

ASMFC American Shad Sustainable Fishing Plan for Georgia

Submitted by

Georgia Department of Natural Resources

Wildlife Resources Division

P.O. Box 2089, 108 Darling Avenue

Waycross, Georgia 31501

(912) 285-6094

ACCEPTED: OCTOBER 2017

PROPOSED UPDATE APPROVED AUGUST 4, 2020

Introduction:

The purpose of Georgia's sustainable fisheries management plan for American shad is to allow the continuation of existing American shad fisheries in Georgia rivers where it has been determined continuation of fishing will not adversely impact the Atlantic Coast American shad stock. The plan fulfills requirements of Amendment 3 to the Interstate Fishery Management Plan (FMP) for Shad and River Herring (American Shad Management). Georgia's current shad FMP was accepted in October 2017.

Management of American shad in Georgia is shared between the Georgia Department of Natural Resources' (GADNR) Wildlife Resources Division's Fisheries Management Section (FMS) and GADNR's Coastal Resources Division (CRD). The river complex utilized by fish stocks defines Georgia's management units. Historically, all of Georgia's Atlantic-slope rivers (Savannah, Ogeechee, Altamaha, Satilla, St. Mary's) supported a commercial fishery for American shad (Fig. 1). However, in recent years, commercial landings of American shad have been reported from only two (Altamaha and Savannah) of these five rivers. Known recreational shad fisheries exist only at the New Savannah Bluff lock and dam (NSBL&D) on the Savannah River, the Ogeechee River, and Ocmulgee River. However, in 2014 the Army Corps of Engineers closed public access to the NSBL&D due to safety concerns. This closure greatly reduced the bank fishery for American shad on the Georgia side of the river, which was by far the largest portion of the fishery. There have been no reports of commercial landings from the Satilla or St. Mary's rivers since 1989.

During 2010, the Georgia Board of Natural Resources adopted new commercial shad fishing rules based on a recommendation from GADNR. These changes modified the temporal and spatial components of the commercial shad fishing efforts along Georgia's Atlantic-slope rivers, both to provide the basis for American shad sustainability plans and to address shortnose sturgeon bycatch issues. Following these changes, the St. Mary's and Satilla rivers were officially closed to commercial shad fishing. The Ogeechee River commercial shad fishery was also closed prior to the 2014 commercial shad season due to lack of participation during the 2012 and 2013 seasons and to reduce concerns of potential sturgeon bycatch

issues. These three rivers will remain closed to commercial American shad fishing. Additionally, prior to this change, the entire Altamaha River and lower portions of the Ocmulgee River and Oconee River (which join to form the Altamaha River) were open to commercial and recreational fishing.

Georgia's Commercial American Shad Fisheries

The commercial shad (American and hickory) season is open each year from January 1 to March 31. Drift and set gill nets with mesh sizes of at least 4-½ inches (stretch mesh) are legal gear in the Altamaha and Savannah Rivers. From 2015 – 2018, shad fishermen were required to possess a letter of authorization (LOA) in conjunction with a commercial fishing license to fish in Georgia's commercial shad fishery. These LOA's were adopted because Georgia's general commercial fishing license doesn't specify the targeted fishery. Effective April 2018, Georgia began requiring shad fishermen to purchase a shad endorsement stamp, which provides better information about participation in Georgia's commercial shad fishery.

The Altamaha River, formed by the confluence of the Ocmulgee and Oconee rivers, supports the state's largest commercial shad fishery and is Georgia's largest watershed, draining 37,192 km². Despite having dams on the Oconee and Ocmulgee rivers, the main-stem Altamaha flows unimpeded (e.g. no dams) for approximately 220 kilometers to the Atlantic Ocean. Historically, the entire river and lower portions of the Oconee and Ocmulgee River were open to commercial fishing. However, currently only that portion of the Altamaha River from the U.S. Hwy 1 Bridge (rkm 183) downstream to the Atlantic Ocean is open to commercial fishing (Fig. 1). Including the waters of its major tributaries, this is an area approximately 347 rkm, or 65% smaller, than previously open to commercial shad fishing. The Altamaha River is open Monday through Friday below Seaboard Railroad bridge (SBR) and Tuesday through Saturday above SBR crossing (Fig. 1). Drift and set gill nets are the gear types used to commercially fish for shad throughout the river. Most full-time commercial fishermen focus their efforts in the lower 60 kilometers of the river. Drift nets are the most prevalent gear type in the lower river, whereas set nets are the more prevalent gear type in the upper river (upstream of Jesup, GA).

The Savannah River drains a watershed of approximately 17,022 km² and forms the boundary between Georgia and South Carolina. It is open to commercial shad fishing from the U.S. Hwy 301 Bridge (rkm 192) downstream to the Atlantic Ocean, an area approximately 103 rkm or 35% smaller than previously open to commercial shad fishing (Fig. 1). The Savannah River is open from Tuesday through Friday east of the I-95 Bridge and Wednesday through Saturday west of the I-95 Bridge (Fig. 1). Commercial fishing gear consists of drift and set gillnets, with most effort occurring in the lower portion of the river. The first barrier to upstream migration on the Savannah River is the NSBL&D located at river km 301, just south of Augusta, GA and approximately 109 rkm above commercial fishing waters.

American shad once passed through this dam via lockage, but in recent years the U.S. Army Corps of Engineers (USACE) has declared the facility unsafe to operate, so fish are not being passed through the lock at this time. The dam is now a true migration barrier and is the uppermost reach of the American shad migration in the Savannah River. The USACE is currently overseeing the Savannah Harbor Expansion Project, which has mitigation plans to install a migratory fish passage at the dam that, once in place, will allow American shad to access further upriver habitats above the dam. Three additional dams (located from river km 333 – river km 355) are above the NSBL&D. At this time, construction of the fishway is scheduled to begin in January 2021.

Georgia's Recreational American Shad Fisheries

Recreationally, Georgia has a statewide 8 shad (American and/or hickory) daily creel limit. Small-scale recreational fisheries for American shad are known to still exist in the Savannah, Ogeechee, and Ocmulgee rivers. In 2014, the Army Corps of Engineers closed public access to the NSBL&D due to safety concerns. This closure essentially eliminated the bank fishery for American shad on the Georgia side of the river, which was by far the largest portion of the recreational fishery. Consequently, this once prevalent recreational fishery on the Savannah has virtually ceased existing.

Georgia has periodically conducted recreational creel surveys on the Ogeechee River specifically targeting the recreational shad fishery. The most recent of those was completed in 2015. The creel survey estimated that 463 American shad were harvested with a total harvest weight of 473 Kg. Anglers also released 27 American shad, and zero hickory shad were harvested by anglers.

Anecdotal information from fishermen suggests some recreational fishing may occur on the Ocmulgee River, but no creel surveys are being conducted on this river. The accounts of fishermen capturing shad on this river have not been substantiated, and it is the belief of GADNR that any significant effort on this river would be known through anecdotal or various media outlets.

