

KINROSS

Great Bear

Great Bear Gold Project Impact Statement

Appendix W-5:

Climate Change Roadmap





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Acronyms and Abbreviations

ANA	Asubpeeschoseewagong Netum Anishinabek
ECCC	Environment and Climate Change Canada
fVC	Valued component under federal jurisdiction
GHG Emissions	Greenhouse gas emissions
IPCC	Intergovernmental Panel on Climate Change
LSA	Local study area
LSFN	Lac Seul First Nation
NWOMC	Northwestern Ontario Métis Community
PA	Project area
pVC	Pathway valued component
RCP	Representation Concentration Pathway
RSA	Regional study area
SAR	Species at Risk
SSP	Shared Socioeconomic Pathway
TISG	Tailored Impact Statement Guidelines
WFN	Wabauskang First Nation

1.0 Introduction

This Climate Change Roadmap has been developed to support the Impact Statement for the Project for the Great Bear Project (Project). The roadmap outlines where and how climate change was considered throughout the Impact Statement.

Climate change is a dynamic process that can affect how projects interact with the environment over the long term. Climate change can modify the potential environment effects of a project by altering thermal and hydrologic regimes. Projects can affect the climate by emitting greenhouse gases (GHGs), and in turn, the climate can affect the resilience of projects over the long term by changing the frequency and magnitude of weather events. As such, climate change has been considered throughout the Impact Statement in primarily the following manner:

- 1) Consideration of climate change by valued component
- 2) Identifying potential effects of the Project on climate change
- 3) Identifying potential effects of climate change on the Project.

Table 1, Table 2 and Table 3 summarize where climate change has specifically been incorporated into the Impact Statement aligned with these topics. For each of the primary sections where climate change was incorporated into the Impact Statement, the table summarizes how climate change was considered, whether the methods were quantitative or qualitative, and the overall approach and key assumptions:

- Table 1 identifies the sections of the Impact Statement where effects of climate change were considered as part of the assessment of effects on the environment for each valued component, including both the federal valued components (fVCs) and the pathway components (pVCs), as defined in Effects Assessment Methodology (Section 6) of the Impact Statement. Climate change projections developed for the proposed Project were applied where applicable, to identify the effects of climate change on the pVC or fVC (Section 7 to Section 15). The approach for the incorporation of climate change was based on the potential for climate change to influence the valued component.
- Table 2 identifies the section of the Impact Statement that evaluated the effects of the Project on climate change. The Project has the potential to emit GHGs which contribute to climate change. Further detail regarding Project-related GHG emissions is provided in WSP (2025a).
- Table 3 identifies the sections of the Impact Statement that considered how climate change may have potential to impact the Project. Changes in future climate regimes could affect Project infrastructure and activities. The detailed climate change dataset developed for the Project (WSP 2025b) was not only used to assess the impacts of climate change on the valued components, but they were also used to support the Climate Risk and Resilience Assessment presented in WSP (2025c).

