the Shellcracker

FLORIDA CHAPTER OF THE AMERICAN FISHERIES SOCIETY http://www.sdafs.org/flafs

October, 2015

President's Message:

Dear all,

I hope the beginning of fall is treating you well. Here in Miami we are catching up with some spirited and much needed rainfall that is helping us make up from the extreme summer drought. Some of you may have attended the national AFS meeting in Portland I hope you enjoyed it as much as we did! I was a coorganizer on a symposium on skip spawning, where attendance was deemed 'Woodstock-like', with folks sitting cross legged on the floor eagerly waiting for the next slide of purplish blobs as far as the eyes could see…. I had never heard this term applied to a meeting sessions but it certainly set a new bar for popularity! I thought the meeting was fantastic, but not a huge fan (as many of you) of the "app-only" program. This reminds me to make a call to all of you to get involved and participate in the planning of the 147th Annual AFS meeting, which we will be hosting in Tampa, Florida in August 2017! We will need everyone's help. Please contact Travis Tuten travis.tuten@myfwc.com and Kerry Flaherty Kerry.Flaherty@myfwc.com to volunteer.

I wanted to highlight how excited we are to host our 2016 Florida Chapter meeting at a new location! Our next meeting will be at the Florida FFA Leadership Training Center in Haines City, Florida (http://www.flaltc.org/). Please note that we are also pushing our meeting back a little to avoid overlap with other conferences, so the meeting will be March 2-4, 2016. Please save the date! This should be a great location for us and a great meeting. A call for a symposium organized by president-elect Andy Strickland and for more details on the meeting is on page 13. This is a good time to remind ourselves to invite new fisheries colleagues to attend the meeting and become part of our Florida fisheries community. It is also a good time to encourage students to start thinking of what to present at the meeting. The chapter meeting is a great opportunity to share your research, to learn about what we are doing fisheries-wise in Florida and to meet the folks that do this awesome research. We look forward to seeing you in the spring!

Sincerely,

Jennifer Rehage
Florida Chapter President

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Upcoming Event
Southeastern Fishes Council: November 12-13, 2015 in Gainesville, Florida.

Interested in contributing something to the Shellcracker? Email Chris Wiley at *chris.wiley@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 December 15th, 2015 so start fishing...

Feature Article

Density dependence and recruitment of American Shad *Alosa sapidissima* in the St. Johns River, Florida: Does spawning stock demographics explain young-of-year production?

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INTRODUCTION

A key aspect concerning fisheries management and conservation is understanding the mechanisms influencing the reproductive potential of fish populations (Trippel et al. 1997). Examining relationships between the structure of the spawning stock and subsequent recruitment is a critical component to the regulation of fish stocks, yielding important information about population growth and survival. Stock-recruitment relationships can also be used to model how future changes in a parental stock may influence larval production and recruitment under different perturbation scenarios. At present, stock-recruitment theory is well developed (Beverton and Holt 1993; Ricker 1954; Shepherd and Cushing 1980), and has been extensively applied to fisheries management decisions. However, stock-recruitment relationships are frequently unclear, primarily as a result of failure to account for all the underlying density-dependent (population-level), and density-independent (environmental) mechanisms controlling recruitment variability (Walters and Ludwig 1981; Myers and Barrowman 1996; Gilbert 1997; Hilborn 1997; Myers 1997).

The structure of the parental stock (i.e., abundance at age and gender) may be an important density-dependent factor regulating recruitment variability, and may infer the significance of parental stock structure on the quality of the offspring (i.e., survival rates). In some instances, studies have shown recruitment variability is highly regulated by the structure of the parental stock (Marteinsdottir and Thorarinsson 1998; Myers and Barrowman 1996; Brodziak 2001). Because the relative strength of density-dependent and density-independent mechanisms affecting recruitment are likely highly variable across species and ecosystems, quantifying the relative importance of each of these underlying processes should be approached on a case-by-case basis (Rose et al. 2001). In this paper, we focus on American Shad *Alosa sapidissima* in the St. Johns River, Florida, to understand the relative importance of how temporal variability in the age and gender structure of the parental stock influences young-of-year production.

American Shad are an anadromous clupeid whose native range is distributed along the western North Atlantic from the southern Labrador to northern Florida. American Shad spend much of their life span in the ocean, but travel long distances upstream to spawn in freshwater rivers and tributaries (Walburg and Nichols 1967). Once supporting vast commercial and recreational fisheries in the western Atlantic, overfishing of American Shad and habitat degradation (i.e., dam construction impeding upstream spawning migrations), unfortunatley, has resulted in severe population declines (Bilkovic et al. 2002). American Shad are regulated by the Atlantic States Marine Fisheries Commission (ASMFC) and are under current commercial and recreational harvest restrictions.

