

16th and 17th Annual Reports of the

**PACIFIC MARINE
FISHERIES COMMISSION**

FOR THE YEARS 1963 AND 1964

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

16th and 17th Annual Reports of the

PACIFIC MARINE FISHERIES COMMISSION

FOR THE YEARS 1963 AND 1964

To the Congress of the United States and the Governors and Legislatures of the Four Compacting States, Washington, Oregon, California and Idaho, 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	WAYNE E. PHILLIPS
FRANK GULLEN	WILLIAM O. RILEY
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EDWARD G. HUFFSCHMIDT	GEORGE C. STARLUND
ARLIE JOHNSON	VINCENT THOMAS
HERMAN P. MEIERJURGEN	MAX WEDEKIND (deceased 1964)
J. PAT METKE	ROBERT L. CHARETTE (appointed 1964)
"	JOHN R. WOODWORTH

*

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16th Annual Report — 1963

The staff comprised the following:

Richard S. Croker, Executive Director, resigned
June 30, 1963
Leon A. Verhoeven, Executive Director, effective
July 1, 1963
H. F. Linse, Treasurer, resigned October 31, 1963
Gerald L. Fisher, Treasurer, effective November 1,
1963
M. C. James, Consultant
Alphonse Kemmerich, Consultant
Mrs. Evelyn Korn, Office Secretary

The Advisory Committee during 1963 was:

Oregon

David B. Charlton, Portland, replaced Mr. Lundy
who resigned
Charles S. Collins, Roseburg
Harold C. Gramson, Warrenton
Charles F. Henne, Winchester
J. Frank Hoagland, Astoria
Andrew J. Naterlin, Newport, Chairman
Arthur Paquet, Astoria, replaced Allard J. Conger,
Jr., who resigned

California

Herman P. Meierjurgan, Beaverton, Chairman
B J. Pat Metke, Bend, successor to Rollin E. Bowles,
effective July 20, 1963
Wayne E. Phillips, Baker •
Joseph W. Smith, Klamath Falls

Idaho

William O. Riley, Eureka
W. T. Shannon, Sacramento, Vice Chairman
Vincent Thomas, San Pedro

Washington

Frank Cullen, Coeur d'Alene, new member
Arlie Johnson, Boise, new member
John R. Woodworth, Boise, new member

California

George C. Starlund, Olympia, Secretary
Max Wedekind, Seattle, new member
John H. Wedin, Seattle, new member

Mr. Wedin joined Messrs. Amacher and Hall as Commissioners who were initially members of the Advisory Committee,

This is incorrect; one of the Governor's two appointees was the Chairman of the legislative Interim Committee, Max wedekin.

INTRODUCTION

Idaho became the fourth member of the Pacific Marine Fisheries Commission Compact on July 1, 1963. It was anticipated that Alaska would also join the Compact. However, the Governor of Alaska ruled that Alaska should not join at this time as the annual membership contribution would represent a new expenditure at a time when the new State was instituting stringent economy measures in preparation for the time when federal funds for transition from territorial to state government would cease to be available.

The Idaho Fish and Game Commission, in accordance with Idaho law, appointed three members to the Pacific Marine Fisheries Commission. The Fish and Game Commission also recommended three men for appointment to the PMFC Advisory Committee. These Advisers were confirmed by PMFC at the 1963 Annual Meeting.

By legislative act, Washington State increased its membership on PMFC from one to three. They shall be the director of the Washington Department of Fisheries, ex officio, and two appointees of the Governor of Washington representing the fishing industry, or an industry allied therewith. ~~(The Chairman of the Legislative Interim Fisheries Committee was subsequently made an ex officio member and the Governor's appointees were reduced to one.)~~

Fishery people throughout the nation were saddened on November 22, 1963 by the assassination of President John F. Kennedy, a great President and friend of fisheries.

ADMINISTRATION

Personnel

The official membership in 1963 was:

Oregon

John Amacher, Winchester Tallant Greenough,
Goquille Leonard Hall, Charleston » -
Edward G. Huffschmidt, Portland

Charles R. Carry, Terminal Island, replaced Mr. Davis who resigned in 1962 Clifton D. Day, San Francisco Thomas R. Gardiner, Oakland John P. Gilchrist, San Francisco Anthony Nizetich, San Pedro Ray Welsh, Fort Bragg Charles V. Williams, Crescent City James Barr, Terminal Island, alternate for Mr. Carry M. S. Ballo, San Francisco, alternate for Mr. Day

* **Idaho**

William B. Durbon, Moscow, new member R. J. Holmes, Twin Falls, new member Glenn Stanger, Idaho Falls, new member

Washington

Robert E. Colwell, Seattle
Harold E. Lokken, Seattle
Charles F. Mechals, Seattle
Nick Mladinich, Tacoma, replaced Mr. Wedin
Bjarne Nilsen, Westport
John Plancich, Anacortes
James Walganski, Bainbridge Island
Fred Bullock, Seattle, alternate for Mr. Mladinich

Conferences and Meetings

During the year the Executive Director attended, as a representative of the Commission, the following conferences and meetings (Mr. Croker through June, Mr. Verhoeven commencing July 1):

Second Governors' Salmon Conference, Seattle, Jan. 6-11.

Senate-House Joint Congressional Hearing in Seattle on international north Pacific problems, Feb. 14-15

Annual Meeting of Pacific Fishery Biologists, Gearhart, Oregon, Mar. 20-22

Pacific Salmon Inter-Agency Council, Portland, Mar. 28

Advisory Committee of U.S. Section of International North Pacific Study Group, Seattle, Apr. 10-11

Technical Committee of Pacific Salmon Inter-Agency Council, Portland, Apr. 30-May 1

International Trawl Fishery Committee, meeting of Technical Sub-Committee, Vancouver, B.C., June 17-18. (Attended by both the outgoing Director, R. S. Croker, and the incoming Director, L. A. Verhoeven.)

American Society of Ichthyologists and Herpetologists, Vancouver, B.C., June 18-19

Technical Committee of Pacific Salmon Inter-Agency Council, Portland, July 9-10

Meeting in Seattle regarding Canada's adoption of 12-mile fishing limit, Aug. 7

Shell Oil Company, seismic demonstration at Aberdeen and Westport, Aug. 29

Oregon Interim Legislative Committee on Wildlife, at Corvallis on Sept. 6; at Salem on Sept. 7

Technical Committee of Pacific Salmon Inter-Agency Council, Portland, Sept. 17-18

Fourteenth Pacific Tuna Conference, Lake Arrowhead, California, Sept. 29-Oct. 2

International Trawl Fishery Committee annual meeting, Portland, Nov. 11

U.S. State Department meeting in Seattle regarding Canadian 12-mile limit, Nov. 15

Tenth Annual Meeting of International North Pacific Fisheries Commission, Vancouver, B.C., Nov. 17-22

International Pacific Salmon Fisheries Commission annual meeting, Bellingham, Dec. 18

Oregon Fish Commission hearing on Columbia River fishing regulation, Astoria, Dec. 19

These conferences or meetings were attended in keeping with PMFC's policy that the Commission should be represented, insofar as feasible, at all meetings where the interests of the Commission or its member States are involved.

Executive Director Croker was Program Chairman, Rapporteur, and member of the Editorial Committee for the Second Governors' Salmon Conference. He and PMFC Consultants M. C. James and Alphonse Kemmerich also served on the Conference's Steering Committee.

The Executive Director is ex officio Secretary of the Pacific Salmon Inter-Agency Council and is also an observer on the Council's Technical Committee. He is a member of the Advisory Committee to the U. S. Section of the International North Pacific Fisheries Commission. The Executive Director also acts as liaison officer for the U. S. section of the International Trawl Fishery Committee and in a similar capacity for the Informal Committee on Chinook and Coho Salmon which was formed in November of 1963. Both these latter Committees are informal combinations of Canadian and United States fishery scientists and administrators from the Pacific Coast for the purpose of working out trawl, chinook and coho problems of mutual concern.

Miscellaneous

At the request of the Office of International Relations, Fish and Wildlife Service, the staff again secured specific statistics concerning the salmon, herring and halibut fishery landings, the propagation of salmon, commercial fishing regulations, and enforcement of these regulations concerning salmon, halibut and herring in the States of Washington, Oregon, and California. After consolidation, this material was forwarded through proper channels—U.S.F.W.S., U.S. Section, INPFC—to the Japanese government.

The annual meeting to allocate fin-marks for salmon and steelhead trout was held in Portland on January 22. Representatives from the University of Washington, the U.S. Fish and Wildlife Service, and the fish and game departments of California, Oregon, and Washington attended. Written requests from agencies who were unable to send representatives were also considered. Subsequently, the fin-mark list for 1963 was prepared and given coastwise distribution.

The second through seventh issues of PMFC's NEWSLETTER were distributed during 1963. The NEWSLETTER has been well received and the mailing list is growing.

The Fifteenth Annual Report of the Commission for calendar year 1962 was printed and distributed. This report contains an account of the first 15 years of the Commission's operations, a statement of Commission policy and objectives, amended Article XVI of the Rules and Regulations, pertaining to travel expenses, a budget for the July 1, 1963 to June 30, 1965 biennium, fishery status reports, and research reports.

The report of the Second Governors' Salmon Conference was assembled and edited in PMFC's office before transmittal to the Washington Department of Fisheries. The latter agency processed, printed and distributed the report.

Galley proofs for Bulletin 6 at the year's end were being edited for return to the printer.

Administrative Activities

The Executive Committee convened its first meeting of the year in Portland on May 6 and took the following action:

1. Mr. Leon A. Verhoeven was selected to succeed Mr. Richard S. Croker, who was resigning as Executive Director, effective June 30, 1963.
2. A personnel policy to be effective July 1, 1963 was adopted. This policy, among other things, provides that in addition to Federal Social Security coverage, the Commission will enter into a retirement program with its permanent full-time personnel at the headquarters office.
3. The creation of an assistant director or research coordinator position in lieu of conducting small-scale cooperative research projects was deferred until the new director could become familiar with the situation and could recommend to the Commission.

A second Executive Committee meeting was held November 12, 1963 in Portland to discuss Alaska's financial inability to join the PMFC Compact and to confirm the interim appointment of Mr. Gerald L. Fisher as Treasurer to succeed Mr. H. F. Linse, who resigned as of October 31, 1963 for health reasons. In addition, action was taken on the following business in preparation for the start of the Annual PMFC Meeting on November 13:

1. A revised composition of the Executive Committee and a nominee for each of the four Executive Committee positions were adopted for final acceptance by PMFC at the Annual Meeting.
2. An amendment to Article XIV of the Rules and Regulations (regarding voting procedure) was adopted for submission to PMFC for acceptance.
3. At Idaho's request, a recommendation was accepted that the 1964 Annual Meeting should be held in California instead of Idaho in order to give the new member State additional experience in PMFC affairs before hosting an annual meeting.
4. A revised budget for the fiscal year July 1, 1963 to June 30, 1964 was accepted for recommendation to PMFC.
5. The Director's Report was reviewed prior to its presentation at the Annual Meeting.
6. A contribution of \$5.00 toward each monthly premium of the Executive Director and Office Secretary for participation in the Oregon Physicians' Service-Blue Shield Plan (medical and hospital insurance) was approved.

Mr. Marvich attended this meeting for Mr. Kirkness of the Alaska Department of Fish and Game as an observer.

The Research Staff, which is composed of representatives from the staffs of the fish or fish and game agencies of the member States, held its annual spring meeting on March 18 and 19, 1963 to discuss the status of PMFC research and of fishery problems of mutual concern.

The State of Idaho, by act of its Legislature, effective July 1, 1963, became a member of the Pacific Marine Fisheries Commission.

COMMISSION ACTION

The formal Annual Meeting of the Pacific Marine Fisheries Commission was held in Portland, Oregon from November 13 through 15, 1963, and approximately 150 persons attended the business and plenary sessions. The Advisory Committee, the Research Staff, and the Executive Committee each met on November 12 in advance of the formal Annual Meeting. According to PMFC policy, all proposals or recommendations submitted to the Commission for adoption as resolutions are reviewed by the Advisory Committee before final action is taken on them by the Commission.

Prior to consideration of the proposals by the Commission in the Meeting, the following actions were taken:

1. A new voting procedure was unanimously approved. It reads:

"Voting shall conform to Article VI of the Compact in that a majority affirmative vote of all the members represented shall constitute acceptance of the action being voted upon, but that whenever a State declares that it has no interest in a species concerned in the action and therefore wishes to abstain, a majority vote shall then be defined as a majority of the remaining voting member States. However, in regards to administrative matters pertaining to the operation of the Pacific Marine Fisheries Commission, such as Commission policy, invitations to potential member States, budgets, by-laws, recommendations for change in Compact, etc., a unanimous vote shall be required."

This voting procedure amends Article XIV of the Rules and Regulations of the Pacific Marine Fisheries Commission which were published in the Fourteenth Annual Report for the Year 1961.

2. The composition of the Executive Committee was revised to include a Chairman, First Vice Chairman, Second Vice Chairman, and a Secretary, but no State shall be represented by more than one of these officers.

The Executive Director was directed to make the appropriate changes to Article XI of the Rules and Regulations and to such other Articles as are affected by the revision.

3. The appointments of new advisers, William B. Durbon, R. J. Holmes, Glenn Stanger, Nick Mladinich, David B. Charlton, Arthur Paquet and Charles R. Carry were approved. Messrs. James Barr, M. S. Ballo, and Fred Bullock were accepted as alternates for advisers who could not attend the meeting.
4. Mr. E. S. Marvich, representing Alaska for Mr. Walter Kirkness as an observer, was welcomed and seated at the Commissioners' table.
5. The budget for the fiscal year ending June 30, 1964 was revised because of Alaska's failure to join the Compact on July 1, 1963. The revision was accomplished by deletion of \$2,500 for the publication of Bulletin 7 and \$13,422.68 for Cooperative Research. Both of these deletions were possible as no manuscripts had been prepared for Bulletin 7 and no cooperative research projects had been undertaken.
6. Approval was given to the auditor's recommendation that the collateral (\$50,000) pledged by the U.S. National Bank of Portland to secure Pacific Marine Fisheries Commission's bank balances be increased to \$61,000. However, this has not been done as the recommendation to increase was based on Alaska's anticipated membership in PMFC.
7. The annual staff reports were received and discussed. Mr. Fisher presented the Treasurer's Report. Mr. Verhoeven presented the Executive Director's Report. The Status Reports were compiled and presented by biologists from the host Oregon Fish and Oregon Game Commissions from data contributed by the Research Staffs of the PMFC member agencies. Dr. Donald W. Chapmen, Research Director, Oregon Fish Commission, introduced the speakers who gave the Status Reports:

Mr. James M. Meehan—Status of the 1963 Pacific Coast Albacore Fishery.

Mr. C. Dale Snow—Status of the 1963 Pacific Coast Dungeness Crab Fishery.

Mr. Austin R. Magill—Status of the Pacific Coast Trawl Fisheries, 1963.

Mr. Robert K. McQueen—Status of the 1963 Pacific Coast Troll Salmon Fishery.

Mr. H. J. Campbell—The Status of Salmon and Steelhead Sport Fisheries in Oregon and the Columbia River Basin.

Mr. Jack Robinson—Status of the Pacific Coast Pink Shrimp Fishery.

The salmon sport fishery report is included as Appendix 1 to the 1963 Annual Report. It is an innovation this year which we hope to make more comprehensive in subsequent years. None of the other 1963 status reports will be reproduced, as

they will be superseded by the 1964 status reports which are reproduced herein.

8. Special reports on the following subjects were received: The Marking of Fish by Diets Containing Tetracycline; Movements of Petrale Sole Tagged off California; The Pacific Salmon Inter-Agency Council; the Columbia River Hatchery Evaluation Program "Operation Fin-Clip," and Status of Columbia River Steelhead Stocks. The reports on tetracycline marking, Salmon Inter-Agency Council and Columbia River steelhead stocks and an abstract of the report on "Operation Fin-Clip" are reproduced as Appendix 2 to the 1963 Annual Report. The report by Mr. E. A. Best on Movements of Petrale Sole Tagged off California has been omitted, as it is contained in Pacific Marine Fisheries Commission's Bulletin 6.

Actions on 1962 Recommendations

At the 1962 meeting in Seattle the Commission adopted a number of resolutions or recommendations which required subsequent action by the Commission or its staff.

Seismic Exploration: The Commission resolved to establish a comprehensive scientific study of the effects of all types of explosives on marine life, including but not limited to eggs, larvae and other constituents of the plankton, the spawning environment of anadromous fishes, bottomfish, pelagic fish and invertebrates, including analyses of the immediate and delayed physical effects on the organisms, the effects on their behavior and physiology, etc.

The fish and fish and game agencies of the member States and Alaska were canvassed for written comments and detailed plans for research. Four responded with plans or comments which can be discussed under the headings of Need, Financing, Plan, Research Agency, and Coordination: **Need:** Some agencies felt that an extensive research program is needed. Others felt that the research would be very expensive and that the need might not warrant the expense. **Financing:** State agencies do not have funds to undertake additional seismic research and some felt that PMFC's limited funds should be spent on programs of greater priority. It was the consensus that the oil companies should finance the research. **Plans:** The plans or suggestions received for the design of experiments were detailed but broad in scope, requiring the coordination of many disciplines, such as: physics, physiology, engineering, biology, etc. **Research Agency:** PMFC should contract to have the research done by an outside Agency, such as: Scripps, University of Washington, Oregon State University, etc. **Coordination:** A committee composed of representatives from commercial and sport fisheries, from State agencies and from the oil industry was suggested to advise PMFC in the coordination and administration of the research. No research has been undertaken by PMFC.

Pesticides: PMFC resolved to undertake the compilation of existing State and Federal data regarding the dangers of pesticides to fisheries, other animal resources and to man. A canvass of various agencies was made and much data were received. However, no attempt has been made to compile the data or references, as several agencies that are more adequately staffed and financed for such a chore than PMFC are already devoting much personnel and funds to the pesticide problem.

Salmon: It was recommended that California, Oregon, Washington and Alaska take appropriate action to prohibit

ocean long lining for salmon. By the end of 1963, all four States had passed laws or adopted regulations that prohibited long lining for salmon in the ocean. The British Columbia Fishery Regulations (1962) also prohibit ocean long lining for salmon.

As the result of continued action on a resolution initiated at the 1961 Annual Meeting, an Informal Committee on Chinook and Coho was formed in Vancouver, B. C. on November 20, 1963 between Canadian and United States fishery personnel on the Pacific Coast. The United States Department of State has appointed the Executive Director of PMFC as liaison for the U. S. section of this informal committee.

In accordance with a resolution that PMFC set up a committee for the study and recommendation of regulations in regard to sockeye and pink salmon as may be suggested or recommended by the International Pacific Salmon Fisheries Commission for those waters on the High Seas over which said Salmon Commission does not have control, a committee was appointed and convened on November 1, 1963. At that time Mr. Loyd A. Royal, Director of the International Pacific Salmon Fisheries Commission, presented a report for the Committee's consideration. The Committee voted unanimously to make no recommendations regarding the regulation of the troll fishery at that time, to study the problem further, and to meet again. No subsequent meetings have been held.

PMFC approved in principle a proposal for the establishment of a salmon and steelhead mark and tag processing and analysis center and directed the Executive Director to submit the proposal to the Second Governors' Salmon Conference. It appears that the proposal was subsequently referred to the Pacific Salmon Inter-Agency Council which grew out of the Conference. At present, part of the work of the proposed center is now being done by the Oregon Fish Commission under contract to the U. S. Bureau of Commercial Fisheries in connection with the Columbia River Hatchery Evaluation Program. The Executive Director does not recommend the establishment of the center by PMFC because of the large financial and personnel requirements that would be involved.

Indians: The staff was instructed to prepare a brief report on the subject of Indian fishing and to present the report at the 1963 Annual Meeting. Briefs were solicited and were received from fish or fish and game agencies of the member States and from the Alaska Department of Fish and Game and the Quinault Indians. These briefs were reproduced and copies were distributed at the 1963 Annual Meeting along with the following resume:

Of the five States represented by these briefs, the problem of Indian fishing for salmon and steelhead is most critical and perplexing in Washington. "In areas where salmon runs pass through state-regulated waters, pass through Indian fishing areas and then ascend to spawn in areas under the state's jurisdiction, escape-ment of salmon cannot be maintained." This situation extends to virtually all the important salmon rivers in the state. The state is powerless to regulate fisheries on reservations even when invited to do so by the Tribal Councils. The state has also been generally unsuccessful in the prosecution of Indians for fishing violations off the reservations. Alaska—"While the problems of exclusive Indian fish-

ing in Alaska are not as severe as in the State of Washington, they constitute a stumbling block in proper management of salmon fisheries." California—Indians in California can be prosecuted for the sale of fish which are caught in violation of the state code, "but relatively few cases have been made on this violation. The Department is not in position to document reports of sales of large numbers of fish or that the Indian fishery poses a threat to the salmon and steelhead resources of this state." However, the sale of fish by Indians cannot be considered a major problem. Idaho—The harvest of salmon and steelhead by Indians in Idaho has not been of major importance, but it is becoming increasingly so.

Oregon—Indian fishing is almost entirely off-reservation fishing. The Warm Springs and Umatilla tribes have agreed not to use gill nets above Bonneville Dam. But the Yakima tribe, by virtue of advice from the Bureau of Indian Affairs, has elected to regulate the fishing of its members by tribal ordinances. This has been unsuccessful. "Enforcement of state regulations is only sporadic." Until clear-cut decisions of court cases now pending are obtained, enforcement officials act at their peril (Oregon Game Commission). As the result of the voluntary limitation of fishing by the Umatilla and Warm Springs tribes and the recent conviction of a Yakima who was fishing commercially in violation of a tribal ordinance and state law, the Oregon Fish Commission feels that progress has been made in solving the Indian fishing problem, which is less severe in Oregon than in Washington.

Quinault Tribe—This Indian tribe possesses a unique salmon resource within its reservation boundaries in the State of Washington, and has been regulating its salmon and steelhead fisheries for 48 years. The tribe, with the assistance of the Bureau of Indian Affairs and the advice of fishery agencies, has adopted a program for the rehabilitation of its salmon and steelhead resource.

Albacore: At the request of the Commission, two industry representatives from each of the States of California, Oregon, and Washington were appointed by the Executive Director to the "Albacore Committee. The industry representative from each State are: Washington—Larry M. Kaner and Fred L. Bullock; Oregon—Robert S. Smiley and J. F. Hoagland; California—Harry J. Larsen and Frank Alverson.

Groundfishes and Crabs: The four Pacific Coast States, in response to a request from PMFC, submitted reports on the level of utilization of groundfishes and crabs in marine waters off their coasts. These reports were forwarded by PMFC to Mr. William C. Herrington, Special Assistant for Fisheries and Wildlife to the Under Secretary of the U. S. Department of State.

The Pacific Marine Fisheries Commission Research Staff, after research on the merits of a complete winter closure of the otter-trawl fishery, was opposed to a general winter closure to trawl fishing that would affect all trawlable species. Closed seasons have little or no conservation value unless tailored to fit the biology of a specific fish and applied during period of substantial effort. A general winter closure would be expected to encourage increased fishing before and after the closed period, effectively nullifying any saving of the resource by the

closure. If reduced harvest is necessary to conserve a trawl species, the greatest saving would be realized by a closure during the time when fishing effort is heaviest and that species is most vulnerable. The research staffs of the member States will continue to observe the catch-effort statistics of the trawl fishery and to make appropriate recommendations for conservation based on the biological aspects of the resource.

Shrimp: At the time of this Annual Meeting a joint annual quota for the shrimp bed common to California and Oregon in the Crescent City, California-Brookings, Oregon area had not been established as recommended by PMFC at the 1962 Annual Meeting. However, the scientific and management staffs of the fishery agencies of California and Oregon were continuing discussions of the merits and mechanics of such action.

Administrative: Mr. Verhoeven, in effect, replied no comment to the request that the Executive Director review and comment on the adequacy of the tentative outline of the Commission's functions and powers as adopted at the 1962 Annual Meeting since he had too recently become Executive Director.

Voting procedure was reported on and a new procedure which has already been described in item 1 of COMMISSION ACTION was adopted.

The Executive Committee reported no positive action in regard to PMFC's preparation of legislation to amend Article X of the Pacific Marine Fisheries Compact to revise the formula for allocation of annual state contributions in order to increase the minimum amount so that no state with a marine fishery shall contribute less than \$10,000 per annum. The Committee felt that a request to the Legislatures of the member States and to Congress for legislation amending the formula for annual contributions would be untimely, since these legislative bodies had just enacted legislation authorizing changes in the membership of the Compact.

Commission Action on 1963 Proposals

The following proposals and motions were adopted as resolutions by the Commission at the 1963 Annual Meeting. The resolutions have been numbered in the order in which the proposals were received. A missing number indicates that a proposal was tabled or rejected.

2. Exploitation by Foreign Fishing Fleets

WHEREAS, during 1963, the fishery resources of the Eastern North Pacific Ocean have been subjected to increased exploitation by foreign fishing fleets, and

WHEREAS, this increase in fishing has led to large monetary losses to United States and Canadian fishermen due to destruction of their fishing gear and the pre-emption of many of their fishing grounds by foreign vessels, and

WHEREAS, also during 1963, tripartite negotiations concerning the renewal of the International North Pacific Fisheries Treaty failed in reaching agreement, thus leaving in jeopardy the future of fishery management in the Eastern North Pacific, and

WHEREAS, the developments during 1963, in the absence of a vigorous high seas fishery policy on the part of Canada and the United States, could lead to the virtual destruction of not only the fishery resources now being maintained by ex-

treme sacrifices on the part of Canadian and American fishermen but also could cause the loss of resources not now being utilized by Canada and the United States but which may be of great importance to these countries in the future,

BE IT THEREFORE RESOLVED, That the Pacific Marine Fisheries Commission urges the proper governmental authorities:

1. to resist with all possible means all attempts by fishermen other than those of Canada and the United States to engage in the harvest of the fisheries of the Eastern North Pacific which are now fully utilized and which have been under severe management restrictions, and
2. to insist that all fishing operations contiguous to the coast of Canada and the United States on stocks of fish not fully utilized and not under severe management restrictions be conducted with sufficient restraint as to permit such stocks to be harvested on a maximum sustained yield basis from year to year in the future, and
3. to demand as far as possible that all fishing be conducted in such a manner as to avoid destruction of competing fishing gear and equipment and that government support be given to claims against foreign offenders for compensation to fishermen whose gear is wantonly damaged or destroyed, and

BE IT FURTHER RESOLVED, That copies of this resolution be sent to all appropriate governmental authorities.

3. Taking Salmon on High Seas

WHEREAS, in the interests of maintaining fishery resources at a maximum sustained yield, U. S. fishermen are and have been under severe restraints for many years in the conduct of their fishing operations, and

WHEREAS, an example of one such restraint is the present ban on the taking of salmon on the high seas by means of nets and long lines, and

WHEREAS, such restraints on U. S. fishermen are not legally effective against fishermen of other countries fishing in the same areas, and

WHEREAS, this situation discriminates unfairly against U. S. fishermen both on the fishing grounds and again in the U. S. market where fish caught by U. S. fishermen must compete with foreign fish taken by methods denied to U. S. fishermen,

BE IT THEREFORE RESOLVED, That the Pacific Marine Fisheries Commission recommend to the appropriate governmental authorities that, in addition to restraints already in U. S. law, it be made unlawful for anyone to bring into the United States fish in any form harvested in the North Pacific Ocean east of 175 degrees west longitude by methods denied to U. S. fishermen.

6. Shrimp Problem Between Oregon and California

WHEREAS, a bed of ocean shrimp (*Pandalus jordani*) lies off the coast of southern Oregon and northern California, more particularly between Cape Blanco, Oregon and False Cape, California, and

WHEREAS, shrimp from this bed are taken by the fishermen of both States, their catches are landed at the ports of both States, and therefore the continued optimal production of this bed is of direct concern to the citizens of both States, and

WHEREAS, shrimp landed in California are subject to regulations of the California Fish and Game Commission so far as total catch, gear and season are concerned while shrimp landed in Oregon are not subject to regulation, and

WHEREAS, the historical record of shrimp fisheries here and elsewhere throughout the world demonstrates that limitation on the catch in accordance with sound scientific principles is necessary to insure continued optimal yield from the resource, and

WHEREAS, it is believed that the Oregon-California shrimp fishery is best controlled through a total seasonal bag limit, and

WHEREAS, sufficient data have been available to California for several years upon which it has based regulations of total catch which have brought about a reasonably stable fishery,

NOW, THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission recommend that the States of Oregon and California jointly establish an annual quota for the shrimp bed common to both based upon the findings of their scientific staffs, and that Oregon and California take such joint action as is required to insure closure of the bed when the quota is reached, and

BE IT FURTHER RESOLVED, That copies of this resolution be forwarded to appropriate authorities in Oregon and California. (This was reaffirmation of a 1962 resolution and, as was mentioned previously, California and Oregon are discussing joint action.)

7. Salmon Spawning Sanctuaries in the Sacramento, Smith and Mattole River Watersheds, and Other Watersheds

WHEREAS, the Pacific Marine Fisheries Commission, an interstate compact commission created by the Legislatures of California, Idaho, Oregon and Washington and assented thereto by the Congress of the United States, is charged with the conservation and enhancement of the fisheries of these States, and

WHEREAS, the Chinook salmon produced in the Sacramento, Smith and Mattole River watersheds provide a large part of the recreational and commercial catch of this species off the coasts of California, Oregon, Washington and British Columbia, and

WHEREAS, the continued unrestricted construction of water-use projects in these watersheds would further diminish the stocks of salmon and steelhead contributing to this fishery, and

WHEREAS, the chinook salmon spawning habitat in these California River basins has deteriorated to such an alarming extent, and

WHEREAS, it is necessary to restore and prevent further deterioration of this resource,

THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission urges the Congress of the United States and the Legislature of the State of California to establish by appropriate legislation salmon spawning sanctuaries in the Sacramento, Smith and Mattole River watersheds including the area in the Sacramento Basin upstream from and including Chico and Stony Creeks wherein no dams destructive to migratory fish life shall be built, and

BE IT FURTHER RESOLVED, That this sanctuary prin-

ciple be applied to those sections of all coastal streams in California, Oregon and Washington which embrace significant spawning areas utilized by salmon and steelhead, and

BE IT FURTHER RESOLVED, That copies of this resolution be forwarded to all California, Idaho, Oregon and Washington members of the Senate and the House of Representatives and to the members of the California, Idaho, Oregon and Washington State Legislatures and Secretaries of the Departments of Agriculture and Interior.

(The Advisory Committee presented a statement for the consideration of the Commission, regarding the above resolution. It stated:

"In furthering this objective a committee consisting of one representative from each State be set up to study the streams and determine more specifically the spawning areas needing protection and to initiate action to achieve the sanctuary objective."

In discussion, it was brought out that this is the objective of the Pacific Salmon Inter-Agency Council. Mr. Schoning, who is Chairman of the Salmon Council, stated he would bring the above statement to the attention of the other members of the Council. No further consideration was given this matter.)

8. Power Dam Moratorium

WHEREAS, the creation of an atomic energy reactor at Idaho Falls, Idaho for the production of electrical energy has demonstrated that atomic power is economically attractive with hydro-electrical energy, and

WHEREAS, these facts were released nationally, November 11, 1963, by the Atomic Energy Commission, and

WHEREAS, the building of power dams has proven to be detrimental to anadromous fish runs of the major spawning Rivers of the Pacific Coast, and

WHEREAS, many such dams are presently being considered primarily for electrical power, • ■ -•

NOW, THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission in session at Portland, Oregon, on November 15, 1963, does hereby oppose the creation of any new dams primarily for the production of electrical power that will cause further damage to anadromous fish and. urges the Federal Power Commission to declare a moratorium on all such proposals immediately and urges the Federal Power Commission to expedite the creation of adequate nuclear reactors to meet the electrical needs of the nation, and

IT IS HEREBY DIRECTED, That copies of this resolution be sent to the President of the United States, Secretary of the Interior, the Chairman of the Federal Power Commission, all national and state congressional delegations of these compact States.

