

Suncor’s BMX TISG Project

Section	Section Title	Comments	Recommendations
1.1	Introduction: Factors to be Considered in the Impact Assessment	Proponents often propose to use a number of mitigation measures for upland and wetland plant communities, even though the effectiveness of some of the techniques is not supported by scientific evidence and/or Indigenous knowledge. It is important that any mitigation measures a proponent proposes are not only technically and economically feasible, but supported by scientific evidence and/or Indigenous knowledge. This requirement should be explicitly stated in the TISG whenever there is a discussion of mitigation measures (this includes the residual effects and cumulative effects sections). Scientific evidence should include studies published in peer-reviewed literature, and/or data from other projects in the region that is substantive enough to show clear evidence supporting the proposed mitigation measure. Indigenous knowledge, especially with respect to berries and other vegetation consumed or used by Indigenous communities, should come from the local community that will be affected by the development.	Please revise the guidelines as follows: <i>“The Guidelines correspond to factors listed in subsection 22(1) of the Act and prescribe that the impact assessment of a designated project must take into account: (b) mitigation measures that are technically and economically feasible and that would mitigate any adverse effects of the designated project, <u>as demonstrated by scientific evidence, from peer-reviewed journals and/or data from other projects in the region, and/or local indigenous knowledge, when available;</u>”</i>
2.2	Proponent Information: Qualifications of Individuals Preparing the Impact Statement	Current text states: “A qualified individual would include someone who, through education, experience or knowledge relevant to a particular matter, may be relied upon by the proponent to provide advice within a given area of expertise.” Re-interpretation of Indigenous Knowledge by people not qualified to re-interpret it is a common problem in impact assessment.	It is recommended that the Agency identify that re-interpretation of Indigenous Knowledge and incorporation of it into the IS must be conducted by and/or with the Indigenous group itself, or verified by the Indigenous group as reasonably accurate and adequate in the IS.
3.2	Project Description: Project Location	Current text states: “The following information must be included and, where appropriate, located on map(s): Services and infrastructure and current land and aquatic uses in the area including: Local businesses and industries such as fisheries and outfitters, and any other relevant uses.”	“Other relevant uses” should be clarified to explicitly include (where identified by Indigenous groups and this information approved by them for use in the IS) uses for Indigenous people, including hunting, trapping, fishing, gathering, engaging in spiritual practices. The proponent should be required to identify these uses on the landscape in this project location section.
3.2	Project Description: Project Location	Current text includes “environmentally sensitive areas potentially affected by the project, such as national, provincial, and regional parks, UNESCO World Heritage Sites, other protected areas, ecological reserves”.  Indigenous peoples may identify locations of heightened importance or sensitivity that are nonetheless not subject to current protections.	We recommend adding “...ecological reserves, and locations identified by impacted Indigenous groups as sensitive or culturally important”.
3.3	Project Description: Regulatory Framework	Current text: “The Impact Statement must identify: any relevant land use plans, land zoning or community plans.”	This section should explicitly state “including any Indigenous land use and development plans”. This will reinforce that Indigenous land use plans are an important part of the regulatory framework overlapping and surrounding the project area. This would meet MCFN expectations for strong requirements respecting integration of Indigenous Knowledge. This is also in alignment with the section 22 factor under IAA requiring consideration of regional studies or plans conducted by a jurisdiction, including Indigenous governing bodies.
3.4	Project Description: Project Components and Activities	1) Projects may use water from a range of sources. Those that are additive downstream should be clearly identified as such in the Project Description and the cumulative downstream totals provided for each source.	1) a) Include a new item in section 3.4 as follows: <b>“provide the total loss of water by source for those withdrawals that are additive downstream;”</b>
3.4	Project Description: Project Components and Activities	“The Impact Statement must: highlight activities that involve periods of increased disturbance to environmental, health, social and economic conditions or impacts on Indigenous peoples.”  MCFN notes that the rest of the draft TISG does a good job of indicating that the Proponent is to work with each Indigenous group as its own distinct entity, which is an MCFN priority	It should be explicitly stated here that Indigenous groups should be considered individually and not as an aggregate.

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		expectation, for example at page 12: “To the extent possible, information should be presented separately for each Indigenous group involved in the assessment, and describe contextual information about the members within an Indigenous group”	
4.1	Project Purpose, Needs and Alternatives Considered: Purpose of the Project	Current text: “The proponent is encouraged to consider the perspectives of participants (i.e., public, Indigenous groups, governments) in establishing objectives that relate to the intended effect of the project on society.”	MCFN requests that the word “encouraged” be replaced with the word “required”, in order to align with the many places throughout the draft TISG that <b>require</b> the proponent to engage with, consider, integrate and discuss perspectives of Indigenous groups (including at pages 12, 13, 15, 20, 67 and 78 of the draft TISG).
4.2	Project Purpose, Needs and Alternatives Considered: Need for the Project	Current text: “  “an evaluation of the need for the project that must: o consider the current climate context”	Given the requirement under IAA that decisions must be made in consideration of Section 22 factors, this line item should explicitly read “consider the current climate context <b>and the Government of Canada’s ability to meet its environmental obligations and its commitments in respect of climate change</b> ”.
4.4	Project Purpose, Needs and Alternatives Considered: Alternative Means of Carrying out the Project	The discussion of alternative means and technologies must provide sufficient detail for review. Detail also provides support that the proponent engineers thoughtfully and scientifically considered alternatives. And, if alternatives were not considered, provide a discussion as to why, e.g., existing proven technology is reliable, cost effective, safe, and tunable with respect to reducing emissions. Alternative technologies are frequently discussed in qualitative terms with little or no technical detail to review.	With respect to alternatives that produce emissions to the atmosphere, the particulars of each mean must include: <ul style="list-style-type: none"> <li>• Alternative emission rates relevant to the alternative compared to chosen technology.</li> <li>• Discussion of expected reliability of equipment, up-time, likelihood, and magnitude of upset conditions compared to chosen technology.</li> <li>• Discuss the potential for and consequences of secondary emissions.</li> <li>• Does the alternative provide environmental and health safety and security in the long term?</li> </ul>
6.0	Description of Engagement with Indigenous groups	Current text: “Indigenous knowledge that is not already publicly available should not be included without written consent from the Indigenous group, regardless of the sources of the Indigenous knowledge. The guidance document Protecting Confidential Indigenous Knowledge under the Impact Assessment Act, to which the proponent must refer, describes the approaches to be favoured.”  This meets MCFN’s expectation that the Agency provide clearer guidance in the TISG that speaks to how Indigenous groups can protect confidential IK information and knowledge sources. However, it would be useful additional guidance to also state that “Where Indigenous groups bring forward their own IK protocols, the Proponent will be expected to adhere to those protocols and show evidence of same”. In addition, even when IK is publicly available, guidance should be provided for the proponent to cross-check with the Indigenous group in question in order to validate the IK prior to using it in this Project-specific assessment context.	It would be useful additional guidance to also state that “Where Indigenous groups bring forward their own IK protocols, the Proponent will be expected to adhere to those protocols and show evidence of same”. In addition, even when IK is publicly available, guidance should be provided for the proponent to cross-check with the Indigenous group in question in order to validate the IK prior to using it in this Project-specific assessment context.
6.0	Description of Engagement with Indigenous groups	This is the introduction of the section that outlines the parameters around the proponent’s obligation to consult with Indigenous groups, consider their knowledge, and report engagement activities. This introduction does not include provisions respecting studies carried out by Indigenous groups that may inform the IS.	The section should include provisions for allowing adequate time and funding for Indigenous groups to undertake their own requested studies and assessments as required to fully consider impacts to Indigenous rights and culture. The proponent should also be required to show that they made reasonable efforts to properly fund engagement activities and to show how the Proponent supported requests by Indigenous groups for Indigenous-led studies.
6.1	Description of Engagement with Indigenous Groups: Indigenous	Current text: “Indigenous knowledge can provide insights related to knowledge of the biophysical environment, as well as social, cultural, economic, and health aspects, Indigenous governance, and resource use. It is important that Indigenous knowledge, where available to the proponent, be included for all these aspects in the impact assessment, not only to look at potential impacts of the project on Indigenous groups. It is also important to capture the context in which	We further request that the text explicitly include identification and integration of Indigenous “observational parameters” for biophysical and well as human environmental VCs that have been incorporated into the impact assessment process, whether quantitative or qualitative.

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	Knowledge Considerations	<p>Indigenous groups provide their Indigenous knowledge and to convey it in a culturally appropriate manner. It should describe where and how Indigenous knowledge and input were considered in determining baseline conditions.”</p> <p>This requirement meets MCFN’s expectation that there are strong requirements respecting integration of Indigenous Knowledge (IK) and IK holders into scoping, data collection, and assessment steps for all aspects of this assessment, to provide better guidance to Proponents on how to develop an Impact Statement (IS) that is respectful to the increasing importance of Indigenous Knowledge under IAA.</p>	
6.2	Description of Engagement with Indigenous Groups: Record of Engagement	<p>This section outlines expectations on the proponent for how engagement with Indigenous groups will be carried out. It requires the proponent to communicate with Indigenous groups about timelines for reviewing the impact statement, allowing for capacity needs.</p> <p>It states at one point a requirement for “a description of how engagement activities by the proponent were intended to ensure Indigenous groups were provided an opportunity to evaluate the project’s potential positive and negative effects on their members, communities, and activities, and impacts to rights, as identified by the Indigenous group(s).”</p> <p>The section includes many items that MCFN supports, including requirements for adequate engagement efforts, requirements for the proponent to explain why engagement with some Indigenous groups were unsuccessful, results of engagement and perspectives of Indigenous peoples involved, and descriptions of preferred methods for sharing information. This section acknowledges that there may be barriers for Indigenous groups to engage in consultation, including language, capacity and technology barriers. Acknowledgement that the proponent may need to provide capacity funding to create communication mechanisms is also important.</p>	<p>Indigenous groups need to be provided meaningful opportunities to review draft sections of the Impact Statement prior to them being filed and to seek to resolve any disagreements before sections are filed. This could be revised to: <u>Indigenous groups will have opportunity to review draft sections of the IS where they have provided IK and local knowledge and that are relevant to their rights and interest prior to them being filed may deal with the concern.</u></p> <p>In addition, MCFN requests a requirement that the proponent show it has made all reasonable efforts in their engagement to properly fund Indigenous engagement activities, including adequate funding for Indigenous-led studies. The current section requires a description of efforts to engage Indigenous peoples, but does not require the proponent to make efforts to fund Indigenous-led studies.</p> <p>This section should also require that Indigenous groups are provided an opportunity to review the consultation log and ensure that all their concerns were captured accurately, prior to it being filed on the public record.</p>
6.3	Description of Engagement with Indigenous Groups: Analysis and Response to Questions, Comments, and Issues Raised	<p>This requirement partially fulfills MCFN’s expectation that the proponent should be required to provide details of all VCs nominated by Indigenous groups in the IS, and where they are not adopted, a rationale will be provided for Agency and party review.</p>	<p>While section 7.2 Selection of valued components (page 18) states, “The Impact Statement must provide the rationale for selecting specific VCs and for excluding others”, it would be very clear that this is a requirement if section 6.3 also included language about providing a rationale for the exclusion of any proposed VCs identified by Indigenous groups.</p>
7.1	Assessment Methodology: Baseline Methodology	<p>The draft TISG refers to “baseline”, Which is often read as current conditions only.</p>	<p>MCFN requests that references to baseline throughout the TISG are replaced by “baseline and trend-over-time conditions” for each VC, in order to make it clear that for each VC, and appropriate temporal backcast to identify trends in the health/status of that VC that have occurred to date are included in the IS as well. This is in line with the spirit and intent of instructions in Section 7.3.1 of the draft TISG.</p>
7.1	Assessment Methodology: Baseline Methodology	<p>“The Impact Statement must: describe where and how Indigenous knowledge and input were considered in determining baseline conditions.”</p>	<p>This requirement does not necessarily require the proponent to utilize Indigenous knowledge in the description of baseline conditions. The proponent should be required to utilize IK, so the wording should be “The Impact Statement must <b>utilize Indigenous knowledge and input to describe baseline conditions.</b>”</p> <p>As there may be limited baseline and trend-over-time data, and current VC-specific data represents a “damaged baseline” – i.e., conditions that are already impacted by development - the proponent should be required to utilize IK as this may be the most</p>

