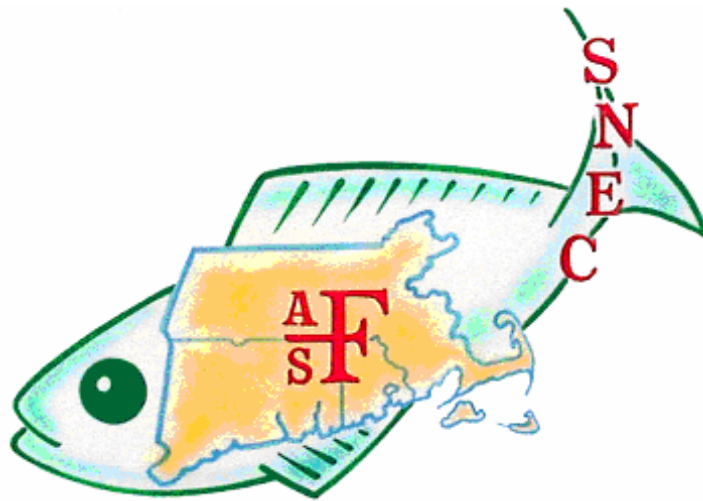


Southern New England Chapter

American Fisheries Society

2011 Winter Meeting



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January 20, 2011

**Woods Hole Oceanographic Institute, Redfield Auditorium
Woods Hole, MA**

Program

AGENDA FOR SNEC AFS 2011 WINTER MEETING THURSDAY JANUARY 20, 2011

- 8:20-8:50 *Registration and Coffee*
- 8:50-9:00 **Opening Comments.** Tracy Maynard, SNEC AFS President
- 9:00-9:20 **Morphometric variation of scup (*Stenotomus chrysops*) in the Northwestern Atlantic Ocean.** Chase, Peter D., *National Oceanic and Atmospheric Administration, Northeast Fisheries Science Center, Ecosystems Surveys Branch, Woods Hole, MA 02543*
- 9:20-9:40 **Characterizing the extent of sub-surface petroleum and dispersants associated with the Deepwater Horizon CM-252 incident.** Brown, Russell W., *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Woods Hole, MA 02543*
- 9:40-10:00 **A comparative analysis of the diets of yellowfin tuna and dolphinfish in the Northwest Atlantic.*** Koske, Amy K.¹, Michelle D. Staudinger², and Francis Juanes¹, ¹*University of Massachusetts Amherst, Department of Environmental Conservation, Amherst, MA 01003*; ²*University of North Carolina Wilmington, Department of Biology and Marine Biology, Wilmington, NC 28403*
- 10:00-10:20 **Dynamics of hard substratum communities inside and outside of a fisheries habitat closed area in Stellwagen Bank National Marine Sanctuary (Gulf of Maine, NW Atlantic).** Tamsett, Allison¹, Peter J. Auster¹, James Lindholm², ¹*University of Connecticut Avery Point, Department of Marine Sciences and Northeast Undersea Research Technology & Education Center, Groton, CT 06340*; ²*California State University Monterey Bay Division of Science and Environmental Policy and Institute for Applied Marine Ecology, Seaside, CA 93955*
- 10:20-10:40 **Break**

- 10:40-11:00 **Ichthyoplankton collections from the northeast U.S. continental shelf ecosystem: development of an atlas of abundance and distribution.** Walsh, Harvey J., David E. Richardson, and Jonathon A. Hare, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Narragansett, RI 02879*
- 11:00-11:20 **Investigating juvenile sea scallop (*Placopecten magellanicus*) abundance and distribution.*** Carey, Jonathan D. and Kevin D.E. Stokesbury, *University of Massachusetts Dartmouth, School for Marine Science and Technology, Fairhaven, MA 02719*
- 11:20-11:40 **Impacts of ghost fishing from American lobster traps.** Perry, Derek, Kelly A. Whitmore, and Robert P. Glenn, *Massachusetts Division of Marine Fisheries, Invertebrate Fisheries Program, New Bedford, MA 02744*
- 11:40-12:00 **Application of Dual-frequency Identification Sonar (DIDSON) to monitor gray seal (*Halichoerus grypus*) occurrence at commercial fish weirs.*** Nichols, Owen C. and Steven X. Cadrin, *University of Massachusetts Dartmouth, School for Marine Science and Technology, Fairhaven, MA 02881*
- 12:00-12:20 *Awards and Business*
- 12:20-1:10 *Lunch*
- 1:10-1:30 **Changes in relative distribution of six species commonly caught by Massachusetts Spring Trawl Survey in the region of the Massachusetts Bay and Cape Cod Bay.** Correia, Steven, Jeremy King, Matthew Camisa, and Vincent Manfredi, *Massachusetts Division of Marine Fisheries, New Bedford, MA 02740*
- 1:30-1:50 **Non-linear interactions between fishing, haddock egg predation and climate can drive major population cycles in Atlantic herring.** Richardson, David E. and Jonathon A. Hare, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Narragansett, RI 02879*
- 1:50-2:10 **Assessing climate change impact on size-specific abundance of brook trout in headwater stream networks using hierarchical regression modeling.** Kanno, Yoichiro¹, Jason C. Vokoun¹, and Kent E. Holsinger², ¹*University of Connecticut Storrs, Department of Natural Resources and the Environment, Storrs, CT 06238;* ²*University of Connecticut Storrs, Department of Ecology and Evolutionary Biology, Storrs, CT 06238*
- 2:10-2:30 **Poster Speed Presentations**
- 2:30-3:10 **Poster Session**

- 3:10-3:30 **A photogrammetric system for sampling and observing catches on bottom otter trawl vessels.** Chamberlain, Glenn, *University of Massachusetts Dartmouth, School for Marine Science and Technology, Department of Fisheries Oceanography, Fairhaven, MA 02719*
- 3:30-3:50 **An assessment of river herring stocks in Massachusetts.** Nelson, Gary A.¹, P. Brady², J.J. Sheppard², and M.P. Armstrong¹, ¹*Annisquam River Marine Fisheries Station, Gloucester, MA 01930*; ²*Quest Campus, New Bedford, MA 02740*
- 3:50-4:10 **Examining settlement dynamics of postlarval American lobster, *Homarus americanus*, in Massachusetts coastal waters.** Whitmore, Kelly A.¹, Jillian Weber², and Robert P. Glenn², ¹*Massachusetts Division of Marine Fisheries, Gloucester, MA 01930*; ²*Massachusetts Division of Marine Fisheries, New Bedford, MA 02740*
- 4:10-4:30 **Restoration of a salter brook trout population to the Childs River, a Waquoit Bay tributary.** Hurley, Steve, *Massachusetts Division of Fisheries and Wildlife, Buzzards Bay, MA 02532*

