Kathlyn Creek III and Henry Road – Environmental Assessments

November 23, 2021 | Final #1

Submitted to: BC Ministry of Transportation
Prepared by McElhanney

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Our file: 2321-30342-00 Task 2004

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1. Introduction

1.1. SCOPE

McElhanney Ltd. (McElhanney) was retained by the Ministry of Transportation and Infrastructure (MoTI) – Northern Region to complete Environmental Assessments for the proposed Kathlyn Creek III Highway 16 clear-span bridge and the Henry Road Kathlyn Creek clear-span bridge construction projects. In addition, McElhanney's understanding is that Henry Road may be used as a detour route during construction at the Kathlyn Creek III site on Highway 16 and, as such, may require upgrading to handle highway traffic. McElhanney completed field assessments of both proposed sites on Wednesday, September 30, 2020. Field observations were made from the Highway 16 and Henry Road shoulders, existing MoTI right-of-way (ROW), the banks of Kathlyn Creek, and private property alongside Kathlyn Creek.

1.2. OBJECTIVE

The objective of this report is to identify and summarize environmentally sensitive terrestrial and aquatic features and resources within the two project areas that may impact the design or works for the proposed construction of the clear span bridges over Kathlyn Creek on Highway 16 and on Henry Road. The environmental assessments will support subsequent *Fisheries Act* and *Water Sustainability Act* applications for project approvals. Mitigation measures to minimize potential environmental impacts by the projects will be outlined in separate Environmental Management Plan (EMP) documents for each site.

1.3. STUDY AREA LOCATIONS

The Kathlyn Creek III project area is located at UTM coordinates 09U, E: 624271, N: 6076434. The Kathlyn Creek III crossing is located approximately 3.8 km northwest of the Highway 16 and Main Street intersection in Smithers, BC. The Kathlyn Creek III project area (Figure 2) encompasses both sides of Highway 16 from 250 m before the Lake Kathlyn Road intersection north to 415 m beyond the intersection. As well, the project includes an area centered around Kathlyn Creek extending approximately 140 m upstream and 130 m downstream, by approximately 60 m wide (15,300 m^2). To improve the Lake Kathlyn Road intersection with Highway 16, the project will require an area of 3,200 m^2 west of Lake Kathlyn Road and north of Proctor Junction Road and an area west of Lake Kathlyn Road and Highway 16 and south of Proctor Junction Road (17,600 m^2).

Figure 1: Kathlyn Creek III and Henry Road culvert locations 3.8 and 3.2 km, respectively, northwest of Smithers, BC (Google Earth, July 28, 2021).

Figure 2: Kathlyn Creek III project area (Google Earth, August 5, 2021).

The Henry Road project area is located at UTM coordinates 09U E: 624271, N: 6076434. Henry Road begins on Highway 16, west of Smithers opposite the Slack Road and Highway 16 intersection. The Henry Road culvert is approximately 90 m north of the intersection and is 3.25 km from the Highway 16 and Main Street intersection in Smithers. The project includes an area (Figure 3) centered around Kathlyn Creek extending approximately 90 m upstream and 145 m downstream, with width varying from 20 to 70 m (7,245 m^2). As well, the full length (1.5 km) of Henry Road from the Highway 16 intersection at the south end to the Highway 16 intersection at the north end is proposed as a detour route for the Kathlyn Lake III project and thus may require upgrades to MoTI standards. The total area including the existing road surface required for the detour route is approximately 23,500 m^2.

Both the Kathlyn Creek III location and the Henry Road location are in semi-rural settings on the west side of the Bulkley Valley, with rural residences and acreages surrounding the locations (Figure 1). The Henry Road bridge location is approximately 750 m downstream of the Highway 16 Kathlyn Creek III crossing.

Figure 3: Henry Road project area (Google Earth, Aug 05, 2021).

2.1. EXISTING CONDITIONS

The flow from Kathlyn Creek passes under Highway 16 through a large, multi-plate, closed bottom arch culvert, 3700 mm wide by 2340 mm high (Figure 4). The culvert was not embedded and was 22 m in length. Water depth in the culvert was approximately 50 cm at the time McElhanney visited the study area. Based on the rust stains, the Ordinary High Water Mark (OHWM) is at approximately 0.70-0.75 m. The culvert inlet and outlet were flush with the stream bed and the outlet end of the culvert had infilled naturally with a shallow layer of bed material (Figure 5). The bed material within the culvert was a mix of fines with larger cobbles and gravels which was not suitable as spawning habitat. Wooden piles present in the stream channel approximately 35 m downstream of the Highway 16 culvert suggest a previous stream crossing existed here.

Figure 4: Kathlyn Creek III culvert outlet.

2.2. AQUATIC RESOURCES

Approximately 10 m downstream of the Highway 16 culvert outlet, the stream channel makes a hard bend to the south against a 2-m-high embankment. The stream channel then parallels Highway 16 southward on the east side for approximately 22 m before turning southeast for 45 m. From here the stream channel once again turns south and passes under a private driveway bridge approximately 90 m downstream of the outlet.

Figure 5: Kathlyn Creek III culvert outlet with naturally infilled bed material.

Figure 6: Kathlyn Creek III culvert outlet pool with old pumphouse to northeast.

Existing shrubs such as alder (*Alnus* sp.), willow (*Salix* spp.) and young cottonwood (*Populus trichocarpa*) overhung the stream below the highway and provided good stream cover in the reach (Figure 7). There

was good stream cover for the first 30 m upstream of the existing Highway 16 culvert (Figure 8), then the channel became wider, with less tall shrub cover along the stream banks.

Figure 7: Kathlyn Creek view downstream of the Highway 16 culvert with good overhanging vegetation.

Figure 8: Kathlyn Creek upstream of the Highway 16 culvert with good overhanging vegetation.

Dense, thick, short shrubs such as pink spirea (*Spirea douglasii*) and forbs like fireweed (*Epilobium angustifolium*) were the predominant vegetation adjacent to the stream from approximately 30 to 105 m upstream (Figure 10). Bed material was predominantly small gravels and fines for the upstream and downstream reaches assessed, except where riffle habitat was present. Where riffles occurred, the bed material tended to larger substrate like cobbles and boulders. The replacement of the culvert on Highway 16 with a clear-span bridge structure will restore approximately 81 m^2 of functional stream habitat and provide safe fish passage upstream for all life stages of fish present in Kathlyn Creek.

Simpson Creek is a tributary stream to Kathlyn Creek approximately 135 m upstream of the Highway 16 Kathlyn Creek III culvert and is outside the proposed project limits. The Highway 16 ditch on the east side of the highway drains south and directly enters Kathlyn Creek on the north side of the culvert outlet pool beside the old pumphouse (Figure 6). The ditch was dry at the time of the field assessment. No ditch was observed on the east side of the highway south of the Kathlyn Creek III culvert. As well, no ditches were noted on the west side of the highway north of the Highway 16 and Lake Kathlyn Road intersection. What appeared to be an old, abandoned pump house was located on the northeast side of the culvert outlet pool approximately 2 m north of Kathlyn Creek (Figure 6). The Northwest Water Tool website indicated two water licences upstream of the Kathlyn Creek III project site and two water licences downstream of the Henry Road project area on a north tributary to Kathlyn Creek (Figure 9). All four water licence locations are outside the proposed construction limits and should not be impacted by construction activities.

