31st Annual Report of the

PACIFIC MARINE FISHERIES COMMISSION

FOR THE YEAR 1978

TO THE CONGRESS OF THE UNITED STATES AND TO THE GOVERNORS AND LEGISLATURES OF WASHINGTON, OREGON, CALIFORNIA, IDAHO, AND ALASKA

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To the Congress of the United States and the Governors and Legislatures of the Five compacting States, Washington, Oregon, California, Idaho and Alaska, by the Commissioners of the Pacific Marine Fisheries Commission in Compliance with the State Enabling Acts Creating the Commission and Public Laws 232; 776; and 315 of the 80th; 87th; and 91st Congresses of the United States Assenting Thereto.

Respectfully submitted,
PACIFIC MARINE FISHERIES COMMISSION

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PREFACE

The Pacific Marine Fisheries Commission was created in 1947 with the consent of Congress. The Commission serves five member States: Alaska, California, Idaho, Oregon and Washington. The Commission's goals are to promote the wise management, development, and utilization of marine, shell and anadromous fisheries which are of mutual concern, and to develop a joint program of protection, enhancement and prevention of physical waste of such fisheries. 1978 marks the 31st year of effort by the Pacific Marine Fisheries Commission and its member States toward these goals.

The Fishery Conservation and Management Act (FCMA) of 1976 has made a dramatic change in the fisheries of the United States. The FCMA created the Fishery Conservation Zone (FCZ) between three and two hundred nautical miles off our coasts, established eight Regional Fishery Management Councils with authority to formulate management plans for fisheries resources within the FCZ, and granted the Secretary of Commerce the power to regulate both domestic and foreign fishing fleets within the FCZ. With these three actions, the FCMA greatly modified the fisheries management role of the United States at the interstate as well as State-Federal and international levels.

The operational role of the Pacific Marine Fisheries Commission has changed somewhat due to the FCMA. The Commission provides a communication exchange between the Pacific and North Pacific Regional Councils especially on fisheries in state waters. The Commission also provides a mechanism for federal funding of regional fishery projects of the Pacific States. Resolutions formulated by agency and industry representatives serve as a base for Commission action, and the Commission plays an important advocacy role for state fisheries in interactions with NMFS, NOAA, and the Congress. Finally, the Commission provides information in the form of data series for various fisheries.

This year's Annual Report emphasizes the evolving role of the Pacific Marine Fisheries Commission in fisheries management under FCMA. The Annual Meeting had symposia on underutilized fisheries on the West Coast and the improvement of upriver habitat for salmon and steelhead production. Also, eleven resolutions were passed at the Annual Meeting, and the Executive Committee directed the Executive Director to analyze the functions of*the Commission. Finally, the activities of various committees and the status of Pacific Coast fisheries were reviewed.

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ANNUAL MEETING EVENTS

The 1978 Annual Meeting was held October 17-19 at the Northshore Motor Hotel and Convention Center in Coeur d'Alene, Idaho. A summary of the meeting's major events appears below. In addition. Commission elections were held: all changes are included in the *Personnel* section under *Administrative Support* on page 27.

Symposium: West Coast Development of Underutilized Fisheries

Panelists for the symposium on development of underutilized fisheries were: Robert L. Demory of the Oregon Department of Fish and Wildlife and Chairman of the Groundfish Management Plan Development Team for the Pacific Fishery Management Council; Michael B. Fraser of the Pacific Marine Fisheries Commission and Principal Investigator for the West Coast fisheries development foundation project; Henry Haugen, Counsel for the Fisherman's Marketing Association of Washington; and Ted Smits representing the Association of Pacific Fisheries. A summary of the panelists' presentations and the audience's comments follows.

The Panel

Robert L. Demory reviewed the species that are capable of supporting substantial fisheries. Off Alaska, pollock is the single most dominant species and its annual harvest can exceed a million metric tons, most being caught in the Bering Sea. By comparison, off Washington, Oregon, and California, Pacific whiting or hake is the single most important species that is underutilized "domestically and its harvest could be about 200,0Q0 m.t. in 1979; The extensive foreign fisheries have shown that Pacific whiting is readily available and represents the greatest harvest potential off California, Oregon, and Washington.

Other species are available. Off Washington and Oregon, sharks, skates, rays and ratfish probably could support a harvest of 10,000 m.t. At the height of the shark liver fishery in the late 1940's, approximately 52,000 m.t. of shark were landed. There obviously exists a great potential for harvesting shark.

The arrowtooth flounder, currently underutilized, has the greatest potential for expansion of the flatfish fishery under Pacific Council jurisdiction: its harvest off Washington and Oregon could yield annually up to 5,000 m.t. The waters off Washington and Oregon have been emphasized in these estimates because information has been gathered from extensive trawl surveys on the continental shelf and upper slope waters off those two states conducted by Oregon Department of Fish and Wildlife. However, not much is known yet about the vast resource off California. A rockfish survey completed in 1977 indicated extensive stocks of shortbelly rockfish with an estimated annual yield of 59,000 m.t. This species is much more pelagic than other rockfish species.

In conclusion, Demory pointed out that hake, or Pacific whiting, is the single most important species capable of increased domestic harvest off California, Washington, and Oregon. If all species presently caught in the trawl fishery were utilized, total production probably would increase by one third.

Michael B. Fraser provided a brief overview of the fisheries development foundation project. This project, funded by National Marine Fisheries Service (NMFS), was initiated at the request of industry representatives from Humboldt Bay, California. PMFC's basic role is to provide staff assistance. The project is designed to center on various members of industry directly concerned with fisheries development. It was imperative to have advice from certain key industry advisors as early as possible. Advice was solicited from the Groundfish Advisory Panel for the Pacific Council and from Working Team "A" at PMFC's 1978 Annual Meeting, concerning five key questions. First, is a new organization needed to assist the fishing industry in fisheries development or could the role of an existing institution be modified? Second, what should be the role or services of a new or modified institution? Third, what should be the geographic boundaries of the institution? Fourth, who should participate? Finally, what are alternative schemes for financial support? Fraser ended his presentation by indicating that the next two panelists, both industry representatives, would discuss these key questions.

, Henry Haugen presented the views of fishermen. He, working together with Dennis Grotting, represents the trawl fleets off Washington, Oregon, and California. Haugen indicated that a new institution is necessary because existing ones are not working. The regional fishery management councils have more or less been told that their role is limited to management and does not include developing commercial fisheries. Further, NMFS is reexamining its role in developing commercial fisheries and this role is decreasing. Thus there is a need for some new institution devoted solely to commercial fisheries development.

Haugen said that experiences in other regions were examined. These include the Alaska Fisheries Development Corporation, the Pacific Tuna Development Foundation, a New England Fisheries Taskforce, and a Gulf and South Atlantic Fisheries Development Foundation. Michael Fraser is inquiring of these existing fisheries development organizations about their experiences, their success record, and their problems. Future choices will be clearer when that information is available.

The geographic range of any new institution should include only Washington, Oregon and California. Including Alaska would increase the scope beyond what could be accomplished productively, and Alaska already has formed a development corporation.

The role of the organization is undetermined now. Experiences of others include a very successful demonstration fishery for albacore off Midway, an exploratory fishing program for Spanish mackerel for the Gulf and South Atlantic Foundation, and clearing of underwater obstructions in the Gulf of Mexico. These projects have been quite useful.

Off California, Oregon and Washington is the hake situation. Though it's the largest resource, the market value to U.S. fishermen is close to zero. Though NMFS has done substantial work over the years, there still is no substantial U.S. fishery delivering hake to the U.S. market place. The shortbelly rockfish, capable of being harvested at 59,000 m.t. annually, is an incredible amount of fish, nearly equivalent to the current harvest by the entire West Coast groundfish industry. But what can be done with it? There is one fellow in California who will buy it at a very low price and grind it up. It will never reach the fresh fish market or be used for food. So there is a lot of work to be done in this area.

Haugen discussed potential new commercial fisheries off the Pacific Coast. The groundfish resource condition deeper than 500 fathoms is unknown. Fishermen in Washington and Oregon do not fish below 250 fathoms and California fishermen fish only to 500 fathoms. The Oregon Department of Fish and Wildlife rockfish survey did not go below 250 fathoms. The development corporation possibly could assess stock sizes below 500 fathoms.

In conclusion, Haugen indicated that the fishermen would be willing to invest funds into a properly organized development corporation or foundation. To get this thing off the ground will require some private funding. No decisions have been made yet. The alternatives and the track records of others must be examined closely and then a very hard business decision must be made as to whether it is in the fishermen's best interest to participate. Certainly the fishermen are interested, have an open mind and are going to study the project very carefully. They anticipate reaching a decision shortly after the first of the year.

Ted Smits said he agreed with much of what Henry Haugen had gaid. Smits emphasized that the fishing industry and its needs are changing. Industry will react to new needs amd opportunities. The exact direction in which industry will proceed is unknown because they are not sure of what resources are available. The industry does have an interest in developing underutilized fisheries.

This is a new era of intensified cooperation between the harvester and the processor and there is a need to combine our forces. There is a need for the harvester and processor to communicate better and to base their decisions on improved data. Presently, data are not sufficient and it is good that NMFS and other government agencies have taken the initiative to improve information to the industry.

Regardless of the initiative and involvement of government management agencies, there has to be continued involvement and leadership by private industry. As Henry Haugen indicated, the fishermen have shown a willingness to put their interest, involvement, and money on the line to help develop the fisheries. Processors are in this same position. They are willing to cooperate actively with the harvesters in making this truly a United States fishing industry. Any new development corporation or foundation must take into consideration the total involvement of the industry. A sales or marketing organization is not needed. What is needed is a coastwide marketing development organization where technology, economics, and marketing come together to assist the fishing industry in realizing the full potential offered by the Fisheries Conservation and Management Act of 1976.

Audience's Comments

Henry O. Wendler of the Washington Department of Fisheries asked where Demory got his information on the amount of shark available, 52,000 m.t., because the amount seemed small. Demory replied that his information had come from a Canadian source.

Mike Fraidenburg of the Washington Department of Fisheries questioned the priorities of industry. Will industry want to develop new marketing techniques for existing resources like hake and shortbelly rockfish, or will industry want to venture into deep water to locate unutilized stocks of currently marketable species? Haugen replied that the Washington draggers, whom he represents, faced a 25% decrease in landings because of the Canadian restrictions on U.S. fishermen fishing in Canadian waters. An immediate goal is to use those resources that are known to exist, such as the hake stocks which should be at peak abundance in 1979.

Concerning the activities of the development corporation, Haugen said that industry must look to the future when there will be increased pressure on the known resources. New boats are being builtand crab vessels may transfer into the groundfish fishery. Thus, long- and short-range goals have to be established.

Smits agreed with Haugen's assessment of priorities, which is keeping the industry alive. Smits stressed that corporate processors give high priority to ensuring a return to their stockholders and keeping the corporations healthy. Thus, processors will pursue activities that allow the greatest return for the least investment. A lower priority will be given to research and development projects that cost more in the short run but may have a long-range payoff.

Ed Greenhood of the California Department of Fish and Game asked how industry expected to interface with existing government agencies or PMFC. Many of the successful existing organizations are motivated exclusively by industry. Haugen replied that fisheries development is in a period of change and seems to be approaching a point where there is a need for a combination of private industry and federal-state-public funding. Existing institutions should be replaced because they are limited in geographic range and base. Haugen believes that with $100,000 of private funding, an additional $400,000 in public funds could be obtained from local, state, and federal sources. The development corporation will require about $500,000 annually to accomplish much. The New England Taskforce receives an absolute grant of $400,000 each year through NMFS New England Region, but NMFS retains veto control over the expenditure of those funds.

Smits added that he thought this current effort to form a development organization may be one of the industry's last attempts to wrestle the initiative of fisheries development from government.

Vic Kaczynski of CH_2M Hill was requested by his clients, the ports along the West Coast, to determine if this new stimulus of the bottom fishery is real. The ports want to know if they should begin planning for substantial development including new processing facilities. New development entails meeting coastal zone management and environmental impact regulations. To make investments, the ports must be shown a reasonable economic return. In the short run, that means a return to the fishermen. There has to be fish stocks that are economically exploitable close to home. The stocks have to be identified before fishermen and banks can establish loan agreements. John Harville, PMFC, indicated that PMFC's Resolution 5 addressed this issue (see p. 14 for Resolution).

Kirk Beiningen, Oregon Department of Fish and Wildlife, asked about the dangers involved in blending public and private operations to attract working capital, and the implications on the free enterprise concept championed by many in the fishing industry. Haugen replied that the implications are severe. Neither existing institutions or NMFS are getting into fisheries development. The Councils have been told that it is not their role either. Thus an institution is needed. Instances of funding shared by public and private organizations are occurring more frequently. The industry wants to maintain control over expenditures though it recognizes that it will not have a completely free hand. There is not enough private funding from the fishing industry alone to perform fisheries development and industry needs to be shown a potential for economic return. A development corporation with demonstration projects may be able to do this.

Mike Fraser, PMFC, added that the executive directors of existing foundations or fisheries development corporations have indicated to him that combining private and public funds is a modified free enterprise approach and not a threat to private industry. This arrangement enhances the capabilities of private industry and allows the normal relationship of government-and industry to be reversed, i.e., the government becomes aq advisor to industry. Industry retains the final operating responsibility in these organizations. Another advantage is that funding can be attracted from multiple, different funding sources.

Larry Hreha of the Oregon Department of Fish and Wildlife made one final comment. About eight years ago, the West Coast albacore industry began taxing themselves through the Western Fishboat Owner's Association and the packers. They also have received federal matching funds. This funding has boosted the research program along the whole coast and contributed significantly to the research findings. It has been a very desirable program and has not hurt anyone.

Symposium: Improving Upriver Salmon and Steelhead Production

Panelists for the symposium on improving upriver salmon and steelhead production were: Dale Evans of the Columbia River Project of the National Marine Fisheries Service; Cliff Millenbach of the Washington Department of Game; Terry Holubetz of the Columbia River Fisheries Council; and Ted Bjornn of the Idaho Cooperative Fishery Unit. A summary of the panelists' presentations and the audience's comments follows.

The Panel

Dale Evans reviewed the major impoundments in the Columbia River Basin and the problems they now pose to anadromous fish. The Ice Harbor Dam type of fishway (1:10 slope) impedes upstream adult passage. Though adult mortality appears to increase with increasing flow at Bonneville Dam, determining the full extent of this mortality is complicated by imprecise estimates of adult turnoffs into tributaries above Bonneville Dam and adult fallback at the dam. Completion of the second powerhouse at Bonneville Dam should eliminate the spill and therefore the fallback. In the past, gas supersaturation contributed significantly to adult mortality; installation of flip lips at many dams has helped to eliminate this type of mortality.

Downstream migrants face problems of dam passage and predation. While passage through turbines may kill migrants outright, stunned and disoriented fish are preyed upon by gulls. Research continues on diverting downstream migrants into gatewells at turbine entrances and around dams by sluiceways. Migrants can be graded, sorted, marked, and transported to below the dam if desired. The traveling screens used to divert fish entering turbine intakes are expensive to buy and operate. The use of cheaper fixed-bar screens in place of traveling screens is being explored. Mechanisms for diverting downstream migrants around the new bulb-type turbines being installed at Rock Island Dam will be investigated next year by the NMFS. Side-scanning sonar may be used to monitor schooling and movement of downstream migrants in dam forebays.

Ted Bjornn discussed the use of hatcheries to maintain and augment salmon stocks, and interactions between wild and hatchery fish that affect the productivity of wild stocks. The effects on wild stock productivity depend on the type of hatchery operation. The four types of hatchery operations that could impact wild fish are:

1. A mitigation hatchery that replaces fish prevented by a dam from reaching their spawning ground. Hatchery re leases are expected to go to the ocean and return to the hatchery.
2. A stock transplant hatchery where a stock is trans planted from one river system to a new system. Trans planted fish are spawned, reared, and released from, and return to the hatchery in the new river system.
3. A hatchery that rears fish for stocking other rivers. The fish are expected to go to sea from the river in which they are planted and return to that river.
4. Surplus or culled fish from regular hatchery stocks are planted in some other river system.

Mitigation hatchery operations usually are relatively free of complications. However, sometimes up to 50% of the fish do not migrate. The extent of competition between these residuals and the wild stocks is uncertain. Hatchery fish affect the productivity of wild stocks basically two ways:

1. Planted hatchery juveniles or juveniles arising from in-river spawning of hatchery adults compete for food or space with wild stocks.

2. Hatchery stocks may be exploited at higher rates than wild fish. This is often detrimental to wild fish in a mixed fishery. For example, wild steelhead stocks of the Clearwater River can withstand harvest rates of 40-50% while hatchery fish can be harvested at 80-90% and still sustain a maximum yield. Management of these mixed stocks is difficult because a harvest rate of 80-90% applied to wild fish would be disastrous. Salmon and steelhead stocks of the Salmon River also follow this pattern.

What can be done to maintain wild stock productivity when hatchery production is needed to maintain good fishable runs of fish? There seems to be no question that hatcheries are necessary to have more than just remnant salmon runs in the Snake River. Hatcheries must be operated in a way that minimizes the reduction in productivity of wild stocks. This can be done by selecting the correct stock, releasing smolts that migrate to sea and do not stay in the river, and supplementing wild stocks with good comparable hatchery juveniles.

Cliff Millenbach discussed additional environmental interactions. He indicated that if environmental problems, particularly fish passage problems, were solved, salmonid production could be increased in the Columbia River drainage. Fish culture is a proven enhancement technique. The very ,low number of salmonids returning to the Yakima system, and the success of the Wells Hatchery in increasing the average escapement of steelhead over Wells Dam from 2,000 to 5,000 fish (with hatchery augmentation after 1976) show the need for and benefits of hatcheries.

Several biological factors must be considered if any enhancement is to be achieved. These include a clarification of the role of genetics, the interrelationships of anadromous and resident species, and the use of new stocks to accommodate environmental changes that have occurred.

Management agencies have been accused of destroying gene pools by loose hatchery practices and failing to provide for adequate escapement of wild fish. There is little question that fish adapt to a given environment: in the hatchery successive generations from a wild stock become much easier to handle. It is equally apparent that the habitat in the wild is not static and changes may be frequent and even dramatic. Tagging and marking studies of steelhead have shown that straying is a natural occurrence. Returns last year to one of the Olympic Peninsula streams in Washington easily accounted for 15 to 20% of the smolts that went out from the hatchery. This attests to the fact that hatchery fish can maintain a strong ability to survive in the marine environment.

The Washington Department of Game did some research with support money from the Columbia River Fisheries Development Program on the success of hatchery steelhead in the wild and their ability to reproduce. By means of electrophoretic protein analysis, some hatchery stocks were selected that had a specific allele which could be checked in successive generations. This reliable technique allowed the researchers to distinguish hatchery fish both as juveniles and adults. To date the study has shown that fry from hatchery fish have resulted from successful spawning in the study area and that this allele has carried through to the F-, generation. Hopefully a complete picture of survival of the hatchery progeny both in the stream environment and in the marine environment can be obtained.

Addressing the question of interrelationships of salmon and trout, certainly the real challenge to management is the control of that combination and it may be one of the key considerations to obtaining maximum production from the stream. If two species of salmonids are planted in a stream, natural selection will optimize the total production. However, if you plant fish from a hatchery on top of the wild production in a stream, then some of the natural selection of the stock is lost, making it difficult to optimize the production from that stream.

There also is evidence that anadromous fish can dramatically impact resident trout. Some work in coastal Washington streams demonstrated that silver salmon may completely displace resident coastal cutthroat trout. Several basic research programs are presently underway which should provide information in the next few years on the sensitivity of the interrelationships between resident and anadromous salmonid stocks.

Wild fish that are passed through the hatchery for one generation should maintain the ability of the progeny to survive in the wild. Hatcheries now have the capacity to use stocks and maintain the viability of their progeny.,

Terry Holubetz discussed habitat and flow problems in the Columbia River drainage. Habitat loss and degradation in the Columbia River have been extensive, but the remaining habitat for anadromous fish is also extensive and extremely valuable. The term habitat refers both to production habitat and to migration habitat.

The responsibility for habitat maintenance does not lie with the fishery interests or the fishery agencies. The authorities responsible for the maintenance of those habitats are numerous and fragmented. There is a need for constant demonstration to these multiple authorities of the value of the habitat. The decline of production habitat has been slowed. Many land management agencies are now mounting extensive efforts to protect and improve anadromous fish habitats.

The migration habitat also has been declining for a number of years, primarily because of the construction of water development projects. Only very recently have we been aware of how badly the migration habitat has been affected. The fishery interests in the Columbia River basin have been working very hard in the last few years to resolve the migration problem.

There is a relationship between production habitat and migration habitat that must be recognized. In the Columbia River basin in its present state, the best production habitat is also the best migration habitat. If the production habitat is not producing, there is little or no escapement into that area and the rationale for protecting that area and maintaining adequate flows is largely lost. This can have a domino effect on the rest of the river in

terms of the ability to demand migration habitat or proper flows. Thus, if production habitat is lost and then adequate flows are lost, a large part of the economic value that is produced by the Columbia River anadromous fish stocks also is lost.

Water development interests advocated for years that if natural habitats are affected, the resources should be moved downstream and placed in a hatchery or artificial production facility. This allows total flexibility in using water resources in the upriver areas. They have maintained that this is the most efficient alternative. From their standpoint this is probably correct. Most economics approaches have been simplistic and weighed inflated flood control or power benefits against depressed, or in some cases incomplete, fishery values. In recent years, the fishery interests have demonstrated potential benefits. They have done a good job of trying to establish the total value of the resource. River systems must be managed to give the best mix of hydroelectric power, flood control, and fishery benefits.

By maintaining natural production of anadromous fish at every opportunity, fishery interests are actually giving themselves an economic edge. Future land and water management will be based on a combined resource yield. If a productive habitat is maintained, Columbia River salmon and steelhead runs can be restored to a highly productive level. On the other hand, if the natural habitat is allowed to go largely unused, while emphasizing artificial production, much of the economic value in the Columbia River anadromous fisheries will be lost. Sustaining natural production of salmon and steelhead in the remaining available habitat is pivotal to the future of the entire Columbia River anadromous fisheries.

In summary, the proper analysis has not been made to determine the cost effectiveness of maintaining upriver natural habitat for production. If a thorough analysis were to be made, this upriver maintenance would be found cost effective. However, the cost effectiveness of maintaining natural production habitat may be irrelevant. Social criteria may be more important than economic criteria. The planning effort initiated by the Columbia River Fisheries Council will analyze this issue along with others."This plan is needed as soon as it is available.^It was probably needed yesterday. Production habitat can be kept viable and the necessary flows maintained; but in order to do so, fishery agencies and interests are going to have to quickly act together and plan very carefully.

Audience's Comments

Joseph C. Greenley, PMFC Chairman and Director of the Idaho Department of Fish and Game, opened the discussion to the panelists and audience noting that the panel presentations had covered a broad array of environmental problems from passage upstream, to hatcheries, interrelationships of salmonids, and water use. He observed that as a Director of the fisheries agency for an inland state like Idaho, he has many management problems with fish and wildlife. However, anadromous fish problems absorb a vast amount of his time. As far as Idaho is concerned, land management practices in national forests are being determined by the existence of salmon and steelhead. These salmonids have a higher prestige from a national standpoint than elk or deer, and sometimes higher than Bighorn sheep. The Forest Service, Bureau of Land Management, and Bureau of Reclamation advocate practices beneficial to salmon and steelhead. This fact is not well understood along the Pacific Coast. There are misconceptions on why ocean harvest should be reduced to get more fish up the river to Idaho. The importance of production areas is not understood and the causes of declines are misinterpreted or not understood.

Cliff Millenbach asked Ted Bjornn about the suitability of enhancing streams with hatchery juveniles spawned from wild adults captured and placed in the hatchery. These offspring would be only one generation in the hatchery process and their progeny would have only one year's interruption of their normal behavior pattern. Can hatchery culture then be taken advantage of and still protect wild steelhead?

Ted Bjornn responded that he thought hatchery offspring could be produced which were viable in the wild. It does take care and change in operations. Some hatchery operations want to shift spawning time. For example, in raising steelhead in Idaho, two months of rearing helps fish grow to smolt size. If those fish come back two months earlier to spawn, they could find ice conditions in the river. Presumably, fish spawn in mid-May for better survival. If such things as release time and spawning time are carefully controlled, good viable hatchery fish can be used to supplement wild stocks.

