

25th Annual Report of the

**PACIFIC MARINE
FISHERIES COMMISSION**

FOR THE YEAR 1972

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

25th Annual Report of the

PACIFIC MARINE FISHERIES COMMISSION

FOR THE YEAR 1972

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; 766; and 315 of the 80th; 87th; and 91st Congresses of the United States Assenting Thereto.

Respectfully submitted,
PACIFIC MARINE FISHERIES COMMISSION

H. JACK ALVORD	JOHN W. McKEAN
G. RAY ARNETT	FRANK PERATROVICH
JAMES'w."BROOKS	TED G. PETERSON
HAROLD F. CARY	JACK F. SHIELDS
JOSEPH C. GREENLEY	VINCENT THOMAS
PAUL C. KEETON	T. E. THOMPSON
THOMAS E. KRUSE	THOR C. TOLLEFSON
HAROLD E. LOKKEN.	

Headquarters Office:
PACIFIC MARINE FISHERIES COMMISSION
JOHN P. HARVILLE, *Executive Director*
ANNE REYNOLDS, *Office Secretary*

342 State Office
Building 1400 S.W. Fifth
Avenue Portland,
Oregon 97201

LEON A. VERHOEVEN, *Editor*

July 1973

25th Annual Report - 1972

The Pacific Marine Fisheries Commission at its Annual Meeting on November 15 and 16, 1972 in Portland, Oregon featured a series of special addresses of historical interest in commemoration of the Commission's 25th Anniversary. To provide a review of these presentations and their perspectives of the past quarter century of Pacific Coast fishery matters, the structure of this introduction has been modified from that used in recent Annual Reports to include these four items:

1. A summary of the welcoming address to the Pacific Marine Fisheries Commission by Kessler R. Cannon on November 15;
2. A transcription of a talk, "50 Years of Pacific Fisheries, 1947—1997," by Richard S. Croker at the Anniversary Banquet;
3. A transcription of a talk, "25 Years of PMFC" by Alphonse Kemmerich at the Anniversary Luncheon;
4. A paper, "Fisheries Events Leading to the Establishment of the Pacific Marine Fisheries Commission and Progress and Changes, 1948—1967," which was written by former Editor W. Markham Morton several years ago.

Mr. Cannon, Assistant for Natural Resources to the Governor of the State of Oregon, at the request of the Honorable Tom McCall, who was out of the state, welcomed the Pacific Marine Fisheries Commission to its 25th Anniversary Meeting. He commented on PMFC's history, recalling from the first annual report that November 17, 1947 was the Commission's founding day, that John Veatch of the Oregon Fish Commission presided as temporary chairman and was elected first permanent chairman, and that Arnie Suomela, Director of the Oregon Fish Commission was named Executive Director of PMFC. Mr. Cannon emphasized that concern about a possible federal takeover of fisheries jurisdiction in this area was one of the major reasons for formation of PMFC 25 years ago, but now he was pleased to note that this concern for the most part was certainly dissipated. In fact it was very significant that there would be discussions at this meeting of strengthening state and federal cooperation in fishery management and research.

However, it seemed even more significant to him that PMFC has striven diligently to achieve the goals for which it was founded: to conserve the offshore fisheries contiguous to the coastal States and of mutual concern to their citizens; to secure uniform regulations; to agree on uniform legislation proposed to each legislative assembly; and to develop coordinated research programs. What has been accomplished in salmon regulations and research is a good example.

This steady progress has gained the Commission stature far beyond the Compact's area; the Commission's voice of reliable management certainly has national recognition. Its research programs will continue to generate federal funds and assistance.

Mr. Cannon, in closing, thanked PMFC for its cooperation and mutual understanding with Governor McCall's program and with him; and paid tribute to Andy Naterlin and Leonard Hall, two of PMFC's original Advisors from Oregon who have long been associated with wise and prudent management of marine resources. He noted that PMFC's present goals and objectives relate to solutions of economic, social, political, and legal problems as well as biological problems. He paid his and Governor McCall's respects and best wishes to Commission Chairman, Dr. Gene Kruse, to Advisory Committee Chairman, Dr. Dave Charlton, and to the Commission for a successful conference and continued accomplishment in the next 25 years.

Commissioner Harold E. Lokken at the request of Chairman Thomas E. Kruse at the banquet introduced the speaker, Richard (Dick) S. Croker and gave the audience the following information about him. He and Harold have been friends since PMFC's formation when Dick was appointed a Commissioner and Harold an Advisor. Dick Croker after graduation from Stanford went directly to the California Department of Fish and Game. During World War II he was in the Air Force and directly afterwards he was Fishery Officer for the Occupation Forces in Japan. Then he returned to the California Department of Fish and Game as Chief of Marine Resources where he continued his association with PMFC and served on various delegations for a number of treaties and conferences, including the 1960 Law of the Sea Conference. After retirement from the California Department of Fish and Game, he resigned in June 1962 from membership on PMFC. On September 1, 1962 he was appointed Executive Director of PMFC in which position he served until July 1, 1963. Then he became Fishery Attache in Mexico for the U.S. Department of State for five years before becoming unemployed by choice. This is a delightful way of retiring and working when you can. He now has been taking several consulting jobs in various parts of the world, either for pay or as a volunteer executive, for the International Executive Service Corps. It's a volunteer organization where people with experience, people such as Dick, will go to Mexico, Brazil, or wherever, to assist government and industry without pay. They only pay expenses. He has been doing this for the last several years.

about let Seattle in and call it three; I'm not kidding. I don't know what your definition of a city is; there were a lot of good-sized towns; there were only two or three cities. In the last 25- years we have seen real cities grow—Vancouver, a cosmopolitan city where you can get a decent meal in one of 25 or 30 places. You couldn't have done that 25 or 30 years ago. Seattle has graduated into first-class status. Portland, Sacramento, and Oakland have become cities. San Diego is larger than San Francisco now—almost twice as big. But, it isn't all cities; it's everywhere. I live in what the Census Bureau calls a metropolitan area now. It's Orange County in Southern California (*Disneylandia*). That's the fastest growing metropolitan area in the whole United States and probably Canada too; not Mexico City, though, but everywhere else. Orange County has doubled its population in the last two censuses. Yet there isn't a single community in that metropolitan area that you could call a city by any means. I don't know the definition of a metropolitan area, but I think it is any place with more or less distinct boundaries and with enough people to create its own smog problem.

People came and brought with them the greatest combination of technology and skills in the whole world. They came from Europe and from all over the United States. They brought with them all these skills and technology, and they built up this so-called civilization. A lot of poor and unskilled people came, and, on the other hand, a great deal of capital moved here. Along the West Coast there is as much money as there is almost anywhere. I have seen several comments that if California were a nation it would have probably the fourth largest gross national product in the world, and California is just part of the Pacific Coast. Let's now put all of this in the context of what the effect is upon our national resources. What is the demand upon the environ'mest of putting all of these people here with their factories and cars, et cetera? What is the impact on the natural resources (which include the fisheries, the land, and the wildlife) and on the demand on public service? Just think of sewage disposal for the hordes of people.

We are going to talk about the domestic fisheries from Alaska to southern Baja California. We have the collapse of the sardine. It was complete; there is a moratorium now. I once said that I didn't intend to conduct "an interview with the last remaining pair of sardines; we should do something before we are down to two. By the time I retired, we were down to three. The Northerners don't appreciate it as much as the Southerners do.

The Pacific mackerel resource collapsed just as drastically and disastrously as the sardine. Mackerel were once so numerous you could catch them in purse seines; some people caught them in dip nets. Believe it or not, they could catch so many they could keep catching until their boats sank. Last year, on a party boat, my wife caught one mackerel. We took him home and ate him with great ceremony. One day before the war, as noted in my logbook, I caught 539 mackerel on a feather jig, fly fishing. There wasn't any limit.

During these past 25 years we have seen a miracle. It has cost millions, but we have seen the preservation of the salmon resource. It took a great deal of work, a lot of money, and a lot of thinking, but we have seen the preservation of the salmon resource on our coast.

For a totally different reason we have seen the revival of the soupfin shark resource. That came about because since the invention of synthetic vitamins, the livers weren't needed anymore, and everyone quit fishing for soupfin. Meanwhile, most fisheries maintained themselves at about the same level.

We have seen the expansion of the Dungeness crab fishery to what some people would say almost a maximum potential. Some of us would say a little more than the maximum. We have seen the phenomenal development of the king crab fishery in Alaska, and the equally phenomenal development of the pink shrimp fishery all along the coast from northern California to Alaska. An undreamed of resource has developed over these last few years. One potential resource disaster that some of you may have overlooked was the near loss of the kelp bass, the very valuable fish of southern California; we will mention later the rebuilding of the fishery. During these past 25 years some of us have very happy memories of a situation that existed for all of us. That was the petroleum exploration and drilling off our coast.

The extermination of the world's whale resources has all happened since the war. We helped the Japanese start a whaling expedition. The only species that is still viable, that has a chance of recovery, is the gray whale because of the peculiar and fortunate habit of going into the lagoons and bays in northern Mexico for breeding and for giving birth to the young. The Mexican Government has avidly determined to maintain the whale resource and the gray whale is still with us. It is unofficial, but Mexico made it pretty clear that if the whalers of any nation start taking gray whales on the high seas, Mexico would permit the complete extermination of them in the bays, and that would be the end of that.

We have seen the unbelievable expansion of the eastern Pacific tuna fishery. I am speaking about the whole eastern Pacific from Alaska to South America. We have seen the changeover from live-bait fishing to purse seining—the most modern and highly developed technological fishery anywhere in existence, I guess, now engaged in by a dozen or fifteen countries. The United States no longer has a monopoly. We have seen the expansion of the tropical shrimp fishery (not for small shrimp—these are large shrimp) all the way from Mexico to Ecuador. One of the most startling developments we have seen was the virtual explosion of the Peruvian anchovy fishery which grew from zero in just a matter of three or four years to be the world's largest singlerspecies fishery that ever has been. We have seen the appearance of high seas fleets from other nations off our coast, and we have felt the impact of that.

Now, meeting the challenge of all these things I have just mentioned—vanishing species, maintaining resources, foreign fleets coming, et cetera—has been the growth during these last 25 years of the research and management staffs of the states

the day when the federal fishery agency and the state fishery agencies would be working together in this kind of program. I, for one, hope and pray that it will be successful.

The next 25 years—This is from my own personal crystal ball. When you get to be far enough along you can become a founding member of the Order of Spent Salmon. You can do like the salmon in the last little bit of his life. No one can tell him what to do. He has done it. He can say what he pleases. So, I am going to call things in the future the way I see them, not the way I would like to see them.

Local Fisheries

1. The sardine and the Pacific mackerel won't come back. There will be enough of them so that college classes, if they spend a day out on the ocean, will get a couple for their university collection.

2. Most of our salmon runs will be maintained in spite of everything. The obstacles are numerous. The cost is going to be tremendous. I think that we will be able to keep our salmon and steelhead runs and in some instances augment them.

3. The king crab and Dungeness crab have seen their glory days, and I think they are both going to rock along. Utilization of other shellfish will increase, I think. There are new and improved culture methods for oysters, clams, et cetera, and there may be in a few cases for shrimp and even crab culture. We are going to have more artificial mariculture. A very promising sign is the geoduck program in the State of Washington's Puget Sound. Here we have a new fishery with "limited-entry" type of operation, close supervision, and that type of thing. I think this will be a bright spot.

4. As the years go on, sport fishing will take over a greater share of the harvest of a great many of the resources. Some day, maybe within the next 25 years, the people in the Northwest will learn there are other fish in the ocean and along the coast besides salmon, and will start utilizing some of the marvelous and gamey sport and food fish that more civilized people down South catch in great numbers: northern halibut, lingcod, some of the rockfish, perch, et cetera.

5. Someday, maybe within these 25 years, we are going to come to limited-entry fisheries. I would guess at this point that probably the first to have it applied will be king and Dungeness crab fisheries and salmon fisheries.

Last month my wife and I made a trip to the fishing ports in Puget Sound and along the coast between Westport, Washington, and Moss Landing, California. If I were still working and was a boss, I would require everyone to make a trip like that every ten years to see the fisheries for one's self. It was the first time in a great many years for me. You can read how many boats and crab pots there are, but the figures don't mean much. If you go down just after salmon season and before crab season starts, you'll see what we saw—thousands of crab pots on the dock and on the shore, and people making crab pots. We saw thousands of salmon trollers. I have no statistics, just round numbers. We saw hundreds of sport-fishing charter

boats, dozens of trawlers, and just happened to chance on the launching of a fine new all-steel trawler. We saw a great number of trollers and trawlers on the ways being built. At Moss Landing, where Dr. Harville used to hail from, there were hundreds of trollers sitting there. There were salmon fishing skiffs and people fishing from the shore.

How are our resources going to stand up to this kind of fishing? Someday, for sport and commercial, there is going to have to be some kind of limited entry, I'm afraid; I'm not advocating it. That is the way of life that I think is the finest of all our fisheries—the small-boat fishery—but we have overdone it. Someday, in an effort to preserve our salmon runs, until we can sort out what salmon are what in the ocean, and in order to maintain our pious position of conservation management of the runs against the rest of the world whose nations want to harvest our salmon, we may have to eventually do away with all the trolling and other ocean fishing for salmon, both sport and commercial. It may come to that someday. That is a terrible prediction to make. I would rather believe that our ocean and land environments as they pertain to our fishery resources will fairly well hold their own in the face of this onslaught of people and what people do to the land and water. It is going to be difficult, and very expensive. It is going to be a dreadful decision for our government at all levels to face up to and to maintain our environment so we will still have fisheries.

Foreign or International Fisheries

On the international level, my first prediction is that the foreign fleets off our coast are going to fish themselves out of business before we get around to doing anything about it. They are already losing money. As their catches decrease, the temptation is going to be greater and poaching will probably increase, and very likely we are going to turn the other cheek.

The United States and all the other nations with their supermodern tuna fleets are going to fish themselves out of business, very likely within the 25-year span. They are going to overfish the yellowfin because, with all its good work in holding the line, the Inter-American Tropical Tuna Commission is very apt to fall by the wayside in the face of depredation from too many other countries in the eastern Pacific. The skipjack will hang on until the Japanese fishing fleets get permits to fish in all the South Sea Islands and in the mid-Pacific. Then they will clean out the last shreds of them. The Peruvian anchovy fishery will decline. I don't know how it can stand both the birds and the purse seiners and the ever-recurring El Nino wind conditions that cause such great die-offs.

