



NORTHWEST BOREAL

Landscape Conservation Cooperative

Agenda

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The Northwest Boreal Landscape Conservation Cooperative (NWB LCC) hosted a three-day workshop retreat for Steering Committee members and invited guests on November 19-21 at the Morris Thompson Cultural Center in Fairbanks, Alaska. The workshop discussed various approaches to landscape conservation planning and science to support the development of a landscape conservation foundation, or long-term (10-year) strategic plan for the LCC. This strategic plan will provide the context, or 'blueprint', for integrating our priority information needs into a comprehensive plan for landscape conservation and facilitate strategic prioritization of our activities over time. The strategic plan will also guide us in identifying key science gaps that link our priority information needs in a landscape conservation plan. Drawing on the knowledge of experts, participants learned about and discussed topics in landscape conservation, climate change adaptation, scenario planning, ecosystem stewardship, transparent and participatory engagement in planning and decision-making, and planning for rapid environmental, economic and social change in the northwest boreal.

BACKGROUND

The northwest boreal is a vast boreal landscape with large wilderness areas, intact ecosystem processes, ecologically functional wildlife populations, and a relatively low human population. In contrast to most other LCC regions, wildlife and land management agencies and organizations in this region are not faced with the cumulative effects of human activities on the landscape that result in conservation emergencies and require reactive conservation strategies. However, the northwest boreal landscape is rapidly changing due to growing populations, resource development, and climate change, and thus the opportunity for a pro-active approach to landscape conservation is now.

The LCC vision for the northwest boreal is 'a landscape that sustains functioning, resilient boreal ecosystems and associated cultural resources in perpetuity'. This vision is broadly shared by the members of the partnership but how we get there is not as clear. Collectively, we've identified priority information needs that are necessary to understand, monitor, and manage for landscape change and sustainable resource management. However, it is not clear how LCC support for individual projects that fill these information gaps will synergistically lead to a functioning, resilient landscape for the future. To ensure our efforts support pro-active, landscape-scale, conservation planning and science across the northwest boreal, we need a blueprint for integrating individual management and science information needs into a long-term strategic plan. Many 21st century conservation challenges require us to work across boundaries and jurisdictions and to leverage our increasingly limited resources. The NWB LCC has a unique opportunity to facilitate communication and planning among partner organizations in support of a common vision for the region; a pro-active, strategic conservation plan will guide us in these efforts. **Thus, the goal of this workshop is to take a step back and think about what it means to plan for a functioning, resilient landscape in perpetuity and how we, the LCC partnership, support projects that will lead to realization of that vision.**

WORKSHOP STRUCTURE AND TOPICS

The workshop focused on building a foundation of knowledge and ideas that can ultimately be used to develop our 10-year strategic plan. We focused on the HOW, WHAT, WHY, and for WHO of landscape conservation and planning for change as it relates to the northwest boreal. Topics will include:

- Overview of ecosystem stewardship and planning for change;
- Setting conservation goals in an era of change;
- The changing role of science and scientific institutions;
- Challenging conventional conservation paradigms;
- Visions of the Northwest Boreal ecosystem;
- Assessing vulnerability and identifying trajectories of change;
- Exploring proactive strategies to address directional changes;
- Embracing and reducing uncertainty;
- Planning for resilience and adaptation.

OUTCOMES

Over the course of three days, the NWB LCC Steering Committee discussed cutting-edge landscape conservation approaches, opportunities and challenges as they relate to the northwest boreal region.

- Ecosystem Stewardship was embraced as an umbrella model for the LCC:
 - ◇ E.S. is a framework linking the social, ecological and political components of a system – the sustainability and integrity of ecosystems and human society are both essential goals; neither can be achieved without the other;
 - ◇ E.S. explicitly enables us to prepare for change at multiple scales by:
 - ◆ Identifying trajectories of change and intervention opportunities;
 - ◆ Embrace uncertainty by maintaining flexibility and fostering adaptive learning;
 - ◆ Engaging key stakeholders to consider opportunities and risks associated with scenarios and management options;
 - ◆ Foster opportunities for adaptive capacity (through increasing resilience of natural, human, social and cultural capital) and empower communities and organizations to take stewardship action.
- LCCs are more than a source of funding, but the NWB LCC in particular, can have a conservation impact by strengthening the communication and collaboration among partner organizations and by providing the information needed to plan proactively and adapt to change within the region. This is a distinct divergence from focusing on annual projects and requests for funding.
- Communication is an important role for the NWB LCC. Climate-change science is complicated and uncertain; the LCC can develop narratives describing scenarios of future change that resonate with the public.
 - ◇ Science translation is a crucial role of the LCC – taking complicated science and making it accessible to diverse audiences. Narratives and storytelling are compelling approaches to communicate complicated interactions and their impacts.
 - ◇ The LCC links broader landscapes – our individual land and resource management actions affect others, e.g., water quality downstream, movement of fish and wildlife. Land-use planning should be approached from broader scales. This is a rare opportunity to support communication across international borders or even across jurisdictions within a state or province
 - ◇ Institutional and political challenges are the largest challenges to climate-change adaptation. Government agencies need to be more nimble, and are currently restricted by mandates and

strict policies that do not allow for the flexibility required to deal with uncertainty and learning. The NBW LCC can provide information and support in helping agencies cope with change.

- ◆ This is a time to be creative and inventive, and to consider new ways of implementing conservation given the pace of social-ecological change in the region. New solutions may be outside the mandate of formal institutions and the LCC can bridge various organizations and scales to create new lines of communication necessary to deal with arising situations – this is a more social role for the LCC;
 - ◆ Develop contingency plans (crisis management) that will allow us to be ready to act when events occur to maximize the potential to grasp opportunities;
 - ◆ Establish recommendations for how agencies can incorporate learning in plans so that plans can be adaptive, responsive to changing conditions, and be more useful for the agencies/organizations.
- ◇ The NBW LCC can approach landscape conservation by creating a ‘diverse portfolio’ of options and products that focus on long-term and near-term planning for species and habitats as well as enduring features and evolutionary and ecological processes, and planning for adaptation and resilience.

Day 1 : Setting the stage for WHY to do proactive conservation planning at the LCC SCALE

Overview of ecosystem stewardship and planning for change

Terry Chapin, Professor Emeritus of Ecology, Department of Biology and Wildlife, University of Alaska Fairbanks

- The Northwest Boreal Region is changing as rapidly as any place in the world. Climate is warming; permafrost is thawing; fires are more frequent; ecosystems and their fish and animal populations are changing; subsistence needs must be met in new ways; fuel and commercial foods are more expensive. If these changes continue, as seems likely, what can be done to minimize the risks and maximize the opportunities?
- Stewardship involves shaping the changes that are occurring for the benefit of ecosystems and society. This involves actions that reduce the rates of preventable changes and adapting to and shaping those changes that cannot be prevented.
- Since people will often disagree about which potential future changes are most desirable, it is important to engage many stakeholder groups in the planning process. Although we cannot know for certain what the future will look like, we can imagine several scenarios of what might occur.
- Management actions can be identified that increase the likelihood of favorable changes and reduce risks of unfavorable changes. Monitoring programs can be established that assess whether ecosystems are moving toward particular scenarios and therefore whether new management approaches should be considered.
- A stewardship approach recognizes that people have always interacted with the rest of nature and that this can be done in ways that increase the likelihood of favorable outcomes.

