

Living Lab Program for Climate Change and Conservation - Final Report



Project title: Drivers and dynamics of wildfires and encroachment in Churn Creek Protected Area

Lead researcher(s): Dr. Jill Harvey

Andrea Robinson, MSc Student; Kassidy Herrick, undergraduate researcher

Research findings

- Datasets are still being analyzed for the 2025 dataset. The undergraduate student assigned to data processing had some personal delays and will complete this work by April 15 2026.
- Between the first set of observations (2023) and the 2025 data collection, an increase in overall percent cover and species richness across most functional groups is evident.
- On average, plots burned at a high severity had a greater increase in species richness than plots that burned at moderate or low severity. The greatest increases in richness were observed for forbes and grasses. For Example, Tables 1 and 2 below include datasets for two plots that burned at high severity. In Table 1, a notable increase in the number of species observed in 2025 (particularly for forbes in this case) is evident. In Table 2, a notable increase in the diversity of grasses in 2025 is evident.
- Planned analyses include comparisons between 2023 and 2025 dataset for all functional groups and modelled as a function of Composite Burn Index (CBI).

Table 1. Species and percent cover of all plants observed in Plot 2. Plot burned at high severity with a Composite Burn Index (CBI) of 2.85.

Plot ID: 2		Lat: 51.445030		Lon: -122.285965					
CBI A + B: 2.75		CBI: D + E: 3.00		CBI Total: 2.85					
Common Name	Scientific Name	2023	2025		Common Name	Scientific Name	2023	2025	
Moss/Lichens					Graminoids				
Fire Moss	<i>Ceratodon purpureus</i>		3.9		Junegrass	<i>Koeleria macrantha</i>	0.1	1.4	
					Spreading needle grass	<i>Achnatherum richardsonii</i>	0.1	1	
					Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	0.1	6	
Forbs					Quackgrass	<i>Elymus repens</i>		0.6	
Nodding Onion	<i>Allium cernuum</i>	0.5	0.3		Kentucky bluegrass	<i>Poa pratensis</i>		0.7	
Prickly lettuce	<i>Lactuca serriola</i>	0.4	0.9		Pinegrass	<i>Calamagrostis rubescens</i>		2.5	
Slender hawksbeard	<i>Crepis atrabarba</i>	0.1							
Common dandelion	<i>Taraxacum officinale</i>	0.5	1.8		Shrubs				
Yellow salsify	<i>Tragopogon dubius</i>	0.5	1.5		Snowberry	<i>Symphoricarpos albus</i>	0.1	1	
Brown-eyed Susan	<i>Rubeckia triloba</i>	0.2	0.1		Rabbitbrush	<i>Chrysothamnus spp.</i>	0.1	1.5	
Lamb's-quarters	<i>Chenopodium album</i>	0.1	0.8						
Field milk vetch	<i>Astragalus agrestis</i>	2	4.7						
Pussytoes	<i>Antennaria spp.</i>	0.1	0.1						
Showy Daisy	<i>Erigeron speciosus</i> var. <i>speciosus</i>	0.1	0.9						
Yarrow	<i>Achillea millefolium</i>		5.5		Trees				
Large-fruited desert parsley	<i>Lomatium macrocarpum</i>		0.2						
Alfalfa	<i>Medicago sativa</i>		4.6						
Annual hawkseard	<i>Crepis tectorum</i>		2.9						
Spikelike goldenrod	<i>Solidago spathulata</i>		1.2						
Loesel's tumble mustard	<i>Sisymbrium loeselii</i>		1.1						
Tall tumble mustard	<i>Sisymbrium altissimum</i>		1.3						

Table 2. Species and percent cover of all plants observed in Plot 22. Plot burned at high severity with a Composite Burn Index (CBI) of 3.00.

