

COMMENTS BY
WILDLIFE CONSERVATION SOCIETY CANADA
ON

The Dawson Regional Planning Commission Draft Plan – June 2021
On The Land We Walk Together

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This set of Comments has been put together for the Commission's review

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INTRODUCTION

We provide the following set of comments based on the invitation for public input on the Draft Dawson Regional Land Use Plan, “On the Land We Walk Together /Nän kāk ndä tr’ädäl”, for guiding development, conservation and stewardship for almost 40,000 square kilometers of land in the Dawson area split into 23 different management areas. We thank the Dawson Regional Planning Commission for this opportunity to provide input on their hard work on the final draft plan and how roughly 10 per cent of Yukon's land mass should be managed in the future. We also want to wish them the best in their continued dedication to achieve the objectives of Chapter 11 of the Tr’ondëk Hwëch’in Final Agreement.

WCS Canada is a national non-government organization of scientists conducting research on species and ecosystems to inform conservation decisions. Our role is to provide long-term, site-based, research and syntheses of science that inform policy and practice and that support the implementation of effective conservation measures. We do this by providing technical advice and by engaging relevant decision-makers at all levels, from local to federal. WCS Canada scientists have been working in Yukon since 2004 on land use and protected areas planning, land and water management, wildlife conservation research, and policy applications for conservation science. Dr. Chrystal Mantyka-Pringle has contributed scientific expertise to land use planning and management, and environmental assessments in Yukon and Northwest Territories since 2014, and has three active collaborative research projects in the Dawson planning area on climate change modelling and the cumulative effects of land-use and climate change in partnership with Tr’ondëk Hwëch’in, Yukon Environment, and the Canadian Wildlife Service. She is also an invited expert as part of the Dawson Regional Cumulative Effects Working Group and has been providing scientific expertise to Tr’ondëk Hwëch’in Government. Dr. Donald Reid has contributed scientific expertise to land use planning, forest management, wildlife policy, and environmental assessments in Yukon since 2004 and provided technical assistance to Yukon Land Use Planning Council for the Peel and North Yukon regional land use plans.

We have organized our comments into headings, with specific mention of the page number and text in the original document, so that headings can be used for high level feedback, but the page number can be used for linking text change suggestions. Our more specific recommendations are underlined for easier identification.

GUIDING PRINCIPLES OF SUSTAINABLE DEVELOPMENT AND STEWARDSHIP

We commend the Commission on their take of adding “Stewardship” into this plan as a theme and for their attempt at striking a balance between development and ecological and socio-cultural preservation. There is still much growth and healing needed in this country to move towards land and Indigenous reconciliation, and one way is connecting this plan to Tr’ondëk Hwëch’in’s values on stewardship and protecting essential environmental and cultural integrity values within Tr’ondëk Hwëch’in’s homeland. In order to ensure that fish and wildlife populations and their habitats remain healthy and sustainable for the next 7 generations as listed under Chapter 11 of the Umbrella Final Agreement, it is our moral responsibility to highlight our concerns that we see as Conservation Scientists in the Draft Plan and to provide scientific understanding. We start with addressing the term “Sustainable Development”.

On page 16, the plan states that to “Achieve sustainable development requires (1) sustaining ecosystem integrity, (2) sustaining communities and cultures, and (3) sustaining economic activities.” We argue that

ecology is not one of three equal contributing influences in achieving sustainability. Neither economy nor society can exist without ecology. Ecology is a more fundamental entity and all human activities are embedded in ecology, not separate entities from it. Trading-off ecology, and often society, for economy is a never-ending model for ecological deterioration. We, therefore, recommend using a more appropriate model in which economy is nested within society, which is in turn nested within ecology (see Image 1 below)¹. If the plan can truly push for a sustainable model, then environmental goals such as ensuring the protection of all source water, caribou herd ranges, landscape connectivity and food security should be prioritized before economic development.



Image 1. Nested Sustainability Framework²

In addition, the text addresses economic activities of “two kinds”, described as being sustainable: economic activities that do not degrade the land or undermine communities, and those activities that deplete resources, but from which the land can recover. However, we argue that there is a third kind, not mentioned so far, which is economic activity that removes ecosystems in ways that they cannot be restored or recovered even within 7 generations. Placer mining is such an activity, as is some hard-rock mining. The land (in the case of placer) and often the water (in the case of hard rock tailings ponds) cannot recover from the human activities within 7 generations and often much longer. Restoration is not possible; only some semblance of reclamation of partial values can be achieved. As a result, these cannot be thought of as sustainable economic activities. They do not conform to the definition of sustainable development used in the text (“Beneficial socio-economic change that does not undermine the ecological and social systems upon which communities and societies are dependent”) because they do in fact undermine the ecological systems (wetlands and water courses) on which society depends – they

¹ Doppelt, B., 2012. *The power of sustainable thinking: How to create a positive future for the climate, the planet, your organization and your life*. Routledge.

² Future Oxford, Our path towards sustainability. Source: <http://futureoxford.ca/general/sustainabilityplan/index.htm>

permanently remove certain ecosystems from the land, and permanently put water quality at high risk of pollution. If the Plan is to allow these economic activities to continue, it needs to discuss this breach of sustainability: What limits does the Plan envisage for these breaches of sustainability? What mitigations are included in areas where sustainability are breached?

On page 17, the promotion of stewardship is potentially a ground-breaking and influential step forward in land use planning in Yukon. However, without more careful and detailed explanation of how it differs from management, there is potentially high risk that it may just become a synonym for management.

For example, the plan details that community stewardship is about “sharing the responsibility and respect for the land” and “it is our responsibility to protect our traditional territory as a whole”. This is all very important, particularly because we know that reclaiming Indigenous and community stewardship has served as an effective tool for the protection and resiliency of natural resources in other places^{3,4}. But, the plan often switches from using the word “stewardship” to “management” (e.g., “stewardship is promoted in this plan through the application of adaptive management in implementation”; and the use of management in the insert box). This is confusing, because the two are quite distinct from another. If stewardship is taking responsibility of our land, water, animals and plants, whereas management is a set of actions used to how people interact with their resources, then we recommend either dropping the word “management” in the Plan as a stewardship concept or explicitly discussing how the two are coupled in the Commission’s view.

PRECAUTIONARY PRINCIPLE AND ADAPTIVE MANAGEMENT

On page 18, the International Institute for Sustainable Development (IISD) quote is somewhat misleading in that it is not a definition of the principle, but rather an interpretation of how one might act in consideration of the principle. Therefore, it does not very well tell the reader what the principle is. The same IISD document provides the following text: *Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.* This definition/explanation better explains how this principle can be applied to address risk with uncertainty.

Useful illustrations of the principle lie in explaining situations where precaution is an appropriate way forward: (i) avoid allowing human activities that might be detrimental when the costs to ecosystem integrity are high (e.g., a massive tailings pond/dam that might fail); (ii) avoid hesitation to act in the face of an impending threat when that threat is massive with costs far higher than actions to avert it (e.g., repairing or upgrading a tailings pond/dam facing excessive inflows, or implementing more extensive fire suppression through caribou winter range in the face of more intense fire risk).

Some more careful wording, with examples, would help explain this principle, and its use.

Adaptive management is essential for feedback learning and especially in times of uncertainty. Essentially, adaptive management is learning-by-doing, and is a holistic part of Indigenous knowledge. For example,

³ Appiah-Opoku, S., 2007. Indigenous beliefs and environmental stewardship: A rural Ghana experience. *Journal of Cultural Geography*, 24(2), pp.79-98.

⁴ Chapin III, F.S., Sommerkorn, M., Robards, M.D. and Hillmer-Pegram, K., 2015. Ecosystem stewardship: A resilience framework for arctic conservation. *Global Environmental Change*, 34, pp.207-217.

Indigenous hunters have been learning-by-doing for countless generations and the result is a rich traditional ecological knowledge. This principle, however, uses the term “management”, which is contrasted with stewardship earlier and approached here in a very western world-view manner. We suggest reframing this section here to indicate that adaptive management or perhaps “adaptive stewardship” is not simply about a “structured, iterative process to decision making”, but includes practices, beliefs, and values, that are embedded in Indigenous knowledge systems⁵. This would create more of a community of learning that can pursue deliberate goals, measures, and collaborative problem solving, with ethical intent.⁶

PRIORITY CRITERIA FOR PROTECTED AREAS

Achieving representation of all ecoregions in the portfolio of protected areas is highly desirable, as indicated on page 19 and as formally mandated by the Parks and Land Certainty Act. However, the text is somewhat misleading and is incomplete. There is no mention of the Klondike Plateau ecoregion that currently has no representation, but almost 60% of which falls in this planning region (see Image 2 below). Failing to list this ecoregion, and the importance of this planning process in providing protection for a portion of it, is an oversight. Yes, this planning process can provide some needed protection for the McQuesten Highlands ecoregion, - currently lacking protection. One “ecoregion” mentioned in the text as being under-represented in current protected areas is questionable, - North Yukon Ogilvie Mountains – is this the same as North Ogilvie Mountains? If so, the Peel Watershed Plan does offer considerable protection for this ecoregion, as do the protected areas associated with Ni’iinlii Njik Territorial Park. The opportunity this planning process offers to provide significant necessary protection for the Klondike Plateau ecoregion needs to be included.

