Performance Report
Job A, District I-D

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

I. Summary: During 1980 the upper Frio River was surveyed to identify areas where fishing recreation could be increased by applying management techniques. The river was found to have substantial populations of channel catfish and sunfish. Distributions of information that discuss these populations and the various fishing techniques for harvesting them will serve to increase utilization.

II. Significant Deviation: None

III. Cost: $3,600.

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Date March 27, 1981

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Project F-30-R

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Assistant Program Director
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DESCRIPTION OF STUDY AREA

The Frio River originates in the northeast corner of Real County and flows in a southeasterly direction about 265 miles to enter the Nueces River near the town of Three Rivers. The Frio River watershed drains 6,977 square miles. Major tributaries include the Dry Frio, the Sabinal River, Hondo Creek, the Leona River, San Miguel Creek, and the Atascosa River.

The Frio River flows in a gorge through the Edwards Plateau Region for about 60 miles before entering the Coastal Plain. In crossing the Balcones Fault Zone, the river loses its perennial spring flows, as well as substantial amounts of flood runoff, through percolation into the Edwards aquifer. Consequently, flow downstream from the fault zone consists almost entirely of runoff. Prolonged droughts are common and flow rates vary from intermittent during drought periods to 2,000 cfs or more during periods of heavy rains. Average flow for the Frio River at Concan is 108 cfs.

The topography of the study area is hilly, rough and broken with a shallow stony clay soil. A wide range of vegetation consisting of grasses, forbs, live oak, and shinoak brush occupy rangeland. Elm, live oak and other large trees are found in the bottom lands bordering stream channels.

Water usage is primarily recreational with some irrigation of small acreages.

MATERIALS AND METHODS

Two water quality sampling stations were established and sampled during May and July (Fig. 1). Temperature and dissolved oxygen were measured with a YSI Model 57 meter and conductivity with a Model 133 SCT meter. A Corning Model 1487 pH meter was used to determine pH. Total hardness and alkalinity were determined with a AL-36-WR Hach kit.

River flow rates were determined using a Model 2030 digital flowmeter. The width of the river was measured and the flow and depths measured at three points across the river. Three readings were taken at each point to insure accuracy. Flow rates were then determined using the following formula: $(\overline{W})$ $(\overline{D})$ $(\overline{VA})$ (roughness constant on the bottom) = cubic feet per second.

Visual observations of aquatic vegetation were made while conducting surveys. Information of fish habitat needs were noted and recorded.

The fish communities of the Nueces River were sampled using seines and a backpack shocking unit. All common and scientific names used in this report are in accordance with A List of Common and Scientific Names of Fishes from the United States and Canada, American Fisheries Society, Special Publication No. 6 (Table 1).

A 26-ft x 6-ft, ¼-inch mesh seine with a 6-ft x 6-ft bag was used in May and July. Average seine width was recorded for each station and multiplied times length of drag to determine the area sampled. Samples were preserved in 10% formalin and returned to the laboratory to be identified, counted and measured. Specimens collected were recorded as number per 1,000 ft^2 of seine sample.

A Smith-Root Type VII electrofisher backpack shocking unit was used during May and July. Collections were preserved in 10% formalin and returned to the laboratory to be identified, counted and measured. Fish collected were recorded as number per fifteen minutes shocking time.

Public access and fisherman information needs were evaluated by determining if existing access, facilities and sources of information were adequate to promote maximum utilization of the fishery resource.

Fish population information was used to determine needs for changes in harvest regulations. Any public hearings concerning regulation proposals were attended and justifications for these proposals were discussed with the attending public.

RESULTS AND DISCUSSIONS

Physicochemical Characteristics

No deviations from normal area water quality values were found which were considered detrimental to the fish community of the Frio River (Table 2).

