21st Annual Report of the

PACIFIC MARINE FISHERIES COMMISSION

FOR THE YEAR 1968

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

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FOR THE YEAR 1968

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 and 766 of the 80th and 87th Congresses of the United States Assenting Thereto.

Respectfully submitted,

PACIFIC MARINE FISHERIES COMMISSION

JOHN P. AMACHER	CHARLES A. POWELL
HAROLD F. CARY	AUGIE REETZ
JOSEPH *1:* EOFF	WALTER T. SHANNON
DWIGHT S. HAWLEY	JOSEPH W. SMITH
GEORGE L. HIBBARD	McKEE A. SMITH
R. J. HOLMES	VINCENT THOMAS
EDWARD G. HUFFSCHMIDT	T. E. THOMPSON
ARLIE JOHNSON	* THOR C. TOLLEFSON
HAROLD E. LOKKEN	JAMES WHITTAKER
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INTRODUCTION

Among the 21 years of the Pacific Marine Fisheries Commission's development and history, 1968 was a good year. On July 1 the State of Alaska became the fifth member of the Commission. Thus a long-time dream of having the whole family of Pacific Coast fishermen and state fishery agencies represented in one organization, while maintaining a good relationship with our neighboring Canadian fishery folk, was finally realized.

Alaska's enabling act provides that the Governor shall appoint three members to the Commission, and the appointments shall be confirmed by the Legislature in joint session. One member must be the administrative or other officer of the Alaska Department of Fish and Game charged with the conservation of the State's marine fisheries resource; another member must be from the Legislature's Committee on Resources; and another member must be a citizen of Alaska who has a wide knowledge of and an interest in marine fisheries. Following the appointment of fish and game administrator Augie Reetz, legislator Charles A. Powell, and fish processor T. E. Thompson as members of PMFC, the new members recommended seven Alaskans for appointment to PMFC's Advisory Committee. The Commission on November 21 at its Annual Meeting confirmed Advisers Cotant, Eliason, Engdal, Meacham, Rettig, Riddell and Wells.

The Pacific Coast commercial and sport fisheries in general had a good year. All-time catch records were established for landings of pink shrimp from all west coast waters, Dungeness crab in Alaska, and albacore.in Oregon. Although the troll salmon and the groundfish landings were down from the records of 1966, they were still well above the previous 10-year averages. The same thing was essentially true for the rapidly growing sport fisheries for salmon and albacore. It is gratifying to be able to report that most major Pacific ^coastal fisheries remain in good condition at this writing. However, the depletion of Pacific ocean perch and the declining abundance* of halibut caused by foreign fleets trawling off the west coast of North America are grave matters of continuing concern, as is* our inability to establish profitable domestic fisheries for the abundant west coast anchovy and hake resources.

The establishment of water quality standards and their submission by all the Pacific Coast States to the U. S. Department of Interior for approval in 1968 were important milestones in the struggle against pollution. The standards are considered generally to be sufficiently rigorous to prevent harm to coldwater fishes, but adequate funding of the Clean Water Restoration Act of 1966 (P.L. 89-753) is urgently necessary to permit accomplishment of the Act's intent.

Concern by conservation agencies in recent years over the probable or possible detrimental effects of thermal effluents on the aquatic environment began to receive consideration in 1968. For example, Portland General Electric Company announced plans to construct cooling towers at its proposed nuclear electric plant on the Columbia River, about 50 miles downstream from Portland, Oregon. In California, most of the thermal electric steam plants will be established on the coast, where great volumes of ocean water are available to dissipate the heat from the plant discharges. PMFC, because of division and indefiniteness of responsibilities among agencies regarding the licensing of thermal electric plants, has and will continue to advocate licensing of thermal electric steam plants by a single federal agency, responsible for the maximum protection of the public's interests.

Another notable milestone in conservation during 1968 was the passage of a Congressional Act establishing a National Wild and Scenic Rivers System. Among the eight "immediate" wild rivers named by Congress on October 2, 1968 were 84 miles of Oregon's Rogue River extending from Applegate River to Lobster Creek Bridge; the middle fork of the Salmon River in Idaho; and the middle fork of the Clearwater River which includes the Lochsa and Selway Rivers also in Idaho.

However, 1968 was not without fishery problems. At this writing, methods for effective and harmonious management of non-Indian sport and commercial fisheries and Indian fisheries are still being sought for optimum utilization and enhancement of salmon and steelhead trout resources.

The anadromous fish resources of the Columbia River were dealt a devastating blow in the summer of 1968 when thousands of summer-run chinook salmon and other salmonid fishes died prematurely while on their spawning migration because of the improper functioning of fishways initially at the newly completed John Day Dam. Similar losses to the salmon and steelhead resources of this great river, which contributes to fisheries from Alaska to California, have occurred at times in the past as other dams were erected and brought into operation and unquantified losses of both adult and juvenile salmonids continue to occur annually due to the existence and operations of dams. These losses represent an economic waste and an increased drain on the fishery resources. The surviving adult salmon and steelhead must reproduce at normal or above normal efficiency and the commercial and sport fisheries must be restricted increasingly to permit additional or needed escapement to the up-river spawning grounds for purposes of rebuilding the fish populations to pre-loss levels. Even if the pre-loss levels are attained, the fish that died unharvested or unspawned remain an economic loss.

The following changes in the roster of Commissioners occurred. Alaska's entry into the Compact added three new Commissioners. In California, Harold F. Cary succeeded Ray Welsh; in Oregon, Joseph I. Eoff succeeded Leonard N. Hall, and James Whittaker succeeded the late Wayne E. Phillips. Commissioner Leonard Hall's resignation from the Fish Commission of Oregon ended 20 years of continual service to PMFC which began with Leonard's appointment to the newly formed Advisory Committee in 1948. Wayne E. Phillips' death on June 4, 1968 removed a hard-working and respected member of the Oregon Game Commission from PMFC. He served both Commissions devotedly for six years.

ADMINISTRATION

Personnel

The following served as Commissioners during 1968:

Alaska

Charles A. Powell, Kodiak
Augie Reetz, Juneau
T. E. Thompson, Petersburg

California

Harold F. Cary, San Diego
W. T. Shannon, Sacramento, First Vice-Chairman
Vincent Thomas, San Pedro

Idaho

R. J. Holmes, Twin Falls
Arlie Johnson, Boise
John R. Woodworth, Boise, Chairman

Oregon

John P. Amacher, Winchester Joseph I. Eoff, Salem, Secretary George L. Hibbard, Oregon City Edward G. Huffschmidt, Portland J. Pat Metke, Bend Joseph W. Smith, Klamath Falls McKee A. Smith, Portland James Whittaker, Pilot Rock

Washington

Dwight S. Hawley, Seattle Harold E. Lokken, Seattle Thor C. Tollef son, Olympia, Second Vice-Chairman

The Advisory Committee functioned under the "ADVISORY-RULES AND PROCEDURE" (Resolution #27, 1964; revised 1968) and consisted of the following members

Alaska

J. B. Cotant, Ketchikan
Richard I. Eliason, Sitka
Ben Engdal, Wrangell
Charles H. Meacham, Juneau
R. L. Rettig, Anchorage
Norman A. Riddell, Juneau, Section Chairman
Charles Wells, Cordova

California

Charles R. Carry, Terminal Island, Section Chairman
Clifton D. Day, San Francisco
Thomas R. Gardiner, Oakland
John P. Gilchrist, San Francisco
Paul McKeehan, Santa Clara
Anthony Nizetich, Terminal Island
Charles V. Williams, Crescent City

Idaho*

William B. Durbon, Moscow, Chairman Ray Sims, Bonners Ferry, Deputy Chairman Glenn Stanger, Idaho Falls

Oregon

David B. Charlton, Portland, Section Chairman
Charles S. Collins, Roseburg
Harold C. Gramson, Warrenton
Charles F. Henne, Salem
J. F. Hoagland, Astoria
Andrew J. Naterlin, Newport
Arthur Paquet, Astoria

Washington

Robert E. Colwell, Seattle
Charles F. Mechals, Seattle
Nick Mladinich, Tacoma, Section Chairman
Bjarne Nilsen, Westport
Jesse Orme, Seattle
John N. Plancich, Anacortes
Earl Engman, Tacoma

Alternates were approved for those members who were unable to attend the annual meeting. These alternates serve only during the designated meeting.

The permanent staff comprised:

Leon A. Verhoeven, Executive Director
Gerald L. Fisher, Treasurer
Mrs. Evelyn Korn, Office Secretary

They were assisted for short periods by:

Alphonse Kemmerich, Consultant J. T. Barnaby, Consultant

Temporary clerical employees were utilized as needed.

Conferences and Meetings

The intergroup relationships of the Pacific Marine Fisheries Commission call for frequent participation in conferences and meetings. In furtherance of this function, the Executive Director attended the following as a representative of the Commission during 1968:

Committee for Clean Water, Vancouver, Washington, January 12, discussion of potential thermal pollution and other fishery problems.

Oregon Chapter, American Fisheries Society, annual meeting, January 19-20, Oregon State University, Corvallis.

International Pacific Halibut Commission, Seattle, January 23.

Bureau of Commercial Fisheries' Ad Hoc Committee on Surveillance (on foreign fishing), Seattle, February 8.

Pacific Northwest River Basins Commission, Seattle, February 13.

Oregon Division, Izaak Walton League of America, Winter Directors' Meeting, Portland, February 17, discussion of nuclear power vs. fisheries.

National Fishermen and Wives, Inc., 6th Annual Meeting, Seattle, March 9-

Pacific Northwest River Basins Commission, Vancouver, Washington, March 22.

Conference on the Future of the United States Fishing Industry, Seattle, March 24-27, sponsored by University of Washington, *et d.*

Fisheries Committee, Pacific Northwest River Basins Commission, Vancouver, Washington, April 4, organizational meeting.

Bureau of Commercial Fisheries Ad Hoc Committee on Surveillance, Olympia, April 18.

Pacific Northwest River Basins Commission, Portland, April 26.

Meeting of fishery administrators from Pacific Northwest fish and wildlife agencies, Portland, May 6, discussion of thermal pollution.

Federal Water Pollution Control Administration and Oregon Committee on Natural Resources, Newport, Oregon, May 9, public meeting regarding National Estuarine Pollution Study.

Committee for Clean Water, Portland, May 24, nuclear power vs. Columbia River salmon.

National Symposium on Thermal Pollution, Part I, The Biological Considerations, sponsored by Federal Water Control Administration and Vanderbilt University, Portland, June 3-5.

Bureau of Commercial Fisheries' Ad Hoc Committee on Surveillance, Astdria, June 20.

Meeting between Director Harold E. Crowther, Bureau of Commercial Fisheries, and persons interested in fisheries, Astoria, July 24, discussion of domestic fishing problems.

Bureau of Commercial Fisheries' Ad Hoc Committee on Surveillance, Seattle, July 25.

Dedication of Oregon Fish Commission's salmon hatchery on South Santiam River, August 2.

Bureau of Commercial Fisheries' Ad Hoc Committee on Surveillance, Seattle, September 13.

Pacific Northwest River Basins Commission, Jackson, Wyoming, September 16-17.

Bureau of Commercial Fisheries Ad Hoc Committee on Surveillance, Seattle, October 11.

Pre-annual meeting discussions of Oregon section of PMFC Advisers, Portland, October 29; and of Washington section of PMFC Advisers, Seattle, November 2.

U. S. Section, International Trawl Fishery Committee, Coeur d'Alene, November 19-

International Trawl Fishery Committee (composed of Pacific Coast Canadian and U. S. fishery agency personnel), Coeur d'Alene, November 19-

Pacific Northwest River Basins Commission, Vancouver, Washington, December 5-6.

Coastal States Conference on a Multiple Use Approach to Ocean Mining Law, Portland (Attended December 12 only).

Bureau of Commercial Fisheries' Ad Hoc Committee on Surveillance, Seattle, December 20.

Administrative and Service Activities

The Executive Director continued to serve in ex officio status as Secretary of the Pacific Salmon Inter-Agency Council and observer on the Council's Technical Committee. In compliance with a request of the Second Governors' Conference on Pacific Salmon, he compiled and distributed items on salmon management and research to members of the Technical Committee. He has continued to provide liaison between the Canadian and United States sections of international committees created to resolve questions concerning trawl fisheries and chinook and coho salmon. It is expected that an exchange of scientific information between Canadian and United States members of the Working Group of the Informal Committee on Chinook and Coho will result in reports on available biological information, status of present stocks, and recommendations for cooperative action.

The annual meeting to allocate fin-marks for salmon and steelhead trout, at Portland on February 6, 1968, was attended by representatives from the University of Washington, the U. S. Fish and Wildlife Service, and the fish and game departments of the Pacific Coast States. A 46-page listing of all authorized marks for 1968 was prepared and distributed to all interested parties.

As in previous years the staff again secured specific statistics concerning salmon and herring catches, propagation of salmon, commercial fishing regulations and their enforcement concerning salmon and herring in the States of Washington, Oregon and California. After consolidation, this material was forwarded to the International North Pacific Fisheries Commission via the Bureau of Commercial Fisheries and United States Section of INPFC.

As liaison officer for the United States Section, the Executive Director attended the ninth annual meeting of the Technical Subcommittee of the International Trawl Fishery Committee, in San Francisco on June 25-27, and chaired the tenth annual meeting of the International Trawl Fishery Committee of the Conference on Coordination of Fishery

Regulations Between Canada and the United States, in Coeur d'Alene on November 20. Canadian and United States agencies furnished statistics for the "Bottom or Trawl Fish" and for the "Crab and Shrimp" sections of PMFC's Data Series. A third section, "Albacore and Bluefin Tuna" is planned.

The Program for Compilation of Pacific Coast Salmon and Steelhead Catch Statistics of the Pacific Salmon Inter-Agency Council has made the preparation of a salmon-steelhead section of PMFC's Data Series unnecessary. PMFC's office acts as a clearing house for this program. The first report (Catch Statistics for 1965) was distributed at the annual joint meeting of the Pacific Salmon Inter-Agency Council and its Technical Committee on August 1 in Seattle. Similar data received for the Province of British Columbia and the West Coast States for 1966 and 1967 are being processed for general distribution via subsequent reports.

As the Council's secretary, the Executive Director is also coordinating the administration of a project to update the Salmon Compendium in cooperation with the Bureau of Commercial Fisheries and the University of Washington.

On July 7-9 at Washington, D. G, the Executive Director met with Executive Directors of Atlantic States and Gulf States Marine Fisheries Commissions, with Bureau of Commercial Fisheries personnel, and with various members of Congress to urge extension of the Commercial Fisheries Research and Development Act. The joint effort of these three Commissions resulted in the extension of the Act for four years from June 30, 1969. Collaboration between these three interstate marine fisheries commissions is important, because they not only represent 24 States, but the entire continental coastal area of the United States as well.

The paper entitled, "Summary of Progress on Pacific Oyster Mass Mortality Investigations, 1967-8," presented in Appendix 2 of this report, is the result of a cooperative study financed by the Bureau of Commercial Fisheries following the adoption of PMFC Resolution No. 11 of 1964. Likewise, the report on "Pprt.Sampling, Final Report, January 1966 - November 1968" also found in Appendix 2, presents the results of*a recent cooperative program between California and Oregon which has been supervised by California and financed by funds from Commercial Fisheries Research and Development Act and matching money from PMFC (see Resolution No. 1 of 1965).

On December 4 the Executive Director delivered a lecture on PMFC to the World Fishery Resources Class at Oregon State University in Corvallis.

The Staff was especially busy during 1968 preparing memoranda and letters to conservation and fishery agencies, Congressmen, and conducting the increasingly active program of PMFC. As a result, the orderly issuance of printed publications has lagged. However, every, effort will be made to complete and present, as soon as this report is distributed, the 19th and 20th Annual Reports for calendar years 1966 and 1967, respectively, and Bulletin 7 in 1969.

The Research Staff, at its annual spring meeting in Portland on March 19,1968 proposed that the Commission finance a technician to read otoliths of Pacific Ocean perch, petrale sole, and English sole as part of an age determination unit at the Bureau of Commercial Fisheries Laboratory in Seattle.

The Executive Committee at its first meeting of the year in Portland on May 21, with representatives from Alaska present, adopted or approved the following:

1. Operating budget for the year July 1, 1968 to June 30, 1969.
2. Proposed budget for the biennium July 1, 1969 to June 30, 1971.
3. Research Staff's proposal to hire a technician to be part of a federal-state unit for aging groundfish.
4. Scheduling a workshop on the troll salmon fishery.
5. Plans for the Annual Meeting at Coeur d'Alene, Idaho, November 21-22, 1968.
6. Instructions to the Executive Director to collaborate with the Assistant Director of the Fish Commission of Oregon in seeking advice from the Attorney General's Office of the State of Oregon in the drafting of a format that each member State could use as a basis for legislation to amend Article X of the Pacific Marine Fisheries Compact in order that the membership con tribution formula described in Resolution No. 9 of 1967 might be put into effect on July 1, 1969.
7. Instructions to the Executive Director to:
   a. Prepare another draft of the Commission's Objec tives and Courses of Action;
   b. Bring the Commission's Rules and Regulations up to date for reprinting as soon as possible;
   c. Seek extension of the Commercial Fisheries Research and Development Act which would expire on June 30,1969;
   d. Urge all pertinent Senators and Congressional Dele gates from the West Coast States to enact such legis lation as H. R. 8377 and S. 3212 that would reaffirm the rights of States to manage, regulate, and control fish and resident wildlife on all lands, including those owned by the Federal Government, with cer tain exceptions.

The technician for aging groundfish was hired on July 18 to be on the payroll of and supervised by the Washington Department of Fisheries which will be reimbursed by PMFC for expenses not to exceed $8,000 for one year. A report on the troll salmon workshop of August 20-21 in Portland was distributed to representatives of Canadian and United States federal and non-federal fishery management and research agencies or institutions who attended the workshop. This was followed by a panel discussion of salmon trolling at the Annual Meeting on November 21. The Commercial Fisheries Research and Development Act was extended for four more years, but Congress did not take final action on the States Rights bills referred to in 7(d) above.

COMMISSION ACTION

The 21st annual meeting of the Commission was highlighted by the introduction of three Commissioners from Alaska who were attending as official members for the first time. The 1968 conference in Coeur d'Alene, Idaho, was the second time the Commission had met in Idaho since that State had become a party to the Compact in 1963. Including official participants, approximately 150 persons registered during the course of the meeting on November 21 and 22, and the ancillary committee meetings on the two preceding days.

While the primary purpose of the annual meetings is to arrive at conclusions and recommendations affecting the fisheries of the Pacific Coast, other matters of internal concern require consideration. Such subjects included:

i 1. The following alternates for Commissioners who were unable to be present were approved:

Clifton D. Day for Harold C. Cary (California)
Charles R. Carry for Vincent Thomas (California) P. W. Schneider for J. Pat Metke (Oregon)

2,. The following alternates for members of the Advisory Committee who were unable to attend were approved:

Ed J. Huizer for Charles H. Meacham (Alaska) Fred Phebus for Thomas R. Gardiner (California)
William Hill" for Charles V. Williams (California)
Leonard N. Hall for Andrew J. Naterlin (Oregon)
William Saletic for Nick Mladinich (Washington)

3. The Commission received and approved reports from the Executive Director and the Treasurer. The latter report is reprinted in a subsequent section of this report.

4. Mr. James C. Simpson, Chief of the Division of Fish eries, Idaho Fish and Game Department, and Chairman of PMFC's Research Staff, introduced the speakers who presented the fishery status reports, which are presented in Appendix 1. This was followed by a series of panel discussions or special reports, on thermal pollution; limited entry into a fishery; the salmon troll fishery; and proposals for consideration as resolu tions.

