

Performance Report  
Job A, District II-C

Objective: To recommend habitat improvement, fisherman information, fish population manipulation, vegetation control, pollution control, fisherman access, facility development and fishing regulations for existing and proposed public waters of Texas.

I. Summary: The 1979 study area of the lower Colorado River was confined to eight stations, two per access point, between Webberville, Travis County, and Smithville, Bastrop County. Fish were collected by gill netting, seining, electrofishing, and trawling. Public access, aquatic vegetation and fish habitat were also observed.

Surveys confirmed angler success reports with indications of excellent channel catfish and Guadalupe bass populations and evidence of substantial channel catfish reproduction. An abundant blue sucker population, previously reported as depleted, was discovered. Excellent fish habitat for these species was observed.

Management recommendations were: stock blue catfish fingerlings, conduct research to determine if smallmouth bass should be stocked, continue monitoring of blue sucker populations to prevent possible endangerment of this species, construction of a concrete boat ramp under State Hwy 183 bridge, renovation of Webberville County Park with fishing facilities provided, improvement of road and boat ramp at Bastrop City Park, publication of water releases from Town Lake (Austin) and strict enforcement of commercial fishing laws in the Travis County portion of the Colorado River.

II. Significant Deviation: None

III. Cost: \$10,000.00

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## DESCRIPTION OF STUDY AREA

The Colorado River of Texas, begins in Dawson County near the Texas-New Mexico border. After flowing more than 600 miles in a south easterly direction this river empties into Matagorda Bay, Matagorda County, along the Texas Gulf Coast. There are numerous impoundments on the upper Colorado watershed including the seven "Highland Lakes". The water released from these reservoirs by the Lower Colorado River Authority (LCRA) directly affects the flow of the river downstream.

Surveys were conducted along portions of the lower Colorado River beginning at the Travis County Park in Webberville (13-miles east of Austin on State FM 969) and ending 14 river-miles downstream of the U. S. Hwy 71 bridge at Bastrop, Texas (Fig. 1). Survey stations were both upstream and downstream of the following locations: county park at Webberville (1 & 2), State FM 969 bridge near Utley (3 & 4), city park near U. S. Hwy. 71 bridge at Bastrop (5 & 6), and Copperas Creek (7 & 8).

The study area included portions of Travis and Bastrop Counties. In Travis County the Colorado River traverses the Blackland Prairie, consisting of deep calcereous Bergstrom loam and silty Norwood clay soils. Both are moderately alkaline due to their limestone origin. Agriculture crops supported by these soils include cotton, sudangrass, corn, grain sorgum, oats, and wheat. Along the river dense growths of underbrush, poison ivy, and wild mustang grape vines can be found. Pecan, mesquite, hackberry, ash, cottonwood, sycamore, willow, and varieties of oak were also observed.

In Bastrop County, the Colorado River flows through the "Lost Pines Forest" of Texas. This forest contains mixed hardwoods of hickory, blackjack and post oaks, thickets of eastern redcedar, and yaupon, in addition to approximately 38,000 acres of loblolly and slash pines. Bald cypress are also found along the river's edge dispersed among similar species of trees in Travis County. The soils of this region, commonly referred to as the Texas Claypan, are acid sands of both Bosque and Smithville loam. Outcroppings of sandstone and iron rocks are common to hillsides and the high cut river banks of red clay subsoil south of Bastrop. Land use is primarily ranching with some pecan orchards found along the river. Grasses associated with these pastures are love, Indian, Johnson, bermuda and bluestem varieties.

This portion of the Colorado River has two flow patterns, each having a six months duration. The U. S. Geological Survey recorded a mean daily flow of 334 cfs from October 1977 through March 1978 at Hwy 183. The flow increased during April through September with a mean daily flow of 2,102 cfs. Complete data for 1979 are not available (Table 2), however, visual observations support the six month flow trend of 1977 and 1978. These high flow periods result from LCRA water contract requirements with downstream rice farmers during planting periods. Agreements to maintain some constant level reservoirs among the "Highland Lakes", despite runoff waters from watersheds, must also be kept.

The physical strata of the river bottom was easily observed during the low water months. The water levels dropped between 4 and 6 feet leaving exposed sand flats, banks, and occasional islands. Clear, shallow water flats, (often

less than a foot deep) became common place. Deep pools were easily located and exposed large sandstone and iron rock boulders were seen. Scattered throughout the entire river were riffles composed of fist-sized flint rocks. These shallow areas of rock substrate had dense mats of water stargrass (Table 1).

Channel catfish and Guadalupe bass were the two most abundant game fishes collected. Other important sport fishes included flathead catfish, white bass, striped bass and their hybrid, largemouth bass, white crappie, and eight species of sunfishes. The blue sucker, reported to be depleted in this area (Hubbs, 1976), was found to be abundant.

#### MATERIALS AND METHODS

Water quality parameters were measured by the Texas Department of Water Resources personnel at fixed based stations. Data were limited to their sampling periods and designated parameters. Measurements were taken at two stations, one within the river survey area (Bastrop City Park) and one upstream (Del Valle at State FM 973). All measurements were taken at a depth of one foot.

Availability and diversity of fish habitat were noted during field surveys. Water fluctuations and bottom types were observed and recorded. Common aquatic vegetation and shoreline associated terrestrial vegetation were identified in the field. Collection and subsequent laboratory identification using Fassett (1957) and Correll and Correll (1975) .

The fish community of the Colorado River was sampled by seining, gill netting, electrofishing, and trawling. Species identification followed Anon. (1968) and Eddy (1969). Common and scientific names used were in accordance with Bailey et al. (1970).

Seining was conducted at eight designated stations during April, July, August, September and October. Stations were selected upstream and downstream from the four river access points. Four additional stations were seined during July and September at selected habitat types and tributaries. A 26-foot seine, constructed of  $\frac{1}{4}$ -inch mesh nylon having a six-foot square bag, was used for all seine collections. Seine collections were made between 8 am and 5 pm. Fish collected were preserved in 10 percent formalin for subsequent identification and enumeration.

Gill nets were used to sample the deep river pools during the low flow periods of February and October. Monofilament gill nets, 200 feet long and eight feet deep, were set at sunset and retrieved at dawn. Mesh size increased by  $\frac{1}{2}$ -inch increments from  $\frac{1}{2}$  to 4-inch at 25-foot intervals. One net per station was set parallel to the bank in the river channel either as an entire or bottom set. Collected fish were sorted, counted, individually weighed, and measured by species.

