Addendum to the Loomis Creek Eco-hydrology Phase 1 Study (2025): Review of the Updated 2026 Annual Operating Plan

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Prepared for: Canadian Parks and Wilderness Society
Prepared by: Matt Coombs, M.Sc., P.Biol., Fintegrate Fisheries & Watershed Consulting Ltd

About

The Canadian Parks and Wilderness Society (CPAWS) Southern Alberta Chapter is a non-profit conservation organization working since 1967 to promote thriving, healthy, and diverse lands and waters in Alberta. We have long been engaged in land-use planning and sustainable forest management with a focus on promoting science-driven solutions that address cumulative effects and achieve sustainable ecosystem-based management.

Matt Coombs has been operating as Fintegrate Fisheries & Watershed Consulting Ltd. (Fintegrate) since 2021 working on projects for industry, governments, and First Nations. Fintegrate specializes in work on native fish species, many of which are listed as species at risk or species of special concern. Linkages are found between fish distribution and habitat use, broader watershed and hydrologic processes, and development of land and water resources. Fintegrate helps clients meet project-specific objectives while navigating applicable provincial and federal legislation protecting fish and fish habitat.

Online Map Compendium

An Online Map compendium accompanies this report and provides photographs, videos, and additional details for sites visited throughout the Project area as part of the field assessment supporting the 2024 eco-hydrology assessment (Coombs et al. 2025).

Coombs, M., Green, K., & Killeen, J. (2025). Loomis Creek Eco-hydrology Phase 1 Study: 2024-2025. Prepared for Canadian Parks & Wilderness Society Southern Alberta Chapter. (https://cpaws-southernalberta.org/wp-content/uploads/2025/05/loomis_ecohydro_report_final_20250527.pdf)

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1. Executive Summary

In 2026 West Fraser Mills Ltd. (West Fraser Cochrane, WFC) announced an updated logging plan for the Highwood River area (hereafter referred to as the Annual Operating Plan, AOP). This update was made after the publication of an eco-hydrological assessment for the Loomis Creek watershed, commissioned by the Canadian Parks and Wilderness Society (CPAWS) in 2024.

All watercourses and water features within the watershed are designated critical habitat for bull trout (*Salvelinus confluentus*), listed as Threatened under the *Species at Risk Act* (SARA). This addendum review is a desktop assessment focused on the Loomis Creek watershed that evaluates changes to both the AOP and interpretation of hydrologic risks associated with the original and updated plans by MacDonald Hydrology Consultants Ltd. (MacHydro).

The eco-hydrological assessment found that the Loomis Creek watershed sustains a bull trout population isolated from the Highwood River, with all spawning and young-of-the-year (YOY) rearing habitat occurring upstream of the confluence of Bishop Creek. Both the original and updated AOPs include extensive clearcuts, roads, and stream crossings within this upper watershed, highlighting the sensitivity of this area in terms of assessment of the risk of hydrologic alteration and direct habitat damage from the logging. However, the hydrologic risk assessments by MacHydro were conducted at larger spatial scales, with the entire Loomis Creek watershed being the smallest scale examined. This is important, because integrating hydrologic effects over large spatial scales can underestimate localized risks occurring in smaller subwatersheds.

The updated AOP reduces the logging footprint but does not reduce risk to bull trout to insignificant levels. Clearcuts and roads remain in the upper watershed. Hydrologic sensitivity here is due to greater snow accumulation and more rapid melting on south facing aspects with greater solar radiation. Both AOPs increase mean annual flows and 2- and 20-year peak flows and result in earlier peak flows, although these increases are less for the updated AOP. However, average increases of 10-13% in daily flows over 2.5 months during the spring are still predicted for the updated AOP. These will damage tributary stream channels through incision, aggradation, and avulsion, leading to erosion and sedimentation of Loomis Creek. In the mid-reach of Loomis Creek where all bull trout spawn and all YOY rear, channel instability and downstream movement of spawning gravel will occur because the entire bedload is already mobile during bankfull flows, no riparian trees and large woody debris provide protective armouring, and non-linear increases in bedload movement are common. The channel will become wider and shorter and backwater oxbows used for YOY rearing will be cutoff. Alluvial groundwater inputs and hyporheic downwelling necessary for spawning and overwinter egg incubation could be lost. Substantial uncertainty in the hydrologic modelling can also not rule out reduced August-September low flows that are critical for spawning for the updated AOP.

Reduced road footprint is primarily in the lower watershed, downstream of the most sensitive bull trout habitat, and roads still extend up the Loomis Creek valley on both sides with a high-risk road segment still crossing Loomis and Bishop creeks. The Loomis crossing is directly on top of, and upstream of, sensitive spawning and rearing habitat and requires construction through a floodplain where ground compaction and cut-and-fill slope grading could alter shallow alluvial groundwater flow and hyporheic downwelling that are critical for bull trout spawning. A section of road lies within the provincially prescribed buffer, watercourse crossing structures are missing elsewhere, and a high density of roads still overlap a broad groundwater seepage area. There will be 0.65 km/km^2 of new roads in the upper watershed, which is high relative to levels found impacting bull trout elsewhere. Overall, erosion and sedimentation will impact spawning, egg incubation, and juvenile survival, and both the 2026 MacHydro assessment and recent regional reviews of forestry practices suggest best management practices (BMPs) for road and stream crossing maintenance may not be effectively implemented and maintained.

Issues with riparian buffers remain only partially resolved in the updated AOP. Several mapped and unmapped water features, including mapped tributaries to Loomis Creek, unmapped intermittent and ephemeral channels, groundwater-influenced wetland areas, and groundwater seepage areas, remain unbuffered or inadequately buffered for the updated layout. Ground surveys to locate and map water features throughout the planned logging area are still needed to ensure they are all appropriately buffered. The addendum review presents locations identified during the desktop review where portions of cut blocks remain within the 60 m prescribed buffer on Loomis Creek, where the 30 m SARA critical habitat buffer has not been applied to watercourses or water features, and where cut blocks still overlap predicted wet areas from the Alberta Wet Area Mapping (WAM) layer and overlap a 30 m buffer around wetlands.

Overall, while the updated 2026 AOP presents meaningful improvements relative to the original AOP assessed in 2024, the updated AOP continues to present unresolved risks to bull trout critical habitat in the Loomis Creek watershed, particularly in the upper watershed where all documented spawning and YOY rearing habitat occurs. There are still predicted increases in mean annual and peak flow under the updated AOP, with an average increase of 10-13% in daily flows over a 2.5-month period in the spring, which will damage critical habitat on tributaries as well as the critical mid-reach of Loomis Creek in the upper watershed. With these impacts remaining, a finer-scale hydrologic risk assessment of the upper Loomis Creek watershed upstream of Bishop Creek, together with additional field-based assessment and long-term hydrologic and ecological monitoring, is recommended before determining whether forest harvest can proceed.

2. Introduction

This addendum review evaluates the changes made by West Fraser Mills Ltd. (West Fraser Cochrane, WFC) to the forest harvest layout (roads and cut blocks) within the 2026 Highwood River logging plan (hereafter referred to as the Annual Operating Plan, AOP), as compared to the previously assessed 2024 plan. Updates were made to the AOP after the publication of an eco-hydrological assessment for the Loomis Creek watershed, commissioned by the Canadian Parks and Wilderness Society (CPAWS) in 2024.

In addition to reviewing changes to the harvest layout in the updated AOP, this addendum review also considers hydrologic modelling of the effects of the planned forest harvest conducted by MacDonald Hydrology Consultants Ltd. (MacHydro). Specifically, an initial desktop watershed assessment and partial risk analysis conducted for Alberta Forestry and Parks (Chernos et al. 2024) is compared to a second field assessment and partial risk analysis commissioned by WFC for the 2026 AOP (MacDonald et al. 2026).

The eco-hydrological field assessment conducted for CPAWS identified an isolated, stream-resident population of bull trout (*Salvelinus confluentus*) in the watershed. As noted in the assessment, a 1 m high natural force step pool barrier prevents upstream bull trout migration into Loomis Creek from the larger Highwood River bull trout population. While the location of these types of barriers can change during large flood events, reflecting that they are dynamic channel features, they have been documented in the lower reaches of Loomis Creek before and after the 2013 flood event, suggesting a barrier is often present to prevent immigration into Loomis Creek from the Highwood River. Therefore, if the Loomis Creek population became extirpated because of habitat damage or destruction associated with the planned forest harvest, it may not be able to be recolonized from the Highwood River.

Given that the 2024 eco-hydrological assessment only found spawning and young-of-the-year (YOY) rearing habitat upstream of the confluence of Bishop Creek, the most ecologically relevant scale for an assessment of the hydrological impacts of the planned forest harvest may not be the entire Loomis Creek watershed, but rather the smaller upper subwatershed above Bishop Creek. Bull trout occupy the lower reaches of Loomis Creek downstream to the mouth at the Highwood River as well as Bishop Creek, but these reaches of stream may not provide adequate suitable areas for spawning and YOY rearing to maintain the population if the mainstem habitat upstream of Bishop Creek is degraded.

