Southern New England Chapter

American Fisheries Society

2008 Summer Meeting

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June 11, 2008

University of Connecticut
Storrs, CT

Program

AGENDA FOR SNEC AFS 2008 SUMMER MEETING
WEDNESDAY JUNE 11, 2008

8:30-9:00 ***Registration and Coffee***

9:00-9:10 **Opening Comments.** Justin Davis, SNEC President

9:10-9:30 **Planning a creel survey for a large river: A case study in Connecticut.** Justin Davis, Neal Hagstrom, and Robert Jacobs, *Connecticut Department of Environmental Protection, Inland Fisheries Division, Marlborough, CT 06447*

9:30-9:50 **A tale of two fishways: Contrasting performance of nature-like fishway designs in coastal New England streams.*** Abigail Franklin[1], Alexander Haro[2], and Theodore Castro-Santos[2], [1]*University of Massachusetts, Amherst, MA 01003-9285;* [2]*United States Geological Survey Biological Resources Division, Silvio O. Conte Anadromous Fish Research Center, Turners Falls, MA 01376*

9:50-10:10 **Newly revised Atlantic sturgeon research and sampling protocols.** Kimberly Damon-Randall, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Gloucester, MA 01930*

10:10-10:30 ***Break***

10:30-10:50 **Mercury bioaccumulation and trophic transfer in the striped bass (*Morone saxatilis*) and tautog (*Tautoga onitis*).*** Maria. N. Piraino and David L. Taylor, *Roger Williams University, Department of Marine Biology, Bristol, RI 02809*

10:50-11:10 **Mercury bioaccumulation in benthic and pelagic estuarine fishes relative to their nitrogen and carbon isotope signatures.** David L. Taylor, Joseph T. Szczebak, Eric J. Payne, Stacey A. Helming, Loong Fat Ho, Maria N. Piraino, and Jennifer Linehan, *Roger Williams University, Department of Marine Biology, Bristol, RI 02809*

11:10-11:30 **Underwater soundscape of New England rivers.** Rodney A. Rountree, *Marine Ecology and Technology Applications, Inc., East Falmouth, MA 02536*

11:30-11:50 **Recent federal mandates and efforts on improving marine recreational fishing information.** Paul Perra, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Gloucester, MA 01930*

11:50-12:20 **Business Meeting**

12:20-1:10 ***Lunch***

1:10-1:50 **Poster Session**

1:50-2:10 **Influence of rare species on electrofishing distance when estimating fish species richness in streams.*** Yoichiro Kanno and Jason Vokoun, *University of Connecticut, Department of Natural Resources Management and Engineering, College of Agriculture and Natural Resources, Storrs, CT*

2:10-2:30 **Nature or nurture: Did overfishing cause the collapse of the Rhode Island lobster fishery?** Richard B. Allen, *Westerly, RI 02891*

2:30-2:50 **Spatial variations in otolith microchemistry for *Tautoga onitis* in the Northeast US.*** Ivan Mateo[1], Dave Bengtson[1], and Edward Durbin[2], *[1]University of Rhode Island, Department of Fisheries, Animal and Veterinarian Sciences, Kingston, RI 02881; [2]University of Rhode Island, Graduate School of Oceanography, Narragansett, RI 02882*

2:50-3:10 **An analysis of dam removal efforts in New England states.** Lisa M. Cavallaro[1], James Turek[1], and Marti McGuire[2], *[1]National Oceanic and Atmospheric Administration (NOAA) Restoration Center, Narragansett, RI 02882; [2]NOAA Restoration Center, St. Petersburg, FL 33702*

3:10-3:30 **Describing how fish use habitat: A new approach using geospatial modeling.** Jose J. Pereira[1], Eric T. Schultz[2], and Peter Auster[3], *[1]National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Milford Laboratory, Milford, CT 06460; [2]University of Connecticut, Department of Ecology and Evolutionary Biology, Storrs, CT 06269; [3]University of Connecticut, Department of Marine Science, Groton, CT 06340*

* Denotes student paper

Poster Session

Effects of climate change on the run timing of anadromous alewife (*Alosa psuedoharengus*) in Connecticut.** David Ellis, *Connecticut Department of Environmental Protection, Inland Fisheries Division, Diadromous Fish Program, Old Lyme, CT 06371*