Creel surveys have been a popular tool used on several Georgia rivers to collect data from anglers. Numerous recreational creel surveys have been conducted on the Altamaha and Satilla rivers in recent years and American shad have never been observed in angler harvest. While GADNR does not conduct creel surveys on the Oconee or St. Mary's rivers, there is no information to suggest any evidence or reports of anglers capturing American shad.

Landings

Reported commercial landings of American shad are available from the National Marine Fisheries Service and the State of Georgia through CRD, which has recorded river-specific landings since 1962. In 2001, Georgia instituted a mandatory reporting system that requires an individual record (trip-ticket) to be completed at the time of sale for each catch sold to a seafood dealer. Data collected includes the river of capture, type of gear, total net soak time, etc. Numbers of wholesale dealers processing shad have declined over time, and from 2010 to 2013 there were less than 3 dealers that purchased shad from commercial fishermen. Due to the low number of dealers and corresponding confidentiality agreements, commercial landings data obtained from trip-tickets on the Altamaha and Savannah rivers during 2010-2013, along with the 2014 Savannah River commercial landings data, must be excluded from reports (Fig. 2).

Recreationally, landings data has been collected by the GADNR via periodic creel surveys on the Ogeechee River since 1986 to estimate harvest and catch-per-unit-effort (CPUE). The number of American shad caught per hour of fishing time has varied from a low of 0.2 shad/hour in 1986 and 2010 to a high of 0.75 fish/hour in 2015. It is important to note that flow conditions can have a significant impact on angler catch rates in this fishery. Total effort and fish harvested has ranged from a high of 2,210-angler hrs and 1,053 shad harvested in 1996 to a low of 620-angler hrs in 2015 and a low of 10 shad harvested in 2000. Effort data from the last five creel surveys has averaged 1,148-angler hrs and total shad harvested has averaged 424 fish.

Recreational creel surveys were conducted on the Savannah River in the late 1990s by the GADNR (1997) and South Carolina Department of Natural Resources (1998 and 1999). Estimates of catch from these surveys varied from year to year, largely due to dramatically different flow conditions. Catch estimates from each of these creel surveys were provided by Boltin (1999). Additionally, SCDNR has additional creel data from the SCDNR since 1999 (Bill Post, pers. communication).

Fishery Dependent Indices

Reported American shad landings from the Altamaha River reached a high of 471,700 lbs in 1968 and then declined for several years. Landings averaged approximately 299,000 lbs during 1962-1969 and approximately 130,000 lbs during 1970-1979. Reported Altamaha River shad landings peaked in 1987 at 193,469 lbs and again in 1995 at 121,811 lbs (Fig. 2). During 1980-2000, total reported shad landings averaged 89,739 lbs. Since 2000, total reported shad landings have averaged around 34,776 lbs. Landings for the last ten years have averaged approximately 37,437 lbs. Savannah River landings data was supplied to the SCDNR and will be combined with their landings data and reported in the South Carolina sustainability plan.

Since 2000, commercial shad fishing effort has been quantified based on total number of reported commercial trips. The highest recorded statewide effort was 860 commercial fishing trips for the Altamaha River in 2000 (Fig. 3). During 2000-2005, commercial fishermen averaged approximately 420 trips/yr in the Altamaha River, while during the 2006-2015 period commercial fishermen averaged approximately 264 trips/yr.

Fishery Independent Indices

GADNR has utilized gill net surveys to generate population size and exploitation rate estimates for American shad through mark and recapture efforts in the Altamaha River since 1982 and CPUE since 1986. The American shad population was also estimated in 1967.

Adult shad electrofishing surveys were initiated in 2010 on the Ogeechee (Fig. 4) and Savannah (Fig. 5) rivers in preparation for future monitoring under the sustainability plans to be submitted pursuant to requirements of Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring (Shad and River Herring ISFMP). GADNR staff conducts these surveys twice a month for three months during the spawning immigration. Since 2010, the Ogeechee River adult shad electrofishing surveys have averaged around 15 shad per hour, and the Savannah River adult shad electrofishing surveys have averaged around 300 shad per hour. The reason that the Savannah River electrofishing catch rates are much higher than the Ogeechee River catch rates is because the electrofishing samples on the Savannah River are concentrated immediately below the NSBL&D. The Ogeechee River is undammed and electrofishing samples are not concentrated below a migration barrier so efforts are much less effective.

GADNR estimated juvenile American shad abundance from trawl surveys on the Altamaha River during 1982-1991 and the Ogeechee River during 1982-1985. Although, it is important to note, juvenile catch rates could not be correlated to estimated spawning populations nor future adult spawning return rates, so juvenile sampling ceased after 1991. However, GADNR reinstated a juvenile sampling program utilizing a 50-ft seine in 2010 on the Altamaha, Ogeechee, and Savannah rivers in preparation for future monitoring under the sustainability plans to be submitted pursuant to requirements of Amendment 3 to the Shad and River Herring ISFMP. Seine mesh size and site locations are standardized. GADNR staff annually sample 3-6 sites/river twice a month from July-September, as water levels allow. Since 2011, the Altamaha, Ogeechee, and Savannah River juvenile shad geometric means have averaged around 24.2, 7.9, and 7.6 shad per seine haul, respectively (Fig. 6). No juvenile sampling was completed in 2013 due to high water. The decrease in juvenile shad sampled on the Ogeechee and Savannah Rivers from 2014 to 2015 should be attributed to water level issues and changes in manpower of the monitoring staff, and not a true depiction of a decrease in juvenile shad abundances.

Altamaha River

Management of shad in the Altamaha River is done through analyzing data from fishery-independent monitoring. GADNR has produced annual Lincoln-Peterson population estimates and exploitation rates from a tagging study that was initiated in 1982. Adult American shad are captured via gill nets in the lower section of the Altamaha River and tagged with a T-bar anchor tag produced by Floy Tag & Mfg, Inc. Tagging efforts are conducted on Saturday, Sunday, or Monday each week of the commercial shad season that runs from January 1 through March 31. These days were chosen because the commercial fishery is closed in different portions of the river on these days, thus allowing the fish to naturally disperse before potential recapture by commercial fishermen. Before the start of the season, 500 tags are randomly assigned values of \$4, \$10, \$50, or \$100. Two percent of the tags receive a \$100 value, 3% are \$50, 20% are worth \$10, and 75% worth \$4. Tag values are not printed on the tag. Upon capturing a tagged fish, commercial fishermen are required to remove tags and mail them into GADNR to receive the monetary award. GADNR keeps record of the number of fish tagged (M) and recaptured (R) and then utilizes reported commercial landings data to produce the total number of fish captured (C). In an effort to account for non-reported commercial landings and produce a more accurate estimate of "C", GADNR conducted a roaming creel survey from 1982-1992. After the 10-year creel survey was completed, GADNR staff developed a statistically based formula to account for non-reporting. From 1993 to present, "C" is calculated by entering the total reported commercial drift net landings into the formula $C = ((2.322 \times 10^{-6}) + (0.214 / \text{Reported Landings})^{-1})$.

