

RM 38881

AQUATIC ECOLOGY
Coletto Creek Project

CENTRAL POWER AND LIGHT COMPANY

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Scott Murray
Scott Jinnette
Frank Moseley

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1.0 INTRODUCTION

The biological and physical-chemical characteristics of the aquatic environs of portions of Coleta Creek and the Guadalupe River have been investigated through field sampling and laboratory analyses. Results from quarterly and bi-weekly sampling during 1975 and 1976, designed to provide baseline information for analysis of the effects of the proposed CCP and associated cooling lake, are presented in the subsequent sections.

Perturbations in stream channel morphology as a result of human activities (largely agricultural) in the Coleta Creek area have had an effect on species composition at each trophic level (Environment Consultants, 1975). Land clearing and alterations in native vegetation have reduced the retention capacity of the watershed, resulting in greater runoff and stream discharge. Channel bottoms tend to be very unstable due to flash erosion and sediment loading. This drastically reduces the substrate types necessary for both fish nesting and stable benthic communities.

2.0 DESCRIPTION OF STUDY AREA AND METHODOLOGY

2.1 DESCRIPTION OF STUDY AREA AND LOCATION OF SAMPLE STATIONS

The study area includes portions of the Guadalupe River and Coleta Creek contained in DeWitt, Goliad, and Victoria Counties.

The section of the Guadalupe River located in the study area is characterized by generally murky waters in elongated pools, separated by short, rocky riffles. Abandoned channels are common on the broad, flat floodplain. The river bank is dotted with stands of ash, tallow, cypress, and pecan. Along its course, the Guadalupe River is fed by many intermittent tributaries, including Coleta Creek.

Coleta Creek originates in the central portion of DeWitt County. Further South, it is joined by Fifteenmile Creek to form the boundary between Victoria and Goliad Counties for approximately

12.5 miles. At the proposed dam location, Coleta Creek drains an area of 507 square miles. Major tributaries of Coleta Creek are Twelvemile Creek, Fifteenmile Creek, Eighteenmile Creek, Turkey Creek, Thief Creek, Perdido Creek, Sulphur Creek, and the Payton Branch. The drainage pattern for the creek is primarily dendritic with a low-to-medium drainage density. The stream is characterized by a wide, sandy, sparsely vegetated floodplain which ranges from 50 to 600 feet wide and is incised some 25-50 feet into the surrounding topography (Appendix I).

Substrates of Coleta Creek and its tributaries are composed of medium grain sand with some gravel found in the infrequent pool-riffle areas, and is composed primarily of a "pool-bar" type continuity. The flow on Coleta Creek near Schroeder, Texas, fluctuates dramatically, but frequently is below 10 cfs. Recorded peak flows on Coleta Creek have ranged from 31,380 cfs to 34,800 cfs.

Station G-1 on the Guadalupe River is located approximately two miles south of where the Texas Hwy 447 bridge crosses the river. It is located along the west bank of the river 1,000 feet downstream from the discharge pipe of South Texas Electric Cooperative's Sam Rayburn Generating Station situated just west of Nursery. The site for Station G-1 was selected to coincide with the proposed pumping station on the Guadalupe River. At this point, the river has steep banks and is approximately 8 feet deep with a muddy, silty substrate covered by large trees and roots.

Station C-1 on Coleta Creek (Fig. 1) is located just north of the Hwy 622 bridge, 2.3 miles northeast of Schroeder. This station is characterized by a "pool-riffle" type morphology with gravel and a coarse-to-medium grain sand bottom. The depth at this station over the study period ranged from 0.5-3.5 feet. Periods of high runoff heavily influenced the morphology of this station by changing depth and pool size. This station was selected to provide samples taken from the upper reaches of the area of the proposed reservoir.

Station C-2 on Coleta Creek (Fig. 1) is located 5.2 miles southeast of Schroeder, immediately south of the Coletoville Rd low-water bridge crossing. The depth of this station through the study ranged from 1.5 to 5 feet. The stream retained a pool-bar configuration throughout the studies. Data from this station reflect pre-construction conditions in the mid-reservoir area.

Station C-3 on Coleta Creek (Fig. 1) is located immediately north of U.S. Hwy 59, approximately 11.2 miles west of Victoria. This site was selected to provide downstream pre-construction baseline data in the mid-reservoir area. This station is also characterized by the pool-bar morphology. Immediately downstream there is debris from pre-existing bridges offering more potential shelter to aquatic life than is present at the other stations. Depth during the study period at this station ranged from 1 to 3 feet.

