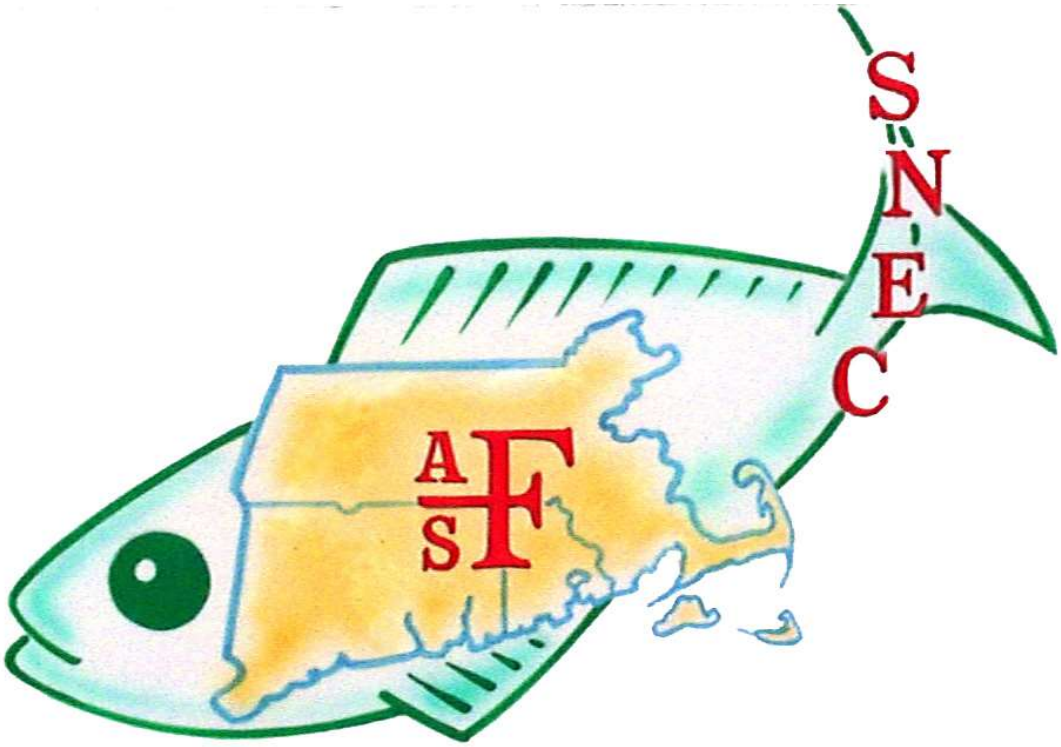
2021 Virtual Summer Science Meeting



Southern New England Chapter

American Fisheries Society

June 28, 2021

Program

AGENDA FOR THE SNEC AFS 2021 SUMMER SCIENCE MEETING
Monday June 28, 2021

9:30 – 9:40 **Opening Comments** Chris McDowell, SNEC President Elect

9:40 – 10:00 **Size at Maturity of Female American Lobsters from Offshore Southern New England and Eastern Georges Bank.** Ellertson, Aubrey[1], Jessica Waller[2], Tracy Pugh[3], N. David Bethoney[1], [1] *Commercial Fisheries Research Foundation, Saunderstown, RI*, [2]*ME Department of Marine Resources, West Boothbay Harbor, ME,* [3]*MA Division of Marine Fisheries, New Bedford, MA*

10:00 – 10:20 **Anadromous Versus Landlocked Alewife: Intraspecific Comparison of Ovarian Dynamics.** Mouchlianitis, Foivos Alexandros[1], Eric Schultz[2], Kostas Ganias[1], [1]*School of Biology, Aristotle University of Thessaloniki, Thessaloniki, Greece*, [2]*Department of Ecology and Evolutionary Biology, University of Connecticut, Storrs, CT*

