



The 2018 Shovel Lake Wildfire – Vegetation Recovery Monitoring

Irene Ronalds, RPBio

Society for Ecosystem Restoration in Northern British Columbia | Information Bulletin

March 2026

Introduction & Study Context

The 2018 Shovel Lake wildfire impacted approximately 92,000 hectares of sub-boreal forest on the Nechako Plateau, north of Fraser Lake in central British Columbia (Figure 1). This event was among several significant wildfires recorded in the region during that year, marking the highest provincial area burned since record-keeping commenced in the 1950s. The traditional territories of the Nadleh Whut'en and Stelat'en First Nations were primarily affected, with the fire approaching within 3 km of Nadleh village at the east end of Fraser Lake, and 5km of Stellaquo village at the west end.

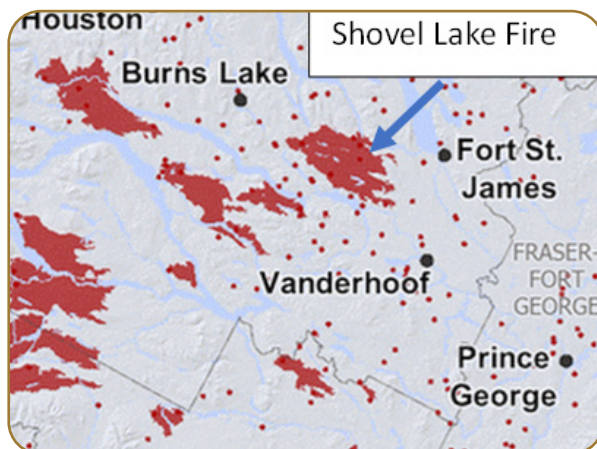


Figure 1. Location of the 2018 Shovel Lake wildfire (and nearby fires) in central British Columbia. (Image from Ministry of Forests, 2019).

Aside from the obvious impacts on timber resources, residents were concerned about the long-term effects of such a large and intense wildfire on ecosystems, especially in a changing climate. There was particular concern for Black Huckleberry (*Vaccinium membranaceum*), while the plant is known to resprout from underground rhizomes¹, there was concern that rhizomes may have been lost altogether in severely burned stands.

In the aftermath of the fire, the Yun Ghunli Advisory Council was struck, with representatives of the Carrier Sekani First Nations, the BC Provincial Government, the forest industry, and SERNbc. The Council called for an Ecosystem Restoration Plan, which identified a list of high-priority values and recommended a series of management zones and treatment options. The plan recommended monitoring of understory vegetation to improve understanding of local ecosystem recovery and identify areas of restoration concern. Yun Ghunli continued to be engaged throughout the project. All field work was carried out with the assistance of an Environmental Monitor from the Nadleh Whut'en First Nation.

ECOSYSTEM RESTORATION

Ecosystem restoration is the process of assisting with the recovery of an ecosystem that has been degraded, damaged, or destroyed by re-establishing its ecological processes and structural characteristics.

The fire severity mapping, prepared shortly after the fire, illustrates that although the fire was large and intense, it left a patchwork of fire effects within the fire perimeter, as shown in Figure 2. Roughly 35% of the area burned at high severity, and the rest was a mix of moderate severity, low severity, and areas skipped by the fire. Further analysis confirmed that 10% of the area within the fire perimeter was unburned. This mix of fire severities results in a diverse stand structure, an important attribute in maintaining biodiversity and for ecosystem recovery.

¹ Rhizomes are underground stems that allow Black Huckleberry to regenerate after disturbances.

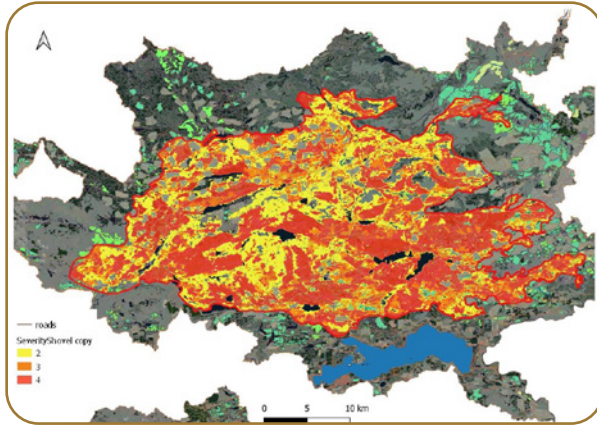


Figure 2. Burn severity within Shovel Lake wildfire perimeter. (From Daust and Price, 2019).



