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The History of Marine Fisheries Research on the
Pacific Coast of North America

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Alan S. Egarston

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By Alan S. Hourston

I - INTRODUCTION

Basically, marine fisheries research on the Pacific Coast of North America began with the faunal and life-history studies conducted by marine biological stations which were established about the turn of the century. These were set up in conjunction with universities (Hopkins Marine Station and Friday Harbour Laboratories), as locally-sponsored organizations (Marine Biological Association of San Diego) or as government-sponsored laboratories (Pacific Biological Station of the Biological Board of Canada at Nanaimo, B.C.). As the commercial fisheries grew in importance, state and federal governments became concerned with research in this field and established laboratories along the coast. Since the scale of operations required for most fisheries problems was beyond the scope of the university programs, fisheries research became centered in the government laboratories, with most universities confining their efforts in this field to local problems and contract work with and for government agencies. The bulk of the descriptive or "pure" research remained in the hands of the universities, whose activities thus also expanded.

The growth of commercial fisheries also presented technological problems in preservation and packing the product. This led to the establishment of technological research stations, mainly by government agencies.

As the commercial fisheries expanded, individual stocks became subject to fisheries by more than one state and more than one country. This led to the establishment of commissions for the investigation and management of these stocks. Some were set up as coordinating bodies for the research carried out independently by the states or countries concerned, while others had their own research staff and tackled the problems themselves.

This continuous expansion of fisheries research required a nucleus of trained men to occupy key positions in each new agency. Prominent centers of practical training were the Department of Fish and Game Marine Laboratory in California and the Pacific Biological Station in British Columbia.

II - ESTABLISHMENT OF MARINE BIOLOGICAL STATIONS

(1) Hopkins Marine Station

The Hopkins Marine Station of Stanford University was the pioneer of the Pacific Coast marine laboratories. It was established in 1892, one year after Stanford University opened its doors, under the joint directorship of G.H. Gilbert and O.P. Jenkins (Ritter, 1915). Its location at Pacific Grove, California, has a richness of marine life which is possibly the greatest on the coast. Instruction as well as research was carried out at this station which served as an adjunct to the Departments of Zoology and Botany of Stanford Univer-

sity (Evermann, 1921). Its present director is L.R. Blinks.

(2) Scripps Institution of Oceanography

Established as the Marine Biological Association of San Diego in 1903, this institution had its beginnings as a tent laboratory in Pacific Grove in 1882 (Ritter, 1910). After a succession of temporary quarters on Santa Catalina Island, San Pedro, Coronado and La Jolla, its present site was occupied in 1910, a year after the appointment of W.E. Ritter as full-time director (Ritter, 1912a). In 1912 the association was transferred to the Regents of the University of California and the name changed to the Scripps Institution for Biological Research of the University of California (Ritter, 1912b). Policy stressed research and remained in the hands of a local board. By 1915 there were four resident investigators (Ritter, 1915) and by 1916 it boasted a public aquarium, pier and two concrete buildings (McEwen, 1921).

(3) Friday Harbor Laboratories

The Friday Harbor Laboratories of the University of Washington were established in 1903 on San Juan Island in the San Juan Islands after several years of preliminary collecting by Professor Kincaid (Ritter, 1915). Work was begun in 1904 and a permanent building erected in 1910 (Frye, 1921). Its original function was to produce better teachers of biology but research soon became one of the chief aims. Dr. Frye succeeded Professor Kincaid as director of the laboratories in 1914 (Phifer and Phifer, 1930) and the name was changed to The Puget Sound Biological Station. In 1915 the Publications of the Puget Sound Biological Station began. The laboratories are open only during the summer months and the work is mainly ecological and physiological.

(4) Pacific Biological Station

The Pacific Biological Station of the Biological Board of Canada was opened in 1908 following the earnest representations made to the B.C. Fisheries Commission by Rev. G.W. Taylor who became its first Director (Clemens, 1953). The Board itself was established ten years previously as a result of the efforts of E.E. Prince and A.P. Knight. Early work was confined to a biological survey of the Gulf of Georgia and the life history of food fishes conducted during the summers by university personnel (Fraser, 1921). The field of endeavour expanded to include biochemistry, general physical and chemical oceanography, embryology and morphology (Clemens, 1940). Succeeding Taylor as Director were C. MacLean Fraser, W.A. Clemens, R.E. Foerster, J.L. Hart, and A.W.H. Needler, the present incumbent.