10:20 – 10:40 **Behavioral Patterns of Winter Skate (*Leucoraja ocellata*) In and Around Actively Fishing Gill Nets Off the Coast of Chatham, Massachusetts.*** Cadene, Isabelle[1], Owen Nichols[2], Douglas Feeney[3], Andrea Bogomolni[4], Alessandro Bocconcelli[5], [1]*Roger William University, Bristol, RI*, [2]*Center for Coastal Studies, Provincetown, MA*, [3]*F/V Noah, Chatham, MA,* [4]*MA Maritime Academy, Buzzards Bay, MA,* [5]*Woods Hole Oceanographic Institution, Woods Hole, MA*

10:40 – 11:00 ***Break***

11:00 – 11:20 **Spatial and Temporal Variations in Mercury Contamination in Recreational Fisheries from Southern New England Estuarine and Coastal Waters.*** Peters, Colby, David Taylor, *Roger Williams University, Bristol, RI*

11:20 – 11:40 **Seawater Tolerance and Feeding in Landlocked and Anadromous Populations of Sea Lamprey.*** Norstog, Jessica L.[1], Stephen D. McCormick[2], [1]*University of Massachusetts Amherst, Amherst MA,* [2]*EESC USGS Conte Anadromous Fish Research Center, Turners Falls, MA*

11:40 – 12:00 **Downstream Migration of Juvenile Sea Lamprey Transformers and Evaluation of Light for Control Trapping.** Haro, Alexander[1], S. Meihls, N. Johnson, and M. Wagner, [1]*USGS Conte Anadromous Fish Lab, Turners Falls, MA*

12:00 – 12:30 ***Awards and Business Meeting***

12:30 – 13:00 ***Lunch***

13:00 – 13:20 **Western Atlantic Torpedo Strandings on Cape Cod, MA from August 2020 through January 2021, Including a Mass Stranding Event in Late December on Long Point, Provincetown, MA.*** Carson, Carol[1], Jack Gerrior[1,2], Austyn Morin[1,3], Christopher Block[4], [1]*New England Coastal Wildlife Alliance, Middleboro, MA*, [2]*MA Maritime Academy, Buzzards Bay, MA,* [3]*Stonehill College, Easton, MA,* [4]*Bridgewater State University, Bridgewater, MA*

13:20 – 13:40 **Synchrony of Fish Populations in Geographically Separated Estuaries Along the U.S. East Coast.** Arnott, Stephen A., *Queens College, City University of New York, New York City, NY*

13:40 – 14:00 **How Negative Feedback Loops That Lead to Fish Stock Depletion, Job Loss, and Environmental Degradation Have**

Contributed to Maritime Security Concerns in the Latin American and Caribbean Region. Mrakovcich, Karina, Chris LaMonica, *U.S. Coast Guard Academy, New London, CT*

14:00 – 14:20 ***Break***

14:20 – 15:20 **Keynote Presentation: You Can Be the Future Now: How Will History View You?** Jearld Jr., Ambrose, *NOAA Northeast Fisheries Science Center (ret.)*

* Denotes student paper

Abstracts:
Platform Presentations

Synchrony of Fish Populations in Geographically Separated Estuaries Along the U.S. East Coast. Arnott, Stephen A., *Queens College, City University of New York, New York City, NY*

Spatial synchrony refers to correlated fluctuations in the abundance of geographically separated populations. Theory predicts that synchrony can be driven by at least three main processes including broad-scale climatic influences (Moran effect), predator-prey interactions, and dispersal. This study examined the synchrony of fish populations in seven estuaries separated by up to 220 kilometers along the U.S. east coast. Using a 24-year time series of catch per unit effort data, synchrony was detected in 29 of 33 species examined, but the degree of synchrony varied substantially. The population dynamics of several species were closely related with winter conditions. These same species showed the highest levels of population synchrony because their population levels were "re-set" by especially cold winters. There was speculative evidence that synchronized populations in one of the winter-affected species may have knock-on effects through predator-prey interactions, but further work is needed to confirm this relationship. Dispersal, as quantified by tag-recapture data, showed no apparent relationship with synchrony. In summary, species whose populations were related with winter conditions showed the highest levels of synchrony, indicating that the Moran effect is an important driver of this ecological process in estuarine fish populations.

