

Science Planning for Future Alaska Landscapes

In 1945 Columbia University scholar, Walter Rautenstrauch, defined the importance of “scientific planning”. From his *Philosophy of Science* article published by the University of Chicago, he argued that “among the issues before the American People today none are of greater importance than that of National [Scientific] Planning.” He goes on to describe how the vital balancing of natural resources, science tools, and humankind’s belief systems will result “in building a better world”.

Not much has changed in nearly seven decades. Scientific planning on national, regional, and smaller scales is vital for making effective conservation decisions in rapidly changing environments. Landscape Conservation Cooperatives (LCCs) in Alaska are actively developing long-term science plans that will help multiple agencies and organizations make good decisions to sustain resources. The following articles describe how each Alaska LCC is following a distinctive process for science planning that flows from the unique needs of each region. The long-term science plans that result from these processes will ultimately help “in building a better world” for Alaska’s wildlife and its people.

Focusing Science on “Things that Count”: Science Planning in the North Pacific LCC



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The North Pacific LCC (NPLCC) extends from the Kenai Peninsula southward to Bodega Bay, California—a region corresponding to the coastal temperate rainforest, including all of southeast Alaska. The intermixed forest, streams and lakes, ice fields, and marine shorelines provide abundant natural resources that support fish, wildlife, and humans. Landscape-scale change here is rapid, creating many conservation challenges. How does the NPLCC approach science planning for a varied landscape and its diverse people?

The structure of the NPLCC includes three subcommittees: Science and Traditional Ecological Knowledge Subcommittee (S-TEK), Partnership Liaison Subcommittee,

and Communication and Outreach Subcommittee. The three Subcommittees are in differing stages of planning and focus on separate NPLCC tasks.

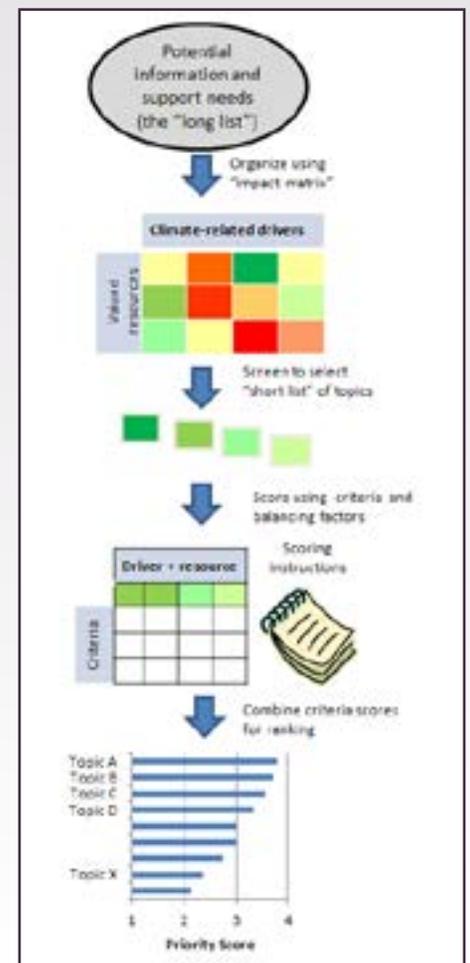
Science planning was first undertaken and completed by the Science and Traditional Ecological Knowledge Subcommittee (S-TEK), with several “Guiding Principles” developed for the process.

Guiding Principles: The S-TEK subcommittee first agreed on “Guiding Principles” that include:

1. a primary focus on support for natural resource manager needs related to climate change;
2. building LCC collaboration and capacity to effectively assist these decision-makers;
3. appropriate use of Traditional Ecological Knowledge as agreed on by tribal and first nation partners; and
4. consideration of ecosystem connections and interactions in all activities.

Priority Topics: A long list of specific climate-related issues resulted from a Steering Committee Framing Workshop, findings of a National Wildlife Federation Project involving more than 200 scientists and resource

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Northwest Boreal LCC: Focused on the Science of Conservation

The Northwest Boreal LCC (NWB LCC), formerly known as the Northwest Interior Forest LCC, has made great progress in the past few months. A streamlined name and fully developed website are two additions. Like other LCCs in Alaska, the NWB LCC is also actively working toward a long-term science plan to guide its efforts.

The NWB LCC is in the process of developing a scientific framework for proactive landscape conservation and planning across the northwest boreal landscape. LCC staff have conducted a comprehensive information needs assessment to begin to prioritize biological and cultural resources, management objectives, and information needs of the LCC Steering Committee partners and the broader partnership community across this large region.

