SEGMENT COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-3-R-10

Fisheries Investigations and Surveys of the Waters of Region 3-B

Job No. B-19 Basic Survey of Fish Species in Lake Palestine

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ABSTRACT

Lake Palestine is a newly impounded reservoir containing 6,000 surface acres. The project was constructed by the Upper Neches River Municipal Water Authority. A year-long basic survey was conducted, using experimental type gill nets, bag seines and liquid rotenone. Fifty-one species of fish were collected, including adequate numbers of important sport and commercial species. Submerged aquatic vegetation is the only major problem foreseen in the future of the lake. Failure to properly clear certain areas of the lake of brush and timber has enabled the plants to maintain a rapid growth rate. Recommendations are made to resurvey the lake at bimonthly intervals during the coming segment.

SEGMENT COMPLETION REPORT

State of TEXAS

Project No. F-3-R-10 Name: Fisheries Investigations and Surveys of the Waters of Region 3-B.

Job No. B-19 Title: Basic Survey of Fish Species in Lake Palestine

Period Covered: February 1, 1962 - January 31, 1963

Objectives:

To gather fundamental data on this newly impounded reservoir located on the Neches River in regard to its physical, chemical and biological aspects. To determine the growth rates and food of game species stocked. To observe the influx of other fish species and to record chemical changes, if any, of the water. To observe any influx of noxious vegetation and to control same under Job S-1 if necessary.

History:

Lake Palestine is now in the second stage of a three stage project constructed by the Upper Neches River Municipal Water Authority. The project was authorized by the Texas State Board of Water Engineers on July 12, 1956. Stage one, which was the aquisition of the dam site and the engineering, was begun in 1956. Stage two, which consisted of the construction of the present dam was begun June 1, 1960, and was scheduled for completion on January 1, 1962.

The earth filled dam is located near Blackburn Crossing, which is approximately 4 miles east of Frankston. The dam has a height of 48 feet above the stream bed and a length of 4,000 feet. The upstream slope of the dam is protected from erosion by rip-rap. The dam has an uncontrolled spillway 500 feet in width. The top elevations of the dam and spillway from mean sea level are 343 feet and 322 feet, respectively.

Water was impounded in the winter of 1961-62.

Lake Palestine, at its present second stage level, covers 6,000 surface acres and 60,000 acre feet of water.

Procedure:

A collecting trip was planned each month for 10 months beginning in February, 1962. A trip was made each month with the exception of November. Data collected each month included gill netting results, seining collections, water analysis, temperature, turbidity readings and general weather conditions.

Netting Methods

Sixteen experimental type gill nets were set each month, with the exception of December, when only 14 nets were set. The nets were set at 12 random locations each month. Eight of these nets were 8 feet deep and eight were 6 feet in depth. All of the nets were 125 feet in length with mesh sizes of 1, 1½, 2, 2½ and 3 inches arranged in 25 foot sections. The nets were set in the evening and picked up the following morning. A total of 120 sets were made, consisting of 158 sets.

All netted fish were separated according to species, then counted and weighed. The game fish were individually weighed and measured for standard length. Their sexual condition and stomach contents were also recorded. Coefficients of condition ("K" factors) of the game fish were calculated. The average lengths, weights and condition factors were calculated according to species.

Seining

Seining collections were made with a 26 by 6 foot bag seine with 1/4 inch mesh and a 15 by 4 foot bag seine with 1/8 inch mesh. Seining was done at random, but old road beds leading into the lake were generally seined because they were free of brush and provided good seining collections.

Rotenone

During the months of June, July, August, September and October, liquid rotenone was applied to a small area as an additional means of collection. The rotenone was applied to the same area each month, a creek entrance on the west side of the lake approximately 1/4 mile above the dam. One quart of liquid Pro-Nox Fish was applied to each collection. The water was then agitated with outboard motors to disperse the chemical. As the fish began to surface, they were picked up with landing nets, buckets and even hands. Many specimens were also recovered from the bottom in shallow water.

The surface area treated was approximately 2000 square feet, but the creek bed formed a deep channel, thus making a relatively high number of cubic feet of water as compared to the surface area. This depth, no doubt, enabled some fish to escape the chemical by swimming out into the lake proper.

