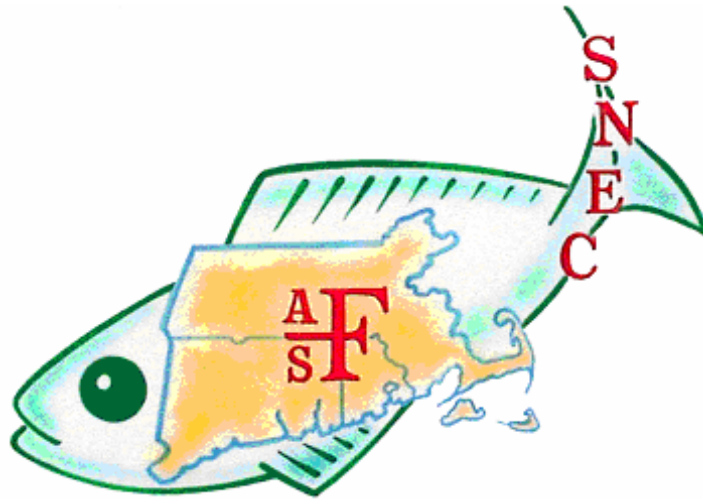


Southern New England Chapter

American Fisheries Society

2010 Summer Meeting



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June 23, 2010

**University of Rhode Island
Kingston, RI**

Program

AGENDA FOR SNEC AFS 2010 SUMMER MEETING WEDNESDAY JUNE 23, 2010

- 8:30-9:00 **Registration and Coffee**
- 9:00-9:10 **Opening Comments.** Ken Sprankle, SNEC President
- 9:10-9:30 **Expansion of Atlantic croaker (*Micropogonias undulatus*) larval habitat on the northeast US continental shelf.** Katrin E. Marancik, Harvey J. Walsh, David E. Richardson, and Jonathon A. Hare, NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center, Narragansett, RI 02882
- 9:30-9:50 **Abundance, growth, and diet of juvenile summer flounder (*Paralichthys dentatus*) and winter flounder (*Pseudopleuronectes americanus*) in tributaries of the Narragansett Bay.*** Carissa Gervasi and David L. Taylor, Roger Williams University, Department of Marine Biology, Bristol, RI 02809
- 9:50-10:10 **Large New England rivers project: Connecticut River survey.** Bryan Apell, Kleinschmidt Associates, Essex, CT 06426
- 10:10-10:30 **Break**
- 10:30-10:50 **Are Fast Repetitive Tick (FaRT) sounds more common in fishes than previously thought?** Rodney A. Rountree¹ and Francis Juanes², ¹Marine Ecology and Technology Applications, East Falmouth, MA 02536; ²University of Massachusetts Amherst, Department of Natural Resources Conservation, Amherst, MA 01003
- 10:50-11:10 **Ontogenetic patterns in bluefish *Pomatomus saltatrix* feeding ecology and the effect on mercury biomagnification.** David L. Taylor and Joseph Szczebak, Roger Williams University, Department of Marine Biology, Bristol, RI 02809

- 11:10-11:30 **Assessing the role of mangroves as nurseries for French grunt and schoolmaster through otolith elemental fingerprints.** Ivan Mateo¹, Edward Durbin², Richard Appeldoorn³, Aaron Adams⁴, Francis Juanes⁵, Richard Kingsley², Peter Swart⁶, ¹*University of Rhode Island, Department of Fisheries, Animal and Veterinary Sciences, Kingston, RI 02881;* ²*University of Rhode Island, Graduate School of Oceanography, Narragansett, RI 02882;* ³*University of Puerto Rico, Department of Marine Sciences, Mayaguez, Puerto Rico 00681;* ⁴*Mote Marine Laboratory, Pineland, FL 33945;* ⁵*University of Massachusetts, Amherst, Natural Resources, Amherst, MA 01003;* ⁶*University of Miami, Division of Marine Geology and Geophysics, Rosenstiel School of Marine and Atmospheric Science, Miami, FL 33149*
- 11:30-11:50 **Fine-scale population genetics and mating systems of brook trout across headwater stream networks in Connecticut.*** Yoichiro Kanno¹, Jason C. Vokoun¹, Ben H. Letcher², ¹*University of Connecticut Storrs, Department of Natural Resources and the Environment, Storrs, CT 06269;* ²*Silvio O. Conte Anadromous Fish Research Center, United States Geological Survey, Turners Falls, MA 01376*
- 11:50-12:40 **Awards and Business Meeting**
- 12:40-1:40 **Lunch**
- 1:40-2:30 **Keynote Speaker.** William Hyatt, *Connecticut Department of Environmental Protection, Hartford, CT 06106-5127*
- 2:30-2:50 **Shifting species assemblages in the Northeast US Large Marine Ecosystem.** Sean M. Lucey and Janet A. Nye, *NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA 02543*
- 2:50-3:10 **Working toward consensus: Application of carrying capacity in management of bivalve aquaculture.*** Carrie J. Byron¹, David Bengtson¹, Robert Rheault², David Alves³, David Beutel¹, Barry Costa-Pierce⁴, and Jason Link⁵, ¹*University of Rhode Island, Department of Fisheries, Animal and Veterinary Science, Kingston, RI 02881;* ²*East Coast Shellfish Growers Association, Wakefield, RI 02879;* ³*NOAA Aquaculture Program, Gloucester, MA 01930;* ⁴*Rhode Island Sea Grant, Narragansett, RI and University of Rhode Island, Kingston, RI 02881;* ⁵*NOAA, National Marine Fisheries Science Center, Woods Hole, MA 02543*
- 3:10-3:30 **Measuring, minimizing, and mitigating ageing error for stock assessments.** Richard S. McBride¹, S. J. Sutherland¹, L. A. Lombardi², and R. J. Allman², ¹*NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA 02543;* ²*NOAA, National*