CLIMATE CHANGE

On page 27 & 28, the draft plan talks about the anticipated increases in temperature and precipitation in the Dawson area, without any links on what the potential effects will look like on the landscape (although some are detailed on pages 99 and 100). Without laying out some of the main affects at the forefront, it is difficult for the reader to envision how the draft plan can tackle the effects of climate change and adapt for the changes to come. WCS Canada has undertaken a number of projects designed to help us better understand what climate change will mean for Yukon’s landscapes and wildlife. In particular, we have developed some projections of how warmer temperatures, shifts in precipitation and other climate-driven factors could alter our landscapes^{7,8}. Climate change, for example, could lead to shifts in wildlife ranges and even reduce populations of some species⁹. We are already experiencing this with salmon

⁵ Berkes, F., 2017. *Sacred ecology*. Routledge.

⁶ Parlee, B.L. and Caine, K.J. eds., 2018. When the caribou do not come: indigenous knowledge and adaptive management in the Western Arctic. UBC Press.

⁷ Rowland, E.L., Fresco, N., Reid, D. and Cooke, H.A., 2016. Examining climate-biome (“cliome”) shifts for Yukon and its protected areas. *Global ecology and conservation*, 8, pp.1-17.

⁸ Stralberg, D., Arseneault, D., Baltzer, J.L., Barber, Q.E., Bayne, E.M., Boulanger, Y., Brown, C.D., Cooke, H.A., Devito, K., Edwards, J. and Estevo, C.A., 2020. Climate-change refugia in boreal North America: what, where, and for how long?. *Frontiers in Ecology and the Environment*, 18(5), pp.261-270.

⁹ Cooke, H. 2017. Securing a Wild Future. Planning for Landscape Scale Conservation of Yukon's Boreal Mountains

For land-use planning, there are several climate change adaptation strategies that we can take to help plan for a hotter and wetter Yukon and temper the effects of a changing climate on the land, water, fish and wildlife that all Yukoners value:

- Think big and conserve areas large enough to withstand some of the impacts of more frequent and extreme heat, fires and floods. The International Union for Conservation of Nature recommends protecting at least 30% of ecosystems by 2030 to slow down the crisis of biodiversity loss and buffer the effects of climate change.
- Think about helping wildlife adapt, such as by identifying areas that won't change as quickly and conserving these areas as "climate refuges."¹⁴
- Think reducing the effects of fires in old-growth habitats for species like caribou, by expanding our fire suppression efforts¹⁵ more widely across the land.
- Think connection and retain natural corridors so that wildlife can move and adapt to a warming world¹⁶.
- Think sustaining cooler areas like the cold-water areas fish need to spawn and keeping generous stream buffers in place to provide relief from warming waters.
- Think about how climate change will add to other pressures, such as from mining development, and plan accordingly to reduce these cumulative impacts.
- Think about keeping carbon in the ground and vegetation by properly valuing the natural carbon storage services provided by forests, peatlands, and other wetlands.
- And, most important of all, think long-term benefits and not just about the next decade or two or the short-term benefits of the next development boom.

We call upon the Commission to take this opportunity to prepare for the changes to come and carefully consider the impacts of climate change and what we need to do to reduce its effects on both culture and the environment. Without doing so, plans will miss one of the dominant forces affecting land and water, and may well fail to achieve the outcomes they hoped to reach. The recommended management strategies in response to climate change on page 100 are too vague and not pointed to specific adaptation/mitigation strategies as we have suggested above and in other sections throughout this response.

SPECIAL MANAGEMENT AREAS

On page 30, how is wilderness defined? The objective for special management area II (SMA2) is listed specifically as "long-term maintenance of wilderness character". This is the first time "wilderness" has been mentioned in the text, and without a clear definition, the reader has difficulty interpreting its inclusion here, especially with respect to a land use designation that covers large portions of the planning region. What is it about "wilderness" that deserves this attention, and how does wilderness relate to ecological values, subsistence use values, cultural values, etc.? Probably the most prominent North

¹⁴ Stralberg, D., Carroll, C. and Nielsen, S.E., 2020. Toward a climate-informed North American protected areas network: Incorporating climate-change refugia and corridors in conservation planning. *Conservation Letters*, 13(4), p.e12712.

¹⁵ Wickham, S., Trant, A., Davis, E., and Hoffman, K. 2021. How Indigenous burning practices can help curb the biodiversity crisis. The Conversation: <https://theconversation.com/how-indigenous-burning-practices-can-help-curb-the-biodiversity-crisis-165422>

¹⁶ Bauduin, S., Cumming, S.G., St-Laurent, M.H. and McIntire, E.J., 2020. Integrating functional connectivity in designing networks of protected areas under climate change: A caribou case-study. *PLoS one*, 15(9), p.e0238821.

American definition of wilderness is that in the 1964 US Wilderness Act: “A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain”. Is that the intention here? If not, then what is the definition? As described in the draft Plan, SMA2s would not satisfy the definition of wilderness commonly applied in North America because they would allow exploration and development of mineral tenures.

How does SMA2 differ from Integrated Stewardship Area I (ISA1) or ISA2? The cumulative effects thresholds of ISA1 or ISA2 would apply in the SMA2 Land Management Units (LMUs). The difference between the two seems to be in the proposal that SMA2s would have no new mineral exploration and development, and no new road access. However, if the withdrawal of these areas from future exploration and development is not firmly embedded in this Plan (i.e. it is dependent on only an Order-in-Council instead of the Plan), then such withdrawal is subject only to political will at the time and not to the intent of the Planning Commission. The ending of a withdrawal of these LMUs from new exploration would effectively turn these SMA2s into ISA1s or ISA2s. The lesson is that the Plan has to permanently withdraw these areas; the decision cannot be left to decision-making outside the Plan. If the Plan keeps the ambivalent wording with respect to SMA2s that all other lands not currently holding mineral or other land use tenure should be withdrawn “on either an interim or permanent basis”..., then the Plan lacks the certainty for all land users that it is trying to achieve, in particular a lack of clarity between SMA2s and ISA1s or ISA2s.

Why does the Plan specifically state that the Commission does not recommend that SMA2s acquire legal designation as protected areas? What is it about these areas that should preclude some kind of protected area designation? This assertion is contrary to the precedent set by ratified Regional Plans in the North Yukon and Peel Watershed. It is also contrary to the apparent intent of Chapter 10 of the Umbrella Final Agreement, in which SMAs are defined and explained as (i) areas with high ecological and cultural values needing particular protection, and (ii) areas that require a management plan. In the case of LMU7, an SMA2 designation is promoted as a way to obtain ecological representation of the McQuesten Highlands ecoregion, but this is misleading if the LMU does not acquire legal standing. The change in approach in this regional land use plan compared to others, and the proposed lack of protection through legal designation, both need to be better explained in the text of the Plan itself.

The withdrawal of mineral staking opportunities from these areas is currently in place, and presumably would be part of a Recommended Plan, at least in interim capacity. What criteria does the Commission propose should be applied to any consideration of revoking the interim withdrawal? Who (e.g., which governments) would have such power with respect to this Plan? Answers to these questions need to be explicitly laid out in the Plan, and ideally a Plan should have no reliance on withdrawals instituted outside the Plan (i.e. by OIC).

INTEGRATED STEWARDSHIP AREAS

Integrated Stewardship Areas will be a key component of this Plan, and need careful consideration. The concept of putting limits on specific aspects of human activity (notably those associated with industrial activity and access to the land), to limit ecological and cultural damage, is fundamentally important and commends strong support. There are just some aspects that require more explanation on page 31. For

instance, the text does not explicitly state that there are 4 different categories of ISA, although that becomes evident in Table 3-1, which is not referenced in this section. But, why so many categories? Is there really enough technical and scientific information to adequately discriminate among 4 levels of thresholds of cumulative effects? And a larger number of categories makes implementation of the Plan more difficult. The text deserves more explanation here with regard to why there are four categories.

CORRIDOR AREAS

The plan recommends deferring three highway corridors for sub-regional planning on page 31 without direction to the subsequent planning process or the key values and issues in these corridors. Based on discussions at one of the community engagement sessions in Dawson on sub-regional planning, it was voiced that the Commission recognizes the importance of the Dempster Highway corridor being highly valued for ecological, cultural and recreational values as is outlined on page 52. So if the values are already well known for the Dempster Highway, why not include the Corridor as another LMU in the plan? If the values are not well known or require more localized detail than elsewhere, particularly for the Klondike Highway Corridor and the Top of the World Highway Corridor, then explicitly say this with a clear timeline for implementation.

