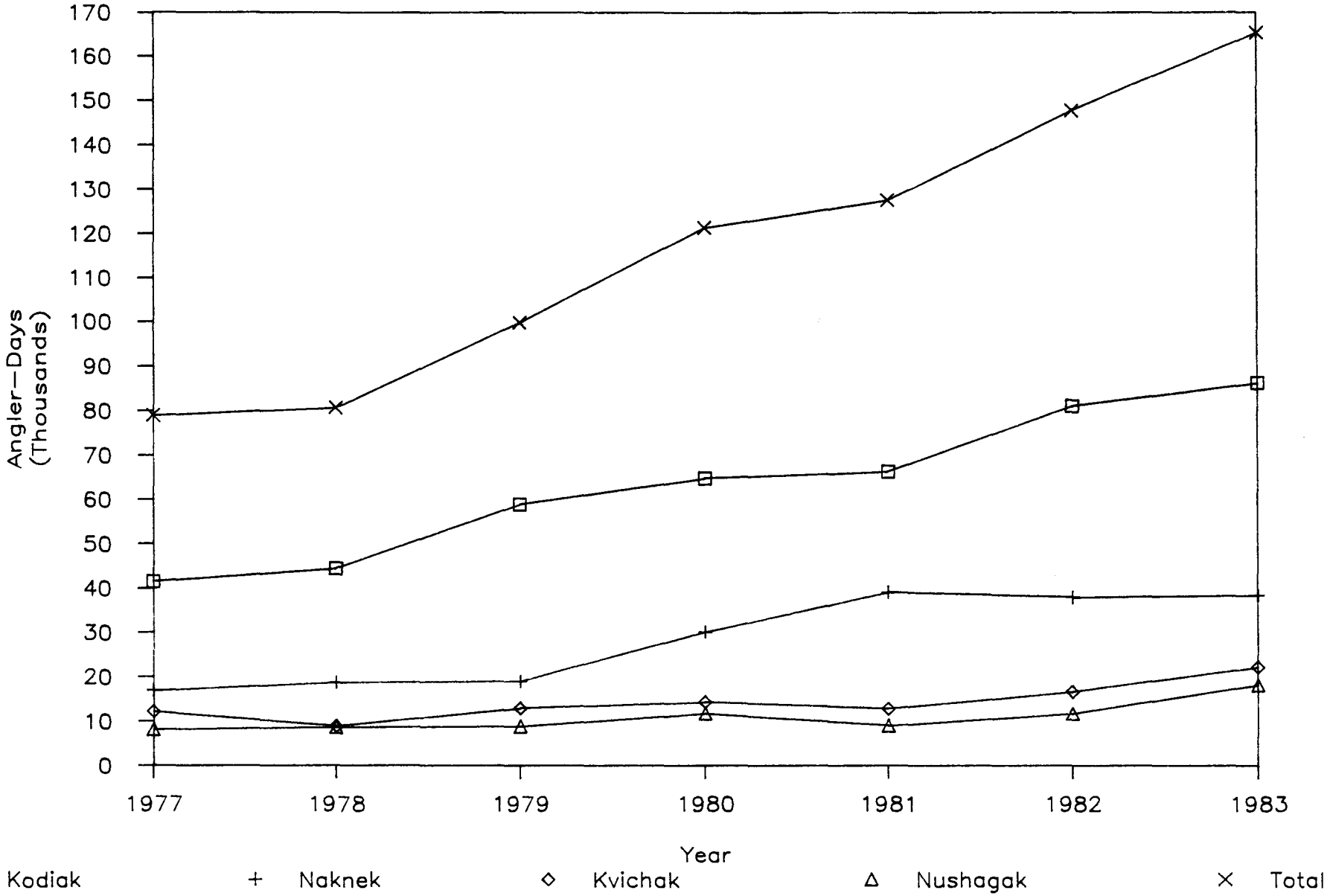


Figure 1. Southwest Region sportfishing effort by area (Mills 1984).

The total harvest of the most important sport fish species doubled between 1977 and 1983, from 55,600 to 110,300 (table 3, fig. 2). The 1982 catch was the highest of the period tallying 127,700 during an even-year peak pink salmon run. Dolly Varden/arctic char regularly accounted for the largest portion of the sport fish catch in the Southwest Region, averaging between 30 and 40% of the annual catch. The char catch more than doubled between 1977 and 1983. The Southwest Region char catch was about 24% of the statewide total in 1982 (ibid.). Pink salmon and coho salmon are the next most important species. The harvest of rainbow trout, however, increased 260% over the period; in one year, 1982 to 1983, the harvest jumped from 8,768 to 14,811. The sockeye salmon sport harvest also increased steadily and significantly, up 144% from 1977 to 1983.

A list of 71 lodges and guides and 23 air taxi outfits serving the Bristol Bay area and catering to sport anglers as well as other users can be found in the Alaska Habitat Management Guide for the Southwest Region, Human Use section.

B. Kodiak and Aleutian Islands Sportfish Guides Survey

In December, 1983, the ADF&G mailed 30 questionnaires to commercial sportfish guides and air charter companies who had operated in the Kodiak and Aleutian islands area in 1982. Surveys were returned (after two survey mailings) by 17 operators, 15 of which were useable. The overall response rate of the survey was 51%. All of the survey respondents operated on Kodiak Island. A sample survey is attached to this section (attachment A).

The results of the survey are presented in this section. It should be noted that the sample size for this survey was small, especially taking into consideration the variation in the types of operators. Therefore these results should be used cautiously.

Table 4 presents information on the types of services offered by Kodiak Island sportfish guides. The majority of operators (11 of 15) offered lodging, transportation, and guide service for their clients. Only four of the responding operators offered the option of drop-off air charter service. Because of the small sample size results of survey were analyzed for the whole response group or regardless of their operation type. The respondents are referred to as guides or operators interchangeably.

Most of the guides (12) offered services during summer and fall (table 5); seven of these also offered services in the spring. Only two of the drop off air charter operators offered year-round service. Winter service might not have been directly related to sportfishing.

Table 3. Southwest Region Sport Fish Harvest Totals* by Species,** 1977-83

Species	1977	1978	1979	1980	1981	1982	1983
Chinook salmon***	3,216	4,282	4,250	4,501	5,226	8,681	9,056
Coho salmon	6,861	7,509	13,683	16,453	14,042	18,180	14,406
Sockeye salmon	5,092	6,656	8,553	7,283	8,253	10,959	12,446
Pink salmon	14,634	21,737	19,698	31,392	20,650	31,604	12,880
Chum salmon	2,017	2,351	773	1,481	1,545	3,378	1,801
Total sea-run salmon	31,280	42,535	46,957	61,110	49,716	72,802	49,635
Dolly Varden/ arctic char	17,344	19,747	36,058	34,662	35,963	40,098	37,464
Steelhead	232	162	318	671	313	258	302
Rainbow trout	4,064	4,546	4,618	8,082	7,153	8,768	14,811
Arctic grayling	2,184	3,353	3,599	5,433	4,201	5,777	7,193
Total	55,644	70,343	91,550	109,958	127,703	127,703	110,359

Source: Mills 1979-84.

* Freshwater and saltwater sport fish harvest combined; numbers reflect caught and kept fish only, not caught and released fish.

** Selected sport fish species only.

*** Includes harvest of "small" chinook salmon (less than 20 inches in Area Q, less than 28 inches in Areas R, S, and T.

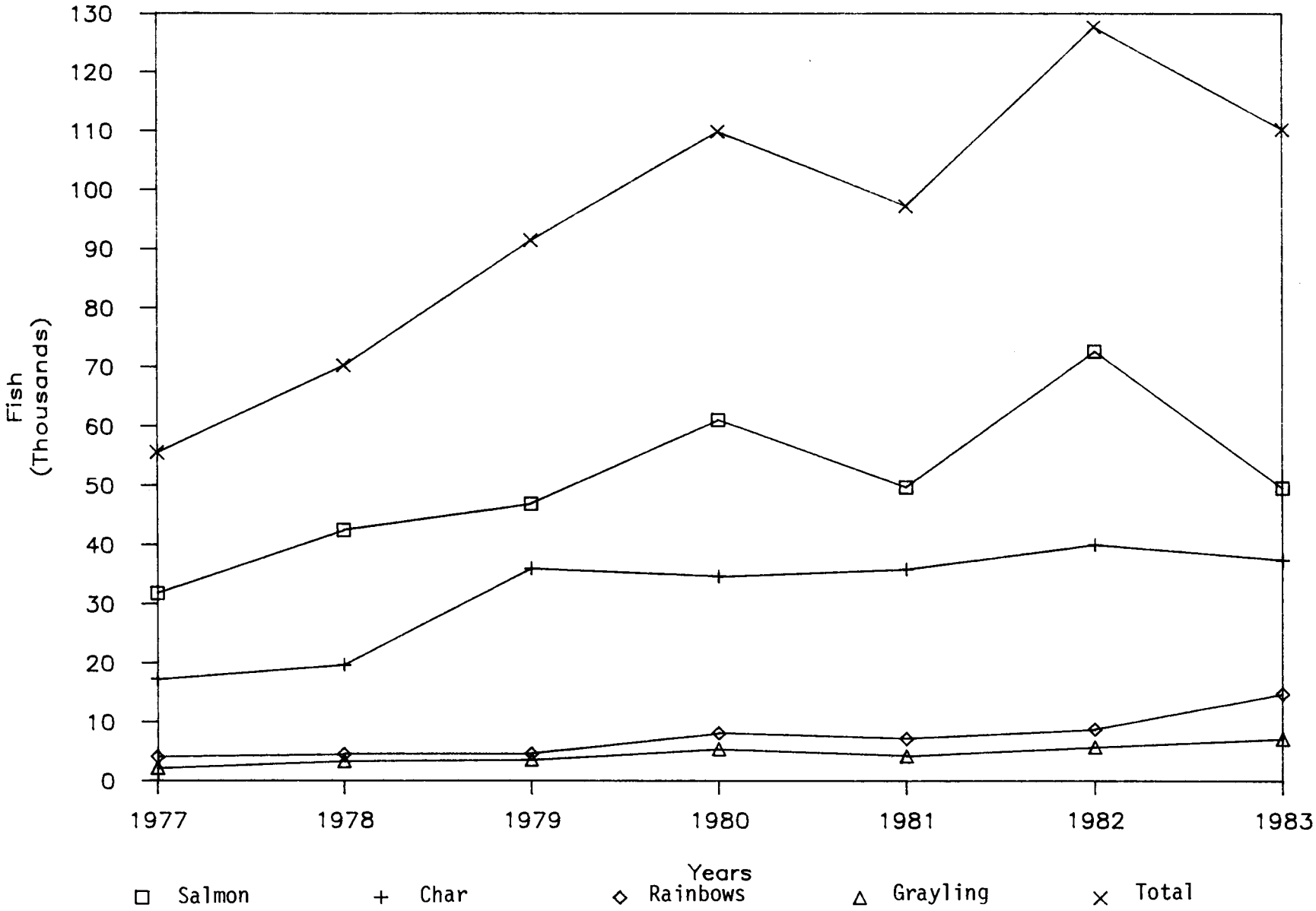


Figure 2. Southwest Region sportfishing harvest of selected species (Mills 1984).

Table 4. Services Offered By Responding Sport Fishing Guides and Air Charter Operators in the Kodiak Island Area

Service	No. of Operators*
Lodging with air transportation and guide service	2
Lodging with boat transportation and guide service	9
Guided air charter fishing trips	0
Guided float fishing trips	4
Drop off air charter service	4

n = 15

* Operators could offer more than one type of service

Table 5. Seasons of Service Offered by Responding Kodiak/Aleutians Islands Area Sportfishing Guides and Air Charter Operators

Season	Number of Guides and Operators
Summer only	1
Summer and fall	5
Spring, summer, and fall	7
Year round	2
Total	n = 15

* Drop off air charter service operators.

Information in table 6 indicates that the number of sport fish clients of responding guides on Kodiak Island increased steadily from 1978 through 1982. In 1978, 295 clients were guided by five operators. By 1982, 832 clients were guided by 11 operators. A portion of the increase in clients was offset by the increase in the number of guides (from 5 to 11, a 182% increase) and partially offset by an increase in the average number of clients served by guides (from 59 to 76, a 29% increase). Because surveys were sent to guides who operated in 1982, some businesses that only operated in earlier years (1978 to 1981) were not surveyed. To the extent that this occurred, the data may overestimate the rate of increase in the number of clients served and income for the 1978-1982 period.

The number of angler-days spent by clients of responding guides also increased dramatically from 648 in 1978 to 3,139 in 1982 (a 384% increase) (table 7). The average number of angler-days per responding guides increased from 108 per guide in 1978 to 262 angler-days per guide in 1982 (a 143% increase).

The distribution of sport fish guiding income for the years 1978 to 1982 is presented in table 8 by income categories. Income categories from the original survey have been combined because of nondisclosure regulations. Gross incomes tended to be skewed further upward during the more recent years. Table 9 presents estimated total and average gross incomes of responding guides and air charter operators for the years 1978-1982. These are rough estimates because of the large size of individual income categories used in the survey. Estimates were made by multipling the number of respondents by the mid-point value of the income category. Average incomes per guide and operator increased from $17,571 in 1978 to $54,536 in 1982 (21% increase). The gross earnings of respondents increased from $123,000 for 7 guides in 1978 to $763,500 for 14 guides in 1982.

Table 10 shows the areas of use and type of use of responding guides in 1982. Approximately 48% of the guiding was conducted on salt water, of which 30% was by boat and 18% from shore. Freshwater fishing comprised the remaining 52%. Karluk River and Karluk Lake accounted for 15 and 4%, respectively, of guided sportfishing use. Other streams, which include Pauls, Uyak, Uganik, Portage, Afognak, Frazer, Red, Browns, and Shuyak Island streams, accounted for 24% of guided sportfishing use (table 10). Other lakes, which include Uganik, Afognak, Paul's, Laura, and Shuyak Island lakes, accounted for 9% of guided sportfishing use.

Table 6. Number of Clients Served by Responding Kodiak Island Area Sport Fishing Guides and Air Charter Operators, 1978-82

Year	Total Guided Clients	Number of Clients/Guide	Number of Operators
1978	295	59	5
1979	381	54	7
1980	602	54	11
1981	722	66	11
1982	832	76	11

Table 7. Number of Angler-days Spent by Clients of Responding Sport Fishing Guides in the Kodiak Island Area, 1978-82

Year	Total Angler-Days	Angler Days Per Guide	Number of Guides
1978	648	108	6
1979	961	120	8
1980	2,452	189	13
1981	2,442	188	13
1982	3,139	262	12

Table 8. Gross Income for Responding Guides from Sportfishing Clients, 1978-82

Income Category* $	1978	1979	1980	1981	1982
0 - 10,000	4	3	8	7	5
10,000 - 50,000	3	3	4	4	4
50,000 - 250,000	0	3	3	3	5
Total	7	9	15	14	14

* Income categories are combined from the original survey because of nondisclosure regulation.

Table 9. Estimated Total Income of Responding Guides and Air Charter Operators, 1978-82

Year	Gross Income ($)	Average Income Per Guide ($)	No. of Guides
1978	123,000	17,571	7
1979	319,000	39,875	8
1980	415,000	29,643	14
1981	489,000	34,929	14
1982	763,500	54,536	14

Table 10. Approximate Percentage of Type of Use and Area of Use by Guided Sport Anglers, Kodiak Island

Salt water	
Boat	30%
Shoreline	18%
Subtotal	48%
Fresh water	
Karluk River, lagoon	15%
Karluk Lake	4%
Other streams[a]	24%
Other lakes[b]	9%
Subtotal	52%
Total	100%

a Includes Paul's, Uyak, Uganik, Portage, Afognak, Frazer, Red, Browns, and Shuyak Island streams.

b Includes Uganik, Afognak, Paul's, Laura, and Shuyak Island lakes.

C. Bristol Bay Sport Fishing Guides Economic Survey

During fall 1982, a questionnaire was mailed by the ADF&G, Division of Habitat to 50 commercial sport fish guides and 22 air charter operators in the Bristol Bay area. This survey was done to obtain information for the Bristol Bay Cooperative Management Plan. The questionnaire requested information on season, location, and type of operation, gross income of guides and air charter operators, the number of clients and angler-days of service, and their opinions on several questions important to sportfishing and land management. A sample survey is attached to this section (attachment B).

Three mailings of the survey were done. Responses were received from 49 operators for an overall response rate of 68%. Results of the survey are presented in tables 11 through 17. Because of the relatively small sample size, all returned questionnaires were analyzed together without striation of the sample by types of operators. Results should be used with that in mind. Respondents are referred to as guides or operators interchangeably.

Table 11 provides information regarding the types of services offered by responding sport fishing guides and air charter operators in the Bristol Bay area. Almost all (94%) offered guiding service. Ninety percent offered meals and 86% offered lodging. Approximately 47% offered tent camping. It is unclear what the overlap between the tent camping and lodging is, but it is likely that overnight facilities were provided by more than 86% of the operators. Sixty-nine percent of the operators offered daily boat and/or air transportation.

Most of the operators (40, or 82%) provided services during the summer and fall, which is defined as the months of June, July, August, and September (some operated in October, also) (table 12). Another eight guides (16%) operated May through September or October. Only one guide operated only in the summer, June through August.

The number of clients served by responding guides and air charter operators steadily increased during the period 1978 to 1982 from 7,703 in 1978 served by 37 guides and operators to 9,411 served by 42 guides and operators (22% increase) (table 13). Alaska resident clients increased by 13%, while nonresidents increased by 29% during the same 1978 to 1982 time period (table 13). The number of angler-days increased more dramatically than the number of clients, meaning that the length of trips increased as well as the number of clients. Client angler-days increased from 16,350 in 1978 for 31 guides (average of 527 angler-days per guide) to 23,497 in 1982 for 38 guides (average of 618 angler-days per guide) (table 14). The survey did not distinguish between

Table 11. Services Offered by Responding Sportfishing Guides and Air Charter Operators in the Bristol Bay Area

Type of Service	Number of Operators* (n = 49)	(%)
Lodging	42	(88%)
Tent camps	23	(47%)
Meals	44	(90%)
Daily air transportation	34	(69%)
Daily boat transportation	34	(69%)
Sportfishing guiding	46	(94%)

* Operators could offer more than one type of service.

Table 12. Seasons of Service Offered by Responding Sportfishing Guides and Air Charter Operators in the Bristol Bay Area

Seasons	Number of Operators
Summer only (June, July, August)	1
Summer and fall (June-September or October)	40
Spring, summer, and fall (May-September or October)	8

Table 13. Number of Adult Residents and Nonresident Clients Served by Responding Bristol Bay Sportfishing Guides and Air Charter Operators, 1978-82

Year	Alaska Residents	Nonresidents	Total Clients	Number of Operators
1978	3,089	4,614	7,703	37
1979	3,110	4,941	8,051	37
1980	3,165	5,244	8,409	37
1981	3,313	5,631	8,944	39
1982	3,477	5,934	9,411	42

Table 14. Number of Angler-days by Clients of Responding Bristol Bay Guides, 1978-82

Year	Angler-days	Average Angler-days Per Guide	Number Guides
1978	16,350	527	31
1979	18,387	575	32
1980	20,682	627	33
1981	22,846	653	35
1982	23,497	618	38

Table 15. Gross Income of Responding Bristol Bay Sportfishing Guides by Income Categories, 1978-8_

Income Category ($)	1978	1979	1980	1981	1982
100 - 999	0	0	0	0	1
1,000 - 9,999	6	7	8	7	6
10,000 - 24,999	5	4	3	5	5
25,000 - 49,999	6	5	4	3	1
50,000 - 99,999	5	8	6	3	3
100,000 - 249,999	4	4	5	10	9
250,000 - 499,999	2	2	3	4	6
500,000+	2	3	3	4	6
Total respondents	30	33	32	35	37

Table 16. Gross Income of Responding Bristol Bay Sportfishing Guides and Air Charter Operators, 1978-82

Year	Total Gross Income ($)	Average Gross Income Per Operator ($)	Number of Operators
1978	4,028,200	130,000	31
1979	4,719,600	147,500	32
1980	5,665,850	171,700	33
1981	7,215,450	206,200	35
1982	8,801,800	231,600	38

Table 17. Percentage of Sportfishing Guides Using Major Drainages in the Bristol Bay Area, 1982

Major Drainages	Percentage of Guides Using Drainage (n = 49)
Kanektok (Quinhagak) drainage	12
Goodnews drainage	13
Togiak drainage	16
Wood River drainage	22
Nushagak drainage (including Mulchatna and Nuyakuk)	57
Nuyukuk River - Tikchik Lakes	37
Mulchatna drainage	54
Kvichak drainage below Iliamna Lake	52
Alagnak (Branch) drainage	57
Iliamna Lake and its tributaries	63
Naknek drainage	37
Egegik drainage	21
Ugashik drainage	36
Alaska Peninsula south of Ugashik drainage	16

nonresident and resident angler-days. Because surveys were sent to guides who operated in 1982, some businesses that only operated in earlier years (1978 to 1981) were not surveyed. To the extent that this occurred, the data may overestimate the rate of increase in the number of clients served and income for the 1978-1982 period.

Table 15 presents responding sportfishing guides gross income by income categories. The distribution of incomes tends to become skewed upward in more recent years. Some of the income categories at the upper levels have been combined for disclosure reasons, which makes this shift in distribution somewhat less evident. The distribution of gross incomes also tends to have more of a bimodal distribution (two separate peaks), which could reflect increasing differences in the size of operations.

The total gross income of responding guides and air charter opeators also increased considerably, from 31 guides earning $4,028,200 in 1978 to 38 guides earning $8,801,800 in 1982 (119% increase) (table 16). The average gross income of guides increased from $130,000 in 1978 to $231,600 in 1982 (78% increase) (table 16). All these values are in nominal dollars, which means they are not adjusted for inflation. If the 1982 gross earnings of the 38 guides/operators was extrapolated to the total population of 72 guides/operators (assuming the number of each type of service in the sample is proportional to the number in the whole population), the total adjusted gross earnings would be $13,026,700.

Table 17 shows the percentage of useage by guides of major river drainages in the Bristol Bay area. It is evident that most of these areas receive a considerable amount of use.

In response to questions about characteristics of use and land and sportfishing management concerns, responding guides provided the following information:

Approximately 70% of the responding sportfishing guides believe that an increase in the number of fishermen in an area reduces the value of the sportfishing experience. Overfishing depletes the fish population, especially trophy-size fish, and reduces the wilderness quality of the trip, which is an important element of the sportfishing in the Bristol Bay area. Use of many streams and lakes has increased tremendously in recent years. About 55% of the guides believed that an increase in the number of users would cause a decrease in the amount clients are willing to pay for the Bristol Bay sportfishing experience.

Eighty-four percent of the responding guides think clients would be content with a catch and release philosophy. An additional 10%

favor catch and release for all species except salmon. Most of the guides believed their clients are interested in the trophy value of the fish they catch; half of their clients were interested in the food value. Most guides think Alaska residents are more interested in the food value of fish than nonresidents.

Approximately 62% of the responding guides think there is a public access problem that limits the availability of sportfishing areas. Approximately 76% thought that the increase in private lands adjacent to streams and lakes limited accessibility.

Eighty-eight percent of the guides thought the number of lodges and guiding services in the Bristol Bay area satisfied the demand for sportfishing services. Most guides believed there would be a continued 10-20% annual increase in demand, although a couple speculated the demand would increase as much as 50% annually.

III. SPORTFISHING IN THE SOUTHCENTRAL REGION

Sportfishing effort in the Southcentral Region increased almost 40% between 1977 and 1983 (table 18, fig. 3). In 1983, sport anglers spent over 1 million angler-days fishing in the region. Between 1977 and 1982, an average of 64% of the total number of angler-days fished in Alaska were in the Southcentral Region (Mills 1983). Within the region, almost 60% of the annual effort takes place on the Kenai Peninsula. Most of the sportfishing effort in the Southcentral Region is for chinook salmon, sockeye salmon, rainbow trout, char, pink salmon, and coho salmon (table 19, fig. 4 and 5).

A major sportfishing economic survey in Southcentral Alaska is in progress. It is scheduled to be completed by February 1987, with a draft report scheduled for November 1986. For more information on this study, contact the Division of Sport Fish. For more information on sportfishing harvests and effort in the Southcentral Region, see the Alaska Habitat Management Guide, Southcentral Region, Volume 2, Sportfishing section.

IV. SPORTFISHING IN THE WESTERN AND INTERIOR REGIONS

Almost 10% of all sportfishing angler-days spent in Alaska are in the Interior and Western regions. From 1977 through 1984, the regions accounted for an annual average of 9.5% of Alaska's sportfishing angler-days (Mills 1985). Most of the fishing effort in the Interior and Western Regions is concentrated in the Fairbanks area (ibid.). Table 20 and figure 6 show the sport fish effort for the three major sport fish areas of the Interior and Western regions. The Tanana River drainage area (which includes Fairbanks) had an average 12,290 of angler-days of effort during the period 1977-1983.

Table 18. Southcentral Region Sportfishing Effort by Area*, 1977-83

Area Fished	Angler-days						
	1977	1978	1979	1980	1981	1982	1983
Glennallen (I)	51,485	44,566	57,266	50,518	53,499	54,953	51,276
Prince William Sound (J)	48,369	35,046	46,594	46,468	42,734	40,568	47,614
Knik Arm (K)/ Anchorage (L)	137,009	106,687	143,836	182,195	172,670	173,720	213,361
E. Susitna (M)	56,651	86,010	78,222	91,304	59,854	80,745	67,471
W. Cook Inlet (N)	32,842	38,771	52,747	49,924	40,658	56,811	74,652
Kenai Penin. (P)	422,954	521,498	535,327	530,493	519,662	576,585	592,846
Total	749,310	832,578	913,992	950,902	889,077	983,382	1,047,220

Source: Mills 1984.

* Sport Fish Postal Survey Areas.

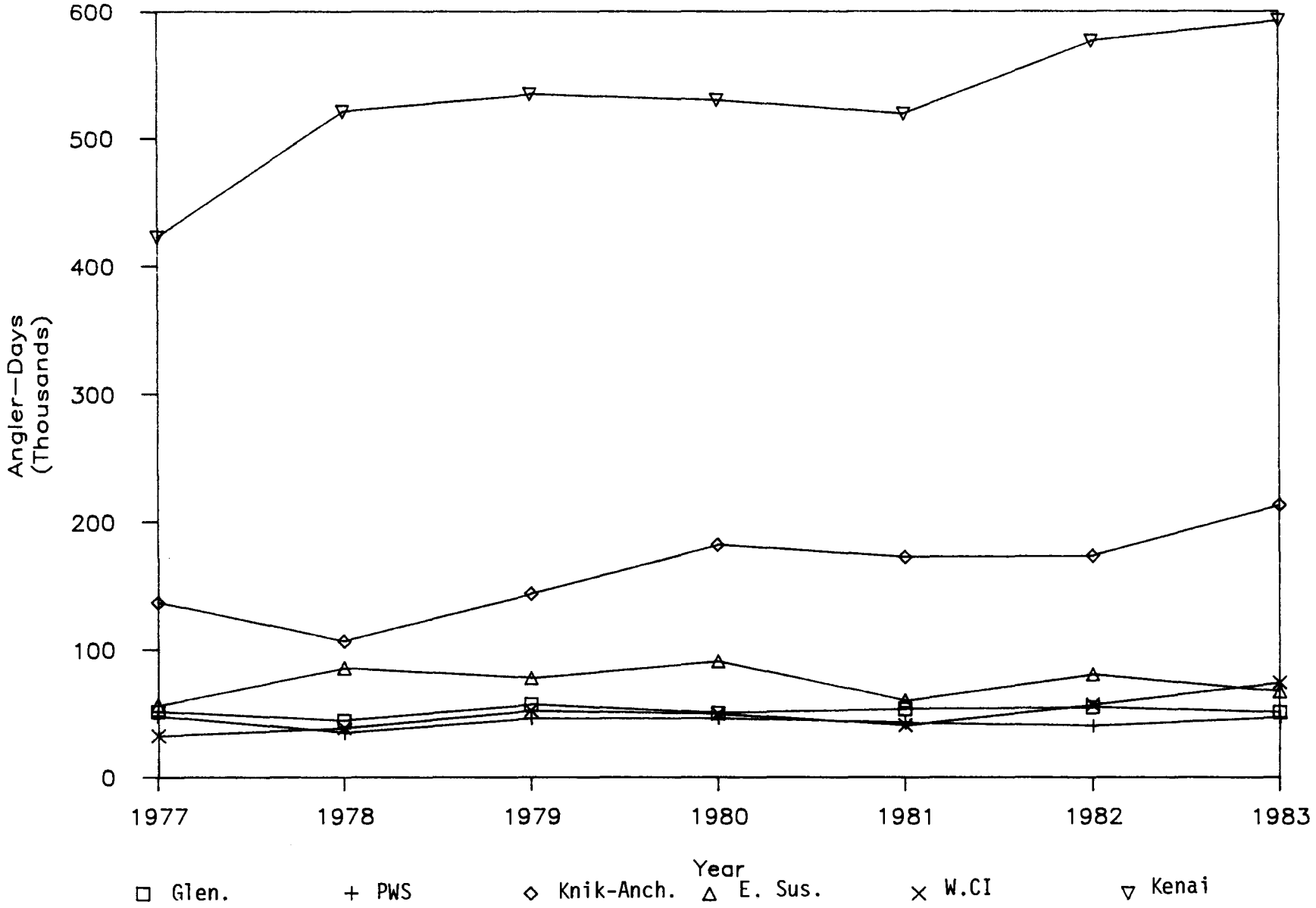


Figure 3. Southcentral Region sportfishing effort by area (Mills 1984).

Table 19. Southcentral Region Sport Fish Harvest Totals by Species,* 1977-83

Species	1977	1978	1979	1980	1981	1982	1983
Chinook salmon	25,112	26,415	34,009	24,155	35,822	46,266	57,094
Coho salmon	67,866	81,990	93,234	127,958	95,376	136,153	87,935
Sockeye salmon**	99,697	120,001	80,873	108,265	82,073	131,434	172,698
Pink salmon	85,543	143,483	63,366	153,794	64,163	105,961	47,264
Chum salmon	5,044	23,755	8,126	8,660	7,810	13,497	11,043
Landlocked coho/ chinook	31,152	26,583	17,907	43,142	39,930	24,102	33,482
Dolly Varden/ arctic char	79,405	102,107	160,029	130,009	149,543	115,832	151,503
Steelhead	1,949	2,720	1,554	2,063	1,727	1,305	1,895
Rainbow trout	80,354	107,243	129,815	126,686	149,460	142,579	141,663
Arctic grayling	45,748	47,866	70,316	69,462	63,695	60,972	56,896
Lake trout	15,200	10,910	13,876	15,752	15,495	15,423	16,210
Pacific halibut	17,412	30,954	34,603	39,796	52,370	55,198	75,047
Total	554,482	724,027	707,708	849,742	757,464	848,722	852,730

Source: Mills 1984.