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			suitable, temporally deep, source of information about health of VCs in the pre-development and pre-Project context.
7.1	Assessment Methodology: Baseline Methodology	<p>Air quality model results require more discussion on the robustness of the conclusions relative to the uncertainties in the methodology; more than just discussion of meteorological variability. Further to uncertainty, the assessment must describe robustness of the facts, findings and/or conclusions. An uncertainty analysis provides information about how inputs can affect the outputs. Robustness puts the uncertainty into context relative to acceptable criteria or thresholds.</p> <p>For Example:</p> <ol style="list-style-type: none"> <li>1. Air quality impacts are determined based upon emissions and meteorology. Meteorology contains quantifiable uncertainty included in the air quality assessment... i.e., results of 99.9<sup>th</sup> percentile compared to ambient objectives. The results are generally made with estimates of emissions either at maximum or average rates. What if the baseline emissions were incorrect? How wrong are the emissions likely/possible to be and what would that effect be on the results and comparisons to the ambient/health criteria? Would the conclusions of the project or regional developments change? How much change in project emissions would it require for the conclusions to change and what is the risk of this occurring? How much change/error in regional emissions would it require for the conclusions to change?</li> <li>2. Ozone levels and volatile organic compound (VOC) levels have a strong inter-relationship to the nitrogen dioxide (NO<sub>2</sub>) predictions. However, ozone is based upon sparse measurements in the large air dispersion modeling domain. What is the variability of ozone in the domain? How does ozone concentration variability impact NO<sub>2</sub>? What if the ozone or VOC levels were much higher or lower accounting for uncertainties? How does this impact NO<sub>2</sub> impacts? Would the conclusion of the project or regional development change? How much change would it require for the conclusions to change and what is the risk of this occurring?</li> <li>3. Precipitation has a strong impact on deposition. If variabilities were assessed and extrapolated to the cumulative impacts in the domain, how would this effect the impacts? Would the conclusions of the project change? How much change would it require for the conclusions to change and what is the risk of this occurring?</li> </ol>	Add a requirement for testing the robustness of air quality models and identify the uncertainties in the methodology, i.e., an uncertainty analysis including components such as uncertainty around emissions and meteorology, Ozone, VOC and NO2 level predictions, and precipitation and deposition.
7.1	Assessment Methodology: Baseline Methodology	The guideline indicates that models should be validated using field data from local and regional study areas. It is refreshing to see the identification of the need for model validation; however, we suggest that guideline specify that independent data be used in validation procedures. Independent data includes measured environmental data that has not been used in the development or parameterization of the model itself. This will ensure that the model accurately represents the quality or behaviour of the system it is designed to represent by verifying that model output agrees with observed data.	Please revise the guideline to state: “ <i>where applicable, describe modelling methods and include assumptions, calculations of margins of error and other relevant statistical information. Models that are developed should be validated using <u>independent field data</u> from the appropriate local and regional study areas;</i> ”
7.1	Assessment Methodology: Baseline Methodology	Defined targets and/or thresholds are valuable for determining significance of effects for relevant biophysical elements, evaluating the occurrence of impacts, and can be used to triggers for adaptive management. We recommend the establishment or identification of benchmarks, targets and thresholds against which future monitoring results would be compared so as to ensure that residual impacts are at or below predicted levels.	<p>Please add the following guideline to Section 7.1:</p> <ul style="list-style-type: none"> <li>• <u>identify any thresholds relevant to understanding the current state of the biophysical resource and any change in the resource that has occurred over time.</u></li> </ul>
7.2	Assessment Methodology: Selection of Valued Components		<p>Please add the following final sub-bullet under the bullet starting: “comments from Indigenous groups”:</p> <ul style="list-style-type: none"> <li>• sites of cultural importance/value</li> </ul>

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7.2	Assessment Methodology: Selection of Valued Components	Current text: “The following VCs must be considered in the Impact Statement: migratory birds and birds of Indigenous importance;”	Effects to migratory or non-migratory bird habitat may be captured in wildlife habitat, but for a full capture of effects, MCFN recommends the inclusion of “and their habitats” in this sentence.
7.2	Assessment Methodology: Selection of Valued Components	Current text: “The following VCs must be considered in the Impact Statement: Indigenous land and resource use (including navigation for traditional purposes);	It is recommended that “...including Indigenous land use and development plan objectives” is included in describing this VC.
7.2	Assessment Methodology: Selection of Valued Components	<p>The guidance indicates that the selection of VCs should not be influenced by the quantity of information available. However, it should be specified that, if there is limited information available, there should be an associated initiative to develop a strong foundation of knowledge and information on the VC (i.e., Ronald Lake Bison Herd (RLBH) technical team or an Indigenous-led data collection and monitoring initiative). Confidence in the assessment will be low for resources with limited data/understanding.</p> <p>The second guideline identified above conflicts with the guidance in the first guideline identified because it suggests that effects of the project on the VC must be measurable. It is less likely that effects can be measured if little information on the VC is available. Clearly, data quantity is an important consideration for monitoring and measurement, and subsequently, confidence in the assessment and outcome; hence the recommendation above for initiatives to develop a strong foundation of knowledge.</p>	<p>Please revise the guideline to state: “<i>The Impact Statement must provide the rationale for selecting specific VCs and for excluding others. The priority in selecting VCs to be included and assessed should be project-specific and focused on appropriateness, not influenced by the quantity of information available or the use of the VCs in other assessments. <u>If there is limited information available for the selected VC, propose or develop an associated initiative to develop a strong foundation of knowledge and information on the VC.</u></i>”</p>
7.3.1	Assessment Methodology: Spatial and Temporal Boundaries; Temporal Boundaries	It is not clear from the wording that Suncor has committed to this, nor that the TISG are specifying that it should be done. To understand effects that have resulted from past development requires evaluating a development scenario that addresses past land use or a background case. This would be in addition to present, application/proposed (i.e., project), and possible/planned future development effects. A pre-development scenario should be described using quantitative measures as much as possible and be kept as a separate scenario from baseline (current) conditions.	<p>Please revise the item to “<i>The proponent <u>will describe</u> four typical development scenarios in the Detailed Project Description, Appendix E, as follows:</i></p> <ul style="list-style-type: none"> <li>• <i>Pre-development Scenario, scenario that existed prior to the establishment of any industrial development in the Athabasca Oil Sands Region;”</i></li> </ul>
7.3.2	Assessment Methodology: Spatial and Temporal Boundaries	<p>1) The proposed local study area doesn’t seem to include the entirety of the potentially affected local watersheds, including those to the north – possibly because the excluded areas overlap with part of another project (Syncrude). However it should still be valid to require an investigation of historical conditions, existing impacts and the potential for cumulative impacts to these areas. This is especially true when taking into account the extent of groundwater-surface water interactions. If not, how will these potential impacts be treated in this process? Apparently, inflowing water to BMX from upstream in one local watershed must be diverted in part to the neighbouring oil sands project – this makes it very clear that at least that watershed is overlapping between projects.</p> <p>Beyond the local study area, the regional study area does not include the entire lower Athabasca River watershed (i.e., tributaries), but only a narrow strip along the Athabasca River itself and the PAD. It is not understandable how atmospheric deposition effects on water quality will be accounted for under this approach (e.g., atmospheric deposition effects on the water quality in watersheds along the eastern side of the Athabasca River, or to the north and south of BMX; impacts to groundwater and resulting effects on surface water.)</p>	1) Expand both the local and regional study areas for aquatic resources. The local study area must be expanded to include the entirety of the potentially affected watersheds, including watersheds that overlap with existing/other oil sands mines and projects (e.g., the Syncrude Mildred Lake Mine to the north). The regional study area should include all contributing sub-watersheds to the Athabasca River and potentially other basins that may be impacted by the Project, including via atmospheric deposition of constituents of concern or via impacts to groundwater that interacts with surface waters.
7.4	Assessment Methodology: Effects Assessment Methodology	2) Climate nonstationarity means that future climates will be different than past climates. Given the widespread influence of climate on effects assessments, and the uncertainty associated with future climates during Project life and including the post-closure period, the range of projections should be carried through the effects assessments to identify the full range of potential effects	<p>2) a) Include a new item in section 7.4 as follows:</p> <p><b>“retain the range of potential climates in those effects assessments that are affected by climate and include discussion in those effects assessments of changes in climate extremes expected to accompany future climates;”</b></p>

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		due to the Project. A discussion of changes in climate extremes should be included in the effects assessment. Future climate of the closure landscape should also be addressed in the design of the closure landscape.	b) Include a new item in section 7.4 as follows: "design of the closure landscape should address future climates;"
7.4	Assessment Methodology: Effects Assessment Methodology	3) Project effects must be evaluated in their appropriate context. For example, changes in magnitude indicator/impact metrics should not be diminished and/or dismissed by comparison with large physically-unrelated numbers. For example, total annual quantity of water withdrawals should not be compared to mean annual flow of the Athabasca River because it distorts understanding of the significance of the impact. Instead, the rate of withdrawal should be evaluated against the flow and depth when conditions are limiting to the relevant valued component.  Additionally, changes in water depth should not be dismissed simply because they appear to be small. Instead, they should be assessed based on their context which should include the state of Indigenous navigability and its requirements when that change in water depth is projected to occur.	3) a) Include a new item in section 7.4 as follows: "Assess Project effects in their appropriate context – this requirement is especially important with respect to apparently small Project effects;"
7.4	Assessment Methodology: Effects Assessment Methodology	2) The certainty of model predictions for surface waters must be assessed using specific and quantitative model performance measures, and must be assessed in the context of model calibration and validation. Model validation must be completed with observed environmental data that has not been previously used in model calibration.	2) Please add the underlined text to the end of the first sentence noted  Reference: TISG, p. 22, "In the case of quantitative predictions derived from models, the Impact Statement must detail the model assumptions, parameters, the quality of the data and the degree of certainty of the predictions obtained."  <b>Comments/Rationale:</b> The certainty of model predictions for surface waters must be assessed using specific and quantitative model performance measures, and must be assessed in the context of model calibration and validation. Model validation must be completed with observed environmental data that has not been previously used in model calibration.  <b>Request/Recommendation:</b> Please add the underlined text to the end of this sentence: "...the degree of certainty of the predictions obtained, <u>including an explanation of model calibration, validation and model performance metrics used.</u> "
7.4	Assessment Methodology: Effects Assessment Methodology	The consideration and accounting for Indigenous tolerance thresholds is an important part of developing an impact statement that utilizes Indigenous Knowledge and perspectives. This is in line with MCFN expectations. Further clarity is recommended on what reporting requirements are for the Proponent, however.	It should be clearly stated that "The Proponent will provide evidence that it has engaged Indigenous groups on their thresholds (if these have been developed), evidence that the way this is described in the IS has been verified by those Indigenous groups, and evidence that the Proponent has considered these tolerance thresholds and Indigenous perspectives on significance in setting thresholds for significance used in the IS".
7.4	Assessment Methodology: Effects Assessment Methodology	While section 7.2 Selection of valued components (page 18) states, "The Impact Statement must provide the rationale for selecting specific VCs and for excluding others", it would be very clear that this is a requirement if section 7.4 also included language about providing rationale regarding the exclusion of certain VCs identified by Indigenous groups.	The Impact Statement should also identify instances where Indigenous knowledge and input were not used and require the proponent provide a rationale for why Indigenous Knowledge was not considered, to help ensure no relevant Indigenous Knowledge was missed.

