

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
VOLUME 3B: EFFECTS ASSESSMENT (FLOOD AND POST-FLOOD OPERATIONS)**

Assessment of Potential Effects on Traditional Land and Resource Use
March 2018

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Abbreviations

| | |
|-------------|---|
| LAA | local assessment area |
| PDA | project development area |
| RAA | regional assessment area |
| RAP | restricted activity period |
| the Project | Springbank Off-stream Reservoir Project |
| TLRU | traditional land and resource use |
| TUS | traditional use studies |
| VC | valued component |

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14.0 ASSESSMENT OF POTENTIAL EFFECTS ON TRADITIONAL LAND AND RESOURCE USE

14.1 SCOPE OF THE ASSESSMENT

The scope of the assessment and existing conditions for traditional land and resource use (TLRU) are presented in Volume 3A, Sections 14.1 and 14.2. The baseline for flood and post-flood operations is defined as the dry operations phase with components of the Project in place and vegetation reclaimed after construction.

This assessment considers two phases of the Project: flood operations and post-flood operations.

- Flood operation refers to when water is diverted from Elbow River to the diversion channel and off-stream reservoir (i.e., reservoir filling) and the draining of the reservoir.
- Post-flood operation includes sediment partial cleanup, if required, and maintenance activities required on project infrastructure (e.g., the diversion channel, floodplain berm, off-stream dam, access roads and bridges).

The effects of flood and post-flood operation are assessed for three floods. In order of decreasing magnitude, these are the design flood (based on the 2013 flood), 1:100 year and 1:10 year floods. The volume, area, and length of time required for the reservoir to fill and drain varies for each flood (see Volume 1, Section 3.5 and Section 3.6).

14.1.1 Potential Environmental Effects, Pathways, and Measurable Parameters

A discussion of how effects on Aboriginal and Treaty rights are considered in the assessment, as well as a definition of "current use of lands and resources for traditional purposes" are provided in Volume 3A, Section 14.1.3.

Flood and post-flood operation can affect TLRU through a:

- change in availability of traditional resources for current use, affecting the availability of species relied upon to exercise TLRU activities (e.g., hunting, trapping, fishing, and plant gathering) or
- change in access to traditional resources or areas for current use or
- change in sites or areas for current use through the disruption or alteration of a traditional use site or location (e.g., habitation areas, trails and travelways, and cultural or spiritual practices sites and areas)

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Characterizing the effects of the Project on TLRU requires the selection of parameters that can be used to evaluate each type of potential effect. Ideally, these parameters are measurable and quantifiable (e.g., availability of habitat for harvested species). However, some effects on TLRU lack defined parameters to measure effects and are therefore evaluated qualitatively based on comments received from Indigenous groups, past project experience and professional judgment. Potential effects, effects pathways and measurable parameters used to characterize and assess effects on TLRU are provided in Volume 3A, Table 14-1.

14.1.2 Indigenous Commercial Activities

The Project is in an area where Indigenous commercial activities occur. Specifically, Tsuut'ina Nation's business ventures identified in the RAA include Sarcee Gravel Product Ltd. gravel pits, Bragg Creek paintball, and Redwood Meadows Golf and Country Club. Although these identified Indigenous commercial activities are not directly related to TLRU activities and practices, there is the potential for effects on these activities to occur.

Through the engagement program for the Project, Tsuut'ina Nation expressed concerns about economic consequences for Redwood Meadows Golf and Country Club in the event that the land becomes contaminated or access to the region is affected as a result of a flood. Tsuut'ina Nation also expressed concerns that this potential flooding or contamination would also have an effect on Tsuut'ina Nation's ability to develop reserve lands for future economic growth.

14.1.3 Residual Environmental Effects Description Criteria

The characterization of residual effects on TLRU from flood and post-flood operation are the same as for construction and dry operation of the Project (see Volume 3A, Section 14.1.5, Table 14-2) except for duration. The duration of a residual effect is:

- short-term, where the residual effect is restricted to the time required to drain the reservoir or
- long-term, where the residual effect extends past the time required to drain the reservoir

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14.2 ASSESSMENT OF RESIDUAL ENVIRONMENTAL EFFECTS ON TRADITIONAL LAND AND RESOURCE USE

14.2.1 Analytical Assessment Techniques

The assessment of residual environmental effects on TLRU presents project interactions and pathways, mitigation measures and residual effects for each potential Project effect on TLRU. The analytical assessment techniques are the same as outlined in Volume 3A, Section 14.3.1.

14.2.2 Change in Availability of Traditional Resources for Current Use

14.2.2.1 Project Interactions and Pathways

Project components and activities related to flood and post-flood operation have the potential to affect the availability of traditional resources. These project activities include reservoir filling, reservoir draining, reservoir sediment partial cleanup, channel maintenance, and road and bridge maintenance. The following describes potential pathways that could affect the availability of traditional resources. The specific information presented in this section is in response to potential interactions and pathways identified by Indigenous groups.

Change in Habitat (Vegetation, Wildlife, Fish)

The Project could lead to changes in habitat for traditionally used plant or animal species that support hunting, trapping, fishing or plant gathering activities. Changes in plant community diversity, species diversity and wetland function could occur with varying degree depending on flood duration and sediment deposition. Changes to wildlife are anticipated from direct effects of flood operation (e.g., temporary diversion of flood waters into the off-stream reservoir) and post-flood (e.g., diminishing off-stream reservoir extent, sedimentation, and revegetation) operation, including effects from sensory disturbance caused by maintenance equipment during post-flood operation. Fish habitat could be affected by sediment transport, water retention in the reservoir, temperature increase in retained water, change in food availability, flow modification, or the introduction of deleterious substances. These are further described under Sections 8 (Aquatic Ecology), Section 10 (Vegetation and Wetlands), and Section 11 (Wildlife and Biodiversity).

This potential pathways have been identified by Indigenous groups in relation to the Project through the Indigenous engagement program for the Project:

- Tsuut'ina Nation identified that the Project could destroy critical fish and wildlife habitat and noted the potential for reduction to or damage of fescue grassland and wetland habitat from contaminated sediment left behind following a flood.

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- Tsuut'ina Nation also reported the suitability of wetland habitat in the project area¹ for breeding, nesting and brood rearing for waterfowl and migratory birds and the potential for reduced availability of habitat following floodwater release.
- Tsuut'ina Nation reported the potential for the loss or contamination of bird habitat from debris left by a flood and noted the potential for flood waters to affect plants that are harvested in the project area.
- Concern regarding fluctuating water levels due to flooding in the reservoir, and the associated effect on fish and fish habitat in Elbow River was noted by Piikani Nation through the engagement program for the Project and in the TUS report (PN n.d.).
- Kainai First Nation identified potential effects on small animals and plants (including medicinal) due to sediment deposition from a flood, as well as effects on wetlands.
- Siksika Nation expressed concern that "during period of flooding, there will be impacts to Traditional Use rights from the use of the control structure that would not occur if the Elbow River were permitted to flood normally." Specifically, Siksika Nation expressed concern that during a major flood "there may be an initial upstream surge of water as the gates are raised on the control structure to divert water to the reservoir. This upstream surge may flood high bank riparian areas that would not otherwise be impacted if the flood were permitted to proceed naturally."