Here's one prediction I don't like to make. I wish it would, but I am afraid that the Law of the Sea Conference won't go the United States' way for the reasons mentioned today. The odds are one-third that our position will hold, which I am strongly in favor of; one-third that an adverse position will hold; and one-third that things will just rock along in chaos. So it is two to one that we will be disap-

Prior to World War II management and regulation of the coastal fisheries by California, Oregon, and Washington were accomplished by the individual state fishery agency largely without consultation with its border State. Fishing pressure or intensity, except perhaps for certain stocks of Pacific salmon, was moderate.

The bombing of Pearl Harbor and subsequent World War II changed all that. The War brought with it many problems for the fishing industry, particularly regarding procurement of vital equipment and supplies with which to operate the boats and plants on an accelerated war-time basis. This led to the establishment of the Office of Fishery Coordination in the federal war-time structure to assist the fishing industry to meet the heavy demands for food from the sea. This operation worked quite satisfactorily, but gave rise to the fear that this function could be expanded to include regulation and management.

These fears were intensified when, with the War's end, but prior to termination of this Office, President Truman, on September 28, 1945, by Proclamation No. 2668, enunciated the "Policy of the United States with Regard to Coastal Fisheries in Certain Areas of the High Seas." Following this Proclamation, meetings and conferences were held between representatives of the three coastal States to offset the possibility of a federal take-over of the Pacific Coast fisheries particularly those within existing state jurisdictions. The net result of those meetings was the ultimate passage by the three state Legislatures of identical bills establishing the Pacific Marine Fisheries Compact. Compacts between the States require the consent of the Congress; consequently, a bill was introduced in the House of Representatives to accomplish this. As passed by the House, the bill provided for participation in the alliance by the Federal Government through its Fish and Wildlife Service. This provision for federal participation in the consent legislation was stricken from the bill as it passed the Senate and was subsequently modified by the House. With approval by the President on July 24, 1947, there came into being the Pacific Marine Fisheries Commission.

Let us now briefly examine the Compact¹ previously adopted by the States. Article I states, the purposes "... are and shall be to promote the better utilization of fisheries, marine, shell, and anadromous, which are of mutual concern, and to develop a joint program of protection and prevention of physical waste of such fisheries in all of those areas of the Pacific Ocean over which the states of California, Oregon, and Washington jointly or separately now have or may hereafter acquire jurisdiction." Article I further states, "Nothing herein contained shall be construed so as to authorize the aforesaid states or any of them to limit the production of fish or fish products for the purpose of establishing or fixing the prices thereof or creating and perpetuating a monopoly."

Article III designates the manner in which appointments to the Commission are made and the tenure of the appointees. The Article stipulates the voting powers of each State.

Article VII, described by many as the most important arm of the Commission, states: "The fisheries research agencies of the signatory States shall act in collaboration as the official research agency of the Pacific Marine Fisheries Commission." This Article then continues: "An Advisory Committee to be representative of the commercial fishermen, commercial fishing industry, and such other interests of each State as the Commission deems advisable shall be established by the Commission as soon as practicable for the purpose of advising the Commission upon such recommendations as it may desire to make."

The Commission at its annual meeting of 1960 authorized payment of travel and living expenses of its Advisory Committee for attendance at Annual Commission Meetings. This has encouraged participation by all segments of the industry, and it has resulted in PMFC having the best attendance record of the three existing interstate marine fisheries Compacts.

From the foregoing Articles I, III, and VII, we perceive a three-layer organization consisting of the political-administrator followed by the research and advisory groups.

Article IV sets out quite clearly the duties and responsibilities of each layer in this organization. In the interest of time, I shall omit further reference to this Article except to say it's the lengthiest in the Compact.

During the sixties, the States of Alaska and Idaho sought and gained entry into this Commission by adoption of the amended Compact by the States of Alaska, Idaho, California, Oregon, and Washington, and the consent of the Congress.

Now, what has the Commission accomplished? First and foremost, it has brought together in open forum fishery administrators, members of the industry, commercial and sport fishermen, fishery scientists, and the public for frank discussions of problems of mutual concern to two or more of the States. Frequently, accord has been reached between the States based upon facts presented to them by the Commission's research and advisory arms. Failure to reach agreement has nevertheless provided positive benefits in that, after full discussion of the pros and cons, the agencies concerned were better equipped to re-examine the matter for further study and discussion. Prime examples of this are the uniform opening dates and minimum-size limits for the chinook and coho salmon ocean troll commercial fisheries.

At this point, I call attention to our wonderful but informal relationship with our Canadian counterparts. For reasons of protocol it is not logical for Canada to be a formal participant in PMFC, but down through the years this has not prevented Canada's fishing industry, its Fisheries Service, and its Research Board from attending PMFC's deliberations and contributing generously to solution of mutual problems. We welcome the Canadian delegates and hope they will continue to attend and to participate informally but enthusiastically in this and future meetings.

Fishery Events Leading to Establishment of Pacific Marine Fisheries Commission and Progress and Changes, 1948—1967

W. MARKHAM MORTON

Brief History of Events Leading to Establishment

Although American oceanic fisheries have maintained a high position among the major industries of our Atlantic seaboard for almost three centuries, Pacific marine fisheries did not really come alive until after the Civil War (1861—1865), over a hundred years ago, when an Englishman named Hume began preserving and storing salmon in tin containers at Sacramento, California and Astoria, Oregon. This process soon replaced the barrels of salt fish which had been the backbone of commercial fisheries for centuries. For the next fifty years (about 1870 to 1920) practically all of the gold produced by our Pacific fisheries was derived from the seemingly inexhaustible supply of salmon entering streams annually from San Francisco Bay, California to Bristol Bay, Alaska to reproduce their kind. These fish were taken by fixed gear such as fish wheels, fish traps and set nets; and by mobile gear such as drift gill nets, purse seines and beach seines. This nutritious and once cheap food soon became one of the most common staples on dining tables all over America and in many other parts of the world as well.

About 1915 the Pacific salmon industry became alarmed for the first time in its history over a rather sudden and unexpected failure of the usual large numbers of salmon to return from the sea to their natal streams along almost the entire Pacific coast. The most important effect of this decline was the almost immediate and strenuous united appeal from all segments of the fishing industry to the federal government for assistance in solving their dilemma. Pacific fishery biology, as we know it today, dates from this event, and was born under the early and able leadership of:

Dr. Charles H. Gilbert, on salmon in Alaska and the Fraser River, Canada;

Dr. Willis H. Rich, on salmon in the Columbia River and Alaska;

Dr. William F. Thompson, on pelagic and bottom fishes of California and the Pacific Northwest and Canada;

Dr. Frank Weymouth, on razor clams and shellfish along our entire Pacific Coast from California to Alaska.

These men were all students of the renowned Dr. David Starr Jordan, usually recognized as the Father of American Ichthyology, and more particularly of all Pacific Fishery Biology, and still the idol of many fishery biologists today. In spite of the millions of dollars and hours of professional study spent on Pacific salmon over the past fifty years, these fish were never restored to the level of abundance recorded just before and after the turn of this century.

Although the need was great to continue the progressive fishery research and management plans and programs of the Pacific fishery institutions (the California Fish and Game Commission, the U. S. Bureau of Fisheries (USBF) and the Biological Board of Canada) of that period. World War I (1914—1918) put a serious damper on such activities. Finally, in the 1920's, the needed research was resumed. Among the most noteworthy developments of that period were:

1. The initiation of an active fishery research and management program in Alaska by the USBF which included establishing open and closed seasons after annual meetings with fishermen in each district to discuss proposed regulations—In the case of Alaskan salmon: The White Act established fifty per cent escapement, active predator control, stream clearance and fish hatchery programs; and many tagging programs were undertaken and many counting weirs were established.

2. The beginning in California of a rapidly increasing fishery for sardine (pilchard) by Italian and Yugoslavian immigrants, employing their native lampara-net boats and delivering large tonnages of sardine to canneries at Monterey and San Pedro—This fishery became a giant California industry and a stimulant to the development of a huge purse-seine fishing fleet which quickly expanded to fishing in all west coast waters. A by-product of this was a training ground for many Pacific fishery biologists.

3. The rapid expansion of the halibut fishery in waters off Washington, British Columbia and Alaska and a general concern for the fishery's sustained welfare—This led to the establishment of the International Pacific Halibut Commission, the oldest and until recently the most successful fishery management organization of our time.

4. The establishment of a School of Fisheries at the University of Washington which was, in the next few decades, to wrest the national leadership for fishery biology from Stanford University—

5. The construction of Rock Island Dam, the first of many major dams across the Columbia River, and the rapid development of arid lands by irrigation in the Snake, Yakima and Sacramento-San Joaquin Valleys—

Most of these developments were just getting well under way when the Great Depression of the 1930's seriously restrained the research and management programs then in progress. However, economic recovery by the late 30's brought on the following noteworthy developments:

ation- Montgomery Phister, California Fish Cannery Association; and David V. Oliver, California Sardine Products Institute.

"This committee met at Del Mar, Calif., in June and adopted the recommendation for a tri-state advisory compact. State legislative action was determined upon at a meeting of the fisheries committee of the Western Region of the Council of State Governments at San Francisco. Members of this committee are: California- Warren Hannum, director of natural resources; Harrison B. Call, state senator; Oregon- George Aiken, director of the budget; P. J. Stadelman, state senator; Carl H. Francis, state representative; Washington— Smith Troy, attorney-general; Harold A. Pebbles, assistant attorney-general; H. N. Jackson, state senator."

The recommendation of the above 5-man Pacific Fisheries Committee that the Conference "favor a tri-state advisory compact, to advise and recommend on research and regulation of offshore fisheries; and that on such tri-state commission, or other body, there shall be provided representation from each state of the offshore or commercial fishing industry" provides one of the most succinct definitions of the Pacific Marine Fisheries Commission in print.

The "History and Development of the Commission" on pages 5 and 6 of its Bulletin 1, issued in 1948, mentions the political or legislative efforts but does mention the fishing industry's concurrent efforts in formation of the Pacific Marine Fisheries Commission. However, anybody who lived, or was connected with fisheries during those hectic days surrounding World War II knows that no one man or group of men was entirely responsible for this organization. It was the general consensus, of a large group of fishery people, which had been developing for almost a decade. However, if one were to select those persons who might be considered as possible prime movers for this organization, one could not ignore the long-time efforts of Montgomery Phister, Attorney for the California Fish Cannery Association, representing the industry, ably assisted in those early days by Captain Miller Freeman, editor and founder of *The Pacific Fisherman*. Captain Freeman is referred to in the literature on this general topic as the instigator of practically-all fisheries commissions of his time, on the West Coast.

Among the "mid-wives" of this organization during those early years was a nation-wide group called the Association of Interstate Compacts. In all three Pacific Coast States a Committee on Interstate Cooperation in each Legislature carried the bills and saw them through. A handful of forgotten Legislators thereby helped create PMFC. Among those in California was Vince Thomas, presently senior member of the California lower house, who replaced Senator Mayo on the above committee in 1947, and who is still a Commissioner of PMFC. It is hoped others will come to light as time goes on and that they can be credited for their contributions in later editions of these annual reports.

To this list of early promoters of PMFC we would add the name of Edward Allen, well-known Seattle attorney, who is

generally recognized as the greatest authority of our time on international fisheries law; and the name of Fred J. Foster, former USBF hatchery administrator and Director of the Washington Department of Fisheries, who wrote one of the earliest letters on the subject in the Pacific Northwest.

Among the scientists of that era, Wilbert M. Chapman, O. E. Sette and Richard Van Cleve contributed much to the generation of fishery research and to promotion of the idea of an interstate compact. They were all in residence at Palo Alto, California, during the War, but left immediately afterward: Chapman to become the first fishery representative in the U. S. Department of State at Washington, D.C.; Sette to initiate the extensive federal Pacific Oceanic Fishery Investigations at Honolulu, Hawaii; and Van Cleve to be chief biologist of the International Pacific Salmon Fisheries Commission at New Westminster, B.C., and subsequently Dean of the College of Fisheries at the University of Washington, Seattle.

The rest of the story of the origin of PMFC is aptly presented in Bulletin 1 and the First Annual Report of the Commission issued in 1948. The Bulletin reproduced the 11 articles of the original compact¹ along with a picture of 6 of the first 7 commissioners. *The Pacific Fisherman* of May 1948, page 25, presented a picture of all in attendance at the first plenary session, which of course included the first Advisory Committee members.

Resume of Progress and Changes During PMFC's First 10 Years, 1948-1957

The Pacific Marine Fisheries Commission was created in 1947 when the States of California, Oregon and Washington entered into a compact with the consent of the Congress (Public Law 80-232, July 24, 1947) for the purpose of coordinating research and management of the marine, shell and anadromous fisheries of mutual concern.

The following official representatives, designated by the enabling laws of each of the compact States, met in Portland, Oregon, November 17, 1947, for the first time:

- California: Eugene D. Bennett, Fishing Industry Representative
Sen. Jesse M. Mayo, Legislative Representative
Richard S. Croker, Director, Bureau Marine Fisheries, California Department of Fish and Game (elected vice-chairman)
- Oregon: Earl H. Hill, Oregon Fish Commission
Robert L. Jones, Oregon Fish Commission
John C. Veatch, Oregon Fish Commission (elected chairman)
- Washington: Milo Moore, Director, Washington Department of Fisheries (elected Secretary).

bottomfish was increased during this period as the sablefish or black cod catch of 1956 was one of the best on record. Significant improvements in net and cod-end regulations for otter trawl nets were inaugurated.

Probably the most drastic action ever recommended by the Commission, following observation of extensive gill netting on the high seas by Japanese vessels, was to abolish the taking of salmon by nets or other gear, except by hook-and-line trolling, in offshore waters of Canada and the United States.

Some administrative changes during this 5-year period were the suspension in 1955 of 8 Advisors for missing 3 consecutive meetings in violation of the 1952 resolution requiring attendance, and the resignations and appointments of Research Coordinators. John T. Gharrett resigned December 31, 1955 to accept a position with BCF's Alaska Region in Juneau. Milton C. James was appointed Research Coordinator and served from December 29, 1955 to November 26, 1956. He also served as Director of the Fish Commission of Oregon from August 1, 1956 to May 17, 1957. Milt was succeeded as Research Coordinator by Charles K. Phenice on November 5, 1956, who resigned on April 26, 1957. Milt James, on June 1, 1957, again accepted the PMFC duties and responsibilities and served until September 12, 1960.

PMFC Chairman Richard S. Croker attended the organizational meeting of the International North Pacific Fisheries Commission in Tokyo, Japan, in October of 1955. At the 1955 Annual PMFC Meeting the Commission moved to consider sport fishing as well as other environmental factors affecting the resource. In 1957 research reports at Annual Meetings were condensed to one-day presentations to give more time to consider recommendations of the Advisory Committee.

