

SEGMENT COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-3-17

Region III-B Fisheries Studies

Job No. 5 Pollution Studies

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ABSTRACT

Reports of pollution were investigated in the Sabine River, a private pond in Panola County, Caddo Lake and Big Cypress Bayou.

These investigations were conducted in coordination with the Region III Chemist, M. O. Green, the Texas Water Quality Board, and the Texas Railroad Commission. A moderate fish kill was investigated in the Sabine River during July. The remaining fish kills were considered to be light.

The Sabine River flows into the newly constructed 185,000-acre Toledo Bend Reservoir and is also used as a municipal water supply at points downstream from the areas investigated. For these reasons alone, the pollution investigations on the Sabine River are very important.

Municipal and industrial effluents in the Longview, Texas area caused some problems during the summer of this project segment. The low flow condition of the river at that time was also a factor involved in the fish kills.

The Texas Eastman Company constructed a 100-acre solar evaporation lagoon and another large holding area for their effluent. It is felt that these measures will greatly benefit the Sabine River in retaining the quality of water necessary to support aquatic life.

It is recommended that this job be continued to better understand the evaluate aquatic pollution in Region III-B.

March 13, 1970

SEGMENT COMPLETION REPORT

State of Texas Name: Region III-B Fisheries Studies
Project No. F-3-R Title: Pollution Studies
Job No. 5
Period Covered: February 1, 1969 - January 31, 1970

OBJECTIVES:

To determine the source and nature of natural or man-made pollutants which affect fish populations in the waters of Region III-B.

TECHNIQUES:

When pollution was reported or evidence indicating pollution was found, investigative procedures were initiated to determine the source and nature of the pollutant. Standard water analyses were made with a portable Hach DR EL chemistry kit to determine water quality and type of pollution. These analyses included pH, total alkalinity, chlorides, dissolved oxygen, free carbon dioxide, sulfates, phosphates, and turbidity. Stream analyses were made above and below the polluted area for comparison of water quality and to trace the influx of the pollutant into the stream. Field bio-assays utilizing sunfish species (Lepomis sp.) were conducted above, in, and below polluted areas to better ascertain the toxicity of the pollutant.

FINDINGS:

Investigations of reported fish kills were made at the Sabine River in Gregg, Harrison, and Panola Counties, a private pond in Panola County, Caddo Lake in Harrison County, and Big Cypress Bayou in Harrison County. The Sabine River fish kill during July was considered moderate, the remainder being considered light.

SABINE RIVER - GREGG, HARRISON, AND PANOLA COUNTIES:

Repeated occurrences of pollution were investigated on the Sabine River during this project segment.

Game Management Officer Bill Milling of Panola County reported a fish kill at the U. S. Highway 59 bridge crossing on May 6, 1969. His investigation revealed numerous distressed fish in the river and some dead ones. A water sample taken by Mr. Milling indicated low pH and a low dissolved oxygen content.

Additional analyses were made downstream from U. S. Highway 59 on the morning of May 7, 1969. These analyses were made at bridge crossings on U. S. Highway 79 and FM 2517 and revealed no adverse chemical water quality. A sharp chemical odor was present at these downstream stations. This investigation came at a time of high water and heavy rains. It is felt that a "slug" of polluted water passed downstream and caused this light fish kill. Because of the large volume of water involved, the source of pollution could not be determined.

An additional fish kill was reported by Game Management Officer Bill Daniel in Gregg County on May 10, 1969. This occurrence was at the confluence of Grace Creek and the Sabine River. A water sample taken in Grace Creek revealed a phosphate content of 2.2 ppm and a dissolved oxygen content of 1.0 ppm, which is toxic to aquatic life. Observations taken above and below this confluence revealed water that was of adequate chemical quality to support aquatic life.

Grace Creek receives effluents from the Longview waste treatment plant and waste products from the Joseph Schlitz brewery in Longview. The sharp chemical odor noted in the Panola County investigation May 7, 1969, was not evident in the Grace Creek investigation.

A number of investigations were conducted on the Sabine River during the month of July. These were prompted by numerous reports of fish kills from local citizens.

On July 7, 1969, investigations were made by F-3-R project personnel, along with Region III Chemist M. O. Green, and Jim Starkey of the Texas Water Quality Board. A boat was put in at the State Highway 149 bridge crossing and travel was made downstream to the Texas Eastman Company holding lagoons. Numerous areas of seepage were noticed along the river banks adjacent to Texas Eastman holding lagoons. A sample of this seepage was taken by Jim Starkey. Samples also were taken further downstream at the Texas Eastman effluent discharge. The effluent discharge exhibited a strong chemical odor and was observed to be very dark with an oily film on the surface. A slight trace of oxygen was noted in the discharge accompanied by sulfate concentration in excess of 300 ppm and a phosphate concentration of 7.4 ppm. Detailed laboratory analysis by Chemist Green revealed a high biochemical oxygen demand in this effluent. A high biochemical oxygen demand would rapidly reduce the amount of dissolved oxygen present, either naturally occurring or mechanically introduced into the water.