Electrofishing surveys were made during the day in April, due to swift river currents. February and July collections were completed at night as prescribed in A Manual of Survey and Management Techniques for Reservoir and Stream Management (Texas Parks and Wildlife Dept. 1978).

A trawl made of  $\frac{1}{2}$ -inch mesh nylon, with a mouth 10 feet wide and 2 feet deep, was employed during October night sampling. Ten minute drags were made using the 16-foot long device lined with a  $\frac{1}{8}$ -inch mesh nylon sock. The trawl was pulled by a 14-foot boat powered by a 25-hp outboard motor from a pipe towbar designed by Bonn (1968). Specimens were processed according to seining procedures.

Scales from Guadalupe bass taken during April electrofishing collections were taken for age and growth analysis. Information recorded with each scale sample included (1) sex, (2) total length (TL) in millimeters and (3) weight in grams. Scales were pressed on clear plastic slides for later reading and back calculation of TL by year class, described by Prentice and Whitesides (1974). Channel catfish age and growth analysis was calculated from a similar process using sections of the left pectoral spine.

Existing regulations were reviewed to determine if the river fisheries of District II-C would benefit from changes in present commercial and sport fishing laws. Public hearings were attended to propose changes in existing regulations to the public.

## RESULTS AND DISCUSSION

### Physicochemical Characteristics

The Colorado River mean daily flow measured 225 cfs at Austin (State Hwy 183 bridge) October 1978 through March 1979 and 653 cfs during the same period at Bastrop ( $\frac{1}{2}$ -mile above State Hwy 71 bridge). The flow increased from several tributaries which drain water into the river downstream from Austin. Although data was incomplete for 1979, measurements from April and May 1979 showed a similar flow increase at Austin (2,030 cfs/day) and Bastrop (2,393 cfs/day).

Data from the Bastrop station furnished the only turbidity measurements (Table 3). Turbidity increased from 0 JTU in February 1978 to 45 JTU in May 1978. Increases in turbidity corresponded to the increases of water released from Town Lake at Austin.

All water quality parameters measured were within tolerance ranges of native fish species. Dissolved oxygen varied from 7.3 to 15.0 ppm and temperature ranged from 9.9 C to 27.5 C.

### Fish Habitat

Fish habitat for this portion of the Colorado River was substantial and diversified. Numerous overhanging tree canopies and root formations above undercut river banks furnished both shade and shoreline habitat. Submerged log jams and drift wood were common throughout the river. Electrofishing produced largemouth bass and channel catfish from these areas. Alternating pools, sand flats, and rock riffles constituted the river morphology.

Dense mats of water stargrass were observed in conjunction with rock and gravel riffles. The association of plant life with riffles was attributed to several interrelated ecological factors. The fist-sized rock and subsequent smaller

gravel acted as a filter of the river water as it passes over and through the formations. The substrate traps nutrients required for aquatic plant life. It also offers sufficient foundation protection from the intense river currents (March-September) coincidental to the primary growing season.

These vegetated riffle areas are important to the river ecosystem; aquatic life abounds in them. Habitat preference of numerous minnow and other forage species and associated predators (channel catfish and Guadalupe bass) was indicated by electrofishing these riffles.

Minnow species and channel catfish fingerlings were collected from waters associated with flat sand bottoms by day seining and night trawling. Night observations aided by a "Q"-beam spot light revealed further habitat utilization of these clear waters by schools of large gizzard shad, river carpsucker, and blue sucker.

As indicated electrofishing returns, back-waters of tributaries and pools offered excellent spawning habitat for sunfishes, largemouth bass, and gizzard shad. These deep pools furnished a place of seclusion for fish during the low flow periods.

#### Fish Community

Forty-three species of fish were identified from four methods of collection during this survey (Table 4). A similar survey of the Colorado River by Tilton (1956), from Austin to Matagorda Bay of the Texas Coast, collected 59 species by three methods. Upstream above the "Highland Lakes" in Runnels County, Follis (1978) collected 26 species by three methods.

Forage Fishes: Blacktail shiner was the most abundant of all forage species, accounting for 56 percent of the 1,901 specimens seined. Tilton (1956) found 60 percent of the specimens seined was blacktail shiner, the most abundant forage collected. Only 2 percent of the 3,141 specimens seined by Follis (1978) was blacktail shiner. While red shiner and mimic shiner minnows comprised 6 percent each of the seined fish in this study, Follis (1978) reported 88 percent red shiner and no mimic shiners collected. In both studies, 4 percent of the seined collection was bullhead minnow. Reproduction of these four species was confirmed by seine and trawl samples (Tables 5, 6, and 7).

Gizzard shad fingerlings were collected only during July seining from one station (Table 5). Despite recovery only once in 44 seine drags, these fingerlings were the second most abundant of all the forage seined. A few specimens of threadfin shad were seined during September and October. While appreciable numbers were not collected, these fish are believed to be important forage.

Other significant forage fish collected included mosquitofish, Mississippi silverside, eight species of sunfish and Rio Grande perch.

Sport Fishes: White bass, striped bass, and their hybrid were collected during February and October netting surveys (Tables 8 and 9). All were thought to be present in greater numbers than reflected by netting data. Sampling bias, from

netting pools isolated by rock riffles during low water conditions, offered possible explanation. Upstream areas near Longhorn Dam of Town Lake have resulted in excellent catches of all three species during discharge periods. While the river was not stocked with either of these exotics, Town Lake has received numerous stockings of these species.

Channel catfish, the subject of much controversy among local residents and considered by most anglers as the most significant sport fish of the entire Colorado River, were collected by every sampling method. Despite the 1978 stocking of the species by this agency, natural reproduction was confirmed both by the seine and trawl collection (Tables 6 and 7). Since the seine collections yielded only 10 specimens from one station, an alternate sampling method was determined necessary. Even though limited by water flow conditions and availability of un-observed sample sites, a trawl proved to be the most efficient device for collecting fingerling catfish. During limited October use, trawling returned 37 channel catfish fingerlings from six stations. A late summer spawn seemed probable, since 70 percent of these fish represented a strong 2-inch class. The mean weight of channel catfish collected by electrofishing (1.5 lb) and combined netting (1.5 lb) was heavier than those shocked (0.6 lb) and netted (1.3 lb) upstream by Follis (1978).