The Tenth Annual Report of the Pacific Marine Fisheries Commission for the Year 1957 is dedicated to a "ten-year perspective rather than a recital of the Commission activities during 1957 alone," and contains a good condensed review of the Commission's history and progress during its first decade. Research studies were intensive on salmon-marking and otter trawl fishery programs. There were no funds available for extensive albacore or shellfish studies until near the end of the decade.

Resume of Progress and Changes During PMFC's Second 10 Years, 1958-1967

The west coast shrimp fishery, which had a spectacular start in Washington waters in 1957 with a catch of 2 million pounds, zoomed to an all-time record high for those waters of over 6 million pounds in 1958 (before declining precipitously to an annual average of about 1 million pounds—Editor). Nothing else like this would occur for another decade when Oregon and Alaska together would produce over 52 million pounds of shrimp in 1967. (In 1972, shrimp landings in Alaska were over 82 million pounds, and in Oregon they were nearly 21 million—Editor). The United Nations called an international conference on the Law of the Sea at Geneva, Switzerland, in February of 1958, at which the American nations,

Mexico, the United States, and Canada, were unable to obtain approval for extending fishery jurisdiction from the present 3-mile limit to some increased multiple of three. The coming of statehood to Alaska in 1958 started legislative actions to bring Alaska into the Compact. Due to lack of funds, however, this would not be accomplished until July 1, 1968.

An excellent review of the important changes and new objectives that had developed during the first 10 years of PMFC is presented in the introduction to the 1959 Annual Report. In that year membership on the official Advisory Committee was increased to seven from each State to include representatives of sport fishing interests. Enabling action in 1959 and 1961 by Washington, Oregon, and California broadened their Acts to include the States of Alaska or Hawaii, or any State having rivers or streams tributary to the Pacific Ocean. The position of Research Coordinator was replaced in 1959 by the position of Executive Director, to which Milt James was reappointed. The format of the Annual Report was changed in 1959 to limit the main body of the report to Commission action highlights and to move all research details to Appendices.

The introduction to the 13th Annual Report for 1960 attempted to answer the perennial question. Why hasn't PMFC provided the degree of coordination in research management and regulations originally intended? Status Reports as we know them today first appeared in Appendix A to this Annual Report. Milt James resigned as Executive Director and he was replaced by Alphonse Kemmerich on September 12, 1960. Milt was retained as Consultant for temporary services as needed. Bulletin 4, "A Study of Annual and Seasonal Bathymetric Catch Patterns for Commercially Important Groundfishes of the Pacific Northwest Coast of North America" was issued in 1960 and the supply of copies was almost immediately exhausted.

The Fourteenth Annual Report for 1961 is the largest (120 pages) and the most comprehensive ever published. It also was the last to be issued in the 6" x 9" size. The last 40 pages present the very clear and concise otter-trawl landing statistics beginning with 1956, prepared by J. Arthur Thomson of the Fisheries Research Board of Canada. It was later decided that similar tables for other fisheries would be too costly to print in the Annual Reports; the Data Series, as we know it today, would be initiated to take care of statistics. A revised set of Rules and Regulations for PMFC, adopted in December of 1960, appeared on pages 8-10 of the 1961 Annual Report. Bulletin 5 was published in 1961 concerning a variety of fishery research projects. The First Governors' Salmon Conference was convened by Governor William A. Egan of Alaska at Juneau in February 1961.

In 1962, Al Kemmerich resigned as Executive Director, and Richard S. Croker was appointed to the position on September 1. Al was retained as a Consultant. The Fifteenth Annual Report for 1962 was the first to appear in its present 9" x 12" size, and contained an excellent review of "The First Fifteen Years" by Dick Croker who had been a member of the

financial support as it had in the past due to a formula based on the annual value of the commercial fisheries of the individual member States. Although this agreement had to go the tortuous legislative route of amendment of each member State's enabling act and of approval by Congress, it was put into effect on July 1, 1968 and resulted in the State of Alaska joining the Compact on that date.

Among other matters of concern to west coast fisheries in 1967 were: continued fishing by foreign fleets off the Pacific Coast of North America, including the launching by South Korea of a small abortive high-seas fishery off Alaska and entry of the Cuban long-line vessel *Bonito* into the eastern Pacific convention area of the Inter-American Tropical Tuna Commission; an affirmative vote, by a U. S. delegation on December 6, 1966, on United Nations Resolution 2172 to internationalize the resources of the seas; threats of thermal pollution from proposed nuclear fueled plants for generating electricity; continued off-reservation Indian fishing for salmon; signs of over-fishing of Alaskan king crab; and the wreck of the *Torrey Canyon* in the British Isles and the increasing number of oil spills.

(A resume of progress and changes during PMFC's third 10 years, 1968-1977, will be left for writing in the future-Editor)

International

Iceland's declaration of a 50-mile fishing limit effective September 1, 1972 caused the "Cod War" to flare anew as Iceland sought to enforce the limit against British trawlers.

The United Nations on December 7 approved plans to open a World Conference on Law of the Sea in November 1973 in New York. In 1974 the Conference would be moved to Santiago, Chile. This is where Chile, Ecuador and Peru adopted the Santiago Declaration in 1952 which has been a factor in causing the world's nations to seek an acceptable revision of the Law of the Sea. Pre-conference meetings were held in New York in March and in Geneva in August 1972. These meetings concerned the United Nations Committee on Peaceful Uses of the Sea Bed and the Ocean Floor.

At the August meeting there appeared to be some agreement on a revised U.S. draft convention containing the following regarding the species approach to fisheries management.

"The coastal state should have the right to regulate the fish stocks inhabiting coastal waters off its shores as well as its anadromous resources." Inherent in this would be strong preference for harvesting by the coastal state.

Maximum utilization should require that any portion of a stock that is not being utilized by local fishermen must be available to others.

Enforcement of regulations applicable to fisheries under coastal state jurisdiction should include

not only coastal state inspection and arrest, but trial and punishment of the offending vessel as well, if the flag state has not established procedures of its own requiring compliance with legitimate coastal state regulations.

Those states harvesting a resource under regulation by a coastal state could be charged a reasonable fee to help defray the costs of rational management of the fishery.

A register of experts would be available to assist the coastal state in formulating effective conservation programs.

Regulation of oceanic or pelagic species should be by international commissions.

Mexico in late 1972 proposed a "Patrimonial Sea Concept" and Hector Medina Neri, Undersecretary of Fisheries for Mexico has said Mexico will strive to extend its fishery jurisdiction to 200 miles in 1973. The seabed resources out to a depth of 200 meters would also be included, as covered by the Declaration of Santo Domingo of June 1972. As of this writing Mexico has not asserted jurisdiction beyond 12 miles, but U.S. and Mexican fishermen in 1972 lost reciprocal rights to fish within 12 nautical miles of each other's coast, when Mexico allowed a 5-year bilateral agreement to expire.

The Pacific Marine Fisheries Commission on November 15 during its annual meeting held a panel discussion on Law of the Sea and Problems Relating to Foreign Fishing. A summary of the discussion was included in the minutes of the annual meeting. The reader is referred to page 31 of this report for Resolution No. 1, "Support for the United States Position at the Law of the Sea Conference for Management of Ocean Fisheries, and Other Fisheries Protection Measures," which was adopted unanimously at the meeting by PMFC.

Denmark and the United States consummated a bilateral agreement in early 1972, in which the Danes agreed to reduce their high-seas gillnetting catch of Atlantic salmon to about 800 metric tons, round weight, in 1972; to 600 tons in 1973; to 550 tons in 1974; and to 500 tons in 1975. After 1975 the Danish high-seas fishery for Atlantic salmon would be completely terminated. Local Greenland fishermen within the 12-mile fishery zone of that Danish dependency would be permitted to catch up to 1,000 tons per year. Subsequently, the International Commission for Northwest Atlantic Fisheries (ICNAF) adopted a proposal embracing in substance the Denmark-United States bilateral agreement.

Fishing by foreign vessels off the coasts of the United States continues to be a matter of grave concern. An unofficial conclusion from the Atlantic States Marine Fisheries Commission's (ASMFC) meeting on October 30 and November 1, 1972 was that the federal government and Atlantic coast fisheries interests are at an impasse in solving the foreign fishing problem. The federal position is that extension of U.S. fisheries jurisdiction is out of the question and that settlement of the problem must be sought at the U.N. Law of the Sea Conference (LOS); and in the interim, ICNAF and bilateral

In November the Environmental Protection Agency took over the Corps of Engineers' responsibility for issuing discharge permits and issued guidelines for States seeking authority to issue permits.

The 6th Annual American Commercial Fish Exposition (Fish Expo '72) was held in Seattle, October 12-15, 1972. Some 12,000 visitors viewed the 150 displays of new products and technology in the fishing industry, and some took in one or more of the 23 seminars during the Exposition. Among the seminar subjects were Law of the Sea Conference and Alaska Pipeline. On October 11 the *National Fisherman* acquired all of the stock in American Commercial Fish Exposition. The magazine's publisher, David P. Jackson will be the new president of Fish Expo but no changes were planned for the show. The 7th Annual American Commercial Fish Exposition will be held in New Orleans on November 25-28, 1973.

PMFC and Local Events

Congressman Thomas M. Pelly about mid 1972 was appointed an official observer to the Conference on the Law of the Sea, following his decision to retire at year's end from Congress after 20 years of service as the State of Washington's Representative from its First Congressional District (Seattle area). Mr. Pelly was the ranking Republican on the House Merchant Marine and Fisheries Committee. His efforts on behalf of and his experience in fishery and governmental matters are highly regarded. Fishery people throughout the Nation were pleased to learn of his appointment.

Some other changes involving west coast persons and fisheries in 1972 were:

Toshio Isogai succeeded Robert E. McLaren as Executive Director of the International North Pacific Fisheries Commission shortly before the Commission's 19th annual meeting late in the year. Mr. Isogai is a Japanese fishery biologist and former expert in the Japanese Ministry of Foreign Affairs. Mr. McLaren had resigned earlier to accept the directorship of the new Canadian Environmental Protection Service's Pacific region.

Wallace H. Noerenberg resigned on June 30 as Commissioner of the Alaska Department of Fish and Game after 24 years as a highly regarded fishery biologist and administrator in Alaska. Before leaving Alaska to look after personal business in the Longview, Washington area, he was presented by Governor William A. Egan with an "Award of Recognition for Outstanding Service to the State of Alaska." Wally's successor as Commissioner effective August 1 was James W. Brooks. Jim had been director of the game division of the Alaska Department of Fish and Game prior to 1967 when he took a research scientist position with the U.S. Fish and Wildlife Service where he specialized in polar bear research and the environmental impact of oil and gas development in Alaska.

The Washington State Department of Fisheries since 1969 has led the nation in pounds of juvenile salmon reared and released at its hatcheries. In 1972 the pounds released were

3,874,865 compared to 2,548,386 in 1969. The Department estimates that commercial or sport fishermen catch one hatchery produced adult salmon for each pound of juvenile salmon released. This record of successful hatchery operation was achieved under the guidance of C. H. "Bud" Ellis, Chief of Hatchery Management and Research who retired from the Department on September 1, 1972 after 40 years of service which began in 1932 when the Departments of Fish and Game were a single department. Ellis became chief of the Department's 13 hatcheries, of which 3 were then closed, in 1941. Now the Department operates 26 hatcheries and three spawning channels.

Two west coast men, Charles R. Carry and Theodore T. Bugas were among seven men appointed by Secretary of Commerce Peter G. Peterson on October 5, 1972 to the Department of Commerce's Marine Fisheries Advisory Committee.

Pacific Coast Fisheries

Detailed accounts of the status of the albacore, Dungeness crab, groundfish, sport salmon and steelhead, troll salmon, and shrimp fisheries are contained in Appendix 1. of this report. The following provide highlights of developments in Pacific Coast fisheries during 1972.

Albacore: Total albacore landings in 1972 were about 68 million pounds and marked the 6th consecutive year in which the total has exceeded the 25-year average. Over 60 million pounds were landed in California, Oregon and Washington and nearly 8 million pounds were landed in British Columbia. Substantial numbers of albacore were found for the first time as far west as 1,100 miles off California as the result of joint research by the American Fishermen's Research Foundation and the National Marine Fisheries Service.

Clams and Oysters: The British Columbia fishing industry in collaboration with the Canadian Department of the Environment's Fisheries Service began digging razor clams with a mechanical monster, with limited but encouraging success.

Scuba divers of the Washington Department of Fisheries by the end of 1972 had proven 32,925 acres of submerged geoduck clam bottom in Puget Sound with an estimated standing crop of 64 million geoducks. Each clam will average 3 pounds, shell-on, and will yield about 1 pound of meat. Bottoms more than 10 feet below the zero-tide depth are available for lease from the State. However, at the moment this resource does not appear to be a BONANZA for the lessee or digger.

Pacific oysters on this coast produced abundant seed in 1972 which is a rare occurrence in this area.

Crab: The king crab resource of eastern Bering Sea is decreasing, and consequently U.S. crab fishermen no longer fish the area significantly. An agreement in late November 1972 between the United States and Japan reduced the Japanese annual quota of 885,000 king crabs or 37,500 cases in 1971 and 1972 to 700,000 crabs or about 29,500 cases in

demand for pollock blocks will continue because of decreasing abundance and increasing cost of Atlantic cod.

The largest portion of the pollock harvest occurs in the eastern Bering Sea off Alaska, but the species occurs in the subarctic Pacific from the Sea of Okhotsk and the Sea of Japan to the west coast of North America, extending as far south as California. However the abundance declines south of Alaska. Pollock appear to be substantially less abundant in the Gulf of Alaska than they are in the eastern Bering Sea, but the Gulf stock appears to be nearly untapped except for intermittent fishing by the Japanese south of Unimak in the Aleutian Islands. A small exploratory U.S. fishery took place in the spring of 1972 in the vicinity of Kodiak Island with one vessel reporting single-trawl catches as large as 40,000 pounds of pollock. The National Marine Fisheries Service in the summer began to concentrate its trawl surveying in the Gulf of Alaska on pollock, using the *R.V. John M. Cobb*.

In 1971, the total catch of pollock in Bering Sea was 1.8 million metric tons. This is the upper limit of Soviet estimates of the allowable harvest. The Soviets have no information that the Bering Sea stocks are overfished but they feel some limitations on fishing will be needed eventually. See "Untapped Alaskan Pollock Stocks" by Miles Alton and Ron Nicholl in *National Fisherman*, Yearbook Issue, 1973.

