A STEWARDSHIP STRATEGY FOR GRIZZLY BEARS IN THE NORTH CASCADES OF BRITISH COLUMBIA

JOINT NATIONS

NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

A framework through which grizzly bears can be restored to the North Cascades landscape and stewarded for generations to come through partnership and collaboration.

August 2024

North Cascades Grizzly Bear Stewardship Team

v: 2 September 2024

DISCLAIMER

The North Cascades Grizzly Bear Stewardship Strategy identifies goals, objectives, and a framework for coordinating necessary actions to recover grizzly bears in the North Cascades Grizzly Bear Population Unit based on Indigenous Knowledge systems and the best available scientific information. This Stewardship Strategy shall not create obligations or commitments legally binding on the strategy participants. The objectives and action items herein are subject to governmental and management partner priorities, budgetary constraints, and modifications necessary to accommodate new objectives or findings. This Stewardship Strategy uses an adaptive management framework to achieve shared recovery goals and objectives. It recognizes that approaches and actions used in habitat and population restoration may need to be modified in the future to be effective or accommodate the need for new objectives.

Success in this grizzly bear recovery initiative depends on the commitment and cooperation of many constituencies that may be involved in implementing this Strategy's directions. The North Cascades Grizzly Bear Team (North Cascades Team) invites everyone who shares concerns about grizzly bears to support and participate in the recovery and stewardship of grizzly bears in southwest B.C. and ensure their meaningful ecological and cultural relationships are maintained within the lands they have traditionally inhabited.

Copies of this Strategy may be obtained from:
jointnationsgrizzlybear.com

This Strategy may be cited as:

North Cascades Grizzly Bear Team. 2024. A Stewardship Strategy For Grizzly Bears (*Ursus Arctos*) In The North Cascades Of British Columbia. North Cascades Grizzly Bear Team, Penticton, British Columbia.

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ACKNOWLEDGEMENTS

The successes, to date and in the future, of the North Cascades Grizzly Bear Stewardship Initiative are dependent on multiple partnerships, collaboration across many boundaries, and broad support from the partners participating in the Southwest Grizzly Bear Steering Committee. Special acknowledgements for:

- Partnering Nations Stó:lō , Nlaka'pamux, St'at'imc, Secwépemc, and the Syilx Nation. The Syilx Nation ultimately held the pen on this document but strived to represent the unique connections and contributions of all partnered Nations in the North Cascades.
- Conservation Northwest and Coast to Cascades Grizzly Bear Initiative for continued and unwavering support for Grizzly Bear recovery in the North Cascades, providing advice, support, facilitation and much more.
- The Province of B.C. for their commitment to a collaborative and First Nation-led approach to Grizzly Bear stewardship, and the continued placement of capacity, resources and participation in the North Cascades Team.
- The consultants and experts who continue to help restore grizzly bears to the North Cascades landscape.

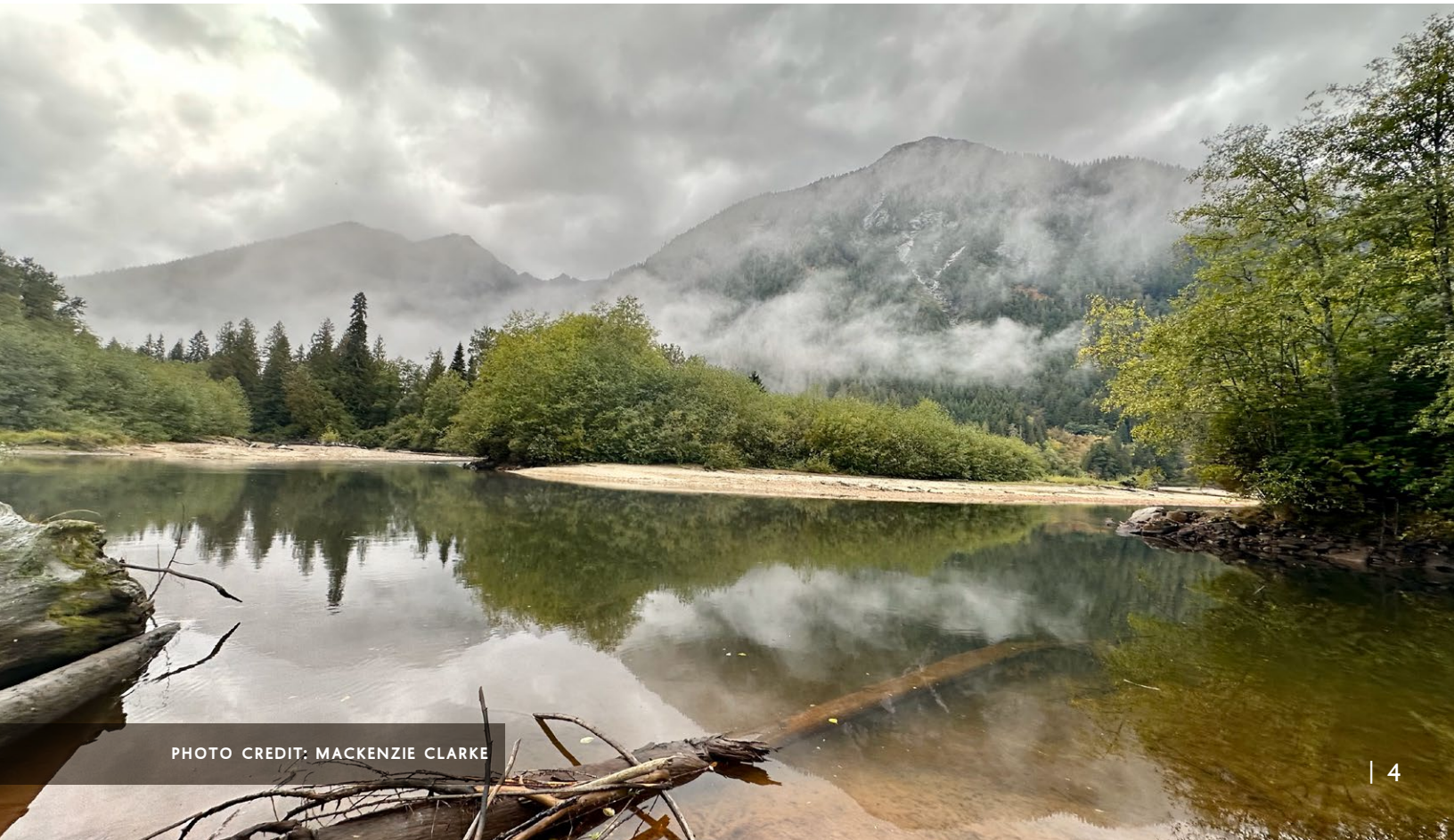

PHOTO CREDIT: MACKENZIE CLARKE

Partners

Okanagan Nation Alliance ("ONA") as comprised of leadership of

- Syilx Okanagan Member Communities
- Okanagan Indian Band
- Upper Nicola Band
- Westbank First Nation
- Penticton Indian Band
- Osoyoos Indian Band
- Lower Similkameen Indian Band

The Province of BC recognizes the importance of Grizzly Bear in First Nations' laws and protocols and as an iconic species for British Columbians. BC is collaborating with First Nation partners on recovery planning for the NC GBPU and is supporting First Nation's led-actions including communication and outreach, human-bear conflict management, habitat stewardship, adaptive management and monitoring.

Nlaka'pamux Nation Tribal Council, as comprised by leadership from

- Snepa,
- Nteq'm
- Lytton
- Skuppa
- Boothroyd

STSA S'ólh Téméxw Stewardship Alliance

- Chawathil First Nation
- Cheam First Nation
- Seabird Island Band
- Shxw'ōwhámél First Nation
- Skawahlook First Nation
- Skwah First Nation
- Sumas First Nation
- Yale First Nation
- Aitchelitz First Nation
- Shxwhá:y Village
- Skowkale First Nation
- Soowahlie First Nation
- Squ.0iala First Nation
- Tzeachten First Nation
- Yakweakwioose First Nation as represented by the Ts'elxwéyeqw Tribe Limited Partnership

COAST TO CASCADES GRIZZLY BEAR INITIATIVE

INDIAN GOVERNMENT LILLOOET TRIBAL COUNCIL

Upper Similkameen Indian Band

Simpcw First Nation People of the Rivers

Sekw'el'was

ST'ÁT'IMC PEGP'ÍG'LHA

Conservation Northwest Keeping the Northwest Wild

GLOSSARY OF TERMS

Adaptive management: an iterative process utilizing systemic approaches to continually learn from management interventions and apply that knowledge to develop more effective management decisions.

Connectivity: A measure of the extent to which individuals within a species can migrate or exchange genetic material between different subpopulations, habitats, or geographic locations.

Habitat: The locality or environment in which an animal lives. It includes the physical and biological factors that influence the growth and survival of that organism or population, such as climate, vegetation, water availability, and the presence of other species.

Secure Habitat: Refers to a habitat with low potential for human-caused mortality. This is usually associated with areas with low road density or no road access, seldom used by people.

Fragmentation: the physical disintegration of continuous habitats into smaller units or patches, most often caused by urban or transport network expansion. This has various environmental, social, climate change adaptation and mitigation, and biodiversity implications.

Indigenous Knowledge: a living knowledge system held by Indigenous people, which is place-based and rooted within a cultural context. As a cumulative knowledge system, Indigenous knowledge provides insight into nature's wide-ranging and complex relationships and dynamics. These can range from wildlife population trends, phenology, species habitat use, population genetic structure, and ecosystem response to natural disturbances (e.g., fire, floods, drought). Indigenous Knowledge systems have developed through intergenerational teaching, oral histories, direct observations.

Coexistence: people and animals living together in the same communities at the same time.

"For Syilx people, ki?lawna? (grizzly bear) is a significant part of our laws and protocols and are an important part of our creation stories and reminds us of our responsibilities to our tmxwulaxw (land)."

"Bear is a close friend to man."
Stólō Story

EXECUTIVE SUMMARY

First Nations in southwest B.C. have revered the grizzly bear as a relative and steward of the landscape, and for the resources it has provided to their communities since time immemorial. The North Cascades (N.C.) grizzly bear population was dramatically reduced in size and distribution by many decades of persecution, overhunting, and isolation. British Columbia now classifies this grizzly bear population unit (GBPU) as having an extreme conservation priority (B.C. Ministry of Forests, 2024). The International Union for the Conservation of Nature (IUCN) ranks the N.C. Grizzly Bear unit as Critically Endangered.

The North Cascades Grizzly Bear Stewardship Strategy, supported by the Joint Nations Grizzly Bear Initiative (JNGBI), provides the framework for restoring grizzly bears to the North Cascades landscape and stewarding this species for generations to come through partnership and collaboration. The JNGBI is founded on resolutions and direction from Stó:lō, Nlaka'pamux, St'át'imc, Syilx and Secwepemc Nation leadership, including a 2018 Joint Nation Grizzly Bear Resolution and Okanagan Nation Alliance Tribal Council Resolution 2014 (Appendix A and C) to protect and conserve grizzly bears.

The Stewardship Strategy is designed to provide Provincial government partners, communities, and stakeholders with a transparent and inclusive process for successfully recovering grizzly bears in the North Cascades landscape while taking appropriate steps to support human-bear coexistence. This initiative benefits from lessons learned in the 2001 North Cascades Grizzly Bear Recovery Strategy Process and learnings from successful grizzly bear recovery models in other regions. The Stewardship Strategy holds up the cultural understandings, values, responsibilities, and knowledge systems of Indigenous Peoples from Nations leading this process and aims to integrate with local communities as steps are taken to recover grizzly bears in the area. The Stewardship Team will oversee the implementation of the Stewardship Strategy and necessary stewardship actions for the North Cascades GBPU through the objectives and priority actions presented in this document. In this process, the Stewardship Team is committed to supporting comprehensive stakeholder and public engagement, recognizing that successful recovery will depend on local support.

