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ASMFC American Shad Sustainable Fishing Plan for Florida, St. Johns River

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## **Introduction**

The spawning run of American shad in Florida's St. Johns River is subjected to a small, primarily catch and release recreational fishery. Present stock abundance is low but stable (ASMFC 2007). There have been no commercial landings of American shad in Florida since 2000. Florida Fish and Wildlife Conservation Commission (FWC) seeks to maintain the open status of the recreational fishery as its existence should not threaten maintenance and recovery of the St. Johns River population of American shad.

## **St. Johns River**

The St. Johns River is entirely coastal and drops a total of 9.1 m over its entire 499km length. Most of that drop occurs upstream of river kilometer 314 (McLean 1955). The river passes through three large shallow lakes; Lake Harney (6200 acres) between rkm 306 and 314, Lake Monroe (9400 acres) between rkm 266 and 276, and Lake George (40,000 acres) between rkm 182 and 199. The head of the tide is generally at Lake George. The tidal freshwater reach below Lake George varies in width from 0.18 km to 2 km and has an average tide range of 0.33 m. Weak tides can reach as far as the Lake Monroe outlet at river kilometer 266 during low flow. The St. Johns River has a "southern river flow pattern" (Kelly and Gore 2008) in which low flow typically occurs from late winter into early summer and high flows occur in the late summer and early fall corresponding to a summer wet season. Spawning can occur from river kilometer 235 to 400 but primarily occurs between river kilometer 276 and 378. The spawning season lasts from late December to Early May with peak activity from mid January to mid March. (Figures 1 and 2).

## **Description of the Fishery**

Gear restrictions have effectively eliminated commercial harvest. Pound nets were phased out through the 1980's and 1990's. None are operating and new licenses will not be issued. Entanglement nets were prohibited by constitutional referendum in all state waters in 1995. There are no commercial fisheries operating in state waters that take shad deliberately or that are likely to take shad as bycatch. Furthermore, hook and line has been the only permissible gear for the taking of all *Alosa* species since 1997. A saltwater fishing license is required to possess anadromous species. The current bag limit is 10 fish per angler per day for American shad and hickory shad in aggregate. The existing recreational fishery is small and dominated by catch and release fly fishermen. Angling primarily occurs between river kilometers 285 and 292 and between river kilometers 314 and 321 whereas spawning grounds primarily occur from river kilometer 280 to 295 and from river kilometer 314 to 378.

## **Stock Monitoring Programs**

### **a) Fishery Independent**

#### **i. Juvenile abundance indices**

Juvenile abundance will be assessed annually as catch per tow by bow mounted push net. Development of this index began in 2007. From 2007 through 2009 an attempt was made to document the timing of migration of juveniles through the river in order to select reaches for annual monitoring. The nursery zone was sampled monthly from March or April to October. The pushnet successfully captured juvenile *Alosa* species with American shad catches up to a geometric mean of 28 per tow in April 2009 between river kilometer 200 and 305. Sampling consisted of 48 five-minute tows at randomly selected stations between Warner Point and Lake Harney which corresponds to river kilometers 125 and 305 with sampling occurring at 12 stations each on four consecutive nights (Figure 1). Juveniles were distributed throughout this 200 km area from late April through mid-summer under conditions of low discharge. Juveniles transition to below river kilometer 200 into tidal freshwater by early summer under conditions of high discharge. Two representative index reaches have been selected; one in the river run between river kilometer 210 and 260 and one in tidal freshwater between river kilometer 125 and 165 (Figure 1). Index sampling occurs bi-weekly from the end of March until September. We are still trying to standardize this index in way that best represents real inter-annual differences in abundance since river discharge affects migration timing though the respective reaches. Therefore we do not think that it can contribute a benchmark at this point. JAI will be monitored going forward for increasing or decreasing trends with a goal of developing a benchmark.

#### **ii. Spawning stock survey**

The spawning stock survey tracks the relative abundance of adult American shad by electrofishing the spawning stock between river kilometers 314 and 357 (Figure 2). Sampling occurs biweekly from January through April within 10 transects selected randomly. Six of those 10 samples occur upstream the recreational fishery. Sampling will continue on an annual basis. Biological samples are collected for length, sex composition, and aging (beginning in 2011) from these transects. This is the longest continuous index currently running on the St. Johns River. The index was flat from 2003 through 2008 but the last three index years show improvement (Figure 3). We propose that a benchmark be established based on this index.

