

Grand Saline Salt Dome

The discharge of brine from a marsh in a depression bordering the southern edge of the city of Grand Saline constitutes a local water-quality problem which would not be easily resolved. The depression containing the marsh, appropriately called the "Grand Saline" has developed by solution of salt in the underlying salt dome and subsequent collapse of the sediments overlying the dome.

The brine is discharged into the marsh via seeps and springs, by overflow of disposal pits at the Morton Salt plant, and by washing salt from truck and railroad tank cars at nearby transportation facilities. The brine is diluted by precipitation, surface runoff, and effluent from the sewage plant at Grand Saline. The brine flows into Grand Saline Creek and is carried downstream to the Sabine River (Figure 24).

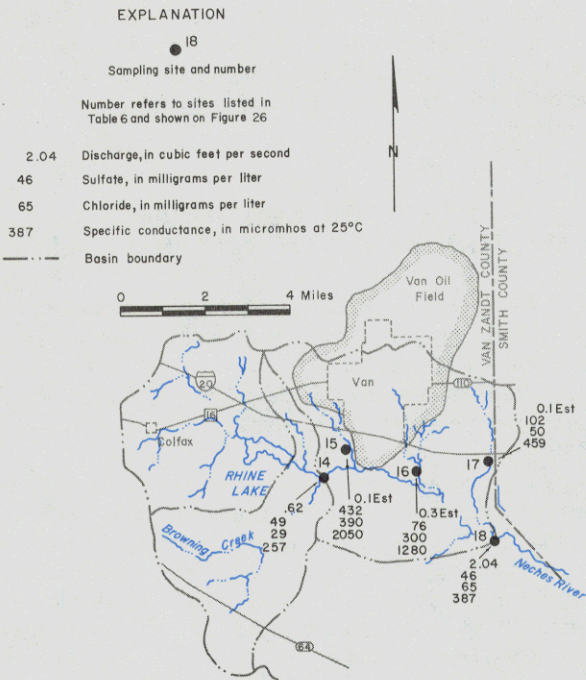


Figure 23.—Quality of Water Sampled From Five Sites in the Upper Neches River Basin, June, 1970

The southern half of the Van oil field is drained by tributaries of the Neches River. During the period June 6-7, 1970, samples of water were collected from the Neches River upstream and downstream from the oil field. The flows in three tributaries that drain areas in and near the field were also sampled. Comparison of the analyses shown on Figure 23 indicate that the quality of water in the river has been degraded by runoff from the Van oil field.

The reach of the Neches River that was studied extends from Rhine Lake, 2.5 miles southwest of Van, to a county road crossing 4.5 miles southeast of Van (site 18 on Figures 23 and 26). During the 2-day study period, there was no flow over the spillway at Rhine Lake. A flow of 0.62 cfs (cubic foot per second) was measured at site 14, one mile downstream from the lake; the flow increased to 2.04 cfs at the county road 6 miles downstream from the lake (site 18).

Concomitant with the increase in flow between sites 14 and 18, and specific conductance increased by 50 percent and the chloride concentration more than doubled. However, the sulfate concentration decreased slightly. Analyses of water from three tributaries upstream from site 18 indicate that most of the increase in the conductance and chloride was caused by inflow from streams draining the city of Van and Van oil field.

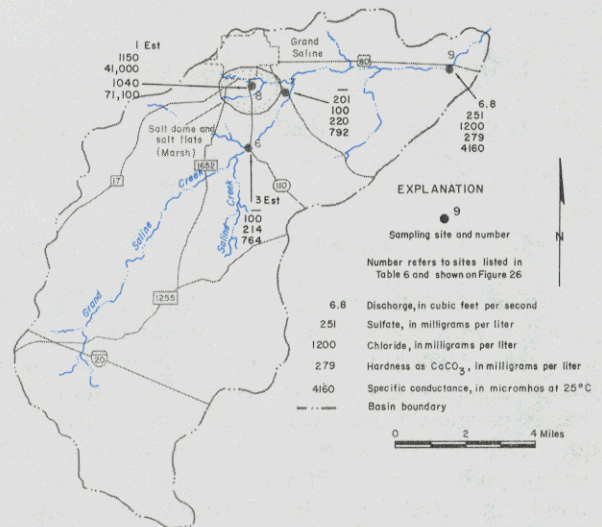


Figure 24.—Quality of Water Sampled From Four Sites in the Grand Saline Creek Basin, February, 1963

In December 1967, the U.S. Geological Survey, in cooperation with the Texas Water Development Board, instituted a daily sampling program at the stream-gaging station near the confluence of Grand Saline Creek and the Sabine River (site 9 on Figures 24 and 26). During the period December 18, 1967, through September 30, 1968, an average amount of 98 tons per day of dissolved solids passed the gaging station. Most of the salt load, about 65 tons per day was sodium plus chloride (Table 5). The concentrations of dissolved solids in the water ranged from 171 to 7,350 mg/l; the discharge-weighted average was 406 mg/l.

The salt load that enters the Sabine River from Grand Saline Creek is diluted and carried downstream past