Fish Habitat

Typical stream bed habitat in the study area consists of varying concentrations of bedrock, boulders, rubble, gravel, sand, silt and a variety of aquatic vegetation species (Table 3). Habitat seems optimum for reproduction and recruitment; however, the volume of water flow appears to be a primary limiting factor. Flow data for the years 1970 through 1979 illustrate the variations in stream flow (Fig. 2). Because of drought conditions during the survey period, flows varied from 36 cfs to flow rates that were immeasurable (Table 4). Tributaries such as the Dry Frio and Sabinal Rivers were not flowing during the sample period.

Fish Communities

Forage Fishes: A diverse forage base existed in the Nueces River. The bulk of the forage consisted of Texas shiner, blacktail shiner, stoneroller and young-of-the-year sunfish (Tables 5 and 6).

Sport Fishes: Large numbers of sport fishes were collected. Sunfish were the most abundant with substantial numbers of channel catfish also being collected.

Rough Fishes: No problematic rough fish populations were observed.

Fisherman Information

Distributions of information discussing existing sport fish populations and productive means and methods for harvesting them would increase public utilization.

Public Access and Facilities

Road crossings provide adequate access to the Frio River. Additional access and facilities are provided by Garner State Park.

Fish Harvest Regulations

Current regulations are adequate.

MANAGEMENT RECOMMENDATIONS

Physicochemical Characteristics

Surveys revealed no problematic water quality parameters; therefore, no recommendations are necessary.

Fish Habitat

Existing habitat is adequate to sustain the fishery in the river; therefore, no recommendations are made.

Fish Communities

Diversity and quantity of sport fishes within the Frio River are adequate; therefore, no recommendations are made.

Public Access and Facilities

Access to the Frio River appears adequate; therefore, no recommendations are made.

Fisherman Information

Distributions of information promoting utilization of existing fish populations are recommended.

Fish Harvest Regulations

Existing regulations are adequate; therefore, no recommendations are made.

LITERATURE CITED

Young, Willard C., Bobby G. Whiteside, Glenn Longley and Neil E. Carter, 1973. The Guadalupe-San Antonio-Nueces River Basin Project. Review of existing biological data, phase I. Aquatic Station, Southwest Texas State University, San Marcos, Texas. 400 pp.

Armstrong, Ellis L., Leon W. Hill, 1971. Nueces River Project, Texas. Vol. II, Bureau of Reclamation. 26 pp.

Dietz, M. C. Elgin, 1956. Basic survey and inventory of fish species present, as well as their distribution in the Nueces River, its tributaries and watershed, lying within Edwards, Real, Uvalde and Kinney Counties, Texas. Job completion report. Texas Parks and Wildlife Department, Austin. 17 pp.

Water Resources Data for Texas, 1970-1979. United States Department of the Interior, U. S. Geological Survey, Austin, Texas. 9 vols.

