Chapter 4. History of Conservation and Management Measures

4.1 Regulatory History in California

Fisheries regulation in California began in 1851 when the Legislature enacted its first law dealing specifically with fish and game matters by delineating rights to take oysters and to protect aquatic property. The first closed seasons for trout were established in 1861 when fishing fees were first collected. Nine years later, in 1870, the Legislature established a Board of Fish Commissioners to provide for the restoration and preservation of fish in the State's waters. California had the first wildlife conservation agency in the nation, predating even the U.S. Commission of Fish and Fisheries.

By the end of the 19th century, fish and game laws had been expanded and the administration of these laws had strengthened. In 1871, two wardens were appointed to patrol San Francisco Bay and the Lake Tahoe area. In 1878, the Fish Commission's authority was expanded to include game animals as well as fish. The Commission established a Bureau of Patrol and Law Enforcement in 1883 and published the first compilation of California fish and game laws in 1885.

The first hunting licenses were issued in 1907 and money from license sales and fines were deposited in a new Fish and Game Preservation Fund established by the Legislature. The name of the Board of Fish Commissioners was changed to the Fish and Game Commission in 1909; to more accurately reflect the scope of its interests and activities.

In 1927, the governor approved a Division of Fish and Game within the Department of Natural Resources. The new Division was unique, because it was administered by the Commission. A separate Fish and Game Code was enacted by the Legislature in 1933; replacing portions of the State Penal Code. The Legislature delegated the responsibility for making state recreational fishing and hunting regulations to the Commission through a constitutional amendment in 1945. Six years later, the Reorganization Act of 1951 elevated the Division of Fish and Game to Department status.

4.2 Regulatory History Specific to White Seabass fisheries

4.2.1 Commercial Fishery

Declining white seabass landings in the late 1920's and during most of the 1930's led to a series of regulations designed to stabilize the catch (Young 1973) (Table 4-1). The first of these regulations, instituted in 1931, was aimed primarily at the commercial fishery and imposed a commercial fishing closure during May and June, and a commercial minimum size limit of 28 in. (711 mm). The main purpose of these restrictions was to protect seabass during spawning and to provide the fish the opportunity to spawn at least twice before they were caught (Skogsberg 1939).

By the 1940s, commercial gear restrictions were imposed on the fishery. The use of purse seine and other roundhaul nets to take white seabass in waters off California was prohibited in 1940, however, their use in Mexican waters was still allowed and fishermen could transit through California waters with purse seine-caught fish under a Department-issued permit. A minimum gill net mesh size of 3.5 in. (89 mm) was established in 1941 and later increased to 6 in. (152 mm) in 1988. Four years later, California voted to ban the use of gill and trammel nets in state waters along the mainland shore south of Point Arguello, Santa Barbara County, and one mile offshore or within 70 fathoms around the Channel Islands.

Since the fishery began, California commercial fishermen fished in Mexican waters for white seabass. The catches from Mexico contributed between 30 to 85% of California's white seabass fishery depending on market and fishing conditions. In 1982, the Mexican government enacted a Foreign Fishery Act which closed Mexico's waters to the United States and all other foreign countries. In order to fish in Mexico, a fish business has to have 51% Mexican ownership (Arenas pers. comm.). Currently, there are no specific commercial white seabass regulations in Mexico, however, white seabass are managed under the general Sciaenidae regulations that prohibit increases in fishing effort in the artisanal fishery where white seabass are taken as bycatch (Arenas pers. comm.).

4.2.2 Recreational Fishery

In 1913, the Anglers License Act made it a misdemeanor for any person over 18 years of age to take, catch, or kill any "game fish" for any purpose other than profit, without first purchasing a license. For purposes of the Act, "game fishes" did not include white seabass, but did include tuna; yellowtail; giant sea bass; albacore; barracuda; bonito; rock bass (kelp bass); California whiting (corbina); surf-fish; yellowfin croaker; spotfin croaker; salmon; steelhead; other trout; charr; white-fish (mountain whitefish); striped bass; and black bass. White seabass was added to the list of "game fish" in 1937. The addition of white seabass to the list meant that all persons catching white seabass for sport had to have a sport fishing license (Table 4-1). This change meant that the size limit, season closure and bag limit regulations instituted prior to 1937 also applied to sport take.