From 1982 to present, the estimated size of the adult American shad population in the Altamaha River has ranged from a low of 70,396 shad in 1990 to a high of 560,023 fish in 2014 (Fig. 7). After 1996, estimated shad abundance declined for six consecutive years, through 2002, before showing a moderate rebound through 2006. The population estimates decreased again through 2010. However, the 2011 mark and recapture efforts revealed a sharp increase in American shad abundance with a population estimate of 277,824 fish. This upward trend peaked in 2014 at 560,023 which is the highest population estimate in the time series. Population estimates have averaged around 236,000 American shad in the Altamaha River American shad run for the last ten years.

Trends in GADNR tagging CPUE data appear to be like those observed in GADNR's mark and recapture population estimates (Fig. 8) and have ranged from a low of 0.59 shad/ft-hr in 2005 to a high of 3.66 shad/ft-hr in 1998 (Fig. 9). CPUE, for the last ten years, has averaged 2.4 shad/ft-hr in the Altamaha River American shad run.

From 1982 through 1992, exploitation rates estimated from recaptures of tagged fish averaged 43.63%, which was often above the previous 40% maximum sustainable yield recommended by ASMFC in the Addendum to Amendment 1, before declining to present levels (Fig. 7). Since 1990, the exploitation rates have been below ASMFC's recommended

40% maximum sustainable yield. From 1993-2003, exploitation of American shad averaged 26.1%, ranging from 17.7% to 33%. From 2004-2010, exploitation of American shad averaged 19.7%, ranging from 13.7% to 23.6%. On January 1, 2011, new commercial regulations went into effect that closed approximately 65% of the Altamaha River system. This change resulted in a decrease in exploitation rates. Following these new regulations, from 2011-2015, exploitation of American shad averaged 11.5%, ranging from 8.6% to 12.7%. Total exploitation has averaged around 16%, for the last ten years, for the Altamaha River American shad run. As an additional measure to ensure the conservation of this stock, a temporary American shad stocking program was initiated in 2014. This 5-year stocking program, which ceased in 2019, resulted in American shad being annually stocked above migration barriers in an attempt to re-establish shad in section of the Oconee and Ocmulgee rivers.

Juvenile sampling on the Altamaha River was initiated in 2010, and 291 juvenile shad were collected in 12 seine hauls utilizing a combination of two 50-ft bag seines (one with ½-inch mesh and one with 3/8-inch mesh). The resulting geometric mean was 14.6 shad/haul. However, staff observed juvenile shad escaping through both of these nets. Therefore, catch rates would have been higher if a smaller mesh seine had been utilized. Since 2011, GADNR has utilized a 50ft bag seine with ¼-inch mesh to sample juvenile shad. Annual geometric means continue to fluctuate since 2011, though such fluctuations are not only the result of biological influences but intermittent high-water events occurring during the sampling season which hinders access to sampling sites. During July 1968, Godwin and Adams (1969) utilized a similar seine to collect juvenile shad and reported an arithmetic mean of approximately 15 shad/haul. Despite annual fluctuations in observed juveniles, American shad reproduction appears to be at a sufficient level to sustain the population.

The ASMFC American Shad Stock Assessment Sub-committee (SASC) utilized CPUE data through 2005 from GADNR tagging efforts on the Altamaha River as an indicator that the Altamaha stock was in decline when the 2007 stock assessment was completed. During 2006-2015, CPUE data from GADNR's tagging efforts averaged 2.4 shad/ft-hr, which is 112.4% higher than the average of 1.13 shad/ft-hr observed from 2000-2005 (Fig. 9). This fact, along with the apparent increase in population abundance, decreased exploitation rates, and recent juvenile abundance data, supports the fact that the current fishery appears to be sustainable. In addition, GADNR believes that the changes in the 2011 regulations have allowed sufficient escapement of adults and helped ensure that fishery harvest will not adversely impact the Atlantic Coast American Shad population. Over the years, the attrition of commercial fishermen has also lessened effort and exploitation on American shad in the Altamaha River and even more so on the Savannah River. For example, there were only two commercial shad fishermen on the Savannah River in 2015, and one of these fishermen retired from shad fishing after the 2015 season.

The SASC and TC expressed concerns with utilizing population estimates and exploitation rates generated from annual tagging efforts as stock indicators since GADNR has not studied non-reporting rates, tag loss, tagging mortality, post tagging movements, or repeated the 1980's creel survey to validate the formula that accounts for non-reporting of commercial landings. Instead, the TC recommends using annual CPUE data as a benchmark. Therefore, GADNR continues to monitor the Altamaha stock through a fishery independent gill netting survey to develop annual CPUE data for use as a stock abundance indicator. GADNR utilizes a CPUE benchmark of 75% of the mean for 3 consecutive years. In the last fishery management plan, the TC asked GADNR to consider two potential CPUE benchmark means. The first would utilize the entire time series of data (1983-2011) to calculate the mean, resulting in a benchmark CPUE of 1.11 shad/ft-hr (Fig. 9). The second option was to exclude the first seven years and utilize data from 1993 through 2011 to present and would establish a CPUE benchmark of 1.29 shad/ft-hr. GADNR believed it to be more appropriate to utilize the entire time series of data to establish the benchmark CPUE since it encompasses a greater degree of environmental and population variability. The Altamaha shad population has historically shown the capacity to rebound after 7 consecutive years below this benchmark, and historically a benchmark of 1.29 shad/ft-hr would not have triggered action any more frequently than a benchmark of 1.11 shad/ft-hr. Consequently, a benchmark of 1.11 shad/ft-hr (accepted in October 2017) will be used as a sustainability measure for both the commercial and recreational fisheries going forward (Table 1). If gill netting CPUEs drop below 1.11 shad/ft-hr for 3 consecutive years, GADNR will evaluate commercial fishing regulations and harvest data and consider modifications to the Altamaha fishery to ensure the fishery remains sustainable.

In the future, utilization of a juvenile index of abundance may be added once GADNR has collected several years of data to establish a CPUE benchmark appropriate to the Altamaha River. When the 2007 stock assessment was completed, the SASC utilized available data as an indicator that the Altamaha stock was in decline. Since that time, GADNR's relative abundance data from 2005-2015 was 112% higher than observed relative abundance from 2000-2005. This increase, combined with increases in population estimates, decreased exploitation rates, and JIA data all point to healthy and sustainable stock.

