# Environmental Considerations for the Springbank SR1 Off-Stream Reservoir Project

*OPENING STATEMENT OF*
*CLIFF WALLIS P. BIOL.*
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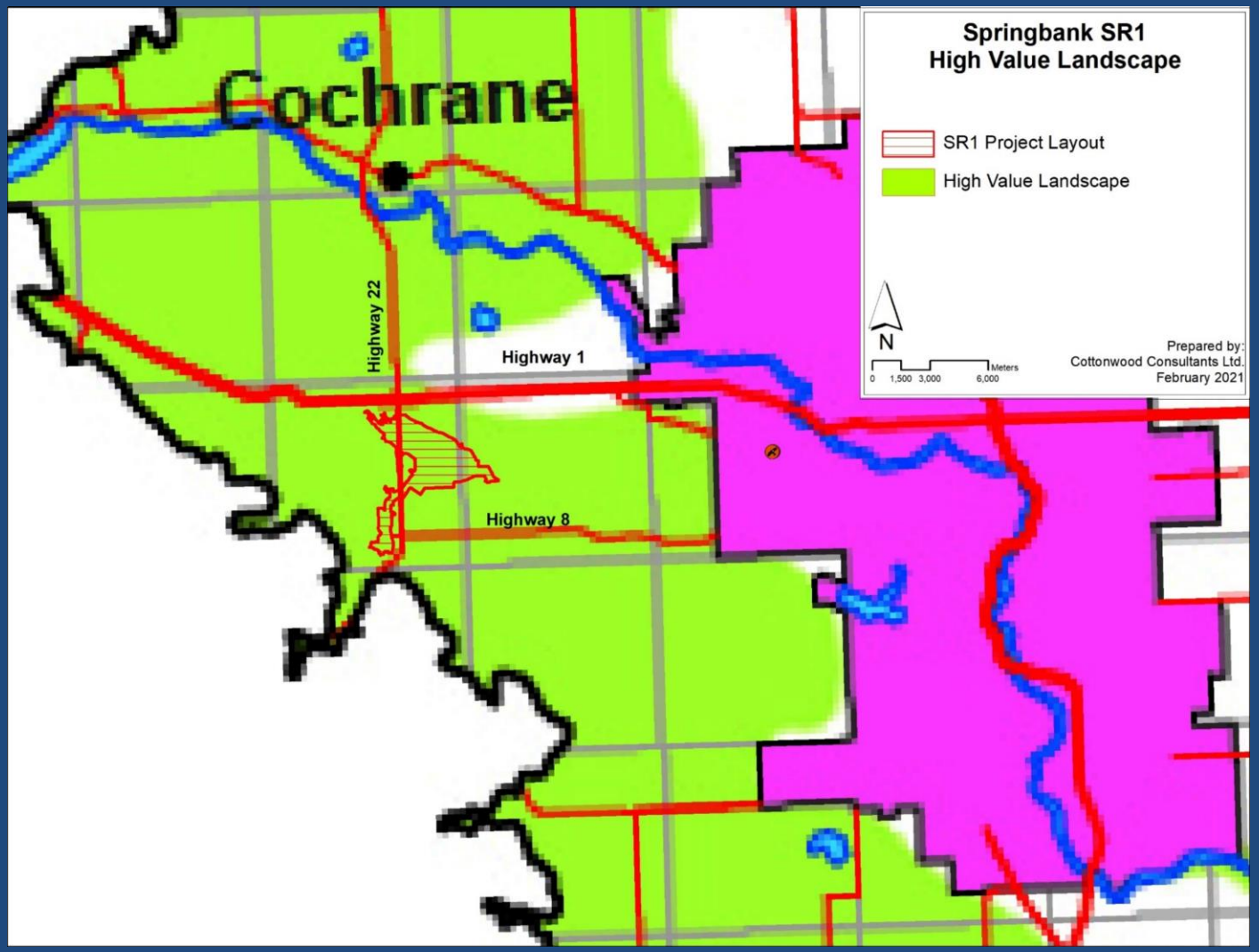
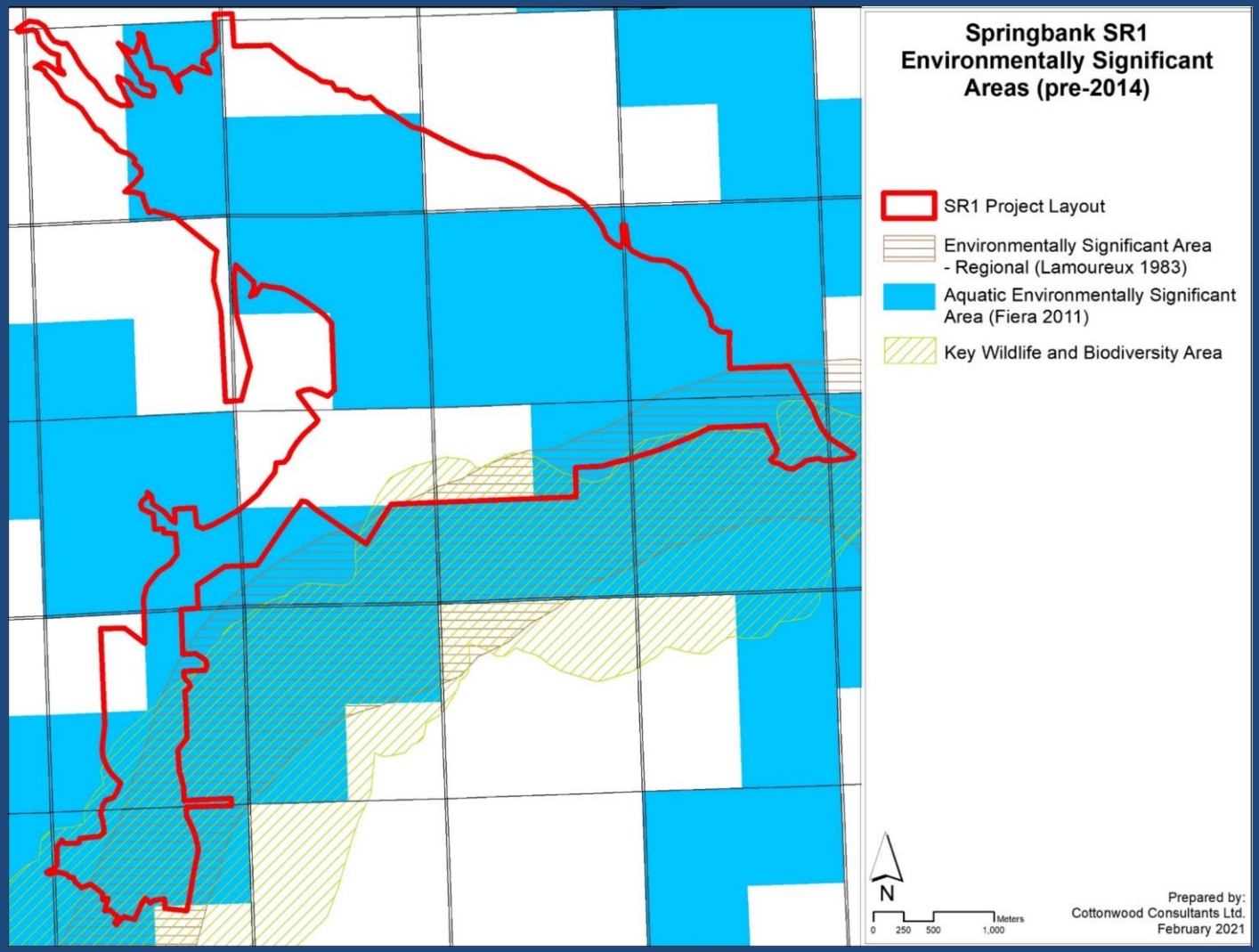
# LANDSCAPES OF CONSERVATION SIGNIFICANCE

