-ABSTRACTS-

52nd ANNUAL MEETING OF THE NEW YORK CHAPTER AMERICAN FISHERIES SOCIETY

07 – 09 February 2018

Otesaga Resort Hotel

Cooperstown, NY

PLENARY PRESENTATIONS

PLENARY SESSION (Ballroom 08, February 2018)

Who's driving this ship? Alewife and the changing Lake Ontario food web

Brian Weidel[1*], Michael Connerton[2], Jeremy Holden[3]

[1]US Geological Survey, Great Lakes Science Center, Oswego NY; [2]New York State Department of Environmental Conservation, Lake Ontario Unit, Cape Vincent NY; [3]Ontario Ministry of Natural Resources and Forestry, Lake Ontario Assessment Unit, Picton ON

Alewife, the most abundant fish in Lake Ontario, drive food web dynamics but their population responds to changes in lake productivity, species composition and physical habitat (water clarity, temperature). Understanding those dynamics and effects is critical for Lake Ontario management and large lake ecology. Alewife support the dominant salmonid sport fishes, therefore balancing stocked and wild-reproduced predators with available prey is a management interest. In contrast, as an introduced species, Alewife hamper native fish population recovery. We describe how our conceptual understanding of Lake Ontario Alewife has changed recently and hope our experiences will help the audience identify similar elements in their research. Critique and subsequent changes have improved inference from bottom trawl surveys. Cross-lake comparisons and alternative analyses have illustrated accuracy bias in biomass estimates from bottom trawl and acoustic surveys. Similarly, physical lake changes have altered Alewife habitat use and may help native species recovery. Time series suggest Lake Ontario prey fish biomass (>80% Alewife) have closely tracked nutrient concentration over the past 40 years while recent growth changes seem to be influenced by zooplankton community composition. We discuss how future nutrient load changes may impact Alewife and ramifications of lower productivity on fisheries in Lake Ontario and other systems.

PLENARY PRESENTATIONS

River herring population dynamics in coastal ecosystems: movement from one black box to the other

Adrian Jordaan

Department of Environmental Conservation, University of Massachusetts, Amherst, MA

PLENARY PRESENTATIONS

Toward reconciling energy production and diadromous fish migrations on Atlantic rivers.

John Waldman

Queens College, City University of New York (CUNY), Queens, NY

Diadromous fish once migrated in Atlantic rivers so abundantly that they were said to make the waters "run silver." Today, the extent of these runs are diminished as much as five orders of magnitude, largely because of hydro-dams, but the public remains only vaguely aware of these losses—constituting a prime example of the "shifting baselines syndrome." Part of the overall failure of restoration is the existence of fishways that appear to be a solution to allowing fish to reach spawning grounds upstream of hydro-dams, but are at best only halfway measures. The one truly effective restorative approach is dam removal; however, hydro-dams also provide societally important electricity. A potential novel way forward would be to remove hydro-dams and to replace the electricity forgone with either on- or near-site alternative energy sources, derived from some combination of solar, wind, and hydrokinetic facilities. Initial real-world climate analyses suggest that the power from two small hydro-dams in New England with 1.8 MW total nameplate capacity could be replaced by ~two acres of photovoltaics. On a broader scale, all of the hydro-dams in the U.S. could be replaced with solar arrays equal to the geographic area of Delaware. If all hydro-dams in the U.S. were removed and 50% of emergent land was used for solar arrays, 1,078,785 GWh/yr could be generated, which is almost 4X current hydropower generation.

PLENARY PRESENTATIONS

Historic high Lake Ontario-St. Lawrence River levels: maximizing outflows in a record year

Tony David

U.S. Member, International Lake Ontario-St. Lawrence River Board, and Water Resources Program, Environment Division, Saint Regis Mohawk Tribe

Water levels on Lake Ontario in 2017 stand alone as the most extreme event since modern record keeping began. Communities were impacted across the entire basin. These levels primarily stemmed from two factors: record-breaking rainfall across the entire Lake Ontario – St. Lawrence River system, and related record-setting spring runoff event in the Ottawa River basin. Prior to this event, in January of 2017 the International Joint Commission implemented Plan 2014—a modernized water regulation plan for the Lake Ontario-St. Lawrence system based on more than 16 years of intense study. Plan 2014 operational limits under extreme events are nearly identical to the previous plan (called Plan 1958-D with Deviations); thus illustrating the limited role of water regulation—in a system where inflows are unregulated—in preventing the occurrence of extreme water levels. The demonstrable history of extreme water levels, both highs and lows, emphasizes the importance of planning for coastal resiliency. The coincidental occurrence of record-setting high water levels and the implementation of a new water regulation plan presented a unique set of communication hurdles. This presentation will summarize Plan 2014 operations during the high water event, the extraordinary basin-wide factors that led to this event and what can be expected in 2018.

Email: tony.david@smrt-nsn.gov

ORAL PRESENTATIONS

Trophic changes in Otsego Lake, NY Following introduction, expansion, and collapse of invasive Alewife (Ballroom, 08 February 2018)

Otsego Lake 30 years post-Alewife *Alosa pseudoharengus* introduction: a recent history of a managed food web

Holly Waterfield

SUNY Oneonta Biological Field Station, Cooperstown, NY 13226

Alewife were introduced to Otsego Lake, New York in 1986 and were the dominant forage fish by 1991. Their predation on crustacean zooplankton had cascading trophic effects that resulted in a change in the character of the lake. Within five years of the Alewife population irruption, shifts in zooplankton community composition led to decreased clarity and increased algal growth, increased Lake Trout (*Salvenlinus namaycush*) abundance, and hypolimnetic oxygen stress. Walleye (*Sander vitreus*) stocking began in 2000 in an attempt to control Alewife abundance; in 2008 record low abundance of spawning Alewife signaled a turning point, after which abundance declined rapidly, with the last live Alewife collected in 2011. Immediately following the Alewife crash, Lake Trout fitness declined and foraging behavior changed as lake-wide prey abundance was low. Since 2015, historically abundant coldwater species, including Lake Whitefish (*Coregonus clupeaformis*) and Rainbow Smelt (*Osmerus mordax*), have increased in abundance, Lake Trout fitness has increased, natural Walleye recruitment has been successful, and the zooplankton community resembles that of the mid-1980s.

Email: holly.waterfield@oneonta.edu

ORAL PRESENTATIONS

Changes in trophic conditions in Otsego Lake, NY as influenced by changes in the plankton community, as influenced by changes in the fishery…

Matthew Albright

SUNY Oneonta Biological Field Station, Cooperstown, NY 13226

The zooplankton community of Otsego Lake, NY has changed profoundly over the last three decades, initially following the establishment of the alewife (*Alosa pseudoharengus;* an efficient planktivore), again during the decline and extirpation of the alewife, and more recently during the establishment of the zebra mussel (*Dreissna polymorpha*). Characteristics of these communities (including taxonomic composition, density, mean length, and dry weight) over time will be compared to concurrent limnological characteristics (including Secchi transparency, chlorophyll *a*, total phosphorus and rates of oxygen depletion).The presence of relatively large bodied daphnia, even at low densities, seems to influence trophic characteristics more than any other feature of the plankton community.

Email: matthew.albright@oneonta.edu

ORAL PRESENTATIONS

Density-dependent changes in Alewife growth

Connor Murch[1,2], and Dan Stich[3,2]

[1]Department of Chemistry & Biochemistry, State University of New York (SUNY) College at Oneonta, Oneonta, NY, USA 13820; [2]SUNY Oneonta Biological Field Station, Cooperstown, NY, USA 13820; [3]Biology Department, SUNY Oneonta Oneonta, NY, USA 13820

Alewife *Alosa pseudoharengus* are a key component of many coastal and inland food webs. However, when landlocked they have the potential to become invasive and have highly variable effects on lake ecosystems. Alewife were introduced to Otsego Lake, NY in the 1980s, and abundance peaked in the early 2000s. High population density resulted in limnological changes and food web shifts. A targeted stocking of 0.5 million Walleye, in combination with other factors resulted in reduction of Alewife below detectable levels by 2011. We used otoliths from Alewife that were caught in Otsego Lake 2000–2011 to variability in growth during the course of these events. We developed a growth model that allowed us to assess influences of environmental factors on growth from year to year. We determined that mean cladoceran size, and density of the Alewife population we strong predictors of Alewife growth rate, but growth was not related to annual ice cover duration. Alewife growth was 23% slower during years of greatest abundance than in years with lowest abundance. Growth rate was positively related to mean cladoceran size, changing by 39% over the range of cladoceran sizes observed. Preliminary results indicate density dependent regulation of individual growth in this population. Future work will attempt to incorporate additional environmental influences as predictors, including temperature from long-term data sets available for Otsego Lake, and predator population metrics.

Email: muccl40@oneonta.edu

ORAL PRESENTATIONS

The re-introduction of walleye to Otsego Lake

Mark D. Cornwell

Fisheries, Wildlife & Environmental Science Department, State University of New York College of Agriculture and Technology at Cobleskill, Cobleskill, NY 12043

Walleye were routinely stocked in Otsego Lake from 1913–1934, with heaviest stocking 1922–1934. Once common 1950's-1960's, they were believed extirpated by 2000 due to fry predation by abundant alewife. In 2000, a major effort was begun to re-introduce walleye to Otsego Lake with the management goal of re-establishing the walleye fishery. Interest for walleye as sportfish and their historical presence in the lake prompted a cooperative project between NYSDEC, SUNY Oneonta, SUNY Cobleskill and a benefactor to contract growers to re-stock the lake. Walleye were chosen because of their popularity and their attributes as a predator to forage on epilimnetic alewife during stratification. Since 2000, 608,000 walleye have been stocked, including 512,000 pond fingerlings (32–65 mm) and 96,000 advanced fall fingerlings (100–165 mm). Walleye survival appears to be linked to predation on pond fingerlings by largemouth bass, smallmouth bass, yellow perch, rockbass, and chain pickerel. Stomach analysis of predators indicates high predation on stocked walleye 0–48 hours after stocking. Night time stocking lowers post stock predation by 20–30% compared to daytime stocking. Examination of walleye stomachs (2002) revealed that walleye were foraging exclusively on alewife with 65% of stomachs containing one or more alewife, other stomachs were empty. Walleye stocking success has been evaluated by gill net, trap net, boat electrofishing and mark and recapture estimates. Walleye are now abundant, healthy and growing at or above NYS average. Natural reproduction of walleye in Otsego Lake is now widespread, with recruitment of a least 3 wild year classes. Walleye are now re-established in Otsego Lake.

Email: cornwemd@cobleskill.edu

ORAL PRESENTATIONS

The feasibility of restoring Lake Whitefish as an integral component of the cold-water fish community in Otsego Lake, NY.

Samantha Carey*[1], Caroline V. Shafer[1], Kevin C. Thomas[1], Daniel T. Garrett[1], Brent C. Lehman[1], John R. Foster[1], Mark D. Cornwell1, Scott Wells[2], Daniel S. Stich[3]

[1]Fisheries, Wildlife & Environmental Science Department State University of New York, Cobleskill, NY 12043; [2]New York State Department of Environmental Conservation, Stamford, NY 12167; [3]State University of New York College at Oneonta, Oneonta, NY 13820

Lake Whitefish *Coregonus clupeaformis* (LWF), a key component of the cold-water fish fauna of Otsego Lake was decimated by the introduction of Alewife *Alosa pseudoharengus* in the 1980s. With the recent collapse of the Alewife in this system, the restoration of the historically important LWF population is now feasible. A collaborative effort to enhance LWF in Otsego Lake is now underway, involving the New York State Department of Environmental Conservation, the State University of New York (SUNY) at Cobleskill, and the SUNY Oneonta Biological Field Station. Project objectives are to 1) document LWF spawning locations and population dynamics, and 2) supplement the population through field spawning, egg rearing and stocking of fry and fingerlings. Electrofishing, trap netting and fry emergence traps identified three spawning locations in the lake. The LWF produced in the Endangered Fish Hatchery at SUNY Cobleskill will help restore an important Otsego Lake fishery and balance the lake's cold-water fish community by enhancing the lake trout forage base.

Email: careys@cobleskill.edu

ORAL PRESENTATIONS

Who is eating WHAT and for HOW MUCH? (Ballroom 08 February 2018)

Lake Ontario Deepwater Sculpin diet identification using gut content and stable isotopes: Are all *Mysis* equal?

T.M. Evans[1], M.G. Walsh[2], B.C. Weidel[1]

[1]USGS Lake Ontario Biological Station, Oswego, NY 13126; [2]USFWS Panama City Field Office, Panama City, FL 32405, U.S.A.

Deepwater Sculpin *Myoxocephalus thompsonii* are an important member of the deepwater fish community in Lake Ontario. Apparently extirpated from Lake Ontario by 1970, they have become reestablished and now constitute the majority of benthic prey fish biomass in areas of the lake >130 m. Prior to their collapse, Prior to the collapse, Deepwater Sculpin diets were composed of the amphipod *Diporeia affinis* (hereafter *Diporeia*) and *Mysis diluviana* (hereafter *Mysis*). However, *Diporeia* is now rare, having suffered a collapse of its own, and in spite of this Deepwater Sculpin numbers continue to increase in yearly lakewide assessments. We found that Deepwater Sculpin < 50 mm had gut contents composed of *Mysis* < 8 mm and ostracods, but almost entirely (>90% by weight) of larger *Mysis* (mean: 15 mm) after surpassing 50 mm. Interestingly, while stable isotope analysis agreed with gut content that diet was invariant between locations and seasons, stable isotopes of Deepwater Sculpin were elevated by more than one trophic level above *Mysis* 15 mm in length. While gut content is effective at identifying the food source supporting Deepwater Sculpin in Lake Ontario, stable isotopes suggest a nuanced story.

Email: tmevans@usgs.gov

ORAL PRESENTATIONS

Stain- and flame-resistant fish? Perfluorinated Substances (PFAS) in Fish from Contaminated Sites

Wayne Richter, and Jesse Becker

Division of Fish and Wildlife, New York State Department of Environmental Conservation, Albany, NY 12233-4756

Following discovery of PFOA in well and surface waters near Hoosick Falls and Petersburgh, and PFOS near Newburgh, the New York State Department of Environmental Conservation did an intensive study of these and other PFAS in fish from these areas. DEC Fisheries staff collected two to six species of fish from five potentially affected waters plus one reference site near Hoosick Falls and Petersburgh, and from six potentially affected waters plus one reference site near Newburgh. We analyzed edible-size sportfish in three portions: (1) a standard fillet to evaluate potential human health risk from consumption, (2) the viscera to evaluate tissues thought to have the highest potential concentrations, and (3) the remaining carcass so that whole fish concentrations could be calculated from the three components to evaluate potential risks to piscivorous wildlife. We also analyzed smaller forage fish as whole fish for this same goal. PFAS were detected in all 310 fish and 698 samples, including those from reference sites. PFOS was the dominant PFAS in both frequency (99%) and concentration. Concentrations were highest in viscera with a maximum of 3,360 ppb, intermediate in carcasses, and lowest in fillets. At the six non-reference sites in Newburgh and at a pond near the Hoosick Falls landfill, PFOS concentrations were high enough for the New York State Department of Health to issue advisories against eating fish until further notice. PFOA, an eight-carbon acid, was detected in low concentrations in almost half the samples. The longer 10-, 11- and 12-carbon acids were detected in 75% to 88% of the samples, typically at concentrations somewhat higher than PFOA but much less than PFOS. Findings support the hypothesis that PFAS are pervasive in fish and can be found at high concentrations near release sites.

Email: wayne.richter@dec.ny.gov

ORAL PRESENTATIONS

Economic feasibility and marketing of boneless Bighead and Silver Carp meat on a small scale

Dakota J. Raab[1], Siddhartha Dasgupta[1], Changzheng Wang[1], and Quinton Phelps[2]

[1]Kentucky State University; [2]Missouri Department of Conservation

Bighead carp *Hypophthalmichthys nobilis* and silver carp *Hypophthalmichthys molitrix* are a popular food fish in much of the world; however, in the United States, these invasive fish are not widely consumed. Lack of consumption is likely due to the presence of intramuscular "Y" bones that are difficult to remove. Intramuscular bones were removed via fillet knife and a break-even price was determined for boneless meat. Willingness to pay (WTP) and market perception was elicited through a survey of chefs. On average 134 silver or 179 bighead carp could be processed per day using optimal labor allocation. Break-even prices were $13.72/kg for bighead and $10.06 /kg for silver carp. Perception of taste was significantly different between species (P = 0.0216) and bighead carp meat was favored. Average stated WTP was $13.95/kg for bighead and $12.43/kg for silver carp; however, analysis showed no significant difference (P = 0.1176). Processing of bighead carp was not profitable when selling at the average stated WTP; however, silver carp processing appears to be feasible.

Email: RaabDJ@cobleskill.edu

ORAL PRESENTATIONS

Predator-prey dynamics (Iroquois, 08 February 2018)

Community Response to Smallmouth Bass Removal – Long Term Review

Benjamin Marcy-Quay*, Kurt J. Jirka, Clifford E. Kraft, Daniel C. Josephson, and Eileen A. Randall

Department of Natural Resources, Cornell University, Ithaca, NY 14853

Targeted mechanical removal is a potential option for the management of invasive species. The most notable example of this technique is the lake trout (*Salvelinus namaycush*) removal program in Yellowstone Lake that has been ongoing since 1994. Cornell University started a similar removal program on an Adirondack lake in 2000, with the goal of suppressing invasive smallmouth bass (*Micropterus dolomieu*) using targeted electrofishing. By 2005, the removal program had successfully reduced smallmouth bass abundance by more than 90%, shifted smallmouth bass size structure towards smaller fish, and increased abundance of six native littoral species. We evaluated fish species composition and abundance, as well as changes in growth of the dominant native predator species, lake trout after 17 continuous years of bass removal. The continued removal of smallmouth bass has led to further changes in the native fish community and a corresponding shift in lake trout growth rates. This investigation provides insights into long-term changes in a native fish community and an invasive predator population in response to intensive management efforts.

Email: bm455@cornell.edu

ORAL PRESENTATIONS

Changes in diets of two top predators in response to a long-term smallmouth bass removal program.

Kurt J. Jirka, Benjamin Marcy-Quay, Clifford E. Kraft, Daniel C. Josephson, and Eileen A. Randall

Department of Natural Resources, Cornell University, Ithaca, NY 14853

A long-term smallmouth bass removal project was initiated almost 20 years ago on Little Moose Lake in the southwestern Adirondack Mountains with a goal of suppressing the invasive bass population to allow the native fish community to recover. Boat electrofishing has been used to remove an average of nearly 6,000 smallmouth bass annually, resulting in significant changes in the composition and abundance of the native fish community. Diets of lake trout, the apex native fish predator in the community, and invasive smallmouth bass were analyzed to determine if the observed changes in fish community structure resulted in changes to the composition and relative abundance of prey items of these competing species. Both juvenile and adult lake trout have shown a substantial shift in diet from predominantly invertebrate prey to fish prey. The species composition of the fish prey has also shifted over the course of the removal program. Additional changes have been observed in diets of young-of-year, juvenile, and adult smallmouth bass, though these shifts are not consistent among life stages. The bass removal program has resulted in diversification of the forage base for lake trout and smallmouth bass and changes in the predator-prey dynamics among these top predators.

