the Shellcracker

FLORIDA CHAPTER OF THE AMERICAN FISHERIES SOCIETY

http://www.sdafs.org/flafs

October 2018

President's Message:

Paying it forward,

I would imagine that quite a few of us got into this line of work because of a passion for nature and the outdoors. This passion leads us to spend our careers conserving our natural resources and hoping to leave them in better shape for future generations. Part of ensuring this continues is sharing this passion to help bring others into this field.

I know we all get busier and busier each year and seem to get asked to do more with less. It is tough just to keep up with our routine duties let alone add something. I probably get three or four calls/emails a year from students interested in fisheries looking to volunteer and get out to see what we do in our jobs. Personally, I have realized over the years I tend to reply more and more often that we don't have any field work going on at the time or that I just don't have time in general at that moment. I think this is easy for all of us to do. I would like to challenge all of us to attempt to improve on this.

Speaking of helping students, I want to share with you how I ended up getting into fisheries. As a senior in high school we had to do a year-long mentorship project working with someone in a career we were interested in. As part of the assignment we had to volunteer so many hours of work and then write papers and give presentations on what we had done. We lived in North Carolina at the time and I had absolutely no clue what I wanted to do or go to school for. I had always loved to fish and one of our neighbors knew someone that knew a fisheries biologist. They got me in touch with her and I spent several days over the course of the year electrofishing, gill-netting, and ageing fish. She informed me I could go to school for fisheries, which I had never even heard of, and got me in touch with schools that had fisheries programs. After following the advice she gave me I have now been a fisheries biologist with FWC for over 13 years. She did not have to take me out on those sampling trips with her to slow her down and have me asking her questions all day, but I am sure glad she did. I still call her every couple of years to thank her and she talks about how rewarding it was for her to help someone else get into the field and help carry it on.

I have told myself that I will try to get at least one or two of these young folks that contact us out a year. In the big picture that does not really impact our busy schedule but could have lifelong impacts on those that we help out. I hope all of you will try to do the same. There are even some more formalized programs if you are more serious about mentoring such as the Hutton Junior Fisheries Biology Program (https://hutton.fisheries.org/). Another easy way to mentor is to introduce someone to fishing. I know at least one state agency gives their employees one paid day off a year if they take someone fishing that has never been before. As much as I wish I could give all of you a day off to do this, that is not up to me, but I do think you will find it plenty rewarding enough to get someone new out on your day off once a year. There is no telling what sort of lifelong impacts it will have on them. We owe ourselves to pass the passion we have along to future generations to help conserve and show the importance of the resources we work on. Please pay it forward!

Sincerely,
Nick Trippel
Florida Chapter President

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Upcoming Events

November 30, 2018: SDAFS abstract submission deadline.

January 24–27, 2019: Southern Division- American Fisheries Society meeting. Galveston Island, Texas.

March 1, 2019: Chapter Award nomination deadline.

April 3–5, 2019: Florida Chapter Annual Meeting Haines City, Florida.

Interested in contributing something to the Shellcracker? Email: Scott Bisping at *Scott.Bisping@myfwc.com* with any articles or information that you would like to be included in the next issue. The deadline for the next issue is September 1st, 2018, so start fishing...

Feature Article

Seasonal Use of Silver Glen Springs by *Morone spp.*

By: Andrew Marbury

Background:

Figure 1. A typical summer aggregation of *Morone spp.* at the Silver Glen Springs "chimney".

The St. Johns River (SJR) was historically home to the southern-most native population of Atlantic strain Striped Bass *Morone saxatilis*. However, natural reproduction of this stock was low compared to more northern rivers and was thought to have ceased completely by the 1970's, likely due to anthropogenic sources. Since, the Florida Fish and Wildlife Conservation Commission (FWC) and U.S. Fish and Wildlife Service (USFWS) have stocked both Striped Bass and Hybrid Striped Bass *M. chrysops x M. saxatilis* into the system as a means of replacing, and expanding upon, this bygone fishery. Because of the biological and ecological similarities between the two species, they are managed jointly in most water bodies, including the SJR. Due to no evidence of natural reproduction, it is considered a put-grow-and-take fishery. Stocking rates for each species vary drastically for any given year due to brood fish availability, hatchery success, and hatchery/ management priorities.