As the first step in this process, the NWB LCC used an informal questionnaire and sweeping partnership scoping effort that reached out to over 200 organizations across Alaska and northwest Canada. The

resulting information was coarse-filtered and further distilled in a “Management Framing Workshop” hosted by Yukon College in Whitehorse. At the workshop, the Steering Committee and partner participants identified:

- (i) types of natural resource management decisions and desired outcomes;
- (ii) uncertainties in natural resources’ responses to drivers of landscape change; and
- (iii) specific science and management information needs that are shared across the 330 million-acre region.

These information needs were further categorized as gaps or uncertainties associated with: baseline data, monitoring, understanding relationships, projecting future states, and adaptation planning and best management practices.

The next step in planning for the NWB LCC is to develop a scientific framework that will facilitate how the Steering Committee will choose

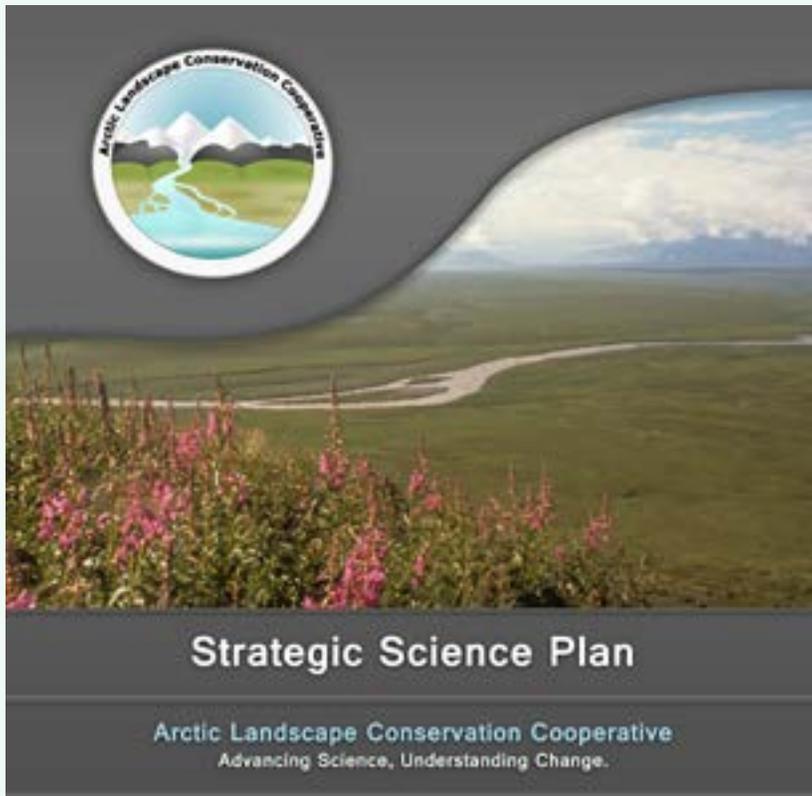
among the many high-value projects to support in the region. This process will identify projects that will most substantially contribute to the longer-term strategy of landscape conservation. A combination of previous and future efforts to identify commonalities in science priorities, management objectives, and information gaps will lead to the development of scalable products that will benefit the whole LCC partnership, from the level of resource managers and individual communities, to regional and landscape-level activities. The resulting long-term (10-year) strategy will become a foundation for landscape planning and science in the northwest boreal region and will be based on the NWB LCC’s vision of a sustainable and resilient boreal landscape.

Stay tuned as the Northwest Boreal LCC requests more input from stakeholders to complete this effort, which will include a landscape conservation planning workshop in the fall of 2013 and a science workshop later in 2014.

New Website

The Northwest Boreal LCC is pleased to announce its new website located at: <http://nwblcc.org/>. LCC staff and partners encourage anyone interested in learning more to visit the new site and subscribe to the mailing list to receive future updates and other news.





“Managing for the Future in a Rapidly Changing Arctic”

In March the Department of the Interior released this report to the President written by an interagency working group tasked with coordinating domestic energy development and permitting in Alaska. Arctic LCC geography and information were used in the development of the report. For more information: <http://www.doi.gov/>.