9. Indian Affairs

WHEREAS, the Pacific Marine Fisheries Commission is created by compact between the States of California, Oregon, Washington and Idaho to promote the better utilization of fisheries, marine, shell and anadromous, which are of mutual concern, and to develop a program of protection and prevention of physical waste of such fisheries in all of the areas of the Pacific Ocean over which the States of California, Oregon, and Washington jointly and separately now have or may hereafter acquire jurisdiction, and

WHEREAS, the preservation and conservation of anadromous fish are of mutual concern to the several States, and

WHEREAS, said anadromous fish, spawning in the rivers of Idaho, California, Oregon, and Washington, from which the young migrate into and through the waters of these States and ultimately return as adults to the streams of their origin to spawn and perpetuate the cycle, and

WHEREAS, it is necessary that the anadromous fish be protected not only during their period of migration to and at sea but also during their return passage through the rivers to the several States to their spawning grounds, and also while on the spawning grounds, if the stocks are to be conserved and perpetuated, and

WHEREAS, the United States, in 1854-1856, entered into treaties with numerous Indian tribes and bands in the States of Idaho, Oregon and Washington in which these anadromous fish spawn, and

WHEREAS, these treaties provided that the several tribes and bands would be secured in their right to fish at their usual and accustomed grounds outside of the Indian reservations in common with other citizens of the territory, and

WHEREAS, the Indians claim that, by reason of such treaties, they have the right to fish at such places off the Indian reservations without regulation by the States or United States both for personal consumption and commercial sale, and

WHEREAS, the United States Supreme Court has ruled that such rights granted by these treaties have survived the admission of the States to the Union upon equal footing with other States, and

WHEREAS, the United States Supreme Court has likewise stated that the States may apply regulations relating to the time and manner of fishing by Indians at such places when necessary for conservation, but other Federal courts have ruled that the States must, in each instance, prove that the regulation in issue is necessary for conservation and that no regulation may be enforced when there is an alternate means of conserving the fisheries, and

WHEREAS, such interpretation has resulted in one Federal court ruling that a regulation of fishing gear to hook and line could not be applied to Indians fishing at such places, because an alternate means of regulation existed consisting of periodic closures, while another Federal court ruled that a periodic closure could not be applied to Indians at such places because non-Indians could be stopped from fishing, special sites could be given to the Indians elsewhere, or regulations could be agreed upon with the Indians, and

WHEREAS, the resulting confusion in the law has substantially impaired the powers of the States of Idaho, Oregon and Washington to conserve and protect the anadromous fish in their migration through the rivers in that numerous Indians are fishing on such rivers with modern gear for commercial purposes, and

WHEREAS, if such rights do exist, there is no way to distinguish treaty from non-treaty Indians fishing at such places, or to distinguish Indians from non-Indians, and

WHEREAS, the Department of Interior is presently pursuing a policy of encouraging joint regulation by the various tribes and bands and the States, but few of said tribes and bands have participated in said program and it is doubtful that they have any power to impose regulations on Indians outside of the reservation in any event, and

WHEREAS, said policy of joint regulation by the Indians and the States was advanced to the United States Supreme Court by the Department of Interior in 1916, and rejected by the Court, which pointed out that if neither could control the other, then either could destroy the resource, and

WHEREAS, there appears to be no possibility of obtaining adequate relief through the courts consistent with the need for enforceable regulation for the protection of the anadromous fish resources, and

WHEREAS, Congress, by the Indian Claims Act of 1946, has provided a remedy to said tribes and bands for the satisfaction of any alleged wrongs arising from violation of said treaties, and

WHEREAS, several Congressional Bills are currently being prepared for the purpose of controlling Indian fisheries outside reservation boundaries, and

WHEREAS, some of the proposed Congressional Acts would place the power to control off-reservation Indian fisheries with the State Conservation Agencies, and

WHEREAS, for purposes of efficient and coordinated management of all the various fisheries pursued within a State's waters it is imperative that the State Conservation Agencies involved be assured of complete control of the fisheries within its waters,

NOW, THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission urges Congress to enact such legislation within the framework of existing treaties as may be necessary to *insure to the States* of Idaho, Oregon and Washington the necessary powers to conserve the anadromous fish resources while within those States, and to effectively apply State laws and regulations to Indians fishing outside of Indian reservations, and

BE IT FURTHER RESOLVED, That copies of this resolution be sent to the Congressional delegations of the States of Alaska, California, Idaho, Oregon, and Washington, and to the Secretary of the Interior.

TO. A Permanent Sanctuary for Salmon in the Salmon River, Idaho

„ {This was reaffirmation of resolution No. 1 adopted at the 1960 Annual Meeting, except that it was amended to include Idaho as a member of PMFC.)

BE IT RESOLVED, That the Pacific Marine Fisheries Commission, acting under its responsibility as an interstate compact organization charged by the Legislatures of Washington, Oregon, California, and Idaho and the Congress of the United States with the conservation and enhancement of the fisheries, requests and urges that Congress set aside the Salmon River of Idaho, tributary of the Snake River, as a sanctuary for fish.

To this purpose, the Pacific Marine Fisheries Commission proposes that Congress prohibit the construction of high dams, for power or other purposes, at the Lower Canyon site, Crevice site, Freedom site, or any other site in the Salmon River.

The Commission urges, further, that the prohibition against dams barring access of salmon and steelhead to the Salmon River and the seaward migration of small fish include the construction of a high dam at the Nez Perce site or any comparable site in the Middle Snake River below the entrance of the Salmon River.

The Commission calls attention to the fact that the chinook salmon and steelhead produced in the Salmon and Snake Rivers provide a large part of the sport and commercial catch off the coasts of California, Oregon, Washington and British Columbia. Idaho enjoys a large sport fishery from the same resource.

Electric power is in good supply in the Pacific Northwest in this period. Power for the future may be obtained from other dams which do not pose a serious fish problem, from a dual-purpose, plutonium-power reactor at the Hanford Works, from now feasible nuclear power reactors or from Northwest coal fields. But there could be no replacement for the salmon and steelhead production of the Salmon River in Idaho, now approximately 40 per cent of the anadromous fish production of the Columbia Basin.

BE IT FURTHER RESOLVED, That copies of this resolution be forwarded to the Congressional delegations and Governors of the member States; and also to the President of the United States, the Secretary of the Department of the Interior, the Department's Bureaus of Commercial Fisheries and of Sport Fisheries and Wildlife, and also to the members of Idaho's Legislature.

11. Proposed Water Projects

WHEREAS, water development has always posed a problem to anadromous fish, and

WHEREAS, recent Supreme Court decisions adverse to California users of Colorado River water have brought forth a rash of proposed water projects far in advance of original plans for their developments, and

WHEREAS, most of these plans and proposals will affect the best watersheds now being utilized by anadromous fish,

THEREFORE BE IT RESOLVED, That the Pacific Marine Fisheries Commission, urges the departments of fish and game of member States to:

1. Seek legislation that makes the use of water by fish a beneficial use.
2. Seek guaranteed flows of suitable water to maintain the runs of anadromous fish.
3. Work diligently to obtain guarantees of mitigation, below all impoundments, based upon the fish-producing potential of the lost area.
4. Be cautious that the great natural resource of anadromous fish not be traded for some other form of recreation.
5. Assure that mitigation facilities be part of project cost, and maintenance and operation of these facilities be a user's cost, and

BE IT FURTHER RESOLVED, That Pacific Marine Fisheries Commission requests the Legislatures of the member States to cooperate with the fisheries departments to secure the needed assurances for protection of these runs of fish.

12. Increase of Research Staff from Three to Five (Expenses Paid by PMFC)

WHEREAS, it is necessary that technical advice be available to Pacific Marine Fisheries Commission advisers and commissioners from each member State of Pacific Marine Fisheries Commission, and

WHEREAS, technical advice should be available from each member State based on the particular problems to be

considered at Pacific Marine Fisheries Commission meetings, and

"WHEREAS, it is presently the policy of Pacific Marine Fisheries Commission to pay travel and subsistence expenses for up to three research staff members from each State, and

WHEREAS, three technical advisers are an inadequate number from some States, and

WHEREAS, prior to 1963, expenses were paid by Pacific Marine Fisheries Commission for up to five persons from each member State,

BE IT THEREFORE RESOLVED, That Pacific Marine Fisheries Commission pay travel and subsistence allowances for up to five technical persons from each compacting State at meetings of the Commission.

13. Senate Bill 627, Research and Development Act

WHEREAS, S. 627, a bill to promote state commercial fishery research and development projects would provide funds to greatly accelerate research and rehabilitation programs of the several states, and

WHEREAS, the Pacific Coast States are currently straining their fiscal resources to the utmost by heavily investing in fishery programs, and yet are not fully meeting the need, and

WHEREAS, the funding provided by S. 627 recognizes the responsibility of the federal government for participation in the development of strong and sustained commercial fisheries by the several states in the national interest, and

WHEREAS, S. 627 has passed the Senate and is currently being considered by the House of Representatives,

THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission in meeting assembled does respectfully urge the United State House of Representatives to favorably consider S. 627.

14. Pesticide Program

"- ..

WHEREAS, there has been little action taken on the 1962 resolution of the Pacific Marine Fisheries Commission concerning the establishment of a pesticide research laboratory to study the effects of pesticides on anadromous fish, and

WHEREAS, the widespread use of pesticides has been shown in some areas to be detrimental to fish, including marine and anadromous forms and shellfish and their environments, and

WHEREAS, the U. S. Government has established a pesticide research laboratory to assess the damage done by pesticides in the Southeastern states, and

WHEREAS, adequate pesticide research facilities are not available in those Western states where fish and shellfish are most likely to be affected,

THEREFORE, BE IT RESOLVED by the Pacific Marine Fisheries Commission at its Annual Meeting on November 15, 1963, that it recommends to the U. S. Government that it immediately establish a pesticide research program on the Pacific Coast to study the effects of pesticides on anadromous fish, other fish, shell fish and their environments, and

BE IT FURTHER RESOLVED, That copies of this resolution be sent to the Secretaries of Agriculture; Health, Education and Welfare; and the Interior; and to the U. S. Senators from California, Oregon, Washington and Idaho.

16. Conflicting Meetings by Other Agencies with Annual Commission Meeting

WHEREAS, the complexity of Pacific Coast fishery problems has become such to require an increasing number of meetings of fishery agencies and industry personnel, and

WHEREAS, many of these problems are often interrelated and require the attendance of representative personnel in order that proper decisions may be assured, and

WHEREAS, the Pacific Marine Fisheries Commission has a prime responsibility and function to coordinate the fishery concerns of the Pacific Coast,

NOW, THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission offer the use of its offices to fisheries organizations of the Pacific Coast for purposes of scheduling meetings and for the purpose of scheduling simultaneously and at the same place as many of these meetings as are compatible with the Annual Meeting of the Pacific Marine Fisheries Commission.

18. Seismic

WHEREAS, this Commission recognizes the need for additional information on the effect on fish and fisheries of blasting as used in seismic methods for studying the geology of an area, and

WHEREAS, this Commission resolved at the 1962 meeting to establish a comprehensive scientific study of the effects of all types of explosives on marine life, and

WHEREAS, increased seismic exploratory activity is anticipated to occur along the Oregon-Washington coast in 1964, and

WHEREAS, all pertinent phases of a comprehensive scientific study cannot all be undertaken at once,

NOW, THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission adopt the following research proposal as the joint study plan of the affected Pacific Coast States and that it should include but not be limited to the projects listed below:

1. Determination of the lethal range of nitro-carbo-nitrate explosives relative to the immediate and delayed mortality of chinook and coho salmon, Dungeness crabs, and petrale sole using techniques not requiring caging of the fish where possible.
2. Determination of the lethal range of nitro-carbo-nitrate explosives relative to the immediate and delayed mortality to the eggs and larvae of the English sole.
- 3- Determination of the extent to which salmon, anchovies, rockfish and flatfish will float following critical injury or death.
4. Determination of methods of estimating the total fish kill by species as judged from the fish observed on the surface, and

BE IT FURTHER RESOLVED, That the Executive Director of Pacific Marine Fisheries Commission be instructed to make immediate contact with all potential contracting entities that he deems appropriate so that methods of accomplishing the work are developed and expected costs calculated, and

BE IT FURTHER RESOLVED, That the Executive Director be instructed to explore methods of funding the program, and

BE IT FURTHER RESOLVED, That the Executive

Director, in keeping with the policies and charter of the Pacific Marine Fisheries Commission, be empowered to take whatever immediate action is necessary to implement the objectives of this resolution.

19. Iron Canyon Dam, Sacramento River

WHEREAS, the Pacific Marine Fisheries Commission, an interstate compact organization created by the Legislatures of California, Oregon, Washington and Idaho and approved by the Congress of the United States, has considered the aspects of both the U. S. Army Engineers Iron Canyon project and its alternatives, the Bureau of Reclamation Sacramento River tributary dam system in resolutions #2 and #3 of 1961 and again in 1962, and

WHEREAS, no evidence has since been presented showing that the Iron Canyon project would not irreparably damage the anadromous fish runs of the Sacramento River, while on the other hand the tributary dam system would aid the fish runs, provide flood control, contribute to the over-all water supply and enhance recreational values,

NOW, THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission assembled in Portland, Oregon, this 15th day of November, 1963, reaffirms its opposition to the Iron Canyon Project and urges the adoption of the tributary system outside the areas shown on the map by E. P. Hughes dated December 7, 1961, and

BE IT FURTHER RESOLVED, That the Executive Director of the Pacific Marine Fisheries so inform all Senators and Congressmen of California, Oregon, Washington and Idaho, and also the Bureau of Reclamation, the U. S. Army Engineers, the Federal Power Commission, the Bureau of Outdoor Recreation, the Department of Agriculture, and all other interested parties of the intent of this resolution.

20. Bruces Eddy Dam, Clearwater River

WHEREAS, the combined conservation organizations of the States of Oregon, Washington, Idaho and California, plus the major conservation groups nationally have heretofore expressed their view and opposition to the construction of Bruces Eddy Dam on the North Fork of the Clearwater River in Idaho, and

WHEREAS, said Bruces Eddy Dam now known as the Dworshak Dam is still a major threat to the anadromous fish resource of the Clearwater River system, and

WHEREAS, construction of the Dworshak Dam has been authorized but no appropriation has been made, and

WHEREAS, atomic energy power is now practical and close at hand,

NOW, THEREFORE, BE IT RESOLVED, That the Pacific Marine Fisheries Commission does hereby request no appropriation be made for the construction of Dworshak Dam, and

BE IT FURTHER RESOLVED, That copies of this action be sent to the Secretary of the Interior, to the Federal Power Commission, to the Congressional delegations of the Compact States and to the Chairmen of the Appropriations Committee in both the U. S. Senate and the House of Representatives.

In addition to the 16 proposals, which were adopted as resolutions, 4 proposals were tabled or rejected.

Proposal #1, to allow trawlers in waters south of Cape Blanco, Oregon to retain incidentally caught halibut, was ordered returned to its author with the suggestion that it be referred directly to the International Pacific Halibut Commission.

Proposal #4, to abolish the June 15 opening date for silver or coho salmon fishing by troll gear in the State of Washington and to permit trolling for silver salmon at any time provided that only silvers twenty-two inches long, or longer, may be retained and provided that the regulation is the same in all member PMFC States, failed to pass.

Proposal #5, to make March 15 through October 15 the trolling season for chinook salmon in all PMFC member States, failed to pass.

Proposal #15, to urge the United States House of Representatives to pass S. 1988 (a bill to prohibit foreign fishing in U. S. territorial waters and to provide penalties for violation) was tabled. (S. 1988 was eventually passed and on May 20, 1964 became Public Law 88-308).

Proposal #17, to commend the United States Senate for passage of S. 649 (a bill to amend the Federal Water Pollution Control Act, to establish the Federal Water Pollution Control Administration, to increase grants for construction of municipal sewage treatment works, etc.) and to urge the United States House of Representatives to pass the bill, was tabled.

Election of Officers, Etc.

•The following were elected officers for the calendar year 1964:

Walter T. Shannon, Chairman
John R. Woodworth, First Vice Chairman
John H. Wedin, Second Vice Chairman
J. Pat Metke, Secretary

The 1964 Annual Meeting will be held in the San Francisco Bay Area of California sometime in November or December.

Leon A. Verhoeven was confirmed as Executive Director.

FINANCES

The Commission receives its finances 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 the 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.

STATEMENT OF RECEIPTS AND DISBURSEMENTS

January 1, 1963 to December 31, 1963

CASH BALANCE Dec. 31, 1962
(Ending Balance 15th Annual Report).....\$20,428.72

RECEIPTS: Contributions by

Member States—		
California	\$26,600.00	
Idaho	2,000.00	
Oregon	3,900.00	
Washington	10,800.00	43,300.00
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Refund on Plane Fare—		
Van Wyk Travel Service	135.40	
United Air Lines	7.14	142.54
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DISBURSEMENTS:

Salaries and Wages:		
Executive Director, Consultants, Treasurer, Office Secretary, and Temporary	\$19,536.62	
Office Supplies	\$ 1,188.06	
Telephone and Telegraph	425.01	
Postage, Freight, Express	433.27	
Printing of Publications	2,106.00	
Rents: Headquarters Office and Meeting Rooms	1,571.68	
Premiums: Fidelity Bonds, Fire Insurance, Workmen's Com- pensation Insurance	121.54	
Audit of Fiscal Books and Records	300.00	
Private Car Mileage	146.79	
Fares: Airplane, Railroad Pullman, Other	683.90	
Meals and Lodging	1,010.94	
Physician and Hospital Insurance..	10.00	
Library Supplies	4.75	
Retirement Contributions	539.81	
Annual and Research Meetings:		
Advisory Committee	2,357.95	
Commissioners	1,144.65	
Administrative and Research	959.42	
Meeting Rooms	440.00	
<hr/>		
Total General Expenses	13,443.77	
Office Furniture and Equipment	264.71	
Cooperative Research with Other Agencies.....	1,070.15	
<hr/>		
Total Disbursements	\$34,315.25	
<hr/>		
Cash on Deposit in The United States National Bank of Portland, Oregon: General Checking Account, Dec. 31, 1963	29,556.01	
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	\$63,871.26	\$63,871.26

AUDIT REPORT

ALLEN H. ADAMS
Certified Public Accountant
Portland, Oregon

September 23, 1963

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, 1963. The audit includes the verification of the assets and liabilities of all funds at June 30, 1963 and a detailed examination of each financial transaction for the period under review. Other auditing procedures were employed to the extent considered necessary in the circumstances.

The following exhibits are submitted:

- A. Balance Sheets, as at June 30, 1963 of the General Fund and the Property Fund.
- B. Statement of Income and Expenses for the period July 1, 1962 to June 30, 1963.
- C. Analysis of Surplus for the period July 1, 1962 to June 30, 1963.
- D. Statement of Cash Receipts and Disbursements for the period July 1, 1962 to June 30, 1963.
- E. Notes to Financial Statements and 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, 1963, 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, 1963

EXHIBIT "A"

GENERAL FUND

ASSETS

Cash in Bank\$7,055.75

LIABILITIES, RESERVES AND SURPLUS

LIABILITIES:

Accounts Payable\$ 774.55

RESERVES:

Reserve for Purchase Commitments 5,263.80

FUND BALANCE:

Surplus—Current—Exhibit C 1,017.40

Total Liabilities, Reserves and Surplus\$7,055.75

PROPERTY FUND

ASSETS

Office Furniture and Equipment\$3,799.40

FUND BALANCE

Investment in Fixed Assets\$3,799.40

**STATEMENT OF INCOME AND EXPENSES
GENERAL FUND**

For the Fiscal Year Ended June 30, 1963

EXHIBIT "B"

INCOME:
Contributions from Member States\$42,100.00

EXPENSES:

Salaries and Wages—Full Time Employees ..\$18,048.85
Salaries and Wages—Part Time Employees ... 1,662.20
Office Supplies 1,255.15
Telephone and Telegraph 404.13
Postage, Freight and Express 425.01
Printing of Publications 7,763.00
Rents 2,242.48
Insurance Premiums 138.28
Auditing Fee 300.00
Private Car Mileage 515.40
Railroad, Plane and Other Transportation
Fares 1,420.59
Meals and Lodging 2,834.64
Motor Vehicle Supplies 26.30
Retirement Contributions 470.45
Travel Expenses—Advisory Committee 1,785.88
Sound Service for Annual Meeting 84.36
Capital Outlays: Office Equipment 407.40
Research Expenses 1,964.49
Library Supplies 6.75

TOTAL EXPENSES 41,755.36

Excess of Income over Expenses for Year—Exhibit "C".....\$ 344.64

ANALYSIS OF SURPLUS

For the Year Ended June 30, 1963

EXHIBIT "C"

Surplus—Current—July 1, 1962.....\$349.13
Portion of Funds Reserved for Revolving Fund payments
transferred to General Fund during year..... 390.99
Reserved for Cooperative Research, July 1, 1962..... (67.36)
Excess of Income over Expenses*for the fiscal year ended
June 30, 1963..... 344.64
Surplus—Current—June 30, 1963.....\$1,017.40

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS

For the Period July 1, 1962 to June 30, 1963

EXHIBIT "D"

GENERAL FUND

Cash in Bank, July 1, 1962.....\$ 326.11

RECEIPTS DURING PERIOD JULY 1, 1962 TO JUNE 30, 1963:

Appropriations from Member States\$42,100.00
Transfer In—Elimination of Revolving Fund 390.99
Refunds from Air Lines..... 142.54 42,633.53
Total Cash Available.....\$42,959.64

DISBURSEMENTS DURING PERIOD JULY 1, 1962 TO JUNE 30, 1963:

Salaries and Wages—
Full Time Employees 17,568.72
Part Time Employees 1,660.40
Office Supplies..... 1,029.29
Telephone and Telegraph 371.06
Postage, Freight and Express 425.01
Printing of Publications 2,641.00
Rents 2,242.48
Insurance Premiums 131.61
Auditing Fee 300.00
Private Car Mileage 515.40
Railroad, Plane and Other Transportation
Fares 1,563.13
Meals and Lodging 2,834.64
Motor Vehicle Supplies 26.30
Library Supplies 6.75
Retirement Contributions 353.24
Travel Expenses—Advisory Committee 1,785.88
Sound Service for Annual Meeting 84.36
Capital Outlays: Office Equipment 407.40
Research Expenses 1,957.22

Total Disbursements\$35,903.89

Cash in Bank, June 30, 1963\$ 7,055.75

REVOLVING FUND

Cash in Bank, July 1, 1962.....\$ 390.99

DISBURSEMENTS:

Transfer Out—to General Fund—Elimination of Fund... 390.99
Cash in Bank, June 30, 1963.....\$ None

NOTES TO FINANCIAL STATEMENTS AND COMMENTS

June 30, 1963

SCOPE OF THE AUDIT For the

Period July 1, 1962 to June 30, 1963

EXHIBIT "E"

NOTE 1:

The following schedule will summarize appropriations by the Member States to the Commission:

	Ore.	Wash.	Cal.	Total
1961-63 Biennium:				
Legislative Approp.	\$7,800.00	\$19,000.00	\$	\$26,800.00
1962-63 Fiscal Year				
Legislative Approp.			26,600.00	26,600.00
	<u>7,800.00</u>	<u>19,000.00</u>	<u>26,600.00</u>	<u>53,400.00</u>
1961-62 Fiscal Year				
Approp. Received	2,400.00	7,300.00		9,700.00
1962-63 Fiscal Year				
Approp. Received	3,900.00	11,600.00	26,600.00	42,100.00
	<u>6,300.00</u>	<u>18,900.00</u>	<u>26,600.00</u>	<u>51,800.00</u>
Appropriations Not				
Received	\$1,500.00	\$ 100.00		\$ 1,600.00

The appropriations not received from the States of Oregon and Washington were due to a downward adjustment in their proportionate shares because the State of California appropriated \$16,700.00 for the 1961-62 fiscal year instead of \$26,600.00 as called for in the biennial budget of the Commission.

NOTE 2:

The Revolving Fund was discontinued on October 17, 1962, the balance remaining on that date, \$390.99, being transferred to the General Fund Bank Account. This fund was eliminated because of a change in the By-Laws on December 13, 1961 authorizing the signing of checks by the Executive Director and Treasurer (together), thus eliminating the signature requirement of a Commissioner.

NOTE 3:

The books of the Commission were converted to the accrual basis for expenditures for the fiscal year ending June 30, 1963. In order to present clearly the expenses applicable to 1962-63 on Exhibit "B" (Statement of Income and Expenses), the accrued expenses at June 30, 1962, amounting to \$44.34, were eliminated, since, according to the prior method of accounting, they were reflected as expenses when paid in the 1962-63 fiscal year.

NOTE 4:

I feel that the amount of the collateral (\$50,000.00) pledged by the depository bank to secure the Commission's bank balances should be increased in view of the addition of two additional states into the Commission. Although the maximum amount on deposit at any one time is to be approximately \$61,000.00 and the collateral along with the F.D.I.C. insurance should be near this amount, it is my suggestion that the Oregon Municipal law, requiring 110% coverage, be followed in this regard. (The fifth state did not join and the suggestion has not been carried out — L.A.V.)

NOTE 5:

I feel that the continuation of the Treasurer's Bond at \$35,000.00 to be reasonable in relation to the developments described in the preceding note.

NOTE 6:

The Balance Sheet account "Reserve for Purchase Commitments" represents purchase obligation of the Commission at June 30, 1963 for which vendors invoices had not been received at that date. Such amounts are also reflected as expenses; consequently the surplus at June 30, 1963 represents solely the unobligated funds of the Commission at this date.

EXHIBIT "F"

Cash on deposit in the general fund as at June 30, 1963 was verified by certificate from the depository. The United States National Bank of Portland, Oregon. Collateral, consisting of United States Treasury Bonds in the amount of \$50,000.00, pledged by the depository bank to the First National Bank, Portland, Oregon, to secure the Commission's bank balance was verified by certificate from the latter bank. Cash received by the Commission for the period under review was substantiated by certificates from the respective Secretaries of State of the three states.

Property of the Commission, consisting of office furniture and equipment, was verified by physical inventory, additions during the year being substantiated by inspection of appropriate evidence. A fire insurance policy on the property was inspected for dates and adequacy of coverage.

A surety bond, with a limit of \$35,000.00, on the Treasurer of the Commission was inspected for dates, coverage and premium cost.

Liabilities of the Commission, owing as of June 30, 1963, were substantiated by inspection of purchases invoices and vouchers, and by related approvals of these items. Such liabilities were subsequently paid when due. The amount shown as reserve for purchase commitments was substantiated by inspection of outstanding purchase orders.

A detailed examination was made of all financial transactions for the period under review, substantiating book entries for these transactions by inspection of cancelled checks, purchase invoices, travel vouchers, wage and salary vouchers, receipt vouchers, and by reference to the Commission Minute Book and correspondence for authority where applicable. I am satisfied that all transactions are properly substantiated by appropriate evidence, authority, and general tests of reasonableness and are correctly recorded in the books of account.

Appendix 1 to the 1963 Annual Report

THE STATUS OF SALMON AND STEELHEAD SPORT FISHERIES IN OREGON AND THE COLUMBIA RIVER BASIN

HOMER J. CAMPBELL
Oregon Game Commission

The backbone of a coordinated fishery management program is knowledge of the status of stocks being managed. Because of a realization that angling pressure would increase on salmon and steelhead trout, the Oregon Game Commission began developing methods of measuring catch on a statewide basis ten years ago with the introduction of a mandatory salmon and steelhead catch card. Table 1 contains data derived from catch cards.

Later the development of sampling programs at Coos, Winchester, Siuslaw, and Yaquina Bays provided specific biological information not available from punch cards.

Catch estimates compiled by the Department of Statistics at Oregon State University are made on the basis of punch card returns and the validity of the estimates are subject to certain assumptions in the analysis: (1) that the catch by anglers who do not return the cards is the same as that for anglers who do return cards and (2) the fraction of anglers returning tags is constant for all months and rivers.

In order to qualify the data included in this report, knowledge of the non-response bias inherent in punch card estimates must be known. In Oregon non-response bias was found to cause catch estimates to be approximately 15 percent too high. In the State of Idaho a non-response bias causes estimates to be too high by 25 percent on steelhead trout and about 8 percent too high for salmon.

Information used in the preparation of this report came from the Oregon Fish Commission, flie" Washington Department of Fisheries, Washington Department of Game, and Idaho Fish and Game Department in either separate or cooperative sampling procedures and projects in the Columbia River Basin.

Salmon-Steelhead Catch in Oregon

(Punch cards issued, returned, and state-wide estimates of catch of salmon and steelhead)

Year	No. Issued	Number Returned	Percentage Returned	Salmon Catch ¹	Steelhead Catch	Total Catch
1953	173,216	50,106	28.92	91,683	87,942	179,625
1954	170,879	53,019	31.02	98,896	74,333	173,229
1955	165,442	45,508	27.51	82,342 ²	59,287	141,629
1956	166,386	57,374	34.48	155,823	83,845	239,668
1957	135,230	69,527	51.41	130,285	57,762	188,047
1958	215,410	69,108	32.08	127,975	90,709	218,684
1959	285,700	67,030	23.46	221,360	121,223	342,583
1960 ³	172,332	52,996	30.75	145,758	79,851	225,609
1961	202,977	56,642	27.90	223,782	83,200	306,982
1962	221,364	64,932	29.33	237,811	126,288	364,100
Totals & Averages	1,908,936	586,242	31.69	151,571	86,444	238,016

¹Yearly catch figures are estimates from data. Confidence limits vary each year and appear in annual reports. Totals on this table and those on stream catch summaries may not agree because of confidence limit variance.

²1955 figures are for a 9-month period. Records changed over to calendar year.

³Initial year for \$1.00 punch card.

Year	Angler Trips	Chinook	Coho	Total Fish	Catch per Angler Trip
1946	40,400	23,400	2,600	26,000	.64
1947	39,000	12,800	3,200	16,000	.41
1948	47,500	12,000	3,000	15,000	.32
1949	40,500	11,200	2,800	14,000	.35
1950	40,000	16,600	2,300	18,900	.47
1951	48,500	7,200	1,900	9,100	.19
1952	34,000	11,000	4,000	15,000	.44
1953	50,700	14,700	8,000	22,700	.45
1954	55,000	12,500	16,000	28,500	.52
1955	64,300	12,500	15,200	27,700	.43
1956	78,000	34,000	50,000	84,000	1.08
1957	54,000	18,500	38,700	57,200	1.06
1958	66,000	25,000	39,600	65,200	.99
1959	75,000	23,400	50,500	73,900	.99
1960	78,000	37,700	34,600	72,300	.93
1961	89,900	20,500	85,500	106,000	1.18
1962	116,400	29,900	118,900	148,800	1.28
1963	117,813	32,590	116,223	148,813	1.26

TABLE 1 Special Summary,

SPORT CATCH OF SALMON, COLUMBIA RIVER AND TRIBUTARIES

Dissimilar regulations and methods of collecting catch statistics in Oregon, Washington, and Idaho preclude precise total catch estimates for races of salmon or steelhead in the Columbia drainage. The difficulty of recording runs arbitrarily by date of catch results in a grouping which cannot be separated (by species) on the basis of punch card returns. For example, the salmon catch recorded on punch cards from the Columbia River cannot be separated as to species. However, intensive sampling at the mouth of the river reveals that 50 to 80 percent are coho salmon¹ in the estuary sport fishery.

In addition the Oregon punch card salmon totals recorded for the Columbia cannot be added to the total catch reported at the mouth of the Columbia River because Oregon anglers punch either "Columbia River" or "Ocean" for salmon taken in the lower river fishery.

The increasing proportion of coho in the catch in recent years (Figure 1 and Table 2) seems to be the result in part of increasing numbers of anglers and more of them fishing seaward each year.

Columbia River Estuary

The data used in calculating the estimates are total angling pressure in the form of boat counts, and catch success measured as fish-per-boat. The boat counts are made daily from the U.S. Coast Guard tower at Cape Disappointment. The number of boat types (charter, pleasure, and outboard motor) is calculated from early morning counts as the boats leave harbors. Catch-per-boat is determined from interviews in Oregon and Washington boat harbors and applied to the appropriate boat type. Estimates of catch are made on a weekly, biweekly or monthly

¹This should not be construed to mean that 50 to 80 per cent of the salmon in the Columbia River are coho. Chinook is the dominant salmon in the Columbia.

TABLE 2
Estimated Columbia River (Ocean) Sport Catch of Salmon
1946-1963, Oregon and Washington

basis depending on the magnitude of the fishery. The precision of the estimates has been about 10 percent.

Joint studies by the Oregon Game Commission and the Washington Department of Fisheries indicate an increasingly higher catch of salmon from the mouth of the Columbia River. Of the coho and chinook salmon taken in the fishery, coho generally constitute 60 to 80 percent of the catch. The catches of salmon recorded in the river proper above the mouth of the Cowlitz River indicate emphasis on fall chinook. Although numbers are small, 94 percent of the September catch in the Columbia River between the Cowlitz River and Bonneville Dam is comprised of chinook. The numbers of fish taken in the river proper as compared to the Astoria, Ilwaco, and Columbia jetty areas are insignificant and would not materially change the catch composition established at the mouth of the river.

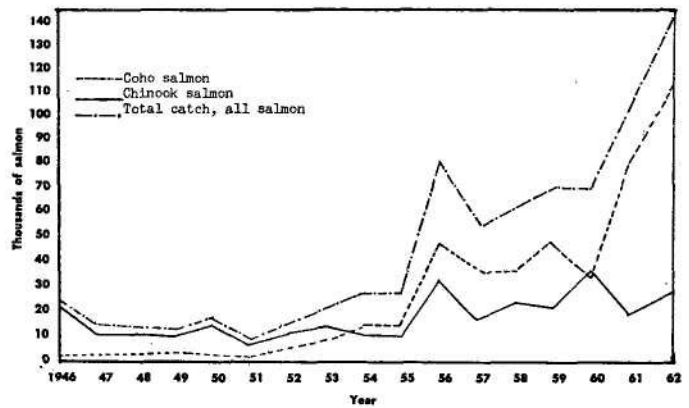


FIGURE 1
Columbia River estuary and ocean salmon sport catch.

