CMI Annual Researchers' Meeting
May 5-6, 2007
Radium Hot Springs, BC

Columbia Mountains Institute of Applied Ecology
Box 2568, Revelstoke, British Columbia, Canada V0E 2S0
Phone: 250-837-9311 Fax: 250-837-9311
Email: office@cmiae.org
Web site: www.cmiae.org

This document is available as a free PDF file from *www.cmiae.org*
and look for the link in the "Past Events" section.

Summaries of presentations for most of our conferences and workshops
are available on our web site.

If you would like more information about the
Columbia Mountains Institute of Applied Ecology, please contact us at:

Columbia Mountains Institute of Applied Ecology
Mail Address: Box 2568, Revelstoke, British Columbia V0E 2S0
Street Address: Second Floor, 200 Campbell Avenue, Revelstoke
Phone: 250-837-9311 Fax: 250-837-9311
Email: office@cmiae.org
Web site: www.cmiae.org

(Pages have been left blank intentionally,
to allow for correct pagination in the printed version.)

Acknowledgements

The Columbia Mountains Institute of Applied Ecology would like to thank CMI Directors **Doug Adama and Brendan Wilson** for their roles in organizing the meeting. Thanks also to **Brendan and CMI Director Mike Miller** for being the Masters of Ceremonies at the meeting.

We are grateful for the time taken by our **presenters and field trip leaders** to prepare for and attend the meeting.

And, of course, we'd like to thank the **CMI members and other participants,** who travelled from various towns in British Columbia and Alberta to attend the meeting.

Thank you to the
Nature Conservancy of Canada!

The CMI was pleased to accept the support of the Nature Conservancy of Canada for this meeting. They covered the costs of our coffee breaks. Mugs up to the NCC!

Table of Contents

Meeting Description

Every year CMI members get together to provide updates on their projects, catch up on the news, and hear about new ecological initiatives in southeastern British Columbia. This year, in addition to the regular assortment of talks, we highlighted habitat restoration activities in the East Kootenays.

About 35 people attended this year's CMI Annual Researchers' Meeting at the Seniors' Hall in Radium Hot Springs. The meeting began at 9:00 a.m. on Saturday, May 5 with welcoming remarks from CMI President Brendan Wilson and Greg Deck, Mayor of Radium Hot Springs. Presentations took place all day, with opportunities for further exchange of information at coffee breaks and lunch hour. We reconvened on Sunday, May 6 for a morning of presentations and then attended field trips in the afternoon.

CMI's short Annual General Meeting was held after lunch on May 5.

List of Speakers

1. **Revisions to the biogeoclimatic ecosystem classification system,** Deb MacKillop, Ministry of Forests and Range.
2. **Wildlife research capability project,** Patrick Daigle and Jenny Feick, Ministry of Environment.
3. **Wildland urban interface fires - What's the risk to your house?** Harry Quesnel, Ecotessera Consulting.
4. **FWCP's on-going project to assess impacts of BC Hydro developments in the Columbia Basin,** John Krebs, Fish & Wildlife Compensation Program.
5. **Definition of Coeur D'Alene salamander habitat in Mount Revelstoke National Park,** Lisa Larson, M.Sc. student, University of BC.
6. **Columbia Basin Trust "State of the Basin" reporting,** Cindy Pearce, Mountain Labyrinths Consulting.
7. **A summary of US fire and fire surrogate studies in Montana and Washington,** Patrick Daigle, Ministry of Environment.
8. **Response of understory vegetation to soil disturbance in IDF zone of southeastern BC and applications of remotely sensed data to ecosystem monitoring,** Derek Marcoux, and Robert Magai, Selkirk College.
9. **Ecosystem restoration: Rocky Mountain Forest District experience,** Randy Harris, Ministry of Forests and Range.
10. **Who thinks what and why do they care? Results of EKCP public opinion poll and focus groups,** Nancy Newhouse, East Kootenay Conservation Program.
11. **Ecological restoration work in provincial parks of the Kootenays,** Mike Gall, Ministry of Environment.
12. **Climate change in the Columbia Basin,** Kindy Gosal, Columbia Basin Trust

13. **Ecology and management of wild edible mushrooms in the Kootenays,** Tyson Ehlers, Tysig Ecological Research.
14. **Preparing for Climate Change: A report from the Ministry of Forests and Range,** Kathy Hopkins, Ministry of Forests and Range, Victoria.
15. **Effectiveness Monitoring for Ecosystem Restoration,** Gary Tipper, Nature Conservancy of Canada.
16. **Restoring fish habitat in Goat River,** Jim Clarricoates, Canadian Columbia River Intertribal Fisheries Commission.

