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PERFORMANCE REPORT

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FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project F-4-R-20

Region 2-A Fisheries Studies

Objective C-1: Pollution Studies

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ABSTRACT

Investigations were made on reported fish kills on Lake Mineral Wells, Lake Arrowhead, Lake Olney, Mud Creek, and Indian Creek. Pollution investigations were made of several gravel and sand dredging operations on the Brazos River.

PERFORMANCE REPORT

State: Texas Project Number: F-4-R-20

Project Title: Region 2-A Fisheries Studies

Project Section: Research and Surveys

Study Title: Pollution Studies

Contract Period: January 1, 1973 to December 31, 1973

Program Narrative Objective Number: C-1

Objective: To locate and identify aquatic pollution

I. Job Segment Objective:

1. To determine the source and extent of natural or man made pollutants which affect fish populations.
2. To suggest remedial action in pollution abatement.

II. Summary of Progress

Reports of fish kills and suspected pollution were investigated. Efforts were made to determine the nature and source of any pollutants through visual observations and appropriate water analyses. Water analyses were made according to standard methods (A.P.H.A., 1971). If fish mortalities had occurred, estimates of the number of fish, by species, killed were made. Mortality estimates were determined by estimating number of fish carcasses per square yard by visual counts and extrapolating for the entire affected area. When necessary, findings were reported to appropriate enforcement agencies for further action.

Lake Mineral Wells

On February 25, 1973, a fish kill was investigated in Lake Mineral Wells, a 600 acre municipal water supply lake in Parker County. The lake is located on the Rock Creek tributary of the Brazos River. The lake area had been reduced to approximately 100 acres because of repair work on the dam. The kill extended over the entire lake with an estimated mortality of 700 fish. Fishes consisted of 63% gizzard shad, 35% channel catfish, and 2% bluegill. All fish killed were less than 7 inches in total length.

Water samples were taken and the following results obtained:

Water temperature	54°F	NO ₃	0.25	mg/l
Dissolved oxygen	11.3 mg/l	Specific Conductivity	380	umoh/cm
B.O.D.	4.0 mg/l	SO ₄	106.0	mg/l
pH	6.9	PO ₄	0.12	mg/l
Total alkalinity	150.0 mg/l	Cd	0.0	mg/l
Cl	28.0 mg/l	Cu	0.001	mg/l
NH ₃	0.1 mg/l	Fe	0.1	mg/l
NO ₂	0.01 mg/l	Zn	0.0	mg/l
Ni	0.0 mg/l	Cr	0.0	mg/l

None of the above parameters were identified as the causative agent.

Dead and dying fish were collected and examined for parasites. The fish had yellow or cream colored external lesions along the head and dorsal fin areas. Using methods described by Inman and Hambric (1970), a parasite Chondrococcus columnaris, was determined to be the apparent cause of the kill. The epizootic was likely of natural origin and due to stress placed on the fish populations by the lake draw-down, coupled with unusually severe winter weather conditions.

Lake Arrowhead

Since impoundment in 1966, Lake Arrowhead, (Archer and Clay Counties) has had a history of spring fish kills. Located on the Little Wichita River drainage the lake serves as a municipal water supply. The lake has never completely filled since impoundment and has been subjected to considerable water level fluctuation. At the time of this year's fish kills it was approximately 10,000 surface acres. This year fish kills were investigated on two occasions, March 22 and April 6, 1973.

On the first survey, 700-800 gizzard shad, averaging 2 inches total length, were observed dead. Fish were scattered over the entire lake and portions of the headwaters. The only concentrations of dead fish were located on the downwind shorelines.

At the time of investigation the fish had been dead for about 4 days. Inspection of fish samples in the field revealed no parasites or obvious signs of diseases except for secondary fungal infections on a few individuals. Water samples were analyzed for dissolved oxygen, pH, hardness, total alkalinity, and chlorides. Results identified none of these parameters as the causative agent of the kill. Due to inconclusive results, the cause of the kill was not determined.