III - MOVEMENT OF FEDERAL AND STATE AGENCIES INTO FISHERIES RESEARCH

(1) Fisheries Research Board of Canada

The work of the Pacific Biological Station at Nanaimo, B.C., gradually shifted in emphasis from descriptive studies to fisheries research. By 1924 the program stressed fisheries biology, life histories of commercially important shellfish, fish diseases and dynamic oceanography; by 1928 ten additional permanent staff had been appointed to carry out the year-round investigations (Clemens, 1929). The Pacific Salmon Research Station at Cultus Lake was

established in 1928 under R.E. Foerster (Foerster, 1929) to determine the effectiveness of hatcheries in comparison with natural propagation (Foerster, 1930). Other major studies included salmon migrations, origin, abundance and composition of pilchard and herring stocks, oyster propagation and oceanography (Clemens, 1940). The name of the Board was changed to Fisheries Research Board of Canada in 1937 when the objective of the work became "to determine the state of each fishery, its general trend, and to ascertain what measures might be taken, if and when necessary, to so regulate or manage the fishery that it can enjoy maximum exploitation on a sustained yield basis" (Foerster, 1953).

(2) United States Fish and Wildlife Service

The United States Bureau of Fisheries was established as the United States Commission of Fish and Fisheries in 1871 (Smith, 1908). The role of the commission was to determine what diminution in the fish supply of our coastal waters and streams had occurred, to discover what caused the decline and to recommend remedial measures (Higgins, 1940). Biological investigations were supplemented by the collection of statistics of commercial fisheries, a complete series of which are available for the Pacific coast from 1922 on (Sette, 1926). In recognition of the need for making effective some of its recommendations regarding the maintenance of the supply of fish, the Bureau was granted authority to undertake the artificial propagation of fish. The first salmon hatchery was opened in California in 1872 under the direction of Livingston Stone (Hedgpeth, 1941). The hatching and planting of food and game fishes soon became the most extensive branch of the service (Higgins, 1940). In 1919 the Bureau was authorized by law to exercise control over the salmon and other fishes of Alaska, to regulate and supervise the Alaska fur seals and to act as adviser to the states regarding fisheries legislation. In 1924 a law was passed providing for 50% escapement in Alaska salmon spawning runs. Counting weirs were established in 17 streams and fishing regulated to balance counts with catch. Where counting weirs could not be established, stream surveys were made to estimate escapement. Distribution, migration routes and composition of the stocks were studied by tagging programs on adults and marking programs on fingerlings, and population size was predicted annually based on studies of the ratio of the number of returning adult fish to the number of spawners in the parent escapement. Studies on herring indicated the existence of a series of populations and age-composition; spawning and survival were analysed for regulation area by area. This program was marked by the introduction of tagging with metal body-cavity tags by Rounsefell (Rich, 1926). Meanwhile, the research vessel "Albatross" was working off the United States proper (Moore, 1921), salmon marking was begun in Oregon in 1924 and a laboratory was established in Seattle in 1925 (Rich, 1926). Research on the pilchard was undertaken by the South Pacific Fisheries Investigations in conjunction with the Pacific Coast states, especially California (Sette, 1940).

(3) California Department of Fish and Game

In 1917 the California Fish and Game Commission (later Department of Fish and Game) inaugurated scientific investigations of the commercially important fishes of southern California under the direction of W.F. Thompson (Thompson, 1919). The initial work was concentrated on the albacore in the form of a biological study of the fish and an analysis of records of relative abundance. The work soon expanded to supply the information most needed for managing the state's fisheries on a basis of sustained yield (Scofield, 1940). Priorities, set up on the basis of the value of the fisheries and their need for research, gave the following order of precedence: sardines, salmon, tunas, mackerel sharks, drag fisheries and shellfish (Van Cleve, 1945). The sardine and tuna programs became

part of international investigations and the mackerel and salmon programs became interstate investigations. Many illustrious names are associated with the California marine laboratory over this period, including W.F. Thompson, E. Higgins, W.L. Scofield, G.A. Rounsefell, O.E. Sette, R. Van Cleve, Francis Clarke, H.B. Holmes and T. Skogsberg (Cattell, 1955).

(4) Oregon Fish Commission

Research laboratories were established in 1938 at Astoria and in Bay City and Newport in 1947 by the Oregon Fish Commission (Hiatt, 1954). Biological and statistical investigations of marine fisheries are carried out from these laboratories, including studies on the effect of environment on salmon fisheries, life histories and population dynamics and management of shellfish resources.

