and practices rather lengthy migrations. Maximum size about 13 inches. No commercial value. Stations 1, 2, 2A, 3.

Gambusia affinis affinis - western mosquito fish

Ranges from southern Illinois and Indiana to Alabama and the Rio Grande region. Widely introduced for mosquito control. Stations 1, 2, 2A.

Herichthys cyanoguttatus cyanoguttatus - Rio Grande perch

The only member of the family native to the United States and the most northerly of all chilids. Ranges east slope of Mexico from the Rio Grande to Rio Panuco. Length 7 to 9 in. Stations 1, 3.

Ictalurus furcatus - blue catfish

Mississippi Valley and Gulf States in all large streams and lakes and bayous. Often caught in deep holes. The largest and most valuable of North American catfishes. Reaches weights of 150 pounds and up to 5 feet in length, but rarely larger than 20 pounds. Spawns April to May. Stations 2, 2A, 3.

Ictalurus lacustris punctatus - southern channel catfish

Ranges through the Mississippi Valley to Florida and northern Mexico. The most abundant of the large catfish of the Mississippi Valley. A bottom-feeder that migrates for considerable distances up and down streams, abundant in channels of large streams. Travels in schools when small. Omnivorous, eats algae and insects. Maximum size about 30 pounds, rarely over 20

pounds. An important commercial fish. Rather tolerant of pollution. Spawns in April in the South, in June in the Wabash. Stations 2, 2A, 3.

Ictiobus bubalus - smallmouth buffalo

Ranges from central Canada to Gulf Coast and northeastern Mexico. In bayous and small lakes and large rivers, characteristically in channels. The largest of the suckers, sometimes reaching a weight of 30 to 50 pounds and a length of 3 feet. Spawns March-April in the South. A commercial fish. Station 2.

Lepisosteus osseus oxyurus - northern longnose gar

Ranges from Upper Mississippi River to Quebec and Vermont, south to Florida and northern Mexico. Usually near surface in open rivers and lakes, rarely in salt water. Everywhere regarded as a pest. Reaches 4 to 5 feet in length. Feeds chiefly on smaller fish. Spawns in shallow water in early spring. Stations 2, 2A, 3.

Lepisosteus productus - spotted gar

Ranges from Great Lakes region to Florida and Texas. Usually found in weedy bayous rather than in open silty rivers. Stations 2, 2A, 3.

Lepomis cyanellus - green sunfish

Found from Great Lakes area to Georgia and Alabama, New Mexico and northern Mexico. Commonest member of the family in the Mississippi Valley and Great Lakes region. Prefers ponds, sluggish creeks, and brooks. A good food fish, though the length

is only 6 to 8 inches and weight 4 to 5 ounces. Station 1.

Lepomis macrochirus - common bluegill

Found from Minnesota and southern Ontario to Georgia and the Arkansas and Red river systems. Most common in lakes and ponds with moderate amount of vegetation and in quieter pools in streams. The most important food fish of the genus. Station 1.

Lepomis megalotis - northern spotted bass

Abundant from Michigan and Minesota to South Carolina and the Rio Grande in most streams, especially clear brooks. 7 to 8 inches long. Station 2, 2A.

Micropterus punctulatus treculi

Rare at all stations.

Mollienesia latipinna - sail-finned killifish

Found South Carolina to Mexico. Common in fresh, brackish, and sea water, abundant inswamps and around wharfs on rivers and shores. Reaches length of about 3 inches. Viviparous. Station 1.

Notropis amabilis

Known from Texas rivers. Station 1.

Notropis buchanani - ghost mimic shiner

Ranges central North America, Great Lakes to northeastern Mexico. Typically in deep, quiet backwaters and sloughs of large rivers in silty water. Stations 1, 2, 2A.

Notropis lutrensis lutrensis

Common. Occurs central and south Mississippi Valley. Attains a length of 2-3/4 inches. Stations 1, 2, 2A, 3.

Percina caprodes carbonaria

Occurs in streams of Mississippi to Rio Grande. Station 1.

Pilodictis olivaris - flathead catfish

Found in central United States from Great Lakes to the Rio Grande system. Usually a large-river form; young commonly under stones on riffles. Grows up to 50 pounds in the Guadalupe. Good food fish. Stations 2, 2A, 3.

Pimephales vigilax vigilax - bullhead minnow

Ranges from Ohio to Georgia, Iowa to Texas. Station 1.

CHEMISTRY AND BACTERIOLOGY

Chemical analyses were made on all surveys (Tables 1-3). In general, the methods and procedures used followed those in "Standard Methods for the Examination of Water and Sewage," 9th edition. Total hardness, calcium, and magnesium were determined by the Betz methods.

The bacteriological analyses (Table 5) included a total plate count and a coliform count. The latter was obtained by calculating the most probable number as outlined in "Standard Methods." The confirmed test, with the use of brilliant green bile broth, was used to check the presumptive test.

Conclusions

From these studies it is evident that the Guadalupe River is a hard water river with a higher chloride content at Stations 2, 2A, and 3 than at Station 1. As one would expect, the total solids were also higher at Stations 2, 2A, and 3 than at Station 1.

The bacteriological and BOD data indicate that Station 1 was much freer of pollution than Stations 2, 2A, and 3. It is evident that these lower stations were influenced by sewage. The highest coliform count was found at Station 2. The highest BOD and total counts were at Station 3.

Comparing the chemical and bacteriological results of analysis with those of previous years, it is evident that the chloride

content was higher in 1950-52 than in 1949 (Tables 1-3). The iron content was similar to that found in 1949 but higher than in 1950. The nitrates were higher in 1949 than in 1950 or 1952, whereas the ammonia content was highest in 1952. The volatile solids were also higher in 1952 than in previous years. The temperature of the water had increased considerably (compare figures in Tables 1 and 2 with Table 4). Whether the higher content of organic matter was due to additional pollution or to natural conditions resulting from high temperatures and low flow is hard to tell. It is probable that both factors were responsible.

The total bacterial counts at Stations 2, 2A, and 3 and the BOD's were much higher in 1952 than in 1950. However, in 1949 the total bacterial count of Station 2 was much higher than in the two subsequent years (29,000 as compared with 33 for 1950 and 3200 for 1952). The highest total counts encountered to date were in the current survey: 58,000 at Station 2A and 70,000 at Station 3.

Table 1

Chemical and Physical Analyses, 1949 Survey

All results in ppm, except Temp. and pH

	Stations	
	1.	2
Alkalinity, P.	3.40	7.00
M.O.	211.00	174.00
Cl	14.80	59.00
CO_2	6.80	4.00
D.O.	5.17	6.82
Fe	0.0152	0.0242
Hardness (Total)	188.00	173.20
Ca	155.00	128.00
Mg	33.00	45.20
Ca	62.10	51.30
Mg	8.03	10.98
NH_3 - N	0.0417	0.0493
NO_2 - N	0.0106	0.0029
NO_3 - N	0.531	0.221
PO_4 - P	0.0108	0.0052
SiO_2	11.40	11.68
SO_4	19.50	20.5
Turbidity	54.00	106.80
Temperature	29.8° C.	30.2° C.
pH	7.8	8.00

Table 2

Chemical and Physical Analyses, 1950 Survey

All results in ppm, except for Sp. Cond., Temp., and pH

	Stations			
	1	2	2A	3
Alkalinity P.	16.00	13.80	10.40	14.60
M.O.	208.00	184.20	181.60	190.00
Cl	19.80	71.00	82.80	88.00
CO_2	5.40	3.70	2.90	3.80
D.O.	5.84	6.64	6.53	6.86
Fe	< 0.001	< 0.001	< 0.001	< 0.001
Hardness				
Total	232.00	211.80	220.40	222.00
Ca	152.40	134.40	145.00	138.00
Mg	79.60	77.40	75.40	84.00
Ca	61.03	53.82	58.07	55.27
Mg	19.35	18.82	18.33	20.43
NH_3 - N	0.153	0.023	0.024	0.048
NO_2 - N	0.0190	0.022	0.0186	0.0156
NO_3 - N	0.036	0.036	0.073	0.043
PO_4 - P	0.005	0.024	0.011	0.010
SiO_2	11.72	18.32	17.94	18.20
SO_4	20.16	19.96	12.09	19.48
Sp. Cond., mhos	3.68×10^{-4}	5.14×10^{-4}	5.31×10^{-4}	5.27×10^{-4}