Age and growth data of the channel catfish (Table 11) showed an average TL of 189.61 mm for yearling catfish and 308.65 mm for a two year old fish. Length-weight regression for channel catfish was computed to be:

$$\text{Log Weight (g)} = -4.7 + (2.9) \text{ Log Total Length (mm)}.$$

Comparisons of calculated growth curves for channel catfish from selected reservoirs and the lower Colorado River indicate excellent growth rates for this species in the study area (Figure 2).

Blue catfish were not collected during this survey. Tilton (1956) collected blue catfish along the entire Colorado River from Travis County to the Texas Coast. He reported occurrence of this species was more common downstream.

Flathead catfish were considered to be the trophy fish by the many trotline fishermen of this river. A 27.2 pound specimen was netted in February. Great numbers were not collected; however, their role in the fishery as a predator and sport fish was most important. One 5-inch flathead was collected, but the extent of reproduction could not be established.

Largemouth bass were well represented in the electrofishing collections, with one bass weighing 6.4 pounds from the February collection. This species preferred the slower current of back-water pools and tributaries. The association of these fish to certain structure habitats was evidenced during the electrofishing surveys. Reproduction was verified from July seining collections (Table 5). While largemouth bass were considered an important sport fish of the river, fishing pressure was considered minimal.

Guadalupe bass were collected at a rate of 4.8 fish for each 15-minutes of electrofishing (Table 10). While this species seldom attains the size preferred by bass anglers, fishermen were observed with several 1 to 2 pound

Guadalupe bass during October. The river furnishes ample forage for this fish including insect life, crayfish, minnows, and sunfishes. The numerous riffles offer excellent habitat. Since these areas could not be seined, reproduction was not confirmed. However, April 6, 1979 electrofishing collected four gravid female Guadalupe bass (6 ounces to 1 lb. 10 oz.) which spawned five days later at the San Marcos State Fish Hatchery (Hutson, personal communication).

Age and growth data of the Guadalupe bass (Table 12) showed an average TL of 100.03 mm for yearlings and 148.05 mm for a two year old fish. Length-weight regression for Guadalupe bass was computed to be:

$$\text{Log Weight (g)} = -2.5 + (1.9) \text{ Log Total Length (mm)}.$$

One white crappie was collected during October netting (Table 9). As expressed by Tilton (1956), crappie were not considered present in significant numbers to be important to the fishery. Eight species of sunfishes were collected (Table 4). While some could be considered sport fish, local anglers utilize them as bait for the numerous limb and trotlines observed along the river. Freshwater drum were collected only in small numbers, but were reported to be an important species according to fishermen interviews. Abundant small freshwater clams found throughout the study area undoubtedly sustain this species.

Rough Fishes: Blue sucker were the most significant catch by weight from the entire survey, but they were not reported by Tilton (1956). Numerous surveys of the "Highland Lakes" (Butler, 1977) and Follis (1978) made no mention of this species. Hubbs (1976) reported the fish as depleted from this area. Blue sucker prefer large rivers with sufficient currents to keep silt deposits from accumulating over associated river gravel and sand (Pflieger 1975).

February netting (Table 8) took 65 blue suckers totaling 345.1 pounds. October nets yielded only 19 blue suckers (Table 9). The mean weight decreased from 5.3 pounds in February to 3.7 pounds in October. This weight reduction trend was noticed for all species netted except the one freshwater drum collected (Table 9). The weight gain prior to spring spawning offered a possible explanation.

Other rough fish collected included spotted and longnose gar, carp, river carpsucker, smallmouth buffalo, and gray redhorse (Table 4). The American eel was collected by electrofishing and was observed along the bottom in the clear water at night with the aid of a "Q"-beam light. This species, although not collected by Tilton (1956), was reported by Hubbs (1955). A report of a bow fisherman taking a 7½-foot alligator gar weighing 169 pounds was received at the time this report was written. It was shot in Willbarger Creek.

#### Public Access and Facilities

Travis County Park at Webberville, a 2.5-acre site, has a narrow concrete boat ramp and limited areas for fishing and picnic activities. During low water periods, deep water is inaccessible from the boat ramp. Steep river banks overgrown with underbrush inhibit effective angler utilization of this facility. Domestic sanitation and concession facilities are also lacking. This park affords the only public access to the Colorado River in Travis County downstream of the U. S. Hwy 183, Montopolis Bridge at Austin. The area at the bridge

provides public access, but no boat ramp is available.

Investigations and meetings with Travis County Commissioner, Precinct I, disclosed the recent county acquisition of 100 acres located 4 river-miles downstream of the Webberville Park. This land will be developed with the assistance of this agency and matching federal funds. The park will have controlled access and camping by permit at 12 sites with electrical hook-ups. The large native pecan trees furnish both shade and a forest atmosphere. Areas will be provided for picnicking, camping, fishing, hiking, kite flying and a children's playground. This 3,600-foot river front park will have a double lane concrete boat ramp and designated areas selected for construction of fishing facilities. This rural park is scheduled to open for limited use in February 1980.

Bastrop County has two public access points within the study area. Under State FM 969 bridge, referred to as the Utley Bridge, a concrete boat ramp and one picnic table are available to the public. A city park at Bastrop offers limited picnic and utility hook-up sites, a concrete boat ramp, night security lighting, and bank fishing. Neither site in Bastrop County provides domestic sanitation facilities.

#### Fisherman Information

Difficulty in planning fishing trips on the river was expressed by out of town anglers, since they have no advance knowledge of water flow conditions.

#### Fish Harvest Regulations

Existing fishing regulations permit adequate harvest of the fisheries resources. However, commercial fishing has been quite extensive in this portion of the Colorado River for generations. The taking of channel catfish for sale is permitted in Bastrop County, but not in Travis County. Fishermen interviews indicated channel catfish taken from the Colorado River and its tributaries of Travis County have been transported and sold in Bastrop and surrounding areas.

Statewide changes in fish harvest regulations during 1979 included an increase in bag and possession limit of striped bass and hybrid striped bass. For striped bass the change was from three to five per day and from six to ten in possession. Bag and possession limits for hybrid striped bass were also abolished.

### MANAGEMENT RECOMMENDATIONS

#### Physicochemical Characteristics

Water quality data indicated suitable conditions for maintaining the available fisheries.

#### Fish Habitat

Surveys indicated fish habitat was both substantial and diversified for the portion of the river studied.

