Georgia Chapter of the American Fisheries Society

2020 Annual Meeting

January 28 – 30, 2020
Doubletree by Hilton
Augusta, GA

2020 GA-AFS Annual Meeting Program

Tuesday, January 28, 2020		
10:00 – 4:00	Registration	
12:30 – 12:40	Welcome/Opening Comments	Jim Page
12:40 – 1:00	State of the State (Freshwater)	Thom Litts
1:00 – 1:20	State of the State (Marine)	Carolyn Belcher
1:20 – 1:35	Law Enforcement in Fisheries	Brian Hobbins
1:35 – 1:50	Parent Society Information --- Membership	Cecil Jennings
1:50 – 2:05	**BREAK**	
2:05 – 4:40	**Session 1: Student Presentations**	
2:10 – 2:25	The effects of varying dietary protein levels on the growth of juvenile Bluegill	Lauren Halloran
2:25 – 2:40	Comparing recruitment estimation methods for age-1 Atlantic Sturgeon in the Altamaha River, GA from 2008-2019	Michael Baker
2:40 – 2:55	Side scan sonar as an effective tool for estimating Atlantic Sturgeon spawning run size	Cortney Bunch
2:55 – 3:10	Changes to Gulf Sturgeon recruitment, mortality, and behavior following Hurricane Michael in the Apalachicola River, Florida	Brendan Dula
3:10 – 3:25	Age and growth characteristics of the subspecies of Largemouth Bass (*Micropterus salmoides*) exhibit differential responses to a thermal gradient	Mary Halbrook
3:25 – 3:40	**BREAK**	
3:40 – 3:55	Flatfish matter, too: How an obsolete navigational cut can affect local assemblage patterns along the coast of Georgia	Abigail Bickle
3:55 – 4:10	Using video surveys to identify habitat preferences of the Gag Grouper (*Mycteroperca microlepis*) in the eastern Gulf of Mexico	Gina Alvarez
4:10 – 4:25	An assessment of the benthic fish assemblage in a Georgia tidal creek	Jennie Wiggins
5:00 – 6:00	**BUSINESS MEETING**	
7:00 – 9:00	**POSTER SESSION AND SOCIAL**	

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Tuesday, January 28, 2020

Poster Session 7:00 – 8:00

--Student--	
A pilot model to prioritize sites for eastern oyster reef restoration with an emphasis on red drum habitat suitability	Cameron Atkinson
Environmental conditions promoting aetokthonotoxin production in the epiphytic cyanobacteria, (*Aetokthonos hydrillicola*)	Jeffrey Cullen
Connecting volunteerism, science, and community engagement to protect water quality in a southern Appalachian watershed	Elizabeth Howell
Artificial cuts may affect shark population diversity and population density in the Satilla River estuary	Richard Johnson
Effects of salinity on species richness in the Satilla River estuary	Rebecca Patterson
--Professional--	
Genetic identification of pure and hybrid Bartram's Bass in the tributaries of the Savannah Basin	Daniel Farrae
Chronological ages from scales and bones of the coelacanths (*Latimeria chalumnae*) and (*Axelrodichthys araripensis*) suggest long lifespans	Michael Newbrey

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Wednesday, January 29, 2020		
7:30 – 8:15	**Fellowship of Christian Conservationists**	
8:30 – 5:00	**Registration**	
8:30 – 9:35	**Session 1: Student Presentations - continued**	
8:35 – 8:50	Comparison of diet habits of invasive Blue Catfish from the Altamaha and Satilla rivers, GA	Victoria Montgomery
8:50 – 9:05	Analysis of population demographics of the invasive Blue Catfish in the Satilla River, Georgia	Julia Palmer
9:05 – 9:20	Assessing supply and demand of trout in north Georgia under current and projected thermal regimes	Jenna Haag
9:20 -9:35	Influence of introductions of Alabama Bass (*Micropterus henshalli*) on Black Bass growth rates in north Georgia reservoirs	Elizabeth Howell
9:35 – 9:50	**BREAK**	
9:50 – 2:10	**Session 2: Georgia Public Fishing Area Symposium**	
9:55 – 10:05	Georgia State Parks – Gateways to Fishing	Scott Robinson
10:05 – 10:15	Big Lazer Public Fishing Area	Brent Hess
10:15 – 10:25	Dodge County Public Fishing Area	Tim Bonvechio
10:25 – 10:35	Evans County Public Fishing Area	Steve Mincey
10:35 – 10:45	Flat Creek Public Fishing Area	Brandon Baker
10:45 – 10:55	Hugh Gillis Public Fishing Area	Aaron Gray
10:55 – 11:10	**BREAK**	
11:10 – 11:20	McDuffie County Public Fishing Area	Jason Payne
11:20 – 11:30	Ocmulgee Public Fishing Area	Tim Bonvechio
11:30 – 11:40	Okefenokee and Banks Lake National Wildlife Refuges	Susan Heisey
11:40 – 11:50	Paradise Public Fishing Area	Jesse Boles
11:50 – 12:00	Rocky Mountain Public Fishing Area	Jim Hakala
12:00 – 1:30	**LUNCH**	
1:30 – 1:40	Fort Gordon Public Fishing Area	Steven Camp
1:40 – 1:50	Carters Lake Public Fishing Area	Jonathan Wise
1:50 – 2:00	Silver Lake Public Fishing Area	Johnathan Pritchard
2:00 – 2:15	**BREAK**	

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Wednesday, January 29, 2020		
2:15 – 5:00	**Session 3: Professional Presentations**	
2:15 – 2:30	One fish, two fish, hopefully more fish: how an obsolete navigational channel affects fish assemblages in the Satilla River estuary	Jessica Reichmuth
2:30 – 2:45	Improving post-release survival of hook-caught Red Snapper and Red Drum: a private-public partnership	Spud Woodward
2:45 – 3:00	Maternal provisioning gives young-of-the-year hammerheads a headstart in early life	Kady Lyons
3:00 – 3:15	Estimating the impact of recreational crabbing in coastal Georgia	Bryan Fluech
3:15 – 3:30	Georgia Department of Natural Resources' marine recreational fisheries surveys	Dawn Franco
3:30 – 3:45	**BREAK**	
3:45 – 4:00	Fish tagging studies in Georgia's marine waters: past, present, and future	Jared Flowers
4:00 – 4:15	Robotic acoustics: new directions in fisheries science using autonomous underwater vehicles	Catherine Edwards
4:15 – 4:30	Boating Access Program Overview	Jeff Bishop
4:30 – 4:45	Georgia Fish Consumption and Mercury Projects	Thomas Miklos
4:45 – 5:00	Outreach at Savannah River Ecology Laboratory	Amanda Hurst
6:00 – 8:00	**AWARDS BANQUET AND ANNUAL RAFFLE**	

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Thursday, January 30, 2020		
8:30 – 11:35	**Session 3: Professional Presentations - continued**	
8:35 – 8:50	An impossible whopper of an idea?: considering the adoption of a "fish-friendly" diet by fisheries professionals	Johnathan Davis
8:50 – 9:05	Warm Springs National Fish Hatchery restoration and recovery efforts in Georgia and the southeast U.S.	Jessica Radich
9:05 – 9:20	Surrender of Langdale and Riverview hydropower projects on the Chattahoochee River	Patrick O'Rouke
9:20 – 9:35	Interstate fishery management and American Shad: a case study	Caitlin Starks
9:35 – 9:50	Evaluation of migratory behavior and philopatry in Savannah River Striped Bass (*Morone saxatilis*)	Jackson Sibley
9:50 – 10:05	**BREAK**	
10:05 – 10:20	The influence of connectivity on native and invasive fish populations in the Kansas River	Martin Hamel
10:20 – 10:35	Confirmation of a wild population of Northern Snakehead (*Channa argus*) in Gwinnett County, Georgia	Hunter Roop
10:35 – 10:50	Status update on Chattahoochee Bass distribution and genetics in the upper Chattahoochee River basin	Marcus Zokan
10:50 – 11:05	Upper Chattahoochee River native Black Bass study - preliminary findings	Steven Patrick
11:05 – 11:20	Effects of fungicidal hydrogen peroxide treatments on the hatching success of Walleye eggs and the growth of oomycete pathogens	Cecil Jennings
11:20 – 11:35	Questionable native status of several common fishes in the Chattahoochee River basin	Marcus Zokan
11:35 – 11:45	**CLOSING COMMENTS**	
ADJOURN		

ORAL PRESENTATION ABSTRACTS

SESSION 1: STUDENTS

The effects of varying dietary protein levels on the growth of juvenile Bluegill

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Christian Humbert, Department of Biology, Berry College, Mount Berry, GA.

Breanna Cartwright, Department of Biology, Berry College, Mount Berry, GA.

Caroline Moe-Lunger, Department of Biology, Berry College, Mount Berry, GA.

Bill Davin, Department of Biology, Berry College, Mount Berry, GA.

