

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



OFFICE OF FISHERIES
INLAND FISHERIES DIVISION

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

BUSSEY BRAKE RESERVOIR

WATERBODY EVALUATION &
RECOMMENDATIONS

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED ANNUALLY

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Sportfish species are managed to provide a sustainable population while providing anglers the opportunity to catch or harvest numbers of fish adequate to maintain angler interest and efforts.

Commercial

Although commercial fish species are abundant within the impoundment the commercial fishery is restricted by International Paper Company.

Species of Special Concern

No threatened or endangered fish species are found in this waterbody.

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations are in effect for all fish species.

Commercial

Commercial fishing is restricted by International Paper Company. Harvest is allowed on a contract basis only for rough fish control.

SPECIES EVALUATION

Recreational

Largemouth bass are targeted for evaluation since they are a species indicative of the overall fish population due to their high position in the food chain. Electrofishing is the best indicator of largemouth bass abundance and size distribution, with the exception of large fish. Sampling with gill nets determines the status of large bass and other large fish species. Shoreline seining has been used in the past to collect information related to fish reproduction and forage availability.

Largemouth Bass

In the chart below (Figure 1), fall electrofishing data is used as an indicator of largemouth bass relative abundance with total catch-per-unit-of-effort (CPUE) indicated since 1991. Spring and fall electrofishing samples were conducted every other year

from 1991 – 2003, with the exception of 2005 and 2007. Spring electrofishing was conducted in 2006. While the electrofishing CPUE has been somewhat variable, a decline has been observed for all sizes of largemouth bass over the last 19 years as shown in Figure 1. The trend in the long-term decline of stock-size fish is shown in Figure 2. With exceptions noted for 1997 and 2001, fish larger than 12 inches are indicated to have followed a similar decline in abundance. A limited amount of age and growth data (n=17) on largemouth bass was collected from the 2003 fall electrofishing sample. Six age classes were represented in this sample, and the oldest fish was eight years old. Growth rates were not calculated from this data set of largemouth bass due to small sample size. Reproduction and recruitment rates for largemouth bass are of concern. Recruitment of stock-size fish has been largely hindered by the lack of suitable spawning habitat. Disturbance of the lake bottom by common carp, channel catfish, and buffalo fish has reduced availability of suitable spawning habitat by increasing water turbidity.

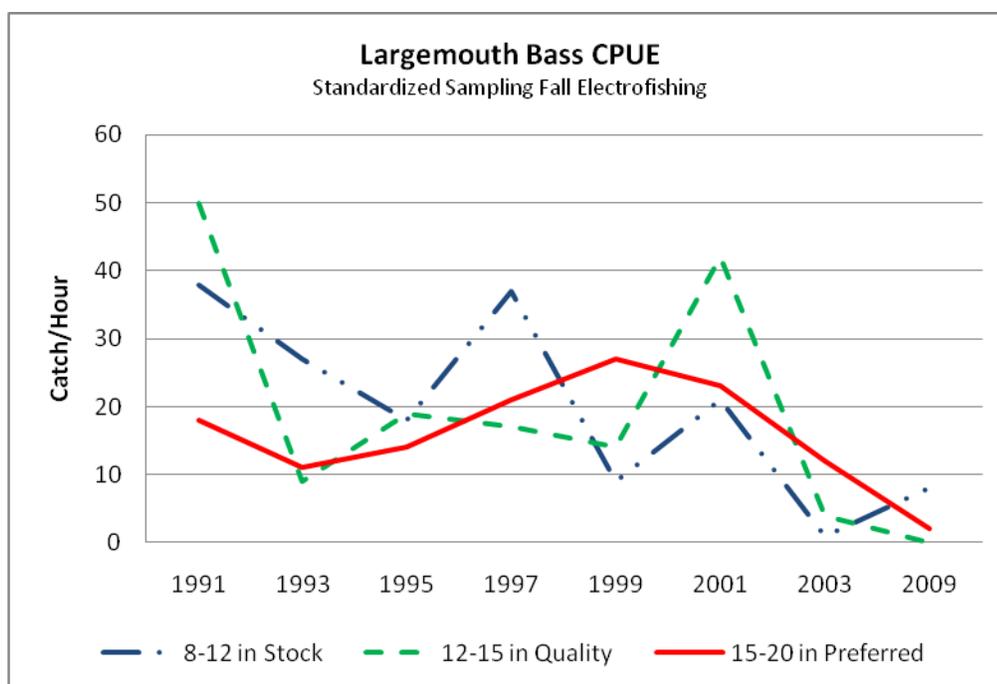


Figure 1. CPUE for stock, quality, and preferred-sized largemouth bass collected from fall electrofishing on Bussey Brake Reservoir, LA from 1991 – 2009.

