

FISHERIES SNAPSHOTS

On Trade and Conservation Issues

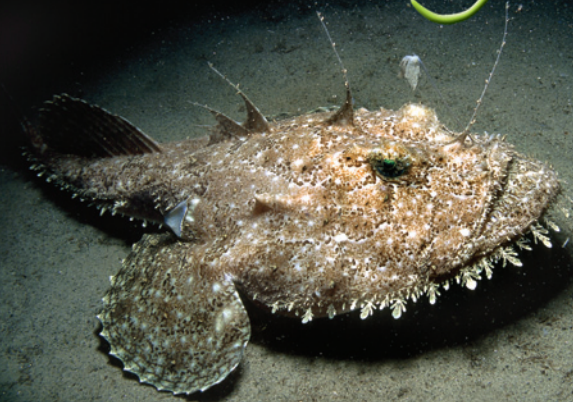
TRASH TO TREASURE

Once tossed overboard as trash, monkfish have become valuable to fishermen and fashionable with diners. From around 1900 through the 1960s, monkfish were bycatch in the groundfish and scallop fisheries in North American waters, but now they have filled the gap left by depleted cod, flounder, and hake in New England and become prime targets off the Mid-Atlantic. The significant demand for monkfish resulted from the depletion of those same species in the waters of Europe, where it is valued for its firm, mild, and slightly sweet tail meat; from the opening of export markets to Japan, where the livers are prized for soup and sushi; and from the displacement of the groundfish fleet from historic fishing areas. A federally funded marketing push by well-known chefs also contributed to increased demand in the United States.

Over the last decade, the cheeks, liver, and tail of the monkfish have become lucrative products for one of the fastest growing sectors of the New England and Canadian groundfish fleets. It was not until catch levels had dramatically increased and monkfish populations significantly decreased in some areas, however, that Canada and the United States imposed management plans. To the south, off the Mid-Atlantic states and North Carolina, monkfish remain at low levels. Monkfish populations now appear to be rebuilding somewhat in the northern part of the U.S. range, but even there fishing mortality is still too high. Nevertheless, many in the fishing industry continue to oppose decreases in allowable catch levels.

MONKFISH

Lophius americanus



Courtesy of Rudolf Svensen

This fish looks so bizarre that in 18th-century France it was illegal to display the entire creature in the market. But in the 1980s it became the darling of famous chef Julia Child, and today the monkfish is one of the hottest items in seafood cuisine.

Although recent management measures seem to be reversing the decline of monkfish populations in some areas,

TRAFFIC remains concerned about their status. Years of unsustainable and largely unregulated fishing have driven populations to low levels. Demand, particularly export demand, and high prices continue to drive high catch levels. Mortality from directed fishing remains high and mortality from bycatch is not fully monitored, meaning that our understanding of the total impact of fishing on monkfish populations involves much uncertainty. It will be important to manage this fishery in a precautionary manner into the future to ensure the health of monkfish populations and the fisheries that depend upon them.

BIOLOGY AND ECOLOGY

The fantastic brown monkfish, with its chin flaps and dangling protuberances, has been described as one big mouth with a tail. It is also known as goosefish, bellyfish, anglerfish, allmouth, and lawyer. Monkfish are found in inshore and offshore waters from the northern Gulf of St. Lawrence to Florida, although concentrations are primarily north of Cape Hatteras.

Monkfish have been found in depths ranging from the tide line to 840 meters (2,700 feet) with concentrations between 70 and 100 meters (230 and 330 feet) and at 190 meters (620 feet). Females live up to 12 years, whereas few males live more than 6 years, though they have been recorded as old as 9 years. Monkfish reach sexual maturity between ages 3 and 4. Both sexes reach lengths of about 50 centimeters (20 inches) by age 4. Females can grow to as long as 100 centimeters (40 inches) by age 12. Males reach lengths of about 90 centimeters (35 inches) and can weigh 30 kilograms (70 pounds). The average size of fish taken in the fishery has decreased so that most monkfish caught in the U.S. fishery are now between 43 and 49 centimeters (17 and 20 inches) and are less than 4 years old. This indicates that many monkfish are being caught before they are able to reproduce and contribute to the future population.



Monkfish shifted from being “trash fish” to being valuable as overfishing depleted other species and demand for monkfish in haute cuisine grew. Courtesy of OAR/National Undersea Research Program

Voracious eaters and fast growers, monkfish consume everything from eels to cod to lobsters and seabirds and do not appear to have any predators once they are mature. Reports of prey items larger than the fish itself are common. Monkfish are actually said to fish for some of their food, as they have a sort of fishing rod as part of their anatomy. The rod is the front spine of the fin on its back, with a piece of skin on the end. When hungry, a monkfish can wave the rod in front of its mouth to attract prey.