CUMULATIVE EFFECTS MANAGEMENT

Tackling cumulative effects is the responsibility of all departments and governments and we commend the Commission for digging in deeper and requesting a specialized workshop focused on cumulative effects in the Dawson region. As cumulative effects can be quite technical, we recommend the Plan to use a conceptual model, on page 36, to help lay out the definition used and the approach of a cumulative effects framework that was presented in the workshop. Below is a simple version, but a specific indicator or value such as surface disturbance or water could be used as an example.

The use of surface disturbance is a logical choice for a cumulative effects indicator as it is easily measurable using up-to-date satellite imagery, but it is not clear whether surface disturbance will also include the physical footprint of fires, permafrost slumping, and other climate change impacts? In the text on page 37, it states that “any activity that results in a physical footprint on the landscape”. This should, therefore, include climate change effects too as they are essentially caused by human activities and may result in tipping points for ecosystems (i.e., a point at which an ecosystem can no longer cope with environmental change)^{17,18}. The plan should explicitly mention how climate change impacts will be considered as additional effects both for the indicators and thresholds chosen.

¹⁷Davis, K.T., Dobrowski, S.Z., Higuera, P.E., Holden, Z.A., Veblen, T.T., Rother, M.T., Parks, S.A., Sala, A. and Maneta, M.P., 2019. Wildfires and climate change push low-elevation forests across a critical climate threshold for tree regeneration. *Proceedings of the National Academy of Sciences*, 116(13), pp.6193-6198.

¹⁸ Liu, J., Kattel, G., Arp, H.P.H. and Yang, H., 2015. Towards threshold-based management of freshwater ecosystems in the context of climate change. *Ecological Modelling*, 318, pp.265-274.

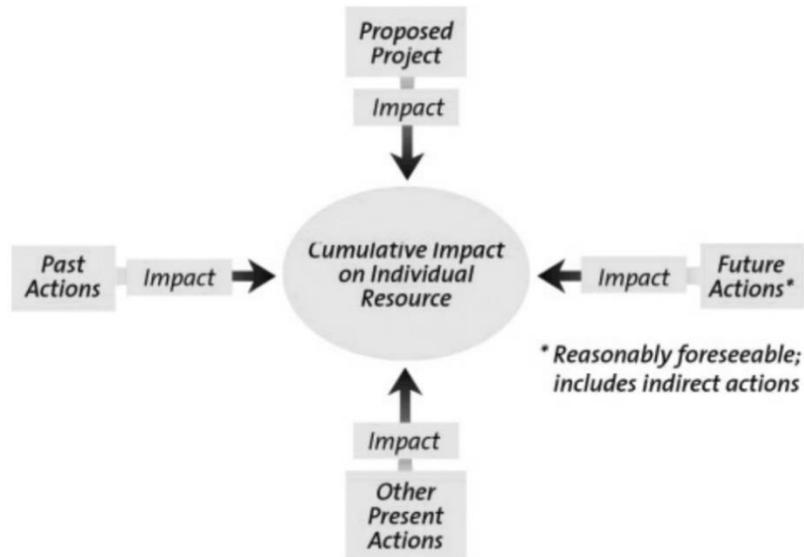


Image 3. A simple Cumulative Effects Diagram¹⁹

Recovery based on vegetation height and contouring also seem fairly reasonable. But what proportion of the vegetation needs to have achieved that height, and why that height? As discussed in the cumulative effects workshop, reclaimed deciduous trees, for example, may have a beneficial effect on moose, but not other values such as caribou. What should be done in alpine or meadow/wetland areas where vegetation does not grow that high? For these reasons, the plan should specify “native” vegetation (some invasive species such as sweet clover can reach 1.5 m in height) so that it targets the original values in that LMU.

Linear density is another practical way of keeping track of cumulative effects, but satellite imagery can only pick up >1.5m width trails due to the resolution of the imagery. Trails <1.5m will be missed, but still add to the cumulative effects of fragmentation on wildlife habitat. For instance, we know that edge effects of small trails can have an impact on breeding birds²⁰, and small and large mammals through predation²¹. We, therefore, suggest that a community monitoring program keep track of the number of small trails (<3m) in high use areas so that there is a more accurate representation of linear density in targeted parts of the ISAs.

A bigger question on page 39, is whether these two cumulative effects indicators (surface disturbance and linear density) link well to the key values identified in the plan: caribou, wetlands, water, salmon, and stewardship as listed at the workshop. We know that caribou populations that have been exposed to increased development and disturbance features elsewhere, have suffered through increased predation, hunting, energy expenditure, and vehicle collisions²². But what we don’t currently understand very well

¹⁹ Roudgarmi, P., 2018. Cumulative effects assessment (CEA), a review. *Journal of Environmental Assessment Policy and Management*, 20(02), p.1850008.

²⁰ Miller, S.G., Knight, R.L. and Miller, C.K., 1998. Influence of recreational trails on breeding bird communities. *Ecological Applications*, 8(1), pp.162-169.

²¹ Larivière, S., 2003. Edge effects, predator movements, and the travel-lane paradox. *Wildlife Society Bulletin*, pp.315-320.

²² Palm, E.C., 2021. LINKING HABITAT, POPULATIONS AND POLICY FOR CARIBOU IN THE FACE OF INCREASING DISTURBANCE.

are the implications of human disturbance to caribou caused by cumulative effects at annual and regional scales²³. The migratory Fortymile caribou herd will be exposed to different levels of cumulative effect thresholds throughout their range as indicated in the draft plan depending on the LMU, and if we are only measuring linear features and surface disturbance, without considering other stressors at the scale of the herd's range, such as increased hunting pressure and human presence in the region, we may be missing key signals. We recommend that surface disturbance and linear density get paired with hunting pressure, traffic volumes, wildfires, and number of people in the Dawson area (seasonally) to determine current cumulative risk associations and better cumulative effects monitoring for herd management.

For water and salmon habitat, WCS Canada is leading a new study that looks at the cumulative impact of surface disturbance and climate change stressors on water quality in the Indian and Klondike River drainages. We have presented this research to the Commission and at the Cumulative effects workshop in Whitehorse as an example of how linear density, surface disturbance and climate stressors can be linked to water quality indicators, such as total suspended sediments, turbidity, total organic carbon, and water temperature in salmon spawning streams. We found that surface disturbance and linear density were associated with an increase in total suspended solids (TSS), which is a concern for salmon because increased TSS can decrease eggs, larvae, and juvenile survival and recruitment for salmon and other fish^{24,25,26}. We also found that mining and forestry roads, - road types that are unpaved and see a high amount of activity -, have the highest impact on water quality directly downstream (see report attached to this submission). We call upon the Commission to use water quality as a cumulative effects indicator because of the important links between placer mining, roads, climate change and water. The Government of Yukon Energy Mines and Resources already monitor water throughout the Yukon River drainage area using the CABIN Canadian Aquatic Biomonitoring Network²⁷ for assessing the health of freshwater ecosystems in Canada. These methods and data collection²⁸ can be extended to other areas in the planning region as a resource for monitoring and tracking cumulative effects.

The other indicator that is listed on page 40 is the potential use of 'stewardship' as a cumulative effects indicator (we will discuss wetlands in a separate section later). Right now, as the draft plan stands, there are no socio-cultural and/or socio-economic indicators listed as part of the cumulative effects framework for this plan, and if none is nominated by Tr'ondëk Hwëch'in, then this should be a research recommendation to match the priority as expressed on page 17. Recognizing stewardship practices as indicators of social resilience has been done before at other community levels elsewhere, using various qualitative information drawn by the community²⁹. The cumulative effects working group have expressed this gap before and we look forward to seeing how the Commission will consider Tr'ondëk Hwëch'in's

²³ Wolfe, S.A., Griffith, B. and Wolfe, C.A.G., 2000. Response of reindeer and caribou to human activities. *Polar research*, 19(1), pp.63-73.

²⁴ Neuswanger, J.R., Wipfli, M.S., Evenson, M.J., Hughes, N.F. and Rosenberger, A.E., 2015. Low productivity of Chinook salmon strongly correlates with high summer stream discharge in two Alaskan rivers in the Yukon drainage. *Canadian Journal of Fisheries and Aquatic Sciences*, 72(8), pp.1125-1137.

²⁵ Pentz, S.B. and Kostaschuk, R.A., 1999. Effect of placer mining on suspended sediment in reaches of sensitive fish habitat. *Environmental Geology*, 37(1), pp.78-89.

²⁶ Greig, S.M., Sear, D.A. and Carling, P.A., 2005. The impact of fine sediment accumulation on the survival of incubating salmon progeny: implications for sediment management. *Science of the total environment*, 344(1-3), pp.241-258.

