

NORTHEAST FISHERIES CENTER

TARGETED INFORMATION



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National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Center
Woods Hole, Massachusetts 02543

BLUEFISH:

BIOLOGY AND MANAGEMENT ALONG THE ATLANTIC COAST

by

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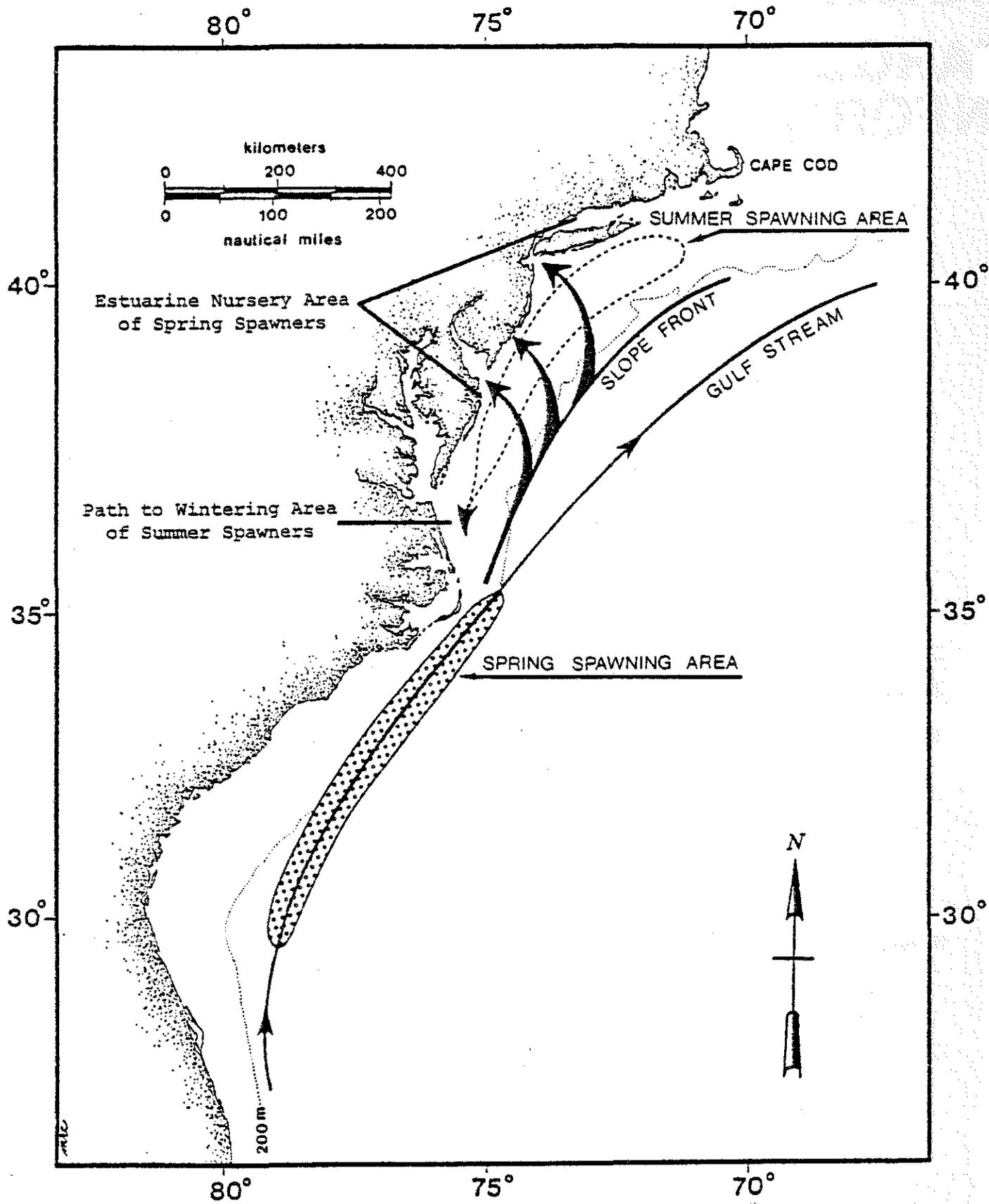


Figure 1. Spawning areas and coastal migration patterns for bluefish along the Atlantic Coast.

INTRODUCTION

Bluefish, *Pomatomus saltatrix*, are a fast-growing, cosmopolitan, temperate-water species. They thrive off the East and Gulf Coasts of the United States and along the coasts of South America, Africa, southern Europe, and Australia. They undertake long coastal migrations and take advantage of offshore ocean currents, inshore bays, and estuaries for survival.

