ABSTRACTS

55th Annual Meeting of the New York Chapter American Fisheries Society

February 24-26, 2021, Virtual Meeting

"Embracing Diversity: Resilient Fishes and Fisheries"

Plenary Speaker Profiles

Lisa Holst – *Looking for Moore in Fisheries Science*

New York State Department of Environmental Conservation

Lisa Holst has worked for the New York State Department of Environmental Conservation for 29 years doing tidal wetland protection, habitat restoration, and fish and wildlife conservation planning. Most recently she has been heading up the Rare Fish Unit in the Bureau of Fisheries. She holds a degree in Marine Biology, but has finally come to terms with never becoming a renowned clownfish researcher. When she is not researching obscure nuggets of NYS fish history she can be found knitting, especially during Chapter meetings.

Joseph Zydlewski - *The Burden - and Benefits - of Bias in Fisheries*

U.S. Geological Survey – Maine Cooperative Fish and Wildlife Research Unit

Joe holds a B.S. in Chemistry and Biology from Bates College and a Ph.D. in Biology from the University of Massachusetts Amherst, MA. He joined the US Geological Survey, Maine Cooperative Fish and Wildlife Research Unit in 2004 as Assistant Unit Leader, coming from the US Fish and Wildlife Service Columbia River Fisheries Program Office. Joe's work centers on the study of fish behavior and physiology during migrations - often in the context of dams. He is Professor of Fisheries in the Department of Wildlife, Fisheries, and Conservation Biology. In that position he has had the opportunity to work with dozens of talented graduate students over the last 15 years. In doing so, he has been dragged far from his comfort zone, and in multiple directions including agent-based modeling, social network analysis and fish personality studies.

Lisa Kerr – *Population Diversity and its Role in the Resilience and Stability of Fishery Resources*

Gulf of Maine Research Institute

Lisa holds a B.S. in Biology from Tufts University, and M.S. in Marine Science from California State University, Moss Landing Marine Laboratories, and a Ph.D. in Marine, Estuarine and Environmental Sciences from the University of Maryland Center for Environmental Science. She is a fisheries scientist broadly interested in understanding the structure and dynamics of fish populations, with the goal of enhancing our ability to sustainably manage fisheries and ecosystems as a whole. Lisa is particularly motivated to understand the role complex population structure and connectivity play in the productivity and stability of local and regional populations. Core objectives underlying her current work include: 1) understanding the influence of climate, harvest, and management on fishery resources, 2) advancing the study of fish population structure and its implications to sustainable management of fishery resources, and 3) applying management strategy evaluation to develop improved approaches to fisheries stock assessment and management. Lisa is actively involved in advising on regional and international fisheries management.

Oral Presentation – Student

Predator-prey population dynamics modeling for Chinook Salmon and Alewife in Lake Ontario

Kimberly B. Fitzpatrick[1], Brian C. Weidel[2], Michael J. Connerton[3], Jana R. Lantry[3], Jeremy P. Holden[4], Michael J. Yuille[4], Steven R. LaPan[4], Brian Lantry[2], Lars G. Rudstam[1], Patrick J. Sullivan[1], Travis O. Brenden[5], and Suresh A. Sethi[1]

[1]Cornell University; [2]USGS Great Lakes Science Center; [3]New York State Department of Environmental Conservation; [4]Ontario Ministry of Natural Resources; [5]Michigan State University

Abstract

Chinook Salmon are the hallmark Lake Ontario recreational fishery and provide important cultural and economic benefits to New York anglers and surrounding communities. However, the stability of this fishery is closely tied to the availability of the salmon's preferred prey, Alewife. Recent declines in lake-wide Alewife biomass concurrent with increased Chinook Salmon abundance have raised concerns about the continued stability of this key predator-prey relationship. Building upon existing Great Lakes research, we collaborated with lake managers to develop a multispecies statistical catch at age model to examine Chinook Salmon and Alewife dynamics over the past two decades. We then used the model to explore the potential for Alewife recovery within the next five years, under different scenarios of Chinook Salmon stocking and naturalized production. Our simulations suggest that, based on current conditions, the Alewife population may recover as long as naturalized Chinook Salmon production does not substantially increase. Additionally, we found that stocking reductions proposed by managers could substantially increase the probability of Alewife recovery, demonstrating the utility of using multispecies models to help inform management decision making.

Email: kbf53@cornell.edu

Oral Presentation – Student

Combining historic records and habitat suitability analysis to assess the potential for Lake Sturgeon (*Acipenser fulvescens*) reintroduction into tributaries of Lake Erie

Kylie Wirebach[1], Dimitry Gorsky[2], and Christopher Pennuto[1]

SUNY Buffalo State College[1]; U.S. Fish and Wildlife Service[2]

Abstract

The reintroduction of extirpated species is one method by which we can boost species and fishery resilience. The Lake Sturgeon *(Acipenser fulvescens)* was abundant throughout Lake Erie until the mid-1800s, when it was 'destroyed' as a nuisance species. Today, remnant populations exist in the Detroit and Niagara Rivers at each end of Lake Erie. Investigations into whether spawning occurs, or could occur, between these two rivers has been sparse, particularly within tributaries. Reintroduction into suitable tributaries is a priority of fishery managers, and population estimates suggest Lake Sturgeon remain below carrying capacity despite conservation measures. This project combines Lake Sturgeon habitat preferences and geospatial data related to stream characteristics (velocity, temperature, depth, etc.) in a series of habitat suitability analyses on historically-used tributaries. Within the U.S., 22 historically-used tributaries have been identified (13 in Ohio, 3 in Pennsylvania, 3 in New York, 3 in Michigan). Pre-existing, landscape-level datasets such as the National Land Cover Dataset have been compiled and will be used to derive surrogate inputs in place of unmeasured in-stream data, based on reported relationships (e.g., % watershed forest cover for cobble substrate habitat). Resulting suitability maps can guide local reintroduction efforts.