Terry Holubetz asked Bjornn about comparing catch-to-escapement ratios for hatchery stocks and wild stocks. The ratios were quite different in a diagram Bjornn had shown during his talk. Recognizing that there has not been much of a harvestable surplus of wild stocks in the Columbia River in recent years, will these ratios become more similar as fish passage and water flows are improved? And if so, will maintaining natural habitat and wild stocks become less a problem?

Bjornn said he hoped problems would lessen, and that mortality associated with fish transportation and other operations could be decreased and thus more than just a remnant run of wild fish could be produced. Supplementing fish stocks is a real problem because of the extensive drainages and effort needed. Both major and minor drainages must be supplemented to maintain increased production.

Dale Evans commented on the idea of cost effectiveness. Cost effectiveness in a GAO publication is defined as an analytical approach to solving problems of choice that requires the definition of objectives, identification of alternative ways of achieving the objective, and identification of the alternative that yields the greatest effectiveness for any given cost, or yields a chosen degree of effectiveness for the least cost. Evans said he initially confused cost effectiveness with benefit-cost analysis. If benefit-cost analysis is involved, it is in the initial definition of objectives and setting of policy, but not in the setting of alternatives. Objectives that have been identified by the Pacific Fishery Management Council include preserving all natural habitat now available for anadromous salmonids by encouraging management of conflicting uses to assure no obstruction of access, and maintenance of high standards to protect water quality and quantity for migration, spawning, and rearing of salmon and steelhead. Secondly,

water should be allocated for anadromous fish use. Thirdly, diversions at dams and pump intakes should be improved to provide safe passage for anadromous salmonids. In reviewing a single program, there is often a benefit-cost analysis that has been done at the time policy was set. This is like mixing tactics and strategy. Thinking at the tactical level often leads to narrow approaches and the real goals are often lost sight of. So, cost effectiveness of fish passage measures is the search for a means of achieving stated objectives such as put forward by the Pacific Council, at least cost. The most critical issue is the securing of water rights for fish. PMFC's Resolution 9 (see p. 15) concerns this. The President's message on water policy reform, sent to Congress in June 1978, directly addressed the need for instream flows for fishery purposes at existing and planned federal projects. Evans asked Terry Holubetz to respond to this in light of his experience on the Columbia Basin Fishery Technical Committee and Columbia River Fisheries Council.

Holubetz responded that the Committee and Council have examined the cost-benefit ratios for maintaining adequate stream flows and identifying alternatives for providing the necessary flows in the Columbia River for anadromous fish. This examination must be completed soon. Concerning flow problems in the Columbia River, decisions will be made soon, and without adequate benefit-cost analysis, anadromous fish may not be provided for. Both the Committee and Council will be concentrating on this flow problem.

Ted Bjornn commented that techniques for transporting fish from the hatchery directly to the estuary are being examined. Whether these fish will return to the hatchery is unknown. NMFS is also examining this problem. Cliff Millenbach may have additional information.

Millenbach said that in 1976, 20,000 steelhead were coded-wire tagged and their adipose fins excised at Wells Hatchery. Some were released directly into the Columbia and some were released downstream of Bonneville Dam. In summer, 1977-78, 906 adults were recovered. Of these returning adults, 60% were taken in the Zone 6 fisheries (Indian fisheries above Bonneville Dam), 35% at Little Goose Dam, and only 5% at Wells Dam. So the knowledge of migration routes is completely disrupted in hatchery smolts released directly into the estuary.

Pat O'Brien, California Department of Fish and Game, pointed out that ocean fisheries managers are very concerned about the different exploitation rates that can be sustained by hatchery and wild stocks. Ocean harvesters generally do not understand the concept. In a fishery on mixed stocks of hatchery and wild fish, there may be over-escapement to a particular hatchery and not enough escapement for wild fish. An objective adopted by the Pacific Council for the Comprehensive Salmon Management Plan is to "establish ocean harvest rates for commercial and recreational ocean fisheries that are consistent with requirements for optimum spawning escapements and continuance of established recreational, commercial, and Indian fisheries". To achieve this objective, according to the Plan, requires that "in managing mixed-stock salmon fishing, the level of exploitation that can be sustained for regional aggregates of important wild stocks such as Washington coastal, Oregon coastal, and the Columbia River will be used by the Council to establish maximum fishing rates". This relates to the problems with wild stocks: does Ted Bjornn think this is a good approach or should this objective be reworded to consider hatchery versus wild stocks in a river system?

Ted Bjornn responded that he had examined that objective and did not know of an alternative approach. There are problems with stocks: for example, the Snake River fall chinook can stand little fishing, but if the ocean fishery rate is set to protect that stock, fish will be over-abundant everywhere else. Hopefully most other wild fish stocks requiring protection will be able to sustain more of a fishery than the Snake River fall chinook, and probably they can. The approach in the Comprehensive Plan is a good one.

Don Stuart, of the Sports Fisheries Division of the Alaska Department of Fish and Game commented that the State of Alaska has initiated a private non-profit salmon hatchery program and is rapidly accelerating both private and state hatchery efforts. Overall policy guidance is needed on what donor systems are to be used in these hatcheries. Should or should not the genetic integrity of wild stocks be compromised? Cliff Millenbach stated that it was probably desirable, in order to optimize productivity from a system, to mix a gene pool. In contrast, Ted Bjornn gave the impression that the hatchery stocks must be harvested even though the wild stocks cannot sustain a comparable harvest rate. Is the sacrifice of a genetic integrity of wild stocks being advocated? This is a question that Alaska is going to have to address immediately.

Cliff Millenbach responded that he does not advocate the destruction of genetic integrity, but that artificial program efforts could be arranged to protect genetic integrity. For example, in the artificial propogation of salmonids, the return area, the harvest area, and final disposition of that stock can be controlled. This has not been the case through the years as much as it could have been, but doing it would help the genetic stock in the stream environment. The stock that is in a given habitat area is best adapted to that area and management should and can accommodate it.

Ted Bjornn said that genetic integrity should not be sacrificed as a basic rule. Whenever hatchery fish are added to a system, the picture will be complicated. It is irrelevant whether one chooses voluntarily to introduce hatchery fish or is forced into it. In Idaho there was no hatchery program until the late 1950's or early 1960's. It was all wild production. Idaho was forced into hatchery operations because of the losses. The approach could have been taken that only enough hatchery fish would be produced to have hatchery runs as productive as the wild runs. But runs of fish were so low that probably the public would not have accepted it. So, to increase run size, there are problems with mixed stock and their widely-divergent harvest capabilities.

Large problems result if stocks are not chosen properly. The lower Clearwater, for example, was thought to have almost entirely B-group fish, the B-group steelhead of the Columbia system. After further examination it was found that some of the

lowermost Clearwater tributaries had A-group fish, a smaller, earlier-spawning fish that comes into the river earlier. This is related to the nature of the streams: they are small, low elevation streams into which runoff comes one to two months earlier than in the major portion of the drainage. Those A-group fish were ideally suited for those particular streams. The introduction of B-group fish probably would be marginally successful. Therefore there must be careful consideration of appropriate hatchery stocks to be used in those streams. In the case where there is limited hatchery stock available, stocks still must be chosen that are suitable to a particular stream. It would be better to let a year's production go by than introduce a stock that would not help maintain the stream's productivity.

In response to additional questioning, Cliff Millenbach said that steelhead were not quite as sensitive or as critical as salmon stocks. This view is based on the very substantial straying of steelhead stocks among the river systems. So there have been stock interactions as wild fish and this probably is more true of steelhead than of salmon.

Don Stuart noted that Alaska has one state facility near Sitka (Stargaven) where a brood of coho has been established - and is being maintained. In the last two years fish returning to that facility have come in near the saltwater rearing pens where the fish were held just prior to release. Freshets cause these fish to back out of the bay and distribute themselves in other wild stock systems all around the Sitka area. Similarly, a pathogen or a bacterial kidney disease problem would also be distributed to these other river systems. Thus there is a need for directives, policies and guidelines for these donor systems. Should the genetic integrity of the wild stock be sacrificed in some cases?

Ted Bjornn responded that this is a management decision that is tough, and is best made by the biologist familiar with the stocks in the area. As an illustration, and not speaking for the Idaho Fish and Game Department, the fish coming into the Clearwater system are basically called B-group fish. There are other streams in the Salmon River drainage that also contain B-group fish, but the streams are widely separated and electrophoresis analysis "Would probably show some differences between the two stocks. However, the stocks are so similar in their important aspects that there would not be much risk in taking B-group fish from the Clearwater and using themjn the south fork of the Salmon River, for example. Because the stocks show similar behavior, their productivity would be maintained. However, there could be complications if a stock of fish from Wells Hatchery was introduced into the Clearwater.

Ed Manary, Washington Commercial Passenger Carrying Fishing Vessel Association, asked about the composition, hatchery and wild, of salmon produced in the upper Columbia River drainages.

Terry Holubetz responded that with outmigrants the ratio of hatchery to wild fish is fairly close to 50-50 on the Snake River and in the mid-Columbia. Upriver stocks have about the same ratio. Ed Manary noted an inference in a series of articles in the *Seattle Post Intelligencer* that 75% of the wild stock in the upriver drainage now was destroyed. Those articles precipitated the question about stock composition. Secondly, on another topic, ocean salmon harvesters are willing to look down the road into the future but are scared to death of the other competing water users, power and irrigation. When will there be an integrated policy so that ocean harvesters will know that if they cut back on a short-term basis, there will be long-term benefits even though the fish must compete with other users for water?

Terry Holubetz responded that the Columbia River Fishery Council hopes to have a joint operations plan developed within about 18 months that will identify some alternatives. These will deal with river rather than ocean fishery management. However, some alternatives will relate to reducing mixed-stock fisheries in order to phase in more known-stock fisheries. In phasing in known-stock fisheries, there could be increased benefits to all parties. Alternatives for maintaining gene pools will also be examined.

Joe Greenley noted that Manary's question has been asked by many, many people concerned with the resource from mid-ocean to the highest tributary. All have been faced with cutbacks in harvest and they ask, "If I give this up now, what assurance do I have that it will be better in the future?". There probably is no guarantee. But people are now beginning to communicate, and if there was ever a chance for optimism, it is here now. Technology has in many respects kept pace with the problems on the Columbia River, and practically every problem is being addressed. But probably the toughest question to be faced, even in the smallest community in Idaho, is why should a closed season be accepted this year unless there is a guarantee that the closed season will provide something. Why not take the last fish? The same question applies to the ocean. It's a tough one to answer and probably never will be answered. Cool heads must prevail and hopefully there will be progress. Some progress is being made. Certainly the groundwork and basis for progress exists; but if we fail, shame on us.

Dale Evans noted that in the President's message on water policy reform, where it addressed instream flows, it said "the governors are being asked to work with federal agencies to protect fish and wildlife and other values associated with adequate instream flows. Federal agencies working in cooperation with the states are directed to improve, where possible and consistent with state law, the operation and management of existing projects to protect instream uses". Several memoranda have been sent out to implement this message. The one on instream flows said in part, "in the planning stage, federal agencies shall establish and provide for the stream flow necessary to maintain instream needs below proposed dams or other facilities. For existing water resource legislation that now lacks provision for maintaining instream flows and where commitments and economic feasibility permit, federal agencies working in cooperation with the states shall develop legislative amendments to correct the situation. These amendments are to be submitted by the middle of December this year. Then in order to develop effective operational and management techniques for protecting instream uses, agencies shall submit by June 6, 1979 to the Secretary of Interior, the Chairman of the Council on Environmental Quality, and the Director of the Office of Management and Budget, a report on the techniques that were implemented and the steps taken to meet this directive". All this really says is that if the states, and federal resource agencies do not act within the next

several months, a great opportunity for providing critical fish habitat for both hatchery and wild fish will be missed.

Don Moos, Chelan County Public Utility District, noted that in the case of the Columbia River, it is impossible to find any one particular entity that is in charge. This has to be very frustrating to all users of Columbia River resources. The Columbia River Compact seems obsessed with the harvest management of the river, but never pays attention to the propagation, either the hatchery coordination or the habitat. As Ted Perry recommends, there should be one single entity similar to the International Pacific Salmon Fisheries Commission running the river. The interested three states could serve as a commission with its own specific directorship and operation so that someone would be in charge. The problem of having no one in charge was exemplified by Cliff Millenbach in describing the Wells Hatchery operations. Returns have been getting better in the last few years. However, Wells is shared also by the Washington State Fisheries Department which has a very extensive spawning channel there. It was agreed that there would be a capacity of 6,000 spawning adults in that channel. Each year far less than that return to the channel so the fish ladder is closed so that wild migrants, the summer chinooks, cannot go upstream to the Methow and the Okanogan to spawn naturally. Each year, very methodically, the wild run is reduced to put additional fish into a channel that does not work. This is an agreement and nobody can find the right button to push to change the agreement. The channel capacity should be changed to 2,000 fish so that upriver wild stocks are not borrowed from. And yet changing that agreement is almost impossible because there is no control authority. So when people are lamenting how few upriver summer chinooks there are left and that they may not be worth saving anymore, it must be remembered that management agencies contributed to the deterioration of their condition.

Another example of management problems relates to the tragic incident where someone used an explosive device to wipe out all the bright fall chinook at Priest Rapids. However, there was no mention of the fact that through poor management, year after year, many fish die at hatcheries, for example Leavenworth, because of poor management practices relating to spring chinooks. It has to be terribly frustrating for all people interested in fisheries when there is no controlling management body for the Columbia River system.

Henry Wendler said that he believed that the viability of the wild stocks would deteriorate over time unless they were separated completely from hatchery fish. The straying of the fish from Wells, noted by Millenbach, is a pretty good example of what happens with hatchery returns to areas in which wild stocks spawn. There must be a very clear separation of those wild and hatchery stocks. The only way to do it is to develop a hatchery run in such a way that it does not interfere with the wild stocks. Then there can be a supplemental increase in the stream. This does not answer the question that Ed Manary raised: How can wild stocks in the ocean be managed alongside the tremendous numbers of hatchery fish that are out there? Wendler concluded that a genetic pool cannot be maintained if hatchery fish are introduced continually into a system with wild stocks. Over time, in his view, the wild stock will be debilitated.

Joe Greenley, Chairman, thanked the panel and audie for the stimulating presentations and discussions and conclud d the symposium.

Update of Actions Taken on 1977 Resolutions

Actions through August 1978 concerning Resolutions adopted at the 1977 Annual Meeting were summarized in the *30th Annual Report of the Pacific Marine Fisheries Commission for the Year 1977.* These and subsequent actions were reviewed at PMFC's 1978 Annual Meeting by Executive Director John Harville (p. 23). Briefly, actions since August 1978 on some of the Resolutions include:

Resolution 1 —Urge Congressional and Federal Agency Use of the Eastland Fisheries Survey Report: PMFC is working actively with various legislators to reintroduce a major bill for assisting the fishing industry to assist itself. PMFC also is supporting a study to design a suitable institution for developing underutilized fisheries along the Pacific Coast.

Resolution 3—Increase Annual Appropriations for Commercial Fisheries Research and Development Act: A $1.2 million increase in funding for FY-1979 under the Commercial Fisheries Research and Development Act {P.L. 88-309) was approved by both House and Senate and signed into law by the President in late 1978.

Resolution 12—Establish Priority Water Usage and Protect Habitat for Fish, and **Resolution 14—Conduct Fishery Enhancement Research:** These subjects were discussed as part of a keynote symposium on improving upriver salmon and steelhead habitat at the 1978 Annual Meeting (p. 7).

Resolutions Adopted in 1978 and Supporting Actions

Of 15 Proposals submitted for consideration by PMFC Advisors, Scientific and Management Staff, and Commissioners, 10 (Resolutions 1, 2, 3, 4, 5, 6, 9, 10, 13 and 14) were approved unanimously by all five Compact States and 4 (Resolutions 7, 8, 11 and 12) were tabled. Resolution 15 was approved with California and Oregon voting for, Washington voting against, and Alaska and Idaho abstaining. The approved Resolutions bear their original proposal numbers. Publication of these Resolutions in PMFC's Newletter No. 31 of November 1978 constituted the first step toward implementation. The Newletter mailing list of approximately 1,100 addressees includes Pacific state and federal agencies and congressional delegations (U.S. Senators and Representatives from the Pacific states), plus interested individuals and representatives of fisheries groups and organizations.

Explanatory transmittal letters and copies of relevant Resolutions also were mailed to members of the Pacific and North Pacific Fishery Management Councils, and to NOAA's Marine Fisheries Advisory Committee (MAFAC) and its Chairman, Terry Leitzell, Assistant Administrator for Fisheries, National Oceanic and Atmospheric Administration. The full texts of approved Resolutions and a summary of additional supporting actions to February 28, 1979 are provided below.

1. Need for Congressional Legislation to Develop Harvesting, Processing, and Marketing of Marine Fishery Resources

WHEREAS, the Congress affirmed through S. Con. Res. 11 (The Eastland Resolution) that it is Congressional policy ". . . that our fishing industry be afforded all support necessary to have it strengthened . . . ;" and

WHEREAS, U.S. fishermen were given priority rights to harvest fishery resources within the 200-mile Fishery Conservation Zone (FCZ) established by enactment of the Fishery Conservation and Management Act of 1976; and

WHEREAS, the Act was amended in 1978 by HR 13340 to provide U.S. processors similar rights to fishery resources in the FCZ; and

WHEREAS, maximum benefits will accrue to the U.S. economy only when the U. S. fishing industry is able to effectively catch, process, and market those resources; and

WHEREAS, improved U.S. capability to harvest, process, and market presently underutilized fishery resources will result in (1) increased flow of high quality seafoods to U.S. consumers, (2) reduction in foreign trade deficits now resulting from imports, and (3) provide financial benefits to all sectors of the domestic fishing industry;

NOW BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission urges Congress to develop legislation based upon recommendations of the U. S. fishing industry as found by the Eastland Fisheries Survey conducted by the Pacific, Atlantic, and Gulf States Marine Fisheries Commissions and presented to the Congress in 1977; and

BE IT LASTL Y RESOL VED, that such legislation address the development of harvesting, processing, and marketing of marine fishery resources not now fully iftilized by the U. S. fishing industry.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

2. Request National Marine Fisheries Service to Improve its Services to Fishing Industry .

WHEREAS, S. Con. Res. 11 (The Eastland Resolution) was unanimously passed by the Congress in 1973; and

WHEREAS, the "grass roots" recommendations for improving and strengthening the U. S. fishing industry asked for by the Eastland Resolution were obtained through a survey conducted by the Pacific Marine Fisheries Commission, among others; and

WHEREAS, the survey effort was based upon systematic organization of the fishing industry into its component parts, i. e., harvesting, processing, marketing, and consuming; and

WHEREAS, many industry members who participated in the survey believe that processing and marketing of fishery resources in the U.S., particularly those that are underutilized, can be materially improved through reappraisal of existing institutional and policy arrangements in the federal government; and

WHEREAS, these participants emphasized that enhancement of operational capabilities of the Office of Fishery Development and Utilization within the National Marine Fisheries Service will provide such improvement;

NOW BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission urges the Department of Commerce and National Marine Fisheries Service to act immediately to reappraise and to adjust its services to the fishing industry along lines recommended by fishing industry participants to the Eastland Fisheries Survey; and as recommended by PMFC resolution number 7 of 1977,

BE IT FURTHER RESOLVED that the President of the United States be requested in the national interest to direct his Office of Management and Budget to release Saltsonstall-Kennedy and other funds for the express purpose of providing aggressive federal support for programs to enhance the processing and marketing sectors of the fishing industry.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

Action

A letter explaining the need for the Office of Management and Budget to release Saltonstall-Kennedy funds for helping the fishing industry to help itself was sent to all Pacific-area Senators. On February 1, 1979, Senator Ted Kennedy and 17 co-sponsors, including all ten Pacific-area Senators, introduced Senate Resolution 50 to disapprove OMB deferral of $6.5 million in Saltonstall-Kennedy funds. These co-sponsors include the Chairmen of key Senate committees, so there is a very good chance for Senate passage of this resolution and release of the funds soon thereafter.

3. U.S.-Mexico Cooperation in Conservation and Management of Anchovies

WHEREAS, the United States Government, as part of the program consequent to the Fisheries Conservation and Management Act, Public Law 94-265, popularly known as the 200-mile law, after extensive preliminary research and consultation which included consultation with Mexican Government scientists, has instituted the Anchovy Fishery Management Plan to conserve and manage the central subpopulation of northern anchovy off the Pacific Coast of the United States; and

WHEREAS, the National Marine Fisheries Service, in conformance with the plan, has announced estimates of the spawning biomass of northern anchovy (central subpopulation) for the 1978-79 season and has set a substantially reduced harvest quota for this season; and

WHEREAS, U.S. fishermen are conforming to these regulations in order to properly conserve and manage this vitally important fishery stock for the ultimate benefit of the commercial and recreational fishing interests and the consumer populations of the United States and Mexico; and

WHEREAS, the central subpopulation of northern anchovy is a trans-boundary stock which is fished by both United States and Mexican commercial and recreational fishermen, and consequently, the success of any fishery plan depends absolutely upon the joint cooperation of both countries;

NOW THEREFORE BE IT RESOLVED, by the Pacific Marine Fisheries Commission, that Congress and the President of the United States be memorialized to direct the Department of State to immediately take all steps necessary to effect a timely agreement between the Governments of the United States and Mexico regarding the implementation of a joint anchovy fishery management plan for the conservation and management of the trans-boundary stocks of the central subpopulation of northern anchovy, in order that this important fishery be conserved and managed for the immediate and future benefit of the people of the United States and Mexico.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

4. Government-Fishing Industry Cooperation for Fisheries Management

WHEREAS, the Congress passed unanimously the East/and Resolution (S. Con. Res. 11) in 1973, and passed the Fisheries Conservation and Management Act of 1976 (PL 94-265), signed by the President on April 13, 1976; and

WHEREAS, Congressional supporters of the Fishery Conservation and Management Act have stated their intent to create a renaissance in the fisheries which included cooperative management of the resources between user groups and agencies; and

WHEREAS, effective management of marine fishery resources requires both the expertise and authority of state and federal fisheries agencies and the expertise and support of fishermen and processors; and

WHEREAS, organizations exist on the West Coast of both fishermen and processors, providing a single voice for their membership;

NOW THEREFORE BE IT RESOLVED, that the Pacific Marine Fisheries Commission memorializes the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and the fisheries agencies of the member States to consult on a regular basis, a/lowing for timely input and discussion, with commercial and recreational fishermen and seafood processor organizations to facilitate management of marine fishery resources.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

5. Coordinated Planning of Fishing Harbor Development in the Coastal Zone

WHEREAS, Congress passed the Coastal Zone Management Act of 1972 to facilitate the protection of coastal resources and the orderly development of coastal areas; and

WHEREAS, many coastal States also passed legislation to protect coastal resources and provide for the orderly development of coastal areas including the States of California, Oregon and Washington, which have federally approved coastal programs; and

WHEREAS, the federal agency responsible for coastal zone management is the Office of Coastal Zone Management in the National Oceanic and Atmospheric Administration under the Department of Commerce; and

WHEREAS, the federal agency responsible for fisheries development is the National Marine Fisheries Service in the National Oceanic and Atmospheric Administration under the Department of Commerce; and

WHEREAS, there exists a critical shortage of modern berthing, unloading, support and processing facilities in Pacific coastal fishing ports; and

WHEREAS, the need for larger berthing facilities, high volume unloading machinery, increased on-shore support facilities and additional processing capabilities will increase as the U. S. fishing fleet begins to harvest many currently underutilized species; and

WHEREAS, the lack of modern fishing port facilities will hinder the growth and size of the U. S. fishing fleet, and hinder U. S. processors' abilities to modernize and expand to compete in the world market; and

WHEREAS, present development of facilities is seldom planned on a regional basis and is often hindered by local planning and permit processes; and

WHEREAS, the construction of modern fishing port facilities within the coastal zone is necessary, and must be coordinated to consider present and future regional berthing needs, present and future fish unloading needs, present and future regional on-shore support needs, and present and future regional fish processing needs while minimizing adverse environmental impacts, in order that the United States be able to fully utilize its fishery resources;

NOW THEREFORE BE IT RESOLVED, that the Pacific Marine Fisheries Commission memorializes the Office of Coastal Zone Management and the National Marine Fisheries Service to support, coordinate and fund the planning by state coastal zone agencies and state fisheries agencies for fishing port development and improvement within the coastal zone.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

Action

Summaries of this Resolution were sent to the Pacific Coast Congress of Harbormasters. PMFC will be sponsoring a representative at the Coastal Zone Conference at Salishan Lodge, Oregon, on February 20-23, 1979.