The highest quality bull trout habitat in the entire Loomis Creek watershed was found upstream of Bishop Creek midway between the headwaters and mouth of Loomis Creek where bull trout spawning and YOY rearing were observed in a beaver meadow complex. Here, a shallower stream gradient, apparent groundwater inputs and high-volume exchange of surface to hyporheic flow, finer gravel grainsize, mobile bedload, and riffle-pool morphology across a broad floodplain, together support bull trout spawning and rearing. Suitable low-velocity habitats (e.g., pools, back eddies, side channels, oxbows, beaver ponds) provide habitats for both YOY and larger fish to feed and overwinter.

2. Impacts to SARA Critical Habitat

All mapped and unmapped watercourses and water features draining into the Highwood River in the Loomis Creek watershed are designated as critical habitat under the federal *Species at Risk Act* (SARA), as outlined in the bull trout recovery strategy (Fisheries and Oceans Canada 2020). Section 58(1) of SARA prohibits destruction of a designated 30 m buffer of riparian critical habitat surrounding all critical habitat water features.

Both the original and updated AOP involve constructing roads over the watercourses and other water features that are legally designated as critical habitat in the Loomis Creek watershed. These roads, as well as some remaining portions of the clearcuts that have not been removed from the updated AOP, overlap the 30 m riparian critical habitat buffer, so the current AOP still plans for the destruction of SARA-designated riparian critical habitat.

Beyond direct destruction of riparian critical habitat and potentially instream critical habitat during stream crossing construction, indirect effects of forest harvesting on the features, functions, and attributes that bull trout rely on for survival and reproduction may also occur through alteration of the hydrologic regime.

3. Valued Components and Assessment Scale

The isolated, SARA-listed Threatened, stream-resident bull trout population, which relies entirely on the spawning and rearing habitat in Loomis Creek upstream of Bishop Creek, is the valued component focused on in this addendum review.

While no formal terms of reference for the hydrologic assessments prepared by MacHydro are provided, the valued components considered are generally described as:

1. water supply for human use and
2. fish and fish habitat (i.e., bull trout, westslope cutthroat trout-*Oncorhynchus lewisi*)

While increased risk of flooding, erosion, and terrain instability are not listed as valued components, harmful events described in the 2024 and 2026 MacHydro assessments are:

- a change in sediment generation and delivery;
- a change in mean annual flow;
- a change in low flow;
- a change in 2-year peak flow;
- a change in 20-year peak flow; and
- a change in peak flow timing.

However, the 2024 and 2026 MacHydro assessments do not include a rationale for selecting the spatial scales used in the risk assessments or discuss the management, regulatory, or decision-making context that the assessments were intended to support.

Both the 2024 and 2026 MacHydro assessments were conducted at large spatial scales, with the Loomis Creek watershed upstream of the Highwood River being the smallest scale. The two larger scales assessed were the Highwood River below Carnarvon Creek immediately downstream of the broader upper Highwood River logging plan that includes Loomis Creek, and the Highwood River above Flat Creek, which is roughly halfway between Carnarvon Creek and where the river flows through the town of Longview, Alberta. These large assessment scales are important because scale strongly influences interpretation of hydrologic risk. Using too large a scale can risk missing important impacts occurring in smaller subwatersheds, and yet all the bull trout spawning and YOY rearing habitat identified in the eco-hydrology assessment was upstream of the Bishop Creek confluence within a substantially smaller and likely substantially more hydrologically responsive portion of the watershed than the entire Loomis Creek watershed. By focusing hydrologic modelling and interpretation on watershed-scale indicators and analyses for Loomis Creek at the mouth and the two downstream points on the Highwood River, the 2024 and 2026 MacHydro assessments integrate hydrologic effects over large scales, potentially underrepresenting localized risks.

The 2026 MacHydro assessment explicitly acknowledges that "disturbance within specific areas within a watershed can disproportionately impact its hydrologic regime" and that assessment scale may "obscure impacts happening especially at smaller scales." It further notes that "runoff is accumulated consistently in the upper reaches of the catchment above Bishop Creek with most of the downstream discharged gained from Bishop Creek itself rather than other smaller tributaries", suggesting isolating the effects of the planned logging on this upper portion of the watershed would be appropriate. It is therefore unclear why the 2026 MacHydro risk assessment remained focused on broader watershed scales, given that the eco-hydrological assessment was provided to West Fraser in June 2025 and highlighted that the Loomis Creek watershed upstream of the Bishop Creek confluence as the most ecologically sensitive portion of the watershed and the primary area of concern for impacts to SARA critical habitat (Coombs et al. 2025). Focusing analyses on the entire watershed may potentially dilute indicators of hydrologic risk that would be otherwise higher in the upper watershed.

It is worth noting that the 2026 MacHydro report included field assessment sites in 2025 at the mouth of Loomis Creek near the Highwood River (LOM02), at the mouth of Bishop Creek (LOM03), on Loomis Creek immediately upstream of Bishop Creek (LOM04), and Loomis Creek upstream of the Beaver Meadows (LOM05), suggesting hydrologic modelling at the subwatershed scale may have been considered (MacDonald et al. 2026). This field assessment showed differences in sediment transport capacity from upstream to downstream of the beaver meadows that reflected differences in channel gradient. It also showed differences in hydraulic geometry along the length of Loomis Creek that reflected differences in upstream watershed area. This highlighted that watershed processes change along the length of Loomis Creek, but the MacHydro hydrological modelling did not evaluate these differences within the Loomis Creek watershed.

This review highlights:

- higher hydrologic sensitivity in the smaller ecologically relevant upper watershed;
- erosion, sedimentation, and localized degradation of tributary channels are all still apparent from less intensive historical logging in the 1940s-1960s;
- channel morphology in the headwaters will still be degraded even under the updated AOP because the 2026 MacHydro assessment still predicts average increases of 10-13% in daily stream flows at the mouth of Loomis Creek during the spring and because increases in flow will be even greater in the more hydrologically reactive upper watershed; and
- finer-scale risk assessment and monitoring are needed to more clearly evaluate risk to bull trout critical habitat.

4. Purpose and Limitations of this Addendum Review

The purpose of this addendum review is to assess whether the updated AOP significantly changes the conclusions of the eco-hydrological assessment (Coombs et al. 2025) with respect to impacts to bull trout critical habitat and sustainability of the Loomis Creek bull trout population. This review focuses specifically on:

- desktop assessment of changes to the AOP forest harvest layout;
- review of unresolved issues identified in the eco-hydrological assessment and whether the 2026 MacHydro assessment changes the interpretation of hydrologic risk to bull trout critical habitat relative to the 2024 MacHydro assessment; and
- whether the eco-hydrological risk assessment conclusions are still valid:
  1. damage or destruction of bull trout critical habitat will occur, including prolonged degradation of spawning and rearing habitat; and
  2. the isolated bull trout population could be extirpated if growth, survival, and recruitment decrease and population productivity is no longer sustainable.

Like the eco-hydrological assessment, this addendum review focuses just on the Loomis Creek watershed and does not assess risks associated with the broader upper Highwood River AOP. A field assessment of the updated layout has not yet been conducted, although this is advised. Assessment of local ground conditions is based on previous field observations, measurements, photographs, and field notes collected during the 2024 eco-hydrological assessment. Where locations of planned roads and cut blocks have not been previously visited, the presence of water features and saturated soils that could constitute designation as SARA critical habitat could only be ascertained from the mapped SARA critical habitat layer, the WFC-produced stream layer used for AOP development, and the LiDAR-based Alberta Wet Area Mapping (WAM) layer. No groundwater investigations or hydrologic modelling have been conducted for this review.

Tributary and subwatershed locations and labels within the Loomis Creek watershed, as mapped in Figure 7 of the eco-hydrological assessment, are referenced throughout this addendum report (Coombs et al. 2025). Site IDs referenced in this addendum are also associated with the Online Map compendium that is part of the eco-hydrological assessment.

5. Improvements in the Updated AOP

The following improvements are noted with respect to the updated AOP layout in the Loomis Creek watershed relative to what the eco-hydrological assessment evaluated:

- projected Equivalent Clearcut Area (ECA) at the scale of the entire Loomis Creek watershed has been reduced from approximately 19% to 10%;
- total planned clearcut harvest area within the Loomis Creek watershed was 549 ha and has been reduced to 367 ha, a reduction of 33%;
- total planned clearcut harvest area in the Loomis Creek subwatershed upstream of the Bishop Creek confluence was 351 ha and has been reduced to 242 ha, a reduction of 31%;
- modelled hydrologic changes presented in the 2026 MacHydro assessment are smaller than those projected in the 2024 MacHydro assessment (**Table 1**);
- clearcut harvest areas on hydrologically sensitive south-facing slopes in the western portion of the watershed where snow accumulation is greatest have been reduced by as much as 40%, depending on how these areas are defined, with two smaller cut blocks at the western limit of the original AOP removed, resulting in Loomis Creek tributaries LSBN9 and LSBN8 no longer being crossed by roads;
- one road segment has been removed from the plan that crossed steep slopes on the North side of the valley and was associated with historical slope failures into Loomis Creek that occurred both naturally and from the historical logging road, resulting in a meaningful reduction in mass wasting and sediment delivery risk relative to the original layout; and
- other cut blocks have been removed or reduced in size in the vicinity of where the road on the North side of the valley was removed, reducing the harvest footprint.

Table 1. Loomis Creek watershed-wide hydrologic indicators for original and updated AOP.