Email: wirebakp01@mail.buffalostate.edu

Oral Presentation – Student

A 100-Year Analysis of Trends in Fish Functional Diversity of Central New York

Megan Hazlett

SUNY ESF

Abstract

Species diversity is the traditional metric used in assessing the diversity of stream fishes, however, functional diversity can add complementary information by linking species traits to the biotic and abiotic environment. Thus, changes in functional diversity can be used to understand how changing landscapes effect the functioning of stream communities. Using a historic 100-year dataset, we assessed metrics of functional richness, evenness, dispersion, and divergence over the past century in the Oswego River Watershed. Seventeen functional traits for 116 species were mapped in reduced ordination space using PCoA. The four functional indices studied quantify the distribution of species in the resulting trait space. Preliminary results suggest that functional richness, dispersion, and evenness increased over time with no changes in functional divergence. This suggests an overall trend towards a more functionally unique stream community over time. While further exploration of these results is in progress, invasive species often bring novel traits to the ecosystems they invade, providing a feasible explanation for the increase in functional trait diversity. This study has broad implications for management decisions because it provides the tools to monitor and protect not only the fish present in the watershed, but the functioning of the stream as well.

Email: mahazlet@syr.edu

Oral Presentation – Student

Habitat Suitability Analysis for the Reintroduction of *Salvelinus fontinalis* in New York State Parks

Susan Cushman and Colby Poerio

Hobart and William Smith Colleges

Abstract

Brook Trout, a native trout species found in eastern North America, represent stability in stream systems. Deforestation, habitat fragmentation, overfishing, and the introduction of invasive species have caused Brook Trout to experience local extinctions. In this study, five streams in the Rochester and Ithaca areas of upstate New York were surveyed to assess their potential habitat suitability for Brook Trout reintroduction in October and November of 2020. Variables measured were broken into five categories: water quality, stream habitat, flow, mesohabitat variation, and macroinvertebrate samples. All samples had temperature ranges suitable for Brook Trout, but high conductivity in the Ithaca streams indicates pollution. Additionally, Taughannock creek in Taughannock State Park is too large of a stream and Enfield Creek in Buttermilk State Park showed low levels of macroinvertebrates. Due to their high levels of flow and mesohabitat variability, we have determined Dry Creek in Filmore Glen State Park and Enfield Creek in Robert H Treman State Park were determined to be able to support Brook Trout throughout the fall season.

Email: colby.poerio@hws.edu

Oral Presentation – Student

Eye lens and otolith chemistry reveals the secret lives of fishes

Hadis Miraly, Karin Limburg, and Roxanne Razavi

State University of New York, College of Environmental Science and Forestry, Syracuse, NY

Abstract

For decades, chemical analysis of calcified structures such as otoliths and scales has been used to the study life history of fishes, from age determination to fish movements. More recently, other "chronometric structures" are increasingly being studied in this way. Among these structures, the eye lens is an interesting candidate for providing chemical information complementary to otoliths. Like otoliths, eye lenses grow throughout the life of a fish; yet unlike the aragonitic otolith, eye lenses are made entirely of protein. Further, eye lenses have been found to take up mercury (Hg), a known environmental contaminant, preferentially. The aim of this study is to compare the chemical composition of eye lenses with corresponding otoliths of Yellow Perch (*Perca flavescens*), Walleye (*Sander vitreus*), and Round Goby (*Neogobius melanostomus*) in Lake Erie to (1) develop a concordance of chronologies between these two structures and (2) elucidate Hg exposure histories. We tested the uptake trend of different elements including Hg and selenium (Se) in eye lenses and manganese (Mn), as a low dissolved oxygen (DO) signature, in otoliths through the fish lifetime. The results of this research will help to clarify the time and severity of both low DO and Hg exposure on fish.

Email: hmiraly@syr.edu

Oral Presentation – Student

New York's only endemic fish(?): An opportunity for co-production between evolution and management

Carl St. John[1], Douglas Carlson[2], Lisa Holst[3], Nina Overgaard Therkildsen[1], and Peter B. McIntyre[1]

[1]Cornell University; [2]SUNY Potsdam; [3]NYSDEC

Abstract

Collaboration between evolutionary biology and conservation and management agencies generates rich datasets and resultantly innovative research. Working on shared goals like species delineation and local adaptation, we can uncover evolutionary mechanisms of speciation and provide practical monitoring methods for fishery biologists. Here, in collaboration with New York State Department of Environmental Conservation (NYSDEC), we investigate species delineation and local adaptation in the Summer Sucker (*Catostomus utawana*), putatively New York's only endemic fish. This species is restricted to headwaters of the Adirondacks and is currently listed as Species of Greatest Conservation Need. In spring 2020, we confirmed two extreme adaptive traits of Summer Suckers: small size at maturity and a late, prolonged spawning period relative to their sister species, White Suckers (*Catostomus commersonii*). We also describe novel spawning behavior associated with weather patterns. We will combine these intensive field efforts with whole genome sequencing methods to determine if 1) the diverged phenotypes we observed translate into reproductive isolation and good species, or 2) these phenotypes resulted from convergent adaptation and represent important pools of genetic diversity but not species. Ultimately, we hope to describe evolutionary mechanisms and provide NYSDEC with practical genomic or phenotypic tools to differentiate Summer and White Suckers.

Email: cas399@cornell.edu

Oral Presentation – Student

Demographic history analysis of Great Lakes Coregonus spp. using whole genome resequencing

Nathan J. C. Backenstose[1], Daniel J. Macguigan[1], Moisés A. Bernal[2], Wendylee Stott[3], Daniel L. Yule[4], and Trevor J. Krabbenhoft[1]

[1]Department of Biological Sciences, University at Buffalo, Buffalo, New York; [2]Department of Biological Sciences, Auburn University, Auburn, Alabama; [3]USGS, Michigan State University CESU, Ann Arbor, Michigan; [4]USGS, Great Lakes Science Center – Lake Superior Biological Station, Ashland, WI

Abstract

The North American ciscoes (*Coregonus* spp.) are a species complex that provides valuable ecological services including important fisheries in the Laurentian Great Lakes. Cisco populations have been shaped by glaciation events and anthropogenic influence, which includes overfishing, pollution, and sea lamprey invasion that collapsed the fisheries by the mid-twentieth century. To better understand the evolutionary and geological origins of the cisco radiation in the Great Lakes, we used demographic modeling to reconstruct the history of effective population size changes in *Coregonus* populations related to environmental changes. A draft *C. artedi* genome was assembled and combined with whole genome resequencing of an additional 18 individuals, representing five forms from the *Coregonus* complex. Demographic analyses revealed consistent timing of rapid expansion of effective population sizes, apparently corresponding to the formation of the Great Lakes following the last glacial maximum. Genomic approaches and demographic modeling are expanding our understanding of the origins of diversity in the Great Lakes coregonine radiation and the impacts anthropogenic factors have subsequently had on loss of diversity. Preserving the diversity within coregonines is critical to support resilient fisheries and ecosystem function in the Great Lakes in the face of ongoing threats such as climate change and invasive species.