Despite conducting a creel survey on the Altamaha River for over 20 years, no recreational fishing is known to occur in the river. Since the river is open to commercial fishing, GADNR proposed utilizing the same sustainability benchmark that is used for the commercial fishery, which is a gill netting CPUE below 1.11 shad/ft-hr for 3 consecutive years. This benchmark was accepted by the TC and continues to be in place. However, the most recent SFMP did not contain insight on how GA would manage shad recreationally in the two rivers that form the Altamaha (Oconee and Ocmulgee rivers). Though no commercial fishing for shad is allowed in the Ogeechee and Ocmulgee rivers, recreational fishing is allowed. To address the lack of a management trigger for the Oconee and Ocmulgee rivers, GADNR proposes

applying the same recreational management strategies (e.g. closures, creel changes, etc.) implemented on the Altamaha to also apply to the Ocmulgee and Oconee Rivers.

Savannah River

Management of shad on the Savannah River has historically been done using landings data provided by commercial fishermen. Specifically, GADNR and SCDNR worked collaboratively to establish a joint sustainability benchmark for the Savannah River using data from roe shad landed in Georgia associated with the commercial drift-net fishery. The agreed upon sustainability benchmark was a commercial roe drift gillnet CPUE of 9.03 kg shad/trip for 3 consecutive years. However, participation in the commercial drift net fishery has declined in recent years, and zero (0) landings were reported from this sector of the fishery in 2019 and 2020. As a result, GADNR staff felt it necessary to examine other potential available datasets from fishery-independent work being done on the Savannah River. Since 2010, GADNR staff have conducted electrofishing surveys for adult American shad each year between the months of Feb – June at the New Savannah Bluff Lock and Dam (NSBLD) on the Savannah River. The NSBLD is the first barrier to upstream migration on the Savannah River and is located at river km 301, just south of Augusta, GA and approximately 109 rkm above commercial fishing waters. American shad once passed through this dam via lockage, but in recent years the U.S. Army Corps of Engineers (USACE) has declared the facility unsafe to operate, so fish are not being passed through the lock at this time. The dam is now a true migration barrier and is the uppermost reach of the American shad migration in the Savannah River. When feasible, GADNR staff conduct electrofishing surveys for adult American shad during each of the aforementioned months. Since 2010, annual CPUEs (# fish/hr) for the NSBLD electrofishing efforts have ranged from 59 fish/hour to 430.01 fish/hour (Figure 5), averaging 246.2 fish/hr during the 10-year time series. As a result of ongoing concerns with changing commercial fishery dynamics in the Savannah River (declining participation by commercial drift-netters, etc.) as seen in both GA and SC, GADNR recommended to the TC in May that consideration be given to utilizing data from the electrofishing survey at the NSBLD to establish a sustainability metric for manage shad in the Savannah River. Specifically, GADNR proposed using the 25th percentile (61.56 fish/hr) for 3 consecutive years as a sustainability benchmark for the Savannah River (both commercial and recreational fisheries). This proposed change was discussed in a TC call on 6/25/20 and approved by the TC. Under this change, if the adult shad CPUE falls below 61.56 fish/hr for 3 consecutive years, GADNR will take the same approach it does for other managed rivers and evaluate and identify the causes thereof and initiate appropriate actions (Table 1).

Additional fishery-independent surveys conducted on the Savannah River include a juvenile electrofishing survey done by SCDNR. This juvenile survey is done in late summer and has proven to be a valuable dataset as well. As part of the TC recommendation on 6/25/20 allowing GADNR to use the fishery-independent NSBLD electrofishing survey as the primary metric to determine sustainability, GADNR has also agreed to work with SCDNR to utilize

their juvenile electrofishing survey as a secondary metric to assess the shad population in the river. GADNR will remain in contact with SCDNR to examine annual results of these surveys and respond as necessary to any observed declines.

Ogeechee

The Ogeechee River was officially closed to commercial fishing due to lack of participation and potential sturgeon interactions. There are no plans to re-open the commercial fishery on the Ogeechee River. A temporary 5-year American shad stocking program was initiated in 2014 as an additional measure to ensure the conservation of this stock. Adult American shad are monitored via electrofishing and juveniles are sampled with a 50' bag seine.

The Ogeechee River is one of the rivers in Georgia known to have a recreational shad fishery. The GADNR initiated an electrofishing survey in 2010 for adult American shad and the CPUE has averaged 14.8 fish/hr over a 7-year period. The GADNR was approved in October 2017 to use the 25th percentile for 3 consecutive years as a sustainability benchmark for the recreational fishery (Table 1). Consequently, if the adult shad CPUE falls below 3.7 fish/hr for 3 consecutive years, the GADNR would need to establish conservation measures to ensure the sustainability of the fishery.

Satilla and St. Mary's Rivers

The Satilla and St. Mary's rivers are currently closed to commercial shad fishing and there are no plans to open these rivers. Technically, the Satilla and St Mary's river are open to recreational harvest of shad. However, several recreational creel surveys have been conducted on the Satilla River in recent years (2006-2014) and American shad have never been observed in angler harvest. While the GADNR does not have any recreation creel survey data for the St. Mary's River, there has never been any evidence or reports of anglers incidentally capturing American shad. Additionally, annual spring electrofishing surveys targeting sportfish populations indicate that American shad abundance is extremely low in both rivers. There is very little chance of incidental angler interactions due to the low abundance of shad in these rivers.

Because it will be impossible to develop a sustainable fishing plan with any credible metrics for two river systems where American shad are currently at such low abundance as to be functionally absent, GADNR recommends applying management strategies triggered and implemented on the Altamaha River to also apply to the Satilla and St. Mary's rivers. Geographically, the Altamaha River is the closest system with adequate monitoring and a sustainability metric. Consequently, the application of any triggered management responses conducted on the Altamaha River onto the Satilla and St. Mary's will prevent GADNR from having to seek a modification of Georgia state law to prohibit the harvest of American shad in these two rivers, which we believe will result in no demonstrable conservation benefit.

Summary of Georgia’s Sustainable Fisheries Management Plan

The GADNR will continue to monitor and manage the commercial and recreational shad fisheries through fishery-dependent and -independent sampling on the Altamaha, Ogeechee, and Savannah rivers. Data from the Savannah River will be shared with SCDNR, and the agencies will work cooperatively towards the management of this population. The management benchmarks identified in Table 1 will be used as triggers for management decisions for each river system.

If three consecutive years of data show that CPUE of adults is decreasing, GADNR would evaluate and identify the causes thereof and initiate appropriate actions. Potential actions may include reducing the number of fishing days, modifying season dates, or altering legal fishing gears. In the event, such actions are not successful in reversing negative trends, GADNR would then consider closing the fishery in that river system.