Bluegill are important not only as a forage species, but also as a game fish. An increased demand has forced state fish hatchery personnel to increase overall production and to be more efficient, so the results of this study are important to hatchery biologists. A 70-day study was undertaken to measure the growth of juvenile bluegill (mean weight: 1.6 ± 0.7 g) feed diets with three protein concentrations (32, 36, and 45%). Three different commercially available feeds were used and the fish were split between two identical recirculated systems, each with three – 435 L tanks (25 fish per tank) so each protein level was replicated. The food was milled and sieved prior to feeding so the appropriate size particles were offered to the juvenile fish. The fish were fed three times daily (6% body wt. per day) and then bulk weighed weekly by treatment. The food allotment was adjusted after each weighing. Temperature was monitored daily and water quality was tested weekly. At the end of the 70-day study, the fish were individually weighed and measured. Survival was in excess of 95% for all the tanks but one (60%). The weight gain was significantly higher ($p<0.05$) with the 45% protein feed (avg. 9.7 g) as compared to the other two feeds at 3.0 (36%) and 4.6 g (32%). The fish fed the 32% protein feed yielded a slightly higher but significant weight gain than those feed the 36% protein meal (difference of 1.6 g). The Specific Growth Rates were 2.7, 1.5 and 1.9 for the high, medium and low protein feeds, respectively. Water quality parameters (NH3-N, NO2-N, NO3-N, and Hardness) were well within acceptable ranges throughout the study. DO concentrations stayed at or above 80% saturation and the temperature dropped from 24°C to 19°C during this investigation.

Comparing recruitment estimation methods for age-1 Atlantic Sturgeon in the Altamaha River, GA from 2008-2019

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The Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) is an anadromous fish species that was once of great commercial importance in many of the coastal rivers of the eastern U.S.A. The life history traits of this species, including its slow growth and late age at maturity, make it particularly vulnerable to the effects of overharvest and habitat degradation. Over the course of the 19th-20th centuries, commercial harvest and infrastructural projects, such as damming and dredging, depleted most historical stocks of Atlantic Sturgeon. Consequently, the species was placed on the endangered species list in 2012. The objective of this study was to compare the use of two techniques to estimate recruitment of age-1 juvenile Atlantic Sturgeon in the Altamaha River, GA from 2008-2019. The project involved capturing river-resident juveniles in gill and trammel nets during slack tides. Fish were measured and individuals identified using passive integrated transponder (PIT) tags. Capture histories of individual sturgeon were used to derive estimates of age-1 recruitment through two methods. The first involved using Huggins closed capture models in the RMark package. The second method incorporated the spatial aspect of the capture histories in the secr package. Model strength will be compared using information criterion as well as the variability of the confidence intervals around yearly point estimates. These estimates will give managers insight into long-term population trends of Atlantic Sturgeon in a southern river, information which will help to drive management actions for this imperiled species. In addition, this study will provide information about the precision of these two estimation methods and their usefulness in these complex systems.

Side scan sonar as an effective tool for estimating Atlantic Sturgeon spawning run size

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The Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) is a large, benthic, anadromous fish that occurs off the east coast of North America. Many populations were nearly extirpated by commercial harvest and the construction of dams on spawning rivers, which resulted in the species being listed as federally endangered in 2012. Recruitment studies indicate that the Atlantic Sturgeon population in the Altamaha River, Georgia is among the most robust within the South Atlantic Distinct Population Segment (DPS). Unfortunately, population estimates for the large, migratory adults are lacking because quantifying them is logistically challenging. The recent availability of cost-effective remote sensing technology offers a new method for estimating the abundance of adult spawners during their upstream migrations. In this study, we used side scan sonar surveys to assess the run size of Atlantic Sturgeon throughout the entire navigable reach of potential spawning habitat (535 river km) in the Altamaha River system, from September-November of 2017 and 2018. An N-mixture model used count data from a continuous survey of the whole system and estimated that there were 161 (95% CI: 101-249) and 125 (95% CI: 28-129) adult Atlantic Sturgeon in the 2017 and 2018 spawning runs. Overall detection probabilities calculated from repeated surveys of selected river were 0.57 (SE = 0.13) and 0.21 (SE = 0.31), respectively. We also investigated several factors, including river depth, depth-to-swath width ratio, substrate, that might influence detection probability. This study is one of the only recent estimates of adult Atlantic Sturgeon abundance in the Altamaha River or the South Atlantic DPS and provides managers with important quantitative data about the population. Compared to previous mark-recapture estimates of spawning run size, side scan sonar was less invasive, required substantially less effort, and resulted in tighter confidence intervals.

Changes to Gulf Sturgeon Recruitment, Mortality, and Behavior following Hurricane Michael in the Apalachicola River, Florida

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Gulf Sturgeon (*Acipenser oxyrinchus desotoi*) populations have undergone significant declines since the start of the 20th century because of overfishing and habitat loss such as the 78% reduction in historic spawning habitat in the impounded Apalachicola River basin. Recent studies of Gulf Sturgeon in the Apalachicola River documented very low annual recruitment, which suggests that the population is not recovering well. Predicted rise in frequency and severity of hurricanes, possibly driven by climate change, presents an additional and increasingly recognized threat to fragile Gulf Sturgeon populations with post-hurricane hypoxic and anoxic conditions in a river leading to fish kills causing the threat. In October 2018, Hurricane Michael struck the Apalachicola River basin and caused sudden changes to water quality and a documented fish kill that included adult sturgeon. Because the storm occurred during a long-term study of juvenile Gulf Sturgeon recruitment and fish movement, we had a unique opportunity to investigate changes to the population following the hurricane. Using a combination of mark-recapture and acoustic telemetry data, we estimated juvenile abundance and examined adult sturgeon movements in the Apalachicola and Brothers rivers during and after the hurricane. Recruitment for the 2018 young-of-the-year cohort was greater than 5 of the previous 6 years, indicating the hurricane did not cause a year class failure. However, there was a sharp increase in apparent annual mortality of adults with 46% of tagged fish not detected since the storm and presumed to have died. Storm-induced hypoxia also appears to have triggered an early and rapid out-migration of the surviving tagged adults within 2 days following the storm. These preliminary findings suggest that frequent hurricanes may cause dramatic increases in the annual mortality of adult Gulf Sturgeon and eventually threaten their populations' future stability.

Age and growth characteristics of the subspecies of Largemouth Bass (*Micropterus salmoides*) exhibit differential responses to a thermal gradient

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Climate change has become a growing concern in the world of environmental research. Climate change can refer to any number of different statistical changes in weather patterns, but temperature change is a key component of climate change. Fish are adapted for global temperature change through evolution of unique phenotypic responses to thermal gradients. Our goal is to examine the relationships between mean annual temperature and variation in Largemouth Bass (*Micropterus salmoides*) longevity and size at age 3. We expect Largemouth Bass to live longer but grow smaller in cooler temperatures than in warmer temperatures. Previously published data on this species has been collected from across the United States and Canada. We collected high-resolution thermal data developed for climatological research and compared age and growth data to corresponding collection localities. Our results show there is a significant negative relationship between temperature and total length at age 3. There is no relationship using least squares regression between temperature and longevity; however, the data are arranged in a significant vertical parabola that opens upward. Nonlinear relationships between temperature and longevity have been previously reported in other taxa, such as the pikes, *Esox*. This study shows there are different patterns in longevity along a thermal gradient between the subspecies of Largemouth Bass and that the subspecies need to be managed differently from one another.

Flatfish matter, too: How an obsolete navigational cut can affect local assemblage patterns along the coast of Georgia

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The Satilla River Estuary (SRE) has been historically altered by human activity, especially during the construction of navigational “cuts” through the marsh in the early 1900s. These cuts, used to transport timber harvests, are now unused & obsolete. In contrast, St. Catherines Island (SCI), a pristine uninhabited barrier island off of the Georgia coast, is believed to have experienced less anthropogenic alterations when compared to mainland estuarine habitats. Because of the differences in human influences, we hypothesize that the fish assemblages will be different. As benthic species, flatfish may be especially affected by anthropogenic disturbances of the estuarine substrates, since they spend much of their life cycle in the benthic system. We compared the abundance of various resident flatfish species captured when trawling & using gill nets in these two systems. We compared catch-per-unit effort for six flatfish species among data at several collection sites, seasonally, between 2015 & 2018. We also examined environmental variables when assessing abundance. The data are reflective of differences that exist in resident flatfish populations, & this condition could be explained by the anthropogenic activities. This study provides insight into the effects of human disturbances on benthic fish species abundance & assemblage.

Using video surveys to identify habitat preferences of the Gag Grouper (*Mycteroperca microlepis*) in the eastern Gulf of Mexico

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The Gag Grouper (*Mycteroperca microlepis*) is a popular recreationally and commercially targeted fish found along the continental shelf of the United States and Mexico. Historical overfishing led to declines in the Gulf of Mexico stock, which was declared overfished in 2009. In response, numerous fishing regulations were established to rebuild the stock. Although Gag Grouper are no longer listed as overfished in the Gulf of Mexico, the population has not yet recovered to historic levels. Limited availability of information on life history has created uncertainty about the long-term effectiveness of current management strategies in aiding recovery. Adult Gag Grouper spend much of their life on offshore reefs, but little is known about their habitat preferences there. Our objective was to identify factors that influence habitat use by Gag Grouper at the local reef scale throughout the eastern Gulf of Mexico. We associated the occurrence of Gag Grouper with reef habitat variables using data from three separate fisheries-independent video surveys conducted from 2010-2016 by the National Marine Fisheries Service (NMFS) Southeast Area Monitoring and Assessment Program (SEAMAP), Florida Fish and Wildlife Research Institute SEAMAP, and NMFS Panama City Laboratory. Generalized linear models were used to assess habitat characteristics (e.g., substrate, habitat type, vertical relief, and/or sessile organisms) as useful predictors of Gag Grouper presence. Our preliminary results indicate that the probability of Gag Grouper occurrence is highest in habitats with fragmented bottom, higher latitudes, and greater depths. This information will allow managers to prioritize the conservation of reef habitats that are important to Gag Grouper.