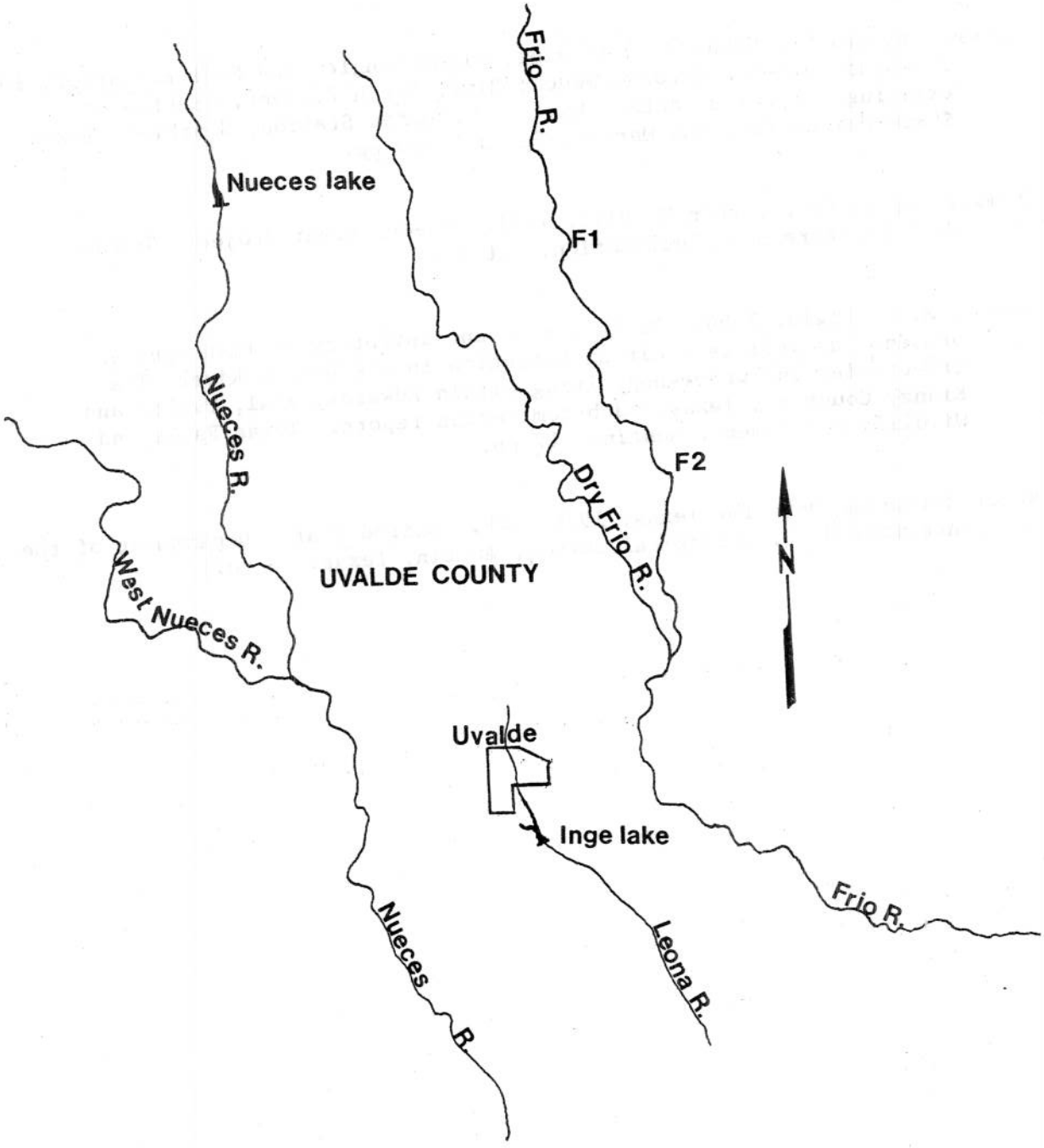


Figure 1. Collection and sampling sites, Frio River, Texas, 1980.