The southern most extent of American Shad spawning migrations occurs in the St. Johns River, Florida in the upper portions of the river during the late winter months from December to May. The current status of American Shad in the St. Johns River is considered stable, but at low levels of abundance (McBride and Holder 2008). As part of a sustainable fisheries management plan in cooperation with ASMFC, the Florida Fish & Wildlife Conservation Commission (FWC) conducts an annual spawning stock and a subsequent juvenile abundance survey ongoing since 2007. Understanding American Shad spawner-recruitment relationships in the St. Johns River may elucidate whether density-dependent factors play a large role in recruitment and provide a foundation for predicting the local status of the population as the structure of the parental stock changes under different management scenarios.

In this study, our goal is to understand how temporal patterns in the American Shad spawning stock demographics in the St. Johns River influences the relative year class strength of age-0 cohorts. Our objectives are as follows: 1) Examine temporal patterns in the age and gender structure of adult American Shad in the St. Johns River, Florida, and 2) Determine how young-of-year production may be affected in relation to the spawning stock age and gender structure. We hypothesize that the abundance at age and gender of the spawning stock plays a large role in explaining the annual production of juvenile American Shad in the St. Johns River.

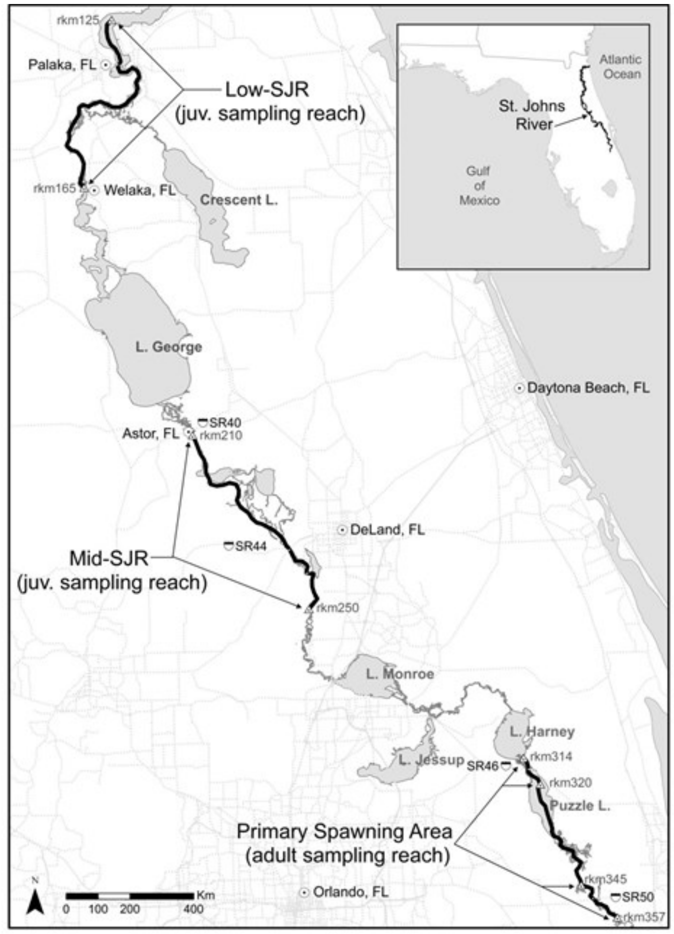

Figure 1. Map showing American Shad sampling regions in the St. Johns River Florida. Sampling adult American Shad via boat electrofishing occurred on the primary spawning grounds located in the upper SJR basin between river kilometers (rkm) 314 – 357. For juvenile push net sampling, two 40km long representative nursery areas were selected; a middle SJR stretch (Mid-SJR) located between the Florida State Road 40 bridge and 1 km upstream of the Blue Springs confluence, and a tidal freshwater/estuarine reach in the lower SJR basin (Low-SJR) between Welaka and 5 km downstream of Palatka, Florida.

METHODS

Area of study.—The St. Johns River (SJR) is located along the coast of northeast Florida (Figure 1). Considered the longest river in Florida, the SJR flows northward a length of 500 km before entering the Atlantic Ocean near Jacksonville, Florida (Brenner et al. 2001). The SJR is a slow flowing river with an average rate of 0.48 km/hr (Belleville 2001). Spawning activity of American Shad typically occurs during the late winter months from December to early May, and usually peaks between mid January and mid March in the Upper SJR basin. Migration of juveniles proceeds directly after spawning, which typically leave the river system into the Atlantic Ocean by late August.