Change in Wildlife Health

The Project could lead to elevated levels of methylmercury, initiating mercury methylation process by filling the off-stream reservoir with flood waters. This could lead to bioaccumulation and higher health hazards for wildlife, especially piscivorous (fish-eating) species. In addition, flood operations could deposit contaminated sediments into the off-stream reservoir, and draining of the reservoir would leave the deposited sediment behind. These are further described in Section 11 (Wildlife and Biodiversity).

This potential pathway has also been identified by Indigenous groups in relation to the Project. Through the Indigenous engagement program for the Project, Tsuut'ina Nation noted the potential for bird, wetland, and fescue grassland habitats to be affected by contaminated sediment deposition or debris from flooding.

¹ "project area" is used in cases where specific areas were not provided by Indigenous groups; "Project area" is assumed to be the RAA in this assessment.

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Change in Wildlife Movement

The Project could lead to changes in movement patterns of wildlife that support hunting and trapping activities. Wildlife movement can be affected by the creation of physical barriers or isolated patches of wetland being connected during flood operations. Movement can also be affected by sensory disturbance hindering wildlife's ability to move through the landscape during post-flood maintenance of project infrastructure. These are further described in Section 11 (Wildlife and Biodiversity).

Change in Mortality (Wildlife, Fish)

The Project could lead to changes in wildlife mortality risk from the destruction or abandonment of wildlife residences (e.g., nests), drowning, or animal-vehicle collisions. The Project could also create additional fish pressure (e.g., bodily harm in the Project channels, entrainment in the reservoir). Fish movement in Elbow River may be restricted due to increased velocities at the structure, turbidity, debris movement and post-flood erosion downstream of the diversion structure. A change in contaminants, temperature, flow conditions or interspecies interaction could result in a change in fish health that may lead to reduced fecundity, affecting the productivity and sustainability of a fishery. These are further described in Section 8 (Aquatic Ecology) and Section 11 (Wildlife and Biodiversity). Wildlife mortality can affect the availability of wildlife, which support hunting and trapping activities. Similarly, fish mortality can affect fishing activities.

Through the Indigenous engagement program for the Project:

- Tsuut'ina Nation reported that release of floodwater from the off-stream reservoir had the potential to alter water temperatures and adversely affect fish.
- Tsuut'ina Nation and Piikani Nation also reported the potential for fish to be stranded in the diversion structure when water is released from the reservoir (Indigenous engagement program results; PN n.d.).
- Kainai First Nation expressed concern about the potential for fish mortality due to the Project operations during a flood event.

Change in Channel Morphology

Operation of the Project could change the nature of bedload transport in Elbow River. This is further described in Section 6 (Hydrology).

Through the Indigenous engagement program for the Project, Stoney Nakoda Nations indicated that Elders have songs about Chiefs and sand dunes, pointing to the cultural importance of sand bars, which occur in Elbow River.

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Change in Conditions for Current Use

The Project could lead to changes to conditions for current use (e.g., air quality [including fugitive dust, odours, and carbon sequestration capacity], noise, terrain stability, soil quality and quantity). These are further described in Section 3 (Air Quality and Climate), Section 4 (Acoustic Environment), and Section 9 (Terrain and Soils).

Through the Indigenous engagement program for the Project, Kainai First Nation identified potential changes to air quality from flood residue in the off-stream that could be spread by the wind and Piikani Nation expressed concern about the deposition of sediment in the reservoir and subsequent wind-blown dust.

Change in Country Foods

Potential effects on traditionally harvested wildlife, fish and vegetation may result in corresponding effects on the consumption of country foods by Indigenous groups. In addition, the assessment of effects on public health (Section 15) considers the health risk to people from their exposure to chemical hazards, including those in country foods. If methylmercury concentrations in Elbow River increase in the post-flood operation phase, it may bioaccumulate and biomagnify in the aquatic food chain. People who harvest and consume fish from Elbow River could be exposed to higher concentrations of methylmercury in fish tissue.

Change in Drinking Water

Through the Indigenous engagement program for the Project, Tsuut'ina Nation expressed concern that the Project would affect their ability to use Elbow River as a source of drinking water. It is understood that Tsuut'ina Nation holds a license to withdraw water from the Elbow River, located upstream of the PDA.

Tsuut'ina Nation also expressed concern that water retained in the reservoir could contaminate the groundwater on the Tsuut'ina Nation reserve and that changes in the groundwater flow regime could lead to changes in groundwater availability from local wells. Five registered water wells have been identified on the Tsuut'ina Nation reserve within the hydrogeology RAA.

14.2.2.2 Mitigation Measures

In addition to applicable mitigation measures discussed in Volume 3A, Section 14.3.2, mitigation measures discussed in the various biophysical and socio-economic assessments in relation to flood and post-flood operations would reduce or eliminate effects on the availability of traditional resources for current use and reduce or eliminate effects on conditions that may prohibit or deter current use.

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As of March 16, 2018, Indigenous groups have not recommended mitigation measures related to changes in availability of traditional resources for current use during flood and post-flood operations.

Project-specific recommendations made by Indigenous groups that do not pertain directly to potential effects of the Project on TLRU are discussed in Volume 1, Section 7.

Alberta Transportation offered to hold a workshop to be held with each Indigenous group during February 2018 and March 2018 to obtain feedback on how TLRU has been presented in the draft TLRU sections (Sections 14 of Volumes 3A and 3B), as well as obtain input on proposed mitigation measures, and discuss how Project-specific concerns have been addressed in the EIS. The intention was to validate the use of the traditional use information in the EIS and include any feedback received.

Workshops were held with Stoney Nakoda Nations (February 12, 2018), Métis Nation of Alberta, Region 3 (February 22, 2018), Samson Cree Nation (February 23, 2018), Siksika Nation (February 26, 2018), and Tsuut'ina Nation (March 1, 5, 6, and 7, 2018). Each workshop was facilitated by CEAA Project Managers and the structure and format for each workshop was developed in consultations with individual Indigenous groups. In accordance with protocols established at the start of each workshop and in recognition of the proprietary nature of TLRU, written summaries of the workshop proceedings were completed by Alberta Transportation and provided to each Indigenous group for review and validation before incorporating any information into the EIS.

As of March 16, 2018, the summaries of the workshops had not been validated by Indigenous groups for use in updating the TLRU sections. Relevant TLRU information, concerns, and recommendations from workshops summaries validated and approved for use on the Project by Indigenous groups after the EIA has been filed will be used for project planning and implementation purposes, where applicable. Project-specific TLRU information will be reviewed against the results of the EIA and a formal response will be developed.

14.2.2.3 Residual Effects

A change in availability of traditional resources for current use could occur because of flood and post-flood operations of the Project through changes in wildlife, fish, and plant habitat, wildlife health and movement, and wildlife and fish mortality. The Indigenous engagement program for the Project, including TUS reports conducted for the Project and the literature review, identified traditionally harvested plants, fish, and wildlife species within the project area, in addition to other resources for current use (see Volume 3A, Section 14.2.4).

Indigenous groups expressed several concerns related to flood and post-flood operations and the potential effects to wildlife and vegetation through sediment deposition and debris associated with the Project, as well as the resulting effects on harvesting for traditional purposes (see Section 14.2.2.1).