6. Control the Transfer of Serious Fish Pathogens

WHEREAS, the transportation of live fish and live-fish products has historically resulted in the inadvertent transfer of serious fish pathogens; and

WHEREAS, historic and current records have documented the transfer of serious fish pathogens inter- and intra-state to the detriment of local native species; and

WHEREAS, the introductions of such disease organisms have necessitated the destruction of millions of fish worth hundreds of thousands of dollars which has seriously impacted the fishery programs of many States and agencies; and

WHEREAS, the member States of the Pacific Marine Fisheries Commission, federal agencies and others have received requests for live fish and live-fish products from out-of-state politicians, biologists or other well-meaning individuals who are sometimes not totally cognizant of the dangers involved;

NOW BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission calls upon its member States and the federal agencies to convene a group of fish patho/ogists as soon as possible to consider and propose minimum standards concerning the transfer of live fish and live-fish products between or into the member States.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

9. Recognition of Water Requirements for Anadromous Salmonids by Water Use and Water Management Entities

WHEREAS, the Fishery Conservation and Management Act of 1976 requires a national program for the conservation and management of the fishery resources of the United States in order to realize the full socio-economic potential of the Nation's fishery resources; and

WHEREAS, as required under the FCMA, the Pacific Fishery Management Council is actively drafting for 1980 a comprehensive management plan for Pacific salmon under its jurisdiction, such plan to direct salmon management activities throughouttheir ocean and freshwater range; and

WHEREAS, this planning has full coordination with, and support by, the U. S. Departments of Commerce and Interior, the Pacific Marine Fisheries Commission, and the States of Alaska, Washington, Idaho, Oregon, and California; and

WHEREAS, the successful management of Pacific salmon will require prescriptions for not only the obvious harvest management and fish production activities, but also for essential fish life support activities, such as stream flow regulation, watershed management, and fish passage and survival at dams, that are not directly the responsibility of fishery management agencies;

NOW BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission urges Congress and all water use and water management entities; (1) to affirmatively respond to the directive of the President of the United States to establish and provide for the stream flow necessary for the maintenance of instream fishery needs below existing and future water development projects; and (2) that they actively plan and conduct functions to be consistent with the FCMA and the Pacific Council's comprehensive salmon management plan; and

BE IT LASTL Y RESOL VED, that copies of this resolution be provided to the above listed entities and to the Congressional delegations. Governors, Legislative units, and water regulatory agencies of the member States, and to the Pacific Northwest River Basins Commission.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

Action

PMFC Executive Director Harville submitted oral and written testimony for the Pacific Northwest Electric Power Planning and Conservation Act hearings, December 13 in Portland, Oregon, by the Honorable John D. Dingell, Chairman of the Subcommittee on Energy and Power of the Committee on Interstate and Foreign Commerce, House of Representatives. Harville urged that water requirements for anadromous fish be considered fully in all plans and programs for water conservation and development. Congress should identify anadromous fisheries as a priority water use which must be evaluated fully in developing water resources for power and other purposes.

Harville noted that President Carter, in his June 1978 speech concerning new federal water policies, was now concerned that "some water projects are unsafe or environmentally unwise and have caused losses of natural streams and rivers, fish and wildlife habitat, and recreational opportunities," and that water projects "often are planned without a uniform, standard basis for estimating benefits and costs." Harville stressed that any benefit-cost analysis of water use must consider fully the value of anadromous fisheries to people of the Pacific Northwest including employment and recreational opportunities, food, and future options. He supported President Carter's concern that planning and implementation of water development projects should be shared by state and federal governments with the stales "integrally involved in setting priorities and sharing in Federal project planning and funding."

President Carter further underscored the need for full consideration of fish and wildlife values by issuing "a directive to Federal agency heads to provide increased cooperation with States and leadership in maintaining-instream flows and protecting groundwater through joint assessment of needs, increased assistance in the gathering and sharing of data, appropriate design and operation of Federal water facilities, and other means. I also call upon the Governors and the Congress to work with Federal agencies to protect the fish and wildlife and other values associated with adequate instream flows. New and existing projects should be planned and operated to protect instream flows, consistent with State law and in close consultation with States. Where prior commitments and economic feasibility permit, amendments to authorizing statutes should be sought in order to provide for streamflow maintenance."

Harville emphasized that the five Pacific States align themselves solidly behind the intent and substance of President Carter's initiatives, and reviewed several earlier PMFC resolutions calling for consideration of anadromous fisheries as a priority use of various river systems. He pledged PMFC's and the Pacific

States' full support for and commitment to active state participation in joining state-federal planning for water resource use, and urged recognition of the value of the fisheries and their consideration as a key element in water resource planning be included in the Pacific Northwest Electric Power Planning and Conservation Act.

At the request of Chairman John Dingell, Harville agreed to provide suggested specific language for inclusion of anadromous fish needs in a revision of the Pacific Northwest Electric Power Planning and Conservation Act. On the basis of consultations with state and federal scientists, and with particular assistance from Terry Holubetz, Executive Director, Columbia River Fisheries Council, recommended language was developed and transmitted to Mr. Dingell's staff.

10. State Management of Marine Mammals within State Waters

WHERE A S, marine mammals and marine fishes are both integral parts of the marine ecosystem; and

WHEREAS, effective management of marine fisheries entails consideration of individual species within the total ecosystem including the food chain and predator-prey relationships; and

WHEREAS, Congress passed the Marine Mammal Protection Act of 1972, designating the Commerce and Interior Departments as the responsible management agencies over marine mammals; and

WHEREAS, separate management authorities over marine mammals and marine fishes precludes effective management; and

WHEREAS, state agencies have expertise regarding local fish and marine mammal populations and can best prescribe those management measures necessary for marine mammals in state waters; and

WHEREAS, most marine mammals are neither threatened nor endangered; and

. WHERE A S, fisheries for such animals as aba/one and clams have been reduced or eliminated by populations of marine mammals while other fisheries such as salmon are suffering from marine mammal predation and the situation will worsen unless coordinated management and control of marine mammals are forthcoming;

NOW THEREFORE BE IT RESOLVED, that the Pacific Marine Fisheries Commission urges the Congress of the United States to amend, at the earliest opportunity, the Marine Mammal Protection Act of 1972, returning to the States management authority over marine mammals within state waters.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

13. Restrict Fishing Privileges to Nations Restricting U.S. Imports

WHEREAS, one of the purposes of the Fishery Conservation and Management Act of 1976 (FCMA) is to encourage "the development of fisheries which are currently underutilized or not utilized by United States fishermen," specifically underdeveloped groundfish resources; and

WHEREAS, very large allocations of such resources from the U. S. Fisheries Conservation Zone (FCZ) have been made to foreign nations which prohibit or restrict the importation of those same species of fish where such products are taken by U. S. fishermen; and

WHEREAS, said nations, in several cases, use such fisheries resources not only in their domestic markets, but also in foreign markets, including those within the United States; and

WHEREAS, this practice permits these foreign nations to dominate international fisheries markets, making it difficult or impossible for the U.S. fishing industry to gain entry into these markets with U. S. products in the same waters of the FCZ; and

WHEREAS, this allocation policy appears to be contrary to the purpose and policy of the FCMA and impedes the development of fisheries currently underutilized or unutilized by U.S. fishermen; and

WHEREAS, this practice is contrary to an expression of the national interest by the United States Congress;

NOW BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission strongly recommends that allocations of groundfish resources from the FCZ to other nations should be restricted or stopped if those nations restrict the import of those same resources caught or produced by the U. S. fishing industry, either by quota, unreasonably high tariffs, or other impediments; and

BEITLASTL Y RESOL VED, that the United States Department of State establish a policy supporting the intent and purpose of the FCMA by restricting or stopping allocations of groundfish resources to any nation which denies access to its domestic markets for similar resources produced by the U. S. fishing industry.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

14. Continue Research and Monitoring of U.S. Pacific Halibut Resource and Fishery

WHEREAS, the Pacific halibut fishery in waters of the United States produces an average annual harvest of about 22 million pounds per year having a landed value in excess of $44 million per year; and

WHEREAS, conservation, wise management, and rehabilitation of halibut stocks require a continuous program of research, in-season harvest monitoring, and regulation; and

WHEREAS, the International Pacific Halibut Commission has assembled a highly competent professional staff to perform these research and management tasks, and has for the past 54 years carried forward these functions; and

WHEREAS, under provisions of the Fishery Conservation and Management Act of 1976 (FCMA), the United States has been forced to serve notice of termination effective April 1, 1979

of the treaty providing for joint U.S.-Canada support for the International Pacific Halibut Commission, unless suitable U.S.-Canada agreement can be reached for its continuance in compliance with the new management requirements of FCMA; and

WHEREAS, prospects for U.S.-Canada agreement on this and other fisheries matters appear dim as a result of recent Canadian rejection of U. S. positions on a number of fisheries issues; and

WHEREAS, the North Pacific Fishery Management Council has undertaken development of a Pacific Halibut Management Plan to provide for U.S. management of Pacific halibut in U.S. waters, if and when the authority of the International Pacific Halibut Commission is terminated; and that management plan will depend upon continuance of the research and management programs which have been developed and carried forward over the past decades by the staff of the International Pacific Halibut Commission;

NOW THEREFORE BE IT RESOLVED, that the Pacific Marine Fisheries Commission requests the Congressional Delegations of its member States of Alaska, California, Idaho, Oregon and Washington to co-sponsor urgent legislation which will permit the transfer of appropriate staff and other research and management resources from the International Pacific Halibut Commission in the event of its termination to the National Marine Fisheries Service; and

BE IT FURTHER RESOL VED, that this legislation carry authorization for expenditures sufficient to carry on the work of the International Pacific Halibut Commission as an activity of the United States solely, such authorization to include the part previously funded by Canada as well as that funded by the United States.

Adopted unanimously by the five Compact States: Alaska, California, Idaho, Oregon and Washington.

Action

PMFC Executive Director John Harville sent a letter to Representatives Don Young of Alaska and Joel Pritchard of Washington supporting *the* introduction of H.R. 14354 (October 13, 1978) to provide that halibut research and management functions of the International Pacific Haljbut Commission be transferred to the Northwest and Alaska Fisheries Center of NMFS and offering PMFC's assistance in developing strong Pacific Coast support from all Congressional delegations for any new legislation introduced into the first session of the 96th Congress. Harville subsequently supported further actions of the North Pacific Fishery Management Council to assure continuity to the vitally needed research and management functions of the Commission staff. Current negotiations between Canada and the United States appear favorable to continuation of the International Pacific Halibut Commission.

15. Completion of an Examination of Effects of Seafood Wastes on Marine Environment

WHEREAS, the discharge of seafood wastes should be a/lowed without secondary or tertiary treatment where there is a sufficient ecological base to sustain or benefit from the assimilation of such wastes in the marine environment; and

WHEREAS, the Seafood Study mandated by Section 74 of the Clean Water Act is clearly intended by Congress to include a full examination of the compatibility of natural seafood wastes with marine waters in order to determine the need of requiring technologically-derived effluent standards for seafood processors discharging into these waters; and

WHEREAS, the Seafood Study has not been completed and sufficient information for a reasonable assessment of the compatibility of seafood waste with the marine environment is not available;

NOW BE IT THEREFORE RESOL VED, that because there are sufficient data available to suggest that current effluent standards are environmentally unnecessary, that the Pacific Marine Fisheries Commission urges the EPA to exempt the tuna seafood processors in the Terminal Island area of California to allow completion of studies to determine if there is sufficient water flow and aquatic life to support the harmless or beneficial assimilation of seafood waste discharge, and requests that the Seafood Study be extended with adequate funding to assure a full and complete examination of the effects of seafood wastes on the marine environment.

Adopted with California and Oregon voting for, Washington voting against, and Alaska and Idaho abstaining.

Special Directive to the Executive Director

PMFC Commissioner John R. Donaldson (Oregon) recommended that the Executive Committee instruct the Executive Director to:

1. Review PMFC's documents (Rules and Regulations, Goals and Objectives, Research Policy and Procedure, Advisory Committee Rules and Operating Procedures) and bring them into conformity with changes created by FCMA and other factors;
2. Improve the cost effectiveness of PMFC's operating budget;
3. Suggest new structure and modes of operation for the Commission, Advisors, Scientists and Managers, and Secretariat with particular attention to the annual meet ing format; and
4. Evaluate the action forms available to PMFC, particularly the resolution process, with recommendations for im provements.

Donaldson noted PMFC's contributions over the past two years to the affairs of the Pacific and North Pacific Fishery Management Councils, and the emerging role of PMFC in coastal fisheries matters outside Council purview. He recalled that at the 1976 and 1977 Annual Meetings, PMFC's role had been examined thoroughly and the Executive Committee had determined there was a definite purpose for PMFC's continued existence.

However, Donaldson noted increasing constraints upon manpower and dollars and concluded that some functions of

PMFC must be discontinued in their present form. He felt that PMFC should continue to meet its Congressional mandate but under a more contemporary framework than now exists.

The Executive Committee endorsed Donaldson's recommendations. Chairman Greenley instructed the Executive Director to begin this analysis of PMFC and present a progress report at the Executive Committee's summer meeting, and a final report and proposal for alternative actions at the 1979 Annual Meeting. Chairman Greenley pointed out that this topic should be a major function of that meeting.

Committee Reports on PMFC Activities

PMFC's research, management, and support activities are performed by its Secretariat, and its Scientific and Management Staff composed of the fisheries managers and scientists of its member States. PMFC's various committees play important roles in resolving regional fisheries management problems. The committees' activities during 1978 were reviewed at the 1978 Annual Meeting and are reported below.

Regional Fisheries Data Project

Clarence G. Pautzke, Assistant to PMFC's Executive Director and Team Leader for the Coastwide Fisheries Data Project, summarized efforts in 1978 to improve regional fisheries data. A new PMFC Committee on Goals and Guidelines for Regional Fisheries Data Consolidation, representative of state and federal fisheries agencies and the Regional Fishery Management Councils, was convened on July 31, 1978 to review the status of the Coastwide Data Files for 1974-1976 and examine a PMFC proposal to NMFS. PMFC proposed to: 1. create the Coastwide Data Files for 1974-1976; 2. evaluate fisheries information requirements for regional management, availability of this information, and alternatives for improving its flow from collector to user; and, 3. facilitate a Pacific Coast Marine Recreational Fishery Statistics Survey. Funding of $54,000 was approved by NMFS in September 1978. ' *

Specifications for construction of the Coastwide Data Files have been sent to state fisheries agencies. Alaska and California currently are reviewing confidentiality statutes and examining various encoding techniques to protect the confidentiality of individual fisherman records. PMFC staff members have visited the data processing departments of the state fisheries agencies in California, Oregon, Washington and Alaska to review data base construction and become familiar with agency data processing programs. In addition, a questionnaire has been distributed to fishery biologists, economists, and managers along the Pacific Coast to evaluate information requirements, their priorities and reporting frequencies, for effective fisheries management. About 75 questionnaires were distributed on September 18, 1978. As of October 13, 38 had been returned.

The second meeting of the Regional Fisheries Data Committee was held October 16 and 17 in conjunction with PMFC's annual meeting in Coeur d'Alene. Discussion concerning the Coastwide Data Files for 1974-1976 indicated that some states were proceeding toward completion of the data base. A major concern of various agencies is maintaining the confidential nature of individual fisherman's records, and the protection of this confidentiality in constructing a data base. This concern continues to be a major impediment to completing the files.

The Committee also discussed ways of improving fisheries information needed to manage fisheries resources shared by two or more States. The Committee agreed to focus on only those types of fisheries information needed for interstate management. A subgroup was appointed having one representative from each state agency, one from NMFS, and one from PMFC to examine available information, and various alternative pathways and processes to achieve information flow from collectors to users. Further, the subgroup will identify user-groups and develop questions to be asked of users with respect to what information they want and need from a regional system, and the levels of aggregation of the data appropriate to each user. State and federal agencies will be visited for dialogue concerning their data needs from other agencies.

The subgroup met on December 6 in Portland and established a methodology for determining user needs for regional fisheries information. Users identified were on all levels including state, regional, federal and international organizations. Agency interviews will be conducted by PMFC's staff in February and March, 1979.

Albacore

Albacore Committee: Chairman Larry Hreha (Oregon Department of Fish and Wildlife) reported that the National Marine Fisheries Service, for the third consecutive year, has contracted with PMFC to administer funds for Washington, Oregon and California to increase albacore data collection to a level adequate for stock assessment studies. The 1978 sampling effort resulted in the measurement of 28,967 albacore and information being collected about 871 fishing trips totaling 6,336 days of fishing effort.

During the year, the Albacore Committee did not hold a formal meeting; however, all the members participated in the Third North Pacific Albacore Workshop in Honolulu on September 13 and 14, 1978. The meeting was hosted by NMFS and was attended also by scientists from Japan and Canada. Several papers were presented and data were exchanged which again indicated that the North Pacific albacore population is being harvested at a rate near the estimated MSY of 115,000 to 125,000 metric tons. Twelve recommendations were made of information that should be known or added to the present data base to answer questions about this important stock of fish.

Groundfish

U.S. Section of Technical Subcommittee of the International Groundfish Committee: Phil Rigby (Alaska Department of Fish and Game) reported that the U.S. Section met in June prior to the Technical Subcommittee's annual meeting. This group, previously called the PMFC Groundfish Committee, is

representative of state agencies and the National Marine Fisheries Service and reviews interstate problems, coordinates interstate groundfish projects, and develops U.S. positions on stock assessment and research programs affecting both the United States and Canada. The U.S. Section annually reviews (1) catch and effort compatibility between the states, (2) the PMFC Groundfish Data Series, (3) the PMFC Review of the Groundfish Fishery Report, (4) the PMFC age-reader position, (5) groundfish management plans, and (6) coastwide groundfish tagging programs.

With regard to data submissions for the Data Series and Fishery Review, both California and Alaska are implementing new data processing systems to increase the timeliness of their data reports. The addition of other gears, Pacific hake and recreational catch estimates to the Data Series, and the inclusion of both English and metric units were recommended.

The continued funding of the present age-reader position and the addition of another PMFC-supported age-reader with the necessary equipment was recommended to satisfy age determination needs of the expanded groundfish programs. Emphasis would be placed on the aging of lingcod and sablefish. The U.S. Section also recommended standardization of all trap and longline logbooks and the review of the terms of reference for the Technical Subcommittee in light of the present U.S.-Canada fishery situation.

Technical Subcommittee of the International Groundfish Committee: Phil Rigby reported that the Technical Subcommittee (TSC) held its Nineteenth Annual Meeting in June 1978, hosted by the California Department of Fish and Game in Menlo Park. Other U.S. member agencies of the TSC include the Oregon Department of Fish and Wildlife, Washington" Department of Fisheries, Alaska Department of Fish and Game, and the National Marine Fisheries Service; and for Canada, the Department of Fisheries and Oceans. The International Pacific Halibut Commission has observer status.

v Annually the TSC reviews agency programs, Canada-U.S. groundfish fisheries and fisheries conducted by other nations in the fisheries conservation zones of these two countries, major regulation changes, and international fisheries agreements. Tagging and stock assessment programs of each agency are reviewed in greater detail.

Because of the severely depressed conditions of Pacific Ocean perch stocks and the relatively unknown status of the other rockfish groups which are now receiving increased fishing effort. Pacific Ocean perch and other rockfish have been given special attention. There are presently two active working groups reviewing stock assessment and separation problems, summarizing available knowledge, and appraising alternate management strategies. Two other working groups are also compiling data on Pacific cod, lingcod, rock sole, and petrale sole.

Activities coordinated in part through the auspices of the TSC include the coastwide coordinated rockfish survey and a joint Canada-U.S. Pacific cod tagging project. Also in September, hydroacoustic equipment was intercalibrated between a Canadian, a Polish, and a U.S. research vessel.

During 1978, three workshops were conducted at the recommendation of the TSC. An aging-techniques workshop for Pacific cod, lingcod, rockfish, sablefish, and Dover sole was held at the Pacific Biological Station, Nanaimo. Participants were from member agencies actually doing the aging work. The workshop proved to be of great value to all the participants by giving them a chance to see the latest techniques demonstrated and to consider standardization of these techniques coastwide. The hydroacoustics and the sablefish workshops hosted by the Northwest and Alaska Fisheries Center, Seattle, proved to be of great benefit in the standardization of data collection techniques, as a general summary of the data available, and as a review of ongoing projects.

Recent and current tagging projects reported include tagging of Pacific cod by Canada and Washington, English sole by Oregon, lingcod by Canada and Oregon, and continued tagging of sablefish by Canada and the United States.

The TSC reviewed and adopted proposals to include Pacific hake in the Data Series and status reports of member agencies, and to create the working group, previously mentioned, to address the problems of assessment and management of other rockfish in Area 3C. the TSC recommended to the International Groundfish Committee that it continue its efforts to seek support for continuing the coordinated rockfish survey and to assist in expediting arrangements for a joint Canada-U.S. tagging experiment in early 1979 to delineate stocks of Pacific cod in Areas 3B and 3C. The TSC also requested the IGC support the TSC in implementing the standardization of sablefish data collection as recommended at the Sablefish Workshop.

During the June meeting, after considering the Canada-U.S. fishery situation, some members felt that changes to the TSC terms of reference should be made; however, this action was postponed until the October interim meeting. After the Annual Meeting, those in attendance were encouraged to continue disaussions on the non-political and scientific aspects of fisheries management problems, and to conduct business with the usual spirit of cooperation.

At the 1978 interim meeting of the TSC in October, the Shelf Rockfish Working Group composed of Bruce Leaman, Canada, and Mike Fraidenburg, Washington, responding to a 1978 TSC recommendation, reported a summary of available data on shelf rockfish species and prioritized research needs. This cooperative document will serve as an excellent starting point for future research on shelf rockfish. The goal of the Pacific Ocean Perch Working Group now is to present its findings by March, 1979 in order to meet the management needs of this controversial fishery. With the increasing importance of marine recreational fisheries, the TSC is planning a workshop to observe and review present methods of data collection and analysis for groundfish. A significant contribution hopefully will come from the State of California which has had extensive experience in the manage ment of marine non-salmonid sport fisheries. Also during the in terim meeting, the recommendations to the International Ground fish Committee for continued support of the coordinated rockfish survey and the joint Canada-U.S. Pacific cod-tagging project were reiterated.

International Groundfish Committee: Phil Rigby reported that the International Groundfish Committee (IGC), created in 1959 by the Second Conference on Coordination of Fisheries Regulations Between Canada and the United States, is especially important during this period of political transition in providing a forum for the presentation, discussion, and coordination of groundfish research, and the review of management problems and options.

The single most important action during the 1978 Annual Meeting of the IGC was the proposal of revised Terms of Reference which in essence stress the scientific and technical responsibilities of this joint Committee and will deemphasize the separation between it and its Technical Subcommittee.

In direct response to the proposed changes in the Terms of Reference is the action the IGC has taken with regard to the 1976 recommendation for specific harvest limits on Pacific Ocean perch in the Vancouver and Columbia areas. Considering the recent changes in the fishery management regimes of both nations, and in the available data and analysis, the IGC has deemed this recommendation no longer appropriate and has urged the TSC and especially the Pacific Ocean Perch Working Group to proceed as quickly as possible with analysis of the data and the effects of various management options. It is hoped that this will include estimates of rebuilding at various harvest levels.

North Pacific Council's Groundfish Management Plan: Phil Rigby reported that the plan for the Gulf of Alaska remains essentially the same as reported at the 1977 Annual Meeting of PMFC. The plan still contains harvest allocations by major statistical areas, trawl observer programs on U.S. vessels, sanction areas for U.S. fishermen, and a 20% reserve to allow for unexpected expansions in the U.S. fishery. The major objective continues to be management of groundfish stocks for optimum yield while protecting Pacific halibut. The plan originally was scheduled for approval in May 1978 but now approval may not come until December. The single major change for 1979 is the allocation of 100,000 metric tons of pollock for joint ventures. The first draft of - the-plan for groundfish for the Bering Sea was released on July 27 and presently is going through the public hearing process. The public comment period will end on January 10, 1979.

Pacific Council's Groundfish Management Plan: Bob Demory (Oregon Department of Fish and Wildlife) briefly reviewed the status of the groundfish management plan of the Pacific Council. The working team presented its first draft of the plan to the Council in Los Angeles in October. The draft plan was limited in distribution because of its very preliminary nature. The next draft will be presented to the Council in December in Portland. At that time, a public hearing on the plan probably will be scheduled. The implementation of the plan is scheduled for January 1, 1980, and it is assumed that the Council's choice of management options will be known by June, 1979.