In April, the kill consisted of 2,000-3,000 fish composed of 90% gizzard shad and 10% freshwater drum. The gizzard shad averaged 2 inches and the freshwater drum 4 inches in total length. Dead fishes were observed over the entire lake. Water samples were taken and analyzed with results close resembling those in March. Turbidity readings were higher due to 1 foot rise in water level.

Dying fish were observed to have an erratic movement with loss of equilibrium. Some fish had external lesions on the dorsal and ventral sides and were covered with

secondary fungal infections. Close examinations of fish revealed the parasite Chondrococcus columnaris. It is felt this was of natural origin and probable cause of the kill.

Lake Olney

Lake Olney is a 165 acre lake located on the Mesquite Creek drainage in Archer County. It serves as a water supply for the city of Olney. On May 11, 1973, a fish kill was reported and investigated by project personnel.

The only fish found dead were six flathead catfish ranging in size from 5 to 50 pounds. A search of the entire lake produced no other dead fish. At the time of investigation the remains of the fish were too decomposed for detailed examinations. Water chemistry results indicated none of the parameters measured as the cause of the kill.

Research of available literature revealed no parasites or diseases that were so host specific as to affect only large flathead catfish in a particular aquatic system. Causative agent of the kill was undetermined.

Mud Creek

On May 25, 1973, a fish kill was investigated on Mud Creek, Parker County. It is a small tributary creek of the Brazos River near the headwaters of Lake Granbury.

The areas affected were the headwaters of Lake Granbury and 1.5 miles of Mud Creek. The kill consisted of approximately 90% bluegill (2-6 inches TL), 7% largemouth bass (4-12 inches TL), and 3% longear and green sunfish. There were only a few dead fish found in Lake Granbury. In the creek, the total number of dead and dying fishes were estimated at 2,500. Water and fish samples were collected, analyzed, and sent to the Regional Chemist for further analyses.

The following are the results of water analyses:

Water temperature	28°C
Dissolved oxygen	8.6 mg/l
pH	7.8
Total alkalinity	148.0 mg/l
Hardness (as CaCO ₃)	700.0 mg/l
Salinity	1.1 ppt
Chlorides	952.0 mg/l
Specific conductivity	3600 umoh/cm

None of these chemical parameters were identified as the cause of the kill.

Most of the fishes observed were decomposed. Results of the investigation indicated the kill was caused by the use of a pesticide, malathion. Law enforcement personnel indicated malathion had been used on the pecan groves adjacent to the creek prior to the kill. Rains in the area possibly washed lethal concentrations of malathion into the creek. The land owner was advised to the affects of pesticides on an aquatic population.

Indian Creek

On June 11, 1973, a fish kill on Indian Creek, Tarrant County, was investigated by project personnel. The exact location of the kill was ¼ mile upstream from the confluence with Eagle Mountain Lake.

Approximately 200 dead fishes were observed along a 100 yard section of the creek. Fishes found dead were gizzard shad, river carpsucker, channel and flathead catfish, sunfish, and freshwater drum. Approximately 50% of the fishes killed were game species.

Water and fish samples were taken and analyzed. The fishes appeared to have been dead for 2-3 days. Results of analyses indicated the use of pesticides in pecan groves adjoining the creek may have caused the kill.

Other Activities

Several onsite inspections were made of gravel and sand dredging operations on the Brazos River. Notifications of permit renewal requests were received, inspections made, and recommendations sent to the Environmental Section for consideration.

III. Significant Deviation:

There were no deviations from the planned schedule.

IV. Recommendations:

A final report on all data pertinent to each fish kill was forwarded to the Regional Chemist and the Game Warden in each area for further action.

Due to inconclusive results from investigations, 1972 and 1973 fish kills on Lake Arrowhead, it is recommended that detailed investigations be undertaken by the Regional Chemist if and when fish kills are reported in 1974. Complete water analyses, including examinations for pesticides, should be made. Fish samples should be carefully examined for parasites and diseases.

V. Prepared by:

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Date: December 10, 1973

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LITERATURE CITED

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Inman, Charles R., and R. N. Hambric 1970. Diseases and parasites of warmwater fishes. Texas Parks and Wildlife Department, Technical Series No. 4, 55 pp.