Table 2 (Continued)

	Stations			
	1	2	2A	3
Suspended Solids				
Total	48.00	54.00	63.00	36.00
Volatile	14.00	16.00	16.00	7.00
Fixed	34.00	38.00	47.00	29.00
Turbidity	70.6	67.5	86.9	58.6
Temperature °C.	26.5	26.6	27.0	27.6
pH	7.9	8.0	8.1	8.0

Table 3

Chemical and Physical Analyses, 1952 Survey

All results in ppm, except Sp. Cond. and pH

	Stations			
	1	2	2A	3
Alkalinity, M.O. as $CaCO_3$	202.0	180.0	183.0	184.0
Cl	18.0	80.0	83.0	86.0
CO_2	7.2	5.7	3.6	0.0
D.O.	4.7	6.2	6.4	6.6
Fe	0.01	0.03	0.04	0.04
Hardness, Total as $CaCO_3$	245.0	226.0	227.0	222.0
Ca	64.0	60.8	60.8	58.8
Mg	20.7	18.0	18.2	18.2
NH_3-N	0.33	0.20	0.43	0.33
NO_2-N	0.020	0.002	0.018	0.005
NO_3-N	0.07	0.05	0.06	0.03
PO_4-P	0.004	0.035	0.045	0.075
SiO_2	14.3	14.4	14.0	14.2
SO_4	19.5	23.5	32.5	31.0
Turbidity	140.0	90.0	120.0	100.0
pH	7.7	7.8	8.0	8.2
Sp. Cond., mhos	3.5×10^{-4}	7.0×10^{-4}	7.7×10^{-4}	7.5×10^{-4}
Solids *				
Total	48	65	57	60
Volatile	21	24	17	28
Fixed	27	41	40	32

* Analyses done by State Dept. of Health

Table 4

Temperature Gradients, 1952 Survey

Results in °C.

	Surface	Middle	Bottom
Station 1			
Left Bank	31	31	31 (at 10.6 ft.)
Middle	31	31	31 (at 6.8 ft.)
Right Bank	31	31	31 (at 5.0 ft.)
Station 2			
Left Bank	30.0	30.5	30.5 (at 2.5 ft.)
Middle	30.5	31.0	30.0 (at 3.0 ft.)
Right Bank	----	30.5 (at 5 in.)	---------
Station 2A			
Left Bank	----	32.5 (at 5 in.)	---------
Middle	32.0	----------	31.5 (at 2.0 ft.)
Right Bank	32.0	32.0	32.0 (at 3.0 ft.)
Station 3			
Left Bank	----	34.5 (at 5 in.)	---------
Middle	34.5	----------	34.0 (at 2.0 ft.)
Right Bank	34.5	34.0	34.0 (at 3.5 ft.)
25 Ft. Above Outfall			
Midstream	----	31.0 (at 3.5 ft.)	---------
25 Ft. Below Outfall			
Midstream	----	31.0 (at 3.0 ft.)	---------
50 Ft. Below Outfall			
Midstream	----	31.0 (at 3 ft.)	---------
At Outfall	31.0	----------	---------

The instrument was shaded at all times.

All temperatures were taken at head of station.

Table 5

Bacteriological Analyses

	1950 Survey				1952 Survey			
	Station				Station			
	1	2	2A	3	1	2	2A	3
BOD* as ppm	1	1	1	2	2	3	2	5
Coliform MPN per 100 ml, 48 hr., 37°C	-	-	-	-	70	3300	950	790
Total Plate Count Colonies per ml, 1 week at room temperature	520	33	820	4500.	740	3200	58,000	70,000

*Analyses done by State Dept. of Health

DISCUSSION OF RESULTS AND CONCLUSIONS

As compared with the results of previous surveys, Station 1 had a similar number of species in the various groups of organisms. Particularly is this true for histogram columns 4, 6, and 7 which are the ones used most in a quantitative sense in evaluating the state of health of a region.

Stations 2, 2A, and 3 were more variable. This was especially true in the number of species of algae and the number of species and of individuals in Protozoa. These two groups indicate most forcefully the somewhat semi-healthy conditions which existed. The most common species of algae were the bluegreens, Stigeoclonium lubricum, and certain species of diatoms commonly found in water rich in organic matter. Likewise the most abundant Protozoa were certain Euglenas typically found where there is organic enrichment, and certain ciliates which are known to be bacterial feeders.

It is interesting to note that the gizzard shad was the most common species of fish in Stations 2, 2A, and 3. It is an algal feeder and therefore might be expected in this region of abundant phytoflagellate and algal growth. The common occurrence of rough fish and the paucity of game fish were notable. The insect fauna was somewhat poorer in the downstream stations in 1952 than in the two previous years. Particularly notable was the scarce occurrence of burrowing mayflies which had previously been so abundant in 1949 and 1950. The larger number of species of chironomids was probably due to the fact they were more

effectively collected on this survey. The invertebrate fauna was very similar to that of previous years, except that dead crabs were found at Stations 2, 2A, and 3.

A comparison of the results of the BOD tests shows a considerable increase in BOD particularly at Station 3 for 1952. As one would expect, the bacterial count is also highest at this station. At Stations 2, 2A, and 3 the total bacterial counts and coliform counts are much higher in 1952 than in 1950.

The results of chemical analyses for 1952 are very similar to those for 1950. The sulphates are somewhat higher particularly at Stations 2A and 3. The total and volatile solids are higher at Station 3 in 1952 than in 1950. The NH_3 content is a little higher at all stations in 1952. As in 1950 the chlorides are considerably higher in Stations 2, 2A, and 3 than in Station 1.

Thus it is clear that the bacteriological and chemical data support the biological conclusions that there was a higher organic load in the river in 1952 than in 1950.