Morone spp. can be found throughout the SJR system in winter, but the Florida summer brings temperature extremes well above their upper thermal preference of 25°C (Coutant 1985). In synchrony with rising water temperatures in the spring, fish migrate into cool-water refuges such as freshwater springs or the upper, canopy-shaded sections of tributaries. While restricted to thermal refuge, fish have little, if any, available forage, especially if confined to mostly barren spring boils. The compounded physiological stress caused by water temperature, fasting, and crowding can result in significantly declining health and condition factors during this period, lasting upwards of 6 months. Once surrounding waters cool in the fall, surviving fish can safely make their way back into the productive waters of the SJR.

Study Area/Current Projects:

Directed electrofishing efforts and snorkeling surveys throughout the SJR system have confirmed that Silver Glen Springs (SGS) holds one of the largest summer aggregations of *Morone spp.* SGS is a first magnitude spring that discharges into Lake George after a one-kilometer run. *Morone spp.* primarily utilize the "Chimney" boil (Figure 1.), but have also been seen in the nearby main boil in large numbers.

Feature Article

Study Area/Current Projects (cont.):

In the past, FWC researchers have used this annual concentration of Striped Bass and Hybrids to gauge the abundance and health of the population via summer snorkel surveys while utilization of SGS is at its highest (May–August). Due to the tight confines of the "Chimney" (a roughly 40-ft deep, 15 -ft radius cylinder), accurate counts are not always feasible when large numbers of *Morone spp.* are present, in which case abundance is listed as 1,500+ individuals. Surveys were expanded to year-round in May 2016 to record the timing and degree of migrations to and from this important thermal refuge habitat.

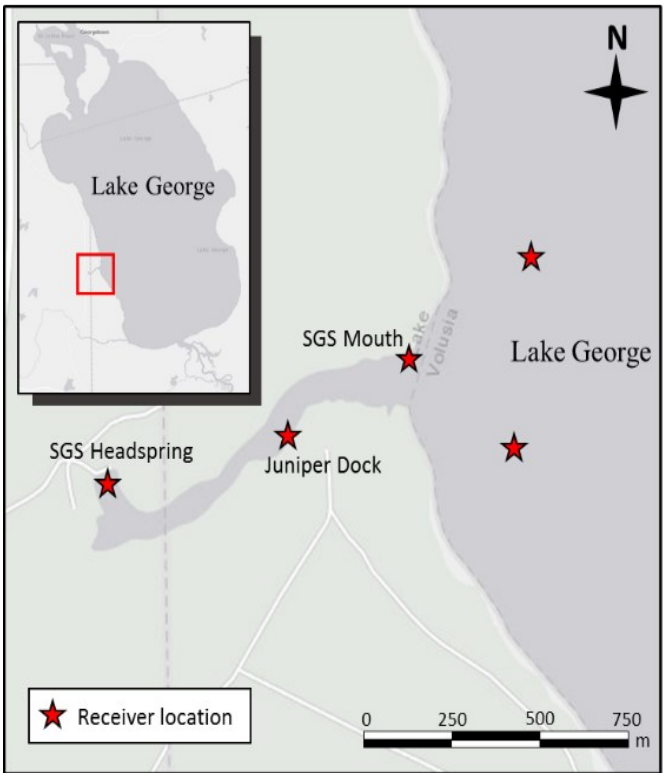

Figure 2. Map of Silver Glen Springs (SGS) run and current acoustic receiver locations.

In May 2018, a pilot telemetry study was initiated to determine the temporal and spatial movements of individual *Morone spp.* in SGS. This allows researchers to 1) study movement patterns on a more intensive scale than snorkel observations, 2) accurately determining residence time and 3) identifying any forays out of the headspring. A total of 10 fish (1 Striped Bass, 9 Hybrids) from SGS were internally tagged with an acoustic transmitter (Vemco, V9) and 5 receivers (Vemco, VR2W) were deployed throughout the spring run and outflow to Lake George (Figure 2.). Transmitter fish were also marked with a dart tag to aid in identification during ongoing snorkel surveys. Transmitters have an estimated 476 days of battery life, providing more than one full year of data. Final results will determine if a larger-scale telemetry study is feasible on the middle SJR.