Treasures in archived histopathology collections: Preserving the past for future understanding. Doranne Borsay Horowitz[1], Esther C. Peters[2], Inke Sunila[3], and Jeffrey C. Wolf[4], *[1]U.S. Environmental Protection Agency, Atlantic Ecology Division, Narragansett, RI 02882; [2]Tetra Tech, Inc., Fairfax, VA 22030; [3]State of Connecticut, Department of Agriculture, Bureau of Aquaculture, Milford, CT 06460; [4]Experimental Pathology Laboratories, Sterling, VA 20166*

Polychlorinated biphenyls (PCBS) and polybrominated diphenyl ethers (PBDES) in current and historical samples of avian eggs from nesting sites in Buzzards Bay, MA, USA. Saro Jayaraman[1], M. Cantwell[1], C. S. Mostello[2], I.C.T. Nisbet[3], and D.E.Nacci[1], *[1]U.S. Environmental Protection Agency, Office of Research and Development, Narragansett, RI; [2]Massachusetts Division of Fisheries & Wildlife, Westborough, MA; [3]I.C.T. Nisbet and Company, North Falmouth, MA*

Mercury bioaccumulation in young-of-the-year fish of Narragansett Bay, Rhode Island.** Joseph T. Szczebak and David L. Taylor, *Roger Williams University, Department of Marine Biology, Bristol RI 02809*

Warm water discharge from power plants located in the coastal zone in the northeast: Good for the fishermen but not too good for the fish that live there. John Ziskowski[1], Robert Murchelano[1], James H. Ridinger[2], Chet Zawacki[3], Byron Young[3], *[1]National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Milford Laboratory, Milford, CT 06460; [2]Real Estate Management, Miami, FL; [3]New York Department of Environmental Conservation, Albany, NY 12233*

** Denotes student poster

ABSTRACTS

Nature or nurture: Did overfishing cause the collapse of the Rhode Island lobster fishery? Richard B. Allen, *145 High St., #A, Westerly, RI 02891; 401-874-7153, rba@FisheryConsulting.com*

"Fishermen and scientists blame the sharp decline in lobsters in New England waters in the last decade on everything from the l996 North Cape oil spill and pollution to rampant shell disease and warming waters." (http://www.projo.com/extra/2007/rough_seas/stories/story_three.htm). This quote from the Providence Journal typifies the prevailing view of lobster fishermen concerning the "sharp decline" in the Rhode Island lobster population that followed extraordinarily high catches in the mid-1990s. The belief that factors other than fishing are responsible for fishery depletion is a common characteristic of fishery downturns. The fishing community often objects to stricter fishing regulations on the grounds that they are being unfairly punished for factors beyond their control, including environmental conditions that prevent adequate reproduction and recruitment. Fishery policy-makers may be receptive to these arguments, being reluctant to impose harsh restrictions on fishing if other factors actually control the status of the stocks. The U.S. Atlantic lobster fishery is regulated primarily with the use of technical measures that define certain classes of lobsters as prohibited. There is no direct control over the volume of landings. Total fishing effort was similarly uncontrolled until recently and the current allowable level of fishing effort is the result of a negotiated arrangement within the lobster industry, rather than a level that is intended to control fishing mortality. The research reported on here used a surplus production model to determine whether control over the total landings of lobsters could have prevented the sharp decline in the abundance of lobsters in Rhode Island waters in recent years. The results indicate that abundance could have been maintained if landings had been controlled at levels approximating the average annual landings of the 1980s.

An analysis of dam removal efforts in New England states. Lisa M. Cavallaro[1], James Turek[1], and Marti McGuire[2], *[1]National Oceanic and Atmospheric Administration (NOAA) Restoration Center, 28 Tarzwell Dr., Narragansett, RI 02882; [2]NOAA Restoration Center, St. Petersburg, FL 33702; 401-782-3281, lisa.cavallaro@noaa.gov*