**Much of the Springbank SR1 Project boundary is located in one or more landscapes of conservation significance (High Value Landscape, Environmentally Significant Areas, Areas of High Wildlife Sensitivity, Key Wildlife and Biodiversity Area, High Sensitivity Watershed)**

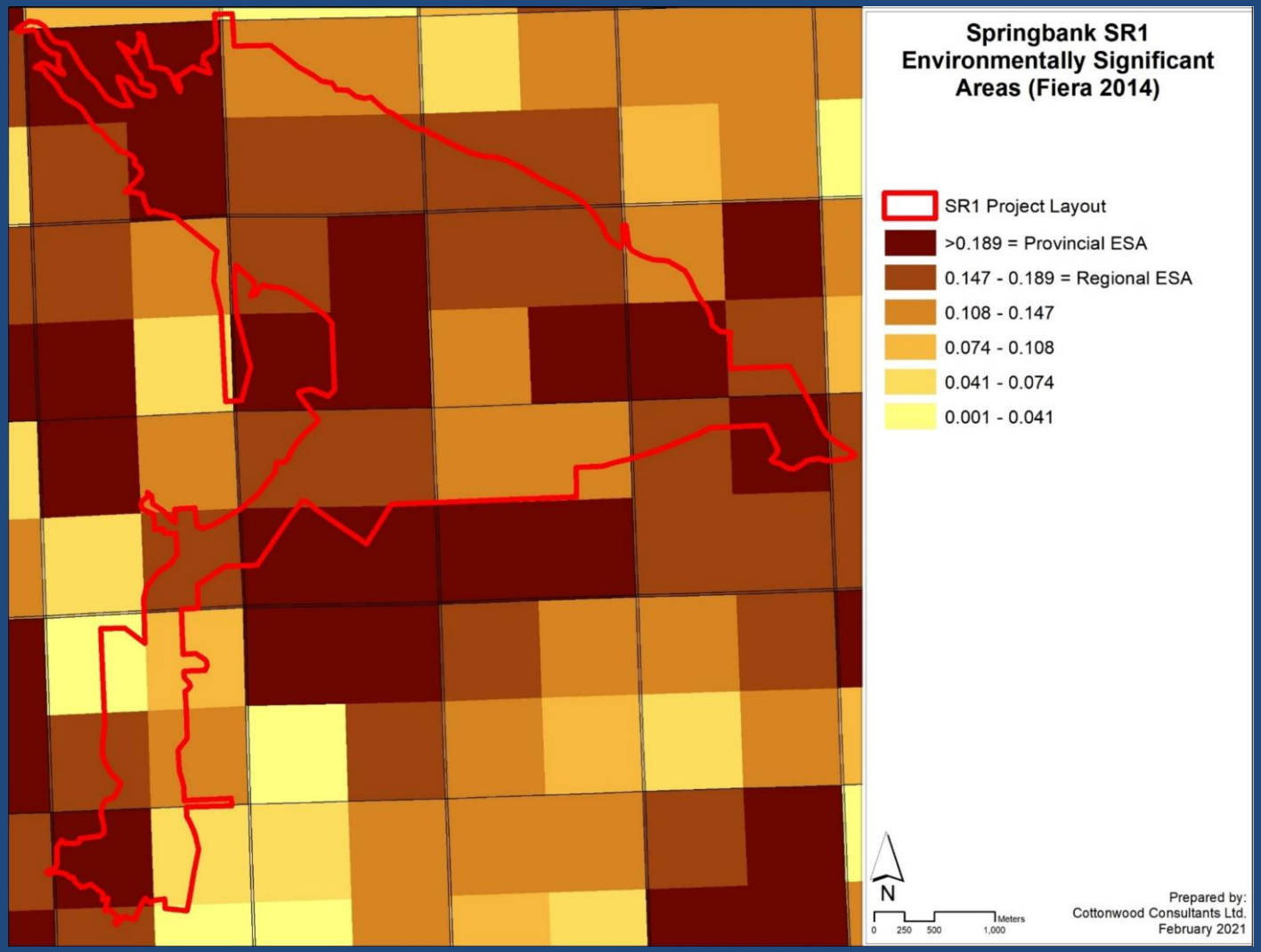
# HIGH VALUE LANDSCAPE



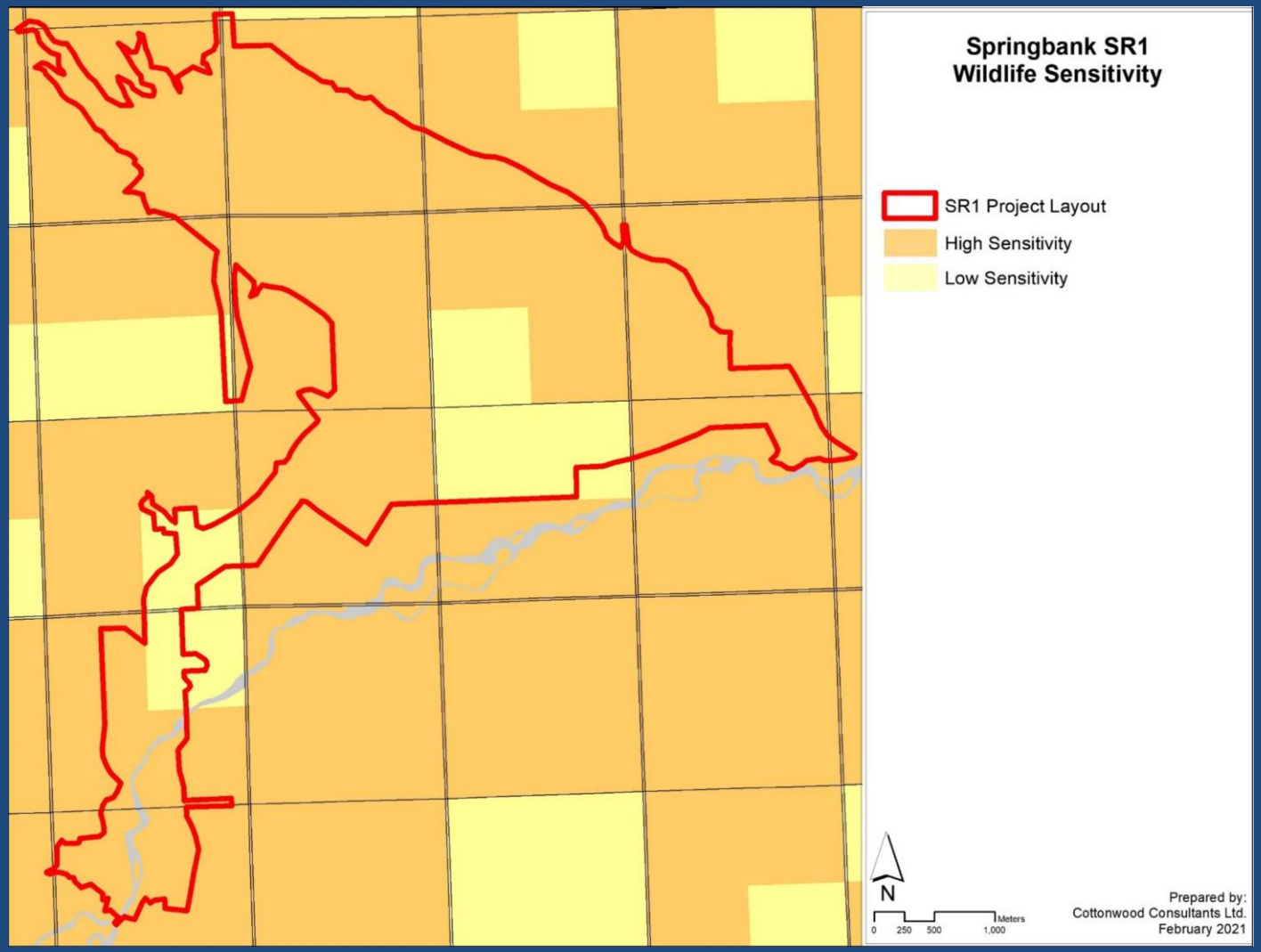
