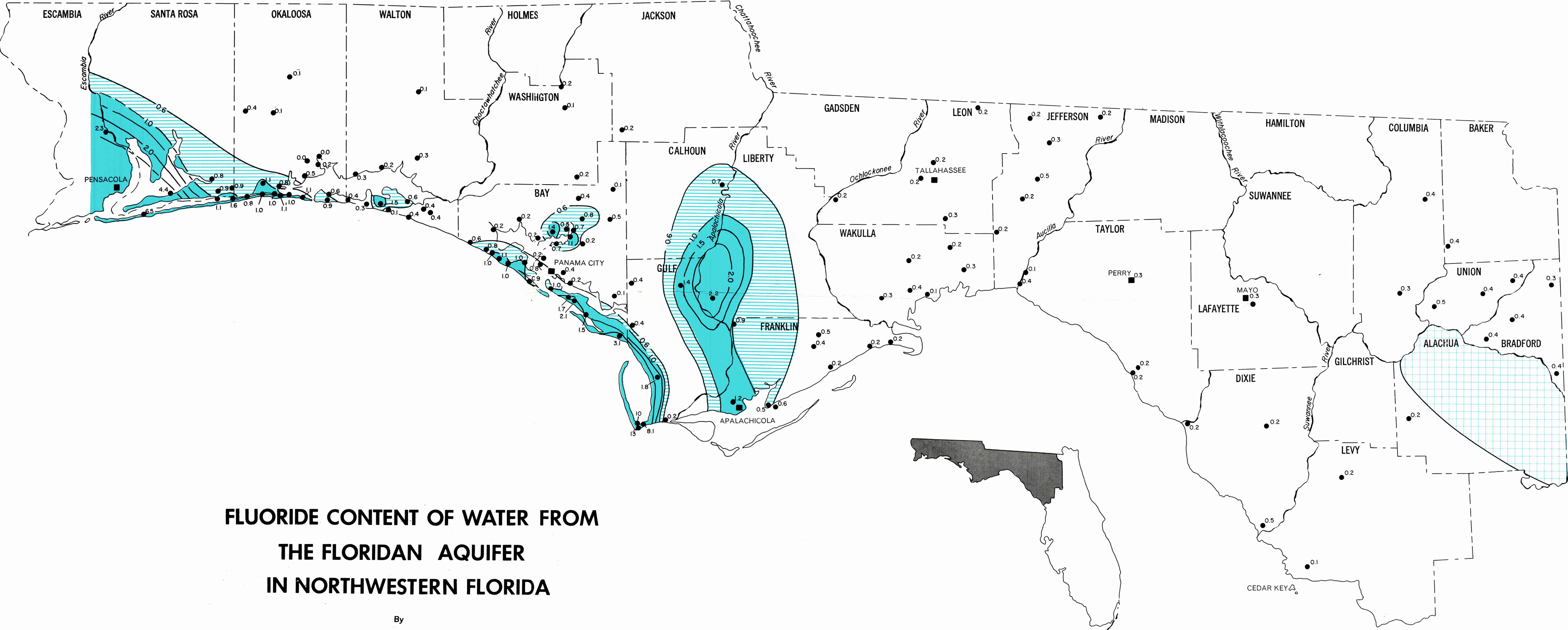




FLUORIDE CONTENT OF WATER FROM
THE FLORIDAN AQUIFER
IN NORTHWESTERN FLORIDA

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Fluoride in drinking water can aid in the prevention of dental caries in children (U. S. Public Health Service, 1962). Low concentrations have no apparent effect and high concentrations may cause mottled enamel known as dental fluorosis. The recommended concentration of fluoride ranges from 0.6 to 1.7 parts per million and varies with air temperature. A lower fluoride concentration in drinking water is considered optimum in areas of high air temperature than in areas of low air temperatures because normally more water is consumed by an individual in areas of high air temperatures. Therefore, the total fluoride intake in a warm area where the concentration is low will be approximately the same as in a cooler area where the concentration is somewhat higher.

The U. S. Public Health Service (1962, p. 8) recommends fluoride concentrations as follows:

Annual averages of maximum daily air temperatures 1/	Recommended control limits Fluoride concentration in ppm		
	Low	Optimum	Upper
50.0-53.7	0.9	1.2	1.7
53.8-58.3	.8	1.1	1.5
58.4-63.8	.8	1.0	1.3
63.9-70.6	.7	.9	1.2
70.7-79.2	.7	.8	1.0
79.3-90.5	.6	.7	.8

1/ Based on temperature data obtained for a minimum of five years.

The annual average maximum daily air temperature for three stations in northwestern Florida reported by the U. S. Weather Bureau were: Pensacola, 74.7° F.; Tallahassee, 77.6° F.; and Perry, 80.3° F. These averages are for the five-year period, 1958-62.

The recommended limits of fluoride concentration in northwestern Florida will vary slightly depending on the air temperatures; however, the limits will be between 0.6 and 1.0 ppm. Areas in which water from the Floridan aquifer generally has fluoride concentrations within the recommended limits are shown by horizontal lines on the map. Areas of generally lower than recommended fluoride concentrations are shown in light blue and areas of generally higher than recommended concentrations are shown in dark blue. Data for Santa Rosa, Okaloosa, and Walton Counties were taken from Barraclough and Marsh (1962), modified slightly where more recent data were available. The analyses of samples collected from 1960 to 1963 were used to construct the map. The locations of all wells sampled and the concentration of fluoride in parts per million are shown.

The Floridan aquifer underlies all the State of Florida and consists of a thick section of limestone which locally may contain lenses of sand and clay. The rocks forming the aquifer are at or near the surface in most of the eastern part of the mapped area and in parts of Holmes, Jackson, and in Washington Counties. In the west-central part of the area, the rocks dip beneath the surface and the top of the aquifer is about 250 feet below the surface near Panama City and about 1,200 feet below the surface near Pensacola. Generally, the wells penetrated only the upper part of the aquifer. The concentration patterns shown on the map are generalized. The detailed studies referenced for Escambia, Santa Rosa, Okaloosa, and Bay Counties resulted in a large number of fluoride analyses and a better definition of the areas of different fluoride concentrations in these counties. More detailed sampling in other parts of the area could reveal other localized occurrences of fluoride different from the general limits shown. Also, the concentrations shown on the map do not reflect the fluoride content of water from a single geologic horizon. Some of the data suggest that the fluoride content of the water may increase with depth of penetration into the aquifer.

Possible sources of fluoride in ground water are naturally occurring minerals that contain fluoride, such as phosphate minerals, topaz, tourmaline, mica, glauconite, fluorite, and possibly others (Carlston 1942; LaMoreaux, 1948; Sinnott and Whetstone, 1962). Of these, glauconite, mica, and phosphate minerals have been found in significant quantities in the rocks of northwestern Florida. No analytical data are presently available to determine whether any of these minerals is a principle source of the fluoride. Water samples analyzed for fluoride were also analyzed for phosphate but no correlation was found between the concentrations of the two constituents. This lack of correlation, however, does not preclude the phosphate minerals as a source of the fluoride.

References

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EXPLANATION

- 1.0 — Isofluor (Shows concentration of fluoride in parts per million; dashed where approximate.)
- 0.3 Well (Number indicates fluoride concentration.)
- Less than 0.6 ppm
- 0.6 to 1.0 ppm
- More than 1.0
- Contour not feasible because of wide local variation. (Range: 0.6 to 1.5.)