Spawning stock sampling.—From 2007 to 2014, FWC conducted spawning stock surveys in the SJR to track the relative abundance of American Shad using boat mounted electrofishing. Using a stratified random design, sampling occurred during daytime hours every two weeks from January through April annually between river kilometers (rkm) 314 and 357 (Primary Spawning Area; Figure 1). During each sampling event, FWC conducted 10 electrofishing transects randomly selected from pre-determined 1-km long sites. Upon capture, American Shad were placed in an aerated live well, processed at the end of each transect, and released. Prior to release, sex was determined by external inspection and total length (TL) recorded in mm. A subsample of five to 10 fish per centimeter group for each sex were sacrificed for otolith removal and aging. After otolith removal, FWC biologist read whole otoliths using a dissecting microscope, counting the annuli illuminated parallel to the sagittal plane (age =annuli rings + 1) following techniques using known-age American Shad described in Duffy et al. (2012).

Juvenile sampling.—From 2007 to 2014, FWC conducted nocturnal push net trawls on the SJR to collect juveniles. The push net boat consisted of a modified four panel Cobb trawl fixed to a rigid frame. Two representative nursery areas were sampled to measure the peak number of juveniles as they migrated downstream and eventually out of the river; 1) a 40 km river stretch in the middle St. Johns River (Mid-SJR) located between the Florida State Road 40 bridge and 1 km upstream of the Blue Springs confluence (rkm 210 to 250, respectively), and 2) a 40 km tidal freshwater estuarine reach in the lower portions of the river (Low-SJR) between Welaka, Florida and 5 km downstream of Palatka, Florida (rkm 125 to 165, respectively; Figure 1). Push net sampling occurred every other week from April to June annually for the Mid-SJR reach, and later in the year for the Low-SJR every other week from May through July. A sample consisted of 12 five-minute tows at randomly selected stations spaced 1 km apart.

Statistical analysis.—To examine temporal patterns in the gender and age structure of adult American Shad, we first obtained unbiased mean length-at-age estimates from the aged subsampled fish following methods described in DeVries and Frie (1996), and Betoli and Miranda (2011). We then used an age-length key to extrapolate sex specific length-at-age for the entire dataset in order to estimate catch-at-age by gender. To detect for significant differences in the size and age structure of adults, we used Pearson's Chi-square goodness of fit to test if the total estimated catch-at-age distribution (age-3, age-4, age-5, and age-6) for adult American Shad 1) varies among gender for all years combined and within each year, and 2) varies across years independently for males and females. Differences between observed and expected values were considered significant at $P < 0.05$. All Chi-square tests were performed in R (R-core team 2014).

To determine whether the spawning stock sex and age structure is a good predictor of young-of-year production, we first generated a sex specific spawning stock abundance index (mean catch-at-age) as well as a juvenile abundance index. Because the distribution of juveniles migrating from the spawning grounds to the Atlantic Ocean exhibit a patchy distribution, and the speed of their movement can be highly variable from year to year, we used the peak nightly average (# fish/trawl) in a given year as a proxy for juvenile year class strength which refers to the highest average nightly catch per trawl between the upper and lower river reaches in a given year. We then used a second-order Akaike's information criterion (AICc) model selection approach to determine the effects of all possible combinations of catch-at-age estimates of adults (age-3, age-4, age-5, and age-6 fish) in predicting juvenile year class strength of American Shad. Candidate models were generated independently for males and females. The relative performance between top candidate models with ΔAICc <2 were considered equally strong. Model selection analyses were conducted using R statistical software version 3.1.1 (R Core Team 2014) using the package AICcmodavg (Mazerolle 2011).

RESULTS

Temporal patterns of adult and juvenile American Shad relative abundance.—Collections from the adult electrofishing spawning stock survey from 2007 to 2014 produced a total of 6,155 adult American Shad including 4,079 males and 2,076 females. For males, mean CPUE (# fish/sample) peaked in 2013, at 9.57 fish per sample followed by 2011, 2012, and 2009 at 7.67, 7.26, and 7.24, fish per sample, respectively (Figure 2). For females, mean CPUE's were observed to be lower for every year relative to males. However, mean CPUE for females peaked in 2013, which was the same as the timing