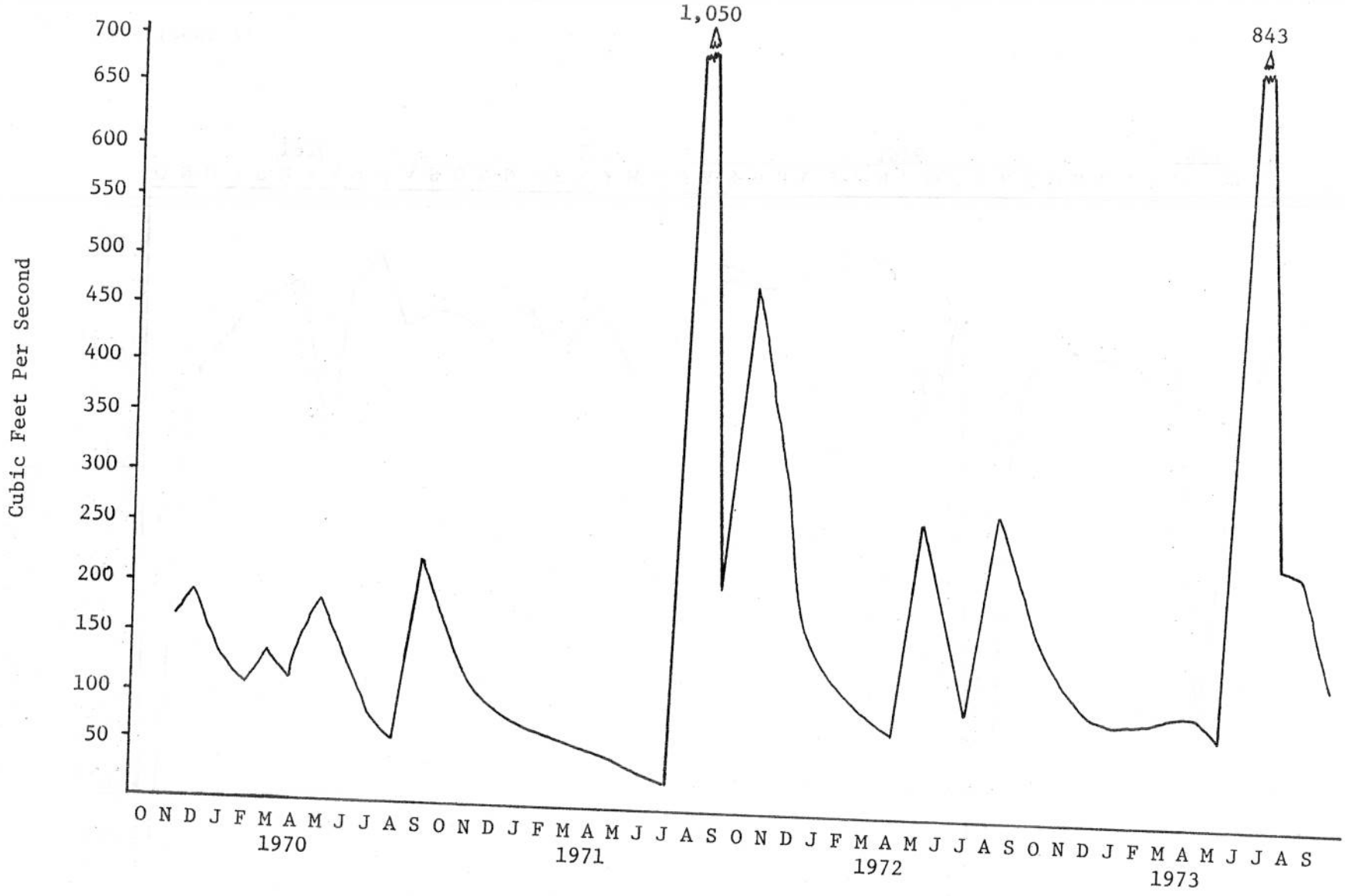