²⁷ CABIN Canadian Aquatic Biomonitoring Network. Available here: <https://open.canada.ca/data/en/dataset/13564ca4-e330-40a5-9521-bfb1be767147>

²⁸ Government of Yukon water quality monitoring. Available here <https://yukon.ca/en/water-quality-monitoring>

²⁹ McMillen, H., Campbell, L.K., Svendsen, E.S. and Reynolds, R., 2016. Recognizing stewardship practices as indicators of social resilience: In living memorials and in a community garden. *Sustainability*, 8(8), p.775.

requests for monitoring other stewardship values and providing a more two-eyed seeing approach to cumulative effects³⁰.

Disturbance thresholds are a tool to manage cumulative effects on a working landscape, but they should be scientifically informed or based on traditional knowledge, and if not, we really need to take a precautionary approach and consider the scale of each value (e.g., migratory caribou will be impacted by various management thresholds across several LMUs). How were the thresholds in page 44, Table 3-2, decided? The text needs to have sources referenced. From conversations within the cumulative effects working group and based on the text on page 43, current cumulative effects thresholds were based on the level of industry that already exists. Fitting thresholds to accommodate existing levels of development is not an evidence-based approach that links the threshold to levels of impact on a value. Scientific or community information on how a value is affected by and responds to the human activity should be used to identify a threshold. If existing activities exceed the threshold, then efforts need to be made to reduce or mitigate those activities in order to return the impacted value to a sustainable situation. We call upon the Commission to choose indicators and establish associated thresholds based on best available information, and not post hoc on existing levels of activity. When information is not available for a specific value, then we recommend finding a value that is impacted and assign thresholds for that value. New mine projects such as Coffee Gold also needs to adhere to thresholds as Coffee Gold will produce substantial new foot print in the Dawson Region.

Road densities that exceed 0.6 km/km² with motorized human access have been found to negatively effect grizzly bears through effects on bears' habitat use, home range selection, movements, population fragmentation, survival and reproductive rates³¹. Road density of 0.6 km/km² has also been identified as an apparent threshold value above which moose populations and caribou have declined^{32,28}. In other areas when linear structures exceeded 0.8 km/km², caribou numbers decreased by 90%³³. For salmon habitat sensitivity, we found that a mining threshold of 0 to 63.7% for surface disturbance and road density of 0 to 842 m/km² was needed to maintain water quality objectives for different salmon habitat classes derived by Fisheries and Oceans Canada (unpublished data, see Image 4 below). We, therefore, respectfully call upon the Commission to derive cumulative effects thresholds based on science or traditional knowledge related to several values in each ISA. If this information is unknown, then we recommend taking a precautionary approach and make recommendations to derive that knowledge before considering further development.

³⁰ Wright, A.L., Gabel, C., Ballantyne, M., Jack, S.M. and Wahoush, O., 2019. Using two-eyed seeing in research with indigenous people: an integrative review. *International Journal of Qualitative Methods*, 18, p.1609406919869695.

³¹ Proctor, M.F., McLellan, B.N., Stenhouse, G.B., Mowat, G., Lamb, C.T. and Boyce, M.S., 2020. Effects of roads and motorized human access on grizzly bear populations in British Columbia and Alberta, Canada. *Ursus*, 2019(30e2), pp.16-39.

³² Beazley, K.F., Snaith, T.V., Mackinnon, F. and David, C., 2004. Road density and the potential impact on wildlife species such as American moose in mainland Nova Scotia. *Proceedings of the Nova Scotian Institute of Science*.

³³ Vistnes, I., Nellemann, C., Jordhøy, P. and Strand, O., 2001. Wild reindeer: impacts of progressive infrastructure development on distribution and range use. *Polar biology*, 24(7), pp.531-537.

Salmon Habitat Sensitivity	Mining threshold (% disturbance)	Road threshold (m/km ²)
High	0	0
Moderate – High	0	0
Moderate – Moderate	11.3	105
Moderate – Low	63.7	842
Low	No threshold	No threshold

Image 4. Thresholds derived by WCS Canada and the University of Saskatchewan for maintaining total suspended solids (mg/L) in the five different salmon habitat classes within the Dawson Regional Planning Area (report is attached to submission)

Furthermore, the policy recommendation on page 40: “Detailed (i.e., spatial) project proposals and year-end reporting should be mandatory for all Class 3 and 4 projects”, is too vague. Instead of the word “spatial”, we think it should read that “proposals and reports include georeferenced maps on which the alignments of proposed and newly created disturbances (linear features and clearings), that remove or re-arrange the land cover, are accurately mapped.” Also, what is meant by Class of project? This could be a reference to the classes of mineral exploration (Quartz Mining Act) or to the four categories of ISA in this Plan; some clarification would help.

The intent of the Recommended Actions listed on page 40 are certainly well founded and necessary, but need more specifics. The ability to track cumulative effect thresholds will be one of the most necessary components of this Plan; ISAs will be ineffectual without good tracking. So, the Plan needs to lay out substantial detail as to how this might be done. That detail could happen here, or in the Implementation section of the Plan. Key issues are:

- What government agency would be responsible for the tracking?
- How and when (frequency) would tracking be reported?
- How would information flow from the agency(ies) (YESAB, Mines Branch?) that reviews mineral exploration and development, in each of the Classes, and receives reports of activities done under permits, to the tracking agency, and how often?

On page 41, the Policy Recommendation is incomplete and liable to be overlooked because it defers action. It defers an implementation action to “the Parties”; why doesn’t it prescribe a process that can then readily be applied by the implementation team? It seems to assume the Yukon Land Use Planning Council will be the agency tracking the cumulative effects indicators, with ready access to all the permit applications (which go to YESAB and EMR) and reports (which go to EMR) related to mineral exploration or other land use permitting, and staff to do digital updates to mapping needed for conformity checks. Is this realistic, especially when other agencies are more directly involved with the users of the land? Referring only to YESAB seems incomplete.

The Recommended Action on page 41 is certainly worthwhile. Making it work will require more thought as to where it is housed (what agency?), and who will have the task of regularly updating the mapping. Some more detail here would be useful.

GENERAL MANAGEMENT DIRECTION & SPECIAL MANAGEMENT DIRECTION

The text on page 45 was pointed in its differentiation of stewardship and management when discussing ISAs. So why is this section not called General Stewardship Direction? It deals mostly with ISAs, but repeated use of “management” to describe how people will act is contradictory to the theme of the Plan. Recommend using General Stewardship Direction. The text in the top right box of Table 4-1 on page 46 talks about “strategies”. It seems that these should be “practices” to be consistent with the wording in the top left box.

In the special management direction section on page 46, the adjective “specific” is used, but it is not clear whether “specific” is interchangeable with “special”. Given that this text sits within the section General Management Direction, it is confusing. It seems that the Plan intends for the Special Management Directions for each LMU to be specific directions regarding which and how the General Management Directions should be applied in each LMU. Therefore, the term Specific Management Direction is better than Special Management Direction.

What is the “land application review process” mentioned in the second paragraph here? There are various processes in Yukon, including at least project application reviews (YESAB), agricultural land applications (YTG EMR Agriculture Branch, and YESAB), other applications through Lands Branch of EMR. More specifics on what is anticipated need to be included.

SUSTAINABLE ECONOMY

The text states on page 46: “To ensure that development occurs with the intention of providing future generations with the wealth and abundance that the land currently provides, the Plan will need to balance economic interests with other ecological, cultural, or social values”. This sentence is contradictory to the notion of sustainable development, as defined in the Umbrella Final Agreement (UFA): “Beneficial socio-economic change that does not undermine the ecological and social systems upon which communities and societies are dependent.” Balance is problematic when used as a metaphor. As applied here (text in the Plan), balance means that certain values (likely ecological and social) may well be compromised to allow for realization of economic values. This contrast with the text in the UFA that states that ecological values should not be undermined. Consequently, some of the ecological and social systems on which communities depend in the long term will be compromised and may well be undermined (any pretence at balancing failed). It all depends on whether the values compromised by the economic activity can be recovered over a reasonable period of time. When they cannot be recovered then the activity is not sustainable. More appropriate wording of the key sentence would be: “To ensure that development occurs with the intention of providing future generations with the wealth and abundance that the land currently provides, the Plan will need to assess which economic activities will permanently compromise ecological and social values (unsustainable) and which activities can be followed by recovery within 7 generations (sustainable)”. When the Plan allows unsustainable economic activities (e.g., placer mining, multi-generational tailings ponds, climate change, population growth), then it should provide explicit

justification and an accounting for the breach of sustainability with explanation of how the values lost or put at risk might be left in place in sufficient extent elsewhere, sufficiently insured, and/or replaced.