Poster

17. Biophysical and Human Factors Affecting Road and Trail Crossings by Wolves, Grizzlies, and Elk in Banff National Park (Poster) by Jenny Coleshill, University of Calgary

Field trips

Gerry Wilkie – local birds, geography and human history.
Bruce Sandbo, Parks Canada – Restoration at Redstreak area of Kootenay National Park.

Presentation Summaries

About the Presentation Summaries

Presenters provided the following summaries or abstracts. Contact information is provided for all presenters, along with an invitation to contact the presenters directly for more details about their work.

1. Revisions to the biogeoclimatic ecosystem classification system

Deb MacKillop, Research Ecologist. Southern Interior Forest Region
Ministry of Forests and Range, Nelson BC
deb.mackillop@gov.bc.ca

The biogeoclimatic ecosystem classification system (BEC) forms the basis of many planning and silviculture decisions across BC. Zones, subzones, variants, and site series are used to assess rare ecosystems, wildlife habitat, Allowable Annual Cut determinations, protected areas strategies, and other management applications. In the Columbia Basin, BEC classification primarily follows the Field Guide produced in 1992 by Braumandl and Curran. Since its publication, several modifications and changes have occurred, including the identification and mapping of several new subzone variants. However, the largest changes to BEC classification since the early 1990s are underway. These changes include creation of new variants, changes to existing zones, and creation of new site series for existing BEC units. Deb explained how these changes will affect the Southern Interior Forest Region over the next few years.

2. Wildlife research capability project

Dr. Jenny Feick, Environmental Stewardship Division, Ministry of Environment, Victoria BC. jenny.feick@gov.bc.ca

Patrick Daigle, Ecosystems Branch, Wildlife Science Section, Ministry of Environment, Victoria BC. patrick.daigle@gov.bc.ca

No abstract provided.

3. Wildland interface fires – What's the danger to your house?

Harry Quesnel, Ecotessara Consultants, Nelson BC.
hquesnel@netidea.com

An increase in house construction during the past few decades has increased the risk from wildland fires in urban-interface areas. In Canada, wildland fires in urban-interface and rural areas have destroyed approximately 400 houses during the past decade. This issue raises

important social questions. What is the risk of wildland fire to a home in a rural area? For rural communities in general and for individual home owners, what is the appropriate risk reduction strategy?

References

Filmon, G. 2004. Firestorm 2003 – Provincial Review. Province of British Columbia, 100 p.

Foote, E.I.D Foote, and J.K. Gilless, 1996. Structural Survival. *In*: R. Slaughter (ed.) California's I-Zone. CFESTER, Sacramento, California.

4. FWCP's ongoing project to assess impacts of BC Hydro developments in the Columbia Basin

John Krebs, Fish & Wildlife Compensation Program, Nelson BC
john.krebs@bchydro.bc.ca

The Fish and Wildlife Compensation Program is conducting a project to evaluate the footprint impacts of BC Hydro developments within the Columbia Basin by determining habitat, primary productivity, and fish and wildlife community changes as a result of dam construction. The footprint impacts project will provide a baseline understanding of the amount, location, and significance of ecosystem impacts of dam footprints in the Columbia Basin, as well as assist FWCP to develop, prioritize, and monitor compensation projects. This talk provided an update on the progress of this project.

5. Definition of Coeur D'Alene Salamander habitat in Mount Revelstoke National Park

Lisa Larson, Revelstoke, M.Sc Student at University of British Columbia
larsonl@interchange.ubc.ca

The Cœur d'Alene salamander (*Plethodon idahoensis*) is a species of Special Concern throughout its limited range in BC, Idaho, and Montana. Given the limited global range and number of occurrences in BC (n=53), there is a requirement to better define the habitat of the species at the landscape scale, at the stream scale and at the microhabitat scale to protect *P. idahoensis* in areas of habitat disturbance, especially along roadsides. The goal of this study is to determine associations between density of Cœur d'Alene salamanders and habitat features on three streams in Mount Revelstoke National Park. We surveyed four sites per stream, 2 sites below 949 m and two sites above 950 m. Night surveys were conducted from June through September during which salamanders were captured, measured, marked, and released at their capture locations. Habitat variables reflecting geomorphology, hydrology, vegetation, and climate were collected in 1 m^2 quadrats at salamander capture sites and in random locations throughout each transect. Salamanders were present on one of six transects above 950 m and on all six transects below 950 m. There was no statistical difference in

salamander abundance between the study streams, and the low recapture rate (3.3%) made it impossible to accurately estimate the population size. All recaptures were within the site of original capture. The density (#/750 m^2) of salamanders on any stream varied (11-79). Individuals were dispersed throughout sites with some small clumps. The majority of salamanders were found within 2 m of the stream centre and 53% were captures within 50 cm of flowing water. Although this species is classified as fully terrestrial, we observed *P. idahoensis* retreating to water and swimming in the streams. The *National Parks Act* requires park managers to monitor wildlife at risk, thereby protecting the population. The data this study provides will be available as a baseline for monitoring this Cœur d'Alene salamander population, providing an important biological indicator of the ecological integrity of Mount Revelstoke National Park.