Email: kjj23@cornell.edu

ORAL PRESENTATIONS

Long-term assessment of lipid content and fatty acid signatures of Lake Ontario prey fishes

Matthew Futia*[1], Brian Weidel[2], Michael Connerton[3], Jacques Rinchard[1]

[1]Department of Environmental Science and Ecology, The College at Brockport – State University of New York, Brockport, NY 14420; [2]U.S. Geological Survey, Great Lakes Science Center – Lake Ontario Biological Station, Oswego, NY 13126; [3]New York State Department of Environmental Conservation – Lake Ontario Research Unit, Cape Vincent, NY 13618

Lipid content and fatty acid concentrations provide valuable information regarding fish health and diet. Lipid content is positively correlated to the condition factor of a fish, and thereby its general state of well-being. In addition, lipids are composed of various fatty acids, which serve many functions including production of energy and regulation of biological activities (e.g. membrane function). Fatty acids are obtained through diet; therefore, concentrations of fatty acids can be determined and compared to identify differences in diet based on multiple variables such as species, season, location, and year. For this study, common prey fish from Lake Ontario (Alewife, Round Goby, and Rainbow Smelt) were collected outside of Rochester, New York between 2010 and 2016. Differences in lipid content and fatty acid concentrations were compared across species and year, as well as season (spring and fall) when available. Results from this study as well as their importance in fisheries management will be discussed.

Email: mfuti1@u.brockport.edu

ORAL PRESENTATIONS

Thiamine deficiency complex in salmonines from New York State

Jacques Rinchard[1], Matthew Futia[1], Donald Tillitt[2], Clifford Kraft[3]

[1]Department of Environmental Science and Ecology, The College at Brockport – State University of New York, Brockport, NY 14420; [2]Columbia Environmental Research Center, USGS, Columbia, MO 65201; [3]Department of Natural Resources, Cornell University, Ithaca, NY 14853

Thiamine deficiency complex (TDC) is a reproductive disorder affecting health and recruitment of various salmonine species in the Great Lakes region. Although the cause of TDC is unknown, it has been linked to high consumption of Alewife. This study examines (1) the trends in egg thiamine concentration for Lake Trout collected in Lake Ontario and Cayuga Lake from 2009 to 2016; (2) the correlation between egg thiamine concentration and fry mortality from thiamine deficiency; and (3) the potential causes of thiamine deficiency. We will also present preliminary data related to thiamine concentrations from Chinook Salmon, Coho Salmon, Steelhead Trout, and Lake Trout collected in Lake Ontario in 2016 and 2017. Comparisons among thiamine concentrations for these species will be discussed.

Email: jrinchar@u.brockport.edu

ORAL PRESENTATIONS

Round Goby: friend or foe in the Lake Erie food web?

James L. Markham

Lake Erie Fisheries Research Unit, New York State Department of Environmental Conservation, Dunkirk, NY 14048

The invasive Round Goby was first discovered in the west basin of Lake Erie in the early 1990s and quickly spread throughout the lake, arriving in the east basin by the late 1990s. Prior to their arrival, the introduction of Dreissenids caused a massive shift in the productivity of nearshore waters with associated declines in Yellow Perch and Walleye fisheries. The arrival of Round Goby brought with it a fear of significant negative effects on the lake ecosystem and fisheries due to its reputation as a voracious egg predator. While the Round Goby did bring profound changes to the entire food web, these fears were largely unfounded, as the goby became a predator on Dreissenids and an alternative prey item for a host of predators. Some species benefitted as goby created a vector for energy trapped in Dreissenid biomass to be transferred back into the food chain, effectively resetting percid stocks to pre-Dreissenids conditions. Changes also occurred in the structure of the pelagic prey fish community. Other negatives consequences also accompanied the goby; they were identified as a critical link in botulism outbreaks throughout Lake Erie and impacted competing native benthic prey species. As such, Round Goby provided both detrimental and beneficial effects on the Lake Erie food web.

Email: james.markham@dec.ny.gov

ORAL PRESENTATIONS

Setting the Table for Predators: Cisco *Corigonus atedi* culture at the Northeast Fishery Center

Nicholas Markley, Steve Davis, Mark Yost, and Tom Kehler

U.S. Fish & Wildlife Service, Northeast Fishery Center, Lamar, PA 16848

Abstract: The population of cisco has declined in Lake Ontario due to poor water quality conditions and overfishing. The Northeast Fishery Center (NEFC) in Lamar Pennsylvania is one of many locations putting effort into Cisco *Corigonus atedi* culture to recover this species. Our first year of cisco culture was 2017, and we started with 178,000 eggs that were collected from Lake Ontario and grown to the eyed stage at Tunison Fish Hatchery in Ithica New York. Following transfer of eyed eggs to the NEFC, cisco were raised in a small isolation building and fed a strict diet daily to ensure the best possible growth. After the first culture year at the Northeast Fishery Center, there were two stocking events one in June containing 125,000 cisco and one in October of 35,000 cisco adding up to roughly 161,000 total cisco stocked into Sodus Bay of Lake Ontario in New York. Two studies were also done with the cisco while at the NEFC. One study was a chemical marking study that determined the effective concentration needed to mark a hatchery fish with calcein and alizarin red. The other study examined stress response hormones as it relates to the stress of hauling the fish in a stocking truck. In the future the NEFC will increase production by renovating a large building to become another isolation building with the ability to raise approximately 250,000 cisco to a suitable stocking size.

Email: Nicholas_markley@fws.gov

ORAL PRESENTATIONS

Trophic interactions between Alewife, Walleye, and Yellow Perch

J. R. Hulbert*, and D. S. Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

Proportional size distribution (PSD) indices were developed for quantifying length frequency data and estimating size structure of fish populations. Length categories for PSD indices are based on percentages of world record length for each fish species. Stock density indices have been correlated with population dynamics (recruitment, growth, mortality) for many game fish populations, several methods have been used in analyzing PSD index data to improve inferences on size structure and explain the variability in the relationships. In Canadarago Lake, New York Walleye *Sander vitreus* have been stocked for the dual purpose of supporting recreational fisheries and biocontrol of invasive Alewife *Alosa pseudoharengus* for more than two decades. We developed a hierarchal Bayesian, binomial logistic regression model (GLMM) to facilitate analysis of Walleye PSD regionally as probabilities based on the numbers of stock- and of quality-size fish sampled, and a binomial logistic regression model (GLM) to analyze changes in percid PSD in Canadarago Lake. We fit fixed effects of year and Alewife CPUE in models for both Walleye and Yellow Perch *Perca flavescens* to investigate changes in the percid fishery during the last two decades. In general, the PSD of Yellow Perch decreased and the size structure of Walleye increased from 1991 to 2013. Alewife CPUE was implicated as one driver of changes in percid PSD. The predator to prey ratio of Walleye and Yellow Perch in Canadarago Lake, NY was trending toward a range described as a fishery with over populated, small-bodied Yellow Perch that may interfere with walleye recruitment.

Email: hulbjr82@oneonta.edu

ORAL PRESENTATIONS

What's going on with the Emerald Shiner?: A Look at a Native Species through the lens of an Invasive Species Early Detection Program

Jacob Cochran, Theodore Lewis, and Dimitry Gorsky

U.S. Fish and Wildlife Service, Lower Great Lakes Fish and Wildlife Conservation Office, Basom, NY 14013

The U.S. Fish & Wildlife Service Lower Great Lakes Fish and Wildlife Conservation Office supports an aquatic invasive species (AIS) early detection and monitoring (EDM) program that surveys areas within the lower Great Lakes (Erie and Ontario) for unestablished non-native fish species. Searching for potential invasive fish species within these waterbodies requires the utilization of fishing gears that are effective across broad habitats and are relatively nonspecific. The AIS EDM program therefore excerpts effort conducting numerous boat-based electrofishing surveys each year. Although the objective of this program is to detect newly invading fish species, the primary catch are native species. This native fish "bycatch" has allowed a unique opportunity to observe these species over a multi-year timeline (2012-Present). A standout observation over the years of this program has been the reduction in catch-per-unit-effort (CPUE) of emerald shiners (*Notropis atherinoides*). This small, short-lived, fast growing, warm-water forage fish is a staple food source for many of the lower Great Lakes piscivorous fish and birds. Although apparent, little is understood about what factors may be driving these declines. Are these declines a result of environmental conditions? Or, is this an artifact of a naturally cyclical forage fish population? This presentation aims to identify potential drivers of population and recruitment, while emphasizing the lack of knowledge we have of such a vital base of the Great Lakes food-web.

Email: jacob_cochran@fws.gov

ORAL PRESENTATIONS

Resource and habitat selection (Kingfisher Tower, 08 February 2018)

The role of invasive Round Goby in the Great Lakes basin: habitat use and standing stock biomass in a recently invaded deep inland lake

Suresh Sethi[1], Jesse Lepak[2], Aaron Rice[3], Kara Andres[3], Elizabeth Duskey[3], Bobbi Estabrooks[3], Kimberly Fitzpatrick[3], Ellen George[3], Ben Marcy-Quay[3], Kelly Perkins1, Matt Paufve[3], and Annie Scofield[3]

[1]U.S. Geological Survey, New York Cooperative Fish and Wildlife Research Unit; [2]New York Sea Grant; [3]Cornell University

Round Goby spread throughout the Great Lakes faster than any other invasive fish. These invaders have been implicated in population declines and extirpations of native fish through resource competition and direct egg depredation. However, because of their unique ecological niche, Round Goby may also provide beneficial ecosystem services. In the Great Lakes Round Goby facilitate an energy and nutrient pathway as consumers of invasive *Dreissenid* mussels and subsequent prey for piscivorous game fish in nearshore areas (summer distribution) and deeper, benthic areas (winter distribution). The extent to which this may be the case in other systems along the Round Goby invasion path is largely unknown. Unfortunately, assessing Round Goby distribution and density is difficult because of their benthic behavior and preference for rocky habitat, limiting the effectiveness of traditional assessment tools like trawls. However, Round Goby monitoring is necessary for determining the extent to which they serve as a benefit or detriment to fisheries resources. We designed a course at Cornell University to build upon previous efforts to assess Round Goby populations in an attempt to improve methodology. We used benthic videography to describe seasonal habitat use, and estimate density and biomass of Round Goby in a recently invaded, deep, inland lake within the Great Lakes basin (Cayuga Lake, NY). Further, we use repeat observations of video footage and hierarchical statistical models that correct for detection processes to minimize bias in species distribution and density estimates.

Email: jml78@cornell.edu

ORAL PRESENTATIONS

Habitat Selection by Reintroduced Lake Sturgeon in a Cayuga Lake Tributary

Dawn E. Dittman, Marc A. Chalupnicki, and Phyllis L. Randall

U.S. Geological Survey, Tunison Laboratory of Aquatic Science, Cortland, NY 13045-9357 USA

We document the first observed spawning by reintroduced Lake Sturgeon in a tributary to Cayuga Lake since the beginning of the New York Lake Sturgeon restoration program. Timing of water temperature increases and high flows may be important triggers of spawning. The selection of spawning habitat with the deposition of eggs was quantified. In Fall Creek, egg deposition was selectively on gravel size substrate with depths and flows that were a unique microhabitat combination, not typical of values found in other Lake Sturgeon spawning habitat studies across the Great Lakes. We estimate that between 810,000 and 1.3 million viable eggs were deposited in the sampled area of Fall Creek in June 2017. The identified productive spawning microhabitat type in this small stream is likely to be widespread in similar tributaries to the Finger Lakes. Ongoing research is evaluating the extent of Finger Lakes habitat similar to that found in Fall Creek. This microhabitat evaluation of Sturgeon spawning and the broad scale landscape knowledge of tributary habitats will support management and subsequent efforts to restore Lake Sturgeon.

Email: ddittman@usgs.gov

ORAL PRESENTATIONS

Movement patterns and home range fidelity of bowfin in Oneida Lake, New York

James R. Jackson[1], Alexander W. Latzka[2], Tomomi Landsman[2], Scott D. Krueger[2], and Amy R. McCune[2]

[1]Department of Natural Resources, Cornell Biological Field Station, Cornell University, Bridgeport, NY; [2]Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, NY

The bowfin is widely distributed through the eastern United States and into southeastern Canada, but because they are not typically valued as a food or sport fish, few intensive studies of their ecology have been undertaken. In Oneida Lake, New York, catches of bowfin in standardized sampling gears have increased in recent years, presumably reflecting the combined effects of macrophyte expansion following establishment of zebra mussels and warmer summer water temperatures. We surgically implanted radio transmitters into17 bowfin (10 females, 8 males) during the spring of 2009 and an additional 22 in fall 2009 (11 females. 11 males). Manual tracking of tagged bowfin was conducted weekly from June-October in 2009 and April-October in 2010 and 2011. Spring distributions suggested that most fish undertook an annual spawning migration to a large, marshy embayment at the northwest end of the lake, after which they dispersed up to 20 km away. Most fish showed fidelity to a summer home range over multiple years. Males tended to occupy smaller home ranges than females and females were more likely to range widely over the lake during the summer. These results show that bowfin exhibit movement patterns similar to more modern fishes.

Email: jrj26@cornell.edu

ORAL PRESENTATIONS

Cisco Movement and Spawning Behavior in Eastern Lake Ontario

Curt Karboski[1], Dimitry Gorsky[1], Michael Connerton[2], Eric Bruestle[1], and Brian Lantry[3].

[1]U.S. Fish and Wildlife Service; [2]New York State Department of Environmental Conservation; [3]U.S. Geological Survey Lake Ontario Biological Station

Cisco were historically one of the most abundant and ecologically important preyfish in Lake Ontario. In the early 1900s their populations declined drastically in response to overfishing and invasive species introductions. However, recently there has been a surge in spawner abundance in Lake Ontario. In 2016 we initiated a pilot study to describe behavior of spawning adults in Chaumont Bay and the eastern basin. Specifically, our objectives were to study spawn timing and residency in the bay, small movements associated with spawning, and large scale movement patterns throughout the year using the GLATOS array. In 2016 we tagged 10 Cisco and continued in 2017 with another 40 fish. Results of the pilot study showed that the Cisco exhibited little site fidelity within the bay with all individuals being detected in multiple areas. In addition, behavioral patterns associated with spawning were observed with fish consistently being detected on specific areas of the shoals. They also showed a wide range of behaviors post-spawn, moving out of the array and as far as the Bay of Quinte, indicating possible mixing of the two main spawning populations in Lake Ontario.

Email: ckarboski@gmail.com

ORAL PRESENTATIONS

Discovery of Cisco Spawning Locations in Eastern Lake Ontario

Ellen George*[1], Darran Crabtree[2], Matthew Hare[1], Dimitry Gorsky[3], Lars Rudstam[1], Marc Chalupnicki[4]

[1]Cornell University Department of Natural Resources, Ithaca NY 14853; [2]The Nature Conservancy of New York, Rochester NY 14607; [3]U.S. Fish and Wildlife Service, Basom NY 14013; [4]USGS Tunison Lab of Aquatic Science, Cortland NY 13045

Cisco *Coregonus artedi* spawning runs existed in many of the embayments and nearshore areas of Eastern Lake Ontario until their population collapse in the early 1900s. In recent years only two remnant spawning populations have been known to exist in Lake Ontario: one on the American side in Chaumont Bay, and a second on the Canadian side in the Bay of Quinte. In November and December of 2016 and 2017 we searched for other previously unknown spawning populations of cisco by deploying egg mats at various sites in the Eastern Basin. Sites were chosen based on their similarity to spawning habitat observed in Chaumont Bay, historical reports of spawning runs, and angler reports of cisco harvest. Coregonine eggs were recovered at Fox and Grenadier Islands and in Henderson Harbor, and were identified to species using genetic barcoding of the mitochondrial cytochrome C oxidase I gene. The discovery of new spawning locations and populations will help to inform our understanding of the cisco population in Lake Ontario, as well as guide future management decisions concerning coregonine restoration in the lake.

Email: emg239@cornell.edu

ORAL PRESENTATIONS

Characterizing the spawning and incubation habitat of Cisco (*Coregonus artedi*) in the Great Lakes

[1,2]Paufve*, M.R., [1,2]Sethi, S.A., [3]Lantry, B.F., [4]Jonas, J.L., [5]Yule, D.L., [6]Berglund, E.K., [7]Connerton, M. J., [8]Gorsky, D., [9]Chalupnicki, M., [3]Weidel, B.C., [3]Furgal, S., [8]Karboski, C., [8]Biesinger, Z., [8]Castiglione, C., [4]O'Neill, P., [6]Chiodo, A., [1,10]Rudstam, L.G.

[1]Cornell University Department of Natural Resources, [2]USGS New York Cooperative Fish and Wildlife Research Unit, [3]USGS Lake Ontario Biological Station, [4]Michigan Department of Natural Resources, [5]USGS Lake Superior Biological Station, [6]Ontario Ministry of Natural Resources and Forestry, [7]New York State Department of Environmental Conservation, [8]USFWS Lower Great Lakes Fish and Wildlife Conservation Office, [9]USGS Tunison Laboratory of Aquatic Science, [10]Cornell Biological Field Station

Cisco *Coregonus artedi* are a native, mid-trophic coregonine that were historically abundant in the Great Lakes, serving as important prey for piscivores and supporting large commercial fisheries. In response to fishing pressure and interactions with nonnative species, among other threats, populations declined precipitously through the mid-1900s. This led to local extirpations and low abundances that persist today. Recent efforts to improve system resiliency in Lake Ontario through native fish rehabilitation have targeted remnant Cisco populations. To support these efforts, information on spawning ecology is needed to assess available habitat and to prioritize areas targeted for restoration. We studied known spawning sites to identify habitat variables associated with egg presence and viability at a high-energy reef complex in Lake Michigan, a relatively low energy area in Lake Superior, and historically important spawning areas in Lake Ontario. We utilized a diaphragm pump and egg mats to collect eggs from the lake bottom and assess the association between spawning evidence and habitat variables. In this talk, we present preliminary results from study sites in Lakes Superior, Michigan, and Ontario, and a controlled experiment testing the efficiency of benthic pump egg sampling.

Email: mp863@cornell.edu

ORAL PRESENTATIONS

Analyzing dynamic movement processes of Hudson River spawning Atlantic sturgeon using multiple analytical perspectives

Elizabeth Duskey*1, Amanda Higgs2, and Patrick Sullivan1

[1]Department of Natural Resources, Cornell University, Ithaca, NY 14853; [2]Cornell University/New York State Department of Environmental Conservation, New Paltz, NY 12561

Acoustic tagging data provides a unique opportunity to study relative fine-scale movement processes of individuals. There is a suite of modeling tools which can address hypotheses concerning these processes. These may include resource selection models, dynamic occupancy models, and binomial success models. The advantage of these tools is that one set of data has the potential to answer questions from multiple perspectives. Here, we present two perspectives of movement processes using multi-year tagging data of Atlantic sturgeon in the Hudson River: (1) habitat-based and (2) individual-based. A habitat-based perspective leads to models that consider the movement of fish from a set of spatially indexed units of habitat, whereas an individual-based perspective leads to models that consider when and where we might expect to find individual fish. Using a Bayesian framework, we apply binomial models from both perspectives, and demonstrate how the results are complimentary. The habitat-based binomial model gives the probability of finding individuals in a given unit of habitat. The individual-based binomial model gives the heterogeneous detection probability of the fish in the tagging study. The latter may also provide a crude population estimate. Considering both perspectives allows us to understand the dynamics of Atlantic sturgeon in the Hudson River – how individuals are expected to move through the ecosystem, how many individuals are in the ecosystem at a given time, and how our probability of detecting individuals changes with varying conditions. Overall, this gives a more complete understanding of how a given population moves through its environment.

Email: epd48@cornell.edu

ORAL PRESENTATIONS

Tracking diel foraging behavior of Chinook Salmon in Lake Ontario using pop-off archival tags

James Watkins[1], Christopher Perle[2], Jesse Lepak[2], and Lars Rudstam[1]

[1]Department of Natural Resources, Cornell University, [2]Florida St College Jacksonville, FL, [3]New York Sea Grant

Chinook Salmon are an important open water fishery in Lake Ontario fueled by abundant alewife forage. With the assistance of charter boat captains, pop-off satellite archival tags (PSATs) were deployed on several mature Chinook Salmon off of Oswego and Rochester in July 2017. These tags measure depth, temperature, light level, and acceleration. This presentation will focus on the paths of two fish tagged off of Oswego on July 13 whose tags were retrieved in spawning habitat in Cobourg Creek and Salmon River in the early fall. The salmon had a clear temperature preferences (12-14 C) which corresponds to a depth of 15-30 m in the open lake. Fish responded rapidly to changes in thermal structure, including coastal upwelling events, to maintain that preferred temperature. Each night of the two-month journey the fish made several forays into the epilimnion, presumably to track alewife prey. During the day, the fish made several dives as deep as 100 m into 4C water. Quantification of these short-term deviations from thermal preferences supplement continued bioenergetics modeling of Chinooks.