Email: njbacken@buffalo.edu

Oral Presentation – Student

Land use as a driver of fish community changes in New York's Oswego River watershed

Kate Henderson, Megan Hazlett, and Joshua Drew

Department of Environmental and Forest Biology, The State University of New York College of Environmental Science and Forestry, Syracuse NY

Abstract

New York State's freshwater fish communities have been impacted by a variety of threats over the century, including land use change. Land cover exerts a powerful influence on aquatic communities at multiple spatial scales, and alterations to systems can persist even after restoration actions are taken. The Oswego River Watershed is an excellent system for studying the long-term impacts of land use change because over a century of fish survey records exist from the New York State Department of Environmental Conservation. The watershed was heavily agricultural in the early 1900s and has experienced both reforestation and urbanization in the subsequent century, two changes which we may expect to have opposite effects on biodiversity. We tested for relationships between land cover and species richness over time and found that while some trends are visible, other factors may also influence changes in diversity. Still, understanding how land use at different spatial scales impacts species richness, particularly sensitive endemic species, can help us to make management decisions about the best ways to balance human needs and ecosystem health.

Email: kahender@syr.edu

Oral Presentation – Student

Niche Partitioning and Mercury Accumulation in Tubenose Goby and Round Goby in the St. Lawrence River

Iman Pakzad, John M. Farrell, and Roxanne Razavi

SUNY ESF

Abstract

Tubenose Goby (*Proterorhinus semilunaris*) have recently increased in abundance in the St. Lawrence River. To assess the potential ecological impact of the growing Tubenose Goby population, this study compared their diet, mercury (Hg) concentrations, and δ15N and δ13C stable isotopes with those of the invasive Round Goby (*Neogobius melanostomus)*. The objective of this study was to evaluate niche overlap between the goby species by comparing the relative importance of common prey items in their diets, and to assess if this influences their trophic level and potential for Hg bioaccumulation. Diet analyses showed that the Tubenose Goby's diet is predominately zooplankton while that of similarly sized Round Gobies was also zooplankton dominated and becomes more diverse as they grow. Tubenose Goby had significantly lower δ15N values than the Round Goby but despite these differences, the two species had similar Hg concentrations and Hg bioaccumulation rates. Based on the current size structure of Tubenose Goby, we do not expect this invasive species to present a different Hg exposure risk to consumers relative to the Round Goby.

Email: ipakzad@esf.edu

Oral Presentation – Student

Fishing Behavior in New York State in the Context of COVID-19 Food System Disruptions

Jeanne Coffin-Schmitt, Kathryn Fiorella, and Zi Wang

Cornell University

Abstract

The COVID-19 pandemic damaged connections within global and local food systems and impacting food security negatively. Self-production or harvest of food, as coping strategies in times of stress, can be used to achieve and support food access, ease food insecurity, and foster resilience within food systems. Fishing, as one specific harvest strategy, can be a sustainable way to access food by utilizing local natural resources. After distributing a cross-sectional online survey across six New York counties, we have received fishing behavior responses from 140 people who indicated their participation in fishing in the year 2019 as compared to their participation since the start of the COVID-19 pandemic. Our research team analyzed patterns of reported fishing, fish consumption, food sharing, and food security and behavior change from those respondents between 2019 and 2020 due to the COVID-19 pandemic. Our research results will be tailored to help community partners in upstate New York better understand COVID-19's impact on fishing behavior by providing helpful data and findings and supporting fishing in the wake of COVID-19 as well as in future crises.

Email: jlc558@cornell.edu

Oral Presentation – Professional

Round Goby in interior New York: current distribution and monitoring strategies

Scott D. George[1], Barry P. Baldigo[1], Christopher Rees[2], Meredith L. Bartron[2], Dylan Winterhalter

[1]U.S. Geological Survey; [2]U.S. Fish and Wildlife Service

Abstract

The Round Goby (*Neogobius melanostomus*) is an invasive benthic fish indigenous to the Ponto-Caspian region of Eurasia which recently colonized the Great Lakes and is invading eastward through New York towards the Hudson River. During 2016-2020, the U.S. Geological Survey, NYS Department of Environmental Conservation, and U.S. Fish and Wildlife Service conducted a collaborative study to (a) document the distribution and rate of expansion of Round Goby through the Mohawk River-Barge Canal system and (b) evaluate the efficacy of environmental DNA (eDNA) and traditional fish sampling methods for monitoring the invasion front. Round Goby were captured as far east as Frankfort, NY by summer 2020, and benthic trawling was the most effective traditional sampling method. Round Goby DNA was detected in water samples during all surveys in which individuals were captured, and the estimated concentration of DNA explained 69% of the variability in trawl catch. At multiple study sites, DNA was identified during consecutive surveys before Round Goby were first captured. This suggests that eDNA has the potential to forecast the arrival of Round Goby to new locations but results also underscore the importance of using eDNA in a repeated sampling framework and supplementing with traditional sampling methods.