(5) Washington Department of Fisheries

The State of Washington established a Department of Fisheries and Game in 1921 with a three-man board and a salaried director (Schoettler, 1954). In 1929 the board was eliminated and in 1932 the food and game fish were separated into the Department of Fisheries and the Department of Game, each with a director and staff. A shellfish laboratory was established at Quilcene in 1939 and a salmon laboratory at Bowman's Bay, Anacortes. In 1951 an expanded salmon rehabilitation program doubled the budget and by 1953 there were 230 employees. Activities include salmon research of various sorts and studies of bottom-dwelling species (Seattle), rates of conversion of salmonoids migrating from fresh to salt water, brackish water planting of salmonoids, and effects of industrial effluents on migrating salmonoids (Anacortes) and biological and hydrological studies related to oyster cultures (Quilcene).

IV - EXPANSION OF UNIVERSITY ACTIVITIES

(1) University of California - Scripps Institution of Oceanography

In 1926, in keeping with the expansion of its activities, the Scripps Institution for Biological Research became the Scripps Institution of Oceanography. Under the succeeding directorships of T.W. Vaughan, H.O. Sverdrup, C.H. Eckart and R.R. Revelle the work was extended to embrace physical, chemical and biological oceanography, marine geology, ecology, physiology, biochemistry and biology and taxonomy of marine plants and animals. The institution plays an active part in the California Cooperative Oceanic Fisheries Investigations and houses the headquarters of the South Pacific Fisheries Investigations of the U.S. Fish and Wildlife Service and the Inter-American Tropical Tuna Commission. Although instruction is provided, research is stressed.

(2) Stanford University

Stanford University provides instruction both at the main campus and at the Hopkins Marine Station. Early work was concentrated on systematics, one of the most notable products being Jordan and Evermann's Fishes of North and Middle America. As a result of this the university now possesses one of the best collections of fishes of the Pacific Basin (Myers, 1940). Fisheries work is also carried out, mainly contract work for government agencies. The Hopkins Marine Station is a participant in the California Cooperative Fisheries Investigations and the university has housed various research agencies over the years.

(3) University of Washington

A School of Fisheries was established at the University of Washington under J.N. Cobb in 1919 (Van Cleve, 1953). It was originally patterned after the Japanese style as a training place for fisherfolk. When W.F. Thompson took over as director in 1930 there were signs of depletion in the stocks of marine and anadromous fish and a shift in curriculum was made to fisheries biology and conservation with the object of training fisheries biologists for research in administrative, field and technical positions as needs of the times indicate. By 1940 five state, federal and international agencies had set up research staffs at or near the University of Washington (U.S. Fish and Wildlife Service, Washington Department of Fisheries, Washington Department of Game, International Fisheries Commission and International Pacific Salmon Fisheries Commission). These were joined by the Fisheries Research Institute in 1947. Thompson was succeeded as director by W. Chapman and R. Van Cleve in turn.

(4) University of British Columbia

Fisheries research in British Columbia is carried out by the Pacific Biological Station at Nanaimo but the University trains biologists and does some contract work in fisheries, particularly in the experimental and physiological approach.

V - ESTABLISHMENT OF TECHNOLOGICAL LABORATORIES

(1) Pacific Fisheries Experimental Station

As the Pacific Coast fisheries grew into a major industry, problems concerning the handling and preserving of fish came to the fore. The Pacific Fisheries Experimental Station was established in Prince Rupert B.C. in 1926 by the Biological Board of Canada to investigate these problems (Carter, 1953; Finn, 1930). Its aims were to use all available knowledge to overcome difficulties which are met with in the various industrial processes as they now exist, and to develop new processes (Finn, 1929). Work was begun on refrigeration problems and a little later studies on fish oils and meals were initiated (Clemens, 1953). Subsequently investigations extended to various problems connected with canning, smoking, production of vitamins, production of by-products and many other phases of the fishing industry. The Station was moved to Vancouver during the Second World War when its buildings in Prince Rupert were needed for other purposes. The present director is H.L.A. Tarr.

(2) Pacific Coast and Alaska Technological Research Laboratory

The Pacific Coast and Alaska Technological Research Laboratory was established in 1933 in Seattle by the U.S. Fish and Wildlife Service (Hiatt, 1954). Its program, directed by M.E. Stansby, includes investigations on preservation of fish, fishing by-products, composition of fish and chemical analytical methods.