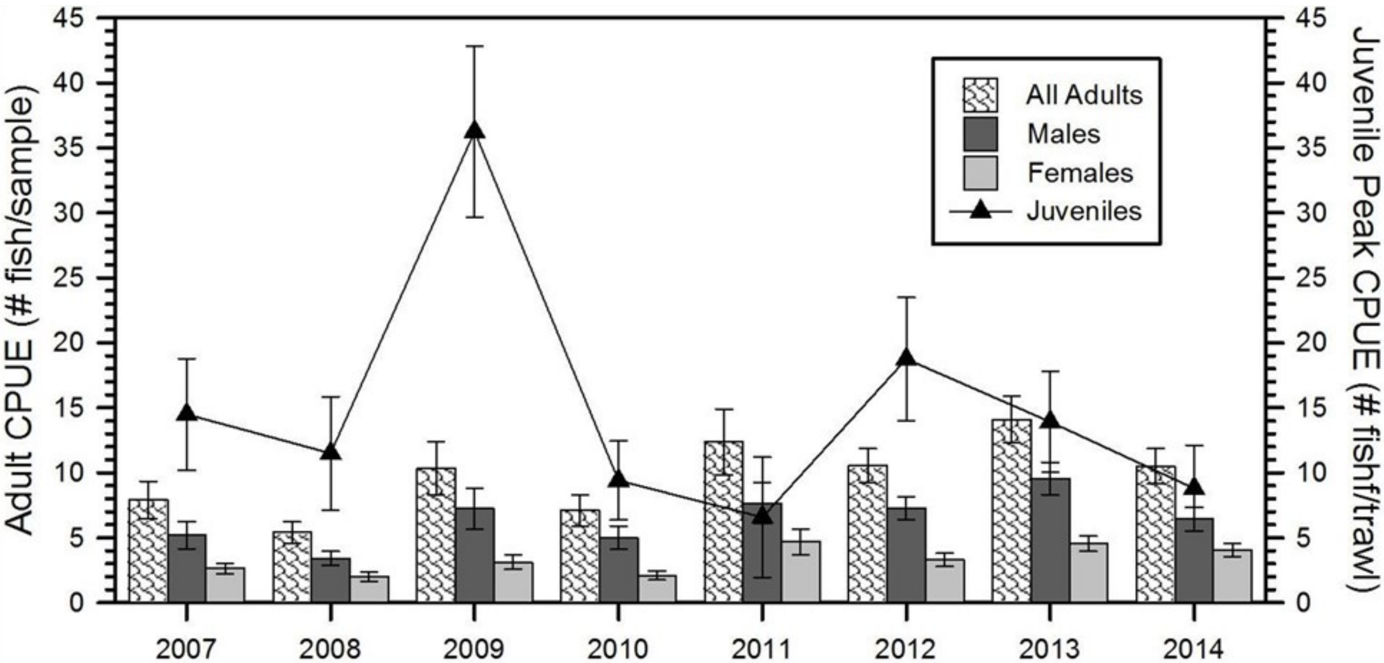

Figure 2. Annual mean electrofishing catch per sample of Adult American Shad (bars; left y-axis), and mean catch per trawl of Juvenile American Shad (triangle symbols; right y-axis) collected from the St. Johns River, Florida. Adult American shad are partitioned by "All adults" (fish scale bars), "Male Adults" (dark grey bars), and "Female Adults" (light grey bars), respectively. Juvenile peak mean catch per trawl refers to the highest average nightly catch per trawl between the upper and lower river reaches in a given year. All values shown are means ± SE.

of the peak for males, at 4.54 fish per sample. Relatively higher mean CPUE's for females were also observed in 2011 and 2014 at 4.70 and 4.06 fish per sample, respectively (Figure 2). We observed the lowest mean CPUE's for both males and females in 2007, 2008, and 2010 (Figure 2). Overall, no discernable increasing or decreasing trends in adult CPUE over time were observed for either males or females (Figure 2). For juvenile American Shad, night time push-net trawls occurring subsequent to the spawn from 2007 to 2014 produced a total of 3,614 fish of which 2,283 and 1,331 fish were collected from the upper (Mid-SJR reach), and lower (Low-SJR reach) river sections, respectively. We observed the highest peak mean juvenile CPUE values in 2009 and 2012 at 36.25 and 18.75 fish per trawl, respectively (Figure 2). Juvenile relative abundance dropped substantially from 2009 at 36.25 fish per trawl down to the lowest value observed across the entire time series to 6.58 fish per trawl in 2011 (Figure 2). Equally low juvenile abundances were also observed in 2010, and 2014 (<10 fish per trawl; Figure 2).