Email: jmw237@cornell.edu

ORAL PRESENTATIONS

Molecular applications (Ballroom, 09 February 2018)

Population genetics and diversity of Brook Trout *Salvelinus fontinalis* in the headwaters of the Ausable River, New York

Carrianne E. Pershyn*[1], Neil H. Ringler[1], and Margaret H. Murphy[2]

[1]State University of New York College of Environmental Science and Forestry; [2]Integrated Aquatic Sciences

Affiliation: SUNY Environmental Science and Forestry, Department of Environmental and Forest Biology

Abstract: In the Northern Forest region that encompasses much of the northeastern United States and eastern Canadian provinces, Brook Trout *Salvelinus fontinalis* are an iconic native stream-dwelling salmonid and an ecological indicator species of healthy, coldwater streams, ponds, and rivers. This species has also been stocked extensively throughout the region since the 1800s to supplement and restore a recreational fishery. This study examines the genetic diversity and habitat use of Brook Trout *Salvelinus fontinalis* in tributary streams and a lake that form the headwaters of the Ausable River, in the Adirondack Mountains of New York State. Tissue samples were collected from lake and tributary dwelling fish, and will be analyzed using microsatellite loci to determine the genotype within this subwatershed. The goal of this study was to evaluate whether tributary habitat availability and/or past stocking efforts influence wild reproduction of lake fish. Further, Brook Trout genetics from this system are be compared to other genotypes across the Adirondacks and New York State to understand the overall diversity and relatedness of Adirondack Brook Trout, and the full impact of historical stocking efforts across the region. This study will provide definitive results on whether the Brook Trout in the headwaters of the Ausable River are dominated by wild and heritage fish, or if there are lasting effects of fish stocking in this system. (*Student)*

Email: cpershyn@syr.edu

ORAL PRESENTATIONS

Genetic assessment of Western New York Brook Trout *Salvelinus fontinalis*

Meredith L. Bartron[1], Stephanie Dowell[1], Scott Cornett[2], Peter Austerman[3], Betsy Trometer[4], and Thomas Hoffman[4], Fred Henson[5]

[1]US Fish and Wildlife Service, Northeast Fishery Center, Lamar, PA; [2]New York State Department of Environmental Conservation, Allegany, NY; [3]New York State Department of Environmental Conservation, Avon, NY; [4]US Fish and Wildlife Service, Lower Great Lakes Fish and Wildlife Conservation Office, Basom, NY; [5]New York State Department of Environmental Conservation, Albany, NY

Brook Trout are distributed throughout eastern North America, and some populations are at risk to population fragmentation through habitat loss, climate change, competition with non-native species, and barriers limiting connections between habitats. Small and fragmented populations become at risk of inbreeding, reductions in loss of genetic diversity, and reduced fitness leading to a greater potential for local extirpation. Understanding the genetic diversity of brook trout populations across the landscape is important to assess patterns of local population interaction and potential limitations to population movement. In this study, we assessed 2,294 sampled brook trout, representing 27 sites from the Allegheny, Erie/Niagara, Genesee, and Susquehanna watersheds in western New York. Additionally, two brook trout hatcheries (one in NY and one in PA) were also genetically characterized. In general, estimates of genetic diversity varied widely: average number of alleles per locus ranged from 2.25 to 7.58, and observed heterozygosity ranged from 0.437 to 0.743. For sites where effective population size (N_e) was able to be calculated, estimates ranged from a low of 3.8 (3.3-5.0 95% CI) to 106.4 (64.0-251.7 95% CI). As observed elsewhere throughout the range for headwater brook trout populations, a high degree of genetic differentiation was observed using pairwise F_{st} values and STRUCTURE results, even within watersheds. Very little introgression with hatchery fish was observed except in locations in close proximity to areas where long-term stocking occurred. Understanding the genetic relationships among neighboring brook trout populations is useful to management of the resource in order to understand connectivity among brook trout populations and interactions with stocked fish.

Email**:** Meredith_Bartron@fws.gov

ORAL PRESENTATIONS

Genomic underpinnings of fisheries-induced evolution

Nina Overgaard Therkildsen

Department of Natural Resources, Cornell University, Ithaca, NY 14853

A growing body of evidence suggests that the strong mortality fishing imposes on particular size and age groups has caused notable changes in heritable life history traits in many exploited fish stocks. Such rapid evolutionary change is of concern because it may compromise stock productivity and resilience to overfishing. In wild fish stocks, it is, however, often difficult to fully disentangle genetic from environmentally induced changes and to distinguish selection caused by fisheries from selection driven by other factors. To get a basic understanding of how fisheries selection may affect the exploited populations at the molecular level, we have returned to a seminal experiment that under highly controlled conditions demonstrated substantial evolution in growth rates and a suite of correlated traits in response to size-selective fishing over just five generations in the Atlantic silverside *Menidia menidia*. I will present results from an exome-wide scan for genomic changes underlying these phenotypic shifts. The results provide a first look into the genomic basis for fisheries-induced evolution and shed light on what types of genetic variation and physiological pathways fisheries-selection acts on, how extensively it impacts the genome through direct and indirect effects, and how reversible the changes are once fishing stops. These insights should provide a better understanding of how fisheries-induced selection operates and what signatures we may expect in affected natural populations.

Email: nt246@cornell.edu

ORAL PRESENTATIONS

Comparison of electrofishing and environmental DNA detection methodologies in Great Lakes tributaries

Christopher B. Rees[1], Aaron P. Maloy[1], Henry R. Quinlan[2], Mark J. Brouder[2], and Meredith L. Bartron[1]

[1] U.S. Fish and Wildlife Service, Northeast Fishery Center, Lamar, PA; [2] U.S. Fish and Wildlife Service, Ashland Fish and Wildlife Conservation Office, Ashland, WI

New advances in genetic analysis of environmental DNA (eDNA) have allowed alternate methods for assessing fish communities. A primary advantage of eDNA sampling is the ability to cover a large geographic area in a relatively short period of time with little field effort. Traditional electrofishing requires substantial time and effort due to the labor involved with sampling, processing fish, and gear preparation. Depending on the aquatic system, electrofishing can be difficult due to flow rates, depth of water, overhead and submerged cover, or conductivity. Use of eDNA can help to provide insight into species composition surveys in situations where electrofishing may not be feasible, however comparative studies are needed to directly compare the data obtained from traditional techniques to those obtained using eDNA. The two primary eDNA detection techniques are quantitative PCR (qPCR) and metabarcoding. qPCR is used for the targeted detection of a specific species, while metabarcoding is used for biodiversity assessment of the broader species assemblage in a given eDNA sample. Here we evaluated the effectiveness of qPCR and metabarcoding for species detection relative to electrofishing. For five small (<25 cfs) Great Lakes cold water tributaries, no difference (PERMANOVA: pseudo-$F_{2, 33} = 0.12$; p value = 0.97) was found in relative abundance measures obtained using qPCR, metabarcoding and electrofishing for the four species of fish assayed with qPCR (brook trout, rainbow trout, brown trout, and coho salmon). In addition, no significant difference (PERMANOVA: pseudo-$F_{1, 23} = 1.55$; p value = 0.18) was found in the relative abundance of fish communities using metabarcoding and electrofishing techniques. In all cases, species data recovered using the various techniques were highly correlated (Pearson $r >$ 0.88). These data suggest that similar measures of presence/absence and relative abundance can be obtained using eDNA detection techniques in small, relatively non-complex stream habitats as compared to that of electrofishing. Additional studies are necessary to evaluate the repeatability of this work and whether similar results can be obtained from a wider diversity of habitat types with increasing species complexity.

Email: Christopher_rees@fws.gov

ORAL PRESENTATIONS

Efficacy of Environmental DNA and Traditional Sampling Methods to Monitor the Expansion of Round Goby in the Mohawk River-Barge Canal System

Scott D. George[1], Christopher Rees[2], Meredith L. Bartron[2], Barry P. Baldigo[1], and Michael deMoulpied[1]

[1] U.S. Geological Survey, New York Water Science Center, Troy, NY;[2] U.S. Fish and Wildlife Service, Northeast Fishery Center, Lamar, PA

The Round Goby (*Neogobius melanostomus*) is an invasive benthic fish indigenous to the Ponto-Caspian region of Eurasia which recently colonized all five Great Lakes and is presently invading eastward into the Mohawk River Basin through the New York State (Barge) Canal System. During 2016 and 2017, the U.S. Geological Survey, New York State Department of Environmental Conservation, and the U.S. Fish and Wildlife Service conducted a collaborative study to (a) document the distribution, relative abundance, and rate of expansion of Round Goby through the Mohawk River-Barge Canal system and (b) compare the efficacy of environmental DNA (eDNA) and traditional fish sampling methods for monitoring the distribution of this species. The presence of Round Goby was assessed using water samples (eDNA) and standard benthic trawls, bag seines, and minnow traps twice annually at 12 sites between Rome and Albany, NY during June and August in 2016 and 2017. Preliminary results indicate Round Goby were captured or detected at 2 of 12 sites and have invaded waters at least as far east as Utica, NY. Environmental DNA appears to be the most sensitive method for detecting populations at low abundances. The slow expansion towards the Hudson River drainage is surprising considering the rapid colonization that recently occurred west of the study area.

Email: sgeorge@usgs.gov

ORAL PRESENTATIONS

Initial Phylogenetics of 2017 Cayuga Lake VHSV Outbreak

RG Getchell[1], E First[1], A Schulman[1], J Kramer[1], SM Bogdanowicz[2], J Andrés[2], AD Noyes[3], GE Eckerlin[3], JM Farrell[4], and H Marquis[1]

[1]Aquatic Animal Health Program, Department of Microbiology and Immunology, College of Veterinary Medicine, Cornell University, [2]Department of Ecology and Evolutionary Biology, Cornell University, [3]Rome Field Station, New York State Department of Environmental Conservation, [4]Department of Environmental and Forest Biology, College of Environmental Science and Forestry, State University of New York

Eleven viral hemorrhagic septicemia virus (VHSV) genotype IVb isolates were sequenced and their genetic variation explored to determine the likely source of the May 2017 VHSV outbreak on the eastern shore of Cayuga Lake. NYSDEC Region 7 Fisheries Unit first received reports of a fish kill from a homeowner who witnessed dead round gobies (*Neogobius melanostomus*) washing up on shore near King Ferry in early May. No fish were found when this area was initially searched. An active fish kill on May 12, 2017 at King Ferry and Long Point was intensely sampled. Moribund and fresh-dead fish were collected and then frozen. Additional collections were made at sample sites at the southern end of Cayuga Lake as well, including lamprey and round goby from Cayuga Inlet and round goby from Stewart Park and near the Ithaca Yacht Club. The 76 moribund and fresh-dead round gobies from the fish kill measured 64 mm to 165 mm and weighed from 3.8 grams to 119.9 grams. Two rock bass also were collected from Long Point that measured 55 mm and 61 mm and weighed 3.2 grams and 3.9 grams, respectively. External and internal gross lesions observed included: moderately hemorrhagic liver, testes, intestines, and coelomic fluid; enlarged spleen; poor body condition; and erythematous areas on the head, flank, and base of fins. RT-qPCR tests for VHSV were positive for 78/78 fish from Long Point and King Ferry, including both rock bass. Viral isolation on epithelioma papulosum cyprinid (EPC) cells showed cytopathic effect (CPE) characteristic of VHSV for 6 round goby samples from King Ferry. The complete 11,183-base-pair VHSV IVb genomes of five Cayuga Lake round goby isolates were all deep sequenced on an Illumina platform and compared with 2017 VHSV isolates from asymptomatic round gobies collected from: Lake Erie near Dunkirk, NY; the St. Lawrence River near Clayton, NY; and Lake St. Lawrence near Massena, NY. The initial phylogenetic tree created from these aligned sequences appears to show the Cayuga Lake isolates were most closely related to the Lake Erie isolate. Further phylogenetic analyses are needed to describe the diversity of viral isolate sequences from this new VHSV outbreak.

Email: rgg4@cornell.edu

ORAL PRESENTATIONS

Using stable isotopes to identify the nutritional sources supporting American Brook Lamprey *Lethenteron appendix* along a stream gradient

T.M. Evans[1], A.M. Weber[2]

[1]USGS Lake Ontario Biological Station, 17 Lake Street, Oswego, NY 13126; [2]Aquatic Biogeochemistry Laboratory, the Ohio State University, Columbus, OH

American Brook Lamprey *Lethenteron appendix* are a native non-parasitic lamprey found throughout New York. Like all lampreys, American Brook Lamprey depend upon a long larval period (e.g., ammocoete stage) where the animal feeds on algae and detritus. Gut content analysis has identified detritus as important to ammocoete growth, but stable isotope analysis has found ammocoetes rely primarily upon algae for growth, especially as they increase in size. The disagreement between approaches are as yet unresolved. Multiple isotopic ratios ($\delta^{2}H$, $\delta^{13}C$, $\delta^{15}N$, and $\delta^{34}S$) were measured in ammocoete muscle and potential sources along a stream gradient. Ultimately, a Bayesian mixing model (MixSIAR) predicted that ammocoetes were largely (>90%) dependent on detritus developed from aged terrestrial material for their growth. Ammocoete dependence on detritus was similar in all sites, but algae did increase in importance slightly at the most downstream site. These results suggest ammocoete growth is limited by detrital quality at all stream reaches. Clarification of how isotopic signatures are developed in ammocoetes offers the ability to better leverage isotope data to study lamprey ecology, including invasive Sea Lamprey *Petromyzon marinus*.

Email: tmevans@usgs.gov

ORAL PRESENTATIONS

Community and habitat restoration (Iroquois, 09 February 2018)

Aquatic plant community response to restoration of Muskellunge nursery habitat in the Upper St. Lawrence River

Jessica A. Goretzke*, and John M. Farrell

Department of Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry, 1 Forestry Drive, Syracuse, NY, 13210

Muskellunge *Esox masquinongy*, are large, uncommon sportfish with a historically self-sustaining population in the upper St. Lawrence River. The spawning and nursery habitats of Muskellunge within the St. Lawrence River have seen dramatic changes, driven in part by water level regulation and establishment of invasive species. In the emergent zone, hybridization of cattail species has caused numerous wetland community shifts, including downslope expansion of cattail into critical habitats of Muskellunge bays. The restoration of native emergent vegetation of wetlands along the St. Lawrence River has been more extensively studied than the submersed aquatic vegetation (SAV), despite its importance as nursery habitat of Muskellunge. A variety of aquatic invaders has limited the availability of desirable SAV habitat, including Eurasian milfoil *Myriophyllum spicatum* and dense macroalgae (both native and invasive). Our objectives are to develop a successful system for transplanting sediments from healthy nursery sites to restore SAV in historic nursery sites and determine macrophyte succession and efficacy of wetland enhancement techniques in restored Muskellunge nursery sites. Results will serve as a baseline for future restoration projects and to document changes to SAV communities as a result of habitat restoration.

Email: jagoretzke@gmail.com

ORAL PRESENTATIONS

American Eel Stocking in Upper Susquehanna

Thomas P. Franzem*, and Paul H. Lord

State University of New York College at Oneonta, Oneonta, NY 13820

American Eel *Anguilla rostrata* are believed to have once occupied nearly all of the accessible aquatic habitat available in the Upper Susquehanna. Following dam construction, eels have been unable to access the upper watershed on their own. The absence of eels has negatively impacted local ecology. Specifically, recent work indicates that Eastern Elliptio *Elliptio complanata* populations in the Susquehanna drainage require American Eels to complete their life-cycle; lack of eels is likely the cause of Elliptio population decline in the watershed. Recently, the NYSDEC has granted permission to stock American Eels from the Chesapeake Bay in the Upper Susquehanna. Eels will be stocked at three locations throughout the watershed. These areas will be closely monitored after stocking. We expect eel stocking will have fish community impacts, crayfish impacts, Eastern Elliptio impacts, and Yellow Lampmussel impacts.

Email: paul.lord@oneonta.edu

ORAL PRESENTATIONS

Walleye early-life as an important component of management: habitat restoration, protection, and evaluation in eastern Lake Ontario

John Paul Leblanc, Brandeis L. Brown, John M. Farrell

College of Environmental Science and Forestry, State University of New York, Syracuse, New York, 13210, USA

To assist with management of tributary spawning walleye (*Sander vitreus*) populations of eastern Lake Ontario, we report on our efforts to identify novel spawning habitat, evidence of diel outmigration behaviour of larval walleye, and results of a recent spawning habitat enhancement project. In 2013 and 2014, we assessed patterns of larval outmigration at tributaries with known and unknown spawning status during daylight and nighttime driftnet surveys. Among tributaries with unknown spawning status, two were confirmed as newly discovered walleye spawning habitat. Catches of out-migrating larval walleye were also consistently higher during nighttime surveys indicating increased capture efficiency at night, which should be included in future monitoring protocols. Lastly, in 2015 and 2016, we evaluated the success of a Newbury weir, created with added angular crushed limestone, to enhance spawning habitat for walleye in a tributary of eastern Lake Ontario (i.e., Kent's Creek). Following construction in 2014, similar patterns of egg deposition, egg viability, and larval outmigration were found between the Newbury weir and a natural spawning bed each year. When data were pooled between years, significantly higher densities of out-migrating larvae were observed at the Newbury weir despite finding significantly more eggs at the natural site. Our results indicate that when installed in an appropriate fluvial geomorphic setting, the Newbury weir successfully created functional spawning habitat promoting out-migrating larval walleye. Overall, early-life stages proved to be a powerful tool to identify and evaluate management actions for tributary spawning walleye.

Email: johnpaul.leblanc@gmail.com

ORAL PRESENTATIONS

Restoring Alewife Habitat in the Peconic River

Elizabeth Hornstein[1], Sarah Schaefer[2,3], Byron Young[4,5,6], Alison Branco[7], Julie Nace[8], Chart Guthrie[9], Matthew Sclafani[10]

[1]New York State Department of Environmental Conservation Peconic Estuary Program Coordinator/Division of Marine Resources/Bureau of Marine Habitat, East Setauket, NY 11733; [2]Peconic Estuary Program Acting Director; [3]Suffolk County Department of Health Services, Office of Ecology, Yaphank, NY 11980; [4]Citizens Advisory Panel to the ASMFC Shad and River Herring Management Board; [5]Seatuck Environmental Association; [6]Peconic River Fish Restoration Commission, Ridge, NY 11961; [7]The Nature Conservancy New York, Long Island Chapter, Cold Spring Harbor, NY 11724; [8]US Environmental Protection Agency, Region 2, New York, NY 10007; [9]New York State Department of Environmental Conservation, Stony Brook University, Stony Brook, NY 11790; [10]Cornell University Cooperative Extension, Riverhead, NY 11901-3071

Alewife *Alosa pseudoharengus* is a diadromous fish that spends most of its life in the ocean but returns to freshwater rivers, streams, and lakes to spawn. Throughout its life cycle Alewife provide many vital ecosystem services, including filtering the water column and providing forage for numerous commercial and recreational fish species, migratory birds, and mammals. On Long Island, a major Alewife spawning run occurs in the Peconic River. Until recently, the Peconic River had six dams along its length that prevented Alewife and other diadromous fish species from migrating up and downstream. However, in 2010, a fishway was built at the first barrier on the Peconic River, Grangebel Dam. Since then, an annual Volunteer Alewife Monitoring Program has been implemented and it is estimated that 40,000 to 80,000 spawners successfully use this fishway each year. In 2016 another fish passage project was completed at the Edwards Avenue Dam. Construction of a third fish passage at the Woodhull Dam, the next major barrier to Alewife passage on Little River, a major tributary of the Peconic River, will occur in the near future. By providing passage through or around these barriers on the Peconic River, Alewife and other diadromous fish will be able to access critical habitat, thereby promoting the recovery of these species and improving biodiversity in the Peconic Estuary and marine ecosystem. All dams on the Peconic River, with the exception of the most upstream dam, are in some phase of river connectivity restoration, which will ultimately lead to the restoration of over 300 acres of diadromous fish habitat. Efforts have been led by the Peconic Estuary Program, partnering with NY State, Suffolk County, local governments, non-profit organizations and others.