Station C-4 on Coleta Creek (Fig. 1) is located immediately south of the U.S. Hwy 77 bridge. This station was added to the sampling program in the winter of 1976 to provide additional downstream baseline data. The station is characterized by a broad, long pool that varies in depth from 3 to 7 feet, with sandy, gravel riffles above and below the pool. The pool substrate is generally fine sand covered by a layer of silt.

Station GC is located approximately 500 feet below the confluence of the Guadalupe River and Coleta Creek, approximately 7 miles south of the Texas Hwy Loop 175 bridge south of Victoria (Fig. 1). The depth at this station ranged from 8 to 9 feet with a substrate of mud, silt, and organic debris. This station was added just prior to the winter, 1976 survey. Data were taken from this station to provide baseline information which may be relevant in predicting downstream impact of reservoir construction and operation.

2.8 FISHES AND MACROINVERTEBRATES

Nekton samples were taken from each station on the Guadalupe River and Coleta Creek. However, due to morphometric differences between the two systems, different sample collection methods were utilized in each.

Stations in the Guadalupe River were sampled with baited hoop nets and experimental gill nets. Station G-1 was sampled bi-weekly during the spring and all stations were sampled quarterly. Additionally, Station G-1 in the fall, 1975 was sampled with three trawl hauls, one during the day and two after dark. Since nothing was caught in the trawl hauls, this sample method was discontinued. The trawl used was a 10-foot otter trawl of $1\frac{1}{2}$ -inch stretch mesh with a $1\frac{1}{4}$ -inch stretch mesh liner in the cod end.

The hoop nets employed on the river were 18-foot x 5-foot with 2-inch stretch mesh, 7 hoops, and 2 throats, and were baited with commercial canned cat food. At Station G-1, three hoop nets were placed along the west bank of the Guadalupe River, which corresponds to the bank where the intake structures for reservoir makeup water will be located. One net was positioned upstream of the proposed pump station; another was positioned downstream; and the final net was placed directly at the proposed intake site.

The experimental gill nets were 150-foot x 6-foot with $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, 4, and 5-inch stretch meshes. Each mesh section was in 25-foot length panels. The three gill nets were fished concurrently with the hoop nets and were placed just downstream of each hoop net. The three hoop and gill nets were fished in a corresponding manner at Station GC. At both these stations, the nets were allowed to fish for two successive 24-hour periods except under conditions of heavy debris load and high flow conditions. In addition to the above sampling techniques, seine samples were collected in the rapids approximately $\frac{3}{4}$ mile above Station G-1 in the fall of 1975. This sampling was discontinued since the rapids were so far from the area of potential impact.

3.5 BENTHOS

The benthic macroinvertebrates were sampled from all stations in the study area. Thirty taxa were collected from the Coleta Creek system, while 19 were collected from the Guadalupe River.

Results of benthic sampling in the Guadalupe River are shown in Tables 6 through 9. These data indicate that occurrence of benthos is quite seasonal with largest numbers occurring during the fall. During this time, samples were dominated by Chironomids. Spring sampling yielded moderate numbers of benthic organisms; however, numbers were small during summer and winter samplings.

Benthic data for Coleta Creek are shown in Tables 10 through 13. As in the case of the Guadalupe River, diversity and numbers were high in the fall sampling with samples being dominated by Chironomids at all stations. In contrast to the seasonal abundance during the fall sampling on the Guadalupe River, large numbers of Chironomids were found in Coleta Creek during the winter at C-3. Abundance of benthic organisms in the spring and summer samplings were small, probably the result of high flow periods prior to the sampling dates.

3.6 ICHTHYOPLANKTON

Few ichthyoplankters or small juvenile fishes were collected from either Coleta Creek or the Guadalupe River during the course of the study. These small numbers are reflected in Tables 14 and 15, showing ichthyoplankton results from both the Guadalupe River and Coleta Creek during spring and summer seasons. Station G-1 produced the smallest number of ichthyoplankters with only two juvenile Atherinids being collected in the fall. No other fish eggs, larvae, or juveniles were collected from this station during the course of the study. Since G-1 has steep banks with soft, silty bottoms, it is unlikely that this area serves as a spawning habitat for many species. Station GC did

produce a few larval fishes; the only ones of sport or commercial importance were two *Pomoxis* larvae found during the April survey (Table 14). This station was not sampled in the fall. Slightly larger numbers of fish eggs, larvae, and juveniles were found in Coleta Creek (Tables 14 and 15). Although no larval fishes of sport or commercial consequence were found in any season in Coleta Creek during the course of the study, a few juvenile *Pomoxis annularis* and *Micropterus punctulatus* were found during summer (Table 15). Based on data collected, it does not appear that Coleta Creek serves as a significant spawning area for sport or commercial fishes; however, some species do utilize the creek when conditions permit.

