

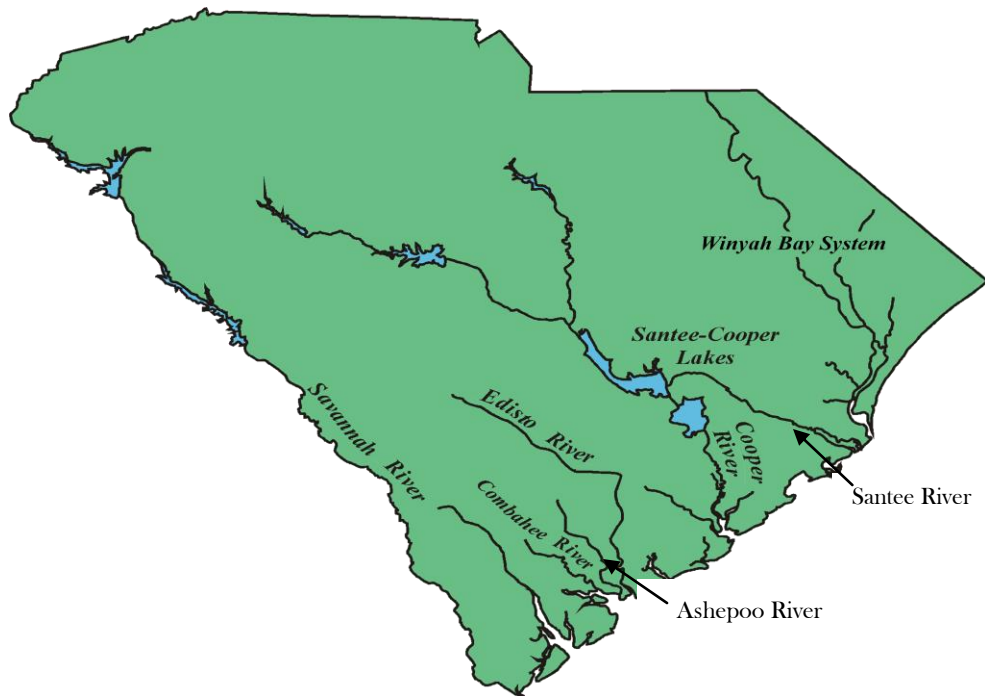
ASMFC American Shad Sustainable Fishing Plan for South Carolina

Introduction:

The purpose of this sustainable fisheries management plan is to allow existing shad fisheries that are productive and cause no threat to future stock production and recruitment to remain in place and close all others. Some excerpts from the ASMFC 2007 stock assessment for SC's American shad were used in this document (ASMFC 2007). The assessment, which was prepared and submitted to the ASMFC shad and river herring board by SCDNR and the Stock Assessment Subcommittee (SASC), summarizes SC's fisheries for American shad.

American shad (*Alosa sapidissima*) are found in at least 19 rivers of South Carolina (Waccamaw, Great Pee Dee, Little Pee Dee, Lynches, Black, Sampit, Bull Creek, Santee, Cooper, Wateree, Congaree, Broad, Wando, Ashley, Ashepoo, Combahee, Edisto, Coosawhatchie, and Savannah rivers). Many have historically supported a commercial fishery, a recreational fishery, or both, including the Winyah Bay system (primarily the Waccamaw and Pee Dee rivers), the Santee-Cooper system, Ashley, Edisto, Ashepoo, Combahee, Coosawhatchie, and Savannah Rivers (Figure 1).

Figure 1. Map of major South Carolina drainage basins and river systems with American shad (*Alosa sapidissima*) fisheries or historical American shad runs.



Currently, commercial fisheries exist in Winyah Bay, Waccamaw River, Pee Dee, Black, Santee, Edisto, Combahee, and Savannah rivers, while the Sampit, Ashepoo, Ashley, and Cooper rivers no longer support commercial fisheries. With the closure of the ocean-intercept fishery beginning in 2005, the Santee River and Winyah Bay complex comprise the largest commercial shad fisheries in South Carolina. Recreational

fisheries exist in the Cooper, Savannah, Edisto, and Combahee rivers, as well as the Santee River Rediversion Canal.

Data for American shad are available to assess trends in fishery and stock status for the following river systems in South Carolina: the Pee Dee run (consisting of Winyah Bay, Waccamaw and Great Pee Dee rivers), Santee River, Cooper River, Edisto River, Combahee River, and Savannah River. Additional data for the Savannah River are provided by Georgia Department of Natural Resources (GADNR).

The South Carolina Department of Natural Resources (SCDNR) manages American shad populations and collects fishery-independent and fishery-dependent data for the major shad rivers in the state. SCDNR has collected voluntary landings data by river system since 1979 and instituted mandatory catch and effort reporting in 1998. Mandatory reporting has not been fully implemented, as many licensed fishermen fish infrequently and provide incomplete, incorrect, or no effort data. However, SCDNR continues to work successfully with several cooperating commercial American shad gill-net fishermen to collect commercial catch and effort data on several river systems. There are still some gaps in these data, but they provide the broadest temporal and spatial view of American shad stocks in South Carolina. SCDNR has also conducted tag-return studies in the gill-net fisheries for several rivers, but these were not used to determine stock status, because there are no information available to determine if the assumptions of tag-return investigations were violated. In the past, these studies rotated among rivers and ran 2 to 5 years per river before changing to a different river. However, due to growing concern for the species, SCDNR began conducting this monitoring on multiple rivers during the shad season. During these studies, SCDNR has collected biological information to support other studies (e.g., age, repeat spawning, length and weight data). In some systems, SCDNR has conducted creel surveys (Cooper River and Savannah River), fish counts (Santee River), and young of the year (YOY) sampling (Santee-Cooper system, Pee Dee River, Edisto River, and Savannah River).

This plan primarily draws upon investigations conducted by the SCDNR's Marine Resources Division and Division of Wildlife and Freshwater Fisheries to provide a river-specific assessment of relative stock status for American shad. The general approach to this document was to (1) characterize fisheries by the magnitude and trend of landings data and note if the system still supports a viable fishery and (2) review supporting fishery-dependent and fishery-independent data sets and conduct analyses for each river system when applicable.

Current Regulations:

South Carolina manages its shad fisheries using a combination of seasons, gear restrictions, and catch limits (Appendix 1.) implemented over several management units: Winyah Bay and Tributaries (Waccamaw, Great Pee Dee, Little Pee Dee, Lynches, Black and Sampit rivers); Santee River; Charleston Harbor (Wando, Cooper & Ashley rivers); Edisto River; Ashepoo River; Combahee River; Coosawhatchie River; Savannah River within South Carolina; Ocean Waters; and Lake Moultrie, Lake Marion, Diversion Canal, Intake Canal of Rediversion Canal and all tributaries and distributaries.

The first river-specific commercial regulations for American shad in South Carolina were enacted in 1993 for the Edisto River in response to SCDNR's studies that identified overfishing as a major contributor to a perceived trend of population decline [Act # 343 of the 1992 South Carolina General Assembly]. Beginning with the 1998 commercial shad-netting season, all licensed fishermen are required to report their daily catch and effort to the SCDNR. In 2000, Act #245 of the 2000 South Carolina General Assembly was passed in response to the perceived population status of shad populations in each of the state's river systems supporting an American shad fishery. This Act led to the closure of the commercial gill-net fishery on the Coosawhatchie River and a substantial reduction in potential gill-net fishery effort for other systems supporting small American shad stocks in South Carolina, including the Combahee, Ashepoo, and Ashley rivers (www.dnr.sc.gov).

Significant changes in shad and herring regulations became effective in 2001 with the passage of the Marine Resources Act of 2000, which gave the SCDNR authority to implement a permit program for the State's shad and herring fisheries. All commercial shad and herring fishery license holders were issued permits that could be used to "restrict the number of nets for taking shad...in any body of water where the number of nets or fishermen must be limited...to prevent congestion of nets or watercraft, or for conservation purposes". The number and conditions of permits can be controlled "to designate areas, size and take limits, hours, type and amount of equipment, and catch reporting requirements," and enabled SCDNR to phase out the ocean-intercept fishery by 2005. In addition, a recreational aggregate creel limit of 10 American and hickory shad per person was implemented in all state waters, except for the Santee River in which a 20 fish creel limit was set.

Proposed restrictions in this document, to address sustainability, will be the first changes in SC's shad fishery since the closure of the ocean-intercept fishery in 2005. These changes (Appendix 3), in concert with changes required by the National Marine Fisheries Service (NMFS) to account for by-catch of sturgeon (Appendix 2), without a doubt, far exceed by a wide margin, any restrictions imposed on SC's shad fishery to date.

