



**CULTURAL HERITAGE ASSESSMENT
BASELINE
APPENDIX C – LINKAGE TABLE**

**Fort McKay
Specific Assessment**

**Fort McKay
Industry Relations Corporation**

March 2010

Linkage between Indicators Assessed In the Environmental Specific Assessment and Measures of Industry Stressors Proposed By the Community

Environmental Component	Indicator from Environmental Specific Assessment	Effected Traditional Activity(s)	Measure of Industry Stressor Proposed by the Community
<p>Air Quality</p>	<p>Air quality</p> <ul style="list-style-type: none"> • Sulphur dioxide (SO₂) • Nitrogen Oxide (NO₂) • Ozone (O₃) • Particulate Matter (PM_{2.5}) • Particulate Matter (PM₁₀) • Carbon Monoxide (CO) • Benzene • Benzo-a-pyrene • Arsenic • Nickel • Total Hydrocarbons (THC) • Total Reduced Sulphur (TRS) <p>Odours</p> <ul style="list-style-type: none"> • Hydrocarbons (THC) • Total Reduced Sulphur (TRS) • Volatile Organic Compounds (VOCs) • H₂S (Hydrogen Sulphide) • Carbon Disulphide (CS₂) • Mercaptans • Thiophenes <p>Vegetation/Ecosystem Effects</p> <ul style="list-style-type: none"> • Sulphur dioxide (SO₂) • Nitrogen Oxide (NO₂) • Ammonia (NH₃) • Ozone (O₃) • Nitrogen deposition • Potential acid input (PAI) 	<ul style="list-style-type: none"> • Gathering • Hunting • Trapping • Fishing <p>Education (indirectly through hesitation to carry out Traditional Activities)</p>	<p>Industry Stressor: Pollution</p> <ul style="list-style-type: none"> • Air quality (visual and measured) • Smell

Environmental Component	Indicator from Environmental Specific Assessment	Effected Traditional Activity(s)	Measure of Industry Stressor Proposed by the Community
Groundwater	<ul style="list-style-type: none"> • Direct loss of groundwater resources (e.g. mine pits) • Groundwater quantity changes leading to drawdown of surface water in fens and at specific traditional use sites (e.g. cabins) • Groundwater quality and quantity changes that lead to potential seepage of process affected water to wetlands, surface water and specific traditional use sites 	<ul style="list-style-type: none"> • Fishing • Hunting • Trapping <p>Education (indirectly through hesitation to carry out Traditional Activities)</p>	<p>Industry Stressor: Pollution</p> <ul style="list-style-type: none"> • Water quality • Water quality perception <p>Industry Stressor: Industrial Water Use</p> <ul style="list-style-type: none"> • Volume of permitted industrial water use/year • Water quantity
Surface Water	<ul style="list-style-type: none"> • Change in the magnitude and frequency of seasonal flows. • Percentage of watershed area undergoing change due to development and related land-use activity. • The two key indicators provide a first order overview of the state of surface water in a given watershed. This qualitative assessment points more to the need for water management planning than the potential state of a particular component. Watershed state is ranked as sustainable, threatened, or endangered. 	<ul style="list-style-type: none"> • Fishing • Hunting • Trapping <p>Education (indirectly through hesitation to carry out Traditional Activities)</p>	<p>Industry Stressor: Industrial Water Use</p> <ul style="list-style-type: none"> • Volume of permitted industrial water use/year • Water quantity <p>Industry Stressor: Loss of land</p> <ul style="list-style-type: none"> • % of land disturbed
Water Quality	<p>Key water quality parameters</p> <ul style="list-style-type: none"> • Naphthenic acids, • Polycyclic aromatic hydrocarbons (PAHs), • Total dissolved solids (TDS) or salinity (i.e. sodium), • Metals, • Acute and chronic toxicity, • Tainting potential, • Temperature, and • Dissolved oxygen. <p>Fish habitat loss</p> <p>Aquatic Change Index (high, moderate, low) based on whether water quality parameters exceed guidelines (and to what magnitude) provides quick guide as to magnitude of predicted change in given water quality variable, or change in fish habitat.</p>	<ul style="list-style-type: none"> • Fishing • Gathering • Hunting • Trapping <p>Education (indirectly through hesitation to carry out Traditional Activities)</p>	<p>Industry Stressor: Pollution</p> <ul style="list-style-type: none"> • Water quality • Water quality perception