Discussion on the potential for ecosystem stewardship in the NWB LCC:

- The information needs identified by the NWB LCC map out well on choices of managers/communities in shaping the outcomes of current and future changes.
- Build the science:
 - ◇ The NWB LCC is suited to engage multiple perspectives and practices
 - ◇ Identify scenarios of change and intervention (opportunities).
- Apply the science to sustainability issues:
 - ◇ Engage key stakeholders;
 - ◇ Facilitate dialogue among groups with different viewpoints, identify points of agreement and disagreement;
 - ◆ Explore differences as a basis for decisions.
- Empower organizations and communities to take stewardship action:
 - ◇ What is happening? What is likely to happen?
 - ◇ Effective communication can minimize barriers;
 - ◇ Empower local action – planning can be regional or national, but action is local.
- What Stewardship is NOT:
 - ◇ Trying to prevent inevitable change;
 - ◇ Separating people from nature;
 - ◇ Taking action without consultation – The NWB LCC recognizes the importance of engaging dialogue among various decision-making groups.
- This is a time to be creative, inventive:
 - ◇ Think about things to come, both good and bad;
 - ◇ Think about how to manage;
 - ◇ Focus on social-ecological systems, rather than just ecological.
- In order for government agencies to practice ecosystem stewardship, they must be more nimble:
 - ◇ Decision-making rules should have contingencies, rather than responses (this event triggers this response);
 - ◇ Contingencies can be built around crisis planning – require pathways of communication among agencies and non-governmental organizations;
 - ◇ Nimbleness varies with 3 types of institutional structure:
 - ◆ Communities
 - ◆ Industry
 - ◆ Government
 - ◆ The first two are much more nimble than government institutions – the question is how to break through the bureaucracy to encourage change.
 - ◇ If resilience = nimble, then making active management options should be structured to allow agencies to become more nimble.
 - ◇ Options should be discussed in terms of allowing flexibility, versus reducing in.
- It's foolish to manage trajectories without considering the consequences using scenarios;
 - ◇ There will always be unintended consequences;

- ◆ Do not shut off options;
- ◆ Remain adaptive in case something goes wrong.
- A crucial part of ecosystem stewardship is communication – the community of practice needs to develop a relationship with the media:
 - ◇ This needs to be developed now, before drastic changes occur;
 - ◇ One example would be to develop a scenario of a spruce bark beetle or mountain pine beetle outbreak in the area; the media can be instructed on how to handle this type of event – the NWB LCC could facilitate this type of event;
 - ◇ The LCC could take advantage of where scenarios have already played out (especially when they have been done well);
 - ◇ The National Weather Service (US) offers extensive training in crisis communications.
- The flip side is to ask what criteria are important for determining trajectories?
 - ◇ Make scenarios – then becomes collaborative.
 - ◇ Land-use planning is a mechanism for communities to reach agreement on trajectories but the challenge is how to do this with a mix of large, urban centers and small communities in this region.

Challenging conventional conservation paradigms

Fiona Schmiegelow, Professor and Director, Northern ENCS Program, University of Alberta/Yukon College, Whitehorse

- Conservation science developed as a crisis discipline largely focused on highly altered systems comprised of remnant natural habitats and imperiled species. Planning has been largely reactive, with application of a static approach that places primary emphasis on protected areas as the principle conservation tool. The landscape matrix is viewed as largely hostile with little conservation value. These paradigms are not appropriate for the Northwest Boreal Region where:
 - ◇ The systems still support a full complement of natural and cultural values;
 - ◇ The systems are inherently dynamic, and remain shaped by large, natural disturbances;
 - ◇ The landscape matrix has high conservation value;
 - ◇ Conditions are changing rapidly due to climate and societal change;
 - ◇ There remain opportunities to plan pro-actively.
- A more appropriate conservation paradigm for the Northwest Boreal Region shifts from managing scarcity to maintaining integrity and enhancing resilience. Rather than focusing on existing patterns, emphasis is placed on understanding underlying processes (disturbance regimes, hydrological processes, biotic interactions) and managing for resilience to environmental change.
 - ◇ The question shifts from “how much is enough” with respect to protection, to “how much is too much” with respect to development and human-mediated landscape change.
 - ◇ Emphasis is placed on identifying the domain of sustainability within which systems maintain integrity and resilience.
 - ◇ There is explicit recognition of uncertainty and the risk of unintended outcomes, and active adaptive management is employed to reduce risk through enhanced learning, maintaining flexibility to changing conditions, and providing opportunities for societal engagement.

- A new framework for landscape conservation is proposed to embrace these opportunities. The conservation matrix model (CMM) applies a systems approach that recognizes the valuable role that all landscape elements can and must make to achieving true sustainability, and encourages innovation through shared stewardship responsibility. Within this framework:
 - ◇ The conservation matrix is the supportive environment that plays a critical role in maintaining connectivity and ecological flows across large landscapes;
 - ◇ Ecological benchmarks serve as reference sites for understanding the dynamics of natural systems and their response to change, as well as acting as anchors for a comprehensive conservation network;
 - ◇ Site-specific protected areas capture values that are particularly sensitive to human disturbance;
 - ◇ Active management zones and adaptive management areas represent development sites managed to reduce uncertainty and improve the likelihood of desirable outcomes. Implementation of innovative practices and effectiveness monitoring are key.
- Examples of application of the CMM and related concepts are occurring throughout boreal regions of Canada, and the NWB LCC is particularly well-positioned to advance this framework through the explicit mandate for partnerships to advance shared science to ensure sustainability of natural and cultural resources.

Discussion on how this relates to NWB LCC:

Consistent with Terry's earlier points, we spend an awful lot of time thinking about and having anxiety about the likelihood of outcomes from conventional management strategies, instead of investing the same energy into identifying the opportunities for working outside of the box; these are the opportunities for innovation which requires vision and commitment. An organization like an LCC is a good model for advancing this. The NWB LCC can lead by example, showing the advantages of innovation and proactive thinking.