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7.4	Assessment Methodology: Effects Assessment Methodology	Defined targets and/or thresholds are valuable for determining significance of effects for relevant biophysical elements, evaluating the occurrence of impacts, and can be used to triggers for adaptive management. We recommend the establishment or identification of benchmarks, targets and thresholds against which future monitoring results would be compared so as to ensure that residual impacts are at or below predicted levels.	Please add the following guideline to Section 7.4: <ul style="list-style-type: none"> <li>● <u>take into account thresholds relevant to evaluating change in the resource that has occurred over time.</u></li> </ul>
8.1	Biophysical Environment: Meteorological Environment	The atmospheric baseline modelling performed for pre-project conditions in Section 8.1 must be validated with monitoring data compiled and reviewed in Section 7 “ <i>Models that are developed should be validated using field data from the appropriate local and regional study areas</i> ”. The air quality dispersion models have the ability to predict conservative and representative ambient concentrations when the correct inputs (emissions and meteorology) are used, and the modelling parameters are appropriately used. Application of the air dispersion model without validating the predictions with the historical baseline data is a modelling necessity in the scientific process. If the validation of the model reveals overprediction, it is not sufficient to simply conclude that the model is conservative, but it may only be a reflection of poor modelling. Similarly, underprediction is not acceptable and produces results which are not believable.	Add a requirement for: <ul style="list-style-type: none"> <li>● Compare baseline predictions for each emissions category with relevant historical monitoring data (previous 10 years) and provide a discussion on the strengths and weaknesses of the air dispersion modelling results.</li> <li>● Monitoring data may include factors not included in the modelling. Discuss these differences for each emissions category. Discuss how the modelling results should be reviewed in relationship to the differences.</li> <li>● When the modelling uses an alternate data set (e.g., meteorology) the assessment should compare the monitoring data to information used in modelling.</li> </ul>
8.1.1	Biophysical Environment: Meteorological Environment; Baseline Conditions	Climate nonstationarity means that future climates will be different than past climates. Given the widespread influence of climate on Project feasibility and effects assessments, the impact assessment should include more than a <i>consideration</i> of “the influence of climate change” as indicated in section 8.1.1. Instead, future climates during the life of the project should be determined based on global climate models with a range of projections determined based on leading models as supported by the Intergovernmental Panel on Climate Change. Projections should include an emissions scenario corresponding to the business-as-usual case. The package of projections should be provided without averaging, and available for use in the effects assessments, to clarify the full range of potential effects due to the Project. A discussion of changes in climate extremes should accompany the projected means.	a) Include a new item in section 8.1.1 as follows: <b>“Provide the range of climates expected during the life of the project and including the post-closure period. Base the climate projections on leading global climate models as supported by the Intergovernmental Panel on Climate Change and including a business-as-usual emissions scenario. A discussion of changes in climate extremes in precipitation and temperature should accompany the projected means.”</b>
8.3	Biophysical Environment: Topography, Soil and Sediment	Depending on the volume of suitable reclamation materials, some of the soil series at closure will be altered or permanently lost because of the expected changes to topsoil and peat placed in stockpiles. Additionally, disturbed organic soils of the Project area are most likely to be reclaimed as mineral soils. To understand impacts of the Project disturbances on soil biodiversity and its capability to support native vegetation communities compatible with the surrounding undisturbed area, it is important that impacts of the Project on soil series are quantitatively assessed. The Guidelines have not directed the Project proponent to document and map pre-disturbance soil series present in the project area and to quantitatively assess potential changes to soil resources due to disturbances of the Project.	Please add the following guidelines: <ul style="list-style-type: none"> <li>● <u>Identify and map soil series present in the local study areas (LSAs) of the Project.</u></li> <li>● <u>Provide pre-disturbance land capability classification for forestry in the LSAs.</u></li> </ul> <u>Quantitatively assess potential changes to soil resources (soil loss and soil alteration) and changes to land capability classification at closure.</u>
8.3	Biophysical Environment: Topography, Soil and Sediment	Fine-textured soils, in combination with poor drainage regimes, are sensitive to compaction and rutting. The use of vehicles and heavy equipment during construction, operation and reclamation phases of the project are anticipated to deteriorate the quality of soils that are sensitive to compaction and rutting. Although Section 8.6.2 (Changes to vegetation and riparian, wetland, and terrestrial environments) of the Guidelines require Suncor to describe any changes in soil compaction that could result in a loss of soil productivity, requirements with respect to identification of and mapping the spatial distribution of soils sensitive to compaction and rutting have not been provided in the Guidelines. Availability of baseline information will assist construction managers to be mindful of soils susceptible to compaction and will allow them to take proactive measures to minimize impacts on soil quality.	Please add the following guidelines: <ul style="list-style-type: none"> <li>● <u>Identify and map soils sensitive to compaction and rutting.</u></li> </ul> <u>Provide a mechanism to monitor and report soil compaction and rutting and undertake mitigative measures in a timely fashion.</u>

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8.3.1	Biophysical Environment: Topography, Soil and Sediment; Baseline Conditions	Deposition of organic and inorganic contaminants emitted from industrial activities onto soils is a concern. Continued deposition and accumulation over time in surface soils presents significant risk to soil quality and the quality of other terrestrial natural resources such as surface waterbodies, wildlife, and vegetation. Potential changes in soil properties due to acidification and loss of organic matter or due to climate change will increase bioavailability of some of these contaminants. Uptake of some of these contaminants (e.g., metals) by plants may be introduced to food chain especially Indigenous country foods (such as berries etc.). Section 8.6.2 (Changes to vegetation and riparian, wetland, and terrestrial environments) of the Guidelines require Suncor to “describe any contaminants of concern potentially associated with the project that may affect vegetation, soil, sediment or water” (Page 44); however, there is no mention of the requirement to obtain organic and inorganic chemicals data of pre-disturbed soils which will be used as a benchmark to assess impacts of contaminants deposited onto soils due to emissions of the Project.	Please add the following guidelines: <ul style="list-style-type: none"> <li>● <u>Obtain pre-disturbance organic and inorganic chemicals data of soils in the Project local and regional study areas.</u></li> <li>● <u>Provide predicted annual loadings of organic and inorganic contaminants emitted from the Projects and other regional projects onto soils in the local and regional study areas.</u></li> <li>● <u>Describe the relation of the project to cumulative effects monitoring, and describe the plan to monitor deposition of organic and inorganic contaminants onto surface soils during the life of the Project and beyond.</u></li> <li>● <u>Describe impact of potential changes in soil properties at closure on bioavailability of contaminants and potential introduction to food chain.</u></li> </ul>
8.4.1.1	Biophysical Environment: Atmospheric, Acoustic and Visual Environment; Baseline Conditions	The oil sands mining area has an extensive history of development and environmental impact assessments. That history provides a valuable opportunity for review and improvement.	Provide the following additional assessment details: <ul style="list-style-type: none"> <li>● Baseline and future cumulative assessments have been completed several times in the past. Identify data or methodology gaps in the assessments including: modelling ability to accurately predict air quality for each source group; ability to predict cumulative impacts; ability to represent frequency and impacts from upsets/emergencies/leaks/fugitive emissions.</li> <li>● Provide a review of Suncor’s previous air quality predictions made in their Environmental Impact Assessments (EIAs) in the past 10 years. Compare those historic predictions to observed air quality monitoring levels over the past 10 years. Identify strengths and weakness in the previous ability to provide conservative assessments of air quality. The objective in the review is to identify gaps in past methodology to enhance the understanding of impacts from a lessons-learned point of view. For example: <ul style="list-style-type: none"> <li>○ Modelling of NO2 near mining areas typically has not matched well with monitoring, what changes to the modelling can be made to create better agreement.</li> <li>○ Modelling of H2S/TRS excludes accidental leaks nor the prediction of frequency of such; however, these leaks lead to odours. Can the frequency or size of leaks be predicted based on past operational performance.</li> </ul> </li> </ul> Based upon the historical validation of methods, identify changes required in the modelling methods for this assessment.
8.4.1.2	Biophysical Environment: Atmospheric, Acoustic, and Visual Environment; Changes to the Atmospheric Environment	Current text: ““The Impact Statement must: estimate the deposition of dust and other contaminants on sensitive receptors...”	Recommend revising to “...sensitive receptors, including any locations Indigenous groups identify as important.”
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	5) Characterization of the long-term climate of the Project site is a critical input into effects assessments. All available climate data relevant to this characterization should be assembled within the impact assessment including Indigenous Knowledge of Elders related to past climates. The availability of data from an on-site weather station should not preclude the assembly of Elders’ Knowledge and long-term data from nearby climate stations.	5) a) Revise the item to read as follows: “provide complete hydrometeorological information (temperature, precipitation, evapotranspiration) based on data from nearby weather stations, Indigenous Knowledge or from a weather station <b>on site or nearby sufficient to characterize the long-term climate of the Project site;</b> ”



Section	Section Title	Comments	Recommendations
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	6) Springs are critical water features on the landscape because in addition to supporting ecosystem processes during periods of limited water availability, they are also of potential support to Indigenous land users during land-based activities and other times of travel. They should be mapped alongside other features such as wetlands and intermittent streams as listed in the item.	6) a) Revise the item to read as follows: “describe and illustrate on one or more topographic maps, at appropriate scales, the drainage basins in relation to key project components. On the map(s), identify all waterbodies and watercourses, including intermittent streams, wetlands, <b>springs</b> , watershed and sub-watershed boundaries, and indicate the intended locations of crossings of water bodies or watercourses, if applicable, and any watercourse diversions;”
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	7) All impacted watercourses and waterbodies are of interest in the impact assessment, not just those considered to be watercourses, which are generally understood to be channels of some kind containing flowing water. This item correctly includes examples of impacted waterbodies, <i>i.e.</i> , not only watercourses. To avoid any ambiguity, the item should also refer to impacted waterbodies.	7) a) Revise the item to read as follows: “indicate the type of watercourses <b>and waterbodies</b> impacted (e.g. lotic or lentic system, lake, river, pond, temporary or permanent stream); the size of the water bodies and watercourses, the width at the ordinary high water mark (OHWM) based on the following classes: large stream (over 20m in width), medium stream (between 5 and 20m in width), small permanent and intermittent streams less than 5m in width);”
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	8) Development of hydrographs suitable in characterizing the long-term runoff behaviour of the Project site is critical to the impact assessment. All available hydrometric data relevant to this characterization should be assembled within the impact assessment. The availability of data from on-site hydrometric stations should not preclude the assembly of longer-term time-series data from other nearby stations. In addition, characterization of the hydrographs using on-site stations should be based on at least three years of direct flow measurements.  A footnote reference is made to a federal navigation study that contains factual errors with respect to Indigenous navigation. The corrected information has been provided by ACFN and MCFN but this superior information is not referenced in the footnote. Given the significance of navigation to the exercise of the rights of Indigenous Peoples, the corrected information should be used by the Project proponent.	8) a) Revise the item to read as follows: “... The hydrographs may be based on data from nearby gauging stations or from gauging stations on site <b>such that they are sufficient to characterize the long-term runoff behaviour of the Project site at all relevant spatial scales. Characterization of hydrographs using on-site stations should be based on at least three years of direct flow measurements.</b> Information pertaining to the PAD must also be included. In collaboration with Indigenous communities, identify expectations and impacts of flow level on Indigenous land use. Utilize community-led understanding of how water flow levels impact Indigenous communities to identify pathways for impacts on the rights of Indigenous Peoples”.;”  b) Footnote 10 refers the reader to Transport Canada’s 2019 report titled Athabasca River Navigational Study <sup>1</sup> . This source contains a number of errors in its description of Indigenous navigation and repeats errors originated in Alberta’s Surface Water Quantity Management Framework (GoA 2015). In respect of these errors, this footnote should be amended to also refer the reader to a technical review of this study which provides correct information as given by Mikisew Cree First Nation and Athabasca Chipewyan First Nation (Carver 2020).
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	9) Surface water balance determinations provide key insights as part of the impact assessment process. The item appears to indicate that they can be provided at either local or regional watersheds, however, they should be provided for both these scales.	9) a) Revise the item to read as follows: “...develop a quantitative surface water balance for the local <del>or</del> <b>and</b> regional watershed(s) containing the project;”
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	10) All potable water sources are critical water features to Indigenous communities for exercising their rights as Indigenous Peoples. It is inappropriate to determine “whether” these sources have Indigenous cultural importance because their degree of use today is affected by a complex of factors that need to be carefully understood. In addition, their current level of use may not indicate their relative value to Indigenous groups today or in the future. Whichever of these water sources may be affected by the Project, they should be fully identified and characterized and done so within the Local Study Area rather than only the local Project area. Their value to Indigenous groups can be determined only by the Indigenous communities in whose territory the Project is situated.	10) a) Revise the item to read as follows: “identify ( <b>or rely on Indigenous knowledge to identify high priority</b> ) springs and potable surface water resources within the local project area <b>Local Study Area</b> and describe their current use and potential for future use, and whether their consumption has Indigenous cultural importance; <b>in collaboration with each Indigenous community, assess the historic change in Indigenous use of each potable water source and the Indigenous value placed on each source by Indigenous community. In collaboration with Indigenous communities identify the potential impacts on potable water sources and the resulting pathways for impacting the rights of Indigenous Peoples</b> ”.”