The only conservation issue identified by the team is for Pacific Ocean perch. Management options that will be presented to the Council involve tradeoffs between types of rebuilding schedules for perch stocks. Options probably will range from no rebuilding to the most rapid rebuilding. The team currently is attempting to identify the economic tradeoffs of different rebuilding schedules. At least in the Columbia area and in the U.S. portion of the Vancouver area, rebuilding schedules range from about 8 to 20 years depending on catch level. These data of course are subject to revision depending upon what the environment does to the stocks. For example, rebuilding schedules could be reduced substantially by the presence of two or three strong year-classes, one of which can now be seen in the fishery.

The status of other groundfish stocks is generally good and the team has not identified any conservation issues that will have major impact. The team has identified a problem with biological data: many of the groundfish species currently harvested have no data base at all, while others such as the petrale sole and some other flatfish, have been studied for a number of years. Pacific Ocean perch is probably the only rockfish species that has received extensive study, though there are about 20 species in the fishery. In terms of the domestic fishery, there are some rather substantial untapped groundfish resources.

Shrimp

Pacific Council's Pink Shrimp Management Plan: Richard F. G. Heimann (California Department of Fish and Game) reported on the progress of plan development. The Council had undertaken the development of a plan in July 1977; the proposal for plan development was described at the 1977 PMFC Annual Meeting. The plan's stated objectives were:

1. To measure shrimp abundance by one or a combination of methods to insure the well-being of the resource.
2. To maximize the economic yield through regulation of the fishery and control the growth in the industry.

During 1978 the plan development team has been collecting and analyzing data for the 10 shrimp stocks that exist along the coast. These efforts include:

1. Catch and effort data based on logbooks are collected by the three states. These data were used for Schaeffer-type production modeling for all 10 stocks. This analysis provided information on theoretical maximum sustain able yield.
2. Age composition data were summarized for the major shrimp beds. These data were subjected to a cohort analysis which provided information on stock sizes and the proportion of the stock taken by the fishery.
3. Net mesh size data in published analyses and in raw form from the NMFS' Seattle gear base were examined to determine relationships between mesh size and escape ment rates through the mesh. Analyses were hampered by the lack of data for the otter trawls now used in the fishery.
4. Economic data were not readily available. This severely limited the economic analyses for the plan.

This work provides the information needed to determine the kind and amount of management required. The team is working with the industry advisors to develop viable options to present in the plan. The team is now writing the plan. The first draft will be presented to the Council in February 1979, about three months behind schedule. However, this still will allow implementation in time for the 1980 season, as originally scheduled.

Salmon and Steelhead

Pacific Council's Salmon Management Plan: Steve Lewis (Oregon Department of Fish and Wildlife) reported on the activities of the Salmon Plan Development Team of the Pacific Council. Personnel changes on the team include the appointment of Ted Perry as coordinator for its activities. He has done a very excellent job in helping to put together a very complex plan. Pat O'Brien is the new chairman. Two new members include Dennis Austin from Washington State, replacing Sam Wright, and Jim Bray, an economist from the University of Washington Marine Advisory Program. The remaining members of the team are Ken Henry (NMFS), Gerry Davis (U.S. Fish and Wildlife Service), and Lewis. Team members work well together and are making good progress on their planning effort for salmon.

The salmon plan was completed in early 1978. It went through the drafting process and public hearing process, and was approved in March. Some of the major differences between the current plan and the]977 plan include the expansion of management area boundaries on the northern Oregon coast from Tillamook Head south to Cape Falcon. This extended the area for which there was a 28"-minimum-size limit for chinook salmon and for which there was a closure from June 15 to July 1 to provide additional protection for chinook stocks from the Columbia River to meet the needs of the Indian Treaty Obligation. This is an extremely controversial item in the current plan but it was felt necessary to provide the Indian Treaty Obligation needs. In addition the area for barbless hooks was extended south throughout the entire Pacific Coast area. Another change was to increase the minimum size of the chinook salmon recreational fishery on the southern Oregon coast to 22". In the current plan, the team is trying to finely tune the 1977 plan. The 1978 plan is currently under court litigation by the concerted troll organizations. The outcome is not yet known.

In planning for 1979, the team intends to utilize the current or an earlier salmon plan. This will be done because time constraints imposed by the review process made it impossible to establish a comprehensive plan by 1979. The Council decided to use the existing or current plan for one more year. This would allow adequate time for updating the data base required to develop a sound comprehensive pjan.

The team is working on the comprehensive salmon plan and has made good progress. The comprehensive plan is scheduled for implementation for the 1980 season. The outline for the plan has been completed and the management unit for the plan has been defined as the salmon fisheries off the coasts of Washington, Oregon, and California including consideration of other anadromous salmonid species. In effect, the plan will be directed primarily toward salmon species. However, other anadromous salmonids such as steelhead and cutthroat will be considered where there is an incidental catch or related environmental problems. The team is trying to make a comprehensive plan which addresses all those salmonids at least in terms of the environmental situation, but it did not feel that most states had adequate data to provide detailed plans regarding other anadromous species such as steelhead and cutthroat.

Objectives for the comprehensive plan have been completed. This was a very difficult, complicated process. Probably the most controversial of the objectives involves the management for wild fish. It is an extremely controversial area and one in which it is extremely difficult to reach a compromise solution. The plan states that "in managing the mixed-stock salmon fishing, the level of exploitation that can be sustained for regional aggregates of important wild stocks such as Washington coastal and Oregon coastal, etc., will be used by the Council to establish maximum harvest rates." This is a very pivotal item and it represents a very major change in the approach and philosophy of managing for salmon. It will dictate the direction of salmon management in the future.

The team is working also with models developed by the Washington Department of Fisheries and California Department of Fish and Game. The models will try to assess the impact of various regulations proposed in the comprehensive plan. The team is making progress in writing various sections of the plan and will be incorporating the hatchery production information gathered by Russell Porter (PMFC). Economic data from Fred Smith's economic study will be added also. In addition there has been an environmental task force working on habitat problems and information on habitat problems will be incorporated into the comprehensive plan.

At the team's October meeting, it jointly met with the North Pacific Salmon Plan Development Team to discuss mutual problems associated with the two salmon plans that are being developed by the respective Councils. This was found to be an excellent opportunity to exchange ideas and talk about mutual problems. Each of the teams was updated regarding specific objectives or problems of the other team so that an integrated plan could be developed that addresses over-all stock problems when dealing with stocks under the jurisdiction of both Councils. The teams intend to maintain this productive liaison.

PMFC's Support of the Pacific Council's Salmon Plan: Russell G. Porter (PMFC) reported on PMFC's activities during 1978 in support of the Pacific Fishery Management Council's Comprehensive Salmon Management Plan. The National Marine Fisheries Service contract to PMFC for this support began in June 1977 and was to run through September, 1978. However, the contract was extended until December, 1978 at the request of the Pacific Council.

One of PMFC's major tasks under this contract was to coordinate the Pacific States in developing a series of background documents supporting the Comprehensive Salmon Management Plan. A description of the subject areas covered by these Reference Documents was given last year at PMFC's 1977 Annual Meeting and was printed in PMFC's 1977 Annual Report. During 1978, the Reference Documents were updated twice to improve their usefulness in supporting the development of the Comprehensive Salmon Management Plan. An additional printing of the Reference Documents in 1978 was distributed to West Coast university libraries near areas of fishing industry concentration.

Three publications were produced under this contract during 1978. The first, *A Comparative Analysis of Alternatives for Limiting Access to Ocean Recreational Salmon Fishing* by Drs. Frank J. Hester and Phillip E. Sorensen, was developed under a PMFC subcontract to the authors as a service to the Pacific Fishery Management Council. The authors were asked to "assess benefits and costs of limiting access to ocean recreational fishing for coho and Chinook salmon, including a comparison of various alternatives for implementation of such a program."

The second report, *Review of Limited Entry Alternatives for Commercial Salmon Fisheries* by Russell G. Porter, reviews limited entry criteria and techniques as well as limited entry programs presently in effect in North America. Limited entry programs for salmonids as well as herring, abalone, other shellfish, and Lake Erie commercial fishes are reviewed.

The third report, *Summary of Pacific Coast Salmonid Hatchery Capacities and Production Trends and Ocean Ranching* by Russell G. Porter, summarizes by river system the 1978 production potential, recent production trends (1972-76), and planned future increases in production capacity (through 1992) for the salmonid hatcheries in Washington, Oregon and California.

PMFC distributed these three reports to the Pacific Fishery Management Council, its Scientific and Statistical Committee, Salmon Plan Development Team and its Advisory Subpanel, and to interested members of the public. Copies may be obtained from PMFC.

Responses from a 1977 mail survey of West Coast fishermen's associations regarding their view of limited entry programs for the commercial salmon fishery were tabulated and submitted to the Moratorium Task Force of the Pacific Fishery Management Council. Additional activities by the Commission under this contract included staff support by Russell G. Porter to the Pacific Council's Salmon Management Plan Development Team, Comprehensive Salmon Plan Coordinator, and Moratorium Task Force. In addition, assistance was provided in writing the background material required by the FCMA for the Pacific Council's Moratorium Amendment to the Salmon Plan. This amendment subsequently was postponed by the Council in favor of the states implementing the moratorium in their own legislatures.

Dungeness Crab

Pacific Council's Dungeness Crab Management Plan: Darrell Demory (Oregon Department of Fish and Wildlife) reported that the Dungeness Crab Management Team was established in August 1977. The writing team includes Demory, Mel Odemar (California Department of Fish and Game), Ron Westley (Washington Department of Fisheries), and Ed Ueber (NMFS). The Advisory Subpanel includes three commercial crabbers Ernie Summers (Washington), Vern Davis (Oregon), and Walt Ghera (California), processor Leif Anderson (Washington), sportsman Henry Rancourt (Oregon), consumer advocate Mary Sorber (Oregon), and Indian representative Oliver Mason.

The crab team had one big advantage over other teams because it was able to rely very heavily upon the PMFC-sponsored state-federal crab plan for 1973-76. A great deal of that report has been used in the crab plan to date with only some minor updating. The basic objectives of the crab plan are to minimize the physical and economic losses of the resource due to wasteful fishing practices and minimize the adverse social and economic impacts on traditional fisheries patterns. The only remaining undecided issue of the plan is how to handle those odd seasons that occur once every ten or fifteen years where the shell condition of the resource is extremely poor at the start of the season. Season closures in general are not agreed upon at this point. California's fishery usually terminates in July, Oregon .has now extended its season to September 15 along with Washington in most years, and yet, for all practical purposes, the fishery is over with by the end of June. But there remain those odd years that occur when fishermen will want to continue fishing clear to the end of the season. The team does not know exactly how to handle that problem.

The final meeting with the advisors is scheduled for November 15-17 in Astoria, Oregon and probably will be well attended. Other meetings were in Portland, Oregon, and Eureka, California.

Regional Mark Processing Center

Since the invention of coded-wire tags small enough for implantation in salmonid fry there has been a dramatic increase in tagging. Now several millions of the salmon and steelhead released each year into the Pacific Ocean carry a coded-wire tag and hundreds of thousands of tags are recovered each year. Data processing methods, developed to handle fin-clip data, rapidly became obsolete and the practice of multiple-fin-clipping itself has now been replaced by the use of coded-wire tags when ocean recoveries are required.

To meet the increased need for regional coordination created by the boom in coded-wire tagging, the Pacific States, through PMFC, created a position for a Regional Coordinator whose duties were to include coordination of tagging, sampling, and related data processing on a regional basis. This position was funded by the Pacific Northwest Regional Commission for two years and Grahame King was hired to the position in May 1977.

A few months later the Regional Mark Processing Center, which had been operated by the Oregon Department of Fish and Wildlife, was placed under PMFC's supervision and the Center's operations for the following year were funded through a contract with NMFS. The operations of the Center include the maintenance of a regional data base on tag release and recovery data and the generation and publication of reports.

In order to improve communications between cooperating agencies along the coast, two workshops have been held—the first in Pacific Grove, California, in November 1977 and the second in Vancouver, British Columbia, in November 1978. These workshops have resulted in standardization of procedures to make the data collected by different agencies comparable. There are still significant problems to be solved, however. To this end

and to document procedures that are already standard, a loose-leaf notebook was created. This document entitled *Pacific Salmon Sampling and Tagging—A Review of Current Methodology,* is produced in a format that allows updates as needed. It is hoped that this will provide a vehicle for maintaining the overall quality and compatibility of data collected and may serve as a reference book for people using the data.

In August 1978 a first step was taken in arranging for the exchange of machine-readable tag recovery data with the Canadians. There may still be some problems, but there is a strong commitment by both Canadian and American agencies. The exchange of machine-readable data up to 1976 is almost complete.

Late in 1977 PMFC began negotiations with the Oregon Department of Fish and Wildlife for an arrangement allowing the Regional Mark Processing Center to share the Department's minicomputer. This involved the acquisition of an extra magnetic disk unit to expand the computer's memory. All arrangements have now been completed and the new hardware has been installed. Software development is well underway and the 1977 tag recovery reports can be generated as soon as the data are forthcoming from the states.

A modular publishing approach has been adopted allowing data to be published when available so that tardy elements do not delay the timely ones. The 1976 recovery reports were the first to be handled this way and the last module was distributed at the end of 1978. Each state is working on improving the timeliness of its processing of catch statistics. The processing of catch statistics is typically the slowest step. Given the efforts being made by the states, the publishing delay is expected to decrease significantly over the next year.

ADMINISTRATIVE REPORTS

Report of the Executive Director

For the past few years, the Report of the Executive Director has emphasized interactions of the Pacific Marine Fisheries Commission with the Regional Fishery Management Councils. This emphasis was continued in PMFC's 1977 Annual Report which reviewed some major gains to the United States resulting from the Fishery Conservation and Management Act (FCMA) of 1976. Three major gains include the extension of U.S. jurisdiction over fisheries to 200 miles and the consequent significant reductions in foreign fishing, the full-scale operations of the eight Regional Councils with broad participation by users and interested public at all levels of council operations, aad_the new National Standards for fishery management requiring management of stocks as units throughout their range while considering socio-economic and ecological aspects when formulating management plan objectives.

In accordance with FCMA provisions, PMFC has participated actively and effectively in operations of the North Pacific and. Pacific councils. The FCMA requires the Executive Directors of the interstate commissions to each be a non-voting member in the Councils, contiguous with each interstate commission's area of jurisdiction. Both Pacific Coast Councils have treated non-voting and voting members alike up to the point of voting. A large share of PMFC attention and energies necessarily has gone to supporting those Councils.

This year it has become very clear that a wide array of fisheries issues and problems not under Council purview needs to be addressed in behalf of the Pacific States. It is in this area, issues and problems not related directly to management planning for fisheries subject to Council jurisdiction, that PMFC continues to serve a unique and critically important function. PMFC's services can be divided into two categories:

1. Activities relating to resolution of national and interna tional problems identified by the Pacific States constitu ency. These are illustrated best by PMFC's resolutions and special instructions to its secretariat.
2. Operational services to the Pacific States and Councils in facilitation of fisheries management, such as the Regional Mark Processing Center, publication of data series, and development of the Coastwide Data Files.

The first category of PMFC services is related directly to two of PMFC's four defined objectives adopted at its 1970 Annual Meeting. Objective I is to provide energetic leadership in recognizing and resolving fishery problems. Objective III is to develop PMFC positions and communicate them to the legislatures of the respective states, the Congress, the concerned agencies of federal, state, or local government, and to the private sector. In context of the instructions of the Executive Committee to PMFC to reevaluate itself, these objectives remain vitally important.

PMFC Activities to Resolve Fishery Problems

Resolutions adopted at PMFC annual meetings are very important in defining the areas for action of the PMFC secretariat in the ensuring year. Though resolutions carry very little weight as mere paper submissions to the Congress, they are a primary source for the terms of reference under which PMFC operates.

Resolutions adopted at the 1977 Annual Meeting, and other inputs to the secretariat from the State Fisheries Directors and PMFC's Commissioners and Advisors, identified six fisheries issues and problems for action in 1977-78:

1. Demand for increased federal funding for commercial fisheries grant-in-aid programs to the States in order to strengthen state research and management capabilities for marine fisheries (1977 Res. 3).
2. Urgency for congressional implementation of Eastland Fisheries Survey recommendations, particularly those which would assist the fishing industry to develop cur rently underutilized fisheries resources and thereby, re build itself (1977 Res. 1).
3. Need for increased research on marine mammal-fisheries interactions and interference, and for major revisions in the Marine Mammal Protection Act to support rational management of ocean ecosystems (1977 Res. 9 and 10).

4. Increased attention to the quantity and quality of water and habitat required to maintain anadromous fish stocks, and to species interactions to evaluate the impacts of various enhancement programs (1977 Res. 12 and 14).
5. Need to streamline the development of fishery manage ment plans, shorten the review process and assure that council operations are responsive to the real needs of Pacific Coast fisheries in a timely manner.
6. Importance of improved communication between the Coast Guard and fishermen with respect to policies and guidelines for boardings at sea (special instructions from the Executive Committee in response to a 1977 proposed resolution).

These issues constituted the marching orders for PMFC's activities in 1977-78 with respect to Objective III, the development of PMFC positions and actions to seek support for them from state and federal governments and the private sector. These actions through August 1978 were reviewed in detail in PMFC's 1977 Annual Report (see Report of the Executive Director, p. 5-11, and Resolutions Adopted in 1977 and Actions Supporting Them, p. 16-24).

Summarized, this has been a banner year for gains in all six problem areas. PMFC won probably its greatest victory in the legislative arena in 1977, when the House Appropriations Committee agreed to add $1.2 million to the funding for FY-1979 under the Commercial Fisheries Research and Development Act. This 30% increase is the first in eight years since 1970. The gains in federal funding for the Pacific States total about a quarter of a million dollars: $73,000 each for Alaska and California, $52,000 for Washington, $39,000 for Oregon, and $19,000 for Idaho. In terms of cost-effectiveness for PMFC, the $250,000 gained by the five states is about 2-1 /3 times the total cost of"state support of all of PMFC's programs, not a bad cost/benefit ratio! It is believed that these gains will continue through the years ahead, and PMFC intends to campaign vigorously for further needed increases, not only under the Commercial Fisheries Research and Development Act but under the Anadromous Fish Conservation Act as well. This fOndftig increase can be attributed directly to the three interstate fisheries commissioris appearing in joint testimony before the Appropriations Committee. The commissions were supported also by congressmen from various states.

With respect to implementation of the Eastland Fisheries Survey recommendations, the priority recommendations of 104 West Coast respondents to the questionnaire sent by PMFC in response to last year's directive are summarized in the 1977 Annual Report (p. 16) and tabulated in Appendix 3 of that Annual Report (p. 55).

The Congress is responding to these recommendations with legislation and bills introduced by Congressman AuCoin, Senator Hatfield, Senator Weicker, and Congressman Forsythe. PMFC is working actively with these sponsors and pressuring for re-introduction in the next session of Congress of a major bill for assisting the fishing industry to assist itself. PMFC is hopeful that Congressman Forsythe, the Republican leader of the House Merchant Marine and Fisheries Subcommittee, will champion this major piece of legislation. Resolution 1 for 1978 addresses this issue. Its approval at the 1978 Annual Meeting has strengthened PMFC's position in seeking legislation.

Additionally, PMFC is assisting the fishing industry to develop a suitable institution for supporting development of underutilized fisheries along the Pacific Coast. The project is a direct outgrowth of the Eastland Fisheries Survey recommendations and PMFC directives for 1977.

PMFC's four-year campaign to bring about needed revisions in marine mammal management is reviewed in detail in the 1977 Annual Report (p. 20-24). The mood of the Administration and the Congress is believed to be shifting somewhat in the direction of more rational handling of this difficult problem. Added research capabilities are being funded to assess and quantify impacts of marine mammal predators on Northwest and Alaska fish and fisheries. Congressional leaders agree privately that the Act needs amending. This may be politically unfeasible given the explosive emotional nature of public attitudes toward marine mammals. PMFC will continue to work aggressively on this issue.

PMFC's continuing concerns for quantity and quality of water and habitat as fundamental requirements for anadromous fish have been conveyed to the Pacific Fishery Management Council, and have been incorporated into the overall objectives of the Comprehensive Salmon Management Plan. Further, PMFC convened a keynote symposium on improving upriver salmon and steelhead habitats at the 1978 Annual Meeting.

While it was not a subject of a PMFC Resolution, there is no question that there is continuing frustration caused by the incredibly time-consuming procedures for implementation of Council management plans. Also there has been a clear concern about the scope of Council planning and operations being relevant in terms of the realities of Pacific Coast fisheries. As a member of the two Pacific Councils, PMFC's Executive Director actively and aggressively has encouraged shortening of the plan review process, and has used all avenues available to carry forward that campaign outside the Councils as well. Also he actively opposed at Congressional hearings a recent bill which would have destroyed the concept of management planning for fisheries as a unit throughout the range of the stocks, a concept which was a cornerstone of PMFC's original intent and certainly a key to ultimate effectiveness of the Councils. Happily, that regressive legislation died in committee, thanks in part to some very persuasive interventions by Congressman Les AuCoin of Oregon.

By invitation of Senator Magnuson and Congressman Leggett, PMFC's Executive Director testified before both Senate and House committees at their oversight hearings on operations under FCMA, and at those hearings he emphasized the areas of concern identified here—streamlining of management plan reviews, rationalization of marine mammal management to conform to ecosystem principles of fisheries management, and the need to assist the U.S. industry toward full utilization of underutilized fisheries.

Finally, PMFC's discussions with the Coast Guard concerning boardings at sea have been fruitful. Vice Admiral A. C. Wagner and his entire staff have been most cooperative in participating in local meetings with fishermen's groups and in develop-

merit of a statement of policy and guidelines for boardings at sea. PMFC-published that statement in full in its summer Newsletter (No. 29) and as a special supplement in the 1977 Annual Report.

PMFC's Ongoing Services

PMFC maintains an active headquarters in Portland in support of the total array of PMFC functions. PMFC continues to produce data series on crab, shrimp, and groundfish statistics coastwide along with other general publications. Concerning fisheries data, PMFC has two major projects, the (salmonid) Regional Mark Processing Center and the Coastwide Data Coordination Project. PMFC also continues to assist the states with cooperative port sampling projects for chinook and coho salmon off California and Oregon, and for albacore coastwide.

PMFC's Financial Support

PMFC's support base for operations is the $106,000 contributed by the states each year (Fig. 1). This is divided into office operations, salaries and wages, committees and publications, and annual meetings, and provides a power base from which PMFC operates. Superimposed on this support base are contract operations totalling several hundred thousand dollars, including contracts for Regional Fishery Management Council support.

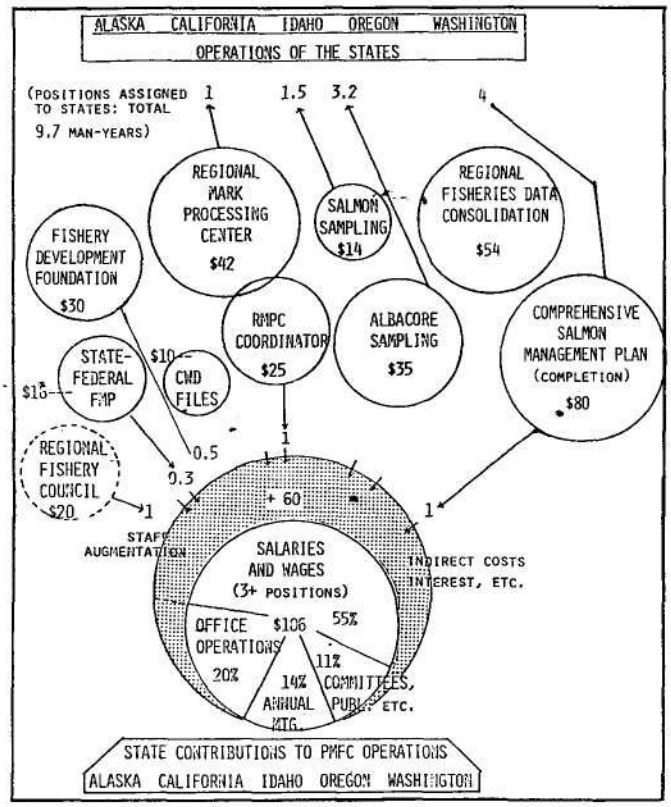


FIGURE 1. Pacific Marine Fisheries Commission 1978 cooperative projects, levels of funding (in thousands of dollars), and generation of staff.

[1]The Executive Committee is composed of the heads of the fisheries agencies of PMFC's member states. See the list of 1978 Commissioners on page 27 for Committee members.