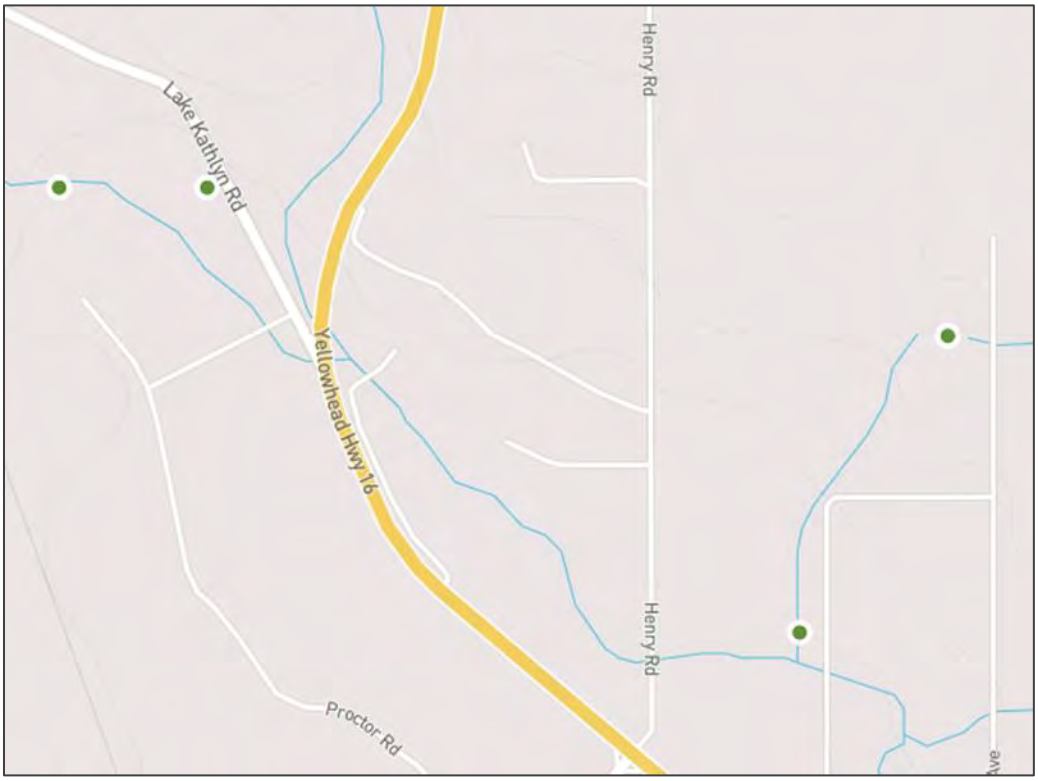

Figure 9: Water licence locations upstream and downstream of the project areas. (BC Water Tool, Sept 9, 2021).

Figure 10: Kathlyn Creek 40 m upstream of the Highway 16 culvert with short shrubs along the stream banks.

2.2.1. Fish Presence

Kathlyn Creek is a direct tributary to the Bulkley River, which subsequently drains into the Skeena River. A search of the Ministry of Forests, Lands and Natural Resource Operations and Rural Development (FLNRORD) Fisheries Inventory Data Query (FIDQ) database indicated the presence of at least eleven fish species in Kathlyn Creek. These include coho salmon (*Oncorhynchus kisutch*), pink salmon (*O. gorbuscha*), cutthroat trout (*O. clarkii*), rainbow trout (*O. mykiss*), steelhead (*O. mykiss*), lamprey (general) (*Lampetra* sp.), longnose dace (*Rhinichthys cataractae*), longnose sucker (*Catostomus catostomus*), mountain whitefish (*Prosopium williamsoni*), northern pikeminnow (*Ptychocheilus oregonensis*), and prickly sculpin (*Cottus asper*). The author has observed steelhead spawning in Kathlyn Creek in the spring, where Kathlyn Creek runs through the Smithers Golf Course downstream of the Kathlyn Creek II and III culverts. Wilson and Rabnett (March 2007) reported steelhead presence in Kathlyn Lake and spawning upstream of the Chicken Creek confluence. The same report indicates the main coho spawning occurs in Simpson, Kathlyn and Chicken Creeks downstream of Lake Kathlyn. Three adult coho salmon were observed spawning approximately 40 m upstream of the Kathlyn Creek III culvert inlet during the field investigation (Figures 10 and 11).

Figure 11: Coho salmon spawning approximately 40 m upstream of the Highway 16 culvert inlet.

Sampling for fish presence was not considered necessary, as fish presence in Kathlyn Creek is well documented. No impassable barriers exist between the MoTI Kathlyn Creek III culvert and the Bulkley River. As well, there are no known barriers to fish passage between the culvert and Lake Kathlyn upstream. Fish not included in the list above but present in the Bulkley River could also be present in Kathlyn Creek. Some likely species would be chinook salmon (*Oncorhynchus tshawytscha*), Dolly Varden (*Salvelinus malma*), and bull trout (*S. confluentus*). None of the fish species identified as being present (or likely to be present) in Kathlyn Creek are listed under Schedule 1 of the Government of Canada's Species at Risk Act (SARA) Species at Risk Public Registry (2012). As well the DFO Aquatic Species at Risk Map page was reviewed which found no species at risk present in Kathlyn Creek and Lake Kathlyn, Coastal cutthroat trout and bull trout are provincial blue-listed species (BC Conservation Data Centre, 2021). Due to the extensive species assemblage in Kathlyn Creek, there is no least-risk timing window for this stream due to overlapping instream work windows (Table 1). Aquatic resources and fish presence associated with Kathlyn Creek near the project site are summarized in Table 2.

Table 1: Graphic representation of species-specific Reduced-Risk Instream Work Windows for Bulkley River (blocked out in green).

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
BT												
CH												
CO												
CT												
DV												
MW												
PK												
RB												
ST												

Table 2: Highway 16 Kathlyn Creek III Culvert Aquatic Resources Summary.

Watershed Code	Kathlyn Creek (WSC 460-345400-26700)
Field Investigation	A field investigation was completed September 30th, 2020 by McElhanney biologist Ralph Kossman.
General Description	Kathlyn Creek is a known fish bearing stream with important fish values. Simpson Creek joins Kathlyn Creek approximately 135 m upstream of the Kathlyn Creek III culvert on Highway 16 and should be unaffected by this project. Coho salmon were observed spawning approximately 40 m upstream of the Highway 16 culvert inlet during the field investigation.
Channel Description	Average channel width is 6.2 m (from Kathlyn Creek #2 Stream Assessment Report, McElhanney, March 2012). The stream provides good spawning and rearing habitat as well being an important migratory route.
Additional Aquatic Features	Highway ditch on the east side of the highway north of the Kathlyn Creek III culvert. Old pump house on north side of outlet pool outside of the wetted perimeter. Ditches were absent on the west side of the highway. Two water licences upstream of the Kathlyn Creek III project site.
Stream Classification	Kathlyn Creek is classified as an S2 stream in accordance with the Riparian Management Area Guidebook (Province of BC 1995).
Fish Habitat and Presence	*Habitat Wizard* indicates Kathlyn Creek supports populations of coho salmon (*Oncorhynchus kisutch*), cutthroat trout (*O. clarkii*), lamprey (general) (*Lampetra* sp), longnose dace (*Rhinichthys cataractae*), longnose sucker (*Catostomus catostomus*), mountain whitefish (*Prosopium williamsoni*), northern pikeminnow (*Ptychocheilus oregonensis*), pink salmon (*O. gorbuscha*), prickly sculpin (*Cottus asper*), rainbow trout (*O. mykiss*), and steelhead (*O. mykiss*). Kathlyn Creek is an important migratory route and provides good quality spawning, rearing and overwintering habitat for fish.
Instream Work Window	Due to the species assemblage in Kathlyn Creek, there is no least-risk timing window for this stream due to overlapping instream work windows.
Amphibians	Four species of amphibian potentially could occur within the project limits. They include the western toad (*Anaxyrus boreas*), the Columbia spotted frog (*Rana luteiventris*), the wood frog (*Lithobates sylvaticus*), and the northwestern salamander (*Ambystoma gracile*).
Species at Risk	No fish Species at Risk were noted for Kathlyn Creek. The western toad is yellow-listed in BC and is designated federally as a species of Special Concern.