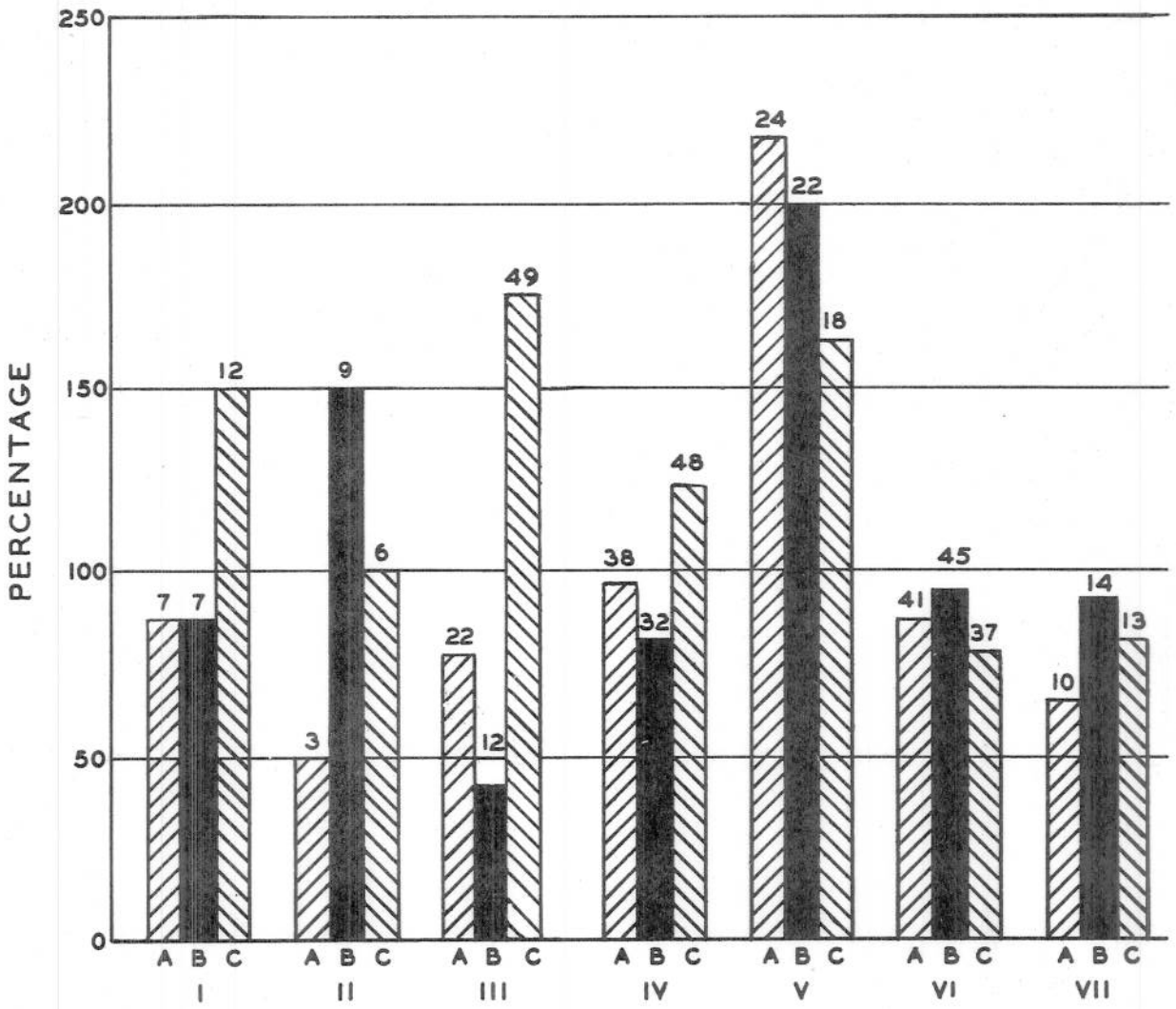
This condition is probably due in part to the fact that a very low flow existed in the river during this period. It also indicates that a heavier organic load is entering the river. Since this is first apparent at Station 2 one would conclude that it is in a large part due to upstream conditions.

The result of this condition is that the river is approaching a semi-healthy state at Stations 2, 2A, and 3.

FIGURE 1

HISTOGRAM OF STATION 1- GUADALUPE RIVER

COASTAL PLAIN BASE



LEGEND -

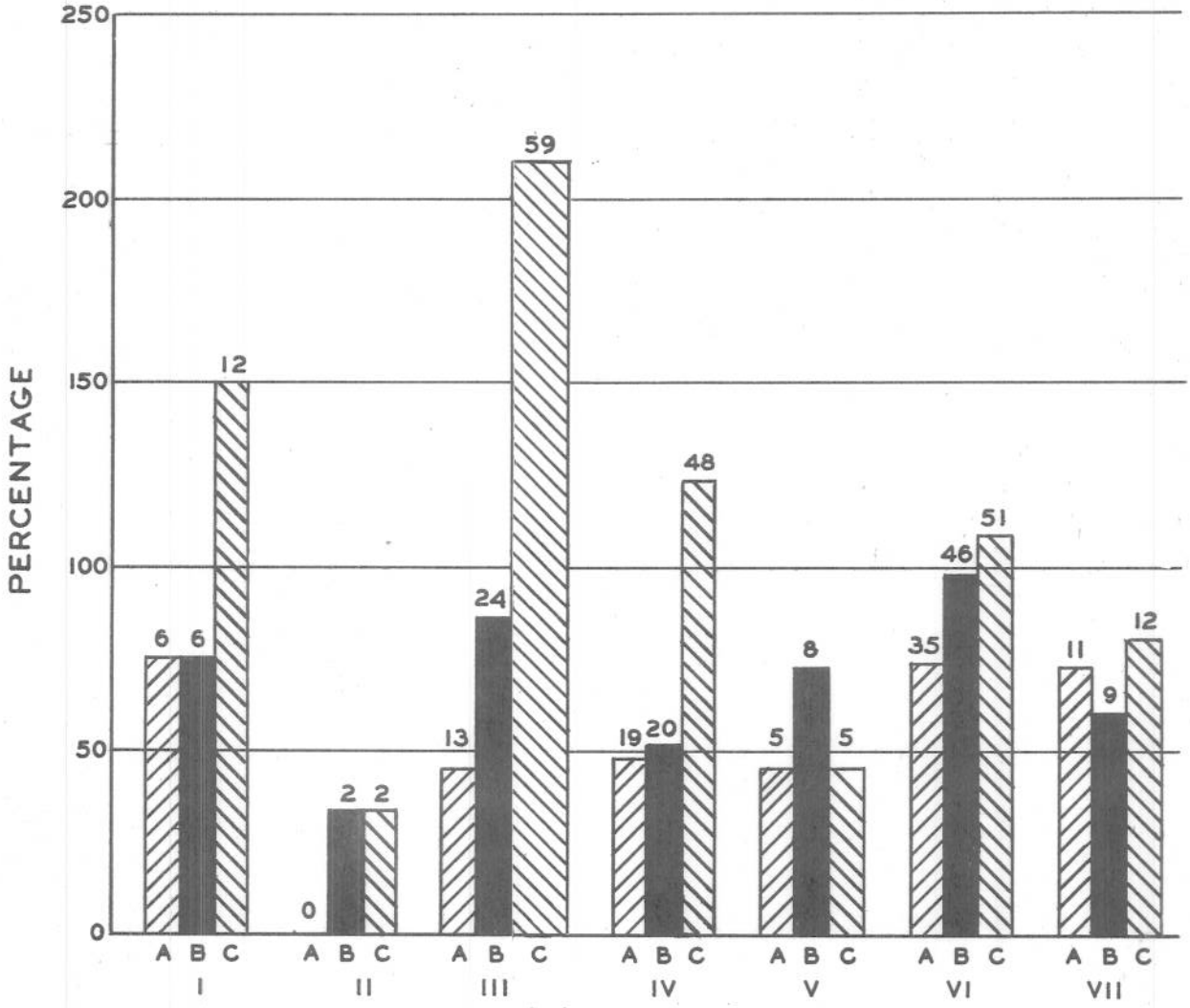
A- 1949 SURVEY
B- 1950 SURVEY
C- 1952 SURVEY

I - TOLERANT ALGAE AND ROTIFERS
II - TOLERANT WORMS AND SNAILS
III- PROTOZOA
IV- NON-TOLERANT ALGAE
V - NON-TOLERANT WORMS, ROTIFERS AND MOLLUSKS
VI- CRUSTACEA AND INSECTS
VII- FISH

