



Winter Flounder
Pseudopleuronectes americanus

Common Names: Blackback, lemon sole, flounder, flat fish, mud dab, black flounder

Interesting Fish Fact
•Name derived from its tendency to move during the winter months to shallower inshore waters

Largest Recorded: 25 inches, 8 lbs, 2 oz.

Oldest Recorded: 20 years

Stock Status:
•GOM - not overfished & overfishing is not occurring
•SNE - overfished & overfishing is occurring

Age at Maturity:
•GOM - 86% mature @ age 4
•SNE/MA - 95% mature @ age 4

Age at Recruitment:
•GOM - fully recruited @ age 5 (12")
•SNE/MA - fully recruited at age 4 (12")

Species Profile: Winter Flounder

Current Plan Seeks to Rebuild Southern New England/Mid-Atlantic Stock and Sustain Gulf of Maine Stock

Introduction

Winter flounder are an important commercial and recreational fish throughout New England and the Mid-Atlantic. Inshore habitat degradation and overfishing have contributed to serious stock declines throughout the species' range leaving both fisheries at a fraction of their historical numbers. Efforts of the Atlantic coastal states and the New England Fishery Management Council (Council) to reduce fishing mortality and identify essential habitat have allowed stocks to begin recovery.

The Gulf of Maine (GOM) stock has shown the greatest improvement, with the current estimate of spawning stock biomass well above the target established in the federal plan. The Southern New England/Mid-Atlantic (SNE/MA) stock still has a long way to go, but passage of the Commission's Amendment 1 to the Interstate Fishery Management Plan for Inshore Species of Winter Flounder and the Council's Amendment 13 to the Northeast Multispecies Fishery Management Plan are allowing for new cooperative management systems.

Every January, winter flounder migrate from offshore federally managed areas to inshore state controlled spawning grounds making joint management a necessity. These amendments have prioritized cooperative management between state and federal agencies to protect the fish in both areas. The stock is divided into three management units (1) the GOM unit, ranging north of Cape Cod, (2) the SNE/MA unit, extending from south of Cape Cod to the Delaware-Maryland border; and (3) the Georges Bank unit, occurring in federal waters.

Life History

One can identify winter flounder from three distinguishing characteristics; the eyes are located on the right side of the body, the lateral line is straight, and they are the darkest of all the flatfish. Coloring often varies in accordance with the bottom on which they lie, ranging from muddy to slightly reddish brown, olive green, dark slate, to an almost black upper. Their underside is white. Dorsal and anal fins are often tinged with pink, red, or yellow on the eyed side.

Winter flounder are named so because of their annual spawning migrations into shallow inshore water in winter and early spring. Spawning occurs from January to May in cool water temperatures (32-42°F). Following their migration, females will deposit negatively buoyant eggs on sandy bottom and algal mats at nighttime. This event occurs on average forty times per spawning season. Adults tend to return to the same spawning grounds every year. Females usually produce between 500,000 to 1.5 million eggs, but up to 3.3 million have been reported.

Proper temperature and salinity conditions are essential for survival of eggs during the two to three months of larval development. Five to six weeks after hatching, larvae will



settle to the bottom to begin metamorphosis. After eight weeks, the left eye migrates to the right side of the body to complete metamorphosis. Young-of-the-year and some one year-old fish remain in natal estuaries throughout the year while adults will return to their offshore feeding grounds. Juvenile flounder prefer sand or sand-silt bottoms and tolerate a wide range of salinity (from fresh to saltwater) and temperature (32-77°F).

Predatory fish such as striped bass, bluefish, toadfish, and summer flounder, as well as birds, invertebrates, and marine mammals prey on larvae and juveniles. Atlantic cod, spiny dogfish, goosefish, and winter skate are the main predators of adult winter flounder. Little skate, smooth dogfish, hakes, sea raven, striped sea robin, striped bass, bluefish, and wrymouth also consume adult winter flounder in smaller amounts.

Winter flounder diet is limited by their small mouth size, with adults feeding primarily on small invertebrates, shrimp, clams, and worms. Feeding occurs solely during the day because they depend on sight to locate prey (a behavior called sight feeding), with the activity becoming more intense during ebbing and flooding tides. At night, winter flounder lie flat with their eye turrets retracted until sunrise.

Adult winter flounder utilize a wide range of habitat types, depths, and temperatures. Inshore, they seem to prefer muddy sand -- especially when it is broken up by patches of eelgrass. Winter flounder are also distributed over clean sand, clay, and even pebbly and gravelly ground. Fish that occupy muddy bottom will bury their whole body except for the eyes. Offshore populations inhabit hard bottom habitat. Winter flounder size generally increases with an increase in depth with the largest individuals typically inhabiting the deeper Georges Bank waters and the smaller individuals inhabiting the shallower in-shore waters. Research has found substantial variability in length and age of winter flounder by region, with the fastest growth occurring in southern waters.