2.3. AMPHIBIANS

There is only one listed species of amphibian that is likely to occur within the project area: the western toad (*Anaxyrus boreas*). The western toad was designated federally as a species of Special Concern in 2002 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC); the status was reviewed and upheld by COSEWIC in 2012. It is on Schedule 1 (1-SC) of the federal Species at Risk Act (SARA) (2018). It is probable that the provincially yellow-listed (Not at Risk) western toad will be

encountered within the project footprint during the summer months. Other non-listed amphibians that may be encountered include the Columbia spotted frog (*Rana luteiventris*), the wood frog (*Lithobates sylvaticus*), and the northwestern salamander (*Ambystoma gracile*). It is likely these species will be encountered along the floodplain of Kathlyn Creek and within the ditches of the roads within the project area. An amphibian survey of the project area should be undertaken before the anticipated start of the project works. It is not anticipated that ROW clearing before spring will impact any amphibians.

2.4. TERRESTRIAL RESOURCES

Both the Kathlyn Creek III and Henry Road locations are within the Sub-Boreal Spruce dry cool (SBSdk) biogeoclimatic subzone, on the west side of the Bulkley Valley near the valley bottom (Figure 12). The sites are near the northern limits of the SBSdk subzone in the Bulkley Valley where the subzone transitions to the adjacent Sub-Boreal Spruce moist cold subzone Babine variant (SBSmc2) and Interior Cedar Hemlock moist cold subzone Hazelton variant (ICHmc2). Human activity in the forms of agriculture, settlement, logging and burning along with a history of wildfire have affected all parts of the SBSdk. Consequently, much of the landscape is in early to mid seral stages. The field review of the two sites indicated anthropogenic activities have influenced the present riparian and upland vegetation found at the sites. A review of the B.C. Conservation Data Centre's BC Species and Ecosystems Explorer website did not identify any red or blue listed ecosystem associations within the project areas.

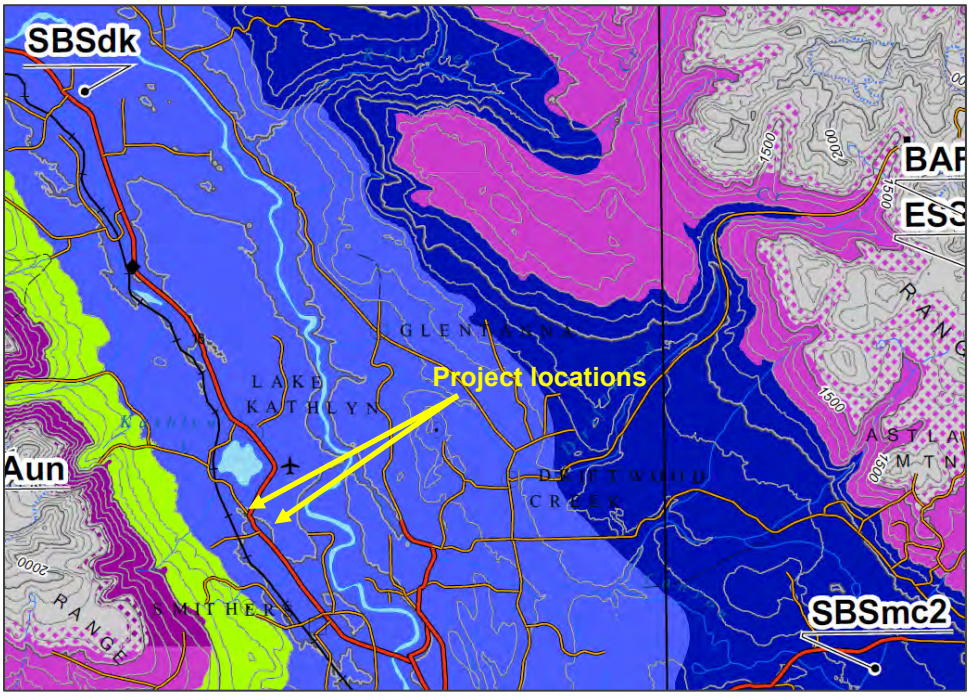

Figure 12: Kathlyn Creek III and Henry Road project locations in the SBSdk biogeoclimatic subzone.

2.5. VEGETATION

Vegetation in the floodplain area adjacent to Kathlyn Creek was a patchy distribution of young deciduous species in a variety of seral stages, ranging from shrub-herb to young forest. Observations indicate the site was previously disturbed or cleared at some time, and that periodic maintenance brushing may have occurred to maintain sight lines and keep vegetation away from the highway right-of-way and power and telephone lines. Tree species present were trembling aspen (*Populus tremuloides*), cottonwood (*Populus trichocarpa*), paper birch (*Betula papyrifera*) and hybrid white spruce (*Picea glauca x engelmannii*). Only one birch and two spruce were observed, all on the upstream side of the Highway 16 culvert between Highway 16 and Lake Kathlyn Road. In the shrub layer, black twinberry (*Lonicera involucrata*), hardhack (*Spiraea douglasii*), prickly rose (*Rosa acicularis*), red-osier dogwood (*Cornus stolonifera*), Sitka alder (*Alnus crispa* ssp. *sinua*ta), snowberry (*Symphoricarpos albus*) and willow species (*Salix* sp.) were noted. Hardhack was more prevalent on the floodplain near the creek while prickly rose and snowberry were common higher up and further away from the stream where there was less influence from the water table. Fireweed (*Epilobium angustifolium*) and grasses were the most common herbs observed.

The area to the north and west of Lake Kathlyn Road is on a piece of flat property which is mostly lawn with young cottonwood, a few juvenile spruce and willow shrubs along the south edge adjacent to Proctor Junction Road. The area to the south of Proctor Junction Road is also mainly flat. Deciduous species are predominant with a small stand of trembling aspen southwest of the Lake Kathlyn Road and Highway 16 intersection. The center of the area is shrubby with willow, hardhack and black twinberry as the predominant species which indicate the area likely experiences a higher than zonal hydrological regime. A relatively deep ditch is located on the south side of Proctor Junction Road with some trembling aspen trees, immature cottonwood trees and willows bordering the road. It is unlikely that any rare or endangered plant species occur within the study area, due to the suspected periodic maintenance brushing and the young age of the trees.

Figure 13: View southwest to proposed new intersection of Lake Kathlyn Road and Highway 16.

2.5.1. Invasive Plant Species

Canada thistle (*Cirsium arvense*) was observed on the east embankment of Highway 16 during the site investigation and may also be present along Lake Kathlyn Road and Proctor Road. A review of known invasive plant species was also conducted for the project area. The Invasive Alien Plant Program (IAPP) Map Display was searched; Table 3 lists the species that were identified nearest to the project limits. Other invasive plants may or may not be present within the study area but were not observed during the field review.

Table 3: Invasive plant species documented in the vicinity of the Kathlyn Creek III and Henry Road project limits.

Common Name	*Scientific Name*
Burdock species	*Arctium* spp.
Canada Thistle	*Cirsium arvense*
Common Tansy	*Tanacetum vulgare*
Curled dock	*Rumex crispus*
Dalmatian toadflax	*Linaria dalmatica*
Groundsel	*Senecio vulgaris*
Mountain Bluet	*Centaurea montana*
Meadow buttercup	*Ranunculus acris*
Orange Hawkweed	*Hieracium aurantiacum*
Oxeye Daisy	*Leucanthemum vulgare*
Scentless chamomile	*Matricaria maritime*
Tall Hawkweed	*H. piloselloides*
Yellow Hawkweed	*H. pratense*

2.6. WILDLIFE

There are three blue-listed mammal species identified that have the potential to occur within the SBSdk biogeoclimatic subzone and thus the project area. These include the wolverine, luscus subspecies (*Gulo gulo luscus*), the caribou (*Rangifer tarandus* pop. 15), and the grizzly bear (*Ursus arctos*). Generally, these species avoid human contact. Considering that the proposed project location is in a semi-rural setting with rural residences and acreages surrounding the location and heavy daily traffic on Highway 16 and Lake Kathlyn Road, the risk of encountering any of these species is very low. No evidence of ungulate browsing was apparent on the roadside or streamside shrubs.