### **b) Fishery Dependent**

A roving creel survey of recreational anglers was conducted between the mouth of Lake Jesup (river kilometer 285) and just south of Iron Bend (river kilometer 298) in 11 out of 13 years from 1992 to 2005 (McBride and Holder 2008). This creel documented declining effort and relatively stable catch rates. An access point creel was introduced in 2011 (Table 1) and will continue

annually as funds allow. The access point creel covers the old creel area (Mullet Lake Creel Area) via two boat ramps and an upstream area (Puzzle Lake Creel Area) via one boat ramp (Figure 2). Canvassing anglers on the water indicated that greater than 95% of shad fishing effort originates at these ramps. These ramps are the primary access points to the 50km in which most shad fishing occurs. Total estimated shad-directed effort for both areas combined was 4728 angler hours with a total fished-for catch of 3485 fish. Of the catch, an estimated 198 fish were harvested and the remainder was released. No harvest was documented in the Puzzle Lake Creel Area where roughly two thirds of the catch occurred. Some anglers encounter shad as an incidental catch but do not generally retain them. Black crappie anglers caught an estimated 555 American shad as by-catch but did not retain any. There were an estimated 2,323 angler-hours in the Mullet Lake Creel Area. This was low in comparison to the 1992 to 2005 creels in which 8,089 angler- hours was documented in an average year (McBride and Holder 2008). The angler success rate in the Mullet Lake Creel Area in 2011 was 0.7 fish/hour which was similar to the 0.71 fish/hour average for shad between 1992 and 2005 (McBride and Holder 2008).

A benchmark angler catch rate of 1 fish per angler hour was selected as a restoration target based on the previous roving creel (ASMFC 2007). However, the nature of the fishery has changed. The fish camp at river kilometer 287, from which much of the shad fishing effort occurred, has closed and some fishing effort has shifted to another section of river. Additionally, fishing techniques have changed from primarily trolling to primarily fly fishing. Therefore we do not believe that angler catch rate can be used as a benchmark at this time. Annual monitoring of this fishery through an access point creel will continue as long as funding is available.

## **Sustainable Fishery**

### **a) Proposed Fishery Independent Benchmark**

FWC requests to maintain the recreational fishery on the St. Johns River as is. Spawning stock fishery independent CPUE is stable or increasing. Harvest rate is voluntarily low (5.7% of fished-for catch in 2011) and total harvest is small. The fishery independent spawning stock index median for the series 2003 through 2011 is 3.39 and the 25<sup>th</sup> percentile is 2.83 (Table 2). If the index drops below the 25<sup>th</sup> percentile of the time series for three consecutive years then action should be taken to adjust the fishery by reducing bag limits or closure depending on the trajectory of other indices that are still in development.

### **b) Possible Future Benchmarks to Incorporate Fishery Dependent Data**

Harvest and effort are both currently low in the recreational fishery so changes aren't warranted. But the fishery is being promoted by some fly fishing clubs and Coastal Angler Magazine and effort could increase. An increase in effort due to an increase in abundance and attraction to the fishery caused by higher catch rates is desirable. However, if total harvest increases in the

recreational fishery due to an increase in harvest rate (percent of catch retained) without a concurrent increase in fishery independent spawning stock index then the bag limit should be reduced. Likewise, a substantial increase in effort without a concurrent increase in angler catch rate and/or the fishery independent spawning stock index then FWC should consider limiting the fishery by possible effort reduction through temporal or spatial closures. Data are currently insufficient to set benchmarks based on fishery dependent monitoring. We propose development of benchmarks based on a ratios of angler harvest and angler total catch to fishery independent electrofishing CPUE in five years.

## **Literature Cited**

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

Kelly, M.H. and J.A. Gore. 2008. Florida river flow patterns and the Atlantic multidecadal oscillation. *River Research and Applications* 24 (5): 598-616.

McBride, R.S and J. C. Holder. 2008. A review and updated assessment of Florida's anadromous shads: American shad and hickory shad. *North American Journal of Fisheries Management* 28: 1668-1686.

McLEAN, W. M. 1955. The fishes of the St. Johns River system. Ph.D. dissertation. University of Florida, Gainesville. 362 pp.

