Vaseux Lake - West
Reconnaissance-level Assessment

Environmental Feasibility Study
Kettle Valley Railway, South Spur Trail

Prepared for:

British Columbia Ministry of Forests, Lands,
Natural Resource Operations and Rural Development
Recreation Sites and Trails BC
Sea to Sky Natural Resource District
101-42000 Loggers Lane
Squamish BC V8B 0H3

Prepared by:
EBB Environmental Consulting Inc.

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Respectfully submitted;

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1 Introduction

The B.C. Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Recreation Sites and Trails BC (RSTBC) contracted EBB Environmental Consulting Inc. (EBB) to conduct a high-level desktop review and analysis of environmental values of the former Kettle Valley Railway (KVR) Line, South Spur for assessing the feasibility of a public recreation route connecting much of the South Okanagan. That report and its recommendations have been presented within the broader report.[1]

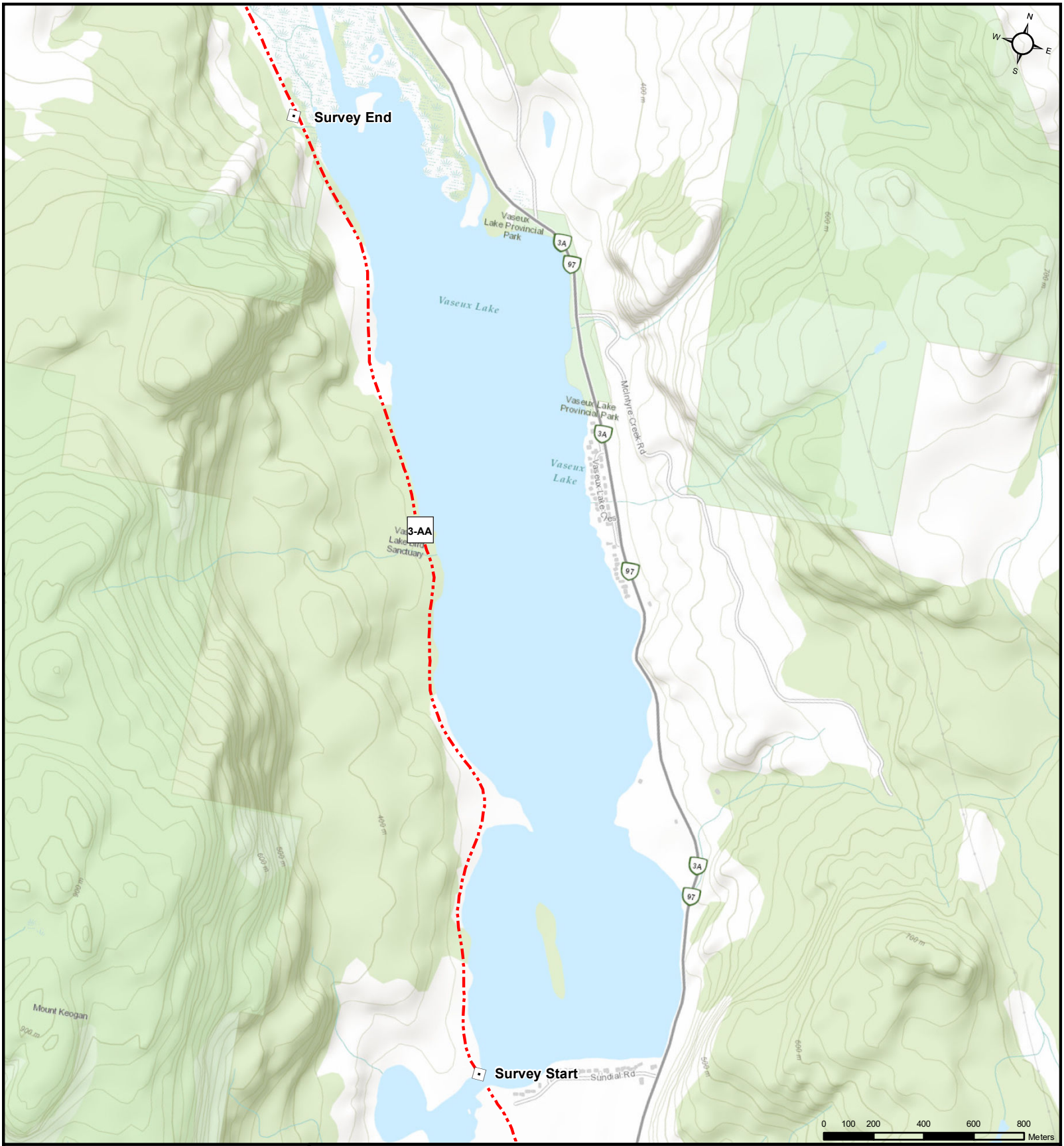
The Regional District of the Okanagan-Similkameen (RDOS) has indicated that they are primarily interested in the development of the former KVR right-of-way (ROW) along the western shores of Vaseux Lake. It is understood that this priority determination is driven in part by health and safety, environmental impact, and the aesthetic considerations of potential routes along Highway 97. There are several environmental constraints on the west side of Vaseux Lake that would need to be addressed in any development proposal and include maintaining habitat connectivity, managing unauthorized off-trail access, monitoring and managing trail traffic frequency, control of invasive species and mitigating direct and indirect effects on species at-risk, breeding birds, fish, and wildlife