An assessment of the benthic fish assemblage in a Georgia tidal creek

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Many species of estuarine fishes and invertebrates are dependent upon shallow tidal creeks at some point during their early life history as settlement areas or nursery grounds. The purpose of this study was to assess the structure of the entire benthic assemblage of Wylly Creek near Savannah, GA specifically targeting smaller individuals. For this study, sampling for flatfishes has occurred in Wylly Creek since 2015 with the addition of the complete assemblage assessment starting in 2019. Sampling was conducted monthly at ebb tide using a 1-m beam trawl. Fish were identified to species and measured to the nearest mm TL. Temperature and salinity were measured monthly using a refractometer and thermometer, respectively. A total of 687 fish were collected comprising 4 families: Paralichthyidae, Cynoglossidae, Sciaenidae, and Triglidae. The Bay Whiff *Citharichthys spilopterus*, Fringed Flounder *Etropus crossotus*, and Blackcheek Tonguefish *Symphurus plagiusa*, were collected every season, while the other fish species had greater seasonal variation. During colder months blue crab *Callinectes sapidus* and commercial shrimp were the only species consistently collected. Blue crabs remain prevalent throughout most of the dataset. Overall, more species were collected in the warmer months than during the colder months. These results provide a perspective into the seasonal differences of shallow-water fish and macroinvertebrate assemblages.

Comparison of diet habits of invasive blue catfish from the Altamaha and Satilla rivers, GA

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The non-native blue catfish, *Ictalurus furcatus*, was first documented in the Altamaha River, Georgia in the early 2000's, and has become increasingly invasive over time. Expansion of this species has reached the Satilla River, Georgia, with the first reported individual found in 2011. Biologists from the GA DNR collected 195 blue catfish from the Altamaha River in the summer of 2017 and over 300 blue catfish from the Satilla River in the summer of 2019. Both samples were delivered to the research laboratory at Georgia Gwinnett College for further analysis to assess the potential impact of the blue catfish on native fauna in each system. The stomachs were dissected, and any gut contents were identified, enumerated, and weighed for diet analysis to investigate food habits. From the Altamaha River sample, 175 of the 195 stomachs contained diet contents, with the Asiatic clam (64%, frequency of occurrence), vegetation/detritus (40%), and fish and fish parts (16%) being the most dominant prey items. From the Satilla River sample, 64 stomachs have been dissected with 50 containing prey items. This preliminary data reveals that vegetation/detritus (52%), grass shrimp (40%), and fish and fish parts (22%) are the most dominant prey items. Both analyses demonstrate that blue catfish are opportunistic predators that feed on a wide variety of prey. Although the Asiatic clam and grass shrimp are the most dominant prey items in their respective systems, both collections exhibit increased piscivory with size, which may negatively affect native fish assemblages through predation. Future research will include completing our diet analysis of the Satilla population. This comparative analysis should further inform fisheries management on the diet preferences of invasive blue catfish that inhabit the Altamaha and Satilla rivers.

Analysis of population demographics of the invasive blue catfish in the Satilla River, Georgia

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We investigated population demographics of the non-native blue catfish, *Ictalurus furcatus*, in the Satilla River, Georgia, assessing changes in population age and size structure over time. The blue catfish was first documented in the Satilla River in 2011, and biologists are concerned that this species may expand and become increasingly invasive over time. Biologists from GA DNR collected 227 blue catfish from the Satilla River in the summer of 2017 and approximately 300 blue catfish in 2019, which were delivered to the research laboratory at Georgia Gwinnett College. Blue catfish were then weighed (g), measured (mm Total Length - TL) and lapilli otoliths were extracted from each fish for age and growth determination. Otoliths were embedded in a clear epoxy resin and then sectioned with a high-precision sectioning saw. Otolith aging was conducted by two readers, and any disagreements in age determination were reconciled by a third reader. All blue catfish from 2017 has been aged (N=227), while 31 catfish from 2019 have been aged to date. We conducted preliminary analyses to compare growth and population size and age structure between 2017 and 2019. Over this two-year period, we observed distinct shifts in population age and size structure, with mean (± S.D.) ages and total lengths increasing from 1.3 (± 0.04) to 2.5 (± 0.17) years and 234 (± 3.9) to 386 (± 21.3 mm), respectively. In addition, growth rates of blue catfish have increased over time, with mean total length at age-3 increasing from 350 (± 14.0) mm in 2017 (N = 11) to 415 (± 18.7) mm in 2019 (N = 14, $t = 2.61$, $P = 0.02$). Our preliminary analysis indicates that the Satilla population has a great capacity for rapid growth and expansion, as a result of their consistent reproduction over the last three years and advancing age and size structure. Future research will include the completion of fish aging and final comparisons of age and growth. This study should further inform the management of the latest invasive catfish species to inhabit the Satilla River.

Assessing supply and demand of trout in north Georgia under current and projected thermal regimes

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There is little debate that our climate is warming, and this change may affect the persistence of trout in the cool-water regions of Georgia. This study focused on how warming could affect both trout-based recreational opportunities and future suitable thermal habitat availability from May to September within the state. The effect warming may have on future habitat availability and recreational opportunities for trout was uncovered by modeling three climate change scenarios. Increases in water temperature were then intersected with angler preference data to determine where habitat and angling opportunity loss would be the greatest across northern Georgia. Results revealed a substantial decrease in future suitable thermal habitat and a loss of angling opportunities for anglers during the summer months. Model forecasts predicted a decline in available habitat of 18% to 71% for brook trout and 7% to 71% for brown trout and rainbow trout. Suitable thermal habitat for all three species will be increasingly restricted to higher elevations during summer, where refuge from lethal temperatures will be available. As water temperatures rise, stream temperatures may be within the appropriate range to stock fish a small percentage of fish earlier in the spring to provide fishing opportunities up to the hottest parts of the summer. The remaining proportion of fish could then be stocked when stream temperatures are below the lethal threshold after August and the fish would be available for angler enjoyment until the following summer.

Influence of Introductions of Alabama Bass *Micropterus henshalli* on Black Bass Growth Rates in North Georgia Reservoirs

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Spotted bass *Micropterus punctatus* were introduced into multiple reservoirs in the southeastern United States, including deep highland reservoirs of north Georgia, and represent the most abundant black bass species in most of these reservoirs. However, the quality of the fishery can vary substantially among reservoirs, most likely because introductions actually consisted of the morphologically similar black bass species, the Alabama bass *Micropterus henshalli*, that is known to grow faster and attain larger sizes. This study compared the growth of black bass populations among Chatuge, Nottely, and Lanier Reservoirs. It is hypothesized that differences between populations might occur due to a mixed introduction of Alabama bass and spotted bass among reservoirs. Data was collected from each reservoir during spring electrofishing surveys by Georgia DNR biologists. Otoliths were removed, processed, and analyzed for annual growth. Tissue samples were analyzed for allele composition. Mean growth rates of populations differed between reservoirs and appears to be related to the observed frequency of Alabama bass alleles in the population. Ranges of Alabama bass allele frequencies in the reservoir with the slowest growth (Nottely Reservoir) was 30.3 – 87.5 with no pure Alabama bass present whereas Chatuge Reservoir, which had a significantly ($P<0.05$) faster growth rate, had a frequency of 85.7 – 99.8 with 88.9% pure Alabama bass. Lanier data is still being processed. Thus, historical stockings of *M. punctatus* and *M. henshalli* may influence current fisheries due to a reservoir's genetic legacy, impacting growth and maximum size.

SESSION 2: GEORGIA'S PUBLIC FISHING AREAS (SYMPOSIA)

Georgia State Parks – Gateways to Fishing

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Georgia's state parks are owned and operated by the Georgia Department of Natural Resources. Many of the parks are located on or near a major waterbody and have fishable waters within the park. Visitors come from all over the nation to enjoy the natural beauty of these parks. The Wildlife Resources and the Parks and Historic Sites Divisions of Georgia DNR have partnered to improve fishing and fishing access at state parks across the state. Fifteen state parks are targeted for initial improvements to fisheries. These enhancements include fish population assessments through sampling, development of fish stocking and management plans, habitat enhancements, fertilization programs, and the installation of automatic fish feeders and feeding stations. In addition, each park will offer beginning fishing programs, Kids Fishing Events, and a tackle loaner program.

Wildlife Resources Division staff who are experienced in Kids Fishing Events and educational activities have also held training sessions for Parks staff so they can learn to fish and be prepared to answer questions about fishing, train new anglers, and host Kids Fishing Events on the parks. This program began in 2019. This year (2020) we hope to see increased angling on Parks waters and increased visitation to Parks while making Georgia State Parks the Gateway to Fishing for new anglers and their families.

Big Lazer Public Fishing Area

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Jay Williams, Georgia Department of Natural Resources, Wildlife Resources Division, Talbotton, GA.

Big Lazer Public Fishing Area (PFA) is one of eleven Department of Natural Resources owned and managed fishing areas in Georgia. All PFA lakes are intensively managed to provide visitors with quality fishing opportunities in a safe and clean outdoor environment. Big Lazer PFA was opened to the public on June 28, 1989 and consists of a 195-acre lake impounded on Gum Greek and is located entirely on Big Lazer Wildlife Management Area in Talbot County (west-central Georgia). The lake's fish population provides many harvestable bream including redear, redbreast, and bluegill as well as largemouth bass. Although the black crappie fishery was unintentional, the fishery has become popular with many anglers. Channel catfish are stocked as needed in providing for Kids Fishing Events and for maintaining a channel catfish sport-fishery on the PFA. In addition to fishing, the Big Lazer complex includes recreational activities such as hunting, bird watching, hiking, canoeing, camping, and a shooting range. New enhancement money following the recent license increase has helped fund several improvement projects for Big Lazer PFA. For example, existing facilities received security lighting for the recently implemented night fishing program. Also, an additional fishing pier and upgraded parking area improved access for bank anglers at the picnic area location. Big Lazer PFA has also benefited from having a full-time employee based on the area. An overview of these improvements at Big Lazer PFA as well as future opportunities are the focus of this presentation.