<sup>1</sup> Available at: <https://www2.tc.gc.ca/wwwdocs/TCDR/en/athabasca-final-report-20200206.pdf>

Section	Section Title	Comments	Recommendations
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	<p>4) a) For the first bullet above – it is concerning that there is no discussion regarding how the described baseline information collection program relates to the establishment of the pre-development scenario conditions. Requirements for the establishment of the pre-development scenario conditions should also be provided here.</p> <p>For the second bullet above - Naphthenic acids are not to be discussed in terms of “labile” and refractory” fractions, but in terms of measured and measureable concentrations included in monitoring programs. In addition, data that illustrate the seasonal and inter-annual variability in water quality must be a firm requirement and not “as appropriate”.</p>	<p>4) a) Please add a bullet that describes the requirements for establishing a pre-development scenario for surface water and sediment quality. Please also explain how the pre-development and baseline water and sediment quality data collection processes will relate to one another or differ. MCFN acknowledges this will be a difficult and imperfect exercise, but prefers to have some imperfect data rather than none at all.</p> <p>Please add to the second bullet in question the following underlined wording and remove the strike out wording:</p> <p><b><u>“provide baseline data for physiochemical parameters and relevant chemical constituents for surface water and groundwater quality. Water sample collection and analysis should use appropriately sensitive detection limits. Include additional data, <del>as appropriate,</del> to illustrate the seasonal and inter-annual variability in baseline water quality with sufficient years of baseline data to fully characterize natural variability, including possible changes due to groundwater–surface water interactions. <u>Naphthenic acids are not to be discussed in terms of “labile” and refractory” fractions, but in terms of measured and measureable concentrations included in monitoring programs.”</u></u></b></p>
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	<p>4) b) While many details are provided regarding the required models used for groundwater/hydrogeology, there is no mention made of surface water models in this section. Detailed requirements should be provided.</p>	<p>4) b) Please add the following points to the list of requirements.</p> <ul style="list-style-type: none"><li>• Develop a conceptual model of how the subject surface water systems function, as well as how impacts may occur. This should serve as the basis for development of computational surface water models used to model Baseline conditions and in the assessment of Project impacts. Such models will provide outputs of predicted hydrological, and water/sediment quality-related outcomes for all subject surface waters, including rivers, streams, lakes, springs and wetlands.</li><li>• Input from multiple parties, including regulators and Indigenous communities, can be considered throughout the conceptual model development and computational model selection, evaluation and application process.</li><li>• Data quality and adequacy must be assessed before using a computational surface water model. Input data must adequately reflect conditions in all seasons and the complete hydrological cycle. Water and sediment quality input data must span at least three years of data collection from all systems to be modeled. Where data are not available, data collection must be completed and surrogate data from another water body should not be substituted. Further information is available from: Alberta Environment. 2006. Guidelines for Quality Assurance and Quality Control in Surface Water Quality Programs in Alberta. Prepared by Patricia Mitchell Environmental Consulting. 67 pp.</li><li>• If a new or an existing model(s) is applied in this way, it must be evaluated for the specific Project application in order to answer the following questions:</li></ul>

Section	Section Title	Comments	Recommendations
			<ul style="list-style-type: none"> <li>o How have the principles of sound science been addressed during model development?</li> <li>o How is the choice of model supported by the quantity and quality of available data?</li> <li>o How closely does the model approximate the real system of interest?</li> <li>o How well does the model perform the specified task? (See US EPA (United States Environmental Protection Agency). 2009. Guidance on the Development, Evaluation, and Application of Environmental Models. Office of the Science Advisor, Council for Regulatory Environmental Modeling.)</li> </ul> <ul style="list-style-type: none"> <li>• Surface water models must be calibrated and validated to determine how well they correspond to the system being modeled. This includes using independent measured environmental data, not previously used in model development or parameterization, to compare to model outputs.</li> </ul>
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	This section describes the parameters the proponent is to report on regarding baseline conditions of groundwater and surface water.	This section would benefit from including a requirement to describe the connection of area waterbodies to any important wildlife habitat.
8.5.1	Biophysical Environment: Groundwater and Surface Water; Baseline Conditions	Springs and potable water sources are a likely shifting baseline as development occurs across the landscape. Given the need to link baselines with cumulative effects, it is necessary to identify the <i>past-use</i> sources of potable water within the baseline conditions.	Include past locations of springs and potable water sources within the project area.
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	12) The ability to exercise the rights of Indigenous Peoples is dependent on water availability in the appropriate quantity and timing. Project activities can disrupt seasonal and subseasonal patterns of water availability leading to a decline or loss in Indigenous land use through loss of waterway access. An assessment of environmental change that does not reflect the use and timing of Indigenous water-use requirements, as identified by Indigenous groups, is inadequate in determining project impacts on the right of Indigenous Peoples.	12) a) Revise the item to read as follows: “...and any potential changes to seasonal flows or fluxes from project activities. <b>In collaboration with Indigenous communities, assess the change to seasonal flows including input of timing requirements of the Indigenous water uses. Utilize community input of timing requirements in identifying pathways for impacts on the rights of Indigenous Peoples;</b> ”
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	13) Reference is made in this item to a federal navigation study (Dillon 2019) that contains factual errors with respect to Indigenous navigation. Corrected information has been provided by First Nations (Carver and Maclean 2016; Candler <i>et al.</i> 2010) but this information is not included in the item. Given the significance of navigation to exercise the rights of Indigenous People, the corrected information should be explicitly provided in the item.  The item also appears to limit the navigation discussion to one of navigation safety in the PAD implying that navigation limitations of other types and in other locations are not of concern, for example, access for Indigenous use related to the Aboriginal Base Flow, and access limitations and thresholds along the lower Athabasca River.	13) a) Seasonal variability must cover the entire low flow season of late summer to early spring, particularly during river freeze-up and periods important for Indigenous navigation within the PAD (e.g. early spring and late summer/fall). Changes to water levels and flows in the PAD should be referenced to important thresholds <b>such as the Aboriginal Extreme Flow (AXF) and others</b> those required for safe navigation <b>along the Athabasca River and tributaries and</b> through the PAD by Indigenous peoples (suggested references: <i>Athabasca River Navigational Study</i> from Transport Canada, 2019 <sup>13</sup> , <b>Candler <i>et al.</i> 2010; Carver and Maclean 2016</b> );”
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to	14) Hydrologic models require field data for calibration and validation. A minimum of 3-5 years of data is needed to provide a mix of dry, average and wet years. These data should be acquired from a source that is independent of the Project proponent.	14) a) Include a new item in section 8.5.2 as follows: “ <b>Use a minimum of 3-5 years’ site-specific hydrometric data to calibrate hydrologic models for small- and medium-sized streams.</b> ”  b) Include a new item in section 8.5.2 as follows:

Section	Section Title	Comments	Recommendations
	Groundwater and Surface Water		<b>"Data used to calibrate and validate hydrologic models should be acquired from sources that have some independence from the proponent or peer review of their approach."</b>
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	15) Hydrologic models are simulations of natural systems. Outputs are subject to uncertainty related to prevailing scientific understanding, the data sets and the model itself. It is scientifically inappropriate to use model outputs without regard for their uncertainty. The degree of output uncertainty should be clearly communicated as part of the model outputs.	15) a) Include a new item in section 8.5.2 as follows: <b>"Quantify and discuss the implications of uncertainty in outputs from hydrologic models;"</b>
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	16) Hydrology effects assessments require appropriate metrics to reflect and compare the magnitude of effects. The indicators of impact must meaningfully represent potential impacts on valued components. For low flow effects assessment, the seven-day minimum daily flow should be used to represent low flows. Where modelled flow rates reach 0 m <sup>3</sup> /s, the assessment must report and compare the length of time the outcome is projected to remain at 0 m <sup>3</sup> /s.	16) a) Include a new item in section 8.5.2 as follows: <b>"Indicator metrics must be chosen to meaningfully represent potential Project impacts. For low flow effects assessment, the seven-day minimum flow should be used. Where modelled flow rates reach 0 m<sup>3</sup>/s, the assessment must report and compare the length of time the outcome is projected to remain at 0 m<sup>3</sup>/s."</b>
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	17) The return periods of extreme flows used in the design of channels and erosion protection should be large enough that the Project is ready for the likely worst-case situation that may occur during Project life including the post-closure period. At a minimum, a 100-year return period should be chosen in Project design and effects assessments. Depending on Project duration and other considerations, a 200-year return period may be required.	17) a) Include a new item in section 8.5.2 as follows: <b>"The return period of flood flows used for channel design and erosion protection works should be a minimum of 100 years."</b>
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	18) Site water balances are affected by a host of variables including the climate. During the life of the Project, climate means and extremes are projected to change. These changes must be reflected in the site water balances determined for both the operation and post-closure periods.	18) a) Revise the item to read as follows: "present an integrated site water balance model incorporating surface and groundwater fluxes to or from all major project components, for the operation and post-closure periods <b>and incorporating quantitative consideration of changes in mean and extreme projected climates;</b> "
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	19) Effluent may be released from the Project site during the Project life, affecting the receiving environment and downstream Indigenous land uses. To prepare for these releases, it is important that the quality, quantity and timing of each release be taken into account with respect to the downstream environment and the people who depend on it for sustenance.	19) a) Revise the item to read as follows: "describe the quantity, <b>timing</b> , and quality of all effluent streams released from the site to the receiving environment, including seepage from tailings management facilities, overflow from pits or mine workings, and surface runoff from mine components. Releases must include notifications to Indigenous communities so that they are aware and can make land-use choices to reduce their risk;"
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	20) Modifications of channels and other surface flow paths are subject to flood flows. The design of modified channels determines their erodibility to flood flows. Given the duration of the project and rapidly changing climate extremes, channel modifications should withstand floods of a 100-year return period. Depending on Project duration and other considerations, a 200-year return period may be required.	20) a) Include a new item in section 8.5.2 as follows: "describe design elements sufficient to enable new and modified channel to withstand floods of a 100-year return period;"

Section	Section Title	Comments	Recommendations
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	21) Water balances of end pit lakes are shaped by a host of variables including the climate. During the life of the Project including the post-closure period, climate means and extremes are projected to change. Water balances determined for end pit lakes must taken into account these changes and not be based on only present climate normals.	21) a) describe potential changes to surface water quality associated with the inclusion of end pit lakes in the project, including predicted water quality within the pit lake through closure and post-closure. This should include: <ul style="list-style-type: none"> <li>a comprehensive water balance <b>and taking into account quantitative consideration of changes in means and extremes of projected climates;</b></li> </ul>
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	22) Indigenous groups use frozen waterways for winter travel. Ice thickness and quality affect the reliability of these surfaces for travel. Ice dynamics and ice reliability at confluences and other locations can be compromised by climate change, water withdrawals and other factors, and particularly toward the margins of the ice season and at confluences. ACFN and MCFN (2021) have carried out almost a decade of ice monitoring through its ongoing program of community-based monitoring. An effects assessment should be included in the impact assessment to address the potential for Project-related effects on Indigenous ice travel. Indigenous use requirements should be characterized by the Indigenous groups who use these winter travel routes.	22) a) Include a new item in section 8.5.2 as follows: <b>“carry out an effects assessment of the Project on Indigenous ice travel. The associated Indigenous-use requirements should be characterized by the Indigenous groups who use these ice-related travel routes.”</b>
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water	5) c) A risk assessment can’t be done on those constituents that exceed guidelines only, although it should be completed on them. The comprehensive and complete water quality model predictions must be brought into the risk assessment, especially to be able to assess the potential risk of complex mixtures of constituents.	5) c) Please revise the bullet as follows (add underlined text, remove text with strikethrough). <ul style="list-style-type: none"> <li><b>guidelines, objectives or standards. <del>Where guidelines are exceeded,</del> The risk of adverse effects occurring to receptors in the receiving environment should be evaluated <u>for each constituent and the overall water and sediment quality</u>, on a site specific basis, and adaptive management practices identified, where appropriate;</b></li> </ul> <p>And please ensure that comprehensive and complete water quality model predictions must be brought into risk assessments.</p>
8.5.2	Biophysical Environment: Groundwater and Surface Water; Changes to Groundwater and Surface Water		It is recommended to include water quantity in the following statement: <ul style="list-style-type: none"> <li>Describe potential downstream effects to water quality and quantity including in Wood Buffalo Park, Ruth Lake, Richardson Lake, the Athabasca Watershed, Slave River, PAD, and Old Fort River.</li> </ul>
8.5.3	Biophysical Environment: Groundwater and Surface Water, Mitigation and Enhancement Measures	23) Informed by Indigenous land user experience and knowledge, Candler <i>et al.</i> (2010) show the existence of a navigation threshold called the Aboriginal Extreme Flow (AXF). The AXF is defined as the river discharge (as measured at Fort McMurray) below which widespread and extreme disruption of Indigenous navigation occurs due to loss of access related to low waters. Community-based monitoring of water depth carried out by ACFN and MCFN across their territories has confirmed the quantitative value of the AXF as 500 m <sup>3</sup> /s (Carver and Maclean 2016). Occurrence of this threshold provides the opportunity to mitigate impacts of Project effects related to water quantity and navigation. Community-based monitoring is ongoing to further refine and evaluate the magnitude and spatial applicability of this and other navigation thresholds.	23) a) Include a new item in section 8.5.3 as follows: <b>“for mitigating navigation effects, include an option that involves ceasing water withdrawals or adaptive management measures that would be applied from for lower Athabasca and tributaries when the flow in the Athabasca River (as measured at Fort McMurray) drops below the Aboriginal Extreme Flow (500 m<sup>3</sup>/s);”</b>

