

Goose Lake Range Development Plan

November 2022



Prepared for



Prepared by



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TERRITORIAL ACKNOWLEDGEMENT

Goose Lake Range is in the traditional territory of the Secwepemc First Nations and the syilx Okanagan People.

1 INTRODUCTION

Goose Lake Range is a 46-hectare natural area owned by RDNO that lies on a broad plateau between Swan Lake and Okanagan Lake. This recreation potential for this area of interest is being considered as part of the long-term planning process in the Greater Vernon Trails and Natural Spaces Master Plan 2022 – 2032 (GVTNS Master Plan). The scope of the Goose Lake Range Development Plan (Plan) is to look at the options for trail and park amenities that would make the best use of the natural area and meet the objective of conservation with passive recreation as defined in the GVTNS Master Plan.

Natural spaces are areas that are relatively undisturbed, or in the process of recovering from human disturbance. They help to protect biodiversity and environmentally sensitive habitats or features. In the case of Goose Lake Range Park, they can also provide passive outdoor recreation (e.g. hiking) and preserve areas of cultural or historical significance (e.g. Grey Canal).

The park is part of a larger area historically used for ranching and for defence ordinance and munitions training by the Canadian Department of Defence, (DOD). As such, there exists the potential of encountering munition items within the Goose Lake Range. In addition, the entire parcel is located within the Agricultural Land Reserve and as such any non-farm use and/or recreational improvements will be subject to ALC approval. Recommended mitigating measures and design solutions are presented in sections 5.10 and 6.0.

The slopes in the area are gentle and long with a few small wet draws that run approximately north to south and tie into the north end of Goose Lake near the dam. Between the draws lie native grasslands and rocky outcrops. The ecological values have been assessed and recommendations to preserve these values are presented in the environmental assessment section.

The plan is guided by the framework developed for Goose Lake Range in the GVTNS Master Plan and specifically the four pillars of sustainability as they relate to the benefits of parks and trails: environmental, social, economic, and cultural. Through the Plan, options will be presented to add sustainable trails while also protecting environmentally sensitive areas and culturally significant features in this conservation-focused natural space. An additional important component will be a strategy for decommissioning existing infrastructure that was part of past land use by the DOD and ranchers and restoring them to a natural state. The goal will be to create a net ecological benefit by offsetting any new trail and park infrastructure development with decommissioning.

2 SPECIFIC PROJECT GOALS AND OBJECTIVES

The goal of this Plan is to present options for a sustainable and safe trail network that will connect with the Grey Canal Trail, while also protecting environmentally sensitive sites.

Supporting this goal are several key objectives:

- Present Recommendations for New Trail Sections

Presently there are old roads and trails that have been used in the past by the DOD and ranchers to access the site. New options for Class 3 trails will utilize some of the old trails/roads, where suitable, and new construction where necessary through the grasslands. All proposed options follow the best locations identified in the field in terms of user experience and minimizing environmental impact.

- Minimize Environmental Impact and Support Conservation

The desired outcome of the Plan will balance the development of trails and park infrastructure with the decommissioning of existing sections of old trail/road. This should minimize the development footprint in the park and bring some old, disturbed sites back to a natural state. In addition, the preference for trail options is guided by the desire to protect environmentally sensitive sites. One of the benefits of protecting these sensitive areas is a high-quality recreation experience.

- Present Recommendations for New Park Amenities

Goose Lake Range does not have any park infrastructure. As such, this plan will provide recommendations on the type and amount of infrastructure required, all of which will be to RDNO standards.

- First Nations Engagement and Archaeology Assessment

RDNO intends to engage with local First Nations about the proposed trail development and conduct an archeological assessment of the site.

3 ENVIRONMENTAL ASSESSMENT

3.1 STUDY AREA

The study area is a 46ha parcel lying directly north of Goose Lake. The parcel is sandwiched between Okanagan Lake to the west, and Swan Lake to the east. The proposed developments include a ~2.5km loop trail starting from a new parking area heading southward to the north dam of Goose Lake and looping back north to the trail entrance. Spurring off the north and south end of the proposed loop trail are two sections of the historic grey canal trail which are proposed to be recommissioned. The general project location is situated approximately 6km directly north of Vernon's city centre, and just 800m west from the shore of Swan Lake.

3.2 LANDSCAPE ATTRIBUTES

The proposed trail loop will be perched on top of a low elevation ridge overlooking Swan Lake to the east and lying at the foothills of the Goose Lake Mountain range to the southwest. The site is located within the Interior Douglas Fir very dry hot subunit (IDFxh1) biogeoclimatic (BEC) zone. No coniferous woodland is located within the project area. The site is dominated by disturbed grasslands and intermixed with shrublands and wetlands throughout.

Although the grassland habitat existing within the parcel boundaries is disturbed (i.e., historic canals and footpaths are present), and heavily dominated by invasive species, the area still offers considerable wildlife value. The diversity of wetland, shrubland, and grassland ecosystems offer suitable foraging and nesting habitat for an array of reptile, amphibian, and bird species at risk. In addition, high-density burrowing areas were documented on site demonstrating small mammal use and potential habitat for American Badger. Several rocky outcrops were also identified which are attractive features for various reptile and small mammal species, as well as nonvascular plant communities which take many years to establish.

The trail is proposed to bisect grasslands which are primarily dominated by cheatgrass, smooth brome grass, and sulphur cinquefoil. However, native grasses are present in lower densities throughout. Snowberry and wild rose thickets are sporadic amongst the landscape, as are the occasional black hawthorn, Saskatoon, and chokecherry shrubs. In some areas, historic canals and catch basins from historical agricultural use have developed into functioning wetland ecosystems dominated by rushes and sedges. These wetland habitats are mostly ephemeral but are likely productive ecosystems in the spring – supporting various waterfowl species and have high potential to support amphibian breeding.

3.3 ECOSYSTEM AND WILDLIFE VALUES

3.3.1 Wildlife and Terrestrial Resources

A desktop review of the Conservation Data Centre (CDC), Wildlife Species Inventory (WSI), Habitat Wizard, and EcoCat was conducted on August 26, 2022, and rendered several wildlife species found within or nearby the project area (Province of BC, 2022). A list of these wildlife documentations can be found in Table 1. In addition to the species recorded in Table 1, the plant and wildlife species observed during the September 06 (2022) site visit are listed in Tables 2 and 3 respectively.

Table 1: Query results from various provincial databases demonstrating wildlife observations within or near the project area

Source	Species Name	ID
CDC	American Badger <i>Taxidea taxus</i>	74373 (Shape ID)
CDC	Masked occurrence (Goose Lake Range)	54146 (Observation ID)
CDC	Northern Pacific Rattlesnake <i>Crotalus oreganus</i>	5920 (Critical habitat ID)
CDC	Great Basin Gopher Snake <i>Pituophis catenifer deserticola</i>	5679 (Critical habitat ID)
EcoCat	Sensitive Ecosystem Inventory (various SAR)	Sensitive Ecosystems Inventory: Bella Vista – Goose Lake Range 2002
WSI	Western Yellow-bellied Racer <i>Coluber constrictor mormon</i>	163468 (Observation ID)
WSI	Snowy Owl <i>Bubo scandiacus</i>	116286 (Observation ID)
Habitat Wizard	Western Painted Turtle <i>Chrysemys picta</i>	103909 (Shape ID)
Habitat Wizard	American Badger <i>Taxidea taxus</i>	70562 (Proposed critical habitat ID)

Table 2: Plant species inventoried within the project area on September 6th and November 01st, 2022, by the QEP. Species designated with an asterisk are provincially or regionally recognized as noxious weeds