“Balance” also varies in outcome depending on what point in time it is assessed. Deriving a mix of watershed conservation with placer mining in 1898 would have left many more conservation options available to society in the present than we actually have. We are now dividing up a cake for which large numbers, perhaps the majority, of the slices were eaten by industry in the last century and more.

The text states on page 47 that “The conflict between existing and future mineral exploration and mining, and conservation of ecological and socio-cultural values, was a significant challenge in the planning process.” So what specifically was challenging, and how has the process developed the information, analysis, and planning measures to deal with the challenge(s)? More detail would be useful, or reference to the sections where that detail is provided: e.g., wetlands and placer.

Comments on the Policy Recommendations table on page 49:

First: “Allowance of continued mineral exploration and development on existing mineral tenure in SMA II” would mean, in our interpretation, that an SMA II is actually an ISA (the Plan suggests ISA1 or ISA2). If this is a clear policy recommendation of this Plan, then there is no point in having an SMAII category. Logically speaking, this Policy Recommendation has to be dropped from the Plan or SMAII has to be dropped.

Second: This reflects a continuation of the status quo, but with application of this Plan’s direction on cumulative effects within ISAs.

Third: The Plan does not interfere in any advanced projects, so this seems status quo.

Fifth: Reclamation efforts are certainly better than nothing and deserve support. They do not make the industry sustainable, however, as some ecosystem functions and values can never be replaced^{34,35}.

TRANSPORTATION AND ACCESS

The values, issues and interests along the Dempster Highway have been laid out on pages 50 to 52, but we question why the Dempster Corridor is being deferred for sub-regional planning if the corridor is already named for hunting, tourism, and cultural activities? Shouldn’t such a highly ecological and culturally sensitive area be prioritized for more immediate attention within this plan or at the very least require a timeline for the sub-regional plan? In the interim, all surface impacts in the Dempster Corridor should be monitored and included in future indicator levels.

New All-Season Surface Access:

The Plan needs to take the lead on such things as precluding new road development in certain LMUs (as is done in Recommendations on p. 57). These need to be fixed aspects of the Plan, specified in the LMU – specific direction in section 5.

³⁴ Hancock, G.R., Duque, J.M. and Willgoose, G.R., 2020. Mining rehabilitation—Using geomorphology to engineer ecologically sustainable landscapes for highly disturbed lands. *Ecological Engineering*, 155, p.105836.

³⁵ Foote, L., 2012. Threshold considerations and wetland reclamation in Alberta’s mineable oil sands. *Ecology and Society*, 17(1).

Under key planning issues (p.56), one bullet talks about the difficulty of controlling public access to roads. Although such controls are often circumvented by the public, they are not hopeless, and the Plan needs to advocate for them wherever possible. They have to be a part of the Resource Road Regulation (see below) for that Regulation to have any real effect. For example, in regard to the Northern Access Route, there are very specific opportunities for stopping public access to portions of the route. These are where the route crosses the Stewart and Yukon Rivers. The Plan needs to specify that there is a gated control on access to the Northern Access Route roadway on the south side of the Stewart River crossing especially, but also the Yukon River crossing.

The Recommendation (p.58) that Yukon Government pursue a new Resource Road Regulation is very important. Given that legislation to allow for the designation of Resource Roads is now under review by the Legislative Assembly (Territorial Lands (Yukon) Act), it will hopefully be in place before end of 2021, and will be followed quickly by a legislated Regulation to make it operational. In that case, this section of the Plan will need re-writing. The Plan can and then should specifically recommend/prescribe that new roads accessing resources in all LMUs should be considered Resource Roads under the amended Act and its Regulation. The Peel Plan stepped forward and gave solid direction on various aspects of access control (controls on public access, hunting, and closure), and this plan should do the same.

A key part of a Resource Road Regulation should be the principle that such Resource Roads remain privately owned and operated by the proponent, with no public access. This is the mechanism to help manage many of the adverse effects of new road development (notably increased wildlife harvest, minimizing increased disturbance to wildlife). If the tabled legislation does not include this principle, then this Land Use Plan should add it to the access management provisions (e.g., designating the new road access to Coffee Gold as a Resource Road, or at least the portions of it that are not yet built - and so are not technically Highways under the Highways Act).

Off-Road Vehicle Access:

The Plan does not put forward any direct recommendations for Off-Road Vehicle Management Areas (ORVMA). Respectfully, this is an oversight in our view. The text on the Top-of-the-World Highway repeatedly mentions the risk of ORVs to caribou and other values, but it only recommends further study. Some LMUs have high conservation emphasis, but this cannot be realized if ORV access is allowed. A specific example is LMU 18 (Matson Uplands), proposed as SMA1, with caribou as a key value. The surrounding LMU 23 (Forty Mile Caribou Corridor) is also of very high value to this species. Caribou are highly susceptible to disturbance by noise (e.g., from ORVs) that is sometimes associated with direct risk of being shot at. It seems that LMUs 18 & 23 should be recommended for ORVMA designation in this Plan. The other SMA1 in the Draft Plan (LMU 10 – Upper Klondike) should also be considered for ORVMA status. This Plan is missing an important opportunity to make caribou habitat more secure and effective for the caribou if it does not designate ORVMAs in some of the LMUs established for caribou conservation.

FORESTRY

The Research Recommendation advocates for expansion of biomass energy produced by burning wood. This contradicts societal goals given the current climate crisis. Although wood biomass is labelled a renewable energy source, it is not an environmentally benign source in terms of carbon emissions. Burning wood produces a net addition to the carbon in the atmosphere year by year, which adds to the carbon

climate crisis³⁶. It is not carbon neutral. This Research Recommendation should be replaced with planning direction to search for sources of energy that can provide more sustainable options (e.g., solar, wind, micro-hydro).

KEY SPECIES

Caribou

The “Key Planning issues” section on pages 77-78 is missing one of the dominant threats to caribou habitat quality which is fire. Caribou rely, especially in winter, on habitats that have not been disturbed for considerable periods of time (i.e. older forests and taiga) because these provide healthy growth of ground lichens and in some circumstances arboreal lichens. Fires readily destroy this food source, making habitat relatively unusable for periods lasting decades, and perhaps much longer given increasing chance of forests regenerating in deciduous species³⁷. With an overheating climate, fires are becoming more frequent and severe, and can to a larger extent be attributable to people (through our carbon emissions) even if they are started by lightning. People can directly address this aspect of climate change by increasing our efforts to suppress fires, not only in the front-country, but also in the “wilderness” fire management zone. This conservation issue for caribou needs to be listed under Key Planning Issues, and in Recommended Management Practices, with specific recommendation to fight fire in all areas with high habitat suitability, in terms of lichen availability, for caribou.

Recommended management practices listed on pages 78-79, suggest ‘mining activities should define and implement safe operating distances from caribou’ as advised by Regional Biologists. What are they for this plan? It’s important to be transparent so that other Biologists can make recommendations if the distances are too small based on existing research.

Research recommendations page 79:

- Second bullet: Monitoring migration and habitat cannot, as specific activities, “accommodate for development and habitat change”. Migration (movement) patterns may well be the caribou herd’s way of responding to (accommodating) development and habitat change. Suggest separating this into two bullets: one for monitoring movement patterns (incl. seasonal migrations) so that up to date information is available; the second for monitoring habitat quality (using remote sensing and ground validation) so that movement patterns can be better interpreted and high value habitats can be conserved in the face of development pressures.
- Third bullet: The wording is convoluted, partly because the word “efficacy” is vague and non-specific in biological terms, and “mitigations” does not include a reference as to why mitigations are required. Suggest phrasing more like: “Design controls and interventions on the siting and timing of human activity to minimize negative impacts on the seasonal movements of FMCH.”
- Fourth bullet: “Modelling” itself does not “monitor”. A separate bullet advocating “monitoring of habitat” (see above) is necessary. And this bullet could be merged with that one, by adding a sentence recommending “application and refinement of existing models of lichen distribution

³⁶ Kılıç, Ş., Krajačić, G., Duić, N., Montorsi, L., Wang, Q. and Rosen, M.A., 2019. Research frontiers in sustainable development of energy, water and environment systems in a time of climate crisis.

³⁷ Gustine, D.D., Brinkman, T.J., Lindgren, M.A., Schmidt, J.I., Rupp, T.S. and Adams, L.G., 2014. Climate-driven effects of fire on winter habitat for caribou in the Alaskan-Yukon Arctic. *PLoS one*, 9(7), p.e100588.

and abundance, that are based on remote sensing, to track and project habitat quality especially in the face of likely changes in quality from fires and other human activity”.

Salmon

A sustainable placer mining industry can not coincide with the protection of salmon and fish habitat in the same watershed. In a recent wetlands meeting, Darren Taylor, Director of Natural Resources - Tr’ondëk Hwëch’in spoke about how he heard Elders once say that they used to fish for salmon in the Indian River prior to heavy mining in the area, but now the murky waters support limited fishing opportunities. Just because a stream may be classified as being low suitability for salmon spawning or even classified as unknown, doesn’t mean that it wasn’t suitable for salmon habitat in the past. If industry is prioritized over the conservation and protection of salmon or habitat in one area, what accounting and measures will the plan take to ensure other salmon habitat is protected elsewhere or restored?