FIGURE 2

HISTOGRAM OF STATION 2 - GUADALUPE RIVER

COASTAL PLAIN BASE



LEGEND -

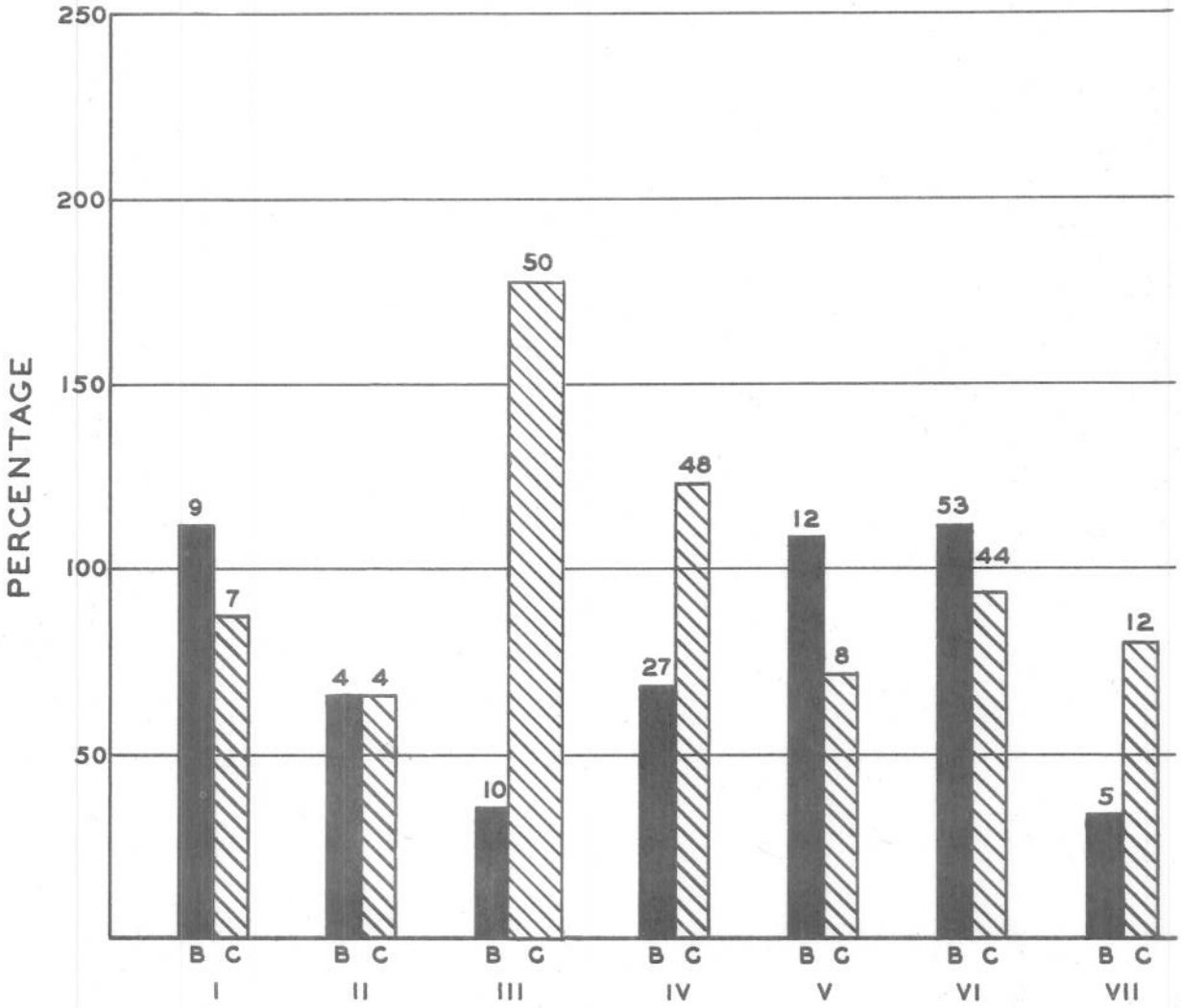
A- 1949 SURVEY
B- 1950 SURVEY
C- 1952 SURVEY

I- TOLERANT ALGAE AND ROTIFERS
II- TOLERANT WORMS AND SNAILS
III- PROTOZOA
IV- NON-TOLERANT ALGAE
V- NON-TOLERANT WORMS, ROTIFERS AND MOLLUSKS
VI- CRUSTACEA AND INSECTS
VII- FISH

FIGURE 3

HISTOGRAM OF STATION 2A - GUADALUPE RIVER

COASTAL PLAIN BASE



LEGEND-

B- 1950 SURVEY

C- 1952 SURVEY

I- TOLERANT ALGAE AND ROTIFERS

II- TOLERANT WORMS AND SNAILS

III- PROTOZOA

IV- NON-TOLERANT ALGAE

V- NON-TOLERANT WORMS, ROTIFERS AND MOLLUSKS

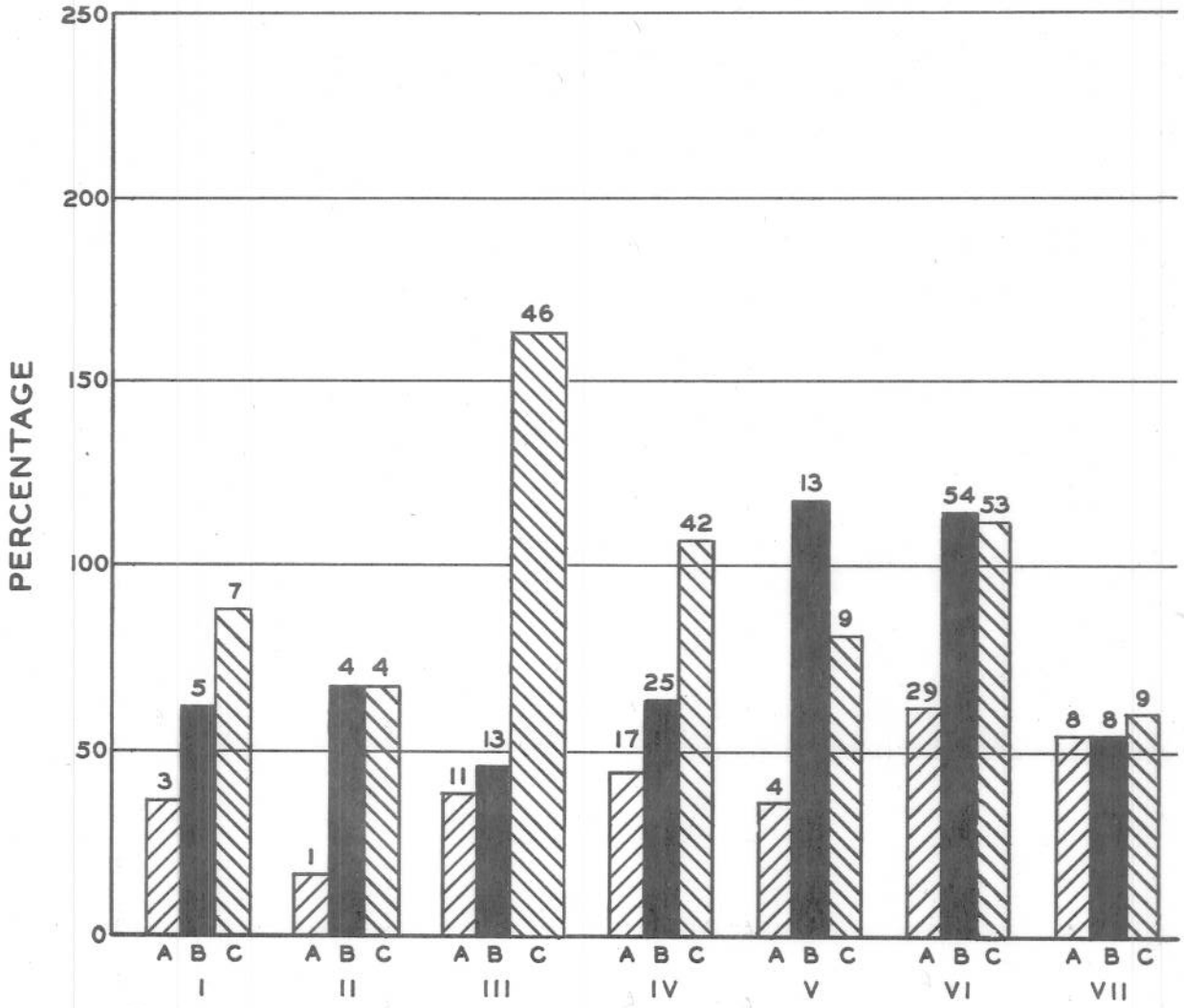
VI- CRUSTACEA AND INSECTS

VII- FISH

FIGURE 4

HISTOGRAM OF STATION 3 - GUADALUPE RIVER

COASTAL PLAIN BASE



LEGEND -

A - 1949 SURVEY
B - 1950 SURVEY
C - 1952 SURVEY

I - TOLERANT ALGAE AND ROTIFERS
II - TOLERANT WORMS AND SNAILS
III - PROTOZOA
IV - NON-TOLERANT ALGAE
V - NON-TOLERANT WORMS, ROTIFERS AND MOLLUSKS
VI - CRUSTACEA AND INSECTS
VII - FISH