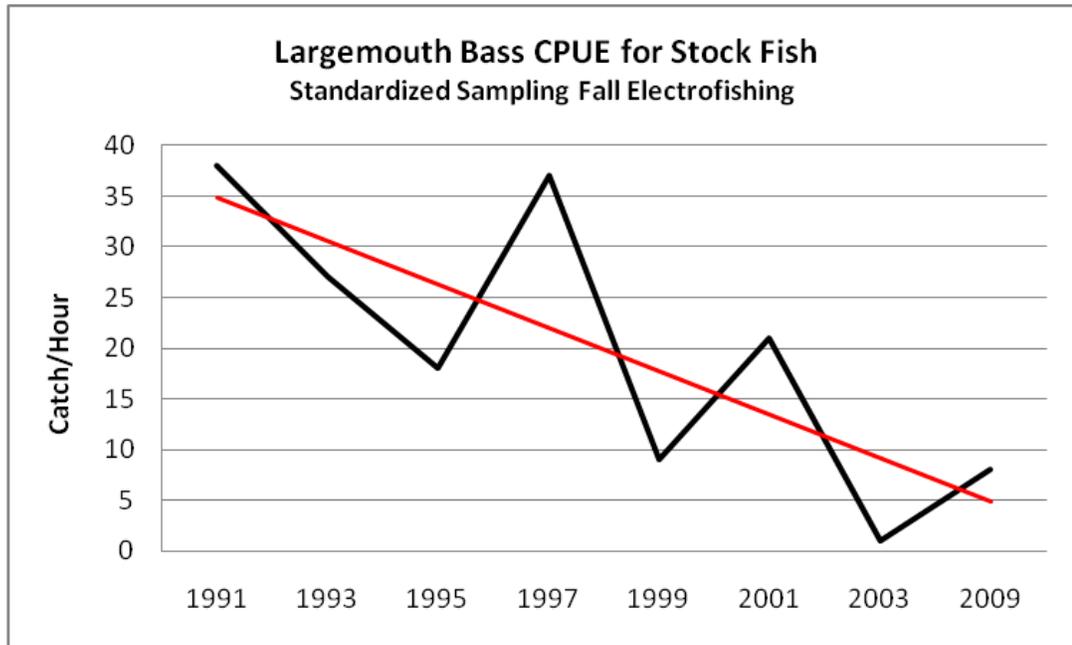


Figure 2. CPUE for stock-sized largemouth bass on Bussey Brake Reservoir, LA from 1991-2009. Trend line illustrates the long-term decline of bass 8 – 12 inches in length.

Forage

Sunfish, silversides, and cyprinid minnows have been identified as the primary bass forage species in Bussey Brake (Figure 3). The most abundant forage found during seine sampling was minnows and silversides. Largemouth bass and crappie young-of-the-year (YOY) made up a relatively insignificant portion of all fish captured during these seine surveys. Forage availability is measured through shoreline seine sampling and indirectly through measurement of largemouth bass body condition or relative weight (W_r). Relative weight is the ratio of a fish’s weight to the weight of a “standard” fish of the same length. The W_r index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth bass relative weights below 80 indicate a potential problem with forage availability. Bussey Brake relative weights have remained at or near 100 for all size groups over the past 20 years, indicating that adequate forage is available for bass in this reservoir.