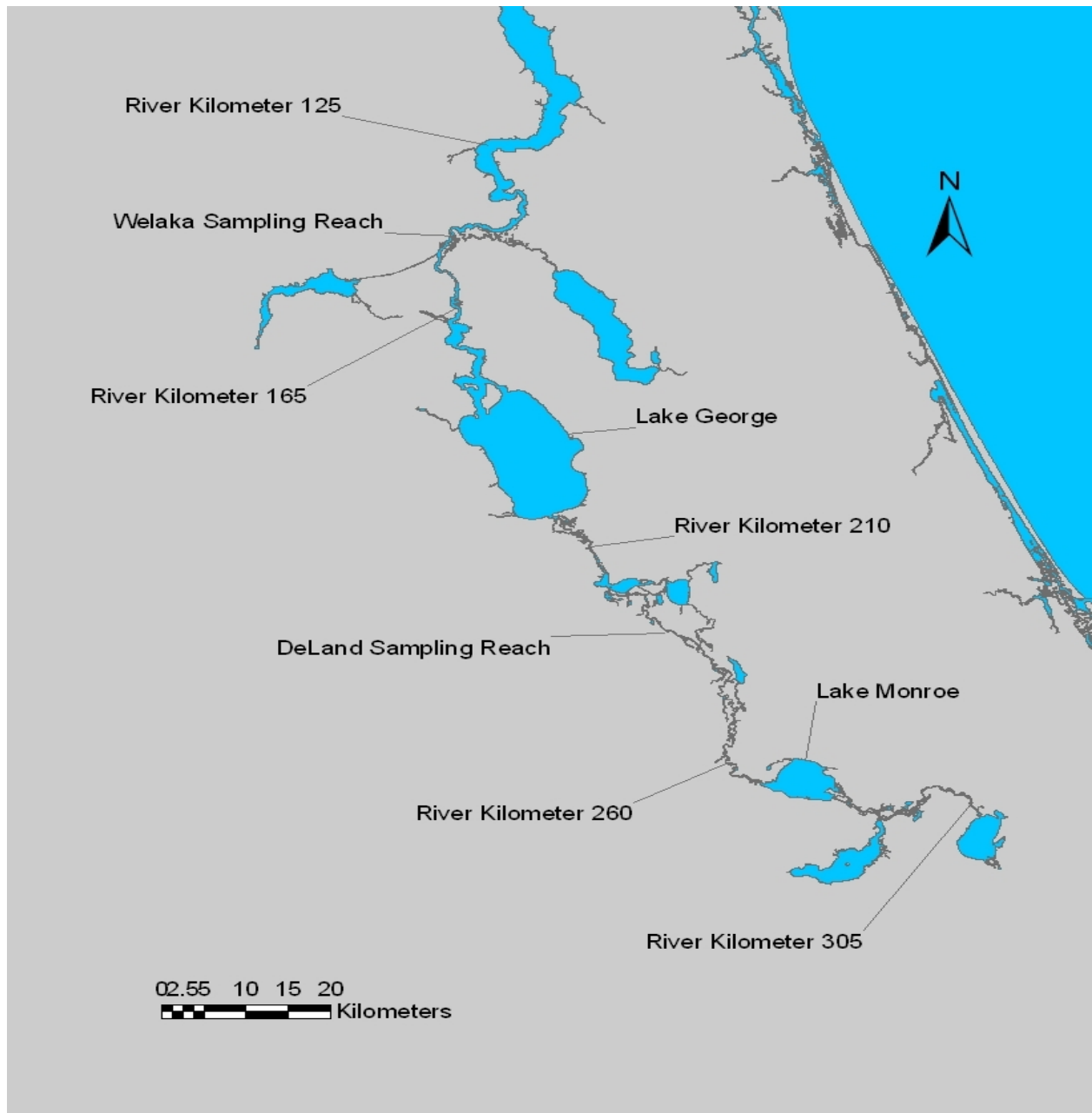


Figure 1. Middle and lower St. Johns River. The juvenile American shad nursery zone extends from river kilometer (rkm) 305 at the Lake Harney outlet to below river kilometer 125. Diurnal tides extend up to Lake George. Juvenile sampling by pushnet in 2007-2009 extended from rkm 125 to 305 from spring to fall. From 2010 forward, the DeLand Sampling Reach (rkm 210-260) and the Welaka Sampling Reach (rkm 125-165) will be sampled to create a juvenile abundance index.