Section	Section Title	Comments	Recommendations
8.5.3	Biophysical Environment: Groundwater and Surface Water, Mitigation and Enhancement Measures	<p>6) Any proposed mitigations for surface water quality impacts must be described alongside real-world quantitative and qualitative evidence of their effectiveness and performance. This should include peer-reviewed scientific information and data, and examples of topics to consider may include:</p> <ul style="list-style-type: none"> <li>the effectiveness of on- and off-lease water quality monitoring programs at detecting and managing water quality impacts at oil sands mine water release locations and further downstream/downgradient;</li> <li>the effectiveness of oil sands mine sedimentation ponds and overland release in attenuating sediment loads to receiving environments;</li> <li>the state of knowledge and level of confidence that potential contaminants of concern deposited from oil sands mines via atmospheric deposition are not impacting off-lease surface water quality;</li> <li>The mechanisms by which and relative effectiveness with which oil sands mine end pit lakes that contain fine tailings or fluid fine tailings will improve surface water quality over time (i.e., compare mechanisms such as dilution, degradation, adsorption, sequestration beyond a theoretical discussion).</li> </ul> <p>As well, additional criteria should be referred to where they are applicable, in addition to Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines, including any criteria associated with contaminated site regulations, especially during remediation and closure activities.</p>	<p>6) Please revise <u>the bullet as follows (add underlined text)</u>.</p> <ul style="list-style-type: none"> <li><b><i>describe the mitigation measures for the possible effects on the quantity and quality of surface water and groundwater, including water supply wells, and provide a rationale <u>with quantitative and qualitative evidence</u> that explains the effectiveness of proposed measures;</i></b></li> </ul> <p>Please also add to the second bullet above additional information and specific reference to applicable guidance, regulation and legislation (e.g., contaminated sites regulation) for inclusion in any discussion of mitigation, remediation and closure activities undertaken during construction, operation and closure phases of the Project.</p>
8.5.3	Biophysical Environment: Groundwater and Surface Water, Mitigation and Enhancement Measures	Current text: “The Impact Statement must describe the mitigation measures for the potential effects on groundwater and surface water, including: “	The following bullet is recommended to be included in this section: describe post closure surface water quality and quantity evaluation/monitoring plan/strategy.
8.6.1.1	Biophysical Environment, Vegetation and Riparian, Wetland and Terrestrial Environments, Vegetation and Riparian, Wetland and Terrestrial Environments, Baseline Conditions		<p>It is recommended that tubers be included as an example of plant tissue ingested for medicinal or other uses:</p> <ul style="list-style-type: none"> <li>plant tissue (e.g., roots, bark, leaves, seeds, <b>and tubers</b>) ingested for medicinal or other uses (e.g., teas).”</li> </ul>
8.6.1.1	Biophysical Environment: Vegetation, Riparian, Wetland and Terrestrial Environments; Vegetation and	The draft TISG describes the aspects of vegetation that must be included in the description of baseline conditions, with a particular focus on plant species and communities at risk, old-growth forests, and plants of traditional importance. It seems that terrestrial plant species and plant communities (i.e., ecosites or ecosite phases) other than species at risk, old-growth, and traditionally important species, are missing from the list of components that need to be described and mapped. It may be that the phrasing is simply unclear. Also, although implied, it should be explicitly stated that data should be quantified whenever possible.	<p>Please revise the guidelines as follows:  <i>“The Impact Statement must:</i></p> <ul style="list-style-type: none"> <li><i>provide a description of <u>and quantify the biodiversity, relative abundance and distribution vegetation species and communities, including those that are of ecological, economic or human importance, within the local study area of the project (see also section 3.6.1 of Annex I), including:</u>”</i></li> </ul>



Section	Section Title	Comments	Recommendations
	Communities of Importance		<ul style="list-style-type: none"> <li>plant community type (i.e., ecosite, ecosite phase (including the use of Field Guide to Ecosites of Northern Alberta (Willoughby et al. (2019) for the Central Mixedwood, Willoughby et al. (2020) for the Athabasca Plain, and Willoughby et al. (2020) for the Lower Boreal Highlands.</li> <li>provide maps, at an appropriate scale, of <u>all</u> vegetation species and communities, including those of importance, within the local study area;"</li> </ul>
8.6.3	Biophysical Environment: Vegetation and Riparian, Wetland and Terrestrial Environments; Mitigation and Enhancement Measures	Proponents often make predictions about the timing of plant species establishment, the expected differences in community composition and structure, and the recovery of plant communities, with no direct evidence to support the predictions. Evidence is not provided for predictions that plant re-establishment will occur naturally, with a large diversity of species predicted to re-establish over time. And evidence is not provided for predictions that the recovery to a diverse, mature forest will take 50 or more years. The length of the recovery period is such that any number of predictions can be made, with no consequences possible if predictions turn out to be inaccurate. Any expectations for the timing of plant species and plant community re-establishment and recovery must be supported with direct evidence from the scientific literature, and/or using data from the oil sands region or a similar area in the boreal forest. If no evidence can be provided, then the uncertainty of predictions must be highlighted, and predictions qualified.	<p>Please revise the guidelines as follows:</p> <p><i>“describe any reclamation and revegetation procedures to be implemented as part of the project or as additional mitigation measures, including:</i></p> <ul style="list-style-type: none"> <li><i>the expected timelines, from an ecological perspective, for establishment and recovery of vegetation communities and the expected differences in community composition and structure. <u>Direct evidence from peer-reviewed scientific literature or data from the oil sands region must be used to support predictions (see also section 3.6.2 of Annex I);”</u></i></li> <li><i>any uncertainty with respect to the anticipated effectiveness of reclamation <u>must be highlighted and predictions qualified, particularly if direct evidence from the peer-reviewed literature cannot be provided;</u>”</i></li> </ul>
8.6.3	Biophysical Environment: Vegetation and Riparian, Wetland and Terrestrial Environments; Mitigation and Enhancement Measures	Proponents often argue that a variety of plant species will re-establish through natural successional processes within reclamation sites. This belief is used as justification for species-poor planting prescriptions. However, evidence from the oil sands region shows that only a limited number of species are able to naturally re-establish (e.g., Geographic Dynamics Corp. 2006). Therefore, concepts of natural re-establishment through succession should not be used to justify species-poor revegetation prescriptions.	<p>Please revise the guidelines as follows:</p> <p><i>“concerning wetlands:</i></p> <ul style="list-style-type: none"> <li><i>explain how mitigation measures consider the natural succession and the variability of the environment over time. <u>Provide direct evidence from the peer-reviewed scientific literature or data from the oil sands region to support explanations.</u>”</i></li> </ul>
8.7.1	Biophysical Environment: Fish and Fish Habitat; Baseline Conditions	The sensitivity of fish habitat is a vague term because it can refer to many ecological aspects, including (among others) how resilient the habitat itself is to disturbance or how sensitive the fish that use the habitat are to losing the habitat. If sensitivity is to be used as a manner of grouping waterbodies and watercourses, an explicit list of the categories and how they are defined is required. We note that further examples of sensitivity are given later in section 8.7.2, but it would be most useful to identify them at the first mention of the term.	Include the explicit definition of “sensitivity” in this document or include more detail on how sensitivity will be defined within a project.
8.7.1	Biophysical Environment: Fish and Fish Habitat; Baseline Conditions	This is the only bullet that refers to baseline data collection within this section of the TISG. There are a lot of details provided and likely more that are necessary, so as a first suggestion, this topic may benefit from sub-bullets, as done for Species at Risk. The field survey data collected by the proponent should be described in greater detail than <i>“standardized experimental fisheries”</i> . This term is potentially misleading as experimental fisheries typically refer to fisheries that are experimenting with either selling new species (e.g. marketing new types of crab) or types of harvest management (i.e. exchangeable quota systems). As such, the term “standardized fish and fish habitat survey protocols” is likely more descriptive of baseline data collection. Further, there are examples of standard protocols that can be referenced to strengthen this section (e.g. the American Fisheries Society has released a book on “Standard Methods for Sampling North American Freshwater Fishes”, Bonar et al. 2009), or if regionally standards are being considered, they should be listed as examples.	<p>Arrange this paragraph with sub-bullets to improve clarity.</p> <ul style="list-style-type: none"> <li>Change <b><i>“standardized fish and fish habitat survey protocols”</i></b> to a more descriptive term for data collection of fish communities and fish habitat.</li> <li>Refer to standard protocols as examples of appropriate standardization, or as the actual protocols being considered.</li> <li>Include the need and a possible mechanism to including a statistical power analysis within the field data collection to ensure that the baseline results will have enough resolution to detect change in the relevant metrics.</li> <li>Include metrics and protocols that can be used to estimate fish production metrics (e.g. absolute abundance, habitat area and volume, and fish weight).</li> </ul>

Section	Section Title	Comments	Recommendations
		<p>A missing component of the field and historical data listed here the statistical power of this data to detect change (Jones and Petreman 2012, Peterman 1990). Often, field survey data from any source is plagued by high variation from natural and survey related mechanisms that make future comparisons difficult. Field survey data should be collected with an appropriate effect size (i.e. the relative change in the average value of the metric compared to its variation) in mind, which can allow for statistical power analyses to be conducted. For example, a standard effect of size of 0.5 (from Cohen’s D statistic) is achievable in many biological sampling programs. The benefit of identifying the effect size prior to surveying is that the effort required in a survey can be determined adaptively, allowing the crews to continue working until they have met their needs for statistical power.</p> <p>The changes in the <i>Fisheries Act</i> over the last decade have for the most part shifted the emphasis from habitat to fish production (Randall et al 2012). While habitat metrics still have value under the most recent iteration of the <i>Fisheries Act</i> policy, from a practical perspective, metrics that allow proponent to estimate fish production remain the most important metric to estimate for large projects. Fish production requires that field surveys don’t just record a catch-per-unit-effort metric of fish abundance, but instead sample water bodies and watercourses in a manner that absolute abundance can be estimated (Minns et al 2011). For lakes, this might require using calibrated nets (e.g. the Alberta FWIN net), or for rivers, using depletion sampling techniques. Further, the surface area or volume of the sampled waterbody or watercourse will be required, as well as fish weights.</p>	
8.7.2	Biophysical Environment: Fish and Fish Habitat; Effects to Fish and Fish Habitat	For large projects with a wide range of potential permanent and temporary disturbances to fish habitat, it makes most sense to describe in quantitative terms the loss of habitat (i.e. area or volume) and the loss of habitat quality (i.e. productive capacity, contributions to fish biomass). Descriptions in terms of habitat sensitivity and significance (as listed in the TISG) have value for informing the reader, but in terms of assessing impacts in an acute and cumulative manner, they hold less value. Existing habitat frameworks such as HEAT (DFO 2019) or Habitat Productivity Indices (Minns et al. 2011) can be used to quantify these sometimes-simultaneous changes in habitat quantity and quality. Note that the quantification of habitat quality will link well with the positive benefits listed in the second bullet if the same type of metric is chosen.	<ul style="list-style-type: none"> <li>• Include a quantitative measure of habitat quality within this framework. We suggest referring to existing tools such as the federal HEAT model, or other Habitat Suitability Indices.</li> <li>• Ensure that equivalent metrics are chosen when comparing negative and positive changes to fish and fish habitat for an “apples to apples” comparison.</li> </ul>
8.7.2	Biophysical Environment: Fish and Fish Habitat; Effects to Fish and Fish Habitat	This bullet is certainly valuable in the TISG and touches upon the federal science advice to identify the pathway of effects from an impact to a population level change (DFO 2014a), however, it is a little incomplete. The effect of chronic and acute disturbances to fish populations are often dependent on the state of the fish population on a dose-response type curve. If the fish population is already quite depleted, the effect of a chronic or acute disturbance could be quite minimal. This same logic applies for robust populations, which could have a buffer to withstand disturbances. As such, identifying where the population in question resides on this dose-response relationship adds the necessary context to understanding the ecological significance of the impact.	Please revise the phrase as follows: <i>“characterize how potential chronic and acute effects to fish populations relates to population density and resilience in the context of the status of the fish population on a dose response curve from pristine to degraded systems within the same type of local environment”</i> .
8.8	Biophysical Environment: Birds, Migratory Birds and Their Habitat	Data visualization is important for reaching all potential audiences for the impact assessment. We recommend a line item requiring figures or maps showing the location and type of bird habitat and habitat features for those species likely to be affected by the Project. This should include the identification and mapping of critical habitat for affected species at risk.	Please revise the guideline to <i>“provide a characterization of potential habitat and habitat features found in the project area that are associated with the presence of those bird species that are likely to be affected, based on the best available existing information (e.g. land cover types, vegetation, aquatic elements, fragmentation, disturbance). Provide maps showing the location of identified habitat and habitat features associated with the presence of those bird species that are likely to be affected. This information can refer to the habitat description required in section Error! Reference source not found. Error! Reference source not found.”</i>



