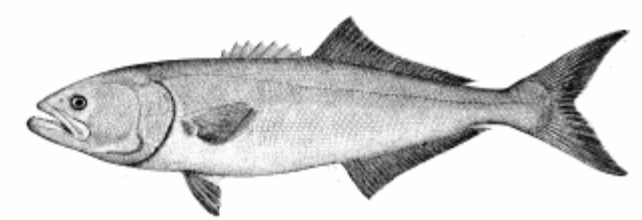

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Bluefish

by

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Distribution, Biology and Management

The bluefish, *Pomatomus saltatrix,* is a migratory, pelagic species found throughout the world in most temperate coastal regions, except the eastern Pacific. Bluefish may reach ages of 12 years and sizes in excess of 100 cm (39 in.) and 14 kg (31 lb) (Collette and Klein-MacPhee 2002). Along the U.S. Atlantic coast, bluefish are found from Maine to Florida and mix extensively during seasonal coastal migrations (Figure 25.1). During winter, large bluefish tend to remain in the Middle Atlantic Bight, moving south to North Carolina by March. Small fish move farther south in winter with some fish wintering off the coast of Florida. As water temperatures increase, the spring migration north begins and spawning occurs in the South Atlantic Bight at this time. By summer, bluefish move north into the Middle Atlantic Bight, although some medium size fish may remain off Florida (Shepherd et al. 2006). A second spawning occurs in the offshore waters of the Middle Atlantic Bight during summer. The result of these two spawning events is the appearance of two distinct size groups of juvenile bluefish during autumn; a spring spawned cohort having fish about 15-25 cm in length and a summer spawned cohort having fish about 4-14 cm in length (Able and Fahay 1998). Fish from the two spawning cohorts mix extensively during the year and constitute a single genetic stock (Graves et al. 1992). Bluefish are voracious predators, feeding primarily on squid and fish, particularly menhaden and smaller fish such as silversides (Buckel et al. 1999, Fahay et al. 1999).

Bluefish are managed under a joint management plan collaboratively developed by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission and implemented in 1990. The management measures presently include an overall annual landings quota in which 17% of the quota is allocated to the commercial fishery and 83% is allocated to the recreational fishery. The total commercial quota is divided into state specific quotas, and there may be a transfer of a portion of the recreational quota to the commercial sector if predicted recreational landings are below the annual allocation.

The Fishery

Most of the recreational catch of bluefish is taken in the Middle Atlantic states (New York to Virginia). Historically, the recreational fishery has accounted for 80 to 90% of the total catch, and recreational landings peaked in 1981 and 1985 at over 43,000 mt (Figure 25.2). Recreational landings have averaged over 19 thousand mt since 1982, but have been under 8,000 mt since 1995, and were 6,900 mt in both 2004 and 2005. Total numbers of bluefish caught and released in the recreational fishery has increased steadily since 1981. During 1981-1983, fishermen released an average of 18% of the bluefish caught, whereas during 2002-2004 63% of the bluefish caught were released. The commercial fishery for bluefish operates primarily in the Middle and South Atlantic regions. Gillnets are the principal gear used and account for approximately 40% of landings. Other gear used include hook and line, pound nets, seines, and trawls. Commercial landings ranged from 1,000 to 2,000 mt during the 1950s and 1960s, increased during the 1970s and 1980s, peaking at 7,466 mt in 1981, and then declined throughout the 1990s reaching a low of 3,300 mt in 1999 (Figure 25.2). Landings in 2005 were 3,500 mt (Table 25.1).

Research Vessel Survey Indices

NEFSC autumn survey abundance indices for bluefish in the Middle Atlantic exhibit wide variation due to the appearance of large cohorts entering coastal waters (Figure 25.3) (Shepherd and Packer 2006, NEFSC 2005). The majority of bluefish caught in the fall are age-0 or age-1. The two annual cohorts of age 0 bluefish can be partitioned into separate indices based on size (Figure 25.4). Large year classes for both the spring and summer spawned cohorts occurred in 1981,1984 and 1989. There has not been a significant spring spawned cohort since 1989; however the summer cohort in 2003 was very large. It has been hypothesized that the success of the spring cohorts is critical to maintaining stock abundance (Munch and Conover 2000).