SPECIES LISTS

Plants

	Stations			
	1	2	2A	3
Division Chlorophyta Class Chlorophyceae Order Ulotrichales Family Ulotrichaceae				
Stichococcus subtilis (Kütz.) Klercker	-	-	X	-
Ulothrix zonata (W. & M.) Kütz.	X	-	-	-
Order Chaetophorales Family Chaetophoraceae				
Stigeoclonium lubricum (Dillw.) Kütz.	-	-	-	X
Stigeoclonium sp. (juvenile)	-	-	-	X
Family Trentepohliaceae				
Gomontia sp. (juvenile)	-	-	-	X
Order Cladophorales Family Cladophoraceae				
Cladophora sp.	X	-	-	-
Rhizoclonium hieroglyphicum (Ag.) Kütz.	-	X	-	X
Order Oedogoniales Family Oedogoniaceae				
Oedogonium sp. (sterile)	-	-	X	X
Order Chlorococcales Family Scenedesmaceae				
Scenedesmus bijuga (Turp.) Lag.	-	-	X	-
Scenedesmus quadricauda (Turp.) Bréb.	-	-	X	-
Order Siphonales Family Dichotomosiphonaceae				

	1	2	2A	3
Dichotomosiphon tuberosus (A. Br.) Ernst.	X	-	-	-
Order Zygnematales Family Zygnemataceae				
Mougeotia sp. (sterile)	X	-	-	-
Spirogyra sp. 1 (sterile)	X	X	-	-
Spirogyra sp. 2 (sterile)	X	X	-	-
Spirogyra sp. 3 (sterile)	X	-	-	-
Spirogyra sp. (sterile)	-	-	X	X
Family Desmidiaceae				
Closterium acerosum (Schrank) Ehr.	-	X	X	-
Closterium moniliferum (Bory) Ehr.	-	X	-	-
Cosmarium laeve Rabh.	-	-	X	-
Cosmarium subcostatum Nordst.	X	-	X	-
Penium margaritaceum (Ehr.) Bréb.	X	-	-	-
Division Chrysophyta Class Bacillariophyceae Order Centrales Family Coscinodiscaceae Subfamily Coscinodiscoideae				
Coscinodiscus marginulatus var. 1	-	X	X	X
Cyclotella meneghiniana Kützz.	-	X	X	X
Order Pennales Suborder Araphidineae Family Fragilariaceae Subfamily Fragilarioideae				
Fragilaria vaucheria (Kützz.) Boye P.	X	-	-	-
Opephora sp.	X	-	-	-

	1	2	2A	3
Synedra affinis Kütz.	-	-	-	X
Synedra goulardi (Bréb.) Grun.	X	X	X	X
Synedra ulna var. danica (Kütz.) Grun.	X	-	-	-
Suborder Monoraphidineae Family Achnanthaceae Subfamily Achnanthoideae				
Achnanthes exigua var. heterovalvata Krasske	-	-	X	X
Achnanthes minutissima Kütz.	X	-	-	-
Suborder Biraphidineae Family Naviculaceae Subfamily Naviculoideae				
Amphipleura pellucida Kütz.	X	-	-	-
Amphipleura rutilans (Trent.) Cl.	-	-	-	X
Anomoeoneis exilis (Kütz.) Cl.	X	-	-	-
Anomoeoneis exilis var. 2	X	-	-	-
Caloneis sp. 1	X	X	-	-
Diploneis puella (Schum.) Cl.	X	X	X	X
Gyrosigma kutzingii (Grun.) Cl.	X	X	X	X
Gyrosigma scalproides (Rabh.) Cl.	-	-	X	X
Gyrosigma spencerii var. nodiferum Grun.	X	X	-	-
Navicula cincta var. leptocephala (Bréb.)V.H.	-	X	X	X
Navicula circumtexta Meist.	-	X	X	X
Navicula confervacea (Kütz.) Grun.	-	-	X	X
Navicula cuspidata var. ambigua (Ehr.) Cl.	-	X	X	X
Navicula lanceolata Kütz.	X	-	-	-

	1	2	2A	3
Navicula mutica Kützz.	X	-	-	-
Navicula pumila Grun.	X	-	-	X
Navicula pupula var. capitata Hust.	-	X	X	X
Navicula pygmaea Kützz.	-	X	-	-
Navicula subatomoides Hust.	X	-	-	-
Navicula symmetrica Patr.	-	-	X	-
Navicula thienemanni Hust.	X	X	X	-
Navicula sp. 1	X	-	-	-
Navicula sp. 3	X	X	X	X
Navicula sp. 4	X	X	X	X
Navicula sp. 8	X	X	X	X
Navicula sp. 9	-	X	X	-
Navicula sp. 22	-	X	-	-
Navicula sp. 26	X	-	-	-
Navicula sp. 27	-	X	X	X
Navicula sp. 28	-	X	X	X
Navicula sp. 30	-	X	X	X
Navicula sp. 31	-	X	X	X
Pinnularia microstauron (Ehr.) Cl.	X	X	X	X
Family Gomphocymbellaceae Subfamily Gomphocymbelloideae				
Amphora pediculus (Kützz.) Grun.	X	-	-	-

	1	2	2A	3
Amphora perpusilla Grun.	X	-	-	-
Amphora sp. 1	-	X	X	X
Cymbella affinis Kutz.	X	-	-	-
Cymbella microcephala Grun.	X	-	-	-
Cymbella tumida (Breb.) V.H.	X	-	-	-
Cymbella turgidula Grun.	X	-	-	-
Cymbella sp. 1	X	-	-	-
Cymbella sp. 2	X	-	-	-
Gomphonema parvulum var. parvulum Kutz.	X	X	X	X
Gomphonema sp. 1	X	-	-	-
Gomphonema sp. 7	-	X	-	-
Gomphonema sp. 8	X	-	-	-
Family Epithemiaceae Subfamily Rhopalodioideae				
Rhopalodia gibba (Ehr.) O. Müll.	-	X	-	-
Rhopalodia gibberula (Ehr.) O. Müll.	-	X	-	-
Family Nitzschiaceae Subfamily Nitzschioideae				
Bacillaria paradoxa Gmel.	X	-	X	-
Nitzschia amphibia Grun.	-	X	-	-
Nitzschia apiculata (Greg.) Grun.	-	X	X	X
Nitzschia calida Grun.	-	X	X	X
Nitzschia clausii Hantz.	X	-	-	-
Nitzschia closterium (Ehr.) W. Sm.	-	X	X	X

	1	2	2A	3
Nitzschia filiformis (W. Sm.) Schutt	X	X	X	-
Nitzschia frustulum (Kutz.) Grun.	X	-	X	X
Nitzschia kutzingiana Hilse	X	X	X	X
Nitzschia littoralis Grun.	-	X	X	-
Nitzschia obtusa W. Sm.	-	X	X	X
Nitzschia palea (Kutz.) W. Sm.	X	X	X	X
Nitzschia panduriformis var. continua Grun.	-	X	X	-
Nitzschia sigma var. rigida (Kutz.) Grun.	X	X	-	-
Nitzschia subvitrea Hust.	X	-	-	-
Nitzschia tryblionella var. debilis (Arnott) A. Mayer	-	X	X	X
Nitzschia sp. 15	-	-	X	X
Nitzschia sp. 20	-	X	X	X
Nitzschia sp. 21	-	X	-	X
Nitzschia sp. 23	-	X	X	-
Nitzschia sp. 24	-	-	-	X
Family Surirellaceae Subfamily Surirelloideae				
Surirella sp. 2	-	X	X	X
Division Cyanophyta Class Myxophyceae Order Chroococcales Family Chroococcaceae				
Coccochloris elabens (Breb.) Dr. & Daily	X	X	-	-
Gloeothece sp.	-	X	-	-

