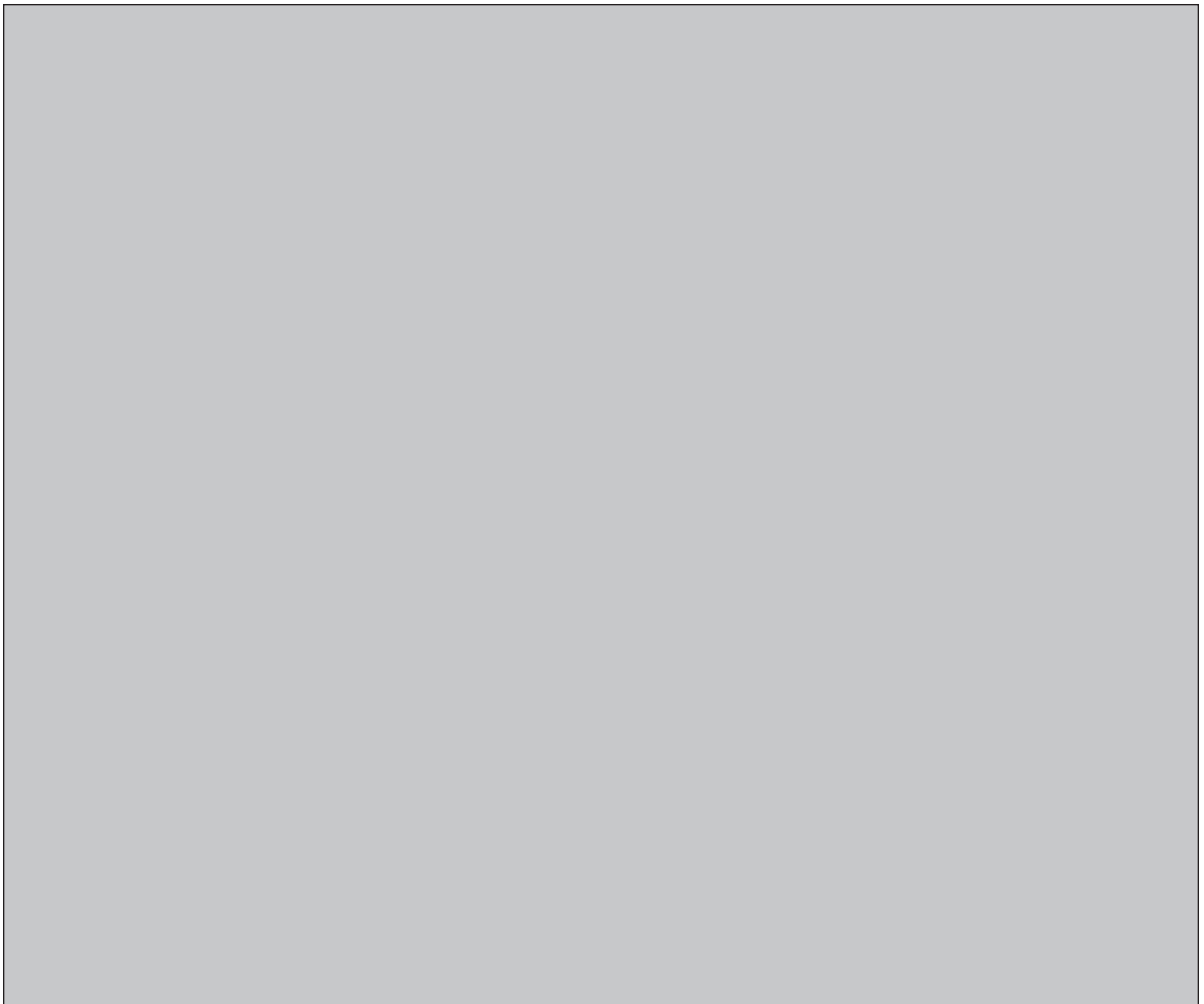


**NWMO BACKGROUND PAPERS**  
**4. SCIENCE AND ENVIRONMENT**

**4-1 CURRENT STATUS OF BIOSPHERE RESEARCH RELATED TO HIGH-LEVEL  
RADIOACTIVE WASTE MANAGEMENT (HLRWM)**

**EXECUTIVE SUMMARY**

**ECOMatters Inc.**



ECOMatters Inc.

## **Background Paper on the Current Status of Biosphere Research Related to High-Level Radioactive Waste Management (HLRWM)**

**July 21, 2003**

### **SUMMARY**

The biosphere is anywhere organisms live. The biosphere research related to high-level radioactive waste management (HLRWM) deals entirely with the potential effects of the various management options that might be considered. Effects in the biosphere on humans or other biota are the ultimate performance criteria for these HLWRM options, so related biosphere research is quite important. The biosphere cannot be a barrier to the spread of contamination, because by definition there are organisms present everywhere in the biosphere, and any of them could be impacted. Thus the biosphere is the potential receptor of contamination or other impacts from a HLRWM facility. We must understand the severity of these impacts and be able to engineer facilities to prevent or minimize them.

Historically, the emphasis in biosphere research related to nuclear environmental contamination was on the protection of humans, especially from contamination in agricultural settings. Since about 1996, there have been rapid developments worldwide to include predictions of effects on non-human biota. Canada has at times been a leader in issues related to biosphere aspects of HLRWM, and continues to play a role with contributions to the scientific literature and involvement in international programs. The underlying scientific discipline, radioecology, has particular strengths in dealing with the transport and dispersion of radioactive contaminants in soil, water and air. It borrows from human health and safety research and is well advanced in the estimation of the additive effects of multiple radioactive contaminants. Radioecology is now adapting scientific methods from other ecological disciplines to deal with the multiple organisms present in natural settings.

Although the biosphere is not usually conceived as a manageable barrier, biosphere research has additional importance because the public identifies with biosphere issues. This aspect is becoming increasingly more important as the HLWRM programs worldwide progress and facilities are built.