Table 1: Consideration of Climate Change by Valued Component

Valued Component	Quantitative or Qualitative Methods	Approach Summary	Key Assumptions
Air Quality: Section 7.2: Air Quality Appendix D-2: Air Quality Modelling Report	Qualitative The effects of climate change are not considered in this section.	<ul style="list-style-type: none"> Climate change has the potential to affect dispersion of air contaminants due to potential changes in wind patterns. There is uncertainty in how average winds speeds and wind direction will change over time and therefore it is difficult to project chronic changes to air containment dispersion. As such, air quality was assessed using a conservative modelling approach across the Project phases. Proposed mitigation measures such as a dust management plan will provide a proactive approach for recognizing and managing climate change impacts to air quality. 	<ul style="list-style-type: none"> Not applicable
Sound: Section 7.3: Appendix E-2: Noise Modelling Report	Climate change is not anticipated to materially interact with the noise assessment criteria for the Project.	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable
Vibration: Section 7.4 Appendix F: Blasting Assessment Report	Climate change is not anticipated to materially interact with the vibration assessment criteria for the Project.	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable
Groundwater: Section 7.5: Groundwater Appendix H-1: Hydrogeology Baseline Report Appendix H-2: Hydrogeology Modelling Report	Qualitative The site-specific climate change dataset (WSP 2025b) was used in the development for the hydrogeological baseline conditions and modelling, which was the basis of the hydrogeological modelling for the Project.	<ul style="list-style-type: none"> The site-specific climate change dataset (WSP 2025b) was used in the development of the hydrological baseline conditions, which incorporated various temperature, precipitation and evaporation / evapotranspiration indicators for the Project site. Using the baseline conditions, hydrogeological modelling was completed under six potential scenarios, to predict groundwater response to the proposed Project. Sensitivity analyses were conducted to assess variability in groundwater inflows, outflows, and seepage, including scenarios that could reflect future environmental changes (e.g., changes in recharge rates or hydrologic conditions). These sensitivity cases are designed to capture a range of plausible future conditions. 	<ul style="list-style-type: none"> The site-specific climate change dataset was only integrated in the hydrogeological baseline conditions and modelling. Due to the non-linear response between changes in climate and the influence it will have on groundwater, high uncertainty exists. As such, a sensitivity analysis was completed to capture a range of recharge rates from complex interactions resulting from the differing trends of climate variables that could influence recharge rates (e.g., changes in precipitation, changes in snowpack, changes in drought). The sensitivity analysis was completed to capture plausible future conditions for the Project.
Surface Water Flows and Levels: Section 7.6: Surface Water Flows and Levels Appendix I-2: Mine Site Water Balance Report Appendix 1-3: Receiver Water Balance Report	Quantitative The assessment of changes to surface water flows and levels and water quality included simulations under various climate conditions and climate change scenarios. These scenarios were modelled to evaluate the potential impacts of both typical and extreme future climate conditions on surface water systems and water quality.	<ul style="list-style-type: none"> The site-specific climate change dataset (WSP 2025b) developed for the Project was used to support this assessment of surface water and water quality. The modelling approach was intentionally conservative, presenting the greatest simulated change in flow as well as quality, and assuming that these changes could occur under the most extreme plausible climate conditions. 	<ul style="list-style-type: none"> Climate projections for 2071 to 2100 (2080s or end-of-century) were utilized for modelling, and the 50th percentile values were adopted. The use of the longer-term projections (2071 to 2100) was considered more conservative than the use of the near-term projections (2041 to 2060) for modelling across the Project phases.

Valued Component	Quantitative or Qualitative Methods	Approach Summary	Key Assumptions
<p>Water Quality: Section 7.7: Water Quality Appendix K-2: Mine Site Water Quality Modelling Report Appendix K-3: Receiver Water Quality Modelling Report</p>	<p>Quantitative The assessment of changes to surface water flows and levels and water quality included simulations under various climate conditions and climate change scenarios. These scenarios were modelled to evaluate the potential impacts of both typical and extreme future climate conditions on surface water systems and water quality.</p>	<ul style="list-style-type: none"> • The site-specific climate change dataset (WSP 2025b) developed for the Project was used to support this assessment of surface water and water quality. • The modelling approach was intentionally conservative, presenting the greatest simulated change in flow as well as quality, and assuming that these changes could occur under the most extreme plausible climate conditions. 	<ul style="list-style-type: none"> • Climate projections for 2071 to 2100 (2080s or end-of-century) were utilized for modelling, and the 50th percentile values were adopted. The use of the longer-term projections (2071 to 2100) was considered more conservative than the use of the near-term projections (2041 to 2060) for modelling across the Project phases.
<p>Vegetation Communities: Section 7.8: Vegetation Communities Appendix M-2: Terrestrial Technical Methods and Results</p>	<p>Qualitative The assessment considered climate change effects on vegetation ecosystems and traditional use plants qualitatively for different climate variables (i.e., increased temperature, precipitation, and evapotranspiration rates), and scientific literature.</p>	<ul style="list-style-type: none"> • Climate change scenarios were incorporated into the Project's hydrological modelling to evaluate the effect of climate change on the hydrology (e.g., surface water elevation), which was considered for the direct and indirect impact assessment of vegetation. • The influence of climate change using scientific literature on vegetation ecosystems and traditional use plants was assessed qualitatively. 	<ul style="list-style-type: none"> • Not applicable
<p>Wild Rice: Section 7.9: Wild Rice Appendix M-2: Terrestrial Technical Methods and Results</p>	<p>Qualitative The assessment considered climate change effects on Wild Rice and traditional use indirectly for different climate variables (i.e., increased temperature, precipitation and evapotranspiration rates).</p>	<ul style="list-style-type: none"> • Climate change scenarios were incorporated into the Project's surface water flows and levels and water quality assessments, which were considered for the direct and indirect impact assessment of Wild Rice. 	<ul style="list-style-type: none"> • Not applicable
<p>Moose: Section 7.10: Moose Appendix M-2: Terrestrial Technical Methods and Results</p>	<p>Qualitative The assessment follows Ontario's approach to Moose habitat management which recognizes that climate change may have an impact on Moose habitat, as climate change may provide large scale pressure on wildlife habitat. This is a proactive approach to Moose habitat management, which provides adaptive management measures and monitoring throughout the life of the Project.</p>	<ul style="list-style-type: none"> • This assessment uses the Ontario Landscape Tool which considers forest composition, tree species distribution, stand structure, age distribution, and wetlands across Ontario's managed forests on a 10-year basis. • Proposed adaptive management measures such as monitoring and habitat rehabilitation will provide a proactive approach to recognizing and managing climate change impacts to Moose. • Climate change scenarios were incorporated into the Project's surface water flows and levels and water quality assessments, which were considered for the potential effects to Moose. 	<ul style="list-style-type: none"> • Not applicable
<p>Other Wildlife: Section 7.11: Other Wildlife Appendix M-2: Terrestrial Technical Methods and Results</p>	<p>Qualitative The assessment considered climate change effects on other wildlife indirectly for different climate variables (i.e., increased temperature, precipitation, and evapotranspiration rates).</p>	<ul style="list-style-type: none"> • Climate change scenarios were incorporated into the Project's surface water flows and levels and water quality assessments, which were considered for the potential effects to other wildlife. 	<ul style="list-style-type: none"> • Not applicable