Brief description – Current status of the stocks:

a) Landings:

South Carolina has monitored commercial fisheries for American shad within state waters since 1979. The NMFS landings data before 1979 were collected from major wholesale outlets located near the coast; therefore, it is likely that inland landings were not completely accounted for in these years, since many shad fishermen claim not to sell their catch and keep it for personal consumption. No landings were attributed to the South Carolina ocean-intercept fishery before 1979. SCDNR has landings by system since 1979 for the Atlantic Ocean (i.e., the ocean-intercept fishery), Winyah Bay, Waccamaw River, Pee Dee River, Black River, Santee River, Cooper River, Edisto River, Combahee River, and Savannah River. These data were used in the 2007 shad stock assessment by SC and ASMFC. Data collected since 1979 generally include inland landings and should be considered as a separate time series.

There are some discrepancies between SCDNR and NMFS American shad landings. One reason for this is that NMFS uses dealer landings reports for their records; however, many shad fishermen claim not to sell their catch and keep it for personal consumption.

The Cooper River supports an active recreational fishery below the Pinopolis Dam tailrace in the late winter to early spring. SCDNR has conducted a creel survey from 2001 to 2005 to estimate exploitation and catch-per-effort in this recreational fishery. SCDNR also conducted sportfishing creel surveys on the Cooper and Santee Rivers from 1981 to 1982 and 1991 to 1993 in order to evaluate the impact of the Rediversion Canal on these rivers' recreational fisheries (Cooke and Chappellear 1994). These surveys examine the total recreational fisheries on each river for each study period.

Recreational creel surveys were conducted on the Savannah River in the late 1990s by GADNR (1997) and SCDNR (1998 and 1999). Estimates of catch from these surveys varied from year to year largely due to dramatically different flow conditions, as 1998 was a "flood" year and 1999 a "drought" year. Catch estimates from each of these creel surveys are available in Boltin (1999); however, the year-to-year estimates were highly dependent on the impacts of the river flow on the recreational fishery. In 1997, no additional information on the flow was reported. Due to requirements of Amendment 3 to ASMFC's shad and river herring fishery management plan, SCDNR conducted creel surveys beginning in 2011.

b) Fishery Independent Indices:

Spawning stock:

Fishery-independent CPUE data were collected using 12.7 mm stretch mesh drift gill nets for the years 1994 - 2011. In the past, as approved by Amendment 1 of ASMFC's shad and river herring fishery management plan (FMP), these studies rotated among rivers and ran 2 to 5 years per river before changing river systems. However, due to growing concern for the species, SCDNR began conducting this monitoring on multiple rivers during the season. During these studies, SCDNR has collected biological information to support other studies (e.g., age, repeat spawning, length and weight data).

Juvenile Surveys:

Trawl sampling studies were conducted for juvenile American shad in the fall of 1985 in the Edisto River and Winyah Bay using 4.9 and 7.6 m otter trawls. Sampling in the Edisto River occurred from September through November with 32 trawls that caught two American shad. Winyah Bay sampling took place October and November. Nineteen trawls over five stations yielded three American shad. Data were also collected from another SCDNR trawl project in the Santee River where 15 juvenile American shad and 30 juvenile blueback herring were collected. These programs were discontinued after a single sampling season. However, due to growing concerns to prove sustainability, SCDNR began yearly sampling for YOY in 2009 in some systems and 2010 in others. In addition, YOY sampling occurred as part of yet another SCDNR study in 2008.

c) Fishery Dependent Indices:

Historical commercial shad landings from NMFS² are available for South Carolina back to 1880 with the highest reported landings occurring in 1896 (304,819 kg). NMFS reporting agents compiled landings recorded before 1979. Landings data are available for 11 years between 1880 and 1926 with a range of 94,349 to 304,819 kg and a mean of 188,615 kg. Beginning in 1927, a continuous data stream of landings is available to the present, except for the 1940s (WWII). Landings generally declined from the late 1800s throughout the twentieth century reaching a low in the 1970s, with annual landings averaging 16,477 kg from 1973 to 1976.

With the onset of mandatory reporting in 1998, South Carolina shad fishermen were required to report effort and landings data. However, some questions regarding the integrity of the reports, irregular or infrequent fishing by license holders, and year-to-year variability in river-wide records have not permitted complete development of total catch and effort statistics by river; although in recent years, SCDNR has made efforts to gather more accurate data. In 2000, 2,727 commercial shad fishing trips were reported to SCDNR. The number of reported trips generally decreased from 2000 to 2005 with 2,132 trips taken in 2005, the first year of the closure of the ocean-intercept fishery. Nearly all fishermen (>95%) have submitted at least one monthly report since 2000, while only 60 to 70 percent report some catch (SCDNR records). It is likely that the ocean-intercept fishery closure in 2005 contributed to the decrease in landings from the 2004 amount of 170,212 kg. The total number of shad trips in South Carolina decreased from 2,384 in 2004 to 2,132 in 2005. Winyah Bay complex (including trips from Winyah Bay, Waccamaw River, Pee Dee River, and Black River) shad trips decreased from 1040 in 2004 to 998 in 2005. The decrease in Winyah Bay Complex trips was driven by a decrease in trips in Winyah Bay trips (144 to 106) and Waccamaw River trips (339 to 189), but buffered by an increase in trips in the Pee Dee River from 523 to 672 trips.

With the closing of the ocean-intercept fishery in 2005, the Santee River and Winyah Bay now constitute the largest remaining commercial shad fisheries in South Carolina with Santee River landings comprising 58 percent and Winyah Bay landings 38 percent of the 2005 statewide total. In 2005, shad trips in Winyah Bay complex and Santee River accounted for 49 percent and 27 percent of the total shad trips, respectively.

d) Other: none

e) Fisheries to be Closed (Commercial and Recreational):

- a. Waccamaw River (Bull Creek to North Carolina border)
- b. Black River
- c. Ashley River
- d. Charleston Harbor
- e. Wando River
- f. Ashepoo River

Fisheries requested to be Open (Commercial and Recreational):

- a. Pee Dee River run (Winyah Bay, Waccamaw, and Pee Dee River)
- b. Santee Cooper System
- c. Edisto River
- d. Combahee River
- e. Savannah River

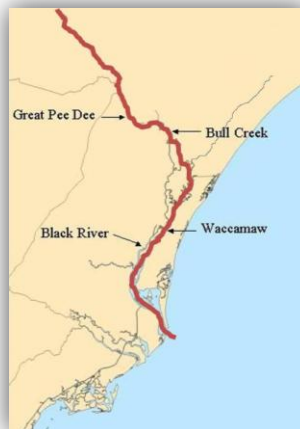
f) Sustainability

Systems with a sustainable fishery are defined as those that demonstrate their shad stocks could support a commercial and / or recreational fishery that will not diminish potential future stock reproduction and recruitment. Data used, in most cases, are landings that occurred since the 2007 stock assessment (i.e. after 2004). Sustainability for SC rivers is determined by catch trends (both using fishery-independent and fishery-dependent data), juvenile abundance, and in some cases, fish passage counts at dams. In addition to these, SC will propose a number of gear restrictions, cap limits, and changes to the legal fishing season. Furthermore, in response to the National Marine Fisheries Service (NMFS), SC is required to limit by-catch of sturgeon in the shad fishery. To accomplish this, additional statewide gear restrictions will be implemented (Appendix 2). These restrictions, while helping to limit by-catch of Atlantic and shortnose sturgeon, will no doubt lead to more protection for adult shad during spawning runs. In most cases, sustainability targets have been developed by using fishery-dependent data (landings) and/or fishery-independent data collected since the last year of data included in the stock assessment. The sustainability targets were developed using 75% of the annual mean of CPUE's for the last 10 years.