### Fish Community

It is not known why blue catfish were not collected during the survey. The inability to adequately sample the river during swift water conditions leaves some doubt to the presence of this species. Unconfirmed angler catches of an occasional blue catfish were reported. Considering angler utilization of the fishery, it is recommended that 4-inch fingerling blue catfish be stocked to expand or restore this species to the river study area. Favorable habitat conditions appeared to be present for both blue and channel catfish. Pflieger (1975) reported that blue catfish change from an invertebrate diet sooner than channel catfish. He reported fish in the diet of a 4-inch blue catfish. Channel catfish are not thought to make this transition until they are 11-12 inches in size. Blue catfish are known to attain larger size than channel catfish and could be expected to be more plentiful than the flathead catfish. This expanded fishery could help crop the abundant adult gizzard shad populations of the river and hopefully increase the harvest weight of sport fishes in the future. Future monitoring of the blue and channel catfish populations should be conducted to determine stocking success and species coexistence.

Based on the abundance of Guadalupe bass and the similar preferences for food and habitat they share with smallmouth bass, it is believed that an excellent smallmouth bass fishery could be established. If both of these bass could maintain species integrity of subsequent populations without excessive hybridization or elimination of either species, stocking recommendations should include smallmouth bass fingerlings. Smallmouth bass grow faster and larger than the Guadalupe bass in area lakes and could be expected to obtain weights over 5 pounds in this fishery. This species, if introduced, would surely increase the bass fishermen interest and utilization of the Colorado River. Research should be conducted to determine if the future stocking of this species is warranted.

Future monitoring of the blue sucker populations should be conducted to determine population trends.

### Public Access and Facilities

Construction of a concrete boat ramp under the Hwy 183, Montopolis Bridge at Austin is recommended to provide fishermen access to the Colorado River.

Multiple recommendations for Webberville Park were discussed and well received by Travis County Precinct I Commissioner. Plans were formulated to replace the existing boat ramp. A wider and longer ramp with less gradient will extend to the deep water. Picnic tables, parking spaces, and a public restroom facility will be added. A series of gabion supported planks will provide a fishing platform from the steep river bank where brush and selected trees will be cut and trimmed as needed.

Bastrop City Park needs a public restroom facility. This park is frequented by numerous people at all hours. Dust from the graveled road and parking lot is a deterrent for picnic and fishing activities. The park could be better utilized if road and parking areas were paved. Fishermen can launch at the ramp during all water levels, but the ramp gradient is very steep at the water's

edge. Boat ramp modifications and construction of a fishing platform along the river bank are recommended.

Fishermen Information

Daily publication and announcements by appropriate news media regarding the amount of water released from Town Lake at Austin are recommended.

Fish Harvest Regulations

Strict enforcement of the existing Travis County commercial fishing laws is recommended especially during the spring and summer months.

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Figure 2. Channel catfish growth curves from the 1979 collections of Lakes Bastrop, Buchanan, and E. V. Spence compared to the lower Colorado River (plotted from predicted values).

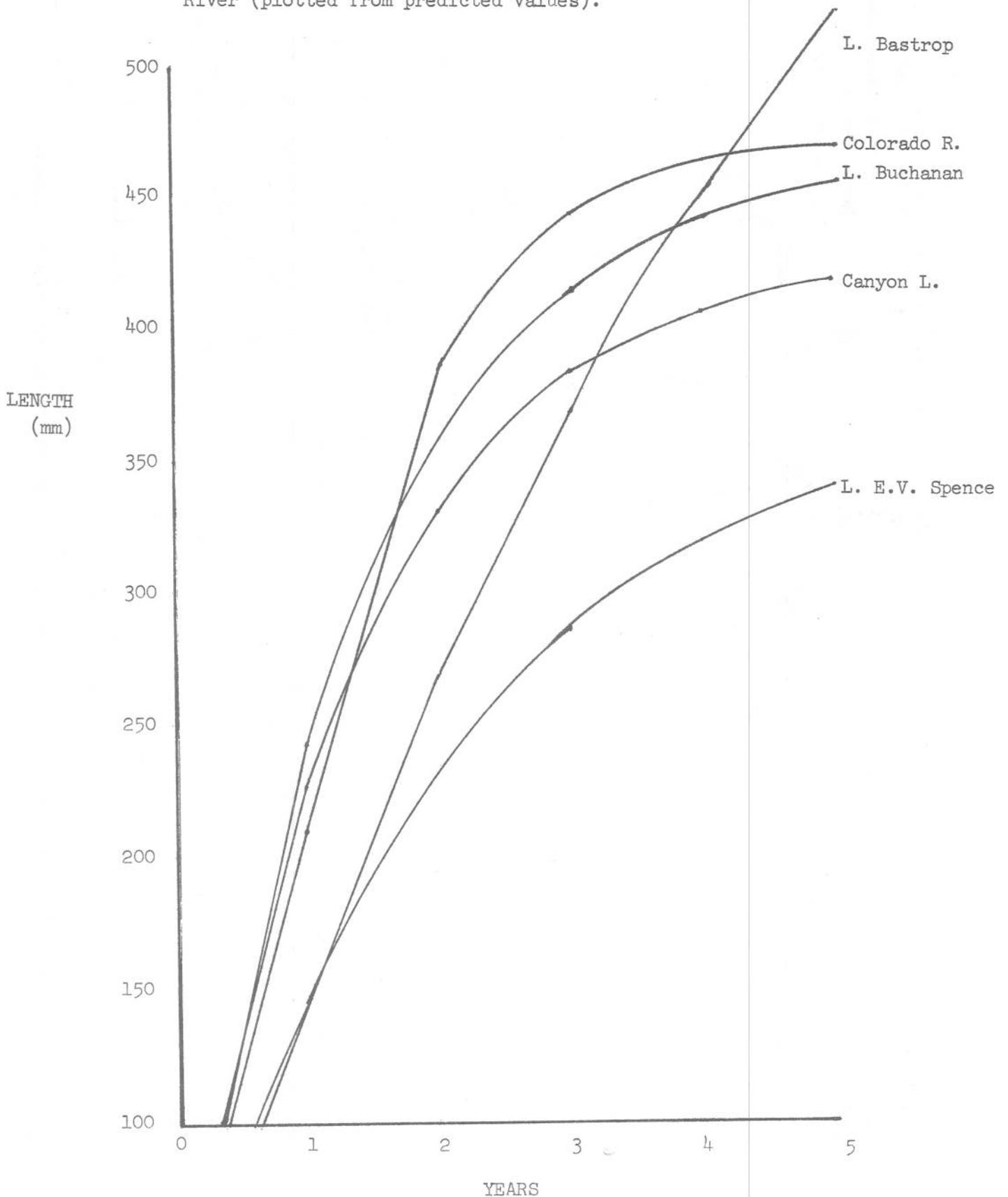


Table 1. Vegetation found associated with the lower Colorado River, Texas, September, 1979.