Email: sgeorge@usgs.gov

Oral Presentation – Professional

Incorporation of non-native species in the diets of cisco (*Coregonus artedi*) from eastern Lake Ontario

Alexander J Gatch[1], Brian Weidel[2], Dimitry Gorsky[1], Brian P. O'Malley[2], Michael J. Connerton[3], Jeremy P. Holden[4], Kristen T. Holeck[5], Jessica A. Goretzke[3], Curt Karboski[1]

[1]USFWS; [2]USGS; [3]NYSDEC; [4]OMNRF; [5]Cornell University

Abstract

Cisco *Coregonus artedi* was once an important forage fish in Lake Ontario, however, in the 1950s, the cisco stock collapsed and has yet to recover to historic abundances. Recent interest in restoring cisco in Lake Ontario has underlined the lack of information known about cisco since drastic lower trophic level changes have occurred. Specifically, we wanted to document contemporary cisco diets in Lake Ontario following the introduction of non-native zooplankton species including *Bythotrephes longimanus* and *Cercopagis pengoi*. We collected 177 cisco in eastern Lake Ontario from 2016-2020 to analyze diet composition. Cisco diets indicated that Lake Ontario cisco are generally planktivores and non-native zooplankton dominate diet composition during July and September. Cisco smaller than 300 mm had a diverse diet including both native and non-native zooplankton while cisco larger than 300 mm fed almost exclusively on *Bythotrephes longimanus* and *Cercopagis pengoi* (98.9% consumed biomass). Fish eggs were found in 75% of the cisco collected in December suggesting that eggs may subsidize cisco when zooplankton abundances are low. Piscivory was observed but comprised < 1% of diets. Cisco are a potentially important bioindicator species in Lake Ontario and their diets may be used to identify changes in the zooplankton community.

Email: alexander_gatch@fws.gov

Oral Presentation – Professional

The parasites of Oneida Lake fishes: then and now

Florian Reyda[1], Stephen Curran[2], Tom Brooking[3], Isaiah Crosbourne[1] and Emma Nielsen[1]

[1]SUNY Oneonta; [2]Auburn University; [3]Cornell University

Abstract

Pioneering North American parasitologists Van Cleave and Mueller published several papers in which they reported on the fish parasites they encountered following an extensive (1929-1931) survey of Oneida Lake. Their foundational work included descriptions of 24 new species of parasitic worms (trematodes, cestodes, monogeneans and nematodes) in 34 species of fish examined. Since then, Oneida Lake has experienced a variety of changes, including loss of some fisheries, and addition—via exotic introductions—of others. Our current work aims to compare the species composition of the fish parasites of Oneida Lake today with what was reported almost a century ago. To date, we collected and examined >300 fish specimens representing 25 species for parasitic worms. We have encountered a diversity of parasitic worms in many of the fish we examined, including several for which Oneida Lake is the type locality. We have, however, yet to encounter multiple species of trematodes discovered in the lake, in spite of having examined the same species of fish from which they were originally reported. The results of our study, though preliminary, support our hypothesis that that the diversity of species of parasitic worms in Oneida Lake has decreased.

Email: florian.reyda@oneonta.edu

Oral Presentation – Professional

Common carp may negatively affect water quality and sportfish in New York City waters

Toniann Keiling, Melissa Cohen, and Jeffrey Loukmas

New York State Department of Environmental Conservation

Abstract

Nonnative common carp may negatively impact water quality and native sportfish populations in invaded lakes, and most New York City (NYC) waters have common carp populations. It has been hypothesized that as common carp abundances in NYC lakes increase, turbidity and harmful algal blooms (HABs) would increase, and bluegill sunfish and largemouth bass populations would decrease. To investigate this, we reviewed data collected during 13 boat electrofishing surveys conducted in NYC waters between 2010-2019. Water quality and catch rate metrics were ranked and Spearman correlations were used to assess relationships between carp observations and Secchi depth, HAB frequency, bluegill catch rate, and largemouth bass catch rate. The hypothesis was supported and indicated significant negative relationships between carp observations and Secchi depth, bluegill catch rate, and largemouth bass catch rate ($p \leq 0.04$ for all metrics). Frequency of HABs was the only metric not significantly correlated with common carp observations ($p=0.64$). Used in combination with NYC angler habits and preferences, findings can help guide New York State Department of Environmental Conservation fisheries managers to better improve both water quality standards and sportfish angling opportunities in NYC waters.

Email: toniann.keiling@dec.ny.gov

Oral Presentation – Professional

Rapid response of the nearshore round goby population to temperature declines associated with upwelling events in Lake Ontario.

Christopher Pennuto

SUNY Buffalo State College

Abstract

Temperature plays an integral role both as an immediate trigger for metabolic performance and as a proximal cue directing the behavior of freshwater fishes. Recent work has linked seasonal offshore/inshore migratory behavior of Round Goby in Lake Ontario to changes in water temperature. Rapid temperature change can occur throughout the nearshore environments with upwelling events induced by sustained directional winds. We witnessed changes in Round Goby population density and observable fish size during two upwelling events in Lake Ontario nearshore in summer 2019. On both dates, population density declined to near zero and the fish observed were smaller than those from the preceding and subsequent sample dates. Fish density returned to pre-upwelling levels when temperatures returned following these events, though we don't know if the fish were the same or different individuals. These observations indicate the abundance and size distribution, and thus the local impacts, of the fish community can change rapidly in the nearshore as a result of upwelling events. Future work will seek to decipher where the fish went and what mechanisms they use to return to the nearshore.

Email: pennutcm@buffalostate.edu

Oral Presentation – Professional

Pedigree accumulation analysis: combining methods from community ecology and population genetics for breeding adult estimation

Rob D. Hunter[1], Ed F. Roseman[2], Dan B. Hayes[3], Robin L. DeBruyne[2], Kim T. Scribner[3], and Nicholas Sard[4]

[1]Department of Environmental Sciences, University of Toledo; [2]USGS Great Lakes Science Center; [3]Department of Fisheries and Wildlife, Michigan State University; [4]Department of Biological Sciences, SUNY Oswego

Abstract

The number of successfully breeding adults (NS) is an indicator of expected levels of recruitment but estimating NS can be difficult due to habitat inaccessibility and low adult abundance. Alternatively, sampling offspring produced during specific breeding seasons may provide large, comprehensive samples. Therefore, we evaluated a novel application of non-parametric species richness estimators and data associated with reconstructed pedigrees using samples of offspring to estimate NS. Accuracy, precision, and bias in the Chao and first-order Jackknife NS estimates were evaluated using simulations of breeding adults (NS range: 25-100) and the number of offspring sampled (Noff_s range: 25-100). The Chao method was unbiased across all NS and Noff_s sample sizes but estimates were imprecise when Noff_s was small relative to NS. Jackknife estimates were precise across all sample sizes but biased low when Noff_s was low relative to NS. We also evaluated the effect of skewed sex ratios, variance in reproductive success, and genotyping errors on NS estimates. Finally, we evaluated estimates from empirical datasets in light of simulation results. Results indicate that accurate estimates of NS can be obtained when Noff_s was sufficiently large and thus may provide a novel method to assess recruitment where adult collections are limited.

