PERFORMANCE REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

Federal Aid Project F-30-R-11

Statewide Fishery Management Recommendations

Job A: Existing Reservoir and Stream Management Recommendations

Angelina River below Sam Rayburn Reservoir, 1985

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February 20, 1986

Performance Report
Job A. District IV-A

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

I. Summary:

The Angelina River from Sam Rayburn Dam to its confluence with the Neches River in the upper portion of B. A. Steinhagen was surveyed during 1985 by methods outlined in the Texas Parks and Wildlife Department Management Manual to identify needs for increasing fishing recreation and to recommend management techniques. A creel survey was conducted on the Sam Rayburn Dam tailrace area during March, April and May. Gill net samples were taken in August and elctrofishing samples were taken during October. Other survey techniques were carried out in association with these sampling methods.

Physicochemical characteristics and fish harvest regulations were determined to be adequate at this time. The fish community was also found to be adequate. Forage fishes present included threadfin shad, gizzard shad and sunfishes. Rough fishes present were mainly smallmouth buffalo, but several others species were also present. Sport fishes included channel catfish, blue catfish, flathead catfish, largemouth bass, spotted bass, white crappie, black crappie, hybrid striped bass and white bass. The largemouth bass populations in the mainstream river were found to be low with few legal size bass present; however, anglers fish for these species mainly in the backwaters, sloughs and oxbows. Vegetation in the mainstream river was found to not present any problems, but in the sloughs and oxbows, submerged vegetation did limit access.

It is recommended that B. A. Steinhagen Reservoir be lowered 6 to 10 feet on an annual or biannual basis during January for at least two weeks to provide some control of submerged vegetation in the sloughs and oxbows. Another recommendation was for the construction of stairs and walkways to provide better and safer access to the Rayburn tailrace. Fishermen information could be improved by more advance notice of water releases from Rayburn Dam when this information is available.

I. Significant Deviation: Gill net samples were taken during August rather than May due to time limitations of project personnel.

I. Cost: $30,000

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Date: February 21, 1986

Approved by: Philip P. Durocher
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DESCRIPTION OF STUDY AREA

The study area consists of the 25-mile segment of the Angelina River in Jasper County located between Sam Rayburn Reservoir Dam and the confluence with the Neches River at the upper end of B. A. Steinhagen Reservoir. This is in the Piney Woods Vegetational Area. Stream width in this section of the river varies from 75 to 250 feet and the water is generally clear and deep. River flow is dictated primarily by releases from Sam Rayburn Dam for power generation during March through November. The U. S. Army Corps of Engineers controls these releases.

Water quality in the river is good with pH running from slightly acid to neutral; turbidity usually very low due to water releases from Rayburn Dam; water temperatures generally ranging from 38°F. to 85°F.; total hardness and total alkalinity usually less than 30 parts per million; and conductivity ranging from 110 to 150 micromhos.

Bank fishing access is good in the tailrace area below Rayburn Dam and two improved boat ramps are present in this section of river. Boat access is also readily available from launching sites on B. A. Steinhagen Reservoir.

Fishing in the tailrace area is best during March, April and May when anglers can expect to catch crappie, white bass, hybrid striped bass, freshwater drum, channel catfish, spotted bass, largemouth bass and an occasional striped bass or walleye. Fishing in the remainder of the river segment runs from fair to good for largemouth bass, spotted bass, black and white crappie, channel, blue and flathead catfish and white bass. The primary fishing areas are located in the feeder streams, sloughs and oxbows, rather than in the mainstream areas.

MATERIALS AND METHODS

Water quality data were obtained from the Texas Water Commission for 1984 and 1985 for their sampling station on state highway 63, six miles downstream from Sam Rayburn Dam. Water release information was obtained from the U. S. Corps of Engineers at Sam Rayburn Dam.

Aquatic vegetation and fish habitat were surveyed and evaluated during August by on-site inspection. The common names of aquatic vegetation used in this report are those given in the Texas Parks and Wildlife Mangement Manual.

Gill net samples were collected during August. Collections were made using 200-foot experimental gill nets constructed of eight panels, 25 feet long, 8 feet deep of monofilament webbing with eight mesh sizes ranging in ½-inch increments from ½-inch to 4-inch bar mesh. Twenty net sites were sampled overnight with one gill net (Figure 1).

