

FILE

PERFORMANCE REPORT

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FEDERAL AID IN FISHERIES RESTORATION ACT

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Federal Aid Project F-2-R-22

Region V-B Fisheries Studies

Objective B-26: Fisheries Management Recommendations

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PERFORMANCE REPORT

State: Texas Project Number: F-2-R-22
Project Title: Region V-B Fisheries Studies
Project Section: Research and Surveys
Study Title: Fisheries Management Recommendations
Contract Period: February 1, 1974 to December 31, 1974
Program Narrative Objective Number: B-26

ABSTRACT

This objective is designed to situate management practices in the public waters of Region V-B. To determine management needs, Lakes Canyon, Travis, Lyndon B. Johnson and Inks were surveyed (gill netting, seining, water quality). Cove rotenone samples were collected from Lakes Canyon and Lyndon B. Johnson. Surveys indicate acceptable game fish populations in the lakes surveyed but all lakes have overpopulations of rough fishes. Recommendations for the lakes surveyed include continued predator stockings for control of rough fish populations, habitat improvement to concentrate predators for harvest, and the construction of fishing piers for additional fishermen access at all times of the year.

Additional walleye stockings were carried out on Lakes Canyon and Lyndon B. Johnson. Surveys indicate good survival and growth of walleye in both lakes.

Striped bass were stocked for the second year in Lakes Canyon and Travis. Survival from both stockings has been documented and growth is excellent in both lakes. Smallmouth bass were also stocked in Canyon Lake and a portion of the Guadalupe River near Kerrville, Kerr County.

Northern pike were introduced into Inks Lake and Town Lake.

Objective: To situate fishery management practices in the public waters of Region V-B.

I. Segment Objectives:

1. To prepare fish harvest regulations for the waters of Region V-B.
2. To recommend management practices for waters not providing adequate sports fishing.
3. To determine the needs for supplemental stocking of hatchery reared fish.

4. To conduct detailed surveys on Lakes Canyon, LBJ, and Travis.
5. To determine the source and extent of natural or artificial pollutants affecting fish populations.
6. To determine needs for vegetation control.
7. To determine public access.

II. Summary of Progress:

Meetings were held with game management officers, biologists, and supervisory personnel to discuss existing and proposed fishing regulations in the Edwards Plateau, Possum Kingdom, and Trinity-Brazos Regulatory Districts. Public hearings were also held in each of the counties under regulatory authority and the proposed proclamation was presented to the Texas Parks and Wildlife Department Commission for approval.

Detailed surveys (gill, netting, seining, water quality) were conducted on Lakes Canyon, Travis, Lyndon B. Johnson, and Inks to determine management needs and evaluate stockings. Cove rotenone surveys were also carried out on Lakes Canyon and Lyndon B. Johnson to estimate standing crops of existing fish populations. Visual surveys were made on the lakes of the region for vegetation control needs and public access.

There were no reports of pollution affecting fish populations in Region V-B this segment.

III. Significant Deviation:

Changes in Department alignment have made it necessary to transfer this objective to Project F-30-R, Statewide Management, beginning January 1, 1975. Since a report on the progress of this objective was necessary to affect the change in alignment, the quarterly surveys for the last quarter were not accomplished and the data reflects only the information collected for the first three quarters.

IV. Conclusions, Evaluations, and Recommendations:

LAKE TRAVIS

Lake Travis is the second largest lake in Region V-B having a surface area of 18,930 acres. It is a deep lake (mean depth - 62 feet) impounded upon a limestone basin within the Edwards Plateau, Travis County. The lake was impounded in 1940 and is utilized for recreation, flood control, hydroelectric power, and municipal and industrial water supplies. Lake Travis impounds waters of the Colorado River and is controlled by the Lower Colorado River Authority.

An additional 137,500 striped bass fingerling were stocked in Lake Travis

in June, 1974. This was the second year of stocking, bringing the total stocking to 343,648 stripers over the past two years.

Lake Travis was surveyed quarterly using 150-foot experimental gill nets set overnight on the bottom at 15 stations. A total of 45 net-nights produced 845 fish weighing 1,357.26 pounds representing 21 different species. Game fishes represented 25.09 percent of the catch by number and 25.84 percent by weight (Table 1). Figure 1 illustrates a three year trend of rough fish, game fish, and sunfish based on the catch per 100 feet of net.

The gill netting data reflects overpopulations of gizzard shad (35.86 percent by number, 15.29 percent by weight), river carpsucker, and European carp. Populations of channel catfish, flathead catfish, and blue catfish seem to be acceptable as are the populations of largemouth bass, spotted bass, white crappie, and white bass.

Seine samples were collected only in July and September. Results indicate available forage consisting of predominantly blacktail shiners, and Mississippi silversides (Table 2). Only four largemouth bass were collected in seining collections but the morphometry of the basin makes seining very difficult and the results could be misleading.

Time did not permit cove rotenone surveys on Lake Travis as planned but the surveys will be carried out during the next segment to determine standing crop estimates.

Although few striped bass were collected in netting surveys this segment there have been numerous reports of catches by area fishermen. September striper surveys produced only one from 1974 stockings.

Management Recommendations:

1. The stocking of striped bass should continue. This species could assist in the control of the large population of gizzard shad and other open water rough fishes.
2. Additional forage should be provided for the predator species in Lake Travis. A few threadfin shad have been collected but additional stockings of this species should be made in an attempt to establish a good population in all parts of the lake.
3. The construction of lighted and heated fishing docks could provide an increase in angler harvest of exotic stockings and native species. The lake area is heavily populated but only a few areas provide access to fishermen without the aid of a boat.
4. Brush shelters and baited areas could also be useful in increasing angler harvest. Such areas could be marked and located in and around fishing docks to attract fish for harvest.