6. Columbia Basin Trust "State of the Basin" reporting

Cindy Pearce, Mountain Labyrinths Consulting, Revelstoke
cindypearce@telus.net

The State of the Basin project is a vehicle for presenting information on economic, social, environmental, and cultural characteristics of the Columbia Basin Trust area. The project will develop the model, create a prototype (early version) for the fall of 2007, and test this work with two community-based planning projects. After research and advice from the CBT volunteer Working Group, a model is emerging. This presentation addressed the highlights of the model.

Based on a review of other indicator models, with a special focus on approaches for rural areas, the Basin model is being built on the following principles:

- Meaningful to Basin communities - It should reflect what's important to residents and illuminate the diversity of the Basin.
- Adds value – It should build on and go beyond data/information that is available from other sources.
- Credible – Information and interpretation should be accurate and trustworthy.
- Affordable – The model should be achievable with the resources available for the prototype, and be continued with reasonable resources over the long-term.

The State of the Basin Report will be interesting and useful to:

- Local governments
- Columbia Basin Trust
- Businesses
- Schools, colleges
- Media
- Community and regional organizations (Community Foundations, Chambers of Commerce, social service groups, etc.)
- Libraries
- Researchers

An ongoing State of the Basin reporting system has many potential uses. The most important are to:

- Inform citizens and organizations about the people, natural environment, communities, and economy of the Basin by providing accurate, credible, timely, and accessible information.
- Encourage understanding of complex issues and trends over time, including into the future when possible.
- Signal whether conditions are moving towards or away from desired trends to highlight successes so they can be celebrated and identify significant issues, ideally before they become critical.
- Motivate discussion and collective action.

As an organization the Columbia Basin Trust can use the reporting information to:

- Support strategic thinking, planning decisions, and program implementation.
- Improve accountability by being better informed about Basin conditions.

Based largely on two models for rural areas – the *Measuring our Progress*[1] reports from the Islands Trust on BC's Gulf Islands, and the *Community Accounts*[2] for the province of Newfoundland - the project team is evaluating a model with these components:

Components	Description
 **Data links**	On-line links to original data that is available from existing sources such as BC Stats, Stats Canada, government agencies, research organizations, school districts, municipalities, regional and community organizations, etc.
 **Web-based Community Statistics/Reports**	On-line access to community-based statistics and reports. Ideally the system would allow data to be aggregated at a number of different geographic scales that are pre-defined, or possibly user defined (i.e. municipalities, municipalities and local regional district areas, local health areas, regional districts, etc.). Implementing this component of the model depends on support and /or contributions from other organizations (potentially BC Stats, IHA and/or Selkirk College).
 **Support**	Access to individuals who are knowledgeable about particular types of information such as census data, health data and environmental data, and are able to assist with interpreting information about local areas. This could be provided by individuals within existing organizations rather than by CBT.
 **Basin-wide Indicator Report**	Every 2-3 years the Trust would compile information at the Basin scale and issue a web-based and paper report (ideally in conjunction with a symposium). These reports would highlight where the Basin as a whole, and Basin communities are doing well, as well as areas needing attention. In alternate years the Trust may choose to issue special reports on key topics of interest to Basin residents.

[1] http://www.islandstrust.bc.ca/poi/mop.cfm

[2] http://www.communityaccounts.ca/CommunityAccounts/OnlineData/getdata.asp

An indicator is a factor we can measure to provide objective information and clues about conditions and trends. In most indicator reporting models indicators are organized within a framework so users can more easily find relevant information. The project is testing the organizing framework (at the right) which is used in Newfoundland's *Community Accounts*. This framework was developed through a partnership with Memorial University.

The team is now refining a list of indicators and investigating options for the data links and web-based community statistics/reports components. During April and May the team will be meeting with groups and individuals in the Basin to seek input on this emerging model and the suggested indicators.

For more information on the State of the Basin Report:

http://www.cbt.org/stateofthebasin

7. *Summary of US fire and fire surrogate studies in Montana and Washington*

Patrick Daigle, Ecosystems Branch, Wildlife Science Section, Ministry of Environment, Victoria
patrick.daigle@gov.bc.ca

The Fire and Fire Surrogate Study (FFS) has been undertaken to address fuel build-ups and restoration issues across the US. Two FFS study sites, located in Montana and Washington, are in low-elevation dry forests similar to those in the southern interior of BC.

The FFS long-term study sites are to test several hypotheses:

Hypothesis 1: Forest ecosystems are best conserved by restoring ecosystem structure. (Tested by the cut-only treatment)

Hypothesis 2: Forest ecosystems are best conserved by restoring ecosystem processes. (Tested by the burn-only treatment)

Hypothesis 3: Restoration of sustainable forest ecosystems requires both process and structural restoration. (Tested by the cut-burn treatment)

Hypothesis 4: Forest ecosystems are best conserved by passive management – i.e., "let nature take its course." (Tested by the control or "no treatment").