In the United States, the bluefish is currently one of the most important recreational fish caught along the East Coast. This importance stems from its abundance and nearshore movements, and recent declines in production of other popular species, particularly the striped bass. Millions of dollars are spent annually on boats, motors, and fishing gear to catch bluefish. The economic activity generated by recreational and commercial fishing makes bluefish one of the most valuable marine species on the East Coast.

Management of this valuable resource is now being addressed by the Mid-Atlantic Fishery Management Council. The National Marine Fisheries Service is responsible for preparing stock assessments of bluefish to aid the Council in managing this species. This issue of the Northeast Fisheries Center's *Targeted Information* summarizes the most recent assessment information available for this important fishery resource.

BIOLOGY

Distribution

Populations of bluefish occur in the continental shelf waters of all temperate ocean coasts except the eastern Pacific. In the western Atlantic, they range from Nova Scotia to Texas, along the Venezuelan coast, and from Brazil to Uruguay. In the eastern Atlantic, they range from Portugal to Senegal, including the shores of the Mediterranean and the Black Sea, and around the tip of Africa from Angola to Madagascar. They are also found along the Malayan Peninsula and the entire Australian coast.

Distinct southern and northern stocks have been identified along the East Coast of the United States. The southern stock spawns in April and May along the inner edge of the Gulf Stream from southern Florida to Cape Hatteras, while the northern stock spawns from mid-May to mid-September in continental shelf waters from Cape Hatteras to Cape Cod (Figure 1). The two stocks often intermingle.

Age and Growth

Bluefish are phenomenally prolific. They start to spawn at age 2. By age 4, a 23-inch female may contain over a million eggs. The eggs develop rapidly, hatching in about two days at a water temperature of 20°C (68°F); yolk sacs are absorbed in another four days. Larvae stay near the surface and move inshore as the growing season progresses.

Juvenile bluefish, called "snapper blues," distribute themselves along ocean beaches and in estuarine waters in early summer in Florida, and by late summer and early fall further north. Growth of juveniles is rapid. They can attain a length of 175-200 mm (7-8 inches) by late September of their first year. In the fall, anglers along the Middle Atlantic and New England coasts often notice two distinct size groups of snapper blues. Those that were spawned in the south during spring are 15-20 cm (6-10 inches) long, while those that were spawned in the summer are only 5-10 cm (2-4 inches) long.

Two-year-old bluefish make up most of the recreational and commercial catch. The average length of a two-year-old fish is 35 cm, close to 14 inches. Growth rates fall off as bluefish mature (Figure 2). Bluefish are seldom found over 8-years old, when they average 80 cm (32 inches) in length and can weigh over 15 pounds.

