

Louping Reciprocity: Applying Traditional Ecological Knowledge to an Educational Field Site



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in collaboration with The L.I.G.H.T Foundation.



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1. Executive Summary

In partnership with the L.I.G.H.T Foundation, Sustainability Pathways is working to develop a culturally responsive sustainability framework for Career and Technical Education (CTE) programs in Okanogan County high schools to support the integration of a place-based sustainability curriculum. This proposal is centered around the opportunity to utilize a privately owned property along Loup Loup Creek, fondly referred to as "Loup Canyon". This report documents the historical significance of the property and how it could serve as a future educational field site where students participate in long term ecological stewardship projects and engage with cultural practices that tie in with the Since Time Immemorial Curriculum (STI) and support Indigenous identity.

The included recommendations are drawn from conversations with partners including the indigenous-led L.I.G.H.T Foundation, the Career Connected Learning Tribal Engagement Specialist from the office of Native Education, the property owner, and Sustainability Pathways leadership. Field visits to Loup Canyon with Joshua Porter, Sustainability Pathways Director and project lead for the Stewardship Plan, and Indigenous members of the L.I.G.H.T Foundation informed the proposed methods for future cultural land surveys and educational opportunities at Loup Canyon.



2. Introduction

On behalf of Sustainability Pathways and Western Washington University (WWU), Joshua Porter has been working with Lee Whittaker, WWU alum and owner of the Loup Canyon property, since 2020 to explore opportunities for sustained WWU student engagement at the Canyon. This partnership led to Sustainability Pathways taking on the responsibility of developing a model for the long term land stewardship of Loup Canyon while increasing opportunities for student engagement and expanding the breadth of educational partners. Completion of this model is a year-long goal and will be completed with the guidance of this proposal.

In working in partnership with the Methow Valley School District's Career and Technical Education program and with support from North Central Washington Education Service District's Director of STEM Initiatives and Strategic Partnerships, Sustainability Pathways secured a program expansion grant through Career Connect Washington to develop a culturally responsive framework for integrating sustainability into Career and Technical Education (CTE) programs in Okanogan County high schools and provide the creative groundwork for an educational field site beside Loup Loup Creek, which will support the integration of a place-based sustainability curriculum.

At the confluence of these two initiatives, Joshua identified the Loup Canyon as a central field site to connect the sustainability framework to the land, and engage multiple schools, programs, and stakeholders in the process. Forming a partnership with the Indigenous-led L.I.G.H.T Foundation was an opportunity to connect directly with their aligned initiatives.

2.1 Partner Introduction: The L.I.G.H.T Foundation

Amelia and Joaquin Marchand founded the non-profit L.I.G.H.T Foundation with the intent of supporting native plant conservation and the restoration of native plant gathering traditions for Pacific Northwest Tribes. Amelia is the Executive Director of the Center for World Indigenous Studies and Joaquin is the Executive Director of the L.I.G.H.T foundation. They work alongside Dr. Kimberly Richards Ph.D K^waʔk^wíslaʔx^w, and founding members Justin and Tess Williamson and John Stensgar Jr. to *“cultivate positive relationships between Indigenous Peoples and landowners in order to have shared outcomes in ecological stewardship, habitat conservation, and climate adaptation, enrich communities by providing hands-on tools and support for teaching gathering traditions and honoring native plants in culturally appropriate ways, and perpetuate ecological heritage of Indigenous People through intergenerational knowledge transmission and supporting traditional landscape practices”* (LIGHT, rt. 2022). Eventually the ongoing care and restoration of the Loup Canyon property can be used as a standard framework when the L.I.G.H.T Foundation partners with other private landowners whose land contains similar habitats.

L.I.G.H.T Foundation Tenants:

- Leadership - We cultivate relationships between traditional gatherers and landowners which encourage mutually beneficial conservation easements while supporting food sovereignty and access rights.
- Indigenous - We support projects which restore holistic land use practices of Indigenous Peoples and provide opportunities for community involvement and co-management.
- Guardian - We develop partnerships with allies who protect pollinator health and the habitats of Indigenous spirit relatives (traditional foods, medicines, fibers, and other plant materials).
- Honor - We advocate for initiatives which strengthen the understanding of humanity’s reciprocal relationships with nature, particularly those that seek wisdom and knowledge of Indigenous Elders.
- Teach - We nurture educational opportunities that encourage participation in activities and academics of environmental stewardship, conservation, permaculture, and food sovereignty.

2.2 Context of Traditional Territories

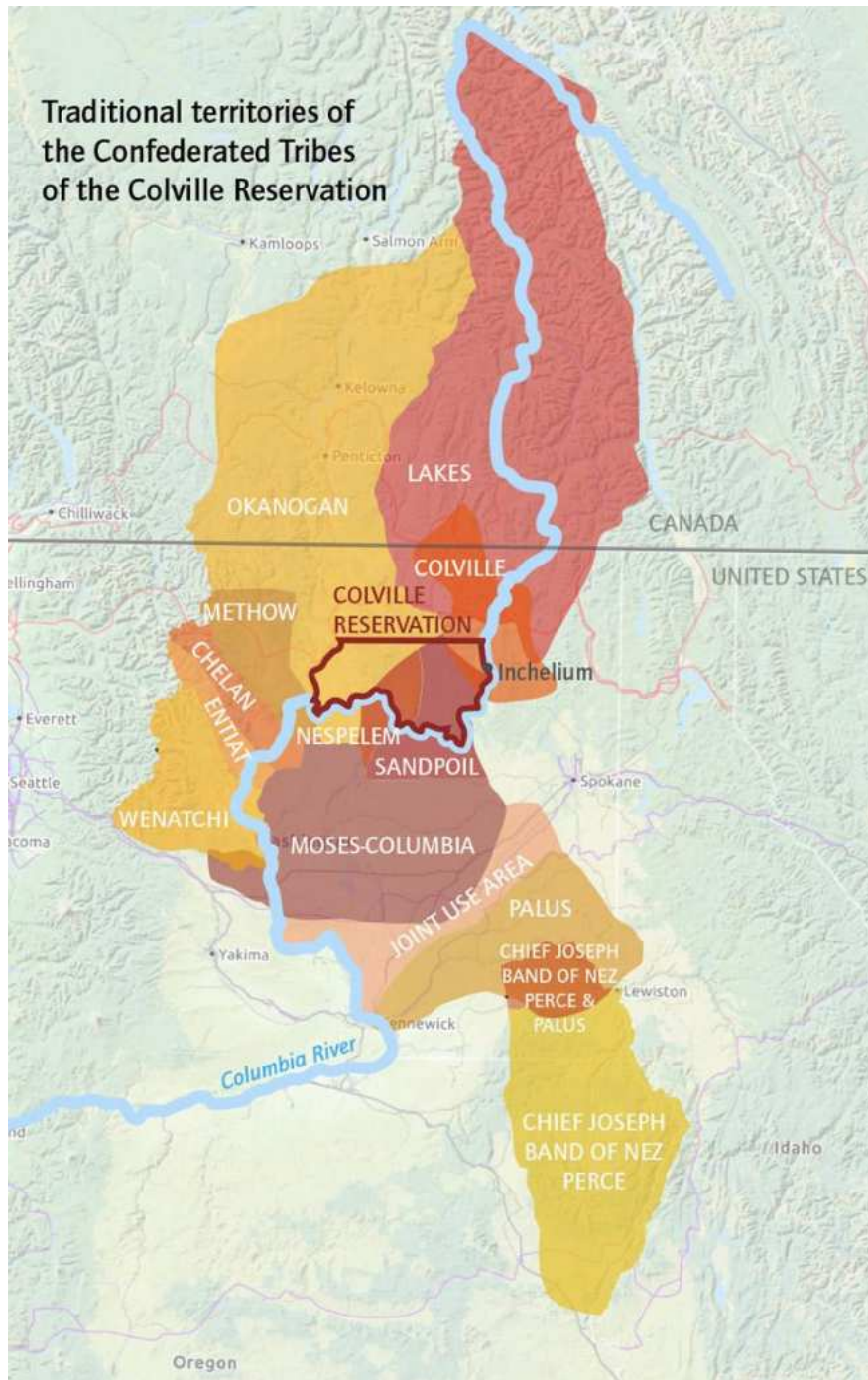


Figure 2.2: The traditional territories of the Colville Tribes extend across eastern Washington and into portions of British Columbia, Oregon and Idaho. This expanse covered approximately 39 million acres as the homeland of the Lakes, Colville, Okanogan, Moses-Columbia, Wenatchi, Entiat, Chelan, Methow, Nespelem, Sanpoil, Chief Joseph Band of Nez Perce and Palus Indians (CCT, 2022).