TABLE 3
Sport Catch of Salmon in Columbia River and Tributaries

	Columbia River only		Columbia River tributaries				Total	
	Oregon	Washington	Oregon		Washington			Idaho
			Lower	Upper	Lower	Upper		
1962								
Spring chinook	10,004		17,417	2,343			13,200 ¹	
Summer chinook	6,954		1,978	676 ²			10,800	
Fall ch. & coho	19,063 ³		4,000					
Total	36,021		23,395	3,019			24,000	
1961								
Spring chinook	9,029		10,730	1,496			14,300	
Summer chinook	6,648		1,051	1,144			11,700	
Fall ch. & coho	17,682		2,121					
Total	33,359		14,902	2,640			26,000	
1960								
Spring chinook	11,547		10,861	2,243			23,100	
Summer chinook	6,220		591	1,036			18,900	
Fall ch. & coho	15,437		1,773				1,000	
Total	33,204		13,228	3,279			43,000	
1959								
Spring chinook	14,576		28,721	3,525			20,900	
Summer chinook	8,793		2,411	2,190			17,100	
Fall ch. & coho	21,642		4,442				2,000	
Total	45,011		35,594	5,715			40,000	
1958								
Spring chinook	5,149		21,509	1,509			26,950	
Summer chinook	1,684		2,377	793			22,050	
Fall ch. & coho	13,415		1,735					
Total	20,248		25,621	2,302			49,000	
1957								
Spring chinook	1,653		9,615	1,402			42,900	
Summer chinook	2,128		1,012	760			25,100	
Fall ch. & coho	5,130	2,240	1,735		1,343			
Total	8,911	2,240	12,341	2,180	1,343		68,000	
1956								
Spring chinook	1,750		18,284	309			22,550	
Summer chinook	1,760		1,955	465			18,450	
Fall ch. & coho	8,186	3,908 ⁴	2,280		2,853 ⁴		2,000	
Total	10,696	3,908	22,519	774	2,853		43,000	

¹An estimated 55 percent of the total salmon catch are spring chinook.

²Fall chinook and coho runs are not distinguished in the catch from Oregon tributaries above Bonneville.

³August to December catch may be 50 to 80 percent (or more) coho salmon. The exact proportion cannot be determined from punch cards.

⁴About 13 percent coho included.

Main Stem Columbia River and Tributaries

The three major periods of spring, summer and fall chinook migration are defined according to the distribution by monthly catches which the Oregon Fish Commission has adopted. Spring chinook are classified as those taken from January 1 to May 31, summer chinook from June 1 to July 31, and fall chinook and coho from August 1 to December 31. Because of the nature of the species involved, tributaries below Bonneville are designated "lower" and those above Bonneville as "upper."

Sport catch data from Washington were not available except in the years indicated. An obvious need is an interstate effort to provide total sport catch data on Columbia River salmon above Astoria.

Willamette River

A sizable component (24,000 to 96,000 since 1946) of the Columbia River spring chinook run ascends the Willamette River. An intensive sport fishery exists in the lower Willamette River for which estimates have been made. The run appears to have recovered from the low of 24,000 in 1960, although variance between years makes trend analysis only an intelligent guess.

Since 1946, catch statistics for the lower Willamette River have been compiled in a joint effort by the Oregon Fish and Game Commissions. The area includes the Willamette River from the Falls to its confluence with the Columbia River. Consistent methods of estimation have been used since 1946 involving the use of catch per boat (per day) as the measure of fishing success applied to the number of boats counted by airplane and recorded at moorages.

Passage facilities at Willamette Falls and pollution of the lower river hinder management efforts. Oxygen blocks at Portland are known to have serious effects on smolt movement.

TABLE 4
Escapement and Sport Catch of Willamette River
Spring Chinook Salmon, 1946-1962

Year	Willamette Falls Fishway Escapem't (Calculated)	Clackamas ¹ River Escapem't (Estimated)	Lower Willamette Sport Catch (Calculated)	Calculated Total Run	Sport catch ² as % of Run
1946	53,000	3,000	12,600	68,600	18
1947	45,000	2,000	12,000	59,000	20
1948	30,000	1,800	8,300	40,100	21
1949	27,000	1,800	9,100	37,900	24
1950	14,500	1,500	8,800	24,800	35
1951	34,300	2,000	13,300	49,600	27
1952	52,200	2,800	12,500	67,500	19
1953	76,400	4,000	16,400	96,800	17
1954	31,100	1,800	11,500	44,400	26
1955	22,000	1,500	9,000	32,500	28
1956	58,600	3,000	16,000	77,600	21
1957	39,300	2,000	11,500	52,800	22
1958	45,200	2,100	15,500	62,800	25
1959	31,900	3,000	18,500	53,400	35
1960	14,400	1,800	8,000	24,200	33
1961	18,900	2,200	6,400	27,500	23
1962	26,000	3,000	9,100	38,200 ³	24
Average	36,500	2,300	11,700	50,500	23

¹As in prior years the 1962 estimate of the Clackamas River escapement is by necessity an estimate based on observations, interviews, North Fork Dam counts, and numbers of fish returning to the Eagle Creek National Fish Hatchery.

²Below Willamette Falls.

³This total includes 113 salmon which died at Willamette Falls following stranding or isolation in potholes.

Table 4 lists the escapement and total run in addition to the sport catch for Willamette River spring chinook. Attention is called to the percentage of the total run that is caught in the sport fishery downstream from Willamette Falls. The general stability of the catch in relation to wide fluctuations in total runs is a point of interest.

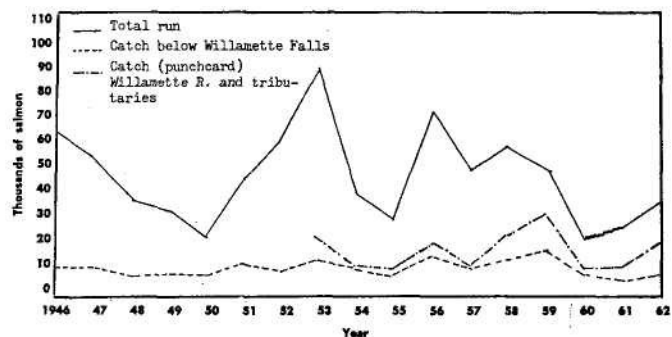


FIGURE 2

Willamette River salmon sport fishery.

SPORT CATCH OF SALMON IN OCEAN AND COASTAL RIVERS, OREGON

Since 1956, Oregon anglers have been instructed to record fish taken "over the bar" as "ocean" caught. The difficulty in distinguishing separate stocks of salmon recorded as "ocean" caught is obvious. More accurate, however, become the estimates of catch from coastal rivers and bays when the "ocean" category for reporting is used. Trends in ocean catch estimated from punch cards versus catch in the coastal rivers are shown by Figure 3.

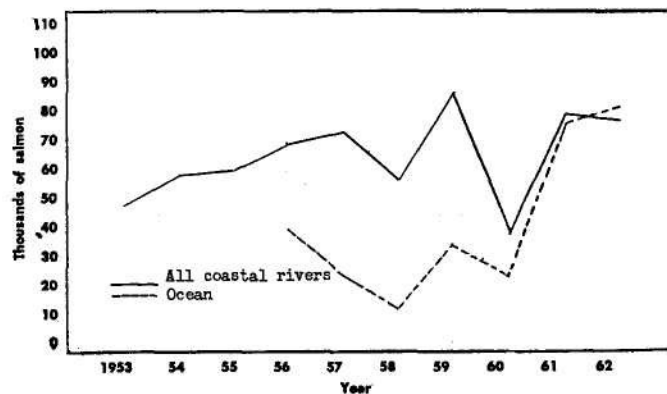


FIGURE 3

Oregon salmon sport catch, ocean and all coastal rivers and bays, exclusive of the Columbia River.

From a total of 41 rivers and bays a combined catch has been calculated from the analysis of salmon punch card returns. It is likely that a proportion of the salmon catch reported by river could have been made on the "bar" or in the ocean in close proximity to the river mouth and reported as ocean catch. From the punch card return there is no precise way of assigning total ocean catch by species.

Total catch, its composition and relative angler success is recorded under a separate sampling procedure for several principal salmon angling areas in Oregon, exclusive of the Columbia River (Table 5).

TABLE 5
Oregon Coastal Sport Salmon Fishery

Year	Coho	Chinook	Total Catch	Total Anglers	Fish/Angler
1962 ¹	81,338	4,037	85,375	115,433	0.74
1961 ²	41,921	5,986	47,907	68,461	0.70
1960 ³	14,233	4,993	19,226	52,116	0.36
1959	14,770	4,579	19,349	42,705	0.45
1958 ⁴	10,779	4,232	15,011	27,846	0.54

¹Winchester, Coos, Siuslaw, and Yaquina Bays.

²Winchester, Coos and Siuslaw only.

³Winchester and Coos only, 1959 and 1960.

⁴Winchester Bay only.

OREGON STEELHEAD SPORT CATCH

Coastal Rivers and Bays

Included in the estimates of steelhead catch for all of the coastal rivers and bays in Oregon are unknown numbers of summer steelhead. The magnitude of catch of the latter is probably not high except in the Rogue. Although a few summer steelhead have been reported from the Siletz and Alsea

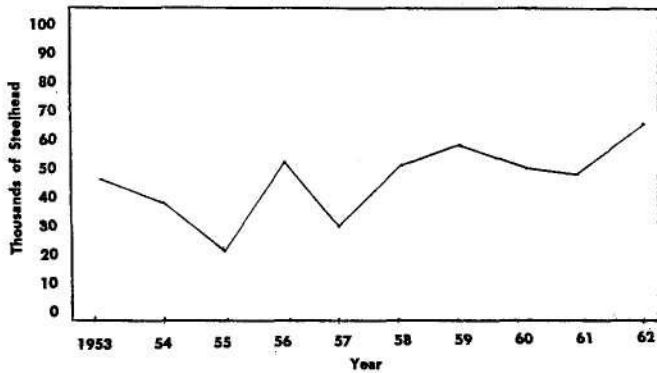


FIGURE 4

Oregon steelhead sport catch, coastal rivers and bays, exclusive of the Columbia River.

Rivers in recent years, the catch of this particular stock of fish is low by comparison with that of winter steelhead.

From a total of 41 rivers a combined catch of steelhead is calculated from punch card returns. (See Figure 4). Intensive catch sampling indicates that, on the average, 16,000 angler trips are made per year to the Wilson River to take about 2,500 steelhead, while on the Alsea only 9,500 angler trips are needed to take about 1,500 fish per season. These data indicate the tremendous usage anglers make of an area to fish for steelhead.

Sport Catch of Steelhead, Columbia River and Tributaries

When steelhead are recorded on the Oregon punch card as Columbia River fish, they are largely summer steelhead taken in the main river at McNary, The Dalles, Bonneville, and from bars in the lower river. All of the Columbia River tributaries in the three states above Bonneville are assumed to hold the summer steelhead. Major streams such as the Deschutes, John Day, Snake, Grande Ronde, Clearwater and Salmon Rivers are examples of the extensive drainages included in this catch statistic.

Of the tributaries in Oregon below Bonneville, the Willamette River provides the bulk of the catch, which is essentially of winter steelhead. In Washington, the Cowlitz, Kalama, Toutle and Washougal Rivers are major winter steelhead producers. Until 1962, Washington law required steelhead anglers to use a catch card only from December 1 to April 1. Catch card use is now year round.

Steelhead catch estimates from Idaho were made on the basis of postal card surveys. Estimates are high as indicated by a non-response bias (about 25 percent) in the first year (1962) of use of the Idaho salmon-steelhead punch card.

Table 6, based on the above assumption regarding the distribution of the summer and winter runs of steelhead in the Columbia and its tributaries and the timing of those runs, shows the contribution of each run to the sport fishery.

TABLE 6 Sport Catch of
Steelhead, Columbia River and Tributaries

	Columbia River only		Columbia River tributaries			Total
	Oregon	Washington	Oregon	Washington	Idaho	
1962 Summer	22,765 ¹	20,954 ²	19,857	37,051	39,000 ³	139,627
Winter	3,946	6,869	11,622	39,707	-----	62,144
Total	26,711	27,823	31,479	76,758	39,000	201,771
1961 Summer	10,998		13,001		38,000 ⁴	
Winter	1,483	4,350	6,204	23,701		
Total	12,481		19,205		38,000	
1960 Summer	11,337		18,560		60,000	
Winter	2,873	9,274	7,219	28,889		
Total	14,210		25,779		60,000	
1959 Summer	18,139		29,910		62,000	
Winter	2,219	5,508	8,978	19,781		
Total	20,358		38,888		62,000	
1958 Summer	6,016		19,930		60,000	
Winter	1,685	7,736	10,280	20,195		
Total	7,707		30,210		60,000	
1957 Summer	8,798		10,637		40,000	
Winter	428	1,375	5,065	20,195		
Total	9,226		15,702		40,000	
1956 Summer	8,427		8,013		16,000	
Winter	812	2,288	11,307	22,904		
Total	9,239		19,320		16,000	
1955 Summer			9,758		26,000	
Winter		3,699	5,078	19,121		
Total	19,127		14,836		26,000	
1954 Summer			12,075		25,000	
Winter		9,830	6,683	27,192		
Total	13,304		18,758		25,000	
1953 Summer			17,562			
Winter		3,381*	10,525	19,727		
Total	10,568		28,087			

¹Segregated from punch card by month and arbitrarily divided June 1 to December 15 for summer steelhead and December 16 to May 30 as winter fish.

²Estimates made from first return of statewide steelhead card in Washington.

³Idaho estimates obtained from postal card surveys.

⁴The 1961 estimate of 51,000 was corrected for a non-response bias to 38,000.

Appendix 2 to the 1963 Annual Report

SPECIAL REPORTS

MARKING OF FISH BY DIETS CONTAINING TETRACYCLINE ANTIBIOTICS

GEORGE J. RIDGWAY and DOUGLAS D. WEBER

U. S. Bureau of Commercial Fisheries

Biological Laboratory

Seattle, Washington

Because of the need for additional and better methods of marking salmon, we have been investigating a method of marking fish by incorporating tetracycline antibiotics in the diet. This method has its basis in the discovery by scientists at the National Institute of Health (1) that a small fraction of tetracycline antibiotics administered to man or other mammals is fixed in the growing surface of their bones. This fixed material may be detected by the ultrasensitive method of fluorescence microscopy. In this method a bone specimen is illuminated with ultraviolet light and the deposited material observed through a microscope as a thin yellow gold fluorescent band. The fluorescent mark has been shown to last as long as nine years in humans (2).

We have successfully applied this method to marking salmon and some preliminary results have been published (3). We encountered some problems; higher doses are required to mark salmon than is necessary for other animals; also, some of the commercially available feed grades of these antibiotics are unpalatable to fish. However, the materials are completely non-toxic when fed at levels even higher than those necessary for marking, and the antibiotics are commercially available in forms palatable to fish. In most of our studies we have been feeding a total of 1 to 2 grams of oxytetracycline per kilogram body weight over a 2- to 4-day period.

We have results from two pilot experiments in which this method of marking has been applied. One was conducted at the Klaskanine Hatchery through the cooperation of the Oregon Fish Commission. In this experiment 17.24 percent of the yearling silver or coho salmon released in 1961 were marked. In the "jack" return to the hatchery during 1962, 1602-fish were examined and 334 (21.2 percent) were found to be marked. In 1963, the nearby Young's Bay Commercial fishery was sampled; 822 adult silvers were examined, 143 (17.4 percent) of which were marked. Ten percent of the adults returning to the hatchery were also sampled. Of 437 examined, 21 percent were marked, the same percentage found in jack returns of 1962.

In the other pilot experiment, sockeye salmon were marked at the Leavenworth National Fish Hatchery and released into Lake Wenatchee. In this study, some of the fish were also fin clipped. The salmon smolts migrating out of Lake Wenatchee 9 months later were sampled, and the ratio of tetracycline-marked-only fish to tetracycline-marked-plus-fin-clipped fish was found to be not significantly different from this ratio at the time of release. Thus, we have evidence that the tetracycline mark did not effect the survival of these fish.

This method of marking has the advantage that it can be applied in the fish's food, avoiding the necessity of handling or mutilating the fish; the method does not adversely affect the survival of the fish; in fact, it may enhance the survival by curtailing certain diseases often found in the hatchery. This marking method is also less expensive than fin clipping. A bone in the roof of the mouth, the entopterygoid, which can be removed without adversely affecting the commercial value of the fish, has been found suitable for recovery of the marks.

In summary, we have a new method of marking that works. It has a number of advantages, and with a little more research, we hope to be able to apply it to the hatchery evaluation program as well as to other important salmon biology problems.

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PACIFIC SALMON INTER-AGENCY COUNCIL PROGRESS REPORT

ROBERT W. SCHONING

Director Oregon Fish
Commission

Salmon are the most important species of fish on the Pacific Coast with value to the sport and commercial fisheries of hundreds of millions of dollars annually. It is only logical that the management and regulation of fisheries on them be coordinated. Three significant steps have been taken in the past two years to bring about closer productive cooperation in the interest of perpetuating this great resource. Two conferences were held and a council was formed.

In February, 1961, Governor Egan of Alaska convened the First Governors' Salmon Conference. With the results of this meeting providing the impetus and showing the need for future work, Governor Rosellini of Washington consulted with other Governors involved and announced he would host a second conference in Seattle in early January of 1963. About 300 people were registered at the meeting including top scientists and administrators from all of the state, federal, and international organizations responsible for management and research in Pacific Salmon. In addition, there were representatives from all segments of private industry with even a remote interest or association with salmon. It was the largest and most inclusive collection of salmon-minded people of this importance in history. The hours were long and the interest and enthusiasm high, with members of the audience contributing significantly to the deliberations. The months of careful planning resulted in extensive constructive recommendations from each of the five committees and one of the recommendations was to form the Pacific Salmon Inter-Agency Council. Another very important product of the meeting was the new awareness of the importance and complexity of *thp* problem. As Governor Rosellini stated at the conclusion of the Conference, "I believe the Conference laid a solid base for future action in protecting and improving our Pacific Coast salmon runs."

What has happened since? There has been relatively little in the papers about developments since, but progress has been made. Whenever a new entity is created comprised of many state and federal agencies with specific statutory responsibilities, there is always some organizational wheel-spinning and liaison problems. Regardless of the goodness of the intentions and the competence of the personnel[^] involved, this is inevitable in at least some degree. The Council has been no exception, but at last a measurable break-through is in sight.

In late March of this year the Pacific Salmon Inter-Agency Council was officially formed with 12 members including the 7 state fish and game agencies and 5 federal entities. A technical committee to be composed of top scientists from the member agencies was created and given the following instructions:

1. Review and evaluate reports and recommendations of Second Governors' Conference.
2. Review existing programs to ascertain areas of duplication or omission.
3. Determine areas of greatest need, and recommend to the Council areas of priority. After the Council approves this, the Technical Committee will be asked to

develop a comprehensive program which will come to the Council for study, review, and execution.

They were further instructed, "The contributions of other organizations, institutions, and agencies through their scientists are invited, and the Technical Committee shall consult with those who can contribute."

To date, the Technical Committee has organized, met three times, made a number of committee assignments, produced two formal reports, and has done a substantial amount of investigation and compilation. The reports are entitled "Water Supply Problems in Providing Fish Passage at Willamette Falls" and "Turbine Operation for Optimum Fish Passage." They are transmitted to the Council for study and eventual distribution on a limited basis. The complete 166-page Report of the Second Governors' Conference on Pacific Salmon is now available, also.

In my opinion, the Technical Committee's most significant accomplishment is the near-completion of a report on the status of all of the salmon stocks on the Pacific Coast. Most of it is in the hands of the typist now and the remainder soon will be. Based on the status report, the scientists will determine areas of greatest need and recommend to the Council programs on a priority basis. In the interest of time, the program and recommendations will be only in preliminary form. The Council and Technical Committee will have a joint meeting as soon as this material is ready which should be in less than two months. The Council, after careful evaluation of all the material in a frank discussion with the scientists, will give them specific instructions for getting on with the business at hand.

I had some misgivings about the super-agency approach in the beginning, but the more I become involved with it and the[^]more I see of the interest, enthusiasm, and dedication of the scientists, and yes, the administrators too, the more convinced I am that it will work.

Look at the ingredients. A tremendously valuable resource producing at far less than optimum, a Council dedicated to improving the runs and with the authority to bring it about and comprised of all of the agencies with significant Pacific salmon and steelhead research or management interests or responsibilities except for the Canadians, all of the top scientists in the field either on the technical committee or with other organizations but available for consultation and advice and assistance on call from other related interests.

The plans were carefully drawn, the keel laid, the hull built, and crew assigned, and the mission determined. The preliminary shakedown cruises have been promising. It is about to embark on the first major voyage which will form the basis for future trips. The course must and will be charted carefully. We cannot and must not fail. Too much is at stake and time is running out. There are no other ships to replace this one if it founders and is lost. We of the Council are dedicated to reaching port safely with the cargo intact. You will be kept informed periodically of our goals as we accomplish them.

STATUS OF COLUMBIA RIVER STEELHEAD STOCKS

ROBERT N. THOMPSON

Oregon Fish Commission

In a general appraisal of Columbia River steelhead stocks, we recognize two major racial groups. One group is the winter steelhead which enter the Columbia River from November to April and spawn in the tributary streams below Bonneville Dam. The other group is the summer steelhead which enter the Columbia River from March to October with July and August being the main months of entry. These fish spawn principally in tributaries above Bonneville Dam the year following their entry into the Columbia.

WINTER RUN STATUS

The term status as used here relates the size of the stock to its environment. The status of a stock is measured by the numbers in the stock compared to the numbers which the environment will permit. Run refers to catch plus escapement.

We consider the status of the winter steelhead as good. The exact size of the run is not known, but a tagging program in the winter of 1955-56 estimated the run at 220,000 fish. We have no reason to believe that this has declined. This tagging study estimated the combined sport and commercial harvest at no more than 26 percent of the run at that time. The commercial landings of steelhead in the winter season since 1938 have been relatively stable in spite of curtailed fishing time.

SUMMER RUN STATUS

The summer steelhead are more important than the winter run in terms of both the commercial and sport harvest. In the period 1938-62, the commercial catch has ranged from 0.6 million pounds to 2.6 million pounds. The annual catches have been variable, but the trend has been downward, especially in the 1940's. Peak catches are attributable to large runs, but the long term decline in landings is due to restricted fishing time. Fishing time has been reduced from 272 days per year during the early 1940's to 100 days per year at present. In the months of June, July, and August, when most of the run is entering the river, the fishing time has been cut from 73 to* 44 days. The rate of harvest on the run shows the effect of reduced fishing time. Approximately 75 percent of the run was cropped in the early 1940's, while the 1962 fishing rate of 36 percent is the lowest on record.

The size of the summer run since 1938 has varied from over 400,000 down to 160,000, but there is no definite declining trend. The 1962 run was the best since 1955.

The escapement above the commercial fishery shows a slight upward trend. Generally, it has been better since 1952

when a fishing closure in late July was put into effect. The 1962 estimated escapement was the second highest on record. From the standpoint of escapement above the commercial fishery, the status of the run is good. The ever increasing sport fishery in the upper Columbia, however, makes the estimated escapement less and less reliable as a measure of the true escapement.

The accuracy of the sport catch estimates is a matter of question. The estimates have been as high as 130,000 in 1959 when the Bonneville count in that year was 129,000. We in the Oregon Fish Commission and others believe that these estimates are much too high. The interpretation of the effect of sport catch estimates is confounded by the fact that the estimates are on a calendar year basis while the run is fished on in the last half of one year and the first half of the next.

Although the sport fishery is felt to be increasing, it does not yet appear to have had an appreciable effect on steelhead production. During this past summer we have embarked on a scale study to help us better understand the summer steelhead. Although this study is still preliminary and many questions are unresolved, it appears that we have a good basis for stating that escapement in a given year contributes to the runs through the lower Columbia 4 and 5 years later. This information indicates that the rather low escapements of 1947 through 1950 were capable of producing relatively as good runs as they did in the years 1952 through 1955. This information also shows that the record 1952 escapement did not produce well in 1956 and 1957 and that large escapements are not necessarily a panacea for increasing the runs.

In view of the relatively stable condition of the run, we feel that the sport fishery is not seriously suppressing the escapement and we consider the general status of the run as good. To emphasize this point, I would like to make reference to the steelhead counts at Lewiston Dam on the Clearwater River. These counts took a substantial jump after 1957 when the Celilo Falls Indian fishery was flooded out and commercial fishing above Bonneville Dam was stopped. The 1962-63 run year steelhead count at Lewiston Dam was 43,000 fish, the largest count on record. This shows that substantial numbers of fish destined for the Clearwater River system are surviving the relatively intense sport fishery in the Lewiston area.

In summary, I would like to review the effect of the commercial fishery as it is related to the status of the summer steelhead run. Beginning with 1938 and continuing through 1962, we find that the commercial landings are down, fishing time has been reduced, the harvest rate has been reduced, the size of the run is not declining, and the escapement shows a slightly increasing trend.

OPERATION FIN-CLIP

PAUL ZIMMER

U. S. Bureau of Commercial Fisheries
Portland, Oregon

AN ABSTRACT

Operation fin-clip is a joint effort of the Federal Government and the state fish and game agencies of Oregon and Washington. The purpose of this study is to measure the contribution of Columbia River salmon hatcheries to the sport and commercial fisheries both in the Columbia and at sea. This is the largest such study ever undertaken and it has been assigned specifically to fall Chinook salmon.

In 1962, 7.7 million marked fish were released. In 1963, 7.2 million marked fish were released. Roughly the same number will be released in 1964 and 1965, making the current total approximately 30 million fin-clipped fish in this one experi-

ment. The recovery effort for these marked fish will extend from Alaska to California and into the Columbia River.

Samples of young fish marked in each hatchery are tested at the Abernathy Fish Cultural Laboratory where chemical and biological tests are conducted. The fishes are also tested for stamina in a specially designed stamina tunnel.

The data secured will be used to evaluate the quality of fish produced at the hatcheries.

This year the first returns of marked fish appeared. These fish had grown from about 4 inches when they left the hatchery in 1962 to about 23 inches when captured in 1963. The total cost of this study is now estimated at about \$2 million.

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INTRODUCTION

The Alaskan earthquake on Good Friday, March 27, and the Christmas floods, primarily in Oregon and Northern California, served to mark 1964 as a disaster year.

The utter failure in 1964 of the halibut fishery in the Bering Sea Triangle area confirmed Canadian and United States fishery fears that Japan's entry into the Bering Sea halibut fishery in 1963, plus the already high rate of harvesting by Canadian and U.S. fishermen, would be too much for the halibut stocks in that area. Nevertheless, Soviet and Japanese trawl fishing for other species and shrimp continued to increase in intensity and southward extent off the coast of North America. However, the king crab resource of the U.S. continental shelf area of the Bering Sea and the North Pacific Ocean will receive a measure of relief from foreign fishing as the result of the enactment on May 20, 1964 of Public Law 88-308, which had been introduced by Senator Bartlett as Senate Bill 1988 in the Eighty-eighth Congress, and the enactment on June 10, 1964 of the International Convention on the Continental Shelf, which had been adopted at the 1958 United Nations Conference on the Law of the Sea.

Commissioner Max Wedekind, who was also a member of the State of Washington Fisheries Legislative Interim Committee, died on June 27. Governor Rosellini appointed Senator Robert L. Charette to fill the vacancy left by the Honorable Max Wedekind on PMFC. Senator Charette is Chairman of the State of Washington Fisheries Legislative Interim Committee.

The U.S. Bureau of Commercial Fisheries expended much effort in a continuing attempt to evaluate and promote a fishery for Pacific hake (*Merluccius productus*). At present, this abundant but unutilized species off California, Oregon and Washington is regarded as a pest.

Negotiations between the California Department of Fish and Game and the Oregon Fish Commission, regarding the pink shrimp bed - south of the Oregon-California boundary which is fished jointly by fishermen from the two States, were culminated on October 21 by the adoption by Oregon of a regulation which will in effect support California's management of the shrimp bed by catch quota.

ADMINISTRATION

Personnel

The official membership in 1964 was:

California

William O. Riley, Eureka
W. T. Shannon, Sacramento, Chairman
Vincent Thomas, San Pedro

Idaho

Frank Cullen, Coeur d'Alene
Arlie Johnson, Boise
John R. Woodworth, Boise, First Vice Chairman

Washington

George C. Starlund, Olympia
Max Wedekind, Seattle, deceased, June 27, 1964
John H. Wedin, Seattle, Second Vice Chairman
Robert L. Charette, Aberdeen, new member

Oregon

John Amacher, Winchester
Tallant Greenough, Coquille
Leonard Hall, Charleston
Edward C. Huffschmidt, Portland
Herman P. Meierjurgan, Beaverton
J. Pat Metke, Bend, Secretary
Wayne E. Phillips, Baker
John W. Smith, Klamath Falls
~~Joseph~~

The staff comprised the following:

Leon A. Verhoeven, Executive Director
Gerald L. Fisher, Treasurer
M. C. James, Consultant
Alphonse Kemmerich, Consultant
Mrs. Evelyn Korn, Office Secretary

The Advisory Committee during 1964 was:

California

Charles R. Carry, Terminal Island
Clifton D. Day, San Francisco
Thomas R. Gardiner, Oakland
John P. Gilchrist, San Francisco, Chairman
Anthony Nizetich, Terminal Island
Ray Welsh, Fort Bragg
Charles V. Williams, Crescent City
James Barr, Terminal Island, alternate for Mr. Carry

Idaho

William B. Durbon, Moscow
R. J. Holmes, Twin Falls
Glenn Stanger, Idaho Falls

Washington

Robert E. Colwell, Seattle
Harold E. Lokken, Seattle
Charles F. Mechals, Seattle
Nick Mladinich, Tacoma
Bjarne Nilsen, Westport
John N. Plancich, Anacortes
James Walganski, Bainbridge Island
Fred Bullock, Seattle, alternate for Mr. Nilsen
Dan Luketa, Seattle, alternate for Mr. Lokken

Oregon

David B. Charlton, Portland
Charles S. Collins, Roseburg
Harold C. Gramson, Warrenton
Charles F. Henne, Winchester
J. Frank Hoagland, Astoria
Andrew J. Naterlin, Newport
Arthur Paquet, Astoria
William Westerholm, Astoria, alternate for
Mr. Gramson

Conferences and Meetings

During 1964, the Executive Director attended, as a representative of the Commission, the following conferences and meetings:

- International Pacific Halibut Commission annual meeting, Seattle, Jan. 28-30
- Oregon Fish Commission Research Staff meeting, West Linn, Ore., Feb. 20-21
- Oregon Legislative Interim Committee on Wildlife, Portland, Feb. 26, regarding Indian fishing, etc.
- Inter-American Tropical Tuna Commission annual meeting, San Diego, Mar. 18-19
- Pacific Fishery Biologists annual meeting, Ocean Shores, Wash., Mar. 25, first day only
- Astoria Chamber of Commerce meeting regarding seismic explorations, Astoria, Apr. 16
- Technical Committee of Pacific Salmon Inter-Agency Council, Portland, Apr. 13-14
- National Fisheries Institute annual convention, Seattle, Apr. 26-28
- Oregon Legislative Interim Committee on Wildlife, Portland, May 26; Astoria, May 27; Tillamook, May 28, testified on seismic program
- Pacific Salmon Inter-Agency Council and its Technical Committee, joint meeting in Portland, June 11
- International Trawl Committee, meeting of Technical Subcommittee, Menlo Park, June 23-24
- Oregon Fish Commission hearing on offshore seismic explorations for oil, Portland, July 24.
- U.S. State Department meeting regarding International North Pacific Fisheries Commission Convention, Seattle, Aug. 7
- Pacific Coast Oyster Growers Association annual meeting, Portland, attended session on research, Aug. 21
- U.S. Department of the Interior' meeting, delivered brief on seismic problem, Portland, Aug. 26
- Western Interstate Water Conference, Las Vegas, Sept. 16-17
- Fifteenth Pacific Tuna Conference, Lake Arrowhead, Sept. 28-30
- * Technical Committee of the Pacific Salmon Inter-Agency Council, Portland, Sept. 23-24 »
- Washington Seismic Exploratory Advisory Committee, Seattle, Oct. 23
- International Trawl Committee annual meeting, San Francisco, Nov. 17

Attendance at these meetings was in keeping with PMFC's policy to be represented, whenever possible, at all meetings where the interests of PMFC or its member States might be concerned.

The Executive Director continued as ex officio Secretary of the Pacific Salmon Inter-Agency Council and as an observer on the Council's Technical Committee. He also continued to act as liaison officer for the U. S. Section of the International Trawl Committee and the Informal Committee on Chinook and Coho Salmon. However, beginning in 1965, he will no longer be a member of the Advisory Committee to the U.S. Section of the International North Pacific Fisheries Commission. His membership constituted a duplication in representation since the Directors of the fishery agencies of the Pacific Coast States are members of the Advisory Committee.

Miscellaneous

The annual request by the Office of International Relations of the US. Fish and Wildlife Service for specific statistics on salmon, herring and halibut fishery landings; the propagation of salmon; commercial fishing regulations; and the enforcement of these regulations concerning salmon, halibut and herring in the States of Washington, Oregon and California was complied with. Upon receipt from the individual States the statistics were consolidated and forwarded through channels—U.S.F.W.S., U.S. Section of INPPFC—to the Japanese Government.