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* Denotes student paper

ABSTRACTS

Large New England rivers project: Connecticut River survey. Bryan Apell,
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Kleinschmidt Associates (Kleinschmidt) and the Midwest Biodiversity Institute (MBI) conducted a fish assemblage survey in the main stem of the Connecticut River, extending from the First Connecticut Lake (New Hampshire) downstream to the salt wedge in Old Saybrook, CT. The data collected will be used to investigate the relative abundance and distribution of the fish assemblages in relation to an accompanying qualitative habitat assessment and the prevailing summer water quality of the Connecticut River. This project is part of a larger study funded by the USEPA to develop a fish based bioassessment indices in large New England rivers. Work began in the state of Maine in 2002 and was expanded to the Connecticut River in 2008. A total of 79, 1-km sections of Connecticut River main stem were sampled utilizing pulsed D.C. boat electrofishing techniques during August and September, 2008 and 2009. Sample sites were strategically located using an intensive pollution survey design (Yoder et al. 2005b) in areas of potential sources of pollution, key tributary confluences, and in reaches of contrasting habitat quality (e.g., free-flowing riverine, impoundments, and other hydrologic modifications). The purpose of this presentation is to summarize the methods used and demonstrate general spatial trends within the dynamic fish assemblage of the Connecticut River.

Working toward consensus: Application of carrying capacity in management of bivalve aquaculture. Carrie J. Byron¹, David Bengtson¹, Robert Rheault², David Alves³, David Beutel¹, Barry Costa-Pierce⁴, and Jason Link⁵, ¹*University of Rhode Island, Department of Fisheries, Animal and Veterinary Science, Kingston, RI 02881;* ²*East Coast Shellfish Growers Association, Wakefield, RI 02879;* ³*NOAA Aquaculture Program, Gloucester, MA 01930;* ⁴*Rhode Island Sea Grant, Narragansett, RI and University of Rhode Island, Kingston, RI 02881;* ⁵*NOAA, National Marine Fisheries Science Center, Woods Hole, MA 02543; 401-874-6800, carriebyron@mail.uri.edu*

We present a framework for determining carrying capacity (CC) through mass-balance ecosystem modeling and stakeholder involvement that can be used to guide management of bivalve aquaculture. Two Ecopath models were constructed for Narragansett Bay (NB) and coastal ponds (CP), Rhode Island, USA where aquaculture has doubled in six years and user conflict is high. Stakeholders informed the modeling process at four critical steps; conceptualization of models, evaluation of data sources for parameterization, mass-balancing of the model, and calculation of carrying capacity. Cultured oysters were not a significant part of NB or CP, despite rapid increase in the industry. Cultured oyster biomass in NB is currently at 0.5MT km⁻² and could be increased 625 times without exceeding the

ecological CC of 297MT km⁻². Production CC was calculated to be 3,481MT km⁻² which could exist over only 9% of NB surface area without exceeding the ecological CC. Cultured oyster biomass in CP is currently at 12MT km⁻² and could increase 62 times this value without exceeding the ecological CC of 722MT km⁻². Production CC was calculated to be 1,561MT km⁻². CP could support this high level of biomass production across 46% of surface area before exceeding the ecological CC. Harvest was 40% of biomass. Both CP and NB were more productive and had higher CC than oligotrophic and heavily cultured New Zealand bays. Involving the stakeholders in the modeling process increased understanding and acceptance of the science thereby making the results more likely to be incorporated into future management and policy formulation.