The traditional territories of the twelve Confederated Tribes of the Colville Reservation cover a vast area of 39 million acres in Washington and British Columbia, as well as portions of Idaho and Oregon (Figure 2.2). The seasonal patterns of a Tribe moved fluidly throughout their territory, and “traditional use areas were sometimes shared with other Tribes with permission from the host Tribe. Constituent Tribes of the Colville Confederated Tribes belong to what anthropologists call the Plateau Culture [and Interior Salish] Area based on similarities in language and culture. While culturally distinct and diverse, there are a great deal of shared general social and cultural practices and teachings” (Johnson, 2022).

While no studies specifically about Indigenous presence at Loup Canyon have been identified, our Indigenous partners affirmed that its location on the south west reaches of the traditional Okanogan territory adjacent to the Methow territory indicates that this area was traditionally used by both the Methow and Okanogan Tribes and their ancestors for thousands of years.

The $sp'a\lambda mu\text{'}\text{e}\chi^w\text{e}\chi^w$ (Methow) originally lived in and around the Methow River Valley along rivers and creeks including the Methow, Twisp, and Okanogan Rivers. The $sp'a\lambda mu\text{'}\text{e}\chi^w\text{e}\chi^w$ traditional territory fell within the boundaries of the 1879 Moses-Columbia Reservation. $s\text{'}\text{u}\text{u}\text{'}\text{na}\text{'}\text{q}\text{in}$ (Okanogan) means "seeing over the top" in a nselxcin dialect of the northern interior Salish. The $s\text{'}\text{u}\text{u}\text{'}\text{na}\text{'}\text{q}\text{in}$ traditional territory is comprised of the drainage systems of the Okanogan and Chewuch rivers, as well as the Sinlahekin Valley. It extends from Okanogan Lake and the Similkameen Valley in British Columbia, Canada, southward to the mouth of the Okanogan River (Johnson, 2022). Both Tribes relied upon the availability of traditional food sources and access to natural resources of value and cultural significance, and continue to today.

The current Reservation was established July 2, 1872 by Presidential Executive Order for the Methow, Okanogan, Sanpoil, Lakes and Colville. It also included the Spokane, Kalispel and Coeur d'Alene because they were assigned to the first Reservation, but they never moved to this Reservation. At that time, the Nespelem were included as a band of the Sanpoil. In 1872 the first Colville Reservation was established on the Spokane side of the Columbia River. This decree was supported by Chief Moses of the Sinkayuse-Columbia Tribe who claimed to speak for the Methow and other affected Tribes, but the Methow people were never directly consulted about this decision. Tribal members were forced to choose between taking allotments of 640 acres within their territory or moving to the Colville Reservation. Many of the Methow people who were higher in the valley never heard about the opportunity to get an allotment, and this is why very few live on allotments today. Most of the Methow were moved to the Reservation, a place that is further from where their ancestral and spiritual connections are strongest to the land. (CCT, 2022).

2.3 Sovereignty

The Sustainability Pathways program had the opportunity to learn about Tribal and Indigenous Sovereignty from Shandy Abrahamson through conversation and stories at an on-site gathering at Loup Canyon. The following excerpt beautifully encapsulates the importance and difference between these terms:

“Tribal Sovereignty refers to the legal recognition in the United States of America law of the inherent sovereignty of American Indian Nations. Although undermined by various Acts, legal decisions, and policies, it still stands to this day. Indian reservations are recognized as what can be termed “nations within.” Each has its own government and sovereign powers to make laws, tax, etc. and most also have their own tribal justice system, also based upon their inherent powers... It is important to understand that tribal sovereignty is not delegated from the US government. Treaties do not create tribal sovereignty. Treaties are an affirmation between Indian nations and nation-states.

Indigenous Sovereignty is not a nation-state recognition of inherent sovereignty under nation-state dominion. Rather, it arises from Indigenous Traditional Knowledge, belonging to each Indigenous nation, tribe, first nation, community, etc. It consists of spiritual ways, culture, language, social and legal systems, political structures, and inherent relationships with lands, waters and all upon them. Indigenous sovereignty exists regardless of what the nation-state does or does not do. It continues as long as the People that are a part of it continue.

Efforts to destroy our foods is an attack of our inherent food sovereignty which is connected to our respective spiritual ways, culture, language, social and legal systems, political structures, and inherent relationships with lands, waters and all upon them.

Efforts to engage in destructive actions like fossil fuel extraction, fossil fuel pipeline infrastructures crossing across Indigenous territories, lands and waterways, uranium mining and other mining, attack our traditional ecological knowledge which is connected to our respective spiritual ways, culture, language, social and legal systems, political structures, and inherent relationships with lands, waters and all upon them.”

(Indigenous Environmental Network, 2021)

2.4 Site History

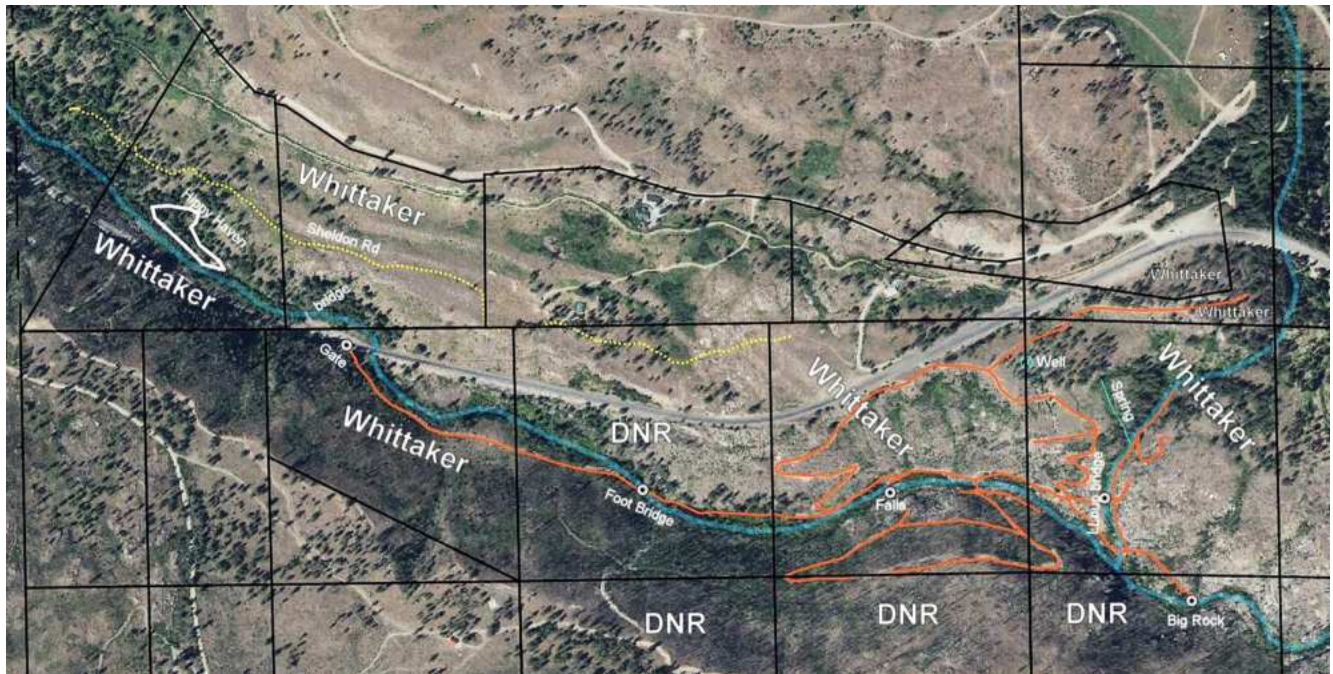


Figure 2.4.1: A G.I.S map displaying the land parcels of land owned by Lee (labeled with “Whittaker”) and the trail systems he built (orange). The two bottom right parcels are where our surveys have been focused thus far (Lee Whittaker communication August 4, 2022).