* Denotes student paper

Poster Session

- P1 **Mercury and selenium relationships in local fisheries.**** Ares, Nichole and David L. Taylor, *Roger Williams University, Department of Marine Biology, Bristol, RI 02809*
- P2 **Start all bilge pumps in a perfect storm.** Babey, George J., *Connecticut Department of Environmental Protection, Inland Fisheries Division, Connecticut Aquatic Resources Education, Hartford, CT 06106*
- P3 **Non-random patterns of species occurrence in the Massachusetts Inshore Bottom Trawl Survey.** Camissa, Matthew, Steven Correia, Jeremy King, and Vincent Manfredi, *Massachusetts Division of Marine Fisheries, New Bedford, MA 02740*
- P4 **The American Fisheries Society Hutton Junior Fisheries Biology Program, 2010: An innovative summer program for high school students.**** Hong, Gloria Ha-young, David G. Stormer, and Francis Juanes, *University of Massachusetts Amherst, Department of Natural Resources Conservation, Amherst, MA 01003*
- P5 **Detection probability and movement of bridle shiner in a southeastern Connecticut low-gradient stream.**** Jensen, Timothy and Jason Vokoun, *University of Connecticut Storrs, Department of Natural Resources and the Environment, Storrs, CT 06260*
- P6 **Occurrence, abundance, and developmental stage of a parasitic nematode (*Philometra saltatrix*) in juvenile bluefish (*Pomatomus saltatrix*).**** Lajoie, Jessica L., David G. Stormer, and Francis Juanes, *University of Massachusetts Amherst, Department of Natural Resources Conservation, Amherst, MA 01003*
- P7 **Estimation of wave exposure using fetch and wind data at horseshoe crab spawning beaches along the Connecticut coast.**** Landi, Alicia¹, Jason Vokoun¹, Peter Auster², Penny Howell³, ¹*University of Connecticut Storrs, Department of Natural Resources and the Environment, Storrs, CT 06238;* ²*University of Connecticut Avery Point, Department of Marine Sciences, Groton, CT 06340;* ³*Connecticut Department of Environmental Protection, Marine Fisheries Division, Old Lyme, CT 06371*
- P8 **FISHSCAPE: Assessment of shifting seasonality in Arctic grayling migration.** MacKenzie, Cameron and Linda Deegan, *Marine Biological Laboratory, Ecosystems Center, Woods Hole, MA 02543*
- P9 **Applications of an acoustic camera for a study of piscivore behavior.**** Price, Victoria, *University of Connecticut Avery Point, Department of Marine Sciences,*

Groton, CT 06349

- P10 **A histological appraisal of dolphinfish (*Coryphaena hippurus*) oogenesis, maturation, and spawning offshore of Florida.** Rowinski, Yvonna K. and Richard S. McBride, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA 02543*
- P11 **Improving at-sea sampling efficiency during multispecies bottom trawl surveys.** Shook, Geoff, Jakob Kircun, Heath Cook, and Russell Brown. *National Oceanic and Atmospheric Administration, Northeast Fisheries Science Center, Woods Hole, MA 02543*

** Denotes student poster

ABSTRACTS

Mercury and selenium relationships in local fisheries. Ares, Nichole and David L. Taylor, *Roger Williams University, Department of Marine Biology, Bristol, RI 02809; nares980@g.rwu.edu*

Mercury (Hg) is a toxic environmental contaminant that negatively affects human health, and exposure occurs through the consumption of finfish. Selenium (Se) has a strong relationship with mercury, and is believed to have a mitigating effect on Hg toxicity. Hg levels have been previously investigated in the edible filets of fish, including target species, like the summer flounder (*Paralichthys dentatus*) black sea bass (*Centropristis striata*), tautog (*Tautoga onitis*), and bluefish (*Pomatomus saltatrix*), but the Hg in other tissues, like the brain and liver are lacking. The brain is of particular concern since Hg is a neurotoxin, and the liver due to its role in detoxification. The relationship of Hg and Se has been investigated in some species, however overall, there has been little done. This study concentrates on the differences seen between the four target species. The objectives of this study were to: (1) examine Hg and Se bioaccumulation within the three target tissues, (2) examine the molar ratios of Se:Hg within the tissues, and (3) compare the differences between species, and attribute them to life-history characteristics. From June to August 2007-2010, target fish were collected from Narragansett Bay (RI, USA). Length (cm) was recorded for each fish, and the total Hg was determined using a DMA-80 (direct mercury analyzer) which utilizes automated atomic absorption spectroscopy. Total Se using ICP-MS (inductively coupled plasma mass spectroscopy). Molar ratios of Se:Hg were calculated to determine the protective quality of Se over Hg toxicity, with a ratio ≥ 1 showing a protective quality of Se over Hg.

Start all bilge pumps in a perfect storm. Babey, George J., *Connecticut Department of Environmental Protection, Inland Fisheries Division, Connecticut Aquatic Resources Education (CARE), Hartford, CT 06106; george.babey@ct.gov*

CARE program staff recruit, train, and manage volunteer Instructors who teach families about water, fish, and fishing. For two decades, we've tried to advance students along a continuum of awareness, interest, participation, and stewardship. Multiple-meeting (4 session) courses, which include both practical and ecological information, have achieved this objective best. By early 2009, we were documenting: 1) more virtual living, 2) reduced time outdoors, 3) greater need for immediate gratification, and 4) impossibly-busy schedules in Southern New England families. It became impossible to fill or retain students in the classrooms of our multiple-meeting courses. Almost simultaneously, legislation passed that increased fishing license fees by 100%. We were witnessing a perfect storm. Families, now busier and more upset than ever before, predictably responded with even lower student registration, more cancelled courses, and plunging license sales. Solutions initiated in 2010 included scaled-back license fees and development of shorter courses that better fit into

busy schedules. Condensed courses will be long on fishing knowledge and skills, but short on the ecological foundations taught in our current courses. Objectives will change from producing participants, anglers, and stewards to simply creating participants. We will continue to employ our comprehensive curriculum wherever we are able: in schools, with very select partners, and (soon) on the internet. We expect to begin increasing the number of families attending courses and the number of families going fishing sometime in 2012.