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Wildlife habitat would be temporarily inaccessible as the reservoir fills during a flood, the extent of inaccessibility would depend on the magnitude of the flood (see Section 11.3, Table 11-5 and Table 11-6). A design flood would result in a high magnitude effect on wildlife habitat because more than 10% of upland and wetland habitat would be temporarily affected.

Draining the reservoir following a flood would leave sediment behind, covering vegetation and reducing habitat suitability for wildlife in the reservoir. The total area of land affected by sedimentation during the design flood would be 375.4 ha; 192.6 ha of the PDA, all in the reservoir, would be covered by sediment less than 3 cm deep; 37 ha of the PDA, all in the reservoir, would be covered by sediment between 3 and 10 cm; 104.6 ha in the reservoir is anticipated to be covered in sediment deposition between 10 cm and 1 m; while 40.8 ha of the reservoir would be affected by sedimentation of greater than 1 m. The sediment deposited during a flood is expected to reflect the natural background chemistry of the watershed and, therefore, not be toxic. Most sediment would be coarse silt and sand, which is less susceptible to wind erosion, rather than fine particulate matter such as fine silt or clay (see Section 6). Areas of sediment deposition where wind erosion might be an issue would be hydroseeded with native plant species (see Section 11).

Plant species described as traditional resources in Volume 3A, Table 10-7 likely do not have adaptations to survive prolonged flooded conditions, and mortality of traditional plant use species found in upland plant communities is expected. However, these species are widespread and are expected to re-establish by natural recruitment; permanent loss of traditional plant use species is not predicted. Overall, residual effects on vegetation and wetlands post-flood would not result in the loss of native upland or wetland plant communities, nor would it result in the loss of wetland function from the LAA (see Section 10.5).

The magnitude of residual effect on wildlife habitat would be moderate because, although a measurable change in the abundance and distribution of wildlife in the LAA is possible, a measurable change in the RAA is unlikely due to the presence of suitable habitat overall in the RAA. The amount of wildlife habitat affected during both flood operations and post-flood operations is relatively small compared to the availability of wildlife habitat remaining in the RAA (see Section 11).

Flooding and post-flood maintenance could result in increased mortality risk for ground-nesting migratory birds. However, the mitigation measures outlined in Section 11.3 are expected to lessen the risk; it is further anticipated that birds are likely to re-establish nesting after the reservoir is drained, depending on the timing of the flood relative to breeding season and the condition of the vegetation (see Section 11.3). The magnitude of the effect is also dependent on the type and extent of the flood (see Section 11.6). Any residual effect on mortality risk or habitat for waterfowl and migratory birds is not anticipated to result in a long-term threat to the persistence or viability of wildlife species (see Section 11.4).

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The estimated methylmercury concentrations in all floods are below the CCME Canadian Water Quality Guideline for the Protection of Aquatic Life (see Section 7). During post-flood operations, deposited sediment in the reservoir would reflect natural background chemistry in the watershed; therefore, the quality of the sediment would not be toxic (see Section 7). Consequently, effects from the flood and post-flood operations of the Project on wildlife health are not anticipated.

Indigenous groups expressed several concerns related to flood and post-flood operations and the potential effects on fish, fish habitat, movement and health, as well as the resulting effects on the traditional activity of fishing (see Section 14.2.2.1).

Fish mortality is expected from flood operations. Entrainment of fish into the reservoir during active diversion may cause fish mortality. Fish could be stranded during dewatering of the reservoir; even with monitoring and fish rescues, it is likely that fish mortality would occur. The numbers of fish lost is unpredictable because the ability to rescue fish depends on ponding, drawdown rate, and sediment deposition in the reservoir (see Section 8.2).

Changes in downstream flows can also result in fish stranding in the low-level outlet or Elbow River. The Project may result in fish mortality that would threaten the long-term persistence or viability of aquatic species of management concern in the RAA.

During the 1:10 year flood, flows in Elbow River would be less during active water diversion when compared to flows without the Project. Therefore, fish migration in Elbow River at the diversion structure should be comparable to during the dry operation condition. During floods greater than the 1:10 year flood, fish movements in the main channel of Elbow River may be restricted due to turbidity and debris movement attributed to the flood discharge. During post-flood operations, upstream fish movement should not differ from upstream movement during dry operations, with maintenance on the structure and mitigation measures presented in Section 8.2.

During floods, channel forming flows would continue in Elbow River downstream of the diversion structure and would maintain overwintering and spawning habitat, shallow side-channel, nearshore rearing habitats, and macrophyte growth. Although a large reduction in magnitude of erosion and deposition would occur at the 1:100 year and design floods, they are not predicted to be frequent enough to affect overwintering and spawning habitat maintenance in Elbow River away from the diversion structure.

Flood flows above 160 m³/s would be regulated (see Section 8). Therefore, changes to flow are unlikely to affect food availability and fish feeding patterns in Elbow River. With flood water dilution, reservoir draining is unlikely to alter nutrient levels enough to cause serious harm to fish in Elbow River.

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As the water from the reservoir is released, it would mix with Elbow River water, which would increase temperature in the river. Dissolved oxygen concentrations would also decrease, though this effect is expected to be localized. Increased turbidity and sediment deposition could affect fish habitat quality in the low-level outlet and in Elbow River downstream of the low-level outlet. Given the low probability of diversion occurrence, the slow rate of reservoir drainage, and with the implementation of mitigation measures (see Section 8.2), the potential downstream change in sediment and turbidity is not anticipated to result in residual effects on aquatic ecology.

Through the Indigenous engagement program for the Project, Stoney Nakoda Nations indicated that sand bars are culturally important. During diversion, channel planform and bedload movement is predicted to be maintained; only the magnitude of aggradation and degradation would be affected. During release, most of the mobilized bed material is predicted to remain within the low-level outlet and minimal interaction with Elbow River would occur (see Section 6.4).

The Project is not anticipated to measurably affect the water quality of Elbow River. The Project does increase suspended sediment concentrations for a short duration (days) at the end of water release back into Elbow River. However, it is anticipated that this increase in suspended sediment concentration can be mitigated with the operation of the low-level outlet and with physical sediment barriers. As noted above, although, release of water stored in the reservoir can result in a higher mercury methylation rate in Elbow River, methylmercury concentrations in all flood scenarios are below the CCME Canadian Water Quality Guideline for the Protection of Aquatic Life and not anticipated to cause acute or chronic toxicity of Elbow River. Moreover, for reasons of physical safety, it is impractical and inadvisable to drink water from the river during a flood, with or without the Project.

Regarding effects on groundwater and underground streams, suspended sediment would not readily infiltrate into the underlying aquifers because groundwater cannot readily migrate through the subsurface in fine grained sediments such as clays and silts that overly much of the RAA. During a flood, filling the reservoir is expected to result in changes to groundwater quantity; however, these are expected to be limited to the LAA and groundwater levels will recover to pre-flood levels within one year following the end of the flood. Some effects are noted just outside of the PDA in areas near the off-stream reservoir. However, in all cases, effects on groundwater levels are well within the LAA, and changes are only observed north of Elbow River.