In order to get a better understanding of the recent ecological history of Loup Canyon, we interviewed Lee Whittaker, the current owner of the land. Lee purchased these parcels of land (Figure 2.4.1) from 1983 to 2018. Before Lee bought the main parcels of land containing Loup Canyon, they were owned by a timber company that was in the process of logging the trees. They reportedly transported timber down Loup Loup Creek after cutting, which is a highly damaging process that negatively impacts stream health. However, new timber regulations came into place in the 1980s which made logging much more difficult on the steep canyon terrain; this motivated the timber company to sell this property.

Lee reported that before he purchased the parcels from the timber company, ranchers also ran their cattle through parts of Loup Canyon, leading to ecological problems with erosion and water quality. After purchasing the land, Lee built a fence to prevent the passage of cattle and turned his efforts to restoring the land. He began photo-documenting the terrain and brought in biologists to survey for water quality and fish habitat potential. He excavated trails, built two bridges, and dug a well to make this lush and densely forested land accessible for educational field trips with local schools, particularly with the Okanogan High School ecology class.

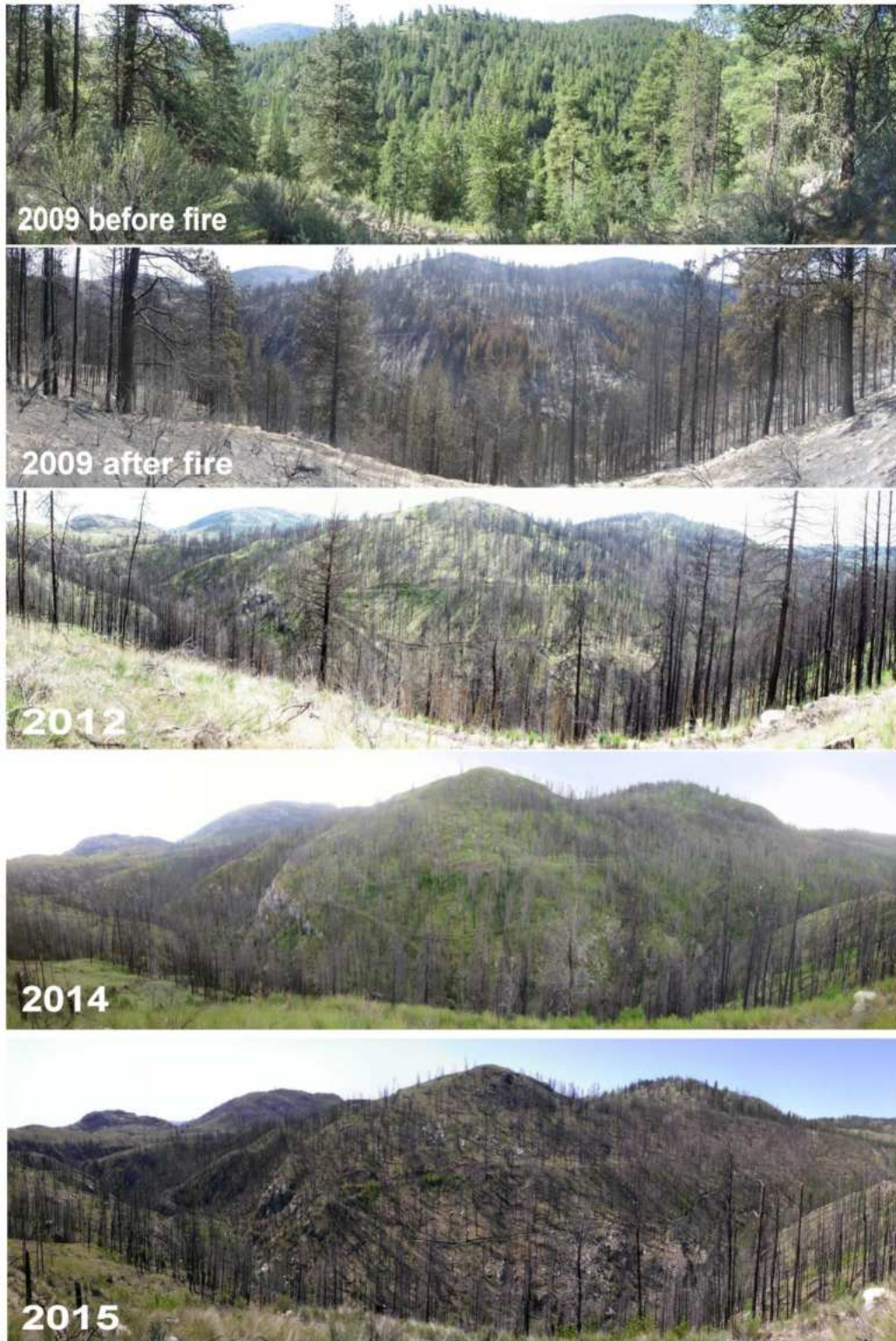


Figure 2.4.2: Panorama photo series documenting the ecological impacts of the Oden Road Fire of 2009, photographed by Lee Whittaker from 2009-2015 (Whittaker, L., communication August 4, 2022).

In 2009 the Oden Road Fire burned through 9,604 acres of land, including the parcels owned by Lee. This event dramatically changed the ecological terrain of the canyon; except for a tree stand on the eastern ridge, all vegetation was thoroughly burned.

Lee's careful photo-documentation before the fire provided a rare opportunity for research into the impacts of fire on a landscape (Figure 2.4.2). Teachers at local schools were invited to use Loup Canyon as a field site to study ecological regrowth. One local ecology class has been doing the post-fire recovery study for 13 years; this includes involvement from the Washington Department of Fish and Wildlife, the Okanogan Land Trust, and Okanogan County Conservation District.

2.5 Building a Reciprocal Relationship with the Land

Through deep understanding and connection with the land, Indigenous communities have managed their environments sustainably for generations. In turn, the flora, fauna and other resources available on Indigenous lands and territories have provided them with their livelihoods and have nurtured their communities. This is a harmony that is dangerously out of balance due to an era of overconsumption, unsustainable practices, and a disrespect for the natural world and Indigenous ecological knowledge by non-Indigenous colonizers and their descendants.

The Loup Canyon stewardship plan aims to create a sustainably-stewarded place of abundance where youth educational programs can take place that support the strength of their Indigenous identities by providing access to culturally valuable natural resources. This will be a place of reciprocity, respectfully tended by people dedicated to nurturing and understanding the intersection between ecology and culture.



3. Methodology

3.1 Interviews

The Colville Confederated Tribes have strong traditions of oral history; their culture encourages passing down knowledge through generations through stories, conversation and song. Thus, hearing first hand from storytellers, Knowledgekeepers, and stakeholders was the most accurate way to collect information on Traditional Ecological Knowledge, to learn what land education on site looks like and how to appropriately teach cultural traditions accurately and impactfully.