Since 1996, NOAA's Restoration Center has provided funding and technical assistance to restore migratory fish passage to New England waterways. Fish passage projects have included modification and installation of structural fishways, nature like fishways, and dam removals, as well as feasibility studies and project performance and research monitoring. Comparison of NOAA-supported projects by project type and year awarded indicates a substantial increase in dam removal projects among New England states. Typical dam removal projects are small (average height 8 feet with impoundments < 50 acre-feet), non-

hydropower, run-of-the-river dams no longer serving their original purpose. Technical and social issues associated with removal may include hydrology and hydraulics, sediment quality and transport, wetland alterations, cultural values, and other social issues (e.g., impoundment use recreation). State efforts to address this increased interest in removing obsolete dams vary but include efforts to complete barrier inventories, develop project prioritization tools, streamline the permitting process for these pro-active restoration projects, and release guidance documents. State data are being used to inform national inventory and prioritization tools. Recent efforts to evaluate project performance include publication of a barrier removal monitoring guide, innovative fish passage assessment and a plant and animal community trends analysis for a dam removal in Connecticut.

Newly revised Atlantic sturgeon research and sampling protocols. Kimberly Damon-Randall, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, One Blackburn Dr., Gloucester, MA 01930; 978-281-9300 x6535, Kimberly.Damon-Randall@noaa.gov*

In November 2007, NOAA's National Marine Fisheries Service (NOAA Fisheries Service) and the Atlantic States Marine Fisheries Commission (ASMFC) co-sponsored a workshop on research techniques and sampling methodologies for Atlantic sturgeon. The goal of the workshop was to identify research activities, sampling methodologies, and other techniques that allow for information to be obtained on Atlantic sturgeon subpopulations while minimizing to the maximum extent possible the adverse impacts of the activities on the species. The information from this workshop is being used by a small subgroup in order to prepare a new comprehensive protocol document for research on Atlantic sturgeon. The subgroup is working on drafting the protocols which will be specific to Atlantic sturgeon and update the information contained in NOAA Fisheries Service's 2000 protocol document for both shortnose and Atlantic sturgeon. The information addressed in the revised protocols includes long and short-term holding, tissue sampling, gastric lavage, laparoscopic techniques, tagging, marking, and sampling. The protocols as well as a research techniques workshop at the upcoming annual American Fisheries Society meeting will be discussed.

Planning a creel survey for a large river: A case study in Connecticut. Justin Davis, Neal Hagstrom, and Robert Jacobs, *Connecticut Department of Environmental Protection, Inland Fisheries Division, 209 Hebron Rd., Marlborough, CT 06447; justin.davis@po.state.ct.us*

Creel surveys are used by fishery managers to assess the efficacy of management programs via collection of data on angler effort, harvest, socioeconomic attributes, and opinions. Sound planning is essential to achieving survey objectives and the unique characteristics of a water body and its associated fisheries are a primary concern in the planning process. Planning a creel survey for a large water body characterized by widely-dispersed access points and directed fisheries for multiple species can be particularly challenging. This presentation will discuss design of a creel survey for the Connecticut River, the largest freshwater fishery resource in Connecticut. Recent increases in angling activity on this water body may be creating high harvest rates for some gamefish, yet current data on angler effort and harvest are unavailable. To address this need, the Connecticut Department of Environmental Protection will conduct a creel survey of the Connecticut River in 2008-09 to assess angler effort, catch, and harvest. A stratified-random "bus stop" creel survey was conducted on a portion of the Connecticut River in 1997-98. The data generated by this historic survey have been used to assess optimal allocation of sampling effort, sensitivity of effort and harvest estimates to imprecision in analysis parameters, and potential shortcomings of the bus stop approach. These analyses informed modifications to the original survey design that will improve the accuracy and precision of angler effort and catch estimates.

Effects of climate change on the run timing of anadromous alewife (*Alosa psuedoharengus*) in Connecticut. David Ellis, *Connecticut Department of Environmental Protection, Inland Fisheries Division, Diadromous Fish Program, P.O. Box 719, Old Lyme, CT 06371; 860-447-4341, David.Ellis@ct.gov*

Climate change is predicted to have global impacts on many physical and biological systems; and has already changed aspects of aquatic systems, where the majority of biota are cold-blooded. Specifically seasonal temperature increases have been shown to correlate with changes in the migration timing of fishes. We looked at existing temperature data and fish-count data for alewife (*Alosa pseudoharungus*) in several southern New England Stream. The result of two methods aimed at identifying a 'central' temperature that describes alewife run timing both agreed that 13ºC was a consistent predictor of recent alewife runs (historical fish-counts of spring runs are unavailable). Therefore, we used the occurrence of 13ºC stream temperatures to determine the magnitude of any detectable shift in the migration timing of alewife from the 1970's to the present. Stream temperatures in the spring are warming to 13ºC about eleven day earlier now than in the 1970's. This implies that alewife runs in Connecticut are now occurring on average about eleven days earlier. Management of water supply to fish-passage facilities may need to be operated earlier to accommodate climate-mediated shifts in migration timing.