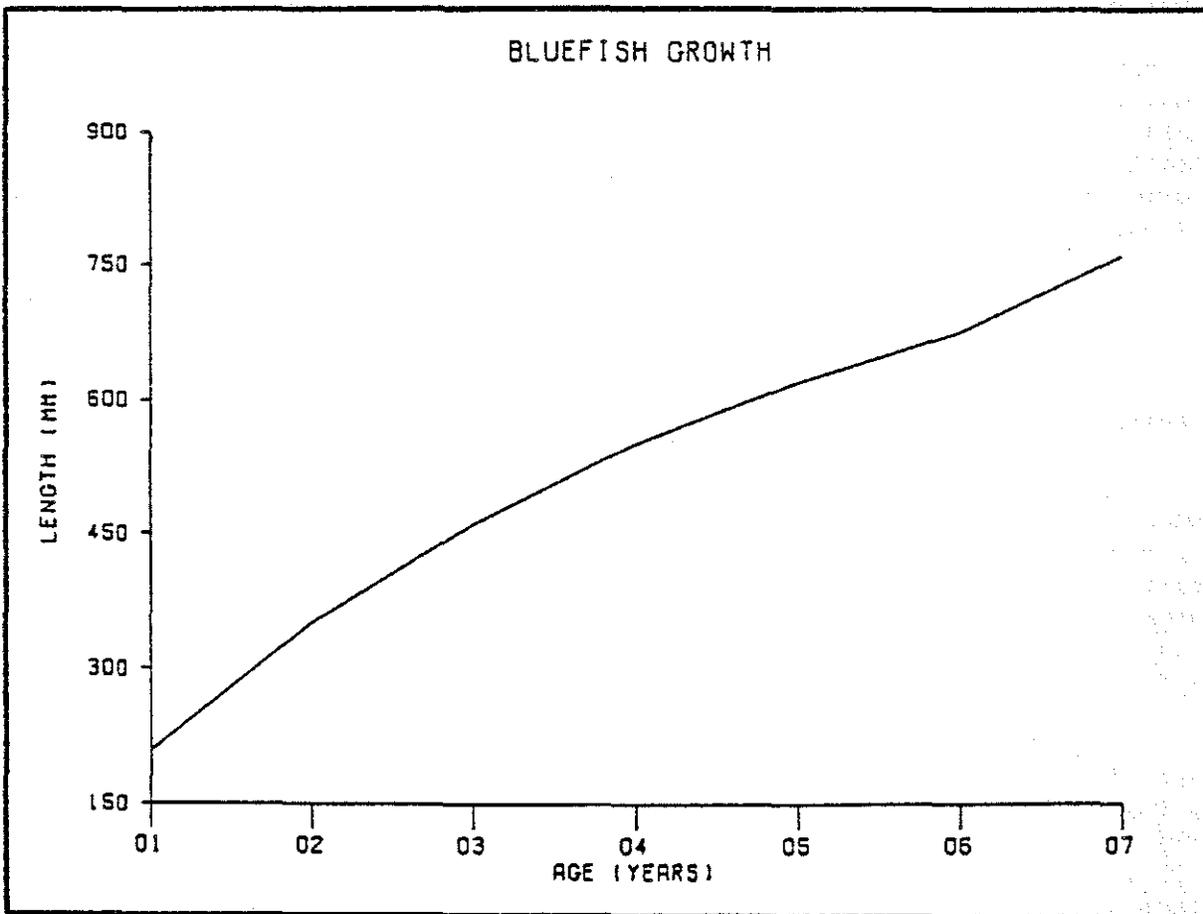


Figure 2. Growth curve for Atlantic Coast bluefish.

Migration

East Coast bluefish undertake extensive coastal migrations (Figure 1). In the spring, anglers see bluefish arrive from the south in a series of waves. Their northward migration is triggered by rising water temperature and increasing day length. The larger fish arrive in the northern areas when the

water warms to 12-15°C (54-59°F). They are followed by the middle-aged fish and finally by the juvenile snapper blues. In late July and August, anglers might see another wave of adult fish as they return inshore from spawning.

The fall migration takes place when water temperatures drop to 13-15°C (55-59°F). Local and short-time movements in and out of bays and inlets are probably triggered by changes in tide, weather, season, food supply, and size of the fish.

Feeding

Bluefish feed voraciously. Although they respond to scent, they rely primarily on vision to locate and capture their prey. Studies have corroborated anglers' observations that the size of preyfishes is an important motivation for feeding. Bluefish that have stopped feeding on small bait fishes can be induced to resume feeding by offering them larger lures or larger individuals of the same baitfish species.

Bluefish feed throughout the water column on virtually any food they can catch and swallow. Among the fishes most frequently found in bluefish stomachs are butterfish, Atlantic menhaden, round herring, sand lances, Atlantic silversides, Atlantic mackerel, anchovies, Spanish sardine, weakfish, spotted seatrout, Atlantic croaker, and spot. Among the invertebrates found are various shrimps, lobsters, squids, and crabs. In estuaries such as the lower Hudson River, juvenile bluefish feed on bay anchovy, white perch, American shad, alewife, blueback herring, and striped bass.

Pollution

During recent years, there has been growing public concern about concentration of PCB's (polychlorinated biphenyls) in bluefish. Bluefish acquire PCB's when they migrate through areas where the contaminant has accumulated in bottom sediments and has been incorporated into the food chain. Because bluefish have a preference for fatty baitfishes such as Atlantic menhaden, they probably consume more PCB's than similar predatory species such as striped bass which prefer squid. Government studies, however, have yet to isolate the pathway of PCB's from the pollution sources to bluefish.

The U.S. Food and Drug Administration (FDA) presently recognizes five parts per million (5 ppm) as the acceptable level of PCB's in fish used for public consumption. For several years, the FDA has considered reducing the acceptable level to 2 ppm. New Jersey and Massachusetts have found some bluefish which contain amounts of PCB's higher than 2 ppm and a few higher than 5 ppm. These states have warned pregnant women and nursing mothers not to eat bluefish, and have cautioned those who might consume significant amounts of bluefish to avoid the skin and dark meat.