Dodge County Public Fishing Area

Tim Bonvechio, Georgia Department of Natural Resources, Wildlife Resources Division, Waycross, Email: Tim.Bonvechio@dnr.ga.gov

The Georgia Department of Natural Resources, Wildlife Resources Division, operates ten public fishing areas (PFAs) throughout the state. These facilities together provide fishermen and other user groups with an opportunity to engage in and enjoy several forms of outdoor recreation, including fishing. One of these facilities is Dodge County PFA, just south of Eastman. Open 7-days a week, 24 hours a day, Dodge County PFA offers several recreational opportunities, including day and night fishing, a large archery range, a sign in deer hunt, a quota alligator and turkey hunt, an interpretive education hiking trail, boat-in primitive camping, and facilities for picnics and other outdoor events. The property contains a 104-acre lake surrounded by 444 acres of wooded terrain. The lake is intensively managed for multiple sportfish species, including largemouth bass, bluegill, black crappie, redear sunfish, and channel catfish. Since it's impoundment in 1991, Steven Bell Lake has been a trophy bass factory, producing at least 5 bass over 13lbs that were documented between 1999 and 2010 including the lake record 15lb & 8.5 ounce bass caught on March 16, 2002 by Mr. David Hudson. Special regulations exist for the largemouth bass at this special lake, including no minimum length limit and a five fish bag limit of which one fish over 16 inches per person may be kept. One large off-site kids fishing event (KFE) is held per year, designed to encourage young anglers to learn about and engage in fishing. Currently, we are experiencing a staffing shortage, and as a result the group shelter normally open for rent, is closed due to these shortages. This presentation will provide an overview of Dodge County PFA and the efforts being done to continue this facility an excellent destination for folks seeking to enjoy the outdoors.

Evans County Public Fishing Area

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The Georgia Department of Natural Resources, Wildlife Resources Division, operates several public fishing areas (PFAs) throughout the state. These facilities collectively provide fishermen and other user groups with an opportunity to engage in and enjoy several forms of outdoor recreation, with a primary focus on fishing. One of these facilities is Evans County PFA, located in Evans County in Claxton Ga. Open 24 hours a day throughout the year, Evans County PFA offers a plethora of recreational opportunities, including fishing, limited waterfowl hunting and alligator hunting, hiking trails, 3-D and static archery ranges, a newly-constructed RV/Tent camping facility, a newly-constructed and fully equipped event center and a pavilion for picnics and other outdoor events. The property contains three lakes, 84, 30 and 8 acres in size, for a total of 122 acres of water surrounded by 252 acres of wooded terrain. The 84-acre and 30-acre lakes are managed for multiple species, including largemouth bass, bluegill, redear sunfish, channel catfish, hybrid striped bass and crappie. The smaller, 8-acre, lake is managed for channel catfish, providing excellent year-round harvest opportunities while also serving as a venue for kids fishing events, designed to encourage young anglers to learn about and engage in fishing. This presentation will provide an overview of Evans County PFA and the efforts being done to make this facility an excellent destination for families seeking to enjoy the outdoors.

Flat Creek Public Fishing Area

Brandon Baker, Georgia Department of Natural Resources, Wildlife Resources Division, Fort Valley, GA. Email: brandon.baker@dnr.ga.gov

Flat Creek Public Fishing Area is located on 852 acres, south of Perry, Georgia in Houston County. This 102-acre intensively managed public lake offers excellent fishing opportunities where anglers can fish from the shore or launch a boat. Boaters are restricted to idle speed for safety and as a courtesy to other visitors. The area offers the opportunity to see many types of wildlife, including a variety of bird species that frequent the large grassland or lake shoreline. Hunting opportunities for whitetail deer, turkey, hogs and waterfowl are available at Flat Creek PFA. This PFA's location in central Georgia near I-75 make it easily accessible to many outdoor enthusiasts. Visit Flat Creek PFA for an exceptional fishing or outdoors experience with friends and family.

Hugh Gillis Public Fishing Area

Aaron Gray, Georgia Department of Natural Resources, Wildlife Resources Division, Adrian, GA. Email: aaron.gray@dnr.ga.gov

The Georgia Department of Natural Resources, Wildlife Resources Division, operates several public fishing areas (PFAs) throughout the state. These facilities collectively provide fishermen and other user groups with an opportunity to engage in and enjoy several forms of outdoor recreation, including fishing. One of these facilities is Hugh Gillis PFA, located in Laurens County. Open 7-days a week, Hugh Gillis PFA offers a plethora of recreational opportunities, including fishing, hunting, hiking trails, boat-in primitive camping, and facilities for picnics and other outdoor events. The property contains a 109-acre lake surrounded by 640 acres of wooded terrain. The lake is intensively managed for multiple species, including largemouth bass, bluegill, redear sunfish, channel catfish, and crappie. Special regulations exist for largemouth bass, including a prohibited harvest slot limit of 16-24 inches. Several kids fishing events (KFEs) are held at the facility each year, all designed to encourage young anglers to learn about and engage in fishing. While many recreational opportunities currently exist at Hugh Gillis PFA, additional opportunities are being considered and explored, including the addition of an archery range. This presentation will provide an overview of Hugh Gillis PFA and the efforts being done to make this facility an excellent destination for families seeking to enjoy the outdoors.

McDuffie Public Fishing Area

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The Georgia Department of Natural Resources, Wildlife Resources Division, operates several public fishing areas (PFAs) throughout the state. These facilities collectively provide fishermen and other user groups with an opportunity to engage in and enjoy several forms of outdoor recreation, including fishing. One of these facilities is in McDuffie County and includes a warmwater fish hatchery and McDuffie Environmental Education Center in addition to the McDuffie PFA. Open 7-days a week, McDuffie PFA offers a plethora of recreational opportunities, including fishing, camping, hunting, hiking, boating, picnicking and other outdoor events. The property contains 7 PFA lakes ranging from 5 to 37 acres, totaling 102 acres. The lakes are intensively managed for multiple species, including largemouth bass, bluegill, redear sunfish, and channel catfish. Rodbender Lake is managed for trophy largemouth bass and has a 22" length limit. Several kids fishing events (KFEs) are held at the facility each year, all designed to encourage young anglers to learn about and engage in fishing. This presentation will provide an overview of McDuffie PFA and the efforts being done to make this facility an excellent destination for families seeking to enjoy the outdoors.

Ocmulgee Public Fishing Area

Tim Bonvechio, Georgia Department of Natural Resources, Wildlife Resources Division, Waycross, GA. Email: tim.bonvechio@dnr.ga.gov

The Georgia Department of Natural Resources, Wildlife Resources Division, operates ten public fishing areas (PFAs) throughout the state. These facilities together provide fishermen and other user groups with an opportunity to engage in and enjoy several forms of outdoor recreation, including fishing. One of these facilities is Ocmulgee PFA, located near Cochran. Open 7-days a week, 24 hours a day, Ocmulgee PFA offers several recreational opportunities, including day and night fishing, complete with a 2-lane boat ramp, 2 fishing piers, public restrooms, an Alligator quota hunt is available, a hiking trail, primitive camping, and facilities for picnics and other outdoor events. Ocmulgee PFA offers a 106-acre lake that is intensively managed to provide the optimum environment for anglers. Whether you're fishing from the bank or from a boat, the lake provides an abundance of trophy largemouth bass & white crappie. Bluegill and redear sunfish are also popular sportfish that anglers may also encounter. In an effort to keep the trophy bass fishery rolling right along, there is a catch and release regulation on all bass. We are currently looking for a lake record largemouth bass at Ocmulgee PFA with biologists now sampling several bass in the 8 and 9lb range. Several kids fishing events (KFE) are typically held per year at our special events pond (Wayne Sapp Lake), and these events are designed to encourage young anglers to learn about and engage in fishing. This presentation will provide a quick overview of Ocmulgee PFA and the efforts being done to continue this facility as an excellent destination for folks seeking to enjoy the outdoors.

Recreational Opportunities on Refuges in South Georgia

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The U.S. Fish and Wildlife Service offers visitor opportunities on National Wildlife Refuges throughout the country. There are 568 refuges across the United States, at least one in every state. Visitor opportunities on refuges are centered around wildlife dependent recreation – including hunting, fishing, wildlife observation, wildlife photography, interpretation, and environmental education. Okefenokee National Wildlife Refuge was designated in 1937 to conserve and protect the unique qualities of the vast Okefenokee Swamp. Today, approximately 80% of the swamp is managed by the U.S. Fish and Wildlife Service as the refuge and provides outstanding visitor opportunities. Fishing is best in late winter/spring and boasts such species as flier, warmouth, channel catfish, and bowfin. The Banks Lake National Wildlife Refuge was established in 1985 and offers great opportunities for fishing for many species of panfish and largemouth bass. This presentation will provide an overview of Okefenokee and Banks Lake National Wildlife Refuges and the recreational opportunities found at these locations.

