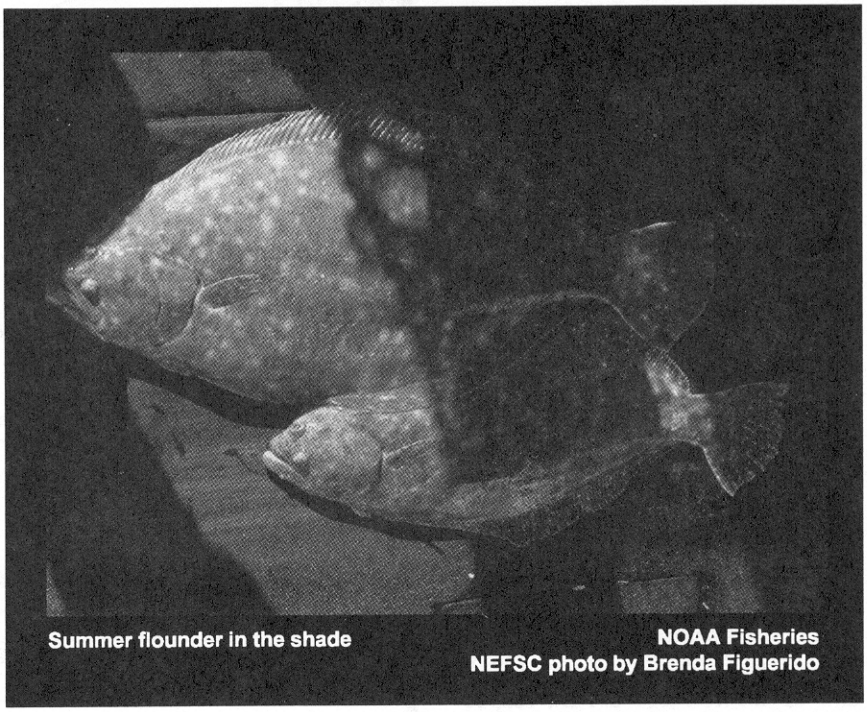
Summer Flounder

by M. Terceiro

The summer flounder or fluke, *Paralichthys dentatus*, occurs from the southern Gulf of Maine to South Carolina. Important commercial and recreational fisheries exist within the Mid-Atlantic Bight (Cape Cod to Cape Hatteras). Summer flounder are concentrated in bays and estuaries from late spring through early autumn, when an offshore migration to the outer continental shelf is undertaken. Spawning occurs during autumn and early winter, and the larvae are transported toward coastal areas by prevailing water currents. Development of post-larvae and juveniles occurs primarily within bays and estuarine areas, notably Pamlico Sound and Chesapeake Bay. Most of the population is sexually mature by age 2. Female summer flounder may live up to 20 years, but males rarely live for more than 7 years. Growth rates differ appreciably between the sexes with females attaining weights up to 11.8 kg (26 lb).

The resource is managed under the Summer Flounder Fishery Management Plan (FMP) as a unit stock from North Carolina to Maine. Amendment 2 to the FMP made several major regulatory changes including annual commercial quotas, recreational harvest limits, a commercial vessel permit moratorium, minimum fish size and gear restrictions, and a recreational fishery possession limit. The amendment also implemented a target fishing mortality rate reduction schedule, which under Amendment 7 to the FMP was as follows: F = 0.41 in 1996, 0.30 in 1997, and 0.23 in 1998 and beyond. Total landings were capped at 8,400 mt (18.51 million lbs) in 1996.

Total landings averaged 22,700 mt annually during 1979-1986, peaking at 28,300 mt in 1980. Since 1989, landings have been much lower, ranging between 6,500 and 10,800 mt. Total landings in 1996 were 10,500 mt, 11 percent higher than in 1995.



Summer flounder in the shade

NOAA Fisheries
NEFSC photo by Brenda Figuerido

The principal gear used in commercial fishing for summer flounder is the otter trawl. Commercial landings of summer flounder averaged 13,700 mt during 1979-1986, reaching a high of 17,100 mt in 1984. Commercial landings during 1989-1996 have been markedly lower (4,200 to 8,100 mt per year). In 1996, commercial landings fell to 5,800 mt, 17 percent lower than in 1995.

The recreational fishery for summer flounder harvests a significant proportion of the total catch, and in some years recreational landings have exceeded the commercial total. Recreational landings have historically constituted about 40 percent of the total landings. Recreational landings averaged 9,000 mt during 1979-1986, and peaked at 14,100 mt in 1980. Since 1987, recreational landings have been considerably lower although recent trends have been upwards. In 1996, recreational landings increased to 4,700 mt, the highest level observed since 1988.