Assessment Results

Average fishing mortality peaked at 0.46 in 1987 and has since steadily declined to 0.15 in 2004 **(Figure 25.5)**. Stock abundance declined steadily between 1983 and 1993 from 175.6 million fish in1982 to 58.4 million in 1993 where it remained stable for the next five years (Figure 25.5). Since 1998, abundance has slowly increased, reaching 105.4 million in 2003 but declined to 92.3 million in 2004. Biomass peaked in 1982 at 229,000 mt, declined to 64,700 mt in 1997 and have since increased to 104,100 mt in 2004 (Figure 25.6). The bluefish assessment was reviewed by a Stock Assessment Review Committee in June 2005 and the review concluded that the assessment results were uncertain and should be used with caution (NEFSC 2005).

Biological Reference Points

Fishing mortality and spawning stock biomass biological reference points in the Bluefish FMP were based on a general surplus production model which has since been considered technically inappropriate by the SARC (SARC 39 report). New biological reference points based on the 2005 stock assessment were recommended as F_{msy} = 0.19 and B_{msy} = 147,052 mt (Table 25.2).

Summary

The Bluefish fishery management plan was implemented in 1990 to halt the decline of the stock and restore the population to sustainable levels. The stock has been increasing but is still below the target biomass. Since the 2004 estimate of fishing mortality was 0.15, the stock was not experiencing overfishing (Figure 25.5). Biomass below ½ B_{msy} (i.e. below 73,526 mt) defines an overfished stock under the current management plan. Since biomass in 2004 was estimated as 104,136 mt, the stock was not in an overfished condition (Figure 25.6) (NEFSC 2005). Cycles of low and high abundance of bluefish follow a pattern that seems to be the converse of striped bass, another popular target of recreational fishermen. Several recent studies have examined potential causes of this pattern and have found no biological explanations (Buckel and McKown 2002.). Ongoing research continues on bluefish population dynamics and recruitment patterns along the Atlantic coast.

Table 25.1 Recreational and commercial landings of bluefish (thousand metric tons).

Category	1986-95 Average	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
U. S. Recreational	19.0	6.3	7.7	6.6	5.4	6.2	7.5	6.6	6.0	6.9	6.9
Commercial											
United States	5.5	4.1	4.1	3.7	3.3	3.7	3.9	3.1	3.4	3.8	3.5
Canada	-	-	-	-	-	-	-	-	-	-	
Other	-	-	-	-	-	-	-	-	-	-	
Total Nominal Catch	24.5	10.4	11.8	10.3	8.7	9.9	11.4	9.7	9.4	10.7	10.4

Table 25.2. Yield and spawning stock biomass per recruit and MSY based reference points for bluefish.