The intent of this report is to document the conditions along the existing ROW, identify environmental considerations and constraints and provide recommendations specific to any potential development along the western edge of Vaseux Lake.

2 Methodology

A reconnaissance-level assessment of the existing KVR right-of-way along the westside of Vaseux Lake was carried out on April 3 to 6, 2019 to provide field-level observations and to provide a frame of reference for existing conditions along the ROW from the northern extent of the Vaseux Lake, where the Okanagan River inflows into the lake south to the outflow into the Okanagan River. Field personnel walked the ROW to both observe and photo document the existing conditions of the ROW. Representative photos of the ROW were taken every 100 m. Wildlife species, watercourse crossings and other features of interest were observed and recorded as encountered.

[1] EBB Environmental Consulting Inc. (2018) Environmental Feasibility Study: Kettle Valley Railway, South Spur Trail. Unpublished Report prepared for Recreation Sites and Trails BC, BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development.



BC MINISTRY OF FORESTS, LANDS, NATURAL RESOURCE OPERATIONS AND RURAL DEVELOPMENT
KVR SOUTH SPUR FEASIBILITY STUDY

WEST VASEUX LAKE ASSESSMENT

FIGURE 1

LEGEND

TRAIL_NAME
KVR SOUTH SPUR TRAIL

IMAGERY CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

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MAP SCALE: 1:20,000

Prepared by: EBB Environmental Consulting Inc.

COORDINATE SYSTEM: NAD 1983 BC ENVIRONMENT ALBERS PROJECTION: ALBERS DATUM: NORTH AMERICAN 1983

3 Observations

3.1 Field Conditions

Observations of the former KVR right-of-way indicates that the railbed has retained many qualities of a disturbed site, with little to no re-establishment of vegetation on the former railbed. Some ground cover has started to establish; however, the route remains predominately exposed gravels. Encroachment of the shoulders of the former railbed was noted, with instances of antelope-brush, rabbit-brush and big sagebrush occurring throughout the observed area. Ponderosa pine was also observed re-establishing along the shoulders of the former railbed (Figure 1). Slight to moderate existing use of the trail was observed, both by hiking and horseback riding. Given the pre-existing level of disturbance, habitat loss qualifiers for critical habitat, sensitive ecosystem and ecosystems at risk are likely to be less affected by the re-activation of the trail corridor. Similarly, changes to habitat as a result of trail use will likely be suppressed given the presence of residual effects from the historical railway and its operations.

Figure 1. Representative photos of the existing trail conditions; (1) trail surface with minimal groundcover establishment and ponderosa pine; (2) exposed trail surface with evidence of trail use and density of antelope-brush along the shoulders; (3) exposed railbed and (4) trail condition near the north end of Vaseux Lake.

3.2 Watercourse Crossings

Three existing culverted crossings were observed crossing the exiting railbed (Figure 2). While no active flows were observed at the time, these are presumed to convey snowmelt and stormwater flows and represent one type of sensitive habitat along the route.