Interviews were conducted with Amelia and Joaquin Marchand, Shandy Abrahamson, a Career Connected Learning Tribal Engagement Specialist with the Office of Native Education and the Office of the Superintendent of Public Instruction, and Lee Whittaker. These interviews were invaluable to our research; they strengthened relationships with the stakeholders while providing information on the site's history and insights into traditional Indigenous practices and ecological knowledge.

Joshua Porter, as the leader of the Sustainability Pathways Program, acted as supervisor and mediator for this stewardship plan. Joshua helped coordinate contact information and scheduling, and mediated for productive, respectful relationships to all parties involved and supervised the progress of the stewardship plan throughout its course.

3.2 Wildlife Cameras

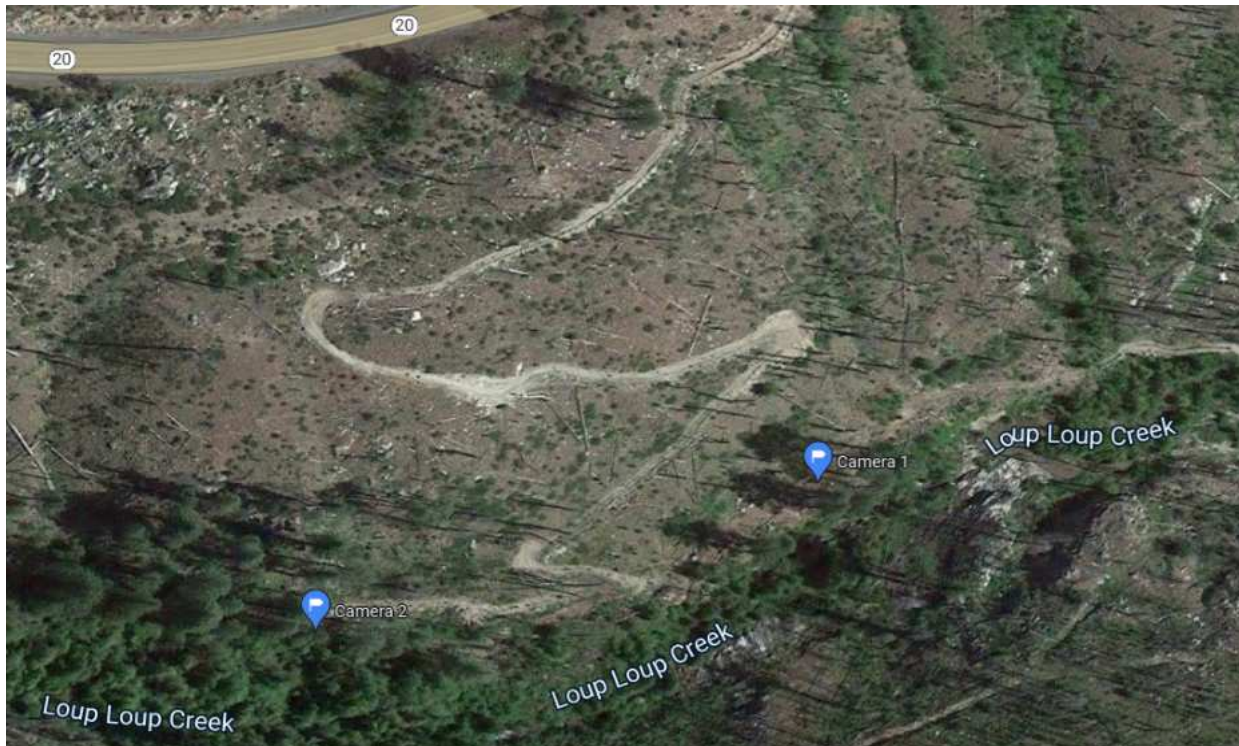


Figure 3.2: Google Maps photo of where the Wildlife Cameras were placed. Camera 1, set to take pictures, was placed at 48.36354, -119.73898. Camera 2, set to take videos, was placed at 4.36318, -119.73898.

After Emma and Renee, both Cascade Carnivore Project Practicum students, identified carnivore scat samples during the first Canyon site visit, Heather Rolph, Cascades Carnivore Project Field Lead, led a group in placing two wildlife cameras along Loup Loup Creek (Figure 3.2) to document animals in the area on July 20, 2022. The cameras were set to take photos or videos when motion was detected in their field of view. In order to encourage animal activity, a rock and a log in the picture foreground were marked with several scents including fox urine.

On August 12, 2022 the cameras were checked for battery life and storage (see results in Section 4.2) and currently remain up and active. This method provides clear documentation of the animals who call Loup Canyon home. In order to preserve wildlife habitat, these surveys can be used to inform non-invasive land management practices as Loup Canyon develops into an educational site that is used by more people in the future.

3.3 Primary Land Survey

In 2018, the Colville Tribes and the University of Washington Climate Impacts Group partnered to calculate the vulnerability of 72 culturally significant plant and animal species in the face of a changing climate. Tribes rely upon natural resources for “cultural, subsistence, and economic purposes”. The conditions of a changing climate, such as “warmer and drier summers, lower summer streamflows, and more frequent and intense natural disturbances (e.g., wildfire, floods, landslides)” will have a significant impact on their availability, and “each of these changes will affect the plants and animals that the Colville Tribes depend on for the health of their communities” (Krosby, 2018).

English Name	Latin Name	2050s		2080s	
		RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5
Whitebark Pine	<i>Pinus albicaulis</i>	EV	EV	EV	EV
Western Redcedar	<i>Thuja plicata</i>	EV	EV	EV	EV
Antelope Bitterbrush	<i>Purshia tridentate</i>	HV	EV	EV	EV
Thinleaf Huckleberry	<i>Vaccinium membranaceum</i>	MV	EV	HV	EV
Foamberry	<i>Shepherdia canadensis</i>	MV	HV	HV	HV
Idaho Fescue	<i>Festuca idahoensis</i>	MV	HV	HV	HV
Ponderosa Pine	<i>Pinus ponderosa</i>	MV	HV	HV	HV
Western Larch	<i>Larix occidentalis</i>	MV	HV	HV	HV
Ceanothus	<i>Ceanothus velutinus</i>	MV	HV	MV	HV
Basin Wildrye	<i>Leymus cinereus</i>	LV	MV	MV	MV
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	LV	MV	MV	MV
Fernleaf Biscuitroot	<i>Lomatium dissectum</i>	LV	MV	MV	MV
Lodgepole Pine	<i>Pinus contorta</i>	LV	MV	MV	MV
Pacific Yew	<i>Taxus brevifolia</i>	LV	MV	MV	MV
Quaking Aspen	<i>Populus tremuloides</i>	LV	MV	MV	MV
Service Berry	<i>Amelanchier alnifolia</i>	LV	MV	MV	MV
Paper Birch	<i>Betula papyrifera</i>	LV	MV	LV	MV
Wood's Rose	<i>Rosa woodsii</i>	LV	MV	LV	MV
Devil's Club	<i>Opopanax horridus</i>	LV	LV	LV	MV
Arrowleaf Balsamroot	<i>Balsamorhiza sagittata</i>	LV	LV	LV	LV
Scouler's Willow	<i>Salix scouleriana</i>	LV	LV	LV	LV
Water Birch	<i>Betula occidentalis</i>	LV	LV	LV	LV

LV	Less Vulnerable
MV	Moderately Vulnerable
HV	Highly Vulnerable
EV	Extremely Vulnerable

Figure 3.3: Results of the Climate Change Vulnerability Assessment, (Krosby, 2018).