A tale of two fishways: Contrasting performance of nature-like fishway designs in coastal New England streams. Abigail Franklin[1], Alexander Haro[2], and Theodore Castro-Santos[2], *[1]University of Massachusetts, Holdsworth Hall, 160 Holdsworth Way, Amherst, MA 01003-9285; [2]United States Geological Survey Biological Resources Division, Silvio O. Conte Anadromous Fish Research Center, Box 796, One Migratory Way, Turners Falls, MA 01376; 413-863-3805, afranklin@nrc.umass.edu*

Nature-like fishways have been designed as an alternative to technical fishways which often have poor or unknown efficiency, as well as a desire to re-connect river corridors and provide passage for all species occurring in a system. Providing passage for adult anadromous clupeids to spawning areas is especially important considering their recent dramatic population declines. Two nature-like fishways in New England were evaluated for passage of alewives (*Alosa pseudoharengus*) using passive integrated transponder (PIT) telemetry and showed differing results. At Town Brook in Plymouth, Massachusetts a 30-m long perturbation boulder style fishway with a 1:20 slope passed 96% of the tagged fish with most ascending in under 22 minutes. At East River in Guilford, Connecticut a 48-m long step pool design fishway with a 1:15 slope passed only 40% of the fish with a median transit time of 75 minutes. Tagged fish were detected utilizing the fishways for downstream passage after residence in the ponds. Temperature, water level, and photoperiod were shown to have effects on the entry rate and transit times.

Treasures in archived histopathology collections: Preserving the past for future understanding. Doranne Borsay Horowitz[1], Esther C. Peters[2], Inke Sunila[3], and Jeffrey C. Wolf[4], [1]*U.S. Environmental Protection Agency, Atlantic Ecology Division, 27 Tarzwell Dr., Narragansett, RI 02882;* [2]*Tetra Tech, Inc. 10306 Eaton Place, Suite 340, Fairfax, VA 22030;* [3]*State of Connecticut, Department of Agriculture, Bureau of Aquaculture, P.O. Box 97, Milford, CT 06460;* [4]*Experimental Pathology Laboratories, 45600 Terminal Dr., Sterling, VA 20166; borsay.dodi@epa.gov*

Extensive collections of histopathology materials from studies of marine and freshwater aquatic organisms are archived in the Registry of Tumors in Lower Animals (RTLA), the U.S. Environmental Protection Agency, NOAA's National Marine Fisheries Service, and other agency or academic institutions. These collections are valuable resources for scientists seeking to understand health/disease in diverse species, train new invertebrate pathologists, predict risks from biotic/abiotic stressors (e.g., toxicant impacts on organisms in multiple locations), determine disease status through DNA extraction and analysis, supply data for historical reconstructions (e.g., when a virus first affected a host species), examine trends in parasite distribution and prevalence, and improve interpretation of host/parasite population fluctuations for modeling ecosystems. However, they are in danger. For example, RTLA's collection (www.pathology-registry.org) now at Experimental Pathology Laboratories, Sterling, VA, formerly National Cancer Institute funded, lacks current funding for maintenance or processing of additional case submittals. To ensure future availabilities of these irreplaceable resources, online databases with cross-linking records of materials for search and retrieval—as is being developed for the EPA's Atlantic Ecology Division's collections— can provide access, but these collections need cross-agency support to improve their database capabilities, maintain histoslides, and provide hands-on examination and study.