Dr. Charles E. Woelke, Washington Department of Fisheries, Olympia, and PMFC Commissioner Harold E. Lokken, Fishing Vessel Owners Association, Seattle, were the respective moderators on the thermal pollution and the salmon troll fishery panels. The remarks of the moderators were included in the minutes of the meeting. Included during the panel discussions were the following papers:

"Thermal Power Plant Siting" by John Radovich, California Department of Fish and Game, Sacramento

'^Research on Thermal Pollution—Report on the Columbia River and Estuary" by • George R. Snyder, Bureau of Commercial Fisheries, Seattle

"Problems of Thermal Effluents in Marine and Estuarine Waters" by Anthony J. Novotny, Bureau of Commercial Fisheries, Seattle ,

"Salmon Net Gear Limitation in Alaska—1968 and 1969" by Ed Huizer, Alaska Department of Fish and Game, juneau

"A Review of Steps Leading up to the Implementation of a Licence Control Plan for the Salmon Fishery in British Columbia" by M. P. Houghton, Department of Fisheries • of Canada, Vancouver

Copies of the papers on thermal pollution were distributed at the meeting. Copies of the papers on limited entry into a fishery were attached to the minutes of the meeting which were sent to each registered attendant. Also included with the minutes was a paper, "The Status of Columbia River Salmon and Steelhead and the Role of Idaho in Their Future," by L. E. Perry, Bureau of Sport Fisheries and Wildlife, Portland. This latter report was presented by Dr. Perry at a luncheon of the Coeur d'Alene Chamber of Commerce and the Pacific Marine Fisheries Commission. None of these papers will be reprinted herein. A limited number of copies of individual papers are available upon request.

Principal participants on the salmon troll fishery panel were Sam Wright, Washington Department of Fisheries, Olympia; Bill Hill, Humboldt County Fishermen's Marketing Association, Eureka; Vern Davis, West Coast Trailers Association, Warrenton Oregon Chapter; Richard Patana, a troller, Ilwaco, Washington; and Jack Cotant, a PMFC Advisor and a troller, Ketchikan. A paraphrased transcription of the tape recording of this panel's discussion was included in the minutes of the meeting.

Dr. F. A. Cleaver, Bureau of Commercial Fisheries, Portland, at the close of the discussions, summarized the report to PMFC on the efficiency and economics of 21 Columbia River Development Program salmon and steelhead hatcheries. PMFC distributed copies of this report in support of its Resolution No. 2, "Columbia River Hatcheries—Operate at Design Capacity and Maintain in Proper Condition."

Action on 1967 Resolutions

The following information was sent to all Commissioners and Advisers and Research Supervisors on October 16, 1968 in compliance with Resolution No. 10 of 1965, "Report of Actions Taken on Last Year's Resolutions." It also appeared as Appendix A to the Report of the Executive Director on November 21,1968.

Resolution 1, Use of Water by Fish and Shellfish is a Prime and Beneficial Use: Copies of this resolution were sent with appropriate transmittal letter to the Federal Water Pollution Control Administration in Washington, D. C; its regional directors in Portland and San Francisco; and to the pollution control agencies and the Governors of Alaska, California, Idaho, Oregon and Washington.

Subsequently, the Western Governors' Conference at its annual meeting, May 12-15, 1968 adopted the following resolution.

"Ill Fishery Resources*

WHEREAS, the rich and varied marine fishery resources of adjacent areas of the Pacific Ocean constitute a natural wealth of great magnitude; and

WHEREAS, many of the rivers, streams and lakes of the United States tributary to the Pacific Ocean support runs of salmon, steelhead and other anadromous fish which are of enormous value to the people of this nation as food, livelihood and recreation; and

WHEREAS, water quality standards and water resource conservation, enhancement, development and utilization are pressing subjects of international, national and state concern;

NOW, THEREFORE, BE IT RESOLVED by the 1968 Annual Meeting of the Western Governors' Conference in Honolulu, Hawaii that:

1. Safeguarding fish and shellfish be a prime and ben eficial use of both fresh and marine waters, and that action be taken to obtain and maintain optimum water quality conditions for this use in the changing years ahead;

2. Where construction projects for dams, reservoirs and other facilities affecting fresh-water bodies are pro posed, there be biological studies concurrent with or pre ceding engineering feasibility studies — and that these biological studies be conducted by appropriate state fish and wildlife agencies, financed by-the agencies that pro pose to build and operate the projects;

3. The Congress be urged to authorize a single appro priation for completion of the Willamette Falls Fishway.

» - (*Governor Jack Williams of Arizona was recorded as abstaining.)" *

Resolution 2, To Promote Comprehensive Planning and Coordination of Waste Disposal: Copies of this resolution were sent with transmittal letters to the Commissioner of the Federal Water Pollution Control Administration; the Administration's S. W. and N. W. Regional Offices, and to the Governors and pollution agencies of California, Idaho, Oregon and Washington. The Commissioner of the FWPCA requested the N. W. Regional Office in Portland to prepare a report for PMFC as requested by the resolution. The report has been received.

Resolution 3, Delta Facilities of the California Water Plan: On December 18, 1967, a 2-page letter plus copies of the resolution were sent to Governor Reagan and California Legislators Cologne and Porter requesting that the letter and resolution be made part of the record of a hearing on the California Water Plan which was scheduled for December 22, 1967 in Sacramento. One hundred and seventy-nine copies of the letter and resolution were also sent to:

California Water Commission (Ira Chrissman, Chairman)
Resources Agency of California
California Department of Water Resources (William Gianelli, Director)
California Department of Fish and Game
U. S. Bureau of Reclamation, Washington, D. C.
U. S. Bureau of Reclamation, Branch Office, Sacramento
Commissioner, U. S. Fish and Wildlife Service
Director, Bureau of Commercial Fisheries, Washington, D. C.
Director, Bureau of Sport Fisheries and Wildlife, Washington, D. C.
Chief, U. S. Army Corps of Engineers, Washington, D. C.
Division Engineer, U. S. Army Corps of Engineers, S. Pacific Division, San Francisco
District Engineer, U. S. Army Corps of Engineers, San Francisco District
Secretary of the Interior
Chairman, California Assembly Committee on Fish and Game
Chairman, California Assembly Committee on Wildlife and Conservation
Chairman, California Assembly Committee on Water
Chairman, California Senate Committee on Fish and Game
Members of California Legislature Members of California
Congressional Delegation Chairman, U. S. Senate
Committee on Appropriations Chairman, U. S. House of
Representatives Committee on Appropriations
American Fisheries Society
California Division of Izaak Walton League
California Wildlife Federation
Sierra Club

The April 13, 1968 News Release of the California Department of Fish and Game contained the following:

COMMISSION URGES
SPEEDUP ON CANAL

The California Fish and Game Commission has urged the U. S. Bureau of Reclamation to prepare its feasibility report on the proposed Peripheral Canal around the Sacramento-San Joaquin Delta "at the earliest possible date."

"The California Fish and Game Commission as well as sportsmen's organizations and conservation groups are concerned about the delay in the preparation and release of the bureau's 'Feasibility Report for the Peripheral Canal

Unit, Central Valley Project'," the commission said **in** a letter to Robert J. Pafford, Regional Director for the Bureau.

The commission reaffirmed its pledge of continued support in obtaining authorization and funding for the canal, which has been recommended by the Department of Fish and Game as the facility which can correct some of the adverse conditions for wildlife presently caused by pumping from the Delta.

A news Release of February 3, 1968 had earlier mentioned a report (number 7 in a series) entitled, "Water Development and the Delta Environment" which presents the progress of a 6-year Delta Fish and Wildlife Protection Study and recommends construction of the Peripheral Canal "at the earliest possible date."

In spite of this urging and recommendation, the Pacific Marine Fisheries Commission has not received word that the U. S. Bureau of Reclamation's feasibility report will be forthcoming soon. In the meantime the king salmon catches off California and in the Central Valley are decreasing because of unfavorable freshwater environment and the California Department of Fish and Game has had to propose emergency restrictions on sport and commercial fishing for salmon.

Resolution 4, Penny Cliffs and deregulating Dams, Clearwater River, Idaho: This resolution was distributed via transmittal letter of July 5, 1968 to congressional delegates from Alaska, California, Idaho, Oregon and Washington, and to various other pertinent officials, conservation groups, and agencies throughout the United States.

Senator Hatfield was particularly responsive and asked the Corps of Engineers for comment on the .resolution. The Corps stated that it will not make further studies of or ask for authority to build Penny Cliffs Dam until a Department of Interior study of the effects of Penny Cliffs on fish and wildlife has been completed. However, the Corps also stated that, if additional generators are eventually installed (1985 or 1990) in Dworshak Dam, a reregulating dam will be needed, and the reach of the river upstream from Lenore would ba a possible site for such a dam. Now that the Wild and Scenic Rivers Act has been passed, it is unlikely that the Corps would ask for authority to construct Penny Cliffs, but there is always a possibility that the Corps might propose a dam at some point downstream from Penny Cliffs, and a proposal to construct a reregulating dam for the Dworshak Project is a definite possibility.

Resolution 5, To the Memory of Milton C. James: A copy of this resolution, together with a letter expressing sympathy and regret, was sent to Milt's widow, Mrs. Eleanor James.

Resolution 6, Thermal Plants to be Licensed by FPC: This resolution was sent by letter to all members of Congress from Alaska, California, Idaho, Oregon and Washington. The letter contained a postscript suggesting rhat bills S. 2889 or H. R. 14971, the "Electric Power Reliability Acts," might be conveniently amended to include a provision to the effect that any water diversions for the development of thermal energy shall be subject to the regulatory authority of the Federal Power Commission. Copies of the resolution and letter were also sent to the Governors and pollution control authorities of the above States, the Federal Power and Atomic Energy Commissions, the Federal Water Pollution Control Administration, the Department of the Interior and its Bureaus for commercial and sport fisheries, and to various conservation and fishery groups.

The resolution was also sent to Senator Thruston Morton, author of S. J. Res. 148 (to establish a committee on nuclear development); to Senator Edmund S. Muskie, Chairman, Special Subcommittee on Air and Water Pollution; to Congressman Robert E. Jones, Chairman, Natural Resources and Power Subcommittee.

Congresswoman Edith Green's reply mentioned a third Power Reliability Act, S. 1934. It was learned subsequently that Congressman Dingell had introduced H. R. 16852, to amend the Federal Water Pollution Control Act to give the Department of the Interior the responsibility for prescribing in federal licenses the provisions necessary to protect fish, wildlife, recreation, and esthetic values at projects that may result in the discharge of heated effluents into interstate or navigable waters or into the tributaries of such waters.

Resolution 7, Fund Biological Studies as Part of Water Project Planning: Distribution of this resolution to all addressees was not completed prior to the adjournment of the Ninetieth Congress. The Executive Director of PMFC therefore proposed that a similar resolution be adopted at the 1968 annual meeting and promised to send it to all congressional delegates from the PMFC member States when the Ninety-first Congress convenes in January 1969. (See Resolution No. 7 in the next section of this report.)

Resolution 8, Greenland Flounder: This resolution to change the name of Greenland halibut to Greenland flounder or some other name so *Reinbardtius hippoglossoides* would not be confused with the true halibuts, *Hippoglossus hippoglossus* or *Hippoglossus stenolepsis* was mailed via a 3-page transmittal letter to the Food and Drug Administration of the U. S. Department of Health, Education and Welfare on March 18, 1968. Copies of the resolution and transmittal letter were sent to numerous addressees including the following:

American Fisheries Society, Committee on Names of Fishes

U. S. Bureau of Commercial Fisheries

Members of the Committee on Commerce of the U. S. Senate

Members of the Committees on Merchant Marine and Fisheries, and on Interstate and Foreign Commerce of the U. S. House of Representatives Governors of the

States of Alaska ,Washington, Oregon and California

Secretary of the U. S. Department of Commerce President's

Special Assistant for Consumer Affairs Chairman, Trade

Information Committee, Office of the Special Representative for Trade Negotiations

Many favorable replies were received. On April 1, Congressman Pelly introduced H.R. 16330 to require that imported fish products, "in whole or part," shall be labeled in English as to country of origin. The prime purpose of this bill was to resolve the problem relative to Greenland halibut. Also on April 1, the Ninth U. S. Circut Court of Appeals dismissed a case protesting Oregon's law forbidding the labeling of *Reinhardtius* as Greenland halibut and ruled that, "Labeling and selling the fish as Greenland halibut is deceptive."

On July 9, Massachusetts by passage of a law joined the States of Alaska, Oregon and Washington in prohibiting the sale of *Reinhardtius* as Greenland halibut. The Massachusetts law will not be effective until January 1, 1969-

The U. S. Commissioner of Food and Drug Administration on August 20, 1968 filed "Statements of general policy or interpretation," Common name for Food fish of the species *Reinhardtius hippoglossoides* (Federal Register, vol. 33, no. 163, August 21, 1968). These statements designated "Flounder" or "Northern Flounder" as the common name for this fish and ruled that the use of any name which includes the name "Halibut" for this species is misbranding. On September 7, 1968, the Canadian Embassy delivered an "Aide-memoire" which urged a 90-day postponement of the effective date, of the Food and Drug Administration's ruling.

The American Fisheries Society's Committee on Names of Fishes considered PMFC's resolution and letter, but favored the continued use of Greenland halibut for *Reinhardtius hippoglossoides.* The Society at its annual meeting on September 9, 1968 approved the Committee's action.

Resolution 9, Revision of Membership Contribution Formula: Copies of this resolution we're ~se\it to the Governors and Congressional Delegates of Alaska, California, Idaho, Oregon and Washington. A format was sent to the member PMFC agencies in each state that could be, used as a basis for legislative action to amend the respective PMFC enabling acts. All the agencies have replied that, except for some minor changes which are now being discussed, they are ready to urge their respective state Legislatures to adopt the amended enabling act which would make the revised membership contribution formula described in Resolution No. 9, effective July 1,1969.

Senator Magnuson on May 24, 1968 introduced S. 3545, and Congressman Pelly on June 24, 1968 introduced H. R. 18067, to allow the PMFC member States to amend article X of the Pacific Marine Fisheries Compact to provide whatever membership contribution formula they determine to be equitable and acceptable to them. Because of the rush of matters in the final days of the Ninetieth Congress, these bills were not acted upon. Therefore, similar bills will have to be introduced when the Ninety-first Congress convenes.

Resolution TO, Aid and Protect Groundfish Stocks: This resolution was sent, along with a 4-page transmittal letter of April 5, 1968, to all Governors and Congressional Delegates from the States of Alaska, California, Idaho, Oregon and Washington. Copies were also sent to an additional 20 persons or agencies in the Federal Government, including the President, Secretary of the Interior, Secretary of State, Special Assistant for Fisheries and Wildlife to the Secretary of State, Director of Bureau of Commercial Fisheries, Chairman of Tariff Commission, Chairman of pertinent House and Senate Committees, President's Assistant for Consumer Affairs, and other Congressmen and Senators interested in legislation to protect or enhance U. S. Fisheries.

A large number of bills were introduced in Congress such as: S. 2411 (Morse, et al), H.R. 12696 (Wyatt), 12834 (Pelly), 12864 (Dent), 12911 (Clausen), 13149 (Sandman), 13888 (Dellenback), and 14924 (Burke); and S. 2426 (Edward Kennedy) and H.R. 13362 (Hathaway) to establish quotas on the importations of groundfishes or to establish programs to aid and enhance U. S. fisheries, but to the best of our knowledge none of these bills was passed.

The College of Fisheries of the University of Washington, along with the Bureau of Commercial Fisheries, the Council on Marine Resources and Engineering Development, and certain organizations within the U. S. Fishing Industry, sponsored a 4-day "Conference on the Future of the United States Fishing Industry," from March 24 through 27, 1968, in Seattle. Many leaders in fisheries participated, and many excellent papers were presented; but one could not help but conclude that the U..S. fisherman, upon whom our domestic catch depends, was the most forgotten man at the Conference.

in June of this year, Harold E. Crowther, Director of the Bureau of Commercial Fisheries, announced plans to develop a "Master Plan for Commercial Fisheries" (Fishermen's News, Seattle, July 1968). It appears at the close of 1968 that all individuals, members of public and private groups, and representatives of local and federal government interested in the fishing industry are being canvassed for assistance in the formulation of a comprehensive plan.

Resolution 11, **Commendation to Departments of State and Interior:** Copies of this resolution were sent via transmittal letter of December 6, 1967 to Secretary Dean Rusk, Department of State, and Secretary Stewart L. Udall, Department of the Interior, and to the following:

Donald L. McKernan, Special Assistant for Fisheries and Wildlife to the Under Secretary of State

Clarence F. Pautzke, Commissioner, U.S. Fish and Wildlife Service

• Harold El Crowther, Director, Bureau of Commercial Fisheries

Senator Warren C. Magnuson, Chairman, Committee on Commerce, U. S. Senate

Senator E. L. Bartlett, Chairman, Subcommittee on Merchant Marine and Fisheries, U. S. Senate

Congressman Edward A. Garmatz, Chairman, Committee on Merchant Marine and Fisheries, U. S. House of Representatives

Congressman John D. Dingell, Chairman, Subcommittee on Fisheries and Wildlife Conservation, U. S. House of Representatives

1968 Resolutions

The extensive pre-meeting preparations, including the provision of secretarial assistance to the Advisory Committee, facilitated a careful screening of the many recommendations and resolutions which emanated from the diverse fishery interests of the Pacific Coast. Simultaneously, the Research Staff received the proposals, with the result that the Commission had available the views of the Advisers and Researchers before it acted upon the pending resolutions at the final business meeting.

Twenty-four proposed resolutions were received prior to or during the meeting. Of these, eight were rejected or tabled because of late submission, improper form, or question as to the competence of the Pacific Marine Fisheries Commission to act upon the subject matter. Some of the remaining resolutions were amended during the screening by the Advisers and Researchers. The following 16 resolutions are cited verbatim as they were approved on November 22. Missing numbers are the result of the rejection or tabling of proposals bearing those numbers.

1. To the Memory of Wayne E. Phillips

WHEREAS, upon the death of Wayne E. Phillips on June 4, 1968, at Baker, Oregon, the Pacific Marine Fisheries Commission and the fisheries of the Pacific Coast lost a dedicated friend, and

WHEREAS, this hard-working and astute man served as a member of the Oregon Game Commission and of the Pacific Marine Fisheries Commission for six years during which time he gave generously of himself, bringing" to <he Commission the benefit of his business experience as well as his deep devotion to the welfare of our region's vast fisheries resources,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission, in regular session on November 22,^.968, at Coeur d'Alene, Idaho, observe a moment of silence in memory of Wayne E. Phillips, and that the Executive Director be instructed to convey the Commission's appreciation for Wayne's services to his widow and family.

*

2. Columbia River Hatcheries—Operate at Design Capacity and Maintain in Proper Condition

WHEREAS, many of the naturally propagated runs of salmon and steelhead trout in the Columbia River Drainage have declined greatly and are continuing to decline as the result of the construction of an ever increasing number of dams and water-usage projects, and

WHEREAS, the Federally financed Columbia River Fishery Development Program was instituted as mitigation for the anticipated adverse effects of dams and water-usage projects, and

WHEREAS, funds from the Development Program have built and are operating 21 state and federal fish hatcheries along the lower Columbia River in Oregon and Washington for the purpose of offsetting by artificially propagated runs the declines in natural runs, and

WHEREAS, the funds from the Development Program have been insufficient to permit full utilization of the design capacity of the hatcheries and to maintain them in proper structural and operating condition, and

WHEREAS, at the request of the Pacific Marine Fisheries Commission, the Federal Bureau of Commercial Fisheries has furnished the Commission with a report on the efficiency and economics of artificial propagation at the 21 Columbia River Development Program hatcheries, the estimated benefits and costs of operating the hatcheries at design capacity and maintaining them in proper condition, and the possibilities of increasing the design capacity of the hatcheries by the conversion and operation of certain natural ponds to rearing ponds for juvenile salmon and steelhead, and

WHEREAS, the member fishery agencies of the Pacific Marine Fisheries Commission have studied the report carefully and have concluded that adequate funding of the operation and maintenance of the Development Program hatcheries is required to fulfill the initial promises of mitigation and to offset the declining runs of naturally propagated salmon and steelhead, and in addition is in the national interest as a profitable investment and proper management of a valuable renewable resource,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission urge adequate funding of the Columbia River Fishery Development Program to permit full maintenance and operation of the 21 lower Columbia River hatcheries and the development of certain natural ponds for rearing and thereby supplementation of the capacity of the hatcheries.