Email: elizabeth.hornstein@dec.ny.gov

ORAL PRESENTATIONS

Wood is good! How reintroducing wood can increase stream function.

Gian Dodici,

US Fish and Wildlife Service, Cortland, NY 13045.

Anthropogenic changes to stream corridors are well documented; these changes include straightening, enlarging, removing boulders, and removing wood "debris." Although large-scale anthropogenic changes are not on-going, the effects of past stream alterations continue to affect fluvial geomorphology today. Additionally, small scale modifications continue (e.g. dredging, wood removal) which can lead to further degradation of stream function. Wood is often the foundation of a healthy riverine ecosystem, providing cover, food and other important functions so its removal can have significant effects. Here I will discuss a stream function framework and how the removal of trees affects not only geomorphological function but also biological function. I will also discuss methods to reintroduce wood into streams in a stable manner and thereby enhance ecological function.

Email: gian_dodici@fws.gov

ORAL PRESENTATIONS

DEC's Freshwater Mussel Caging Project on the Lower Grasse River

Corbin Gosier

New York State Department of Environmental Conservation, Bureau of Habitat

The lower 7.2-miles of the Grasse River in Massena, NY is about to undergo extensive sediment dredging and capping under the US EPA Superfund program due to historical releases of polychlorinated biphenyls (PCBs) by Arconic (formerly Alcoa). Recent studies conducted during the remedial design documented ten species of native freshwater mussels present throughout the lower Grasse River project area. In 2017, the New York State Department of Environmental Conservation (NYSDEC) began collecting freshwater mussels from remedial areas (i.e., areas to be dredged and capped). The goal of our project is to assist mussel community recovery by holding a representative number of each species for the duration of the remedy to attempt to replace "founder colonies" within reconstructed areas. The first year of collection is now complete and over four thousand mussels representing seven species have been collected from more than 20 areas to be dredged and capped. 2,115 of those mussels were returned to "safe" areas within the river, 2,010 mussels are being held in specially designed in-river mussel holding cages and 100 mussels are in experimental propagation.

Email: corbin.gosier@dec.ny.gov

ORAL PRESENTATIONS

Response to lotic flow changes: Brook Trout

James E. McKenna, Jr.[1], Howard W. Reeves[2], and Paul W. Seelbach[3]

[1]US Geological Survey/GLSC, Tunison Laboratory of Aquatic Science, Cortland, NY 13045; [2]US Geological Survey, Michigan Water Science Center, Lansing, MI 48911–5991; [3]US Geological Survey, Great Lakes Science Center, Ann Arbor, MI 48105

Living aquatic communities respond to changes in the volume and quality of flowing waters. However, lotic systems vary and flow is one of the most frequently and extensively altered features of rivers and streams; effects likely to be exacerbated by climate change. Also, different fish species need different conditions, and problems differ by spatial scales. We developed a flow-fish abundance tool to evaluate the effects of altered flows throughout the Great Lakes Region at scales from the stream reach to the Region. We fit the logistic model to a cumulative Brook Trout (*Salvelinus fontinalis*) abundance curve as a function of yield. Response zones of yield for Brook Trout in each system type (i.e., size-thermal class) illustrate how criteria may be developed for decision-making about flow management. We evaluate the general response of Brook Trout abundances to changes in flows and assess their sensitivity to flow alteration in each stream. Mapping stream sensitivity throughout the US Great Lakes Region with a multiscale spatial framework, shows regional variability in sensitivity for support of Brook Trout (or other species). This tool provides managers with information to help determine where the best opportunities for protection or restoration of streamflows and associated communities may exist.

Email: jemckenna@usgs.gov

ORAL PRESENTATIONS

Fisheries management (Kingfisher Tower, 09 February 2018)

A citizen-based approach to supplementing state collected fishery data

*Ryan Elliott, and Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, New York 13820

The inland fisheries of New York State are important ecological and recreational resources, valued at approximately $200 million (Connelly & Brown 1991). Monitoring these fisheries is an integral part of long-term management, though in some cases limited budgets can preclude the monitoring of these important resources in public lakes. Citizen involvement has become more common in routine limnological monitoring and may provide a useful and cost-effective method for supplementing semi-annual monitoring of inland fisheries in some cases. Lake of the Woods, a publically accessible lake in northern New York, supports a popular two-story fishery. Although the NYSDEC has sampled Lake of the Woods semi-regularly over the last three decades, members of the Lake of the Woods Association have expressed the desire to monitor balance in the fish community more frequently for the purpose of adaptive fishery management. In order to balance stakeholder demands with the NYSDEC sampling schedule, we developed an angler log-book program. This program collected catch data from volunteer anglers so that the species present and the proportional size distribution for each species could be evaluated. In order to account for angler and fish behavior, effort was spatially stratified and analyzed using a generalized linear mixed model (GLMM) with a logit-link function. This study was low impact, allowed contemporary data to be collected on the fisheries in Lake of the Woods at minimal cost to stakeholders, and no cost to state agencies.

Email: ellirj14@oneonta.edu

ORAL PRESENTATIONS

Rapid response for invasive waterweeds in temperate lakes: assessment of collateral impacts from herbicide treatment

Suresh Andrew Sethi[1], Michael P. Carey[2], John M. Morton[3], Edgar Guerron-Orejuela[4], Robert Decino[5], Mark Willette[5], James Boersma[6], Jillian Jablonski[6], Cheryl Anderson[6]

[1]U.S. Geological Survey, New York Cooperative Fish and Wildlife Research Unit, Cornell University, Ithaca, NY 14853, USA; [2]U.S. Geological Survey, Alaska Science Center, Anchorage, AK 99508, USA; [3]U.S. Fish and Wildlife Service, Kenai National Wildlife Refuge, Soldotna, AK 99669, USA; [4]Kenai Watershed Forum, Soldotna, AK 99669, USA; [5]Alaska Department of Fish and Game, Soldotna, AK 99669, USA; [6]U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Conservation Office, Soldotna, AK 99669, USA

Invasive waterweeds have potential for high ecological and economic impact. Many species reproduce vegetatively, such that mechanical removal is costly and typically fails to eradicate infestations. As a result, a rapid eradication response with herbicides has been identified as a priority invasion control strategy for several waterweeds. However, concern for collateral impacts to native flora and fauna from herbicides remain an important management question. In this talk, we present results from a multi-lake monitoring effort to assess collateral ecological impacts from fluridone and diquat-based herbicide treatment for invasive *Elodea* in Alaskan lakes. *Elodea spp.* is the first aquatic invasive plant to become established in Alaska and shares commonalities with invasive waterweeds currently impacting lower 48 U.S. systems such as *Hydrilla*. Variability in data was driven by seasonal dynamics and natural lake-to-lake differences typical of high latitude waterbodies, indicating lack of evidence for systematic impacts to water quality or plankton communities associated with herbicide treatment of *Elodea*. Impacts on native macrophytes were benign with the exception of some evidence for earlier onset of leaf senescence for lily pads (*Nuphar spp.*) in treated lakes. We observed a substantial increase in native flora richness after *Elodea* was eradicated from the most heavily infested lake, indicating potential for retention of native macrophyte communities if infestations are addressed quickly. While avoiding introductions through prevention may be the most desirable outcome, these applications indicated low risks of non-target impacts associated with fluridone- and diquat-based herbicide treatment as a rapid response option for invasive waterweeds in high latitude systems.

Email: suresh.sethi@cornell.edu

ORAL PRESENTATIONS

Estimating the precision and accuracy of high resolution side-scan sonar length estimates of overwintering adult Shortnose Sturgeon

Amanda Higgs[1], Richard Pendleton[1], Dewayne Fox[2], John Madsen[3], David Kazyak[4], Patrick Sullivan[5], Gregg Kenney[6]

[1]Department of Natural Resources, Cornell University, in cooperation with New York State Department of Environmental Conservation; [2]Department of Agriculture and Natural Resources, Delaware State University; [3]Department of Geological Sciences, University of Delaware; [4]U.S. Geological Survey, Leetown Science Cente; [5]Department of Natural Resources, Cornell University; [6] Division of Marine Resources, New York State Department of Environmental

Shortnose Sturgeon *Acipenser brevirostrum* were initially listed as an endangered species in 1967 under the Endangered Species Preservation Act of 1966. As such, they were the first fish listed as endangered with enactment of the 1973 Endangered Species Act. In the 1990's, population estimates of Shortnose Sturgeon in the Hudson River, where presumably the largest abundance occurs along the entire Atlantic coast, indicated that the spawning population had increased substantially from that observed earlier in the 1970's. A new population estimate would identify if the increase has continued. Mark recapture population estimates are labor intensive and in a system like the Hudson would be prohibitively expensive. Recent studies using high-resolution side-scan sonar to locate and count fish suggest that this methodology can be successfully employed in population estimates. However, the minimal body size for a positive detection of an individual fish in a field setting using side-scan sonar is largely unknown. To better understand this limitation, 12 wooden Shortnose Sturgeon models of different sizes ranging from 0.5 to 1.5 m TL were mounted to cement blocks, lowered to the bottom of the Hudson River within the vicinity of a Shortnose Sturgeon overwintering area, and were imaged with a high-resolution Edgetech 4125P 600-1,600 kHz dual frequency side-scan sonar system. Adult Shortnose Sturgeon can be as small as 0.5 m and the detection/confirmation of sonar targets (fish) in the 0.5 to 1.5 m range provides critical information on the feasibility of using side-scan technology, integrated with other methods (e.g., acoustic telemetry), to assess Shortnose Sturgeon populations. In conjunction with the side-scan sonar data collection, gill netting was carried out to better understand the length frequency and assemblage of Shortnose Sturgeon in the area relative to the side-scan sonar imagery.

Email: amanda.higgs@dec.ny.gov

ORAL PRESENTATIONS

Effectiveness of Daily Limit Regulations for Controlling Percid Harvest in Lake Erie

Jason Robinson and Donald W. Einhouse

Lake Erie Fisheries Research Unit, New York State Department of Environmental Conservation

Walleye and Yellow Perch fisheries in the New York waters of Lake Erie are among the most popular and valuable in the state. Daily harvest limits are the only viable tool available to control harvest because of the largely recreational nature of these fisheries. Regulatory changes are sometimes made without a complete understanding of whether they will have the desired effect. The goal of this work is to quantify the effect of changing daily limits on the total annual harvest of Yellow Perch and Walleye in the New York waters of Lake Erie. We used a simulation approach to evaluate the effectiveness of changing daily limits on total harvest. A range of potential daily limits were evaluated using 15 years (2002–2016) of open lake angler survey data. Reductions in daily limits were simulated by reducing individual angler harvest in existing angler survey interview data. This work provides a framework on which to base future regulatory decisions and will allow us to respond to future inquiries about regulation changes from a scientific, data-driven position. These results may be used to inform regulatory decisions for smaller scale harvest oriented fisheries that do not have the associated long-term data required to implement the analyses presented here.

Email: jason.robinson@dec.ny.gov

ORAL PRESENTATIONS

Lake Ontario Cooperative Science and Monitoring Initiative

Jesse M. Lepak, Katherine Bunting-Howarth, and Paul Focazio

New York Sea Grant

It imperative that we study and understand the Great Lakes to better protect, maintain, and enhance the ecological services they provide. However, their size and complexity make it challenging to conduct comprehensive research and monitoring efforts, even within a single lake. Scientists have learned a lot about the Great Lakes over the past several decades by doing high quality, long-term studies and monitoring. To get even more value out of these efforts, in 2002, the United States and Canada committed to a collaborative, binational scientific effort in the Great Lakes. The effort is now known as the Cooperative Science and Monitoring Initiative (CSMI). CSMI rotates from lake to lake on a 5-year cycle, and aims to promote, organize, and unify different research and monitoring efforts by local, state, provincial, federal, First Nations, academic, and non-governmental groups. However, until 2017 there was no formal or standardized effort to extend CSMI results to the public. This talk is designed to describe the structure of CSMI and principal findings in the context of the 2013 effort in Lake Ontario. Further, the upcoming CSMI 2018 field season will focus once again on Lake Ontario, and the primary objectives will be presented for this ideal audience consisting of multiple CSMI collaborators, organizers, and communicators.

Email: jml78@cornell.edu

ORAL PRESENTATIONS

Anadromous River herring in the Hudson River: status, research and management

Gregg Kenney, and Wes Eakin

New York State Department of Environmental Conservation

The Hudson River is home to two species of anadromous river herring that support commercial and recreational fisheries as well as a suite of estuarine and ocean predators. There is currently considerable conservation concern about the status of river herring stocks throughout the Atlantic Coast. The New York State Department of Environmental Conservation is conducting annual monitoring, research and management of both river herring species in the Hudson River. We provide an overview of activities conducted by the Department, and partners, to ensure self-sustaining populations of river herring for future generations.

Email: gregg.kenney@dec.ny.gov

ORAL PRESENTATIONS

Dead or alive: estimating catch-and-release mortality of Spotted Seatrout *Cynoscion nebulosus* in the Gulf of Mexico

Grant Scholten*, Mike Allen, Rob Ahrens, James McKenna Jr.

[1]United States Geological Survey, University of Florida; [2]Fisheries and Aquatic Sciences, University of Florida, Gainesville, FL 32653; [3]United States Geological Survey. U.S. Geological Survey, Tunison Laboratory of Aquatic Science, Cortland, NY 13045-9357 USA.

Spotted Seatrout represent one of the most economically important fishing industries in Florida. An economic study valued the fishery at just over $81 million, and estimated that it generates $137.7 million in total sales and 1,409 jobs. Maintaining the Spotted Seatrout recreational fishery requires ensuring fish stocks are not being overharvested. However, this also includes fish that die from injuries sustained during the capture process but are still "released" (catch-and-release [CR] mortality). Current management of Spotted Seatrout mortality assumes CR mortality to be 8% based on literature-reported estimates. However, some research suggests that CR mortality could be higher and variable. It's apparent that identifying key influences on CR mortality as well as an empirical estimate would benefit the management of this species and advance our understanding for other species. Our research obtains an empirical effort-based temperature-dependent CR mortality estimate for Spotted Seatrout in the Gulf of Mexico and also uses a simple linear model and generalized linear model (logistic) to identify variables that explain key influences on mortality rates. Catch-and-release mortality rates ranged from 7—22% with an effort-based temperature-dependent catch-and-release mortality of 15%. Although significant, a fairly weak coefficient of determination (R-squared value=0.35) suggested there were other variables that could explain variation. Handling time and bleeding were positively related to mortality and explained a significant amount of variation in the generalized linear model, while corner lip and upper mouth injuries were both negatively related to mortality and explained a significant amount of variation in the model.

Email: grantmscholten@ufl.edu

ORAL PRESENTATIONS

A case of missing adults and the size distribution of seasonally migrating round goby in Lake Ontario

Chris Pennuto and Knut Mehler,

Great Lakes Center, Buffalo State College, Buffalo, NY 14222

Population size structure is an important feature of migrating organisms with implications for future reproductive success, nutrient translocations, and conservation efforts. In Lake Ontario, the round goby moves offshore to deeper waters in winter and returns to nearshore waters in the spring. We assessed goby density and size structure using underwater video to document conditions when the population headed offshore and when it returned in the spring. In this project we compared the late fall size structure to the early spring structure. The departing goby population was dominated (65%) by adult fish >5 cm TL, whereas the returning population was predominately (62%) juvenile fish $\leq$ 5 cm. We speculate that the loss of larger fish during the winter in offshore waters represents a potentially significant nutrient translocation by round gobies. Possibly, offshore habitats contain less refuge habitat, making larger fish vulnerable to offshore predators in winter.

Email: pennutcm@buffalostate.edu

POSTER PRESENTATIONS

POSTER ABSTRACTS (*student presenter, presenting author underlined if not first)

Restoration of native Muskellunge in the upper St. Lawrence River in the face of viral hemorrhagic septicemia virus and Round Goby invasions

Katherine M. Abbott*[1], John M. Farrell[1], Rodman Getchell[2], and Christopher Whipps[2]

[1] Dept. of Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry, Syracuse, NY 13210; [2] Department of Microbiology and Immunology, Cornell University College of Veterinary Medicine, Ithaca, NY 14853

Between 2005 and 2008, the native Muskellunge *Esox masquinongy* population in the upper St. Lawrence River declined rapidly, following widespread outbreaks of viral hemorrhagic septicemia virus (VHSv). Concomitant increases in abundance of Round Goby *Neogobius melanostomus*, that are known VHSv vectors, may perpetuate the spread of the virus; however, mechanisms behind this interaction remain unclear. We therefore propose to test VHSv disease dynamics between stocked and wild Muskellunge and Round Goby to elucidate effects on population declines and recovery potential. To accomplish this, Muskellunge fingerlings will be stocked annually between 2017 and 2020 in collaboration with SUNY-ESF, NYSDEC, OMNRF, and USFWS. Prior to stocking, all muskellunge will be implanted with passive integrated transponder tags to enable individual identification. Seine surveys will be conducted post-stocking to assess early growth and distribution of fingerlings, and Muskellunge VHSv immune response will be tested using enzyme-linked immunosorbent assays (ELISA). Quantitative RT-PCR will used to determine VHSv prevalence among Round Gobies and ambient water samples at time of seine surveys. Results are expected to enable a better understanding of the factors influencing population decline and the potential disease risks to naïve stocked Muskellunge that may inhibit recovery.

*Email: kaabbott@syr.edu

POSTER PRESENTATIONS

Where do the Walleye go? Analyzing fry stocking success in Butterfield Lake, NY.

David Andrews*, and Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

Butterfield Lake, located in Jefferson County New York, boasts a prolific sport fishery. Largemouth Bass *Micropterus salmoides* are most abundant, however, numerous other target species including Walleye *Sander vitreus* are present. Walleye and Largemouth Bass often exhibit negative impacts on each other when they exist in the same system, due to predation and competition pressure. In Butterfield Lake Walleye have been stocked intensively since 1990, at a rate of approximately 3 million fry annually, with seven instances of fingerling stocking. Despite this effort, catch rates of Walleye in fisheries surveys has failed to improve significantly. We analyzed data from historical fisheries surveys on Butterfield Lake for trends in Walleye and Largemouth Bass populations and lay out a plan to understand better the efficacy of current Walleye stocking practices and their impacts on the food web. Gut content analysis via gastric lavage and a Walleye fry dispersal survey surrounding a stocking event will be performed

Email: davidandrews7@hotmail.com

POSTER PRESENTATIONS

Changes in fish assemblages after the removal of the Hogansburg Dam on the lower St. Regis River, NY

Alexander Arams[1], James McKenna Jr.[1], and Anthony David[2]

[1]Tunison Laboratory of Aquatic Science, United States Geological Survey, Great Lakes Science Center, Cortland, NY 13045; [2]Environment Division, St. Regis Mohawk Tribe, Akwesasne, NY 13655

Dam removal is a common restoration tool used to reestablish natural flow regime, sediment transport, and habitat connectivity to historically lotic systems. However, without comprehensive pre-dam and post-dam removal monitoring and assessment, immediate biological responses to barrier removal remain poorly understood. The 2016 removal of the decommissioned Hogansburg Dam on the lower St. Regis River provides a unique opportunity to examine changes in fish assemblage structure, migratory patterns, and overall ecological recovery following a dam removal. In a collaborative effort between the U.S. Geological Survey and St. Regis Mohawk Tribe (SRMT), pre-removal fish assemblages and baseline habitat conditions were evaluated throughout 2009-2015 with support of the Fish Enhancement, Mitigation, and Research Fund (FEMRF). Following a similar sampling design in 2017 (one year post-removal), we identified and enumerated fishes captured through a series of gear types (beach seine, gillnet, boat electrofishing) within 4 kilometers above and below the former dam site. Species composition and abundances (# fish/100m^2) of pre- and post-removal fish assemblages were compared by gear type using bootstrapped cluster analysis and Student's t-tests. Immediately after dam removal, we observed significant decreases in assemblage diversity ($p = 0.003$) and richness ($p = 0.03$) in shallow lentic habitats and deep bottom habitats, respectively. Continued long-term monitoring is needed to quantify how fish assemblages transition to historic hydrologic and habitat connectivity, as well as assess passage of key migratory fishes upstream through the dam site.