Common Name	Latin Name	Status
Common snowberry	<i>Symphoricarpos albus</i>	Native
Black hawthorn	<i>Crataegus douglasii</i>	Native
Woods rose	<i>Rosa woodsii</i>	Native
Tarragon	<i>Artemisia dracunculus</i>	Native
Black elderberry	<i>Sambucus nigra</i>	Native
Chokecherry	<i>Prunus virginiana</i>	Native
Douglas maple	<i>Acer glabrum</i>	Native
Saskatoon	<i>Amelanchier alnifolia</i>	Native
Red-osier dogwood	<i>Cornus stolonifera</i>	Native
Western stoneseed	<i>Lithospermum ruderales</i>	Native
Western white clematis	<i>Clematis ligusticifolia</i>	Native
Prairie sagewort	<i>Artemisia frigida</i>	Native
Arrowleaf balsamroot	<i>Balsamorhiza sagittata</i>	Native
Fireweed	<i>Chamaenerion angustifolium</i>	Native
Yarrow	<i>Achillea millefolium</i>	Native
Parsnip-flowered buckwheat	<i>Eriogonum heracleoides</i>	Native
Crevice alumroot	<i>Heuchera micrantha</i>	Native
Beardless wildrye	<i>Leymus triticoides</i>	Native
Silky lupine	<i>Lupinus sericeus</i>	Native
Water smartweed	<i>Persicaria amphibia</i>	Native
Milkweed	<i>Asclepias speciosa</i>	Native
Common cocklebur	<i>Xanthium strumarium</i>	Native/Naturalized
Sticky geranium	<i>Geranium viscosissimum</i>	Native
White heath aster	<i>Symphyotrichum ericoides</i>	Native
Slender cinquefoil/silverweed	<i>Potentilla anserina</i>	Native
Foxtail barley	<i>Hordeum jubatum</i>	Native
Golden dock	<i>Rumex fueginus</i>	Native
Hard-stemmed bulrush	<i>Schoenoplectus acutus</i>	Native
Sedge	<i>Carex sp.</i>	Native
Baltic rush	<i>Juncus balticus</i>	Native
Kentucky bluegrass	<i>Poa pratensis</i>	Native
Bluebunch wheatgrass	<i>Agropyron spicata</i>	Native
Nuttall's alkaligrass	<i>Puccinellia nuttalliana</i>	Native
Fringed willowherb	<i>Epilobium ciliatum</i>	Native
Common wormwood	<i>Artemisia absinthium</i>	Exotic
Smooth brome	<i>Bromus inermis</i>	Exotic
Orchard grass	<i>Dactylis glomerata</i>	Exotic
European barberry	<i>Berberis vulgaris</i>	Exotic
Redtop bentgrass	<i>Agrostis gigantea</i>	Exotic
Timothy grass	<i>Phleum pratense</i>	Exotic
Crested wheatgrass	<i>Agropyron cristatum</i>	Exotic
White campion	<i>Silene sp.</i>	Exotic
Mullein	<i>Verbascum thapsus</i>	Exotic
Asparagus	<i>Asparagus sp.</i>	Exotic
Field mint	<i>Mentha arvensis</i>	Exotic
Chicory	<i>Cichorium intybus</i>	Invasive

Field mustard*	<i>Sinapsis arvensis</i> *	Invasive/Noxious
Rush skeletonweed *	<i>Chondrilla juncea</i> *	Invasive/Noxious
Cheatgrass	<i>Bromus tectorum</i>	Invasive
Reed canary grass	<i>Phalaris arundinacea</i>	Invasive
Scotch thistle *	<i>Onopordum acanthium</i> *	Invasive/Noxious
Perennial pepperweed *	<i>Lepidium latifolium</i> *	Invasive/Noxious
Sulphur cinquefoil *	<i>Potentilla recta</i> *	Invasive/Noxious
Yellow salsify	<i>Tragopogon dubius</i>	Invasive
Common tansy *	<i>Tanacetum vulgare</i> *	Invasive/Noxious
Knapweed *	<i>Centaurea</i> sp. *	Invasive/Noxious
Bittersweet nightshade	<i>Solanum dulcamara</i>	Invasive
Canada thistle *	<i>Cirsium arvense</i> *	Invasive/Noxious
Common burdock *	<i>Arctium minus</i> *	Invasive/Noxious
Vetch	<i>Vicia</i> sp.	Invasive
St. John's wort	<i>Hypericum perforatum</i>	Invasive

Table 3: Wildlife species documented using the project area. The inventory includes species detected using visual observations, audible detection, or other confirming evidence such as scat, burrows, and skin sheds. Species designated with an asterisk are currently at risk in the province

Common Name	Latin Name	Animal Type
Savannah sparrow	<i>Passerculus sandwichensis</i>	Bird
American robin	<i>Turdus migratorius</i>	Bird
Song sparrow	<i>Melospiza melodia</i>	Bird
Dark-eyed junco	<i>Junco hyemalis</i>	Bird
Canada goose	<i>Branta canadensis</i>	Bird
Common raven	<i>Corvus corax</i>	Bird
American goldfinch	<i>Spinus tristis</i>	Bird
Tree swallow	<i>Tachycineta bicolor</i>	Bird
Cedar waxwing	<i>Bombycilla cedrorum</i>	Bird
Black-billed magpie	<i>Pica hudsonia</i>	Bird
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	Bird
Barn swallow *	<i>Hirundo rustica</i> *	Bird
Northern harrier	<i>Circus hudsonius</i>	Bird
Cooper's hawk	<i>Accipiter cooperii</i>	Bird
Turkey vulture	<i>Cathartes aura</i>	Bird
Red-tailed hawk	<i>Buteo jamaicensis</i>	Bird
Black-capped chickadee	<i>Poecile atricapillus</i>	Bird
Spotted towhee	<i>Pipilo maculatus</i>	Bird
Gray catbird	<i>Dumetella carolinensis</i>	Bird
Northern flicker	<i>Colaptes auratus</i>	Bird
European starling	<i>Sturnus vulgaris</i>	Bird
Ring-necked pheasant	<i>Phasianus colchicus</i>	Bird
Northern pocket gopher	<i>Thomomys talpoides</i>	Mammal
Columbia ground squirrel	<i>Urocitellus columbianus</i>	Mammal
Coyote	<i>Canis latrans</i>	Mammal
Black bear	<i>Ursus americanus</i>	Mammal
Western yellow-bellied racer *	<i>Coluber constrictor mormon</i> *	Reptile
Western painted turtle *	<i>Chrysemys picta bellii</i> *	Reptile
Valley garter snake	<i>Thamnophis sirtalis fitchi</i>	Reptile

Although not all these species would be year-round residents of the project area, they may utilize the area for part of their life cycle (e.g., nesting) or as a corridor of undeveloped space connecting to patches of less disturbed grassland habitats in the Goose Lake Range. Furthermore, many other species are anticipated to use these lands, although documented observations may be limiting for many species.

3.3.2 Environmentally Sensitive Areas (ESA)

ESAs can be generally described based on habitat type, such as riparian areas, wetlands, and grassland/meadow ecosystems. These habitats provide valuable ecosystem services and support a disproportionate number of species at risk. Wetlands, grasslands, and rocky outcrops were documented in the project area, and all these habitat types/features represent attractive habitat characteristics for various species at risk. The RDNO has mapped much of the project area as being of high or very high conservation value, likely for the values previously described. As seen in Table 1, there are two confirmed critical habitat areas overlapping the project area bounds (gopher and rattlesnake), and one suggested critical habitat area (badger). All three species rely on grassland/shrub-steppe habitat, and rocky outcrops to support their life cycles – habitat features which are found on the parcel.

The QEP assisted in the layout of proposed trails to identify such areas and adjust the trail alignments so that sensitive habitats were not encroached or bisected. One crossing installation may be required over the wetland complexes to the south, and therefore the thinnest section of the wetland was selected for a proposed crossing location to minimize potential negative impacts. At this location, a clear-span crossing structure could safely span the wetland gully without harmful disturbance to the wetland vegetation or be at risk of inundation.

