SEGMENT COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-3-R-11

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

Job No. B-19 (Seg. 2) Basic Survey of Fish Species in Lake Palestine

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ABSTRACT

Six collections were made on Lake Palestine during this segment. The resulting data showed that the game fish population has dropped since 1962. The black crappie however is one game fish species that is increasing rapidly in number and size.

Aquatic vegetation is becoming excessive in the upper half of the reservoir and from all indications it will continue to be a problem in conjunction with the submerged timber and brush that was not cleared from the lake bed before impoundment.

It is recommended that a better clearing technique be applied before the impoundment of the proposed third stage of the reservoir. It is also recommended that this job be continued as quarterly collections during the coming segment to maintain accurate data on the lake's progress.

SEGMENT COMPLETION REPORT

State of Texas

Project No. F-3-R-11 Name: Fisheries Investigations and Surveys of the Waters of Region 3-B.

Job No. B-19 (Seg. 2) Title: Basic Survey of Fish Species in Lake Palestine.

Period Covered: February 1, 1963 - January 31, 1964

OBJECTIVES:

1. To determine gross changes in fish populations.
2. To determine the growth rate and food of game species stocked.
3. To determine chemical changes.
4. To observe the influx of vegetation and to recommend control of noxious species.

HISTORY:

Lake Palestine is a 6,000 surface acre reservoir on the Neches River. The dam is located at Blackburn's Crossing approximately 4 miles east of Frankston. Water was impounded in the winter of 1961-62.

TECHNIQUES USED:

In 1962, a collection was made each month during the segment with the exception of November. During the 1963 segment bimonthly surveys were made. Data collected included gill netting results, seining collections, water analysis, temperature checks, turbidity readings and general weather conditions.

Netting Methods

Fourteen experimental type floating gill nets were set for each collection. The nets were set at twelve random locations. Eight of the nets were 6 feet deep and six were 8 feet in depth. All of the nets were 125 feet in length with mesh sizes ranging from 1- to 3-inches. The nets were set in the evening and picked up the following morning. A total of six collections was made this segment, consisting of 84 nets.

All netted fish were separated according to species, counted and weighed. The game fish were individually weighed and measured for standard length. Sexual conditions and stomach contents were 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 due to heavy brush along most of the shoreline many clear areas were seined repeatedly.

Stocking

In March 1963, 46 white bass (Roccus chrysops)from Caddo Lake were released in Lake Palestine at the Highway 155 bridge. The sexual ratio was 15 females and 31 males. The right pelvic fin was clipped on all of the bass for identification. To date none of these fish have been recaptured.

Fish Collections

A total of 38 species representing 13 families was collected this year from Lake Palestine. In the 1962 collections, 51 species were taken, representing 14 families.

One new species, the taillight shiner (Notropis maculatus), was collected this year. Table 1 is a complete check list covering both segments.

Netting

A total of 2,348 fish consisting of 26 species was taken from Lake Palestine by netting. Twelve of these species were game fish.

The most numerous game fish netted was the black crappie (Pomoxis nigromaculatus). This species has increased rapidly as only 50 were netted in the eleven collections during the 1962 segment as compared to 139 taken in the six collections of 1963.

The number of other important game fish species collected during this segment is lower than the 1962 figures. Two hundred and forty-two channel catfish (Ictalurus punctatus) were netted during the 1962 segment as compared to 62 taken this segment. Two hundred and twenty-five largemouth bass (Micropterus salmoides) were caught in 1962 and only 43 were netted in 1963-64.

The total per cent of game fish taken dropped from 27.67 per cent in 1962 to 17.36 per cent this segment. Table 2 is a graph showing the per cents of game fish numbers taken in 1962 and 1963. A seasonal increase is obvious for both years during the summer months. The highest game fish percentage to date was collected in May 1962.

Table 3 contains netting data for each species taken in 1963. Total numbers and weights are listed for each species, as are their respective per cents. Total numbers and weights for each collection is listed also.

Table 4 gives a comparison of the average "K" factors for several game fish species taken during both segments. The regional "K" is also listed for each species. In general, the Lake Palestine fish are above this average.

Many small gizzard shad (Dorosoma cepedianum) were found in the stomachs of game fish examined during this segment. The most prevalent food item found in 1962 was crayfish. Evidently the flooding of the river bottom during the lakes impoundment exposed a large number of the crustaceans to fish. Now the crayfish are found less frequently and forage fish have become the principal food item.

Fishing pressure has continued to increase on Lake Palestine although bass fishing has not been as successful this segment as it was in the summer of 1962. Several fishermen have reported good catches of catfish, both channel cat and flathead cat (Pylodictis olivaris). Crappie fishing should continue to improve as this species is increasing in both numbers and size.

