Groundwater fluoride concentration levels in private water supply wells in the eastern Annapolis Valley region, Nova Scotia

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Fluoride (F⁻) is a naturally occurring inorganic species in groundwaters which has significant health implications, particularly for children. It is an essential element in human nutrition as optimum development of teeth and bone depend on its availability. Children are most sensitive to fluorides during the first six years of life when their adult teeth and their bones are still forming. A strong correlation has long been established between low levels of F⁻ in drinking water (and no use of dietary supplements) and increased dental caries (tooth decay) in children. More recently, concerns have been raised over situations where and when the F⁻ intake of children is more than optimum because of the possibility of mild or even moderate fluorosis. Fluoride supplementation or removal from drinking water may therefore be necessary in some groundwater flow system regions.

No detailed inventory and mapping of F⁻ concentrations in the groundwater flow systems of the eastern Annapolis Valley region currently exists. This preliminary study of the spatial and temporal F⁻ concentration levels in groundwaters utilized for drinking water purposes from private wells has been initiated to provide base level data for this region. Fluoride concentrations were analyzed with a solid state Orion No. 9609BN selective ion (combination) electrode (calibrated with TISAB standard solutions). Measurements of pH, Eh, electrical conductivity and temperature were made concurrently at each well site. Well owners were also questioned regarding: (1) their knowledge of the F⁻ concentration in their drinking water, (2) the number and ages of children consuming their well water, and (3) their knowledge of the daily F⁻ intake for children recommended by the Canadian Dental Association.