

FLUORIDE AND CHLORIDE IN WATER FROM
DEEP WELLS IN THE CHARLESTON AREA

by J. Kevin Meadows

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Most public-supply wells near Charleston obtain their water from aquifers between depths of 1,500 and 2,000 feet in the Black Creek and Middendorf Formations. Continuing development in the area has resulted in an increase in the number of wells using the aquifers. In 1975, seven deep wells were in use; in 1985, 14 deep wells were in use, withdrawing at least 2.7 million gallons of water per day. Such usage makes documentation and monitoring of water quality in this coastal locality important in order to recognize deterioration of the water supply if it occurs in the future.

Fluoride in the deep ground water in part of the area exceeds the U.S. Environmental Protection Agency (EPA) revised recommended limit of 4.0 mg/L (milligrams per liter) (Federal Register 1986). As Figure 1 shows, fluoride concentrations increase toward the coast.

Chloride is not typically a problem in the area. Concentrations are usually below the EPA recommended limit of 250 mg/L. Of all the chemical species dissolved in ground water, chloride is the best indicator of seawater intrusion (Mercado, 1985); therefore, Figure 2 can be used for comparison with future water quality data. As Figure 2 shows, chloride concentrations increase toward the coast. This is probably a natural trend unconnected with ground-water pumpage. For example, in 1985 the chloride concentration in an Isle of Palms well was no greater than the 170 mg/L reported when the well was completed in 1975.

Selected references

- Colquhoun, D.J., and others, 1983, Surface and subsurface stratigraphy, structure and aquifers of the South Carolina Coastal Plain: University of South Carolina, 78 p.
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- Mercado, Abraham, 1985, The use of hydrogeochemical patterns in carbonate sand and sandstone aquifers to identify intrusion and flushing of saline water: in, Ground Water, September October 1985 Volume 23, Number 5, pp. 635645.
- Park, A.D., 1985, The ground water resources of Charleston, Berkeley, and Dorchester Counties, South Carolina: South Carolina Water Resources Commission Report Number 139, 145 p.