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. *N. maculatus* - taillight shiner
23. *Pimephales vigilax* - parrot minnow

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

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

Table 1. A checklist of Lake Palestine Fish Species (continued)

X. Family: POECILIIDAE - Mosquitofishes
31. Gambusia affinis - mosquitofish

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

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

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

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

Table 2. Comparison of Percentages of Game Fish Collected in Lake Palestine, 1962 and 1963.

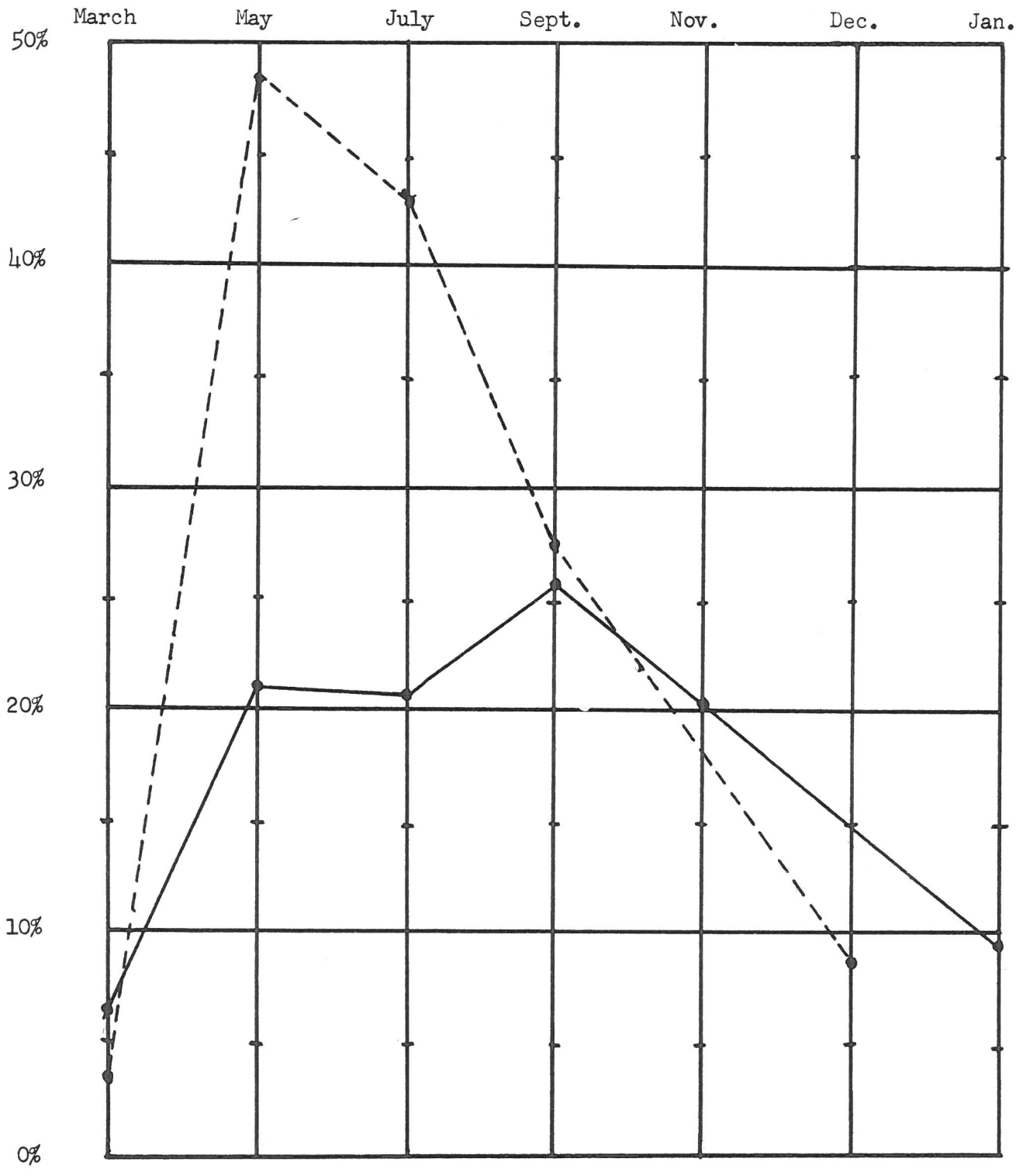

Table 3. Lake Palestine Netting Data

Species	March		May		July		Sept.		Nov.		Jan.		Totals		Per cents	
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
* Spotted gar	20	19.06	46	66.38	61	73.06	52	68.00	3	3.50	0	0	182	230.00	7.75	12.36
* Longnose gar	1	1.50	0	0	0	0	0	0	0	0	0	0	1	1.50	.04	.08
* Bowfin	29	41.00	16	25.81	5	9.94	4	3.62	5	17.00	5	21.88	64	119.25	2.72	6.41
* Gizzard shad	161	52.75	142	22.93	74	18.00	58	15.07	71	16.00	87	21 79	593	146.54	25.26	7.87
* Grass pickerel	0	0	0	0	0	0	0	0	1	.25	0	0	1	.25	.04	.01
* Smallmouth buffalo	45	35.88	12	16.62	16	30.75	19	44.06	29	87.69	39	118.75	160	333.75	6.81	17.94
* Bigmouth buffalo	28	39.75	2	4.19	2	4.44	9	20.56	5	17.12	4	17.12	50	103.18	2.13	5.55
* Spotted sucker	7	6.06	10	8.31	13	9.62	16	16.38	23	28.75	99	133.45	168	202.57	7.16	10.89
* Chubsucker	71	19.94	2	.57	1	.25	2	.75	7	2.25	35	18.81	118	42.57	5.02	2.28
* Carp	9	34.69	5.	14.38	6	20.69	1	9.50	5	18.00	4	15.06	30	112.32	1.28	6.04
* Golden shiner	7	1.31	0	0	1	.31	0	0	3	.44	7	.81	18	2.87	.77	.16
Channel cat	5	29.00	27	57.13	9	35.50	9	26.19	11	32.06	1	.88	62	180.76	2.64	9.72
* Black bullhead	192	30.37	57	12.19	16	4.93	16	5.50	37	16.00	146	77.94	464	146.93	19.76	7.89
* Yellow bullhead	31	16.62	15	4.19	14	6.12	14	7.00	26	14.88	27	20.00	127	68.81	5.41	3.70