Setting conservation goals in an era of change

Molly Cross, Climate Change Coordinator, Wildlife Conservation Society North America Program, Bozeman, MT; Talk delivered by Erika Rowlan, Climate Change Ecologist, Wildlife Conservation Society North America Program, Bozeman, MT

Part I: Consequences of climate change for conservation goals

- Climate change is likely to upend traditional assumptions that underlie current conservation goals, such as:
 - ◇ What is 'native' and 'natural'? (as climate change induces range shifts, it makes it more challenging to define what is native or natural to an area)
 - ◇ Restoring to 'historic' conditions (they may no longer be feasible as climate changes)
 - ◇ Managing for a historic range of variability (can no longer make assumptions based on stationary, but need to embrace directional change)
 - ◇ Striving for protection 'in perpetuity' (directional change may undermine our ability to keep things the way they are forever into the future)

- Examples of current language from a goal statement for cold-water native fish that might be problematic in light of climate change includes (underlined text):
 - ◇ Ensure the long-term persistence of westslope cutthroat trout (WCT) within the current range in Idaho.
 - ◇ Manage WCT populations at levels capable of providing angling opportunities.
 - ◇ Restore WCT to those parts of its historical range in Idaho where feasible.
- Climate change-informed goals may need to consider:
 - ◇ Different spatial scales (e.g., larger areas to encompass future distributions of a target species or ecosystem; or a sub-set of current areas that are likely to remain suitable)
 - ◇ Different temporal scales (e.g., time frame over which goals may be feasible may change)
 - ◇ Being more accepting of change, since not all change is bad (an example is an ‘adaptation forestry’ project in Minnesota that is embracing climate-driven shifts in tree composition by proactively planting different species mixes and drawing from a wider geography for seed sources)
 - ◇ Focus more on process than pattern (less about specific species in specific places, and more about ecological processes, ecosystem services, and evolutionary opportunities -- sometimes called protecting the “geophysical stage”)
- There are many challenges to revisiting goals, including issues related to:
 - ◇ Whether one has authority to change goals
 - ◇ Legal constraints to changing goals
 - ◇ Psychological barriers
 - ◇ Limits of our knowledge
 - ◇ Coordinating across jurisdictions at a large landscape scale

Part II: Taking a large landscape perspective on climate change and conservation

- It can be valuable to take a large landscape perspective on assessing impacts and vulnerabilities and identifying adaptation options:
 - ◇ It can be useful to know where your smaller piece of the landscape fits within the bigger landscape picture – e.g., are you a hotspot of vulnerability relative to other areas, or a relative refugia for current climate conditions?
 - ◇ At a smaller scale, we tend to focus on what may be lost rather than what might come into an area – this could result in being insufficiently prepared to take advantage of new opportunities that might arise because of a pre-occupation with what might be lost.
 - ◇ Some adaptation actions require larger scale, cross-jurisdictional coordination (e.g., protecting/enhancing connectivity between current and future habitats, or ensuring that neighboring jurisdictions’ actions are compatible with your jurisdiction’s goals).
 - ◇ You can take advantage of economies of scale and more efficient pooling of resources and expertise.

Discussion for NWB LCC:

- How to choose priorities: Focus on process rather than pattern;
 - ◇ One challenge is the that conservation of focal species generally revolves around food;

- ◇ A climate-change adaptation strategy is food switching (e.g., from moose to bison).
- The example of the WCT shows a good example of conservation goals associated with endangered species.
 - ◇ It's important that climate change isn't used to justify poor management, e.g., giving up on a species because the future climate will be unsuitable but perhaps the major threat is historically poor management.
- Is there a refugium option for the NWB LCC?
 - ◇ The boreal as we know it will persist in the mountains – there are more options to preserve mountain ecosystems compared to east;
 - ◇ Sanctuary may be a better term than refugium as the landscape is large and variable enough that biota can rearrange/shift (word use is also important for Aboriginal partners).
- The largest challenges for adapting to climate change are institutional and political – the largest challenge for government agencies to change goals in light of climate change are agency mandates, e.g., Endangered Species Act, that are likely to be unsustainable given future projections.
- The NWB LCC could incentivize climate-change action by directly funding programs (within organizations) or communities.
- Given what we've discussed about the new roles of scientists and managers [referring to Terry's table in the Ecosystem Stewardship paper – Chapin et al 2009]: The new role of research is away from transferring findings to managers who take action to researchers and managers collaborating through adaptive management and learning loops. The NWB LCC could innovate adaptation options and use science to lead action.
- The LCC could end up with a menu of options that organizations can choose/apply.

The changing role of science and scientific institutions

Annette Watson, Department of Political Science, College of Charleston, Charleston, South Carolina

- Taking the approach of Ecosystem Stewardship means that the roles of research and the resource manager will have to change.
- Instead of researchers independently researching and transferring findings to use by managers, researchers and managers need collaborate through adaptive management principles, creating continuous learning loops.
- Resource managers evolve from decision-makers to facilitators who engage multiple stakeholder groups. Some of these changes are already happening—or managers have already found the latter processes more effective to achieve their goals.
- Engaging in Ecosystem Stewardship would fit into the larger trends across science and management: called “mode 2 science.” The techniques engage public participation and address interdisciplinary problems.
- The rest of the presentation explained why the change to “mode 2” science has been happening: research from the literature in geography and the sociology of science.
- The public confidence in science and government has decreased over the last decades because scientists and governments misrepresent the work that they do as “objective.”

- As much as those trained in fields of natural sciences say they “represent the fish” or “produce the facts” for resource management, these fields are not objective.
- For example, the science of conservation has not evolved “objectively,” but in response to environmental crises created by human societies, particularly urban societies.
- And the actions of managers are taken within the context of their institutions’ goals, missions, and incentive structures—all mandated by policies.
- Fisheries’ management example: not an “objective” endeavor
- limited by assumptions of bioeconomics, which calculate that all human actors will become “greedy capitalists.” This assumption makes managers blind to ways that human use of resources are diverse—and blind to the use of local knowledges.
- Because of budget constraints and the practicalities of managing complex systems, how managers can measure the system is limited, often to large scale analyses. They are unable to “see” at smaller scales in the same way as many local users of the resource. The public loses trust in scientists and managers who claim they can understand the whole system—or do not value the expertises that the public may have.
- White-fronted geese management example: not an “objective” endeavor
- The scale of the management system and the requirements to be efficient with measurement techniques and expenses pre-determined one way to frame a problem of decreasing White-fronted geese in Interior Alaska: conservation of species. Not in itself bad, but an incomplete framing of the problem.
- The management structure cannot help smaller communities to deal with issues of “food security.” When management institutions do not even realize they are co-opting the framing of the problem, the public loses trust in science and management.

Conclusions:

- Trust is achieved through evaluating and recognizing expertise at the local level
- Trust is achieved through mutual construction/framing of an environmental problem, between natural scientists, managers, and publics.
- “Participatory” practices of research/management are not “biased,” they are actually more rigorous
- LCCs could have a role in not only bridging stakeholders, but also understanding a problem from multiple scales and perspectives.

Discussion:

- Trust is key for community goals/values to be part of the conversation.
 - ◇ The NWB LCC can act as a bridging mechanism to build trust.
 - ◇ Just as important – how do you communicate when you get it wrong? No one can be blamed, given the level of uncertainty, but there could be public trust issues (aka blame the weather man).
 - ◇ This could affect the trust.
- In order to reframe science issues, it is necessary to move people away from being constrained from working within traditional disciplines – what mechanisms can the LCC develop (professional development) that can serve a role?

Visions of the Northwest Boreal ecosystem

Annette Watson, Department of Political Science, College of Charleston, Charleston, South Carolina

The Steering Committee members and others in the audience were asked to evaluate the current mission statement of the LCC, given what they learned about ecosystem changes and the approach of Ecosystem Stewardship. This was an open discussion where the facilitator pointed questions toward revealing underlying assumptions in parts of the statement, such as that of historic conditions. The discussion that followed attempted to ensure that the Steering Committee was transparent about what they desired to achieve as a new institution facilitating the adaptation to climate and social change.