# ESAs (pre-2014)/ KEY WBA



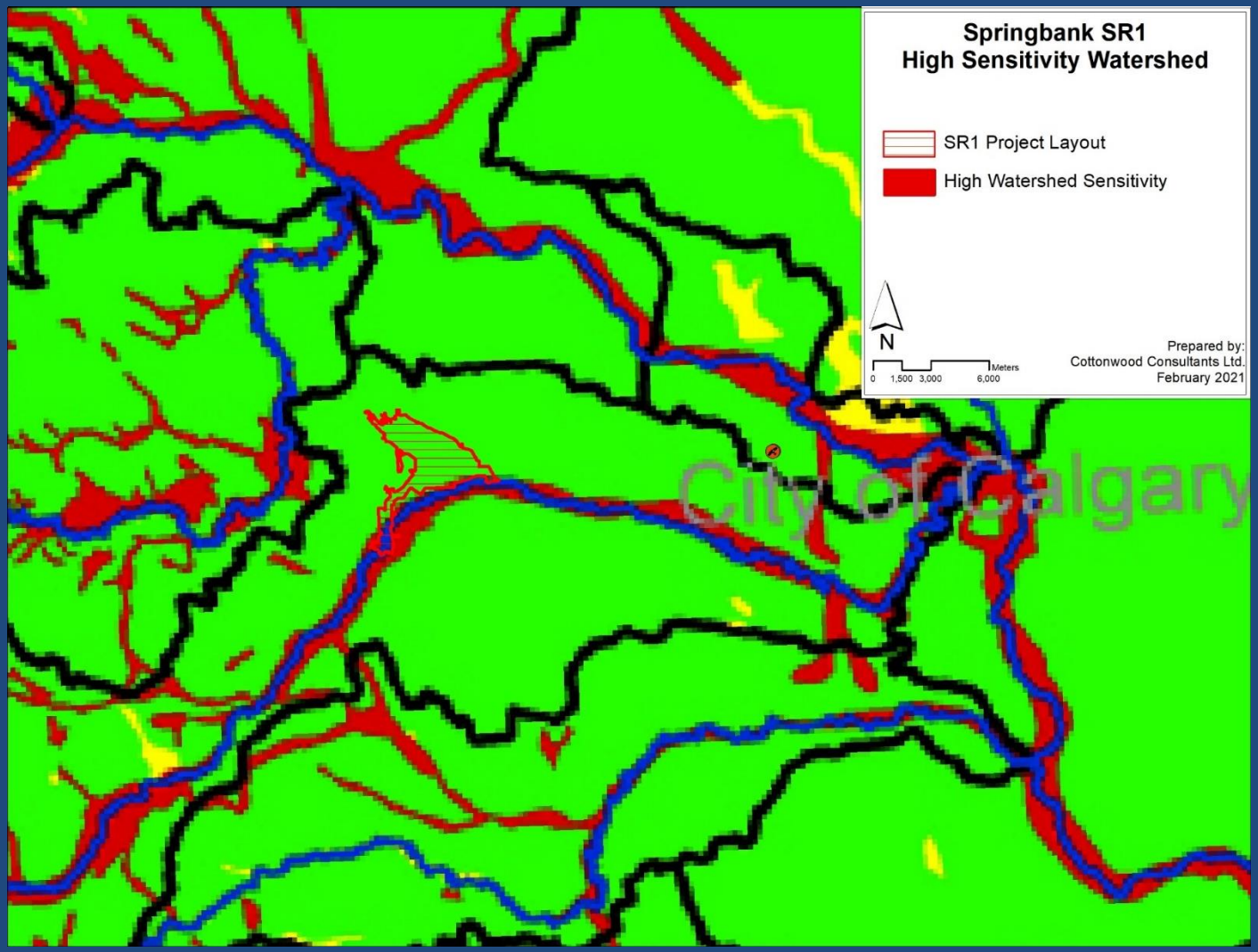
# ESAs (2014)


Springbank SR1
Environmentally Significant
Areas (Fiera 2014)
SR1 Project Layout
>0.189 = Provincial ESA
0.147 - 0.189 = Regional ESA
0.108 - 0.147
0.074 - 0.108
0.041 - 0.074
0.001 - 0.041
N
0 250 500 1,000
Meters
Prepared by:
Cottonwood Consultants Ltd.
February 2021

