



# Long-term ecological monitoring:

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A growing need for long-term condition and trend information across Canada's many ecosystems and biomes is prompting an interest in monitoring protocols. The Ecological Monitoring and Assessment Coordinating Office (EMAN CO), a branch of Environment Canada, has developed a series of standardized, peer-reviewed monitoring protocols at both the entry (FrogWatch and PlantWatch) and technical levels.

Practitioners were able to work with these protocols at a recent 2.5 day Ecosystem Monitoring workshop, co-sponsored by FORREX and Parks Canada. The focus of the workshop, held at Kootenay National Park, was EMAN CO's technical Terrestrial Vegetation Biodiversity Monitoring protocol.

The workshop's first stop was at a dry Douglas-fir forest at the south end of Kootenay National Park, near Radium Hot Springs where participants set up monitoring plots. Under the tutelage of **Brian Craig**, Science Advisor with EMAN CO, participants randomly established a series of 20 x 20 metre plots. Using inexpensive, hand-held infrared distance meters, they located each tree spatially within the plot by measuring the tree's distance from two adjacent plot boundaries. Each stem was tagged and identified by species, condition, and diameter at breast height. The height of any veteran trees was estimated using an inclinometer and

tape measure. Back in the classroom, participants logged onto the EMAN CO Data Management System, and entered all of the tree data from each plot.

The result of the data entry was a permanent, exportable electronic data archive, plus an actual spatial map of the plot showing the location and diameter of each tree. The plot map allowed participants to go back out on site and quickly double-check measurements to confirm their accuracy.

## Monitoring Methods

Forests are subject to a host of different monitoring methods, such as permanent sample plots, vegetation resource inventory plots, cruise plots, and forest health plots. The EMAN CO protocol, while not intended to replace any of the standard timber-related measurements, provides one means of tracking long-term ecological change in forest communities. It also offers some significant features:

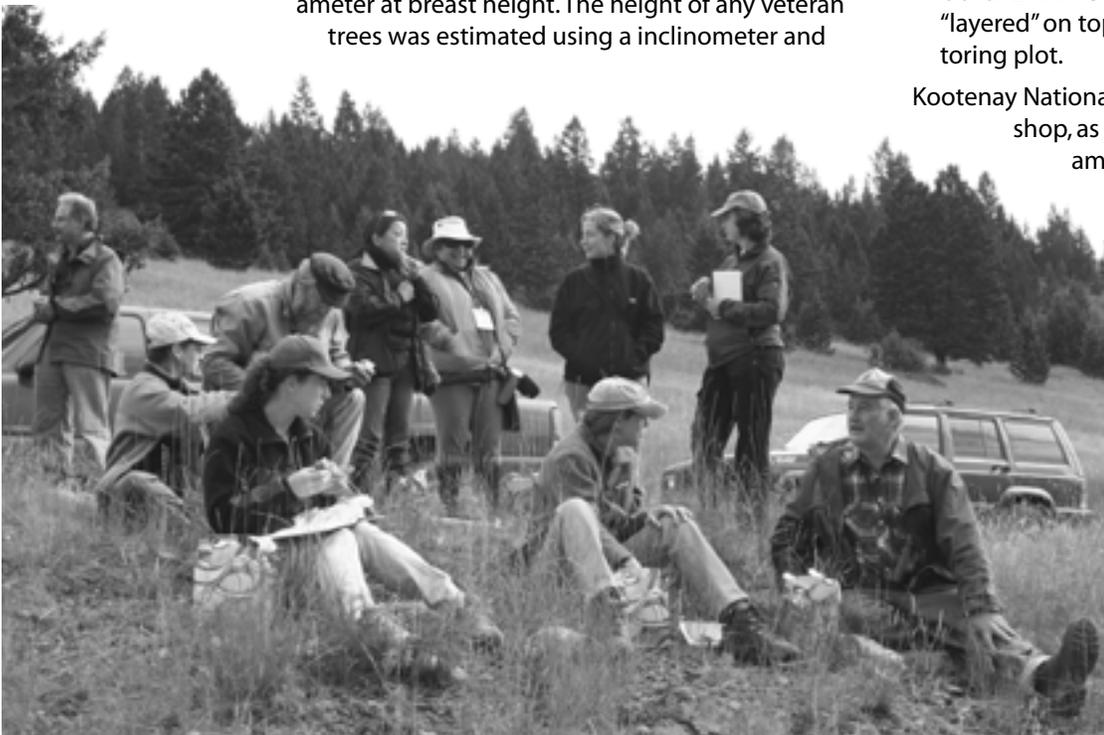
- The protocol is standardized, peer-reviewed, and in use across the entire country.
- It uses standard, inexpensive equipment.
- A well-refined technique and explicit instructions make it useable by interested non-professionals, with a minimum of training.
- The options of electronic data entry and a permanent data archive are available.
- Other EMAN CO monitoring protocols can be "layered" on top of the basic vegetation monitoring plot.

