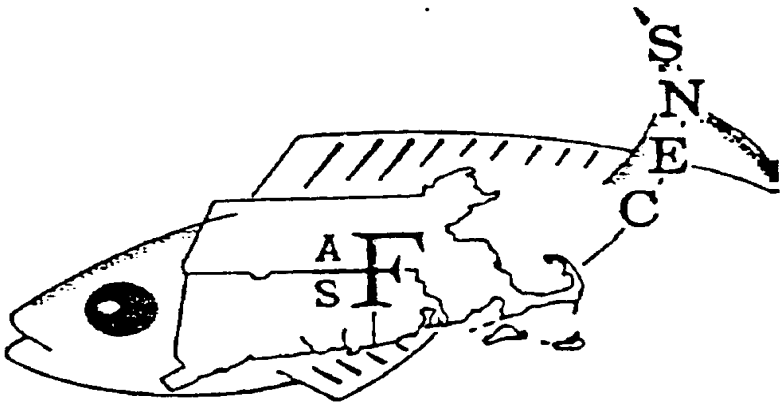
Southern New England Chapter

American Fisheries Society

2003 Winter Meeting



January 14, 2003
Ramada Inn
Auburn, MA

Program & Abstracts

AGENDA FOR SNEC AFS 2003 WINTER MEETING
TUESDAY JANUARY 14, 2003

8:40-9:00 ***Registration and Coffee***

9:00-9:10 **Opening Comments.** Tim Sheehan

9:10-9:30 **Age, growth, and fecundity of grubby, *Myoxocephalus aenaeus*, in Niantic River and Niantic Bay, Long Island Sound.** Tracy Maynard[1], Edward F. Roseman[2], Christine Tomichek[2], Jennifer Burton[3] , [1]Kleinschmidt Associates, Deep River CT, [2]Dominion Millstone Power Station Environmental Laboratory, Waterford CT, [3]Connecticut Department of Environmental Protection, Old Lyme CT

9:30-9:50 **Tagging study of lobster in Long Island Sound.** Colleen Gianni, Jacque Benway, Penny Howell, Connecticut Department of Environmental Protection, Old Lyme CT

9:50-10:10 **Growth estimate for sea scallops in the Nantucket Lightship Closed Area of Georges Bank.*** Bradley P. Harris, Kevin D.E. Stokesbury, The University of Massachusetts Graduate School of Marine Sciences and Technology, New Bedford, MA

10:10-10:40 ***Break***

10:40-11:00 **Examination of sea scallop-sea star predator-prey interactions on Georges Bank.** Michael Marino[1], Kevin D.E. Stokesbury[1], and Francis Juanes[2], [1]The University of Massachusetts Graduate School of Marine Sciences and Technology, New Bedford MA, [2]Department of Natural Resources Conservation, University of Massachusetts - Amherst

11:00-11:20 **Growth of quahogs (*Mercenaria mercenaria*) and softshell clams (*Mya arenaria*) in response to eutrophic-driven changes in food supply and habitat.** Ruth H. Carmichael*, Andrea C. Shriver, Erica T. Weiss, and Ivan Valiela Boston University Marine Program, Marine Biological Laboratory, Woods Hole MA

11:20-11:40 **Using remote sensing and GIS to examine longline bycatch in the North Atlantic.** Chris Orphanides, John Hoey, and Grayson Wood, National Marine Fisheries Service, 28 Tarzwell Drive, Narragansett RI

11:40-12:00 **Gear and approaches for quantifying fish populations and characterizing habitats - a review.** Giancarlo Cicchetti, U.S. Environmental Protection Agency, Narragansett RI

12:00-1:15 ***Lunch***

1:15-2:00 **Massachusetts' Inland Fishes - An Overview.** Karsten Hartel, Museum of Comparative Zoology, Harvard University, Boston MA

2:00-2:20 **Railroad Brook fish habitat restoration project.** Brian D. Murphy, Connecticut Department of Environmental Protection, Marlborough CT

2:20-2:40 **Sand shrimp *Crangon septemspinosa* size-selective predation on post-settled winter flounder.*** David L. Taylor, University of Rhode Island, Graduate School of Oceanography, Narragansett RI