Behavioral Patterns of Winter Skate (*Leucoraja ocellata*) In and Around Actively Fishing Gill Nets Off the Coast of Chatham, Massachusetts.* Cadene, Isabelle[1], Owen Nichols[2], Douglas Feeney[3], Andrea Bogomolni[4], Alessandro Bocconcelli[5], [1]*Roger William University, Bristol, RI*, [2]*Center for Coastal Studies, Provincetown, MA*, [3]*F/V Noah, Chatham, MA,* [4]*MA Maritime Academy, Buzzards Bay, MA,* [5]*Woods Hole Oceanographic Institution, Woods Hole, MA*

Bycatch and catch depredation in the northeast U.S. sink gillnet fishery have been identified as a concern among commercial fishermen and fishery managers. Among the target species of this fishery is the Winter Skate, *Leucoraja ocellata*. In order to inform our understanding of the specific interactions between the gillnets, target species, and non-target species, cameras were deployed on actively fishing gillnets from July-October 2018-2019, recording 168 hours of video during 7 deployments ranging from 4-24 hours. This footage allowed for the observation of

interactions between individual Skates and the net, providing insight into behavioral patterns of Winter Skate and gear performance. Analysis of a subset of the footage involved the close observation of individual Skates within the camera field of view (FOV). Detailed notation was taken of consecutive actions made by each subject during the full time they were in the FOV. Analysis to date quantified a preference for approach direction to the net (relative to current direction) and actions following contact with the gear. Some Skates seemed to evade entanglement through tactile senses, changing behavior upon contact with the gear. The nets were observed to fish as intended, allowing for undersize Skates to pass through the mesh with little resistance. Over longer soak periods, especially in instances with a high catch density, the gear was observed to gradually collapse over time, reducing fishing power. To our knowledge, these are the first in situ observations of Winter Skate behavior around gillnets in this fishery. Analysis of video footage is ongoing.

Size at Maturity of Female American Lobsters from Offshore Southern New England and Eastern Georges Bank. Ellertson, Aubrey[1], Jessica Waller[2], Tracy Pugh[3], N. David Bethoney[1], [1] *Commercial Fisheries Research Foundation, Saunderstown, RI*, [2]*ME Department of Marine Resources, West Boothbay Harbor, ME,* [3]*MA Division of Marine Fisheries, New Bedford, MA*

Female reproductive dynamics of the offshore American Lobster fishery lack description. We determined the size at which female Lobsters reach sexual maturity for two offshore areas utilizing data from commercial Lobster gear (CFRF's Lobster Crab Research Fleet) and the Northeast Fisheries Science Center (NEFSC) bottom trawl survey. One group was captured from offshore Southern New England and the other from eastern Georges Bank. A total of 491 female Lobsters were collected and assigned a maturity status based on ovarian staging. Lobsters in Southern New England matured at a smaller size (L_{50} = 79.7 mm) than those in Georges Bank (L_{50} = 91.4 mm), which were caught in cooler northern waters. These differences between stock locations provide new tools for management, and reinforce the value achieved by working collaboratively with the industry to address data gaps in the offshore Lobster fishery.

Western Atlantic Torpedo Strandings on Cape Cod, MA from August 2020 through January 2021, Including a Mass Stranding Event in Late December on Long Point, Provincetown, MA.* Carson, Carol[1], Jack Gerrior[1,2], Austyn Morin[1,3], Christopher Block[4], [1]*New England Coastal Wildlife Alliance, Middleboro, MA*, [2]*MA Maritime Academy, Buzzards Bay, MA,* [3]*Stonehill College, Easton, MA,* [4]*Bridgewater State University, Bridgewater, MA*