Table 1

Results of Lake Travis Gill Netting for 1974
45 Net Sets

Species	Number	Percent of Number	Weight (pounds)	Percent of weight	Average Weight
<u>Lepisosteus osseus</u>	37	4.38	133.01	9.80	3.59
<u>Dorosoma cepedianum</u>	303	35.86	207.51	15.29	.68
<u>Ictiobus bubalus</u>	26	3.08	235.50	17.35	9.06
<u>Carpionodes carpio</u>	76	8.98	190.19	14.01	2.50
<u>Moxostoma congestum</u>	22	2.60	34.38	2.53	1.56
<u>Cyprinus carpio</u>	46	5.44	142.69	10.51	3.10
<u>Aplodinotus grunniens</u>	15	1.78	42.25	3.11	2.82
* <u>Ictalurus punctatus</u>	40	4.73	37.32	2.75	.93
* <u>Ictalurus furcatus</u>	15	1.78	62.32	4.59	4.15
* <u>Pylodictus olivaris</u>	17	2.00	109.64	8.08	6.45
* <u>Morone chrysops</u>	69	8.17	88.44	6.53	1.28
* <u>Morone saxatilis</u>	1	.12	1.44	.11	1.44
<u>Lepomis macrochirus</u>	56	6.63	12.25	.90	.22
<u>Lepomis auritus</u>	11	1.30	2.13	.16	.19
<u>Lepomis megalotis</u>	10	1.18	1.63	.12	.16
<u>Chaenobryttus cyanellus</u>	12	1.42	2.20	.16	.18
<u>Chaenobryttus gulosus</u>	3	.36	.56	.04	.19
* <u>Micropterus salmoides</u>	25	2.97	16.62	1.22	.66
* <u>Micropterus punctulatus</u>	26	3.08	21.62	1.59	.83
* <u>Pomoxis annularis</u>	19	2.25	13.25	.98	.70
<u>Cichlasoma cyanoguttata</u>	16	1.89	2.31	.17	.14
Totals	845	100.00	1357.26	100.00	

Percent of catch by:

Number	Weight
Rough fish = 64.02	72.78
Game fish = 25.09	25.84
Sunfish = 10.89	1.38

Catch per 100 feet of net:

Number	Weight
Rough fish = 8.01	14.63
Game fish = 3.14	5.16
Sunfish = 1.36	.28

* Denotes game fish species

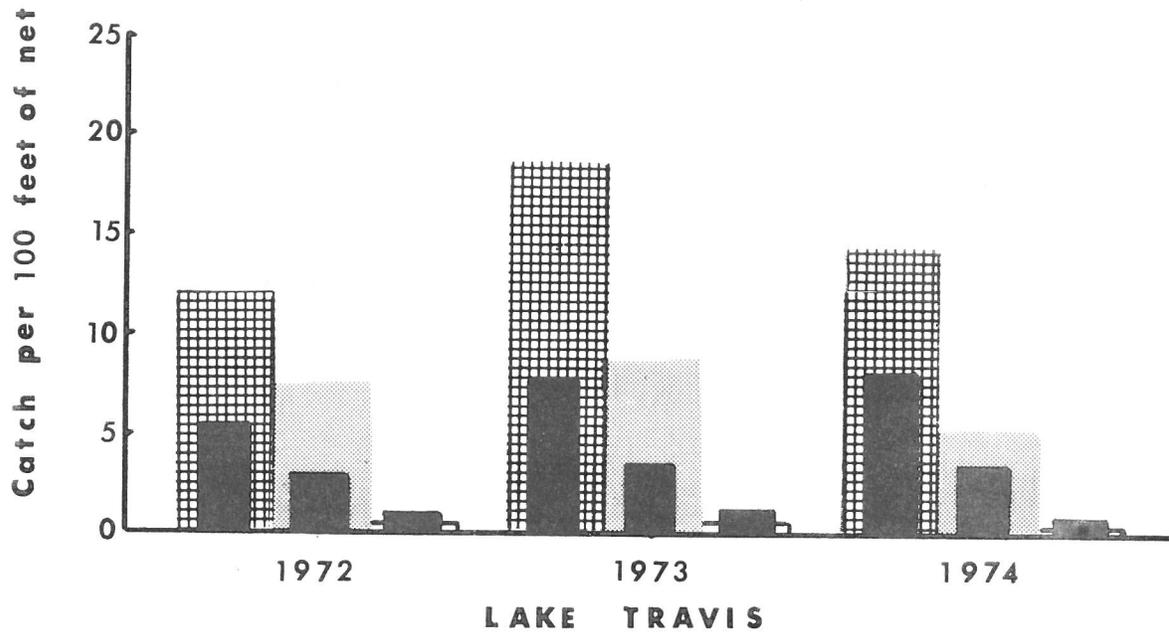
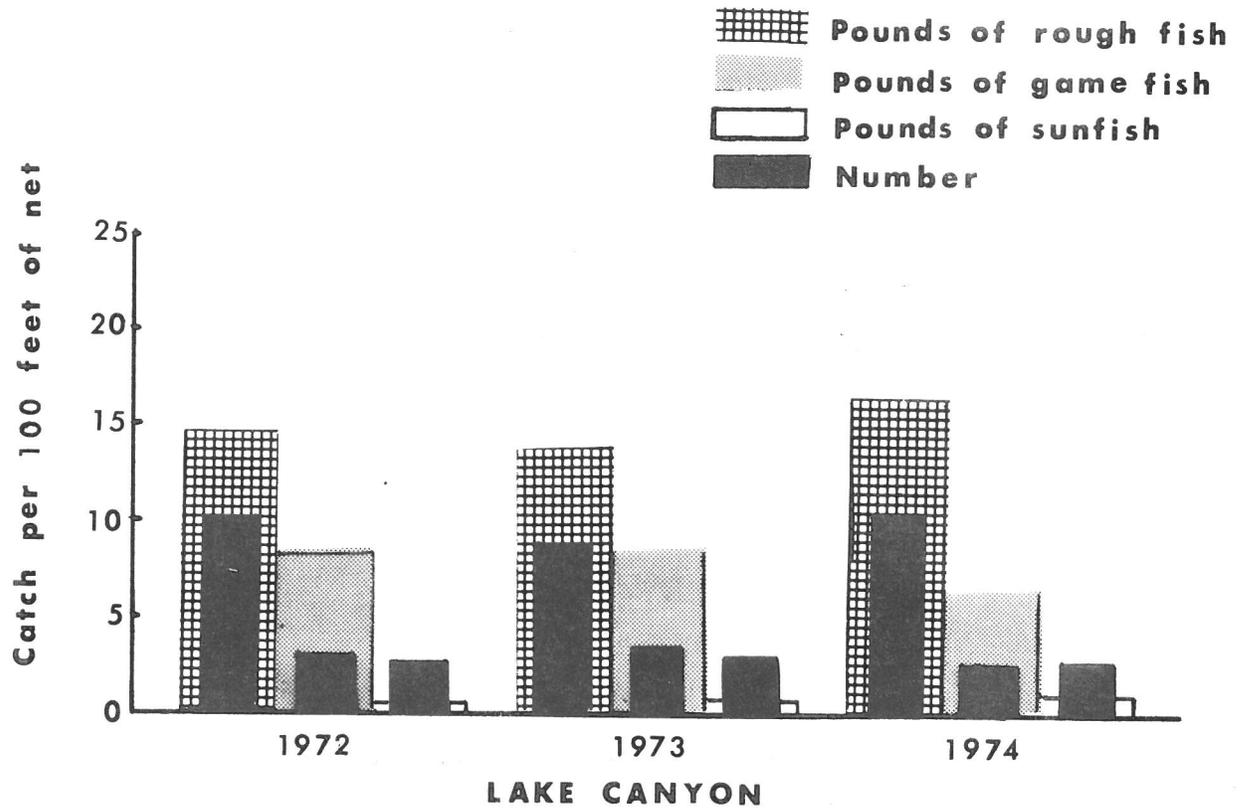