	1	2	2A	3
Order Hormogonales Suborder Homocystineae Family Oscillatoriaceae				
Lyngbya aerugineo-caerulea Gom.	X	X	-	-
Lyngbya putealis Gom.	-	-	X	X
Microcoleus chthonoplastes Gom.	X	X	X	-
Oscillatoria limosa Gom.	X	X	X	-
Oscillatoria princeps Gom.	X	-	X	-
Oscillatoria proboscidea Gom.	X	-	-	X
Phormidium uncinatum Gom.	X	X	-	-
Phormidium valderianum Gom.	X	X	-	-
Suborder Heterocystineae Family Nostocaceae				
Cylindrospermum muscicola B. & F.	-	X	X	X
Nostoc muscorum Gom.	-	X	X	X
Division Rhodophyta Class Rhodophyceae Subclass Florideae Order Nemalionales Family Chantransiaceae				
Audouinella violacea (Kutz.) Hamel	-	X	-	X

SPECIES LISTS

Animals

	Stations 1	2	2A	3
Phylum Protozoa Subphylum Plasmodroma Class Mastigophora Subclass Phytomastigina Order Cryptomonadina Family Cryptomonadidae				
Chilomonas paramecium Ehr.	X	-	X	-
Cryptomonas erosa Ehr.	X	X	X	-
Cryptomonas marssonii Skuja	X	-	X	X
Cryptomonas pyrenoidifera Geitler	-	-	-	X
Cyathomonas truncata Ehr.	-	X	X	X
Order Phytomonadina Family Chlamydomonadidae				
Chlamydomonas gelatinosa Kors.	-	X	-	X
Chlamydomonas globosa Snow	-	-	X	-
Chlamydomonas sp.	X	X	-	-
Family Carteriidae				
Carteria globosa Kors.	-	X	-	X
Carteria globulosa Pasch.	-	X	-	X
Family Phacotidae				
Phacotus lenticularis (Ehr.)	X	X	X	X
Phacotus rectangularis Playf.	-	X	-	-
Phacotus sp.	-	X	-	X
Family Volvocidae				

	1	2	2A	3
Eudorina elegans Ehr.	-	X	X	-
Gonium formosum Pasch.	-	X	X	X
Gonium pectorale Mull.	-	X	X	X
Pandorina morum (Mull.)	-	X	X	X
Order Euglenoidina Family Euglenidae				
Euglena agilis Cart.	X	X	X	X
Euglena chadefaudii Bour.	X	-	-	-
Euglena ehrenbergii Klebs	-	-	X	-
Euglena fusca (Klebs)	-	X	-	-
Euglena gasterosteus Skuja	-	X	X	-
Euglena granulata (Klebs)	-	X	X	X
Euglena intermedia (Klebs)	X	-	-	X
Euglena mutabilis Schm.	X	X	X	-
Euglena oxyuris var. charkowiensis (Swir.)	X	-	-	-
Euglena polymorpha Dang.	-	X	X	X
Euglena proxima Dang.	-	X	-	-
Euglena sanguinea Ehr.	-	X	-	X
Euglena schmitzii Gojd.	-	X	-	-
Euglena sociabilis Dang.	-	X	-	-
Euglena stellata Mainx	X	X	X	X
Euglena tripteris (Duj.)	X	-	X	X
Euglena viridis Ehr.	X	-	-	-

	1	2	2A	3
Lepocinclis texta (Duj.)	X	-	-	-
Phacus pleuronectes (Müll.)	X	-	-	-
Phacus pseudonordstedtii Poch.	-	-	X	X
Phacus pyrum (Ehr.)	X	-	-	X
Trachelomonas bernardinensis Visch.	-	X	-	-
Trachelomonas gibberosa Playf.	-	X	X	X
Trachelomonas obovata Stokes	-	X	X	X
Trachelomonas schauinslandii Lemm.	X	-	-	-
Trachelomonas vapiformis Playf.	-	-	X	-
Trachelomonas vapiformis var. elegans Playf.	X	-	-	-
Trachelomonas sp.	-	-	X	-
Family Astasiidae				
Peranema granulifera Pen.	-	-	X	-
Peranema pleururum Skuja	-	X	X	-
Peranema trichophorum (Ehr.)	X	X	X	-
Peranema sp.	-	X	-	X
Petalomonas angusta (Klebs)	-	-	X	-
Petalomonas prototheca Skuja	-	-	-	X
Family Anisonemidae				
Anisonema acinus Duj.	X	-	-	-
Entosiphon sulcatum (Duj.)	X	-	-	-
Heteronema acutissimum Lemm.	-	X	-	-
Heteronema sp.	-	X	-	-

	1	2	2A	3
Notosolenus orbicularis Stokes	-	-	X	-
Order Dinoflagellata Family Cystodiniidae				
Glenodinium edax Schill.	-	X	-	-
Family Peridiniidae				
Peridinium sp.	X	X	-	-
Subclass Zoomastigina Order Protomonadina Family Oikomonadidae				
Oikomonas ocellata Scherf.	-	-	X	-
Family Amphimonadidae				
Cladomonas fruticulosa Stein	X	-	-	-
Family Monadidae				
Anthophysa steinii Senn.	X	-	-	-
Monas socialis (Kent)	-	-	-	X
Family Bodonidae				
Bodo fusiformis Stokes	X	X	-	X
Class Sarcodina Subclass Rhizopoda Order Rhizomastigina Family Mastigamoebidae				
Cercobodo crassicauda (Alex.)	-	-	X	X
Order Amoebina Family Amoebidae				
Amoeba proteus (Pal.)	-	X	X	-
Amoeba radiosa Ehr.	-	-	X	-
Amoeba striata Pen.	X	-	-	-

	1	2	2A	3
Amoeba sp.	X	-	X	X
Vahlkampfia limax (Duj.)	-	-	X	X
Order Testacea Family Arcellidae				
Arcella bathystoma Defl.	-	X	-	-
Arcella vulgaris Ehr.	-	-	X	X
Family Difflugiidae				
Difflugia acuminata Ehr.	X	X	X	-
Difflugia globulosa Duj.	-	-	X	X
Difflugia oblonga Ehr.	X	X	-	X
Difflugia oviformis Cash	-	X	-	-
Difflugia urceolata var. amphora Leidy	-	-	X	-
Difflugia sp.	X	-	-	-
Pseudodifflugia archeri Pen.	-	-	-	X
Subclass Actinopoda Order Heliozoa Family Actinophryidae				
Actinophrys sol Ehr.	-	X	-	-
Subphylum Ciliophora Class Ciliata Subclass Euciliata Order Holotricha Suborder Gymnostomata Family Didiniidae				
Askenasia volvox Cl. & Lach.	-	-	-	X
Mesodinium acarus Stein	-	X	-	X
Family Colepidae				

	1	2	2A	3
Coleps sp.	X	-	X	-
Family Holophryidae				
Holophrya sp.	-	X	-	-
Family Amphileptidae				
Hemiophrys sp.	-	X	-	-
Lionotus trichocystus Stokes	-	-	X	X
Family Tracheliidae				
Dileptus anser (O.F.M.)	-	X	-	-
Dileptus monilatus (Stokes)	-	X	X	-
Family Loxodidae				
Loxodes magnus Stokes	X	X	X	X
Family Nassulidae				
Nassula aurea Ehr.	X	-	-	-
Family Chlamydodontidae				
Chilodonella uncinata Ehr.	X	-	-	-
Chilodonella sp.	-	-	X	X
Suborder Trichostomata Family Parameciidae				
Paramecium caudatum Ehr.	X	X	-	-
Paramecium multimicronucleatum P. & M.	X	-	X	-
Paramecium woodruffi Wenrich	-	-	-	X
Suborder Hymenostomata Family Frontoniidae				
Cinetochilum margaritaceum Perty	X	X	X	X

