

TEXAS
WATER
DEVELOPMENT
BOARD



REPORT 35

**QUALITY OF WATER OF
BIG MINERAL ARM
AND TRIBUTARIES
LAKE TEXOMA, TEXAS
January 18-20 and
February 10-11, 1966**

NOVEMBER 1966

TEXAS WATER DEVELOPMENT BOARD

REPORT 35

QUALITY OF WATER OF BIG MINERAL ARM AND TRIBUTARIES

LAKE TEXOMA, TEXAS

January 18-20 and February 10-11, 1966

By

H. B. Mendieta and P. W. Skinner
United States Geological Survey

Prepared by the U.S. Geological Survey
in cooperation with the
Texas Water Development Board
and the
City of Sherman

November 1966

TABLE OF CONTENTS

	Page
INTRODUCTION.....	1
QUALITY OF WATER OF BIG MINERAL ARM.....	1
QUALITY OF WATER OF TRIBUTARIES TO BIG MINERAL ARM.....	6
CONCLUSIONS.....	10
RECOMMENDATIONS.....	14
REFERENCES CITED.....	16

TABLES

1. Diagrammatic table showing depths, specific conductances, and chlorides in that order for sampling sites in Big Mineral Arm, January 20, 1966.....	4
2. Chemical analyses of water from Big Mineral Arm and main body of Lake Texoma, January 20, 1966.....	5
3. Chemical analyses of inflow water during low and high flows into Big Mineral Arm, January 18-19 and February 10-11, 1966.....	8

ILLUSTRATIONS

Figures

1. Map of Lake Texoma and Vicinity Showing Location of Report Area.....	2
2. Map Showing Locations of Sampling Sites.....	3
3. Stiff Diagrams of Selected Chemical Analyses of Lake Texoma and Red River Waters.....	7
4. Stiff Diagrams of Chemical Analyses of Inflow Water During Low and High Flows into Big Mineral Arm.....	11

QUALITY OF WATER OF
BIG MINERAL ARM AND TRIBUTARIES
LAKE TEXOMA, TEXAS
January 18-20 and
February 10-11, 1966

INTRODUCTION

On January 18-20 and February 10-11, 1966, a quality-of-water survey was made of the Big Mineral Arm and its tributaries, Lake Texoma, Texas (Figure 1). The purpose was to determine suitability of water in the Arm for municipal supply. Water quality was determined at various locations and depths in Big Mineral Arm and was also determined at three verticals in the main body (Red River) of Lake Texoma for comparison with the quality of Big Mineral Arm (Figure 2). Sampling sites on 16 of the largest tributaries to Big Mineral Arm were visited on January 18-19, 1966 (a period of low-flow of the tributaries), and samples were collected at 10 sites where there was flow. Heavy rains in the second week of February caused substantial runoff in the drainage area of Big Mineral Arm. Samples from the 16 inflow sites were collected on February 10-11, 1966, to compare the chemical quality of the water during high runoff with that of low flow.

The quality-of-water survey was done under a cooperative agreement with the city of Sherman and the Texas Water Development Board. Field and laboratory work required to sample and analyze the inflows into Big Mineral Arm during February were done as a part of chemical-quality reconnaissance of the Red River basin, which is a cooperative project of the Texas Water Development Board and the U.S. Geological Survey.

QUALITY OF WATER OF BIG MINERAL ARM

On January 20, 1966, the water in Big Mineral Arm of Lake Texoma was essentially the same in chemical quality from top to bottom (Tables 1 and 2). From the analyses it seems reasonable to infer that complete mixing may be the normal condition during the winter. In winter, the air temperature is usually lower than the temperature of the water in the lake, and thus the top layer of water is cooled, increasing its density. When the density of the lake water near the surface becomes greater than the density of the water at the bottom, the top layer of water moves toward the bottom and ultimately the lake becomes completely mixed.