Email: aarams@usgs.gov

POSTER PRESENTATIONS

Eastern Brook Trout Joint Venture surveys in NYSDEC Region 3: 2016-2017

Frank Benedetto, and Michael DiSarno

New York State Department of Environmental Conservation, Region 3 Inland Fisheries, New Paltz, NY

Brook trout *Salvelinus fontinalis* populations have been declining in NYSDEC Region 3, and in 2006 the Eastern Brook Trout Joint Venture (EBTJV) categorized their populations as "reduced, greatly reduced or extirpated." However, this assessment was based on outdated or lacking information, and an assessment at the catchment level was deemed necessary by the NYSDEC. During 2016 and 2017, seasonal fisheries technicians conducted backpack electrofishing surveys to document the presence of wild Brook Trout populations in 1st to 3rd order streams in Region 3. These surveys were conducted as part of the EBTJV, which has a primary goal of conserving, enhancing and restoring Brook Trout populations that have been impacted by habitat modification, or other threats and disturbances. As such, a secondary goal of these surveys was to document potential threats to brook trout populations, such as manmade barriers, and to upgrade water quality classifications to protect these streams from in-stream work and further development. One thousand sixty-six streams were sampled over the course of the two field seasons, and 281 streams in total contained populations of wild trout (Brook trout, Brown Trout *Salmo trutta* or Rainbow Trout *Oncoryhnchus mykiss*). There were 129 streams that supported populations of only wild Brook Trout, and there were 71 streams in which Brook Trout coexisted with either brown trout or Rainbow Trout or both species. Brown trout were documented in 146 streams, and Rainbow Trout in 21. Manmade, potentially impassible barriers (mostly culverts) were found in 109 of the streams sampled. Water quality classification upgrades are necessary in 147 of the streams surveyed which will further protect these populations of wild trout.

Email: Frank.benedetto@dec.ny.gov

POSTER PRESENTATIONS

Effects of acoustic tag implantation on the spawning behaviors and migration of Striped Bass *Morone saxatilis* in the Hudson River

Matthew Best, Jessica Best, Wes Eakin, and Amanda Higgs

New York State Department of Environmental Conservation, New Paltz, NY 12561

The Department of Environmental Conservation's Hudson River Fisheries Unit tagged Striped Bass *Morone saxatilis* with acoustic tags to monitor the effects that the tagging process has on the spawning behavior and migration of the fish in the Hudson River. The fish were sampled during an annual spawning stock survey conducted by the unit, where bass are corralled along the shore of the Hudson River using a 500 foot haul seine, as well as electrofishing, between April and June during their spawning run. Forty-one Striped Bass were surgically implanted with acoustic tags in the spring of 2015, and 100 more bass were implanted with acoustic tags in the spring of 2016. Movements were tracked using an array of 22 stationary receivers throughout the river, as well as mobile tracking efforts. Preliminary receiver data suggests that after being tagged, some Striped Bass either fall back out of the river, fall back for a short period of time before continuing up river to spawn, or some bass continue upstream to spawn without delay. Bass that were tagged continued to be monitored, in the following years, to examine and compare their "normal" spawning behaviors, with their post-tagging behaviors. In future years, the behavior of acoustic tagged Striped Bass will continue to be monitored and examined to more fully understand the effects that acoustic tagging may have on normal striped bass spawning behavior.

Email: matthew.best@dec.ny.gov

POSTER PRESENTATIONS

Examining reproductive potential of Alewife *Alosa pseudoharengus* in Lake Ontario

Tom Bianchi[1], Brian Weidel[2], Michael Connerton[3], Matthew Futia[1], Jacques Rinchard[1]

[1]Department of Environmental Science and Ecology, The College at Brockport – State University of New York, Brockport, NY 14420; [2]U.S. Geological Survey, Great Lakes Science Center – Lake Ontario Biological Station, Oswego, NY 13126; [3]New York State Department of Environmental Conservation – Lake Ontario Research Unit, Cape Vincent, NY 13618.

Population dynamics of prey fish directly impact the success of economically valuable predatory fish in the Great Lakes region. In Lake Ontario, Alewife *Alosa pseudoharengus* is the most abundant pelagic prey fish, and therefore, is the primary food source for the lake's valuable salmonines. Recently observed variability in Alewife year class strength has identified a need to understand how climate and Alewife population age structure influence year class strength. Previous research has focused on the role of climate, but little is known about how age or size influence Alewife reproductive potential. Age at 1st reproduction, reproductive value, and spawning timing may be important factors for modeling stock recruitment and population dynamics of Alewife. The objective of this study is to determine if Alewife spawn at age 2; if reproductive success is constant across ages after maturity; and if females shed all of their eggs in a single spawning event. Preliminary results including spawning and fertilization success as well as gonad development through histological analysis will be included.

*Email: tbian1@u.brockport.edu

POSTER PRESENTATIONS

Histological analysis for evidence of endocrine disruption in Blacknose Dace *Rhinichthys atratulus* in the Seneca Lake watershed

Walter Bowyer, Sarah Garcia, Nhung Nguyen, Penelope Murphy, and Susan Cushman

Hobart & William Smith Colleges; Geneva, NY 14456

Endocrine disrupting chemicals have been shown to adversely affect exposed fish populations in freshwater systems all over the world. Our goal was to histologically determine the effect of these chemicals on male Blacknose Dace in the Seneca Lake watershed in the Finger Lakes region. Four streams were selected, and a total of 127 male BND were captured May-August 2016 and 2017. Testes were dissected, processed, sectioned and inspected for the presence of testis-ova. Six of 127 male BNDs had testis-ova, all at low severity. All six were in the two streams running through Geneva, NY. Further analysis is planned to determine if there is a correlation between these findings and endocrine disruptors

Email: bowyer@hws.edu

POSTER PRESENTATIONS

A Muskellunge telemetry study in the Buffalo Harbor and Upper Niagara River

Justin Brewer, Michael Todd, Christopher Driscoll, Robert Roth Jr., James Zanett

New York State Department of Environmental Conservation Region 9 Fisheries, Allegany, NY USA 14706

The Muskellunge *Esox masquinongy* fishery in the Buffalo Harbor and Upper Niagara River, historically considered one of the best in North America, has declined substantially since the late 1990's. This urban Muskellunge fishery is one of only three self-sustaining populations in New York State. A reduction of spawning and nursery habitat are suspected to be a leading cause of declining Muskellunge numbers, particularly in the Buffalo Harbor. Knowledge about seasonal use of the Buffalo Harbor by Muskellunge will help us to determine the factors limiting the recovery of the Muskellunge population in the Buffalo Harbor and ultimately aid in directing future habitat restoration and enhancement work. The New York State Department of Environmental Conservation, with assistance from the Niagara Musky Association, is conducting an acoustic telemetry study to pinpoint critical spawning and over-wintering habitat and investigate migratory patterns of Muskellunge in the Buffalo Harbor and upper Niagara River. A total of 20 adult muskellunge in pre-spawn condition will be surgically implanted with acoustic transmitters in the Buffalo Harbor. In the spring of 2017, the first ten fish were successfully tagged and nine acoustic receivers were deployed near suspected spawning habitat and travel corridors. Over the next 5 years, as part of the Great Lakes Acoustic Telemetry Observation System (GLATOS), our Buffalo Harbor receivers and nearby receiver arrays will be used to monitor tagged Muskellunge movements.

Email: Justin.Brewer@dec.ny.gov

POSTER PRESENTATIONS

Migration and spatial ecology of Bay of Quinte-eastern Lake Ontario Walleye

Erin N. Brown, and James A. Hoyle

Ontario Ministry of Natural Resources and Forestry, Lake Ontario Management Unit, Glenora Fisheries Station Picton, Ontario, K0K 2T0, Canada

Walleye *Sander vitreum* are the dominant piscivorous fish in the Bay of Quinte-eastern Lake Ontario nearshore waters and are known to be highly migratory. Historical mark-recapture studies and age-specific geographical and seasonal distributions suggest that movements are related to spawning habitat, temperature regimes, and foraging opportunities. We use acoustic telemetry techniques to describe Bay of Quinte-eastern Lake Ontario walleye movement at a finer scale than currently exists, and subsequently, to better understand the mechanisms which influence aspects of walleye life history. In 2017, 36 mature walleye were captured and equipped with internal acoustic transmitters and external tags. An established array of passive acoustic receivers in the Bay of Quinte and eastern Lake Ontario were used to monitor walleye movement. We present preliminary insight into seasonal distribution and movement patterns of mature walleye, identify areas of walleye aggregation, and highlight netting data which describes a period of distributional overlap of offshore prey. Increasing our knowledge of Bay of Quinte-eastern Lake Ontario walleye movement will help define the distributional range and better management of the fishery. Further, this work may provide insight into the linkages which exist between the condition and abundance of seasonally available offshore prey, and the condition and migratory patterns of walleye.

Email: erin.n.brown@ontario.ca

POSTER PRESENTATIONS

Lake Sturgeon spawning migration patterns and timing in the lower Niagara River.

Eric Bruestle, Zy Biesinger, Curtis Karboski, and Dimitry Gorsky

United States Fish and Wildlife Service Lower Great Lakes Fish and Wildlife Conservation Office, Basom, NY

Beginning in 2014, the U.S. Fish and Wildlife Service has been tagging Lake Sturgeon *Acipenser fulvescens* with acoustic tags to track their movements and migratory behaviors in the lower Niagara River. This area is home to a recovering remnant population of Lake Sturgeon, which spawns in the Niagara Gorge. Eighty-five Lake Sturgeon have been tagged across four years. Examination of multi-year acoustic telemetry data has shed light on the periodicity and timing of spawning migrations. It has also provided insight into the water temperatures at which spawning movements are initiated. Here we investigate whether there are sex-specific differences in spawning periodicity and highlight these behaviors in selected individuals. These findings are informative to the management of flow regimes in hydroelectric regulated rivers during periods that are important for sturgeon spawning success.

Email: eric_bruestle@fws.gov

POSTER PRESENTATIONS

Fish recovery programs in NYS: players and scorecards

Doug Carlson

New York State Department of Environmental Conservation Rare Fish Unit, Watertown, NY 13601

Recovery programs for Endangered, Threatened or extirpated fishes in NYS began after the 1990s, even though conservation efforts have been underway for decades. Activities for six of them have followed extensive inventory, development of recovery plans and hatchery propagation. Achievements are landmarked because of several cooperators. Six species programs have been administered by the Rare Fish Unit and by DEC regions, as shown in scorecard summaries. Round Whitefish recovery has nearly met its initial goal with efforts from DEC Regions 5-6, two DEC hatcheries and Cornell Univ. Lake Sturgeon recovery has nearly met its initial goal with efforts of DEC Regions 6-9, USGS, Cornell U., ESF, USFWS, two hatcheries (DEC and USFWS) and St. Regis Mohawk Tribe. This landmarked progress is from juvenile recruitment at three locations for each. For the remaining four species listed below, cooperators with DEC included SUNY at three locations, Kentucky S.U., and other neighbors like PA Fish and Boat Commission. Paddlefish have been stocked for 17 years before 2015, but we have not yet seen their reproduction in Allegheny Reservoir. They are widespread in those immediate areas of NY and PA. Northern Sunfish have nearly disappeared from western NY and have not made visible gains from 10 years of propagation. However, a newly discovered and secure population was found in Northeast NY in 2016. Gilt Darter and Pugnose Shiner have been stocked for two years since 2013 and have been detected as a mere few individuals. These programs have exceptional field studies and/or reports completed.

Email: douglas.carlson@dec.ny.gov

POSTER PRESENTATIONS

Unusual suckers of Big Moose Lake: environmental disturbances and recovery?

Doug Carlson, and Eric Maxwell

New York State Department of Environmental Conservation, Watertown, NY 13601

Suckers have been an important part of the fish community of Big Moose Lake of Herkimer County throughout its history, even during times of severe environmental acidification in the 1970-80s. Mather in 1882 reported on the two widespread species of suckers, White and Longnose Sucker, and he also described the unusual late-spawning variants of each, calling them species. The species most like White Sucker is now called Summer Sucker *Catostomus utawana* and this late-spawning adaptation can no longer be observed there. Greeley reported in 1931 when the lake and the fish community were still typical of the Adirondacks, and he described only one of the late spawning variants, of Longnose Sucker. By the early 1980s environmental acidification was at its worst, and losses from the fish community included Lake Trout, Brook Trout and Longnose Sucker. Also during this period came establishment of Yellow Perch. Details of that environmental acidification, as studied by Cornell and Syracuse University, placed Big Moose Lake among the best studied and most severely impacted from acid rain. Subsequent studies by ALSC and Syracuse Univ. have shown there are now elements of recovery in pH due to reduction in acidic deposition. Fish changes since then, and by the 2000s, included restoration with stocking of both *Salvelinus* trout and the unintended addition of non-native Largemouth Bass and Rock Bass. There appears to be nothing unusual today about the one remaining species of sucker in Big Moose Lake. However, more study on suckers and on fisheries restoration here are warranted.

Email: douglas.carlson@dec.ny.gov

POSTER PRESENTATIONS

Detecting shifts in an Adirondack Lake Trout *Salevlinus namaycush* population using size structure and condition

J. Benjamin Casscles*, Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

Lake Trout *Salvelinus fontinalis* in Piseco Lake, NY are supplemented by NYSDEC annually with stocking of 1,600 – 3,600 individuals. The goal of this effort was to assess changes in size structure and condition of the Lake Trout population in Piseco Lake during the course of the last decade to inform stakeholders about the status of the cold-water fishery. In this study, Lake Trout proportional size distribution (PSD), and relative weight (Wr) were compared between gillnet surveys in 2002 and 2014. Based on PSD analysis, the population seems to have been more in balance during than in 2002, with a slightly higher PSD–Q and lower PSD Q–P and PSD S–Q. Mean W_r increased from 88 in 2002 to 100 in 2014. The presence of Rainbow Smelt *Osmerus mordax* in 2014 and absence in 2002 suggest that changes in the Lake Trout population may be related to a change in forage availability. Future work regarding growth rates and recruitment as related to Rainbow Smelt density is required to assess this hypothesis.

Email: cassjb36@oneonta.edu

POSTER PRESENTATIONS

Grass Carp *Ctenopharyngodon idella* population models for Song Lake (Cortland County) and Crooked Lake (Onondaga County)

Stradder Caves*, and Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

Grass carp *Ctenopharyngodon idella* are herbaceous fish feeding intensively on aquatic plants. Because of their feeding behavior and preferences, Grass Carp have been stocked in many lakes in to help control nuisance macrophytes. Triploid Grass Carp have been developed in order to stop natural reproduction of the fish to help control their population within a system. Even with this control effort in place, Grass Carp can live to be older than thirty years of age and persist in a system long after they accomplish their intended purpose of reducing plant biomass. Song Lake and Crooked Lake, located on the border of Cortland and Onondaga Counties, have both been stocked with Grass Carp for aquatic plant control. Between 1995 and 2005, more than 2,500 triploid Grass Carp were stocked in Song Lake, while 200 triploid grass carp were stocked in Crooked Lake in 2013. Population models can be constructed in order to help determine the population of grass carp over the years for both lakes. With the two lakes being in different stages of stocking efforts, different conclusions can be derived from the models. This will help guide stocking decisions in the future, and can help determine whether or not the Grass Carp have become a nuisance and need to be removed.

Email: caves09@oneonta.edu

POSTER PRESENTATIONS

Impacts of the invasive Round Goby on benthic and pelagic prey in lakes

Susan Cushman, and Noland Michels

[1]Finger Lakes Institute, Hobart & William Smith Colleges, Geneva, NY 14456; [2]Unversity of Minnesota, Duluth, MN 55812

The Round Goby (RG), *Neogobius melanostomus,* an invasive species in the Great Lakes, has begun to invade new territories in the Finger Lakes of New York. It is known to forage primarily on Dreissenid mussels and Lake Trout eggs, but their impact on other lake invertebrates is unknown. Observations of declining snail populations and abundant pelagic invasive Mysids (Bloody Red Shrimp [BRS], *Hemimysis anomala*) led us to conduct tank feeding studies to assess consumption patterns and rates. We hypothesized that RG can change the benthic invertebrate community composition in invaded lakes. RG not only consumed snails, but preferred some families Physidae over others. BRS were consumed at a low but variable rate, and more in summer than fall. Smaller goby consumed more in June, but all gobies consumed few BRS in September indicating that season-dependent foraging occurs in the water column in addition to benthic prey. In conclusion, these studies indicate that RG will forage on a variety of invertebrates depending on life stage, environmental conditions, and phase of invasion in new waters.

Email: cushman@hws.edu

POSTER PRESENTATIONS

Seasonal movements & habitat utilization of White Suckers *Catostomus commersonii* in Cobleskill Creek, New York

Zachary R. Diehl*, Lyndon M. Watkins, John R. Foster

Fisheries, Wildlife & Environmental Science Department, State University of New York, Cobleskill, NY 12043

While white suckers *Catostomus commersonii* are one of the most widely distributed fresh-water fish in North America, relatively little is known about their habitat utilization and seasonal movements. What little research that has been conducted on white sucker movements and habitat utilization has occurred in large rivers and lakes. The goal of this study is to characterize the habitat utilization and seasonal movements of white suckers in a small watershed, Cobleskill Creek. Twelve adult white suckers were surgically implanted with Advanced Telemetry Systems radio tags and radio telemetry was used to locate and plot over 2,000 fish positions from November 2014 through January 2018. The dominant habitat utilized was pools, followed by runs and riffles. The majority of the time white suckers remained stationary in their home pool, venturing into shallower riffles and runs primarily during hours of darkness. Greatest movements occurred during spring spawning migrations, when movements of up to 3km were observed. In spite of their wide-spread distribution, historical and ecological importance, this is the first description of whiter sucker habitat utilization and movements in streams.

Email: zdiehl39@gmail.com

POSTER PRESENTATIONS

Population characteristics of spawning Walleye in Otsego Lake, NY

Hayley Dower*, and Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820.

Walleye *Sander vitreus* are a popular game fish in North America that are stocked to support recreational fisheries throughout New York. They also have been stocked for attempted control of Alewife *Alosa pseudoharengus* in several lakes in the state. Following the reduction of Alewife below detectible abundances in Otsego Lake, NY, there is recent evidence that Walleye are now successfully recruiting through natural reproduction, but quantitative assessment of many population characteristics in the absence of stocking is largely absent. The goal of this research was to provide information about the recently established walleye population in Otsego Lake, NY. We investigated demographics of spawning walleye (e.g., sex ratio, size structure, age, and growth). We collected 528 spawning Walleye in three tributaries during spring 2017, applied passive integrated transponder (PIT) tags that allowed for identification of individual fish, and we physically recaptured Walleye throughout the year to inform quantitative estimates of population parameters. Specific data collected from each fish included length, sex, and scale samples for aging. Sex ratios, age, growth, and size structure were estimated using repeated collection of this information. Walleye in Otsego Lake appear to be fast growing compared to other regional lakes, and sizes were similar between streams. Preliminary results indicate a low proportion of females across spawning streams (< 10%), which is consistent with previous work but lower than is commonly observed elsewhere. Females (mean = 537 mm TL) were also significantly larger than male spawners (mean = 487 mm TL) collected during this study, a relationship that was consistent across streams. These results indicate that Walleye are likely persisting at relatively low densities corresponding to fast growth rates even after the elimination of Alewife from this system, but that recruitment may be sensitive to harvest of large females from this population in the absence of stocking.

