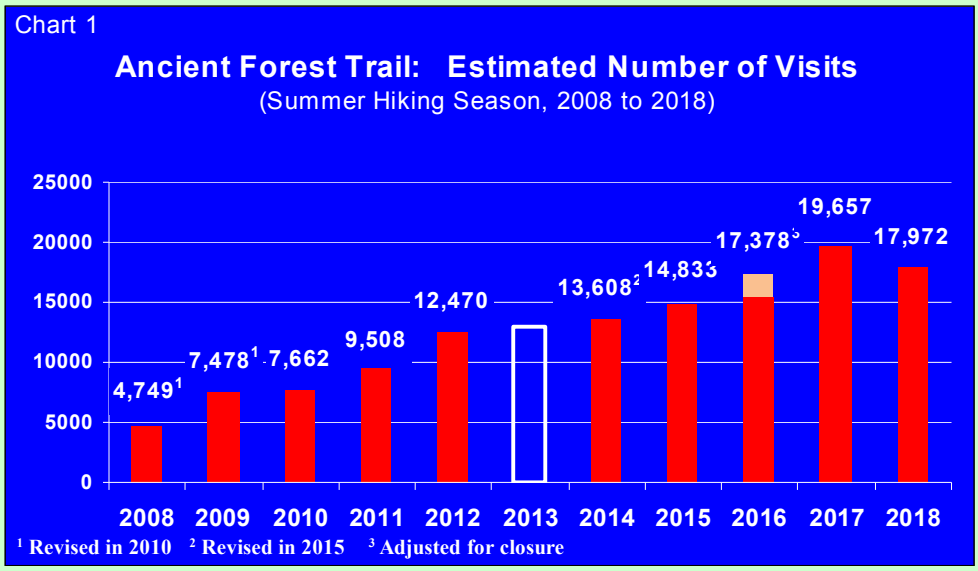
Ancient Forest

Socio-economic Benefits of Non-timber Uses of BC's Inland Rainforest
Research Bulletin, December, 2018

Visits to Trail for 2018 Hiking Season

David J. Connell

The number of visits to the Ancient Forest/Chun T'oh Whudujut Provincial Park and Protected Area during the 2018 hiking season was 17,972. The total number of visits is down 8.6% from 2017, but consistent with the longer trend of growth (Chart 1). Much of this decline is due to a drop in the number of Commuter visits, while the estimated number of Tourist visits increased in 2018.



Due to unusual circumstances making sense of the trend over the past three years is difficult. For two years in a row, the province of British Columbia (BC) experienced historic levels of wildfires. According to the BC Wildfire Service, in 2017, over 1.2 million hectares of were burned; over 1.3 million hectares burned in 2018. Central interior BC was affected directly and severely in both years.

It is likely that two years of historic wildfires kept some tourists away from central interior BC. If the extensive media coverage of the fires did not deter people from visiting then extended periods of persistent, dense smoke most likely affected

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The purpose of this research bulletin is to communicate the results of on-going research on the socio-economic benefits of non-timber uses of the inland rainforest of the upper Fraser River valley in British Columbia. The information contained in this bulletin may be distributed freely with proper citation, as follows:
Connell, David J. (Ed.) 2018. *Socio-economic Benefits of Non-timber Uses of BC's Inland Rainforest: Research Bulletin, December 2018*. Prince George, BC: Ecosystem Science and Management, University of Northern British Columbia.
For more information about this study please contact Dr. David J. Connell (email: david.connell@unbc.ca; tel.: 250-960-5835).
Website: https://www.unbc.ca/david-connell/ancient-cedar

Celebration Day at the Park

Natasha Ewing, BC Parks

The Ancient Forest/Chun T'oh Whudujut Park and Protected Area is one of BC's newest and one of the most unique provincial parks--a temperate rainforest far removed from the coast. Connecting and unifying local communities, diverse organizations, and the public from around the world, BC Parks, in collaboration with several partners, hosted a family-friendly event on September 1, 2018, to celebrate the beauty, biodiversity, and magic of Ancient Forest/Chun T'oh Whudujut.