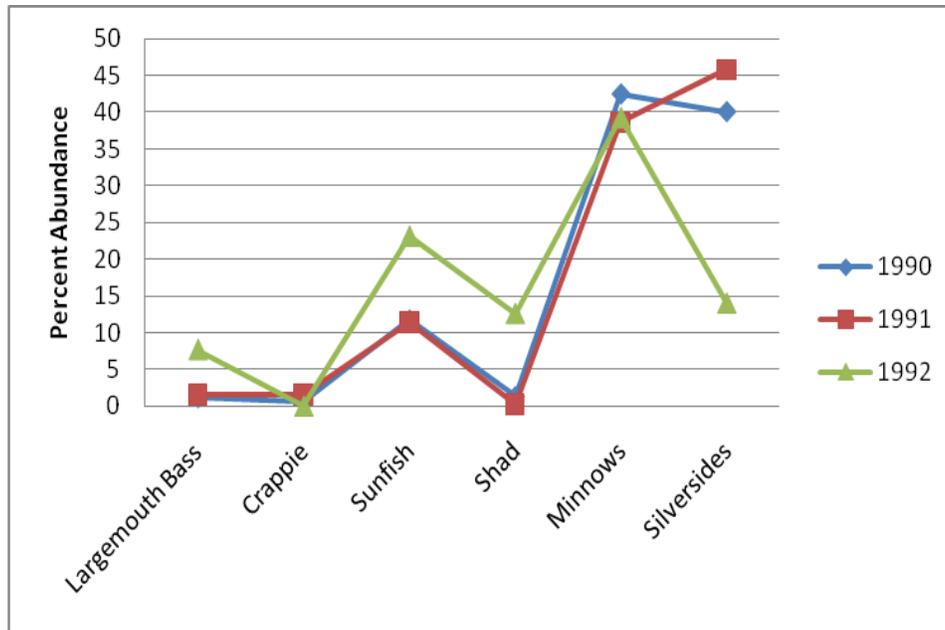


Figure 3. Percent relative abundance of fish captured during standardized seine surveys on Bussey Brake Reservoir, LA between 1990 – 1992.

Crappie and Other sunfish species

Extensive rotenone sampling was conducted on Bussey Brake beginning in 1959 and continuing until 1995. Rotenone sampling was used to indicate status of predatory and non-predatory fish abundance. Table 1 shows biomass (standing stock) estimates for crappie and sunfish species captured using rotenone sampling from 1980 until 1995. Biomass of black crappie was less than white crappie each year with the exception of 1982, 1983, and 1985. Sunfish biomass was lowest in 1995 with only 3.77 lbs per acre. Total weight of available-size non-predatory game fish (sunfish) ranged from 2.7 – 160.6 lbs per acre with a yearly average of 48 lbs per acre. Crappie ranged from 0.3 – 72.2 lbs per acre with a yearly average of 14.5 lbs per acre.

Forage sampling was conducted with electrofishing in the years 1997, 1999, and 2003. Forage abundance for the 2003 sample was greatly reduced compared to the other years sampled (Figure 4). Potential explanations include to sampling error or an actual reduction in sunfish abundance.

Crappie age and growth data were collected in 1998 using frame nets (Table 2). Only white crappies were captured in this sample. The average length for an age-1 fish was 171.7 mm and the average weight was 67 grams. In 2007, crappie sampling was conducted using standardized lead nets (Figure 5). Only one black crappie was collected in this sample. Stock-size fish were the most abundant fish captured in lead net sampling with five inch fish being the most common. Relative weights of white crappie in 2007 ranged from 85 – 91 percent among all age classes. The relative weights were

lower than optimal, but not at a level of concern. Explanations could include inhibited sight feeding on small aquatic insects and minnows due to increased turbidity or an actual reduction in crappie forage. The low number of black crappies captured in these samples may also be indicators of increased turbidity, as white crappie are more tolerant of turbid conditions.

Table 1. Biomass (standing crop) estimates for white and black crappie and sunfish species collected during standardized rotenone sampling on Bussey Brake Reservoir, LA from 1980 until 1995. Average biomass estimates are shown in pounds per acre.

Year	White Crappie	Black Crappie	Sunfish Sp.
1980	0.6	0.45	49.84
1981	2.12	1.0	61.16
1982	0.76	1.05	46.14
1983	0.26	0.29	16.97
1984	5.8	3.16	48.28
1985	1.49	2.28	31.89
1986	1.58	0.99	45.97
1987	9.3	1.52	34.27
1989	1.56	1.36	44.49
1993	7.29	0.05	6.69
1995	18.6	1.66	3.77

Table 2. White crappie age and growth data from frame net sampling on Bussey Brake Reservoir, LA in January, 1998. Average length and weight at age are shown with the number of individuals sampled from each age class.