3. Concerning Dam Development on Middle Snake River

WHEREAS, the salmon and steelhead runs of the Snake River have been progressively and seriously reduced by the construction of dams, and

WHEREAS, the United States Supreme Court relative to the High Mountain Sheep Dam license proceedings recently instructed the Federal Power Commission to reconsider the entire issue of dam development on the Middle Snake River, particularly in regard to fish and wildlife, and

WHEREAS, the High Mountain Sheep Dam and the concomitant China Gardens Dam would further seriously reduce these runs by damaging the major Snake River runs into the Salmon River, as well as the runs into the Imnaha River, and

WHEREAS, dams constructed upstream from the Imnaha River would be far less damaging, and

WHEREAS, the Middle Snake runs could be reduced to token numbers by construction of any high storage dam on the Middle Snake River without features to control the temperature and oxygen level of downstream releases,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission urge the Federal Power Commission or the Congress of the United States, whichever may be the determining body, to rule that any dam development on the Middle Snake River, if such development is found to be in the public interest, be limited to the area above the mouth of the Imnaha River, and

BE IT FURTHER RESOLVED, that if any high storage dam is licensed by the Federal Power Commission or authorized by the Congress of the United States that mitigative features be required for the regulation of temperature and dissolved oxygen levels of downstream releases.

***6. Thermal Plants to be Licensed by FPC**

WHEREAS, the Pacific Marine Fisheries Commission on December 1, 1967 adopted the following Resolution No. 6:

"WHEREAS, thermal plants, especially nuclear plants, for the generation of electric power are expected to increase rapidly in number, and

"WHEREAS, it is anticipated that many of these plants will be located on bodies of water where the use of water for cooling will have significant effect on the aquatic resources therein, and

"WHEREAS, the present system of licensing and control of thermal power plants does not provide adequately for the protection of these resources, and ' - •

"WHEREAS, the Federal Power Commission has the responsibility to see that all resource values, including fish and wildlife, are protected at projects proposed under its licensing authority,

" "NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission urges Congress to require all thermal plants to be licensed by the Federal Power Commission." and ^

WHEREAS, a number of bills were introduced in the Ninetieth Congress to require all thermal plants to be licensed by a single Federal agency, but none of these bills was passed, and

WHEREAS, the Pacific Marine Fisheries Commission still regards the Federal Power Commission as the one most logical agency to exercise licensing power at thermal electric plants where preservation of fish and wildlife as well as other factors may be at issue,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission reaffirms its Resolution No. 6 of December 1,1967.

7. Fund Biological Studies as Part of Water Project Planning

WHEREAS, Resolution III, "Fishery Resources" adopted by the Western Governors' Conference at its annual meeting on May 12-15, 1968 contains the following subparagraph: "2. Where construction projects for dams, reservoirs and other facilities affecting fresh-water bodies are proposed, there be biological studies concurrent with or preceding engineering feasibility studies — and that these biological studies be conducted by appropriate state fish and wildlife agencies, financed by the agencies that propose to build and operate the projects;"

and

WHEREAS, Resolution No. 7, "Fund Biological Studies as Part of Water Project Planning" adopted by the Pacific Marine Fisheries Commission at its annual meeting on December 1, 1967 had a paragraph similar in intent to subparagraph 2 from Resolution III of the Western Governors' Conference to wit:

NOW, THEREFORE, BE IT RESOLVED, that all State logical studies be commenced at the earliest opportunity concurrent with or preceding engineering feasibility studies — and that these biological studies be conducted by the appropriate state fish and wildlife agencies, having jurisdiction for these resources in the pertinent area, and be financed by the agencies that propose to build and operate the projects,"

and

WHEREAS, the concern of the Pacific Marine Fisheries Commission extends not only to the rivers, streams and lakes tributary to the Pacific Ocean and Bering Sea and the runs of salmon and steelhead trout and other anadromous fish that those waters support, but the concern also extends to estuarial and marine fishery resources that can be adversely affected by poorly conceived or operated projects, such as: jetty, harbor, dredging, desalinization, thermal electric, etc., projects, and

WHEREAS, the prime requisites for biological studies in connection with construction projects that might adversely affect freshwater and marine fishery resources are time (early start of studies), adequate funding, and allocation of funds to the state fish and wildlife agencies who are requested to furnish the basic data for the studies and who have the paramount responsibility for protecting the fishery resources, and

WHEREAS, the Fish and Wildlife Coordination Act appears to be an impediment to the attainmetnt of those prime requisites,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission urge Congress to consider revision of the Fish and Wildlife Coordination Act to make it more effective in causing the start of biological studies before or concurrent with the start of feasibility studies, in allocating sufficient funds commensurate with the biological problems involved and the funds being spent on feasibility and planning aspects of specific projects, and in reimbursing state fish and wildlife agencies for their participation in the biological studies.

8. Manage Fisheries to Prevent Depletion and to Ensure Mankind a Continuous Food Supply

WHEREAS, massive fishing efforts by foreign fishing fleets have been mounted on stocks of fish on the continental slopes of the Northeastern Pacific Ocean and Bering Sea during the last several years, and

WHEREAS, it is apparent from the change in the numbers and character of the vessels in these foreign fleets and from scientific evidence that drastic depletion is occurring, and

WHEREAS, this depletion is contrary to best fishery management practices,

BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission urge all appropriate governmental agencies to redouble their efforts to ensure that these resources are not over-fished and that they be managed in such a way as to provide a continuous supply of wholesome food for mankind in perpetuity.

10. State and Federal Institutions Use Only Domestically Produced Fishery Products

WHEREAS, our domestic otter trawl fishery has problems in securing markets for its products, and

WHEREAS, the percentage of imports of trawl caught or ground fishes has been steadily increasing to where imports amount to over 80 percent of the ground fish products consumed in the United States, while at the same time domestic production in pounds as well as percent has decreased, and

WHEREAS, if this trend is not reversed it can only lead to the destruction of the U. S. trawl fishing fleets, and

WHEREAS, this is against the best interests of our Nation in times of peace and could be disastrous in times of national emergency, and

^W^ HERE AS, a healthy fishery is a valuable part of our economy and could be of great value in reducing this Nation's unfavorable balance of payments,

NOW, THEREFORE, BE IT RESOLVED, that all State and Federal institutions be urged to use only fishery products which are domestically produced when available.

11. Membership on the Pacific Northwest River Basins Commission

WHEREAS, the Water Resources Planning Act of 1965 states that interstate compact agencies, consented to by Congress, are eligible for membership on river basins commissions, and

WHEREAS, the Pacific Marine Fisheries Commission is an interstate compact agency representing the States of Alaska, California, Idaho, Oregon and Washington with the approval of Congress, and

WHEREAS, the Pacific Marine Fisheries Commission has requested membership on the Pacific Northwest River Basins Commission, and

WHEREAS, the Chairman of the Pacific Northwest River Basins Commission has ruled that invitation to the Pacific Marine Fisheries Commission to join the River Basins Commission is the prerogative of the state representatives of the River Basins Commission,

NOW, THEREFORE, BE IT RESOLVED, that the Governors of the States of Idaho, Montana, Oregon, Washington and Wyoming be asked to request their respective representatives on the River Basins Commission to invite the Pacific Marine Fisheries Commission to become **a** member of the Pacific Northwest River Basins Commission.

12. Opposition to Asotin Dam on the Snake River

WHEREAS, the runs of chinook salmon and steelhead trout to the Snake River have suffered irreparable damage and are continuing to decline because of the construction of dams on the River, **and**

WHEREAS, construction of a dam, primarily for the generation of electricity, on the Snake River near Asotin, Washington has been authorized but funds for construction have not been appropriated, and

WHEREAS, with the advent of thermal nuclear electric stations this dam is not needed and will cause additional damage to the salmon and steelhead runs produced in the portion of the Snake River upstream from the dam and in the Grande Ronde, Salmon and Imnaha Rivers which are tributary to the Snake River above the Asotin site,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission urge Congress to refuse to appropriate funds for the construction of Asotin Dam.

13. Offshore Herring Fishing

WHEREAS, any operation of foreign fishing fleets off the Pacific Coast of the United States, particularly directed to the taking of herring is causing great concern to U. S. fishermen with reference to its effect on feeding schools of immature salmon which are found intermingled with herring schools, and

WHEREAS, such herring fishing could have a drastic detrimental effect upon coastal and inshore domestic salmon fishing, and

WHEREAS, there is insufficient information at present as to the actual effect such fishing is having upon domestic salmon fishing,

BE IT THEREFORE RESOLVED, that the Pacific Marine Fisheries Commission institute a study with the objective of determining the effect of high seas herring fishing on immature salmon with special attention being paid to suggested solutions of the problem if it is determined there is one.

14. Requesting Corps of Engineers to Revise Policies and Regulations Relating to Economic Analysis for Fish Mitigation

WHEREAS, the U. S. Army Corps of Engineers has developed policies and regulations (EC-1120-2-22 and ER-1165-2-104), and

WHEREAS, these policies and regulations require that a monetary value be established for fish resources that would be lost as a result of proposed water projects, and

WHEREAS, such values are to be compared with the cost of the projects, to establish benefit-cost ratios, and

WHEREAS, such benefit-cost analyses can lead to situations where either no mitigation or only partial mitigation is allowed,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission opposes the use of such economic analyses as the basis for determining the measures required to protect fish resources or means of mitigating damage to them, and

BE IT FURTHER RESOLVED, that the Corps of Engineers is hereby requested to rescind its existing policies and regulations and replace them with a directive requiring an evaluation of fish resources affected by the project and an estimate of the costs of alternative measures necessary to protect or mitigate unavoidable losses to these resources, deleting any reference to a comparison of "benefits" and costs, and

BE IT FURTHER RESOLVED, that a copy of this resolution be sent to the Chief of Engineers, the Board of Engineers for Rivers and Harbors, Pacific Southwest Division Engineer, the Secretary of the Interior,-Commissioner of the U. S. Fish and Wildlife Service and to the Chairman of the U. S. House and Senate Committees on Public Works, and on Interior and Insular Affairs.

T6. Commend Portland General Electric, Pacific Power * arid Light, and Pollution Control Agencies

WHEREAS, the siting and construction of thermal electric plants are relatively new to the Northwest and pose a definite threat to the aquatic environment aad fishery resources unless proper steps are taken for the treatment of plant cooling waters, and

WHEREAS, there is no single authority for regulating the conditions under which new plants may be constructed and operated, and

WHEREAS, the Portland General Electric Company and Pacific Power and Light Company, both constructing thermal plants in the Northwest, have agreed to utilize cooling towers to prevent degradation of the environment, and

WHEREAS, the Oregon State Sanitary Authority, the Washington Water Pollution Control Commission, and the Federal Water Pollution Control Administration have consistently stood for cooling processes that reduce any harm to the environment,

THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission commend the Portland General Electric Company and the Pacific Power and Light Company* for their cooperation in agreeing to use cooling towers; and the Oregon State Sanitary Authority, the Washington Water Pollution Control Commission, and the Federal Water Pollution Control Administration for their consistent stand that "once-through cooling" should not be permitted.

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17. Opposition to Ben Franklin Dam

WHEREAS, the construction of Ben Franklin Dam on the Columbia River has been proposed by the Corps of Engineers and is at present under consideration for authorization by the United States Congress, and

WHEREAS, the Ben Franklin Project will inundate and destroy the last major spawning area for chinook salmon and steelhead in the Columbia River, and

WHEREAS, fall chinook salmon escapements to this area have been steadily increasing in present years with over 23,000 fall chinook salmon spawning in this section of the Columbia River in 1967, and

WHEREAS, the production from this 1967 escapement number will produce to the various fisheries over 2,300,000 pounds of salmon for harvest per annum with a first wholesale value of over $1 million, and

WHEREAS, the various federal and state fisheries agencies of the Northwest as well as interested sport and commercial groups have gone on public record as opposing the construction of this project because of its harmful effects upon this resource, and

WHEREAS, the construction of this reservoir in itself will not be conducive to either downstream migration for juvenile or upstream passage for adult salmonoids since it will intensify undesirable heating effects already present in the Columbia system. Further environmental degradation of the system would impose an overwhelming burden upon maintenance of this resource,

THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission is unalterably opposed to the authorization or construction of the Ben Franklin Project since it would result in nonrecoverable fishery losses to the member States represented by this Commission.

19. Delta Facilities of the California Water Plan

WHEREAS, the State of California and the Federal Government have selected the Peripheral Canal as the engineering facility in the Sacramento-San Joaquin Delta to carry out the California Water Plan and to further develop the Central Valley Project, and

WHEREAS, the State of California is faced with a deficit in the financing of the State Water Project, and the Bureau of Reclamation has suffered some unfortunate delays in submission of the Feasibility Report to Congress, and

WHEREAS, congressional authorization for federal participation in the Peripheral Canal project has yet to be obtained, and

WHEREAS, the California Department of Fish and Game has predicted increasing dangers to the salmon resources in the years between the start of State pumping operations (now operating), increased pumping by the Bureau of Reclamation and completion of the Peripheral Canal, and

WHEREAS, the king salmon resources of the Central Valley of California must pass successfully through the Sacramento-San Joaquin Delta, and

WHEREAS, man's activities have already done considerable damage to the salmon resources, and there is great need to protect and rebuild these resources, and

WHEREAS, these king salmon runs are of major importance to the salmon fisheries in the ocean off California and also contribute to ocean fisheries off Oregon and Washington, and

WHEREAS, the Peripheral Canal Plan is the only known Delta water development plan which will protect existing king salmon resources passing through the Sacramento-San Joaquin Delta, and which will provide opportunities for passage through the Delta of increased king salmon runs thereby allowing restoration of said salmon runs, and

WHEREAS, existing conditions in the Delta are detrimental to the San Joaquin River salmon runs and may become so to the Sacramento River salmon runs before completion of the Peripheral Canal,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission reaffirms its support of the Peripheral Canal Plan and urges the authorization and construction of a joint federal-state Peripheral Canal project at the earliest possible date to protect and restore the salmon resources of the Central Valley of California, and

BE IT FURTHER RESOLVED,^ that copies of this resolution be forwarded to: Governor of California, California Water Commission, Resources Agency of California, California Department of Water Resources, California Department of Fish and Game, Secretary of the Interior, U. S. Bureau of Reclamation, U. S. Fish and Wildlife Service, U. S. Army Corps of Engineers, California Assembly Committee on Wildlife and Conservation, California Assembly Water Committee, California Senate Committee on Water Resources, California Senate Committee on Fish and Game, all members of California Legislature, and appropriate members of Congress.

21. Recommending a Department and Cabinet Post for Marine Fisheries

WHEREAS, the management of our fishery resources is vital to the future of the United States, and

WHEREAS, the United States and the world's populations are increasing at a startling rate and will need this food to an increasing degree, and

WHEREAS, the fishery is a major and vital industry supplying employment and recreation to a significant segment of our population, and

WHEREAS, there are many agencies concerned with fishery policies, and

WHEREAS, the United States should regain its position as a leader in the world's fishery,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission urge the Congress and the President of the United States move to regain the United States' position as a leader in the world's fishery by creating a new department and cabinet post for marine fisheries to deal with those matters which are beyond state jurisdiction.

24. Commendation to Idaho Fish **and** Game Commission

WHEREAS, the 1968 annual meeting of the Pacific Marine Fisheries Commission held in Coeur d'Alene, Idaho has been a most constructive and successful deliberation, and

WHEREAS, the Idaho Fish and Game Commission has acted as official host in an outstanding and cordial manner thereby contributing to the success of the discussions, and

WHEREAS, the cordiality of the meeting was further heightened by the social occasion hosted by the Washington Water Power Company, assisted by the Idaho Fish and Game Commission and the fishing industry,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission hereby expresses its sincere appreciation for the assistance and hospitality tendered so graciously during the course of the meeting and the stay of PMFC's participants in Coeur d'Alene. In addition, special recognition is expressed to the staffs of the Idaho Fish and Game Department and PMFC for their long hours of faithful manning of the typewriters and duplicating machines, and attending to the numerous essential details which contributed to the success of the meeting.

Election of Officers, Etc.

The following were elected officers for 1969:

Augie Reetz, Chairman Walter T. Shannon, First Vice-Chairman Thor C. Tollefson, Second Vice-Chairman Joseph I. Eoff, Third Vice-Chairman John R. Woodworth, Secretary

The Executive Committee's recommendation that the 1969 Annual Meeting be held in Alaska was adopted unanimously at the 1968 meeting in Coeur d'Alene, Idaho. The time and place were subsequently set at Sitka, Alaska on September 30 to October 3. The Advisers and Research Staff will function in committee on September 30 and October 1. The general business and plenary sessions will be held on October 2 and 3.

Budget

A budget in the amount of $121,996 **was adopted for the** biennium July 1, 1969 to June 30, 1971. **An anticipated** surplus of $1,596 from the previous biennium reduced the amount to be raised by membership contributions to $120,400 or $60,200 per year.

PACIFIC MARINE FISHERIES COMMISSION
BUDGET
Biennium July 1, 1969 to June 30, 1971
ALASKA, CALIFORNIA, IDAHO, OREGON AND WASHINGTON

Salaries and Wages:	
Executive Director	$ 29,496
Office Secretary	13,848
Part-Time and Temporary	10,600
General Operations and Maintenance:	
Office Supplies	2,800
Telephone and Telegraph	1,040
Postage, Freight, Express	1,800
Rent, Office	2,218
Premiums, Bonds, Insurance	527
Audit Fees	680
Private Car Mileage	500
Fares, Plane, R. R., Bus	2,850
Meals and Lodging	2,000
Library Supplies	60
Social Security	1,922
Retirement Annuity	2,884
Medical Insurance	240
Annual and Research Meetings:	
Meeting Rooms	225
Advisory Committee, Travel, etc.	13,793
Commissioners, Travel, etc.	7,073
Administrative and Research Staff	12,395
Sound and Recording	500
Spring Research Meetings	3,440
Publications:	
Annual Reports Nos. 22 and 23	5,000
Data Series	600
Cooperative Research	5,000
Capital Outlay:	
Office Furniture and Equipment	400
Miscellaneous	105
Total Estimate	$121,996
Surplus from Previous Biennium	1,596
	$120,400

PROPORTIONATE CONTRIBUTIONS BASED ON TOTAL ANNUAL CONTRIBUTIONS OF $60,200

Member	5-Year Average*	% of Contribution	Annual Contribution
Alaska	$62,824,722	26.578	$16,000
California	51,641,669	25.415	15,300
Washington	19,469,139	22.093	13,300
Oregon	8,726,653	20.930	12,600
Idaho**	Insignificant	4.984	3,000
		100.000	$60,200

*Annual value of catch, 1962-1966 inclusive.

**Idaho, because of its small commercial fishery, pays 5% of the budget as stipulated by revised Article X of the compact. Rounding to nearest $100 resulted in 4.984 instead of 5%.

FINANCES

The Commission receives its financial support from legislative appropriations made in accordance with Article X of the interstate Compact in which the signatory states have agreed to make available annual funds for the support of the Commission in proportion to primary market value of the products of their fisheries as recorded in the latest published reports (five-year average), with provision that no state shall contribute less than two thousand dollars per annum and the annual contribution of each state above the minimum shall be figured to the nearest hundred dollars. A revised Article X will be effective July 1, 1969.