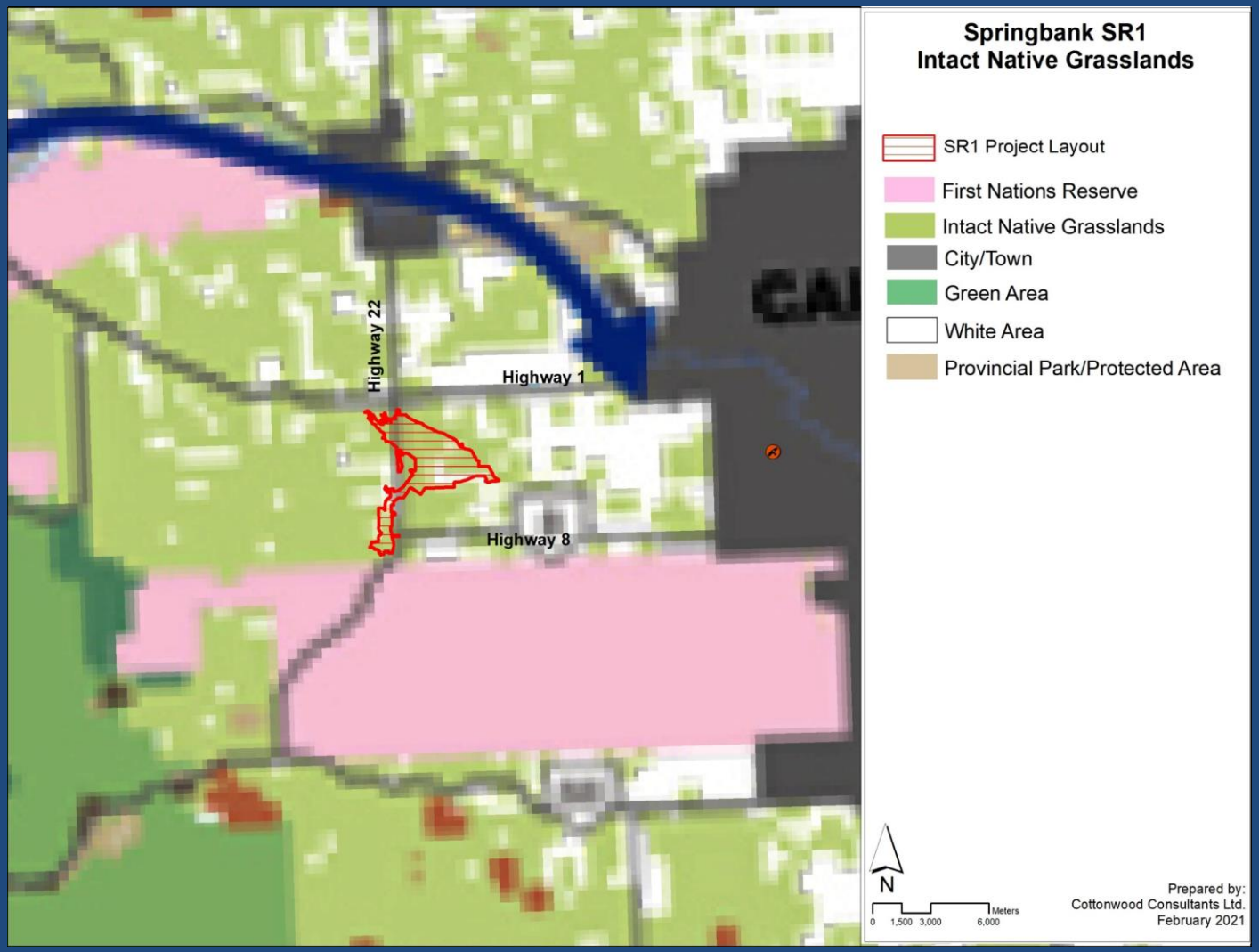
# WILDLIFE SENSITIVITY



# HIGH WATERSHED SENSITIVITY



# SSRP/INTACT NATIVE GRASSLAND



# SSRP/INTACT NATIVE GRASSLAND

**South Saskatchewan Regional Plan (SSRP) guidance for intact native grasslands:**

*"Implement guidelines to **avoid conversion and maintain intact native grasslands on public land** (see Appendix G - Grasslands).*

- *Species at risk habitat – No conversion permitted as habitat needs to be sustained as part of government programs for species recovery (as required under federal and provincial legislation)."*
- *. . .*
- *"Areas with high biodiversity value such as areas important for connectivity and areas that are "intact" and would benefit from remaining in a less disturbed condition such as intact native grasslands."*

- **To summarize, in contravention of the SSRP guidance to maintain intact native grasslands, portions of the project footprint are located on what will be public land inside areas mapped as intact native grasslands in the SSRP**

# SSRP/INTACT NATIVE GRASSLAND

***Lancaster et al. (2016) note:*** *"In the Alberta Grassland Natural Region, recovery of native plant communities can be more readily achieved in drier prairie environments while mesic foothill environments are much more challenging, primarily due to the greater competitiveness of agronomic grasses and weeds in the moister growing environment. Ecological health, function and associated ecological services will be diminished when plant communities are modified by non-native species ."*

*Bradley and Neville (2010) note: "natural recovery has failed to restore foothills fescue plant communities as the native plants simply cannot compete with invasive non-native species. Disturbed sites seeded with native plant cultivars have resulted in limited success in reducing non-native species invasion."*

Reclamation**:**

- High likelihood that foothills fescue grassland reclamation will be unsuccessful

# SSRP/INTACT NATIVE GRASSLAND

Stantec acknowledges in Exhibit 2, pdf page 72 that:

- *"Fescue grasslands are important ecologically as a climax community providing habitat and winter forage for wildlife. . . . Because of the decline of fescue grassland communities in Alberta and the difficulty of re-establishing them, numerous fescue dominated communities are tracked and watched by the Alberta Conservation Information Management System (2014) . . Areas of native prairie within the Project Area have the potential to include fescue grassland. Some of these areas of native prairie would be removed during the construction of the project components and increase the fragmentation of the grassland in the Project Area."*

Reply, Exhibit 325, pdf page 52, point 183, states: "Reclaimed native grassland areas will likely have reduced function and diversity compared to existing areas but will remain dominated by native plants and provide wildlife habitat." I have considerable difficulty with that characterization and Stantec's in Exhibit 94, pdf page 150, of the project area as native grassland following re-vegetation. In the unlikely event that reclamation is successful, those grasslands will not have the full functionality and productivity for native plants and wildlife, including invertebrate populations.