Residual effects on water, wildlife, fish, and vegetation have the potential to affect the activities that are supported by these resources, including hunting, fishing, trapping, plant harvesting, and camping. However, appropriate conditions for current use entail more than availability of traditional resources and this assessment acknowledges that Indigenous groups may choose not to pursue TLRU activities near the Project for a variety of personal, practical, aesthetic, and spiritual reasons, including lack of existing access. Various biophysical and socio-economic environmental conditions may also affect harvesting. For example, poor air quality or water

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quality, noise, or altered visual aesthetics may deter individuals from harvesting traditional resources. Refer to the acoustic environment assessment (Section 4), air quality assessment (Section 3), and public health assessment (Section 15) for further details on effects of noise, light, and air emissions on land users in the assessment areas. Residual effects on these valued components are predicted to be not significant.

Potential effects on traditionally harvested resources may result in corresponding effects on consumption of country foods by Indigenous groups. Only the area along the Elbow River flood plain (i.e., Area A; see Volume 3A, Sections 12 and 14) would be accessible for some TLRU activities following construction. Opportunities for harvesting country foods are not expected to be extensive; however, this assessment acknowledges that some opportunities for the harvest of country foods could remain. The locations where country foods are harvested in the area of the Project or the frequency of consumption of country foods was not provided by Indigenous groups through the Indigenous engagement program for the Project, including the Project-specific TUS, or through the review of publicly available literature. Consequently, it is not possible to reliably estimate consumption rates of country foods harvested from the RAA by Indigenous groups.

The assessment of effects on public health concludes that there is no interaction with terrestrial country foods and public health for the flood and post-flood operations phase (see Section 15.3.2).

The Project will not introduce chemicals into the environment that could bioaccumulate or bioconcentrate in edible tissues of terrestrial country foods. Project interactions with fish from Elbow River are considered in relation to the potential for methylmercury accumulation in fish tissues during post-flood operations. However, considering there have been no fish consumption advisories for methylmercury in Elbow River recently and, given the process of methylmercury bioaccumulation and biomagnification in fish that is typically observed over the span of years in permanently flooded areas, there is a low probability that a single water release from the off-stream reservoir after a flood could substantially change the viability of fish in Elbow River. As such, effects to human health through the consumption of country foods is expected to be remain the same as current conditions.

A design flood would result in varying levels of sedimentation over a total of 375.4 ha in the reservoir, but the effects of a flood and post-flood maintenance would be short-term in duration. The long-term persistence or viability of wildlife and fish species in the RAA are unlikely to be affected, nor would the Project result in loss of vegetation communities or wetland function in the LAA. No measurable effects on downstream water quality are predicted. The adverse effects of the Project would be reversible and extend to the LAA because anticipated changes in wildlife habitat and movement, as well as fish habitat and mortality, are expected to extend to the LAA. The duration of effects ranges from short-term to long-term: long-term effects include those on alteration of fish habitat and fish mortality.

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The magnitude of residual effects on the availability of resources is expected to range from low to high; low because the anticipated magnitude of effects on the diversity of plant communities and fish habitat are anticipated to be low; high because more than 10% of high and moderately suitable elk summer feeding habitat and grizzly bear spring feeding habitat in the LAA, would be affected and effects of the Project on fish mortality are expected to be high in magnitude.

14.2.3 Change in Access to Traditional Resources or Areas for Current Use

14.2.3.1 Project Interactions and Pathways

Once construction is completed, lands in the PDA would be managed by Alberta Environment and Parks for the life of the Project (i.e., indefinitely) and there would be no change to land designation thereafter (see Volume 3A, Sections 12 and 14). The area along the Elbow River flood plain (i.e., Area A; see Volume 3A, Sections 12 and 14) would be accessible for some TLRU activities; this would be a conservation zone with public access and opportunities for low impact recreation. This discussion of effects on access as a result of flood and post-flood operations, therefore, focuses on Area A.

In the Kainai First Nation and Siksika Nation TUS report and in the Piikani Nation TUS report, two trails, known as Old Stoney (Old North-South) and Old Blackfoot trails, were identified during fieldwork (KCO & SCO 2017; PN n.d.). Through the Indigenous engagement program for the Project, Tsuut'ina Nation also identified a trading route. Although the exact location and direction of the trails and trading route have not been disclosed, there is potential for portions of these trails to also extend into Area A. Because of the historical occupation of the land by Indigenous groups, other trails may occur in Area A, even if these sites have not been specifically identified by Indigenous groups. However, access along these trails in Area A would likely be maintained during floods and is unlikely to be hindered by post-flood operations (see Section 12).

Through the Indigenous engagement program for the Project and in a TUS report, Kainai First Nation, Siksika Nation, and Tsuut'ina Nation identified Elbow River as an important year-round travel route (KCO & SCO 2017) (see also Volume 3A, Section 14.2.5). It is assumed that Elbow River would not be used as a travelway, which includes the use of Elbow River for recreational purposes by Indigenous groups (See Volume 3A, Section 14.2.5) during flood operations. Post-flood operations, Elbow River downstream of the Project would be subject to increased volume and flow rate as waters are released from the reservoir (see Section 12).

Access to Area A could also be affected by flood and post-flood operation by restricted access to Springbank Road and other access roads (see Section 12).

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Indigenous groups have raised the concern that there is potential for the Project to affect access to current use sites or areas. Through the Indigenous engagement program for the Project, Kainai First Nation stated that physical and cultural heritage (e.g., ceremonial sites, burial sites, and cultural landscapes) would “no longer be visible so revisiting these sites will stop.”² Kainai First Nation also recommended ongoing mitigation for these sites. Because these sites are assumed to be in the area of the reservoir, where sedimentation is most likely to occur, but where access to the public would be limited after construction (see Volume 3A, Sections 12 and 14), discussion of access to these sites will not be undertaken further here.

14.2.3.2 Mitigation Measures

Mitigation measures discussed in the land use section in relation to flood and post-flood operation would reduce or eliminate effects on access to traditional resources or areas for current use in Area A (see Section 12).

As of March 16, 2018, Indigenous groups have not recommended mitigation measures pertaining to access to traditional resources or areas for current use during flood or post-flood operations.

Changes in access to traditional resources or areas for current use would also be mitigated through applicable mitigation measures presented in Volume 3A, Section 14.3.3.

Project-specific recommendations that do not pertain directly to potential effects of the Project on TLRU are discussed in the Indigenous engagement program section in Volume 4, Appendix B.

14.2.3.3 Residual Effects

Elbow River is a year-round travel route. It is assumed that there would be no users on the river during floods. Post-flood operations would result in increased volume and flow rate downstream of the diversion structure as waters are released from the reservoir; however, use of the river as a travelway, including the use of waterways for recreational purposes by Indigenous groups (see Volume 3A, Section 14.2.5), would return to baseline conditions and may be facilitated by the permanent portage (see Section 12).

Effects on potential access roads to Area A, particularly Springbank Road and associated access roads have the potential to be affected by floods, depending on the magnitude. A 1:10 year flood would not affect Springbank Road and other access roads. During a 1:100 and a design flood, Springbank Road and other access roads would be flooded, although upgrades to Highway 22, Range Road 40, and Township Road 242 would provide alternate routes during flooding. Any restrictions on access to Area A by flooded roads would last until flood waters are

² This statement is assumed to be in relation to sedimentation from flooding in the reservoir.