Adult American Shad catch-at-age estimates.— Across all years, we observed higher estimated mean total lengths (mm) at age for females compared to males. The average estimated mean total length-at-age across all years for age-3 through age-6 females ranged between 35 to 44 mm larger relative to males. For males, age-4 fish were the most common in every year except 2008, where age-3 fish were the most common, and likewise for 2013, where age-3 and age-5 fish dominated (Figure 3). For females, age-4 and age-5 fish were observed to be the most common across all but three years (2008, 2011, and 2014). In 2008, age-3, and age-4 fish were observed to be equally dominant compared to other age classes. Age-5 females were the most common in 2011, and considerably higher relative to all other age classes. Females in 2014 were dominated by age-6 fish, followed by age-4 (Figure 3). In general, over the entire time series, estimated catch-at-ages were by and large male biased with exception to age-5 and age-6 fish in 2011 and 2014 (Figure 3).

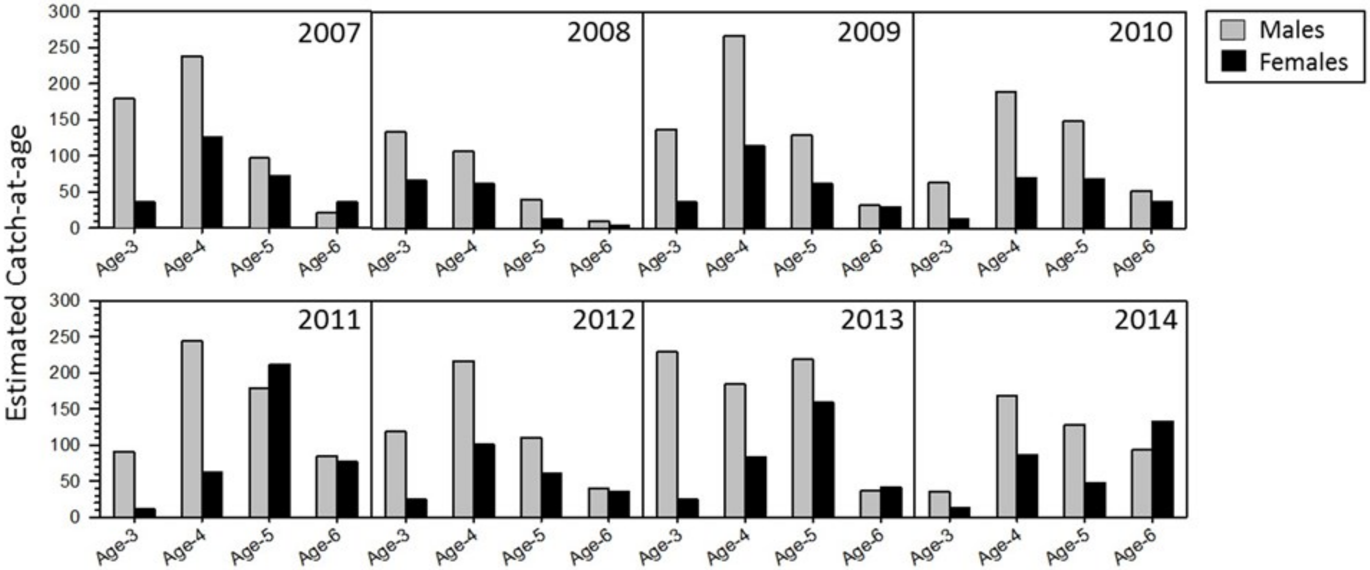

Figure 3. Total estimated catch-at-age for American Shad partitioned by year from spawning stock electrofishing surveys on the St. Johns River, Florida. Sex specific catch-at-age estimates of the un-aged sample were generated from an age-length key and obtained from unbiased mean length-at-age estimates from the aged subsample following methods described in Devries and Frie (1996), and Betoli and Miranda (2011).

Variations in adult American Shad catch-at-age distributions among gender and time.—Results from the Pearson's Chi-square goodness of fit test indicated statistically significant differences in the total estimated catch-at-age distribution for adult American Shad between males and females across all years combined ($X^2 = 273.6$, $P = < 0.001$; Table 1). Similarly, statistically significant differences among males and females were also observed for all within year Chi-square test comparisons for our entire time series with the exception of 2008, which showed no significant variation in the estimated catch-at-age distribution among gender ($X^2 = 2.8$, $P = 0.415$; Table 1). For 2008, it should be noted that the Chi-square approximations may be incorrect, and confounded by only 4 observations occurring for age-6 females. However, when age-6 males and females were excluded, results of the Chi-square test still indicated no variation in the estimated catch-at-age distribution between males and females ($X^2 = 2.69$, $P = 0.260$). In addition, Chi-square results testing whether the total estimated catch-at-age distribution varied across years independently for males and females were also statistically different (Table 1).