In 1949, the sport bag limit for white seabass was set at ten fish per day, with not more than five white seabass less than 28 in. (711mm) in length. In 1957, the allowance for undersized fish was reduced to two fish per day. In 1971, the allowance for undersized fish was abolished, however, it was reestablished in 1973 when the possession of one seabass shorter than 28 in. (711 mm) was allowed. In 1978, it once again became illegal to possess any white seabass less than the minimum size limit, and the daily bag limit was reduced from ten to three fish.

In 1980, a seasonal closure was enacted which prohibited the possession of any white seabass from 15 March through 15 June. However, in 1984, an allowance of one legal-

size fish per day during the closed season was enacted.

Table 4-1. Summary of white seabass regulations from 1931 to the present (modified from Vojkovich and Reed 1983)

Date (License required)	Season length	Size limit	Bag limit	Gear and area restrictions	Special conditions
1931-33 (com'l lic. req.)	July 1-April 30	Commercial $28"; no more than 5 fish <28"	None	No nets within 4-mile radius of San Juan Pt., Orange Co.; bait nets only in Santa Monica Bay.	5 fish any size with hook & line, but may not be sold
1933-35 (same)	Hook & line all year	Same	May 1 - Jun 30 (5 per day - hook & line)	Same	After Oct. 25, 1933, no fish may be sold from May 1 - June 30.
1935-37 (same)	No net fishing May 1 - Aug 31	Same	May 1 - Aug 31 500 lbs/person; 2500 lbs/boat	No nets in any Orange Co. waters (later rescinded)	Same
1937-39 (sportfishing lic. req.)	Same	Com'l and Sport: $28" ; no more than 5 fish <28"	Sportfishing: 15/day for anyone on sportfish boat	Same	Sport-caught fish may not be sold
1939-41 (same)	Year round net fishing allowed	Same	Same	No purse seines. Gill net mesh $3 ½"	Same
1941-49 (same)	Same	Same	Same	Same	Same
1949-53 (same)	Same	Same	Sportfish: 10/day	Same	Same
1953-57 (same)	Same	Same	Com'l: 1000 lbs/person/day; 5000 lbs/boat/day.	Same	Same
1957-71 (same)	Same	Sportfish: 2 fish < 28"	Sportfish: 10/day	Same	Same
1971-73 (same)	Same	Sport and comm. No fish <28"	Same	Same	Same
1973-78 (same)	Same	Sport and comm. One fish <28"	Same	Same	Same
1978 (same)	Same	Sport and comm. No fish <28"	Same	Same	Same
1980-81 (same)	Season closed Mar 15-Jun 15	Same	Sportfish: 3/day/person	Same	Logs required Permits required
1982 (same)	Same	Same	Same	Area closures for nets with mesh less than 6"	Permits no longer required
1984 (same)	Same	Same	Sportfish: 1 white seabass during closed season	Same	Same
1994 (same)	Same	Same	Same	No Gill or trammel nets allowed 0-3 miles from shore along the mainland, or within 1 mile or waters less than 70 fathoms deep at the offshore islands from Point Arguello, Santa Barbara Co. to the United States - Mexico Border, and in waters less than 35 fathoms deep from Point Fermin, Los Angeles Co. to the south jetty Newport Harbor, Orange Co.	

