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Ocean Pout

by

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Distribution, Biology and Management

The ocean pout, *Zoarces americanus*, is a demersal eel-like species found in the Northwest Atlantic from Labrador to Delaware. In US waters, ocean pout are assessed as a unit stock from Gulf of Maine/Cape Cod Bay south to Delaware (Figure 17.1).

Stock identification studies suggest the existence of two stocks: one occupying the Bay of Fundy-northern Gulf of Maine region east of Cape Elizabeth, and a second stock ranging from Gulf of Maine/Cape Cod Bay south to Delaware (Olsen and Merriman, 1946). The southern stock is characterized by faster growth rates, and to date has supported the commercial fishery.

Ocean pout may attain lengths up to 98 cm (39 in.) and weights of 5.3 kg (14.2 lb). Ocean pout prefer depths of 15 to 80 m (8 to 44 fm.) and temperatures of 6° to 7° C (43° to 45° F). Tagging studies and NEFSC bottom trawl survey data indicate that ocean pout do not undertake extensive migrations, but rather move seasonally to different substrates (Bigelow and Schroeder 1953). During winter and spring, ocean pout feed over sand or sand-gravel bottom and are vulnerable to otter trawl fisheries. In summer, ocean pout cease feeding and move to rocky areas, where spawning occurs in September and October. The demersal eggs are guarded by both parents until hatching. During this period, ocean pout are not available to commercial fishing operations. Typically, catches increase when adults return to their feeding grounds in late autumn and winter. The diet consists primarily of invertebrates, with fish being only a minor component (Stemile et al. 1999). Median length at maturity for females is 26.2 cm and 31.3 cm for the Gulf of Maine area and Southern New England area, respectively, with a possible three-year egg development period (O'Brien et al. 1993). Mercer et al. (1993) and Yao and Crim (1995) indicate that ocean pout eggs are internally fertilized.

United States commercial fisheries for ocean pout are managed under the New England Fishery Management Council's Northeast Multispecies Fishery Management Plan (FMP). Under this FMP, ocean pout are included in a complex of 15 groundfish species managed by time/area

closures, gear restrictions, minimum size limits, and, since 1994, by direct effort controls including a moratorium on permits and days-at-sea restrictions. The goal of the management program is to reduce fishing mortality to allow stocks within the complex to rebuild above minimum biomass thresholds, and to attain and remain at or near target biomass levels. The information provided herein reflects the results of the most recent peer-reviewed assessment for ocean pout (Wigley and Col, 2005).

The Fishery

Commercial interest in ocean pout has waxed and waned. Ocean pout were marketed as a food fish during World War II, and landings peaked at 2,000 mt in 1944. However, an outbreak of a protozoan parasite that caused lesions on ocean pout eliminated consumer demand for this species. From 1964 to 1974, an industrial fishery developed, and nominal catches by the U.S. fleet averaged 4,700 mt. Distant-water fleets began harvesting ocean pout in large quantities in 1966, and total nominal catches peaked at 27,000 mt in 1969 (Figure 17.2). Foreign catches declined substantially afterward, and none have been reported since 1974.

Commercial fisheries are conducted year round although peak activity occurs during the late winter and early summer. Otter trawl is the primary gear used. United States landings declined to an average of 600 mt annually during 1975 to 1983. Catches increased in 1984 and 1985 to 1,300 mt and 1,500 mt respectively, due to the development of a small directed fishery in Cape Cod Bay supplying the fresh fillet market. Landings have declined more or less continually since 1987. In recent years, landings from the southern New England/Mid-Atlantic area have continued to dominate the catch, reversing landing patterns observed in 1986-1987, when the Cape Cod Bay fishery was dominant. The shift in landings is attributed to the changes in management (gear) regulations. Total commercial landings in 2005 were 3.6 mt, a record low in the time series (Table 17.1).

Ocean pout discarding occurs in the commercial fishery primarily with otter trawl, longline and lobster pot gears. In recent years, discards appear to have exceeded landings (Wigley and Col, 2005).