Characterizing the extent of sub-surface petroleum and dispersants associated with the Deepwater Horizon CM-252 incident. Brown, Russell W., *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Woods Hole, MA 02543;* Russell.Brown@noaa.gov

In late May 2010, NOAA launched its initial large research vessel response to the incident to survey the spatial extent of sub-surface oil and dispersants associated with the Deepwater Horizon CM252 incident utilizing a variety of technology. A team of scientific experts was assembled from the NOAA Fisheries, National Resource Damage Assessment (NRDA) and the Office of Marine and Aviations Operations (OMAO), the Monterey Bay Aquarium (MBARI), the University of New Hampshire, the University of South Florida, the U.S. Environmental Protection Agency, the United States Coast Guard and contractors working with British Petroleum LLC to execute the scientific mission on the NOAA Ship Gordon Gunter sailing out of Pascagoula, MS. The team utilized split beam acoustics at 18 and 38 kHz to build 3-dimensional images of acoustic anomalies in the vicinity of the well head. Identified areas were then sampled utilizing CTD rosettes equipped with colored dissolved organic matter (CDOM) sensors and Teflon coated water sample bottles. In addition, the team utilized an MBARI Gulper AUV to complete longitudinal missions at depth collecting CTD, CDOM and water samples. In addition, a Shadowed Image Particle Profiling Evaluation Record (SIPPER) instrument was deployed from the surface to depths of 200 meters to evaluate the zooplankton community and detect oil droplets in the water column. The team also conducted coordinated ichthyoplankton surface sampling and MOCNESS sampling, documenting a diverse zooplankton and ichthyoplankton communities including larval bluefin tuna in the vicinity of the well head. The effort was successful in identifying the presence of dissolved hydrocarbon compounds at depths ranging between 800 and 1200 meters and natural methane seeps in the area. Information produced by the cruise effort was utilized to direct follow on sampling cruises by NOAA and university cooperators.

Non-random patterns of species occurrence in the Massachusetts Inshore Bottom Trawl Survey. Camissa, Matthew, Steven Correia, Jeremy King, and Vincent Manfredi, *Massachusetts Division of Marine Fisheries, New Bedford, MA 02740;* matt.camisa@state.ma.us

We examined Massachusetts *Marine Fisheries* spring (1979-2010) and fall (1979-2009) trawl survey data for trends in annual occurrence on one-hundred seventy-seven species. Survey strata were divided into two regional strata sets: Southern New England (SNE, regions 1-3) and Gulf of Maine (GOM, regions 4-5) and two seasons (spring and fall). We

identified twenty-nine species exhibiting non-random patterns of occurrence ($P \leq 0.05$) using runs test by season and region. Fifteen species had significant runs after controlling for the false discovery rate. Presence increased for American shad, northern shortfin squid, smallmouth flounder, spotted hake and striped bass, and decreased for alligatorfish, bluefish, goosefish, horseshoe crab and rainbow smelt for SNE-Spring. Presence for glasseye snapper and smallmouth flounder increased for SNE-Fall. Presence increased for American shad and decreased for goosefish, octopus unclassified and Pollock for GOM_Spring. For GOM-Fall, presence increased for barndoor skate and decreased for Atlantic wolffish. We applied Fisher's combined probability test by combining seasonal results for species with significant runs tests prior to controlling for false discovery rate. We tested the combined probability against the lowest FDR probability for the species. Three species exhibited non-random patterns for pooled seasons ($p \leq 0.05$). Presence for SNE American shad results increased in spring and decreased in fall. SNE striped bass presence increased in both seasons. Presence decreased for tautog in the mid eighties but increased in the late nineties. We explore trends in survey abundance, percent occurrence, and shifts in geographic distribution to help develop biological interpretations for our results and generate hypotheses for future work

Investigating juvenile sea scallop (*Placopecten magellanicus*) abundance and distribution. Carey, Jonathan D. and Kevin D.E. Stokesbury, *University of Massachusetts Dartmouth, School for Marine Science and Technology, Fairhaven, MA 02719;* jon.carey@umassd.edu

The Atlantic sea scallop supports one of the world's largest commercial scallop fisheries, however, our understanding of factors that affect juvenile abundance and distribution is limited due to difficulties detecting and observing them in the wild. Using high resolution digital images from a 2008 and 2009 video survey of Georges Bank and the Mid-Atlantic, we examine the distribution and abundance of juvenile sea scallops and their relation to adults. Based on life history characteristics and observed shell height frequency distributions, we define juveniles as scallops with shell height below 70 mm. Juvenile scallops made up 51% and 43% of all measured scallops on Georges Bank in 2008 and 2009, respectively. In the Mid-Atlantic, juveniles accounted for 44% of measured scallops in 2008 but only 18% in 2009. Juveniles on Georges Bank were more tightly clustered with mean crowding values nearly 4 times higher than adults. In the Mid-Atlantic both groups displayed similar mean crowding values. In both areas, juvenile scallops were significantly less likely to be found next to adult scallops based on a nearest neighbor contingency table analysis. These results suggest that juvenile scallops do not aggregate in areas of high adult abundance, raising questions about microscale patch distribution and bed composition.

A photogrammetric system for sampling and observing catches on bottom otter trawl vessels. Chamberlain, Glenn, *University of Massachusetts Dartmouth, School for Marine Science and Technology, Department of Fisheries Oceanography, Fairhaven, MA 02719;* gchamberlain@umassd.edu

The purpose of this study was to count, measure, and identify fish caught during commercial fishing operations in New England through analysis of images taken of catches. To offset monitoring costs associated with traditional methods of collecting fisheries dependent data, the application of new or existing technologies is required. Technology will provide the most cost effective option for fishing industry members under sector management. The approach chosen in this work was photogrammetry, which makes use of two or more still or video cameras. The system relies on hardware and software designed to calibrate these cameras and obtain measurements from images. Prior to deployment of the system, CatchMeasure (CM), length-weight relationships were established using features of select fish species and published National Marine Fisheries Service tables. In addition to at-sea trials, a number of simulated catches were photographed under controlled conditions. Differences between CM weight estimates and known weights were quantified. The current version of CM is capable of producing a high volume of useful data but an extensive pilot study is required to determine the cost-effectiveness and long term accuracy of the system. This study confirmed that there are many benefits to incorporating a photogrammetric system for the purpose of estimating catches.