STATEMENT OF RECEIPTS AND DISBURSEMENTS
January 1, 1968 to Demember 31, 1968

CASH BALANCE December 31, 1967 (Ending Balance 20th Annual Report)		$29,957.43
RECEIPTS: Contributions by Member States—		
Alaska	$17,600.00	
California	31,400.00†	
Idaho	2,000.00	
Oregon	2,700.00	
Washington	6,500.00	60,200.00
DISBURSEMENTS:		
Salaries and Wages:		
Executive Director, Consultants, Treasurer, Office Secretary, and Temporary	$23,430.59	
Office Supplies	766.44	
Telephone and Telegraph	494.85	
Postage, Freight, Express	708.50	
Printing of Publications	9.27	
Rents: Headquarters Office	1,200.42	
Premiums: Fidelity Bonds, Fire Insurance, Workmen's Compensation Insurance	246.64	
Audit of Fiscal Books and Records	340.00	
Private Car Mileage	129.02	
Fares: Airplane, Railroad, Other	818.60	
Meals and Lodging	438.77	
Physicians and Hospital Insurance	120.00	
Library Supplies	16.33	
Retirement Contributions	2,195.55	
Annual and Research Meetings:		
Advisory Committee	$3,841.23	
Commissioners	1,238.25	
Administrative and Research Staff	4,564.49	
Meeting Rooms	124.13	9,768.10
Capital Outlay	357.70	
Cooperative Research	3,508.51	
All Other	14.50	
Total Disbursements	$44,563.79	
Cash on Deposit in The United States National Bank of Portland, Oregon:		
December 31, 1968	$45,593.64	
	$90,157.43	$90,157.43

†Includes final one-half ($13,300.00) of Annual Contribution for previous fiscal year, July 1, 1967-June 30, 1968.

AUDIT REPORT

ALLEN H. ADAMS
Certified Public Accountant
Portland, Oregon

August 21, 1968

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

Gentlemen:

I have examined the books and records of the Pacific Marine Fisheries Commission for the fiscal year ending June 30, 1968. 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 the 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, 1968, of the General Fund and Property Fund.

B. Statement of Revenue and Expenditures, with Budgetary com parisons, for the period July 1, 1967 to June 30, 1968.

C. Analysis of changes in Unappropriated Surplus and in **the** Property Fund for the period July 1, 1967 to June 30, 1968.

D. Reconciliation of changes in the cash balance with Revenues and expenditures for the period July 1,1967 to June 30,1968.

E. Audit Comments.

F. Scope of the Audit.

In my opinion, the accompanying statements present fairly the financial position of the Pacific Marine Fisheries Commission at June 30, 1968, 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 very truly,

ALLEN H. ADAMS Certified
Public Accountant

BALANCE SHEET

June 30, 1968

EXHIBIT "A"
GENERAL FUND

	Total	General Fund	Property Fund
ASSETS:			
Cash in Bank	$26,783.71	$26,783.71	$ ----
Office Furniture and Equipment	3,847.59	----	3,847.59
Total Assets	$30,631.30	$26,783.71	$ 3,847.59
LIABILITIES:			
Accounts Payable	$ 116.93	$ 116.93	$ ----
RESERVES:			
Reserve for Allocations—			
Coop. Research Note No. 1	$ 1,845.12	1,845.12	$ ----
Printing, Note No. 2	6,960.00	6,960.00	----
Total Reserves	$ 8,805.12	$ 8,805.12	$ ----
FUND BALANCE:			
Investment in Fixed Assets	$ 3,847.59	$ ----	$ 3,847.59
Unappropriated Surplus	17,861.66	17,861.66	----
Total Fund Balances	$21,709.25	$17,861.66	$ 3,847.59
Total Liabilities, Reserves and Fund Balances	$30,631.30	$26,783.71	$ 3,847.59

NOTE #1: During **the** fiscal year ended June 30, 1966, an allocation of $6,331.00 was made for co-operative research on the Crescent City-Brookings-Port Orford Sampling Program as outlined in Resolution #1 at the 1965 annual meeting at Boise, Idaho. During the fiscal year ending June 30, 1967, $2,256.96 of this amount was expended and $2,228.92 was expended during the fiscal year ending June 30, 1968, leaving a balance of $1,845.12 unexpended at that date.

NOTE #2: Purchase orders were issued during the fiscal year ending June 30, 1967, for printing of the 19th Annual Report in the amount of $2,082.00, and Bulletin No. 7 in the amount of $3,510.00, or a total of $5,592.00. In the fiscal year ending June 30, 1968, purchase order was issued for the printing of the 20th Annual Report in the amount of $1,368.00, making a total commitment of $9,960.00 for both years. No charges have been received against these commitments to date.

Appendix 1 — Status Reports

STATUS OF THE 1968 PACIFIC COAST ALBACORE FISHERY

LARRY H. HREHA and PAUL H. REED
Oregon Fish Commission

The combined albacore tuna landings of California, Oregon and Washington will approximate 50.5 million pounds in 1968. This is about 2 million pounds more than last year and about 8 million pounds above the 25-year average of 42.4 million pounds (Figure 1). The record Oregon landings and the poor California landings are the significant points of the 1968 fishery.

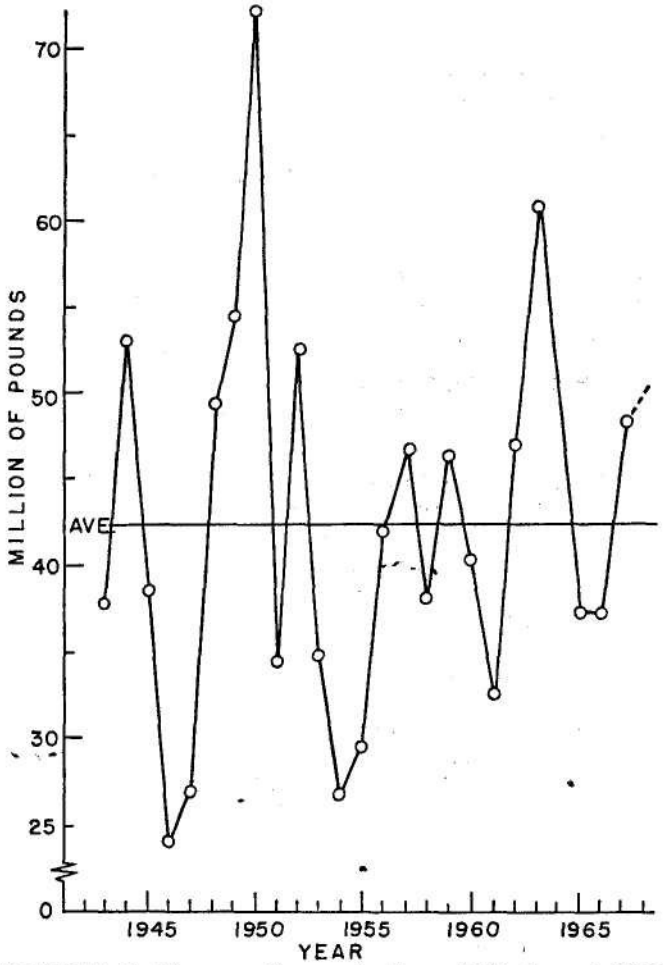

FIGURE 1. Pacific coast albacore landings, 1943 through 1968 and 25-year average.

California

Research vessels from the Bureau of Commercial Fisheries and the California Department of Fish and Game caught several albacore off southern California early in June this year indicating improvement in the southern fishery. However, the Eastern Pacific was warming more rapidly than anticipated, and the warming was extensive enough to divert a preponderance of the 1968 albacore migration into the northern grounds for the fourth consecutive year.

Despite the presence of fish on the southern grounds, the fleet did not sail until a price of $425 per ton was firmly settled on July 10. By this time the best fishing prospects were clearly off southern Oregon, and nearly the entire California fleet joined Oregon and Washington fishermen on the Oregon grounds.

The very small fleet that remained in the south found fishing very slow during July and August. Landings for those months were only about 250 thousand and 1 million pounds, respectively, compared to 8 million to 16 million pounds in past years. By September, a large portion of the California fleet had returned to home waters with the fish they caught off Oregon plus those caught off northern and central California. These were delivered in California ports, with September landings reaching approximately 5 million pounds. This compared more favorably with the past, when September catches ranged from 6 million to 10 million pounds.

The fishery continued into October all along the coast. Weather conditions on the northern and central grounds limited the time spent fishing, but albacore were found in varying concentrations whenever the boats were out. Some good live-bait fishing was underway on the Baja California grounds during the first week in October. This may herald a good, late-season run with landings continuing throughout the month.

Depending upon the duration and extent of this late fishery, we estimate California landings to be 10 million pounds (Figure 2). This is far below the 30-million-pound 25-year average, and would have been barely a good month's fishing during past seasons. California landings have not been so low since 1942, when fishermen caught only 10.6 million pSunds.

For contrast, the California partyboat sport catch this year was well above the 90-thousand fish, post-war average. The sportfishing season began July 1 and continued into October. We estimate the catch will exceed 100-thousand fish by an amount dependent upon the duration of good fishing to the south and off central California. The relative success enjoyed by anglers compared to commercial fishermen was emphasized in July processors' reports. Approximately 124 tons of locally caught albacore were canned commercially, while nearly twice this amount was processed by sport canners.

Oregon

The Oregon Fish Commission's preseason albacore survey on the chartered vessel *Sunrise* found commercial quantities of albacore during the first week of July, but the fleet did not start fishing until July 10 when the price was settled at $425 per ton. As noted, much of the California fleet moved directly to the northwest and exceptionally good fishing in the Cape Bianco-Coos Bay area during July. Excellent catches continued through August with the center of activity moving quite

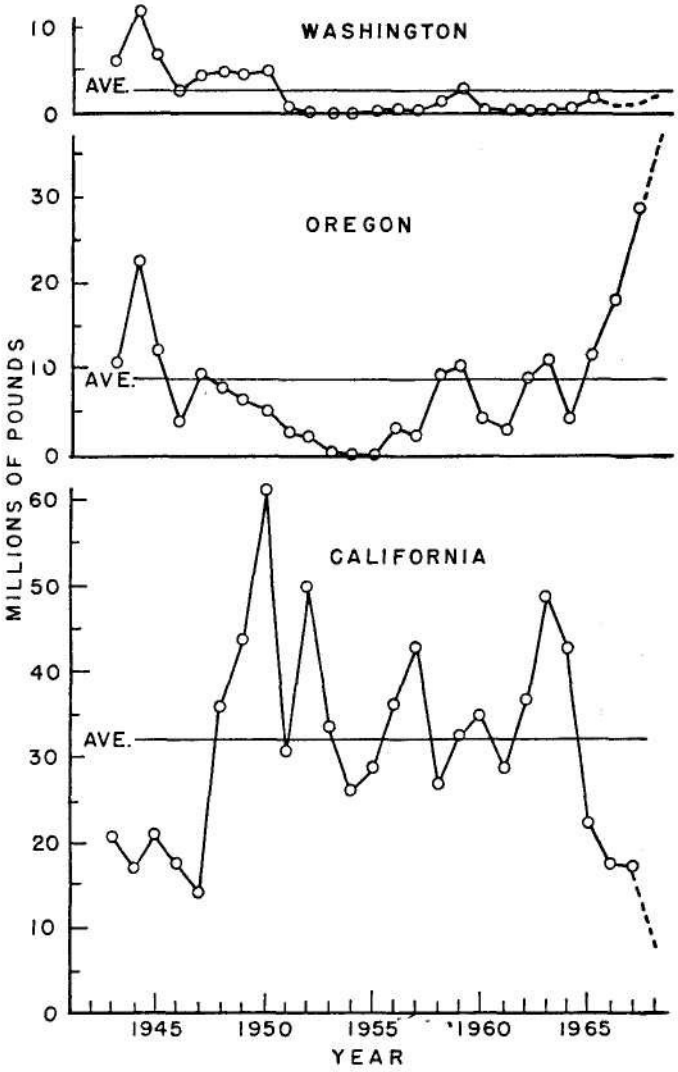

FIGURE 2. Annual albacore landings by state, 1943 through 1968 and 25-year averages.

rabidly northward. The best jig-boat catches (up to 1,700 fish per day) were reported from Newport, Oregon to Grays Harbor, Washington from 60 to 120 miles offshore.

During September the jig-boat success dropped rapidly, and the bait-boat catches increased dramatically. Most of the bait-boat catches were made inshore (20 to 40 miles offshore) and took larger fish (18 to 25 pounds) than the jig boats (average 13 pounds). There appeared to be two centers of fishing by mid-September for the jig boats: one off northern Washington 60 to 150 miles offshore, and another in the area of the Columbia River from 60 to 120 miles offshore. By the end of September jig-boat catches had dwindled to about 100 fish per day with only spotty fishing reported. By October 10 most jig boats had quit and headed for home, and bait boats reported spotty fishing.

Water temperatures were cooling rapidly, and by the end of October the season should be over.

The length-frequency samples gathered showed a wide distribution from 51 to 89 cm with the major mode at 66-67 cm and a minor mode at 75-76 cm. Few small fish were landed, but they were apparently available for awhile in the offshore area (100-150 miles) from Newport northward during late August and early September. However, the fishermen reported leaving the areas where small fish were caught **and few were** landed.

Oregon landings reached record levels during July and August with 7.7 and 17.5 million pounds landed, respectively. Total Oregon landings should approximate 38 million pounds in 1968, which is 9 million pounds more than last year's record (Figure 2).

Washington

An accurate estimation of Washington troll albacore landings for the entire 1968 season is virtually impossible when based on total landings through August. Still, the total figure to this point, 1.8 million pounds, gives definite hope for the highest landings since the 1959 season and a probable final total in the neighborhood of 2.5 million pounds. July 1968 landings were nearly 0.5 million pounds, while August figures exceeded 1.3 million pounds. Of the total (1.8 million pounds), over 1.2 million were landed at Ilwaco (Columbia River District). The final 1968 figure will, in large measure, depend on the amount of albacore landed by boats returning to Puget Sound ports at the termination of their fishing activities.

Sizeable numbers of Washington salmon trailers began switching to albacore trolling in mid-July with Washington landings coming from waters off the central and northern Oregon coast. During August, landings came from the same catch areas plus areas further offshore to the north including northern Washington and inshore. By early September, catches were also coming from inshore areas along the Washington coast.

Overall, albacore abundance was quite favorable off the Washington coast during 1968. The lack of suitable handling, storage, and processing facilities again resulted in most dealers discouraging or actually refusing to accept albacore landings. Thus the poundage figures do not reflect the abundance of fish.

Summary

California landings were the lowest since 1942 and were about one-third of the 2 5-year average. Oregon landings were a record high for the second year in a row. Washington landings were double last year's and very near the 2 5-year average. The combined landings of the three states reached an estimated 50.5 million pounds, up 2 million pounds from last year and 8 million pounds over the 25-year average. For the fourth year in a row, rapid warming of the ocean off Oregon apparently caused the main body of albacore to enter the fishery off southern Oregon. The movement of most of the California fleet into northern waters early in the season; the excellent fishing available; and the virtual absence of buyers in Washington, account for the record Oregon landings.

Large fluctuations in the annual harvest and in the location of the fishery are normal. The above average catch, despite the very poor California fishery, is a result of the great mobility of the albacore fleet. The evidence at hand indicates that the albacore resource remains in good condition.

STATUS OF THE 1967-68 PACIFIC COAST DUNGENESS CRAB FISHERY

CHARLES D. MAGOON
Washington Department of Fisheries

The preliminary 1967-68 season total of 34.5 million pounds of Dungeness crab for the combined landings of Washington, Oregon and California is the highest in 10 years and the third highest poundage since the PMFC records began in 1952-53. This represents a 6 million-pound increase over the 1966-67 season and a 2 million-pound increase over the 1965-66 season (Figure 1). The catch for the West Coast, excluding Canada, was 37.5 million pounds of which Alaska contributed about 13 million.

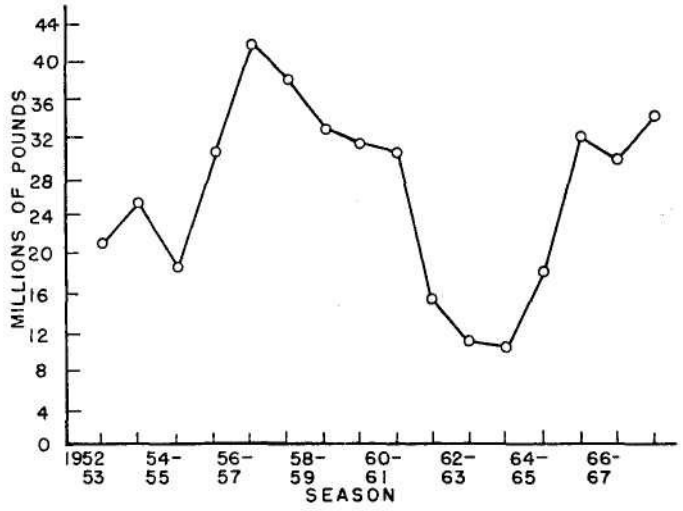

FIGURE 1. Combined Dungeness crab catch Washington, Oregon, California.

California

California had the highest poundage landed with 13-2 million pounds. This is an increase of approximately 2.6 million pounds over the previous season and compares favorably .with the 10-year average of 9.3 million pounds (Figure 2).

The northern California area (Fort Bragg to Crescent City) accounted for "most of the increase. Landings were up from 10.2 million pounds in 1966-67 to 12.2 million pounds in 1967-68. This was 200,000 pounds short of the record set in 1958-59. The northern California price opened at 18 cents per pound, rose to 20 cents by March 1, and finally went to 25 cents per pound late in March.

Central California (San Francisco area) landings increased from a record low of 396,000 pounds in 1966-67 to one million pounds in 1967-68. The central California price to the fishermen opened at 40 cents per pound; dropped to 30 cents two days later; then dropped to 22 cents per pound when the season opened in northern California, and finally rose to 29 cents per pound in late March.

Based on a post season trapping cruise by California Department of Fish and Game biologists, landings for the 1968-69 season in central California are not expected to exceed last season's total. Trawl cruises indicate incoming year classes are small. Thus the forecast is for continued below average fishing.

Pre-season cruises to assess the crab populations are planned for the northern and central California areas in October and November respectively. More accurate predictions of the landings for the 1968-69 season will be made at the conclusion of the cruises.

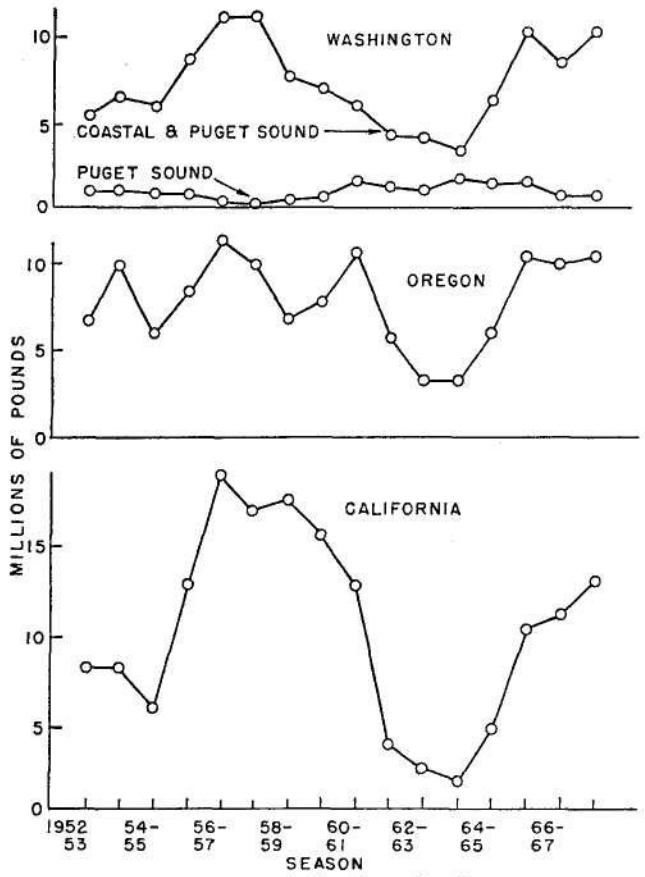

FIGURE 2. Dungeness crab landings by State.

