

*Sabinal River*

JOB FINAL REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-9-R-18

FISHERIES INVESTIGATIONS - REGION 5-A

Job No. III Stocking Recommendations

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SUMMARY

During this segment, public waters of the region were sampled and stocked where and when necessary. Name, location, species, and number of fish stocked in the public waters are given in the text.

THE UNIVERSITY OF TEXAS AT AUSTIN

1971

Project No. 100-10000-10000

REGIONAL OPERATIONS - REGION 2-A

Job No. 111 Stocking Recommendations

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December 15, 1971

JOB COMPLETION REPORT

TECHNICAL

STATE OF TEXAS

Project No. F9R3 Name Fisheries Investigations and Surveys of the Waters of Region 7-B.

Job No. B-14 Title Basic Survey and Inventory of Fish Species Present, as well as Their Distribution in the Sabinal River, its Tributaries and Watershed, Lying within Bandera, Medina and Uvalde Counties, Texas.

Period Covered: July 1, 1955 through June 30, 1956.

ABSTRACT

From August to October of 1956, a basic survey was conducted on the Sabinal River to determine the species present, their relative abundance and the ecological factors influencing their distribution.

The Sabinal River is a small tributary of the Frio River. It drains extreme western Bandera County and extreme eastern Uvalde County. During the basic survey ten stations were established where seining collections were made. At three of these stations gill nets were set.

The watershed is utilized mostly for grazing, but some farming is done on the alluvial soils adjacent to the stream.

The stream has cut to bed limestone, but in many places there may be a foot or more of gravel over the bed rock. Pools are small and lacking. In these pools muskgrass (Chara vulgaris) is excessive.

No detrimental chemical conditions were found. The pH varied from an average of 8.0, O<sub>2</sub> from 6.9, CO<sub>2</sub> from 4.0 and M.O. alkalinity from 148.6. The water temperatures averaged 78.1, but most readings were taken during October. During the summer water temperatures are much higher due to the shallowness of the stream.

In the course of the survey 408 specimens were taken, representing eight families and 22 species. Larger game fish are not too plentiful due to the fact that there are practically no pools large enough for their existence. As this stream has a small watershed, it is not as subject to extreme flooding as many are in this area. This condition linked with comparatively cheap land makes the stream an ideal location for the construction of small dams.

OBJECTIVES

To gather fundamental data on the above waters in regard to their physical, chemical and biological aspects. To determine the distribution of fish species present, their relative abundance and the ecological factors influencing their distribution.

COOPERATING AGENCIES

Texas Board of Water Engineers  
United States Geological Survey

## TECHNIQUES

During the course of the survey ten seining collections and three gill net collections were made at ten stations. Gill net collections were made with experimental nets 125 feet long and eight feet deep. The mesh of the net was from one to three inches square, graduating one-half inch each 25 feet. Few gill net collections were made because pools of adequate size to accommodate the nets were rare. In one instance a portion of the net could not be set, due to the narrowness of the stream, and the large mesh was left on the bank. All nets were set at an angle across the stream, in order to get as much of the net as possible in the stream. In two instances plats were so dense that it was necessary to walk through them several times to open up a channel in which to set the net.

The seining collections were made with 26 by 6 foot bag seines, one-fourth inch mesh and common sense seines having a one-eighth inch mesh, four feet deep with the length varying from four to ten feet.

A majority of the fish were preserved in 10% formalin solution and taken to the laboratory for identification and tabulation. In instances where large numbers of a single species were collected, they were counted, recorded and returned to the river. The cooperation of Dr. Clark Hubbs, Department of Zoology, University of Texas, and W. H. Brown, Assistant Chief Aquatic Biologist, Texas Game and Fish Commission in the verification and identification of many species was greatly appreciated.

Water analysis, made in the field, included air temperature, water temperature, pH, dissolved oxygen, carbon dioxide and alkalinity. The analysis was made at six of the ten stations.

Data pertaining to river flow was obtained from the United States Geological Survey and the Texas Board of Water Engineers.

## HISTORY

This area was one of the strongholds of the Comanche Indians. The effect of the establishment of San Antonio in 1718 was not felt in this area until 1844. At this time Count Henri de Castro led 500 French and Alsatians west of San Antonio to settle the town of Castroville. Before that date however, the U. S. Army and the Texas Rangers had several skirmishes with the Comanches. In 1841, Texas Ranger Captain "Jack" Hays and a company of 16 Rangers aided by 30 Mexicans had one of the better known battles with the Comanches.

The establishment of Fort Inge in southwestern Uvalde County and Fort Lincoln in western Medina County speeded up the settlement of this area. At the present location of the town of Sabinal, Camp Sabinal was established in 1856. Some twelve miles upstream, and just south of what is now known as Utopia, Waresville was founded the same year. In 1886, this town was moved to its present location and renamed Utopia. From that time on, the settlement of this area was typical of most of the western states.

## PHYSICAL CHARACTERISTICS

The Sabinal is a small stream, both in volume of flow and length. Its head-water springs are some 10 miles north of Vanderpool in Bandera County, well into the rather rough hills of the Edwards Plateau. These springs are small, probably flowing

no more than one-half second foot at the time of the survey. These springs enter into a permeable gravel some 150 yards below their emergence. The flow then reemerges some 100 yards further downstream. The stream bottom is bedrock but a covering of gravel, from three inches to a foot, occurs in many places. In most instances the flow is so small it flows through, rather than over, the gravel deposits.