INTRODUCTION

Indigenous Values, Perspectives, and Relationships with Grizzly Bears

Indigenous Peoples living in southwest B.C. have deep, place-based connections with the land, wildlife, and water. Indigenous peoples' relationships with the natural world are unique to the diversity of cultures, worldviews, ways of being, and knowledge systems that each Indigenous culture embodies. The grizzly bear is a relative with whom they have shared land and resources since time immemorial. The Syilx, Stó:lō , Nlaka'pamux, St'at'imc, and Secwépemc peoples today have close relationships with grizzly bears based on respect and reciprocity from the significant ecological, cultural and spiritual roles that the grizzly bear holds. Grizzly bears are recognized as guardians of their lands and revered for their positive influence on ecosystems and species. While they may share some commonalities, Indigenous Peoples from different Nations hold diverse and distinct values, languages, philosophies, and spirituality – so it is imperative that their perspectives and knowledge systems not be characterized under a singular model.

To Indigenous Peoples in southern B.C., the grizzly bear is a teacher and is credited with showing the people the beneficial foods and medicines and how they may be harvested through cyclical foraging seasons or seasonal rounds (Appendix D).

One Bear, Many Names

Grizzly Bears (*Ursus arctos*) have many different names, in many different languages. Below are some of the different names in Indigenous languages from the North Cascades region, for what is known in English as a "grizzly bear" or "brown bear".

St'alhálam (St'át'imcets)
Skémis, stkwiḵwéy (Secwépemctsin)
Xeytl'áls (Halq'emeylem)
Te sexwsúxw (Nłeʔkepmxcin)
kiʔlawnaʔ (N̓syilxčn̓)

PHOTO CREDIT: UBC STUDIO

Two-Eyed Seeing refers to learning to see from one eye with the strengths of indigenous ways of knowing and Indigenous Knowledge and from the other with the strengths of Western settler knowledge and ways of knowing, thus learning to use both eyes together for the benefit of all (**Bartlett, Marshall, & Marshall, 2012**). This Strategy is written through that lens to the best of our ability.

Indigenous peoples hold inextinguishable responsibilities to their land and resources within their homelands.

Indigenous knowledge systems are living knowledge systems grounded in rights and responsibilities for all life forms. It utilizes adaptive and collaborative processes essential for success in contemporary resource management and decision-making processes. Lessons learned from previous recovery efforts for grizzly bears in the North Cascades demonstrate the clear need for inclusive, local and place-based approaches (Austin 2004).

Therefore, the perspectives, Knowledge and cultural approaches held by the Joint Nations are foundational to the recovery process and will be integrated into management decisions and actions through a Two-Eyed Seeing approach, ensuring the successful recovery and long-term tewardship of the North Cascades grizzly bear. Two-Eyed Seeing (Etuaptmumk) is a guiding principle developed by Mi'kmaq Elder Albert Marshall of the Mi'kmaw Nation of Cape Breton Island (Unama'ki), Nova Scotia.

PHOTO CREDIT: MACKENZIE CLARKE

Indigenous peoples have taken care of their homelands through applying their principles, laws, language, protocols, and intergenerational planning strategies. That has led to thousands of years of resilience, harmony, and adaptation within their Territories. The Strategy attempts to hold up the shared responsibilities and relationships maintained by the the Syilx, Stó:lō , Nlaka'pamux, St'at'imc, and Secwépemc Peoples with grizzly bears and the land supporting them.

Recovery efforts will use mutually acceptable approaches towards sharing knowledge collectively to advance long-term protection and stewardship of populations and habitat within the North Cascades.

Incorporation of non-indigenous knowledge of the N.C. GBPU including support in restoration and enhancement activities will be paramount for success. Thoughtful and robust community engagement along with community advisory committee development will ensure the recovery of grizzly bears is inclusive to all who live, work and play in the North Cascades.

North Cascades Grizzly Bear Population Unit/Ecosystem

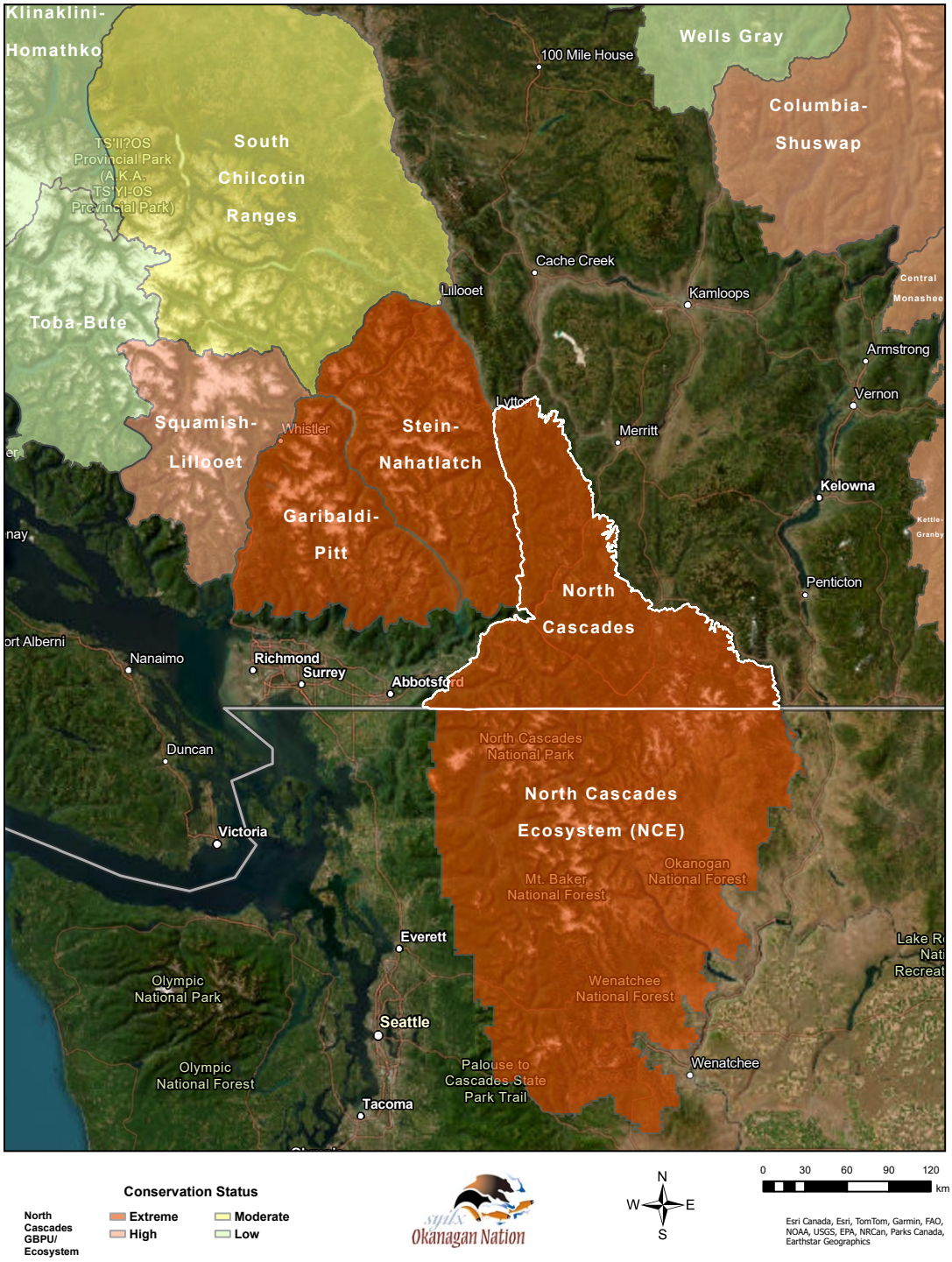

FIGURE 1. GRIZZLY BEAR POPULATION IN SOUTHWEST BC

FIGURE 2. MAP OF THE NORTH CASCADES GBPU

Grizzly Bears in the North Cascades Grizzly Bear Population Unit

The North Cascades Grizzly Bear Population Unit (N.C. GBPU) is located in southwest B.C., crossing into northern Washington State and shares the unceded territories of the Syilx Okanagan Nation, Stó:lo Nation, and Nlaka'pamux Nation (Figure 2). The North Cascades ecosystem is characterized by rugged terrain with mountains spanning both sides of the Canada-US border. It was once home to a healthy transboundary population of grizzly bears. Within British Columbia, the North Cascades GBPU boundaries extend from the Canada-U.S. border north to and including the Thompson and Nicola River watersheds, covering an area of 9,807 km2 (Figure 1). The GBPU contains 11 Provincial Parks, 4 Recreation Areas and 9 Ecological Reserves totaling 1 716 km2 (17.5% of the GBPU) as seen in Figure 3.

FIGURE 3. NORTH CASCADES GRIZZLY BEAR POPULATION UNIT (NC GBPU)

The North Cascades GBPU is one of the most imperiled grizzly bear populations in British Columbia. The IUCN has classified these populations as “Critically Endangered”, due to their demographic and genetic isolation. (IUCN 2016). Grizzly bears are extirpated adjacent to most of the North Cascades unit. A small adjacent area to the northwest is occupied by grizzly bears but is isolated by the Fraser River in the Fraser River canyon which is a particularly dangerous place to cross the river by swimming, even for grizzly bears. As there is no near-term potential for recovery through dispersal from neighboring populations, grizzly bear populations in the North Cascades are considered functionally extirpated on both sides of the Canada-US border (Morgan et al. 2019).

Primary factors believed to have caused the decline of the North Cascades grizzly bear population began in the mid-19th century when high numbers of grizzly bears were commercially trapped and destroyed through direct persecution and fear of potential conflicts (Rine et al. 2018). Syilx Knowledge Keepers confirm that settlers historically hunted grizzly bears at unsustainable levels to reduce population numbers and exploit the animals for the commercial market. It is unlikely that the population will recover naturally due to their genetic and geographic isolation and the imperiled state of the nearest neighboring populations.

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To build true and lasting reconciliation with Indigenous Peoples, new and dynamic ways of stewarding grizzly bears and their habitat must be inclusive and adaptive.

Province of British Columbia Grizzly Bear Management

B.C. has a longstanding commitment to managing grizzly bears (MOE 1996, North Cascades Grizzly Bear Recovery Team 2004). On October 24, 2017, the Office of the Auditor General conducted "An Independent Audit of Grizzly Bear Management" for B.C. This comprehensive review contained ten recommendations to improve the management of this species, which the provincial government accepted. From this, an action plan was created. The action plan focused 5 key areas;

1. Populations that are at risk of extirpation without human intervention,
2. Implementing direct management actions to improve population sustainability,
3. Determining the level of social support for management options to reduce threats (i.e., human-bear conflict),
4. Promoting recovery (i.e., re-introduction of grizzly bears into formerly occupied areas), and
5. Establishing population objectives for Grizzly Bear Population Units with priority focus on those at greatest conservation risk. The NC Stewardship Strategy aims to fulfill these government stewardship actions utilizing available legislation, policy, and Indigenous and local community support (Table 1)

Cumulative effects (C.E.) assessments for grizzly bears have been completed for the North Cascades GBPU (Ministry of Environment and Climate Change Strategy and Ministry of Forests, Lands, Natural Resource Operations and Rural Development 2020). These assessments evaluate the current state of and risks to grizzly bears and their habitats on a coarse landscape level across the province of B.C. The B.C. Cumulative Effects Framework's Grizzly Bear protocol

FIGURE 4. GRIZZLY BEAR POPULATION THREATS IN THE NORTH CASCADES GRIZZLY BEAR POPULATION UNIT

is based on a Western scientific understanding of grizzly bear ecology and uses several indicators to estimate the risk to grizzly bears (e.g., road density and available core secure habitat). The protocol is intended to provide a clear link to management action. The North Cascades GBPU is considered the highest possible conservation risk ("Extreme"), and six out of nine of the remaining indicators are consistently flagged across this GBPU: road density, core secure habitat, front country use, hunter density, quality food and habitat protection.