Flathead cat	1	3.13	2	5.81	2	10.75	2	10.06	0	0	0	0	7	29.75	.30	1.60
Spotted bass	3	3.44	0	0	0	0	0	0	0	0	0	0	3	3.44	.13	.19
Largemouth bass	17	17.63	4	2.81	0	0	2	1.19	2	1.00	18	14.69	43	37.32	1.83	2.00
Warmouth	1	.31	6	1.69	3	1.19	4	1.38	0	0	0	0	14	4.57	.60	.25
Redear sunfish	0	0	4	1.81	0	0	1	.62	0	0	0	0	5	2.43	.21	.13
Redbreast sunfish	0	0	1	.31	0	0	2	.50	1	.50	0	0	4	1.31	.17	.07
Bluegill sunfish	8	1.19	21	6.94	29	6.88	9	2.50	7	2.06	0	0	74	19.57	3.15	1.05
Spotted sunfish	0	0	3	.81	0	0	0	0	1	.06	0	0	4	.87	.17	.05
White crappie	1	.88	0	0	0	0	1	1.37	1	.88	00	0	3	3.13	.13	.17
Black crappie	12	1.25	15	2.38	13	2.12	38	13.12	32	11.00	29	9.81	139	39.68	5.92	2.13
Flier	0	0	2	.19	0	0	0	0	0	0	0	0	2	.19	.08	.01
* Freshwater drum	0	0	3	6.19	3	5.62	3	9.57	3	5.56	0	0	12	26.94	.52	1.45
Totals	649	355.76	395	261.64	268	240.17	262	256.94	273	275.00	501	470.99	2348	1860.50	100.00	100.00
Game fish	48	56.83	85	79.88	56	56.44	68	56.93	55	47.56	48	25.38	360	323.02		
Rough fish	601	298.93	310	181.76	212	183.73	194	200.01	218	227.44	453	445.61	1988	1537.48		
Per cent game fish	7.39	15.97	21.52	30.53	20.89	23.50	25.95	22.16	20.15	17.29	9.58	5.39	15.33	17.36		
Per cent rough fish	92.61	84.03	78.48	69.47	79.11	76.50	74.05	77.84	79.85	82.71	90.42	94.61	84.67	82.64		

* rough fish

Table 4. Data on Condition of Some Game Fish Species from Lake Palestine

Species	1963 No.	1963 Average "K"	1962 No.	1962 Average "K"	Regional "K" Average
Channel catfish	65	1.92	210	1.88	1.70
Flathead catfish	7	2.02	9	1.97	2.03
Spotted bass	3	3.25	35	3.26	2.55
Largemouth bass	44	2.70	99	2.78	2.72
Warmouth	12	4.24	41	4.42	4.10
Bluegill sunfish	54	4.63	59	5.32	4.38
Redbreast sunfish	3	4.85	24	5.76	-
White crappie	3	3.30	5	3.04	3.03
Black crappie	104	3.28	45	3.31	3.34

Seining Collections

Six random seining collections were made, consisting of 59 seine drags. A total of 3,313 specimens were collected, representing 25 species. Table 5 contains the number of each species taken during each collection. A total figure of the 1962 collections is listed for comparison.