Plot ID: 22		Lat: 51.448040		Lon: -122.286926					
CBI A + B: 3.00		CBI: D + E: 3.00		CBI Total: 3.00					
Common Name	Scientific Name	2023	2025		Common Name	Scientific Name	2023	2025	
Moss/Lichens					Graminoids				
Firemoss	<i>Ceratodon purpureus</i>	0.2			Flixweed	<i>Descurainia sophia</i>		0.6	
					Alfalfa	<i>Medicago sativa</i>		0.1	
					Perennial pepperweed	<i>Lepidium latifolium</i>		0.1	
Forbs									
Nodding onion	<i>Allium cernuum</i>	0.8	0.3						
Prickly lettuce	<i>Lactuca serriola</i>	2	1		Needle and thread grass	<i>Hesperostipa comata</i>	0.2	1	
Slender hawksbeard	<i>Crepis atrabarba</i>	0.3			Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	5	11	
Common dandelion	<i>Taraxacum officinale</i>	2	15		Bluejoint grass	<i>Calamagrostis canadensis</i>	2		
Yellow salsify	<i>Tragopogon dubius</i>	3	1.4		Quackgrass	<i>Elymus repens</i>		6.1	
Yarrow	<i>Achillea millefolium</i>	1	10.4		Rough fescue	<i>Festuca campestris</i>		16	
Sagebrush Mariposa lily	<i>Calochortus macrocarpus</i>	0.8			Sedge	<i>Carex spp.</i>		0.3	
Lamb's-quarters	<i>Chenopodium album</i>	2	32		Kentucky bluegrass	<i>Poa pratensis</i>		0.5	
Pasture sage	<i>Artemisia frigida</i>	0.1	1		Pinegrass	<i>Calamagrostis rubescens</i>		18	
Showy Daisy	<i>Erigeron speciosus</i> var. <i>speciosus</i>	0.2	0.2						
Blue stickseed	<i>Hackelia micrantha</i>	0.5			Shrubs				
	<i>Chenopodium spp.</i>	0.5							
Maple leaf goosefoot	<i>Chenopodium simplex</i>	0.2			Snowberry	<i>Symphoricarpos albus</i>	0.1	3.6	
Threadleaf phacelia	<i>Phacelia linearis</i>	0.3							
Annual hawksbeard	<i>Crepis tectorum</i>		11						
Tall tumble mustard	<i>Sisymbrium altissimum</i>		0.6						
Western stickseed	<i>Lappula occidentalis</i>		0.3						
Field milk vetch	<i>Astragalus agrestis</i>		1		Trees				
Q6			0.1		Trembling aspen	<i>Populus tremuloides</i>		0.5	
Loesel's tumble mustard	<i>Sisymbrium loeselii</i>		2						

Methods summary

- In June 2025 we revisited 28 permanent plots we established in 2023. These plots were established in the area burned in the 2021 wildfire and capture areas burned at low, moderate and high severity.
- At each plot (3.99 m radius) we recorded all species present and ocular estimations of percent cover.
- Data was collected with the SXFN Land Guardians.

Key outcomes for BC Parks

- The ecological impacts of 2021 wildfire are still evident across the burned area; however, recovery of plant cover and species richness and diversity was observed. When measurements were compared (preliminarily) to the 2023 dataset, there were notable increases in percent cover and species richness over those two years at the plot level. This is likely to indicate that seedbank for many understory species is intact in areas impacted by low and moderate severity fire. In areas impacted by high severity fire, recovery is comparably slower, however, since 2023 there was a notable increase in diversity of grass species observed. Collectively, these findings indicate that recovery is ongoing in this area impacted by the 2021 wildfire.

Relevance to BC Parks management

- Continue to monitor post-fire recovery at this site. We will complete another remeasurement of these plots in 2027. Following the 2027 collection, we plan to write a manuscript to detail this understory recovery.
- Support for the fire management plan and prescribed/cultural burning practices to become more prolific under the right conditions. Our preliminary insights suggest natural recovery post-fire is ongoing.
- Continuation of collaboration with the local first nations and Friends of Churn Creek Society for further restoration efforts
- Consider how these practices can be used to further decolonize and increase reconciliation efforts
- Public engagement with the Friends of Churn Creek Society and other groups discussing the importance of managing our fire-prone ecosystems for the future among climate change. This could include updating information at the visitor centre.

Project's challenges/opportunities

- Challenges: Relocating permanent plot markers. We did encounter some difficulties locating several plot markers, but did manage to find them after some time. As vegetation recovery continues, perhaps we could consider marking these plots with spray painted trees, or we may need to return with a metal detector.
- Opportunities: Working with the land guardians was a wonderful opportunity to learn on the land with local community members. Together, watching the land recover following a severe wildfire and identifying plants of cultural significance was a immeasurable learning experience.

Conclusions/next steps

- We anticipate having a complete data analysis of the 2025 measurements by mid-April 2026. We are glad to share with any interested individuals (jharvey@tru.ca).
- We will return to the site in 2027 to remeasure these plots for a third time.
- We will share our findings with SXFN at an upcoming community meeting (planning for ~June 2026).