Commercial & Recreational Fisheries

Gulf of Maine

Throughout the 1960s and 1970s, commercial landings from the GOM stock fluctuated around 2.2 million pounds. In 1982, landings peaked at six million pounds and then declined steadily to a time series low of 557,770 pounds in 1999. This decline may be attributed to extended spring closures in the Gulf of Maine. Landings have averaged 1.1 million pounds since 1999, with a maximum catch of 1.5 million pounds in 2003. Landings in 2004 were approximately 1.1 million pounds (see Figure 1).

Recreational landings from the GOM stock fluctuated around 4.4 million pounds in the early 1980s before declining to under 200,621 pounds in 1991. Recreational landings have remained below 220,000 pounds since 1994. On average, recreational landings comprised 40 percent of the total catch from 1979-1990. Since 1991, recreational landings have comprised between five and 19 percent of the total landings, averaging 8.4% of total catch.

Southern New England/Mid-Atlantic

Commercial landings from the SNE/MA stock averaged 18.7 million pounds from 1964 to 1972 before declining to around 10.6 million pounds throughout the mid- to late 1970s. Landings increased in the early 1980s to a record high of 24.6 million pounds, but

Figure 1. GOM Winter Flounder Commercial & Recreational Landings
Source: NEFSC Groundfish Assessment Review, 2005

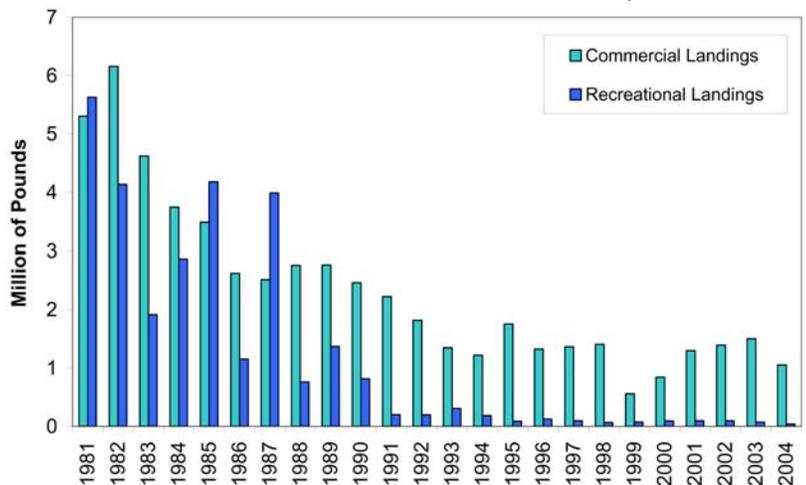
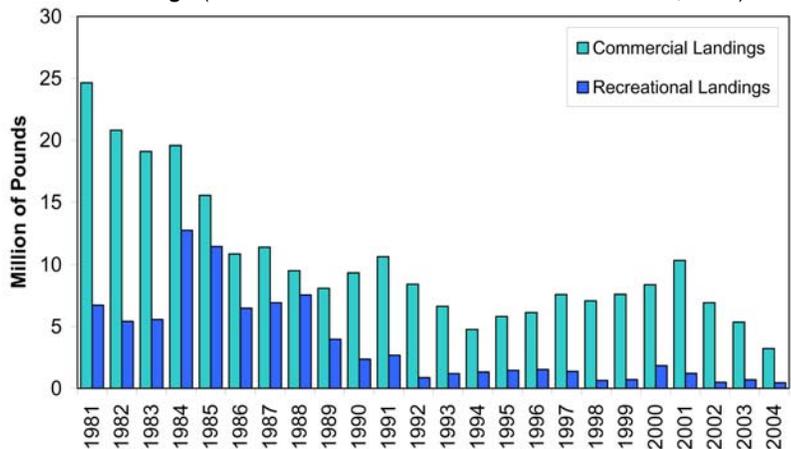


Figure 2. SNE/MA Winter Flounder Commercial & Recreational Landings (Source: NEFSC Groundfish Assessment Review, 2005)



Species Profile: Winter Flounder (continued from page 5)

then declined to 4.7 million pounds in 1994 (see Figure 2). From 1995 to 2003, landings ranged from 10.3 to 5.4 million pounds, reaching a time series low of 3.2 million pounds in 2004.

Recreational landings from the SNE/MA stock peaked at 12.7 million pounds in 1984 before declining to a low of 866,417 pounds in 1992. Landings have ranged between 450,000 pounds and 1.8 million pounds in recent years, with 2004 landings estimated at 454,152 pounds. On average, recreational landings comprised 21 percent of the total landings (1981-2004).

Stock Status

Gulf of Maine

The latest stock assessment update, conducted by the Groundfish Assessment Review Meeting (GARM) in 2005, concluded that GOM winter flounder stock is not overfished and overfishing is not occurring. Fishing mortality (F) in 2004 was well below the estimate of F_{msy} , and spawning stock biomass in 2004 was estimated to be about 67 percent above the estimate of spawning stock biomass (SSB) threshold (see Figure 3). Recruitment to the stock has been above or near average since 1995.