Email: doweh10@oneonta.edu

POSTER PRESENTATIONS

Historic commercial fishing records document shifts in fish communities and fisheries in eastern Lake Erie

Jonathan Draves*, Jason Robinson, Donald Einhouse, and James Markham

New York State Department of Environmental Conservation Lake Erie Fisheries Research Unit, Dunkirk, NY 14048

Throughout the 20th century Lake Erie has supported one of the largest freshwater fisheries in the world. While these commercial fisheries have remained significant, they have undergone drastic changes over the last century resulting from food web shifts, invasive species introductions, pollution, changing regulations, and changing fisher demographics. Since 1929 commercial fishers have been required to submit monthly reports summarizing their fishing effort and harvest. Until recently, only summaries of historic data (<1970) were known to exist. The recent discovery of detailed pre-1970 commercial harvest reports has allowed analysis of fishery changes at a level that was not previously possible. This work describes preliminary results of an analysis to describe long-term trends in species composition of harvest, fisher participation, and location of prominent commercial fisheries though the present day. Over the 20th century commercial harvest has shifted from being dominated by Lake Sturgeon, Cisco, and Blue Pike to a fishery dominated by Yellow Perch. Fishery participation and spatial coverage have also decreased substantially. As these historical harvest records are fully converted into a digital database more detailed analysis will be possible. Future analysis will be used to inform restoration by describing historic spawning locations and habitats, and to understand the timeline of extinctions and extirpations.

Email: jonathan.draves@dec.ny.gov

POSTER PRESENTATIONS

Predator-prey population dynamics model for Lake Ontario salmon management

Kimberly B. Fitzpatrick*[1,2], and Suresh A. Sethi[1,2]

[1]Department of Natural Resources, Cornell University, Ithaca, NY 14850; [2]U.S. Geological Survey New York Cooperative Fish and Wildlife Research Unit, Cornell University, Ithaca, NY 14850

Sustaining populations of salmon in Lake Ontario requires mangers to balance the abundance of stocked and naturally reproducing predators with the availability of prey, primarily alewife. These management strategies may benefit from an increased understanding of predator-prey relationships and identification of key information needs. In conjunction with lake managers, we aim to improve the understanding of predator-prey population dynamics and develop pertinent support tools for Lake Ontario salmon management. To do so, we are building upon previous Great Lakes predator management efforts by updating existing predator-prey models for Lake Ontario and incorporating more recent data. The updated model will then be tested under different scenarios to design management strategies that are robust to uncertainty. Finally, we will use the model to identify key data needs and cost-effective approaches to improve decision support for salmon management strategies in Lake Ontario.

Email: kbf53@cornell.edu

POSTER PRESENTATIONS

Lake Trout spawning habitat changes in Lake Ontario: historical and contemporary evidence from Stony Island Reef

S. L. Furgal[1], B. F. Lantry[2], J. M. Farrell[1], J. E. Marsden[3], D. Gorsky[4], and J. R. Lantry[5]

[1]SUNY College of Environmental Science and Forestry, Syracuse, NY 13210; [2]USGS Lake Ontario Biological Station, Oswego, NY 13126; [3]University of Vermont, Burlington, VT 05405; [4]USFWS Lower Great Lakes Fish and Wildlife Conservation Office, Basom, NY 14013; [5]NYS Department of Environmental Conservation Lake Ontario Unit, Cape Vincent, NY 13618

Lake Trout *Salvelinus namaycush* were the native top predator in the Lake Ontario fish community but were extirpated in the 1950s due to a suite of anthropomorphic ecosystem changes. Sea Lamprey *Petromyzon marinus* control and stocking restored a population, but success at establishing wild recruitment has been limited. In the 1980s, surveys at Stony Island Reef, a cobble reef in the Eastern Basin, documented substantial egg deposition and swim-up fry. Bottom trawls in the same area confirmed juvenile wild reproduced lake trout. More recently, few native juveniles have been found in the Eastern Basin. To determine if there was still egg deposition at Stony Island Reef, we set 108 egg nets during the spawning period, only capturing 1 egg. Comparing present to historical substrate images suggest that previously clean cobble is now in-filled, potentially due to *Dreissena* mussel changes to the interstitial spaces that may have inhibited spawning activity at the reef.

Email: sfurgal@usgs.gov

POSTER PRESENTATIONS

A novel approach to compare gut microbiota in native and invasive fish species in the upper St. Lawrence River using emerging next generation sequencing (NGS) technologies

Benjamin D. Gallo*[1], John M. Farrell[1,2], and Brian F. Leydet[1]

[1]Department of Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry, NY 13210; [2]Thousand Islands Biological Station, Clayton, NY 13624

The emergence of Next Generation Sequencing (NGS) technologies in the past 5 -10 years have exposed immense diversity of microbes inhabiting the gut of their vertebrate hosts. Research indicates that this gut microbiome can greatly influence the host's metabolism, immune function, and development. Little is known concerning the gut microbial assemblage of fishes, and fundamental questions concerning factors related to bacterial composition among fish species and their habitats remain. We examined if NGS can detect differences in fish gut microbiome between species and sample locations. DNA was extracted from 20 mg of hindgut samples and amplified using PCR through universal V6-V8 16S rRNA primers. Bacterial DNA samples will be processed using the Illumina Miseq system, allowing for over 16 Gb of output and 25 million sequencing reads organized into Operational Taxonomic Units (OTUs). OTUs will subsequently be compared using Analysis of Similarity (ANOSIM) and Principal Coordinate Analysis (PCoA) to determine if fish microbiome samples cluster by species, location, or both. These analyses will reveal the efficacy of utilizing NGS techniques for fish gut microbiome analysis.

Email: bdgallo@syr.edu

POSTER PRESENTATIONS

Efficacy of environmental DNA and traditional sampling methods to monitor the expansion of Round Goby in the Mohawk River-Barge Canal system

Scott D. George[1], Christopher Rees[2], Meredith L. Bartron[2], Barry P. Baldigo[1], and Michael deMoulpied[1]

[1] U.S. Geological Survey, New York Water Science Center, Troy, NY; [2] U.S. Fish and Wildlife Service, Northeast Fishery Center, Lamar, PA

The Round Goby *Neogobius melanostomus* is an invasive benthic fish indigenous to the Ponto-Caspian region of Eurasia which recently colonized all five Great Lakes and is presently invading eastward into the Mohawk River Basin through the New York State (Barge) Canal System. During 2016 and 2017, the U.S. Geological Survey, New York State Department of Environmental Conservation, and the U.S. Fish and Wildlife Service conducted a collaborative study to (a) document the distribution, relative abundance, and rate of expansion of Round Goby through the Mohawk River-Barge Canal system and (b) compare the efficacy of environmental DNA (eDNA) and traditional fish sampling methods for monitoring the distribution of this species. The presence of Round Goby was assessed using water samples (eDNA) and standard benthic trawls, bag seines, and minnow traps twice annually at 12 sites between Rome and Albany, NY during June and August in 2016 and 2017. Preliminary results indicate Round Goby were captured or detected at 2 of 12 sites and have invaded waters at least as far east as Utica, NY. Environmental DNA appears to be the most sensitive method for detecting populations at low abundances. The slow expansion towards the Hudson River drainage is surprising considering the rapid colonization that recently occurred west of the study area.

Email: sgeorge@usgs.gov

POSTER PRESENTATIONS

Keuka Lake forage collapse: A management perspective

Brad Hammers

New York State Department of Environmental Conservation Region 8 Avon, NY

Keuka Lake, the third largest by area of the Finger Lakes, supports an important recreational fishery consisting of both warmwater and coldwater species. Anglers primarily target black bass *Micropterus dolomieu* and *M. salmoides* and Lake Trout *Salvelinus namycush*, although Rainbow *Oncorhynchus mykiss* and Brown Trout *Salmo trutta* and Atlantic salmon *Salmo salar* provide added diversity to angler catches. Historically, the forage base consisted of Alewives *Alosa pseudoharengus*, Rainbow Smelt *Osmerus mordax*, Slimy Sculpin *Cottus cognatus* and Mysids. Recent survey results as well as angler reports suggest that fishery dynamics are changing in Keuka Lake. Forage base has experienced a significant decline and top predators as well as anglers are being impacted. Several factors including invasive *Dreissenids*, shifts in food web dynamics, decreasing lake productivity, predator abundance and recent winters may have resulted in these forage changes. Future management decisions need to focus on the current and future state of Keuka Lake and its fisheries. This includes exploring the reintroduction of native forage species.

Email: brad.hammers@dec.ny.gov

POSTER PRESENTATIONS

Ecological risk screening summaries: Quickly evaluate risk of non-native species including climate matching with future climate scenarios

Heidi Himes[1], Chris Castiglione[1], Mandi Ohar[1], Katherine Wyman-Grothem[2], and Scott Sanders[3]

[1]U.S. Fish and Wildlife Service, Lower Great Lakes Fish and Wildlife Conservation Office, Basom, NY 14013; [2]U.S. Fish and Wildlife Service, Bloomington, MN 55437; [3]U.S. Army Corps of Engineers, Fort Peck Project, Fort Peck, MT 59223

Assessing the potential risk of invasive species can be a long and labor intensive process. The U.S. Fish and Wildlife Service (USFWS) has developed a rapid risk screening protocol to serve as a first assessment of the ecological, economic, and human health risks posed by non-native species. An Ecological Risk Screening Summary (ERSS) can usually be completed in 1-2 days as compared to 1-2 years for a comprehensive risk assessment and takes into account the species' history of invasiveness, the quantity and quality of the information available, and the results of a climate match. The outcome of the ERSS can be used to demonstrate the need for a more comprehensive risk assessment. USFWS developed the Risk Assessment Mapping Program (RAMP) that matches 16 climate variables from the species' native range and established non-native populations to the same variables within a target region. Potential target regions include the entire U.S., the contiguous U.S., the Great Lakes Basin, all 50 individual states, and U.S. territories. To address how climate change may impact the species' range in the future, RAMP uses three future climate scenarios developed by the Intergovernmental Panel on Climate Change for the years 2050 and 2070. The species' current climate requirements are matched to the same target locations under the projected climate scenarios and future years. The species chosen to be assessed come from various watch lists and requests from USFWS's partners including state agencies and non-government organizations. The results of the ERSS and climate matches can help agencies better allocate limited resources for early detection and education programs. The future climate scenarios built into RAMP provide managers an easy to use, science-based tool to incorporate the effects of climate change into long term planning.

Email: heidi_himes@fws.gov

POSTER PRESENTATIONS

Resurgence of Rainbow Smelt *Osmerus mordax* following the collapse of the Alewife *Alosa pseudoharengus* population in Otsego Lake, New York

Abbey R. Holsopple*, Mary K. Mulvihill, and John R. Foster

Fisheries, Wildlife & Environmental Science Department, State University of New York, Cobleskill, NY 12043

Rainbow Smelt *Osmerus mordax*, a key species in the 1980's cold-water fish fauna of Otsego Lake, were decimated in the 1990s by the introduction of the Alewife *Alosa pseudoharengus*. With the recent collapse of the Alewife population, the rebound of the Rainbow Smelt population was expected. The goal of this study was to examine the population dynamics of spawning Rainbow Smelt in Mohican Canyon Creek, for evidence of that recovery. In April 2015, 2016, and 2017, 1560 Rainbow Smelt were collected on their spawning run using a Halltech backpack electrofisher. Captured smelt were measured (total length), sexed, and a few scales were removed from behind the pectoral fin for aging. The spawning population in Mohican Canyon Creek increased dramatically in 2016. Measures of the spawning smelt population dynamics (average size of males and females, spawning age, and sex ratios) also improved significantly over this 3-year post-Alewife study. However, average size of spawners, spawning age, and sex ratios did not return to the pre-Alewife years (1983 and 1984).

Email: holsopa590@cobleskill.edu

POSTER PRESENTATIONS

Building the perfect (maybe?) mussel cage: a pilot approach on the Grasse River

Scott Jamieson, Corbin Gosier, and Jennifer Ryan

New York State Department of Environmental Conservation Bureau of Habitat

The lower Grasse River in Massena, NY is about to undergo a major sediment dredging and capping remedy under the U.S. EPA Superfund program to reduce polychlorinated biphenyl (PCB) contamination from historic releases by Arconic (formerly Alcoa). The remedy will occur over a 7.2-mile stretch of river that is home to a diverse unionid mussel community. In 2017 prior to the start of the remedy, the New York State Department of Environmental Conservation (NYSDEC) collected mussels from areas targeted for dredging, but storing those mussels for the duration of the remedy presented serious ecological and logistical challenges. We needed a design that could house mussels for up to 5 years while withstanding the physical demands of a northeastern river. We adapted our cage design from the U.S. Fish and Wildlife Service mussel culture cages used for in-river culturing. Here, we describe the design modifications to our cages as well as some of the processes we used for in-river cage placement. The first year of collection is now complete and so far, we collected over four thousand mussels from future dredge areas. Of the mussels we collected 2,115 were returned to "safe" areas while 2,010 mussels representing seven species are being held in 23 of our specifically designed in-river cages. This spring, we will assess the condition of our mussel cages and determine mussel survival after the winter to help us determine if additional modifications to cage design are needed.

Email: scott.jamieson@dec.ny.gov

POSTER PRESENTATIONS

Push nets: better than your average icthyoplankton gear?

Colleen Keefer, Connor Hartigan, Jacob Cochran, and Michael Senske

U.S. Fish and Wildlife Service, Lower Great Lakes Fish and Wildlife Conservation Office, Basom, NY 14013

Comprehending sampling efficiency is imperative to gear selection and assessing the larval fish community. Larval fish can provide insight into population dynamics, increase the understanding of year class strength, and help aid in the detection and monitoring of invasive species. Traditional methods of larval fish collection, including bongo nets and light traps, are limited by habitat type and therefore can create bias in the families and species collected. A non-traditional method, push nets, is not subject to the same type of restrictions and can be used to sample larval fish communities in both pelagic and littoral zones. In both 2016 and 2017 the U.S. Fish and Wildlife Service Lower Great Lakes Fish and Wildlife Conservation Office sampled larval fish communities, with push nets being added in the latter. As a result of utilizing push nets along with traditional gear types, there was a significant increase in the overall number of larval fish captured in 2017 compared to 2016, with two unique families being collected in the push nets. Initial results also indicate an increase in the number of species detected in 2017. Push nets can be used to effectively sample both pelagic and littoral larval fish communities, increasing our efficiency and effectiveness at detecting species.

Email: colleen_kolb@fws.gov

POSTER PRESENTATIONS

Longitudinal changes of fish assemblages in Nine Mile Creek, tributary to a recovering urban lake

Gregory R. Kronisch*, Donald J. Stewart, and Neil H. Ringler

State University of New York College of Environmental Science and Forestry

Nine Mile Creek is one of the main tributaries to Onondaga Lake in Syracuse, New York. This system is a modest portion of the Oswego River Watershed, but has a long history of anthropogenic degradation. Since 2012, significant work has been done to remediate and monitor biota of Onondaga Lake, but aquatic communities within the tributaries require further attention. Fish were collected throughout the main channel of Nine Mile Creek in the spring and summers of 2008, 2009, 2011, and 2017 using backpack electrofishers and blocking seines. These samples were grouped by 12-digit hydrologic unit code (HUC12) into three significant sections for analyses of fish assemblage composition and overall fish species richness and diversity. Previous research on the Onondaga Lake watershed has found that lake-dwelling fish rely heavily on external refugia. We test the hypothesis that previously observed shifts in the Onondaga Lake fish assemblages may correlate with changes in the tributary assemblages.

Email: grkronis@syr.edu

POSTER PRESENTATIONS

Water regulation effects on community associations in the St. Lawrence River

Zi Xun Kua*[1,2], John M. Farrell[1,2], and John C. Stella[3]

[1]Department of Environment and Forest and Biology, College of Environmental Science and Forestry, State University of New York, Syracuse, NY 13210; [2]Thousand Islands Biological Station, Clayton, NY 13264 [3]Department of Forest and Natural Resource Management, College of Environmental Science and Forestry, State University of New York, Syracuse, NY 13210

Hydrologic management affects wetland communities by altering habitat availability and biological interactions. The construction of the Robert-Moses-Saunders Power Dam in 1958 decreased hydrologic fluctuations in the St. Lawrence River, altering the surrounding wetland community structure, and is thought to have led to increased expansion of invasive cattails *Typha x glauca* and *Typha angustifolia*, decrease in Muskrat *Ondatra zibethicus* populations, and decline in habitat heterogeneity. The recent implementation of Plan 2014 sought to restore natural hydrology in the St. Lawrence River, however, the actual effects of the strategy still needs to be evaluated. The success of *Typha* has led to its expansive dominance in emergent plant communities of coastal wetlands, further decreasing habitat heterogeneity and connectivity. As Muskrats are known to positively affect wetland habitat heterogeneity by consuming herbaceous emergent plants and constructing structures, we examined the potential enhancement of local fish habitat by Muskrat disturbances. We compared the community differences in selected wetlands in the Thousand Islands region by manipulating seasonal water levels, focusing on *Typha* percent cover, Muskrat house density, and local fish diversity and abundance. This study will help us better understand the effects of Plan 2014 on the wetland community interactions in the St. Lawrence River.

Email: zkua01@syr.edu

POSTER PRESENTATIONS

Length predictions of young-of-year (YOY) Chinook Salmon *Oncorhynchus tshawytscha* in the Salmon River, Pulaski, NY

S. H. Kucera[1], J. H. Johnson[1], J. E. Mckenna[1], D. L. Bishop[2], S. E. Prindle[2], F. Verdoliva[3], and N. Ringler[4]

[1]USGS Great Lakes Science Center Tunison Laboratory of Aquatic Science Cortland, NY 13045; [2]New York State Department of Environmental Conservation, Cortland, NY 13045; [3]New York State Department of Environmental Conservation Salmon River Fish Hatchery, Altmar, NY 13302; [4]SUNY College of Environmental Science and Forestry, Syracuse, NY 13210

The first natural reproduction of Chinook Salmon *Oncorhynchus tshawytscha* in the Salmon River was documented in the 1970's after their initial introduction to the Lake Ontario system in the late 1960's. The NYS Department of Environmental Conservation and the United States Geological Survey standardized a seining effort in 2001 to study the distribution of these wild fish in the river. The survey collected 30 young-of-year (YOY) Chinook Salmon lengths from four sites along the Salmon River (Altmar, Pineville, CO RT 2A, and Douglaston) every week during May and June each year from 2001 to 2017. The sampling sites begin below the DEC's Salmon River Hatchery adjacent to the Altmar drift boat launch and end just above the estuary on the Douglaston Salmon Run property. We tested for significant differences in lengths among the four sites as the weeks progressed to examine if the length was dependent on site. A Kruskal-Wallis one-way nonparametric AOV test was performed for each week at every site for years 2001 to 2017 to determine if the lengths were significantly different from each other and then, if significant, a Dunn's all-pairwise comparisons test to see which lengths were similar. General trends indicate fish increasing in length going downstream from Altmar to Douglaston, with several notable exceptions. More investigation will explore the variables that influence the length of YOY Chinook Salmon. The information gained in this study will help provide a better understanding of how wild Chinook Salmon from the Salmon River are contributing to the Lake Ontario fishery and could suggest an approximate length at which the salmon leave the river. The general assumption is that larger YOY fish survive better than smaller ones.