3.7 FISHES

A total of 12 families and 32 fish species were collected from Coleta Creek sampling stations during the study period (Tables 16 through 19). These numbers compare with 8 families and 14 species previously collected (Environment Consultants, 1975), although 66 potential species and 19 potential families were indicated in the same report. These potentials were based on general distribution patterns of fishes in Texas. Of those fishes collected, none is considered rare or endangered.

Based on data shown in Tables 16 through 19, the Coleta Creek study area was characterized by dominance of populations of small forage fishes, including the minnow family, Cyprinidae, the livebearers, Poeciliidae, and bass and sunfishes, Centrarchidae. It should be noted that the Centrarchids collected were usually juveniles or sub-adults.

The Cyprinid, *Notropis lutrensis*, was the most ubiquitous form, collected at all creek stations during all seasons (Tables 16-19). A total of 3,484 *N. lutrensis* were collected during the study period.

The mosquitofish, *Gambusia affinis*, was relatively abundant at most stations in all seasons, particularly during winter

when a total of 106 specimens were collected (Table 17). Additionally, Centrarchids, particularly the bluegill, *Lepomis macrochirus*, were abundant at most stations during all seasons.

Data collected thus far show that the greatest numbers of individuals and species were collected during the spring survey. However, the fall survey produced slightly higher numbers of representative families (Tables 16 and 18), while the winter and summer sampling produced the fewest numbers.

Although no samples were collected from Station C-4 during the fall, this station consistently produced the highest numbers of individuals during winter and spring sampling. This was probably due to the physical characteristics of this station, being much wider and considerably deeper than the other creek stations.

Three commercially or recreationally important fish species were identified from the affected areas of the creek. Two specimens of *Ictalurus punctatus* were collected during the fall, 1975 survey. A single juvenile measuring 19 mm (SL) was taken at Station C-1 and another measuring 99 mm (SL) was collected at C-2 (Table 16).

Pomoxis annularis, white crappie, were taken in some numbers from the sampling area. Two individuals, measuring 64 and 66 mm (SL) were captured at C-3 during the fall survey (Table 16). One individual measuring 130 mm (SL) was collected in the spring at C-1 and 11 specimens ranging from 56 to 106 mm (SL) were taken at C-14 (Table 18). Twenty-one white crappie ranging from 36 to 56 mm (SL) were collected at Station C-4 during summer sampling (Table 19).

Although adults were never collected, tentatively identified spotted bass (*Micropterus punctulatus*) occurred randomly at most stations during all seasons. The most significant occurrence of this species was at Station C-4 during April, when 65 juvenile bass, ranging from 17 to 27 mm (SL) were collected in one sample

(Table 18). A total of 33 juvenile spotted bass ranging from 30 to 72 mm (SL) were collected from Coleta Creek during summer quarterly sampling (Table 19). Populations of young spotted bass in the study area showed an average growth of 34 mm (SL) between April and July. Young, et al (1973) have reported this species potentially occurs in the Coleta Creek environ; however, spawning information on this bass is sketchy at best.

The data indicate that Coleta Creek is typical of intermittent flowing streams in Central Texas. Habitat varies within the stream channel depending on flow conditions, and it is doubtful that any permanent populations of sport or commercial fishes can be maintained within the Coleta Creek environs.

A total of 11 families and 27 species of fishes were collected from the Guadalupe River during the study period (Tables 20-27). It is felt that the collections on the Guadalupe River are representative for sport and commercial fishes; however, due to gear selectivity, it is doubtful that collections for small individuals, such as minnows, are complete. Dominant fishes during the study were members of the sucker family, Catostomidae; the gar family, Lepisosteidae; the catfishes, Ictaluridae; and the bass and sunfish family, Centrarchidae (Tables 20 through 27).

The longnose gar, *Lepisosteus osseus*, was the most abundant fish species collected from the river stations (Tables 20-27). The channel catfish, *Ictalurus punctatus*, was collected during all sampling dates excepting March 31, and was the second most abundant fish collected. Other abundant species were smallmouth buffalo, white crappie, and bluegills.

Fishes considered to be of recreational or commercial importance collected on the Guadalupe River were examined for gonadal development in an attempt to determine spawning activities. Fishes examined and determined to be in advanced gonadal development or in spent conditions included *Ictalurus furcatus*, *Pylodictis olivaris*, *Ictalurus punctatus*, *Pomoxis nigromaculatus*, *P. annularis*, *Micropterus salmoides*, and *Micropterus punctulatus*. Based on the results of

gonadal examination, it appears that most species mentioned spawn during spring; however; *Ictalurus punctatus* was found to have advanced gonadal development from October through mid-April.