***** Denotes student papers.

Age, growth, and fecundity of grubby, *Myoxocephalus aenaeus*, in Niantic River and Niantic Bay, Long Island Sound. Tracy Maynard[1], Edward F. Roseman[2], Christine Tomichek[2], Jennifer Burton[3] , [1]Kleinschmidt Associates, 161 River Street, P.O. Box 1050, Deep River CT 06417, (860) 526-2358, [2]Dominion Millstone Power Station Environmental Laboratory, P.O. Box 128, Waterford CT 06385, (860) 444-4235, [3]Connecticut Department of Environmental Protection, Marine Fisheries Division, P.O. Box 719, Old Lyme CT 06371, (860) 434-6043

Grubby *Myoxocephalus aenaeus* is a common benthic fish of inshore waters and estuaries of eastern Long Island Sound. Despite their frequent occurrence in fish collections, little information exists describing their life history or population demographics. Using data collected as part of a long-term monitoring program, we examined a time series of relative abundance for larval and adult grubby to explore trends in abundance. We also assessed the age, size, and fecundity of adult grubby in 2001-02 to determine the population demographic characteristics of the species in the region. Mean grubby CPUE in Niantic Bay ranged from about 0.4 per trawl in 1976 to a peak of 2.9 per trawl in 1984. In the Niantic River, grubby CPUE was lowest in 1977 at 0.4 per trawl and peaked in 1989 at 7.6 per trawl. Catch of grubby in bottom trawls varied seasonally with highest CPUE occurring from November through January in the Niantic River and in December, January, and April in Niantic Bay. Highest abundance of grubby larvae was observed in 2001 and lowest abundance was observed in 1991. Age classes 0+ through III+ were derived from otolith analysis while length frequency analysis indicated the possibility of older but rare fish in the population. The total number of eggs in ovaries of 64 grubby ranging in size from 52 mm to 155 mm ranged from 286 to 16,451, respectively. We also present information on length and weight of grubby. Our results represent a comprehensive assessment of grubby life history and population demographics in northeastern Long Island Sound.

Tagging study of lobster in Long Island Sound. Colleen Gianni, Jacque Benway, Penny Howell, Connecticut Department of Environmental Protection, Old Lyme CT

Growth estimate for sea scallops in the Nantucket Lightship Closed Area of Georges Bank.* Bradley P. Harris, Kevin D.E. Stokesbury, The University of Massachusetts Graduate School of Marine Sciences and Technology, 706 South Rodney French Blvd., New Bedford MA 02744, (508) 910-6359, bharris@umassd.edu

In 1994 three large sections of Georges Bank (GB) were closed to mobile fishing gear, including commercial trawls and scallop dredges. Presently these closed areas contain ≈80% of the sea scallops, *Placopecten magellanicus* on GB. The GB scallop resource is managed as a single stock using a yield per recruit model, which relies on specific von Bertalanffy growth equation (vB) parameters to predict annual scallop yield. The 2001 National Marine Fisheries Service Stock Assessment Review Committee reported that predicted scallop growth failed to describe shell height frequencies observed in the closed areas. To obtain accurate estimates of scallop growth in the Nantucket Lightship Closed Area (NLSA) we tagged 11,700 scallops in spring 2001. Scallops were collected using commercial dredges, and plastic numbered Perterson disc tags were attached to the top valve with stainless steel wire. Shell heights were measured and scallops were released within 500 meters of the closed area. Presently commercial fishermen have returned 1,236 tagged-shells with 65 to 521 days at large. A least sum of squared errors

method was used to estimate K = 0.23 year^{-1} from tag returns. Scallop shell height measurements from SMAST video surveys of the NLSA were used to estimate L_{∞} = 180 mm. Published research on juvenile scallop growth and early life history supports a t_0 = 0.5 yrs. Accurate growth estimates for the closed areas on GB are critical to avoiding waste or growth over-fishing. Further, a rotational scallop fishery management strategy, requiring area-specific growth information, is being considered for GB.