Email: nicholas.sard@oswego.edu

Oral Presentation – Professional

Studies of "Aristotle's Mud" - Glass Eels on Long Island

Carol Hoffman, Caitlin Craig, Justin Pellegrino, Andrew Sinchuk, and Megan Barrow

NYS DEC

Abstract

American eel (*Anguilla rostrata*) are a catadromous fish species. The latest Atlantic States Marine Fisheries Commission's (ASMFC) stock assessment indicated the American eel population is depleted in U.S. waters, and information is limited regarding eel abundance and biological characteristics. Beginning in 2000, the New York State Department of Environmental Conservation (NYS DEC) initiated an annual survey to investigate glass eel abundance and recruitment on the Carmans River. Data from the survey is used in ASMFC stock assessments to determine annual recruitment and Young-of-the-Year trends in abundance. Since 2002, a total of 12,208 glass eels have been collected for length, weight, and pigmentation stage measurements. Approximately 95% of these have ranged from 52 to 66 mm total length. The 2020 geometric mean glass eel index of abundance (catch/hr. fished) was 1.07, similar to the index in 2019.

Email: carol.hoffman@dec.ny.gov

Oral Presentation – Professional

Comparing the impacts of tournament and recreational fishing on Smallmouth Bass in Lake Erie

Pascal Wilkins, Jason Robinson, and James Markham

New York State Department of Environmental Conservation

Abstract

Recent declines in Smallmouth Bass (*Micropterus dolomieu*) population status and angler catch rates in the New York waters of Lake Erie have raised concerns regarding potential sources of angler induced mortality. We quantified the extent of tournament fishing on the Smallmouth Bass Population in the New York waters of Lake Erie to determine if current levels of tournament fishing play a significant role in smallmouth bass survival when compared with recreational fishing methods. Using three years of collated smallmouth bass tournament results for the New York waters of Lake Erie we estimated mortality from tournament fishing using a range of published tournament-associated mortality rates. We documented 47 tournaments from 2018-2020, all based out of Buffalo. Tournament fishing accounted for 9.4% of total bass fishing effort and 8.2% of the total bass catch out of Buffalo, but only 5.8% of total New York effort. Total estimated mortality of smallmouth due to tournament fishing was nine times lower than the total estimated fishing harvest in Buffalo during the study. Based on these findings, we conclude that the lethal effects of bass tournament fishing (at the current levels) play a smaller role in smallmouth bass survival than recreational harvest practices.

Email: pascal.wilkins@dec.ny.gov

Oral Presentation – Professional

Bridging equity gaps in remote fisheries education with an intentionally simple tool

Dan Stich

SUNY Oneonta

Abstract

Pre-existing social and environmental inequities have been amplified during the COVID-19 pandemic and have resulted in the need to further refine planning and execution of critical tasks. Among these, much of higher education has shifted temporarily to a remote (online) model of delivery. The shift to remote learning has disproportionally affected underserved and underrepresented populations of learners due to pre-existing inequities such as economic circumstances, geographic location, and access to reliable technology resources. Lack of hands-on experiences in fisheries has been particularly challenging. At liberal arts institutions, electives such as ichthyology may be the only first-person exposure to the natural sciences for many students. Conveying complex topics such as impacts of climate change, fisheries, and dam passage on anadromous fish populations is more difficult when students attend remotely with unequal access to computer software, power, or internet. I instituted a simulation study with remote students using a few household items to promote critical thinking about these problems while attempting to maintain an equitable learning environment. In this presentation, I will discuss context, intentionality, and the results of student simulations.

Email: daniel.stich@oneonta.edu

Oral Presentation – Professional

Can a herring make a livin' on the Erie Canal? It depends

Dan Stich[1], Wes Eakin[2], and Gregg Kenney[3]

[1]SUNY Oneonta; [2]Cornell University, New York State Department of Environmental Conservation; [3]New York State Department of Environmental Conservation

Abstract

We used life history simulation models to understand potential influences of historic habitat loss and novel habitat creation on American shad and blueback herring populations in the Hudson River watershed. Access to historical habitat in the upper Hudson River increased population abundance with sufficiently high upstream passage and downstream survival of adult and juvenile American shad through dams, but abundance was reduced relative to the "no passage" scenario at all but the highest downstream survival rates. Threshold passage efficiencies in the upper Hudson River required to maintain or increase abundance of blueback herring were lower than those for American shad owing to differences in life histories. Access to novel habitat in the Mohawk River increased abundance of blueback herring when upstream survival through locks and downstream passage efficiencies were sufficiently high. However, mortality during upstream and downstream passage of locks in the Mohawk River has the potential to reduce blueback herring abundance below the "no passage" scenario. Therefore, assessment of mortality during both upstream and downstream passage of locks is needed to assess whether the Mohawk River currently serves to increase or decrease population abundance of blueback herring in the Hudson River watershed.

Email: daniel.stich@oneonta.edu

Oral Presentation – Professional

Rehabilitating native Lake Ontario Coregonine fishes: Tunison et al.