Age	Average Length (mm)	Average Weight (grams)
1 (n=38)	171.7	67
2 (n=31)	260	272.3
3 (n=15)	325.8	537.1
4 (n=3)	352.7	663.3
5 (n=3)	331.7	534
6 (n=2)	307.5	432
7 (n=1)	285	368

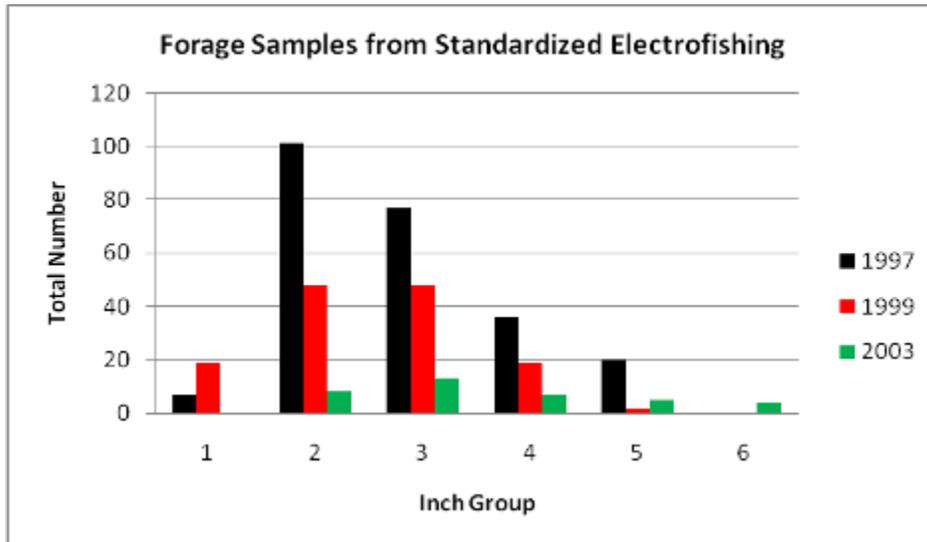


Figure 4. Total number by inch group of sunfish captured during standardized electrofishing (forage samples) at Bussey Brake Reservoir, LA from 1997 – 2003.

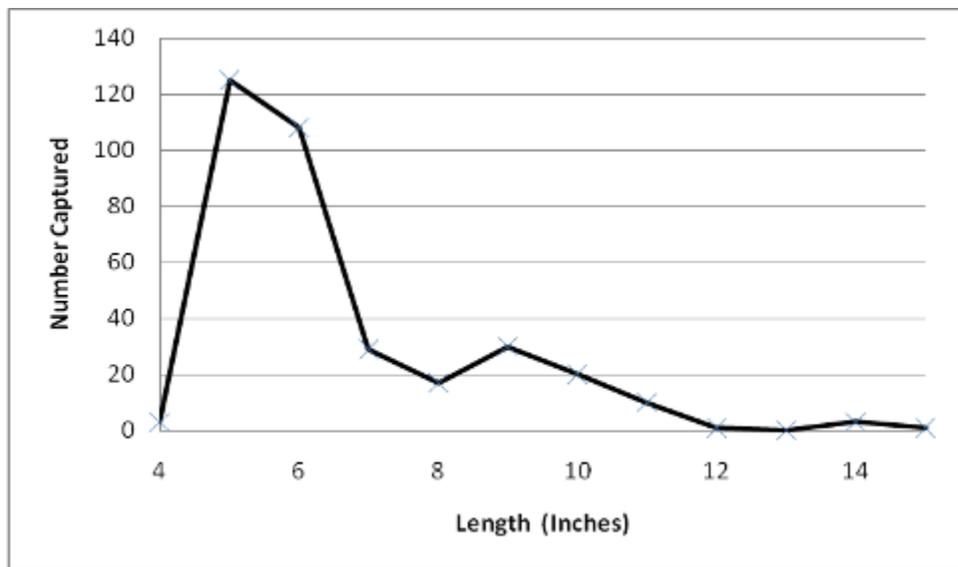


Figure 5. Number of white crappie captured per inch group using lead nets on Bussey Brake Reservoir, LA in October, 2007 sample.