* Select sport fish species only.

** Includes kokanee.

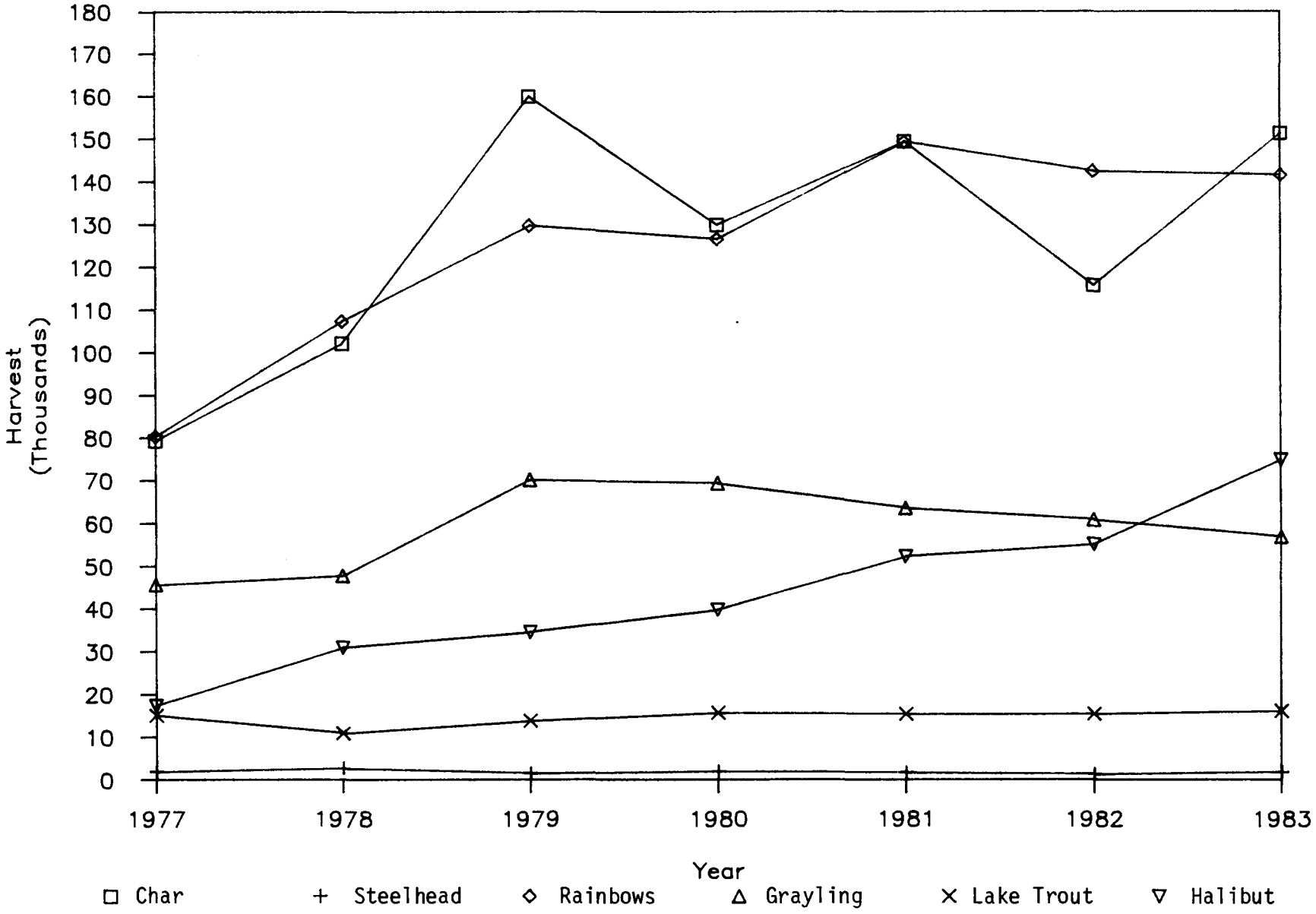


Figure 4. Southcentral Region sport fish harvest of selected species (Mills 1984).

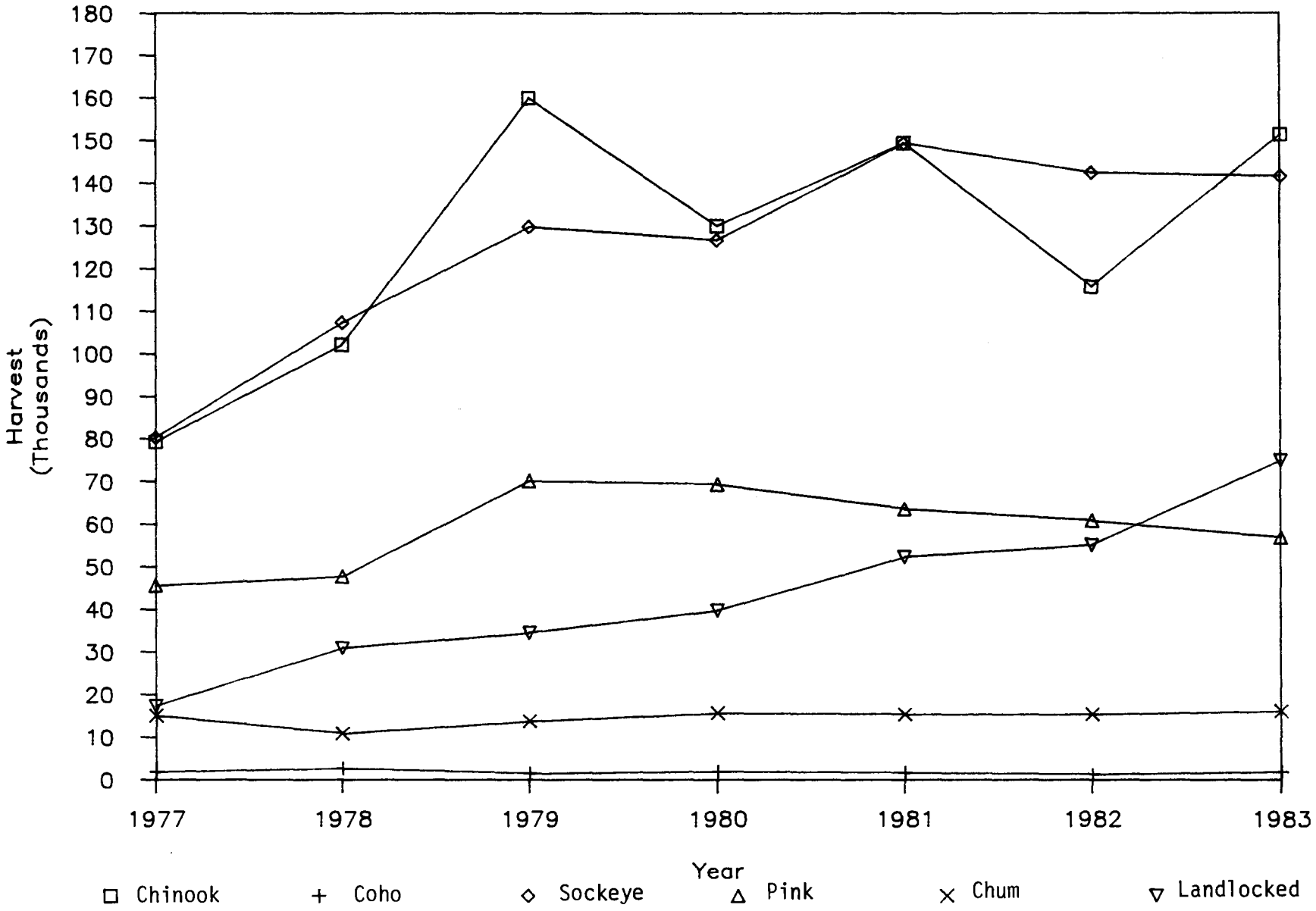


Figure 5. Southcentral Region sport fish harvest of salmon (Mills 1984).

Table 20. Western and Interior Regions Sportfishing Effort, 1977-83

Area Fished*	Angler-days						
	1977	1978	1979	1980	1981	1982	1983
Tanana River drainage	99,919	119,364	98,514	131,494	115,099	150,530	145,386
Interior Alaska	7,337	8,616	11,331	11,209	10,605	16,162	16,528
South slope Brooks Range	2,156	2,714	3,407	3,612	4,483	7,182	6,921
Total	109,412	130,694	113,252	146,315	130,187	173,874	168,835

Source: Mills 1984.

* Sport Fish Postal Survey Areas.

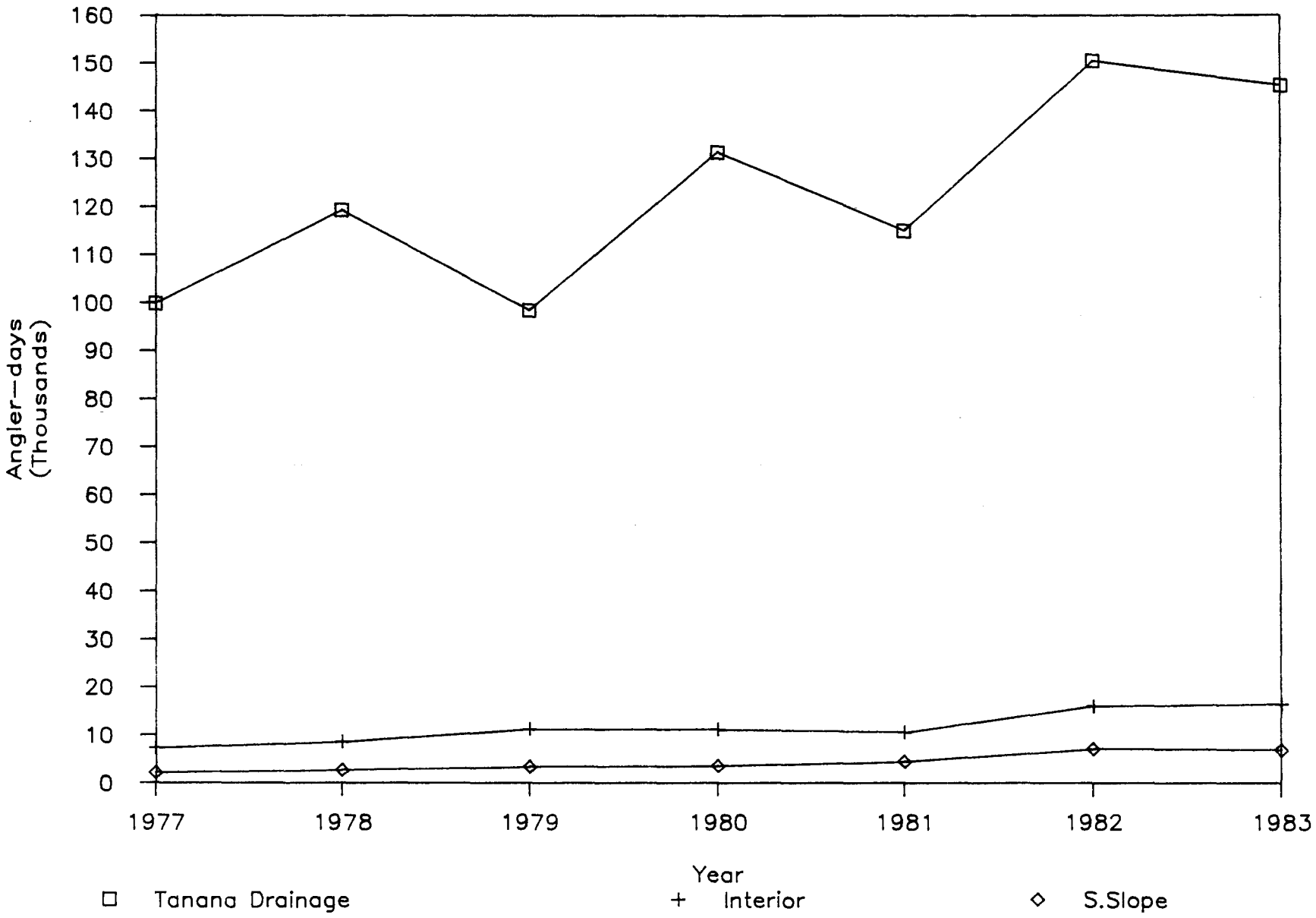


Figure 6. Western and Interior regions sportfishing effort by area (Mills 1984).

Information on guiding operations and means of access in this discussion has been summarized from the Alaska Habitat Management Guide for the Interior and Western Regions. See this volume for more information on local sportfishing use of streams, lakes, and drainages in the region.

No economic studies or surveys have been conducted on sportfishing in the Interior and Western regions.

The major sport fish species in the regions in terms of harvest are arctic grayling, landlocked salmon, rainbow trout, and northern pike. Grayling harvest is considerably greater than that for the other species, averaging almost 32,000 fish from 1977 through 1983; in 1983, the grayling harvest peaked at 107,600 fish (table 21, fig. 7). Peak harvest of landlocked salmon in the period 1977 through 1983 was 57,200 fish in 1981. Harvest of rainbow trout during that period has ranged from 5,500 fish in 1979 to 26,900 in 1982. Increased stocking of lakes in the Fairbanks area brought the annual average harvest up from 6,200 rainbows during 1977-1979 to 26,200 fish during 1980-1984 (ADF&G 1986).

Guiding for sportfishing is important in the Interior and Western regions, especially in areas where there is no road access. In the southwestern portion of Western Region lower Kuskokwim drainage, the number of fishing guides in the Kanektok and Goodnews rivers areas has increased, and some Bristol Bay area guides have expanded their operations to include those rivers (USFWS 1985a). The Kanektok and Goodnews are within the boundaries of the Togiak National Wildlife Refuge and are considered two of the premier salmonid streams on the continent (ibid.). The establishment of the refuge in the early 1980's may be partly responsible for the increasing interest in the area. Guides in the Togiak National Wildlife Refuge operate for 10 to 16 weeks during the summer and fall (ibid.). In 1984, 12 principal guides were using the Kanektok River, and there were five established camps used by guides on the river (ibid.). The number of guided float groups and guided fly-in groups increased from 8 and 6, respectively, in 1980 to 37 and 22 in 1983 (ibid.). The average guided float group size in 1984 was eight people. The average fly-in group size was five people. The ADF&G estimates for angler-days spent on the Kanektok increased from 1,517 in 1983 to 6,881 in 1984 (Mills 1979-1985).

Unguided recreational fishermen made up the largest single use of the Kanektok River in 1984. An estimated 700 unguided fly-in groups visited the river that year, primarily residents of Bethel (USFWS 1985a). Qanirtuug, Inc., the local Native corporation, owns the land along the lower Kanektok and has charged a fee to recreational users of the area (Snellgrove 1985).

On the Goodnews River, five principal guides were using the three forks of the river, and there were three guide camps reported (USFWS 1985a). The USFWS estimated that 31 guided fishing groups and 53 unguided

Table 21. Western and Interior Regions Sport Fish Harvest,* 1977-83

Species	1977	1978	1979	1980	1981	1982	1983
Arctic grayling	62,915	90,434	83,781	95,356	85,826	95,073	107,639
Landlocked salmon	7,151	22,412	36,073	25,733	57,294	43,374	34,255
Sea-run salmon	1,541	3,703	2,304	5,210	4,253	8,797	7,993
Rainbow trout	6,215	6,768	5,587	20,419	25,553	26,982	22,447
Northern pike	11,212	10,975	11,002	14,506	14,357	16,593	16,774
Arctic char/ Dolly Varden	2,577	2,468	2,263	1,884	2,402	4,035	5,606
Whitefish	3,599	7,345	5,578	6,271	5,240	10,037	11,541
Total	95,210	144,105	146,588	169,379	194,925	204,891	206,255

Source: Mills 1984.

* Selected species only.

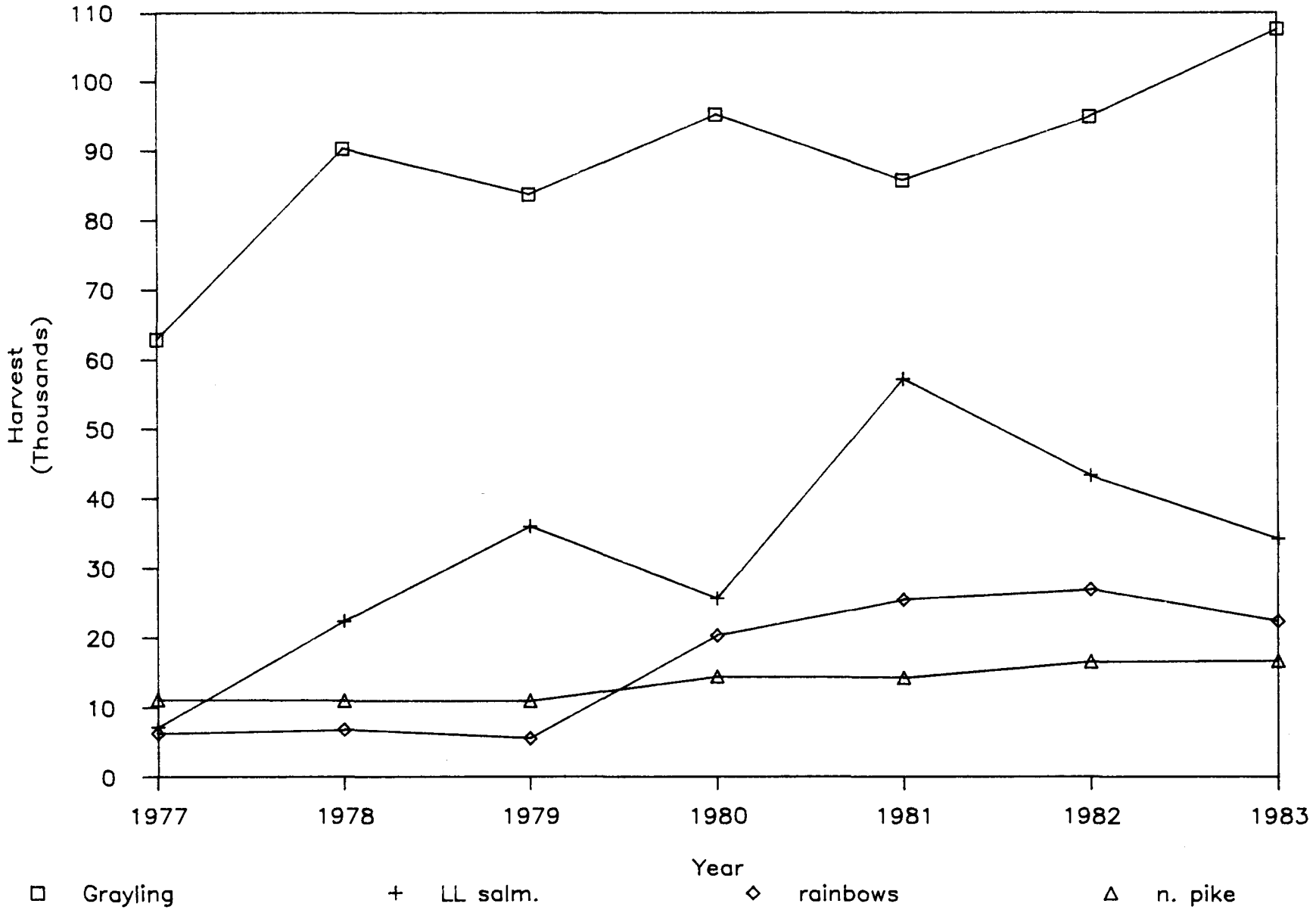


Figure 7. Western and Interior regions sportfishing harvest of selected species (Mills 1984).

groups used the river in 1984. Guided motorboat use, with an average group size of 12 people, was the principal use of the river (ibid.).

Guided fishermen account for the bulk of the harvest on the Holitna River and other Kuskokwim tributaries between Sleetmute and McGrath (Alt 1981a). Prime species are sheefish and chinook salmon. Local guides and guides from the Bristol Bay area service the area. Both local and nonlocal anglers participate (ibid.).

Guide operations have been noted on the Andreafsky, Innoko, and Anvik rivers (Alt 1981b, 1980, 1983; this includes fly-in float trips by sport anglers on the Andreafsky and Innoko rivers (ibid.).

Most sportfishing effort on the south slope of the Brooks Range (South Slope Brooks Range Postal Survey Area) takes place in lakes and streams accessible from the Dalton Highway (Haul Road), near the mouths of Yukon River tributaries, and at remote lakes and streams that are accessible by boat or small plane (ADF&G 1986). Limited access to the South Slope Brooks Range area is probably the most important factor limiting sportfishing in the area. Few people have the means necessary to reach the sportfishing areas (ibid.).

Guided fishing trips are available in the Minto flats area near Fairbanks. Access to the area is by boat, float plane, or road (Cheney 1971). Another guide service that has been noted in the Tanana drainage-Fairbanks area is a boat charter service on the Salcha River. Fishing guide service is available in Tok for the Tetlin National Wildlife Refuge, but demand for these services is low (USFWS 1985b). Sportfishing in the refuge takes place primarily in road-accessible lakes and streams or fly-in lakes (ibid.).

Boats are an important means of access for sport anglers in the Fairbanks area. A popular float fishing trip for canoeists and kayakers is on the Delta Clearwater River (Ridder 1982). Air boats and boats with jet units are used for upstream access on the Delta River-Tangle Lakes-Tangle River system. The BLM estimated in 1982 that nearly 2,200 user-days were expended floating the Delta River. Approximately 120 user-days were also expended on the Delta River by people using motorized boats to go upriver from mile 212 (USDI 1975-1982). The average length of a float trip is about three days (USDI 1975-1982, Peckham 1984).

V. SPORTFISHING IN THE ARCTIC REGION

The Arctic Region accounted for less than 3% of the total sportfishing effort in Alaska from 1977 to 1983 (Mills 1984). Despite the low figures in comparison to other regions of the state, sportfishing is an important activity in the Arctic Region for residents and visitors alike. During the period 1977 to 1983, total estimated sportfishing

effort in the region increased 122%, from 13,749 angler-days in 1977 to 30,526 angler-days in 1983 (table 22, fig. 8).

It is important to emphasize that sport harvest estimates from the statewide postal survey for fisheries that attract relatively few anglers may not be accurate when compared to total statewide effort. This is true for many fisheries within the Arctic Region that may be important within the region but attract only a small percentage of total statewide sportfishing effort. In 1983, for instance, no fishing location in the arctic had more than 50 respondents in the statewide harvest survey, and many had less than 10 (Mills 1984).

The Seward Peninsula-Norton Sound Area (Sportfish Postal Survey Area W) regularly accounted for over half the sportfishing effort in the region. Effort there increased 116%, from 7,828 angler-days in 1977 to 16,944 in 1983. In both the Northwest and the North Slope-Brooks Range Postal survey areas, effort increased about 130% over the seven-year period.

Arctic grayling, arctic char, and pink salmon are the most important sportfish species in terms of numbers harvested in the Arctic Region. The char sport harvest increased from about 2,300 fish in 1977 to 15,600 fish in 1983, a 560% increase (table 23, fig. 9). The grayling sport harvest quadrupled, from 5,200 fish in 1977 to 21,700 in 1983. The region's pink salmon harvest in even-numbered years averaged 9,624 from 1978 to 1983. The odd-year harvest averaged 3,324 fish from 1977 to 1983.

The total harvest of the seven most important sport fish species in the Arctic Region was almost 52,000 fish in 1983, up more than 300% from the 12,500 caught in 1977 (table 23, fig. 9).

VI. SPORTFISHING IN THE SOUTHEAST REGION

Sportfishing is an integral part of the Southeast Alaska life style. Not only is it one of the most important recreational activities for residents of the region; it also attracts thousands of visitors annually (Sigman 1985).

There is a broad spectrum of participants who engage in sportfishing, from those who are primarily seeking recreation to those seeking fish for food (ibid.). Nearly 31,000 of the region's approximately 60,300 residents (51%, 1983 participation and population) engage in sportfishing, and participation has increased by about 10% annually. Angler-days in the Southeast Region increased from 225,000 in 1979 to 320,500 in 1983 (Mills 1984). Approximately 400,000 fish were harvested during 1983; the Southeast Region accounted for 16 to 21% of the annual statewide harvest from 1977 to 1983 (ibid.). Table 24

Table 22. Arctic Region Sportfishing Effort by Area*, 1977-83

Area	Angler-days						
	1977	1978	1979	1980	1981	1982	1983
Seward Peninsula - Norton Sound	7,828	8,379	8,725	7,968	10,879	13,198	16,944
Northwest	3,487	4,997	2,593	3,841	5,219	6,840	7,963
North Slope - Brooks Range	2,434	1,422	1,526	2,142	2,601	4,879	5,619
Total	13,749	14,798	12,844	13,951	18,699	24,917	30,526

Source: Mills 1984.

* Sport Fish Postal Survey Area.

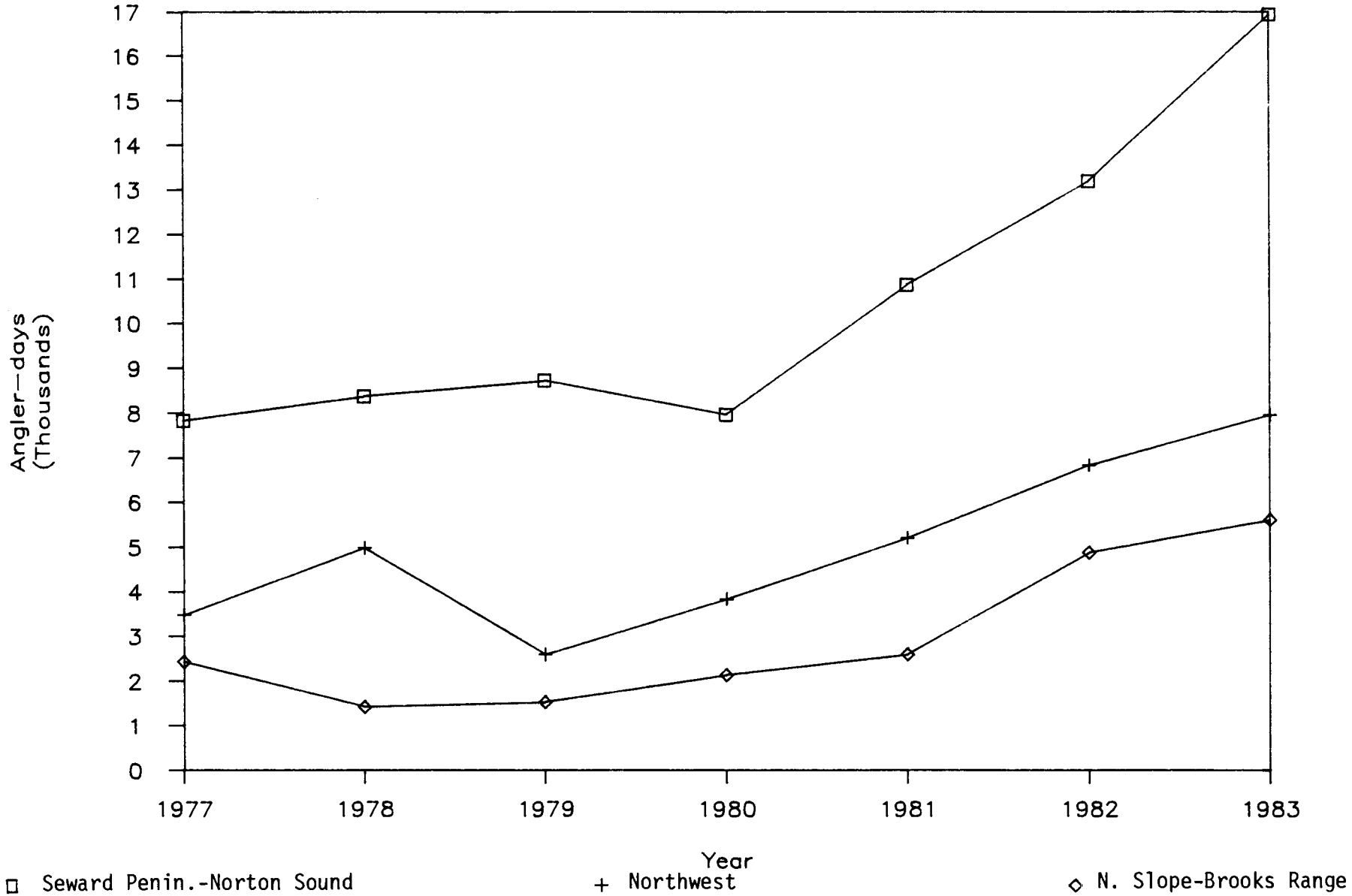


Figure 8. Arctic Region sportfishing effort by area (Mills 1984).

Table 23. Arctic Region Sport Fish Harvest,* 1977-83

Species	1977	1978	1979	1980	1981	1982	1983
Pink salmon	2,410	7,399	2,918	7,732	3,101	13,742	4,866
Coho salmon	449	742	2,421	1,455	1,504	2,986	3,823
Arctic char	2,342	2,070	6,290	6,973	6,508	10,272	15,605
Arctic grayling	5,285	6,236	11,763	11,269	14,339	18,544	21,705
Northern pike	664	1,248	1,204	1,851	1,751	1,178	2,190
Sheefish	795	578	836	1,747	1,587	2,389	2,265
Whitefish	555	137	436	1,421	209	2,314	1,516
Total	12,500	18,410	25,868	32,448	28,999	51,425	51,970

Source: Mills 1984.

* Selected species only.