A team of 10 Japanese fishery experts may visit Alaska to evaluate little used marine resources such as edible seaweed, abalone, and sea urchin as the result of a meeting between Governors Egan of Alaska and Dogakinaï of Hokkaido in the fall of 1972. These resources are in demand in Japan but not in Alaska and they could be the basis for increasing the earning period of some Alaskans beyond the seasons for more important commercial fisheries. Canadians are exploring the possibility of exporting sea urchin roe to Japan.*

The Japanese pot fishery for sea snails (large 4"-6" gastropods resembling the Oregon triton and representing at least 5 species of the genus *Neptunea* of the whelk family) which was first observed in eastern Bering Sea in 1971 was reduced[^] to 5 vessels in 1972. The snails are an expensive delicacy in Japan. - ♦

ADMINISTRATION

Personnel

The following served as Commissioners during 1972:

Alaska

James W. Brooks, Juneau, Second Vice-Chairman
(successor to Wallace H. Noerenberg effective August 1)
Frank Peratrovich, Klawock
T. E. Thompson, Petersburg

California

G. Ray Arnett, Sacramento, Third Vice-Chairman

Harold F. Cary, San Diego
Vincent Thomas, San Pedro

Idaho

H. Jack Alvord, Pocatello
Joseph C. Greenley, Boise, First Vice-Chairman
Paul C. Keeton, Lewiston

Oregon

Thomas E. Kruse, Portland, Chairman
John W. McKean, Portland
Jack F. Shields, Tigard (successor to Edward G. Huffs Schmidt effective August 3)

Washington

Harold E. Lokken, Seattle
Ted G. Peterson, Seattle
Thor C. Tollefson, Olympia, Secretary

The Advisory Committee functioned under the "ADVISORY COMMITTEE RULES AND PROCEDURE" of November 1971. Its members in keeping with Article X of PMFC's Rules and Regulations were reappointed for 2-year terms beginning January 1, 1971 or were appointed subsequently for the unexpired remainders of 2-year terms as vacancies occurred. The membership during 1972 was as follows:

Alaska

J.B. Cotant, Ketchikan
Richard I. Eliason, Sitka, Section Chairman
Ben Engdal, Wrangell
Harold Z. Hansen, Juneau
Lewis Hasbrouck, Cordova
Charles A. Powell, Kodiak
Norman A. Riddell, Juneau

California

Earl Carpenter, Bodega Bay
Charles R. Carry, Terminal Island
Clifton D. Day, San Francisco
Peter T. Fletcher, Rancho Santa Fe
John P. Gilchrist, San Francisco
Robert Hetzler, Terminal Island, Section Chairman
Paul McKeehan, Santa Clara

Idaho

John Eaton, Cascade
Jack Hemingway, Sun Valley
Robert G. Kalb, Sandpoint, Section Chairman

Oregon*

H. C. Buckingham, Newport
David B. Charlton, Portland, Overall Chairman

*The Advisors from the host State elect an overall Chairman and Deputy for the Advisory Committee.

luncheon meeting and inspection of Willamette falls fishway, West Linn, Oregon, July 11;

Western Association of Fish and Game Commissioners' Annual Meeting concurrent with Western Division of American Fisheries Society, Portland, July 16-19.

Administrative and Service Activities

Executive Committee Actions: The Committee met on June 1 in Portland, Oregon, and took the following significant actions:

1. Personnel matters
 - a. Authorized continuation of existing levels of medical coverage for PMFC employees at no net increase in cost to employees;
 - b. Approved changes in PMFC pension plan to provide an interest rate of 5%, vesting at 20% per year, and opportunity for voluntary increased employee contributions of up to 10% of annual salary;
2. Budget approval
 - a. Approved budget revisions for FY 1972-73 and the biennial budget for 1973-75;
 - b. Authorized expenditure of \$3,500 per year for support of pilot researches, with 1972-73 funds allocated for initiation of expanded albacore port-sampling in California and Oregon;
3. Actions on recommendations from scientific staff
 - a. Authorized publication of Bulletin 8 (salmon papers) as recommended by Salmon-Steelhead Committee and Research Directors/Coordinators;
 - b. Approved recommendations of Groundfish Committee that other federal funds "Be sought to support otolith reader presently funded through State of Washington's P.L. 88-309 program; also inclusion of brief oral reports on status of fisheries in the annual meeting agenda;
- 4[^] Albacore research program: Authorized commitment of Executive Director's time to the Coordinated Pacific Coast Albacore Research Program as proposed for Sea Grant financial support, with the condition that other PMFC functions would not be reduced in consequence, and provision that the subject be reviewed at the November Executive Committee meeting;
5. State-Federal Fisheries Management Program: Approved agenda for the June 1-2 Pacific Coast Leadership Conference in Portland, and directed that PMFC's Chairman and Executive Director attend the State-Federal conference in Washington D.C., June 6-7;
6. 1972 Annual Meeting
 - a. Approved inclusion of a symposium on mariculture;
 - b. Authorized the Executive Director to develop a second segment of the program around topics of immediate importance as alternative to a second panel presentation;

- c. Authorized re-structuring of the scientific staff's meeting to encourage discussion of topics of importance to the scientists;
 - d. Authorized inclusion of special topics relating to PMFC's 25 years of service, and recommended Richard S. Croker and Alphonse Kemmerich as speakers;
 - e. Authorized formation of editing committee to review language of resolutions prior to action by the Commission; Consultant Kemmerich to assure that editing involves no substantive changes in meaning;
7. 1973 Annual Meeting approved for Boise, Idaho, November 13-15, at the Rodeway Inn.

The Executive Committee met a second time in 1972 in Portland on November 14 and 15 in conjunction with the Annual Meeting and took the following actions:

1. Approved minutes of the June 1 meeting, and arrangements for Annual Meeting;
2. Recommended new and alternative Advisors for confirmation by the Commission;
3. Reviewed reports of the Executive Director and Treasurer;
4. Nominated members to the Executive Committee for 1973 and reviewed plans for 1973 Annual PMFC Meeting to be held in Boise, Idaho;
5. Approved continuation of the scientific staff's practice of meeting the day prior to the plenary session at the Annual Meeting, and discussed the possibility of a joint staff-advisors meeting, perhaps in conjunction with the Annual Meeting;
6. Agreed that the state component of the Policy Board for the Dungeness crab project of the State-Federal Fisheries Management Program be composed of the State Fisheries Directors of California, Oregon and Washington with the Commissioner of the Alaska Department of Fish and Game as an observer, and endorsed the recommendations of PMFC's shellfish committee;
7. Recommended that each agency supply the Executive Director with the name of one of its staff members who would furnish advice and assistance to PMFC regarding environmental matters which do not logically fall within the purview of existing standing committees;
8. Approved additional remuneration to the Treasurer from federal funds budgeted for added work required by state-federal contracts.

PMFC Standing Committees: Four Technical or Scientific Committees assist PMFC to meet its stated goal: "to promote 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." Particularly, these committees assist with "Objective II." within that goal, to "Coordinate research and management projects relating to

on June 28 to 30 in Newport to evaluate condition of groundfish stocks, problems arising from differences in fishing regulations, and other matters of mutual concern; and to make recommendations to the parent committee. The parent committee accepted the Technical Subcommittee's recommendation that the total annual catch of Pacific ocean perch by all nations should not exceed 1,500 metric tons from INPFC Columbia area off the States of Oregon and Washington, and 2,000 metric tons for INPFC Vancouver area off the Province of British Columbia.

The second international committee is the Informal Committee on Chinook and Coho. PMFC's Executive Director and NMFS' Northwest Region Director, Donald R. Johnson, are the U.S. members; and the Canadian Fisheries Service's Pacific Region Director, W. R. Hourston and the Fisheries Research Board of Canada's Director of the Nanaimo Biological Station, W. E. Johnson, are the Canadian members. Advice and assistance are provided the Committee by a Technical Working Group composed of west coast scientists from Canada, NMFS, and the States.

State fisheries directors or their representatives serve as observers on both of these international committees. Committee recommendations are forwarded to the two Governments and for the United States these are forwarded via Ambassador Donald L. McKernan, Coordinator for Ocean Affairs and Special Assistant for Fisheries and Wildlife to the Secretary of State.

PMFC's Executive Director in early 1972 participated along with other advisors from the Pacific States in the formal Canada-United States discussions of salmon problems held in Vancouver, B. C. He also participated in discussions organized by Ambassador McKernan for representatives of Pacific Coast States and the fishing industry to review the purposes and terms of U.S. bilateral agreements with Japan and with the Soviet Union, and to make recommendations concerning negotiations in late 1972 and early 1973.

PMFC on February 16, 1972 convened the annual work session in Portland to coordinate allocation and listing of salmon and steelhead. fin marks for Pacific Coast fishery agencies. Written allocation requests and information from agencies that did not send representatives to the meeting were considered. Subsequently PMFC's office distributed a 67-page 1972 Mark List.

On the National scene, PMFC helped develop compromise language that exempted fish processing wastes from permit requirements of the Ocean Dumping Bill (H.R. 9727) except in specific areas designated by the Environmental Protection Agency as lacking adequate dilution or tidal flushing for ecologically safe dispersion of these normally nontoxic wastes. PMFC also continued to assist in the establishment of the State-Federal Fisheries Management Program (SFFMP). As mentioned earlier in regard to the Shellfish Committee's activities, the Dungeness crab fishery has been selected for study under SFFMP. Additional administrative and service activities are implied by the preceding section "Conferences and Meetings" of this report.

Publications in 1972: The 23rd and the 24th Annual Reports for the Years 1970 and 1971 were published and distributed. Bulletin 8, which deals with chinook and coho salmon and the ocean commercial troll and sport fisheries, was published in time for distribution at the 1972 Annual PMFC Meeting. Three newsletters were issued: No. 16 in May; No. 17 in October; and No. 18 in December. A 67-page 1972 (salmon and steelhead) Mark List was distributed in March. Revised and supplementary pages providing 1971 catch statistics for the Dungeness Crab and Shrimp Section of PMFC's Data Series were distributed to holders of copies of the Section. Upon distribution of this 25th Annual Report for the Year 1972, PMFC's publication schedule will be current for the first time in nearly a decade. A goal of publishing future annual reports soon after the close of the pertinent year now seems attainable.

COMMISSION ACTIONS

Action on 1971 Resolutions

In order to implement PMFC's 1971 resolutions, cover letters were prepared and resolutions mailed selectively, in accordance with stated instructions or apparent relevance, to a total of nearly 80 agencies and responsible individuals. Follow-up meetings were arranged with key Senators and Representatives and their legislative assistants with respect to preservation of the Middle Snake River (Resolution No. 4), and Marine Mammal legislation (Resolution No. 8). On balance, PMFC was successful in 1972 in securing favorable action on most of the issues on which it had taken a position at the 1971 Annual Meeting. Perhaps of equal importance, PMFC has established effective communications with key Representatives and Senators and their staffs which should materially enhance PMFC's effectiveness.

The following in numerical order is a summary of the actions taken on each of the seven resolutions of 1971. Numbers 3 and 5 are omitted as they were the numbers assigned to proposals that failed to be adopted as resolutions.

Resolution 1, In Support of Fisheries Management by Coastal, Anadromous, High Seas Groupings: Copies of this resolution were sent to the President and his Cabinet Members, to appropriate Congressional Committees and federal agencies, and to the Congressional Delegates and Governors of PMFC States. Copies were sent also to the Governors of the Atlantic and Gulf Coast States. This resolution was matched by similar expressions from all segments of the fishing industry and all parts of the country in an unprecedented display of solidarity of opinion among fisheries agencies and private interests. As first tangible result, the U.S. State Department appointed two fisheries representatives to its Law of the Sea Conference Preparatory Committee: August Felando of the American Tuna Boat Association, San Diego, California, and Jacob J. Dykstra, Point Judith Fisherman's Cooperative, Narragansett, Rhode Island. In addition, Walter V. Yonker, National Cannery Association, Seattle, Washington, and William Neblett, National Shrimp Congress, Key West, Florida, were named

hearings to be held in preparation for establishment of permanent lines of demarcation."

Congressman John Dingell on behalf of his House Subcommittee on Fisheries and Wildlife Conservation made inquiries of the Department of State and other executive departments concerning the provisional charts. Congressman Edward Garmatz, Chairman of the Committee on Merchant Marine and Fisheries supplied PMFC with copies of correspondence resulting from the inquiries. This correspondence disclosed that the federal documents (charts) had been prepared under the aegis of a Law of the Sea Task Force, an inter-agency group composed of the Departments of Commerce, Defense, Interior, Justice, State, and Transportation. The Task Force felt that the charts involved no changes in existing policy and therefore did not require filing of an environmental impact statement, however, the question raised by Congressman Dingell regarding the necessity of an environmental impact statement was being assessed in consultation with the Council on Environmental Quality.

Since no positive recall of the controversial charts seemed likely to occur during the year, PMFC at its Annual Meeting on November 16, 1972 unanimously reaffirmed this resolution with slight changes in wording and order of logic (see Resolution No. 2 page 31). The reaffirmed resolution was sent to all pertinent federal government entities and officials including those of the Legislative Branch. It was also sent to national fishery organizations, regional agencies including the Atlantic and Gulf states marine fisheries commissions, and to the Governors of PMFC States. On January 18, 1973, Congressman Dingell introduced H.R. 2283 for himself and Congressmen Downing, McCloskey, J. M. Murphy of New York, and G. M. Anderson of California, to require that the method of straight baselines shall be employed for the purposes of determining the boundaries of the contiguous fishery zone.

Resolution 4, Establish Minimum Flows for Fisheries-Snake and Columbia Rivers: Responses to this resolution from national, regional, and state agencies indicated general concurrence with the principles expressed therein. Support at the highest level was noted by the U.S. Water Resources Council as follows:

The new Principles and Standards (December 1971) explicitly recognize that programs for the improvement of water quality and the maintenance of stream flow contribute to all three of the broad planning objectives. It is therefore apparent that conformance to the new Principles and Standards will require full consideration of programs to meet fisheries needs along with other resource needs in planning for the management of water and land resources.

Other expressions of support for the concept of equal consideration for fishery needs were received from the U.S. Corps of Engineers, Federal Power Commission, Bureau of Reclamation, Environmental Protection Agency, and Pacific Northwest River Basin Commission. Director Phil Roedel of NMFS supported the concept and suggested that the Commis-

sion consider "a study group to assess the present knowledge about optimum and minimum flows of any streams, especially of West Coast streams. Such a study group would of course be expected to make recommendations for both specific and general research needed." Director Roedel further indicated the active interest of NMFS scientists in this action approach.