Pee-Dee River Run (Winyah Bay, Waccamaw to Bull Creek, and Pee Dee River)

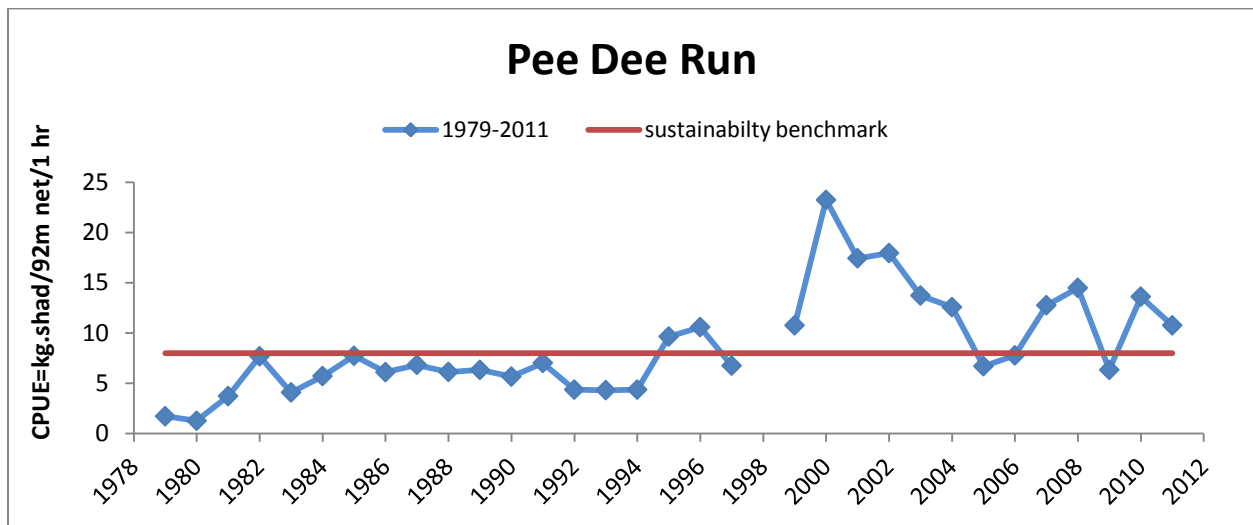
In order for American shad to enter the Pee Dee River, they must first swim through the Winyah Bay and parts of the Waccamaw River. Therefore, SCDNR will refer to this as the Pee Dee River Run of shad. There is little doubt some shad continue up the Sampit, Black, and Waccamaw Rivers, but those rivers/river segments are not being considered in the sustainability option and will therefore be closed to fishing (Figure 2).

Figure 2. Map of the Winyah Bay system highlighting the “Pee Dee run” of shad



SCDNR will use both fishery-independent and fishery-dependent data to justify the continued existence of this fishery. The 2007 stock assessment concluded “that, overall, these shad stocks have remained stable or increased slightly since the late 1970s.” More recent catch rates (kilogram of shad captured in a 92m. net fished for one hour) also indicate a stable and slightly increasing trend (Figure 3). In fact, during the 2011 fishing season, fisheries were suspended twice for two weeks at a time, due to the excess of shad at the local fish markets. SCDNR conducted fishery-independent sampling, during the 2011 season, in the Waccamaw River using a 92m. floating/drift gill net with 12.7 cm. stretch mesh. Catch rates (CPUE=kg. of shad/92m. net/1 hr.) for this year were 5.86. This is comparable to past years sampling in this river (2005 CPUE= 7.17). SCDNR will continue this sampling on an annual basis.

Figure 3. Commercial catch per unit effort (kg. fish per 92-m net hr) of American shad and sustainability target for the Pee Dee run



Beginning in 2010, SCDNR also collected YOY shad from this system during the summer outmigration. Shad with lengths ranging from 77-137mm were collected using electro-fishing gear. Catch rates (CPUE=number of shad caught per hour) were equal to 31.28. This was also somewhat comparable to efforts from another SCDNR survey conducted in 2008 which yielded a CPUE of 47 for American shad. However, during this study, more sites were used over a broader reach of river during this project and unfortunately, due to ongoing budget cuts, sampling for this project was discontinued. However, YOY sampling is consistent with results from 2010 and will continue on an annual basis.

SC requests to maintain this fishery at current levels with annual monitoring to occur as mentioned. The Pee Dee run is considered by SCDNR to be sustainable at current levels and with coming regulations changes (NMFS by-catch of sturgeon), migrating shad should receive additional protection which will only help the sustainability argument. The sustainability benchmark of 8.0 was developed by using 75% of the annual mean for CPUE's for the last ten years. If CPUE's fall below the sustainability target for three consecutive years management action will be taken. Potential management actions are gear restrictions, season changes, catch limits, or closure. Because SCDNR has just begun to conduct juvenile

sampling in this system, additional data will need to be collected before a benchmark will be identified. This should occur once multiple years of data have been collected and analyzed.

Black River

SC will close this fishery due to declining catches and the inability to demonstrate this river can support recreational / commercial fisheries for shad.

Waccamaw River (From Bull Creek to the North Carolina border)

SC will close this fishery due to declining catches and the inability to demonstrate this river can support recreational / commercial fisheries for shad.

Sampit River

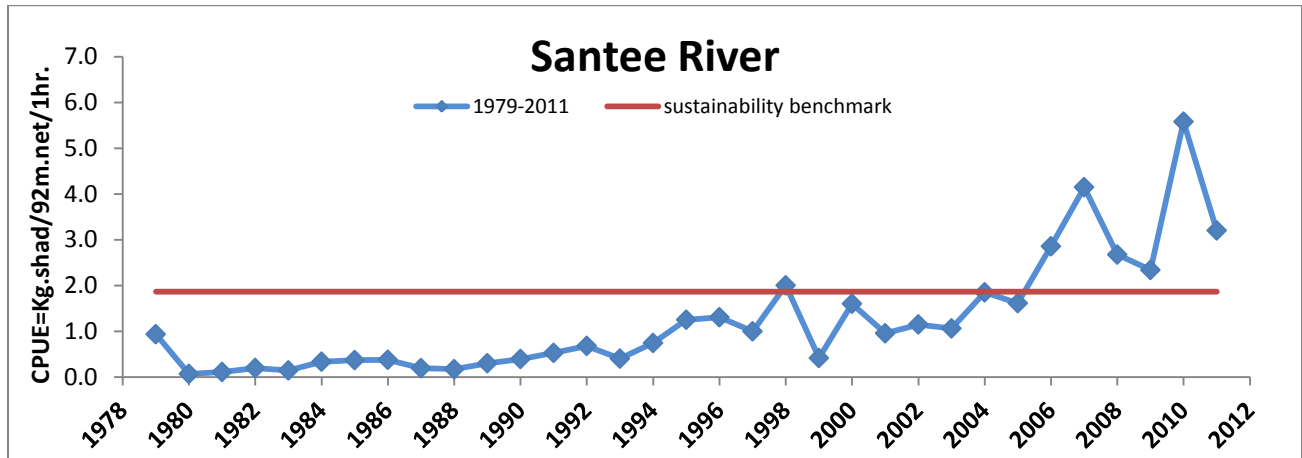
SC will close this fishery due to declining catches and the inability to demonstrate this river can support recreational / commercial fisheries for shad.

Santee Cooper System

Santee River

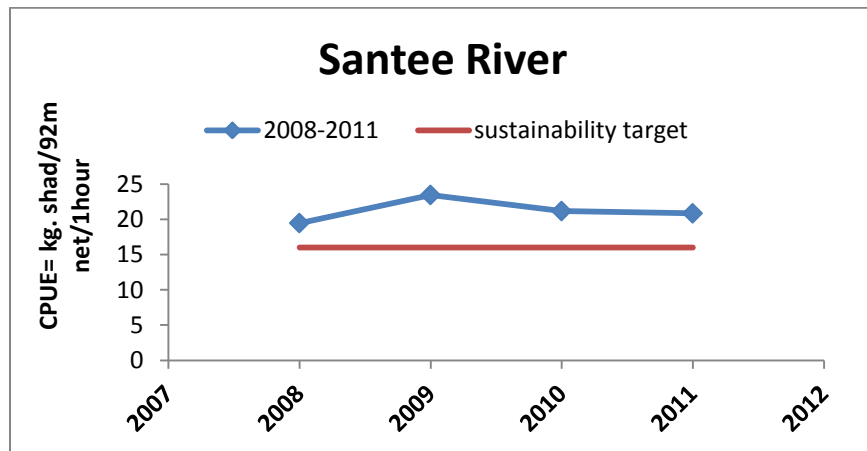
SCDNR has both fishery-independent and fishery-dependent data to justify the continued existence of this fishery. The 2007 stock assessment concluded “that the Santee River American shad stock in the Santee River benefited greatly from the Rediversion project.” Catch rates (CPUE), used in the assessment, indicated a stable if not increasing trend. More recent CPUE (kg. of shad captured in a 92m. net fished for one hour) data suggest that those trends continue (Figure 4). As mentioned earlier, during the 2011 fishing season, fisheries were suspended twice for two weeks at a time, due to the excess of shad at the local fish markets.