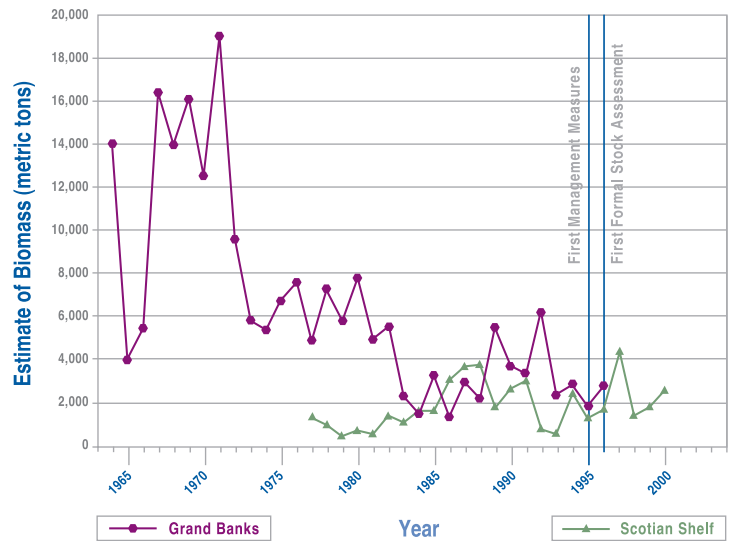


Figure 1. Biomass in Canadian Waters. Data Source: Department of Fisheries and Oceans, Canada

CONSERVATION STATUS

In Canada, data on monkfish have been collected since the 1960s, with the first full stock assessment in 1996. Monkfish populations on the Grand Banks have declined over time while monkfish populations on the Scotian Shelf, where the fishery has been less intense and data have been collected for a shorter period of time, have remained more stable (fig. 1). The most recent stock assessment, conducted in 2000, described the overall condition of the stock as showing good recruitment (the number of new young in the stock) and abundance, but also indicated a loss of large adults that made up a significant portion of the fishery in the 1970s and 1980s. Scientists are concerned about the small number of large fish, since they are the source of reproduction.

In the United States, data on monkfish have been collected by government scientists as a part of periodic groundfish surveys for many years, but the species was not formally assessed until 1997 when it was determined to be overfished. The stock has declined with time, reaching the lowest levels in the mid-1990s, and increasing somewhat since then (fig. 2). Monkfish are still considered overfished in the southern part of the range. Management measures appear to be reversing the decline of monkfish in the northern part of the U.S. range. Even there, however, fishing mortality remains too high to enable stocks to rebuild to safe levels. Surveys show improved recruitment, which is an important indicator of population health. Still, managers are cautious because of lack of knowledge about the distribution of the population and the effects of the U.S. fishery.

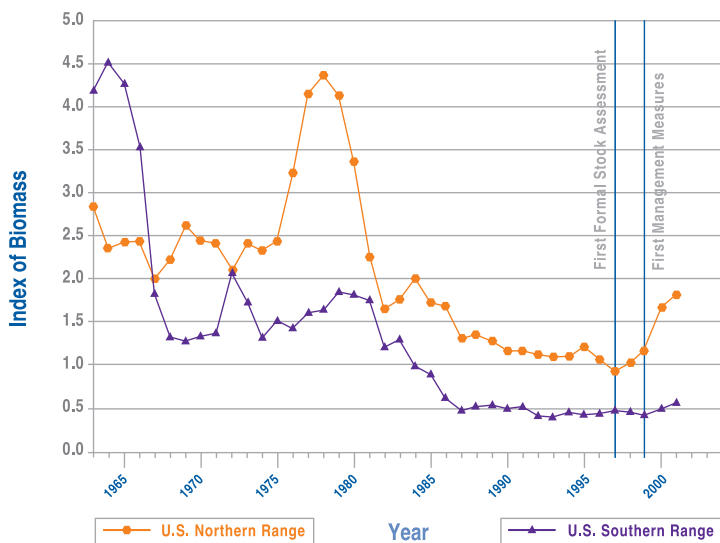


Figure 2. Biomass in U.S. Waters. Note: The biomass estimates for monkfish in Canadian waters are managers' estimates of the total biomass in Canadian waters based on periodic trawl surveys. The indices of biomass in U.S. waters are likewise based on periodic surveys, but incorporate other data as well. The biomass data sets presented for Canada and the United States are not directly comparable in absolute terms. The most important message from the figures, and the aspect that is comparable, is the general decline over time. *Data source: NOAA Fisheries, United States*