Paradise Public Fishing Area

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Paradise Public Fishing Areas (PFA) is one of the 11 PFAs operated by the Georgia Department of Natural Resources, Wildlife Resources Division throughout the state. Paradise PFA is a large multi-lake facility located on 1,341 acres in Berrien County, GA. The area has over 50 lakes and ponds with a total of 525 acres of water. Open 7-days a week, Paradise PFA is multi-use area offering a variety of recreational opportunities, including fishing, hunting, birding, hiking trails, primitive camping, archery, and facilities for picnics and other outdoor events. There are 13 intensively managed lakes that are open to the public for fishing and an additional 3 ponds that are managed for kids fishing events. There are 9 lakes with boat ramps and excellent bank fishing access on most of the area's lakes. The area offers quality fishing for several species, including largemouth bass, bluegill, redear sunfish, channel catfish, crappie, and hybrid striped bass. Paradise PFA is very popular with citizens, as illustrated by the results of a creel survey conducted from 2018-2019 which estimated that there were approximately 22,041 angling trips and 16,787 non-angling trips on the area.

Rocky Mountain Public Fishing Area

Jim Hakala, Georgia Department of Natural Resources, Wildlife Resources Division, Gainesville, GA. Email.: jim.hakala@dnr.ga.gov

Rocky Mountain Public Fishing Area (PFA), located in northwest Georgia, is operated through a unique partnership of the Georgia Department of Natural Resources and the Oglethorpe Power Company. The 5,000-acre facility opened in 1997 and offers visitors angling opportunities on three lakes (559 acres), as well as hunting, camping, swimming and hiking amenities. Primary sport fish species include largemouth bass, bluegill, redear sunfish, black crappie, channel catfish and walleye. Rocky Mountain is the only Georgia PFA containing walleye. All three lakes have been fertilized annually since 1998. A general decline in fertilization rates across all lakes from 2007–2013 resulted in a significant (43-51%) decline in the total biomass of largemouth bass, bluegill and redear sunfish by 2013. Fertilization rates have drastically improved in recent years and biomass of the three species is now trending towards pre-2007 levels. Two of the facility's lakes are open to fishing all year and the third, termed the "trophy lake", is open the first ten days of every month. This unique access model was designed to limit fishing pressure on the trophy lake and has been well received by anglers. In 2005, the 18-inch minimum length limit (MLL) for largemouth bass at the trophy lake was replaced with a 14-20 inch slot-length limit (SLL). The creel limit remained five bass, but no more than one could be over 20 inches in length. The mean electrofishing catch rate of bass >20 inches in the trophy lake under the SLL (3.2 bass/hour) is significantly ($p<0.1$) higher relative to mean catch rates (1.3 bass/hour) under the previous MLL. These findings suggest that the SLL is producing relatively more large bass than under the previous MLL and is functioning as intended.

Fort Gordon Public Fishing Areas

Steven Camp, Fort Gordon Natural Resources Branch, Fort Gordon, GA.

The Department of Army has several installations in Georgia that offer public fishing to include Fort Benning, Fort Stewart and Fort Gordon. These installations provide fishermen and other user groups with an opportunity to engage in and enjoy several forms of outdoor recreation, including fishing, hunting, hiking, bird watching, etc. Fort Gordon is located southwest of Augusta in Richmond, Columbia, McDuffie and Jefferson counties. It is a 55,500-acre Military base with approximately 45,000 acres of forest and 425 acres of lakes with the remaining acreage in ranges or developed cantonment area. Fort Gordon has 89 streams that cover approximately 93 acres and measures around 88 miles. However, a majority of the fisheries management is concentrated on the 27 managed lakes. These lakes range in size from Butler reservoir (95 Ac) to Clay Pit 3(2.9 Ac). Most of these lakes are intensively managed for multiple species, including largemouth bass, bluegill, redear sunfish, channel catfish, rainbow trout, hybrid striped bass and crappie. Fort Gordon also host 3 kids fishing events (KFEs) each year with average attendance of approximately 120 kids each. This presentation will provide an overview of the opportunities available at Fort Gordon and the efforts being done to manage the resources at this location.

US Army Corps of Engineers- Carters Lake Project

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Carters Lake Project is part of the Mobile District within USACE. The main lake encompasses 3200 acres, while the Reregulation Lake is roughly 1000 acres, and impounds water from a drainage area of approximately 375 square miles. The main lake dam is the tallest earthen dam east of the Mississippi River and is approximately 450 feet tall. Construction began in 1962 and completed in 1977. The powerhouse contains two (2) conventional hydroelectric units and two (2) pump back units that pulls water from the Reregulation Lake and pumps back up to the main lake to be used again for power production when power demands are at their peak. Upland acreage is approximately 5200 acres, terrain ranges from mountainous slopes of the Cherokee Uplands to the rolling hills of Ridge and Valley that results in a wide variety of flora and fauna. The majority of this upland acreage is licensed to Georgia Department of Natural Resources (GADNR) to operate as the Carters Lake Tract of the Coosawattee Wildlife Management Area. Carters Lake Project offers numerous outdoor recreational opportunities to include camping, mountain biking, hiking, hunting, archery range, swimming, fishing and picnicking. There are ten (10) developed recreational areas that includes five (5) boat launch ramps that provides fisherman and boating enthusiasts convenient access to Carters Lake. GADNR- Fisheries Section, provides excellent population monitoring and management for the Carters Lake fishery. Anglers regularly catch quality spotted bass, as well as, respectable striped bass, hybrid bass, crappie, channel catfish, and walleye. Aquatic habitat management occurs annually and involves cooperation between GADNR and USACE. Management consists primarily with placement of deep and shallow water artificial structures, shoreline tree cutting and location documentation for public dissemination.

One fish, two fish, hopefully more fish: how an obsolete navigational channel affects fish assemblages in the Satilla River estuary

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Healthy estuaries protect productive coastlines and support diverse ecosystems. They act as migratory routes and nursery areas, as well as feeding and/or breeding sites in support of abundant fish assemblages. The Satilla River estuary in Georgia has been altered several times since 1932, with the most notable being Noyes Cut, which today is an obsolete navigational channel. Based on USACE reports as well as local observations, Noyes Cut has altered sediment transport, salinity gradients, and water flow in adjacent creeks. Since July 2014, we have been investigating how Noyes Cut influences the estuary's fish assemblages. Four sites were sampled monthly by otter trawl, experimental gill nets, minnow traps, and eel pots. All fish were identified to species, and length was measured to the nearest cm. Simultaneously, water quality parameters (pH, DO, temperature, chl *a*, and salinity) were measured using a multi-probe water quality sonde. During the 5.5 years of study, 86 species were observed and 13 species were found to be common among all sampling sites. Piney Bluff Node, the site immediately downstream of Noyes Cut, had the least species richness and smallest fish as well as lowest salinity and chl *a* on average. These data combined suggest Noyes Cut is affecting fish assemblages in the Satilla River estuary. USACE has proposed closing Noyes Cut in hopes of restoring natural water flows, with construction beginning in 2020. Fish assemblages are expected to redistribute into the surrounding tidal channels creating positive effects for both recreational and commercial fisheries.

Improving post-release survival of hook-caught Red Snapper and Red Drum
a private-public partnership

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Each year, millions of saltwater fish are released after being caught by anglers. Post-release survival of these released fish varies greatly based on the species, the angling and handling techniques and conditions of the aquatic habitat where the fish are caught. Most released fish must survive if catch-and-release fishing, both voluntary and regulatory, is to be effective as conservation. During 2018 and 2019, a partnership of four state marine fishery management agencies, including Georgia DNR Coastal Resources Division, NOAA Fisheries, and the tackle/marine industry was formed to improve post-release survival of two iconic species in the Southeast – red snapper and red drum. The latter is vulnerable to deep-hooking and the former to barotrauma. Anglers targeting red snapper were provided descending devices which are used to return fish suffering barotrauma back to depth. Anglers targeting adult red drum were provided short-leader, circle-hook rigs which reduce deep hooking. Both groups were also provided information on fish handling best practices. Results of an online survey of participants indicated most respondents successfully used the provided items and plan to continue using them during their fishing activities. Furthermore, most respondents indicated they changed their behavior to incorporate the use of fish handling best practices. This project has demonstrated the value of a private/public partnership for making saltwater anglers better stewards of living marine resources.

Maternal provisioning gives young-of-the-year hammerheads a head start in early life

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For species that do not provide parental care after birth, excess maternal provisioning during development beyond what is required for embryogenesis provides offspring with resources that may increase their chances of survival. Maternally-derived provisions, such as lipids, are expected to be important for buffering offspring against limited food resources or time needed to learn how to properly feed. Young-of-the-year (YOY) Scalloped Hammerheads (*Sphyrna lewini*) were sampled from two nurseries along the US Atlantic Coast and compared to near-term embryos collected from the same geographic region to make inferences on the reliance of maternal stores during early life. We found large declines in lipid content, corresponding to progression in umbilical scar healing (a proxy for time since birth), particularly during the period of time when scars were open to newly closed. In addition, while total body weight did not differ between YOYs and near-term embryos, the relative contribution of liver weight to total body weight was less in YOYs, highlighting the reliance on the liver as the energy storage organ in elasmobranchs. While the high metabolic rate of YOY *S. lewini* may shorten the period of time they can rely on maternal stores, the significant drop in lipid content and liver quality from near-term embryos to YOY sharks with newly closed scars indicates that this species heavily relies on maternal stores during early life. Therefore, access to high quality nursery habitat, with regards to food resources, may be an important factor for the survival of young *S. lewini* once they have depleted their maternal stores.