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released from the off-stream reservoir. Damage to roadways would then be assessed and repaired (see Volume 3B, Section 12).

Overall, the residual effects resulting from flood and post-flood operations of the Project on access to traditional resources, current use sites, or locations are anticipated to be low in magnitude. Restrictions on access to use of Area A or use of Elbow River as a travelway during floods would be temporary, beyond the minimum retention period after the design flood, but not beyond the complete release of water from the off-stream reservoir (see Section 12). Effects are expected to be reversible.

14.2.4 Change in Current Use Sites or Areas

14.2.4.1 Project Interactions and Pathways

Although only the area along the Elbow River flood plain (i.e., Area A; see Volume 3A, Sections 12 and 14) would be accessible for some TLRU activities following construction, effects from flood and post-flood operations are anticipated on sites and areas that are currently used elsewhere in the PDA. The following describes potential pathways that could affect current use sites or areas.

Current-use sites and areas—including, but not limited to, harvesting sites and areas, sites and areas for cultural or spiritual practices, or archaeological or palaeontological sites and areas—could be affected in the flood and post-flood operation phase by direct physical disturbance of sites and areas (e.g., reservoir filling or draining, sediment deposition or debris, or reservoir sediment partial cleanup).

Through the Indigenous engagement program for the Project, Indigenous groups have raised the concern that there is a potential for the Project to affect current use sites or areas through flood or post-flood operations:

- Tsuut'ina Nation expressed concern that burial sites would be destroyed should the reservoir be filled.
- Tsuut'ina Nation also noted that artifacts within the project area cannot be moved and are not protected from flooding.
- Kainai First Nation identified the potential for physical and cultural heritage sites or areas (e.g., ceremonial sites, burial sites, and cultural landscape) to be destroyed by the Project.³

³ This statement is assumed to include potential effects from flooding in the reservoir.

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14.2.4.2 Mitigation Measures

Recommendations and mitigation requests made by Indigenous groups are presented in Table 14-1 along with mitigation measures to be implemented for addressing changes in current use sites or areas.

Table 14-1 Mitigation for Change in Current Use Sites or Areas

| Recommendations, Mitigation Requests and Mitigation Measures | Mitigation Measures to be Implemented on the Project |
|--|---|
| Through the Indigenous engagement program for the Project, Kainai First Nation expressed concern that physical and cultural heritage (e.g., ceremonial sites, burial sites and cultural landscapes) would be destroyed by the Project, and asked for ongoing mitigation. | Alberta Transportation will follow current industry best practices and comply with all provincial and federal legislation. Should additional historical resources be encountered, Alberta Transportation will follow current Alberta Culture and Tourism policies and guidelines. |

Changes in current use sites or areas would also be mitigated through applicable mitigation measures presented in Volume 3A, Section 14.3.4. Project-specific recommendations that do not pertain directly to potential effects of the Project on TLRU are discussed in the Indigenous engagement section in Volume 4, Appendix B.

14.2.4.3 Residual Effects

Current use sites and areas identified by participating Indigenous groups within the RAA include sites and areas of historical interest or use, such as remnants of structures and artifacts, medicinal plant locations, ceremonial sites, areas of cultural or spiritual importance, former habitation sites, and current use areas. Known sites within the PDA include tipi rings, a medicinal and ceremonial plant locale, Blackfoot traditional camp sites that include multiple tipi rings, fire-broken rock, a spearhead (biface), and a possible reported traditional medicine wheel (KCO & SCO 2017; PN n.d.). Through the Indigenous engagement program for the Project and in one of the TUS reports, Tsuut'ina Nation, Siksika Nation, and Kainai First Nation identified Elbow River as important for fishing, as a gathering area, and as generally important for traditions and culture (KCO & SCO 2017). Stoney Nakoda Nations members indicated through the Indigenous engagement program that the Project area is used for trapping, and that two traplines are located near the Project.

These current use sites or areas, and those identified in Volume 3A, Section 14.2.6, are not considered an exhaustive list. Because of the historical occupation of the land by Indigenous groups, additional sites are likely to be present even if they have not been specifically identified by Indigenous groups. In addition, through the Indigenous engagement program for the Project, Kainai First Nation, Siksika Nation, and Piikani Nation noted that many cultural and spiritual sites are no longer accessible and cannot be identified, but are still important.

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A change in current use sites or areas could occur as a result of flood and post-flood operations by direct physical disturbance of sites and areas through reservoir filling or draining, damage from sediment deposition or debris, or cleanup. Through the Indigenous engagement program for the Project, Tsuut'ina Nation noted that artifacts in the project area are not protected from a flood and that burial sites would be destroyed should the reservoir be filled. Through the Indigenous engagement program for the Project, Kainai First Nation stated that physical and cultural heritage sites or areas (e.g., ceremonial sites, burial sites, and cultural landscape) would be destroyed by the Project.⁴

Appropriate conditions for current use entail more than preserving traditional sites and locations: Indigenous groups may choose not to pursue current use activities near the Project for cultural, personal, practical, aesthetic, and spiritual reasons. Regarding ceremonial sites, burial sites, and cultural landscapes, Kainai First Nation stated through the Indigenous engagement program for the Project that "they will no longer be visible so revisiting these sites will stop." This is also discussed in Section 14.2.3.

Sites and areas within the reservoir would be temporarily inundated during flood operations. The extent of area affected by floodwaters would depend on the size of the flood, but for the floods considered here, the area varies between 21 ha and 816 ha. The maximum amount of time that diverted water would remain in the reservoir is approximately 84 days.

Effects on cultural sites and areas could result from post-flood sedimentation. Following a design flood, 104.6 ha of the PDA with sediment deposition between 10 cm and 1 m and 40.8 ha of the PDA with over 1 m are expected. Following a flood, cultural sites and areas are expected to be restored to dry operation conditions in the portions of the PDA covered by sediment (in the reservoir) of less than 3 cm; however, sites in areas with greater sediment deposition are more likely to be affected by sediment deposition. The design flood is based on the 2013 flood; effects from a 1:100 year or 1:10 year flood would be less. In addition, some of these sites may have already been disrupted by construction and dry operation activities, as described in Volume 3A, Section 14.5.4. Use of some areas would be precluded by changes to land-use type and associated access restrictions, as outlined in Volume 3A, 14.3.3 and Section 12).

No effects from the Project are anticipated on Area A during flood or post-flood operations; the ability to continue to use sites and areas for some TLRU would be maintained (see Section 12).

Overall, the residual effects resulting from flood and post-flood operations on current use sites or areas are anticipated to be moderate for cultural sites, except for effects from deeper sedimentation; in these areas, effects are anticipated to be of high magnitude. Timing is seasonal and restricted activity periods (RAPs) of wildlife movement and habitat availability, as well as the seasonality of vegetation for traditional purposes. However, during flood operations, these considerations would be not applicable. The effects resulting from flood and post-flood

⁴ This statement is assumed to include potential effects from flooding in the reservoir.

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operations of the Project would be restricted to the PDA (the reservoir), short term and reversible except for effects from deeper sedimentation (sediment excavation is not planned except sufficient to maintain flows in and out of the reservoir for future floods). Effects on cultural sites would be long term in these areas.