Electrofishing samples for largemouth bass and spotted bass were conducted during October. Four hours of electrofishing were carried out in the lower six miles of the mainstream area. No samples were taken from feeder streams, sloughs or oxbows (Figure 1).

A creel survey was conducted on the Sam Rayburn Dam tailrace during March, April and May to determine fisherman success and harvest during this peak

fishing period. Either one or two creel clerks covering both access points conducted this survey (Figure 1). Creel data were collected on nine randomly selected days during the survey period. Five survey days started at randomly selected times in the morning between sunrise and 9:30 a.m. and ended at sunset. When there was no generating, the creel clerks left. On four days, the creel survey was conducted continuously from 7:30 a.m. to sunset. These data were analyzed according to methods outlined in the Texas Statewide Creel Survey Program and Lambou (1960) except that the yield values were estimated from the actual catch and not from fish being sought data.

Information relating to public access and facilities, needs for fisherman information programs and harvest regulations were obtained during the process of other survey activities.

The common names of fishes used in this report are those approved by the American Fisheries Society (Robins, 1980). All methods used in this survey are outlined in the Texas Parks and Wildlife Mangement Manual.

RESULTS AND DISCUSSION

Physicochemical Characteristics

The quarterly water samples conducted by the Texas Water Commission during 1984 and 1985 revealed no problem areas (Table 1). Dissolved oxygen (Environmental Protection Agency, 1976), alkalinity (Environmental Protection Agency, 1976), pH (Environmental Protection Agency, 1976), conductivity (McKee and Wolf, 1963) and turbidity (Buck, 1956) were well within acceptable limits.

The U. S. Army Corps of Engineers' water release data for Sam Rayburn Dam during 1985 indicates that regular releases began on March 7 and continued until October 25. Releases were made only a total of 17 times during January, February and December (Table 2). Water releases ranged from only two hours per day (569 day sec. ft.) to 24 hours per day (max. 9200 day sec. ft.).

Fish Habitat

The survey of aquatic vegetation revealed no problems at this time (Table 3). Primary vegetation observed during this survey included waterweed, pondweed, water milfoil, and coontail. Emergent vegetation on the riverbanks included black willow, buttonbush and wax myrtle. While aquatic vegetation does not pose any problems in the mainstream area, the backwaters, sloughs and oxbows have become inaccessible in recent years due to growth of submerged vegetation stimulated by the relatively stable water levels of B. A. Steinhagen Reservoir.

Fish Community

Even though these data do suggest quantitative values such as relative abundance of the different fish species, comments of a quantitative nature drawn from these data must be considered speculative. This is because it is not possible to know how accurate estimates are since confidence limits cannot be calculated.

Forage Fishes: Forage species collected in the river include threadfin shad, gizzard shad, blacktail redhorse, warmouth, redear sunfish, bluegill and longear sunfish (Table 4). These species should provide an adequate forage base for sport fishes in the river system.

Sport Fishes: Gill net samples produced the following sport fishes: channel catfish, blue catfish, flathead catfish, largemouth bass, spotted bass, white crappie, black crappie, hybrid striped bass and white bass (Table 4). October electrofishing samples in the mainstream river indicated low densities of largemouth bass and spotted bass and very few legal size bass (10 inches or greater total length) present in the main river (Figure 2). However, discussions with anglers who fish this section of the river indicate that most of the fishing for bass and crappie is done in the backwaters, sloughs and oxbows.

The creel survey conducted on the Sam Rayburn Dam tailrace area indicated that hybrid striped bass (74.9±52.1 hours per acre), striped bass (69.5±50.7) and crappie (67.2 ± 47.6) were the most sought after species during the period March 1 through May 31, 1985 (Table 5). During the creel interviews, it was noted that many anglers expressed a preference for a certain species, but they retained whatever species they happened to catch. Yield per acre in the tailrace was low for a tailrace fishery in my opinion (144.9 ± 79.4 fish per acre and 72.3 ± 45.9 pounds per acre). It was made up mainly of hybrid striped bass, crappie, freshwater drum and sunfishes (Table 5).

Various standards for judging fishing quality are given in Table 6. Bennett (1971) found that most people will not fish when their catch rate does not exceed 0.1 pound of fish per hour unless some other factor is involved. All categories of fishes exceeded this minimum catch rate. The percent successful fishing parties for hybrid striped bass was 15.8 ± 11.2 percent and no limits were taken.

