TABLE 9.1
SUMMARY OF STATUS OF THE ENVIRONMENT ASSESSMENT FOR CURRENT CONDITIONS AND TRENDS

SYMBOL KEY: Assessment of the Current Condition: ▲ Favourable; — Intermediate; ▼ Unfavourable
Assessment of the Trend: ✔ Improving; ? Uncertain; ✘ Deteriorating

Valued Component	Indicator	Current Condition	Trend	Comments
AIR QUALITY, CLIMATE, AND CLIMATE CHANGE				
Air Quality	Particulate Matter Concentrations	▲	✔ to ?	**Current Condition:** • The four operating air quality (AQ) monitoring stations provide a good baseline for assessing AQ impacts in the NWT from future oil and gas and other industrial developments. **Trend:** • Future AQ trends are uncertain as the NWT is experiencing pressure for large-scale industrial developments. The GNWT does not have jurisdiction over industrial developments that are not located on community lands, and therefore has no enforcement capability in the event of AQ impacts from such developments. **Gaps:** • Surveillance could be enhanced by adding at least one more monitoring station in the Fort Simpson/Wrigley area to capture the effects of pipelines and compressors in the area. • Need additional monitoring for VOCs and methane for oil and gas developments
	SO_2/NO_x Concentrations	▲	✔ to ?	
	POPs	▲	✔	**Current Condition:** • In general, the Canadian northern atmosphere contains lower levels of POPs and heavy metals than those found over most other circumpolar countries. • Negotiations for a legally binding global instrument on POPs under the United Nations Environment Programme were completed with the signing of the POPs Convention in Stockholm, Sweden on May 23, 2001. **Trend:** • The coming into being of the POPs Convention should result in a favourable trend. **Gaps:** • Continued monitoring of legacy POPs is required to clearly discern trends for those that are still being used in some parts of the world. • Monitoring of new POPs is also required to determine whether any of these contaminants shows signs of accumulation in the North.
	Mercury	▲	✔ to ?	**Current Condition:** • Generally atmospheric mercury levels are not of concern, however, Current data still make it uncertain whether atmospheric mercury levels are increasing or decreasing. **Trend:** • Current data still make it uncertain whether atmospheric mercury levels are increasing or decreasing. **Gaps:** • Canada has signed onto several plans and protocols demonstrating its commitment to controlling mercury. • More research is required on transportation pathways, source apportionment (natural vs. anthropogenic) and the processes by which atmospheric mercury is deposited and accumulated in terrestrial, aquatic and marine ecosystems. • Continued research is required to assess the importance and nature of mercury depletion events.
Climate	Temperature	▼	? to ✘	**Current Condition:** • Since 1945, the western half of the Northwest Territories has exhibited a warming trend, mostly in the winter and spring. There is evidence to suggest that in the Mackenzie region, this trend may go back to the late 1900's or before. **Trend:** • Increases in global mean temperatures have been predicted as a result of increases in atmospheric greenhouse gases generated by human activities. These changes have been predicted to be greatest in the polar region. **Gaps:** • As a result of budget cuts several NWT monitoring stations have been closed and the national climatological network of temperature and precipitation monitoring has lost numerous stations. • Particular areas with data gaps in the NWT are the Mackenzie Mountains, Mackenzie River east bank, north of Great Bear Lake, Coppermine River basin, North Slave, and South Slave.
	Precipitation	—	?	**Current Condition:** • Precipitation has shown an increase in the Tundra portion of the Canadian Arctic since 1945, however, there is no clear trend on an annual basis in other regions of the NWT. **Trend:** • Precipitation has shown an increase in the Tundra portion of the Canadian Arctic since 1945, however, there is no clear trend on an annual basis in other regions of the NWT. • Detecting changes in precipitation trends is difficult because precipitation varies widely across even small geographic areas.

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Valued Component	Indicator	Current Condition	Trend	Comments
Climate Change	Changes in Temperature and Precipitation	— to ▼	? to ✕	**Current Condition:** • Traditional knowledge has provided a broad perspective on the issue of climate change. Not only has it reported warmer temperatures, a more variable climate and unpredictable weather, but it has also indicated that the environment has changed in response to these changes in climate. • In the past 40 years, annual temperatures in the western Arctic have climbed by 1.5°C. The average temperature in the Arctic has risen at almost twice the rate as the rest of the world in the past few decades. • Additional evidence of Arctic warming comes from the widespread melting of glaciers and sea ice, and a shortening of the snow season. Increasing precipitation, shorter and warmer winters, and substantial decreases in snow cover and ice cover are among the projected changes that are very likely to persist for centuries. **Trend:** • Climate change is expected to have a profound effect on the Canadian North and more research is needed to increase understanding of the effects of climate change on the physical environment (e.g., erosion) and behaviour of contaminants. **Gaps:** • Factors that influence high-latitude energy fluxes including the Arctic Oscillation are fundamental science questions that need to be addressed. • The magnitude, frequency, and causes of extreme events in Arctic weather, stream flow, lake and sea ice, snow cover and other climatic-related variables need careful study in order that trends in global climate change are correctly interpreted and understood. • Understanding of the magnitude and speed of past and ongoing climate change in the Arctic needs to be improved through continued monitoring and the analysis of already existing time-series data.