Morphometric variation of scup (*Stenotomus chrysops*) in the Northwestern Atlantic Ocean. Chase, Peter D., *National Oceanic and Atmospheric Administration, Northeast Fisheries Science Center, Ecosystems Surveys Branch, Woods Hole, MA 02543;* peter.chase@noaa.gov

Stock structure of scup (*Stenotomus chrysops*) was evaluated by investigating variations in morphology from Georgia and Cape Cod. A geometric landmark-based analysis of morphological variables and meristic characters was used to compare morphology at extreme and intermediate latitudes of the species' range. A discriminant function analysis of size-adjusted morphometric data significantly differentiated scup from northern and southern latitudes with 98% and 96% respective accuracy. Northern individuals had larger foreheads while southern individuals had a deeper shape in the posterior half of the body. While the discriminant function model was inaccurate at classifying scup from intermediate latitudes, it classified those specimens to one of the two extreme groups with high probability. The results support the theory that two scup stocks are present in the Western Atlantic Ocean, with one stock at the southern extent of the species range and the other at the northern extent of the range, in the Mid-Atlantic Bight where there is an active commercial fishery. Mixing between groups occurred off of South Carolina and North Carolina. Morphological differences were not related to sex or age, and appear to be temporally stable. A multiple group Principal Components Analysis showed distinct separation between the scup examined here and an outgroup of longspine porgies (*Stenotomus caprinus*) from the Gulf of Mexico, indicating clear morphological differences between *S. chrysops* and *S. caprinus*. The morphological differences can be attributed to phenotypic plasticity. Future work involves genetic analysis to further investigate stock structure and to determine if morphologically distinct scup groups in the Western Atlantic Ocean should be separated taxonomically.

Changes in relative distribution of six species commonly caught by Massachusetts Spring Trawl Survey in the region of the Massachusetts Bay and Cape Cod Bay.

Correia, Steven, Jeremy King, Matthew Camisa, and Vincent Manfredi, *Massachusetts Division of Marine Fisheries, New Bedford, MA 02740; steven.correia@state.ma.us*

We measured annual changes in dispersion of 25 fish species commonly caught in areas of Cape Cod and Massachusetts Bays covered by the Massachusetts spring trawl survey using annual changes in Gini index. Six species had non-random patterns of runs ($P \leq 0.05$) using the runs tests above and below the time series median. Densities became more uniform among strata for winter flounder, little skate, fourspot flounder, and American lobster but more concentrated for yellowtail flounder. The Gini index for rainbow smelt increased through the mid 1980's, declined through the mid 1990's before increasing. We describe trends in relative abundance by strata as well as shifts in annual catch-weighted means of latitude, longitude, depth and temperature trends. Catch-weighted mean depth increased for five of six species. Smelt had no discernable trend in catch weighted depth, but displayed a shift in distribution to the west and north. We found significant trends in catch-weighted mean latitude and/or longitude for yellowtail flounder, winter flounder, rainbow smelt, lobster, and fourspot flounder. None of the trends in catch weighted mean temperature were significant. We explored shifts in spatial distribution over three time periods using bagplots. Relative densities shifted from Cape Cod Bay to Massachusetts Bay for yellowtail flounder, fourspot flounder, rainbow smelt, and little skate. Lobster densities have become relatively higher in northern Massachusetts Bay and Ipswich Bay compared to other areas. In general, distributions have shifted northward, reflecting declines in formerly high density areas rather than increases in low density areas.

The American Fisheries Society Hutton Junior Fisheries Biology Program, 2010: An innovative summer program for high school students.

Hong, Gloria Ha-young, David G. Stormer, and Francis Juanes, *University of Massachusetts Amherst, Department of Natural Resources Conservation, Amherst, MA 01003; hayoung.hong@gmail.com*

The Hutton Junior Fisheries Biology Program is a summer mentoring program for high school students sponsored by the American Fisheries Society. The objective of the Hutton Program is to stimulate interest in fisheries careers among groups underrepresented in the fisheries professions, including minorities and women. Students selected for the program are matched with a professional mentor in their area for a summer-long, research experience. I was fortunate to be awarded an AFS Hutton Summer Scholarship in 2010 and worked in the Fish Ecology Lab at the University of Massachusetts, Amherst. Initially, my summer research included the construction of a lipid profile for selected forage fishes of the lower Hudson River estuary (HRE). The forage fishes were selected based on their contribution to juvenile bluefish diets in 2008 and 2009, but were also important seasonal components to the community structure of the lower HRE. Selected species included bay anchovy, striped bass, Atlantic silverside, banded killifish, alewife, menhaden, and American shad. Bay anchovy exhibited the highest lipid content of all the forage fishes examined (mean = 13.7 %; n = 12). Another portion of my summer research consisted of building an otolith image archive for the forage fish assemblage of the HRE. Otoliths were

removed from positively identified whole forage fishes, image-archived, and digitally measured using the Q-capture Pro image analysis program attached to an Olympus SZX stereoscope. Prey-specific otolith shape was also used to identify 377 diet items of juvenile bluefish collected from the HRE in 2008 and 2009 that were formerly categorized as unidentified prey. The results of this project will provide the New York State Department of Environmental Conservation with previously unavailable information for developing a multispecies management approach to the lower HRE, and the techniques employed here could serve as a tool for state, and/or federal management agencies to more clearly understand predator-prey interactions.

Restoration of a salter brook trout population to the Childs River, a Waquoit Bay tributary. Hurley, Steve, *Massachusetts Division of Fisheries and Wildlife, Buzzards Bay, MA 02532; steve.hurley@state.ma.us*

In the early 1800s, Waquoit Bay and its tributary rivers were noted fishing destinations for anglers seeking sea run brook trout (*Salvelinus fontinalis*) which are locally known as “salters”. Populations of salter brook trout on Cape Cod have been greatly reduced or extirpated due to habitat modifications from mill dams and cranberry bog development. In the 1960s through the early 1990s, many of these streams were heavily stocked with brown trout (*Salmo trutta*) to create sea run brown trout fisheries. Stream habitat improvement work started on the Quashnet River in 1975 and brown trout stocking was terminated after April 1994. Increased brook trout populations in the Quashnet River and a PIT (Passive Integrated Transponder) tagging study offered an opportunity to restore nearby extirpated brook trout populations through the transplant of wild brook trout brood stock. The Childs River was extensively surveyed in 2006 and no reproducing brook trout population was evident. Nineteen adult brook trout were electrofished from the Quashnet River in June 2008 and transplanted into the Childs River. Twenty-nine adult brook trout were transplanted in May 2009 and 37 adult brook trout were transplanted in May 2010. Excellent summer growth of recaptured PIT tagged transplanted trout was noted. Successful brook trout reproduction in the Childs River has been documented from the fall 2008 and fall 2009 spawning seasons. Movement of PIT tagged brook trout has been detected between the Childs River and the Quashnet River through the Waquoit Bay Estuary.