Date (License required)	Season length	Size limit	Bag limit	Gear and area restrictions	Special conditions
2000	Same	Same	commercial: 1 seabass during closed season	Same	

Sport fishing regulations for white seabass in Mexico are not specific to this species but apply to all species not covered under separate regulations. In general, fishing can be done with hook and line, and by pole or spear gun while scuba diving. There is a ten fish per day bag limit of which no more than five fish can be white seabass. The bag limit for fish taken using scuba has an additional limitation that no more than 55 lbs (25 kg) of fish may be taken.

For more detail on the statutes and regulations specific to the various components of the white seabass fishery see Appendix B.

4.3 Additional Conservation Measures for White Seabass Stocks

The Ocean Resources Enhancement and Hatchery Program (OREHP) was created by the following legislation: Assembly Bill 1414 (Stirling, Ch. 982, Stats. 1983); and, Fish and Game Code §6599 which was continued through 1992 by Senate Bill 204-Stirling (Ch. 8, Stats. 1989) and extended through 31 December 2002 by Assembly Bill 960-Alpert (Ch. 987, Stats. 1992); further modified by Assembly Bill 3011-Alpert (Ch. 369, Stats. 1994); and extended indefinitely by Senate Bill 58-Alpert (Ch. 89, Stats. 2001). The ultimate goal of this legislation is to enhance populations of marine fin fish species important to California for their sport and commercial fishing value. The OREHP was developed to conduct a program of basic and applied research into the artificial propagation, rearing and stocking of important marine fin fish species that occur in ocean waters off southern California.

The OREHP is funded through the establishment of the Ocean Fishery Research and Hatchery Account (OFRHA) within the Fish and Game Preservation Fund. The program receives most of its revenue from the sales of ocean fishing enhancement stamps. The costs of investigating and developing artificial propagation techniques to enhance marine fish species are high, and the implementation of this program within the Department's existing budget would seriously impact the Department's ongoing research and management functions. Recognizing this, the Legislature established this program as a self-supporting entity. These stamps are required to be purchased by recreational anglers taking fish in ocean waters south of Point Arguello, Santa Barbara County ($2.50 annually or $0.50 for one day licenses); owners of Commercial Passenger Fishing Vessels (CPFV), which operate in waters south of Point Arguello ($25.00 annually); and by commercial fishermen landing white seabass south of Point Arguello ($25.00 annually). The ocean enhancement stamp is required in addition to the basic sport and commercial fishing licenses. Revenues generated from the ocean enhancement stamp have averaged $860,840 annually since 1995, with 98.4% of the revenue coming from recreational fishermen (Table 4-2). From 1983 through 1995,

annual OREHP revenues averaged $0.5 million per year based on a $1.00 stamp for all recreational anglers and $10.00 stamp for commercial fishing vessels. OREHP also receives funding through the Sportfish Restoration Act and from mitigation for the San Onofre Nuclear Generating Station. In addition, volunteers provide thousands of hours of assistance at grow-out facilities.

Table 4-2. Revenue generated through the purchase of the ocean enhancement stamp[1], 1992-2000

Fishing segment	1995	1996	1997	1998	1999	2000	2001
Recreational	868,960	859,568	927,444	846,833	827,757	822,697	804,709
CPFV [2]	5,125	5,200	5,875	4,950	6,350	5,675	5,500
Commercial	5,700	4,700	3,875	7,825	9,975	13,150	14,600
Total	879,785	869,468	937,194	846,833	827,757	822,069	824,809

1 Data from California Department of Fish and Game, License and Revenue Branch.
2 Commercial passenger fishing vessel.

The program is administered by the Director of the Department of Fish and Game with the advice and assistance of a ten-member Ocean Resources Enhancement Advisory Panel (OREAP). The panel consists of representatives of various user groups, affiliated marine research organizations, and the aquaculture industry. Members of the panel provide policy direction, review research proposals, and recommend allocation of funds for the OREHP.

