



Sustainable Seafood in the United States

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The United States is a major seafood-consuming country ranked third behind China and Japan in total fish and shellfish consumption. In 2009, the average U.S. resident consumed 15.8 pounds of seafood; about three quarters was fresh and frozen finfish and shellfish, and almost a quarter was canned seafood, primarily tuna. Seafood provides not only an excellent and delicious source of protein but also multiple health benefits. Most notably, seafood is low in saturated fat and rich in essential nutrients, such as omega-3 fatty acids that protect against cardiovascular disease and promote brain development.

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In addition to this appetite for seafood, U.S. consumers are placing a higher value on sustainably harvested seafood. Starting in the mid-1990s, the concept of environmental or ecological sustainability ignited public concerns about how fishing operations were conducted. These concerns led to efforts to ensure that fishing be conducted in ways that minimized harm to marine ecosystems. The sustainable seafood movement gained momentum, particularly

within the last decade, as more people have become concerned about the consequences of fishing, specifically, overfishing, bycatch, and habitat impacts. Eco-labeling programs have emerged to identify seafood harvested according to accepted standards such as the United Nations Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries. Unfortunately, these consumer awareness efforts often fail to acknowledge that seafood harvesting by U.S. fishermen in federal waters has improved greatly since the 1970s and is currently comprehensively managed for sustainability.

Federal Governance and Sustainability

Seafood harvested in the United States is managed under various state and federal authorities, with the individual coastal states responsible for managing fisheries that occur in state waters, in most cases, within three nautical miles offshore. Domestic federal fisheries occur within the U.S. Exclusive Economic Zone (EEZ) that usually extends from 3 to 200 nautical miles offshore. In 1976, Congress passed the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the nation's fishing law, which established eight regional fishery management councils. These councils, consisting of relevant state and federal authorities, and commercial and recreational fishing stakeholders, recommend management measures to the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries), within the Department of Commerce for fishing activities in the EEZ. Regional council recommendations, in the form of Fishery Management Plans (FMPs) and regular



plan updates, are approved by NOAA Fisheries if the recommendations are consistent with all applicable laws. On the U.S. West Coast, the Pacific Fishery Management Council (Pacific Council) recommends fishery management measures for salmon, groundfish, coastal pelagic species (sardines, anchovies, and mackerel), and highly migratory species (tunas, sharks, and swordfish) in the EEZ off the coasts of Washington, Oregon, and California. These recommended measures apply to commercial and recreational fishermen.

The primary purpose of the MSA and its subsequent amendments is to ensure that domestic fisheries are sustainably managed to contribute to the nation's food supply and economy, as well as to provide recreational opportunities. However, whether undertaken recreationally or commercially, fishing is primarily a food production system and, like farming, comes with ecological impacts (Figure 1). For example, fishing can impact fish habitats, and can unintentionally catch non-targeted marine animals. Consequently, the MSA requires that fishing be coupled with precautions to minimize these physical and biological impacts.

The MSA includes ten national standards that all FMPs must address:

1. Prevent overfishing while achieving optimum yield.
2. Use the best available science in preparing conservation and management measures.
3. Manage stocks as a unit throughout their range.
4. Allocate harvests fairly and equitably.
5. Utilize fishery resources efficiently.
6. Account for variations in fisheries, fishery resources, and catches.
7. Minimize costs and unnecessary duplication in management measures.

8. Sustain participation of fishing communities, in a manner consistent with conservation goals, and minimize adverse economic impacts to such communities.
9. Minimize the catch of non-target species (called "bycatch") and bycatch mortality.
10. Promote fishermen's safety while at sea.

Federal fisheries are also managed with consideration for the sustainability of coastal fishing communities. This is usually overlooked in sustainable seafood discussions. There are business costs to fishing. Fishermen, as well as ports and waterfronts, often make substantial long-term investments that support fishing activities. Fishery managers strive to balance these ecological, social, and economic factors.

Federal fisheries also comply with other laws, such as the Endangered Species Act (ESA), which protects endangered and threatened species, and the Marine Mammal Protection Act (MMPA), which safeguards marine mammals.