These treatments typify options managers are considering for fuel hazard reduction and ecosystem restoration. Researchers are addressing treatment (and no treatment) effects on fuels, soils, wildlife, native and alien vegetation, tree mortality and growth, bark beetles, and pathogens. Findings will help managers prioritize and plan areas for treatment and predict treatment outcomes.

For more information:

Fire and Fire Surrogate Study national website:
http://frames.nbii.gov/ and look for the link to the Fire and Fire Surrogate Study, which is:
http://frames.nbii.gov/portal/server.pt?open=512&objID=363&mode=2&in_hi_userid=2&cached=true

Fire and Fire Surrogate Study at the Lubrecht Forest (Montana) website:
http://www.forestry.umt.edu/research/MFCES/programs/FFSL/FFSPage/Default.html

8. *Response of understory vegetation to soil disturbance in IDF zone of southeastern BC and applications of remotely sensed data to ecosystem monitoring*

Derek Marcoux, Robert Magai, and Margaret Magai, of Selkirk College; and Mike Curran, BC Ministry of Forests and Range
dmarcoux@selkirk.ca

This research studies soil disturbance effects on understory vegetation and the application of remotely sensed data in three replicated Long-Term Soils Productivity sites in southeastern British Columbia. Forest floor removal reduced total cover of vegetation; and soil compaction had little effect on vegetation cover. Rough fescue cover increased significantly over five years where the forest floor was retained. Total species richness and diversity increased after canopy removal. Grass diversity increased under forest floor retention and decreased under forest floor removal and heavy compaction. Forb diversity increased with organic matter removal. Soil rehabilitation reduced vegetation cover and organic matter amelioration did not affect vegetation cover greatly. Remotely sensed vegetation cover data detected trends in cover classes but was not strongly correlated to ground data. This study indicates that vegetation cover is a suitable indicator of severe soil disturbance and may be useful as a visual classification system in adaptive forest management.

9. Ecosystem restoration: Rocky Mountain District experience

Randy Harris, Ministry of Forests and Range, Cranbrook
randy.harris@gov.bc.ca

Since the 1950s the Rocky Mountain Trench of British Columbia has lost 50% of its natural grasslands by ingrowth of ponderosa pine and Douglas fir into the margins of the grasslands. The loss of forage resulted in overgrazing by both wildlife and range cattle and considerable contention over the allocation of the resource. The increasing fuel load in the forest was also raising concerns about interface fires amongst local residents. After some twenty years of effort all stakeholders (ranchers, hunting groups, naturalists, community representatives, the forest licensees, the Ministries of Environment and Forests & Range) met and came to a consensus of opinion and action in 1997 under the umbrella of the Kootenay Boundary Land Use Plan. The legal direction produced was the Natural Disturbance Type 4 guidelines that was further enhanced in 1998 by the planning document "Blue Print for Action" covering ecosystem restoration.

Based on the direction by the higher level plans the decision was made to manage 118,000 hectares of valley bottom marginal forest land to a mosaic of shrub lands, open range, and open and closed forest. The driest sites least suited for tree growth were to be managed as open range (<75 total stems/ hectare). Slightly better growth sites were to be managed for open forest (76 to 400 total stems/ hectare) and the moister mesic sites as conventional managed forest. Management option was made based on local knowledge, site indices, aspect and crown closure of the existing forest; precision in delineating the areas and stocking regime can be made at the prescription level. Timber Supply Review estimated that impact to the annual allowable cut was minimal. There is a goal to treat 4000 hectares of forest each year for the next twenty years to meet the landscape level objective.

This talk built upon previous presentations on ecosystem restoration given at this meeting, by focusing on the technical and operational considerations that need to be addressed in a large scale open forest ecosystem restoration program. It used the Rocky Mountain Forest District as an example and notes the importance of partnerships with other stakeholders such the Ministry of Environment, the Habitat Conservation Trust Fund, the Fish and Wildlife Compensation Program, the various associations of range licensees and forest licensees, and the Rocky Mountain Trench Natural Resources Society in delivering such a program.

For more information visit the web site of the Rocky Mountain Forest District:

http://www.for.gov.bc.ca/drm/

10. Who thinks what and why do they care? Results of EKCP public opinion poll and focus groups

Nancy Newhouse, East Kootenay Conservation Program, Invermere
ekcp@cyberlink.bc.ca

The East Kootenay Conservation Program (EKCP) is a partnership of over 40 organizations that share a common vision of landscapes that sustain biological diversity and ecological processes, economic and social well being, and communities that demonstrate the principles of environmental stewardship for future generations.