Southern New England/Mid-Atlantic

The 2005 GARM update concluded that the SNE/MA winter flounder stock is overfished and overfishing is occurring. Fishing mortality in 2004 was .38, 19% higher than the F threshold. Spawning stock biomass in 2004 was only 26% of the threshold value of 33.2 million pounds SSB (see Figure 4). The average recruitment from 1981 to 2001 was 23.9 million age-1 fish. Recruitment to the stock has been below average since 1989. The 2002 year class, with only 4.4 million fish, is the smallest in the 22-year time series.

Atlantic Coastal Management Considerations

Historically, the Council and Commission have chosen different approaches to managing winter flounder stocks, but the unique biology of winter flounder makes cooperation essential. When winter flounder migrate to inshore spawning grounds, they become concentrated in certain areas, making it easy for anglers to locate and remove a substantial portion of them. Proximity of the spawning grounds to land also creates a number of problems as well. For starters, recreational fishermen can easily access the spawning areas. The nearshore spawning grounds are also vulnerable to water pollution and habitat loss. Recent tagging studies have shown spawning-site fidelity in winter flounder, meaning that individuals will often return to the location where they were hatched, or close by. What this suggests is that there is the possibility for subpopulations of winter flounder that may be particularly vulnerable to extinction -- if you wipe out a breeding ground or spawning subpopulation, the stock may never rebuild. Flounder are vulnerable to commercial fishing from June through December when they are found further offshore which is where the majority of the catch takes place.

Amendment 13 to the Northeast Multispecies Fishery Management Plan, focused on offshore commercial fisheries, aims to rebuild overfished fisheries by reducing fishing mortality and minimizing adverse effects on all essential fish habitat. Winter flounder are managed as a "large mesh species" employing seasonal closures, gear restrictions, minimum size limits, trip limits, limited access, and days-at-sea restrictions to reduce fishing pressure on the stocks. The success of Amendment 13 in

Figure 3. GOM Winter Flounder Total & Spawning Stock Biomass
Source: NEFSC Groundfish Assessment Review, 2005

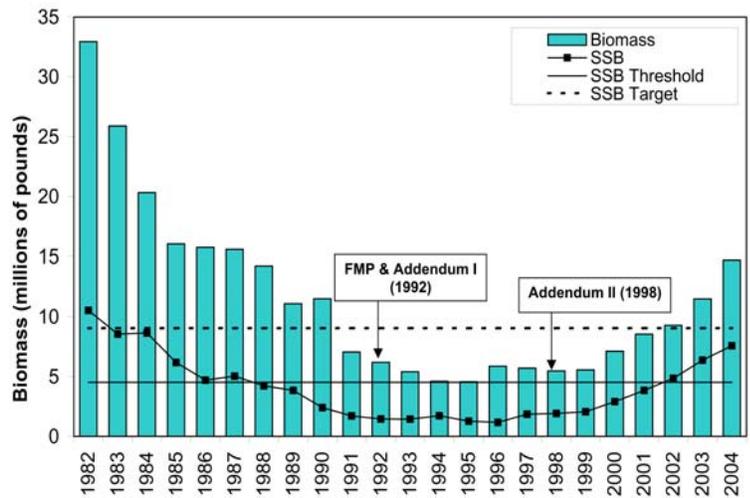
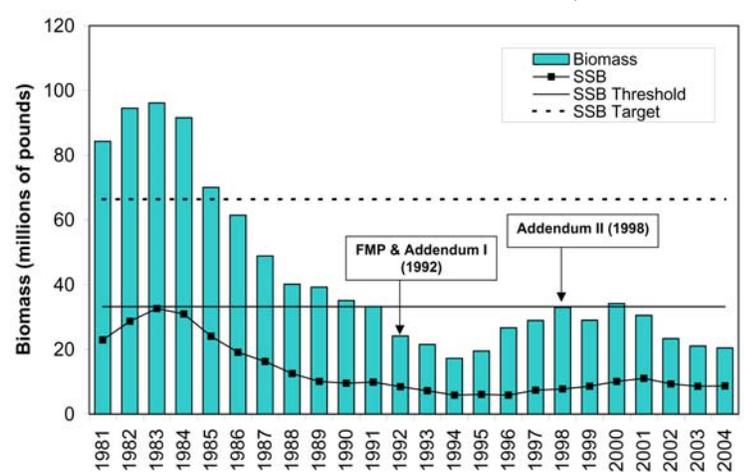


Figure 4. SNE/MA Winter Flounder Total & Spawning Stock Biomass
Source: NEFSC Groundfish Assessment Review, 2005



rebuilding depleted stocks is unknown at this time because stock assessment updates have not been conducted since its provisions became effective in May 2004.

The Commission's Amendment 1, passed in November 2005, focuses on joint management between the Commission and the Council due to the life history of winter flounder. It is intended to rebuild and then maintain spawning stock biomass at or near target biomass levels. In addition, Amendment 1 prioritizes restoration and maintenance of essential winter flounder habitat. Specific provisions are listed below. Since this amendment is barely one year old, it is too early to tell how well its provisions are working.

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