Results/Discussion:

Snorkel surveys have illustrated the importance of SGS as a primary thermal refuge and the impact it has on SJR *Morone spp.* Typical summer utilization is above 1,000 fish and likely is much higher than 1,500 on years where the "Chimney" is topped-out. As expected, fish health declines throughout the summer, with many of the fish exhibiting sunken stomachs, sores and general lethargy by August. Year-round surveys show the majority of *Morone spp.* are confined to SGS until river water temperatures drop below 25°C, typically in late October (Figure 3). Interestingly, a small number (<100 fish) of *Morone spp.* have been observed using the "Chimney" throughout the winter. These fish seem to be in generally good health, suggesting some level of foraging. Extensive immigration of *Morone spp*. back into SGS generally occurs between April–May, likely dependent on temperature.

Feature Article

Results/Discussion (cont.):

Data collection for the pilot telemetry study is ongoing, with the last receiver downloads occurring on September 10, 2018. Initial results show more movement than was expected during summer residency, allowing fish an opportunity to forage during this stressful time. There has been documented downstream movement to at least the mouth of SGS run by all ten fish, nine of which subsequently returned to the headspring. Most of these fish made several treks into Lake George, sometimes with water temperatures above 30°C in August and September. Typical summer movements are accurately represented by a snapshot of fish #5158, a tagged Hybrid Striped Bass (Figure 4.). As the summer progressed, however, seven tagged fish left the system and never returned. Unless these fish found alternative thermal refuge, they likely died either before emigration, or shortly thereafter due to high water temperatures in Lake George. Of the three remaining fish, two have been confirmed alive via snorkel surveys at the headspring. While preliminary data suggest high summer mortality and/or variable residence time, continued monitoring along with an expanded receiver array and a larger sample size in future years will help to fully assess these questions.

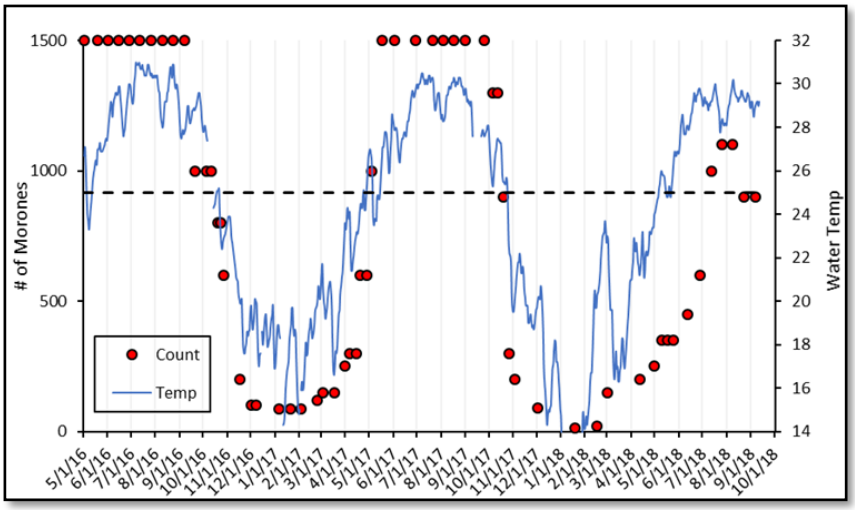

Figure 3. *Morone spp.* counts at Silver Glen Springs, FL and associated St. Johns River water temperatures. 25°C designation (dashed line) represents

