



# **State-Of-The-Art Above Ground Mesocosm Facility**

**Location:** InnoTech; Vegreville, Alberta

#### Issues

- Alberta industry faces some of the greatest environmental challenges in Canada, including establishing reclaimed landscapes using novel materials (tailings, etc.), treating wastewater, and developing best practices for environmental monitoring.
- Current and future impacts from development on local terrestrial and aquatic ecosystems remain unclear.
- Prohibition on release of process water to the local environment limits large-scale research and testing of model predictions in natural settings.
- Scaled laboratory experiments do not realistically reflect temporal and seasonal environmental conditions that influence physical and/or biotic processes.
- Complex ecosystem interactions are not captured by bench-scale experiments.
- Natural conditions may alter toxicity and environmental impacts in both upland and wetland environments.
- Field studies typically have limited treatments, low replication, high variability and high costs.

The **above ground mesocosm facility** enables configurable, innovative approaches for:

- Assessing potential environmental and ecological impacts of upstream and downstream oil and gas activities.
- Examining indirect and synergistic responses.
- Incorporating more complex and controlled assessments into current and future research programs.



#### Above Ground Mesocosm Facility





Example configuration of mesocosm: main tank (A) - 5000 L; ancillary tanks (B; drain, fill) - 370 L each.

Instrumentation options include: time lapse and plant root cameras, lysimeters, piezometers, temperature, conductivity and moisture sensors, soil gas flux measurement, and more. Modular configuration allows for custom placement of main and ancillary tanks; more tanks can be added, depending on needs.



Drainage pipes over tailings sand installed in a mesocosm.

Biota	Vascular plants, soil dwelling arthropods, microbiota (bacteria, fungi, etc.)
Matrix	Soil, amendments, tailings, novel materials, water

## FOR MORE INFORMATION, CONTACT:

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Mesocosms can support native species.



The above ground mesocosm facility offers a near field scale research opportunity with 16 main tanks and 32 ancillary tanks.