Project Title: *Informing Connectivity Conservation Decisions in the Transboundary Okanagan-Kettle Subregion*

Project Coordinator: Tory Stevens, BC Parks, Ministry of Environment

Project PIs: WDFW—Brian Cosentino (Brian.Cosentino@dfw.wa.gov), Scott Fitkin (scott.fitkin@dfw.wa.gov), Annemarie Prince (Annemarie.Prince@dfw.wa.gov); WCSI—Bill Gaines (bgaines@genext.net), James Begley (begleyj@nwi.net); USFS-PNW—Peter Singleton (psingleton@fs.fed.us); BCMoE—Tory Stevens (Tory.Stevens@gov.bc.ca); CNW—Jen Watkins (jwatkins@conservationnw.org); UW—Meade Krosby (mkrosby@uw.edu); UBC-Okanagan and Institute for Species at Risk and Habitat Studies-Lael Parrott (lael.parrott@ubc.ca), Veridian Ecological-Rachel Holt (rachel@veridianecological.ca); and Independent Researchers—Leslie Robb (robblar@homenetnw.net) and Gregory Kehm (gregory.kehm@gmail.com).

Partners: The Washington Wildlife Habitat Connectivity Working Group (WHCWG; http://waconnected.org) is a science-based collaboration of land and resource management agencies, NGOs, universities, and Washington Treaty Tribes. The working group is co-led by Washington State Departments of Fish and Wildlife (WDFW) and Transportation (WSDOT). The BC Connectivity Collaborative is a newly formed science-based forum open to universities, NGOs, First Nations, and government agencies in British Columbia launched in fall 2013 with an early strong focus on the transboundary region with Washington. Okanagan Collaborative Conservation Program (OCCP) and South Okanagan Similkameen Conservation Program (SOSCP).

Project Summary: We request funding to complete operational scale connectivity analyses within identified priority linkage areas in the British Columbia–Washington transboundary subregion (from the Cascades crest eastward through the Kettle River Range within the Columbia Mountains). Our efforts will build upon previous investments by the Great Northern Landscape Conservation Cooperative and independent analyses that identified the major fracture zones within this landscape and the most important linkage areas to maintain or restore through those fracture zones including those expected to be resilient to climate change. We propose to broaden our partnerships while narrowing our focus for conservation planning to 4 individual linkage areas, selected based on a combination of ecological and social criteria to ensure the science is applied.

Category for Proposal: Strategic Science

Need: Maintaining large, connected landscapes is a primary conservation goal of the Great Northern LCC. However, the U.S.–Canada border bisects the heart of the GNLCC, presenting political, technical, and legal barriers to the conservation and management of wildlife and ecosystems at a regional scale. Within this area, the Okanagan-Kettle Subregion (Appendix A) between the Cascades and Rocky Mountains was identified as a regional priority for maintaining a connected network of habitats by previous connectivity analyses and management plans. Bordered to the west by the Cascades crest and the east by Christina Lake in the Kettle River Range of the greater Columbia Mountains, this landscape has a long history of facilitating the movement of people and wildlife both north-south between British Columbia and Washington, and east-west between large blocks of secure habitat. Natural impediments to wildlife movement such as rivers have always existed on this landscape, but subsequent development to ease the movement of people including construction of Highway 97 and Route 3 has restricted the options for wildlife. Additional landscape stressors including land use change and climate change are influencing the opportunities and needs for wildlife habitat linkages on this landscape.