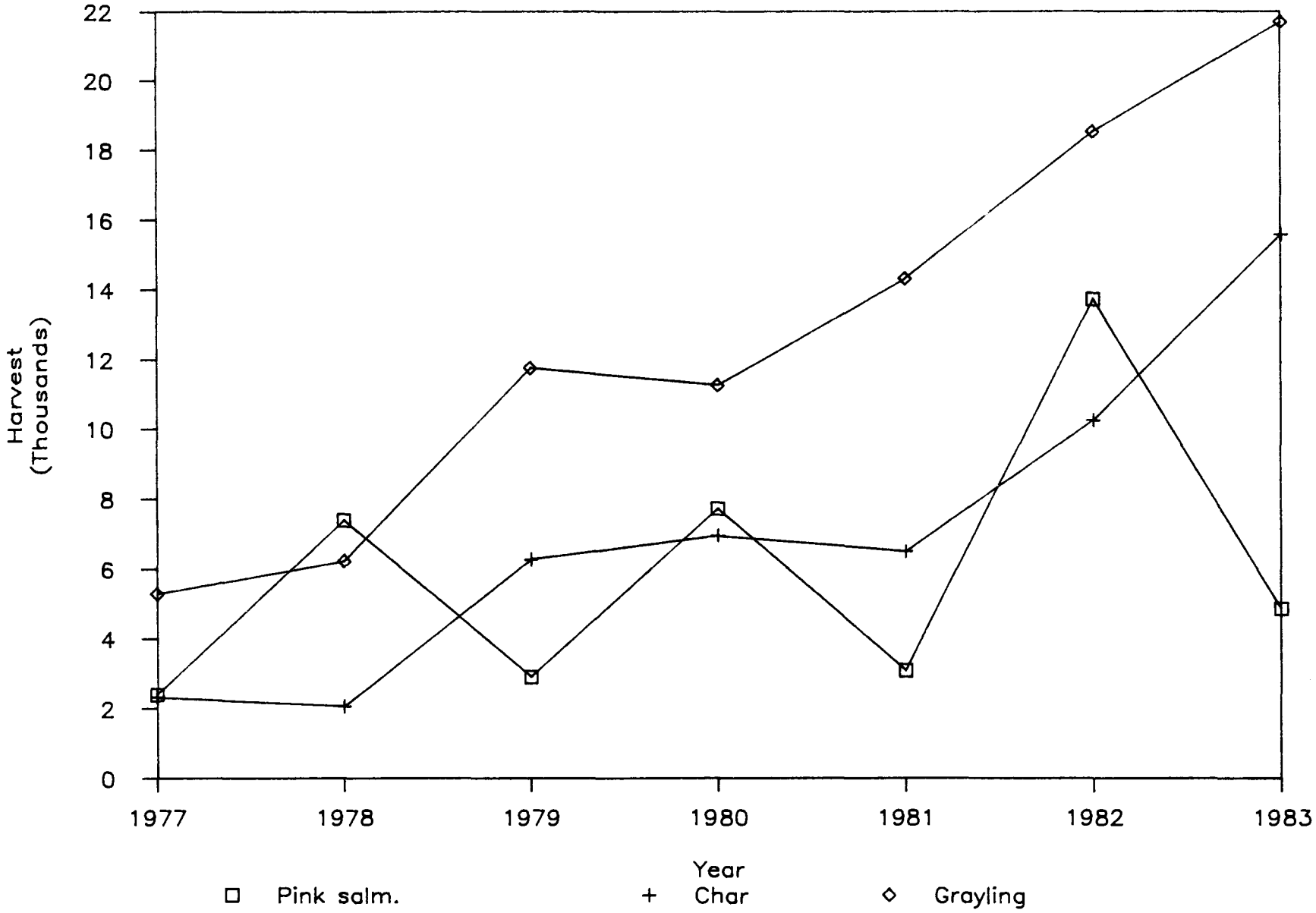


Figure 9. Arctic Region sport fish harvest of selected species (Mills 1984).

Table 24. Southeast Alaska Sport Fish Harvests by Species, 1977-83

Species	1977	1978	1979	1980	1981	1982	1983
Chinook salmon	17,449	16,639	16,581	20,213	21,300	25,756	22,321
Sea-run coho salmon	36,152	48,508	23,112	32,808	28,158	53,436	55,403
Landlocked coho/ chinook salmon	0	0	0	0	0	0	1,301
Sockeye salmon	5,803	5,890	3,479	4,175	3,173	4,146	5,701
Kokanee salmon	574	181	645	439	288	492	73
Pink salmon	34,031	43,006	31,351	34,561	33,717	53,581	51,815
Chum salmon	1,116	4,431	1,398	2,084	2,607	1,567	3,270
Steelhead	1,750	1,618	1,424	2,769	1,537	2,368	3,469
Rainbow trout	7,741	6,220	4,071	6,542	3,600	3,722	4,672
Cutthroat trout	23,377	23,188	19,345	24,433	16,436	22,816	18,605
Brook trout	759	1,691	672	2,273	861	818	1,606
Lake trout	0	0	0	0	0	0	0
Dolly Varden/ arctic char	34,734	34,919	31,405	44,175	33,398	37,524	49,752
Arctic grayling	775	669	281	129	49	482	947
Northern pike	0	0	0	0	0	0	0
Whitefish	0	0	118	551	0	524	31
Burbot	0	0	0	0	0	0	0
Sheefish	0	0	0	0	0	0	0
Smelt	55,034	14,431	80,006	20,306	1,468	1,531	62,708
Pacific halibut	4,832	6,131	13,102	24,862	21,842	37,160	41,995
Rockfish	8,962	16,886	30,981	41,791	45,671	51,602	50,268
Razor clam	10,309	9,576	13,393	8,606	8,597	4,684	8,791
Other fish	11,456	7,259	11,979	31,502	20,306	29,602	19,590
Total	255,854	241,243	283,343	302,219	243,008	331,811	402,318

Source: Mills 1984.

summarizes the regional sport fish harvest from 1977 through 1983. Table 25 shows angler-days of effort for the same years.

Two surveys of sportfishing participants have been completed in the Southeast Region; both of these contained questions regarding economic aspects of sportfishing. Another survey more specifically directed at the economic value of sportfishing in the Juneau area has been initiated and is scheduled to be completed in February 1987, with an interim draft report due November 1986. A portion of the results of the first two studies is presented in this section. For results of the ongoing study, contact the ADF&G, Division of Sport Fish.

A. Opinion Survey of Recreational Fishermen in Southeast Alaska

Residents of Ketchikan, Wrangell, Petersburg, Craig, Sitka, Juneau, and Haines were surveyed in early 1983 to determine angler patterns, preferences, and attitudes towards ADF&G fisheries management. A 25-question survey was prepared by the ADF&G public communications staff (see attachment C). During the first three months of 1983, a fisheries biologist from the Division of Sport Fish travelled to most of the communities and circulated the questionnaires at meetings of groups such as the Rotary, Chamber of Commerce, and sport associations and schools. Additionally, ADF&G staff randomly contacted households by telephone. The sample size of the telephone portion of the survey was the square root of the community size. There were a total of 921 completed and useable surveys (Schwan 1984). (See Attachment C for a sample of the survey.)

Responses to the survey questions were, for the most part, very similar throughout the region. Except where the results are for a community, they are reported for the Southeast Region as a whole (ibid.).

Approximately 89% of the households represented had at least one or more sport anglers. The average family size of respondents was 3.9 people, with an average of 2.6 anglers per family (ibid.).

Table 26 summarizes the answers, by percentage frequency, to six different questions regarding the the reasons why people sport fish. Three of the reasons for sportfishing that were indicated to be very important were recreational enjoyment (71.8%), chance to get outdoors (68.5%), and to spend time with family and friends (57.0%).

The survey results indicated that sport fisheries in Southeast Alaska are dominated by saltwater boat fishing which has also been documented in the Statewide Harvest Study (Schwan 1984). Table 27 lists results to the question regarding the type of water fished

Table 25. Number of Angler-days Fished in Southeast Alaska and Percentage of Statewide Harvest by Area, 1977-83

	1977		1978		1979		1980		1981		1982		1983	
Area Fished	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Southeast														
Ketchikan	55,740	4.7	42,972	3.3	43,024	3.2	54,357	3.7	59,575	4.2	72,812	4.5	68,141	3.9
Prince of Wales I.	12,043	1.0	16,478	1.3	14,086	1.0	20,200	1.4	20,200	1.4	21,838	1.3	28,896	1.6
Petersburg-Wrangell	27,212	2.3	25,741	2.0	23,406	1.7	26,503	1.8	27,460	1.9	30,409	1.9	27,754	1.6
Sitka	37,744	3.2	32,941	2.6	40,510	3.0	38,682	2.6	38,494	2.7	43,349	2.7	44,158	2.5
Juneau	92,379	7.7	81,830	6.4	85,035	6.2	90,095	6.1	77,362	5.8	93,842	5.8	108,173	6.1
Haines-Skagway	11,602	1.0	17,901	1.4	9,729	0.7	18,164	1.2	20,761	1.2	19,654	1.2	30,181	1.7
Glacier Bay	4,375	0.4	1,658	0.1	2,642	0.2	2,442	0.2	2,438	0.2	2,764	0.2	3,490	0.2
Yakutat	5,879	0.5	6,633	0.5	6,193	0.5	5,869	0.4	7,689	0.5	8,273	0.5	9,694	0.6
Total	246,974	20.6	226,154	17.6	224,625	16.5	256,312	17.2	254,555	17.7	292,941	18.1	320,487	18.5

Source: Mills 1984.

Table 26. Level of Importance of Reasons for Sportfishing

Reason	Very Important	Somewhat Important	Does Not Matter
A - Change to get outdoors	68.5%	24.0%	4.8%*
B - Get fish for food	32.7%	46.8%	17.2%
C - Recreational enjoyment	71.8%	23.2%	3.4%
D - Developing a skill	24.3%	45.9%	25.2%
E - Friendly competition	12.8%	35.8%	46.4%
F - Spend time with friends and family	57.0%	31.6%	8.7%

Source: Schwan 1984.

* Percentages across a row will not add to 100% because some respondents did not answer the question.

Table 27. Mean Percentage of Angling Trips by Type of Water Fished, 1982

Water	Community							
	Ketch.	Wrgl.	Psbg.	Sitka	Juneau	Haines	Klawock/ Craig	SE Total
Boat, marine	73.1%	80.7%	75.3%	77.0%	71.9%	37.9%	55.1%	71.3%
Roadside	14.0%	15.1%	17.7%	13.6%	15.2%	58.6%	30.9%	18.3%
Hike-in	5.7%	2.6%	4.0%	4.3%	8.5%	3.0%	13.9%	6.0%
Fly-in	7.0%	1.2%	3.1%	5.0%	3.7%	0.4%	0.1%	4.0%

Source: Schwan 1984.

by the surveyed community. Approximately 90% of the sportfishing effort by respondents occurs in local waters, and 10% occurs in more remote sites, such as fly-in or hike-in locations. Respondents from Haines, Klawock, and Craig indicated a much greater use of roadside angling opportunities than in other areas sampled. This is probably due to the more extensive road systems or reduced marine-boat angling opportunities (ibid.).

The number of fishing trips taken by some anglers was quite high. More than half of the respondents take 11 or more angling trips during May through September; of these anglers, over 50% take more than 20 or 30 angling trips during the summer season (table 28). Unquestionably, sportfishing is a major recreational activity for most Southeast Alaska residents; anglers annually spend considerable sums of money on this recreation (table 29).

In the survey, anglers were also asked about what characteristics make a high-quality sportfishing experience. The factor that most anglers responded to as being "very important" was being in an uncrowded situation (70.8%). The second and third ranked "very important" factors were being in a wilderness setting (44.8%) and catching lots of fish (44.4%) (table 30).

(For more information on this survey or sportfishing in the Southeast Region, see Schwan 1984.)

B. Forest Service Cabin Use: A Survey of Eight Cabins in the Ketchikan Area

The ADF&G, under contract with the Alaska Region of the U.S. Forest Service, conducted a survey of visitors to eight U.S. Forest Service cabins in the Ketchikan area. A questionnaire was mailed to all individuals who obtained a cabin reservation during the period October 1, 1983, through September 30, 1984, for any one of the following U.S. Forest Service cabins: 1) the six Naha River system cabins (Heckman, Patching, Jordan, Fisheries, Naha, and Portage) and 2) the two cabins at Wilson Lake (Wilson View and Wilson Narrows). Multiple mailings of the questionnaire were sent to individuals who failed to return their questionnaires (Sanders 1986).

The survey population included 144 unique addresses. A total of 97 questionnaires (67.4%) were returned. Eighteen respondents (18.6%) indicated that that they did not use their reservation, and 79 (81.6%) did. The survey asked 27 questions regarding the costs associated with U.S. Forest Service cabin use, user demographics, user expectations, and the degree of satisfaction with their experience at a U.S. Forest Service cabin, plus

Table 28. The Number of Sportfishing Trips Made in 1982

	0-5	6-10	11-20	21-30	Over 30
January - April	70.3%	10.3%	4.5%	1.1%	0.7%*
May - September	23.2%	22.5%	24.0%	12.2%	15.1%
October - December	68.0%	11.5%	4.6%	1.1%	1.3%

Source: Schwan 1984.

* Percentage of responses are corrected for nonanglers. However, percentages across each row will not add up to 100% because some people did not answer the question.

Table 29. Dollars Spent by Anglers per Season for Fishing-Related Activities and Equipment

Dollars Spent	% Anglers Responding
0-50	13.9%
50-100	14.0%
100-500	26.8%
500-1,000	16.6%
1,000-5,000	17.5%
Over 5,000	4.8%
No response	6.5%

Source: Schwan 1984.

Table 30. Responses Concerning What Makes for a Quality Sportfishing Experience

Character	Very Important	Somewhat Important	Does Not Matter	No Response
Uncrowded	70.8%	18.3%	4.6%	6.3%
Wilderness setting	44.8%	31.1%	17.9%	6.2%
Lots of fish	44.4%	35.4%	12.9%	7.3%
Remote from urban area	35.8%	36.3%	19.8%	8.1%
Not too costly	30.8%	45.5%	15.6%	8.1%
Close to home	24.3%	40.9%	28.6%	6.2%
Variety of species	22.3%	42.2%	27.3%	8.2%
Trophy fish	18.8%	31.8%	40.2%	9.2%

Source: Schwan 1984.

information regarding their fishing harvest and effort. Most data are presented for resident and nonresident users (ibid.).

Table 31 presents the total number of trips, the total number of days, and the mean number of days per trip spent at each of the eight USFS cabins surveyed. Nonresidents, on average, spent 5.6 days, whereas residents spent 2.5 days per trip at cabins. The average party size of Alaska residents and nonresidents was 2.7 and 3.5 people, respectively (table 32). Because nonresidents had a larger average party size and more days per trip, nonresidents accounted for 666 cabin-use days (58.8%), whereas residents accounted for 466 cabin-use days (41.2%) (Sanders 1986).

Ninety-one percent of the Alaska residents travelled less than 100 mi to reach their cabin destination; 69% of the nonresidents travelled over 1,000 mi (fig. 10). Alaska residents using USFS cabins tended to be younger than nonresidents; 69% of the Alaska residents were 35 years old or younger versus 42% for nonresidents (Sanders 1986).

The mean gross annual income for Alaska residents was in the $30,000 to $39,999 category; the nonresident mean gross income was in the $40,000 to $49,999 category (table 33, fig. 11).

Fishing was the primary consideration in selecting a USFS cabin for 88% of the nonresidents and 59% of the Alaska residents (Sanders 1986). Tables 35 and 36 present the expenditure results of the survey. Three sets of values are indicated based on the primary residency of a given party. An additional category (I) shows the combined results of nonresident and resident parties.

In the ranking of characteristics important in choosing which USFS cabin to use, "getting away (solitude)" was most frequently listed as "high" by both residents and nonresidents (77% of the total sample) (table 34). Nonresidents rated "abundance of fish present" as the second most important characteristic, whereas Alaska residents selected "aesthetic setting (scenery)" as the second most important feature (table 34).

The average Alaska resident respondent's party spent $248 per trip for transportation to and from their permanent residence(s) and the USFS cabin, plus an additional $350 associated with activities while at the cabin site, for a total expenditure of $598. Thus, the average Alaska resident spent approximately $221.50 for his/her share of the cost of visiting one of the surveyed cabins ($598/party divided by 2.7 people/party). This information is presented in tables 35 and 36; values in table 36, number II.e. have been adjusted to more accurately reflect a trip portion of the capital expense (Sanders 1986).

Table 31. Number of Trips, Number of Days, and Mean Number of Days per Trip at Each USFS Cabin Surveyed (Responses to Question No. 1*)

Cabin Name	Total No. of Trips	Total No. of Days	Mean Days/Trip
I. Alaska Resident and Nonresident Responses Combined			
Patching Lake	8	33	4.1
Jordan Lake	14	42	3.0
Fisheries	5	25	5.0
Naha River	31	92	3.0
Heckman Lake	24	100	4.2
Portage	0	0	0.0
Wilson View	12	42	3.5
Wilson Narrows	9	30	3.3
	103	364	3.5
II. Alaska Resident Responses Only			
Patching Lake	7	28	4.0
Jordan Lake	11	23	2.1
Fisheries	3	6	2.0
Naha River	22	42	1.9
Heckman Lake	11	27	2.5
Portage	0	0	0.0
Wilson View	11	36	3.3
Wilson Narrows	4	12	3.0
	69	174	2.5
III. Nonresident Responses Only			
Patching Lake	1	5	5.0
Jordan Lake	3	19	6.3
Fisheries	2	19	9.5
Naha River	9	50	5.6
Heckman Lake	13	73	5.6
Portage	0	0	0.0
Wilson View	1	6	6.0
Wilson Narrows	5	18	3.6
	34	190	5.6

Source: Sanders 1986.

* During the October 1983 through September 1984 period did you stay at any of the U.S. Forest Service (USFS) cabins in Southeast Alaska listed below? If your answer is "NO," check the appropriate space and return the survey in the envelope provided.

Table 32. Number of Alaska Residents and Nonresidents per Trip, by Residency Status of the Person Reserving the USFS Cabin (Responses to Question No. 7*)

Number in Party	Residents per Response Frequency	(%)	Nonresidents per Response Frequency	(%)
I. Alaska Resident Respondents Only				
1	6	(13)	10	(56)
2	18	(40)	6	(33)
3	6	(14)	0	(0)
4	13	(29)	2	(11)
5	2	(4)	0	(0)
No. of people =	122		30	
No. of trips =	45		18	
Average no. of people/trip =	2.7		1.7	
II. Nonresident Respondents Only				
1	1	(33)	1	(3)
2	1	(33)	7	(23)
3	0	(0)	9	(29)
4	0	(0)	10	(32)
5	1	(33)	3	(10)
10	0	(0)	1	(3)
No. of people =	8		107	
No. of trips =	3		31	
Average no. of people/trip =	2.7		3.5	

Source: Sanders 1986.

* On a typical trip to a USFS cabin, how many residents and nonresidents were in your party?

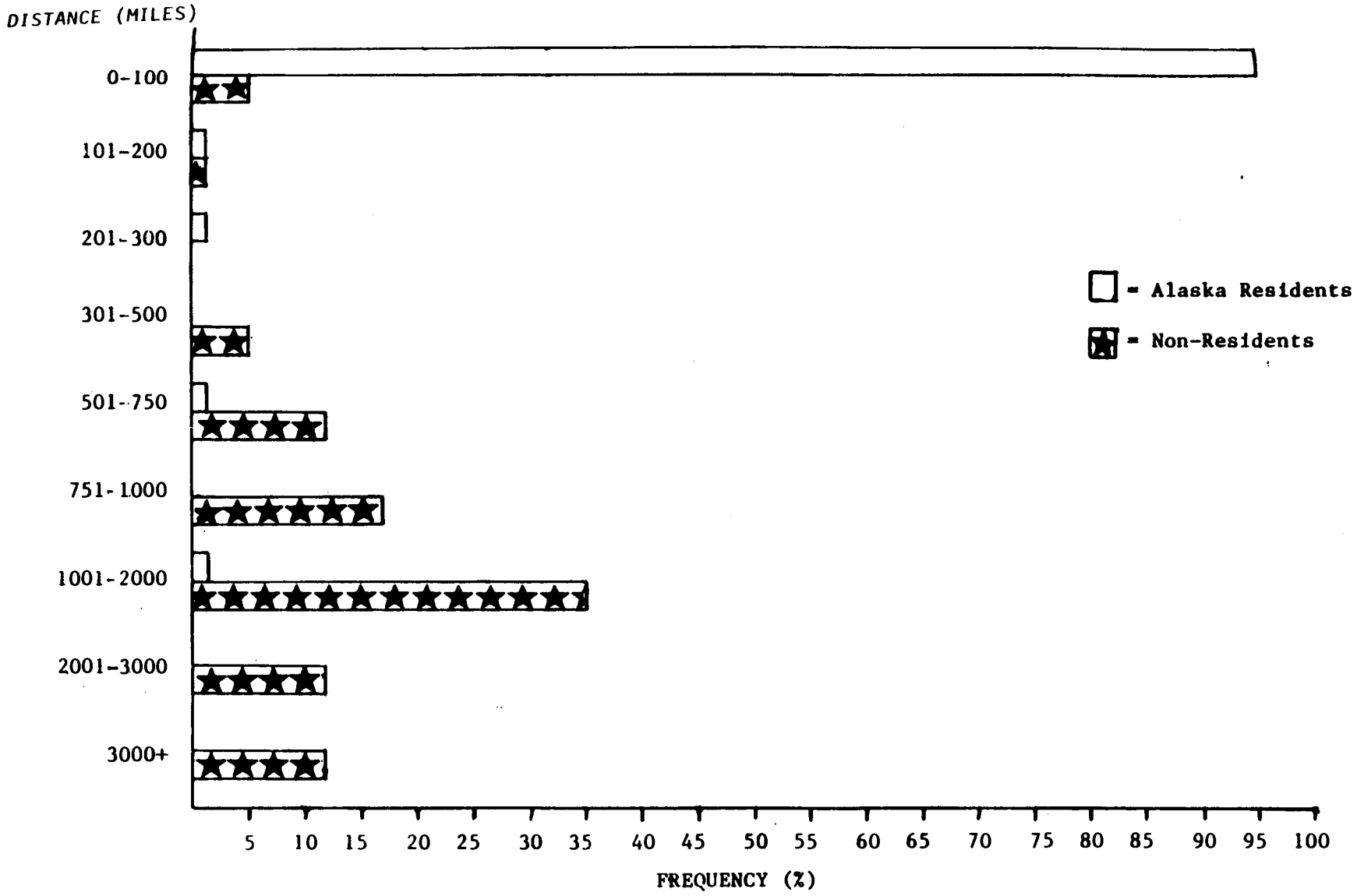


Figure 10. Frequency distribution of the distance travelled, Alaska residents versus nonresidents (Sanders 1986).

Table 33. Frequency Distribution of the Annual Gross Household Income of Surveyed USFS Cabin Users, by Residency Status (Responses to Question No. 9*)

Income Bracket	Responses n**	Responses (%)
I. Alaska Resident and Nonresident Responses Combined		
Under $5,000	0	(0)
$ 5,000 - 9,999	1	(1)
$10,000 - 14,999	0	(0)
$15,000 - 19,999	2	(3)
$20,000 - 24,999	6	(8)
$25,000 - 29,999	8	(11)
$30,000 - 39,999	14	(19)
$40,000 - 49,999	22	(29)
$50,000 - 59,999	9	(12)
$60,000 - 100,000	10	(13)
Over $100,000	3	(4)
II. Alaska Resident Responses Only		
Under $5,000	0	(0)
$ 5,000 - 9,999	1	(2)
$10,000 - 14,999	0	(0)
$15,000 - 19,999	1	(2)
$20,000 - 24,999	4	(10)
$25,000 - 29,999	5	(12)
$30,000 - 39,999	11	(27)
$40,000 - 49,999	8	(20)
$50,000 - 59,999	4	(10)
$60,000 - 100,000	5	(12)
Over $100,000	2	(5)
III. Nonresident Responses Only		
Under $5,000	0	(0)
$ 5,000 - 9,999	0	(0)
$10,000 - 14,999	0	(0)
$15,000 - 19,999	1	(3)
$20,000 - 24,999	2	(6)
$25,000 - 29,999	3	(9)
$30,000 - 39,999	3	(9)
$40,000 - 49,999	13	(40)
$50,000 - 59,999	5	(15)
$60,000 - 100,000	5	(15)
Over $100,000	1	(3)

Source: Sanders 1986.

* Which of the following categories most closely described the combined yearly gross income (before taxes) of all members of your household in 1984?

** The sample size (n) for "Alaska resident responses only" added to the sample size for "nonresident responses only" does not always equal the sample size for "Alaska resident and nonresident responses combined" because not all respondents indicated whether they were an Alaska resident or a nonresident.

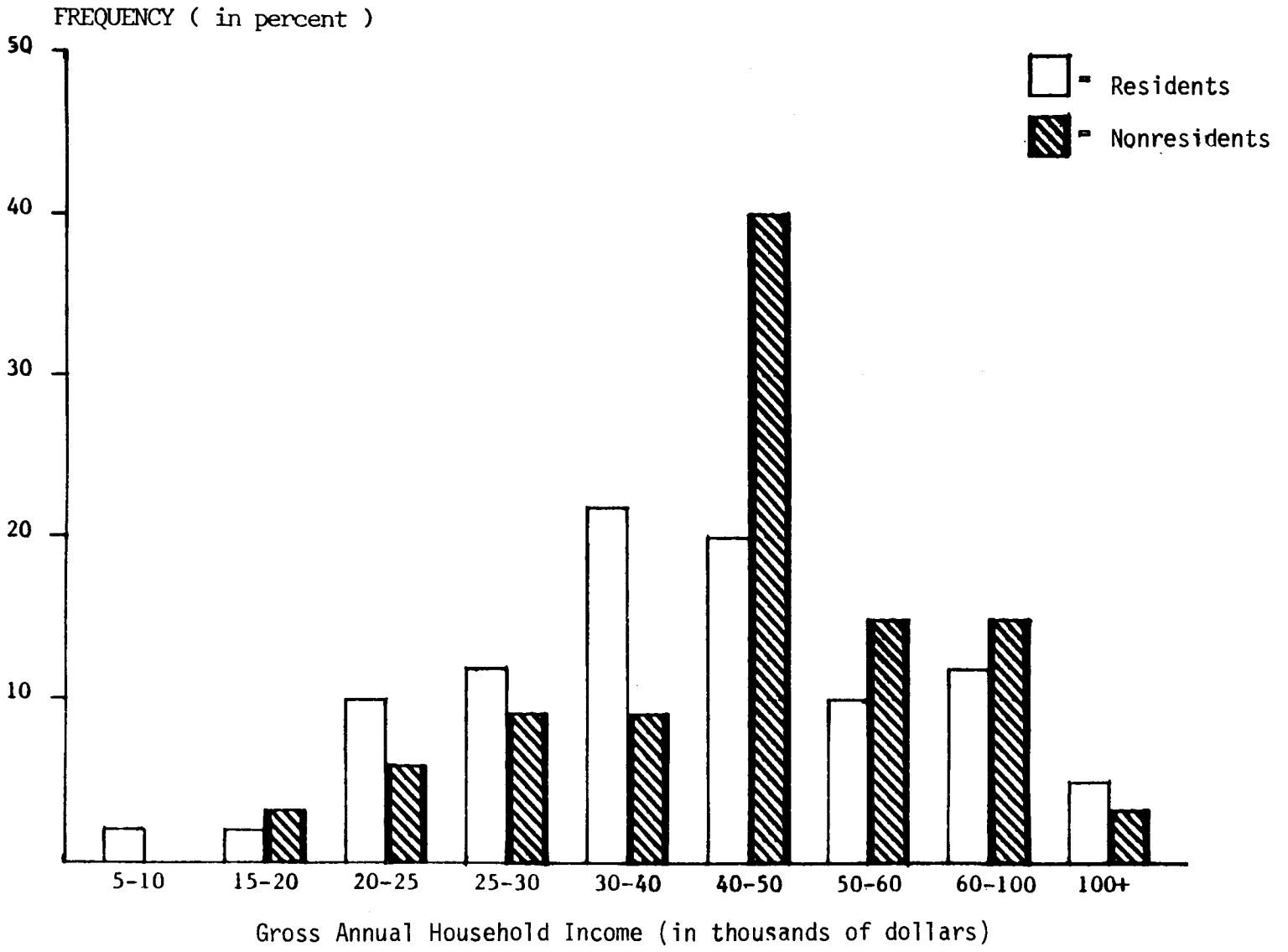


Figure 11. Resident and nonresident gross household annual income (responses to question no. 9) (Sanders 1986).

Table 34. Ranking of Characteristics Important in Deciding Which USFS Cabin to Reserve, by Residency Status (Responses to Question No. 10*)

Characteristic	Low n**	Low (%)	Medium n**	Medium (%)	High n**	High (%)
I. Alaska Resident and Nonresident Responses Combined						
a. Number of fish species present	22	(30)	19	(26)	33	(44)
b. Abundance of fish present	10	(13)	19	(25)	46	(62)
c. Wilderness status	11	(14)	22	(29)	43	(57)
d. Aesthetic setting (scenery)	8	(10)	22	(29)	47	(61)
e. Getting away (solitude)	5	(6)	13	(17)	59	(77)
f. Cabin availability (ease/reserving)	15	(20)	30	(39)	31	(41)
g. Cabin accessibility (distance/cost)	21	(28)	31	(41)	24	(31)
II. Alaska Resident Responses Only						
a. Number of fish species present	15	(38)	12	(30)	13	(32)
b. Abundance of fish present	6	(15)	14	(34)	21	(51)
c. Wilderness status	8	(19)	11	(26)	23	(55)
d. Aesthetic setting (scenery)	2	(5)	11	(26)	29	(69)
e. Getting away (solitude)	2	(5)	8	(19)	33	(76)
f. Cabin availability (ease/reserving)	8	(19)	16	(37)	19	(44)
g. Cabin accessibility (distance/cost)	11	(26)	14	(33)	18	(41)
III. Nonresident Responses Only						
a. Number of fish species present	6	(18)	7	(21)	20	(61)
b. Abundance of fish present	4	(12)	5	(15)	24	(73)
c. Wilderness status	3	(9)	11	(33)	19	(58)
d. Aesthetic setting (scenery)	5	(15)	11	(33)	17	(52)
e. Getting away (solitude)	3	(9)	5	(15)	25	(76)
f. Cabin availability (ease/reserving)	7	(22)	13	(41)	12	(37)
g. Cabin accessibility (distance/cost)	10	(31)	16	(50)	6	(19)

Source: Sanders 1986.

* Please indicate the importance of the following characteristics on your choice of the USFS cabinslisted in question 1. that you visited by placing one check to the right of each characteristic. "Low" indicates it was of minor importance in cabin selection.

** The sample size (n) for "Alaska resident responses only" added to the sample size for "nonresident responses only" does not always equal the sample size for "Alaska residents and nonresident responses combined" because not all respondents indicated whether they were an Alaska resident or a nonresident.