State-Federal Fishery Management Programs, and Coastwide Data Files, etc. These external contracts generate an additional $60,000 in indirect costs as well as augment the staff by 3.5 position. Additionally, these programs generate staff positions (9.7 man-years) that are assigned to states for various tasks such as seasonal aides.

State support for PMFC has increased from about $65,000 in 1971 to $106,000 presently. This rate of increase is slightly less than the inflation rate over the same period. Support of the secretariat by indirect costs on contracts has increased from zero in 1971 to about $34,000 for 1978. Total support including contract funding of projects has increased from $68,000 in 1971 to over $390,000 in 1978.

PMFC's Continuing Role

Interaction with the Regional Councils will continue to be an extremely important functional role of PMFC. The Executive Director considers this function a top commitment. However, it is very worthwhile to examine PMFC's involvement separate from Council support. PMFC has a capability to communicate with the Congress and State Legislatures on behalf of its Pacific State fisheries constituency, and is not subject to the lobbying restrictions affecting the Councils. PMFC has developed credibility with congressional staffs and key committees by being honest and careful in presenting background materials and information. An example of this was when the three interstate commissions testified in support of increased grant-in-aid funding to states before the Appropriations Committee. The commissions' Executive Directors were followed by a spokesman for the Merchant Marine and Fisheries Committee who endorsed fully the commissions' testimony.

.Executive Committee Actions

In 1978, the Executive Committee[1] met in special session on April 6 in Washington, D.C., in conjunction with the State Directors' Conference. Regular meetings were held on July 13 in Monterey, California and on October 17 in Coeur d'Alene, Idaho. The Committee took the following more prominent actions in 1978:

The Committee agreed that PMFC should proceed with programming to merge state data files into one coastwide file if possible or two regional files if so compelled by confidentiality laws. State Directors were asked to encourage internally the preparation of compatible state files. Executive Director John Harville was directed to seek additional federal funding for the prerequisite programming and technical support necessary to meet added demands on state resources resulting from council requirements for information. The Committee approved in principle a draft proposed by PMFC to the National Marine Fisheries Service Northwest Regional Office to fund a one-year fisheries data project that would assist the completion of the Coastwide

Data Files for 1974 to 1976, examine alternative regional fisheries information system designs, and facilitate a Pacific Coast Marine Recreational Fisheries Statistics Survey. Executive Director Harville was instructed to negotiate with NMFS for project support.

The Committee approved PMFC's budget for FY-1979 and the states' contributions for the 1979-81 biennium. Executive Director Harville was directed to reevaluate and resubmit the base budget for the 1979-81 biennium with the aim of reducing expenses to match income, reducing annual meeting costs, and the drawing of reasonable salary increases from the year-end surplus funds. Following resubmission, the biennial budget with a $40,000 year-end balance was approved. This approved budget was 7% below that originally submitted.

The Committee approved a FY-1979 budget adjustment to allow PMFC to purchase a computer data storage disc for the Regional Mark Processing Center. The Committee also approved using $7,000 from PMFC's budget to fund the states' contributions to the Regional Mark Processing Center.

PMFC's Rules and Regulations, Section II on Membership, were changed to read ". . . three members from Oregon, the State Fish and Wildlife Director, and two members appointed by the State Fish and Wildlife Commission . . ." to conform with present Oregon policy. Section XIV on Reimbursement of Travel and Subsistence Expense was changed to allow up to $65 per day actual costs for food and lodging while on PMFC-authorized travel in Alaska.

Finally, the Committee instructed Executive Director Harville to review PMFC's tasking documents and operating guidelines and procedures, particularly the resolutions process and the annual meeting format, with the intent of increasing PMFC's cost-effectiveness and possibly realigning its fisheries management role now that the Regional Councils are fully functional (see also p. 17).

Report of the Treasurer

Treasurer Gerald L. Fisher reported as of September 30, 1978, the cash balance was $145,369.54 and accounts receivable totalled $66,912.14. The annual audit for the year ended June 30, 1978 found PMFC's financial records in satisfactory condition (see Appendix 1 —Financial and Audit Reports).

Publications in 1978

Releases of Coded-Wire Tagged Salmon and Steelhead from Pacific Coast Streams through 1977, published in March, documents the use of coded-wire tags in Pacific Coast salmon and steelhead studies for fish still at large. The *1978 Mark List was published* in July. It contains a record of all groups of salmon, and some groups of steelhead (primarily from the Columbia River system), which had been marked by excision of one or more fins before they were released to migrate to the ocean and are still at large. It also lists those groups of juvenile fish which were scheduled for marking and releasing in 1978. *Pacific Salmon Sampling and Tagging—A Review of Current Methodology,* published in August, documents methods used in coded-wire tagging experiments, including tagging and tag recovery techniques as well as sampling strategy and data processing.

The *Dungeness Crab Project of the State-Federal Fisheries Management Program,* published in May, presents comprehensive information concerning the Dungeness crab fishery as compiled by Pacific Coast fishery scientists, economists and managers during 1973-1977. This report reviews the State-Federal Fisheries Management Program and the Dungeness Crab Project, the crab resource, data base and data management, sampling techniques, various harvesting regimes, movement of tagged crabs, the relationship between effort and yield, benefits of effort management, and alternative effort management plans.

The *30th Annual Report of the Pacific Marine Fisheries Commission for the Year 1977* was published in October. *PMFC Newsletters #29, #30,* and *#31* were published in April, September, and November, respectively.

A Comparative Analysis of Alternatives for Limiting Access to Ocean Recreational Salmon Fishing, published in April, assesses the impact of recreational fishing on coho arjd chinook salmon stocks and estimates the socio-economic effects of various management alternatives designed to limit the recreational catch of salmon in Pacific Ocean waters under PMFC's purview.

A *Review of Limited Entry Alternatives for Commercial Salmon Fisheries,* published in June, summarizes the techniques available for instituting a limited entry program and reviews existing programs. *Reference Documents Prepared for the Comprehensive Salmon Management Plan of the Pacific Fishery Management Council* was updated in June.

Coastwide Data File Input/Output Specifications, published in September, contains the necessary design and operational specifications for participating member states to submit detail tape files of the specified fisheries data to PMFC and for those files to be combined into a contiguous multi-file/multi-volume data base by year.

1979 Annual Meeting

The 1979 Annual Meeting will be held on October 1-3 in Sitka, Alaska at the Shee Atika' Lodge and the Sitka Centennial Building.

Personnel

The following served as Commissioners during 1978:

Alaska
- Richard I. Eliason, Sitka
- Charles A. Powell, Kodiak
- Ronald 0. Skoog, Juneau —First Vice Chairman

California
- E. Charles Fullerton, Sacramento—Second Vice Chairman
- Vincent Thomas, San Pedro Helen Xitco, Lakewood (succeeded Harold F. Cary in October)

Idaho
- Joseph C. Greenley, Boise—Chairman
- Steven J. Herrett, Twin Falls Richard A. Schwarz, Idaho Falls

Oregon
- John R. Donaldson, Portland—Secretary Walter H. Lofgren, Portland Herbert F. Lundy, Portland (succeeded Allan Kelly in October)

Washington
- Harold E. Lokken, Seattle
- John Martinis, Everett
- Gordon Sandison, Olympia—Third Vice Chairman

Coordinators for 1978 were:

Alaska
- Rupert E. Andrews, Alaska Department of Fish and Game (succeeded Ed J. Huizer in March)

California
- Edward C. Greenhood, California Department of Fish and Game

Idaho
- Stacy Gebhards, Idaho Department of Fish and Game

Oregon
Kirk Beiningen, Oregon Department of Fish and Wildlife (succeeded Charles J. Campbell in March) Washington
- Cliff J. Millenbach, Washington Department of Game
- Henry 0. Wendler, Washington Department of Fisheries

The Coordinators act as intermediaries between PMFC and the fisheries agencies of its member States and between PMFC's Advisors and the heads of these state fisheries agencies.

Advisory Committee members during 1978 were:

Alaska
- Jack B. Cotant, Ketchikan
- Knute Johnson, Cordova
- Carl Kerr, Sitka (succeeded James Burris in October)
- Bruce Lewis, Juneau
- Andy Mathisen, Petersburg —Section Chairman
- Charles H. Meacham, Juneau Larry Powell, Yakutat (succeeded Jack Phillips in October)

California
- John P. Gilchrist, Sacramento—Section Chairman
- Herbert R. Kameon, Santa Monica (succeeded Oliver A. Schulz in October)
- Frank Mason, San Diego (succeeded John P. Mulligan in October)
- Anthony V. Nizetich, Terminal Island
- L. R. Budd Thomas, Fields Landing
- Roger Thomas, San Jose
- Elizabeth Venrick, La Jolla

Idaho
- W. H. Godfrey, Boise Keith Stonebraker, Lewiston E. G. Thompson, Sandpoint-tion •Committee and Sec- Chairman

Oregon
- Theodore T. Bugas, Astoria Don Christenson, Newport—Section Chairman Charles S. Collins, Roseburg ■ Bbb Hudson, Charleston John Marincovich, Astoria Phillip W. Schneider, Portland Wayne Viuhkola, Astoria

Washington
- Paul Anderson, Seattle
- Les Clark, Chinook
- Earl Engman, Tacoma —Section Chairman
- Edward Manary, Olympia
- Guy McMinds, Tahola
- Jesse M. Orme, Seattle
- Ted Smits, Seattle

Elections were held at the annual meeting to select the Commission's officers and its Advisory Committee's Steering Group for 1979.

Officers for 1979 are:

Chairman —
- Ronald 0. Skoog, Commissioner
- Alaska Department of Fish and Game

1st Vice Chairman —
- E. Charles Fullerton, Director California
- Department of Fish and Game

2nd Vice Chairman —
- Gordon Sandison, Director
- Washington Department of Fisheries

3rd Vice Chairman —
- John R. Donaldson, Director
- Oregon Department of Fish and Wildlife

Secretary
- Joseph C. Greenley, Director Idaho
- Department of Fish and Game

The 1979 Steering Group is composed of:
- Committee and Alaska Section Chairman—Andy Mathisen
- Committee Deputy Chairman —Larry Powell California
- Section Chairman—John P. Gilchrist Oregon Section
- Chairman —Don Christenson Washington Section
- Chairman —Earl Engman Idaho Section Chairman —E. G. Thompson

During 1978, the Secretariat was composed of: John P.
- Harville—Executive Director Maria J. Clark—Secretary
- Gerald L. Fisher—Treasurer Michael B. Fraser—Staff
- Assistant Richard J. Goldsmith —Assistant to the Executive Director
- (resigned March) Grahame King —Coordinator, Regional Mark Processing
- Center Clarence G. Pautzke—Assistant to the Executive Director
- (after August)
- Russell G. Porter—Staff Assistant Kathleen J. Scorgie—Administrative Assistant (resigned
- January)
- Beverly A. Shinn —Secretary (resigned November) Ann L. Swenson—Administrative Secretary

Assisting the staff part-time was:
- Leon A. Verhoeven, Consultant

Appendix 1—Financial and Audit Reports

1978 Financial Support

The Commission receives its financial support from legislative appropriations made in accordance with Article X of the Interstate Compact (creating the Commission) in which the signatory states have agreed to make available annual funds for the support of the Commission as follows: eighty percent (80%) of the annual budget is shared equally by those member States having as a boundary the Pacific Ocean; and five percent (5%) of the annual budget is contributed by each other member State; the balance of the annual budget is shared by those member States having as a boundary the Pacific Ocean, in proportion to the primary market value of the products of their commercial fisheries on the basis of the latest 5-year catch records.

TREASURER'S REPORT OF RECEIPTS AND DISBURSEMENTS
November 1, 1977 to October 1, 1978

CASH BALANCE November 1, 1977			
(November 1977 Treasurer's Report)			$134,606.22
RECEIPTS:			
Contributions by Member States			
Alaska (FY 1979)	$27,400.00		
California (FY 1979)	26,600.00		
Idaho (FY 1979)	5,300.00		
Oregon (FY 1979)	22,600.00		
Washington (FY 1979)	24,100.00		$106,000.00
Other Receipts			
National Marine Fisheries Service	$215,380.04		
Oregon Dept. Fish & Wildlife	17,670.75		
Washington Dept. Fisheries	69,258.42		
Pacific Northwest Regional Commission	30,002.03		
Miscellaneous	1,862.29		$334,173.53
Interest on Saving Certificates			$ 7,105.05
DISBURSEMENTS:			
Annual Meeting, November 1977, Portland			
Commissioners	1,793.77		
Advisory Committee	2,427.26		
Admin. & Research Staffs	4,959.12		
Tape Recording & Room Rental	975.85	$10,156.00	
Salaries & Wages		$45,930.76	
Retirement & Social Security		7,660.77	
Medical Insurance		2,308.35	
Travel Expenses, unclassified		2,330.96	
Office Supplies & Maintenance		3,483.15	
Telephone & Telegraph		2,425.17	
Postage, Freight, Express		3,657.84	
Rent, headquarters space		3,744.00	
Printing & Publications		479.05	
Bond & Accident Insurance Premiums		583.38	
Library Supplies		197.95	
Capital Outlay		14,460.35	
Prepaid Insurance Premiums		1,477.95	
Professional Services		1,210.00	
Cooperative Research			
Otolith Reader Project	3,167.70		
Other Disbursements	796.71		
Subtotal State Funded Expenditures	$104,070.09		
External Contract Expenditures			
Councils Liaison	18,341.26		
Eastland Resolution	628.49		
Wash. Coastal & Puget Sound Sampling	49,079.12		
Federal and Oregon Shares of Salmon Maturity Study	38,413.26		
State-Federal Relations Contracts	16,171.37		
NMFS Regional Mark Center	14,606.58		
NMFS Underutilized Species Foundation	1,590.14		
NMFS Regional Data Coordination	3,261.36		
Federal Share of Otolith Reader	9,503.51		
NMFS Dungeness Crab Contracts	7,050.40		
NMFS Coastwide Data System	2,776.36		
NMFS Salmon Management Plan	100,419.54		
NMFS Albacore Logbook & Port Sampling	33,494.10		
PNRC Regional Mark Coordinator	20,495.09		
Other	16,614.59		
Subtotal External Contract Expenditures	$332,445.17		
Total Disbursements		$436,515.26	
CASH BALANCE September 30, 1978		$145,369.54	
		$581,884.80	$581,884.80

Audit Report

CAHALL & ROBERTS
Certified Public Accountants
10700 S.W. Beaverton Highway, Suite 500
Beaverton, Oregon 97005
September 14, 1978

The Board of Commissioners Pacific
Marine Fisheries Commission Portland,
Oregon

We have examined the statement of assets and liabilities arising from cash transactions of Pacific Marine Fisheries Commission as of June 30, 1978, and the related statements of revenue collected and expenditures, changes in cash position and changes in fund balance for the year then ended. Our examination was made in accordance with generally accepted auditing standards and, accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

As described in Note 8, the Commission's policy is to prepare its financial statements on the basis of cash receipts and disbursements, with the exception of the accrual of expenses on the General Fund. Consequently, certain revenue and related assets are recognized when received rather than when earned in all funds, and certain expenses are recognized when paid rather than when the obligation is incurred in the special projects funds. Accordingly, the accompanying financial statements are not intended to present financial position and results of operations in conformity with generally accepted accounting principles.

In our opinion, the financial statements referred to above present fairly the assets and liabilities arising from the cash transactions of the.Paeific Marine Fisheries Commission as of June 30, 1978, and the revenue collected and expenditures during the yearthen ended on the basis of accounting described in Note 8, which basis has been applied in a manner consistent with that of the preceding year.

Cahall and Roberts

Balance Sheet June 30, 1978

ASSETS

	General Fund	Property Fund
Cash		
Cash on hand and in savings	$ 15,487.00	
Certificate of Deposit	85,000.00	
Receivables		
Due from Washington Dept., Fisheries		
Otolith Project	2,549.00	
Ocean Salmon Sampling	12,636.00	
Due from National Oceanic and Atmospheric Administration		
Contract #03-78-M02-117	4,933.00	
Grant-in-aid #8M02 PM1B	9,292.00	
Contract #01-7-208-14721	1,173.00	
Contract #03-6-208-35163	799.00	
Contract #03-7-208-35287	6,307.00	
Due from Pacific Northwest Regional Commission	4,511.00	
Due from Oregon Department of Fish & Wildlife	4,852.00	
Office Furniture and Equipment		$9,740.00
Total Assets	$147,539.00	$9,740.00

LIABILITIES

Bank Overdraft (Checking Account)	$13,382.00	
Accrued Liabilities	4,658.00	
Unexpended Grant Funds		
National Oceanic and Atmospheric Administration—		
Contract #03-6-208-35390	7,114.00	
Contract #03-7-208-35170	675.00	
Contract #04-8-M01-44	2,935.00	
Total Liabilities	$28,764.00	0

FUND BALANCES

Unappropriated Surplus, June 30, 1978	118,775.00	
Investment in Fixed Assets, June 30, 1978		9,740.00
Total Liabilities and Fund Balances	$147,539.00	$9,740.00

Appendix 2 — Pacific Coast Fishery Review Reports

Albacore Fishery in 1978

The 1978 albacore catch by U.S. vessels is estimated at 37,000,000 pounds which is less than the 25-year average of 43,771,000 pounds (Table 1). Washington landings are down about 800,000 pounds from 1977, at 4,150,000 pounds. Oregon landings are about 11,250,000 pounds, over twice as much as landed in 1977, but about 1,200,000 pounds less than the 25-year average. California landings increased about 7,000,000 pounds over the estimated 15,000,000 pounds landed in 1977 to about 22,100,000 pounds. (Figures 1 and 2.) The total 1978 landings are a substantial increase over the record low landings of 24,373,000 pounds in 1977. The price to the fishermen was settled in June at a record high of $1,220 per ton.

TABLE 1. Albacore landings in California, Oregon and Washington (in thousands of pounds)

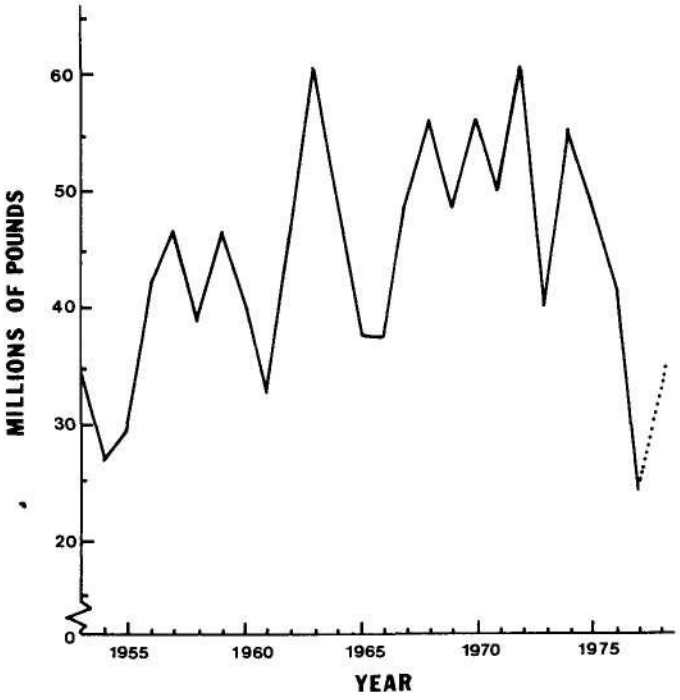
Year	California	Oregon	Washington	Total
1953	33,836	776	89	34,701
1954	26,107	469	421	26,997
1955	29,002	503	233	29,738
1956	37,055	3,654	630	41,339
1957	43,525	2,702	433	46,660
1958	27,188	9,754	1,503	38,445
1959	32,740	10,582	2,961	46,283
1960	35,113	4,563	526	40,202
1961	29,123	3,251	456	32,830
1962	36,622	8,936	365	45,923
1963*	48,860	11,413	527	60,800
1964	42,551	4,452	1,055	48,058
1965	23,218	12,122	2,048	37,388
1966	18,189	18,041	1,101	37,331
1967	17,858	29,243	1,240	48,341
1968	15,077	37,752	3,050	55,879
1969	14,722	29,828	3,561	48,111
1970	29,932	21,779	4,390	56,101
1971	36,117	8,420	5,250	49,787
1972	21,001	23,560	16,239	60,800
1973	8,641	16,350	14,446	39,437
1974	11,806	25,225	17,983	55,014
1975	15,413	17,149	16,297	48,859
1976	27,754	5,934	7,202	40,890
1977	15,000*	4,425	4,948	24,373
25-year average	27,058	12,435	4,278	43,771
1978*	22,100	11,250	4,150	37,000

* Preliminary

Conditions Affecting the Fishery

Although the U.S. catch was about 6,700,000 pounds less than the 25-year average, there were several factors which contributed to lowering the potential catch. They were: 1. the weak development of thermal fronts for much of the season, 2. the closure to U.S. fishermen of the waters within 200 miles of the British Columbia coast, and 3. the rough weather that was prevalent during August and September.

FIGURE 1. Combined annual landings of albacore in California, Oregon and Washington, 1953-1978.



California

It appears that the 1978 landings exceeded the 15,000,000 pounds landed in 1977, although as of September 15, 1978, incomplete figures indicated approximately 8,114,638 pounds of albacore had been landed in California. California's marine statistical unit is currently undergoing modernization with new equipment. The changeover has resulted in a backlog of landing data to be processed and recorded.

Jig boats, operating out of San Diego, made small catches of albacore throughout the 1977 winter into April 1978. This small

fleet caught from 10 to 15 fish per boat per day fishing northeast of Guadalupe Island, Baja California, from albacore overwintering in Mexican waters. No landings were recorded in May. In June, catches of from 1 to 30 fish per boat per day were reported from a wide area from Guadalupe Island to off Cape Colnette, Baja California. Two size modes appeared, one at 12 pounds and the other around 20 pounds. Fish ranged from 5 to 25 pounds. One boat, fishing inside Erban Bank, reported a catch of 200 fish per day. Sport boats fishing about 85 miles south of San Diego made minor catches of albacore the last week in June.

By early July, fishing was scattered from the San Diego Dumping Grounds to the Boutelle Seamount (200 miles west of Point Arena). A few high scoring boats caught up to 200 fish per day, but the fleet average was 20 to 50 fish per boat per day. Two size classes dominated the catch, one around 12 pounds and the other about 21 pounds. More of the larger size fish were taken. This size composition continued throughout the month. Also the larger fish were found inshore. Rough weather off central and northern California reduced fishing effort. Sport boats averaged 1 to 3 fish per angler off San Diego. In mid-July the fleet concentrated on hot spots southwest of San Diego, off Morro Bay, inside Guide Seamount and along the Mendocino Ridge. Catches ranged up to 150 to 200 fish per day of mixed sizes, 12 to 25 pounds. By the end of the month fishing extended along the entire California coast.

In August, scattered fishing ranged from the San Diego Dumping Grounds to off Crescent City. Fishing was slow and intermittent off southern California, excellent off Morro Bay to Pioneer Seamount, and good off northern California when the boats could get out between storms. Hign" boats scored up to 400 fish per day off of San Simeon. The fishery was taking mixed size fish, ranging in size from 10 to 35 pounds with two modes: one at 12 pounds, the other at 21 pounds. Generally the larger fish were taken inshore out to 100 miles and the smaller fish outside of there. Purse seiners, setting on bluefin tuna, have caught up to 15 tons t)f albacore a trip. These seiners worked schools located off the 60 Mile Bank, Cortez Bank and the San Juan Seamount. San Diego sport boats fishing the 213 Spot, 60 Mile Bank, and the San Diego Dumping Grounds had, fluctuating catches from 0.5 to 3 fish per angler. Sport boats out of Morro Bay recorded catches up to 8 fish per angler.

Weather hampered fishing in central and northern California during September. From Morro Bay south to San Diego fishing was poor, however, only a few boats remained in southern California waters. Small catches of very large fish, up to 40 pounds, were reported around the 60 Mile Bank. Good fishing developed in the area between Morro Bay and Moss Landing. Jig boats that had been fishing north of the state and in southern California waters moved into the fishing grounds between the 1908 Spot to the Pioneer and Guide seamounts. Good catches up to 600 fish per day were made. Intermittent storms and rough seas forced the fleet into port on many days when fishing success was at its peak. Fishermen claim that rough weather during the 1978 season was the worst they had seen in years.

In October and through November, bait boats recorded small catches from the general area between the 295 Spot, San Diego Dumping Grounds and the 60 Mile Bank. By December the fishery ended because of low catches.

