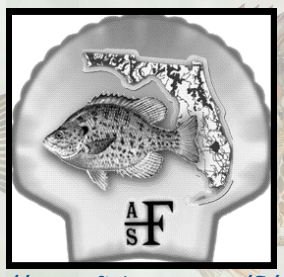
The Shellcracker



FLORIDA CHAPTER OF THE AMERICAN FISHERIES SOCIETY

https://units.fisheries.org/fl/

Summer 2022

Hello from Gainesville! Aka “the swamp”, well-known as an absolutely pleasant place to spend the hot and humid summer months. As Gainesville local Tom Petty once said, “I feel summer creeping in and I’m tired of this town again”. Enjoy that beach and water time as we escape the summer swelter!

And speaking of beaches, we are very excited about our 2023 meeting venue at St. Augustine Beach. A thank you again to our venue team for their hard work in finding us new places to try, and a giant shout-out to Steve Beck for working with this venue to sort out the details and secure our contract. Our annual meeting is one of my favorite things each year, and I look forward to trying out somewhere new with you all! So from the woods to the beach, here’s to 2023 and a new adventure for our Chapter!

As we look forward to 2023 and the future, I want to take a minute to reflect on inclusion and belonging. As many of you are aware, AFS is dedicated to supporting DEI (Diversity, Equity, and Inclusion) efforts. Inclusion is an important part of this. Imagining our Chapter as a metaphorical table: inclusion goes beyond making sure everyone has a seat, to ensuring everyone feels they have a voice and that they belong there. Inclusion means not feeling like you must contort yourself to fit in to a certain type of seating, but that it was designed for you as you are. And so sometimes inclusion means making changes to the table itself so that everyone feels it is a place for them.

I certainly didn’t come up with this analogy but found it very impactful when it was shared with me. Diversity, equity, and inclusion efforts are important to our Chapter and to our fisheries profession. Our new DEI committee is making strides in identifying things we can do at our Chapter. However, addressing DEI and creating inclusive spaces takes work from all of us. And there’s lots of resources out there to help, like the EOS toolkit . I encourage everyone (myself included) to spend some time reflecting on inclusion and what we can do as a Chapter not only to increase diversity, but also to make sure that all people of diverse identities and lived experiences feel welcome and belonging in our amazing Florida Chapter.

Sincerely,

Chelsey Crandall

President, Florida Chapter AFS

Getting in Touch

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Secretary/Treasurer
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Florida International University
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University Liaison
Mack White
Florida International University
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Upcoming Events

August 21-25, 2022: AFS National Meeting: Spokane, WA

February 2-5 2023: AFS Southern Division annual meeting Norfolk, VA
Deadline for symposia and papers:Nov15th

Interested in contributing something to the Shellcracker? Email: Kyle Miller at *kylea.miller@myfwc.com* with any articles or information that you would like to be included in the next issue. Prize will be awarded for the best, and worst fish jokes submitted.

Getting Involved!

Committees Seeking members:

Award Committee
Rich Caiteux/Outstanding Achievement Awards
Eric Nagid
Eric.Nagid@myfwc.com

Continuing Education Committee
Planning future continuing education workshops
Allison Durland Donahou
adurland@flsouthern.edu
Jason O'Connor
Jason.Oconnor@myfwc.com

Marketing and Membership Committee
New membership ideas in recruitment, retainment, and reactivation of members
Kerry Flaherty-Walia
Kerry.Walia@myfwc.com

Policy Committee
Keep members informed on local to national policy issues on aquatic resources
Ed Camp
edvcamp@ufl.edu

New Venue Search Committee
Search for new venues for future Florida Chapter meetings
Matt Wegener
Matt.Wegener@myfwc.com
Kevin Johnson
Kevin.Johnson@myfwc.com

Diversity, Equity, and Inclusion Committee
Providing members with information on DEI
Chelsey Crandall
Chelsey.Crandall@myfwc.com

Feature your research:

Shellcracker Newsletter
Feature articles or other AFS content
Kyle Miller
Kylea.Miller@myfwccom

Website
Updates, articles, content
Jason O'Connor
Jason.Oconnor@myfwc.com

Student Scholarships and Travel Grants

Assistance with student scholarships and future scholarship opportunities:
Rottman Scholarship and
Dennis Punches Memorial Scholarship
Chuck Cichra
cecichra@ufl.edu

Student Sub-unit

Swag sales, blog updates, student chapter involvement
Nicholas Castillo
ncast169@fiu.edu

Raffle/Silent Auction

Assistance with raffle collections, auction items
Amanda Croteau
acroteau@uwf.edu

Positions

Code of Conduct Officer
Searching for officers to represent FL AFS code of conduct
Daniel Nelson
Daniel.Nelson@myfwc.com

OR!