Findings:

Stocking

The following fish were put in the lake by the Tyler Fish Hatchery:

Largemouth bass (fry) (Micropterus salmoides)	750,000
Warmouth (goggle-eye) (Chaenobryttus gulosus)	10,000
Redear sunfish (Lepomis microlophus)	32,000
Redbrest sunfish (Lepomis auritus)	16,000
Black crappie (Pomoxis nigromaculatus)	5,000
Channel catfish (Ictalurus punctatus)	164,000

Fish Collections

A total of 51 species, representing 14 families was collected from lake Palestine as shown in Table 1 and Table 2.

Netting

A total of 3,263 fish made up of 29 species was collected from Lake Palestine by netting. The spotted gar (Lepisosteus oculatus) was the most numerous species netted with a total of 497 (15.23 per cent). Black bullheads (Ictalurus melas) were the second most numerous species netted. Other numerous species of rough fish netted were gizzard shad (Dorosoma cepedianum), smallmouth buffalo (Ictiobus bubalus), and bowfin (Amia calva). Rough fish are defined as any species other than those ordinarily sought by sport fishermen.

The most numerous game fish species netted was the channel catfish (Ictalurus punctatus). A total of 242 (7.42 per cent) channel catfish were caught. Their weight averaged 1.77 pounds. Table 3 gives the complete netting results for each months collection.

Table 4 indicates the condition of the more important game fish species netted from Lake Palestine. In general, the coefficient of condition ("K" factor) for each species is good. This indicates that the existing game fish populations are in good balance with their food supplies. The length and weight ranges in millimeters for each species also indicated that the growth rates are adequate.

Seining Collections

Ten seining collections were made, consisting of 115 seine drags. A total of 6,390 specimens were collected, representing 39 species. Table 5 shows the numbers of each species caught during each collection as well as the total number caught each month.

Rotenone Collections

Twenty-six species of fish were collected by the use of liquid rotenone. There were some species caught by this method that were not taken by netting or seining. Table 6 gives the methods by which each species was collected each month.

Food

Most of the fish stomachs that were examined contained some type of food. The most numerous food item found during the spring months was crayfish. Many bass and catfish stomachs contained small crayfish. This was true of the majority of bowfin stomachs also. This high frequency of crayfish was undoubtedly due to the recent flooding of the river bottom which exposed the crustaceans to the fish.

Table 1. A checklist of Lake Palestine fish species

I. Family: PETROMYZONTIDAE - lampreys
1. Ichthyomyzon castaneus - chestnut lamprey

II. Family: LEPISOSTEIDAE - gars
2. Lepisosteus oculatus - spotted gar
3. L. osseus - longnose gar

III. Family: AMIIDAE - bowfin
4. Amia calva - bowfin

IV. Family: CLUPEIDAE - herrings
5. Dorosoma cepedianum - gizzard shad

V. Family: ESOCIDAE - pickerels
6. Esox americanus - grass pickerel

VI. Family: CATOSTOMIDAE - suckers and buffalofishes
7. Ictiobus cyprinellus - bigmouth buffalo
8. I. bubalus - smallmouth buffalo
9. Carpiodes carpio - river carpsucker
10. Moxostoma poecilurum - blacktail redhorse
11. Minytrema melanops - spotted sucker
12. Erimyzon sucetta - lake chubsucker

VII. Family: CYPRINIDAE - shiners and minnows
13. Cyprinus carpio - carp
14. Notemigonus crysoleucas - golden shiner
15. Notropis atherinoides - emerald shiner
16. N. fumeus - ribbon shiner
17. N. texanus - weed shiner
18. N. potteri - chub shiner
19. N. venustus - spottail shiner
20. N. stramineus - sand shiner
21. N. volucellus - mimic shiner
22. Pimephales vigilax - parrot minnow

VIII. Family: AMEIURIDAE - freshwater catfishes
23. Ictalurus punctatus - channel catfish
24. I. melas - black bullhead
25. I. natalis - yellow bullhead
26. Pylodictis olivaris - flathead catfish
27. Schilbeodes gyrinus - tadpole madtom

IX. Family: CYPRINODONTIDAE - killifishes and topminnows
28. Fundulus chrysotus - golden topminnow
29. F. notatus - blackstripe topminnow