Free, accessible transportation from Prince George and McBride to the celebration helped to increase attendance, diversity, and inclusiveness. Five buses were filled, encouraging community members of all abilities and those without personal transportation to participate--many of which enjoyed the Ancient Forest for their first time!

The celebration began at 11am with a welcome to the Territory by an elder of the Lheidli T'enneh First Nation and a series of speeches by Lheidli T'enneh Chief Frederick, government dignitaries, and members of the celebration committee.

The morning was punctuated by the signing of a Memorandum of Understanding (MoU) between the Lheidli T'enneh and the BC Ministry of Environment, which outlined the co-management of the Ancient Forest/Chun T'oh Whudujut Park and Protected Area and the future working relationship. The development of park management plans are currently underway; learn more about the process via the BC Parks website at: www.env.gov.bc/bcparks/planning/process.

Gandalf (Harold Edwards)

Left to right: George Heyman, Minister of Environment and Climate Change Strategy; Regional Chief Terry Teegee, B.C. Assembly of First Nations; Chief Dominic Frederick, Lheidli T'enneh First Nation; Shirley Bond, MLA (Prince George-Mount Robson); Larry Boudreau, Regional Director, Northern Region, BC Parks.

Chief Frederick and Minister Heyman signing the MOU

Afternoon events included approximately 60 local artists and musicians, from highland dancers and quilters, to painters and poets, scattered throughout the forest performing and showing off their creations.

Attendees with an interest in science and learning about the forest's incredible biodiversity were encouraged to join a guided nature walk led by UNBC students. And those with wild imaginations explored the trails searching for Gandalf and the mystical forest fairies or took a welcomed rest while enjoying an Ancient Forest inspired story.

Nearly 800 people attended from Prince George and the Robson Valley. Positive comments were shared, citizens were inspired, and all 750 lunches and cupcakes were consumed!

BC Parks is greatly appreciative for the generous support and enthusiasm by all partners: Lheidli T'enneh Forst Nation; Village of McBride Mayor and Council; Caledonia Ramblers Hiking Club; Dome Creek Community Association; Robson Valley Arts and Culture Council; City of Prince George; Regional District of Fraser-Fort George; Engage Sport North; Diversified Transportation; Tourism Prince George; BC Legislature – MLA Shirley Bond; Spinal Cord Injury BC/Access BC; UNBC; and the many artists, musicians, and exhibitors.

Celebration Day at the Park

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Lunch station, Dome Creek Community Association

Glen Frear, Artist, McBride, BC

Janine Friberg, BC Parks

Jerry the Moose and Ranger Karen Mohr

Hugh Perkins, Forest Felters, Dome Creek, BC

Alison Kubbos, Artist, Valemount, BC

Dome Creek Community Association

Jazz Hoetjes and Fiddlesticks

Mapping Primary Forest Intactness in the Interior Wetbelt

Michelle Connolly and Jeff Werner

BC's inland rainforests are globally unique and are increasingly recognised as a hotspot for biodiversity. As one of the only temperate rainforests in the world not associated with the ocean, this region supports iconic wildlife, an assemblage of large carnivores, old growth forests that capture and store vast amounts of atmospheric carbon[1], and a staggering variety of lichens and rare plants[2]. The socio-economic benefits of the area have also been well documented by researchers.[3]

A group of local and international scientists[4] are initiating a large-scale study to assess the 'ecological health', carbon storage potential, and conservation opportunities throughout the entire length of BC's inland rainforest.

To account for the fact that distinct forest types are connected to one another through watersheds, the study area was expanded to include a large portion of BC running north-south along the Rocky Mountain Trench. Included within the study area (Figure 1, next page) is a wider region of old forests collectively referred to as the 'interior wetbelt'. The interior wetbelt includes all of BC's inland rainforest and some adjacent, drier forest types[5].