The Climate Change Vulnerability Assessment (CCVA) used a *braided approach*, utilizing the Indigenous knowledge of Tribal Elders and Western science. A species’ climatic vulnerability was understood to be a “product of its exposure to climate change (i.e., how much climate change it will experience), its sensitivity to climate change (i.e., how much a given change in climate will affect it), and its adaptive capacity (i.e., its ability to undergo changes that would help it respond)... key sensitivities contributing to vulnerability across species include movement barriers (e.g., roads), limited mobility, potential human response to climate change (e.g., solar

or wind farm installation), dependence on cool habitats, sensitivity to changes in aquatic habitat features, sensitivity to disturbance (e.g., wildfire), the potential for increased pressure from pathogens or competitors, and low genetic variation”. This Assessment is an invaluable tool for development of the Loup Canyon stewardship plan: “*knowing which priority species may be most vulnerable, and why, will be critical to supporting efforts by the Colville Tribes to promote the future resilience of their landscapes and communities*” (Krosby, 2018).

The results of the CCVA (Figure 3.3) were used to guide the Primary Land Survey and the recommendations for future cultural surveys at Loup Canyon. As Amelia identified, at the intersection between environment, culture, and humans are Traditional Foods and Medicines (Marchand, *CCT Climate Activities NAQS Action Plan*, n.d.). Additionally, Joaquin provided insight into flora species to search for and their associated cultural uses: food sources, such as Bitterroot (*Lewisia rediviva*), Indian potato (*Claytonia lanceolata*), Wapato (*Sagittaria latifolia*), Thin-leaf huckleberry (*Vaccinium membranaceum*), Black camas (*Camassia quamash*), White camas or Biscuit Root (*Anticlea elegans ssp. glaucus*), medicinal plants, such as the tips of Douglas fir (*Pseudotsuga menziesii var glauca*), and ceremonial materials, such as Tule (*Schoenoplectus acutus*), all had the potential to be collected and gathered for ceremonial meals and celebrations on the Loup Canyon Property if their presence is established during future cultural land surveys (Marchand, J., communication August 12, 2022).

In order to deepen our understanding and orientation to the Loup Canyon property, we visited the site in July; there we began making observations about the attributes and the present flora and fauna with the results of the CCVA in mind. We generated ideas about general needs, such as a shelter, running water, and restrooms, for future educational programming to take place. While not included in this report, this information will be available in the larger Stewardship Plan upon its completion.

In August, the Sustainability Pathways cohort visited the Canyon for a day of cultural engagement. We learned about Tribal sovereignty, Tribal relations, and then accompanied Amelia and Joaquin as they completed a cultural land survey, documenting the first foods and medicines they mentioned, harvest timings, and other important uses. On this day we also collected results from the wildlife cameras



4. Results

4.1 Primary Land Surveys

In the years to come, Central Washington will be subject to the effects of a changing climate. Warmer and drier summers partnered with lower summer streamflows will have significant implications for the health of vulnerable plants that are depended upon by the Colville Tribes for the health of their communities (Krosby, 2018). In order to preserve the health of both plant and Indigenous communities, steps must be taken to understand what makes a plant vulnerable to climate change, and how to best support their presence on the landscape.

In a Primary Land Survey that we conducted over the course of three trips to Loup Canyon, it was discovered that out of the 19 plant species analyzed with the CCVI, 9 species were documented in Loup Canyon; Thinleaf Huckleberry, Ponderosa Pine, Western Larch, Bluebunch wheatgrass, Quaking Aspen, Service Berry, Arrowleaf Balsamroot, and Scouler's Willow. We also documented the bird and mammal species that were present on those visits (Figure 4.1.1).

On August 12, 2022 we had the opportunity to visit Loup Canyon with Amelia and Joaquin for the Primary Cultural Land Survey. During this time we recorded the species of cultural significance (Figure 4.1.3), including their location (Figure 4.1.4) and Indigenous uses.

Future surveys can provide insight into the annual abundance of these culturally significant and vulnerable plants, and guide supportive restoration projects in the Canyon.

Results of the Primary Land Survey

FLORA	BIRDS	MAMMALS
Arrowleaf Balsamroot*	Kestral	Black Bear
Bitterbrush	Canyon Wren	Coyote
Showbrush	Flycatcher	Yellow-bellied Marmot
Loupine	Lazuli Bunting	Lynx
Ponderosa Pine*	Towhee	Skunk
Service Berry/Saskatoon (berries)*	Black-capped Chickadee	Mountain Lion
Birch*	Robbin	Townsend's Chipmunk
Yarrow	Raven	
Quaking Aspen*	Coopers Hawk	
Mullein	Western Tanager	
Elderberry (in bloom)	Louis' Woodpecker	
Fireweed	Morning Dove	
Current (berries)	Stellar Jay	
Mariposa Lily	Poorwill	
Willow*		
Nutkana Rose		
Alder		
Oceanspray		
Thimbleberry		
Mock Orange		
Honey Suckle		
Burdock		
Oregon Grape		
Vine Maple		
Cottonwood		
Western Larch*		
Horsetail		



Figure 4.1.1: The results of the 2022 July-August primary Loup Canyon survey.

*species that are also present in the Colville Tribes Natural Resources Climate Vulnerability Assessment (above).

Figure 4.1.2: Poorwill nest, photographed on August 12, 2022 at Loup Canyon (below).

Results of the Primary Cultural Land Survey

CULTURAL SURVEY (8/12/22)	FUTURE CULTURAL SURVEY FOCUS
Service Berry*	Thinleaf Alder
Arrowleaf Balsomroot*	Beaked Hazelnut
Buckbrush	Cranberry
Quaking Aspen*	Thinleaf Huckleberry
Ponderosa Pine*	Chamise
Short-Thorned Rose	Service Berry
Horsetail	Phipps Harthorn
Fireweed	Foamberry
Yarrow	Wood's Rose
Mullien	Blue Elderberry
Alder	
Larch*	LIGHT FOUNDATION FOCUS
Yellow Willow	Bitterroot
Oregon Grape	Douglas Fir
Stinging Nettle	Indian Potato
Cat Tail	Tule
	Thinleaf Huckleberry
	Black Camas
	White Camas

Figure 4.1.3: Results of the Primary Cultural Survey, followed by a list of plants to survey for in the future based on the focus of the L.I.G.H.T Foundation.