Table 1. Management Benchmarks and Triggers

River System	Index	Years Included in Index	Benchmark Value	Benchmark Level	Management Trigger
Altamaha (commercial & recreational)	Gillnet CPUE Index	1983-2015	1.11 shad/ft-hr	25 th percentile	3 consecutive years below the benchmark
Savannah (commercial & recreational)	NSBLD Electrofishing CPUE Index	2010-2019	61.56 shad/hr	25 th percentile	3 consecutive years below the benchmark
Ogeechee (recreational)	Electrofishing CPUE Index	2010-2015	3.7 shad/hr	25 th percentile	3 consecutive years below the benchmark

Future Considerations

Georgia will continue to actively pursue effective management strategies that will allow the continued sustainability of our shad fishery. In recent years, fishery managers in Georgia have seen positive trends in our shad populations, particularly in the Altamaha River, which supports our largest shad population and fishery. As previously mentioned, GADNR’s relative abundance data in the Altamaha River from 2005-2015 was 112% higher than observed relative abundance from 2000-2005. This increase, combined with increases in population estimates, decreased exploitation rates, and juvenile indices data all point to a healthy and sustainable stock. In an effort to pursue effective shad management beyond traditional data collection efforts, fishery

managers will continue conducting various monitoring programs conducted annually since 2010, including juvenile sampling in the Ogeechee, Altamaha, and Savannah rivers and an electrofishing survey targeting adults in the Ogeechee River. Data from these efforts, which may include length, age, or other biological metrics, may eventually be considered with traditional management benchmarks to inform fishery managers in decision making efforts. Additionally, future considerations may include additional assessments of the impacts of a new fish passage structure at the NSBL&D, should such a structure be developed. Managers will also continue to evaluate the effectiveness of stocking efforts in the Altamaha and Ogeechee that occurred annually from 2014 – 2019, and data from these efforts may also be considered for use in future management decisions. Finally, considerations may be given in the future for collecting genetic samples for analysis of shad stocks in Georgia to better identify and understand stock compilation.

Literature Cited

Godwin, W.F. and J.G. Adams. 1969. Young Clupeids of the Altamaha River, Georgia.

GA Game and Fish Comm., Mar. Fish. Div., Contribution. Ser. No. 15.

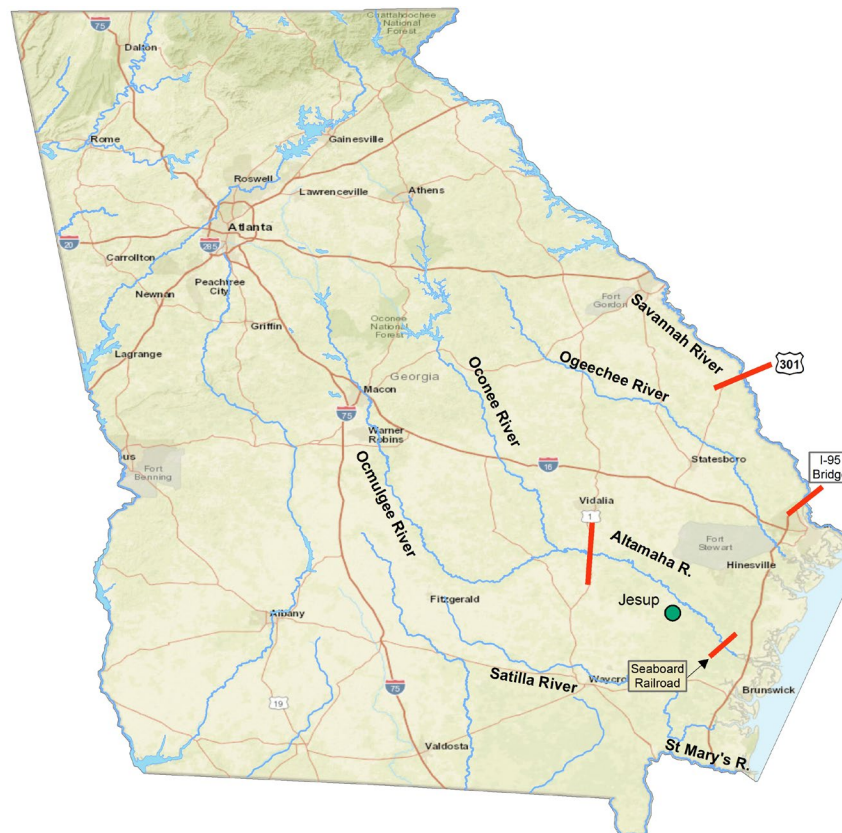


Figure 1. Georgia Atlantic-Slope Rivers. The larger lines are the upper boundaries to the commercial American shad fishery and the smaller lines are the boundary lines for different open days of the fishery.

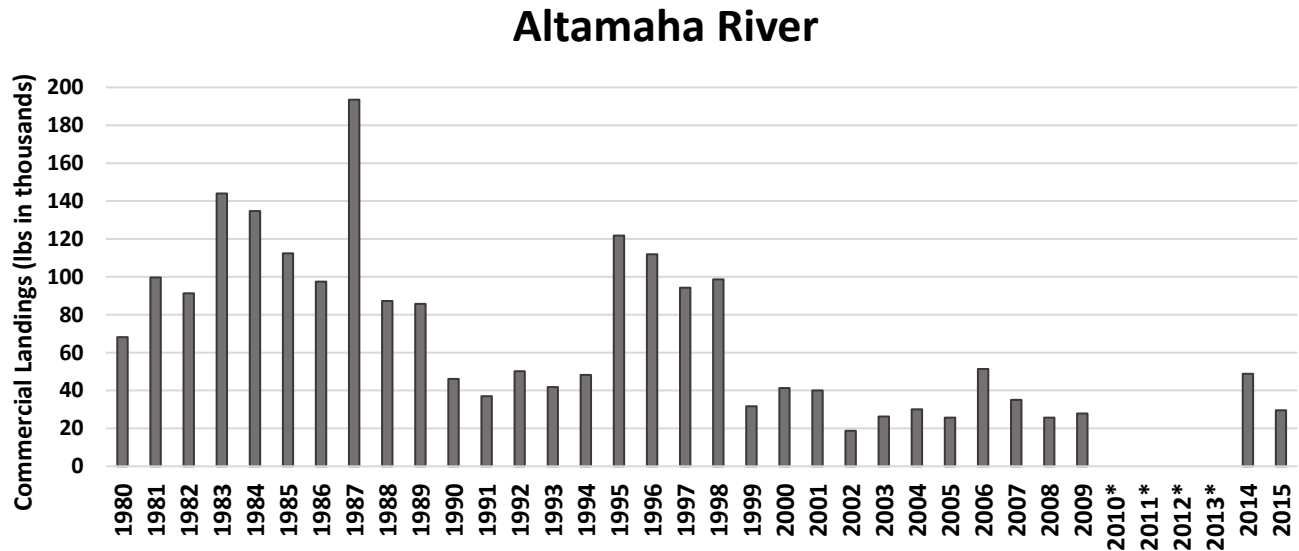


Figure 2. Reported commercial landings, reported by pounds in thousands, of American shad from the Altamaha River, Georgia. Due to confidentiality agreements, data from 2010*-2013* have been excluded.