Grizzly Bears in the US-North Cascades Ecosystem

Grizzly bears do not recognize administrative or political boundaries. Effective population stewardship of wildlife requires cooperative efforts and inter-jurisdictional strategies in a transboundary ecosystem like the North Cascades. U.S. federal agencies developed an **Environmental Impact Statement** March 21, 2024 (EIS) outlining several options for grizzly bear population restoration in 2017 as a requirement under the United States Endangered Species Act. The National Park Service and U.S. Fish & Wildlife Service have announced the **Decision to Actively Restore Grizzly Bear to the North Cascades Ecosystem**. The two agencies have signed a **Record of Decision** (April 25, 2024) selecting an alternative involving the active restoration of grizzly bears to the ecosystem under a 10(j) nonessential experimental population designation.

While recovery processes in the two countries are being conducted independently, the Joint Nations Grizzly Bear Initiative team supports the work of the U.S. Fish and Wildlife Service, National Parks Service and the **IGBC Subcommittee** and is committed to taking cooperative approaches towards meeting shared stewardship objectives. Implementation Plans and communication strategies are now being drafted by both agencies.

LEGISLATIVE FRAMEWORK OF NOTE	TOOLS
Forest and Range Practices Act (FRPA), Forest Recreation Regulation (FRR)	Government Action Regulation (GAR), resource road development, stocking standards, Forest Landscape Plans (FLP), recreation sites and trails management.
Oil and Gas Activities Act	BC regulator may put permit conditions on authorizations that help oil and gas operators meet 'governments environmental objectives' within established wildlife habitat areas.
B.C. Wildlife Act	Grizzly bear management.
Land Act	Crown land management.
Park Act, Park, Conservancy and Recreation Area Regulation	Park area management.
Environmental Assessment Act, Protected Area Management Plans	Environmental assessments within NC GBPU.
Environment and Land Use Act	Environment and Land Use Act empowers a Land Use Committee of Cabinet
Interim Cumulative Effects Policy	Evaluate the current state and risks for grizzly bears.
Environmental Mitigation Policy	Support authorization processes to consider environmental values and how they will mitigate environmental impacts.
Identified Wildlife Management Strategies	Identifies Regionally Important Wildlife, which include species that are considered important to a region of British Columbia, and rely on habitats that are not otherwise protected under the FRPA, and may be adversely impacted by forest or range practices.
Together for Wildlife Strategy	Improve wildlife and habitat stewardship through additional funding, proactive objectives and improved data and knowledge.

TABLE 1: AVAILABLE LEGISLATION, POLICY, AND INDIGENOUS AND LOCAL COMMUNITY SUPPORT

STEWARDSHIP STRATEGY

What is a Stewardship Strategy?

Stewardship recognizes our collective responsibility to restore and retain the quality and abundance of our land, air, water, and biodiversity and to manage it in a way that conserves the environmental, economic, social, and cultural values. This Strategy is a toolbox for all partners involved to advance grizzly bear security on the landscape in perpetuity.

VISION

A framework through which grizzly bears can be restored to the North Cascades landscape, and stewarded for the generations to come, through partnership and collaboration.

PRINCIPLES

COEXISTENCE

Grizzly bears have lived in this region and safely coexisted with Indigenous peoples for many generations and are a necessary part of the land, they have an inherent right to persist and thrive on the landscape and have an intrinsic value to all people.

INTER CONNECTEDNESS

Grizzly bear recovery and stewardship must be informed by the diverse and distinct Indigenous cultural values and local community knowledge. Relationships between people and grizzly bears and respect Indigenous rights and traditional laws and advance reconciliation principles, as outlined in B.C.'s DRIPA Action Plan.

INDIGENOUS KNOWLEDGE

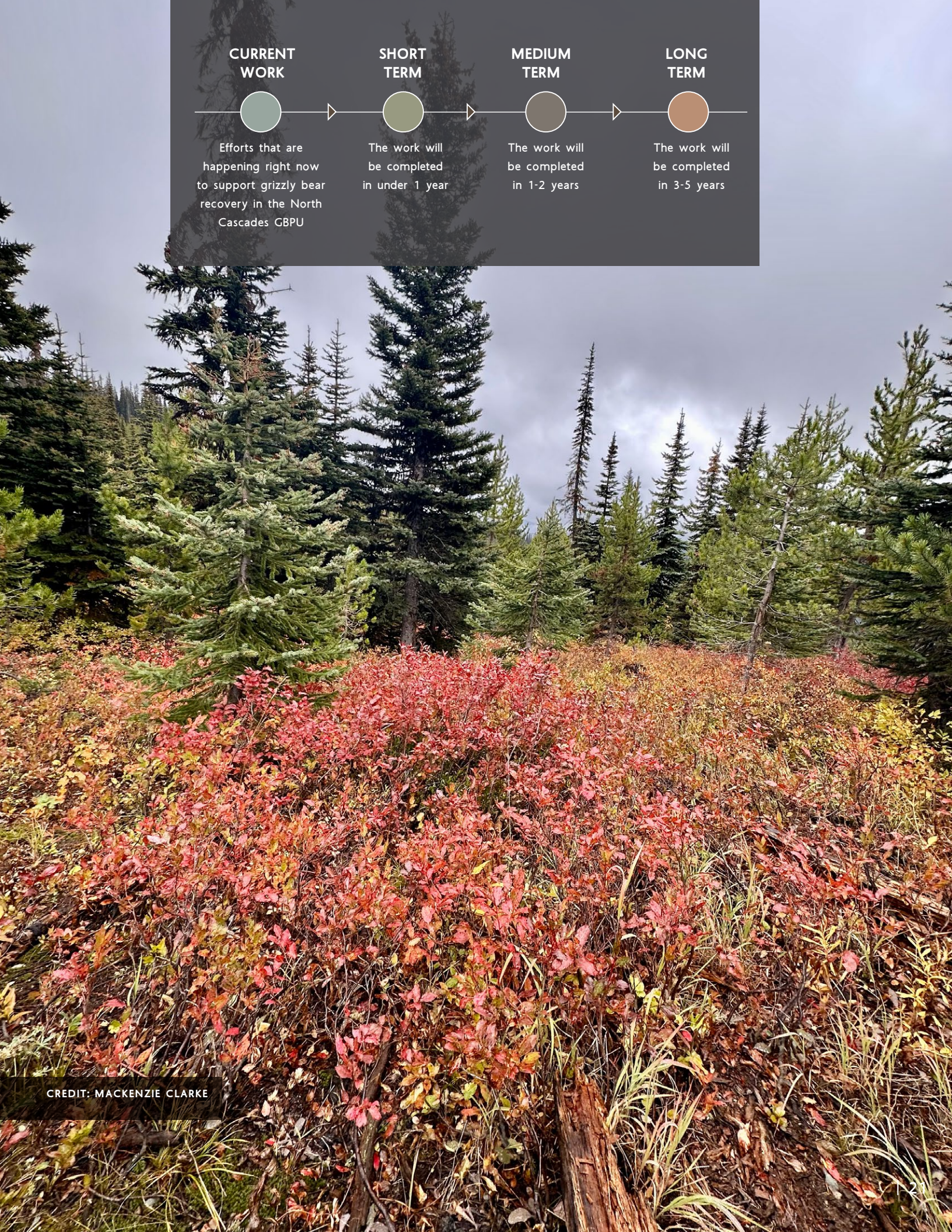
Grizzly bear recovery and stewardship should respect the varied uses of grizzly bears by Indigenous Peoples, including cultural uses, viewing, hunting and ecological functions and primarily requires addressing or modifying human behaviors and actions toward bears and their habitat, recognizing that all living things are interconnected.

TWO-EYED SEEING & COLLABORATION

Grizzly bear recovery and stewardship requires all governments, relevant boards and councils, industry, organizations, communities, and individuals to work together and must be informed by and based on multiple sources of Knowledge.

ADAPTIVE

Grizzly bear recovery and stewardship actions need to be adaptive to new information and innovations and require careful consideration for effects climate change has on habitat and resources for bears.



CURRENT WORK

Efforts that are happening right now to support grizzly bear recovery in the North Cascades GBPU

SHORT TERM

The work will be completed in under 1 year

MEDIUM TERM

The work will be completed in 1-2 years

LONG TERM

The work will be completed in 3-5 years

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Why Develop a Stewardship Strategy for Grizzly Bears in the North Cascades?

Grizzly bears provide many benefits, including increasing ecosystem integrity through nutrient and seed transfer, high conservation value as an "umbrella species", human health and well-being benefits, and deep cultural connections and identity. These positive effects and benefits demonstrate the high cultural, ecological, and societal value placed on grizzly bears, suggesting that conserving and coexisting with grizzly bears is of high priority to people.

Indigenous cultures within the North Cascades GBPU and transboundary communities are diverse, and their relationships with grizzly bears reflect such diversity. To build true and lasting reconciliation with Indigenous Peoples, new and dynamic ways of stewarding grizzly bears and their habitat must be inclusive and adaptive. British Columbia is committed to the Principles of the United Nations Declaration on the Rights of Indigenous Peoples, reflected in the unanimous passing of the 2019 Declaration on the Rights of Indigenous People's Act (DRIPA), and consequently, B.C.'s DRIPA Action Plan 2022-27. The North Cascades Grizzly Bear Stewardship Strategy can help B.C. meet its commitments under all four themes of the DRIPA Action Plan (Figure 5).

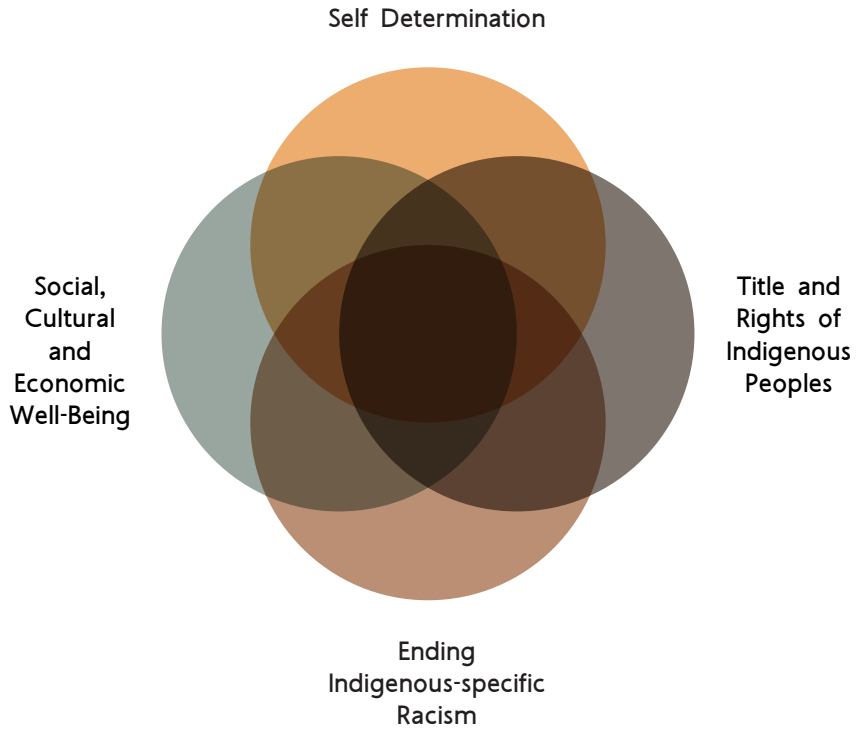

FIGURE 5. THE THEMES OF THE DRIPA ACTION PLAN

STEWARDSHIP GOALS AND PRIORITY ACTIONS

The North Cascades Grizzly Bear Stewardship Strategy is an adaptive framework composed of six overlapping goals for achieving recovery and long-term stewardship of grizzly bears in the North Cascades (Figure 6):