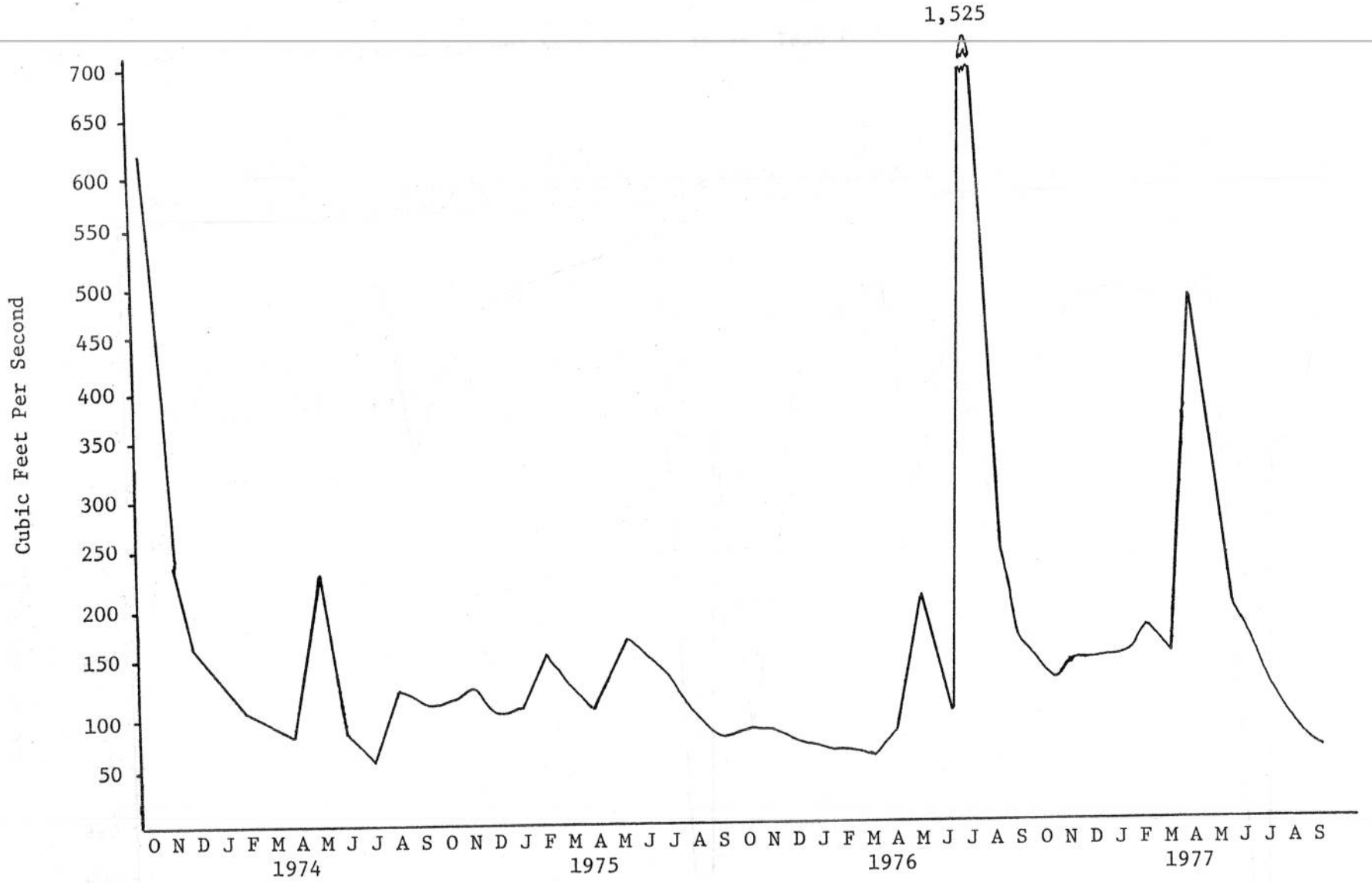