It is difficult to determine which wetlands on the parcel are a result of natural processes and groundwater conditions, and which are an artefact of historic manmade canals. Wetlands 1 & 2 appear to lie within natural depressions with no visible evidence of surface flow modifications. These wetlands possess characteristics of rare vegetation communities and are dependent on seasonal precipitation and/or high-water tables to maintain saturation. They are dominated by large bulrushes, sedges, silverweed, and various grasses. Wetland 2 is especially unique given it supports the growth of sphagnum moss – an indication of an acidic bog environment not often associated with grassland ecosystems. Wetland 1 is the most ephemeral and isolated wetland on the parcel. However, a Western painted turtle shell was found near its boundary. This observation suggests that any of the wetlands could provide habitat for this threatened species, regardless of their connection or proximity to Goose Lake.

Wetlands 3 & 4 are not channelized but lie immediately north of the Goose Lake dam. In wetter seasons, the two wetlands are likely connected, forming one large complex with Wetland 5 and share a common water source. The ground along the north side of the dam is saturated year-round, indicative of a high-water table extending northwards from the reservoir. These wetlands are dominated by cattails, bulrushes, and various grasses.

Wetlands 5 & 6 appear to be a result of water diversion from Goose Lake. What were once historic canals are now fully developed wetland features and riparian habitats – some of which still have old canal infrastructure within them. Wetlands 5 & 6 are more confined to riparian gullies with minimal slopes, but are interspersed with flat, saturated areas dominated by cattails and sedges. Many of these cattail marshes are surrounded by dense thickets of riparian shrubs such as wild rose, red-osier dogwood, black hawthorn, and snowberry, and may support seasonal flows.

Natural or not, all six wetlands identified on the property offer valuable ecosystem services (e.g., food, water, and habitat), and are sensitive to disturbance.



Figure 1: South view of Wetland 1



Figure 2: North view of Wetland 2



Figure 3: North view of Wetland 3



Figure 4: Southwest view of Wetland 4



Figure 5: Northeast view of typical sedge-dominated section observed in Wetlands 5 & 6



Figure 6: North view of typical cattail marsh confined to a small gully in Wetlands 5 & 6

3.3.3 Species and Ecosystems at Risk (SEAR)

A previous species at risk inventory completed for the Goose Lake Range demonstrates all the likely occurrences within or near the project area. This inventory may exaggerate the true diversity of species at risk found using or residing in the project area but demonstrates the density of threatened and endangered wildlife which depend on the grasslands and savannas of the Okanagan valley for survival (Iverson, 2002).

Suitable habitat was identified on site for all the reptile and amphibian species documented in the report, with direct observations of Yellow-bellied racer and Western painted turtle. Since the site lacks mature trees and snags, preferred habitat for many raptors and bat species is more limited

in this region of the Goose Lake Range. However, the wetland features, surrounding shrublands, and wild rose/snowberry thickets provide ideal foraging and nesting habitat for a wide array of songbirds, including those at risk such as the Yellow-breasted chat and Grasshopper sparrow. The entire region also boasts suitable habitat for various small mammal species at risk, as well as the American badger. Although, no active/historical burrowing sites were identified during the site assessment indicating resident badgers were present. Even where habitat suitability is not found within the project area, chance encounters of all the species at risk documented in inventory are possible.

In addition to the species at risk known in the area, a query of the ecosystems at risk was also conducted. Several ecological communities in the IDFxha BEC zone and native to the North Okanagan, can be found within or near the project area. Patches of the blue-listed Common snowberry – Prairie rose¹ and Bluebunch wheatgrass – Arrowleaf balsamroot² communities were documented on site. Remnants of several red-listed communities were also observed, such as Alkali saltgrass – Foxtail barley³, Idaho fescue – Bluebunch wheatgrass – Silky lupine – Junegrass⁴, and Nutall’s alkaligrass – Foxtail barley⁵ communities. No sagebrush or aspen trees were documented during the site visit, but if present in lower densities, these species also make up major constituents of blue and red-listed ecological communities when found with other native grasses.

An inquiry was made regarding the masked sensitive occurrence overlapping the parcel boundaries on September 7th and a response was received on September 12th. It was determined that the mitigation measures already detailed for the proposed trail building activities was sufficient to prevent disturbance to the masked occurrence. Should trail alignments or the scope of work change considerably from the current proposal, a QEP must be consulted to determine if disturbance to the masked occurrence and/or other sensitive areas can still be safely mitigated.

3.3.4 Fisheries and Aquatic Resources

No flowing streams were present within the project area during the site visit. However, historic man-made canals are still visible amongst the landscape from previous agricultural use. Some of the historic channels appear to have become wetlands and are dominated by wetland vegetation. Despite their capacity to hold water throughout the year, these wetland complexes are disconnected from Goose Lake via the north end dam which prevents fish from migrating upstream. In addition, the wetlands are ephemeral and not connected by any natural, free-flowing streams towards fish-bearing waters. They are therefore isolated features and provide no usable fisheries habitat.

Despite the lack of fish habitat available, wetlands provide valuable wildlife habitat and are still protected under the Water Sustainability Act (WSA). Any proposed crossings over these wetlands will require a WSA Section 11 application. Site-specific environmental mitigations are required for every crossing, along with any additional prescriptions determined necessary by the QEP and/or provincial habitat officer. No stream crossings are to be installed without the appropriate authorization or without environmental mitigation measures (e.g., sediment controls) in place.

For instream works involved with the installation of stream crossings, the following documents outline the mandatory terms and conditions of works near water (Government of British Columbia, 2022).

1,2, and 4 represent grassland, shrub steppe/savanna communities
3 and 5 represent wetland fringe communities

- Habitat Officer's Terms and Conditions for changes in and about a stream specified by Ministry of Environment Habitat Officers, Okanagan Region (Section 42)
- Requirements and Best Management Practices for Making Changes In and About a Stream (CIAS) in British Columbia (Version 2022.01), subsections 5.3 to 5.6

3.3.5 Recommended Mitigation Strategies for Reducing Disturbance to Fish, Wildlife, and Sensitive Habitat

- Retain mature shrub patches and wild rose/snowberry thickets wherever possible. These features are used by a variety of bird species and offer suitable nesting habitat for bird species at risk. Fruit-bearing shrubs also offer critical winter food sources for birds and large mammals
- Consult a QEP to conduct bird nest sweeps prior to construction so that appropriate buffers and retention areas can be delineated (if works are proposed for within sensitive timing windows)
- Retain mature trees and shrubs wherever possible for shade maintenance, particularly within 30m of wetland/riparian features
- Maintain habitat connectivity wherever possible
- Stage materials and machinery away from any wetland boundary or sensitive habitat
- Revegetate disturbed soils outside of the trail alignment with native Okanagan grasses, or enhancement with native tree/shrub plantings
- Reuse existing trail footprints where possible to avoid disturbing new areas
- Avoid machine operations near sensitive features such as wetland fringes, rocky outcrops, or high-density burrowing areas

4 FRAMEWORK FOR EVALUATION AND DEVELOPMENT

4.1 TRAIL CLASSIFICATION AND STANDARDS

The trails proposed in Goose Lake Range Park will follow the RDNO Regional Park Design Guidelines and trail classification system. The trail classification system is reproduced in Table 4 and the Design Guidelines are presented in Appendices. Type 3 trails are proposed for the park.