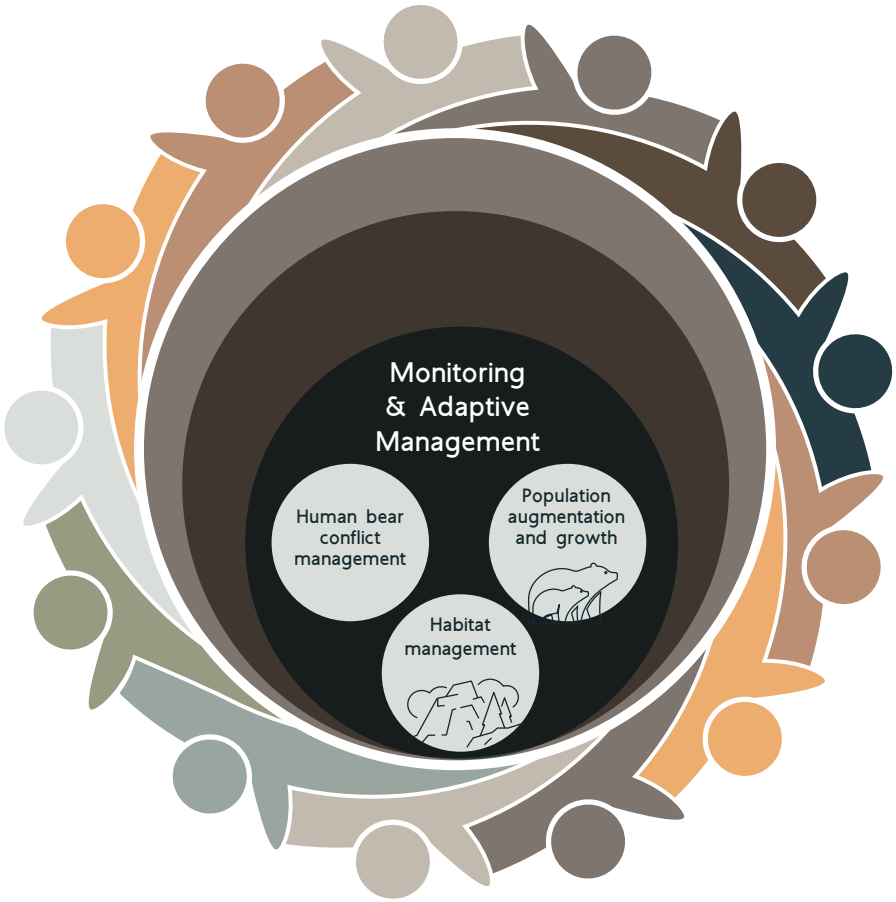

FIGURE 6. SPHERES OF RECOVERY ACTIONS AND STEWARDSHIP COMMITMENTS

OVERARCHING GOAL: SHARED STEWARDSHIP

Shared stewardship is what the Joint Nations Grizzly Bear Initiative Team strives for in the work it does to recover grizzly bears in the North Cascades. Shared stewardship is a crucial approach to restoring grizzly bear populations that recognizes the interconnectedness of ecosystems, communities, and economies. It emphasizes collaborative decision-making and action among diverse stakeholders, including governments, Indigenous nations, local communities, and other partners.

Advance Communication, Shared Understanding and Engagement on Human-Bear Coexistence

- Develop a communications, shared understanding and engagement strategy that includes diverse and timely avenues for delivering educational information, regular communication and opportunities for receiving input on successive phases of restoration and the coexistence of humans and grizzly bears within the North Cascades.
- To grow local support for grizzly bear population recovery, provide avenues and opportunities for two-way information flow with indigenous communities and stakeholders on grizzly bears' cultural and ecological significance.

Stewardship Objective 1: Local Engagement

Develop programs and initiatives that support the three goals of Grizzly Bear Coexistence –

- Shared Understanding,
- Supporting Programs and Infrastructure, Enforcement and
- Relationship Building

Stewardship Objective 2: Engaging Our Neighbours

Maintain ongoing communications and work cooperatively with partnering Nations, government agencies and organizations working toward grizzly bear recovery within neighbouring Stein-Nahatlatch GBPU and U.S. North Cascades Ecosystem to provide mutual support for transboundary grizzly bear enhancement efforts within the entire North Cascades ecosystem.

GOAL 1 : PRIORITY ACTIONS

CURRENT WORK	SHORT TERM	MEDIUM TERM	LONG TERM
The NC Stewardship Team has endorsed a communication and engagement strategy.	The NC Team will work with appropriate agencies and Indigenous communities to design restoration actions derived from integrated and evidence based, Indigenous Knowledge systems and updated scientific information.	The NC Team will identify and address community and stakeholder questions and concerns through a comprehensive engagement process as laid out in our communications and engagement plan.	Continue to implement communication and engagement plan.
Engagement and information sharing with Indigenous communities.	The NC Team will develop shared understanding materials and, project messaging, coordinating with appropriate agencies to disperse information through comprehensive public and stakeholder engagement initiatives.		
The NC Team participates in meetings with the Southwest B.C. Grizzly Bear Stewardship Steering Committee. Additionally, Indigenous partners participate in the Indigenous Grizzly Bear Working Group	The NC Team members will continue to collaborate with US agencies on transboundary recovery and restoration efforts.		

Habitat Restoration and Stewardship

Stewardship Objective 3: Habitat

Assess the quality and security of existing areas with high-quality foraging habitats and, if necessary, enhance habitat quality in key secure areas. Work toward developing secure habitat connectivity to ensure sufficient quantity and quality habitats are available to support population growth and avoid fragmentation among habitat areas.

Improve Human-Bear Coexistence and Proactively Manage Human-Bear Conflict Risks Conflicts Throughout The GBPU

Stewardship Objective 4

Foster a culture of human-bear coexistence.

Stewardship Objective 5

Minimize human-caused mortality risks to grizzly bears.

GOAL 3 : PRIORITY ACTIONS

CURRENT WORK

- Completion of Bear Hazard Assessments for Provincial Parks within the North Cascades.
- Develop educational information and resources to help empower people who live, work and recreate within bear country.
- Work with partner organizations to proactively manage human-bear conflict risks for communities adjacent or within the North Cascades GBPU.

SHORT TERM

- Assess existing bear hazard assessments within recreational, residential, and industrial land use settings and implement mitigations and recommendations.
- Assess security in high quality habitat to inform where management and habitat restoration efforts could best benefit grizzly bears.
- In Parks and Recreational Areas, conduct front-country and back-country outreach with Park users.

MEDIUM TERM

- Work with Parks, provincial agencies, residents and stakeholders to provide front-country and back-country outreach support and help empower people to manage attractants and reduce negative encounters.

LONG TERM

- Employ compliance and enforcement of proper bear hazard management in provincial Parks.
- Increase enforcement needs in areas outside of Parks.

Advance Population Recovery Through Augmentation, Ongoing Management and Restored Connectivity

Stewardship Objective 6:

Augmentation

Increase the number of grizzly bears by introducing a founder population, where mortality risks to bears have been minimized in the NC GBPU.

Stewardship Objective 7:

Connectivity

Restore inter-population connectivity for long-term species persistence and stability to prevent population fragmentation and maintain genetic diversity in the future.

GOAL 4 : PRIORITY ACTIONS

CURRENT WORK

- NC Grizzly Bear Translocation Team is forming, to be tasked with drafting a plan.
- Identify and assess candidate release sites for translocated bears.
- Donor grizzly bear populations are being discussed with partner Nations.

SHORT TERM

- Complete an Indigenous-led Translocation Strategy which includes a Translocation Plan, and Grizzly Bear Population Monitoring Plan (Appendix I).

MEDIUM TERM

- Translocate founder population of grizzly bears into the North Cascades.
- Monitor movements, habitat use, foraging behaviors and reproductive success of translocated bears. Share findings with Indigenous, BC Government, and interagency wildlife managers and make any necessary adaptations to augmentation planning.

LONG TERM

- Continue with bear translocation program as informed by telemetry data, field assessments, and integrative knowledge systems to inform release site locations.
- Commence long-term monitoring activities, as per the N.C. Grizzly Bear Population Monitoring Plan.

Monitoring Programs Inform Decisions Through an Adaptive Management Process

Stewardship Objective 8

Monitoring Grizzly Bears

Monitor grizzly bears and population demographics to assess the efficacy of population recovery efforts.

Stewardship Objective 9

Monitoring Habitat

Monitor effectiveness of habitat restoration and improvements to habitat connectivity and forage supply.

Stewardship Objective 10: Monitoring Coexistence

Monitor the success of human-bear coexistence efforts, including public engagement.

GOAL 5 : PRIORITY ACTIONS

CURRENT WORK	SHORT TERM	MEDIUM TERM	LONG TERM
Information sharing sessions with Indigenous communities to gather initial perspectives and values towards population recovery approaches.	Collaborate with Indigenous communities on developing a long-term monitoring strategy to assess effectiveness of habitat restoration activities and changes to forage supply. The strategy will include considerations for climate-driven impacts to bear habitat.	Develop human-bear coexistence monitoring), which includes performance indicators and thresholds to help understand how to best support human-bear coexistence.	Develop long term DNA-based population monitoring program. to track demographic dynamics and trends. Coordinate information sharing with management teams in neighboring grizzly bear populations.
In partnership with Indigenous Knowledge Keepers and scientists, develop telemetry monitoring program, as part of the translocation strategy, to ensure vital information are recorded and used for subsequent initiatives.	Implement public engagement and information sharing programs, to receive input on public's values and perspectives on recovery efforts.	In partnership with local communities, establish long-term vegetation monitoring for forage availability.	
Preliminary public engagement conducted with recreationists in B.C. Parks through surveys developed to gather information on perspectives and values towards population recovery.			

STEWARDSHIP STRATEGY REVIEW

Implementation, Action Tracking and Review

The evaluation of progress on the specific actions outlined in this Strategy will consist of two levels of review:

1. **Implementation action tracking and review.**
Yearly tracking of progress on implementation actions will be maintained throughout the life of this Strategy. A full implementation report will be completed every two years. Progress on specific action plans and strategies will be assessed based on performance indicators and measures identified by the Stewardship Team.

2. **Strategy Review.**
A complete strategy review should be conducted within ten years unless otherwise agreed to by all management partners. This review will evaluate the progress toward achieving the vision and provide an opportunity to ensure that this Strategy's long-term direction is still relevant and consistent with the overall wildlife management direction in the North Cascades Grizzly Bear Population Unit..

Roles and Responsibilities

The Joint Nations Grizzly Bear Initiative Team will be responsible for tracking progress on action items. Information will be requested from other management partners, as required. The JNGBI Team will review and develop the two-year implementation report. The full strategy review will be completed by the Okanagan Nation Alliance and B.C. Government., including the Steering Committee and other management partners.

Next Steps

The implementation of the Stewardship Strategies Goals is underway. A Communication and Engagement Strategy has been drafted and is now being implemented to advance human-bear coexistence. Priority areas for habitat restoration and stewardship have been identified and plans are underway on how to best restore these areas for grizzly bears. An augmentation/ implementation plan is currently being drafted and will be reviewed by the JNGBI team. This progress is a testament to our collective efforts and should motivate us to continue prioritizing habitat areas for biodiversity pathways.

A Living Process

The framework proposed in the Strategy is meant to guide the process and future work in the recovery initiative in ways consistent with Indigenous laws, culture and traditions, and apply the best available science.

The framework utilizes an adaptive management approach towards stewardship actions to learn how to respond to changes and unanticipated effects over time, ensuring the best chances for long-term success.

As such, this Stewardship Strategy document is a living document that will be reviewed and updated regularly and made available to all those with a vested interest in resource and land stewardship within the North Cascades GBPU.

