

**A CROWN ADAPTATION PARTNERSHIP (CAP) TOOLBOX
FOR THE CROWN OF THE CONTINENT**



TAKING ACTION ON CLIMATE CHANGE

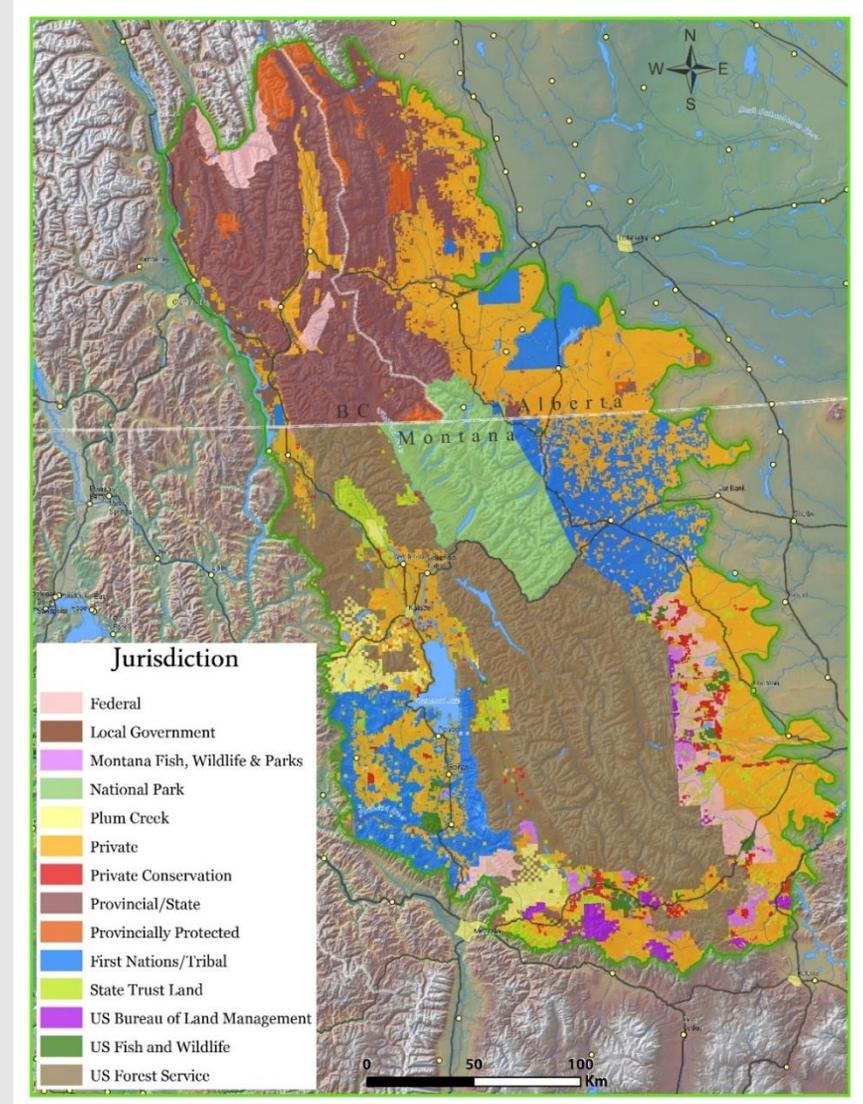
‘Taking action on climate change’ is a strategic initiative of the Crown Adaptation Partnership (CAP), led by the Crown Managers Partnership, Crown Conservation Initiative, the U.S. Forest Service’s Northern Rockies Adaptation Partnership, and The Wilderness Society.

Together, CAP brings together the expertise of a broad suite of government and conservation representatives, tribes and First Nations, universities, and community stakeholders to implement coordinated climate change adaptation strategies across the Crown of the Continent ecosystem based on the best available science.

By working together, we seek to:

- 1) Identify shared adaptation strategies that build resilience to current and projected climate change impacts to the forests and watersheds, wildlife and fish of the Crown of the Continent;
- 2) Coordinate strategies at multiple scales to achieve borderless outcomes across the Crown;
- 3) Identify and replicate examples of successful adaptation actions by managers across the landscape;
- 4) Develop landscape-scale learning networks and adaptive management frameworks that identify and fill key information gaps.

Early successes of our collaborative work include the continued expansion of our partnership to include the Great Northern Landscape Conservation Cooperative, and the recognition of our collaborative work to date by the Obama Administration’s Resilient Lands and Waters Initiative in June of 2015.