Arctic LCC Science Planners Seek Input

The days of informally structured natural history research in the Arctic are all but gone. “Big Science” projects ingest images from satellites, reams of data logged by automated sensors, and models so complex that they require the resources of a supercomputing center. Much of this attention is aimed at understanding the role of the arctic region in regulating global climate. But work conducted at scales relevant to arctic resource management also demands attention. And, while it seems obvious that managers need to know how the terrestrial system is changing under the influence of climate, very little progress has been made to organize observing activities across northern Alaska into a coherent, consistent network.

The Arctic Landscape Conservation Cooperative (Arctic LCC) Science Plan seeks to fill this gap (see <http://arcticlcc.org/about/scienceplan/>) while addressing management information needs. The plan, released on

February 21, 2013, looks forward ten years but retains flexibility to allow the Arctic LCC to address emerging issues without the need for plan revision.

The science plan takes a “systems approach”, recognizing that climate change affects species and habitats through complex interactions of geophysical and meteorological processes. To develop the long-term coordinated measurements of changing conditions, the Arctic LCC presents a vision for a Terrestrial Environmental Monitoring Network (TEON) that will address incomplete understanding of these interactions.

TEON will focus work in a limited number of focal watersheds that collectively represent the diversity of landscape settings at the eco-regional scale. The Network will leverage existing science infrastructure and logistics capacity, and provide opportunities to build on existing long-term data sets.

The plan also stresses the importance of interdisciplinary research. Understanding the effects of climate on species and landscapes is greatly facilitated by bringing together experts from multiple disciplines, as climate change is not manifested or understood within the confines of any individual discipline.

Finally, this plan promotes developing integrated ecosystem response models that are far more complex than any existing discipline-centric response model. It promotes improved data integration, management and access, and will strengthen interagency and intergovernmental collaboration in addressing shared needs.

The science plan is intended to be a living document, and the Arctic LCC staff encourages ongoing comment. Suggestions can be submitted to: staff@arcticlcc.org. Please include the words “Science Plan” in the subject line.

Science Planning: When All Eyes Are on You

Like other LCCs in Alaska, The Aleutian and Bering Sea Islands LCC (ABSILCC) is in the process of developing a strategic science plan to guide its investments in applied science. This planning effort began with an analysis of more than 50 existing research and management plans from the ABSILCC region, which identified six landscape-scale stressors as well as resources and ecosystem services of common management interest.

ABSILCC Landscape-scale Stressors

- ~ Climate Variability & Change
- ~ Commercial Fishing
- ~ Marine Shipping
- ~ Invasive & Introduced Species
- ~ Contaminants & Pollutants
- ~ Ocean Acidification

At the half-way mark in this process, ABSILCC chose the public venue of the Alaska Marine Science Symposium to introduce its approach. The ABSILCC hosted a “Strategic Science Plan Workshop” on the last day of the annual symposium. The workshop began with sharing a draft matrix of conservation threats in the ABSILCC region that had been previously ranked by the Steering Committee.

During the three-hour interactive workshop, participating managers, researchers and stakeholders systematically provided input on a draft assessment of conservation threats and participated in an open



dialogue about the ABSILCC’s assumptions, biases, and overall planning approach.

Beyond soliciting structured input from the participants, focused on identifying key management information needs associated with the LCC’s six landscape-scale stressors, the staff of the LCC and its Steering Committee members responded to questions, made clarifications about intents, and invited the participants to help guide the LCC’s thinking on the issues.

The ABSILCC identified topic areas that had been missed in the first ranking, including threats to cultural

resource sites from introduced ungulates and potential for looting. On this particular issue, an invitation offered during the meeting to collaborate with a recently formed cultural resources working group for the Aleutian Islands was accepted.

Workshop participants helped identify a total of 18 management issues across all six of the identified landscape-scale stressors. The management issues are described in the resulting workshop report available online at <http://absilcc.org>. The ABSILCC continues to encourage input on its planning efforts from those interested in the process and outcome.

Science Planning Continues Online

Participants at the ABSILCC workshop expressed interest in providing their perspectives on impacts of landscape-scale stressors to resources and ecosystem services within the region. In order to gather insights of others who weren’t able to attend the workshop, including the region’s diverse stakeholders and key scientific experts, the ABSILCC has developed an online survey tool which leads respondents through a threat evaluation process similar to the one completed by the Steering Committee. The survey will be open through May 10 at <http://absilcc.org>. Results will be compiled and incorporated into a draft Strategic Science Plan which will be released for broad and targeted review this summer.