Abundance, growth, and diet of juvenile summer flounder (*Paralichthys dentatus*) and winter flounder (*Pseudopleuronectes americanus*) in tributaries of the Narragansett Bay. Carissa Gervasi and David L. Taylor, Roger Williams University, Department of Marine Biology, Bristol, RI 02809; cgervasi924@g.rwu.edu

Summer flounder, *Paralichthys dentatus*, and winter flounder, *Pseudopleuronectes americanus* utilize estuaries as nursery habitat during early life history stages. In southern New England estuaries, however, little is known regarding the spatiotemporal overlap and potential biotic interactions between the flounder species. The purpose of this research was to assess the abundance, growth, and dietary habits of juvenile summer and winter flounder to determine if predator-prey and/or competitive relationships exist. From May to September 2009, flounder in the Seekonk and Taunton Rivers were sampled biweekly using beach seines. Captured flounder were enumerated, measured for total length (mm), and a sub-sample was preserved for subsequent stomach content analysis. Summer flounder abundance (mean=0.34fish/m²) decreased significantly over time, but the abundance of winter flounder (mean=0.15fish/m²) remained relatively constant during the sampling period. Summer flounder grew significantly faster than winter flounder (growth rates=0.85 and 0.25mm/day, respectively), which may be attributed to differences in dietary habits. Decapods and fish were an important component of the summer flounder diet (52% and 4% by volume, respectively), while amphipods and nematodes were favored by winter flounder (both 37% by volume). These data suggest that competition for food resources is minimal between species. Among the identifiable fish prey in summer flounder stomachs, however, there was evidence of predation on winter flounder, albeit to a limited extent. In order to achieve a better understanding of the diets of the two species, future work will analyze fatty acids. Also, otolith studies will make it possible to more accurately determine growth rates.

Fine-scale population genetics and mating systems of brook trout across headwater stream networks in Connecticut. Yoichiro Kanno¹, Jason C. Vokoun¹, Ben H. Letcher², ¹University of Connecticut Storrs, Department of Natural Resources and the Environment, Storrs, CT 06269; ²Silvio O. Conte Anadromous Fish Research Center, United States Geological Survey, Turners Falls, MA 01376; yoichiro.kanno@uconn.edu

The spatial genetic structure and mating systems of brook trout were investigated in two

headwater stream networks in Connecticut. Brook trout were captured via electrofishing from continuous sampling of the entire headwater networks (5-7 stream km). Eight microsatellite loci were genotyped from fins clips of 1,228 individuals in the two stream systems. Spatial patterns were observed despite the fine spatial scale and spatially continuous fish distribution, even in the absence of an apparent physical barrier. An isolation-by-distance pattern was observed, such that geographically closer individuals were more genetically similar to each other than those further apart. Sibship reconstruction inferred that most brook trout, both males and females, were polygamous. In one study site in which stocked trout were present, cluster and assignment analyses indicated minimal reproductive contribution by stocked fish in recent times and no genotyped individuals were assigned back to the genetic pool of stocked trout. The information obtained from the genetic analyses was useful for better understanding the reproductive biology and spatial population ecology of brook trout in headwater streams.

Shifting species assemblages in the Northeast US Large Marine Ecosystem. Sean M. Lucey and Janet A. Nye, *NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA 02543; 508-495-2011, Sean.Lucey@NOAA.gov*

The Northeast US large marine ecosystem (NEUS LME) has experienced a variety of pressures due to fishing and climate. Differences in the reactions of marine species to these changes stemming from differential behavior and life histories have led to a variety of adaptations, which in turn alters the species assemblage of an area. The NEUS LME has traditionally been assessed using four eco-regions: Mid-Atlantic Bight, Southern New England, Georges Bank, and Gulf of Maine. Although each eco-region has a distinct species assemblage, we found that those assemblages are shifting over time. The shift appears to be towards species that prefer warmer-water which creates an assemblage that more closely resembles the historic assemblage found in the adjacent eco-region to the south. We found that these shifts are occurring by a combination of fishing pressure and climate therefore current reductions in fishing pressures may not be adequate to return the system to a more historic species assemblage.