Detection probability and movement of bridle shiner in a southeastern Connecticut low-gradient stream. Jensen, Timothy and Jason Vokoun, *University of Connecticut Storrs, Department of Natural Resources and the Environment, Storrs, CT 06260; timothy.jensen@uconn.edu*

Imperfect detection is an important, yet commonly overlooked, source of variation for occupancy estimates. We estimated detection probability of the imperiled bridle shiner (*Notropis bifrenatus*) in a southeastern Connecticut low-gradient stream during the summer and fall of 2010. Stream sections were surveyed using a beach seine to establish detection histories among 16 habitat patches along 6.2 kilometers of river. Two thousand thirty eight bridle shiner were marked using Visible Implant Elastomer to evaluate whether movement

patterns would violate the assumption of closure. Of the 148 recaptured individuals, only five bridle shiner exhibited movement, ranging 175 to 395 meters from the initial point of capture. Bridle shiner were more abundant in 2010 than anticipated and occupancy in the patches was higher than expected. Detection probabilities for mid-summer, late-summer, and mid-fall were estimated to be 0.815, 0.841, and 0.904, respectively. Our results suggest the beach seine may be an acceptable gear for monitoring bridle shiner occupancy, even in challenging low-gradient “swampy” habitats that are difficult to sample.

Assessing climate change impact on size-specific abundance of brook trout in headwater stream networks using hierarchical regression modeling. Kanno, Yoichiro¹, Jason C. Vokoun¹, and Kent E. Holsinger², ¹*University of Connecticut Storrs, Department of Natural Resources and the Environment, Storrs, CT 06238*; ²*University of Connecticut Storrs, Department of Ecology and Evolutionary Biology, Storrs, CT 06238*; yoichiro.kanno@huskymail.uconn.edu

In size-structured populations, understanding the population-level response to environmental changes requires the examination of potentially different impacts across size classes. We used hierarchical linear regression models to examine habitat features that affect size-specific abundance of brook trout and assess potential impact of climate change. The dataset for model development was an electrofishing survey from 239 stream reaches (50 m) nested within 31 stream segments (100’s m) in five stream categories collected over two contrasting summers with regards to temperature (cold vs. average summer). The influence of stream habitat variables differed by trout size class, and to some extent by year. Increased stream temperature reduced abundance of the three smaller size classes in the warmer summer of 2008, but temperature was important only for the smallest size class (i.e., young-of-the-year trout) in the colder summer of 2009. Amount of pool habitat was generally important across size classes (except the smallest size class), but abundance of the smallest size class was positively associated with the amount of riffle habitat and the largest size class was affected by maximum pool depth and stream gradient in both years. Hierarchical regression models were used to predict brook trout abundance under different climate change scenarios, in which temperature elevation was assumed based on paired stream-air temperature records and stream flow reduction was assumed to affect pool and riffle habitats differently. Brook trout of all size classes were projected to decrease in abundance under climate change scenarios, but the impact of habitat volume reduction due to drought condition differed by size class. Overall, the study stream channel networks were projected to experience habitat loss and fragmentation gradually with increasing severity of air temperature increases. However, some stream segments, particularly tributaries, remained thermally suitable for brook trout in the hot and dry summer of 2010, and they were projected to remain thermally suitable and harbor populations dominated by small-sized trout even under the most severe climate change scenario. This study highlighted potentially different impacts of climate change across trout size classes and local streams in the same region, and these findings have important implications for predicting population persistence of headwater brook trout under climate change.

A comparative analysis of the diets of yellowfin tuna and dolphinfish in the Northwest Atlantic. Koske, Amy K.¹, Michelle D. Staudinger², and Francis Juanes¹, ¹University of Massachusetts Amherst, Department of Environmental Conservation, Amherst, MA 01003; ²University of North Carolina Wilmington, Department of Biology and Marine Biology, Wilmington, NC 28403; akoske@cns.umass.edu

Yellowfin tuna (*Thunnus albacares*) and dolphinfish (*Coryphaena hippurus*) are top pelagic predators of great ecological and commercial importance in the Northwest Atlantic (NWA). Though yellowfin tuna has been a long-time seasonal migrant to the fruitful waters of the NWA, dolphinfish is a more recent invader due to its pole-ward range expansion. As the most common species of tropical tuna landed in the NWA, yellowfin tuna must be properly managed to ensure continued harvest in this region. A current and comprehensive understanding of the trophic ecology of these species is essential to determine if the presence of dolphinfish, a similarly opportunistic, surface-feeding predator, is affecting the trophic niche of yellowfin tuna in the NWA. A comparative analysis of the diets of yellowfin tuna and dolphinfish collected from recreational fishing tournaments and charter boats on the northeast coastal United States is presented here as a prelude to mercury (Hg) analysis of the tissues of these and other pelagic predators. Preliminary results have revealed striking similarities in the two diets, with almost identical dependence on teleost, cephalopod and crustacean prey. Shortfin squid (*Illex illecebrosus*) has been identified as the most important prey to both dolphinfish and yellowfin tuna, with lesser but considerable shared reliance on amphipod and euphausiid prey. An assessment of trophic niche overlap will be performed with respect to prey availability, yearly diet variability and predator population estimates derived from catch data. These results will complement mercury analysis to determine trends in bioaccumulation with diet, size and growth rate.

Occurrence, abundance, and developmental stage of a parasitic nematode (*Philometra saltatrix*) in juvenile bluefish (*Pomatomus saltatrix*). Lajoie, Jessica L., David G. Stormer, and Francis Juanes, University of Massachusetts Amherst, Department of Natural Resources Conservation, Amherst, MA 01003; jllajoie@student.umass.edu