	1	2	2A	3
Cyrtolophosis mucicola Stokes	X	-	-	-
Frontonia acuminata Ehr.	X	X	-	-
Frontonia leucas Ehr.	X	X	-	X
Lembadion bullinum Perty	X	-	-	-
Loxocephalus plagius (Stokes)	X	X	-	-
Family Pleuronematidae				
Cyclidium citrullus Cohn	-	X	-	X
Cyclidium glaucoma O.F.M.	X	X	X	X
Order Spirotricha Suborder Heterotricha Family Spirostomidae				
Blepharisma clarissimum Anigs.	-	X	-	-
Suborder Oligotricha Family Halteriidae				
Halteria grandinella (O.F.M.)	X	-	X	-
Suborder Hypotricha Family Oxytrichidae				
Stichotricha secunda Perty	-	X	X	-
Trichotaxis fossicola Kahl	X	X	X	X
Urosoma cienkowski Kow.	X	-	-	-
Family Euplotidae				
Euplotes eurystomus Wrzes.	X	-	-	-
Family Aspidiscidae				
Aspidisca costata (Duj.)	X	X	X	X

	1	2	2A	3
Aspidisca lynceus Ehr.	-	X	-	-
Order Peritricha Suborder Sessilia Family Vorticellidae				
Vorticella campanula Ehr.	-	-	-	X
Vorticella sp.	X	-	-	-
Phylum Porifera Class Demospongiae Order Haplosclerina Family Spongillidae				
Spongilla sp.	X	-	-	-
Trochospongilla leidii (Bowerbank)	-	X	X	X
Phylum Platyhelminthes Class Turbellaria Order Tricladida Family Planariidae				
Dugesia tigrina (Girard)	X	-	-	-
Phylum Aschelminthes Class Rotifera Order Bdelloidea Family Philodinidae				
Philodina roseola Ehr.	X	-	-	-
Rotaria rotatoria (Pallas)	-	X	-	-
Order Monogononta Suborder Flosculariacea Family Testudinellidae				
Filinia longiseta (Ehr.)	-	-	X	-
Testudinella patina (Hermann)	-	-	-	X
Suborder Ploima Superfamily Brachionoidae Family Brachionidae				

	1	2	2A	3
Brachionus mirabilis Daday	-	-	-	X
Brachionus quadridentatus Hermann	-	X	X	-
Family Lecaniidae				
Colurella colurus Ehr.	-	X	-	-
Dapidia pyriformis (Gosse)	-	-	-	X
Lecane bulla (Gosse)	X	-	-	-
Lecane hastata (Murray)	-	-	X	-
Lecane lunaris (Ehr.)	X	-	X	-
Lecane papuana (Murray)	X	-	-	-
Lecane pyriformis (Daday)	X	-	-	-
Lepadella ovalis (Müll.)	-	X	-	-
Lepadella patella (Müll.)	X	-	-	-
Trichotria truncata (Whittlegge)	-	-	-	X
Superfamily Notommatoidae Family Notommatidae Subfamily Notommatinae				
Cephalodella catellina (Müll.)	-	-	-	X
Cephalodella forficula (Ehr.)	-	-	X	-
Family Trichocercidae				
Trichocerca macera (Gosse)	-	-	-	X
Trichocerca porcellus major (Haver)	-	X	X	-
Trichocerca pusilla (Jennings)	-	-	X	X
Class Nematomorpha Order Gordioidea Family Gordiidae				

	1	2	2A	3
Paragordius sp.	-	-	-	X
Phylum Bryozoa Class Phylactolaemata Family Plumatellidae				
Plumatella repens (L.)	X	X	X	X
Phylum Annelida Order Oligochaeta Family Tubificidae				
Monopylephorus sp.	-	X	X	X
Branchiura sowerbyi Beddard	X	-	X	X
Family Lumbriculidae				
Undet. sp.	-	X	X	X
Order Hirudinea Family Glossiphoniidae				
Placobdella sp.	X	-	-	-
Phylum Mollusca Class Gastropoda Order Prosobranchiata Family Amnicolidae				
Amnicola sp.	X	-	-	X
Lyrodes coronatus (Pfr.)	X	-	-	-
Order Pulmonata Family Lymnaeidae				
Lymnaea humilis Say	X	-	-	-
Pseudosuccinea columella (Say)	X	-	-	-
Family Physidae				
Physa halei Lea	X	-	X	X
Family Ancylidae				

	1	2	2A	3
Ferrissia excentrica (Mor.)	X	-	-	-
Class Pelecypoda Order Eulamellibranchiata Family Unionidae				
Amblema plicata perplicata (Con.)	X	-	-	-
Anodonta grandis Say	X	-	-	-
Carunculina parva texasensis (Lea)	X	-	-	-
Lampsilis anodontoides (Lea)	X	-	-	-
Lampsilis fasciata hydiana (Lea)	X	-	-	-
Proptera purpurata (Lam.)	X	-	-	-
Quadrula aurea (Lea)	X	-	-	-
Quadrula quadrula apiculata (Say)	X	-	-	-
Quadrula verrucosa (Raf.)	X	-	-	-
Family Sphaeriidae				
Sphaerium sp.	X	X	X	X
Phylum Arthropoda Class Crustacea Order Amphipoda Family Talitridae				
Hyalella azteca (Sauss.)	X	-	-	-
Order Decapoda Family Palaemonidae				
Palaemonetes paludosa Gibbs	X	X	-	X
Macrobrachium acanthurus (Wiegmann)	-	-	X	-
Family Astacidae				
? Cambarus clarki Girard	X	-	-	-

	1	2	2A	3
Family Portunidae				
Callinectes sapidus acutidens Rathbun	-	-	-	X
Class Insecta Subclass Ptilota Group Paleoptilota Order Odonata Suborder Zygoptera Family Agrionidae				
Hetaerina sp.	-	X	X	X
Family Coenagrionidae Subfamily Coenagrioninae				
Argia sp.	-	-	-	X
Argia prob. immunda (Hagen)	X	-	-	X
Argia sedula (Hagen)	-	-	-	X
Argia apicalis (Say)	-	-	-	X
Nehallenia sp.	-	-	-	X
Ischnura sp.	X	-	-	-
Neoneura aaroni Calvert	-	-	X	X
Suborder Anisoptera Family Aeshnidae Subfamily Gomphinae				
Gomphoides obscurus (Ramb.)	-	X	X	X
Gomphus (Gomphurus) sp. 1	-	X	X	X
Gomphus (Gomphurus) sp. 2	-	-	-	X
Gomphus (Gomphurus) nr. fraternus (Say)	X	-	-	-
Gomphus (Gomphus) sp.	-	-	X	-
Gomphus (Stylurus) notatus? Ramb.	X	X	X	X

	1	2	2A	3
Dromogomphus spinosus Selys	X	-	-	-
Family Libellulidae Subfamily Corduliinae				
Macromia sp.	X	X	X	-
Neurocordulia sp. ?	-	-	-	X
Order Ephemeroptera Family Ephemeridae Subfamily Ephemerinae				
Pentagenia vittigera (Walsh.)	-	X	X	X
Hexagenia prob. bilineata (Say)	X	X	X	X
Subfamily Campsurinae				
Campsurus sp.	X	-	-	-
Tortopus primus McD.	-	X	X	-
Family Heptageniidae Subfamily Heptageniinae				
Stenonema femoratum tripunctatum (Banks)	X	-	-	-
Stenonema pulchellum prob. integrum (McD.)	-	X	X	X
Family Baetidae Subfamily Leptophlebiinae				
Paraleptophlebia sp.	-	X	-	-
Traverella poss. presidiana Traver	-	X	X	-
Subfamily Caeninae				
Caenis sp. 1	X	-	-	-
Caenis sp. 2	X	X	X	X
Brachycercus poss. flavus Traver	-	X	X	-