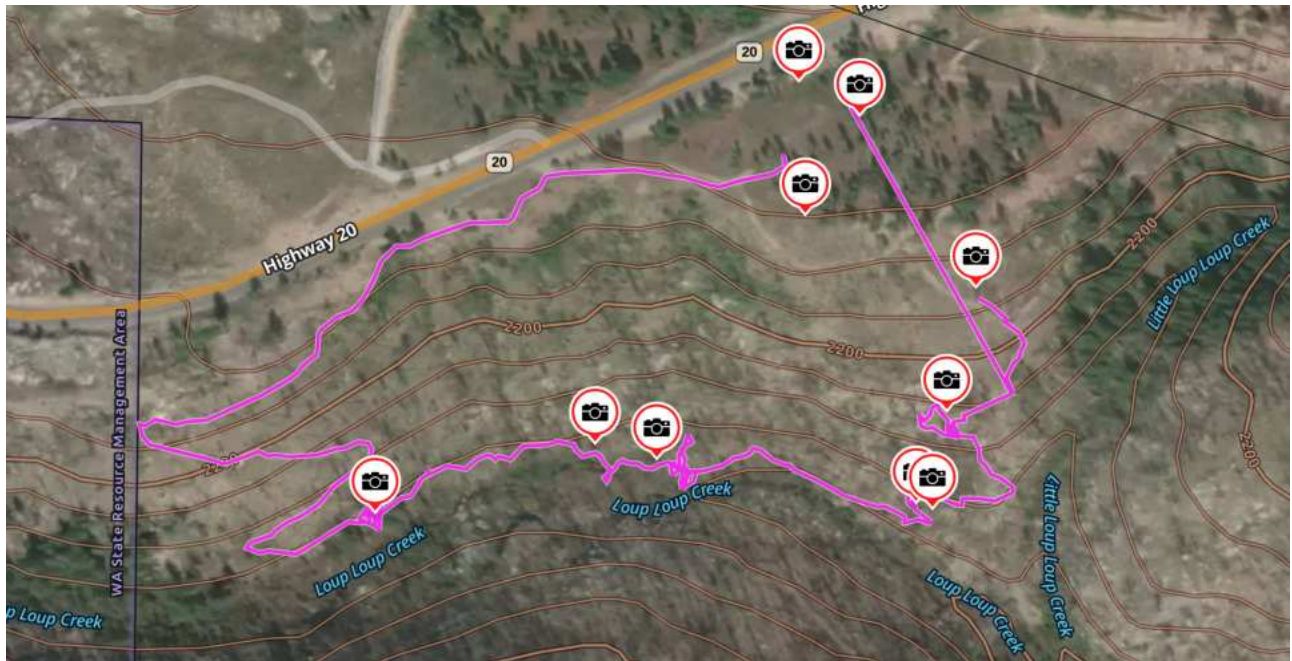


Figure 4.1.4: Recorded track of the Primary Cultural Land Survey conducted on August 12, 2022. Photo points mark the location of culturally significant species found by Amy and Joaquin.

4.2 Wildlife Cameras

Our wildlife camera footage clearly showed us that these animals, along with many small rodents, use Loup Canyon for foraging, hunting, water access, and raising their young.



Figure 4.2.1: August 3, 2022 at 9:13 pm, a mother Mountain Lion (*Puma concolor*) with her four cubs in the background to the right (Camera 1).



Figure 4.2.2: August 10, 2022 at 1:16 pm, a cinnamon-colored Black Bear (*Ursus americanus*) returning from a swim in Loup Loup Creek (Camera 2).



Figure 4.2.3: August 4, 2022 at 9:13 am, a Striped Skunk (*Mephitis mephitis*) visits the scent-marked boulder only 5 minutes before a mother bear and her two cubs were filmed at the same location (Camera 2).

Figure 4.2.4: August 6, 2022 at 11:18 am, Yellow-bellied Marmot (*Marmota flaviventris*).

4.3 Applicable Traditional First Foods, Medicines, and Projects

Gathering is a central component to Indigenous cultures. The foraged resources hold a deeper meaning than solely providing biological sustenance or material value. Today, Tribes often struggle with natural resource availability and sovereignty due to barriers preventing access to traditional resources. Some of these barriers include a lack of recognition of sovereign rights, a loss of land, environmental toxins, geographic isolation, lack of transportation and general cultural oppression that generations have endured (Krohn et al, 2010). Loup Canyon offers a site where many culturally significant plant species grow; the proposed educational activities will be centered around the gathering and processing of these materials in the hope of incorporating Indigenous-led native plant gathering practices into the educational programs at the Canyon.

Since time immemorial, native people have cultivated and honored their relationship to resources both from the land and water, and have always been accustomed to diets that were rich in complex nutrients. During and after colonization, the maintenance of habitats and traditional practices of food harvesting sometimes became illegal or extremely difficult to keep up, and native foods soon were replaced with Western crops and commodity items that have severely impacted the health of many Indigenous people (Krohn, 2007). Not only do traditional foods feed the body, but also the spirit. A Klallam Elder, Monica Charles, explained this concept

so elegantly at a gathering on the Lower Elwha Reservation: “Taking in the food of one’s ancestors can bring people back to where we came from, and in doing so, it can help them remember who they are” (Krohn, 2007).

In the Swinomish Action Agenda that determines five key indicators of Tribal human health, access to traditional resources is a common theme between all. These indicators include community cohesion, food security, ceremonial use, knowledge transmission and self-determination (Donatuto, Swinomish Action Agenda, 2009). While these findings were prepared by a Tribal health group from the Salish Sea region, they hold a universal idea of health that can be examined no matter the geographical location of a tribe.



Figure 4.3: Example of a Seasonal Round at the Methow Interpretive Center.

Across Northwest cultures, there has been a revival of traditional plant uses that has created a growing need for materials to produce these crafts (Krohn, 2007). These activities include weaving, basketry, carving, beading and gathering native food and plant medicines. The Loup Canyon environment is home to many culturally significant plants (like Scouler’s Willow, for example) and this stewardship plan works to make this property a site where materials like these can be cultivated and gathered.

In addition to utilizing the plants already on this landscape, there are possibilities for future projects involving the intentional cultivation of key species in a healing garden or plot-designed space. This would allow for the careful selection and care of traditional medicinal plants, and could be designed to honor the four directions, as one example is described in *Feeding the People, Feeding the Spirit* (Krohn, 2010). To help organize the knowledge of seasonal harvests that happen within these spaces, a seasonal harvesting round could act as a blueprint for these plantings and practices. For example, the Methow Interpretive Center has an exhibit on the seasonal cycles of the Methow people that could be used to guide the creation of a Seasonal Round for the Canyon made by the knowledge keepers of Loup Canyon (Figure 4.3).

4.4 Importance of Land Education

A belief that is largely universal among Indigenous cultures is that “children are the keepers of tomorrow’s world” (Krohn, 2007). In a conversation with Mark Miller of the Methow Tribe, he explained how we are all currently borrowing the Earth from future generations (Miller, M., Hummingbird Land Back Celebration, June 24, 2022). A core goal of this stewardship plan is that the Loup Canyon site will become a place where youth, especially, can deepen their connection to the natural world and learn how to care for it through traditional practices. One of the key indicators of human health identified by the Swinomish Tribe is the capacity for knowledge transmission, passed down through generations: “*It is through the teachings, transferred from those that hold the knowledge (elders) to those that learn and carry on the knowledge (youth), that the health and well-being of the community are preserved and upheld*” (Swinomish Action Agenda, 2019). By inviting the continued practices of traditional medicine and food harvesting, preparations, ceremony, and community sharing to happen at the Loup Canyon, a stronger sense of self-identity and connection to place might be possible for the youth of this region.

In speaking with Shandy, she expressed great enthusiasm when imagining the Loup Canyon as an accessible place for field trips and land education partnerships with local schools. In thinking about the definition of ‘land education’ it is important to keep in mind that “land can be considered a teacher and conduit of memory, in that it ‘both remembers life and its loss and serves itself as a mnemonic device that triggers the ethics of relationality with the sacred

geographies that constitute Indigenous peoples’ histories” (Brooks 2008, Wilson 2005, Byrd 2011, as cited in Tuck et al, 2014, pg. 9). While this will continue to be a site for environmental science-themed ecological studies, it is anticipated that a much broader scope of teachings will flourish here. Shandy thinks a far more significant aspect of children’s interactions with this land will be the strength of self-identity that can be found by cultivating a relationship with the Earth and natural resources humans depend on (Abrahamson, S., communication July 28, 2022). When “people learn about the place they live and enter into an active relationship with that place, they can help keep it intact. They remember how to listen to the voices of the land” (Krohn, 2007). Ultimately, this will be a place for intergenerational and cross-cultural learning that will foster a reconnection of people with their local environment.



Figure 4.4: The Sustainability Pathways program learning about Tribal and Indigenous Sovereignty from Shandy Abrahamson through conversation and stories at an on-site gathering at Loup Canyon.