Pools found along the Sabinal's course are small. The largest natural pools found covered no more than one acre, and only three of this size were found.

One small dam was found on the main stream near Highway 187 crossing north of Utopia. Several other dams were found on Mill Creek. This creek is a perennial flowing stream, but none of this flow enters the Sabinal due to these dams.

A majority of the work was done on this stream in October of 1955. At this time the flow occurred over most of the entire stream north of the Edwards Limestone outcropping near Highway 187 crossing between the towns of Sabinal and Utopia. From this point south, the porous Edwards limestone combined with the faults of the Balcones Escarpment absorbs the flow of the river. An occasional pool is found below this fault, but differing from the clear pools of the northern portion in that they have a silt bottom and are usually rather turbid.

During the summer of 1956 reports were that the flow had stopped completely and all but the largest pools dried, even in the parts north of the Edwards Limestone.

The flow of the Sabinal has never been large and the prolonged drought of recent years has practically ruined the stream for fishing. The flow of May 7, 1925, four miles south of Utopia, was 2.84 sec. feet, the average for May 1945 was 19.1 sec. feet, and the river was completely dry the month of May 1953. The average flow for the year of 1953 was 1.05 sec. feet.

The river winds some 64 miles, draining 247 square miles of western Bandera and eastern Uvalde Counties before its confluence with the Frio River in the extreme southeastern corner of Uvalde County.

The average rainfall is near 24 inches, but much less has fallen in recent years. The growing season is 248 days.

#### CHEMICAL CHARACTERISTICS

During the survey six water analyses were made. With one exception all of the analyses were made in October. The highest water temperature was found in the one August analysis. This high water temperature is probably the most detrimental condition occurring. The shallowness of the stream allows the water temperature to fluctuate rapidly to simulate that of the air.

Dissolved oxygen was determined by the Rideal-Stewart modification. Methyl Orange alkalinity and dissolved carbon dioxide were checked. The hydrogen ion concentration was determined with a Hellige Pocket Comparator. The water samples for analysis were taken from a flowing portion of the stream, or if not from a flowing portion, from one of the deeper parts of the pools. Dissolved oxygen ranged from 6.2 to 8.2 p.p.m. averaging 6.9. During the cooler months this average would no doubt be higher. The dissolved oxygen range is not disadvantageous.

The variance in CO<sub>2</sub> was from 2.0 to 8.0 p.p.m. The high in CO<sub>2</sub> was found with

the high water temperature. The low CO<sub>2</sub> concentration was found with the two lowest water temperatures. The carbon dioxide range is not detrimental. Total alkalinity and pH were within the acceptable ranges for waters emerging in the Edwards Plateau. Alkalinity averaged 148.6 p.p.m. and the pH average was 8.0.

No industrial or municipal waste was found to enter the stream. Some sewage from homes could be entering the stream but none was found, or actually seen.

There were instances where silt was as much as a foot deep. If and when a scouring flood occurs this condition will be alleviated.

Other than the previously mentioned water temperature condition, no chemical condition which could be called injurious was found.

### SOILS, VEGETATION AND LAND USE

The watershed of the Sabinal is utilized primarily for grazing but the recent years of drought have practically turned it into a desert. The average rainfall in the past 39 years has been 24 inches. In recent years it has been 10 inches or less. Under these conditions any livestock whatever was too much, but as the people of this area depended on livestock as their livelihood, they were forced to utilize all the grass and brush that was available. The spines were burned from the prickly pear to feed cattle and oaks were cut for goat food. These practices were carried on only after practically every blade of grass had disappeared. The range conditions are worse than in many years, if not at an all time low. The rains, to wet soil under this condition must fall slowly. This is not usually the case in this area. Violent thunderstorms are more nearly the pattern. This means the area is ripe for flash floods which erode the rocky soil even more. The soil contains a large amount of humus and is very fertile. Along the river there is a rather wide strip of alluvial soil which is farmed extensively when rain occurs. In places this bottom land is perhaps two miles wide. Little irrigation is carried on as the river would not supply a irrigation system of any size and still leave enough water for the neighbors downstream. The crops are small winter grains such as wheat, oats, and barley. They are grazed and harvested for grain. Other crops are milo and hegari which are summer crops but fed to livestock during winter when grass becomes short.

This stream could be made to have good fishing if some dams were constructed. The cost would not be prohibitive. Ranchers can not be expected to construct such dams at this time, because the drought has put them so far in debt that it will take many years for them to recover. As there is no good fishing lake for a hundred or more miles and with the land fairly cheap, it might be a good location for some State or Federal Agency to investigate the possibilities of constructing a dam and park in the area.

### AQUATIC PLANTS

There are many types of aquatic plants found on the Sabinal River. The most common are: cattail (Typha latifolia), spikerushes (Eleocharis sps.), sedges (Cyperus sps. and Eleocharis sps.), yellow waterlily (Nuphar advena), pondweeds (Potamogeton sps.) and muskgrass (Chara vulgaris). Table 4 is a checklist of the more common aquatic plants found on the Sabinal River. The only vegetation which has become over abundant is muskgrass (Chara vulgaris). Most pools on the river are completely choked by this plant. In some instances where gill nets were set it was necessary to open a channel before

the net could reach the bottom. Such concentrations of plants make it difficult for large game fish such as largemouth black bass, to keep forage fish down in numbers. As a result sunfish are overpopulated and stunted in most pools. Floods, which will no doubt occur with the range conditions as they are, will remove or at least thin most of these plants which will give temporary relief from these conditions.