Expansion of Atlantic croaker (*Micropogonias undulates*) larval habitat on the northeast US continental shelf. Katrin E. Marancik, Harvey J. Walsh, David E. Richardson, and Jonathon A. Hare, *NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center, Narragansett, RI 02882; marancik@mola.na.nmfs.gov*

Climate change has the potential to affect the abundance and distribution of marine fish species. The Northeast Fisheries Science Center (NOAA / NMFS) has conducted larval sampling programs along the northeast US continental shelf since the early 1970's. Two programs, Marine Resources Monitoring, Assessment and Prediction (1977 to 1988) and Ecosystem Monitoring (1999 to present), provide shelf-wide data from Cape Hatteras, North Carolina, to southern New England. These data were used to identify changes in abundance and distribution of larval croaker over a 30-year period. Atlantic croaker larval distribution expanded northward from the eighties to the present. A non-linear least-squares larval-

index indicates an increase in larval croaker abundance concomitant with the expansion in distribution. Analysis of larval habitat use (i.e., water temperature, salinity, and water depth) indicates preferred larval habitats have not changed significantly over the same time periods. Together, these analyses suggest Atlantic croaker larval habitat has expanded on the northeast US shelf potentially contributing to the increase in abundance. Atlantic croaker provides an example of how habitat modeling of long-term abundance and environmental data already in existence can be used to identify habitat changes on the shelf. In addition, combining larval-indices and larval habitat models will improve the data available for stock assessments.

Assessing the role of mangroves as nurseries for French grunt and schoolmaster through otolith elemental fingerprints.

Ivan Mateo¹, Edward Durbin², Richard Appeldoorn³, Aaron Adams⁴, Francis Juanes⁵, Richard Kingsley², Peter Swart⁶, ¹*University of Rhode Island, Department of Fisheries, Animal and Veterinary Sciences, Kingston, RI 02881*; ²*University of Rhode Island, Graduate School of Oceanography, Narragansett, RI 02882*; ³*University of Puerto Rico, Department of Marine Sciences, Mayaguez, Puerto Rico 00681*; ⁴*Mote Marine Laboratory, Pineland, FL 33945*; ⁵*University of Massachusetts, Amherst, Natural Resources, Amherst, MA 01003*; ⁶*University of Miami, Division of Marine Geology and Geophysics, Rosenstiel School of Marine and Atmospheric Science, Miami, Florida 33149*; imateo32@cox.net

Juvenile French grunt (*Haemulon flavolineatum*) and schoolmaster (*Lutjanus apodus*) were captured in mangrove and seagrass stations in St. Croix and Puerto Rico in 2006 and 2007 to determine if fish juvenile areas can be discriminated by otolith chemistry. Concentrations of 13 elements were determined in 0-group fish otoliths using (LA-ICPMS). ($\delta^{18}\text{O}$) and ($\delta^{13}\text{C}$) stable isotopes in otoliths were also analyzed. Multi-elemental signatures for both species differed significantly (MANOVA $p < 0.001$) among mangrove and seagrass stations within both Islands. Furthermore, concentrations of six elements (Sr, Ba, Cu, Mg, Co, Na) and ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) for both species within each year differed significantly among mangrove and seagrass stations within Islands (ANOVA $p < 0.001$). Classification success for French grunt and schoolmaster juvenile stations within St. Croix across years ranged from 87-92% and from 76-77%, respectively, whereas in Puerto Rico, for French grunts and schoolmaster for the two years ranged from 80-84% and 84-87%, respectively. Classification success between mangrove and seagrass habitats (stations combined) in Puerto Rico for French grunt ranged from 84-91%, and for schoolmaster ranged from 94-99%. In St. Croix, classification success for French grunt was 95-96%, and for schoolmaster was 86-89%. The percentage of the French grunt subadults collected from fore-reef stations in St Croix, identified as having resided as juveniles in mangrove habitats in 2006 and 2007, was 40% and 68 % while for Puerto Rico, it was 70% and 74%. By contrast for schoolmaster almost 100% of all fish in both islands resided as juveniles in mangrove habitats across years. This study contains the first direct evidence of post-settlement fish movement connecting mangrove habitats to the reef using otolith chemistry.

Measuring, minimizing, and mitigating ageing error for stock assessments. Richard S. McBride¹, S. J. Sutherland¹, L. A. Lombardi², and R. J. Allman², ¹NOAA, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA 02543; ²NOAA, National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City, FL 32408; Richard.McBride@noaa.gov