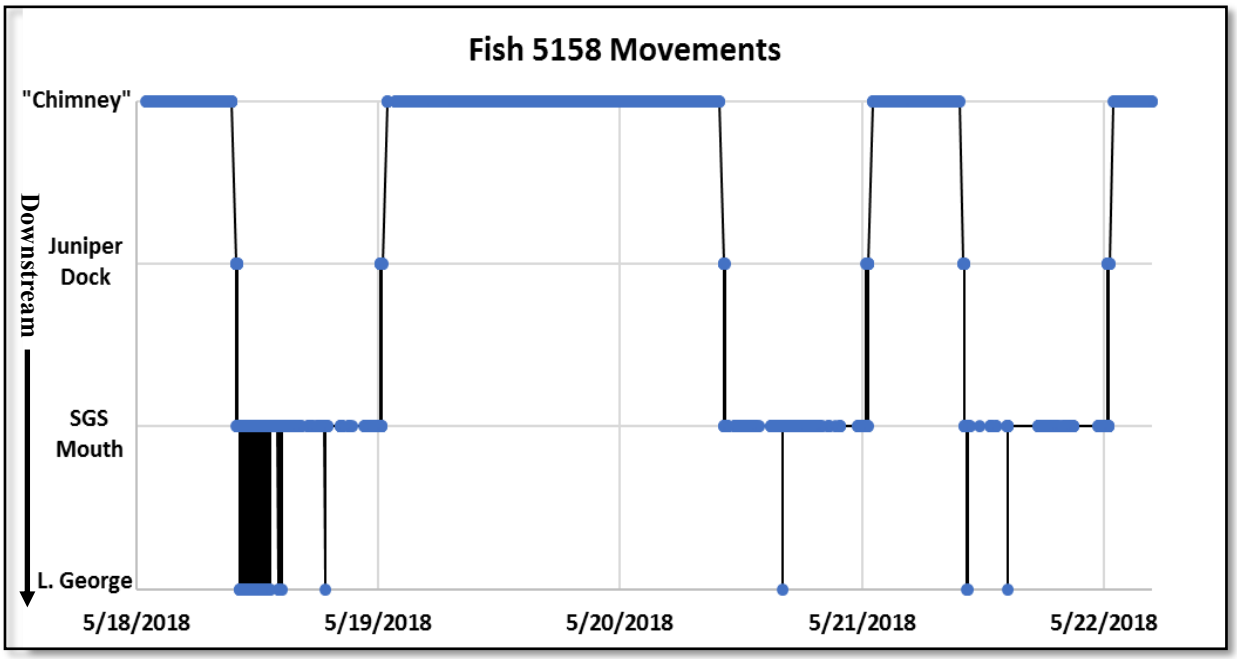

Figure 4. Receiver detections of tagged Hybrid Striped Bass (#5158) in Silver Glen Springs, FL. Individual detections are represented by blue dots and direction of movement represented by black line.

We invite you to submit abstracts for the 2019 annual meeting of the Florida Chapter of the American Fisheries Society. The meeting will take place April 3–5, 2019 at the Florida FFA Leadership Training Center, located in Haines City, on the shore of Lake Pierce. We hope you can join us!

The meeting will consist of both invited and contributed oral presentations and posters. The 2019 symposium is titled **'Technology-the Catch in Fisheries'**.

Technology is the big game changer. The shift from analog to digital and wired to wireless has changed how we do our jobs, how we spend leisure time, how we communicate with peers and family, how we manage our lives. Fisheries, both freshwater and marine, are no exception. While still using boats, hook & line, and nets as the main tools of harvesting, most fisheries have been transformed by advances in communication, precision navigating, detection and characterization of both fish and seabed, and even boating itself. Fishery managers depend on fishery scientists to provide the best available data to make good informed decisions**.** Hopefully the technology for harvesting is not outstripping the resource faster than fishery scientists can detect it. The resource pie is still the same but there are many, many more players and they want bigger slices to justify the cost of their new technological marvels. Agencies and institutions both public and private are now cultivating stakeholders in preparation for organized challenges to normal management strategies. Are fishery scientists keeping up? This symposium is your chance to present cutting edge ideas and tools that can be used to successfully navigate some stormy high waters.

We strongly encourage submissions for the symposium, but will also accept submissions outside the scope of the symposium topic. Therefore, in your abstract submission please specify if you would like your presentation to be part of the symposium.