The first phase of this project began in 2018 and involved mapping the distribution of primary (unlogged) forests known to support much of the region's biological diversity. Fragmentation analyses are revealing where, and how much, of our inland rainforests remain intact. These analyses are presently underway, but preliminary findings suggest that a large fraction of the original forests are lost to industrial activity, human settlement, and forest extraction. The majority of forests outside of parks and protected areas are fragmented, especially in the south. Future activities will involve identifying the conservation value of remaining intact forests based on occurrences of rare and endangered species, including plant communities, and top carnivores.

Figure 3. Large dimension cedar trees

Approximately 30 old-growth rainforest sites were chosen as reference points for quantifying forest carbon. At each site the above-ground biomass of all live and dead trees was measured in large (1 Ha) plots (Figure 2). Many of the cedar-leading sites support ancient trees of huge dimension (Figure 3). To our knowledge, these data comprise the largest dataset of forest carbon for the region. During 2019 existing allometric equations will be used to estimate carbon pools, and to extrapolate storage potential to similar forest types throughout the interior wetbelt.

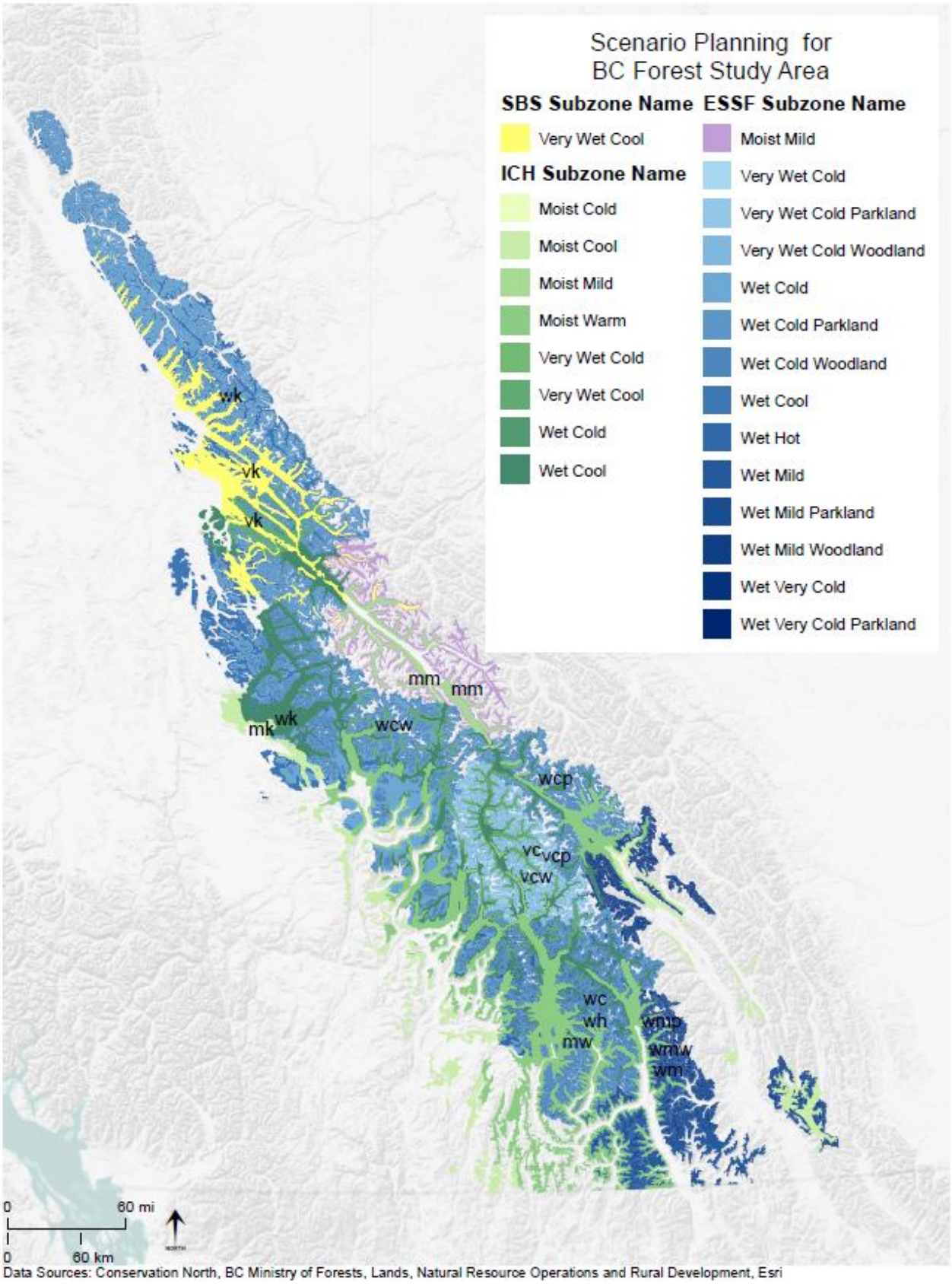
The next phase of work is to complete field and mapping analyses and publish our findings. This study is part of a global effort to map and assess primary forest intactness in North America, Australia, Russia, Europe, and the tropics. This research is designed to support responsible decision-making in this ecologically and culturally important landscape. For more information please contact Michelle.Connolly@alumni.unbc.ca