Factor	*df*	X^2	*P*
Variation across sex			
All years	3	273.6	<0.001
2007	3	54.8	<0.001
*2008	3	2.8	0.415
2009	3	17.5	<0.001
2010	3	13	0.004
2011	3	120.3	<0.001
2012	3	23.6	<0.001
2013	3	92.2	<0.001
2014	3	52.2	<0.001
Variation across years			
Males only	21	420	<0.001
Females only	21	567	<0.001

**Note:* only 4 observations for age-6 females in 2008.*

Table 1. Pearson's Chi-square goodness of fit results testing if the total estimated catch-at-age distribution (age 3, age 4, age 5, and age 6) for adult American Shad 1) varies among gender for all years combined, and within each year, and 2) varies across years independently for males and females. Differences between observed and expected values were considered significant at P < 0.05.

Relative strength of adult age structure in predicting juvenile year class strength.—For both male and female AICc model runs, the most parsimonious model best explaining our juvenile year class strength included only age-4 fish (Table 2). The next most parsimonious model for both the males only and females only model included only age-6 fish, and was considered to be as equally strong of a candidate model indicated by evidence ratios <2 (Table 2). The observed relationship between both age-4 males, and age-4 females in relation to juvenile abundance, in general, illustrates an increase in mean juvenile abundance as age-4 males and females increase, with age-4 females explaining the most percent variation ($R^2 = 0.406$; Table 2).

Candidate Models	*K*	AIC_c	ΔAIC_c	*w*	LL
Males only					
Age(4)	3	67.16	0.00	0.39	-27.58
Age(6)	3	67.91	0.75	0.27	-27.95
Age(3)	3	68.75	1.59	0.18	-28.38
Age(5)	3	69.45	2.29	0.12	-28.72
Age(4) + Age(6)	4	72.92	5.76	0.02	-25.79
Age(4) + Age(5)	4	75.29	8.13	0.01	-26.98
Age(3) + Age(4)	4	75.79	8.62	0.01	-27.23
Age(5) + Age(6)	4	77.11	9.95	0.00	-27.89
Females only					
Age(4)	3	65.36	0.00	0.62	-26.68
Age(6)	3	68.32	2.96	0.14	-28.16
Age(3)	3	68.87	3.51	0.11	-28.44
Age(5)	3	68.95	3.58	0.10	-28.47
Age(4) + Age(6)	4	73.13	7.77	0.01	-25.90
Age(3) + Age(4)	4	73.85	8.49	0.01	-26.26
Age(4) + Age(5)	4	74.52	9.16	0.01	-26.60
Age(5) + Age(6)	4	77.34	11.97	0.00	-28.00

Table 2. Relative performance of top candidate models testing the effects of all possible combinations of catch-at-age estimates of adults in predicting juvenile year class strength of American Shad in the St. Johns River, Florida. Tested factors include age-3, age-4, age-5, and age-6 fish for both adult males and females, respectively. Model sets were evaluated using second-order Akaike's information criterion (AIC_c) value. Candidate models with ΔAIC_c values <2 are considered equally strong. The number of parameters for each model (*K*), evidence ratios in favor of any given model being the most parsimonious (*w*, and *Cum. w*), and log-likelihoods (LL) are shown.

Although age-6 males and females also proved to be equally strong candidate models in explaining juvenile year class strength, we observed opposing relations compared to that of juvenile abundance and age-4 fish. For both age-6 males and females, we observed a decreasing relationship in juvenile abundance as age-6 males and females increased. Thus, age-4 fish appear to be the best predictor of juvenile year class strength for American Shad in the St. Johns River.

DISCUSSION

Improving forecasts of stock sizes by understanding the factors that influence the production of new recruits is one of many critical components to sustainably managing fish populations and is especially important for species that have historically been overfished (Hilborn and Walters 1992; Patterson et. Al 2001). By examining the St. Johns River American Shad spawning stock demographics in relation to the number of recruits, our results have improved our understanding of some of the potential density-dependent mechanisms that may be influencing juvenile production. Over the duration of this study, we observed clear temporal differences in American Shad estimated catch-at-age distributions among gender. We found that models that included only age-4 spawners for both males and females substantially improved our predictive power at explaining the year-class strength of age-0 cohorts. In addition, size-at-age for females was considerably higher compared to males across all years. The latter finding is not surprising as it is consistent with observations in other systems and is attributed to higher metabolic demand requirements of females for gamete production (Glebe and Legget 1981). Historical data from the St. Johns River in the late 1960's showed similar differences in American Shad fork length of around 30mm between males and females (Leggett and Carscanden 1978).