In Washington the Okanagan-Kettle subregion includes portions of the Okanogan-Wenatchee and Colville National Forests as well as state, private, and Colville Confederated Tribal lands. In British Columbia a majority of the subregion is Crown Land including multiple protected areas from Cathedral Park and Protected Area to Granby and Gladstone Parks, while lying within the territory of members bands within the Okanagan Nation Alliance. The Okanagan-Kettle subregion includes core habitat and linkages for priority terrestrial species identified in the GNLCC Strategic Plan across all three ecotypic areas, including mule deer, grizzly bear, Canada lynx, wolverine, Greater Sage-Grouse, and Burrowing Owl. This subregion also overlaps the scope of the Cascadia Partner Forum and addresses one of its four early action priority issues to understand habitat connections within and between Cascadia and other systems. Finally, the Okanagan-Kettle subregion includes the northern-most extent of the Columbia Plateau Ecoregion, and poses a potential bottleneck to climate-driven range shifts of shrubsteppe endemics. Maintaining the Okanagan-Kettle's permeability to wildlife movement will thus be vital for promoting regional resilience to climate change.

In response to these needs, transboundary partners came together in 2012 forming a Transboundary Subgroup to frame the context for connectivity across the transboundary region between British Columbia and Washington. In August 2013, the subgroup released the *Washington Connected Landscapes Project: British Columbia – Washington Transboundary Habitat Connectivity Scoping Report* that prioritized work in the Okanagan-Kettle subregion. With the support of the GNLCC and leveraged resources, an Okanagan-Kettles subregional team has engaged with stakeholders to identify the major fracture zones on this landscape and the most permeable opportunities for wildlife to move through them. Relying on a combination of results from previous analyses analyses of the Transboundary Group, the OCCP and the SOSCP; and local knowledge; a report identifying the spatial priorities for maintaining and restoring terrestrial connectivity in the Okanagan-Kettle subregion will be available this summer. The next vital step is to step-down analyses and planning within individual linkages to the operational scale; i.e., provide science that can be applied by managers, conservationists, planners, and other stakeholders to produce on-the-ground projects. This approach conforms with the Great Northern Science Plan, which recognizes the importance of varying spatial scales of analyses to inform management and conservation as well as measure progress towards a goal of a connected landscape.

We propose selecting 4 diverse individual linkages to step-down to operational scale planning. These pilot linkages will serve as testing grounds for methodologies to inform future work at this scale. The selection of pilot linkages to will be structured to ensure a spatial mix of linkages across the subregion and to include opportunities for wildlife movement in different directions (east-west, north-south). The selection process will also include collaboratively established criteria that consider both social and ecological factors such as: (1) immediacy of risk to conservation threats, (2) importance to stakeholder application of conservation actions *(i.e. land management, conservation, and/or species recovery plans*), (3) functional resilience as the climate changes.

Past experiences in California and other locations have demonstrated that connectivity conservation planning at a scale fine-enough to inform project development must rely both on expert judgment of partners and scientific models. We recognize that the likely contribution of certain conservation actions to improving connectivity function of a linkage may not be estimated accurately by models alone. Thus, connectivity analysis and planning at the operational scale will require development and integration of new techniques beyond those used at the statewide and ecoregional scales. The data layers available at the

correct spatial scale will strongly influence the models and metrics we will be able to develop. Therefore, science products for the proposed work will include: (1) a comprehensive, fine-scale linkage report outlining the role of each linkage in the landscape for wildlife, factors contributing to resistance in the linkage, scenarios for conservation and restoration to maintain and improve connectivity function highlighting potential options to practitioners, and suggested metrics for measuring progress; (2) a suite of maps and GIS layers for each linkage; (3) a GIS decision support tool for stakeholders to utilize in prioritizing actions and measuring progress as they apply the science within the linkages.

We will make our products widely available through conference and workshop presentations, online mapping tools, and the GNLCC USGS data portal. Ultimately, one of the most valuable products of this work will be the final delivery of products to the end user stakeholders within each linkage to integrate into their decisions. We purposefully intend our work to provide a template to guide other transboundary and/or regional landscape conservation planning efforts in British Columbia, Washington, and beyond.