If fishing pressure on bluefish along the East Coast is reduced due to concern over contamination and the species continues its relatively high level of production, abnormally high populations of bluefish could affect other commercially and recreationally-caught species such as striped bass, weakfish, and Atlantic cod.

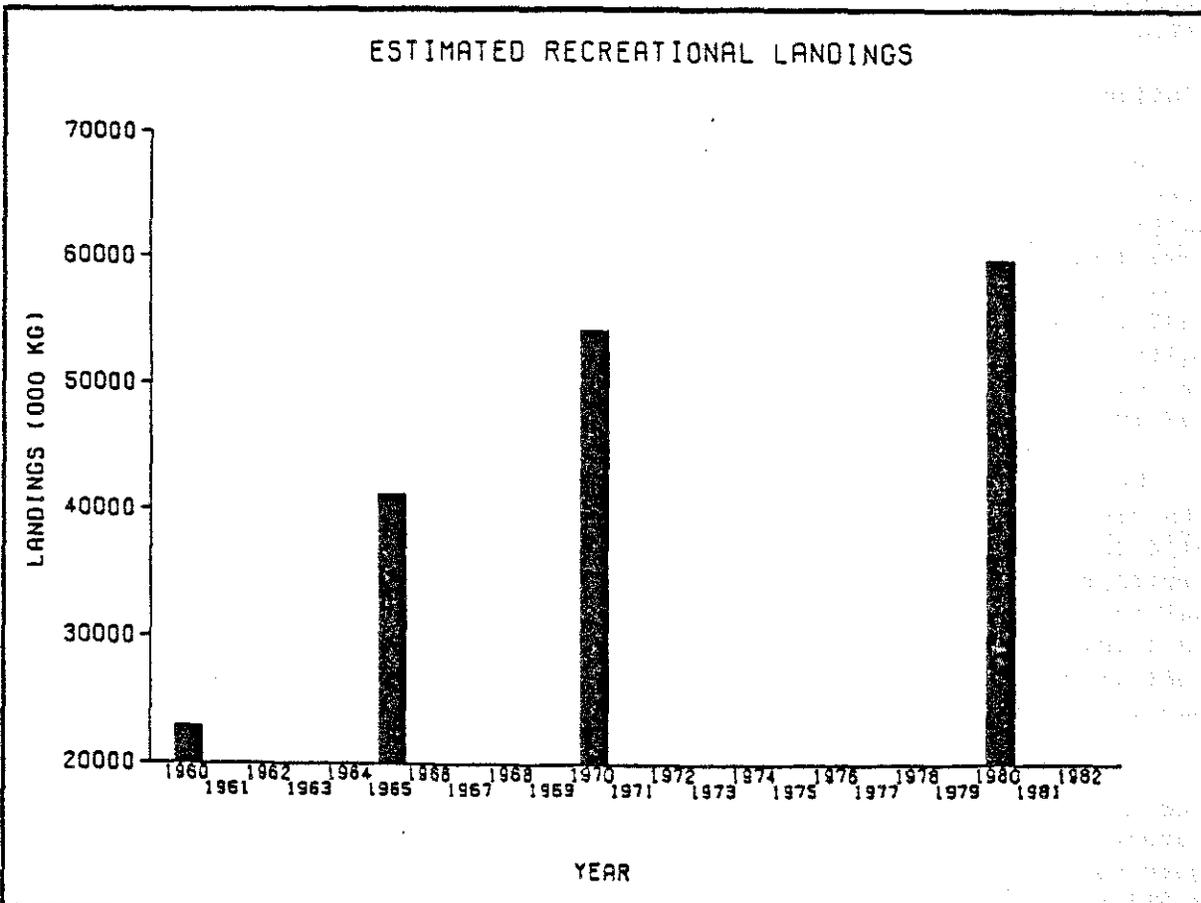
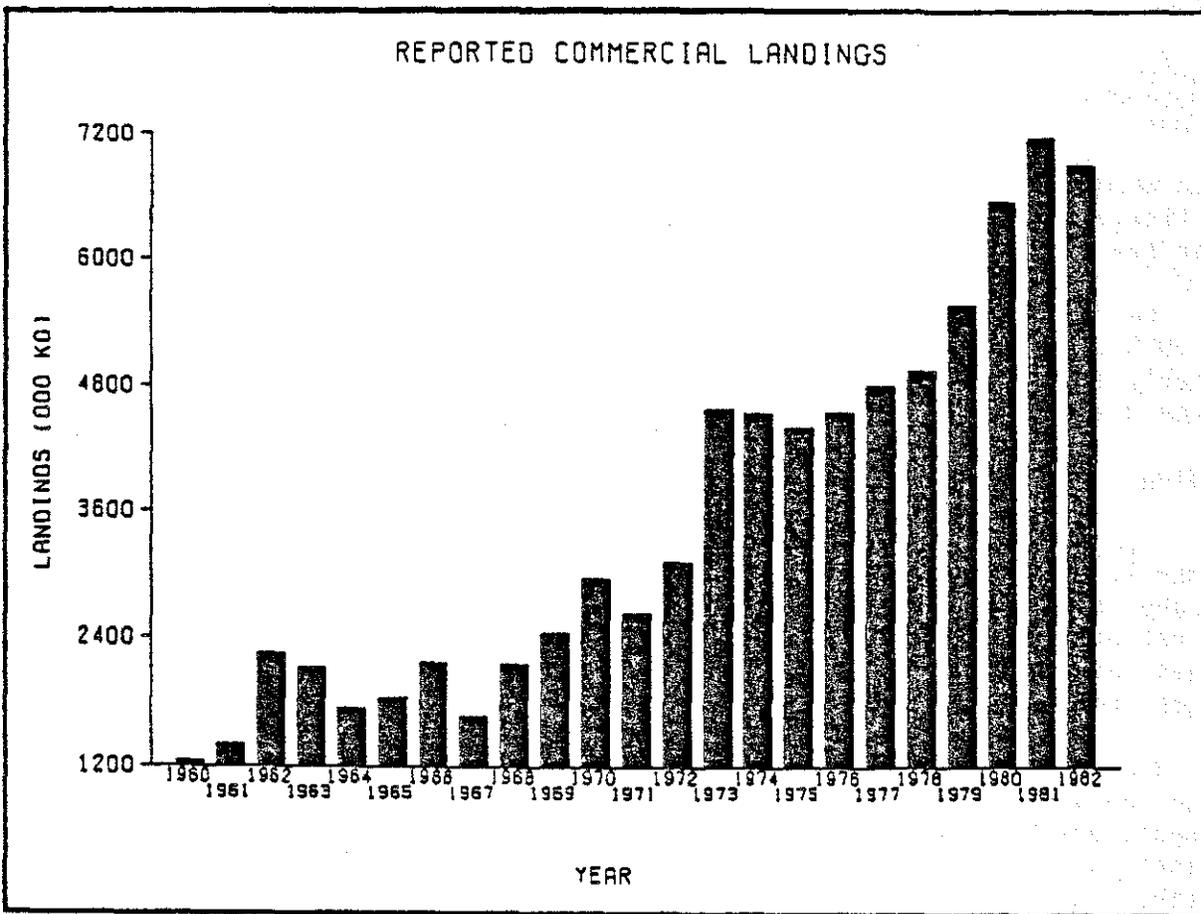