Research Vessel Survey Indices

Due to the ocean pout's pattern of seasonal distribution, the NEFSC spring survey biomass index (Figure 17.3) is more useful than the autumn survey index for evaluating relative abundance. Commercial landings and the NEFSC spring survey showed similar trends during 1968 to 1975 (encompassing peak levels of foreign fishing and the domestic industrial fishery); both declined from very high values in 1968-1969 to lows of 300 mt and 1.3 kg per tow, respectively, in 1975. Between 1975 and 1985, survey indices increased to record high levels, peaking in 1981 and 1985. Since 1985, survey catch per tow indices have generally declined, and are presently below the long-term survey average of 3.3 kg per tow. The 2004 and 2005 spring survey indices, 0.55 and 0.53 kg per tow, respectively, are the lowest values in the time series. Decreases in maximum size are also observed in the survey length frequencies over time. Recent biomass indices suggest the population biomass is very low.

Assessment Results

The three year average of NEFSC spring survey indices and an exploitation ratio index (e.g. 2004 landings / average of 2002-2004 spring survey biomass indices) are used as proxies for biomass and fishing mortality, respectively. After a sharp decline in 1975, relative exploitation fluctuated between 0.05 and 0.45 until 1991 when indices declined (Figure 17.4). In 2004, the three year average survey index was 1.78 kg/tow and the exploitation ratio was 0.003.

Biological Reference Points

Yield and spawning stock biomass biological reference points are not known for ocean pout. The Working Group on Re-Evaluation Biological Reference Points for New England Groundfish (NEFSC 2002a) explored replacement ratios for ocean pout; however, the replacement ratio and relative F analyses were not sufficiently informative upon which to base B_{msy} , F_{msy} , and MSY. Thus, biological reference points for ocean pout continue to be based on research vessel survey biomass trends and exploitation history (Applegate et al. 1998). MSY was chosen to be 1,500 mt and the B_{msy} proxy was determined as the median survey index from 1980-1991 (4.9 kg/tow). Given these proxies, the F_{msy} proxy is 0.31 (1.5/4.9). The MSY-proxy reference points are given in Table 17.2.

Summary

Ocean pout landings, survey indices, and exploitation rates have declined since 1991 and remain at or near record-low levels. Recent annual estimates of discards exceed the landings. In 2004, the three year average survey index was below the B_{msy} proxy and the relative exploitation rate was below the F_{msy} proxy. Hence, in 2004, the ocean pout population was in an overfished condition but overfishing did not occur.

Table 17.1 Recreational and commercial landings of ocean pout (thousand metric tons).

| Category | 1986-95 Average | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|----------------------------|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| U. S. Recreational | - | - | - | - | - | - | - | - | - | - | - |
| Commercial | | | | | | | | | | | |
| United States | 0.98 | 0.05 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 |
| Canada | - | - | - | - | - | - | - | - | - | - | - |
| Other | - | - | - | - | - | - | - | - | - | - | - |
| Total Nominal Catch | 0.98 | 0.05 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 |

Table 17.2 MSY proxy reference points for Ocean Pout.

MSY-based Reference Points

| | | |
|-----------------|---|--------------|
| MSY proxy | = | 1,500 mt |
| B_{MSY} proxy | = | 4.909 kg/tow |

F_{MSY} proxy = 0.31

For further information

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Yao, Z., and L.W. Crim. 1995. Copulation, spawning and parental care in captive ocean pout. *Journal of Fish Biology*, 47, 171-173.