Objectives:

Objective 1: Define subset of 4 individual linkages for operational scale analyses and conservation design. We are currently reviewing the set of individual linkages important in current and future conditions for maintaining a connected network of habitats within this subregion defined by our summer 2013 report. The Transboundary Subgroup will select 4 linkages within the Okanagan-Kettle subregion for operational scale analyses and conservation design. Additional local stakeholders relevant to each selected linkage will engaged to provide expert input.

Objective 2: Conduct connectivity analyses and conservation design within each linkage including pinchpoint and barrier restoration analyses. For each linkage the linkage team within the Okanagan-Kettle Transboundary Subgroup will develop a workplan to complete (1) a comprehensive linkage report outlining the role of the linkage in the landscape for wildlife, factors contributing to resistance of connectivity in the linkage, scenarios for conservation and restoration to maintain and improve connectivity function, and suggested metrics for measuring progress; (2) a suite of maps and GIS layers for the linkage; (3) a GIS decision support tool for stakeholders to utilize in prioritizing actions and measuring progress as they apply the science within the linkage.

Objective 3: Identify transboundary climate-connectivity priorities. The WHCWG Climate Change subgroup will work in collaboration with the Okanagan-Kettle Transboundary Subgroup to 1) apply existing climate and climate-connectivity science to identify potential climate impacts to priority linkages and opportunities for maintaining climate-connectivity in the region, and 2) devise management strategies for addressing these impacts and opportunities. We will engage with partners in the landscape to create maps and user-driven decision support materials to guide climate-connectivity decision-making in the transboundary region.

Objective 4. Conduct a synthesis workshop from all 4 operational scale linkage efforts to review approaches, findings, and lessons learned. Throughout the process we will facilitate communications between all 4 linkage teams to exchange ideas to address opportunities and challenges unique to each landscape. Upon completion of the project we will hold a workshop to present and exchange information from each completed effort with an eye towards lessons learned and recommendations for future efforts at this scale.

Objective 5. Identify long-term ownership of the decision support tool by one or more stakeholders within each linkage. The goal of this effort is to generate the scientific analyses and tools to inform managers and conservationists interested in maintaining and restoring connectivity on this landscape. The actual application of our science is beyond the scope of our work. As we work with the end-users to develop the science, however, we will identify a longterm owner of the decision support tool to inform and guide application into the future.

Methods:

Objective 1: Define subset of 4 individual linkages for operational scale analyses and conservation design.

Task 1.1. Establish collaborative set of criteria for selection of linkages

Task 1.2. Select 4 linkages for operational scale design

Task 1.3 Develop teams for each linkage including local managers and stakeholders

Objective 2: Conduct connectivity analyses and conservation design within each linkage

Task 2.1 Interpret existing science and utilize local knowledge to establish the context of each linkage in the larger landscape network, and define factors contributing to resistance

Task 2.2 Select focal species for the linkage

Task 2.3 Identify and collect scale appropriate data layers to evaluate the landscape and reflect resistance factors

Task 2.4 Develop a GIS based decision support tool, and conduct pinchpoint and barrier analyses

Task 2.5 Develop scenarios for addressing resistance factors and run analyses in decision support tool to show outcomes on connectivity function within the linkage and landscape network

Task 2.6 Summarize and share results including final report, data layers, maps, and decision support tool

Objective 3: Identify transboundary climate-connectivity priorities.

Task 3.1 Work with partners to identify regional connectivity goals and objectives in light of climate change. Identify climate-impact models to be used for analyses given stakeholder needs. Analyze available climate models to assess potential climate impacts to linkages selected in Obj. 1. Identify available climate-connectivity models to assess potential climate-connectivity models to be used for analyses given stakeholder needs. Analyze available climate-connectivity models to assess opportunities for climate-connectivity within linkages selected in Obj 1.

Task 3.2 Work with partners to identify potential management strategies for addressing climate impacts and climate-connectivity opportunities within linkages selected in Obj 1.

Task 3.3 Develop and share management strategies for maintaining and restoring climate-connectivity within the transboundary region, including maps and guidance materials tailored to practitioner information needs.