Table 4. RDNO Trail Classification

Classification	Surface	Construction	Tread Width	Cleared Trail Width	Maximum Grade	Accessibility	Vertical Clearance
Type 1: Nature Trail	Native material with some rock and vegetation/roots in the tread	Machine/hand	0.5 – 1.2 m	2.1 m min.	25%	Very limited due to slope and surface	2.5 m
Type 2: Standard Multi-Use	Native material	Machine	1.2 – 3 m	2.4 m min.	25%	Limited due to slope and surface	3.3 m
Type 3: Surfaced Multi-Use	Compacted granular	Machine	2.4 – 3 m	> 3 m	15%	Limited due to slope	3.3 m

There are sections of trail options presented that lie on undisturbed ground and will require new construction. In addition, there are rogue routes that have been established by users walking around obstructions or developed as service roads for ranching or access for the Department of Defense. These unsanctioned established trails and roads do not meet the RDNO trail standards. They are identified and recommended for upgrades to become classified trails. Unsustainable rogue routes/trails are recommended for decommissioning in the Implementation Section.

Unsustainable Trails are defined as trails that do not have the 5 key elements of a Sustainable Trail. The key elements are as follows:

- Keep the trail grade at less than half of the side slope. So, if the trail is crossing a 30% slope, the trail grade should be less than 15%.
- Always try to keep sustained pitches (>50m) of the trail at 20% grade or less.
- Maintain an average trail grade of 10% or less.
- Use grade reversals and drainage structures or grade dips to shed surface water on the trail tread and minimize erosion.
- Outslope the trail tread at 2 - 4% to shed water off the trail. The outslope grade may have to increase if the trail grade is > 12%.

Unsafe Trails are harder to define as there are certain risks that are accepted on park trail systems. As such, we have defined Unsafe Trails as sections that are in a condition that presents a very high risk of injury for users. This includes sections that have limited solid footing and

significant exposure and sections where it is not practical to make a safe surfaced trail, such as rocky outcrops.

4.2 TRAIL DEVELOPMENT

The development of trails will strive to minimize the disturbance on site while allowing for a main trail loop that has connection points in the north and south to the Grey Canal Trail. The loop will connect with key features of interest, such as Goose Lake/Reservoir but will also avoid sensitive sites around the wetlands and will instead offer opportunities to view these from designated sites. The proposed trail network was designed to balance the needs of ecological conservation with maximum user experience and enjoyment.

4.3 TRAIL DECOMMISSIONING AND RESTORATION METHODS

Where an old road/trail has been found to be unsustainable or unnecessary, decommissioning that follows accepted ecological restoration methods will be recommended.

Accepted ecological restoration methods that could be applied include scarifying the trail treads, seeding with an approved native grassland mix, and pocket planting with native plants harvested from low to moderately sensitive sites in the park.

In addition to restoration treatments, experience shows that education is essential to stop past users from opening restored trails again. To that end, signs that provide the reason for the restoration along with sections of fence at entrance points to the restored trails are recommended. Signage could also include First Nations cultural information and descriptions of ecological values and wildlife habitat. Additional information (including a trail map) can be presented at entrances to the park and online that clearly describe restoration objectives and ways in which the public can support the restoration efforts.

4.4 MAPPING UPDATES

As the trail system and infrastructure is developed at Goose Lake Range Park, the associated maps will need the GIS layer for the trails to be updated with each phase of construction and corresponding decommissioning. Online maps will reflect the changes and signs can pass along the message for why the changes were made.

5 TRAIL INVENTORY AND EVALUATION

The inventory and assessment of the Plan used the RDNO Trail Classification (See Table), and the definition of an “unsustainable” and/or “unsafe” trail presented in Section 4.1

5.1 INVENTORY OF FEATURES

All existing access roads and old trails were assessed and mapped during the site visits on September 6th and November 1st, 2022. In addition, roads to the park, buildings and structures on site, and other man-made features were identified. Natural features that have recreational value, such as wetlands and rock outcrops have been identified and described in Section 3 and will not be covered here.

5.1.1 Section of Western Existing Access Road (forms part of Main Loop):

An existing access road that is approximately 2-3m wide and 380m long runs near the west boundary of the proposed park from north to south. In the north, it connects with the access road to the park and in the south, it connects with the access road to the dam and chlorine plant on the east side of Goose Lake. The road is in usable condition between the proposed parking area and the boundary of Wetland 2, and would only need grading, surfacing, and drainage structures to be upgraded to a Class 3 trail. South of Wetland 2, the road is heavily vegetated and not maintained.

5.1.2 Section of Western Existing Access Road (proposed for decommissioning):

The section of the western existing access road south of Wetland 2 is not proposed to be utilized for any of the trail options and could be decommissioned. It is approximately 680m long and is heavily vegetated and the tread condition deteriorates as the trail progressed south. It was not considered to lie in the ideal location for use as a trail, so a new alignment was selected for the proposed trail and the old road is proposed to be decommissioned.

This section of existing road starts at the south end of Wetland 2 and ends just south of where it crosses Wetland 4. It is recommended that signage be erected on the north end of Wetland 2 indicating the adjusted trail pathway as it skirts the toe of the slope further west. The old access road offers no scenic vantage points and would require more vegetation removal to maintain. Having a new, defined path with better vantage points and scenic viewing would likely suffice to distract trail users from following the vegetated roadway. Signage could assist in discouraging road use beyond Wetland 2. Further decommissioning effort of the rest of the road is likely not necessary given its current state.

5.1.3 Section of the Eastern Existing Access Road (forms part of Main Loop):

Connecting with the western access road at its southern end is another road that runs to the northeast to the boundary of the park. The road is 2-3m wide and approximately 500m long. It is in good condition and would only need grading, surfacing, and drainage structures to be upgraded to a Class 3 trail. It is also in a good location for scenic viewing of the shrublands downslope to the east and distant views of Swan Lake and neighbouring hills.

5.1.4 Two Eastern Existing Roads (proposed for decommissioning):

There are two existing paths that run parallel and slightly to the east of the Eastern Access Road that is proposed to be used for the eastern part of the Option #1 Trail. The one closest to proposed Option #1 trail is around 1200m and the one closest to the Grey Canal Flume is 725m long. Neither path was considered suitable to form part of the proposed trail system since they are lower down the slope and have lower quality vantage points than the higher elevation Option #1 trail.

They are also more densely vegetated, narrower, and would overall require more costly construction to restore than Option #1. Several shortcut trails along Option #1 were documented where wildlife and/or people had cut downslope to the lower paths. These shortcuts are causing erosion of the hillside and should be seeded to restore soil cover. A combination of seeding and signage would likely suffice to discourage foot traffic downslope, since without these shortcuts, the lower paths are barely visible from the Option #1 trail.



Figure 7: View of shortcut trail proposed for decommissioning



Figure 8: Northwest view of cattle fence where Option #1 trail ends (along with other two paths downslope)

5.1.5 Grey Canal Trail:

The spatial layer in RDNO's data library identifies the Grey Canal Trail as a right of way acquired but not constructed. As per the name, it follows the grey canal through the proposed park near the eastern boundary. Historic canal infrastructure involving concrete walls, wells, valves, and discharge pipes are all visible within the flume. The flume itself is not in a desirable location for a trail and is surrounded by dense vegetation. It is difficult to find without a prior knowledge of its location. However, there are historical/educational advantages of a potential "flume trail" which could enhance user experience if these features were incorporated into a grander trail network.



Figure 9: Example of existing canal infrastructure



Figure 10: North view of concrete walls in the canal/flume



Figure 11: View of canal infrastructure apparently draining out of Wetland 5



Figure 12: View northeast of discharge pipe/spillway of canal into riparian gully feature connecting to Wetland 5

5.1.6 Access Road to Park from the North

There is a gravel road that is 6m wide and 409m long that provides access to the northwest corner of the park from Stepping Stones Road. There is a metal farm gate and old corral at the entrance to the park. The road is in good condition and will need grading and surfacing to meet a suitable engineered standard.



Figure 13: View south of entrance road



Figure 14: View south of entrance gate and old corral

5.1.7 Dam

Near the southern end of the park is the dam on Goose Lake. The top of the dam currently has a 4m wide gravel/compact soil surface in good condition, and apparently open for public use. There is signage present on the northeast corner of the dam acknowledging the dangers of swimming in the reservoir. On the lake side of the dam, the slope is armoured with 10-25kg angular riprap with no fence or guardrail separation. The riprap ties into the top of the dam and existing pathway along it.