### RESULTS OF FISH COLLECTIONS

In making the survey ten stations were established along the river. A seining collection was made at each of the stations and a gill net collection was made at three of the stations. Table 2 is a key to their location and Table 1 is the species and number caught at each station. A total of 408 specimens was collected representing eight families and 22 species.

#### Family Clupiedae

##### Shads

Dorosoma cepedianum: gizzard shad. The 19 shad collected were found in the lower half of the river. This species has made further encroachment into the clear waters of the Sabinal River than in the Nueces or the Frio Rivers, immediately to the west. The Sabinal, not having the volume of the Nueces and Frio, nor a recent rise, has accumulated considerably more silt. This would be the apparent reason for their successful immigration.

#### Family Characidae

##### Tetras

Astyanax fasciatus: banded tetra. The tetras range appears to be limited to the clear waters of the upper portion of the Sabinal. The small pools which occur in these upper parts have a tendency to keep the water temperature high enough for their survival in the immediate spring areas during the winter months. Being a good forage fish, their numbers could be kept at a minimum in the pools of the lower parts by the larger game fish.

#### Family Catostomidae

##### Suckers

Moxostoma congestum: gray redhorse sucker. Only five of these fish were taken, all by gill nets. The factor which limits this fish's distribution is habitat. Only a few pools which are deep enough for their existence are found. At these places they are fairly numerous but could not be considered detrimental. Even though these fish are eaten by many people, they are considered a rough fish. Their use as food is probably limited because of the difficulty to catch them by legal methods.

#### Family Cyprinidae

##### Minnows

Opsopoeodus emiliae: pugnose minnow. Only six pugnose minnows were taken, and they were found at the most southern station. This is about the most northwestern point at which this species occurs. It is very common from the Balcones Escarpment south and southeast.

Notropis roseus: weed minnow. This species was also found only in the lower pools below the Balcones Escarpment. This is near the northwestern limits of this species, as it is common from this point southeast.

Notropis venustus: spottail shiner. The 20 specimens of this species were picked up in the last two stations where the flow is perennial. Why they were not taken at other stations can not be determined. There is little doubt that their distribution is over the entire area, but perhaps not in large numbers.

Notropis lepidus: Edward shiner. This species, endemic to the rivers in this portion of the Edwards Plateau, was one of the most prevalent fishes found. They were found near the headwaters and in the pools below the Balcones Escarpment. This is an excellent bait and forage minnow.

Notropis deliciosus: sand shiner. The sand shiner range in the Sabinal is limited to the upper one-third of the river. This area of the river has numerous springs, none of them large, gravel bottoms and considerably more vegetation. They are not common at any point, and only four were found at these stations.

Dionda episcopa: roundnose minnow. Typically, the 24 fish of this species were found in immediate large spring areas only. They were found at the headwater spring of the Sabinal and the headwater spring of Mill Creek. All though a fair forage minnow, it offers little food in this stream because the spring areas are such that the larger game fish would not inhabit them.

Pimephales vigilax: parrot minnow. Only two parrot minnows were found. They were taken in a large standing pool. The bottom of this pool was deep silt and a dense growth of muskgrass was present. This species is a good forage and bait minnow.

Campostoma anomalum: stoneroller. This fish was found in the upper one-third of the stream. They occur in large numbers, even more than the seining collections indicate. At Station 3 they were especially numerous, but the type bottom prevented any more being taken. This is a fair forage minnow. Only 14 were recorded.

#### Family Ameiruidae

#### Freshwater catfishes

Ictalurus punctatus: channel catfish. Even though only seven individuals were found at two stations, they are more widely distributed. The stream is by nature not too suitable for catfish, due to the lack of large pools. Those fish found were in fairly good condition. Channel catfish are stocked from the Federal Fish Hatchery at Uvalde and the State Hatchery at Ingram. This fish is about the most, if not the most, desirable fish which occurs in the river. They are fished for by trotline, set-hook and still fishing.

Ictalurus natalis: yellow bullhead. The 11 bullheads taken were found at three stations, but their distribution is general. The larger fish are taken in pools, but the smaller ones find harbor among the gravel and rubble in the solution channels of the bed limestone bottoms. At Station 7 they were very common, and almost every stone had a small bullhead under it. This fish is not of too much importance from a sport fishing standpoint. Their being a fair forage fish for channel catfish is about their only importance.

Family Poecillidae

## Mosquitofishes

Gambusia affinis: gambusia. This mosquitofish is found throughout the watershed in the more shallow waters. Their value is chiefly in their control of mosquito larvae. There were four taken.

Family Centrarchidae

## Black Basses and Sunfishes

Micropterus salmoides: largemouth black bass. This fine game fish is found in practically all of the larger pools of the river, even though the collection would indicate their occurrence is limited to only the lower parts of the river. There are two impoundments on Mill Creek, which is near the headwaters, that offer excellent bass fishing. The factor which limits the numbers of the largemouth is pool size. As mentioned in the earlier discussion, very few pools are present which will support the larger game fish. Seven were taken, mostly in nets.

Chaenobryttus gulosus: warmouth. These fish were taken in the three largest natural pools found on the river. The competition from other sunfishes must limit their numbers. At Station 8 the six warmouth found were stunted. None of the nine taken at all stations were of sufficient size to be considered edible.