Early in the project, we toured the study area with Nadleh First Nation elder Roy Nooski, visiting former berry-picking sites near Peta Mountain and spiritual sites near Ormand and Oona Lakes. Figure 3 shows Nooski at Ormand Lake, home to Nadleh's Culture Camp and Healing Centre. Berry picking sites have long served as gathering places for families and are central to traditional food practices. Spiritual sites near Ormand and Oona Lakes hold ceremonial importance for the community. At the close of the tour, Roy reflected that "Mother Nature was healing itself by wildfire", suggesting that natural disturbances play a role in ecological renewal and cultural resilience.

Figure 3. Field visit at Ormand Lake during site reconnaissance (2020).

WILDFIRE BURN SEVERITY MAPPING

is a coarse tool that uses pre- and post-wildfire satellite imagery to estimate the degree of impact on the forest overstory. Categories are:

- **Unburned**
- **Low burn severity** has minimal impact on forest tree cover, resulting in most trees surviving – it is primarily a surface fire that burns fuels on the forest floor, leaving the tree canopy largely intact.
- **Moderate burn severity** is characterized by variable effects on forest overstory trees, killing an average of 30-80% of the vegetation, and potentially causing moderate soil exposure.
- **High burn severity** means a fire has severely impacted vegetation and soil, often leading to the complete loss of tree cover in those areas.

ECOLOGICAL DISTURBANCE

is a discrete event (natural or human-caused) that alters an ecosystem's biomass, resource availability, structure or function. Natural disturbance is a vital ecological process in B.C. ecosystems. Fire-maintained forests and grasslands have evolved with specific "disturbance regimes" (patterns of fire, insects, wind, etc.) that shape the landscape, create a mosaic of habitats, and maintain biodiversity.

Vegetation Monitoring Methods

Working on behalf of Yun Ghunli, we adopted a coarse-filter monitoring approach. We set up a series of 20 vegetation transects (Figure 4) that would be broadly representative of the fire effects on different sites within the study area. The sites varied by elevation, aspect, and management history: primary forest, juvenile plantations, and salvage-logged post-mountain pine beetle (MPB). We used the biogeoclimatic ecosystem classification system as a general guide for site unit classification, focusing on characteristic site properties, such as soil texture and slope position, rather than relying solely on vegetation, since these early seral plant communities are different than the climax plant communities.



Figure 4. Establishment of vegetation monitoring transect.

We focused on mesic sitesⁱⁱ that would have supported black huckleberry, being the predominant site type across the study area. Some dry sites were also monitored. Moist sites were not monitored because reconnaissance work showed vegetation recovery was already well advanced on them.

Each transect was 30 m in length, with 1-meter square vegetation quadrats set out at 5-meter intervals, on alternating sides of the transect. Within each quadrat, we identified all plant species and recorded cover values. Monitoring was carried out in 2021, 2023, and 2025.

Results: Understory Vegetation Recovery

The monitoring results show how understory vegetation recovery is progressing and how it varies by fire severity and site moisture. Since the 2018 fire, the region has experienced significant drought, further affecting recovery. To provide a high-level overview of vegetation recovery, plant species cover data have been summarized by broad plant life-form group, fire severity class, and monitoring year as shown in Figure 5.

Early Vegetation Recovery on Mesic sites and Herb Dominance

In the early years post-fire, including the 2021 monitoring year, herb cover was dominant across all transects and fire severity classes (pink bar in Fig. 5). High herb cover is characteristic of this early stage of post-fire succession, as shown in Figure 6. Fast-growing annuals and perennials, like fireweed and asters, dominate this phase by taking advantage of increased sunlight and nutrients released by the fire. Pink corydalis (shown in Fig. 3) is an example of a fire-dependent species whose seeds germinate after heat or other triggers from fire. This stage contributes to plant community diversity and ecosystem recovery, underscoring fire's role in plant succession and biodiversity. The average cover of grasses and dry sedges remained relatively steady over all 3 monitoring surveys (orange bar in Fig. 5).