Discussion:

Suggestions for revising the vision statement:

- Is the term 'boreal' appropriate given climate change?
- If remove 'boreal'
 - ◇ It becomes more focused in the organizations that are engaged;
 - ◇ Organizations that do not manage land see 'boreality' as having less value and more importance is placed on collaboration and coordination;
 - ◇ Change boreal to social-ecological-systems?
 - ◇ Who is the vision for? The Steering Committee? External audiences? Academia? Boreal conjures up an image that may be beneficial for the partnership;
 - ◇ The NW boreal will always be interesting and distinct place – geographic/climate barriers to north and south and continental climate;
 - ◇ There is no reason that we can't work to preserve the stage and some of the actors (not 'or'); but actors are boreal specific – if become arctic in latitude are they still the species of concern or are the new species that move in?
- "In perpetuity" seems unsustainable (especially given the example in Molly/Erika's talk)
- The vision statement may evolve as much as the system (i.e., need to revise periodically)
- First Nations take the approach – What can we do today to make a better future for tomorrow?
- The vision should have some language to do with change and adaptability.
- See discussion notes after Jim Pojar's presentation (p. 22) referring to revisiting the vision statement.

Day 2: HOW to do proactive conservation planning at LCC scale in light of landscape changes

Assessing vulnerability and identifying trajectories of change: Climate change vulnerabilities and impacts

Dawn Magness, Landscape Ecologist, Kenai National Wildlife Refuge, US Fish & Wildlife Service

- Vulnerability assessments can help to identify risk and identify likely future trajectories

- General approaches include (1) geographic shifts, (2) relative indices, and (3) conceptual models of social-ecological systems
- Vulnerability assessments must consider spatial scale, time scale, target (species, ecosystem, region), output (spatial vs. aspatial)
- Vulnerability assessments can (1) change expectations, (2) identify problems, and (3) identify where, when and how to act (adaptation)

Discussion:

- The LCC is already funding vulnerability assessments and they have been identified as a priority.
 - ◊ Vulnerability assessments are critical in identifying and reducing uncertainty in land-use and climate change.
- An interesting story is emerging from multiple vulnerability assessments from various scales (global to local) – the boreal zone is projected to remain primarily boreal, albeit with potentially different community composition (e.g., douglas fir and other western boreal species). Several vulnerability assessments show increased probability of change to new vegetation types in Seward Peninsula and a few other regions (e.g., conversion to Saskatchewan grassland).

Assessing vulnerability and identifying trajectories of change: ALCES – quantifying cumulative impacts

Matt Carlson (webinar), ALCES Landscape and Land-Use Ltd. (<http://www.alces.ca/>)

Discussion:

- Beneficiaries of this approach are often members of the general public – outcomes are often communicated to management agencies, but it has been an important tool in creating narratives for the general public
- Dissemination of scenario analyses (ALCES online www.albertatomorrow.ca) as an education tool for high school students to better understand the consequences of land-use decisions.
- This tool could be used for zoning decisions – to better understand zoning or mitigation impacts (explore scenarios)

Exploring proactive strategies to address directional changes: ACT framework as an example of a method for identifying adaptation actions to meet goals in light of climate change

Molly Cross, Climate Change Coordinator, Wildlife Conservation Society North America Program, Bozeman, MT

- The Adaptation for Conservation Targets (ACT) framework is a participatory and iterative framework for generating place-based adaptation strategies:
 - ◊ Participatory = brings scientists and managers together to plan for the effects of climate change to ensure best available science is considered and to help target future management-relevant research questions.

- ◇ Iterative = follows basic “plan-act-evaluate-revise” adaptive management cycle to accommodate and adjust planning in response to new information.
- ◇ Place-based adaptation strategies = what actions we can take to achieve our management and conservation goals for specific targets in particular places in light of climate change.
- ACT is a step-wise process to provide practitioners with a road map to get started with climate change planning. It is flexible (i.e., not overly prescriptive) so as to accommodate planning concepts, tools and approaches that practitioners are already familiar with, to help facilitate integration of climate change into existing planning (rather than it being a separate process).
- Several key features of the ACT planning process include:
 - ◇ Starting by identifying a finite set of conservation features (e.g., species, ecosystems, ecological processes) to focus on for planning. This can be done through climate change vulnerability assessments (i.e., you might want to focus on features that are particularly vulnerable to climate change), but you might just choose features that are currently the focus of management attention.
 - ◇ Assessing climate change impacts by utilizing conceptual models that highlight the climate and non-climate drivers that influence your selected features.
 - ◇ Considering the effects of multiple plausible future scenarios, and therefore embracing uncertainties about the future.
 - ◇ Broadly brainstorming potential actions that might be needed to achieve goals in light of the climate change effects discussed.
 - ◇ Considering whether goals need to be revised to be more achievable in light of climate change.
 - ◇ Gathering information gaps and needs that are directly relevant to making management decisions in light of climate change, to drive future research agendas.
- The ACT framework has been tested and refined in over 11 landscapes across North America, for 18 different features (e.g., species, ecosystems and ecological processes).
- Feedback from users has been positive. In a workshop exit survey in Colorado, 88% of workshop participant respondents indicated they found the framework to be “absolutely” or “mostly” useful for developing climate adaptation strategies. Two years after attending an ACT workshop, 80% of respondents in the Adirondacks and 64% of respondents in the Northern U.S. Rockies indicated that the workshop “helped me understand how to move from analysis of impacts to the creation of specific strategies and actions aimed at addressing those impacts”.
- In summary, the ACT framework is perhaps most applicable:
 - ◇ To identify actions for specific place and target(s)
 - ◇ To use readily-available information (including expert opinion and local/traditional knowledge)
 - ◇ For exploring options vs. making decisions (although can probably be paired with decision-making frameworks)
 - ◇ For transparent, collaborative planning
 - ◇ To initiate adaptation efforts
- Lastly, the ACT framework is one of a growing number of frameworks for adaptation planning, that share many similarities but also some differences. In reality, there is unlikely to be one “best”

approach to planning...the most important thing is to pick a tested approach and get started with considering how climate change may affect your goals and actions.

Discussion

- The conceptual model is important and is primarily qualitative, but could be as rigorous and quantitative as group chose (could be a simple diagram in a 2-day workshop and then revisited to make more rigorous).
- This type of exercise can help put information into action. For example, the Bureau of Land Management could use this process to integrate information (e.g., Rapid Ecological Assessments) into action items (what to do with that information).
- This model is suited for an LCC: Different partners have different capacities and mandates – we can learn from each other and see what works.
- Coordination can be experimental;
- Not everyone needs to prioritize equally;
- This is useful for brainstorming, but in planning, decisions must be based on reliable information (defensible in court).
- Decisions are never based on perfect science – they have always been based on best available information along with socio-political considerations.
- Management agencies can use this to look at what we could do – the challenge is getting to what we can do;
- The LCC can help to break down institutional barriers and hold discussions on how to change (bridge between could and can)

Exploring proactive strategies to address directional changes: Conservation assessments in Atlin-Taku and Muskwa-Kechika areas, as examples of approaches using enduring features/land facets/geophysical settings

Jim Pojar, Retired British Columbia Forest Service botanist, ecologist and forester, and former Executive Director, Yukon Chapter of Canadian Parks & Wilderness Society

CONSERVATION IN A DYNAMIC CLIMATE

- Land use and conservation planning that professes to be long term must consider not only the current environment and contemporary plant and animal communities, but also and more fundamentally, future environmental scenarios underpinned by the physical components of regional landscapes and waterscapes—the different types of bedrock geology, physiography, landforms, lakes and streams. Traditional conservation strategies can be complemented or enhanced by a focus on physical enduring features, on habitat elements that will not change much as climate changes, as species sort themselves out and as biological communities undergo upheaval and reassembly.
- Assumptions of enduring features approach: habitat heterogeneity is a major driver of species richness, especially over evolutionary time; biodiversity is in large part a consequence of geophysical diversity; the physical landscape is the template for ecosystems, it is the stage upon which the

drama of climate change is playing out; conserving physical diversity will help conserve biological diversity and contribute to ecological resilience under present and future climates.