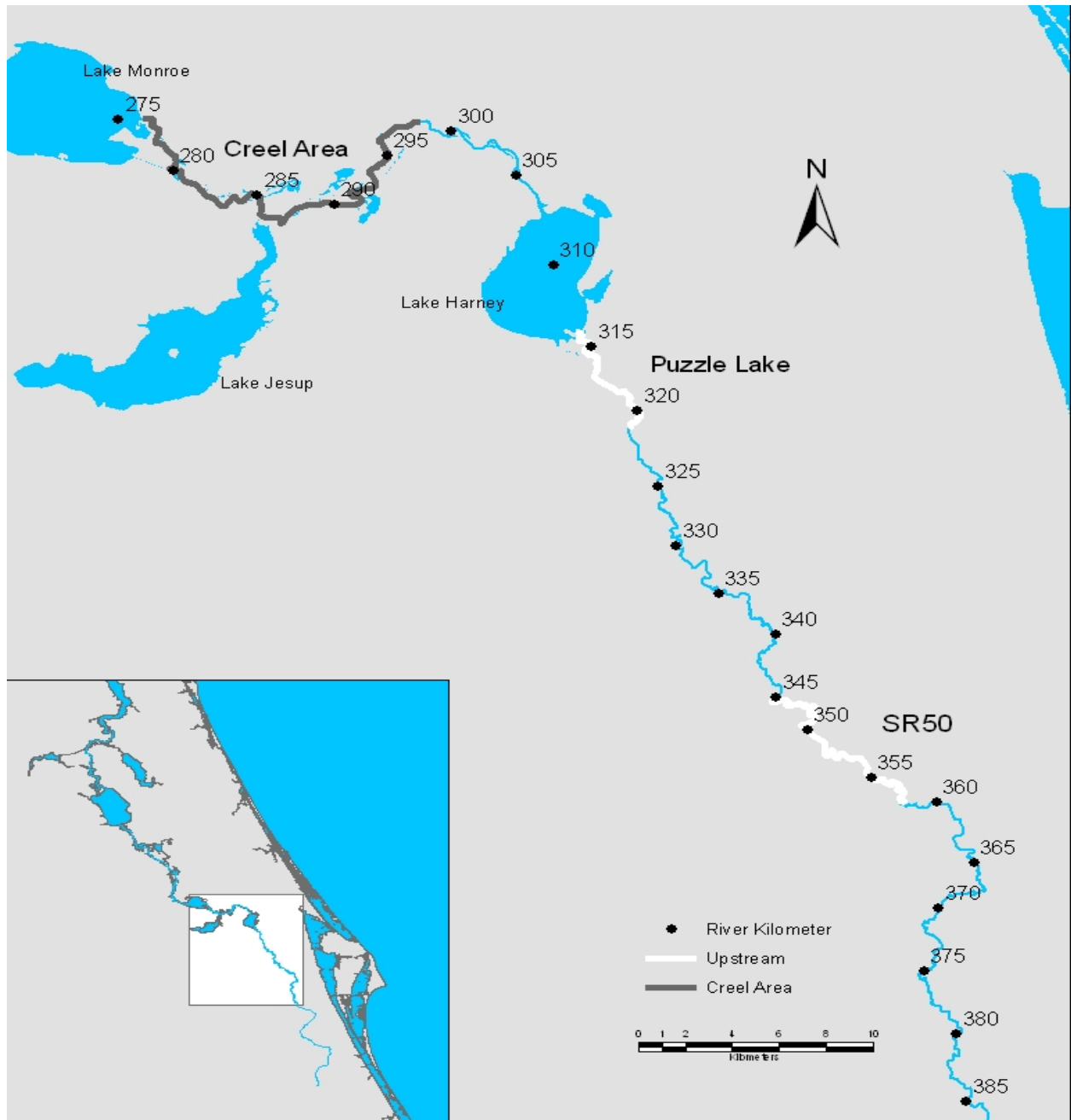


Figure 2. Upper St. Johns River. Primary spawning grounds occur from river kilometer (rkm) 276 to 378. Fishery independent monitoring for adult American shad occurs at Puzzle Lake (rkm 314-320) and at State Road 50 (SR50, rkm 345-358). The recreational fishery occurs mainly at the Creel Area and Puzzle Lake.