In addition to the fishes, blue crabs, *Callinectes sapidus*, were collected in large numbers in the Guadalupe River in all seasons but spring (Tables 20-27). Only occasional collections of blue crabs were made in Coleta Creek, however (Tables 16-19). Although this species is of commercial value, it is not fished in the study area for commercial purposes.

Data collected during this study indicate that the Guadalupe River and its tributary, Coleta Creek, are not atypical of other South Texas streams. The Guadalupe River is dominated by "rough fish" and catfish. However, it does support some sunfish and basses. Coleta Creek is somewhat typical of an intermittent flowing tributary and supports small forage fishes and juvenile sunfishes. Perturbations resulting from construction and operation of CCP should have little effect on the existing biota below Coleta Creek Dam or on the Guadalupe River.

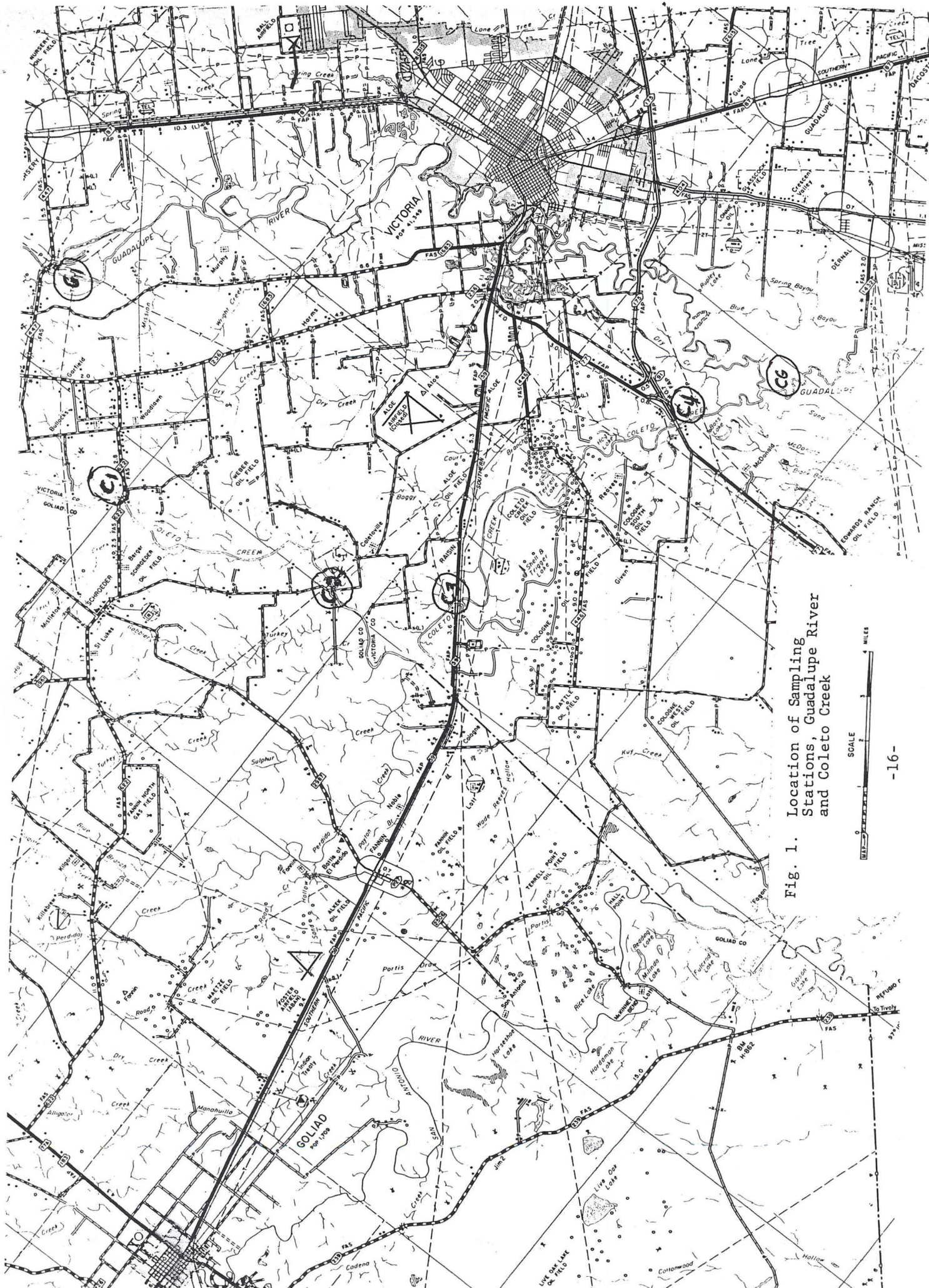


Fig. 1. Location of Sampling Stations, Guadalupe River and Coletto Creek

TABLE 14
NUMBER OF FISH EGGS, LARVAE, AND JUVENILES CONTAINED IN SAMPLES FROM THE
GUADALUPE RIVER AND COLETO CREEK DURING 12-14 APRIL 1976