Common Name	<u>Species</u>	Scientific Name	Percent Area Occupied	Acres Needing Treatment
Marsh ash		<u>Fraxinus pensylvanica</u>	10	0
Pecan		<u>Carya illinoensis</u>	5	0
Hackberry		<u>Celtis occidentalis</u>	5	0
Elm		<u>Ulmus americana</u>	5	0
Black willow		<u>Salix nigra</u>	25	0
Cottonwood		<u>Populus sp.</u>	10	0
Bald cypress		<u>Taxodium distichum</u>	5	0
Button bush		<u>Cephalanthus occidentalis</u>	15	0
Cocklebur		<u>Xanthium spinosum</u>	10	0
Common cattail		<u>Typha latifolia</u>	2	0
Water smartweed		<u>Polygonum sp.</u>	10	0
Water pennywort		<u>Hydrocotyle sp.</u>	1	0
Cut grass		<u>Zizaniopsis miliacea</u>	2	0
False loosestrife		<u>Ludwigia peploides</u>	1	0
Water star-grass		<u>Heteranthera dubia</u>	25	0
Water milfoil		<u>Myriophyllum sp.</u>	5	0
Duckweed		<u>Lemna sp.</u>	1	0

Table 2. Mean daily stream flow velocities in cubic feet per second, by station and month/year, measured by U.S. Geological Survey, October 1978 through May 1979 for study area of lower Colorado River, Texas.

Site	Month/Year							
	10/78	11/78	12/78	01/79	02/79	03/79	04/79	05/79
Austin (State Hwy 183 bridge)								
	186	104	95	275	323	369	1,760	2,030
Bastrop ( $\frac{1}{2}$ mile upstream of State Hwy 71 bridge)								
	359	344	198	761	1,171	1,128	2,202	2,641

Table 3. Water quality data, lower Colorado River, Texas measured by Texas Water Quality Board for selected months 1978-1978.

Station/ date	Depth (m)	Temp. (C)	D.O. (ppm)	pH	Total Alk. (ppm)	Specific Conductance (umhos/cm)	Turbidity (JTU)
Bastrop City Park ( $\frac{1}{2}$ mile upstream from State Hwy 71 Bridge)							
02/21/78	surface	9.9	15.0	8.1	186	580	0
05/10/78	surface	24.0	7.3	7.9	201	590	45
Del Valle (state FM 973 Bridge)							
08/08/78	surface	27.5	7.2	7.7	153	595	---
10/31/78	surface	23.0	9.1	7.5	156	650	---
02/13/79	surface	18.0	8.9	7.4	186	400	---
05/30/79	surface	24.0	8.6	7.7	162	550	---

Table 4. Checklist of Fishes from the Lower Colorado River (between Webberville and Smithville, Texas).

Scientific Name	Common Name
<u>Lepisosteus oculatus</u>	spotted gar
<u>L. osseus</u>	longnose gar
<u>Anguilla rostrata</u>	Americal eel
<u>Dorosoma cepedianum</u>	gizzard shad
<u>D. petenense</u>	threadfin shad
<u>Campostoma anomalum</u>	stoneroller
<u>Cyprinus carpio</u>	carp
<u>Hybopsis aestivalis</u>	speckled chub
<u>Notropis atrocaudalis</u>	blackspot shiner
<u>N. lutrensis</u>	red shiner
<u>N. venustus</u>	blacktail shiner
<u>N. volucellus</u>	mimic shiner
<u>Phenacobius mirabilis</u>	suckermouth minnow
<u>Pimephales vigilax</u>	bullhead minnow
<u>Carpiodes carpio</u>	river carpsucker
<u>Cycleptus elongatus</u>	blue sucker
<u>Ictiobus bubalus</u>	smallmouth buffalo
<u>Moxostoma congestum</u>	gray redborse
<u>Ictalurus punctatus</u>	channel catfish
<u>Pylodictis olivaris</u>	flathead catfish
<u>Fundulus notatus</u>	blackstripe topminnow
<u>Gambusia affinis</u>	mosquitofish
<u>Poecilia latipinna</u>	sailfin molly
<u>Menidia audens</u>	Mississippi silverside
<u>Morone chrysops</u>	white bass
<u>M. saxatilis</u>	striped bass
<u>Lepomis auritus</u>	redbreast sunfish
<u>L. cyanellus</u>	green sunfish
<u>L. gulosus</u>	warmouth
<u>L. humilis</u>	orangespotted sunfish
<u>L. macrochirus</u>	bluegill
<u>L. megalotis</u>	longear sunfish
<u>L. microlophus</u>	redear sunfish
<u>L. punctatus</u>	spotted sunfish
<u>Micropterus dolomieu</u>	smallmouth bass
<u>M. salmoides</u>	largemouth bass
<u>M. treculi</u>	Guadalupe bass
<u>Pomoxis annularis</u>	white crappie
<u>Etheostoma spectabile</u>	orangethroat darter
<u>Percina sciera</u>	dusky darter
<u>Aplodinotus grunniens</u>	freshwater drum
<u>Percina caprodes</u>	logperch
<u>Cichlasoma cyanoguttatum</u>	Rio Grande perch

Table 5. Seine sampling statistics, 8 stations, lower Colorado River (between Webberville & Smithville) Travis and Bastrop Counties, Texas, April, July-October, 1979.

