FOSS RESERVOIR

5-YEAR FISHERIES MANAGEMENT PLAN

NORTHWEST REGION

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

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Foss Lake Management Plan

Physical Description

Foss Lake, located in Custer County, was constructed in 1961 by the Bureau of Reclamation to serve as a flood control, irrigation, municipal water supply, and fish and wildlife recreation reservoir. The reservoir is also a major waterfowl stop with the Washita National Wildlife Refuge providing a wintering resting area.

Foss covers 8,800 acres at normal pool and has a storage capacity of 256,220 acre feet. The drainage area is 1,496 square miles. Foss Lake impounds the Washita River with an annual exchange rate of 0.29. The secchi disk reading in the main pool is around 38 inches. Foss has a mean depth of 23 feet and a maximum depth of 89 feet. There is 63 miles of shoreline with a shoreline development ratio of 4.79. Prevailing winds are from a southerly direction at 12 mph. Typical annual fluctuation is 2 feet.

Water Quality

The Oklahoma Water Resources Board conducted a bump study from September 2004 through June 2005. Water quality samples were collected at five sites to represent the riverine, transition, and lacustrine zone of the reservoir. Surface samples were collected at all sites and a sample was collected 20 inches from the bottom at the dam. The lake wide annual turbidity value was 9 NTU (Appendix Chart A). Water clarity was average based on secchi disk depth, turbidity, and true color values (Appendix Chart B) and results for these parameters were similar to that in 2003. The trophic state index (TSI) values for all sites varied by season; ranging from oligotrophic in the summer to mesatrophic in the winter and spring, to eutrophic in the fall. The TSI value of 52 indicates the lake was eutrophic, with high levels of productivity and nutrient conditions. Turbidity values ranged from a low of 4 NTU to a maximum of 30 NTU (Appendix Chart A).

Vertical profile for dissolved oxygen, pH, temperature, specific conductivity, and salinity were recorded at all sample sites during the study period. Salinity values ranged from 1.06 parts per thousand (ppt) to 1.24 ppt. Salinity concentrations were higher than most Oklahoma reservoirs suggesting higher levels of chlorides or other salts. Specific conductivity values were also higher than expected for Oklahoma reservoirs indicating a high level of electrical current conducting compounds. Values ranged from 1,963 µS/cm in the summer to 2,320 µS/cm in

the fall. Lake pH values were neutral to slightly alkaline with spring benthic readings of 6.7 and 8.3 at the surface during winter. The lake was not stratified during the fall, winter and spring quarters (Appendix Charts C, D & E). The lake was stratified during the summer quarter. Stratification occurred between 22 to 26 feet from the surface. Anoxic conditions were not present.

Bacteriological samples were not collected during this sampling period, therefore an assessment of the Primary Body Contact Recreation (PBCR) beneficial use could not be made.

Water quality samples were analyzed for nutrients including total nitrogen and total phosphorus. The lake wide total nitrogen (TN) average was 0.67 mg/L at the surface. The epilimnetic (surface) TN ranged from 0.49 mg/L to 1.12 mg/L, both values occurred during the winter sample. The lake wide total phosphorus (TP) average was 0.022 mg/L at the surface. Surface TP values varied from 0.014 mg/L to 0.039 mg/L. The nitrogen to phosphorus ratio (TN:TP) was 30:1 for this reporting period. This value is higher than 7:1; characterizing the lake as phosphorus limited (Wetzel, 1983).

The Oklahoma Department of Environmental Quality (ODEQ) sampled the lake in 2002 as part of their Toxics Monitoring Program and detected no compounds above the consumption advisory level. The lake is fully supporting fish consumption beneficial use. Foss Lake was also sampled for total metals during 2002. Results of sampling showed the lake to be fully supporting its FWP beneficial use based on toxic (metals) compounds in the water column.

Habitat

Fish habitat consists primarily of rip-rap along the dam, cutberth, north side, and marina camping areas. Beds of American pondweed and water willow are present near Little Panther boat ramp and the marina. These weed beds appear to be expanding. Habitat is lacking and numerous man-made fish attractors have been added consisting mainly of cedar brush piles. These brush piles are located:

Marine Cove:	N35 31.891’	W99 11.549’
	N35 31.397’	W99 11.084’
	N35 31.824’	W99 11.934’
	N35 32.006’	W99 11.576’
	N35 32.151’	W99 11.532’
	N35 32.042’	W99 11.397’
	N35 31.861’	W99 11.353’

No Wake Buoy:	N35 32.223’	W99 11.397’
	N35 32.187’	W99 11.397’
Marina Camping Area:	N35 32.535’	W99 12.235’
Soldier Creek North:	N35 34.665’	W99 12.721’
Soldier Point West Jetty:	N35 32.825’	W99 14.043’
Mouse Creek:	N35 33.007’	W99 14.088’

All brush piles are accessible by boat. Habitat plans in the future include recharging existing brush piles, construction of new brush piles and continued introduction of aquatic vegetation such as water willow.

Fisheries History

Popular sport fish found in Foss include walleye, white bass, hybrid striped bass, crappie, and channel catfish. A history of the largemouth bass population shows a booming population in the early years as the lake slowly stage filled. Upon reaching normal pool elevation with lack of new shoreline cover, bass densities dropped and recruitment was low. Currently, the bass population is rebounding with habitat improvements and expanding natural weed beds. Foss primary productivity is poor. This lack of nutrients from the watershed along with a phosphorus deficiency can be seen in the lower abundance of gizzard shad forage and unsatisfactory relative weights of predatory species. A 2007 stocking of threadfin shad also failed to supplement the forage base (Table 1). Current regulations include a 14-inch minimum length limit for walleye/saugeye, a 20 fish per day aggregate limit for white bass and striped bass hybrids of which only five may be 20-inches or greater, and a 14-inch length limit on black bass.

Walleye were first stocked in Foss in 1970. Fry stockings were used to establish this fishery, which was satisfactory to local anglers with trophy walleye being harvested. In 1989, walleye were replaced by saugeye fingerling stockings which continued through 2004. It is theorized that increased survival of saugeye fingerlings raised the abundance of the population beyond the point that with the available forage base, the saugeye were unable to reach the 18-inch minimum length limit. This lack of suitable size and abundance of forage may have been responsible for the downward trend in saugeye catch rate from 2001 through 2004 (Figure 1).

