

## **N. Ocean Pout by S.E. Wigley**

### **1.0 Background**

Ocean pout, *Macrozoarces americanus*, are assessed as a unit stock from Cape Cod Bay south to Delaware. An index assessment for this species was last reviewed at SAW 11 in 1990 (NEFSC 1990). The most recent update of stock status determined the ocean pout population was overfished and overfishing was occurring in 1999 (Wigley 2000). Ocean pout are included in the New England Fishery Management Council's Multispecies Fishery Management Plan under the "nonregulated multispecies" category.

### **2.0 The Fishery**

From 1964 to 1974, an industrial fishery developed for ocean pout, 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. Foreign catches declined substantially afterward, and none have been reported since 1974 (Table N1, Figure N1). 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 spite of continued market demand. 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/mesh) regulations. Total landings in 1999 were only 18 mt, a near record low in the time series (Table N1, Figure N1).

### **3.0 Research Survey Indices**

Commercial landings and the NEFSC spring research vessel survey biomass index followed 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 less than the long-term survey average (3.9 kg per tow); the 2000 spring survey index was 2.0 kg per tow (Table N2, Figure N1). While the NEFSC winter survey and the Massachusetts Division of Marine Fisheries inshore research vessel surveys both confirm the declining trend observed in the NEFSC spring survey, length frequency data from all three surveys do not reveal a truncation in the size range.

Exploitation ratios have declined sharply from a peak in 1973 to low levels in the early 1980s then increased slightly in the late-1980s, after which they declined to record low levels (Table N3, Figure N2).

## 4.0 Assessment Results

The index assessment presented above reveals that landings, survey and exploitation ratios trends have remained stable indicating that no substantial change in stock status has occurred since the last assessment.

## 5.0 Harvest Control Rule

The Overfishing Definition Review Panel (Applegate et al. 1998) proposed a harvest control rule for ocean pout based upon research vessel survey biomass trends and the exploitation history. 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 threshold F-msy is 0.31 (1.5/4.9). The minimum biomass threshold is ½ of the B-msy proxy (2.4 kg/tow). The control rule states that a target F should be set at 60% of the F-msy proxy (F-msy = 0.19) when the spring survey index is greater than 4.9 kg/tow, and would decrease linearly to zero at 2.4 kg/tow.

To evaluate stock conditions, a three year average of NEFSC spring survey indices and an exploitation ratio (1999 catch/ average of 1997,1998,1999 spring survey biomass indices) are used as proxies for biomass and fishing mortality, respectively. In 1999, the three year average survey index (1.97 kg/tow) indicates that biomass is below the minimum biomass threshold (2.4 kg/tow) and the exploitation ratio (0.009) indicates F is well below the F threshold (Figure N3).

## 6.0 Sources of Uncertainty

- Due to the lack of commercial length samples (one sample of 17 fish since 1996), the size composition of the commercial landings could not be characterized.
- Discards have not been estimated, only landings were used to derive exploitation ratios instead of total catch. Therefore, exploitation ratios may be underestimated.

## 7.0 References

- Applegate, A., S.X. Cadrin, J. Hoenig, C. Moore, S. Murawski, and E. Pikitch. 1998. Evaluation of existing overfishing definitions and recommendations for new overfishing definitions to comply with the Sustainable Fisheries Act. New England Fishery Management Council Report.
- NEFSC [Northeast Fisheries Science Center]. 1990. Report of the Eleventh Stock Assessment Workshop (11th SAW), Fall 1990. Woods Hole, MA: NOAA/NMFS/NEFC. NEFC Ref. Doc.90-09.
- Wigley, S.E. 2000. Ocean Pout. In: Clark, S.H. (Ed.) Status of the Fishery Resources off the Northeastern United States. NOAA Tech. Mem. NMFS-NE-115. Electronic document. <http://www.nefsc.nmfs.gov/sos/spsyn/og/pout.html>

Table N1. Commercial landings (mt, live) of ocean pout from the Gulf of Maine-Mid-Atlantic region (NAFO Subarea 5 and 6), 1962-1999.