The values in Table 7 give the composition of the creel and the average weights calculated from these values. Redear sunfish, freshwater drum, bluegill, and white crappie were the most abundant species taken by anglers during the creel period. Despite heavy fishing pressure for striped bass and hybrid striped bass, only seven hybrid striped bass were recorded on the creel and no striped bass were observed.

The creel data summary, given in Table 8, indicated only moderate fishing pressure on the tailrace. The catch rate totals and the percent parties successful verify the observation that tailrace anglers may be seeking a specific species, but they will take whatever species of fish they happen to catch. The catch rate for sought-after species was 0.20 ± 0.08 fish weighing 0.12 ± 0.04 pounds per hour and the percent success for fish being sought was 12.0 ± 4.7 while the total catch rate was 0.64 ± 0.34 fish weighing 0.27 ± 0.09 pounds per hour and the percent success for all anglers was 34.5 ± 9.5.

Rough Fishes: Smallmouth buffalo was the most abundant rough fish taken in gill nets (Table 4). Other rough fishes included spotted gar, longnose gar, river carpsucker and freshwater drum. Freshwater drum contributed a significant amount to the Sam Rayburn Dam tailrace fishery (Table 5). Rough fishes were not deemed to present a serious problem to the Angelina River fishery.

Public Access and Facilities

Public access and facilities are adequate on this section or river. Access to the tailrace could be improved by the addition of concrete steps down to the water and possibly a concrete walkway along the riprap above the high water level. This would allow easier access particularly for senior citizens who might have difficulty walking on the riprap or down the steep hillsides.

Fisherman Information

The U. S. Army Corps of Engineers could provide advance notice of water releases from Rayburn Dam when this information is available. The present practice of announcing the release schedule on a daily basis on the local radio station is good for local anglers, but does not help people living outside the Jasper area.

Fish Harvest Regulations

All regulations are adequate at this time.

MANAGEMENT RECOMMENDATIONS

Physicochemical Characteristics

No action is necessary.

Fish Habitat

B. A. Steinhagen Reservoir should be lowered 6 to 10 feet on an annual or biannual basis during January for at least two weeks to provide some control of submerged vegetation in the backwaters, sloughs and oxbows along the Angelina River and increase the accessibility of these areas to anglers.

Fish Community

No action is necessary.

Public Access and Facilities

Access to the Sam Rayburn Dam tailrace could be improved dramatically by the addition of concrete steps from the parking area to the river and concrete walkways above the high water level running along the riprap. This would provide better and safer access to the tailrace for all anglers.

Fisherman Information

When water release schedules are known in advance, the Corps of Engineers should make this information available to area newspapers and radio stations.

Fish Harvest Regulations

No action is necessary.

REFERENCES CITED

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Buck, D.H. 1956. Effect of turbidity on fish and fishing. Oklahoma Fish. Res. Lab. Rept. 56. 62 pp.

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McKee, J.E., and H.W. Wolf, eds. 1963. Water quality criteria, 2nd ed. State of California State Water Quality Control Board Publ. No. 3-A, Sacramento, California. 548 pp.

Robins, C.R., Chairman. 1980. A list of common and scientific names of fishes from the United States and Canada. Am. Fish. Soc. Spec. Publ. No. 12.