Kootenay National Park (KNP) hosted the workshop, as Parks Canada has started an ambitious program of long-term ecological monitoring. The

monitoring site, close to the BC community of Radium, was a typical example of the overdense, ingrown forests found in many parts of the dry Southern Interior, and is the result of decades of fire suppression. Park officials are attempting to return the forest to a more natural state through carefully applied thinning and burning treatments.

KNP staff also hope these treatments will help entice the endangered Rocky

Participants discuss wetland monitoring during lunch break.



Larry Halverson photo



# Unravelling the Gordian knot



Larry Halverson photo

Mountain bighorn sheep population away from the Radium townsite area. Park naturalists conclude that the sheep's natural habitat—the open benchlands along the sides of the Rocky Mountain Trench—have been so degraded by ingrowth that the sheep resort to grazing along roadsides in the valley bottom. While this phenomenon has delighted many tourists, it has resulted in severe highway mortality.

Park staff are confident that the forest restoration treatments will provide more suitable habitat and forage for the bighorn sheep, but will reassess the EMAN forest monitoring plots over time to help verify the treatment's effect.

**Larry Halverson**, Kootenay National Park's encyclopaedic naturalist and a key player in the forest restoration work, was very pleased with the monitoring. "I can see this as the beginning of a community-based monitoring network, which will help us to understand ecosystem change, focus our research priorities, and assess the effectiveness of our management actions."

## Wetland Monitoring

The Radium workshop ended with a half-day session on wetland monitoring. While recognition of the importance of wetlands to landscape-level biodiversity is growing, wetlands also present major monitoring challenges. Participants gathered around a small, slightly saline wetland on the Nature Trust's spectacular Hoodoos property, south of Invermere, and discussed what would constitute an ideal monitoring suite. First, researchers would analyze the hydrology and chemistry of

the waterbody. Next, they would assess the aquatic life—waterfowl, benthic invertebrates, fish, and amphibians. Then, they would examine the complex and highly stratified riparian vegetation, including the small, but important, grove of aspen at the slough's south end. But even after this exhaustive—and hypothetical—assessment, monitoring would not be complete, participants concluded. This wetland is an integral

part of a larger landscape of dry grassland grading into Douglas-fir forest. Processes at play in the larger landscape, such as timber harvesting, grazing, fire, fire suppression and soil erosion, all have a direct bearing on the life of the wetland. Truly, a monitoring Gordian knot for ecologists and land managers to untangle.

Most participants at the workshop informally agreed on the importance of long-term ecological monitoring, of establishing baselines, and of tracking the impact of treatments and management strategies. Participants also recognized that there is no such thing as a perfect monitoring protocol. However, using standardized approaches, sharing and preserving data, and re-monitoring with the same protocol over time, will help foster a better understanding of British Columbia's complex and magnificent ecosystems. 🌲



Larry Halverson photo

## EMAN CO

The Ecological Monitoring and Assessment Network (EMAN) is made up of linked organizations and individuals involved in ecological monitoring in Canada to better detect, describe, and report on ecosystem changes. The network is a co-operative partnership of federal, provincial, and municipal governments, academic institutions, aboriginal communities and organizations, industry, environmental non-governmental organizations, volunteer community groups, elementary and secondary schools, and other groups/individuals involved in ecological monitoring. The Coordinating Office (EMAN CO) works collaboratively with the EMAN partners to improve the effectiveness of ecosystem monitoring to ensure informed decision making and to create environmental awareness among Canadians. For more information on EMAN and its monitoring protocols, consult <http://www.eman-rese.ca>

*Top photo: Brian Craig (right), EMAN Science Advisor, discussing monitoring with Don Gayton of FORREX.*

*Left photo: Sal Rasheed, Parks Canada, uses an inclinometer to measure tree height.*