

Report of Fisheries Investigations
Pollution Studies

by

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Dingell-Johnson Project F-7-R-7, Job C-1
June 1, 1959 - December 31, 1959

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Segment Completion Report

Investigations Projects

State of TEXAS

Project No. F-7-R-7

Name: Fisheries Investigations and Surveys
of the Waters of Region 1-B.

Job No. C-1

Title: Pollution Studies.

Period Covered:

June 1, 1959 through December 31, 1959

ABSTRACT

Results of previous studies have shown that the Canadian River is being seriously polluted by industrial wastes in the vicinity of Borger, Texas. The violation was brought to the attention of the responsible industrial concern who agreed to study the problem and take the necessary action to abate the pollution. Studies are being conducted in cooperation with the State Department of Public Health, to determine the extent and results, if any, of their efforts. A discussion of these studies is given.

Although possibly improved, the Canadian River is still being polluted by industrial effluents in the Borger area. Efforts of the polluting industrial concerns have not been sufficient to substantially reduce the previously reported pollution violation.

An investigation was made to determine causes of a fish-kill in the Rita Blanca Lake, near Dalhart, following a light rain on the watershed. The toxicant responsible for the fish-kill was Cooper-Tox, an insecticide containing toxaphene, which had been used to control flies in watershed feed lots. No extensive damage was done.

A pollution study was conducted in October 1959, to determine causes of an extensive fish-kill on the Yellow House Creek, near Lubbock. The fishery of all three V-8 Ranch lakes on the Yellow House Creek was destroyed. Only black bullhead catfishes remained after the die-off. Causes of pollution were insecticides which were used to control flies and grubs in large, watershed feed lots, and were washed into the creek by thundershowers. No legal action was taken by the Game and Fish Commission because only privately-owned waters were affected. Plans were made for a pollution survey of the Yellow House Creek and its watershed by the State Health Department and the Lubbock County and City Health Units.

OBJECTIVES

To determine the source of and nature of natural and man-made pollutants which affect fish populations.

TECHNIQUES

In conjunction with other work done under the project, a search was made for places where pollution was suspected of being present. Water samples were collected from all project waters under study and from all other waters in the region where pollution was suspected or reported. Standard chemical tests for pollution were made on water samples collected, either by the State Health Department Laboratory or by the Soils Laboratory at Midwestern University.

FINDINGS

Canadian River

Background Information

During the period from June 1, 1954, to May 31, 1955, a basic survey and inventory of species was conducted on the Canadian River by the Inland Fisheries Division of the Texas Game and Fish Commission. Results of this work are contained in the report, F-7-R-2, Jobs A-1 and B-5. During that same period, an intensified study was made on the pollution of the Canadian River, with special attention being given to the most seriously polluted area near Borger. Details of this study are given in the report, F-7-R-2, Job C-1, Part 1.

Results of this work revealed that effluent ditches of the Phillips Petroleum Company were seriously polluting the Canadian River with floating and suspended solids, volatile organic compounds, and dissolved salts. These pollutants were lethal to fishes and other aquatic life, and detrimental to wildlife that might otherwise drink the water.

This violation was brought to the attention of the Phillips Petroleum Company, Bartlesville, Oklahoma, which resulted in conferences with officials and staff members of the Texas Game and Fish Commission. Certain agreements were made by the polluting concern to study the problem and take the necessary action that would eventually abate their contributing pollution of the Canadian River. In accordance with their agreements, officials of the Phillips Petroleum Company have submitted occasional progress reports outlining their efforts to reduce their pollution.

Periodic observations continued, and on January 17, 1958, another intensified, 12-hour study was made to determine the extent and results, if any, of their efforts to abate the pollution. According to chemical analyses of water samples collected during this 12-hour study, supplemented by check-seining and observations, effluents from this industrial concern were still polluting the Canadian River. Their efforts had not been sufficient during the previous three years to substantially reduce the amount of pollution from that originally reported. Details of this investigation are given in the Report, F-7-R-5, Job C-1, Part 2.

In January 1959, an additional cooperative study with the State Health Department was conducted on the Canadian River, insofar as it exists in Texas. Water samples were collected from the original sampling locations between the New Mexico line and the Oklahoma line, across the Texas Panhandle. Also, at this time, a 24-hour study was conducted in the Borger area to determine the extent of pollution present as compared to previous investigations. Collecting stations were established at the same locations on the river and effluent ditches that were used previously. Each station

was visited every three hours for a period of 24 hours, at which time samples were collected, sealed, and labeled. In addition to samples collected regularly, random samples were collected from the river above the entrance of all industrial effluents, other effluent ditches, and the river, as far down as the Highway 70 crossing, north of Pampa. After collection, samples were delivered to the Texas State Department of Health Laboratory and analyzed. Results of this work will supplement data collected by the State Health Department's resident sanitarian who was making a detailed, continuous study of the problem, and will be included in their final report after completion of the study.