	Atmospheric CO_2 Concentrations	▼	✕	**Current Condition:** • Global atmospheric CO_2 concentrations have increased by 33% since the beginning of the industrial age. • Globally, carbon dioxide emissions from energy use have quadrupled since 1950. • Northern CO_2 emissions are approximately 30 tonnes per person compared to the national average of 21 tonnes per person. **Trend:** • CO_2 emissions and population growth in the NWT are both increasing at higher rates than the national average. **Gaps:** • Increased awareness and effective programs are required worldwide to promote reductions in fossil fuel use (<u>note</u>: such reductions would also have a positive impact on local and regional air quality by directly reducing emissions of sulphur dioxide, nitrogen oxides, and volatile organic compounds and indirectly reducing levels of ground-level ozone and inhalable airborne particles formed in the atmosphere).
FRESHWATER AQUATIC ENVIRONMENT				
Surface Water Quality	Turbidity	▲ to —	? to ✕	**Current Condition:** • While turbidity levels in all the sub-basins considered exceed CCME environmental quality guidelines at various times throughout the year the causes are natural in origin and are not leading to deteriorating water quality. **Trend:** • The NWT water quality database is not adequate to determine overall trends; however, it is anticipated that climate change impacts will increase turbidity which may have negative impacts on surface water quality. **Gaps:** • Future monitoring of surface water quality needs to be maintained as it will be useful in determining changes in water quality as they relate to climate change effects. • The number of long-term monitoring stations in the NWT is limited in comparison to the geographic size. • Means of expanding current regional surface water quality monitoring to include key locations in unmonitored watersheds would be beneficial. • Integration of more intensive local research (e.g., mine-specific aquatic effects monitoring) into the long-term monitoring network database would be another means of expanding the water quality database.
	Metals	▲ to —	?	**<u>Mackenzie Great Bear Sub-Basin</u>** **Current Condition:** • Exceedances of aluminium, iron, and copper are measured at stations along the Mackenzie River, however, they are primarily associated with natural conditions, and do not contribute to deteriorating water quality. **Trend:** • The overall trend for this region is uncertain.
		—	?	**<u>Great Slave Sub-Basin</u>** **Current Condition:** • Arsenic is elevated in local watersheds draining the Giant Mine and Con Mine sites near the City of Yellowknife; however, in other watersheds levels of metals are generally not of concern. **Trend:** • The overall trend for this region is uncertain.
		▲ to —	?	**<u>Peel Sub-Basin</u>** **Current Condition:** • Seasonal exceedances of zinc are measured in the Peel River, however, they are associated with natural erosion processes, and do not contribute to deteriorating water quality. **Trend:** • The overall trend for this region is uncertain.

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Valued Component	Indicator	Current Condition	Trend	Comments
		▲ to —	?	**Liard Sub-Basin** **Current Condition:** • Elevated concentrations of copper and zinc have been measured on several occasions in the Liard River, however, the overall frequency of exceedance of CCME guidelines ranges from 0-34%. **Trend:** • The overall trend for this region is uncertain.
Sediment Quality	Metals	▲ to —	?	**Current Condition:** • In general the levels of metals in sediments are not of concern, however, there is uncertainty due to few baseline data. • Locally elevated arsenic levels have been measured throughout Yellowknife Bay near Yellowknife. The accumulation of arsenic in the lake sediments has been attributed to uncontrolled releases to the atmospheric and aquatic environments from the Giant Mine during the early years of its operation. **Trend:** • Lack of general monitoring makes the determination of an overall trend impossible. **Gaps:** • Long-term monitoring of river sediments and periodic collection of lake sediment core samples is required to better understand the fate of contaminants in the benthic environment.
	Organic Contaminants	▲	✔	**Current Condition:** • A general decline in POPs in lake sediments has been observed in the NWT and is attributed to international protocols which have led to reduced atmospheric concentrations in northern Canada. **Gaps:** • Information on PCBs, pesticides, polycyclic aromatic hydrocarbons, dioxins and furans, and heavy metals in sediments is very limited with the exception of specific investigations on the Slave River at Fort Smith and the Liard River above Kotaneelee River.
Surface Water Quantity	Discharge Rates	▲	?	**Mackenzie Great Bear Sub-basin** **Current Condition:** • Analysis of the flow record has indicated no significant trend in mean annual flows in the Mackenzie River. **Trend:** • Analysis of the flow record has indicated no significant trend in mean annual flows in the Mackenzie River, however, uncertainty related to climate change make an overall trend uncertain. **Gaps:** • Future monitoring of surface quantity needs to be maintained to measure the effects of climate change on long-term average flows, extreme flow events and timing of snow melt and freeze over.