Hydrologic indicator	2024 MacHydro modelling: (Chernos et al. 2024)	2026 MacHydro modelling: (MacDonald et al. 2026)
Equivalent Clearcut Area (ECA)	19%	10%
Mean annual flow	+9%	+4%
Mean Aug–Sep flow	+6%	+2%
2-year peak flow	+9%	+4%
20-year peak flow	+9%	+3%
Peak flow timing	2.6 days earlier	<1 day earlier

6. Persistent Concerns with the Updated AOP

Despite the improvements in modelled hydrologic indicators and the harvest layout, persistent issues identified in the 2024 MacHydro hydrologic analysis and the eco-hydrological assessment remain unresolved and represent a high risk of directly and indirectly impacting bull trout or bull trout critical habitat. These issues are:

- hydrologic alteration resulting from accelerated snowmelt and runoff and higher peak flows where hydrologically sensitive areas are clearcut at the highest elevations of the AOP and there is greater snow accumulation on south-facing slopes; this is likely to disturb tributary stream channels resulting in erosion and sedimentation and to alter Loomis Creek channel morphology where spawning and rearing habitat is critical to the isolated bull trout population;

- roads will destroy riparian critical habitat at all watercourses and water feature crossings and are likely to disturb alluvial groundwater and hyporheic downwelling critical for bull trout spawning success where the beaver meadow floodplain is crossed with a newly constructed road; roads will damage or destroy water features where they are still planned to cross these features with no crossing structure identified; and roads located within the provincial Operating Ground Rules (OGR) buffers for large permanent streams (Government of Alberta 2024) will be a source of erosion and sedimentation to bull trout critical habitat in Loomis Creek; and

- timber harvest and disturbance of provincial riparian buffers outlined in the OGRs (Government of Alberta 2024) and in the SARA bull trout recovery strategy (Fisheries and Oceans Canada 2020) are likely to result in erosion and sedimentation, buffer windthrow, and disturbance of groundwater inputs contributing to increased stream temperature and decrease stream flow.

These three main persistent concerns with the updated AOP are reviewed in detail below.

6.1 Risk from Hydrologic Alteration

Although the updated 2026 AOP reduces the overall harvest footprint within the Loomis Creek watershed, hydrologic modelling by MacHydro before and after the AOP was updated both predict increases in mean annual flow, higher peak flows, and an earlier freshet. While these increases are smaller with the updated AOP, these measures of hydrologic alteration are also flow-weighted on an annual basis and do not reveal the magnitude of seasonal changes in flows that could be more significant.

In snow-dominated watersheds, channel disturbance primarily occurs during spring freshet when flows peak, and the hydrologic modelling by MacHydro shows that even for the updated AOP, daily flows during the spring freshet will increase by 10-13%, on average, at the mouth of Loomis Creek. With greater hydrologic sensitivity in the upper Loomis Creek watershed and the concentration of clearcuts in some subwatersheds with high snow accumulation and south facing aspects, the predicted percent increases in daily flows could be higher than 10-13%. This could result in significant disturbance of headwater tributary channels as well as spawning and rearing habitat in the mid-reach of Loomis Creek. Hydrologic modelling at finer spatial scales and more detailed field assessments may be necessary to understand the unresolved uncertainty remaining regarding the risk of hydrologic alteration at the ecologically relevant scale of the upper Loomis Creek watershed.

An overview comparison of interpretation of risk in the MacHydro 2024 and 2026 reports is presented below (**Table 2**), followed by a discussion of indicators of hydrologic alteration, predicted changes in daily stream flow, ECA, channel instability, and August-September low flow response.

6.1.1 Indicators of Hydrologic Alteration and Predicted Annual Hydrographs

The overall direction of modelled hydrologic change resulting from the original and updated AOP (Chernos et al. 2024, MacDonald et al. 2026) is the same (**Table 1**). Both MacHydro assessments predict increased annual flows, increased peak flows, altered summer and fall low-flow dynamics, and earlier freshet timing. There are smaller increases in these indicators of hydrologic alteration for the updated AOP compared to the original AOP, but whether these differences are statistically significant and ecologically meaningful is not addressed by MacDonald et al. (2026).

The predicted annual hydrographs based on model outputs using the original and updated AOP are similar. This can be seen when Figure 13 (Chernos et al. 2024) and Figure 18 (MacDonald et al. 2026) are digitized and data are replotted on a common x-axis (**Figure 1**).

Table 2. Comparison of MacHydro 2024 and 2026 interpretation of risk for Loomis Creek watershed.

Topic	2024 Interpretation (Chernos et al. 2024)	2026 Interpretation (MacDonald et al. 2026)
Overall risk of hydrologic alteration	High likelihood of increased alteration of a harmful hydrologic event, particularly for peak flows.	Low likelihood of increased alteration of a harmful hydrologic event, particularly for peak flows.
Risk to fish habitat	Increases in peak flows and changes to low flows could cause detrimental impacts to fish habitat, including reduced channel stability, higher rates of sediment erosion and transport, and higher water temperature.	Low likelihood that proposed harvest will affect fish habitat values within Loomis Creek.
Role of ECA	ECA is strongly linked to hydrologic alteration although it is noted that thresholds may vary at differing scales and for different indicators. It is advised to not rely on a single metric to characterize risk; to use a holistic, process-based approach, and look at multiple indicators of hydrologic alteration.	Notes large uncertainty in applying stand-scale forest recovery estimates and ECA indices to evaluate hydrologic change at the watershed scale.
Spatial configuration and location of forest harvest	The importance of this is not specifically highlighted, although spatial variability in precipitation and runoff generation are noted as well as the effects of slope aspect on snowmelt due to greater solar radiation.	Watershed processes contributing to runoff are complex and vary spatially. Disturbance in specific areas in a watershed can disproportionately impact its hydrologic regime making it difficult to apply stand-scale indices to understand quantitative relationships between forest cover loss or regrowth and streamflow.
Importance of scale	Importance of considering scale in any assessment of hydrologic alteration is highlighted, noting that the analysis only reports on the hydrologic alteration at the mouth of Loomis Creek and that local effects could be considerably higher.	Too small of an assessment scale and watershed-scale shifts are not understood, too large and important impacts occurring within smaller tributaries are missed; notes that the choice of scale used may be obscuring impacts happening at smaller scales (i.e., immediately downstream of proposed harvest).
Hydrologic recovery	Multi-decadal recovery emphasized.	Multi-decadal recovery and uncertainty strongly emphasized.
Aug-Sept low flow response	Increase in low flows are projected but uncertainty and potential effects of forest regeneration and groundwater depletion reducing late summer low flows are acknowledged.	Increase in low flows are projected but uncertainty and potential effects of forest regeneration and groundwater depletion reducing late summer low flows are acknowledged.
Effects of road erosion leading to sedimentation	Not discussed.	Significant uncertainty regarding Best Management Practice (BMP) implementation and effectiveness is acknowledged.