Polychlorinated biphenyls (PCBS) and polybrominated diphenyl ethers (PBDES) in current and historical samples of avian eggs from nesting sites in Buzzards Bay, MA, USA. Saro Jayaraman[1], M. Cantwell[1], C. S. Mostello[2], I.C.T. Nisbet[3], and D.E.Nacci[1], [1]*U.S. Environmental Protection Agency, Atlantic Ecology Division, 27 Tarzwell Dr., Narragansett, RI 02882;* [2]*Massachusetts Division of Fisheries & Wildlife, Westborough, MA;* [3]*I.C.T. Nisbet and Company, North Falmouth, MA; jayaraman.saro@epa.gov*

We measured concentrations of polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) in eggs from breeding colonies in Buzzards Bay, MA, USA. Eggs

from two piscivorous bird species, common (*Sterna hirundo*) and roseate (*Sterna dougallii*) terns, were collected in the spring of 1972, 1994 - 96, 1998 – 99 and 2005. Prior to analyses, we predicted temporal declines in tern egg PCBs in association with declines since the 1970s in sediment PCBs from a nearby Superfund site, New Bedford, MA. However, we expected a temporal increase in PDBE concentrations in tern eggs, reflecting local and globally-transported industrial contamination from these compounds primarily used in recent years as flame retardants. As predicted, PCB concentrations have declined since 1972 in eggs from both tern species. For example, total PCB concentrations, reported as the sum of eighteen selected PCB congeners, averaged 157,322 ng/g lipid for 1972 samples and 34,602 ng/g lipid for 2005 samples of common tern eggs. PCB congener patterns in tern eggs have also changed. The predominant congeners found in tern eggs collected in recent years included PCBs 118, 153 and 138, which contributed to 66-70% of total PCBs; whereas lower chlorinated PCBs predominated the PCB patterns from earlier years (1972). PBDEs were measured in extracts from these same egg samples using a novel negative ion mass spectrometer method (described elsewhere) and reported for eight selected congeners. As expected and in contrast to the decline observed for PCBs, total PBDE concentrations increased from detection limit (< 3 ng/g) in 1972 samples to an average of 1,086 ng/g lipid for 2005 common tern egg samples. Results from these analyses were also compared to PCB and PBDE concentrations measured for recently collected (2003) eggs of tree swallows (*Tachyineta bicolor*), insectivorous birds drawn to nesting boxes located in the Superfund site. Statistical analyses are underway to evaluate contaminant-specific interspecies variations, assess the influence of the Superfund site on PCB contamination, and characterize the potential for adverse effects from these toxic contaminants in avian eggs.

Influence of rare species on electrofishing distance when estimating fish species richness in streams. Yoichiro Kanno and Jason Vokoun, *University of Connecticut, Department of Natural Resources Management and Engineering, College of Agriculture and Natural Resources, 1376 Storrs Rd., Storrs, CT 06269-4087; yoichiro.kanno@uconn.edu*

Electrofishing distance needed to estimate fish species richness accurately in streams is in theory influenced by a combination of factors such as number of species, subreach (habitat) selection by fish, fish abundance, and occurrence of rare species. We present empirical data from streams in 4 regions in North America to illustrate that some species are proportionately rare in many streams, and longer stream distance needs to be sampled for accurate species richness estimates when rare species are numerically uncommon, resulting in spatially discontinuous distributions. The majority of species were typically captured at shorter stream distances when removing species represented by one and two individuals, singletons and doubletons, respectively. Simulation of individual aggregation indicated that common species did not select or avoid particular subreaches. We conclude that spatial discontinuity increases the stream electrofishing distance requirement, and spatial discontinuity in empirical data is typically due to occurrence of species represented by few individuals, especially singletons and doubletons.

Spatial variations in otolith microchemistry for *Tautoga onitis* in the Northeast US.
Ivan Mateo[1], Dave Bengtson[1], and Edward Durbin[2], [1]*University of Rhode Island, Department of Fisheries, Animal and Veterinarian Sciences, Kingston, RI 02881;* [2]*University of Rhode Island, Graduate School of Oceanography, Narragansett, RI 02882; 401-316-7326, imateo32@cox.net*