Figure 1 Three year trend of fish populations in Lakes Canyon and Travis based on catch per unit effort of netting surveys.

Table 2
Seining Results - Lake Travis

Species	July		September		Totals
	Number	Number per seine haul	Number	Number per seine haul	
<u>Dorosoma cepedianum</u>	1	0.13	1	0.13	2
<u>Dorosoma petenense</u>	-	-	3	0.38	3
<u>Notropis venustus</u>	13	1.63	65	8.13	78
<u>Notropis lutrensis</u>	1	0.13	-	-	1
<u>Lepomis macrochirus</u>	8	1.00	10	1.25	18
<u>Lepomis auritus</u>	-	-	11	1.38	11
<u>Notemigonus crysoleucas</u>	1	0.13	3	0.38	4
<u>Ameiuria beryllina</u>	31	3.88	10	1.25	41
<u>Carpisdes carpio</u>	-	-	3	0.38	3
<u>Chaenobryttus gulosus</u>	-	-	1	0.13	1
<u>Pimephales vigilax</u>	-	-	7	0.88	7
<u>Sichlasoma cyanoguttata</u>	-	-	3	0.38	3
* <u>Micropterus salmoides</u>	-	-	4	0.50	4

* Denotes game species

LAKE CANYON

Lake Canyon is a large (8,240 acres), deep (mean depth - 47 feet) reservoir located entirely within Comal County. The lake was constructed in 1964 by the U.S. Army Corps of Engineers and impounds waters from the Guadalupe River.

Canyon Lake was the target of considerable exotic stockings during this segment. A total of 16,160 striped bass fingerling were stocked for the second year bringing the total to 35,910 since June, 1973. Walleye were also stocked for the second year of a three year schedule. A total of 124,000 fingerling walleye were stocked in April and May, 1974. This brings the total walleye stocked for 1973-74 to 749,000 fingerling.

Smallmouth bass were also introduced into Canyon Lake in May of this segment. Approximately 75,000 fingerling were stocked at five locations in the lake.

Approximately 600 threadfin shad were collected from Lake Calaveras and stocked into Canyon Lake in April, 1974 in an attempt to provide additional forage.

Canyon Lake was netted quarterly during this segment using 150-foot standard experimental gill nets set overnight on the bottom at 15 stations. A total of 60 net-nights produced 1,376 fish weighing 2,052.58 pounds representing 22 species. Game species represented 15.70 percent of the catch by number and 26.35 percent by weight (Table 3). The remainder of the catch was comprised of nine species of rough fishes (67.71 percent by number and 70.02 percent by weight) and five species of sunfishes (16.86 percent by number and 3.63 percent by weight). Figure 1 illustrates a three year trend of rough, game, and sunfishes based upon catch per 100 feet of net.

Netting data reflects high populations of gizzard shad and grey redhorse suckers representing almost 60 percent of the total catch by number. Channel catfish represented the greatest numbers of the game species collected (9.59 percent) while flathead catfish represented the greatest biomass (10.86 percent).

Large populations of sunfishes are also reflected in the gill netting with the redear sunfish representing the greatest biomass of this group.

Seining collections were made at five stations (two drags at each station) monthly from May through September to determine availability of forage, survival of walleye and striped bass stockings, and survival of young-of-the-year native predators. The available forage consists of blacktail shiners, red shiners, threadfin shad and fathead minnows (Table 4). Large numbers of sunfish were also collected. Good numbers of young-of-the-year largemouth were collected in July collections, but few were collected after this time. It is possible that largemouth bass could be the victim of considerable predation by the large sunfish population in Lake Canyon.

Table 3
Results of Lake Canyon Gill Netting for 1974
60 Net Sets

Species	Number	Percent of Number	Weight (pounds)	Percent of Weight	Average Weight
<u>Lepisosteus osseus</u>	27	1.96	69.38	3.38	2.57
<u>Dorosoma cepedianum</u>	420	30.53	176.14	8.58	.42
<u>Notemigonus crysoleucas</u>	4	.29	.82	.04	.20
<u>Cyprinus carpio</u>	51	3.70	420.26	20.48	8.24
<u>Carpiondes carpio</u>	8	.58	26.32	1.28	3.29
<u>Moxostoma congestum</u>	389	28.28	716.45	34.91	1.84
<u>Morone chrysops</u>	23	1.67	26.70	1.30	1.16
* <u>Ictalurus punctatus</u>	132	9.59	262.51	12.80	1.99
* <u>Ictalurus furcatus</u>	1	.07	17.50	.85	17.50
<u>Ictalurus natalis</u>	1	.07	.25	.01	.25
* <u>Pylodictus olivaris</u>	33	2.40	223.00	10.86	6.76
* <u>Micropterus salmoides</u>	24	1.74	15.82	.77	.66
<u>Chaenobryttus gulosus</u>	21	1.53	4.63	.22	.22
<u>Chaenobryttus cyanellus</u>	13	.94	1.88	.09	.14
<u>Lepomis macrochirus</u>	76	5.52	10.58	.51	.14
<u>Lepomis microlophus</u>	120	8.73	56.94	2.77	.47
<u>Lepomis auritus</u>	2	.15	.56	.03	.28
* <u>Pomoxis annularis</u>	11	.80	5.76	.28	.52
* <u>Stizostedion vitreum</u>	15	1.09	16.20	.79	1.08
<u>Cichlasoma cyanoguttata</u>	3	.22	.19	.01	.06
<u>Tilapia sp.</u>	1	.07	.63	.03	.63
<u>Carassius auratus</u>	1	.07	.06	.01	.06
Totals	1376	100.00	2052.58	100.00	