Philometra saltatrix is a dracunculoid parasitic nematode that appears to be specific to bluefish (*Pomatomus saltatrix*). A variety of ovarian disorders have been associated with *Philometra saltatrix* in adult bluefish and recent research from the UMass Fish Ecology Lab has identified severe pathologies associated with *Philometra Saltatrix* infection in the pericardium of juveniles. Unfortunately, for reasons unknown, the prevalence of this parasite in juvenile bluefish appears to be increasing. We investigated the developmental stage of female *Philometra saltatrix* by location of infection in juvenile bluefish inhabiting the Hudson River estuary 2010. A total of 64 juvenile bluefish were examined for *Philometra saltatrix* infection location and staging from July to September 2010. Female *Philometra saltatrix* occurred in 44% of the juvenile bluefish examined. Independently, the pericardium was the site most affected by *Philometra saltatrix* (n = 22), while only 2 infections occurred in the gonad. Simultaneous infections of the pericardium and the gonad occurred in 3 juvenile bluefish. Overall, 87 nematodes were enumerated from the 28 infected juvenile bluefish (mean_{abundance} = 3.1 nematodes/fish_{infected}). The developmental

stages of female *Philometra saltatrix* were 22% non-gravid, 60% sub-gravid and 18% gravid. Interestingly, 87% of pericardial infections were from gravid female parasites. It has been assumed that *Philometra saltatrix* temporarily inhabits the juvenile bluefish pericardial cavity before migrating to the ovary to release their larvae at the time adult spawning. We provide the first account of reproducing *Philometra saltatrix* in the pericardium of juvenile bluefish. Moreover, the juvenile bluefish collected during this study were likely 2 years from maturity, so our observations of female *Philometra saltatrix* with larvae in the pericardium indicate an alternative reproductive strategy of this parasite than previously assumed with possible implications for increased juvenile bluefish vulnerability to infection.

Estimation of wave exposure using fetch and wind data at horseshoe crab spawning beaches along the Connecticut coast. Landi, Alicia¹, Jason Vokoun¹, Peter Auster², Penny Howell³, ¹*University of Connecticut Storrs, Department of Natural Resources and the Environment, Storrs, CT 06238*; ²*University of Connecticut Avery Point, Department of Marine Sciences, Groton, CT 06340*; ³*Connecticut Department of Environmental Protection, Marine Fisheries Division, Old Lyme, CT 06371*; alicia.landi@uconn.edu

The Atlantic horseshoe crab, *Limulus polyphemus*, utilizes beaches for egg incubation during early summer and could be particularly sensitive to habitat changes in a dynamic landscape. As part of ongoing research, we are combining field surveys and spatial data to classify beach habitats along the northern shore of Long Island Sound. Relative wave exposure at the shoreline is a potentially important driver of horseshoe crab population dynamics as breeding adults are known to select lower energy beaches and will avoid laying eggs during periods of heavy wave action. Fetch lines radiating in several directions over open water from evenly spaced shoreline points were created and summed in ArcGIS, with weight given to those distances lying in dominant wind directions, and used with wind magnitude data to calculate an index of wave exposure. This information will ultimately become part of a resource selection model used to predict the suitability of beaches for horseshoe crab spawning.

FISHSCAPE: Assessment of shifting seasonality in Arctic grayling migration. MacKenzie, Cameron and Linda Deegan, *Marine Biological Laboratory, Ecosystems Center, Woods Hole, MA 02543*; cmackenzie@mbl.edu

Arctic grayling (*Thymallus arcticus*) is an important circumpolar Arctic species that provides a model system for understanding the impacts of changing seasonality on arctic ecosystem function. Grayling serve as food for other biota, including lake trout, birds and humans, and as top-down controls in stream ecosystems suggesting that changes to their populations will have effects that reverberate throughout the arctic ecosystems. For one component of a larger study, the FISHSCAPE project is assessing how the shifting seasonality of Arctic river hydrology alters key biotic linkages within and between lake and stream components of watersheds and may alter the function of the Arctic system. To address these goals we undertook new surveys of grayling migration dynamics for a

population located in the Kuparuk River on the North Slope of the Brooks Mountain Range, Alaska. In summer of 2010, we used Passive Integrated Transponder (PIT) tags, coupled with stream-side antenna units to monitor grayling migration timing into winter refugia. Initial results indicate that flooding events may have a strong influence in migration timing. Many fish used high water in the Kuparuk River as an opportunity to move closer to the headwater lakes. Current analysis involves using Mixed Effects Models to evaluate other factors that influence grayling migration dynamics. These results will be integrated into a systems-level model, evaluating the effects of altered linkages on lake and stream ecosystems. Improved understanding of these processes will advance our general understanding of the role of animals in ecosystem dynamics, life-history evolution and ecosystem management.

An assessment of river herring stocks in Massachusetts. Nelson, Gary A.¹, P. Brady², J.J. Sheppard², and M.P. Armstrong¹, ¹*Annisquam River Marine Fisheries Station, Gloucester, MA 01930*; ²*Quest Campus, New Bedford, MA 02740*; gary.nelson@state.ma.us

Data on abundance, size structure and age composition were used to assess the current status of alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) populations in Massachusetts rivers. Count data for three rivers (Parker River, Monument River and Mattapoissett River) indicated a precipitous decline in alewife abundance after 2000. A strong decline was not observed in the Nemasket River, but average passage count after 2004 (587,000 fish) was about half of the average passage count prior to 2004 (1.04 million fish). Abundance has increased slowly in each river since about 2006-2008. A decline in the Monument River run size of blueback herring was not observed until after 2004 and total run size is still low. Size data from the Monument River and Stony Brook showed that the average total lengths of alewife and blueback herring have declined by about 20-27 mm over time. The current maximum age of both species is 1-2 years less than the maximum age observed during 1985-1987. The proportions of alewives that were repeat spawners in the Monument River declined in recent years by 64% or more compared to data from 1986-1987. Similar reductions in proportions of repeat spawners were observed for blueback herring. Results from a statistical catch-at-age model, and estimates of total instantaneous mortality from age, repeat spawner, and length data showed that total mortality of alewife in the Monument River during the late 1990s increased by at least 20% compared to the earlier part of the time series. Potential causes of the declines in size and abundance, and increases in total mortality will be discussed.

Application of Dual-frequency Identification Sonar (DIDSON) to monitor gray seal (*Halichoerus grypus*) occurrence at commercial fish weirs. Nichols, Owen C. and Steven X. Cadrin, *University of Massachusetts Dartmouth, School for Marine Science and Technology, Fairhaven, MA 02881*; onichols@umassd.edu

Marine mammal depredation can have significant negative effects on the performance of fixed fishing gears. Gray seals (*Halichoerus grypus*) feed on fish weir catches in Nantucket Sound, and partially consumed longfin inshore squid (*Loligo pealeii*) and finfish in the nets are

attributable to seal depredation. A Dual-frequency Identification Sonar (DIDSON) was deployed in a weir to monitor diel patterns of squid and fish catches, as well as seal presence and behavior. Over 144 hours of sonar data were collected from 19 May-01 June, 2009. Continuous 24+ hour recordings were sub-sampled for varying lengths at multiple intervals to optimize the likelihood of seal detection while minimizing processing time. Targets detected and identified to species included squid, bluefish (*Pomatomus saltatrix*), and gray seals. Seal occurrence in the weir was observed throughout 24-hour periods, regardless of fishing activity, indicating that seals are likely habituated to the weir as a food source regardless of any “dinner bell” attractant associated with gear tending by fishermen. The presence and behavior of seals may negatively affect the efficiency of the weir due to disruption of the passage of schooling squid and finfish into the catch chamber (“bowl”) and should be considered as a factor in analysis of catch data.

