

CHLORIDE CONCENTRATION IN WATER FROM THE UPPER PART OF THE FLORIDAN AQUIFER IN FLORIDA

By
William J. Shampine

This map shows general trends of the chloride concentration of water in the upper part of the Floridan aquifer. Below this part of the aquifer, high chloride water can be found everywhere in the State. The accompanying cross section shows the depth to salty water across central Florida. In the center of Florida, fresh water may be found as deep as 2,000 feet, whereas, along the coast it may extend no deeper than about 200 feet. Chloride concentration in small local areas may deviate from the values represented on both the cross section and the main map.

The Floridan aquifer, which underlies all of Florida, contains high chloride water in the southern part of the State and along most of the east coast. In most of the remainder of the State, the water has a chloride concentration of less than 50 parts per million. In the areas where the Floridan aquifer contains salt water, fresh water is usually available at shallow depths from other aquifers.

Chloride occurs in almost all natural water. Some chloride is contained in rainwater and some is dissolved from surface materials. The amount of chloride contributed to the water from these sources will normally be small in Florida. After the water enters the ground, however, the chloride concentration is generally increased. This increase may result from solution of the rocks and minerals through which the water percolates, mixing with connate water (water that was trapped in the rocks when they were formed), encroachment of salt water from the ocean, or by pollution. Pollutants which usually contain chloride are sewage, industrial wastes, and fertilizers.

The U. S. Public Health Service (1962, p. 33) recommends that chloride in drinking water does not exceed 250 parts per million. The recommended maximum chloride concentration in drinking water is based on palatability

rather than on health requirements; however, high concentrations may be injurious to some people suffering from diseases of the heart or kidneys (McKee and Wolf, 1963, p. 159).

McKee and Wolf (1963, p. 161) report that the following concentrations of chloride normally will not be harmful for the specified use:

1. Domestic water supply	250 ppm
2. Industrial water supply	50 ppm
3. Irrigation	100 ppm
4. Stock and wildlife	1,500 ppm

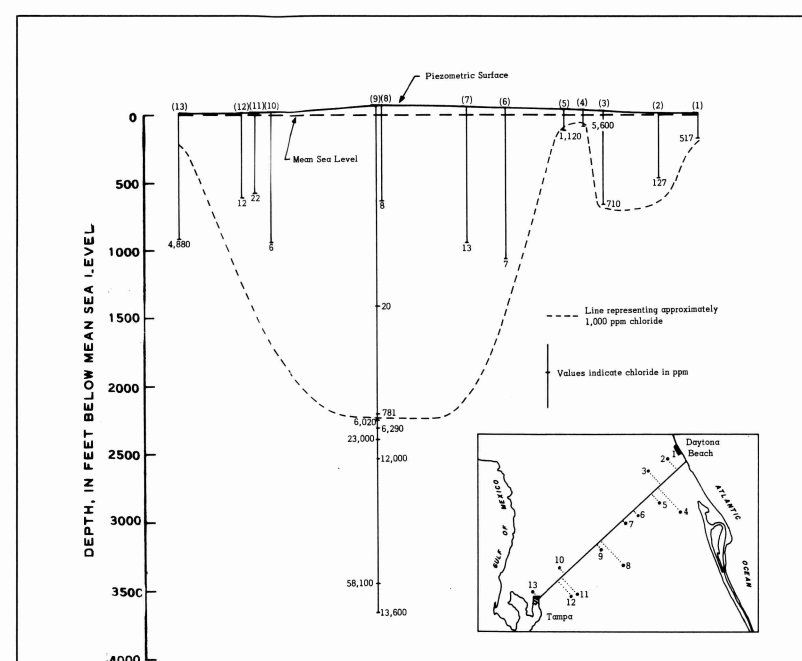
The permissible concentrations of chloride ions or chloride compounds in industrial water vary with the industry. Some of these threshold concentrations (McKee and Wolf, 1963 p. 160) in parts per million are tabulated below:

Industry	Chloride	CaCl ₂	MgCl ₂	NaCl
Brewing	60-100	100-200	50-200	275-500
Carbonated beverages	250	---	---	---
Dairy industry	30	---	---	---
Food canning and freezing	---	---	---	1,000-
Food equipment washing	---	---	---	1,500
Ice manufacture	250	---	---	---
Paper making:	---	300	171-300	300
Groundwood pulp	75	---	---	---
Soda pulp	75	---	---	---
Kraft pulp	200	---	---	---
Sugar making	20	---	---	---
Textile processes	100	---	---	---

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Vertical distribution of chloride content of water in wells across central Florida.
(After: R. N. Cherry, Personal Communication)

DATA AVAILABILITY

- EXCELLENT
(Information taken from detailed studies)
- GOOD
(More than two samples per 250 square miles)
- POOR
(Less than two samples per 250 square miles)

EXPLANATION

PARTS PER MILLION

- Less than 50
- 50-250
- 251-1000
- Greater than 1000

Prepared by
U. S. GEOLOGICAL SURVEY
in cooperation with the
FLORIDA GEOLOGICAL SURVEY
Tallahassee, Florida
1964

0 10 20 30 40 50 MILES

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IN WATER FROM THE UPPER PART
OF THE FLORIDAN AQUIFER
IN FLORIDA**By
William J. ShampinePrepared by
UNITED STATES GEOLOGICAL SURVEY
in cooperation with the
BUREAU OF GEOLOGY
FLORIDA DEPARTMENT OF NATURAL RESOURCES
TALLAHASSEE, FLORIDA
1965
REVISED 1975

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Paper making:				
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FLORIDA DEPARTMENT OF NATURAL RESOURCES
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This public document was promulgated at a total cost of \$325.00 or a per copy cost of \$1.13 for the purpose of disseminating hydrologic data.