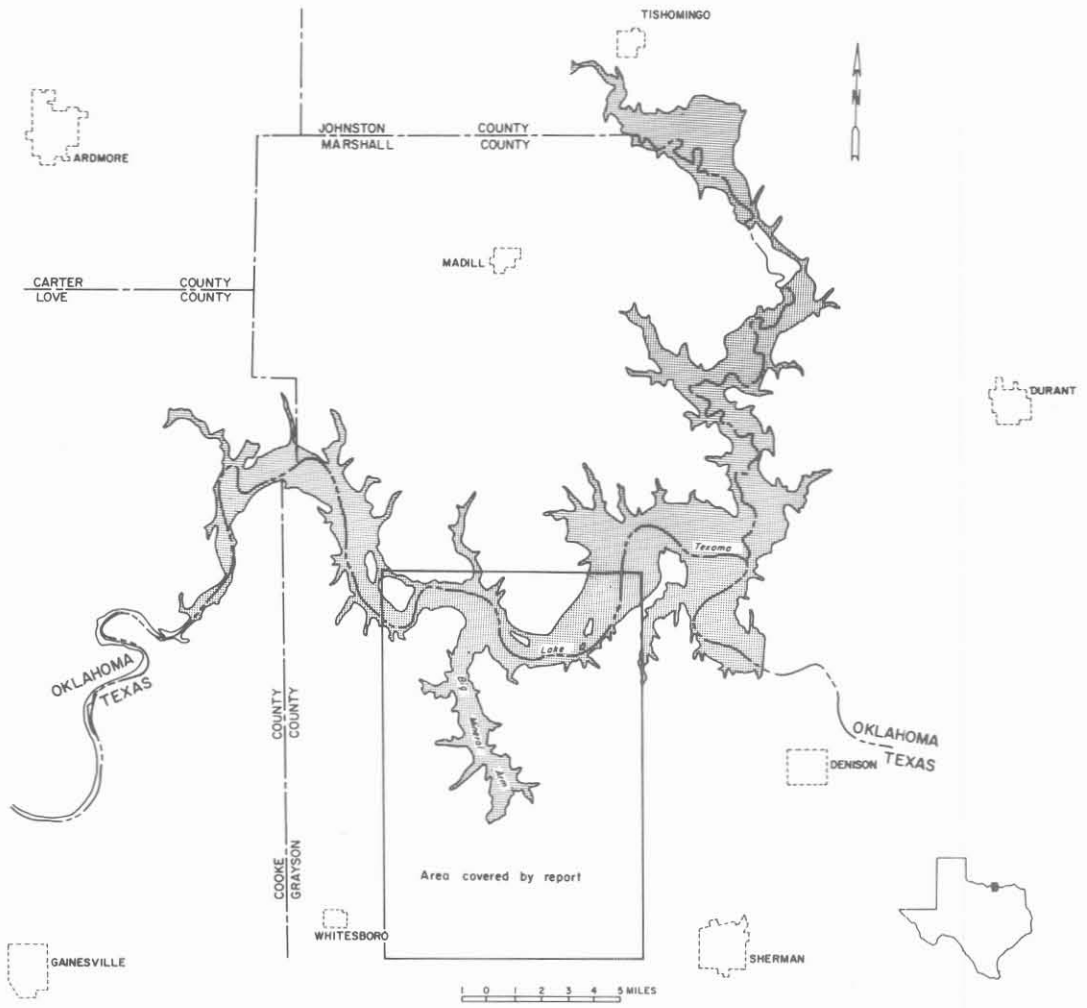


Figure 1
 Lake Texoma and Vicinity Showing Location of Report Area
 U. S. Geological Survey in cooperation with the Texas Water Development Board
 and the City of Sherman

