STATE Texas
PROJECT NO. F-5-R-1, Job B-6
PERIOD June 22, 1953 - June 12, 1954

Job Completion Report

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TITLE

Inventory of species present and their distribution in those portions of the Middle and South Concho Rivers occuring within Tom Green, Reagan, Irion and Schleicher Counties, Texas.

OBJECTIVES

To determine distribution of species present, their relative abundance, and the ecological factors influencing their distribution.

METHODS

Forty-seven seining collections were made at fifteen locations on the South and Middle Concho watershed. In nearly all collections both 26 ft. $\frac{1}{4}$" mesh bag seines and 15 ft. $\frac{1}{4}$" mesh common sense seines were used. To estimate relative abundance a count was made of all individuals taken in sixteen collections. Four collections were taken in each type stream habitat, and the resulting data analyzed on a seasonal basis. In other collections data pertaining to species distribution only was recorded and in addition to the above equipment, six ft. and four ft. common sense seines and 1/8" mesh fry seines were employed.

Sixteen gill net collections were made. Experimental nylon gill nets measuring 125 ft. x 8 ft. in depth and made up in five, 25 ft. sections, were set at eight stations. Mesh size for these nets increased progressively in each following section at one-half inch intervals beginning with 1" mesh and terminating with a 3" mesh section.

Three rotenone collections were made, one for each stream sub- division. Data pertaining to numerical and weight percentage was taken for each species recovered and the volume of water treated estimated.

In all collections most of the fish taken were identified and counted in the field. However, some individuals whose identity was questionable were preserved in 10% formalin and a sample of each species was saved for a laboratory collection.

FINDINGS

For reasons discussed in the Completion Report for Job A-1, it is considered desirable to report distribution and abundance of species data under titles used to denote the three ecological associations found in the watershed.

1. Spring fed, permanent flow, clear water association. (Description and discussion in report for Job A-1. Shown on map stations 5, 10, 11 and 12)

   Seining Collection Results

   A. Spring areas (Stations 5 and 10)

      Estimations based on total counts for four seasonal collections.

	Species	Number	Total %
1.	Moxostoma congestum	1	.3
2.	Campostoma anomalum	38	10.9
3.	Gambusia affinis	113	32.7
4.	Pimephales vigilax	27	7.8
5.	Etheostoma spectabile	31	8.9
6.	Notropis buchanani	12	3.6
7.	Notropis amabilis	11	3.2
8.	Notropis venustus	18	5.2
9.	Lepomis cyanellus	41	11.8
10.	Lepomis megalotis	21	6.1
11.	Lepomis auritus	24	6.9
12.	Lepomis macrochirus	2	.5
13.	Lepomis microlophus	2	.5
14.	Pomoxis annularis	2	.5
15.	Chaenobryttus coronarius	4	1.2
	Totals	347	100.1

B. Clear water, permanent flow areas below springs. (Stations 11 and 12) Estimate based upon four seasonal collections.

	Species	Number	Total %
1.	Dorosoma cepedianum	54	6.5
2.	Moxostoma congestum	36	4.3
3.	Carpiodes carpio	18	2.2
4.	Campostoma anomalum	63	7.5
5.	Pimephales vigilax	61	7.3
6.	Notropis venustus	121	14.5
7.	Notropis lutrensis	183	22.0
8.	Notropis percobromus	4	.5
9.	Notropis amabilis	9	1.1
10.	Micropterus salmoides	3	.4
11.	Micropterus punctatus	4	.5
12.	Chaenobryttus coronarius	9	1.1
13.	Lepomis cyanellus	114	13.7
14.	Lepomis megalotis	61	7.3
15.	Lepomis macrochirus	64	7.6
16.	Lepomis microlophus	13	1.6
17.	Lepomis auritus	2	.2
18.	Pomoxis annularis	12	1.4
19.	Ictalurus punctatus	2	.2
20.	Pilodictus olivaris	1	.1
	Totals	834	100.2

Netting Results

A. Netting in spring fed, clear water, permanent pools created by Stilson and Christoval Dams (Stations 11 and 12). Estimate based on six netting collections.