Figure 4. Commercial catch per unit effort (kg. fish per 92-m net hr) of American shad and sustainability target for the Santee River



SCDNR also conducted fishery-independent sampling, during the 2011 season, in the Santee River using a 92m. floating/drift gill net with 12.7 stretch mesh. Catch rates (CPUE=kg. of shad/92m. net/1 hr.) for this year were 20.86. This is comparable to past years sampling in this river (2008 CPUE= 19.48, 2009 CPUE=23.49, 2010 CPUE=21.19) (Figure 5).

Figure 5. Fishery-independent catch per unit effort (kg. fish per 92-m net hr) of American shad and sustainability target for the Santee River



SCDNR also operates a fish passage facility on the Rediversion canal (part of the Santee River System). The St. Stephen fish lock has been operational for shad passage since 1988; here, passing fish are enumerated as they pass by the viewing windows. Since 1988, passage at the facility and has averaged 257,440 shad per year (Table 1). The fish lock is operated upstream of all commercial and recreational shad fishing, therefore any shad that make it to the fish lock, and are passed, are allowed to continue upriver to spawn. The reported commercial harvest's effects on the spawning stock (exploitation rate) since mandatory reports were instituted (1998) averages 18.3% for all years (Table 2). Meaning, at very

least, regulations in place allow for, on average, ~84% escapement for shad and that figure is based on a minimum population estimate (Figure 6). Minimum population, for this purpose, equals commercial harvest plus annual passage. However, it does not account for numbers of shad that chose to migrate up the Santee River proper and avoid the Rediversion canal or the large numbers of shad that simply do not pass through St. Stephen fish lift, so this number should be considered very conservative. SCDNR will continue this sampling on an annual basis.

Table 1. Annual American shad passage at St. Stephen fish lock

Year	# of Am. shad passed
1988	10,000
1989	27,000
1990	81,000
1991	176,000
1992	147,000
1993	159,000
1994	212,000
1995	445,000
1996	477,047
1997	387,755
1998	543,681
1999	306,493
2000	592,321
2001	165,875
2002	140,398
2003	298,902
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2005	215,428
2006	283,225
2007	328,197
2008	29,002
2009	398,197
2010	346,879
2011	262,961

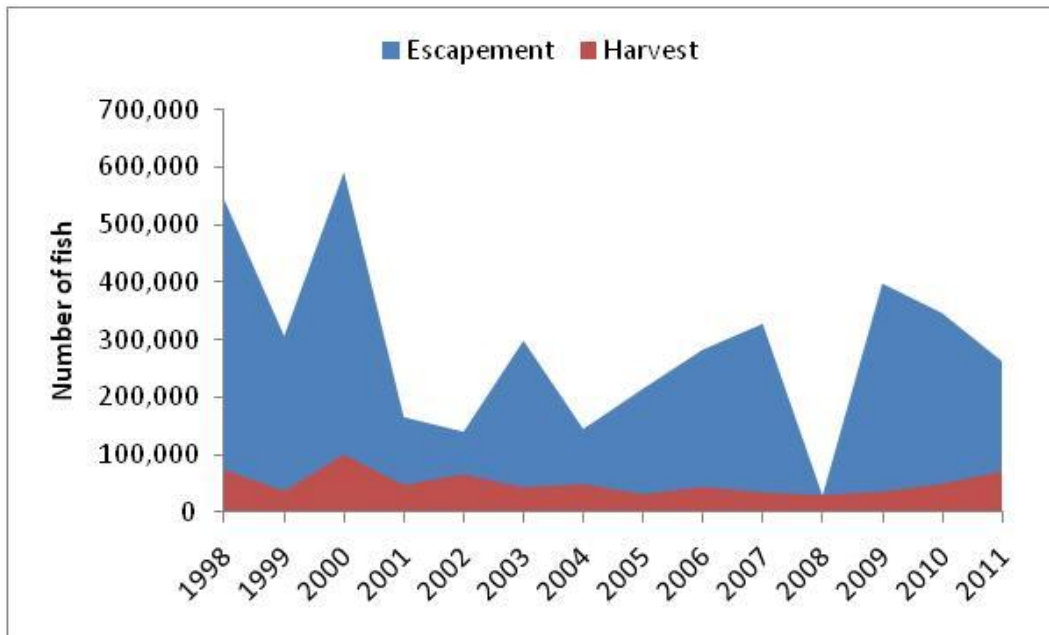
Note: 2008 was a year of extreme drought and the fish lock was inoperable during most of the shad season.

Table 2. Annual exploitation rate of Santee River commercial shad fishery on the population

	<u>Com. catch</u>	<u>Passage</u>	<u>Min. pop.</u>	<u>%exploitation</u>
1998	73,132	543,681	616,813	11.9
1999	36,866	306,493	343,359	10.7
2000	99,216	592,321	691,537	14.3
2001	47,215	165,875	213,090	22.2
2002	65,470	140,398	205,868	31.8
2003	42,984	298,902	341,886	12.6
2004	48,621	145,201	193,822	25.1
2005	31,206	215,428	246,634	12.7
2006	43,721	283,225	326,946	13.4
2007	34,353	328,197	362,550	9.5
2008	30,003	29,002	59,005	50.8
2009	35,640	398,197	433,837	8.2
2010	49,083	346,879	395,962	12.4
2011	70,722	262,961	333,683	21.2

Note: 2008 was a year of extreme drought and the fish lock was inoperable during most of the shad season.

Figure 6. Annual commercial harvest and escapement for the Santee River Fishery



Note: 2008 was a year of extreme drought and the fish lock was inoperable during most of the shad season.

Beginning in 2009, as part of another study to assess juvenile recruitment in the Santee Cooper Lakes system, SCDNR also collected YOY shad from this system,. Sampling was also conducted during the summer outmigration while using electro-fishing gear. 2010 catch rates (CPUE=number of shad caught per minute) were equal to 0.57 for the upper Santee River and 0.92 for the Congaree River. These results are consistent with those from the 2009 sampling effort that yielded CPUE's of .37 and .97 for the upper Santee River and Congaree Rivers respectfully. This project is scheduled to continue for at least 8 more years, with the possibility of being extended. SCDNR will continue to collect juvenile shad abundance information until funding for this project ends.

SC requests to maintain the Santee River fishery at current levels with annual monitoring to occur as mentioned. This run is considered by SCDNR to be sustainable at current levels and with coming regulations changes (NMFS by-catch of sturgeon), migrating shad should receive additional protection which will only help the sustainability argument. SC proposes that a catch rate sustainability benchmark of 1.8 (kg. of shad/92m net fished for 1 hr.) be used to manage the Santee River commercial shad fishery. In addition, fishery-independent sampling catch rates (CPUE) for the Santee River must not fall below 11.4. These sustainability benchmarks were developed by using 75% of the annual mean for CPUE's for the last ten years or in the case for the fishery independent data all available data. If catch rates or CPUE's fall below the sustainability targets for three consecutive years management action will be taken. Potential management actions are gear restrictions, season changes, catch limits, or closure. Because SCDNR has just begun to conduct juvenile sampling in this system and escapement for adults is high these data will not be used at this time to support sustainability. However, as data are collected in coming years, a sustainability benchmark will be identified.