Lepomis cyanellus: green sunfish. The green sunfish was the most widely distributed sunfish found. It is most numerous in the lower portions however. This is a good game fish when it reaches some size, but its tendencies to overpopulate seriously retard the growth rate. This overpopulation of green sunfish along with other sunfishes has retarded the growth rate in this stream.

Lepomis microlophus: redear sunfish. Only one was found. It was taken from a standing pool in the lower parts of the stream. This species appears to be more of a pond fish which could limit its distribution and numbers. The State Hatcheries have distributed this species for 20 years or more. The Federal Hatcheries have started distributing them in the past few years.

Lepomis macrochirus: bluegill. All sunfish have a tendency to overpopulate, but the bluegill seems to be the most inclined to do so. Of the 106 taken, not more than a dozen were over three inches long. They were found mostly in the pools below the Balcones Fault. The only flow which occurs in these pools is in times of small rises or floods which have been practically absent in recent years. These floods would clear some of the vegetation and redistribute these sunfish, allowing the few larger game fish to utilize them for food. As stated for the green sunfish, few people fish for these bluegills because of their size, therefore their size becomes smaller. This develops into a very undesirable cycle.

Lepomis auritus: yellowbelly sunfish. The 14 yellowbellies were taken fairly uniformly throughout the stream, but are more numerous near the headwaters as would be expected. This is a desirable pan fish, but suffers from the chronic ailment in this stream of overpopulation and lack of pools large enough to support a big population.

Lepomis megalotis: longear sunfish. This sunfish was found in all but three collections. This species fairs somewhat better than the others, if the size caught in

nets and seining collections are any indication. There seldom appeared to be an overpopulation of this individual sunfish. This species is a very good pan fish and is the most sought after by the "perch fishermen". There were 22 taken on this survey.

Lepomis microlophus X Lepomis megalotis: redear-longear hybrid. This rather common hybrid was found in a standing pool. This pool contained one of the largest total fish populations of any section of the stream.

### Family Cichlidae

#### Cichlids

Cichlasoma cyanoguttatum: Rio Grande cichlid. This semi-tropical cichlid was found only in the lower sections of the stream. Their numbers have not become excessive. The nature of the stream, shallow and slow flowing, is conducive to rapid and extreme fluctuation in temperature. This condition could keep the numbers of the Rio Grande cichlids limited to the larger pools of the southern parts where all four specimens of this kind were taken. Even though the temperature in spring areas is more suitable, especially during the winter months, other habitat conditions such as small pools and shallow water evidently prevent the Rio Grande from moving upstream to these areas.

The following is a list of fish which were not taken but could possibly occur:

Lepisosteus productus

Notropis amabilis

Lepisosteus osseus

Mollienisia latipinna

Ictiobus bubalus

Etheostoma lepidum

Prepared by Fred G. Lowman, Jr. Approved by \_\_\_\_\_  
Assistant Project Leader

Marion Toole  
Chief Aquatic Biologist

Date May 15, 1957

Table 1. Species and Number of Fish Collected from Each Station on the Sabinal River.

Species	Station Number										Total
	1	2	3	4	5	6	7	8	9	10	
<u>Dorosoma cepedianum</u>	0	0	0	0	0	7	0	11	0	1	19
<u>Astyanax fasciatus</u>	2	0	0	0	3	0	6	0	0	0	11
<u>Moxostoma congestum</u>	0	0	0	0	0	4	0	1	0	0	5
<u>Opsopoeodus emiliae</u>	0	0	0	0	0	0	0	0	0	6	6
<u>Notropis roseus</u>	0	0	0	0	0	0	0	0	4	7	11
<u>Notropis venustus</u>	0	0	0	0	0	8	12	0	0	0	20
<u>Notropis lepidus</u>	0	1	0	22	0	1	4	0	0	11	39
<u>Notropis deliciosus</u>	0	1	2	0	1	0	0	0	0	0	4
<u>Dionda episcopa</u>	15	0	0	9	0	0	0	0	0	0	24
<u>Pimephales vigilax</u>	0	0	0	0	0	0	0	2	0	0	2
<u>Campostoma anomalum</u>	2	4	3	2	3	0	0	0	0	0	14
<u>Ictalurus punctatus</u>	0	0	0	0	0	6	0	1	0	0	7
<u>Amelurus natalis</u>	0	1	0	0	0	3	7	0	0	0	11
<u>Gambusia affinis</u>	0	4	3	0	6	9	2	2	11	4	41
<u>Micropterus salmoides</u>	0	0	0	0	0	1	0	4	1	1	7
<u>Chaenobryttus coronarius</u>	0	0	0	0	1	0	0	6	2	0	9
<u>Lepomis cyanellus</u>	0	0	1	0	19	2	1	2	1	3	29
<u>Lepomis microlophus</u>	0	0	0	0	0	0	0	1	0	0	1
<u>Lepomis macrochirus</u>	0	0	0	0	4	3	0	12	82	5	106
<u>Lepomis auritus</u>	0	7	4	0	0	2	0	1	0	0	14
<u>Lepomis megalotis</u>	2	1	0	0	11	0	3	1	3	1	22
<u>Lepomis mic. X meg.</u>	0	0	0	0	0	0	0	2	0	0	2
<u>Cichlasoma cyanoguttata</u>	0	0	0	0	0	2	1	1	0	0	4
Totals	21	19	13	33	48	48	36	47	104	39	408

Table 2. Key to Fish Collection Stations on the Sabinal River within Bandera and Uvalde Counties, Texas.