A recent initiative of the EKCP was hiring Cameron Strategies, a professional polling company, to survey residents of the Columbia-Kootenay region to determine values towards water, wildlife, agriculture, economic development, and private land conservation issues. It also assessed the willingness of residents to establish a conservation fund at the local government level. Poll results indicated strong support for conservation.

The telephone survey was conducted with a random and representative sample of 751 East and West Kootenay residents in 2006. The survey has a margin of error is +/-3.6%, 19 times out of 20. The *Regional Values and Priorities Study* found that people place a high value on ecological goods and services, including clean water, clean air, wildlife, and open spaces.

Survey Results

The most important issue facing the Columbia-Kootenay region is:

- Clean air & water/waste management (19%)
- Jobs & the economy (17%)
- Health care/hospitals (15%)

Columbia-Kootenay residents feel that the most valuable assets that contribute to quality of life are:

- Clean environment (27%)
- Quality/way of life (22%)
- Wilderness/natural beauty (22%)

Residents are most concerned about:

- Safety of drinking water (66%)
- Loss/extinction of wildlife species (57%)
- Air quality (55%).

Columbia-Kootenay residents agree that it is important to:

- Have locally grown food products that support locals (88%)
- Conserve private lands as a good way to conserve wildlife/landscapes (83%)

- 94% of Columbia-Kootenay residents feel it is important to look after or conserve the private land in valley bottoms in its natural state.

Local Conservation Fund Proposal

- 89% of Columbia-Kootenay residents support the idea of creating a dedicated conservation fund to support conservation initiatives.

Residents that support a conservation fund feel that the following are important initiatives to support with a dedicated conservation levy:

- Restoring fish and wildlife habitats (97%)
- Improving drinking water (93%)
- Conserving farms and ranches (92%)

Based on strong public interest in a local conservation fund, EKCP is considering putting forward a proposal to the Regional District of East Kootenay. The proposal will likely recommend that:

- Through a service bylaw, a dedicated fund be established to support local conservation projects for water quality, wildlife conservation, and farm land/natural areas.
- The fund should be supported by a small charge on all property taxes, with a total annual target of $1,000,000.
- The fund could provide "leverage" to federal, provincial and private funding that require matched contributions.
- An independent Review Board be established to assess expenditures based on established criteria. The board would include representatives of social, environmental, and economic sectors, First Nations, RDEK, the EKCP, and the general public.

The East Kootenay Conservation Program is a partner-based organization that facilitates communication and coordination to achieve our common goals. Our vision is to have landscapes in the East Kootenay that sustain naturally functioning ecosystems as well as economic and social well being, and to create communities that demonstrate the principles of environmental stewardship for future generations.

For more information on the East Kootenay Conservation Program:

www.ekcp.ca

11.Ecological restoration work in provincial parks of the Kootenays

Mike Gall, Ministry of Environment, Nelson
mike.gall@gov.bc.ca

Mike's talk addressed the ecological restoration work in provincial parks of the Kootenays. He is wrapping up a multi-year ER project at Kikomun Creek Park and now starting another at Premier Lake Park. The initiative at Premier is interesting as it is a collaborative working venture between BC Parks, the Ktunaxa Kinbasket Development Corporation, and a contractor that has been working for BC Parks for years on ER projects. Lessons learned at the Kikomun project are being incorporated into the Premier project.

12.Climate change in the Columbia Basin

Kindy Gosal, Columbia Basin Trust, Golden
kgosal@cbt.org

Kindy is with the Water Initiatives Program of the Columbia Basin Trust. He spoke on what the regional climate was like in the past and what we can expect in the future.

For information on the Water Initiatives Program:
http://www.cbt.org/water/

For the 20 page document titled "Climate Change in the Canadian Columbia Basin" (PDF download), go to:
http://www.cbt.org/Files/ColumbiaBasinClimateChangeDialogueBrochure[3].pdf

For the background science document which was the basis for the above report, go to:
http://www.cbt.org/Files/ClimateChangeAnalysis.pdf

13.Ecology and management of wild edible mushrooms in the Kootenays

Tyson Ehlers, Tysig Ecological Research, Winlaw
tysig@uniserve.com

British Columbia's forests host a great diversity of fungi. It could also be said that fungi host a great diversity of forests in British Columbia. Fungi perform essential ecological functions and many produce gourmet and medicinal mushrooms. Some of these mushrooms are valuable non-timber forest products. Over 40 species of mushrooms have been commercially harvested in the province. Major commercial species include the pine mushroom (*Tricholoma magnivelare*), chanterelles (*Cantharellus spp.*) and morels (*Morchella spp.*). Commercial harvests of wild mushrooms contribute significantly to regional economies, yet

there has been very little effort to manage forests for wild mushroom production. Recent research has focused on the ecology and management of pine mushrooms and chanterelles. This research has produced habitat models and other useful information to incorporate wild mushrooms into sustainable forest management.