VI - ESTABLISHMENT OF COMMISSIONS

(1) International Fisheries Commission

The International Fisheries Commission was founded in 1925 by treaty between the United States and Canada (International Fisheries Commission, 1931) with the object of rebuilding the supply of halibut off the Pacific Coast of North America. Its approach was research as a basis for regulation and to this end the commission had undivided control of the program and was free to pursue its aim in any way it saw fit (Thompson, 1936). The program, as laid down by the first Director, W.F. Thompson was: (1) to determine the limit of the stock of fish that must be dealt with, and (2) what must be done to that unit (Thompson, 1940). The first objective was attacked by migration studies, surveys to locate and follow the eggs and larva and the collection of statistics, the second by studies of natural and fishing mortality rates, growth rates and effects of the fishery. By reconstructing what had happened and what was then happening on the individual banks, the staff was able to demonstrate the presence of overfishing. A system of voluntary fleet control involving catch limits per trip and tie-up periods between trips was instigated to alleviate this situation and has resulted in increases both in spawning stock and catch. Thompson was succeeded as director by H.A. Dunlop.

(2) International Pacific Salmon Fisheries Commission

The sockeye salmon convention between the United States and Canada was signed in 1930 but ratifications were not exchanged until 1937 (International Pacific Salmon Fisheries Commission, 1937 and 1939). A Commission was set up, including three commissioners for each country to investigate and regulate the Fraser River sockeye salmon fishery. Its regulations apply to territorial waters and the high seas westward of Canada and the United States from a line between Bonilla Point, Vancouver Island and Tatoosh Island, Washington (48 and 49° north latitude) except Barkley Sound and Nitnat Lake. Regulations are enforced by the nation concerned in its own territorial waters; on the high seas either nation can seize a vessel but prosecuting is by the nation in which the vessel is registered. The research program, initiated by its first director, W.F. Thompson, includes the investigation of: (1) the natural history of sockeye salmon, (2) hatchery methods, (3) spawning ground conditions, and related matters. The first major project was an investigation of the effects of the Hell's Gate obstruction on the Fraser River (Thompson, 1945). The removal of the obstruction was recommended and fishways were built, resulting in a four-times increase in the catch of the 1954 four-year cycle over that of 1950. However the 1954 catch only represents about 56% of the 1910-1913 catch (International Pacific Salmon Fisheries Commission, 1954). L.A. Royal is the present director.

(3) Pacific Marine Fisheries Commission

As the Pacific Coast fisheries expanded and the operating radius of fishing boats increased, localized regulations became less effective and some stocks were seriously reduced. Also many species supporting offshore fisheries migrate extensively along the coast and were subject to the fishery at various points along their migration routes. Consequently, in 1947 the States of Washington, Oregon and California entered into a compact with the consent of the Federal Government for the purpose of coordinating the research and management of the marine fisheries of mutual concern to the three States (Pacific Marine Fisheries Commission, 1947). The Commission has no regulatory powers but develops concurrent action and recommends enactment of the necessary research programs

and regulations to the member states. Cooperation of the Alaska Department of Fisheries, the Fisheries Research Board of Canada, The Department of Fisheries of Canada and the United States Fish and Wildlife Service has supplemented the work of the Commission and has established coordinated research and management of the coastal fisheries on a coastwise basis. The Commission has collected and published available research data, statistics and other pertinent facts to establish priority on research programs. Ocean salmon, bottom fish and albacore head the list. Other programs concern sablefish, tuna, sardine, soupfin shark, crab, anchovy, shad, striped bass and oysters.

(4) California Cooperative Oceanic Fisheries Investigations

Studies on the California sardine (pilchard) have been carried out by the California Department of Fish and Game since 1919. From 1939 to 1941 these were augmented by the cooperative efforts of the Scripps Institution of Oceanography and the United States Fish and Wildlife Service. After dropping somewhat in the early 1940's the sardine catch plummeted to a low of a little over 100,000 tons in 1947-48, the lowest point in recent history. Under the auspices of the Marine Research Committee of the State of California Department of Fish and Game, four agencies--the California Academy of Sciences, the California Department of Fish and Game, the University of California's Scripps Institution of Oceanography and the U.S. Fish and Wildlife Service--were asked to apply their resources and skills to the sardine problem (California Cooperative Sardine Research Program, 1950). In 1949 the resulting California Cooperative Sardine Research Program embarked on a series of routine oceanographic cruises on an unparalleled scale to investigate the Pacific sardine in relation to its physical and chemical environment, its food supply, its predators and competitors. Findings were to be evaluated in terms of the survival of young and in terms of the distribution and availability of sardines when they reach commercial size. In 1951 the Hopkins Marine Station of Stanford University joined the program (California Cooperative Sardine Research Program, 1952). The work was expanded in 1953 to include other food fishes and the name of the program changed to the California Cooperative Oceanic Fisheries Investigation. These studies indicate that the survival and distribution of the sardines may have been affected largely by two important factors; namely, variations in water temperature and the intensity of the fishery (California Cooperative Oceanic Fisheries Investigations, 1955). The extent to which each of these factors has affected the sardine population is controversial.