Station Number	Collection Number	Location
1.	S-6	Sabinal River: Lat. $29^{\circ}50'30''$ , Long. $99^{\circ}34'30''$ , Bandera County. 3 miles north mouth of Can Creek or $6\frac{1}{2}$ miles north of Vanderpool.
2.	S-7, GN-1	Sabinal River: Lat. $29^{\circ}48'$ , Long. $99^{\circ}34'30''$ , Bandera County. Weed Ranch 4 miles North of Vanderpool.
3.	S-8	Sabinal River: Lat. $29^{\circ}46'$ , Long. $99^{\circ}34'30''$ , Bandera County. $2\frac{1}{2}$ miles south Weed Ranch.
4.	S-5	Sabinal River: Lat. $29^{\circ}48'$ , Long. $99^{\circ}31'$ , Bandera County. Head waters of Mill Creek, 2 miles N.E. of Vanderpool on the Layton Ranch.
5.	S-2	Sabinal River: Lat. $29^{\circ}39'$ , Long. $99^{\circ}32'$ , Bandera County. Fisher Camp Ground, 1st. crossing north of Utopia on Hwy. 187.
6.	S-9, GN-2	Sabinal River: Lat. $29^{\circ}32'40''$ , Long. $99^{\circ}34'30''$ , Uvalde County. Girl Scout Camp 3 miles south of Utopia.
7.	S-1	Sabinal River: Lat. $29^{\circ}31'15''$ , Long. $99^{\circ}30'30''$ , Uvalde County. Hwy. 187, first crossing north of Sabinal.
8.	S-10, GN-3	Sabinal River: Lat. $29^{\circ}24'30''$ , Long. $99^{\circ}29'45''$ , Uvalde County. 7 miles north of Sabinal on Kincaide Ranch.
9.	S-4	Sabinal River: Lat. $29^{\circ}29'$ , Long. $99^{\circ}19'20''$ , Uvalde County. 1st. crossing west of Sabinal.
10.	S-11	Sabinal River: Lat. $29^{\circ}16'10''$ , Long. $99^{\circ}27'50''$ , Uvalde County. 6 miles south of Sabinal, 2nd crossing.

Table 3. Checklist of Fishes from the Sabinal River and its Tributaries within Bandera, Medina and Uvalde Counties, Texas.

Scientific Name	Common Name
<u>Dorosoma cepedianum</u>	Gizzard shad
<u>Astyanax fasciatus</u>	Tetra (Mexican Jumper)
<u>Moxostoma congestum</u>	Gray redhorse
<u>Opsopoeodus emiliae</u>	Pugnose minnow
<u>Notropis roseus</u>	Central weed shiner
<u>Notropis venustus</u>	Blacktail shiner
<u>Notropis lepidus</u>	Edwards shiner
<u>Notropis deliciosus</u>	Sand shiner
<u>Dionda episcopa</u>	Roundnose minnow
<u>Pimephales vigilax</u>	Parrot minnow
<u>Campostoma anomalum</u>	Stoneroller, (Steelback)
<u>Ictalurus punctatus</u>	Southern channel catfish
<u>Ictalurus natalis</u>	Yellow bullhead
<u>Gambusia affinis</u>	Gambusia, (Common Mosquitofish)
<u>Micropterus salmoides</u>	Largemouth black bass
<u>Chaenobryttus gulosus</u>	Warmouth
<u>Lepomis cyanellus</u>	Green sunfish
<u>Lepomis microlophus</u>	Redear sunfish
<u>Lepomis macrochirus</u>	Bluegill
<u>Lepomis auritus</u>	Yellowbelly sunfish
<u>Lepomis megalotis</u>	Longear sunfish
<u>Lepomis mic. X Lepomis meg.</u>	Hybrid
<u>Cichlasoma cyanoguttatum</u>	Rio Grande Cichlid