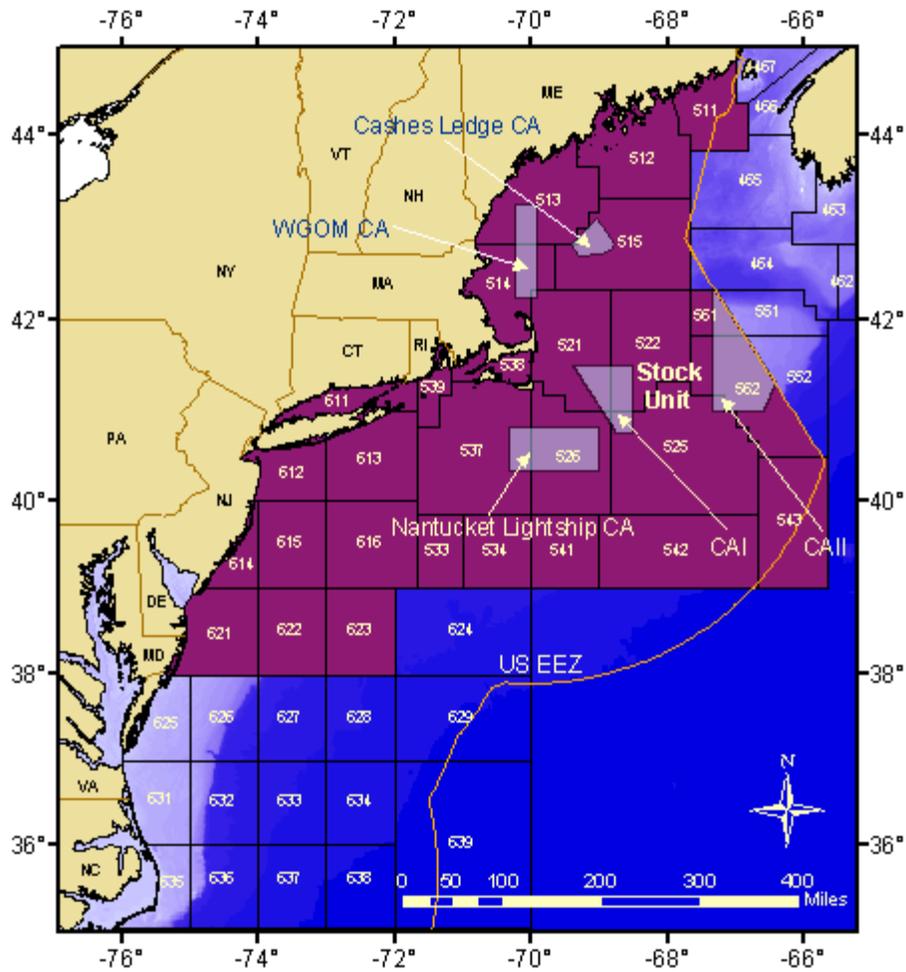


Figure 17.1. Statistical areas used to define the ocean pout stock.