Figure 1

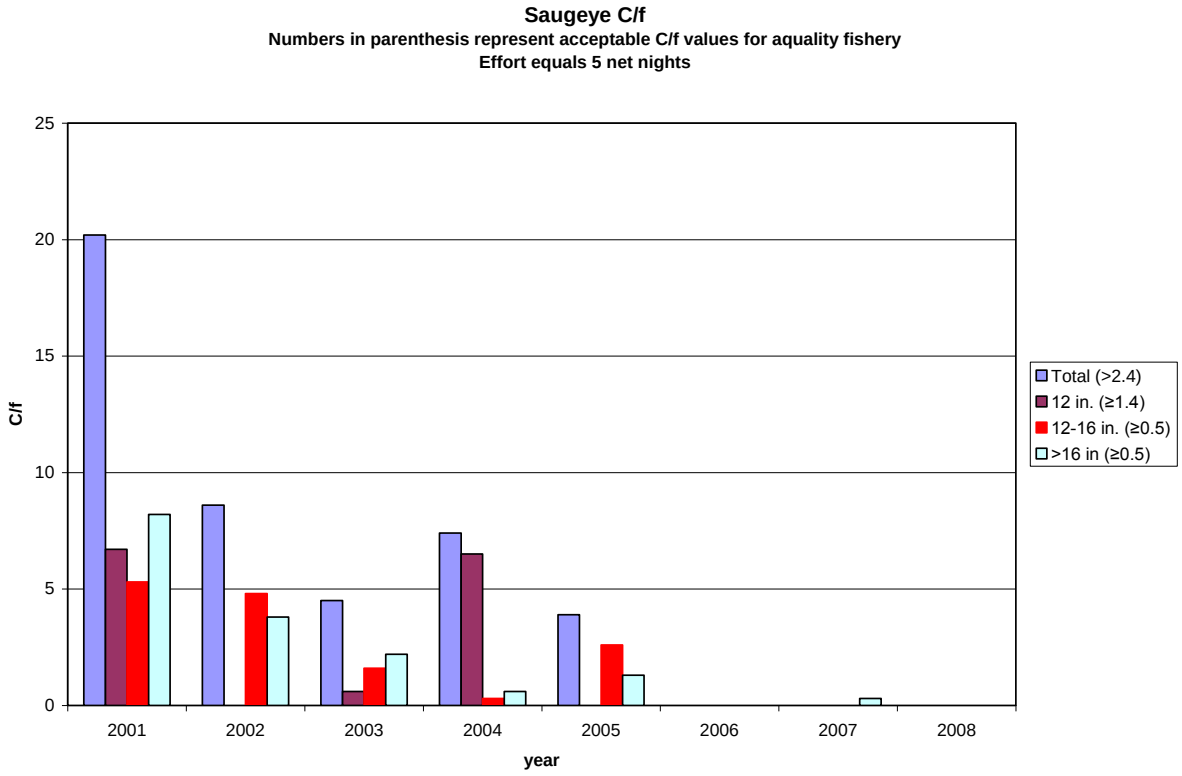
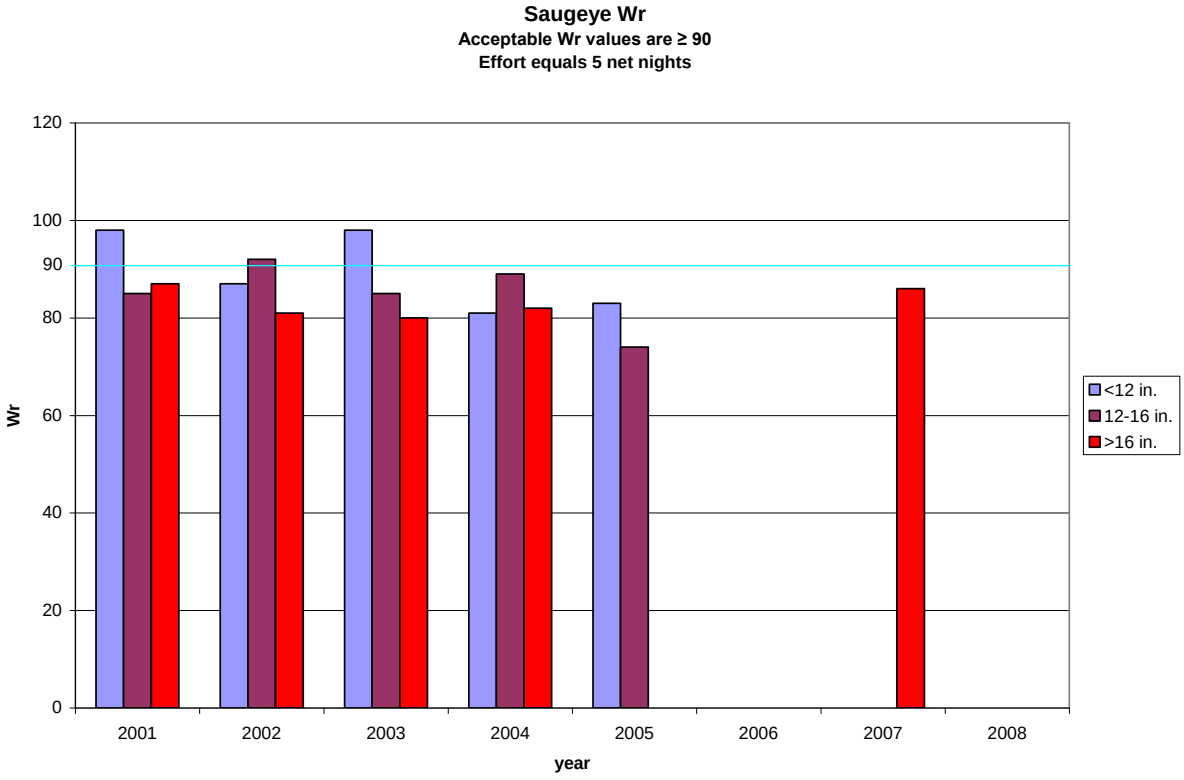


Figure 2.



This downward trend was also seen in saugeye relative weights (Figure 2). In 2005, at the request of local anglers, the ODWC returned to walleye fry stockings. Since reintroduction of walleye in 2004, the catch rates have steadily increased (Figure 3).