	Species	Number	Total Weight lbs.	Total Weight ozs.	% by Number	% by Weight
1.	Dorosoma cepedianum	115	58	10	40.2	15.9
2.	Carpiodes carpio	60	216	0.0	21.0	57.5
3.	Moxostoma congestum	32	64	0.0	11.2	17.1
4.	Aplodinotus grunniens	12	3	2.0	4.2	.8
5.	Lepisosteus osseus	18	12	1.0	6.3	3.3

	Species	Number	Total Weight lbs.	ozs.	% by Number	% by Weight
6.	Pilodictus olivaris	2	4	6.0	.7	1.0
7.	Micropterus salmoides	4	4	1.0	1.4	1.0
8.	Ictalurus punctatus	6	9	8.0	2.1	1.0
9.	Lepomis sp.	34	4	8.0	11.9	.5
10.	Pomoxis annularis	3		4.0	1.1	.0
	Totals	286	376	8.0	100.0	100.5

Rotenone Collection

A. Collection by rotenone made approximately two miles northeast of Station 8. Area treated approximately .25 acre ft.

	Species	Number	Total Weight lbs.	ozs.	% by Number	% by Weight
1.	Dorosoma cepedianum	13	1	1	8.3	5.5
2.	Micropterus salmoides	20	1	4	12.5	6.3
3.	Ictalurus punctatus	5	1	5	3.2	6.7
4.	Chaenobryttus coronarius	3		0	2.0	2.3
5.	Lepomis cyanellus	29	4	7	17.6	22.6
6.	Lepomis macrochirus	26	3	2	16.0	15.8
7.	Lepomis megalotis	14	4	1	9.0	20.5
8.	Lepomis auritus	4		11	2.6	3.4
9.	Lepomis humilis	3		7	3.1	2.4
10.	Lepomis punctatus	3		6	3.1	1.9
11.	Lepomis microlophus	14	1	4	9.1	6.3
12.	Hybrid sunfishes	9	1	2	5.8	5.7
13.	Gambusia affinis	12		2	7.7	.6
	Totals	155	19	13	100.0	100.5

Orangethroated darters (Etheostoma spectabile) were in spring areas only. Such spring communities were dominated by small plankton feeders and by sunfishes. In other clear water associations, sunfishes averaged 32% of the total for all type collections. Green sunfish (Lepomis cyanellus) and western lonear (Lepomis megalotis) were more abundant and have the greatest area of distribution. However, yellowbelly sunfish (Lepomis auritus) and warmouth bass (Chaenobryttus coronarius) were often larger and are preferred by fishermen. Bluegill (Lepomis macrochirus) were the more abundant species in larger pools, especially where aquatic vegetation was heavy. These fish usually appear to be stunted. Common mosquitofish (Gambusia affinis) were the most abundant species taken and were in all localities where a swift stream flow was not prohibitive. These fish were especially numerous in shallow backwaters. Blacktail shiner (Notropis venustus) and red shiners (Notropis lutrensis) were concentrated in swifter water and in the deeper pools below riffles. Below springs, in clear water associations where there was appreciable current, gizzard shad (Dorosoma cepedianum) and gray redhorse suckers (Moxostoma congestum) increased in numbers and may possibly be the dominant species in some communities. Downstream as transition into murky water association occurs and in irrigation reservoirs, river carp suckers (Carpiodes carpio) become more abundant over Moxostoma.

11. Murky Sluggish Flow Association

Seining Collections

Near impoundments on Spring and Dove Creek and on the South Concho near Christoval Dam and Gardner Dam (Stations 7, 8, 9, 13, 14 and 15). Estimates based on four seasonal collections.

	Species	Number	% Total
1.	Lepisosteus osseus	5	.7
2.	Dorosoma cepedianum	31	4.3
3.	Carpiodes carpio	27	3.7
4.	Moxostoma congestum	2	.3
5.	Cyprinus carpio	2	.3
6.	Ictiobus bubalus	6	.8
7.	Aplodinotus grunniens	4	.6
8.	Notemigonus chrysoleucas	13	1.8
9.	Pimephales vigilax	22	3.0
10.	Percina caprodes	18	2.5
11.	Hybognathus placitus	14	1.9
12.	Gambusia affinis	140	19.3
13.	Notropis venustus	112	15.5
14.	Notropis lutrensis	41	5.7
15.	Ictalurus punctatus	5	.7
16.	Ameiurus natalis	21	2.9
17.	Ameiurus melas	3	.4
18.	Morone chrysops	11	1.5
19.	Micropterus salmoides	11	1.5
20.	Micropterus punctulatus	1	.1
21.	Lepomis megalotis	67	9.3
22.	Lepomis cyanellus	33	4.5
23.	Lepomis microlophus	27	3.7
24.	Lepomis auritus	7	1.0
25.	Pomoxis annularis	61	8.4
26.	Lepomis macrochirus	41	5.7
	Totals	725	100.1

Netting Collections

Impoundments on Spring and Dove Creek and South Concho River (Stations 7, 9, 13, 15). Estimate based on six seasonal collections.