James McKenna[1], James Johnson[1], Steven Lapan[2], Marc Chalupnicki[1], Gregg Mackey[1], Mike Millard[3], Kevin Loftus[4], Michael Connerton[2], Christopher Legard[2], and Brian Weidel[5]

[1]USGS Great Lakes Science Center, Tunison Laboratory of Aquatic Science; [2]New York State Department of Environmental Conservation, Lake Ontario Unit; [3]US Fish and Wildlife Service, Northeast Fisheries Center; [4]Ontario Ministry of Natural Resources and Forestry, White Lake Fish Culture Station; [5]USGS Great Lakes Science Center, Lake Ontario Biological Station

Abstract

Restoration of native coregonines to Lake Ontario will improve forage for salmonid predators and ecological function in the lake, but efficacy of experimental releases for native species restoration must be evaluated. The Coregonine Research Program at the USGS Tunison Laboratory of Aquatic Science (TLAS) encompasses a diverse array of research, with an emphasis on improved culture methods and field assessments of juvenile coregonines released experimentally. This research is carried out to support Fish Community Objectives of the Lake Ontario Committee, is funded by the Great Lakes Restoration Initiative, and is done in collaboration with other laboratories and agencies, particularly, the US Fish and Wildlife Service; New York Department of Environmental Conservation; Ontario Ministry of Natural Resources and Forestry; and other USGS laboratories. TLAS and partners have developed new and innovative hatchery techniques to raise Cisco and Bloater to life stages suitable for survival in Lake Ontario; assessed adult Bloater survival in Lake Ontario; and evaluated survival, return rate, and reproduction of adult Cisco in historic spawning locations in Lake Ontario embayments. Successes, challenges, and research needs are discussed.

Email: jemckenna@usgs.gov

Oral Presentation – Professional

Why diversity & inclusion matters?

Lindsay Agness

Trout Unlimited

Abstract

Trout Unlimited is grounded in conserving, protecting & restoring North America's cold water fishers and their watersheds. But today more than ever Trout Unlimited is supporting equal opportunities for fly-fishing, conservation and education with their leadership and members. Lindsay will speak frankly about TU's Diversity Initiate, why diversity matters, and what's happening in the local communities and thru social media to make the world a more diverse place. Lindsay has been actively involved in this mission with leading women's fly fishing seminars, teaching women recovering from breast cancer to fly fish and helping our wounded veterans to get outdoors and enjoy the sport of fly fishing. Please take the time to listen, learn and grow with Lindsay!

Email: lindsay.agness@rochester.rr.com

Poster Presentation – Student

Effects of in-stream boulder placement on flow complexity and aquatic habitat quality

Amir Golpira and Abul B.M. Baki

Civil and Environmental Engineering Department, Clarkson University

Abstract

The placement of in-stream structures into lotic environments to alter local flow hydrodynamics and to provide cover and habitat for fish and other aquatic organisms has a long history. Boulder placement within streams and rivers for restoration enhances the aquatic habitat of fish and other organisms by creating flow complexity. Here, the effects of two staggered boulder arrangements with varying areal density on flow complexity were investigated. Flow complexity was quantified by habitat metrics M2 and M4, indicating spatial variation in kinetic energy and flow recirculation on the horizontal plane, respectively. Experiments were carried out in a 13-m long gravel-bed flume under a constant flow rate. Possible influences of the habitat quality metrics on fish species were discussed to evaluate the boulder arrangement with the superior ecological performance. The results can be beneficial for habitat restoration projects that use the boulder placement technique.

Email: golpira@clarkson.edu

Poster Presentation – Student

Does a high lipid diet cause thiamine deficiency in lake trout?

Aaron Heisey[1], Donald Tillitt[2], Brian Lantry[3], and Jacques Rinchard[1]

[1]SUNY Brockport; [2]USGS-Columbia Environmental Research Center; [3]USGS-Lake Ontario Biological Station

Abstract

Thiamine (vitamin B1) is an essential molecule for cellular metabolic function, mediating enzymatic reactions and oxidative stress antioxidant. In salmonine species, thiamine deficiency complex (TDC) results from an inability to retain enough thiamine for reproduction, leading to a recruitment bottleneck. In the Great Lakes, TDC in lake trout is linked to the consumption of alewife, which has twice the lipid content when compared to other prey species. Highly unsaturated fatty acids (e.g., ecosapentaenoic acid and docosahexaenoic acid) are susceptible to oxidative stress due to molecular structure, imposing an additional demand for thiamine as an antioxidant. In this study, juvenile lake trout were fed six diets, with three lipid levels (10%, 20%, 30%) and presence or absence of thiamine (0% vs 1%) over a six-week period, with an additional two-week positive control period to determine the role of thiamine under oxidative stress conditions. Overall, higher lipid treatments resulted in more growth and fatty acid signatures showed differences among lipid treatments. However, there was no significant effect of lipid level on overall thiamine concentration. We will use biomarkers of oxidative stress to further elucidate the role of a high lipid diet on thiamine deficiency.

Email: aheis1@brockport.edu

Poster Presentation – Student

Insight of the deepwater sculpin reproduction in Lake Ontario

Jarrod Ludwig[1], Brian Weidel[2], Brian O'Malley[2], Michael Connerton[3], and Jacques Rinchard[1]

[1]SUNY Brockport; [2]USGS-Lake Ontario Biological Station; [3]NYS DEC Lake Ontario Research Unit

Abstract

Little information is known about the reproduction of the deepwater sculpin (*Myoxocephalus thompsonii*), a species considered extirpated from Lake Ontario until the late 1990s and that made a resurgence since then. In this study, we examined their gonadal development, fecundity, and oocyte development during two consecutive falls (2018 and 2019). Our preliminary data indicated that gonadosomatic index reached 1.3 ± 0.7 and 7.9 ± 6.2% in males and females, respectively, with females at different stage of maturity. The data confirmed that this species is a multiple spawner. Absolute fecundity measured as the number of the largest oocytes present in the ovary averaged 723 ± 196 and 840 ± 268 eggs in 2018 (n = 30) and 2019 (n = 22), respectively. Relative batch fecundity ranged from 9 to 27 eggs/g of fish. The diameter of the largest oocytes averaged 1.84 ± 0.06 mm. These data bring new insight to the reproduction of deepwater sculpin in Lake Ontario.