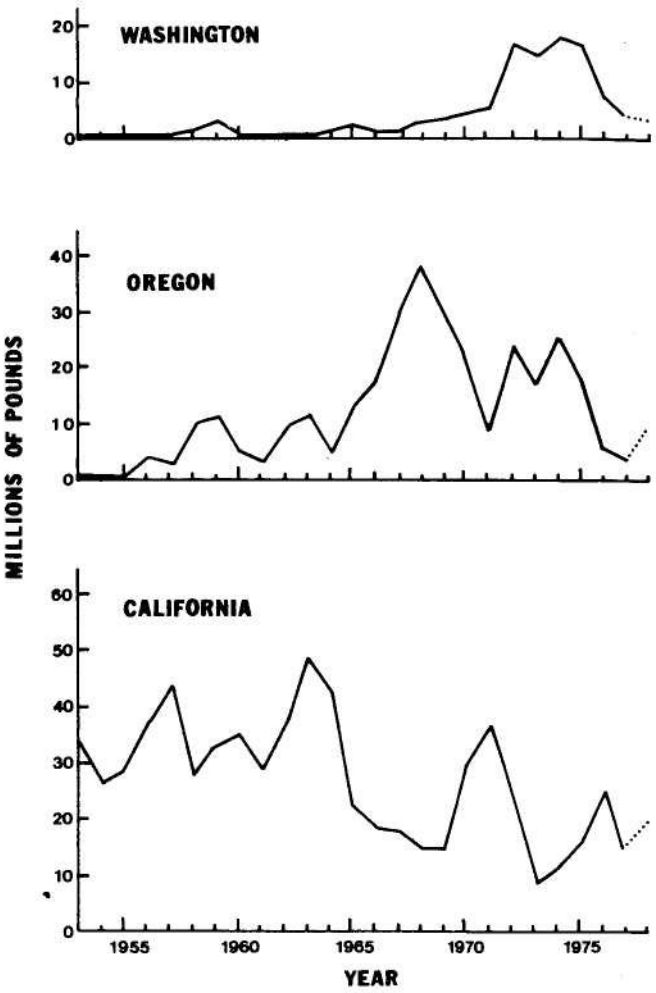


FIGURE 2. Annual albacore landings by State, 1953-1978.

Oregon

The commercial fishing vessel "New Dawn", under charter to the Oregon Department of Fish and Wildlife for the annual preseason cruise, caught 9 albacore about 150 miles off of Coos Bay on July 8 and 9, 49 albacore about 100 miles off of Newport on July 12, and 20 south of the Columbia River Dumping Grounds on July 13, 1978. However, there were no commercial catches reported off Oregon until the third week of July when some catches up to 400 fish per day were reported around the Jackson Seamount area off southern Oregon by a few boats. Bad weather then set in for a few days. The boats got back out the last week of

July and reported good catches of up to 200 fish per day off Cape Blanco with scattered catches off Heceta Head, the Columbia River, and Westport, Washington. The fish were mostly in the 11- to 13-pound class with a few 20 pounders. July landings were an estimated 858,000 pounds.

The first week of August, fishing was good along most of the Oregon Coast, with the Cape Blanco area being the most consistent. Boats in that area, when weather permitted fishing, averaged 100 to 150 fish per day with some catching over 400 fish. The Columbia River Dumping Grounds and the area off Newport and Cascade Head also produced good catches intermittently in the 100- to 200-fish per boat per day range. The sport charter fleet also started making trips all along the coast with good success of 1 to 5 fish per rod, 20 to 60 miles offshore from Coos Bay to the Columbia River. The commercially caught albacore averaged 11 to 13 pounds while the sport catch was mostly 15- to 25-pound fish.

During the third week of August, the area 100 to 160 miles off Coos Bay produced catches of from 100 to 400 fish per boat per day (averaging around 150 fish). On August 23 high winds drove most of the boats into port. After the winds let up, catches declined to 30 to 150 fish per boat per day. Meanwhile, fishermen off Newport and the Columbia River reported catches of 70 to 200 fish per boat per day before the storm and 40 to 100 fish per boat per day after the storm. The sport fleet continued to do well, when weather permitted, on large fish of 15 to 25 pounds; catches ran up to 7 fish per angler. August landings were estimated to be around 7,060,000 pounds.

September catches were very good off central and northern Oregon during the first week, with up to 600 fish per boat per day on 10- to 12-pound fish. On September.?,.a .sudden intense storm hit the coast, sinking 8 small boats and pushing the rest of the fleet into port. When the boats returned to sea the best fishing was off the Columbia River and Cascade Head on 12-to 15-pound fish, with scores averaging around 100 to 150 fish per boat per day. The sport boats did well until the September 7 storm after which most of the boats quit for the season. During the second half of September, aperies of storms moved through the area and catches dropped considerably, although some 100-fish days were reported off the Columbia River Dumping Grounds on the few days when the boats could fish. By the end of the month most boats had quit for the season or had gone south to California to finish the season. September landings were estimated at 3,032,000 pounds.

For October and the rest of the season an estimated 300,000 pounds were landed by boats still fishing off Oregon or by boats returning from California, making the total estimated Oregon landings in 1978 about 11,250,000 pounds.

Washington

Fishing did not begin off the Washington Coast until late July when jig boats began making scattered catches of 11- to 13-pound albacore between the Columbia River and Westport. Daily catches generally averaged less than 50 fish per boat. Washington landings for July were an estimated 50,000 pounds.

During the first part of August, most of the Washington albacore fleet was fishing off the Oregon Coast where jig boats reported daily averages of 100 to 150 fish between Coos Bay and Tillamook Head. Most fish from this area averaged 11 to 13 pounds. As the month progressed fishing effort began to increase in the area between the Dumping Grounds off the Columbia River and Westport. Jig boats fishing the Dumping Grounds during the latter part of August averaged catches of 100 to 300 fish per day on 11- to 13-pound fish. Catches off Westport were generally lower with a few boats reporting daily catches in excess of 150 fish. Most albacore from this area averaged 11 to 13 pounds, however, small jig boats fishing nearer to shore than the majority of the fleet had catches with up to a third of the catch averaging 18 to 20 pounds. Washington sport boat catches during the month ranged from 2 to 5 fish per angler with generally greater success toward the end of the month. Albacore caught by the sport boat fleet during this period averaged 18 to 20 pounds. An estimated 2,500,000 pounds of albacore were landed in Washington during August.

A series of vigorous storms during September prevented most Washington jig boats from fishing more than a few days at a time. When weather permitted, however, jig boats fishing the Dumping Grounds off the Columbia River reported averages of 200 to 400 fish per day on albacore averaging 10 to 12 pounds. Similar scores were reported off Westport although most jig boats in this area were making daily catches averaging 30 to 100 fish. Fishing success off the entire coast decreased during the last week of September. Washington sport boats had excellent success during September with average catches ranging between 4 and 7 fish per angler of fish weighing 12 to 20 pounds. Estimated landings for the month were 1.5 million pounds.

An estimated 100,000 pounds of albacore were landed in October from boats fishing in southern areas and unloading in Washington at the conclusion of their season. This brought total landings in Washington to an estimated 4,150,000 pounds, approximately 800,000 pounds below last year's total and only slightly higher than the 25-year average.

Several factors may have had a substantial influence in reducing Washington's 1978 landings. Canadian restrictions on U.S. fishing off the coast of British Columbia limited the northward extension of the jig boat fleet. They also discouraged California bait boats, which often fish northern areas late in the season, from coming to the Pacific Northwest. In addition, Washington for the first time imposed a 1 % landing tax on fishermen delivering albacore. Many fishermen, who traditionally deliver in Washington, chose to unload in Oregon, which imposes no landing tax on the fishermen.

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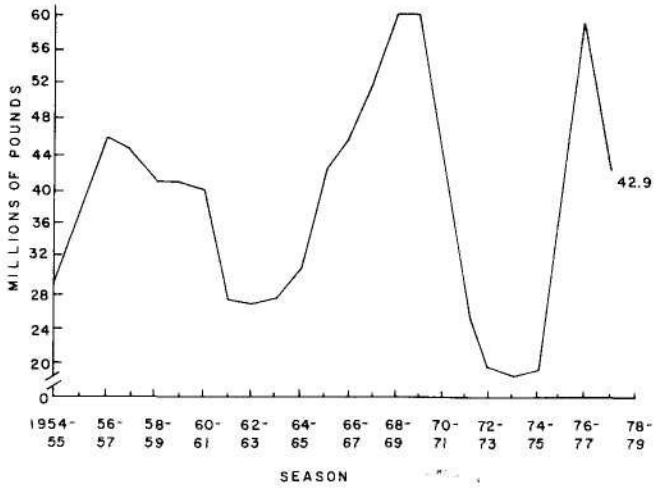
Dungeness Crab Fishery in 1977-78

The 1977-78 Pacific Coast Dungeness crab landings, including Canada, totalled 42.9 million pounds, a decrease of 16.3 million pounds from the record landings of 1976-77. This is 4.9 million pounds more than the 20-year average (1958-77) of 38.0 million pounds and 3.6 million pounds more than the 10-year average (1968-1977) of 39.3 million pounds. Landings in Washington (excluding Puget Sound), Oregon and California totalled 31.4 million pounds, which was a decrease of 22.1 million pounds from the 1976-77 season.

FIGURE 1. Pacific Coast Dungeness crab landings by season, including British Columbia.



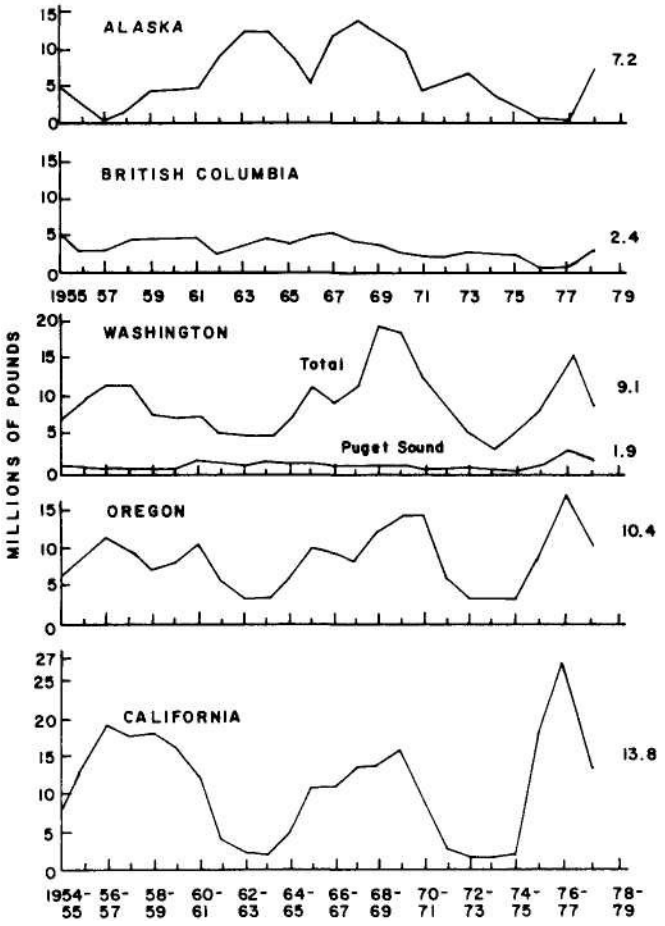


FIGURE 2. Dungeness crab landings by season, 1954-55 through 1977-78, except Alaska and British Columbia seasons are calendar years, i.e., 1954-55 = 1955.

Alaska[1]

Statewide landings of Dungeness crab reached 7.2 million pounds. This was the highest catch since 1964 and is well above the 10-year average of 5.9 million pounds. Improved market conditions, ex-vessel prices of 65-75 cents per pound and increased abundance stimulated the 1978 fishery.

British Columbia

Dungeness crab landings for 1978 totalled 2.4 million pounds, a slight increase over landings for 1977 but nearly equal to the average annual total for the last 10 years.

Washington

Washington's coastal crab landings from December 1, 1977 through September 1978 totalled 7.2 million pounds. Commercial crab catches in Puget Sound totalled 1.9 million pounds, down from 2.4 million pounds taken in the previous season.

Conditions Affecting the Fishery «

Despite a strong show of effort, catches were down in all areas except Alaska. Year classes of moderate strength reflected the drop in landings. The sharply increased production in Alaska resulted from a good price incentive. The Washington coastal crab season began by emergency order on December 1, 1977 to coincide with Oregon and northern California openings, and was extended 15 days past the normal September 15 closing to September 30. In general, crab condition at the beginning of the season was good in all areas. Early season landings in Washington were depressed by severe storms, but in northern California, nearly 80% of the total catch was landed during the first two months of the season. Opening prices started at 50 cents per pound and were as high as $1.20 per pound at the end of the season. In Oregon, six helicopters were used in the fishery for a period of one month.

1 Alaska and British Columbia crab data are reported by calendar year.

Oregon

Landings in Oregon for the 1977-78 season, which ended September 15, totalled 10.4 million pounds. This was well below the record catch of 16.2 million pounds landed in 1977, but better than the 10-year average (1968-77) of 9.3 million pounds.

California

Statewide landings totalled 13.8 million pounds, a sharp drop from the record 26.2 million pounds landed in the 1976-77 season. Northern California landings of 12.8 million pounds were half the previous season's catch. Landings in the San Francisco area totalled 587,000 pounds, about the same as the previous season.

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Groundfish Fishery in 1978

1 Preliminary totals.

2.DQ6S not include unrecorded catches for crab bait of over 2 million pounds sold on grounds.

TABLE 1. Trawl landings (1000's of pounds) by region: 1977 vs. 1978 and 10-year mean (1968-1977)

Region	1977	1978[1]	% change	10-year Mean
Alaska	2,529	5,791[2]	+129	—
Washington	50,934	51,444	+1	47,058
Oregon	20,941	32,121[3]	+53	20,759
California	62,500	63,250	+1	50,652
Total U.S.	136,904	152,606	+11	118,469
Canada (B.C.)	54,608	56,861[4,5]	+4	41,530
Total (U.S.-Canada)	191,512	209,467	+9	159,999

3 Includes 1.9 million pouncls of Pacific whiting from joint-venture fishing off Oregon.

4 Includes 2.364 million pounds of trawl-caught herring.

5 Does not include 4 million pounds of Pacific whiting caught by joint-ventures.

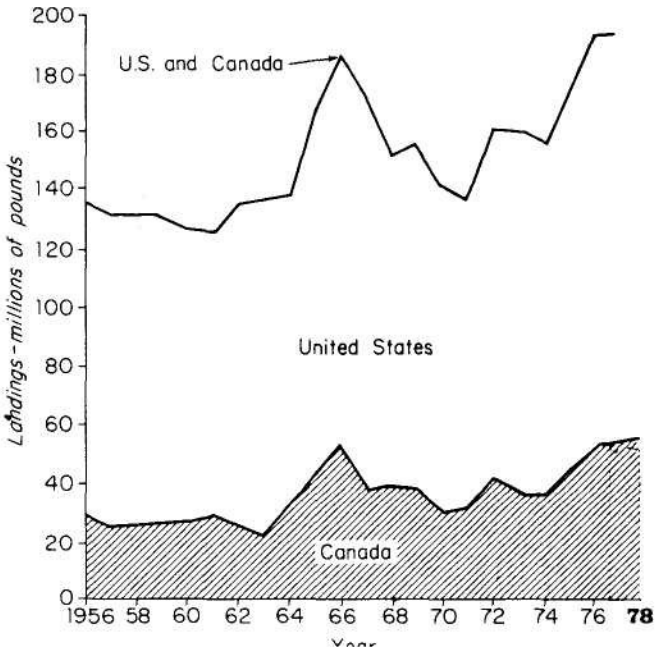

FIGURE 1. Pacific Coast trawl landings of the United States and Canada.

Preliminary Pacific Coast groundfish landings for all purposes by U.S. and Canadian fisheries in 1978 exceeded 240 million pounds. About 209 million pounds of this were trawl-caught: the trawl catch is 9% above 1977 and 31 % above the 10-year mean of 160 million pounds (Table 1, Figure 1). At200 per pound, the ex-vessel value for all landings exceeded $48 million. An additional 3.4 million pounds of Pacific Whiting (hake) were caught by joint-venture vessels of U.S. and Canada but were landed on vessels of another foreign nation. Foreign catches of groundfish are reported elsewhere in this Appendix (see Foreign Fishing Activity off the Pacific Coast in 1978).

The Alaska trawl catch in 1978 was 129% above 1977's (Table 1). About 1.9 million pounds of the increased catch resulted from increased fishing effort on walleye pollock in the southeastern and western regions of Alaska (Table 2). Most of the remainder of the increase was of species not listed in Table 2. Additionally, an estimated 2.2 million pounds of groundfish were caught and sold on the fishing grounds for crab bait, but not recorded.

Within Alaska, the catch by all gears was apportioned among southeast (6.8 million pounds), central (0.2 million

pounds), and western Alaska (3.0 million pounds). The southeastern catch was mostly longlined sablefish (3.1 million pounds), trawled walleye pollock (1.3 million pounds), and trawled flounders (1.7 million pounds). Pacific cod in southeastern (0.2 million pounds) and western Alaska (1.4 million pounds) were taken equally by both longline and trawl. The fish caught for crab bait (2.2 million pounds) in western Alaska were mostly trawled cod, pollock, large flounders and skates.

The Washington trawl catch was 51.4 million pounds in 1978, about 1 % above 1977's (Table 1). Much of the effort of the Washington fleet was displaced from Canadian waters to off Washington and Oregon, due to Canadian closures to U.S. trawlers. There was a 6-week (February 22 to April 3) Canadian closure for the protection of Pacific cod; Canadian waters south of latitude 50° 30' N. were closed on May 17 to U.S. trawling for rockfish; Canadian waters were completely closed to U.S. trawlers beginning June 4 for the rest of the year. Washington implemented a 20,000-pound trawl trip limit for Pacific Ocean perch in September. Lingcod landings were lower due to unavailability to trawlers. Increased catches of flatfish and other rockfish enabled the Washington industry to maintain total groundfish production at 1977 levels.

Oregon trawl landings of 32.1 million pounds were 53% above 1977's (Table 1). The increase was due mainly to increased catch of other rockfish (Table 2). An excellent rockfish market in 1978 and continued use of the new high-opening trawls were mainly responsible for the increase. Landings of soft-brown rockfish *ISebastes entomelas)* were above 1977's, probably because of the use of pelagic trawl gear late in 1978. Increased market interest in sablefish and salmon trailer switching to pot and longline gear resulted in greater fishing intensity and catches of 1.4 million pounds by trawl, and 1.2 million pounds by pot and longline (mostly pots). The longline sablefish fishery was ten times that of 1977 (111,000 pounds) and most landings were from off southern Oregon. Dover sole landings also increased substantially (87%) in 1978.

California landings of 63.3 million pounds were nearly the same as in 1977 (Table 1). Dover sole landings increased only 3% over 1977, while lingcod landings were down about 10% and English sole were up 9% "(Table 2). Most other species were about the same as in 1977, including other rockfish. Total trawl landings were still 25% above the 10-year mean of 50.7 million pounds.

British Columbia trawl landings (56.9 million pounds) were about 4% above 1977's (Table 1, Figure 1). Landings of Pacific Ocean perch, walleye pollock, and other rockfish were substantially higher in 1978 than 1977 (Table 2). Soles, Pacific cod and lingcod were down from 1977.

MAJOR TRAWL SPECIES

Pacific cod, Dover sole, and rockfish continued to dominate coastal landings in 1978. Each of these species exceeded 22 million pounds in 1978 (Figure 2, Table 2).

Petrale sole, *Eopsetta jordani,* landings of 7.3 million pounds were 8% above 1977's but 10% below the 10-year mean. Landings increased only in Oregon and Washington.

English sole, *Parophrys vetulus,* landings of 12.6 million pounds were 2% above 1977's and 18% above the 10-year mean.

Dover sole, *Microstomus pacificus,* landings of 34.2 million pounds were 17% above 1977's and 27% above the 10-year mean. Landings increased in all regions except off British Columbia.

Rock sole, *Lepidopsetta bilineata,* landings of 3.1 million pounds were 4% below 1977's and 33% below the 10-year mean. Canadian landings continued to dominate (84%) Pacific Coast landings.

Pacific cod, *Gadus macrocephalus,* landings of 22.4 million pounds were 17% below 1977's and 6% below the 10-year mean. British Columbia landings were reduced substantially from 1977. Alaska reported a catch of 838,000 pounds for 1978.

Lingcod, *Ophiodon elongatus,* landings of 5.9 million pounds were 32% below 1977's and 42% below the 10-year mean. Large decreases were recorded in Washington and British Columbia. Decreases in catch may have resulted from reduced availability rather than reduced abundance.

Pacific Ocean perch, *Sebastes alutus,* landings of 12.7 million pounds were 11 % above 1977's and 3% above the 10-year mean. The only decrease occurred in Washington. Oregon data are actual estimated *Sebastes alutus* landings rather than "perch complex" reported on fish tickets as P.O.P. The 19% increase in Oregon landings was taken in the Columbia Area (PMFC Areas 2C and 3A).

In late August of 1978, Washington and Oregon estimated that the equilibrium yield for the depleted perch stocks in the INPFC Columbia and (U.S. portion) Vancouver areas would be exceeded. Washington subsequently restricted landings there to 20,000 lb/delivery effective September 5 to December 31. Oregon acted similarly on October 26. Increased perch fishing in the two areas by Washington trawlers, displaced from usual fishing

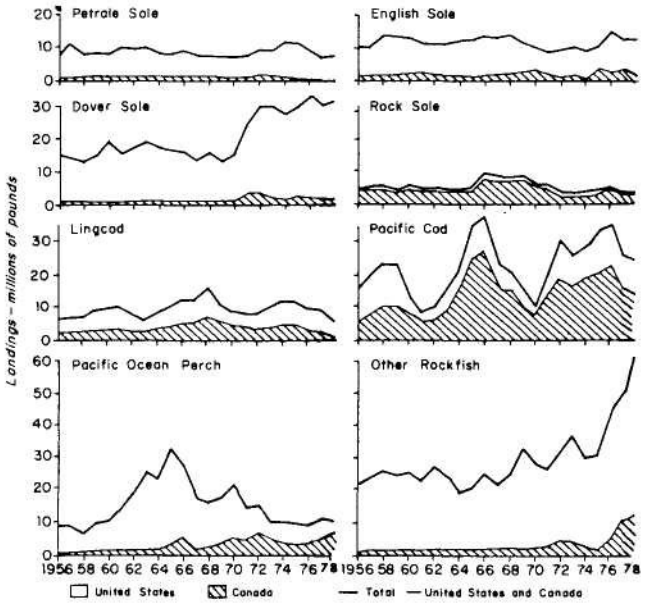

FIGURE 2. Pacific Coast trawl landings by major species or group.