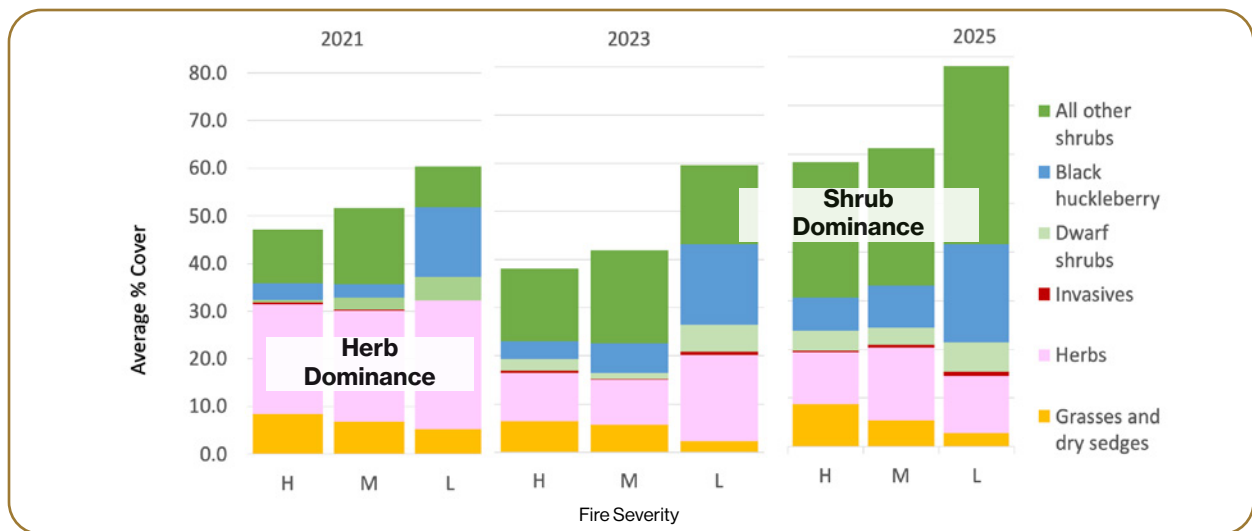


Figure 5. Average understory vegetation cover by life-form group and fire severity on mesic sites, 2021, 2023, 2025.

ⁱⁱ For mesic sites, transects were placed in the Babine Moist Cold Sub Boreal Spruce (SBSmc2), and for dry sites, transects were placed in the Stuart Dry Warm Sub Boreal Spruce (SBSdw3) biogeoclimatic subzone variants.

These plants, such as wildrye and Ross's sedge, are drought-tolerant and are excellent colonizers following fire; yet they did not outcompete other vegetation layers. Invasive species were observed at very low cover throughout the monitoring period (red bar in Figure 5). These species included dandelions and various hawkweeds. The primary vector of distribution for invasive species in the region is cattle grazing, however, most of the study area is not tenured for grazing. These weed species had low cover before the fire and remained low in cover for the first 7 years post-fire.

Intermediate Vegetation Recovery on Mesic Sites and Shrub Dominance

As the shrubs began to resprout, they rapidly outcompeted herbaceous plants for essential resources such as nutrients, water, and sunlight, marking the next phase of early ecological succession, where shrubs become dominant. This successional trend is reflected in the bar graphs for 2023 and 2025 in Figure 5 (green and blue bars) and illustrated in Figure 7. In areas of high fire severity, the shrubs were top-killed and resprouted from surviving root crowns or below-ground rhizomes.

In areas that burned at low to moderate fire-severity, the landscape exhibited a mosaic of burned and unburned stems, resulting in a patchwork pattern. Among the most common shrub species recorded were birch-leaved spiraea, prickly rose, thimbleberry, willows, and alder. The dwarf shrub layer was predominantly composed of dwarf blueberry and twinflower.

Black Huckleberry Response to Fire Severity

Black huckleberry survival and subsequent recovery varied according to burn severity, as illustrated by the blue bars in Figure 5.

Sites that burned at high fire severity suffered significant initial damage, with average huckleberry cover in 2021 at just 2%. By contrast, sites that burned at low severity showed signs of good survival, with average huckleberry cover in 2021 of 17%. (Note that a minor stimulatory effect of low-severity fire was observed but not measured.) By 2025, the average huckleberry cover on high-severity sites increased slowly and steadily to about 5%, representing more than a twofold increase in seven years.



Figure 6. Early vegetation recovery 3 years post-fire showing herb dominance on mesic sites with different pre-fire stand-condition.



Figure 7. Intermediate vegetation recovery 5 years post-fire showing shrub dominance on mesic sites of different pre-fire stand-condition.