PRODUCTS AND MARKETING

The lucrative market for monkfish is driven by demand for tails, cheeks, and livers. The fresh product is provided as skinless tail fillets, whole tails, or whole fish with the head still on. Frozen monkfish



Popularity on the dining table helped make monkfish a valuable commodity—and adversely affected its numbers. © StockFood/Leser

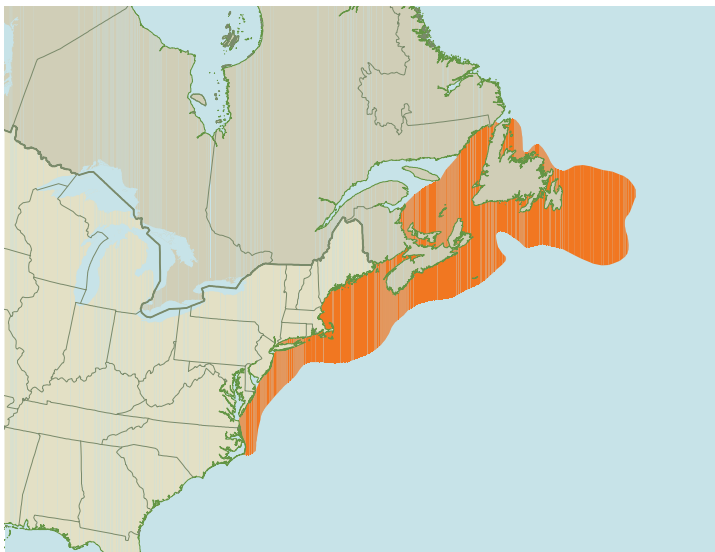
comes as skinless tail fillets or whole tails with the skin on. Sometimes called “poor man’s lobster,” monkfish is more like lobster or scallop than most fish in texture, and monkfish is prized for use in soups and on the grill. Monkfish tails provide mild, very firm meat. Suitable for baking, poaching, or sautéing, monkfish tails have been used in Europe for decades, and only more recently in the United States. Cheeks are sautéed, roasted, served in sauces, or used in fish stews. Livers are exported to Japan for use in soup and sushi.

The “islet of Langerhans” in the monkfish pancreas is of possible biomedical use for the production of insulin. One monkfish yields 20 to 40 times more islet tissue than can be obtained from any other vertebrate. This use of monkfish in the production of insulin is now in the research stage.

FISHERY

In Canada, the largest fishery occurs on the Scotian Shelf, but monkfish also are taken as bycatch off Newfoundland on the Grand Banks and in the Gulf of St. Lawrence. In the United States, the commercial fishery for monkfish operates primarily in the deeper waters of the Gulf of Maine, Georges Bank, and southern New England (see map, p. 4).

In both Canada and the United States, monkfish were historically taken as bycatch in scallop and groundfish fisheries. Monkfish landings grew significantly in response to new markets and high prices in the late 1980s and early 1990s. Instead of discarding monkfish caught in the course of fishing for scallops and groundfish, fishermen off New England and Canada kept them to sell. In some areas, especially off the U.S. Mid-Atlantic states, fishermen also began to target monkfish. The monkfish fishery of Canada is still developing in areas off Newfoundland.



The North American monkfish fishery extends from Newfoundland to North Carolina (orange shows estimated range). Map by WWF-US Conservation Science



Although management measures are now in place, the U.S. fishery continues to exceed target catch levels in some areas. Courtesy of NOAA Fisheries, United States

Trawls, gill nets, and scallop dredges are the principal gear types historically used to land monkfish. Fishing effort for, and catches of, monkfish increased dramatically along the entire Atlantic coast from Labrador to North Carolina in the early 1990s. For the year 2000, there were approximately 2,500 U.S. vessels permitted to catch monkfish, many of those fishing primarily for other groundfish species and catching monkfish incidentally. All monkfish in trade are taken from wild stocks; there is no aquaculture of the species.

FISHERY MANAGEMENT

The Canadian monkfish fishery is managed by the Department of Fisheries and Oceans, based on recommendations from scientists and the Fisheries Resource Conservation Council. Canadian managers have restricted monkfish catches since 1995, when they imposed a limit on the amount of monkfish that could be taken as bycatch by trawlers on the southern Scotian Shelf. That limit resulted in reduced landings of monkfish in subsequent years.