Beavers have been well documented in the Kathlyn Creek system with beaver dams noted at the Smithers Golf course and downstream of the Kathlyn Creek II bridge. No dams or recent observations of beavers or dams were noted during the field review of the Kathlyn Creek III culvert location. It is unlikely that any terrestrial habitat or feature essential to the survival of individual animals or populations exist within the project area.

2.7. BIRDS

Six species of blue-listed birds were identified as potentially occurring within the SBSdk biogeoclimatic subzone: the barn swallow (*Hirundo rustica*), the black swift (*Cypseloides niger*), the northern goshawk atricapillus subspecies (*Accipiter gentilis atricapillus*), the olive-sided flycatcher (*Contopus cooperi*), the rusty blackbird (*Euphagus carolinus*), and the short-eared owl (*Asio flammeus*). With the exception of the northern goshawk, the other five species are migrants and are not known to overwinter in the area. The existing vegetation on each side of Highway 16 at the Kathlyn Creek III culvert can provide suitable breeding and nesting habitat for passerine avian species during the spring/summer nesting window. The presence of active nests could cause work delays until the young birds have fledged and vacated the nests.

No raptor nests were observed within the project footprint during the field investigation. The northern goshawk typically prefers large areas of coniferous old-growth and mature forest which were not present at the project location. The short-eared owl prefers open terrain and would therefore not be expected to nest within the project location either.

Together, the federal Migratory Birds Regulations (MBR) and the BC Wildlife Act prohibit the possession, injury, disturbance/molestation or destruction of birds, their eggs, or their nests when occupied by birds or eggs. The clearing of the project footprint has the potential to impact nesting birds if clearing occurs within the breeding and nesting period. The project location is in Environment Canada's Nesting Zone A4, which has a nesting period from late April (April 20) to mid-August (August 15) (Figure 14).

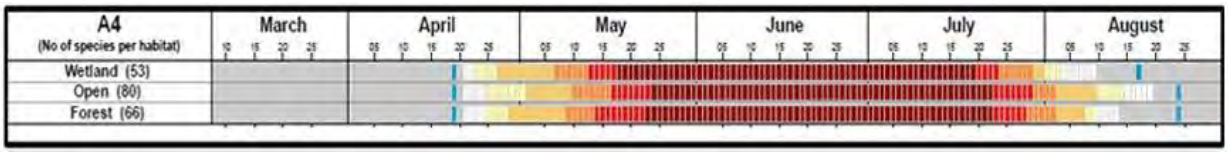

Figure 14: Environment Canada Nesting Zone A4 nesting calendar

Provided clearing for the project can be completed before the start of the nesting period, migratory bird nesting and breeding surveys could be avoided. If clearing is not completed before the nesting season, a Qualified Environmental Professional should be retained to complete the breeding bird and nesting surveys. All felled trees and cleared material should be removed from the project area before the onset of the nesting period so the material doesn't provide nesting opportunities.

2.8. RARE ECOSYSTEMS

A review of the BC Conservation Data Centre website did not indicate the presence of any provincially listed ecological communities within 1.5 km of the proposed project footprint. No SARA-listed ecological communities were identified. The nearest occurrence of a red-listed ecosystem is a saskatoon/slender wheatgrass (*Amelanchier alnifolia/Elymus trachycaulus*) community 2.8 km south of the project area. A blue-listed ecosystem, the black cottonwood – hybrid white spruce/red-osier dogwood community occurs 1.5 km east of the Henry Road location on the west bank of the Bulkley River.

There is no risk that the project will impact either of the listed ecological communities due to the distance between the project location and the ecosystem occurrence. Terrestrial resources associated with the study area around Kathlyn Creek III are summarized in Table 4.

Table 4: Kathlyn Creek III Terrestrial Resources Summary.

Biogeoclimatic Zone	The project is located within the Sub-Boreal Spruce dry cool (SBSdk) biogeoclimatic subzone on the west side of the Bulkley Valley near the valley bottom.
Field Investigations	A field investigation was completed Sept 30th, 2020 by McElhanney biologist Ralph Kossman.
General Description	The terrestrial area assessed was limited to visual observations from the shoulders of Highway 16, Lake Kathlyn Road, Proctor Junction Road and the banks of Kathlyn Creek. Private lands surround the MoTI Right of Ways. Aside from Kathlyn Creek, no other aquatic features were observed within the project area. Vegetation was predominantly young deciduous tree and shrub species of various seral stages.
Vegetation	Vegetation within the Project area is typical of previously disturbed areas within the SBSdk subzone. Vegetation was a patchy distribution of deciduous forest in a variety of early seral stages ranging from shrub-herb to young forest. Tree species present were trembling aspen (*Populus tremuloides*), cottonwood (*Populus trichocarpa*), paper birch (*Betula papyrifera*) and hybrid white spruce (*Picea glauca x engelmannii*). A listing of plant species observed within the study area is provided in Appendix I. A BC red-listed ecological community occurrence (Saskatoon / Slender Wheatgrass) is documented approximately 2.8 km south of the project area and a BC blue-listed ecological community occurrence (black cottonwood–hybrid white spruce/red-osier dogwood) is documented approximately 1.5 km east of the project area. Appendix II provides a list of the nearest rare ecosystems and their proximity to the project areas.
Wildlife	Due to the relatively young age and patchy distribution of the deciduous forest on each side of Highway 16 and Lake Kathlyn Road, it is unlikely that the project area provides any effective ungulate over-wintering habitat and no evidence of browsing was noted. It is likely that most wildlife common to the area pass through the project site occasionally but would generally tend to avoid it due to the traffic on Highway 16, Lake Kathlyn Road, Proctor Junction Road and the construction activity. A list of rare and/or endangered animal species potentially occurring within the project area is provided in Appendix III.
Birds/Nesting	The vegetation on each side of the MoTI RoW of Highway 16, Lake Kathlyn Road, Proctor Junction Road and around Kathlyn Creek provides suitable breeding and nesting habitat for avian species during the spring/summer nesting window. In order to avoid undertaking breeding/nesting bird surveys and construction delays due to the presence of active nests, the RoW should be cleared prior to the onset of the nesting season (April 20) and all felled trees and cleared material should be removed from the project area.
Species at Risk	There is limited potential for several listed wildlife species to be found within the Project area. It is extremely unlikely that any habitats essential to the survival of individual animals or populations exist within the project area due to the early seral stage of the vegetation.

3.1. EXISTING CONDITIONS

The flow from Kathlyn Creek passes under Henry Road through a skewed 2500 mm diameter corrugated metal culvert (Figure 15). The culvert was not embedded and was 18.7 m in length. The culvert skew is in a northeast direction compared to the north-south orientation of Henry Road. Water depth in the culvert was approximately 50 cm at the time McElhanney visited the study area. Rust stains indicate the OHWM is at approximately 0.7–0.8 m. The culvert appeared to be flush with the stream bed rather than embedded in the stream channel. Due to the constricted width of the culvert compared to the average channel width (2.5 m vs. 6.2 m), velocities through the culvert barrel can be high enough to act as a velocity barrier to some life stages of fish. However, the culvert appears to be passable to all life stages of fish at certain times of the year as it does not limit fish distribution upstream of the culvert. Some erosion of the south bank was observed approximately 8 m upstream of the culvert inlet (Figure 18).

Figure 15: Outlet of Henry Road culvert looking upstream (McElhanney Sep. 30, 2020).