During the first six years of the program, research focused on the capture, maintenance, spawning (both natural and captive), and grow-out to release size for white seabass and California halibut. Additionally, work was undertaken to determine juvenile natural mortality and distribution in the wild, post release survivability of hatchery-reared fish, and marking methods to identify hatchery-reared fish in the wild. Finally, a cost/benefit model was developed to evaluate the economic feasibility of the OREHP. Reports to the Legislature by Schultze (1984 and 1985) and Crooke (1986, 1987, 1988, 1989) give detailed accounts of yearly activities.

Beginning in 1990, OREHP research focused on white seabass with only limited effort on California halibut. The reduction in research on halibut was necessary because of limited funding and increased expenses associated with producing 100,000 white seabass annually for release. Raising and releasing a large number of juveniles was undertaken to gain experience with new hatchery protocols associated with increased production and to provide juveniles for release and recapture studies. In addition, the recapture field work provided data on juvenile distribution and natural mortality. To facilitate rearing increased numbers of white seabass, OREHP accepted an offer by

United Anglers of California to equip and run a pen rearing grow-out facility at Oxnard (Channel Islands Harbor). By the end of 2001, additional pen rearing facilities located at San Diego, Mission Bay, Dana Point, Newport Beach, Huntington Harbor, Alamitos Bay, Santa Catalina Island, King (Redondo) Harbor, Marina Del Rey, Port Hueneme, and Santa Barbara had joined the volunteer program and accepted fish. (Crooke 1990, 1991, 1992; Crooke and Domeier 1993, Crooke 1994, Crooke 1995, Crooke 2000, Crooke 2001). Volunteers from the sportfishing community not only raised money to

build the grow-out pens, but they also contributed over 20,000 hours a year of their time to raise and care for the hatchery-bred white seabass.

Concurrent with the passage of new OREHP legislation in 1992, the California Coastal Commission authorized use of $1.2 million in mitigation funds for OREHP capital construction and enhanced recovery of fish in the field. The money was part of a mitigation package which Southern California Edison and San Diego Gas and Electric Company agreed to for environmental effects of the San Onofre Nuclear Generating Station (SONGS). Obtaining the funding was essential to OREHP since it provided construction money for an experimental production hatchery. Without increased funding, there would only have been adequate resources to continue work at the 1992 level for hatchery production and field recoveries. Department and Coastal Commission staff spent 1993 developing a Memorandum of Agreement (MOA) to cover financing, construction, and operation of the proposed hatchery. Construction started during July 1994 and the hatchery was dedicated on October 13, 1995.

Soon after initial completion of the hatchery, it became apparent that funding for construction was not adequate to completely build-out the facility, nor was OREHP stamp revenue sufficient to cover the costs of operating a larger facility. In addition, field sampling to recover tagged fish was proving to be more costly than anticipated. Acting on a recommendation developed by the staff in conjunction with the Department, the Coastal Commission authorized an additional $3.6 million in SONGS mitigation at their September 1997 meeting. The funds were used to reduce the debt incurred during initial construction of the hatchery ($428,965), provide funding ($816,800) for equipment to build out the hatchery, and supplement operating funds by $2,189,440 over the next eight years.

During 2000, the operator of the hatchery at Carlsbad, Hubbs-Sea World Research Institute (HSWRI), completed build-out of the hatchery and continued operations to supply juvenile fish to grow-out facilities. Build-out focused on completing the installation of three new sea water recirculating (closed) systems. Poor water quality during the winter of 1998 due to fresh water run-off and dredging of the lagoon supplying hatchery water prompted the recirculating experiments. Preliminary experiments showed that eggs, larval and juvenile fish survival rates were significantly enhanced under closed conditions in which temperature and sterility of the water could be controlled.