Commercial

Commercial netting has been prohibited by International Paper Company from time of impoundment to date. Gill netting has been allowed on a contract basis for rough fish control only. Common carp were the most abundant commercial species found in Bussey Brake. The largest harvest of carp came in 1996 with nearly 58,000 lbs being

harvested (Figure 6). The greatest harvest of channel catfish and buffalo was in 1994 with almost 29,000 lbs of channel catfish and 7,600 lbs of buffalo being harvested (Figure 5). Commercial fishing in 1994 was allowed from April thru December and for the entire year during 1995 and 1996. Commercial fishing was conducted for only five months, January thru May, which is the primary reason for the reduced harvest in 1997.

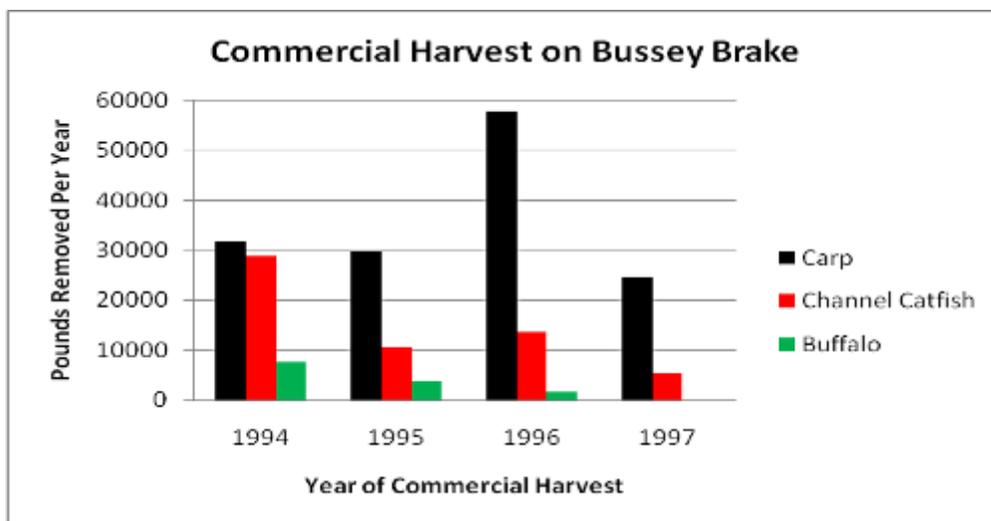


Figure 6. Commercial fishing harvest on Bussey Brake Reservoir, LA between 1994 - 1997.

HABITAT EVALUATION

Aquatic Vegetation

Bald cypress trees (*Taxodium distichum*) were planted on two transverse rows prior to impoundment in order to form windbreaks. Aquatic vegetation is very sparse in the impoundment with a few areas containing American Lotus (*Nelumbo lutea*). Excessive turbidity resulting in a reduced photic zone is likely the cause of the decline in submerged aquatic vegetation. Wind and wave action control emerged vegetation. No aquatic vegetation sampling has been conducted. It has been 20 years since the last herbicide application on Bussey Brake Reservoir for control of nuisance vegetation.

Substrate

The loamy substrate of Bussey Brake Reservoir does not provide a firm spawning habitat for nesting fish. Activity of bottom oriented fish species, primarily common carp, creates chronic water turbidity throughout the impoundment. Rip-rap, in the form of concrete rubble, has been placed around much of the shoreline to protect the levee from wave action. The layer or hard surface extends a few feet above and below the normal water line. It provides quality cover for small fish and even cavities for spawning catfish.

Available complex cover

Standing timber represents the most abundant form of complex cover in Bussey Brake. Much of the current lake bottom was covered with large trees at the time of impoundment. Most of the trees are now broken off at the water surface, with only vertical stems remaining. Much of the submerged limbs also break off over time, reducing the amount of horizontally oriented structure. In 2001, numerous trees around the perimeter of the impoundment were “hinged” with a chainsaw and allowed to fall from the shoreline into the water. Figure 7 shows a hinged tree toppled into the water. By hinging the trees versus cutting completely through the stems, the trees were held in place along the shoreline (Figure 8). This project was in an effort to increase the amount of complex cover for protection of young fish and to potentially increase angler success.



