



Wetlands

NOAA Fisheries

National Marine
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Habitat Connections: Wetlands, Fisheries and Economics

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Part One: Wetlands, Fisheries, & Economics in the Pacific Coastal States

The relationships between wetlands and fish production are an essential and important part of the ongoing debate on wetland regulation and policy. Unfortunately, these relationships are complicated and often unappreciated. For some Fisheries, such as shrimp in the Gulf of Mexico, the connection between wetlands and productivity has been demonstrated through extensive research. For others, such as salmon in the Pacific northwest, the relationship between habitat loss and productivity has been shown principally through the failure of the fisheries themselves. For a few fisheries, such as lobster, the connection to wetlands has been discovered only recently, and the primary influences on productivity are still being investigated. Because of the complexity of aquatic systems, it is difficult to quantify the exact effect of the loss or degradation of a particular acre of wetland on a fishery as a whole.

However, the life cycles of most commercial fish and shellfish species are fairly well understood, and biologists have determined that wetlands play an important part in providing food, protection, areas spawning areas for a number of species. Approximately 75% of the nation's commercial fish and shellfish depend on estuaries at some stage in their life cycle. Estuaries themselves depend on their wetlands to maintain water quality and provide the basis for food chains that culminate in human consumption of seafood. Many estuarine-dependent species have even closer ties to wetlands in that they feed, take refuge, or reproduce in the wetlands themselves. Without wetlands, these fish and shellfish cannot survive.

Commercial marine fisheries contributed \$19.8 billion in value added to the U.S.

Gross National Product in 1993. Commercial fishing in 1988 employed over 274,000 fishers and 90,000 shore workers. Fresh water and saltwater recreational fisheries in 1991 supported 924,600 jobs, provided \$19.2 billion in earnings, and resulted in \$24 billion in expenditures. This industry also contributed \$1.1 billion in state sales tax, \$227 million in state income taxes, and \$2.1 billion in Federal income taxes.

The following summaries for the Pacific coastal states provide information about the contribution of commercial and recreational fisheries to local and state economies, the relationships between the important fish species and wetlands, and the status of

wetland habitats. Of the commercial fish and shellfish harvested in Alaska, about 76% are dependent on estuaries and the wetlands that are an integral part of the estuarine ecosystem. For the Pacific northwest, California, and the Pacific islands, the estuarine-dependency is 52%, 18%, and 1%, respectively.

Salmon, smelt, herring, and sole, which are important elements of the eastern Pacific's fisheries, are dependent on the wetlands of this region.

In the late 1970's and early 1980's this country was losing wetlands at an estimated rate of 300,000 acres per year. The Clean Water Act and state wetland protection programs have helped to decrease wetland losses to an estimated 70,000 to 90,000 acres per year. Strong wetland protection must continue to be a national priority, otherwise fisheries that support more than a million jobs and contribute billions of dollars to the national economy are at risk.

California

Commercial fishing makes a considerable contribution to California's economy. In 1995, the wholesale value of commercial fisheries was in excess of \$166 million. In 1990, more than 6,000 people were employed directly in wholesale and processing operations. Major population centers, such as Los Angeles and the San Francisco Bay area, as well as smaller communities, like Eureka and Crescent City, depend on fishing to support their local economy. Wetlands provide an important link in maintaining the productivity of California's commercial fisheries, maintaining water quality, and providing spawning/rearing grounds, food supply, and habitat for commercial estuarine-dependent species such as Dungeness crab, salmon, shrimp, and herring. It was estimated in 1990 that the total value of California wetlands to commercial fisheries production was more than \$90 million.

California wetlands also support an important sport fishing industry. During 1991 it was estimated that 2.7 million people spent more than \$1.5 billion fishing in California. The state's recreational fishery generated more than \$900 million in earnings by supporting 40,000 jobs and contributed more than \$90 million in state sales tax. The majority of the fishing activity occurred in fresh water lakes, rivers, streams, and ponds, whose health is integrally related to the wetland systems supporting them. Saltwater sport fishing was also popular, accounting for about a quarter of the state's recreational fishing activity. The San Francisco Estuary supports the largest sport fishery on the west coast. Some of the more commonly caught estuarine-dependent recreational species include white croaker and surf smelt.

Pacific salmon are an integral part of the culture, heritage and economy of the Pacific northwest. In California the 1995 salmon landings had a dockside value of \$11.7 million. Salmon are anadromous fish, i.e., fish that move between fresh water and saltwater and thus are dependent on both coastal and riverine wetlands for the successful completion of their life cycle. Logging, mining, and industrial urban development can often degrade salmon habitat. As a result of habitat losses, some salmon runs in Idaho and California have already been listed as threatened or endangered under the Endangered Species Act. Several other salmonid species are currently being reviewed for listing. Declines in California salmon runs have resulted in the loss of more than 30,000 salmon fishing industry jobs since 1978. In recognition of the importance of salmon fisheries, millions of dollars in Federal, state, and local money are going toward restoring coastal and riverine habitats. Since further loss of habitat is counterproductive to these restoration efforts, strong wetland protection is essential to the future health and productivity of the salmon fisheries of California.