Water Quality

Table 6 contains water analysis data for each collection made this year. The average data for the two segments indicates little variation in the water quality of the lake.

Vegetation

Excessive aquatic vegetation is becoming an increasing problem on Lake Palestine. During the summer of 1963 the shallow areas of the upper portion of the lake became choked with various types of plants. The most numerous species included coontail (Ceratophylum demersum), filamentous algae (Cladophora sp.), bladderwort (Utricularia sp.), pondweed (Potamogeton sp.) and duck weed (Lemna minor). Heavy mats of floating heart (Nymphoides sp.) infested the area around the Highway 155 bridge.

Boat operation continues to be hazardous in all parts of the lake due to the vast amount of submerged brush and timber that was cut but not removed or burned prior to impoundment.

It is strongly recommended that a more satisfactory type of clearing be conducted before the proposed third stage of this reservoir is completed. If it is not economically feasible to clear all of the additional impoundment area, an effort should be made to clear the shoreline and burn or bury all brush and timber.

Table 5. Tabulation of Seining Collections from Lake Palestine

Species	1962-63 Total	1963-64 Mar.	May	July	Sept.	Nov.	Jan.	Total
Spotted gar	1		1					1
Bowfin	1,267							
Gizzard shad	10			4		1		5
Grass pickerel	108	2						2
Bigmouth buffalo	1							
River carpsucker	13							
Lake Chubsucker	1					2		2
Carp	1							
Golden shiner	91		41	3	1	19	2	66
Emerald shiner	5							
Ribbon shiner	18							
Chub shiner	68							
Spottail shiner	381		7	5		6		18
Sand shiner	1,241		48	39	44	2	21	154
Mimic shiner	13							
Taillight shiner			1					1
Parrot minnow	3							
Black bullhead	1				208			208
Yellow bullhead	18		2					2
Tadpole madtom					2			2
Golden topminnow	10			1		1		2
Blackstripe topminnow	230	2	6	56	65	34		3
Mosquito fish	1,133		38	12	336	382	4	772
Brook silversides	49	2	39	102	9	86	17	255
Spotted bass	27		1	1				2
Largemouth bass	559		27					27
Warmouth	3				1			1
Green sunfish	5							
Spotted sunfish	64		14	21	70	20		125
Redear sunfish	47		1	5	42	54	8	110
Bluegill sunfish	59	2	197	323	146	175	538	1,381
Redbreast sunfish	17							
White crappie	2							
Black crappie	144		2	2	2			6
Flier	625							
Banded pigmy sunfish	40							
Dusky darter	1							
River darter	41							
Logperch					1	1		2
Scaly sand darter	20				1			1
Bluntnose darter	7							
Slough darter	65		3		2			5
Totals	6,389	8	428	574	930	783	590	3,313
Number of seine drags	115							

Table 6. Data on Surface Water Analysis From Lake Palestine

	March	May	July	Sept.	Nov.	Jan.	Averages 1963	1962
pH	6.8	6.8	7.0	7.2	-	7.0	6.9	6.8
Alkalinity (methyl orange)	25	28	50	73	-	18	38.80	32.50
Chlorides	42.55	42.55	35.46	49.64	-	21.28	38.29	39.39
Air temp. ^{o}F	61	88	89	84	53	55	71	74
Water temp. ^{o}F	62	79	89	87	68	51	73	72
Turbidity -inches (secchi disc)	52	22	32	45	32	36	37	40

CONCLUSIONS AND RECOMMENDATIONS:

The per cent of game fish taken in 1963 from Lake Palestine is lower than the 1962 figure. Although the largemouth bass and channel catfish numbers dropped this segment the black crappie showed a considerable increase. The last collection made for this segment contained 18 largemouth bass which indicates that this species is probably present in greater numbers than the data for the entire segment indicates.

Vegetation and brush will continue to be problems in Lake Palestine. This condition could be improved if proper clearing techniques are used prior to the impoundment of the third stage level of the reservoir.

It is recommended that continued quarterly surveys be made during the coming segment to maintain accurate data of the reservoirs progress.

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Date July 8, 1964

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