Catch curve analyses of NEFSC survey and commercial fishery age composition data for 1976 through 1983 indicated that fishing mortality rates during this period were about 0.6 to 0.7 (41-46% exploitation rates), well in excess of the current overfishing definition for the stock, F_{max} = 0.24 (19% exploitation rate). Recent virtual population analyses (VPA) have used NEFSC survey age composition data, survey age composition data from the states of Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina,

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and commercial and recreational fishery age composition data to estimate fishing mortality rates and stock sizes. Current VPA results indicate that fishing mortality has been high in recent years, peaking at F = 2.1 (82% exploitation rate) in 1992, and was near 1.0 (58% exploitation rate) in 1996.

Spawning stock biomass declined 75% from 1983 to 1989 (18,900 mt to 5,200 mt), but has since increased to 17,400 mt in 1996. The age structure of the spawning stock has begun to expand, with 34% of the biomass at ages 2 and older in 1996, although about 85% of the spawning stock would be expected to be ages 2 and older if the stock were rebuilt and fished at F_{max}. The 1982 and 1983 year classes were estimated to be the largest in the VPA time series at 76 and 83 million age 0 fish, respectively. Recruitment declined from 1983 to 1988, with the 1988 year class the smallest, at only 13 million fish. The 1995 year class, at about 47 million fish, is of about average strength (1982-1996), but the 1996 year class is estimated to be the poorest since 1988. The summer flounder stock is at an intermediate level of historical (1968-1996) abundance and is overexploited.

For further information

NEFSC [Northeast Fisheries Science Center]. 1997. [Report of the] 25th Northeast Regional Stock Assessment Workshop (25th SAW) Stock Assessment Review Committee (SARC) consensus summary of assessments. Woods Hole, MA: NOAA/NMFS/NEFSC. *NEFSC Ref. Doc.* 97-14.

Georges Bank-Middle Atlantic

Summer Flounder

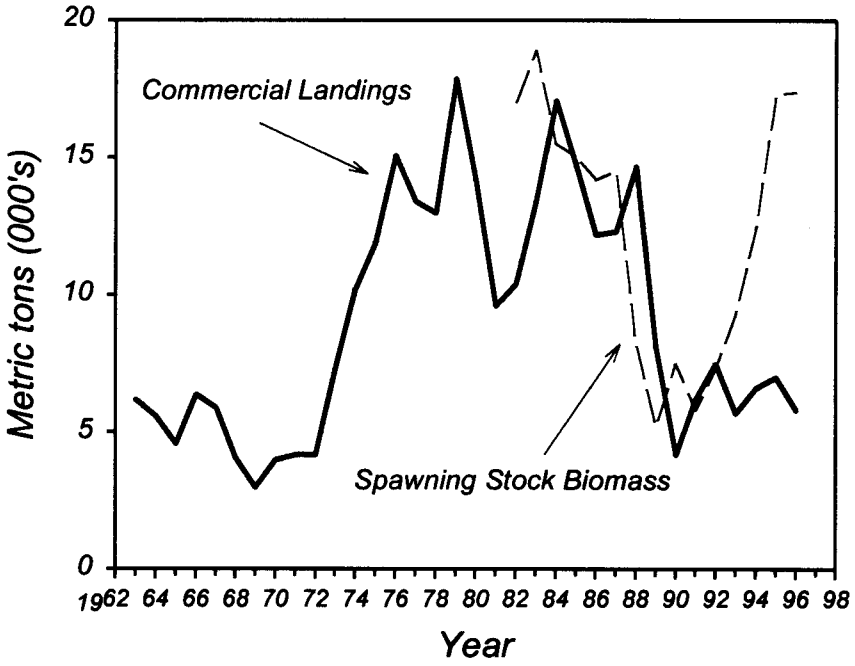

Table 8.1 Recreational and commercial landings (thousand metric tons)

Category	Year										
	1977-86 Average	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
U.S. recreational	9.0[1]	5.5	6.7	1.4	2.3	3.6	3.2	3.5	4.1	2.5	4.7
Commercial											
United States	13.6	12.3	14.7	8.1	4.2	6.2	7.5	5.7	6.6	7.0	5.8
Canada	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-	-
Total nominal catch	22.6	17.8	21.4	9.5	6.5	9.8	10.8	9.2	10.7	9.5	10.5

[1]1979-1986

Summary Status

Long-term potential catch	=	Unknown
SSB for long-term potential catch	=	Unknown
Importance of recreational fishery	=	Major
Management	=	Summer Flounder FMP
Status of exploitation	=	Overexploited
Age at 50% maturity	=	1.0 years, males 1.5 years, females
Size at 50% maturity	=	24.9 cm (9.8 in.), males 28.0 cm (11.0 in.), females
Assessment level	=	Age structured
Overfishing definition	=	F_{max}
Fishing mortality rate corresponding to overfishing definition	=	F_{max} = 0.24

M = 0.20 **$F_{0.1}$ = 0.14** **F_{1996} = 1.0**