Section	Section Title	Comments	Recommendations
8.8.1	Biophysical Environment: Birds, Migratory Birds and their Habitat; Baseline Conditions	Adequate baseline data is key to ensuring accurate prediction of Project impacts and for verifying predictions and mitigation measure effectiveness in monitoring programs. Quantitative information must be collected and used in the impact assessment to increase certainty regarding impact predictions and assessment conclusions. With respect to temporary relocation hypotheses, providing support for the hypothesis prior to project construction is preferable because, in the event that the hypothesis was determined as inaccurate via testing during project operations, impacts would have been underestimated (greater than anticipated).	Please revise the guidelines as follows: 8.8.1 Baseline conditions <ul style="list-style-type: none"><li>“<u>provide quantitative estimates of the abundance and distribution, and information on the life history of migratory and non-migratory birds (e.g. waterfowl, raptors, shorebirds, forest birds, fen/bog/marsh birds, and other land birds) in the study areas defined for the assessment; providing methods used and rationale for the baseline data collection.</u>”</li></ul>
8.8.2	Biophysical Environment: Birds, Migratory Birds and their Habitat; Effects to Birds, Migratory Birds, and their Habitat	Adequate baseline data is key to ensuring accurate prediction of Project impacts and for verifying predictions and mitigation measure effectiveness in monitoring programs. Quantitative information must be collected and used in the impact assessment to increase certainty regarding impact predictions and assessment conclusions. With respect to temporary relocation hypotheses, providing support for the hypothesis prior to project construction is preferable because, in the event that the hypothesis was determined as inaccurate via testing during project operations, impacts would have been underestimated (greater than anticipated).	Please revise the guidelines as follows: 8.8.2 Effects to birds, migratory birds, and their habitat <ul style="list-style-type: none"><li>“<u>describe and quantify, where possible, any changes to bird-habitat relationships, including avoidance of habitats due to sensory disturbance and any change in diversity, abundance, and density of the avian community and bird species at risk that utilise the various habitat types or ecosystems. Particular attention must be paid to the change in detection before and after the project is carried out;</u></li><li><u>describe and quantify, where possible, the change in mortality risk, including as a result of collision of migratory and non-migratory birds, and bird species at risk, with flaring gas, any project infrastructure and vehicles, and as a result of indirect effects such as an increase in the ease of movement of predators in the predictions of mortality effects;</u></li><li><u>describe and quantify, where possible, potential incidental effects caused by increased disturbance (e.g. sound, artificial light, presence of workers), such as change in relative abundance, distribution, and daily or seasonal movement patterns, considering the critical periods for birds, including nesting, breeding, staging/stopover, migration and overwintering. If a temporary relocation hypothesis is made during the operational phases of the project, support the hypothesis with scientific evidence and test the hypothesis through study and monitoring within the project area as the project proceeds;</u></li><li><u>describe and quantify, where possible, the potential direct effects of contaminants and bioaccumulation of contaminants on resident and migratory birds, and bird species at risk, including those that may be consumed by Indigenous peoples;”</u></li></ul>

Section	Section Title	Comments	Recommendations
8.8.2	Biophysical Environment: Birds, Migratory Birds and their Habitat; Effects to Birds, Migratory Birds, and their Habitat	The determination of significance should be done collaboratively with affected communities (Lawrence 2007). In practice, this requires that the significance of impacts be defined by Indigenous peoples so that it accurately reflects their values and culture. Suncor would need to gain an understanding from Indigenous communities on what they perceive to be potential impacts and how they anticipate those impacts might be mitigated. Once mitigation measures have been designed, with input from the Indigenous communities, the significance of residual impacts would need to be rated by the communities. Suncor should be required to provide a description as to how Indigenous information was factored into the impact significance determination.	<p>Please add the following guidelines:</p> <ul style="list-style-type: none"><li>• <u>“describe potential adverse and positive effects of the project on bird species noted as important to Indigenous groups and local communities, such as effects resulting from changes to important habitat areas, including grouse, ducks, and geese, and their eggs and nests that are not currently listed under the <i>Species at Risk Act</i> or provincial statutes. This must include a discussion of the availability of species for traditional use, considering potential habitat loss, habitat avoidance, increased mortality (e.g. due to vehicle collisions, increased non-Indigenous hunting pressure), and other project-related effects (see also AB TOR section 3.7.2; Annex I);</u></li><li>• <u>describe concerns and issues expressed by Indigenous communities and the actions taken to address those concerns and issues, including how Indigenous communities’ input was incorporated into the Project design, effects assessment, mitigation, monitoring, and reclamation plan. Discuss how issues, concerns, or traditional ecological knowledge from Indigenous communities were used in the significance determination of potential impacts of the proposed Project to migratory and non-migratory birds, including species at risk.</u></li><li>• <u>take into account the tolerance thresholds for potential adverse effects that Indigenous peoples have identified;”</u></li></ul>
8.8.3	Biophysical Environment: Birds, Migratory Birds and their Habitat; Mitigation and	Mitigation measures should not only be described in terms of anticipated effectiveness but should also be tested to verify their effectiveness at minimizing Project impacts. Providing support for a hypothesis prior to project construction is preferable because, in the event that the hypothesis was determined as inaccurate via testing during project operations, impacts would have been underestimated (greater than anticipated).	Please revise guideline to <i>“describe the anticipated effectiveness of the measures proposed to mitigate effects on birds, including deterrents. The anticipated effectiveness of mitigation measures, including deterrent systems, must be supported with scientific evidence or tested through study and monitoring within the Project area as the project proceeds.”</i>

Section	Section Title	Comments	Recommendations
	Enhancement Measures		
8.9	Biophysical Environment: Wildlife and its Habitat	<p><b>Wildlife and its Habitat: General Comments;</b></p> <p>In general, there is considerably more detail in the TISG than that provided in typical Terms of Reference for industrial activities in northeastern Alberta. Important concepts have been included in the TISG, such as the need for model validation (Section 7.1), the accessibility and sharing of data from follow-up programs for the general public (Section 16.1), and recognition of the importance of Indigenous Knowledge in the selection of VCs (Section 7.2). However, there are some concepts that require the addition of details to existing guidelines and the addition of new guidelines to the TISG to ensure all relevant information is captured in the Impact Statement.</p> <p>With regards to wildlife habitat models, additional wording ensures that model validation is described and demonstrated and provides guidance regarding data to be used for validation purposes. While Indigenous Knowledge has been identified in some sections of the TISG, there are other places where it can inform the assessment that should be identified. Additional guidelines are recommended with regards to caribou and significance determination to ensure Indigenous Knowledge is incorporated into the assessment. In addition, the collection of quantitative information where possible should be specified, which would increase confidence in the assessment and Suncor’s ability to assess mitigation effectiveness and detect any unanticipated impacts. Mitigation measures designed to address concerns identified by Indigenous peoples must also be supported with evidence that they are likely to be successful. This has also been explicitly requested with regards to caribou mitigation measures. With regards to follow-up monitoring, additional guidelines are recommended to incorporate the concepts of benchmarks and targets into programing, which is also applicable to other biophysical disciplines. Finally, an area where additional guidelines are recommended is with respect to reclamation activities. The TISG should include guidance requiring Suncor to identify when wildlife habitat will be restored and how Suncor will determine that wildlife habitat has been successfully re-established.</p>	
8.9.1	Biophysical Environment: Wildlife and its Habitat; Baseline Conditions	<p>Habitat models are often used to assess how the Project may impact the available wildlife habitat in and around the proposed Project area. Model validation (i.e., comparing collected field data to the model results) is an important step in ensuring the quality of the model predictions. Understanding the accuracy of wildlife habitat models aids in understanding how changes to the landscape might affect any given wildlife species, influences the level of confidence one has in the impact predictions, and provides insight into the interpretation of future monitoring data.</p> <p>For some wildlife species, depending upon the level of survey effort used to collect the baseline data and the generally lower detectability of certain species, the collected baseline data may be too sparse for use in the validation exercise. In these cases, the proponent should supplement the collected field data with external sources of data from other EIAs or monitoring programs conducted in areas near the proposed Project, government databases or from traditional users.</p>	<p>Please revise the guidelines as follows: <i>“for these species, describe and map as appropriate (see also section 3.7.1 of Annex I), providing quantitative information, where possible:</i></p> <ul style="list-style-type: none"> <li><i>species composition, abundance (including relative abundance in each habitat type), population status, distribution (including across survey sites), general life history</i></li> <li><i>the location and quantity of habitat, including residences, seasonal movements and ranges, movement and migration corridors, habitat features, requirements, key habitat areas, and species use and potential use of habitats; Describe and demonstrate the validation of any habitat models used to map wildlife resources. If collected field data are insufficient, additional surveys should be completed or alternative, external sources of data should be used to provide a quantitative validation of the habitat models developed for the proposed Project.”</i></li> </ul>
8.9.2	Biophysical Environment: Wildlife and its Habitat; Effects to Wildlife and its Habitat	<p>Quantitative information must be collected and used in the impact assessment wherever possible in order to increase certainty regarding impact assessment conclusions. Wildlife health is also linked with human health for people consuming harvested species for subsistence or cultural purposes. As such, we recommend that the guidelines also require that wildlife species consumed by Indigenous peoples be given specific consideration in the assessment of wildlife health.</p>	<p>Please revise the item to <i>“describe and quantify, where possible, the potential direct effects to wildlife and species at risk, including acute and chronic effects to wildlife health, of changes to air and water quality and/or contaminants, including effluents, atmospheric emissions and dust deposition, and bioaccumulation of contaminants in wildlife, including those that may be consumed by Indigenous peoples (see also section 3.7.2 of Annex I);”</i></p>

Section	Section Title	Comments	Recommendations
8.9.3	Biophysical Environment: Wildlife and its Habitat; Mitigation and Enhancement Measures	Mitigation measures should not only be described in terms of anticipated effectiveness but should also be tested to verify their effectiveness at minimizing Project impacts. Providing support for a hypothesis prior to project construction is preferable because, in the event that the hypothesis was determined as inaccurate via testing during project operations, impacts would have been underestimated (greater than anticipated). Mitigation measures designed to address concerns identified by Indigenous peoples must also be supported with evidence that they are likely to be successful.	<p>Please revise the guidelines as follows:</p> <ul style="list-style-type: none"> <li>“describe all feasible measures to avoid or lessen potential adverse effects to wildlife and species at risk and their habitat, including critical habitat. Include a description of the measures in terms of the effectiveness of each measure in avoiding negative effects. <u>The anticipated effectiveness of mitigation measures, including deterrent systems, must be supported with scientific evidence or tested through study and monitoring within the Project area as the project proceeds.</u>”</li> <li>“take into account species of interest to Indigenous peoples in the identification of mitigation measures for potential effects on species and ecological communities. Provide evidence of mitigation effectiveness corresponding to the identified issues in the Impact Statement, as well as those identified by Indigenous communities.”</li> </ul>
8.9.3	Biophysical Environment: Wildlife and its Habitat; Mitigation and Enhancement Measures	There are no explicit criteria requiring Suncor to provide timelines for when wildlife habitat will be restored or how Suncor will determine when wildlife habitat has been successfully re-established. Simply revegetating a landscape does not necessarily lead to successful re-colonization by wildlife species and depending on the type of plant communities that may develop, this could have consequences for wildlife population dynamics in that area. This uncertainty makes it difficult for traditional land users to understand whether the area will be returned to a state suitable for their future harvesting and cultural use.	<p>Please revise the guidelines as follows: “describe how baseline biodiversity metrics are considered in the reclamation plan. <u>Identify expected timelines, targets, and how progress to achieve these targets will be measured.</u>”</p> <p>Please add the following guidelines to Section 8.9.3:</p> <ul style="list-style-type: none"> <li>“provide details of the monitoring program that will address uncertainties in the assessment for wildlife and the effectiveness of proposed mitigation measures where <u>scientific evidence supporting their effectiveness is not currently available.</u>”</li> <li>“regarding the reclamation plan, discuss expected timelines for establishment and recovery of vegetative communities and wildlife habitat, and anticipated recolonization by wildlife indicator species. Provide an outline for key milestone dates for reclamation, including targets for vegetative communities and wildlife habitat and how progress to achieve these targets will be measured. Ensure active involvement of relevant Indigenous groups in the reclamation planning so that Indigenous views and perspectives are represented and taken into account for the restoration of resource quality.”</li> </ul>
8.9.3.1	Biophysical Environment: Wildlife and its Habitat; Caribou, Mitigation and Enhancement Measures	“With respect to caribou:”	<p>It is recommended the following bullet point be included in this section:</p> <ul style="list-style-type: none"> <li>describe effects of potential changes to caribou migration patterns as a result of the project including associated activities such as noise, blasting, light and others.</li> </ul>
8.9.3.1	Biophysical Environment: Wildlife and its Habitat; Mitigation and Enhancement Measures; Caribou	Suncor must provide evidence that the standard mitigation practices they are proposing have been successful in minimizing impacts. Evidence could be from collected data, peer-reviewed literature or other literature sources; but cannot simply be anecdotal or because they are commonly or historically used mitigation measures. FPAC (2007) concluded that “Given the lack of monitoring and the importance of monitoring, this audit was inconclusive when ranking the effectiveness of mitigation and operating practices”, which demonstrates that monitoring programming is required to address uncertainties in the assessment and the effectiveness of proposed mitigation measures, particularly as they relate to caribou.	<p>Please add the following guideline to Section 8.9.3.1:</p> <p>“provide details of the monitoring program that will address uncertainties in the <u>assessment for boreal caribou and the effectiveness of proposed mitigation measures where scientific evidence supporting their effectiveness is not currently available.</u>”</p>
8.10	Biophysical Environment: Climate Change	Given that Indigenous peoples, especially Elders and knowledge keepers have been observing the land for a long time, Indigenous knowledge should be incorporated into the analysis of the impacts of climate change as a result of the project and its footprint.	<p>It is recommended to provide a requirement for the IS to show how IK was incorporated into climate change considerations.</p> <p>See also comment on 8.10.2 below.</p>