The 18 million acre Crown of the Continent - spanning NW Montana, SE British Columbia, and SW Alberta - is a mosaic of jurisdictional complexity, necessitating coordinated management action if managers are to effectively address climate change in this landscape. Map courtesy of the Crown Managers Partnership.

IDENTIFYING SHARED PRIORITIES AT THE LANDSCAPE-SCALE

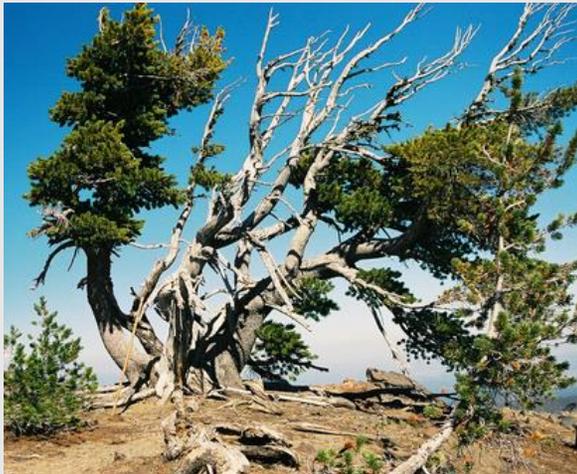
OUR FIRST 'BIG TENT' WORKSHOP

(March 19-29, 2014; Missoula, Montana)



In late 2013, CAP began working to identify a 'Big Tent' framework for collaboratively addressing climate change across the Crown of the Continent, and through which we could build on many important existing collaborative efforts in the landscape.

We agreed that components of the new 'Big Tent' model included: (1) working at the landscape-scale, (2) using the best available science, (3) diverse and inclusive collaboration, but with (4) a solid understanding of the priorities and directives of each jurisdiction in the Crown, (5) sharing effective management actions across the landscape, (6) establishment of adaptive management frameworks, and (7) engaging a mixture of senior-level managers, middle managers, and on-the-ground biologists and partners.



By the end of this first workshop, participants had identified multiple opportunities for collaboration, including: aquatic invasive species; five needle pine restoration; cold-adapted native salmonids; terrestrial invasive plants; and prescribed fire in mixed severity fire regimes. A final category of meso-carnivores was added after follow-up meetings with Forest Service staff and additional partners.

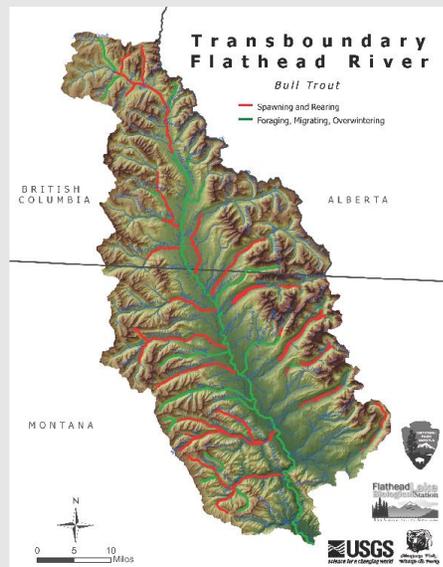
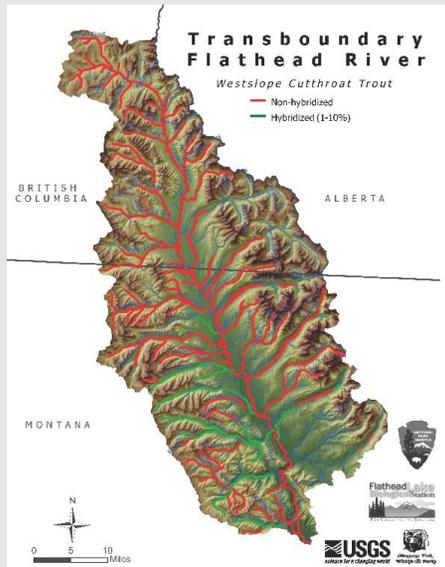
Here, we summarize our ongoing efforts to address these collaboratively-chosen values, share early successes, provide access to a resource library, and discuss next steps.

Photo credits: top photo: US Forest Service; all others: iStock.

