

# Northeast Fisheries Science Center

## RESEARCH HIGHLIGHTS



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Jon A. Gibson  
Editor

The Northeast Fisheries Science Center's *Research Highlights* is a news bulletin on selected Center research findings. News write-ups focus on practical applications and implications of those findings to fisheries resource and habitat management. A name and telephone number have been included at the end of each write-up to contact for detailed information. Names of organisms follow--to the extent possible--the lists of scientific and common names of fishes, mollusks, and decapod crustaceans published by the American Fisheries Society. Any mention of trade names does not imply endorsement. *Research Highlights* is produced by the NEFSC Information Services Unit with the assistance of the Center's scientific staff.



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### Landings of New England's Traditional Groundfish Dive in 1993

Landings-by-species data for the New England and Mid-Atlantic 1993 commercial fisheries are now available from the Northeast Fisheries Science Center. (A very small amount of landings data for 1993 has not yet been tabulated, so all data remain provisional.) Following are summarized highlights for both areas:

**New England:** Atlantic herring was the most landed species (106 million pounds); American lobster was the most valuable (\$143 million in dockside or "ex-vessel" revenue). Between 1992 and 1993, herring dropped by seven percent in poundage, lobster dropped by four percent in revenue.

Sea scallop was the second-most valuable species (\$64 million). Between 1992 and 1993, scallops dropped by 38 percent in revenue.

Atlantic salmon, which is harvested from marine aquacultural operations along coastal Maine, has risen to be the fourth-most valuable species. In 1993, almost 15 million pounds of salmon were harvested, worth some 43 million dollars.

The green sea urchin, whose roe is highly prized by the Japanese, has risen to be the sixth-most valuable species. In 1993, more than 42 million pounds of urchins were harvested, worth more than 27 million dollars.

Landings of New England's three "traditional groundfish"--haddock, yellowtail flounder, and Atlantic cod--dove in 1993. Between 1992 and 1993, haddock dropped by 63 percent in poundage and 52 percent in revenue, yellowtail dropped by 36 percent in poundage and 25 percent in revenue, and cod dropped by 18 percent in poundage and 14 percent in revenue. Haddock landings have fallen so low that they are now worth less than Maine's seaworm fishery. The seaworm fishery captures two species--bloodworms and sandworms--for sale as live bait to recreational fishermen.

**Mid-Atlantic:** Atlantic menhaden was the most landed species (672 million pounds) and second-most valuable (\$40 million); blue crab was the most valuable (\$76 million). Between 1992 and 1993, menhaden rose by 11 percent in poundage and 33 percent in revenue; crabs rose by 120 percent in revenue.

Sea scallop was the third-most valuable species (\$32 million). Between 1992 and 1993, scallops dropped by 33 percent in revenue.

Landings in the offshore pelagic trawl fisheries generally fared well. Between 1992 and 1993, landings of butterfish rose by 53 percent in poundage and 43 percent in revenue, longfin squid rose by 23 percent in poundage and 26 percent in revenue, and northern shortfin squid rose by 20 percent in poundage and 11 percent in revenue.

Tables are available which list the poundage and revenue for: (1) landings of all major commercial species in the New England and Mid-Atlantic areas for 1992 and 1993, and (2) total landings by state and major port in both areas for 1992 and 1993.

**Contact Harold Foster, (508) 548-5123x212,**  
*for a copy of the tables or for more information on landings*

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### Georges Bank Yellowtail Flounder Collapse; Atlantic Cod Approach Collapse

The Georges Bank stock of yellowtail flounder has collapsed, and the Georges Bank stock of Atlantic cod faces possible and imminent collapse. The Georges Bank stock of haddock had earlier been declared collapsed. To improve the chances of Georges Bank yellowtail recovering from its collapsed state, and to avert the imminent collapse of Georges Bank cod, fishing mortality should be reduced to as low a level as possible, approaching zero.

The term "collapse" is not a subjective term. It refers to three objective conditions: (1) recruitment (*i.e.*, addition of new individuals to the population of catchable-sized fish due to reproduction, survival, and growth) is chronically low due to the reduced biomass of the population of spawning-sized individuals; (2) the proportion of older fish which would normally occur in a healthy population is greatly reduced; and (3) there are prolonged periods when the yields are less than 25 percent of what could be indefinitely sustained in a healthy population.