ation w Direction	G1		GC		C1		C2		C3		C4		Totals
	Up	Down	Up	Down	Up	Down	Up	Down	Up	Down	Up	Down	
<hr/> TAXA <hr/>													
sh Eggs - Dorosoma (?)					3	2						1	6
val Fish - Dorosoma sp.			1(26)*			1(3)		1(4)	1(4)	1(3.5)			5
Cyprinidae											1(8)		1
Pomoxis sp.			1(11)	1(12)									2
Totals	0	0	2	1	3	3	0	1	1	1	0	2	14
	0		3		6		1		2		2		
eniles - Notemigonus crysoleucas												1(21)	1
Notropis lutrensis (number)					2	8	7	1	1(29)	5	0	3	27
Length range					(29-30)	(30-37)	(28-49)	(37)	(28-46)			(25-31)	(25-49)
					10		8		6		4		28

= total length in mm

TABLE 15

NUMBER OF FISH EGGS, LARVAE, JUVENILES AND ADULTS CONTAINED IN SAMPLES FROM THE
GUADALUPE RIVER AND COLETO CREEK DURING 12-14 JULY 1976

Station Flow Direction TAXA	G-1		CG		C-1		C-2		C-3		C-4		TOTAL
	Up	Down	Up	Down	Up	Down	Up	Down	Up	Down	Up	Down	
Fish eggs - none													
Larval Fish -													
<i>Dorosoma</i> sp.			1(15)										1
<i>Notropis</i> sp.			2(5.5,7)								1(8)		3
<i>Lepomis</i> sp.											1(6)		1
Subtotal	0	0	3	0	0	0	0	0	0	0	1	1	5
Total Larvae	0		3		0		0		0		2		
Juveniles -													
<i>Notropis</i> sp.			2(14,16)				1(11)		1(12)				4
<i>Pomoxis annularis</i>											1(49)	1(59)	2
<i>Micropterus punctulatus</i>											1(67)		1
<i>Notropis lutrensis</i>											1(24)	4	5
Length Range												(16-27)	
<i>Lepomis</i> sp.											4	2(8,11.5)	6
Length Range											(12-17)		
Subtotal	0		0	1	0	0	1	0	1	0	7	7	18
Total Juveniles	0		0		0		0		0		0		
Adults													
<i>Notropis lutrensis</i>					2(38,41)								2
<i>Notropis emiliae</i>											5	4	9
Length Range											(20-28)	(21-35)	
Subtotal	0	0	2	0	2	0	0	0	0	0	5	4	11
Total Adults	0		0		2		0		0		0		

() = total length in mm

TABLE 16
NEKTON CATCH, COLETO CREEK
FALL SURVEY, 1975

DATE	STATIONS				Total
	C1	C2	C3	C4	
October 2, 1975					
AXA					
PALAEMONIDAE				(No samples)	
<i>Palaemonetes kadiakensis</i> *	11	12	--		23
DECAPODACEAE					
<i>Procambarus simulans</i>	--	1	--		1
PORTUNIDAE					
<i>Callinectes sapidus</i> BLUE CRAB	--	1	--		1
CLUPEIDAE					
<i>Dorosoma cepedianum</i>	--	--	1		1
<i>D. petenense</i>	--	--	1		1
CHARACIDAE					
<i>Astyanax fasciatus mexicanus</i>	15	--	2		17
CYPRINIDAE					
<i>Pimephales vigilax</i>	45	10	26		81
<i>Notropis lutrensis</i>	147	22	45		214
<i>N. venustus</i>	1	--	--		1
<i>N. emiliae</i>	--	--	1		1
CATOSTOMIDAE					
<i>Carpiodes carpio</i>	--	--	2		2
ICTALURIDAE					
<i>Ictalurus punctatus</i> YELLOW CAT	1	1	--		2
<i>Noturus gyrinus</i>	--	--	1		1
CYPRINODONTIDAE					
<i>Fundulus olivaceus</i>	7	--	--		7
<i>Cyprinodon variegatus</i>	--	3	11		14
POECILIIDAE					
<i>Foecilia latipinna</i>	4	9	--		13
<i>Gambusia affinis</i> MOSQUITO FISH	60	6	14		80
HERNIMIDAE					
<i>Menidia beryllina</i>	--	--	2		2