		—	?	**Great Slave Sub-basin** **Current Condition:** • Flow in the Slave River has been found to be affected by the operation of the Bennett Dam some 1,500 kilometres upstream of Great Slave Lake. **Trend:** • Uncertainty related to climate change make an overall trend uncertain. **Gaps:** • Future monitoring of surface quantity needs to be maintained to measure the effects of climate change on long-term average flows, extreme flow events and timing of snow melt and freeze over.
		—	?	**Peel Sub-basin** **Current Condition:** • Flow in the Peel River is affected by spring snowmelt and rainstorms that can result in dramatic increases in steam flow in the river and its tributaries. High flow recorded between the mid 1960s and early 1980s have not been matched in recent years, which possibly reflect effects of climate change. **Trend:** • Uncertainty related to climate change make an overall trend uncertain. **Gaps:** • Future monitoring of surface quantity needs to be maintained to measure the effects of climate change on long-term average flows, extreme flow events and timing of snow melt and freeze over.
		—	✘	**Liard Sub-Basin** **Current Condition:** • Average annual flows measured at three stations were found to decline by 12.5% between 1960 and 1995. **Trend:** • The declines in discharge rates thus far suggest a continued declining trend. **Gaps:** • Future monitoring of surface quantity needs to be maintained to measure the effects of climate change on long-term average flows, extreme flow events and timing of snow melt and freeze over.

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Valued Component	Indicator	Current Condition	Trend	Comments
	Ice Phenology	▼	✕	**Southern Crossing ice bridge** **Current Condition:** • The number of days the ice bridge was in service each year at the two southern crossings of the Mackenzie River has decreased, presumably due to warmer temperatures. **Trend:** • Climate warming is anticipated to increase the frequency of interruption of the ferry service due to more frequent ice jams and reductions in water flow. **Gaps:** • Continued monitoring of river flows, frequency and timing of ice jams and days of operation of the ferry and ice bridge services will be important for determining the effects of climate change.
		—	?	**Northern Crossing ice bridge** **Current Condition:** • The days of operation of the ice bridge at the northern crossing has not changed substantially. **Trend:** • Climate warming is anticipated to increase the frequency of interruption of the ferry service due to more frequent ice jams and reductions in water flow. **Gaps:** • Continued monitoring of river flows, frequency and timing of ice jams and days of operation of the ferry and ice bridge services will be important for determining the effects of climate change.
Fish Habitat	Aquatic Habitat Structure and Quality	—	? to ✕	**Current Condition:** • There is only limited data to define baseline habitat conditions in the NWT. **Trend:** • Climate change is expected to directly and indirectly affect fish habitat and its biodiversity. These effects will be gradually induced as a result of physical and chemical changes. **Gaps:** • There is only limited data to define baseline habitat conditions in the NWT. • Aside from fish habitat assessments near residential, transportation, and industrial sites, fish habitat information is not commonly collected in the NWT. • Within government agencies with objectives to protect and enhance aquatic ecosystems, there has been no consolidation of programs or data, which would allow for an assessment of parameters as indicators of well-functioning aquatic ecosystems over time. • There is a need to compile data on various fish habitats for Great Slave Lake and Great Bear Lake, as they relate to fish harvest data. These data should reach a level of detail that would be useful for future comparisons.
	Spawning, Rearing And Over-wintering Locations	—	? to ✕	**Current Condition:** • There is only limited data available to define baseline conditions in the NWT. • Changes in the timing of ice break-up will affect water temperatures, dissolved oxygen levels, nutrient supplies, sediment loads, and water levels. A change in any of these physical and chemical attributes has the potential to alter the freshwater species composition. **Trend:** • There may be a deteriorating trend with climate change as changes in the timing of ice break-up will affect water temperatures, dissolved oxygen levels, nutrient supplies, sediment loads, and water levels, which can all have potential impacts on spawning and rearing.
Fish Population	Distribution and Abundance	—	✔ to ?	**Current Condition:** • Within the NWT, three fish species are listed as "may be at risk", eight species are considered as "sensitive", and 12 are assigned the "secure" status. The short jaw cisco (*Coregonus zenithicus*), the bull trout and the inconnu of the Upper Mackenzie River and Great Slave Lake are listed as "may be at risk" species due to excessive harvesting. • Overall, the NWT ecozones are largely untouched by human activities, and as a result, relatively few species are at risk compared with areas in Canada's south. **Trend:** • Population and stock status of most species is relatively unknown and more work is needed. • In the Mackenzie-Great Bear Sub-basin, broad whitefish and lake whitefish remain the most sought after species for subsistence. However, status on these species, populations and stocks are unknown. **Gaps:** • The Department of Fisheries and Oceans fish survey of the 1970s for the Mackenzie Valley Impact Study needs to be up-dated. Little data is available for the non-commercial species. • Great Slave Lake fish are exploited by several types of fisheries activities, which can affect and deplete populations and stocks. It is therefore imperative to manage the fisheries with proper planning and regulations, record and monitor harvests, and assess the stocks.