Oregon

Oregon crab landings through June 1968 reveal a catch of 10.0 million pounds. The season total is expected to be between 10.1 and 10.3 million pounds (Figure 2). This represents three seasons in a row when approximately 10 million pounds of crabs were landed in Oregon. Landings were about average or a little below at most ports except Astoria where 37% of the catch was landed (3.7 million pounds). Normally this port lands only about 28-29% of the total Oregon catch.

Washington

The preliminary total of the Washington coastal crab season indicates landings of approximately 10.2 million pounds through September of the 1967-68 season (Figure 2). This is the highest poundage landed since the 1957-58 season, exceeding 1966-67 season by 1.9 million pounds and the 1965-66 season by 0.1 million pounds.

Fishing was very good from December through March, with January setting an 18-year record of 2.6 million pounds. Nearly all of the crabs landed were caught south of Cape Elizabeth, the Destruction Island area failing to produce any significant catches. Approximately 13% of the coastal catch came from inside Willapa Bay. The opening season price of 17 or 18 cents per pound to the fishermen held through March, then rose to 20, and eventually to 22 cents per pound.

The Puget Sound season was only slightly better than last season. The 1967-68 season produced a total of 863,000 pounds as compared to 768,000 pounds for the 1966-67 season.

Alaska

Landings of Dungeness crab in Alaska have increased from *4.4* million pounds in 1955 to an (estimated) all-time high of 13.0 million pounds in 1968 (Figure 3). The abrupt drop from 1965 through 1966 was due, in part, to the earthquake in 1964 which disrupted the fisheries in Kodiak and Prince William Sound. Coupled with this was the relatively high production in Washington, Oregon and California which, until 1967, was a controlling factor in the Alaska production. The king crab production has declined since 1966 and many fishermen have turned to the Dungeness crab fishery in Western Alaska as market conditions for this species have become favorable.

The 1968 catch by region is as follows: the Southeastern Region (Petersburg, Wrangell, Juneau, Yakutat) 3,659,300 pounds; the Central Region (Prince William Sound, Cook Inlet) 2,994,156 pounds; and the Westward Region (Kodiak, Alaska Peninsula) 6,400,000 pounds.

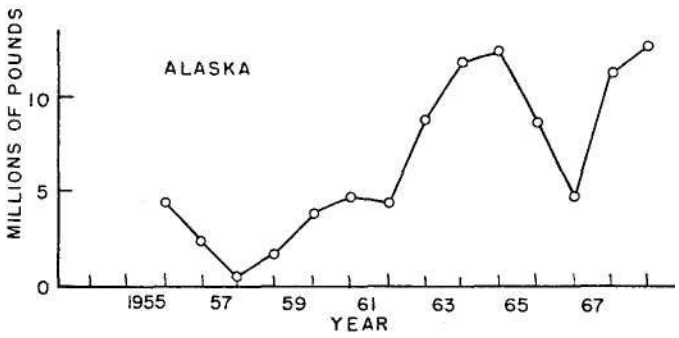

FIGURE 3. Dungeness crab landings in Alaska.

STATUS OF THE 1968 TRAWL FISHERIES OF THE PACIFIC COAST

TOM JOW
California Department of Fish and Game

Pacific coast trawl landings during the past 10 years have fluctuated between 125 and 184 million pounds. An increasing trend beginning in 1962 culminated in the record landing of 184 million pounds in 1966. Last year, 1967, a trend reversal occurred when landings declined 8% from those of 1966 to 170 million pounds (Figure 1). Fleet tie-ups during labor and price negotiations and market difficulties were major factors responsible for the decline in landings. However, the total landings were 19% above the 10-year average of 143 million pounds (Table 1).

TABLE 1

Total Otter Trawl Landings and Landings of Major Species from the Northeastern Pacific by Canadian and United States Vessels in 1966, 1967, and the Mean for 1957-1966 in Millions of Pounds

	Year		
	1966	1967	1957-66 Mean
Total landings	184.4	170.0	142.7
Petrale sole	8.6	7.4	8.9
English sole	13.3	13.7	12.2
Dover sole	15.4	12.0	15.8
Rockfish	23.4	19.6	22.0
Pacific ocean perch	27.2	16.1	16.8
Pacific cod	36.9	23.3	20.3

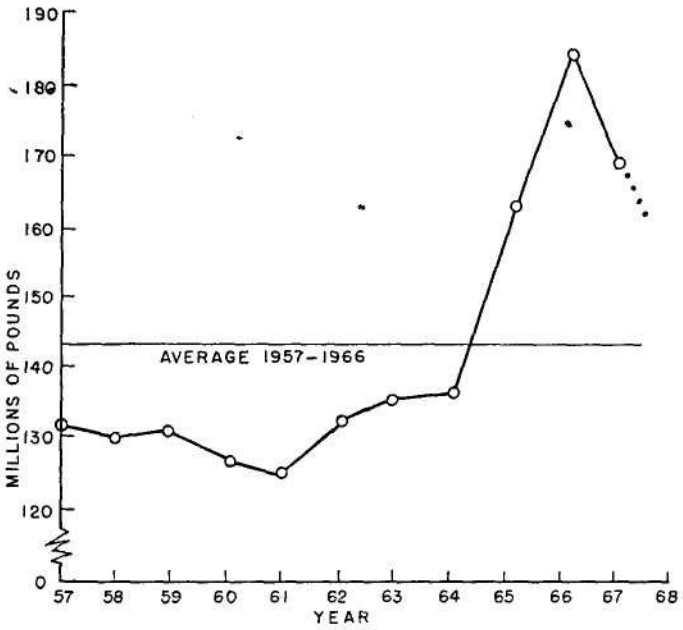

FIGURE 1. Total Pacific Coast trawl landings 1957-1967 and 1968 trend.

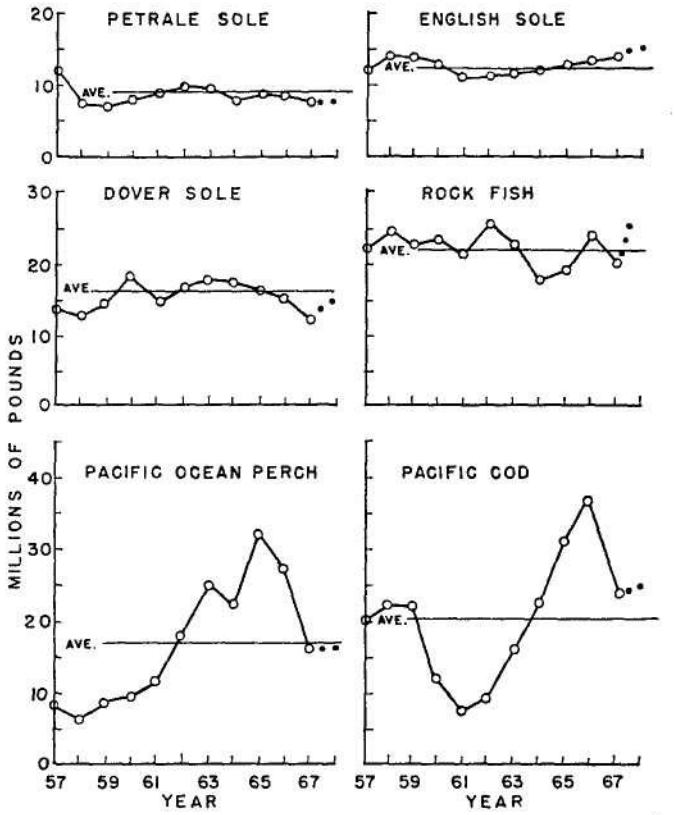

FIGURE 2. Pacific Coast trawl landings by species 1957-1967 and 1968 trends.

Alaska trawl landings were insignificant in 1967. The 1967 British Columbia catch of 37 million pounds was 32% below that of 1966. The record catch by Washington fishermen of 78.9 million pounds was 14% above the 1966 catch but did not offset the declines in other areas. This record catch was the result of the expansion of hake fisheries off the coast and in Puget Sound. Oregon landings in 1967 of 20.6 million pounds were 20% below those of 1966. The 33.1 million pounds landed in California in 1967 were 6% below the 1966 catch.

In 1968, compared to similar 1967 periods, British Columbia landings have increased 29%; Oregon and California landings have increased 5%, and Washington landings have decreased 33%. The Washington decline is due to the absence of a coastal hake fishery in 1968 which did not materialize due to the marginal economic situation caused by a worldwide decrease in fishmeal prices. The current trend in landings indicates that final 1968 landings will be below those of 1967 but above the 10-year average (Figure 1).

Landings of five of the six major species declined in 1967. In contrast, in 1968, trends for five of the six species are upward (Figure 2).

Petrale Sole

The 1967 catch of petrale sole of 7.4 million pounds declined 14% from the 8.6 million pounds of 1966 and 17% from the 10-year average of 8.9 million pounds. Landings declined for Canada and each of the states. In 1968, compared to similar 1967 periods, Canadian petrale landings were down 28%; the Washington catch was equal; Oregon landings declined 4%, and the California catch increased 2%. The total 1968 coastal catch is expected to be below average and less than the 1967 total of 7.4 million pounds.

English Sole

The 1967 English sole coastal landing of 13.7 million pounds increased 3% and 12%, respectively, over the 1966 and the 10-year average landings. Oregon catches were down from those of 1966, but increases were noted in all other areas.

This year, trends in English sole catches are upward for all states and Canada. Compared to 1967, respective increases of English sole landings for California, Oregon, Washington, and Canada are 3%, 6%, 11%, and 45%. Total 1968 landings should be about 15 million pounds.

Dover Sole

The 1967 Dover sole catch of 12 million pounds was 22% below that of 1966 and 24% below the 10-year average. Canada and each of the states had decreased landings. The outlook for 1968 is improved. Catches are up in all areas, and the final catch should exceed 15 million pounds.

Rockfish

Rockfish landings in 1967 of 19.6 million pounds declined 16% from those of 1966 and 11%. from the 10-year average landing. Landings were down in Canada and each of the states. In 1968, compared to similar 1967 periods, rockfish landings are about equal in Oregon and up significantly in Canada, Washington, and California. The total for 1968 should be about 25 million pounds.

Pacific Ocean Perch

Landings of Pacific ocean perch continued to decline in 1967. The 16.1-million-pound take of 1967 was 41% and 4% below the respective catches of 1%6 and the 10-year average. The 1968 trend to date in perch landings is downward. Canadian landings have increased significantly, but landings in Washington and Oregon have declined. Consequently, the final 1968 catch should be below those of recent years but close to the 10-year average of 16.8 million pounds.

Pacific Cod

The upward trend of Pacific cod landings of recent years was reversed in 1967 when landings totaled 23.3 million pounds, a 37% decrease from 1966. This total, however, was 15% greater than the 10-year average of 20.3 million pounds.

The trend in 1968 is upward as Canadian landings are improved and offset the decline in Washington landings. The majority of Pacific cod are taken by Canadian and Washington fishermen. Pacific cod is not a major species in Oregon landings and is seldom taken off California.

Foreign Fishing Activities

Foreign distant sea trawlers continued to fish in the northeastern Pacific in 1967 and in 1968. Their catch off the United States of hake and rockfish for 11 months of 1967 was estimated at 432 million pounds.

Summary

Pacific coast groundfish catch by Canadian and U.S. fishermen in 1967 of 170 million pounds was a decline from the record 1966 catch of 184 million pounds but was significantly above the 10-year average of 143 million pounds. Fleet tie-ups and reduced market demands were major factors contributing to the decline.

Landings in 1967 of petrale sole, Dover sole, rockfish, Pacific ocean perch, and Pacific cod declined from those of 1966. Of the six major species only English sole increased in 1967.

Foreign fleets were active in the northeastern Pacific in 1967 and 1968.

Landings in 1968 have improved, but the downward trend in total catch is expected to continue due to the absence of the Washington coastal hake fishery which boosted Washington landings to a record high in 1967.

With the exception of Pacific ocean perch, the catches of all major species have increased in 1968 over similar 1967 periods. Final landings for 1968 should exceed 150 million pounds, well above the 10-year average of 143 million pounds.

STATUS OF THE 1968 PACIFIC COAST TROLL SALMON FISHERY

STACY V. GEBHARDS Idaho
Fish and Game Department

The estimated troll salmon catch for British Columbia, Alaska, Washintgon, Oregon, and California for 1968 is 63-8 million pounds (round weight), an increase of 11 percent over 1967 but well below the record catch of 71 million pounds landed in 1966. Total landings by species were 23.8 million pounds of chinook and 40.0 million pounds of coho, both showing an increase over 1967 (Figure 1). Coho landings in Alaska and British Columbia increased sharply, while Washington, Oregon and California dropped below the 1967 landings (Figures 2 and 3).

Since 1968 was the "off" year for pink salmon, few pinks were landed.

TABLE 1

Pacific Coast States Estimated Troll Salmon Landings (pounds round), 1968.

State	Chinook	Coho	Total
British Columbia	9,814,000	20,887,000	30,701,000
Alaska	5,805,000	6,575,000	12,380,000
California	5,175,000	2,875,000	8,050,000
Washington	1,890,000	4,620,000	6,510,000
Oregon	1,100,000	5,000,000	6,100,000
Total	23,784,000	39,957,000	63,741,000
1967 Total	20,400,000	35,800,000	56,200,000

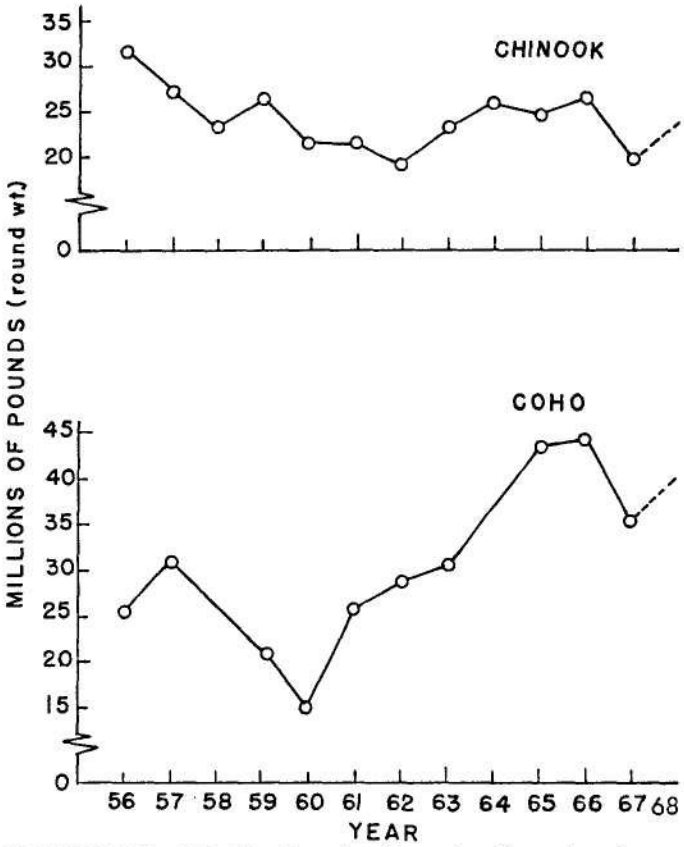

FIGURE 1. Total Pacific Coast landings of troll-caught salmon, 1956-68 (1968 figures are estimated).

Troll Chinook Fishery

Oregon chinook landings for 1968 will be about 1.1 million pounds (round weight), slightly under the 1.3 million pounds landed in 1967. The Columbia River area had good catches in April and May, but August was very poor. The Newport area had fair fishing in May but the rest of the summer has been poocGcfbs Bay area chinook fishing has been good and is the only area in which 1968 landings are better than 1967. Brookings landings have been poor during the entire season.

The expected 1968 "Washington total of 1.9 million pounds round weight is below the recent "1961-1967 mean of 2.1 million pounds per annum. Still, the catch was 2.5 million pounds below the long-term average (1935-1960) of 4.4 million pounds and continued the trend of small catches which has prevailed since the late 195O's. The trolling grounds off Washington, from the Quillayute River south to Willapa, which are fished by boats operating from the coastal ports of LaPush and Westport, consistently produced the best catches during the season. Over 75 percent of the Washington troll chinook landings occurred at these two ports. One exception was a period of excellent fishing off the mouth of the Columbia River in April and early May. Fishing grounds off northern Washington, the Strait of Juan de Fuca, and southern Vancouver Island, were again poor producers for Washington boats, continuing a trend which became apparent in the early 1960's.

The near-record-low chinook landings in California, coupled with poor escapement to the Sacramento River in 1967, prompted the Department of Fish and Game to initiate action to restrict salmon landings. Although chinook landings increased somewhat, the Department has not changed its position regarding fishery restriction and will not until such time as spawnings escapements show signs of recovery.

Troll Coho Fishery

Oregon coho landings for 1968 will be about 5.0 million pounds round, compared to 8.3 million pounds landed in 1967. This ranks as the fifth highest coho year on record, topped only by 1935, 1965, 1966 and 1967. The coho in this year's troll catch were quite small. The average weight for troll-caught coho in 1968 was 5.4 pounds dressed, as compared to 7.2 pounds dressed in 1967. The Columbia River area had an exceptionally good June fishery but July and August landings were down. The Newport area had slow fishing during the entire season. Coos Bay area had good fishing in June and August. July catches were only fair in comparison to last year, but good when compared to earlier years. Brookings had only fair landings in June and August. July catches were very poor in comparison to earlier years.

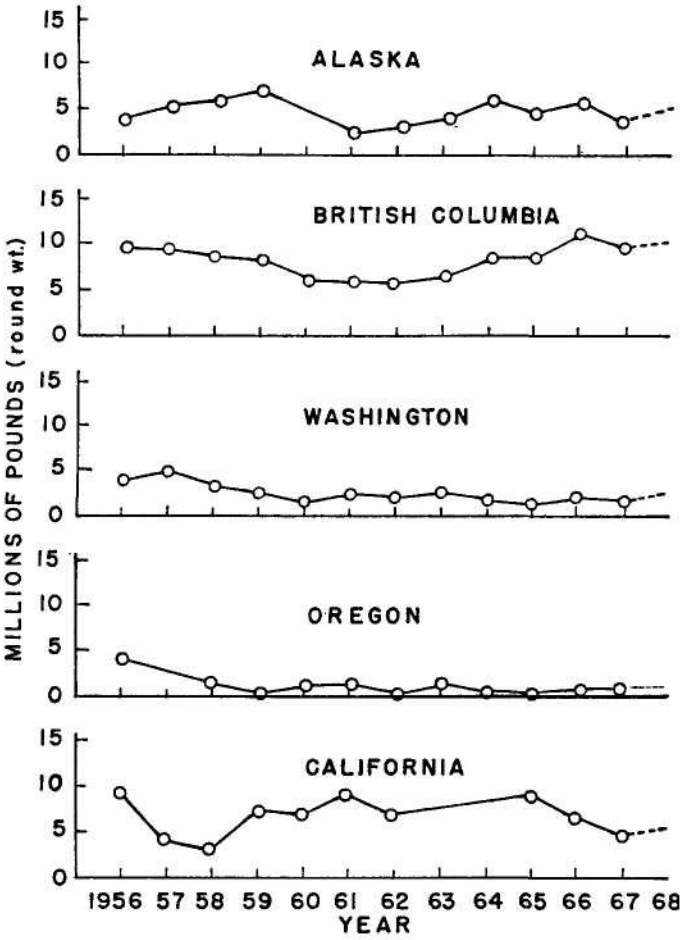

FIGURE 2. Pacific Coast troll chinook salmon landings, 1956-68 (1968 figures are estimated).