The top of the dam is wide enough to be considered a suitable location for the southern end of the loop trail and has the added benefit of avoiding a few wetlands. The dam is maintained by Greater Vernon Water, and they will have to be consulted if this were to become part of the trail system.

5.1.8 Water Operations Building

The Water Operations Building is a small building at the northeast corner of the dam that once housed chlorine equipment for water treatment. The chlorine was removed in 2014 and now is only used for storage of monitoring and operations equipment. There is a narrow access road to the building, and this is proposed to serve as part of the south access trail to the Grey Canal Trail.

At present, the building is vehicle-accessible via the private road off Old Kamloops Road that RDNO has a Statutory Right of Way for operations access, but which is not accessible to the public and requires key access.

5.1.9 Agricultural Land Reserve

The land parcels that comprise the Goose Lake Range lie within the provincial Agricultural Land Reserve [ALR]. When parks or trails are proposed in the ALR, an application must be submitted to the Agricultural Land Commission [ALC] to seek approval. RDNO are aware of the approval process and will coordinate this with ALC commissioners.

Any trail improvements will be designed so as to ensure that the long-term viability of the lands for agricultural production will be maintained and will follow the ALC's "Common Design Solutions" and "Landscape Buffer Specifications". One key element of the common design solutions involves directing trails away from agricultural areas and the proposed design has attempted to keep trails on existing access roads, or where new trails are proposed in areas not actively being used for agriculture. Additional design solutions that will be utilized include some of the five basic types of buffers that include fencing [as noted in 5.1.11 below] to separate Goose Lake Range from adjacent agricultural land, proposing new trails on upper slopes, maintaining vegetation visual buffers, and using riparian features as buffers.

Signs are included in the development plan. Some of these could include information for users so they are aware that they are on an agricultural site and they can managing their actions on the trails to minimize their impact.

5.1.10 Cattle Fence

There is existing cattle fencing along the perimeter of the north end dam, as well as the north, west, and eastern parcel boundaries. The fencing is 1.2-1.5m high and is wooden post and barbed

wire fencing. An eastern and western entrance gate are connected to this cattle fencing on either side of the dam.



Figure 15: View of eastern entrance gate to dam



Figure 16: View east along top of dam, cattle fencing visible along the toe of the slope on north side



Figure 17: View north of dam with coyote standing on top



Figure 18: View north of existing trail entrance with small cattle cate adjacent to chlorine plant

6 TRAIL DEVELOPMENT RECOMMENDATIONS

6.1 INTRODUCTION

Trail development options include constructing new sections of trail and adding infrastructure, such as culverts, bridges, and boardwalks where necessary. In addition, rehabilitation/decommissioning recommendations are presented for old roads and rogue trails. A detailed description and associated budget estimate for the options for each section is presented below.

As noted, before, any new trail development should be balanced with the decommissioning of unsustainable trails and restoration of the site.

6.2 DEVELOPMENT DETAILS AND RECOMMENDATIONS FOR TRAIL

OPTIONS:

6.2.1 Trail Option #1 (Main Loop):

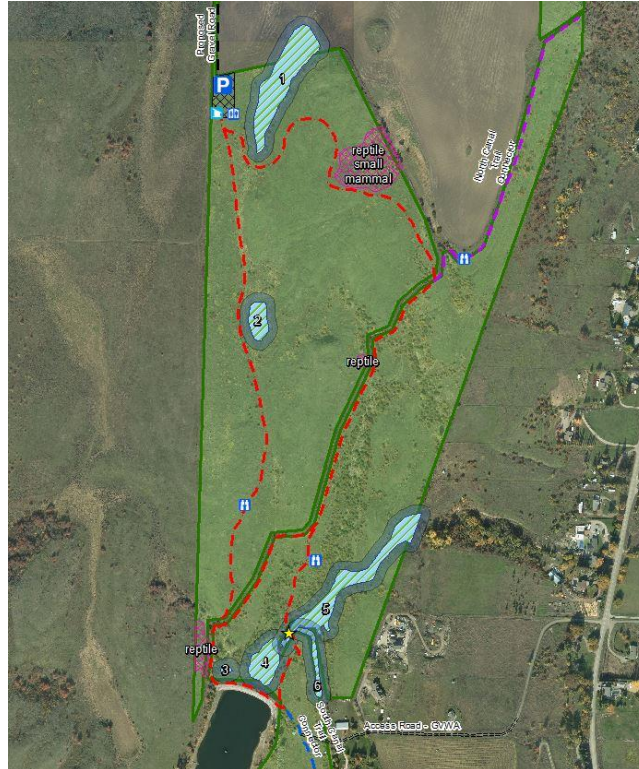


Figure 19: Option #1 Outlined in Red

Being the longest trail within the network at around 3000m long, it would offer the most diverse user opportunities. There are six unique wetlands this option passes. The wetlands offer bird viewing opportunities, as well as habitat for a diverse range of mammals and amphibians. The trail comes close (<10m) of unique rocky features and high-density burrowing habitats which showcase the spatial diversity of the landscape without compromising the ecological integrity of these features.

The trail alignment is designed to remain outside of the RMZ of wetlands 1 and 2. Adequate drainage control measures should be employed on the trail to prevent sediment entering the wetlands. Where the proposed trail alignment is within and around the riparian management zones (RMZ) for wetlands 3, 4, 5 and 6, special trail construction techniques and infrastructure will be required to protect the sensitive sites. Near wetlands 3 and 4, the trail should remain on the dam as it is already a disturbed site and can avoid most of each RMZ. A guardrail may be required along the lake interface with the dam for user safety. As the trail turns and heads north on the east side of the dam, it traverses the RMZ and a finger of Wetland 5. This crossing between wetlands #4 and #5 would require approximately 10-15m of elevated boardwalk to clearly span the wetland boundaries. A clear-span bridge, archway, or elevated boardwalk all satisfy the crossing requirements (so long as they do not encroach the wetted perimeter of the wetland), while also offering trail enhancement.

There are sites immediately north and south of the crossing that would make ideal locations for viewpoints. Options for the viewpoints include an elevated viewing platform with gazebo-style layout and interpretive signage, or a simpler bump-out extending out from the Class 3 Trail. By far the greatest viewpoint of the Spallumcheen Valley and Swan Lake would be appreciated from the northeast corner of the parcel. The view from this hillside is unincumbered and would be easily appreciated from a simple park bench.

The northern end of this loop trail passes by a rock outcrop that was identified as potential reptile and small mammal habitat. Additionally, a narrow 0.02 ha strip along the edge of this rocky outcrop was identified as having high archaeological potential based upon the AOA completed by Ursus Heritage Consulting. The trail remains far enough away to not disturb the site or the sensitive wildlife habitat and will offer viewing opportunities of different landscape attributes (e.g., rocky knolls and shrubby slopes). There is freedom in this section to adjust the trail layout to different gradient options. The trail could meander around the existing knolls without exceeding sustained 5% gradients, or more moderate terrain could be included to summit the knolls, requiring short-term (but sustained) gradients between 5-10% to allow greater vantage options. What is most important about developing in this terrain is the avoidance of rocky features, high-density burrowing areas, and shrub thickets offering the greatest habitat potential. In doing so, the conservation values of the site could be upheld, while allowing for user appreciation of the natural spaces. Although construction activities such as grading and surfacing may be more involved in this section, the user experience could be greatly enhanced.

On the western half of the Option #1 trail, the new trail construction would require gentle side-sloping of the adjacent hillside (southwest of Wetland 2) where it would branch away from the historic access road. The grade could be sustained at approximately 5% to enhance scenic viewing opportunities from a higher elevation while keeping foot traffic off the old road and allow it to naturally regenerate. Grading and surfacing will also be more involved in this section working along the slope but will offer higher elevation viewing areas that are unmatched by those on the existing trails/roads.