Species	Number	Total Weight lbs.	Total Weight ozs.	% by Number	% by Weight
Doroxoma cepedianum	145	90	9	51.5	37.3
Carpiodes carpio	40	84	0	14.2	34.7
Moxostoma congestum	18	31	8	6.4	12.8
Aplodinotus grunniens	10	4	2	3.6	1.6
Lepisosteus osseus	4	10	2	1.4	4.2
Pilodictus olivaris	3	9	2	1.1	3.7
Ictalurus punctatus	4	4	8	1.4	1.7
Pomoxis annularis	6	1	1	2.1	.4
Micropterus salmoides	1	1	4	.4	.4
Morone chrysops	13	3	9	4.6	1.3
Sunfishes	37	4	2	13.2	1.7
Totals	281	242	15	99.9	99.8

Rotenone Collections

Pool treated located approximately one mile from Station 15. Area treated about 1.5 acre ft.

Species	Number	Total Weight Lbs.	Oz.	% by Number	% by Weight
Dorosoma cepedianum	123	40	3	15.4	30.1
Carpiodes carpio	21	36	0	2.6	27.5
Moxostoma congestum	11	14	2	1.4	10.5
Aplodinotus grunniens	4	1	0	.5	.7
Cyprinus carpio	12	4	9	1.5	3. 3
Ictalurus punctatus	14	6	2	1.5	4.5
Pilodictus olivaris	4	7	3	.5	5.3
Micropterus salmoides	8	4	0	.9	3.5
Pomoxis annularis	9	3	2	1.4	2.2
Sunfishes	102	14	1	12.6	10.4
Small forage fishes*	500	3	11	61.6	2.2
Totals	818	133	1	100.0	100.4

* - Estimated number for genus Notropis, Hybognathus, Gambusia and Pimephales.

The greatest number of species found in any association in the watershed occur in murky sluggish flow associations. Most of these pools are created by reservoir impoundments and Blacktail shiners (Notropis venustus) and Red shiners (N. lutrensis) were usually found in the upper portions of such pools and were numerous below the water outlet. Netting results, rotenone collections and stomach analyses of game fish indicate that gizzard shad (Dorosoma cepedianum) as the most important forage species. Sunfishes, especially green sunfish and western longears, are common and bullheads (Ameiurus and A. melas), log perch (Percina caprodes) and flathead catfish (Pilodictus olivaris) were taken only in this habitat.

III. Silty Intermittant Pool Association.
Description and discussion in report for Job A-1. (Appended map stations 1,2 & 3

Seining Collections

Turbid, intermittent pools at Stations 2 and 3. Estimate based on four seasonal collections.

Species	Number	% Total
Dorosoma cepedianum	44	11.5
Carpiodes carpio	61	16.0
Cyprinus carpio	37	9.7
Aplodinotus grunniens	7	1.8
Gambusia affinis	111	29.8
Notropis venustus	25	6.6
Notropis lutrensis	32	8.4
Notemigonus crysoleucas	6	1.6
Lepomis cyanellus	31	8.1
Lepomis megalotis	14	3.7
Morone chrysops	4	1.0
Lepomis macrochirus	7	1.8
Ictalurus punctulatus	1	.3
Micropterus salmoides	2	.3
Totals	382	100.1

Rotenone Collections

Pool location approximately 3/4 miles southwest of Station 3. Area treated approximately one acre ft.

Species	Number	Total Weight Lbs.	Ozs.	% by No.	% by Wt.
Dorosoma cepedianum	37	11	0	14.50	4.6
Carpiodes carpio	76	94	9	28.80	37.0
Cyprinus carpio	22	78	8	8.64	31.7
Ictiobus bubalus	4	12	0	.38	4.8
Aplodinotus grunniens	77	27	0	30.00	10.8
Moxostoma congestum	4	7	4	1.57	2.8
Ictalurus punctatus	2	3	4	.78	1.7
Sunfishes	33	7	2	12.72	2.8
Totals	255	249	12	100.16	99.9

Gill nets were not set in this type association because suitable netting sites were not available.