Elemental composition of otoliths may provide valuable information in establishing connectivity between nursery grounds and marine fish populations. Juveniles of the economically important fish species *Tautoga onitis* were captured in 3 stations within Narragansett Bay and 4 high salinity areas along US Northeast Coast in a single year. Concentrations of Rb, Mg, Ca, Mn, Sr, Na, K, Sr, Pb and Ba were determined in otoliths of YOY using solution-based inductively coupled plasma mass spectrometry. Stable oxygen (18O) and carbon isotopic ratios (13C) in YOY otoliths were also analyzed using isotope ratio mass spectrometry to discriminate tautog nursery grounds. Results of MANOVA showed that elemental signatures differed significantly among the distinct nurseries within Narragansett Bay (Pillai's trace =4.465, $P<0.001$) and among the states (Pillai's trace =1.705, $P<0.001$). In addition, univariate contrasts indicated that concentrations of three elements (Sr, Ba, Mn) and two stable isotopes (18O and 13C) differed significantly among the 4 high salinity nurseries within states (ANOVA, $P<0.001$). Our linear discriminant analysis found that the three tautog nurseries within Narragansett Bay (Mount Hope Bay, Gaspee Point, Rose Island) were distinguished with 100% of classification success. High salinity stations along the US coast (RI, CT, NJ, VA) were correctly classified with 92% accuracy. Since accurate classification of juvenile fish to their nursery sites was achieved, otolith chemistry analysis can be used as a natural habitat tag in assigning adult fish to their estuarine nursery.

Describing how fish use habitat: A new approach using geospatial modeling. Jose J. Pereira[1], Eric T. Schultz[2], and Peter Auster[3], [1]*National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Milford Laboratory, 212 Rogers Ave., Milford, CT 06460;* [2]*University of Connecticut, Department of Ecology and Evolutionary Biology, Storrs, CT 06269;* [3]*University of Connecticut, Department of Marine Science, Groton, CT 06340; 203-882-6538, jose.pereira@noaa.gov*

A better understanding of habitat requirements is mandated by recent federal fisheries law. One way to approach this issue is to examine factors that influence distribution. We are investigating how distribution changes with abundance, which is of particular interest in exploited populations that undergo large changes in abundance. Three theories have been proposed for the relationship between marine fish abundance and distribution: the Constant Density Model (CDM), the Proportional Density Model (PDM), and MacCall's Basin Model (MBM). The CDM predicts that the population's range expands and contracts with changes in global abundance while local density does not vary. Habitat quality varies and the best habitats, conferring the highest fitness, remain occupied at lowest abundance. The PDM predicts that range remains constant and that local density varies with changes in abundance. Local density is highest in habitats that confer the highest fitness. The MBM predicts that there is density-dependent habitat use, such that both local density and species range vary

with changes in abundance. Fitness should be the same across habitats because of these density-dependent processes. We are testing these theories using geospatial modeling and National Marine Fisheries Service trawl survey data. We test for changes in range by mapping non-zero catches at high and low population levels. We test for fitness changes across habitats by assessing spatial autocorrelation in fitness metrics (weight-at-length, weight-at-age). The analyses are being conducted on a benthivore (yellowtail flounder, *Limanda ferrugineus*), a pelagic planktivore (Atlantic herring, *Clupea harengus*), a piscivore (silver hake, *Merluccius bilinearis*), and a demersal omnivore (haddock, *Melanogrammus aeglefinus*).

Recent federal mandates and efforts on improving marine recreational fishing information. Paul Perra, *National Oceanic and Atmospheric Administration, National Marine Fisheries Service, One Blackburn Dr., Gloucester, MA 01930; 978-281-9153, paul.perra.noaa.gov*

The 2007 amendments to the Magnuson-Stevens Fishery Conservation and Management Act call for a complete overhaul of the major surveys used in the United States to determine the catch and effort associated with marine recreational fishing. In addition, a national saltwater fishing recreation angler registry (registry) will be required for anglers in states currently not collecting appropriate angler contact information through a license or permitting program. We will discuss the Marine Recreational Information Program Initiative which is a major effort to overhaul and improve current marine recreational fishing surveys, and the development of a national registry for Saltwater Anglers who fish in the Exclusive Economic Zone and/or for anadromous fish, as required by law by January 2009. Also, the critical need of the Federal registry program in the Northeastern United States to partner with states for complimentary or alternative state marine angler information will be discussed.