Deadline for abstract submission and early registration: **Friday, February 22, 2019.**

Meeting details
The 2019 meeting will be held at the Florida FFA Leadership Training Center, 5000 Firetower Road, Haines City. Maps and directions will be available in the next issue of the Shellcracker or can be found on the Florida FFA Leadership Training Website at www.flaltc.org.

The meeting's schedule of events will be similar to past meetings. We will begin in the afternoon on Wednesday, April 3rd with the presentation of contributed papers. The poster session will take place following dinner on Wednesday evening. The **'Technology-the Catch in Fisheries'** symposium will start on Thursday morning. The business meeting and raffle will follow dinner on Thursday night. We will hear more contributed papers on Friday morning, followed by lunch and the presentation of awards immediately following lunch.

Registration, Lodging, Meals, and Chapter Dues
Early registration deadline is **Friday, February 22, 2019.** The cost for early full registration is $60.00. The cost for full registration after Friday, February 22, 2019 is $80.00. **We strongly encourage folks to register early because the venue needs estimates for meals and rooms several weeks in advance.** If you are staying at the FFA Leadership Training Center for this year's meeting, the cost for full meals and lodging is $272.00. Costs of meals and lodging are higher for this year's meeting than they were in past years because the amenities offered at the FFA Leadership Training Center will be much better and gratuity is built into the cost. The full cost of meals and lodging is still cheap compared to most meetings. Linens will be provided including pillows, towels, and sheets.

For your convenience, **all registrations will be made online at** https://FLAFS.regfox.com/florida-chapter-of-the-american-fisheries-society-2019-39th-annual-meetin

This link to the registration website will also be made available on our chapter's website at https://units.fisheries.org/fl/. **There will be no mail-in registration forms this year, however, you can still mail a check for your meeting costs.**

If you can't attend the meeting, we have a link on the chapter's website (https://units.fisheries.org/fl/chapter-dues/) where you can pay your $10 annual dues electronically, or you can still mail a check for $10 to the Secretary/Treasurer made payable to Florida Chapter AFS.

Opportunities for student support
As in previous years, student travel awards will be available for the annual meeting. Master's and doctoral students are also eligible for the Roger Rottmann Memorial Scholarship, for which the recipient(s) will be announced at the annual meeting. More information and the application materials are available on the chapter's website at https://units.fisheries.org/fl/awards-and-scholarships/.

2019 Student Raffle
We need your help to make this meeting's raffle a great one. If you are interested in helping or donating items please email Amanda Croteau (acroteau@ufl.edu) or Chelsey Crandall (kicksea@ufl.edu) Remember all proceeds fund our student travel grants for the following year's meeting. Please contact us to get involved!

We look forward to seeing everyone in Haines City for our 2019 annual meeting!

Thanks,
Bob Heagey

1st Call for Oral & Poster Presentations!

Abstract Submission

Please submit your abstract as a MS Word document to bob.heagey@myfwc.com. Please follow these instructions for submission:

In the email subject line, please enter FLAFS 2019: followed by the author names in your abstract (e.g., FLAFS2019 SmithTaylorRosen)

Use the same name for the abstract file, e.g., FLAFS2019 SmithTaylorRosen.doc
Please include the associated information requested above with the abstract

Abstract format

Abstract *word limit is 300 words* and should include the following information:

Presenter: Williams, Brian
Email: BrianWilliams@FloridaFish.net
Author(s): Williams, B.[1], K. Rowley[1], and P. George[2]
[1]Affiliation with address.
[2]Affiliation with address.

Title: Recommendations for New Limits on Some of Florida's Most Targeted Fish Species

Abstract: 300 word maximum

Student Presentation: No or Yes (work presented was completed while a student)

Presentation type: Oral or Poster

Would you like to be considered for the symposium? Yes or No

Are you willing to be a moderator? Yes or No

Are you willing to be a judge? Yes or No If so, oral presentation or poster?

Presentation details

Speakers will be given 20 minutes for talks (15 minutes for presentations and 5 minutes for questions and/or discussion). We will have PowerPoint on a laptop capable of accepting your presentation on a flash drive or other device.

All posters will be presented on *Wednesday evening, April 3rd*, and can be left up for the entire meeting. Posters should be no larger than 150 X 100 cm (60" X 40"), but they can be set up either as portrait or landscape format on an easel.