Dr. Robert R. Lee, Director of the Idaho Water Resource Board, also generally supported the importance of "equal consideration of all water use functions and the need to obtain data and information and instream flow requirements", which he noted was a priority item in the Board's report to the Pacific Northwest River Basin Commission. Subsequently, he made these comments and suggestions with respect to the need for a study group to assess present knowledge about optimum and minimum flows of streams:

Considerable emphasis is now being placed both at the state and national levels on formulating methodology to identify and evaluate stream flow needs for water quality, fish, wildlife, and recreation. These water uses are commonly referred to as "instream needs". On May 19, a panel of six fishery and water resource consulting specialists met in Boise at the invitation of the Idaho Water Resource Board to assist us in establishing a program to determine instream flow needs for Idaho waters . . .

At the conclusion of the meeting, the consultants were unanimous in their recommendations to the Board staff that we continue our efforts in developing a detailed work program designed to adequately identify water requirements to meet instream water use functions. The Board intends to proceed in this study effort in cooperation with concerned state and federal planning agencies.

More specifically, as to the suggestion that the Commission consider establishing a study group to assess the present knowledge about optimum and minimum flows, I endorse this action. I suggest, however, that the study group confine its activities to an overview of the study efforts being conducted by other groups and not attempt to become involved in establishing study methodology or in evaluation of research efforts now underway. It would appear that the study group could perform a most useful function by meeting with those state and federal planning bodies which are engaged in this type of study effort and then reporting back to the Commission along with their views and comments regarding the ongoing and proposed study efforts in this field. The study group would then serve as a means of communications between the established study groups and the fisheries commission.

In response to expressed interest of water resources scientists, the Pacific Northwest River Basins Commission sponsored an Instream Flow Requirement Workshop March

areas for the valuable salmon and steelhead fisheries of the Columbia River System. Resolutions in 1970 and 1971 opposed further damming of the Middle Snake, and pressed for action to protect both quantity and quality of Snake River waters.

We believe that the continued best interests of irreplaceable fisheries resources will best be served by sequestering as much as possible of the Middle Snake River shoreline within the public domain. Clearly the quality of river waters are strongly influenced by the quality of the shoreline that contains them. This sector of the Snake River provides spawning grounds and key migration routes for major components of Columbia River salmon and steelhead runs; further, it furnishes the unique environmental qualities required for important local freshwater fisheries. Certainly it is very much in the public interest that protection of these resources, and access to them, be maintained for all the people through public acquisition of key sectors of this threatened shoreline.

A recent communication from Senator Packwood's office indicates that Chief John McGuire of the U.S. Forest Service has called for appraisals of the shoreline lands involved. McGuire reports that so far the ranchers have refused offers made, but that it is the Forest Service's intention to pursue this matter through the authority they now have.

Of great future importance. Senators Church and Packwood and their staffs have been discussing possible contents for a bill to be introduced jointly by the Senators in the 93rd Congress toward the object of developing a management plan for preservation of a free-flowing Middle Snake River.

In August, 1972, Oregon's Governor Tom McCall requested that the State Highway Commission initiate a study of the Middle Snake, leading to its inclusion in the Oregon Scenic Waterways System. As consequence of this request, the Oregon State Water Resources Board also plans a detailed re-evaluation of its existing program and position with respect to the Middle Snake River, and for this purpose had included funds in the 1973-1975-biennial budget.

In support of this state effort to protect the Middle Snake River, PMFC wrote the Oregon Water Resources Board and Oregon Highway Commission detailing fishery concern for water quality and quantity in the Middle Snake River. PMFC provided copies of earlier letters and testimony in support of a free-flowing Middle Snake River and in support of U.S. Forest Service purchase of critical sections of shoreline. Responses from both agencies expressed appreciation for PMFC's interest and support, and also indicated that if the Highway Commission decides to proceed with its study, the Water Resources Board will request funds from the Oregon Emergency Board for an immediate preliminary study to be completed by April, 1973.

PMFC at its 1972 Annual Meeting in November unanimously adopted a new Resolution No. 4, "Preservation of Middle Snake River as a Free-Flowing Stream for Optimal

Protection of Irreplaceable Fishery and Recreation Resources" (see page 31 for the resolution's text).

Resolution 6, Recommend Easing of Alien Fishing Act Provisions in Relation to Boundary Trespass by Canadian Fishermen in the Strait of Juan de Fuca: The consensus of respondents to this resolution was that the best or least complex solution appeared to be liberal interpretation of existing law rather than changes which would require national legislation and/or reciprocal international agreement.

Resolution 7, Support of Strengthened Troll Salmon Enforcement Procedures in Oregon and Washington: At year's end neither Oregon nor Washington had found an acceptable procedure for eliminating pre-season fishing violations in the troll fishery. However, early in 1973 the Fish Commission of Oregon, in regard to the June 15 opening for troll caught coho salmon in waters north of the California-Oregon border, adopted a regulation establishing a vessel certification and inspection program. This was subsequently suspended when California in 1973 changed its coho trolling regulation from an April 15 opening with a 25-inch minimum-size limit to a May 15 opening with a 22-inch minimum-size limit. The Fish Commission of Oregon felt that its program designed to prevent pre-season catching of coho would be ineffective because trollers off Oregon prior to June 15 could divert their catches of coho of 22-inch or greater length to California ports.

Resolution 8, Marine Mammal Management: PMFC's letters and personal contacts helped to generate language in the Senate version of H.R. 10420 (Marine Mammal Protection Act of 1972) which provides for cooperation between the States and the Federal Government in the management of marine mammals within coastal waters, rather than total pre-emption as specified in the earlier House of Representatives version. PMFC also joined other management and conservation agencies in insisting on provisions for waiver of the moratorium on the taking and importation of marine mammals and marine mammal products if the best available scientific information and advice indicates this is desirable. These important provisions were approved by the House-Senate Conference Committee, and signed into law by the President in October, 1972 (P.L. 92-522).

Resolution 9, Immediate Reimbursement of Fines for Unlawful Vessel Seizure by Foreign Nations: Congress passed H.R. 7117 which was signed by the President on October 26, 1972 (P.L. 92-569). This law provides procedures designed to expedite reimbursement to owners of U.S.-flag fishing vessels for certain expenses in the form of fines, license fees, or other such charges incurred as a result of illegal seizures, and amends and strengthens the provisions for seeking collection of such reimbursed amounts from the foreign countries involved in such seizures.

General Actions at the 1972 Annual Meeting

The 25th annual meeting of the Commission was held in Portland, Oregon on November 15 and 16, and was preceded

for Management of Chinook and Coho Salmon Resources." The following are the text of and the record of voting on each resolution:

1. Support for the United States Position at the Law of the Sea Conference for Management of Ocean Fisheries, and Other Fisheries Protection Measures

WHEREAS, the member States of the Pacific Marine Fisheries Commission have diverse fishery resources and accompanying management problems; and

WHEREAS, the fisheries include coastal, anadromous, and high seas fisheries; and

WHEREAS, use of these resources is important to the commercial, subsistence and recreational user groups; and

WHEREAS, the well-being of these fisheries stocks is important to the member States; and

WHEREAS, the Pacific Marine Fisheries Commission is aware of the total national and international problems in managing these fisheries; and

WHEREAS, the United States presented a proposal at the summer 1972 preparatory session of the Law of the Sea Conference in which a species approach to fisheries jurisdiction was advocated; and

WHEREAS, final action by the Law of the Sea Conference may be unduly delayed;

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission endorses the species approach as proposed by the United States; and

BE IT FURTHER RESOLVED, that the Pacific Marine Fisheries Commission urges the United States government:

- a. To continue its efforts to secure a successful conclusion to the Law of the Sea Conference;
- b. To continue and increase its practice of coordination with industry in these proceedings;

- ** c- To take on an urgency basis whatever steps are necessary, pending conclusion of the Law of the Sea Conference, to protect U.S. coastal fishery resources now being seriously damaged due to uncontrolled overfishing by foreign fleets, such steps should include, but not be limited to, full utilization of the 1958 Geneva Fisheries Convention, other conventions, bilateral agreements, and multilateral agreements; and

BE IT LASTLY RESOLVED, that copies of this resolution be forwarded to the President of the United States, the Secretaries of State, Interior, Commerce, and Defense, to members of the House Merchant Marine and Fisheries Committee, to members of the Senate Committee on Commerce, to members of the Senate Committee on Foreign Affairs, and to the Governors of all coastal States of the United States.

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

2. Opposition to Certain Federal Documents Provisionally Delimiting the Territorial Sea, Contiguous Zone, and Certain Internal Waters of the United States

WHEREAS, in early 1971 the Federal Government issued documents provisionally delimiting the territorial sea, contiguous zone, and certain internal waters of the United States; and

WHEREAS, these documents or charts were prepared by an interdepartmental committee of federal officials without holding public hearings or obtaining input from the several affected States; and

WHEREAS, some waters previously defined as internal waters of the State of Alaska are now provisionally defined as contiguous zone waters or high seas waters in which foreign fishing may be conducted; and

WHEREAS, these documents have been distributed to certain Foreign Governments; and

WHEREAS, the United States Coast Guard in Alaska is under orders to use these charts as a guide for units assigned law enforcement missions, to aid in the determination of jurisdiction in the coastal waters of Alaska; and

WHEREAS, the United States Government needs to protect the historic internal waters of the State against foreign fishing encroachment because of the existence of these documents; and

WHEREAS, the State of Alaska, since statehood, and the Federal Government in prior years, have managed and protected the fisheries resources in these waters for the benefit of their citizens;

NOW BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission reaffirms its unanimous resolution of November 1971 and again respectfully requests the President of the United States to order that these documents be withdrawn from public and foreign distribution, and that they be disregarded for all purposes in determining the delineation of the internal waters, territorial sea or contiguous zone of Alaska, thereby allowing public authorities to proceed in the enforcement of the laws according to previously established practices.

Adopted unanimously by the five Compact States

4. Preservation of Middle Snake River as a Free-Flowing Stream for Optimal Protection of Irreplaceable Fishery and Recreational Resources

WHEREAS, the Middle Snake River and tributaries below Hells Canyon Dam constitute one of the few remaining free-flowing reaches of the main stem Columbia River system; and

WHEREAS, this Middle Snake River reach provides a vital artery for migration of enormously important salmon and steelhead stocks between spawning grounds in Snake River tributaries and the sea—stocks which provide about 5 percent of fall run chinooks, 40-50 percent of spring and summer run

WHEREAS, anadromous and resident fish populations of the Pacific Coast traverse state lines and are exceptionally valuable resources of national significance for which the demand is greater than the supply; and

WHEREAS, some federal water developments may have the potential for increasing anadromous and resident fish resources with benefits to both commercial and sport fishermen; and

WHEREAS, the Act requires that non-federal interests must agree to pay one-half of the separable costs and all operation, maintenance, and replacement costs assigned to fish and wildlife enhancement in connection with federal water projects; and

WHEREAS, state or local agencies often do not possess the financial capability of meeting the cost-sharing provisions of the Act; and because of budgetary limitations, the fish and wildlife enhancement purposes of the project will be deleted, permanently eliminating project potentials for enhancement; and

WHEREAS, the Act limits federal funding to \$100,000 for fish and wildlife enhancement at projects authorized prior to 1965 and among such projects many opportunities to enhance fish and wildlife resources cannot be fully realized within this limitation; and

WHEREAS, some question exists as to the application of the provisions of the Act to areas downstream from a project but within the project impact area, although it is in such downstream areas that enhancement may be achieved for species such as salmon and steelhead trout;

NOW BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission recommends that the Federal Water Project Recreation Act (P.L. 89-72)X>e amended:

- A. To make all costs of enhancing anadromous and resident fishes at federal water developments non reimbursable federal costs;
- B. To provide for operation and maintenance of such • * enhancement facilities by either federal or non-federal bodies as may be appropriate;
- C. To remove the \$100,000 limitation that presently applies to projects authorized prior to 1965;
- D. To specifically include enhancement in areas downstream from any project but within the impact area of such project; and

BE IT FURTHER RESOLVED, that this resolution be sent to appropriate members of the Congress of the United States, the Secretary of the Interior, Secretary of Commerce, and Secretary of Defense.

Adopted unanimously by the five Compact States

Election of Officers; 1973 Meeting Location

The following were elected officers for 1973:

Executive Committee:

Chairman—Joseph C. Greenley, Director,
Idaho Fish and Game Department

1st Vice-Chairman—James W. Brooks, Commissioner,
Alaska Department of Fish and Game

2nd Vice-Chairman—G. Ray Arnett, Director,
California Department of Fish and Game

3rd Vice-Chairman—Thor C. Tollefson, Director,
Washington Department of Fisheries

Secretary—Thomas E. Kruse, Director,
Fish Commission of Oregon

Steering Group of Advisory Committee: Overall

Chairman—Robert G. Kalb, Idaho Deputy Chairman—
Jack Hemingway, Idaho Sectional Chairman—Charles

A. Powell, Alaska Sectional Chairman—Robert
Hetzler, California Sectional Chairman—Earl E.

Engman, Washington Sectional Chairman—David B.
Charlton, Oregon

The new Chairman, Joseph C. Greenley, announced that the 1973 annual meeting would be held in Boise, Idaho, November 13-15 at the Rodeway Inn. Before adjourning the 1972 meeting he thanked out-going Chairman Gene Kruse and the Staff for the excellent meeting arrangements. Dr. Kruse gave special thanks to the seafood industry of Oregon (Columbia River Salmon and Tuna Packers Association; O.S.U. Seafood Laboratory; Otter Trawl Commission of Oregon; Pacific Shrimp, Inc.; Point Adams Packing Company; Portland Fish Company; and Sea Food Dealers of Astoria) and the Oregon Division of Izaak Walton League of America for their part in the«Social Hour.

Audit Report

ADAMS, RAYMOND & CO.
 Certified Public Accountants
 Portland, Oregon

September 26, 1972

The Board of Commissioners Pacific
 Marine Fisheries Commission State
 Office Building Portland, Oregon 97201

Gentlemen:

We have examined the books and records of the Pacific Marine Fisheries Commission for the fiscal year ending June 30, 1972. The examination was made in accordance with generally accepted auditing standards and, accordingly, included such procedures as were considered necessary in the circumstances.

The accounting procedures of the Commission reflect revenue in the accounts when it is received rather than at that date when appropriated by member states to the Commission and reflect expenditures in the fiscal period in which they arise irrespective of when paid, i.e., the accrual basis.