In Canada, current management does not directly limit total monkfish catch. It relies instead on a bycatch limit that restricts monkfish landings to 20 percent of total groundfish landings. The scallop fishery also takes some monkfish as bycatch, but discard information is not currently collected and there are no monkfish bycatch limits for the fishery. Canada is working to ensure a sustainable fishery, but absence of an effective limit on, or full accounting of, total monkfish mortality in Canadian waters poses a conservation challenge.

Some sectors of the groundfish fishery are monitored by observers, and vessels are required to report both catch and discards of monkfish. Canadian compliance authorities found 16 violations related to monkfish management in the last 5 years.

The U.S. monkfish fishery is managed by the National Oceanic and Atmospheric Administration (NOAA) Fisheries pursuant to a plan developed by the New England Regional Fishery Management Council and the Mid-Atlantic Fishery Management Council and

approved by NOAA Fisheries. The development of a management plan for the U.S. monkfish fishery was triggered by a 1997 stock assessment which determined that monkfish were overfished. After long controversy, and well after the fishery had grown rapidly in response to price and market demand, the plan was finally adopted in 1999.

The stated objective of the plan is to rebuild the stock to a safe level (defined in the management plan as the level capable of producing the maximum sustainable yield) by 2009, but there is doubt as to whether this objective can be achieved at present fishing mortality levels. The fishery has exceeded the plan's target annual catch rates in every year since the plan's inception.

In the United States, current management does not directly limit the total annual monkfish catch, but includes a daily trip limit on directed catches, as well as limited access and effort restrictions. Monkfish are taken as bycatch in other fisheries, including the cod, flounder, and scallop fisheries, and some discard information has been collected since 1996. There are no total annual limits on monkfish bycatch, but there are daily limits for monkfish bycatch in the groundfish and scallop fisheries. Like Canada, the United States' efforts to secure a sustainable fishery may be hampered by the absence of effective limits on, or full accounting of, total monkfish mortality in U.S. waters.



Research is needed to determine how the removal of the monkfish—a voracious predator—affects the ecosystem. Courtesy of Maryland Dept. of Natural Resources, www.dnr.state.md.us

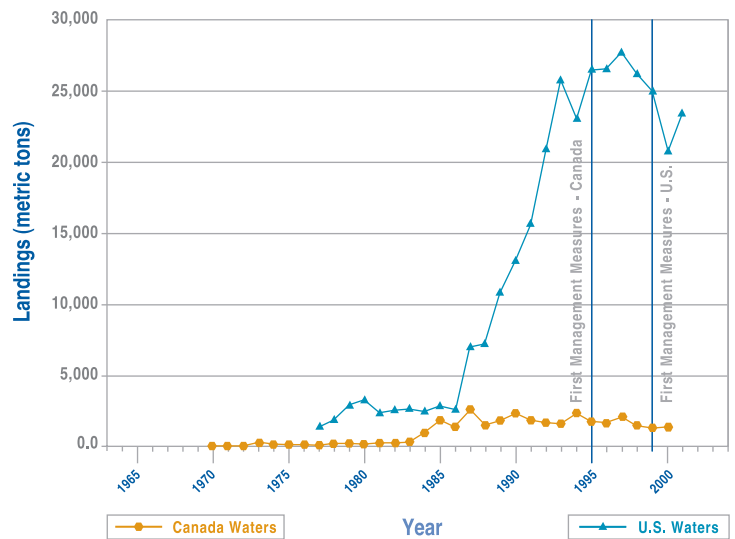


Figure 3. Landings from Canadian and U.S. Waters. Data source: NOAA Fisheries, United States, and UN Food and Agriculture Organization

Groundfish and scallop vessels that take monkfish as bycatch are required to report their landings, and a very small portion of the groundfish fleet and a greater portion of the scallop fleet are monitored by observers. In the last five years, NOAA Fisheries has opened 77 cases of violations pertaining to monkfish, and the monetary penalties and fines associated with these cases have totaled \$763,678.

LANDINGS AND TRADE

U.S. monkfish landings climbed significantly between the mid-1980s and mid-1990s, reaching a high of more than 27,000 metric tons (60 million pounds) in 1997 (fig. 3). In 2000, with stocks already significantly overfished and the first management plan finally in place, U.S. landings decreased to 20,000 metric tons (44 million pounds). Although landings were lower after 1997, total export value continued to climb, reaching nearly \$35 million in 2001.