Ocean Pout Total Commercial Landings

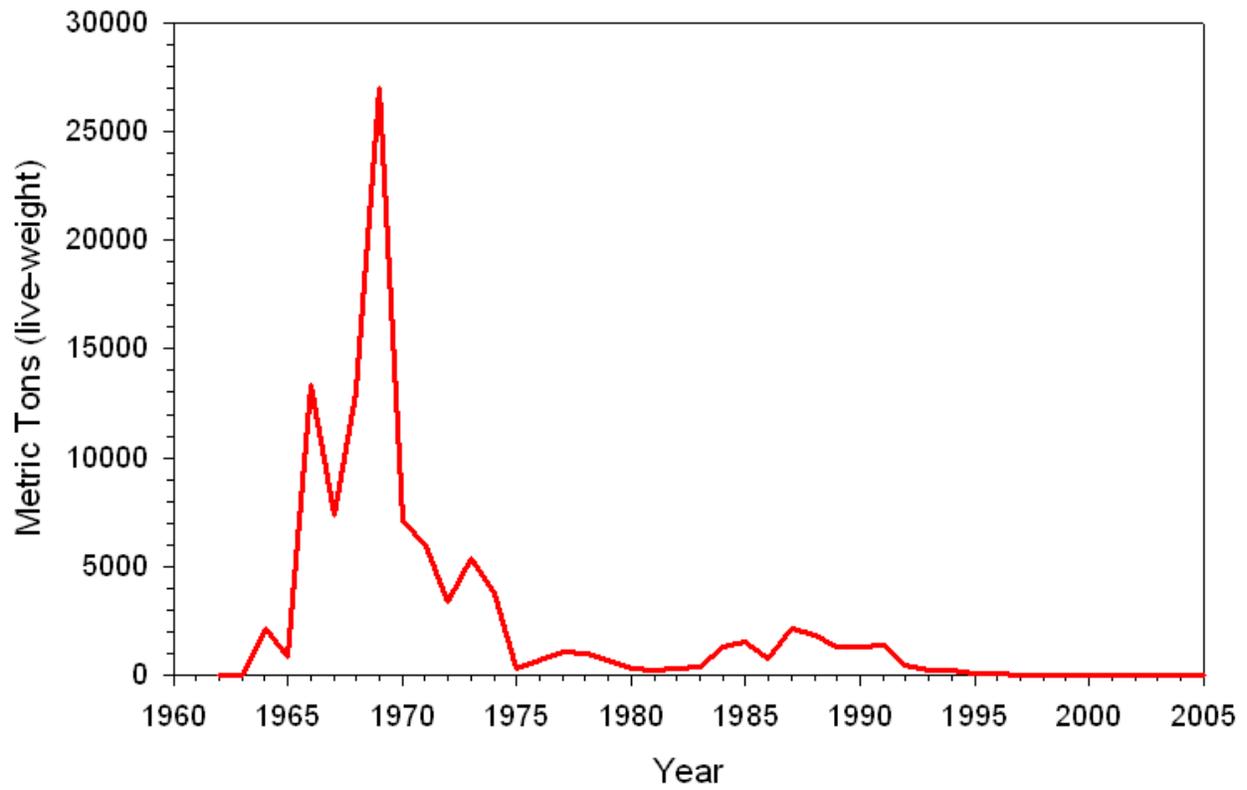


Figure 17.2. Total commercial landings of ocean pout, 1962-2005.

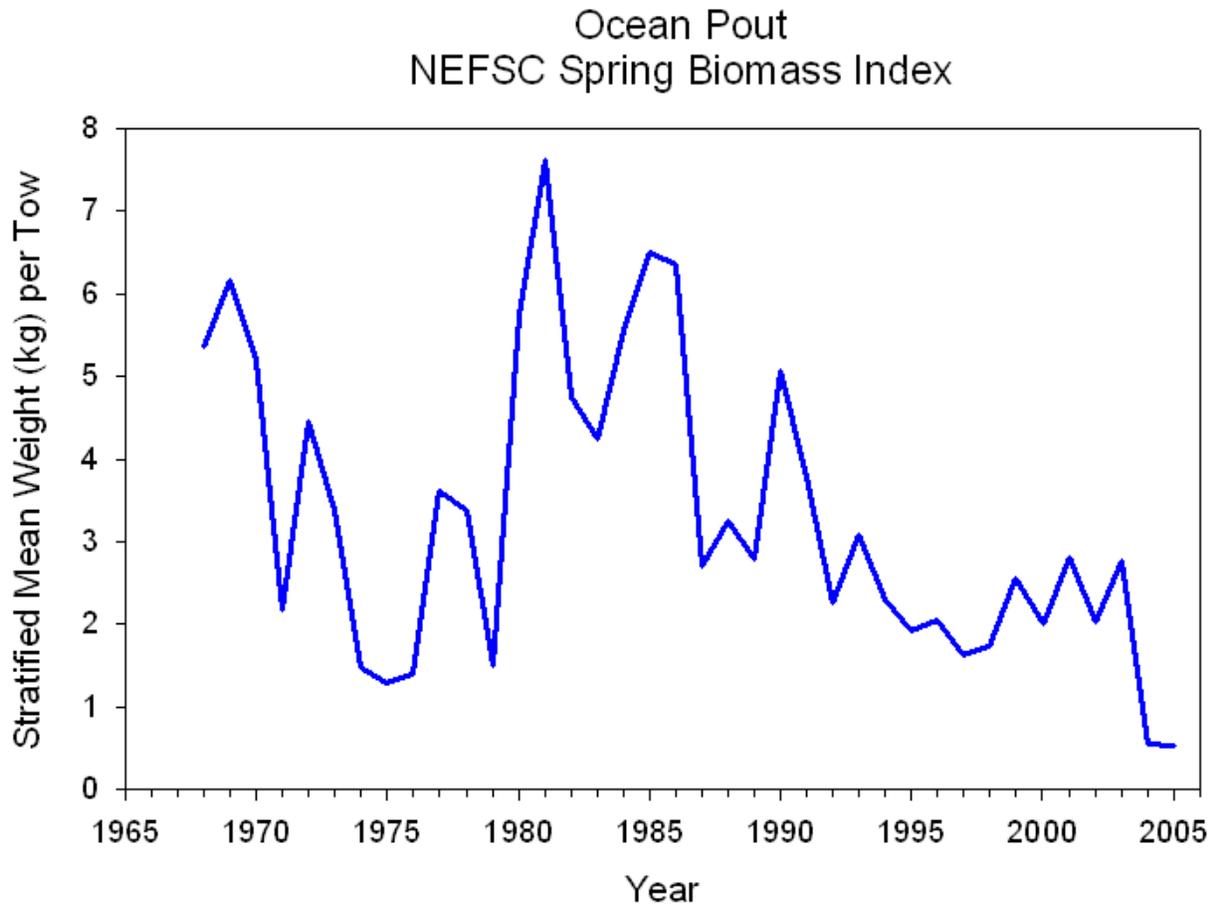


Figure 17.3. Biomass index (stratified mean weight per tow) for ocean pout from the NEFSC spring research vessel survey.