Figure 3. Reported U.S. commercial landings and estimated recreational landings of bluefish along the Atlantic Coast, 1960-82.

Bluefish-Striped Bass Abundance Cycles

While the reported catch of bluefish is presently at an historic peak, striped bass catch is very much depressed. For the past two centuries, anglers have noticed that striped bass and bluefish seem to mirror each other's fluctuations in abundance. During the past decade, bluefish abundance has been increasing and striped bass abundance has been declining.

Striped bass spawn in estuaries, primarily the tributaries of Chesapeake Bay and the Hudson River. Pollution in these highly industrialized systems is affecting the survival of striped bass eggs and larvae. Bluefish have an advantage in egg and larval development because they are offshore spawners. The earliest life stages of bluefish are not exposed to estuarine pollution and the adults are not heavily exploited on their spawning grounds. These advantages might explain the current relationship between bluefish and striped bass stock abundances.

MANAGEMENT

Fishing Regulations

All Atlantic Coast states except Delaware require a permit or license for the commercial harvest of bluefish, and some states have further restrictions on gear and season. Maryland is the only state with a minimum size limit for its recreational fishery (8 inches or 20 cm). This size limit protects most bluefish from exploitation during their first growing season.

The enactment of the Magnuson Fishery Conservation and Management Act, which included establishment of the eight Regional Fishery Management Councils, allowed offshore exploitation of bluefish (3-200 miles) to be controlled by one management body. The Mid-Atlantic Fishery Management Council is charged with preparing a coastwide bluefish management plan to control both the recreational fisheries, which now comprise over 90 percent of the total catch of bluefish, and the expanding commercial fisheries. The current draft of the plan calls for no restrictions on recreational fisheries, allows for a small increase in the commercial harvest, and limits catch with such "non-conventional" gear as purse seines and pair trawls.