Current Investigations

On October 7, 1959, another cooperative pollution investigation was conducted by the Inland Fisheries Division of the Texas Game and Fish Commission and the Texas Department of Public Health. Water samples and seine collections were taken from the original sampling locations between the New Mexico line and the Oklahoma line, across the Texas Panhandle, by employees of the Inland Fisheries Division. At the same time, a 24-hour study was being conducted in the Borger area by employees of the State Health Department. All water samples were analyzed by the Texas Department of Public Health Laboratory in Austin, Texas.

Figure 1. presents the chemical analyses of water samples in the order of downstream collections on October 7. Figure 2. presents the fishes collected from seine samples at the various locations. Data collected during the 24-hour study in the Borger area by the State Health Department will be included in their report on the pollution of the Canadian River and its watershed after completion of their study.

An attempt was also made to determine daily variations in water quality of the Canadian River from approximately 60 miles above the Borger area to approximately 65 miles below the Borger area over a five day period. Water samples were collected by game and fish wardens of the Texas Game and Fish Commission from the Tascosa, Amarillo, Borger, Pampa, and Canadian stations at 10:00 A.M., October 5 through 9, 1959. Results of the analyses of these water samples are given in Table 3.

Discussion

Unfortunately, the latest pollution investigation on the Canadian River was conducted during a period when the river was "high" or "considerably above normal flow". Adverse weather conditions had caused postponement on previous occasions, however, and the investigation was conducted regardless of conditions because of previous commitments to a very crowded work schedule. Although results of analyses of water samples collected in October 1959, are not comparable to those collected previously because of increased dilution by natural precipitation, they definitely indicate changes in water quality along the river during that particular collection period.

As shown in Figures 1 and 3, there were no significant changes in water quality in the Canadian River above the Borger area. Below the Borger area, however, there were considerable increases in chlorides and total solids. Figure 3 shows this situation to be a continuous occurrence, at least during the five day collection period.

During the basic survey and inventory of species of the Canadian River in 1954 and 1955, only four fish were taken during the entire year at the Pampa station, which is approximately 50 river miles below the major sources of pollution. During

the survey in October 1959, however, nine minnows were taken in seine samples. Presence of fish at this station would have been quite encouraging if the river had been near normal conditions, but under the circumstances at the time of capture, very little importance was given to their presence. The dilution factor was probably great enough at the time of sampling to render the water safe for fish life regardless of the amount of pollution 50 miles upstream. It should be noted, however, that only nine fish were taken at this station, comprising only 1.2 percent of the total fishes taken during the study. This is considered significant because equal seining effort was exerted at each station. Fishes taken from this station were probably migrants from fresher water farther downstream, or from tributary creeks.

As stated previously, this study was conducted jointly with the State Health Department, whose employees sampled all of the major effluent ditches in the Borger area at regular intervals over a 24-hour period. Since it was not raining during the collection period, analyses of effluents entering the river will depict extent of pollution, as compared to previous investigations, more so than samples collected from the rain-swollen river. This information will be included in their report on the pollution of the Canadian River at a future date.

Judging from periodic observations during the segment period covered by this report, and from information obtained during the latest study, the Canadian River is still being polluted by industrial effluents in the Borger area. Efforts of the polluting industrial concerns have not been sufficient to substantially reduce the previously reported pollution violation.

Periodic observations and studies will continue in order to determine the extent and results of any efforts made by industrial organizations to abate pollution in the Canadian River.

Rita Blanca Lake

An investigation was made in August 1959, to determine causes of a fish-kill in Rita Blanca Lake, near Dalhart. Fish of all species, but mostly golden shiners and bullhead catfish, began dying on August 16, following a light rain on the immediate watershed. Fish mortality was confined primarily to a large bay near the dam which receives run-off from the large feed lot on the hill overlooking the lake.

The toxicant responsible for the fish-kill was found to be Cooper-Tox, an insecticide containing Toxaphene, which had been used to control flies in the watershed feed lots.

Although no extensive damage was done to the fishery of Rita Blanca Lake, an account of the investigation was presented to the State Health Department, Dallam and Hartley County officials in charge of the lake, and to the manager of the feed lots, so that arrangements could be made to prevent repetition of the incident.

Yellow House Creek

A pollution study was conducted in October 1959, to determine causes of an extensive fish-kill on the Yellow House Creek, near Lubbock. This creek is the principle headwater tributary of the Double-Mountain Fork of the Brazos River.

Fish of all species, including numerous large channel catfish and largemouth black bass, were killed in the three V-8 Ranch lakes, which are impoundments on the Yellow House Creek. Gill net results revealed that the fisheries of all three lakes was destroyed. Only black bullhead catfish remained after the die-off.