Percent of catch by:	Number	Weight
Rough fish =	67.71	70.02
Game fish =	15.70	26.35
Sunfish =	16.86	3.63

Catch per 100 feet of net:	Number	Weight
Rough fish =	10.31	15.97
Game fish =	2.40	6.01
Sunfish =	2.78	.83

* Denotes game fish species

Table 4

Seining Results - Lake Canyon

Species	May		June		July		Aug		Sept		Totals
	Number	Number per seine haul									
<u>Notropis venustus</u>	37	3.7	122	12.2	13	1.3	61	6.1	139	13.9	372
<u>Notropis lutrensis</u>	2	0.2	7	0.7	-	-	-	-	-	-	9
<u>Lepomis microlophus</u>	23	2.3	25	2.5	40	4.0	1	0.1	1	0.1	90
<u>Lepomis macrochirus</u>	22	2.2	18	1.8	18	1.8	4	0.4	16	1.6	78
<u>Lepomis auritus</u>	16	1.6	14	1.4	36	3.6	12	1.2	26	2.6	104
<u>Lepomis megalotis</u>	-	-	-	-	5	0.5	-	-	-	-	5
* <u>Micropterus salmoides</u>	1	0.1	5	0.5	45	4.5	2	0.2	1	0.1	54
* <u>Micropterus dolomieu</u>	-	-	-	-	-	-	1	0.1	-	-	1
* <u>Micropterus punctulatus</u>	-	-	-	-	-	-	-	-	4	0.4	4
<u>Chaenobryttus cyanellus</u>	2	0.2	3	0.3	2	0.2	-	-	-	-	7
<u>Dorosoma cepedianum</u>	-	-	1	0.1	-	-	-	-	-	-	1
<u>Dorosoma petenense</u>	5	0.5	-	-	6	0.8	9	0.9	14	1.4	36
<u>Notemigonus crysoleucas</u>	8	0.8	1	0.1	-	-	-	-	-	-	9
<u>Pimephales vigilax</u>	3	0.3	18	1.8	5	0.5	12	1.2	6	6.0	44
<u>Menidia beryllina</u>	8	0.8	-	-	60	6.0	5	0.5	39	3.9	112
<u>Gambusia affinis</u>	-	-	5	0.5	1	0.1	-	-	-	-	6
* <u>Ictalurus punctatus</u>	-	-	7	0.7	1	0.1	1	0.1	-	-	9
<u>Percina caprodes</u>	-	-	3	0.3	2	0.2	-	-	-	-	5
<u>Carpoides carpio</u>	-	-	1	0.1	-	-	-	-	-	-	1
<u>Lepiosterus osseus</u>	-	-	-	-	1	0.1	-	-	-	-	1
<u>Tilapia sp.</u>	-	-	-	-	7	0.7	-	-	-	-	7
<u>Cichlasoma cyanoguttata</u>	-	-	-	-	3	0.3	-	-	1	0.1	3
<u>Astyanax mexicanus</u>	-	-	-	-	-	-	48	4.8	-	-	48

* Denotes game species

No walleye or striped bass were collected in seine samples, but survival was documented in netting collections at a later date. One smallmouth bass was also collected.

Water quality data was collected monthly at two stations.

Cove rotenone samples were conducted in three coves during the month of August. Results are tabulated in Figure 2. Total average pounds per acre was calculated at 233.48 pounds and fish were collected representing 22 species. This represents only the fish actually collected and does not reflect adjustments for tagged fish returns. Gizzard shad (63.30 pounds/acre) and yellowbelly sunfish (53.85 pounds/acre) represented the greatest biomass in the rotenone samples. Gill netting results did not reflect this high population of yellowbelly sunfish, but instead indicated a high populations of redear sunfish. Sunfish represented 103.68 pounds/acre or 45 percent of the total biomass. Walleye and striped bass were also collected during the surveys.

Overall survey results indicate an overpopulation of large gizzard shad and to a lesser degree grey redhorse suckers. Overpopulations of sunfishes also is a problem and probably has an impact upon the largemouth bass population due to predation and competition. Rotenone surveys indicated excellent survival and reproduction of the threadfin shad stocked in the early spring representing 1.74 pounds/acre. It is hoped that this species will provide additional forage for largemouth bass and other predators. There has already been evidence that walleye are utilizing this species.

Walleye continue to be collected and show good growth rates. A total of 15 walleye were collected during the quarterly netting surveys. The largest collected to date is 1 pound 14 ounces measuring over 18 inches in length. Walleye from the 1973 stocking are ranging from 1 pound to 1 pound 14 ounces. Only a few walleye from the 1974 stockings have been collected, but it appears that the growth rates will conform closely to last years stocking. Walleye from the 1973 stocking seem to be maturing and could reproduce this year. The males will definitely mature but it remains to be seen if the females will develop as well. Sampling will continue to monitor gonadal development.

Only one smallmouth bass was collected in seining collections, but a number were collected in the cove rotenone surveys. At this time, growth rates appear to be slow but survival is good.

Striped bass appear to have survived well from both stockings. Stripper surveys during October, 1974 produced seven stripers ranging from 1 pound 14 ounces to 2 pounds 9 ounces. Five stripers from the 1974 stocking were also collected.

Management Recommendations:

1. Striped bass and walleye stockings should continue until natural reproduction is documented. Large populations of gizzard shad could possibly be controlled if populations of striped bass increase and walleye could crop sunfish populations.

Figure 2

... ..

pounds per acre

0 10 20 30 40 50 60 70 80

Lorosoma cepedianum



Lorosoma petenense



Cyprinus carpio



Tilapia sp.



Morostoma congestum



Ictalurus natalis



Ictalurus punctatus



Cylodictus olivaris



Amoxis anularis



Micropterus salmoides



Micropterus punctulatus



Micropterus dolomieu



Lepomis auritus



Lepomis macrochirus



Lepomis microlophus



Lepomis microlophus



Chaenobryttus cyanellus



Chaenobryttus culosus



Cichlasoma cyanocuttatur



Stizostedion vitreum



Morone chrysops



Morone saxatilis



* Based on pounds of fish ...