14. Stoddart Creek habitat restoration: A case study in developing and implementing a restoration project

Doug Adama, Adama Wildlife
damawildlife@uniserve.com or doug.adama@bchydro.com

The slopes of the Rocky Mountains above the Invermere and Radium area have long been recognized as important winter range for Rocky Mountain Bighorn Sheep. A habitat restoration plan was developed to increase forage production in this area, near Stoddart Creek. The plan identified the presence of the noxious weed leafy spurge (*Euphorbia esula*), and recommended delaying treatment until leafy spurge was brought under control. Throughout the 1990's, the biological control agent *Apthona nigriscutis* (a flea beetle) was dispersed throughout the area and by 1999 leafy spurge was brought under control. In 2000, 60.6 hectares on the north side of Stoddart Creek was treated mechanically through timber harvesting, slashing and sloop burning. Presently, mechanical treatment of 110 hectares on the south side of Stoddart Creek is underway and a prescribed burn is planned for the spring of 2008. The Fish and Wildlife Compensation Program are implementing these projects in conjunction with the Ministry of Forests and Range, the Ministry of Environment, and the East Kootenay Regional District.

The intent of this presentation is to describe the complexity of developing and implementing restoration prescriptions. Although the impetuous of the project was primarily to improve winter range for bighorn sheep, the restoration prescriptions also address archeological values, recreational values, forestry values, and other ecological values such as species at risk. Furthermore, due to the proximity of rural properties, fire-interface concerns are also considered. To ensure the objectives of these projects are met, forage production, understory vegetation, stand structure, snag retention, course woody debris, and crown and surface fuel loading will be monitored. Preliminary monitoring results will be presented.

*** *Unfortunately Doug was ill and not able to give his presentation at the meeting. The abstract is included here for those wishing to contact Doug regarding this project.*

15. Preparing for Climate Change: A report from the Ministry of Forests and Range

Kathy Hopkins, Ministry of Forests and Range, Victoria
kathy.hopkins@gov.bc.ca

By the end of the 21st century, the mean annual temperature for western North America could be 2 - 5 ºC above the mean annual temperatures of the last 1000 years (International Panel on Climate Change 2001), precipitation changes are expected, and climatic variability may increase.

These changes will significantly affect forest and range ecosystems and the sectors and communities that rely on them. Projected changes include migration of some species northward and up in elevation, new assemblages of species occurring in space and time, overall loss of biodiversity, and changes in disturbance regimes, forest productivity and hydrology. These changes are expected to have a number of adverse, and in some cases, positive effects on British Columbia's forest and range resources.

To prepare for these changes, BC's Chief Forester initiated a task team in 2005 and released a report in 2006 on preparing for climate change. The report identifies potential risks and opportunities, knowledge and research gaps, and some short- and long-term actions that could be taken. It also includes a number of recommendations for adapting to impacts on BC's forest and range resources.

As a member of the Chief Forester's Climate Change Task Team and now the Ministry's technical Advisor for Climate Change, Kathy Hopkins spoke to highlights of the report, actions to date, and plans for the future. These include, for example, plans and actions under the Future Forest Ecosystem Initiative, and results of a scoping study for vulnerability assessments.

For more information:

http://www.for.gov.bc.ca/mof/Climate_Change/

16.Effectiveness monitoring for ecosystem restoration

Gary Tipper, Nature Conservancy of Canada, Kimberley
gktipp@telus.net

Topics covered in this talk were:

- Importance of long-term monitoring
- Nature Conservancy of Canada (NCC) effectiveness monitoring framework
- NCC effectiveness monitoring and NDT4 effectiveness Monitoring
- Monitoring at Kootenay River Ranch

What is effectiveness monitoring

Effectiveness monitoring is the process of determining if an activity, or strategy, achieved its stated goal or objective (Noss and Cooperrider 1994). It can apply to objectives for biophysical variables (conservation targets, threats, resources), socio-economic variables, or the process of conservation planning and management.

Why is effectiveness monitoring important?

Effectiveness monitoring allows us to evaluate, increase, confirm, and promote the effectiveness of our conservation efforts.

Adaptive management goals

- To monitor and evaluate the effectiveness of NCC actions (e.g., restoration, best management practices, invasive species removal, etc.) for meeting conservation management objectives and conserving biodiversity.
- To track and assess the status of biodiversity targets and threats over time.
- To adapt conservation and stewardship strategies according to effectiveness of past and ongoing strategies and status of biodiversity indicators.

Accountability goals

- To demonstrate effective use of conservation funds.
- To demonstrate progress toward and achievement of conservation goals and commitments shared with landowners, land-donors, partner organizations, local communities, and other stakeholders to whom we are accountable.