X. Family: POECILIIDAE - mosquitofishes
30. Gambusia affinis - mosquitofish

XI. Family: ATHERINIDAE - silversides
31. Labidesthes sicculus - brook silversides

XII. Family: CENTRARCHIDAE - black basses and sunfishes
32. Micropterus punctulatus - spotted bass
33. M. salmoides - largemouth bass
34. Chaenobryttus gulosus - warmouth
35. Lepomis cyanellus - green sunfish
36. L. punctatus - spotted sunfish
37. L. microlophus - redear sunfish
38. L. macrochirus - bluegill sunfish
39. L. auritus -redbreast sunfish
40. L. megalotis - longear sunfish
41. Pomoxis annularis - white crappie
42. Pomoxis nigromaculatus - black crappie
43. Centrarchus macropterus - flier
44. Elassoma zonatum - banded pigmy sunfish

XIII. Family: PERCIDAE - perches and darters
45. Hadropterus scierus - dusky darter
46. H. shumardi - river darter
47. Percina caprodes - logperch
48. Ammocrypta vivax - scaly sand darter
49. Etheostoma chlorosomum - bluntnose darter
50. E. gracile - slough darter

XIV. Family: SCIAENIDAE - croakers, drums and weakfishes
51. Aplodinotus grunniens - freshwater drum

Table 2. Annotated Checklist of Fish Species

1. Ichthyomyzon castaneus - chestnut lamprey. Five lampreys were collected in February and March.

2. Lepisosteus oculatus - spotted gar. The spotted gar was the most numerous species collected by netting.

3. Lepisosteus osseus - longnose gar. Only 15 longnose gar were netted.

4. Amia calva - bowfin. Large schools of young bowfin were observed and many were netted. In May there were an estimated 1,200 bowfin fingerlings collected in one seine haul.

5. Dorosoma cepedianum - gizzard shad. A good shad population is established in the lake.

6. Esox americanus - grass pickerel - Only a few of this species were taken by nets but several were collected by seining.

7. Ictiobus cyprinellus - bigmouth buffalo. Although not as numerous as the smallmouth buffalo, this species is fairly common.

8. Ictiobus bubalus - smallmouth buffalo. A large number of this species was caught during February and March. The numbers caught declined greatly but increased again in the following fall.

9. Carpiodes carpio - river carpsucker. This species was collected only during the summer months.

10. Moxostoma poecilurum - blacktail redhorse. A few of these suckers were collected during the winter.

11. Minytrema malanops - spotted sucker. Except for the buffalo, this was the most numerous sucker collected.

12. Erimyzon sucetta - lake chubsucker. A large number of chubsuckers were netted in December.

13. Cyprinus carpio - carp. Although netted consistantly, most of the carp were caught during the summer months.

14. Notemigonus crysoleucas - golden shiner. A few golden shiners were netted but the majority was collected by seining.

15. Notropis atherinoides - emerald shiner. This species was collected during the month of March.

16. Notropis fumeus - ribbon shiner. The ribbon shiner was collected in February and April.

17. Notropis texanus - weed shiner. This shiner was collected in June with rotenone.

18. Notropis potteri - chub shiner. The chub shiner was collected in May.

19. Notropis venustus - spottail shiner. This was the most commonly collected shiner.

20. Notropis stramineus - sand shiner. The sand shiner was collected in winter and spring.

21. Notropis volucellus - mimic shiner. The mimic shiner was collected on three trips.

22. Pimephales vigilax - parrot minnow. This species was taken in February and May.

23. Ictalurus punctatus - channel catfish. The channel catfish was the most numerous game fish collected.

24. Ictalurus melas - black bullhead. One hundred and sixty black bullheads were netted in December, which was the largest number collected in one month.

25. Ictalurus natalis - yellow bullhead. Although not as numerous as the black bullhead, this species was netted consistantly.

26. Pylodictis olivaris - flathead catfish. A total of twelve flatheads was taken during the year.

27. Schilbeodes gyrinus - tadpole madtom. One madtom was collected in September with rotenone.

28. Fundulus chrysotus - golden topminnow. This species was collected on three occasions.

29. Fundulus notatus - blackstripe topminnow. The blackstripe topminnow is common in the lake.

30. Gambusia affinis - mosquitofish This species was collected rather consistently.

31. Labidesthes sicculus - brook silversides. This species was collected by both seining and rotenone.

32. Micropterus punctulatus - spotted bass. All of the spotted bass caught were in very good condition.

33. Micropterus salmoides - largemouth bass. This important game fish species is growing rapidly and is very numerous.

34. Chaenobryttus gulosus - warmouth. A total of forty-one warmouths was netted.

35. Lepomis cyanellus - green sunfish. This species, collected during the summer, is rather scarce.

36. Lepomis punctatus - spotted sunfish. Only twenty-one spotted sunfish were collected.

37. Lepomis microlophus - redear sunfish. Only eight redear were caught.

38. Lepomis macrochirus - bluegill sunfish. This was the most numerous sunfish collected.

39. Lepomis auritus - redbreast sunfish. The redbreast sunfish was collected on occasions.

40. Lepomis megalotis - longear sunfish. Only a few of this species were collected.

41. Pomoxis annularis - white crappie. A total of nine white crappie was netted.

42. Pomoxis nigromaculatus - black crappie. This species was netted consistently in small numbers; however, several hundred fingerlings were collected with rotenone.