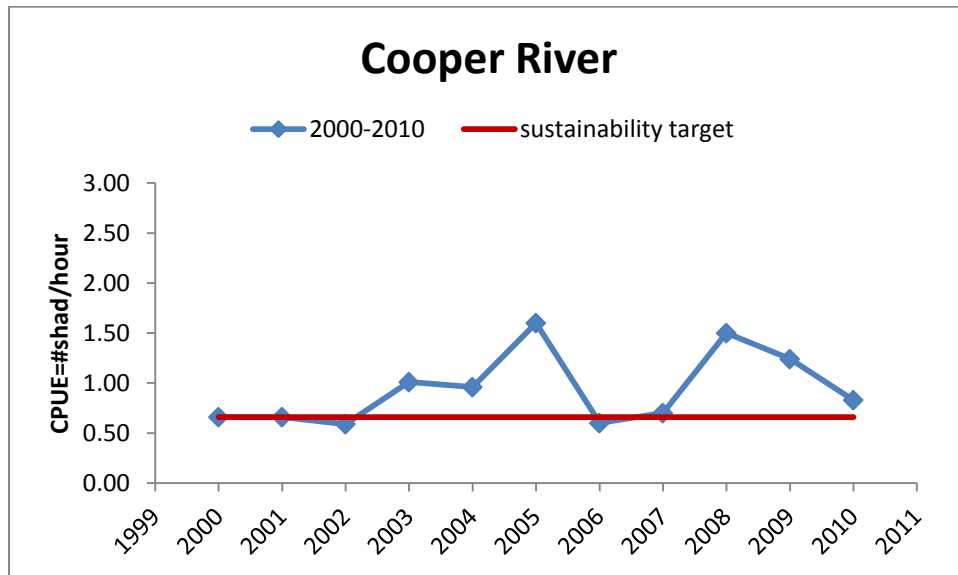
Cooper River

No commercial fisheries exist on the Cooper River by SC regulation. However, there is a recreational fishery that exists below Pinopolis Dam. SCDNR conducts annual creel surveys to assess catch rates in this fishery. The Cooper River fishery is concentrated near Pinopolis Dam from the sanctuary line (0.2 km downstream of the dam) to about one km downstream of the dam. Since the fishery season is relatively short (about two months) effort and catch-per-unit-effort were estimated daily to increase precision. Data collection, consisting of either angler surveys, effort estimates, or both were conducted for virtually all days during each year's study period, which was defined subjectively by angler presence and manpower availability. During survey periods, a creel clerk interviewed shad fishermen as they landed their boats. An average of 6 hours of survey periods were conducted during daylight hours. Creels took place during these time periods; because it was determined these were times when the most effort was being exhibited. Effort estimates consisted of counting boats in the fishery, which is virtually entirely visible from Pinopolis Dam, several times daily; this estimate assumed that the maximum daily count equals total daily effort. Catch rate (CPUE=#shad caught in 1 hour) data from these surveys has been collected, beginning in 2000, and is used to manage the fishery. CPUE for 2010 equaled .83, this is consistent with previous years (Figure 7).

SC requests to maintain this fishery at current levels with annual monitoring to occur as mentioned. The Cooper River run is considered by SCDNR to be sustainable at current levels. SC proposes that an sustainability CPUE benchmark of .66 (75% of the annual mean of CPUEs for all years) be used to manage the Cooper River recreational shad fishery. If CPUE for Cooper River recreational fishery fall

below .66, three consecutive years, changes by SCDNR to the recreational regulations will be considered. Potential management actions are gear restrictions, season changes, catch limits, or closure.

Figure 7. Annual catch per unit effort (number of shad per hour hr) and sustainability target for the Cooper River recreational shad fishery



Charleston Harbor

SC will close this fishery due to declining catches and the inability to demonstrate this river can support recreational / commercial fisheries for shad.

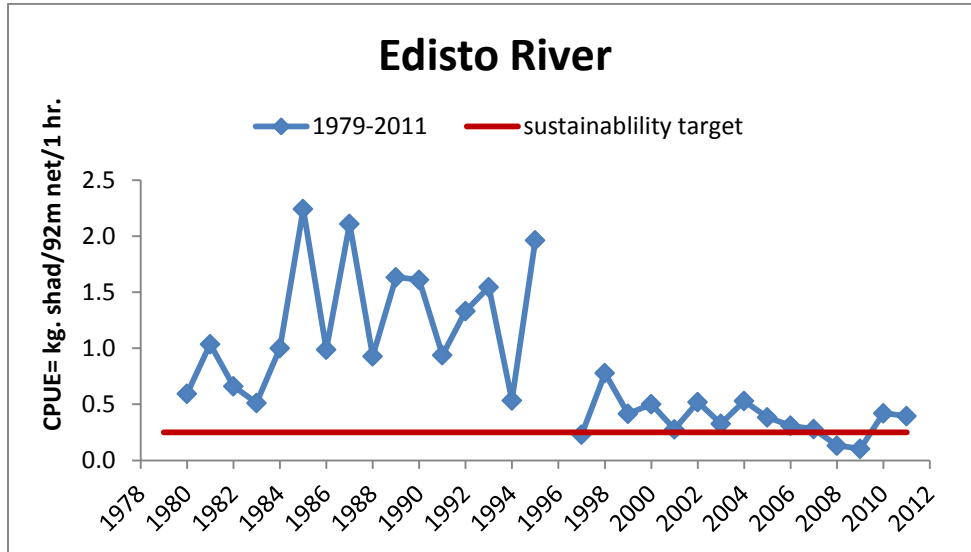
Ashley River

SC will close this fishery due to declining catches and the inability to demonstrate this river can support recreational / commercial fisheries for shad.

Edisto River

The 2007 stock assessment concluded “that recent estimates of commercial CPUE have been very low for the Edisto River for time series (1979 to 2005) and average for 13 of the last 15 years, but have rebounded a bit since 1997.” More recent CPUE (kg. of shad captured in a 92m. net fished for one hour) data suggest that while catches are low, they remain consistent (Figure 8). In addition, the ACE Basin Rivers (Ashepoo, Combahee, and Edisto) have been under “drought” conditions for the majority of recent years. In fact, the average flow during those years was 1453 cfs. This is extremely low considering in “normal” years, flows are ~ 4,500 cfs. Also, the Edisto River is SC’s longest undammed river and flows pale in comparison with flows from the Santee River (5912 cfs) or Pee Dee River (11,267 cfs) for the same time series.

Figure 8. Commercial catch per unit effort (kg. fish per 92-m net hr) of American shad and sustainability target for the Edisto River



SCDNR collected fishery-independent data only for the years for years 1994-1998. During these years, shad were captured using a 92m. floating/drift gill net with 12.7 stretch mesh. Catch rates (CPUE=kg. of shad/92m. net/1 hr.) remained relatively consistent for these years. SCDNR tried to duplicate this effort in 2006 and 2007. Unfortunately, due to copious incidental catches of Longnose gar (*Lepisosteus oseus*), sampling was discontinued. These fish were encountered at each sampling trip which made catching shad problematic. When numerous gar became entangled, the net became very inefficient. The average catch rate for gar for the sampling period was 4.86 fish per 92 m net per hour.

Adult sampling

As part of another study, SCDNR has fishery-independent data for adult and juvenile shad. Fish were collected using electro-fishing gear in 2009-2011 as part of a trial stock enhancement study. Adult shad were captured during the spring spawning migration to be used as broodstock for propagation. This is especially problematic as there is no congregation point (i.e. dam) where shad could be collected in mass. However, it was determined that shad could be collected by sampling one stretch of river with some efficiency. Results yielded 167 shad in 2010 and 117 in 2011. Catch rates (CPUE= # shad captured/ minute) were equal to .030 in 2010 and .055 in 2011. This study has ended, but USFWS has committed to continue sampling on an annual basis. Although, this is subject to change pending further agency wide budget cuts.

Juvenile sampling

In an effort to collect juvenile indices and, in later years, to assess hatchery contribution, sampling to capture YOY shad during outmigration were initiated. In 2008, bottom trawls, mid-water trawls, and electro-fishing gears were selected gear used to capture juvenile shad. Bottom trawl sampling using a 4.3 m otter trawl with 0.6 cm cod end mesh was used in 2008 with little success, so it was not used in 2009.

Due to timing and logistical issues, a mid-water trawl rather than electro-fishing gear was used in the Edisto River in 2009 with limited success. Forty-one sets yielded a total of 1 juvenile shad, this proved to not be the most efficient gear type, so it was not used in 2010. Electro-fishing gear only was used in 2010 with better results. Therefore, in future years to maximize catch, SCDNR will standardize sampling using this gear type. By using electro-fishing gear in 2010, 601 YOY shad were captured. Catch rates (CPUE=number of shad caught per minute) were equal to 0.27 for Edisto River. As mentioned earlier, SCDNR or USFWS will continue to collect juvenile shad abundance information on an annual basis. By using CPUE data, SC should be able to, at very least, have a continuous trend of juvenile abundance in the Edisto River. Whether that correlates to adult year class strength is yet to be determined.

SC believes sufficient data to determine whether or not the Edisto River has sustainable fisheries may not be available at this time. However, current snapshot data indicates, at least in more recent years, it may be sustainable at lower levels. Nevertheless, SCDNR will continue yearly sampling mentioned above, but also proposes significant changes to the recreational and commercial fishery regulations for the Edisto River (Appendix 3).