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Fish Harvest	Population Size and Age/Size Distribution of Fish Stocks	—	?	**Peel Sub-basin** **Current Condition:** • Dolly Varden is one of the most desired species caught for subsistence in this watershed. The annual catch has been voluntarily reduced, however monitoring of the Rat River (Char) Dolly Varden stock has not been carried out since 2001. **Trend:** • The current data make the trend uncertain. **Gaps:** • Data from fish harvests could be useful to derive population and stock parameters relating to: (1) Energy Use; growth and reproductive investment, (2) Survival; age structure and length frequency analysis, and (3) Energy Storage; condition. Sufficient information appears available to derive new data, even assess trends at some local and regional levels within the NWT.
		—	?	**Great Slave Sub-basin** **Current Condition:** • Commercial fishing is not allowed in certain areas important to subsistence fishing, or the East Arm, which is managed for trophy lake trout sport fishery. The population of lake whitefish, which is fished commercially, appears to be stable; however, the overall current condition is uncertain. The lake trout population is the East Arm, which is set aside for sport fishing, is reported to be doing well. **Trend:** • The current data make the trend uncertain. **Gaps:** • Fish stock assessment studies are needed on Great Slave Lake to determine the current status of lake trout as well as other important fish species throughout the lake. • Detailed information is required about fish populations and stocks in order to achieve a corresponding good level of fisheries management. • On Great Slave Lake, additional information is needed on the subsistence and sport fisheries to complete the understanding of the fisheries resources.
		▲	?	**Mackenzie Great Bear Sub-basin** **Current Condition:** • Great Bear Lake fishing includes subsistence and sport. The lake trout stock declined until 1984, when studies demonstrated that conservation measures were warranted and quotas were put in place. The current harvest is considered below the maximum sustainable yield. Trophy lake trout fishing is based on a catch and release policy. **Trend:** • The current data make the trend uncertain. **Gaps:** • Broad whitefish and lake whitefish remains the most important catch. Harvest status on these species is unknown and needed.
Fish Quality	Mercury	— to ▼	?	**Current Condition:** • Health advisories for ***mercury*** have been issued for some fish species, including northern pike, lake trout, burbot, whitefish and suckers, in several NWT lakes. • ***Mercury*** is the only contaminant that is consistently greater than guideline limits for consumption or commercial sale. • Most data produced with respect to heavy metal contamination in fish is on mercury because of human consumption concerns. However, studies have looked at ***arsenic, cadmium, lead and selenium*** although levels for these parameters are rarely of concern. • ***POPs*** levels measured in fish in the NWT are believed to have a low potential to affect the health of fish. In addition, the levels of POPs such as dioxins and furans have been declining. **Trend:** • There is inadequate information to determine a possible trend. **Gaps:** • More research is needed to understand how climate change and variability will affect the ways in which heavy metals, POPs, and radionuclides are transported to, and within the NWT, as well as how they accumulate and impact biota. • There is a need for information on contaminant levels by species, types of contaminant and geographic areas - especially data collection to statistically elucidate temporal trends. • Specific areas that require more information are Great Slave Lake and Great Bear Lake, because of their importance with respect to human health, and the Slave River to monitor upstream impacts. • There is an overall lack of information with respect to biological effects of contaminants on the NWT fish. • Specific research needs to determine threshold effects for NWT fish species rather than comparison of burden levels to laboratory studies on non-Arctic species.
	Other Metals	▲ to —	?	
	POPs	▲ to —	✔ to ?	

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MARINE ENVIRONMENT				
Polar Bear	Natality (Ratio of live births to population)	▲	✔ to ?	**Current Condition:** • Since hunting quotas were put in place in Canada in 1968 the polar bear populations are believed to have stabilized. **Trend:** • No long term trend has been established in polar bear ***natality***, but it appears to be closely linked to the productivity of ringed seals which are the bear's primary prey. • A substantial increase in the mean ***sex specific a***ge of polar bears occurred in the decade following establishment of harvest quotas. • Due to the sensitivity of polar bears to changes in the ice environment, climate change will stress their populations. **Gaps:** • With the threat of global warming there is a need to re-establish baseline parameters for polar bears and their prey that will permit scientists to evaluate change and develop appropriate responses for conservation and management of marine mammals in the Beaufort Sea. • Temporal trends in the abundance of bear populations are uncertain. • The causes of short-term fluctuations in natality and condition remain uncertain. Linkages to other monitoring research on seals and sea ice should be continued and augmented to improve understanding of the how changes in these parameters affect bear populations. • The effects of high contaminants levels on the health and reproductive success of polar bears are not well understood.