If you require other options for projection or poster formats, please contact the annual meeting's Program Chair, Bob Heagey, bob.heagey@myfwc.com.

Florida Chapter of the American Fisheries Society

2019 Annual Meeting Registration Information

Florida FFA Leadership Training Center
April 3-5, 2019

All registrations will be made online:
https://FLAFS.regfox.com/florida-chapter-of-the-american-fisheries-society-2019-39th-annual-meetin

Payments for registration, meals, lodging, and chapter dues prior to the meeting will be made online via credit card or by mailing a check to the address listed on the registration website.

EARLY-REGISTRATION: registration paid online or check postmarked by Friday, February 22, 2019
$50.00 One-day Registration $60.00 Full Registration

LATE-REGISTRATION: registration paid online or check postmarked after Friday, February 22, 2019
$60.00 One-day Registration $80.00 Full Registration

Meals and Lodging (lodging price based on double occupancy rooms)

Wednesday, April 3, 2019	Thursday, April 4, 2019	Friday, April 5, 2019
No Lunch This Year	$6.00 Breakfast	$6.00 Breakfast
$19.00 Dinner	$11.00 Lunch	$11.00 Lunch
$100.00 Lodging	$19.00 Dinner	
	$100.00 Lodging	

Full Meals and Lodging $272.00
Linens (provided)

Florida Chapter dues (calendar year 2019) $10.00

Registrations will still be accepted at the meeting, but with a late registration fee.
We can accept VISA, MASTERCARD, AMEX, DISCOVER, cash, or check at the meeting.**

Note: This is a buffet-style service and food must be ordered one week in advance.
Since meals are pre-paid, **please** submit your registration online as soon as possible.

**FWC employee's may only use a state-issued P-Card to pay for the cost of registration and lodging.
However, it is recommended to pay for all meeting costs with personal funds and seek reimbursement.

Award Nominations

The Florida Chapter American Fisheries Society is seeking nominations for the Outstanding Achievement and Rich Cailteux Awards. Our membership is full of dedicated professionals, and it's time to recognize their efforts. Please review the award criteria below and send nominations to Eric Nagid (eric.nagid@myfwc.com) by **March 1st, 2019**. Applications should be limited to one page, but descriptive enough to convey why the individual is deserving of the award.

Outstanding Achievement Award

The purpose of the Outstanding Achievement Award is to recognize individuals for singular accomplishments and contributions to fisheries, aquatic sciences, and the Florida Chapter. The award aims to honor individuals for distinct contributions to the fisheries profession and enhancing the visibility of the Chapter. The Outstanding Achievement Award is the highest honor Florida AFS may bestow upon an individual member or collaborating group.
Candidates will be evaluated according to the following criteria:

- Original techniques or research methodology
- Original ideas, viewpoints, or data which contributed to fisheries management or our understanding of aquatic resources
- Important ecological discoveries
- An original fishery research or management program of statewide importance
- Activities in public education and outreach that have statewide impacts

Rich Cailteux Award

The purpose of the Rich Cailteux Award is to recognize individuals who have maintained a long-term commitment to research, management, and/or conservation of Florida fisheries and aquatic re-sources. This award aims to honor individuals for their career contributions to the fisheries profession and enhancing the visibility of the Florida Chapter.
Candidates will be evaluated according to the following criteria:

- A minimum of 20 years spent in a fisheries related field in Florida
- Substantial career contributions to Florida aquatic resources and the fisheries profession
- An imaginative and successful program in fisheries and aquatic sciences education
- A history of mentoring young fisheries professionals, and involvement and leadership with the Florida Chapter of the American Fisheries Society

Student Subunit Update
By: Natalie Simon

Sheepshead Shuffle

The 2nd Annual Sheepshead Shuffle Virtual 5k was a huge success! The student subunit brought in $1,050 in registrations, donations and merchandise sales. Thank you to everyone who participated and shared their #Sheepsheadselfie. The money raised funded student travel grants to the 2018 AFS annual meeting in Atlantic City.