Figure 2. Measuring above-ground biomass

Notes:

1. Matsuzaki, E., Sanborn, P., Fredeen, A. L., Shaw, C. H., & Hawkins, C. (2013). Carbon stocks in managed and unmanaged old-growth western redcedar and western hemlock stands of Canada's inland temperate rainforests. *Forest ecology and management*, *297*, 108-119.
2. See Coxson and Bjork, Assessment of Plant and Lichen Biodiversity Update, page 6 in, Connell, David J. 2014. Socio-economic Benefits of Non-timber Uses of BC's Inland Rainforest: Research Bulletin, December 2017. Prince George, BC: School of Environmental Planning, University of Northern British Columbia.
3. Connell, David J. 2014. Socio-economic Benefits of Non-timber Uses of BC's Inland Rainforest: Research Bulletin, December 2014. Prince George, BC: School of Environmental Planning, University of Northern British Columbia.
4. Collaborators include affiliates of UBC Biodiversity Research Centre, UNBC, GEOS Institute, Conservation Biology Institute, and Conservation North.
5. Stevenson, S. (2011). *British Columbia's inland rainforest: Ecology, conservation, and management*. UBC Press

Figure 1. Study area



Visits to Trail for 2018

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people's travel plans after they arrived. Dense smoke blanketed the area in 2018 from early July to late August.

In 2017, many of the residents affected by fire in the Cariboo Regional District were evacuated north to Prince George, thereby increasing the amount of traffic across Highway 16. From our surveys of trail users we know that many evacuees stopped by the park on their way through the area, and likely contributed substantially to the spike in Commuter visits in July, 2016, as evident in the monthly statistics (Chart 2 and Table 1). People who were evacuated and travelling through the area were classified as Commuters. At the same time, extended highway closures also affected other people's travel routes.

In 2016, access to the park was closed on weekdays from September 6 to October 7 due to re-construction of the highway to improve access to the park and of a new parking area. To account for this impact, we adjusted the total estimated number of visits for the full hiking season in 2016 (refer to the 2016 issue of the Ancient Forest research bulletin for more details).

The negative effects of the wildfires in 2017 and 2018 and park closure in fall 2016 offset what was expected to be positive benefits of the Ancient Forest Trail becoming part of the new Ancient Forest/Chun T'oh Whudujut Park and Protected Area, which was enacted as a Class A park on May 19, 2016. The general expectation was that the new park status and its inclusion in government materials promoting the provincial park system would contribute to a significant rise in the number of visitors.

The mix of factors influencing total visits makes it difficult to assess the benefits of the new park status. Nevertheless, in spite of the above circumstances, the estimated number of Tourist visits increased in 2018 compared to 2017, from about 8,300 to 9,100 (Table 1). The estimates are based on data from surveys of trail users conducted throughout the two hiking seasons and data from on-trail counts of trail users (for details about these methods, see the 2015 issue of the bulletin). For the whole season, the proportion of Tourist visits increased from 43% in 2017 to 50% in 2018. In 2018, the percentages of other types of users were Day-trippers (40%) and Commuters (9%).