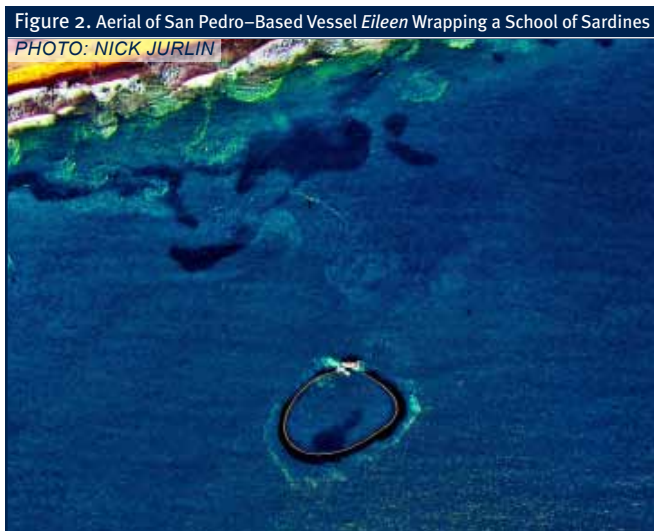
Fisheries science is also evolving to better understand species and habitat relationships, as well as how these are affected by chemical and physical ocean processes. This will allow managers to include more of these ecosystem dynamics in decisions. This approach is known as "ecosystem-based fishery management."

Sustainable Fish Stocks

The MSA has always required prevention of overfishing, but in the 2007 MSA amendments, Congress specified annual catch limits as another means of protection. Catch limits for commercial and recreational fisheries ensure that exploitation rates do not exceed established thresholds based on the best available science and factor in scientific uncertainty. The Pacific Council recently amended its four FMPs to establish annual catch limits.

Other management measures are also employed to control how many fish are removed each season. Examples include bag limits, harvest guidelines, quotas, trip and landing limits, area restrictions, depth restrictions, size limits, seasonal closures, and gear restrictions (e.g., the minimum mesh size for nets). The West Coast sardine fishery, for instance, is closed when harvest quotas are reached (Figure 2). NOAA Fisheries implements fishing regulations that specify these measures for a fishery, based on Pacific Council recommendations, and NOAA's Office of Law Enforcement enforces the regulations. NOAA Fisheries also places fishery observers on some U.S. commercial fishing vessels to monitor the catch and to collect data about the fishing activities. Observer

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programs log more than 60,000 observer days annually, in efforts to monitor 42 different fisheries around the nation. NOAA has been using observers to collect data since 1972. On the West Coast, NOAA Fisheries places observers on commercial fishing boats harvesting groundfish, swordfish, and tuna species, and is considering a program for the coastal pelagic fisheries (e.g., sardine).

Minimizing Bycatch

Federal fishery managers also use three strategies—avoidance, deterrence, and gear selectivity—for minimizing bycatch, while attempting to balance the need for fishing. The method that best applies to a particular fishery depends on known behaviors of the targeted species and the non-target species, the practicality of the approach, and the latest research on the effectiveness of alternative gear, as well as compliance with relevant laws.

To avoid interactions between fishing gear and non-target marine species, managers commonly designate times and areas closed to fishing. This strategy is especially useful for gear types such as nets to avoid spawning or nursery areas and migratory routes. Such closures may be implemented annually or seasonally depending on the characteristics of the non-target species. For example, the Southern California Bight is closed to drift gillnets used to catch swordfish during El Niño years (Figure 3). This avoidance measure prevents interactions with loggerhead sea turtles that migrate up from Central American waters to feed during these warm-water periods. Additionally, an area of 214,000 nautical square miles, stretching from Point Conception to northern Oregon, is closed to these same nets every year between August and November to prevent interactions with leatherback sea turtles that migrate annually from Southeast Asia to feed in the rich marine waters off the U.S. West Coast.

While avoidance strategies seem simple and direct in achieving a particular conservation objective, such measures may result in displacing fishing to other areas, thereby shifting the problem elsewhere, sometimes without achieving the intended objective. Time and area closures also affect fishermen by limiting, or even eliminating, opportunities to fish. To simultaneously achieve both objectives of harvesting ample fish while minimizing interactions with fewer non-target species in the same area, technology can be employed, such as deterrence devices and selective fishing gears. Compliance with these solutions usually places less of an economic burden on fishermen than a full fishing closure. A good example is the requirement that California drift gillnet fishermen attach acoustic pingers to their nets. The pingers emit detectable signals that deter marine mammals away from the gear. Pingers were first required in the fishery in 1998, and since then, there has been a significant decrease in interactions between fishing gear and marine mammals in the West Coast swordfish fishery (Figure 4).