Table 35. Mean Value Spent by Expenditure Category and Average Respondent's Total Expenditure While Traveling to and from USFS Cabin(s), by Residency Status (Responses to Question No. 15, Part A*)

Expense Category	Res. Costs Total	Res. Costs Mean	n	Nonres. Costs Total	Nonres. Costs Mean	n	Res./Nonres. Total	Res./Nonres. Mean	n
I. Alaska Resident and Nonresident Party Responses Combined									
a. Gas and oil for car	155	9	17	1,265	115	11	1,420	51	28
b. Private plance costs	380	190	2	3,555	508	7	3,935	437	9
c. Commercial air charter	4,980	996	5	37,329	910	41	42,309	920	46
d. Air charter costs	5,702	259	22	11,450	409	28	17,152	343	50
e. Ferry costs	308	154	2	1,751	80	22	2,059	86	24
f. Railroad costs	---	---	---	230	77	3	230	77	3
g. Parking and lodging fees	635	64	10	5,285	220	24	5,920	174	34
h. Food and drink consumed	2,785	103	27	5,728	159	36	8,513	135	63
Total	$14,945			$66,593					
Avg. respondents expenditures**		$340	44**		$1,417	47**			
II. Alaska Resident Party Responses Only									
a. Gas and oil for car	150	9	16	175	88	2	325	18	18
b. Private plance costs	380	190	2	0	---	---	380	190	2
c. Commercial air charter	2,100	700	3	5,755	443	13	7,855	491	16
d. Air charter costs	4,382	231	19	470	118	4	4,852	211	23
e. Ferry costs	300	300	1	260	130	2	560	187	3
f. Railroad costs	---	---	---	200	100	2	200	100	2
g. Parking and lodging fees	295	37	8	580	290	2	875	88	10
h. Food and drink consumed	2,545	102	25	1,255	139	9	3,800	112	34
Total	$10,152			$8,695					
Avg. respondents expenditures**		$248	41**		$580	15**			
III. Nonresident Party Responses Only									
a. Gas and oil for car	---	---	---	1,090	121	9	1,090	121	9
b. Private plance costs	---	---	---	3,555	508	7	3,555	508	7
c. Commercial air charter	2,800	1,440	2	31,574	1,128	28	34,454	7,148	30
d. Air charter costs	820	410	2	10,980	458	24	11,800	454	26
e. Ferry costs	8	8	1	1,491	75	20	1,499	71	21
f. Railroad costs	---	---	---	30	30	1	30	30	1
g. Parking and lodging fees	340	170	2	4,705	214	22	5,045	210	24
h. Food and drink consumed	240	120	2	4,473	166	27	4,713	163	29
Total	$4,288			$57,989					
Avg. respondents expenditures**		$2,144	2**		$1,809	32**			

Source: Sanders 1986.

--- means no data were available.

* A. While traveling to and from the USFS cabin(s) (from your permanent residence): Please estimate the total money spent for the following items by the residents and nonresidents in your party on all trips to those USFS cabins listed in question 1. of this survey. If you spent no money on some items, please put a zero for those answers.

** The "n" value used to calculate average respondent's expenditure is based on the number of surveys with at least one expeniture.

Table 36. Mean Value Spent by Expenditure Catagory and Average Respondent's Total Expenditure While Using o Preparing to Use USFS Cabin(s), by Party or Individual Residency Status (Responses to Question No. Part B*)

Expense Category	Res. Costs Total	Mean	n	Nonres. Costs Total	Mean	n	Res./Nonres. Total	Mean	n
I. Alaska Resident and Nonresident Party Responses Combined									
a. Guide service	---	---	---	10	10	1	10	10	1
b. Boat rentals	10	10	1	260	87	3	270	68	4
c. Gas and oil for boat	1,409	40	35	365	41	9	1,774	40	44
d. Fishing gear	3,619	106	34	5,524	145	38	9,143	127	72
e. Boat, motor, etc.	49,550	4,129	12	395	79	5	49,945	2,938	17
f. Special clothing	2,360	131	18	3,975	137	29	6,335	135	47
g. Camping equipment	4,740	198	24	3,665	147	25	8,405	172	49
h. Food and drink	3,770	92	41	5,133	139	37	8,903	114	78
Total	$65,458			$19,327					
Avg. respondent's expenditures**	$1,393	47**		$420	46**				
II. Alaska Resident Party Responses Only									
a. Guide service	---	---	---	---	---	---	---	---	---
b. Boat rentals	10	10	1	---	---				
c. Gas and oil for boat	1,404	41	34	225	113	2	1,629	45	36
d. Fishing gear	3,499	109	32	1,075	98	11	4,574	106	43
e. Boat, motor, etc.	49,550	4,129	12	---	---	---	49,550	4,129	12
f. Special clothing	2,360	131	18	770	128	6	3,130	130	24
g. Camping equipment	4,665	203	23	1,010	168	6	5,675	196	29
h. Food and drink	3,630	93	39	735	74	10	4,365	89	49
Total	$65,118			$3,815					
Avg. respondent's expenditures**	$1,447	45**		$254	15**				
III. Alaska Nonresident Party Responses Only									
a. Guide service	---	---	---	10	10	1	10	10	1
b. Boat rentals	---	---	---	260	87	3	260	87	3
c. Gas and oil for boat	---	---	---	140	20	7	140	20	7
d. Fishing gear	20	20	1	4,449	165	27	4,469	160	28
e. Boat, motor, etc.	---	---	---	395	79	5	395	79	5
f. Special clothing	---	---	---	3,205	139	23	3,205	139	23
g. Camping equipment	---	---	---	2,655	140	19	2,655	140	19
h. Food and drink	80	80	1	4,398	163	27	4,478	160	28
Total	$100			$15,512					
Avg. respondent's expenditures**	$100	1**		$500	31**				

Source: Sanders 1986.

* B. While using or preparing to use USFS cabin(s). Please estimate the total money spent for the following items by the residents and nonresidents in your party on all trips to those USFS cabins listed in question 1. of this survey. If you spent no money on some item, please put a zero for those answers.

** The "n" value used to calculate average respondent's expenditure is based on the number of surveys with at least one expenditure.

--- means no data were available.

The average nonresident respondent's party spent approximately $1,809 per trip while travelling to and from their permanent residence(s) and the USFS cabin. On average, however, only 75.2% of their time in Alaska was spent at a USFS cabin. Therefore, their portion of their overall travel cost attributed to visiting the cabin is $1,360 ($1,809 x 75.2%). An additional $500 was spent on costs associated with using the cabin, for a total expenditure of approximately $1,860. Therefore, the average nonresident spent approximately $531 for his/her share of the cost to visit one of the surveyed cabins ($1,860/party divided by 3.5 people/party) (tables 35 and 36).

The average cost per recreational-day was approximately $89 for Alaska residents and $95 for nonresidents (mean cost/person divided by #days/trip) (Sanders 1986). This statistic, however, is very limited and should be used with caution. It is applicable to this set of cabins for the time period covered and should not be used to estimate user-day expenditure values for other unsampled sites. This figure would undoubtedly change considerably with the type of access and distance from population centers for individual cabins in the Southeast Region. Data on average user costs per day (which the U.S. Forest Service frequently uses in models in the continental U.S.) are much more reliable under the assumptions of other geographical areas where extensive road systems exist. If a wide variety of USFS cabins were sampled, a model could be generated that would more accurately estimate user expenditures based on type of access and distance travelled as well as on the other expense categories sampled in the survey. This would be considerably more reliable than using a simple figure. It is also very important to note that expenditures do not equal value, or user net benefits. (For more information regarding economic methodologies, see the Statewide Overview section.)

(See Attachment D for a copy of the survey of U.S. Forest Service cabin use.)

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Attachment A. ADF&G Sport Fish Guide and Air Charter Operator Survey

STATE OF ALASKA

BILL SHEFFIELD, GOVERNOR

DEPARTMENT OF FISH AND GAME

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99502

Sport Fish Division
December 6, 1988

TO: Kodiak Sport Fishing Guides and Air Charter Operators

Changing land ownership and accelerating resource development activities in the Kodiak/Aleutian Islands area are ever-increasing threats to fish and wildlife habitat, fishery resources and user opportunities. The sport fishing industry, of which sport fish guiding and air charter operations are an important part, has not had a significant influence in land use planning due to the lack of data on the magnitude of the industry. This survey is designed to help the Alaska Department of Fish and Game obtain the best possible information necessary to determine the economic value of the sport-fishery resource in the Kodiak Island area and Aleutian Island area south of Unimak Island. In the fall of 1984 an indepth survey is planned to determine the overall economic value of the sport fishing industry. The information collected will aid the Department in accurately portraying the importance of sport fishing to your region in land and water management planning processes in the future.

This questionnaire is a means by which you can participate in decisions concerning the Kodiak/Aleutian Islands area fishery resources. We need your input. Please take a few minutes to answer the important questions which are attached to this letter and return the form in the enclosed pre addressed, prepaid envelope or mail to:

Keith Webster
Fishery Biologist
Alaska Department of Fish and Game
Sport Fish Division
333 Raspberry Road
Anchorage, Alaska 99502
(907) 344-0541

Please return this questionnaire by January 3, 1984. The identity of those returning the questionnaire will remain anonymous. Be assured that your responses will be considered confidential. Thank you for your cooperation.

SURVEY OF SPORT FISHING GUIDES AND AIR CHARTER OPERATORS DEPENDENT UPON THE SPORT FISHERY OF THE KODIAK/ALEUTIAN ISLANDS AREA

1. Please check the following services which you provide:

_____ Lodging with daily air transportation and guide service.

_____ Lodging with daily boat transportation and guide service.

_____ Guided air charter fishing trips.

_____ Guided float fishing trips.

_____ "Drop off" air charter service.

2. Between what dates do you annually provide services to sport fishermen?

Dates _____

3. How many clients did you have in each of the following years?

1982 _____ 1981 _____ 1980 _____ 1979 _____ 1978 _____

4. How many angler days did your business provide services for in each of following years? [An angler day is equal to one person fishing any portion of a day.]

1982 _____ 1981 _____ 1980 _____ 1979 _____ 1978 _____

5. Please check the appropriate box to indicate the gross income your business received from sport fishermen for the last five years:

Gross Income	1982	1981	1980	1979	1978
$999 or Less					
1,000 - 9,999					
10,000 - 24,999					
25,000 - 49,999					
50,000 - 99,999					
100,000 - 249,999					
250,000 - 499,999					
500,000 - 749,999					
750,000 - 999,999					
1,000,000 or more					

6. How many people are earning an income from your business including your working family? _____

7. In your judgement, what percent of all your clients' total angler days were spent in each of the following waters? If you are unable to give a precise value, please estimate the percentage.

Percent(%) of total angler days (when added, should equal 100%).

Kodiak

Saltwater

_____ Boat

_____ Shoreline

Freshwater

_____ Karluk River, Lagoon

_____ Karluk Lake

_____ Other Streams (Please Specify)

_____ Other Lakes (Please Specify)

Aleutian Island Area (South of Unimak Island)

Saltwater

_____ Unalaska Area

_____ Adak Area

_____ Other Areas Boat

_____ Other Areas Shoreline

Freshwater

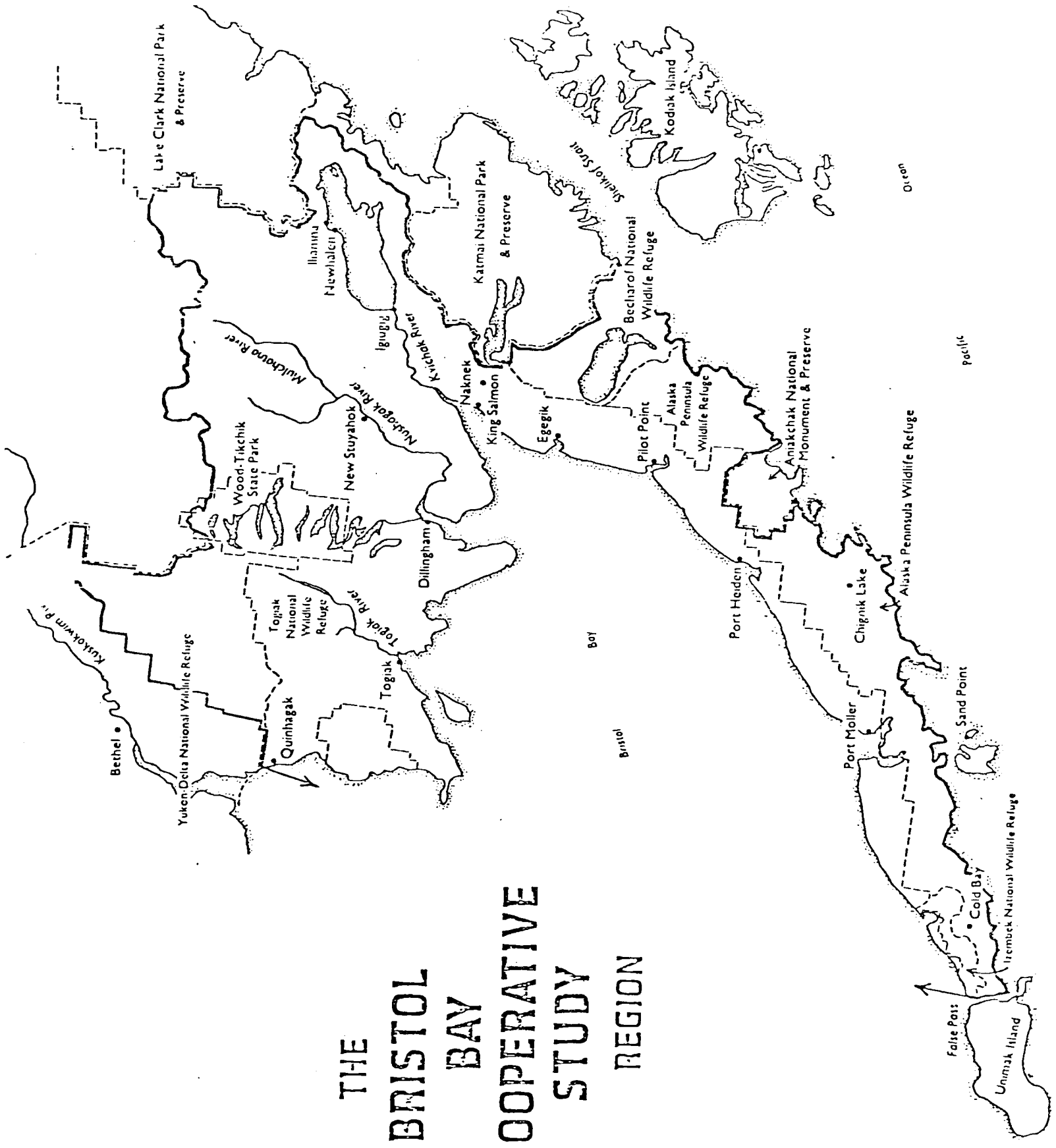
_____ Unalaska Area

_____ Adak Area

_____ Other Waters (Please Specify)

Thank you very much for your cooperation. Please return this questionnaire by January 3, 1984.

Attachment B. ADF&G Sport Fishing Guide and Air Charter Operator Survey



SURVEY OF SPORT FISHING GUIDES AND AIR CHARTER OPERATORS
DEPENDENT UPON THE SPORT FISHERY OF THE BRISTOL BAY - ALASKA
PENINSULA-KUSKOKWIM BAY AREA

1) Please check all of the following services which you provide.

Lodging_____ Daily air transportation_____

Tent camp_____ Daily boat transportation_____

Meals_____ Sport fishing guiding services_____

2) Between what dates do you annually provide services to sport fishermen?

Dates_____

3) How many adult (at least 16 years of age) Alaskan clients did you have in each of the following years?

1982_____1981_____1980_____1979_____1978_____.

4) How many adult non-resident clients did you have?

1982_____1981_____1980_____1979_____1978_____.

5) An angler day is equal to one person (adult or child, resident or non-resident) fishing any portion of a day. How many angler days did your business provide services for in each of the following years?

1982_____ 1981_____ 1980_____ 1979_____ 1978_____

6) Please check the appropriate box to indicate the gross income your business received from sport fishermen only for each of the last 5 years.

GROSS INCOME $	1982	1981	1980	1979	1978
100 - 999					
1,000 - 9,999					
10,000 - 24,999					
25,000 - 49,999					
50,000 - 99,999					
100,000 - 249,999					
250,000 - 499,999					
500,000 - 749,999					
750,000 - 999,999					
1,000,000 - 1,250,000					

7) What percent of your clients' total angler days were spent in each of the following drainage areas? If a rough estimate is impossible to determine, merely check those drainages in which your clients fished.

% of total angler days

_____Kanektok (Quinhagak) drainage

_____Goodnews drainage

_____Togiak drainage

_____Wood River drainage

_____Nushagak drainage (including Mulchatna and Nuyakuk)

_____Nuyakuk River - Tikchik Lakes

_____Mulchatna drainage

_____Kvichak drainage below Iliamna Lake

_____Alagnak (Branch) drainage

_____Iliamna Lake and its tributaries

_____Naknek drainage

_____Egegik drainage

_____Ugashik drainage

_____Alaska Peninsula south of Ugashik drainage

_____Other drainages that you want to specify by name

_____

_____

8) Does the level of fisherman use affect the value of sport fishing in Bristol Bay? Yes__No__. If so how? _____

_____

_____.

Would an increase in the current number of sport fishermen in the area cause a decline in the amount that individuals are willing to pay for a Bristol Bay fishing experience? Yes__No__.

9) Would most sport fishermen be content with a catch and release philosophy? Yes__No__. Are they concerned with the food value? Yes__No__. Trophy value? Yes__No__. Does this attitude differ between local residents, Anchorage-Kenai residents, and non-residents? Yes__No__. If so, how? _____

_____

_____.

10) Are you aware of any problems resulting from limited public access to sport fishing areas? Yes__No__. Will increased private ownership of land adjacent to the rivers, streams, and lakes of the Bristol Bay region lessen sport fishing opportunities in the near future? Yes__No__.

11) Does the current supply of lodges, guides, boat and air charter services satisfy the demand for these services in the Bristol Bay - Alaska Peninsula - Kuskokwim Bay areas? Yes__No__. Do you expect the demand to rise in the next 20 years? Yes__No__. What would you estimate the annual percent increase in demand will be over the next 20 years? _____.

Thank you very much for your cooperations. Please return this questionaire by November 15, 1982 to:

Lana Shea
Habitat Biologist
Alaska Department of Fish and Game
333 Raspberry Road
Anchorage, Alaska 99502
(907) 344-0541 ext. 329

Attachment C. ADF&G, Division Sport Fish, Region I, 1983, Survey

Southeast Sport Fishing Opportunity Survey

1. How many years have you lived in (name of community)?

( )Up to 5 years
( )5 to 10 years
( )10 to 15 years
( )16 to 20 years
( )More than 20

2. How many people are there in your family?( )

3. Of those, how many sport fish?( )

I'm going to read off several age groups. Please tell me how many of the anglers in your household are in each group.

( )under 16
( )16 - 30
( )31 - 60
( )Over 60

4. Did any buy a license last year and not fish? Yes( ) No( )

5. If they didn't fish, could you identify one or more of the following reasons why not?

( )Not interested
( )No access to a boat
( )No transportation to streams or shore
( )No place to fish
( )Fishing not good enough
( )Other_____

6. Is there anything you could suggest that would make you or your family interested in sport fishing?_____

_____

_____

(SKIP to questions 21-23 IF THERE ARE NO ANGLERS IN FAMILY)

(IF THERE ARE ANGLERS IN FAMILY, PROCEED...)

7. I'm going to list a number of reasons why people go sport fishing. In your opinion, would you say these reasons are--for you--very important, somewhat important, or don't matter?

	Very	Somewhat	Doesn't Matter
A. the chance to get outdoors	( )	( )	( )
B. getting fish for food	( )	( )	( )
C. recreational enjoyment of catching fish	( )	( )	( )
D. satifaction of developing a skill	( )	( )	( )

E. friendly competition with other anglers	( )	( )	( )
F. opportunity to spend time with family and friends	( )	( )	( )

8. When you go fishing, do you go to the following types of areas most often, occasionally, or least often:

	Most	Occasional	Least
A. marine/deep water	( )	( )	( )
B. lake	( )	( )	( )
C. stream	( )	( )	( )
D. off dock or breakwater	( )	( )	( )
E. from shoreline	( )	( )	( )

9. If you could have your preference, where would you go?

	Most	Occasional	Least
A. marine/deep water	( )	( )	( )
B. lake	( )	( )	( )
C. stream	( )	( )	( )
D. off dock or breakwater	( )	( )	( )
E. from shoreline	( )	( )	( )

10. In your best estimate, how many sport fishing trips did you make last year during the following three periods:

	0-5	6-10	11-20	21-30	Over 30
January to April	( )	( )	( )	( )	( )
May to September	( )	( )	( )	( )	( )
October to December	( )	( )	( )	( )	( )

11. Of the fishing trips you take, what percentage would you say were:

%( ) by boat?
%( ) to roadside streams and lakes?
%( ) remote, fly-in trips?
%( ) hike in

12. What species do you most often catch, with #1 being the most frequent and #15 being the least frequent?

( )King salmon	( )Grayling	( )Halibut
( )Coho salmon	( )Dolly Varden	( )Cod
( )Pink salmon	( )Cutthroat trout	( )Pollock
( )Chum salmon	( )Steelhead trout	( )Rockfish
( )Sockeye salmon	( )Rainbow trout	( )Other

13. If you could have your preference, which species would you most like to catch, with #1 your highest preference, and #15 your lowest?

( )King salmon	( )Grayling	( )Halibut
( )Coho salmon	( )Dolly Varden	( )Cod
( )Pink salmon	( )Cutthroat trout	( )Pollock
( )Chum salmon	( )Steelhead trout	( )Rockfish
( )Sockeye salmon	( )Rainbow trout	( )Other

14. Sportfishing can be very inexpensive, or can cost a lot. During the average season would you say you spend on boat payments and insurance, gear--new or replacement, gas, bait and so forth, from:

( ) $0 to 50?
( ) $50 to 100?
( ) $100 to 500?
( ) $500 to 1,000?
( ) $1,000 to 5,000?
( ) $5,000 or more?

15. I'm going to list a number of phrases used to describe a "quality" fishing experience. In your view, are these factors very important, somewhat important, or don't they matter?

	Very	Somewhat	Doesn't Matter
A. close to home	( )	( )	( )
B. remote from urban areas	( )	( )	( )
C. wilderness setting	( )	( )	( )
D. uncrowded	( )	( )	( )
E. trophy fish	( )	( )	( )
F. lots of fish	( )	( )	( )
G. variety of species	( )	( )	( )
H. not too costly	( )	( )	( )

16. To reach a location where you feel you could have a quality fishing experience, would you be willing to travel:

	½ hour	1 hour	longer
By car	( )	( )	( )
By boat	( )	( )	( )
By plane	( )	( )	( )
By hiking	( )	( )	( )

17. Would you approve, disapprove, or have no opinion about the following methods of enhancing sport fishing in your area?

	Approve	Disapprove	No Opinion
A. Hatcheries	( )	( )	( )
B. Stocking	( )	( )	( )
(If approve, which species?_____)			
C. Lake Fertilization	( )	( )	( )
D. Boat Landings	( )	( )	( )
E. Access trails	( )	( )	( )
F. Easement purchases	( )	( )	( )
G. Artificial reefs	( )	( )	( )
H. Other	( )	( )	( )

18. If the following species were raised in hatcheries for stocking in your area, would you approve, disapprove or have no opinion?

	Approve	Disapprove	No Opinion
A. king salmon	( )	( )	( )
B. coho salmon	( )	( )	( )
C. pink salmon	( )	( )	( )
D. chum salmon	( )	( )	( )
E. sockeye salmon	( )	( )	( )
F. dolly varden	( )	( )	( )
G. cutthroat trout	( )	( )	( )
H. steelhead trout	( )	( )	( )
I. grayling	( )	( )	( )

19. There are several methods and means not presently available to anglers in Southeastern. If the following methods were permitted, would you approve, disapprove, or have no opinion?

	Approve	Disapprove	No Opinion
A. Freshwater snagging	( )	( )	( )
B. Spearfishing(submerged)	( )	( )	( )
C. Spearfishing(non-submerged)	( )	( )	( )
D. Bow and arrow fishing	( )	( )	( )
E. Dipnetting	( )	( )	( )
F. Fly fishing only	( )	( )	( )

20. Could you name one thing you think the Department is doing to improve your sport fishing opportunities?

21. Could you name one thing you think the Department does that hurts sport fishing in your area?

22. If you could name one thing you would like to see the Department do to help sport fishing in your area, what would it be?

... Now just a few quick questions for classification purposes...

23. Is your age?

( )under 16
( )16-24
( )25-40
( )41-55
( )56 and over

24. Sex

( )Male
( )Female

25. Is your total household income?

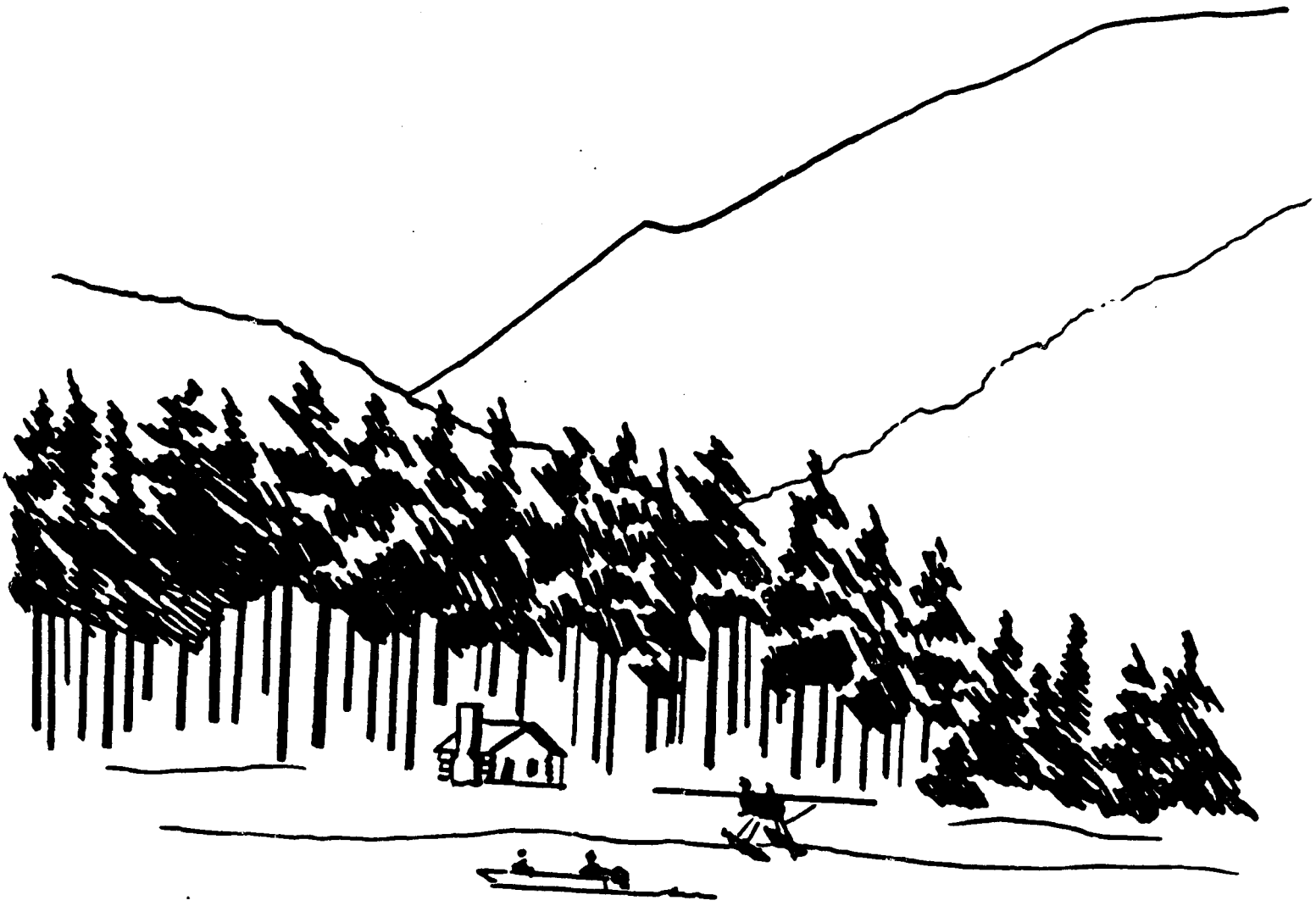
( )$0-20,000
( )$20-45,000
( )$45-60,000
( )Over $60,000

Thank you very much for your time and interest.

Attachment D. ADF&G, Division Sport Fish, Region I, 1984, Recreational Survey.

RECREATIONAL SURVEY

Alaska Department of Fish & Game



STATE OF ALASKA

BILL SHEFFIELD, GOVERNOR

DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

P.O. BOX 3-2000
JUNEAU, ALASKA 99802
PHONE: (907) 465-4100

Dear Forest Service Cabin User:

We missed hearing from you on our Recreational Survey on the use of specific U.S. Forest Service cabins in the Ketchikan area between October 1, 1983 and September 30, 1984. We really need your help.

You are one of a small number of people contacted, and your input is very important. Please take just a few minutes to help the Alaska Department of Fish and Game and the U.S. Forest Service to continue to provide enjoyable recreational opportunities in association with the cabin program by completing this questionnaire and returning it in the enclosed postage-paid envelope.

If you have returned your questionnaire, please disregard this letter and accept our sincere thanks.

Sincerely,

Don W. Collinsworth
Commissioner

11-K11LH

INSTRUCTIONS

1. All questions pertain to the October 1, 1983 to September 30, 1984 period and ONLY those U. S. Forest Service (USFS) cabins listed in the first question of the survey. Some questions may be difficult to answer, but please provide your best estimates for the information requested.

2. For this survey, RESIDENT shall mean any person whose permanent residence for the 12 months prior to cabin use was in the State of Alaska.

3. Some questions will ask only about YOU, while others ask about your HOUSEHOLD, or your PARTY.

4. Everyone living at your place of residence, including yourself, but NOT including visiting friends and relatives should be considered members of your HOUSEHOLD.

5. A PARTY will be the group of people, including yourself, who visited a USFS cabin on a trip. In some cases this will be your HOUSEHOLD, while on others it may be a group of friends or may include visiting relatives.

6. Some people may have visited only one cabin. For these people this one trip will be what is referred to in the survey as a TYPICAL trip. For those who visited several cabins or a single cabin several times, a TYPICAL trip should be thought of as an 'average' trip.

7. Please return your completed survey promptly in the postage paid envelope provided. Thank you for your time and cooperation.

1. During the October 1983 through September 1984 period did you stay at any of the U.S. Forest Service (USFS) cabins in Southeast Alaska listed below? If your answer is 'No', check the appropriate space and return the survey in the envelope provided.