For information on this initial phase of CAP's work, please contact Ian Dyson: [Email: Ian.Dyson@gov.ab.ca](mailto:Ian.Dyson@gov.ab.ca)



BULL TROUT AND WESTSLOPE CUTTHROAT TROUT OUR SECOND 'BIG TENT' WORKSHOP (November 18-20, 2014; Kalispell, Montana)



While the Crown is a stronghold for both bull trout and westslope cutthroat trout, both species face significant challenges in an era of shifting climate. Increasing stream temperatures are expected to reduce the suitable habitat available to bull trout and increase hybridization levels between westslope cutthroat trout and non-native trout species.

Ground-breaking work by Clint Muhlfeld and Leslie Jones (US Geological Survey) that projects climate change impacts— as well as threats posed by non-climate stressors - for both species across the entire Crown landscape provided the scientific basis for workshop discussions; leading to the identification of coarse- and fine-scale geospatial priorities for on-the-ground work, as well as focused discussions about specific management actions at each site.

Workshop outcomes included agreement among diverse stakeholders to pursue implementation of three projects, including 1) a Crown-wide identification of native salmonid conservation populations most likely to benefit from adaptation actions, 2) a focus on re-founding westslope cutthroat trout in areas of climatically-suitable habitat, and 3) testing the strategy of native salmonid translocation to areas of potential climate refugia.



For information about CAP's native salmonid work, please contact *Anne Carlson*: [Email: Anne_Carlson@tws.org](mailto:Anne_Carlson@tws.org); or *Erin Sexton*: [Email: Erin.Sexton@mso.umt.edu](mailto:Erin.Sexton@mso.umt.edu)

Map and photo credits: Top left: westslope cutthroat trout (WSCT) photo courtesy of Fish Eye Guy Photography; maps of future habitat suitability for WSCT (left) & bull trout (right) by Clint Muhlfeld; photo of WSCT, bottom photo at left, courtesy of National Park Service.



BATTLING TERRESTRIAL INVASIVE PLANTS TOGETHER

OUR THIRD 'BIG TENT' WORKSHOP

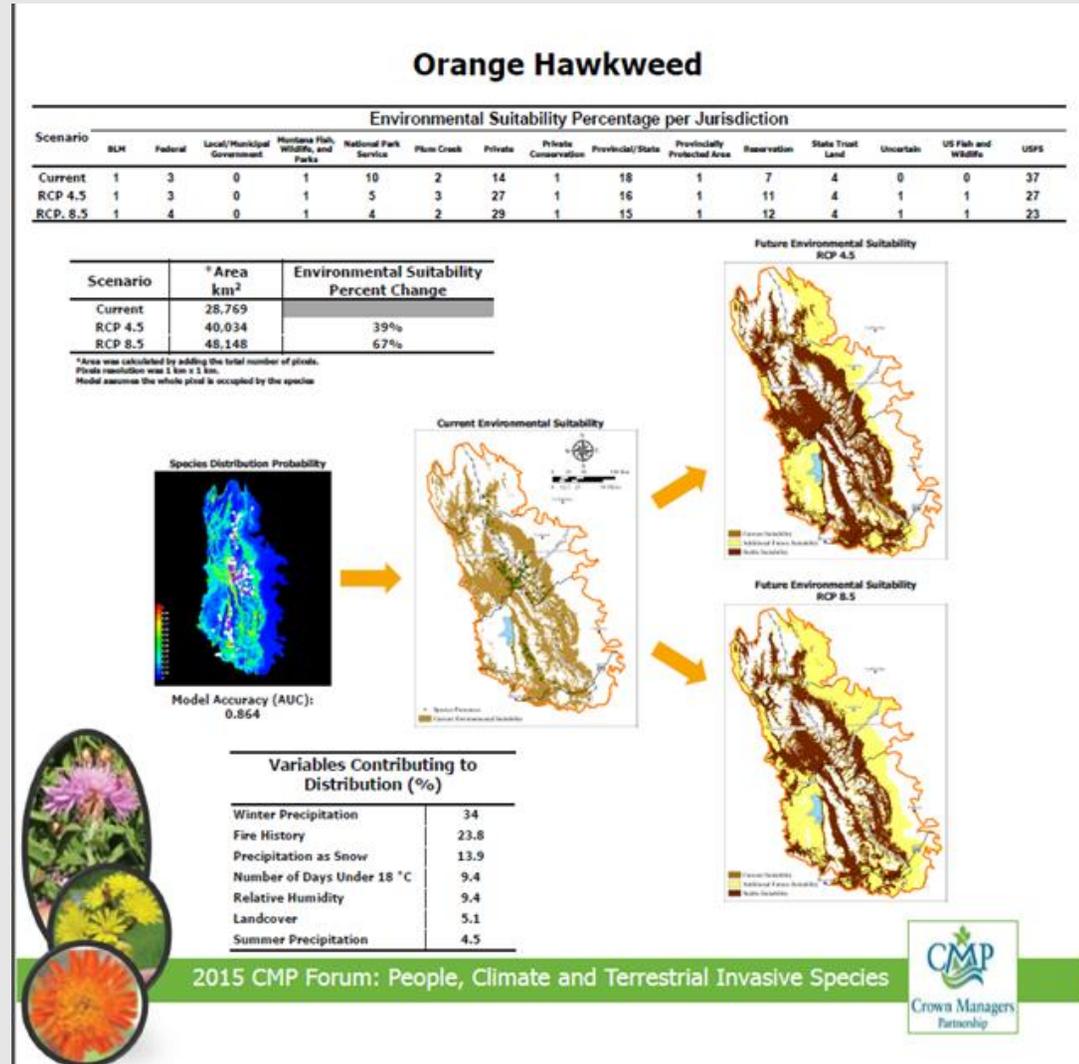
(March 17-19, 2015; Lethbridge, Alberta)