Section	Section Title	Comments	Recommendations
		Elders have been watching how the land including animals, water bodies, and climate are changing as a result of anthropogenic disturbances. The use of IK in this assessment should be considered at the same level as western science.	
8.10.2	Biophysical Environment: Climate change; Effects to Climate Change	“The Impact Statement must:”	It is recommended the following bullet point be included in this section: <ul style="list-style-type: none"> <li>Identify and incorporate Indigenous knowledge in the analysis/assessment of the project’s impacts on climate change as well as the development of mitigation and adaptation measures. The use of Indigenous knowledge in the assessment of the project’s impacts on climate change should be considered complementary and equitable to western science.</li> </ul>
9.1	Human and Health Conditions: Baseline Conditions	Current text: “To understand the context and to develop the baseline health profiles of local and Indigenous communities, the proponent must: describe the determinants of health selected specifically for Indigenous communities, including for subgroups within them (e.g. Indigenous women)”	This should include additional information requirements such as: 1. a discussion on how subgroups were identified (self-identification or other measures); 2. What role Indigenous communities play in the identification of determinants of health relevant to their communities; 3. Evidence of Indigenous community verification of chosen determinants of health.
9.2.1	Human and Health Conditions: Effects to Human Health; Biophysical Determinants of Health	Current text: <p>“With regard to the biophysical determinants of health, the Impact Statement must:</p> <ul style="list-style-type: none"> <li>provide an assessment of adverse and positive effects on human health taking into consideration, but not limited to, potential changes in: “</li> </ul>	It is recommended the following bullet points be included in this section: <ul style="list-style-type: none"> <li>Surface and ground water contaminations with metals, releases, and elements; microbiological contamination from sewage and wastes in campsites and project worker residential areas.</li> <li>Climate change impacts through loss of CO2 uptake by forests and vegetation that is cleared, CO2 emissions from machinery (e.g., diesel powered heavy vehicles) involved in extracting and transporting and from the processing activities.</li> </ul>
9.2.1	Human and Health Conditions: Effects to Human Health; Biophysical Determinants of Health	Current text: “With regard to the biophysical determinants of health, the Impact Statement must:”	It is recommended the following bullet point be included in this section: <ul style="list-style-type: none"> <li>provide a description of potential increase threat of communicable, sexually transmitted infections and others.</li> </ul>
10.3.1	Social Conditions: Navigation; Baseline Conditions	24) The waterbodies and waterways within the PAD and the lower Athabasca River provide critical access to Indigenous territory for the ACFN and MCFN. These waterbodies are generally shallow and subject to considerable seasonal variation in water depth due to industrial water withdrawals, climate change, and other factors. Given the scope of potential definitions of navigability, what constitutes the “existing navigable waterways” should be determined only as provided by the Indigenous groups who use or have used the waterways in the Regional Study Area, recognizing that some waterways may already be no longer navigable or are not currently in use due to a host of reasons including loss of access and avoidance of an area due to environmental degradation.	24) a) Revise the item to read as follows: “identify and describe navigable waterways and all their uses <b>as provided by the Indigenous communities who use the waterways within the Regional Study Area;</b> ”
10.3.2	Social Conditions: Navigation; Effects to Navigation	25) The Peace-Athabasca Delta and lower Athabasca River and tributaries form an integrated Indigenous travel and access system. The fulfillment of the rights of Indigenous Peoples depends on the maintenance of navigability of these travel and access corridors. Any description of Project effects to navigation and navigation safety should include assessment within both spatial components to identify pathways for impacts on the rights of Indigenous Peoples.	25) a) Revise the item to read as follows: “ <b>In collaboration with Indigenous communities</b> , describe the Project effects on navigation and navigation safety, including potential effects from changes to water levels and flows in the PAD <b>and along the lower Athabasca River and tributaries. Consideration must be given to the complex of navigability requirements (including Indigenous requirements) existing along the full length of the river from Fort McMurray to Lake Athabasca. It is inadequate to identify one location and base an effects assessment on changes at that one site;</b> ”

Section	Section Title	Comments	Recommendations
10.3.2	Social Conditions: Navigation; Effects to Navigation Navigation; Effects to Navigation	26) Pinch points are defined as shallower locations of key Indigenous open-water access and travel routes which are the first to become impassable as water depths decline. These sites are known to be critical to the fulfillment of the rights of Indigenous Peoples and should be considered in all navigation effects assessments. In addition, navigation assessments must pay careful attention to the seasonal timing of water availability and any consequent changes in water depth.	26) a) Include a new item in section 10.3.2 as follows: <b>“Navigation effects assessments should include quantitative consideration of changes in water depth at critical pinch points in both the PAD and along the lower Athabasca River and tributaries as defined by Indigenous groups. Pinch points are defined as locations which are the first to become impassable as water depths decline and which are used to access large parts of Indigenous Territory and/or key travel routes.”</b> b) Include a new item in section 10.3.2 as follows: <b>“Navigation effects assessments should consider the timing of change of water availability and consequent changes in water depth and should be informed by Indigenous Knowledge about navigation requirements.”</b>
10.3.2	Social Conditions: Navigation; Effects to Navigation Navigation: Effects to Navigation		The following change is recommended for this section (in bold): <ul style="list-style-type: none"> <li>▪ <b>describe cultural and environmental values of water used by Indigenous peoples and other communities.</b></li> </ul>
10.4.2	Social Conditions: Community Well-Being; Effects on Community Well-Being		This section should include a discussion on how the project may contribute to spread of viruses in any future epidemic or pandemic.  It is also recommended that the following changes be made in this section (in bold): <ul style="list-style-type: none"> <li>▪ describe the effects of in-and out-migration and the influx of transient workers or temporary work camps, including changes in social and cultural make-up of affected communities, changes in populations, and the potential for increased risks to local communities (e.g. greater spread of sexually transmitted infections, <b>prostitution, drugs, alcohol, crimes</b>, racism, and ethnicity- and gender-based violence) and vulnerable groups who may be disproportionately affected by these risks;</li> <li>▪ <b>describe the effects of potentially converting a rural based economy into a cash based economy as a result of the project and associated businesses;</b></li> <li>▪ <b>describe how the influx of new populations that have not been planned for would burden public services and resources.</b></li> </ul>
10.5	Social Conditions: Mitigation and Enhancement Measures	Current text: “The Impact Statement must describe the mitigation and enhancement measures that will be implemented for all potential effects on social conditions, including:”	It is recommended the following bullet points be included in this section: <ul style="list-style-type: none"> <li>▪ Describe the proponent’s current and/or committed to drug and alcohol policy, including any drug and alcohol screening program. This policy should also include the development and delivery of education programs as well as describe available counselling and treatment resources.</li> <li>▪ Describe proponent’s existing and/or committed to expert crime prevention training program/policy. The program or policy should outline regular trainings on various crimes, violent and potential abusive acts by employees, contractors as well as others working on various aspects of the project.</li> </ul>
11.2.4	Economic Conditions: Effects to Economic		It is recommended the following bullet point be included in this section: <ul style="list-style-type: none"> <li>▪ describe the effects of inflation, if predicted, on local economic conditions.</li> </ul>

Section	Section Title	Comments	Recommendations
	Conditions; Economics		
11.3	Economic Conditions: Mitigation and Enhancement Measures	Current text: “The Impact Statement must describe the mitigation and enhancement measures that will be implemented for all potential effects on economic conditions, including: <ul style="list-style-type: none"> <li>identify opportunities for enhancing positive effects, such as creation of local employment and Indigenous employment, including: “</li> </ul>	It is recommended the following bullet point be included in this section: <ul style="list-style-type: none"> <li>“Describe the approach to providing cultural awareness training to all Project personnel, with an aim to enhance the understanding of the history of Indigenous Peoples (e.g., the history and legacy of residential schools, the United Nations Declaration on the Rights of Indigenous Peoples, Treaties and Aboriginal Rights, Indigenous laws”.</li> </ul>
12.0	Indigenous Peoples		It is recommended the following change be included in this section (in bold) <ul style="list-style-type: none"> <li><b>Commit to meaningful consultation and building respectful relationships with Indigenous peoples, including the</b> incorporation of Indigenous knowledge into the impact assessment, and view this knowledge as complementary and influential alongside western science;</li> </ul>
12.2.1	Indigenous Peoples: Current Use of Lands and Resources for Traditional Purposes: Baseline Conditions		This is another opportunity to refer to the Section 22 factor associated with Indigenous regional studies and plans as an important ingredient. In addition, MCFN recommends guidance that the proponent provide reasonable opportunity for Indigenous groups to review the Indigenous knowledge and land use information prior to submission of the Impact Statement, including in cases where information was obtained from public sources, to ensure it is submitted in its proper context.
12.4.1	Indigenous Peoples: Rights of Indigenous Peoples; Baseline Conditions	Current text: “Further information related to rights may include;”	The word “ <b>may</b> ” should be revised to “must, when information is available”. This will ensure that the important information described in the bullet points presented in the TISG is considered in the description of baseline and trend-over-time conditions. These are important factors.
12.4.2	Indigenous Peoples: Rights of Indigenous Peoples; <b>Impacts</b> on Rights of Indigenous Peoples	Existing text: “The proponent must work together with Indigenous groups to find mutually agreeable solutions to concerns raised about the project, especially for those concerns raised by Indigenous peoples about impacts on the exercise of their rights.  The Impact Statement must:”	It is recommended the following bullet point be included in this section: <ul style="list-style-type: none"> <li>describe agreed upon mitigation measures or accommodation measures.</li> </ul>
12.4.2	Indigenous Peoples: Rights of Indigenous Peoples; Impacts on Rights of Indigenous Peoples	Existing text: “The proponent and Indigenous groups may consider the following”	The word “ <b>may</b> ” should be revised to “ <b>must, when information is available</b> ”. This will ensure that the important information described in the bullet points presented in the TISG is considered in the description of baseline and trend-over-time conditions. These are important factors. If the proponent is unable to identify any of this information, then the proponent should be required to explain why the information is missing.
14.0	Residual Effects	27) <ul style="list-style-type: none"> <li>“Few persons would argue against the notion that environmental impact assessment (EIA) is concerned primarily with significant environmental impacts.” (Duinker and Beanlands 1986).</li> <li>Significance evaluation has been called the “universal and defining purpose” of EIAs (Wood 2008).</li> </ul>	27) a) Revise the item to read as follows: “The Impact Statement must: characterize the residual effects, even if deemed small or negligible, using criteria and language most appropriate for the effect. <b>A residual effect must not be identified as small or negligible without an adequate objective assessment consistent with CEAA (2012) guidance.</b> If an Indigenous group identifies that there are residual effects to rights or interests, those effects should be carried through for residual effects analysis;”