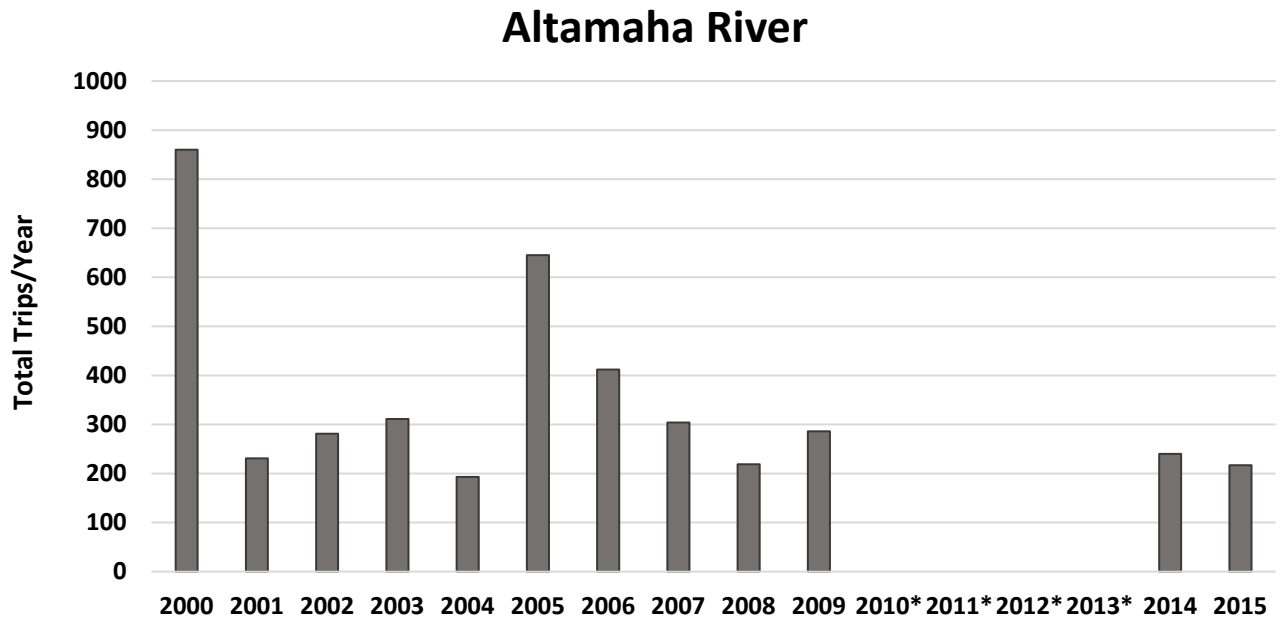


Figure 3. Total commercial fishing effort for American shad in the Altamaha River. Due to confidentiality agreements, data from 2010*-2013* have been excluded.

Ogeechee

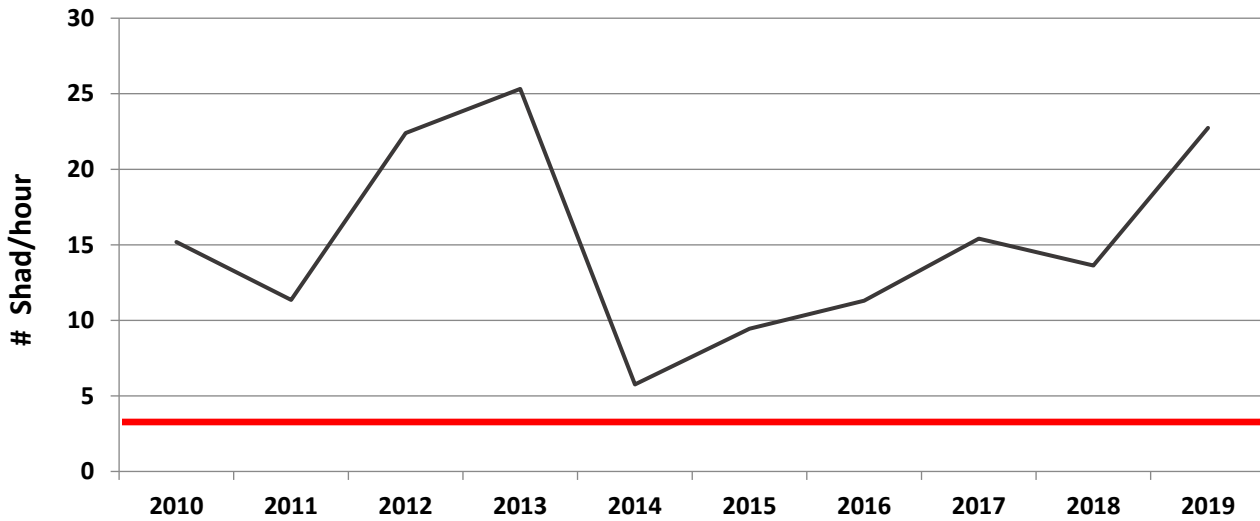


Figure 4. Ogeechee River adult American shad electrofishing CPUE's and the 3.7 shad/hr sustainability benchmark developed by GADNR.

Savannah

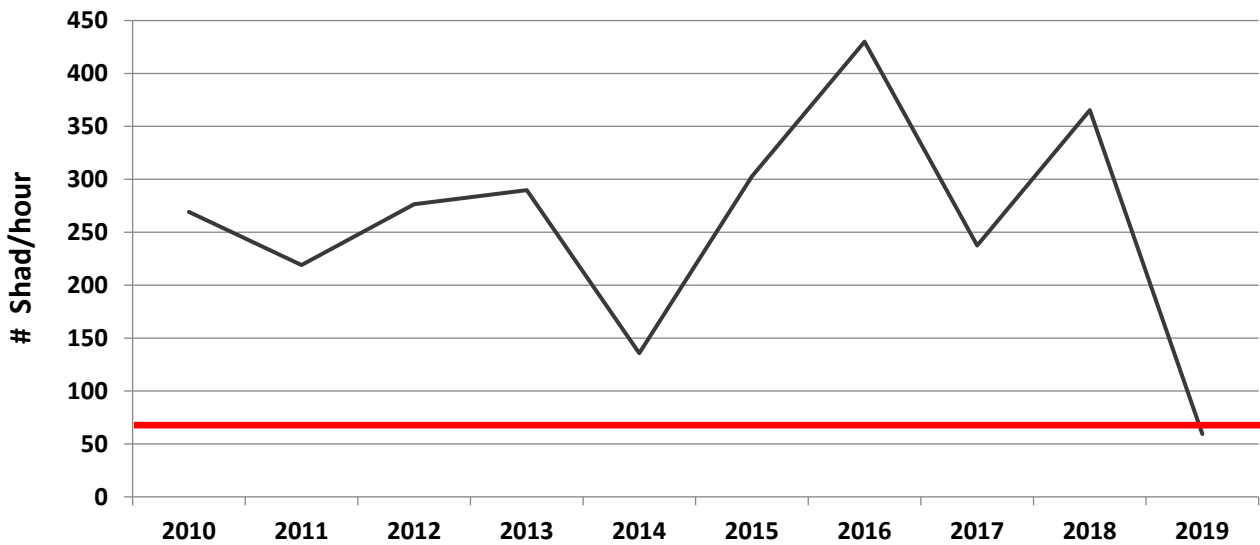


Figure 5. Savannah River adult American shad electrofishing CPUE's collected below the New Savannah Bluff Lock and Dam and the 61.56 shad/hr sustainability benchmark developed by the GADNR.