CREDIT: MACKENZIE CLARKE

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APPENDICES

Appendix A. 2018 Joint Nation Grizzly Bear Resolution

Appendix B. Traditional Stories About Grizzly Bear

Appendix C. Okanagan Nation Alliance Tribal Council Resolution (2014)

Appendix D. Bear Plant Foods in the North Cascades

Appendix E. Grizzly Bear Habitat Monitoring Strategy including Grizzly Bear Habitat Restoration Strategy *(In Progess)*

Appendix F. Coexistence Initiatives Plan *(In Progess)*

Appendix G. Grizzly Bear Monitoring Plan including Population Monitoring Strategy *(In Progess)*

Appendix H. Grizzly Bear Translocation Plan including Augmentation Strategy *(In Progess)*

Appendix I. Implementation Plan *(In Progess)*

Appendix J. Communication and Engagement Plan including Socio-Economic Analysis *(In Progess)*

Appendix K. Grizzly Bear Habitat Prioritization Tool

PHOTO CREDIT: MACKENZIE CLARKE

APPENDIX A

2018 Joint Nation Grizzly Bear Resolution

OKANAGAN NATION ALLIANCE

101 - 3535 Old Okanagan Hwy, Westbank, BC V4T 3L7
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TRIBAL COUNCIL RESOLUTION **2018/19 No. 367**
Governance

NATION SUPPORT FOR JOINT *ki?lawna?* RECOVERY INITIATIVE: A MULTI-NATION APPROACH FOR GRIZZLY BEAR RECOVERY EFFORTS

February 21, 2018

WHEREAS: Grizzly Bears or *ki?lawna?*[1] have been an integral part of our Nation's customs and traditions, including cultural heritage, traditional knowledge, traditional cultural expressions, since time immemorial and as such, our Nation continues its stewardship responsibilities for *ki?lawna?* in accordance with our indigenous laws; and

WHEREAS: The continued presence of *ki?lawna?* is an indicator of the health and well-being of both our peoples, our lands and our resources; and

WHEREAS: The participating Nations and organizations have formed a multi-Nation approach to advocate for the immediate protection and restoration of *ki?lawna?* within the territories of all participating Nations; and

WHEREAS: The participating Nations have traditional knowledge, including Traditional Ecological Knowledge (TEK) and supporting Science to take immediate steps required to recover Grizzly Bears in threatened populations, including the North Cascades Region and the Stein Nahatlach; and

WHEREAS: Both federal and provincial governments have committed to the full implementation of the *United Nations Declaration on the Rights of Indigenous Peoples* (UNDRIP). In accordance with the principles outlined in the UNDRIP, the participating Nations underscore the importance of the following Articles in relation to these collective efforts:

> 18. Indigenous peoples have the right to participate in decision-making in matters which would affect their rights, through representatives chosen by themselves, in accordance with their own procedures, as well as to maintain and develop their own indigenous decision-making.

[1] Enter appropriate word for Grizzly Bear in respective Nation's language.

24.(1) Indigenous peoples have the right to their traditional medicines and to maintain their health practices, including the conservation of their vital medicinal plants, animals and minerals. Indigenous individuals also have the right to access, without any discrimination, to all social and health services.

31.(1) Indigenous peoples have the right to maintain, control, protect, and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games, and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.

(2) In conjunction with indigenous peoples, States shall take effective measures to recognize and protect the exercise of these rights.

WHEREAS: In 2017, the Auditor-General's report entitled, "An Independent Audit of Grizzly Bear Management" (A-G Report), focused on the Ministry of Environment and the Ministry of Forests, Lands and Natural Resource Operations and their roles in meeting government's objective of ensuring healthy grizzly bear populations throughout BC. It also focused on government's planning, activities and reporting as to the effectiveness of grizzly bear management. Ten (10) recommendations are outlined in the A-G's Report and those recommendations are supported by the participating Nations; and

WHEREAS: The A-G's Report emphasizes the need to account for, mitigate and cap the cumulative effects on Grizzly Bear habitat and habitats of other wildlife is acknowledged and the participating Nations have advocated for the protection of these habitats at every level of engagement with the provincial government. Further, the A-G's Report outlines the tools required to carry the long-term recovery objectives for Grizzly Bear and threatened Grizzly Bear populations; and

WHEREAS: The participating Nations recognize the urgent need for a collaborative and multi-Nation approach for Grizzly Bear recovery efforts and the need to work with the provincial government to ensure that provincial commitments to recover threatened Grizzly Bear populations are upheld; and

WHEREAS: The participating Nations recognize the importance to recover the most threatened Grizzly Bear populations within the territories of all participating Nations, including the North Cascades region and the Stein/Nahatlach Grizzly Bear Population Units (GBPUs) and that immediate steps to stabilize and restore Grizzly Bear populations within those GBPUs is urgently needed; and

THEREFORE, BE IT RESOLVED THAT: The participating Nations support the multi-Nation approach to Grizzly Bear Recovery Efforts and will both on an individual and a collective basis, advocate for the appropriate resourcing necessary to undertake the multi-Nation approach; and

FURTHER, BE IT RESOLVED THAT: The leadership of each participating Nation will support and direct staff to undertake the work necessary for the immediate recovery and protection measures necessary for threatened Grizzly Bear populations. This work includes collaborative work with the Province of British Columbia; and

FINALLY, BE IT RESOLVED THAT: The leadership of each participating Nation will both on an individual and a collective basis, advocate for the immediate recovery and protection of Grizzly Bears at every level of engagement with the provincial government.

kiʔlawʔna Chief Clarence Louie
Osoyoos Indian Band

kalʔlupaqn Chief Keith Crow
Lower Similkameen Indian Band

Chief Harvey McLeod
Upper Nicola Band

Chief Byron Louis
Okanagan Indian Band

nkʔɬxʷʔcon Chief Chad Eneas
Penticton Indian Band

xʷnámxʷ nam Chief Roxanne Lindley
Westbank First Nation

Chief Rick Holmes
Upper Similkameen Indian Band

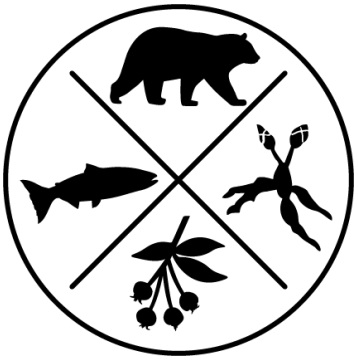
Chairman Mike Marchand
Colville Confederated Tribes

Quorum 4

APPENDIX B

Traditional Stories About Grizzly Bear

Appendix B. The Four Food Chiefs



The laws of our syilx Okanagan Territory are defined by the *captikʷɬ* of the Four Food Chiefs to be continuously enacted in perpetuity. The *captikʷɬ* tells how the differing perspectives of the four chiefs were brought together to inform discussions, problem solving, decision making, and action planning. This *captikʷɬ* illustrates the *nʕawqnwixʷ,* which is a cultural practice that is used to include all views and perspectives in the discussions that lead to resolving conflicts, making decisions, and developing plans for taking action.

In the *captikʷɬ* "How Food was Given", *kʷuləncutn* visited the *tmixʷ*. *kʷuləncutn* sent *sənk'lip* (Coyote) to prepare for the future of the *st'lsqilxʷ* (people-to-be). *kʷuləncutn* told the *tmixʷ* that people were coming. The Four Food Chiefs: *skmxist* (Black Bear), *siya* (Saskatoon Berry), *spiƛ̓əm* (Bitter Root), *ntityix* (King Salmon) then brought all of their voices together to make a plan for how to feed *st'lsqilxʷ*. Each of the Food Chiefs represents different perspectives and all must be included when making decisions.

Chief skmxist (Black Bear) represents the traditions, laws and cultural practices related to all life forms and our responsibility as *sqilxʷ*. Chief *skmxist* is related to ceremony, our Elders, upholding traditions and laws, and the concept of reflection and contemplation through ceremonies on "what is" as informed by an understanding of the past and how that is connected to the future.

Chief ntityix (King Salmon) represents the *siwɬkʷ* and all *tmixʷ*, the traditions and cultural practices related to all life forms and our responsibility as *sqilxʷ*. Chief *ntityix* is related to the duty to carry out actions, to protect, provide and preserve. This Chief exemplifies the process of preparing or readiness, determining the objective, and then taking action. Traits of this Chief are perseverance, logic, finding the tools needed to overcome obstacles, linearity, and directionality.

Chief spiƛ̓əm (Bitter Root) represents relationships and the interconnectedness among *tmixʷ* including but not limited to the people, the animals, the plants, the land, the air, and the *siwɬkʷ*. Chief *spiƛ̓əm* is related to emotions, nurturing, and community building. *spiƛ̓əm's* roots create networks and reach out to gather the resources they need to create that flower on top.

Chief siya (Saskatoon Berry) embodies the spirit of creative energy, vision, and innovation that can be associated with youth or the future. Chief *siya* tells us about the youth, the children, the seeds of our future who—like a sweet Saskatoon berry—have to be protected and enclosed in sweetness, have to have a place to land, and have *siwɬkʷ* and sunshine to grow. With every seed there is potential for a forest, there is future and there is possibility, just as there is in every youth.

Stó:lō Quotes and story from the
North Cascades Grizzly Bear Traditional Knowledge Study: Final Report

A Stó:lō story about the relationship between people and bears:

It is a very cold winter and the community is very hungry and in need of food. Hunters are sent out to find game to bring back to the village. One hunter heads up the mountain, tracks and track and tracks and ends up coming back upon his own footsteps. He is lost and begins to panic. As he runs off in the direction in which he feels the village lies, he falls into a big hole in the ground to land with a "thud". His hands explore his surroundings, and he realizes that he is in a bears den, with a sleeping bear beside him. He panics and starts to rush from the den. But as he does, he hears the bear's voice talking to him in his own language "Don't go outside, it's very cold. Stay here where you'll be warm and safe. Besides, it is a long way from spring." The hunter lies down to rest. Soon, his stomach growls from hunger. The bear hearing this realizes that the man is hungry. "Here, breathe deeply." The bear cups his paws around the man's mouth and the man takes three deep breaths. He falls fast asleep. Bears sleep this way with their paws over their muzzles so they sleep deeply and aren't bothered by hunger. Eventually, spring comes and the man awakes to the smell of new life. He thanks the bear with all of his heart for saving his life. The man walks back down the mountain to the village. "We thought you perished over the winter," say the people in the village. The man recounts his tale and compels all of the people to no longer hunt bear because bear is a close friend of man.

Source for above quotes and story:

Audrey Roburn. *North Cascades Grizzly Bear Traditional Knowledge Study: Final Report*. Stó:lō Nation Aboriginal Rights and Title Department. Grizzly Bear Trust Fund. Report number: QL737R667, 2001

APPENDIX C

Okanagan Nation Alliance Tribal Council Resolution
(2014)

JOINT NATIONS
NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

OKANAGAN NATION ALLIANCE

101 - 3535 Old Okanagan Hwy, Westbank, BC V4T 3L7
Phone 250-707-0095 Toll Free 1-866-662-9609 Fax 250-707-0166 www.syilx.org

TRIBAL COUNCIL RESOLUTION **2014/15 No. 292**
Governance

Kiʔlawnaʔ Recovery & Coast to Cascades Grizzly Bear Initiative
November 28, 2014

WHEREAS: Kiʔlawnaʔ has been an integral and critical part of Syilx culture since time immemorial—its presence in Syilx Territory is an indicator of the health of Syilx land and people; and,

WHEREAS: At least three remnant trans-boundary grizzly bear populations within Syilx Territory need immediate action to assist them from disappearing due to low numbers and habitat isolation; and,

WHEREAS: The Natural Resources Council (NRC) has recommended that the Chiefs Executive Council (CEC) direct Okanagan Nation Alliance (ONA) staff to develop and undertake activities to assist Kiʔlawnaʔ recovery and protection.

WHEREAS: The NRC will provide guidance to ONA staff to ensure that our Kiʔlawnaʔ is protected and recovered in ways consistent with our culture, traditional knowledge, values, laws and customs; and,

WHEREAS: Supportive relationships with other Nations, governments and organizations are needed to ensure that Kiʔlawnaʔ will remain, occupy and thrive in its traditional areas for all time; and,

WHEREAS: Collaborative management processes will help demonstrate Syilx presence and responsibility for the land and resources, and provide capacity to help position the ONA and its member communities as leaders in wildlife conservation; and,

THEREFORE BE IT RESOLVED THAT:

1. The CEC declares that Kiʔlawnaʔ is at-risk and protected within Syilx Territory.
2. That Grizzly Bear Population Recovery and management is a Syilx priority to ensure that Kiʔlawnaʔ will remain, occupy and thrive in its traditional areas for all time.
3. That ONA staff, under NRC direction, will gather traditional knowledge and practices, and work to build the supportive relationships and projects needed to help Kiʔlawnaʔ survive and recover throughout Syilx Territory using best available information, practices and scientific knowledge balanced with our Traditional knowledge and protocols.