	Sex Specific Age Structure of the harvest	▲	✔ to ?	**Current Condition:** • A substantial increase in the mean sex specific age of polar bears occurred in the decade following establishment of harvest quotas. **Trend:** • Since hunting quotas were put in place in Canada in 1968 the polar bear population is believed to have stabilized although the there is insufficient information to assess the trend over time.
Beluga	Composition of the Landed Harvest	▲	✔	**Current Condition:** • Hunter-based monitoring data have been collected in the Mackenzie Delta since 1973. • The rate of removal of belugas from the Eastern Beaufort Sea stock is small in relation to the expected maximum net productivity rate of this stock. It is also smaller than historical harvests. **Trend:** • No trends in the size of males or females in the harvest have been observed over the 30-year period of monitoring. **Gaps:** • Data are needed on the range, movements, site fidelity, stock structure, and reproductive potential of belugas. These data are necessary for developing population models and assessing sustainable harvest potential. Harvest monitors could gather data on the reproductive status and history of harvested belugas that would be useful for assessing the reproductive potential of the population.
	Mercury	— to ▼	?	**Current Condition:** • Studies of beluga teeth suggest that industrialization has led to a substantial increase in ***mercury*** accumulation by beluga whales that summer in the estuary of the Mackenzie River. • ***Mercury*** concentrations observed in the meat and muktuk of belugas exceed the Health Canada human consumption guideline for commercial fish (0.5 µg/g (ww)) and for subsistence fisheries (0.2 µg/g (ww)). • There is also potential for the dietary intake of muktuk to exceed recommended daily intake levels of various ***organic contaminants***, including PCBs. **Trend:** • Levels of ***mercury*** in the liver of belugas in this area are higher than those found elsewhere in the Canadian Arctic, and appear to have increased since 1981. • Temporal trends in the accumulation of persistent ***organic contaminants*** cannot be determined from existing data. **Gaps:** • Little is known of the biological effects of contaminants on belugas, or about temporal trends in their accumulation of persistent organic contaminants in the Beaufort Sea region.
	POPs	— to ▼	?	

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Valued Component	Indicator	Current Condition	Trend	Comments
Ringed Seal	Harvesting Removals	▲	✔	**Current Condition:** • The seal population does not appear to be under stress from over-harvesting but it is sensitive to changes in the ice environment. **Trend:** • Despite an increase in the human population in the Beaufort Sea region, the harvest of seals has declined over the past 50 years. A subsistence harvest has continued, but there is no longer a substantial harvest of seals for the commercial sale of pelts. **Gaps:** • The species' ability to adapt to changes in the ice environment is unknown, and this is a very important information gap. • DFO has identified the need for data and information on the range, movements, site fidelity and stock structure of ringed seals, and on the impacts of climate change related to reduced ice cover.
	Body Condition	▲	?	**Current Condition:** • Approximately 100 seals are examined annually at Holman to assess their body condition (fatness). The poorest body condition observed in adult females occurred in 1974, a particularly heavy ice year, but there have been improvements since. • In 1998 when ice breakup occurred early and there was a long open water season, many starving pups were found while the older animals were in good condition. The early breakup may have provided favourable energetic conditions for the older animals but caused many pups to be weaned before they were ready. **Trend:** • No clear long term trend is evident from the current data.
	Ovulation Rate and Pup Harvest Numbers	▲ to —	?	**Current Condition:** • In the mid 1970s and mid 1980s significant declines were observed in seal ovulation rate and proportion of young seals in the harvest at Holman and Sachs Harbour, after which they increased at both areas. • Drastic changes in the seal population in the past have been linked to changes in ice conditions, although disease and migration may also have been contributing factors. • The proportion of pups in harvests fluctuates markedly and does not closely match the ovulation rate. **Trend:** • High variability obscures any longterm trends in these indicators.
	Mercury	—	?	**Current Condition:** • Average ***mercury*** concentrations in Holman ringed seals varied significantly over the 30-year period from 1972-2001. Higher concentrations were found in 1974 and 1977 than in 1993 and 1996, and results from 2001 were significantly higher than in 1993. • The levels of ***organic contaminants*** yield a mixed signal. Significant declines in the concentrations of PCB and DDT have been observed; chlordanes and hexachlorocyclohexanes have not changed significantly, but concentrations of polybrominated diphenyl ethers in ringed seal blubber over the past two decades have increased dramatically. **Trend:** • Mixed signals in current data make trends uncertain. **Gaps:** • Little is known of the biological effects of contaminants on seals, or about temporal trends in their accumulation of persistent organic contaminants in the Beaufort Sea region.
	POPs	—	?	