These conclusions on Georges Bank yellowtail flounder and Atlantic cod were among findings on six species/stocks of Northeast finfishes by the plenary panel of the 18th Northeast Regional Stock Assessment Workshop. The table below lists the findings of the panel on stock levels and exploitation rates, and includes selected comments by the panel.

Species (Stock/s)	Stock Level	Exploitation Rate	Selected Comments
Spiny dogfish	High	Nearly fully exploited	Harvest of mature females is above rate at which population can replenish itself long term.
Summer flounder	Medium	Overexploited	Recruitment decreased annually during 1982-88, increased annually during 1988-92, then decreased again in 1993 to second-lowest level on record. Harvest of 1991 and 1992 year classes (best in last six years) should be reduced.
Bluefish	Low	Overexploited	Recent recruitment has been low, with 1993 recruitment lowest on record. Harvest of age 0 fish ("snapper blues") should be reduced.
Witch flounder (Gulf of Maine - Georges Bank)	Low	Overexploited	Almost 100% of fishing mortality on ages 1 and 2, 60% on age 3, and 10% on age 4 is caused by discards from northern shrimp fishery. Nordmore grate--device used in shrimp trawls to reduce such finfish bycatch--should continue to be required of shrimp fishermen.
Atlantic cod (Georges Bank)	Low	Overexploited	Stock biomass is only 40% of biomass in 1980. Exploitation rate is 55%. Recruitment has been very low in four of last five years. Without drastic reduction in fishing mortality, stock faces possible imminent collapse.
Yellowtail flounder (Georges Bank)	Low	Overexploited	Stock biomass is only 8% of average biomass in 1960s. Exploitation rate is 65%. Recruitment has remained depressed since 1982. Stock has collapsed.

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The panel's findings are included in a 38-page "Advisory Report on Stock Status: SAW 18 Plenary" which is available upon request.

Contact Helen Mustafa, (508) 548-5123x244

*for a copy of the report*

Contact Steven Murawski, (508) 548-5123x303

*for information on the plenary panel's findings*

### Sea Scallop Population in Mid-Atlantic Increases, Now at High Level

Preliminary findings from the Northeast Fisheries Science Center's 1994 survey of the region's sea scallop resource show the resource in the Mid-Atlantic area to have increased since 1993, and to be at a high level. The resource in the U.S. portion of Georges Bank remains at a near-record-low level.

The Center's survey sampled 482 sites between Georges Bank and the Chesapeake Bight. A *Fishermen's Report*, which lists the location and catch by shell height for each site, is available upon request.

Contact Barbara Lewis, (508) 548-5123x281

*for a copy of the report*

Contact Han Lai, (508) 548-5123x264

*for more information on sea scallop resource status*

### Another Heavy Setting of Softshells off Northern New Jersey

Following the unusually heavy "setting" (*i.e.*, change from a drifting larval stage to a sedentary juvenile stage) of softshells off northern New Jersey last year, another heavy setting has occurred this year. During July in one bed (which extended five miles long and 500 feet wide) along the south shore of Raritan Bay, the Northeast Fisheries Science Center found an average of 24,000 newly set softshells per square meter (*i.e.*, 17 per square inch)! For comparison, during July last year, the bed had 7,000 newly set softshells per square meter (*i.e.*, 5 per square inch).

There appears to be a relationship between the weather during the softshell prespawning-to-postsetting period and the number of softshell juveniles settled into beds by late July. During the heavy setting of softshells along the northern New Jersey coast in 1993 and 1994, the weather featured consistently warming temperatures, clear skies, and light winds. Interestingly, these were the same weather conditions in the summers of the early 1960s when another coastal bivalve--the northern quahog--had such heavy settings in Great South Bay (Long Island, New York) that subsequent harvests from that bay alone accounted for as much as 45 percent of the total U.S. harvest of that species.

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The Center has been and will continue to monitor these softshell stocks to see what factors (*e.g.*, physical, predation, disease) control survival to the recruitment stage. Preliminary observations indicate that shifting sand substrates and sea lettuce patches may play key roles in survival of young softshells. For recently settled juveniles living near the surface, shifting sand dislodges them. Later, for one-year-olds living well under the surface, the sand appears to eliminate their siphon holes with the result that the young softshells can never re-establish contact with the surface and thus ultimately die. Sea lettuce patches "smother" the one-year-olds.