43. Centrarchus macropterus - flier. This species was collected in large numbers during May and June.

44. Elassoma zonatum - banded pigmy sunfish. This species was collected in small numbers during the winter months.

45. Hadropterus scierus - dusky darter. Only one dusky darter was collected.

46. Hadropterus shumardi - river darter. Thirty-five river darters were collected in April.

47. Percina caprodes - log perch. One specimen of this species was collected with rotenone.

48. Ammocrypta vivax - scaly sand darter. Twenty scaly sand darters were collected.

49. Etheostoma chlorosomum - bluntnose darter. Seven of this species were collected in February.

50. Etheostoma gracile - slough darter. Sixty-five slough darters were seined in May.

51. Aplodinotus grunniens - freshwater drum. This species was netted each month except December.

Table

RESULTS OF NETTING COLLECTIONS ON LAKE PALESTINE

Species	February		March		April		May		June		July		August		September		October		December		Total	
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
* Chestnut Lamprey	3	0.06	2	0.06																	5	0.12
* Spotted gar			3	11.62	11	14.13	10	21.33	5	7.50	16	37.00	155	95.56	190	137.69	54	47.50	3	3.25	447	375.58
* Longnose gar			4	7.00	2	3.44	4	10.25	1	0.75	2	1.00					1	1.19	1	1.56	15	25.19
* Bowfin	7	35.00	6	35.62	3	14.62	3	16.25	63	22.37	35	12.31	24	17.13	34	35.31	19	21.89	3	3.25	197	213.75
* Gizzard shad	2	1.56	40	37.00	12	10.19	48	46.62	27	27.94	8	5.00	29	20.89	75	37.37	43	17.25	30	4.00	314	207.82
* Grass pickerel							1	0.33	1	0.25											2	0.58
* Bigmouth buffalo	10	22.87	10	31.06	1	12.19									17	10.56			3	6.50	41	83.18
* Smallmouth buffalo	57	137.81	38	88.12	8	15.62	2	10.25	1	2.00	1	3.62	20	6.88	44	25.31	87	76.27	36	35.12	294	401.00
* River carpsucker									2	0.62	12	1.56	9	2.81							23	4.99
* Blacktail redhorse	34	62.18	13	17.50							1	0.94									48	80.62
* Spotted sucker	53	84.93	27	32.75	5	4.31	5	5.06	16	20.00	2	2.50	15	17.63	4	6.62	5	9.00	36	41.00	168	223.80
* Lake chubsucker	2	0.62									1	0.62					7	1.50	64	15.37	74	18.11
* Carp			2	8.25	1	3.75	1	4.06	9	8.19	47	24.87	52	62.39	12	20.00	13	23.92	20	44.68	157	200.11
* Golden shiner			3	0.44	3	0.31	2	0.31					1	0.13	1	0.19	1	0.19	11	1.75	22	3.32
Channel catfish	25	32.37	4	8.00	15	28.00	56	108.00	39	56.31	19	41.07	25	40.25	36	67.00	15	24.88	8	21.62	242	427.50
* Black bullhead			5	4.75	1	2.00	9	4.50	21	11.56	25	12.00	6	4.06	33	5.94	62	11.38	160	40.76	322	96.95
* Yellow bullhead	2	2.00	2	2.62	3	6.50	1	0.50	4	2.62	10	10.00	9	7.81	13	8.50	29	13.63	28	19.50	101	73.68
Flathead catfish							2	7.25	2	2.69	3	10.38			4	15.94	1	1.37			12	37.63
Spotted bass			2	3.00			10	12.75	12	12.50	8	9.12	5	5.56	5	5.75	7	6.87			49	55.55
Largemouth bass	1	2.25			1	2.50	5	7.44	22	21.75	52	12.19	26	16.75	90	59.75	16	11.87	12	13.37	225	147.87
Warmouth	4	1.12					11	4.00	34	12.37	4	1.75	4	1.13	3	1.13	3	1.14			63	22.64
Green sunfish											1	0.19									1	0.19
Spotted sunfish							2	0.33	7	1.75	3	0.31	8	1.26	1	0.13					21	3.78
Redear sunfish					1	0.44			5	1.25			1	0.44			1	0.25			8	2.38
Bluegill sunfish	1	0.37			1	0.31	17	6.69	44	11.69	27	5.50	37	7.63	11	2.37	27	6.63	3	0.75	168	41.94
Redbreast sunfish					1	0.25	4	1.33	30	8.62	2	0.25			3	0.56	3	0.77	1	0.25	44	12.03
Longear sunfish					1	0.31			6	1.50											7	1.81
White crappie									2	2.81			5	3.81			2	0.75			9	7.37
Black crappie			1	0.50	1	0.25	3	2.00	9	2.88	3	1.19	4	1.25	7	1.56	9	2.16	13	1.19	50	12.98
* Freshwater drum	23	26.24	23	21.44	5	7.62	15	25.62	6	9.25	5	8.82	1	1.44	3	7.94	7	14.91			88	123.28
Total Numbers	224		185		76		211		368		287		436		586		412		432		3,217	
Total Weight		409.38		309.73		126.74		294.87		249.17		202.19		314.81		449.62		295.32		253.92		2,905.75
Game Fish	31	36.11	7	11.50	21	32.06	101	149.79	212	136.12	122	81.95	115	78.08	160	154.19	84	56.69	37	37.18	890	773.67
Rough Fish	193	373.27	178	298.23	55	94.68	110	145.08	156	113.05	165	120.24	321	236.73	426	295.43	328	238.63	395	216.74	2,327	2,132.08
Per cent game fish	13.84	8.82	3.78	3.71	27.63	25.30	47.87	50.80	57.61	54.63	42.51	40.53	26.38	24.80	27.30	34.29	20.39	19.19	8.56	14.64	27.67	26.63
Per cent rough fish	86.16	91.18	96.22	96.29	72.37	74.70	52.13	49.20	42.39	45.37	57.49	59.47	73.62	75.20	72.70	65.71	79.61	80.81	91.44	85.36	72.33	73.37