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Aleutian and Bering Sea Islands
Landscape Conservation Cooperative

Partner Highlight:

Integrated Ecosystem Model for Alaska and Northwest Canada

Of the various projects that LCCs partner in supporting, the “Integrated Ecosystem Model (IEM) for Alaska and Northwest Canada” includes four of the five Alaska LCCs and the DOI Alaska Climate Science Center (AKCSC) as major partners. The IEM collaborative research project, led by University of Alaska Fairbanks researchers from within its Institute of Arctic Biology, Scenarios Network for Alaska & Arctic Planning (SNAP), and the Geophysical Institute, is designed to help resource managers understand the nature and expected rate of landscape change in Alaska and northwest Canada.

The IEM is providing a variety of important tools to resource managers region-wide. First, the IEM project will deliver a common framework for forecasting landscape change in the region. This framework will include responses to climate and to land cover and use-driven changes in vegetation, disturbance (such as fire), hydrology, and permafrost. IEM researchers are also producing maps and other

products related to landscape changes in ecosystem structure and function, with examples including plant composition in tundra and forest and production of plants used by herbivores.

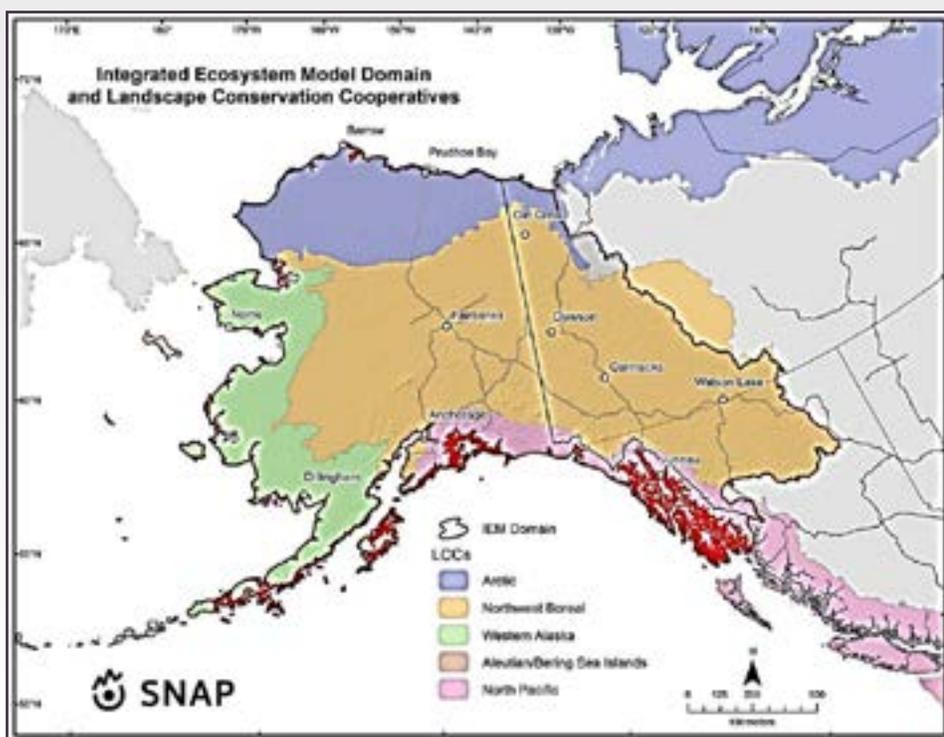
The IEM is working to quantify uncertainty by considering different climate scenarios, different climate models, and aspects of uncertainty in the IEM framework itself. The diverse IEM project team is comprised of software engineers and researchers from across several disciplines. This team helps in the development of impact models. And these models can help address how specific resource management actions may affect landscapes in the face of change. They are also a team that can help to identify valuable adaptation and management responses to forecasted landscape-level changes.

The LCCs in Alaska, and ultimately all of the partner agencies and organizations that make up the

LCCs, benefit from the IEM project in a variety of ways. Because the IEM jointly addresses region-wide information needs, it helps coordinate efforts across boundaries. The IEM serves as a forum for learning and information exchange. It also helps facilitate communication and collaboration among agencies and disciplines. David McGuire, one of the principal investigators on the IEM says of the project, “There has been a real gap in the needs of resource managers to assess how climate change will affect resources. The models haven’t been developed to do those assessments. Our question is, “how will landscapes change?” Once people get forecasts of how things may change, they can relate the changes to the resources they manage.”