Contact Clyde MacKenzie, (908) 872-3019

### **Very Strong Year Class of Black Sea Bass Appears in Hudson-Raritan Bay**

Relative to recent years, the Northeast Fisheries Science Center has found an exceptionally high number of young-of-the-year black sea bass inhabiting Hudson-Raritan Bay, a large estuary straddling the New Jersey - New York border. Although black sea bass are an important commercial species in New Jersey and New York (*i.e.*, accounting last year for 1.5 million pounds of landings and 1.3 million dollars in dockside revenue in the two states combined), they are an especially important species in the bistate recreational fishery. The habitat hosting the greatest concentrations of the young black sea bass was the "shelly bottom" near the mouth of the bay.

Contact Tony Pacheco, (908) 872-3090

### **Population-Level Effects of Pollution Evaluated**

The Northeast Fisheries Science Center has published a report--based on a review of available scientific information--on the "Quantitative Effects of Pollution on Marine and Anadromous Fish Populations." At the core of the report are case studies on Atlantic menhaden, striped bass, and winter flounder. General findings on menhaden are that because of extreme variability in population recruitment, it is not feasible to detect population reductions due to pollution effects unless those effects are catastrophic (*i.e.*, accounting for population reductions greater than 50 percent). General findings on stripers are that fishing mortality plays the dominant role in overall population reductions, but that a combination of toxic contaminants and environmental stress can severely reduce larval populations. General findings on flounder are that pollution reduces reproductive success by producing genetic and cytological abnormalities in developing eggs, and abnormal growths in larval tissue.

A copy of the report is available upon request.

Contact Carl Sindermann, (410) 226-5193

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### Research Briefs

- Egg-bearing female winter flounder were captured by the Northeast Fisheries Science Center in New Haven (Connecticut) Harbor, tagged with ultrasonic transmitters, and released back into the harbor. The fish moved in and out of the harbor far more than expected during the winter, and some were recaptured surprisingly far away (e.g., 70 miles) during the spring. Contact Jose Pereira, (203) 783-4238.
- Winter flounder collected by the Northeast Fisheries Science Center in the vicinity of the New York Bight apex's 12-Mile Dumpsite during the phase-out and cessation of sewage sludge dumping there (1986-89) showed a preference for specific prey species, not feeding on prey based on availability alone. Contact Frank Steimle, (908) 872-3059.
- In a continuing study of the effects of algal blooms on bivalve mollusks, the Northeast Fisheries Science Center has shown that the dinoflagellate *Prorocentrum minimum* alters the digestive tract of eastern oyster larvae and newly settled spat, interfering with feeding and growth of these early life stages. Contact Gary Wikfors, (203) 783-4225.
- A bibliography--indexed by species, geographic area, research discipline, and author--is available for the Northeast Fisheries Science Center's 1990 and 1991 publications, reports, and abstracts. Contact Jon Gibson, (508) 548-5123x228.
- A summary report is available on the marine mammal research supported by the Northeast Fisheries Science Center during the 1980s. The report lists the 172 scientific publications, contract reports, working papers, and abstracts of oral presentations emanating from the research. Contact Tim Smith, (508) 548-5123x251.
- An annual report is available on the National Systematics Laboratory's activities during 1993. Contact Bruce Collette, (202) 357-2524.
- The Northeast Fisheries Science Center has acquired a large supply of the combined 1992 and 1993 annual reports on the National Marine Fisheries Service's conservation, management, and research activities in support of the Marine Mammal Protection Act. Copies are available. Contact David Potter, (508) 548-5123 x262.

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### Recent Scientific Publications and Reports

Northeast Fisheries Science Center authors are indicated in all capital letters in the list below. Unless otherwise indicated, single copies of the listed publications and reports are available from the senior Center author by writing to the address appended to each bibliographic item.