Prior to our third 'Big Tent' workshop, Crown managers identified priority terrestrial invasive plant species based on ecological impact and feasibility for control. Current and future suitable habitat was also modeled for 10 invasive species based on current known occurrences and future climate scenarios.

At the 2016 CAP workshop, participants began developing priority management strategies to coordinate climate adaptation tactics. By convening invasive plant experts, a Crown-wide terrestrial invasive plants strategy conversation was initiated to work collaboratively within a Crown-wide learning network.

Collaborative outcomes of the workshop resulted in five priority themes: 1) Develop a common metric and protocols for inventory and detection, 2) prioritize hot spots for action based on a Crown-wide strategy, 3) develop external and internal communication strategy to increase awareness, 4) develop common management approaches to similar situations and threats, and 5) provide proven mitigations to control and reduce spread through common vectors and corridors.

For information about CAP's noxious weed work, please contact Linh Hoang: [Email: Lhoang@fs.fed.us](mailto:Lhoang@fs.fed.us)



Map and photo captions Bray Beltran developed future distribution models for 10 species of noxious weeds before the March 2015 CAP workshop, e.g. orange hawkweed (above); photos of two noxious weed species: spotted knapweed (above left) and leafy spurge (above right).



RESTORING FIVE NEEDLE PINE FORESTS

OUR FOURTH 'BIG TENT' WORKSHOP

(March 15-17, 2016; Fernie, British Columbia)

The Crown of the Continent's whitebark pine and limber pine forests have declined significantly due to a combination of stressors, including an exotic disease (white pine blister rust), mountain pine beetle outbreaks, and the exclusion of fire from these forests. Climate change adds yet another stressor to whitebark pine forests, which are listed as endangered under Canada's Species At Risk Act and are a candidate species under the U.S. Endangered Species Act.

Our fourth 'Big Tent' workshop resulted in a number of collaborative outcomes, including establishing a multi-stakeholder five-needle pine working group to: 1) develop and implement a Crown-wide restoration strategy, 2) initiate a multi-jurisdictional monitoring network and database, 3) communicate broadly to raise awareness and appreciation of the species, and 4) develop standardized approaches for the use of fire in five-needle pine forests.

Photo captions: *Above*: collecting blister rust resistant whitebark pine (WBP) seeds as part of a restoration program; *Clockwise from top left photo at right*: Clark's nutcracker, one of many species that uses WBP forests as key habitat; a WBP forest (photo courtesy of Travis Belote); grizzly bears also depend on WBP forests for food; and the invasive pathogen, blister rust, that has decimated WBP stands. All other photos courtesy of iStock.



For information about CAP's work on five needle pines, please contact Regan Nelson: Email: Regan@crownsconservation.net

WHAT'S NEXT?

MESO-CARNIVORES AND PRESCRIBED FIRE IN MIXED SEVERITY FIRE REGIMES



Canada lynx and wolverines *and* prescribed fire in mixed severity fire regimes are the two remaining natural resource targets identified for collaborative climate adaptation work at the scale of the Crown of the Continent during our initial CAP workshop in March of 2014.

Given the tremendous complexities involved in developing coordinated, long-term management strategies for meso-carnivores in the Crown of the Continent, we are using a phased approach here. In December of 2015, we collaborated with the National Forest Foundation and other partners in organizing a meso-carnivore monitoring workshop for the states of Montana, Idaho, Wyoming, and Washington to better understand what we know about current distributions, status, and jurisdictional priorities for these species regionally.