Environmental Component	Indicator from Environmental Specific Assessment	Effected Traditional Activity(s)	Measure of Industry Stressor Proposed by the Community
Wildlife	<ul style="list-style-type: none"> • moose habitat • moose density/populations • Canada lynx habitat • fisher/marten habitat • beaver habitat 	<ul style="list-style-type: none"> • Hunting • Trapping Education (indirectly through inability to carry out Traditional Activities)	<p>Industry Stressor: Loss of Land</p> <ul style="list-style-type: none"> • % of land disturbance • Changes to wildlife abundance/distribution • Habitat disturbance • Loss of TLU sites <p>Industry Stressor: Pollution</p> <ul style="list-style-type: none"> • Increased population
Biodiversity	<p>biodiversity potential by:</p> <ul style="list-style-type: none"> • ecodistricts (Landsat classification) • biodiversity potential by ecosite phase (AVI) and wetlands type (AWWI) biodiversity potential by regional land cover classes (Landsat classification)	<ul style="list-style-type: none"> • Fishing • Trapping • Hunting • Berry Picking • Gathering Education (indirectly through inability to carry out Traditional Activities)	<p>Industry Stressor: Loss of land</p> <ul style="list-style-type: none"> • % land disturbance • Change in vegetation abundance/distribution/quality <p>Industry Stressor: Pollution</p>
Upland Vegetation Communities	<ul style="list-style-type: none"> • class area of cover • old growth • riparian communities • timber productive and non-productive (by age class) • rare plant potential • traditional plant potential • dust (ecosite phase) • landscape heterogeneity (of regional upland cover classes) • fragmentation (of natural areas, forested & non-forested areas) 	<ul style="list-style-type: none"> • Fishing • Hunting • Trapping • Berry Picking • Gathering Education (indirectly through inability to carry out Traditional Activities)	<p>Industry Stressor: Loss of Land</p> <ul style="list-style-type: none"> • % land disturbance • Change in vegetation abundance/distribution/quality • Loss of TLU sites • Loss of “berry” sites <p>Industry Stressor: Pollution</p> <ul style="list-style-type: none"> • Air quality (visual and measured)

Environmental Component	Indicator from Environmental Specific Assessment	Effected Traditional Activity(s)	Measure of Industry Stressor Proposed by the Community
Wetland Vegetation Communities	<ul style="list-style-type: none"> class area of cover old growth riparian communities timber productive and non-productive (by age class) rare plant potential traditional plant potential dust (wetland class) landscape heterogeneity (of wetland regional cover class) 	<ul style="list-style-type: none"> Fishing Hunting Trapping Berry Picking Gathering <p>Education (indirectly through inability to carry out Traditional Activities)</p>	<p>Industry Stressor: Loss of Land</p> <ul style="list-style-type: none"> % land disturbance Change in vegetation abundance/distribution/quality Loss of TLU sites Loss of “berry” sites <p>Industry Stressor: Pollution</p> <ul style="list-style-type: none"> Water quality Water quality perception <p>Industry Stressor: Pollution</p> <ul style="list-style-type: none"> Air quality (visual and measured)
Traditional Use (Individual Species)	<p>furbearers</p> <ul style="list-style-type: none"> likely beaver and muskrat <p>traditional use plants species</p> <ul style="list-style-type: none"> cranberries, rat-root, and sphagnum moss 	<ul style="list-style-type: none"> Fishing Hunting Trapping Berry Picking Gathering <p>Education (indirectly through inability to carry out Traditional Activities)</p>	<p>Industry Stressor: Access to Land</p> <ul style="list-style-type: none"> Alteration to trails/roads <p>Industry Stressor: Loss of Land</p> <ul style="list-style-type: none"> Loss of TLU sites Loss of “berry habitat
Traditional Use & Access	<ul style="list-style-type: none"> Traditional trails 	<ul style="list-style-type: none"> Fishing Hunting Trapping Berry Picking Gathering <p>Education (indirectly through inability to carry out Traditional Activities)</p>	<p>Industry Stressor: Access to Land</p> <ul style="list-style-type: none"> Alterations to trails/roads

Environmental Component	Indicator from Environmental Specific Assessment	Effected Traditional Activity(s)	Measure of Industry Stressor Proposed by the Community
Disturbance and Reclamation of Traditional Land Use Resources/ Areas	Disturbance of various traditional land use resources/areas: <ul style="list-style-type: none"> • large game harvesting, (McKillop 1992) • berries (McKillop 1992) • fish (McKillop 1992) • furbearers, (McKillop 1992) • birds (McKillop 1992) • all uses (McKillop 1992) • Fort McKay Traditional Lands • 40 township area • Traplines • subwatersheds • Fort McKay candidate protected areas Area disturbed and reclaimed over time by project	<ul style="list-style-type: none"> • Fishing • Hunting • Trapping • Gathering • Berry Picking Education (indirectly through inability to carry out Traditional Activities)	Industry Stressor: Loss of Land <ul style="list-style-type: none"> • % of land disturbance • Habitat disturbance • Loss of TLU sites • Loss of “berry” habitat • % of land disturbance by Trapline • % of proposed protected area disturbed