- Consider “biogeo-ecosystems”: Real structured volumetric systems occupying relatively fixed earth spaces. Layered site-specific systems—a lake, a wetland, a particular landform-based forest—into & out of which mobile organisms come and go.¹

COARSE FILTER

- The physical landscape can most usefully be characterized in terms of topography (elevation, slope, aspect), physiographic units, bedrock geology, surficial geology/landforms, and hydrologic systems or “ecological drainage units”. Digital information on physical variables can be overlain and combined into digital terrain models and interpretive maps, with derived combinations of enduring features as proxies for ecosystems and ecological processes and as conservation targets.
- Intact watersheds are ideal conservation targets in the Northwest Boreal because a) they still exist in the region, and b) watersheds are functional systems with the greatest likelihood of maintaining ecological integrity over the long term.

FINE FILTER

- An enduring features approach can also enhance the fine filter screen. I recommend enumerating the special physical elements of the Northwest Boreal, including
 - ◇ features of bedrock, glacial history, and geophysical processes;
 - ◇ small-scale terrestrial, wetland and aquatic ecosystem elements that have a major enduring features component.
- Species of unusual specialized habitats are more likely to persist as long as their special habitats continue to exist. In any case, their special enduring features will probably continue to support regionally rare or unusual species and ecosystems indefinitely. It makes conservation sense to focus on the special enduring features as much as on their unusual contemporary inhabitants.
- To the extent that today’s biodiversity hotspots are a function of physiography, topography, geology, sharp environmental gradients and complex local climates, as well as of moisture, nutrients and primary productivity, they too could persist—but with a different assemblage of species.

Discussion

- Information needs:
 - 1) regional environmental assessment
 - 2) historical abundance of focal species
 - 3) regional disturbance dynamics
 - 4) basin characteristics of all major rivers; freshwater “ecological drainage units”
 - 5) “conservation units” of salmonids (Wild Salmon Policy)
 - 6) groundwater (GDW-dependent ecosystems and threats)
 - 7) regional natural capital and ecosystem services
 - 8) more social research

¹ Rowe, J.S & B.V. Barnes. 1994. Geo-ecosystems and bio-ecosystems. Bull. Ecol. Soc. America 75: 40-41.

Meaningful Engagements with communities: How can an LCC be an institutional bridge among stakeholder groups and facilitate flexibility for transformation?

Annette Watson, Department of Political Science, College of Charleston, Charleston, South Carolina

If the goal is to get “the public” to follow conservation plans, they must be created with communities, and incorporate their goals for the landscape. Research and management could thereby maximize flexibility at the local scale to cope with social-ecological transformations.

Scientists and Managers need to recognize that management choices are not “objective,” for each decision helps to shape the social system, in terms of human actions and human identities.

Recognize “community” in managing resources:

- Avoid reducing analyses of humans as “individual actors” by utilizing multiple social science techniques. Do not limit social science techniques to surveys or interviews. There are a wider range of tools available to answer questions about the social-ecological system, such as participatory GIS (PGIS), Q-Method and network analysis.
- Avoid reducing analyses of human motivations to a single type (a.k.a, “maximizing profits/greedy”)
- Understand the goals of a community are to keep things the same (often meaning the sustainability of a resource, and their own identities)
- See the role of local and informal institutions in enforcement/management, and try to support them through capacity-building; these are practices that engender TRUST

Recognize that Traditional Ecological Knowledges (TEK), or Indigenous Knowledges (IK) is not the same as local knowledge.

The “spiritual” cannot be ignored even when it does not correspond to the “facts” of Western Sciences and management “best practices.”

Discussion

- Citizen science can be an important tool for monitoring change at large scales;
 - ◇ Can help with issue of limited staff, is good outreach and teaching opportunity, and provides good data.
- Research agendas can ask questions about food security or other concerns that a community might have.
- It’s important to share financial resources so we don’t come across as exploitative – should be considered in budgets.
- Maps can be a bridging tool for communicating with communities (cross disciplines and across cultures) – there have been many mapping efforts that were successful collaborations among western and traditional science (examples were given from AK, NWT, Y).
 - ◇ Maps can communicate scenarios of change – the map is just the starting point, showing how change can occur, there should be follow up to talk with communities about how change will affect them and how to frame research questions.
 - ◇ Adaptation strategies can be formed by talking about this change – do we need Chinook salmon? Or can we switch to other fish? Historical context helps.

- The role of the manager in ecosystem stewardship is to facilitate dialogue – real challenge is how to effectively engage urban stakeholders and national audience – those decisions have a huge impact on us.
 - ◊ One social-science methodology is Q methods – assessment of individual’s ideas of trade offs (personal) – surveys are far overused to get at personal preferences/don’t get at trade offs. Statements can be made that spread gradient of viewpoints, can pair oppositional statements and have people rank – can get at trade offs. In Huslia, Q-method has been shown that views on fire management don’t divide by native/non-native but was generational.
- Data management – how to preserve data. Who owns these data? Do communities have concerns about who owns data?
 - ◊ An LCC can help keep data/studies alive, reduce the irritation of multiple organizations repeating the same studies over and over.
 - ◊ Transparency is important. Up front – the Park Service will own the data (transcripts) but you will be provided with transcripts, and the data will be public – folks have the option of being anonymous.

Embracing and reducing uncertainty: Implementing a conservation matrix model

Fiona Schmiegelow, Professor and Director, Northern ENCS Program, University of Alberta/Yukon College, Whitehorse

- Following on yesterday’s presentation, the conservation matrix model (CMM) was developed specifically to embrace and address uncertainties inherent to planning for conservation and landscape sustainability in North American boreal systems. A common analytical framework supported by a suite of customized tools allows for integration of tenets of conservation and resource management science, and provides flexibility in achieving conservation goals in the face of uncertainty, while simultaneously identifying ecologically sustainable land-use activities and enhancing resilience.
 - ◊ The full landscape is considered in managing for a conservation matrix that maintains connectivity of key processes.
 - ◊ Ecological benchmarks are identified to serve as reference areas and anchors of a conservation network. These are dynamic learning systems, not static preserves.
 - ◊ Additional sites of high sensitivity may be designated as site-specific protected areas.
 - ◊ Management activities are treated as experiments within an adaptive management framework, involving incremental implementation, effectiveness monitoring and adjustment in light of new knowledge or changing conditions.
 - ◊ Innovation and shared stewardship are emphasized in achieving landscape goals.
- Criteria for ecological benchmarks have been established that can be applied to the evaluation of existing areas, or identification of new areas. The criteria address system dynamics, and include explicit consideration of hydrologic and terrestrial connectivity. Models of landscape change are applied to evaluate resilience over time.