1) No 18 2) Yes 79

If your answer is 'Yes', write the total number of trips and the total number of days spent at EACH cabin listed below.

Cabin Name	Total Number of of Trips	Total Number of of Days	Mean Days/Trip
a) Patching Lake	8	33	4.1
b) Jordon Lake	14	42	3.0
c) Fisheries	5	25	5.0
d) Naha River	31	92	3.0
e) Heckman Lake	24	100	4.2
f) Portage	0	0	0.0
g) Wilson View	12	42	3.5
h) Wilson Narrows	9	30	3.3

2. Are you a resident of Alaska?

1) No 33 2) Yes 46

If you checked 'YES' above, DO NOT complete the rest of this question, but instead continue with question 5. If you checked 'NO' above, how did you travel to Alaska? If you used more than one mode of transportation, please check the one that transported you the greatest distance.

	n (%)		n (%)
1) Private airplane	1 (3)	2) Private Boat	1 (3)
3) Commercial airplane	26 (84)	4) Motor vehicle	3 (10)
5) Ferry System		6) Railroad	
7) Other (specify)			

3. ALASKA RESIDENTS SHOULD SKIP THIS QUESTION. As a NON-RESIDENT of Alaska, what was the primary reason for your visit?

	n	(%)
1) Visit friends/relative	1	(3)
2) Tour the entire State		
3) Tour Southeast Alaska	2	(7)
4) Visit the National Forest	14	(45)
5) Other (specify) Employment	1	(3)
Fishing	12	(39)
Just get away	1	(3)

4. ALASKA RESIDENTS SHOULD SKIP THIS QUESTION. As a NON-RESIDENT, what percent (1-100%) of your stay in Alaska was spent using a USFS cabin?

75.2 %

5. Please check the space which best describes how, on a TYPICAL trip, YOU traveled to a USFS cabin. DO NOT check more than one mode of transportion.

	n	(%)
1) Private airplane.....	7	(9)
2) Chartered airplane....	49	(63)
3) Motor vehicle.....	1	(1)
4) Boat.....	21	(27)

6. On a TYPICAL trip what was the average distance traveled ONE-WAY by the RESIDENTS and NON-RESIDENTS in your party from their permanent residence to the USFS cabin? EXAMPLE: If 2 residents went to a cabin and one traveled 100 miles and the second 50 miles, the average distance would be 75 miles. Thus you would place a check in the space beside 51-100 miles under the Resident Miles column.

a) Resident Miles

	n	(%)
0) 0-50	35	(78)
1) 51-100	6	(13)
2) 101-150		
3) 151-200	1	(2)
4) 201-250		
5) 251-300	1	(2)
6) 301-500		
7) 501-750	1	(2)
8) 751-1,000		
9) over 1,000	1	(2)

b) Non-Resident Miles

	n	(%)
0) 0-100	2	(5)
1) 101-200	1	(2)
2) 201-300		
3) 301-500	2	(5)
4) 501-750	5	(12)
5) 751-1,000	7	(17)
6) 1,001-1,500	6	(14)
7) 1,501-2,000	9	(21)
8) 2,001-3,000	5	(12)
9) over 3,000	5	(12)

7. On a TYPICAL trip to a USFS cabin, how many RESIDENTS and NON-RESIDENTS were in your PARTY?

a) Number of residents.. 2.7 b) Number of non-residents.. 3.5

8. On a TYPICAL trip to a USFS cabin how many RESIDENTS and NON-RESIDENTS in your PARTY were in the following age groups?

Resident Age(s)	n	(%)	Non-Resident Age(s)	n	(%)
a) 0-15....	13	(11)	b) 0-15....	3	(10)
c) 16-25....	8	(7)	d) 16-25....	0	(0)
e) 26-35....	58	(51)	f) 26-35....	10	(32)
g) 36-45....	25	(22)	h) 36-45....	9	(29)
i) 46-55....	5	(4)	j) 46-55....	2	(6)
k) 56-75....	5	(4)	l) 56-75....	7	(23)
m) over 75..	1	(1)	n) over 75..	0	(0)

9. **Which of the following categories most closely describes the combined yearly gross income (before taxes) of all members of your HOUSEHOLD in 1984?**

	n (%)		n (%)
0) Under $5,000....	____	6) $30,000-39,999....	14 (19)
1) $5,000-9,999....	1 (1)	7) $40,000-49,999....	22 (29)
2) $10,000-14,999..	____	8) $50,000-59,999....	9 (12)
3) $15,000-19,999..	2 (3)	9) $60,000-100,000...	10 (13)
4) $20,000-24,999..	6 (8)	10) Over $100,000.....	3 (4)
5) $25,000-29,999..	8 (11)		

10. **Please indicate the importance of the following characteristics on YOUR choice of the USFS cabins listed in question 1 that you visited by placing ONE check to the right of EACH characteristic. 'Low' indicates it was of minor importance in cabin selection.**

Characteristic	Low (1) n (%)	Medium (2) n (%)	High (3) n (%)
a) Number of fish species present.....	22(30)	19(26)	33(44)
b) Abundance of fish present.....	10(13)	19(25)	46(62)
c) Wilderness status.....	11(14)	22(29)	43(57)
d) Aesthetic setting (scenery).....	8(10)	22(29)	47(61)
e) Getting away (solitude).....	5(6)	13(17)	59(77)
f) Cabin availability (ease of reserving).	15(20)	30(39)	31(41)
g) Cabin accessibility (distance & cost)..	21(28)	31(41)	24(31)
h) Other_____...	____	____	____

11. **Please check ONE of the spaces to the right of EACH category that best describes how, on a TYPICAL trip, YOUR actual experience compared with YOUR expectations before the trip. EXAMPLE: If the cabin was much nicer than you had hoped, you would place a check in the far right space for 'a) Cabin Conditions'.**

	Less or Worse Than Expected (1) n (%)	Exactly As Expected (2) n (%)	More or Better Than Expected (3) n (%)
a) Cabin conditions.....	13(18)	40(56)	19(26)
b) Number of people seen.....	11(16)	37(53)	22(31)
c) Cost of trip.....	2(3)	64(90)	5(7)
d) Weather.....	13(18)	39(54)	20(28)
e) Fishing success.....	24(34)	33(46)	14(20)
f) Scenery.....	3(4)	39(55)	29(41)
g) Other (specify).....	____	____	____

_____

12. Please indicate YOUR satisfaction with the following characteristics of the USFS cabin program by checking ONE of the spaces to the right of EACH characteristic. 'Low' indicates you were least satisfied with a characteristic.

Cabin Characteristic	Low (1) n (%)	Medium (2) n (%)	High (3) n (%)
a) Reservation system	10(13)	26(33)	43(54)
b) Cabin maintenance	8(10)	24(30)	47(59)
c) Boat and oars	8(12)	23(33)	38(55)
d) Stove	19(25)	21(28)	36(47)
e) Firewood	____	____	____
f) Other (specify) _____	____	____	____

13. Please indicate which system YOU prefer for assigning high-use USFS cabins during periods of high demand by placing a check beside ONE of the choices.

	n (%)
a) Advertised scheduled drawing by lottery	1 (1)
b) First come, first served (system presently used)	73(99)
c) Other (specify) _____	

14. Assume the USFS were to build one additional cabin on National Forest land in Southeast Alaska and they have asked YOU to help them decide what the cabin site should be like. Please indicate the importance to YOU of each of the following cabin site characteristics by checking ONE of the spaces to the right of EACH characteristic.

Cabin Site Characteristic	Low (1) n (%)	Medium (2) n (%)	High (3) n (%)
a) Freshwater, nearby	2(3)	15(19)	61(78)
b) Saltwater, nearby	28(37)	26(35)	21(28)
c) Near trail access	27(36)	16(21)	32(43)
d) Near boat access	24(31)	19(25)	34(44)
e) Near hunting	29(39)	27(36)	19(25)
f) Near fishing	2(3)	10(13)	66(84)
g) Airplane access	13(17)	6(8)	57(75)
h) Other (specify) _____	____	____	____

15. **Please estimate the TOTAL money spent for the following items by the RESIDENTS and NON-RESIDENTS in your PARTY on ALL trips to those USFS cabins listed in question 1 of this survey. If you spent no money on some items, please put a ZERO for those answers.**

A. **WHILE TRAVELING TO AND FROM USFS CABIN(S) (FROM YOUR PERMANENT RESIDENCE):**

	Resident $\bar{x}$ (n)	Non-Resident $\bar{x}$ (n)
a) Gas and oil for your car.....	$ 9.11(17)	$115.00(11)
b) Private plane costs.....	$190.00(2)	$507.86(7)
c) Commercial air carriers.....	$996.00(5)	$910.46(41)
d) Air charter costs.....	$ 59.18(22)	$408.93(28)
e) Ferry costs.....	$154.00(2)	$ 79.59(22)
f) Railroad costs.....	$ 0	$ 76.67(3)
g) Parking and lodging fees.....	$ 63.50(10)	$220.21(24)
h) Food and drink (include liquor) consumed along the way.....	$103.15(27)	$159.11(36)
Miscellaneous (please specify)		
i) _____.....	$	$
j) _____.....	$	$
k) _____.....	$	$

B. **WHILE USING OR PREPARING TO USE USFS CABIN(S)**

	Resident $\bar{x}$ (n)	Non-Resident $\bar{x}$ (n)
a) Guide services.....	$ 0	$ 10.00(1)
b) Boat rentals.....	$ 10.00(1)	$ 86.67(3)
c) Gas and oil for your boat.....	$ 40.26(35)	$ 40.56(9)
d) Fishing gear (include tackle, rods, reels, tackle boxes, nets, etc.)....	$ 106.44(34)	$ 145.36(38)
e) Boat, motor, accessories, etc.....	$4,129.17(12)	$ 79.00(5)
f) Special clothing (include fishing vests, hip boots, rain gear, coats, etc.).....	$ 131.11(18)	$ 137.07(29)
g) Camping equipment (include sleeping bags, tents, backpacks, stoves, lanterns, etc.).....	$ 197.50(24)	$ 146.60(25)
h) Food and drink (include liquor).....	$ 91.95(41)	$ 138.73(37)
Miscellaneous (please specify)		
i) _____.....	$	$
j) _____.....	$	$
k) _____.....	$	$

16. Enter the number of EACH of the following types of fishing licenses purchased by members of your HOUSEHOLD in 1984. Include those licenses combined with hunting or trapping.

a) Alaska resident.. 42 b) Non-resident.. 38
c) Military..... 0 d) Other..... 1

17. On a TYPICAL trip, how many RESIDENT and NON-RESIDENT anglers in your PARTY actually fished?

	a) Resident	b) Non-Resident
Number of anglers.....	46	48

18. Please write the TOTAL days fished for all trips to ALL USFS cabins listed in question 1 of this survey, for RESIDENTS and NON-RESIDENTS in your PARTY. EXAMPLE: If one person fished on five days and another person fished on three of those days, the total number of days fished (5+3) is 8.

	a) Resident	b) Non-Resident
Number of days.....	7.6(n=45)	12.6(n=49)

19. Including ALL trips to All USFS cabins listed in question 1 of this survey, what would be the AVERAGE number of hours fished per day by RESIDENT and NON-RESIDENT anglers in your PARTY?

	a) Resident	b) Non-Resident
Average hours fished...	8.2(n=44)	7.9 (n=49)

20. Was fishing the PRIMARY consideration for which YOU reserved USFS cabin(s)?

1) No 22(28%) Yes 56(72%)

If your answer was 'No', continue with question 21. If your answer was 'Yes', please indicate what ONE species was of primary interest for RESIDENTS and what ONE species was of primary interest for NON-RESIDENTS, during your stay at those USFS cabins listed in question 1. The same species may be checked for both RESIDENTS and NON-RESIDENTS.

	Resident n(%)	Non-Resident n(%)
1) Steelhead trout.....	12(57)	5(23)
2) Rainbow trout.....	1(5)	2(9)
3) Cutthroat trout.....	7(33)	3(14)
4) Dolly Varden char.....		
5) Chinook (King) salmon.		
6) Coho (Silver) salmon..		7(32)
7) Sockeye (Red) salmon..	1(5)	3(14)
8) Pink salmon.....		1(4)
9) Other (please specify)		
Salmon in general		1(4)

21. Including ALL trips to ALL USFS cabins listed in question 1 of this survey that were visited, how many fish were CAUGHT AND KEPT by RESIDENT and NON-RESIDENT anglers in your PARTY? EXAMPLE: If you caught 10 rainbow trout, but only kept 5, you would enter 5 in the appropriate space. Fish released are recorded in question 22.

	Resident $\bar{x}$ (n)	Non-Resident $\bar{x}$ (n)
a) Steelhead trout.....	4.4(16)	5.8(11)
b) Rainbow trout.....	8.3(12)	8.9(17)
c) Cutthroat trout.....	28.2(21)	12.2(23)
d) Dolly Varden char.....	13.2(14)	6.4(14)
e) Chinook (King) salmon.		
f) Coho (Silver) salmon..	8.5(2)	3.7(11)
g) Sockeye (Red) salmon..		8.0(6)
h) Pink salmon.....	1.0(1)	10.8(11)
i) Other (please specify)		

22. Including ALL trips to ALL USFS cabins listed in question 1 of this survey that were visited, how many fish were CAUGHT AND RELEASED by RESIDENT and NON-RESIDENT anglers in your PARTY? EXAMPLE: If you caught 5 pink salmon and released all of them, you would enter 5 in the appropriate space. Fish kept are recorded in question 21.

	Resident $\bar{x}$ (n)	Non-Resident $\bar{x}$ (n)
a) Steelhead trout.....	18.7(13)	26.1(14)
b) Rainbow trout.....	19.7(13)	18.6(17)
c) Cutthroat trout.....	27.1(22)	36.0(21)
d) Dolly Varden char.....	80.9(14)	13.5(16)
e) Chinook (King) salmon.		
f) Coho (Silver) salmon..	13.7(7)	15.7(10)
g) Sockeye (Red) salmon..	6.0(1)	39.4(9)
h) Pink salmon.....	13.8(4)	56.5(16)
i) Other (please specify)		

23. Do YOU feel that the current sport fishing daily bag and possession limits for the following types of fish are:

	Too low (1) n(%)	Just right (2) n(%)	Too high (3) n(%)
a) Salmon.....	9(12)	62(81)	5(7)
b) Trout.....	17(22)	55(71)	5(7)
c) Steelhead...	11(15)	58(79)	4(6)

24. Did YOU or any member of your PARTY encounter any commercially outfitted/guided parties?

1) No n(%)	2) Yes n(%)
73(92)	6(8)

25. To what degree would it affect YOUR experience if YOU did encounter a commercially outfitted/guided party?

	n(%)
1) Decrease the quality of the experience.....	60(76)
2) No effect on the quality of the experience..	18(23)
3) Increase the quality of the experience.....	1(1)

26. Have YOU ever used the services of an outfitter/guide for sport fishing in Alaska?

1) No	2) Yes
72(91%)	7(9%)

27. Would YOU ever use the services of an outfitter/guide for sport fishing in Alaska?

1) No	2) Yes
55 (73%)	21(27%)

****THANK YOU FOR YOUR ASSISTANCE****

We welcome any comments you might wish to include in this space.

A. ADF&G, Division of Commercial Fisheries, Database

I. INTRODUCTION

The Division of Commercial Fisheries information management systems include data entry and catch and production reporting. Data entry is divided into three subapplications, one of which is the fish ticket database.

II. FISH TICKETS

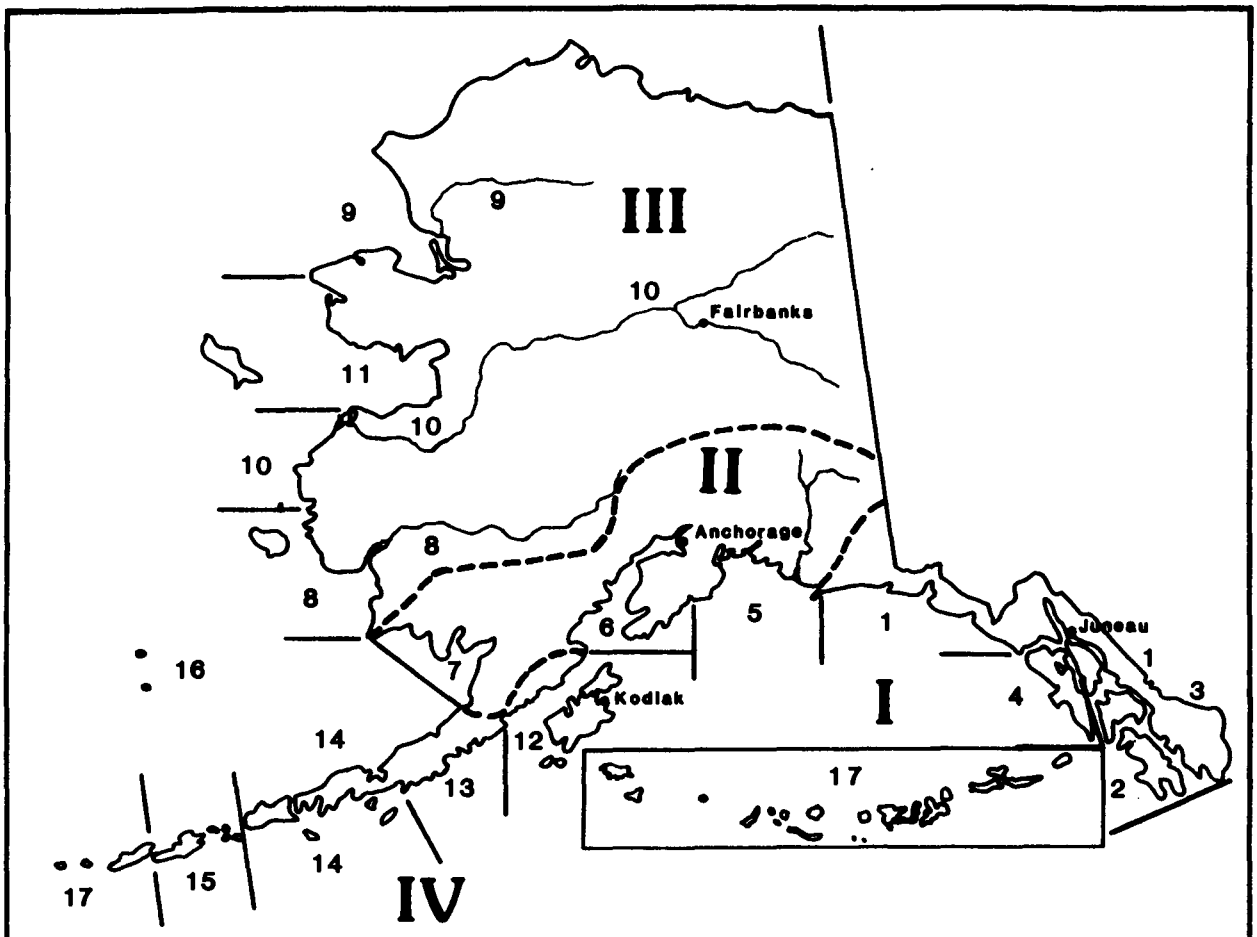
The fish ticket system has been in existence since 1959 (ADF&G 1985a). Fish tickets are the primary data collection system used by the ADF&G to document commercial fisheries harvests under AS16.05.690, which requires all buyers of fish (including fisheries under federal jurisdiction) to complete fish tickets.

Fish tickets are manually filled out at processor sites, with information on harvest date, region, management area, ADF&G vessel number (if applicable), number caught, pounds caught, permit fishery, entry permit number (if fishery is under limited entry) or interim use permit number (if the fishery is not limited), and value. (See appendix figures 1-8 for samples of fish tickets.) A yearly fish ticket report on the catch is generated from this database and used in producing annual catch and production reports. Fish ticket data are also used to produce the Commercial Fisheries Entry Commission's gross earning file (appendix B).

III. CATCH AND PRODUCTION REPORTING

The catch and production database was initially implemented in 1962. It is used to generate annual catch and fishery production reports on 30 species of fish harvested in Alaska waters. Information from the confidential Intent to Operate and Annual Processor Report forms provide the data to produce the "Production" portion of the Annual Catch and Production Report. (See appendix figures 9-10 for samples of processor forms.) The "Catch" portion of the report is drawn from fish ticket data files in the historical record. Information on the following species/species groups is collected: salmon roe, chinook, sockeye, coho, pink, chum, Pacific cod, flounder sole, rockfish, Pacific ocean perch, pollock, sablefish, groundfish (other), herring-roe-on-kelp, herring eggs, herring sac roe, trout, char, whitefish smelt, other miscellaneous finfish, clams, scallops, abalone, Dungeness crab, king crab, Tanner crab, Korean horsehair crab, shrimp, shellfish (other), shellfish deadloss.

See appendix map 1 for a map of Alaska commercial fisheries regions and areas. Note that these Division of Commercial Fisheries regions and areas do not correspond directly to Alaska Habitat Management Guide areas (appendix map 2). Also appendix maps 3-11 show the boundaries of the commercial fisheries management areas and the U.S. Bureau of Census 1980 Alaska census areas. These maps are useful in comparing the tables of



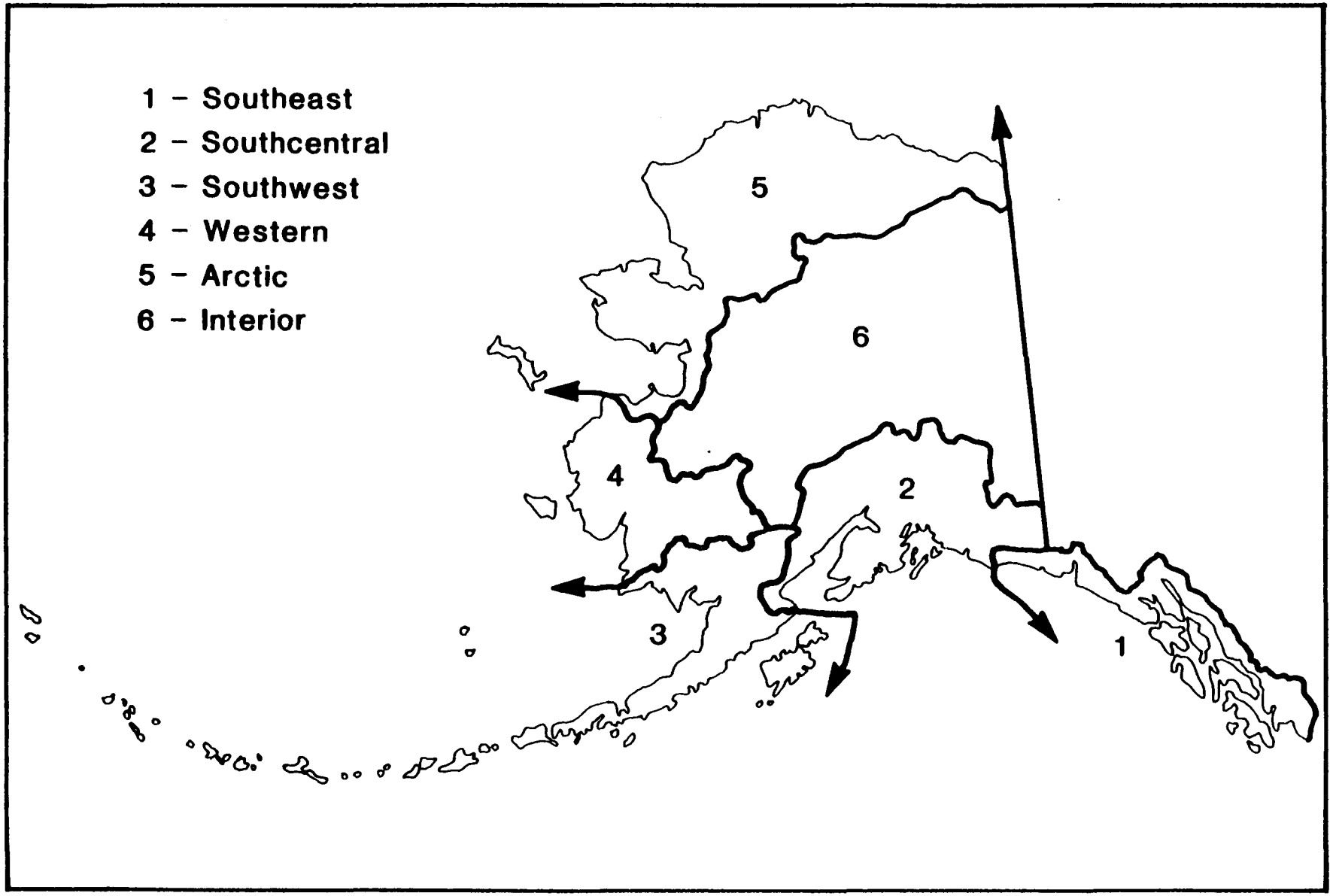
Region I: Southeast
Areas: 1. Juneau and Yakutak
2. Ketchikan
3. Petersburg
4. Sitka

Region II: Central
Areas: 5. Prince William Sound
6. Cook Inlet
7. Bristol Bay (salmon and herring catch; all fish and shellfish production)

Region III: Arctic-Yukon-Kuskokwim (AYK)
Areas: 8. Kuskokwim
9. Kotzebue
10. Yukon
11. Norton Sound

Region IV: Western
Areas: 12. Kodiak
13. Chignik
14. Alaska Peninsula
15. Dutch Harbor
16. Bering Sea
17. Adak and Western Aleutians
7. Bristol Bay (fish other than salmon and herring catch; and shellfish catch)

Map 1. ADF&G, Division of Commercial Fisheries, regions and catch and production areas.



Map 2. The six regions of the Alaska Habitat Management Guides.

ex-vessel value($) by fishery management area and census area of fishermen found in the commercial fisheries sections of this volume.

Information from fish tickets and catch and production reports is combined in an ADABASA database of historical records to help produce the following: area management reports, catch and production reports, technical information reports, CFEC reports, and Board reports (ADF&G 1985a). (See appendix 11 for a system overview diagram in the Division of Commercial Fisheries.)

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SERIES "A" FISH TICKET SAMPLE

DISTRIBUTION: PLACE WRAPAROUND COVER UNDER GOLDENROD COPY
WHITE - PURCHASER — PINK - SELLER
YELLOW - FISH & GAME — GOLDENROD - PURCHASER

PURCHASER
ALASKA DEPARTMENT OF FISH AND GAME
SALMON TICKET

Vessel Name: F/V Salmon Boat

Fishery Name / Permit Number: 5 AAC 39.130.(8)(9) REQUIRES IMPRINTING OF THE CFEC PERMIT CARD HERE

DO NOT WRITE IN THIS SPACE

A85 069007

TIME GEAR OPERATED IN HOURS: 10

ADF&G NO: 00000

Proc. Code: F 0000 0

Company: ADF&G CSS

Date Fishing Began: 8/12/85

Date Landed: 8/13/85

Area Caught: Point Retreat (SHOW NEAREST BAY OR HEADLAND) — 111-50 (STAT. CHART NO.)

SPECIES	CODE	NUMBER OF FISH	NO OF POUNDS	PRICE	AMOUNT
KINGS	410	2	50	1.50	75.00
REDS	420				
COHOS	430	10	100	1.10	110.00
PINKS	440	4	13	.25	3.25
CHUMS	450	1	15	.35	5.25
SALMON ROE	400		10	4.00	40.00
CHAR	520				
STEELHEAD	540				
WHITEFISH	580				
Sub-Total		17	188		233.50
Less Salmon Enhancement Tax @			3%		- 7.01
TOTAL		17	188		226.49

Cash Advance: 850.00

Fish Received by: Mr. Salmon Buyer

NOT NEGOTIABLE *

Capt. John Doe
Fishermen or Capt. making delivery

REV. 8/85 11-16

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS

SERIES " B " FISH TICKET SAMPLE

DISTRIBUTION: PLACE WRAPAROUND COVER UNDER GOLDENROD COPY
WHITE - PURCHASER — PINK - SELLER
YELLOW - FISH & GAME — GOLDENROD - PURCHASER

PURCHASER
ALASKA DEPARTMENT OF FISH AND GAME
BAY SALMON TICKET

DO NOT WRITE IN THIS SPACE

Check type of gear used
03 ☐ Drift Net
04 ☒ Set Net

Vessel Name F/V Bristol Bay

Fishery Name / Permit Number → 5 AAC 39.130.(3)(9) REQUIRES IMPRINTING OF THE CFEC PERMIT CARD HERE

B85 202090

ADF&G NO. 00000

Proc. Code F 0000 0

Company ADF&G CSS

7/6/85 — THIS DELIVERY (DATE LANDED)

5:00 AM PM — TIME

Last Delivery 7/5/85

District Caught Nushagak

STAT CHART NO → DO NOT WRITE IN THIS SPACE

REDS 420			CONTINUED REDS 420			PINKS 440		
NUMBER	POUNDS	AMOUNT	NUMBER	POUNDS	AMOUNT	NUMBER	POUNDS	AMOUNT
1,000	6,000	5,100						
			TOTAL	TOTAL	TOTAL			
			OVERLIMIT REDS 420					
			NUMBER	POUNDS	AMOUNT			
TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
1,000	6,000	5,100						

CHUMS 450			COHOS 430			KINGS 410		
NUMBER	POUNDS	AMOUNT	NUMBER	POUNDS	AMOUNT	NUMBER	POUNDS	AMOUNT
500	5,000	1,500						
TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
500	5,000	1,500						

Fisherman's Signature * Capt. John Doe

Rev 8/84 1137 Fish Received by Mr. Bristol Buyer

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS

ABBREVIATIONS TO BE USED FOR DISTRICT CAUGHT
YOGIAK - YOG
OSVIAK SECT. - OSV
KULUKAK SECT. - KUL
MATOGAK SECT. - MAT
UGASHIK - UGA
KVICHAK - KVI
NAKNEK SECT. - NAK
EGEGIK - EGK
NUSHAGAK - NUS
IGUSHIK SECT. - IGUS

Fig. 3

SERIES "C" FISH TICKET SAMPLE

DISTRIBUTION: PLACE WRAPAROUND COVER UNDER GOLDENROD COPY
WHITE - PURCHASER
YELLOW - FISH & GAME
PINK - SELLER
GOLDENROD - PURCHASER

PURCHASER
ALASKA DEPARTMENT OF FISH AND GAME
~~CRAB~~ SHELLFISH TICKET

DO NOT WRITE IN THIS SPACE
C85 069007

Vessel Name F/V Crab Boat

Fishery Name, Permit Number → 5 AAC 39.130.(B)(9) REQUIRES IMPRINTING OF THE CFEC PERMIT CARD HERE

ADF&G No. 00000

PRINT TYPE OF GEAR USED: POT

Proc. Code F0000 0

Company ADF&G CSS

Date Fishing Began 12/25/84

Date Landed 1/1/85

SPECIES	AREA CAUGHT STAT. CHART NO.	CODE	NO. OF FISH	NO. OF POUNDS	NO. OF POTS PULLED OR DIVERS	PRICE	AMOUNT
DUNGENESS CRAB		910					
RED KING CRAB		921					
BLUE KING CRAB		922					
BROWN KING CRAB	112-14	923	500	4,000	20	1.00	4,000.00
BAIRDI TANNER CRAB		931					
OPILIO TANNER CRAB		932					
DEADLOSS	112-14		10	80	20		

Cash Advance $100.00 Fish Received by Mr. Crab Buyer

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS.