Figure 3

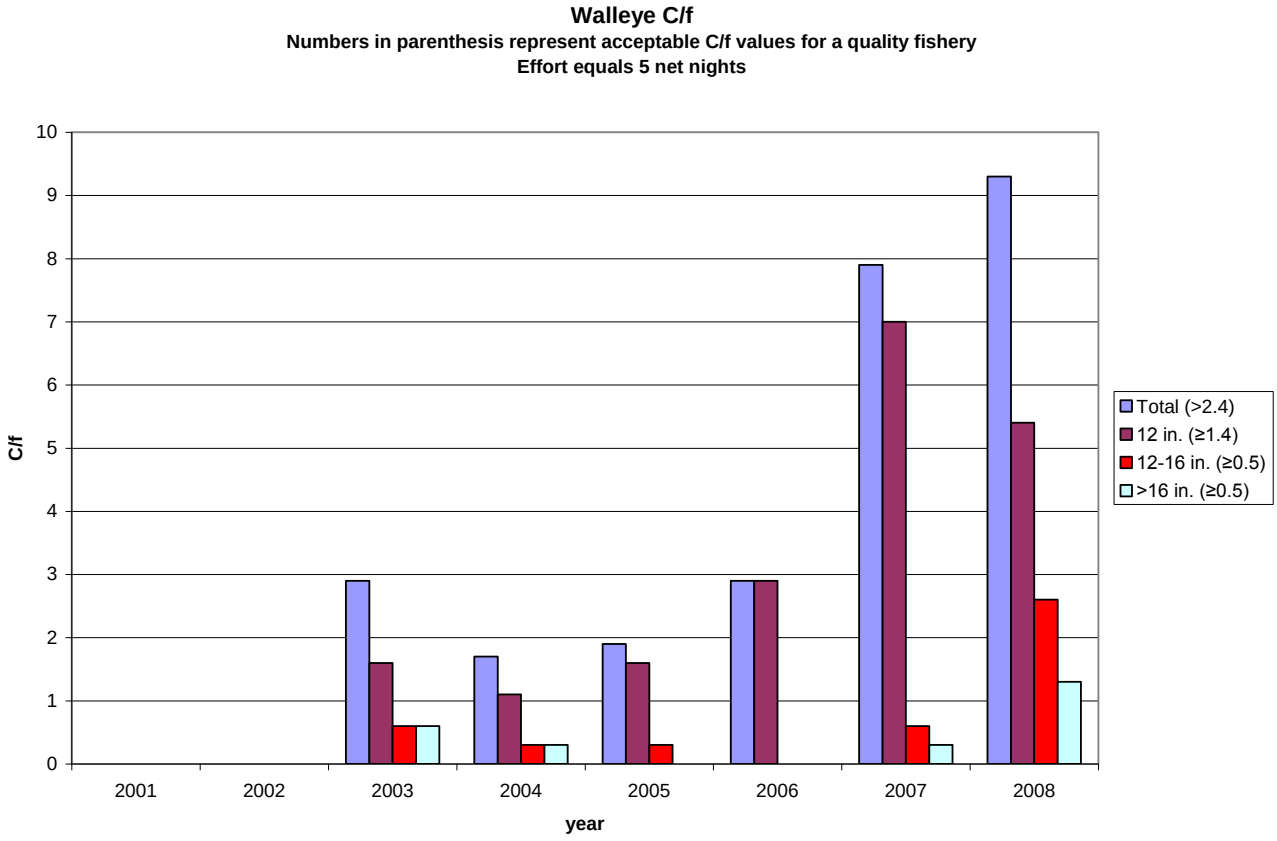
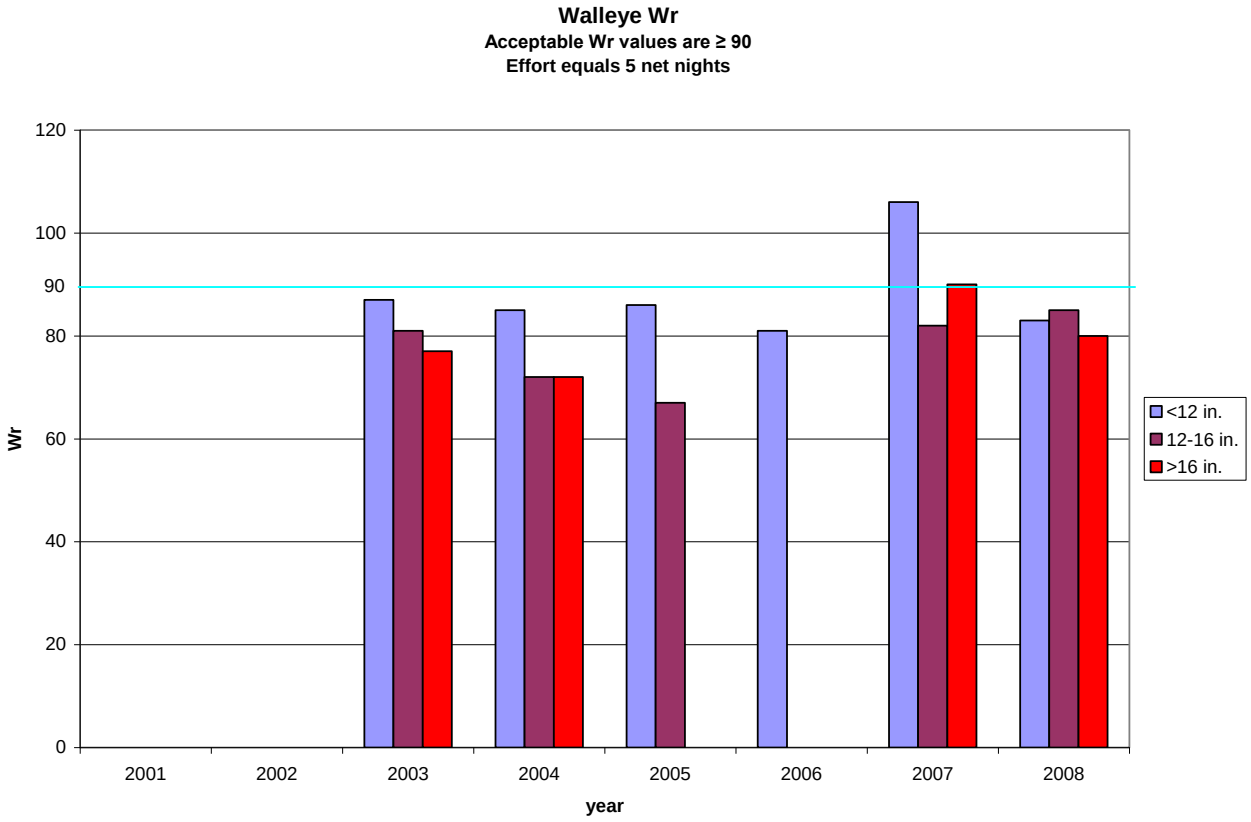
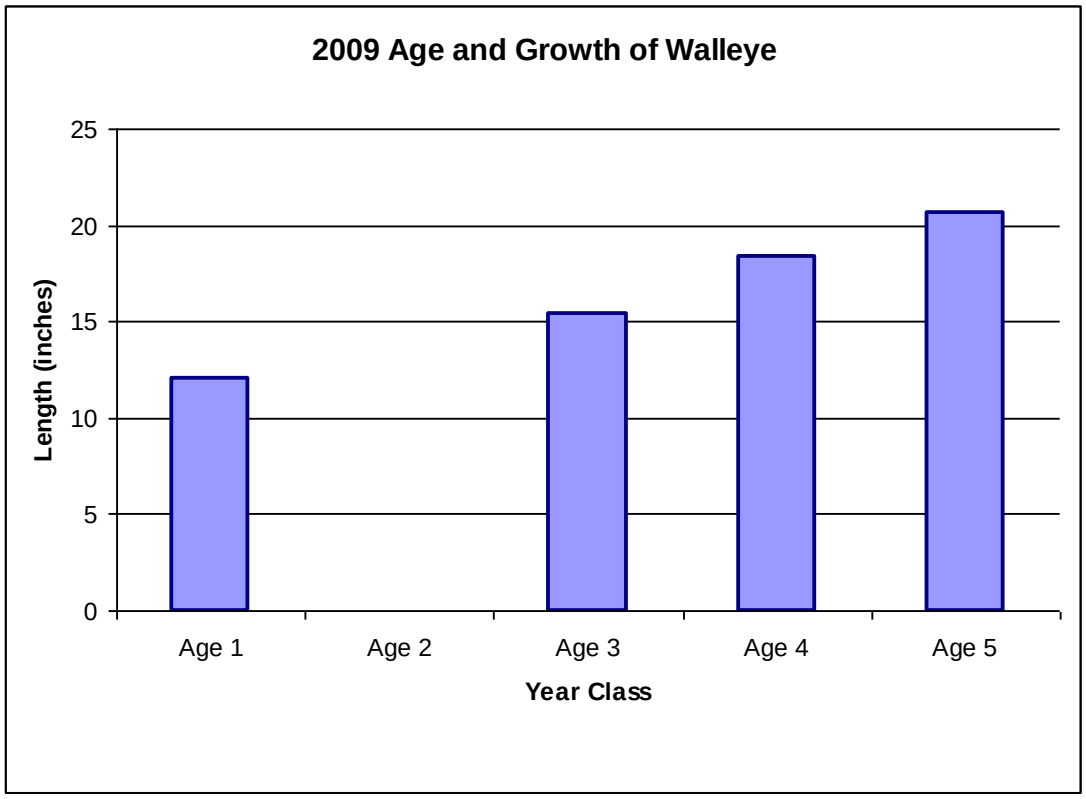