In Table 1, we can also see a significantly greater number and proportion of Commuters in 2017 compared to 2018. The number of area residents (Day-trippers) declined slightly in 2018. This result suggests that the smoke from the wildfires discouraged area residents the most.

Significantly more area residents visit the park on weekends compared to weekdays (Table 2). Of all users who were surveyed on weekends, 45.9% were Day-trippers; on weekdays, the proportion of Day-trippers is 31.5%.

Table 1. Estimates of annual visits by type of trail user, 2018 and 2017 hiking seasons

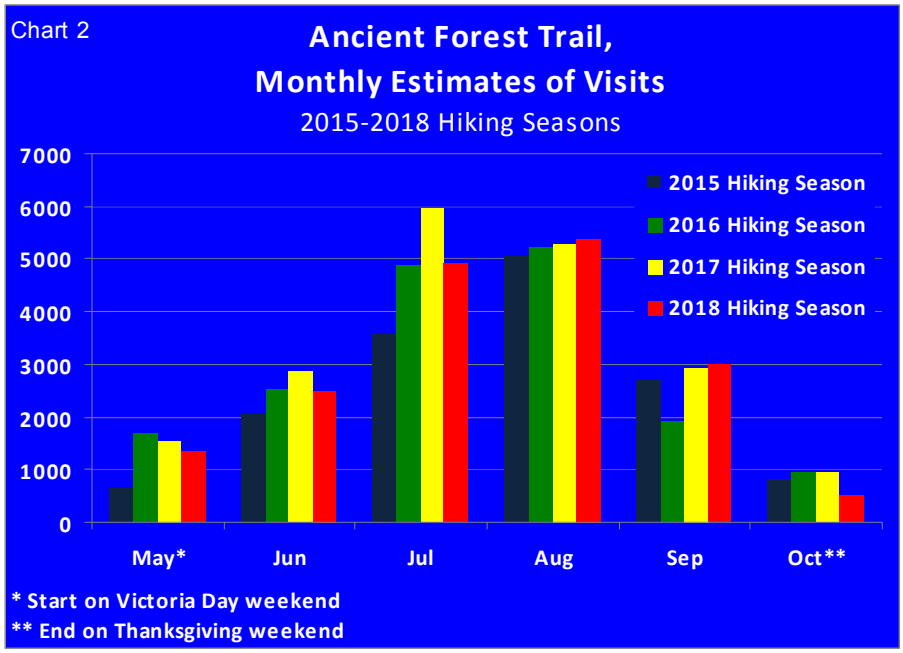
		Day-tripper	Commuter	Tourist
2018	%	40.4%	8.9%	50.6%
	Estimated #	7,266	1,603	9,103
2017	%	39.0%	17.7%	43.3%
	Estimated #	7,506	3,405	8,322

Percentage based on surveys of trail users (2018: n=1,771; 2017: n=1,012)
Estimated number based on estimate of total visits for hiking season

Table 2. Proportion of visits by user type, weekends and weekdays, 2018 hiking season

2018				
		Day-tripper	**Commuter**	**Tourist**
Weekends	%	45.9%	7.5%	46.6%
	Estimated #	5,104	832	5,175
Weekdays	%	31.5%	11.2%	57.2%
	Estimated #	2,162	771	3,927

Percentage based on surveys of trail users (2018: n=1,771; 2017: n=1,012)
Estimated number based on estimate of total visits for hiking season



Ancient Forest Trail Development and Maintenance

Nowell Senior, Caledonia Ramblers Hiking Club

Volunteer members of the Caledonia Ramblers, with support from others, completed the following activities at the Ancient Forest/ Chun T'oh Whudujut Provincial Park and Protected Area in 2018.