The following exhibits are submitted:*

- A. Combined Balance Sheet, as at June 30, 1972, of the General Fund and the Property Fund, and Notes to Balance Sheet.
- B. Statement of Revenue and Expenditures, with Budgetary comparisons, for the period July 1, 1971, to June 30, 1972.
- C. Analysis of changes in Unappropriated Surplus and in the Property Fund for the period July 1, 1971, to June 30, 1972.
- D. Reconciliation of changes in the cash balance with ^ , - Revenues and Expenditures for the period July 1, 1971, to June_30, 1972.
- E. Audit Comments.
- F. Scope of the Audit. •

In our opinion, the accompanying statements present fairly the financial position of the Pacific Marine Fisheries Commission at June 30, 1972, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Yours truly,
 ADAMS, RAYMOND & CO.

*Exhibit A is the Balance Sheet, shown in the right-hand column. It is the only exhibit reprinted for this report. A complete audit report with exhibits was sent each Commissioner.

Balance Sheet, June 30, 1972

ASSETS:	<u>Total</u>	<u>General Fund</u>	<u>Property Fund</u>
Cash in Bank	\$ 7,904.24	\$ 7,904.24	--
Certificate of Deposit	9,000.00	9,000.00	--
Due from State of Washington (Note 1)	1,192.83	1,192.83	--
Due from National Marine Fisheries Service (Note 3)	3,675.92	3,675.92	--
Office Furniture & Equipment	5,836.54	--	\$ 5,836.54
Total Assets	<u>\$27,609.53</u>	<u>\$21,772.99</u>	<u>\$ 5,836.54</u>
LIABILITIES:			
Accounts Payable	\$ 537.47	\$ 537.47	
RESERVES:			
Reserve for Allocation—Printing (Note 2)	\$ 1,327.00	\$ 1,327.00	
FUND BALANCES:			
Investment in Fixed Assets	\$ 5,836.54	--	\$ 5,836.54
Unappropriated Surplus	19,908.52	19,908.52	--
Total Fund Balances	<u>\$25,745.06</u>	<u>\$19,908.52</u>	<u>\$ 5,836.54</u>
Total Liabilities, Reserves, and Fund Balances	<u>\$27,609.53</u>	<u>\$21,772.99</u>	<u>\$ 5,836.54</u>

Note 1: Amounts due from State of Washington reflect 75% of certain cooperative research expenditures by the Commission which are reimbursable from the State of Washington, Department of Fisheries.

Note 2: There is one purchase order for printing currently outstanding, as follows:

<u>Project</u>	<u>Amount</u>
24th Annual Report	\$1,327.00

Note 3: Amounts are due from National Marine Fisheries Service under Contract No. Z-37126 covering enhancement of State-Federal relations in Marine Fisheries Management, period of contract 5/1/72 – 11/1/72.

million pounds was far below the 25-year average of nearly 33 million pounds.

Oregon

The first commercial catches of albacore off Oregon were made during the second week of July, about 100 to 150 miles west of Coos Bay, in the area where AFRF and Fish Commission of Oregon chartered vessels caught the first fish a few days earlier. Early catches per boat were up to 300 fish per day and averaged around 100 fish per day. The fishery moved steadily northward and by mid-month the best fishing was between Newport and the Columbia River with some albacore being caught as far north as Cape Scott, Vancouver Island. During the last half of July good fishing was reported from Coos Bay to Cape Flattery, 60 to 100 miles offshore with the best areas being around the Columbia River Dumping Grounds and off Grays Harbor. High catches were 600 fish per day, and the average was around 200 fish per day. July landings in Oregon totalled 4.8 million pounds.

The first half of August saw good catches scattered from Coos Bay to Cape St. James, but fishing was spotty. Best fishing during the period moved from place to place with Cape St. James being the most consistent with catches of over 600 fish per day and an average of 200 fish per day. During the last half of August, success off Oregon and Washington decreased and most of the fleet moved northward to the Queen Charlotte Sound area where catches per boat averaged 200 fish per day. There were scattered good catches off southern and central Oregon during the period but fishing was spotty. August landings in Oregon totalled 13.6 million pounds.

September catches were spotty off Oregon and Washington for jig boats but bait boats reported good catches off Westport and Cape Flattery. By the end of the third week of September most bait boats had gone south to California along with most of the smaller jig boats. Catches off Queen Charlotte Sound and Cape Scott continued good until about the 20th when rough weather set in for several days. Most of the American boats moved south by the end of September; many of the northern boats quit for the season and the southern boats headed for California to close out the season. Final figures for September landings in Oregon totalled 4.5 million pounds.

Boats returning to Oregon from California in October and November landed 143,000 pounds more.

Length frequencies of albacore measured through the season showed a bi-modal distribution. During July and August the modes were at 65 cm and 76 cm, the 65-cm group being slightly more numerous. During September the 76-cm fish were predominate by about 3 to 1. Oregon landings for 1972 totalled 23 million pounds, which is more than double the 25-year average of 10.1 million pounds.

Washington

Washington enjoyed its best albacore season ever. Preliminary landing statistics through September for Washington's albacore fishery showed total landings of 15.0 million pounds.

October-November landings plus late fish-receiving tickets produced a final 1972 total of 16.2 million pounds. This is over triple the 1971 total of 5.3 million pounds and easily ranks as the highest total in the history of the Washington fishery. Two major factors combined to produce these excellent results: (1) exceptional abundance and availability for a prolonged period, plus (2) high prices and strong market demand for albacore. Troll or jig boats contributed about 13 million pounds to the total with bait boats adding the remaining 3 million pounds.

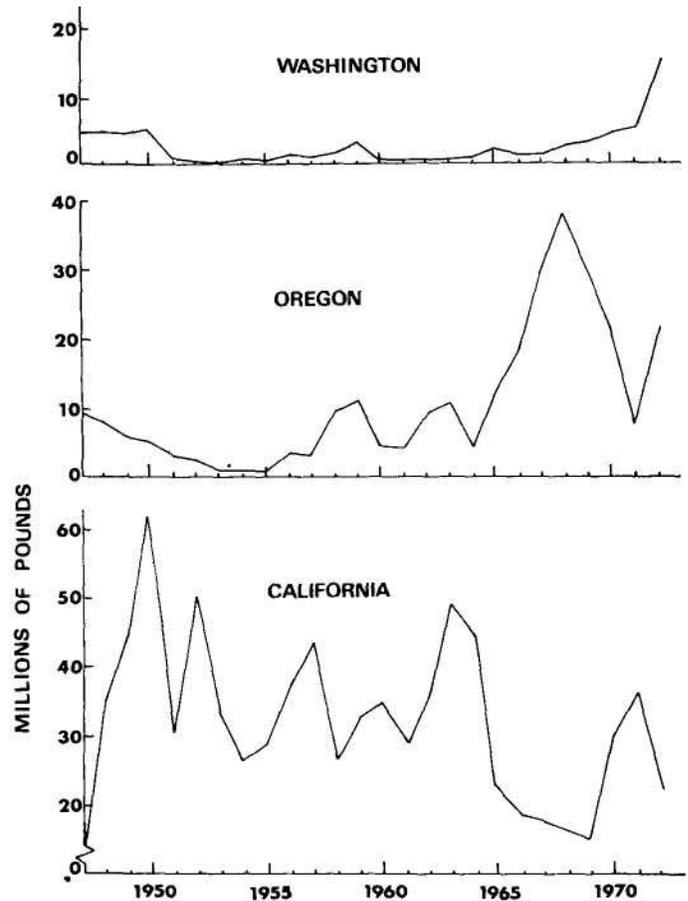


FIGURE 2. Annual albacore landings by State, 1947-1972.

Status

The albacore fishery in the eastern North Pacific depends upon an annual migration, and its catches are subject to wide fluctuations (Figure 2). The most "fishable" albacore schools apparently were concentrated in the Pacific Northwest. Elsewhere, large concentrations of fish would not bite or could not be harvested due to bad weather. The total catch of 60.3 million pounds was about 10.5 million pounds above last year's harvest, not including fish landed in British Columbia. The albacore resource continues to appear healthy.

Compiled by Charles W. Hooker, California Department of Fish and Game

Other Contributors:

Larry H. Hreha, Fish Commission of Oregon
Sam Wright, Washington Department of Fisheries

California

State-wide landings totalled 2.9 million pounds, the lowest in 7 years. Northern California crab landings (Fort Bragg to Crescent City) for 1971-72 totalled 2.5 million pounds, the lowest since the 1963-64 season when 0.8 million pounds were landed. The San Francisco area also showed a decrease from the previous season with landings totalling 319,000 pounds, the poorest catch ever recorded for this area.

Compiled by C. Dale Snow, Fish Commission of Oregon

Other Contributors:

Louis A. Gwartney, Alaska Department of Fish & Game
A. N. Yates, Fisheries Research Board of Canada
Herb Tegelberg, Washington Department of Fisheries
P. Collier & R. Warner, California Dept. of Fish & Game

Status of the 1972 Pacific Coast Shrimp Fishery

The 1972 shrimp landings for the West Coast of the United States and Canada totalled 107 million pounds. Oregon's landings of 20.9 million pounds were up nearly 12 million pounds over 1971 while Alaska's landings of 81.2 million pounds were down nearly 14 million pounds from 1971.

California

Ocean shrimp, *Pandalus jordani*, landings in California totalled 2.5 million pounds. Last year, 3.1 million pounds were landed. Landings from Area A (Crescent City—Eureka; PMFC Area 92) were 2.2 million pounds. The remainder of the harvest was from Bodega Bay (PMFC Area 96), and Morro Bay-Avila (PMFC Area 98). The season was April 16 to October 31.

Oregon

Record landings in Oregon were spurred by good market prices and excellent fishing in all areas off Oregon except PMFC Area 82 (Cape Falcon to Columbia River). Total landings during the 8-month season were 20.9 million pounds. This exceeded the 1970 record by 53% and the 1967-1971 5-year annual average of 11 million pounds by 90%.

Washington

Pink shrimp landings in Washington totalled 1.6 million pounds in 1972, and virtually the entire catch came from the bed off Grays Harbor. Catch rate was at a record level of 885 pounds per hour for single-net vessels, and was appreciably higher for double-rigs that entered the Washington fishery for the first time. The total production from the Grays Harbor

TABLE 1. Annual shrimp landings and previous 10-year means in pounds by region, 1962-1972

Year	Alaska	British Columbia	Washington	Oregon	California	Total
1962	16,943,120	1,663,000	1,367,441	2,750,400	1,786,289	24,510,250
1963	15,126,950	1,788,000	956,105	3,114,700	2,095,278	23,081,033
1964	7,726,750	1,052,000	314,130	5,477,400	980,608	15,550,888
1965	16,818,941	1,755,000	23,468	1,748,000	1,425,875	21,771,284
1966	28,192,621	1,682,000	282,947	4,751,300	1,213,959	36,122,827
1967	41,812,600	1,696,000	1,028,744	10,373,956	1,404,821	56,316,121
1968	42,023,100	1,568,000	1,163,864	10,976,258	2,223,205	57,954,427
1969	47,850,600	2,118,700	1,425,286	10,477,945	2,951,800	64,824,331
1970	74,256,300	1,537,800	925,000	13,735,000	4,044,640	94,498,740
1971	94,891,300	735,000	678,000	9,291,000	3,074,000	108,669,300
Mean	38,564,000	1,560,000	816,000	7,270,000	2,120,000	50,330,000
1972	81,262,000	794,000	1,582,000	20,900,000	2,500,000	107,038,000

Status of the 1972 Pacific Coast Groundfishery¹

TRAWL LANDINGS

Pacific Coast trawl landings of groundfish by American and Canadian fishermen were 158.7 million pounds in 1972 (Figure 1). This amount was up 18.1% from 1971.

A look by region along the entire coast reveals the following pattern. In 1972 as in previous years, there was no significant domestic trawl fishery for groundfish operating out of Alaskan ports (Table 1). Washington's landings were 42.1 million pounds, down slightly from 1971. Oregon's landings were 20.9 million pounds, similar to 1971. Trawl landings of groundfish in California totalled a record high 54.0 million pounds in 1972. The combined catch of all 4 States was 117.0

million pounds in 1972. In British Columbia the total catch was 41.7 million pounds, up 30% from 1971. A major factor in the 1972 Canadian landings was the dominance of Pacific cod.

TABLE 1. Total trawl landings, 1971 v. 1972 in 1,000's of lbs.

Region	1971	1972	% Change
Alaska	negligible	negligible	—
Washington	43,219	42,071	-2.7
Oregon	20,463	20,924	+2.3
California	38,545	54,000	+40.1
Total U.S.	102,227	116,995	+14.4
British Columbia	32,089	41,692	+29.9
Total (U.S.—Can.)	134,316	158,687	+18.1

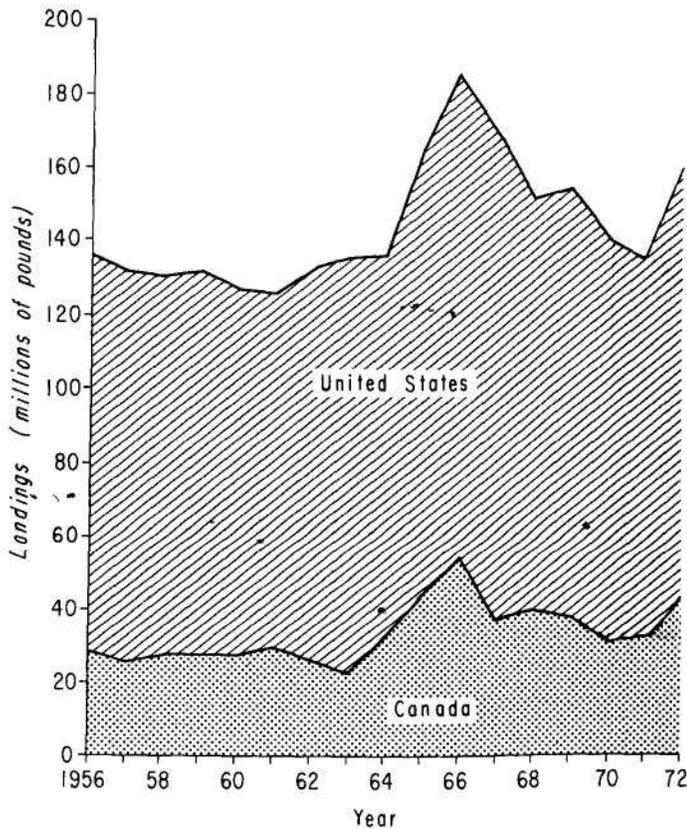


FIGURE 1. Pacific Coast trawl landings of the United States and Canada.

¹ Except halibut fishery which is under the jurisdiction of the International Pacific Halibut Commission. Beginning in 1972 this report was expanded to include groundfish catches by longlines and bottomfish pots.

A capsule look at the status of landings of the most important foodfish species comprising the trawl catch by American and Canadian fishermen reveals the following information (see Figure 2 for landing trends).