The Western Atlantic Torpedo (*Tetronarce occidentalis*), is a batoid species that inhabits the coastal waters of the Gulf of Maine, though little is understood regarding its movements, habits and life history (Storer, 1843). Since 2011, researchers with the New England Coastal Wildlife Alliance (NECWA) have informally documented Torpedo strandings each fall and early winter in the New England area, primarily on the northern shores of Cape Cod. In 2020, NECWA decided to formally investigate these annual strandings and documented 63 carcasses (34 Female, 15 Male, 14 CBD) from August 1, 2020 through January 12, 2021. All but one animal stranded dead and this male died shortly after stranding. Documentation involved the collection of positional information and photographs to support photo-ID analysis and to confirm sex. For all specimens except those that were heavily scavenged or extremely decomposed, body measurements were collected that included total length (TL), disk width (DW), disk length (DL) and tail length (CL). Through external and internal examinations, NECWA was able to determine the sex of 49 carcasses. The sex of the remaining 14 carcasses could not be identified for the gonads were missing due to extensive body decomposition and scavenging activity. Weight was obtained for only 1 carcass as the team struggled to create a portable weighing apparatus that could be used in the field. The digestive tracts of 35 carcasses were examined and only 7 contained food items. Of these 7 individuals, all contained various species of decomposed fish and 1 large female also had a whole Long-Tail Duck (*Clangula hyemalis*) in her stomach. In late December, NECWA documented a mass stranding of 41 Torpedoes on a 2.1 km stretch of beach on Long Point, Provincetown, MA. Historical records indicate the occurrence of large numbers of Torpedos in the vicinity of Provincetown, including those that stranded on the eastern shore of Long Point (Storer, 1867). Annual strandings of the Western Atlantic Torpedo on Cape Cod remind us how little is known regarding the biology and ecology of this species and encourages further investigation into the causes of both single and mass strandings.

Downstream Migration of Juvenile Sea Lamprey Transformers and Evaluation of Light for Control Trapping. Haro, Alexander[1], S. Meihls, N. Johnson, and M. Wagner, [1]*USGS Conte Anadromous Fish Lab, Turners Falls, MA*

Downstream migration of juvenile Sea Lamprey transformers occurs primarily during hours of darkness during flow events in the late fall and early winter months. Sea Lamprey transformers are sensitive to and respond behaviorally to low-intensity white light, which has been shown to attract downstream-moving transformers in the laboratory. A prototype light guidance array for transformers was tested on the Sawmill River (Montague, Massachusetts) to evaluate guidance performance and migratory timing/rates of downstream movement, using PIT telemetry. Transformers were attracted to low level (100 lux) illumination, but the effect of guidance was not strong, and likely varied with river flow/velocity. Refinements of the light array and trapping mechanism may make light-trapping an effective method for sea lamprey control in the Great Lakes.

Anadromous Versus Landlocked Alewife: Intraspecific Comparison of Ovarian Dynamics. Mouchlianitis, Foivos Alexandros[1], Eric Schultz[2], Kostas Ganias[1], [1]*School of Biology, Aristotle University of Thessaloniki, Thessaloniki, Greece*, [2]*Department of Ecology and Evolutionary Biology, University of Connecticut, Storrs, CT*

The Alewife, *Alosa pseudoharengus*, is an exemplary species for evaluating how intraspecific differentiation among populations reflects adaptive change in various traits, due to its capacity to become landlocked so that a formerly diadromous life cycle is restricted to fresh water. The extent to which reproductive biology has been altered upon landlocking has not been characterized. The goal of this study was to compare the ovarian dynamics of the anadromous and landlocked forms, represented by collections taken at two neighboring locations, Bride Lake and Pattagansett Lake respectively. Anadromous and landlocked forms were similar in ovarian development, oocyte release strategy (multiple spawning) and fecundity type (indeterminate type). The forms differed in energy investment to the formation of the spawning batch; the anadromous Alewife invested more on the first batch of the season, while landlocked Alewife invested equitably among batches. This difference aligns with changes that occurred to seasonal variability in food resources, and potentially represents another trait that adaptively differentiated as landlocking occurred.

