

Segment Completion Report

Investigations Projects

State of TEXAS

Project No. F-7-R-8

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

Job No. C-1

Title: Pollution Studies

Period Covered:

January 1, 1960 - December 31, 1960

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 AND DISCUSSION

Red River Drainage

Considerable time and effort has been expended during the past ten years by personnel of the Inland Fisheries Division in detecting, measuring, and reporting various types and sources of pollution in the Wichita Valley areas. This work has been discussed in quarterly reports and segment completion reports since March, 1950.

Pollution of the Big Wichita River has included brine and other substances from oil fields, domestic effluents (including raw sewage from tourist courts, garbage dumps, etc.), "sludge" or other materials removed in clarifying municipal drinking water, industrial effluents, and salts contributed by natural springs emerging from the Blain formation at the headwater streams of the river.

Attempts have been made on several occasions by the combined efforts of various county, state, and federal agencies to decrease pollution and improve the quality of the public waters in northwest Texas. Intensive studies were conducted in 1952 by qualified individuals employed by the Game and Fish Commission, the Wichita County Water Improvement and Control Districts 1 and 2, the Texas Agricultural Experiment Station, the U. S. Geological Survey and by Midwestern University Soils Laboratory. These endeavors disclosed a great number of disturbing violations. The studies were followed by a series of public hearings, as well as conferences with individual oil

producers, in an attempt to reduce the amount of pollution contributed by oil field brine. However, it was learned that pollution laws in effect at that time were insufficient to cope with existing situations. Not only were the pollution regulations inadequate, but there was considerable misunderstanding as to which agencies were charged with responsibilities of abating the various types of pollution. As a result, a disgustingly large number of pollution violations continued without contest. Only the most flagrant violations received court action. This caused some of the biologists and investigators in the field to render only token efforts toward pollution abatement.

These are the conditions that inspired the organization of the Red River Authority of Texas. One of the duties of this organization as prescribed by law is to correct and police all sources of pollution on the complete watershed of Red River and its Texas tributaries. New pollution rules and regulations were formulated, approved by the legislature, adopted by the Authority and became effective July 1, 1960. They are as follows:

"Pursuant to the provisions of Sec. 59, Article XVI of the Constitution, and the Acts of 1959, 56th Leg., p. 604, Ch. 279, and the Acts of 1925, 39th Leg., Ch. 25, p. 87, Sec. 3, as amended, and Ch. 25, p. 88, Sec. 7, as amended, the following rules and regulations are approved and adopted and shall hereafter constitute the rules and regulations of the Red River Authority of Texas in order to protect, preserve and, when necessary, restore the purity and sanitary condition of the surface waters of Red River and its tributaries.

DEFINITIONS

Sec. 1. "Authority" means the Red River Authority of Texas.

Sec. 2. "Tributaries" shall mean all rivers, creeks, streams, bayous, lagoons, canals, laterals, public drainage ditches and ravines within the Texas Watershed of Red River, included within the Authority, including such River.

Sec. 3. "Surface Water" is that water within such tributaries, as defined in Sec. 2, including all storm and flood waters thereof and the run-off therefrom and shall extend to and include all lakes, reservoirs, ponds, bayous, lagoons, and other bodies of surface water whether artificial or natural including all such bodies of surface water that are subject to overflow from or into a tributary as hereinabove defined in Sec. 2.

Sec. 4. "Beneficial Purposes" means the use of waters described in Sec. 3, preceding, for human consumption, agriculture, irrigation, gardening, domestic stock raising, municipal, for manufacturing, industrial, commercial, mining, recreational or other pleasure purposes that are useful and beneficial to the user thereof.

Sec. 5. "Pollute" is hereby defined to be the throwing, discharging, or otherwise permitting to reach or to be injected or introduced into any surface water as defined in Sec. 3, of any substance, material or thing, including but not limited to the carcass of any dead animal, cans, discarded buckets or pails, garbage, ashes, wire, earth, offal, oil or any or its by-products or waste therefrom by the manufacturing or production thereof, including oil field brine, oil-slick or basic sediment from oil, regardless of the quantity thereof, which renders such surface water unfit for one or more of the beneficial purposes, or contributes to rendering such

surface water unfit for one or more of such beneficial purposes.