- ALMEIDA, F.; SHEEHAN, T.; Smolowitz, R. 1994. Atlantic sea scallop, *Placopecten magellanicus*, maturation on Georges Bank during 1993. *Northeast Fish. Sci. Cent. Ref. Doc.* 94-13; 9 p. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- ANDERSON, E.D. 1994. Profile: International Council for the Exploration of the Sea. *Fisheries* 19(9): 33. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- Conservation & Utilization Division, Northeast Fisheries Science Center. 1994. Estimating harbor porpoise bycatch in the Gulf of Maine sink gillnet fishery. *Northeast Fish. Sci. Cent. Ref. Doc.* 94-24; 5 p. Reprint/copy request address: G.T. Waring, National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- GIBSON, J.A. 1994. Indexed bibliography of Northeast Fisheries Science Center publications and reports for 1990-91. *NOAA Tech. Memo. NMFS-F/NEC-102*; 40 p. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- HELSE, T.E.; MAYO, R.K. 1994. Estimation of discard in the silver hake fisheries and a re-analysis of the long-term yield from the stocks. *Northeast Fish. Sci. Cent. Ref. Doc.* 94-01; 58 p. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- HOLZWARTH-DAVIS, T.; TAYLOR, M.H. 1994. Description of the 1993 oceanographic conditions on the Northeast continental shelf. *Northeast Fish. Sci. Cent. Ref. Doc.* 94-11; 80 p. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- JOHNSON, D.L.; MORSE, W.W. 1994. Net extrusion of larval fish: correction factors for 0.333 mm versus 0.505 mm mesh bongo nets. *NAFO Sci. Counc. Stud.* 20: 85-92. Reprint/copy request address: National Marine Fisheries Service, 74 McGruder Rd., Highlands, NJ 07732, U.S.A.
- MAYO, R.K.; HELSE, T.E.; O'BRIEN, L.; SOSEBEE, K.A.; FIGUERIDO, B.F.; HAYES, D. 1994. Estimation of standardized otter trawl effort, landings per unit effort, and landings at age for Gulf of Maine and Georges Bank cod. *Northeast Fish. Sci. Cent. Ref. Doc.* 94-12; 17 p. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- MAYO, R.K.; O'BRIEN, L.; SERCHUK, F.M. 1994. Assessment of the Georges Bank cod stock for 1993. *Northeast Fish. Sci. Cent. Ref. Doc.* 94-10; 75 p. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- MORSE, W.W. 1994. Atlantic cod, *Gadus morhua*, larvae: an analysis of the MARMAP time series, 1977-1987: a report to the Office of Global Programs, R/OGP, National Oceanic and Atmospheric Administration. *Northeast Fish. Sci. Cent. Ref. Doc.* 94-08; 44 p. Reprint/copy request address: National Marine Fisheries Service, 74 McGruder Rd., Highlands, NJ 07732, U.S.A.

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- Patterson, G.W.; Tsitsa-Tzardis, E.; WIKFORS, G.H.; Ghosh, P.; SMITH, B.C.; Gladu, P.K. 1994. Sterols of eustigmatophytes. *Lipids* 29(9): 661-664. Reprint/copy request address: National Marine Fisheries Service, 212 Rogers Ave., Milford, CT 06460, U.S.A.
- SHEPHERD, G.R.; TERCEIRO, M. 1994. The summer flounder, scup, and black sea bass fishery of the Middle Atlantic Bight and Southern New England waters. *NOAA Tech. Rep. NMFS* 122; 13 p. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.
- SHERMAN, K.; Solow, A.; GREEN, J.; JOSSI, J. 1994. Multidecadal stability, resilience, and diversity of the zooplankton in a stressed large marine ecosystem. Paper presented at: ICES symposium on zooplankton production, 15-19 August 1994, Plymouth, England; 25 p. Reprint/copy request address: National Marine Fisheries Service, 28 Tarzwell Dr., Narragansett, RI 02882, U.S.A.
- STEIMLE, F.W.; JEFFRESS, D.; FROMM, S.A.; REID, R.N.; VITALIANO, J.J.; FRAME, A. 1994. Predator-prey relationships of winter flounder, *Pleuronectes americanus*, in the New York Bight apex. *Fish. Bull. (U.S.)* 92(3): 608-619. Reprint/copy request address: National Marine Fisheries Service, 74 McGruder Rd., Highlands, NJ 07732, U.S.A.
- WARING, G.T.; QUINTAL, J.M.; SMITH, T.D. 1994. Marine mammal studies supported by the Northeast Fisheries Science Center during 1980-1989. *NOAA Tech. Memo. NMFS-F/NEC*-103; 27 p. Reprint/copy request address: National Marine Fisheries Service, 166 Water St., Woods Hole, MA 02543, U.S.A.

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