NCC's national effectiveness monitoring framework

- Characterize the situation. (This leads to the formulation of management objectives)
- Design the evaluation approach.
- Plan and implement the monitoring procedures.
- Implement conservation strategy.
- Communicate monitoring result to enhance conservation success.

Trench ecosystem restoration and NCC

- The Trench ecosystem restoration program is the largest and longest running terrestrial restoration initiative in BC.
- Restoration prescriptions are designed to achieve a number of objectives.
- Long-term monitoring is already on-going. NCC will use existing regional methodology.
- The Trench effectiveness monitoring program fits into NCC's national framework i.e. complementary processes.
- NCC will use Kootenay River Ranch as a pilot.

Kootenay River Ranch restoration objectives

- To re-establish historic stand structure and ecological processes.
- To maintain critical ungulate winter range in a healthy condition.
- To maintain/restore critical habitat for Red- and Blue-listed species.
- To reduce the risk of catastrophic wildfire.
- To promote the production of tall, large diameter conifers (including recruitment of wildlife trees and snags).
- To minimize/reduce noxious weed infestations.

Kootenay River Ranch prescription

- Slash to open range/treed grassland densities: 0-100 sph (stems per hectare) or
- Slash to treed grassland/open forest densities: 50-150 sph.
- Slash all stems <20 cm.
- Slash all Lodgepole pine regardless of size.
- Select Py over Fdi.
- Maintain all stems, except Lodgepole pine >30 cm.
- Maintain all Lw.
- Slash abatement in slash removal zones.
- Product may be removed.
- Slash may be burned (broadcast or sloop).

Setting goals and objectives

Broad visionary goals: "restore historic ecosystem structure".
Middle-range goals/objectives: "restore habitat for badger".
Specific (conservation/management) objectives: "Increase the density of bluebunch wheatgrass at the Kootenay River Ranch by 15% between 2007 and 2012."
Specific (conservation/management) objectives: are detailed statements of the desired future condition of an attribute of interest or its indicator. They may be quantitative or qualitative. An example of one specific objective (given a middle-range objective to "sustain or restore viable populations of all vulnerable and keystone species") is to "Increase the density of *Lomatium cookii* at the Agate Desert Preserve by 20% between 2003 and 2008." (Elzinga et al. 2001).

Selecting Indicators
NCC is also interested in monitoring social and economic indicators.

NCC wish list: presence known
Vegetation
- Ponderosa pine woodlands
- Interior Douglas fir forests
- Antelope brush (*Purshia tridentata*) plant communities
- Grassland plant communities
- Wildlife trees (big trees and snags)
- Big larch

Wildlife
- Mammals
- badger
- ungulates

NCC wish list: presence unknown
- Two surveys have been completed for rare plants and rare plant communities; none have been located.
- Mammals: Townsend's big-eared bats
- Cavity Nesters: Williamson's sapsucker, Lewis's woodpecker, Western screech owl, Flammulated owl
- Songbirds (broad-scale, all-encompassing inventories will be conducted): Bobolink, Brewer's sparrow, Laconte's sparrow
- Other birds: long-billed curlew, short-eared owl
- Amphibians and reptiles: painted turtle, western toad
- Invertebrates: Blue damselfly. Dionne's copper.

Indicator selection
Although one may want to measure response of grizzly bears to restoration, it may not be the most appropriate target given the time and resources. In such a case it may be better to monitor habitat quality and other proxy indicators. It is important to use different types of indicators to ensure you have a comprehensive monitoring program in place.

Function based: would have to measure proxies of ecosystem function – like the amount of bare soil or litter as a proxy for hydrologic processes
Species based: at risk, focal species and functional group (e.g. bunchgrasses)
Structure based: essential for dry forest restoration as it also serves as a form of implementation monitoring i.e. did you achieve the stand structure you set out to achieve?

Determining Goals and Objectives
- Based on historic range of variability (if available).
- Value judgments based on expert opinion i.e. 10% cover of bluebunch wheatgrass is very good.

- Accepted targets in the literature e.g. 'Habitat Attribute Targets for Red and Blue Listed Wildlife Species and Plant Community Conservation' (Cooper et al. 2004).

Determine Method of Evaluation

- Existing data
- What data needs to be collected
- How is the data to be collected?
    - Retrospective
    - Change over time
    - Spatial control
- What is the regional context i.e. is a plan in place?

Look first to existing data, second to new data collection. This may involve looking at past, present or future conditions (e.g., retrospective studies; alternative futures simulation modeling). Based on data already available, determine what data needs to be collected. Determine how the data are to be collected:

- Retrospective, i.e. has the work already been done?
- Change over time (usually the case)
- Use of spatial control. This is the ideal situation as you can determine change over time and also change in relation to an untreated control. Unfortunately, there are rarely resources available to set up a spatial control.