Representatives from Federal and State fish or fish and game agencies and also from the University of Washington met in Portland on January 16, 1964 to consider the annual allocation of fin marks for salmon and steelhead trout. Agencies who did not send personal representatives submitted written requests for marks for consideration at the meeting. Subsequently, a 48 page 1964 Mark List was prepared and about 180 copies were distributed to interested Pacific Coast personnel and agencies. Information on salmon marked by means of tetracycline compounds or by insertion of coded magnetic wire tags was also included in the list.

Issues 8 through 12 of PMFC's NEWSLETTER were distributed in 1964. The mailing list now exceeds 200 names.

Bulletin 6 was published and distributed. It contained articles on: "Statistical Methods for Estimating California Salmon Landings" by N. J. Abramson and P. T. Jensen; "Results from Tagging a Spawning Stock of Dover Sole, *Microstomus pacificus*" by S. J. Westrheim and A. R. Morgan; "Movements of Petrale Sole, *Eopsetta jordani* (Lockington), Tagged off California" by E. A. Best; "Results of a Sampling Program to Determine Catches of Oregon Trawl Vessels. Part I. Methods and Species Composition" by R. B. Herrmann and G. Y. Harry, Jr.; "The Development and Status of the Pink Shrimp Fishery of Washington and Oregon" by A. R. Magill and M. Erho; and "Availability of Small Salmon off the Columbia River" by H. Heyamoto.

The Bottom or Trawl Fish Section of the Data Series was being printed at the year's end and preparation of the Crab and Shrimp Section was begun.

Administrative Activities

The Research Staff held its annual spring meeting on March 23 and 24 in Portland to discuss research and problems of mutual concern to PMFC's member agencies. At this meeting the Staff drafted a research policy which was proposed to the Commissioners and adopted by them as Resolution 1 at the November Annual Meeting.

On May 18, the Executive Director sent a letter to the Honorable Herbert C. Bonner, Chairman, House Committee on Merchant Marine and Fisheries, and a telegram to the Honorable T. A. Thompson, Chairman, House Subcommittee on Fisheries and Wildlife Conservation, urging passage of H. R. 2392, an anadromous fish bill. Both of these communications were printed in the "Hearings before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, Eighty-eighth Congress..." May 26 and 27, 1964. The House, on September 1, passed this bill providing for \$25 million over the next 5 years to conserve and develop anadromous fish runs.

However, the bill died in the Senate when Congress adjourned.

On June 19, the Executive Director wrote the Honorable Wilbur D. Mills, Chairman, House Ways and Means Committee, requesting continuation of the Pittman-Robertson and Dingell-Johnson Acts. Congress subsequently passed a bill which provided for the continuation of existing excise taxes for one year, thus assuring the continuation of these two Acts for one year.

The Executive Committee changed to permanent the interim appointment of Mr. Gerald L. Fisher as Treasurer and inaugurated a retirement plan effective July 1, 1964 for the Office Secretary and Executive Director. The Committee's only meeting of the year was held November 16 in San Francisco, two days before the Annual PMFC Meeting. Secretary J. Pat Metke requested that Commissioner Herman P. Meierjürgen represent him at the Executive Committee Meeting. Mr. Walter Kirkness of the Alaska Department of Fish and Game asked that Mr. Roy Rickey represent him as an observer at the Executive Committee and the Annual Meetings.

The following actions were taken at the Executive Committee Meeting:

1. Officers were nominated for 1965 and a place and dates for the 1965 Annual PMFC Meeting were chosen for recommendation to the full Commission.
2. A current operating budget for the fiscal year July 1, 1964 to June 30, 1965 was approved.
3. Rates of annual salary increases for the Office Secretary and Executive Director not to exceed five increases without review were approved, but as a matter of policy, salaries will be reviewed each year.
4. The budget proposed for the biennium July 1, 1965 to June 30, 1966 in the amount of \$110,584 was returned to the Executive Director and Treasurer with instructions to revise it for final Commission approval so that it would not exceed the current membership contributions of \$86,600, plus an anticipated surplus of \$9,584 from the present biennium. The Executive Committee said, since the member State agencies have already prepared their own budgets on the basis of the present membership contributions and since these budgets were
*** * about to be presented to the respective State Legislatures, it would, be very difficult to get approval to increase membership contributions.
5. The 1962 Resolution regarding membership contributions was discussed. The Executive Director and Treasurer were instructed to prepare a report for the next Executive Committee meeting which would show how present annual contributions are determined and how much each State contributed and how much was paid back to each State section (Commissioners, Advisers and Research Staff) in the form of transportation, lodging and subsistence allowances during a biennium.
6. An invitation from the Atlantic States Marine Fisheries Commission and the Gulf States Marine Fisheries Commission to attend a joint meeting of the three marine commissions in Florida in 1965 was considered. It was felt that this was not practical because of the expense that would be involved and that it would be more desirable for the three directors to meet, preferably at a time when none of them would be involved in details of

a meeting of his own Commission. With this in mind, Executive Director Verhoeven was authorized to attend the North American Fisheries Conference, April 30-May 5, 1965, Washington, D. C., and to attempt to meet the Directors of the other two Commissions there. The Members and Directors of the Atlantic and Gulf States Marine Fisheries Commissions were to be invited to attend PMFC's Annual Meeting and to come to Portland for the meetings of the International Association of Game, Fish and Conservation Commissioners and the American Fisheries Society in September 1965. 7. The Director's Report was reviewed prior to its presentation at the Annual Meeting.

The Advisory Committee and the Research Staff each met independently on November 17 to consider proposals that would be presented to PMFC for adoption as resolutions.

The Annual Meeting of the International Trawl Committee was also held on November 17 in San Francisco. The United States section met with industry and other interested persons in the morning. Representatives from Canada and the United States met formally in the afternoon with PMFC Executive Director Verhoeven as Chairman.

COMMISSION ACTION

The formal Annual Meeting of the Pacific Marine Fisheries Commission was held in San Francisco, California from November 18 through 20, 1964. Approximately 135 persons attended the business and plenary sessions. Prior to final action on the proposals during the last day of the meeting, the Commission took the following actions:

1. Mr. Roy Rickey was introduced, as the representative of Mr. Walter Kirkness of the Alaska Department of Fish and Game who was unable to attend the meetings as an observer, and was seated at the head table with the Commissioners.

In regard to a question about the possibility of Alaska joining the Compact, Mr. Rickey replied that although Alaska wishes to join and the necessary enabling legislation exists he could not be optimistic since the necessary funds for membership appear to be unavailable at least until the end of the next fiscal year. He thanked PMFC for the opportunity to take part in its deliberations.

2. The Honorable Robert L. Charette was welcomed as a new member of PMFC from the State of Washington.
3. Messrs. James Barr, Fred Bullock, Dan Luketa and William Westerholm were accepted as alternates for advisers who could not attend the meeting.

There were no appointments to the Advisory Committee in 1964. Mr. R. J. Holmes assisted by Dr. William B. Durbon will be Chairman of the Advisory Committee in 1965. Chairmen or members of the Committee's Executive group will be Messrs. R. J. Holmes, Idaho; Charles F. Mechals, Washington; Andrew J. Naterlin, Oregon; and John P. Gilchrist, California.

4. The annual staff reports were received and discussed. Mr. Fisher presented the Treasurer's Report. Mr. Verhoeven presented the Executive Director's Report. The Status Reports were compiled and presented by biologists from the Department of Fish and Game of the host State, California, from data contributed by the Research Staffs of the member agencies of PMFC.

Dr. H. G. Orcutt, Research Director, California Department of Fish and Game introduced the speakers who gave the Status Reports:

Mr. Harold B. Clemens—Status of the 1964 Pacific Coast Albacore Fishery (prepared by William L. Craig).

Mr. Richard L. Poole—Status of the 1964 Pacific Coast Dungeness Crab Fishery.

Mr. Tom Jow—Status of the Trawl Fisheries of the Pacific Coast, 1964.

Mr. Paul T. Jensen—Salmon Status Reports, 1964. Mr. W. A. Dahlstrom—Status of the Pacific Coast Pink Shrimp Fishery.

These reports appear as Appendix 1 to the 1964 Annual Report.

5. Special reports were received from the following:

Mr. James C. Simpson—The Pend Oreille Lake Kokanee Fishery (prepared by Jerry Mallet).

Dr. Lyle D. Calvin—An Evaluation of the Punch Card Method of Estimating the Salmon-Steelhead Sport Catch in Oregon.

Mr. Tom Jow—California-Oregon Cooperative Crab Tagging Study.

Mr. Richard L. Poole—Identification of *Cancer magister* Larvae.

Mr. R. J. Nitsos—Species Composition of Rockfish (Family Scorpaenidae) Landed by California Otter Trawl Vessels, 1962-1963.

Mr. Daniel J. Miller—Ocean Sport Fisheries.

These reports are included as Appendix 2 to the 1964 Annual Report.

6. A verbal report was received from Mr. Russell T. Norris, Assistant to the Director, XL S. Bureau of Commercial Fisheries, Washington, D. C., on Public Law 88-309, the Commercial Fisheries Research and Development Act of 1964.

Actions on 1963 Recommendations

* 'At the 1963 meeting in Portland the Commission adopted a number of resolutions or recommendations which* required subsequent action by the Commission or its staff beyond the mailing of the resolutions to pertinent addressees.

Shrimp: Adoption of a joint quota by California and Oregon for the bed of ocean or pink shrimp that lies off the coast of southern Oregon and northern California, more particularly between Cape Blanco, Oregon and False Cape, California, was recommended. Representatives of the California Department of Fish and Game and the Oregon Fish Commission met frequently during 1964 in an effort to arrive at a common management policy for this shrimp bed. California permits shrimp fishing to begin May 1 and to continue until October 31, but may prohibit fishing before October 31 if the predetermined quota is caught. Oregon did not wish to adopt the quota system, but at its October 1964 meeting the Oregon Fish Commission adopted a regulation designed to complement California's quota system. The regulation prohibits the landing in Oregon of shrimp caught south of 42° North Latitude between October 1 of any year and May 1 of the following

year, except that the Fish Commission may modify this closure by as much as 60 days.

Salmon Spawning Sanctuaries: The chore of determining which streams contain significant spawning areas and should be reserved as sanctuaries for salmon and steelhead was referred to the Pacific Salmon Inter-Agency Council. The Council decided against pursuit of the sanctuary principle on the basis that it was a shotgun-like approach whereas a more versatile and precise approach was often necessary. In general, prospective water users are required to collaborate with the respective Pacific Coast fish and game agencies for the protection of fish before the water users are granted permission to proceed with their projects. The sanctuary approach would tend to lessen rather than increase the powers of the conservation agencies. The member agencies of the Salmon Council resolved to remain vigilant against the encroachment of water users on fishery resources and to maintain cognizance of the status of those resources in the waters of their respective jurisdictions.

Conflicts Between Meetings: Letters were sent to individuals, publishers, and fishery organizations on the Pacific Coast advising them that PMFC wished to avoid conflicts between meetings of various fishery organizations, and had set up a meeting-register in its office for the purpose of answering inquiries about the dates and places of fishery meetings.

Seismic Explorations: PMFC resolved to undertake a research program to determine the effects of conventional seismic explosions on marine life, and the Executive Director was directed to explore methods of funding the program.

The Executive Director did not immediately attempt to implement this resolution because there were no funds for such research in PMFC's budget. In addition, some groups of fishermen stated that they would not accept the results of research unless they showed that seismic explosions were damaging fisheries and should be stopped. The Executive Director and representatives from fish and game agencies of Washington, Oregon and California met on January 17, 1964 to draft common regulations for the conduct of seismic surveys. Representatives from the U. S. Bureau of Commercial Fisheries were also present. They were asked to investigate the possibility of incorporating provisions in leases of federal offshore lands for funds for seismic research. They subsequently reported that they had been told that this was impossible.

PMFC's Research Staff at its meeting in March concluded that the Executive Director should not defer action on the resolution. The Staff recommended that the research should be done by independent research groups, such as universities and colleges, and not by fishery agencies so as to avoid possible accusations of bias. A letter inviting the submission of research proposals was sent to 15 educational and private organizations. Only 2 submitted proposals.

While awaiting the receipt of proposals, the Executive Director appointed a Seismic Committee of 10 men, composed of 5 biologists from Washington, Oregon and California fish and game agencies, and from the U. S. Bureau of Commercial Fisheries; 3 men from the fishing industries of Washington, Oregon and California; 1 man from the Western Oil and Gas Association; and the Executive Director of PMFC as ex officio chairman. The purpose of the Committee is to aid the Executive Director in the administration of seismic research that might be undertaken.

Humboldt State College submitted the first proposal, a study of the effects of seismic explosions on adult and larval crabs. The Stanford Research Institute submitted the second proposal, a study in a laboratory situation of the lethal range of explosives on marine life. Both proposals were referred to the Seismic Committee in the order in which they were received. The Committee recommended acceptance of the Humboldt State College proposal on crabs, and the Western Oil and Gas Association was asked if it would finance the proposed study. The Association replied that its member oil companies did not wish to finance the research on crabs as they considered it unnecessary. The estimated cost of this proposal was less than \$6,000. The Seismic Committee recommended rejection of the Stanford Research Institute proposal. The primary objection to this proposal was its laboratory rather than marine environment. This proposal was for 1 or 2 years at an annual cost in excess of \$100,000.

On July 21, 1964 the Director of the Washington Department of Fisheries cancelled all permits for the use of explosives in seismic surveys off the coast of Washington. However, the U. S. Geological Survey said that the oil companies may continue to survey outside the 3-mile limit. Spokesmen from the fishing and recreation industries contend that, if the oil companies will not finance research on the effects of seismic explosions, the federal government should from the large sums of money it has derived from the sale of offshore leaseholds. A spokesman for the oil industry told PMFC's Executive Director that the oil industry would not object to the expenditure by the federal government of lease money for either a research or public information program to resolve the conflict between the oil industry and industries allied with fishing. The revenue from the October 1, 1964 sale of federal leases off California, Oregon and Washington was reported to total about \$66 million.

On August 26, 1964, Department of Interior representatives from the Bureaus of Land Management, Geology, Commercial Fisheries, and Sport Fisheries and Wildlife met in Portland with representatives from state fish and game agencies to consider a policy for handling conflicts of interest. The Executive Director of PMFC delivered a brief to the effect that a conflict of interest existed and that regardless of whether research or public information or both were necessary to dispel the conflict, funds should be included in all leases for a program to deal with the problem. There has been no announcement of policy by the Department of the Interior.

Actions on 1964 Proposals

PMFC's procedure requires that proposals be submitted in writing at least 15 days in advance of the Annual Meeting. However, tardy proposals, upon recommendation by the Advisory Committee, may be considered by the Commission as emergency proposals. All proposals are routed to the Advisory Committee for study and recommendation that the proposal be passed, rejected, or tabled. In 1964, for the first time, all proposals were also routed to the Research Staff for recommendation that they be passed, rejected, or tabled. All proposals, regardless of the recommendations of the Advisory Committee and Research Staff, are considered by the Commission in plenary session on the last day of the Annual Meeting, and persons or groups from the floor may testify for or against individual proposals.

The following proposals and motions were adopted as resolutions by the Commission at the 1964 Annual Meeting. The resolutions have been numbered in the order in which the proposals were received. A missing number indicates that a proposal was tabled or rejected.

1. Research Policy and Procedure of PMFC

POLICY

- I. PMFC shall do research within the limits of its needs and funds.
 - A. Research which is needed by two or more States may be considered regardless of whether the research is defined as applied or fundamental, immediate or long-term.
 - B. Research shall be undertaken only at the request of the member States involved, and with the approval of all the member States.
- II. The technical staffs of the fishery agencies of the member States shall constitute PMFC's Research Staff.
 - A. The Research Staff may propose and recommend research projects. These proposals and recommendations shall be referred to the Advisory Committee for their consideration and further recommendation to the PMFC for their final action.
 1. Funds for research may be derived from the annual contributions of the member States as provided for in PMFC's biennial budgets, or they may be derived from some outside agency or group, such as the Federal government or an industry.
 2. Regardless of the source of funds, all research must be budgeted and all research expenditures must be kept within the budgetary limitations.
 - B. The Research Staff may recommend various modes for the performance of research:
 1. Cooperative research without PMFC funds — each member agency agrees to carry out a portion of a PMFC project without reimbursement from PMFC.
 2. Cooperative research supplemented by PMFC funds — each member agency agrees to carry out a portion of a PMFC project, and PMFC agrees to reimburse the agencies for boat charters, hiring of additional men, etc.
 3. Contract research — PMFC to contract with non-member agencies, such as universities, or private research organizations who would do the research and be paid by PMFC.

PROCEDURE

- I. The Research Staff shall meet twice a year.
 - A. Spring meeting — each state fishery agency shall give a formal oral description of its PMFC research program and progress and will discuss mutual problems and research proposals.
 - B. At time of annual meeting — Research Staff will convene in room reserved for it, where each state agency will formally describe its research programs and progress to the Research Staff.

In addition:

1. Progress on current PMFC research shall be discussed.
2. Fishery problems including proposals for research are to be discussed.
3. The Research Staff must submit proposals to the Executive Director each Spring for PMFC consideration at the Annual Meeting. All such proposals must have concurrence of the individual State agency prior to submission to the Executive Director. This is necessary to permit the PMFC office staff to evaluate the financial considerations (budget) and to forward the proposals to the Advisers prior to the Annual Meeting.
4. Proposals must state purpose of the research and recommend how it is to be done; i.e., (a) cooperatively — a portion by each agency with no cost to PMFC; (b) cooperatively — a portion by each agency with PMFC reimbursing the agencies for the hiring of extra men, for boat charters, for tag rewards, etc.; (c) PMFC to contract (with a member agency or with a non-member agency) to have the research done. Proposals must also be accompanied by budgets and time estimates.

C. The Research Staff shall be at the disposal of the Commissioners and Advisers for consultation during the Annual Meeting.

*1. The Research Staff shall submit its comments or endorsements on all proposals to the Advisory Committee. The Advisory Committee, in turn, shall report to the PMFC the recommendations of the Research Staff together with the recommendations of the Advisory Committee. In addition, for future PMFC meetings, it is the recommendation of the Advisory Committee that all proposals be presented orally by the Chairman of the Advisory Committee for consideration of the Commission with recommendations from both the Advisory Committee and the Research Committee.

*(This is an amendment resulting from the acceptance by the Commission of Emergency Proposal No. 29. It does not cancel the requirement that the authors of proposals must submit them in writing.)

D. This research policy or procedure does not terminate the customary presentation of status and special reports at plenary sessions of the Annual Meeting.

4. A permanent Protection Area for Anadromous Fish Spawning in the Salmon River, Idaho

WHEREAS, the Pacific Marine Fisheries Commission, an interstate compact commission created by the Legislatures of California, Idaho, Oregon and Washington and assented thereto by the Congress of the United States, is charged with the conservation and enhancement of the fisheries of these States, and

WHEREAS, the Pacific Marine Fisheries Commission

has, by resolution, previously expressed its concern about protecting the extremely valuable salmon and steelhead resources which depend upon the Salmon River remaining an unobstructed stream, and

WHEREAS, the protection of this spawning area is important because of both its national and international significance, and

WHEREAS, Congress has not acted on specific legislation such as S. 1043 (Church, et al), or similar federal legislation which would be the surest method of protecting this important fishery resource,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission does hereby urge the passage of a specific act of Congress which would permanently maintain the Salmon River, which is so vital to the future of Columbia River salmon and steelhead populations, as a Salmon Spawning Protection Area and an unobstructed stream.

9. Need for Accurate Statistics

WHEREAS, one of the basic purposes of the Pacific Marine Fisheries Commission is to seek uniformity of regulation and research based on the dictates of scientific data and the gathering of accurate statistics, and

WHEREAS, scientific recommendations must necessarily rely heavily on accurate catch statistics and tag returns based on fleet production totals to effect a sound program of conservation and management, and

WHEREAS, statistics presently secured have been found to be inaccurate by some State agencies as to weight and species reported,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission recommend that all States analyze and evaluate their individual State statutes and regulations toward an enforcement program which will produce accurate catch statistics by weight and species, and

BE IT FURTHER RESOLVED, that in States where inadequate statute or regulation exists in this regard, that the Pacific Marine Fisheries Commission urge consideration of adequate legislation at the earliest possible legislative session.

11. Oysters — Cause of Mortalities

WHEREAS, mortalities of oysters have occurred from British Columbia to California, and

WHEREAS, these mortalities appear to be spreading to new areas,

BE IT RESOLVED, that the Pacific Marine Fisheries Commission and its members request members of Congress to institute an immediate program to find the cause and the cure of the oyster mortalities that have developed on the Pacific Coast.

12. Public Law 88-309

WHEREAS, there is great need for research and development in the fishing industry,

BE IT RESOLVED, that funds be appropriated by Congress as soon as possible to carry out needed research and development under the recently passed Research and Development Act (PL 88-309), and that the federal government give full support to the various state agencies involved in their request for funds to match state funds, and that the state programs be expedited as quickly as possible.

15. Fisheries Cabinet Position

WHEREAS, the United States and its pertinent federal agencies are presently deeply involved in international fishery problems, and

WHEREAS, the negotiations necessary for the resolution of said international fishery problems are increasing and will continue to grow, and

WHEREAS, as a duty to United States citizens it is incumbent on the said government agencies to resolve these problems in the best interest of the American Fisheries,

THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission at its Annual Meeting in San Francisco, California, November 20, 1964, does petition the Executive Branch of the United States Government to provide its Federal agencies concerned with international fishery problems with the necessary policy positions and administrative personnel to adequately negotiate the solution of all international fishery matters in the best interest of the United States and its citizens.

16. Seismic Operations

WHEREAS, this Commission recognizes the need for additional information on the effect on fish and fisheries of blasting as used in seismic methods for studying the geology of an area, and

WHEREAS, this Commission resolved at the 1963 meeting to establish a comprehensive study of the effects of all types of explosives on marine life, and

WHEREAS, the Washington Advisory Committee has deemed it necessary to explore methods of funding this program,

NOW, THEREFORE, BE IT RESOLVED, that the PMFC at its Annual Meeting in San Francisco initiate a positive program designed to produce the funds necessary for continuing research on the effects--of seismic exploration in the waters of the Pacific Ocean and to define "clean practices" in the event drilling for oil is undertaken.

17. Shrimp Research

BE IT RESOLVED, that the Pacific Marine Fisheries Commission contract to have the research on the larval stages of the pink shrimp done as described in the following application:

Application to the Pacific Marine Fisheries Commission for support of a project entitled THE LARVAL STAGES OF *PANDALUS JORDANI* by the Oregon Fish Commission, October 28, 1964.

INTRODUCTION

It is proposed to make a study of the larval stages of the ocean pink shrimp, *Pandalus jordani* Rathbun of the Eastern Pacific of North America. This littoral and semi-benthic pandalid shrimp is numerous in near-shore areas along the Oregon Coast in waters between 40 and 100 fathoms over sand or mud and sand bottoms.

It cannot be said that the post-larval stages are unknown or even poorly known, due to the publication in 1930 of Berkeley's manuscript on post-larval stages of some common pandalids of British Columbia, which included *P. jordani*, however, relatively nothing is known of the zoea and mysis stages which occur immediately subsequent to hatching.

DESCRIPTION OF THE PROPOSED RESEARCH

Since 1961, members of the Department of Oceanography, Oregon State University, have undertaken an increasingly intensive study of the fauna of the waters off the continental shelf and slope of Oregon. Out of this study a wealth of ecological (chemical, physical, geological, biological) and distributional (vertical, horizontal, geographical) information has become available. There is need to bring together their results, which are scattered among the various divisions of the Department of Oceanography, to summarize their findings, and to subject these findings to analysis in relation to the larval stages of *P. jordani*, using the techniques available to modern systematics. Because the larvae are planktonic and subjected to many physical phenomena, such as: currents, dilution by Columbia River discharge, and temperature changes, these phenomena have a direct influence upon larval distribution and survival. Upon recognition and identification of the larval stages, a critical analysis of the backlog of plankton samples may allow us to ascertain seasonal and vertical distribution.

PROCEDURE

It is proposed first to review all pertinent literature, most of which is on hand or immediately accessible through the Fish Commission and Oregon State University libraries. Following this, gravid females will be brought to the laboratory and the procedure used to rear larvae will be after Coffin (1958), Forss (1960), Hart (1935), and Knudsen (1958). Also, observations of size and sex (when possible), growth changes, individual variation, color in life and parasitism will be reviewed with emphasis. Included in the study will be drawings of all the appendages and a lateral view of each stage up to the mysis stage, and one or two post-mysis stages. If the larvae beyond the post-mysis stages are viable and molt frequently enough, it is proposed that the research will continue until the pre-adult forms are recognized by adult characters, thus enabling future research in the backlog of plankton samples. The findings of this study, including procedures, will be summarized in manuscript form, and will be presented to the Pacific Marine Fisheries Commission within 6 months of the termination of the study. It is anticipated that the manuscript treatment of the larval stages of *Pandalus jordani*, when completed, will be acceptable for publication.

FACILITIES AND PERSONNEL

This work will be done at the Department of Zoology, Oregon State University, where laboratory space is available in room 22 3A and in an adjoining cool room where critical manipulation of low temperature is available. Microscopes, measuring devices, typewriters, and other necessary laboratory and office equipment can be provided.

The principal investigator on this study will be Mr. Carl Forss who is employed in a professional capacity part time by the Zoology Department of Oregon State University. Mr. Forss has qualifications which include two publications on Crustacea and a professional interest in the larval stages of Crustacea.

LITERATURE CITED

Berkeley, Alfreda K., 1930, The post-embryonic development of the common pandalids of British Columbia. *Contributions to Canadian Biology and Fisheries*, Vol. IV, No. 6:81-114.

Coffin, Harold G., 1958, The laboratory culture of *Pagurus samuelis* (Stimpson) (Crustacea, Decapods). Publications of the Walla Walla College Dept. Biol. Sci. and Biol. Sta., No. 22:1-5.

Forss, Carl A., 1960, The use of the brine shrimp nauplii, *Artemia salina*, as food for the laboratory culture of decapods. Publications of the Walla Walla College Dept. Biol. Sci. and Biol. Sta., No. 26:1-17.

Hart, Josephine F. L., 1935, Culture methods for Brachyura and Anomura. The Collecting Net. No. 6, 10:199-200.

Knudsen, Jens W., 1958, Life cycle studies of the Brachyura of Western North America, General culture methods and the life cycle of *Lophopanopeus leucomanus leucomanus* (Lockington). Bui. So. Calif. Acad. Sci. 57-51-59.

The Commission allocated \$3,000 to cover the amount asked for in the budget which was included in the application. To save space, the budget has been omitted.

18. To the Memory of Commissioner Max Wedekind

WHEREAS, upon the passing away of Washington's Commissioner Max Wedekind on June 27, 1964, the Pacific Marine Fisheries Commission and the entire seafood industry lost a devoted friend and worker, and

WHEREAS, during the 19 years Max Wedekind served in Washington's legislature and worked as a member of the State Legislative Interim Committee his actions were a real service to the promotion of commercial and recreational fisheries.

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission in regular session on the 20th day of November, 1964, in San Francisco, California, hold a moment of silence in Max Wedekind's memory and that the Executive Director of the PMFC be, instructed to convey an appreciation of Max's services to Mrs. Wedekind and to the Speaker of the House of Representatives of the Washington State Legislature.

(Irrespective of number, adoption of this resolution was the last business transacted by the Pacific Marine Fisheries (commission before adjournment of its Annual Meeting on November 20, 1964. A moment of silence was observed.)

19. Urge Passage of Anadromous Fish bill

WHEREAS, in 1962 and 1963, the P.M.F.C. supported H. R. 2392, the anadromous fish bill, and

WHEREAS, the P.M.F.C. put forth much effort to secure passage of this legislation, and

WHEREAS, this bill provides funds on a matching basis, for capital outlay, habitat improvement, and/or research, for anadromous fish, and

WHEREAS, this bill passed the House of Representatives without dissension, but reached the Senate too late for action, and

WHEREAS, we have been assured that this same legislation will be re-introduced in the House as soon as the session gets under way,

NOW, THEREFORE, BE IT RESOLVED, that the P.M.F.C. again support this legislation, and do all possible to secure the early passage by both houses of Congress, and

BE IT FURTHER RESOLVED, that letters to this effect be sent to all appropriate parties involved, particularly the committee members of both the House and the Senate.

20. Delta Facilities of the California Water Plan

WHEREAS, the State of California and the Federal Government will construct engineering facilities in the Sacramento-San Joaquin Delta to carry out the California Water program and to further develop the Central Valley Project, 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 engineering plan which will protect existing king salmon resources passing through the Sacramento-San Joaquin Delta and provide opportunities for passage through the delta of increased king salmon runs thereby enhancing said salmon runs, and

WHEREAS, existing conditions in the delta are detrimental to the San Joaquin River salmon runs,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission fully support the selection of the Peripheral Canal Plan by the California Department of Water Resources and the United States Bureau of Reclamation and Army Corps of Engineers and request that construction of this project be completed at the earliest possible time to protect and enhance the salmon resource of the Central Valley of California, and

BE IT FURTHER RESOLVED, that copies of this resolution be forwarded to: California Water Commission, Resources Agency of California, California Department of Water Resources, California Department of Fish & Game, United States Bureau of Reclamation, U. S. Army Corps of Engineers, California Assembly Fish & Game Committee, California Senate Natural Resources Committee, all members of California State Legislature, and appropriate members of Congress.

21. Sacramento-Feather-American River Dredging

WHEREAS, Senate Resolution of July 6, 1962, authorized an investigation by the Corps of Engineers of the navigation problems of the Sacramento, Feather and American Rivers and the dredging thereof and the construction of 17 locks and dams which would create severe problems in salmon and steelhead passage and would raise water temperatures, and

WHEREAS, the economic value of such a project is of a major negative value, and

WHEREAS, 70 per cent of the king salmon spawning area would be destroyed and king salmon might ultimately become extinct in these rivers, and

WHEREAS, a capital investment in the commercial and recreational fisheries in excess of \$24,000,000 will be rendered worthless, Coleman Hatchery will be rendered ineffective, Nimbus Hatchery and a presently unfinished hatchery on the

Feather River may be rendered ineffective and the livelihood and recreation of thousands of citizens destroyed, and

WHEREAS, transportation by rail and truck are more than adequate to serve the community,

NOW, THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission opposes this proposal in order to preserve this anadromous fishery resource, and

BE IT FURTHER RESOLVED, that this resolution be forwarded to: Commanding General, Chief of Engineers, Washington, D. C. Col. Robert E. Mathe, CO, Corps of Engineers, Sacramento, Calif., California Assembly Fish and Game Committee, California Senate Natural Resources Committee, Members of the California Legislature, Members of the Congress (California, Oregon & Washington), U. S. Department of the Interior; Bureau of Sport Fisheries & Wildlife; and any pertinent legislative or other agencies.

22. Review Tariff on Imported Fish

WHEREAS, the importance of fish and shellfish in the American diet is continually being stressed as an important protein resource, and

WHEREAS, there is an abundant supply of otter trawl species of fish and shellfish in waters of the Pacific coast, and

WHEREAS, the producers, processors, and handlers of Pacific coast seafood products believe in and encourage better production and handling methods to give the American consumer a product of the highest quality, and

WHEREAS, processing plants of the Pacific coast are now limiting the amount of landings on certain edible species of otter trawl products due to the heavy imports of similar species, and

WHEREAS, "In 1963, for the first time, over half of the U. S. supply of fish and shellfish was received from foreign countries" (U. S. Dept. of the Interior, Fish and Wildlife Service, Leaflet C.F.S. #3500),

THEREFORE, BE IT RESOLVED, that the Pacific Marine Fisheries Commission respectfully request that the U. S. Government, through its proper agencies, review the tariff on imported fishery products and recommend legislation of regulation that would provide for and encourage a healthy domestic fishery for our abundant trawl species.

26. Regarding International North Pacific Treaty

BE IT RESOLVED, that the Pacific Marine Fisheries Commission urgently requests our representatives at the regular meetings of the International North Pacific Fisheries Treaty to restate our grave concern of the Japanese high seas fishery for salmon, and any increased participation on the part of the Japanese on the carefully nurtured and fully utilized stocks of Pacific halibut, and

BE IT FURTHER RESOLVED, that the U. S. negotiators at the fourth round of North Pacific Treaty renegotiation meetings, and at all future meetings, insist that any new treaty with Japan include the strongest possible protection for halibut stocks and for Pacific salmon of North American origin. Copies of this resolution to be sent to all affected and concerned, including the Secretary of the U. S. Department of State; Ambassador Benjamin Smith; Secretary of the U. S. Department of

Interior; Pacific Coast Governors; and all Senators and Representatives in Congress, from the Pacific States.