Kathlyn Creek approaches Henry Road from the west, approximately 40 m upstream of Henry Road the stream makes a hard turn southward for 20 m before turning northeast and entering the Henry Road culvert. From the culvert outlet, Kathlyn Creek runs north roughly parallel to Henry Road for approximately 20 m and then curves eastward over the next 15 m before running due east for the next 60 m (Figure 16).

Ditches were present on the east and west sides of Henry Road to the north and south of the Kathlyn Creek culvert and drained towards Kathlyn Creek. From the north, the east ditch runs directly into Kathlyn Creek approximately 25 m downstream of the culvert outlet. The west ditch appeared to drain into a low lying and seasonally wetted area to the north of Kathlyn Creek. The ditches to the south of the Kathlyn Creek culvert are short (<100 m) and on flat ground.

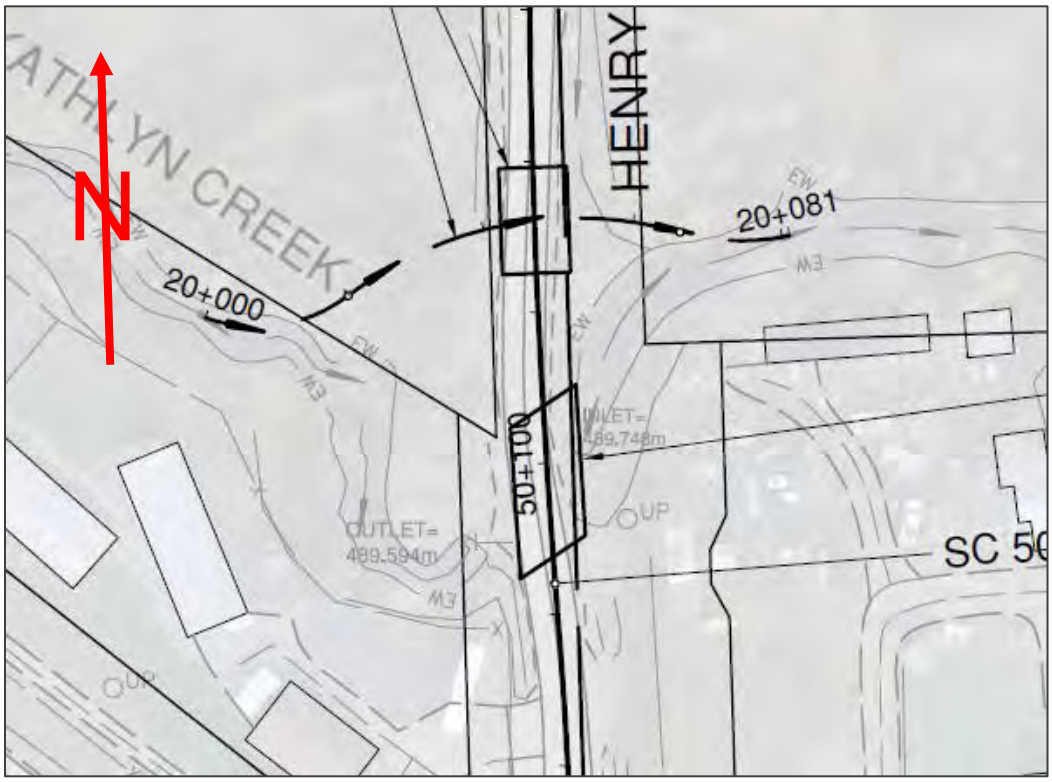

Figure 16: Sketch of Henry Road crossing with potential bridge locations (MoTI Sep 29, 2020)

Henry Road extends north from the Highway 16 intersection at the south end for 1.5 km before rejoining Highway 16 at the north end. It is McElhanney's understanding that Henry Road will be used as a detour route during construction at the Kathlyn Creek III site on Highway 16 and as such may require upgrading to handle highway traffic.

Figure 17: View upstream to the Henry Road culvert outlet

Figure 18: Erosion of the south bank approximately 8 m upstream of the culvert inlet

Figure 19: View upstream approximately 20 m upstream of the culvert inlet

3.2. AQUATIC RESOURCES

Kathlyn Creek is the primary aquatic feature within the Henry Road project area. Two small wetlands dominated by willows (*Salix* sp.) and bullrushes (*Typha* sp.) occur on the east and west side of Henry Road, 175 m north of the Derbyshire Road intersection. Additionally, there are ditches present on the east and west sides of Henry Road north and south of the Kathlyn Creek culvert. The ditches to the south extend back to Highway 16. The west ditch is approximately 60 m long while the east ditch is approximately 85 m long. The catchment area for the south ditches is small and the terrain is generally flat. The ditches to the north are approximately 630 m long as they extend from the Kathlyn Creek culvert north to the crest of Henry Road. The ditches were dry at the time of the field assessment.

Figure 20: Small wetland on the east side of Henry Road 175m north of Derbyshire Road

Figure 21: Small wetland on the west side of Henry Road 175 m north of Derbyshire Road

3.2.1. Fish Presence

Kathlyn Creek is a direct tributary to the Bulkley River, which subsequently drains into the Skeena River. A search of the Ministry of Forests, Lands and Natural Resource Operations and Rural Development (FLNRORD) Fisheries Inventory Data Query (FIDQ) database indicated the presence of at least eleven fish species in Kathlyn Creek. These include coho salmon (*Oncorhynchus kisutch*), pink salmon (*O. gorbuscha*), cutthroat trout (*O. clarkii*), rainbow trout (*O. mykiss*), steelhead (*O. mykiss*), lamprey (general) (*Lampetra sp.*), longnose dace (*Rhinichthys cataractae*), longnose sucker (*Catostomus catostomus*), mountain whitefish (*Prosopium williamsoni*), northern pikeminnow (*Ptychocheilus oregonensis*), and prickly sculpin (*Cottus asper*). The author has observed steelhead spawning in Kathlyn Creek in the spring, where Kathlyn Creek runs through the Smithers Golf Course downstream of the Kathlyn Creek II and III culverts. Wilson and Rabnett (March 2007) reported steelhead presence in Kathlyn Lake and spawning upstream of the Chicken Creek confluence. The same report indicates the main coho spawning occurs in Simpson, Kathlyn and Chicken Creeks downstream of Lake Kathlyn. No redds or adult salmon were observed spawning within the vicinity of the Henry Road culvert at the time of our field investigation.

Sampling for fish presence was not considered necessary as fish presence in Kathlyn Creek is well documented. No impassable barriers exist downstream between the Henry Road culvert and the confluence with the Bulkley River. As well, there are no known barriers to fish passage upstream from Henry Road to Lake Kathlyn. Fish not included in the list above but present in the Bulkley River could also be present in Kathlyn Creek. Some likely species would be chinook salmon (*Oncorhynchus tshawytscha*), Dolly Varden (*Salvelinus malma*), and bull trout (*Salvelinus confluentus*). None of the fish species identified as being present (or likely to be present) in Kathlyn Creek are listed under Schedule 1 of the Government of Canada's Species at Risk Act (SARA) Species at Risk Public Registry (2012). As well, the DFO Aquatic Species at Risk Map page was reviewed which found no aquatic species at risk present in Kathlyn Creek and Lake Kathlyn. Coastal cutthroat trout and bull trout are provincial blue-listed species (BC Conservation Data Centre, 2021). Approximately 46 m^2 of functional stream habitat and safe fish passage upstream for all life stages of fish present in Kathlyn Creek will be restored with the replacement of the culvert on Henry Road with a clear-span bridge structure. Aquatic resources and fish presence associated with Kathlyn Creek near the Henry Road project site are summarized in Table 5.