Submit your awful fish–related pun/joke to the newsletter editor to win a prize. I promise the corniest of the fish jokes will find their way into a future newsletter.

What runs but never walks?

Water

Where do bad rainbows go?

Prism

What did the duck say when he bought chapstick?

Put it on my bill

The Southern Division

Of the American Fisheries Society

Annual Meeting, Norfolk, VA—February 2-5, 2023

The Virginia Chapter invites you to share science and management information and experience an in-person (no virtual option) meeting in beautiful waterside Norfolk, VA.

Call for papers: Submit abstracts electronically for 20-minute oral or poster presentations:

Deadline for submissions is **November 15th**. Abstracts should be less than 250 words. Presenters should specify whether they want to be included in a planned symposium (currently Alabama Bass introgression, American Eel management, Fish population genetics and Off-shore wind production).

Call for symposia and workshops: The Program Committee is still soliciting proposals for symposia and workshops, which may be scheduled in two-hour blocks ranging from two hours to full-day sessions. They may include individual presentations, panel discussions or other formats. Organizers should note that contributed papers should be scheduled in 20-minute blocks (which include the presentation and Q&A). Proposals should state symposium objectives, format, time required, tentative list of topics and participants, and audio-visual requirements. Organizers will be responsible for submitting abstracts for presentations in their sessions (deadline and format below). Symposium proposals should be submitted to Program Chairs John Odenkirk or Scott Smith at john.odenkirk@dwr.virginia.gov or scott.smith@dwr.virginia.gov and workshop proposals to Workshop Chair Jeff Williams at jeff.williams@dwr.virginia.gov by September 30, 2022.

Student participation:

Students should indicate whether they want to be considered for inclusion for an award in the Best Student Oral Presentation or Poster evaluation. Abstracts must be submitted by November 15th, 2022.

Students interested in being paired with a mentor for lunch on Saturday, mark the appropriate selection on the registration form; you may also send an email to Chas Gowan (cgowan@rmc.edu) Chair of the Student Affairs Committee, stating your interest.

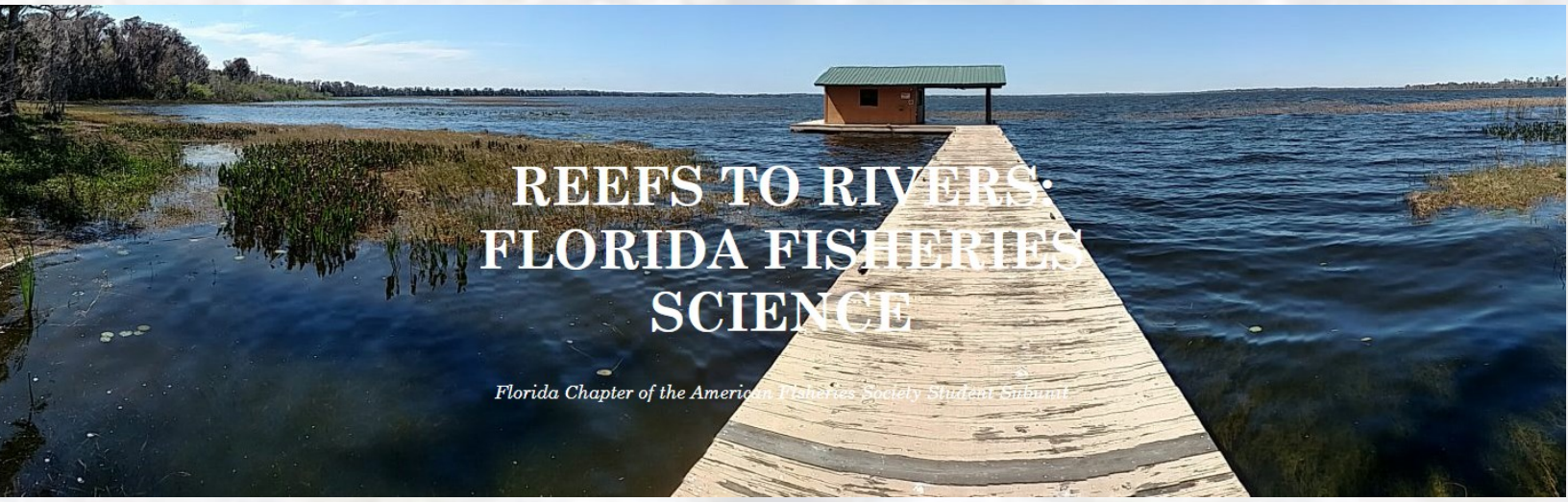
More meeting information, including registration and schedule, may be found at the meeting website as content is created and/or updated: https://units.fisheries.org/va/annual_meeting/2023-sdafs/.