Anadromous Dolly Varden and Arctic Char	Population Size and Harvest	▲	?	**<u>Rat River Dolly Varden</u>** **Current Condition:** • Sustainable harvest levels, the vulnerability of stocks at various locations, and the reasons for declining harvests are uncertain for most anadromous Dolly Varden and Arctic char stocks in the Northwest Territories. • Results from harvest monitoring suggest that the Rat River Dolly Varden stock is stable and sustaining the present harvest level. **Trend:** • Uncertain. **Gaps:** • Annual harvest estimates are available on the Rat River since 1986. However, data are not currently collected on smolts. Their collection would provide more information on recruitment, but would also increase mortality.
		▼	?	**<u>Big Fish River Dolly Varden</u>** **Current Condition:** • Abundance estimates suggest that the population was reduced substantially between 1972 and 1988, and has not recovered. **Trend:** • Uncertain. **Gaps:** • Linkages between habitat changes and the failure of the Big Fish River Dolly Varden population to recover are uncertain. If habitat changes are limiting the fishery, knowledge of the mechanisms by which they act could improve the ability to manage regional fisheries in response to changing climatic conditions.

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		—	?	**Hornaday River Arctic Char** **Current Condition:** • Harvests peaked over the period 1976 to 1984, and since then have declined slowly, except in 1995 when there was a particularly large harvest. The Hornaday River char population does not appear to be capable of sustaining harvests of the magnitude taken in 1995. **Trend:** • Uncertain. **Gaps:** • The sustainable harvest level for the Hornaday River char stock cannot yet be determined. • Linkages between sea ice cover and the condition of anadromous fishes have not been examined, but may be important determinants of the sustainable harvest level.
	Contaminants	—	?	**Current Condition:** • While some data are available on contaminant levels in fish in the Rat River, Big Fish River and Hornaday River systems, they are too few to provide a useful assessment of the trend of accumulation over time. **Trend:** • Uncertain. **Gaps:** • Monitoring of contaminant concentrations in Dolly Varden and Arctic Char is important to ensure protection of the people who rely upon these species for subsistence.
Sea Ice	Duration and Areal Extent of Ice Cover	▼	? to ✕	**Current Condition:** • Satellite observations suggest that there has been a general decrease in the duration and areal extent of the Arctic sea ice cover since the mid-1970s. This is consistent with observations in Amundsen Gulf and the western Beaufort Sea, but evidence for change in the southeastern Beaufort Sea is equivocal. **Trend:** • Uncertainty remains as to possible trend. That is, if the recent observed ice changes are tied most closely to Arctic warming that continues, then the ice cover should continue to decrease; but, if the sea-ice changes are tied more closely to oscillatory changes in the climate system, such as the North Atlantic Oscillation and the Arctic Oscillation, then sea ice cover will likely fluctuate. **Gaps:** • The factors underlying natural variability of the sea ice cover, atmospheric couplings, and linkages between changes in sea ice and other aspects of the marine ecosystem are uncertain. These information gaps limit the ability to predict how ice cover may change over time, and how species and biological communities may respond over the short or long term, and from one area to another.
Sea Ice	Ice Thickness	—	?	**Current Condition:** • While synoptic data are available for the duration and extent of ice cover, they are not available for ice thickness. **Trend:** • Uncertain. **Gaps:** • The lack of synoptic data for ice thickness is a very important gap in the information necessary to understand changes in ice cover and develop predictive climate models. • The role of sea ice in moving contaminants from one part of the environment to another needs to be better understood

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TERRESTRIAL ENVIRONMENT				
Caribou	Population Size	▼	?	**Current Condition:** • Bathurst Herd: a census in 2003 showed a decline from about 350,000 in 1996 to about 187,000 • Porcupine Herd: has been in decline since 1989 when the herd size reached a maximum of about 180,000. • Cape Bathurst Herd: has declined from an estimate of 17,500 in 1992 to an estimated 2,400 in 2005. • Bluenose West Herd: has declined from an estimate of 98,900 in 1987 to an estimated 20,800 in 2005. • Bluenose East Herd: has declined from an estimate of 104,000 in 2000 to an estimated 66,600 in 2005. • Beverly/Qamanirjuaq Herd: the last census was conducted in 1994. A census was to have been conducted in 2000 but was deferred therefore the current status of the herd is uncertain. **Trend:** • The trends for the different caribou herds are uncertain as it remains difficult to distinguish natural cycle variations in population from decreases as a result of environmental stressors. It is clear that there will be increasing pressure to increase development in the range of several of the herds even though the effects of the development are largely unknown. Research in both Europe and Alaska has shown that roads, pipelines, airstrips, etc., can have an impact on the movement and distribution of caribou and reindeer during the annual cycles. The most significant changes appear to occur in females during the calving period, who tend to avoid the infrastructure associated with development and may move to suboptimal habitat to calve if the level of development becomes too great. **Gaps:** • Greater frequency of census surveys is needed. • More research on impacts related to development pressure is needed in the NWT.
