

Project Summary and Scope of Work

Project Title: *Furthering adaptation coordination and planning for species and ecosystems in the transboundary Cascadia landscape, and assessing contribution of eDNA to monitoring priority species and climate indicators in two Cascadia watersheds.*

Project Coordinator: Jen Watkins, Conservation Northwest on behalf of the Cascadia Partner Forum

Lead Project Partners: Cascadia Partner Forum leadership team, North Cascades National Park, Rocky Mountain Research Lab, St'at'imc First Nation.

Project Summary:

2016 *WildLinks*

Each year our partner forum hosts a fall *WildLinks* conference to bring our network of practitioners and managers together to further coordination around adaptation and resilience for the species and ecosystems of Cascadia with specific objectives. This fall, *WildLinks* will specifically focus on furthering collaborative planning around a few of our partner forum's priority topics including:

- Digesting the results from our first phase of work on spatial priorities conducted in 2016, and chart a pathway forward for continuing this work;
- Initiate transboundary conservation planning from science gaps to recommendations and monitoring suggestions for two of our priority topics: Terrestrial habitat connectivity and Canada lynx.
- Facilitate side meetings and work sessions on timely topics in Cascadia.

2016 eDNA aquatics pilot project in two Cascadia watersheds

The Cascadia Partner Forum requests funding to support a pilot project effort with our partners to:

- Produce reliable and precise estimates on the distribution of priority aquatic associated species in these two watersheds and simultaneously lay the groundwork for detecting nonnative species presence to inform management, monitoring, and conservation investments. Both watersheds will include detection of bull trout (a strong climate indicator species associated with cold water refugia systems, and a priority species of the Cascadia Partner Forum) as well as one additional high priority species for local managers to inform their ongoing work.
- Build a transboundary community in Cascadia to coordinate the planning and implementation of eDNA-based surveys and sample analyses that can be coupled with species occupancy models for both of the watersheds, serving as a pilot that can be scaled up to a larger spatial extent in the future. In British Columbia, conduct scoping efforts to identify laboratory needs for samples collected in watersheds on that side of the border if efforts scaled up.
- Provide momentum for expanding range-wide species assessments using eDNA sampling, already underway across the entire interior Columbia River basin in the U.S., to the rest of western North America.

Formed by practitioners in Washington and British Columbia's Cascade mountains in the summer of 2012, the Cascadia Partner Forum fosters a network of natural resource practitioners working with the Great Northern and North Pacific Landscape Conservation Cooperatives to build the adaptive capacity of the landscape and species living within it. The partner forum hosts an annual meeting to bring together practitioners throughout our network called *WildLinks*. At the 2015 *WildLinks* conference supported by the North Pacific LCC, Michael Young of the Rocky Mountain Research Station was invited to present on "[The rapid, range-wide inventory of bull trout: a crowd-sourced, eDNA-based approach with application to many aquatic species](#)". This topic was of interest to the partner forum to help inform discussions about approaches and science that could assist in addressing several of our [priority issues](#) including salmon, bull trout, aquatic connectivity, and water. Following the presentation, interest from a core group of attendees on both sides of the border and from varying organizational backgrounds developed a proposal to pilot the use of this technology to inform existing management questions with climate adaptation implications in two priority watersheds in the Cascadia landscape: (1) the Upper Skagit in Washington and British Columbia and (2) the Bridge watershed in British Columbia in the St'at'imc First Nations territory and initiate a conversation about the utility of this technology and related models to the greater climate adaptation needs in the transboundary Cascadia landscape.



Map displaying the Bridge-Seton watershed boundary in pink, transboundary Skagit watershed in orange, and Cascadia Partner Forum boundary in green.