Species	Catch/1,000ft <sup>2</sup> by inch group					
	1	2	3	4	5	5
April						
Gizzard shad						0.4
Red shiner	0.1	1.6	0.4			
Blacktail shiner	1.3	14.8	4.5			
Mimic shiner	0.7	3.6				
Bullhead minnow		0.5				
Mosquitofish	0.3	1.8				
Sailfin molly		0.1				
Mississippi silverside			0.2			
Orangespotted sunfish		0.1				
Bluegill		0.8	0.4	0.2	0.1	0.2
Longear sunfish			0.1	0.1	0.1	0.2
totals:	<u>2.4</u>	<u>23.3</u>	<u>5.6</u>	<u>0.3</u>	<u>0.2</u>	<u>0.8</u>
July						
Gizzard shad		0.8	6.3	5.0	0.4	0.3
Speckled chub		0.1				
Red shiner	0.1	3.3	0.2	0.1		
Blacktail shiner		9.2	5.7	1.3		
Mimic shiner		0.6				
Suckermouth minnow		0.1				
Bullhead minnow		0.6	0.1			
Mosquitofish	0.9	0.8				
Mississippi silverside		0.2	0.1			
Redbreast sunfish		0.2	0.2	0.1		
Bluegill	0.1	0.2	0.3	0.2		
Longear sunfish			0.4	0.4		0.1
Redear sunfish				0.1		
Largemouth bass		0.1	0.4			
totals:	<u>1.1</u>	<u>16.2</u>	<u>13.7</u>	<u>7.2</u>	<u>0.5</u>	<u>0.5</u>
August						
Gizzard shad		0.1	0.4	0.1	0.1	0.2
Stoneroller		0.1				
Red shiner	0.4	1.1	0.1			

Table 5. (Cont'd.) Seine sampling statistics, 8 stations, lower Colorado River (between Webberville & Smithville) Travis and Bastrop Counties, Texas, April, July-October, 1979.

Species	Catch/1,000ft <sup>2</sup> by inch group					
	1	2	3	4	5	5
August (Cont'd.)						
Blacktail shiner	3.5	8.0	4.2	0.3		
Mimic shiner	1.0	1.3				
Bullhead minnow	0.2	1.1				
Gray redhorse						0.4
Channel catfish		0.2				
Blackstripe topminnow		0.1				
Mosquitofish	0.1					
Mississippi silverside		0.1				
Redbreast sunfish		0.2	0.3	0.3	0.2	
Bluegill	0.2					
Largemouth bass					0.1	
totals:	<u>7.1</u>	<u>12.3</u>	<u>5.0</u>	<u>0.7</u>	<u>0.4</u>	<u>0.6</u>
September						
Gizzard shad				0.1	0.1	0.2
Threadfin shad		0.2				
Speckled chub		0.1				
Red shiner	0.1	0.5				
Blacktail shiner	0.8	10.8	7.3			
Mimic shiner	0.5					
Bullhead minnow	0.1	0.1	0.1			
River carpsucker						0.3
Gray redhorse						0.1
Mosquitofish	0.1	0.1				
Bluegill	0.1					
Longear sunfish			0.6		0.1	0.1
Guadalupe bass			0.1	0.1		
Logperch			0.1			
totals:	<u>1.7</u>	<u>11.8</u>	<u>8.2</u>	<u>0.2</u>	<u>0.2</u>	<u>0.7</u>
October						
Threadfin shad		0.2	0.1			
Speckled chub		0.3				
Red shiner	0.2	0.7				

Table 5. (Cont'd.) Seine sampling statistics, 8 stations, lower Colorado River (between Webberville & Smithville) Travis and Bastrop Counties, Texas, April, July-October, 1979.

Species	Catch/1,000ft <sup>2</sup> by inch group					
	1	2	3	4	5	5
October (Cont'd.)						
Blacktail shiner	0.1	9.8	4.4	0.1		
Red X Blacktail shiner		0.1	0.1			
Mimic shiner		1.3	0.1			
Bullhead minnow	0.4	0.8				
Gray redbreast						0.1
Blackstripe topminnow		0.1				
Mosquitofish	1.3					
Mississippi silverside		0.1				
Redbreast sunfish			0.1			
Bluegill	0.1			0.1		
Longear sunfish			0.1	0.3		
Largemouth bass				0.3	0.4	
Guadalupe bass				0.1		
Orangethroat darter		0.1				
totals:	<u>2.1</u>	<u>12.5</u>	<u>4.9</u>	<u>0.9</u>	<u>0.4</u>	<u>0.1</u>

Table 6. Seine sampling statistics, 4 additional stations, lower Colorado River (between Webberville and Smithville) Travis and Bastrop Counties, Texas, July, September, 1979.

Species	Catch/1,000ft <sup>2</sup> by inch group				
	1	2	3	4	5
July					
Gizzard shad	1.3	4.2	0.5		
Red shiner		0.3			
Blacktail shiner	1.3	1.3			
Mimic shiner		1.5			
Bullhead minnow	0.2	0.2			
Gray redhorse			0.2		
Channel catfish	0.3	1.0			
Mosquitofish	0.7				
Bluegill	0.2				
Longear sunfish			0.2		
Largemouth bass		0.2			
totals:	4.0	8.7	0.9		
September					
Threadfin shad		0.2			
Blackspot shiner		0.3			
Red shiner	0.3				
Blacktail shiner	1.3	0.2			
Bullhead minnow	1.3	1.7			
Mosquitofish	0.5	0.2			
Mississippi silverside		0.2			
Redbreast sunfish	0.2	0.2			
Warmouth		0.5			
Bluegill	9.0	3.8	0.2		
Longear sunfish		1.0	0.2		
Largemouth bass				0.2	0.3
totals:	12.6	8.3	0.4	0.2	0.3
				0.6	0.6



Table 7. Trawl sampling statistics, 3 stations, lower Colorado River (Webberville, Utley & Bastrop) Travis and Bastrop Counties, Texas, October, 1979.

Species	Catch/10-min.drag by inch group					
	1	2	3	4	5	5
October						
Blackspot shiner		0.2				
Blacktail shiner	0.4	0.5	0.4			
Mimic shiner	13.2	12.1				
Bullhead minnow	8.4	6.3	0.2			
Channel catfish	0.4	4.6	1.8	0.4		
Redbreast sunfish		0.2			0.2	
Bluegill	0.4	0.2	0.4	0.2		
Longear sunfish	0.2	0.4	0.7		0.2	0.2
Dusky darter		0.5	0.4	0.2		
Logperch				0.2	0.2	
totals:	<u>23.0</u>	<u>25.0</u>	<u>3.9</u>	<u>1.0</u>	<u>0.6</u>	<u>0.2</u>

Table 8. Gill net sampling statistics, 8 net-nights, lower Colorado River (between Webergville and Smithville) Travis & Bastrop Counties, Texas, February, 1979.