- The CMM encourages consideration of what, where, when and how land-use activities might proceed to support landscape goals, and a platform for identifying opportunities to reduce uncertainties while managing risk.
- Landscapes of the Northwest Boreal Region are rapidly changing due to land-use and climate, and there is an opportunity to plan pro-actively before potentially pre-emptive activities reduce options. Key actions for the LCC include:
 - ◊ Identifying and sustaining the functions of the conservation matrix
 - ◊ Identifying a network of ecological benchmarks and associated monitoring strategy
 - ◊ Accelerating understanding of drivers of change through active adaptive management
 - ◊ Identifying and leveraging the contributions of partners in working towards shared goals

Discussion

- In a nutshell, the Conservation Matrix Model is carefully-planned and managed activities within a matrix of conservation lands
 - ◊ 11% protected lands in Yukon
 - ◊ Actions for LCC?
 - ◊ ID and sustain functions of conservation matrix
- We are different (geographically) from where conservation planning theory developed, where the matrix is highly altered
- Values are important to maintain resilience over time as well as adaptive capacity
- ID a network of ecological benchmarks and associated monitoring strategies in 2 forms:
 - Analysis of existing protected areas in AK (for ID of ecol benchmarks)
 - other regions is more to inform proposing new areas for protection
- Accelerate understanding of drivers of change through active adaptive management
- This has been a theme of the workshop, Molly's presentation show scenario analysis as part of the adaptive cycle
- ID and leverage the contributions of partners in working towards share goals and actions across the landscape
- What are individual contributions of each agency? How can we build collectively to manage across the landscape?
- Where are the gaps in management authority?
- How can individual agencies work towards the NWB LCC vision?
- The landscape can be viewed as a continuous risk surface.
- It is worth including sites on the opposite ends of the spectrum – from where change has already happened to those relatively unaltered.
- Ecotonal or extremities of LCC region are important (i.e., Kenai Peninsula, northern B.C.)

Embracing and reducing uncertainty: Scenario Planning for Embracing Uncertainty

Erika Rowland, Climate Change Ecologist, Wildlife Conservation Society North America Program, Bozeman, MT

- There are connections between resilience thinking/ecosystem stewardship, adaptive management, structured decision making and scenario planning
 - ◇ All deal with uncertainties
 - ◇ Not mutually exclusive in application
 - ◇ Scenario planning best suited to planning and decision situations when complexity and uncertainty are both high
- Scenario planning can be complementary to other planning/decision processes
- Scenario planning is: using multiple, plausible futures (not predictions or forecasts) developed through a structured process to address a specific issue or question to explore their potential impacts on one or a set of targets.
- Scenarios typically incorporate drivers external to the system (outside managerial control=irreducible uncertainty) that can significantly influence decision /planning outcomes of interest
- Scenarios can encompass multiple drivers: environmental (e.g., climate), social, political, policy (e.g., land use), economic, science/technological
- Three key phases (that include multiple steps) in scenario planning:
 - ◇ Preparation-similar to most processes
 - ◇ Building and refining scenarios
 - ◇ Using: Planning and implementing
- Uncertainties are not all equal and scenarios are built around those that have the highest uncertainty and highest potential for impact (challenge management)
- Scenarios bound the range of possible futures, and are commonly developed using a 2x2 matrix
- Why engage in scenario planning?
 - ◇ Include rather than ignore “irreducible” uncertainty
 - ◇ Overcome cognitive barriers to considering very different futures
 - ◇ Consider chance events, to increase creativity and brainstorming
 - ◇ Consider cross-scale influences
 - ◇ Develop stakeholder awareness, buy-in
- Scenario planning facilitates the identification and organization of management options associated with different futures
- From this, options to take now, future decision points and associated decision triggers (certain conditions) can be laid out in a time line
- Scenario planning can:
 - ◇ Contribute to developing understanding
 - ◆ Broaden awareness
 - ◆ Consider impacts

- ◆ Identify vulnerable targets
- ◆ Examine climate interaction with other drivers & stressors
- ◇ Facilitate planning
 - ◆ Consider what futures to move toward or avoid
 - ◆ Evaluate existing or develop new response options
 - ◆ Engage stakeholders
- ◇ Move projects toward decision and implementation
 - ◆ Identify triggers and system indicators for monitoring
 - ◆ Identify most effective ways of implementing options

Embracing and reducing uncertainty: Planning for resilience and adaptation

Jim Pojar, Retired British Columbia Forest Service botanist, ecologist and forester, and former Executive Director, Yukon Chapter of Canadian Parks & Wilderness Society

How?

We need a dual strategy for conservation and climate change adaptation. And a variety of tactics, to get as much biodiversity as possible through “big squeeze” of climate change to end of this century—then beyond.

- 1) Long-term (centuries) conservation planning should focus on enduring features, in addition to scenarios of individual species and their habitat. Conserve the stage (“geophysical settings”²) or arena (“land facets”³) and [some of] the actors.
- 2) Near-term (ensuing decades): continue with focal and at-risk species and ecosystems; habitat connectivity based on species biology and present-day land cover & patterns of productivity.
 - Reduce adverse land use impacts; restore selected degraded areas(?).
 - Strive to minimize habitat fragmentation, secure core sanctuaries with buffers, and around the conservation lands and waters provide a supportive, Nature-friendly matrix with functional migration spaces and connectivity on land and in the water.
 - Address long-term needs of focal species such as caribou, moose, grizzly, mountain goat, sheep, coldwater fish.
 - Revamp nature conservation.
 - ◇ Diversify ecological and evolutionary portfolios—as risk management strategy.
 - ◇ Re-examine roles of protected areas, buffer zones, connectivity, ‘special’ management zones, and matrix management.
 - ◇ Reorient from historical or status quo distributions/abundances of species and communities towards:
 - ◆ Enabling ecosystems to self-adapt & reorganize, maintaining ecological and evolutionary processes;

² Anderson, M.G. and C.E. Ferree. 2010. Conserving the stage: climate change and the geophysical underpinnings of species diversity. PLoS ONE 5(7): e11554: 1-10.

³ Beier, P. and B. Brost. 2010. Use of land facets to plan for climate change: conserving the arenas, not the actors. Conservation Biology 24: 701-710.

- ◆ Maintaining well-functioning, resilient ecosystems of sometimes novel composition that continue to deliver ecosystem services;
- ◆ Practicing triage, which includes trying to retain a diversity of (desirable) species and ecosystems.