27. Advisory Committee Rules and Operating Procedures

WHEREAS, there has been confusion and lack of consistency in the deliberations and procedures of the Pacific Marine Fisheries Commission Advisory Committee, and

WHEREAS, much of this inconsistency has resulted from a lack of continuing record as to decisions on questions of operating procedure from year to year, and

WHEREAS, this lack of consistency in rules and operating procedures has resulted in a distinct, continued time loss for organization at each annual meeting, and

WHEREAS, the work load of the Advisory Committee and the responsibilities of this PMFC group have grown substantially with each succeeding year,

NOW, THEREFORE BE IT RESOLVED, that the Pacific Marine Fisheries Commission Advisory Committee advises the Commission of the adoption of rules and operating procedures which have been filed with the Executive Director to be made a matter of permanent record of the Commission, such rules and regulations to be forwarded, as amended, on an annual basis with the first brochure mailing, and

BE IT FURTHER RESOLVED, that the Executive Director be authorized to provide the necessary expenses for a one-day meeting immediately prior to the first regularly scheduled meeting of the Advisory Committee at each annual PMFC meeting for one delegate from each participating State, and such delegate to be authorized, per the adopted rules and regulations, to take such measures in the allocation of resolutions and the appointment of sub-committees to facilitate and make more efficient the annual Advisory Committee work.

ADVISORY COMMITTEE RULES AND OPERATING PROCEDURES

1) Each State Advisory Committee shall elect, during the annual PMFC meeting a chairman who will serve from the final date of the current meeting until the end of the succeeding year's meeting. In addition, the Advisory Committee from the Host State will elect an over-all Advisory Committee Chairman and alternate who will serve for the ensuing year. The over-all chairman and the Advisory Committee chairmen from the participating States shall comprise the Executive Committee of the Advisory Committee.

2) It shall be the duty of the Executive Committee, which shall be led by the over-all chairman, to meet at the annual meeting site one day in advance of the first meeting of the Advisory Committee at the annual meeting. The Executive Committee, at this time, shall appoint four Committees to be identified as Working Team A; Working Team B; Working Team C; and Working Team D. Wherever possible, the Executive Committee shall use the best possible judgment in the allocation of membership to include representatives familiar with specific issues on specific Committees. Upon formation of the four Committees or Teams, the Executive Committee shall assign numbers to and affix short titles to each proposal that has not been previously provided with a number and short title by the PMFC office staff. The Executive Committee of the Advisory Committee shall:

a. Attempt, wherever possible, to assign proposals to committees where membership will be representative of, and competent concerning the issues involved.

b. Attempt to measure the gravity of the proposals and the discussion time necessary so that the work loads of the four Working Teams will be as equal as possible.

3) The Executive Committee shall further establish an agenda for the first meeting of the Advisory Committee and ensuing meetings with a goal that brief full Advisory Committee meetings may be held as regularly as possible to maintain liaison with the Working Teams as to problems and progress.

4) Agenda time shall be allocated at the Advisory Committee meetings for statements from accredited advisors who may wish to make statements for the benefit of other advisors on subjects which may or may not be the subject of specific proposals.

5) Initial determination of ineligibility of proposals within PMFC Compact requirements only, shall be made by the Executive Committee and shall be returned to the maker, if available, or referred to one of the Working Teams for revision and consideration.

6) A copy of the adopted Advisory Committee Rules and Operating Procedures shall be filed with the Executive Director immediately and all subsequent alterations or amendments shall be filed in the same manner. A copy of the current Rules and Procedures shall be mailed to all advisors with the first brochure mailing.

7) Alterations or amendments to the Rules and Procedures may be made at any regularly scheduled meeting of the Advisory Committee.

8) A quorum for a meeting of the Advisory Committee shall be a majority of the Advisors, present from each individual State.

9) All voting on procedures, proposals or any other business of the Advisory Committee shall be on the basis of the participating States with the actual voting conducted and announced by the State Chairman. Majority vote shall determine the vote under the unit rule. State delegations may request time for caucus on any decision.

10) The Advisory Committee Chairman shall request confirmation of Advisors from the PMFC Executive Committee prior to the first official meeting of the Advisory Committee.

11) All Advisory Committee meetings shall be open. Statements from non-Advisors may be made by permission of the Chairman.

12) The Alternate or Deputy Advisory Committee Chairman shall assist the Advisory Committee Chairman where and whenever possible.

13) PMFC shall furnish the Executive Committee of the Advisory Committee at its pre-Advisory Committee meeting with a consultant to assist the Executive Committee with the editing, as to form and grammar, of all proposals before they are considered by the entire Advisory Committee.

14) The fishery agency of the Host State shall provide the Executive Committee with a stenographer during the pre-Advisory Committee meeting.

29. Amendment to Resolution No. 1

Inasmuch as there has been considerable confusion in the three official versions of Resolution No. 1, Research Policy, the Advisory Committee, for clarification recommends the adoption of the following rule of procedure, for insertion after "C" of the section on *Procedure*.

1. The Research Staff shall submit its comments or endorsements on all proposals to the Advisory Committee. The Advisory Committee, in turn, shall report to the PMFC the recommendations of the Research Staff together with the recommendations of the Advisory Committee.

In addition, for future PMFC meetings, it is the recommendation of the Advisory Committee that all proposals be presented orally by the Chairman of the Advisory Committee for consideration to the Commission with recommendations from both the Advisory Committee and the Research Committee.

In addition to the 16 proposals which were adopted, the Commission reaffirmed 3 resolutions from 1963. They were No. 8, Power Dam Moratorium; No. 9, Indian Affairs; and No. 20, Bruce Eddy Dam, Clearwater River (see pages 7 and 10 of 1963 Annual Report).

The Commission also instructed the Executive Director to repeat his appeal to Congress to retain the Pittman-Robertson and Dingell-Johnson Acts when abolition of excise taxes is considered.

The Commission rejected or tabled the following 13 proposals:

2. Minimum Legal Size of Coho to be 22 Inches
3. Change Trolling Season to March 15-October 15
5. Northern California Crab Season to be Advanced to December 1
6. Suspend Seismic Surveying with Explosives
7. Prohibit Issuance of Licenses to Part-time Fishermen and Anglers
8. Permit Trawling Within 3-Mile Limit off California
10. Trawl Fishery Marketing Practices
- The Commission referred this to the Executive Committee for study and recommendation at the 1965 meeting.
14. Washington Proposal for Similar Crab Seasons
23. Prohibit Foreign Fishing and/or Processing of Fish Within U. S. Waters
24. 12-Mile Fishing Limit
25. Seasons and Bag Limits for Recreational Marine Salmon Fishery
28. Make Study of Purchases of Commercial Licenses by Sport Fishermen

Election of Officers, Etc.

The following were elected officers for the calendar year 1965:

John R. Woodworth, Chairman
John H. Wedin, First Vice Chairman
J. Pat Metke, Second Vice Chairman
Walter T. Shannon, Secretary

The 1965 Annual Meeting will be held at Boise, Idaho from November 18 to 20.

Budget

A budget in the amount of \$95,384 was adopted for the biennium July 1, 1965 to June 30, 1967. An anticipated surplus of \$9,584 from the previous biennium reduced the amount to be raised by membership contributions to \$85,800 or \$42,900 per year.

PACIFIC MARINE FISHERIES COMMISSION BUDGET

Biennium July 1, 1965 to June 30, 1967

CALIFORNIA, IDAHO, OREGON AND WASHINGTON

Salaries and Wages:	
Executive Director	\$25,274
Office Secretary	11,388
Part-Time and Temporary	9,100
General Operations and Maintenance:	
Office Supplies	2,000
Telephone and Telegraph	800
Postage, Freight, Express	1,100
Rent, Office	2,216
Premiums, Bonds, Insurance	300
Audit Fees	630
Private Car Mileage	475
Fares, Plane, R. R., Bus	2,500
Meals and Lodging	2,100
Library Supplies	80
Social Security	1,167
Retirement Annuity	2,890
Medical Insurance	240
Annual and Research Meetings:	
Meeting Rooms	800
Advisory Committee, Travel, etc.	8,529
Commissioners, Travel, etc.	3,828
Administrative and Research Staff	4,983
Sound and Recording	500
Publications:	
Annual Reports Nos. 18 and 19	5,500
Bulletin No. 7	3,200
Data Series	500
Cooperative Research	4,800
Capital Outlay:	
Office Furniture and Equipment	384
Miscellaneous	100
Total Estimate	\$95,384
Surplus from Previous Biennium	9,584
	<u>\$85,800</u>

PROPORTIONATE CONTRIBUTIONS BASED ON TOTAL ANNUAL CONTRIBUTION OF \$42,900

Member	5-Year Average*	% of Contribution	Annual Contribution
California	\$52,230,865	65.066	\$26,600
Washington	20,640,555	25.712	10,500
Oregon	7,402,703	9.222	3,800
Idaho**	Insignificant	—	2,000
		100.000	<u>\$42,900</u>

*Annual value of catch, 1958-1962 inclusive.

**Idaho, because of its small commercial fishery, pays the \$2,000 stipulated by Article X of the Compact.

FINANCES

The Commission receives its finances 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 the 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.

STATEMENT OF RECEIPTS AND DISBURSEMENTS

January 1, 1964 to December 31, 1964

CASH BALANCE Dec. 31, 1963	
(Ending Balance 16th Annual Report)	\$29,556.01
RECEIPTS: Contributions by	
Member States—	
California	\$26,600.00
Idaho	2,000.00
Oregon	3,900.00
Washington	10,800.00
	<u>43,300.00</u>
REFUNDS:	
United Airlines, Fare	10.50
Social Security	4.39
Pension Plan	5.27
	<u>20.16</u>
DISBURSEMENTS:	
Salaries and Wages:	
Executive Director, Consultants, Treasurer, Office Secretary, and Temporary	\$20,417.29
Office Supplies	\$ 1,055.12
Telephone and Telegraph	379.03
Postage, Freight, Express	652.81
Printing of Publications	3,016.00
Rents: Headquarters Office and Meeting Rooms	1,410.75
Premiums: Fidelity Bonds, Fire Insurance, Workmen's Com- pensation Insurance	159.82
Audit of Fiscal Books and Records	315.00
Private Car Mileage	145.19
Fares: Airplane, Railroad Pullman, Other	544.45
Meals and Lodging	529.31
Library Supplies	19.50
Physician and Hospital Insurance	120.00
Retirement Contributions	1,873.83
Annual and Research Meetings:	
Advisory Committee	3,673.72
Commissioners	2,106.20
Administrative and Research	3,689.36
Tape Recording	184.00
Total General Expenses	<u>19,874.09</u>
Office Furniture and Equipment	4.29
Prepaid Employee Contribution for Pension Fund	722.21
Total Disbursements	<u>\$41,017.88</u>
Cash on Deposit in The United States National Bank of Portland, Oregon: General Checking Account, December 31, 1964	
	<u>31,858.29</u>
	<u>\$72,876.17</u>
	<u>\$72,876.17</u>

AUDIT REPORT

ALLEN H. ADAMS
Certified Public Accountant
Portland, Oregon

August 31, 1964

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, 1964. 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:

- Combined Balance Sheet, as at June 30, 1964, of the General Fund and the Property Fund.
- Statement of Revenue and Expenditures, with Budgetary comparisons, for the period July 1, 1963 to June 30, 1964.
- Analysis of changes in Unappropriated Surplus and in the Property Fund for the period July 1, 1963 to June 30, 1964.
- Reconciliation of changes in the cash balance with Revenues and Expenditures for the period July 1, 1963 to June 30, 1964.
- Audit Comments.
- Scope of the Audit.

In my opinion, the accompanying statements present fairly the financial position of the Pacific Marine Fisheries Commission at June 30, 1964, 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

ANALYSIS OF UNAPPROPRIATED SURPLUS ANALYSIS OF CHANGES IN THE PROPERTY FUND

For the Year Ended June 30, 1964

EXHIBIT "C"

UNAPPROPRIATED SURPLUS:	Budget	Actual	Difference
Balance July 1, 1963	\$ 995.68	\$ 1,017.40	\$ 21.72
Add: Revenues for Fiscal Period	43,300.00	43,300.00	*
	<u>\$44,295.68</u>	<u>\$44,317.40</u>	<u>\$ 21.72</u>
Less: Expenditures for Fiscal Period	\$42,401.34	\$32,290.10	\$10,111.24
Adjustment for under-accrual of liabilities at June 30, 1963		4.23	(4.23)
	<u>\$42,401.34</u>	<u>\$32,294.33</u>	<u>\$10,107.01</u>
Balance, June 30, 1964	<u>\$ 1,894.34</u>	<u>\$12,023.07</u>	<u>\$10,128.73</u>
PROPERTY FUND:			
Balance July 1, 1963		\$ 3,799.40	
Add: Office Equipment purchased during year		127.05	
		<u>\$ 3,926.45</u>	
Less: Assets deleted from inventory		\$ 23.80	
Check protector traded-in		84.50	
		<u>\$ 108.30</u>	
Balance June 30, 1964		<u>\$ 3,818.15</u>	

BALANCE SHEET

June 30, 1964

EXHIBIT "A"

GENERAL FUND

ASSETS:	Total	General Fund	Property Fund
Cash in Bank	\$12,801.81	\$12,801.81	\$ —
Office Furniture and Equipment	3,818.15	—	3,818.15
Total Assets	<u>\$16,619.96</u>	<u>\$12,801.81</u>	<u>\$ 3,818.15</u>
LIABILITIES:			
Accounts Payable	\$ 778.74	\$ 778.74	\$ —
FUND BALANCE:			
Investment in Fixed Assets	3,818.15	—	3,818.15
Unappropriated Surplus	\$12,023.07	12,023.07	—
Total Liabilities and Fund Balance	<u>\$16,619.96</u>	<u>\$12,801.81</u>	<u>\$ 3,818.15</u>

STATEMENT OF REVENUES AND EXPENDITURES

For the Fiscal Year Ended June 30, 1964

EXHIBIT "B"

GENERAL FUND

	Budget	Actual	Difference
REVENUES:			
Contributions from Member States:			
Oregon	\$ 3,900.00	\$ 3,900.00	\$ —
Washington	10,800.00	10,800.00	—
California	26,600.00	26,600.00	—
Idaho	2,000.00	2,000.00	—
Total Revenues	<u>\$43,300.00</u>	<u>\$43,300.00</u>	<u>\$ —</u>
EXPENDITURES:			
Salaries and Wages—Full Time Employees	\$17,040.00	\$17,040.00	\$ —
Salaries and Wages—Part Time Employees	3,130.64	2,404.64	726.00
Office Supplies	1,042.75	936.87	105.88
Telephone and Telegraph	481.59	364.15	117.44
Postage, Freight and Expenses	430.51	541.46	(110.95)
Printing of Publications	3,500.00	—	3,500.00
Rent	1,539.00	1,539.00	—
Premiums	222.95	122.22	100.73
Auditing Fee	300.00	300.00	—
Legal and Professional Services	—	400.00	(400.00)
Private Car Mileage	142.23	140.97	1.26
Fares	1,421.14	432.40	988.74
Meals and Lodging	1,076.86	680.39	396.47
Employees Health Insurance	—	70.00	(70.00)
Library Supplies	45.75	18.25	27.50
Employee Retirement	1,253.61	569.97	683.64
Travel Expenses—Advisory Com.	3,915.00	2,742.15	1,172.85
Rentals—Meetings Rooms	688.00	440.00	248.00
Travel Expenses—Commissioners	1,894.00	1,547.70	346.30
Meetings—Expenses of Administ. and Research Staff	3,919.00	1,872.88	2,046.12
Expenditures—Gen. Fund	<u>\$42,043.03</u>	<u>\$32,163.05</u>	<u>\$ 9,879.98</u>
PROPERTY FUND			
Expenditure for Office Equipment	\$ 358.31	\$ 127.05	\$ 231.26
Total Expenditures	<u>\$42,401.34</u>	<u>\$32,290.10</u>	<u>\$10,111.24</u>
Excess of Revenues Over Expenditures	<u>\$ 898.66</u>	<u>\$11,009.90</u>	<u>\$10,111.24</u>

**RECONCILIATION OF CHANGES IN CASH BALANCE
WITH REVENUES AND EXPENDITURES**

For the Period July 1, 1963 to June 30, 1964

EXHIBIT "D"	
Cash in Bank, July, 1963	\$ 7,055.75
RECEIPTS FOR FISCAL YEAR ENDING JUNE 30, 1964:	
Contributions from Member States	43,300.00
	<u>\$50,355.75</u>
DISBURSEMENTS:	
Total Expenditures per Exhibit "B"	\$32,290.10
Add: Accounts Payable and Purchase Commitments at June 30, 1963, paid in 1963-64 fiscal year	6,042.58
	<u>\$38,332.68</u>
Less: Accounts Payable at June 30, 1964, to be paid in 1964-65 fiscal year	778.74
Net Cash Disbursed	<u>37,553.94</u>
Cash in Bank, June 30, 1964	<u>\$12,801.81</u>

AUDIT COMMENTS

June 30, 1964

EXHIBIT "E"

NOTE 1:

The following schedule will summarize appropriations by the Member States to the Commission:

<u>Period</u>	<u>Oregon</u>	<u>Washington</u>	<u>California</u>	<u>Idaho</u>	<u>Total</u>
1963-65 Biennium: Legislative Appropriation	7,800.00	21,600.00	\$ -----	\$ 4,000.00	\$33,400.00
1963-64 Fiscal Year: Legislative Appropriation	-----	-----	26,600.00	-----	26,600.00
	<u>7,800.00</u>	<u>21,600.00</u>	<u>26,600.00</u>	<u>4,000.00</u>	<u>60,000.00</u>
1963-64 Fiscal Year: Appropriation Received	3,900.00	10,800.00	26,600.00	2,000.00	43,300.00
Appropriation of Last Year of Biennium to be Received: 1964-65	<u>\$ 3,900.00</u>	<u>\$10,800.00</u>	<u>\$ -----</u>	<u>\$ 2,000.00</u>	<u>\$16,700.00</u>

NOTE 2:

An inconsistency was noted in the approval of travel claims of persons authorized to receive reimbursement of funds expended for the use of their private car in behalf of activities of the Commission. Operational Memo 63-1, dated April 1, 1963, allows 8c per mile for use of a private auto; however, such reimbursement is limited to the cost of first class train and pullman or plane fares, including limousine and/or taxi fares. On those expense vouchers where a private auto had been utilized, such reimbursement limitation usually was enforced on the basis of first class plane fare, or, in some cases, no limitation on mileage claimed was made. It is recommended that travel regulations be amended to provide that reimbursement for use of private auto be limited to the equivalent cost of first class plane fare only thus removing the consideration of alternate forms of transportation (including time en route for per diem) as limitations.

NOTE 3:

The following opinions are expressed relative to the financial affairs of the commission:

- (a) The accounting records are adequate for the activities involved and are well maintained.
- (b) Internal control procedures for safeguarding the funds of the Commission are adequate in the circumstances.
- (c) Collateral securing depository balances, insurance coverage, and size of fidelity bond are considered adequate.
- (d) Budgetary procedures are adequate in the circumstances; supplemental budgets are adopted when conditions change, such budget as appears in Exhibit "B" being a revised projection of expenditures.
- (e) I am satisfied that all transactions are properly substantiated by appropriate evidence, authority, and general tests of reasonableness and are correctly recorded in the books of account.

SCOPE OF THE AUDIT For the

Period July 1, 1963 to June 30, 1964

EXHIBIT "F"

Cash on deposit in the general fund as at June 30, 1964 was verified by certificate from the depository, The United States National Bank of Portland, Oregon. Collateral, consisting of United States Treasury Bonds in the amount of \$50,000.00, to secure the Commission's bank balance was verified by certificate from the latter bank. Cash received by the Commission for the period under review was substantiated by certificates from the respective Secretaries of State of the four states.

Property of the Commission, consisting of office furniture and equipment, was verified by physical inventory, additions during the year being substantiated by inspection of appropriate evidence. A fire insurance policy on the property was inspected for dates and adequacy of coverage.

A surety bond, with a limit of \$35,000.00, on the Treasurer of the Commission was inspected for dates, coverage and premium cost.

Liabilities of the Commission, owing as of June 30, 1964 were substantiated by inspection of purchase invoices and vouchers, and by related approvals of these items.

A detailed examination was made of all receipt and disbursement vouchers for the period under review, substantiating book entries for these transactions by inspection of cancelled checks, purchase invoices, travel vouchers, wage and salary vouchers, receipt vouchers and by reference to the Commission Minute Book and correspondence for authority where applicable.

Appendix 1 to the 1964 Annual Report

STATUS OF THE 1964 PACIFIC COAST ALBACORE FISHERY

WILLIAM L CRAIG

California Department of Fish and Game

Pacific Coast albacore landings are trailing well behind those of last year at this time. The catch will approach 35 to 40 million pounds, about two-thirds of last season and some 2 to 5 million pounds behind the preceding 20-year average (Figures 1 and 2, Table 1). The smaller harvest was caused primarily by extended periods of stormy weather which kept many fishing vessels in port.

California

The fishery began slowly for the second consecutive season; albacore appeared on the fishing grounds in mid-June, but none was caught until June 23. The opening price was \$25 per ton higher (\$325) than last year and increased numbers of northern boats came to southern California. However, inclement weather held most of the fleet in port so there were no June landings and fishing effort was only slight.

In July, a few albacore were caught off northern California

and southern Oregon as the sea warmed, but the bulk of the fleet operated between Guadalupe Island and Point Conception. Best fishing occurred from 100 to 300 miles offshore, though a small, steady fishery developed near the northern Baja California coast. Landings amounted to 3.5 million pounds, a million more than July, 1963.

In August, part of the fleet continued to fish the southern grounds, while the remainder moved upcoast and operated in central and northern California. Landings were high, reaching nearly 15 million pounds.

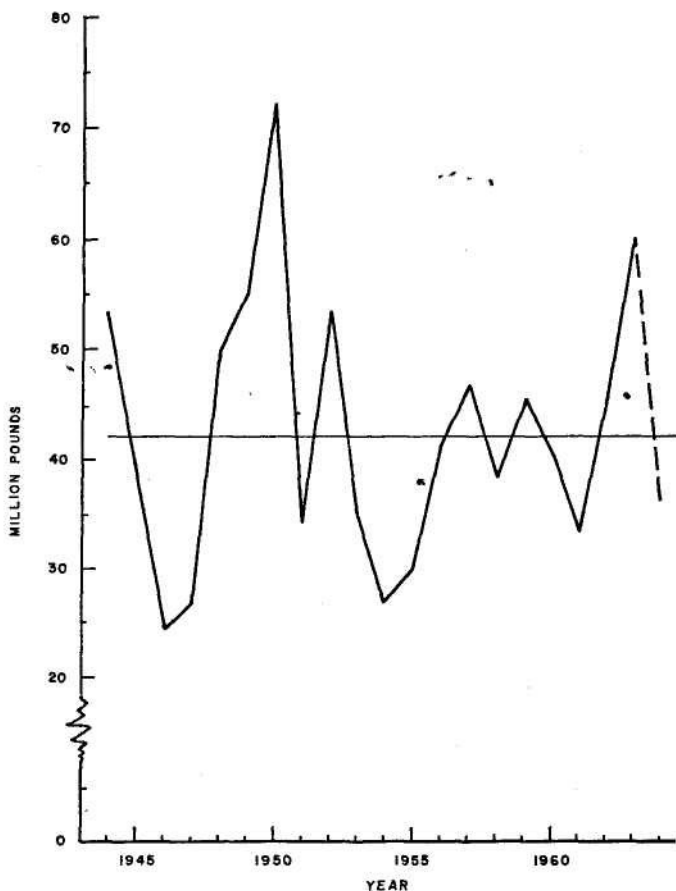


FIGURE 1. Pacific Coast albacore landings 1944-1963, and 20-year average.

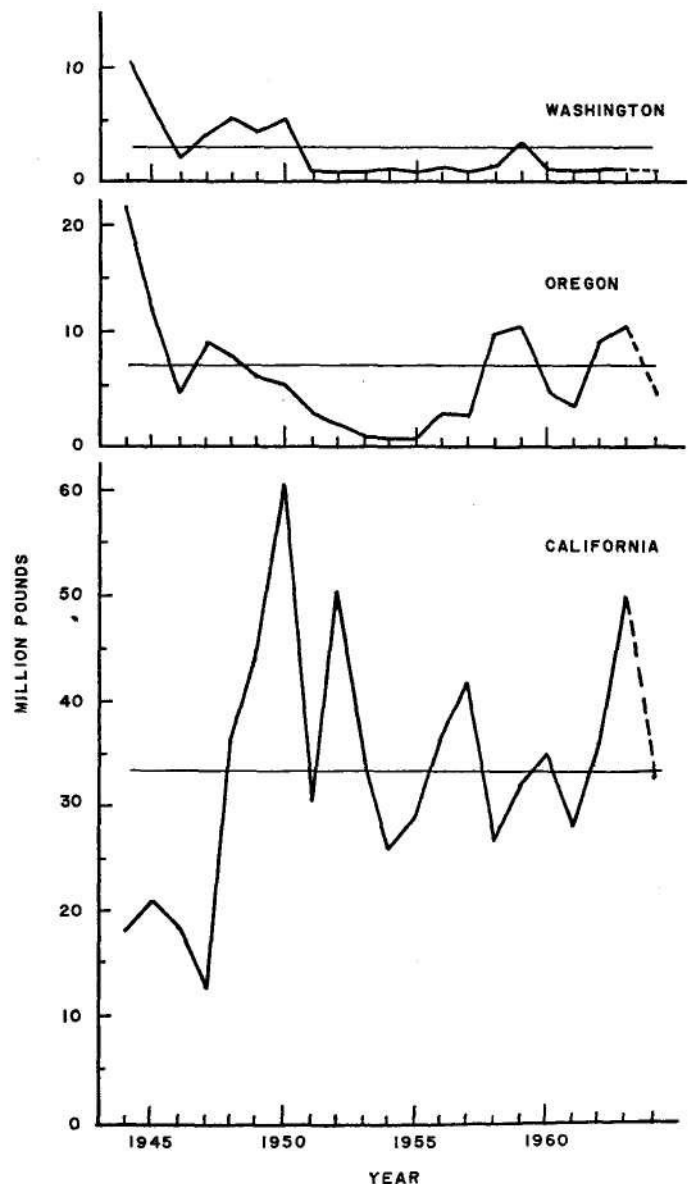


FIGURE 2. Annual albacore landings by State 1944-1963, and 20-year average.

TABLE 1

Pacific Coast Albacore Landings—1944 through 1963, and 20-Year Average (Thousand Pounds)

Year	California	Oregon	Washington	Total
1944	18,454	22,492	11,870	52,816
1945	21,225	12,178	6,030	39,433
1946	18,078	3,951	2,123	24,152
1947	13,172	9,558	4,243	26,973
1948	36,456	8,004	4,917	49,377
1949	44,006	6,457	4,434	54,897
1950	61,745	5,386	5,035	72,166
1951	30,915	2,917	625	34,457
1952	49,804	2,586	177	52,567
1953	33,836	776	89	34,701
1954	26,107	469	421	26,997
1955	29,002	503	233	29,738
1956	37,055	3,654	630	41,339
1957	43,525	2,702	433	46,660
1958	27,188	9,754	1,503	38,445
1959	32,740	10,582	2,961	46,283
1960	35,113	4,563	526	40,202
1961	29,123	3,251	456	32,830
1962	36,622	8,949	365	45,936
1963	48,860	11,395	527	60,782
Total	673,026	130,127	47,598	850,751
Average	33,651	6,506	2,380	42,538

Fall fishing off central California "was good in 1964, although not on a par with 1963. September landings were about one-third of those made in 1963, but in October and November they nearly equaled the previous season's figures.

We estimate the 1964 commercial catch will total between

32 and 35 million pounds. This is about one-half of 1963's harvest but close to the 33.5-million-pound 20-year average. By the end of October, partyboat anglers had taken nearly 104,000 albacore, however, we do not expect them to reach last season's 158,000 total. Partyboats from San Diego consistently provided good fishing for their passengers, while the Los Angeles-Long Beach fleet made sporadic catches for short periods because the albacore schools remained outside vessel operating range most of the time.

Oregon

The Oregon fishery was slow in 1964. Good salmon fishing and the relatively low price paid for albacore resulted in few local boats fishing for them. Albacore schools were widely scattered off southern Oregon during August and off northern Oregon through mid-September, only moderate catches resulted. Sea temperatures were several degrees cooler than in 1963.

We estimate the 1964 commercial landings will not exceed 4.5 million pounds. This is only 40 percent of the 1963 harvest and about 2 million pounds below the 20-year average.

Washington

Few albacore were taken off the Washington coast through August, and landings for 1964, if the present rate continues, will not exceed 300,000 pounds. Most albacore were caught off Willapa Bay, Washington and south to Cascade Head, Oregon. Many of the salmon trailers, that turned to albacore fishing during the latter part of June, headed for the grounds off Oregon and California.

Low price and an unstable market influenced Washington landings.

Summary and Status

Pacific coast fishermen have averaged 42 million pounds of albacore annually since 1944. The 1964 catch will fall some 2 to 5 million pounds below average. Although large catch fluctuations typify this period, there has been no downward trend in fishing success. Data presently at hand indicate that ou/ albacore resource can withstand additional fishing pressure.

STATUS OF THE 1964 PACIFIC COAST DUNGENESS CRAB FISHERY

RICHARD L. POOLE

California Department of Fish and Game

Preliminary landing figures indicate a continued decline in landings of market crabs on the Pacific Coast with 8.3 million pounds landed during the 1963-64 season. This is 0.9 million pounds less than the 1962-63 total of 9.2 million pounds. Catch statistics compiled by PMFC's research staff (Figure 1) illustrate the decline in the fishery since the high season in 1956-57. Prices paid fisherman were high, but not high enough to keep their total income from declining.

California crab landings have continued at extremely low levels for three successive seasons. A total of 2.0 million pounds had been landed through June as compared to 2.3 million pounds for the same period in the 1962-63 season. This is far below the long term average of 10 million pounds. San Francisco landings declined slightly from 1.3 to 1.2 million

pounds and Eureka-Crescent City landings were the lowest in 20 years with 0.8 million pounds landed. The 10-year average for the Eureka area is nearly 8 million pounds. Fishermen again enjoyed high prices that allowed them to continue fishing even though the catches were reduced.

Oregon crab landings totaled 3.1 million pounds through June as compared to 3.0 million pounds during the same period of the 1962-63 season. Total landings for the season are expected to be a little over 3.5 million pounds, 50 percent below the long term mean of 7-8 million pounds, although slightly better than the 1962-63 season. Forty-two percent of the catch was made in the first 30 days of the season, a slight increase over the 1962-63 season.

In Washington the 1963-64 season began on December 1, 1963, one month earlier than in previous years to conform to an unexpected change in the Oregon crab season. Total catch for this season stands at 3.2 million pounds through August with 32 percent of the landings occurring during the first month. Total catch for this season will approximate 3-3 million pounds, one of the poorest seasons of record. Inside Puget Sound the catch for the season totaled 1.7 million pounds, above average for this area. Washington prices were also high, reaching 30 cents per pound to the fishermen.

Fluctuations in Pacific Coast crab landings have been a characteristic of the fishery since its inception. Coastwide landing statistics reveal that fluctuations are not limited to just one state, but are more wide spread. Because of this, the staff believes the recent low harvests are due to changes in the environment that have influenced the resource along the coasts of the three states. No changes in regulations are recommended. Washington biologists feel, however, that the December 1 date is too early to open their ocean crab season.

This is the editor's summarization of the lively discussion that followed the report on Dungeness crabs.

Tagging studies indicate that there are well-separated, independent crab populations. This leads to the conclusion that the fluctuations in abundance which have occurred uniformly off California, Oregon and Washington have been due to coast-wide changes in environment. Changes in temperature or currents are possibilities. Temperature changes reflect current changes and it may be that unfavorable currents sweep the pelagic crab larvae away from favorable and into unfavorable areas.

The research staff has no recommendations for changing the crab fishing regulations, but feels that increased investigation into the causes of the extreme fluctuations is desirable. Where the Legislators of a state are concerned, they should seek the advice of their respective state fishery agency. There are rather separate, independent crab populations which should be, where practical, managed separately by the states concerned so as to obtain the maximum yield from each population and yet protect the resource. The management problems are biologically and economically complicated and require careful deliberations.

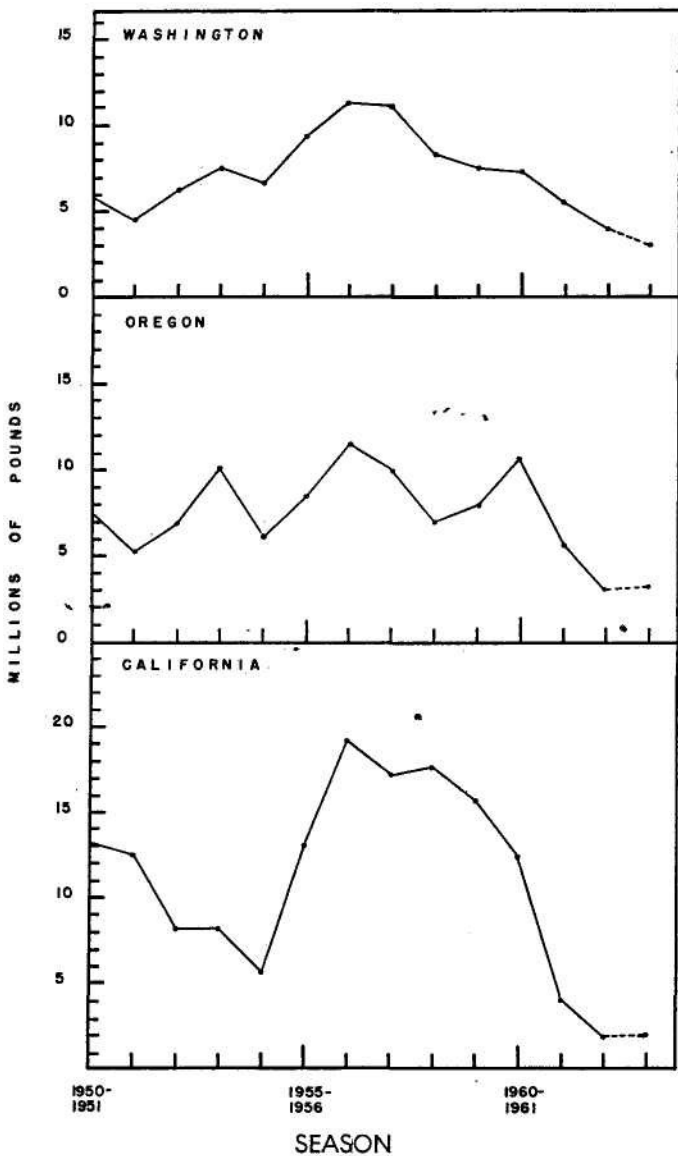


FIGURE 1. Crab landings by State.