(5) Inter-American Tropical Tuna Commission

The convention between the United States of America and the Republic of Costa Rica for the establishment of an Inter-American Tropical Tuna Commission was signed in 1949 and ratifications were exchanged in 1950 (Inter-American Tropical Tuna Commission, 1952). The purpose of the convention is to establish a means of cooperation in the gathering and interpretation of factual information to facilitate maintaining, at a level which will permit maximum sustained catches, the populations of yellowfin and shipjack tuna and other kinds of fishes taken by tuna fishing vessels in the eastern Pacific Ocean, which by reason of continued use have come to be of common concern. The present program, directed by M.B. Schaefer, includes the following lines of investigation (Inter-American Tropical Tuna Commission, 1955):

- 1 - Routine collection and analysis of catch statistics, logbook data and related information for measuring changes in yield, abundance and intensity of fishing for the tunas and bait fishes.

- 2 - Compilation and analysis of historical statistical data for measuring changes in abundance and yield of the fish populations in response to changes in fishing intensity as well as environmental factors.
- 3 - Research on the theory of population dynamics to provide a basis for interpreting the foregoing statistical data with respect to estimation of level of maximum sustainable catch.
- 4 - Studies of the biology, ecology and life history of bait species with major emphasis on the anchoveta.
- 5 - Investigations of the life history and biology of the yellowfin and shipjack tunas.
- 6 - Cooperation with the Scripps Institution of Oceanography and other agencies in the collection and analysis of oceanographic data from the eastern Pacific and interpretation of such data to further elucidate the ecology of the tropical tunas.

(6) International North Pacific Fisheries Commission

The International North Pacific Fisheries Commission was formed in 1954 to investigate the fish stocks of the high seas of the north Pacific Ocean mainly in an effort to distinguish those of North American and Asian origin. The research which is essential to the work of the Commission was to be carried out by the existing agencies of the three governments concerned--Japan, United States and Canada. Investigations on salmon were begun early in 1955.

(7) Committee for Management of the Skeena River Salmon Fisheries

In 1954 a committee composed of the Chief Supervisor of Fisheries for the Pacific Coast of Canada and the Director of the Pacific Biological Station at Nanaimo was appointed to manage the Skeena River salmon fisheries in a manner similar to that of the Fraser River sockeye salmon by the International Pacific Salmon Fisheries Commission. Investigations are being directed by F.C. Withler. The prestige attained by the success of the International Commission is reflected in this adoption of their organization and methods by an individual government.

VII - TRAINING OF PERSONNEL

A few institutions stand out as centers for the academic and practical training of fisheries research personnel. Stanford University, thanks to the impetus given by D.S. Jordan and C.H. Gilbert, has produced such accomplished graduates as C.L. Hubbs, W.F. Thompson, G.A. Rounsefell, O.E. Sette, H.B. Holmes and J.C. Marr. M.B. Schaefer, W.M. Chapman, M.W. Johnson, R. Van Cleve and J.L. Kask (Ph.D. only) received academic training at the University of Washington. In Canada, the University of Toronto provided the academic training of A.W.H. Needler, J.L. Hart, W.E. Ricker, A.L. Pritchard, A.L. Tester, J.R. Brett, W.A. Clemens (B.A., M.A.) and R.E. Foerster (Ph.D.). J.L. Kask, J.L. McHugh, R.E. Foerster, H.A. Dunlop and R.H. Fleming took their early academic training at the University of British Columbia.