Shuffle Awards:

The fastest shuffler: Sharon Anderson
The slowest shuffler: Chelsey Crandall
Most interesting place: Shirley Coleman Baker (3 states, a desert, & Joshua Tree)
The marathon shuffler: Travis Tuten (22 miles in 4 days, Chicago)
Fastest team & team that raised the most money: Geoffrey Smith and Amanda Croteau.
2018 Annual Meeting Travel Award:
Olivia Meyers, MS Candidate, University of Central Florida; Check out Featured Student Article

128th Annual Meeting of AFS

Our student subunit was invited to speak at the "Engaging the Next Generation of Fisheries Scientists: Strategies for Student Subunits of AFS" symposium in Atlantic City, NJ. The goal of this symposium was to facilitate discussion of ideas ranging from how to start up a subunit, attempts to engage the public, and ways to work with regional and local chapters of AFS. Amanda Croteau and Natalie Simon's presentation "Reefs to Rivers: Bridging Florida's Diversity by Empowering Student Involvement" showcased the Florida Chapters financial support, welcoming environment, and encouragement which has led to students giving 33-48% of total presentations in the past 5 years, taking on leadership roles (serve on planning committees, develop workshops, etc.), and actively connecting with the public and professional community beyond the annual meeting. As a subunit, we focus on building connections and developing collaborations to empower the next generation of Florida's fisheries scientists.

Get Involved

Are you a student interested in promoting your research or developing your science communication skills? Become a contributor to our blog Reefs to Rivers (https://flafsstudentsubunit.wordpress.com) or have your research featured on our Instagram (Instagram.com/flafsstudent).

Contact us at flafsstudent@gmail.com for information on how you can get involved. Don't forget to follow our blog, Instagram, and Facebook (Facebook.com/AmericanFisheriesSocietyFlStudentChapter)

Do you use Amazon? By shopping with our Amazon Smile account, https://smile.amazon.com/ch/52-1208319, Amazon donates to FLAFS. Funds go to support student travel awards. Sign up today!

Student Research Highlight

Business in the Estuary, Party in the Sea: Striped Mullet (*Mugil cephalus*) Migration Patterns in the Indian River Lagoon Complex

Olivia Myers
M.S. Candidate
University of Central Florida Marine Ecology and Conservation Lab

While only approximately 2.5% of fish species migrate, those species are both highly economically and ecologically valuable (Binder et al. 2011). As these fish travel, their routes and spawning sites are not always regulated, leaving them subject to pollution, anthropogenic devices such as dams, and fishing pressures. There are currently 888 spawning aggregations documented within the Science and Conservation of Fish Aggregations (SCRFA) database, 91 of which take place in the U.S. More than half of these aggregations are categorized as an 'unknown' status (Russell et al. 2014). With this lack of information, it is often difficult to determine what, where, and how frequently management actions need to be implemented. I aim to address this knowledge gap locally by examining an integral component that has been largely overlooked and poorly studied to date; the essential migration routes of striped mullet within the Indian River Lagoon (IRL).

Figure 1. Olivia Myers releasing a striped mullet after a successful tagging.

Mugil cephalus, also known as striped or black mullet, are globally distributed throughout tropic and temperate coastal waters, often moving into estuaries and other freshwater environs. Migrating up to 50 miles offshore to spawn during fall and winter months, individual females can produce up to two million eggs (Bester 2014). As they are so numerically abundant, the majority of higher order predators consume this fish. Striped mullet have a high individual productivity rate due to their protein rich diet, and this energy is transferred to predators as they are eaten; as such *M. cephalus* is a critical link in the highly productive and diverse food web of the IRL. To shed light on this species' migration patterns, we are utilizing passive acoustic telemetry technology. Telemetry was developed over fifty years ago as a means to study organisms in their natural environment without the restrictions and biases of conventional sampling techniques. This method is unique in allowing for the continuous and simultaneous observation of animals in both space and time by implanting electronic devices that transmit a variety of data to programmed receivers (Cote et al. 1998). Passive acoustic monitoring is particularly useful when the goal is to determine the activity of an assemblage of individuals over large temporal and spatial scales.