Estimating the impact of recreational crabbing in coastal Georgia

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Kris Sikes, UGA Carl Vinson Institute of Government, Athens, GA

The blue crab, *Callinectes sapidus* is one of coastal Georgia's most iconic and recognizable species. Catching them is a popular recreational activity, as access to crabbing locations is fairly abundant, they are easy to catch with minimal amounts of gear, and their meat is prized by consumers. Despite the popularity of these activities, little is currently known about the impacts of recreational crabbing in Georgia, and this deficiency has been identified as a coastal management research need. In response Marine Extension and Georgia Sea Grant received a Coastal Incentive Grant from the Georgia Department of Natural Resources to characterize the activities of recreational crabbers in Georgia. In collaboration with UGA's Carl Vinson Institute of Government, the team developed and distributed an online survey to estimate effort and harvest rates as well as characterize the economic significance of recreational crabbing. Dock intercept surveys were also conducted at known public crabbing locations to ensure that adequate representation of the recreational crabbing population was included. In addition to the questions asked on the online surveys, the intercept surveys also collected information on crabbers' opinions and knowledge of crabbing regulations. Marine Extension and Georgia Sea Grant used the survey results to develop outreach resources and organize crabbing outreach events to promote the importance of the recreational fishery to the state and demonstrate responsible crabbing practices. This presentation will discuss the results of the surveys and highlight the outreach resources that were developed.

Georgia Department of Natural Resources' marine recreational fisheries surveys

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The saltwater fishing surveys conducted in Georgia are part of a federal program called the Marine Recreational Information Program (MRIP). The National Oceanic and Atmospheric Administration (NOAA) Fisheries Service is responsible for survey design, protocols and generating estimates. The state is responsible for collecting the data according to NOAA's guidelines. There are several surveys under the umbrella of MRIP including the Access Point Angler Intercept Survey (APAIS), Fishing Effort Survey (FES), For-Hire Telephone Survey (FHTS), Large Pelagics Survey (LPS) and Highly Migratory Species (HMS) census card program. Only the APAIS and FHTS are completed by Georgia DNR employees. Since 2016, each state from Maine to Georgia conduct the APAIS through a cooperative agreement coordinated by the Atlantic Coastal Cooperative Statistics Program (ACCSP). The APAIS is the only survey within MRIP that collects catch data. Effort estimates from the FES are combined with catch data from the APAIS to create recreational catch estimates for shore and private boat modes. In 2019 a total of 290 APAIS assignments were drawn with over 2,600 intercepts completed. The FHTS is used for estimating effort for the For-Hire sector. Estimates of effort from the For-Hire telephone survey are combined with catch data from APAIS to create recreational fishing estimates for charter mode. Sampling occurs during two-month time periods (waves) when fishing activity is expected to occur. Catch estimates are provided online for each wave that surveys are conducted. An average of 150 vessels were contacted each wave. Starting in 2020, through a cooperative agreement with ACCSP and NOAA Fisheries, all states from Maine to Georgia will be responsible for conducting the FHTS. Many improvements have been made to the MRIP in recent years and we look forward to working alongside NOAA Fisheries to continue to make progress in the future.

Fish Tagging Studies in Georgia's Marine Waters: Past, Present, and Future

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Tagging studies are an established, widely used tool in fisheries research to determine the fate and movement of fish. In Georgia, the Cooperative Angler Tagging program has been ongoing since 1989, although effort has not been consistent. The tagging program uses conventional dart tags and primarily relies on anglers to voluntarily tag and provide recapture information. The program has provided a long-term dataset of tag returns, but there are limitations to the program that affect its utility. In order to improve the program double tagging and high reward tags have been implemented to allow estimation of tag retention and reporting rates, respectively. Additionally, staff biologists are tagging fish to fill spatial and size coverage gaps. A second tagging effort has been initiated with the goal of gaining finer resolution into Red Drum behavior and escapement from inshore waters. This study will use acoustic telemetry tags and passive receivers, focusing in Wassaw Sound, GA. The acoustic tags will provide detailed movement information as well as fate information that can be used in conjunction with conventional tags. The overall goal of these studies is to gain greater insight into Georgia's Red Drum fishery and provide information for future management decisions and stock assessments.

Robotic acoustics: new directions in fisheries science using autonomous underwater vehicles

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Gliders are autonomous underwater vehicles (AUVs) that have emerged as robust scientific tools for coastal ocean sampling, with long range, endurance, and low-noise propulsion that make them attractive as mobile platforms for acoustic data collection. Recent glider telemetry work in Gray's Reef National Marine Sanctuary demonstrates that physical processes change how and when animals can be detected, as the effective detection radius expands and contracts with density stratification (and thus sound speed variability) on tidal, synoptic, and seasonal time scales. Further, co-located estimates of CTD and passive or active acoustic data can be incorporated into acoustic models to provide improved localization capabilities, as well as guidance beyond mere acoustic detection. Current work incorporates these methods into a framework of artificial intelligence that can lead to greater understanding of processes that affect sampling procedure, measurement, and interpretation of data collected on autonomous platforms.

Boating Access Program Overview

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The Department of Natural Resources, Wildlife Resources Division (WRD) maintains and operates 156 boating access facilities across Georgia. These places provide access to the state's waterways for a variety of outdoor recreation including fishing, waterfowl hunting and boating. Many of these properties are newly constructed while others are older and undergoing revitalization. Efforts are underway to identify new opportunities for site development and facility acquisition while maintaining existing access points. We value the partnerships we hold with local municipalities who are often enlisted to assist with maintenance. The boating access program is fortunate to have a supportive management structure and a highly skilled work force who build out our facilities mostly "in house". Although challenges are often faced, being able to present a newly completed and well-built project for local citizens is very rewarding. A range of topics will be covered including program structure, boat ramp construction, facility data and information management along with a brief overview of efforts to achieve compliance with the Americans with Disabilities Act (ADA).

Georgia fish consumption and mercury projects

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Fishing is a fun and exciting recreational activity enjoyed by many people across the state of Georgia. Along with being a fun sport, fishing can also be the source of a delicious meal. But what, exactly, is in the fish that you are eating? Georgia EPD runs two projects to try and help answer that question; the Georgia Fish Consumption Guidelines, a general study that samples for 42 separate organic and inorganic contaminants, and the Mercury in Fish Tissue study. In my presentation we will be discussing why both projects are important, how sampling and data analysis is different between them and how the data is being used.

Outreach at Savannah River Ecology Laboratory

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The Savannah River Ecology Laboratory (SREL) is a research unit of the University of Georgia located near Aiken, S.C. on the Savannah River Site (SRS), a Department of Energy facility. SREL pursues basic and applied research at multiple levels of ecological organization, from atoms to ecosystems as well as extending beyond the site to regional, national, and global projects. SREL faculty, staff and students have published more than 3500 scientific journal articles, more than 60 books, and several hundred popular articles. The lab has hosted over 700 undergraduate research participants from all over the United States, and more than 400 masters and doctoral degrees have been earned by the lab's students. The SREL Outreach Program formally began in 1991 and has steadily been growing each year. In 2019, the Outreach program provided over 300 lectures and exhibits by visiting local schools, libraries, and colleges. The Outreach group also provides safety and environmental education talks to employees of the Savannah River Site, the general public, and fellow educators all while integrating current research into the presentations. "Ecologist for a Day" is one of SREL's top outreach programs providing a hands-on experience for students of all ages while encouraging them to consider careers in the sciences. This presentation will provide a brief overview of the history of the lab and its ties with the "father of modern ecology," as well as its role on Savannah River Site and the surrounding communities.

An impossible whopper of an idea?: considering the adoption of a "fish-friendly" diet by fisheries professionals

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Study of aquatic ecosystems and imperiled fishes has revealed several actions within watersheds that alter aquatic habitats, reduce fish diversity and impact fish health. Many of the identified culprits are directly or indirectly related to raising livestock for human consumption. Examples include the intensive grazing of livestock near streams that increases sedimentation, nutrient loads and bacteria levels, contamination of streams with concentrated animal waste from feedlot operations, greater release of methane, a known greenhouse gas, water withdrawals for watering livestock, destruction of riparian habitat for cattle access and increased suspension of in-stream sediments. Whereas many management actions have been proposed to limit the impact of livestock operations, such as preventing livestock access to streams, I suggest that a previously unconsidered factor is the increased consumption of meat in the American diet. Adoption of sustainable eating habits that reduce the amount of meat in the diet and support locally-grown, organically-produced foods may lessen observed impacts from livestock operations. This is especially intriguing given the recent interest from the general public in faux meats. Thus, I suggest that individuals in support of fish conservation who have food choice should consider supporting a more sustainable personal diet such as a vegetarian or organic-based diet and endorsing recent food movements that emphasize sustainably-produced foods.

Warm Springs NFH Restoration and Recovery Efforts in Georgia and the Southeast of U.S.

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The National Fish Hatchery System (NFHS) is comprised of a network of Service field stations located throughout the nation that works with tribal, local, and state governments, other federal agencies, and foreign nations to conserve fisheries. The Warm Springs National Fish Hatchery (WSNFH) in Warm Springs, GA was authorized by Congress in 1898, and established in 1899. The species of fish propagated here do best in spring and summer water temperatures of 18.0 to 29.0 degrees Celsius. Species such as lake sturgeon, alligator gar, sicklefin redhorse, smallmouth bass, striped bass, freshwater mussels, gopher frogs, and gopher tortoise, which are vital to the upland habitat and fishery resources of the Southeastern United States, are raised and distributed in cooperation with the various state game and fish agencies. The Warm Springs NFH consists of 56 acres with 40 ponds totaling 18.23 acres of water. The hatchery's primary area of concern is in local area watersheds, but work performed benefits species throughout the states in the southeast. Alteration of habitat by impoundment, drought, pollution, and competition with aquatic invasive species have all played a part in placing a number of the Southeast's aquatic species in peril. To address this problem, Warm Springs National Fish Hatchery is involved in the recovery and restoration of imperiled aquatic species, including freshwater mussels, gopher frogs, and non-game fish. This presentation will provide an overview of WSNFH and efforts on restoration and recovery of endangered, threatened, imperiled, and native species.