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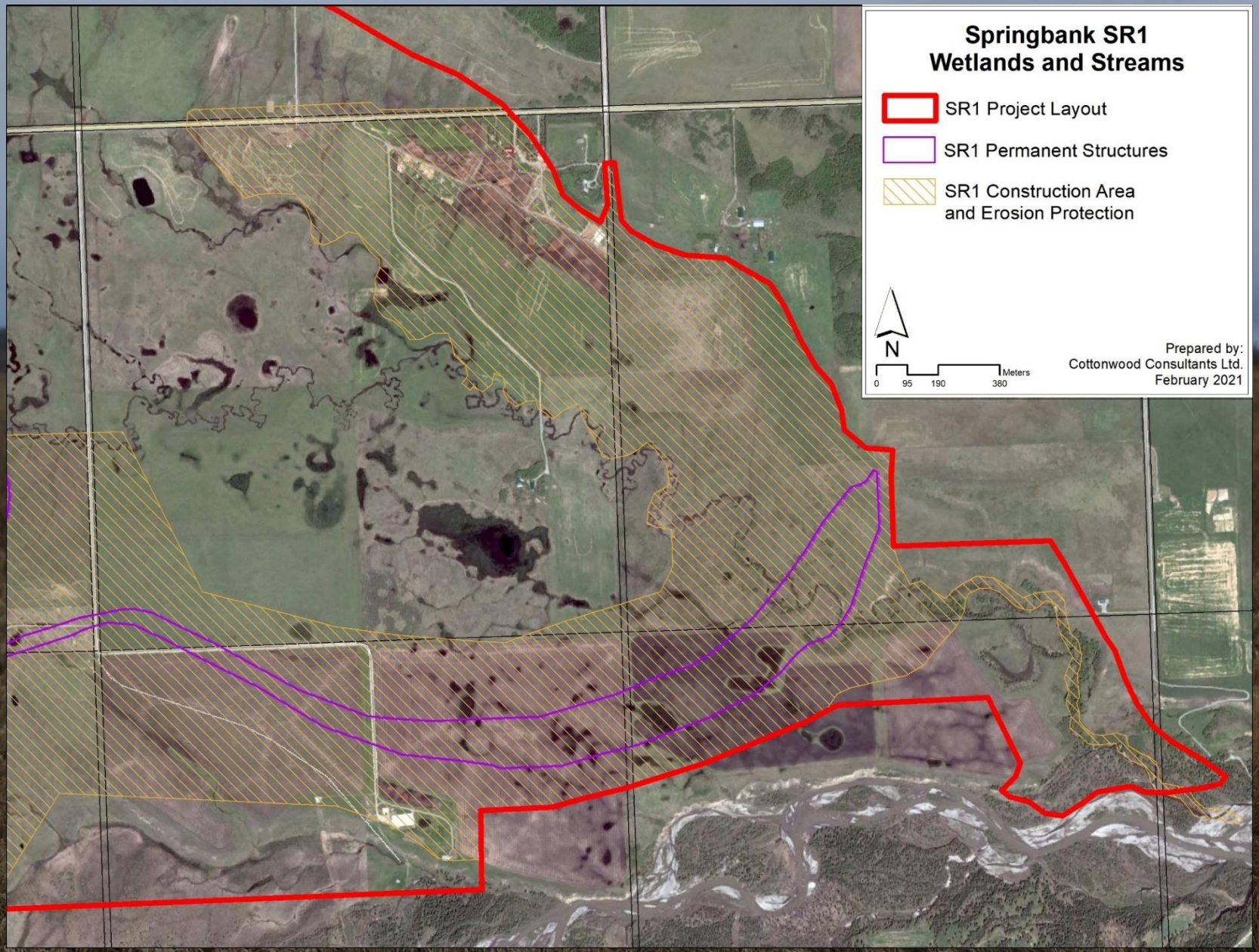

Springbank SR1
Wetlands and Streams
SR1 Project Layout
SR1 Permanent Structures
SR1 Construction Area
and Erosion Protection
N
0
95
190
380
Meters
Prepared by:
Cottonwood Consultants Ltd.
February 2021

# ALBERTA WETLAND POLICY

"Alberta's Wetland Mitigation Hierarchy can best be described as follows:

1. Avoidance – The primary and preferred response is to avoid impacts on wetlands.
2. Minimization – Where avoidance is not possible, proponents are expected to minimize impacts on wetlands.
3. Replacement – As a last resort, and where avoidance and minimization efforts are not feasible or prove ineffective, wetland replacement is required."

Stantec notes in Exhibit 217, pdf page 24 that dry operations would result in the loss of over 52% of wetlands classed as either moderate or high value.

To summarize, despite proposed and suggested mitigation, there will be residual negative biodiversity impacts of the project on valuable wetlands and streams through sediment deposition during flood events and activities to remove sediment following floods, as well as modification of stream flow or outright loss of these features under project components.

In contravention of the avoidance direction in Alberta's Wetland Policy, some wetlands and streams will be permanently lost.