Canadian landings have been consistently much lower than U.S. landings, but have followed a similar pattern. Canadian landings increased significantly in the 1980s, reaching a high of nearly 2,700 metric tons (6 million pounds) in 1987, stabilized in the 1990s, and decreased to approximately 1,200 metric tons (2.6 million pounds) in 2000, with management beginning in 1995.

In the grand scheme of what fish products contribute to the balance of trade, monkfish is a minor player. However, monkfish is significant for certain regions and ports, because it has high value and substitutes for other species that have been overfished. U.S. monkfish exports have increased significantly since the export markets to Asia and Europe developed in the late 1980s and early 1990s. From 1995 to 2001, U.S. monkfish product exports increased from approximately 3,000 metric tons (6.6 million pounds) to more than 8,000 metric tons (17.6 million pounds) annually, and the export value remained consistently above \$3,500 per metric ton (fig. 4).

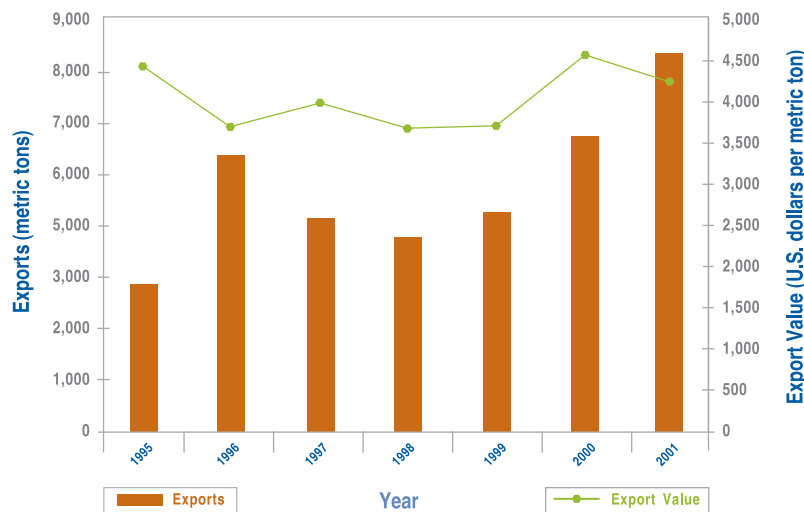


Figure 4. U.S. Exports and Unit Value. Data source: NOAA Fisheries, United States

Canadian monkfish exports are not tracked separately from other groundfish in government statistics, however there are exports from Canada. Also, some Canadian monkfish exporters use U.S. shipping facilities in Boston and New York because of air transportation connections to markets in Europe and Asia, so some U.S. exports are actually Canadian-caught monkfish. Exports reflect the weight of the tails, cheeks, and livers rather than the whole weight of the fish, which is reflected in landings data.

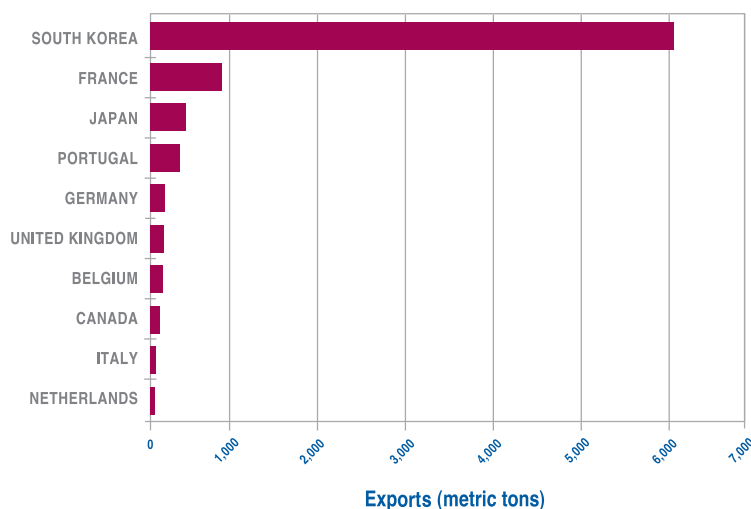


Figure 5. U.S. Export Destinations (2001). Note: The United States also exported less than 20 metric tons to Indonesia (13 metric tons), Malta (12 metric tons), and Taiwan (1 metric ton). Data source: NOAA Fisheries, United States

When monkfish were just bycatch in other fisheries, the best price they could bring in the marketplace was 80 cents a pound for the tails. Today they are prime fishery targets worth \$5 or more per pound for the tails and as much as \$30 per pound for the livers.