Yield and SSB per Recruit-based Reference Points

$F_{0.1}$ = 0.18
$F_{30\%}$ = 0.28
F_{MAX} = 0.28

MSY-based Reference Points

B_{MSY} = 147,052 mt
F_{MSY} = 0.19

For further information

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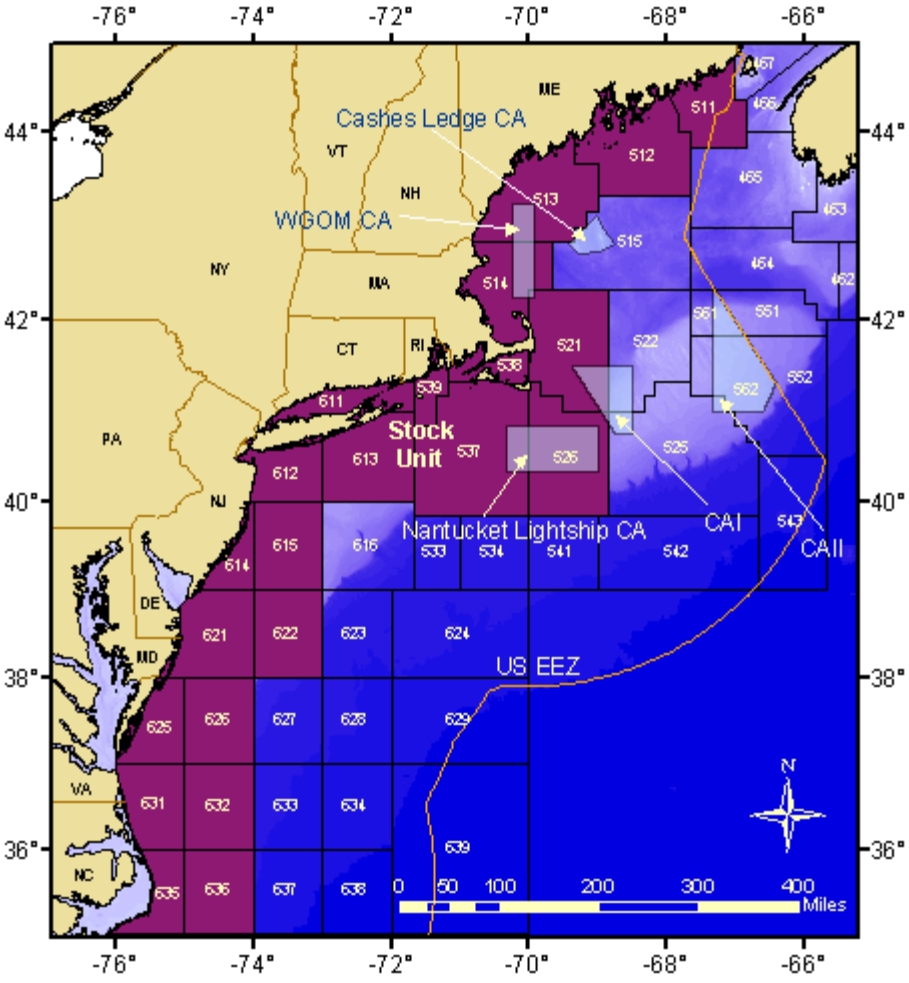

Figure 25.1. Statistical areas used to define the northeast segment of the coastal bluefish stock.