Although largemouth bass (Micropterus salmoides), white bass (Morone chrysops), blacktail shiners (Notropis venustus) and red shiners (Notropis lutrensis) were taken in this habitat, their presence is attributed to entrapment, recession of the flowing stream to an intermittent pool condition. Mosquitofish (Gambusia affinis) and freshwater drum (Aplodinotus grunniens) appear capable of adapting to this environment. Green sunfish (Lepomis cyanellus) and bluegill (L. macrochirus) are not uncommon. However, a complete dominance of this association by river carp suckers (Carpiodes carpio), longnose gar (Lepisosteus osseus) and gizzard shad (Dorosoma cepedianum) is overwhelming.

SUMMARY

1. Field work for this job was done in conjunction with Job A-1. (Basic Survey of the South and Middle Concho Rivers.)

2. Forty-seven seining collections were made at fifteen stations, sixteen gill net collections were taken and three pools were treated with rotenone.

3. A total of 39 species from ten families were taken by all methods of collection for the entire watershed.

4. Three ecological associations were found to exist and seining, netting and rotenone collection data was analyzed on that basis.

5. Spring bed, permanent flow, clear water associations were dominated by sunfishes, especially green sunfish and western longear sunfish and by small plankton feeders.

6. The greatest number of species found were in murky sluggish flow associations and most communities were dominated by river carp suckers. However, game species were more numerous than in intermittent pool associations and were probably larger in average size.

7. Silty intermittent pool associations were characterized by an overwhelming dominance of all species by river carp suckers and carp. Few game fish were taken in collections and conditions often indicated that survival of all game fishes, excepting sunfishes, was unlikely.

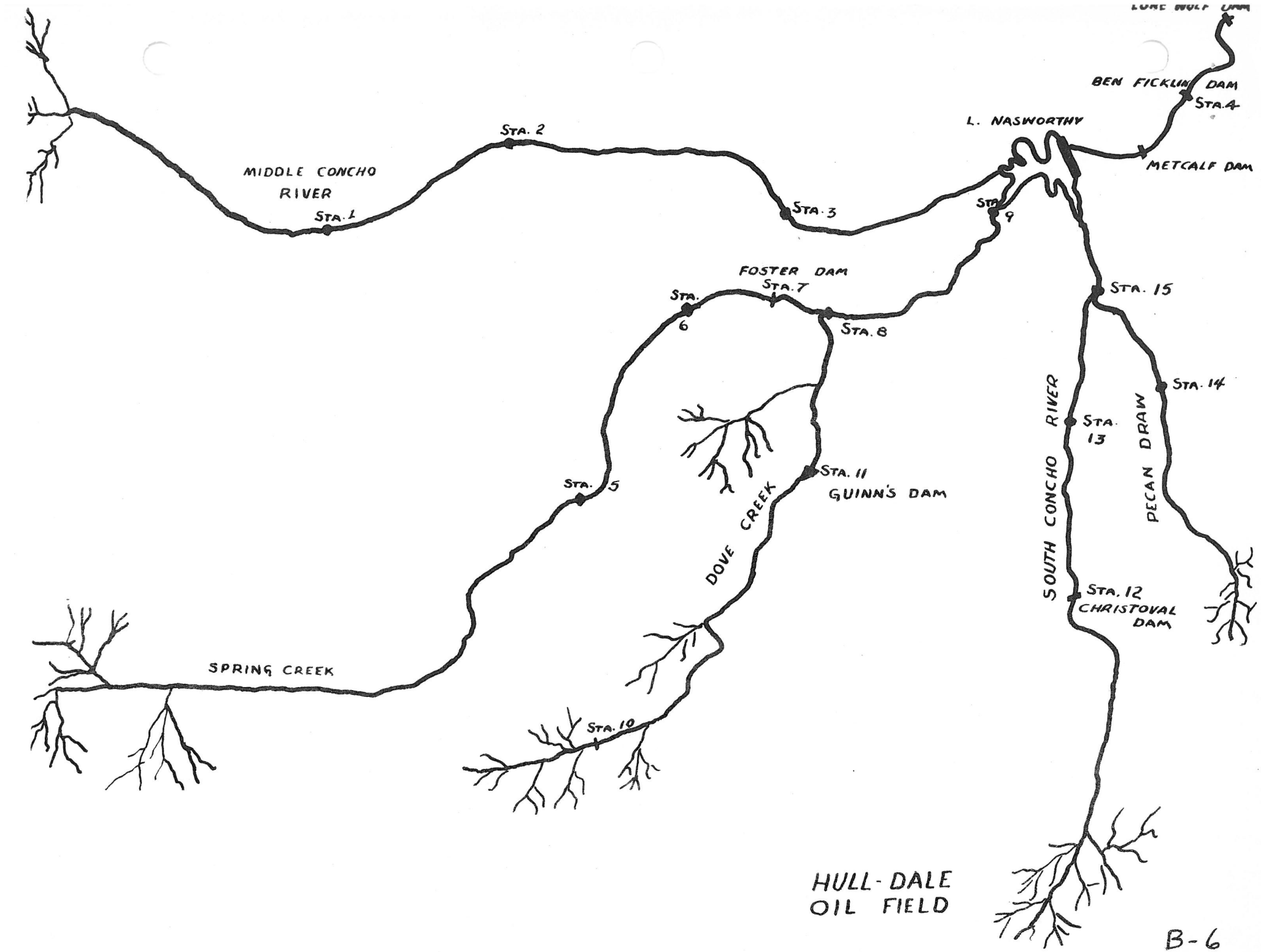
Checklist of Fish Species from South and Middle
Concho Rivers, July 22, 1953 - June 12, 1954