Email: skucera@usgs.gov

POSTER PRESENTATIONS

Populations on the brink: predictive estimates of time since recruitment for *Elliptio Complanata* by thin-section aging of deceased individuals

Mark L. Kugler[1], Paul H. Lord[2], Andrew M. Gascho Landis[1]

[1] Department of Fisheries, Wildlife, and Environmental Science, State University of New York at Cobleskill, Cobleskill, NY 12043; [2]Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

A hallmark of many freshwater mussel population declines is the failure of recruitment. Recent surveys in the upper Susquehanna drainage of New York found no evidence of recruitment for Eastern Elliptio *Elliptio complanata*. Our goal was to determine the age distribution of dead individuals and to create a relationship between length and age for predicting the ages of the remaining living mussels in each population. Lack of catadromous American Eel *Anguilla rostrata* hosts has been hypothesized as the cause for decline and date of last Eastern Elliptio recruitment is thought to correspond to the time period during which eel migrations ceased. Timed searches were conducted in 5 Susquehanna River tributaries for both live and dead Eastern Elliptio. Live samples were measured for length and returned unharmed, while dead samples were brought to the lab for aging using standard thin-sectioning techniques. Length frequencies of dead samples were consistent with those of live samples, with length ranges for dead samples between 71-136 mm and live sample length ranges between 76-144 mm. Youngest ages of dead mussels ranged from 15-46 y across all study areas; while the youngest predicted ages of living mussels ranged from 35-48 y. Overall, this confirms aging populations with little to no recruitment in the past several decades. Our conservative estimates of time since last recruitment correspond to dam construction on the Susquehanna River creating impassible barriers for eels to migrate and provide a host for Eastern Elliptio. While limited recruitment may be occurring through secondary hosts, it appears that eels are important for the recruitment of large year classes of Eastern Elliptio. Supplemental stockings of American Eel, in addition to the construction of eel ladders are recommended to promote recruitment of Eastern Elliptio.

Email**:** Kuglerm778@cobleskill.edu

POSTER PRESENTATIONS

The effects of every-other-day feeding on the growth performance of yearling stellate sturgeon, *Acipenser stellatus*

Christian Lane[1], E. J. Livengood[2], Richard D. Miles[3], and Frank A. Chapman[3]

[1]New Symrna Sturgeon Farm; [2]School of Agriculture and Natural Resources, Morrisville State College, Morrisville, NY 13408; [3]Program in Fisheries and Aquatic Sciences, University of Florida, Gainsville, FL, 32611

Abstract: The purpose of this study was to evaluate the effect of a skip-a-day feeding regime on the growth of one-year-old sturgeon *Acipenser stellatus*. Sturgeons possess a spiral valve intestine, which slows down the passage of food to longer than 24 hours, providing a scientific justification for the experiment. The experiment had a duration of 12 weeks and consisted of two treatments groups with four replicates each. One group of sturgeons (n = 120) was offered feed every day, on a continuous basis, at 2% of their body weight daily; while a second group of sturgeons (n = 120) were fed every other day, also at 2% of their body weight daily. The sturgeons had an average initial body weight of 178 ± 32 g and measured 44.6 ± 2.9 cm in total length. At the end of the experimental period, all sturgeons were alive, in good health, and no statistically significant differences ($P > 0.05$) on growth performance indices were detected between sturgeons fed every day and every other day. The average weights and lengths of sturgeons at the end of the trial were 406 ± 96 g and 55.4 ± 4.4 cm. The results of this study suggest that yearling sturgeon may be fed every other day rather than daily. A skip-a-day feeding regime can result in feed savings for a commercial operation, help protect the natural resources such as those for making fish meal, and lessen the impact of excess nutrients in natural bodies of water.

Email: livengej@morrisville.edu

POSTER PRESENTATIONS

SUNY Cobleskill conservation fisheries efforts: past, present, future

Brent C. Lehman, John R. Foster, Mark Cornwell, Ben German, and Sam Carey

Department of Fisheries, Wildlife & Environmental Studies, State University of New York, Cobleskill, NY 12043

As SUNY Cobleskill moves forward into more conservation fisheries work it's important to remember the beginning. Many of the projects worked on at SUNY Cobleskill where just ideas brought to use by varies interests, some personal some from state/federal agencies. These projects were intended to aid in answering questions related to feasibility, production techniques, and reintroductions to name a few. SUNY Cobleskill has unique facilities allowing us to work with a wide range of organisms and rearing systems, making us a prime candidate for these types of projects. As an educational facility we have the ability to introduce students to all these different projects. These projects have student managers who learn valuable skills in project management, scientific methods, and communication. These are all skills used every day in all job fields.

Email: lehmanbc@cobleskill.edu

POSTER PRESENTATIONS

Barotrauma in Lake Erie Yellow Perch: take pride in your perch!

Jesse M. Lepak

New York Sea Grant, Oswego, NY 13126

Abstract: Yellow Perch are one of the primary fish species targeted by commercial and recreational anglers in the New York portion of Lake Erie. Unfortunately, based on catch data, the majority of Yellow Perch caught in this area are from depths where they suffer the effects of barotrauma when brought to the surface. These fish sustain tissue damage from the change in pressure and subsequent expansion of their gas bladders. When released at the surface, these fish often float, and either experience mortality directly or from predation by birds or other predators. Given that the majority of Lake Erie Yellow Perch captured in New York are from depths where they suffer from the effects of barotrauma, the seemingly sustainable and ethical practice of catch-and-release angling actually results in mortality and waste of improperly released fish. This situation provides an educational opportunity to encourage more sustainable behavior and reduce the practice of wasting resources that could provide much needed protein to consumers. Thus, harvest of fish suffering from barotrauma, or the proper release (with deep release recompression devices) of Yellow Perch would reduce unnecessary mortality and increase sustainable practices and ethical behavior.

Email: jml78@cornell.edu

POSTER PRESENTATIONS

Quantifying benthic habitat disturbances of commercial vessel anchoring: implications for protected resources and submerged electric-power transmission cables

John A. Madsen[1] and Dewayne A. Fox[2]

[1] Department of Geological Sciences, University of Delaware; [2] Department of Agriculture and Natural Resources, Delaware State University

The Hudson River is widely considered one of New York's most valuable natural resources; serving as a vital conduit of commerce and a hub of fisheries production. The commercial use of the river has come under increased focus recently with proposals to both increase the number of commercial anchorages as well as the placement of submerged electric-power transmission cables. Shipping is known to have a number of direct and indirect effects on aquatic communities and its compatibility with power transmission requires careful planning. While conducting side-scan surveys of the Hudson River Hyde Park Reach numerous disturbances to the bottom were observed within, and in the vicinity of, the Hyde Park Anchorage Ground. These disturbances included numerous oblong-shaped depressions 1-3 m wide, 1-2 m deep, and 10-20 m long, caused by anchors settling into the river bottom with minimal drag. Even more pronounced were linear depressions of similar widths and depths with lengths up to 300 m, attributed to dragging of anchors during the process of setting or during periods of high flows/winds while vessels are at anchorage. Disturbances of the river bottom within and near the anchorage are of concern as this region includes the largest known concentration of spawning Atlantic Sturgeon. Our findings counter claims made by the shipping industry that benthic disturbances fill in over a "matter of days" and can persist for periods exceeding months to perhaps years. Additionally, disturbances to depths of 1-2 m and *outside* the designated anchorage are of particular concern given the proposed burial depths of a planned electric-power transmission cable and its proximity to anchoring activities. Our findings provide the first insights into the potential conflicts of commercial vessel anchoring, energy transmission, and benthic habitats for the Hudson River.

Email: dfox@desu.edu

POSTER PRESENTATIONS

Fatty acid signatures of Lake Trout *Salvelinus namaycush* from the Finger Lakes

Christopher Maier*[1], Matthew Futia[1], Brad Hammers[2], Emily Zollweg-Horan[3], Michael Speziale[4], and Jacques Rinchard[1]

[1]Department of Environmental Science and Ecology, The College at Brockport - State University of New York, Brockport, NY 14420; [2]New York State Department of Environmental Conservation, Avon, NY 14114; [3]New York State Department of Environmental Conservation, Cortland, NY 13045; [4]New York State Department of Environmental Conservation, South Otselic Hatchery, South Otselic, NY 13155

Fatty acid signature (FAS) analysis has been widely used within the field of ecology to examine the dietary history of organisms. It is based on the knowledge that fatty acids of prey are conservatively transferred from prey to predator after consumption, reflecting the idea of "you are what you eat". Therefore, by comparing the FAS of predators to that of their potential prey, we can infer their long term dietary history. The objective of this study was to determine the FAS of Finger Lakes Lake Trout *Salvelinus namaycush*. Belly flaps of Lake Trout where collected from Keuka Lake in 2016 and Cayuga, Seneca, and Skaneateles lakes in 2017 by the New York State Department of Environmental Conservation, and were analyzed for lipids contents and fatty acid composition. We will discuss spatial differences among the FAS of Lake Trout from these lakes, which may reflect differences within their diets.

Email: cmaie1@u.brockport.edu

POSTER PRESENTATIONS

Long-term proportional size distribution trends in Lake Ronkonkoma

Monica Matt*, and Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

Proportional Size Distribution (PSD) is a robust index that is used to quantify the size structure and determine the quality of a recreational fishery. It can be used to better understand a system due to the relationships between population size and recruitment, mortality, and predator-prey interactions. Lake Ronkonkoma in Suffolk County, NY is actively managed to provide opportunities for recreational fishing; however, over the last 20 years, the White Perch *Morone americana* population has grown considerably and has affected the recreational fisheries of the lake. The New York State Department of Environmental Conservation (NYSDEC) began stocking Walleye *Sander vitreus* in 1994 to control the white perch population. The PSD of several fish, including Largemouth Bass *Micropterus salmoides*, Walleye, and White Perch, were determined using the data collected by the NYSDEC during the past two decades. The PSD values were compared and used to describe relevant predator-prey interactions. Trends in PSD values over the years can help describe how the recreational fisheries of Lake Ronkonkoma have changed and also aid in future fishery management decisions.

Email: mattma17@oneonta.edu

POSTER PRESENTATIONS

Larval and juvenile Lake Sturgeon assessment of the Lower Niagara River

Colin Mulloy, Eric Bruestle, Curt Karboski, and Dimitry Gorsky

United States Fish and Wildlife Service Lower Great Lakes Fish and Wildlife Conservation Office

Lake Sturgeon *Acipenser fulvescens* is a large bodied, slow growing and late maturing species that is currently threatened and protected from harvest in New York State. Sturgeon are known to spawn in the lower Niagara River gorge below Niagara Falls. This unique habitat provides protection and ideal conditions for spawning sturgeon. Adult Lake Sturgeon have been studied in the lower Niagara River since 2010, however, there is limited knowledge of larval and juvenile abundance. Beginning in 2002, there has been little to no recruitment of Lake Sturgeon in the lower Niagara River. This is based on few catches of adults born during that time-period. The goals of this study are to measure the abundance of larval and juvenile Lake Sturgeon in the lower Niagara River, track dispersal patterns and growth during larval drift period, and determine whether there is a barrier to recruitment in the lower Niagara River. Traditional fish sampling methods, including gill nets and set lines have been used previously, and if still unsuccessful, alternative methods will be used. Acoustic telemetry will be used to track the movement of the fish. This poster will address proposed methods and outcomes of the study.

Email: colin_mulloy@fws.gov

POSTER PRESENTATIONS

Comparison of sub-basin characteristics within Cassadaga Lakes Chautauqua County, New York

Joey O'Reilly*, and Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

Multi-basin lakes have the potential to require more-intensive monitoring of limnological parameters than single-basin lakes if individual basins change in different ways throughout the year. As the number of sub-basins in a lake increases, the number of sampling and monitoring locations increase as well, multiplying the time and energy needed to accurately study the lake. The need for sampling in individual sub-basins is rarely validated in practice. Cassadaga Lakes in Chautauqua County, New York, is an interconnected chain of lakes. The lake itself has three primary basins: Upper Cassadaga, Middle Cassadaga, and Lower Cassadaga lakes. Among the three basins are a total of seven distinct sub-basins. The objective of this study was to determine whether or not differences in key limnological parameters (e.g., temperature and dissolved oxygen) could be detected in seasonal measurements within these sub-basins. General linear models were used to test for effects of primary basins and sub-basins on limnological parameters of interest while accounting for differences in depth and seasonal variability. Results indicate that if statistical differences in measurements between sub-basins or primary basins do exist, then they are beyond our ability to detect them based on precision of measurement. These results underscore the importance of validating assumptions associated with annual lake monitoring, and indicate that sampling intensity in Cassadaga Lakes can likely be reduced without losing important information about seasonal changes collected through limnological monitoring.

Email: oreijr01@oneonta.edu

POSTER PRESENTATIONS

Round Gobies, piscivory, and growth rate in Oneida Lake young-of- year Largemouth and Smallmouth Bass

Iman Pakzad*[1], Randy Jackson[1,2], Tony VanDeValk[2], and Tom Brooking[2]

[1]Department of Natural Resources, Cornell University, Ithaca, NY 14853; [2]Cornell Biological Field Station at Shackelton Point, Bridgeport, NY 13030

As a recent invasive species in the Laurentian Great Lakes region, the potential impacts of the Round Goby *Neogobius melanostomus* on young piscivores is still unclear. Since a high piscivory rate is strongly tied to growth and survival of young-of- year (YOY) piscivores, we examined the diets and growth of YOY Largemouth Bass *Micropterus salmoides* and Smallmouth Bass *M. dolomieu* before and after the Goby arrival. In 2010-2013, 95% of Largemouth and 53% of Smallmouth Bass contained fish and fall mean lengths averaged 93mm and 88mm, respectively. In 2015-2017, after the arrival of Round Goby, 78% of Largemouth Bass and 41.7% of Smallmouth Bass contained fish and fall mean lengths averaged 90.5 mm and 98.5 mm, respectively. In 2015-2017, Goby comprised 9% and 60% of identifiable fish consumed by Largemouth Bass and Smallmouth Bass respectively. While there was no significant change in total piscivory rate, Smallmouth Bass showed a significant increase in growth rate since the Round Goby arrival. If the trend continues, it may lead to increased survival of YOY Smallmouth Bass and increases in the Smallmouth Bass population. In conclusion, the Round Goby appears to have a positive effect on the YOY Smallmouth Bass growth in Oneida Lake.

Email**:** iyp4@cornell.edu

POSTER PRESENTATIONS

Brown trout movement and spawning tributary use in the West Branch Delaware River tailwater, Delaware County, NY

Timothy Pokorny

New York State Deparment of Environmental Conservation, Region 4 Fisheries, Stamford, NY USA 12167

The West Branch Delaware River (WBDR) tailwater is considered one of the best wild trout fisheries in New York State. Stream flows are greatly influenced by the Flexible Flow Management Program (FFMP) releases program from the Cannonsville Reservoir. A radiotelemerty study in 1995-1996 showed that WBDR tailwater trout were utilizing 6 of the WBDR tailwater tributaries for spawning. A number of changes have occurred to the FFMP releases from Cannonsville Reservoir since the 1995-1997 study. Flushing spillage from the reservoir has been reduced, resulting in concerns about tributary fluvial fan buildup inhibiting trout access to the tributaries. Documenting trout movements in the WBDR and into spawning tributaries is needed to better understand the fishery. A total of 788 brown trout ≥12" were tagged with passive integrated transponder (PIT) tags. Small-scale PIT arrays (adopted from Ben Marcy-Quay's design) were installed in four historically important spawning tributaries. A total of 102 fish were recaptured during electrofishing surveys from June – October, of which 93 were recaptured at the original tagging location. Twenty fish were recaptured with small-scale arrays during the fall spawn. These results show a lack of fish movement from May - September and that fish are utilizing historically important spawning tributaries.

Email: tim.pokorny@dec.ny.gov

POSTER PRESENTATIONS

Integrated Management of Invasive and other Aquatic Plants in Lake Ecosystems

Timothy J. Post

New York State Department of Environmental Conservation Division of Fish and Wildlife Region 5, Warrensburg, NY 12885

Invasive aquatic plant invasions have the potential to cause considerable negative impacts to lake ecology and recreational use. Once an invasive plant spreads beyond a localized population in a lake, eradication is improbable. Thus, control efforts for invasive aquatic plants become long-term management to control the perceived negative impacts. Far too often, these long-term control efforts do not consider the potential negative impacts that the control efforts themselves can have on lake ecology and fish populations. Such control efforts can become efforts to have a 'weed-free' lake for boating and swimming. Proper planning and review is needed to ensure the control efforts do not cause significant impacts to fish and wildlife resources.

Email: tim.post@dec.ny.gov

POSTER PRESENTATIONS

Effect of the Round Goby invasion on fish mercury bioaccumulation in the Oneida Lake food web

Roxanne Razavi[1], Randy Jackson[2], Tony Van De Valk[2], Noland Michels[3], Charley Driscoll[4], and Lisa Cleckner[5]

[1]Department of Environmental and Forest Biology, SUNY-ESF, Syracuse, NY; [2]Cornell University Biological Field Station, Cornell University, Bridgeport, NY; [3]Department of Biology, University of Minnesota Duluth, Duluth MN; [4]Civil & Environmental Engineering, Syracuse University, Syracuse NY; [5]Finger Lakes Institute, Hobart and William Smith Colleges, Geneva NY

Food web structure plays a large role in the extent of contaminant exposure in fishes. Invasive species can cause significant changes in the bioaccumulation and biomagnification rate of mercury (Hg) in aquatic food webs. In New York State, several lakes have recently experienced invasion by the Round Goby *Neogobius melanostomus* including New York's largest inland lake, Oneida Lake. Research on the effect of the Round Goby on Oneida Lake reveal this species has become abundant and incorporated into the diets of all the major piscivores in the lake. Changes in young-of-year growth rates in Walleye *Sander vitreus* and black bass species have also been observed. In 2010, sampling was conducted to measure Hg concentrations in six species including Smallmouth Bass *Micropterus dolomieu*, Walleye, White Perch *Morone americana*, Yellow Perch *Perca flavescens*, White Sucker *Catostomus commersonii*, and Freshwater Drum *Aplodinotus grunniens*. Sampling of the same species was repeated in 2016 and 2017, after the Round Goby invasion in 2013/2014. Comparison of fish tissue Hg concentrations in 2010 to 2016 showed mean Hg concentrations declined in all species, with significant declines for Walleye and White Perch. Future work will include analyses of diet composition and fish age and growth with respect to fish Hg concentrations. This study will inform to what extent the changes in fish Hg bioaccumulation patterns in Oneida Lake can be explained by the invasion of Round Goby and the mechanisms underlying those changes.

Email**:** razavi@esf.edu

POSTER PRESENTATIONS

Implications of invasive species management on native fish populations

Katelyn Reed, Heidi Himes, Theodore Lewis, and Marcus Rosten

U.S. Fish and Wildlife Service, Lower Great Lakes Fish and Wildlife Conservation Office, Basom, NY 14013

Early detection and monitoring of invasive species is an important part of conservation strategies that help prevent the potential chaos within our aquatic communities that is caused by an invasion. Invasions can have significant harmful impacts including extirpation or extinction of native species, decreases in native species abundance and richness, physical and chemical changes to the environment, reductions in recreational use and revenue, and even consequences for human health. Control methods are most effective when implemented early but those methods can also have an impact on the native populations at risk from the invasive species. Good control programs maximize effectiveness while minimizing additional impact to native species. In 2012, hydrilla, an invasive plant species, was identified in the Tonawanda reaches of the Erie Canal, eliciting an immediate management response. Control measures for the hydrilla began in 2014 and resulted in the die-off of 99% of the Hydrilla and most native aquatic plants during the second half of the summer in 2014-2016. Concerns from local fishermen about a perceived decrease in sport fish connected to the hydrilla treatment prompted a closer look at fish population data for that area. The U.S. Fish and Wildlife Service Lower Great Lakes Fish and Wildlife Conservation Office has been conducting the New York State Canal Prevention Program since 1999. This invasive species early detection and monitoring program has amassed a relatively large dataset pertaining to fish communities in the canal. We were able to use this dataset to address the concerns of the fishermen. An overall decline in sport fish CPUE since 1999 has been found but it could not be linked to the hydrilla control program. However, forage fish populations seem to be increasing after the initiation of hydrilla control and species abundance has a more even distribution compared to that of the years before the control measures. Analysis of this data allows us to better assess the impacts of our invasive species management decisions and the potential consequences they may have on the native populations we are trying to protect.