Lodging Information: Norfolk Waterside Marriott, 235 E. Main Street, Norfolk, VA 23510

Student Subunit Update

By: Nick Castillo

The Sheepshead Shuffle is in full swing and it's time to start shuffling! Between now and August 24th , run, walk, or shuffle to help support the Florida AFS Student Subunit. You can participate by completing a 5k at the location of your choosing. Participants are encouraged to track their times to compete with other shufflers. Prizes will be awarded for the fastest shuffler, slowest shuffler, and most interesting location. Take a selfie when completing your shuffle and either tag us on instagram @flafsstudent or send via email to flafsstudent@gmail. Registration is $30 and you can sign up on Eventbrite at https://www.eventbrite.com/e/florida-afs-sheepshead-shuffle-2022-tickets-371547296967?aff=ebdssbonlinesearch. You can also purchase awesome swag such as buffs, stickers, cups etc., the sales of which also help support the student subunit.



Check our recent Blog post:

at

https://flafsstudentsubunit.wordpress.com/

Jordan Massie recently published a post titled "*Waves of Invasion: Non-Native Peacock Eeels in the Florida Everglades*." Read this new post for updates and photos from electrofishing for exotics in the Everglade's Shark River.

Featured Research: Summer Snook

With: Kyle Williams, Kristin Cook, and Alexis Trotter

FWRI's Fish Biology Department

Summer is heating up, and snook take advantage of these warm waters to spawn on both our Gulf and Atlantic coasts. Just how far North on these coasts do snook successfully range? FWRI's snook biology crew is narrowing in on those successful new spawning locations as you're reading this newsletter. In June, I sampled with the Snook crew, trying to encounter females with mature oocytes in waters that may have previously been too chilly. Genetic samples from these females will hopefully be linked to future young-of-the-year snook to document successful spawning. While I've only got room in the newsletter for one article, there is some excellent research being published on these efforts. Please reach out to the newsletter editor for more info, and if you find a tagged snook call: Fish Biology Department: (727) 896-8626

Or reach out to biologist Kyle Williams for more info on the program : Kyle.Williams@myfwc.com

Highlight Article

Investigation into the Occurrence of Juvenile Common Snook Centropomus undecimalis, a Subtropical Estuarine Sport Fish, in Saltmarshes Beyond Their Established Range

Philip W. Stevens & Matthew E. Kimball & Garrett M. Elmo & Kyle L. Williams & Jared L. Ritch & Derek P. Crane

Abstract:

Given recent trends of warming water temperatures and shifting fish distributions, detecting range expansion is important for resource management and planning. The subtropical common snook *Centropomus undecimalis* (hereafter referred to as snook) is an estuarine species that historically extended from the tropics to southern portions of Florida and Texas, but this range has been expanding for the past decade. We collected juvenile snook (n = 16; size range = 96–210-mm standard length [SL]) in saltmarshes of South Carolina, which is well outside their usual range but not unprecedented. Growth rates of juvenile snook in South Carolina (0.72-mm SL d−1) were similar to those reported for Florida during a cold period, but faster than rates reported for Florida during a recent period of mild winters (0.49-mm SL d−1).