More than 90% of California's original wetlands have been lost, the largest loss of any state in the nation. Much of this loss can be directly related to economic development. Projects that eliminate wetlands frequently have obvious economic value, but the value gained in preserving wetlands is often difficult to assess. However, it is clear that the destruction of wetlands and the functions they provide can lead to a reduction in fish populations. The Clean Water Act and the state's coastal wetlands statute have succeeded in reducing the rate of wetland loss in California, but development pressures remain a threat to fish habitats. Consistent, long-term protection for wetlands at the Federal, state, and local level is essential for the protection of the fish habitats and fisheries that are so important to the economy of California.

Oregon

The commercial and recreational fishing industries are an important part of the economy in Oregon. In 1995, approximately 240 million pounds of fish were landed in Oregon, generating approximately \$78 million for cities such as Astoria, Newport, and Garibaldi, Oregon. This commercial fishing industry is dominated by estuarine-dependent species such as flounder, shrimp, herring, Dungeness crab, and salmon. Wetlands are a critical element in the life cycles of these species.

Oregon's wetlands and estuaries also support numerous species that are the backbone of a significant sport fishing industry. The economic effects of angler expenditures support local, state, and national economies by sustaining an extensive number of jobs in manufacturing, supplies and service industries. In 1991 more than 700,000 anglers spent \$489 million fishing in Oregon waters for species such as Dungeness crab, herring and salmon. In towns like Depoe Bay, Newport, and Garibaldi, this industry generated more than \$284 million in worker earnings, supporting 15,570 jobs. In 1991 this industry generated more than \$15 million in state income tax.

Pacific salmon fisheries deserve a specific mention because Pacific salmon are an integral part of the culture, heritage and economy of the Pacific northwest. In 1995 Oregon salmon landings had a dockside value of approximately \$3.6 million. Because salmon move between fresh water and saltwater, they are dependent on both coastal and riverine wetlands for the successful completion of their life cycle. Logging, mining, and industrial urban development can often degrade salmon habitat. In recognition of the importance of salmon fisheries, millions of dollars in Federal, state, and local money are going toward restoring coastal and riverine habitats. Since further loss of habitat is counterproductive to these restoration efforts, wetland protection is essential to the future health and productivity of the salmon fisheries of Oregon.

The coastal areas of Oregon and urban areas such as Portland, and surrounding Multnomah County, have seen a great population increase in the last few years. As more and more people move into these areas, it becomes more important to take into consideration the consequences associated with urban development of wetlands. The Clean Water Act and the state's regulations governing wetland fill have proved effective in reducing wetland losses. Local planning efforts, such as the West Eugene Wetlands Plan, also have improved wetland management in Oregon. The future of Oregon's wetlands and estuaries, the fisheries that depend upon them, and the communities that rely on fishing, hinge upon maintaining these strong regulatory programs and comprehensive planning efforts for wetland conservation.

Washington

Commercial and recreational fishing industries make an important contribution to the economy in Washington. In 1995, a total of approximately 243 million pounds of fish

economy in Washington. In 1975, a total of approximately 545 million pounds of fish were landed in Washington, generating approximately \$115 million for cities such as Anacortes, Bellingham and Seattle. In 1992, Washington exported \$672 million in fisheries products. This commercial fishing industry is dominated by estuarine-dependent species such as flounder, shrimp, herring, Dungeness crab, oysters, and salmon. Wetlands are a critical element in the life cycles of these species.

Washington's wetlands and estuaries also support numerous species that are the backbone of a significant sport fishing industry. The economic effects of angler expenditures support local, state, and national economies by sustaining an extensive number of jobs in manufacturing, supplies and service industries. In Washington during 1991, 995,000 anglers spent almost \$1 billion fishing in Washington waters for species such as salmon and steelhead. This industry generated more than \$555 million in worker earnings, supporting 27,020 jobs in towns like Westport and Port Angeles. In 1991, the state sales tax generated by this industry was over \$63 million.

Salmon fisheries are particularly important in Washington because Pacific salmon are an integral part of the culture, heritage and economy of the Pacific Northwest. In 1995, Washington salmon landings had a dockside value of approximately \$9.5 million. Salmon are anadromous fish, i.e., fish that move between fresh water and saltwater and thus are dependent on both coastal and riverine wetlands for the

successful completion of their life cycle. Logging, mining, and industrial urban development can often degrade salmon habitat. In recognition of the importance of salmon fisheries, millions of dollars in Federal, state, and local money are going toward restoring coastal and riverine habitats. Since further loss of habitat is counterproductive to these restoration efforts, strong wetland protection is essential to the future health and productivity of the salmon fisheries of the Pacific.