Figure 4



Relative weight (Wr) values have increased in 2007 and 2008 (Figure 4). This increase is attributed to availability of gizzard shad forage in 2006 and 2007 (Figure 12). In 2009, age and growth data indicated that walleye were reaching 15-inches in three years (Figure 5). The walleye population is maintained by annual fry stockings (Table 1). Natural recruitment does occur but cannot support the population. The overall status of walleye population has improved in recent years, angler satisfaction is high, and the first lake record walleye was harvested in December 2009 at five pounds eight ounces.

Figure 5.



White bass were present in the Washita river system at the time of impoundment. The white bass population is very healthy with good to excellent recruitment annually. April spawning runs in the Washita produces some outstanding catches and lasts for approximately two weeks. The most popular angling method at Foss is trolling. Fall gill net catch rate data (Figure 4) indicates total catch and catch rates by length groups to meet or exceed statewide averages. The W_r values have ranged from fair to acceptable (Figure 5). The Foss white bass population tends to be the backbone of the lake; anglers trolling or slabbing will take a "mixed bag" of walleye, hybrid, and channel catfish, with white bass dominating the catch.

Figure 6

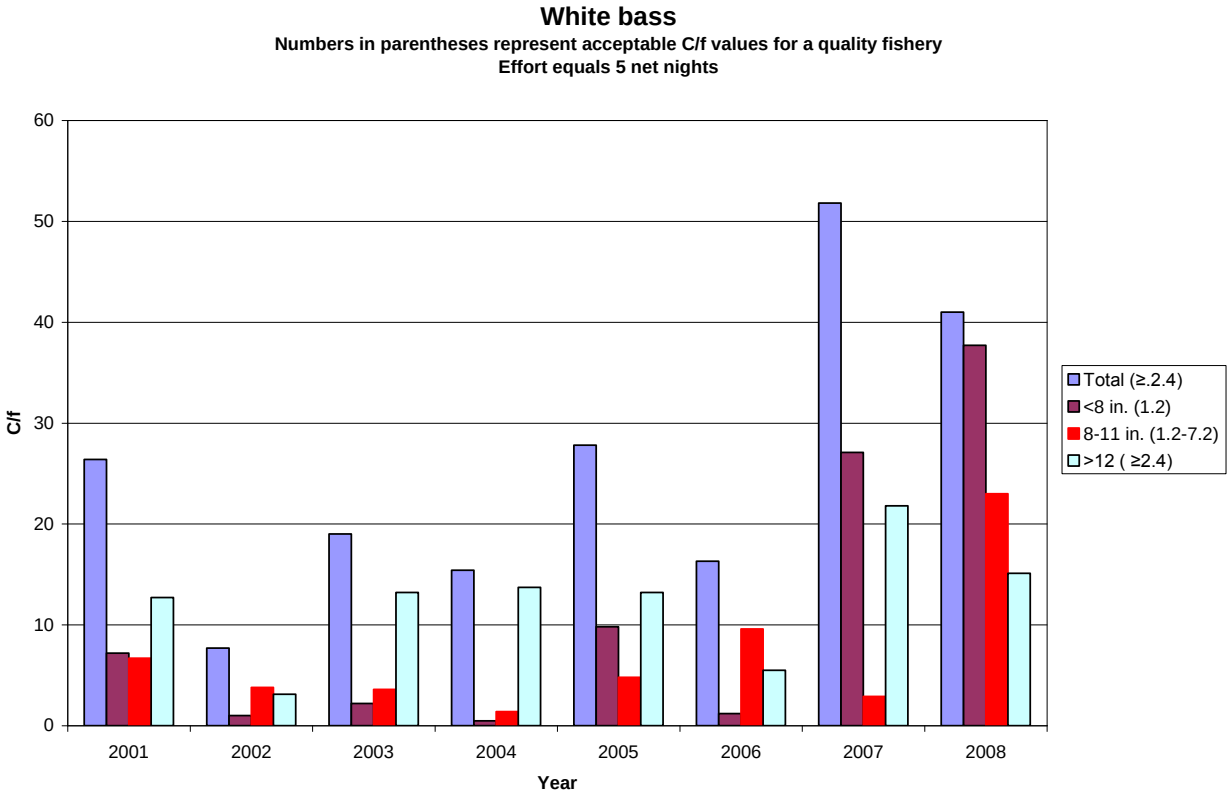
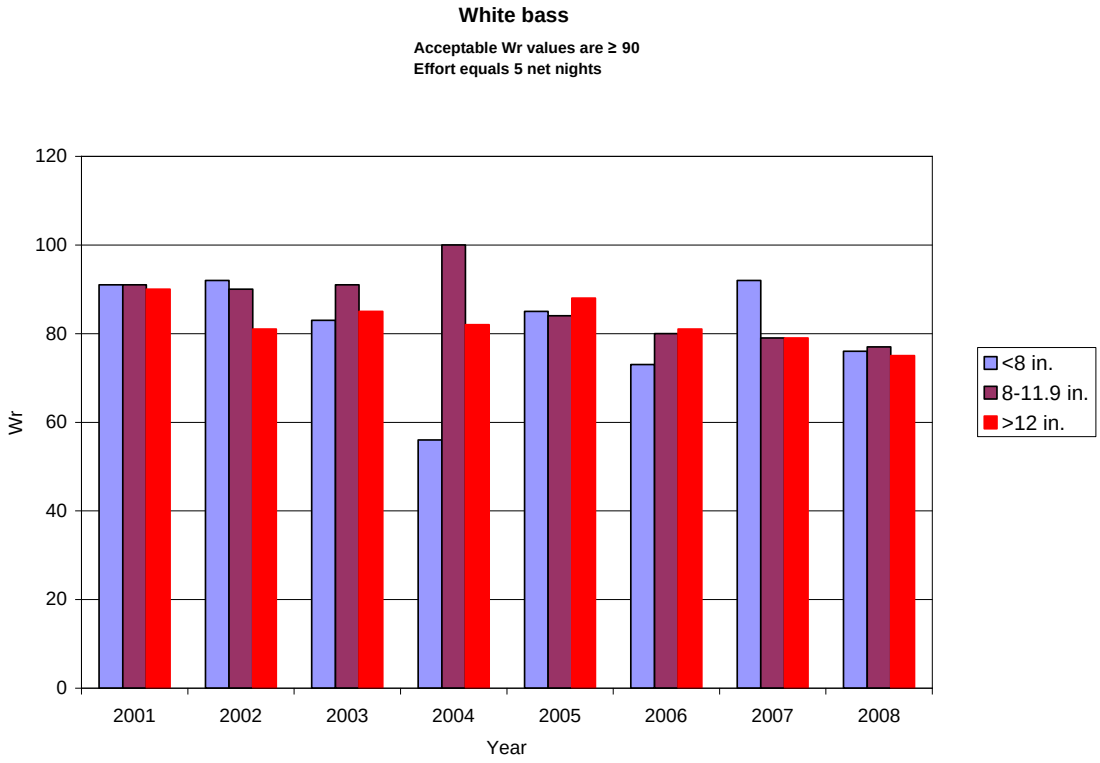