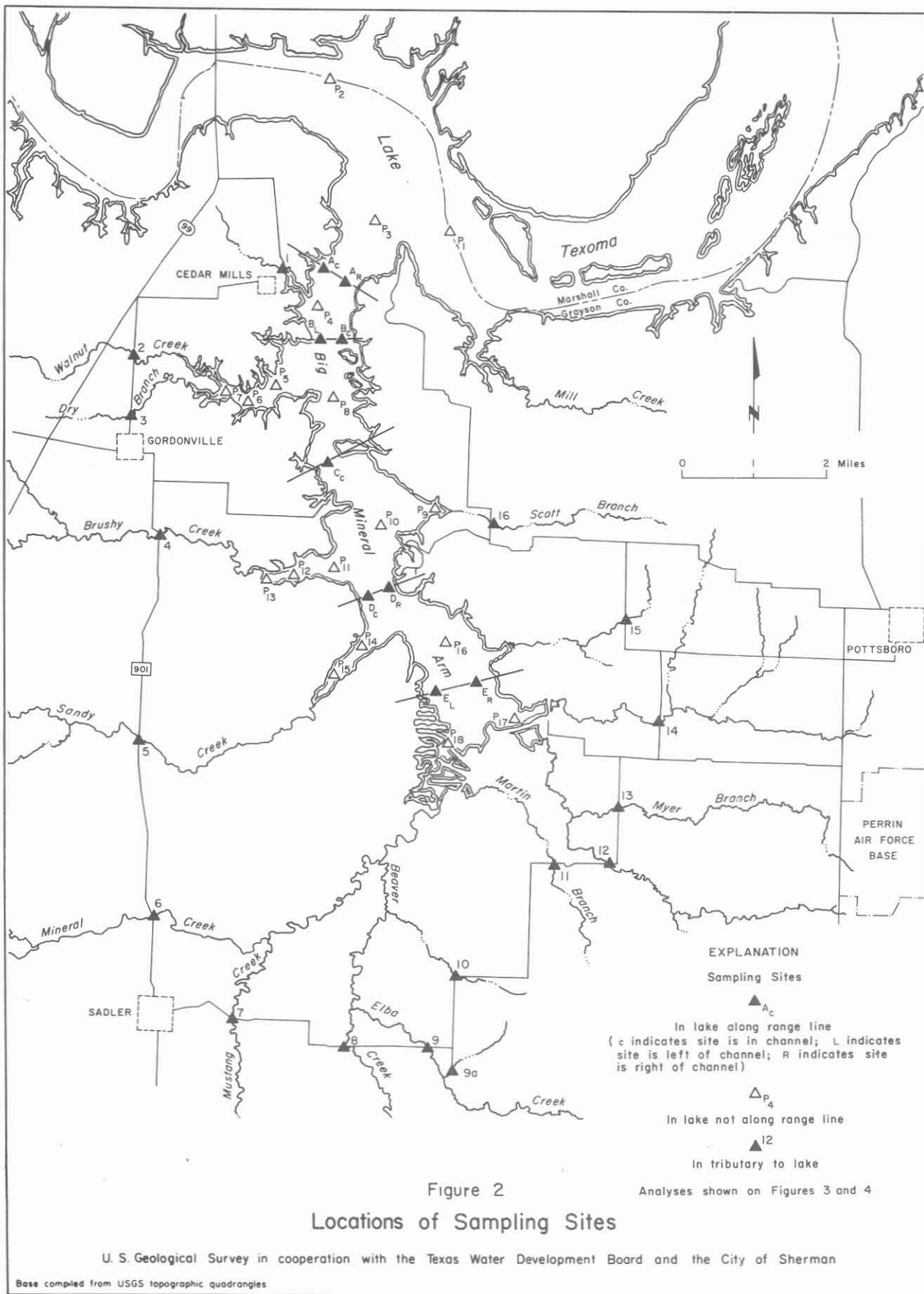


Figure 2
Locations of Sampling Sites

U. S. Geological Survey in cooperation with the Texas Water Development Board and the City of Sherman

Base compiled from USGS topographic quadrangles

Table 1.--Diagrammatic table showing depths, specific conductances, and chlorides in that order for sampling sites in Big Mineral Arm, January 20, 1966

[Exact location of sampling points shown on Figure 2. Specific conductance in micromhos at 25°C and chloride in parts per million.]