Featured Research: Summer Snookin’

Based on collection and estimated hatch dates, and supported by winter water temperature records, juvenile snook overwintered for at least 1 year allowing them to grow to sizes that are typical for emigration from nursery habitats to open estuarine shorelines. Continued work is needed to determine whether there is potential for ongoing range expansion of snook to the region, and a strategy is proposed to focus on future research.

Introduction: Fish distributions are shifting around the world in response to climate change (Perry et al. 2005; Hare et al. 2016; Sunday et al. 2014; Poloczanska et al. 2013; Morley et al. 2017), because species biogeography is often linked to thermal tolerances (Payne et al. 2016). At temperate locations in the Eastern USA, the responses to warming oceans are often poleward shifts in distributions as species seek to remain within their optimum temperature range (Pinsky et al. 2013; Kleisner et al. 2017). For example, the center-of-abundance of black sea bass *Centropristis striata* has shifted from North Carolina northward to New Jersey, leading to fishery management challenges because harvest allocations long-established among states must be adapted (Hare et al. 2016). Similarly, other temperate species such as Atlantic cod *Gadus morhua*, American lobster *Homarus americanus*, and northern shrimp *Pandalus borealis* have shifted their distributions by more than 200 km (Hare et al. 2016).

Warming winter ocean temperatures are expected to lead to the poleward range expansion of tropical and subtropical fishes, a phenomenon known as the tropicalization of temperate ecosystems (Vergés et al. 2014). Along the coasts of the Southeastern USA, the poleward distributions of some subtropical fishes (e.g., common snook *Centropomus undecimalis,* smalltooth sawfish *Pristis pectinata*, gray snapper *Lutjanus griseus*, goliath grouper *Epinephelus itajara*, tarpon Megalops atlanticus) are ultimately limited by their cold tolerance (Howells et al. 1990; Poulakis et al. 2011; Hare et al. 2012; Mace et al. 2017). If winter temperature minima become milder along the coasts of the Southeastern USA, tropicalization of these waters can be expected and, in some cases, new fisheries may develop. Managing species range expansions (i.e., establishment of sustainable populations poleward of established range) and capitalizing on new opportunities require early detection of range-expanding fishes and supporting research on species life histories (Mace et al. 2018), habitat use (Stevens et al. 2018), niche partitioning (compared with temperate species, Malinowski et al. 2019), and trophic effects (Heck et al. 2015) within these new habitats.

Featured Research: Summer Snookin’

To detect range expansions of tropical and subtropical species that use estuaries, investigations into the occurrence of early life history phases that are likely to arrive first in novel estuaries are warranted. One such species that can be found as juveniles farther north of their established range, which spans from the tropics of South America into the southern portions of Texas and Florida (Rivas 1986), is the common snook *Centropomus undecimalis* (hereafter referred to as snook). Some reports of juvenile snook less than 125 mm in length have occurred in Georgia (Linton and Rickards 1965; Dahlberg 1972), South Carolina (Lunz 1953), and North Carolina (Martin and Shipp 1971). These reports, possibly the result of chance dispersal events to the region caused by tropical storms or eddies associated with prevailing currents (Linton and Rickards 1965), were not followed by range expansion. However, during the past decade, mild winters have allowed snook to expand their range at least 200 km northward on the US Gulf of Mexico coast (Anderson et al. 2020; Purtlebaugh et al. 2020) with similar range expansion on the Atlantic coast (P. Stevens pers. obs.). Thus, investigations into contemporary reports of juvenile snook found in saltmarshes of South Carolina may help determine if the occurrence of snook this far north of their established range could be the start of further range expansion. The objectives of this study were to (1) age juveniles collected in South Carolina to compare hatch dates and growth rates with those collected from known nursery habitats in Florida, and (2) determine whether sizes, catch dates, and ages demonstrate that juvenile snook are overwintering at this latitude.