14.2.5 Change in Indigenous Commercial Activities

14.2.5.1 Project Interactions and Pathways

The Project is located downstream from identified Indigenous commercial activities, including Redwood Meadows Golf and Country Club (see Section 18, Figure 18-3). Therefore, no interactions are anticipated to occur between the Project and Indigenous commercial activities during flood and post-flood operations.

14.2.6 Summary of Project Residual Environmental Effects

Table 14-2 summarizes the residual environmental effects on TLRU during flood and post-flood operations.

Table 14-2 Summary of Project Residual Effects on Traditional Land and Resource Use during Flood and Post-flood Operation

| Residual Effect | Residual Effects Characterization | | | | | | | | |
|--|-----------------------------------|-------------------|-----------|-----------|-------------------|----------|-----------|---------------|---------------------------------------|
| | Project Phase | Timing | Direction | Magnitude | Geographic Extent | Duration | Frequency | Reversibility | Ecological and Socio-economic Context |
| Change in availability of traditional resources for current use | F/PF | T/S/R/N/A (for F) | A | L-H | PDA-LAA | ST-LT | S/IR | R | D |
| Change in access to traditional resources or areas for current use | F/PF | T/S/R/N/A (for F) | A | L | LAA | ST | IR | R | D |

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Table 14-2 Summary of Project Residual Effects on Traditional Land and Resource Use during Flood and Post-flood Operation

| Residual Effect | Residual Effects Characterization | | | | | | | | |
|---|-----------------------------------|-------------------|-----------|---|-------------------|---|-----------|---------------|---------------------------------------|
| | Project Phase | Timing | Direction | Magnitude | Geographic Extent | Duration | Frequency | Reversibility | Ecological and Socio-economic Context |
| Change in current use sites or areas | F/PF | T/S/R/N/A (for F) | A | M-H (H for cultural sites under sediment > 10 cm) | PDA | ST (LT for cultural sites under sediment > 10 cm) | IR | R | D |
| <p>KEY</p> <p>See Table 14-2 in Volume 3A for detailed definitions</p> <p>Project Phase F: Flood Operation PF: Post-flood Operation</p> <p>Timing Consideration T: Time of day S: Seasonality R: Regulatory N/A: Not Applicable</p> <p>Direction: P: Positive A: Adverse</p> <p>Magnitude: N: Negligible L: Low M: Moderate H: High</p> <p>Geographic Extent: PDA: Project Development Area LAA: Local Assessment Area RAA: Regional Assessment Area</p> <p>Duration: ST: Short-term; LT: Long-term</p> <p>Frequency: S: Single event IR: Irregular event R: Regular event C: Continuous</p> <p>Reversibility: R: Reversible I: Irreversible</p> <p>Ecological/Socio-Economic Context: D: Disturbed U: Undisturbed R: Resilient NR: Not Resilient</p> | | | | | | | | | |

14.3 DETERMINATION OF SIGNIFICANCE

The definition of significant adverse effects on TLRU is provided in Volume 3A, Section 14.1.6. The determination of significance for assessment of residual environmental effects on TLRU provided here considers information on current use of lands and resources for traditional purposes obtained from Project-specific TUS, the Indigenous engagement program for the Project, a review of relevant publicly available literature, consideration of significance determinations for related biophysical and socio-economic assessments, the ecological and socio-economic context of the Project area, past project experience, and professional judgment.



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The residual environmental effects from flood or post-flood operations on TLRU are determined to be not significant because they will not result in the long-term loss of availability of traditional use resources in the LAA or RAA. Short-term effects from flood and post-flood operations on access to lands relied on for traditional use practices or current use sites in Area A are anticipated to be reversible and are not expected to critically reduce or eliminate current use in the RAA.

14.4 PREDICTION CONFIDENCE

Prediction confidence in the assessment of effects on TLRU is moderate. This reflects the available Project-specific TLRU and traditional ecological knowledge information provided through the Indigenous engagement program, including TUS reports, understanding of applicable mitigation measures, and reliance on assessments of other valued components of relevance to TLRU. Project-specific TUS reports are the best source of information on which to base an assessment of project effects on TLRU.

As of March 16, 2018, two TUS reports, comprising the traditional knowledge of three potentially affected Indigenous groups, had been incorporated into the assessment of residual effects on TLRU (see Volume 3A, Section 14.1.2). Given the qualitative and subjective nature of assessing TLRU, the views of Indigenous groups may differ from the findings of this assessment.

TLRU information received after the EIA has been filed will be used for project planning and design purposes, where appropriate. Alberta Transportation will notify Alberta Environment and Parks and the CEA Agency upon receipt of any new TUS reports submitted by Indigenous groups during the regulatory process and of any considerations made in response to these reports. Additional TUS reports will be reviewed against the results of the EIA and a formal response will be developed in a table format that breaks out relevant TLRU information, issues and concerns according to standard EIS assessment categories, cross-references where these have been assessed in the EIS, and identifies applicable mitigation measures. The intention is to provide a copy of this review to the Indigenous group for their review and comment within 90 days of receiving a new TUS.

14.5 EFFECTS ON INTANGIBLE COMPONENTS

For effects on intangible components related to construction and dry operation of the Project, see Volume 3A, Section 14.8. No intangible components related specifically to flood or post-flood operations were raised by participating Indigenous groups through TUS reports or the Indigenous engagement program for the Project, and thus are not discussed further here, consistent with the approach outlined in Volume 3A, Section 14.1.3.3.

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14.6 PROJECT EFFECTS ON TRADITIONAL LAND AND RESOURCE USE BY INDIGENOUS GROUP

The sections below present TLRU assessment conclusions for each Indigenous group, in terms of flood and post-flood operations of the Project. No intangible components related to these phases of the Project were identified by Indigenous groups for consideration on the Project in a TUS report or through the Indigenous engagement program and, therefore, none are discussed below.

14.6.1 Kainai First Nation

Kainai First Nation identified several areas within the RAA, including Elbow River, a trail, tipi rings, a medicinal and ceremonial plant locale, traditional camp sites with multiple tipi rings, fire-broken rock, a spearhead, and reported the presence of a medicine wheel. Kainai First Nation⁵ also explained that many cultural and spiritual sites in the RAA are no longer accessible and cannot be identified, but are still important.

Issues of importance related to flood and post-flood operation on TLRU identified by Kainai First Nation through the Indigenous engagement program for the Project, including the TUS study, include:

- sediment deposition has the potential to:
 - destroy ceremonial sites, burial sites, and cultural landscapes or to prevent their future use if the sites are no longer visible
 - affect wildlife, fish, and plants, and hunting, trapping, fishing, and plant gathering
 - result in loss of land area for harvesting activities due to sediment deposit
 - affect air quality by wind transporting flood residue
- sites identified, including a trail, tipi rings, a medicinal and ceremonial plant locale, Blackfoot traditional camp sites (with multiple tipi rings, fire-broken rock, a spearhead, and possible medicine wheel)

Harvesting activities and associated locations in Area A (e.g., trapping, fishing and plant gathering areas) would not be affected by flood or post-flood operations of the Project.

⁵ Some information provided by Kainai First Nation was also provided by Siksika Nation and/or Piikani Nation. Where the information is shared between more than one Nation, it has been repeated under each Nation.