The source of the toxicants responsible for the fish-kill was traced to the Leuders Feed Lot, situated on the canyon rim along the Yellow House Creek and immediately above the V-8 Ranch lakes. Operators of the feed lot had been spraying cattle and the feed lot with insecticides, including Dipterex and Korral, for the control of flies and grubs. Apparently, these substances had been washed into the creek above the lakes by recent locally-heavy thundershowers.

No fish were killed in Buffalo Springs Lakes, public waters, which are located on the Yellow House Creek and immediately below the V-8 Ranch lakes, because these lakes had been treated with rotenone earlier in the month for the total eradication of all species. Fortunately, these lakes had not been re-stocked prior to the fish-kill in Yellow House Creek.

Since no public waters were affected by this pollution, no legal action was taken by the Game and Fish Commission. A tour of the polluted waters was made with officials of the State Health Department and the Lubbock County and City Health Units, who initiated plans for a pollution survey of the Yellow House Creek and its watershed.

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Figure 1. Analysis of Water Collected from the Canadian River on October 7, 1959.

Station	pH	Cond. Micromhos	Total Solids	Chloride	Sulphates	Chlorine Demand	Dissolved Oxygen	B.O.D.
New Mexico Line		1300	780	145		3		
Tascosa	7.8	1200	720	140	210	2	5.5	1
Amarillo	7.8	1550	930	180	220	13	4.0	2
Borger	7.8	1750	1050	290	194	4	3.2	0
Pampa	7.6	2150	1290	400	238	3	1.3	1
Canadian	7.6	2700	1620	580	248	3.5	2.5	0.5
Oklahoma Line		2300	1380	470				

Figure 2. Fishes Collected from the Canadian River on
October 7, 1959.

	New Mexico Line Station	Tascosa Station	Amarillo Station	Borger Station	Pampa Station	Canadian Station	Oklahoma Line Station
<u>Dorosoma cepedianum</u>		1	1				
<u>Hybopsis storeriana</u>	4					1	
<u>Hybopsis aestivalis</u>	2			2			
<u>Notropis bairdi</u>	34	3	13	32	1	101	85
<u>Notropis girardi</u>			25				
<u>Notropis lutrensis</u>	1						
<u>Hybognathus placita</u>	77	52	42	23	8	28	184
<u>Ictalurus melas</u>						1	
<u>Gambusia affinis</u>						3	1
<u>Fundulus kansae</u>	1		4	2		2	
Total	119	56	85	59	9	136	270

Figure 3. Analysis of Water Collected from the Canadian River at 10:00 A.M., October 5 through October 9, 1959.

	pH	Cond. Micromhos	Total Solids	Chlorides	Sulphates	Chlorine Demand	Dissolved Oxygen	B.O.D.
<u>Tascosa Station</u>								
10-5-59	7.9	1220	732	160	185	2.5	3.0	1
10-6-59	7.9	1220	732	140	190	2	4.7	0.5
10-7-59	7.8	1200	720	140	210	2	5.5	1
10-8-59	8.0	1250	750	150	167	2	5.5	1
10-9-59	8.0	1300	780	150	177	3	4.8	1
<u>Amarillo Station</u>								
10-5-59 (above sewage)	8.1	1550	930	210	243	1.5	5.0	0.5
10-5-59 (below sewage)	7.8	1550	930	190	210	16	4.0	5
10-6-59 (above sewage)	8.1	1600	960	200	252	3	5.6	0.5
10-7-59 (below sewage)	7.8	1550	930	180	220	13	4.0	2
10-8-59 (above sewage)	8.1	1600	960	210	235	7	6.1	0.5
10-9-59 (above sewage)	8.1	1550	930	200	240	2	6.5	0
10-9-59 (below sewage)	7.8	1550	930	190	220	13	3.3	3
<u>Borger Station</u>								
10-5-59	7.8	1500	900	210	163	2	2.6	0.5
10-6-59	7.6	1550	930	220	169	4	1.5	2
10-7-59	7.8	1750	1050	290	194	4	3.2	0
10-8-59	7.8	2050	1230	370	212	4	3.6	0
10-9-59	7.8	2150	1290	400	224	5	3.4	0
10-13-59	8.3	3600	2160	780	242	16	7.1	1
<u>Pampa Station</u>								
10-5-59	7.6	2900	1740	640	240	8	3.0	1
10-6-59	7.5	2800	1680	560	252	5.5	1.4	2
10-7-59	7.6	2150	1290	400	238	3.0	1.3	1
10-8-59	7.7	2200	1320	400	260	2.5	3.2	0.5
10-9-59	7.7	2250	1350	400	252	3	2.5	0.5
<u>Canadian Station</u>								
10-5-59	7.4	2700	1620	600	190	3	2.7	1
10-6-59	7.5	2500	1500	560	195	3	2.5	0.5
10-7-59	7.6	2700	1620	580	248	3.5	2.5	0.5
10-8-59	7.6	2300	1380	380	230	2.5	2.2	0
10-9-59	7.8	2150	1290	380	218	3	3.6	0.5