2. The reservoir should be stabilized during the spawning of large-mouth bass. Inundation of shoreline areas immediately after spawning would provide cover and food for young-of-the-year and increase survival.
3. Angler harvest could be increased with the construction of lighted and heated fishing docks. Excellent fisheries exists for catfish and crappie and increased fishermen utilization would result in the construction of these facilities. Walleye fishing is usually more productive at night and this type of facility would provide access when the waters are cooler and more productive for walleye.
4. The construction of fish shelters and baited areas would also increase angler harvest. These structures could be located in and around fishing docks and access areas and attract fish for harvest.

LAKE LYNDON B. JOHNSON

Lake LBJ is a large (6,375 acres), shallow (mean depth - 22 feet), lake located in Burnet and Llano Counties. The lake was constructed in 1951 by the Lower Colorado River Authority and is used for hydroelectric power, cooling waters for a steam generator plant, recreation, and municipal and industrial water supplies. The lake lies upon a granite basin and impounds waters from the Colorado and Llano Rivers. Lake LBJ was chemically renovated in April of 1971.

Walleye were stocked in Lake LBJ for the second year of a three year schedule. A total of 1,200,000 fry were stocked in May, 1974 bringing the total stocked to 7,200,000 since May, 1973.

Lake LBJ was netted quarterly using 150-foot standard gill nets set overnight on the bottom at 15 stations. A total of 46 net-nights yielded 1,291 fish weighing 1,630.25 pounds representing 22 species (Table 5).

Game fishes represented 15.65 percent of the catch by number and 28.48 percent by weight. The remainder included seven species of rough fishes (80.46 percent by number, 71.03 percent by weight) and five species of sunfishes (3.89 percent by number, 149 percent by weight). Figure 3 illustrates a three year trend based upon the catch per unit effort in gill netting samples.

Seining collections were made May through September to determine forage availability, spawning success, and survival of walleye stockings. Available forage consists predominantly of threadfin shad, Mississippi silversides and blacktail shiners (Table 6). Collections indicate low survival of largemouth bass young-of-the-year. Threadfin shad have been present in low numbers for a number of years but this year the species was collected and observed in large numbers.

Cove rotenone surveys were carried out on Lake LBJ also during September, 1974. Three coves were surveyed averaging 220.96 pounds/acre. Carp, smallmouth buffalo, and gizzard shad represented the greatest biomass totalling 175.55 pounds/acre of the fish collected (Figure 4). Largemouth

Table 5
Results of Lake LBJ Gill Netting for 1974
46 Net Sets

Species	Number	Percent of Number	Weight (pounds)	Percent of Weight	Average Weight
<u>Lepisosteus osseus</u>	102	7.90	241.94	14.84	2.37
<u>Dorosoma cepedianum</u>	238	18.44	61.02	3.74	.26
<u>Cyprinus carpio</u>	91	7.05	152.27	9.34	1.67
<u>Carpiodes carpio</u>	294	22.76	324.70	19.93	1.10
<u>Moxostoma congestum</u>	24	1.86	14.50	.89	.60
<u>Ictiobus bubalus</u>	103	7.98	121.70	7.47	1.18
<u>Morone chrysops</u>	81	6.27	100.20	6.15	1.24
* <u>Ictalurus punctatus</u>	46	3.56	72.26	4.43	1.57
* <u>Ictalurus furcatus</u>	1	.08	8.00	.49	8.00
<u>Pylodictus olivaris</u>	62	4.80	259.88	15.94	4.19
* <u>Micropterus salmoides</u>	17	1.32	20.82	1.28	1.22
* <u>Micropterus punctulatus</u>	1	.08	.38	.02	.38
* <u>Micropterus treculi</u>	1	.08	.75	.05	.75
<u>Chaenobryttus gulosus</u>	5	.39	1.75	.11	.35
<u>Chaenobryttus cyanellus</u>	5	.39	1.00	.06	.20
<u>Lepomis auritus</u>	2	.15	.56	.03	.28
<u>Lepomis macrochirus</u>	28	2.17	3.44	.21	.12
<u>Lepomis megalotis</u>	10	.77	1.20	.07	.12
* <u>Pomoxis annularis</u>	92	7.13	75.04	4.60	.82
* <u>Pomoxis nigromaculatus</u>	1	.08	.94	.06	.94
* <u>Stizostedion vitreum</u>	28	2.17	26.33	1.61	.94
<u>Aplodinotus grunniens</u>	59	4.57	141.57	8.68	2.40
Totals	1291	100.00	1630.25	100.00	

Percent catch by:

Rough fish	=	80.46	71.03
Game fish	=	15.65	28.48
Sunfish	=	3.89	.49

Catch per 100 feet of net:

Rough fish	=	15.07	16.78
Game fish	=	2.93	6.73
Sunfish	=	.72	.12

* Denotes game fish species

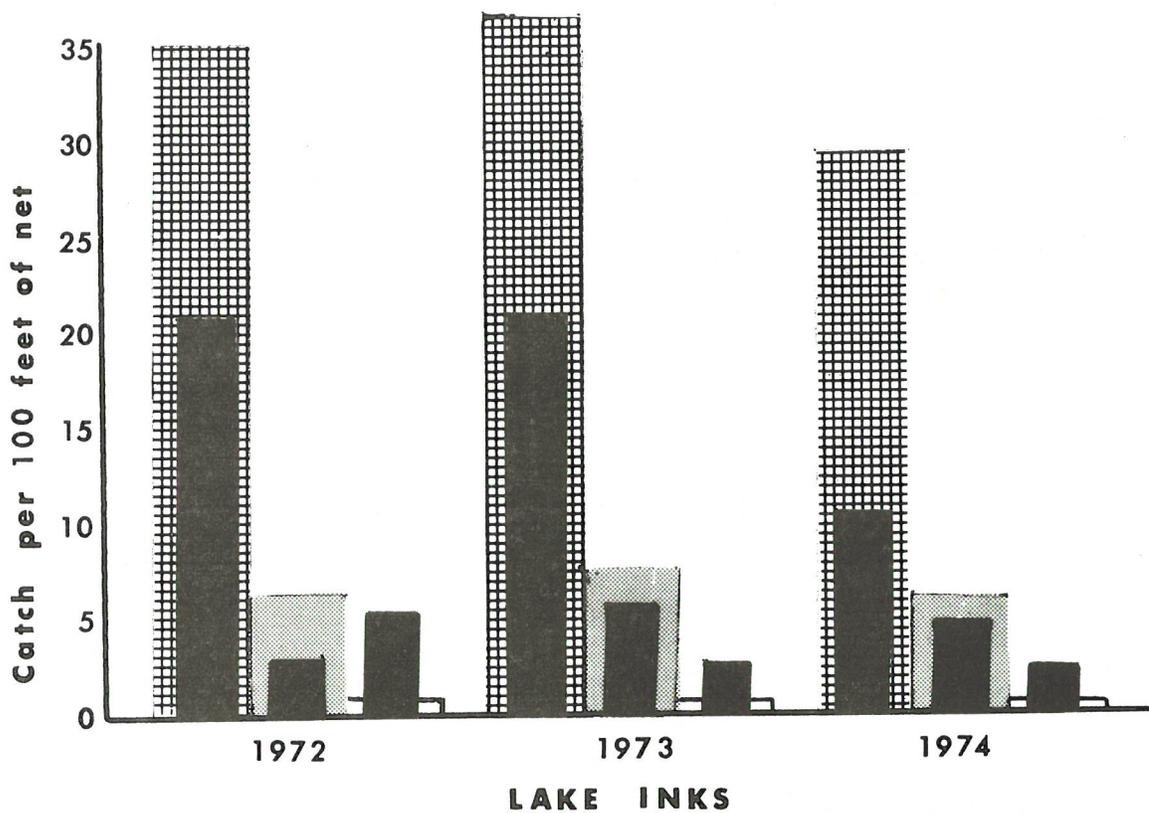
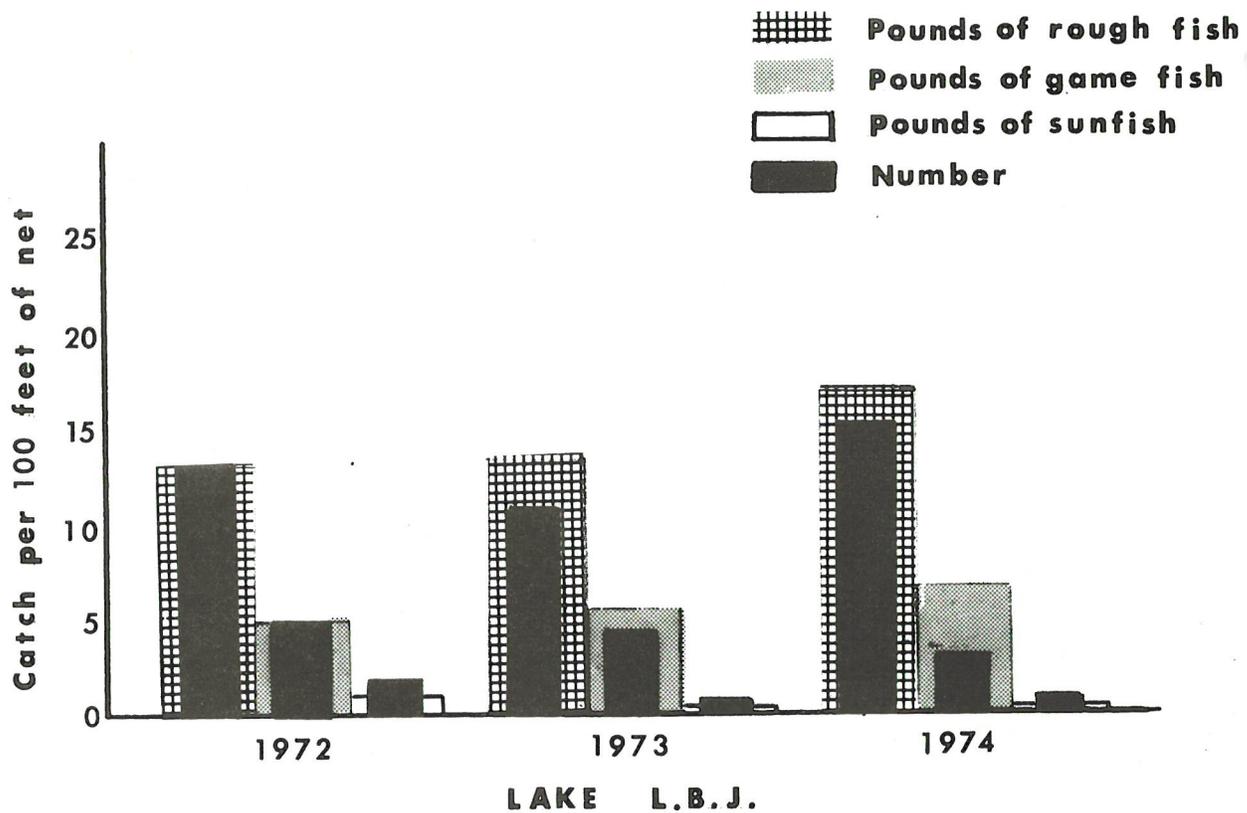


Figure 3 Three year trend of fish populations in Lakes LBJ and Inks based on catch per unit effort of netting surveys.