Section	Section Title	Comments	Recommendations
		Guidance provided by CEAA (2012) indicates that potential environmental effects should be evaluated in terms of them being adverse, significant and likely. A potential effect should not be dismissed without evidence. Unnecessary reliance on “professional judgment” in significance assessment is not considered good practice (Lawrence 2007b). Professional judgment should always be supported by appropriate criteria and justification. In addition, selection of valued components, evaluation of effects against thresholds, precautionary considerations and other factors should all be informed directly by the Indigenous communities potentially affected by each potential Project effect.	
15.0	Cumulative Effects Assessment	28) The lower Athabasca River and tributaries and the Peace-Athabasca Delta form an integrated Indigenous travel and access system. The fulfillment of the rights of Indigenous Peoples depends on the maintenance of navigability of these travel and access corridors. Any consideration of cumulative effects of the Project on water quantity should include assessment within all components.	28) a) Revise the item to read as follows: “The proponent must consider the following cumulative effects raised during the Planning phase in the cumulative effects assessment, or justify their exclusion, where appropriate: ... effects to water quantity and quality in Wood Buffalo National Park, and the PAD <b>and the lower Athabasca River and tributaries;</b> ”
15.0	Cumulative Effects Assessment	Current text: <ul style="list-style-type: none"> <li>“assess the cumulative effects for each VC, taking into account the following;</li> </ul>	It is recommended the following sub-bullet be included in this section: <ul style="list-style-type: none"> <li>IK provided to support the assessment of cumulative impacts on specific VCs, as verified by Indigenous groups;</li> </ul>
15.0	Cumulative Effects Assessment	Current text: “The proponent must consider the following cumulative effects raised during the Planning phase in the cumulative effects assessment, or justify their exclusion, where appropriate.”	It is recommended the following bullet point be included in this section: <ul style="list-style-type: none"> <li>effects on Indigenous country foods</li> </ul>
15.0	Cumulative Effects Assessment	Follow-up programs to assess the effectiveness of mitigation measures need to be scientifically defensible and supported by Indigenous knowledge, if available. Proponents need to provide enough detail such that their potential effectiveness can be evaluated based on the description. Follow-up programs should enable proponents to quantify the changes in plant community composition and abundance over time and evaluate the similarity of reclamation sites to pre-disturbance communities or adjacent reference or control areas.	Please revise the guidelines as follows: <i>“The Impact Statement must:</i> <ul style="list-style-type: none"> <li><i>develop a follow-up program to verify the accuracy of the assessment and the effectiveness of mitigation measures for applicable cumulative effects. <u>The follow-up program must be scientifically defensible and supported by Indigenous knowledge, if available, and it must be described in enough detail that stakeholders can evaluate its potential effectiveness in detecting changes in plant community abundance and distribution over time.</u>”</i></li> </ul>
15.0	Cumulative Effects Assessment	Suncor must consider the cumulative effects issues raised during the planning phase or justify their exclusion. A few details in the list of cumulative effects issues relating to wildlife and birds are missing.	Please revise the item to “ <i>effects related to fragmentation, including habitat disturbance and loss (both direct and indirect), barriers or changes to movement, and direct and indirect mortality of wildlife species, including birds and migratory birds (e.g. moose, caribou, furbearers important to Indigenous peoples, fish at the watershed level);</i> ”
16.1	Follow-up Programs: Follow-up Program Framework	If monitoring data indicates mitigation is not working as anticipated and Suncor implements additional or different mitigation, time is needed to gather sufficient data to evaluate whether the new mitigation is effective. According to the 2009 Operational Policy Statement under CEAA, “Adaptive management is a planned and systematic process for continuously improving environmental management practices by learning about their outcomes. Adaptive management provides flexibility to identify and implement new mitigation measures or to modify existing ones during the life of a project” (CEAA 2009).	Please revise the guideline to “ <i>The duration of the follow-up program must be as long as necessary to verify the accuracy of environmental, health, social and economic effects predicted during the impact assessment and to evaluate the effectiveness of the mitigation measures, including any adaptive measures implemented during the life of the project.</i> ”
16.2	Follow-up Programs: Follow-up Monitoring	Measuring the effectiveness of mitigation, which includes reclamation, requires that both the baseline and the future effects can be quantified. The effectiveness of mitigation measures can only be determined by a monitoring approach that is based on testable or answerable questions and includes adequate sampling and statistical procedures.	Please revise the guideline to “ <i>a description of the methodology and mechanism for monitoring the effectiveness of mitigation and restoration measures including how Indigenous peoples will be notified and incorporated into programing:</i> <ul style="list-style-type: none"> <li><i><u>To the extent possible, the impact statement should present data that may be used for a baseline or benchmark in setting targets, thereby providing the</u></i></li> </ul>



Section	Section Title	Comments	Recommendations
			<p><u>foundation needed in the future to demonstrate the effectiveness of mitigation measures.</u></p> <ul style="list-style-type: none"> <li>Where such data for benchmarks and targets are not presented, a schedule and a process by which such data will be provided and used in the development of follow-up and monitoring targets should be provided. The targets are to be used in defining the expected success of mitigation. As not all indicators or data are conducive to measurement using targets, the impact statement should clearly indicate where qualitative and quantitative goals are used in place of targets.”</li> </ul>
21.0	Appendix 2 – Additional Guidance	9) It would be preferable to see groundwater generally listed here, because mine pit depressurization water is also released from oil sands mines, which is not seepage but is groundwater, and tends to have very unusual quality compared to surface waters.	<p>9) Please revise the bullet as follows (remove text with strikethrough).</p> <ul style="list-style-type: none"> <li>• <b><i>construction of water management infrastructure to divert, control, collect and discharge surface drainage and groundwater seepage to the receiving environment (e.g. collector ditches, groundwater interception wells, sedimentation ponds, sumps, and pump and pipeline systems);</i></b></li> </ul>
21.2	Appendix 2 – Additional Guidance, Sources of Baseline Information	10) There are additional useful information sources that should be included in this list.	<p>10) Please revise the bullet as follows (add underlined text).</p> <ul style="list-style-type: none"> <li>o database searches, including federal, provincial, territorial, municipal and local data banks, namely: <ul style="list-style-type: none"> <li>Athabasca Chipewyan First Nation - Community Based Monitoring Program (<a href="https://datastream.org/dataset/9ea09cd1-6b3c-420d-ab1a-757972c6d1a3">https://datastream.org/dataset/9ea09cd1-6b3c-420d-ab1a-757972c6d1a3</a>)</li> <li>Mikisew Cree First Nation - Community Based Monitoring Program (<a href="https://datastream.org/dataset/1597f8d4-8290-44a2-9d9f-b4278fe6335e">https://datastream.org/dataset/1597f8d4-8290-44a2-9d9f-b4278fe6335e</a>)</li> <li>ECCC Long Term Monitoring Water Quality Monitoring Data for the Peace-Athabasca River Basin (<a href="https://open.canada.ca/data/en/dataset/0c31b924-9aaf-4ca0-ae29-276bafecf008">https://open.canada.ca/data/en/dataset/0c31b924-9aaf-4ca0-ae29-276bafecf008</a>)</li> <li>The Regional Aquatics Monitoring Program database (<a href="http://www.ramp-alberta.org/ramp/data.aspx">http://www.ramp-alberta.org/ramp/data.aspx</a>)</li> <li>The Alberta Long Term River Network (LTRN), Lake Water Quality (LWQ) program and other surface water quality data (<a href="https://www.alberta.ca/surface-water-quality-data.aspx">https://www.alberta.ca/surface-water-quality-data.aspx</a>)</li> <li>The federal (<a href="https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring.html">https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring.html</a>) and provincial (<a href="https://aws.kisters.net/OSM/applications/public.html?publicuser=Guest#waterdata/stationoverview">https://aws.kisters.net/OSM/applications/public.html?publicuser=Guest#waterdata/stationoverview</a>) databases for data generated by the Oil Sands Monitoring (OSM) program.</li> </ul> </li> </ul> <p><b><u>Other water quantity and quality data and information held by Indigenous communities in the lower Athabasca River, peace Athabasca Delta, and Lake Athabasca regions.</u></b></p>
21.2	Appendix 2 – Additional Guidance,	<p><b>Topic:</b> Sources for baseline information</p> <p><b>Comment Category:</b> Revision</p>	Please revise the guidelines as follows:

Section	Section Title	Comments	Recommendations
	Sources of Baseline Information	<b>Comments/Rationale:</b> The draft TISG provides a list of information sources for describing baseline environmental conditions and the list includes “ <i>published literature, including specialized publications.</i> ” Published literature can refer to a wide variety of publication types, some of which are more scientifically defensible than others. Publications that have undergone scrutiny by experts in the field (i.e., peer-reviewed) should be used whenever available, over those that have not. For example, papers and posters presented by researchers at a conference may be published in a book of conference proceedings, and therefore considered published literature. However, conference presentations typically feature research that is incomplete or has yet to be peer-reviewed and therefore any results presented may be preliminary or lack validity for a variety of reasons. In contrast, research published in peer-reviewed journals has been scrutinized by experts in the field and therefore, is far more likely to contain results that are scientifically defensible. Given the value of peer-reviewed research, it should be explicitly included as a preferred information source, to be used whenever possible.	<p>“<i>Information sources and data collection methods used for describing the baseline environmental, health, social and economic setting may consist of:</i></p> <ul style="list-style-type: none"> <li>• <i>published literature, including specialized publications, with preference given to literature that has been peer-reviewed and published in scientific journals;</i>”</li> </ul>
21.10	Appendix 2 – Additional Guidance: Compensation and Offset Plant	At a fundamental level, compensation ratios for fish and fish habitat will likely adhere to the principle of <i>no-net-loss</i> and so be justified at 1:1. However, this justification ignores the many sources of uncertainty that lie within the creation of new habitat to offset impacts (Moilanen et al 2009). As such, it is typical to also invoke the <i>precautionary principle</i> when proposing offset ratios. Highly uncertain impact assessments, or delayed compensation projects with unclear rates of success should be buffered with higher offset ratios. We note that a 2:1 ratio is proposed for wetlands for similar reasons, yet none are identified for fish and fish habitat.	Include uncertainty and the <i>precautionary principle</i> , as an explicit part of the rationale when assigning compensation and offsetting ratios.
21.10	Appendix 2 – Additional Guidance: Compensation and Offset Plant	The TISG list a series of six bullets that describe what is required for fish and fish habitat offsetting, and while none of the bullets listed are incorrect, they are not complete. First, there exists a large amount of federal science advice on offsetting (e.g. DFO 2014b), and as such, the TISG should explicitly state that the proponents will follow this advice to the best of their abilities. Second, the TISG should explicitly categorize the offsetting as <i>in-kind</i> (i.e. affecting the same habitat or species) or <i>out-of-kind</i> (i.e. affecting different habitats or fish communities) offsetting (DFO 2017). Once this categorization is made, the TISG should commit to using the appropriate metrics for each of these categories to ensure an “apples to apples” type comparison is made from compensation to impact. Finally, the TIGS should list the type of quantitative metrics that will be considered for making these calculations. Common metrics include: weighted usable area, fish abundance, Age-1-Equivalent biomass, or fish production (DFO 2017).	<p>Please include the following bullets within the list on the bottom half of pg. 121:</p> <ul style="list-style-type: none"> <li>• the relevant federal science advice on fish and fish habitat offsetting will be followed to the best of the proponent’s abilities (e.g. DFO 2017, DFO 2014b).</li> <li>• the offsets will be explicitly categorized and described as <i>in-kind</i> versus <i>out-of-kind</i> offsetting and the appropriate metrics will be described to ensure an “apples to apples” comparisons in the offset ratios.</li> <li>• list common quantitative metrics of habitat quality or fish production that will be used to calculate the offset ratios (e.g. Age-of-Equivalency, Production Forgone).</li> </ul>
21.12	Appendix 2 – Additional Guidance: Additional Guidance for Biophysical Components	Generally, the wording in this section is somewhat vague, indicating that the “ <i>guidance should be consulted</i> ”, leaving an open question as to how strictly Suncor is expected to adhere to the detailed guidance in Section 21.12. Given that the guidance in this section is quite detailed, it should be made clear how much or what proponents should address in their assessment. This concern is also relevant for Section 21.12 – Wildlife and Species at Risk.	Please revise the wording to provide some direction to Suncor regarding how strictly they must adhere to the information in Section 21.12.
21.12	Appendix 2 – Additional Guidance: Additional Guidance for Biophysical Components	There are some technical recommendations that are listed under Section 21.12 - Birds and their habitat that are relevant and should also be indicated under “Wildlife” and “Species at Risk” sections. The guidance should ensure adequate sample sizes for baseline datasets which is useful for improving prediction accuracy and for use in follow-up monitoring programs to evaluate predictions and mitigation effectiveness.	<p>Please consider adding the following guidelines under Section 21.12 – Wildlife (copied from 21.12 – Birds and their habitat):</p> <ul style="list-style-type: none"> <li>• “<u>survey protocol planning should include modeling and simulations to estimate sampling requirements and analysis to evaluate resulting survey options. It is recommended to:</u></li> <li>• <u>collect field data over at least two years. The goal of collecting data over multiple years is to improve the understanding of natural variability in populations. Two years of</u></li> </ul>

Section	Section Title	Comments	Recommendations
			<p><u>sampling is suggested as a minimum. As the number of sampling years increases so does the understanding of natural variability;</u></p> <ul style="list-style-type: none"><li>• <u>plan sample size to support evaluation of the project study area within the context of the local study area and regional study area. Appropriate design of surveys will need to consider multiple survey locations in order to represent the habitat heterogeneity of the RSA, and to yield multiple survey locations per land cover or habitat class, without requiring aggregation of habitat classes post-hoc;</u></li><li>• <u>design sampling effort per unit area - field survey effort to be most intensive within the project study area. The level of effort per unit area may be similar or somewhat less within the remainder of the LSA, but should be scaled to the likelihood that project effects will effect birds within that zone. Efforts outside the project study area should be carefully designed to ensure that estimates comparing within and across the project area, LSA, and RSA are unbiased and as precise as possible; and</u></li><li>• <u>use simulation modelling to assess bias and precision between project area, LSA, and RSA to ensure the estimates are useful for comparison;”</u></li></ul>