

OFFICE MEMORANDUM



MICHIGAN

DEPARTMENT OF STATE HIGHWAYS

90

March 14, 1973

To: G. J. McCarthy
Assistant Deputy Director
Engineering and Operations

From: M. N. Clyde

Subject: Water Quality Investigation on Griffin Lake at the Interchange of M 78 and M 15, Research Project 73 TI-148, Research Report No. R-854 (EV-23).

On March 12, 1973 a field study was made of the chloride levels in Griffin Lake, located in the southeast quadrant of the M 78 - M 15 Interchange, Davison Township, Genesee County. The study was conducted by T. A. Herbert, geologist in the Research Laboratory, who has been working on a research project concerning the problem of salt contamination of the surface and ground water near highways. Pertinent details regarding the history of the on-going problem at Griffin Lake were supplied by E. L. Upson, District Engineer, and F. A. Deschamps, Construction Engineer.

Background Information

Concern over pollution of Griffin Lake has existed for some time. The property owners, represented by Richard W., Plymale, D.D.S.; President, Griffin Lakewood Estates Association, succeeded in having the highway drainage that had previously flowed into Griffin Lake diverted away from the lake into a county drain. An 800-ft dike was constructed along the north end of the lake in order to channel water into an existing 12-in. drain. At high water periods, overflow does breach the dike across a concrete spillway. Retention of the fee interest in the lake by the Department has assured retainment of the overflow rights.

Recent run-off from snowmelt and heavy rains has caused overflow into the lake to occur. The property owners have again expressed concern over possible contamination from chlorides entering via roadside drainage water.

Field Study

Water samples were taken from a boat at 24 locations around the edge of the lake on March 12. Access was gained through the R-O-W fence across the spillway. Chemical analyses for the chloride ion were performed in the field with a portable test kit. An additional five samples were taken from water flowing in drainageways in the area of the Interchange for comparison purposes. All water samples from the lake were taken at the surface.

OFFICE MEMORANDUM



MICHIGAN

DEPARTMENT OF STATE HIGHWAYS

90

March 14, 1973

To: G. J. McCarthy
Assistant Deputy Director
Engineering and Operations

From: M. N. Clyde

Subject: Water Quality Investigation on Griffin Lake at the Interchange of M 78 and M 15, Research Project 73 TI-148, Research Report No. R-854 (EV-23).

On March 12, 1973 a field study was made of the chloride levels in Griffin Lake, located in the southeast quadrant of the M 78 - M 15 Interchange, Davison Township, Genesee County. The study was conducted by T. A. Herbert, geologist in the Research Laboratory, who has been working on a research project concerning the problem of salt contamination of the surface and ground water near highways. Pertinent details regarding the history of the on-going problem at Griffin Lake were supplied by E. L. Upson, District Engineer, and F. A. Deschamps, Construction Engineer.

Background Information

Concern over pollution of Griffin Lake has existed for some time. The property owners, represented by Richard W., Plymale, D.D.S.; President, Griffin Lakewood Estates Association, succeeded in having the highway drainage that had previously flowed into Griffin Lake diverted away from the lake into a county drain. An 800-ft dike was constructed along the north end of the lake in order to channel water into an existing 12-in. drain. At high water periods, overflow does breach the dike across a concrete spillway. Retention of the fee interest in the lake by the Department has assured retainment of the overflow rights.

Recent run-off from snowmelt and heavy rains has caused overflow into the lake to occur. The property owners have again expressed concern over possible contamination from chlorides entering via roadside drainage water.

Field Study

Water samples were taken from a boat at 24 locations around the edge of the lake on March 12. Access was gained through the R-O-W fence across the spillway. Chemical analyses for the chloride ion were performed in the field with a portable test kit. An additional five samples were taken from water flowing in drainageways in the area of the Interchange for comparison purposes. All water samples from the lake were taken at the surface.

Findings

The 24 lake samples had a range in chloride values from 110 mg/l to 125 mg/l with a mean of 120 mg/l. This compares well with two samples taken in May 1970 in the main body of the lake by the Water Quality Appraisal Section of the Water Resources Commission. They recorded values of 94 and 100 mg/l. The small difference is probably in the analytical procedures rather than a marked change in the values over time.

Two comparison samples from the water flowing in the ditch on the roadway side of the diversion dike showed values of 60 and 80 mg/l, respectively. Samples from water within the median showed higher values in the range of 400 to 600 mg/l; but these values are within the normal range to be expected along rural expressways. While the flowing water along the roadway was lower in chloride at the time of sampling, it is assumed that higher levels occurred for a short period during the beginning of the run-off period. However, by the time of peak flow and overflow into the lake the chlorides were probably sufficiently diluted to be within the range of samples taken on March 12 (60 to 80 mg/l).

Within the vicinity of the spillway the water was slightly more turbid than the rest of the lake, probably as a result of sediment carried with the overflow. In addition, flotsam littered the shore in the east and north end of the lake near the R-O-W. It would be difficult to determine if this was entirely due to highway litter or not.

The abnormally high chloride concentration of 120 mg/l may represent a slight influx due to the overflow but activities of the property owners themselves tend to elevate the concentration also. Percolation from septic tank drainfields can have as much as 500 mg/l chloride; likewise, water softeners add to the chloride concentration. Normal background levels in the Davison area are in the range of 20 to 50 mg/l chloride.

Conclusions

At this time the chloride limit set at 250 mg/l by the U.S. Public Health Service for drinking water has not been exceeded. There seems to be no great change in the concentration from 1970 levels, at which time no diversion of drainage water was taking place. Some sediment and highway-generated litter is a minor problem due to the proximity to the roadway. The long-term changes in concentration of the drainage water would have to be monitored over a period of several years to be sure of the source of the high chloride levels. Local, non-highway sources of chlorides may be contributing to the problem to a significant degree.

TESTING AND RESEARCH DIVISION

Engineer of Testing and Research