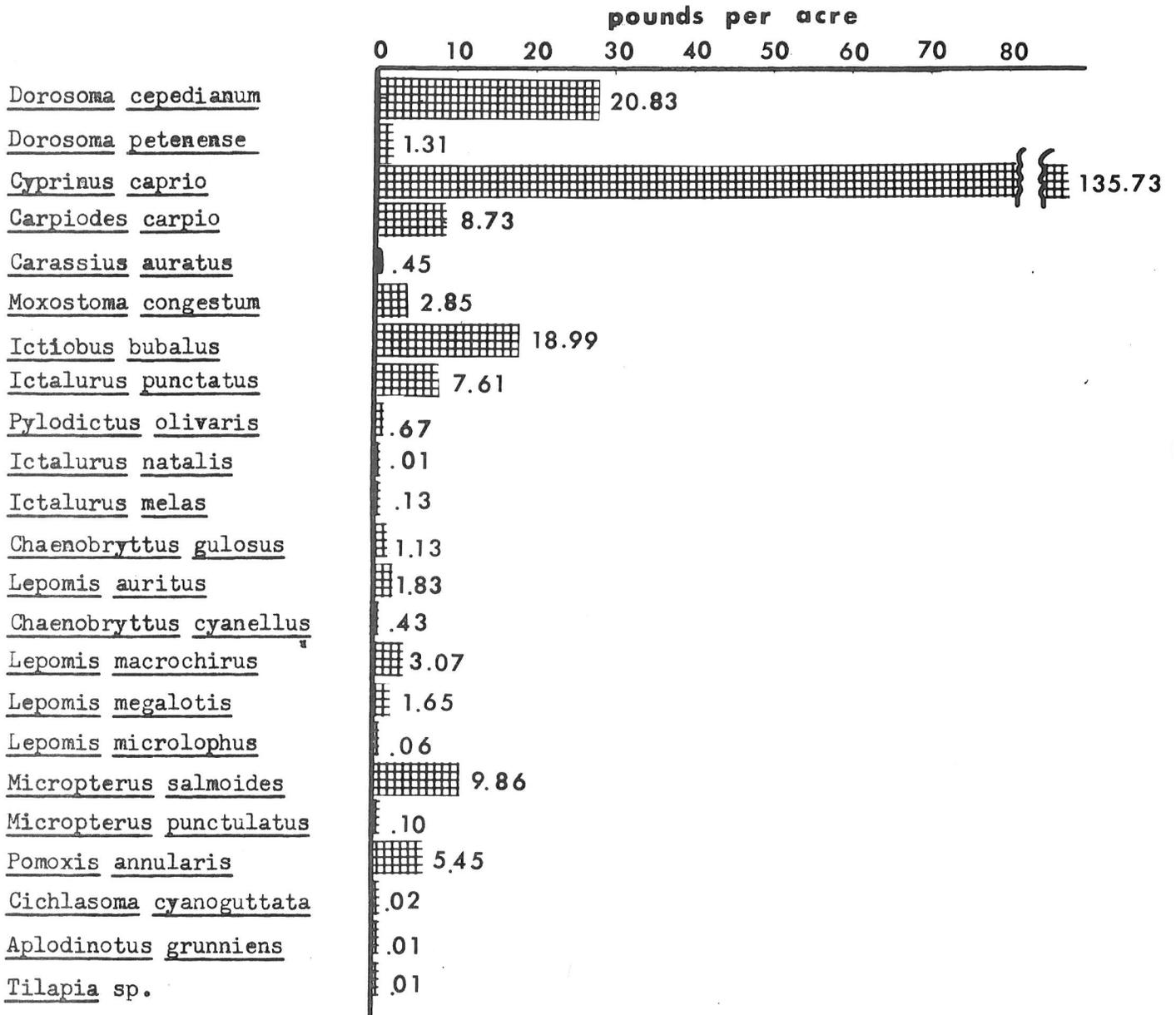
Table 6

Seining Results - Lake LBJ

Species	May		July		Sept		Totals
	Number	Number per seine haul	Number	Number per seine haul	Number	Number per seine hauls	
<u>Dorosoma cepedianum</u>	41	4.1	-	-	29	2.9	70
<u>Dorosoma petenense</u>	283	28.3	-	-	1357	135.7	1640
<u>Notropis venustus</u>	59	5.9	27	2.7	10	1.0	96
<u>Notropis lutrensis</u>	8	0.8	5	0.5	-	-	13
<u>Notropis volucellus</u>	-	-	-	-	1	0.1	1
<u>Menidia beryllina</u>	101	10.1	55	5.5	14	1.4	170
<u>Lepomis auritus</u>	12	1.2	15	1.5	7	0.7	34
<u>Lepomis macrochirus</u>	9	0.9	8	0.8	6	0.6	23
<u>Lepomis megalotis</u>	2	0.2	20	2.0	13	1.3	25
<u>Pimephales vigilax</u>	1	0.1	-	-	7	0.7	8
* <u>Pomoxis annularis</u>	1	0.1	-	-	1	0.1	2
* <u>Ictalurus punctatus</u>	4	0.4	1	0.1	2	0.2	7
* <u>Micropterus punctulatus</u>	1	0.1	1	0.1	-	-	2
* <u>Micropterus salmoides</u>	1	0.1	1	0.1	1	0.1	3
<u>Percina caprodes</u>	5	0.5	2	0.2	4	0.4	11
<u>Cyprinus carpio</u>	-	-	-	-	1	0.1	1
<u>Notemigonus crysoleucas</u>	-	-	-	-	1	0.1	1

* Denotes game species

Figure 4
COVE ROTENONE RESULTS
LAKE L.B.J.



bass contributed 9.86 pounds/acre and white crappie 5.45 pounds/acre. Water temperatures were low during this survey and only 59 percent of the tagged fish were returned.

Composite results of all surveys on Lake LBJ indicate heavy reinfestation of rough fishes since renovation in 1971. Very high populations of carp (average weight - 1.67 pounds) present the most immediate problem. Few larger carp or smallmouth buffalo have been collected but it seems inevitable that large individuals of both species will dominate the reservoir within a few years. As in other lakes of the area, overpopulations of gizzard shad remain a problem.

Only 17 largemouth bass were collected in gill netting samples and seining collections indicate what appears to be limited spawning success. Cove rotenone surveys, however, relate a population of 9.86 pounds/acre which is comparable to that of Canyon Lake. Lake LBJ has almost no cover present on the lake bottom and little vegetation is present in the warmer months of the year. This provides for little protection for young-of-the-year and, consequently low survival. It is a possibility that carp and smallmouth buffalo also play a part in poor spawning success of largemouth bass by destroying nests and prohibiting egg hatching.

Channel and flathead catfish populations seem to be acceptable and producing. Flathead catfish have made an excellent recovery since renovation and represented 4.80 percent of the catch by number and 15.94 percent by weight of the gill net collections.

A good fishery also exists for white crappie in Lake LBJ. This species represented 7.13 by number of gill net collections and reflected a standing crop of 5.45 pounds/acre.

Walleye were not collected in the cove rotenone surveys but 28 were collected in quarterly surveys. Growth rates of the 1973 stocking have conformed closely to the walleye in Canyon Lake. No walleye have been collected from the 1974 stocking but surveys will shortly be carried out to document survival.