Fisherman's Signature * Capt. John Doe
Fisherman or Captain making delivery

REV. ~~8/84~~ 11-17

14

SERIES "E" FISH TICKET SAMPLE

DISTRIBUTION: PLACE WRAPAROUND COVER UNDER GOLDENROD COPY
WHITE - PURCHASER — PINK - SELLER
YELLOW - FISH & GAME — GOLDENROD - PURCHASER

PURCHASER
ALASKA DEPARTMENT OF FISH AND GAME
SHELLFISH TICKET

Boat Name F/V Crab Boat

DO NOT WRITE IN THIS SPACE
E 069010

Fishery →
Name →
Permit Number →

ADF&G No ←

CHECK TYPE OF GEAR USED
07 ☐ SINGLE RIG OTTER TRAWL
09 ☒ POTS REG UNDER 50 FT
17 ☐ BEAM TRAWL
18 ☐ SHOVEL
22 ☐ DREDGE
27 ☐ DOUBLE RIG OTTER TRAWL
37 ☐ PAIR TRAWL
91 ☐ POTS REG OVER 50 FT
OTHER ☐ SPECIFY

Proc. Code F0000 0

Company ADF&G CSS

1/1/85 ← Date

SPECIES	AREA CAUGHT STAT. CHART NO	CODE	NO. OF FISH	NO. OF POUNDS	NO. OF UNITS PURCHASED	PRICE	AMOUNT
RED KING CRAB		921					
BLUE KING CRAB		922					
BROWN KING CRAB	112-14	923	500	4,000	20	1.00	4,000.00
DUNGENESS CRAB		910					
BAIRDI TANNER CRAB		931					
OPILIO TANNER CRAB		932					
PINK SHRIMP		961					
SIDESTRIPE SHRIMP		962					
HUMPY SHRIMP		963					
COONSTRIPE SHRIMP		964					
SPOT SHRIMP		965					
SCALLOPS		850					
CLAMS		830					

Cash Advance $100.00 Fish Received by Mr. Crab Buyer

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS

Fisherman's Signature * Capt. John Doe
Fisherman or Captain making delivery

REV 10/81 11-17 (P) ■

SERIES "G" FISH TICKET SAMPLE

PLACE WRAPAROUND COVER UNDER GOLDENROD COPY

DISTRIBUTION: WHITE - PURCHASER YELLOW - FISH & GAME PINK - SELLER GOLDENROD - PURCHASER

PURCHASER

ALASKA DEPARTMENT OF FISH & GAME
GROUNDFISH TICKET

DO NOT WRITE IN THIS SPACE

G84 002499

Vessel Name F/V Ground fish Boat

Fishery Name Permit Number → 5 AAC 39.130.(3)(9) REQUIRES IMPRINTING OF THE CFEC PERMIT CARD HERE

ADF&G No. 00000

DELIVERY CONDITION CODES
ENTER FOR EACH SPECIES IN COLUMNS 4 & 11 BELOW

1 = WHOLE FOOFISH	6 = SALTED AND SPLIT
2 = WHOLE BAIT	7 = WESTERN CUT
3 = BLED	8 = EASTERN CUT
4 = GUTTED ONLY	9 = FILLETS
5 = GUTTED AND HEADED	10 = LANDED DISCARD

Proc. Code F0000 0

Company ADF&G CSS

Date Fishing Began 3/16/85

Date Landed 4/16/85

PRINT TYPE OF GEAR USED: LONG-LINE

SPECIES	STAT AREA	CODE	COND CODE	POUNDS	PRICE	AMOUNT	SPECIES	STAT AREA	CODE	COND CODE	NO. PCS	PRICE	AMOUNT
FLATHEAD SOLE		122					PACIFIC OCEAN PERCH		141				
ROCK SOLE		123					BLACK ROCKFISH		142				
DOVER SOLE		124					IDIOT ROCKFISH		143				
REX SOLE		125					RED SNAPPER YELLOWEYE	252-54	145	5	500	.75	375.00
							" "	252-70		5	300	.75	225.00
YELLOWFIN SOLE		127					CANARY ROCKFISH		146				
STARRY FLOUNDER		129					QUILLBACK ROCKFISH		147				
ALASKA PLAICE		133					CHINA ROCKFISH		149				
FLOUNDER - UNSPECIFIED		120					ROSETHORN ROCKFISH		150				
PACIFIC COD	350-51	110	9	15,000	1.00	15,000	DUSKY ROCKFISH		154				
POLLOCK		270					RED ROCKFISH UNSPECIFIED		140				
SABLEFISH		710					ROCKFISH - UNSPECIFIED		139				
3/5 #1	252-54	710	7	1,000	.30	300							
5/7 #2	252-54	710	7	1,000	.60	600	LINGCOD		130				
							SCULPIN		160				
							SKATE		700				
							SHARK		689				

Fisherman's Signature * Mr. John Doe

Fish Received by Mr. Groundfish Buyer

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS

REV. 8/84 11-019

NOT NEGOTIABLE

6

SERIES " J " FISH TICKET SAMPLE

PLACE WRAPAROUND COVER UNDER GOLDENROD COPY

DISTRIBUTION: WHITE - PURCHASER YELLOW - FISH & GAME PINK - SELLER GOLDENROD - PURCHASER

PURCHASER

ALASKA DEPARTMENT OF FISH & GAME
FISH BUYING TICKET

DO NOT WRITE IN THIS SPACE

J85196511

Vessel Name F/V Salmon Troller

Fishery Name Permit Number → 5 AAC 39.130(c)(9) REQUIRES IMPRINTING OF THE CFEC PERMIT CARD HERE

ADF&G NO 00000

CHECK TYPE OF GEAR ONLY IF MSB HEARING GILLNET
03 ☐ DRIFT NET 04 ☐ SET NET

TIME GEAR OPERATED HOURS 12

Proc. Code F0000 0

Company ADF&G C55

Date Fishing Began 6/23/85

Date Landed 6/24/85

AREA CAUGHT Hawk Inlet ↑SHOW NEAREST BAY OR HEADLAND↑

112-16 ↑ STAT. CHART NO. ↑

SPECIES	Code	FISH	POUNDS	PRICE	AMOUNT	SPECIES	Code	FISH	POUNDS	PRICE	AMOUNT
HALIBUT 10 - 20 lbs	202					SALMON Lg Red Kings	410				
20 - 40 lbs.	202					Med Red Kings	410	10	100	1.60	160.00
40 - 80 lbs.	202					Sml Red Kings	410				
Total Medium	202					Jacks	410				
						Lg White Kings	410				
80 - 80 lbs.	203					Sml White Kings	410	5	30	1.20	36.00
80 - 100 lbs.	203					TOTAL KINGS	410				
100 - 150 lbs.	203										
Over 150 lbs.	203					REDS (SOCKEYE)	420				
Total Large	203										
						Lg Cohos	430				
No. 2's Med	204					Med Cohos	430				
No. 2's Lg.	204					Sml Cohos	430				
						TOTAL COHOS	430				
TOTAL (LESS HEAD + GUMS)	200										
						PINKS	440				
HERRING Herring Eggs on Kelp	231										
Herring Roe Skeins	232										
Herring Bait	233					BRIGHT CHUMS	450	2	20	.35	7.00
Herring Food	235										
Herring Sac Roe	234					DARK CHUMS	450				
% Roe Content =											
MISCELLANEOUS Capelin	516					TOTAL CHUMS	450				
Steelhead	540					SALMON ROE	400		10	5.00	50.00
						Sub-Total		17	160		253.00
						Less Salmon Enhancement Tax @ 3%					- 7.59
						TOTAL		17	160		245.41

Fisherman's Signature * Capt. John Doe

Fish Received by Mr. Salmon Buyer

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS

REV 8/84 11 19

NOT NEGOTIABLE

fig. 7

SERIES "S" FISH TICKET SAMPLE

DISTRIBUTION: PLACE WRAPAROUND COVER UNDER GOLDENROD COPY
WHITE - PURCHASER — PINK - SELLER
YELLOW - FISH & GAME — GOLDENROD - PURCHASER

PURCHASER
ALASKA DEPARTMENT OF FISH AND GAME
SHRIMP SHELLFISH TICKET

DO NOT WRITE IN THIS SPACE

S85 069007

Vessel Name F/V Shrimp Boat

Fishery Name / Permit Number → 5 AAC 39.130.(B)(9) REQUIRES IMPRINTING OF THE CFEC PERMIT CARD HERE

ADF&G NO 00000

PRINT TYPE OF GEAR USED: POT

Proc. Code F0000 0

Company ADF&G C55

Date Fishing Began 12/30/84

Date Landed 1/1/85

SPECIES	AREA CAUGHT STAT. CHART NO.	CODE	NO. OF FISH	NO. OF POUNDS	NO. OF POTS PULLED OR DRAGS	PRICE	AMOUNT
CLAMS		830					
SCALLOPS		850					
ABALONE		860					
OCTOPUS		870					
PINK SHRIMP		961					
SIDESTRIPE SHRIMP		962					
HUMPY SHRIMP		963					
COONSTRIPE SHRIMP	112-14	964		30	20	6.00	120.00
SPOT SHRIMP	112-14	965		200	20	7.00	140.00
TRAWL WASTE FISH		101					
SHRIMP DEADLOSS	112-14	969		10	20		

Cash Advance $50.00

Fish Received by Mr. Shrimp Buyer

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS.

Fisherman's Signature * Capt. John Doe

Fisherman or Captain making delivery

REV 11-17

fig 8

SERIES "T" FISH TICKET SAMPLE

PLACE WRAPAROUND COVER UNDER GOLDENROD COPY

DISTRIBUTION: WHITE - PURCHASER YELLOW - FISH & GAME PINK - SELLER GOLDENROD - PURCHASER

PURCHASER

ALASKA DEPARTMENT OF FISH & GAME
FISH BUYING TICKET

DO NOT WRITE IN THIS SPACE

T85 124511

Vessel Name F/V Salmon Seiner

Fishery Name Permit Number → 5 AAC 39.130(b)(9) REQUIRES IMPRINTING OF THE CFEC PERMIT CARD HERE

ADF&G NO. C0000

LAST DELIVERY 7/4/85

FISH DELIVERED TO ADF&G CSS (BUYER)

Proc. Code F0000 0

Company ADF&G CSS

THIS DELIVERY (DATE LANDED) 7/6/85 TIME 11.00 AM PM

7/5/85 ← Date Fishing Began

Tender Tender Salmon

AREA CAUGHT Hawk Inlet ↑ SHOW NEAREST BAY OR HEADLAND ↑

11.2-16 ↑ STAT. CHART NO. ↑

TALLY INFORMATION

KINGS 410		PINKS 440		PINKS 440		CHUMS 450		CHUMS 450		CHUMS 450	
NUMBER	POUNDS	NUMBER	POUNDS	NUMBER	POUNDS	NUMBER	POUNDS	NUMBER	POUNDS	NUMBER	POUNDS
		1,000	3,600			100	1,000				

REDS 420 — NUMBER / POUNDS

COHOS 430 — NUMBER / POUNDS

OTHER SPECIES — NUMBER / POUNDS

SPECIES CODE

SPECIES	CODE	NUMBER OF FISH	NUMBER OF POUNDS	PRICE	AMOUNT
KINGS	410				
REDS	420				
COHOS	430				
PINKS	440	1,000	3600	.20	720.00
BRIGHT CHUMS	450	90	900	.30	270.00
DARK CHUMS	450	10	100	.20	20.00
TOTAL CHUMS	450	100	1,000		
Sub-Total		1,100	4,600		1010.00
Less Salmon Enhancement Tax @			3%		- 30.30
TOTAL		1,100	4,600		979.70

Fisherman's Signature * Capt. John Doe

Fish Received by Mr. Salmon Buyer

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS

REV 5/77 11 216

fig 9

CONFIDENTIAL

ALASKA DEPARTMENT OF FISH & GAME
Commercial Fisheries Division
P.O. Box 3-2000
Juneau, Alaska 99802
Tel.: (907) 465-4150

PROCESSOR CODE:

DO NOT COMPLETE THIS SECTION OFFICE USE ONLY

Information Complete ☐ Yes ☐ No

If no, Date Complete: / /
Logged: / /
Routed: / /
Avg. Price
Coded: / /

ALASKA COMMERCIAL OPERATOR'S ANNUAL REPORT 1984

FORM A: This report should include information only on the fish/shellfish which were bought/harvested/processed by your company, exclusively for your company. One form must be filed for each different location and each Alaska management area for which an intent to Operate was filed in 1984. DO NOT INCLUDE JOINT OR CUSTOM PRODUCTION ON THIS FORM – FILE ON FORM B, ATTACHED.

1. Company Name & Address: If address as shown is incorrect or missing, please correct the error on the label or print your permanent address.	Seasonal Mailing Address (Give months for which any seasonal address is applicable)
Permanent Mailing Address:	Seasonal Mailing Address:

DID YOU OPERATE IN 1984? ☐ YES ☐ NO If you checked YES, complete the remaining applicable sections of this report. If you checked NO, complete the certification section below and return this form in the enclosed envelope.

I. THIS OPERATION IS (Check One) ☐ a. On-shore ☐ b. Floating ☐ c. Catcher/Processor ☐ d. Catcher & Exporter ☐ e. Flying

Check the box below which applies to this operation and answer all related questions.

☐ 1. On-shore Processing	Location	How many persons employed at this location at season peak? (Give Number)
☐ 2. On-shore buying station only	Location	

Complete this section for all vessels. File one report for each Alaska management area in which the vessel operated.

☐ 3. Processing Vessel ☐ 4. Floating Buyer Only			How many persons employed in buying or processing on this vessel (Give Number)
Vessel Name	Area of operation for this report	ADF&G Number	

5. Flying Buyer Only- Give location from which fish/shellfish were flown.	Destination of Fish.

6. ☐ Check here if Buyer only, i.e., raw fish sold before processing. List Companies and locations where fish were sold in the "Marketing Information" section below.

II. CERTIFICATION: Please be sure that you have reviewed all information in the remaining pages of this report before signing.

I, _____ (Your Signature), certify under penalty of perjury that I have reviewed all information contained in this report, that it is true and complete to the best of my knowledge, and that I am the owner/authorized agent.

Your Name (Printed or Typed)	Your Title	Date	Telephone Number(s)

Contact Party if you are not available (Print or type name)	Telephone Number(s)

Marketing Information for Raw Fish and Shellfish

ease indicate companies and locations in Alaska (town or city) and outside Alaska own, state, and country) where raw fish and shellfish were sold:

III. BUYING INFORMATION - PRICE PAID TO FISHERMEN, 1984. Complete this section for all fish/shellfish bought at this location in 1984. Give for each species the total amount paid in dollars and the total number of pounds bought. Note that for salmon species this information must also be given by gear type. The dollar value of any bonuses, such as gas, groceries, ice, given to fishermen, if any, should be included in the total price paid.

			TOTAL POUNDS BOUGHT	TOTAL PRICE PAID	PRICE
(03)	**GILLNET**				
1	King (Chinook)	410		$	$
1	Red (Sockeye)	420			
1	Coho (Silver)	430			
1	Pink (Humpy)	440			
1	Chum (Dog)	450			
(01)	**SEINE**				
1	King (Chinook)	410			
1	Red (Sockeye)	420			
1	Coho (Silver)	430			
1	Pink (Humpy)	440			
1	Chum (Dog)	450			
(05)	**TROLL (SE) FISHWHEEL (AYK)** (08)				
1	King (Chinook)	410			
1	Red (Sockeye)	420			
1	Coho (Silver)	430			
1	Pink (Humpy)	440			
1	Chum (Dog)	450			
1	Salmon Roe	400			
	SALMON				
3	King Crab	920	Lbs.	$	$
3	Dungeness Crab	910			
3	Bairdi Crab	931			
3	Opilio Crab	932			
3	Hair Crab	940			
4	Large Shrimp (POT)	960			
4	Small Shrimp (TRAWL)	961			
5	Clams	830			
5	Abalone	860			
5	Scallop	850			
	SHELLFISH				
2	Herring Roe on Kelp	231	Lbs.	$	$
2	Herring Bait	233			
2	Sac Roe Herring	234			
2	Food Herring	236			
6	Sablefish (Black Cod)	710			
6	Pacific Cod	110			
6	Pacific Ocean Perch	141			
6	Rockfish (Red Snapper)	140			
8	Halibut	200			
	Other: (Specify)				
	MISCELLANEOUS FISH				

V. CANNED PRODUCTION: Complete this section for all fish/shellfish canned. Information must be given by can size for each species: e.g. if you produce both ½lb. and 1lb. cans of pink salmon, there must be an entry for each size. *See note in Section IV of this form.

SPECIES	CAN SIZE	SMOKED – CONVENTIONAL (Specify)	CANS PER CASE	TOTAL CASES	TOTAL WHOLESALE VALUE*
		6 ☐ 1 5 ☐ 1			
		☐ ☐			
		☐ ☐			
		☐ ☐			
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VI. MISCELLANEOUS PRODUCTION: Complete this section for any processed fish/shellfish not included in Fresh/Frozen or Canned Production categories. Production types would be Smoked, Salted, Kippered, Pickled, Bait, Meal, Oil. *See note in Section IV of this form.

SPECIES	PRODUCT TYPE	TOTAL NET WEIGHT	TOTAL WHOLESALE VALUE*
1 SALMON ROE 400		Lbs.	$

VII. JOINT OR CUSTOM PRODUCTION INFORMATION: List all processors for whom your company custom-processed fish/shellfish. DO NOT include any of that production in this report, or in the report for form B. The processor you name will file the information on their own Form B.

COMPANY FOR WHOM YOU PROCESSED FISH	LOCATION OF COMPANY

IV. FRESH/FROZEN PRODUCTION: Complete this section for fish/shellfish intended for the Fresh/Frozen market, NOT for fish/shellfish frozen and canned later. IF YOU DO NOT SELL FISH WHOLESALE, GIVE THE RETAIL PRICE YOU RECEIVED FOR SELLING FISH/SHELLFISH.* The total wholesale value is simply the price that the processor gets for the product.

	FINFISH		FRESH		FROZEN	
			TOTAL NET WEIGHT	TOTAL WHOLESALE VALUE*	TOTAL NET WEIGHT	TOTAL WHOLESALE V
1	King (Chinook)	410				
1	Red Salmon (Sockeye)	420				
1	Coho Salmon (Silver)	430				
1	Pink (Humpy)	440				
1	Chum (Dog)	450				
1	SALMON ROE	400				
2	Herring Roe on Kelp	231				
2	Herring Bait	233				
2	Sac Roe Herring	234				
2	Herring Food	235				
8	Halibut	200				
6	Sablefish (Black Cod)	710				
6	Pacific Cod	110				
6	Ling Cod	130				
6	Pacific Ocean Perch	141				
6	Rockfish (Red Snapper)	140				
6	Other Groundfish (Specify)					
7	Sheefish	570				
7	Other Miscellaneous (Specify)					
	SHELLFISH					
3	King Crab - Whole	920				
3	King Crab - Sections	920				
3	King Crab - Meat	920				
3	Dungeness - Whole	910				
3	Dungeness - Sections	910				
3	Dungeness - Meat	910				
3	Tanner - Whole	930				
3	Tanner - Sections	930				
3	Tanner - Meat	930				
5	Scallops	850				
4	Shrimp - Whole	960				
4	Shrimp - Tails	960				
4	Shrimp - Meat	960				
5	Clams - Bait					
5	Clams - Food					
5	Abalone - Whole	860				
5	Abalone - Shucked	860				

CANNED PRODUCTION: Complete this section for all fish/shellfish canned for you. Information must be given by can size for each species, e.g. if both ½ and 1 lb. cans were custom produced, there must be an entry for each can size. *See note on for 11-122A, Section IV.

SPECIES	CAN SIZE	SMOKED — CONVENTIONAL (Specify)	CANS PER CASE	TOTAL CASES	TOTAL WHOLESALE VALUE*
		6 ☐ 1 5 ☐ 1			
		☐ ☐			
		☐ ☐			
		☐ ☐			
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om canning of salmon is recorded above and salmon roe production is not shown on reverse, please state in which Annual Report the roe production pear:

11-122B (Rev. 9/84) Back

CONFIDENTIAL tag 10

ALASKA DEPARTMENT OF FISH & GAME
Commercial Fisheries Division
P.O. Box 3-2000
Juneau, Alaska 99802
Tel.: (907) 465-4150

DO NOT COMPLETE THIS SECTION
OFFICE USE ONLY

Information Complete ☐ Yes ☐ No
If no, Date Complete: / /
Logged: / /
Routed: / /
Avg. Price
Coded: / /

ALASKA COMMERCIAL OPERATOR'S ANNUAL REPORT 1984

FORM B JOINT/CUSTOM PRODUCTION - File this form if another company performed custom production for your company. Include only information on the fish/shellfish processed for you by any one company, filing one form for each location or processing vessel

Your company name (As it appears on the Form A showing purchases for this production) & Operation Location	Company performing custom production, location. If vessel, give name and management area of operation

CERTIFICATION: Please be sure that you have reviewed all information in the remaining pages of this report before signing.

I, _____ (Your Signature), certify under penalty of perjury that I have reviewed all information contained in this report, and that it is true and complete to the best of my knowledge, and that I am the Owner/Authorized agent.

Your Name (Printed or Typed)	Your Title	Date	Telephone Number(s)

FRESH/FROZEN AND MISCELLANEOUS PRODUCTION: Complete this section for fish/shellfish custom-processed for your company which are intended for the wholesale/retail market and which are NOT custom-frozen for canning later. Production types would be: Fresh, Frozen, Smoked, Salted, Kippered, Pickled, Bait, Meal, Oil. For Shellfish, be sure to state whole, sections, meat, tails or shucked as specified in Section IV of Form A.

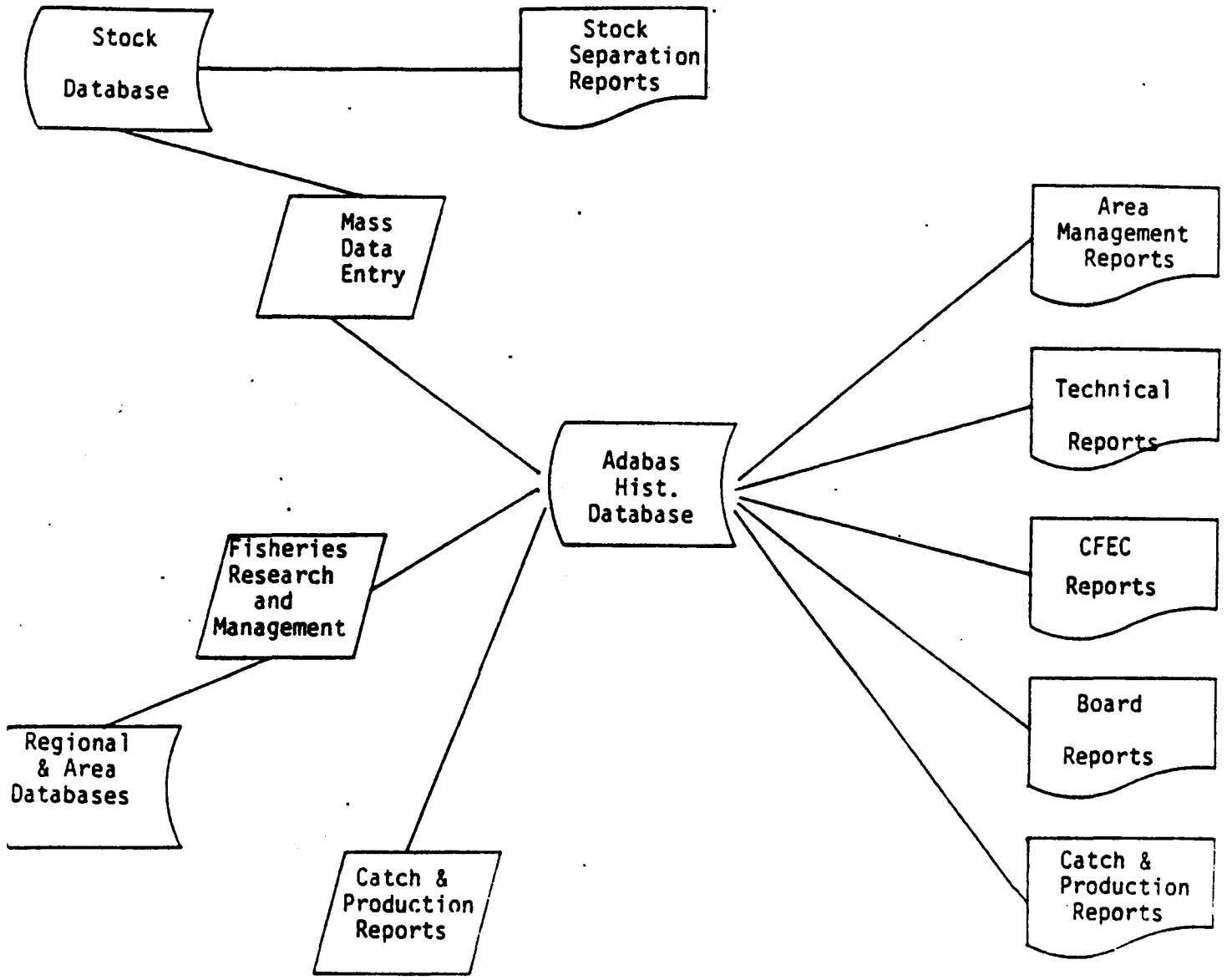
SPECIES	PRODUCT TYPE	TOTAL NET WEIGHT	TOTAL WHOLESALE VALUE
		Lbs.	$

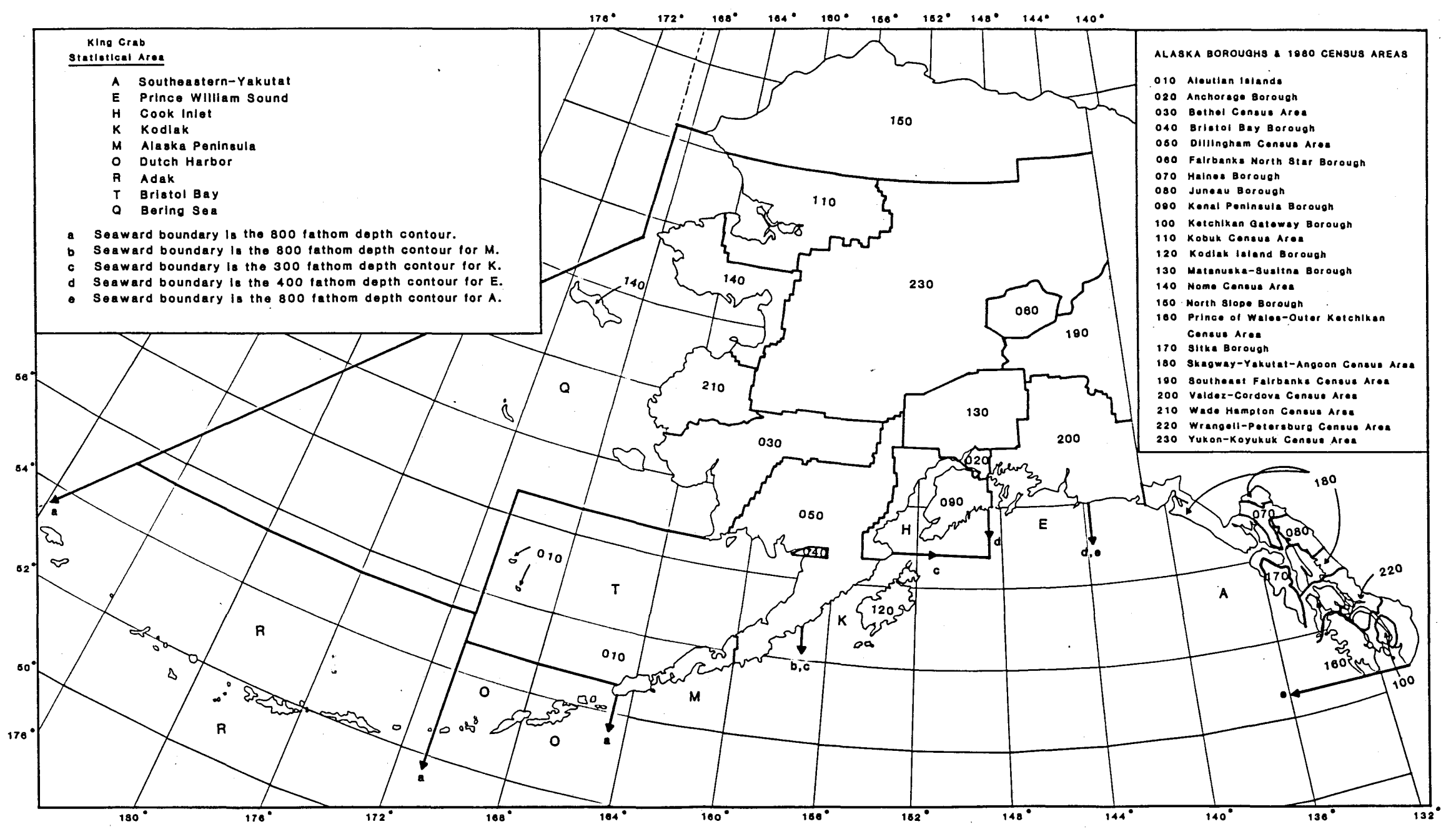
RECORD CUSTOM CANNING IN SPACES PROVIDED ON REVERSE SIDE OF FORM.