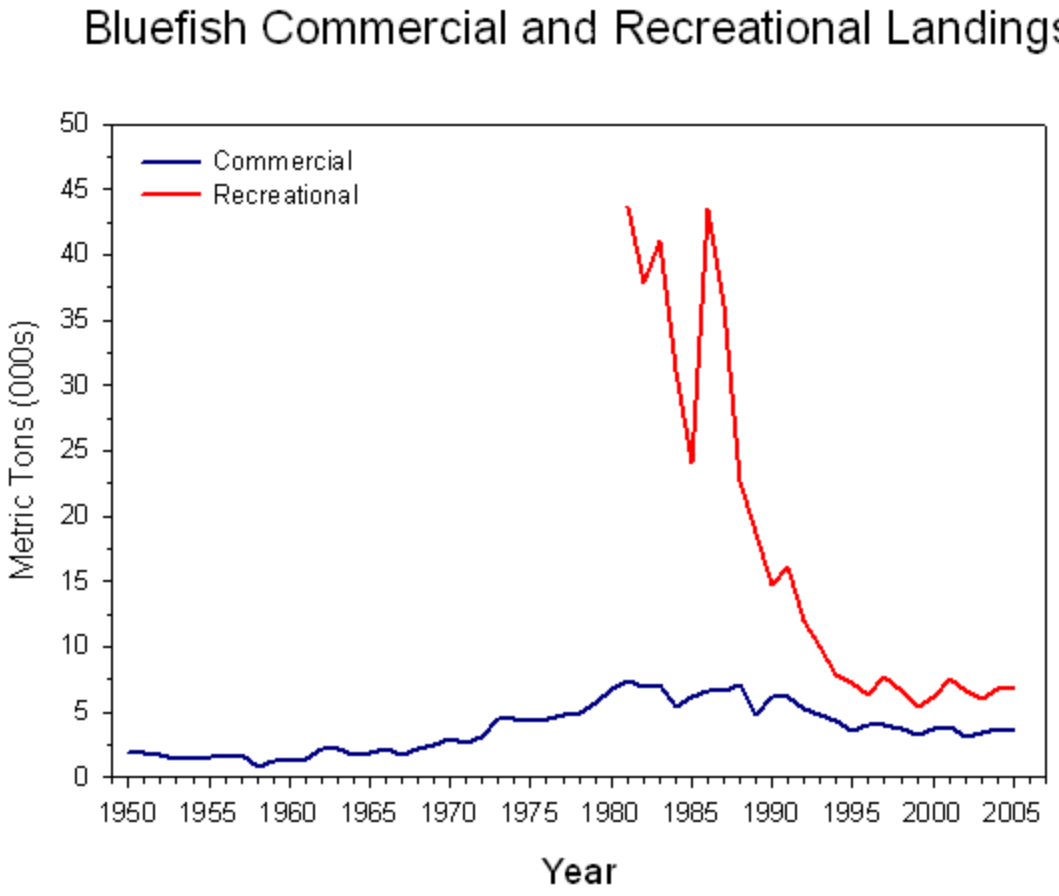

Figure 25.2. Time series of bluefish landings (mt) along the Atlantic coast.