The new trail could then tie into the existing roadway near the northern boundary of the sensitive rocky ledge structures in the southwestern corner of the parcel. In this section, the road is already 3m wide and very established so there would be minimal machine work required to upgrade this section of road to the Class 3 Trail standard. Although it bisects two sections of sensitive habitat on either side, machine activity here would be minimal, and the footprint of the trail would not need to change. Additionally, it would allow residents from Old Kamloops Road (among other users) who access the trail network from the east the opportunity to complete a smaller loop in the south, without committing to a much larger loop extending north.



Figure 20: View east from proposed lookout point along northeast section of Option #1 trail



Figure 21: View east from proposed lookout point just north of southern wetland complexes from Option #1

6.2.3 Trail Option #3:

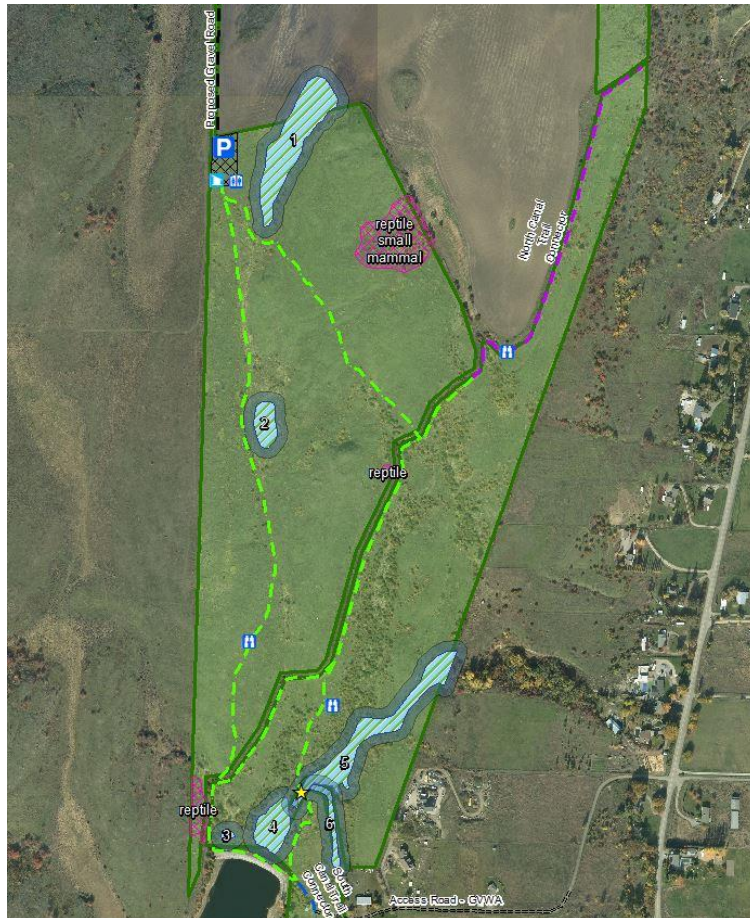


Figure 23: Option #3 Outlined in Green

This option follows almost all of Option #1 alignment, save for the northern section of the ‘Loop’ that traverses some knolls and more complex terrain. Option #3 alignment lies on gentler terrain and presents an easier section to build than the northern portion of Option 1. It also would allow for sustained grades to remain under 5%, which would make it accessible whereas the northern section of Option #1 may not be accessible for all users.

The downside to this option is it is shorter than the outer section of Option 1 and it does not offer the same views or opportunities to observe wildlife and unique habitat features. It does offer some views at its high points, but the trail would be largely benign in the north end and diminish overall user experience of the natural setting.

A narrow 0.03 ha strip along the west side of this trail was identified as having high archaeological potential based upon the AOA completed by Ursus Heritage Consulting. The proposed trail alignment remains far enough away to not disturb the site.

6.2.4 North End Grey Canal Connection Trail:

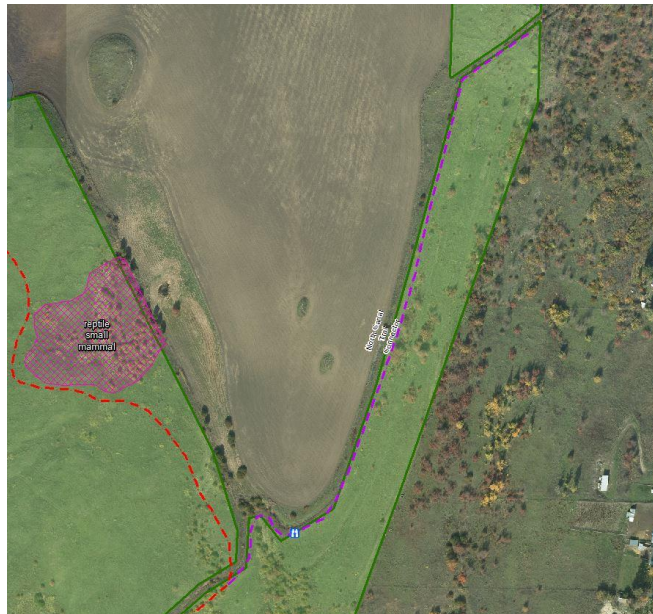


Figure 24: North End Grey Canal Connection Trail Outlined in Purple

This trail option follows the old canal infrastructure. It is approximately 2-3m wide and 600m long and connects with the proposed Grey Canal Trail to the northeast. It offers a great opportunity for a quick there-and-back view of historical canal infrastructure, as well as some of the best vistas available in the park. The old road will need to be graded and surfaced to create a Class 3 Trail. There are shortcut trails spurring off the connector trail which would require decommissioning to keep users on the designated trail. Signage and seeding would be sufficient.

6.2.5 South End Grey Canal Connection Trail:



Figure 25: South End Grey Canal Connection Trail Outlined in Blue

The north end of this trail is located at the east side of the Goose Lake Dam. The south end finishes at a fenced parcel of land. This trail is rather industrial in nature as it follows an access road, and it will only need to be graded and have a limited amount of gravel added for surfacing. This connector trail has minimal scenic value but would be easily accessible for all users. Presently, the connector trail appears to connect to an existing access road outside of the parcel boundaries, presumably on private land to the southeast.

6.2.6 Access Road

The only access road for the public to the park will come in from Stepping Stones Road in the north to the northwest corner of the park. The road will need to be graded and surfaced with gravel to make it suitable for use. A gate should be installed at the entrance to the park to control days/times of access.

6.2.7 Parking:

The proposed parking area is located in the northwest corner of the park where the access road enters from Stepping Stones Road. The location was selected to ensure that it is outside of the RMZ of Wetland 1 and does not encroach any other sensitive features. The parking area should be designed to ensure surface drainage and potential sediment inputs do not drain towards the wetland. The washroom facilities proposed in the parking area will also be located where it will not impact the wetland.

6.2.8 Amenities:

Garbage cans could be installed at the parking lot trail head and at the east side of the Goose Lake Dam. This would provide ease of access for trash removal. Providing garbage cans at viewing platforms throughout the network could create difficult maintenance issues. All junction and control points should be signed accordingly. Including picnic/rest benches at viewpoint platforms should be considered. Signage located throughout the network could include first nations cultural information, viewpoint descriptors, historical information, trail distance markings and flora/fauna descriptors. In addition, "Rules of the Trail" as per the trails through farmland brochure could be added to signs at the parking area and at a main trail junction near the dam. A trail map is encouraged at the parking lot trailhead so that users are aware of the available routes.

In addition, a boardwalk will be required if the Option #1 section between wetlands 4 and 5 is selected as the preferred choice. The design should utilize the most environmentally sensitive materials and construction methods. An elevated viewing platform outside of the wetland boundaries could be established to offer users a great vantage point to observe wildlife.