Gear selectivity is an important and preferred strategy, which, in addition to protecting marine life, allows fishermen to continue working and supplying local seafood to U.S. consumers. Examples include the use of Bycatch Reduction Devices (BRDs) and Turtle Exclusion Devices (TEDs) in U.S. shrimp fisheries along the East



Figure 4. Southern California–Based Fishing Vessel Lands a Swordfish

PHOTO: PETE DUPUY



Coast and Gulf of Mexico. These devices allow non-target fish and sea turtles to escape from trawl nets.

U.S. pelagic longline swordfish fisheries started using gear modifications and new methods to improve selectivity in the mid-1990s. NOAA Fisheries scientists successfully worked with longline fishermen to perfect the use of circle hooks and mackerel bait in place of traditional “J” hooks and squid bait in order to reduce sea turtle interactions and post-hooking mortalities. As shown in figure 5, the catch rates of leatherback, loggerhead, and all sea turtles combined decreased by 85%, 90%, and 89%, respectively, after federal regulations requiring the use of circle hooks and mackerel bait were implemented (Gilman et al. 2007). Circle hooks have proven successful in domestic and foreign shallow-set longline fisheries because the hooks cannot be swallowed (i.e., “gut-hook”) by sea turtles, which is usually fatal. This also benefits undersized fish, marlins, and sharks that can be released alive. U.S. pelagic longline fishermen are also required to use bycatch release and removal gear (e.g., turtle de-hookers, line cutters) and are trained in specific techniques to assist in handling a sea turtle, removing a hook, and resuscitating a sea turtle to maximize its survival rate once released.

Fishing at a Higher Conservation Standard

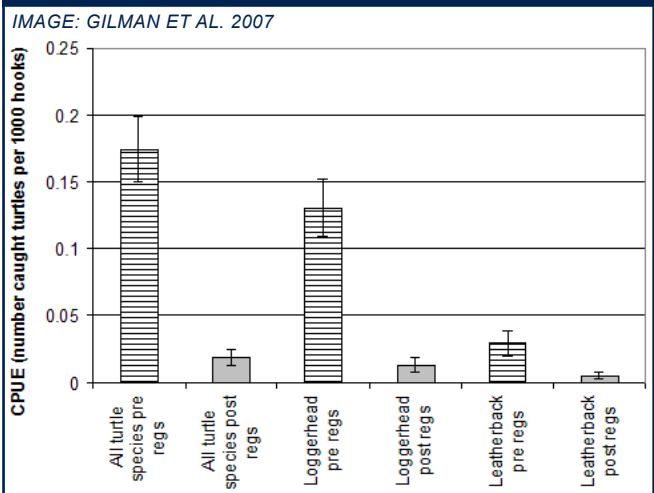
Many U.S. seafood consumers may be unaware of the many laws and policies that require U.S. fishermen to fish sustainably and with more environmentally responsible measures compared to many of their counterparts throughout the world. Consumers trying to make sustainable seafood choices have often overlooked this significant factor. Most U.S. consumers are also unaware that the majority of the seafood they consume is not caught in U.S. waters. The most recent analysis shows that about 84% of the seafood consumed in the U.S. is imported. This is a dramatic increase from the 66% imported just a decade ago (NOAA Fisheries 2010).

Some imported seafood comes from countries that do not have comparable laws for protecting sensitive marine species and habitats or for preventing overfishing. U.S. fishermen, targeting federally managed stocks, are managed under the MSA and must comply with the MMPA and ESA. Therefore, U.S. fishermen are held to much higher conservation standards than fishermen from other countries. Unfortunately, these standards are neither universally adopted nor accepted by the majority of the world’s fishing nations, especially by small-scale or coastal fisheries. Small-scale fisheries contribute to more than half of the world’s fish catch and probably pose the greatest risk to marine ecosystems because they lack strong governance systems and enforcement (FAO 2010). These small-scale fisheries occur primarily in the coastal areas of developing countries.

Other Sources of Seafood

Farmed seafood production, or aquaculture, has expanded dramatically outside the United States in the last three decades and now supplies half of the world’s seafood demand, according to the FAO (2010). The U.S.

figure 5. Pre-Regulation (1994–2001) and Post-Regulation (2004–2007) Turtle Take Rates in the Hawaii-Based Longline Swordfish Fishery



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aquaculture industry, though vibrant and diverse, currently meets less than 10% of the U.S. demand for seafood. However, U.S. consumption of farmed seafood is high, since most of the seafood consumed in the U.S. is imported, and aquaculture comprises almost half of seafood imports to the United States.