Figure 11 :

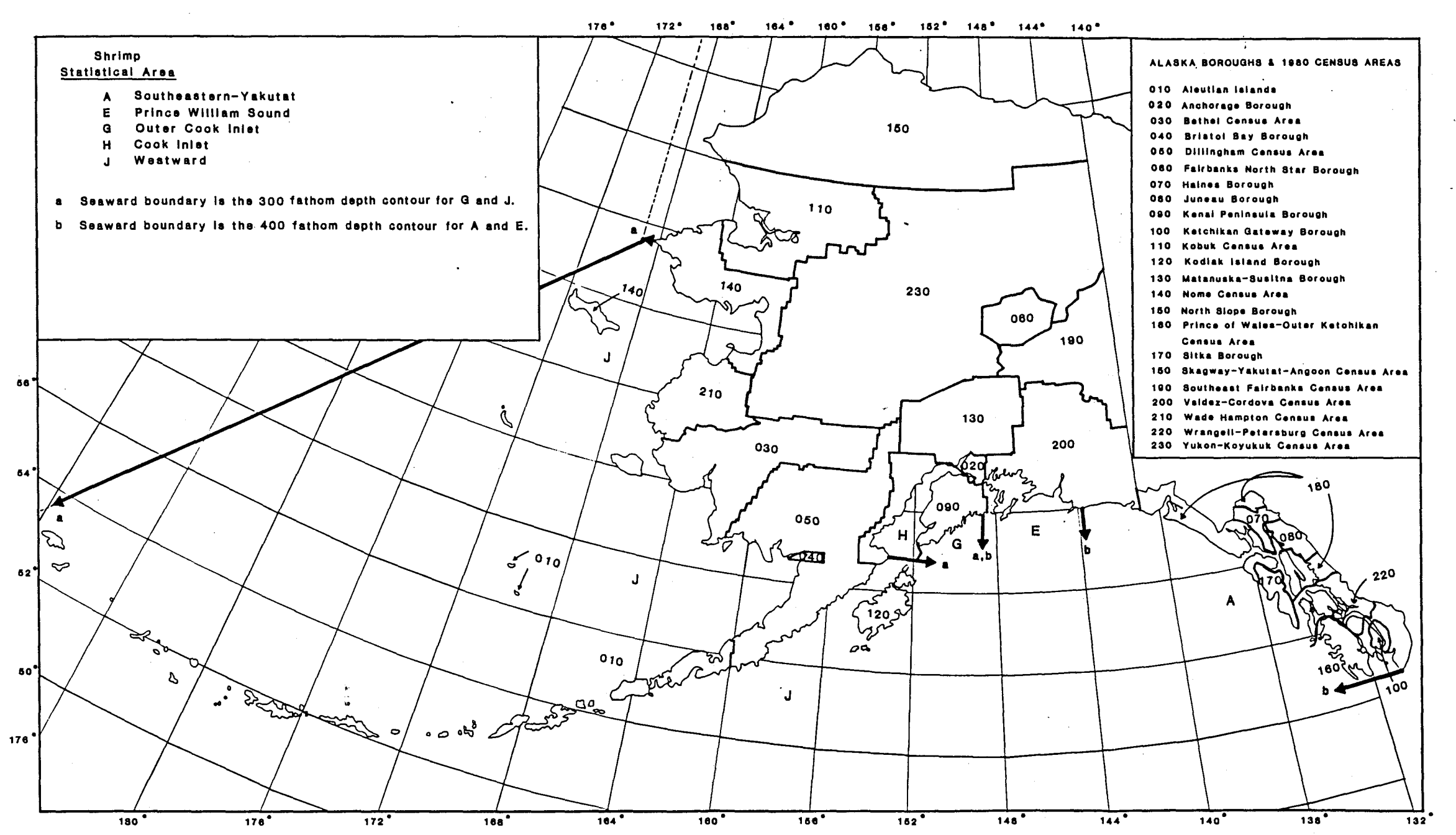
Information Systems in Commercial Fisheries

System Overview Diagram

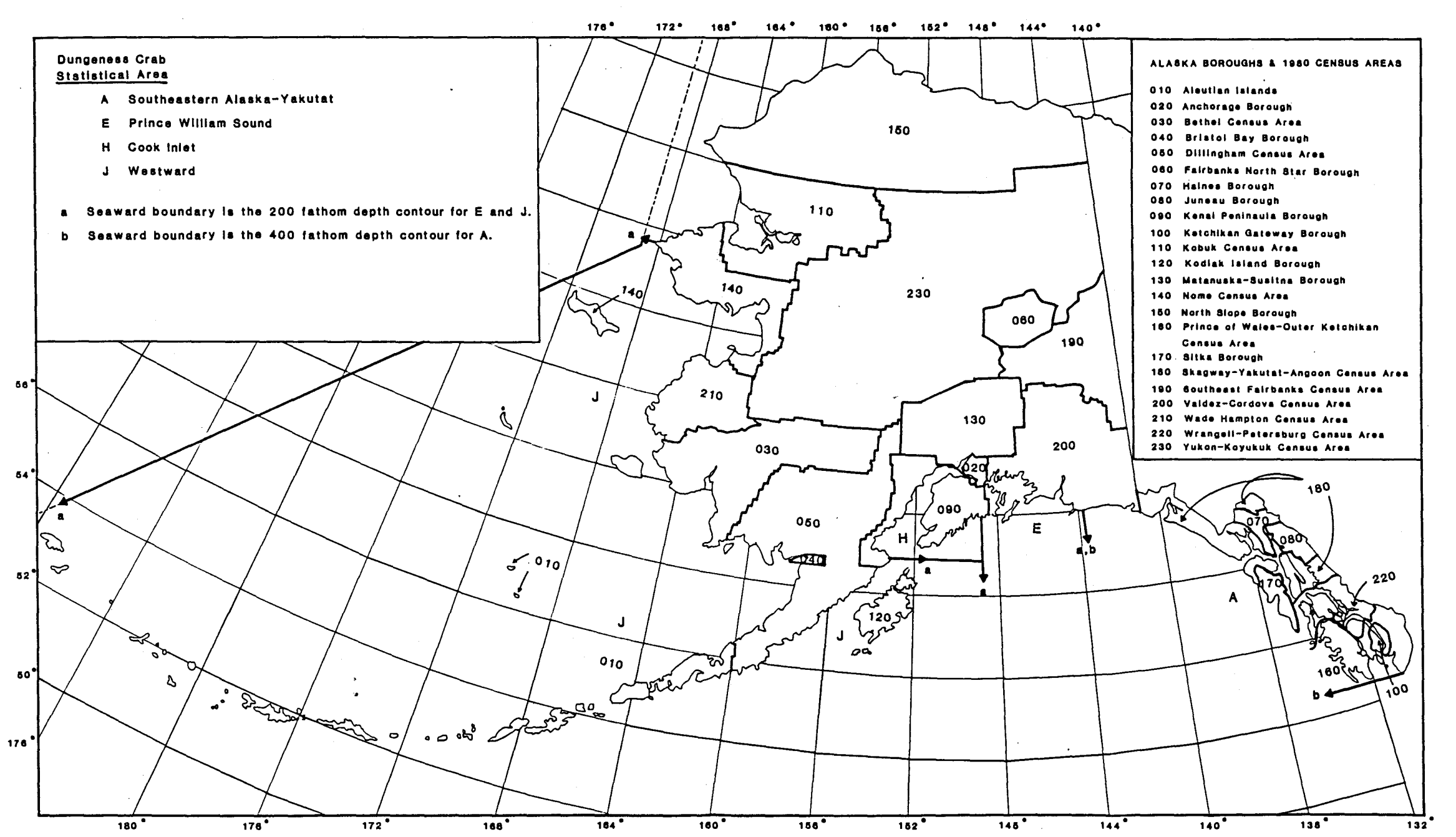




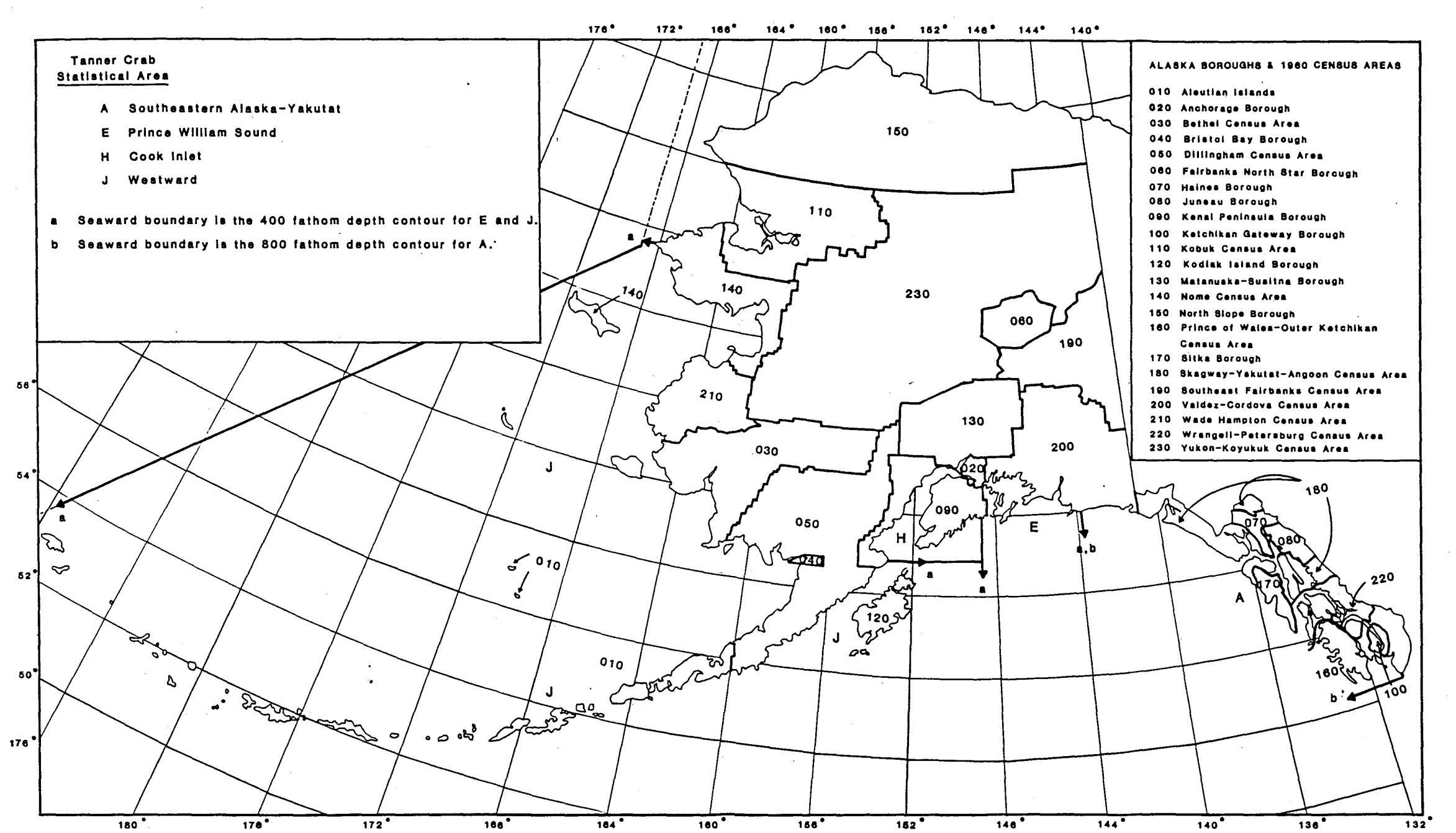
Map 3. ADF&G king crab commercial harvest statistical areas and 1980 Alaska census areas (ADF&G 1985, U.S. Bureau of Census).



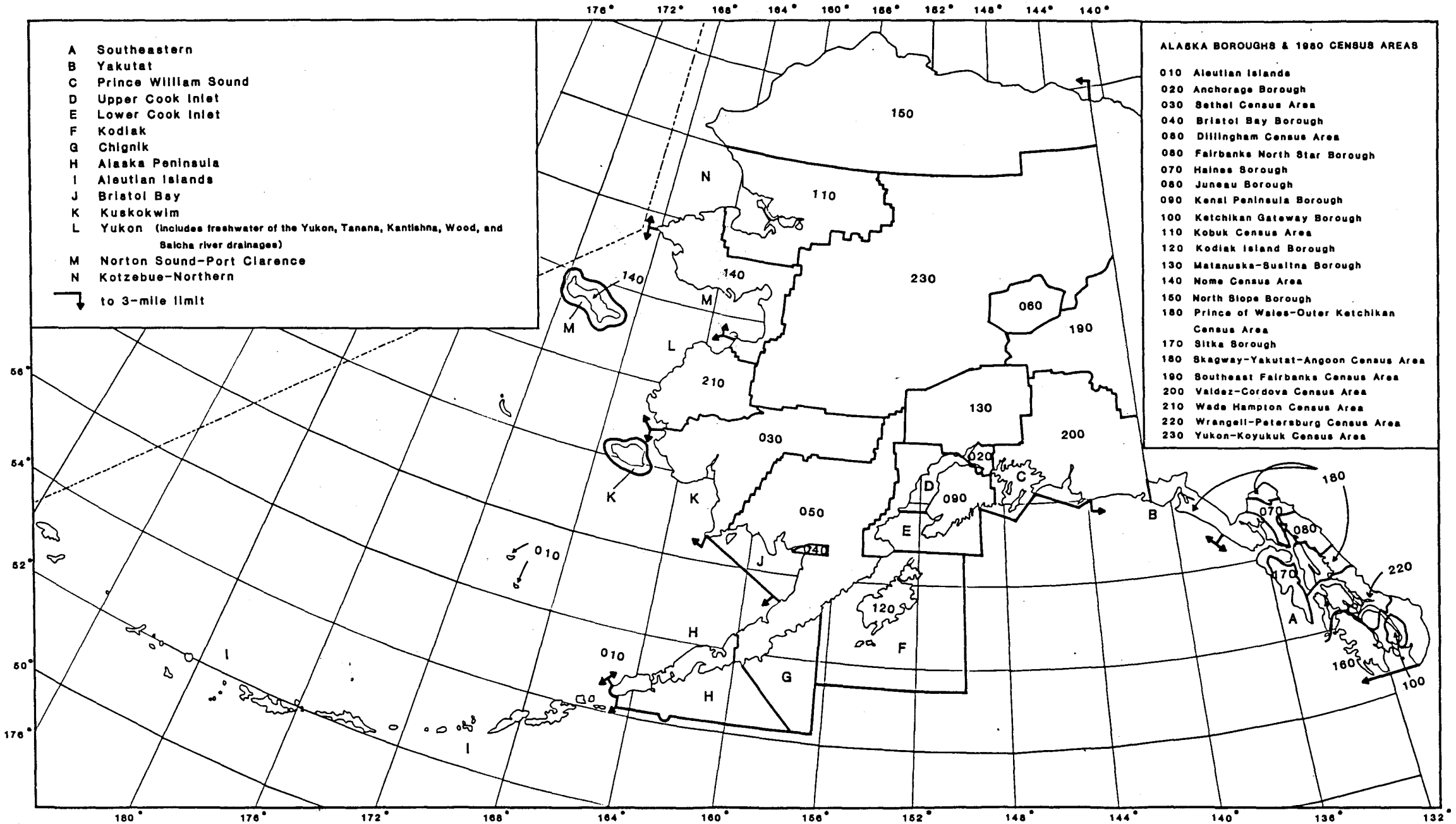
Map 4. ADF&G shrimp commercial harvest statistical areas and 1980 Alaska census areas (ADF&G 1985, U.S. Bureau of Census).



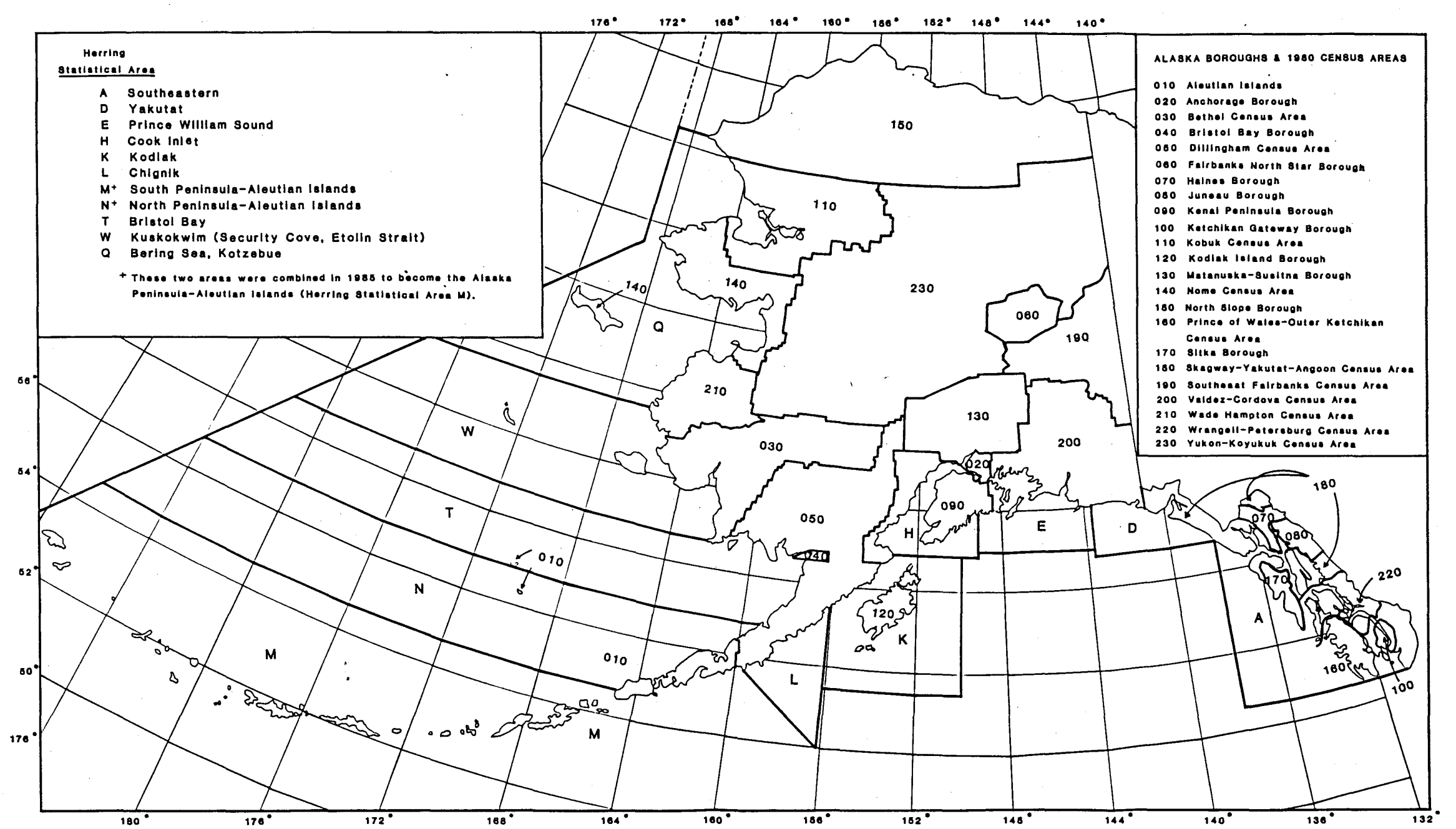
Map 5. ADF&G Dungeness crab commercial harvest statistical areas and 1980 Alaska census areas (ADF&G 1985, U.S. Bureau of Census).



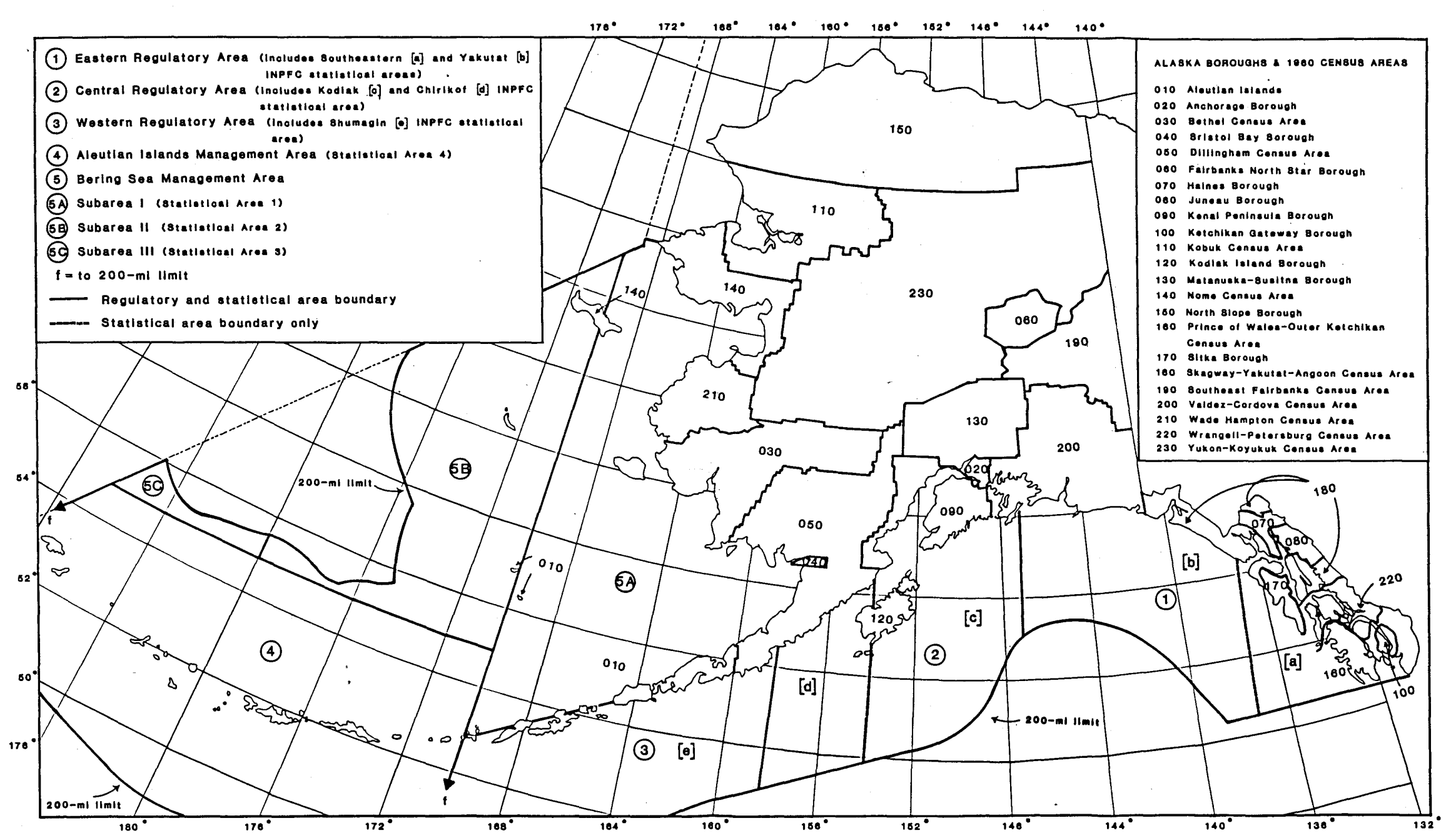
Map 6. ADF&G Tanner crab commercial harvest statistical areas and 1980 Alaska census areas (ADF&G 1985, U.S. Bureau of Census).



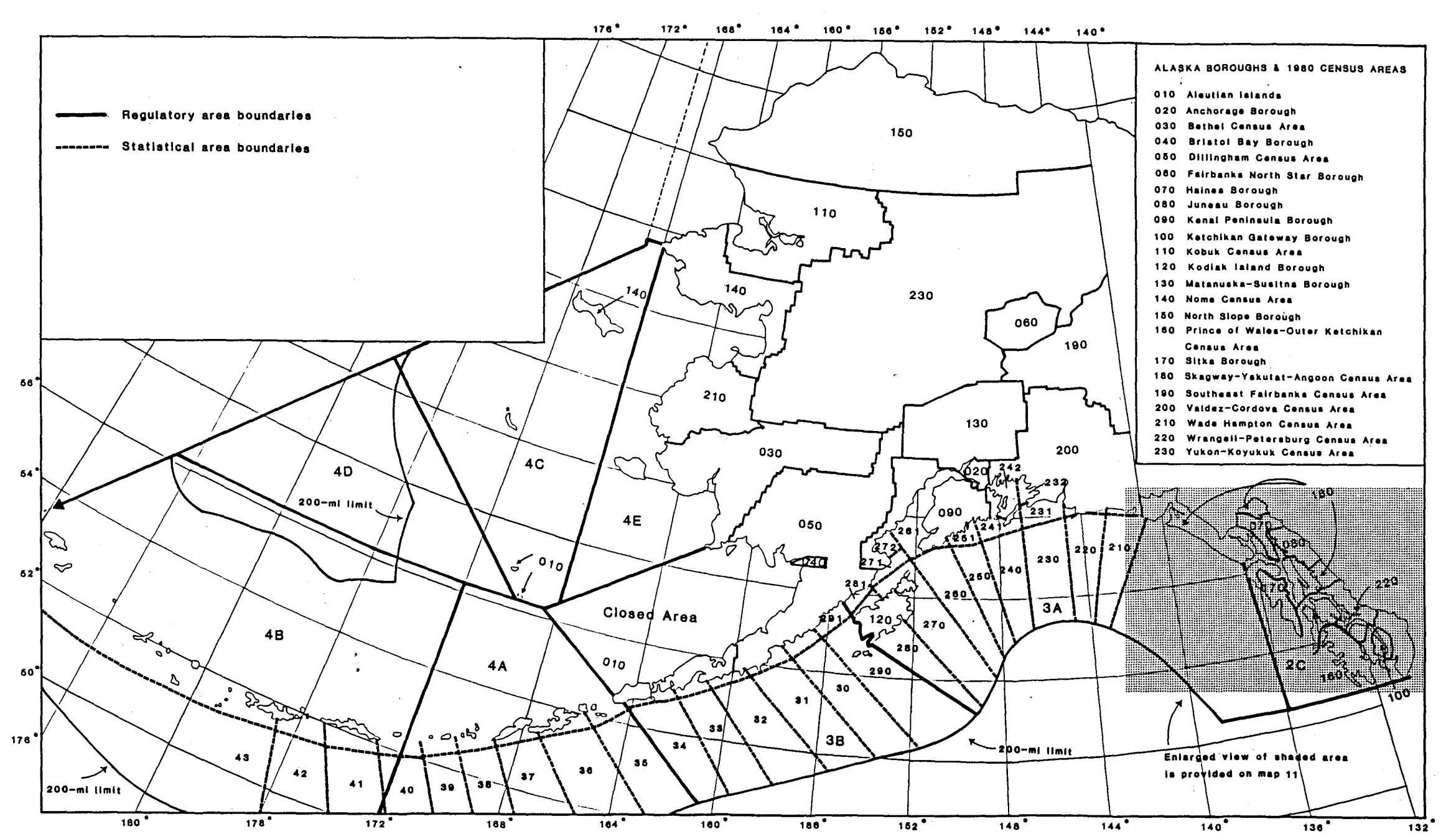
Map 7. ADF&G salmon commercial harvest management areas and 1980 Alaska census areas (ADF&G 1983, U.S. Bureau of Census).



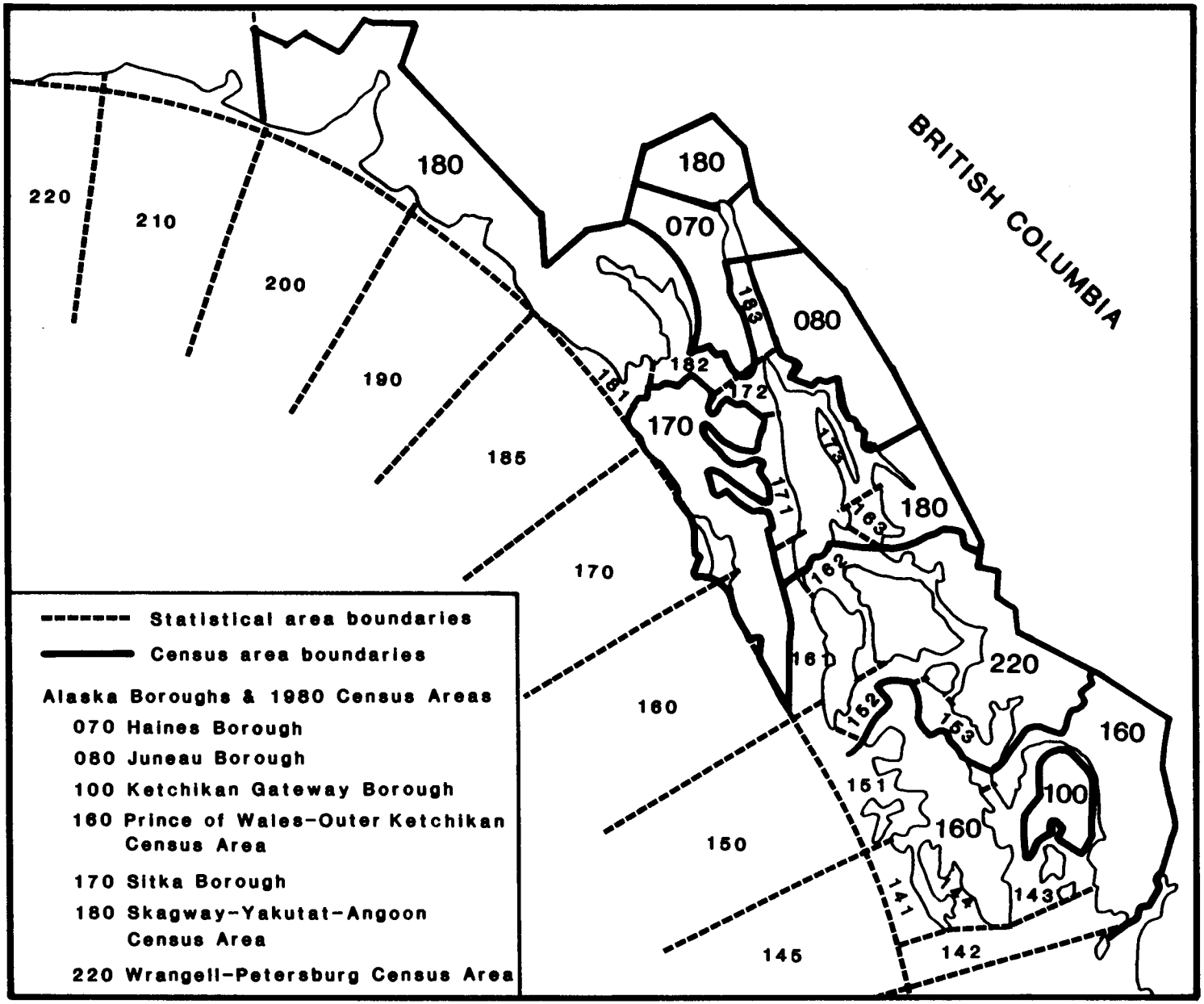
Map 8. ADF&G herring commercial harvest statistical areas and 1980 Alaska census areas (ADF&G 1983, U.S. Bureau of Census).