Table 5: Henry Road Kathlyn Creek Culvert Aquatic Resources Summary

Watershed Code	Kathlyn Creek (WSC 460-345400-26700)
Field Investigation	A field investigation was completed September 30th, 2020 by McElhanney biologist Ralph Kossman.
General Description	Kathlyn Creek is a known fish bearing stream with important fish values. Simpson Creek joins Kathlyn Creek approximately 885 m upstream of the Henry Road culvert and will be unaffected by this project.
Channel Description	Average channel width is 6.2 m (from Kathlyn Creek #2 Stream Assessment Report, McElhanney, March 2012). The stream provides good spawning and rearing habitat as well being an important migratory route.
Additional Aquatic Features	Ditches bound the east and west sides of Henry Road north and south of the Henry Road culvert on Kathlyn Creek. Two small wetlands occur on the east and west side of Henry Road 175 m north of the Derbyshire Road intersection. Two water licences are located downstream of the existing culvert on a small tributary stream which enters Kathlyn Creek from the north.
Stream Classification	Kathlyn Creek is classified as an S2 stream in accordance with the Riparian Management Area Guidebook (Province of BC 1995).
Fish Habitat and Presence	*Habitat Wizard* indicates Kathlyn Creek supports populations of coho salmon (*Oncorhynchus kisutch*), cutthroat trout (*O. clarkii*), lamprey (general) (*Lampetra* sp), longnose dace (*Rhinichthys cataractae*), longnose sucker (*Catostomus catostomus*), mountain whitefish (*Prosopium williamsoni*), northern pikeminnow (*Ptychocheilus oregonensis*), pink salmon (*O. gorbuscha*), prickly sculpin (*cottus asper*), rainbow trout (*O. mykiss*), and steelhead (*O. mykiss*). Kathlyn Creek is an important migratory route and provides good quality spawning, rearing and overwintering habitat for fish.
Instream Work Window	Due to the species assemblage in Kathlyn Creek, there is no least-risk timing window for this stream due to overlapping instream work windows.
Amphibians	Four species of amphibian potentially could be found within the project limits. They include the western toad (*Anaxyrus boreas*), the Columbia spotted frog (*Rana luteiventris*), the wood frog (*Lithobates sylvaticus*), and the northwestern salamander (*Ambystoma gracile*).
Species at Risk	No fish Species at Risk were noted for Kathlyn Creek. The western toad is designated federally as a species of Special Concern.

3.3. AMPHIBIANS

There is only one listed species of amphibian that is likely to occur within the project area; the western toad (*Anaxyrus boreas*). The western toad was designated federally as a species of Special Concern in 2002 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC); the status was reviewed and upheld by COSEWIC in 2012. It is on Schedule 1 (1-SC) of the federal Species at Risk Act (SARA) (2018). It is probable that the provincially yellow-listed (Not at Risk) western toad may be

encountered within the project footprint during the summer months. Other non-listed amphibians that may be encountered include the Columbia Spotted Frog (*Rana luteiventris*), the Wood Frog (*Lithobates sylvaticus*), and the Northwestern Salamander (*Ambystoma gracile*). It is likely these species will be encountered along the floodplain of Kathlyn Creek. An amphibian survey of the project area should be undertaken before the anticipated start of the project works. It is not anticipated that RoW clearing before spring will impact any amphibians.

3.4. TERRESTRIAL RESOURCES

The Henry Road location is within the Sub-Boreal Spruce Dry Cool (SBSdk) biogeoclimatic subzone, on the west side of the Bulkley Valley near the valley bottom (Figure 17). The sites are near the northern limits of the SBSdk subzone in the Bulkley Valley where the subzone transitions to the adjacent Sub-Boreal Spruce moist cold subzone Babine variant (SBSmc2) and Interior Cedar Hemlock moist cold subzone Hazelton variant (ICHmc2). Human activity in the forms of agriculture, settlement, logging and burning along with a history of wildfire have affected all parts of the SBSdk. Consequently, much of the landscape is in early to mid seral stages. The field review of the two sites indicated anthropogenic activities have influenced the present riparian and upland vegetation found at the sites. A review of the B.C. Conservation Data Centre's BC Species and Ecosystems Explorer website did not identify any red or blue listed ecosystem associations within the project areas.

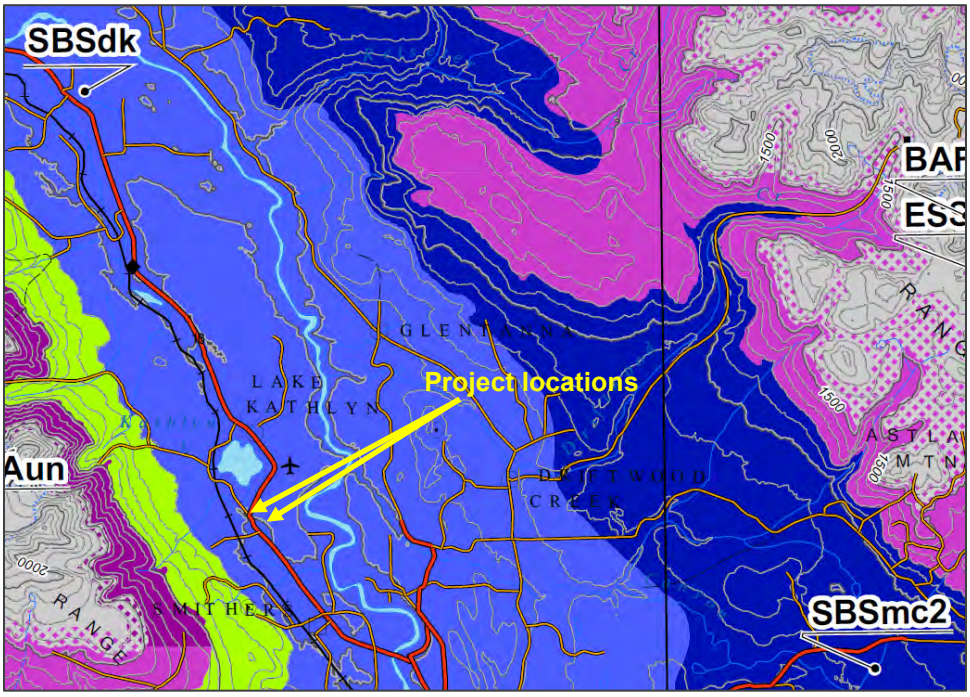

Figure 22: Kathlyn Creek III and Henry Road project locations in the SBSdk biogeoclimatic subzone.

3.5. VEGETATION

Vegetation in the area of the Kathlyn Creek culvert on Henry Road was a patchy distribution of deciduous forest in a variety of seral stages, ranging from shrub-herb to young forest. As with the Highway 16

Kathlyn Creek III site, it is believed the Henry Road site was previously disturbed or cleared at some time, and that periodic maintenance brushing along with other anthropogenic activities have modified the landscape. The main tree species observed at the stream crossing was cottonwood (*Populus trichocarpa*). A few hybrid white spruce (*Picea glauca x engelmannii*) were present at the north periphery of the proposed bridge construction zone and will likely not be affected by the proposed construction. In the shrub layer, black twinberry (*Lonicera involucrata*), red-osier dogwood (*Cornus stolonifera*), prickly rose (*Rosa acicularis*), snowberry (*Symphoricarpos albus*), Sitka alder (*Alnus crispa* ssp. *sinuata*), and hardhack (*Spirea douglasii*) were noted. Fireweed (*Epilobium angustifolium*) and grasses were the main herbs within the construction limits.

Vegetation along the shoulders of Henry Road northward of the Kathlyn Creek culvert consists mainly of deciduous species with young trembling aspen being the predominant tree species. Some hybrid white spruce and lodgepole pine are mixed with the deciduous trees (Figures 23-26). Deciduous shrubs such as black twinberry, prickly rose, hardhack, and willow species are predominant in the ditchlines along with herbs like fireweed, clover species, grasses and invasives such as Canada thistle (*Cirsium arvense*) and oxeye daisy (*Leucantheum vulgare*).

It is unlikely that any rare or endangered plant species occur within the study area, due to the suspected periodic maintenance brushing, anthropogenic activities and younger seral stage of the location.