4. That the ONA supports the *Coast to Cascades Grizzly Bear Initiative* and will join with that group to further Ki?lawna? population recovery and habitat connectivity in southwest BC, Okanagan Territory; and

THEREFORE BE IT FURTHER RESOLVED THAT: The CEC encourages neighboring Nations and other First Nation organizations to join in the effort to sustain Ki?lawna? Grizzly Bear; and,

FINALLY BE IT FINALLY RESOLVED THAT: The CEC call upon the Province of British Columbia, the Government of Canada, the State of Washington, and the United States Government to act promptly and effectively to implement cooperative actions for protection of Grizzly Bear and recovery of threatened Grizzly Bear populations in southern British Columbia and the northern United States.

ki law na Chief Clarence Louie
Osoyoos Indian Band

simlo Chief Robert Louie
Westbank First Nation

Nq'as mulmul Chief Jonathan Kruger
Penticton Indian Band

kal'lupaqn Chief Keith Crow
Lower Similkameen Indian Band

Chief Harvey McLeod
Upper Nicola Indian Band

Chief Byron Louis
Okanagan Indian Band

Chief Charlotte Mitchell
Upper Similkameen Indian Band

Chairman Jim Boyd
Colville Confederated Tribes

Quorum 4

APPENDIX D

Bear Plant Foods in the North Cascades

Potential grizzly bear foods in the North Cascades GBPU, B.C.							
				Season of Use			
Scientific Name	Common Name	nsyilxcən	Halq'eméylem	Spring	Summer	Fall	Portion Eaten
PLANT							
Vegetative Parts (leaf buds, seeds, leaves, stems, flowers, catkins)							
Angelica spp.	angelica			**major**	**major**		stems, leaves
Cyperaceae	sedges						
Carex spp.	sedges		só:xwel	**major**	**major**		stems, leaves
Juncus spp.	rush			minor	minor		stems, leaves
Cirsium spp.	thistle		ts'eqw'ts'éqw'	minor	minor		flowers
Equisetum arvense	common horsetail		xémxem	**major**	**major**	minor	stems, leaves
Equisetum spp.	horsetail			**major**	**major**	minor	stems, leaves
Heracleum maximum/ lanatu	cow-parsnip	xʷəxʷtiɬp	Yóle	**major**	**major**	**major**	stems, leaves
Lomatium spp.	desert-parsley	qʷəxʷqʷaxʷ	q'exmí:l	minor	minor		bulbs
Poaceae	grasses	sqʷʕayálaʔxʷ	táqalh (brome grass). Só:xwel refers to Graminaea famil	**major**	**major**		stems, leaves
Sambucus racemosa	red elderberry	ʾckʷəkʷiɬp	th'íweq'elhp	minor	minor		berries
Taraxacum spp.	dandelion		qwáyúwél	**major**	**major**	minor	stems, leaves, flowers
Trifolium spp.	clover		lhő:me	**major**	**major**	minor	stems, leaves, flowers
ROOTS, CORMS, BULBS							
Claytonia lanceolata	western springbeauty			**major**	**major**		roots or corms
Erythronium grandiflorum	yellow glacier lily		xwoqw'o:ls or sk'ámeth	**major**	**major**		roots or corms
Hedysarum alpinum	alpine hedysarum			minor	minor	minor	roots
Hedysarum sulphurescens	yellow sweetvetch or white sweetvetch			**Major**			
Lomatium spp.	desert-parsley	qʷəxʷqʷaxʷ	q'exmí:l	**major**	**major**		roots
Osmorhiza spp.	sweet-cicely		táqalh	minor	**major**	**major**	roots
Spring = (April, May); Summer = (June, July, August); Fall = (September, October).							

Potential grizzly bear foods in the North Cascades GBPU, B.C.							
				Season of Use			
Scientific Name	Common Name	nsyilxcən	Halq'eméylem	Spring	Summer	Fall	Portion Eaten
FRUIT							
Amelanchier alnifolia	saskatoon	siya?	ts'esláts (fresh berry). Ts'eslátselhp (the whole bush). sk'ak'áxwe (dried berries)		**major**	**major**	fruit
Arctostaphylos uva-ursi	kinnikinnick	skʷlsiɬmlʼx (bush) skʷlis (berry)	tl'íkw'iyelhp (the whole plant) tl'íkw'el (berry, pea, bean of these plants)	**major**		**major**	fruit
Empetrum nigrum	crowberry			**major**		**major**	fruit
Oplopanax horridus	devil's club	xaxagáy̓lhp	Qwó:pelhp		**major**	**major**	fruit
Pinus albicaulis	whitebark pine		qw'eyíléxelhp			possible	nuts
Prunus spp.	cherry				possible	possible	fruit
Prunu virginiana	Pin Cherry		télómelhp				
Prunuspensylvanica	Choke Cherry	ɬuxʷɬuxʷiɬp	ɬəx̌ʷɬax̌ʷ				
Rubus idaeus	red raspberry	ɬʕála?	s'ó:ytheqw (the berry) and s'ó:ytheqwelhp or 'ó:ytheqwelhp (the whole plant)	minor	**major**	minor	fruit
Rubus leucodermis	black raspberry	mcakʷ	Tselqó:má:lhp - "black cap plant" or tselqó:mé		minor	minor	fruit
Rubus spectabilis	salmonberry		Elílá:lhp or elílà:lhp (the whole plant). Elíle (the berry)		**major**		fruit
Sambucus racemosa	red elderberry	ʾckʷəkʷiɬp ʾckʷikʷ (berry)	Sth'íweq'elhp		**major**	**major**	fruit
Sambucus cerulea	blue elderberry	cəʾckʷiɬməlx ʾckʷikʷ (berry)	th'í:kwekw (the berry) and th'í:kwekwelhp (whole tree/bush)				
Shepherdia canadensis	soopolallie, soapberry	sx̌ʷusəm	sxwṓsem		**major**	**major**	fruit
Sorbus scopulina	western mountain-ash		qẃiqwelh		minor	minor	fruit
Sorbus sitchensis	Sitka mountain-ash		ts'qw'élhp		minor	minor	fruit
Vaccinium alaskaense	Alaskan blueberry		Léth'ílets		**major**	**major**	fruit
Vaccinium caespitosum	dwarf blueberry		sxw'éxixeq		**major**	**major**	fruit
Vaccinium membranaceum	black huckleberry	sʔtxałq	kwxwo:mels		**major**	**major**	fruit
Vaccinium ovalifolium	oval-leaved blueberry	sɬəɬaq	sɬəɬaq		**major**	**major**	fruit
Vaccinium deliciosum	Cascade Blueberry		xwikw'				
Vaccinium parvifolium	red huckleberry		sqá:la, sqá:le		minor	minor	fruit
Vaccinium scoparium	grouseberry				minor	minor	fruit
Vaccinium spp.	blueberry, huckleberry		kwoxw		**major**	**major**	fruit
Vaccinium uliginosum	bog blueberry		mólsem or mó:lsem		minor	minor	fruit
Viburnum edule	highbush-cranberry		kwúkwels or kwúkewels		**major**	**major**	fruit
Spring = (April, May); Summer = (June, July, August); Fall = (September, October).							

Potential grizzly bear foods in the North Cascades GBPU, B.C.							
				Season of Use			
Scientific Name	Common Name	nsyilxcən	Halq'eméylem	Spring	Summer	Fall	Portion Eaten
FUNGI							
	various fruiting bodies	ʔpəƛ̓pəƛ̓qayʔn			possible	possible	fruiting bodies
ANIMAL							
Alces alces	moose	paʕpaʕláʕca?	q'oyits	minor	minor	minor	kills, carcasses
Aplodontia rufa	mountain beaver			minor	minor	minor	kills
Castor canadensis	beaver	stunx	sqelá:w				
Cervus elaphus	elk	snɬkɬ̓cá?	shxwlyáxkel	minor	minor	minor	kills, carcasses
Coleoptera	beetles (larva, adults)		slhálhi, slhá:li	**major**	**major**	**major**	larva, adults
Formicidae	ants (larva, adults)	sxʷúxʷya?	xá:ysem	**major**	**major**	**major**	larva, adults
Marmota caligata	hoary marmot		sqwiqw	minor	minor	minor	kills, carcasses
Marmota flaviventris	yellow-bellied marmot		sk'i:l	minor	minor	minor	kills, carcasses
Microtus spp.	voles		há:wt	**major**	**major**	**major**	kills
Odocoileus hemionus	mule deer & black tailed deer	ʃtúɬ̓ca?	tl'élqtele	**major**	minor	**major**	kills, carcasses
Odocoileus virginianus	white-tailed deer	ʔtkʷtups	mówech	minor	minor	minor	kills, carcasses
Oncorhynchus spp.	salmonids	ntytyix	sth'oqi		minor	minor	kills, carcasses
Oriamnos americanus	mountain goat	šxʷƛ̓i?	p'q'elqel				
Spermophilus columbianus	Columbian ground squirrel	?a?isc̓k	sqwéth'elh	minor	minor	**major**	kills, carcasses
Spermophilus saturatus	Cascade Golden-mantled ground sq	?a?isc̓k	sqépő:thél	minor	minor	minor	kills, carcasses
Ursus americanus	black bear	skəm̓xist	spá:th				
Vespidae	wasps (larva, adults)		s'isemó:ya		**major**	**major**	larva, adults
Spring = (April, May); Summer = (June, July, August); Fall = (September, October).							

Potential and important (denoted by bold type) herbaceous grizzly bear forage species in North Cascades of Washington (Almack et al. 1993, Table 9).

SCIENTIFIC NAME	COMMON NAME
Allium schoenoprasum	chives
Angelica arguta	Lyall's arguta
Angelica genuflexa	kneeling angelica
Astragalus robbinsii	Robbins'milk-vetch
Athyrium filix-femina	**lady fern**
Carex spp.	**sedge**
Castilleja spp.	paintbrush
Cicuta douglasii	Douglas' water-hemlock
Cirsium spp.	**thistle**
Claytonia lanceolata	**western springbeauty**
Claytonia megarhiza	**alpine springbeauty**
Clintonia uniflora	beadlily
Danthonia unispicata	onespike danthonia
Disporum sp.	fairy-bell
Dodecatheon pauciflorum	**few-flowered shooting star**
Empetrum nigrum	crowberry
Epilobium angustifolium	fireweed
Equisetum spp.	**horsetail**
Eriophorum vaginatum	cotton-grass
Erythronium grandiflorum	**pale fawn-lily**
Erythronium montanum	**alpine fawn-lily**
Fragaria vesca	woods strawberry
Fragaria virginiana	blueleaf strawberry
Fritillaria pudica	yellow bell
Gymnocarpium dryopteris	oak-fern
Hedysarum spp.	hedysarum
Heracleum lanatum	**cow-parsnip**
Heracleum sphondylium	**cow-parsnip**
Hieracium spp.	hawkweed
Juncus spp.	rush
Ligusticum spp.	lovage

Lomatium spp.	**biscuit-root**
Lupinus nootkatensis	lupine
Luzula spp.	woodrush
Lysichitum americanum	**skunk cabbage**
Medicago sativa	alfalfa
Melica spectabilis	showy onion
Mertensia sp.	lungwort
Mitella sp.	mitrewort
Montia siberica	**Siberian miner's-lettuce**
Osmorhiza spp.	sweet-root
Oxyria digyna	mountain sorrel
Oxytropis spp.	crazyweed
Perideridia gairdneri	Gairdner's yampah
Petasites sp.	**coltsfoot**
Phalaris sp.	Reed canarygrass
Poaceae	All grasses except reed canarygrass
Polygonum spp.	doorweed
Polypodiaceae spp.	common fern family
Pteridium aquilinium	braken
Ranunculus spp.	buttercup
Rumex spp.	dock
Scirpus microcarpus	small-fruited bulrush
Senecio triangularis	groundsel
Smilacina racemosa	western Solomon-plume
Smilacina stellata	starry Solomon-plume
Streptopus amplexifolius	clasping-leaved twisted-stalk
Streptopus roseus	rosy twisted-stalk
Taraxacum spp.	Dandelion
Tiarella rifoliate	coolwort
Tiarella spp.	Coolwort
Trifolium spp.	Clover
Trillium ovatum	white trillium
Veratrum sp.	**False hellebore**
Viburnum edule	moosewood viburnum
Viola spp.	Violet
Xerophyllum tenax	beargrass