Figure 7



A striped bass fishery was established at Foss by fry stockings during the 1970s. Over time, the stripers failed to produce a sustainable "put, grow & take" fishery. Hybrid striped bass were first introduced into Foss in 1986. Annual fingerling stockings (Table 1) have produced a satisfactory fishery with trophy fish in excess of 15 pounds being harvested.

Table 1. Species, number and size of fish stocked in Lake Foss, 2001-2009.

DATE	SPECIES	NUMBER	SIZE
2001	Saugeye	34,000	Fingerlings
2002	Hybrid Striped Bass	68,000	Fingerlings
	Saugeye	170,000	Fry
	Smallmouth Bass	375	Adults
2003	-0-	-0-	-0-
2004	Hybrid Striped Bass	44,518	Fingerlings
	Saugeye	22,209	Fingerlings
	Walleye	25,000	Fry
2005	Hybrid Striped Bass	45,300	Fingerlings
	Northern Largemouth Bass	539	Sub Adults
	Walleye	1,000,000	Fry
	Walleye	7,313	Fingerlings
2006	Walleye	4,400,000	Fry
	Northern Largemouth Bass	288	Adults
2007	Walleye	4,400,000	Fry
	Hybrid Striped Bass	44,060	Fingerlings
	Striped Bass	1,874	Fingerlings
	Blue Catfish	145	Sub-Adults
	Threadfin Shad	11,650	Adults
2008	Walleye	4,400,000	Fry
	Hybrid Striped Bass	45,400	Fingerlings
2009	Hybrid Striped Bass	44,000	Fingerlings
	Walleye	4,000,000	Fry

Catch rates of hybrids less than 12-inches have been low. With acceptable to excellent catch rates of 12 to 19.9-inch and 20-inch size hybrids, the low catch rates of fish less than 12-inches may be due to sampling problems (Figure 6). Relative weight values have remained below the acceptable value ≥90 for all size groups of the population (Figure 7). Age and growth data indicated that hybrids reached 15-inches at Age 2 (Figure 8).