Species	Total Number	Number per 200 ft. of net	Total Weight (lb)	Weight per 200 ft. of net (lb)	Mean Weight (lb)
Gizzard shad	148	18.5	193.1	24.1	1.3
River carpsucker	43	5.4	130.8	16.4	3.0
Blue sucker	65	8.1	345.1	43.1	5.3
Smallmouth buffalo	10	1.3	141.3	17.7	14.1
Gray redborse	4	0.5	12.4	1.6	3.1
Channel catfish	14	1.8	27.0	3.4	1.9
Flathead catfish	2	0.3	46.8	5.9	23.4
Striped bass	1	0.1	2.5	0.3	2.5
Striped/White hybrid bass	1	0.1	4.8	0.6	4.8
Largemouth bass	2	0.3	3.1	0.4	1.6
Guadalupe bass	1	0.1	2.4	0.3	2.4
Freshwater drum	1	0.1	2.0	0.3	2.0
Totals:	292		911.3		



Table 9. Gill net sampling statistics, 6 net-nights, lower Colorado River (between Webberville and Smithville) Travis & Bastrop Counties, Texas, October, 1979.

Species	Total Number	Number per 200 ft. of net	Total Weight (lb)	Weight per 200 ft. of net (lb)	Mean Weight (lb)
Longnose gar	1	0.2	1.5	0.3	1.5
Gizzard shad	55	9.2	53.6	8.9	1.0
River carpsucker	36	6.0	85.0	14.2	2.4
Blue sucker	19	3.2	69.5	11.6	3.7
Smallmouth buffalo	8	1.3	65.8	11.0	8.2
Gray redbhorse	18	3.0	34.0	5.7	1.8
Channel catfish	10	1.7	9.4	1.6	0.9
Flathead catfish	3	0.5	17.5	2.9	5.8
White bass	2	0.3	4.6	0.8	2.3
Guadalupe bass	1	0.2	1.5	0.3	1.5
White crappie	1	0.2	0.5	0.1	0.5
Freshwater drum	1	0.2	2.5	0.4	2.5
Totals:	155		345.4		

Table 10. Electrofishing statistics, lower Colorado River (between Webberville & Smithville) Travis and Bastrop Counties, Texas. April sampling days, February and July sampling nights, 1979.

Species	Number of Fish/15 min.	Weight of Fish/15 min.	Mean Weight
Spotted gar	0.5	0.5	1.1
Longnose gar	1.1	1.6	1.5
American eel	0.1	0.1	1.7
Gizzard shad	15.7	11.5	0.7
Carp	0.7	3.4	4.8
River carpsucker	2.2	4.4	2.0
Blue sucker	0.5	1.9	3.5
Smallmouth buffalo	0.1	2.5	19.9
Gray redhorse	4.5	8.0	1.8
Channel catfish	2.3	3.5	1.5
Flathead catfish	0.6	2.1	3.3
Striped bass	0.1	0.1	2.3
Redbreast sunfish	0.1	0.1	0.1
Green sunfish	0.1	0.1	0.3
Warmouth	0.9	0.2	0.2
Bluegill	6.5	0.9	0.1
Longear sunfish	3.8	0.5	0.1
Spotted sunfish	0.1	0.1	0.1
Largemouth bass	1.6	1.5	0.9
Guadalupe bass	4.8	1.6	0.3
Logperch	0.1	0.1	0.1
Freshwater drum	0.2	0.5	2.3
Rio Grande perch	0.1	0.1	0.9
Totals:	46.7	45.3	

Table 11. Average back-calculated total lengths (mm) of channel catfish from fisherman creel, April 1979, Colorado River, Texas.

Age Group	Year Class	No. Sampled	Total Length (mm) at Year					
			1	2	3	4	5	
0	1979							
1	1978	4	192.7					
2	1977	7	214.4	326.2				
3	1976	10	187.1	311.8	411.5			
4	1975	7	170.5	304.3	411.4	479.5		
5	1974	1	160.7	183.1	286.4	426.5	470.7	
Grand avg-weighted		29	189.61	308.65	404.57	472.96	470.79	
Average increments			189.61	119.04	95.92	68.39	2.17-	
Average annual incr.			189.61	119.53	102.75	77.15	44.23	
Sum of annual incr.			189.61	309.14	411.89	489.04	533.27	

Table 12. Average back-calculated total lengths (mm) of Guadalupe bass from electrofishing, April 1979, Colorado River, Texas.

Age Group	Year Class	No. Sampled	Total Length (mm) at Year			
			1	2	3	4
0	1979					
1	1978	4	117.3			
2	1977	7	89.3	148.7		
3	1976	7	103.5	151.7	188.0	
4	1975	1	80.7	117.1	151.1	228.0
Grand ave-weighted		19	100.03	148.05	183.44	228.02
Average increments			100.03	48.02	35.39	44.58
Average annual incr.			100.03	52.62	36.00	76.89
Sum of annual incr.			100.03	152.65	188.65	265.54

3-Year Management Plan for  
Lower Colorado River  
1980-1982

Reservoir Description:

The Colorado River of Texas, begins in Dawson County near the Texas-New Mexico border. After flowing more than 600 miles in a south easterly direction this river empties into Matagorda Bay, Matagorda County, along the Texas Gulf Coast. There are numerous impoundments on the upper Colorado watershed including the seven "Highland Lakes". The water released from these reservoirs by the Lower Colorado River Authority directly affects the flow of the river downstream.

Surveys were conducted along portions of the lower Colorado River beginning at the Travis County Park in Webberville (13-miles east of Austin on State FM 969) ending 14 river-miles downstream of the U. S. Hwy. 71 bridge at Bastrop, Texas (Fig. 1). Survey stations were both upstream and downstream of the following locations: county park at Webberville (1 & 2), State FM 969 bridge near Utley (3 & 4), city park near U. S. Hwy 71 bridge at Bastrop (5 & 6), and Copperas Creek (7 & 8).

The study area included portions of Travis and Bastrop Counties. In Travis County the Colorado River traverses the Blackland Prairie consisting of deep calcareous Bergstrom loam and silty Norwood clay soils. Both are moderately alkaline due to their limestone origin. Agriculture crops supported by these soils include cotton, sudangrass, corn, grain sorghum, oats, and wheat. Along the river dense growths of underbrush, poison ivy, and wild mustang grape vines can be found. Pecan, mesquite, hackberry, ash, cottonwood, sycamore, willow and varieties of oak were also observed.