	Common Name	Scientific Name
1.	Longnose gar	Lepisosteus osseus
2.	Gizzard shad	Dorosoma cepedianum
3.	Smallmouth buffalo	Ictiobus bubalus
4.	Black buffalo	Ictiobus niger
5.	River carpsucker	Carpiodes carpio
6.	Gray redhorse sucker	Moxostoma congestum
7.	German carp	Cyprinus carpio
8.	Golden shiner	Notemigonus crysoleucas
9.	Plains shiner	Notropis percobromus
10.	Blacktail shiner	Notropis venustus
11.	Red shiner	Notropis lutrensis
12.	Texas shiner	Notropis amabilis
13.	Mimic shiner	Notropis volucellus
14.	River shiner	Notropis blennius
15.	Ghost shiner	Notropis buchanani
16.	Plains minnow	Hybognathus placitus
17.	Parrot minnow	Pimephales vigilax
18.	Flathead minnow	Pimephales promelas
19.	Southern channel catfish	Ictalurus punctatus
20.	Black bullhead	Ameiurus melas
21.	Yellow bullhead	Ameiurus natalis
22.	Flathead catfish	Pilodictus olivaris
23.	Common mosquitofish	Gambusia affinis
24.	White bass	Morone chrysops
25.	Spotted black bass	Micropterus punctulatus
26.	Largemouth black bass	Micropterus salmoides
27.	Warmouth bass	Chaenobryttus coronarius
28.	Green sunfish	Lepomis cyanellus
29.	Spotted sunfish	Lepomis punctatus
30.	Redear sunfish	Lepomis microlophus
31.	Bluegill	Lepomis macrochirus
32.	Orangespotted sunfish	Lepomis humilis
33.	Yellowbelly sunfish	Lepomis auritus
34.	Western longear sunfish	Lepomis megalotis
35.	White crappie	Pomoxis annularis
36.	Logperch	Percina caprodes
37.	Orangethroat darter	Etheostoma spectabile
38.	Freshwater drum	Aplodinotus grunniens

Hybrids

Lepomis macrochirus x L. punctatus

Lepomis humilis x L. cyanellus


LAKE NASWORTHY DAM
BEN FICKLIN DAM
STA. 4
L. NASWORTHY
METCALF DAM
STA. 2
MIDDLE CONCHO RIVER
STA. 1
STA. 3
STA. 9
FOSTER DAM
STA. 7
STA. 6
STA. 8
STA. 15
STA. 14
STA. 13
SOUTH CONCHO RIVER
PECAN DRAW
STA. 5
STA. 11
GUINN'S DAM
DOVE CREEK
STA. 12
CHRISTOVAL DAM
SPRING CREEK
STA. 10
HULL-DALE OIL FIELD
B-6