Figure 8

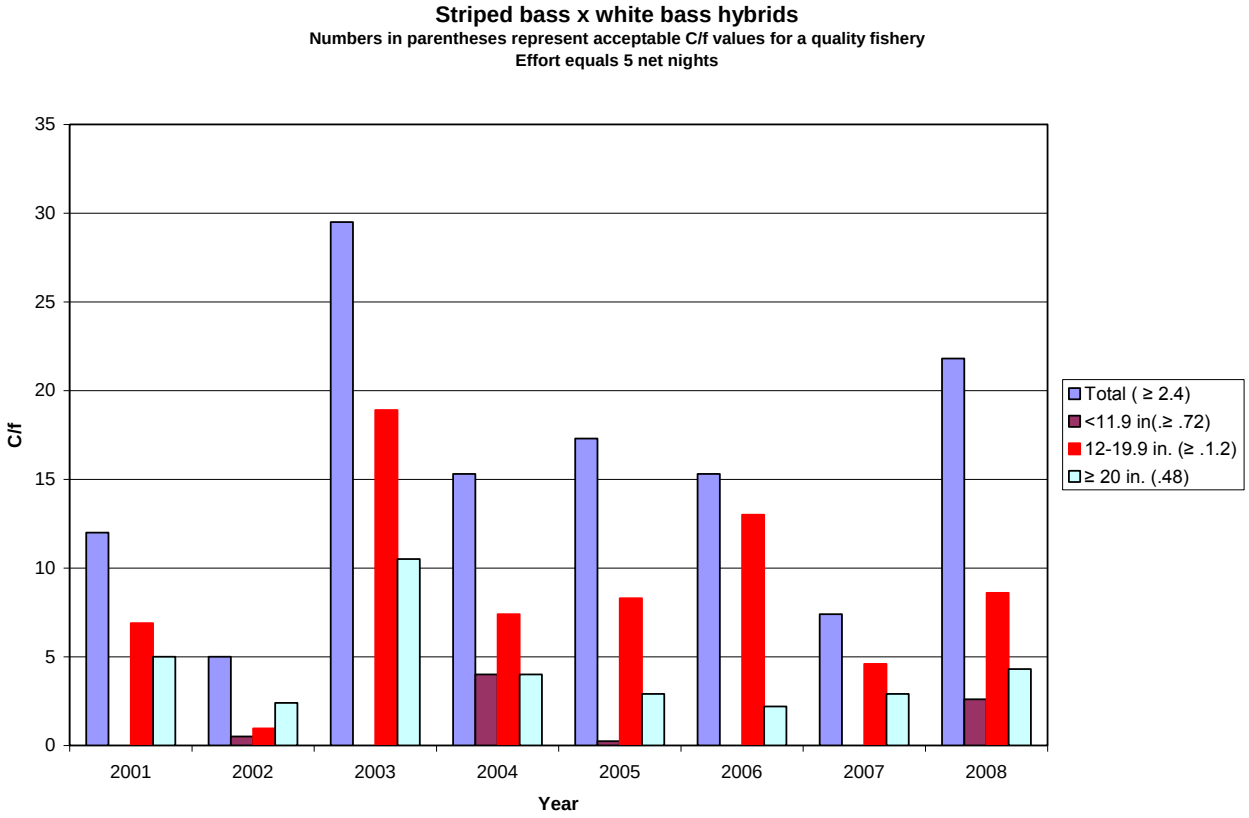


Figure 9

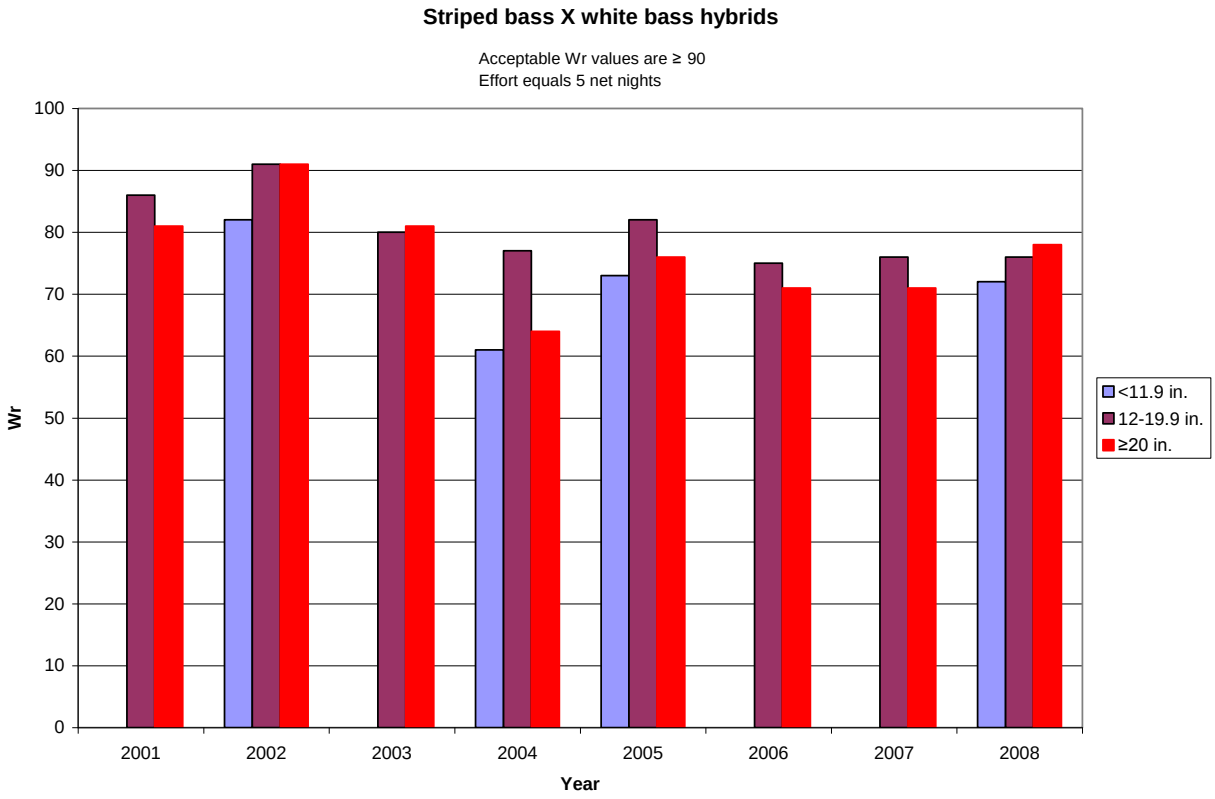
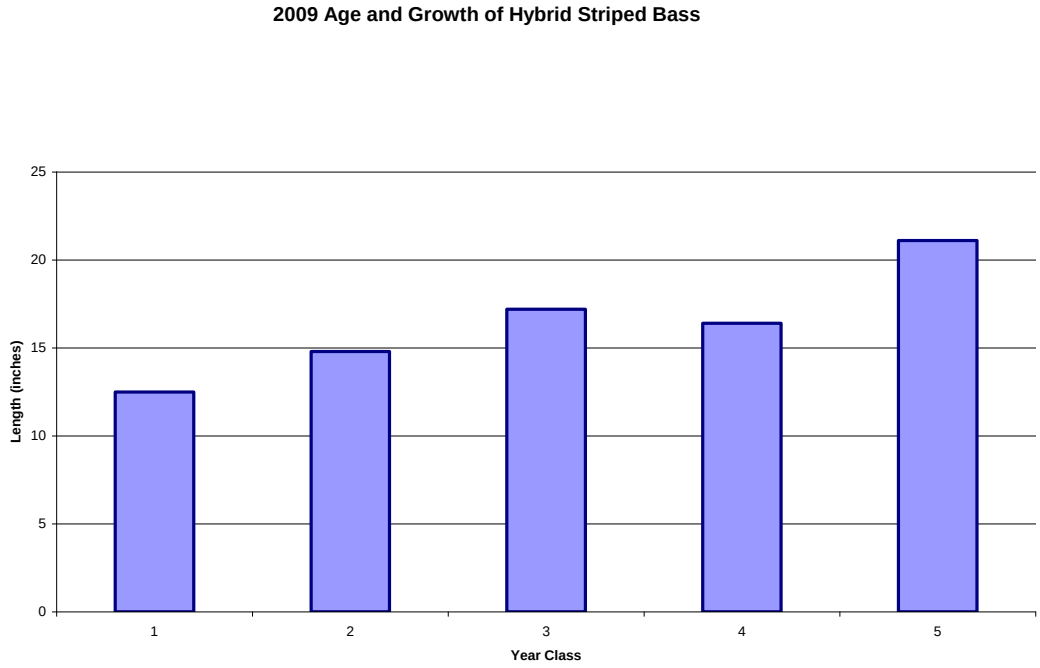
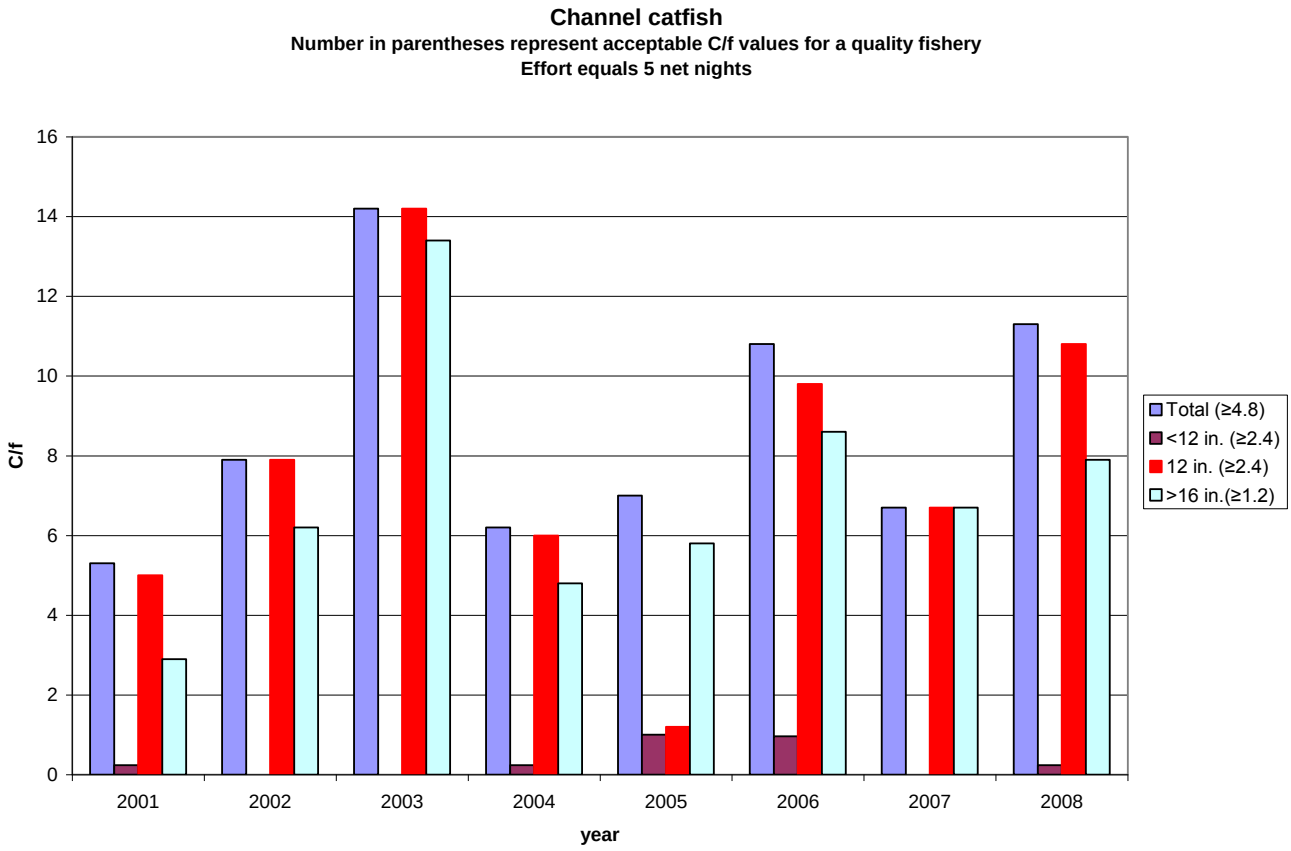