In Bastrop County the Colorado River flows through the "Lost Pines Forest" of Texas. This forest contains mixed hardwoods of hickory, blackjack and post oaks, thickets of eastern redcedar and yaupon, in addition to approximately 38,000 acres of loblolly and slash pines. Bald cypress are also found along the river's edge dispersed among similar species of trees in Travis County. The soils of this region, commonly referred to as the Texas Claypan, are acid sands of both Bosque and Smithville loam. Outcroppings of sandstone and iron rocks are common to hillsides and the high cut river banks of red clay subsoil south of Bastrop. Land use is primarily ranching with some pecan orchards found along the river. Grasses associated with these pastures are love, Indian, Johnson, bermuda and bluestem varieties.

This portion of the Colorado River has two flow patterns, each having a six month duration. The U. S. Geological Survey recorded a mean daily flow of 334 cfs from October 1977 through March 1978 at Hwy 183. The flow increased during April through September with a mean daily flow of 2,102 cfs. Complete data for 1979 is not available (Table 2), however, visual observations support the six month flow trend of 1977 and 1978. These high flow periods result from LCRA water contract requirements with downstream rice farmers during planting periods. Agreements to maintain some constant level reservoirs among the "Highland Lakes" despite runoff waters from watersheds must also be kept.

The physical strata of the river was easily observed during the low water months. The water levels dropped between 4 and 6 feet leaving exposed sand flats, banks and occasional islands. Clear shallow water flats became common place, often less than a foot deep. Deep pools were easily located and exposed large sandstone and iron rock boulders were seen. Scattered throughout the entire river were riffles composed of fist-sized flint rocks. These shallow areas of rock substrate revealed dense mats of water stargrass (Table 1).

Channel catfish and Guadalupe bass were the two most abundant game fishes collected. Other important sport fishes included flathead catfish, white bass, striped bass and their hybrid, largemouth bass, white crappie, and eight species of sunfishes. The blue sucker, reported to be depleted in this area (Hubbs, 1976) was found to be abundant.

#### Physicochemical Characteristics

No pollution was found in 1979 and water quality values were adequate to sustain the fishery. This portion of the Colorado River has two flow patterns, each having a six month duration. The U. S. Geological Survey records indicate the low flow period during October through March (1977-1978 ave. 334 cfs) while the remaining months, April through September have high flow (1978 mean daily flow 2,102 cfs at the State Hwy 183 bridge).

#### Fish Habitat

Fish habitat for this portion of the Colorado River was found to be substantial and diversified.

#### Fish Community

Blue catfish were not collected during the survey. Tilton (1956) collected blue catfish along the entire Colorado River from Travis County to the Texas Coast. It is believed that this fish would make an excellent addition to the existing fishery.

Smallmouth bass should adapt readily to this portion of the Colorado River. Because of controversy concerning their hybridization with the native Guadalupe bass and its possible elimination, research of their coexistence is needed.

#### Public Access and Facilities

Travis County Park at Webberville, a 2.5-acre site, has a narrow concrete boat ramp and limited areas for fishing and picnic activities. Low water conditions render the ramp unusable. Public restrooms are lacking. A new 100-acre rural park will be opened during 1980 near the Bastrop County line along the Colorado River by Travis County. New fishermen facilities such as boat ramps and fishing piers are scheduled to be built.

Bastrop City Park lacks adequate road and fishermen facilities. The popularity of this park with fishermen could be improved if a fishing accommodation structure was installed near the boat ramp and a public restroom furnished.

### Fisherman Information

Information is lacking regarding the river flow. Radio and television news media could announce the daily discharge from Town Lake, Austin.

### Fish Harvest Regulations

Strict enforcement of existing commercial fishing laws would benefit the fishery.

### Management Recommendations:

Recommendations contained herein reflect a mutual agreement between biologist of the Texas Parks and Wildlife Department and the controlling agency.

<u>Year</u>	<u>Activity</u>	<u>Man-days</u>
1980	Present plan to agency personnel concerned with management recommendations.	2
	<u>Physicochemical characteristics</u>	
	None recommended, because existing conditions were adequate.	
	<u>Fish habitat</u>	
	None recommended, existing conditions adequate.	
	<u>Fish community</u>	
	1. Stock 100,000 4-inch blue catfish fingerlings, if hatchery production can provide fish.	1
	2. Initiate action for research to be conducted and determine probability of future smallmouth bass stocking.	2
	<u>Public access and facilities</u>	
	1. Encourage county and city agencies to begin renovation of parks and advise them as needed.	5
	<u>Fisherman information</u>	
	1. Contact local television and radio station managers and discuss possibilities of public announcements regarding daily water discharge from Town Lake, Austin.	4
	2. Notify news media of fish stockings.	1
	3. Encourage county to publicize fisherman access to public.	1

Year	Activity	Man-days
1980	Continued	
	<u>Fish harvest regulations</u>	
	1. Contact Travis and Bastrop County Game Wardens regarding commercial fishing operations in the Colorado River.	1
1980 Total		17

Year	Activity	Man-days
1981	<u>Physicochemical characteristics</u>	
	None	
	<u>Fish habitat</u>	
	None	
	<u>Fish community</u>	
	1. Stock 100,000 4-inch blue catfish fingerlings, between Austin (State Hwy 183 bridge) and Smithville, Texas.	1
	2. Gill net station #6 near Bastrop to monitor blue sucker population.	1
	3. Continue smallmouth bass research coordination.	2
	<u>Public access and facilities</u>	
	Continue to advise county and city agencies if requested.	1
	<u>Fisherman information</u>	
	1. Continue news campaign to announce water releases from Town Lake, Austin.	1
	2. Notify news media of fish stockings.	1
	<u>Fish harvest regulations</u>	
	None	
1981 Total		7

Year	Activity	Man-days
1982	<u>Physicochemical characteristics</u>	
	None	

Year	Activity	Man-days
1982	Continued	
	<u>Fish habitat</u>	
	None	
	<u>Fish community</u>	
	1. Sample river study area to determine survival of blue catfish stocking from 1980, if stocking not made until 1981 conduct survey during 1983.	2
	2. Sample river fishery if smallmouth bass were stocked.	2
	<u>Public access and facilities</u>	
	None	
	<u>Fisherman information</u>	
	1. Notify public of blue catfish and/or smallmouth bass success.	1
	<u>Fish harvest</u>	
	None	
1982 Total		5

Total estimated man-days for the proposed management of Lower Colorado River  
1980-1982 = 29 man-days.