Figure 23: View north on Henry Road from south of the existing culvert on Kathlyn Creek.

Figure 24: View south on Henry Road from crest of hill to the existing culvert on Kathlyn Creek.

Figure 25: View north on Henry Road from crest of hill towards north Highway 16 intersection.

Figure 26: North end of Henry Road near Highway 16 intersection.

3.5.1. Invasive Plant Species

Canada thistle was observed on the west side of Henry Road, on either side of the Kathlyn Creek culvert inlet and within the riparian zone of Kathlyn Creek (Figure 17). Thistle was also observed at a small wetland on both the east and west side of Henry Road approximately 200 m north of the Derbyshire Road intersection (Figure 20). Oxeye daisy was observed on the shoulders of Henry Road at the north end near the intersection with Highway 16. A review of known invasive plant species was also conducted for the project area. The Invasive Alien Plant Program (IAPP) Map Display was searched; Table 3 lists the species that were identified nearest to the project limits. Other invasive plants may or may not be present within the study area but were not observed during the field review.

3.6. WILDLIFE

There are three blue-listed mammal species that have the potential to occur within the project area. These include the wolverine, luscus subspecies (*Gulo gulo luscus*), the caribou (*Rangifer tarandus* pop. 15), and the grizzly bear (*Ursus arctos*). Generally, these species avoid human contact. Considering that the proposed project location is in a rural setting with farms and acreages surrounding the location and the road sees regular daily use, the risk of impacting any of these species is very unlikely. No evidence of ungulate browsing was apparent on the roadside shrubs. It is unlikely that any habitat or feature essential to the survival of individual animals or populations exist within the project area.

Beavers have been well documented in the Kathlyn Creek system with beaver dams noted at the Smithers Golf course and downstream of the Kathlyn Creek II bridge. No dams, recent observations of beavers or beaver activity were noted during the field review of the Henry Road culvert location.

3.7. BIRDS

Six species of blue-listed birds were identified as potentially occurring within the SBSdk biogeoclimatic subzone: the barn swallow (*Hirundo rustica*), the black swift (*Cypseloides niger*), the northern goshawk atricapillus subspecies (*Accipiter gentilis atricapillus*), the olive-sided flycatcher (*Contopus cooperi*), the rusty blackbird (*Euphagus carolinus*), and the short-eared owl (*Asio flammeus*). With the exception of the northern goshawk, the other five species are migrants and are not known to overwinter in the area. The existing vegetation on each side of Henry Road at the Kathlyn Creek culvert can provide suitable breeding and nesting habitat for avian species during the spring/summer nesting window. There are at least 16 young and mature cottonwood trees to the west of Henry Road and north of Kathlyn Creek that can provide good nesting for avifauna. The presence of active nests could cause work delays until the young birds have fledged and vacated the nests.

No raptor nests were observed within the project footprint during the field investigation. The northern goshawk prefers large areas of coniferous old-growth and mature forest which were not present at the project location. The short-eared owl prefers open terrain and would therefore not be expected to nest within the project location either.

Together, the federal Migratory Birds Regulations and the BC Wildlife Act prohibit the possession, injury, disturbance/molestation or destruction of birds, their eggs, or their nests when occupied by birds or eggs. The clearing of the project footprint has the potential to impact nesting birds if clearing occurs within the breeding and nesting period. The project location is in Environment Canada's Nesting Zone A4, which has a nesting period from late April (April 20) to mid-August (August 15) (Figure 27).

Provided clearing for the project can be completed before the start of the nesting period, migratory bird nesting and breeding surveys could be avoided. If clearing is not completed before the nesting season, a Qualified Environmental Professional should be retained to complete the breeding bird and nesting surveys. All felled trees and cleared material should be removed from the project area before the nesting period so the material doesn't provide nesting opportunities.

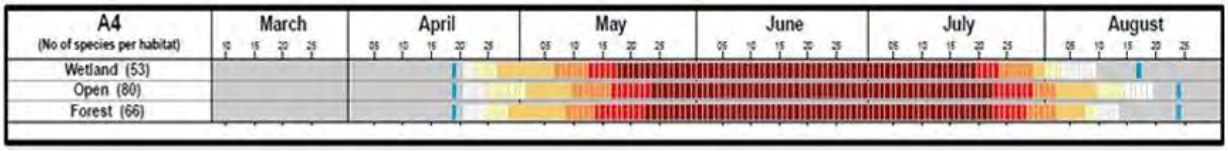

Figure 27: Environment Canada Nesting Zone A4 nesting calendar.

Figure 28: View to southwest (from north side of project) of young and mature cottonwood trees.

3.8. RARE ECOSYSTEMS

A review of the BC Conservation Data Centre website did not indicate the presence of any provincially listed ecological communities within 1.5 km of the proposed project footprint. No SARA-listed ecological communities were identified. The nearest occurrence of a red-listed ecosystem is a saskatoon/slender wheatgrass community 2.8 km south of the project area. A blue-listed ecosystem, the black cottonwood – hybrid white spruce/red-osier dogwood community occurs 1.5 km east of the Henry Road location on the west bank of the Bulkley River. There is no risk that the project will impact either of the listed ecological communities due to the distance between the project location and the ecosystem occurrence. Terrestrial resources associated with the study area around Henry Road are summarized in Table 6.

Table 6: Terrestrial Resources Summary for the Henry Road Site.

Biogeoclimatic Zone	The project is located within the Sub-Boreal Spruce dry cool (SBSdk) biogeoclimatic subzone near the transition to the cooler and moister Babine variant of the Sub-Boreal Spruce moist cold (SBSmc2) subzone.
Field Investigations	A field investigation was completed Sept 30th, 2020 by McElhanney biologist Ralph Kossman.
General Description	The terrestrial area assessed was limited to visual observations from the running surface of Henry Road. Private lands surround the MoTI road RoW. No aquatic features were observed within the project area. Vegetation was mixed forest of various seral stages with deciduous species predominant over coniferous tree species.
Vegetation	Vegetation within the Project area is typical of previously disturbed areas within the SBSdk subzone. Vegetation was a patchy distribution of mixed forest in a variety of seral stages ranging from shrub-herb to young forest. Tree species present included trembling aspen (*Populus tremuloides*), cottonwood (*Populus balsamifera* ssp. *trichocarpa*), hybrid white spruce (*Picea glauca x engelmannii*), and lodgepole pine (*Pinus contorta*). A listing of plant species observed within the study area is provided in Appendix I. A BC red-listed ecological community occurrence (Saskatoon / Slender Wheatgrass) is documented approximately 2.8 km south of the project area and a BC blue-listed ecological community occurrence (black cottonwood–hybrid white spruce/red-osier dogwood) is documented approximately 1.5 km east of the project area. A list of rare ecosystems potentially occurring near the project area is provided in Appendix II.
Wildlife	Due to the relatively young age and patchy distribution of the mixed forest on each side of Henry Road, it is unlikely that the project area provides any effective ungulate overwintering habitat. It is likely that most wildlife common to the area pass through the project site occasionally but would tend to avoid it while there is construction activity. A list of rare and/or endangered animal species potentially occurring within the project area is provided in Appendix III.
Birds/Nesting	The vegetation on each side of the MoTI RoW of Henry Road provides suitable breeding and nesting habitat for avian species during the spring/summer nesting window. In order to avoid undertaking breeding/nesting bird surveys, the RoW should be cleared prior to the onset of the nesting season (April 20) and all felled trees and cleared material should be removed from the project area.
Species at Risk	There is limited potential for several listed wildlife species to be found within the Project area. It is extremely unlikely that any habitats essential to the survival of individual animals or populations exist within the project area.