Management Recommendations:

1. Lake LBJ has almost no bottom cover for largemouth bass and little vegetation is present during the warmer months. Some type of cover (brush shelters, stake beds, etc.) should be constructed on the lake bottom to provide shelter for the largemouth bass and other predators. These areas should be marked for utilization by anglers.
2. Lake LBJ should be lowered prior to spawning of predators and the shoreline areas planted with some type of winter grass. Subsequent raising of the water level after spawning would provide cover and food for newly hatched fry and should increase young-of-the-year survival.
3. The stocking of walleye should continue until natural reproduction is documented.

4. An additional predator is needed in Lake LBJ capable of cropping the gizzard shad and other larger rough fishes in open water. Striped bass should harvest these species and should be stocked when the fish are available.
5. Heated and lighted fishing docks should be constructed to increase angler harvest. At the present time there are few areas accessible to bank fishermen since most of the surrounding property is privately owned.

LAKE INKS

Lake Inks, located in Burnet and Llano Counties, has a surface area of 803 acres and a mean depth of 23 feet. The lake was constructed in 1938 by the Lower Colorado River Authority and impounds waters of the Colorado River immediately upstream from Lake Lyndon B. Johnson and downstream from Lake Buchanan. Impounded water is used for recreation and hydroelectric power.

Lake Inks was stocked with 4,000 northern pike fingerling in April of 1974, and 4,200 catchable Kamloop trout (6-10 inches) in May. A total of 1,000 catchable Coho salmon (6-8 inches) were also stocked in May.

The lake was surveyed quarterly this segment using 150-foot standard experimental gill nets set overnight on the bottom at ten stations. A total of 30 net-nights produced 775 fish weighing 1,584.75 pounds representing 18 species. Game species represented 24.77 percent of the catch by number and 18.75 percent by weight (Table 7). The remainder of the fish collected was comprised of six species of rough fishes (61.68 percent by number, 80.48 percent by weight) and six species of sunfishes (13.55 percent by number, .77 percent by weight). Figure 3 represents a three year trend of fish populations based on catch per unit effort of gill nets.

Gill netting results indicate very high populations of gizzard shad, river carpsucker, and smallmouth buffalo. These species represented 74.39 percent of the catch with river carpsucker having the greatest biomass.

Despite the extremely high rough fish composition, flathead catfish and channel catfish were collected with regularity in good numbers. Largemouth bass and spotted bass were also collected in numbers comparing with those of other lakes in the area although seining collections have indicated low young-of-the-year survival for the past two years.

Seining collections were made in June and July of this segment and results reflect excellent numbers of available forage (Table 8). Mississippi silversides and blacktail shiners represented the greatest numbers but threadfin shad appeared in good numbers also. No largemouth bass were collected and only four spotted bass.

Norther pike have not been collected in quarterly surveys since stocking and there have been no reports from area fishermen.

Table 7

Results of Lake Inks Gill Netting for 1974
30 Net Sets

Species	Number	Percent of Number	Weight (pounds)	Percent of Weight	Average Weight
<u>Lepisosteus osseus</u>	15	1.94	42.19	2.66	2.81
<u>Dorosoma cepedianum</u>	219	28.23	80.75	5.10	.37
<u>Cyprinus carpio</u>	9	1.16	38.32	2.42	4.26
<u>Carpiodes carpio</u>	191	24.65	774.76	48.88	4.06
<u>Ictiobus bubalus</u>	35	4.52	323.51	20.41	9.24
* <u>Morone chrysops</u>	75	9.68	116.26	7.34	1.55
* <u>Ictalurus punctatus</u>	56	7.23	47.20	2.98	.84
* <u>Pylodictus olivaris</u>	14	1.81	81.57	5.15	5.83
* <u>Micropterus salmoides</u>	16	2.06	19.87	1.25	1.24
* <u>Micropterus punctulatus</u>	28	3.61	30.56	1.93	1.09
<u>Chaenobryttus gulosus</u>	3	.39	.75	.05	.25
<u>Chaenobryttus cyanellus</u>	18	2.32	2.88	.18	.16
<u>Lepomis macrochirus</u>	66	8.52	5.69	.36	.09
<u>Lepomis microlophus</u>	5	.65	1.37	.09	.27
<u>Lepomis megalotis</u>	9	1.16	.81	.05	.09
<u>Lepomis auritus</u>	4	.52	.63	.04	.16
* <u>Pomoxis annularis</u>	3	.39	1.57	.10	.52
<u>Aplodinotus grunniens</u>	9	1.16	16.06	1.01	1.78
Totals	775	100.00	1584.75	100.00	

Percent of catch by:

	Number	Weight
Rough fish =	61.68	80.48
Game fish =	24.77	18.75
Sunfish =	13.55	.77

Catch per 100 feet of net:

	Number	Weight
Rough fish =	10.62	28.34
Game fish =	4.27	6.60
Sunfish =	2.33	.27

* Denotes game fish species

Table 8
Seining Results - Lake Inks

<u>species</u>	June		July		Totals
	Number	Number per seine haul	Number	Number per seine haul	
<u>Menidia beryllina</u>	756	75.6	36	3.6	792
<u>Notropis venustus</u>	173	17.3	58	5.8	231
<u>Notemigonus crysoleucas</u>	15	1.5	-	-	15
<u>Dorosoma petenense</u>	26	2.6	-	-	26
<u>Lepomis auritus</u>	16	1.6	24	2.4	40
<u>Lepomis macrochirus</u>	5	0.5	8	0.8	13
<u>Lepomis megalotis</u>	1	0.1	10	1.0	11
<u>Chaenobryttus cyanellus</u>	2	0.2	-	-	2
<u>Percina caprodes</u>	2	0.2	-	-	2
* <u>Micropterus punctulatus</u>	-	-	4	0.4	4

* Denotes game species

Kamloop trout and Coho salmon were introduced in the upper portions of Inks Lake near Buchanan Dam. Hydroelectric generation releases water from a depth of approximately 80 feet from Buchanan Lake providing cool water for the upper portion of Inks Lake. Project personnel collected 25 Kamloop trout three weeks after stocking, but following attempts were unsuccessful. A fisherman was observed in August that possessed five trout but this is not documented.

Management Recommendations:

1. Predators should be stocked capable of cropping larger rough fishes. At this time it is doubtful that the trend of rough fish dominance can be controlled unless the reproductive success of smallmouth buffalo, river carpsucker, and European carp can be reduced.
2. Few areas in Lake Inks have sufficient cover for largemouth bass habitat. Fish attractors should be constructed and marked to increase angler harvest.

V. Costs: \$30,000

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