*Rough fish

Table 4. Data on condition of some game fish from Lake Palestine

Species	Number	Standard Length Range (millimeter)	Average Standard Length	Weight Range (grams)	Average Weight	"K" Range	Average "K"
Channel catfish (Ictalurus punctatus)	210	196 - 490	343	112 - 2693	853	1.15-2.73	1.88
Flathead catfish (Pylodictis olivaris)	9	273 - 465	375	340 - 2455	1164	1.67-2.47	1.97
Spotted bass (Micropterus punctulatus)	35	198 - 323	253	245 - 1191	543	1.84-4.03	3.26
Largemouth bass (M. salmoides)	99	137 - 410	201	72 - 2268	270	1.93-3.66	2.78
Warmouth (Chaenobryttus gulosus)	41	102 - 190	148	40 - 282	158	3.18-5.50	4.42
Bluegill sunfish (Lepomis macrochirus)	59	90 - 164	129	32 - 250	126	3.47-7.14	5.32
Yellowbelly sunfish (Lepomis auritus)	24	95 - 145	124	35 - 218	116	5.27-7.15	5.76
White crappie (Pomoxis annularis)	5	185 - 242	219	205 - 390	325	2.75-3.23	3.04
Black crappie (Pomoxis nigromaculatus)	45	95 - 235	157	22 - 382	150	2.08-4.50	3.31