Figure 7. A “hinged” tree has been toppled into the water along the shoreline of Bussey Brake Impoundment, LA, 2001.



Figure 8. Tree tops are held in place by “hinging” and provide shoreline cover for fish in Bussey Brake Impoundment, LA, 2001.

Artificial Structure

No artificial structure has been placed in Bussey Brake.

CONDITION IMBALANCE / PROBLEM

The primary problem for Bussey Brake Reservoir has been the degradation of the sport fish populations caused by the influence of common carp and other rough fish species. It is suspected that the fish were introduced into the impoundment during the frequent water pumping from the surface source, Bayou Bartholomew. These species compete directly with sportfish at certain life stages for food and spawning habitat. The bottom feeding habits of these fish, along with those of channel catfish, keeps turbidity levels high, which consequently lowers the water quality, prevents growth of aquatic macrophytes, reduces spawning habitat, and impairs the feeding ability of predatory species. High turbidity also increases the possibility of fish kills from an increased anoxic zone void of dissolved oxygen. The wild water supply used for refilling will remain a potential source for unwanted organisms during each operation.

CORRECTIVE ACTION NEEDED

Renovation of the entire impoundment is needed to reduce or eliminate the rough fish population within the reservoir and firm up bottom substrates through drying/oxidation. Pumping “wild” water from Bayou Bartholomew must be controlled to avoid the continued introduction of rough fish, including Asian carp into the impoundment. The

impoundment has no tributaries and with the exception of tremendous rainfall, pumping is only method of refilling the impoundment. If water from Bayou Bartholomew remains the source for refilling, methods to prevent, or reduce transfer of unwanted organisms should be pursued. One concept is a filtering device to prevent larval fish from entering the lake. Pumping should also be scheduled for times that would minimize the likelihood of larval fish introduction. Late fall through mid-winter are generally considered to be the “safest” times for pumping. The following spawning temperatures for the species of concern should be considered:

- Common Carp: 14.5°C – 20°C
- Smallmouth Buffalo: 13.9°C – 21.1°C
- Bigmouth Buffalo: 14.4°C – 26.7°C
- Black Buffalo: similar to Smallmouth and Bigmouth
- Bighead Carp: 18°C – 30°C
- Silver Carp: 18°C – 26°C

RECOMMENDATIONS

The closing of International Paper Company in Bastrop in 2009 may offer the opportunity to improve the fisheries in Bussey Brake with management options not feasible in the past. The fisheries have always been secondary to the primary purpose of water supply for the paper mill. The impoundment is currently available for acquisition. The following recommendations are submitted for improvement of the sport fish population in Bussey Brake Reservoir.

1. Conduct bathometric study of the impoundment to determine location and extent of remaining water in the impoundment that will need treatment after a drawdown is conducted.
2. Draw down the reservoir to the maximum extent possible. Pump remaining water out to the extent possible. Apply the fish toxicant, rotenone to all remaining water to eliminate the existing fish population.
3. Allow the reservoir area to remain dry for a minimum of 12 months.
4. To most effectively prevent transfer of unwanted fish into Bussey Brake Reservoir, pumping must be discontinued. Unfortunately, without pumping the refill process would be slow, if it occurred at all with normal rainfall. If allowing the impoundment to naturally refill is not possible or feasible, pumping in late fall through mid-winter could be conducted with reduced risk. Water temperatures in Bayou Bartholomew should be monitored in late winter and pumps should be shut off when temperatures near the listed spawning temperatures for species of concern. A filtering device should be installed on the pump, if possible to reduce the introduction of larval fish. It is believed that the current pumping system would allow the impoundment to be completely refilled in approximately 5 months of continuous pumping. The existing pump can increase water elevation by approximately 1 inch per day.
5. Restock with fish at rates and as per procedures outlined in the LDWF Stocking Policy. Fish species to include: largemouth bass, bluegill, redear sunfish, channel catfish, flathead catfish, threadfin shad, gizzard shad, black crappie, and white crappie.
6. Continue scheduled standardized sampling of fish populations and aquatic vegetation to determine status over time. Include evaluation of crappie and sunfish populations with the use of standardized lead nets and electrofishing forage samples.