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Permanent loss of traditional plant use species is not predicted as a result of flood or post-flood operation because these species are widespread and are expected to re-establish by natural recruitment. A loss of native upland or wetland plant communities, or wetland function from the LAA, are not expected.

Wildlife habitat changes are anticipated from increased sedimentation for elk and grizzly bear. Flooding and post-flood operation maintenance could increase mortality risk for ground-nesting migratory birds, but nesting should re-establish after the reservoir is drained. These effects are unlikely to pose a long-term threat to the persistence or viability of wildlife species. Effects from the flood and post-flood operations of the Project on wildlife health are not anticipated.

Fish mortality is expected from flood operations by entrainment of fish into the reservoir causing bodily harm, or stranding during dewatering of the reservoir. Fish movement, overwintering and spawning habitat shallow side-channel, nearshore rearing habitats, and macrophyte growth are expected to be maintained, and changes to flow are unlikely to affect food availability and fish feeding patterns in Elbow River.

During post-flood operation, most sediment deposited in the reservoir would be coarse material, not fine particulate matter that is more susceptible to wind erosion.

Use of sites and access to sites within Area A are anticipated to be temporarily restricted due changes in water volume and flow on Elbow River, and flooding of Springbank Road and other access roads during 1:100 year and design floods. These effects are anticipated to be temporary and reversible.

Cultural sites and areas covered by less than 3 cm of sediment are expected to be restored to dry operation conditions, but the integrity of the sites in areas with greater sediment deposition is likely to be affected long term.

14.6.2 Piikani Nation

Piikani Nation identified several areas within the RAA, including Elbow River, a trail, tipi rings, a medicinal and ceremonial plant locale, traditional camp sites with multiple tipi rings, fire-broken rock, a spearhead, and reported the presence of a medicine wheel. Piikani Nation also explained that many cultural and spiritual sites in the RAA are no longer accessible and cannot be identified, but are still important.

Issues of importance related to flood and post-flood operations on TLRU identified by Piikani Nation through the Indigenous engagement program for the Project, including the TUS study, include:

- fluctuating water levels due to flooding and the associated effect on fish and fish habitat in Elbow River

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- fish health and potential mortality due to a flood
- impeded fish movement because of the potential for fish to get trapped in the reservoir or diversion structure
- silt build up in Elbow River due to flood cessation and the potential for the build-up to affect wildlife, plants, and the traditional activities that depend on those resources
- sites identified, including a trail, tipi rings, a medicinal and ceremonial plant locale, Blackfoot traditional camp sites (with multiple tipi rings, fire-broken rock, a spearhead, and possible medicine wheel)

Harvesting activities and associated locations in Area A (e.g., trapping, fishing and plant gathering areas) would not be affected by flood or post-flood operations of the Project.

Permanent loss of traditional plant use species is not predicted because of flood or post-flood operations because these species are widespread and are expected to re-establish by natural recruitment. A loss of native upland or wetland plant communities, or wetland function from the LAA, are not expected.

Wildlife habitat changes are anticipated from increased sedimentation for elk and grizzly bear. Post-flood operations maintenance could increase mortality risk for ground-nesting migratory birds, but nesting should re-establish after the reservoir is drained. These effects are unlikely to pose a long-term threat to the persistence or viability of wildlife species. Effects from the flood and post-flood operations of the Project on wildlife health are not anticipated.

Fish mortality is expected from flood operations by entrainment of fish into the reservoir causing bodily harm, or stranding during dewatering of the reservoir. Fish movement, overwintering and spawning habitat shallow side-channel, nearshore rearing habitats, and macrophyte growth are expected to be maintained, and changes to flow are unlikely to affect food availability and fish feeding patterns in Elbow River.

Access to sites outside of Area A along the Elbow River flood plain would be restricted following construction of the Project and have not been further assessed here. Use of sites and access to sites within Area A are anticipated to be temporarily restricted due to changes in water volume and flow on Elbow River, and flooding of Springbank Road and other access roads during 1:100 year and design floods. These effects are anticipated to be temporary and reversible.

Cultural sites and areas covered by less than 3 cm of sediment are expected to be restored to dry operation conditions, but the integrity of the sites in areas with greater sediment deposition is likely to be affected long term.

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14.6.3 Siksika Nation

Siksika Nation identified several areas within the RAA, including Elbow River, a trail, tipi rings, a medicinal and ceremonial plant locale, traditional camp sites with multiple tipi rings, fire-broken rock, a spearhead, and reported the presence of a medicine wheel. Siksika Nation also explained that many cultural and spiritual sites in the RAA are no longer accessible and cannot be identified, but are still important.

Harvesting activities and associated locations in Area A (e.g., trapping, fishing and plant gathering areas) would not be affected by flood or post-flood operations of the Project.

Permanent loss of traditional plant use species is not predicted as a result of flood or post-flood operation because these species are widespread and are expected to re-establish by natural recruitment.

Access to sites outside of Area A along the Elbow River flood plain would be restricted following construction and are not further assessed here. Use of sites and access to sites within Area A are anticipated to be temporarily restricted due changes in water volume and flow on Elbow River, and flooding of Springbank Road and other access roads during 1:100 year and design floods. These effects are anticipated to be temporary and reversible.

Cultural sites and areas covered by less than 3 cm of sediment are expected to be restored to dry operation conditions, but the integrity of the sites in areas with greater sediment deposition is likely to be affected long term.

14.6.4 Stoney Nakoda Nations (Bears paw First Nation, Chiniki First Nation, and Wesley First Nation)

Stoney Nakoda Nations indicated that the Project area is used for trapping, and two traplines are located near the Project. Stoney Nakoda Nations also indicated that sand bars are culturally important. Stoney Nakoda Nations noted that the waters that flow through the traditional lands have sustained the Stoney Nakoda Nations since time immemorial, but did not identify specific sources of drinking water.

During diversion, channel planform and bedload movement would be maintained. During release, most of the mobilized bed material is predicted to remain within the low-level outlet and minimal interaction with Elbow River would occur.

Harvesting activities and associated locations in Area A (e.g., trapping, fishing and plant gathering areas) would not be affected by flood or post-flood operations of the Project. Similarly, the Project is not anticipated to affect sources of drinking water that may be used by Stoney Nakoda Nations.

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Access to sites outside of Area A along the Elbow River flood plain would be restricted following construction and are not further assessed here. Use of sites and access to sites within Area A are anticipated to be temporarily restricted due changes in water volume and flow on the Elbow River, and flooding of Springbank Road and other access roads during 1:100 year and design floods. These effects are anticipated to be temporary and reversible.

Cultural sites and areas covered by less than 3 cm of sediment are expected to be restored to dry operation conditions, but the integrity of the sites in areas with greater sediment deposition is likely to be affected long term.

14.6.5 Tsuut'ina Nation

Tsuut'ina Nation identified Elbow River as a fishing and gathering area, as well as a travel route. Tsuut'ina Nation also identified a historical trading route.