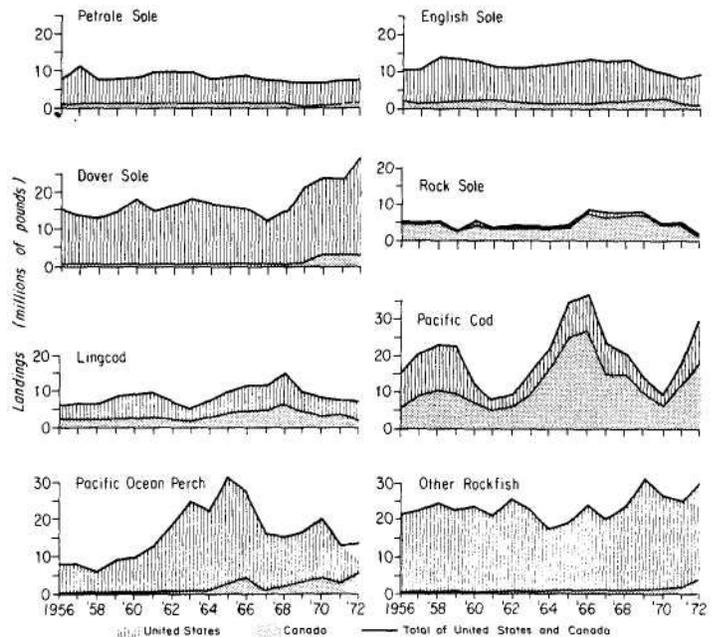


FIGURE 2. Pacific Coast trawl landings by major species or group.

Pacific Cod (*Gadus macrocephalus*)

Pacific cod landings for 1972 were 29.4 million pounds, reflecting an increased abundance of this species (Table 6). American landings in Washington and Oregon were 10.4 million pounds up 70% from 1971. Pacific cod landings in British Columbia were 19.0 million pounds up 73% from 1971. The importance of this species in British Columbia landings is indicated by the fact that it comprises slightly over one-half of all the groundfish landed for foodfish utilization.

TABLE 6. Pacific cod trawl landings, 1971 v. 1972 (in 1,000's of lbs. foodfish use only)

Region	1971	1972	% Change
Alaska	—	—	—
Washington	5,615	9,305	+65.7
Oregon	483	1,069	+121.3
California	—	—	—
Total U.S.	6,098	10,374	+70.1
British Columbia	10,996	19,013	+72.9
Total (U.S.—Can.)	17,094	29,387	+71.9

Lingcod (*Ophiodon elongatus*)

The 1972 lingcod landings by trawlers were 8.1 million pounds, down 3% from 1971 (Table 7). Lingcod landings were up in California and Oregon but were down in Washington and British Columbia.

TABLE 7. Lingcod trawl landings, 1971 v. 1972 (in 1,000's of lbs. foodfish use only)

Region	1971	1972	% Change
Alaska	—	—	—
Washington	1,984	1,481	-25.4
Oregon	1,281	1,349	+5.3
California	1,651	3,000	+81.7
Total U.S.	4,916	5,830	+18.6
British Columbia	3,427	2,288	-33.2
Total (U.S.—Can.)	8,343	8,118	-2.7

Pacific Ocean Perch (*Sebastes alutus*)

Pacific ocean perch landings were 14.5 million pounds, up 13.6% from 1971 (Table 8). Landings in Washington were up slightly; however, Oregon landings dipped to a new low of 602,000 pounds. Total American landings were 9.4 million

pounds. Pacific ocean perch landings in British Columbia rose substantially to 5.1 million pounds.

TABLE 8. Pacific ocean perch trawl landings, 1971 v. 1972 (in 1,000's of lbs. foodfish use only)

Region	1971	1972	% Change
Alaska	—	—	—
Washington	8,074	8,685	+7.6
Oregon	1,649	602	-63.5
California	112	100	-10.7
Total U.S.	9,835	9,387	-4.6
British Columbia	2,947	5,130	+74.1
Total (U.S.—Can.)	12,782	14,517	+13.6

Other Rockfish (*Sebastes* and *Sebastes* species)

The "other rockfish" category comprises all rockfish species other than Pacific ocean perch and some associated deep water species landed incidentally with ocean perch. Landings of "other rockfish" were 31.1 million pounds in 1972, up 27.0% from 1971 (Table 9). American landings of "other rockfish" were up in all 3 States to a total of 27.7 million pounds. British Columbia landings at 3.4 million pounds were almost twice those of 1971.

TABLE 9. Other rockfish trawl landings, 1971 v. 1972 (in 1,000's of lbs. foodfish use only)

Region	1971	1972	% Change
Alaska	—	—	—
Washington	10,525	10,678	+1.5
Oregon	3,404	4,057	+19.2
California	8,858	13,000	+46.8
Total U.S.	22,787	27,735	+21.7
British Columbia	1,716	3,393	+97.7
Total (U.S.—Can.)	24,503	31,128	+27.0

LONGLINE LANDINGS

Longline landings of groundfish species are mostly from catches taken incidental to the halibut fishery. A total of 3.0 million pounds was landed by American fishermen in 1971 (Table 10). Sablefish and rockfish were the major components of these landings. British Columbia line landings in 1971 amounted to 3.5 million pounds. The major species in the Canadian catches was lingcod; however, an unknown proportion of this catch was taken by troll and handline gear.

An extended period of high water in June and early July, as well as nitrogen related losses of chinook, contributed to the low harvest.

Approximately 17,660 steelhead were harvested in 1971 compared to 20,681 in 1970. An estimated 16,569 anglers fished for steelhead but only 6,205 were successful.

Oregon

The Oregon sport catch of salmon and steelhead in 1971 was estimated to be 661,228 fish, of which 463,679 were salmon and 197,549 were steelhead. The numbers of salmon taken set a record, exceeding the 1967 catch of 456,896 salmon. The steelhead catch was also a record, exceeding the 1966 catch of 168,083 steelhead.

A total of 360,563 anglers received Oregon's salmon and steelhead license. Only 53% were successful in catching fish; 20% (73,131) reported they did not fish, and 26% (95,090) reported they fished without success. When all anglers who fished are considered, the average catch per angler per year was 2.3 fish; but for those anglers who actually caught salmon or steelhead in 1971, the catch-per-successful angler per year was 3.44 fish. Approximately 67% of the anglers who fished caught all of the fish.

The Oregon off-shore salmon fishery included 258,875 angler trips to harvest 321,005 salmon (306,110 coho and 14,895 chinook) at a rate of 1.24 salmon per angler trip.

California

California ocean salmon anglers landed a record 255,642 salmon in 1971. This is well above the previous record of 199,000 salmon landed in 1955. The recent (1961-1970) 10-year average is 116,000 fish. In 1970, California ocean sport landings were 163,000 salmon.

The breakdown by species was 188,221 chinook and 67,421 coho. Both landings set records. The previous high chinook catch was in 1955 when 184,000 chinook were landed by ocean anglers. The old record for coho was 40,000 set in 1968. In 1970, 148,000 chinook and 15,000 coho were landed by anglers.

Compiled by Jerry Mallet, Idaho Fish and Game Department

Other Contributors:

Howard Metsker, Alaska Department of Fish and Game
 Gene Nye, Washington Department of Fisheries
 Cliff Millenbach, Washington Department of Game
 James Phelps, Oregon Game Commission
 Patrick O'Brien, California Department of Fish and Game

TABLE 1. Salmon and steelhead sport catch in 1971

State	Anglers	Chinook	Coho	Pink	Other salmon	Steelhead	Total catch	Fish/angler per year
Alaska	----*	14,270	50,500	11,700	22,305	1,200	99,975	----
California ¹	unavailable	188,221	67,421	----	----	unavailable	255,642	----
Idaho	21,661	3,560	----	----	----	17,661	21,221	0.98
Oregon	287,432 ²	128,676	335,003	----	----	197,549	661,228	2.30
Washington	656,847 ³	313,399	845,735	39,548	146,136 ⁴	289,291	1,634,109	2.49
Total		648,126	1,298,659	51,248	168,441	505,701	2,672,175	

*Data not received.

No freshwater data included.

Total anglers who fished.

Composed of 511,200 salmon anglers and 145,647 steelhead anglers, including an unknown number who may have fished for both. 4

Composed of 232 other salmon caught in salt water and the total freshwater catch of 145,904 salmon for which there was no species breakdown.

average of 4.7 million pounds. The Columbia River, Newport, and Coos Bay areas had good fishing during June and July, but catches dropped off drastically during August and September. Brookings' catches were poor all year.

California's troll coho landings for 1972 were 1.2 million pounds round weight and were the lowest in a decade. The 1972 harvest was far below the 1971 landings of 3.7 pounds which was the third best annual total on record. The 10-year average of troll caught coho is 2.0 million pounds.

Troll Pink Fishery

The Alaska troll fishery landed about 550,000 pounds round weight of pinks in 1972. This was above the 1971 total of 470,000 pounds round. The pink salmon are caught

incidental to chinooks and cohos. Troll pink landings in British Columbia totalled 3.1 million pounds, about half of the 1971 total. Washington's pink troll landings totalled 12,000 pounds round weight during 1972. Oregon troll pink landings for 1972 were only 132 pounds round weight. All but about 20 pounds were landed in Florence. California's pink troll landings were 180 pounds during 1972.

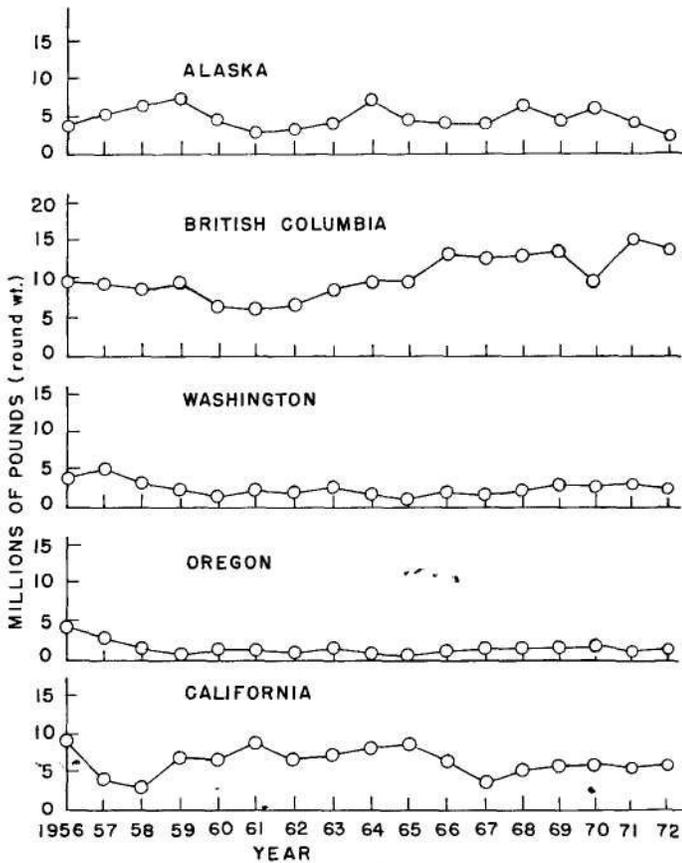


FIGURE 2. Annual troll chinook salmon landings by area, 1956-1972.

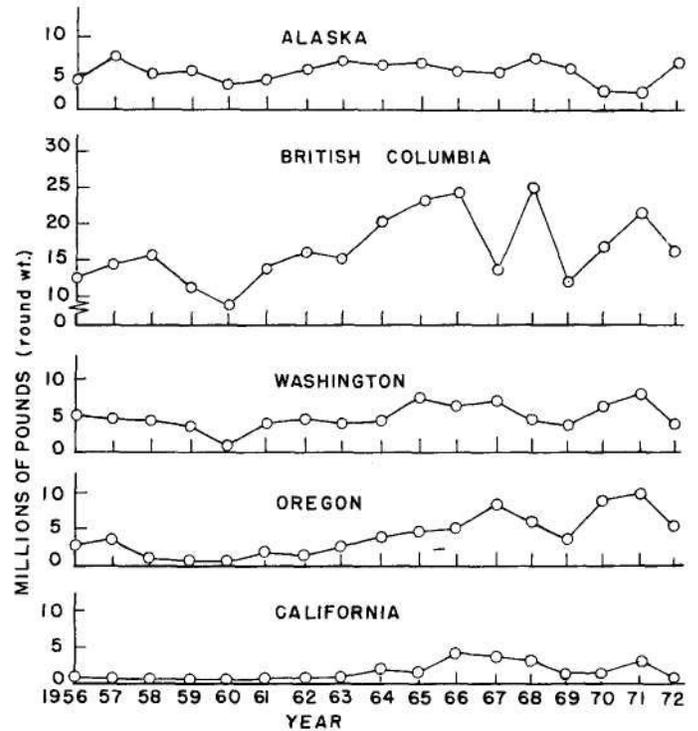


FIGURE 3. Annual troll coho salmon landings by area, 1956-1972.

Compiled by Jerry Mallet, Idaho Fish and Game Department

Other Contributors:

R. Allen Davis, Alaska Department of Fish and Game
R. Roberts, Canada,

Department of the Environment, Fisheries Service
Sam Wright, Washington Department of Fisheries
Robert McQueen, Fish Commission of Oregon
Patrick O'Brien, California Department of Fish and Game

selective breeding can be anticipated. Should fishery science produce highly desirable oysters for specialized markets through selective breeding, oyster hatcheries could become indispensable. If selectively bred oysters were allowed to reproduce naturally, their progeny might revert to the "wild" type after several generations.

Other molluscs which show potential for mariculture include clams, mussels, scallops, and abalone. Mussels and most bay clams presently lack sufficient demand as luxury seafoods, to warrant investment of capital and labor for mariculture. The razor clam, abalone, and scallop are luxury seafoods. Although these molluscs enjoy strong markets, there are many biological and technological problems to be solved before mariculture can become economically feasible. Hatchery methods have been developed for abalone, but growth is slow. The Japanese are growing scallops in cages, and possibly this technology will find application on the Pacific Coast.

Electric utilities are encouraging exploratory research on the development of "factory" systems for molluscs and other seafoods. Oysters grow rapidly in heated seawater, and there may be promising opportunities to grow selectively bred oysters and other seafoods for market in factory systems which utilize waste heat from coastal thermal power plants.

Finfish: There are emerging opportunities for commercial salmon and trout farming which include ocean ranching and feedlot rearing. The two methods could complement one another, since an ocean ranching industry might become the primary source of seed stock for feedlot operations.