Figure 10



The channel catfish population appears to be stable. Anglers pursue channel catfish with trotlines, juglines, shoreline, rod and reel, and drift fishing. Catch rates remain higher than the state average for channel catfish greater than or equal to 12-inches and 16-inches (Figure 9). Channel catfish relative weights vary from fair to acceptable (Figure 10). The channel catfish fishery continues to provide anglers with satisfactory fishing opportunities.

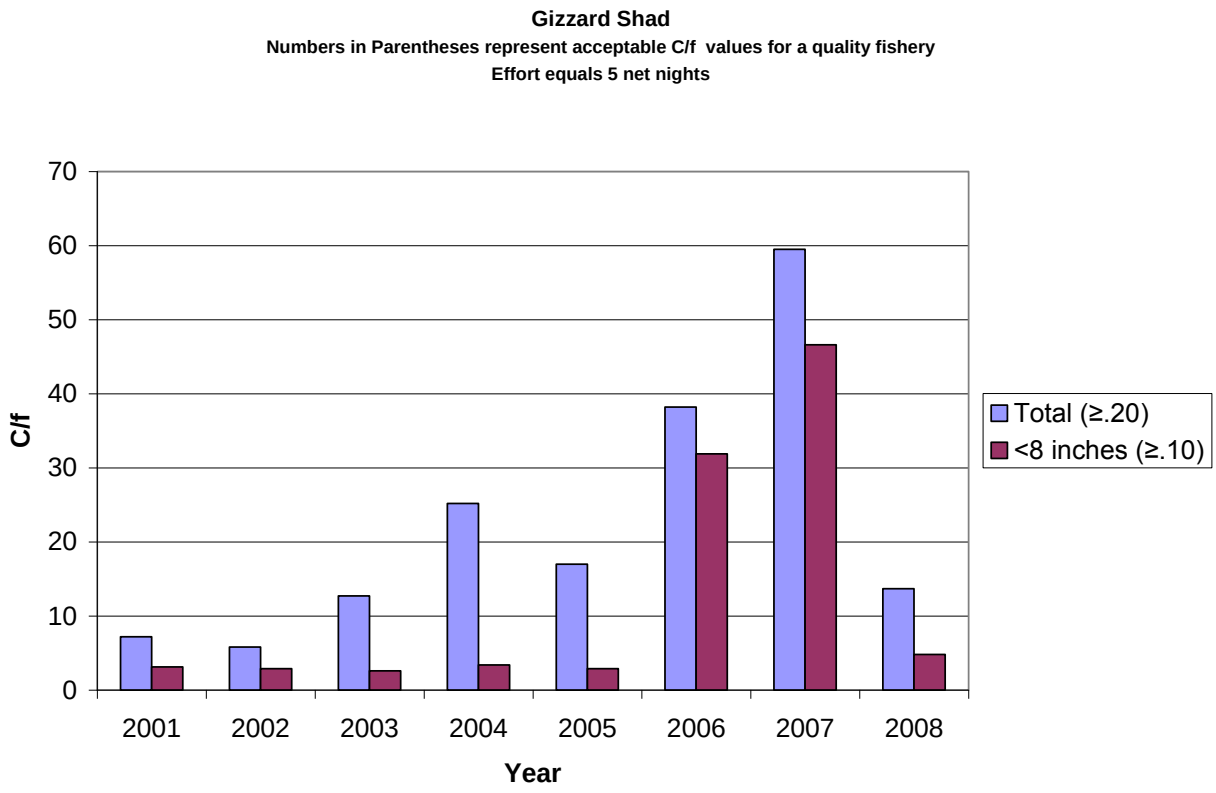
Figure 11



Foss received two fish transfers of 375 lake strain smallmouth bass in 2002 from Lake Lawtonka. Reproduction and recruitment have been verified. Fish have shown good growth with individuals reaching five pounds.

Gizzard shad is the primary forage fish at Foss. Catch rates exceeded the state average of 4.8 (Figure 11). Catch rates less than 8-inches also exceeded the state average. Future sampling will include floating shad nets to obtain more information on this forage.