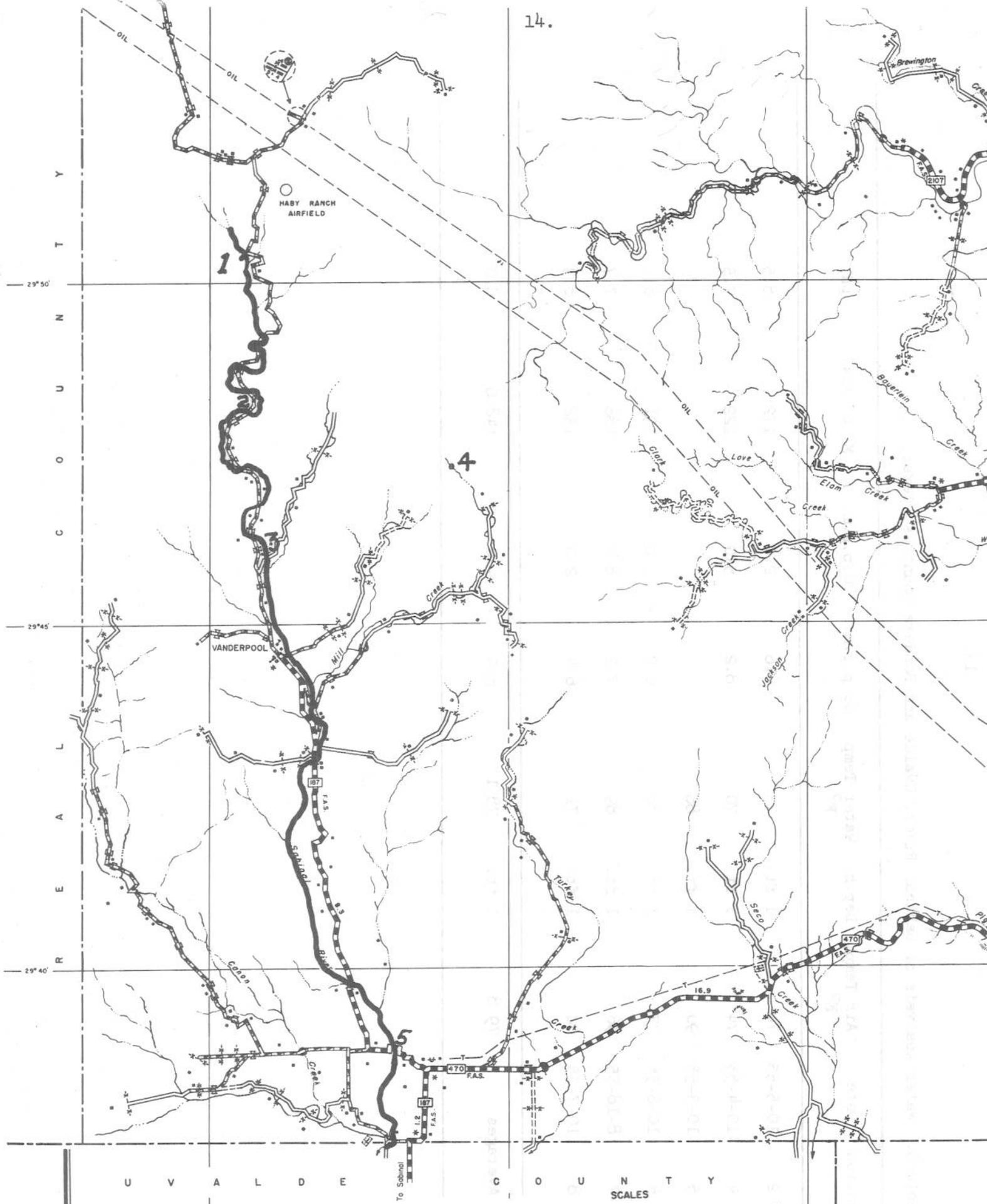
Table 4. Checklist of Aquatic Plants of the Sabinal River and its Tributaries within Bandera, Medina and Uvalde Counties, Texas.

Cattail	<i>Typha latifolia</i>
Bulrush	<i>Scirpus etuberculatus</i>
Spikerush	<i>Eleocharis</i> sps.
Sedges	<i>Cyperus</i> sps. and <i>Eleocharis</i> sps.
Umbrella grass	<i>Fuirena simplex</i>
Yellow waterlily (spatterdock)	<i>Nuphar advena</i>
Pondweeds	<i>Potamogeton</i> sps.
Water pennywort	<i>Hydrocotyle umbellata</i>
Horned pondweed	<i>Zanichellia palustris</i>
Watercress	<i>Nasturtium officinale</i>
False loosestrife	<i>Ludwegia</i> sp.
Water milfoil	<i>Myriophyllum heterophyllum</i>
Coontail	<i>Ceratophyllum demersum</i>
Muskgrass	<i>Chara vulgaris</i>
Green algae	<i>Chlorophyceae</i>
Bluegreen algae	<i>Cyanophyceae</i>

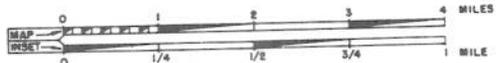
Table 5. Water Analysis of Sabinas River, Uvalde and Bandera Counties, Texas.

Station	Date	Air Temp. F <sup>o</sup>	Depth	Water Temp. F <sup>o</sup>	O <sub>2</sub> p.p.m.	CO <sub>2</sub> p.p.m.	M. O. Alk.	pH
2	10-5-55	74	1 ft.	73	6.6	2.0	172	8.5
4	10-4-55	74	1 ft.	70	8.2	5.0	122	7.5
5	10-3-55	90	1 ft.	88				
6	10-6-55	77	1 ft.	78	6.2	3.0	131	8.1
7	8-18-55	96	1 ft.	89	7.2	8.0	186	7.7
8	10-7-55	68	1 ft.	71	6.4	2.0	132	8.3
<hr/>								
Averages		79.8	1 ft.	78.1	6.9	4.0	148.6	8.0

BANDERA COUNTY



# BANDERA COUNTY



1954

99°25'

99°35'