For the pilot effort, both watersheds would utilize eDNA sampling to detect the presence of bull trout (a priority species for the Cascadia Partner Forum) and select a second aquatic system species of current management importance with current or longer term climate implications to management questions. For the Upper Skagit watershed, staff from the North Cascades National Park selected species following an inquiry to the Skagit International Technical Team. For the Bridge-Seton watershed, the St'at'imc First Nation's fisheries department selected their species of interest. The priority species that will be targeted in this pilot year for each system are:

- Upper Skagit watershed (*bull trout, Dolly varden, harlequin duck*): For this system a specific marker would need to be created to differentiate the Dolly Varden from bull trout to create effective surveys for presence of each species in the system. Harlequin duck is a sensitive species recognized by North Cascades National Park and a priority species for Washington Department of Fish and Wildlife. Last year during stream surveys in areas previously well occupied by harlequins, not a single nest was detected. There are many climate considerations that could impact the timing and use of the streams by harlequins in the park, but better tools to detect their presence are needed to monitor presence/absence.
- Bridge-Seton watershed (*bull trout, chinook salmon*): The St'at'imc First Nations fisheries departments priority system is the Bridge River/Carpenter Reservoir, which is impacted by BC Hydro. In the Bridge River, the number one issue below the BC Hydro dam is the Chinook salmon. This population has been decimated by the flow regime, hatching out too early and dying. There is ongoing research and base line data with which to compare eDNA results with what we currently know, and to assess what additional value eDNA could add to priority monitoring efforts of the First Nation. Bull trout are present both below and above the dam in this system, while the bull trout above the dam have shown a higher than expected mercury content believed to be related to the gold mining in the valley.

A 2-day meeting and field training with Michael Young in North Cascades National Park will be held in late June 2016 to bring together the network of interested parties in utilizing eDNA in Cascadia to discuss this pilot effort and relevant questions to any scaled up future efforts, while time in the field will allow technicians for both pilot efforts during training on the [collection protocol](#). The protocol will be personalized to any amendments suggested by the lab for our secondary species. Tissue samples for all species will be provided by our lead partners to create DNA markers prior to field collection. Attendees to the meeting include field technicians and fisheries staff from our lead partners as well as representatives from Okanogan-Wenatchee National Forest, Mount Baker Snoqualmie National Forest, US Fish and Wildlife Service, and Upper Skagit Tribes.

Field collection is expected to occur in July 2016. All samples collected in this initial year will be sent to the Rocky Mountain Research lab for processing, while a scoping effort of St'at'imc First Nation will be conducted in British Columbia for development of a sister lab facility for any future scaled up efforts from this pilot on the British Columbia side of the border.

In fall-winter 2016, a meeting between all partners will be held to de-brief the season and digest final results from the lab. A pilot season summary report will be produced that will be publicly available, and data collected in the field will be shared to the extent possible respecting any restrictions in rights to knowledge by the St'at'imc First Nation.

Relevance to North Pacific LCC Science and TEK goals

Bridge-Seton system help to understand a population already under stress that is likely to face greater challenges in light of climate change.

Additionally, the North Pacific LCC has invested in the Cascadia Partner Forum since its inception in 2012 and in the annual WildLinks conference. This specific science project is an extension of that investment by providing partners within the partner forum network an opportunity to follow-up on new information shared at our annual meeting through a strategic and limited application of multiple transboundary parties in the Cascadia landscape to inform a more robust dialogue about the utility of a new tool in further our understanding of climate impacts to priority species and ecosystems.

Project Budget:

Project costs		
Meetings (including travel, food, lodging for attendees)	3600	Trainin to be held in late June 2016, post-season meeting dependent upon sample processing timeline.
Skagit watershed sampling and processing (outside of wilderness)	30,000	\$5000 – eDNA marker development for Dolly Varden \$5000 – eDNA marker development for harlequin duck \$20,000 – processing of samples
Bridge River watershed sampling and processing	20,000	No eDNA markers needed, all are already available \$20,000 towards processing of samples
Total		\$53,600

Project funding includes \$25,000 committed from the Skagit Environmental Endowment Commission, \$5000 from Seattle City Light, and \$10,000 from St’at’imc First Nations in addition to significant in-kind donations from project partners covering their field technicians and staff time in planning, coordination, and reporting.

Project Deliverables:

The project will produce data from field sampling on presence for selected species in a report format to lead partner entities. A summary of the field season including methodology and results will be collected into a final report for the Cascadia Partner Forum and all project funders and partners for discussion. A final presentation from lead partners will be provided in a post-season de-brief and to the Cascadia Partner Forum leadership team. Depending on lessons learned and discussions about utility of the application of eDNA to address priority climate indicator species, a possible webinar for the larger Cascadia Partner Forum will be considered.