Key planning issues page 83:

- First bullet: “The cumulative effects across large spatial scales of land use activities” is missing climate change effects as part of that mix of cumulative effects³⁸. Suggest rewriting to include climate change. See supporting text provided on fourth bullet.
- Second bullet: Sedimentation can also be caused by higher precipitation and permafrost thaw upstream (i.e., climate change), which can have a negative impact on both salmon spawning and rearing habitat^{39,40,41}. Suggest rewriting to include permafrost erosion. Intensification of permafrost thaw has increased the frequency and magnitude of permafrost slumping which result in large volumes of sediment transport to rivers and streams and increased sedimentation rates downstream. Increases in air temperature and precipitation can dramatically alter permafrost landscapes by increasing slope instability and accelerating erosion⁴². Such landslides have been found to impact food webs in the nearby Peel Plateau, potentially leading to negative impacts on higher trophic levels, such as fish⁴³.
- Fourth bullet: There is actually more knowledge of the negative effects of climate change on salmon habitat than what is stated here. Warming air temperatures can have a direct effect on salmon and recruitment⁴⁴. For example, warming winters may be beneficial at moderate rates by increasing suitable overwintering habitat, shortening the resource-poor period, and by

³⁸ Schindler, D.W. and Smol, J.P., 2006. Cumulative effects of climate warming and other human activities on freshwaters of Arctic and subarctic North America. *AMBIO: a Journal of the Human Environment*, 35(4), pp.160-168.

³⁹ Platts, W.S., Torquemada, R.J., McHenry, M.L. and Graham, C.K., 1989. Changes in salmon spawning and rearing habitat from increased delivery of fine sediment to the South Fork Salmon River, Idaho. *Transactions of the American Fisheries Society*, 118(3), pp.274-283.

⁴⁰ Neuswanger, J.R., Wipfli, M.S., Evenson, M.J., Hughes, N.F. and Rosenberger, A.E., 2015. Low productivity of Chinook salmon strongly correlates with high summer stream discharge in two Alaskan rivers in the Yukon drainage. *Canadian Journal of Fisheries and Aquatic Sciences*, 72(8), pp.1125-1137.

⁴¹ Suttle, K.B., Power, M.E., Levine, J.M. and McNeely, C., 2004. How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. *Ecological applications*, 14(4), pp.969-974.

⁴² Kokelj, S.V., Tunnicliffe, J., Lacelle, D., Lantz, T.C., Chin, K.S. and Fraser, R., 2015. Increased precipitation drives mega slump development and destabilization of ice-rich permafrost terrain, northwestern Canada. *Global and Planetary Change*, 129, pp.56-68.

⁴³ Chin, K. S., J. Lento, J. M. Culp, D. Lacelle, and S. V. Kokelj. 2016. Permafrost thaw and intense thermokarst activity decreases abundance of stream benthic macroinvertebrates. *Global Change Biology* 22:2715-2728.

⁴⁴ Keefer, M., G. Taylor, D. Garletts, G. Gauthier, T. Pierce, and C. Caudill. 2010. Prespawn mortality in adult spring Chinook salmon outplanted above barrier dams. *Ecology of Freshwater Fish* 19:361-372.

facilitating a longer ice-free growing season⁴⁵. Negative effects, however, are predicted to be dependent on stream size, due to the species' physiological and genetic capacities (e.g., oxygen delivery by the cardiorespiratory system, feeding rates, disease susceptibility, swimming speed, egg incubation) to increase its thermal tolerance at all life stages in response to rising temperatures^{46,47}. Increased rainfall and snowfall by large storm events result in the higher delivery of fine sediments to rivers by natural runoff, which can directly impact salmon⁴⁸. Higher discharge during summer months can reduce the foraging success of Chinook fry particularly because of increased water velocity and debris density⁴⁹. High sediment loads can have adverse effects on fish habitat by causing changes in channel morphology, producing deposition of fine sediment on spawning beds⁵⁰. Increasing concentrations of deposited fine sediment can also decrease growth and survival of rearing juveniles⁵¹ and incubating embryos by influencing the availability of oxygen⁵². Fine sediments potentially reduce primary productivity having resulting impacts on the rest of the food chain by reducing species diversity and organic content for invertebrates and rearing juveniles. Thus, it is important that we consider the cumulative effects of these stressors as they will be far more serious than those caused by any one alone.
Recommend adding a section on climate change effects.

Objective page 83: Recommend rewording: The primary target for salmon should be to identify key habitats with highest resiliency to human disturbance and climate change, at ecosystem scales that encompass hydrological regimes, and conservation of these habitats using protected areas, access management zones, restoration/reclamation of new and old road beds, guidelines for responsible development of infrastructure, or spatial buffers and timing windows around key habitats with respect to human activities.

Recommended management strategies page 84:

- First box: We should be protecting **all known** over-wintering and spawning habitats for salmon as they have been identified a key value by the Commission. And if sensitive areas are disturbed, should they not be restored?

⁴⁵ Dunmall, K. M., N. J. Mochnacz, C. E. Zimmerman, C. Lean, and J. D. Reist. 2016. Using thermal limits to assess establishment of fish dispersing to high-latitude and high-elevation watersheds. *Canadian Journal of Fisheries and Aquatic Sciences* 73:1750-1758.

⁴⁶ Muñoz, N. J., A. P. Farrell, J. W. Heath, and B. D. Neff. 2015. Adaptive potential of a Pacific salmon challenged by climate change. *Nature Climate Change* 5:163.

⁴⁷ Richter, A., and S. A. Kolmes. 2005. Maximum temperature limits for Chinook, coho, and chum salmon, and steelhead trout in the Pacific Northwest. *Reviews in Fisheries Science* 13:23-49.

⁴⁸ Dornblaser, M. M., and R. G. Striegl. 2009. Suspended sediment and carbonate transport in the Yukon River Basin, Alaska: Fluxes and potential future responses to climate change. *Water Resources Research* 45.

⁴⁹ Neuswanger, J. R., Wipfli, M. S., Evenson, M. J., Hughes, N. F., and Rosenberger, A. E. 2015. Low productivity of Chinook salmon strongly correlates with high summer stream discharge in two Alaskan rivers in the Yukon drainage. *Canadian Journal of Fisheries and Aquatic Sciences*, 72: 1125-1137.

⁵⁰ Platts, W. S., R. J. Torquemada, M. L. McHenry, and C. K. Graham. 1989. Changes in salmon spawning and rearing habitat from increased delivery of fine sediment to the South Fork Salmon River, Idaho. *Transactions of the American Fisheries Society* 118:274-283.

⁵¹ Suttle, K. B., M. E. Power, J. M. Levine, and C. McNeely. 2004. How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. *Ecological Applications* 14:969-974.

⁵² Greig, S., D. Sear, and P. Carling. 2005. The impact of fine sediment accumulation on the survival of incubating salmon progeny: implications for sediment management. *Science of the Total Environment* 344:241-258.

- Second box: How wide are riparian buffers classified here? Forestry agencies usually recommend widths of 30 m to protect the physical and chemical characteristics of a stream, while maintaining the ecological integrity⁵³. See our reference for wetland buffers below.
- Fourth box: It is important to realize that it isn't just the large-scale industrial activities that have the greatest impact on salmon, but also the cumulative impact of smaller projects in a watershed.
- An important practice that is missing here is to protect the headwaters of all salmon spawning streams⁵⁴ for sustaining salmon in a warmer climate.

Research recommendations page 84:

We need to continue to get a better understanding of how permafrost thaw, road construction and placer mining are cumulatively impacting salmon habitat. We won't repeat what has already been said in the cumulative effects section earlier, but it is important for the plan to use water quality (particularly total suspended sediments) and salmon habitat as two cumulative effects indicators and incorporate the effects of land use and climate change. We also need to understand the causes of Yukon River Chinook and Chum declines in collaboration with DFO and other partners such as the Yukon River Panel.

Sheep

The introductory paragraph on page 86 misses a key point that there are viable populations of sheep living at lower elevations along the Yukon River and lower White River drainages, and associated uplands, in the southern part of the planning region. These herds need explicit mention in the text, with reference to the different kinds of habitats they occupy compared to northern herds. They require stewardship using the same tools and approaches recommended for northern herds. However, they live in different mixes of habitat than the higher elevation habitats in the northern part of the planning region, have been somewhat overlooked, and so require new and more detailed attention to mapping of seasonal ranges, mineral licks, and travel routes (especially because they exist in ISAs where development is likely to occur).