Planning for a CAP meso-carnivore workshop will begin in earnest in 2016, to be followed by collaborative work to establish Crown-wide learning networks around the use of prescribed fire in mixed severity fire regimes in 2017. Coordinated work on prescribed fire will be coupled with efforts to identify successful regional strategies for applying this management tool in the face of a changing climate.

Top photo of Canada lynx kits in Montana's Helena, Lewis & Clark National Forest courtesy of Kalon Baughn; bottom photo courtesy of National Park Service.

RESOURCE LIBRARY

COLLABORATIVE WORKSHOP TO CHOOSE NATURAL RESOURCE TARGETS

- Workshop website: <http://crownmanagers.org/adaptative-management-initiati>
- Workshop approach and agenda:
http://static1.1.sqspcdn.com/static/f/808688/25189865/1405429825900/AMI_March20+Workshop+Agenda.pdf?token=2GUPXQm9O8F73ZNIp9iQfyVTGV4%3D
- A climate change adaptation gap analysis for the Crown of the Continent (by Regan Nelson):
http://static1.1.sqspcdn.com/static/f/808688/25678703/1416253186333/CC_Gap_Analysis_Report_Public_FINAL_v2+copy.pdf?token=9Yy3x1xGvZKMf3cOF8skiV7bZN8%3D
- Final workshop report:
http://static1.1.sqspcdn.com/static/f/808688/25293162/1407428874157/FINAL+REPORT_Taking+Action+on+Climate+Change+Workshop_July+2014.pdf?token=2Bi57iiOXIJ9Tul8Y%2BQe99PMU2Y%3D

NATIVE SALMONIDS: Bull trout and westslope cutthroat trout

- Workshop website: <http://crownmanagers.org/adaptative-management/>
- Workshop approach and agenda:
<http://static1.1.sqspcdn.com/static/f/808688/25669922/1415991247630/Workshop+participant+packet-agenda2.pdf?token=MzaCb9zF7JQf4bMZAyCHFK9Ds98%3D>
- Vulnerability assessment for bull trout and westslope cutthroat trout assembled by the U.S. Forest Service (Region 1) through its Northern Rockies Adaptation Partnership:
<http://static1.1.sqspcdn.com/static/f/808688/25669987/1415991658210/Workshop+participant+packet-4vulnerassess.pdf?token=xVFmBf0P46efhvzht955c9S6B4%3D>
- Overview of the science available to support decision-making on native salmonid management across the Crown of the Continent (by Clint Muhlfeld and Leslie Jones):
http://static1.1.sqspcdn.com/static/f/808688/25781863/1418851237377/Muhlfeld_Jones_CCE_workshop_2014_combined+copy.pdf?token=z4qkHfayLR4WR%2F9H8yg9N4957Lg%3D
- Summaries of adaptation strategies and tactics used by managers and fisheries biologists for bull trout and westslope cutthroat trout across the Crown:
<http://static1.1.sqspcdn.com/static/f/808688/25775551/1418678780770/Adaptation+Panel+Master+Presentation.pdf?token=xYM59lh9mimu3l7HvWBeNwcRnHg%3D>
- Final workshop report:
<http://static1.1.sqspcdn.com/static/f/808688/26030322/1426003458717/Final+report+AMI+Native+Salmonids+Big+Tent+Workshop+Nov+18-20+2014.pdf?token=zUH94RK1RRLJL2zhY50WldoeTw%3D>

NOXIOUS WEEDS

- Workshop website: <http://crownmanagers.org/2015-forum>
- Workshop approach and agenda: http://static1.1.sqspcdn.com/static/f/808688/26047368/1426541281857/CMP+Forum+Agenda_03+16+2015+FINAL.pdf?token=C5c3QOiuF%2FjngWynV4HDAXvqwGo%3D
- An overview of the status and management of noxious weed species in the Crown of the Continent: Results of a jurisdictional survey for the entire landscape: <http://static1.1.sqspcdn.com/static/f/808688/26132184/1428842871507/Weed+Survey+Exec+Summary+copy+2.pdf?token=pfsLveQC5KmxgCmgHMAh5dEctgo%3D>
- Models of future habitat suitability across the Crown for 10 noxious weed species under two different climate scenarios (by Bray Beltran): <http://static1.1.sqspcdn.com/static/f/808688/26073132/1427200873610/Bray+Beltran+-+March+18.pdf?token=uBvldRqO7Ac0HYU0oI1WRU75FxQ%3D>
- Final workshop report: <http://static1.1.sqspcdn.com/static/f/808688/26245521/1432123463573/Summary+Notes+CMP+Forum+final.pdf?token=qCjOB2B%2FO7aH0n6nH8eU9GeoGgl%3D>