Although the United States has been successful in developing marine shellfish aquaculture, finfish aquaculture for food purposes has lagged far behind. There are exceptions such as salmon hatcheries in Northern California and Hubbs SeaWorld's white seabass program in San Diego (Figure 6). However, these land-based efforts, which are still considered aquaculture, are conducted for stock enhancement purposes rather than food production.

Part of the lag in aquaculture in the United States has to do with concerns about the ecosystem impacts on coastal and marine species and habitats. Recognizing these and other concerns, in 2011 the U.S. Department of Commerce and NOAA released policies for sustainable marine aquaculture (NOAA Fisheries 2011) and how it may supplement the growing demand for healthy seafood, create jobs in coastal communities, and restore vital ecosystems. This new focus may be the catalyst for developing and expanding sustainable aquaculture in the United States.

Informing the Public

The importance of sustainable fish stocks and sustainable fishing practices has become well entrenched in a growing portion of this nation's consciousness. Outreach efforts to mobilize public opinion and change consumer behavior toward sustainable seafood have been under way for years and include a variety of methods, such as boycotts, seafood guides, eco-labeling, and retailer pressure. These various efforts share the common goals of increasing public awareness and seeking support for sustainable seafood, but these campaigns may seem inconsistent and confusing to consumers. Too many competing messages can be overwhelming for consumers, creating mistrust toward the seafood industry and fisheries managers. NOAA Fisheries

developed the FishWatch program to provide consumers with accurate, current, and unbiased information about U.S. seafood, in an easily accessible online tool.

FishWatch (www.FishWatch.gov) is designed to help U.S. consumers make informed decisions about the seafood they eat based on neutral, scientific information (Figure 7). The program does not advocate for particular consumer decisions but rather is designed to help consumers understand the management and science requirements involved with building and maintaining sustainable fisheries in the United States. A critical element of NOAA Fisheries' mission is to make fisheries data and information available to the public in a timely fashion. FishWatch does this by providing consumers with relevant seafood facts, taken from a variety of NOAA sources, including fish stock assessments, fishery evaluations, and fishery management plans and amendments. These science-based sources are used to ensure that the information on FishWatch is considered the most accurate and up-to-date information on seafood available in the United States.

FishWatch currently includes only those marine species managed by NOAA Fisheries under U.S. federal management. For example, varieties of tuna (e.g., albacore), salmon, Pacific sardines, lingcod, and other familiar species harvested by U.S. fishermen are included. Currently, imported species (e.g., orange roughy) and farmed species (e.g., tilapia, catfish) are not included, but revisions to the site are under way to include information on these species as well. FishWatch also details the health benefits of eating seafood, including guidelines for mothers, young children, and the elderly, and the site supplies nutritional facts for each species. Additionally, FishWatch provides information to help select, store, and cook seafood. Lastly, the latest scientific research and seafood news are posted on the site.

Figure 7. FishWatch Logo

LOGO: NOAA FISHERIES



Final Thoughts

Despite the growing resolve for sustainable seafood in the United States and other developed countries, pressure on global fisheries continues and will likely increase. The FAO estimates that today's population of just over 7 billion people will reach 9.1 billion in 2050 and will require a 70% increase in global food production (2010). Nearly all of that population growth will occur in developing countries, which, for the most part, rely on seafood for livelihoods and day-to-day subsistence. Consequently, there will be even greater pressure to harvest seafood as an important source of protein, and much of the harvesting will be done in fisheries that are not being managed with similar objectives for sustainability as in the United States.

It is essential for the United States to maintain a leadership role in ocean stewardship to ensure that wild capture fisheries and marine aquaculture efforts are sustainably conducted and demonstrated globally. Certainly, the United States will continue to play a major role in that effort by transferring to other fishing nations research and developments in cleaner fishing technologies and by remaining a strong advocate for conservation and management in international fisheries organizations, such as the Inter-American Tropical Tuna Commission. To be a strong leader, the United States must also maintain a robust fishing industry and domestic seafood supply rather than continuing to rely heavily on other countries to provide the majority of the seafood the United States consumes (Figure 8). The best way for the United States to accomplish these objectives is to ensure that strong, productive, and sustainable U.S. wild capture and aquaculture fisheries are maintained. The first step in doing that is to support the U.S. fishing industry. U.S. fishermen provide high-quality, sustainable seafood to this nation's homes and restaurants. So the next time you want to buy seafood, look for seafood caught in the U.S.A.—it is sustainable.

Figure 8. California-Based Fishing Vessel Equipped with Drift Nets and Harpoon

PHOTO: NOAA FISHERIES



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