Figure 12



Foss was selected as our second lake for the Lake Records Program. The weight station is located at the B & K Baithouse, HC66 Box 110, Foss, OK 73647. To date, one lake record fish has been certified:

Walleye/saugeye 5.5 lbs.

Threats To The Fisheries

The only clear and evident threat to the fisheries is municipal water usage. Four towns and one small city use Foss at their source of domestic water. Local anglers have complained about untimely releases that would have impacted shoreline nesting species in the spring. Perhaps a lake level manipulation plan can be formulated in the future between all state, local and federal parties. With only two feet of annual fluctuation, there will be little room to manipulate pool elevations.

The water shed (1,496 square miles) usage is mainly agriculture. A large amount of the drainage is native grassland on shallow soils over gypsum bed rock. Some wheat and alfalfa crop fields do occur in flood plain areas. These crop fields could represent a limited potential source of nutrient and pesticide runoff.

Invasive nuisance species found at Foss include zebra mussel veligers. Foss salt concentration would make it a candidate for golden algae.

Management Goals

All species

- Determine angler satisfaction and desires, catch rate and harvest of sport fish species.

Walleye

- Continue annual fry stockings and continue to monitor the population by fall gill netting.

Hybrid striped bass

- Continue annual fingerling stockings and continue to monitor the population by fall gill netting.

Forage sampling

- Starting in August-October 2010, floating shad net sampling will start. It is hoped that this new sampling gear will give a better handle on the forage situation.

Management Objectives

Management objective are to continue fish stockings. Walleye fry (3 days old) should be stocked annually at a rate of 500/acre (4,400,000). Natural reproduction does occur, however, it cannot maintain the fishery. Hybrid striped bass fingerlings (1.25-1.50 inches) should be stocked annually at a rate of 5/acre (44,000). Previous stockings have produced a very satisfactory fishery. Fall floating shad netting should occur annually to monitor the gizzard shad forage base. Gill net sampling will occur annually to monitor open water predators and collect age and growth data on high priority species. Otoliths will be collected from walleye and hybrid striped bass for age and growth analysis.

Zebra mussel veligers have been found at Foss. Precautions will be made to ensure that these veligers are not transferred to other impoundments and that other aquatic nuisance species are not introduced into Foss.

There are six boat ramps built by the Bureau of Reclamation and maintained by the Oklahoma Department of Tourism and Recreation. Shoreline fishing access is

available to anglers at the eight campsites located in the upper, middle, and lower areas of the lake.

Appendix

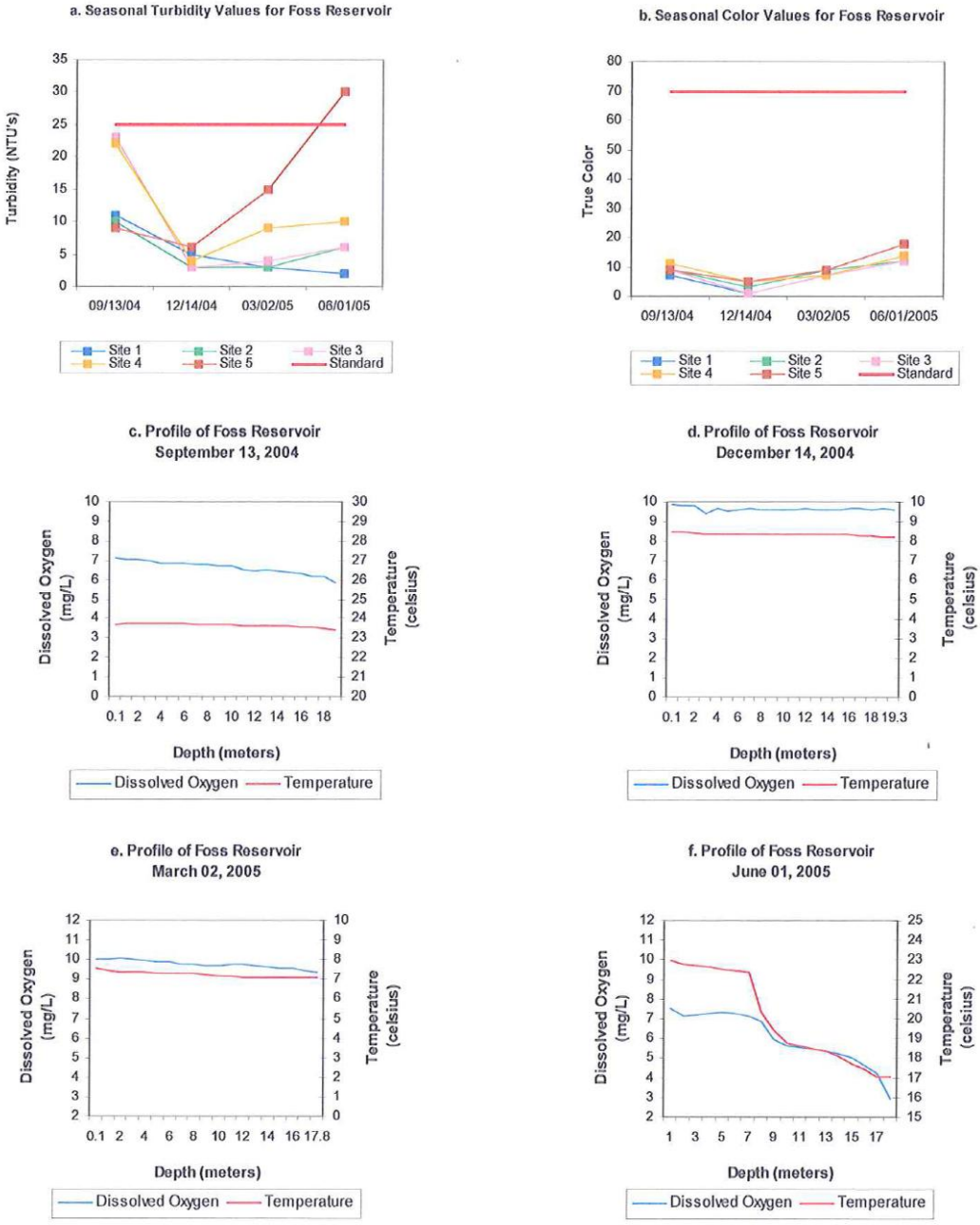


Figure 56a-56f. Graphical representation of data results for Foss Reservoir.

Plate 43 - Lake Water Quality for
Foss Reservoir
LAKES MONITORING PROGRAM
Trophic State
2005
POOR
EXCELLENT
Turbidity
2005
POOR
EXCELLENT
Foss Reservoir
Location
Foss Reservoir
and
Watershed
N
E
S
W
Lake Data
Owner U.S. Dept. of the Interior
County Custer
Constructed in 1961
Surface Area 8,800 acres
Volume 256,220 acre/feet
Shoreline Length 63 miles
Mean Depth 23.15 feet
Watershed Area 1,496 square miles