APPENDIX E

Grizzly Bear Habitat Monitoring Strategy including Habitat Restoration Prioritization Tool and Habitat Restoration Strategies *(To be completed)*

JOINT NATIONS

NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

APPENDIX F

Coexistence Initiatives Plan *(To be completed)*

JOINT NATIONS

NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

APPENDIX G

Grizzly Bear Monitoring Plan including Population Monitoring Strategy *(To be completed)*

JOINT NATIONS

NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

APPENDIX H

Grizzly Bear Translocation Plan including Augmentation Strategy *(To be completed)*

JOINT NATIONS

NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

APPENDIX I

Implementation Plan *(To be completed)*

JOINT NATIONS

NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

APPENDIX J

Communication and Engagement Plan including Socio-Economic Analysis *(To be completed)*

JOINT NATIONS

NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

APPENDIX K

Grizzly Bear Habitat Prioritization Tool

JOINT NATIONS

NORTH CASCADES
GRIZZLY BEAR RECOVERY INITIATIVE

Appendix K: Habitat Restoration Prioritization Tool

Key Purpose

To describe and demonstrate the use of the prioritization tool we developed to prioritize areas for habitat restoration and how it can be used to predict and monitor progress toward restoration and stewardship goals. This appendix outlines how the spatial prioritization tool was built, how it can be used in decision-making involving many variables, and how it can integrate various spatially explicit values.

Background

The purpose of this tool was to provide a strategy for identifying areas that would most benefit from ecological restoration, such as access management or indigenous cultural burning practices, to support the recovery of grizzly bears in the North Cascades. The application of this tool could be extended for other purposes, including providing indigenous communities with spatialized tools which can be helpful in decision-making processes for stewarding their lands and resources and outlining culturally sensitive areas without compromising knowledge-sharing conventions. This appendix will focus on its development and use for grizzly bear population recovery.

Priority Actions

The NC Stewardship Strategy outlined the following actions for meeting specific goals concerning grizzly bear habitat security and mortality reduction. The prioritization tool can be used in developing strategies for addressing the following priority actions.

Goal #2 Priority Actions

- Identify and field verify areas with high or moderate seasonal habitat values within candidate areas.
- Assess habitat suitability and connectivity for prioritized areas to inform where motorized access management and habitat restoration efforts can best benefit grizzly bears.
- Engage partnering indigenous communities in shared understandings of places and resources important for grizzly bears to understand better restorative actions needed for candidate priority areas.

Goal #3 Priority Actions

- Assess security in high-quality habitats to inform where management and habitat restoration efforts could best benefit grizzly bears.

Need for Prioritization

The North Cascades grizzly bear population unit covers 9808 km^2 of area and includes a wide variation of road density and human use intensity, as well as several provincial parks and other protected areas (Figure 1). The quality and quantity of grizzly bear habitat varies across the area concerning seasonal food types available and the degree to which the habitat has been degraded by human use and industry. Furthermore, the successful recovery of grizzly bears in the area requires developing or retaining interconnected secure core areas with low or reduced

potential for human-caused bear mortality. The prioritization approach is a decision-making process for considering various inputs (e.g., road density, protected areas, habitat quality) to identify areas for restoration or protection.

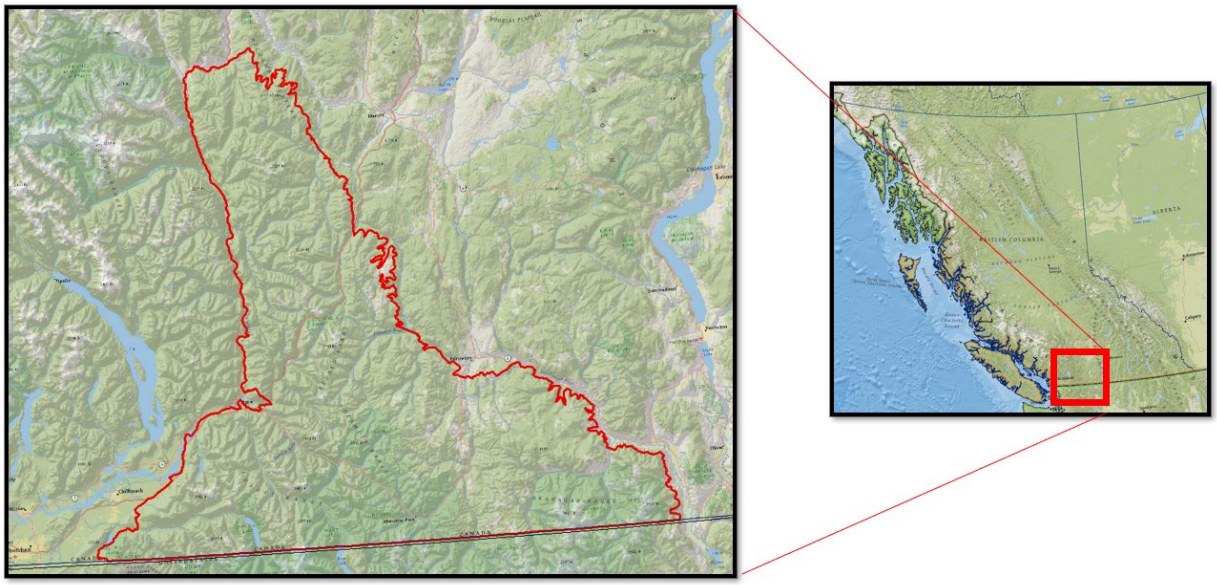


Figure 1: North Cascades grizzly bear population unit and area of integration for prioritizing protections and recovery action for stewarding the restoration of grizzly bears.

Prioritization Approach

Our approach towards restoring grizzly bear core habitat and habitat connectivity in the North Cascades is based on maximizing the gain in unaltered habitat per unit cost while including different goals, costs, and weighting criteria [1]. Our prioritization algorithm ranks grizzly bear units into five zones of restoration priority based on the benefits and costs calculated for each unit. The most significant gain in unaltered habitat occurred following the restoration of the highest priority zones, with diminishing returns as restoration proceeded (Figure 2).

In our application, we developed grizzly bear units, which were defined to be roughly the seasonal home range size of female grizzly bears, as determined in neighbouring populations (Figure 3) [2]. Boundaries were roughly based on several natural and human-developed features such as watershed boundaries, regional Management Units (Ministry of Environment) and highways. Watershed boundaries provide naturally occurring ways of organizing the land, while Management Units are useful delineations for incorporating existing data such as hunter use or human footprint data collected by the provincial government. The overall boundary for consideration is the North Cascades grizzly bear population unit, which roughly follows the historic distribution of grizzly bears in the area (Figure 1). Future modifications to this boundary will not affect the process of identifying prioritization areas but may affect the relative rank priority.

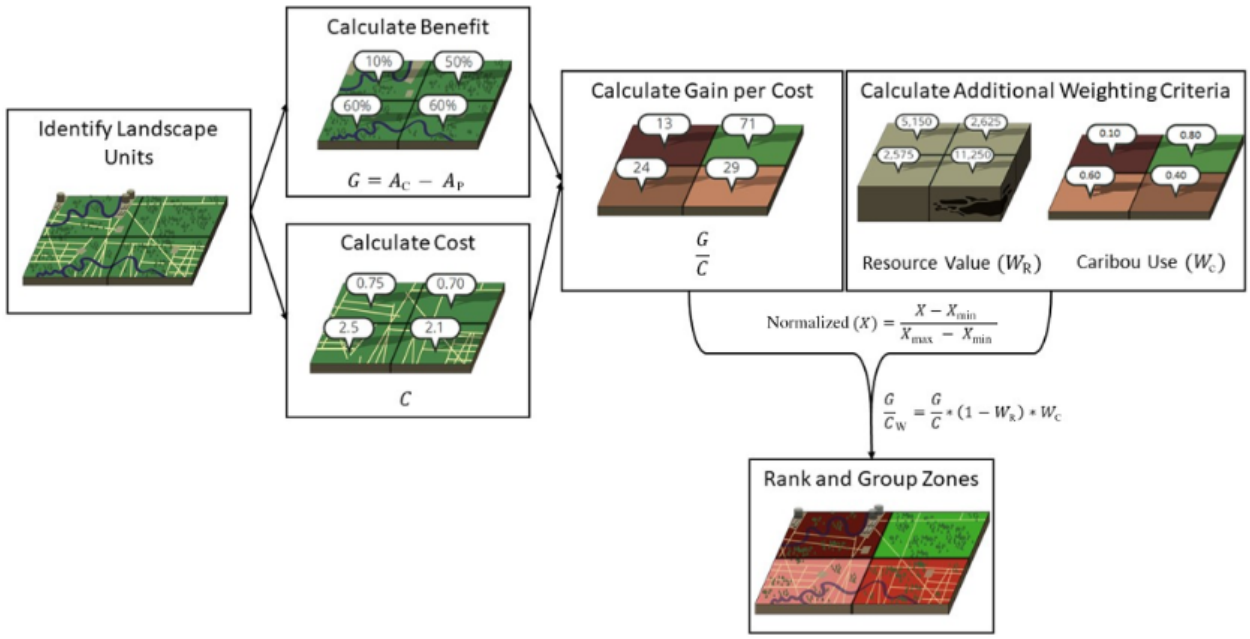


***Figure 2**: Schematic of the prioritization process in which the benefit of restoring linear features relative to the cost of restoration is combined with additional weighting criteria such as grizzly bear habitat quality to group landscape units into priority zones (Figure from Dickie et al. 2023)[1].*

Integrating knowledge

In this example of implementing a prioritization tool for grizzly bears in the North Cascades, we will only use road density and habitat quality models for simplicity. However, this method may also be suitable for integrating many knowledge systems, namely the knowledge, values and perspectives of partnering indigenous communities, without necessarily defining or identifying specific details. In many cases, the transfer of knowledge and systems for sharing knowledge is unsuitable for public sharing in a report or online format—some knowledge cannot be broadly shared or specified. For example, certain types of knowledge are retained by knowledge holders, and they are responsible for the use and sharing of the knowledge they keep. This method allows for identifying culturally important or sensitive areas without necessarily requiring the knowledge holder to share why or what precisely the area holds or specific location details for significant places. In some circumstances, this may be a more appropriate method for including spatially specific knowledge and considering it in broader contexts without sharing details unsuitable for broad sharing.

Grizzly Bear Habitat Quality

To predict grizzly bear occurrence in the North Cascades area, we used data from grizzly bears collared in regions with similar food economies within the Coast Mountains[2] and the Columbia Mountains[3] to develop a species occurrence model. Habitat modelling was conducted using MaxEnt program for modelling species distributions from presence-only species records within the Google Earth Engine. This modelling was conducted as part of a species connectivity project led by TerrAdapt. The model output shows where there is a high probability of grizzly bear occupancy potential (Figure 4A). The median habitat selection score per km^2 within each grizzly bear unit becomes the positive potential gain in the habitat if restoration were completed

(Figure 4B). In this case, polygons with blue or green colouring have relatively high attributes for occupancy per km^2, whereas dark red has relatively low expected occupancy.