TABLE 16

DATE	S T A T I O N S				
	C1	C2	C3	C4	Total
October 2, 1975					
<u>TAXA</u>					
MUGILIDAE				(No samples)	
<i>Mugil cephalus</i>	--	3	14		17
CENTRARCHIDAE					
<i>Micropterus punctulatus</i>	4	1	5		10
<i>Lepomis gulosus</i>	--	--	4		4
<i>L. megalotis</i>	24	18	20		62
<i>L. humilis</i>	1	--	--		1
<i>L. macrochirus</i>	6	8	16		30
<i>Pomoxis annularis</i>	--	--	2		2
CICHLIDAE					
<i>Cichlasoma cyprinoguttatum</i>	2	10	6		18

*Species of questionable identification

TABLE 17
NEKTON CATCH, COLETO CREEK
WINTER SURVEY 1976

DATE	S T A T I O N S				
February 11-12, 1976	C1	C2	C3	C4	Total
AXA					
PALAEMONIDAE					
<i>Palaemonetes kadiakensis</i> *	--	12	2	16	30
CYPRINIDAE					
<i>Pimephales vigilax</i>	2	--	2	20	24
<i>Notropis lutrensis</i>	23	35	106	691	855
<i>N. emiliae</i>	--	--	--	2	2
CYPRINODONTIDAE					
<i>Fundulus olivaceus</i>	--	2	1	--	3
<i>Cyprinodon variegatus</i>	--	--	--	4	4
POECILIIDAE					
<i>Poecilia latipinna</i>	--	2	--	5	7
<i>Gambusia affinis</i>	--	58	1	47	106
CENTRARCHIDAE					
<i>Micropterus punctulatus</i>	1	--	--	--	1
<i>Lepomis megalotis</i>	--	--	1	6	7
<i>L. macrochirus</i>	2	7	2	7	18
CICHLIDAE					
<i>Cichlasoma cyanoguttatum</i>	2	1	--	--	3

species of questionable identification

TABLE 18
NEKTON CATCH, COLETO CREEK
SPRING SURVEY, 1976

DATE	S T A T I O N S				Total
	C1	C2	C3	C4	
April 12, 1976					
<u>TAXA</u>					
PALAEEMONIDAE					
<i>Palaemonetes pugio</i>	46	38	16	518	618
ASTACIDAE					
<i>Procambarus simulans</i>	2	4	5	7	18
CYPRINIDAE					
<i>Campostoma anomalum</i>	--	1	--	--	1
<i>Pimephales vigilax</i>	7	--	--	9	16
<i>Notropis lutrensis</i>	725	110	108	1317	2260
<i>N. venustus</i>	--	2	1	1	4
<i>N. stramineus</i>	3	--	--	--	3
<i>N. emiliae</i>	--	--	--	1	1
<i>N. buchanani</i>	--	--	--	2	2
ICTALURIDAE					
<i>Noturus gyrinus</i>	1	--	--	--	1
GYPRINODONTIDAE					
<i>Fundulus olivaceus</i>	1	2	--	--	3
<i>Cyprinodon variegatus</i>	6	--	--	2	8
POECILIIDAE					
<i>Poecilia latipinna</i>	--	--	--	8	8
<i>Gambusia affinis</i>	5	15	3	53	76
ATHERINIDAE					
<i>Menidia beryllina</i>	1	--	--	7	8
CENTRARCHIDAE					
<i>Micropterus punctulatus</i>	4	1	3	65	73
<i>Lepomis gulosus</i>	1	--	--	2	3
<i>L. cyanellus</i>	--	14	4	--	18
<i>L. punctatus</i>	--	1	--	4	5
<i>L. microlophus</i>	--	2	--	--	2
<i>L. megalotis</i>	9	--	4	22	35
<i>L. macrochirus</i>	21	6	6	62	95
<i>Pomoxis annularis</i>	1	--	--	11	12

Table 18

DATE	April 12, 1976	S T A T I O N S				
		C1	C2	C3	C4	Total
<u>TAXA</u>						
PERCIDAE						
	<i>Etheostoma gracile</i>	--	--	--	3	3
CICHLIDAE						
	<i>Cichlasoma cyanoguttatum</i>	1	--	--	2	3