Tasks completed:

- Platforms complete with tarps were built along the trail for the performers during Celebration Day
- A picnic shelter, built and designed by UNBC's Wood Design Innovation Centre, was completed in the parking area
- Small platform built at Big Tree that provides different views and photo opportunities
- 18 metres of railings were built at Radies Tree
- Railings added and reinforced at the waterfall
- Handrails added at the start of the trail at the west end
- Repairs were carried out on the boardwalk after damage by fallen cedars
- Restoration signs installed at Treebeard, Radies Tree, and at the east and west ends of the trail
- On the Driscoll Trail: switch-back work, a new footbridge, and blowdown work

Resources:

- Number of trips: 44
- Distance travelled: 9,812 km
- Total volunteer hours: 775

Photos: D. Connell

Restoration Project

Ivy Evergreen and Darwyn Coxson

In 2018, UNBC, in partnership with BC Parks, set up trial restoration plots in several of the most heavily impacted areas of the park's trails, including Radies Tree and Treebeard.

The moisture rich soils that support this rare inland rainforest are highly vulnerable to disturbance. Past off trail use has seriously degraded some of the largest trees. Repeated trampling has worn away the moss and lichens from the roots and is rubbing away the outer bark exposing the sensitive living layer. These elevated buttress roots are vital to the tree's health as they facilitate gas exchange where oxygen is poor in soggy soils. We are literally loving these trees to death!

Temporary fencing now protects four sites of major disturbance. Inside the fencing Devil's Club was transplanted to stimulate regeneration. Devil's Club is a large understory plant with large spines that will act as a natural barrier around the trees. Vegetation plots, marked with small flags, have been taken to monitor vegetation recovery at these sites. Once the vegetation has recovered we will remove the fencing.

Discussions with park management will help guide future infrastructure development (boardwalks, railings, and signage) so that the restored vegetation will be sustained after temporary fencing is removed.

Photos: D. Connell

2018 Botany Field Studies

Curtis Björk, Darwyn Coxson, Trevor Goward

Botanical field research in the Ancient Forest/Chun T'oh Whudujut Park area continued in 2018. With more than 100 field days and hundreds of kilometers of on-foot traverse conducted over the past 3 years, over 2,400 species have now been detected in the study area. The lichen moss and liverwort richness values, especially, are of global significance. Many species have been found that are new additions to the flora of BC, new to North America, or even new to science. A major trend in the data set has been the many new occurrences of plant and lichen species that are disjunct from their previously known distribution in coastal rain forests.

Biodiversity surveys in 2018 were focused on the detailed examination of lower slope wetlands, extending from the Ancient Forest/Chun T'oh Whudujut Park and Protected area into Sugarbowl-Grizzly Den Provincial Park, and westward into the Meteor Lake wetland complex, across the Fraser River from Sinclair Mills. The wetlands of the Ancient Forest/Chun T'oh Whudujut Park and Protected area have emerged as a major area of high biodiversity values within the park, lending further conservation significance to the 2016 designation of one of B.C.'s newest provincial parks. Among rare species found in these wetlands were *Castilleja purpurascens*, *Eutrochium maculatum*, *Juncus albescens*, and *Sphagnum cuspidatum*.

The extensive wetlands of the Meteor Lake wetland complex, which extend over an area of some 1500 ha near at the west end of the Robson Valley (see Figure 1), were an especially interesting subject of the 2018 research. This wetland complex may be one of the largest pristine wetlands of the B.C. central interior region. It was notable for the diversity of habitat types, from extensive areas of *Sphagnum* dominated bogs, to fens (areas with calcareous surface water flow), and treed and shrubby marsh complexes. We anticipate that this will be an area with significant conservation values, as we analyze data from our 2018 collections further.