Objective 4. Conduct a synthesis workshop from all 4 operational scale linkage efforts to review approaches, findings, and lessons learned.

Task 4.1 Host workshop including participants from all linkage teams with resulting proceedings report.

Objective 5. Identify long-term ownership of the decision support tool by one or more stakeholders within each linkage.

Task 5.1 Identify one or more participants in each linkage team committed to longterm use of the decision support tool to inform application of science

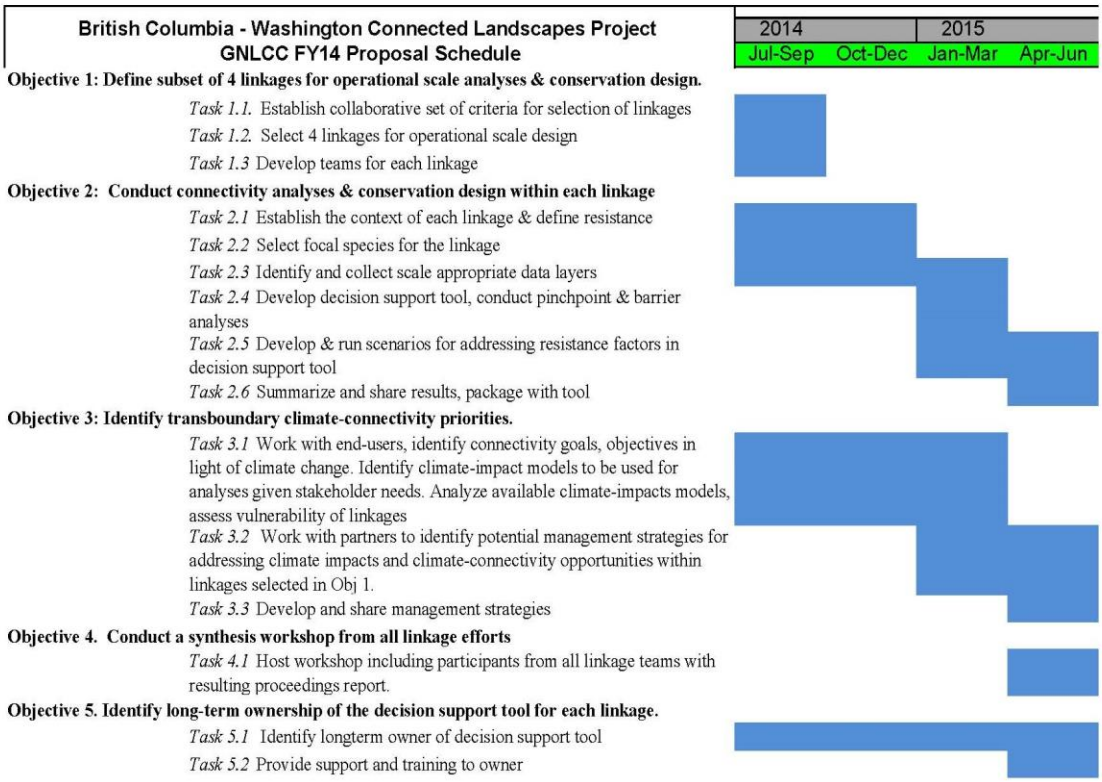
Task 5.2 Provide support and training to transfer ownership and facilitate longterm use

Deliverables: This project will result in:

- 4 individual Okanagan-Kettle Subregion Individual Linkage Analyses including: (1) a comprehensive linkage report outlining the role of the linkage in the landscape for wildlife, factors contributing to resistance of connectivity in the linkage, scenarios for conservation and restoration to maintain and improve connectivity function, and suggested metrics for measuring progress; (2) a suite of maps and GIS layers for the linkage; (3) a GIS decision support tool for stakeholders to utilize in prioritizing actions and measuring progress as they apply the science within the linkage.
- An appendix to the Summer 2014 Okanagan-Kettle Transboundary Subregion report for climate change gradients including user-driven decision support materials will be developed to guide regional climate-connectivity decision-making.
- Workshop proceedings synthesizing the process, findings, and lessons learned from four linkage scale design efforts.
- Identified long-term owners of the decision support tool