Examination of sea scallop-sea star predator-prey interactions on Georges Bank. Michael Marino[1], Kevin D.E. Stokesbury[1], and Francis Juanes[2], [1]The University of Massachusetts Graduate School of Marine Sciences and Technology, 706 South Rodney French Blvd., New Bedford MA 02744, Tel. (508) 910-6359, Fax. (508) 999-8197, mmarino@umassd.edu
[2]Department of Natural Resources Conservation, University of Massachusetts - Amherst

Sea stars, *Asterias vulgaris*, are predators of sea scallops, *Placopecten magellanicus*. Sea scallops frequently swim as an escape response to sea stars suggesting sea star predation inflicted an evolutionary pressure throughout time. The Georges Bank sea scallop resource is the second highest value fishery in the Northeast United States. Natural mortality is an important component of population simulation models used to estimate stocks over time in the management of this fishery. Three large closed areas presently contain highly dense aggregations of sea scallops, ≈ 80% of the entire Georges Bank resource. These aggregations of sea scallops may aggregate predators, including sea stars, resulting in increased natural mortality rates in these areas. Using the video database the School for Marine Science and Technology (SMAST) collected in the closed and open areas of Georges Bank, we will test the hypotheses that: 1.) Sea stars are aggregating in the closed areas of Georges Bank; 2.) Sea stars are larger in the closed areas than in the open area of Georges Bank; 3.) Sea star predation on sea scallops is site-specific causing high levels of localized natural mortality; and 4.) Sea star aggregations are moving from scallop aggregation to scallop aggregation within closed areas. The objective of this research is to generate a spatially specific examination of the sea scallop-sea star predator-prey interaction for closed and open areas of Georges Bank, in order to enhance the understanding of the ecosystem food-web structure and sea scallop natural mortality rates.

Growth of quahogs (*Mercenaria mercenaria*) and softshell clams (*Mya arenaria*) in response to eutrophic-driven changes in food supply and habitat. Ruth H. Carmichael*, Andrea C. Shriver, Erica T. Weiss, and Ivan Valiela Boston University Marine Program, Marine Biological Laboratory, Woods Hole MA 02543, (508) 289-7518, rherrold@bu.edu

In recent years increased urbanization has increased nitrogen loads to coastal estuaries, prompting eutrophication and changing estuarine features. Increased N loads increase phytoplankton and microphytobenthos concentrations, result in accumulation of organic matter from detritus of algae, reduce sediment and water column oxygen content, and may change sediment composition. These changes are likely to affect growth and survival of commercially important bivalves like quahogs and softshell clams. To determine how eutrophication-related changes may affect these bivalves, we transplanted juveniles into estuaries of different N loads, measured changes in sediment and water column properties and in growth and survival of bivalves. We then used N stable isotopes to link responses of bivalves to their food supply and

land-derived sources of N for management. We found growth rates of quahogs and softshell clams increased as land-derived N loads increased their food supply. Changes in water column food sources had a greater effect on growth than sediment sources. Low salinity and high particulate organic matter may have limited growth in some areas despite increased food supply. N stable isotope analysis linked growth responses of bivalves to land-derived N primarily from wastewater sources. This work describes how N loads might alter food supply and benthic habitats used by shellfish and how populations of shellfish are coupled to these changes in habitat. These data will be useful to managers and mariculturists seeking appropriate areas for commercial and recreational shellfishing, as well as planners needing to evaluate impacts of development.

Using remote sensing and GIS to examine longline bycatch in the North Atlantic. Chris Orphanides, John Hoey, and Grayson Wood, National Marine Fisheries Service, 28 Tarzwell Drive, Narragansett RI 02882, (401) 782-3283, chris.orphanides@noaa.gov

All sea turtles in the U.S. waters are considered either endangered or threatened as defined in the Endangered Species Act. In the region of the Grand Banks enough leatherback (Dermochelys coriacea) and loggerhead (Caretta caretta) turtles were incidentally caught as bycatch to shut down the U.S. longlining fishery in that region. In an effort limit this bycatch, oceanographic characteristics in the areas of U.S. longlining fishing sets were examined through the use of GIS and satellite imagery. GIS was used to sample sea surface temperature (SST), chlorophyll, and depth characteristics from satellite imagery and bathymetric grids. This was done for each fishing set in the observer database north of 34^0N from 1997 to 2001. The resulting environmental data was incorporated into the existing observer database. The database was then examined with a series of statistical measures to examine differences between fishing sets with turtles and those without turtles, and differences between leatherback and loggerhead distribution, among other relationships. The promise of this study was that through a combination of fishing gear characteristics and environmental variables, areas with a high probability of sea turtle interaction could be discerned. Preliminary analysis suggests that chlorophyll concentrations and depth characteristics may provide more insight for defining sets with sea turtle interactions than SST fronts. This project is designed to provide useful information towards the management of highly migratory species, and to demonstrate the value of GIS and satellite imagery to fisheries management. The data gathered from satellite imagery for this project is not limited to the assessment of sea turtle populations and can easily be applied to the analysis of any other species in the longlining observer database.