In 2001, South Korea, France, Japan, and Portugal accounted for more than 90 percent of U.S. monkfish exports (fig. 5). Canada's top export markets include South Korea, Europe, and the United States, which imported 72 metric tons (160,000 pounds) of monkfish from Canada in 2001.

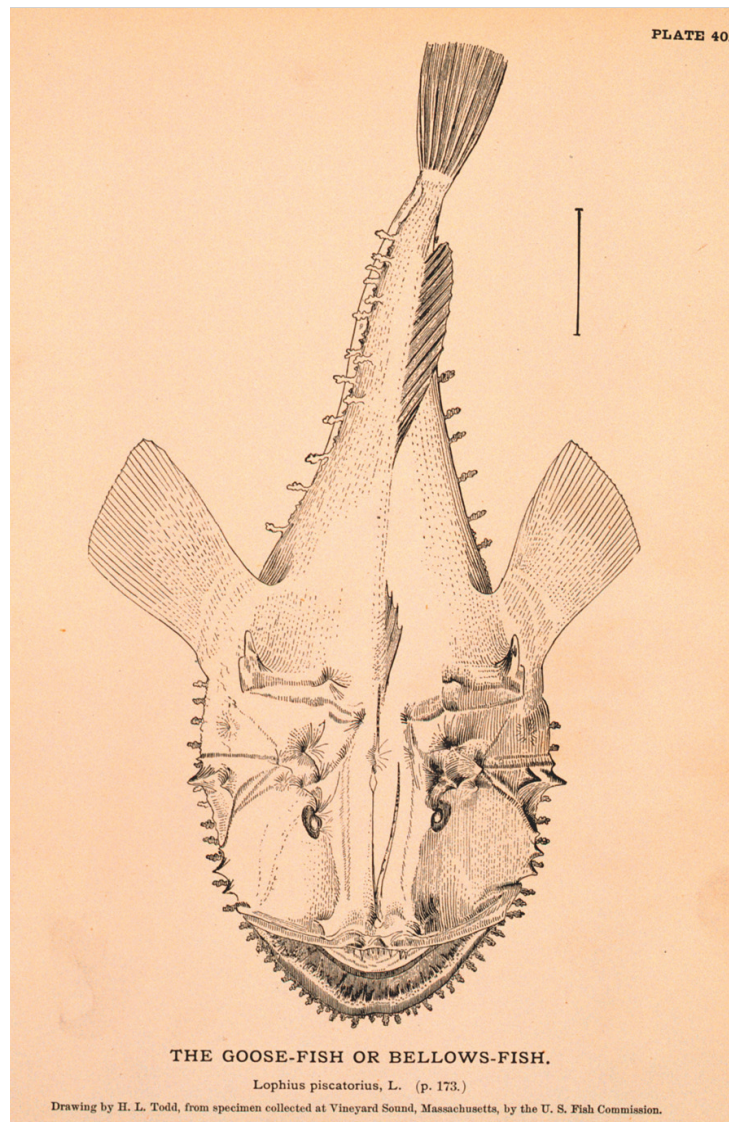


The United States exports monkfish to Asia and Europe, shown in dark blue, with most U.S. exports going to South Korea in recent years. The range of the North American monkfish fishery is shown in orange.

Map by WWF-US Conservation Science

CONCLUSIONS

- The development of the North American monkfish fishery was closely related to the opening of export markets in Europe and Asia, and the severe overfishing of other groundfish species.
- Delay in managing the North American monkfish fishery resulted in declines that could likely have been avoided with earlier, precautionary action. In both Canada and the United States, stock assessments and management came after, rather than before, the most significant growth in the fishery and alarming drops in the biomass of the species.
- To work toward the conservation of the monkfish, TRAFFIC recommends that (1) managers ensure that fishing mortality is limited to a level that provides a high degree of certainty of monkfish stocks rebuilding to established targets within established time frames, (2) managers ensure that target catch rates are not exceeded, and (3) authorities monitor all fishing mortality, including all bycatch mortality.
- To inform conservation efforts, TRAFFIC recommends that research priorities include determination of the role of monkfish as predators in the ecosystem.



Courtesy of NOAA Fisheries, United States

TRAFFIC, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature.

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For more information and key references, see www.traffic.org or www.worldwildlife.org

TRAFFIC North America
c/o World Wildlife Fund
1250 24th Street, N.W.
Washington DC 20037
Tel: 202-293-4800
Fax: 202-775-8287
Email: tna@wwfus.org

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