TABLE 2. Trawl landings[1] (1,000's of pounds) for food by species and region: 1977 vs. 1978 and 10-year mean (1968-77)

Species or Group	Wash.	Ore.	Calif.	Total U.S.	British Columbia	Total U.S. and Canada
Petrale sole						
1977	1,330	1,811	2,950	6,091	629	6,720
1978	1,836	2,209	2,925	6,970	309	7,279
% change	+38	+22	−1	+14	−51	+8
10-year mean	1,916	2,119	3,198	7,233	891	8,124
English sole						
1977	2,585	2,207	4,350	9,142	3,237	12,379
1978	3,929	2,332	4,750	11,011	1,564	12,575
% change	+52	+6	+9	+20	−52	+2
10-year mean	2,471	2,207	3,882	8,560	2,081	10,641
Dover sole						
1977	2,317	4,006	21,500	27,823	1,532	29,355
1978	3,058	7,478	22,250	32,786	1,425	34,211
% change	+32	+87	+3	+18	−7	+17
10-year mean	1,709	5,069	18,141	24,919	1,960	26,879
Rock sole						
1977	422	23	10	455	2,754	3,209
1978	414	78	12	504	2,583	3,087
% change	−2	+243	+20	+11	−6	−4
10-year mean	659	27	8	694	3,893	4,587
Pacific cod						
1977	8,890	803	0	10,052[2]	16,816	26,868
1978	8,446	926	0	10,210[2]	12,151	22,361
% change	−5	+15	—	+2	−28	−17
10-year mean	7,503	520	—	8,023	15,836	23,859
Lingcod						
1977	2,697	839	2,500	6,036	2,591	8,627
1978	1,079	1,017	2,250	4,346	1,554	5,900
% change	−60	+21	−10	−28	−40	−32
10-year mean	2,913	1,346	2,331	6,590	3,505	10,095
Pacific Ocean perch						
1977	4,470	928	90	5,488	5,987	11,475
1978	2,934	1,105	92	4,131	8,577	12,708
% change	−34	+19	+2	−25	+43	+11
10-year mean	7,551	768	98	8,417	3,873	12,290
Other rockfish						
1977	19,219	5,303	20,150	44,672	10,726	55,398
1978	20,706	9,023	20,000	49,729	12,995	62,724
% change	+8	+70	−1	+11	+21	+13
10-year mean	12,023	4,074	14,897	30,994	3,038	34,032
Pacific whiting						
1977	44	992	250	1,286	0	1,286
1978	trace	776[4]	225	1,001	0[5]	1,001
% change	−99	−22	−10	+124	—	−22
10-year mean	12	—	25	37	—	37
Walleye pollock						
1977	288	0	0	791[3]	1,962	2,753
1978	1,000	0	0	3,432[3]	4,861	8,293
% change	+247	—	—	+334	+148	+201
10-year mean	—	—	—	—	487	—

1 Preliminary landings for 1978. 2 Includes Alaska catch of 838,000 lb for 1978 and 359,000 lb for 1977. 3 Includes Alaska catch of 2,432,000 lb for 1978 and 503,000 lb for 1977. 4 Does not include joint-venture catch off Oregon of 1,887,000 lb for 1978. 5 Does not include joint-venture catch off B.C. of 4,048,000 lb for 1978.

grounds in the Canadian Fishery Conservation Zone (3 to 200 mi.) was the major cause of the threat to exceed the equilibrium yield in the Vancouver (U.S. portion) and Columbia areas, estimated as 2.3 million and 1.8 million pounds, respectively. It now appears that equilibrium yield was not exceeded in 1978, but was approached very closely in the two areas combined. It was exceeded in the Columbia Area but underfilled in the Vancouver Area by a similar margin.

Other rockfish, *Sebastes* and *Sebastolobus species,* landings of 62.7 million pounds were 13% over 1977 and 84% more than the 10-year mean. The catch was increased in all areas except California. The large increases resulted from an excellent market for rockfish and the use of improved gear. Oregon's increase resulted partly from an excellent market and increased catch of soft-brown rockfish (S. *entomelas).*

Pacific whiting (hake), *Merluccius productus,* landings of 1.0 million pounds were 22% below 1977's but way above the 10-year mean. Substantial catches were taken by joint ventures off Oregon (1.9 million pounds) and British Columbia (4.0 million pounds).

Walleye pollock, *Theragra chalcogrammus,* landings of 8.3 million pounds were 201% above 1977's. This catch came from off Washington, British Columbia, and Alaska. The Alaska catch was 2.4 million pounds for 1978.

LANDINGS BY OTHER GEARS[1]

Gears other than trawl in 1977 (the most current data available and excluding Pacific halibut) took 41.1 million pounds, including an estimated U.S. recreational catch of 10.7 million pounds. Other commercial gears, including longline, pot, troll and handline, gillnet, setnet, and shrimp trawls took the balance.

The longline catch was 7.1 million pounds with most of it in Alaska, Washington, and British Columbia^ Sablefish (43%), dogfish (39% in British Columbia and Washington), and other rockfish (9%) continued to be the major species. Lingcod and Pacific cod comprised most of the balance of longline landings in 1977 (Table 3).

TABLE 3,-Longline landings by major species in 1977 (1,000's of pounds)

Region						
Alaska	2,202	27	110	280	5	2,624
Washington	658	166	104	3	726	1,657
Oregon[1]	14	3	5	—	1	23
California[2]	—	—	—	—	—	—
Total U.S.	2,874	196	219	283	732	4,304
British Columbia	175	216	355	19	2,077[3]	2,842
Total U.S. & Canada	3,049	411	574	302	2,809	7,146

Pot fishermen landed almost 7 million pounds in 1977, 6.5 million pounds in the U.S. and 477,000 pounds in Canada (Table 4). The 1977 landings coastwide were about 3% below those of 1976 (7.1 million pounds). California landings continued to dominate the total landings with 5.5 million pounds of the total, almost all (99.6%) sablefish.

TABLE 4. Pot landings by major species in 1977 (1,000's of pounds)

Region	Sablefish	Lingcod	Rockfish	Other species	Total
Alaska	67	0	0	11	78
Washington	789	1	9	—	799
Oregon	87	0	trace	0	88
California	5,516	—	—	—	5,516
Total U.S.	6,459	1	9	11	6,481
British Columbia	473	0	2	2	477
U.S. & Canada (total)	6,932	1	11	13	6,958

"Miscellaneous" gears (Table 5) accounted for 16.3 million pounds in 1977 coastwide. Other rockfish (48%), dogfish (22%), and lingcod (20%) dominated landings by these gears. Canada landings of 3 million pounds were mostly handline and troll (87%) and were dominated by lingcod (2.1 million pounds). U.S. landings of 13.2 million pounds were dominated by other rockfish (7.3 million pounds) and dogfish (3.4 million pounds), the latter species landed entirely in Washington. Lingcod and several other species made up the rest of the landings with these gears.

TABLE 5. Landings from miscellaneous gears by major species in 1977 (in 1,000's of pounds)

Region	Rockfish	Lingcod	Dogfish	Other species	Total
Alaska	6	14	0	121[1]	141
Washington[2]	1,162	298	3,400	70	4,930
Oregon[3]	1,682	189	0	226	2,097
California[4]	4,500	575	0	160	5,235
Total U.S.	7,344	1,062	3,400	456	12,262
British Columbia[5]	458	2,148	140	302	3,048
U.S. & Canada (total)	7,802	3,210	3,540	758	15,310

1 Includes 4,000 lb cod, 104,000 lb pollock.
2 Includes handline, troll, setnet, drag seine, shrimp trawl, and gillnet.
3 Includes shrimp trawl and troll.
4 Includes longline, shrimp trawl, troll and gillnet.
5 Mostly caught by handline and troll (87%).

LANDINGS BY RECREATIONAL FISHERIES

In 1977 U.S. sport fishermen accounted for 10.7 million pounds of groundfish. Most of their catch occurred in California (8.5 million pounds) and was dominated by other rockfish (84% of the total). Catches were taken mostly by hook and line, although an unknown, but much smaller catch was taken by scuba and other legal means. Charter and private boat fisheries took most of the reported catch, which is minimal since Alaska and Canada estimates were unavailable, and those reported in Table 6 are incomplete.

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TABLE 6. Estimated[1] recreational landings by major species in 1977 (1,000's of pounds)

Region[2]	Rock-fish	Ling-cod	Flat-fish	Pacific cod	Other species	Total
Washington	787	226	123	396	363	1,895
Oregon	238	111	13	0	7	396
California[3]	8,040	419	12	0	3	8,474
Total U.S.	9,065	756	148	396	373	10,738

1 Numbers of fish (estimated) were converted to weight by multiplying by the following factors: rockfish x 2.5; lingcod x 9.0; flatfish x 1.0; Pacific cod x 3.0; other x 1.0.
2 Estimates from Alaska and Canada not available. California charter boat only; Oregon for period June 15 to Sept. 15 only.
3 Not including catch of 7,000 California halibut (*Paralichthys californicus*).

Pacific Halibut Fishery in 1978

RICHARD J. MYHRE International Pacific Halibut Commission

The total commercial catch of halibut in 1978 was 21.7 million pounds, slightly less than the 21.9 million pounds landed in 1977. Canadian vessels landed 8.4 million pounds compared to 8.8 million in 1977 while United States vessels landed 13.4 compared to 13.1 million in 1977. Landing§,by Canadian and United States vessels by regions of the coast are shown in Table 1.

TABLE 1. Landings of halibut in 1978 by regions of the coast.[1]

Region	Canada	United States	Total
Washington-Oregon	1,265	974	2,239
Southern British Columbia	1,756	—	1,756
Northern British Columbia	3,136	111	3,247
Southeastern Alaska	1,289	5,110	6,399
Central Alaska	932	7,168	8,100
Total	8,378	13,363	21,741

1 Preliminary data in thousands of pounds.

In Area 2 (south of Cape Spencer, Alaska) the total catch of 8.7 million pounds was down slightly from the 8.8 million in 1977. The catch from southeastern Alaska was 4.4 million pounds compared with 3.4 million pounds in 1977. The catch from British Columbia and south was only 4.3 million pounds compared with 5.4 million pounds in 1977.

In Area 3 (the Gulf of Alaska west of Cape Spencer) the catch was 12.3 million pounds of which 11.8 million was taken during the 11 million-pound quota fishing season and the balance was taken during an extended fishing season in Area 3C (the Gulf of Alaska west of 175° W longitude). Canadian vessels took 3.3 million pounds from Area 3 compared with 9.0 million pounds by U.S. vessels.

In Area 4 (the Bering Sea) the catch was 728,000 pounds, compared with 681,000 pounds in 1977. Nearly all of the Bering Sea catch was taken by U.S. vessels.

The fishing season in Areas 2 and 3 was again divided into alternating open and closed periods of approximately 18 days each. This type of fishing season tends to spread fishing over a longer period of time and is favored by most halibut fishermen.

Preliminary analysis of catch per unit of effort, which is a relative measure of abundance, indicates that abundance increased from 1977 to 1978 in Areas 2 and 3. The increase was greatest in Area 3. Also encouraging is the appearance of more young fish in the commercial catch this year than in the previous few years. This change along with results from juvenile surveys indicates that the abundance of young halibut is increasing. In part this increase may be attributed to the reduced incidental catch of young halibut by foreign trawlers, but other factors including environmental conditions may have contributed to this recovery as well.

Although the abundance of juvenile and adult halibut appears to be increasing the stocks remain in critical condition and abundance is still well below the optimum level. A far greater increase in the production of juveniles is required before a major increase in adult stocks can be assured. An increase in the directed or incidental catch of halibut could reverse the present improving trend.

Salmon and Steelhead Sport Catches in 1977

The estimated total sport catch of salmon and steelhead during 1977 in the states of Alaska, Washington, Idaho, Oregon, and California was over 2.3 million fish, compared to 2.9 million caught in 1976. The catch was composed of 2,066,321 salmon and 261,672 steelhead.

Alaska

Alaska sport anglers caught an estimated 3,700 steelhead and 381,051 salmon in 1977. The salmon catch included 122,098 pink, 104,991 coho, 103,501 sockeye, 43,060 Chinook, and 7,401 chum. The steelhead catch exceeded 1976's by 1,400 and the catch of salmon was 180,451 more than that of 1976.

Washington

In Washington 619,543 anglers harvested 1,191,414 salmon (1,094,571 marine and 96,843 freshwater). This was about 558,000 below the 1976 record catch. The marine salmon catch by species showed a catch of 667,577 coho, 371,023 Chinook, 53,689 pink, 1,362 chum and 920 sockeye. The freshwater salmon catch consisted of 27,471 chinook, 15,531 coho, 194 pink, and 12,769 sockeye (Lake Washington only). Additionally, there were 38,155 chinook or coho jacks and 2,723 unidentified salmon caught.

A total of 129,600 steelhead sport anglers caught 100,013 steelhead in 1977.

Idaho

Idaho had its first open season for salmon fishing since 1974. An estimated 11,491 anglers fished 51,532 days and caught 3,682 adult and 474 jack chinook salmon.

An estimated 17,967 steelhead anglers fished 100,194 days and caught 12,855 steelhead. This was Idaho's best steelhead fishery since 1972.

Oregon

The Oregon sport catch of salmon and steelhead (marine and fre'shwater) was estimated at 372,174 and 145,105, respectively. The salmon catch consisted of 215,943 coho, 150,995 chinook, 1,199 chum, and 4,037 pink salmon. The salmon catch was below both the 1976 catch of 66.9,011 and the past 10-year average catch of 440,147. The decline was due to a poor catch of coho and a change in regulations which required anglers to report only salmon over 24 inches in length. In previous years salmon 20 inches and over were reported. The steelhead catch exceeded the 1976 catch of 118,275 fish but was below the past 10-year average of 157,211 fish.

Oregon licensed 352,825 salmon and steelhead anglers in 1977 and 45.9% (161,808) were successful in catching a fish, 40.3% (142,487) reported they fished without success, and 13.8% (48,530) reported they did not fish. The average catch per angler per year was 1.7 fish. Approximately 53% of the anglers who fished caught at least one salmon or steelhead.

Ocean anglers, who accounted for 50.7% of the salmon and steelhead catch, made 404,534 angler trips to harvest 260,683 salmon (196,392 coho, 60,254 chinook, and 4,037 pink) and 1,706 steelhead.

California

Final 1977 ocean salmon sport landings estimates show that ocean anglers landed 118,000 salmon. This represents a decrease of 21,000 below 1976 landings of 139,000 salmon. The 1977 landings were also well below the recent 10-year (1967-76) average of 189,000 salmon.

Chinook landings in 1977 were 106,000, up considerably from 1976's poor landings of only 81,000. Landings were down, however, from the 10-year average of 146,000 fish.

The 1977 ocean sport coho catch of 12,000 was the lowest in over a decade, and well below 1976 landings of 58,000 fish and the recent 10-year average of 43,000. The primary reason for the dramatic decline in California coho landings was poor survival of 1974 brood year Columbia River coho, which accounts for the bulk of California's coho landings.

Compiled by David W. Ortmann, Idaho Department of Fish and Game

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TABLE 1. Salmon and steelhead sport catch in 1977

State	Anglers	Chinook	Coho	Pink	Other salmon	Steelhead	Total catch	Fish/angler per year
Alaska	unavailable	43,060	104,991	122,098	110,902[1]	3,699	384,750	—
California[2]	unavailable	106,000	12,000	—	—	unavailable	118,000	—
Idaho	29,458	3,682	N/A	N/A	N/A	12,855	16,537	0.56
Oregon	304,295	150,995	215,943	4,037	1,199	145,105	517,279[3]	1.70
Washington	619,543	398,494	683,108	53,883	55,929[4]	100,013	1,291,427	2.08
Total	—	702,231	1,016,042	180,018	168,030	261,672	2,327,993	

1 Includes 103,501 sockeye and 7,401 chum.

2 Ocean fishery data only.

3 Includes 3,572 coho jack salmon and 6,595 chinook jack salmon landed at ocean ports.

4 Includes 13,689 sockeye, 1,362 chum, 38,155 chinook and coho jack salmon, and 2,723 unidentified salmon.120

Troll Salmon Fishery in 1978

Preliminary estimates of the toll catch of chinook and coho salmon for Alaska, British Columbia, Washington, Oregon, and California for 1978 totalled 64.6 million pounds compared to the 10-year average of 62.7 million pounds.[1] The overall chinook landings were greater than average, primarily due to the excellent landings in Alaska. Coho landings were below average in all areas except Alaska.

Troll Chinook Fishery

Alaska troll-caught chinook landings were 8.5 million pounds in 1978. This was 4.2 million pounds more than the 10-year average of 4.3 million pounds. These are preliminary figures; final figures will not be available until late in 1979. The Alaska troll fishery is experiencing a larger average size for chinook with more poundage becoming available due to the positive effects of the 28-inch size limit adopted in 1977.

Preliminary figures for British Columbia chinook landings were 13.2 million pounds. This was 700,000 pounds greater than the 10-year average.

Washington troll chinook landings were about 2.2 million pounds, about 900,000 pounds less than the 10-year average.

Oregon troll chinook landings were about 2.2 million pounds. This was about 2.0 million pounds below the 1977 landings and 100,000 pounds below the 10-year average.

The estimated 1978 California troll chinook landings were 6.2 million pounds. This represents an increase over the 5.5 million pounds landed in 1977 and was slightly above the 10-year average of 6.1 million pounds.

Troll Coho Fishery

Alaska 1978 troll coho landings were 9.2 million pounds, compared to the 1977 landings of 4.1 million pounds. The 1978 landings were approximately 4.9 million pounds more than the 10-year average of 4.3 million pounds. These are preliminary figures; final figures will not be available until late in 1979. The increased poundage in 1978 was due to an increase in the number of coho caught, 1.1 million fish compared to the 500,000 fish in 1977.

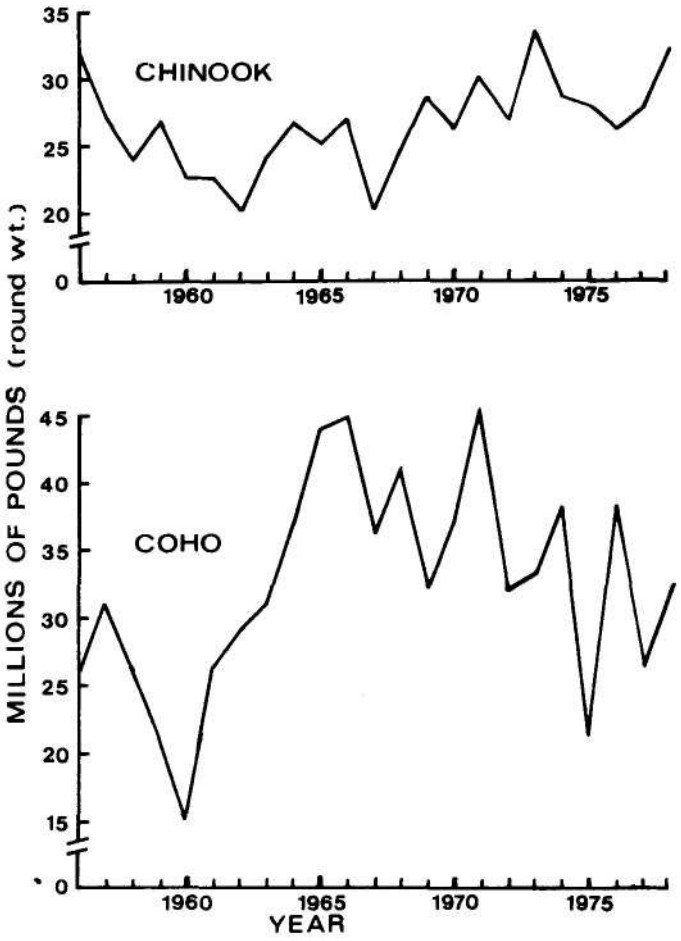


FIGURE 1. Pacific Coast annual landings of troll-caught chinook and coho salmon, 1956-1978.

TABLE 1. Estimated landings of troll-caught chinook and coho salmon in 1978 and 10-year (1968-77) averages (round weight in 1,000s of pounds)

	Chinook		Coho		Total	
Region	1978	10-Year average	1978	10-Year average	1978	10-Year average
Alaska	8,500	4,300	9,200	4,300	17,700	8,600
British Columbia	13,200	12,500	14,800	16,100	28,000	28,600
Washington	2,200	3,100	3,600	5,300	5,800	8,400
Oregon	2,200	2,300	3,200	6,500	5,400	8,800
California	6,200	6,100	1,500	2,200	7,700	8,300
Total	32,300	28,300	32,300	34,400	64,600	62,700

[1] All figures of weight reported are round weight. The period from 1968 through 1977 was used to compute 10-year averages.

Preliminary British Columbia coho landings totalled 14.8 million pounds. This was 1.3 million pounds less than the 10-year average.

Washington troll coho landings were about 3.6 million pounds. This was approximately 1.7 million pounds below the 10-year average.

Oregon troll coho landings were about 3.2 million pounds. This was about 200,000 pounds above the 1977 landings and 3.3 million pounds below the 10-year average of 6.5 million pounds.

California troll coho landings of 1.5 million pounds were up considerably from 1977 landings of only 250,000 pounds. Landings were still well below the 10-year average of 2.2 million pounds.

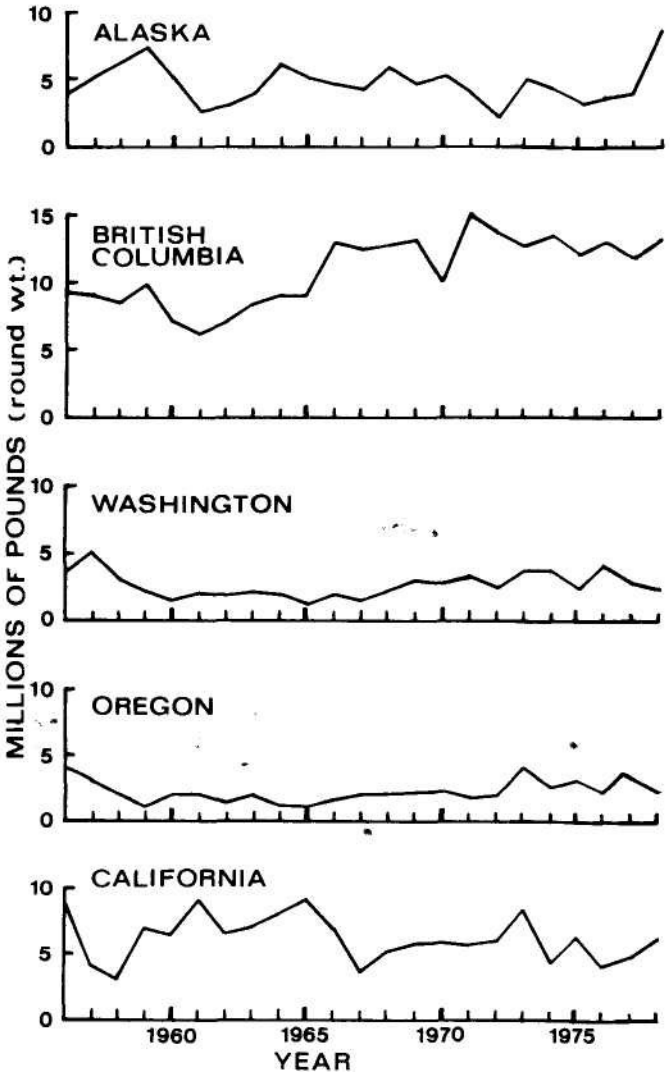
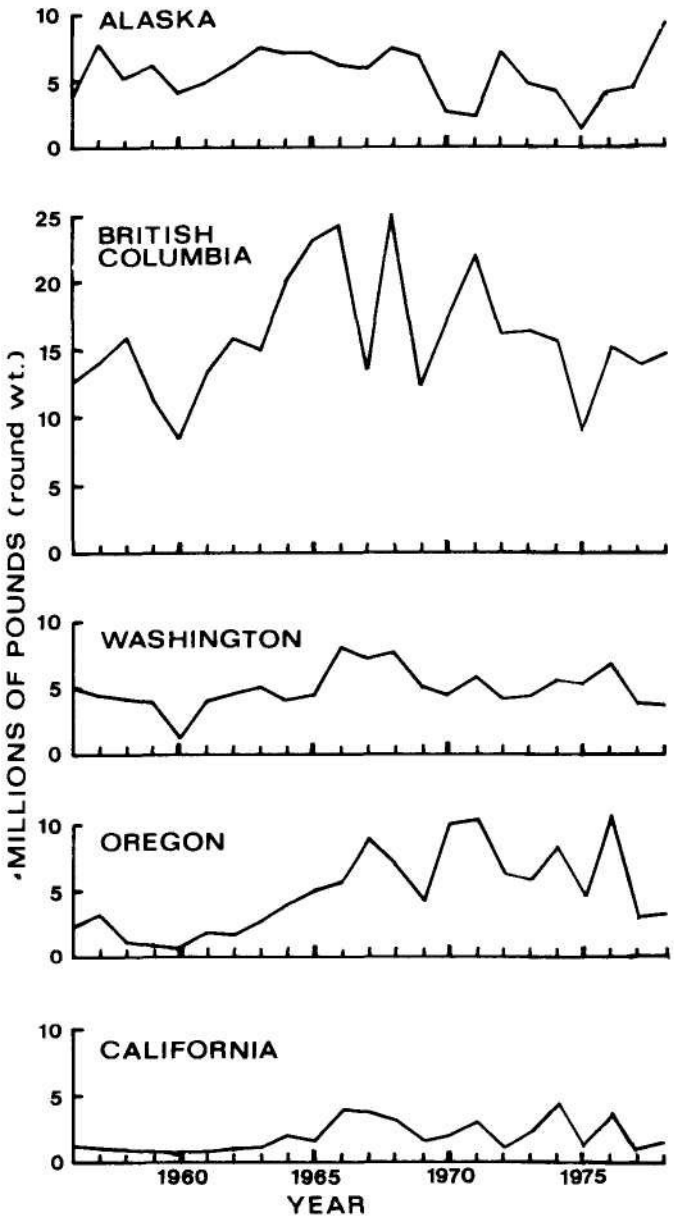


FIGURE 2. Annual troll chinook salmon landings by area, 1956-1978.