Further reports of fish kills were made by local fishermen on July 13, 1969. They reported an area of the river containing black water with a strong odor. Chemical water analyses, observations, and field bio-assays were conducted July 13, 1969, through July 17, 1969, to better evaluate the extent and possible sources of this pollution. These checks were made during minimal flow conditions of the river.

Numerous areas of black water were observed at different times at Hatley Creek, Rock Ford, and U. S. Highway 43 bridge crossing. Chemical water analyses made in these areas of black water revealed only traces of dissolved oxygen, and excessive amounts of sulfates and phosphates.

On July 17, 1969, observations were made by boat from State Highway 149 bridge crossing to U. S. Highway 43 bridge crossing. This covered approximately 22.5 river miles.

Field bio-assays utilizing a variety of sunfish species (Lepomis sp.) were conducted at the State Highway 149 crossing and numerous points downstream. An approximate 15-mile stretch of black water was encountered commencing two miles below Texas Eastman effluent discharge. There were no noticeable signs of fish life in this black water, although large numbers of spotted gar (Lepisosteus oculatus) were seen between State Highway 149 and the Texas Eastman effluent discharge. This stretch of water was typically descriptive of Texas Eastman and/or Longview sewage effluents.

Field bio-assays conducted at the State Highway 149 bridge crossing revealed no ill effects after an eight hour period. Bio-assay conducted below Texas Eastman effluent discharge revealed death of all test fish in 15 minutes. Bio-assay below the stretch of black water revealed no ill effects after a period of 25 minutes.

During December, a report of oil pollution in the Sabine River was made by Game Management Officer Bill Milling of Panola County. The Texas Railroad Commission was notified as no fish kill occurred.

Local fishermen reported quantities of a "cotton lint" like substance in the Sabine River at the State Highway 43 bridge crossing on January 26, 1970. An observation revealed large quantities of filamentous algae in the water and hanging on exposed vegetation along the bank. The algae was present downstream at the U. S. Highway 59 bridge crossing, but in less amounts. The algae originated at the effluent discharge of Texas Eastman Company during high water conditions. After the river fell approximately four vertical feet, all marginal vegetation downstream was covered with the algae. Due to the large volume of water, the algae was dispersed downstream causing no large buildup and possible pollution.

There was an aesthetic factor involved and a nuisance problem where fishermen were involved. The algae adhered to the fishing lines and made fishing almost impossible.

PRIVATE POND - PANOLA COUNTY:

A fish kill in a private pond in Panola County was investigated. Chemical water analyses showed a phosphate concentration in excess of 8 ppm. This high phosphate was considered to be the cause of this kill and was traced to manure drainage. Chicken litter had been spread on the surrounding area as a fertilizer and had washed into the pond during heavy rains.

CADDO LAKE - HARRISON COUNTY:

Reports of oil pollution near Big Lake Camp on Caddo Lake were received. The Texas Railroad Commission was notified. An investigation by F-3-R project personnel and personnel from the Texas Railroad Commission failed to locate any leaks from wells in and around the lake. No dead or distressed fish were seen.

BIG CYPRESS BAYOU - HARRISON COUNTY:

A light fish kill was investigated in Big Cypress Bayou. Oil scum was observed in the area and was attributed to be the cause. The source of this pollution could not be located.

CONCLUSIONS AND RECOMMENDATIONS:

Due to the continued reportings of fish kills on the Sabine River, the Texas Water Quality Board initiated an extensive survey. Twenty-four hour monitoring of the river

in Gregg, Harrison, and Panola Counties was conducted over a two-week period. Additional personnel of the Texas Water Quality Board were necessary for this work.

Numerous samples were collected during the project segment by project personnel and Region III Chemist M. O. Green. Samples collected were utilized by Chemist Green for laboratory bio-assay. These laboratory bio-assays gave F-3-R project personnel a more clear understanding of the nature of Sabine River pollutants encountered during this segment.

As a result of these investigations, Texas Eastman Company constructed a 100-acre solar evaporation lagoon. The toxic portion of their effluent is piped into this lagoon and disposed of by solar evaporation instead of into the Sabine River. This should be of considerable benefit as the Sabine River flows into the newly constructed 185,000-acre Toledo Bend Reservoir.

Sabine River riffle areas in Harrison County have provided excellent spotted bass (Micropterus punctulatus) habitat in past years. This fishery has declined due to municipal and industrial effluents discharging their waste directly into the river. With increased public concern and technological progress this fishery may be restored.

A monitor procedure system was initiated between F-3-R project personnel and Region III Chemist M. O. Green. Sampling sites designated in Figure 1 have been established for future pollution investigations. Upon a report of pollution in the Sabine River, sampling will be initiated at the designated stations.

The products of fast growing municipalities and industries in the northeast Texas area could become an acute problem if controls and checks are not applied. Industrial and municipal effluents coupled with minimal flow conditions of the Sabine River during the summer months of this project segment substantiated this fact. It is recommended that this job be continued to further study and evaluate all cases of aquatic pollution in Region III-B, in cooperation with the Texas Water Quality Board, and the Texas Railroad Commission.

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Date March 16, 1970

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Figure 1. Sabine River showing designated sampling sites.