In 2015, a bill was passed that requires Washington state schools to teach the *Since Time Immemorial: Tribal Sovereignty in Washington State* curriculum that has been endorsed by all 29 federally recognized tribes. Developed in partnership with the Office of Native Education within the Office of Superintendent of Public Instruction, this curriculum provides lesson plans and learning outcomes for all grade levels. The successful implementation of these lessons will only happen if relationships can be fostered between the local schools and tribes, and this needs to happen with great intention of recognizing why a historic distrust of non-tribal educational institutions may still exist today (Partnering with Local Tribes, OSPI). This stems from the ongoing trauma of boarding schools where cultural genocide has taken place, inaccurate histories have been shared, tribal people being viewed as relics of the past, and a lack of commitment to the educational success of tribal children.

Moving forward, the Loup canyon field site will hopefully be a place to support the integration of the STI curriculum into all educational subjects, not just social studies. As Shandy pointed out, Tribal Sovereignty connects to all subjects and almost every field within the umbrella term of "sustainability" (Abrahamson, S., communication August 12, 2022). By teaching these tribally-developed lesson plans to local school children on this land, a reconnection of people with their local environment will have the space to flourish and develop. When people understand their relationship with the local environment and their role in that relationship, they can strive for more sustainable practices. Additionally, by inviting language speakers and knowledge keepers to participate in teaching parts of the STI curriculum at Loup Canyon, it would allow the curriculum to become teaching *with* and not *about* Indigenous peoples.



5. Recommendations

5.1 Survey Methods

5.1.1 Plant Survey

Following the example set by the Climate Change Vulnerability Assessment, it is recommended to implement a braided survey methodology that incorporates both Indigenous knowledge from Tribal elders and Western science. Combined, these two approaches will create a well-rounded, respectful, and accurate analysis of the Loup Canyon flora. Guided by Tribal elders, surveyors can focus on the plants of cultural significance and any other threatened species. There is currently an existing plant survey methodology used by the CCT History and Archaeology Department; consulting Crystal Miller about this program as a resource for survey methods is recommended, as well as further consultations with Amelia. Consistent surveying will provide an insight into securing a sustainable annual harvest for culturally significant plants, and document the Canyon's fire-recovery progression.

5.1.2 Pollinator Survey

Amelia recommended that an insect survey, specifically focusing on the presence of native pollinators, be completed in addition to flora and fauna surveys. Certain insects are excellent 'bioindicators', a term used to refer to a "biological processes, species or/and community of organisms which can be used to assess the quality of an ecosystem and also how

this ecosystem evolves over time, which is especially useful when changes take place due to anthropogenic disturbances, such as pollution” (Vila, 2015). It is recommended research is done on the viability of pollinator gardens, as a way to cultivate and maintain native pollinator presence on site. Last year Amelia did a survey with students on pollinators; this example could help guide pollinator surveys with students at Loup Canyon.

5.1.3 Water Survey

Water is a main feature of this site. There are natural springs that flow down the Canyon walls into Loup Loup creek, eventually leading to the Okanogan River. Monitoring the health of these streams is vital to the property's prosperity. It is recommended that any water protectors available are used to preserve and maintain the stream's health. A survey documenting the location, water quality, and annual flow of the natural springs and Loup Loup Creek could be very impactful for future Traditional ceremonies.

5.1.4 Landscape Scale and Monitoring

It would be valuable to monitor how the landscape changes over time, as well as conducting more research into the general layout of the land. It would be good safety information to know if any especially steep parts of the Canyon are prone to landslides, flooding or erosion. Landscape monitoring can inform safety information as well as soil health and durability. Many plants rely heavily on healthy soil, therefore maintaining soil health should be a priority.

5.1.5 Wildlife Cameras

It is highly recommended going forward to continue to monitor and document the footage and images gained from the wildlife cameras set up by the Cascade Carnivore Project. This footage not only helps the Cascade Carnivore Project, but also is a framework for how to continue to document mammals in the area going forward. It is possible many mammals have set routines that may be impacted by work done on the site. It is advised going forward to use the documentation from wildlife cameras as not only a survey of what mammals are on site, but also their movement patterns. Good documentation of the mammals' behaviors could help in informing how construction and practices on site are implemented in a way non harmful and safely interactive to the local mammals.

5.2 Loup Canyon Flora Phenology Wheel

A Phenology Wheel or Seasonal Round is a circular artwork or “calendar” that encourages routine observations of local seasonal patterns in the natural world. Single observations of what is happening in the lives of plants and animals made over time begin to tell a compelling story

about what is happening in the lives of plants and animals made over time begin to tell a compelling story about the place on our living planet that you call home.

A Phenology Wheel or Seasonal Round differs from regular field guides in showing plants when they are harvestable and their seasonality. Most field guides tend to show plants when they are flowering, which is not necessarily when they are used. A Phenology Wheel or Seasonal Round created from the plants on site would be best suited for learning harvesting and survey methods if it incorporates the plants description of when it is harvestable and when it is most identifiable for surveying.

Creating a large phenology wheel to display at Loup Canyon would not only be beautiful, but also an excellent way to engage visitors with the seasonal patterns. A digitalized phenology wheel that includes plant uses could be a useful educational tool as well; this would be an accessible way to use the phenology wheel to support visual learners in a classroom setting.

It is recommended to commission an Indigenous artist to create the final product of the phenology wheel, and to let it take shape over time. While there is no one language or tradition that unifies the Colville Confederated Tribes, there are cultural practices and seasonal harvests that are shared by some of the Tribes. This stewardship plan has the potential to be a collaborative plan between artists who belong to multiple Tribes; a place to share tribal ecological knowledge, practices, and food cycles that are relevant to the canyon's ecosystem.

5.3 Incorporating Traditional Languages through Song and Creation Stories

The languages spoken in the Colville Tribes are unique and place-based. They carry information about the environment and help us delve into a mindset of awareness and connectedness.

As Shandy explained, these Indigenous languages are verb-based rather than noun-based like the English language. Many of the verbs for animals, plants and land features relate to Creation Stories or are an ecological reference to the peoples relationship to nature . For example, the word for moon in a traditional language translates to "*it rounds*," thereby describing the moon's patterns and cycles (Abrahamson, S., communication August 12, 2022). Primarily using verbs in a language is a way to understand nature not being composed of objects in a stationary or constant state of being, but rather as a moving, changing, fluid system. Incorporating traditional languages as much as possible will help to communicate how intricately connected the landscape is, and our role in how the land is cared for.

When asked about the role of language in Indigenous cultures, Joaquin said the following:

“Within every word and within every prayer or saying, phrase or legend, there is teaching. Each of those teachings are the earliest accounts of how people learned how to adapt and survive on this landscape and it includes not only the environmental knowledge about species, about meteorology, about phenology, it's something that continues and is ongoing...it places us in relationship to what our responsibilities are as caretakers of this land”

(Marchand, J., communication August 04, 2022).

One way to do this is through song. Amelia explained that it is good to open and introduce a place with traditional songs because they describe relationships with elements of the natural world around us (Marchand, A., communication August 6, 2022). This would be a valuable way to incorporate the traditional language into the educational opportunities and at Loup Canyon.

Another way is to incorporate language is through the sharing of Creation Stories by members of the Colville Tribes. Similar to traditional songs, Creation Stories teach lessons about ecology, cultural relationship to the land and connection to ancestors. During an interview with Shandy, she mentioned that when Creation Stories are told, the same story may have different meanings for each individual in the audience depending on their age or chapter of life. It is important to share stories in the appropriate season; according to Shandy, stories are traditionally told in winter (Abrahamson, S., communication, July 28, 2022). It is important to invite Indigenous Knowledgekeepers from the Colville Tribes to share stories orally at Loup Canyon, as they traditionally were told, and to be mindful of the sensitive nature of sharing some of these stories and make sure the tribes have given permission to share them.