Figure 2. Representative photos of the observed culverted crossings trail conditions, (1) inflow of culvert 1; (2) inflow of culvert 2, and (3) outflow of culvert 3.

3.3 Observed Wildlife

37 species of wildlife were either directly or indirectly (sign) observed within or adjacent to the ROW (Table 1) and represent species of wildlife common to the area. No observations of provincially or federally listed species at risk were observed.

Table 1. Listing of species observed during reconnaissance-level surveys.

Wildlife Species Observed				
Class	*Species*	*Scientific Name*	*Number*	*Observations*
Bird	Canada goose	*Branta canadensis*	50	
Bird	American wigeon	*Mareca americana*	2	
Bird	Mallard	*Anas platyrhynchos*	10	
Bird	Bufflehead	*Bucephala albeola*	1	
Bird	California quail	*Callipepla californica*	4	
Bird	Ring-necked pheasant	*Phasianus colchicus*	1	
Bird	Mourning dove	*Zenaida macroura*	2	
Bird	American coot	*Fulica americana*	300	
Bird	Great blue heron	*Ardea herodias*	1	
Bird	Bald eagle	*Haliaeetus leucocephalus*	1	1 inactive nest observed
Bird	Red-tailed hawk	*Buteo jamaicensis*	2	
Bird	Northern flicker	*Colaptes auratus*	3	
Bird	Say's phoebe	*Sayornis saya*	1	
Bird	Steller's jay	*Cyanocitta stelleri*	3	
Bird	American crow	*Corvus brachyrhynchos*	3	
Bird	Common raven	*Corvus corax*	2	
Bird	Tree swallow	*Tachycineta bicolor*	80	
Bird	Violet-green swallow	*Tachycineta thalassina*	10	
Bird	Black-capped chickadee	*Poecile atricapillus*	8	
Bird	Mountain chickadee	*Poecile gambeli*	5	
Bird	Red-breasted nuthatch	*Sitta canadensis*	3	
Bird	Pygmy nuthatch	*Sitta pygmaea*	2	
Bird	Canyon wren	*Catherpes mexicanus*	2	
Bird	Marsh wren	*Cistothorus palustris*	2	
Bird	Ruby-crowned kinglet	*Regulus calendula*	5	
Bird	Western bluebird	*Sialia mexicana*	2	
Bird	American robin	*Turdus migratorius*	1	

Wildlife Species Observed				
Class	*Species*	*Scientific Name*	*Number*	*Observations*
Bird	Pine siskin	*Spinus pinus*	5	
Bird	American goldfinch	*Spinus tristis*	2	
Bird	Song sparrow	*Melospiza melodia*	4	
Bird	Spotted towhee	*Pipilo maculatus*	10	
Bird	Red-winged blackbird	*Agelaius phoeniceus*	11	
Mammal	North American porcupine	*Erethizon dorsatum*	-	Sign documented on Douglas fir
Mammal	Deer sp.	*Odocoileus sp.*	-	Pellets observed along trail; carcass in water
Mammal	Coyote	*Canis latrans*	-	Scat observed along trail
Mammal	Common muskrat	*Ondatra zibethicus*	2	Swimming at trail head
Mammal	Mouse sp.	*Unknown*	2	Observed mating

4 Development Considerations and Constraints

Any potential re-development of the KVR ROW are subject to several considerations and constraints, these include federally managed conservation lands, species at risk, and critical habitat protected under the *Species at Risk Act*.

4.1 Federal Conservation Lands

As the former KVR right-of-way bisects the Vaseux-Bighorn NWA on the western shore of Vaseux Lake, the provisions under subsection 3(1)(a) of the *Wildlife Area Regulation* must be considered and adequately addressed for any potential trail development given the potential for edge effect associated with the development of a trail. Provisions under the regulation prohibits, among others, hunting or fishing; damaging, destroying, or removing a plant; allowing domestic animals to run at large; swimming, picnicking camping or carrying on any other recreational activity, lighting a fire, and dumping or depositing any rubbish, waste material or substance that would degrade or alter the quality of the environment.