Email: jludw3@brockport.edu

Poster Presentation – Student

Fish host for Yellow Lampmussel (*Lampsilis cariosa*) in Schoharie Creek, New York

Connor McDonnell and Andrew Gascho Landis

SUNY Cobleskill

Abstract

Freshwater mussel larvae (glochidia) are obligate parasites on fish hosts, often requiring a specific species or group of fish. Understanding these unique relationships is essential for implementing conservation action. Yellow lampmussel *(Lampsillis cariosa)* is a Species of Greatest Conservation Need in New York State and little is known about the life history of this species. The goal of this study was to determine host fish preference for yellow lampmussel from the Schoharie drainage. We tested six individuals from 10 co-occuring fish species representing four different families. All 60 fish were inoculated with glochidia from five female yellow lampmussel. All glochidia had a viability >90%. Fish were checked every other day for either dead glochidia or live juvenile mussels. Pumpkinseed and largemouth bass were the only two fish species that successfully produced juveniles, both releasing juveniles between three and four weeks after inoculation. On average, each largemouth bass produced 21 juvenile mussels compared to pumpkinseed which produced <1 juvenile over the duration of the 41 day experiment. Largemouth bass are likely the primary host for yellow lampmussel . If conservation efforts in the future require propagating yellow lampmussel, largemouth bass will be the best host fish for this purpose.

Email: mcdonnc926@cobleskill.edu

Poster Presentation – Student

Evaluation of the Rosgen Salmonid Index in Ashokan watershed streams

Brenden Bixby and Andrew Gascho Landis

Fisheries, Wildlife, & Environmental Science Department, State University of New York at Cobleskill

Abstract

Stream restoration is ongoing in Catskill mountain streams because of their value as drinking water to New York City. Many restoration projects focused on stabilizing streams to buffer against flood events and decrease erosion and less emphasis has been placed on improving habitat. Dave Rosgen in an effort to elevate the importance of restoring habitat created a Salmonid Index to measure and score stream geomorphology and physical features to predict trout habitat quality across five life cycle requirements (or sub-indices). Our goal was to evaluate the Rosgen Salmonid Index (RSI) for use in predicting trout habitat in Catskill streams. Five stream reaches were selected for sampling, two degraded sites, two reference sites, and a restored site. We measured longitudinal profiles, cross sections, sampled invertebrates, conducted pebble counts, and estimated physical habitat variables. We found that the two reference sites scored highest in the overall index, while the restored site scored lowest. There was no correlation between the invertebrates abundance and the invertebrate habitat quality sub-index score, but there was a significant relationship with entrenchment ratio. Overall, the RSI shows potential for predicting quality trout habitat and providing guidelines for features to include that optimize habitat in restoration designs.

Email: bixbyb154@cobleskill.edu

Poster Presentation – Student

Stable isotopes and morphometric variation: describing yellow perch (*Perca flavescens*) use of Lake Ontario and two barrier protected coastal wetlands

Kylee Wilson and Matthew Altenritter

SUNY Brockport

Abstract

Yellow perch (*Perca flavescens*) are known to move between both open Great Lakes and coastal wetland habitats during their lifetime. However, uncertainty remains in quantifying variability in the duration of habitat use within these habitats and whether such variation manifests as morphometric differences among individuals. To explore these uncertainties, we measured isotopes of carbon and nitrogen in muscle tissue and compared 13 length-standardized morphometric measurements from yellow perch caught in Lake Ontario, or two coastal wetlands in the Braddock Bay Wildlife Management Area. Our preliminary findings indicate that fish from Lake Ontario are enriched in carbon and nitrogen tissue isotopes relative to fish caught in coastal wetlands. Morphometrically, Lake Ontario-caught fish differed from wetland-caught fish based on head length, pelvic fin length, and to a lesser degree pelvic-anal distance, body depth, and caudal peduncle length. These metrics will be used as baselines for comparison to putatively migratory yellow perch entering coastal wetlands in spring 2021 to elucidate duration of residence using stable isotopes and potential adaptations to a migratory life history based on body morphometrics.

Email: kwils11@brockport.edu

Poster Presentation – Student

Telemetry and mark-recapture data characterize juvenile lake sturgeon (*Acipenser fulvescens*) in the lower Genesee River of Lake Ontario, NY

Kyle Morton[1], Dimitry Gorsky[2], Dawn Dittman[3], and Matthew Altenritter[1]

[1]SUNY Brockport; [2]USFWS; [3]USGS

Abstract

Juvenile lake sturgeon (*Acipenser fulvescens*) use of open Great Lakes habitats represents a knowledge gap that has important implications for assessments of habitat use and survival. Recent observations indicate that juveniles in Lake Ontario undertake movements greater than 100 km as they move among tributaries. However, the rate and timing of emigration remains unknown. The goal of this project is to characterize juvenile lake sturgeon movements within and between the Lower Genesee River and Lake Ontario in New York State using acoustic telemetry to inform rates of emigration needed to estimate survival. Additionally, we will explore how movements of tagged fish correspond with environmental variables like temperature, dissolved oxygen concentrations, and discharge. Seventy stocked yearling sturgeon and thirty sub-adult sturgeon were tagged and released in the Genesee River between 2019 and 2020 with VEMCO acoustic transmitters. Preliminary data indicate that both thermal stratification and hypoxia were present in the Genesee River during summer of 2020 and that a subset of tagged juvenile lake sturgeon were detected outside of the Genesee River in Lake Ontario. As monitoring continues, we will look to estimate rates of emigration for both yearling and subadult lake sturgeon to enhance mark-recapture based estimates of survival.