7 APPENDIX

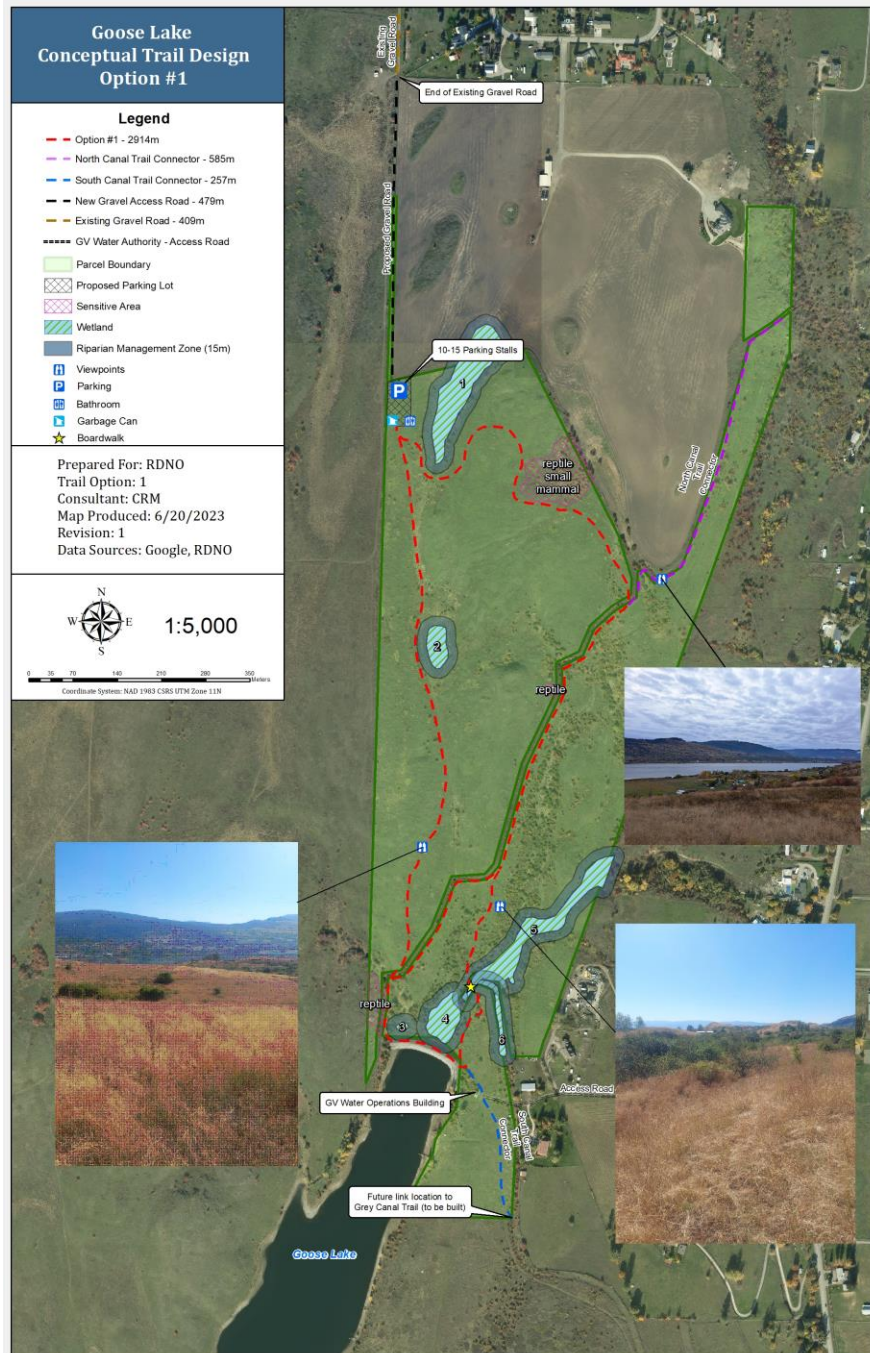
7.1 APPENDIX A: FIGURES

Appendix D. Known and potential threatened and endangered vertebrate animals in the study area.

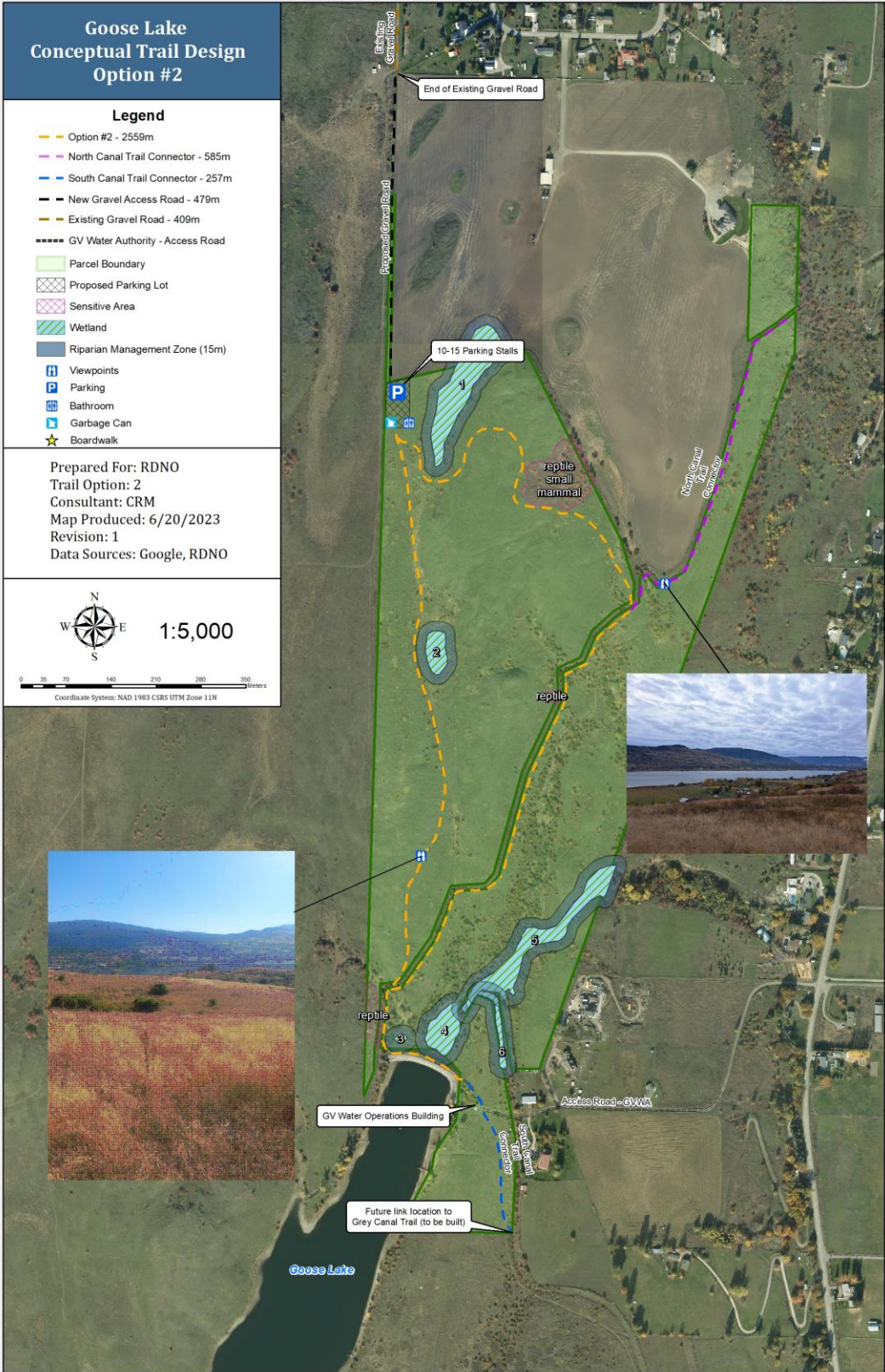
Common Name	Scientific Name	Occurrence in Study Area	Prov. Status	COSEWIC Status	
Amphibians					
Great Basin Spadefoot	<i>Spea intermontana</i>	unknown but likely	Blue	Threatened	
Western Toad	<i>Bufo boreus</i>	unknown but likely	-	Special Concern	
Reptiles					
Painted Turtle	<i>Chrysemis picta</i>	throughout	Blue	-	
Western Skink	<i>Eumeces skiltonianus</i>	unknown but likely	Blue	Special Concern	
Northern Pacific Rattlesnake	<i>Crotalus oreganus</i>	southern portion	Blue	(pending)	
Great Basin Gopher Snake	<i>Pituophis catenifer</i>	throughout	Blue	Threatened	
Racer	<i>Coluber constrictor</i>	throughout	Blue	-	
Rubber Boa	<i>Charina bottae</i>	unknown but likely	-	Special Concern	
Birds					
Great Blue Heron	<i>Ardea herodias</i> ssp. <i>herodias</i>	occasional	Blue	-	
California Gull	<i>Larus californicus</i>	seasonal transients	Blue	-	
American Avocet	<i>Recurvirostre americana</i>	unknown but likely	Red	-	
Long-billed Curlew	<i>Numenius americanus</i>	at least one breeding area	Blue	Special Concern	
Upland Sandpiper	<i>Bartramia longicauda</i>	unknown but possible	Red	-	
Swainson's Hawk	<i>Buteo swainsoni</i>	provincial benchmark	Red	-	
Ferruginous Hawk	<i>Buteo regalis</i>	unknown but possible	Red	Special Concern	
	<i>Otus kennicotti</i> ssp. <i>macfarlanei</i>	unknown but likely	Red	Endangered	
Interior Western Screech-owl	<i>Otus flammeolus</i>	unknown but likely	Blue	Special Concern	
Flammulated Owl	<i>Asio flammeus</i>	unknown but likely	Blue	Special Concern	
Short-eared Owl	<i>Melanerpes lewis</i>	known but uncommon	Blue	Special Concern	
Lewis' Woodpecker	<i>Icteria virens</i>	unknown but possible	Red	Endangered	
Yellow-breasted Chat	<i>Spizella breweri breweri</i>	known from one location	Red	-	
Brewer's Sparrow	<i>Ammodramus savannarum</i>	at least 1 breeding colony	Red	-	
Grasshopper Sparrow	<i>Chondestes grammacus</i>	likely (OK Landing)	Red	-	
Lark Sparrow	Mammals				
Merriam's Shrew	<i>Sorex merriami</i>	unknown but possible	Red	-	
Preble's Shrew	<i>Sorex prebeii</i>	unknown but possible	Red	-	
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	known from one location	Blue	-	
Pallid Bat	<i>Antrozous pallidus</i>	unknown but possible	Red	Threatened	
Fringed Myotis	<i>Myotis thysanodes</i>	unknown (OK Landing)	Blue	Special Concern	
Western Small-footed Myotis	<i>Myotis ciliolabrum</i>	unknown but likely	Blue	-	
Western Harvet Mouse	<i>Reithrodontomys megalotis</i>	known from several areas	Blue	Special Concern	
Great Basin Pocket Mouse	<i>Perognathus parvus</i>	unknown but likely	Blue	-	
Nuttall's Cottontail	<i>Sylvilagus nuttallii</i> ssp. <i>nuttallii</i>	not currently	Blue	Special Concern	
Badger	<i>Taxidea taxus</i>	throughout	Red	Endangered	