Recommended Management Practices: Sections a and b are not clearly distinct, though one talks about industrial activities generally and the other about aerial disturbance. This distinction could be maintained. However, each one of them fails to mention the need for "spatial buffers", as well as "timing windows" on human activity in association with key or critical habitats. Timing windows applied just to the specific habitats themselves are insufficient unless those habitats are buffered spatially so that the disturbances do not happen immediately adjacent to the habitats. Suggest reference to the government publication – Flying in Sheep Country – which includes the concept of spatial buffers as well as timing windows⁵⁵.

Grizzly Bears

⁵³ Broadmeadow, S. and Nisbet, T.R., 2004. The effects of riparian forest management on the freshwater environment: a literature review of best management practice. *Hydrology and Earth System Sciences*, 8(3), pp.286-305.

⁵⁴ Brown, R.J., von Finster, A., Henszey, R.J. and Eiler, J.H., 2017. Catalog of Chinook salmon spawning areas in Yukon River basin in Canada and United States. *Journal of Fish and Wildlife Management*, 8(2), pp.558-586.

⁵⁵ Laberge Environmental Services, 2006. Flying in Sheep Country. <https://yukon.ca/en/flying-sheep-country>

Research Recommendation, page 87: Habitat fragmentation and loss in British Columbia has led to serious declines in grizzly bear populations in some areas, through displacement from useful habitats, plus increased mortality (road kill, greater access for hunters, more defence of life and property kills, more poaching). Research in BC has resulted in specific thresholds in density of linear features at which a population is at significant risk of decline⁵⁶. This Plan needs to at least recommend similar research in Yukon, and even consider using the BC research as part of its system of cumulative effects thresholds.

WETLANDS

The text on page 92 uses the metaphor of society reaching a crossroad with regard to human activity in wetlands. The activity in question is the large impact of placer mining removing wetland vegetation and ground cover, and affecting downstream water flow and quality. In total, however, the draft Plan provides relatively few substantive changes that might slow down the ongoing loss of wetlands, their associated biodiversity, and their ability to provide society with clean water and culturally valuable foods and medicines.

There appear to be two underlying issues driving this reality. First, placer mining is often not a sustainable activity under the definition of sustainable development. It preferentially occurs in valley bottoms where gold is in prehistoric river sediments lying under present-day drainage channels or nearby wetlands and slopes. Accessing the gold most often requires removal of vegetation, re-routing of drainages, and exposure of large amounts of over-burden. When the vegetative cover is complex wetlands (such as fens) or old forest stands, the original ecosystem cannot recover (with or without human action) within a period of time allowing for cultural continuity. Similarly, changes to water flow regime and quality are irrecoverable because they spread downstream and are progressive through time as different placer operations take place.

The second issue, is that the free entry mineral staking regime has allowed mining interests preferential access to wetlands and thereby has prejudiced most choices for future use and stewardship of many of these areas. The region has relatively few extensive lowlands and few lakes; most wetlands are associated with rivers in valley bottoms. Many of the ecologically valuable wetland systems in the region have already been destroyed (e.g., most of the Indian River) or are claimed by prospective placer operations. The inability of the planning process to remove (e.g., buy-out) existing claims, means that options for wetland conservation are severely limited.

The text on page 93 and 94 includes lots of good factual information and aspirational statements (e.g., the Objective, mitigation hierarchy) about wetland conservation. However, there is little evidence for true protection of wetlands (which is the first and key step in the mitigation hierarchy, and is the stated Objective). A recurring issue is that the draft Plan views wetland types (e.g., fens and bogs) as having firm boundaries. This is unrealistic because the wetlands along river drainages are a collective system, controlled by progressive downstream flow of water, both above and below ground. The wetlands of a linear drainage system will always be at some risk if upstream sections of the drainage, including those not actually in wetlands, are developed. Changes to an upstream section of the drainage system

⁵⁶ Lamb, C.T., Mowat, G., Reid, A., Smit, L., Proctor, M., McLellan, B.N., Nielsen, S.E. and Boutin, S., 2018. Effects of habitat quality and access management on the density of a recovering grizzly bear population. *Journal of Applied Ecology*, 55(3), pp.1406-1417.

necessarily have some influence on downstream sections. The strength and nature of that influence is difficult to predict, but is more likely to be strong when groundwater flow patterns are disrupted such as occurs with a lot of upstream placer operations. So, claiming that a wetland is “undisturbed” because it lacks surface disturbance is likely not true. Though detailed modelling based on flow regimes and water quality changes might be able to estimate this risk, mitigating any impacts may not be possible. What the draft Plan lacks is application of the precautionary principle (which it states as one of its objectives) to the question of wetlands; avoid taking risk when the possible outcome of the action has high cost.

Where does the draft Plan fall short of achieving *real* wetland conservation?

- It does not give full protection to any complete ecosystem (drainage) of wetlands and non-wetland floodplains (even though it does protect some individual fens, marshes and bogs), and so misses the first step in the mitigation hierarchy completely:
 - Scottie Creek wetlands (LMU 22), classed as SMA2 which allows continued mineral extraction from existing tenures, where these do not overlap fens, bogs and marshes. Downstream effects and risk to all downstream wetland types will persist.
 - Ladue River wetlands (sitting in LMU 21) – all current and future claims allowed (within ISA limits); no new disturbance to fens, marshes and bogs. Ongoing risk to all wetlands (incl. protected fens, bogs, and marshes) if upstream wetland and non-wetland floodplain areas are disturbed.
 - White River wetlands (sitting in LMU 21) – all current and future claims allowed (within ISA limits); no new disturbance to fens, marshes and bogs. Ongoing risk to all wetlands (incl. protected fens, bogs, and marshes) if upstream wetland and non-wetland floodplain areas are disturbed.
 - Lower Indian River (sitting in LMU 12) – all current and future claims allowed (within ISA limits); no specific protections for wetlands.
 - Upper Indian River (LMU 19) - classed as SMA2 which allows continued mineral extraction from existing tenures, where these do not overlap fens, bogs and marshes. Downstream effects and risk to all wetland types will persist.
 - Flat Creek wetlands (LMU 11) – classed as ISA1, but despite the name for this LMU there are no particular restrictions of impacts to wetlands (probably because placer operations are non-existent or very marginal), yet this lack of management direction seems an oversight.
- Does not solidly address the second step in the mitigation hierarchy, because of its definition of what is and is not avoidable. It assumes that existing claims will have unavoidable impact. That is a failure of political will, and we call upon the Commission to allow real conservation to occur by getting rid of some existing claims in the important wetland complexes listed above. We also urge the Commission to change Scottie Creek wetlands (LMU22) and the Upper Indian River (LMU19) to SMA1's because these are ecologically and culturally sensitive wetland complexes. Doing so would strengthen the protection of: important waterfowl staging grounds; diverse bird nesting habitats; core habitat for supply of harvestable moose: and water quality for these two drainages.
- It proposes a convoluted scheme of applying a threshold on disturbance to fens which is questionable because:
 - Fens, and other wetlands, lose a lot of their ecological function if they are not buffered to allow the ongoing ground-water, shading, and species interactions with adjacent land covers

(i.e. other wetland types, and/or forested ecosystems). Protecting an isolated fen in a matrix of disturbed habitats is futile, ecologically. The draft Plan only deals with buffers in a Research Recommendation (p. 97). This just means that the issue will continue to be ignored as development continues, for potentially many years. The responsibility of this Plan should be to do the literature research and come forward with concrete rules on buffers. WCS Canada has provided research to the Yukon Land Use Planning Council and the Commission demonstrating that 200m riparian buffers around wetlands and open water are sufficient to allow for breeding songbird species to occupy the forests⁵⁷.