This recovery suggests that black huckleberry has a strong capacity for regenerative growth, which is an important aspect of ecological resilience. While in 2021 only small sprouts of huckleberry were observed on high severity sites, by 2025 regrowth was much more advanced on favourable sites, as shown in Figure 8. Overall, the results illustrate the resilience of black huckleberry in fire-affected ecosystems, demonstrating its capacity for recovery and persistence.



Figure 8. Black huckleberry regeneration by 2025 on a site that burned at high severity.

ECOLOGICAL RESILIENCE

in the context of understory vegetation recovery is generally described as the capacity of an ecosystem to withstand or recover from disturbances while maintaining its composition, structure and function. Certain ecosystem adaptations in composition or structure, or even transformations that facilitate the maintenance of ecosystem services, are included in a broader, evolving concept of ecological resilience (Burton, 2025).

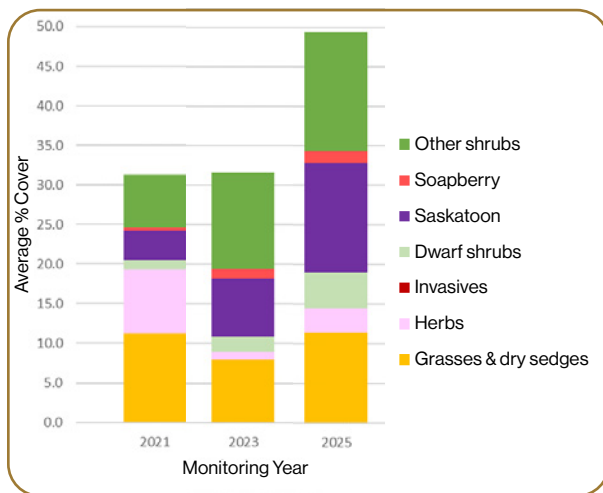


Figure 9. Average understory vegetation cover on dry sites that burned at high severity, 2021, 2023, 2025.

Vegetation Recovery on Dry Sites

The monitoring results for dry sites tell a similar sequence of vegetation succession after fire, although the response was generally slower. As shown in Figure 9, the herb layer was prominent in 2021 (within 3 years of the fire), and by 2023 the herb cover was starting to get outcompeted by shrub species. Saskatoon exhibited rapid recovery relative to other shrub species, as shown by the purple bar, while the recovery of soapberry was much slower, as shown by the pink bar. This prolific regeneration of Saskatoon, and the comparatively slower recovery of soapberry is illustrated in Figure 10. The differences in recovery patterns between these two species reflect their varying adaptations to fire and environmental stress.



Figure 10. Vegetation recovery on a dry site, five years following wild-fire.

Saskatoon is recognized for its high resilience to fire, demonstrating a robust ability to resprout from root crowns and rhizomes. This characteristic enables it to recover quickly and maintain its presence in fire-affected ecosystems. In contrast, soapberry exhibits moderate fire resistance, with a notably slower recovery. Its regeneration is less vigorous, which can influence the dynamics of plant succession in areas affected by fire.

Vegetation Recovery by Disturbance History

To assess whether the cumulative impacts of tree mortality from the Mountain Pine Beetle (MPB) epidemic, followed by salvage logging and subsequent fire, are affecting vegetation recovery, we stratified the 2025 data for stands that burned at moderate to high severity by pre-fire stand condition: 1) recently logged; and 2) age class to through 6, as illustrated in Figure 11. The analysis indicates that understory vegetation recovery is similar across both recently logged and older sites, suggesting that the forest's regenerative capacity remains resilient despite multiple disturbances. However, a notable difference observed is the presence of seedlings predominantly on the older, burned stands. Overall, the findings suggest that while multiple disturbances have altered stand structure, vegetation recovery is progressing comparably across different site ages, with specific differences in seedling establishment linked to older stands with greater lodgepole pine seed availability.

Lodgepole pine regeneration following wildfire is a highly efficient and adaptive process, primarily driven by serotinous cones, which are well adapted to withstand the intense heat generated by fires. When exposed to such heat, the cones open and release large quantities of seed onto the mineral soil, which has been enriched by nutrient-rich ash.