Effects of Fungicidal Hydrogen Peroxide Treatments on the Hatching Success of Walleye Eggs and the Growth of Oomycete Pathogens.

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Abstract:
Infections of walleye eggs by organisms of the family Saprolegniaceae have been implicated in instances of poor hatching success experienced by the Georgia Department of Natural Resources. In 2018 and 2019, the effectiveness of various hydrogen peroxide treatment regimens on the hatching success of incubating walleye eggs was tested at an experimental hatching facility at the University of Georgia, Athens, GA. Each combination of three hydrogen peroxide concentrations (100, 250 or 500 mg/L) and two exposure frequencies (once or twice daily) were tested in triplicate along with a sham water treatment. Results showed a significant effect of treatment concentration on hatching success in 2018 but not in 2019. Specifically, in 2018, eggs treated with 100 mg/L hydrogen peroxide hatched at a higher percentage (18.5 ± 3.69) than every other treatment concentration (mean range 0.02-4.58; p = 2.65e-4). Treatment frequency and the interaction between concentration and frequency did not affect hatching success in either year. Quantification of zoospores during both experiments based on qPCR methodologies did not align with observed hyphal growth and was unaffected by any hydrogen peroxide treatment. DNA sequencing of hyphae revealed that *Aphanomyces laevis* is a naturally occurring pathogen associated with walleye for the first time.

Interstate Fishery Management and American Shad: A Case Study

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The Atlantic States Marine Fisheries Commission (Commission) was formed in 1942 through an interstate compact of the 15 Atlantic states, which acknowledged that collaboration and cooperation are essential to achieve the states' collective fishery management and conservation goals. Today, the Commission serves as a deliberative body of these Atlantic coastal states, coordinating the conservation and management of 27 nearshore fish species. One of those species is American shad (*Alosa sapidissima*), which historically supported substantial commercial, subsistence, and recreational fisheries along the East Coast. In response to drastic declines in commercial landings, the Commission implemented the Interstate Fishery Management Plan for American Shad and River Herrings in 1985. With its complex life history and population dynamics, American shad serves as a prime example of the benefits and challenges of interstate fishery management.

Evaluation of Migratory Behavior and Philopatry in Savannah River Striped Bass (*Morone saxatilis*)

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In 2013, a telemetry project of striped bass in the Savannah River was initiated to investigate seasonal habitat use and migration within the river. Such a comprehensive tagging study had not been undertaken of Savannah River striped bass since the mid-1970s, prior to a largescale fishery collapse which prompted interstate moratorium on species take as well as a long-term stock restoration program. Utilizing an array of 55 stationary receivers throughout the Savannah downstream of J. Strom Thurmond Dam, 28 adult striped bass have been tracked over a large geographic area for up to 3 years each. Resulting telemetry data calls into question our current understanding of South Atlantic striped bass movement dynamics. We detected several instances of straying to other coastal rivers, many of which occurred during spring. We further investigated spawning as a possible biological driver of these inter-river movements by coupling telemetry data with concurrent ichthyoplankton surveys in suspected spawning locations. Four of five straying events corresponded to the spawning window, as evidenced by peaks in egg production in plankton tows. Overall, this study has revealed unexpected migratory connectivity, both within and between Georgia's coastal rivers.

The influence of connectivity on native and invasive fish populations in the Kansas River

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Connectivity on a variety of dimensions and scales is an important attribute for structuring riverine fish assemblages. Therefore, understanding the ecological relevance connectivity plays in riverine networks is critical when developing suitable management strategies for lotic fishes. We examined the impact of connectivity on sport fish and invasive species dynamics in the Kansas River, a large tributary to the Missouri River. Downstream connections to the Missouri River resulted in higher abundance and size structure of blue catfish. An upstream dam limited movement, but abundance remained high due to recruitment and entrainment through upstream reservoirs. Silver carp similarly were more abundant in downstream areas with open connections and were not found above the barrier. Environmental DNA analyses corroborated the lack of movement above the upstream barrier for silver carp. Microchemistry analyses revealed that both transient and local fish exist and natal origins were indicative of multiple spawning sites throughout a variety of connected river ecosystems for both blue catfish and silver carp. These results highlight the importance of connectivity in the Kansas River system and the balance of managing systems where invasive species are present.

Confirmation of a wild population of Northern Snakehead *Channa argus* in Gwinnett County, Georgia

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Northern Snakehead *Channa argus* are highly piscivorous obligate-air breathers native to Asia and currently assigned as injurious wildlife under the federal Lacey Act. In October of 2019, an angler reported catching and releasing an adult Northern Snakehead in a small private pond in Gwinnett County, Georgia. In response, Georgia Department of Natural Resources Fisheries staffers surveyed over 90 acres of wetland and 5.7 miles of stream and river using passive and active sampling methods to determine the extent and abundance of the suspected snakehead population. Two adult and 14 juvenile Northern Snakeheads were captured within proximity of the pond during a series of boat and backpack electrofishing surveys. Low detection rates were suspected throughout field surveys, and a subsequent rotenone treatment in the pond and a portion of the adjacent downstream wetlands produced 18 additional juvenile snakeheads. The most effective field surveying methods were electrofishing after eliminating vegetative cover (catch-per-unit-effort [CPUE] = 6.1 fish/hour) and rotenone (18 fish/application). Genetic analysis of pectoral fin clips from a subset (n = 6) of the specimens confirmed the two adult northern snakeheads were a breeding pair that produced at least two cohorts during the summer of 2019. While it is currently unknown whether a remnant population of wild Northern Snakeheads would threaten Georgia's native fishes, examples of other known wild northern snakehead populations in the United States are discussed to offer insight as to how this exotic and potentially invasive species could affect local aquatic ecosystems.

Status update on Chattahoochee Bass distribution and genetics in the upper Chattahoochee River basin

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The Chattahoochee Bass (*Micropterus chattahoochae*) is a small black bass species endemic to the upper Chattahoochee River basin that may be in decline. The Georgia DNR Stream Survey Team began a project in 2018 primarily to document where extant populations of Chattahoochee Bass exist and to assess their genetic integrity. So far, we have surveyed the region extending from the Chattahoochee headwaters down to the upstream end of West Point Reservoir and will conclude our field work in 2020. Our surveys have revealed that while populations persist in places, abundances have largely declined, and some populations appear to have been extirpated from places they were historically present or have become heavily introgressed. Our work suggests that Chattahoochee Bass are threatened by a combination of habitat degradation and hybridization with non-native black bass species.

Upper Chattahoochee Native Black Bass Update

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Since 20017, GA DNR, UGA Extension, Clemson University, Auburn University, University of Central Oklahoma, and Unicoi Outfitters have engaged in a collaborative project to assess the status of native bass in the Upper Chattahoochee River basin above Lake Lanier. Our efforts have engaged crews of volunteers to sample all bass species in an effort to evaluate primarily genetics, but also other metrics for the species as well. Our efforts also seek to engage the community in regard to awareness and watershed protection. Throughout the past 3 years, several key watershed restoration projects have been implemented, with the hopes of protecting the resource for these native bass species. Our presentation seeks to relay preliminary data, and to also give insight to the steps that lie ahead.

Surrender of Langdale and Riverview hydropower projects on the Chattahoochee River

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On December 18, 2018, Georgia Power filed applications with the Federal Energy Regulatory Commission (FERC) to surrender the licenses for two hydroelectric projects located on the Chattahoochee River — the Langdale Project (FERC No. 2341), located in Georgia east of Valley, Alabama, and the Riverview Project (FERC No. 2350), located one mile downstream from the Langdale Project in Chambers County, Alabama and Harris County, Georgia. The licenses for the Langdale and Riverview Projects will expire on December 31, 2023.

The decision to surrender these projects required significant analysis of the economics of the existing projects, including the cost to refurbish current infrastructure for relicensing purposes and the value of the potential electric generation within Georgia Power's generation portfolio. Additional analysis focused on the potential environmental costs of relicensing (e.g. fish passage) vs. the environmental benefits of surrender and subsequent removal. Several species of conservation concern exist within the vicinity of the project, including shoal bass, blue-striped shiners, southern elktoe, delicate spike, rayed creekshell mussels, and shoals spider lilies. Restoration of connectivity for the mainstem of the Chattahoochee River is expected to benefit some or all of these species.

In advance of public stakeholder meetings that are part of the FERC process in 2020, a hydraulic model is being developed to estimate post-removal conditions and guide demolition strategies. This project is being designed to balance the goals of multiple stakeholders, including state and federal resource agencies, local municipalities, adjacent landowners, and recreational river users. Following stakeholder consultation, Georgia Power will file a final decommissioning plan with FERC describing how these stakeholder interests will be balanced.

Questionable native status of several common fishes in the Chattahoochee River basin

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Over 116 species of fish are known from the Chattahoochee River basin, making it one of the more biodiverse river systems in Georgia. However, several common fish species generally viewed as native, may in fact be non-native introductions from adjacent drainages. These fish species of questionable native status are concentrated in the upper portion of the basin, which has a long history of ichthyological collections. These long-term datasets were examined to compare changes to the fish community over time and have provided evidence that these species were not original inhabitants of the Chattahoochee River basin. In addition, several old dams interrupting connectivity within the basin have led to distributional patterns suggestive of recent introductions. Taken together these data provide a circumstantial, but compelling case that non-native introductions may have played a role in shaping the fish communities presently observed in the upper Chattahoochee River basin.