Methods: The study sites were in the North Inlet–Winyah Bay estuarine system in Georgetown County, South Carolina (Fig. 1). One study site was a tidally restricted, upland pond (33.336160, − 79.207762). The pond (a former borrow pit) has a surface area of 0.12 ha and maximum depth of 2.5 m, and is connected to the North Inlet estuary through a narrow creek that is inundated only during irregularly high tides (such as spring tides) or storms. Other study sites were within marsh impoundments— Fort Trunk (33.249343, − 79.228091) and Rockfish Bridge (33.233212, −79.227177)—of the Tom Yawkey Wildlife Center Heritage Preserve. The marsh impoundments (940 ha out of the 6200-ha total for the preserve) were surrounded by levees; water levels in managed marshes, and exchange with surrounding marshes, were controlled by wooden water control structures called trunks (Mace et al. 2018). Field Collections Juvenile snook were collected from samples taken in ongoing studies of juvenile tarpon. The marsh impoundments were sampled weekly from May to November 2019, and the upland pond was sampled monthly from December 2019 to June 2020. The upland pond also was sampled consistently (approximately every other month) from January 2016 to October 2018 to collect data on juvenile tarpon (Mace et al. 2020), but no snook were collected during those efforts.

Featured Research: Summer Snookin’

Age and Growth Estimation

Age and growth of snook were estimated from counts of daily growth increments in sagittal otoliths. In the laboratory, sagittal otoliths were removed, cleaned, and dried following protocols developed by Secor et al. (2002) and VanderKooy (2009). The core of the left sagittal otolith was marked, and the whole otolith was embedded in a bullet mold with a 5:1 mixture of Araldite:Ardaur epoxy (Huntsman Corp., The Woodlands, TX). The right otolith was saved in case the left was deemed unreadable. The embedded otolith was glued to a piece of card stock and cut to a thickness of 0.8 mm on a lowspeed sectioning saw (Isomet®, Buehler, Lake Bluff, IL) equipped with four, 10.2 cm diamond-coated saw blades to produce three sections. The sections were viewed through a compound microscope, and the section containing the core was identified and mounted to a slide using adhesive (Crystalbond®, Aremco Products Inc., Valley Cottage, NY).

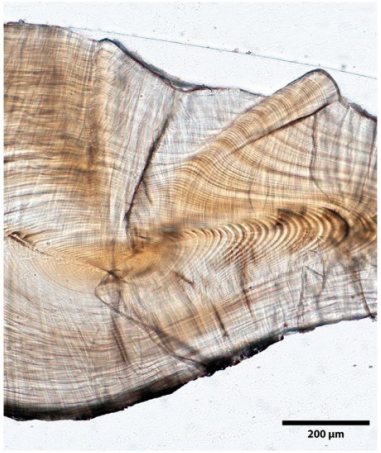
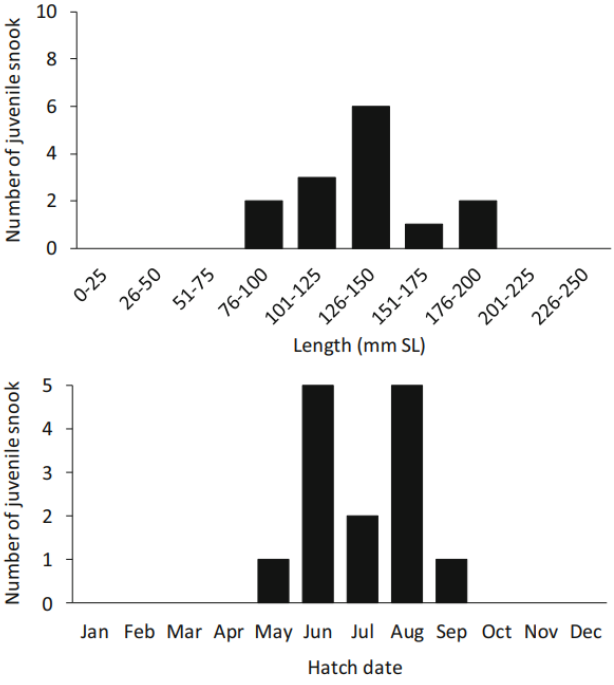