# IMPACT ON DOWNSTREAM RIPARIAN

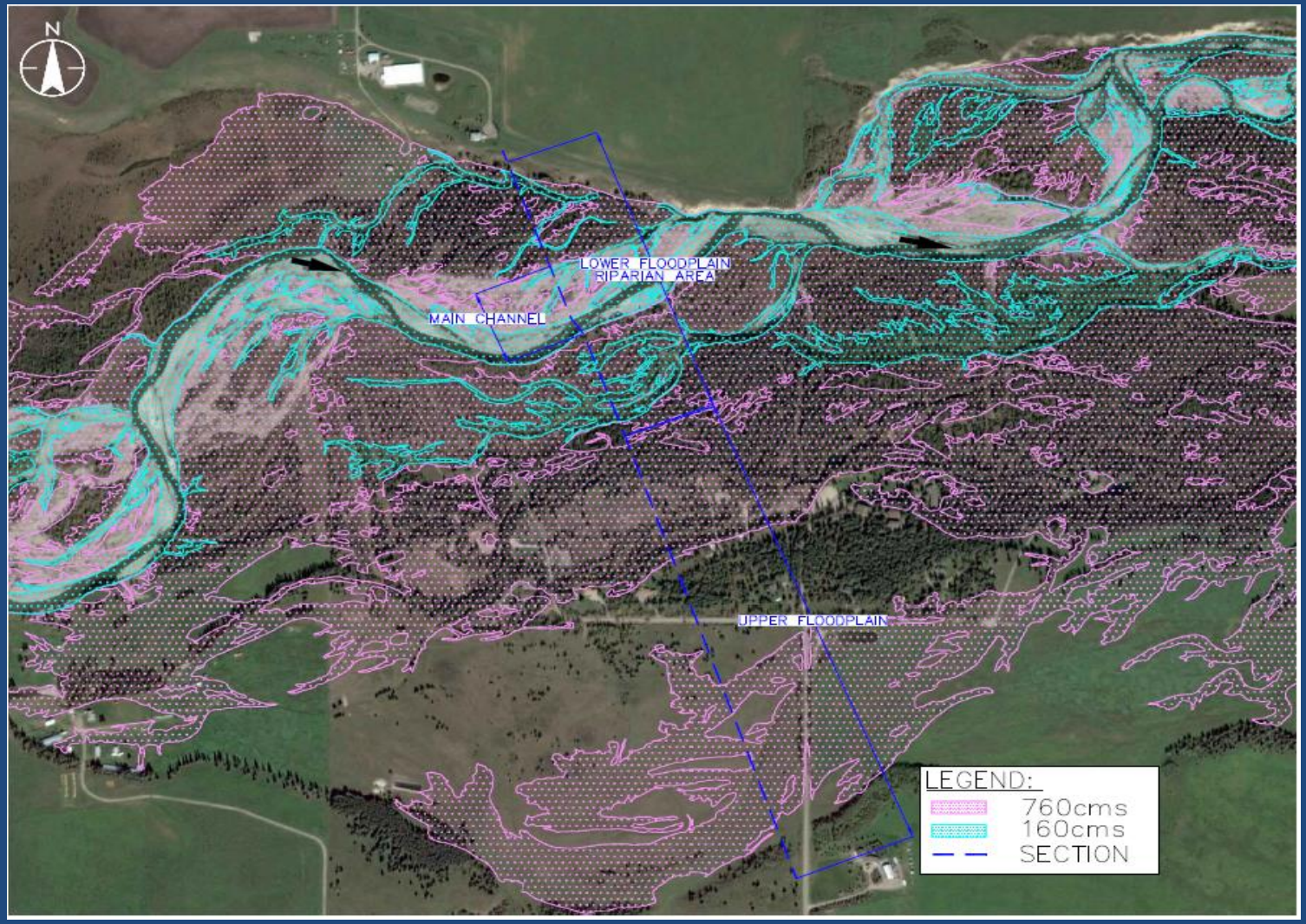
Reply Exhibit 325, pdf 53, point 186 states that SR1's operations:

- "allows much of the hydrologic processes that drive stream and riparian function to occur."

Reply Exhibit 325, pdf 53, point 187 notes the 160 m3/s flow rate is "roughly equivalent to a 1:7-year flood that will inundate the riparian areas of the floodplain while not inundating the upper terraces where development is present."

The proponent may be taking a narrower view of riparian habitats than the broader view of valley bottom habitats influenced or created over time by a stream. My comments pertain to that broader view.

# IMPACT ON DOWNSTREAM RIPARIAN



# IMPACT ON DOWNSTREAM RIPARIAN

| Proposed Cause | Comment | References |
|---|---|---|
| **Hydrological Changes** | | |
| **Reduced flooding** | Spring flooding is essential to create moist seed beds for seedling establishment | Johnson et al. (1976)<br>Brown et al. (1977)<br>Fenner et al. (1985) |
| **Reduced downstream flows** | Diversion of water offstream creates a water deficit downstream, resulting in drought stress and enhanced mortality | Brown et al. ( 1977)<br>Rood et al. (1989) |
| **Geomorphological Changes Resulting From Hydrological Alterations** | | |
| **Reduced meandering** | With reduced flooding, channel migration is reduced and suitable seed beds are reduced | Johnson et (1976)<br>Bradley and Smith (1986) |
| **Sediment depletion** | The water impoundments lead to settling of suspended silt loads and downstream reaches are impoverished of the sediment | Bradley and Smith (1986) |

# IMPACT ON DOWNSTREAM RIPARIAN

Extensive section in my report and appendices that clearly show the importance of riparian habitats, the importance of high magnitude and low magnitude floods, as well as the impact of flow regulation

Exhibits 93 and 94-- misleading re: impact on riparian ecology, particularly the reference to median flows. Median flows are not the major ecosystem shapers for downstream riparian vegetation.