Further considerations should be taken to integrate the management objectives of the NWA into any development plan and long-term operations of the trails route. Key management objectives of the NWA to be considered in any development proposal include:

- To maintain habitats and habitat connectivity between the NWA and surrounding landscapes.
- To protect riparian woodlands and ensure no decrease in the spatial extent.
- To reduce and eliminate the extent and density of invasive plants.
- To eliminate incidents of non-permitted recreational access.
- To protect the loss of antelope brush habitat.

As outlined, detailed ground-truthing has been conducted to verify the existing condition of habitat along the west side of Vaseux Lake, therefore any mitigation recommendation is subject to field verification and refinement.

4.2 Critical Habitat

Several federally listed species at risk with identified critical habitat occur along the western side of Vaseux Lake, including Behr's hairstreak (*Satyrium behrii*), great basin spadefoot (*Spea intermontane*), Lewis's woodpecker (*Melanerpes lewis*), pallid bat (*Antrozous pallidus*), yellow-breasted chat, (*Icteria virens auricollis*) and western tiger salamander (*Ambystoma mavortium*). Provisions under the *Species at Risk Act, 2002* specifically subsection 58(1) prohibits the destruction of critical habitat for migratory birds listed under the *Migratory Birds Convention Act, 1994,* of which both yellow-breasted chat (*Icteria virens*) and Lewis' woodpecker (*Melanerpes lewis*) are identified. While the KVR South Spur trail is considered pre-existing disturbed habitat along the ROW, critical habitat remains along the shoulders of the trail. Therefore, any development or upgrades to the would have to either avoid disturbing or destroying critical habitat or obtain a permit to allow for the removal of habitat outside of the existing ROW, but during the construction phase and the operational phase.

Recommendations

- Restrict any development works to the existing disturbed ROW.
- Install fencing, rails or similar physical barriers to delineate the boundary between the trail and critical or sensitive habitat.
- Install signage to communicate the importance of the habitat to the identified wildlife species.
- Do not install infrastructure, such as benches, that would encourage activities that could adversely impact critical habitat.
- Implement monitoring of the habitat to ensure that no adverse effects are occurring and proactively address any potential issues.

4.3 Species at Risk

Numerous species at risk have been documented to occur or has potential to occur along the west side of Vaseux Lake (Table 2). These have been discussed in detail within the broader environmental feasibility assessment. Any trail development on adjacent to the Bighorn-Vaseux NWA must consider all potential edge effects on federally listed species at-risk to avoid contravening the *Species at Risk Act,* in particular, subsections 32(1), killing, harming, harassing, capturing, or taking; 33, damaging or destructing the residence of; or, 56, destroying any part of the critical habitat of listed wildlife species.

Table 2. Summary of federally listed species at risk potentially occurring along the west side of Vaseux Lake.

Identified SARA Wildlife Species at Risk			
English Name	*Scientific Name*	*CDC List*	*SARA CF Priority*
Blotched Tiger Salamander	*Ambystoma mavortium*	Red	1-E
Western Toad	*Anaxyrus boreas*	Yellow	1-SC
Northern Rubber Boa	*Charina bottae*	Yellow	1-SC
Painted Turtle, Rocky Mountain Population	*Chrysemys picta* pop. 2	Blue	1-SC

Identified SARA Wildlife Species at Risk			
English Name	*Scientific Name*	*CDC List*	*SARA CF Priority*
North American Racer	*Coluber constrictor*	Blue	1-SC
Western Rattlesnake	*Crotalus oreganus*	Blue	1-T
Bobolink	*Dolichonyx oryzivorus*	Blue	1-T
Spotted Bat	*Euderma maculatum*	Blue	1-SC
Rocky Mountain Ridged Mussel	*Gonidea angulata*	Red	1-E
Barn Swallow	*Hirundo rustica*	Blue	1-T
Desert Nightsnake	*Hypsiglena chlorophaea*	Red	1-E
Yellow-breasted Chat	*Icteria virens*	Red	1-E
Western Screech-owl, *Macfarlanei* ssp.	*Megascops kennicottii macfarlanei*	Blue	1-T
Lewis's Woodpecker	*Melanerpes lewis*	Blue	1-T
Little Brown Myotis	*Myotis lucifugus*	Yellow	1-E
Sage Thrasher	*Oreoscoptes montanus*	Red	1-E
White-headed Woodpecker	*Picoides albolarvatus*	Red	1-E
Gopher Snake, *Deserticola* ssp.	*Pituophis catenifer deserticola*	Blue	1-T
Western Harvest Mouse	*Reithrodontomys megalotis*	Blue	1-SC
Behr's Hairstreak	*Satyrium behrii*	Red	1-E
Great Basin Spadefoot	*Spea intermontana*	Blue	1-T
Olive Clubtail	*Stylurus olivaceus*	Red	1-E
Nuttall's Cottontail	*Sylvilagus nuttallii*	Blue	1-SC
American Badger	*Taxidea taxus*	Red	1-SC