In the field of practical training the California Department of Fish and Game is prominent. W.F. Thompson organized the marine investigations and went on to head the International Fisheries Commission, the International Pacific Salmon Fisheries Commission, the School of Fisheries at the University of Washington and the Fisheries Research Institute. E. Higgins, H.B. Holmes and G.A. Rounsefell of the United States Fish and Wildlife Service got their start there as did T. Skogsberg of the Hopkins Marine Station and the marine laboratory's present Director, F.N. Clark. The Pacific Biological Station at Nanaimo, B.C., sent C.M. Fraser and W.A. Clemens in turn to the post of head of the Department of Zoology at the University of British Columbia. A.L. Pritchard went from the Pacific Biological Station to the Department of Fisheries and thence to head the Fish Culture and Development Branch and on to the Conservation and Development Service. After 17 years at the Nanaimo Station, A.L. Tester took a post at the University of Hawaii and later became Director of the Pacific Oceanic Fisheries Investigations of the U.S. Fish and Wildlife Service. W.E. Ricker went from Nanaimo to the University of Indiana and thence to the position of Editor for the Fisheries Research Board of Canada. J.L. Kask, Chairman of the Fisheries Research Board of Canada, and J.L. McHugh, Director of the Virginia Fisheries Laboratory, got their start at the Nanaimo Station.

The International Fisheries Commission provided the basic practical training for H.A. Dunlop and F.H. Bell, and the International Pacific Salmon Fisheries Commission provided early training for J.L. Kask and M.B. Schaefer.

VIII - PRESENT STATUS

The main organizations now actively carrying out fisheries research on the Pacific Coast of North America are tabulated below by region:

<u>Region</u>	<u>Organization</u>	<u>Address</u>	<u>Established</u>
Alaska	U.S. Fish and Wildlife Service	Anchorage	--
		Juneau	1956
	Fishery Products Lab., Ketchikan	1940	
	Dept. of Fisheries Arctic Research Lab.	Juneau	1949
		Fairbanks	1947
British Columbia	International North Pacific Fisheries Comm. (co-ordinating Canada, Japan, U.S.)	University of British Columbia, Vancouver	1954
		International Pacific Salmon Fisheries Commission	1937
	Fisheries Research Board of Canada	Pacific Biological Station, Nanaimo	1908
		Pacific Fisheries Experimental Station, Vancouver	1926

<u>Region</u>	<u>Organization</u>	<u>Address</u>	<u>Established</u>
	Dept. of Fisheries	Shellfish Lab., Ladysmith	1949
	University of British Columbia	Department of Zoology, Vancouver Institute of Fisheries, Vancouver Institute of Oceanography, Vancouver	-- 1953 1949
Washington	International Fisheries Commission	University of Washington, Seattle	1925
	U.S. Fish and Wildlife Service	Pacific Coast and Alaska Technological Research Lab., Seattle Pacific Coast Salmon Investigations, Seattle Salmon Cultural Lab., Entiat Western Fish Disease Invs., University of Washington, Seattle Western Fish Nutrition Invs., University of Washington, Seattle	1953 1930 1951 1936 1950
	Dept. of Fisheries	Biological Division, University of Washington, Seattle	1932
	Fisheries Research Institute	University of Washington, Seattle	1947
	University of Washington	Applied Fisheries Lab., Seattle Department of Oceanography, Seattle Department of Zoology, Seattle Friday Harbor Laboratories, Friday Harbor School of Fisheries	1943 1951 1904 1919
	Walla Walla College	Biological Station, Anacortes	1947
Oregon	Pacific Marine Fisheries Comm. (co-ordinating California, Oregon, Washington)	Portland	1948
	Fisheries Commission	Research Lab., Astoria Bay City Newport	1938 1947 1947
	Oregon State College	Yaquina Bay Fishery Lab.	1940
	Oregon State System of Higher Education	Oregon Institute of Marine Biology, Corvallis	1937

<u>Region</u>	<u>Organization</u>	<u>Address</u>	<u>Established</u>
California	Inter-Amer. Tropical Tuna Commission (U.S., Costa Rica, Panama)	Scripps Institution of Oceanography, La Jolla	1951
	U.S. Fish and Wildlife Service	South Pacific Fishery Investigations, La Jolla	1937
	Dept. of Fish and Game, Marine Fisheries Branch	State Fisheries Lab., San Pedro Eureka Lab., Eureka Stanford Lab., Stanford University Stanford Branch Lab., Hopkins Marine Station	1917 1930 1920
	California Academy of Sciences	San Francisco	1853
	California Institute of Technology	Kerckhoff Marine Lab., Corona Del Mar	1930
	Humboldt State College	Arcata	
	College of the Pacific	Pacific Marine Station, Dillon Beach, Marin Co.	1948
	Pacific Union College	Mendocino Biological Field Station, Albion	1947
	Pomona College	Marine Lab., Corona Del Mar	
	Stanford University	Hopkins Marine Station, Pacific Grove	1892
	University of California	Scripps Institution of Oceanography, La Jolla	1903
	University of Southern California	Allan Hancock Foundation for Scientific Research, Los Angeles	1940

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