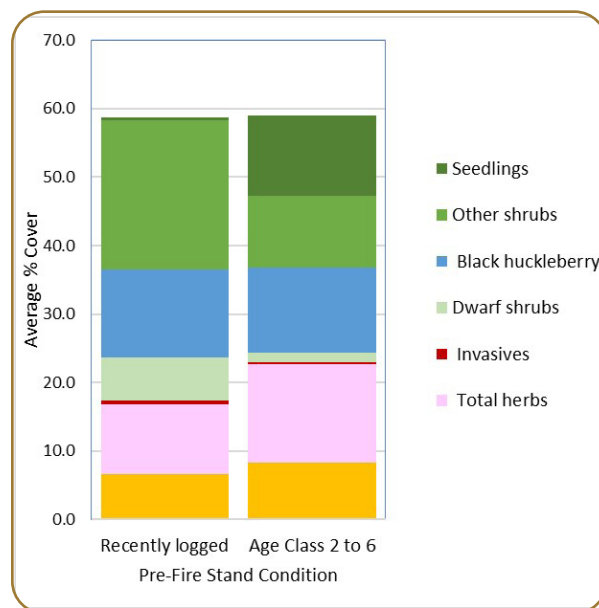


Figure 11. Comparison of vegetation cover 7 years post-fire by stands of different pre-fire stand condition.

This combination creates optimal conditions for seed germination and early seedling development, ensuring the rapid recovery and regeneration of lodgepole pine after fire events, as shown in Figure 12. The lodgepole pine's ability to regenerate effectively after fire highlights its resilience and the importance of fire in maintaining healthy forest ecosystems, promoting biodiversity, and supporting forest succession.

ECOLOGICAL DEGRADATION

occurs when the frequency, intensity, or type of disturbance exceeds the system's natural range of variability, or when human activities introduce chronic stressors that prevent recovery. Key drivers of degradation in B.C. include cumulative impacts, habitat fragmentation or loss, climate change, and the proliferation of invasive species.



Figure 12. Lodgepole pine regeneration in a mesic stand following high-severity wildfire.

Conclusion and Management Implications

Understory vegetation affected by the wildfire is recovering and underscores to us that this process takes time, with full recovery likely to take a decade or more on sites that burned at high-severity, especially on dry sites. These sub-boreal plant species have evolved with fire

and adapted to it through a variety of mechanisms, including seed-banking, seed regeneration, rapid growth of herbs and grasses; nutrient cycling; and shrub resprouting from root crowns and rhizomes. The landscape within the fire perimeter displays a patchwork of ecosystems with varying levels of fire disturbance, leaving a complex structure and a diverse biological legacy of habitats that support biodiversity.

Vegetation recovery is well underway, yet will continue to take time, particularly on drier sites. The plant species composition within the monitored ecosystems aligns with the site unit classification in the regional field guides (1993). However, compositional shifts may occur over time, particularly in response to climate change. On high-severity sites, relatively slow-growing plant species, such as black huckleberry and soapberry, may take a decade or longer to re-establish and reach productive levels suitable for berry harvesting.

To accelerate the recovery of traditional berry-picking sites, planting native seedlings sourced from local nurseries can be an effective strategy, as shown in Figure 13. This approach not only supports ecosystem restoration but also helps preserve local biodiversity and cultural practices associated with berry harvesting.

Acknowledgements

SERBbc extends its gratitude to the Yun Ghunli advisory group for their ongoing support and engagement in this project. Yun Gunli is the Carrier term for 'Stewards of the Land'. Nadleh Whut'en and Stella't'en First Nations participated in the vegetation monitoring, provided frozen huckleberries for propagation, and undertook the planting trial. Additionally, TC Energy's financial support has been vital for the 2025 huckleberry planting field trial.

References

- Burton, Philip J. 2025. *Resilient Forest Management*. Oxford University Press.
- Daust, D. and K. Price. 2019. [Shovel Lake Wildfire Ecosystem Restoration Plan](#). For SERNbc and the Omineca Environmental Stewardship Initiative.
- Ministry of Forests. 1993. *A Field Guide for Site Identification and Interpretation for the Southwest Portion of the Prince George Forest Region*. Land Management Handbook 24. Victoria, BC: Province of British Columbia.



Figure 13. Planting trial for accelerating the recovery of a huckleberry patch on the slopes of Peta Mountain. (photos courtesy of Chris Paulson, Spirit North)

In the spring of 2025, a planting trial of 1000 locally-sourced black huckleberry plugs was initiated. The 2-year-old plugs were grown by Woodmere Nursery. Highschool students from Nadleh and Stellaquo conducted the plant, with support from the Spirit North,ⁱⁱⁱ Burns Lake program.

ⁱⁱⁱ Spirit North is a national charitable organization founded by former Olympic cross-country ski racer, Beckie Scott. Spirit North uses land-based activities to improve the health and well-being of Indigenous youth, empowering them in sport, school, and life.