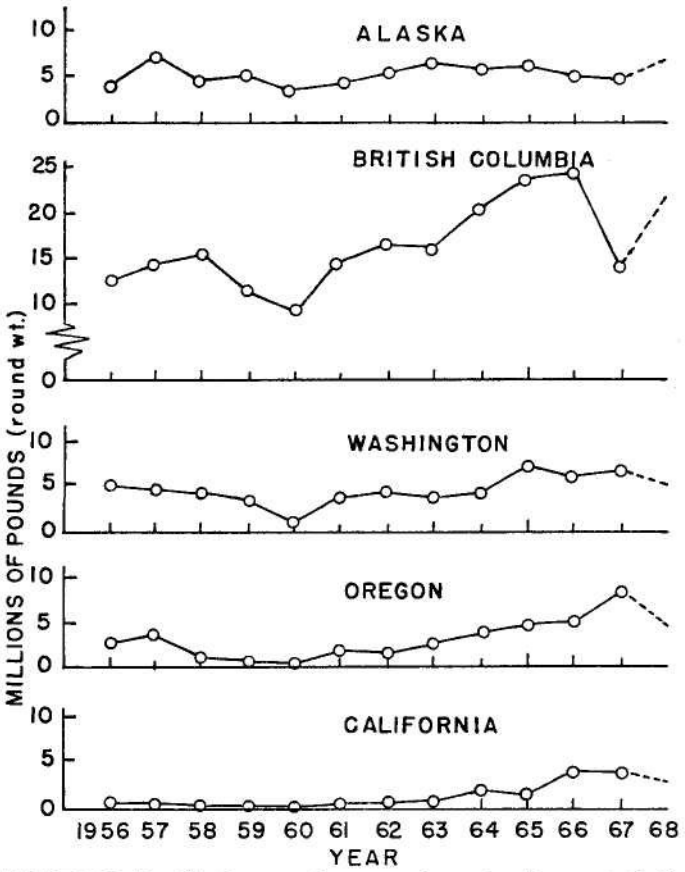

FIGURE 3. Pacific Coast troll coho salmon landings, 1956-68 (1968 figures are estimated).

The early influx of warm water along the Oregon coast may have played a part in the oceanic distribution of coho this year. Tuna fishermen reported finding a greater than normal abundance of coho between 100 and 150 miles offshore.

» The estimated total of *4.6* million pounds round weight landed in 1968 by-Washington represented a marked decline of about 1.5 million poiindi from the 6.1 million pound levels of the previous 2 years, 1966-1967. This was slightly below the recent mean (1961-1967) of 5*.3 million pounds annually, and barely exceeded the long-term (1935-1960) average of 4 million pounds.

Exceptionally good catches were made all along the Washington coast immediately after the opening of the season on June 15, but a prolonged period of erratic and poor or below-average fishing prevailed during much of July and August in many of the important trolling areas. Fishing improved again in late August and early September with exceptionally good catches being made all along the coast. A 2 2-inch total length minimum size limit imposed on the Washington fishery definitely suppressed potential troll coho landings.

Coho landings in California decreased by about 800,000 pounds round from 1967. Recovery of almost 4,000 marked coho from Columbia River hatcheries indicates that Oregon and Washington stocks contribute substantially to California coho landings.

The most notable feature of the 1968 season was the relatively small size of the coho taken. The average size in all major fishing areas was the lowest since at least 1963.

Pink Salmon

The Washington troll fishery depends primarily on "odd year" pink salmon stocks from the Fraser River and Puget Sound streams. Since even-numbered years are "off year" for this species, in this area the total landings for the season were less than 20,000 pounds. Other states did not report pink salmon landings for 1968.

STATUS OF THE 1968 PACIFIC COAST PINK SHRIMP FISHERY

CHARLES D. MAGOON
Washington Department of Fisheries

The estimated combined 1968 landings of 14 million pounds of pink shrimp for the States of Washington, Oregon, and California are an all-time high. This is approximately a million pounds higher than the previous record set last year. Total West Coast poundage, excluding Canada, is approximately 52.5 million pounds. Annual shrimp landings for Washington, Oregon, and California appear in Figures 1 and 2. Approximately 38.5 million pounds were landed in Alaska (Figure 3).

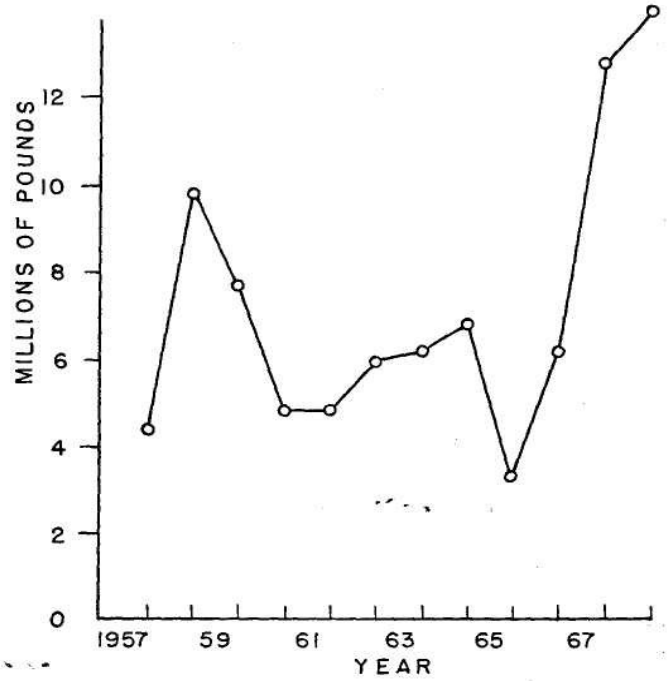

FIGURE 1. Combined shrimp landings for Washington, Oregon and California.

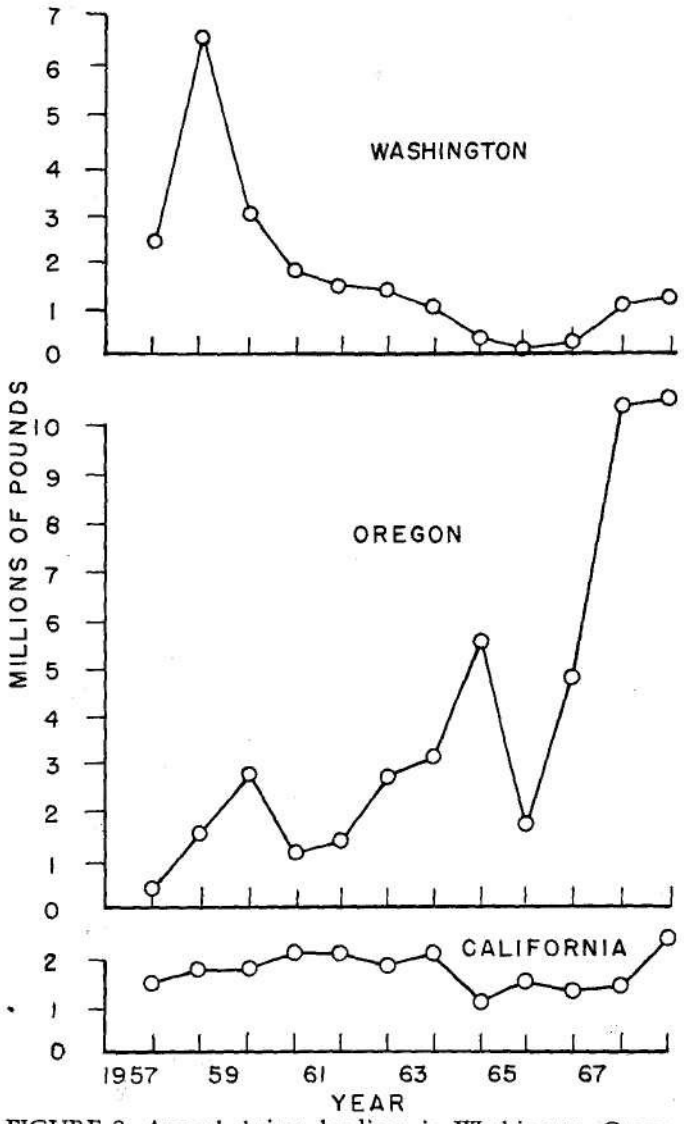

FIGURE 2. Annual shrimp landings in Washington, Oregon and California.

California

California shrimp fishermen broke all existing season records with landings of 2,272,225 pounds as of September 9, 1968. The previous record was 2,090,904 pounds caught in 1963.

Area A (Eureka-Crescent City) provided the bulk of the catch with landings of 2,080,620 pounds — also a record for this area. The increased landings reflected quota increases for Area A of 250,000 pounds just prior to the season and an additional 500,000-pound increase in July. The 2,000,000-pound quota for the area was attained in 49 days of fishing during the period May 1 to July 14. Ten vessels participated in the fishery. Principal areas of fishing were off Crescent City and off the mouth of the Klamath River in 60 to 80 fathoms of water. Catch per hour was 914 pounds in May; 1,759 in June, and 1,038 in July, averaging 1,202 pounds per hour for the 1968 season. This is the highest catch rate on record, substantially exceeding the previous high of 718 pounds per hour in 1967.

A post-season survey in Area A, now in progress, reveals a good showing of shrimp of the 1968-year class which should contribute strongly to the 1969 fishery.

The only other shrimp fishing in California was in Area B-2 (Bodega Bay) where 3 vessels landed 191,605 pounds through September 9- It appears that the fishermen will not reach the quota of 250,000 pounds for Area B-2. Reduced shrimp catches and increased incidental catches of small fish have hampered operations. Catch per hour for this fishery ranged from a low of 479 pounds in May to a high of 747 pounds in July, and averaged 572 pounds. Catches were made off Pt. Reyes mostly in 40 to 50 fathoms of water.

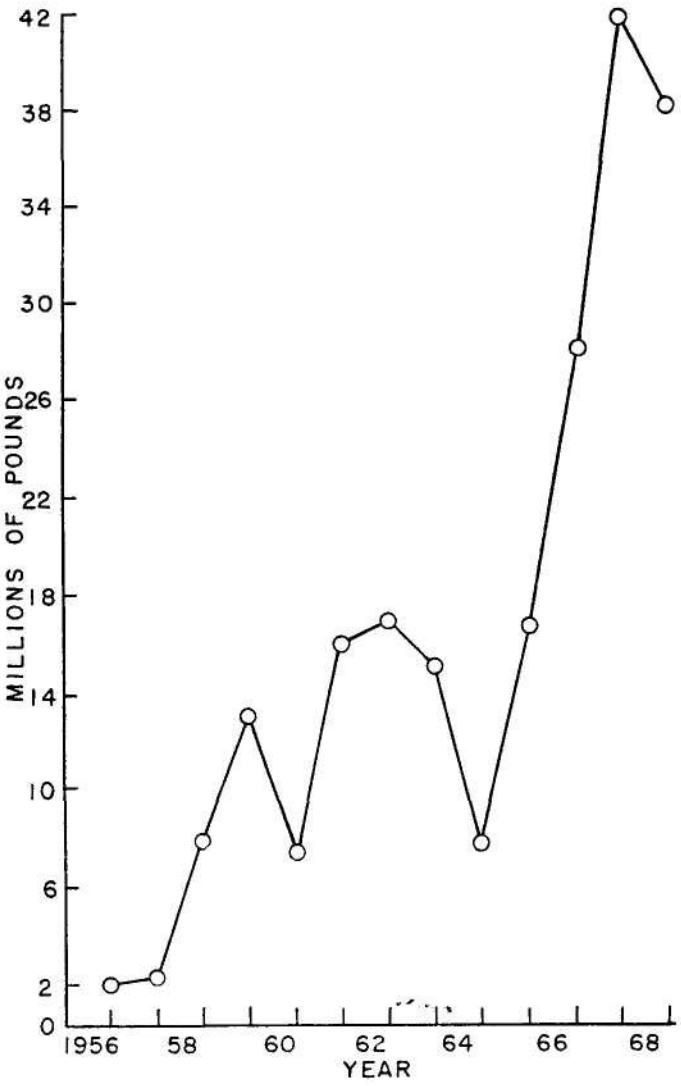

FIGURE 3. Annual shrimp landings in Alaska.

No effort was reported in Areas B-l (Fort Bragg) and C (Morro Bay) this year. Outlook for the 1969 season in the Eureka-Crescent City and Bodega Bay areas is good, "provided the 1968-year class makes a strong contribution.

Oregon

The 1968 Oregon shrimp fishery landed 9,498,000 pounds through August 31, despite marginal market conditions after mid-May. This total was slightly ahead of the record 1967 landing of 9,058,000 pounds in the same period. An estimated 10.5 to 11.0 million pounds will be landed in Oregon before the October 31 closure. This compares to last year's total of 10,374,000 pounds and a 10-year average of 3,500,000 pounds.

The excellent 1968 season was due in large part to the very strong 1966-year class which dominated landings in all areas. A strong showing of the 1965-year class also contributed significantly to landings at Newport and northward, while the 1967-year class was very weak. South coast landings showed fair amounts of 1967-year class shrimp. Catch per effort at Coos Bay rose from 370 pounds per hour of trawling in 1967 to 580 in 1968, with total landings of 3,450,000 pounds, largest since 1964. Port Orford landings reached a record 995,000 pounds taken at an all-time high rate of 1,280 pounds per hour for the period April 15-August 31.

The Astoria landings of 2,007,000 pounds were the highest since 1959, and were taken at a record rate of 790 pounds per hour. Landings at Garibaldi (573,000 pounds) and Newport (1,940,000 pounds) were below 1967, but catch per hour was higher. Brookings landings declined to 530,000 pounds, but catch per effort was above average (845 Ib/hr). A closure on landings captured off California was put into effect on August 2, after the California season was closed.

Washington

Washington pink shrimp fishermen enjoyed excellent fishing during 1968. Three boats landed 1.2 million pounds through September. This is almost exactly the same as a year ago. The fishery got an unusually early start, with 29,000 pounds landed in February and 16,000 pounds in March. Fishing accelerated thereafter, and 202,000 pounds were landed through April — all caught off Oregon. Fishing the rest of the season was off Grays Harbor where 962,000 pounds were taken. The Willapa and Destruction Island areas did not produce commercial quantities. All shrimp were landed at Westport and processed by one shrimp peeling machine. The catch per effort was excellent, averaging 568 to 745 pounds per hour from May through August. A high catch rate continued through September.

The catch was about equally composed of 1965- and 1966-year-class shrimp. These shrimp were of good average size, yielding counts per pound of 134 in May, 112 in June, 110 in July, and 103 in August. The modest total landings over the past two years were due to a lack of effort rather than lack of shrimp. Conditions look good for next year's fishing. The catch rate was high late in the season when the 1966-year class made a strong showing. The 1967-year class, however, appears to be very poor.

Ajaska

The advent of the peeling machine plus exploratory fishing by state and federal agencies is responsible for the tremendous increase in production since 1957. Market demand for the machine-peeled product is the only factor controlling the present production in Western Alaska, which has a tremendous potential. There are many stocks not being fished at present by U. S. fishermen because of lack of market.

In Southeastern Alaska the sizes of the stocks largely control the production. This fishery is a traditional beam-trawl operation by small vessels in inside waters. Until 1957 the total production was a high quality hand-picked product.

It is estimated that the total 1968 shrimp production in Alaska (38.5 million pounds) will be down slightly from 1967 when the landings reached an all time high of 41.8 million pounds. Annual shrimp landings for Alaska appear in Figure 3.

The catch by region for 1968 is broken down as follows: the Southeastern Region (Petersburg-Wrangell area) produced 2,386,000 pounds; the Central Region (Cook Inlet) produced 14,000 pounds; and the Westward Region (Kodiak-Alaska Peninsula) produced 36,100,000 pounds.

STATUS OF THE 1967 SALMON AND STEELHEAD SPORT CATCHES IN THE PACIFIC COAST STATES

STACY V. GEBHARDS
Idaho Fish and Game Department

Estimated total catch of salmon and steelhead during 1967 in Washington, Oregon, California, Alaska, and Idaho by sport fishermen was 2,026,105 fish of which over 1 million were coho salmon. Since 1966 numbers of anglers in Oregon and particularly in Washington increased and the total sport catch in the 2 States increased over 260,000 fish. Coho salmon in 1967 comprised 51% of the sport catch; chinook, 22%; steelhead, 21%; pink salmon, 5%; and red salmon, 1% (Table 1).

TABLE 1

1967 Salmon and Steelhead Sport Catch

State	Anglers	Chinook	Coho	Red	Pink	Steelhead	Total catch	Fish/angler per year
Washington	673,650	274,000	556,300	------	96,000	279,970	1,206,270	1.8
Oregon	304,000	68,000	389,000	------	------	101,000	558,000	1.8
California*	(Unavail-able)	81,600	50,300	------	------	23,000	154,900	------
Alaska	76,950	10,275	31,440	21,820	9,700	1,500	74,735	1.0
Idaho	23,000	7,700	------	------	------	24,500	32,200	1.4
Total		441,575	1,027,040	21,820	105,700	429,970	2,026,105	

*Freshwater catch data available only for Sacramento River system.

In order to compare the sport catch which is always reported in numbers of fish with the commercial catch which is usually reported in numbers of pounds, the following conversion factors were used: coho 6 pounds, chinook 10 pounds, pink 5 pounds, and steelhead 5 pounds. This resulted in an estimated sport catch of 11.2 millioH' pounds of salmon and 2.1 million pounds of steelhead, for a total sport catch of 13.3 million pounds.

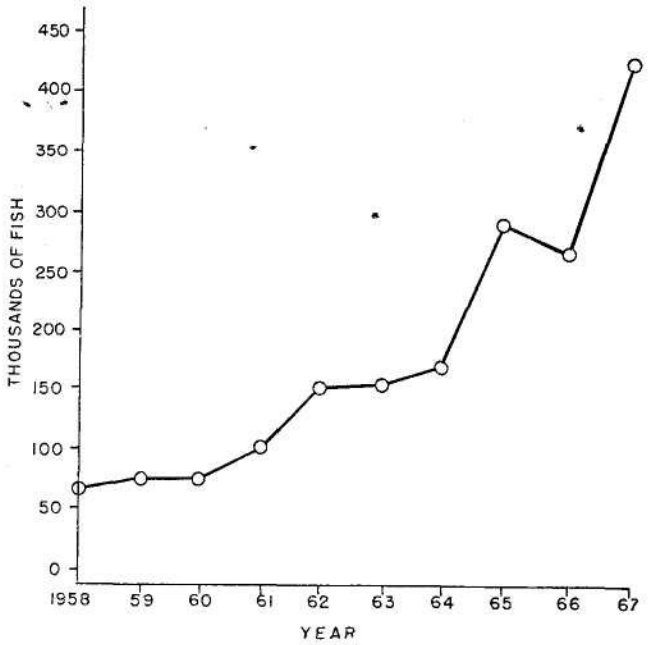

FIGURE 1. Columbia River estuary and adjacent ocean sport catch, salmon.

Washington

Punch card summary data for Washington, 1964-67, showed 1967 to be a record year in both the marine and freshwater fisheries. The marine sport fishery recorded 927,828 salmon taken during 1,295,000 angler trips, or 0.7 salmon per trip. Of the total marine catch, 34% were taken in the Ilwaco area (Columbia River north to Klipsan Beach) and 23% in the Westport area (Klipsan Beach north to Cape Elizabeth). Estimate of the 1967 steelhead catch was 280,000, almost entirely in freshwater, by 137,650 anglers.