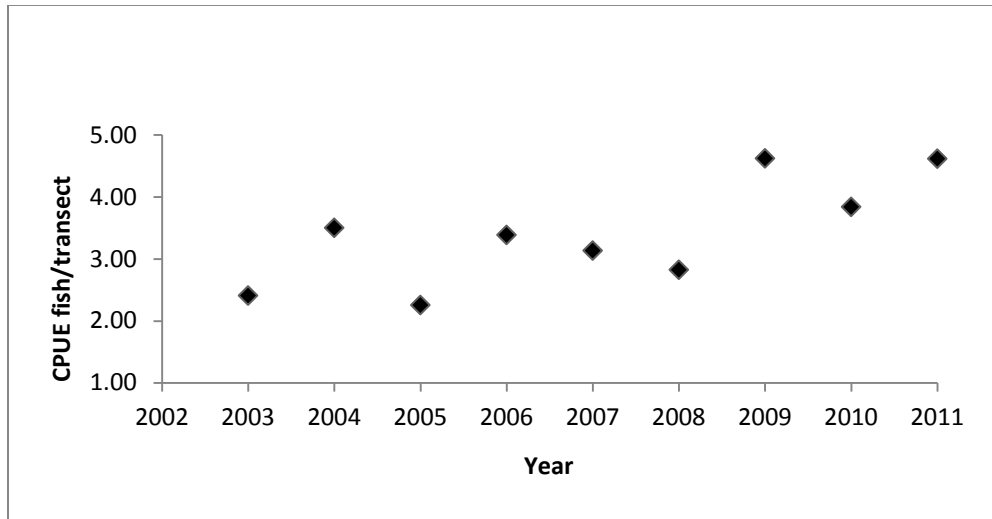


Figure 3. Electrofishing catch per unit effort (geometric mean catch per 10 minute transect) from the St. Johns River between river kilometer 314 and 357 from January through April. Current median is 2.83.

Table 1. Results of the 2011 January 1 to March 25 access point creel survey for American shad. Mullet Lake Creel Area consists of interviews from the Cameron Wight and Mullet Lake Park boat ramps and captures fishing effort between river kilometer 285 and 298 that were sampled in a previous roving creel. Puzzle Lake Creel Area consists of interviews from C.S. Lee boat ramp primarily describing the fishery between Lake Harney and Puzzle Lake. Period 1 = 1-January to 28-January-2011. Period 2 = 29-January to 25-February-2011. Period 3 = 28-February to 25-March-2011. Effort is angler hours. Success is shad caught per hour by anglers targeting American shad.

| Mullet Lake Creel Area |                |          |          |          |          |            |          |          |          |           |           |           |
|------------------------|----------------|----------|----------|----------|----------|------------|----------|----------|----------|-----------|-----------|-----------|
| Period                 | Effort         |          |          | Catch    |          | Fished For |          | Harvest  |          | Success   |           |           |
|                        | (angler-hours) | (number) | (number) | (number) | (number) | (number)   | (number) | (number) | (number) | (fish/hr) | (fish/hr) | (fish/hr) |
|                        | N              | Estimate | S.E.     | Estimate | S.E.     | Estimate   | S.E.     | Estimate | S.E.     | N         | Estimate  | S.E.      |
| 1                      | 9              | 1124     | 440      | 264      | 65       | 176        | 60       | 88       | 48       | 10        | 0.21      | 0.07      |
| 2                      | 9              | 1003     | 285      | 1253     | 374      | 959        | 332      | 110      | 63       | 13        | 1.15      | 0.41      |
| 3                      | 9              | 196      | 113      | 77       | 31       | 47         | 26       | 0        | 0        | 2         | 0.26      | 0.14      |
| Total                  | 27             | 2323     | 536      | 1594     | 381      | 1182       | 339      | 198      | 79       | 25        | 0.7       | 0.23      |

| Puzzle Lake Creel Area |                |          |          |          |          |            |          |          |          |           |           |           |
|------------------------|----------------|----------|----------|----------|----------|------------|----------|----------|----------|-----------|-----------|-----------|
| Period                 | Effort         |          |          | Catch    |          | Fished For |          | Harvest  |          | Success   |           |           |
|                        | (angler hours) | (number) | (number) | (number) | (number) | (number)   | (number) | (number) | (number) | (fish/hr) | (fish/hr) | (fish/hr) |
|                        | N              | Estimate | S.E.     | Estimate | S.E.     | Estimate   | S.E.     | Estimate | S.E.     | N         | Estimate  | S.E.      |
| 1                      | 5              | 793      | 296      | 696      | 306      | 488        | 237      | 0        | 0        | 10        | 0.73      | 0.4       |
| 2                      | 5              | 974      | 435      | 1317     | 445      | 543        | 312      | 0        | 0        | 16        | 0.48      | 0.12      |
| 3                      | 5              | 638      | 280      | 1415     | 628      | 1272       | 665      | 0        | 0        | 11        | 1.4       | 0.48      |
| Total                  | 15             | 2405     | 596      | 3428     | 828      | 2303       | 772      | 0        | 0        | 37        | 0.82      | 0.19      |

Table 2. American shad spawning stock index for the St. Johns River. Geometric mean catch per transect by electrofishing.

| Year | CPUE |
|------|------|
| 2003 | 2.41 |
| 2004 | 3.50 |
| 2005 | 2.26 |
| 2006 | 3.39 |
| 2007 | 3.14 |
| 2008 | 2.83 |
| 2009 | 4.62 |
| 2010 | 3.84 |
| 2011 | 4.62 |