Monitoring Currently Underway

- Vegetation monitoring
    - Species composition/diversity (as per Trench effectiveness monitoring protocol)
    - Overstory structure/health (as per Trench effectiveness monitoring protocol)
- Bird and bat monitoring
    - Targets to be selected by Manning, Cooper and Associates
- Implementation monitoring

Evaluating Success

"A conservation target [is defined] as conserved when all of its key ecological attributes are maintained or restored within some explicitly delineated range of variation [the acceptable range of variation] over space and time, the limits of which constitute the minimum conditions for persistence of the target." – Parrish et al. (2003).

Communicate Results

Clear communication of results is recognized as being critical to have monitoring results incorporated into management decisions and to satisfy external demands for measurable success. The scorecard – each property will be assigned a letter grade based on the results of monitoring.

References

John M. Cooper, Chris Steeger, Suzanne M. Beauchesne, Marlene Machmer, Lynne Atwood, E. Todd Manning. 2004. Habitat Attribute Targets for Red and Blue Listed Wildlife Species and Plant Community Conservation.

Elzinga, C.L., D.W. Salzer, J.W. Willoughby, and J.P. Gibbs. 2001. Monitoring Plant and Animal Populations. Blackwell Science, Malden, M.A.

Noss, R.F. and A.Y. Cooperrider. 1994. Saving nature's legacy: protecting and restoring biodiversity. Island Press, Washington, D.C.

Parrish, J.D., D.P. Braun, and R.S. Unnasch. 2003. Are We Conserving What We Say We Are? Measuring Ecological Integrity within Protected Areas. BioScience 53:851-860.

17.Restoring fish habitat in the Goat River

Jim Clarricoates, Canadian Columbia River Intertribal Fisheries Commission, Cranbrook
jim@ccrifc.org

The Goat River is a tributary to the Kootenay River and is located few kilometres upstream of the South Arm of Kootenay Lake at Creston, BC. The Goat River was a very large and important kokanee salmon spawning channel and could produce up to 90,000 spawners per year. First Nations once depended on the Goat River for sustenance. The Goat River was also important habitat for endangered Kootenay River Burbot and endangered Kootenay River White Sturgeon.

Urban settlement, agriculture, highway development, flood control, and hydro-electric development have affected the Goat River fishery. Today no kokanee spawn in the Goat River and the last 2 spawning kokanee were identified in 2001. Surveys for spawning Burbot have identified only 16 adults. Local residents, anglers, and First Nations were concerned with the status of the fishery and asked for assistance from the Columbia Kootenay Fisheries Renewal Partnership. The local dyking authority was also concerned with dyking plans and maintenance to protect private lands from flooding and erosion.

The Columbia Kootenay Fisheries Renewal Partnership and the Canadian Columbia River Intertribal Fisheries Commission worked with affected parties to look at alternatives to the destructive erosion and flood protection works. Plans were formulated to assist with restoring fish habitat values. Dyking maintenance plans were developed for reducing impacts to fish habitat and stream channel function. Restoration began in 2003 and is now nearing completion along with alternative erosion and flood protection works. To date the results have been positive for fish habitat restoration and erosion protection.

18. Biophysical and human factors affecting road and trail crossings by wolves, grizzlies, and elk in Banff National Park

Jenny Coleshill, M.Sc Candidate, University of Calgary
jencoleshill@yahoo.ca

Poster

My master's thesis is concerned with the effects of human use on wolves, grizzlies, and elk in Banff National Park. I am analyzing which biophysical and human factors affect road and trail crossings by wolves, grizzlies, and elk. The biophysical and human factors important in crossings were determined using logistic regression. I modeled the probability of a road/trail crossing using resource selection functions. Models were created for wolves and grizzlies on Highway 1 and Highway 1A, for elk on Highway 93, and a backcountry trail for each species, in Banff National Park. This analysis relates to a comparison between the species-road spatial relationships under similar ecological conditions, and different levels of human use. Preliminary results have shown some models to be significant in predicting crossing. Human use is an important factor in each model for road crossings for grizzlies and wolves, but not for elk.

Field Trips

On the afternoon of May 6, the participants took part in one of two field trips.

Gerry Wilkie of Edgewater offered a trip featuring bird-watching, geographic features, and human history of the area.
gdwilkie@cyberlink.bc.ca

Bruce Sundbo of Parks Canada hosted a walk at the Redstreak Restoration area located in Kootenay National Park above the Village of Radium Hot Springs. The area, which is comprised of provincial/federal crown and National Park jurisdictions, was thinned in 2002/2003 as part of an effort to restore Bighorn Sheep habitat. It is part of a larger effort in the Rocky Mountain Trench to restore open forest/grassland habitat types. He discussed the project including vegetation response, wildlife response with a focus on the Bighorn sheep and finally the response of the public.
Bruce.sundbo@pc.gc.ca