Email: katelyn_reed@fws.govf

POSTER PRESENTATIONS

Pond culture of the endangered Pugnose Shiner *Notropis anogenus*

Brielle Robbins*, John R. Foster, Brent C. Lehman, Jason M. Ratchford and Michael Soukup

Fisheries, Wildlife & Environmental Science Department, State University of New York College of Agriculture and Technology at Cobleskill, Cobleskill, NY, 12043

Pugnose Shiners *Notropis anogenus* are endangered in New York State and Canada and threatened in Minnesota and Wisconsin. This project was initiated by the Fisheries & Aquaculture program of the State University New York (SUNY) to demonstrate the feasibility of utilizing pond culture techniques to produce Pugnose Shiners for restoration purposes. This project was supported by the New York State Department of Environmental Conservation and the U.S. Fish & Wildlife Service. After disease testing, this project was initiated on 24 June 2015 when 65 brood-stock were collected from Sodus Bay, Lake Ontario. Sodus Bay was utilized because it contains the last remaining New York "lake" population of Pugnose Shiners, which are genetically distinct from the St. Lawrence River population. Brood-stock Pugnose Shiners were placed into a 2/3 acre pond with in the SUNY Cobleskill Experimental Pond Complex. The pond had a maximum depth of 2.95 m and was vegetated with aquatic plants similar to the collection site in Sodus Bay (filamentous algae, curly pondweed, water milfoil, broad-leaved pondweed, and common stonewort). Maximum summer temperature was in the low 20's ^{o}C, pH 6.2-6.7, and conductivity ranged from 241-245. Stocked Pugnose Shiners spawned their first summer producing hundreds of juveniles. By December the pond cultured population was 41 mm long, just 1 mm shorter than the spawning population of Pugnose Shiners collected from Sodus Bay in May. Over the next year (spring 2016-2017), 7,400 pond reared Pugnose Shiners were harvested and stocked into Chaumont Bay, Lake Ontario. This project demonstrates the feasibility of pond culture of Pugnose Shiners, and it's potential for producing thousands of juveniles a year for restoring extirpated wild populations. Culture techniques refined by this project can be used to restore Pugnose Shiner populations in New York, Minnesota, Wisconsin and Canada.

Email: RobbinB163@cobleskill.edu

POSTER PRESENTATIONS

Beaver pond management as a tool to control algae blooms in a small, private lake

Patrick Rose*, David Andrews, Samantha Carey, J. Benjamin Casscles, Stradder Caves, Monica Matt, and Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

Plymouth Reservoir is a small, privately owned meso-eutrophic lake located in Chenango County, NY. An interim management plan has been created as part of a class study in SUNY Oneonta's Lake Management program. A survey conducted at a stakeholder meeting revealed that recent cyanobacterial blooms were the major concern of the Plymouth Reservoir Lot Owner's Association (PRLOA), followed by excessive plant growth. The lake has been experiencing cyanobacterial blooms over the past couple of years, which has many of the residents worried. Water quality data was limited to two water column profiles throughout the semester, but longer term data were borrowed from Citizens Statewide Lake Assessment Program (CSLAP). An electrofishing survey was conducted along the entire shoreline, serving as the first recorded fish survey of Plymouth Reservoir. Nutrient samples taken from within the lake and the surrounding watershed reveal that two beaver ponds are the major sources of phosphorus that is entering lake. Management objectives focus on addressing the beaver ponds as the likely source of phosphorus that could be causing the cyanobacterial blooms, but also include fisheries management.

Email: rosep98@oneonta.edu

POSTER PRESENTATIONS

Changes in a native mussel community over distance: are Zebra Mussels to blame?

Jennifer Ryan, Corbin Gosier, and Denise Mayer

New York State Department of Environmental Conservation Division of Fish and Wildlife, Albany, NY 12233

The lower 7.2-miles of the Grasse River in Massena, NY is about to undergo extensive sediment dredging and capping under the US EPA Superfund program. The 2017 field season marked year 1 of a NYSDEC project to collect native mussels from future dredge areas for holding during the remediation. So far, over 4,000 mussels comprised of seven species were collected from these future dredge areas within the lower Grasse River. We are evaluating the community composition of unionid mussels over the seven-mile stretch of the project area. We compared the relative totals of the three most abundant mussel species, *Elliptio complanata*, *Lampsilis radiata* and *Potamilus alatus*, to habitat variables to assess whether they correspond to spatial variances in species abundance and composition. For example, attached dreissenid mussels (*Dreissena polymorpha* and *D. rostriformis bugensis*, zebra and quagga mussels) and their planktonic larvae (veligers) were found in increasing abundance as sample locations proceeded downstream at the St. Lawrence River; we will discuss whether native mussel abundance and species composition appear to relate to the magnitude of dreissenid mussel abundance In year two of the project we will further investigate other factors, including physical habitat parameters to more thoroughly explain the observed trends in unionid species composition.

Email: corbin.gosier@dec.ny.gov

POSTER PRESENTATIONS

Evaluating the feasibility of imprinting *Coregonus artedi* to increase natal homing ability.

*Grant Scholten, Trevor Pitcher, and James McKenna Jr.

[1]United States Geological Survey, University of Florida; [2]U.S. Geological Survey, Tunison Laboratory of Aquatic Science, Cortland, NY 13045-9357 USA;;[3]University of Windsor, Canada; [4]Great Lakes Institute for Environmental Research, Windsor, Ontario, Canada N9B 3P4

Restoration of native forage fishes has been pushed to the forefront of research needs for the Great Lakes in an effort to improve ecosystem function and sustainability of major fisheries. *Coregonus artedi* were an essential part of the trophic structure for all the Great Lakes, but have been greatly diminished. Recovery may be possible with well-planned stocking programs, which are typically guided by empirical evidence derived from applied research projects. Although much research has been devoted to salmoninae homing to spawn in natal habitats, little is known about coregoninae homing. One can speculate that because both subfamilies reside in the same salmonid family, coregonids also home to natal waters. Several studies associated with salmoninae restoration have demonstrated that stocked hatchery fish have reduced natal homing ability due to imprinting on chemical cues in hatchery water rather than chemical cues of historic spawning waters. One prolific endeavor, has been to identify and replicate unique water chemistry signatures that homing fish use as part of the biological compass. Exposure to these chemical mixtures in hatcheries during critical developmental life-stages has been shown to improve homing to restoration sites for Chinook Salmon *Oncorhynchus tshawytscha* and Lake Sturgeon *Acipenser fulvescens*. Our research will determine Cisco homing ability and investigate the feasibility of improving fidelity of Cisco to release sites, by exposing them to chemical signatures that mimic natural water sources during critical life stages and measuring their response.

Email: grantmscholten@ufl.edu

POSTER PRESENTATIONS

Let them eat insects: evaluating the potential of manure-raised housefly larvae as a feed ingredient in the diet rainbow trout

Nathaniel Sibinga*[1], Vimal Selvaraj[2], and Helene Marquis[3]

[1]Field of Food Science, Cornell University; [2]Department of Animal Science, Cornell University; [3]Department of Microbiology and Immunology, Cornell University

Historically, fishmeal has been an excellent, although unsustainable, source of protein for farm- and hatchery-raised fish. To reduce feed costs and improve the sustainability of aquaculture and hatchery operations, alternative sources of high-quality protein must be developed. Insect larva meal (LM) is a promising alternative to conventional fish feed ingredients: easy to produce, high in protein and fat, and possessing a favorable amino acid profile. Our project aims at exploiting a plentiful local resource, dairy cow manure, to raise insect larvae as a source of protein for fish. Housefly larvae *Musca domestica* were raised on dairy cow manure. The larvae were then processed into LM that was included in diets for Rainbow Trout *Onchorhynchus mykiss*. After 8 weeks, trout fed a diet comprised of 30% LM showed significantly increased growth compared to a control diet based on a typical modern diet. At that time point, samples were collected to evaluate the effects of LM on fish immune health. Indicators such as macrophage activity and serum lysozyme activity are currently being evaluated. These preliminary results suggest that housefly larvae reared on dairy manure are a potentially valuable feed ingredient for trout. This in turn will hopefully improve the profitability and sustainability of dairy and aquaculture/hatchery operations, mitigate environmental impacts, and reduce reliance on fishmeal.

Email: nas275@cornell.edu

POSTER PRESENTATIONS

Community tensions and influences on development of a management plan for a small, private pond

George Smith*, and Dan Stich

Biology Department, State University of New York College at Oneonta, Oneonta, NY 13820

The construction of a lake management plan can be broken up into three categories: organic, inorganic, and social. Very often, social aspects dominate the issues that managers may face when working with stakeholders on private lakes. This study used Big Bowman Pond, in Rensselaer County, NY, as an example of some potential issues that can arise, and how they manifest during the construction of long-term lake management plans. It was made apparent by the stakeholders that there was a lack of consensus in the community regarding the next step in management of the lake, specifically which management issues were most pressing and how they should be prioritized. An anonymous survey was administered to help clarify community concerns related to lake uses and individual meetings were held to address concerns of individuals and small groups. These activities indicated that the primary problem that these stakeholders face in the management of their lake is excessive vegetation growth, primarily bladderwort (*Utricularia spp.*), a non-invasive species. Opinions regarding best management of the vegetation previously caused tension within the community. However, based on the results of this study, it was decided that a compromise would need to be reached between stakeholders to implement a management plan for this lake. For the construction of a complete management plan, lake managers might need to assume the role of a mediator to find the right strategy for the entire lake community.

Email: smitgc89@oneonta.edu

POSTER PRESENTATIONS

Adapting radio frequency identification FDX-B/HDX single antenna system to use in lotic systems

Steven Swenson

New York State Department of Environmental Conservation, Stamford, NY 12167

The New York State Department of Environmental Conservation Region 4 Fisheries unit is currently conducting a study of the migration patterns of trout within the tailwaters of the West Branch of the Delaware River. One method of mark and recapture that is being used to monitor migrating trout is to surgically implant passive integrated transponders into fish and detecting the marked fish using radio frequency identification units (RFID). Staff worked with Benjamin Marcy-Quay, a Ph.D. candidate at Cornell University, to come to understand how he modified animal tag RFID data loggers from Priority 1 Design. Due to our necessity to detect fish within high velocity streams, the design provided by Benjamin Marcy-Quay was modified to utilize an external antenna with the RFID unit remaining out of the stream and elevated above bank full flows. After experimenting with various conductors, twin-axial cable was found to be an effective antenna extension. With one spawning season concluded, the units were functional and capable of detecting tagged fish. These units will also serve to help assess access to thermal refugia and culvert passage. Each unit cost approximately $270 to build, while purchasing other single antenna readers can cost approximately $2000 per unit.

Email: stephen.swenson@dec.ny.gov

POSTER PRESENTATIONS

Larval fish photo repository

Conor VanDemark, Jacob Cochran, and Colleen Keefer

U.S. Fish and Wildlife Service, Lower Great Lakes Fish and Wildlife Conservation Office, Basom, NY 14013

Ichthyoplankton are an important element of any aquatic ecosystem. As such, they are an area of interest for a wide variety of biological and ecological studies. One of the first, and perhaps most dreaded, steps of studying any larval fish community is accurate identification, a process which is difficult, tedious, and often times subjective. Genetic identification provides an alternative to traditional identification, but it is costly and still developing as a reliable, stand-alone tool. Current keys contain illustrations which are often not representative of how actual specimens look after collection. Images of a positively identified specimen similar in size and appearance to a collected specimen would be an extremely useful supplement to aid key-based identification. The USFWS Lower Great Lakes Fish and Wildlife Conservation Office is in the process of creating a photo repository with this goal in mind. It currently contains 28 species collected from the Great Lakes Region. As this project progresses, we hope to collaborate with other offices, agencies, and institutions to share content and expand the catalog to include a greater diversity of species, stages of development, and geographic location of collection.

Email: conor_vandemark@fws.gov

POSTER PRESENTATIONS

Walleye growth in connection with the eradication of Alewife population in Otsego Lake, New York

Alex Walczyk*

Fisheries, Wildlife & Environmental Science Department, State University of New York College of Agriculture and Technology at Cobleskill, NY, 12043

Walleye *Sander vitreus* stocking in Otsego Lake began in 2000 to help control an over populated invasive Alewife *Alosa pseudoharengus* population. Stream electrofishing in Shadow Brook, a tributary to Otsego Lake, was conducted April 10th, 2017- April 20th, 2017 to collect data. Data showed that Walleye, due to lack of their primary food source (Alewife), changed their foraging habits and are growing better without alewife present. Previous studies were used to compare past results that also showed growing trends in walleye size. A total of 110 Walleye (16 female, 94 male) were measured, sexed, and had scales removed to be aged and used for back calculation growths. Male Walleyes become sexually mature at ages 3-4 and females at ages 4-5. This shows in the data having a majority of fish in the 4-6 year age class. Females, on average, were larger than males at the same age. The largest fish caught was a 614 mm female and the smallest was a 413 mm male.

Email: walczya741@cobleskill.edu

POSTER PRESENTATIONS

Lake Ontario Cisco dynamics based on long-term surveys

Brian Weidel[1], Michael Connerton[2], Mark Vinson[3], Jeremy Holden[4], Jim Hoyle[4], Dimitry Gorsky[5], and Ed Roseman[6]

[1]US Geological Survey Great Lakes Science Center, Oswego, NY USA 13126; [2]NY State Department of Conservation, Lake Ontario Fisheries Unit, 541 East Broadway, Cape Vincent NY, USA 13618; [3]US Geological Survey Great Lakes Science Center, 2800 Lake Shore Dr. East Ashland WI, USA 54806; [4]Ontario Ministry of Natural Resources and Forestry, Picton ON, K0K 2T0 Canada; [5]U.S. Fish and Wildlife Service, Lower Great Lakes Fish and Wildlife Conservation Office, Basom NY 14013; [6]Great Lakes Science Center, 1451 Green Rd, Ann Arbor, MI 48105

Cisco *Coregonus artedi* were once likely one of the most abundant native fish in Lake Ontario but currently represent a small part of the fish community. We used long-term gill net, bottom trawl, and commercial catches data to illustrate and understand Lake Ontario Cisco population dynamics over past 60 years. Cisco populations were mainly restricted to eastern portions of the Lake, especially the Kingston Basin. Annual catch per unit effort (CPUE) from gill net and bottom trawl surveys were correlated, and illustrated a consistent pattern of increasing catches through the 1980s, a sharp decline in the early 1990s, the lowest observed values in the 2000s and increases in the mid-2010s. Bottom trawl CPUE were correlated to Lake Superior annual bottom trawl CPUE suggesting broad regional climate as a driver to recruitment patterns. Lake Superior biomass provided a biological reference point for interpretation of Lake Ontario historical stocks. We propose additional areas of research to address knowledge gaps and provide complimentary data to a basin wide understanding of Cisco dynamics.

Email**:** bweidel@usgs.gov

POSTER PRESENTATIONS

Is *Bythotrephes* abundance driving recent increases in Lake Ontario Alewife weight-at-age?

Brian Weidel, Jay Palumbo, Stacy Furgal, Thomas Evans, Kristen Holeck, Jeremy Holden, Michael Connerton

U.S. Geological Survey Great Lakes Science Center, Oswego, NY 13126

Alewife *Alosa pseudoharengus* are the most abundant fish in Lake Ontario and as prey support native and stocked piscivores. Alewife weight-at-age has been consistently monitored using whole-otolith interpretations since 1984. From the 1980s through the early 2000s Alewife weight-at-age was fairly constant, but since 2005 Alewife weight-at-age has generally increased. Weight-at-age increased for all age classes but was greatest for ages 4-8, where from 2006 to 2015 Alewife were 45% heavier than the 10 year period from 1995-2004. Weight-at-age also increased for ages 1-3, but increases were less extreme (26, 33, and 35%, respectively) between the same time periods. General linear models for annual weight-at-age evaluated predictors including water temperature, planktivore density, and zooplankton metrics. The best models include *Bythotrephes longimanus* density as a predictor. Diet data confirmed that in years when *Bythotrephes* were abundant they were commonly observed in Alewife diets from September and October and in individuals greater than 140 mm. *Bythotrephes* abundance has been variable in Lake Ontario since 1982, but it appears their abundance influences Alewife growth rates. Determining conditions that effect *Bythotrephes* abundance will help to predict how Alewife growth and population dynamics will respond to future food web changes.

Email**:** bweidel@usgs.gov

POSTER PRESENTATIONS

Mapping Brook Trout occupancy using environmental-DNA

Brendan Wiltse[1], Carrianne Pershyn[1], and Lee Ann Sporn[2]

[1]Ausable River Association, Wilmington, NY 12997; [2]Natural Science Department, Paul Smith's College, Paul Smiths NY 12970.

Brook Trout (*Salvelinus fontinalis*) have been identified by New York State Department of Conservation (NYS DEC) as a species of greatest conservation need, and the Adirondack Park is considered one of their last population strongholds in the northeastern US. Habitat fragmentation from road-stream crossings and competition from non-native salmonids are listed in the top four threats to Brook Trout in the Northeast by the Eastern Brook Trout Joint Venture. Efforts have been made to model Brook Trout occupancy across their native range. Validating those models using traditional fish surveying techniques is both costly, time consuming, and often not done at a fine spatial resolution. We piloted a project in the 1,571 hectare Otis Brook watershed in Jay, NY using environmental DNA (eDNA) to determine Brook Trout occupancy. Sites were spaced 1 stream kilometer apart throughout the watershed, as well as additional sites added above each road-stream crossing, resulting in 26 sample sites. Each site was sampled in June, August, and October to assess seasonal changes in Brook Trout occupancy. Brook Trout were detected at all sites within the watershed where previous electrofishing surveys had detected them, and at additional sites where electrofishing had failed to detect them. We observed a seasonal contraction of the spatial distribution of the eDNA signal during August. We hypothesize this is due to increased water temperature in the lower reaches and reduced stream flow in the upper reaches. Ongoing work is being done to assess the distribution of Brown Trout and Rainbow Trout within this system using the same samples. We propose that eDNA is a more time efficient and less invasive method for detecting Brook Trout occupancy in Lake Champlain Basin streams. These methods offer the potential to map the distribution of fish species at fine spatial scales and aid in the prioritization of the replacement of culverts that serve as barriers to aquatic organism passage.

Email**:** brendan@ausableriver.org

POSTER PRESENTATIONS

Emphasis on the expansion of fisheries definition to include important nonconsumptive resources

Sonja Wixom*

Biology Department, State University of New York College at Oneonta, Oneonta, NY

Koinonia is a Lutheran campground located in Sullivan County, New York. The camp was settled in the early 1960s, shortly after a small dam was constructed to deepen the bodies of water on site, previously known as Mud Pond and Beaver Pond. Collectively they are now considered one and are known as the Koinonia waterbody (surface area = 0.34 km^2, mean depth = 1 m, maximum depth = 2 m). Koinonia has commissioned the State University of New York College at Oneonta for a comprehensive management plan and state of the lake report focusing on an ecological approach for resource management and education. The watershed that feeds Koinonia is 6.01 km^2 and is primarily forested (88.2%, 5.3 km^2) consisting of coniferous species and moderately well-drained soils, which creates a dystrophic regime and high sedimentation. The Koinonia watershed and ecology allow for an abundant aquatic macrophyte growth throughout the waterbody providing a primarily non-consumptive fishery resource providing services such as carbon, nutrient, and pollutant sequestration, water filtration, flood control, outdoor education programs, wildlife viewing, natural aesthetics and wildlife habitat. Also, due natural eutrophication, this waterbody accommodates a single story, warm-water fish community that cannot progress into a more complex system.

Email: wixosl91@oneonta.edu