The primary function of the hatchery is to provide juvenile white seabass, two to three inches in length, to field-rearing systems operated by volunteer fishermen throughout the Southern California Bight. The hatchery is designed to release 400,000 small fish to the grow-out facilities, which will rear them to eight inches and then release the fish. Unfortunately, the hatchery has not reached anticipated production levels because of water quality and disease problems. The water quality problems appear to be resolved but bacterial and viral diseases contributed to poor production during 1999 and 2000. During 2001, approximately 131,000 juvenile white seabass were released to grow-out facilities and of those, 100,318 were ultimately released into the open ocean; the best year of production in the program's history. Both the Department and HSWRI are continuing to investigate more effective ways to control diseases within the hatchery and grow-out facilities.

Beginning with 1986, direct releases from the hatchery and grow-out facilities have totaled 503,000 white seabass. Since it is possible to back calculate the number of fish remaining in the wild on a yearly basis (1.0 - natural mortality) it is possible to estimate the number of OREHP produced legal size fish (> 28 in.) in the wild population. Using age specific numbers for natural mortality (see section 2.5) for one- to-four-year-old fish from Kent and Ford (1990), and an average of 0.1 for 5+ age fish based on MacCall's papers, there were 43,000 OREHP-produced adult white seabass in the wild at the end of 2001.

The hatchery now possess 230 adult white seabass to act as brood fish. One hundred seventy-five fish are divided among four tanks and kept at different water temperatures and day lengths to assure that the program has continued access to viable eggs. The remaining 55 fish are stored off-site as back-up spawners should something happen to the fish at the hatchery.

California State University, Northridge (CSUN) and the Center for Marine Studies, San Diego State University (SDSU) operate the field studies. Sampling to recover tagged white seabass was redirected in 1997 to emphasize capture of I to IV year-old juvenile fish (12 to 24 in.). A series of variable mesh gill nets were set in nearshore areas for the months of April, June, August and October. Nineteen different stations from San Diego Bay to Santa Barbara were sampled. Thirteen sites were on the open coast, including Santa Catalina Island, and six were in embayments. From April 2000 through June 2001, a total of 560 sets yielded 1,372 white seabass. While the fish ranged in size from 6 to 32 inches, most were in the 9 to 24 inch size range.

All fish were scanned for coded wire tags and 111 (8%) were detected. Approximately 84% of the fish were recovered from embayments while the remainder were taken along the open coast. The ratio of tagged to untagged fish for embayments was 1:1.7 while the open coast ratio was much lower at 1:64.

Eight adult coded wire tagged fish have been recovered since the summer of 1999. These white seabass represent the first recoveries of legal size fish with a known age

and release date. Previously, two legal size fish labeled with tetracycline, an antibiotic which places a permanent mark on the bones, were recovered but the mark on the bones is not specific for a release date so the age of the fish was unknown. One of the coded wire tagged fish was recovered over 90 miles to the north and another was recaptured at the point of release. The fish that was recaptured at it's release site grew to legal size in three years (four or five years is normal), possibly by remaining in the warm waters of Mission Bay and living in the vicinity of a live bait receiver (a steady source of food).

Three additional recoveries of juvenile white seabass during 2000 were especially significant since they showed movement from Santa Catalina Island to the mainland. All previous recoveries only showed movement along the coast.

The OREHP has now progressed to a point where it is possible, with the addition of the new hatchery in 1995, to culture white seabass in quantity. With the new facility, the program has determined many of the factors that are limiting greater production, but all the factors necessary to increase production are still not understood. White seabass culture continues to hold promise for enhancement of the resource because of the current reduced size of the wild stock.

In addition to hatchery related programs, OREHP has sponsored other research which related directly to white seabass management. Foremost among the programs is the juvenile white seabass gill net study which is designed to show the relative abundance of small fish as well as the hatchery contribution to juvenile fish in the wild. This represents the only fishery independent data base focusing exclusively on white seabass recruitment. Researchers working under OREHP grants have examined the genetic structure of the wild stock and found it to be homogeneous throughout its range. Finally, age and growth studies using otoliths to age wild fish and recoveries of tagged fish in the field have shown that white seabass growth is faster than previously documented.