Although stock-recruit relationships have been applied extensively to fisheries management decisions aimed at minimizing the risk of overfishing, their relationships are invariably messy and generally lack any ability to forecast year-class strength with precision (Sissenwine and Shepard 1987; Clark 1991, Smith et al. 1993). Many stock-recruit models are based under the assumption that the size of the spawning stock is directly proportional to the population's spawning potential. However, one argument to this assumption is that the demographic structure of spawners, more specifically the age structure, may influence the spawning potential in a manner that is not directly proportional to spawning stock size as a whole and may be especially true in cases where age composition has changed considerably over time (Lambert 1990; Trippel et al. 1997; Marteinsdottir and Begg 2002). Several studies have shown improved model fit to stock-recruit relationships by incorporating demographic structuring factors that are suspected to play a large role in regulating recruitment. For example, results from Marteinsdottir and Thorarinsson (1998) found that models which included both stock size and the age composition of the spawning stock (and their interaction) as factors, explained a significantly larger proportion of the total variation in recruitment of Icelandic Cod Gadus morhua relative to single factor models. Similarly, Secor (2000) hypothesized reduced recruitment variability in Chesapeake Bay Striped Bass Morone Saxatilis with the inclusion of the age diversity of spawning females and ultimately found positive correlations to age-0 cohort abundance and spawning potential between 1985 and 1995. Although the age diversity did not seem to improve our model's fit for St. Johns River American Shad, we were able to better explain age-0 year-class strength using age and gender specific models, with age-4 female abundance explaining the highest total variation in age-0 year-class strength.

Despite the fact that the relationship of spawners to recruits for American Shad in the St. Johns River improved when age composition was considered, several unknown factors exist that currently present challenges in predicting the health of future SJR stock sizes. Stochastic variability in environmental conditions including water flow, dissolved oxygen, and water temperature, among others, likely play a large role in American Shad larval production and survival as well as up-river migration of adults. Optimal flow requirements conducive for spawning and egg incubation are estimated to range between 0.3 to 0.9 ms-1 (see references in Greene et al. 2009). In southern rivers, water temperate during spawning average between 16.5 and 21.5 °C (Leggett 1976). Temperature is also a main factor contributing to the triggering the up-river migration of spawning adults (Greene et al. 2009). Further, dissolved oxygen is also a critical component for American Shad survival throughout all life history stages (MacKenzie at al. 1985). For adults, sublethal effects on American Shad have been observed at dissolved oxygen levels below 3.5mgL-1, and high mortality associated with values less than 2.0mgL-1 (Tagatz 1961; Chittenden 1969; Chittenden 1973). For the survival, growth, and development of American Shad, studies by Miller et al. (1982) and Bilkovic (2000) found 5mgL-1 to be the minimum dissolved oxygen requirement for both egg and larval stages.

In addition, factors influencing American Shad age-0 natural mortality as they migrate out of the St. Johns River into the Atlantic Ocean is not well understood at present, and accounting for this may also improve our ability to predict future stocks. Food availability, spatially widespread lethal drops in dissolved oxygen, and extreme storm events (e.g., hurricanes) proceeding spawning, are all factors that may play an important role in the survival of migrating juveniles. Future work should focus on incorporating environmental variables as well as factors affecting juvenile survival to improve stock-recruit relationships and the precision of stock forecasts. The time series for this study only covers a relatively short time period. Thus, continuation of American Shad monitoring in the St. Johns River is needed to better understand the natural and anthropogenic processes contributing to inter-annual variability in recruitment to help elucidate the relationship between spawners and recruits.

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2016 AFS Florida Chapter Annual Meeting

We invite you to submit abstracts for the 2016 annual meeting of the Florida Chapter of the American Fisheries Society meeting. The meeting will take place March 2-4, 2016 at the Florida FFA Leadership Training Center in Haines City. We hope you can join us!

The meeting will consist of both invited and contributed oral presentations and posters. The 2016 symposium on March 3 is titled **'Improving Florida's Fisheries: Actions Today That Benefit Tomorrow'**

> The **2016 symposium** will focus on the three primary avenues to improve our fisheries: fish stocking, fishing regulations, and habitat enhancement. What do we do as researchers, scientists, or managers to improve fishing or fishing opportunities throughout the Sunshine State?

We strongly encourage submissions for the symposium. Please note if you would like your presentation to be part of the symposium, indicate it in your abstract submission.

Deadline for abstracts submission & registration: **Friday, January 22, 2016**

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?

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

- In the email subject line, please enter FLAFS2016: followed by the author names in your abstract (e.g., FLAFS2016 SmithTaylorRosen)
- Use the same name for the abstract file, e.g. FLAFS2016 SmithTaylorRosen.doc
- Please include the associated information requested above with the abstract

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 2007 on a laptop capable of accepting your presentation on a flashdrive.

All posters will be presented on *Wednesday evening, March 2,* 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, Andy Strickland, andy.strickland@myfwc.com.