	Harvest Rate	— to ▼	?	**Current Condition:** • Caribou are the primary source of subsistence for Aboriginal people in the NWT. The Bathurst herd is the largest and most hunted in the NWT. The total harvest from 1996 of 14,500 to 18,500 exceeds the harvest rate of 3 to 5% recommended by some biologists. • The harvest rate for the Porcupine herd has been estimated at 2,000 to 3,000 head annually or about 2 to 3% of the herd size. • The total estimated harvest of 5,000 head for the Bluenose East, Bluenose West and Cape Bathurst herds represents approximately 6% of the current total estimated herd count. • A management plan for the Bathurst herd was finalized in 2004 with the participation of 11 parties on the Bathurst Caribou Management Planning Committee. The Porcupine herd is managed by the Porcupine Caribou Management Board comprising representative from Canada and the United States. The Beverly herd is co-managed through the Beverly-Qamanirjuaq Caribou Management Board. **Trend:** • Difficulties in distinguishing possible reasons for declining populations makes the overall trend uncertain. **Gaps:** • Given the sharp reduction in the sizes of the herds, re-examination of the harvest rates is needed by the respective parties.
	Contaminants	▲	✔	**Current Condition:** • Consensus from two or more decades of research indicates that organochlorine contaminants, which reach levels of concern in marine wildlife and some freshwater fish species, remain at very low concentrations in terrestrial biota. The concentrations of major contaminants such as PCBs, DDT, toxaphene and chlordane are at or below detection limits in caribou in the NWT. • Cadmium, total mercury and copper show no indication of consistent large-scale contamination. The concentrations of these metals are consistent with other caribou and reindeer studies from Europe and Alaska. • Radionuclide levels have been found to be at natural levels in caribou.
Moose	Population Size	▲	?	**Current Condition:** • Overall, the NWT moose population is robust and the current rates of harvest can probably be maintained **Trend:** • The lack of NWT-wide data makes a determination of trend uncertain. **Gaps:** • There is very little published in the scientific literature on the status of the moose herd in the NWT. • Population surveys are probably not precise enough to accurately determine desirable harvest rates. For this reason, habitat condition, animal condition, calf productivity, and population size should be monitored more closely.

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Valued Component	Indicator	Current Condition	Trend	Comments
	Harvest Rate	▲	?	**Current Condition:** • Moose harvesting remains relatively successful and does not appear to negatively impact on the population. **Trend:** • Population surveys are probably not precise enough to accurately determine desirable harvest rates. • The lack of NWT-wide data makes a determination of trend uncertain. **Gaps:** • There is a lack of NWT-wide data.
Landbirds	Population Size and Diversity	▲ to —	✔ to ?	**Current Condition:** • It is difficult to assess the status of landbirds and the variability of the long-term survey data is too inconsistent to speculate about trends in the population. It is assumed that the populations in the NWT are robust and can withstand the current harvest rates. • Continuing harvest levels suggest a long-term stability of the populations but this could change with significant change in the climate. **Trend:** • It is difficult to assess the status of landbirds and the variability of the long-term survey data is too inconsistent to speculate about trends in the population. It is assumed that the populations in the NWT are robust and can withstand the current harvest rates. • Continuing harvest levels suggest a long-term stability of the populations but this could change with significant change in the climate. **Gaps:** • There are no dedicated population surveys for these species so their general status is derived from the continuing harvest. • There are no surveys of their habitat. • There are Breeding Bird Surveys and Christmas Bird Counts conducted which provide critical information on bird species; however, they are not NWT-wide. Their presence should be expanded in the NWT.
Waterfowl	Population Size	▲ to ▼	?	**Current Condition:** • Goose species are stable or are increasing significantly over historic levels. • Several other waterfowl species are below their long-term averages; however this only seems to be a major factor for species such as the northern pintail and the scoters that have been significantly below the long-term average for a long time. **Trend:** • The variability in the current condition makes the overall trend uncertain. **Gaps:** • There are currently a large number of programs and resources dedicated to monitoring the status of the populations and habitats of these species. • Information gaps include more research programs on the reasons for the declines in some species of waterfowl.
PERMAFROST, SNOW COVER, AND GROUND ICE				
Permafrost	Mean Annual Air Temperature (MAAT)	▼	? to ✘	**Current Condition:** • The mean annual air temperature is rising across the NWT; permafrost conditions and ground temperature have been shown to be strongly correlated with mean annual air temperature. **Trend:** • The mean annual air temperature is rising across the NWT but its rate of rise is not uniform in all areas of the NWT therefore the overall trend is not clear. **Gaps:** • There is limited long-term MAAT data northeast of Yellowknife where many of the mines are located.
	Mean Annual Ground Temperature (MAGT)	▼	? to ✘	**Current Condition:** • Ground permafrost temperatures are rising across the whole northern hemisphere. • International data which are confirmed by Canadian ground temperature monitoring in permafrost regions show that the permafrost ground temperature is rising in lock step with climate warming. **Trend:** • During the last 10 years numerous studies have clearly demonstrated that climate warming is occurring and that the Arctic is warming at about twice the worldwide rate. **Gaps:** • In Canada there is a lack of long-term MAGT monitoring. • There is limited information in regard to the present ground temperature within northeastern NWT and how it is responding to climate warming. • Monitoring MAGT at selected sites is needed since permafrost warming may have a significant environmental impact in time on infrastructure built on ice rich (high ground ice) permafrost and not designed for climate warming.