Valued Component	Quantitative or Qualitative Methods	Approach Summary	Key Assumptions
<p>Species at Risk: Section 7.12: Species at Risk Appendix M-2: Terrestrial Technical Methods and Results</p>	<p>Quantitative The assessment of Boreal Caribou Sydney Range vital rate and population growth rate was modelled and included climate change projections for temperature and precipitation variables as inputs to the model.</p>	<ul style="list-style-type: none"> Climate projection sources followed the government-approved methodology and model (industry accepted approach) for considering climate change on vital rate and population growth rate. Monthly climate change projections for temperature and precipitation were incorporated into the Project's vital and population growth model for the Boreal Caribou Sydney Range. Representative concentration pathway (RCP) 8.5 climate scenario was used for this modelling. 	<ul style="list-style-type: none"> Climate projections for temperature and precipitation were limited to the 2010 to 2060 time period. RCP 8.5 climate scenario was used in this assessment, which is derived from the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report, which differs from the site-specific climate change dataset (WSP 2025b), which uses the IPCC 6th Assessment Report under Shared Socioeconomic Pathway (SSP) scenarios. RCP 8.5 climate scenario is comparable to the SSP5-8.5 climate scenario that is used in the site-specific climate change dataset developed for the Project.
<p>Land and Resources Use: Section 7.13: Land and Resource Use</p>	<p>Qualitative Influences of climate change on land and resource are considered through pathway linkages to surface water flows and levels, water quality and changes to fish and fish habitat, which consider climate change projections in their assessments.</p>	<ul style="list-style-type: none"> Climate change scenarios were incorporated into the Project's surface water flows and levels, water quality analysis and changes to fish and fish habitat, which was considered for the potential effects to land and resource use. 	<ul style="list-style-type: none"> Not applicable
<p>Cultural Heritage: Section 7.14: Cultural Heritage</p>	<p>Climate change is not anticipated to materially interact with the cultural heritage assessment criteria for the Project.</p>	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable
<p>Archaeology: Section 7.15: Archaeology</p>	<p>Climate change is not anticipated to materially interact with the archaeological assessment criteria for the Project.</p>	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable
<p>Local and Regional Economy: Section 7.16: Local and Regional Economy</p>	<p>Climate change is not anticipated to materially interact with the local and regional economy assessment criteria for the Project.</p>	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable
<p>Fish and Fish Habitat: Section 8: Analysis of Changes to Fish and Fish Habitat</p>	<p>Qualitative The effects of projected climate change on fish and fish habitat were considered in the assessment through the inclusion of a climate change scenario in the hydrological data inputs to the surface water flows and levels and water quality modelling.</p>	<ul style="list-style-type: none"> The assessment incorporated a precautionary approach, assuming that watercourses and waterbodies not currently occupied by fish could become frequented by fish in the future due to long-term natural variation and climate change. This led to these areas being considered for regulatory authorization and mitigation, even if they are not currently fish habitat. The assessment evaluated potential changes to streamflow, water levels, and fish habitat, using thresholds that account for possible climate-driven variability. The spatial and temporal boundaries for the assessment were defined to include future scenarios, and the modelling of surface water interactions considered the potential for climate change to alter hydrological patterns. 	<ul style="list-style-type: none"> Not applicable