Discussion

- Recommendation for NWB LCC: Dual approach for both long-term and short-term planning:
 - ◇ Long term: focus on enduring features in addition to scenarios of individual species within habitat
 - ◆ Conserve the stage and some of the actors
 - ◇ Near term (i.e., 2100): Focus on focal and at-risk species, maintenance of habitat connectivity based on focal species biology and today's landcover and pattern of productivity
- Jim's last point of 'Revamp nature conservation' brought a lot of interest for the NWB LCC
 - ◇ Referring to the bullets under 'Reorient from historical or status quo...'
 - ◇ #3 is great, but is at odds with #1. We need to establish a network and buffer core areas now, but they may have to be moved
 - ⇒ This wouldn't work politically under current system.
 - ◇ Try to maintain integrity and resilience of ecologically valuable areas– concentrations of enduring varieties, rarity, productivity, or wildlife connectivity values.
- There will be an inability for decisions to be revisited in the future if we are not flexible and honest with dialogue now.
- To maintain integrity, do we always need to set aside and protect? Can there be a focus on restoration? (Q)
 - ◇ In principle, we would not need any protected areas if we were truly managing (stewards) (A)
 - ◇ But this does not happen in real life, e.g., fire suppression to protect infrastructure investment, etc.
- From the perspective of a plant expert, is a patch of weeds considered to be invasive or a novel ecosystem? (Q)
 - ◇ Novel ecosystem, but NOT ALL ARE NEUTRAL– some are evil (A)
- Eco-portfolio diversification = risk management
- Regarding the 'Revamp nature conservation slide;'
 - ◇ How does triage related to maintaining well-functioning, resilient ecosystems and retaining diversity of species and ecosystem? Are they at odds? (Q)
 - ◇ Some species are at the edge of ranges and considerable effort would be required to maintain them, especially if we have other demands on resources, but is it worth it? Triage is important for public opinion/values .(A)
 - ◇ Is that because we have trained them to value this? (Q)
 - ◇ Conservation has commonly overemphasized rarity (A).
 - ◆ With climate change, some rare species will become more common, maintaining rare species/populations is maintaining resilience to climate change.
- The NWB LCC can create the dialogue about novel ecosystems, managing for resilience, how ecosystems may develop over time as well as conservations about triage.

- ◇ At what scale is protecting a species a lost cause?
- If we are embracing Jim’s points, we should revisit the vision statement.
 - ◇ Is the ‘Revamped nature conservation’ the same as a vision for the LCC?
 - ◇ A potential role for the NWB LCC is to define ecosystem services and processes that member agencies want to sustain.

Day 3: What comes next for the NWB LCC?

Support stakeholder engagement/communication

Annette Watson, Department of Political Science, College of Charleston, Charleston, South Carolina

- Social science is not stochastic and random; being iterative is a rigorous practice. Adaptive management is premised on “learning loops,” which is what many social scientists mean by being “iterative.”
- It is important to know your own institution’s assumptions. E.g., Meyers-Briggs shows that agency personnel are introverts.
- When you are working with villages, you need to work with multiple people, not just those in power.
- Facebook as an omnipresent networking and communication tool for villages. Villagers use it a lot for many purposes; sometimes it is a survival tool, or even a conduit for sharing cultural stories and values.
- Institutional dysfunction is shared by many, including village government, federal government etc. Building trust between the LCC and communities should be a goal in itself.

Discussion of the Potential roles for NWB LCC

Steering Committee members and invited speakers

During the discussion the following possible roles and comments were made:

- **The NWB LCC could change the way we think about conservation planning; ecosystems and communities are changing and need stewardship.**

The NWB LCC could take central elements of Ecosystem Stewardship and frame them strategically with actions – this could be the guiding principle for our activities. For example, how can we better integrate ecosystem services and processes in planning and conservation? There are new advances in ways of approaching this.

Partners within the NWB region could convene to discuss what really counts, discuss pre-emptive opportunities, and chart the future.

Ecosystem services would be both valued and valuable, perhaps even expressed in terms of currency, e.g., every faucet in Fairbanks is connected to a tree upstream. So then, what is the value of the trees? One role of NWB LCC could be to define ecosystem processes and services that member organizations collectively want to sustain.

LCCs have roles at larger scales, but conservation action, experimentation, and adaptation occurs locally. The LCC has a role in bridging those two scales – it will be necessary to create metrics to see what actually works at local scales.

The NWB LCC should have a social role in informing how agencies can think about facilitating transitions or modifying laws and regulations in light of directional change. In this region, we work internationally (e.g., salmon and migratory birds) as well as with internal policies.

- ◇ In order to meet the requirements of these policies, we need to promote our ecosystem processes, we need to help agencies/bureaucracies be more nimble and flexible, we need to strengthen connections. These are the issues we should organize our goals around.
- ◇ How do we continue to be relevant with modest funding? Perhaps we should consider broader-scale modeling and spatial products but emphasize and encourage partners to consider enduring features and ecosystem services in their thinking – this does not require any funding.
- ◇ The LCC could consider a portfolio response.
- **A central role of the NWB LCC is to provide the kind of information that stakeholders need, in a form that stakeholders can interpret and use, via communication modes that stakeholders use.**
The role of the NWB LCC is to distribute information, not to make recommendations regarding specific land management decisions.

The NWB LCC could hold conferences or professional meetings each year for practitioners across the region to bring latest information in conservation science, and planning. This could be similar to this meeting but for a wider audience.

- ◇ The NWB LCC needs to interact with decision makers in order for partners to be on the same page, working towards common goals.

Often scientists create data/information, but it is not communicated in a way that can be easily/readily applied. Managers are not able to use the information in its current form and therefore the information is not used. Managers respond to the lack of inclusion of scientific information on that particular topic by calling for more information and new scientific methods. Really what that is needed is for scientists to translate complicated science into digestible forms, such as a narrative, for end users and managers.

Education is a resource management tool and the LCCs information and education efforts should be directly linked to the LCCs conservation goals. Education and information dissemination are not stand-alone products of this LCC.

- ◇ For example, why should this LCC care if the general public recognizes that directional change is happening? The LCC should link information dissemination to the conservation goals of the stakeholders they serve.
- ◇ Another example, wildlife managers need the hunting public to understand that caribou management regulations must change in accordance with the boundaries of directional change in caribou habitat.

Social science researchers have found that some people don't believe in climate change because the information is disjunctive and is not offered to them in a synthesized narrative. It is important to offer information and education in a format that is personally useful to stakeholders.

Meaningful and useful communication and information exchange does not mean telling people what information they need, but rather involves providing the information context in which people can see themselves.

- **The NWB LCC should be strategic about building networks and engaging stakeholders**

Perhaps we can apply "Strategic Doing," as a strategic planning method that acknowledges the contemporary speed of horizontal and vertical communication. Strategic Doing focuses on nodes (gov't, communities, etc.) that are networked.

A proven methodology, network analysis, assesses the strength of communication "nodes" and identifies important stakeholders that should be in the network if not at the table. For example, there could be nodes within the NWB LCC that need to representation on the Steering Committee. As an example, the Great Northern LCC has analyzed their network. There is also some research by Graham Long (see Molly).

There are several 'nodes' missing from the table. A network analysis could provide information to strengthen our partnership. It can identify information flow among organizations, but also within jurisdictions. It doesn't need to focus only on information flow, but also the decisions that are made within organizations.

The LCC would benefit from hearing industry's perspective on stewardship in the face of climate change. By understanding industry's decision-making structures, we have better chance of seeing where our goals align.

It is important to know and use your stakeholders' modes of communication, and to be aware that their modes are often very different from the modes used by scientists.