Figure 2. Flow regimes, station at Concan, Frio River, Texas, 1970 through 1979.



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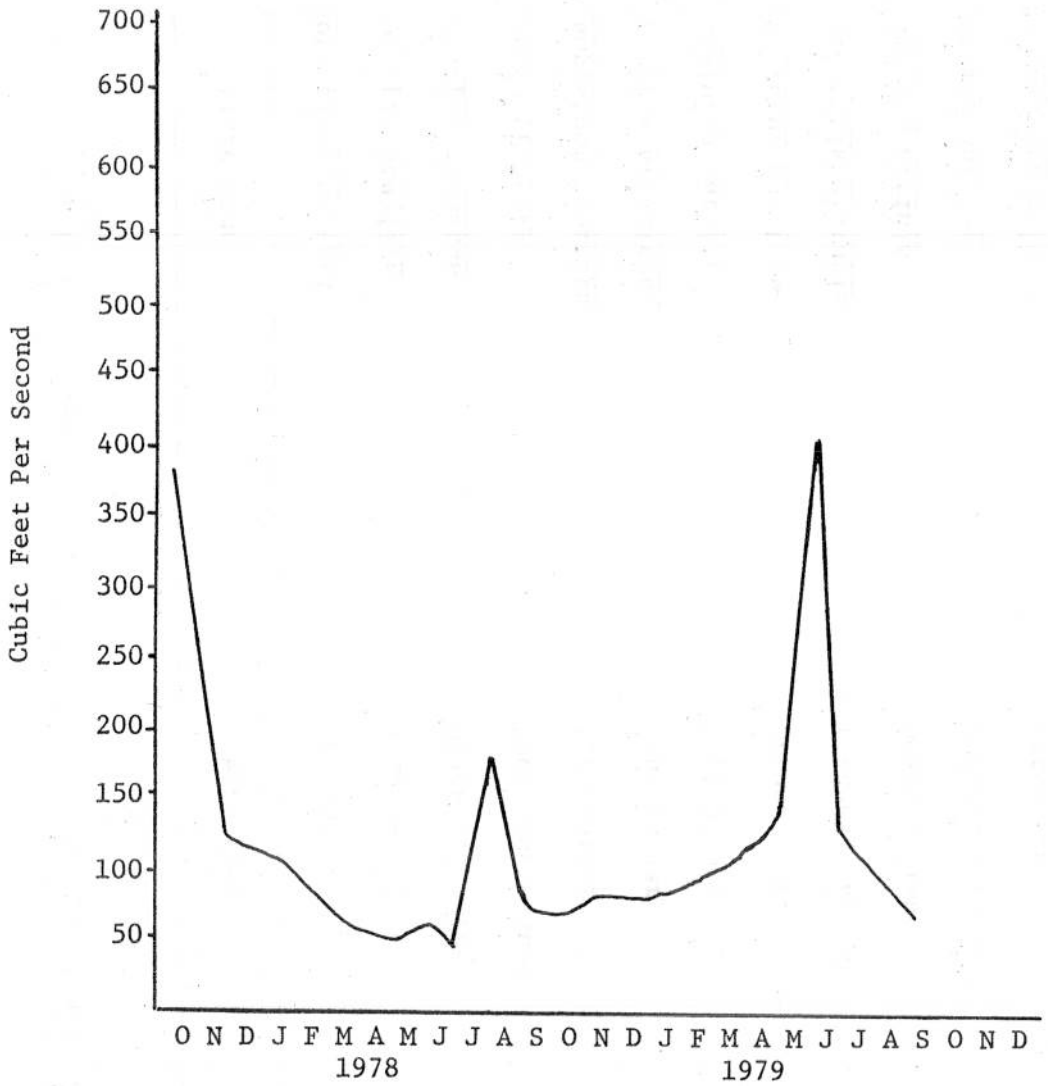

Figure 2 (cont.).

Table 1. Checklist of fish species collected from the Frio River, Texas, 1980.

Scientific Name	Common Name
Notropis leutrensis	Red shiner
Notropis amabilis	Texas shiner
Notropis venustus	Blacktail shiner
Dionda episcopa	Roundnose minnow
Campostoma anomalum	Stoneroller
Notropis stramineus	Sand shiner
Ictalurus natalis	Yellow bullhead
Ictalurus punctatus	Channel catfish
Pylodictis olivaris	Flathead catfish
Gambusia affinis	Mosquitofish
Lepomis auritus	Redbreast sunfish
Lepomis cyanellus	Green sunfish
Lepomis gulosus	Warmouth
Lepomis megalotis	Longear sunfish
Lepomis punctatus	Spotted sunfish
Micropteus salmoides	Largemouth bass
Etheostoma lepidum	Greenthroat darter
Cichlasoma cyanoguttatum	Rio Grande perch

Table 2. Water quality data from the Frio River, Texas, 1980.**

Station	Date	Temp (C)	D.O. (ppm)	pH	Total Alkalinity (ppm)	Specific Conductance (umhos/cm)	Total Hardness (ppm)
F-1	5-14-80	21.5	6.5	8.5	222.3	420	188.1
F-1	7-02-80	32.5	10.2	8.2	222.3	450	171.0
F-2	5-14-80	21.0	6.2	8.4	171.0	400	171.0
F-2*	-	-	-	-	-	-	-

*Station F-2 was dry due to drought conditions and no sample was collected.
**Samples were taken from water less than one meter deep.