Impacts of ghost fishing from American lobster traps. Perry, Derek, Kelly A. Whitmore, and Robert P. Glenn, *Massachusetts Division of Marine Fisheries, Invertebrate Fisheries Program, New Bedford, MA 02744; Derek.Perry@state.ma.us*

Over 4 million lobster traps are fished in the American lobster fishery, with around 400,000 traps set in Massachusetts’ waters. Despite the large scale and high value of this fishery, little information exists on the amount of lobster traps annually lost or how long these “ghost traps” continue to fish. Legally required degradable escape panels are believed to reduce capture and mortality of lobsters, but substantial loss of yield to the lobster fishery may occur even if ghost traps continue to fish short-term. “Missing catch” may also undermine our ability to model lobster population dynamics. In May 2010, we set and “abandoned” two baited six-pot trawls near Manomet Point, Cape Cod Bay and Penikese Island, Buzzards Bay. Divers surveyed the gear twice a month and recorded trap condition, species catch composition, biological information from lobsters and mortality for trapped animals. Animals remained in the trap to mimic “re-baiting.” After 123 days, we observed more than 200 lobsters with an approximate 25% mortality rate. Other entrapped species included 200 tautog, 37 black seabass and 500 Jonah crabs. After 184 days, 88% of traps continue to actively catch lobsters and finfish. This study is scheduled to continue through December 2011.

Applications of an acoustic camera for a study of piscivore behavior. Price, Victoria, *University of Connecticut Avery Point, Department of Marine Sciences, Groton, CT 06349; victoria.e.price@uconn.edu*

Predator-prey interactions are difficult to study in the ocean due to limitations in the space and time requirements for observations. Small-scale direct underwater observations by divers (<10m²) and large-scale hydroacoustic surveys (100s - 1000s m²) are traditional approaches. However, large piscivorous predators identify and attack prey at the scale of tens of meters. Dual-Frequency Identification Sonar, or DIDSON, is a high-resolution acoustic camera operating in the MHz range that provides detailed continuous imaging of objects out to 30 m range. Observations using DIDSON can provide an intermediate spatial scale viewpoint at specific sites by providing a larger picture over long periods of time.

Piscivore behavior and association with reef features were addressed in a preliminary study using DIDSON in Gray's Reef National Marine Sanctuary in June of 2009. These data complemented diver-based visual and hydroacoustic surveys of reef fishes. We quantified group size and predator trajectories along reefs (i.e. either linearly along the reef axis or across reef axis). Analyses illustrate that single individuals were consistently higher in occurrence across all trajectories and that linear trajectories were the most common for groups of all sizes. Understanding the predatory behavior of these fish is critical to understanding the interactions of predators and prey, and the high-resolution sonar allows observation at ecologically relevant space and time scales. The DIDSON is extremely useful for ecological studies such as these, and will be deployed again during a 2010 return trip to Gray's Reef.

Non-linear interactions between fishing, haddock egg predation and climate can drive major population cycles in Atlantic herring. Richardson, David E. and Jonathon A. Hare, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Narragansett, RI 02879; David.Richardson@noaa.gov*

Theoretical models suggest that populations exposed to gradual changes in climate or human pressures may abruptly shift between alternate stable states. However, there is an absence of empirical data and well-parameterized mechanistic models supporting alternate stable states in exploited marine fish populations. We present a population model indicating that egg predation by haddock can cause alternate stable population levels in Georges Bank Atlantic herring. This population model assumes that: (1) larval herring abundance is a function of herring spawning stock biomass and egg survival from haddock predation, (2) that haddock exhibit a type III functional feeding response and (3) that recruitment is a density-dependent function (Beverton Holt) of larval herring abundance. The model estimated that from 1971-2005 herring egg survival rates from haddock predation ranged from <2 to 70%. Year-to-year >90% declines in observed larval herring abundance following the 1975 and 2003 haddock year classes were well predicted by the model. By incorporating estimated fishing mortality rates into this population model, we were able to explain the population trends of Atlantic herring over the past four decades. Climate-associated changes in the dynamics of the herring population were simulated by altering the asymptote of the larval abundance to recruitment relationship. These simulated changes altered the threshold herring population size between an increasing and decreasing population. Even minor changes in the environment could thus trigger abrupt changes in herring abundance. However, herring fishing mortality rates and haddock population levels, both of which are strongly influenced by management decisions, remained dominant drivers of herring population trends. Overall, these results illustrate how predator abundance, fishing intensity, and climate can interact in a non-linear way to drive large-amplitude low-frequency cycles in the abundance of a small pelagic species.

A histological appraisal of dolphinfish (*Coryphaena hippurus*) oogenesis, maturation, and spawning offshore of Florida. Rowinski, Yvonna K. and Richard S. McBride, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA 02543; Yvonna.Rowinski@noaa.gov*

Although several studies have examined dolphinfish oocyte development using fixed tissue samples, few have used histology to examine oocyte development and individual maturity. This study examined ovarian histology of 621 females collected in three Florida regions: the Keys (south Florida, Atlantic Ocean), Cape Canaveral (east coast, Atlantic Ocean), and the Panhandle (west coast, northern Gulf of Mexico). The purpose here was to outline a baseline morphological description of dolphinfish oogenesis, including developmental synchronicity between pre-vitellogenic and vitellogenic oocyte stages and a definition of maturity classes, to improve our understanding of its life history and parameter estimation for stock assessments. We illustrate oogonial proliferation, folliculogenesis, cytoplasmic inclusions such as cortical alveoli and yolk granules, maturation, and common forms of atresia. Asynchronous recruitment of primary oocytes to vitellogenesis occurred throughout the spawning season. Six maturity classes were observed: two immature classes (immature, maturing) and four mature classes (spawning capable, spawning active, partially spent, and postspawning). Maturation and spawning was evident in all three regions offshore of Florida's Atlantic and Gulf coasts.