Gear and approaches for quantifying fish populations and characterizing habitats - a review. Giancarlo Cicchetti, U.S. Environmental Protection Agency, 27 Tarzwell Drive Narragansett RI 02882, (401) 782-9620, cicchetti.giancarlo@epa.gov

Railroad Brook fish habitat restoration project. Brian D. Murphy, Connecticut Department of Environmental Protection, Inland Fisheries Division, Habitat Conservation and Enhancement Program 209 Hebron Avenue, Marlborough CT 06447 (860) 344-2115, an.murphy@po.state.ct.us

Approximately 1,275 feet of Railroad Brook, a 1st order headwater stream had been channelized and relocated in the 19th century due to railroad construction. Channelization created an unproductive and homogeneous instream habitat for the native brook trout population and caused the watercourse to regularly flood and erode the adjacent abandoned railroad bed resulting in excessive stream sedimentation. Primary restoration goals were to: (1) return the channel to a more natural and stable morphometry, (2) increase and enhance instream habitats for adult brook trout, (3) monitor brook trout population response, and (4) reduce non-point source pollution. Channel restoration techniques will be discussed, including recreating and relocating over 325 feet of channel through adjacent wetlands and realignment of 950 feet of channel along the railroad bed to a more sinuous pattern. In both areas, channel hydraulic capacity was increased to contain a two-year bankfull event and reduce flooding of the railroad bed. Numerous instream fish habitat structures were installed, including lunkers, rootwads, cross-logs, deflectors and small boulders. Collectively, these structures were designed to recreate instream cover, provide variations in channel depths and flow patterns and increase the overall diversity and availability of microhabitats. A paired site design that involved electrofishing a fixed 100-meter station before/after restoration with comparisons to a downstream control station was employed to monitor the brook trout population. Two years of monitoring indicated that post-development density (fish/100m^2) of adult brook trout brook increased 176% at the restored station as compared to 19% at the control station. Completed in 2000 at a cost of $111,200, the restored channel has developed a stable channel morphometry despite several storm events. Stabilization of the channel and reduction of flooding over the railroad bed has arrested a major source of sedimentation within the watershed.

Sand shrimp *Crangon septemspinosa* size-selective predation on post-settled winter flounder. David L. Taylor, University of Rhode Island, Graduate School of Oceanography, Narragansett RI 02882, (401) 874-6851, dtaylor@gsosun1.gso.uri.edu

Rapid growth in the early life stages of fish is believed to increase survival by minimizing vulnerability to predation. This concept relies on two premises: rapid growth reduces the time interval fish are susceptible to predation (growth-mortality hypothesis), and fish that are large-at-age are less vulnerable to predation than smaller individuals (bigger-is-better hypothesis). Despite approaching the status of a paradigm, the latter assumption is largely unsubstantiated in fisheries research. The purpose of the following study was to examine sand shrimp, *Crangon septemspinosa*, size-selective predation on post-settled winter flounder. Shrimp were visually observed foraging on three size classes of flounder (8-12, 13-17, and 18-22 mm TL), and the major elements of the "predation cycle" were quantified (attack encounters, capture, consumption, attack and capture success, and handling time). The number of shrimp attacks, captures, and handling time increased with increasing flounder size. Conversely, the proportion of attacks and captures (attack and capture success) that resulted in a flounder being consumed decreased with increasing flounder size. The product of these elements resulted in medium-sized flounder suffering the highest rate of mortality. Small flounder benefit from a decreased rate of encounters with shrimp predators, whereas large flounder profit from superior escape capabilities once attacked and captured. Results from this study challenge the validity of the bigger-is-better hypothesis and suggest that being large-at-age has associated costs.