Institutions, communities, and agencies are multi-layered; communication with one person or division does guarantee that information will be disseminated or understood throughout the organization. Network analysis could identify silos within organizations and information flow and also how decisions are made within jurisdictions.

Networking forms are vitally important. For example, villagers are on Facebook a lot, and it can be a tool for transmitting concepts and ideas.

Building trust should be an explicit goal for communication. It is important to increasing trust within the LCC Steering Committee as well as outside via communication with broader stakeholders and partners. We should keep in mind the different deeply-seated values within agencies.

- **NWB LCC should be outcome driven, focus on outcomes that are broader in scope than filling science and management information gaps**

The LCC must be able to see what LCC-supported actions have influenced management or on-the-ground conservation decisions.

The LCC links broader landscapes – our individual land and resource management actions affect others, e.g., water quality downstream, movement of fish and wildlife. Land-use planning should be approached from broader scales. This is a rare opportunity to support communication across international borders or even across jurisdictions within a state or province.

- **NWB LCC needs to start with a successful, concrete example of how the LCC can work together, perhaps a pilot project connecting current and new partners.**

The NWB LCC should investigate the potential for applying the CMM across boundaries. The Conservation Matrix Model (CMM) provides large landscape approach that could help managers collaborate across jurisdictions and boundaries.

- ◇ The process of identifying and protecting benchmark areas would help the provinces of Yukon and British Columbia during their current conservation planning projects.
- ◇ Applying CMM across boundaries could highlight connectivity through trans-boundary rivers and draw the Provincial governments' attention to internationally important downstream fisheries and ecosystems.
- ◇ By focusing on corridors, valuable regions, matrix areas, we could preserve important resources collectively rather than looking internally [within our own land management units] only.
- ◇ If the U.S. used the CMM model, current Canadian CMM projects would gain stature and importance.
- ◇ There are immediate needs for the kind of information that CMM planning could provide. For example, a CMM could give an overview of existing protected areas in Alaska, and define the levels and types of conservation protection that the areas provide.
 - ◆ This information would help guide managers and stakeholders as they revise the BLM Central Yukon Resource Management plan.
 - ◆ As another example, a federal refuge that needs to protect upstream water quality could use the CMM to influence wildlife and watershed corridor protection as Alaska continues to plan and build roads. If corridors cannot be established and protected, then Alaska's refuge map could resemble the postage stamp refuges in the Lower 48.
 - ◆ The U.S. Army Corps of Engineers is always looking for land that could be purchased or protected in lieu of mitigation. A CMM approach could help them identify the most valuable land for protection. Currently, the Great Land Trust has a prioritized list of ecologically valuable land, however their criteria for selection does not include climate change trajectories.
 - ⇒ Note: There are some political risks for identifying some parcels of land as more valuable for ecosystem services than others. It is possible that some of the land that is currently managed by conservation agencies will be traded for land with higher conservation value. However, there are precedents for these kinds of trades between federal refuges and Native corporations in Alaska.
 - ◆ Alaska land selection process is almost done. CMM would fit into that process insofar as helping agencies look at their portfolio of lands and ecosystem services.

Creating a landscape conservation framework for the NWB LCC: Next steps towards a 10-year strategic plan

During the afternoon discussion, the Steering committee recommended the following to the Strategic Planning Working Group. Self-selected working group members include Robert Ruffner, Carl Markon, Maggie MacCluskie, Jamie Kenyon, Val Barber, Don Reid, Jewel Bennett (John and Amanda).

- Conservation Matrix Model seems like a good “fit” for the LCC to use as a framework (i.e. “how” to plan)
- Jim’s last slide on the second day articulated the “what” the LCC is about
- Time Frame for the strategic plan:
 - ◇ For the vision/goals: 50+ years
 - ◇ For actions/strategies: 5 – 10 years
 - ◇ Consider outputs (shorter term) and outcomes (shorter term)
- ALCES tool is valuable for including the affected communities (and complimentary to Matrix Model)
- Scale:
 - ◇ Larger – LCC-wide
 - ◇ Done in a way that supports decision-making at multiple scales, including fine scale
- Plan needs to be practical and demonstrate timely impact
- Audience(s)
 - ◇ LCC Partners are the main, direct audience
 - ◇ Others we hope to influence:
 - ◆ Resource managers
 - ◆ Local residents
 - ◆ Industry
 - ◆ Large private landowners
 - ◆ NGO’s
 - ◇ Considerations:
 - ◆ Need to engage audience members in the process
 - ◆ Need to choose industry participants carefully
- The plan and its products should be a tool to facilitate dialog and engagement with the LCC, not to dictate outcomes

Discussion of FY14 project direction

During the final hour of the workshop, the Steering Committee made recommendations to the 2014 Project Selection Working Group. It is anticipated that the LCC may have \$150,000 (more or less) for 2014 projects. Members of the 2014 Project Selection Working Group include: Robert Ruffner, Mike Spindler, Eric Schroff (John and Amanda).

- Conservation Matrix model parts
 - ◇ Anthropogenic footprint layer
 - ◇ Estimate of fire size

- ◊ Hydro layer
- IEM product? Do we need to start translating FY13 IEM products?
- Network analysis of the LCC
- Above project
 - ◊ What is relevant to this LCC
 - ◊ Do they need data from us to produce a useful product? Do we need to generate new data?
 - ◊ Do they need translation for stakeholders?
- Permafrost adaptation (Northern Climate Exchange NCE)
- Other piggybacking
- What are other LCCs funding? Can we throw in with another useful project.

Other notes:

- For some of these projects, it may be appropriate for stakeholders on the steering committee to use internal funding.
- It is important to check with Fiona et al., to see what the priority layers are for the conservation matrix modeling.

Handouts are available on the NWB LCC website:

- Northwest Boreal LCC: Prioritized Information Needs by Category
- Presenter Biographies
- Climate Change Adaptation for
- Conservation Targets (ACT) Framework

PDFs of the following presentations are available on the NWB LCC website:

Day 1: Setting the stage for WHY to do proactive conservation planning at the LCC SCALE

- Building a landscape conservation foundation (Amanda Robertson)
- Overview of ecosystem stewardship: Planning for change (Terry Chapin)
- The changing role of science and scientific institutions (Annette Watson)
- Challenging conventional conservation paradigms (Fiona Schmiegelow)
- Integrating climate change into conservation & management (Molly Cross)
- Visions of the Northwest Boreal Forest (Annette Watson)

Day 2

- HOW to do proactive conservation planning at the LCC scale in light of landscape changes? (Dawn Magness)
- Introduction to ALCES: scenario analysis for regional cumulative effects assessment (Matt Carlson)
- Adaptation for Conservation Targets (ACT) Planning Framework (Molly Cross)
- Conservation assessments in Atlin-Taku and Muskwa-Kechika areas, as examples of approaches using enduring features/land facets/geophysical settings (Jim Pojar)
- Meaningful engagements with communities (Annette Watson)
- Implementing a Conservation Matrix Model (Fiona Schmiegelow)

- Scenario planning for embracing uncertainty (Erica Rowland)
- Dual strategy for conservation & climate change adaptation (Jim Pojar)
- Support stakeholder engagement/participation (Annette Watson)