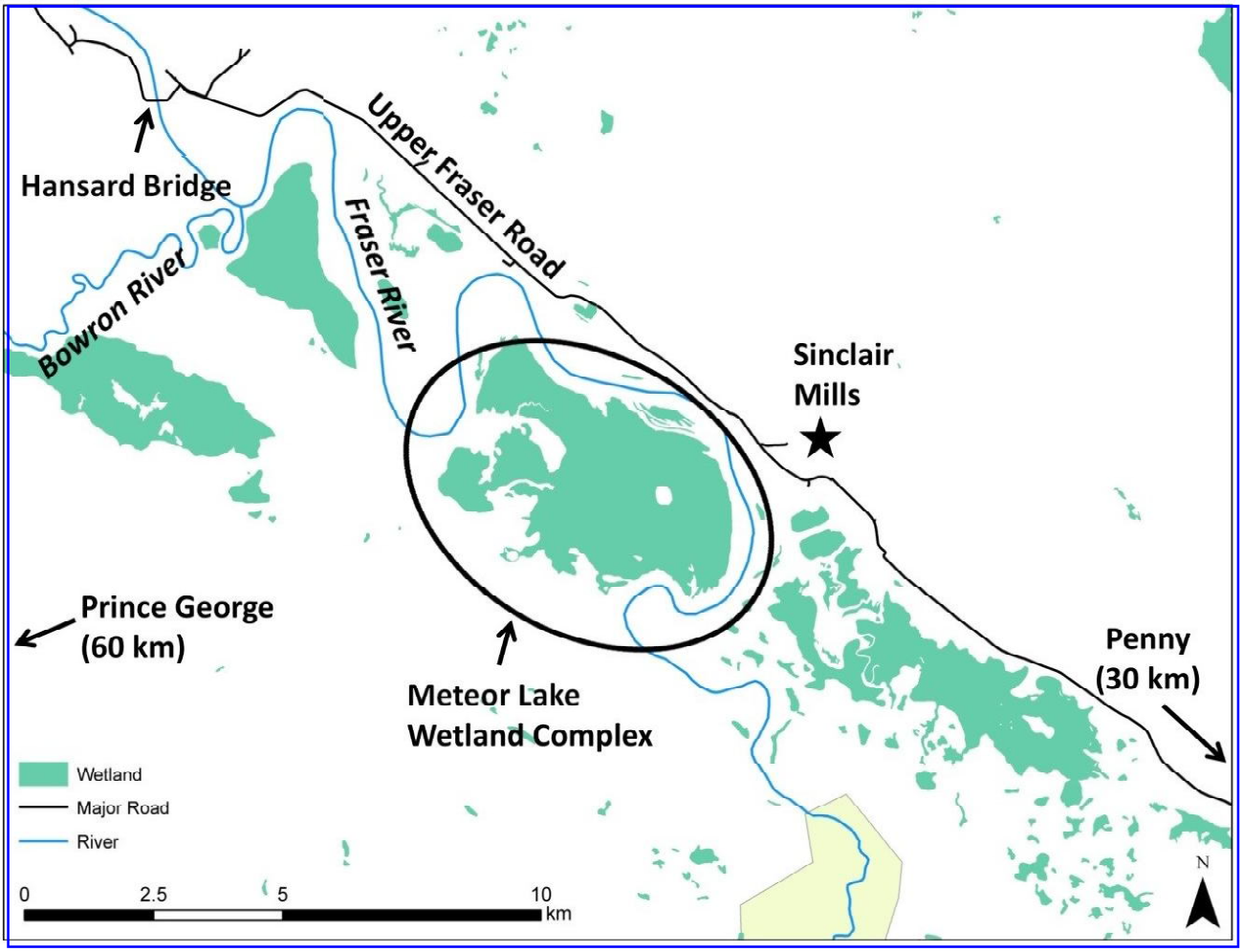


Figure 1. The Meteor Lake wetland complex is found across the Fraser River from Sinclair Mills, upstream from the confluence of the Fraser and Bowron Rivers. Map courtesy of Aita Bezzola.

Figure 2. The Meter Lake wetland complex contains extensive bog habitats, dominated by *Sphagnum* moss.
Photo courtesy of Ivy Evergreen.

Figure 3. The bog habitats in the Meteor Lake wetland support abundant populations of the sundew *Drosera ×obovata*, a hybrid of *D. anglica* and *D. rotundifolia*.
Photo courtesy of Ivy Evergreen.