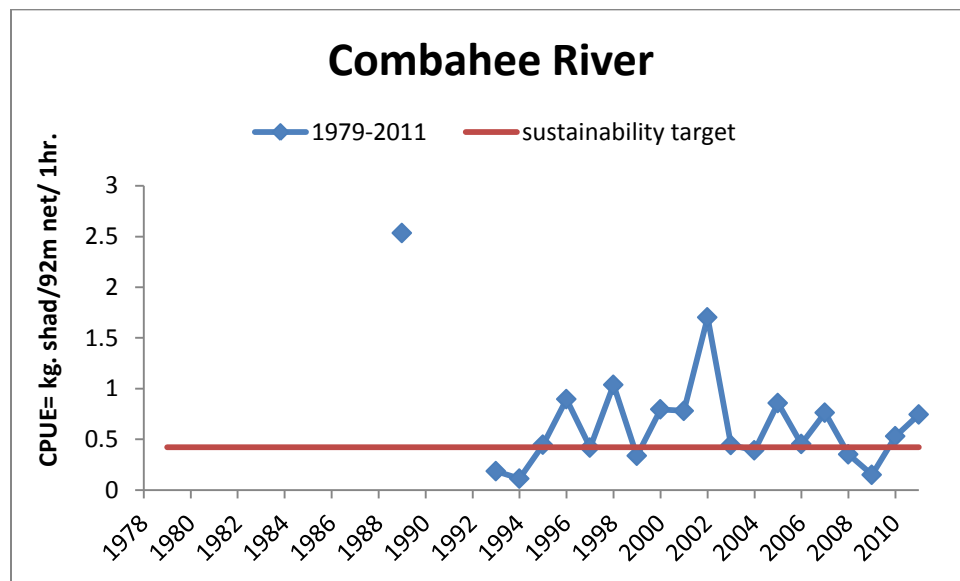
SC requests to maintain this fishery at reduced levels with annual monitoring to occur as mentioned. The Edisto River run of shad is considered by SCDNR to be sustainable at lower levels in combination with pending regulation changes (NMFS by-catch of sturgeon), migrating shad should receive additional protection which will only help the sustainability argument. If catch rates (CPUE= kg. of shad/ 92m net fished for 1 hr.) for the Edisto River run commercial fishery fall below 0.25 three consecutive years, changes by SCDNR to the commercial regulations will be implemented. This sustainability benchmark was developed by using 75% of the annual mean for CPUE's for the last ten years. Potential management actions are gear restrictions, season changes, catch limits, or closure. Because SCDNR has just begun to conduct juvenile sampling in this system, and additional data will need to be collected before a benchmark will be identified. This should occur once multiple years of data have been collected and analyzed.

Regulatory changes in 1993 and 2000 mentioned earlier greatly affected fishing effort and gear used in the ACE Basin (Ashepoo, Combahee, and Edisto) rivers. These changes may be responsible for the perceived increase in catch rates in recent years. In any event, SC believes current restrictions coupled with these proposed regulatory changes (shortening the season, cutting allowable nets by 80%, restrictions on recreational netters gear, reducing the recreational anglers limit by 50%, and ultimately capping the fishery at current levels) and in combination with those required statewide by NMFS for the incidental by-catch of sturgeon, will provide adequate protection for spawning shad for years to come.

Combahee River

The 2007 stock assessment concluded “This relatively small river is perceived to have undergone significant American shad stock declines over the past 25 years.” More recent CPUE (kg. of shad captured in a 92m. net fished for one hour) data (2006-2011) suggest that while catches are low, they remain consistent and appear to be increasing in the most recent years (Figure 9). Currently, the Combahee commercial shad fishery consists of only 2 fishermen and neither fisherman depends on their catch to make a living. In addition, the ACE Basin Rivers (Ashepoo, Combahee, and Edisto) have been under “drought” conditions for the majority of recent years. In fact, the average flow during those years was 182 cfs. This is extremely low considering in “normal” years, flows are ~ 600 cfs. Also, the Combahee River is an undammed river and flows pale in comparison with those from the Santee River (5912 cfs) or Pee Dee River (11,267 cfs) for the same time series.

Figure 9. Commercial catch per unit effort (kg. fish per 92-m net hr) of American shad and sustainability target for the Combahee River



SCDNR collected fishery-independent data for the years 1993 and 1999. During these years, shad were captured using a 92m. floating/drift gill net with 12.7 stretch mesh. Catch rates (CPUE=kg. of shad/92m. net/1 hr.) were .27 for 1993 and 0.21 in 1999. Like the Edisto sampling, copious incidental catches of Longnose gar (*Lepisosteus oseus*), led to the termination of sampling efforts. These fish were encountered at each sampling trip which made catching shad problematic. When numerous gar became entangled, the net became very inefficient for catching shad.

SC believes sufficient data to determine whether or not the Combahee River has sustainable fisheries may not be available at this time. However, current snapshot data indicates, at least in more recent years, it may be sustainable at lower levels. Nevertheless, SCDNR will continue to collect data mentioned above,

but also proposes significant changes to the recreational and commercial fishery regulations for the Combahee River (Appendix 3).

SC requests to maintain this fishery at reduced levels. The Combahee River run of shad is considered by SCDNR to be sustainable at lower levels and with coming regulations changes (NMFS by-catch of sturgeon), migrating shad should receive additional protection. If catch rates (CPUE= kg. of shad/ 92m net fished for 1 hr.) for the Combahee River run commercial fishery fall below 0.48 three consecutive years, changes by SCDNR to the commercial regulations will be implemented. This sustainability benchmark was developed by using 75% of the annual mean for CPUE's for the last ten years. Potential management actions are gear restrictions, season changes, catch limits, or closure.

Regulatory changes in 1993 and 2000, mentioned earlier, greatly affected fishing effort and gear used in the ACE Basin (Ashepoo, Combahee, and Edisto) rivers. These changes may be responsible for the perceived increase in catch rates in recent years. In any event, SC believes current restrictions coupled with these proposed regulatory changes (shortening the season, cutting allowable nets by 90%, restrictions on recreational netters gear, reducing the recreational anglers limit by 50%, and ultimately capping the fishery at current levels) and in combination with those required statewide by NMFS for the incidental by-catch of sturgeon, will provide adequate protection for spawning shad for years to come.

Savannah River

Because the Savannah River occurs in both SC and GA and as part of new ASMFC mandates required in Amendment 3 to the shad and river herring fishery management plan, annual shad monitoring for this system is a cooperative effort between SCDNR and GADNR. Combined, fishery-independent and fishery-dependent data are available to justify the continued existence of this fishery. The 2007 stock assessment concluded "Over the past century, the magnitude of shad landings from the Savannah River has declined tenfold although the CPUE data available since 1979 indicates some stability in the current level of exploitation at a level much reduced compared to historical production." Catch rates (CPUE), used in the assessment, indicated a stable trend. More recent CPUE (kg. of shad captured in a 92m. net fished for one hour) data from SC suggest that those trends continue (Figure 10). Catch rates for GA fishermen are available, but due to confidentiality agreements, are not supplied in this document. However, between the years 2001-2011, fishermen caught no fewer than 25kg of shad per trip.

During the 2010 and 2011 seasons, GADNR conducted fishery-independent sampling for adult American shad in the Savannah River at the New Savannah Bluff Lock and Dam (NSBL&D), near Augusta, GA. Shad were collected during their spawning migration (March, April, and May) using electro-fishing gear. Catch rates (CPUE= # of shad/hour) for this year were 321.19. This is consistent with CPUE's of 269.5 that were observed in 2010. This sampling will continue on an annual basis to better assess the abundance of spawning stocks in the Savannah River.

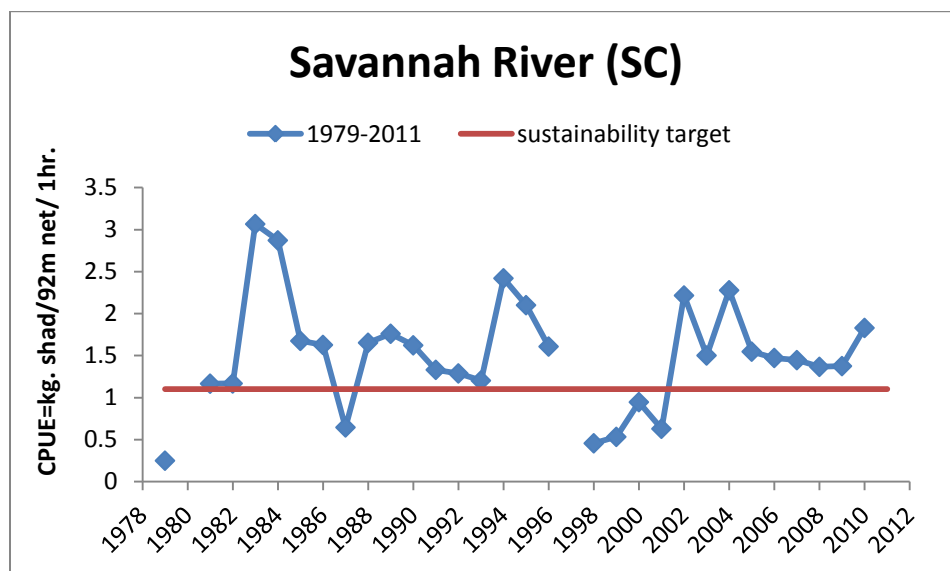
Beginning in 2010, GADNR also collected young of the year (YOY) shad from the Savannah River. Sampling was conducted during the summer outmigration using a 50ft. bag seine net with 1/8 mesh. Nets were hauled at 7 distinct sites from river kilometer (RKM) 33-191, leading to a catch rate (CPUE= # shad/haul) of 4.23. This sampling will continue on an annual basis, however, it is not yet known if this is

the best indicator of shad abundance in the Savannah River. Beginning in 2011, SCDNR will supplement YOY sampling in the Savannah River by using electro-fishing gear to enhance sampling efforts and be more consistent with current sampling techniques, already in use, in other SC rivers.