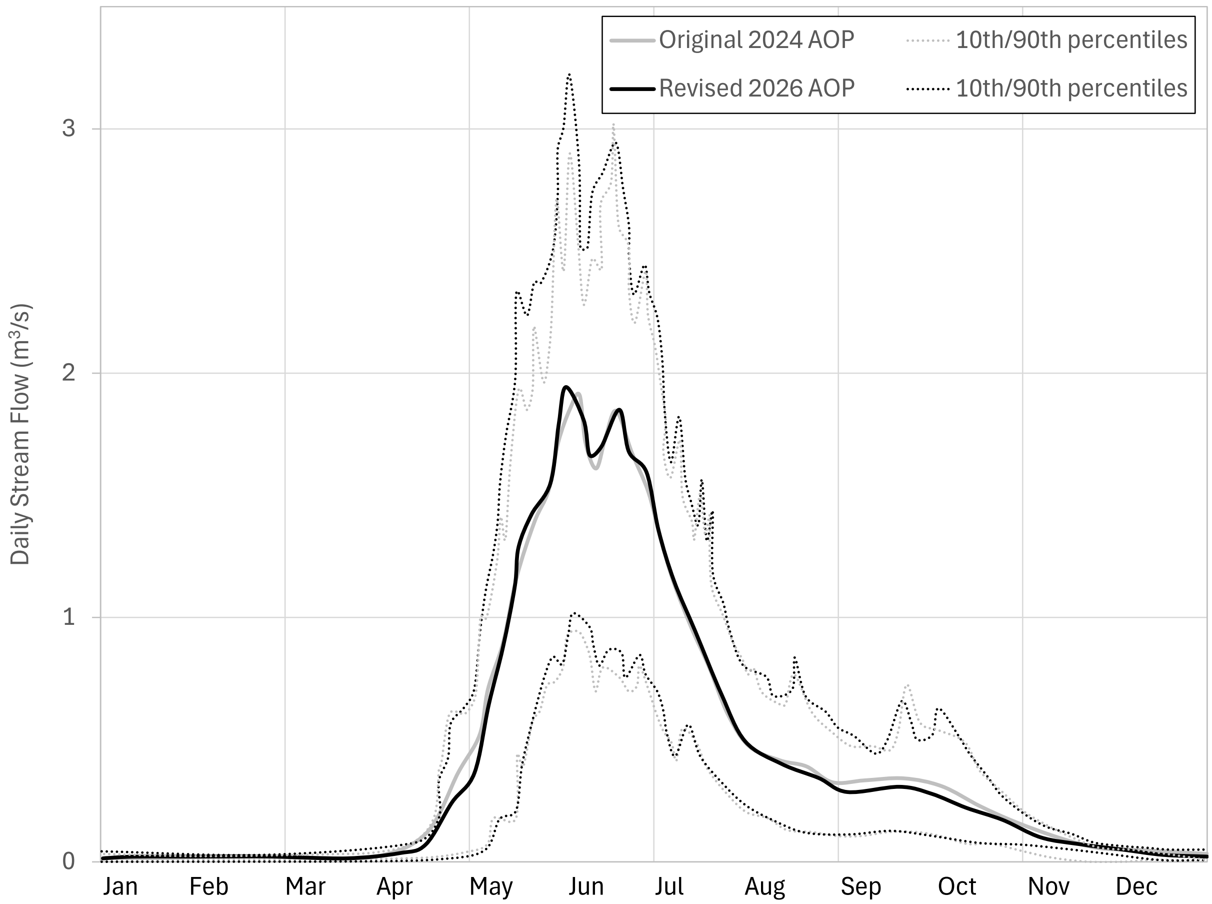

Figure 1. Digitized overlay of model-predicted annual hydrographs for Loomis Creek based on forest cover change associated with the original and updated AOPs; reproduced from Figure 13 (Chernos et al. 2024) and Figure 18 (MacDonald et al. 2026).

Hydrologic alteration resulting from the planned logging is not as apparent when changes are only considered on an annual basis (i.e., increase in annual flows, increase in 2- and 20-year peak flows, and timing of freshet). Broader seasonal increases in spring daily flows have not been considered, despite this period being the most significant period in terms of altering channel morphology and bull trout critical habitat. Instead, only the low flow period has been examined by MacHydro (i.e., mean August-September flow). While this period is critical in terms of minimum flows necessary for bull trout migration and spawning, it is not relevant in terms of high flows disturbing critical habitat.

6.1.2 Predicted Percent Increases in Daily Flows

As noted above, critical habitat could be degraded by higher flows resulting from logging if flows remain elevated throughout the spring freshet. Figure 20 in MacHydro et al. (2026) is reproduced below (**Figure 2**) and shows the model-predicted percent change in daily stream flows over the year for the updated AOP forest harvest scenario. It shows a 2.5-month long period in the spring of daily flows being on average 10-13% higher than if forest harvest did not occur. Even though it also shows a significant but smaller period in the fall when daily flows are 6-8% higher than baseline, flows at this time of year are much lower and are rarely high enough to change channel morphology. The model-predicted percent change in daily stream flows also shows the lower 10th percentile remains above zero throughout most of the year (**Figure 2**), indicating an overall increase in flows is broadly predicted from the planned forest harvest in the updated AOP. The 90th percentile of model-predicted percent change in daily stream flows also peaks as high as 30% in the spring, indicating large increases in daily flows during the freshet are possible even for the updated AOP. Sustained increases in daily flows of 10-13% over 2.5 months or shorter-term increases of up to 30% could significantly alter bull trout habitat quality through a variety of flow driven channel disturbances. While the MacHydro assessment of the original AOP (Chernos et al. 2024) did not present the same percent increases in daily flows, these would be greater than shown below (**Figure 2**).

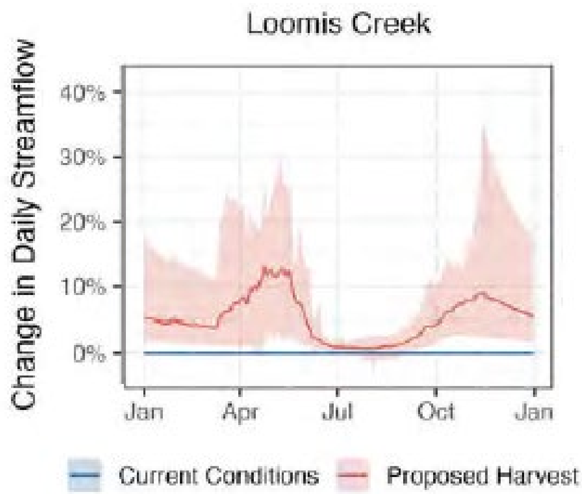

Figure 2. Reproduction of a portion of Figure 20 from MacHydro et al. (2026) showing the percent change in daily average stream flow for current conditions (fully forested) and proposed harvest. The dark line is the average percent change for each day and shading shows the 10th and 90th percentile.

6.1.3 Instability of Tributary Channels

Evidence of the instability of the Loomis Creek tributary stream channels, which are all designated as bull trout critical habitat, was documented in areas where historical logging occurred in the eco-hydrological assessment (Coombs et al. 2025). Erosion and sedimentation from these tributaries would have reached Loomis Creek when this logging occurred even though the logging was less intensive (i.e., selective instead of clearcut) and occurred gradually over decades. Within logged areas, substantial downstream sediment (bedload) movement has occurred leading to channel aggradation and avulsion (LSBN9) as well as channel incision (LSBN5, LSBN4). Although the riparian area was logged on many of the tributaries, one in particular (LSBN5) now lacks large woody debris to slow down and capture sediment movement and stabilize the banks. Some tributary channels consist of loose and unconsolidated substrate, and erosion and incision is likely to accelerate with the predicted increases in flows and sediment inputs to Loomis Creek are likely. Even the largest tributary to Loomis Creek from the South (LSBS6) shows signs of channel incision where it flows through the historical fire of 1936 and has a larger than expected mobile bedload (D90, cm). Together with the evidence from the tributaries that were historically logged, this shows that forest canopy removal alters stream channels in the headwaters of Loomis Creek, even where subwatersheds have a north facing rather than south facing aspect. Given that an average increase of 10-13% in daily flows is predicted for Loomis Creek at the Highwood River and that effects at this scale are diluted by the large size of the watershed, the updated AOP could result in even higher increases in flows in upper tributaries where large portions of each subwatershed are planned to be clearcut (i.e., LSBN4-7). Sediment from these tributaries would cause direct harm to bull trout and could migrate downstream to spawning areas. Spawning gravel could become imbedded with sediment and direct mortality of incubating eggs and rearing juvenile fish could occur.

6.1.4 Instability of the Mid-Reach of Loomis Creek

Average increases in daily stream flow of 10-13% for 2.5 months of each year during the spring freshet will result in significantly more bedload movement of the already fully mobile bedload in the mid-reach of Loomis Creek.

As stated in the eco-hydrology assessment (Coombs et al. 2025), “the mid reach of Loomis Creek meanders over a broad floodplain of finer bedload material formed by glacial retreat and subsequent centuries of beaver activity. The entire stream bedload is already mobile under the current flow regime. Finer bedload material starts moving at 60% of bankfull flows and the amount of bedload movement increases as flows increase. The predicted increases in stream flow will result in more bedload movement as the D90 (cm) increases. Degradation and aggradation on the mainstem will be greater than has occurred under a natural disturbance regime.”

Bedload transport does not increase linearly with streamflow because it is governed by a critical shear force threshold. Once this threshold is exceeded, there is a rapid, non-linear increase in the amount of bedload moving (Ryan 2005).

Given that the gravel bed load in the mid-reach of Loomis Creek is already close to this threshold, an average increase of 10-13% in flows for 2.5 months of each year could mean more frequent and extensive bedload movement. This could result in direct mortality of juvenile bull trout rearing in the stream bed gravel interstitial spaces. It could also lead to extensive habitat damage and degradation through channel erosion and sedimentation.

Given that the banks of Loomis Creek within its mid-reach are made up of unconsolidated gravel armoured only weakly by small woody riparian vegetation, given that trees do not occur within the beaver meadows to provide more robust bank armouring, and given that there is no large woody debris within this reach of stream, channel widening is likely to occur with sustained increases in flows during the spring.

Channel incision in other stream reaches could also occur and disconnect the channel from the floodplain and associated alluvial groundwater inputs as well as hyporheic downwelling, both of which bull trout rely on for overwinter egg incubation.

In other stream reaches where there is extensive bedload movement, channel aggradation could occur leading to avulsion and potentially reducing the overall length of the stream channel. This could involve cutting the stream off from backwater oxbow channel habitat currently used for YOY rearing. It would also reduce the total amount and distribution of suitable spawning and rearing habitat available to the isolated bull trout population.

As shown in the eco-hydrology assessment (Coombs et al. 2025), the position of the Loomis Creek channel has been stable over the last 65 years. This stability supports bull trout spawning site fidelity at sites with suitable groundwater inputs and localized hyporheic downwelling. If the Loomis Creek stream channel starts to shift position more frequently, this could disconnect critical spawning and rearing habitat from underlying channel geomorphic and alluvial groundwater factors that support this habitat.

With the extended length of time required for hydrologic recovery outlined in the first MacHydro assessment (Chernos et al. 2024), the increase in bedload movement also presents a risk of gradually removing the gravel substrates that are critical for bull trout spawning as this material gets washed out of the low gradient mid-reach of Loomis Creek, especially if significant portions of the stream channel become incised.