There was a suggestion that the next California Legislature might be asked whether a limit should be put on the number of crab pots or on the take, or if something else should be done to check the drastic decline of the past three years. This suggestion was countered by the generally accepted concept that the removal of legal-size male crabs has no significant effect on the remaining population, mainly the smaller males and all the females. Moreover, the possibility exists that the stocks have declined due to natural causes. On the other hand, many persons in the crab fishery have noted what is at least a coincidental relationship between greatly increased fishing effort (number of boats and pots used), an accelerated relative rate of harvesting, and a steady decline in total landings. Can the accelerated harvesting inhibit reproduction and therefore result in reduced abundance?

Increasing the reserve of large males in the population during the mating season by some management device that slows the rate of harvest might enhance the reproductive potential of the population. However, evidence of females bearing unfertilized eggs is lacking, consequently, it is felt that the females are being fertilized. Any increase in the size limit, or inauguration of a quota or other device to limit the catch or rate of catching crabs could drastically affect the catch for the ensuing season. The current scarcity is not felt to have been caused by fishing but rather to unsuccessful year classes. Successful and unsuccessful year classes, or series of year classes, have occurred regardless of fishing. Until evidence to the contrary is at hand, drastic changes in regulations are not recommended.

Generally, in California, it is felt that the legal-size male crabs at the start of the season, if taken in the first couple of months, are no more loss to the population than if they were harvested over a more protracted period. There may be, however, a slight chance that, late in the season when the females begin to molt and mating begins, leaving more males on the grounds would result in more assurance of fertilized females. Fertilization is not regarded as a problem in California. Washington feels that its harvest is nearly 100 percent of the available legal-size male crabs and that the rate of harvest has not been too critical since fishing continues for a number of months although a large part of the available harvest is taken within the first 2 or 3 months. In Washington, there has been a considerable increase in effort at the beginning of the season, but this is followed by a decrease in effort as the season progresses.

It was pointed out that the graphs included in the status report only included the catch and did not show the amount of gear or the fishing intensity. If the fishing intensity were included, the declining catches would be seen to be inversely related to the increasing effort. With probably 2 or 3 times the effort of 10 years ago, the individual fisherman is getting a very small fraction of the total harvest and the feeling still persists that the decrease in crabs is related to the increase in effort. If other things have had an even more adverse effect on the crabs, the increased fishing intensity may have simply accelerated the decline in total catch. In opposition, it was mentioned that the present management concept is that, at the start of each season, a finite population of harvestable crabs exists which differs in number from year to year. If the amount of gear increases without limit, the catch per unit of

gear can only decrease. This decrease will be modified by whether a year is a good or bad crab year. Once crabs reach legal-size they have only another year or two to live and if they are not caught they are wasted.

Even though we have no basis for doubting this concept, we now have an hypothesis that it may be desirable to leave some of the large males on the grounds to enhance reproduction. This hypothesis should be tested. A few years ago, it took probably 7 months to remove 90 to 95 percent of the available crabs. Now it hardly takes 7 weeks. That difference in the time that the large males are available for mating could be important. California has scheduled a series of cruises starting in January to observe the number of fertilized females and the number that are bearing eggs, and to deduce what the effects are of a reduced number of males in a small population of crabs.

The crab resource is in great trouble. The big landings used to occur in April, May and June, and frequently the biggest landings were in June. The major mating season occurs around May. Now the big landings occur in the winter at the beginning of the season and most of the legal male crabs are caught by Christmas. The timing is important. When the females go to the beach at molting time, the males follow to fertilize them, and the fishermen formerly waited there to catch the large males. This does not happen any more. High opening prices, and the fact that if one does not start fishing on opening day he will not get his share of crabs, have encouraged a high fishing intensity at the start of the season.

In answer to the question, "Would poor weather curtail the landings of crabs?" it was stated that it would not necessarily. Research has indicated that between 90 and 100 percent of the male crabs over 7 inches in size have been taken annually since 1928 or 1929. The crabs that are not caught one week are probably caught the following week; at least they are caught eventually. In the San Francisco area, over 85 percent of the total landings are made in November, December and January. Even if fishing did not start until January, there would still be sufficient time to harvest the available crabs.

Preseason investigations off California have resulted in predictions of poor crab seasons in recent years because of poor catch-per-pot values during sampling. These predictions have been reasonably accurate. This year's sampling in the San Francisco area indicates a low expected total catch of 750,000 to 800,000 pounds. However, the latest information from northern California indicates that crabs are 3 times as abundant there as they were last year, and a preliminary estimate of a 3-million pound catch this season has been made for the Eureka area.

There is no indication that trawling throughout the year off California is adversely affecting the crab fishery. The trawl fishery has a longer history than the crab fishery in the San Francisco area. The grounds off San Francisco have shown both increases and decreases in crab landings since the war, but the trawl fishery has existed continuously both before and after the war. The take of crabs by trawl boats has not changed materially and there is no basis for inferring that trawling has been responsible for the drastic fluctuations in crab abundance. The impressions in the more northerly states may be different.

THE STATUS OF THE TRAWL FISHERIES OF THE PACIFIC COAST, 1964

TOM JOW

California Department of Fish and Game

Annual trawl landings which were characterized by extreme fluctuations during the forties and early fifties, have since 1955 been relatively stable at levels between 120 and 140 million pounds (Figure 1). The fishery with its complexities of species and influencing factors is by no means predictable. However, I am pleased to report that the outcome of the 1963 Pacific Coast trawl fishery was exactly as Austin Magill predicted last year. He forecast a comparable or slightly lower trawl catch for 1963 in comparison to 1962. The 133,165,000 pounds landed in 1963 were only 1.5 percent below the 135,190,000 pound take of 1962, and was slightly above the 9-year average of 132,000,000 pounds. Substantial increases in Pacific cod and Pacific Ocean perch with moderate gains in the Dover sole fisheries, continued decline in animal food poundages, and modest decreases in the take of other species highlight the 1963 season.

Thus far in 1964, Canada is enjoying a near record season, but Washington is having its worst in 11 years. Oregon and California trawl fisheries show declines from the comparable 1963 period. The gain in the Canadian fishery will probably not offset the declines in the states. The total 1964 landings should be less than that of last year with a decrease of 5 to 12 percent likely. The condition of the fishery is generally good with economic conditions largely responsible for landing reductions.

Total trawl landings are more meaningful when the status and landings of the more important species are examined.

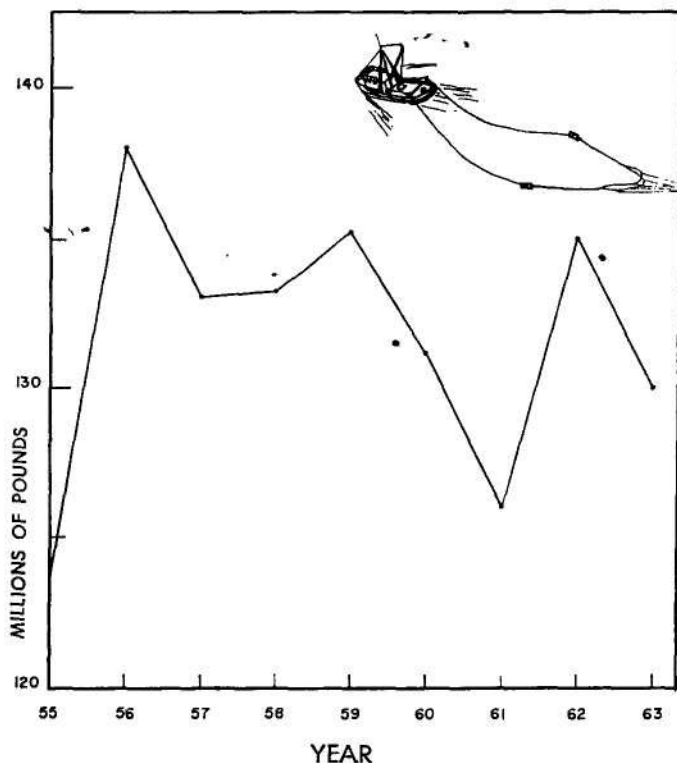


FIGURE 1. Total Pacific Coast trawl landings, 1955-1963.

Petrale Sole

The 1963 coastal catch of petrale sole was 9.5 million pounds. This was 2 percent below the 1962 total of 9.7 million pounds but was above the average of 8.9 million pounds for the years 1955 to 1963 (Figure 2). Canada, Washington, and Oregon reported declines while California landings increased slightly in 1963.

Petrale landings during the first half of 1964 were behind those for the same 1963 period. Canada had improved landings but the three coastal states reported declines. The 1964 total is expected to approximate the 9-year average.

English Sole

In 1963, landings declined 4 percent to 11.1 million pounds from 11.6 million pounds of 1962. California and Washington landings between years were equal but landings in Canada and Oregon declined.

Landings this year have improved in Canada but have declined in Washington, Oregon and California. Total 1964 landings are expected to slightly surpass those of 1963 and approach the average of 11.7 million pounds for the years 1955-1963 (Figure 2).

Dover Sole

The 1963 Dover sole catch of 18.2 million pounds is the largest annual total for the 9-year period, 1955-1963 (Figure 2). It was about 10 percent above the 1962 catch of 16.5

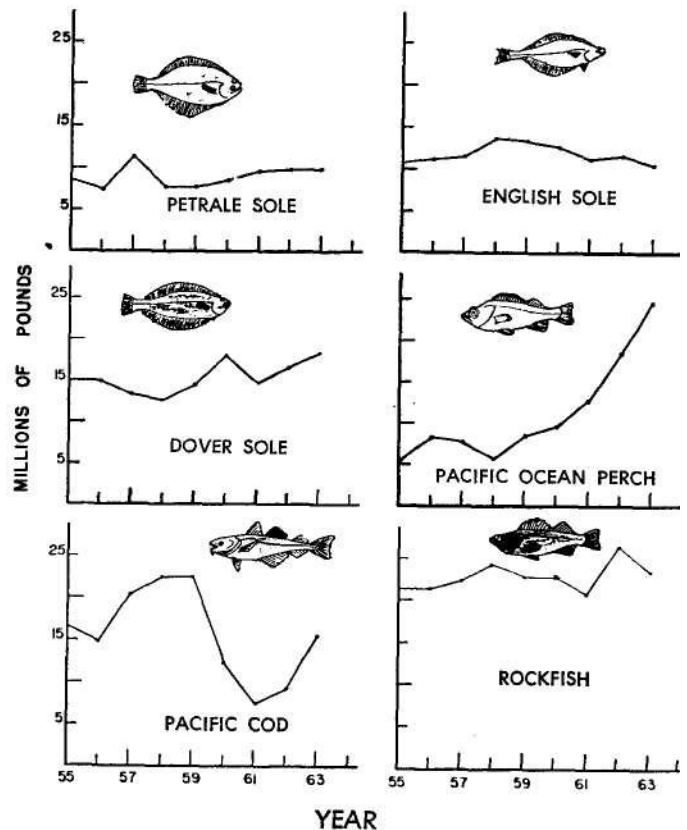


FIGURE 2. Pacific Coast trawl landings, 1955-1963.

million pounds as well as the 9-year average of 16.8 million pounds. The Canadian fishery in 1963 was equal to that of 1962. In Washington landings decreased while those of Oregon and California increased.

The 1964 trend for Dover sole is upward in Oregon while market conditions have limited landings in other states and Canada. Dover stocks appear to be in good condition but market demand may place a ceiling on total landings.

Pacific Ocean Perch

Record landings of 24.7 million pounds of Pacific Ocean perch were made on the coast in 1963. The catch exceeded the 9-year average of 11.3 million pounds by over twofold and the 1962 landings of 18.4 million pounds by about 26 percent (Figure 2). Canada's 1963 catch declined slightly but Washington and Oregon landings increased sharply. Only incidental catches taken off the Oregon coast are landed in California.

This year, landings are down considerably in Canada and Washington. Oregon landings have increased slightly. The potential of the Ocean perch fishery remains high, but economic factors have limited 1964 production. Unless conditions improve, landings will be considerably below those of 1963.

Pacific Cod

Cod is one of the major species in the trawl fisheries of Canada and Washington. It is of minor importance in Oregon and is non-existent in the California fishery. Canada and Washington reported increased cod landings in 1963. The coastal total of 15.4 million pounds equals the 9-year average and is 69 percent greater than 1962 landings of 9.1 million pounds. Annual landings since 1955 have varied between 7.6 and 20.4 million pounds. Landings of the past two years have reversed the sharp downward trend of the preceding years (Figure 2).

This year, Canada reports record landings while Washington is experiencing a slight decline from the comparable 1963

period. Total coastal landings for 1964 will be considerably above the 9-year average. Improvement in condition of the stocks as well as the market has occurred.

Rockfish

Landings totaled 22.2 million pounds in 1963. This is 12 percent less than the 1962 catch of 25.1 million pounds and is about equal to the 9-year average of 22.1 million pounds (Figure 2). During 1963, landings increased in California but declined elsewhere. Early 1964 production is less than that of the comparable 1963 period. Only Canada had increased landings while the three states reported declines in rockfish catch. The annual total is expected to be below average.

Market demand and availability of other species affects the magnitude of rockfish landings.

Summary

Pacific Coast trawl landings in 1963 were 133,165,000 pounds as compared to 135,190,000 in 1962 and the 1955-1963 average of 132,000,000 pounds. Increased Pacific cod, Pacific Ocean perch, and Dover sole landings occurred. Modest declines occurred for other species and animal food landings continued to decline.

A continued downward trend is expected for the 1964 trawl fishery. Canada is experiencing a near record season. Washington is having the worst one in 11 years, and Oregon and California show declines from the comparable 1963 period.

Market conditions have been largely responsible for lower landings. Declines in abundance of certain stocks have also occurred. Some stocks are utilized near or above maximum sustainable level while others are grossly underutilized. The states and Canada are engaged in long term programs to determine trends in stock sizes and define causes for fluctuations in order to provide a sound basis for management. It is recommended that these studies be intensified for early resolution of unknowns.

SALMON STATUS REPORTS, 1964

PAUL T. JENSEN California
Department of Fish and Game

STATUS OF THE TROLL SALMON FISHERY AND A REVIEW OF PAST LANDINGS

The 1964 Pacific Coast troll salmon season was the best in recent years. Combined coastwide landings of chinook and coho salmon were nearly 62 million pounds, highest since 1952 when combined landings were 72 million pounds. Combined landings in 1963 were 54 million pounds.

Coho landings approached or surpassed records in British Columbia and California, and were near or above average in Alaska, Washington, and Oregon. Chinook landings increased in Alaska, British Columbia, and California. In Washington the 1964 chinook landings were nearly equivalent to those of the past 6 years. Only the troll chinook fishery in Oregon showed a significant decline.

Troll Chinook Salmon Fishery

Pacific Coast troll chinook landings for 1964 will be near 26 million pounds, highest since 1959 when landings were also 26 million pounds. Landings in 1963 were 23 million pounds (Figure 1).

Alaska troll chinook landings in 1964 will be just over 5 million pounds. Alaskan chinook landings have increased steadily since 1961 when a low of under 3 million pounds was

landed. Landings in 1963 were slightly over 4 million pounds (Figure 2).

British Columbia troll chinook landings during 1964 will be about 8 million pounds. Landings in 1963 were nearly 7 million pounds. During the past 10 years, British Columbia troll landings have fluctuated between a high of about 10 million pounds in 1956 and a low of nearly 6 million in 1962 (Figure 2).

Troll chinook landings in Washington during 1964 will be just over 2 million pounds. Landings in 1963 were just under 3 million pounds. Washington troll landings have remained near the 2 million pound mark for the past 6 years (Figure 2).

Oregon presents the only sad note in the 1964 troll chinook season. Landings here will be near 700,000 pounds, down from the 1963 figure of 1,600,000 and continuing a decline that began in 1957 (Figure 2).

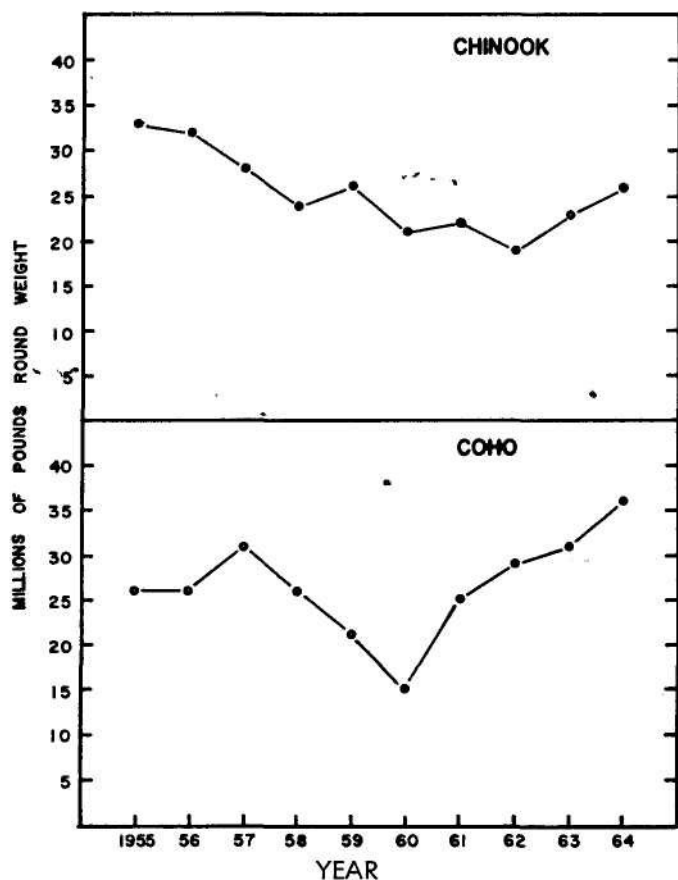


FIGURE 1. Pacific Coast troll landings of chinook and coho salmon. (1964 data are preliminary.)

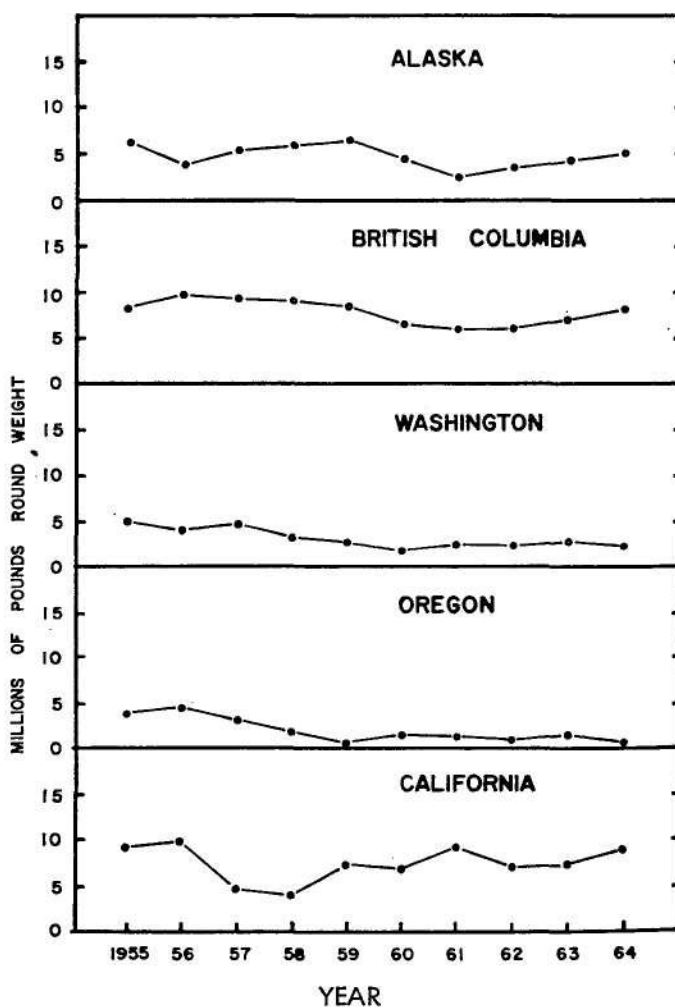


FIGURE 2. Landings of troll-caught chinook salmon by area. (1964 data are preliminary.)

The 1964 troll chinook fishery in California took an estimated 9 million pounds. Landings in 1963 were just under 8 million pounds. During the past 10 years, California chinook landings have fluctuated between a high of just under 10 million pounds in 1956 and a low of 4 million pounds in 1958.

Troll Coho Salmon Fishery

Total Pacific Coast troll coho landings for 1964 will exceed 36 million pounds. Landings in 1963 were just over 30 million pounds (Figure 1).

Coho were collectively abundant and individually large. Dressed coho of more than 20 pounds apiece were observed in both California and Alaska, opposite ends of the fishery's range.

Alaska troll coho landings in 1964 will be near 7 million pounds, a slight increase from 1963, when landings were just under 6.5 million pounds.

Preliminary estimate of British Columbia troll coho landings for 1964 is over 21 million pounds. This will probably exceed every year since 1920 with the possible exception of 1934 when nearly 22 million pounds were landed. Landings in 1963 were 16 million pounds (Figure 3).

Troll coho landings in Washington in 1964 will be near 4 million pounds, approximately what they were in 1963. Washington landings have been near this amount for the past 10 years with the exception of 1960 when they dipped to just under 2 million pounds (Figure 3).

Oregon's troll coho fishery in 1964 took nearly 4 million pounds. Landings in 1963 were 3 million pounds. Oregon's landings have increased steadily from 1960 when a record low of just under 1 million pounds was established.

Coho landings in California during 1964 will be near 2 million pounds—the best troll year for coho in history. Landings in 1963 were just over 1 million pounds. Prior to the 1963 and 1964 seasons, California coho landings rarely exceeded 500,000 pounds.

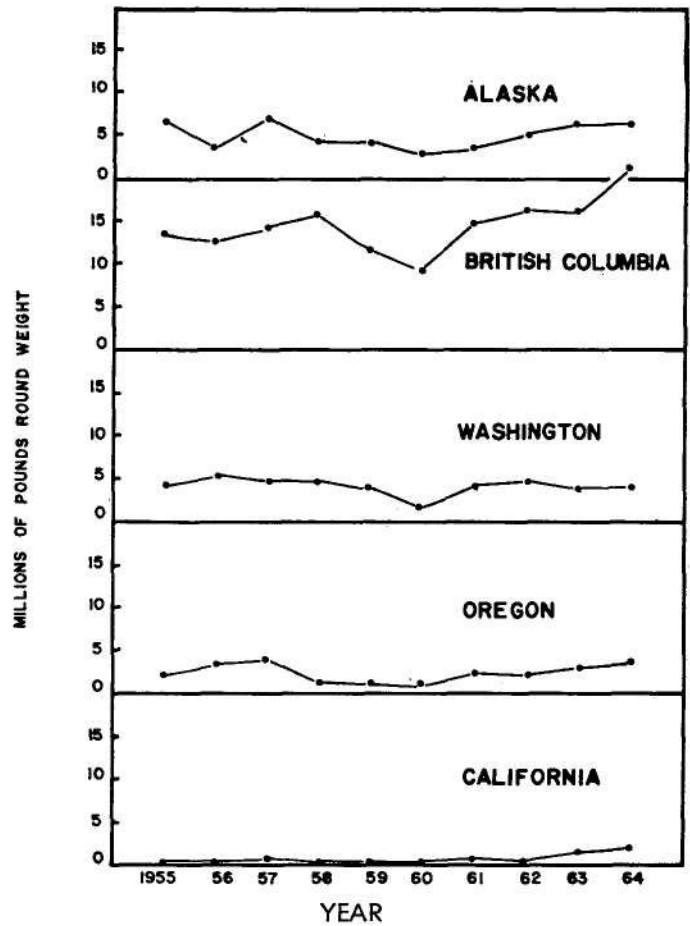


FIGURE 3. Landings of troll-caught coho salmon by area. (1964 data are preliminary.)

STATUS OF THE OCEAN SPORT SALMON FISHERY

Preliminary estimates of 1964 ocean sport salmon landings are not yet available for the entire coast. Descriptions of the various fisheries indicate that landings this year will be at least equal those of 1963 when slightly over 1 million salmon were landed.

Total sport landings increased during the 5-year period 1959-1963 (Figure 4). Coho salmon maintained a 2 to 1 majority over chinook during this period.

To relate sport landings to commercial landings, sport landings have been converted to weight by applying a 10-pound average weight for chinook salmon and a 6-pound average for coho. Annual sport landings (chinook and coho combined) have remained at roughly one-eighth of similar commercial troll landings (Figure 5).

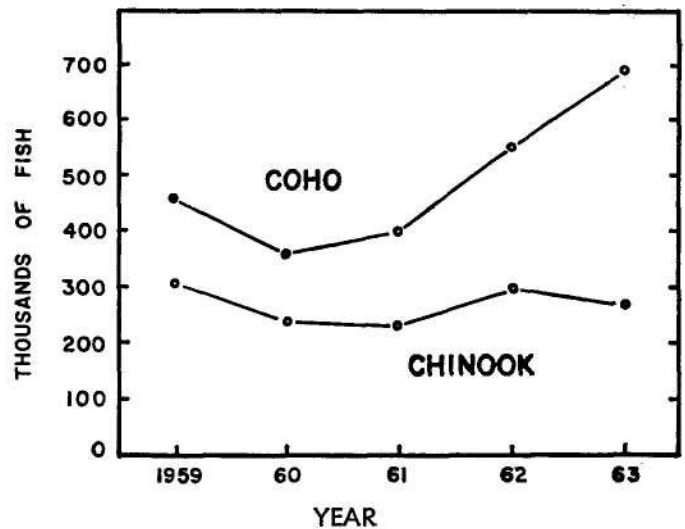


FIGURE 4. Pacific Coast ocean sport salmon landings.

ESCAPEMENT AND INLAND LANDINGS IN 1963

These reports are properly called reports of the status of the fisheries. They are just that. We do not pretend to be making statements of the status of the resource. Admittedly, there is a relationship between salmon landings and the salmon resource—but it can be defined precisely at one point only—zero. When there is no resource, there are no landings.

To illustrate, we shall examine ocean landings and some inland landings and escapement figures for chinook salmon for 1963 (Figure 6). We have good estimates for the ocean fisheries and fairly accurate measures of inland fishery landings and escapements in the Columbia and Sacramento rivers. It is important to recognize, however, that ocean landing figures include salmon from all the spawning streams on the Pacific Coast, not from only the Columbia and Sacramento rivers. We

would be able to more accurately determine the condition of the resource if we could identify, for instance, the Columbia River salmon in these ocean landings.

The 1964 season is now history. We will remember it as a good year—the best in the last decade. However, good landings in 1964 do not guarantee that even average landings will be made in future years. Prediction of future landings requires more detailed knowledge of the resource than we presently have.

Inability to identify salmon stocks at sea is the major obstacle that is now preventing us from making resource status reports rather than historical reviews of fishery landings. More effort should be directed to removal of this barrier to progress.

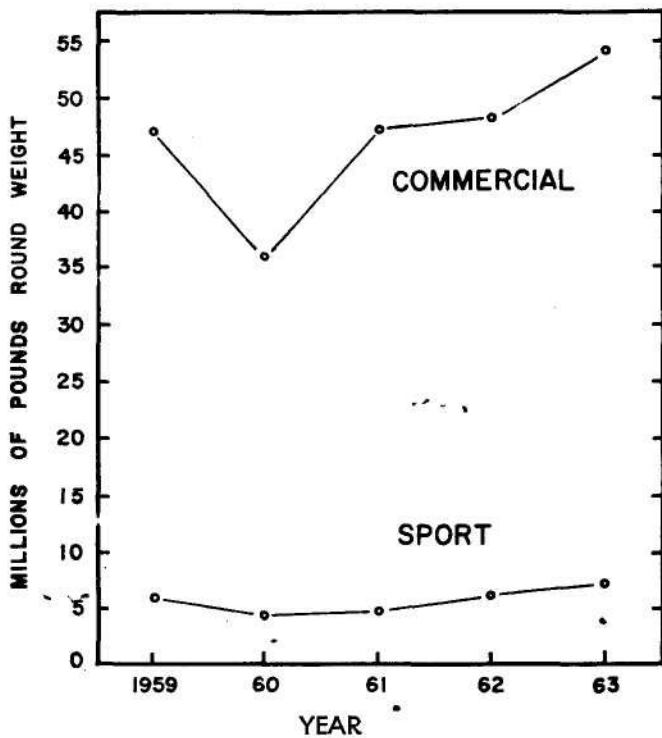


FIGURE 5. Pacific Coast ocean commercial troll and sport landings of chinook and coho combined.

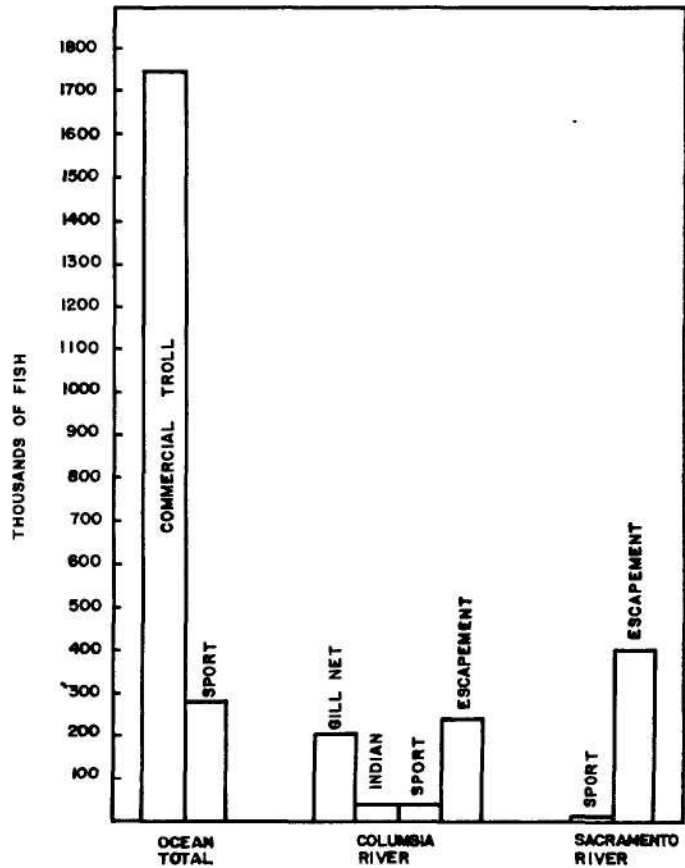


FIGURE 6. 1963 Pacific Coast ocean chinook landings and inland landings and escapements to the Columbia and Sacramento rivers.

STATUS OF THE PACIFIC COAST PINK SHRIMP FISHERY

W. A. DAHLSTROM California
Department of Fish and Game

The combined Washington, Oregon, and California 1964 shrimp landings totaled 6.5 million pounds through September.

Last year's catch of 6.1 million pounds has been exceeded by about 400,000 pounds not including October returns. The average yearly landings for the last 7 years have been 6.1 million pounds. Landings since 1957, when substantial Washington and Oregon fisheries began, have fluctuated widely with a high of 9.9 million pounds in 1958 and lows of 5.0 and 4.9 million pounds in 1960 and 1961 (Figure 1).

Increased landings were due largely to increased catches in Oregon in 1962, 1963, and 1964. Washington landings have continued to decrease since 1958. California landings increased in 1963 but declined in 1964 (Figure 2).

Washington

The disappointing 1964 Washington pink shrimp season with landings of only 314,000 pounds for the year, began with one landing in late April. Fishing continued almost entirely off the Oregon coast until July when two boats operated off Grays Harbor. Fishing success decreased rapidly and August landings were very low.

No further landings have been made as of mid-September, so additional shrimp landings of consequence are not expected. Nearly two-thirds of the catch has been taken off the Oregon coast. The lowest previous catch occurred in 1963 when 956,105 pounds were landed. Reduced landings in 1963 were primarily due to lack of demand. The 1964 low has reflected both economics and scarcity of shrimp. July was the only

month during which shrimp were located in commercial quantities off Washington. The 1961-year class continued to be dominant and the 1962-year class continued to be poorly represented in the Grays Harbor area samples. Recruitment of the 1963-year class also appears to be very poor, therefore, the outlook for the 1965 season is poor. We can anticipate poor fishing off Washington until a sizeable year class appears, unless the 1963 group was missed because of the reduced fishery and the small number of samples in 1964.