SCDNR also conducted a creel survey of recreational fishermen, at NSBL&D in 2011. Sampling was structured similarly to the Pinopolis Dam creel on the Cooper River, SC. However, due to logistical problems, staff was unable to start the creel until well into the shad season. This, unfortunately, led to incomplete angler catch data for the 2011 season. Creel sampling is planned to continue on an annual basis, although it may be reconsidered or even discontinued, based on the opinion of ASMFC

SC and GA request to maintain this fishery at current levels with annual monitoring to occur as mentioned. The Savannah River run is considered by SCDNR and GADNR to be sustainable at current levels and with coming regulations changes (NMFS by-catch of sturgeon), migrating shad should receive additional protection, which will only help the sustainability argument. Before the 2011 season, GA implemented new regulations that moved the upper commercial boundary downstream approximately 103 rkm. SC is currently evaluating a similar regulation. SC proposes that a sustainability benchmark for CPUE (kg. shad/92m. net/fished for 1 hr.) of 1.87 be used to manage the Savannah River shad fishery. GA proposes that a sustainability benchmark for CPUE (Kg. shad/trip) of 25.5 be used to manage the Savannah River shad fishery. If either SC or GA falls below the proposed benchmark three consecutive years, changes by SCDNR and GADNR commercial regulations will be considered. These sustainability benchmarks were developed by using 75% of the annual mean for CPUE's for the last ten years, or in GA's case, all available data. Potential management actions are gear restrictions, season changes, catch limits, or closure. Because SCDNR and GADNR have just begun to conduct adult and juvenile fishery-independent sampling in this system, these data sets will not be used at this time to define sustainability. However, as data are collected in coming years, sustainability benchmarks will be identified.

Figure 10. SC's annual commercial catch-per-unit-effort (CPUE) of American shad and sustainability target for the Savannah River



g) SCDNR will make changes in regulations identified in this document and present them to the SC General Assembly to hopefully meet the 2013 deadline.

h) Adaptive Management

SCDNR will continue to monitor fish passage, commercial fisheries, and recreational landings in SC rivers. In addition, fishery independent sampling to assess spawning adults and juvenile abundance will continue annually.

If collected data indicates changes in exploitation or decreasing abundance in juveniles, action will be taken by SCDNR. These actions may include increasing days for escapement, limiting seasons, etc. In the event these actions are not successful in reversing negative trends, SCDNR would then be forced to close those fisheries.

Several recommendations were included for SC as part of the stock assessment for American shad. They are highlighted in the following:

Commercial Landings and Effort

1. Increase compliance with mandatory catch and effort reporting from commercial fishery, particularly in the Santee River, Winyah Bay system, Savannah River, and Edisto River
2. Continue the “volunteer CPUE” series to compare with CPUE series developed from comprehensive mandatory reporting database
3. Input volunteer commercial catch and effort from field reports into digital format so raw data are available for future analysis
4. Collect age, length, weight, and spawning history information from shad caught in commercial fisheries in the Santee River, Winyah Bay system, Savannah River, and Edisto River
5. Age validation study of American shad from South Carolina rivers (especially, Santee River, Winyah Bay system, Savannah River, and Edisto River)

Tagging

1. Continue monitoring of river systems (Santee River, Waccamaw River and Edisto River) on rotating basis (yearly rather than a three year schedule)
2. Improve tagging study design (e.g., develop high-reward design, telemetry studies to get estimates of migration abortion, double tagging study to estimate tag loss, and tag-mortality study) to improve relative exploitation estimates
3. Conduct tagging studies for duration of shad migration and continue to collect effort information from sampling collections (e.g., soak time, net length, and mesh size) to permit development of CPUE calculations

Creel Surveys

1. Continue to conduct creel surveys in rivers with notable recreational fisheries (Savannah River and Cooper River); if necessary, conduct creel surveys on a rotating basis

Fish Passage

1. Develop species specific upstream and downstream passage efficiency at all rivers with priority given to Santee-Cooper system dams

2. Develop species specific counts at Pinopolis fish lock on the Cooper River

Juvenile Abundance Index

1. Investigate juvenile abundance on at least one river (e.g., Santee River, Waccamaw River, or Edisto River)

General

1. Collect environmental covariates (tidal stage, flood stage, flow rate, water temperature, cloud cover, water clarity, annual precipitation, etc.) to aid development of CPUE indices

SC has since implemented all suggested recommendations and in some cases exceeded them, with the exception of those at the Pinopolis fish lock. This dam is currently undergoing relicensing through FERC and a new fish counter is part of those discussions. Unfortunately, this process is likely headed towards litigation ever since NMFS came forth with a jeopardy finding in their draft biological opinion for shortnose sturgeon. Nevertheless, SC continues sampling as part of ASMFC/ACFCMA funded work or by utilizing other SCDNR funding sources. Furthermore, with the dissolution of Anadromous Fish Conservation Act funds, SCDNR was forced to be creative in order to meet requirements of Amendment 3. To complete all mandated goals annually, personnel from other areas and funding sources have been used. Once these funds expire it is anticipated SCDNR will simply not have adequate personnel to complete this work. Additionally, to date SCDNR has had ~60% cut from the operating budget and is expecting future cuts. If a reduction in force (RIF) is implemented and project personnel are affected, SCDNR will not be able to meet these requirements.

Literature Cited

ASMFC (Atlantic States Marine Fisheries Commission). 2007. American shad stock assessment peer review report. Washington, D.C.

Appendix 1.

Summary of 2011 South Carolina Shad Laws by Water or Fishery Area

A. Winyah Bay and Tributaries (includes Waccamaw, Great Pee Dee, Little Pee Dee, Lynches, Black and Sampit Rivers)

1) Pee Dee River and tributaries above Hwy. 701, Waccamaw River and tributaries above entrance of Big Bull Creek, and Black River above Co. Rd. 179

Open Season	Feb. 1 - Apr. 30
Weekly Open Period	Mon. Noon - Sat. Noon
Special Provisions	None
Gear Restrictions	As specified in general provisions
Hook & Line Gear	No season; 10-fish aggregate creel for American and hickory shad

2) Remainder of Winyah Bay system including Big Bull Creek and Sampit River

Open Season	Feb. 1 – Apr. 15
Weekly Open Period	Mon. Noon - Sat. Noon
Special Provisions	Drift gill-nets measuring not more 300 yards in length may be used between the Waccamaw River mouth and Butler Island
Gear Restrictions	As specified in general provisions
Hook & Line Gear	No season; 10-fish aggregate creel for American and hickory shad

B. Santee River

1) Rediversion Canal

Open Season	None - hook & line only
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Hook & Line Gear No season; 20-fish aggregate creel limit for American and hickory shad

2) Wilson Dam seaward to Hwy. 52

Open Season None - hook & line only

Hook & Line Gear No season; 20-fish aggregate creel limit for American and hickory shad

3) Hwy. 52 bridge seaward to Hwy. 41 bridge

Open Season Feb. 1 - Apr. 30

Weekly Open Period Tues. & Thurs., 7:00 AM - 7:00 PM

Gear Restrictions None

Hook & Line Gear No season; 20-fish aggregate creel limit for American and hickory shad

4) Hwy. 41 bridge seaward

Open Season Feb. 1 – Mar. 31

Weekly Open Period Mon. Noon - Sat. Noon

Gear Restrictions None

Hook & Line Gear No season; 20-fish aggregate creel limit for American and hickory shad