6.1.5 Effects of Equivalent Clearcut Area and Slope Aspect

The updated AOP layout continues to consist of substantial clearcut areas within the upper Loomis Creek watershed that supports spawning and rearing habitat essential for the isolated bull trout population. Although the 2026 MacHydro assessment highlights a reduction in ECA from 19% to 10% in the updated AOP at the scale of the entire Loomis Creek watershed, it does not report ECA for the Loomis Creek watershed upstream of Bishop Creek or for individual tributary subwatersheds draining to this reach of Loomis Creek (e.g., LSBN4–8, LSBS4-6, and other subwatersheds not yet delineated).

The eco-hydrological assessment (Coombs et al. 2025) found that nearly 50% of the originally proposed clearcut harvest area had a southern aspect (24.8% south-facing and 23.2% southeast-facing). Although an updated slope-aspect analysis has not been completed for the updated AOP, approximately 50% of the total planned harvest area still appears to have a southern aspect. In the upper subwatershed above Bishop Creek, the south facing cut blocks are at higher elevations and will accumulate a greater snowpack and experience more rapid snowmelt and runoff due to increased solar radiation.

The eco-hydrological assessment (Coombs et al. 2025) also identified patterns consistent with hydrologic sensitivity to forest disturbance and slope aspect. Across 11 sites surveyed on Loomis Creek, two sites on Bishop Creek, and 1-2 sites on all the major tributaries across the watershed, channel cross-sectional area (m^2) and mobile substrate size (D90, cm) increased with upstream drainage area (km^2) and reflected differences in subwatershed characteristics, including slope aspect and area above tree line, somewhat analogous to the area planned as clearcuts. These trends are consistent with the direction of hydrologic model predictions presented in both MacHydro assessments of increased annual and peak flows and earlier freshet timing following the planned clearcut logging.

While neither the 2024 nor 2026 MacHydro assessments suggest a strict ECA threshold below which hydrologic impacts to bull trout habitat would be expected to be negligible, both reports acknowledge that hydrologic response is influenced by multiple interacting factors including disturbance area and location, watershed sensitivity, slope aspect, elevation, and watershed process dynamics. The ECA metric is still presented in both reports as a useful watershed-scale metric for hydrological impacts.

While the updated AOP reduces whole-watershed ECA from approximately 19% to 10%, disturbance remains concentrated within the smaller upper Loomis Creek spawning and rearing subwatershed where ECA is likely greater than 10% and would be much higher in individual subwatersheds.

The ecological relevance of this finer-scale disturbance concentration is not directly evaluated through hydrologic modelling in either assessment, and the reduction of ECA in the latest MacHydro assessment does not necessarily demonstrate that hydrologic risk to bull trout critical habitat has been reduced to ecologically insignificant levels.

6.1.6 Uncertain Response of August-September Low Flows

How August-September low flows will respond to the proposed forest harvest in the Loomis Creek watershed remains uncertain, because the 2024 MacHydro assessment predicted a 6% increase while the 2026 MacHydro assessment predicted only a 2% increase. This brings into question both the magnitude and potentially the direction of the low-flow response to the Loomis Creek logging plan.

Forest harvest can increase August-September flows through higher snow accumulation, prolonged snow melt, higher groundwater tables, and reduced evapotranspiration following clearcut removal of the trees. However, it can also reduce flows during this time due to more rapid runoff and reduced groundwater recharge. Road construction and riparian windthrow have been documented as common causes of shallow groundwater interception (Fitch et al. 2026). When brought to the surface, grounedwater either evaporates or becomes surface flow instead of supporting streamflow through hyporheic exchange and contributing to maintaining cooler stream temperatures.

Overall, the processes supporting summer baseflows remain uncertain and may not be fully captured by the watershed-scale modelling MacHydro has applied.

As discussed in Chernos et al. (2024), uncertainty also remains regarding the hydrologic behavior of regenerating forest stands. Some evidence suggests regenerating stands may exhibit higher rainfall interception and evapotranspiration rates than mature forest under certain conditions (Goeking and Tarboton 2020; Gronsdahl et al. 2019). If this occurs within the Loomis Creek watershed, both groundwater recharge and discharge that support August-September baseflows could decline as the forest regeneration advances despite initial increases in runoff immediately following harvest.

The uncertainty in August-September flows is important because this is when bull trout spawn and require access to specific sites where flows are maintained by groundwater inputs and where local hyporheic downwelling is occurring. Therefore, the relatively small model-predicted increases in August–September flows should not be interpreted as evidence that there will be no low flow reductions impacting bull trout spawning.

6.2 Risk from Roads and Stream Crossings

Although portions of the original AOP road layout have been removed in the updated AOP, this has primarily been in lower portions of the watershed downstream of the most sensitive bull trout habitat. In the upper watershed where habitat sensitivity is greatest, updated AOP roads still extend up the Loomis Creek valley on both sides and a high-risk road segment still crosses both Loomis and Bishop Creek. The crossing of Loomis Creek is located directly on top of and upstream of sensitive bull trout spawning and rearing habitat. Substantial unresolved road-related concerns remain regarding erosion, sedimentation, groundwater disturbance, and hyporheic flow alteration.

Given the ecological sensitivity of the upper Loomis Creek watershed and the limited ability of watershed-scale hydrologic modelling to evaluate localized groundwater and hyporheic processes, impacts of roads remain one of the highest-priority unresolved concerns in the updated AOP layout, because these impacts could directly or indirectly affect bull trout spawning and rearing habitat.

The following sections summarize the main road-related concerns with the updated AOP.

6.2.1 Road Related Sedimentation Concerns

The 2026 MacHydro assessment notes that road-related sediment generation can be a significant issue because roads become sediment delivery pathways and references literature demonstrating that roads can substantially increase erosion and sediment delivery to streams.

These are relevant to Loomis Creek because planned road crossings and approaches remain directly adjacent to fish-bearing streams and are associated with steep valley slopes as well as overlap groundwater-influenced terrain in some areas. Although construction may involve slope grading and cut-and-fill treatments, these activities would still create exposed and potentially erosion-prone slopes directly connected to the stream network during and following both construction and eventual road rollback.

Despite the 2026 MacHydro assessment stating that “there are no roads on steep slopes directly connected to stream areas”, review of the updated layout and field observations indicate that several planned stream crossings, including crossings of Loomis Creek and

Bishop Creek, require road approaches descending relatively short but steep slopes directly adjacent to fish-bearing streams.

6.2.2 Road Related Concerns to Loomis Creek Upstream of Bishop Creek

The updated layout also continues to include roads along the north and south sides of the Loomis Creek valley where spawning and rearing habitat occurs. Even relatively small changes to inputs of sediment or groundwater to Loomis Creek upstream of Bishop Creek could reduce spawning habitat quality and availability and negatively affect egg survival, juvenile growth, and rearing. The risk of sediment delivery and interruption of groundwater inputs is elevated because roads cross subwatersheds, streams, and shallow groundwater flow paths that all drain into Loomis Creek. Roads will expose soil on slopes prone to erosion and sediment transport and may intersect shallow groundwater, bringing it to the surface before it reaches the creek.

6.2.3 Road Density Concerns in the Upper Watershed

The density of new roads planned for construction by WFC is projected to be approximately 0.65 km/km^2 in the Loomis Creek watershed upstream of Bishop Creek. This does not include the existing historical logging road, which is already eroding and leading to more sediment entering Loomis Creek than would occur in a roadless watershed.

Previous work on bull trout consistently identifies significant negative relationships between roads, stream crossings, sedimentation, and bull trout occurrence, abundance, and redd density (Rieman et al. 1997; Baxter et al. 1999; Dunham and Rieman 1999; Ripley et al. 2005; Scrimgeour et al. 2008).

6.2.4 Road Construction Upstream/Adjacent to Spawning Habitat

The crossing over Loomis Creek planned immediately upstream of documented spawning habitat (Online Map Site ID: LI23) is located approximately 75 m upstream of where bull trout spawning and multiple redds were documented in 2024. It is situated at the downstream limit of the bounded alluvial valley and beaver meadow complex where the spawning habitat is concentrated and where the channel cross-sectional area of the creek decreases by approximately 30%, suggesting hyporheic downwelling is occurring (Coombs et al. 2025). This reach of Loomis Creek at the downstream limit of the beaver meadows also appears to be strongly groundwater influenced, with stream electrical conductivity increasing by approximately 19% relative to the headwaters (Coombs et al. 2025).

Installing, maintaining, and removing a road and bridge crossing over the alluvial valley at the downstream limit of the beaver meadows would require road construction through shallow alluvial groundwater-influenced floodplain terrain. It would involve fill placement, ground compaction, cut-and-fill slope grading, and disturbance immediately adjacent to sensitive spawning habitat. This could alter shallow groundwater flow paths and hyporheic exchange, and lead to sediment harming spawning bull trout, egg incubation, and juvenile survival. Construction may also alter the influence of an important and highly characteristic "longitudinally confined geomorphic knickpoint" where the Loomis Creek valley narrows near the confluence of Bishop and Loomis Creek and bedrock outcrops begin to bound the valley. This type of confined alluvial valley with stable gravel and cobble substrate is characteristic of bull trout spawning habitat (Baxter and Hauer 2000).