Year	USA			Other	Total
	5	6	Total		
1962	0	0	0	0	0
1963	20	0	20	0	20
1964	2123	0	2123	0	2123
1965	877	0	877	0	877
1966	7149	0	7149	6231	13380
1967	7090	0	7090	271	7361
1968	8373	364	8737	4324	13061
1969	5571	966	6537	20435	26972
1970	5851	426	6277	895	7172
1971	2678	1448	4126	1784	5910
1972	1927	358	2285	1066	3351
1973	2810	285	3095	2275	5370
1974	2790	459	3249	483	3732
1975	209	65	274	3	277
1976	341	337	678	0	678
1977	809	250	1059	0	1059
1978	715	320	1035	0	1035
1979	658	14	672	0	672
1980	339	11	350	0	350
1981	234	17	251	0	251
1982	317	4	321	0	321
1983	408	0	408	0	408
1984	1324	0	1324	0	1324
1985	1450	54	1504	0	1504
1986	801	1	802	0	802
1987	2111	74	2185	0	2185
1988	1765	46	1811	0	1811
1989	1308	6	1314	0	1314
1990	1299	13	1312	0	1312
1991	1361	63	1424	0	1424
1992	406	68	474	0	474
1993	217	15	232	0	232
1994*	137	59	196	0	196
1995*	51	14	65	0	65
1996*	22	29	51	0	51
1997*	8	25	33	0	33
1998*	8	9	17	0	17
1999*	8	10	18	0	18

\* 1994-1999 spatial patterns are based upon Vessel Trip Report data.

Table N2. Stratified mean catch per tow in weight and numbers, mean length and individual average fish weight of ocean pout in NEFSC spring surveys, in the Gulf of Maine-Mid-Atlantic region (strata 1-26,73-76), 1968-2000.

Year	Mean weight (kg) per tow	Mean number per tow	Mean Length (cm)	Individual ave weight (kg)
1968	5.366	6.766	51.1	0.793
1969	6.154	8.629	49.3	0.713
1970	5.180	6.133	51.9	0.845
1971	2.183	3.135	50.2	0.696
1972	4.453	5.090	51.6	0.875
1973	3.373	4.591	48.8	0.735
1974	1.479	2.310	47.0	0.640
1975	1.293	1.358	53.4	0.952
1976	1.400	2.440	46.5	0.574
1977	3.605	6.366	44.8	0.566
1978	3.371	11.831	31.6	0.285
1979	1.493	5.197	34.7	0.287
1980	5.729	11.837	42.6	0.484
1981	7.605	14.131	42.7	0.538
1982	4.743	8.690	44.0	0.546
1983	4.236	5.076	50.5	0.835
1984	5.540	7.275	50.0	0.762
1985	6.494	9.011	48.7	0.721
1986	6.345	6.995	53.0	0.907
1987	2.705	3.076	51.7	0.879
1988	3.244	5.405	45.0	0.600
1989	2.792	5.323	44.0	0.525
1990	5.074	6.369	50.3	0.797
1991	3.783	5.596	49.7	0.676
1992	2.257	2.639	52.9	0.855
1993	3.084	3.546	53.4	0.870
1994	2.309	2.639	54.3	0.875
1995	1.916	2.525	50.5	0.759
1996	2.058	3.127	47.6	0.658
1997	1.632	2.069	52.4	0.789
1998	1.733	2.957	46.1	0.586
1999	2.561	3.340	50.2	0.767
2000	2.016	3.113	48.2	0.648

Table N3. Exploitation ratios (annual landings / three year average of spring survey biomass indices) for ocean pout, 1970-1999.