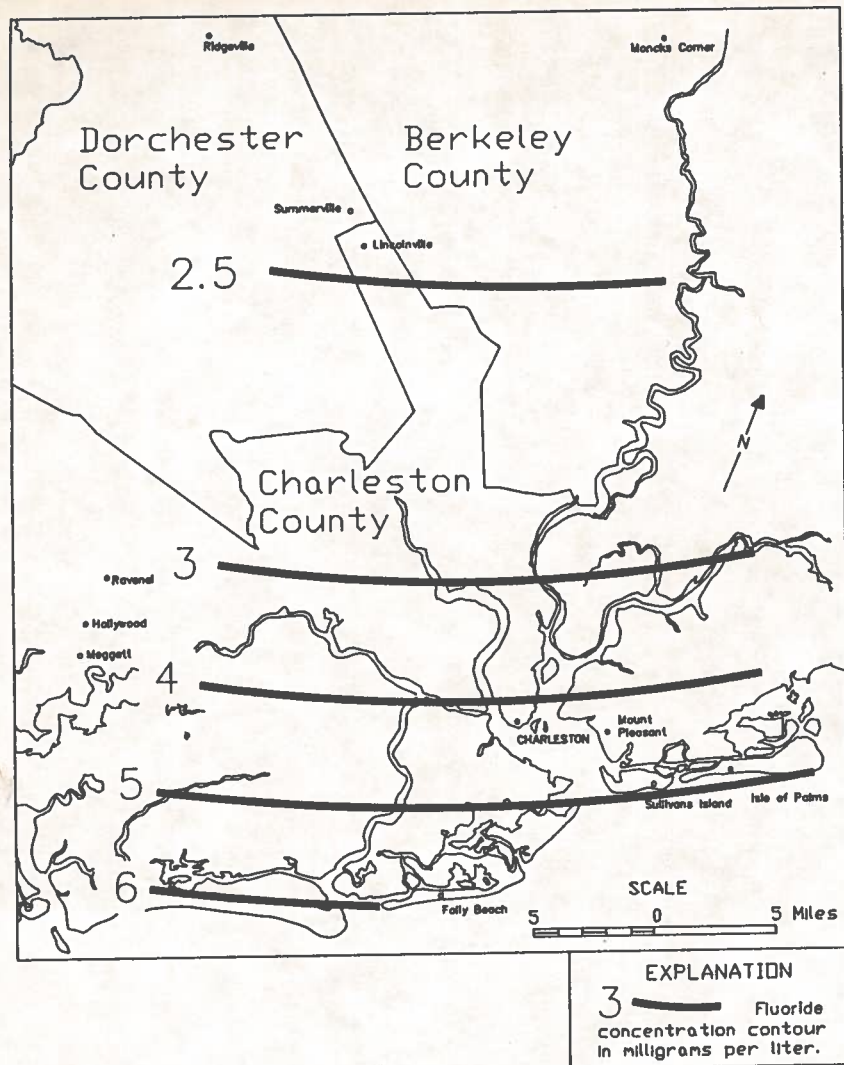


Figure 1. Generalized fluoride concentration in deep wells near Charleston, S.C.

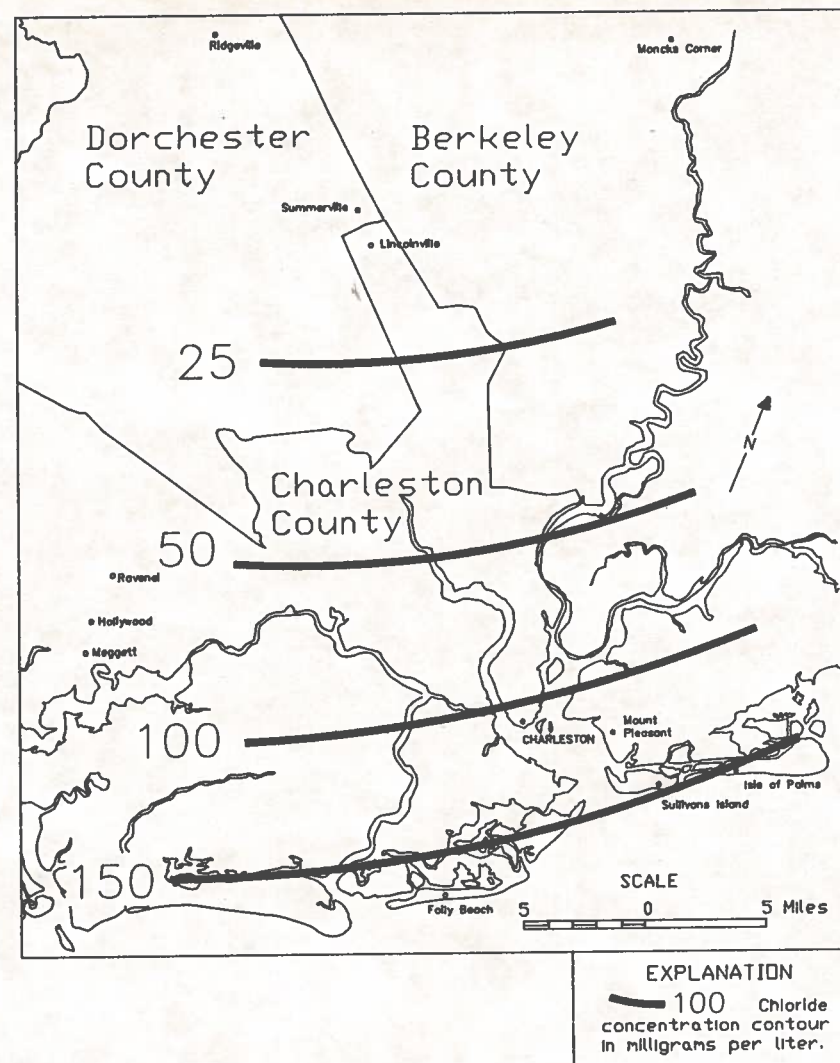


Figure 2. Generalized chloride concentration in deep wells near Charleston, S.C.