Ocean Pout Relative Exploitation Rate and F_{MSY} Proxy

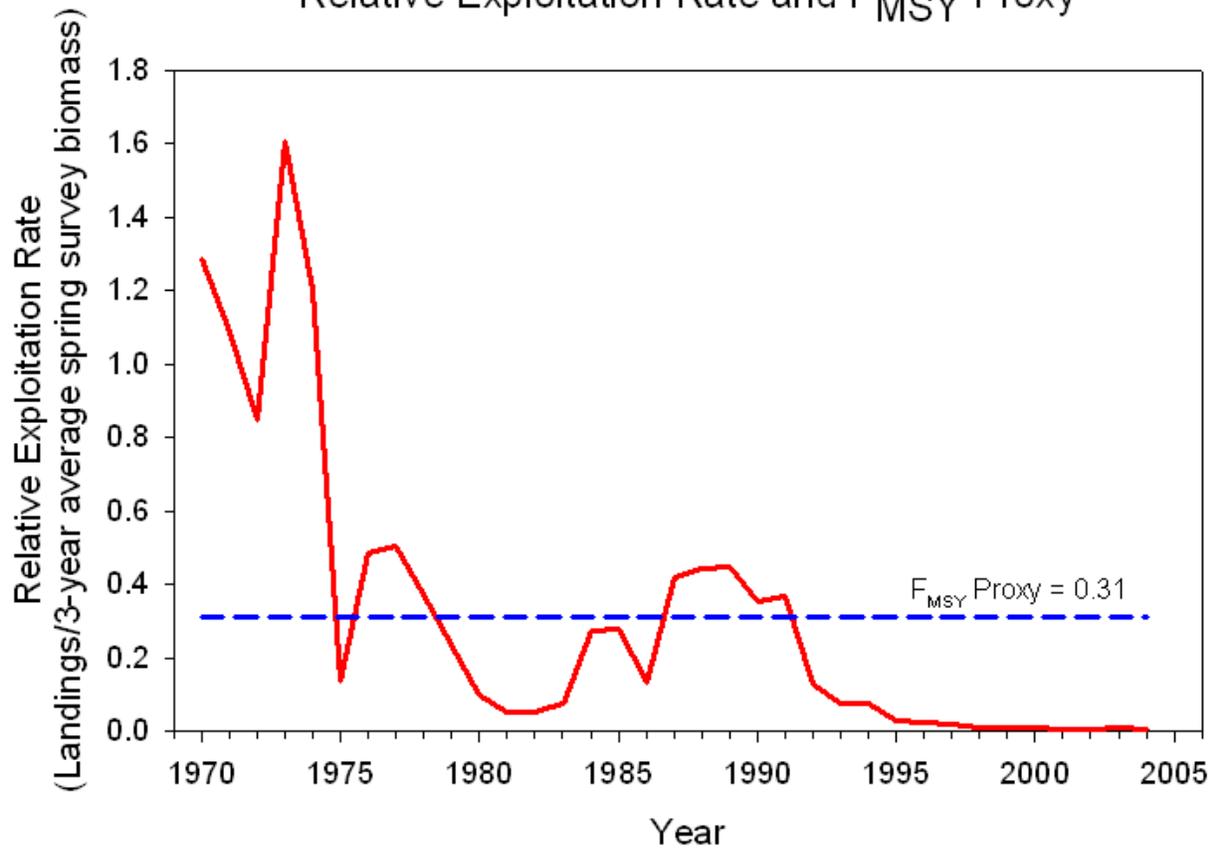


Figure 17.4. Trends in ocean pout relative exploitation rate, calculated as the landings divided by the 3-year average of the spring survey biomass, and F_{MSY} proxy.