Valued Component	Quantitative or Qualitative Methods	Approach Summary	Key Assumptions
<p>Migratory Birds: Section 9: Analysis of Changes to Migratory Birds</p>	<p>Qualitative The assessment indirectly considered climate change effects on migratory bird habitat.</p>	<ul style="list-style-type: none"> Climate change scenarios were incorporated into the Project's surface water flows and levels and water quality analyses, which was considered for the potential effects on migratory bird habitat. 	<ul style="list-style-type: none"> Not applicable
<p>Indigenous Peoples: Sections 10 to 14: Analysis of Change to Indigenous Peoples Appendix N-1: Human Health and Ecological Risk Assessment Appendix N-2: Health Impact Assessment</p>	<p>Qualitative Climate change has the potential to influence lands and resources for traditional use. These potential impacts (e.g. climate change impacts to water flow) were identified during consultation and engagement as an aspect that should be included within the Environmental Impact Statement.</p> <p>Indirect influences of climate change on land and resources for traditional use are considered through pathway linkages to surface water flows and levels, water quality, changes to fish and fish habitat, and terrestrial assessments which consider climate change projections in their assessments.</p>	<ul style="list-style-type: none"> Climate change scenarios were incorporated into the Project's surface water flows and levels, water quality analysis, changes to fish and fish habitat, and terrestrial assessment which was considered for the potential effects to Indigenous Peoples. 	<ul style="list-style-type: none"> Not applicable

Table 2: Potential Effect of the Project on Climate Change

Impact Statement Section	Quantitative or Qualitative Methods	Approach Summary	Key Assumptions
<p>Section 4: Alternatives Assessment Appendix W-1: Net-zero Plan</p>	<p>Qualitative The GHG emissions were considered as a key technical and economic performance criteria in the assessment of alternatives for the Project. A Net-Zero Plan has been prepared for the Project following the requirements of the Strategic Assessment of Climate Change developed by Environment and Climate Change Canada (ECCC 2021), to demonstrate the commitment of Great Bear Resources for climate action and GHG mitigation in alignment with the Net-Zero Emissions Accountability Act.</p>	<ul style="list-style-type: none"> Assessment of alternatives used GHG emissions as a key indicator in assessing alternatives to the Project. That is, how alternatives that release less GHG emissions to the environment, and thus are supportive net-zero GHG emissions by 2050. A Net-Zero Plan was developed for the project which outlines technologies, energy source options, operating practices, and environmental practices to be implemented for the reduction of GHG emissions from all phases and all activities at the Project. Where residual GHG emissions cannot be mitigated using current technologies, carbon offset credits may be used to bring the GHG emissions to net-zero. 	<ul style="list-style-type: none"> Not applicable
<p>Section 5.13: Atmospheric Emissions Appendix D-3: Greenhouse Gas Assessment</p>	<p>Quantitative The Greenhouse Gas Assessment estimated GHG emissions for direct and acquired sources to identify the effects of the Project on climate change during construction, operations, and decommissioning and closure.</p>	<ul style="list-style-type: none"> The estimated GHG emissions were compared to the provincial and federal GHG levels as well as the provincial and federal inventories specific to heavy industry emissions. Project's emission intensity was calculated based on GHG emitted per kilogram of gold produced on an annual basis and compared to the global average intensity for on-grid gold production, as well as other publicly available intensities. Upstream GHG emissions were estimated at a high-level for comparison with the Strategic Assessment of Climate Change's threshold for requiring a full upstream emission assessment. The estimate emissions were below the threshold and therefore detailed calculations were not completed. 	<ul style="list-style-type: none"> Uncertainty associated with GHG emissions was addressed by making assumptions that overestimated rather than underestimated potential effects. A worst-case scenario was assumed while calculating GHG emissions based on maximum expected value in a given year.
<p>Appendix R: Assessment of Alternatives for Storage of Mine Waste</p>	<p>Qualitative The assessment considers GHG emissions as an indicator in the evaluation of mine waste management of alternatives assessment.</p>	<ul style="list-style-type: none"> Mobile GHG emission sources (the number of trucks required to manage waste activity) were considered for each waste stream. Alternatives that require fewer number of trucks and trips were preferred. 	<ul style="list-style-type: none"> Not applicable