Ageing fish is a human endeavor, and despite many technological and statistical advances to the process, ages are measured with error. Our focus here is on ageing efforts in support of data-rich stock assessments. Such assessments require production (program) ageing practices, in contrast to one-time (project) age and growth studies. Error within production ageing can be viewed as having three important aspects: 1) Quality assurance, which begins with age validation, but includes training and procedures to maintain consistent age interpretation over time; 2) Quality control procedures to measure and minimize age error in individual samples; and 3) Practices to evaluate or even mitigate the remaining error in ages used in stock assessments. Ageing, as a science, requires both acceptance that the calcified structure contains reliable annual increments (no process error) and institution of practices to maximize repeatability of age estimates (minimizing observation error). Standards of terminology, processing methods, age assignment, and threshold tests for age readers must all be considered. Inter-laboratory exchanges, ageing workshops, and cooperative efforts to build reference collections are cost-effective tools that significantly enhance the QA/QC procedures of individual laboratories. Other considerations to the development and maintenance of a successful production ageing program include adopting a statistically-sound sampling design, evaluating appropriate sample sizes, and seeking opportunities for innovation. Within stock assessments, several studies have shown that modest ageing error does not confound results, particularly if the error is unbiased. Moreover, methods currently exist to incorporate measured levels of age error into a stock assessment, either to mitigate the error or to test for sensitivity of the error in the outcome of the assessment. In sum, ageing error will exist in the foreseeable future. However, it does not derail efforts to use age-based assessments and can be managed effectively at various steps of the process from the initial field sampling effort to the subsequent stock assessment workshop.

Are Fast Repetitive Tick (FaRT) sounds more common in fishes than previously thought? Rodney A. Rountree¹ and Francis Juanes², ¹*Marine Ecology and Technology Applications, East Falmouth, MA 02536*; ²*University of Massachusetts, Amherst, Department of Natural Resources Conservation, Amherst, MA 01003*; 508-566-6586, rrountree@fishecology.org

As part of a small pilot study to record underwater noise levels in aquatic habitats in the New England region of the United States, we recorded occasional Fast Repetitive Tick (FRT) sounds at two locations in Maine, USA: Indian Pond and the main stem of the Kennebec River in the city of Hallowell. Occurrence of FRT sounds, popularly known as fish “farts”, was unexpected because they are assumed to be unique to the herrings *Clupea harengus* (Atlantic herring) and *Clupea pallasii* (Pacific herring), which are absent from the study area. Underwater sounds were monitored from shore using a calibrated, low-noise, broadband (16-44,000 Hz), cylindrical hydrophone. Two types of FRT sounds were

recorded consisting of a 71 ms – 171 ms broadband burst with dominant energy between 1800-8000 Hz followed by variable length trains of discrete ticks with exponentially increasing tick intervals. Ticks initially have the same frequency structure as the burst phase, but narrow to a peak between 3000 and 5100 Hz as the train continues. A comprehensive literature review found that FRT sounds have previously been observed and described as “air passage” sounds in salmonids and other physostomous fishes. Based on these findings we hypothesize that FRT sounds are likely to be widespread among the physostomous fishes, but have simply been overlooked by modern scientists due to a general lack of information on the aquatic soundscape and biological sound production, together with a tendency to dismiss air passage sounds as incidental and unimportant. We suggest the phenomenon has important implications for the evolution of sound production and the behavioral ecology of fishes.

Ontogenetic patterns in bluefish *Pomatomus saltatrix* feeding ecology and the effect on mercury biomagnification. David L. Taylor and Joseph Szczebak, *Roger Williams University, Department of Marine Biology, Bristol, RI 02809; 401-254-3759; dtaylor@rwu.edu*

The bluefish *Pomatomus saltatrix* is an apex predator common to temperate and semi-tropical waters worldwide. Owing to their high trophic level status, bluefish may have elevated concentrations of biomagnifying contaminants, including mercury (Hg). In this study, we examined the biomagnification and trophic transfer of Hg in bluefish across multiple life history stages (early juveniles to adults; age-0 to age-7). Bluefish were collected from the Narragansett Bay (RI, USA), and white muscle tissue was analyzed for total Hg. Results were evaluated relative to bluefish age, body size, and Hg content of preferred prey. Dietary and nitrogen stable isotope ($\delta^{15}\text{N}$) analysis was also used to elucidate the effect of trophic processes on bluefish Hg concentrations. The Hg content of bluefish muscle tissue was positively correlated with age and length, although age-0 juveniles accumulated Hg faster than older conspecifics (age-1+). Accelerated Hg biomagnification in age-0 bluefish is likely due to these individuals occupying a comparable trophic level to age-1+ bluefish (3.5 and 3.6, respectively), as well as age-0 bluefish having greater standardized consumption rates of Hg-enriched prey. The positive correlation observed between mean biota Hg content and $\delta^{15}\text{N}$ signatures further indicates that Hg is trophically transferred through the estuarine food web, and higher trophic level organisms (i.e., bluefish with enriched $\delta^{15}\text{N}$) have increased Hg concentrations. Concluding, results from this study suggest that: (1) early life history is critical to the cumulative Hg burden in bluefish, and (2) dietary preference and trophic structure are important factors affecting Hg biomagnification in bluefish.