C. Charleston Harbor; Wando, Cooper & Ashley Rivers

1) Tailrace Canal from Wadboo Ck. to Pinopolis Dam

Open Season None - hook & line only

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

2) Cooper River from Wadboo Ck. to Hwy. 17

Open Season None - hook & line only

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

3) Ashley River to confluence with Popper Dam Ck. entrance

Open Season Feb. 1 - Mar. 31

Weekly Open Period Wed. Noon - Sat. Noon

Gear Restrictions Drift gill-nets only

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

4) Remainder of Charleston Harbor system

Open Season Feb. 1 - Mar. 31

Weekly Open Period Wed. Noon - Sat. Noon

Gear Restrictions Drift gill-nets only

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

D. Edisto River

1) Above U.S. Hwy. 17 bridge

Open Season Jan. 15 - Apr. 15

Weekly Open Period Tues. Noon - Sat. Noon

Gear Restrictions 5.5" minimum stretched mesh except minimum 4.5" allowed above Hwy. 15 (beginning in 2003, 5" minimum)

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

2) Seaward of U.S. Hwy. 17

Open Season Jan. 15 - Mar. 31

Weekly Open Period Wed. Noon - Fri. Midnight

Special Provisions None

Gear Restrictions None

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

E. Ashepoo River

1) Above U.S. Hwy. 17 bridge

Open Season Feb. 1 - Mar. 31

Weekly Open Period Fri. Noon - Sat. Noon

Gear Restrictions None

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

2) Seaward of U.S. Hwy. 17

Open Season Feb. 1 - Mar. 31

Weekly Open Period Fri. Noon - Sat. Noon

Gear Restrictions None

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

F. Combahee River

1) All tributaries and distributaries

Open Season	None
Weekly Open Period	None
Hook & Line Gear	No season; 10-fish aggregate creel for American and hickory shad

2) Main river, including main stems of Salkehatchie Rivers

Open Season	Jan. 15 - Mar. 31
Weekly Open Period	Set Nets: Tues. Noon – Thurs. Noon Drift Nets: Mon. Noon - Sat. Noon
Gear Restrictions	None
Hook & Line Gear	No season; 10-fish aggregate creel for American and hickory shad

G. Coosawhatchie River and all tributaries and distributaries

Open Season	None
Weekly Open Period	None
Hook & Line Gear	No season; 10-fish aggregate creel for American and hickory shad

H. Savannah River within South Carolina jurisdiction

1) Above (inland of) U.S. Hwy. I-95 bridge

Open Season	Jan. 1 - Apr. 15
Weekly Open Period	Wed. 7:00 AM - Sat. 7:00 PM
Special Provisions	No open season from confluence of Spirit Creek to New Savannah Bluff Lock & Dam; all tributaries closed

Gear Restrictions None

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

2) Main river seaward of U.S. Hwy. I-95 bridge

Open Season Jan. 1 - Mar. 31

Weekly Open Period Wed. 7:00 AM – Sat. 7:00 PM

Special Provisions Nets prohibited in Savannah's Back River & north channel downriver from New Savannah Cut

Gear Restrictions None

Hook & Line Gear No season; 10-fish aggregate creel for American and hickory shad

J. Lake Moultrie, Lake Marion, Diversion Canal, Intake Canal of Rediversion Canal and all tributaries and distributaries thereto

Open Season None

Weekly Open Period None

Gear Restrictions Cast net, lift net, and hook & line only

Special Provisions Daily limit of 250 pounds of herring and shad combined for cast and lift nets

Hook & Line Gear No season; 10-fish aggregate creel for American and Hickory shad

K. General provisions

1) Gill-net marking/identification

a) All inland saltwaters

20" minimum diameter international orange buoys on each end of all nets; one such buoy must bear name and license number of owner; nets longer than 100 yards must have international orange buoy at least 10" in diameter along float line every 300 ft. Individual nets may not exceed 300 yards in length.

b) All freshwaters

6" minimum diameter international orange buoys on each end of all nets; one such buoy must bear name and license number of owner; nets longer than 100 yards must have international orange buoy at least 6" in diameter along float line every 300 ft. Individual nets may not exceed 200 yards in length.

2) Fishing gill-nets near the mouth or confluence of tributaries

a) All waters

No net may be used within 75 ft. of the confluence of any tributary.

Appendix 2. Proposed statewide changes to SC's shad fishery to account for by-catch of sturgeon

	Existing regulation	Proposed change	Benefit
Recreational			
<i>Gear restrictions</i>			
Gill nets	1 net w/ lengths up to 300yds	1 net w/ length not exceeding 100 ft.	Limits the length of net a recreational angler using commercial gear can use.
Commercial			
<i>Gear restrictions</i>			
All rivers	10 nets per licensee allowed	5 nets per licensee allowed	Cuts available nets by 50%
*Edisto River	10 nets per licensee allowed	2 nets per licensee allowed	Cuts available nets by 80%
*Combahee River	10 nets per licensee allowed	1 nets per licensee allowed	Cuts available nets by 90%
<i>Procedure change</i>			
All rivers	Must check each net once every 24 hrs.	Must check each net twice during 24hrs.	Reduces risk of potential mortality for captured sturgeon.
<i>Area restrictions</i>			
Savannah River	Fishing allowed I-95 to spirit creek	Fishing allowed I-95 to Hwy 301	Restricts fishing on ~110 rkm of potential sturgeon spawning habitat.
<i>Season changes</i>			
Winyah Bay and Tributaries (includes Waccamaw and Great Pee Dee Rivers)			Moves the legal season up two weeks, allowing for fewer nets during the sturgeon spawning migration.
Pee Dee River and tributaries above Hwy. 701, Waccamaw River and tributaries above entrance of Big Bull Creek	Feb. 1 - Apr. 30	Jan. 15 - Apr. 15	
Remainder of Winyah Bay system	Feb. 1 – Apr. 15	Jan. 15 - Apr. 1	
Santee River			Moves the legal season up two weeks, allowing for fewer nets during the sturgeon spawning migration.
Hwy. 52 bridge seaward to Hwy. 41 bridge	Feb. 1 - Apr. 30	Jan 15 - Apr 15	
Hwy. 41 bridge seaward	Feb. 1 - Mar. 31	Jan 15 - Mar 15	
Edisto River			Restrictions as a result of ASMFC's shad sustainability plan will shorten the season to 6 weeks.
Above U.S. Hwy. 17 bridge	Jan. 15 - Apr. 15	Feb. 1 - Mar. 15	
Seaward of U.S. Hwy. 17	Jan. 15 - Mar. 31	Feb. 1 - Mar. 15	
Combahee River			Restrictions as a result of ASMFC's shad sustainability plan will shorten the season to 6 weeks.
Main river, including main stems of Salkehatchie Rivers	Jan. 15 - Mar. 31	Feb. 1 - Mar. 15	

* **Restrictions as a result of ASMFC's state sustainability plan.**

Appendix 3. Proposed changes to shad fisheries in the Edisto and Combahee Rivers.

	Existing regulation	Proposed change	Benefit
Recreational			
<i>Gear restrictions</i>			
Edisto River			
Gill nets	1 net w/ lengths up to 300yds	1 net w/ length not exceeding 100 ft.	Limits the length of net a recreational angler using commercial gear can use.
Hook and line	10 shad per day creel	5 shad per day creel	Decreases the amount of shad legally kept by 50%.
Combahee River			
Gill nets	1 net w/ lengths up to 300yds	1 net w/ length not exceeding 100 ft.	Limits the length of net a recreational angler using commercial gear can use.
Hook and line	10 shad per day creel	5 shad per day creel	Decreases the amount of shad legally kept by 50%.
Commercial			
<i>Gear restrictions</i>			
Edisto River	10 nets per licensee allowed	2 nets per licensee allowed	Cuts available nets by 80%
Combahee River	10 nets per licensee allowed	1 nets per licensee allowed	Cuts available nets by 90%
<i>License cap</i>			
Edisto River	No limit	Only licensees that purchased a license during the last 5 years will be eligible to remain in the fishery with no new licenses issued	Allows current fishermen to fish, does not allow for additional exploitation, and caps the fishery.
Combahee River	No limit	Only licensees that purchased a license during the last 5 years will be eligible to remain in the fishery with no new licenses issued	Allows current fishermen to fish, does not allow for additional exploitation, and caps the fishery.
<i>Season changes</i>			
Edisto River			
Above U.S. Hwy. 17 bridge	Jan. 15 - Apr. 15	Feb. 1 - Mar. 15	Shortens the season to 6 weeks
Seaward of U.S. Hwy. 17	Jan. 15 - Mar. 31	Feb. 1 - Mar. 15	Shortens the season to 6 weeks
Combahee River			
Main river, including main stems of Salkehatchie Rivers	Jan. 15 - Mar. 31	Feb. 1 - Mar. 15	Shortens the season to 6 weeks