Mercury bioaccumulation and trophic transfer in the striped bass (*Morone saxatilis*) and tautog (*Tautoga onitis*). Maria. N. Piraino and David L. Taylor, *Roger Williams University, Department of Marine Biology, One Old Ferry Rd., Bristol, RI 02809; 315-480-3300, mpiraino346@hawks.rwu.edu*

Mercury is a toxic environmental contaminant known to be hazardous to human health, and humans are exposed to mercury primarily through the consumption of contaminated fish. Mercury bioaccumulates through the aquatic food chain, with concentrations varying across fish species partly due to differences in diet history and feeding ecology. This study analyzed the mercury concentration ([Hg]) of two commercially and recreationally important fish with diverse life history characteristics: striped bass (*Morone saxatilis*) and tautog (*Tautoga onitis*). Tautog are demersal fish that feed primarily on mollusks and crustaceans, whereas striped bass are pelagic and consume fish and crustaceans. Striped bass, tautog and their prey were collected from Narragansett Bay, Rhode Island, using otter trawls and hook & line (June-August 2006 and 2007). Muscle tissue biopsies and stomach contents (recovered prey) of adult target fish were extracted. Muscle biopsies, recovered prey, and whole body bioavailable prey (taken directly from the field) were analyzed using atomic absorption spectrometry. In addition, nitrogen stable isotopes of target fish and bioavailable prey were measured using automated continuous-flow isotope mass spectrometry. The rate of Hg bioaccumulation was greater in striped bass than in tautog and was explained by species-specific differences in feeding ecology and diet history. For example, [Hg] was significantly higher in the recovered and bioavailable prey of striped bass than tautog. Furthermore, nitrogen stable isotope analysis suggested that striped bass maintain a higher trophic level status than tautog.

Underwater soundscape of New England rivers. Rodney A. Rountree, *Marine Ecology and Technology Applications, Inc., 178 Teaticket Hwy, Suite 101, East Falmouth, MA 02536; 508-566-6586, rrountree@fishecology.org*

Passive acoustics technologies have received little attention from fish and wildlife scientists and managers working in aquatic systems of North America. In its simplest form, passive acoustics is the act of listening to the underwater sounds made by fishes and other aquatic animals and using that information as an aid to study their habitat requirements and behaviors. A preliminary passive acoustic survey was conducted in four major river systems of New England: the Kennebec, Saco, Merrimack, and Connecticut Rivers. The purpose was not to conduct a full-scale survey of the acoustic environment, but to collect the first data on ambient noise levels from these systems and to document the diversity of sounds found in each area in order to demonstrate the extent to which scientists are still largely ignorant of this important aspect of aquatic ecosystems.

Mercury bioaccumulation in young-of-the-year fish of Narragansett Bay, Rhode Island.
Joseph T. Szczebak and David L. Taylor, *Roger Williams University, Department of Marine Biology, One Old Ferry Rd., Bristol RI 02809; 781-405-7275, jszczebak@gmail.com*

Estuaries harbor high concentrations of heavy metals and toxins resulting from anthropogenic industrialization. In addition, estuaries are utilized by many juvenile fish as nursery grounds that provide refuge from predators and access to food sources. Consequently, juvenile fish are potentially exposed to high levels of mercury (Hg) that accumulates in their tissues. Tautog (*Tautoga onitis*), winter flounder (*Pseudopleuronectes americanus*), summer flounder (*Paralichthys dentatus*), and bluefish (*Pomatomus saltatrix*) are commercially and recreationally valuable fish common in the Narragansett Bay Estuary (NBE), Rhode Island. Therefore, understanding lifelong mercury accumulation patterns in these species is important for minimizing human exposure to Hg through dietary consumption. This study focused on the initial Hg accumulation in young-of-the-year (YOY) fish occurring during NBE residence. Particularly, total Hg concentrations ([Hg]) of YOY fish were analyzed relative to fish size, age, feeding ecology, and local sediment contamination. Sediment cores (0-2 cm) were collected throughout NBE (n=53) and measured for [Hg], grain size, and total organic carbon content. Moreover, YOY tautog, winter flounder, summer flounder, and bluefish were collected (summer 2006 and 2007) using beach seines, fish traps, and hook & line. Sediment and YOY fish (whole bodies)

were analyzed for [Hg] using combustion atomic-absorption spectrometry, while trophic level status of fish was determined by nitrogen stable isotope ($^{15}N/^{14}N$) analysis. The [Hg] of summer flounder and bluefish were significantly correlated with fish size and age. Similarly, the [Hg] of winter flounder and tautog increased with size and age, but this correlation was not significant within the first year of life. Furthermore, [Hg] was positively correlated with $^{15}N/^{14}N$, which suggests amplification of [Hg] with trophic level status. Finally, sediment [Hg] had no effect on fish [Hg].