Table 5. Tabulation of seining collections from Lake Palestine

Species	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sept.	Oct.	Dec.	Total
Spotted gar				1							1
Bowfin			2	1,265*							1,267*
Gizzard shad						4	6				10
Grass pickerel	10	27	37	26	3	2		1	1	1	108
Bigmouth buffalo					1						1
River carpsucker				12	1						13
Lake chubsucker					1						1
Carp					1						1
Golden shiner	2			89							91
Emerald shiner		5									5
Ribbon shiner	10		8								18
Chub shiner				68							68
Spottail shiner	26	41	185		4	6	51	3	63	2	381
Sand shiner	567		11	659	4						1,241
Mimic shiner	8		5								13
Parrot minnow	1			2							3
Black bullhead									1		1
Yellow bullhead				17	1						18
Golden topminnow	4	5			1						10
Blackstripe topminnow	18	2	75	20	3	36	63	13			230
Mosquito fish	331	505	261	33		1		1		1	1,133
Brook silversides		5		21						23	49
›tted bass				8	11	6	1	1			27
Largemouth bass				406	95	38	7	7	4	2	559
Warmouth	1									2	3
Green sunfish								5			5
Spotted sunfish	6		53				4	1			64
Redear sunfish	1				19	20	4	3		1	48
Bluegill sunfish	5	10		3			6	1	11	23	59
Redbreast sunfish				12	5						17
White crappie				2							2
Black crappie			133	9	2						144
Flier			524	101							625
Banded pigmy sunfish	12	5	10	11						2	40
Dusky darter		1									1
River darter	6		35								41
Scaly sand darter	17			3							20
Bluntnose darter	7										7
Slough darter				65							65
Total No.	1,032	606	1,339	2,833	152	113	142	36	80	57	6,390
No. of seine drags	12	14	13	13	8	15	13	9	9	9	115

* denotes estimated number

Table 6. A checklist of Lake Palestine fish species showing methods of collection

Species	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sept.	Oct.	Dec.	Times Coll.
Chestnut lamprey	N	N									2
Spotted gar		N	N	NS	N	N	N	N	N	N	9
Longnose gar		N	N	N	N	N			N	N	7
Bowfin	N	N	NS	NS	NR	NR	NR	N	N	N	10
Gizzard shad	N	N	N	N	NR	NSR	NSR	NR	NR	N	10
Grass pickerel	S	S	S	NS	NSR	S	R	SR	S	S	10
Bigmouth buffalo	N	N	N		SR			N		N	6
Smallmouth buffalo	N	N	N	N	N	N	NS	N	N	N	10
River carpsucker				S	NSR	N	N				4
Blacktail redhorse	N	N			N						3
Spotted sucker	N	N	N	N	NR	N	N	N	N	N	10
Lake chubsucker	N				S	N			N	N	5
Carp		N	N	N	NSR	N	N	N	N	N	9
Golden shiner	S	N	N	NS	R		N	N	N	N	9
Emerald shiner		S									1
Ribbon shiner	S		S								2
Weed shiner					R						1
Chub shiner				S							1
Spottail shiner	S	S	S		S	S	S	S	S	S	9
Sand shiner	S		S	S	S						4
Mimic shiner	S		S		R						3
Parrot minnow	S			S							2
Channel catfish	N	N	N	N	N	N	N	N	N	N	10
Black bullhead		N	N	N	N	N	N	N	NS	N	9
Yellow bullhead	N	N	N	NS	NSR	N	N	N	N	N	10
Flathead catfish				N	N	N		N	N		5
Tadpole madtom								R			1
Golden topminnow	S	S			S						3
Blackstripe topminnow	S	S	S	S	S	S	S	SR			8
Mosquito fish	S	S	S	S	R	S		S		S	8
Brook silversides		S		S				R		S	4
Spotted bass		N		NS	NSR	NS	NSR	NS	N		7
Largemouth bass	N		N	NS	NSR	NS R	NSR	NSR	NSR	NS	9
Warmouth	NS			N	N	N	N	N	N	S	8
Green sunfish					R	N	SR	R			4
Spotted sunfish	S		S	N	N	N	NS	NSR			7
Redear sunfish	S		N		NS	S	NS	S	N	S	8
Bluegill sunfish	NS	S	N	NS	NR	N	NS	NS	NSR	NS	10
Redbreast sunfish			N	N	NS	NS		N	N	N	7
Longear sunfish			N		N						2
White crappie				S	NR		N		N	N	5
Black crappie		N	N	NS	NSR	NS	NSR	NR	N	N	9
Flier			S	S	R		R	R			5
Dusky darter		S			R						2
River darter	S		S								2
Logperch					R						1
Scaly sand darter	S			S							2
Bluntnose darter	S										1
Slough darter			S								1
Freshwater drum	N	N	N	N	N	N	N	N	N		9
Total No. of species	29	26	30	31	39	27	25	29	24	24	

N denotes species taken by netting
S denotes species taken by seining
R denotes species taken by rotenoning

Seining collections and stomach analysis indicate that there is also a good supply of forage fish in Lake Palestine. Many game fish stomachs contained various types of fish remains.

Game and Rough Fish Ratio

During the year, 13 game fish species and 17 rough fish species were netted. Out of 3,217 individual specimens collected, 890 were game fish and 2,327 rough fish. By per cent this was 27.67 per cent game fish and 72.33 per cent rough fish. The percentage by weight ran almost identical to the per cent by number, being 26.63 per cent game fish and 73.37 per cent rough fish.