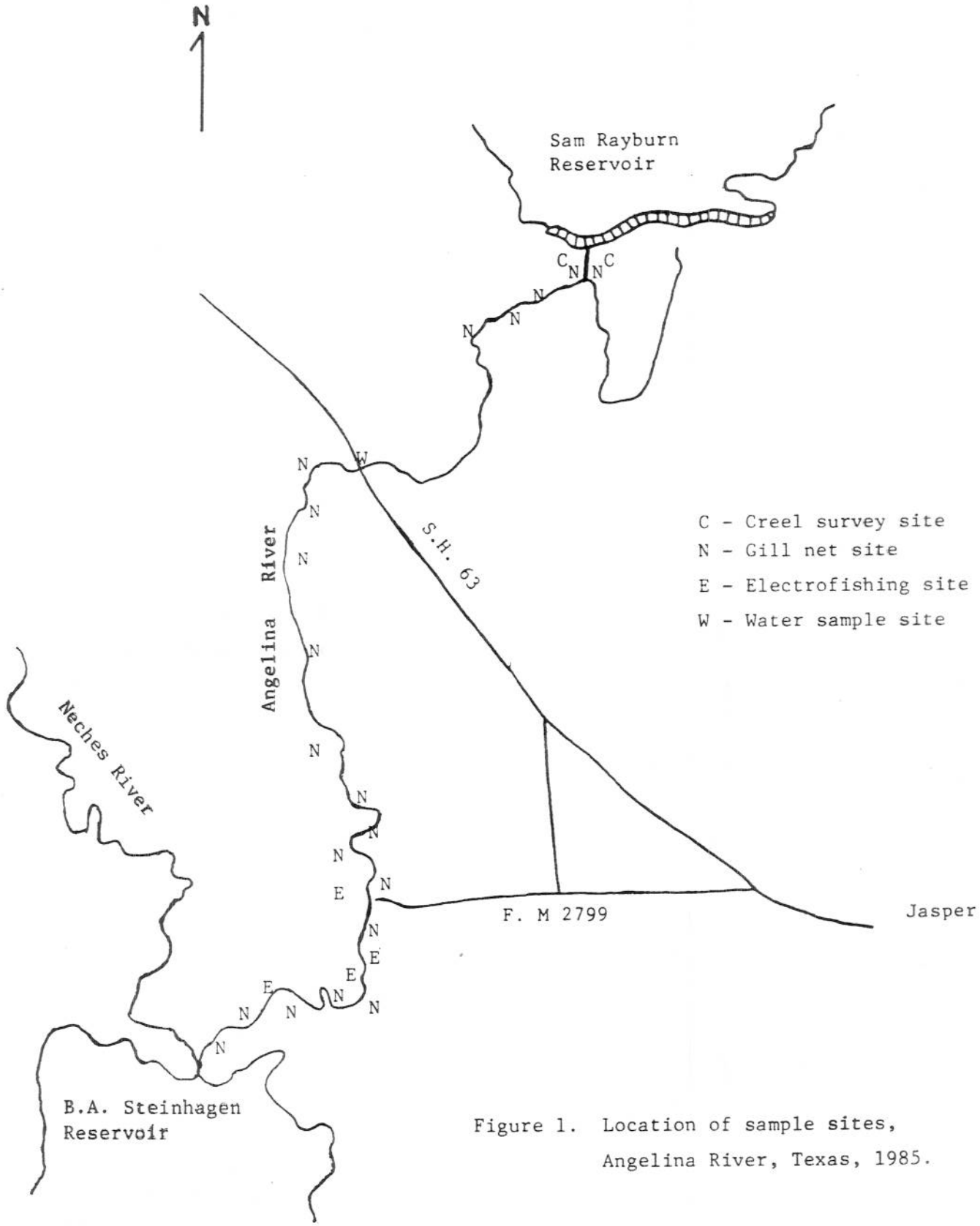

Figure 1. Location of sample sites, Angelina River, Texas, 1985.