	1	2	2A	3
Tricorythodes sp. 1	-	X	X	X
Tricorythodes sp. 2	X	-	-	-
Tricorythodes sp. 3	-	X	X	X
Subfamily Baetinae				
Callibaetis sp.	-	X	-	-
Baetis sp. 5	-	X	-	-
Baetis spp. undet.	-	X	X	-
Group Neoptilota Order Plecoptera Family Perlidae				
Neoperla clymene (Newm.)	-	X	X	X
Order Hemiptera Suborder Heteroptera Series Gymnocerata Family Gerridae				
Limnogonus hesione (Kirk.)	X	-	-	-
Gerris marginatus Say	X	-	-	-
Metrobates artus Anderson	X	X	X	X
Rheumatobates hungerfordi Wiley	X	-	-	-
Trepobates inermis Esaki	X	-	-	-
Family Veliidae				
Rhagovelia choreutes Hussey	-	X	-	X
Family Mesoveliidae				
Mesovelia bisignata Uhl.	X	-	-	-
Series Cryptocerata Family Nepidae				

	1	2	2A	3
Ranatra australis Hung.	-	-	X	-
Ranatra sp. (immature)	-	-	-	X
Family Belastomatidae				
Belastoma flumineum Say	X	-	-	-
Family Corixidae				
Palmacorixa buenoi Abb.	-	X	-	X
Trichocorixa kanza Sail.	-	X	X	X
Order Megaloptera Family Corydalidae				
Corydalis cornutus (L.)	-	X	X	X
Family Sialidae				
Sialis sp.	X	-	-	-
Order Neuroptera Family Sisyridae				
Sisyra sp.	-	X	-	-
Order Coleoptera Suborder Adephaga Family Dytiscidae Subfamily Hydroporinae				
Bidessus sp. 1	-	X	-	-
Bidessus sp. 2	-	X	-	-
Bidessus lacustris (Say)	-	X	X	-
Bidessus fuscatus (Cr.)	-	-	-	X
Bidessus affinis (Say)	-	-	-	X
Coelambus sp.	-	X	-	-

	1	2	2A	3
Deronectes sp.	-	-	-	X
Subfamily Colymbetinae				
Copelatus sp.	-	-	X	-
Coptotomus interrogatus (Fab.)	-	X	-	-
Family Gyrinidae Tribe Enhydrini				
Undet. sp. (larva)	-	X	-	-
Dineutes productus Rbts.	-	X	X	X
Tribe Gyrinini				
Gyrinus sp.	-	-	X	-
Gyrinus analis Say	-	-	-	X
Tribe Orectochilini				
Gyretes sinuatus Lec.	-	X	X	X
Suborder Haplogastra Superfamily Hydrophiloidea Family Hydrophilidae Subfamily Helophorinae				
Helophorus lineatus Say	-	-	-	X
Subfamily Hydrochinae				
Hydrochus subcupreus Rand.	X	-	-	X
Subfamily Hydrophilinae				
Berosus peregrinus (Hbst.)	X	-	X	X
Berosus exiguus ? (Say)	-	-	X	-
Tropisternus lateralis (Fab.)	-	-	X	X
Tropisternus sublaevis (Lec.)	-	-	-	X

	1	2	2A	3
Enochrus (Philhydrus) perplexus (Lec.)	-	-	-	X
Suborder Polyphaga Superfamily Dascilloidea Family Helodidae				
Undet. sp. (larva)	-	-	-	X
Superfamily Byrrhoidea Family Heteroceridae				
Undet. sp. (larva)	-	-	X	-
Superfamily Dryopoidea Family Elmidae				
Stenelmis sp.	X	X	X	X
Heterelmis acicula Hn.	-	X	X	X
Hexacylloepus ferruginea Hn.	-	X	-	-
Microcylloepus sp.	-	X	-	-
Order Trichoptera Family Psychomyiidae				
Neureclipsis sp.	-	X	X	-
Family Hydropsychidae				
Potamyia flava (Hagen)	-	-	X	-
Hydropsyche orris Ross	-	X	X	X
Family Hydroptilidae				
Undet. sp.	-	-	-	X
Family Leptoceridae				
Leptocella ? sp.	-	-	-	X
Leptocella sp. (pupa)	X	-	-	-
Oecetis nr. eddlestoni Ross	-	-	X	-

	1	2	2A	3
Oecetis nr. inconspicua (Walk.)	X	-	-	-
Order Diptera Suborder Nematocera Superfamily Tipuloidea Family Tipulidae				
Undet. sp.	-	X	-	-
Superfamily Culicoidea Family Heleidae				
Palpomyia sp.	-	-	-	X
Family Tendipedidae Subfamily Pelopiinae				
Pentaneura sp. d	X	X	-	X
Pentaneura sp. e	X	X	-	-
Pentaneura sp. i	X	-	-	-
Pentaneura decolorata (Mall.) pupa	X	-	-	-
Coelotanypus concinnus (Coq.)	X	X	X	X
Subfamily Tendipedinae Tribe Calopsectrini				
Calopsectra nr. deflecta (Joh.)	-	X	-	X
Tribe Tendipedini				
Undet. sp.	X	X	X	X
Stenochironomus sp. a	-	X	-	-
Stenochironomus sp. b	X	X	X	X
Polypedilum sp. g	-	X	-	-
Polypedilum sp. nr. illinoense (Mall.)	-	-	X	-
Polypedilum illinoense (Mall.)	-	-	-	X

	1	2	2A	3
Polypedilum prob. halterale (Coq.)	X	X	X	-
Tanytarsus (Endochironomus) sp. d	-	-	-	X
Tanytarsus (Endochironomus) nr. nigricans (Joh.)	-	X	X	-
Tendipes decorus (Joh.)?	X	-	-	-
Phylum Vertebrata Class Teleostomi Order Lepisosteiformes Family Lepisosteidae				
Lepisosteus osseus oxyurus (Raf.)	-	X	X	X
Lepisosteus productus (Cope)	-	X	X	X
Order Clupeiformes Family Clupeidae				
Dorosoma cepedianum (Le Sueur)	X	X	X	X
Order Cypriniformes Family Catostomidae				
Ictiobus bubalus ? (Raf.)	-	X	-	-
Ictiobus sp.	-	-	X	-
Family Cyprinidae				
Notropis amabilis (Girard)	X	-	-	-
Notropis buchanani Meek	X	X	X	-
Notropis lutrensis lutrensis (Baird & Girard)	X	X	X	X
Pimephales vigilax vigilax (Baird & Girard)	X	-	-	-
Family Ameiuridae				
Ictalurus furcatus (Cuv. & Val.)	-	X	X	X
Ictalurus lacustris punctatus (Raf.)	-	X	X	X
Pilodictis olivaris (Raf.)	-	X	X	X

	1	2	2A	3
Order Cyprinodontiformes Family Poeciliidae				
Gambusia affinis affinis (Baird & Girard)	X	X	X	-
Mollienesia latipinna Le Sueur	X	-	-	-
Order Perciformes Family Percidae				
Percina caprodes carbonaria (Baird & Girard)	X	-	-	-
Family Centrarchidae				
Chaenobryttus coronarius (Bartram)	X	-	-	-
Lepomis cyanellus Raf.	X	-	-	-
Lepomis macrochirus Raf.	X	-	-	-
Lepomis megalotis (Raf.)	-	X	X	-
Micropterus punctulatus treculi (Vaillant & Bocourt)	X	X	X	X
Family Cichlidae				
Herichthys cyanoguttatus cyanoguttatus Baird & Girard	X	-	-	X