Rood and Bradley (2015) note for the Bow River downstream of Calgary:

- *"Impacts of dams on riparian ecosystems extend downstream as far as the river flow is altered, distances of tens or hundreds of kilometers.*

Every river system is different and responds uniquely to alterations caused by flow regulation but the causes of change are similar: peak flow reduction and reduction in sediment. The other major lesson from many studies is that the effects take time to develop and fully show up in the ecosystem.

Lack of meaningful analysis of downstream riparian impacts is an omission.

# IMPACT ON DOWNSTREAM RIPARIAN

Stantec in Exhibit 138, pdf 79-86 acknowledges some of the ecologically important processes and ecological values of high magnitude floods and notes some of the impact of the project's flow regulation:

- *"With the reduction of peak flows, the geomorphology of Elbow River between the Project and the Glenmore Dam will be simplified because the creation of new side channels or the activation of abandoned channels within the floodplain will be reduced. ".*
- *"The discharge was not chosen to maintain river processes and does not represent a geomorphic or ecological threshold.". . .*
- *"Changes to ecological function associated with limiting flows in Elbow River to 160 $m^3/s$ cannot be mitigated."*

# IMPACT ON DOWNSTREAM RIPARIAN

Stantec in Exhibit 138, pdf page 475 muddies the waters with their characterization of the effects on cottonwood recruitment :

- *“Natural cottonwood recruitment appears to be associated with a one in five to one in ten-year flood (Mahoney and Rood 1998). Many of the key hydrological processes that maintain riparian health along Elbow River, while altered, will continue to occur. “*

Bradley et al. (1991) re: the importance of two forms of recruitment for riparian cottonwoods, including balsam poplar:

- *“Two forms of replenishment are recognized - 'general replenishment' across much of the floodplain attributed to very large, infrequent floods; and 'fringe replenishment' along existing channels attributed to smaller, more frequent floods.”*

The SR1 project is planned to operate in a way that eliminates most of both types of recruitment and other habitat regeneration that occurs with floods. There is no detailed assessment of the downstream impacts on the broader riparian ecosystem.

# CUMULATIVE EFFECTS

Cumulative Effects (Downstream):

***Mr. Frigo in transcript, EX373, pdf page 160:***

- **“** The City's been participating with Alberta Environment and Parks' Bow River reservoir options . . .
- in its second phase of looking at alternatives where additional storage might be added to the basin for the benefit of both water supply and flood mitigation.”

Downstream effects of SR1 not dealt with directly or cumulatively (other reservoirs with flood mitigation being planned) :

***Exhibit 324, Vol II Reply Appendices*, pdf page 46**

- “SR1 also provides some flood risk reduction for communities along the Bow River and South Saskatchewan Rivers (downstream of the Elbow River confluence) by removing up to 600 m3/s from flood peaks generated from the Elbow. Communities receiving this benefit include the Siksika Nation and even as far downstream as the City of Medicine Hat.”

# CUMULATIVE EFFECTS

Cumulative Effects (Downstream):

A lack of attention to the ecological effects of capture of all flood events over 160 $m^3/s$ on downstream riparian habitats and ecological functions of flood events is a significant omission

Cumulative Effects (SR1 Reservoir):

Cumulative effects are not being addressed adequately due the lack of consideration of the degree to which the Foothills Parkland Natural Subregion has already been modified

# OTHER

Exhibit 94, pdf page 16:

- *"construction of the Project would result in a significant effect on soil because there will be a change in soil quality or quantity resulting in a reduction in agricultural land capability that cannot be offset through mitigation or compensation measures (this occurs in the off-stream reservoir)."*

Exhibit 125, pdf pages 20-21, identifies potential impacts to wildlife:

- *"Construction, dry operations, flood and post-flood operations have the potential to affect wildlife and wildlife habitat through direct habitat loss or alteration, including residences of SAR species."*

To summarize, there will be residual negative biodiversity impacts of the project on scarce foothills parkland habitats, including wetlands and intact native grassland, through direct habitat loss under project components and sediment deposition during floods and activities to remove sediment following floods.

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# CONCLUSION

- Mitigation will not eliminate all effects of the project--there will be significant residual adverse effects on areas of environmental significance in the project footprint and downstream in riparian habitats
- Some adverse effects contravene the spirit & intent found in Alberta's Wetland Policy and guidance on intact native grasslands in the SSRP
- Project will have significant adverse effects on biodiversity during construction/operation (inside/outside of flood events)
- Will impact native habitats in landscapes of environmental significance / potential impacts on wildlife in the dry reservoir & downstream
- The lack of appropriate attention to cumulative effects on Foothills Parkland habitats and downstream riparian habitats, the capture of most significant flood events; the degradation of upland and wetland habitats from sedimentation during flood events; and the destruction of habitats in various permanent components of the project all weigh against project approval from a biodiversity perspective

# RECOMMENDATIONS

Given the impacts on intact native grassland, wetlands, and streams in landscapes of environmental significance, and in contravention of the guidance in the SSRP and Alberta Wetland Policy, I recommend that the project not be approved in its current configuration.

My professional recommendation is that the project not be approved in its current configuration as it will impact downstream riparian habitats with its operating mode capturing (in whole or in part) all floods above 160 $m^3/s$.

If the project is approved, consideration should be given for allowing larger flood events to pass.

If the project is approved, immediate sediment removal following floods should not be a condition of approval.

# RESPONSE TO CROSS