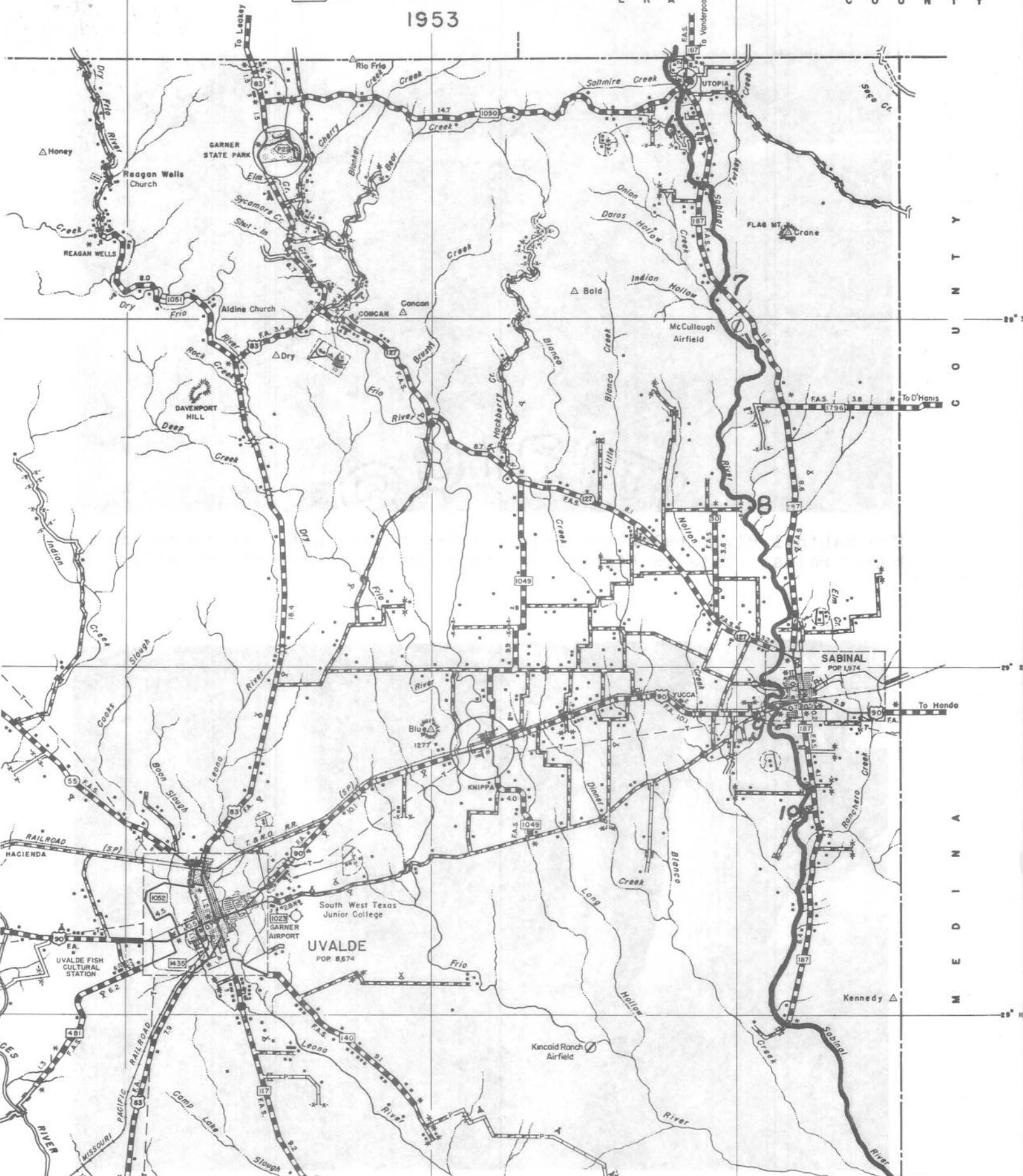
99°30'

SCALE 15.



1953

ERA COUNTY



C O U N T Y

M E D I N A

UVALDE COUNTY

99° 50'

99° 40'

99° 30'