Oregon

Oregon landings totaled 5.1 million pounds through September 1964. This represents a 68 per cent increase over the record 1963 total landings of 3.1 million pounds. About 78 per cent of the 1964 total was landed in the Coos Bay area.

Of the 4.0 million pounds landed there, about 55 per cent came from off Coos Bay and about 45 per cent were captured

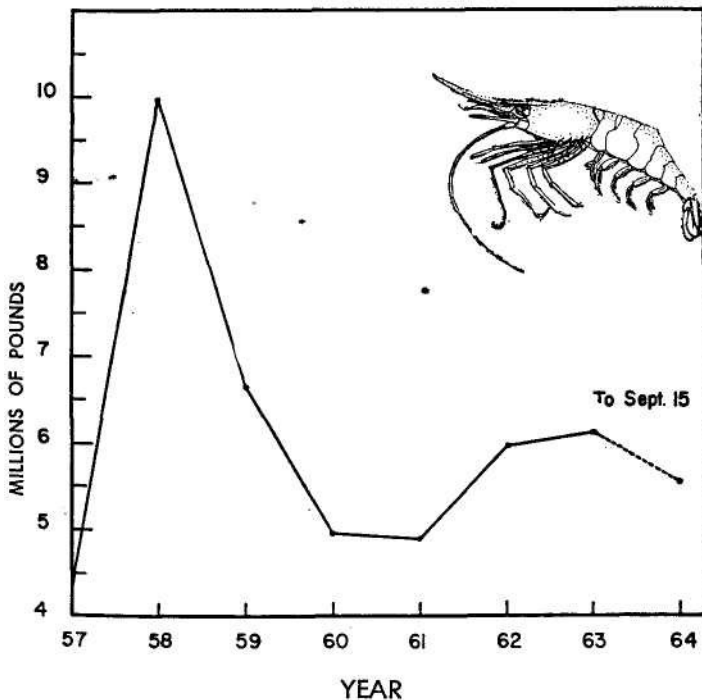


FIGURE 1. Total shrimp landings: Washington, Oregon and California combined.

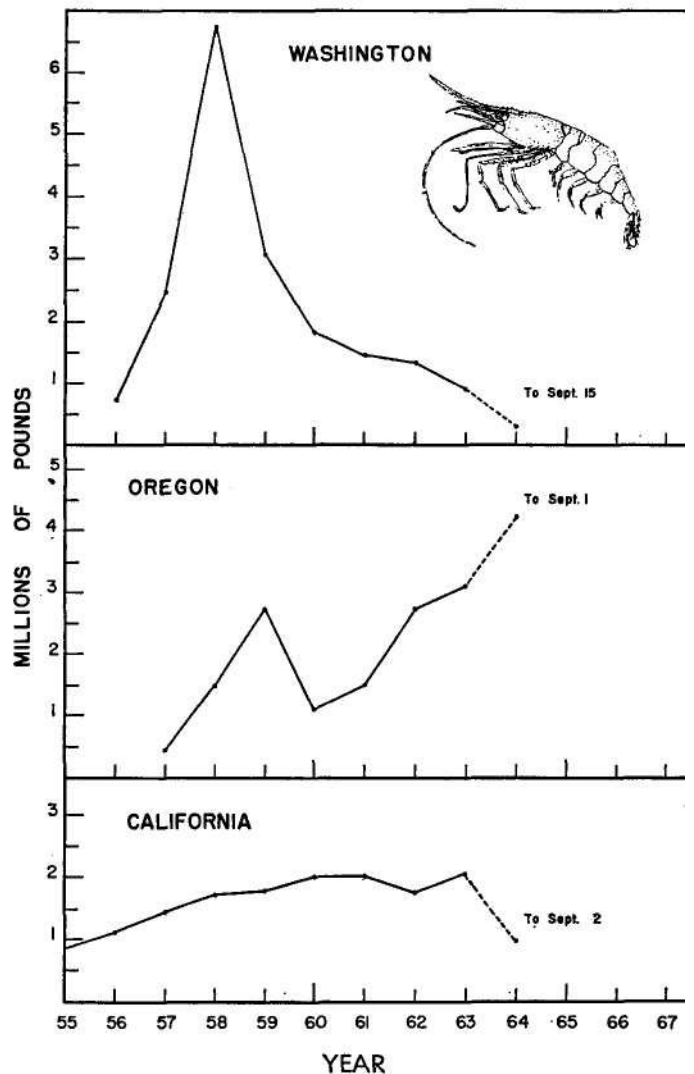


FIGURE 2. Shrimp landings by state.

between Bandon and Cape Blanco farther south. Small landings from the Coos Bay area were also made at Winchester Bay. The remainder of the landings were made at the ports of Warrenton, Newport, Port Orford, and Brookings. The overall catch per hour tow exceeded the 1963 rate in all areas.

The Warrenton landings in 1964 were lower than in 1963 due to a depressed market for machine-processed shrimp. Indications are that the populations fished by the Warrenton and Astoria vessels are as abundant as in 1963 when 1,075,000 pounds were landed.

The Brookings landings are down from 1963 largely because two of the three Brookings vessels enjoyed exceptionally good fishing in the Coos Bay area most of the year. The apparent "bumper crop" of shrimp, particularly the 1961-year class off Coos Bay, and the poor crab season together with relatively scarce shrimp stocks off California, caused a number of northern California vessels to fish shrimp in the Coos Bay area in 1964. This effort was largely responsible for the record landings there. An exceptionally good market for hand-peeled shrimp combined with abundance off Oregon has also led to the development of new shrimp industries at Port Orford, Winchester Bay, and Newport. In 1964 a total of 28 vessels landed shrimp in Oregon; 22 of these landed at Coos Bay.

Status of the Oregon shrimp stocks in 1964 was very good. Overall catch per effort was a record 642 pounds per hour as opposed to 549 in 1963 and 432 in 1962. The record Coos Bay fishery had a catch rate of 654 pounds per hour, and Port Orford had a 900 pounds per hour rate. Age compositions of the northern Oregon stocks and those off Coos Bay and Cape Blanco were dominated by the 1961-year class. Samples at Coos Bay indicated 60 per cent of the catch was from this year class.

It is estimated that the total 1964-Oregon landings will be between 5.1 and 5.5 million pounds. Because the very large 1961-year class probably will be no longer available to the

fishery by 1965 and the strength of the succeeding 1963- and 1962-year-classes appears to be only average, the prospects for 1965 do not appear to be as good as those of 1964. However, we believe that there is a very strong 1964-year class. If survival of these shrimp-of-the-year is good, the 1965-Oregon season could be good.

California

California landings for the season totaled 980,000 pounds. Last season 2,090,000 pounds were landed. The Area A quota of 1,000,000 pounds was surpassed on August 29 when the area was closed. Landings at Brookings, Oregon, of 166,800 pounds of shrimp caught in Area A, were included in the quota. California landings from Area A totaled 944,000 pounds.

Surveys conducted prior to and during the season revealed that the shrimp stocks were considerably reduced in all areas. The California Fish and Game Commission, acting upon recommendations by the Department of Fish and Game, reduced the Area A quota from 2,000,000 to 1,000,000 pounds.

The catch per hour based on 858,000 pounds landed in Area A was 524 pounds. In 1963 landings from this area totaled 1,860,000 pounds with a catch per hour rate of 488 pounds.

Landings in Areas B-1 (Ft. Bragg) and B-2 (Bodega Bay) 710 and 35,000 pounds respectively. The catch per hour rate for the Area B-2 landings was 207 pounds. In 1963, in these areas, respectively, 27,000 and 204,000 pounds were caught.

Sampling of the shrimp in all areas reveals that the representation of the 1962- and 1963-year classes has not been strong. This accounts for reduced population size. On the encouraging side, is the very strong showing of the 1964-year class (0-age group) in Areas A and B-1. These shrimp will become catchable and marketable in 1965.

Appendix 2 to the 1964 Annual Report

SPECIAL REPORTS

THE PEND OREILLE LAKE KOKANEE FISHERY

JERRY MALLET Idaho Fish and
Game Department

(Introduction supplied by James C. Simpson who presented the paper verbally at the annual meeting.)

For those of you who may not be familiar with Pend Oreille Lake and the type of fishery it produces, I would like to say that Pend Oreille Lake is a large inland body of water having a shoreline of approximately 125 miles, located in Bonner County in the northern portion of Idaho. The lake, at least local people say, gets its name from the French meaning, "ear-shaped." The Clark Fork River flows from Montana into the lake. The Pend Oreille River flows from the lake to the Columbia River.

It may be interesting to note why we developed some statistics on Pend Oreille Lake. Beginning in the 1950's the Corps of Engineers and a private utility were each granted permission to construct a dam on the lake. Washington Power Company, the private utility, constructed a dam on the Clark Fork River and the Corps of Engineers constructed one on the Pend Oreille River. Both dams were constructed simultaneously and both went into operation at about the same time. In order to assess the effects of these two projects upon the fisheries of the lake, which for sport and commercial fishing in an inland lake, I think, are rather large, we put into effect a management program designed to gather catch statistics. The program started in 1954 and we have gathered statistics each year since. Because of the importance of this fishery to the economy of the area, we will probably continue to gather statistics for some time to come.)

Kokanee first appeared in Pend Oreille Lake about 1933, probably from stock that had moved down the Clark Fork River from Flathead Lake in Montana. The sport fishery for

Kokanee was well developed by the early 1940's and Pend Oreille Lake has supported a commercial fishery since 1945. The commercial season extends from January 1 through May 31 each year with the kokanee being taken by handlining. Kokanee are of major importance to Pend Oreille Lake since they comprise from 90 to 98 percent of the total catch annually.

Kokanee utilize both the shoreline areas and tributaries of Pend Oreille Lake for spawning. The majority of the fish spawn in their 5th year of life when they are approximately 10 V£ to 11¹/₂ inches in length. Spawning takes place in late November and early December with fry generally emerging from the gravel during April.

During the last 10-year period (1954-1963) the kokanee catch in Pend Oreille Lake has varied from a low of 650,375 to a high of 1,261,943 fish with an average annual catch of 991,617 (Table 1). The number of anglers seeking kokanee (sport and commercial combined) has averaged 61,336 for this period with a range of 44,000 to 80,604.

The commercial catch has varied from a low of 217,134 to a high of 543,504 kokanee with an average of 389,347. The number of commercial anglers averaged 4,828 per year with a range of 2,919 to 7,991. Commercial anglers comprised 7.9 per cent of the total anglers and took 39.3 per cent of the total kokanee harvest.

Fishing success has varied from 2.3 to 3.7 kokanee per hour for all anglers and 10.0 to 22.3 kokanee per hour for commercial anglers.

The harvest has been relatively stable throughout the 10-year period with the lows resulting from weak year classes and/or inclement weather during the fall sport fishery.

TABLE 1
Kokanee Harvest and Catch Rates for Pend Oreille Lake from 1954-1963

Year	Total catch	Commercial catch	Total number anglers seeking kokanee	Commercial anglers	Kokanee caught per hour	
					All anglers	Commercial anglers
1954	1,232,916	543,504	80,604	7,991	2.9	11.4
1955	650,375	240,273	53,440	4,002	2.4	10.0
1956	1,092,651	429,265	69,372	4,375	2.3	14.8
1957	751,113	217,134	55,713	2,919	2.9	12.3
1958	1,197,076	473,212	73,416	6,059	3.6	12.6
1959	1,261,943	452,847	57,768	3,472	3.7	22.3
1960	1,038,200	440,588	57,891	5,181	3.2	13.4
1961	991,595	429,232	65,158	5,286	2.6	11.9
1962	650,960	292,074	44,000	4,369	2.6	10.5
1963	1,049,339	375,371	56,000	4,628	3.3	12.2
Total	9,916,168	3,893,500	613,362	48,282		
Mean	991,617	389,350	61,336	4,828		

AN EVALUATION OF THE PUNCH CARD METHOD OF ESTIMATING THE SALMON-STEELHEAD SPORT CATCH IN OREGON¹

LYLE D. CALVIN
Oregon State University

Sport anglers fishing for salmon or steelhead in Oregon waters are required to obtain a punch card in addition to an Oregon fishing license. For each salmon or steelhead caught, the angler is required to remove a punch from the card and record the date, river and type of fish. The angler is instructed to return the punch card to the Oregon Game Commission by July 1 of the following year. Unfortunately only about 30 per cent of the anglers comply with this request.

The purpose of the punch card is to furnish the Game Commission with a measure of the sport catch, including the ocean take. Estimates of total catch and estimates by river and month are computed by simple expansion methods, subject to the following assumptions:

- (1) The average catch per angler not returning a punch card is the same as the average catch per angler returning a card.
- (2) For salmon and steelhead rivers in Oregon, the average catch on a given river per angler not returning a punch card is the same as the average catch on that river per angler returning a card.
- (4) For each fishing month during the year, the average catch per angler not returning a punch card is the same as the average catch per angler returning a card.
- (4) Anglers accurately report on their punch cards the month and river of catch.
- (5) Anglers report their total catch.

This study is concerned with the validity of the first three assumptions, the possible bias resulting from the failure of the assumptions, and improved methods of estimation. A complete report is given by Hicks and Calvin.² ■ •

Methods

Data for this investigation were obtained by means of a sample survey of Oregon anglers during 1961. A double return postcard was sent each month to a sample of eligible anglers requesting one month's fishing information. Figure 1 shows a questionnaire which the angler was asked to complete and return. Nearly 16,000 anglers' names were drawn systematically by the Oregon Game Commission from the carbon copies of licenses in the month following their purchase. Only those anglers purchasing a punch card at the same time they purchased a fishing license (about two-thirds of those ultimately purchasing a punch card) were included in the sampling.

Anglers not responding to the initial questionnaire were

sent a first reminder, and if necessary a second reminder. A telephone follow-up was used for those still not responding, and a personal interview when contact could not be made by phone. Overall response was 86 per cent.

Estimates of catch rates were computed from questionnaire data for anglers returning their punch card and for anglers not returning their punch card. By comparing these catch rates, it was possible to study the assumptions listed above and to develop improved methods of estimating the salmon-steelhead catch.

Results

Estimates of annual catch rates, expressed as average number of fish caught per angler, are shown in Tables 1, 2 and 3. In addition to the catch rates by type of angler and river and their standard errors, the ratio of catch rate for anglers not returning their punch card to catch rate for anglers returning their punch card is also given. A ratio less than 1.00 indicates that anglers not returning their punch cards caught fewer fish than anglers returning cards, whereas a ratio greater than 1.00 indicates that anglers not returning their punch cards caught at a higher rate.

SALMON-STEELHEAD SURVEY						
Did you fish for salmon or steelhead during February 1961? Yes <input type="checkbox"/> No <input type="checkbox"/>						
If yes, please fill in the information below for days fished.						
Feb.	Check (✓) days fished	If you were fishing ...		Check (✓) if you caught fish	If you caught fish, how many ...	
		... on a river, which river?	... on the ocean, near which river?		Salmon	Steelhead
Wed. 1						
Thu. 2						
Fri. 3						
Sat. 4						
Sun. 5						
Mon. 6						
Tue. 7						
Wed. 8						
Thu. 9						
Fri. 10						
Sat. 11						
Sun. 12						
Mon. 13						
Tue. 14						
Wed. 15						
Thu. 16						
Fri. 17						
Sat. 18						
Sun. 19						
Mon. 20						
Tue. 21						
Wed. 22						
Thu. 23						
Fri. 24						
Sat. 25						
Sun. 26						
Mon. 27						
Tue. 28						

Please detach and mail TODAY. THANK YOU.

FIGURE 1. Double return postcard questionnaire.

TABLE 1
Estimated 1961 Annual Catch Rates

	SALMON			STEELHEAD		
	Anglers not returning punch cards	Anglers returning punch cards	Catch rate ratio	Anglers not returning punch cards	Anglers returning punch cards	Catch rate ratio
Catch rate.....	1.125	1.781	.632	.722	.934	.774
Standard error.....	.047	.123	.061	.041	.106	.143

¹Project supported by funds from Oregon Game Commission.
²Ronald H. Hicks and Lyle D. Calvin, *An Evaluation of the Punch Card Method of Estimating Salmon-Steelhead Sport Catch*, Oregon Agricultural Experiment Station Technical Bulletin 81, November, 1964.

TABLE 2
Estimated 1961 Annual Catch Rates by Type of Angler

Type of Angler	SALMON			STEELHEAD		
	Anglers not returning punch cards	Anglers returning punch cards	Catch rate ratio	Anglers not returning punch cards	Anglers returning punch cards	Catch rate ratio
Resident combination						
Catch rate.....	1.567	2.319	.676	1.040	1.036	1.004
Standard error.....	.091	.104	.079	.046	.034	.188
Resident angler.....						
Catch rate.....	1.116	1.895	.589	.670	.949	.706
Standard error.....	.081	.066	.089	.098	.024	.157
Juvenile angler.....						
Catch rate.....	.978	1.016	.963	.781	.098	7.934
Standard error.....	.074	.146	.149	.411	.182	.559
Daily angler plus five-day vacation angler						
Catch rate.....	.616	.847	.727	.179	.310	.578
Standard error.....	.064	.137	.184	.011	.041	.284
All other anglers						
Catch rate.....	1.604	1.119	1.434	2.261	.572	3.952
Standard error.....	.282	.319	.250	.287	.141	.523
All anglers except daily and vacation anglers						
Catch rate.....	1.356	1.952	.694	.910	1.048	.868
Standard error.....	.062	.143	.061	.057	.125	.157

TABLE 3
1961 Annual Catch Rate Estimates for Several Oregon Waters

Water	SALMON			STEELHEAD		
	Anglers not returning punch cards	Anglers returning punch cards	Catch rate ratio	Anglers not returning punch cards	Anglers returning punch cards	Catch rate ratio
Ocean						
Catch rate.....	.725	1.054	.688	.018	.016	1.137
Standard error.....	.046	.031	.045	.063	.066	.414
Columbia						
Catch rate.....	.093	.204	.458	.065	.152	.426
Standard error.....	.049	.014	.092	.083	.013	.450
All other rivers combined						
Catch rate.....	.306	.524	.685	.640	.766	.835

From Tables 2 and 3, it is apparent that catch rates and their ratios are not the same for all types of anglers and rivers. Further breakdowns not shown here also show differences by fishing month. Table 4 illustrates large differences in catch rate ratios by river, indicating that the use of a common equation to estimate the catch for individual rivers from punch card data will result in considerable error.

Table 1 shows an appreciable bias (ratio = .63 rather than 1.00) due to non-response of punch cards on the part of a large proportion of the anglers fishing for salmon. The bias on the part of the steelhead anglers is not as large but still considerable. To adjust for this bias in the estimate of the total catch of salmon or steelhead, the following equation can be used:

$$T = C \left(1 + R \frac{M}{N} \right)$$

where

T = Estimate of total catch for year

C = Catch for year as reported on returned punch cards

R = Catch rate ratio, as estimated in this survey

M = Number of anglers not returning punch cards

N = Number of anglers returning punch cards

TABLE 4
Ratios of Estimated Annual Catch Rates for
Various Oregon Rivers

River	CATCH RATE RATIO	
	Salmon	Steelhead
Alsea	1.407	1.181
Columbia .....	.458	.426
Coos .....	.215	5.478
Deschutes .....	.159	4.374
Nehalem .....	.482	1.189
Nestucca .....	.654	.696
Pacific-Ocean .....	.688	1.137
Rogue River	4.995	3.096
Siletz .....	.110	.298
Siuslaw .....	.743	.493
Umpqua	2.284	.740
Willamette	1.318	5.765
Wilson .....	.550	.768

This equation utilizes only information which is available to the Game Commission each year. Other estimating equations, using other information such as punch card return by type of angler, might give greater precision; however, such information is not immediately available under present operating procedures and would be more costly to obtain. The equation given above assumes that the return of punch cards by anglers of different types is proportional to their numbers in the total angling population. There is some evidence that this assumption is not completely satisfied, although the disproportionality does not appear great enough to adjust for, considering the low precision of estimates of return by angler type. If accurate data were available, however, a modified estimating procedure could be used.

There is the possibility, or likelihood, that the catch rate ratio will not remain constant in future years, thus invalidating future estimates of total catch. To check on this, it is recommended that smaller follow-up studies be continued.

Summary

Past estimates of catch from data obtained from the salmon-steelhead punch cards have assumed that anglers not returning punch cards had the same average catch rate as anglers returning their cards. This assumption is shown to be invalid, with salmon anglers not returning cards catching only 63 per cent as many salmon per angler as those who return their cards. Steelhead anglers not returning cards catch 77 per cent as many steelhead as those returning cards. Furthermore, these percentages also differ by type of angler, river of catch, and fishing month.

An equation is given which permits adjustment for the bias due to non-response of a portion of the punch cards. This equation is presently being used to obtain better estimates of the sport catch of Oregon salmon and steelhead.

CALIFORNIA-OREGON COOPERATIVE CRAB TAGGING STUDY

TOM JOW

California Department of Fish and Game

The fishery for the market crab (*Cancer magister*) off northern California and southern Oregon is an important one for both states. In order to gain additional information on the population structures, migrations, and mortalities of crabs in this area, a cooperative crab tagging experiment was conducted by the California Department of Fish and Game and the Oregon Fish Commission. Tagging was accomplished aboard the California research vessel N. B. SCOFIELD during cruise 62-S-8 between November 28 and December 10, 1962.

Materials and Methods

Legal-size male crabs captured with commercial crab traps were marked with Petersen disc tags at the lateral margin of the carapace. A 14-inch power drill and 3/32-inch bit were used to facilitate tag attachment with stainless steel pins. Crab sizes, tag numbers, and release locations were recorded.

We had planned to tag and release 1,000 crabs in Pelican Bay near Brookings, Oregon and another 1,000 off California between the Klamath River and Big Lagoon. Due to inclement weather and crab scarcity only 825 crabs were tagged and released in depths between 10 and 17 fathoms off Brookings and 76 tagged crabs were released off the Klamath River in depths between 13 and 22 fathoms.

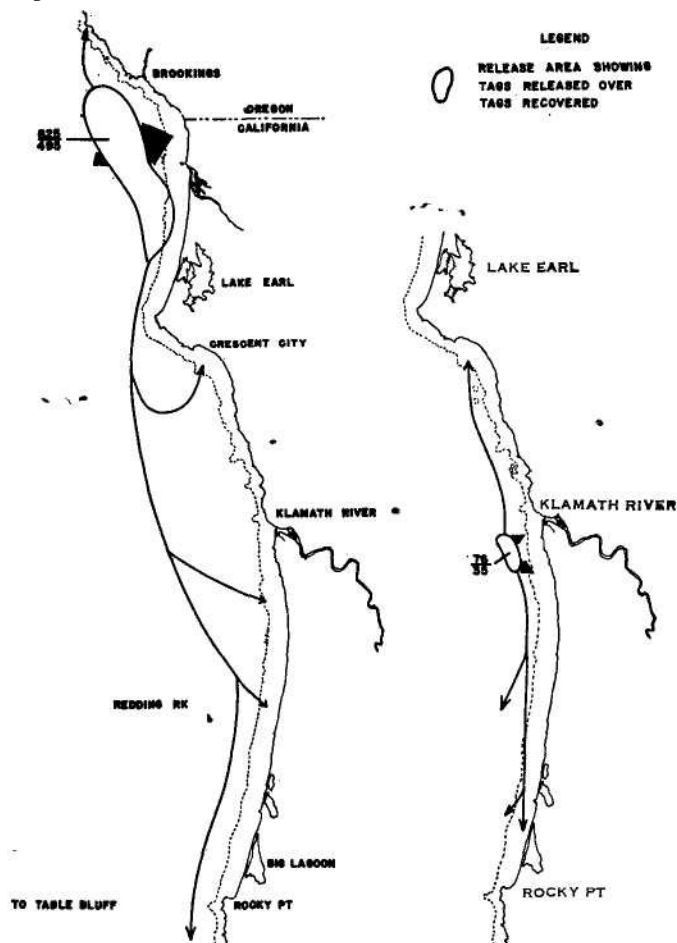


FIGURE 1. Diagrammatic movements of the market crabs released during December, 1962.

Tag return envelopes and tag data sheets were made available to fishermen and dealers. The ports of Brookings, Oregon and Crescent City, California were visited regularly by biologists to recover tags.

Results

A total of 526 tags were returned during the period from December 1962 through July 1963. Four were returned during December of 1963. One additional tag was returned with the year of recovery uncertain.

Movements

Of the 825 crabs released in Pelican Bay off Brookings, 438 were returned with useable information. Most (95 per cent) were retaken near release sites in the bay. One moved 12 miles north to Thomas Creek. Three were recovered off Crescent City and 17 were retaken between the Klamath River and Big Lagoon. One traveled 70 miles south to Table Bluff (Figure 1).

Thirty-three of the 76 crabs released off the Klamath River were returned with catch information. Twenty (57 per cent) had moved slightly inshore from the release site. Two were recaptured off Crescent City and 10 were recovered between Redding Rock and Big Lagoon (Figure 1).

During this experiment several crabs traveled from the Pelican Bay area south to recovery locations between Crescent City and Table Bluff. None of the tagged crabs released off the Klamath River moved northward to Pelican Bay. Tagged crabs released in areas between Eureka and the Klamath River in previous experiments of 1956 and 1958 (Dahlstrom and Jow, unpublished data) were recovered off Brookings and other southern Oregon locations.

Crab Population in Study Area

There are no physical barriers between southern Oregon and northern California to hinder crab movement. This and previous experiments have demonstrated that crabs move between states in both directions. It is evident that a single crab population exists off northern California and southern Oregon.

Mortality and Survival Rates T 962-1963

Returns from successive bi-monthly periods of the 1962-1963 season of 414; 88; 14; and 10 tags were used to estimate survival and mortality rates for legal-size crabs. The logarithms of numbers of recoveries by periods were plotted and an unweighted survival rate was estimated from the slope of the line. The slope of $-.565$ log units per period corresponds to a bi-monthly survival rate of $\text{antilog } 1.435$ or 27 per cent (Figure 2). The survival rate computed from the regression line differs from the weighted survival rate computed from ratios of tag recoveries during successive bi-monthly periods as follows:

$$\hat{s} = \frac{R_2 + R_3 + R_4}{R_1 + R_2 + R_3} = \frac{88 + 14 + 10}{414 + 88 + 14} = .21$$

Since there is a poor fit of the regression line to the points of the logs of return numbers and the two calculated survival rates are not in close agreement, there are probably differences in survival from period to period. Therefore, these rates and subsequent calculations should be accepted with caution.

Using the former survival rate of .27 and following methods outlined by Ricker (1958) bi-monthly mortality rates were estimated. Seasonal rates were obtained by expanding the bi-monthly rates.

Male legal-size crabs	Bi-monthly	Seasonal
Survival .....	.27	.006
Total Mortality .....	.73	.994
Mean Rate of Exploitation .....	.43	.586
Expectation of Natural Death .....	.30	.408

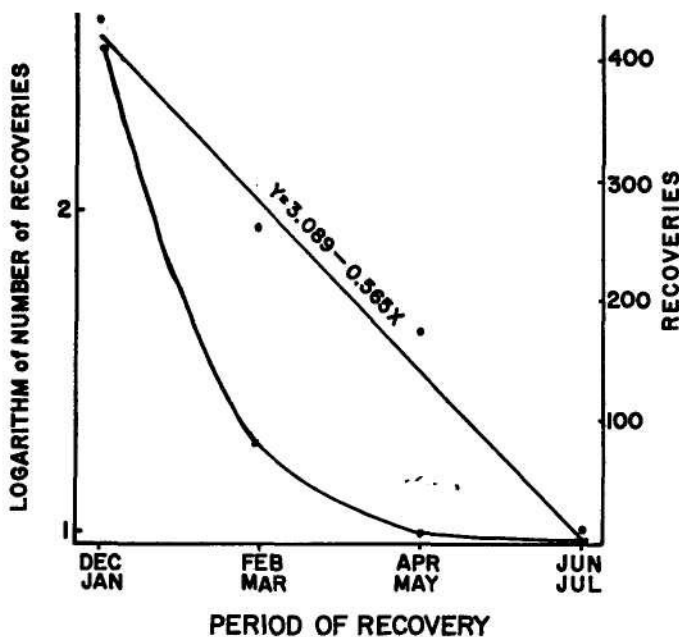


FIGURE 2. Logarithms of numbers of tag recoveries (straight line) and numbers of tag recoveries of crabs released off southern Oregon and northern California, December, 1962.

Incomplete tag returns are a source of error which affects the estimate of fishing rate but not estimates of total mortality or survival. Judging from previous crab tagging (Cleaver 1949) a minimum non-return of 25 to 30 per cent can be expected. Correcting for 30 per cent unreported tags, the seasonal mean rate of exploitation would be 84 per cent. The corresponding expectation of natural death would be 15 per cent. In other words, 84 per cent of all marketable male crabs were caught during the 1962-1963 season and 15 per cent met natural deaths leaving 1 per cent survivors.

Fishing mortality appears to be related to abundance of crabs. During years of scarcity, fishing removes a high percentage while during years of abundance the effect of fishing is not as great. For example, during the 1956-1957 season when 10 million pounds of crabs were landed in northern

California, 32 per cent of crabs tagged were returned (Dahlstrom, unpublished data). This is considerably lower than the 58.6 per cent tag recovery during 1962-1963 when less than 1 million pounds of crabs were taken off northern California,

Summary

During late November and December of 1962, Oregon and California biologists cooperatively tagged and released 901 crabs off northern California and southern Oregon to gain additional knowledge on population structures, migrations, and mortalities.

In the same season 526 tags were recovered. Four were returned during the 1963-1964 season. Coastal migration patterns were not evident although a seasonal inshore movement occurred. Most crabs were caught short distances from release areas. The longest distance traveled by a crab was 70 miles from Pelican Bay to Table Bluff.

A common stock of crabs is exploited by fishermen of both states.

Mortality and survival rates were calculated from the returns. Adjusted seasonal rates, assuming 30 per cent non-response, are:

Survival .....	.006
Total Mortality .....	.994
Mean Rate of Exploitation .....	.84
Expectation of Natural Death .....	.15

Virtually all marketable crabs suffered mortality during the 1962-1963 season. Mortality may be related to crab abundance. High mortality from fishing occurs during years of low abundance while lower fishing mortality occurs during years of high abundance.

Since a single crab population off northern California and southern Oregon is exploited by fishermen of both states, similar management principles should be applied.

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IDENTIFICATION OF *Cancer magister* LARVAE

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Life history studies of *Cancer magister*, the market or Dungeness crab, have been in progress for more than 70 years on the Pacific coast, but research on larval stages has been limited because of the difficulty identifying zoeae taken in plankton samples and an inability to rear larvae in the laboratory. Within the past few years techniques have been developed which permit the rearing of marine invertebrates under controlled laboratory conditions. These developments provide a basis for accurate descriptions for use in identification of larvae obtained in plankton.

During the first several months of this year we were successful in rearing market crabs from hatching through all larval stages to the first crab. This study was made at the California Department of Fish and Game Laboratory, Menlo Park. Ovigerous females were taken in traps off San Francisco in December 1963. These females with dark brown egg masses near hatching were transported to the laboratory and placed in a 50-gallon fiberglass tank of sea water maintained at 51°F. by a cooling table. Water was obtained from Steinhart Aquarium, San Francisco where salinities ranged from 26‰ to 30‰ from January to May, respectively. The largest hatch of larvae occurred on January 6. These larvae were first placed in small containers of 175 ml capacity, 6 larvae per compartment, and maintained in the cooling table at 51°F. Water was changed every other day and recently hatched nauplii of the brine shrimp, *Artemia salina*, were added at this time. Fungal and bacterial growth caused heavy mortality; antibiotics were introduced to reduce bacterial activity. Five gallons of water were treated with 250,000 units of penicillin G and 2,500 mg of streptomycin sulphate the day before the water was used to allow the antibiotics time to mix thoroughly with the water. For detailed study, larvae were fixed at known intervals and exuviae were removed from the holding compartments and preserved.

Identification of Zoeae

Positive identification of zoeae is extremely difficult because of the lack of good diagnostic characteristics and the size of the larvae. External characters such as the dorsal spines, rostrum, lateral spines, chromatophore patterns, the telson, and size of the larvae are used as a means of family and specific recognition. These characteristics alone, however, are not always sufficient to positively identify, to species, the great variety of zoeae found in the ocean. It thus becomes necessary to dissect the zoeae and count spines on various appendages to development. The maxillule and maxilla of *Cancer* crabs show specific differences (Figures 1-6), and in *Cancer magister* the maxillule can be used in segregating larval forms (Figures 7-12).

The complete larval development of *Cancer magister* consists of five zoeal stages and one megalop stage. All larvae emerge from eggs as first-stage zoeae, no pre-zoeal stage was observed. The 5 zoeal stages lasted 18.2, 11.2, 13.6, 14.6, and 22.4 days, respectively; the megalop lasted 31 days. I am sub-

mining complete descriptions and illustrations of the larval stages of *Cancer magister* for publication in CRUSTACEANA.