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<u>Year</u>	<u>Exploitation Ratio</u>
1970	1.2884
1971	1.0897
1972	0.8508
1973	1.6096
1974	1.2032
1975	0.1352
1976	0.4875
1977	0.5044
1978	0.3707
1979	0.2380
1980	0.0991
1981	0.0508
1982	0.0533
1983	0.0738
1984	0.2736
1985	0.2773
1986	0.1309
1987	0.4217
1988	0.4419
1989	0.4482
1990	0.3543
1991	0.3667
1992	0.1280
1993	0.0763
1994	0.0770
1995	0.0268
1996	0.0244
1997	0.0180
1998	0.0097
1999	0.0086

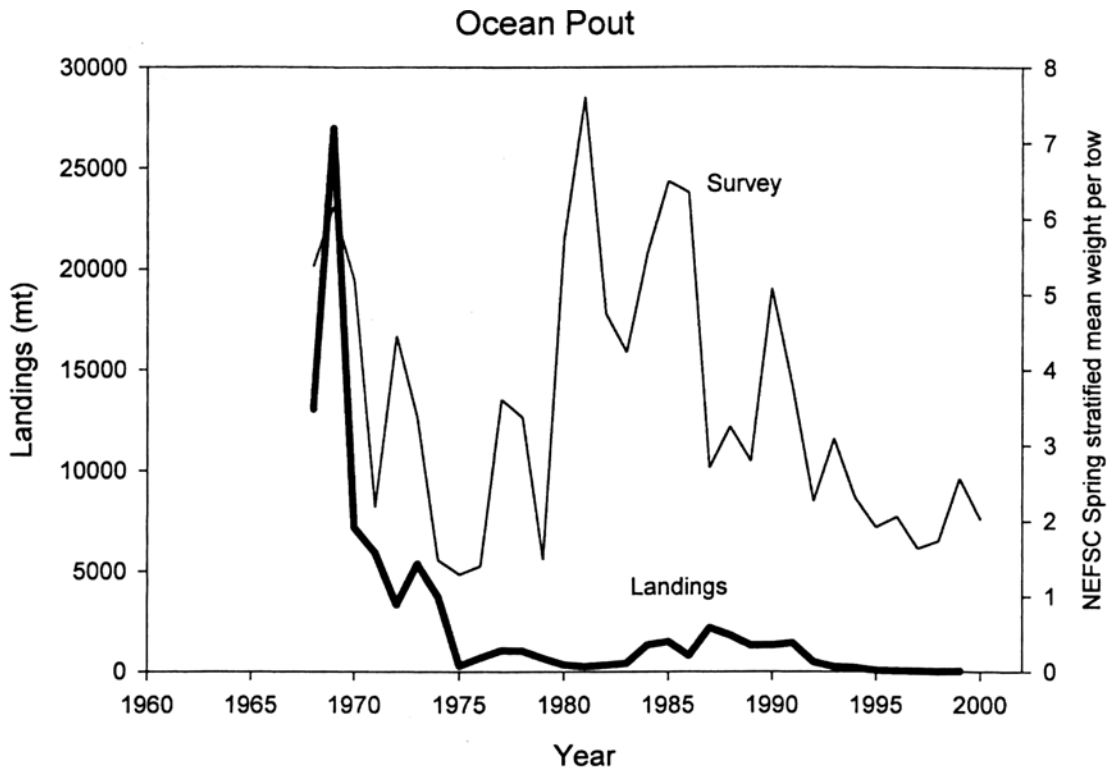


Figure N1. Trends in landings and NEFSC spring survey biomass indices for ocean pout.