FIVE NEEDLE PINES: Whitebark pine and limber pine

- Workshop website: <http://crownmanagers.org/2016-forum>
- Workshop approach and agenda: <http://static1.1.sqspcdn.com/static/f/808688/26908776/1457702392400/Agenda+and+Participant+List+FINAL.pdf?token=MjeQZ3bXOrM8vyEykmQmOj%2F6Ws%3D>
- Overview of the status, trends, and restoration of whitebark pine and limber pine in the Crown (by Cyndi Smith): <http://static1.1.sqspcdn.com/static/f/808688/26931260/1458675577633/WBP-LP+in+CoC+-Cyndi+SMITH+-+2016.03.18.pdf?token=%2BHOUbZ4PbPWa7Gm5swplO2hDQQA%3D>
- Restoring five-needle pine forests in the Crown under climate change (by Bob Keane): http://static1.1.sqspcdn.com/static/f/808688/26931290/1458676446860/CROWN2016_Fernie_RestoringWhitebarkPineClimateChange-Bob+Keane+copy.pdf?token=3sRTN02IY923%2Fn%2BIWA1f3ezin7o%3D

Our sincere thanks to our partners and funders!



Great Northern
LANDSCAPE CONSERVATION COOPERATIVE



**Roundtable on the
Crown of the Continent**

MEET THE CLIMATE ADAPTATION PARTNERSHIP (CAP) TEAM



Anne Carlson is a Climate Adaptation Specialist with The Wilderness Society, a leading nonprofit environmental group that has worked to protect wilderness and connect Americans to our nation's wildest places since 1935. She works on land protection campaigns and landscape-scale adaptation projects across the West in collaboration with conservation partners, scientists, tribal communities, agency staff, and the general public. Prior to joining The Wilderness Society in 2009, Anne devoted 15 years to the study and conservation of mammal species across Africa and Southeast Asia with her colleagues at Cambridge University and the San Diego Zoo. She received Master's and Ph.D. degrees from the University of Wisconsin, Madison in 1995 and 2000.



Ian Dyson is a geographer and planner with 34 years of experience dealing with integrated resource management, water resources, protected areas, land use, and regional cumulative effects management in Alberta, Canada. He is a senior manager responsible for trans-boundary outcomes with Alberta Environment and Parks. His career experiences have focused on building and sustaining partnership approaches to environmental management, conceiving management systems approaches to address environmental cumulative effects, and facilitating institutional and societal capacity to define and meet common, place-based environmental outcomes across boundaries and borders.



Regan Nelson is the Interim Coordinator for the Crown Conservation Initiative (CCI), a collaboration of leading conservation organizations and academic institutions working together to pursue shared conservation and climate adaptation priorities throughout the transboundary Crown of the Continent Ecosystem. Regan previously served as CCI's Climate Change Adaptation Program Manager. In this role, she conducted a Crown-wide assessment of climate change adaptation needs, and crafted recommendations to enhance the resilience and ecological integrity of the landscape. Regan's experience spans scientific, policy and political realms in both marine and terrestrial systems, at the local, national and international level.



Linh Hoang is the Regional Inventory, Monitoring, Assessment and Climate Change Coordinator for the USDA Forest Service, Northern Region. She has over 17 years of experience in resource management with the Forest Service. Linh works on developing approaches to assist managers integrate climate change implications into management operations. In addition, she is establishing a regional broad scale monitoring strategy with an emphasis on how evaluation of monitoring information could inform management at varying scales. Linh began her federal service as a volunteer botanist for the Forest Service, working in Oregon, Washington, California, and Montana.



Erin Sexton is a Research Scientist and Regulatory Affairs Manager with the Institute on Ecosystems, at the University of Montana. Erin's research focus encompasses aquatic ecology and conservation biology in our shared transboundary watersheds between British Columbia, Alberta and Montana. Erin is involved in several collaborations within and across the Crown of the Continent, with a focus on coordinating cross-border research, the intersection of applied science and multi-jurisdictional policy, assessment of ecological condition, and incorporating adaptation strategies for climate change. She was named a Wilburforce Conservation Science Fellow, one of 20 fellows for 2015, from Canada and the U.S.