Troll Pink Fishery

Landings of troll-caught pink salmon were small in the southern areas, which is typical for an even-numbered year. Alaska reported excellent landings of 2.6 million pounds of pink salmon. British Columbia landings were tentatively estimated at 1.5 million pounds and Washington landings at 9,356 pounds.

FIGURE 3. Annual troll coho salmon landings by area, 1956-1978.



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Shrimp Fishery in 1978

Pandalid shrimp landings for the West Coast of the United States and Canada totalled 158.7 million pounds, a decline of 40 million pounds from the 1977 record of 199 million pounds (Table 1). A dramatic decline in Alaskan shrimp landings by 44 million pounds offset the combined record landings from California, Oregon, and Washington. Record ex-vessel prices for shrimp ranging from 16.5 cents in Alaska to 28 cents per pound off Oregon reflected a continued strong market demand.

The exceptionally abundant 1975-year class (age 3) of ocean shrimp continued to be strongly represented in landings from California, Oregon, and Washington and was primarily responsible for the very low shrimp counts per pound experienced throughout most of the season. Combined landings from these states totalled 82.3 million pounds, considerably above the 1977 record of 75.6 million pounds. Oregon landings reached 57 million pounds, 8.4 million pounds more than the 1977 record of 48.6 million pounds. California landings of 13.1 million pounds were second only to the 1977 record of 15.7 million pounds. Washington landings totalled 12.2 million pounds, slightly above the 1977 record of 11.4 million pounds. British Columbia landings reached 3.1 million pounds, far below the 1977 catch of 6.2 million pounds, but above the 10-year average of 2.8 million pounds. Alaska landings totalled only 73.3 million pounds, 43.6 million pounds less than in 1977 and 55.7 million pounds less than the 1976 record of 129 million pounds.

Conditions Affecting the Fishery

The high abundance of ocean shrimp off Oregon and California combined to produce record high catch and effort along the Pacific Coast. Record low catch and effort in Alaska reflected the continuing severe decline in Gulf of Alaska pink shrimp abundance. Strong market demand contributed to record high price settlements with fishermen. Good seasonal weather allowed maximum fishing effort, although above normal ocean temperatures and upwelling apparently contributed to occasional distributional shifts and decreased availability of shrimp.

California

Ocean shrimp *[Panda/us jordani)* landings totalled 13.1 million pounds for the season. Although the landings are less than last year's record catch of 15.7 million pounds, landings are the second highest on record.

Area A landings in the ports of Crescent City and Eureka (PMFC Area 92) totalled 11.1 million pounds. This was the second largest catch ever recorded for Area A, exceeded only by last year's record 13.1 million pounds. Single-rigged and double-rigged vessels averaged 544 and 1,135 pounds per hour, respectively.

Fishing commenced on April 16 after a price settlement of 26 cents per pound to the fishermen. The price increased to 28 cents per pound on August 28, where it remained for the rest of the season. Most effort was concentrated off Point Saint George through mid-June but shifted to the Redding Rock and Klamath River areas in 50 to 90 fm water during July. The boats alternated between these two areas throughout the remainder of the season. By the end of the season, a record 60 vessels, 33 single-rigged and 27 double-rigged, had engaged in the fishery. Average catch per hour in late August and September dropped to almost half of the level observed in the preceding month, accompanied by a significant reduction in effort. Catch per hour finally fell below established criteria for keeping the season open during the first part of October which necessitated closing the season two weeks early. Good seasonal weather permitted generally consistent weekly fishing effort with an overall average of 2.25 landings per week per vessel.

Landings for Area B-1 (Fort Bragg; PMFC Area 94) totalled 2M million pounds, more than double the record landing of

TABLE 1. Annual shrimp landings, 1968-1978, and previous 10-year means in pounds by region

Year	Alaska	British Columbia	Washington	Oregon	California	Total
1968	42,023,084	1,568,000	1,163,864	10,976,258	2,223,205	57,954,411
1969	47,850,560	2,118,700	1,425,286	10,477,945	2,951,800	64,824,291
1970	74,256,326	1,537,800	925,000	13,735,000	4,044,640	94,498,766
1971	94,891,304	735,000	678,000	9,291,000	3,074,000	108,669,304
1972	83,830,064	794,000	1,582,000	20,900,000	2,500,000	109,606,064
1973	119,963,729	1,729,000	5,271,000	24,500,000	1,239,000	152,702,729
1974	108,741,434	2,644,000	9,300,000	19,968,000	2,360,000	143,013,434
1975	98,535,031	1,729,000	10,200,000	23,700,000	4,997,000	139,161,031
1976	129,011,047	8,470,000	9,224,898	25,300,000	3,470,000	175,475,945
1977	116,871,605	6,200,000	11,400,000	48,580,022	15,663,451	198,715,078
Mean	91,597,418	2,752,550	5,117,005	20,742,823	4,252,310	124,462,105
1978	73,292,614	3,100,000	12,200,000	56,997,105	13,100,000	158,689,719

799,722 pounds landed in 1961 under the quota system. Fishing began on April 23 at a price of 26 cents per pound and remained at this figure through the season. Thirteen single-rigged and 6 double-rigged vessels participated in the fishery with average catches of 819 and 1,069 pounds per hour, respectively.

Primary fishing effort focused off Usal in 75 to 80 fm in April, shifting south to off Cape Vizcaino in May in 69 and 75 fm. In June good quantities of shrimp were found from Mistake Point (2 miles north of Usal) south to Abalone Point forming a productive bed 12.5 miles long by 2.5 miles wide. Fishing effort focused off Usal and Mistake Point for the remainder of the season.

Due to increased catches and effort, sampling effort was intensified. These studies will assess the fishing impact of vessel and gear type in relation to stratification of the shrimp population by depth and area.

Sampling in the beginning of the season revealed the age composition as follows: I-8%, II-62%, III-30%; composition steadily changed by season's end to 47%, 51% and 2.5%, respectively. Shrimp grade was excellent throughout the season. The weekly count per pound averages ranged from 91 to 109 for a season average of 98.

No landings were reported for Area B-2 (Bodega Bay; PMFC Area 96). Although some effort was expended, no commercial quantities of shrimp were located. Last year a record 2.0 million pounds was landed.

No landings were made and no effort was reported in Area C (Morro Bay-Avila; PMFC Area 98).

Oregon

Oregon ocean shrimp landings thrdtrgh August totalled a record 51.7 million pounds, 13.3 million pounds greater than 1977 landings for a comparable period. Oregon's 1978 season landings reached 57 million pounds, 8.4 million pounds greater than the record 1977 shrimp season.

Increased effort, continued strong market demand, favorable weather and an unusually high abundance (and/or availability) of shrimp in the Coos Bay-Bandon shrimp grounds (PMFC Area 86) contributed to the record catch.

The season opened in April with a shrimp price at 26 cents per pound. The price was increased in late August to 28 cents per pound reflecting good market conditions. Over 160 vessels landed shrimp in Oregon compared with 100 vessels in 1977. The increased number of shrimp vessels resulted in high production during April through July of over 10 million pounds landed per month. August landings decreased due to upwelling and resultant "brown water" that caused shrimp to disperse.

The Coos Bay and Bandon shrimp grounds (PMFC Area 86) produced over 72% of Oregon's 1978 shrimp landings. Season landings from PMFC Area 86 totalled 41.3 million pounds, compared with 1977 landings of 25.6 million pounds. The strong 1975-year class (age-group 3) continued to be an important component of the shrimp landings through most of the season. Average monthly catch per effort started at 2,035 pounds per hour for double-rigged vessels in April, but declined steadily in succeeding months to average 780 pounds per hour for July and 527 pounds per hour for October. The overall average catch per effort for the season was 879 pounds per hour.

A record 6.9 million pounds was landed from PMFC Area 88. Nearly all came from the area between the Rogue River and the Oregon-California border. The shrimp grade through August was very good with monthly averages ranging from 83 to 194 shrimp per pound. Average monthly catch per effort for the double-rigged vessels fishing the Rogue River-border area ranged from 714 to 1,909 pounds per hour.

Shrimp production from northern Oregon (PMFC Areas 82 and 84) was poor totalling only 3.6 million pounds for the season. Shrimp grade was excellent because of a high percentage of 3- and 4-year-old shrimp in the catches. However, the 1976-year class (age two) was very weak and probably was a contributing factor to the poor production in this area.

Shrimp caught off Washington by Oregon vessels totalled 4.7 million pounds, down 40% from the record 8.0 million pounds caught by Oregon vessels in 1977. The best producing Washington areas for Oregon vessels were the Destruction Island grounds (PMFC Area 72) at 2.3 million pounds and the Grays Harbor grounds (PMFC Area 74) at 2.3 million pounds.

Landings from California waters (PMFC Area 92) by Oregon-based vessels totalled 1.0 million pounds.

Washington

Ocean shrimp landings totalled 12.2 million pounds, exceeding the record catch of 11.4 million pounds in 1977. Landings through June were 8.3 million pounds compared to 5.9 million pounds landed during the same period in 1977. Landings during January and February totalled 235,000 pounds, and in March were 860,000 pounds. Fishing effort was divided between Grays Harbor (PMFC Area 74) and Destruction Island (PMFC Area 72) until late April when most of the Washington fleet directed their efforts to southern Oregon (PMFC Areas 86 and 88). During a 3-week period in late April and early May nearly 2 million pounds were landed from these areas and considerable effort was directed off Oregon after that. Landings totalled 7.3 million pounds during the second quarter of the year with the peak occurring in April when 2.7 million pounds were landed.

Catch rates off Washington began declining in May and some boats began leaving to enter the Alaskan fishery or to operate from ports in southern Oregon. A total of 31 boats (5 single-rigged) participated during the peak of the fishery in April and May and at least 5 other boats made regular landings at other times during the year. A price strike by fishermen in Westport and South Bend idled boats during late June and early July.

High quality shrimp were landed from Washington waters throughout the year. Samples taken from the Grays Harbor area were consistently below 105 shrimp per pound due to the strong 1975-year class and weak showing of the 1976-year class. Samples obtained from the Destruction Island area were mostly below 105 shrimp per pound until June when the 1977-year class began to appear in the catches. The 1977-year class appears to be of moderate strength in both the Grays Harbor and Destruction Island areas.

Biological sampling showed that egg release was nearly complete by the end of the third week of March. A substantial portion of the 1975-year class completed sex change from male to female one year later than usual. The timing of sex change was normal for the weak 1976-year class. Samples also indicate some early sex changes in the 1977-year class had occurred.

The number of shrimp peelers operating in Washington increased to 23, seven more than last year. Canneries operated well under capacity throughout most of the year. Most processors paid 23 cents per pound until July when the price was raised to 26 cents per pound.

British Columbia

Pandalid shrimp landings (all species combined) in 1978 totalled 3.1 million pounds. The decrease of 3.1 million pounds from 1977 was due to the low abundance of 1976- and 1977-year classes of ocean shrimp *(Pandalus jordani)* on the Tofino grounds (PMFC Area 66). Pot fishing for prawn or spot shrimp *(Pandalus platyceros)* accounted for 4% of the total catch.

Alaska

Pandalid shrimp landings (primarily *Pandalus borealis)* totalled 73.3 million pounds, 43.6 million pounds less than 1977. This decline reflects the decreased shrimp abundance and depressed stock conditions existing in most Alaska Peninsula and Kodiak Island fishing sections.

Kodiak landings (PMFC Area 54)^ reached only 22.8 million pounds, 9.2 million pounds below the 1977 catch. Puale Bay and Wide Bay, two newly discovered fishing grounds, produced 9.1 million pounds of the total Kodiak catch. Alitak Bay was the highest producer of the traditional fishing grounds with a harvest of 2.4 million pounds. Limited fishing in other major production areas^such as Marmot Gulley and Twoheaded Island failed to locate commercial concentrations of shrimp. „

Trawl surveys by fhe Alaska Department of Fish and Game indicate that" Kodiak Island shrimp stocks are severely depressed. Kodiak Island harvest levels are still "being allocated to provide for up to one-third of the allowable season catch in certain areas to be taken during January-February. The number of vessels fishing Kodiak was 61 compared to 72 in 1977. Most of the vessels are double-rigged and many are equipped with side-scanning sonar which greatly increases their ability to develop new fishing grounds.

Chignik, South (Alaska) Peninsula and Aleutian districts (PMFC Area 55) landings fell to 41.4 million pounds, 38 million pounds below the 1977 production. Chignik landings reached 23.0 million pounds, 4.8 million pounds below last year's total. South Peninsula landings dropped to 11.8 million pounds, 34.7 million pounds below the 1977 harvest. Aleutian district harvests totalled 5.9 million pounds. Chignik and South Peninsula trawl surveys conducted by National Marine Fisheries Service and Alaska Department of Fish and Game indicate dramatic stock declines in Pavlof and Morzhovoi Bays. Shrimp stocks which were identified in 1977 as depressed, remain essentially unchanged. These depressed stocks included Stepovak Bay, Unga Straits, Beaver Bay, West Nagai, Kennoys Island, and Mitrofania Island.

Most of the vessels that fished Chignik and South Peninsula districts this season were primarily Kodiak-based. Many of these vessels ranged more than 48 hours from port. Quotas for the new productive stocks in each fishing district were reached rapidly due to the concentration of fleet effort. The Kodiak ex-vessel price for shrimp was 13.5 cents per pound for January through May and 16.5 cents per pound for June through December.

Cook Inlet (PMFC Area 53) landings reached 7.5 million pounds, primarily from the Kachemak Bay trawl fishery. Trawl surveys indicate good stock levels although pot surveys indicate a decline in the abundance and average size of coonstripe shrimp (Pandalus hypsinotus), important to the pot shrimp fishery. Quotas for pot-caught shrimp have been lowered from 600,000 to 200,000 pounds.

Prince William Sound (PMFC Area 52) landings set a new record of 448,417 pounds due mostly to exploratory effort by Kodiak-based vessels.

Southeastern Alaska (PMFC Area 51) landings reached 1.0 million pounds. Effort and stock abundance are still below historic levels but continue to improve slowly.

With the continued major decline in shrimp stock abundance in the western Gulf of Alaska, total Alaska production is not expected to exceed 45 million pounds in 1979. Some major stocks have declined so severely that total protection is being considered for at least the 1979-80 season. Total production from the Kodiak, Chignik and South Peninsula shrimp districts is expected to fall within the 20- to 30-million-pound range.

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Foreign Fishing Activity off the Pacific Coast in 1978

This information on foreign fishing was provided by the Alaska and Northwest Regional offices of the National Marine Fisheries Service. A review was not given at PMFC's Annual Meeting.

ALASKA

The Fishery Conservation and Management Act entered its second year of regulating foreign fisheries in the Fishery Conservation Zone off Alaskan shores. Five Preliminary Management Plans continued to regulate foreign fisheries off Alaska during 1978, including plans for the Gulf of Alaska trawl fisheries, Bering Sea and Aleutian Islands trawl and herring fisheries, and fisheries for tanner crab, snails, and sablefish. The Gulf of Alaska Trawl and Tanner Crab Plans were expanded to cover both foreign and domestic fishing within the Fishery Conservation Zone on December 1, becoming the first finalized Fishery Management Plans in Alaska. Five foreign nations dispatched 455 vessels to Alaskan waters to operate under one or more of the five management plans. The nations of Japan, USSR, South Korea, Taiwan, and Poland landed 1.53 million metric tons of catch, or 86.4% of the total 1.77 million metric ton quota. Japan operated a 176 vessel salmon mothership fleet near the western Aleutian Islands under International North Pacific Fisheries Convention regulations. Total number of vessels in Alaskan wafers ranged from 128 to 509, the largest numbers occurring in June and July. Over 65,000 vessel-days (182.6 years) were spent by foreign fishermen fishing Alaskan waters in 1978. Japan again dominated, landing 75% of the foreign catch. The Bering Sea-Aleutian Islands region provided 87% of the total foreign catch from Alaska. Compared to 19*77, total allocations in 1978 were up 8.5% while foreign fishermen landed 158,671 m.t: or 12% more.

Soviet Fishing

The Soviet Union sent 90 vessels to the Alaska region in 1978 to operate under the Bering Sea, Aleutian Islands, and Gulf of Alaska trawl fishery management plans. This fleet was composed of 71 stern trawlers, 13 refrigerator and 1 dry cargo vessel, 4 tankers, and one research patrol vessel. Total number of vessels present monthly varied from 5 to 56, with only the June to August period having less than 35 vessels.

Soviet vessels utilized 8,085 vessel-days effort to land 72% of the total Soviet allocations of 391,862 m.t. during 1978. This amounted to over 12% of the total effort exerted by all foreign fleets in Alaskan waters, and 18.5% of all the catch landed. The Soviet catch was composed of pollock (47.3%), flounders (32.2%), Atka mackerel (14.4%) and miscellaneous species. Almost 70% of the catch was landed in the Bering Sea, followed by 22% in the Gulf of Alaska and 8% from the Aleutian Islands.

Japanese Fishing

Japan conducted its 1978 Alaskan fishery under all five fishery management plans, and the INPFC agreement for the high seas salmon fishery west of 175° east longitude. Japan landed 93% of its 1978 allocation for a total catch of 1.143 million m.t.

A total of 515 Japanese vessels fished off Alaska in 1978. The fleet was composed of 5 pollock factory ships and 1 yellowfin-sole factory fleet accompanied by 59 pair trawlers, 17 Danish seiners, 119 medium stern trawlers, 23 large stem trawlers, 22 longliners, 2 crab factory ships with 12 crab-pot vessels, 10 independent crab-pot vessels, 8 snail-pot vessels, 4 salmon factory ships with 172 gillnet vessels, 40 refrigerator transports, 17 cargo vessels, and 4 tankers. Total number of vessels present per month ranged from 88 to 492 vessels, with the peak activity in June and July. Pollock and crab factory ship fleets operated in the central and northern Bering sea, while the salmon fleet fished in and out of the Fishery Conservation Zone in the western Aleutian Islands. The large trawler fleet fished all Alaskan waters, while longliners exerted over 80% of their effort in the Gulf of Alaska.

Japanese vessels utilized 54,192 vessel-days to land the total catch of 1,142,847 m.t. This was 75% of all the foreign catch landed off Alaska in 1978. Pollock dominated the catches at 71.4% of the Japanese total catch. All other species comprised less than 10% each. Over 90% of the Japanese catch was landed in the Bering Sea, with the Aleutian Islands providing 3.7% and the Gulf of Alaska 5.8%. The total catch by fish plan was:

(1)	Bering Sea-Aleutian Island Trawl	1,058,000 m.t.
(2)	Gulf of Alaska Trawl	59,395 m.t.
(3)	Tanner Crab	14,962 m.t.
(4)	Snail	2,184 m.t.
(5)	Sablefish	8,691 m.t.

The high seas salmon fishery produced an additional estimated 28,000 m.t.

Again in 1978, two crab factory ships with 12 crab-pot catcher boats fished in the Bering Sea. A total catch of 14,961.9 m.t. of tanner crab were landed during the season which began on March 10 and ended September 3. Both mothership fleets spent a total of 329 days in Alaskan waters.

Japan expanded its snail-pot fishery to 8 vessels in 1978. These vessels fished between May and October in the northwestern Bering Sea. These vessels operated under the Snail Fishery Management Plan, landing 73% of the total 3,000-m.t. quota.

Japan directed 10% of its total effort to the Gulf of Alaska by deploying 63 vessels including 22 longliners, 8 large trawlers, 13 medium trawlers, 13 refrigerator and 5 dry transport vessels, and 2 tankers. A total of 5,632 vessel-days were used to land 66,365 m.t. of the total Japanese Gulf of Alaska quota of 101,785 m.t. There was fishing activity in the Gulf of Alaska in every month but December, with peak activity from May to October.

Sablefish were landed under a separate fish plan by Japanese longliners in 1978. The sablefish plan in the Gulf of Alaska terminated on November 30, and then was absorbed into the 1979 Gulf of Alaska Groundfish Fishery Plan. Japanese longliners harvested 71 % of the 1978 allocations, with 80%, or 6,969 m.t. of the harvest coming from the Gulf of Alaska. Japan did not begin fishing under its 1979 Gulf of Alaska allocations prior to the end of 1978. A total of 22 longliners conducted Japan's 1978 sablefish fishery.

South Korean Fishery

South Korea again conducted its Alaskan fishery with a small fleet of 12 trawlers, 2 longliners, and 6 support vessels. This fleet landed 6% of the total Alaskan catch with 4% of the total effort. Seventy percent of the Korean effort was in the Bering Sea-Aleutian Islands area. The total catch was 101,707 m.t., or 89% of the 113,903-m.t. quota. The total number of vessels present ranged from 1 to 17 vessels per month, with a fairly constant effort of 13 or more vessels present after May.

Taiwanese Fishery

Taiwan sent 2 trawlers to the Bering Sea during 1978, using 185 vessel-days to land 3,361.2 m.t. of their 5,960-m.t. quota. The catch was 94% pollock, with miscellaneous flounder, cod. mackerel, and perch. Taiwanese vessels were present in the Bering Sea every month but January and June, with both vessels fishing simultaneously in April, September, and the last two months of 1978.

Polish Fishery

Poland dispatched 5 stern trawlers to the Gulf of Alaska which operated in the Kodiak to Shumagin fishing areas during November. A total of 83, vessel-days were utilized in an effort to harvest the 22,387-m.t. quota. Only 1,266 m.t. were landed prior to December 1 when the 1979 Gulf of Alaska Fisheries Management Plan took effect. Poland removed all 5 trawlers prior to the start of the new plan.

Enforcement and Surveillance

1978 was the first full year of surveillance on the foreign fleets off Alaska by joint NMFS-Coast Guard patrols under FCMA rule. A total of 136,509 surface miles and 265,602 aircraft miles were patrolled. NMFS Special Agents covered 67% of the total miles patrolled in 1978. There were 6,269 sightings of foreign vessels. Personnel from surface vessels boarded 534 Japanese, 150 Soviet, 75 South Korean, and 5 Taiwanese vessels. These boardings resulted in 49 citations and 11 violations against Japanese vessels, 36 citations and 7 violations against Soviet vessels, 7 citations and 4 violations against South Korean vessels, and 3 citations and 4 violations against Taiwanese vessels. One seizure was made during 1978. The Japanese medium stern trawler SACHI MARU NO. 22 was seized on February 23 for trawling inside the Misty Moon halibut fishing grounds in the Bering Sea during a closed fishing period. Final penalty paid was $200,000.

WASHINGTON, OREGON AND CALIFORNIA

Foreign fishing effort off Washington, Oregon, and California in 1978 was reduced by approximately 36% from 1977 levels. Both the Soviet Union and Poland participated in the trawl fishery for Pacific hake and jack mackerel which opened on June 1 and closed on October 31. (Mexico received an allocation for hake and jack mackerel but did not fish.) During the latter part of the season, a US/USSR joint venture operation was initiated by Marine Resources, Inc. Operating in the Fishery Conservation Zone (FCZ) off Oregon, U.S. fishing vessels delivered catches of Pacific hake to two Soviet trawler/processors.

Soviet Union

Vessels of the Soviet Union were permitted to fish for an allocated 89,270 m.t. of Pacific hake and 1,950 m.t. of jack mackerel. The Soviet fleet began fishing operations in June with 14 stern trawlers off the coast of northern California and south-central Oregon. In late June and July, the fleet increased to a peak 24 vessels, with the primary effort in the Oregon area. By October only 4 fishing vessels remained, 2 of which were working in the joint venture operation. The Soviet catch during 1978 amounted to 70,106 m.t. of hake and 673 m.t. of jack mackerel. Catch of incidental species equaled 552 m.t. of rockfish, 2 m.t. of flounder, 57 m.t. of sablefish, and 94 m.t. of other species.

Poland

Poland participated in the foreign fishery for an allocated 28,930 m.t. of Pacific hake and 1,950 m.t. of jack mackerel. Three stern trawlers entered the fishery in June working off northern California and south-central Oregon. The fleet increased to 6 during the months of July, August, and September and 7 through the end of October. Polish catches amounted to 26,721 m.t. of hake and 214 m.t. of jack mackerel. Catch of incidental species equaled 205 m.t. of rockfish, 2 m.t. of flounder, 43 m.t. of sablefish and 69 m.t. of other species.

Boardings and Violations

During the 1978 Pacific foreign trawl fishery, 141 boardings were conducted by Special Agents of the Northwest and Southwest regions of NMFS. Four foreign vessels were issued seven Documentations of Violation for intrusion into a prohibited area. Twelve citations (written warnings) were issued for minor violations, such as failure to give 24-hour notice before entry into the FCZ and failure to properly indicate catch species in log books.