As of March 16, 2018, Tsuut'ina Nation has noted several issues related to flood and post-flood operation on TLRU:

- diversion of flood waters would result in increased sedimentation washing downstream into Elbow River and its tributaries
- reduction to or damage of fescue grassland and wetland habitat from contaminated sediment left behind following a flood
- potential for flood waters to affect plants that are harvested in the RAA
- floodwater release would reduce available wetland habitat for breeding, nesting and brood rearing for waterfowl and migratory birds
- effects on fish movement, particularly the potential for fish to become trapped in the reservoir or diversion structure when floodwater is drained
- changes to water temperatures and associated effects on fish health
- effects on fish health and potential mortality due to a flood
- artifacts that cannot be moved would not be protected from a flood
- burial sites would be destroyed should the reservoir be filled

Harvesting activities and associated locations in Area A (e.g., trapping, fishing and plant gathering areas) would not be affected by flood or post-flood operations of the Project.

Permanent loss of traditional plant use species is not predicted as a result of flood or post-flood operations because these species are widespread and are expected to re-establish by natural recruitment. A loss of native upland or wetland plant communities, or wetland function from the LAA, are not expected.

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Wildlife habitat changes are anticipated from increased sedimentation for elk and grizzly bear. Post-flood operation maintenance could increase mortality risk for ground-nesting migratory birds, but nesting should re-establish after the reservoir is drained. These effects are unlikely to pose a long-term threat to the persistence or viability of wildlife species. Effects from the flood and post-flood operations of the Project on wildlife health are not anticipated.

Fish mortality is expected from flood operations by entrainment of fish into the reservoir causing bodily harm, or stranding during dewatering of the reservoir. Fish movement, overwintering and spawning habitat shallow side-channel, nearshore rearing habitats, and macrophyte growth are expected to be maintained, and changes to flow are unlikely to affect food availability and fish feeding patterns in Elbow River.

Access to sites outside of Area A along the Elbow River flood plain would be restricted following construction of the Project and have not been further assessed here. Use of sites and access to sites within Area A are anticipated to be temporarily restricted due changes in water volume and flow on Elbow River, and flooding of Springbank Road and other access roads during 1:100 year and design floods. These effects are anticipated to be temporary and reversible.

Cultural sites and areas covered by less than 3 cm of sediment are expected to be restored to dry operation conditions, but the integrity of the sites in areas with greater sediment deposition is likely to be affected long term.

Through the engagement program for the Project, Tsuut'ina Nation expressed concerns that Redwood Meadows Golf and Country Club would be affected as a result of contamination or access to the region being affected as a result of a flood. The Project is located downstream from identified Indigenous commercial activities, including Redwood Meadows Golf and Country Club. Therefore, no interactions are anticipated to occur between the Project and the Indigenous commercial activities.

14.6.6 Ermineskin Cree Nation

As of March 16, 2018, no concerns from Ermineskin Cree Nation specific to flood or post-operation were identified through a review of publicly available information or the Indigenous engagement program for the Project.

Residual environmental effects from flood or post-flood operation on TLRU are not expected to result in the long-term loss of availability of traditional use resources in the LAA or RAA. Short-term effects from flood and post-flood operations on access to lands relied on for traditional use practices or current use sites in Area A are anticipated to be reversible and are not expected to critically reduce or eliminate current use in the RAA.

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14.6.7 Foothills Ojibway

Foothills Ojibway has indicated using the land for current use activities such as hunting, plant harvesting, habitation, as well as spiritual and ceremonial practices. As of March 16, 2018, no issues or concerns related to the Project had been identified through a review of publicly available information or the Indigenous engagement program for the Project. Alberta Transportation will continue to attempt engagement with Foothills Ojibway throughout the environmental assessment process.

14.6.8 Ktunaxa Nation

Through engagement activities for the Project, Ktunaxa Nation has informed Alberta Transportation that they were not interested in participating in the engagement activities for the Project and no assessment of potential effects on Ktunaxa Nation's TLRU has been undertaken. Consequently, there are no conclusions regarding project effects on Ktunaxa Nation TLRU. Existing conditions for Ktunaxa Nation, following CEA Agency Guidelines for the Project (CEA Agency 2016), are provided in Volume 4, Appendix P, Attachment 14A.

14.6.9 Louis Bull Tribe

As of March 16, 2018, no concerns from Louis Bull Tribe specific to flood or post-operation were identified through a review of publicly available information or the Indigenous engagement program for the Project.

Residual environmental effects from flood or post-flood operation on TLRU are not expected to result in the long-term loss of availability of traditional use resources in the LAA or RAA. Short-term effects from flood and post-flood operations on access to lands relied on for traditional use practices or current use sites in Area A are anticipated to be reversible and are not expected to critically reduce or eliminate current use in the RAA.

14.6.10 Montana First Nation

As of March 16, 2018, no concerns from Montana First Nation specific to flood or post-operation were identified through a review of publicly available information or the Indigenous engagement program for the Project.

Residual environmental effects from flood or post-flood operation on TLRU are not expected to result in the long-term loss of availability of traditional use resources in the LAA or RAA. Short-term effects from flood and post-flood operations on access to lands relied on for traditional use practices or current use sites in Area A are anticipated to be reversible and are not expected to critically reduce or eliminate current use in the RAA.

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14.6.11 Samson Cree Nation

As of March 16, 2018, no concerns from Samson Cree Nation specific to flood or post-operation were identified through a review of publicly available information or the Indigenous engagement program for the Project.

Residual environmental effects from flood or post-flood operation on TLRU are not expected to result in the long-term loss of availability of traditional use resources in the LAA or RAA. Short-term effects from flood and post-flood operations on access to lands relied on for traditional use practices or current use sites in Area A are anticipated to be reversible and are not expected to critically reduce or eliminate current use in the RAA.

14.6.12 Métis Nation of Alberta, Region 3

As of March 16, 2018, no concerns from Métis Nation of Alberta, Region 3 specific to flood or post-operation were identified through a review of publicly available information or the Indigenous engagement program for the Project.

Residual environmental effects from flood or post-flood operation on TLRU are not expected to result in the long-term loss of availability of traditional use resources in the LAA or RAA. Short-term effects from flood and post-flood operations on access to lands relied on for traditional use practices or current use sites in Area A are anticipated to be reversible and are not expected to critically reduce or eliminate current use in the RAA.

14.6.13 Métis Nation British Columbia

As of March 16, 2018, no concerns from Métis Nation of British Columbia specific to flood or post-operation were identified through a review of publicly available information or the Indigenous engagement program for the Project.

Residual environmental effects from flood or post-flood operation on TLRU are not expected to result in the long-term loss of availability of traditional use resources in the LAA or RAA. Short-term effects from flood and post-flood operations on access to lands relied on for traditional use practices or current use sites in Area A are anticipated to be reversible and are not expected to critically reduce or eliminate current use in the RAA.

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14.7 REFERENCES

CEA Agency (Canadian Environmental Assessment Agency). 2016. Guidelines for the Preparation of an Environmental Impact Statement Pursuant to the Canadian Environmental Act, 2012. Springbank Off-Stream Reservoir Project. Alberta Transportation.

KCO & SCO (Kainai Consultation Office and Siksika Consultation Office). 2017. *Springbank Off-stream Reservoir (SR-1) KCO and SCO TUS Research Study, Alberta Bow and Elbow River Flood Prevention and Mitigation Project: Joint Kainai & Siksika Interim Report*. (March 9, 2017).

PN (Piikani Nation). No date. *Piikani report on Proposed Springbank Reservoir and Dam*. Prepared for Piikani Consultation by William Big Bull, Piikani Nation.