Table 3: Potential Effects of Climate Change on the Project

Key Impact Statement Sections	Quantitative or Qualitative Methods	Approach Summary	Key Assumptions
Section 2: Environmental Setting	<p>Qualitative</p> <p>Current and projected climate conditions for a range of climate variables such as temperature, precipitation, wind speed and wind direction were considered for the Project design.</p>	<ul style="list-style-type: none"> The current climate change conditions were used to support the Project design, while the future climate projections were used to evaluate the Project design parameters. Appendix W-4, Climate Risk and Resilience Report, has been prepared to identify how current and projected climate might affect the Project infrastructure and Project activities during different stages of the Project lifespan. 	<ul style="list-style-type: none"> Not applicable
Section 4: Alternatives Assessment	<p>Qualitative</p> <p>Climate change is considered qualitatively through natural environment criteria, such as surface water flows and levels, water quality, and changes to fish and fish habitat assessments.</p>	<ul style="list-style-type: none"> Climate change scenarios were incorporated into the natural environment criteria assessments, which were considered as criteria in the alternatives assessment. 	<ul style="list-style-type: none"> Not applicable
Section 5: Project Description Appendix S: Preliminary Closure Plan for Impact Statement	<p>Qualitative and Quantitative</p> <p>Current and projected climate conditions for a range of climate variables such as temperature, precipitation, wind speed and wind direction were considered for the Project design. Designing for closure and post-closure conditions which are more likely to be affected by climate change, are an important aspect of the overall design.</p>	<ul style="list-style-type: none"> The current climate change conditions were used to support the Project design, while the future climate projections were used to evaluate the Project design parameters. Appendix W-4, Climate Risk and Resilience Report, has been prepared to identify how current and projected climate might affect the Project infrastructure and Project activities during different stages of the Project lifespan. 	<ul style="list-style-type: none"> Not applicable
Section 17: Effects of the Environment on the Project Appendix W-3: Detailed Climate Dataset Appendix W-4: Climate Risk and Resilience Assessment	<p>Qualitative and Quantitative</p> <p>A detailed climate change dataset was developed for the Project (WSP 2025b). Using the dataset, Appendix K summarizes climate trends. The dataset includes a review of the current climate and future climate projections for the Project region, and a discussion of the climate baseline and future projections for temperature, precipitation and extreme indices.</p> <p>Potential risks to the Project's infrastructure as a result of climate change are identified for two future time-horizons to represent the Project phases.</p> <p>A summary of risk treatment and adaptation measures are provided.</p> <p>Section 17 provide a qualitative summary of the potential impacts to the Project and identified mitigation measures.</p>	<ul style="list-style-type: none"> Site-specific future climate projections were developed for the Project through analysis of available projections from a multi-model ensemble. The multi-model ensemble consists of available regional scale projections from several climate models representing different future climate scenarios (e.g., level of GHG emissions) (WSP 2025a). The assessment of risks to infrastructure is based on a qualitative, high-level risk approach of identifying of how current and projected climate might affect the Project and applying risk scores to each potential impact, using qualitative consequence and likelihood scales. The site-specific climate projections developed in are used for identifying trends to understand how risks may change over time. 	<ul style="list-style-type: none"> The projected changes in climate were estimated using industry standard approaches for a set of climate indicators, which are used to represent the occurrence of climate hazards under current and future climate conditions. This was done to understand the climate signals (probability of change) associated with the different reoccurrence periods, across the time horizons within the modelled data The projected climate for period from 2041 to 2070 represents a conservative estimate for the 2050s, and the period from 2071 to 2100 represents a conservative estimate for the 2070s, in terms of climate change during the Project lifespan.

2.0 References

Environment and Climate Change Canada (ECCC). 2021. Draft Technical Guide Related to the Strategic Assessment of Climate Change. Government of Canada.

WSP Canada Inc. (WSP). 2025a. Great Bear Project, Greenhouse Gas Assessment.

WSP Canada Inc. (WSP). 2025b. Great Bear Project, Detailed Climate Change Dataset.

WSP Canada Inc. (WSP). 2025c. Great Bear Project, Climate Risk and Resilience Report.