The coastal areas of Washington, in particular King County, have seen a great population increase in the last few years. By the mid 1980's Washington had lost approximately 31% of its original wetland acreage. The Clean Water Act and the state's shoreline management statute have proved effective in reducing recent wetland loss. Strong efforts for protection of the state's wetlands is needed to avoid additional wetland loss, which would adversely affect the fisheries that depend on those wetlands, and the communities that depend on the fishing industry.

Alaska

The Alaska region is one of the most productive areas of the world's oceans, supporting large populations of salmon, groundfish, crabs, marine mammals, and seabirds. Alaska leads all other states in pounds of fish landed and their dockside value. Fishing occupies a traditional place in the state's economy, and is considered part of Alaska's heritage. Towns such as Dutch Harbor-Unalaska, Kodiak, Petersburg, Akutan, and Cordova depend to a large extent or almost exclusively on fishing to support their economies. Fishing is the largest nongovernment employer in the state, and the export of fish products from Alaska plays a major role in reducing the nation's trade deficit. The 1995 dockside value of all of Alaska's living marine resources (salmon, groundfish, and shellfish) totaled more than \$1.4 billion. Recreational fishing is also an important part of Alaska's economy. In 1991, more than 300,000 anglers spent more than \$344 million fishing in Alaska's waters, supporting 6,690 jobs which generated more than \$153 million in wages. Approximately one-third of the recreational fishing occurred in coastal waters. Towns such as Sitka, Juneau, and Homer rely on fishing for salmon, flounder, and lingcod as a mainstay of their economies. Alaska's recreational fishing has far-reaching benefits, generating over \$17 million in Federal income taxes.

Pacific salmon fisheries deserve a specific mention because Pacific salmon are an integral part of the culture, heritage and economy of Alaska. It is estimated that the salmon industry in Alaska employs 22,000 people. The 1995 state-wide salmon catch had a dockside value of \$496 million. Because salmon move between fresh water and saltwater, they are dependent on both coastal and riverine wetlands for the successful completion of their life cycle. Logging, mining, and industrial urban development can often degrade salmon habitat. Though large areas of Alaska's wetlands are presently undisturbed and pristine, damage to fresh water fish habitat includes siltation problems and a lack of water for spawning and fish passage due to hydroelectric projects. In recognition of the importance of salmon fisheries, millions of dollars in Federal, state, and local money are going toward restoring coastal and riverine habitats. Since further loss of habitat is counterproductive to these restoration efforts, a strong wetland protection program is essential to the future health and productivity of the salmon fisheries of Alaska.

Although wetlands comprise 174.6 million acres (45%) of the state, the distribution of wetlands in Alaska varies considerably within the state's physiographic regions. Many wetland types are limited in extent, and only certain wetland types are of value to living marine resources. For example, while there are approximately 43,000 miles of shoreline within the state's coastal zone management districts, coastal salt marshes comprise only 360,000 acres, and seasonally flooded forested wetlands on stream and river flood plains comprise only 204,000 acres. These coastal and riverine wetlands are critical to the life cycles of many marine and anadromous species that mature and are harvested offshore, such as salmon, herring, pollack, and sole. Continuing strong protection of these wetlands is essential to maintaining the health of Alaska's commercial and recreational fisheries.

Hawaii

Recreational fishing is an integral part of Hawaii's economy. In 1991, over 200 thousand anglers spent more than \$90 million fishing in Hawaii's waters, supporting almost 2,500 jobs and more than \$48 million in earnings. Commercial fishing is also a growing part of the state's economy. In 1993, commercial landings in Hawaii had a dockside value of more than \$69 million.

It has been estimated that Hawaii at one time contained an estimated 59,000 acres of wetlands. Over the last 200 years Hawaii has lost approximately 12 % of its original wetland acres. It is difficult to quantify the exact effect of the loss or degradation of Hawaii's wetlands on local fisheries. It is estimated that only 1% of the Pacific island recreational and commercial species are estuarine-dependent. However, several of the species that are estuarine-dependent are important to the economy of Hawaii. These species include mullet, milkfish, shrimp, and the nehu, a tropical anchovy used as live bait in the pole-and-line skipjack tuna fishery.

One of the greatest benefits of Hawaii's wetlands is to protect and maintain water quality in other near-shore habitats. This is particularly true for coral reefs occurring seaward of coastal wetlands. Wetlands protect these reef areas from sediment, turbidity, and pulses of fresh water during periods of heavy rain. The protected coral reefs are very important for commercial and recreational fisheries as well as the ocean recreation industry. Wetlands also provide, directly or through the food chain, prey organisms for reef and open coastal fishery resources. The Clean Water Act and the state's coastal zone management statute are important parts of maintaining the quality and quantity of Hawaii's wetlands, and the fisheries that depend on those wetlands.

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