Stock Assessment

Recreational and commercial catches of bluefish are at an all-time high, estimated to be 153 million pounds for 1982 (Figure 3). Inshore and offshore research cruises point to excellent spawning years during 1977-81 (Figure 4). Once these year classes grow to a catchable size (or "recruit" to the fishery) they should support high bluefish catches for at least the next two years.

There is no indication that East Coast bluefish are overfished. However, the total catch of bluefish is more closely related to production of young fish than it is in some other species, where market conditions or other factors can strongly control catch. If production of young fish were to drop, the present level of fishing pressure could seriously damage the future condition of the stocks.

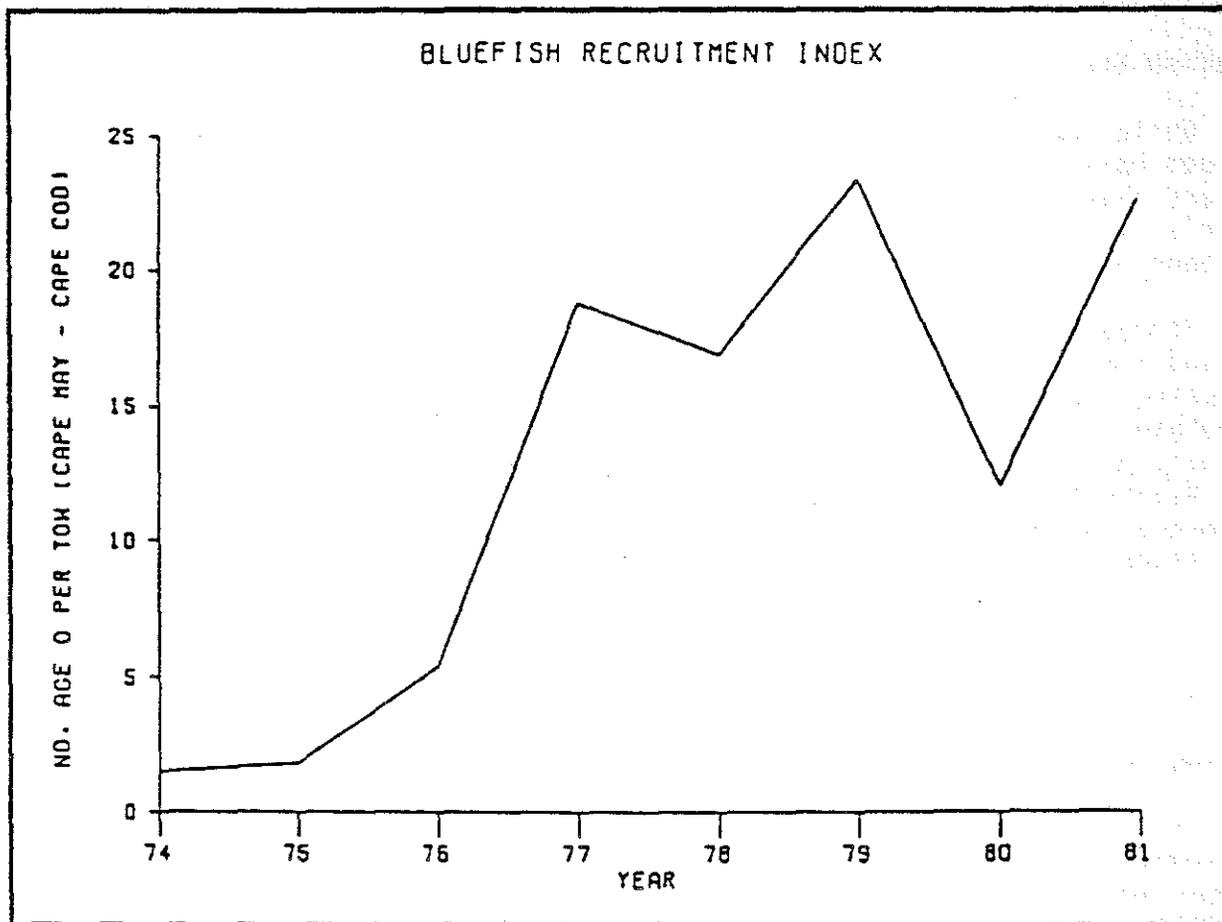


Figure 4. Recruitment indices for bluefish off the northeastern United States, 1974-81.

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