How Negative Feedback Loops That Lead to Fish Stock Depletion, Job Loss, and Environmental Degradation Have Contributed to Maritime Security Concerns in the Latin American and Caribbean Region. Mrakovcich, Karina, Chris LaMonica, *U.S. Coast Guard Academy, New London, CT*

The degradation of coastal habitats and depletion of fish stocks throughout the Latin American and Caribbean (LAC) region are now contributing to increasingly vulnerable threats to regional maritime security. Absent effective mitigation, the LAC region will be left with negative feedback loops that involve overfishing, environmental degradation, and maritime security concerns. As elsewhere, circumstances are a “tragedy of the commons” issue that require urgent redress; in this paper we emphasize the need for heightened awareness of circumstances and policy solutions that have proven to be effective in other parts of the world, to include “adaptive co-management”. Other contributing factors that accelerate the urgency to act include: 1) climate change, now accentuating preexisting vulnerabilities; 2) increasingly illegal, unregulated, and unreported (IUU) fishing – now valued at US$750 million per year in the Caribbean region alone; and 3) growing incidents of maritime violence, to include armed robbery, piracy, and outright conflict. Stakeholders are all aware that COVID-19 has threatened pre-existing market and supply norms. The traditional roles of LAC women who, in addition to

supporting families, work as fishers of smaller fisheries, food processors, and as market fishmongers, have been challenged; LAC men who tend to work predominantly as fishers, have also been challenged, only adding to trends of reduced fish stocks and maritime insecurity. The ongoing marginalization of women in coastal resource management policy also persists. Recommendations to deal with these pressing issues include enhanced maritime governance, use of more technology to detect illegal activity, and empowerment of local communities.

Seawater Tolerance and Feeding in Landlocked and Anadromous Populations of Sea Lamprey.* Norstog, Jessica L.[1], Stephen D. McCormick[2], [1]*University of Massachusetts Amherst, Amherst MA,* [2]*EESC USGS Conte Anadromous Fish Research Center, Turners Falls, MA*

The life histories of anadromous and landlocked Sea Lamprey are similar, though landlocked populations lack exposure to seawater and thus experience relaxed selection on traits associated with survival in seawater, including salinity tolerance and associated physiological traits. This study investigated differences in one anadromous and three landlocked populations of Sea Lamprey in the capacity of metamorphosed juveniles for ion regulation in seawater. Landlocked Lamprey had lower survival in 35 ppt seawater compared to anadromous Lamprey. All populations showed strongly elevated gill NKA activity compared to larvae, which increased over time after exposure to 30 ppt seawater. Plasma ion concentrations after exposure to 30 ppt seawater were elevated in two upper Great Lakes populations compared to the anadromous population. These results suggest that there are population-based differences in salinity performance that are consistent with relaxed selection on traits for seawater entry in landlocked populations.

Spatial and Temporal Variations in Mercury Contamination in Recreational Fisheries from Southern New England Estuarine and Coastal Waters.* Peters, Colby, David Taylor, *Roger Williams University, Bristol, RI*

Fish provide many dietary benefits to human consumers due to their high concentrations of proteins and omega-3 fatty acids. However, persistent contaminants in fish tissue can also adversely affect human health when eaten in high concentrations. For example, mercury (Hg) is a toxic environmental contaminant that bioaccumulates in fish tissue and bioconcentrates across successive trophic levels. To reduce Hg exposure, federal and state government agencies issue consumption advisories to minimize the potential health risks associated with eating fish. Fish consumption advisories, however, often lack species-specific detail, and rarely account for small-scale spatial and temporal variations in fish Hg contamination. This study examined Hg

contamination in recreational fisheries of southern New England estuarine and coastal waters (*Centropristis striata, Morone saxatilis, Paralichthys dentatus, Pomatomus saltatrix, Pseudopleuronectes americanus, Stenotomus chrysops,* and *Tautoga onitis*), with a focus on the effects of habitat (inshore, nearshore, and offshore waters) and time (years 2006-2020) on intra-specific Hg bioaccumulation rates. All target fish experienced Hg bioaccumulation, i.e., positive Hg-size relationship, and the Hg content of legal-size individuals differed significantly across species. Moreover, intra-specific Hg contamination did not vary annually, but was affected by habitat with offshore fish consistently having lower Hg levels relative to conspecifics from other locations. The results from this study support more effective and efficacious state consumption advisories for marine fish.