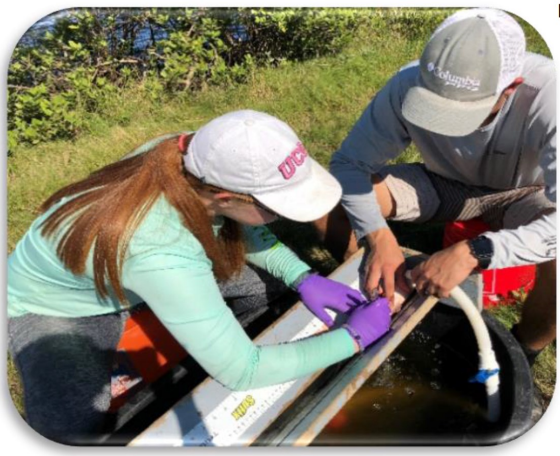

Figure 2. Olivia Myers and Steven Baker surgically implanting a striped mullet with a V9-2L acoustic transmitter

The overarching goal of this study is to assess the migration patterns of striped mullet within the Indian River Lagoon complex, including movements nearshore prior to spawning as well as their return to home estuaries. Firstly, I am working to identify and evaluate the spatial and temporal dynamics of migratory routes along which striped mullet disperse from known aggregation sites around Merritt Island National Wildlife Refuge to offshore spawning locations as well as their return trajectories back to their estuarine home range. Secondly, I am analyzing fish movement trends and employing network analyses to assess mullet migration patterns, focusing on the identification of areas of potential conservation interest, which will be utilized to inform management strategies for striped mullet. Although this research is ongoing, I have been able to parse out some distinct movement trends and am currently examining possible associations between those trends and environmental factors, particularly water temperature, photoperiod, and barometric pressure. Focusing on the migratory movements of such a widespread and adaptable species will allow this project to generate information that can be expanded to inform management strategies for other migratory fish worldwide.

Figure 3. Olivia Myers presenting during the 2018 American Fisheries Society Annual meeting in Atlantic City, New Jersey.

With the generous support of several organizations, including the AFS Florida Chapter Student Subunit, I had the privilege to attend and present my research at the annual American Fisheries Society national meeting. As a part of the Telemetry Symposium, I was able to communicate my science to a variety of stakeholders, from those in the industrial sector to representatives from federal and state entities. This was my first oral conference presentation and I was quite nervous, but my reception was extremely warm and supportive. Professionals in every type of vocation offered compliments, constructive feedback, and networking opportunities. I returned from the conference filled with new ideas and fresh enthusiasm for my work; it is always refreshing to meet with people who are passionate about making a difference in the world. It is also quite comforting to realize that everyone struggles with the same issues that you do! The meeting truly reminded me why I entered this field and why I continue to enjoy every aspect of it. I look forward to graduating with my master's degree in conservation biology from the University of Central Florida this spring and am planning to find a research-oriented position within a government entity or non-profit organization. If you would like to know more about my work and experience or are interested in collaborating, please feel free to contact me at omyers3@knights.ucf.edu.

Bester, C. 2014. Striped mullet: *Mugil cephalus.* Retrieved from https://www.floridamuseum.ufl.edu/fish/discover/species-profiles/mugil-cephalus/.

Binder, T.R., Cooke, S.J., and Hinch, S.G. 2011. The biology of fish migration. In *Encyclopedia of fish physiology: from genome to environment* (Physiological specializations of different fish groups).

Cote, D., Scruton, D. A., Niezgoda, G.H., McKinley, R. S., Rowsell, D.F., Lindstrom, R.T., Ollerhead, L.M.N., and Whitt, C.J. 1998. A coded acoustic telemetry system for high precision monitoring of fish location and movement: application to the study of nearshore nursery habitat of juvenile Atlantic cod (*Gadus morhua). Marine Technology Society Journal* 32: 54-61.

Russell, M.W., Sadovy de Mitcheson, Y., Erisman, B.E., Hamilton, R.J., Luckhurst, B.E. and Nemeth, R.S. 2014. Status Report – World's Fish Aggregations 2014. Science and Conservation of Fish Aggregations, California USA. International Coral Reef Initiative.