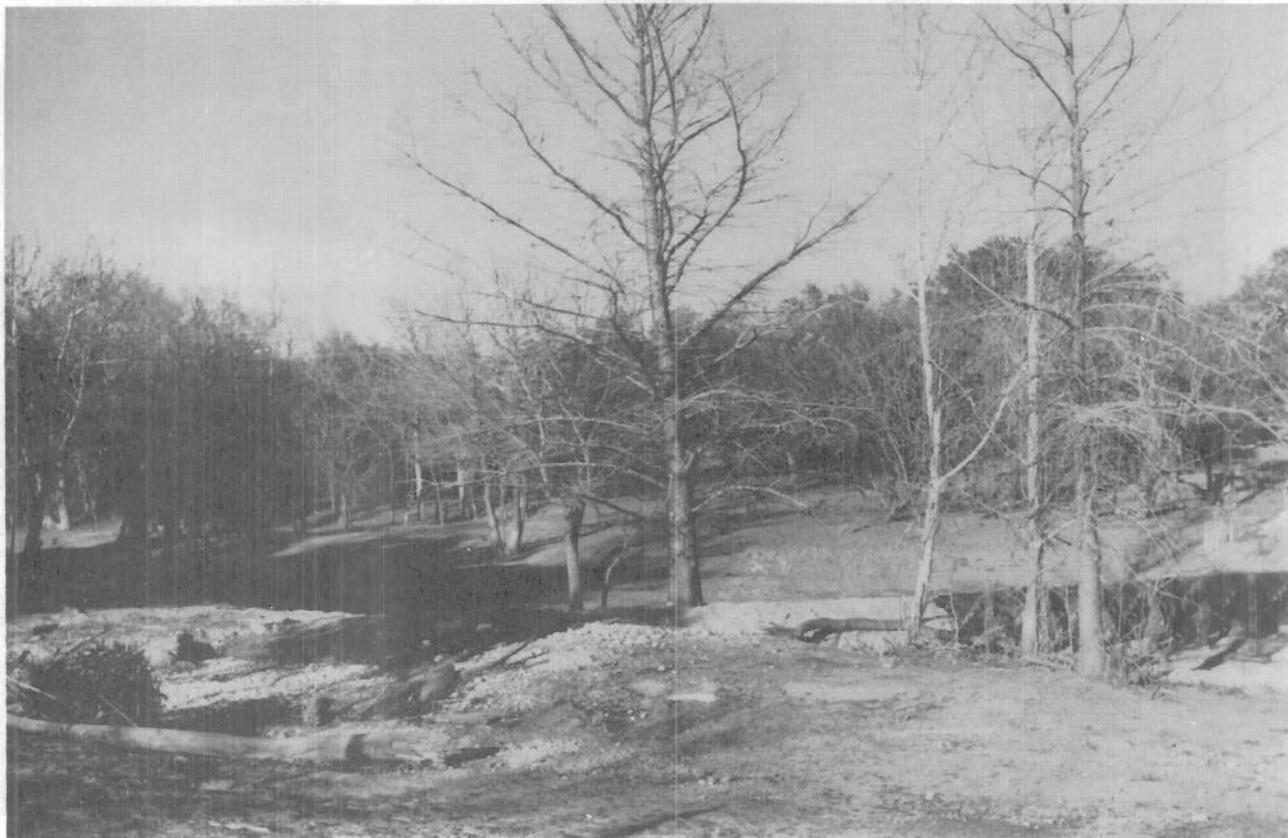
F R I O



The Sabinal River below the Balcones Fault does not flow except during heavy rains. This is Highway 127 crossing northwest of Sabinal.



The Sabinal crossing of Highway 1050 west of Utopia. This section of the river generally flows in years of normal rainfall. Notice the large cypress from which the Sabinal gets its name.



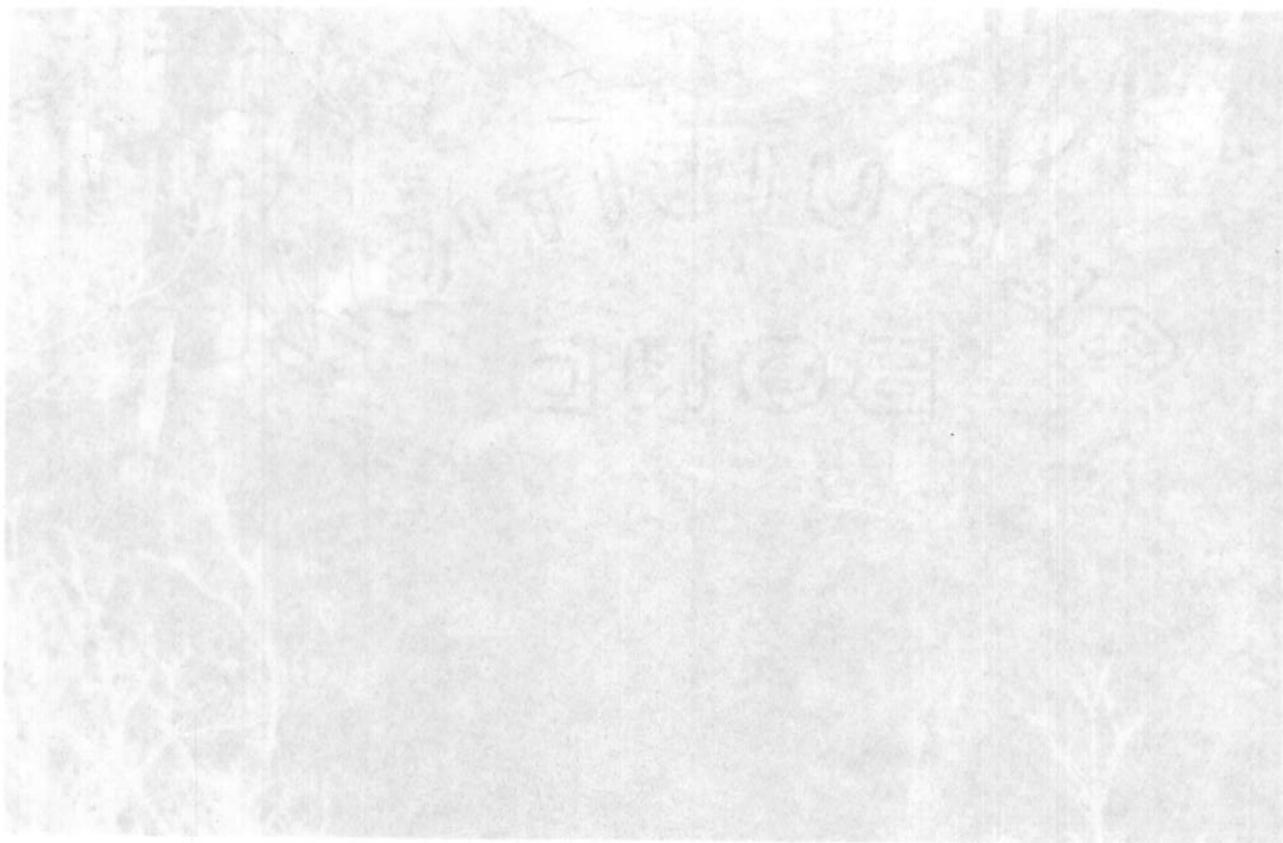
This is Station 5, at Highway 187 crossing northwest of Utopia. A collection was made here before the stream dried.



The Sabinal's meager trickle along Highway 187 north of Station 5.



The Sabinal near Station three. The width is four to twenty feet at this point.



The Sabinal's meager trickle along Highway 187 north of Station 5.