- Applying a threshold, allowable, level of disturbance to fens at either an LMU or claim block level will not result in solid conservation because of the downstream effects of disturbance in all floodplain cover types diminishing the ecological function of whatever fens are undisturbed. The best way to allow some placer mining in a drainage, and also conserve some wetland values, is to limit the placer mining to the furthest downstream sections of the drainage, and then only upstream until some threshold of the rarest land cover type (perhaps fens) is reached, and leave the entire sections further upstream intact.
- The text recognizes the need to define a reference point in time on page 95 against which cumulative disturbance and the thresholds will be calculated, but does not come to a specific decision on when that should be. This Plan has to firmly make a decision on that point in time (deferring a decision just makes the ongoing conflicts more tense), and it likely should differ among drainages. Ideally it should be a point in time prior to development of placer mining (and also impactful quartz claims) in a specific drainage. That might still be possible for some relatively undeveloped drainages (e.g., the Ladue), in which case the present day should be the reference point in time. For already impacted drainages (e.g., Indian River), knowledge of what wetland types were present before development might be gained by interpreting historical air photos or, perhaps, satellite imagery (though wetland types may not be rigorously identifiable from a lot of historical satellite imagery). The Plan needs to research historical imagery and use that to define a historical reference point. For drainages heavily impacted before any suitable historical imagery was taken, then the first available set of comprehensive imagery would have to be the reference point.
- If thresholds apply, then only 25% of fens should be open for disturbance. Figure 4-1 on page 96 misrepresents the proportion of wetlands affected as the threshold proportion increases, because of the downstream effects of development in all land cover types in the drainage (think of a spider web as many wetlands are connected).
- The metaphor of balance, or trade-off, is not really appropriate when considering wetland conservation and placer mining, because the effects on wetlands of increasing levels of disturbance in a drainage are not likely to be linear (though they are depicted as being linear in Figure 4-1). Depending on where upstream, and with what impact on ground water hydrology, disturbance occurs, downstream wetlands will experience a wide variety of impacts (the brown line in Figure 4-1 is unlikely to be linear, is likely to have a steeper incline overall, and is likely to have various segments with quite different slopes).
- Fens are such a small proportion of the land base, yet so high in ecological and cultural values, that arguing about what proportion of them in a LMU needs protection is like arguing over

⁵⁷ Cooke, H.A. and Tauzer, L.M., 2020. Unique songbird communities in mature riparian spruce forest compared with upland forest in southern Yukon. *Canadian Journal of Forest Research*, 50(5), pp.473-486.

who gets the last cake crumbs at a party. The significance of fens as ‘carbon containers’ in response to the global climate emergency is also overlooked in this plan. As ongoing warming is stimulating plant growth, some fens are shifting into bogs and enhancing peatland carbon sink capacity⁵⁸. Retaining and restoring peatlands damaged by placer mining is an important greenhouse gas mitigation strategy that is overlooked⁵⁹.

There have been times that we have listened to concerns from other stakeholders during the DRLUP engagement events that we would like to address here, particularly the theory that “wetlands are the largest natural source of methane to the atmosphere and have a much bigger impact than carbon dioxide with respect to the causes of climate change”.

Our response is that wetlands, especially peatlands have dual effects—sequestering carbon and emitting methane. And scientists often study one effect independent of the other, depending on the question. We can only determine the effects of wetlands on the climate system based on their NET atmospheric effects. One also has to be careful if referring to permafrosted wetlands, wetlands that are disturbed, and their overall sinking capacity vs storage capacity. Even if a wetland is emitting lots of greenhouse gases (even to net negative effect), the ongoing sequestration is still an important ecosystem service that needs to be in place. Wetlands have a net cooling effect on the climate system because methane has a short atmospheric lifetime compared with carbon dioxide, which can continue to have negative effects for millennia or longer⁶⁰. Carbon dioxide persists longer in the atmosphere than methane and the continuous carbon sequestration by wetlands helps to offset the short-term effect of methane emission. That is, wetlands especially peatlands act as a “carbon container”. Northern peatlands alone account for about 30% of the global soil carbon⁶¹. It is never a wise decision to destroy those “carbon containers”.

LAND MANAGEMENT AREAS

LMU1, LMU4, LMU7, LMU19, LMU22 - On page 100, the draft Plan states that the “Commission recommends the identification of special management areas and the withdrawal of large intact landscapes” and protecting “connected areas that will allow native species to move, adapt and survive in the face of climate change”. But these statements are contradicted by what is currently protected in the draft plan. For instance, only 3.8% of the region is newly earmarked for full protection (SMA1) and only 1.3% of the region designated for full protection is crown land (the rest is TH settlement land). In contrast, the International Union for Conservation of Nature recommends protecting at least 30% of ecosystems by 2030 to slow down the crisis of biodiversity loss and buffer the effects of climate change. SMA2s as presently defined, can have no legitimate status as a protected area mainly because they will not be legalized (under Yukon or federal legislation), but also because they may well be “interim” with regard to any cap on proportion of land base in mineral claims. Because they will not be legalized, most of the proposed management direction associated with them is unlikely to occur because there will be no

⁵⁸ Loisel, J. and Yu, Z., 2013. Recent acceleration of carbon accumulation in a boreal peatland, south central Alaska. *Journal of Geophysical Research: Biogeosciences*, 118(1), pp.41-53.

⁵⁹ Loisel, J. and Yu, Z., 2013. Recent acceleration of carbon accumulation in a boreal peatland, south central Alaska. *Journal of Geophysical Research: Biogeosciences*, 118(1), pp.41-53.

⁶⁰ Frolking, S., Roulet, N. and Fuglestedt, J., 2006. How northern peatlands influence the Earth's radiative budget: Sustained methane emission versus sustained carbon sequestration. *Journal of Geophysical Research: Biogeosciences*, 111(G1).

⁶¹ Yu, Z., Loisel, J., Brosseau, D.P., Beilman, D.W. and Hunt, S.J., 2010. Global peatland dynamics since the Last Glacial Maximum. *Geophysical research letters*, 37(13).

government body legally responsible for implementation of the management direction. Some of these SMA2 LMUs cannot ever be considered true protected areas because the proportion of their land base that is currently claimed is very high (e.g., LMU19 – Indian River). So, this provides specific argument to the Commission that, if they truly want strong conservation in SMA2s, these areas need legal designation and removal of any interim (replaced with permanent) status regarding future mineral tenures. Without solid protection in the SMA2s, wide-ranging species such as caribou and grizzly bears will be forced to navigate pockets of habitat surrounded by disturbances. SMA2s are also the heart of the Beringia in terms of endemic and rare species and any hope for salmon recovery because have the higher mountains with colder water.

LMU3 - For the Yukon River corridor, new research from Yukon Environment (led by Caitlin Willier) is showing that Beringia Steppe is significantly less than expected and is mainly located along the Yukon River. Mapping of rare species and rare places such as grasslands, dunes and Meadows will be important information that needs to go into a sub-regional plan.

LMU 12 - The Priority Objective dealing with Access Management needs to specify controls on public access to roads on the south side of the Stewart River – specifically by gating the Northern Access Route roadway.

LMU18 and LMU23 - If we are going to work collaboratively on the range expansion of the Fortymile caribou herd as stated in the draft plan, then this should be reflected in the map. What would happen if a bad fire year wiped out the entire LMU 18 (Matson Uplands, which is the Fortymile's fall and winter range?) – and development could surround this pocket of habitat. SMA1 LMU18 needs to be larger and provide connection through LMU23 up to LMU1. We cannot just protect the ridges and not the valley bottoms for connectivity.

PLAN IMPLEMENTATION

As discussed in the Dawson Regional Cumulative Effects Workshop, the roles and responsibilities for monitoring and managing cumulative effects have to be clear upfront for each Party, including third parties (i.e., YESAB, Yukon Water Board, Forest Management Branch, Lands Department, etc). Key tools and interventions also have to be put into place for taking action when disturbance thresholds reach precautionary, cautionary and critical levels. In the case of water management, this could range from gathering baseline information, to reviewing water allocations, changing the level of reporting, cutting water licenses to operation shutdowns. Stakeholders stated that they have limited capacity or tools for 'adaptive management' so it is important that the plan provides clear guidance on how cumulative effects get tracked, how new knowledge will be incorporated over time, and how it gets coordinated with YESAB assessments and other processes. This Implementation chapter lacks sufficient detail as to what agencies would be best suited to monitoring, reporting on, and assessing compliance with the various cumulative effects indicators.

Sub-regional plans need clear timelines (page 177), at least for the date by when they need to be started. There is a significant risk that they will be ignored or significantly delayed, to the detriment of various values, if the Parties are not induced to act.

Regarding Plan conformity (p.178), the Recommended Action the focus for tracking cumulative effects indicators should be on areas that have not yet been disturbed, and that decisions about what proposed developments need close scrutiny should devolve to “triage” decision making based on relative size of proposed projects. Neither of these approaches is really satisfactory. Ultimately, the most immediate scrutiny needs to be put on developments that are most likely to move the cumulative effects indicator past a threshold. Although those cannot be accurately determined a priori, educated guesses can readily be made based on the content of new proposals, and the most recent indicator values. The basic parameters (remoteness; areal extent; Class of exploration and types of associated activity, etc.) associated with new proposals for development give a strong impression of its likely effect on indicator values. When coupled with the necessary periodic updates of indicator values by LMU or drainage (largely resulting from remotely sensed imagery or field stations), specific decision about conformity checks can be made, independent of actual project size and of the relative lack of previous development in an LMU. In other words, careful judgement is required, and that cannot be reduced to clearly defined rules.

Another issue here is that the actual wording associated with “triage” leaves question as to what actually is to be selected – large or small?

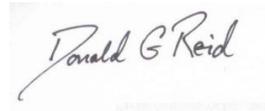
Thank you for your consideration of our comments.

Sincerely,



Dr. Chrystal Mantyka-Pringle

Conservation Planning Biologist



Dr. Donald Reid

Conservation Scientist