Surplus juvenile salmon and trout transferred from a hatchery to a feedlot are held in captivity and fattened for market on artificial foods manufactured largely from fish processing wastes. Feedlots consist of floating pens, submerged cages, impoundments with tide gates, fenced embayments, or raceways receiving pumped water.

Commercial feedlot rearing is being pioneered by private firms and Indian tribes in Puget Sound and by a private firm on Yaquina Bay, Oregon. The Oregon firm is also planning to engage in ocean ranching as a means to obtain seed stock for feedlot operations. There is also considerable interest in feedlot rearing of salmonid fishes in Japan and Europe, especially in Norway.

A major problem with feedlot rearing of salmon and trout is to obtain an adequate supply of foodstuffs. Much offal from fish processing plants is already being converted into food for coho and king (chinook) salmon and steelhead trout raised at government hatcheries. Future expansion of a feedlot industry would provide new opportunities for Pacific Coast fish processing plants to convert their wastes into foodstuffs for salmon and trout. Opportunities could also arise to use waste heat from thermal-electric stations and various industrial processes to create environmental conditions favoring rapid growth of salmon and trout in feedlots.

An ocean ranching industry on salmon and trout would contribute additional fish to common property commercial

and recreational fisheries. Income of private hatcheries would be derived from adult fish which escape common property fisheries to be captured in traps located on the hatchery stream. We can only speculate if enough hatchery fish will survive natural and fishing mortality to compensate private hatchery operators fully. Ocean ranching is presently being evaluated by private firms in California and Oregon and by Indian tribes in Washington. Coho and chum salmon are the principal species presently being raised by private hatcheries. In some instances (particularly with chum and pink salmon) surplus hatchery fish escaping the common property fisheries are likely to be mature (in advanced stages of maturation) and no longer in prime condition for canning. Mature fish, nevertheless, retain considerable market value for caviar, smoking and drying, animal food, and bait. Even the carcasses of artificially spawned fish can be used for animal food and bait, so all adults returning to a hatchery, including carcasses of brood fish, have potential markets.

The emergence of ocean ranching and feedlot systems for raising salmon and trout has been a stimulus to research and development on salmon and trout husbandry. New techniques for raising high quality salmon fry in gravel incubation hatcheries are being tested with pink and chum salmon at a dozen locations along the Pacific Coast. Additional gravel incubation hatcheries are planned in Alaska for tests with sockeye salmon. Development of improved artificial diets and prophylactic methods for control of disease, such as Vibriosis, is receiving increased attention at university and government laboratories. Genetic research on salmon is gaining momentum, which is long overdue. Innovations on saltwater pen rearing are emerging which show considerable promise for substantial reductions in costs over conventional hatcheries. Many more examples of technological progress on salmon and trout husbandry will ensue should ocean ranching and feedlot rearing become economically successful industries.

Although salmon and trout species will probably dominate fish mariculture on the Pacific Coast for many years, technology should begin to emerge with other species as supplies of wild stocks dwindle and/or market demand increases.

David W. Jamison, panelist

My subject is "Mariculture and Aquatic Land Use Allocation." Mariculture is one of many traditional uses of marine waters. In the past, allocation of space for these uses has been on an informal basis, using only biological and economic criteria. Today the intensity of use, especially from recreation and shoreline housing, has increased pressure for regulation to the point that some States, as well as the Federal Government, have enacted coastal zone management legislation. Such legislation is intended to set up machinery whereby aquatic space is allocated on the basis of public need, as well as environmental considerations.

First, let us review the general problem of aquatic land use allocation. Initially one has to become familiar with the

This is a new subject in Alaska. We do not have the knowledge at hand to judge whether mariculture has much future in Alaska. We do recognize that our waters are cold and that the growth rates of our cold-blooded animals and plants are slow. We have serious logistic problems and costs are extremely high. We also have certain legal barriers. Until very recently we had a constitutional provision that prohibited the creation of an exclusive right or special privilege of fishery in natural waters of the State. This has now been changed in order to promote the efficient development of aquaculture in Alaska. Then there is a lack of technology that inhibits the immediate application of mariculture and aquaculture techniques except in an experimental way.

However, there is room for optimism, too. We have to look for innovative ways of adapting mariculture to Alaskan conditions. The selection of the right species, or the right genetic stock might open up some promising possibilities. Certainly our logistic problems are going to be somewhat lessened as transportation facilities to and within Alaska continue to improve and expand. Our expanding marine highway system will possibly assist in this. As mentioned above, we recently had an amendment to our State Constitution relieving the legal barrier to the establishment of exclusive rights of fisheries. We do not yet have a body of laws to implement this, but we expect that some of our Legislators will come forward shortly with proposed laws. The state administration is also carefully studying the problem with the goal of developing appropriate implementing statutes and regulations.

Technology, of course, is presently a big problem. We have some salmon experiments currently underway involving gravel incubators and saltwater rearing of salmon. The saltwater rearing experiment seems to encounter new problems and headaches every day. Not only have we encountered disease problems at low water temperatures where no one expected them, but we found that some wild fish predators are able to eat through our synthetic nets and release our stock prematurely. We found that there are few places that meet our criteria ("i.e., access, shelter, freedom from ice, etc.) where we also have very reliable freshwater supplies.

During the period of transition from fresh to salt water, things are always critical. Some fish apparently adapt more quickly than others, resulting in differential growth rates. In the absence of facilities for grading these fish we very quickly get into cannibalistic problems within our own system. We have weather problems. We have had 4-foot seas and 2-foot swells going over the top of our holding pens in some places. We have debris problems. We don't know yet how our structures are going to hold up under heavy snowfalls and ice. It is possible that the winter will end without a single fish surviving.

There are many problems to overcome before we will be ready to manage mariculture of salmonid fishes. At this time I am somewhat less optimistic than Bill (McNeil) about being able to manage privately-owned stocks of fish that intermingle

with wild stocks. Suppose, for example, that some of the native corporations wanted to go into saltwater rearing of salmon with the "open system". The fish are reared to a certain size (for example, 10 or 40 fish/lb.), they are turned loose, and a high return is expected subsequently. These fish will intermingle with wild fish. The natives who own the regional corporation and the facilities involved in the enterprise are going to be concerned about their returning mature fish being taken in the commercial fishery. They are going to begin giving us advice on how to manage the wild runs in order to minimize the incidental take of their fish. We have enough problems in that area already!

As far as the "closed system" is concerned, I think at the present time that there is little hope of Alaskans competing with more southerly operations. Food, shipping, and labor costs are so much higher in Alaska, and the waters are colder. I doubt that Alaska would be competitive. We do have an availability of space; and we have a willingness to experiment and an open mind on the subject, but would like to hold this in proper relationship to the other responsibilities that we have.

Emanuel H. LeMier, panelist

I will discuss "Administration of Washington's New Mariculture Law." The Washington Department of Fisheries has printed handouts pertaining to policies and procedures regarding salmon aquaculture in the State of Washington. Those guidelines would apply basically to shellfish or other animals also. The 1971 Legislature passed a law, giving authority to the Director of Fisheries to provide for this type of program. The law requires that a permit shall be obtained from the Director of Fisheries of the State of Washington. A separate permit will be required for each site that an operator controls. A \$100 license fee is required for each county. However, if there were three sites in one county, only one \$100 license would be needed, but a state permit would have to be obtained for each site.

"there are 12 steps to obtaining a permit. These require considerable background regarding the purpose of the facilities and their general operation. In administering the program, there has not been a great number of problems. The Department of Fisheries has had several applicants, but today there are actually only two licensed aquaculture programs. One of these is Domsea-Ocean Systems, a Union Carbide subsidiary, which is located in Puget Sound; most people are familiar with it. The National Marine Fisheries Service has worked with Domsea, and I believe it has received some Sea Grant money. Domsea has two permits for fresh water and one for its marine site. Another license is Mariculture Northwest, Inc. It has a freshwater site in Western Washington near Chehalis, and a saltwater site on Puget Sound. Domsea and Mariculture Northwest are both engaged in rearing salmon.

Bay Center Mariculture, located on the southwest coast of Washington near Willapa Bay, has applied for an aquaculture permit. Its initial program has been raising Pacific oyster seed. To our knowledge, this has been technically successful, al-

fish flesh. There is a need for a better diet, particularly where the animals are fed in salt water. The salmon aquaculture programs are in competition for food with the fish cultural operations of the States. There are only two companies manufacturing Oregon Moist Pellets, and demand is almost exceeding supply. Herring meal is an important ingredient of pellets, and is bringing a premium price that will probably increase. Other base ingredients may have to be considered, since competition for animal feed is very critical and is accelerating.

Stock identification, harvest control and food are presently major areas that the Department is looking at from an administrative standpoint. The application forms, et cetera, are processed by the Hatcheries Division of the Washington Department of Fisheries. The Aquaculture Program Manager handles all the applications, and receives assistance from other members of the Department's staff.

At the conclusion of the scheduled panel presentations. Dr. William A. Kennedy, Fisheries Research Board of Canada, was asked to comment on sablefish culture at Nanaimo; and C. Dale Snow, Fish Commission of Oregon and Edward C. Greenhood, California Department of Fish and Game were asked to comment on mariculture in their respective States.

William A. Kennedy

One needs to know something of the life history of the blackcod or sablefish (*Anoploma fimbria*) to understand the project. Essentially, these fish live very deep, at the outer edge of the continental shelf and on the continental slope when they are commercial size. But when they are small (about 1/2 years old), many come inshore and can be easily caught with hook and line by youngsters off the piers of many fishing ports. For instance, three years ago, juvenile sablefish were so plentiful at Port Hardy, Vancouver Island that they jammed gear causing commercial fishermen to stop fishing.

Because the commercial-size fish occur very deep offshore and are therefore hard to catch in Timbers I investigated this question: Is it possible to impound young fish, 1/2 to 1 pound in weight at the time they are caught inshore, and to rear them to commercial size? From a biological view, the answer is yes; sablefish can be raised to commercial size in tanks or in floating fish pens. A growth rate of 1/3 pound per month can be attained. Canadian smokers seem to want sablefish that are not less than 6 pounds dressed, which is about 9 pounds in the round. To raise a fish from 1 pound to 9 pounds at a growth rate of 1/3 pound per month requires 2 years. On the average, reared-fish will reach 9 pounds in 2 years; some will grow slower and some will grow faster.

Sablefish can be fed a variety of inexpensive marine fish such as dogfish and herring. I am convinced that they could be

fed any cheap fish, including offal. The feed is frozen into blocks, then cut on a bandsaw into 1-inch or 2-inch cubes. On such a diet the sablefish will put on 1 pound for every 5 pounds of feed. The mortality rate is relatively low. This means that since each sablefish has to gain 8 pounds, 40 pounds of feed are required plus a small allowance for mortality. If it takes 50 pounds of feed to raise a juvenile sablefish to 9-pound size, then at a recent selling price of 50¢ a pound dressed each fish would be worth \$3.00, and the cost of feed would be 50¢ if the feed could be gotten for 1¢ a pound. I am not sure how a commercial operator could get juvenile fish inexpensively. I was told originally that it is very easy to catch them, but I found it is not quite that simple. There are problems, but competent commercial fishermen should be able to solve them.

For mariculture in British Columbia, the most attractive group of fish are the salmonids. They could be reared in the Gulf of Georgia where water temperatures are relatively high. In contrast, sablefish require low temperatures; anything over 50° Fahrenheit is too warm; they will not feed, except when very small; they must not be grown in water exceeding 50°F. This means that a good deal of the British Columbia coast, which would not be suitable for salmonids from a mariculture point of view because of low temperatures, is presumably suitable for sablefish culture if the problems can be worked out.

C. Dale Snow

As one of the panel members mentioned earlier, Oregon is estuarine-poor. There are 16 estuaries with a total tidal acreage of approximately 42,000 acres, excluding the Columbia River. This could be dropped into Willapa Bay, and it would be lost. The future of mariculture in Oregon is a problem of allocation.

As an example of some of the problems related to this, during 1971 in the period of March through September, over 1 million man-hours were spent by recreational users for non-salmonid species such as marine fishes, clams, crabs, and other invertebrates. Limited estuarine area and intensive use will create problems in allocation of lands for mariculture, and my thoughts on this are not necessarily those of the Fish Commission. Oregon has been looking from the research end from a standpoint of augmenting free enterprise of sport and commercial fisheries, and not so much from the aspect of an enterprise going in and taking up areas in the estuary and having exclusive use. This will become a policy matter in the future, and it will be decided at a high level. Oregon has been working primarily with invertebrates. A lot of this work has been in cooperation with Oregon State University. A few years ago, the Fish Commission of Oregon collaborated with Oregon State University in a cooperative program on the rearing of oysters, which progressed to a point where it was decided that it was time to end the joint effort and let Oregon State continue the work. The OSU workers were able to spawn the native oyster (*Ostrea lurida*)—which Oregon's neighbors to the north improperly call "Olympia"—and the Pacific Kumamoto

lease between the Department and this company was negotiated, specifying a minimum rental of \$10 an acre. All leases are awarded on a bid basis. The lease was for a 5-year period, with two 10-year renewal options. Rather interestingly, a percentage clause was included which places the State in a position to obtain a percentage of the gross profits after a certain minimum level of gross earnings has been reached.

California has a shellfish laboratory at Granite Canyon, south of Monterey. The purpose of this laboratory is to develop mass culture techniques for shellfish. Experimentation has been initiated for the spot prawn (*Pandalus platyceros*), Pacific oyster (*Crassostrea gigas*), abalone (*Haliotis* species), and market crab (*Cancer magister*), with some successes.

Discussion

Robert E. Loeffel, Fish Commission of Oregon, Newport, stated that Oregon's counties have authority to zone. This could include mariculture.

John Glude, in reply to Dale Snow's request for clarifica-

tion of Japan's heavy subsidization of mariculture, commented that the Japanese recognize that there is a limit to high-seas production and they have put a tremendous amount of money into development of techniques for mariculture along the coast. This is noticeable because funding of prefectural laboratories in Japan has increased greatly in contrast to stable funding of national laboratories. The prefectural laboratories are working on practical applications of scientific knowledge for use along the coast. For example, several prefectural hatcheries are rearing seed abalone, which are sold to local fishermen's associations at somewhere between 20-40% of cost. The associations plant the juvenile abalone in open water and harvest them when they have reached commercial size. In Japan the main subsidy is in the development of technology, instrumentation, and engineering aspects of mariculture. Japan has gone through a period of experimentation, and has standardized the size and shape of floating net enclosures so that a net can be purchased which fits a specific framework. The United States hasn't reached this stage. Here the Government could well contribute funds for resolution of problems such as disease control, nutrition, and engineering applications, so that private industry would have a reasonably good chance of succeeding in mariculture.