From the large numbers of largemouth bass and black crappie fry seined and netted during the spring and summer months there is a good indication that a heavy natural stocking of the lake was in progress. Although bass and crappie fry were released only at the State Highway 155 crossing by hatchery personnel, good seining collections were made on practically the same dates on all areas of the lake. This would indicate that the fish collected by seining were natural rather than hatchery stock.

Fishing Success

Lake Palestine was officially opened to the public for fishing during the early part of the summer, 1962. Fishing pressure has increased throughout the summer and fall.

Bass fishing has been very good and many fishermen caught their limits of the yearling largemouths. In fact, for awhile, limit catches were the rule instead of the exception.

Several trotline fishermen also reported good catches of channel catfish.

The data compiled in this report indicates that large populations of largemouth bass and channel catfish are now established in the lake. With the rapid growth rates both species are maintaining, fishing should improve even more in the near future. Table 7 consists of the individual standard lengths in millimeters of some largemouth bass chosen at random. The average monthly increase in length indicates the rapid growth this species has maintained.

Public access to the lake is only fair. There is only one permanent boat launching ramp, which is located at the dam. At its present second stage level, the lake has numerous dirt roads leading to it which make natural boat launching sites. However, when the much larger third stage reservoir is completed, the majority of these roads will be completely submerged.

Water Quality

Analysis of surface water samples from Lake Palestine indicates that the water quality is fairly stable. The water is moderately acid, but about normal in alkilinity and chlorides. The water was generally clear throughout the year but contained a brown stain, evidently from the newly flooded timber and leaves. Table 8 contains data for each months water analysis.

Table 7. Standard lengths (millimeters) of individual largemouth bass from Lake Palestine

May	June	July	August	September	October	December
69	113	67	220	235	225	352
61	113	138	225	274	215	272
64	107	140	190	220	235	257
61	110	146	220	219	240	257
63	112	132	200	212	230	255
82	200	177	255	230	240	256
64	100	142	200	230	250	256
64	112	78	155	232	245	240
62	82	75	155	230	220	240
68	92	75	205	215	235	235
49	77	83	210	230		224
58	94	73	170	211		238
63	92	77	205	226		
51	87	77	180	208		
49	81	72	209	210		
54	70	73	215	228		
63	69	71	210	220		
49	63	55	192	207		
57	66	64	205	215		
46	58	64	202	222		
46	55	56	190	220		
42	47	63	201	218		
56		60	210	231		
58		63	204	237		
58		50	200	228		
51		102	198			
63		58	168			
47		65				
48		60				
55		47				
55		71				
Ave. Length (mm.) 57.29	86.36	83.03	199.78	224.32	233.50	256.83

Average Monthly Increase - 32.56 millimeters

Table 8. Data on surface water analysis from Lake Palestine

	February	March	April	May	June	July	August	September	October	December	Average
pH	6.4	6.6	7.0	6.8	6.8	6.8	7.0	6.6	6.8		6.8
Alkalinity (M.O.)p.p.m.	22	24	35	35	46	30	36	35	30		32.5
Chlorides p.p.m.	49.64	42.55	49.64	35.46	35.46	35.46	35.46	35.46	35.46		39.39
Water Temperature ^{O}F	59	45		76	90	86	86	82	76	49	72
Air Temperature ^{O}F	70	46		75	90	90	90	85	65	56	74
Turbidity (inches) (Secchi Disk)	48	40	74	30	24	26	32	36	36	52	40

pH range 6.4 - 7.0

Alk. range 22 - 46

Cl. range 35.46 - 49.64

Turbidity range 24 - 74

Water Temp. range 45 - 90

Air Temp. range 46 - 90

Vegetation

Submerged aquatic vegetation is soon to be a major problem on Lake Palestine. During August of 1962 filamentous algae (Cladophora sp.) was observed in many areas of the lake and by September other forms of submerged vegetation were becoming well established. In December navigation by outboard powered boats was very difficult in some areas due to the thick "moss". These areas of thick infestation are largely in those areas that were not cleared of timber and brush and in the few areas where some of the timber was cut but left laying where it fell.