Improving at-sea sampling efficiency during multispecies bottom trawl surveys. Shook, Geoff, Jakob Kircun, Heath Cook, and Russell Brown. *National Oceanic and Atmospheric Administration, Northeast Fisheries Science Center, Woods Hole, MA 02543; Geoff.Shook@noaa.gov*

Between 2008 and 2009, NOAA Fisheries' Northeast Fisheries Science Center transitioned its two multispecies bottom trawl surveys from the R/V Albatross IV to the FSV Henry Bigelow. As part of this transition, new and more efficient bottom trawl gear was tested and adopted and trawling procedures and protocols were revised to improve sampling consistency for species thought to have lower catchability in historical surveys. To increase gear performance evaluation, the increased use of net mensuration sensors and tow evaluation software (TOGA) ensures that the fishing gear is operating within acceptable performance tolerances. FSV Bigelow is also now using Olex, a bathymetry mapping navigation program, which assists the vessel in scouting bottom contours to ensure that operations stay within depth parameters for NEFSC protocols. NEFSC, in conjunction with Carnitech Inc., designed a state of the art conveyor sorting and fish processing system to improve handling and sampling efficiency for captured organisms. Efficiency metrics including number of fish measurements, sex/maturity determinations and age samples collected per station were compared for assessed species between the final two years of Albatross IV surveys (2007-2008) and the first two years of Henry Bigelow surveys (2009-2010). Improvement in sampling efficiency was evident across all metrics for most species, and ranged from ~20% to in excess of 500%. Future modifications to data acquisition software (FSCS) including adaptive and species specific size and geographically based implementation of sampling protocols.

Dynamics of hard substratum communities inside and outside of a fisheries habitat closed area in Stellwagen Bank National Marine Sanctuary (Gulf of Maine, NW Atlantic). Tamsett, Allison¹, Peter J. Auster¹, James Lindholm², ¹*University of Connecticut Avery Point, Department of Marine Sciences and Northeast Undersea Research Technology & Education Center, Groton, CT 06340;* ²*California State University Monterey Bay Division of Science and Environmental Policy and Institute for Applied Marine Ecology, Seaside, CA 93955; atamsett@live.com*

This study assessed the dynamics of gravel and boulder reef invertebrate community structure in areas inside and outside a fisheries habitat closed area that overlaps Stellwagen Bank National Marine Sanctuary based on time-series photographic transects from 1998-2005. The performance of this protected area was assessed based on three common predictions that emerge from previous studies of fishing impacts in temperate marine protected areas. In particular, I determined if: (1) community structure diverged between fished and unfished sites attributable to chronic fishing impacts, (2) structure forming invertebrates increased in abundance within the protected area, and (3) diversity increased within the protected area. Overall the results demonstrate that community structure over the seven years since closure in 1998 has been dynamic across both habitat types as well as within and outside the WGOMC despite a high degree of similarity between paired habitat stations at the time of closure. Multivariate and univariate comparisons of each habitat type in closed and open areas across years in regards to community structure, populations of component taxa, and patterns of diversity all demonstrated a response to the closure but not in ways that are normally predicted from previous closed areas studies.

Ichthyoplankton collections from the northeast U.S. continental shelf ecosystem: development of an atlas of abundance and distribution. Walsh, Harvey J., David E. Richardson, and Jonathon A. Hare, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Narragansett, RI 02879; Harvey.Walsh@noaa.gov*

The Northeast Fisheries Science Center (NOAA / NMFS) and its preceding agencies have conducted ichthyoplankton sampling along the northeast U.S. continental shelf since the early 1960's. Most of the early surveys were exploratory in nature; examining larvae and describing the temporal distribution and abundance. Since the 1970's, five multi-year programs of varying goals and spatial coverage have sampled the shelf ecosystem. The International Commission for the Northwest Atlantic Fisheries (ICNAF; 1971 – 1978), Herring and Sand lance surveys (H-SL; 1988 – 1994), and Georges Bank Global Ocean Ecosystems Dynamics (GLOBEC; 1995 – 1999) targeted specific species (Atlantic herring, Sand lance, Atlantic cod, haddock) and spawning locations (Gulf of Maine, Georges Bank, and southern New England). The Marine Resources Monitoring, Assessment and Prediction (MARMAP; 1977 - 1987) and Ecosystem Monitoring (ECOMON; 1999 - present) conducted shelf-wide surveys from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia. Current efforts are underway to compile data from all available surveys into a single dataset and produce an atlas of average abundance and distribution patterns for several hundred taxa from 136 families collected in the ecosystem. Examples of the species-level information available and potential uses of the atlas in examining changes in abundance and habitat use will be presented.

Examining settlement dynamics of postlarval American lobster, *Homarus americanus*, in Massachusetts coastal waters. Whitmore, Kelly A.¹, Jillian Weber², and Robert P. Glenn², ¹*Massachusetts Division of Marine Fisheries, Gloucester, MA 01930;*
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In 2009 and 2010 *Marine Fisheries* investigated mechanisms influencing declines in young-of-the-year American lobster survey indices by monitoring the settlement process from egg-hatch to postlarval settlement. Our objectives were to determine the current geographic distribution of lobster settlement in Massachusetts coastal waters, assess how well young-of-the-year settlement surveys monitor year class strength, assess habitat suitability for settlement in nearshore waters, and examine the relationship between location of egg-bearing females and larval settlement. A combination of satellite-tracked drifters, postlarval settlement collectors, and air-lift sampling efforts were used to capture information on lobster larval dispersal and settlement. Drifter-generated tracks identified coastal current patterns while logging temperatures to link hatching areas to potential inshore recruitment regions. A total of 53 drifter deployments were made, with 34 in southern New England (2009 & 2010) and 19 in Massachusetts Bay (2010). Post-larval collectors were used to gather high-resolution geographic settlement patterns. From June to October, 224 collectors were set from Buzzards Bay to Block Island Sound (2009) and 208 from Cape Ann to Cape Cod Bay (2010). Very low settlement was observed in southern New England (0.02 YOY lobsters per m²) and moderate settlement occurred north of Cape Cod (0.54 YOY lobsters per m²). Air-lift sampling resulted in comparable trends in lobster density by region. Results of the study overall indicate that egg-release and delivery from locations where ovigerous females currently concentrate are unlikely to result in settlement within Buzzards Bay, which may be contributing to stock decline in southern New England. Massachusetts Bay settlement work is on-going; however preliminary results illustrate important settlement trends for the Gulf of Maine stock.