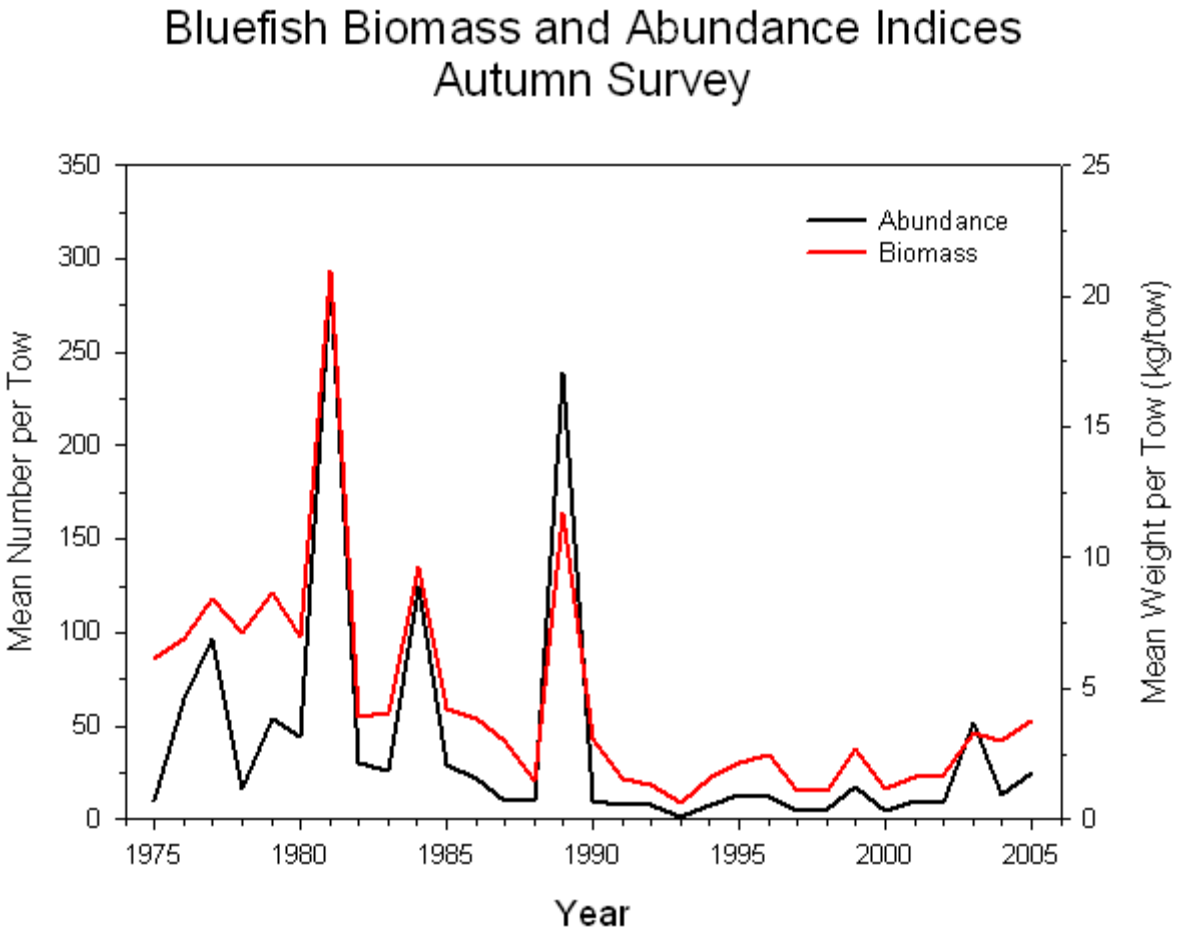

Figure 25.3. Bluefish abundance and biomass indices from NEFSC autumn surveys.