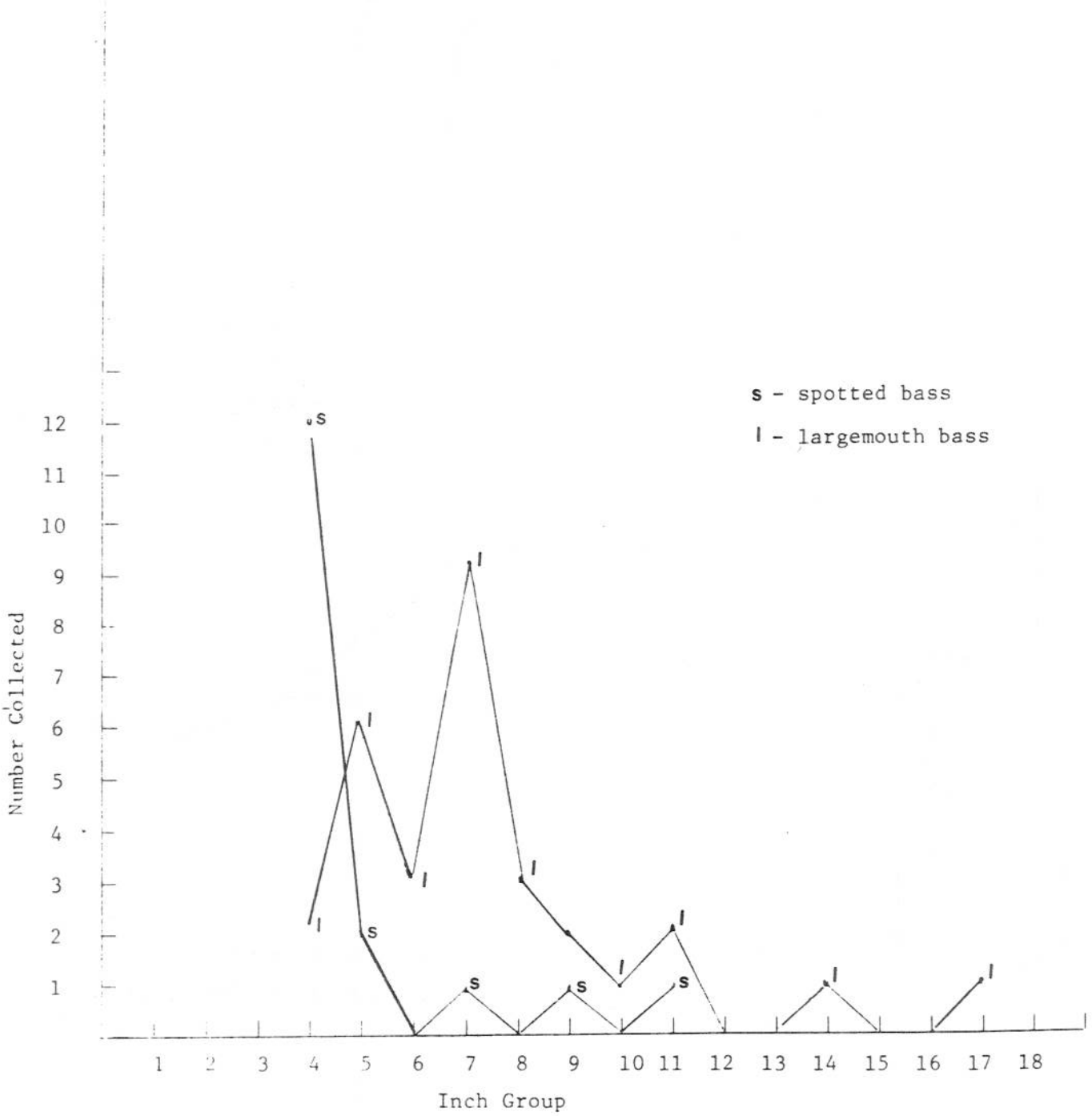

Figure 2. Length-frequency statistics for largemouth bass and spotted bass from electrofishing samples on the Angelina River, Texas, 1985.

Table 1. Results of water quality analyses from the Angelina River (Texas Water Commission statewide monitoring network), Texas, March, 1984 to March, 1985.

Sample date	3-15-84	6-12-84	9-12-84	12-13-84	3-13-85
Depth (ft.)	1	1	1	1	1
Temperature (°C.)	14.0	24.9	26.2	15.5	12.4
Stream flow (cfs)	8600	3205	3098	0	4336
Turbidity (In. Secchi)	-	64	42	24	75
Conducitivity (micromhos)	125	159	145	160	200
Dissolved oxygem (ppm)	9.1	6.8	5.4	9.3	10.5
pH	6.4	6.3	6.0	7.3	7.2
Total alkalinity (ppm)	16	15	20	12	18

Table 2. Summary of water release data from Sam Rayburn Dam, 1985.

Month	Number of days with releases	Average release (Day sec. ft.)	Range of releases (Day sec. ft.)
January	1	2027	2027
February	10	2277	989 - 3322
March	25	3581	1932 - 5286
April	24	6950	569 - 9200
May	31	3579	1980 - 4674
June	27	2825	2017 - 4500
July	26	3038	1756 - 4960
August	29	2990	1550 - 4945
September	23	3083	2084 - 3966
October	19	3156	644 - 4513
November	6	3129	3067 - 3250
December	0	0	0

Table 3. Summary of aquatic vegetation survey, Angelina River, Texas, 1985.

Common name	Estimated area occupied (acre)	Problematic
Black willow	t	No
Buttonbush	t	No
Wax myrtle	t	No
Narrowleaf cattail	10	No
Smartweed	3	No
Spikerush	t	No
Sedge	5	No
Duck potato	t	No
Waterweed	40	No
Water milfoil	10	No
Pondweed	50	No
Coontail	10	No
Water hyacinth	t	No

t = trace

Table 4. Gill net sampling statistics, twenty net-nights, Angelina River, Texas, 1985.