Map 9. NPFMC groundfish commercial harvest regulatory areas and 1980 Alaska census areas (NPFMC 1983a, 1983b; U.S. Bureau of Census).



Map 10. IPHC halibut commercial harvest regulatory and statistical areas and 1980 Alaska census areas (IPHC 1985, Myhre et al. 1977, U.S. Bureau of Census).



Map 11. IPHC halibut commercial harvest statistical areas for southeast Alaska and 1980 Alaska census areas (IPHC 1985, Myhre et al. 1977, U.S. Bureau of Census).

B. Alaska Commercial Fisheries Entry Commission

I. INTRODUCTION

The Alaska Commercial Fisheries Entry Commission (CFEC) is an independent quasi-judicial agency responsible for promoting the conservation and sustained yield management of Alaska's fisheries resources and the economic health and stability of commercial fishing by regulating entry into the fisheries in the public interest. The CFEC's three primary functions include adjudications, licensing, and research (CFEC 1985). (See fig. B.1 for an organizational chart of CFEC functions.) The CFEC produces an annual report that summarizes agency activities and publications.

The CFEC also maintains a number of data files that provide information for economic analyses and research on Alaska commercial fisheries. Of particular interest are the vessel license file, the permit action file, the estimated price series file, and the gross earnings file. The permit action file and the estimated price series file are used to develop the gross earnings file. The special CFEC computer run for the commercial fish sections of the Alaska Habitat Management Guides economic volume was developed from the gross earnings file.

II. VESSEL LICENSE FILE

This file principally contains information on vessel characteristics, which include vessel age, length, tonnage, engine type, horsepower, hold capacity, value, ADF&G and coast guard numbers, and an indication of the gear types the person licensing the vessel intends to use. Vessel licenses are required for boats used for commercial fishing, fishing charters, tender/packers, and freezer/canners. These data have been used to develop models for changes in vessel characteristics and investment patterns following limited entry legislation and net earnings calculations. This information is maintained on the CFEC computer.

III. PERMIT ACTION FILE

This file contains information on all state commercial fisheries entry permits. Data are maintained on permit identification number; fisheries' species, gear, and area; permit status; ADF&G vessel number; and permit usage. This file also contains vessel characteristics (similar to the vessel license file) for the vessel used in the permit fishery.

Permit transactions (renewals, transfers, revokes, suspensions) are recorded on this file and provide the basis for CFEC permit transfer reports. The permit file can also be crossed with a name file ("People

Alaska Commercial Fisheries Entry Commission Organization

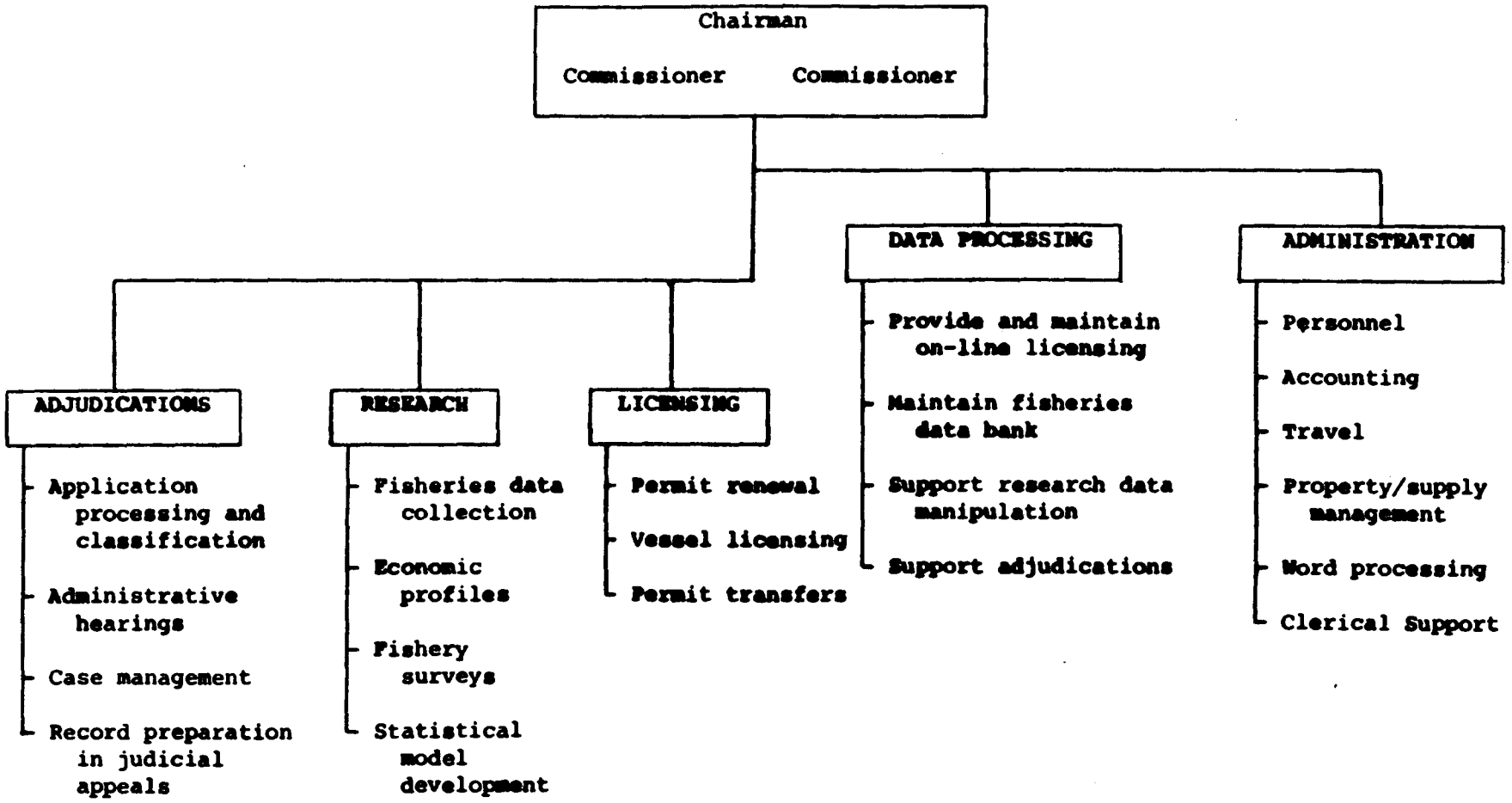


Figure B.1. The above organization chart presents a general view of the commission's primary functions. It by no means lists all functions undertaken to meet the commission's statutory responsibilities.

file") that provides information on the permit holder, including name, age, residency, and address.

The permit file is also maintained on the CFEC computer.

IV. PRICE SERIES FILE

In order to assign a catch value for each fish ticket item (and calculate gross earnings), the CFEC produces average price estimates for all commercially caught fish and shellfish in the state. These data are available from 1969. Average prices must be developed because a reliable catch value is not directly available from either the fish tickets themselves or from the commercial fishing industry (Dinneford 1982).

Catch value, although a bona fide category on fish tickets, is often not reported on the original fish ticket at the time of sale or, if present, is not data commonly entered during the Division of Commercial Fisheries mass fish ticket data entry. Fish tickets from the Southeast and Westward management areas have a relatively high percentage of value information. Values that are entered are not subject to any Division of Commercial Fisheries editing procedures (as is, for example, the "pounds" field). In addition, ex-vessel fish ticket prices do not reflect any after-season adjustments and/or bonuses (ibid.).

The source of fishing industry prices is the Processors Annual Report, prepared and tallied by the Computer Services section (Div. of Commercial Fisheries) of the ADF&G. Although these reports request that bonuses be included in the catch values, whether they actually are included is sometimes uncertain. In addition, the annual report forms do not distinguish between gear types for species other than salmon.

Until the 1981 average price computations, prices were developed by comparing ex-vessel prices as reported by Alaska processors in their annual reports (or, in earlier years, the Alaska Department of Fish & Game Statistical Aid Tables) with the ex-vessel prices from summarized fish ticket files and then selecting one of these prices as most accurate. This comparison and selection process was done almost entirely by hand and was subjective; incomplete data from either source prevented the use of systematic decision rules (ibid.).

Beginning with 1981 price computations, a computerized system of manipulating fish ticket and processor data was developed in order to more systematically estimate and document average prices. Information from the National Marine Fisheries Service (NMFS) Fishery Marketing News, ADF&G staff reports, reported marketing association agreements, etc., are also reviewed. These sources are generally used to

substantiate developed prices; occasionally, they are the primary source for nonsalmon species (ibid.).

The CFEC develops average prices because they, as well as other researchers and agencies coastwide, require an estimate of the value of Alaska's fisheries to develop aspects of fisheries policies. Once catch value has been estimated, gross earnings can be calculated and aggregated in a variety of ways, including by permit, by fisherman, by vessel, by area, and/or by residency status. Developing average prices specific to an area (which CFEC refers to as a price area) species, and gear type provides a very valuable source of economic data for Alaska's fisheries. CFEC average prices form the basis for most Alaska commercial fisheries economic analyses.

V. GROSS EARNINGS FILE

The CFEC gross earnings file is a very large and powerful data file that forms the basis for most commercial fisheries economic analyses in the state, as well as in this report. This file essentially merges entry permit, fish ticket (see Appendix A for detailed information), and CFEC price file information to develop gross earnings data. These data can be assembled in numerous ways to show gross earnings data by categories such as fishery, region, census area, permit number, residents of communities, and/or residency (as well as various other headings). Special computer runs are available from the CFEC. However, because of the complexities of the gross earnings file, requests should be carefully developed to ensure that the most useful results are obtained. It is especially important to examine differences in agency area boundaries or the different meanings of similar terminology. Tables on gross earnings by fishery and census area in this report were developed from a CFEC special computer run and are cited CFEC 1984 in the commercial fisheries text of this volume.

All gross earnings reports are subject to disclosure rules - i.e., no earnings can be reported in categories with three or fewer permits/firms/individuals.

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C. Alaska Department of Labor Database

I. INTRODUCTION

The Alaska Department of Labor (ADL) is responsible for the maintenance of a comprehensive database on employment activity in the state of Alaska. Data series and reports of the Research and Analysis Section provide information to a wide variety of users interested in economic activity. See table C.1 for an identification of report series. This appendix explains the portions of the ADL database, how ADL derives commercial fish-harvesting employment figures, and some of the problems with the database particular to Alaska that should be examined during project and planning review.

II. STATISTICAL QUARTERLY REPORTS: EMPLOYMENT AND PAYROLL STATISTICS

The principal sources of employment and payroll data are the quarterly reports of employers subject to the state unemployment insurance law and quarterly reports of federal agencies made in connection with the state administered program for unemployed federal workers. Wage and salary employment has been included in the Statistical Quarterly data since the first quarter 1964 (ADL 1982). Data are organized primarily by industry and census area.

The data are identified by industry in conformity with the Standard Industrial Classification Manual, U.S. Bureau of Budget, 1972 edition, which classifies businesses numerically on the basis of the principal activity conducted. This classification system covers all economic activity and was developed for purposes of facilitating data collection and analysis and promoting uniformity in the presentation of statistics by federal agencies, state governments, and private research organizations. Area classifications have been made on the basis of the 23 census areas defined in 1980 by the U.S. Department of Commerce (ADL 1982). (See table C.2 for a listing of Alaska 1980 census divisions and fig. C.1 for a map of census areas.)

Employment as reported is a count of the number of jobs that were filled during the pay period containing the twelfth day of each month and is considered a representative estimate for the month. This fairly arbitrary system avoids problems related to estimating employment for pay periods of different lengths (for example, week, two weeks, or month-long pay periods). This is not an unduplicated count of the number of individual workers because some workers may be reported for two or more employers because they hold two jobs or have changed jobs (ADL 1982). No distinction is made between part-time, full-time, and overtime jobs.

The job-count employment estimates are usually considered an appropriate measure of the demand for labor in the state. This is only true, however, if the relationship between average hours worked and persons employed remains constant. In practice, instead of demanding a particular number of employees, an employer demands a number of labor work hours in order to produce an end product. This measure of employment is called full-time equivalents (FTE) and is derived by multiplying the actual number of employees by the average hours worked and dividing by 40. As an indicator of how income and output in the Alaska economy are changing, "FTE workers" is a superior unit of measurement to "persons employed" or job counts (Lane 1982).

For planning purposes, however, where a major concern is the measurement of impacts from a proposed project, neither FTE workers nor persons employed constitute an adequate measure in themselves. Instead, a labor market impact assessment requires not only a knowledge of FTE workers employed and number of jobs created but also the types of jobs created. The interaction of these three aspects of labor demand determines both a local labor market's response to a proposed project and any resulting population immigration (ibid.).

Knowing the types of jobs created (government or private sector, basic or support sector) is necessary because the unique structure of Alaska's economy makes the potential divergence between hours worked (FTE) and persons employed (job counts) both more and less important than elsewhere in the United States for understanding changes in the demand for labor. Government (federal, state, and local) accounts for about one-third of the total average monthly wage and salary employment. This employment is seasonally very stable, and personnel practices discourage the use of overtime and part-time workers. This stability implies that changes in the number of jobs are a good measure of changes in the government's total demand for labor (ibid.).

For Alaska's private employers, however, the use of overtime and part-time workers is prevalent, and seasonal instability is characteristic of many industries. On average, seasonal FTE troughs are lower and the peaks higher than those of actual worker counts. Therefore, the seasonal fluctuation in labor demand measued in FTEs (especially in manufacturing), is greater than that implied by the changes in actual wage and salary employment measued in job counts (ibid.).

The use of FTE versus actual worker numbers can also produce different results in the regional economic analysis in the economic base model, where changes in the basic-sector (manufacturing) industries produce changes in the nonbasic (support) sector. This is referred to as the multiplier effect. Changes in the total regional or local economy are measured through the multiplier process from the change in basic-sector industries. Lane (1982) found that multipliers calculated from actual worker counts were approximately 25% greater than multipliers calculated from FTE workers. This implies that in Alaska the use of actual wage and

salary worker counts to estimate induced support-sector impacts can cause overestimates of about 25%. The reason for this is that there are differences in how Alaska's basic-sector industries and support-sector businesses utilize their work forces because of the seasonality of Alaska's employment.

Employment in most of Alaska's basic industries (for example, mining, seafood processing, timber) fluctuate seasonally, and many manufacturing establishments are isolated from the state's population centers. Under these conditions, employers have a strong incentive to vary employee work time rather than employee numbers. For the manufacturing sector of the economy, this results in FTE figures indicating a higher monthly average employment (and a larger seasonal swing from peak to trough) than the actual number of wage and salary workers.

The opposite occurs in nonbasic or support sectors such as retail trade that are normally concentrated around population centers and regularly use part-time and temporary workers to adjust their work forces to seasonal fluctuations in labor demand. This results in actual wage and salary workers having higher average monthly employment than the FTE figures.

This combination of actual wage-and salary-worker estimates being lower than the FTE estimates in the basic sector and higher in the nonbasic (support) sector is what causes the basic employment multipliers derived from actual worker data to regularly overestimate the secondary employment impacts induced by a change in basic employment. These in turn will regularly overestimate the population effects of increases in secondary employment.

Another factor to consider when assessing labor-market impacts of a proposed project is that most regional and small-area economies in Alaska are relatively undeveloped and the addition of a major new employer will not only change the level of activity but will also change the structure of the local (or regional) economy (ibid.). Therefore, for all these reasons, in analyzing area or development plans (especially where employment is identified as a policy objective), the regional and local economic characteristics, FTE workers employed, number of jobs created, and types of jobs created all need to be considered to fully evaluate the accuracy of findings or projections.

III. FISH HARVESTING AND PROCESSING EMPLOYMENT

Fish-harvesting employment is not included in the ADL Statistical Quarterly Reports because it is self-employment. (Self-employed persons, unpaid family help, domestics, and subsistence users are significant "working" segments not included in the ADL quarterly reports.) For this reason, fish-harvesting employment and wages are added to nonagricultural wages and salary employment figures when making comparisons between the

fishing industry and other employment and income. On the other hand, fish-processing employment is considered nonagricultural employment. Therefore, no adjustments need to be made for the purpose of making comparisons between fish-processing employment and other nonagricultural wage and salary employment (Thomas 1985).

Because of the significance of the fishing industry to Alaska, extensive information must be available in order to make effective policy and management decisions for the fishing industry. Until recently, a systematic estimation of fish-harvesting employment had not been completed. Periodic estimations of fish-harvesting employment have been performed previous to 1977, but estimates to provide a time series of employment (statistics over time) had not been completed until the Department of Labor, Research and Analysis Section, developed the analysis of fish-harvesting employment that is published annually in a separate publication entitled Alaska Seafood Harvesting and Processing Employment. Seafood processing employment data are available monthly in Alaska Economic Trends as well as in the food and kindred products sector of manufacturing employment in the ADL Statistical Quarterly Reports (ibid.).

Many problems arise when trying to make an accurate count of fish-harvesting employment. Throughout the season, fishermen may fish for more than one species, use more than one gear type, and fish more than one area. These transitions make it difficult to establish an actual count of fish-harvesting employment. To overcome these limitations, a methodology was developed by Rogers and Listowski to estimate fish-and seafood-harvesting employment by species, gear type, area fished, and month. (For a more detailed discussion of this methodology, see Rogers et al. 1980 and Thomas 1985.)

Another problem with the presentation of employment related to commercial fisheries is the use of average annual figures, which in most cases do not give an accurate portrayal of harvest patterns or the seasonal importance of income and employment in fisheries. Rogers et al. (1980) added a peak month of employment to annual figures to strengthen the reliability of the presentation of the data.

Six regional labor market areas (Southeast, Gulf Coast, Anchorage/Mat-Su, Southwest, Interior, and Northern) were established by the Alaska Department of Labor to report labor force and employment data. For fish-harvesting employment information to conform to these areas it was necessary to consolidate fish-reporting regions into new groupings. More than 25 salmon, shellfish, and halibut management areas were combined into the following nine study regions: Southeast, Prince William Sound, Cook Inlet, Kodiak, Aleutians, Bristol Bay, and Arctic/Yukon/Kuskokwim (AYK). These smaller regions were used to establish the appropriate crew factors and analyze the rough employment numbers for reliability. Employment tables for these nine regions are available from R&A upon request. These were then aggregated into the four coastal labor market

areas: Southeast, Gulf Coast, Southwest, and Northern. Comparisons among areas are in table C.3 and figure C.2. The Northern region encompasses all of the AYK area plus the Bethel and Wade Hampton census areas because of disclosure regulations. Maps 3-11 in appendix A.1, Division of Commercial Fisheries, illustrate the relationship between fisheries management areas and 1980 Alaska census areas.

IV. UNEMPLOYMENT STATISTICS

The U.S. Bureau of Labor Statistics (BLS) is responsible for providing technical assistance and methodological structure for state agencies who prepare labor force estimates. In recent years, the methodology provided by BLS has been modified to make the labor force estimates prepared by the individual states more comparable and internally consistent. In their labor force classification scheme, employed refers to a person 16 years of age or older if she/he worked for pay or profit in a business or farm or worked 15 hours or more in a week (referred to as the reference week) as an unpaid family worker or had a job but was temporarily absent because of illness, bad weather, vacation, or labor-management dispute; unemployed refers to a person who had no employment in the reference week, was available for work, and actively sought work at any time in the past four weeks; and not in the labor force refers to a person neither "employed" nor "unemployed." The unemployment rate is the proportion of the labor force that is unemployed (i.e., unemployed divided by the total labor force, where the labor force is the employed plus unemployed). The monthly labor force estimates published by the Alaska Department of Labor are based on these definitions (Brown et al. 1981).

Thus, employment figures reflect estimates of the number of people who worked for one hour or more during the reference week, whereas unemployment estimates concern primarily those who actively sought work within the past four weeks. Those persons who have not actively sought work (even though they may have wanted to work) are considered out of the labor force and therefore would not appear within the estimates of unemployed persons. This is a fairly narrow definition of unemployed that accounts for much of the perceived difference between published rates of unemployment and the proportion of people not gainfully employed to which some refer to as "unemployed" (ibid.).

Even though area unemployment rates published by the ADL Research and Analysis Section are carefully developed, periodically reviewed, and sanctioned by BLS, their accuracy has been seriously questioned by various individuals and organizations. The most severe criticism comes from rural areas of the state and is usually based on the contention that the published rates far understate the "real" level of unemployment (ibid.).

Brown et al. (1981) conducted a household employment survey in rural western Alaska. Their survey results indicate that official labor force

estimates overestimated the labor force by 34% and total employed by 55% while underestimating total unemployment by 28%, which resulted in an unemployment rate 10 percentage points below the "real" rate. A broadened definition of unemployment that includes discouraged individuals would provide more accurate unemployment figures, especially in rural Alaska. ADL unemployment rates in this report are based on standard definitions and should be viewed in the context of these recognized problems.

Table C.1. ADL, Research and Analysis Section, Report Series

Report	Description
Alaska Economic Trends (monthly)	Current economic conditions of Alaska, including articles of economic interest, labor force data (by region), and aver age hours and earnings in selected industries.
Statistical Quarterly (quarterly)	Statistical tables covering nonagricul tural wage and salary employment and earnings by industry and census area.
Alaska Fish-Harvesting Employment (annual)	Provides estimates of fish-harvesting employment on a basis comparable to the nonagricultural wage and salary employ- ment statistics published in the Alaska Economic Trends and Statistical Quarterly.
Alaska Planning Information (annual)	A comprehensive publication of labor market information containing useful planning information for Job Training Partnership Act (JTPA), businesses, government agencies, and the Alaska public. Includes data on labor force, wage and salary employment, industry forecasts, population characteristics, cost of living measures, income measures, and area descriptions.
Alaska Population Overview (annual)	Official population determinations for Alaska, census areas, and all incorp- orated places. Includes historical population data and contains state population projections and special reports on related population projects.
Geographic Classification Manual	A detailed geographical coding system based on Alaska's 23 census areas (and including all organized boroughs), 24 census subareas, over 100 specially created geographic subareas, and all cities, towns, villages, and census- designated places with a population of 25 or more (1970 population). Revised in 1983.

(continued)

Table C.1 (continued).

Report	Description
Alaska Report on Equal Employment Opportunity	Seven reports designed to provide labor market information to assist employers in evaluating the utilization of women and minorities in their work forces.
Alaska Occupational Information (annual)	A comprehensive publication of current and projected occupational employment in Alaska and selected areas; a five-year projection of the number of job openings (that result from industry growth plus death and retirement) for more than 500 occupations; occupational supply and demand; the average wage and number of current job openings in Alaska and each of 19 Job Service offices; a bibliography of selected occupational analyses; and a technical discussion of the sources and reliability of occupational information.
Alaska Occupational Injury and Illness Information (annual)	A statistical report on work-related injuries and illnesses in Alaska's work force. Two major sections of the publication concern ongoing statistical programs: (1) annual OSH survey, which provides industry incidence rates, and (2) time-loss injury characteristic data based on reported workers' compensation claims. Additional sections cover a special study of accidents in Alaskas's logging industry, fishing industry injury statistics, statistics not elsewhere available, selected geographic area data on workers' compensation time-loss cases, and a section on the recording and reporting of the job injuries.
Unemployment Insurance Actuarial Report (biennial)	Study of Alaska's unemployment insurance (UI) system focusing on the benefit and tax structures. Includes overview of the current UI system and an analysis of fund adequacy with respect to potential benefit obligations.

(continued)

Table C.1 (continued).

Report	Description
Wage Rates for Selected Occupations (annual)	Presents results of an entry-level wage survey of approximately 1,200 employers and 195 occupations. Data are provided by economic region.
AK'CENS (census newsletter)	Updated information on available census products, including schedule of U.S. Census Bureau releases (census tapes, publications, etc.). Also articles on demographic trends and quality evaluation of census data.

Source: ADL 1984.

Table C.2. Alaska Census Areas, 1980

Aleutian Islands
Anchorage Borough
Bethel
Bristol Bay Borough
Dillingham
Fairbanks North Star
Haines Borough
Juneau Borough
Kenai Peninsula Borough
Ketchikan Gateway Borough
Kobuk
Kodiak Island Borough
Matanuska/Susitna Borough
Nome
North Slope Borough
Prince of Wales-Outer Ketchikan
Sitka Borough
Skagway-Yakutat-Angoon
Southeast Fairbanks
Valdez-Cordova
Wade Hampton
Wrangell-Petersburg
Yukon-Koyukuk

Source: ADL 1982.

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D. ADF&G, Division of Sport Fish, Database

The primary source of information on sport fisheries is the annual Federal Aid in Fish Restoration reports (commonly called "D-J" reports) prepared by the Division of Sport Fish. The reports include results of research projects and management actions and statewide harvest information. Raw data for the reports come from a variety of sources, including creel censuses, postal surveys, and biological sampling from both the field and the laboratory. Information from these sources can be organized into three broad categories: 1) harvest and effort, 2) economic, and 3) biological.

A. Harvest and Effort Information

The two main sources of harvest and effort information in Alaska's sport fisheries are on-site creel censuses and the statewide postal harvest survey.

1. On-site creel censuses. Some sport fisheries must be carefully monitored during the fishing season to provide protective in-season management or to ensure compliance with regulatory and management policies, quotas, or guidelines. For these fisheries, on-site creel censuses may be conducted. Fishermen are interviewed in the field, and their catch (number, species, and size of fish harvested or caught and released) and effort (hours fished) are recorded. It is usually impossible to interview all anglers harvesting a specific stock; however, periodic counts of anglers can be made, and the harvest statistics from fishermen who were interviewed can be extrapolated to estimate total harvest.

   Results of on-site creel censuses are in the Federal Aid in Fish Restoration reports for the specific fishery. For instance, on-site creel census results for the 1983 Kenai River chinook salmon fishery are in the report titled Evaluation of Chinook Salmon Fisheries of the Kenai Peninsula (Hammarstrom and Larson 1984).

2. Statewide postal harvest survey. The statewide harvest survey was implemented in 1977. Survey forms are mailed to a random sample of resident and nonresident anglers who purchased a sportfishing license in Alaska for the current year. (License information comes from the Department of Revenue's sport license data file.) Anglers are asked to report where they and members of their household fished during the year, how many days they fished at each location, and how many fish of each species they harvested.

The results are extrapolated to derive estimates for total sport harvest and effort in Alaska. Estimates of harvest and effort are also calculated for specific lakes and streams that receive a significant amount of effort each year and for each of 25 postal survey areas in the state. Results of the statewide harvest survey for each year are contained in the Federal Aid in Fish Restoration reports, Project SW-1: Statewide Harvest Study (Mills 1979-1984). Copies of the survey form for each year are included as an appendix in those reports. Summary tables of the results are also included in the Sport Use of Freshwater Resident and Anadromous Fish Species narratives found in volume 2 of the Alaska Habitat Management Guide for each region.

When using data from the Statewide Harvest Study, it is important to remember that harvest data include only those fish caught and kept, not those caught and released. This makes harvest totals that are of the most direct importance for management readily available. The importance of recreational fisheries, however, where catch and release is a common practice, may be underestimated if evaluated on the basis of these data alone.

It is also important to remember that sport harvest estimates from the Statewide Harvest Study for fisheries that attract relatively few anglers may not be as precise as estimates for those that attract a large number of anglers. This is true for many fisheries that may be important within a region but that attract only a small percentage of the total statewide sport fishing effort.

B. Economic Information

Postal surveys have been used by the Division of Sport Fish to gather information on the economic impacts of specific sport fisheries in the state. From 1980 to 1983, the division mailed surveys to participants in specific Southcentral Alaska and Kodiak area sport fisheries in an attempt to assess direct economic impacts (such as actual angler expenditures) as well as nonmarket, or consumer's surplus, values. Surveys were mailed to anglers contacted during creel censuses who indicated they would be willing to respond to an economic survey. Editing and analysis of these surveys have not been completed and will not be available for inclusion in the Alaska Habitat Management Guides project economic volume.

A major economic study of sportfishing in Southcentral Alaska is now underway. Resident and nonresident anglers, sportfishing guides, and related service-sector businesses are being contacted to determine the impact of sportfishing in Southcentral on the local, regional, and state economies. The survey is being conducted by a private consulting firm under contract to the state and is scheduled to be completed by

June 1987. One potential application of the data is the development of a behavioral choice model. This model would predict use patterns of a fishing site based on angler preferences expressed during the economic survey.

C. Biological Information

Biological sampling data of various kinds collected by division personnel from the field and laboratory are another major data source for numerous research projects and studies. Biological data such as weight, length, species composition, and scale samples of microwire-tagged fish are collected by field personnel during creel censuses. Some biological information forms the basis for economic analyses. Information on stock separation, for example, is essential for analyzing the economic importance of particular habitat areas. Narrative descriptions of all sport fish research projects can be found in the annual Federal Aid in Fish Restoration reports.

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F. Abbreviations

ACMP	Alaska Coastal Management Program
ADCED	Alaska Department of Commerce and Economic Development
ADCRA	Alaska Department of Community and Regional Affairs
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADL	Alaska Department of Labor
ADNR	Alaska Department of Natural Resources
ADR	Alaska Department of Revenue
AEIDC	Arctic Environmental Information and Data Center
AOU	American Ornithological Union
BBCMP	Bristol Bay Cooperative Management Plan
BLM	Bureau of Land Management
CFEC	Commercial Fisheries Entry Commission
CIRPT	Cook Inlet Regional Planning Team
EPA	Environmental Protection Agency
EPS	Environmental Protection Service (Canada)
ERL	Environmental Research Laboratory
FAO	Food and Agriculture Organization of the United Nations
GMS	Game Management Subunit
GMU	Game Management Unit
IMS	Institute of Marine Science
INPFC	International North Pacific Fisheries Commission
IPHC	International Pacific Halibut Commission
IUCN	International Union of Conservation of Nature and Natural Resources
ISEGR	Institute of Social, Economic and Government Research
LCI	Lower Cook Inlet
MMS	Mineral Management Service
NEGOA	Northeast Gulf of Alaska
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

NPFMC	North Pacific Fishery Management Council
NPS	National Park Service
NWAFC	Northwest and Alaska Fisheries Center
NWR	National Wildlife Refuge
OCSEAP	Outer Continental Shelf Environmental Assessment Program
OMPA	Office of Marine Pollution Assessment
PWS	Prince William Sound
PWSRPT	Prince William Sound Regional Fisheries Planning Team
UCI	Upper Cook Inlet
USDC	United States Department of Commerce
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USDL	United States Department of Labor
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service