The Creation Story about how Coyote brought Salmon to the people translates beautifully onto the Loup Canyon landscape. The story teaches that there were Indigenous ancestors on the land here before Salmon runs began thousands of years ago, and emphasizes the importance of Salmon as a food source and economic commodity. In the story, Coyote visits many Tribes and brings them Salmon, however he takes the Salmon away from the Tribes that would not give him a wife by creating steep waterfalls the Salmon cannot pass over. Thus, the story also describes how specific features of the landscape were formed. This story is connected to Loup Canyon because the terrain is good habitat for Coyotes (Figure 5.3.1) and the creek is too steep

for Salmon to come upstream. There is a clear connection for students to be able to relate the Creation Story and its teachings to the land they are on.



Figure 5.3.1: August 2, 2022 at 04:07 pm, a Coyote (*Canis latrans*) was captured walking down the trail (Camera 1).



Figure 5.3.2: Black Bear (*Ursus americanus*) photos taken in Loup Canyon with CCP wildlife Cameras. Left: August 5, 2022 at 9:25 pm, Mother bear and cub walking at night (Camera 1). Right: August 4, 2022 at 9:18 am, Mother bear and cub examine the scented boulder by Loup Loup Creek. A second cub is also in the area (Camera 2).

While at the Loup Canyon with Justin Williamson, the Board President of the LIGHT Foundation, he mentioned how the Indigenous peoples' ancestors learned to collect and harvest food from the land through watching the animals and how they interacted with the ecosystem. This is further ingrained in the culture through origin stories such as The Boy And Bear. In this story a Grizzly bear with two cubs takes in a lazy child that was abandoned by his family for being lazy. The bear *“washed and washed the boy inside.”* The bear then fills the boy with knowledge of how to hunt and forage. Later the boy, now a man, goes back to his village after promising the grizzly he would not kill bear cubs or his sisters. He later breaks his promise and kills a bear with cubs, and so the bear kills the man in rage. The Grizzly later regrets killing the man, and says *“From now on, you can kill me and you can kill your brothers. You have begun to kill us. It was because of your little sisters that you became a man. You can kill us now. I give you that power”* (Ferguson, 2007, p. 137).

This story relates to the time in memorial practices of how these foods were first discovered and collected. It also implies the understanding of how important it is to care for and sustain the local foods and land, with the knowledge learned from the creatures that have also lived here since time immemorial. The Grizzly bear gives us the power of her knowledge and now we must choose what to do with it. While Grizzly are not currently present on this landscape because they were hunted to extinction by non-Indigenous communities, Black Bears are still here. One mother bear is using Loup Canyon as a safe place to raise her two cubs (Figure 5.3.2).

5.4 Community Involvement

Fostering relationships with local schools, Indigenous peoples, and community members will be vital to ensuring the stewardship plan's success. When asked about how accessible Loup Canyon was to local schools and community, Shandy spoke about the value of building community relationships in order to make this program successful (Abrahamson, S., Communication, July 28, 2022). Through the Career Connect WA Grant to develop the culturally responsive framework for CTE programs the stewardship plan works to establish a community of practice that will meet regularly over the course of the year to develop a place based curriculum. This program will be much more successful if it is able to reach out to many different schools and parts of the community.

There will also need to be local amenities to facilitate on site visitation. Projects to improve the trails, add shelters and other comforts are advised going forward. Making sure the site can facilitate all ages will be important to keep in mind. When interviewing Joaquin Marchand from

the L.I.G.H.T. Foundation, he mentioned many good pieces of advice to make sure facilities are built with sustainability in mind. He mentioned trying to use solar power when possible, thinking of ways to limit noise pollution, possibly building a pit house that is resistant to the more and more common wildfires, minimizing artificial light and possibly using a rain barrel catchment system and composting toilet.

5.5 Sustainable Development Goals

In 2015 the United Nations created the 2030 Agenda for Sustainable Development for peace and prosperity for people and the planet, now and into the future. This Agenda includes 17 goals for all nations to work towards more sustainable activity. Of these 17, the Loup Canyon directly relates to three of them: Quality Education, Life On Land and Peace Justice and Strong Institutions.



The goal of Quality Education is to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (United Nations, 2015). This goal is fundamental to this program; the stakeholders of the Loup Canyon Stewardship Plan are working to ensure community and culture are incorporated into a land based learning program and support the students in fostering lifelong learning practices. Incorporation of the STI curriculum into on-site educational opportunities will further student understanding about Indigenous practices and relationships with the land. This Stewardship plan also works to ensure students participating will understand what it means to be an Indigenous Sovereign nation.



The goal of Life On Land is to “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss” (United Nations 2015). The Loup Canyon Stewardship Plan ensures students and faculty will be monitoring plant and wildlife on site and working to foster sustainable practices through the guidance of Traditional Ecological Knowledge. The site will be protected development outside of the educational and ceremonial facilities and restoration projects will ensure post-fire recovery on the landscape.



The goal of Peace Justice and Strong Institutions goal is to “promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels” (United Nations, 2015). The Loup Canyon Stewardship Plan will function as a

peaceful, inclusive and sustainable development area, available to all learners in the community.

5.6 Furthering Connections and Research

As the stewardship plan continues forward, it would be valuable to interview Crystal Miller, an Indigenous archeologist, for specific insights into the history of Loup Canyon. Crystal may also be able to direct curriculum developers to individual storytellers who could be invited to the land. It would also be valuable to connect with local schools to extend an invitation for field research and project opportunities. Indigenous artists to help create the Phenology wheel in a traditional style, storykeepers and elders should be contacted to continue relationship building and workshopping the future of the Loup Canyon stewardship plan. Many of these relational suggestions are currently in-development.

As the creation of this field site moves forward, Western Washington University students will continue to be active stewards of this project. Part of the design plan is to house students on site to help take care of the land and support educational programming. These students will be central figures who help guide activities and relationships built within the Canyon.

As this educational field site becomes more established, it would be of interest to conduct a proper Cultural Resource survey. Guided by Amelia Marchand's professional experience with these surveys, it could be valuable to understand the historical presence of people on the landscape and how it has been used in the recent or distant past. This would involve possible surveys looking for certain rock features (campsites, graves and trail markers), pictographs, petroglyphs, and digging shovel probes (Amelia Marchand, communication August 1, 2022)



6. Conclusion

With place based learning, this site has the potential to strengthen relationships with Indigenous peoples, foster students' practical job skills, help students develop a relationship with the land, support scientific research by teaming up with local organizations and offer a sanctuary to local wildlife. This stewardship plan has the ability to reorient how we teach students about STI curriculum, and change the perception of Indigenous Sovereignty. This plan strives to connect sustainability goals of the United Nations, the CCT, The LIGHT Foundation, Sustainability Pathways Program, Western Washington University, The Cascade Carnivore Project and the local community, in order to provide a well rounded and inclusive learning environment.

This stewardship plan works to provide a site where the land can serve as an educational environment for youth and other learners through partnerships with local schools; it strives to create a place to develop and apply student projects that have included post-fire recovery studies, and will soon include a project with a construction trades class to build a shelter. In the future as school and program partners evolve, opportunities for extending learning opportunities about sustainable traditional practice on this land should be explored. Activities such as First Food teachings, Creation Story implementation, language immersion, traditional gathering methods, wildlife cameras and medicinal gardens are a few mentioned in this proposal, while leaving room for many other ideas to flourish.

One of the large visions of this project is the ability to teach as the project also develops. In the coming years it will be very impactful to see; facilities built by students, surveys of plants and

animals conducted by youth and partners and learning tools/plan propositions built by previous alumni of the program. People experiencing the site will be able to continue a project that continues to change and evolve with every new youth group input. Students, elders and all ages between will get to be a part of a project involving today's growing generation while continuing practices that have taken place since time immemorial. Surely, the Loup Canyon itself, from the water in the springs, to the hawks in the sky, will guide the development of this educational site.

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