Oregon

The Oregon sport catch in 1967 was estimated at 558,000 fish of which 456,000 were salmon and 102,000 were steelhead. As predicted at the 1967 PMFC meeting, the catch represents a new record and an increase of 103,000 fish over the 1966 catch. A total of 326,400 anglers purchased Oregon salmon and steelhead licenses, but only 190,000 (58%) made catches. Of the remaining 42%, 22,000 or 8% did not fish, and 113,000 or 34% fished but caught no fish. Anglers who fished caught an average of 1.8 salmon or steelhead per year.

The 1967 sport fishery at the mouth of the Columbia River was evaluated through a joint effort of the Oregon Game Commission and Washington Department of Fisheries (Table 2). Sample period was from late June through September. A record catch was made in 1967; the trend is illustrated in Figure 1. Early estimates in 1968 indicate a sharp decline in catch.

California

The marine sport fishery took 72,566 chinook and 50,280 coho during 160,326 angler days, or 0.8 salmon per angler day.

TABLE 2

Columbia River Estuary and Adjacent Ocean Catch, Oregon and Washington, 1967

Angler trips	Chinook	Coho	Pink	Total	Fish/angler trip
193,000	87,000	332,000	2,000	421,000	2.1

Data for the freshwater fishery were incomplete and were available only from the Sacramento system where 9,000 fall-run chinook and 23,000 steelhead were caught.

Preliminary estimates for 1968 indicate the marine recreational fishery by the San Francisco party-boat fleet had its best season in recent years. Recovery of marked coho from Columbia River hatcheries showed northern coho stocks are making significant contributions to California landings.

Alaska

Total poundage of salmon and steelhead landed by Alaska sport fishermen was 653,000 pounds. Of these, 39% were coho, 32% chinook, 21% red salmon, 6% pink salmon, and 2% steelhead. Estimates of the 1968 sport fishery currently indicate a 10% increase in licensed anglers but only a slight increase in total catch.

Idaho

A total of 48,209 salmon and steelhead permits were issued (no charge) in Idaho during 1967; however, only 48% of the permit holders actually fished. During the calendar year, steelhead harvested in the spring are fish that entered the Columbia River the previous year, while those caught in the fall fishery are fish of the current year. Salmon and steelhead are taken in the Snake River below Hells Canyon Dam, and in the Clearwater and Salmon River drainages.

Appendix 2 — Cooperative Research

FINAL REPORT OF PORT SAMPLING, JANUARY 1966-NOVEMBER 1968

DANIEL W. GOTSHALL and ROBERT HARDY
California Department of Fish and Game

The northern California and southern Oregon region from Trinidad Head to Cape Blanco supports local fishing fleets in the major ports of Crescent City, Brookings, and Port Orford. These ports are situated at such distances from regional headquarters in either northern California or Oregon that only sporadic and incomplete data on the fisheries of the area can be obtained. Lack of manpower and excessive travel expense precluded sampling from Eureka, California or Newport, Oregon on a regular basis previous to 1966.

In May 1965 personnel from the California Department of Fish and Game and the Oregon Fish Commission proposed that the Pacific Marine Fisheries Commission furnish manpower in the ports of Crescent City, Port Orford and Brookings on a year-around basis to monitor and sample landings on crab, shrimp and bottomfish and to collect and analyze life history data. The data and observations are prerequisite to proper management of these resources. The Pacific Marine Fisheries Commission on November 20, 1965 approved the proposal and agreed to furnish the required matching money (25%) to permit federal funding of the remainder (75%) of the costs via a Commercial Fisheries Research and Development Act (P. L. 88-309 or Bartlett Bill) contract.

The port sampling program officially began in January 1966, although some crab sampling was accomplished during December 1965. Sampling of the fisheries was continued on a regular basis until October 31, 1968, except from April 1 to May 31, 1967 when a resident biologist was unavailable. During this time some sampling was accomplished by personnel from Eureka. The biologists employed in the port sampling position and their service time follows:

v Gary Varney: January 1 - January 31,1966 Mel Willis: February 8 - July 25, 1966 Steve Taylor: July'26,1966-March 31, 1967 Robert Hardy: June 1,1967 - October 31,1968

The port samplers were under the supervision of Daniel Gotshall, California Department of Fish and Game, Marine Resources Operations, Eureka, California.

This report presents information on the fisheries involved, the methods of sampling, and summarization of data collected.

CRAB

In the Crescent City crab *(Cancer magister)* fishery there are 40-50 vessels with 2- to 3-man crews. These vessels range in length from 30 to 55 feet. The fishing range of these vessels is generally from Big Lagoon, Humboldt county on the south, to Pelican Bay on the north except during the latter part of the season when some of the larger vessels usually extend the range to Cape Sebastian and Gold Beach, Oregon. Depths fished are generally 4 to 40 fathoms. Most fishermen use the standard 40-inch circular traps. The number of traps per boat range from about 50 to 300.

The 10 to 20 crab boats at Brookings and the gear they use are similar to those at Crescent City. In the past two years the harbor entrance (Mouth of the Chetco River) has been in poor condition and at times rough weather makes it impassable. During the 1967-68 season Brookings-based vessels landed crabs at Crescent City when the Brookings entrance was dosed. Brookings vessels ranged from Pelican Bay to Cape Sebastian.

Port Orford has 10-15 vessels (30-40 feet) that fish for crabs. They are smaller than those at the other ports because they are hoisted onto trailers on the pier for protection from southerly storms. These boats range from Gold Beach to the Sixes River just north of Cape Blanco.

Sampling

Obtaining catch data of the crab fishery involved interviewing the fishermen at dockside while they unloaded their catch. Information collected included: number of traps pulled per day; length of time the traps were fished; and the location and depth fished.

Sampling catches for size, weight, and condition data involved measuring widths and weights of crabs to determine average weight, and examining the shell for hardness and mating marks. Mating marks are chafe marks on the side of the claw of male crabs. The marks result from clasping females during copulation. Sampling was similar at all three ports. The goal* was two 100-crab samples per week at Crescent City and one 100-crab sample per week at the other ports.

The port sampler examined, measured, and weighed 7,439 crabs at Crescent City during the project (Table 1). The monthly mean shoulder widths at Crescent City during the 1967-68 season were somewhat smaller than the means of the previous two seasons. The maximum size by month occurred in January in all three seasons and the minimum in the latest month sampled during the seasons. A higher percentage of soft crabs was observed this past season that during the 1966-67 season. High percentages of soft crabs usually occur when large numbers of small crabs (near the legal size limit) are included in the samples.

At Brookings and Port Orford 2,898 and 3,169 crabs respectively were weighed, measured, and examined for shell condition during the project period (Tables 2 and 3). As at Crescent City, crabs sampled at both of these southern Oregon ports during the 1967-68 season were smaller than those taken in the previous two seasons. Throughout the 1967-68 season the crabs at the three ports were comparable in average size.

TABLE 1

Crab Sampling Summary — Crescent City

Month	No. of Crabs	Percent Soft	Mean Shoulder Width (mm)	Mean Weight (lbs.)	Percent Sublegal
			1965-1966 Season		
December	92	6.5	174	*	0.0
January	265	2.3	176	2.10	0.4
February	300	0.3	173	1.70	1.6
March	500	8.0	173	1.88	1.6
April	400	10.2	170	1.72	3.0
May	400	5.0	169	1.67	5.0
June	100	8.0	168	1.65	0.0
Total	2057				
			1966-1967 Season		
December	800	2.9	178.8	2.08	0.5
January	499	1.4	182.7	2.19	0.2
February	400	1.3	177.3	2.06	1.8
March	300	2.0	176.9	2.04	5.3
April	200	1.0	175.6	1.95	7.0
May	*	*	*	*	*
June	86	1.0	169.2	1.86	8.1
Total	2285				
			1967-1968 Season		
December	497	13.8	171.4	1.82	4.2
January	700	5.2	171.9	1.85	0.7
February	700	5.4	170.8	1.81	3.7
March	500	4.0	168.4	1.72	4.6
April	500	3.6	169.0	1.74	6.0
May	200	4.5	166.1	1.60	5.0
Total	3097				

*No Data Available

The high percentage of soft crabs at Port Orford in December and January of the 1967-68 season was due to many small, but mostly legal crabs that entered the fishery. The average sizes were not excessively small because of large crabs also in the samples.

Another responsibility of the port sampler was the recovery of tagged crabs and bottomfish..The sampler recovered 9 California suture-tagged crabs during the 1967-68 season, all of which had molted at least once since being tagged. The average increase in shoulder width was 28.5 mm. The average growth for 9 tagged crabs in 1966-67 season and 9 in the 1965-66 season was 31.0 and 27.5 mm respectively.

Of a total of 59 Oregon-tagged crabs returned to the sampler by fishermen and dealers in Brookings and Port Orford during the 1965-66 season, 32 had molted, and the average increase in shoulder width was 28.0 mm.

Commercial crab fishermen were interviewed at all three ports for catch-per-unit-of-effort data. A total of 401 interviews was made from January through May 1966. The data available at this time for 1966 are a combination of the season's data from all three ports and indicate an increased catch per trap for longer sets (Table 4).

The catch-per-unit-of-effort data for the 1966-67 and 1967-68 seasons have been separated by port of landing (Table *5T*- The data represent 464 and 476 fisherman interviews for the 1966-67 and 1967-68 seasons, respectively. These data reflect slightly better fishing success for the past season over the 1966-67 season. The highest catch per trap for both seasons was recorded at Crescent City. The apparent decrease in number of pounds of crab per trap with longer "soaks" at Brookings in 1967-68 is not real. The fishing effort was low, and small numbers of interviews resulted in too few data. The increased catch per trap would be more obvious if the data could be broken into shorter time periods. Also obscuring the ratio is the fact that when fishing success is good, the fishermen run their gear more frequently; thus the longer "soaks" occur mainly when the catch per unit of effort decreases.

The Crescent City sport crab fishery was monitored, when time permitted, during the entire study period. Interviews were made whenever possible for catch-per-unit-of-effort data, and crabs were measured to determine average size. No sport fishery was observed at Brookings or Port Orford.

The catch of 54 pier fishermen and 60 skiff fishermen during February, March, and April 1966 was 42 and 421 legal crabs respectively. During the period December 1966 through

TABLE 2

Crab Sampling Summary — Brookings

Month	No. of Crabs	Percent Soft	Mean Shoulder Width (mm)	Mean Weight (lbs.)	Percent Sublegal
		1965-1966 Season			
December	*	*	*	*	*
January	*	*	*	*	*
February	200	2.5	174	*	1.5
March	400	1.5	174	*	0.8
April	400	0.8	172	*	3.0
May	300	0.7	171	1.76	4.3
Total	1300				
		1966-1967 Season			
December	100	0.0	175.4	2.05	3.0
January	200	1.5	174.6	2.03	2.5
February	198	0.5	179.5	2.18	1.5
March	200	1.5	173.5	1.96	8.5
April	*	*	*	*	*
May	*	*	*	*	*
Total	698				
		1967-1968 Season			
December	100	9.0	171.1	1.79	3.0
January	200	6.0	172.2	1.86	0.5
February	200	1.5	173.2	1.91	1.0
March	100	2.0	168.5	1.69	1.0
April	300	4.0	166.6	1.62	13.0
May	*	*	*	*	*
Total	900				

*No Data Available

TABLE 3

Crab Sampling Summary — Port Orford

Month	No. of Crabs	Percent Soft	Mean Shoulder Width (mm)	Mean Weight (lbs.)	Percent Sublegal
		1965-1966 Season			
December	*	*	*	*	*
January	*	*	*	*	*
February	200	0.5	175	*	0.0
March	300	2.0	171	*	0.7
April	300	5.3	169	*	7.0
May	200	2.0	169	1.78	4.5
Total	1000				
		1966-1967 Season			
December	300	4.7	172.1	1.90	4.7
January	189	0.5	182.5	2.26	0.0
February	400	5.8	177.8	2.14	2.8
March	284	8.4	174.7	1.97	12.3
April	96	4.2	170.0	1.83	12.5
May	*	*	*	*	*
Total	1269				
		1967-1968 Season			
December	100	30.0	169.0	1.76	11.0
January	100	34.0	170.1	1.70	1.0
February	200	2.0	171.1	1.85	5.0
March	200	10.5	169.3	1.76	7.5
April	300	10.1	168.4	1.71	3.0
May	*	*	*	*	*
Total	900				

*No Data Available

TABLE 4

Catch Per Unit of Effort in Pounds of Crabs Per Trap
Crescent City - Brookings - Port Orford

	No. of Days Traps Out						
	1	2	3	4	5	6	7
Crabs Per Trap	6.5	8.4	7.9	10.1	13.8	12.8	14.5

TABLE 5

Catch Per Unit of Effort in Pounds of Crabs, 1965-1966 Season

Port	No. of Days Traps Out 1	2	3	4
	1966-1967 Season			
Crescent City	13.4	13.5	14.6	13.9
Brookings	12.1	13.8	15.1	16.5
Port Orford	6.3	6.7	9.4	14.7
	1967-1968 Season			
Crescent City	15.5	14.3	15.5	17.8
Brookings	11.9	8.5	4.0	*
Port Orford	13.7	10.4	10.4	14.6

***No Data Available**

March 1967, 29 skiff fishermen caught 69 crabs. Pier fishermen had poorer success catching only 13 legal crabs. During last season, 49 skiff fishermen had 358 crabs when interviewed while 9 pier fishermen had only 5 legal crabs.

The average size of crabs caught'by, skiff fishermen in February, March, and April 1966, was 176, 168 and 166 mm respectively. The crabs caught by skiff fishermen in December, January, and March 1967-68 averaged 171, 166, and 163 mm respectively.

SHRIMP

The fishery for ocean shrimp, *Pandalus jordani,* in the region is divided into two areas. One area is fished by vessels from Crescent City, Eureka and Breokings and extends from about Trinidad Head, California to off Mack Arch, Oregon and at depths of from 50 to 100 fathoms. In the past two years, because of the long distances to the fishing grounds, the Eureka vessels have started moving up to Crescent City at the beginning of shrimp season and fishing out of that port. Shrimp landings at Eureka during the past season were thus reduced to only a minor part of the total catch.

The landings in California are regulated by a quota which is set by the Fish and Game Commission on the basis of recommendations from biologists of the Department of Fish and Game. The quota ranged from 1.25 million to 2.0 million pounds annually from 1966 through 1968. When the California quota is reached, the Eureka and Crescent City vessels generally move to Brookings and Port Orford to continue shrimping in Oregon.

The area fished from Port Orford is much smaller in size than that off Brookings and Crescent City. It covers the area from Island Rock to Cape Blanco at depths from 35 to 100 fathoms. There is only 1 vessel that shrimps regularly out of Port Orford, but 4-5 vessels from California fish there occasionally after the California quota is reached.

Sampling

.The port sampler obtained fishing and catch information from vessel skippers as they unloaded. Information sought was area and depth fished, number of tows made, and total pounds of shrimp caught.

A 1-quart sample (about 0.75 pound) was taken from the catch of an identifiable tow. The last tow of the day was usually selected because it was the most readily identified. In working up the sample, the shrimp are separated by sex and the carapace length of each is recorded. The entire sample is then weighed, and a count per pound is calculated. The length-frequency records are used to determine the age composition of the samples. These statistics are then used to estimate fishing mortality and growth rates.

During the port sampling program from 90 to 124 samples were taken in each of the 3 seasons at Crescent City (Table 6). Average counts per pound ranged from 92 in May 1968 to 141 in June 1967. The 1964-year-class (Age II) shrimp dominated catches in the 1966 season. During the 1967 and 1968 seasons the 1966-year-class shrimp were dominant.

TABLE 6

Shrimp Sampling Summary — Crescent City

Month	No. of Samples[1]	Age (Percent) I	II	III	Sex (Percent) Male	T[2]	Female	Count Per Pound
			1966 Season					
May	14	14.7	78.6	6.7	14.7	32.7	52.6	112
June	48	22.7	73.7	3.6	22.3	22.4	55.3	112
July	38	28.1	69.4	3.5	28.3	13.9	57.8	114
August	24	23.7	72.6	3.6	18.8	10.9	70.3	96
			1967 Season					
June	37	73.6	25.4	1.0	46.6	39.2	14.2	141
July	45	81.2	17.2	1.6	33.7	43.2	23.1	134
August	8	83.2	13.4	3.4	32.0	46.2	21.8	124
			1968 Season					
May	26	27.8	68.7	3.5	22.6	36.6	40.8	92
June	25	25.0	71.8	3.2	28.2	27.3	44.5	102
July	6	23.4	74.5	2.1	21.2	25.5	53.3	95

[1]Data are only for number of samples shown. Additional samples for May, June, and July 1968 are being keypunched; the age and sex composition of all samples is unavailable at this time.

[2]Transitional sexual stage (male to female).

Totals of 74 and 91 shrimp samples respectively were taken at Brookings and Port Orford during the project (Tables 7 and 8). The same year classes were dominant at these ports, with the exception of Port Orford samples, during March and April of 1967 when the 1965-year class made up over 70% of the samples, by June 1967 the 1966-year-dass (Age I) shrimp had become dominant. Average counts per pound for Brookings shrimp ranged from a high oM56 in April 1967 to a low of 91 in August and September 1968, while in Port Orford the range was from 137 in July 1967 to 91 in September 1968. Another phase of the shrimp study involved the collection and examination of stomachs from Pacific hake, *Merluccius productus,* for shrimp. This study was designed to determine whether hake can be used to estimate relative abundance and mortality rates of the various year classes of shrimp. Hake are not available during the entire year as they move off of the

TABLE 7

Shrimp Sampling Summary — Brookings

Month	No. of Samples	Age (Percent) 0	I	II	III	Sex (Percent) Male	T	Female	Count Per Pound
				1966 Season					
June	6	0	26.2	68.8	5.0	25.2	18.4	56.4	141
July	0								
August	11	0	32.4	66.8	0.8	16.9	18.5	64.6	96
September	16	5.0	39.1	55.7	0.2	26.5	19.2	54.3	96
				1967 Season					
March	6	0	54.0	15.0	33.1	49.5	16.8	33.7	150
April	12	0	75.0	15.0	10.0	66.0	15.5	18.5	156
May	0								
June	0								
July	4	0	72.0	16.0	12.0	29.9	48.0	22.1	127
August	8	0	86.0	12.0	2.0	30.0	42.2	27.8	122
				1968 Season					
May	1	0	21.6	66.3	12.1	21.7	30.1	48.2	94
June	2	0	25.6	70.0	4.4	22.8	34.4	42.8	99
July	4	0	19.5	79.1	1.4	18.6	24.3	57.1	93
August	2	0	30.4	65.5	4.1	25.2	27.5	47.3	91
September	2	0	20.4	70.7	8.9	17.3	16.2	66.5	91

TABLE 8

Shrimp Sampling Summary — Port Orford

Month	No. of Samples	Age (Percent) 0	I	II	III	Sex (Percent) Male	T	Female	Count Per Pound
1966 Season									
June	2	0	31.3	68.2	0.5	29.8	16.2	54.0	126
July	2	0	30.3	69.7	0.0	26.4	10.4	63.2	114
August	2	0	24.7	73.6	1.7	22.5	8.1	69.4	109
September	23	2.8	43.2	53.6	0.4	28.1	18.8	53.1	105
1967 Season									
March	1	0	22.0	71.4	6.5	19.5	7.8	72.7	95
April	4	0	22.9	72.2	4.9	21.7	6.0	72.3	
May	0								
June	7	0	65.0	19.0	16.0	45.0	20.5	34.5	134
July	3	0	71.0	22.0	7.0	42.0	41.0	17.0	137
August	3	0	72.0	21.0	7.0	41.5	36.3	22.2	119
September	8	0.4	69.0	27.0	4.0	44.8	4.9	50.3	110
1968 Season									
April	3	0	17.0	68.2	14.8	15.3	44.7	40.0	107
May	4	0	26.9	64.0	9.1	27.0	37.8	35.2	107
June	10	0	40.2	54.1	5.7	37.4	28.8	33.8	110
July	2	0	33.2	60.1	6.7	28.5	25.4	46.1	102
August	8	0	21.8	61.3	6.9	24.2	22.8	53.0	98
September	9	0.4	28.1	63.7	7.8	20.9	20.3	58.8	91

fishing grounds during the winter months. One thousand and seven hake stomachs were examined and a total of 2,898 shrimp were found during the project period (Table 9). The age-class composition of shrimp in hake stomachs is comparable to the composition of commercial catches for the same time periods except that the hake sample the incoming year classes before they are available to the commercial trawl nets. Strong incoming year classes of shrimp are recognizable in the stomach samples as in September 1966 when 307 out of 442 shrimp were from the 1966-year-class (Age 0).