It is McElhanney's understanding that the present bridge designs for the replacement of the Kathlyn Creek III culvert and the Henry Road culvert both will require channel re-alignment of Kathlyn Creek. At the Kathlyn Creek III location this is over 100 m of new channel construction while the Henry Road location is not as extensive but still around 50-60 m. These channel re-alignments will require extensive planning to maintain stream flow and fish passage during the construction period. Environmental mitigation measures will be critical to maintaining water quality and providing erosion and sediment control during construction.

A number of invasive plant species have been identified within the project areas. Construction contractors should be made aware of these plants and ensure their equipment is free of plant parts prior to starting work and clean equipment prior to leaving the site to reduce the spread of invasive plants.

Overall, the main environmental concern with these projects are the channel re-alignments and attendant new stream channel that must be constructed. Given that Kathlyn Creek has high fish values, is an important migratory route, and provides good quality spawning, rearing and overwintering habitat for fish, it will be essential to provide these attributes in the new stream channel designs.

5.1. REGULATORY CONSIDERATIONS

The presence of Kathlyn Creek within the project limits and the proposed channel re-alignments to install the proposed bridges means referrals to Fisheries and Oceans Canada (DFO) and BC's Water Sustainability Act will be required. In the case of DFO it is anticipated the projects will require an application for an "Authorization" under paragraphs 34.4(2)(b) and 35(2)(b) of the Fisheries Act, and under BC's Water Sustainability Act it is expected that "Change Approvals" will be necessary to undertake the proposed works. Regulatory reviews of Change Approvals and Authorizations can take up to 140 days. The reviews generally include consultation with local First Nations.

As well, fish salvage permits will be required both from DFO and FLNRORD for the proposed works. Due to the potential of encountering amphibian species within the project limits, an amphibian salvage permit should be obtained from the province (FLNRORD). Generally, amphibian salvage permits take on the order of 60 to 90 days to obtain. It is not anticipated that any other agency referrals will be required for the environmental aspects of the project. It should be noted that this environmental assessment does not include archaeological or Land Act considerations.

5.2. TIMING CONSIDERATIONS

Kathlyn Creek provides habitat to numerous fish species. As there is no least-risk timing window for Kathlyn Creek, instream work should be timed to minimize the potential impacts to fish and fish habitat. Often when there are no least-risk timing windows available, the late-summer / early-fall low flow period is the next best option. In this case it coincides with the adult coho spawning period in Kathlyn Creek. Accommodations may be needed to ensure spawning adult coho are able to migrate upstream and also to ensure spawning does not occur in stream reaches that may be dewatered for construction purposes.

Suitable nesting habitat is present at both project locations. Clearing activities should avoid the bird nesting window of April 20th to August 15th, unless a nest survey is conducted by a qualified professional. It is anticipated that clearing the site of trees and shrubs before the onset of the nesting season will prevent work delays resulting from avifauna nesting within the work limits.

5.3. OTHER CONSIDERATIONS

As the project moves from design through to construction, it is recommended an environmental management plan (EMP) be prepared and overseen by a qualified professional. The plan should detail site specific erosion and sediment control measures, timing and access considerations, and general best management practices. The EMP should meet the requirements of Section 165 of the 2020 Standard Specifications for Highway Construction (MoTI 2020).

Prepared by:	Reviewed by:
	
Ralph Kossman, BSc, RPBio	Garrett Kerr, BSc, RPBio

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APPENDIX A

Statement of Limitations

Statement of Limitations

Use of this Report. This report was prepared by McElhanney Ltd. ("**McElhanney**") for the particular site, design objective, development and purpose (the "**Project**") described in this report and for the exclusive use of the client identified in this report (the "**Client**"). The data, interpretations and recommendations pertain to the Project and are not applicable to any other project or site location and this report may not be reproduced, used or relied upon, in whole or in part, by a party other than the Client, without the prior written consent of McElhanney. The Client may provide copies of this report to its affiliates, contractors, subcontractors and regulatory authorities for use in relation to and in connection with the Project provided that any reliance, unauthorized use, and/or decisions made based on the information contained within this report are at the sole risk of such parties. McElhanney will not be responsible for the use of this report on projects other than the Project, where this report or the contents hereof have been modified without McElhanney's consent, to the extent that the content is in the nature of an opinion, and if the report is preliminary or draft. This is a technical report and is not a legal representation or interpretation of laws, rules, regulations, or policies of governmental agencies.

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Information from Client and Third Parties. McElhanney has relied in good faith on information provided by the Client and third parties noted in this report and has assumed such information to be accurate, complete, reliable, non-fringing, and fit for the intended purpose without independent verification. McElhanney accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of omissions or errors in information provided by third parties or for omissions, misstatements or fraudulent acts of persons interviewed.

Effect of Changes. All evaluations and conclusions stated in this report are based on facts, observations, site-specific details, legislation and regulations as they existed at the time of the site assessment/report preparation. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions. Construction activities can significantly alter soil, rock and other conditions on the site. McElhanney should be requested to re-evaluate the conclusions of this report and to provide amendments as required prior to any reliance upon the information presented herein upon any of the following events: a) any changes (or possible changes) as to the site, purpose, or development plans upon which this report was based, b) any changes to applicable laws subsequent to the issuance of the report, c) new information is discovered in the future during site excavations, construction, building demolition or other activities, or d) additional subsurface assessments or testing conducted by others.

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this report, or any part thereof. This restriction of liability includes decisions made to purchase, finance or sell land or with respect to public offerings for the sale of securities.

APPENDIX I

Observed Plant Species

COMMON NAME	SCIENTIFIC NAME
hybrid white spruce	*Picea glauca x engelmannii*
lodgepole pine	*Pinus contorta*
black cottonwood	*Populus trichocarpa*
trembling aspen	*Populus tremuloides*
paper birch	*Betula papyrifera*
Sitka alder	*Alnus crispa spp. sinuata*
Willow spp.	*Salix spp.*
prickly rose	*Rosa acicularis*
red-osier dogwood	*Cornus stolonifera*
hardhack	*Spirea douglasii*
black twinberry	*Lonicera involucrata*
snowberry	*Symphoricarpos albus*
thimbleberry	*Rubus parviflorus*
oxeye daisy	*Leucantheum vulgare*
fireweed	*Epilobium angustifolium*
Canada thistle	*Cirsium arvense*
bullrushes	*Typha spp.*
Clover spp.	*Trifolium spp.*

APPENDIX II

Nearest Rare Ecosystems

COMMON NAME	SCIENTIFIC NAME	BC RANK/LIST	SARA RANK	COMMENTS
Saskatoon / slender wheatgrass	*Amelanchier alnifolia / Elymus trachycaulus*	S2 / Red	N/A	2.8 km south of the project sites
Black cottonwood-Hybrid white spruce/Red-osier dogwood	*Populus trichocarpa - Picea engelmannii x glauca / Cornus sericea*	S3 / Blue	N/A	1.5 km east of the project sites

APPENDIX III

Rare and Endangered Wildlife Species

COMMON NAME	SCIENTIFIC NAME	BC LIST	SARA RANK
barn swallow	*Hirundo rustica*	Blue	1-T (2017)
black swift	*Cypseloides niger*	Blue	1-E (2019)
caribou, Pop. 15	*Rangifer tarandus pop. 15*	Blue	1-SC (2005)
grizzly bear	*Ursus arctos*	Blue	1-SC (2018)
northern goshawk, *atricapillus* ssp.	*Accipiter gentilis atricapillus*	Blue	N/A
olive-sided flycatcher	*Contopus cooperi*	Blue	1-T (2010)
rusty blackbird	*Euphagus carolinus*	Blue	1-SC (2009)
short-eared owl	*Asio flammeus*	Blue	1-SC (2012)
western toad	*Anaxyrus boreas*	Yellow	1-SC (2018)
wolverine, *luscus* ssp.	*Gulo gulo luscus*	Blue	1-SC (2018)

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CANADA BEST MANAGED COMPANIES