POSTER ABSTRACTS

STUDENTS

A pilot model to prioritize sites for eastern oyster reef restoration with an emphasis on red drum habitat suitability

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The eastern oyster (*Crassostrea virginica*) and red drum (*Sciaenops ocellatus*) are iconic species along the Georgia coast. Throughout the 20th century, extensive overharvesting lead to the collapse of eastern oyster and red drum populations. For red drum, the effects of overharvesting were compounding. In addition to the overfishing of the red drum broodstock, the loss of oyster reefs led to decreased nursery habitat for juveniles and feeding grounds for sub-adults. Oyster reef restoration, as well as improved management of red drum stocks, has been linked to the modest recovery of both populations. To build on prior restoration success and focus future efforts along the Georgia coast, we propose that prioritizing sites for restoration based on physicochemical parameters could lead to increased restoration success rates for both taxa. Our objectives were to create a restoration suitability index by: 1) identifying critical physicochemical parameters and optimal ranges for *C. virginica* and *S. ocellatus*; 2) create GIS indices that map habitat quality from low to high for both species; 3) use the results of each index to produce a combined habitat suitability index; and 4) modify this index by excluding areas containing potential stressors to both species. Physicochemical habitat suitability indices for both species were created through reclassification of interpolated point water quality data. These data layers were then summed and normalized to create a combined physicochemical habitat suitability index. This index was further modified by incorporating anthropogenic and environmental stressors. Initial results indicate distinct areas of priority habitat throughout the Georgia coast. These areas could lead to increased oyster reef restoration success rates; however, field studies should be conducted to supplement our modeling approach. Further evaluation of the model could be achieved by conducting monitoring studies at sites across the habitat quality scale.

Environmental conditions promoting aetokthonotoxin production in the epiphytic cyanobacteria, *Aetokthonos hydrillicola*

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Vacuolar Myelinopathy (VM) is a neurological disease known to affect waterfowl, raptors, reptiles, amphibians, and may affect certain fish species. VM is caused by a novel neurotoxin (aetokthonotoxin) produced by a recently discovered cyanobacteria, *Aetokthonos hydrillicola* (Ah), that grows on aquatic plants. Aetokthonotoxin is not produced consistently year-round. Previous studies suggest that the toxin is produced from November to February. However, the presence of the toxin has been detected in samples collected as early as September. This study examines correlations between environmental conditions and toxin production.

Connecting volunteerism, science, and community engagement to protect water quality in a southern Appalachian watershed

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Southern Appalachian waters are natural assets due to disproportionately high biodiversity relative to other temperate regions and provide considerable economic opportunity through outdoor recreation. We collaborated with a non-profit organization to development programming that engaged the local community in water quality issues and analyzed water data collected by volunteers throughout the Hiwassee River watershed. This project determined the effects of land use on water quality parameters such as dissolved oxygen, conductivity, and pH. We used data collected by volunteers from 2011-2019 through the Georgia Adopt-A-Stream program, which included 41 sites in 5 watersheds within the Hiwassee River basin. For each site, we utilized data from USGS StreamStats that described basin characteristics (i.e. mean basin slope, watershed area, stream slope, etc.) and land use characteristics, such as the percentage of forested, agriculture, developed, and impervious area. By combining these data sources, we determined if water quality parameters differed among watersheds, if water quality was correlated to land use parameters, and if modeling could predict impacts of land use on water quality. Significant differences in conductivity ($P = 0.025$) and dissolved oxygen ($P = 0.023$) existed between watersheds. Water quality parameters of conductivity ($P < 0.001$) and dissolved oxygen ($P = 0.012$) were significantly correlated to forested cover. Conductivity was also significantly correlated to the amount of developed area ($P < 0.001$) and impervious surface ($P < 0.001$) upstream of a site. When accounting for differences in site characteristics, impervious area was a significant predictor ($P < 0.001$)) of conductivity, and developed area was a significant predictor of dissolved oxygen ($P = 0.009$) and pH ($P = 0.001$). Thus, developed and impervious land use should be carefully considered within watersheds. Results of this study are valuable in identifying problem sites and watersheds, guiding recommendations to stakeholders and policymakers, and supporting acquisition of future restoration grants.

Artificial cuts may affect shark population diversity and population density in the Satilla River estuary

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The Satilla River offer a unique opportunity to observe how natural cuts made into salt-water estuaries affect the population density of local fish species. Along the Satilla River a series of eight cuts have been made near Umbrella and Dover Creeks, with Noyes Cut being the most notable. Based on previous reports, Noyes Cut is responsible for altered salinity gradients and water flow in these tidal creeks. Gill nets were set at four locations throughout the Satilla River estuaries an hour before max flood tide and were soaked for two hours. Any shark that was caught, was identified to species, sexed, and the total and fork length was measured to the nearest centimeter. Through the five-year study there were a total of nine different shark species caught in the system; 73% of all sharks caught were bonnetheads (*Sphyrna tiburo*). Noyes Cut also saw the highest abundance of bonnetheads compared to the other three sites, especially in the summer. *S. tiburo* are the only shark species that are known to be omnivorous and it is expected to find them at a location that is favorable to both smaller crustaceans and seagrass. Current literature also suggests that bonnetheads pass through these waters during the summer months in search of food and their presence may affect the diversity and density of the species lower in the food chain. Our research may be used in order to get a better understanding on how large predators, such as sharks, may be affected by the artificial cuts. The USACE is beginning the closure of Noyes Cut in late 2020 and we expect shark diversity and abundance there to decline while the other locations should see an increase due to redistribution of resources through restored waterflow.

Effects of Salinity on Species Richness in the Satilla River Estuary

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As rivers flow toward the coast, freshwater mixes with saltwater in the estuary and creates a wide salinity gradient, which in turn creates multiple habitats for many species. The Satilla River Estuary has been cut eight times, which has disturbed the gradual salinity gradients that are a result of natural tidal flow. These cuts pose a threat to migratory fish species because they are no longer able to pick up on directional cues that the salinity gradients provide thus affecting species richness in the estuary. The purpose of this study is to determine if these manmade cuts have affected salinity gradients causing a decrease in species richness at five collection sites in the Satilla River. For data collection in the field, experimental gill nets were set one hour before max flood tide and soaked for two hours. All fish species were identified to species with total and fork lengths measured to the nearest centimeter. River Marsh Landing and Noyes Cut had the most species richness while Todd Creek experienced the lowest diversity. *Lepisosteus osseus* and *Sphyrna tiburo* were two most common species caught in River Marsh Landing and Noyes Cut. These two species were found most often due to their ability to adapt to the extreme range of salinities observed at these sites. We believe these large salinity fluctuations are due to a sediment deposit that blocks water flow as a result of Noyes Cut. Noyes Cut is set to be closed within the next few years which should eventually restore natural tidal flow bringing back gradual salinity gradients and thus other fish species.

PROFESSIONALS

Genetic identification of pure and hybrid Bartram's Bass in the tributaries of the Savannah Basin

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Bartram's Bass (*Micropterus sp. cf. M. cataractae*) is endemic to the Savannah Basin in western South Carolina and eastern Georgia. It is one of three priority species included in National Fish and Wildlife Foundations' (NFWF) Native Black Bass Initiative (NBBI) and has been listed as a species of highest concern in South Carolina Department of Natural Resources' (SCDNR) Comprehensive Wildlife Action plan, due primarily to effects of habitat degradation and hybridization with the introduced Alabama Bass *M. henshalli*. Previous research has documented that Bartram's Bass populations are diminishing due to introgression with Alabama Bass in Savannah River impoundments, but the extent of this process in tributary streams is unknown. Samples were collected in 2017 and 2018 from adult individuals and eggs and larvae from nests throughout Savannah River tributaries in South Carolina and Georgia. We used a standard suite of microsatellite markers to identify black bass as 'pure' or hybrids by comparing the unknown field-collected samples to a reference set of known 'pure' species of several black bass that potentially co-exist in the Savannah Basin. Genetic results indicated that approximately three quarters of the fish collected were predominantly Bartram's Bass and nearly 90% of these could be considered 'pure' Bartram's Bass. Future work will integrate the results of individual fish ancestry (species identification and pure or hybrid) with location and local conditions to identify possible refugia for Bartram's bass and the range and frequency of hybridization events.

Chronological ages from scales and bones of the coelacanths *Latimeria chalumnae* and *Axelrodichthys araripensis* suggest long lifespans

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Coelacanth age and growth has been argued for the last 22 years and there are only two published papers on their age and growth. Previously published literature suggests longevities of 20 years old or 40 years old based on ages from scales; an examination of their data suggests very irregular growth. A more recent hypothesis suggests a 100-year lifespan from a 21-year in situ study where larger individuals had little to no observable growth. Our objective is to determine the number of years it takes to attain maximum size. Previous studies have failed to describe growth cessation marks adequately and there were no other structures to compare assigned ages. We used new criteria to identify growth cessation marks on scales of extant (*Latimeria chalumnae*) and extinct (*Axelrodichthys araripensis*) individuals. New age assignments for *L. chalumnae* resulted in higher individual ages than previously noted in the literature. We also compared chronological ages of scales and bones in *A. araripensis* and found that they agree. Our age assignments suggest a lifespan that exceeds 40 years, and we do not refute the 100 year lifespan hypothesis. The results suggest that coelacanths grow much more slowly than previously reported.