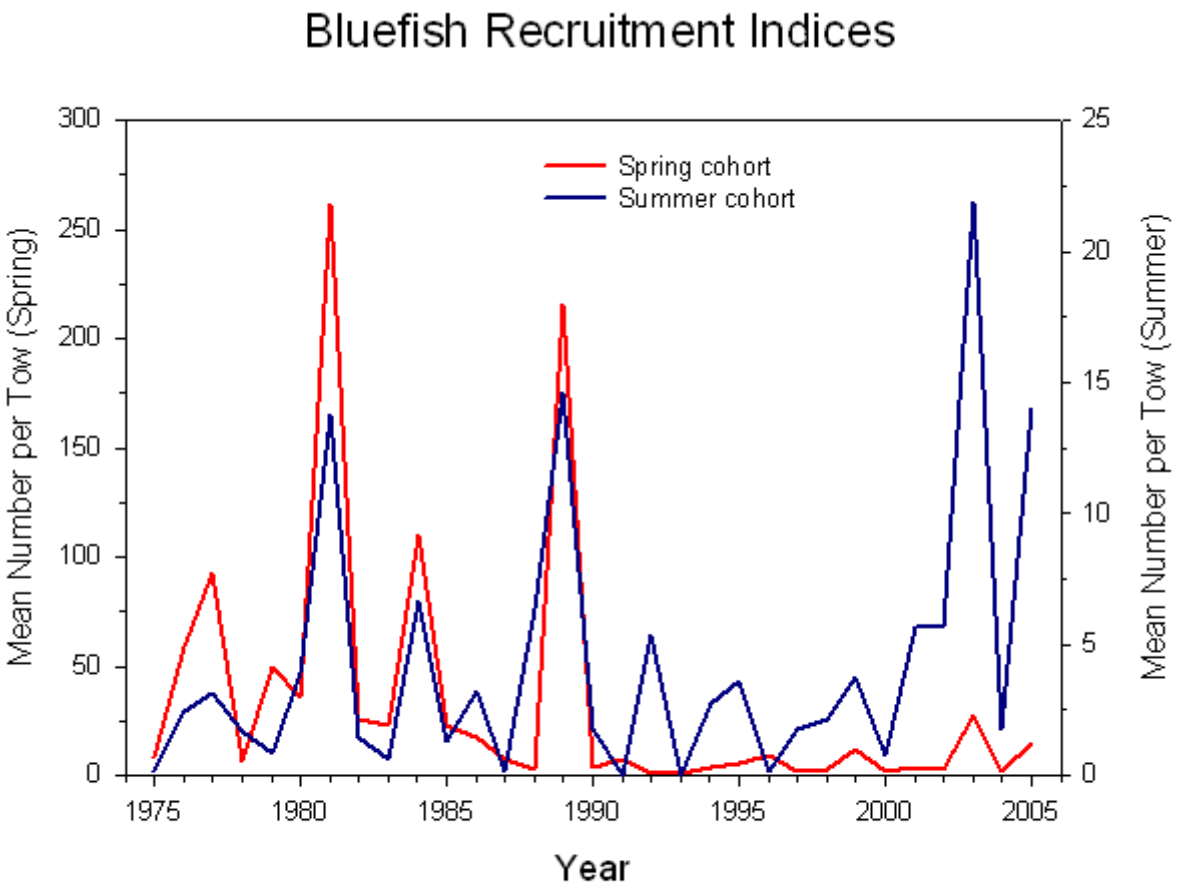

Figure 25.4. Bluefish recruitment indices for spring and summer cohorts from NEFSC autumn surveys.