Although the updated AOP removes approximately 130 m of planned road above a steep slope within 10 m of Loomis Creek, approximately 170 m of this planned road here still overlaps alignment of the historical logging road immediately upstream of spawning habitat. This remaining road segment remains above a steep slope above the beaver meadows and is within the OGR 100 m buffer on Loomis Creek for roads and adjacent to where bull trout redds were documented in the eco-hydrological assessment. The proximity of the road to the creek, combined with steep slopes between the road and beaver meadows, continues to create potential for erosion and sediment delivery into critical habitat during road construction, operation, and following road rollback.

6.2.5 High Density of Stream Crossings Overlapping a Wet Area

Another area of concern is with respect to a location where two of the original AOP roads cross five mapped streams in a small area. The location is on the south side of Loomis Creek with the first crossing being over LSBS6 near the confluence, at which point the road splits and a spur road switchbacks to the south up the side of the steep valley while the main road continues paralleling Loomis Creek. This effectively doubles the number of watercourse crossings in a small area approximately 400 m to the west of LSBS6. This area was not visited in the 2024 eco-hydrology assessment, but the high density of watercourse crossings suggests it is a wet area representing a high risk for erosion, sedimentation, and altered surface and subsurface drainage. Given that this area drains directly into Loomis Creek upstream of where all the bull trout spawning and rearing habitat was observed, a more detailed field assessment of the risks at this location is warranted.

6.2.6 Road Related Concerns to Bishop Creek

The Bishop Creek crossing has been moved in the updated AOP to accommodate bridge approaches that are less steep, but the crossing is no longer perpendicular to the creek and involves an estimated 165 m of road within the 30 m riparian buffer on both sides of the crossing. This will expose soil on slopes prone to erosion and sediment transport on a reach of stream where sediment could directly harm bull trout or damage critical habitat.

6.2.7 Road Related Impacts on Riparian Critical Habitat

In addition to the effects of road erosion leading to sedimentation and habitat degradation, the eco-hydrological assessment concluded that all planned road crossings of water features associated with the logging plan would result in some degree of disturbance to designated bull trout riparian critical habitat. All mapped and unmapped water features within the Loomis Creek watershed are hydrologically connected to habitat relied upon by bull trout and therefore meet the definition of critical habitat under the SARA recovery strategy. Unless crossings fully span both the stream channel and the surrounding SARA-designated 30 m riparian critical habitat buffer, riparian critical habitat will be destroyed.

6.2.8 Best Management Practices Effectiveness

The 2026 MacHydro assessment places substantial emphasis on the role of best management practices (BMPs) in mitigating erosion and sediment delivery to streams. However, it also acknowledges uncertainty regarding BMP effectiveness, noting that it depends heavily on which BMPs are selected, how they are implemented and maintained within a company's operational practices, and under what conditions they are used.

Uncertainty regarding implementation and effectiveness of these erosion and sediment control measures is significant. Existing field observations and recent reviews of forestry practices on the eastern slopes of Alberta indicate that erosion and sediment control BMPs are often not effectively implemented or maintained. In the Oldman River watershed immediately south of the Highwood River watershed where WFC also operates (Fitch et al. 2026) found insufficient deployment of erosion and sediment control at 87% of stream crossing sites assessed and observed evidence of sediment reaching mapped critical habitat in 41% of 119 stream crossings assessed. Similarly, in a broader survey of WFC's practices in parts of the Oldman, Bow, and Red Deer river watersheds, a 2025 CPAWS study found 71% of stream crossings showed evidence of erosion and/or sedimentation, only 50% of crossings had erosion control measures present, and 87% of those erosion controls were failing to some degree (CPAWS 2026).

Therefore, uncertainty regarding BMP implementation and effectiveness remains an important unresolved component of sediment-related risk in the updated AOP within the Loomis Creek watershed. BMP implementation alone is unlikely to mitigate risks to bull trout critical habitat associated with the proposed road network.

6.2.9 Missing Watercourse Crossing Structures

The updated AOP also continues to omit watercourse crossing structures at several locations where roads cross ephemeral runoff channels and groundwater seepage features. Examples documented during the 2024 assessment include Online Map Site ID LI32 and LI19; however, only a relatively small portion of the planned road network was surveyed in the field, and additional unmapped crossings remain unidentified.

6.2.10 Roads Overlap Prescribed Riparian Buffers

In addition, overlap between planned roads and OGR-prescribed riparian buffers remains in several locations, including road segments on the South side of Loomis Creek west of LSBS6 at the western limit of the AOP and on the North side of Loomis Creek immediately west of the planned Loomis Creek crossing.

6.3 Risk from Inadequate Riparian Buffers

SARA and OGR buffer requirements are minimum requirements and may not protect broader and diverse riparian and watershed functions that can extend further beyond uniform buffer widths. Despite this, these are federal and provincial requirements and adherence to them is not optional, especially in watersheds like Loomis Creek where all riparian areas are designated critical habitat under SARA and an isolated population of a SARA-listed Threatened species occurs.

Issues with riparian buffers remain only partially resolved in the updated AOP. Several mapped and unmapped water features, including mapped tributaries to Loomis Creek, unmapped intermittent and ephemeral channels, groundwater-influenced wetland areas, and groundwater seepage areas, remain unbuffered or inadequately buffered in the updated AOP layout. Ensuring buffers are appropriately applied is not just a desktop exercise. It requires ground surveys to locate and map water features throughout the planned logging area to ensure they are all appropriately buffered. Therefore, assessment of this issue is not complete, because only a limited desktop review of buffers was conducted for this addendum report. The following summarizes these findings.

Layout issues persist based on the riparian buffers prescribed in the OGRs. According to Table 4 of Section 2.17 (Aquatic and Riparian Area Protection) of the OGRs (Government of Alberta 2024), large permanent streams should have no removal of timber within 60 m. However, at two locations along the south side of Loomis Creek, portions of the cut blocks still overlap with this prescribed 60 m buffer in the updated AOP (**Figure 3**).

- One area where the cut blocks are within this 60 m prescribed buffer is near the Bishop-Loomis creek confluence, extending approximately 300 m upstream and 250 m downstream of Bishop Creek.
- The other area is near the upstream extent of the AOP on the South side of Loomis Creek, from west of the LSBS6 confluence to near the upstream extend of the AOP and the Don Getty Wildland boundary.

Layout issues also persist based on the 30 m SARA critical habitat buffer. Many locations where the 30 m SARA buffer was not applied (or not fully applied) that were identified in the eco-hydrological assessment (Coombs et al. 2025) remain unaddressed. These locations are listed below (**Table 3**). One example lies on a mapped stream channel in the AOP and is a mapped WAM layer feature, and yet the 30 m buffer has not been applied (**Photo 1**).

Table 3. Sites with inadequate or nonexistent 30 m SARA riparian buffers.

Site ID (see Online Map for locations and photos)	Remaining issue
LI03, LI04, LI15, LI18, LI32, LI33, LI37, LI38, CO070, CO119, CO118, CO120	Some riparian buffer afforded but it does not appear to be a full 30 m
LI02, LI19, LI22, LI24, LI25, LI39, LI40, CM17, CO113, CO138-142	No riparian buffer has been applied

Photo 1. Example of a water feature on a mapped stream channel and a WAM layer feature afforded no riparian buffer in the updated AOP; at 50.4687167, -114.8010639