Boat operation in all areas of this lake is hazardous, even in the area designated for skiing, due to submerged obstacles. If clearing of timber is to be limited by economics then the clearing should be done from the shoreline out toward the middle of the lake instead of clearing a strip down the middle and leaving the edges standing. Contrary to popular belief, netting records indicate that more fish are taken in open water than in the protected areas.

That area of the upper end of Lake Palestine where State Highway 155 crosses is a prime example of poor management. The natural brush was untouched and hence there has been a build up of Lemna minor to an extent that it looks like a green carpet as far as the eye can see, which actually isn't very far. This area is completely lost to fishing from the shore and also by boat because it is impossible to get a boat through the thick brush.

Aquatic vegetation found in Lake Palestine is as follows:

Duck weed	Lemna minor
Coontail	Ceratophylum demersum
Bladderwort	Utricularia sp.
Pondweed (narrow and broad leaf)	Potomogeton sp.
Filamentous algae	Cladophora sp.

To this date there has been no emergent vegetation observed other than black willow (Salix niger).

Conclusions and Recommendations:

Considering the data compiled during this survey, Lake Palestine should support a good sport fishery and a good commercial fishery as well. (Most of the lake is closed to commercial fishing). The water quality of the lake is adequate and there is a good supply of forage fish available.

It is recommended that this lake be surveyed bimonthly during the next segment in order to maintain an accurate record of the lakes progress.

It is evident that aquatic vegetation is going to become a major problem in Lake Palestine.

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Asst. Project Leader

Approved by Marion Toole
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Date November 6, 1963

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Figure 1. Young bowfin collected by seining. Note ruler for size comparison.

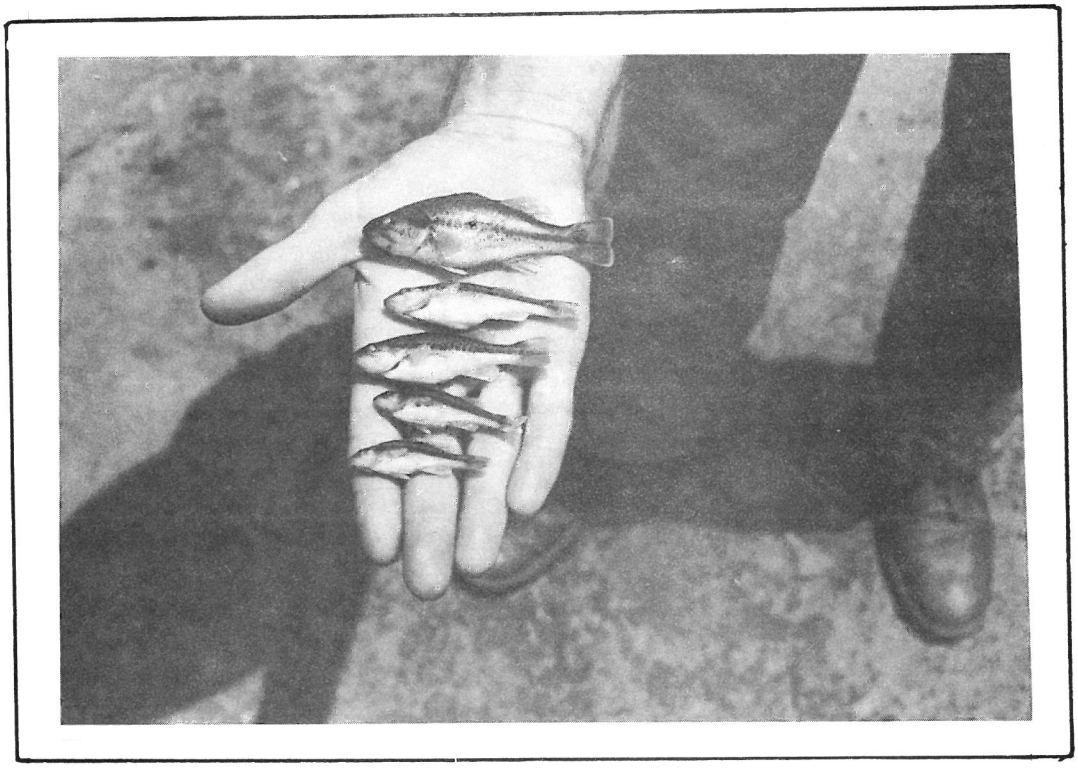

Figure 2. Note the good condition of these largemouth bass fry.

Figure 3. Typical example of heavy timber and brush left standing in the lake.

Figure 4. Good fly fishing territory!

(All Photos by John N. Dorchester)