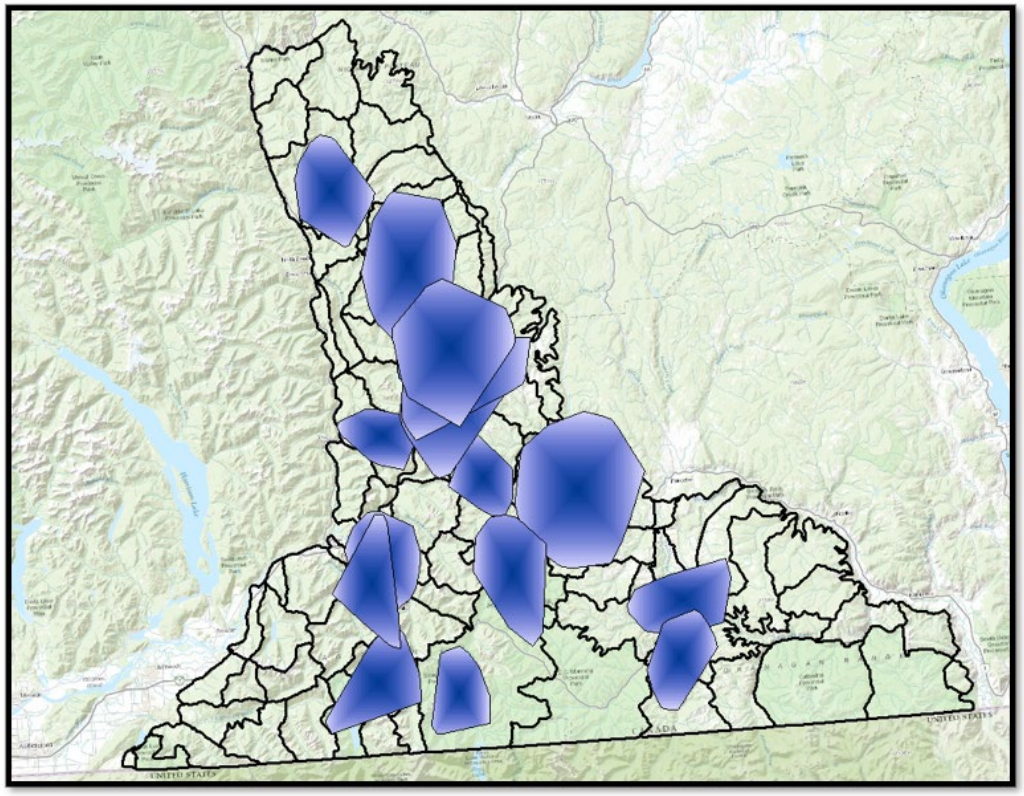


Figure 3: Grizzly bear units (black lines) defined within the North Cascades grizzly bear recovery area. For context and size comparison, examples of average female grizzly bear home range sizes (blue polygons) measured from collared bears in a neighbouring population[2].

Road Density

Research on grizzly bears has demonstrated that road density is strongly correlated to grizzly bear mortality and that even in the absence of hunting, 75% of adult bears die within 100m of a road.[4] In this example of the prioritization tool, we use restorable roads to measure the cost of habitat restoration. In this example, we are trying to increase bear habitat quality by increasing adult survival and habitat security by restoring or closing resource roads. Road decommissioning is expensive and labour-intensive; therefore, we aim to identify areas where it is possible to achieve the most gain in undisturbed, high-quality habitat (Figure 4) for the least amount of effort or the area with the fewest kilometres of closable roads (not highways and paved roads to houses/communities) per area (Figure 5). Therefore, for each grizzly bear unit, we calculate the habitat quality divided by the final road density post-restoration and divide that by the total cost or the restorable road density (Figure 2 and Equation 1-below).

$$\frac{\text{Habitat Gain}}{\text{Cost}} = \frac{\text{Median Habitat/Road Density Post Restoration}}{\text{Restorable Road Density}}$$

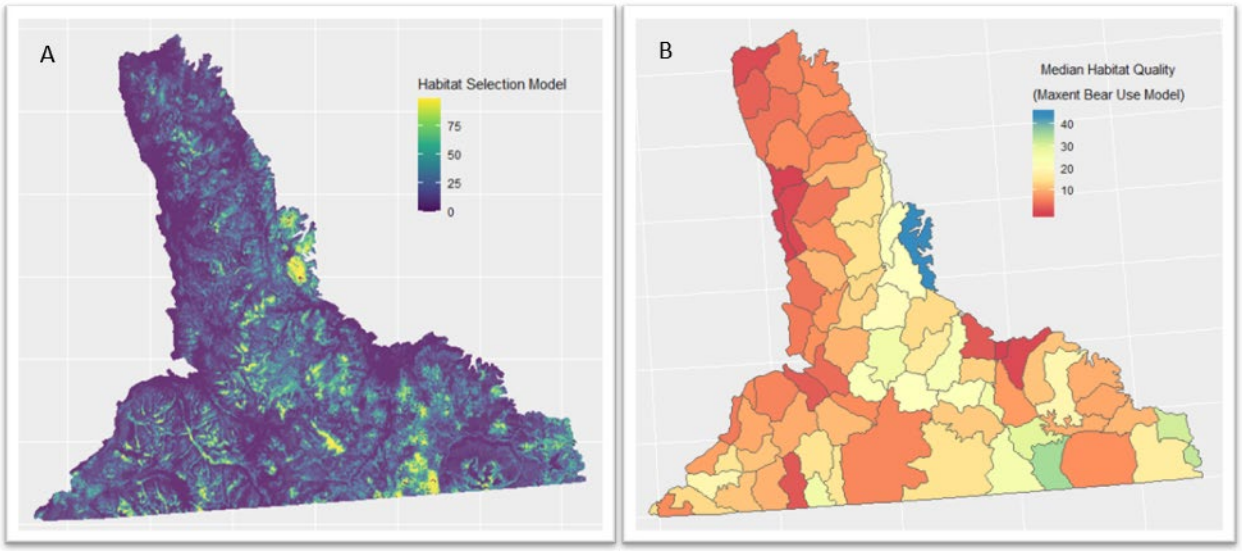


Figure 4: A) MaxEnt grizzly bear occupancy modelling within the North Cascades area of interest. Increasing habitat selection indicates areas with similar landscape characteristics selected by grizzly bears in neighbouring populations. B) The median maxent habitat quality value/km2 of each grizzly bear unit.

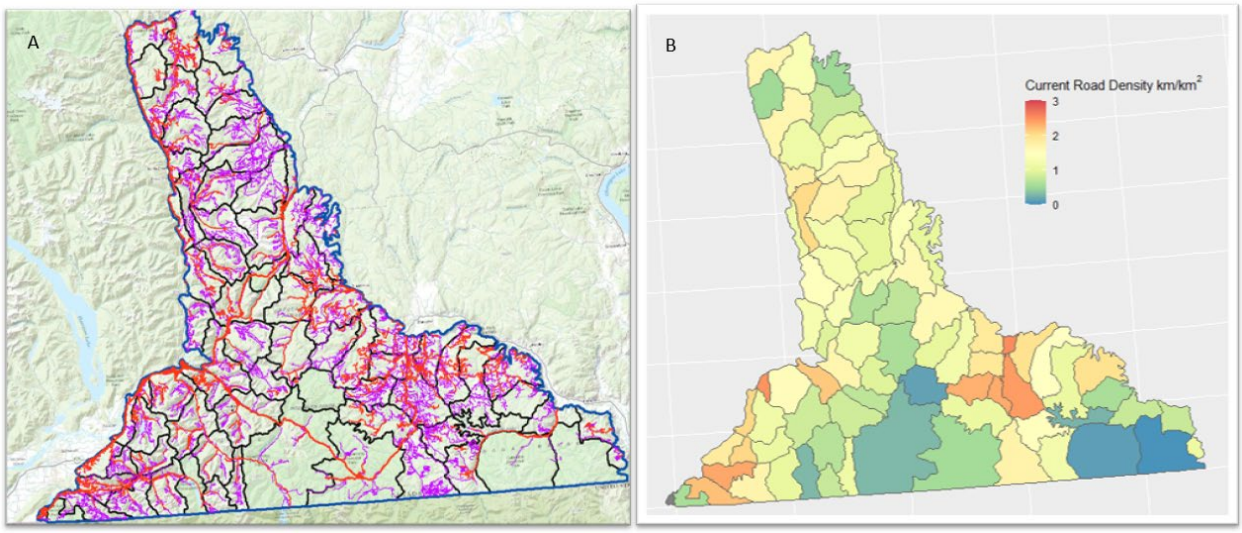


Figure 5: A) Resource (purple) and permanent or paved roads (red) in the North Cascades area of interest. B) km of roads per km2 area within each grizzly bear unit.

Priority Zones for Restoration

The tool outputs provide a ranking of grizzly bear units according to how much gain in grizzly habitat will be obtained for the lowest cost of restoration (Figure 6). In this case, many highlighted areas are already protected (stars) and may require different habitat restoration or security mitigations. Nevertheless, the tool outlines several areas to begin or continue habitat quality assessments on the ground or begin discussions with the provincial and regional governments and industry about improving habitat security via access management.

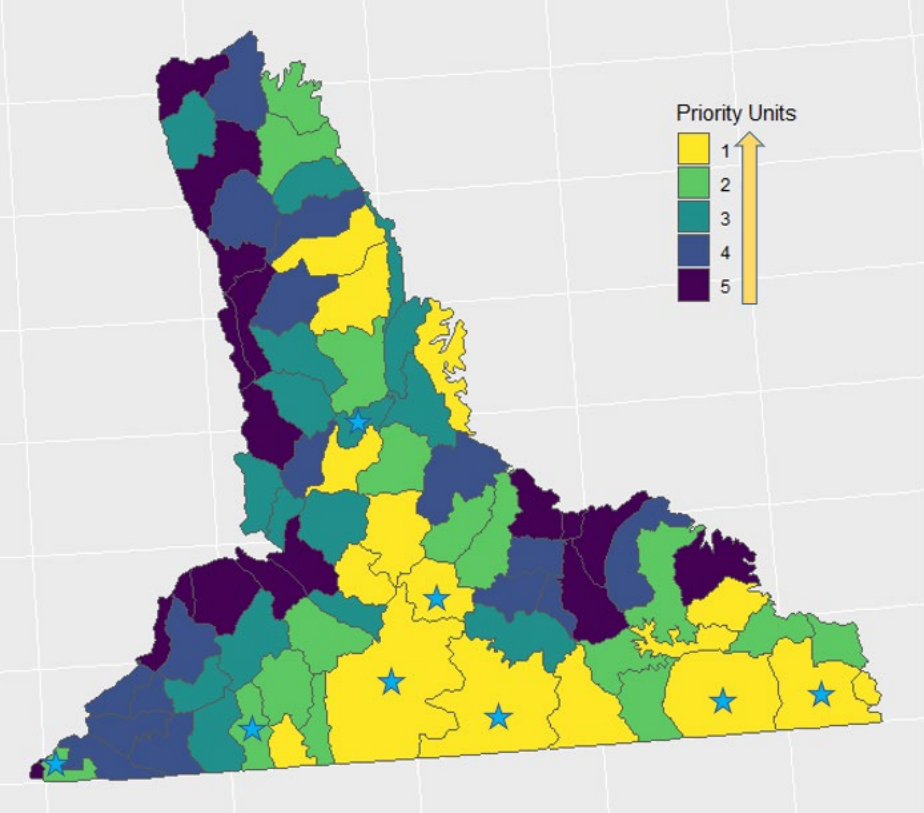


Figure 6: Priority Zones for restoration via access management and road deactivation within the North Cascades area of interest. Provincial Parks are identified by a star.

Next Steps

The following steps are to integrate other essential metrics into this framework as either increased cost to restoration (for example, excluding agriculture areas or high-intensity recreation areas where the social cost of restoration exceeds road density) or increased conservation value (such as other species important habitats or important traditional use areas). Incorporating these values will increase the tool's utility for spatially identifying areas that may be important for grizzlies and other species. It will also help compare areas across the landscape where familiarity may vary.

Literature Cited

1. Dickie, M. *et al.* Where to begin? A flexible framework to prioritize caribou habitat restoration. *Restoration Ecology* (2023) doi:10.1111/rec.13873.

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4. McLellan, B. N. *et al.* Rates and causes of grizzly bear mortality in the interior mountains of British Columbia, Alberta, Montana, Washington, and Idaho. *Journal of Wildlife Management* **63**, 911–920 (1999).