Sec. 6. It shall be unlawful for any person, firm, corporation, association, town, city or other political subdivision of this state, or any agent, officer, employee or representative of such person, firm, corporation, association, town, city or other political subdivision of this state to pollute any surface water within any tributary within the area comprising the Authority.

Sec. 7. Any person, firm, corporation, association, town, city or other political subdivision of this state, or any agent, officer, employee or representative of any such person, firm, corporation, association, town, city or other political subdivision of this state who violates any provision of this act shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in a sum not more than One Thousand and No/100ths (\$1,000.00) Dollars, or by confinement in the county jail for not more than thirty (30) days or by both such fine and imprisonment.

Sec. 8. These rules and regulations shall not be applicable to the Game and Fish Commission in connection with the administration of their lawful activities, any municipal corporation which discharges its sewage into any surface water provided that such discharge does not render such water harmful to public health as may be determined by the State Board of Health and fishlife as may be determined by the Game and Fish Commission.

Sec. 9. Savings Clause. If any section, sentence, paragraph, clause, or part of these rules and regulations should be held or declared invalid for any reason by a final judgement of the courts of this state or of the United States, such decision or holding shall not affect the validity of the remaining portions of these rules; and the Board does hereby declare that it would have adopted and promulgated such remaining portions of such rules irrespective of the fact that any other sentence, section, paragraph, clause, or part thereof may be declared invalid.

Sec. 10. Publication. These rules shall be published once a week for two (2) consecutive weeks in one or more newspapers having general circulation within the Authority and shall become effective fourteen (14) days after date of the first publications.

Effective July 1, 1960

Red River Authority of Texas"

Beginning in January, 1960, a series of pollution conferences were held at Wichita Falls in an effort to study and organize pollution abatement measures. The initial conference was sponsored by the Red River Authority and attended by officials and representatives from the Game and Fish Commission, Texas Department of Public Health, Wichita County Water Improvement Districts 1 and 2, U. S. Geological Survey, Texas Railroad Commission, Wichita Falls Chamber of Commerce and several other agencies and organizations. After completion of the initial conferences the Game & Fish Commission project leader continued to meet with representatives of the Red River Authority to assist in planning and organizing oil field lease investigations on the Big and Little Wichita River watersheds, as well as the Grayback oilfield (Beaver Creek watershed). Some of this work was conducted and accomplished in the field.

One of the most troublesome sources of pollution encountered is the commonly used oil field salt pit. There are approximately 25,000 oil wells on the Red River watershed from Texas, and most of the leases operate 3 to 4 earthen pits to dispose of their salt water. As the water evaporates, salt remains in the pit and gradually seeps out through the sides and down through the bottom to the fresh water sands below. Not only do these evaporation pits pollute the sub-surface water and nearby water courses, but many of them also denude considerable land around the pit of vegetation and cause serious erosion. Old pits that have been abandoned for several years continue to pollute the water courses and adjacent land. This is because the abandoned pits catch rain water which dissolves the salt that remains in the pit for many years after their use has been discontinued.

On October 15, 1960, a petroleum engineer was employed as a pollution officer by the Authority. Since that time this very energetic investigator has inspected a great number of oil-producing leases in the Wichita Valley. A total of 263 leases was inspected during the month of December alone.

As a result of this work, approximately 800 salt water pits have been leveled to conform with the ground surface. Many other pits have been discontinued and will be leveled as soon as weather and time permits. Efforts are being made to get all salt water produced in oil fields pumped directly from the separator into a metal tank, then into a disposal well which will return the troublesome salt back into the formation from which it came.

The accomplishments of the Authority during this short period of time are very encouraging. Personnel of the Inland Fisheries Division in Region 1-B will continue to cooperate with and assist the Red River Authority in every way possible to abate pollution on the Red River drainage in Texas.

Rita Blanca Lake

Periodic fish kills continued to occur in Rita Blanca Lake during this segment. Fish of all species, but mostly golden shiners and bullhead catfish, were usually killed following rains on the immediate watershed. Fish mortality was confined primarily to a large bay near the dam which receives run-off from the feed lot on the hill overlooking the lake.