Email: kmort1@brockport.edu

Poster Presentation – Student

Hatch Lake and Bradley Brook Reservoir (Madison County, NY) fish communities in response to stocking efforts

Meghan M. Marsh and Thad E. Yorks

Cazenovia College

Abstract

Hatch Lake is a 54-ha kettle lake which feeds 55-ha Bradley Brook Reservoir. These lakes are regularly stocked with walleye and occasionally stocked with northern pike. Fish community data were collected using trap-nets in 2016 and 2020. Several species maintained mean relative weights >90 in each lake. In Hatch Lake, these included black crappie, pumpkinseed, largemouth bass, and northern pike. In Bradley Brook Reservoir, these included smallmouth bass, bluegill, chain pickerel, largemouth bass, and northern pike. The most abundant species in Hatch Lake in 2016 were brown bullhead (28%) and bluegill (23%). In 2016, Bradley Brook Reservoir had the most abundant populations of bluegill (31%) and largemouth bass (25%). Hatch Lake's most abundant species in 2020 were bluegill (24%) and black crappie (16%), with brown bullhead decreasing to 3% and largemouth increasing from 1% to 9%. Bradley Brook Reservoir's most abundant species in 2020 included bluegill (54%) and rock bass (17%). Largemouth bass decreased in abundance, and rock bass remained consistent. The appearance of large walleye and northern pike in both lakes indicates some level of success from past stocking efforts.

Email: mcmarsh@cazenovia.edu

Poster Presentation – Professional

Three macroinvertebrate families dominate the benthos of the Upper St. Lawrence River

John Cooper

Cooper Environmental Research

Abstract

Few habitats undergo as much seasonal change as do the shallow aquatic areas at northern latitudes: from an ice-covered surface and sediments that are devoid of living vegetation in winter to open water and profuse vegetation by mid-summer. These changes can support differing life history strategies that, in total, produce a complex and dynamic community. These features are characteristic of the embayments of the upper St. Lawrence River that differ from the less physically complex structure in deep water that have fewer families of macroinvertebrates. Three macroinvertebrate families, Dreissenidae, Gammaridae, and Chironomidae, accounted for 74% of organisms collected from 1995–1997. Other abundant families were Naididae, Asellidae, and Hydrobiidae. A diverse community of 45 families was collected at water depth of less than 4 m: including 10 caddisfly families, 9 gastropod families, and 3 ologochaete families . Two invasive species were collected (excluding Dreissenidae): *Bithynia tentaculata* and *Potamopyrgus antipodarum*. Unionid mussels were few in number due to colonization by Dreissenidae and no living unionid mussels were collected after 1996.

Email: cooperesearch@twc.com

Poster Presentation – Professional

Mooneye, a challenging species for conservation planning

Doug Carlson and Glenn Johnson

SUNY Potsdam, Biology Department

Abstract

Mooneye (*Hiodon tergisus*) are among the 18 Threatened or Endangered species listed by NYSDEC and are considered a priority species for inventory and recovery. Declines have been severe in three of their six watersheds, Lakes Erie and Champlain and in the Allegheny River; there are only 11 records since 1990. In two of the watersheds, the Oswegatchie and St. Lawrence, there has been range expansion but still with only 35 records since 1990. Most of those records come from the Oswegatchie watershed and that population is confined by dams or falls to a 40 km reach. An overview of this species' status in New York suggests it is declining in over half its range, but it is also sustained or improving in one third of its range. In an effort to develop a better understanding of their population dynamics and habitat preferences where they are relatively abundant and secure, a detailed investigation of their life history and spawning behavior is planned for the Oswegatchie River over the period 2021-23. Findings from this study and from the updating of inventories will better inform conservation and recovery efforts across New York State.

Email: carlsodm@potsdam.edu

Poster Presentation – Professional

Lake Sturgeon movement tracking in the Seneca River, New York

Dawn Dittman, Marc Chalupnicki, and Jeremy Kraus

USGS Great Lakes Science Center - Tunison Laboratory of Aquatic Science Cortland

Abstract

Detailed migration and habitat use information is critical for adaptive management of threatened native Lake Sturgeon (*Acipenser fulvescens*). The goal of this study is to determine patterns of migration between spawning habitat and overwintering habitat in the Seneca River, NY. In 2019, we initiated a telemetry study, tagging ten adults with acoustic tags (five fish in spring at Cayuga Lake outlet and five fish in fall in Cross Lake). Receivers in the Cayuga Lake outlet, at Port Byron, and in Cross Lake, data was recorded through December 2020. Movements were tracked for nine out of the ten fish. Three fish stayed near the tagging sites. The general trend for the other six fish was to stay near Cayuga Lake outlet (spawning habitat) into fall 2019, spend the winter and spring in Cross Lake (2020), and return to the outlet for the summer and fall. Movement timing of these adult fish between the known spawning and overwintering habitat was variable. This research helps identify critical habitat and timing of use by this threatened species. However, additional observations are needed to clarify seasonal habitat use by Lake Sturgeon in the Seneca River.

Email: ddittman@usgs.gov

Poster Presentation – Professional

Threatened and endangered fishes of New York

Doug Carlson

SUNY Potsdam

Abstract

The losses of fish species in New York are as severe as in other parts of this country, and there are programs to protect and restore them. These state programs begin with classifying the species as Threatened and Endangered, and the species are placed on lists that are updated. Since 1983 when NYSDEC started this program, there have been two updates of reclassifications, and the second one will likely be completed in 2021. The previous list of fish contained 19 species and the new list (recommended in 2019) has the 17 species, described and illustrated in this poster. Species with these designations of Threatened and Endangered are also eligible for special funding and are sometimes the focus of active recovery efforts. Your participation in conservation efforts starts with reporting new records to NYSDEC and they also include bringing attention to causes for their declines.

Email: carlsodm@potsdam.edu

Poster Presentation – Professional

The resilient Striped Bass

Andrew Sinchuk, Justin Pellegrino, Caitlin Craig, and Carol Hoffman

New York State Department of Environmental Conservation

Abstract

The striped bass (*Marone saxatilis*) is an anadromous species whose range extends from the Saint Lawrence River in Canada to the Saint Johns River in Florida, and in the Gulf of Mexico extending to Louisiana. For decades striped bass has supported commercial and recreational fishing industries in New York and along the Atlantic coast. Throughout its history the striped bass population has gone through periods of depletion and abundance. This poster will provide a brief history of the management of striped bass in New York, recovery efforts and successes, the current stock status, and the challenges it presently faces and those it may face in the future.

Email: Justin.pellegrino@dec.ny.gov