The first zoeal stages of *C. magister*, *C. anthonyi*, and *C. antennarius* were described by Mir (1961) who formulated a key to these species based on the characteristics of the endopodite of the maxillule and the maxilla (Figures 1-6). The distal segment of the endopodite of the maxillule of *C. magister* has six setae and the endopodite of *C. antennarius*, and *C. anthonyi* have four and five setae, respectively. Spinal arrangement on the maxilla also differs for these three species. My study revealed that this setation of the maxillule and maxilla remained unchanged for all five zoeal stages of *C. magister* (Figures 7-11)- Identification and further description thus becomes more feasible for *C. Antennarius* and *C. anthonyi* as does possible identification and description of the other six *Cancer* species found in California waters. Stability in the number of spines on the endopodite of the second maxilliped, the antenna, and the protopodite of the maxillipeds was also noted. The setal formula for the endopodite of the first maxilliped is also constant during the first four stages. These characteristics can be used in a key as additional species characteristics.

The ability to rear larval stages and to identify zoeae in the plankton permits experiments and research on the effects of environmental factors on year class survival. Recently the market crab has received much attention because of record low landings along the entire Pacific Coast. Because the drop in landings is not confined to one area, I feel some change in conditions is the major cause. The effects of many environmental factors to which the marine larvae are subjected is unknown. Were the recent changes in ocean temperature (1957-59) contributory to the failure of the year classes, or were there changes in current patterns which removed crab larvae from suitable growing areas?

Laboratory experiments could be conducted to determine the effect of temperature on larval survival and answer a portion of this question. An endless array of problems relating to larval requirements remains unanswered. Without their solution we must be content with a partial understanding of the many aspects of the larvae and its relationship to the environment.

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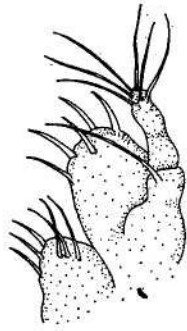


figure 1

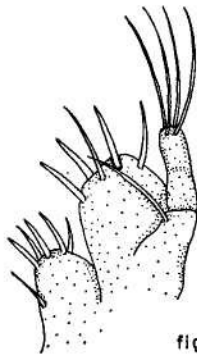


figure 2

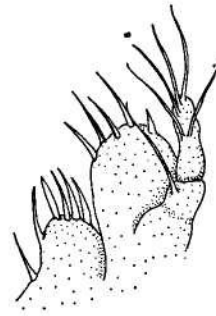


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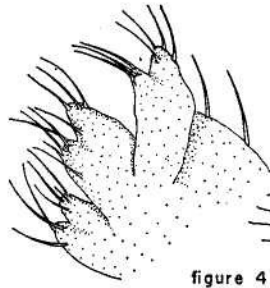


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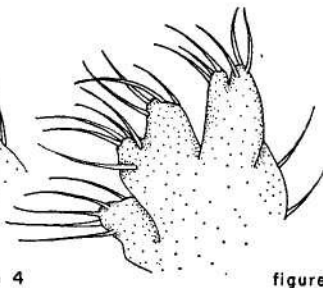


figure 5

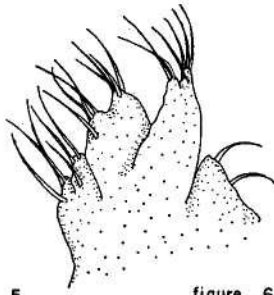


figure 6

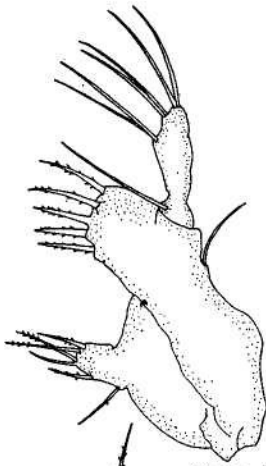


figure 7

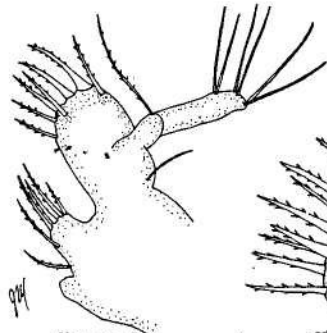


figure 8

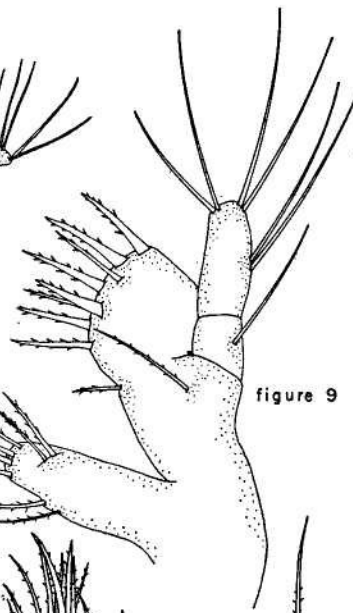


figure 9

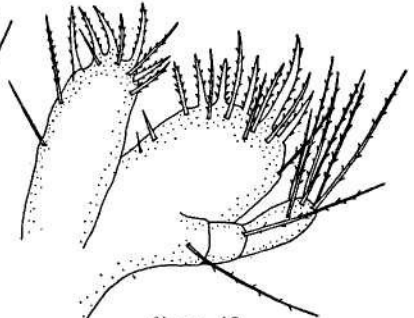


figure 10

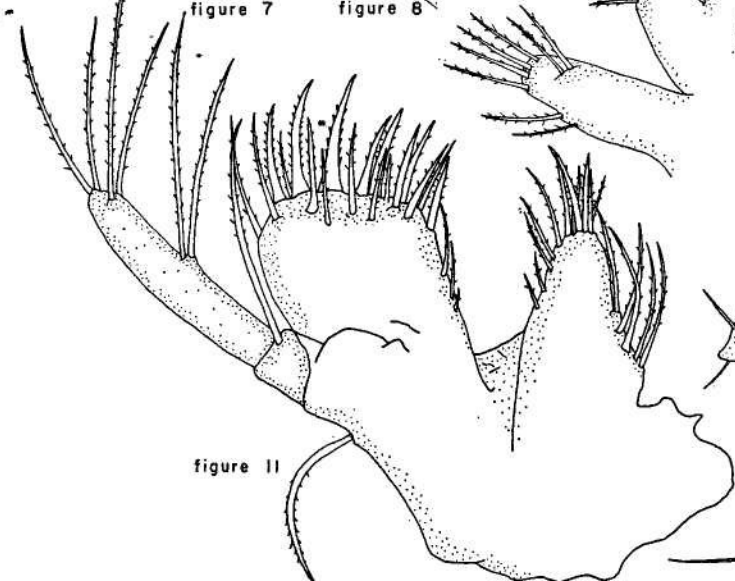


figure 11

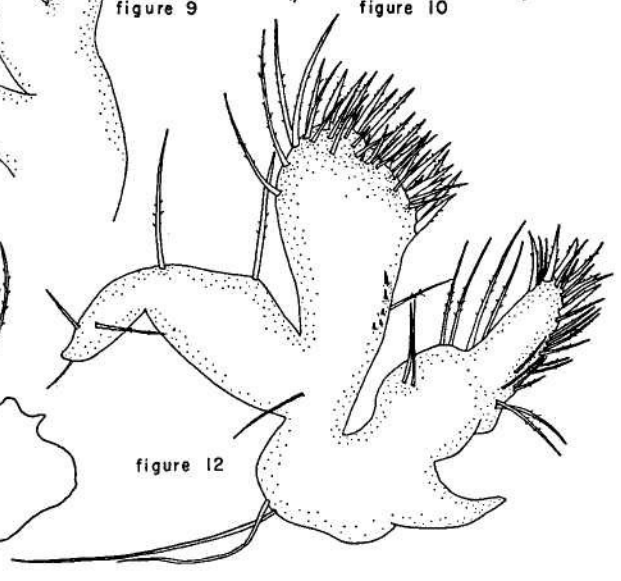


figure 12

SPECIES COMPOSITION OF ROCKFISH (FAMILY SCORPAENIDAE) LANDED BY CALIFORNIA OTTER TRAWL VESSELS, 1962-1963

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The California otter trawl fishery encompasses many species of which rockfishes comprise one of the more important groups. The major rockfish areas prior to 1943 were off central and southern California. This early fishery was conducted primarily by hook and line. Since the introduction of the balloon trawl from Oregon during the latter half of 1943, the major landings of rockfish have been made in central and northern California (Phillips, 1949). During the past 10 years rockfish landings by trawlers have averaged 32.8 per cent of the total trawl fishery landings (Table 1).

Catch records of all species landed in California are submitted to the biostatistical section of the Department. The major portion of the rockfish catch is reported under the general category of rockfish. Records of rockfish by species occur when there is a price differential for a particular species.

In an effort to determine the relative importance of the various species of rockfish landed by trawl vessels, a sampling program was initiated by the trawl investigation in January 1962 and continued through 1963. This program was accomplished incidentally with the major sampling program for flat fish and animal food landings.

Procedures

Landings at Eureka, Fort Bragg, San Francisco, Morro Bay, and Santa Barbara were sampled during 1962 and 1963. In 1963 landings were also sampled at Monterey. The sample unit was the commercial fish box which holds approximately 150 pounds.

Rockfish samples were sorted by species and the total weight of each species was recorded. Landings of shortspine channel rockfish, splitnose rockfish, and Pacific Ocean perch were not sampled as these three species are reported separately from the other rockfish. All sampling data were combined by 3-month periods for each port area and the total pounds by species for each quarter were calculated. The annual species composition for each port area was determined by totaling the

quarterly landings by species, including the landings of shortspine channel rockfish, splitnose rockfish, and Pacific Ocean perch, and calculating the per cent each contributed to the total yearly landings. The species composition of the total California rockfish landings by trawlers was calculated by totaling the poundages by species from all the port areas and calculating the per cent each contributed to the total landings. Twenty-nine species representing five families were encountered during this survey (Table 2). The dominant family in the rockfish landings is Scorpaenidae which represents 25 species. The remaining four families, Gadidae, Carangidae, Anoplopomatidae and Hexagrammidae, each represented by a single species (Table 2), were encountered in the sampling and are included in the total rockfish landings.

SAMPLING RESULTS BY PRINCIPAL PORT AREAS

Eureka

Rockfish landings in the Eureka area have fluctuated around 2 million pounds during the past 10 years with a high of 2.6 million pounds in 1960 followed by a low of 1.5 million pounds in 1961. During the past 2 years landings have increased from 1.6 to 2.5 million pounds, and have made Eureka the leading rockfish port in 1963 (Table 1).

Canary rockfish, shortspine channel rockfish, black rockfish, and bocaccio combined comprised 71.65 per cent of the total rockfish landings in 1962 (Table 3). While in 1963, these same 4 species amounted to 75.69 per cent (Table 4). The remaining 28.35 per cent of the landings in 1962 were composed of 9 species (Table 3), while 8 species in 1963 accounted for the remaining 24.31 per cent of the landings (Table 4).

Fort Bragg

Landings in this port area have decreased from a high of 1.4 million pounds in 1958 to a low of 300,000 pounds in

TABLE 1
Yearly Landings of Trawl-Caught Rockfish & Total Trawl Landings — 1954-1963 (Millions of Pounds)

Year	PORTS						Total	Total Trawl Landings
	Eureka	Ft. Bragg	San Francisco	Monterey	Morro Bay	Santa Barbara		
1954	2.2	0.8	3.0	4.3	0.4	0.1	10.8	35.1
1955	2.4	0.4	1.5	3.9	2.9	0.0	11.1	33.9
1956	2.1	0.9	2.8	4.8	2.3	0.1	13.0	36.0
1957	2.3	1.3	2.7	4.7	2.8	0.3	14.1	37.6
1958	2.2	1.4	4.0	3.8	2.4	0.5	14.3	37.8
1959	2.4	0.9	4.8	3.0	0.8	0.3	12.2	35.2
1960	2.6	0.6	3.2	2.7	2.0	0.7	11.8	32.9
1961	1.5	0.6	2.2	2.5	1.1	1.0	8.9	32.8
1962	1.6	0.3	1.9	2.2	1.3	0.5	7.8	31.2
1963	2.5	0.7	2.3	1.9	1.8	0.6	9.8	34.5
Total	21.8	7.9	28.4	33.8	17.8	4.1	113.8	347.0

1962 (Table 1). In 1962, the principal species of rockfish were bocaccio, chilipepper, and canary rockfish. These species comprised 86.69 per cent of the rockfish landed, while the remaining 13.31 per cent included 5 species (Table 3). In 1963, bocaccio and chilipepper were again the leading species and together with splitnose and darkblotched rockfish they comprised 80.10 per cent of the landings of rockfish while 7 additional species accounted for the remaining 19.90 per cent (Table 4).

San Francisco

San Francisco landings of rockfish have fluctuated considerably during the past 10 years reaching a low of 1.5 million

pounds in 1955, after which they increased to a high of 4.8 million pounds in 1959. Landings have decreased from this high in 1959 to a low of 1.9 million pounds in 1962. The 1963 landings increased to 2.3 million pounds (Table 1).

In the San Francisco area, bocaccio and chilipepper accounted for 81.07 and 75.62 per cent of the total rockfish landings during 1962 and 1963, respectively (Tables 3 and 4). The remaining 18.93 per cent in 1962 was composed of 14 species with splitnose and speckled rockfish predominating (Table 3). The remaining 24.38 per cent of the landings in 1963 was composed of 16 species with widow and splitnose rockfish being most representative of this miscellaneous group (Table 4).

TABLE 2
Common and Scientific Names of Species in California Rockfish Landings

Family Gadidae—codfishes and hakes	
Pacific hake— <i>Merluccius productus</i> (Ayres)	
Family Carangidae—jacks, scads and pompanos	
Jack mackerel— <i>Trachurus symmetricus</i> (Ayres)	
Family Scorpaenidae—rockfishes Pacific	
Ocean perch— <i>Sebastes alutus</i> (Gilbert) Brown rockfish— <i>Sebastes auriculatus</i> (Girard) Aurora rockfish— <i>Sebastes aurora</i> (Gilbert) Greenspotted rockfish— <i>Sebastes chlorostictus</i> (Jordan &	Gilbert)
Darkblotched rockfish— <i>Sebastes crameri</i> Jordan Splitnose rockfish— <i>Sebastes diploproa</i> (Gilbert) Greenstriped rockfish— <i>Sebastes elppgatus</i> (Ayres) Widow rockfish— <i>Sebastes entomelas</i> (Jordan & Gilbert) Yellowtail rockfish— <i>Sebastes flavidus</i> Ayres Chilipepper— <i>Sebastes goodei</i> Eigenmann & Eigenmann Shortbelly rockfish— <i>Sebastes jordani</i> Gilbert Cow rockfish— <i>Sebastes levis</i> (Eigenmann & Eigenmann) Black rockfish— <i>Sebastes melanops</i> (Girard) Bfackgill rockfish— <i>Sebastes melanostornus</i> Eigenmann &	Eigenmann
Vermilion rockfish— <i>Sebastes miniatus</i> (Jordan & Gilbert) Speckled rockfish— <i>Sebastes ovalis</i> Ayres Bocaccio— <i>Sebastes paucispinis</i> (yVyres) Canary rockfish— <i>Sebastes pinmger</i> (Jordan & Gilbert) Rosy rockfish— <i>Sebastes rosaceus</i> Jordan & Gilbert Turkey-red rockfish— <i>Sebastes ruberrimus</i> Cramer Flag rockfish— <i>Sebastes rubrivinctus</i> (Jordan & Gilbert) Stripetail rockfish— <i>Sebastes saxicola</i> (Gilbert) Olive rockfish— <i>Sebastes serranoides</i> Eigenmann &	Eigenmann
Whitebelly rockfish— <i>Sebastes vexillaris</i> (Jordan & Gilbert) Shortspine channel rockfish— <i>Sebastolobus alascanus</i> Bean	
Family Anoplopomatidae—sablefishes	
Sablefish— <i>Anoplopoma fimbria</i> (Pallas)	
Family Hexagrammidae—greenlings	
Lingcod— <i>Ophiodon elongatus</i> Girard	

Monterey

Rockfish landings at Monterey during the past 10 years have fallen from a high of 4.8 million pounds in 1956 to 1.9 million pounds in 1963 (Table 1). The 1963 sampling revealed bocaccio, chilipepper, and splitnose rockfish made up 94.01 per cent of the total rockfish landings, while 14 species contributed the remaining 5-99 per cent (Table 4). Phillips (1939) reports bocaccio and chilipepper as the 2 dominant species making up 70.2 per cent of the catch, which at the time was from a hook and line fishery. Heimann (1963) indicates that chilipepper, bocaccio and splitnose rockfish were the dominant species in the rockfish landings of otter trawl vessels during 1960.

Morro Bay

At Morro Bay landings have fluctuated between 400,000 and 2,900,000 pounds during the past 10 years, with the low occurring in 1954 and the high in 1955. During the past 3 years the landings increased from 1.1 million pounds in 1961 to 1.8 million pounds in 1963 (Table 1). Bocaccio was the leading species during 1962 and 1963 contributing 63.56 and 70.55 per cent of the total catch, respectively, while chilipepper accounted for 22.95 and 13.78 per cent of the landings of rockfish during this period (Tables 3 and 4). In 1962 there were 13 species which accounted for the remaining 13.49 per cent of the rockfish landings (Table 3) and in 1963 there were 12 species which accounted for the remaining 15.67 per cent of the landings (Table 4). Heimann and Miller (1960) reported, during August 1957 - September 1958, the leading commercial species of rockfish were bocaccio and chilipepper which made up 98.7 per cent of the total rockfish landings, with bocaccio contributing over 65 per cent of the total.

Santa Barbara

Landings of rockfish from this area have increased from a low of less than 100,000 pounds in 1955 to a high of 1,000,000 pounds in 1961. In 1962 and 1963 the landings were 500,000 and 600,000 pounds, respectively (Table 1). During 1962 and 1963 bocaccio and chilipepper were the dominant species, contributing 87.54 and 92.74 per cent, respectively, of the total rockfish landings (Tables 3 and 4). During 1962 seven species contributed the remaining 12.46 per cent (Table 3) while in 1963 nine species accounted for the remaining 7.26 per cent of the landings (Table 4).

All Port Areas Combined

The 5 predominant species of rockfish in the 1962 rockfish landings, excluding landings from Monterey, were bocaccio (38.41 per cent), chilipepper (23.06 per cent), canary rockfish (10.99 per cent), shortspine channel rockfish (5.60 per cent), and black rockfish (5.12 per cent). The remainder of the landings (16.82 per cent) were made up of 19 other species, of which 18 were of the genus *Sebastes*. The remaining species was lingcod which accounted for 0.48 per cent of the total landings. Bocaccio and chilipepper ranked as the number one and two species, respectively, at all the port areas except for Eureka where canary rockfish, shortspine channel rockfish and black rockfish were the dominant species (Table 5).

During 1963, the 5 major species of rockfish were bocaccio (43.63 per cent), chilipepper (17.78 per cent), canary rockfish

(11.34 per cent), shortspine channel rockfish (5.96 per cent) and splitnose rockfish (4.89 per cent). Twenty-one species comprised the remainder of the 1963 rockfish landings. Of these 21 species, 17 were of the genus *Sebastes* while the remaining 4 were lingcod, sablefish, Pacific hake, and jack mackerel which contributed a total of 0.30 per cent to the total rockfish landings (Table 6).

During the 2 years of this survey, bocaccio and chilipepper comprised more than 60 per cent of the rockfish landed by trawlers and were the dominant species in all port areas except Eureka. Splitnose rockfish replaced black rockfish as 1 of the 5 major species in 1963. This was due to the inclusion of Monterey in the 1963 survey. In an earlier report on trawling in Monterey Bay, Heineman (1963) indicated that splitnose rockfish was third most dominant species in rockfish landings in the Monterey area.

TABLE 3
Trawl-Caught Rockfish by Port Areas, 1962

Species	PERCENTAGES OF PORT AREA LANDINGS				
	Eureka	Fort Bragg	San Francisco	Morro Bay	Santa Barbara
Rockfish					
Bocaccio.....	8.65	41.95	44.56	63.56	48.59
Chilipepper.....	1.15	28.09	36.51	22.95	38.94
Canary.....	31.28	16.65	2.54	0.02	-----
Shortspine channel.....	16.58	9.23	0.62	-----	-----
Black.....	15.14	-----	2.10	-----	-----
Splitnose.....	1.21	1.62	7.66	2.15	0.53
Flag.....	7.49	0.98	-----	1.21	0.10
Darkblotched.....	7.06	-----	0.37	-----	-----
Yellowtail.....	6.10	-----	0.36	-----	-----
Pacific Ocean perch.....	5.21	-----	-----	-----	-----
Speckled.....	-----	-----	3.27	1.13	-----
Widow.....	0.04	0.85	0.60	4.22	-----
Greenspotted.....	-----	-----	0.06	2.35	5.10
Vermilion.....	-----	-----	-----	0.38	3.87
Turkey-red.....	-----	-----	-----	-----	2.27
Brown.....	-----	-----	0.53	0.01	-----
Whitebelly.....	-----	0.83	-----	0.45	-----
Cow.....	-----	-----	0.01	0.31	0.30
Greenstriped.....	-----	-----	0.01	0.20	0.30
Aurora.....	0.08	-----	-----	-----	-----
Blackgill.....	-----	-----	0.03	-----	-----
Rosy.....	-----	-----	-----	0.03	-----
Stripetail.....	0.01	-----	-----	0.01	-----
Miscellaneous					
Lingcod.....	-----	-----	0.77	1.02	-----
Total	100.00	100.00	100.00	100.00	100.00

Summary

1. Rockfish have averaged 32.8 per cent of the total trawl landings during the past 10 years.
2. Bocaccio and chilipepper are the major species landed by trawlers, comprising over 50 per cent of the trawl caught rockfish annually.
3. On a port basis, bocaccio and chilipepper dominate the species at all ports except at Eureka where canary rockfish and shortspine channel rockfish are the dominant species.

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TABLE 4
Trawl-Caught Rockfish by Port Areas, 1963

Species	PERCENTAGES OF PORT AREA LANDINGS					
	Eureka	Fort Bragg	San Francisco	Monterey	Morro Bay	Santa Barbar
Rockfish						
Bocaccio	10.14	30.26	45.90	59.50	70.54	63.43
Chilipepper	0.45	22.58	29.72	24.95	13.78	29.31
Canary	37.32	9.54	4.07	0.05	0.10	-----
Shortspine channel	17.80	5.89	3.97	-----	-----	-----
Splitnose	1.06	16.49	4.59	9.56	2.46	0.10
Widow	0.21	-----	8.79	3.64	1.99	0.05
Darkblotched	9.00	11.40	0.04	-----	-----	-----
Black	10.43	-----	0.11	-----	-----	-----
Yellowtail	9.16	1.70	-----	-----	-----	-----
Speckled	-----	-----	-----	-----	8.32	-----
Flag	1.66	1.98	0.47	-----	0.13	-----
Pacific Ocean perch	2.66	0.07	-----	-----	-----	-----
Greenspotted	-----	-----	0.15	0.22	2.02	2.60
Blackgill	-----	-----	1.37	-----	-----	-----
Cow	-----	-----	0.12	0.97	0.16	0.64
Brown	-----	-----	-----	-----	-----	2.16
Greenstriped	-----	0.09	Trace	0.13	-----	1.36
Vermilion	-----	-----	0.22	-----	0.10	-----
Aurora	0.11	-----	0.02	-----	0.01	-----
Stripetail	-----	-----	0.04	0.03	0.05	0.24
Olive	-----	-----	0.16	-----	-----	-----
Shortbelly	-----	-----	-----	0.06	-----	-----
Miscellaneous						
Sablefish	-----	-----	-----	0.77	0.04	0.01
Lingcod	-----	-----	0.18	0.09	0.30	-----
Jack mackerel	-----	-----	0.07	-----	-----	-----
Pacific hake	-----	-----	-----	0.03	-----	0.10
Total	100.00	100.00	99.99	100.00	100.00	100.00

TABLE 5

California Trawl-Caught Rockfish Landings, 1962
(Monterey Excluded)
(Thousands of Pounds)

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Species	Eureka	Fort Bragg	San Francisco	Morro Bay	Santa Barbara	Total Pounds	% of Total
Rockfish							
Bocaccio	139.0	144.6	847.2	751.5	243.2	2125.5	38.41
Chilipepper	18.5	96.9	694.2	271.3	194.9	1275.8	23.06
Canary	502.4	57.4	48.2	0.2	.....	608.2	10.99
Shortspine channel	266.3	31.8	11.8	.....	.....	309.9	5.60
Black	243.2	.....	40.0	.....	.....	283.2	5.12
Splitnose	19.4	5.6	145.6	25.4	2.6	198.6	3.59
Flag	120.3	3.4	.....	14.3	0.5	138.5	2.50
Darkblotched	113.4	.....	7.1	.....	.....	120.5	2.18
Yellowtail	97.9	.....	6.9	.....	.....	104.8	1.89
Pacific Ocean perch.....	83.7	.....	.....	.....	.....	83.7	1.51
Speckled .....	.....	.....	62.2	13.3	.....	75.5	1.36
Widow	0.7	2.2	11.4	49.9	.....	64.2	1.16
Greenspotted .....	.....	.....	1.1	27.8	25.5	54.4	0.96
Vermilion .....	.....	.....	.....	4.5	19.4	23.9	0.43
Turkey-red .....	.....	.....	.....	.....	11.4	11.4	0.21
Brown .....	.....	.....	10.1	0.1	.....	10.2	0.18
Whitebelly .....	.....	2.8	.....	5.3	.....	8.1	0.15
Cow .....	.....	.....	0.2	3.7	1.5	5.4	0.10
Greenstriped .....	.....	.....	0.2	2.4	1.5	4.1	0.07
Aurora	1.2	.....	.....	.....	.....	1.2	0.02
Blackgill .....	.....	.....	0.5	.....	.....	0.5	0.01
Rosy .....	.....	.....	.....	0.3	.....	0.3	Trace
Stripetail	0.1	.....	.....	0.1	.....	0.2	Trace
Miscellaneous							
Lingcod .....	.....	.....	14.6	12.0	.....	26.6	0.48
Total	1606.1	344.7	1901.3	1182.1	500.5	5534.7	99.98

TABLE 6

California Trawl-Caught Rockfish Landings, 1963
(Thousands of Pounds)

Species	Eureka	Fort Bragg	San Francisco	Monterey	Morro Bay	Santa Barbara	Total Pounds	% of Total
Rockfish								
Bocaccio	257.2	222.1	1036.8	1142.6	1244.1	372.5	4275.3	43.6
Chilipepper	11.4	165.7	671.2	479.2	243.1	172.1	1742.7	17.7
Canary	946.5	70.0	91.8	0.9	1.7	---	1110.9	11.3
Shortspine channel	451.4	43.2	89.6	---	---	---	584.2	5.9
Splitnose	26.8	121.0	103.7	183.5	43.4	0.6	479.0	4.8
Darkblotched	228.3	83.7	0.8	---	---	---	312.8	3.1
Widow	5.4	---	198.5	69.9	35.1	0.3	309.2	3.1
Black	264.5	---	2.5	---	---	---	267.0	2.7
Yellowtail	232.3	12.5	---	---	---	---	244.8	2.5
Speckled	---	---	---	---	146.7	---	146.7	1.5
Flag	42.1	14.5	10.6	---	2.2	---	69.4	0.7
Pacific Ocean perch	67.6	0.5	---	---	---	---	68.1	0.6
Greenspotted	---	---	3.4	4.2	35.6	15.2	58.4	0.6
Blackgill	---	---	31.0	---	---	---	31.0	0.3
Cow	---	---	2.7	18.7	2.8	3.8	28.0	0.2
Brown	---	---	---	---	---	12.7	12.7	0.1
Greenstriped	---	0.7	0.1	2.4	---	8.0	11.2	0.1
Vermilion	---	---	5.0	---	1.7	---	6.7	0.0
Aurora	2.9	---	0.4	---	0.2	---	3.5	0.0
Stripetail	---	---	1.0	0.5	0.9	1.4	3.8	0.0
Olive	---	---	3.6	---	---	---	3.6	0.0
Shortbelly	---	---	---	1.2	---	---	1.2	0.0
Miscellaneous								
Sablefish	---	---	---	14.8	0.7	0.1	15.6	0.1
Lingcod	---	---	4.0	1.7	5.3	---	11.0	0.1
Jack mackerel	---	---	1.6	---	---	---	1.6	0.0
Pacific hake	---	---	---	0.5	---	0.6	1.1	0.0
Total	2536.4	733.9	2258.3	1920.1	1763.5	587.3	9799.5	100.0

OCEAN SPORT FISHERIES

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In 1962 the first Ocean Sport Fisheries research report was presented to the Pacific Marine Fisheries Commission. It appears in the 15 th Annual Report of the Commission. The report included the general results of a 4-year study of all sportfishing effort and catch from Oregon to Pt. Arguello, California and a resume' of non-salmon ocean sportfishing for the Pacific Northwest area reported by biologists from Oregon, Washington, and Alaska.

Since 1962 research on bottomfish in central and northern California has included a life history study of the blue rockfish and routine partyboat and sport skiff sampling from Bodega Bay to Avila. This study will be terminated in 1965 and the results will be presented in 1966. Log data for the California partyboat fleet are compiled each month for all California ports. Rockfish and most flatfish are not separated by species on these logs, but the more important species such as lingcod, striped bass, salmon, yellowtail, white seabass, barracuda, and cabezon are entered by species. During periods when no assessment study is underway, these partyboat log data are the only source of information which may indicate changes in distribution and availability and/or abundance over the entire coast of California.

In southern California a complete assessment of the marine sport catch and effort was initiated in 1963. In that year the pier fishery was surveyed. The southern California skiff fishery is currently under study.

Current Sportfishing Trends

Salmon fishing in the Pacific Northwest continues to be the most popular sportfishery with boat fishermen. Most boat-caught bottomfish are incidental catches. However, at the mouth of the Columbia River, bottomfish catches increase when salmon catches decrease (Table 1) indicating that, as in California, bottomfish catches are more than incidental during low periods in the salmon catch.

As fishing pressure increases near large urban areas, such as the San Francisco Bay area and off southern California, fluctuations in the bottomfish catch tend to be in response to numbers of bottomfish available. Runs of more popular fish such as salmon, yellowtail, barracuda, and albacore tend to increase the effort and catch instead of resulting in a major shift of effort from one fishery to the other as is indicated by the Columbia River study.

North of Fort Bragg the marine sport fishery by boat is dominantly for salmon and as long as salmon stocks hold up this situation will prevail. However, there are many other species available to sport fishermen such as lingcod, black rockfish, copper rockfish and cabezon. Pier and shore sport catches of surfperch, greenlings and other bottomfish while of relatively small magnitude are of local importance around centers of large populations.

Interfishery Competition Between Sport and Commercial Interests

In central California our studies have yielded data which have already been used to resolve conflicts between commercial and sport interests. At Morro Bay some partyboat concessionaires claimed trawling operations were responsible for a decrease in partyboat catches. A one-year study by trawl and sportfish program personnel disclosed that interfishery competition could not possibly exist because the species taken and the areas of fishing were not the same for the two fisheries. Bocaccio and chilipepper were the principal commercial species, whereas blue rockfish and olive rockfish were the principal sport caught species.

A similar study conducted in Monterey Bay in 1960 revealed a comparable separation of fishing areas and species landed. Here, bocaccio, chilipepper and splitnose rockfish were the dominant trawl caught species, whereas blue rockfish,

TABLE 1
Sport Catch at the Mouth of the Columbia River, 1960-1963

Year	Angler Trips	Rockfish	Lingcod	Halibut	Other*	Total	Salmon
1960	78,000	20,970	119	79	271	21,439	72,300
1961	89,000	12,742	1,560	551	3,333	18,186	106,000
1962	116,400	6,539	378	360	3,182	10,459	148,800
1963	117,800	7,526	462	102	4,554	12,645	148,800

Data supplied by Frank Haw, Washington Department of Fisheries.

*Includes miscellaneous flatfish, sculpins, sharks, steelhead and cutthroat trout, surfperch, sturgeon, Pacific mackerel, and sablefish.

yellowtail rockfish, and lingcod were the principal species taken on party boats.

Differences between the trawl and partyboat bottomfish catches can be expected to remain fairly constant over the entire coast as the trawl fishery is typically a deep-water net fishery, whereas the partyboat fishery is a shallower water hook-and-line fishery. Should trawl nets be devised to fish over rocky reefs, these interrelationships should be re-examined.

Areas of possible competition other than the partyboat-trawl conflict have also arisen. In 1960, Cayucos pier fishermen accused bait haulers using lampara nets of being a threat to pier fishing success. Sportfish project pier sampling data gathered in 1958, along with data collected on the bait sampling program of the Department's pelagic fisheries investiga-

tion revealed that interfishery competition was not possible because species taken by fishermen were not taken by the bait haulers.

The time may eventually come when such basic studies will reveal that opposing groups, consisting of any combination of sport and commercial interests, will be taking large numbers of the same species in the same area. Possibly such situations do now occur within salmon fisheries. So far bottomfishery personnel have been spared the job of determining just how much one fishery affects the other. With an eye upon the inevitable, life history and ecological surveys are being conducted in both southern and central California to supply the information needed to manage such multiuse fisheries of the future.