Meeting details
The 2016 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 with exception of serving lunch on the first day to help cut costs. We will begin in the afternoon on Wednesday, March 2nd with the presentation of contributed papers. The poster session will take place following dinner on Wednesday evening. The **'Improving Florida's Fisheries: Actions Today That Benefit Tomorrow'** 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 and Meals

Early registration deadline is **Friday, January 22, 2016.** The cost for early registration is $40.00. The cost for registration after January 22, 2016 is $60.00. **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 $209.00. 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.

We have designed embroidered chapter logo button-up fishing shirts for this meeting this year! Attendees will have to buy these shirts but the cost will be reduced for folks that register ahead of time. Prices will be announced in the January Shellcracker.

For your convenience, we will have registration available online via our website: Florida Chapter AFS. Once you fill out the online form, you can either pay online through PayPal or print the completed form and mail it in with your check, cash, or money order. A hard copy of the registration form can also be found on the Chapter's website: http://sdafs.org/flafs/.

If you can't attend the meeting, we will have a new link on the chapter's website 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 at FLAFS Awards and Scholarships.

We look forward to seeing everyone in Haines City for our 2016 annual meeting!

2016 Student Raffle

Our next raffle is less than 6 months away. We need your help to make next year's raffle better than ever and expand our donator list for the upcoming national meeting in 2017. If you are interested in helping out please email Andy Strickland (Andy.Strickland@MyFWC.com) or Alan Collins (lac96@bellsouth.net). Remember all proceeds fund our student travel grants for next year's meeting. Please contact us to get involved!

Thanks,
Andy Strickland and Alan Collins

Florida Chapter of the American Fisheries Society
Florida FFA Leadership Training Center
Annual Meeting Registration: March 2-4, 2016

Official Use Only:
Postmarked:__________
Entered:__________
Deposited:__________

First: ______________________ **Last:** __________________ ☐ **Student (please check)**

Affiliation:____
This address will be used in our mailing list and should be the one where you want to receive materials.

Street Address:____

City:__________________ **State:**______ **Zip Code:**____________

Work Phone:______________ **Ext:**________ **Email:**__________________

Shirt Size: (Select One) Small Medium Large X-Large XX-Large

Arrival Time: (Select One) Wed Noon Wed PM Thurs AM Thurs Noon Thurs PM Fri AM

Please check the appropriate boxes below.

PRE-REGISTRATION: registration form postmarked by Friday, January 22, 2016
☐$ 30.00 One-day Registration ☐$ 40.00 Full Registration

LATE-REGISTRATION: registration form postmarked after Friday, January 22, 2016
☐$ 40.00 One-day Registration ☐$ 60.00 Full Registration

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

Wednesday, March 2, 2016	Thursday, March 3, 2016	Friday, March 4, 2016
No Lunch This Year	☐ $14.00 Breakfast	☐ $14.00 Breakfast
☐ $24.00 Dinner	☐ $17.00 Lunch	☐ $16.00 Lunch
☐ $50.00 Lodging	☐ $24.00 Dinner	
	☐ $50.00 Lodging	

Full Meals and Lodging ☐ **$209.00**
Linens (provided)

Florida Chapter dues (calendar year 2016) ☐ **$10.00** ☐ FL Chapter dues paid via AFS annual membership.

Total Amount: ____________

Total Enclosed: ____________ OCash OCheck
(Minimum $10)

Balance Due: ____________ OCash OCheck OCredit

Please Make Checks Payable to Florida Chapter, AFS and mail to:
Kevin Johnson
FWC
601 W. Woodward Ave.
Eustis, FL 32726
Phone: (352) 800-5003
Fax: (352) 357-2941
Email: kevin.johnson@myfwc.com
*Checks not payable to 'Florida Chapter AFS' will be returned to sender.
Registration Forms may be sent via fax (attention: Kevin) or via email: (subject: 2016 AFS FL).
A minimum amount of $10 must be mailed to validate your registration.

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 form as soon as possible.
Registrations will still be accepted at the meeting, but with a late registration fee.
We can accept VISA, MASTERCARD, cash or check at the meeting.
If you would like to pay your meeting fees with a credit card, then please send a $10 check for your deposit.

Award Nominations!?!

The Awards Committee is seeking nominations for the Florida Chapter's, Outstanding Achievement and Rich Cailteux Awards. Send nominations to Eric Nagid (eric.nagid@myfwc.com) by January 22, 2016. Applications should be limited to one page, but descriptive enough to convey why the individual is deserving of the award. Nomination letters should outline the accomplishments of the individual that meet the criteria of each award below.

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 resources. 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.