

## Huron County Groundwater Study

### Summary of Final Report

An executive summary prepared by the County's consultant, Golder Associates Ltd., may be found on page "i" of the report entitled Groundwater Quality Assessment.

#### Clusters of Private Wells Sampled

A total of 177 private wells were sampled and tested from 6 clusters, representing different groundwater conditions in the County. A seventh cluster of 10 wells was sampled for Radium 226 only.

Sampling occurred over a 7 month period from July 2000 to January 2001. Samples were taken by a trained technician using standard sampling procedures. A landowner interview provided information on the characteristics of the well construction, land use and water quality.

Bacteriological analysis was conducted at the Ministry of Health laboratory in London, Ontario, and chemical/physical analysis was conducted at the PSC Analytical Services laboratory in London, Ontario.

Seven clusters of wells were sampled as follows:

P1 - Usborne Tp.; 29 wells; drilled or bored shallow overburden wells < 15 m deep;

P2 - Hullett Tp.; 30 wells; drilled deep bedrock wells; mid-gradient;

M3 - Tuckersmith Tp.; 28 wells; drilled bedrock wells; sinkhole area;

M4 - Ashfield Tp.; 30 wells; drilled bedrock wells; down-gradient;

M5 - Morris-Grey Tps.; 30 wells; drilled shallow bedrock wells < 15 m deep; shallow overburden;

M6 - Hay-Stephen-Usborne Tps.; 30 drilled overburden wells; intermediate overburden;

R7 – Northwest Huron County; 10 drilled wells in a specific bedrock type which can produce R226;

#### Results

Table XV of the final report summarizes the water quality tests of the sampled wells. The following observations are based on the sampling results:

- a high percentage of shallow wells completed in the overburden (from clusters P1 and M6) exceeded the Ontario Drinking Water Standards (ODWS) for total coliform and E. Coli;
- the highest percentage of various toxins were also found in the shallow overburden wells, although all were at trace levels below the ODWS;

- nitrates were present in a high percentage of shallow wells, including shallow bedrock wells where there is less than 15 m of overburden between the surface and the bedrock; although few of these wells exceeded the ODWS for nitrates, the presence of nitrates is a concern regarding the potential for this contaminant to be present in higher concentrations;
- wells drawing water from the overburden generally had higher occurrences of bacteria, nitrate, VOCs, pesticides and TPH than did bedrock wells;
- 4 wells of 177 (2.3%) contained nitrates exceeding the ODWS of 10 mg/l;
- overburden wells are more susceptible to contamination from land use activities than are bedrock wells;
- bedrock wells produce mineralized water resulting from the length of time the water has been in the subsurface (higher concentrations of sodium, sulphate , iron and turbidity);
- nitrate was present in wells in all clusters; lower nitrates were found in deep wells of P2 and M3;
- turbidity increased with iron content, but no significant differences were observed between clusters;
- most wells (85%) exceeded the aesthetic ODWS for total dissolved iron (.3 mg/l), with higher amounts in bedrock wells;
- almost 30% of wells exceeded the sodium health objective of 20 mg/l; highest levels in Hay and Ashfield Tps.;

### **Sentinel Wells**

Sentinel wells are privately owned water wells selected for long term monitoring. These wells were selected based on being of good construction and maintenance and providing typical water quality results for the aquifer. With the consent of the land owner, these wells are recommended for ongoing monitoring to assess water quality changes over time. Sampling is recommended quarterly for the first year, and annually thereafter. Two overburden wells (1 drilled, 1 bored) and 4 bedrock wells (all drilled) comprise the sentinel wells.

### **Recommendations**

The Groundwater Study includes several recommendations:

- Develop broad groundwater protection strategies, because the majority of the County population relies on groundwater sources for drinking water through private, communal, and municipal wells.
- Recommended Components of Strategy:
  - define groundwater resources; (see Rpt. 1 - Resource Assessment)
  - community consultation and awareness program;
  - identify potential contaminant sources; (see Rpt. 1 - Resource Assessment)
  - develop protection policies and regulations; (OP, ZBL, etc.)
  - monitor water quality; (in progress through sentinel wells)
  - manage data;

- prepare emergency plan and contingency plan;
- Tools:
  - Official Plan - protect ground water and surface water resources; quality and quantity; responsible water and waste management practices; evidence of suitable supply before developments approved; not adversely affect the quality and quantity of existing wells; nutrient management strategies; the OP and Zoning By-law are the most effective local tools to protect groundwater;
  - Provincial Legislation - including Environmental Protection Act, Ontario Water Resources Act, Aggregate Resources Act, Health Protection and Promotion Act, etc. and regulations/guidelines (p. 11-12)
- 1. Groundwater Resource Definition
  - define Well Head Protection Areas (WHPA) for municipal wells and key communal wells (a WHPA has been defined for Exeter's water supply);
  - more detailed mapping of aquifer vulnerability throughout the County;
- 2. Community Consultation and Awareness
  - importance of groundwater and the need for aquifer protection;
  - extra effort in WHPAs and vulnerable aquifer areas;
  - include media features, ads, pamphlets (samples in Appendix B) and posters, grade-school program; signage, talks and workshops;
  - address storage, handling and application of pesticides, fertilizers and fuels;
  - emphasize well location, maintenance, decommissioning, water conservation;
  - address public works departments;
  - encourage and possibly cost share new practices in WHPA/vulnerable areas such as NMPs, pesticides/fertilizers/fuels, Environmental Farm Plans;
- 3. Potential Contaminant Sources
  - efforts to identify and decommission abandoned wells, as required under OWRA Reg.903;
  - additional focus on WHPAs
- 4. Water Quality Monitoring
  - sentinel wells;
  - additional monitoring wells in WHPAs;
- 5. Data Management
  - groundwater database including the data from this study, municipal well monitoring, sentinel wells, monitoring wells around landfills, etc., MOE monitoring data, and well record data;
  - other than well water records, most provincial data is not digital and needs to be geo-referenced for use in the County's GIS system;
- 6. Emergency Preparedness and Contingency Plans
  - plans are required for public supply wells to deal with possible contamination events, including notification of officials and the public, clean-up plans and contractors, and back-up water supply;