Species	Total number	Number per 200 ft. of net	Total weight (lb.)	Weight per 200 ft. of net (lb.)	Mean weight (lb.)
Spotted gar	9	0.45	18.4	0.92	2.04
Longnose gar	5	4.00	28.9	1.45	5.78
Threadfin shad	32	6.25	0.4	0.02	0.01
Gizzard shad	38	1.90	12.1	0.61	0.32
Bigmouth buffalo	1	0.05	1.7	0.90	1.70
Smallmouth buffalo	85	4.25	380.8	19.4	4.48
River carpsucker	9	0.45	14.7	0.74	1.63
Blacktail redhorse	4	0.02	1.2	0.06	0.30
Channel catfish*	17	0.85	14.9	0.75	0.88
Blue catfish*	8	0.04	13.3	0.67	1.66
Yellow bullhead	1	0.05	0.5	0.03	0.50
Flathead catfish*	2	0.01	13.6	0.68	6.80
Pirate perch	1	0.05	t	t	0.02
White bass*	1	0.05	0.6	0.03	0.57
Hybrid striped bass*	3	0.15	8.4	0.45	2.97
Spotted bass*	3	0.15	1.4	0.07	0.47
Largemouth bass*	6	0.03	6.0	0.30	0.05
Warmouth	1	0.05	0.1	0.01	0.10
Redear sunfish*	1	0.05	0.1	0.01	0.10
Bluegill*	4	0.02	0.3	0.02	0.08
Longear sunfish*	3	0.15	0.1	0.01	0.03
White crappie*	3	0.15	1.0	0.05	0.33
Black crappie*	2	0.01	0.5	0.03	0.25
Freshwater drum	13	0.65	11.5	0.58	0.04
Total	252	12.60	530.5	26.53	
Game Fish*	54	2.70	60.3	3.02	
Rough Fish	198	9.90	470.2	23.51	

t trace

Table 5. Creel yield and fishing pressure for selected sought-after categories of fishes and the total of all sought-after fishes for Sam Rayburn tailrace, Angelina River, Texas, 3-1-85 to 5-31-85.*

Category	Yield per acre		Hours of fishing per acre
	Number	Pounds	
Total	144.9 ± 79.4	72.3 ± 45.9	602.8 ± 325.2
Catfishes	6.6 ± 6.9	6.3 ± 7.5	40.4 ± 39.5
Striped-white bass hybrid	6.8 ± 7.2	33.8 ± 37.1	74.9 ± 52.1
Striped bass	0.0	0.0	69.5 ± 50.7
Crappie	68.5 ± 54.1	30.9 ± 23.7	67.2 ± 47.6
Freshwater drum	16.3 ± 17.6	12.2 ± 17.3	22.0 ± 22.2
Sunfishes	54.1 ± 113.2	21.1 ± 23.4	43.6 ± 45.5

* 80 percent confidence intervals

Table 6. Fishing quality for selected sought-after categories of fishes and the total of all sought-after fishes for the Sam Rayburn tailrace, Angelina River, Texas, 3-1-85 to 5-31-85.*

Category	Number per hour	Pounds per hour	Average weight (lbs)	Percent fishing parties successful	Percent of fishing parties catching limit	Mean time spent fishing
Total	0.20 ± 0.08	0.12 ± 0.04	0.72 ± 0.16	12.0 ± 4.7		2.02 ± 0.15
Catfishes	0.16 ± 0.03	0.16 ± 0.09	0.68 ± 0.74	47.1 ± 18.4	0.0	2.60 ± 1.24
Striped-white bass hybrid	0.09 ± 0.07	0.45 ± 0.38	5.35 ± 0.03	15.8 ± 11.2	0.0	1.90 ± 0.46
Sunfishes	2.34 ± 0.08	0.48 ± 0.02	0.18 ± 0.00	33.3 ± 8.0		1.90 ± 0.03
Crappie	1.02 ± 0.30	0.46 ± 0.10	0.49 ± 0.08	22.7 ± 8.9		1.26 ± 0.25
Freshwater drum	0.74 ± 0.11	0.56 ± 0.53	1.44 ± 0.39	78.0 ± 15.9		2.64 ± 0.10

* 80 percent confidence intervals

Table 7. Composition of the creel for Sam Rayburn tailrace, Angelina River, Texas, 3-1-85 to 5-31-85.