Species of questionable identification

TABLE 19
NEKTON CATCH, COLETO CREEK
SUMMER SURVEY, 1976

DATE	S T A T I O N S				
July 13, 1976	C1	C2	C3	C4	Total
<u>TAXA</u>					
PALAEMONIDAE					
<i>Palaemonetes pugio</i> *	--	--	--	21	21
PORTUNIDAE					
<i>Callinectes sapidus</i>	--	--	--	1	1
CLUPEIDAE					
<i>Dorosoma cepedianum</i>	1	--	2	12	15
CHARACIDAE					
<i>Astyanax fasciatus mexicanus</i>	3	--	1	--	4
CYPRINIDAE					
<i>Pimephales vigilax</i>	3	3	14	2	22
<i>Notropis lutrensis</i>	81	38	36	--	155
<i>N. stramineus</i>	--	--	--	9	9
CATOSTOMIDAE					
<i>Ictiobus bubalus</i>	1	11	2	--	14
<i>Carpiodes carpio</i>	1	--	--	--	1
CYPRINODONTIDAE					
<i>Fundulus olivaceus</i>	1	2	--	--	3
<i>Cyprinodon variegatus</i>	--	6	--	--	6
POECILIIDAE					
<i>Poecilia latipinna</i>	--	--	--	1	1
<i>Gambusia affinis</i>	6	8	9	18	41
CENTRARCHIDAE					
<i>Micropterus punctulatus</i>	6	2	22	3	33
<i>Lepomis gulosus</i>	--	--	--	1	1
<i>L. cyanellus</i>	--	--	4	1	5
<i>L. microlophus</i>	2	--	--	--	2
<i>L. humilis</i>	--	--	4	6	10
<i>L. macrochirus</i>	2	--	7	20	29

TABLE 19

NEKTON CATCH, COLETO CREEK, Cont'd

DATE	STATIONS				Total
	C1	C2	C3	C4	
July 13, 1976					
XA					
CENTRARCHIDAE, Cont'd)					
<i>Lepomis auritus</i>	--	--	--	21	21
<i>Pomoxis annularis</i>	--	1	--	2	2
CICHLIDAE					
<i>Cichlasoma cyanoguttatum</i>	2	--	1	--	3

TABLE 20
NEKTON CATCH, GUADALUPE RIVER
FALL SURVEY, 1975

DATE October 1, 1975	S T A T I O N S		
	GI	GC	Total
TAXA	(No samples)		
PALAEMONIDAE			
<i>Macrobrachium acanthurus</i>	4		4
<i>Palaemonetes kadiakensis</i> *	28		28
ASTACIDAE			
<i>Procambarus simulans</i>	1		1
PORTUNIDAE			
<i>Callinectes sapidus</i>	28		28
LEPISOSTEIDAE			
<i>Lepisosteus osseus</i>	1		1
<i>L. oculatus</i>	1		1
CHARACIDAE			
<i>Astyanax fasciatus mexicanus</i>	2		2
CYPRINIDAE			
<i>Pimephales vigilax</i>	1		1
<i>Notropis lutrensis</i>	28		28
CATOSTOMIDAE			
<i>Ictiobus bubulus</i>	8		8
<i>Carpionodes carpio</i>	2		2
ICTALURIDAE			
<i>Ictalurus punctatus</i>	7		7
POECILIIDAE			
<i>Poecilia latipinna</i>	2		2
<i>Gambusia affinis</i>	7		7
CENTRARCHIDAE			
<i>Lepomis megalotis</i>	3		3
<i>Pomoxis annularis</i>	2		2

*Species of questionable identification

TABLE 21
NEKTON CATCH, GUADALUPE RIVER
WINTER SURVEY, 1976

DATE February 10, 1976	S T A T I O N S		
	GI	GC	Total
TAXA			
PORTUNIDAE			
<i>Callinectes sapidus</i>	--	102	102
LEPISOSTEIDAE			
<i>Lepisosteus osseus</i>	13	2	15
CLUPEIDAE			
<i>Dorosoma cepedianum</i>	1	--	1
<i>Dorosoma petenense</i>	1	--	1
CATOSTOMIDAE			
<i>Ictiobus bubulus</i>	2	3	5
ICTALURIDAE			
<i>Ictalurus punctatus</i>	5	4	9
<i>I. melas</i>	1	--	1
MUGILIDAE			
<i>Mugil cephalus</i>	6	1	7
CENTRARCHIDAE			
<i>Micropterus punctulatus</i>	1	--	1
<i>Lepomis marginatus</i>	1	--	1
<i>L. macrochirus</i>	1	2	3
<i>Pomoxis nigromaculatus</i>	1	--	1

TABLE 23
NEKTON CATCH, GUADALUPE RIVER
WINTER SURVEY, 1976

DATE March 18-19, 1976	S T A T I O N S		
	GI	GC	Total
AXA		(no sample)	
EPISOSTEIDAE			
<i>Lepisosteus osseus</i>	11		11
<i>L. oculatus</i>	2		2
LUDEIDAE			
<i>Dorosoma cepedianum</i>	1		1
<i>D. petenense</i>	5		5
CATOSTOMIDAE			
<i>Ictiobus bubalus</i>	13		13
<i>Carpiodes carpio</i>	1		1
ICTALURIDAE			
<i>Ictalurus punctatus</i>	2		2
<i>Pylodictus olivaris</i>	1		1
LEPTOCARIDAE			
<i>Micropterus punctulatus</i>	1		1
<i>Lepomis gulosus</i>	1		1
<i>L. macrochirus</i>	3		3
<i>Pomoxis annularis</i>	3		3