The cause of the fish-kill was assumed to be Copper-Tox, an insecticide containing toxaphene, which is used to control flies and grubs in the watershed feed lots. Since large quantities of barnyard manure is also washed into the lake, oxygen depletion caused by organic decomposition in that immediate area could also have been partially responsible for the kills. Surface bubbling of decomposition gases was quite noticeable in the upper one-half of the receiving cove. It was also interesting to note that most of the channel catfish that were collected in the lower end of the lake were feeding (and thriving) on sewage effluent organisms, including psychodid larvae.

Although no extensive damage was done to the fishery of Rita Blanca Lake, accounts of the investigations were recorded and presented to the State Health Department and officials in charge of the lake so that corrective measures could be considered to prevent repetition of the incidents. Recommendations were made to the officials of the lake to construct step-down oxidation ponds between the feed lots and the lake. These ponds would absorb shock-loads of organic matter being washed from the feed lots. They would also retain lethal insecticides until they oxidized sufficiently to be

harmless to fishes.

In June, 1960, a natural, selective fish kill on goldfish, black bullhead catfish and golden shiners occurred at the upper end of Rita Blanca. Although only undesirable species were affected by this die-off, City officials and many of the local sportsmen were quite concerned about eating the other unaffected game species and with water skiing in the water.

An investigation disclosed that all of the moribund and dead fish collected were afflicted by abnormal gill conditions probably caused by a bacteria of the myxobacteria group. This was suggested by both the gross appearance and the behavior of the affected fishes. The gill lamellae were fused, partially destroyed in places, whitened at the tips, and swollen to the extent that they were either hemorrhaging before capture or at the slightest touch after capture. Most of the fish, especially goldfish, were found at the fresh water inlets. Other symptoms included sluggish movements, empty digestive tracts, abnormal softness of internal organs and infected mouth cavities.

Microscopic examination of preserved gills under 100x 430x disclosed rounded protusions of matter extending from the filaments. These protusions were definitely not a part of the gill filaments and may have been colonies of myxobacteria of some type. We had neither the proper stains nor laboratory facilities to identify the organism; however, samples were submitted to the State Health Department Laboratory for professional bacteriological examinations. The fish-kill lasted for only a short duration, and the fishery suffered no noticeable damage.

Canadian River

Although no additional extensive pollution surveys were conducted on the Canadian River during this segment, periodical observations were made in the industrial areas near Borger to detect any changes in the quality of the effluents entering the river. Water samples have been collected every two weeks by local game wardens along the Canadian and submitted to the State Health Department's Water Pollution Control Division. These samples were analyzed and recorded as a part of the state-wide program to detect and measure pollution of public waters in Texas.

Findings and results of pollution surveys conducted on the Canadian River by the State Health Department and Game & Fish Commission's Inland Fisheries Division during the previous segments were published and released during this period of study in the report, Canadian River Water Quality Survey, 1958 - 1959. This report was written by Hugh C. Yantis, Engineer, and distributed by the Texas Department of Public Health.

An additional survey of the Canadian River and the Industrial effluents from the Borger and Amarillo areas has been planned and will be conducted in the early spring season of 1961.

Yellow House Creek

Pollution studies continued on the watershed of Yellow House Creek, near Lubbock, to determine causes of fish kills following rainfall. This creek is the principle headwater tributary of the Double-Mountain Fork of the Brazos River and Buffalo Springs Lake.

During the previous segment period 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 above Buffalo Springs Lake. Gill net results revealed that the fisheries of all three lakes were 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 Co-Ral, 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 Lake at this time because it had been treated with rotenone earlier in the month for the total eradication of all species. Fortunately, these lakes had not been re-stocked with fish prior to the fish-kill in Yellow House Creek.

During the segment covered by this report, however, another heavy rain occurred, and dead fish were found at the head of Buffalo Springs Lake and sick fish were observed near the dam.

Samples of the insecticides used in the feed lots were obtained and submitted to the San Marcos State Fisheries Laboratory for bio-assay. These insecticides were found to be toxic to fish. A detailed report on the bio-assay was submitted in April, 1960, by Mr. Charles Ezell, State Chemist.

Several conferences were held with officials of the Buffalo Springs Lake, Leuders Feed Lots, City of Lubbock, and the State Health Department. Partly as a result of this occurrence of pollution, a stream pollution sanitarian was stationed in Lubbock to study the situation and to conduct a detailed pollution survey of Yellow House Creek and its watershed. No legal action has been taken at the time of this writing, although it is being seriously considered by local authorities.

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