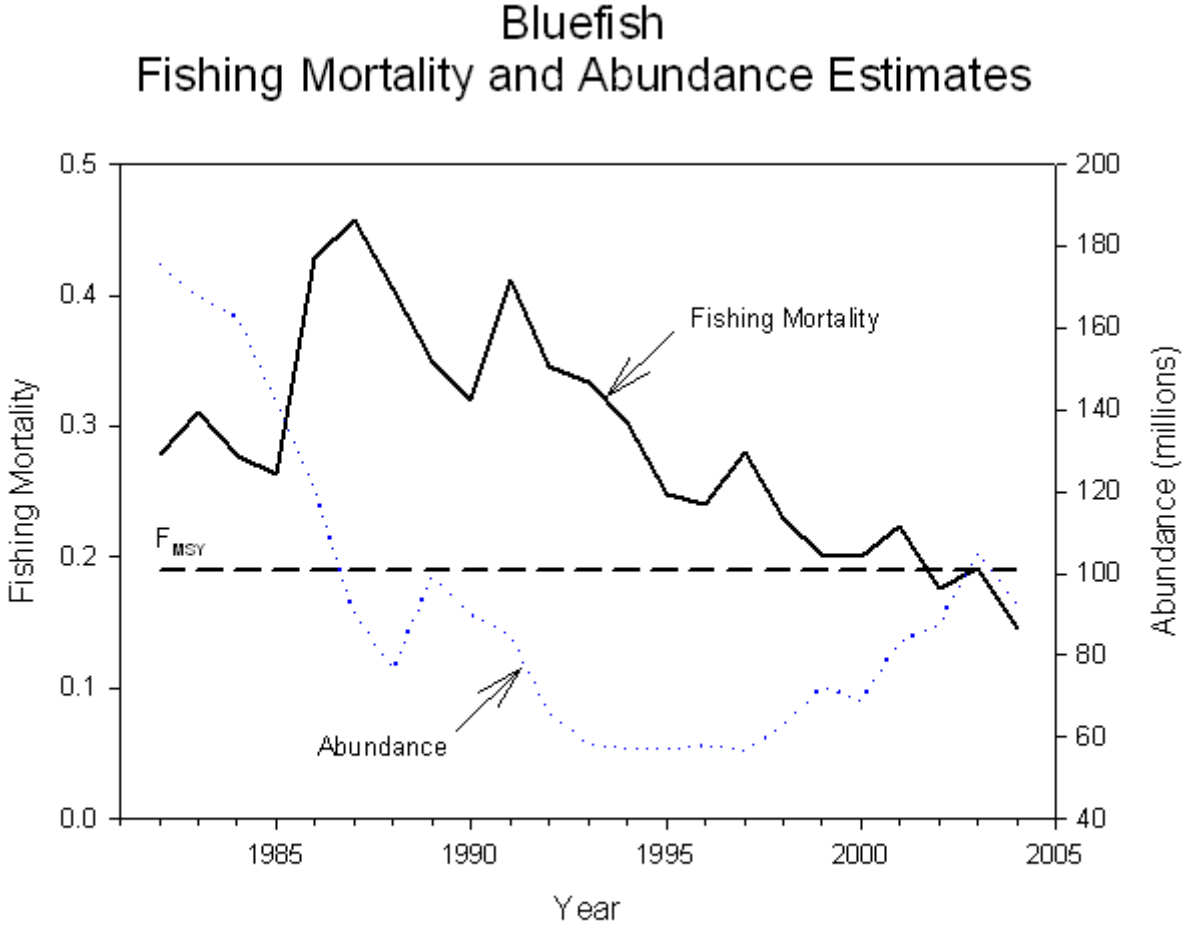

Figure 25.5. Fishing mortality and abundance estimate of bluefish along the Atlantic coast and F_{MSY} reference point.

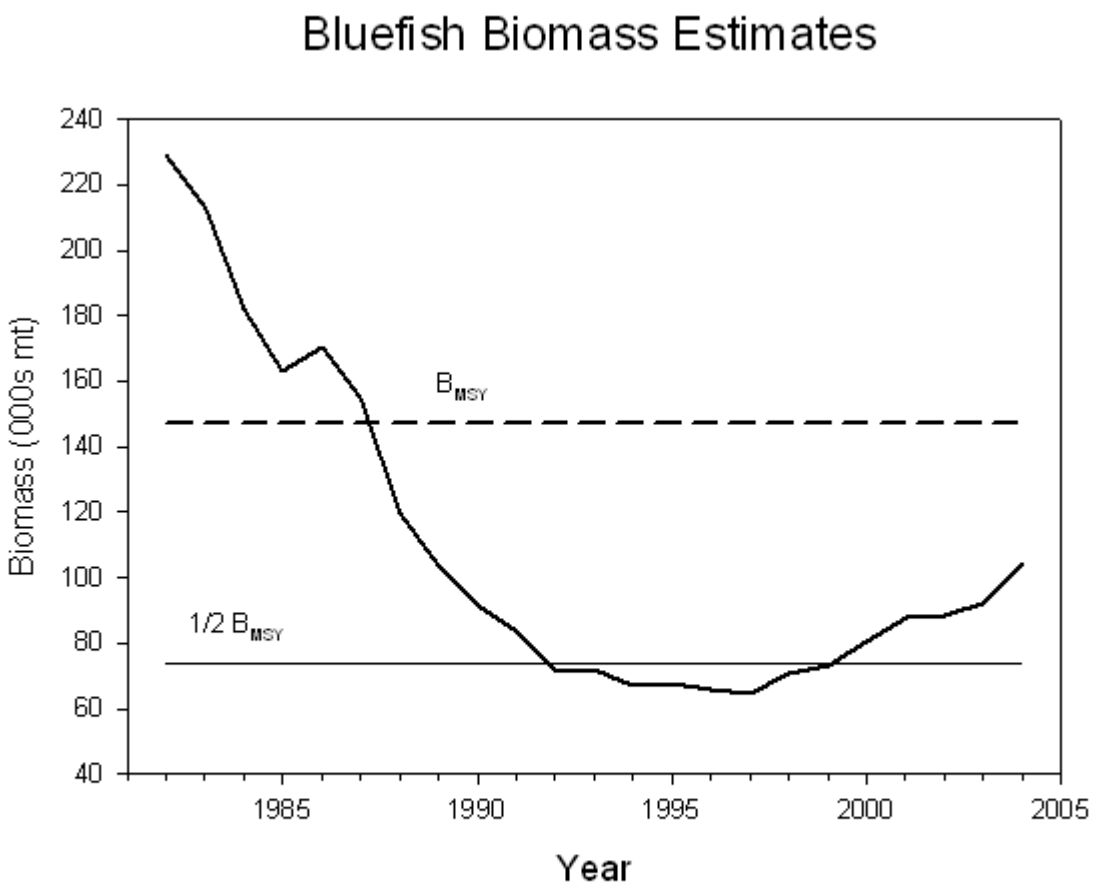

Figure 25.6. Bluefish biomass estimates and associated biological reference points.