Table 3. Aquatic vegetation by station, Frio River, Texas, July 2, 1980.

Station	Scientific Name	Total Acres Occupied	Percent of Waterbody Occupied	Problematic Yes	Problematic No
F-1	Myriophyllum sp.	0.5	30		x
	Potamogetan sp.	0.3	15		x
	Najas sp.	< 0.1	1		x
	Hydrocotyl sp.	< 0.1	< 1		x
F-2*	-	-	-	-	

*Station was dry at the time vegetation survey was conducted.

Table 4. Stream channel characteristics and flow regimes, Frio River, 1980.

Date	Station	Mean Width (ft)	Mean Depth (ft)	Flow Volume (cfs)
5-14-80	F-1	31.0	0.8	35.69
5-14-80	F-2	19.8	1.0	16.38
7-1-80	F-1	28.5	0.9	26.86
7-1-80	F-2	-	-	-

Table 5. Seine sampling statistics, two stations, Frio River, Texas, May and July, 1980.

Species	Total number of each inch group per 1,000 ft^2					
	1	2	3	4	5	>5
			May			
Mosquitofish	2	1				
Blacktail shiner	4	27	10			
Texas shiner	10	112				
Longear sunfish	1	3	4	1		
Largemouth bass				2		
Rio Grande perch						1
			July*			
Mosquitofish	4					
Texas shiner	6	241				
Blacktail shiner		32				
Sand shiner		1				
Redbreast sunfish		1	3		1	
Spotted sunfish		1	1			
Largemouth bass		3				

*Station F-2 was dry due to drought conditions and no sample was collected.

Table 6. Electrofishing statistics, two stations, 15 minute sampling periods, Frio River, Texas, May and July, 1980.

Species	Number of Fish Per 15 Minutes	Weight of Fish Per 15 Minutes (lb)	Mean Weight (lb)
	May		
Red shiner	9	0.02	.002
Blacktail shiner	24	0.09	.004
Roundnose minnow	13	0.05	.004
Stoneroller	26	0.18	.007
Yellow bullhead	3	0.10	.033
Channel catfish	12	0.30	.025
Flathead catfish	1	0.22	.220
Redbreast sunfish	14	0.24	.017
Green sunfish	1	0.01	.010
Warmouth	1	0.04	.040
Longear sunfish	27	1.12	.041
Largemouth bass	1	0.16	.160
Rio Grande perch	5	0.04	.008

Table 6 (cont.).

Species	Number of Fish Per 15 Minutes	Weight of Fish Per 15 Minutes (lb)	Mean Weight (lb)
	July*		
Red shiner	6	0.04	0.007
Blacktail shiner	6	0.03	0.005
Stoneroller	6	0.04	0.007
Yellow bullhead	1	0.02	0.020
Channel catfish	14	0.33	0.024
Flathead catfish	5	0.58	0.116
Redbreast sunfish	2	0.04	0.020
Longear sunfish	26	0.93	0.036
Largemouth bass	1	0.19	0.190
Greenthroat darter	1	< 0.01	0.001
Rio Grande perch	1	0.09	0.090

*Station F-2 was dry due to drought conditions and no sample was collected.

5-Year Management Plan for the
Frio River
1981-1985

Management Recommendations:

Year	Activity	Man-Days
1981	1. Habitat Enhancement--None recommended.	0
	2. Distribute information discussing existing sport fish populations and productive means and methods for harvesting them.	2
	3. Population Manipulation--None recommended.	0
	4. Vegetation Control--None recommended.	0
	5. Pollution Control--None recommended.	0
	6. Fish Harvest Regulations--None recommended.	0
1981 Total		2

1982 - 1985--No activity recommended.

Statewide Fishery Management Recommendations

b A: Existing Reservoir and Stream Management Recommendation
Frio River, 1980

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