Recommendations

- A comprehensive field survey and assessment of potential habitat for federally listed species at-risk, both within and adjacent to the ROW, is to be conducted to determine the presence of a quality of habitat within and adjacent to the ROW.

5 Recommendations

Notwithstanding the reconnaissance-level observations, measures to protect environmental values are recommended. In addition to specific measures detailed in the following sections, general considerations include:

- For any proposed trail development along the western side of Vaseux Lake comprehensive field assessments should be undertaken to fully describe habitat conditions and develop site-specific routing and mitigation measures.
- While any potential trail routing through critical habitat for yellow-breasted chat and Lewis' woodpecker is unlikely to result in direct loss of habitat, the potential for edge effect and changes to habitat structure along the boundary of the trail route are to be taken into consideration. Measures such as re-routing the trail, restricting access, seasonal closure (e.g., during nesting season), should be considered.
- Disturbances to antelope-brush should be kept to a minimum along the shoulders of the trail and managed towards a more natural state.

5.1.1 Habitat Connectivity

Habitat connectivity has been historically impacted by the former KVR South Spur and existing levels of unauthorized trail use; however, further habitat fragmentation can result from trail development, particularly where larger tracts of habitat occur along the between the existing right-of-way and the shoreline. Habitat connectivity between the riparian habitat along the western shore of Vaseux Lake and the upland terrestrial habitat is important in maintaining the form and function of the habitat within the NWA.

Minimizing the effects of any potential trail development on habitat connectivity is important, considering the management objectives of the Vaseux-Bighorn NWA. Relevant objectives include:

- Maintaining habitats and habitat connectivity between the NWA and surrounding landscapes.
- Maintain no decrease in the spatial extent of riparian woodlands.

Recommendations

To mitigate the effects of trail development on habitat fragmentation and maintain connectivity, the following general measures are recommended.

- Maintain the surfaced area of the trail to no more than 2.0 m.
- Elevated boardwalks are recommended to maintain connectivity and wildlife migration from the upland habitat to larger tracts of habitat along the western shore of Vaseux Lake.
- Elevated boardwalks should be constructed over any permanently or seasonally wetted areas and watercourses occurring along the trail alignment.

5.1.2 Unauthorized Off-Trail Access

The development of the trail corridor along the western side of Vaseux Lake will result in an increase of recreational users utilizing the trail. With increased usage comes the increased probability of unauthorised access and off-trail impacts. The *Wildlife Area Regulation* prohibits several activities, that with formal access, are likely to be exacerbated. Activities including fishing, swimming and picnicking are likely increase along the shores of Vaseux Lake with formal access.

Recommendations

Minimizing the effects of off-trail activities are necessary in ensuring compliance with the federal *Wildlife Area Regulation* and the objectives within the Vaseux-Bighorn NWA Management Plan. General mitigation measures include:

- Install fencing, rails or similar visual barriers to delineate the boundary between the trail and the NWA. Installations should focus on environmentally sensitive areas (ESA) or
- Signage should be installed at the north and south boundaries of the NWA identifying access restrictions within the corridor and within strategic locations along the trail section.
- No benches, viewing platforms, kiosks, toilet facilities or similar infrastructure are to be constructed within the section to discourage wandering off-trail.
- An environmental compliance and enforcement policy specific to the west Vaseux Lake route should be prepared and implemented by any future proponent to ensure compliance with the *Wildlife Area Regulation.*