TABLE 24

NEKTON CATCH, GUADALUPE RIVER
SPRING SURVEY, 1976

DATE	S T A T I O N S		
	GC	GC	Total
March 31, 1976			
TAXA	(No samples)		
PORTUNIDAE			
<i>Callinectes sapidus</i>	1		1
LEPISOSTEIDAE			
<i>Lepisosteus osseus</i>	34		34
CLUPEIDAE			
<i>Dorosoma cepedianum</i>	2		2
<i>D. petenense</i>	3		3
CATOSTOMIDAE			
<i>Ictiobus bubalus</i>	25		25
<i>Carpionodes carpio</i>	1		1
ICTALURIDAE			
<i>Pylodictis olivaris</i>	2		2
MUGILIDAE			
<i>Mugil cephalus</i>	2		2
CENTRARCHIDAE			
<i>Micropterus punctulatus</i>	3		3
<i>Lepomis gulosus</i>	1		1
<i>L. microlophus</i>	1		1
<i>L. megalotis</i>	3		3
<i>L. macrochirus</i>	7		7
<i>Pomoxis annularis</i>	6		6
CICHLIDAE			
<i>Cichlasoma cyanoguttatum</i>	1		1

TABLE 25
NEKTON CATCH, GUADALUPE RIVER
SPRING SURVEY, 1976

DATE April 14, 1976	S T A T I O N S		
	GI	GC	Total
AXA			
PORTUNIDAE			
<i>Callinectes sapidus</i>	--	1	1
LEPISOSTEIDAE			
<i>Lepisosteus spatula</i>	--	1	1
<i>L. osseus</i>	6	18	24
CATOSTOMIDAE			
<i>Ictiobus bubalus</i>	4	2	6
ICTALURIDAE			
<i>Ictalurus punctatus</i>	1	1	2
<i>I. furcatus</i>	--	1	1
<i>Pylodictis olivaris</i>	1	3	4
CENTRARCHIDAE			
<i>Lepomis macrochirus</i>	5	2	7

TABLE 26
NEKTON CATCH, GUADALUPE RIVER
SPRING SURVEY, 1976

DATE	S T A T I O N S		
	GI	GC	Total
May 25-26, 1976			
TAXA		No sample	
ASTACIDAE			
<i>Procambarus</i> sp.	1		1
CLUPEIDAE			
<i>Dorosoma petenense</i>	1		1
CATOSTOMIDAE			
<i>Ictiobus bubalus</i>	11		11
<i>Carpionodes carpio</i>	1		1
ICTALURIDAE			
<i>Ictalurus punctatus</i>	3		3
<i>Pylodictis olivaris</i>	4		4
June 9-10, 1976			
PALAEMONIDAE			
<i>Macrobrachium</i> sp.	1		1
PORTUNIDAE			
<i>Callinectes sapidus</i>	1		1
LEPISOSTEIDAE			
<i>Lepisosteus spatula</i>	1		1
<i>L. osseus</i>	3		3
ANGUILLIDAE			
<i>Anguilla rostrata</i>	2		2
CATOSTOMIDAE			
<i>Ictiobus bubalus</i>	8		8
ICTALURIDAE			
<i>Ictalurus punctatus</i>	2		2
<i>Pylodictis olivaris</i>	1		1
CENTRARCHIDAE			
<i>Lepomis macrochirus</i>	2		2

TABLE 27
NEKTON CATCH, GUADALUPE RIVER
SUMMER SURVEY, 1976

DATE	S T A T I O N S		
	GI	GC	Total
July 13-14, 1976			
AXA			
LEPIDOSTEIDAE			
<i>Lepisosteus osseus</i>	2		2
<i>L. oculatus</i>	1		1
ICTIOMIDAE			
<i>Ictiobus bubalus</i>	1		1
ICTALURIDAE			
<i>Ictalurus punctatus</i>	1		1
<i>Nelodietis olivaris</i>	9		9
CATRARCHIDAE			
<i>Catopomus macrochirus</i>	1		1
July 22-23, 1976			
LEPIDOSTEIDAE			
<i>Lepisosteus osseus</i>	--	22	22
ICTIOMIDAE			
<i>Ictiobus bubalus</i>	--	4	4
ICTALURIDAE			
<i>Ictalurus punctatus</i>	--	2	2
<i>Nelodietis olivaris</i>	--	7	7