

# Northern Shortfin Squid

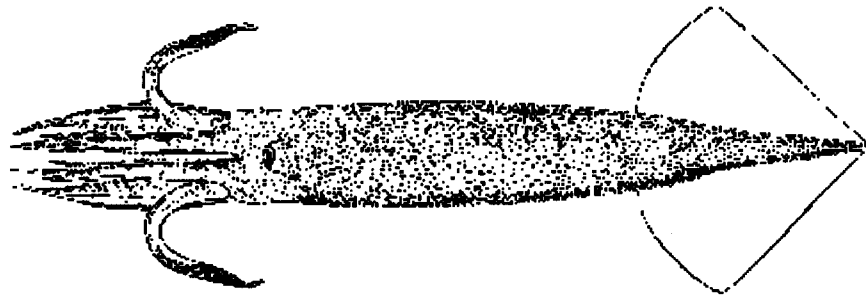
by L. Hendrickson

The northern shortfin squid, *Illex illecebrosus*, is a highly migratory ommastrephid which is distributed in the western Atlantic from Florida to Labrador; primarily in offshore continental shelf and slope waters. From Cape Hatteras to Newfoundland, throughout its range of commercial exploitation, the species is considered to be a unit stock.

Although overlapping seasonal cohorts have been identified, peak spawning occurs during winter. During autumn, individuals from as far north as Newfoundland undergo a lengthy spawning migration to warmer waters south of Cape Hatteras. Larvae and juveniles are transported northward in the warm waters of the Gulf Stream and growth is rapid during the first few months. Squid spawned during winter migrate onto the continental shelf during late spring.

This species may attain dorsal mantle lengths of up to 35 cm, although individuals harvested in the commercial fishery are generally less than 25 cm in length. The species lives for up to one year.

In the U.S. Exclusive Economic Zone (EEZ), shortfin squid are targeted primarily during June-September, by small-mesh otter trawl fisheries near the edge of the continental shelf. The U.S. squid fishery originated in the late 1800s, primarily as a source of bait, and from 1928-1967 U.S. landings (including longfin inshore squid, *Loligo pealeii*) ranged between 500-2,000 mt annually. International effort intensified first off the U.S. coast from 1968-1975 and then in Canadian waters (Northwest Atlantic Fisheries Organization or NAFO Subareas 2-4) from 1976-1981. Total landings rose from 1,600 mt in



1969 to 179,300 mt in 1979, of which 162,100 mt was taken in NAFO Subareas 2-4. Following this period of high landings in the early 1980s, the stock shifted to a low productivity regime. The fishery in NAFO Subareas 2-4 collapsed in 1983; landings in that region declined to only 100 mt in 1986, and have since exceeded 10,000 mt only twice (in 1990 and 1997). Landings in the U.S. EEZ peaked during 1976-1977 at a much lower level (about 25,000 mt). Since 1982, total landings have been taken primarily by the U.S. fishery. There has been no foreign fishery in U.S. waters since 1986. Landings by the U.S. were 14,000 mt in 1995 and 17,000 mt in 1996, representing 93% and 66% of the total landings, respectively.

The U.S. fishery is managed by the Mid-Atlantic Fishery Management Council (MAFMC), under provisions of the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Management measures for shortfin squid include use of moratorium permits, annual quota specifications, and trip limits once 95% of the annual quota is reached. Domestic annual harvest (DAH) for 1997 was set at 19,000 mt, the allowable biological catch (ABC) level. The fishery in Canadian waters is managed under a Total Allowable Catch (TAC) established

by NAFO. Since 1980, the TAC has been 150,000 mt.

Since shortfin squid are highly migratory, an unknown fraction of the stock may reside offshore and outside of the area exploited by the fishery or sampled during NEFSC bottom trawl surveys at any given time. Also, distribution is strongly influenced by oceanographic factors. For these reasons, monitoring of this resource can be problematical.

Standardized landings per unit effort (LPUE) data for the U.S. fishery from 1982-1993 have been used in a surplus production model to estimate fishing mortality rates, stock biomass, and maximum sustainable yield (MSY). A new overfishing definition of  $F_{20\%}$  (0.28, 21% exploitation rate) and a target of  $F_{50\%}$  (0.11, 9% exploitation rate) have recently been adopted to account for the one-year life cycle of this species, and to minimize the risk of recruitment overfishing.