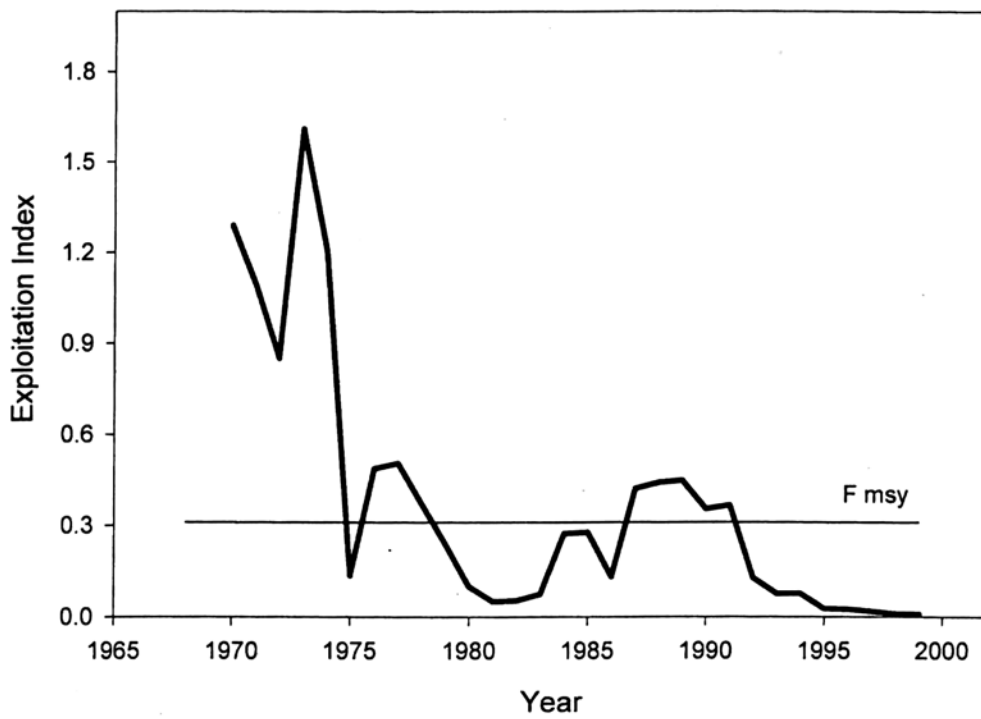


Figure N2. Exploitation index (landings/ three year average of spring biomass index) for ocean pout.

### Ocean Pout

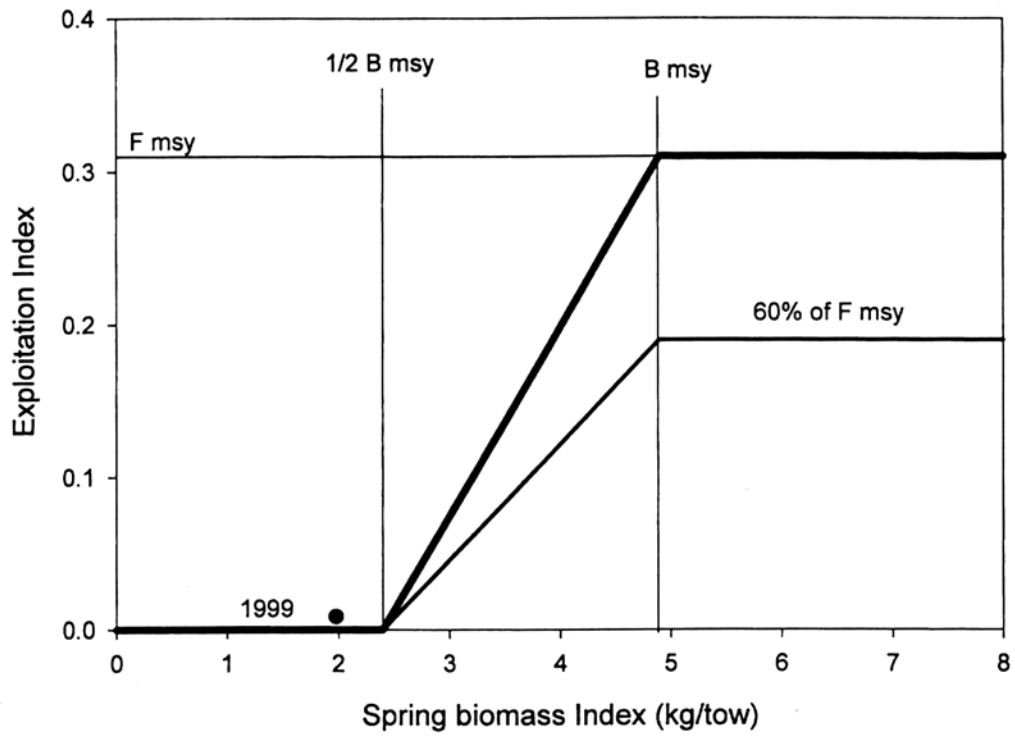


Figure N3. Harvest control rule for ocean pout.