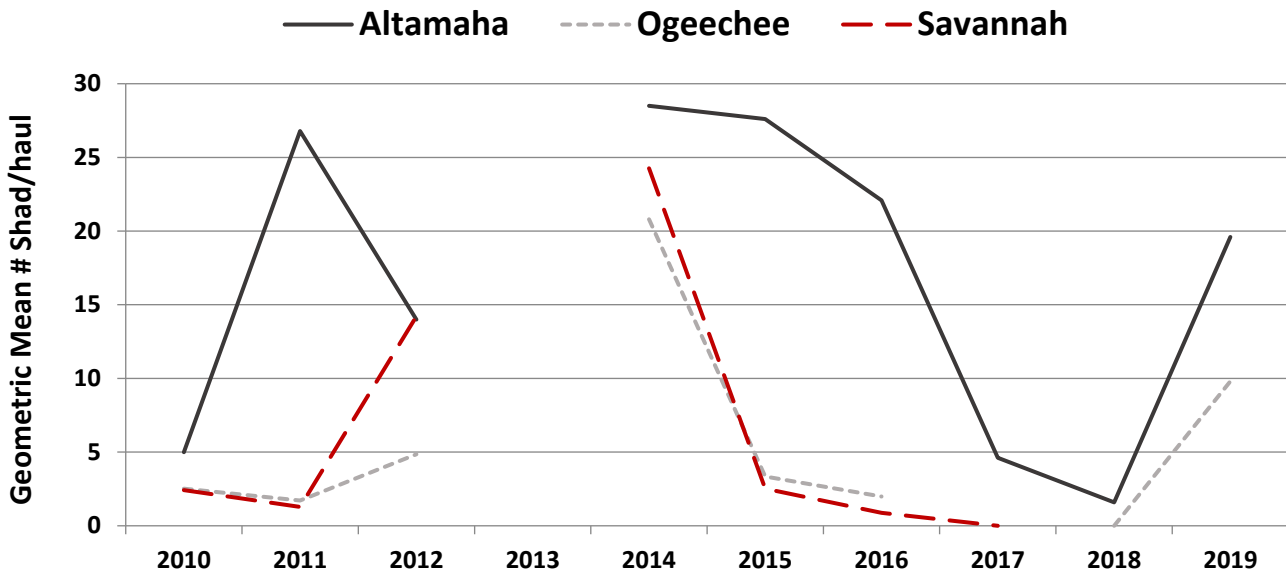


Figure 6. Juvenile American shad sampling program, initiated in 2010, utilizing a 50-ft bag seine on the Altamaha, Ogeechee, and Savannah rivers for monitoring under the sustainability plans to be submitted pursuant to requirements of Amendment 3 to the Interstate Fishery Management Plan for Shad and River Herring (American Shad Management).

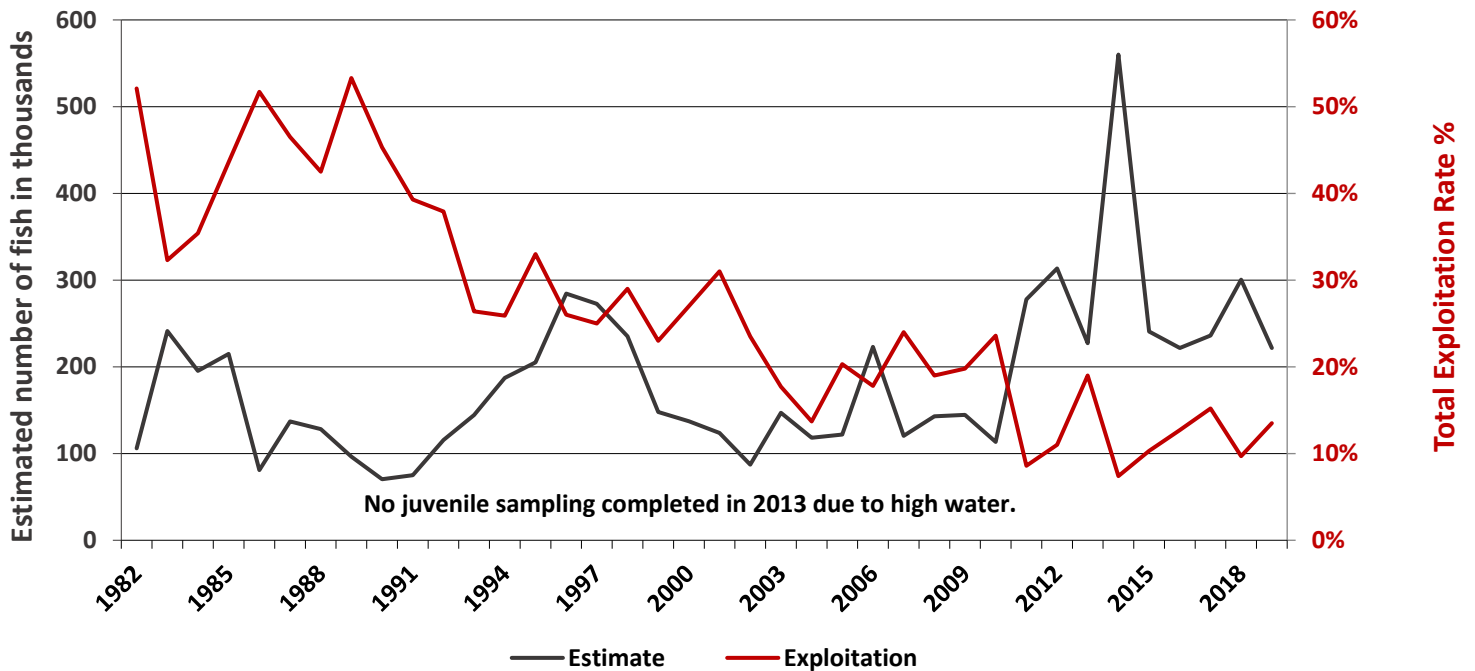


Figure 7. Population estimates and exploitation rates from the Altamaha River American shad run.