TABLE 9

Shrimp in Pacific Hake Stomachs

Year	Month	No. of Stomachs	No. of Shrimp	Age (Percent) 0	I	II	III	Shrimp which could not be aged
Crescent City and Brookings								
May	1966	9	20	0.0	25.0	70.0	5.0	0.0
June	1966	115	36	0.0	27.8	69.4	2.8	0.0
July	1966	75	91	6.6	27.5	59.3	0.0	6.6
September	1966	120	442	69.4	16.3	14.2	0.0	3.2
April	1967	76	126	0.0	69.8	13.5	7.1	9.5
May	1967	0						
June	1967	21	48	0.0	70.8	14.6	6.2	8.3
July	1967	114	194	0.0	77.8	8.8	4.6	8.8
August	1967	21	38	0.0	89.5	0.0	10.5	0.0
May	1968	133	323	0.0	30.3	64.1	5.6	0.0
June	1968	84	316	0.0	28.2	64.9	7.0	0.0
July	1968	122	267	27.0	31.1	39.3	2.6	0.0
Port Orford								
September	1966	58	378	32.5	45.7	21.7	0.0	11.6
August	1967	3	41	0.0	82.9	9.8	0.0	9.8
September	1967	36	308	8.4	63.0	16.2	7.6	10.7
August	1968	20	270	27.7	28.1	39.6	4.4	0.0

Incidental catches of bottomfish landed by shrimp fishermen at Crescent City were sampled for species composition. Since California allows only 500 pounds of incidentally caught fish, sampling is not difficult; entire catches are sampled. Oregon allows 3,000 pounds of incidental fish per boat trip, and no opportunities exist for sampling due to the large num-

TABLE 10

Incidental Fish Caught by Crescent City Shrimp Trawlers

Species		Percent Composition 1966	1967	1968
Canary Rockfish	*Sebastodes pinniger*	28.8	34.8	30.6
Yellowtail Rockfish	*S. flavidus*	46.4	39.8	40.7
Boccacio	*S. paucispinis*	T	3.5	0.6
Splitnose Rockfish	*S. diploproa*	T	—	—
Dover Sole	*Microstomus pacificus*	15.8	7.0	9.4
Petrale Sole	*Eopsetta jordani*	4.1	0.6	5.3
Lingcod	*Ophiodon elongatus*	3.6	9.4	8.5
Rex Sole	*Glyptocephalus zachirus*	T*	0.1	2.1
Pacific Ocean Perch	*S. alutus*	—	1.0	—
Widow Rockfish	*S. entomelas*	—	0.3	—
Sablefish	*Anoplopoma fimbria*	—	2.9	0.7
English Sole	*Parophrys vetulus*	—	0.6	2.1

*Trace

TABLE 11

Summary of Bottomfish Sampling — Crescent City and Brookings
November 1966 - October 1968

Year	No. Sampled Male	Female	Average Size (mm) Male	Female	Average Wt. (lbs.) Male	Female	No. of Age Structures
ENGLISH SOLE			**Crescent City**				
1966	0	125		348		1.02	75
1967	23	227	329	377	0.85	1.20	145
1968	32	219	337	395	0.70	1.30	160
			Brookings				
1966	1	124	318	353	0.50	1.04	75
1967	18	182	332	384	0.67	1.06	120
1968	3	47	324	401	0.6	1.31	40
DOVER SOLE			**Crescent City**				
1966	No Data Available						
1967	23	58	365	419	1.02	1.63	50
1968	54	196	383	414	1.05	1.50	125
			Brookings				
1966	1	99	366	394	1.50	1.50	50
1967	36	268	386	416	1.20	1.57	159
1968	24	76	385	416	1.26	1.35	50
PETRALE SOLE			**Crescent City**				
1966	15	85	346	385	0.90	1.38	50
1967	52	267	341	390	0.95	1.65	150
1968	34	166	358	402	1.10	1.45	100
			Brookings				
1966	25	100	336	369	1.06	1.46	65
1967	66	283	341	394	1.02	1.66	175
1968	17	33	370	404	1.10	1.40	25

bers of fish and the handling methods of dealers. Samples taken at Crescent City revealed that yellowtail rockfish and canary rockfish made up the bulk of the landings (Table 10). These 2 species comprised 75.2, 74.6, and 71.3% of the fish sampled during the 1966,1967, and 1968 seasons respectively.

BOTTOMFISH

Sampling of the otter trawl fisheries at Brookings and Crescent City began in October 1966. Landings of rockfish, Dover, English, and petrale sole were sampled at sea aboard Crescent City trawlers and in Brookings fish markets. The objective was to obtain information on age, growth, population relationships, and long-term fishery trends of important bottomfish species being studied by Oregon and California biologists. The data, not previously available, provide continuous information on trawl landings at ports distant from Oregon and California project headquarters.

The sampling procedure was that used in California and is in agreement with Oregon sampling procedure. Length frequencies and age structures are obtained randomly according to set sample sizes or sampling units. A minimum of two samples for each species is required per month at Crescent City and Brookings. However, the availability of required samples was dependent upon the fishery.

Interopercle bones are used for aging English sole, while otoliths are used for aging petrale and Dover sole. Length, weight, and sex data were taken on a total of 2,979 flatfish from November 1966 to October 1968 (Table 11). In addition, age structures were obtained from 1,614 of these fish.

Rockfish landings were sampled for species composition by randomly taking a box of rockfish from the landing of a boat and measuring and weighing each species in the box. Yellowtail rockfish and canary rockfish were the dominant species in these samples (Table 12).

TABLE 12

Summary of Rockfish Sampling
November 1966 to October 1968

Species	No. Sampled	Average Size (mm)	Average Weight (lbs.)	Percent Total Weight
Crescent City				
Yellowtail Rockfish	105	473	3.44	52.2
Canary Rockfish	45	511	4.63	25.4
Black Rockfish	35	502	3.70	18.7
Bocaccio	3	717	8.50	3.7
Brookings				
Canary Rockfish	50	496	3.29	37.6
Yellowtail Rockfish	39	435	2.13	19.0
Shortspine Channel Rockfish	27	498	3.85	23.7
Lingcod*	7	761	10.30	16.4
Black Rockfish	2	523	5.00	2.3
Boccacio	1	598	4.50	1.0

*Lingcod sold for same price as rockfish; dealers do not separate in Oregon.

Six Washington- and two California-tagged English sole were obtained from fishermen and processed. In addition three tagged Dover sole were recovered, two in Crescent City and one in Brookings.

CONCLUSIONS

The objective of the port sampling project was to provide information for management from catch sampling and communication with the industry at the ports of Crescent City, California, Brookings and Port Orford, Oregon. We feel that the objective was fulfilled at Crescent City. The Oregon Fish Commission's crab and shrimp biologists also report that the project has helped provide data otherwise unobtainable.

The sampling at Crescent City has provided continuous catch-per-unit-of-effort, size, and condition data from the commercial crab fishery for three seasons. In addition, the first data on the size and success of the sport crab fishery were obtained. The crab catch-per-unit-of-effort data will be used in determining fishing and total mortality rates. Size and condition data will be used to evaluate the contributions of the different year classes that entered the fishery.

Excellent coverage of the California and southern Oregon shrimp landings was made possible through the port sampling project. The practice of most fishermen during 1966, 1967, and 1968 was to deliver their catches to Crescent City. The port sampler provided valuable assistance to studies of shrimp in hake stomachs, in many cases, by obtaining samples that would have been unavailable to biologists based at Eureka. The sampler also improved communications between the fishermen and the research staff, even in periods of strained relations during management controversies.

Regular sampling of important bottomfish by the port sampler provided data that were previously unavailable. In addition, he processed bottomfish tag recovery data for two States.

Crab studies in Oregon were benefitted by the availability of tontinuous data on crab condition, size, and success per unit of effort. The port sampling reduced the travel time and expenses of the California and Oregon staffs. Finally, the Oregon crab project personnel were kept informed of fishing activities on the coast 200 miles south of their home station (Dale Snow, personal communication). Essentially similar comments were made by shrimp biologists from Oregon. They were particularly enthused about the data collected during 1966 and 1967 which could be compared with their sea survey data.

The port sampling project has supplied information which has been vital to better understanding of the crab and shrimp resources in controversial Oregon and California border fisheries. Biologists, industry members, and administrators have been better informed because of the project.

It is unfortunate that the port sampling project must be terminated at this time, since both Oregon and California hope to implement a shrimp marking program within the next two years. A port sampler would be invaluable in a sampling program to recover marked shrimp (Jack G. Robinson, personal communication).

SUMMARY OF PROGRESS OF PACIFIC OYSTER MASS MORTALITY INVESTIGATIONS, 1967-68

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Mass mortality of Pacific oysters has occurred each year for the past several years in oyster beds in certain bays of Washington and California. Losses of 2-year-old or older oysters have been 25% to 75%. The coastwise nature of the problem became apparent to the Pacific Coast Oyster Growers Association and the Pacific Marine Fisheries Commission in 1964. Their actions resulted in a subsequent appropriation to the Bureau of Commercial Fisheries of $150,000 each year since 1965. There was some delay in establishing contracts for work in the various states so that the coastwise coverage generally was begun during the spring of 1966 except for earlier work by the University of Washington, Washington Department of Fisheries, and the Oxford, Maryland Laboratory of the Bureau of Commercial Fisheries. Reports of the first two and one-half years' research were given at the 1967 annual meeting of the Pacific Marine Fisheries Commission.

In the early part cf 1968 a review committee consisting of Drs. D. B. Quayle and J. D. Andrews was appointed to make an extensive review of the progress of work by each participant in the prgoram and to make recommendations as to the future course of the work. Their report was completed in February and was considered by the steering committee at its 1968 spring meeting. The findings were that no single clearcut causative agent for the mass mortality had thus far been identified by anyone. In fact, it appeared likely that no single cause would account for coastwise mass mortality. The review committee recommended that work be ite,nsif ied in the areas where greatest mortality was to be expected,* or where results appeared to produce definitive answers. Unproductive lines of investigation were to be reduced or eliminated. It was also recommended that oyster pathogen sampling and histological evaluations be intensified where mortalities indicate a possible pathogen relationship. The status of work through the summer of 1968 is briefly summarized here.

Washington — R. E. Westley

The results of work by both Japanese and United States investigators have indicated that the source of oyster seed might be a factor in determining the intensity of mortalities which occurred on 2-year-old and older oysters. The seed study was set up using seed from a high and a low oyster mortality area in Miyagi Prefecture, Japan, and from West Coast sources in Dabob Bay, Willapa Bay, and Pendrell Sound. The required quantities were purchased during the spring of 1968. One-half was transferred to California while the other half was used in test plots in the high mortality area at Case Inlet, Washington.

As in past years, samples of oysters were collected from each experimental stock, preserved, and shipped to the University of Washington and the Oxford Laboratory for histological examination. Field monitoring of oyster mortalities at experimental plots was continued and results are shown in Table 1.

Area	1964	1965	1966	1967	1968*
Quilcene Bay	13	7	6	10	3
Oakland Bay	6	8	3	14	17
Totten Inlet	12	29	14	48	17
Case Inlet	16	25	12	48	34
Eld Inlet	—	28	21	40	24

TABLE 1
Cumulative Mortality in Per Cent in Washington Areas for Period June to December
•Through September only in 1968.

The 1968 mortalities observed through September followed the expected distribution except that in Oakland Bay they appeared higher than normal. Additional losses may be expected in Case, Eld, or Totten during October. Additional oyster float stations in Eld Inlet were set up to further define areas of occurrence. Results to September 26 illustrate the pattern in these bays progressing from the head toward mouth of each bay:

Float 1 (head of bay at low tide)	28.5%
Float 2 (one mile toward mouth)	23.0%
Float 3 (two miles toward mouth)	8.5%

Emphasis on understanding the scope, location, and environmental conditions in Eld Inlet expanded the 1967 schedule to include more intensive coverage by floating stations, additional beach stations, and more hydrographic measurements.

An experimental cross-transplanting of oysters into and out of the principal mortality area of Eld Inlet every 10 days was expanded to determine if oysters exposed to mortality-producing factors carried an infection with them when transferred out of the mortality area.

Another phase of the work in Washington included cultural experiments designed to circumvent mortalities. Japanese oyster seed planted in Oakland Bay in 1967 was transplanted to Case Inlet in June 1968 to determine whether stocks with history of low mortality would remain so in a high mortality area. Japanese oysters from seed planted in Case Inlet in 1967 were used as a control and results from June to September were:

Case Inlet resident commercial stock (control)	31.0%
Oakland Bay stock transplant at Case Inlet	29.0%

Results indicated that factors affecting mortality acted similarly on stocks originally from different areas.

Recommendations of the review committee concerning standardization of data collection, processing, and analysis were

carried out. This included preparation of all past hydrographic and mortality data for computer analysis. There have been some mechanical problems in doing this, but progress is being made.

Experiments were continued in laboratory culturing of the dinoflagellate *Ceratium* to test toxicity. Only limited success was achieved in the laboratory culture experiments. Field experiments at culturing *Ceratium* were unsuccessful due to equipment failure. These results, together with oyster mortality in 1967 without the presence of *Ceratium,* have caused us to reduce effort in this phase.

Oregon — Dale Snow

The oyster mortality study in Oregon has been underway for two years and is continuing in the third year. Routine oyster mortality and growth data were recorded, and samples of preserved oysters were sent to the University of Washington for histological examination. Hydrographic data were collected at the Yaquina Bay stations and analyzed by oceanographers at Oregon State University. Field sampling stations were reduced from six to three in the upper Yaquina Bay, and a new station was established at the laboratory pier in the lower bay. Mortality of Pacific oysters was negligible. Native oyster mortality was low at the upper bay stations, but a 15% mortality occurred at the new station at the laboratory. This was deemed to have resulted from the transfer and culling of the oysters and/or an abrupt change in environmental conditions. Pacific oyster mortality was negligible in both Tillamook and Coos Bays. Mortality sample sizes from trays and beds were increased as recommended by the review .committee.

California — Dr. S. C. Katkansky

Insofar as funds permitted, review committee recommendations were implemented in California, and results this year have been as follows. Prior to the summer mortality' period, sampling was terminated at stations in Moro Bay and Elkhorn Slough, since observations over the previous 16 months indicated no mortality problems. Sampling and monitoring were intensified in Tomales and Humboldt Bays. Monthly sampling was established in nearby Drakes Estero even though mortalities had been negligible. Losses in Tomales Bay have thus far been significantly lower than during the corresponding period in 1967. Losses among the 1966-67 experimental seed plantings have been 7.9% and 8.5%, respectively, and are similar to those on commercial beds.

The stations at Humboldt Bay are monitored at least three times each week whenever weather and tides permit. Sixty oysters were sampled for histological examination from each station each month. In addition, gaping oysters are collected from experimental sites and from the commercial beds. Approximately 350 gapers have been collected through the middle of July and are currently being examined. Plankton samples have been collected three times each week to determine whether blooms of potentially toxic organisms have occurred. Pacific oyster seed from the two sources in Japan; Dabob Bay and Willapa Bay in Washington; and Pendrell Sound in British Columbia were placed in Humboldt Bay in May after having been received from the Washington Department of Fisheries. The purpose is to ascertain whether there are differences in growth and survival of half-grown and adult oysters from these sources when planted in Humboldt Bay. The average spat per shell was determined at planting and again six weeks later to measure the effects of handling. Mortality and growth observation will be made in November 1968, and commencing in March 1969 observations will be made monthly.

Losses through August among the experimental populations in Humboldt Bay thus far have been significantly lower than in preceding years. Losses among the 1965-, 1966-, and 1967-year class plantings of Pacific oysters have been 3.7%, 5.7%, 11.8%, respectively. Preliminary observations on the commercial beds indicate that mortalities may range from 8% to 25%, depending upon location. Mortalities in beds near channels appear to be higher than on beds further removed from channels. Further observations are being made to clarify the mortality rates in various situations. Histological examination of tissues collected in 1968 is well underway.

Bureau of Commercial Fisheries, Oxford, Maryland — Dr. A. Rosenfield

West Coast oyster mortality investigations by this group began in 1966. These studies included examinations of oysters from the Pacific Coast and from several seed sources in the Orient. The purpose has been to assess the role of parasites and pathogens in mortalities of oysters (principally *Crassostrea gigas).* Research priority has been given to potential pathogens and to certain organisms that appear to cause significant abnormalities which may cause mortalities. Pathogens presently under study are as follows:

A. FOCAL NECROSIS —This is a pathological condi tion presumably the same as that called "multiple abscesses" by Japanese workers. It has been observed in oysters from mortality areas in Japan and from the State of Washington. The disease apparently is caused by a bacterium, but attempts to isolate the causative organism have been unsuccessful thus far.

B. MICROCELL DISEASE (DENMAN ISLAND DIS EASE) — Microcells thus far have been found in Pacific oysters from British Columbia and European oysters *(Ostrea edulis)* planted in California. This may be similar to microcell diseases found in a number of species of oysters from several other areas. Live tissue culture studies have been started, using B.C. oysters as source of material. An amoeboid organism has been isolated and is now under intensive study.

C. MATSUSHIMA BAY AMOEBOID ORGANISM — Relatively frequent occurrence of an amoeboid organism was found in a group of oysters from Matsushima Bay, Japan. This organism is different from organisms observed in the eggs of

oysters from Korea. The Oxford Laboratory recommends that intensive study of this organism is desirable since it represents a potential oyster pathogen that could be introduced in the United States, although it has not been observed from Pacific Coast samples thus far.

D. KOREAN EGG PARASITE — The Korean egg parasite observed by Oxford differs from the egg parasite previously described by Pauley as *Nosema ostrea* in oysters from the West Coast. Staining studies and morphological observations are being made to determine its identity. Because Korea is no longer being actively considered as an immediate source of seed, intensive studies on this organism are not being conducted.

Summary

The results of three years of mass mortality studies may be summarized as follows:

In Washington the areas of consistent mass mortality have been defined, and further, it has been determined that relatively localized portions of each area have active mortalities. Although the initial work seemed to implicate *Ceratium* as an initiator of mass mortality, it appeared later that this was not a causative organism, although it may occur simultaneously with mortalities. No pathogens have been implicated, either. Effort is being shifted toward cultural experiments which may help to define what steps industry may take to minimize the effects of mass mortality on ultimate crop yield.

Oyster mortalities in Oregon continue at an extremely low level and the observations conducted thus far provide a basis for comparison with higher mortality areas.

In California, efforts to define causes of mortality in the principal areas have been intensified, and likewise cultural experiments to determine the feasibility of minimizing losses have been undertaken. Studies in California on oyster pathogens are continuing, although to date no specific causative organisms have been identified.

On a broader basis, the results of extensive research by the Oxford Laboratory have indicated possible pathogenic organisms but none which can be definitely classed as causative for the observed mortalities.