Monthly fishing mortality rates increased during 1988-1993, from 0.01 to 0.12, just above the  $F_{50\%}$  target. Stock biomass has generally decreased since 1989 and is now at a medium level. Estimates of median long-term potential yields for  $F_{20\%}$  and  $F_{50\%}$  are 21,300 mt and 14,600 mt, respectively. However, recruitment is highly variable and yields may vary depending

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on environmental conditions. In 1996, U.S. landings were above the target yield. This stock appears to be fully exploited.

**For further information**

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*Gulf of Maine - Middle Atlantic Northern Shortfin Squid*

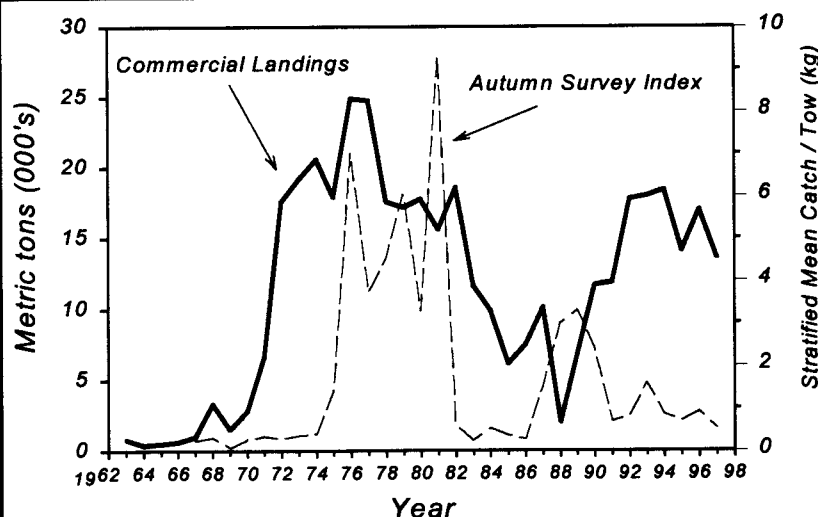


Table 27.1 Commercial landings (thousand metric tons)

Category	Year										
	1977-86 Average	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
U.S. recreational	-	-	-	-	-	-	-	-	-	-	-
Commercial											
United States	4.0	10.1	2.0	6.8	11.7	11.9	17.8	18.0	18.3	14.0	17.0
Canada	<0.1	-	-	-	-	-	-	-	-	-	-
Other	10.6	-	-	-	-	-	-	-	-	-	-
Total US EEZ <sup>1</sup>	14.6	10.1	2.0	6.8	11.7	11.9	17.8	18.0	18.3	14.0	17.0
NAFO SA 2-4	45.7	0.6	0.8	7.0	11.0	4.0	2.0	2.7	6.0	1.0	8.7
Total nominal catch	60.3	10.7	2.8	13.8	22.7	15.9	19.8	20.7	24.3	15.0	25.7

<sup>1</sup>Does not include unidentified squid species

*Summary Status*

Long-term potential catch	=	14,600 mt <sup>1</sup>
SSB for long-term potential catch	=	Unknown
Importance of recreational fishery	=	Insignificant
Management	=	Mackerel, Squid, and Butterfish FMP
Status of exploitation	=	Fully exploited
Age at 50% maturity	=	<1.0 year
Size at 50% maturity	=	200-215 mm dorsal-mantle length, males
Assessment level	=	Surplus production
Overfishing definition	=	F <sub>20%</sub>
Fishing mortality rate corresponding to overfishing definition	=	F <sub>20%</sub> = 0.28 <sup>2</sup>
<b>M = 0.30<sup>2</sup></b>		<b>F<sub>50%</sub> = 0.11<sup>2</sup></b>
		<b>F<sub>1996</sub> = Unknown</b>

<sup>1</sup>Revision based on target of F<sub>50%</sub>

<sup>2</sup>Monthly mortality rate