Mercury bioaccumulation in benthic and pelagic estuarine fishes relative to their nitrogen and carbon isotope signatures. David L. Taylor, Joseph T. Szczebak, Eric J. Payne, Stacey A. Helming, Loong Fat Ho, Maria N. Piraino, and Jennifer Linehan, *Roger Williams University, Department of Marine Biology, One Old Ferry Rd., Bristol, RI 02809; 401-254-3759, dtaylor@rwu.edu*

Mercury (Hg) is a toxic environmental contaminant that adversely affects human health, and exposure occurs primarily through the consumption of contaminated fish. Coastal marine ecosystems support substantial fisheries, and thus, are the dominant source of Hg to fish-consuming humans. Nevertheless, relative to freshwater environments, very little is known about the fate of Hg in near-shore marine food webs. In this study, we analyzed total Hg concentration in the muscle tissue of five commercial/recreational fish collected from the Narragansett Bay Estuary (Rhode Island, USA): striped bass *Morone saxatilis*, bluefish *Pomatomus saltatrix*, tautog *Tautoga onitis*, summer flounder *Paralichthys dentatus*, and winter flounder *Pseudopleuronectes americanus*. Stable nitrogen ($^{15}N/^{14}N$) and carbon ($^{13}C/^{12}C$) isotope signatures of targeted fish and their prey (forage fish, squid, decapods, and bivalves) were used to elucidate the effect of feeding history, trophic position, and carbon sources (benthic versus pelagic pathways) on patterns of Hg burden in fish tissue. The total Hg concentration of all targeted species was positively correlated with fish size and age. Moreover, total Hg concentration increased as a function of nitrogen isotopic signatures, indicating the trophic transfer of Hg through the estuarine food web. Total Hg concentration in target fish also decreased as function of carbon isotopic signatures, suggesting that Hg contamination is more prevalent in pelagic food chains. This may be attributed to the greater complexity (i.e., more trophic levels) of pelagic food chains, and thus, opportunity for Hg bioaccumulation.

Warm water discharge from power plants located in the coastal zone in the northeast: Good for the fishermen but not too good for the fish that live there.
John Ziskowski[1], Robert Murchelano[1], James H. Ridinger[2], Chet Zawacki[3], Byron Young[3], [1]*National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Milford Laboratory, 212 Rogers Ave., Milford, CT 06460;* [2]*Real Estate Management, Miami, FL;* [3]*New York Department of Environmental Conservation, Albany, NY 12233; 203-882-6595, jziskows@clam.mi.nmfs.gov*

Responding to alarming reports of numerous diseased striped bass being caught by sport fishermen from the warm water effluent of the Northport power plant in January 1973, we mounted a gill-net operation the following month to survey this population of fish. Of the 98 bass that we surveyed for gross lesions, 21 (21.4%) exhibited slight to severe lymphocystis lesions with attendant fin erosion. Length range was 274-400 mm SL. Surface seawater temperature at point of capture was 12ºC and 1ºC in surrounding waters. Lymphocystis was confirmed by histological analysis. A control site in the Hudson River at Croton Bay was sampled in March by bottom trawl resulting in the capture of 78 striped bass of comparable size range: 241-475 mm SL. Water temperature at point of capture was 5ºC. None of the fish exhibited signs of lymphocystis disease. Thirty-four years later, there are still reports of diseased striped bass being caught in warm water effluents from power plants during the winter In January 2007, the Narragansett Bay Keeper, John Torgan, reported a 30% prevalence of diseased bass among his catch in the vicinity of the Manchester Street power plant in the Providence River. This disease is caused by a virus which invades skin cells causing them to enlarge up to 500 times normal size. Virus particles are continuously shed from infected fish and can easily infect other bass in the crowded conditions existing in the vicinity of a warm water discharge. Also, the warm water temperatures may accelerate infection rate and intensity. It is not known how widespread this disease occurs within over-wintering striped bass near power plants on the Atlantic coast.