The IEM and Alaska’s LCCs are coordinating observations to detect change, and working to understand existing ecosystem relationships and projecting the future states of ecosystems in Alaska. The LCCs in Alaska eventually will also work with the IEM in helping Alaska agencies and organizations identify adaptation and management practices in response to projections of change. Amy Breen, another principal investigator, describes the need for the IEM, “We anticipate that the results from the project will be used by natural resource managers and other stakeholders to predict and plan for potential landscape changes in Alaska and Northwest Canada.”

To date the IEM and SNAP (Scenarios Network for Alaska & Arctic Planning) programs have downscaled historical and projected monthly climate data, primarily temperature and precipitation across Alaska and large regions of Western Canada.



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The IEM is currently working on a variety of projects including:

- coupling together component models;
- forecasting tundra fire and treeline dynamics (scheduled to be completed July 2013);
- developing Alaska thermokarst model (scheduled to be completed by the end of 2013);

- developing wetlands dynamics model (boreal fens completed, peatland and boreal bogs completed by the end of 2013);
- assessing biological carbon sequestration for Alaska (2013-2014).

More information about the IEM for Alaska and northwest Canada is available at:

- <http://www.snap.uaf.edu/data.php>
- OR
- <http://csc.alaska.edu/projects/integrated-ecosystem-model>.

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“Focusing on Things That Count”



professionals, and discussions by the S-TEK. The S-TEK organized the issues into an “impact matrix” that connected climate-related drivers to valued natural resources. The matrix was then developed into a scoring tool that helped S-TEK members narrow the universe of several hundred issues to a “short list” of 22 topics.

The Guiding Principles were applied, and refined criteria were then developed. A second ranking exercise was applied to yield five Priority Topics related to hydrologic regimes, impacts of changing temperatures on forests, sea level and storm impacts, anadromous fish, and invasive species. These topics became the heart of the North Pacific LCC’s Science and TEK Strategy.

As the Strategy is implemented, the NPLCC recognize that it is not primarily a science organization. The NPLCC will rely on help from its science partners, particularly the Climate Science Centers. Together the partnership aims to accomplish the “things that count”, as identified in the S-TEK Strategy as priorities for the NPLCC for the next four years.

See <http://northpacificlcc.org/> for detailed information on the science planning process and projects of the NPLCC.

2012 Annual Reports Are Available for LCCs in Alaska

Arctic LCC

<http://arcticlcc.org>

Aleutian and Bering Sea Islands LCC

<http://absilcc.org>

Western Alaska LCC

<http://www.arcus.org/western-alaska-lcc>

North Pacific LCC

<http://northpacificlcc.org>

Northwest Boreal LCC

<http://nwblcc.org>

Staff Highlight: Pathways for Students to Federal Careers



Brett Parks is a “Pathways” student employee for the Northwest Boreal LCC based in Fairbanks, with responsibilities focusing on multi-agency/organization international partnership building. Brett expects to graduate from the University of Alaska Fairbanks this August with an Interdisciplinary MSc in International Environmental Principles and Policies. His thesis explores interplay between socio-ecological systems, and multi-level governance of wolves in transboundary regions.

Brett holds B.A.s in English and German Language and Literature from Wayne State University. He spent five years teaching Business-English (ESL) to professionals in Switzerland, before moving back stateside to ‘thru-hike’ the Pacific Crest Trail and attend graduate school in order to more actively engage in natural and cultural conservation at a decision making level.

Suzanne Worker is a “Pathways” student and project coordinator for the Western Alaska LCC, and is working on an M.S. in Wildlife Biology at the University of Alaska Fairbanks. Her graduate work focuses on the causes and consequences of geophagy, or mineral lick use, in snowshoe hares in northern Alaska.

Suzanne has a B.S. in Animal Sciences from Colorado State University, and spent many years working with reindeer herders in Western Alaska on a variety of range management and production issues.



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Alaska's Landscape Conservation Cooperatives

Landscape Conservation Cooperatives (LCCs) are self-directed partnerships that identify shared conservation science needs to help address climate change and other landscape-scale stressors. They complement and build upon existing science and conservation efforts and partnerships. LCCs do not assume other partner responsibilities or supersede agency decision-making. Rather, LCCs provide scientific tools and information to land managers needing to make forward-thinking conservation decisions in a rapidly changing environment.



Terrestrial areas of the five LCCs within Alaska; marine area of Alaska LCCs shown in teal blue. Inset shows distribution of LCCs across the North American continent.