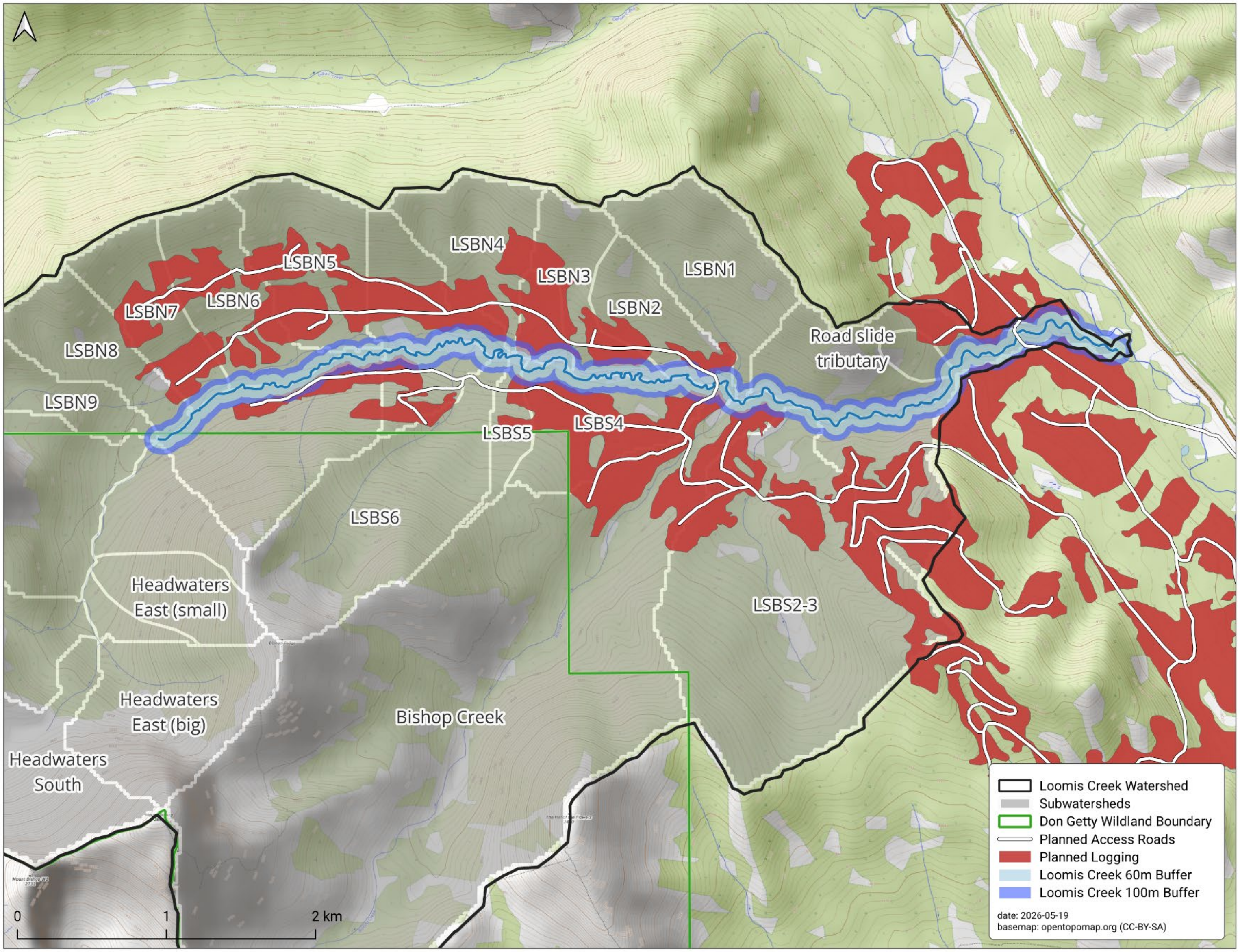

Figure 3. Parts of planned road and cut blocks within respective 100 m and 60 m buffers on large permanent streams.

The SARA bull trout recovery strategy (Fisheries and Oceans Canada 2020) applies a 30 m riparian buffer to all mapped and unmapped water features that are hydrologically connected to mapped critical habitat and support the features, functions, and attributes that bull trout rely on for survival and reproduction. Wetlands directly support bull trout critical habitat through floodwater and groundwater storage and gradual release of water and nutrients that support the aquatic food chain. However, in some locations in the AOP, the edge of wetland areas where there is shallow groundwater and saturated soil that drains to mapped critical habitat still has not been buffered by 30 m. Instead, the 30 m buffer has been applied just from the banks of the watercourse within the wetland and clearcuts are planned to extend to the forested edge of the wetlands.

Not all these inadequately buffered wetland areas were visited, photographed, and mapped during the 2024 eco-hydrological field assessment. Some areas identified in the desktop review for the addendum report where the 30 m SARA buffer has not been applied to the forested edge of the wetlands are listed below with coordinates (**Table 4**). These areas were not assigned Online Map site IDs during the eco-hydrological field assessment, but adjacent Online Map site IDs from that assessment are provided for spatial reference. It should be noted that an exhaustive field-based assessment within the Loomis Creek watershed has not yet been conducted to document all areas where the 30 m riparian buffer has not been applied to the perimeter of wetland areas (**Figure 4**).

Table 4. Wetland areas where a 30 m buffer has not been applied to the perimeter.

Location description (see Online Map for adjacent Side ID locations and photos)	Coordinates
Wetland areas to the East and West of LI33	50.466852, -114.866347 50.466511, -114.868125
Wetland area to the West of CO103	50.468612, -114.861698
Wetland area near CO107	50.469126, -114.857624
Wetland area to the West of CO021	50.458117, -114.823365 50.458954, -114.821993 50.458780, -114.820974
Wetland area to the West of CO018	50.460776, -114.819782 50.461889, -114.821110

A significant number of road crossings of water features in the updated AOP remain within cut blocks and yet the 30 m SARA buffer has still not been applied to these water features. However, all water features connected to mapped critical habitat by surface or groundwater support the features, functions, and attributes that bull trout rely on for survival and reproduction. Therefore, these water features constitute critical habitat, and the 30 m riparian buffer applies. If there is enough water to require a watercourse crossing structure for road construction, the SARA designated 30 m riparian buffer should also apply. A map of unbuffered watercourses crossed by AOP roads was presented in the eco-hydrological assessment (Figure 31 in Coombs et al. 2024), and 14 remaining crossings within the cut blocks with no associated riparian buffers are listed below (**Table 5**).

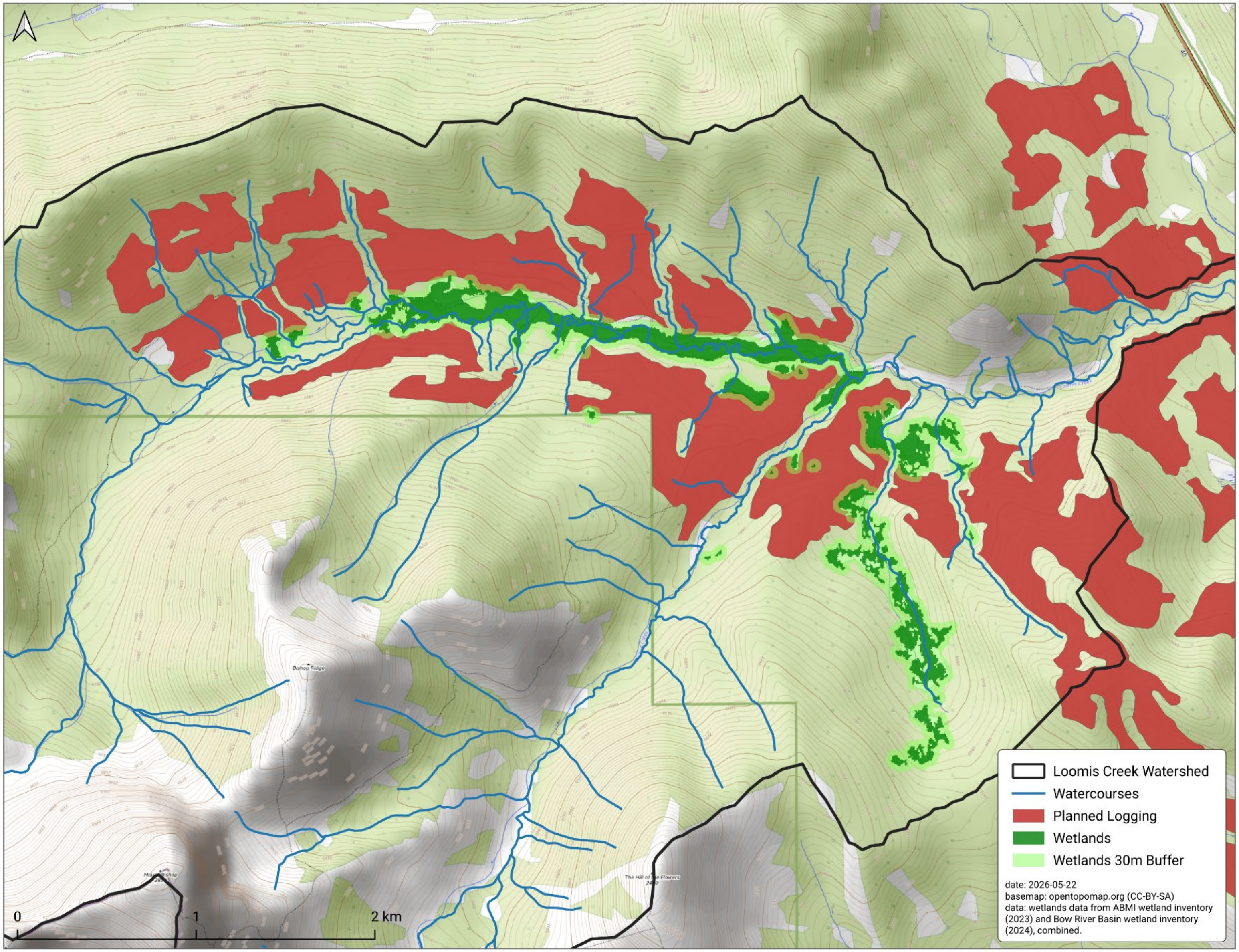

Figure 4. Planned logging overlapping or within 30 m of areas mapped as wetlands.

Table 5. Watercourses crossed by AOP roads without 30 m riparian buffers applied.

Number and type of crossings	Mapped critical habitat and WAM features present	WFC-produced stream layer present	Coordinates
5 Box Crib Crossings	Yes	Yes	50.46876158 -114.86913 50.47016092 -114.86404 50.46325260 -114.83370 50.47010338 -114.85610 50.47089339 -114.87720
2 Box Crib Crossings	No	Yes	50.46905490, -114.80156 50.46793168, -114.83530
1 Bridge	Yes	Yes	50.46963386, -114.84041
4 Corduroy	Yes	Yes	50.46689245, -114.87276 50.46712183, -114.87233 50.47039715, -114.84665 50.47045872, -114.84629
1 Corduroy	Yes	No	50.45854176, -114.80724
1 Corduroy	No	Yes	50.46642836, -114.85235

A significant number of mapped wet areas on the WAM layer overlap with the updated AOP cut blocks (**Figure 5**). Some WAM layer areas of concern that remain in the updated AOP and have not had riparian buffers placed around them are listed below (**Table 6**).