Fig. 2 Example of daily growth rings in otoliths of juvenile common snook

Then, the section was sanded using 400 and 600 grit sandpaper, before being polished with 8-µm sandpaper until the core was visible and the section was thin enough to read. A liquid 1478 Estuaries and Coasts (2021) 44:1477–1483 cover slip (Flo-Texx®, Thermo Fisher Scientific, Waltham, MA) was then added to the polished otolith. Sectioned and polished otoliths were individually examined at × 400 magnification through a compound microscope using transmitted light. Age (in days) was estimated by counting daily growth rings along the sulcal groove of the otolith beginning at the core (McMichael et al. 1989; Fig. 2). Two independent readers estimated age for each otolith, and the mean value was used for analysis. In the event of a discrepancy ≥ 10% between readers, a third, independent reader made an age estimate. If the third count was within 10% of one of the previous two counts, the mean of those two counts was used for analysis. If the third count differed by ≥ 10% from the previous counts, the otolith was not used. Hatch date was estimated for each juvenile snook by subtracting its age from its date of collection. Growth rate (mm d−1) was calculated for each individual by dividing its standard length by its age. These growth rates were compared with those of juvenile snook collected from March 2018 to June 2019 from Tampa Bay, Florida (“natural” sites in Schulz et al. 2020; n = 92 juvenile snook) using a t test after performing a natural log transformation and confirming that data met criteria for normal distribution and equal variance.



Featured Research: Summer Snookin’

Results

Sixteen juvenile snook were collected from study sites in the North Inlet–Winyah Bay estuarine system (Supplemental Table 1). Six were collected during fall and early winter 2019 (October and December), and ten were collected during spring and early summer 2020 (March, April, June). Water temperatures in the upland pond, where 13 of 16 snook were collected, remained above 19 °C through winter (December through end of February) and were typically at least 5 °C warmer than in a nearby tidal creek (Fig. 3). It was apparent that water in the upland pond was stratified. For example, water temperature taken by using a multimeter probe was 11 °C at the surface during the December 6, 2019, collection of juvenile snook, but the data logger at 1-m depth measured water temperatures > 20° C on this date. Sizes of juvenile snook ranged from 96- to 210-mm SL, ages determined from daily rings on otoliths ranged from 135 to 237 days old, and estimated hatch dates ranged from May to September with most in June and August (Fig. 4). On average, estimated age differed by 3.55% (SE = 0.01%, range = 0.37– 8.99%) between readers. No otoliths were discarded due to high error between otolith readers. However, daily rings could not be reliably counted on otoliths of two larger snook captured in June, which had formed annuli. The mean growth rate (± standard error) of snook captured during fall and early winter was 0.75 ± 0.08-mm SL d−1 , and 0.69 ± 0.04-mm SL d−1 for snook captured during spring and early summer (i.e., snook that overwintered). Overall, the growth rate of juvenile snook collected from the study sites in the North Inlet– Winyah Bay estuarine system, South Carolina (0.72 ± 0.04-mm SL d−1), was 0.23-mm SL d−1 greater than the growth rate of juvenile snook collected from Tampa Bay, Florida (0.49 ± 0.01-mm SL d−1 ; $p < 0.001$, t test).

Discussion (Abbreviated)

Although juveniles of a subtropical species were found to occur well outside their range in saltmarshes of South Carolina, their origin, whether from local reproduction or from distant sources, remains unknown. Snook in South Carolina could originate from Florida with larval dispersal by oceanic currents. For comparison, gray snapper spawn on the outer reef tracts in the Florida Keys and can be transported in the Gulf Stream to North Carolina waters in 26 days (Denit and Sponaugle 2004). Thus, it is feasible that snook larvae (larval duration ~ 20 days; Peters et al. 1998) could reach South Carolina from southeastern Florida where spawning takes place at inlets and on offshore reefs close to the continental edge and Gulf Stream (Young et al. 2016). Although the distribution of hatch dates in this study was bimodal, suggesting two dispersal events to the region, hatch dates between the two modes were within the level of precision for the aging method used (mean age of 191 days × mean between-reader difference of 3.5% = 6.7 days). If it is possible to achieve a greater sample size through more extensive sampling, the use of hatch dates may help determine whether larvae reach the South Carolina saltmarshes consistently throughout the spawning season, or whether chance events, from either Gulf Stream eddies or stochastic weather events, disperse larvae to the region from a distant source. Genetics studies using fin clips taken from juveniles would provide even greater insight. Recent genetics work found that snook at the leading edge of their distribution in the Gulf of Mexico, where range expansion has occurred, differed from those in the historic range (Pistole 2019), which suggests that it may be possible to determine whether juvenile snook in South Carolina originated from southeastern Florida, an expanding population in northern Florida, or more locally.