Statement of Compliance: The Project Coordinator and Principal Investigators for this funding request have read Great Northern Landscape Conservation Cooperative Information Management, Delivery, and Sharing Standards and agree to comply with those standards if the proposal is selected. We cannot release to the Public Domain data for Species deemed Sensitive by WDFW, Policy-5210 Releasing Sensitive Fish and Wildlife Information and data under contract such as proprietary energy or defense data.

Schedule:



APPENDIX A – Maps identifying location of Okanagan-Kettle Subregion

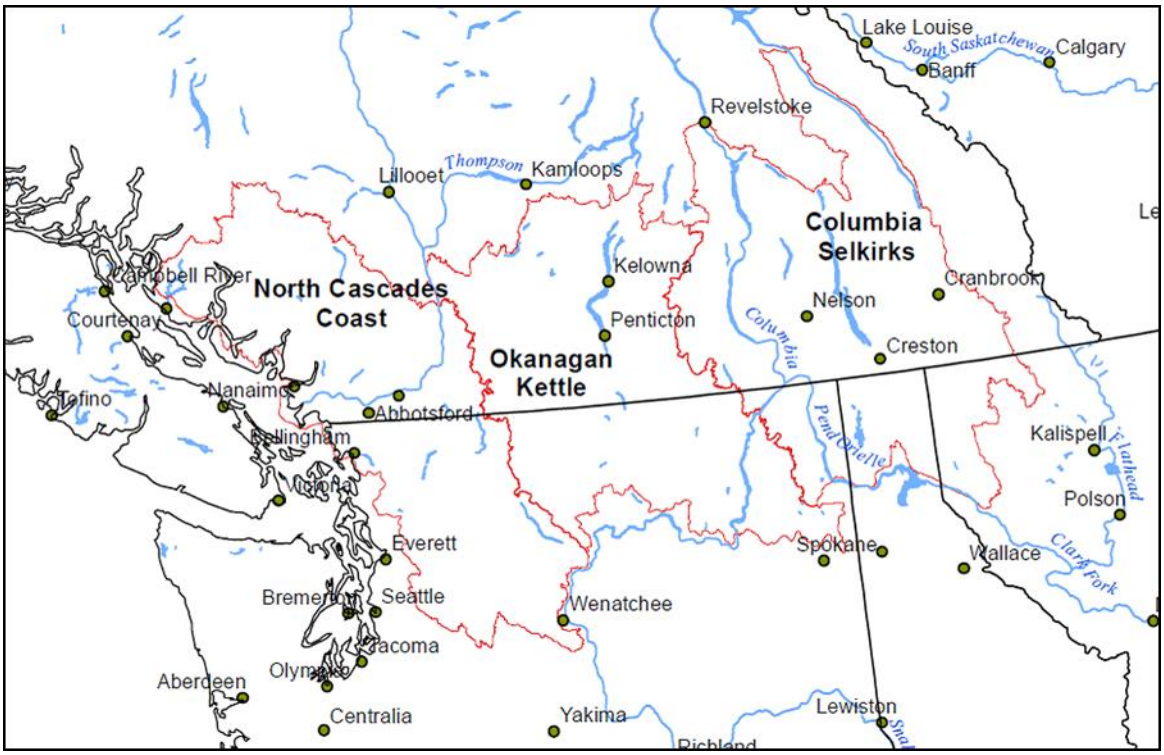


Figure 1. Three subregional transboundary areas between British Columbia and Washington identified by the Transboundary Subgroup

Figure 2. Okanagan-Kettle subregional analysis area