7. Conclusions

The updated AOP and 2026 MacHydro assessment present meaningful improvements relative to the original AOP assessed in 2024. Most notably, the overall harvest footprint and projected watershed-scale ECA have been reduced, several hydrologically sensitive cut blocks have been removed or reduced in size, model-predicted hydrologic alteration is smaller, and one particularly high-risk road segment associated with historical slope instability has been removed.

However, despite these improvements, the updated AOP continues to present unresolved risks to bull trout critical habitat within the Loomis Creek watershed. Substantial disturbance remains concentrated within the upper watershed upstream of Bishop Creek where all documented spawning and YOY rearing habitat occurs. This area represents the most ecologically sensitive and hydrologically responsive portion of the watershed.

Both the 2024 and 2026 MacHydro assessments predict increased annual flows, increased peak flows, and earlier freshet timing following forest harvest. The 2026 assessment

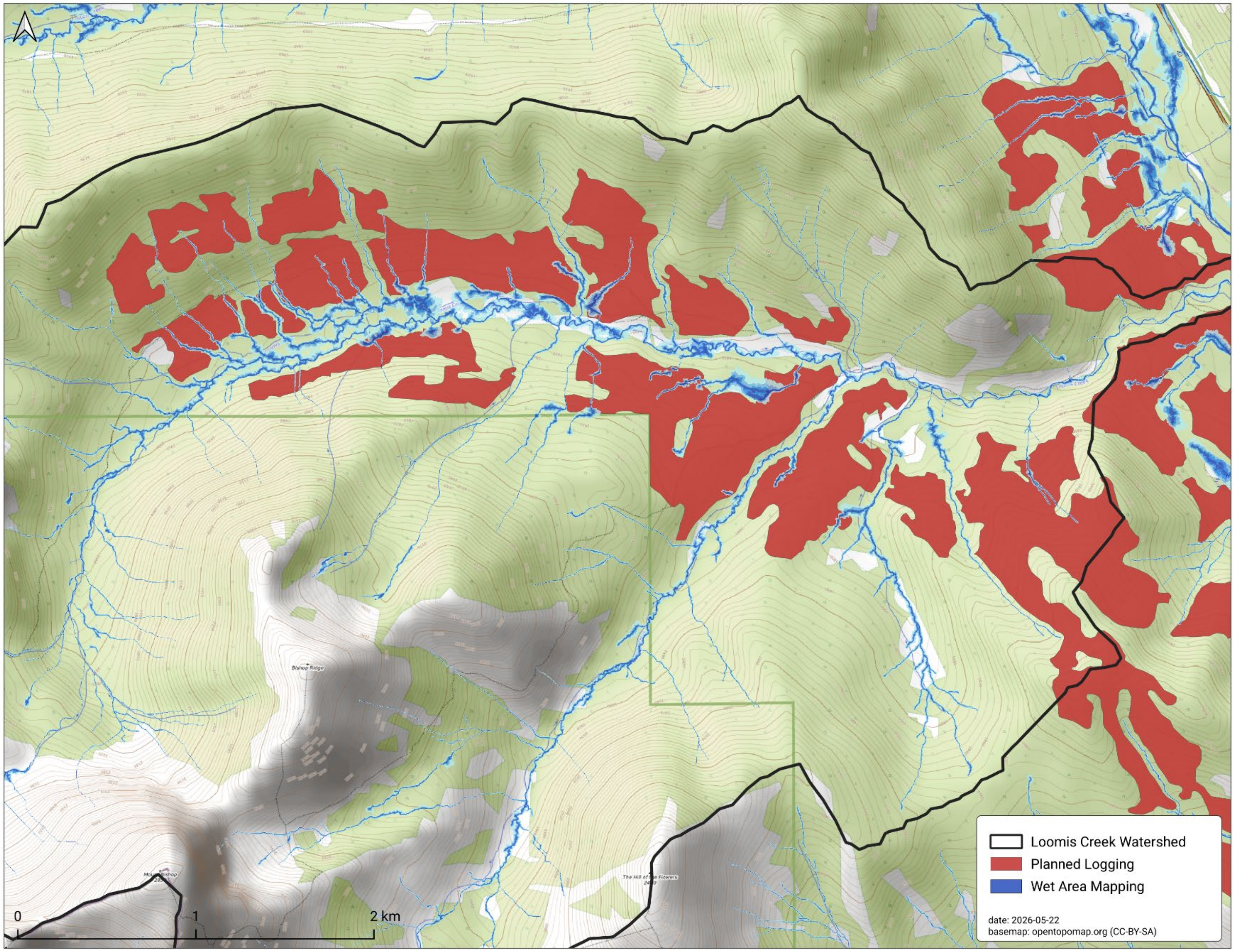

Figure 5. Planned logging overlapping parts of the provincial Wet Area Mapping layer.

Table 6. Locations where cut blocks in the updated AOP overlap with predicted wet areas from the Alberta Wet Area Mapping (WAM) layer.

Site location	Coordinates		
Northern limit of cut block boundary on south side of Loomis Creek, west of LSBS6	From:	50.4663454	-114.8612488
	To:	50.4671385	-114.8532552
Within LSBN7 drainage	From:	50.4660426	-114.8735198
	To:	50.4672150	-114.8767696
	From:	50.4663230	-114.8722393
	To:	50.4679072	-114.8750898
	From:	50.4706629	-114.8772916
	To:	50.4713578	-114.8773357
Within LSBN6 drainage	From:	50.4715620	-114.8710068
	To:	50.4725931	-114.8719427
	From:	50.4708776	-114.8739843
	To:	50.4720506	-114.8755154
	From:	50.4683309	-114.8666066
	To:	50.4697040	-114.8678779
Between LSBN5 and LSBN6 drainages	From:	50.4684743	-114.8622202
	To:	50.4707844	-114.8647020
	From:	50.4689486	-114.8612266
	To:	50.4706590	-114.8624023
Within LSBN5 drainage	From:	50.4691197	-114.8576607
	To:	50.4728614	-114.8593710
Between LSBN4 and LSBN5 drainages	From:	50.4695335	-114.8561636
	To:	50.4721434	-114.8558150
	From:	50.4691408	-114.8489248
	To:	50.4701907	-114.8494885
Within LSBN4 drainage	From:	50.4695822	-114.8439132
	To:	50.4704438	-114.8458787
Between LSBN3 and LSBN4 drainages	From:	50.4675555	-114.8422515
	To:	50.4717498	-114.8397250
Within LSBS5 drainage	From:	50.466117	-114.843349
	To:	50.463154	-114.842903
Within LSBS4 drainage	From:	50.4651490	-114.8359870
	To:	50.4645267	-114.8383004
	From:	50.4644797	-114.8340532
	To:	50.4635560	-114.8377033
	From:	50.4638258	-114.8332914
	To:	50.4624747	-114.8349366
Within Bishop Creek drainage	From:	50.4600565	-114.8270402
	To:	50.4591412	-114.8283848

further predicts sustained increases in average daily spring flows during freshet of approximately 10–13% at the mouth of Loomis Creek, with potential increases of up to 30% under the upper 90th percentile scenario. Because hydrologic effects are assessed at the scale of the entire watershed, these predicted changes may underestimate effects occurring within the upper Loomis Creek watershed upstream of Bishop Creek or in individual tributary subwatersheds that drain into Loomis Creek upstream of the spawning and rearing habitat. At these smaller scales, ECA and the hydrological impacts of clearcut harvest on south facing slopes with high snow accumulation are likely to be magnified.

Field observations from the eco-hydrological assessment indicate tributary channels within the watershed are already sensitive to forest disturbance and sediment delivery. Existing evidence of channel incision, aggradation, avulsion, and mobile bedload transport associated with historical logging suggests additional hydrologic alteration could further destabilize tributary channels and degrade spawning and rearing habitat within the mid-reach of Loomis Creek.

Road-related concerns also remain substantial. Roads and crossings continue to overlap SARA-designated riparian critical habitat, including immediately upstream of documented spawning habitat and within groundwater-influenced floodplain terrain associated with apparent hyporheic downwelling where bull trout are spawning. Planned road density within the upper watershed remains high, stream crossings are still missing at some water features and cross other sensitive groundwater seepage areas and steep terrain, and uncertainty regarding erosion and sediment control effectiveness remains significant.

Uncertainty also remains regarding the long-term response of August–September low flows, groundwater recharge and discharge, and forest hydrologic recovery. Both the 2024 and 2026 MacHydro assessments acknowledge that hydrologic recovery may require multiple decades and that watershed-scale assessments may obscure important localized impacts occurring within smaller tributaries and headwater areas.

Overall, although the updated AOP reduces risk relative to the original layout, this review concludes that it does not fully resolve concerns regarding damage or destruction of bull trout critical habitat within the Loomis Creek watershed and still puts the isolated bull trout population at risk of extirpation. A finer-scale hydrologic risk assessment focused specifically on the upper Loomis Creek watershed upstream of Bishop Creek, together with additional field-based assessment and long-term hydrologic and ecological monitoring, is recommended before determining whether forest harvest can proceed.

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