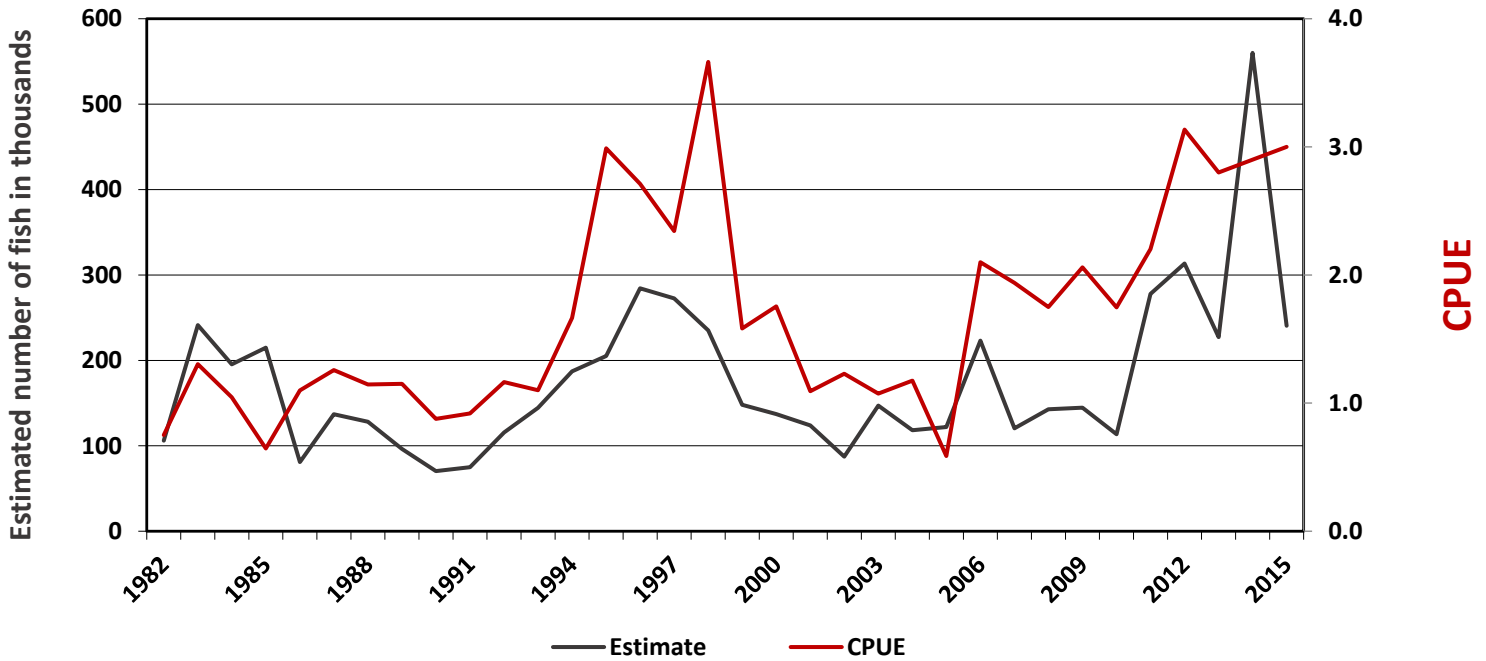


Figure 8. Altamaha River fishery-independent catch-per-unit-effort (CPUE-number caught per foot-hour) of American shad and population estimates from GADNR mark and recapture efforts.

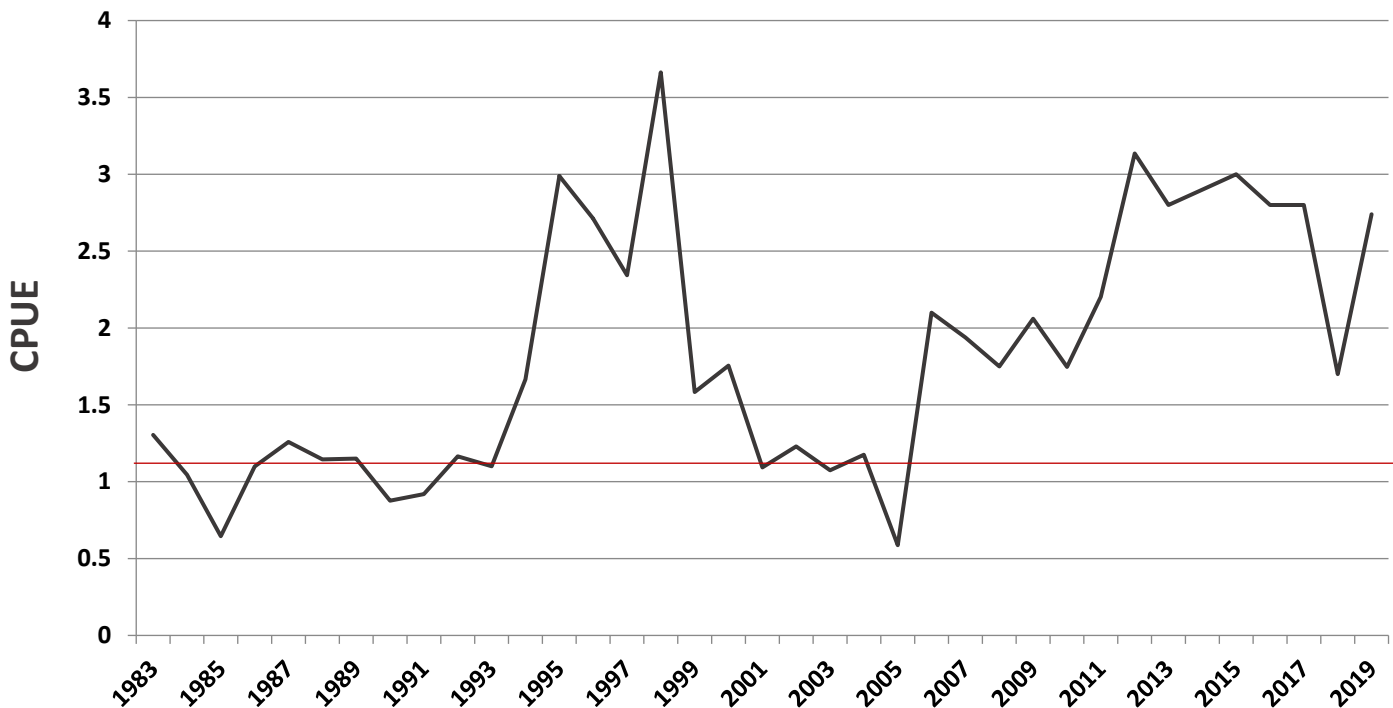


Figure 9. Altamaha River fishery-independent catch-per-unit-effort (CPUE-number caught per foot-hour) of American shad and the 1.11 shad/ft-hr benchmark developed from GADNR gill-net tagging data.