Table excerpt obtained from the Goose Lake Sensitive Ecosystem Inventory (Iverson, 2002)

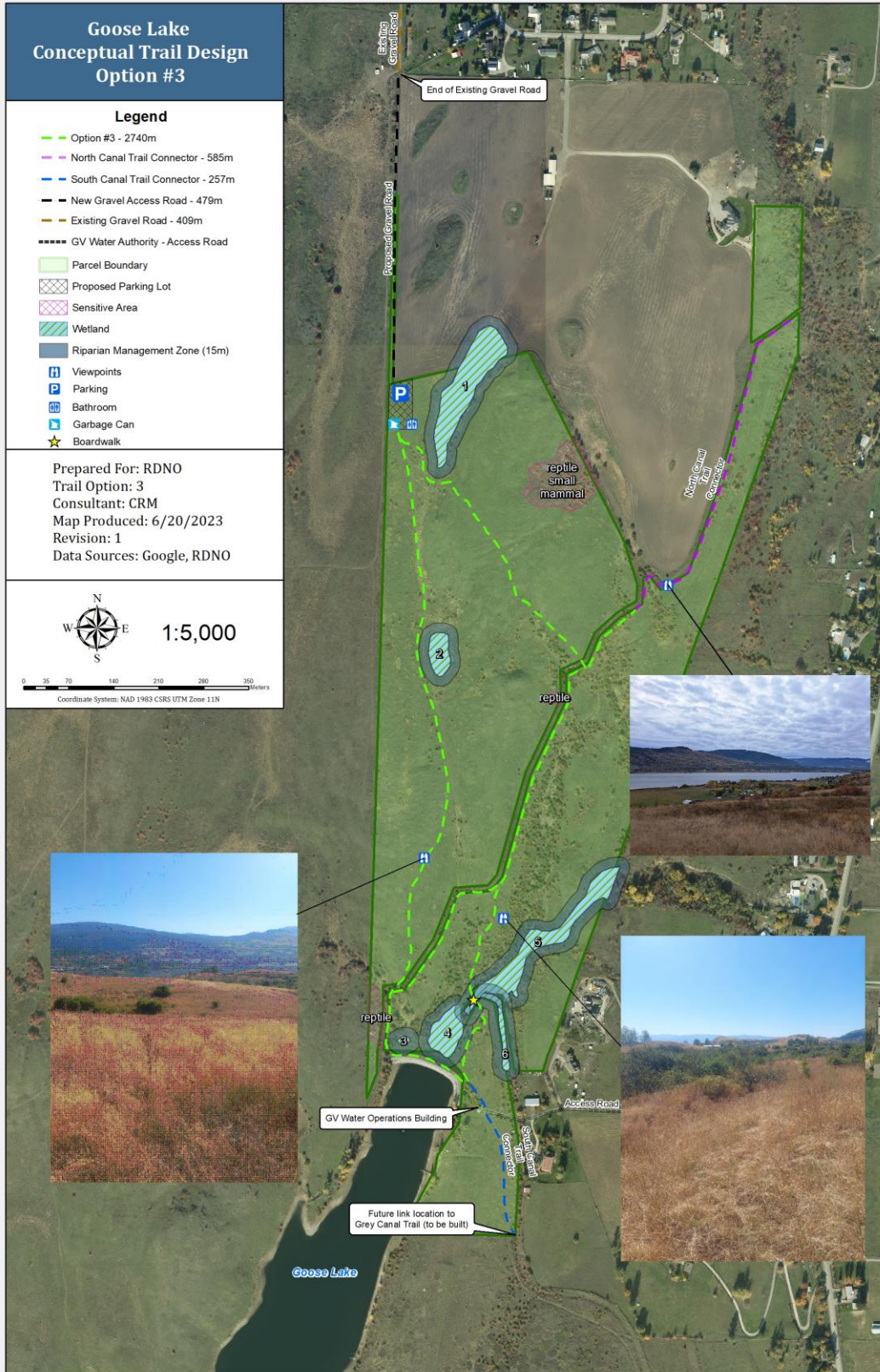
7.2 APPENDIX C: MAPS



Option #1



Option #2



Option #3

7.3 APPENDIX D: PARKING LOT DRAWING