Species	Number	Percent	Weight (lbs.)	Percent weight	Average weight
Smallmouth buffalo	1	0.3	3.50	2.3	3.50
Blue catfish	1	0.3	0.50	0.3	0.50
Channel catfish	4	1.3	2.63	1.7	0.66
Flathead catfish	1	0.3	2.00	1.3	2.00
White bass	9	2.8	5.31	3.5	0.59
Striped-white bass hybrid	7	2.2	34.80	22.7	4.97
Green sunfish	2	0.6	0.31	0.2	0.16
Warmouth	4	1.3	0.62	0.4	0.16
Bluegill	64	20.2	10.38	6.8	0.16
Dollar sunfish	1	0.3	0.12	0.1	0.12
Longear sunfish	19	6.0	2.94	1.9	0.15
Redear sunfish	81	25.6	21.14	13.8	0.26
Spotted bass	1	0.3	0.25	0.2	0.25
Largemouth bass	2	0.6	0.51	0.3	0.26
White crappie	50	15.8	22.43	14.6	0.45
Black crappie	2	0.6	1.06	0.7	0.53
Freshwater drum	68	21.5	44.89	29.2	0.66
Total	317	100.0	153.39	100.0	

Table 8. Creel summary from Sam Rayburn tailrace, Angelina River, Texas, 3-1-85 to 5-31-85.

Pressure:	
Man-hours	8,439 ± 4,553
Man-hours per acre	602.8 ± 325.2
Man-days fishing	3,221 ± 1,746
Harvest Total:	
Fish	5,893 ± 100+%
Pounds	2,234 ± 1,414
Fish per acre	385.1 ± 100+%
Pounds per acre	159.6 ± 101.0
Catch Rate Total:	
Total fish per hour	0.64 ± 0.34
Total pounds per hour	0.27 ± 0.09
Fish sought per hour	0.20 ± 0.08
Pounds sought per hour	0.12 ± 0.04
Success:	
Percent successful	34.5 ± 9.5
Percent success for fish being sought	12.0 ± 4.7

5-Year Management Plan for
lower Angelina River
1986-1990

I. River Segment Description

The study area consists of the 25-mile segment of the Angelina River in Jasper County located between Sam Rayburn Reservoir Dam and the confluence with the Neches River at the upper end of B. A. Steinhagen Reservoir. Stream width in this section of the river varies from 75 to 250 feet and the water is generally clear and deep. River flow is dictated primarily by releases from Sam Rayburn Dam for power generation during March through November.

Water quality in the river is good with pH running from slightly acid to neutral; turbidity usually very low due to water releases from Rayburn Dam; water temperatures generally ranging from 38°F to 85°F.; total hardness and total alkalinity usually less than 30 parts per million; and conductivity ranging from 110 to 150 micromhos.

Bank fishing access is good in the tailrace area below Rayburn Dam and two improved boat ramps are present in this section of river. Boat access is also readily available from launching sites on B. A. Steinhagen Reservoir.

Fishing in the tailrace area is best during March, April and May when anglers can expect to catch crappie, white bass, hybrid striped bass, freshwater drum channel catfish, spotted bass, largemouth bass and an occasional striped bass or walleye. Fishing in the remainder of the river segment runs from fair to good for largemouth bass, spotted bass, black and white crappie, channel, blue and flathead catfish and white bass. The primary fishing areas are located in the feeder streams, sloughs and oxbows, rather than in the mainstream areas.

II. Management Recommendations:

A. Physicochemical Characteristics: None recommended.

B. Fish Habitat:

Water Level Manipulation:

Year	Activity	Man-days
1986-1990	Annual of biannual lowering of B. A. Steinhagen Rservoir during January for vegetation control	4

C. Fish Community: None recommended.

III. Public Access and Facilities:

Year	Activity	Man-days
1986	Plan and coordinate development of stairs and walkways in tailrace area.	20
1987-88	Construct stairs and walkways in tailrace area.	10

E. Fisherman Information: Encourage the Corps of Engineers to provide water release information to area newspapers and radio stations as far in advance as possible.

F. Fish Harvest Regulations: None recommended.