	Snow Cover	—	?	**Trend:** • The depth and duration of snow cover are believed to be factors that effect permafrost ground temperature and it is expected that snow cover in the NWT will change as a result of global warming. **Gaps:** • Measurement of snow cover depth has been found to not be a particularly useful indicator of permafrost conditions.

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Valued Component	Indicator	Current Condition	Trend	Comments
	Ground Ice	—	? to ✘	**Current Condition:** • There is limited cumulative information to quantify the impact of changing ground ice conditions on the stability of facilities associated with abandoned, operating and planned projects. **Trend:** • Ground ice conditions are predicted to change as a result of climate warming. The effects of changing ground ice conditions on the stability of river banks, the arctic shoreline are largely unknown. **Gaps:** • There is limited cumulative information to quantify the impact of changing ground ice conditions on the stability of facilities associated with abandoned, operating and planned projects. • Ground ice is a technical parameter that needs to be determined on a site-specific basis. Ground ice conditions are an important design consideration in determining the stability of structures and earth works.
	Human Activity	—	? to ✘	**Current Condition:** • Industrial and residential developments and other human activity can have an impact on the physical environment, including permafrost conditions. **Trend:** • Industrial and residential developments and other human activity can have an impact on the physical environment, including permafrost conditions. **Gaps:** • Projects contemplated for development in the NWT need to: (1) reflect the complexity of permafrost; (2) address effect of climate warming; and, (3) consider cumulative environmental impact in the longer time span. • There is limited cumulative information in one organization to quantify impact of the abandoned, operating and planned projects. • The collection of the following information would be an asset in assessing the present and long-term effects of development: (1) physical footprints in the NWT; (2) inventory of esker materials and their exploitation; (3) inventory of potentially metal leaching deposits; (4) measure of development within intermediate watersheds.
HUMAN HEALTH				
Human Health	Population Demographics – Life Expectancy	—	✔	**Current Condition:** • For the NWT as a whole, life expectancy at birth compared to the rest of Canada is 3.3 years lower for both males and females. • Life expectancy in Aboriginal communities has improved. **Trend:** • There is no reason to believe that the improvement in the current condition will decline.
	Perinatal Health – Birth/Fertility Rate	▼ to ▲	✔	**Current Condition:** • The NWT experiences higher rates of infant mortality, about 1.6 times that of Canada as a whole. In 1999, the First Nations infant mortality rate was 1.5 times higher than that for Canada. **Trend:** • The infant mortality rate has been steadily declining in First Nations peoples. **Gaps:** • Birth defect reporting at birth is not mandatory but is being considered now as part of the birth defects monitoring system.
	Perinatal Health – Infant Mortality Rate	▼	✔	
	Population Mortality – Causes and Age- and Sex-specific Mortality	▲ to —	?	**Current Condition:** • The principal causes of death in the NWT are cancer (22.4%) and respiratory diseases (40.9%) such as pneumonia and bronchitis. • Age-specific death rates in 1999 were higher in First Nations males than females for almost all age groups. • The mortality rate for infants (males and females) is higher in the NWT than in the rest of Canada. • Among the Aboriginal population, suicide and self-injury were the leading causes of death for youth and adults up to age 44. **Trend:** • Based on the current condition, the trend is uncertain. **Gaps:** • Reasons for the higher than average mortality rate for infants needs to be examined and more specific data need to be collected to be able to implement preventive action to improve these rates.
	Population Morbidity (Incidence of disease)	— to ▼	?	**Current Condition:** • Data gathered on sexually transmitted infections in the NWT indicate that the rate has risen since 1996 from a three year average of about 12 cases per 1,000 population in the 1996/1998 period to 18 cases per 1,000 population in the 2001/2003 period. • Specific data on Infectious Diseases and especially vaccine preventable diseases were not found for the NWT. However, the recent report, "Survey of Inuit and First Nations Health" found that in 1999, First Nations people across Canada experienced a disproportionate burden of many infectious diseases compared to other Canadians as a whole. Given that about half the population in the NWT is Aboriginal, there is a need to focus on preventive and follow up actions in these health areas. **Trend:** • Data gathered on sexually transmitted infections in the NWT indicate that the rate has risen since 1996. **Gaps:** • There is no central database available for hypertension, and no prevalence studies. As a major risk factor for cardiovascular mortality, this is an area that should be explored for NWT populations. • Dental health measures are not collected systematically in the NWT.

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Valued Component	Indicator	Current Condition	Trend	Comments
	Personal Health Practices and Risk Factors	▼	? to ✘	**Current Condition:** • The NWT experiences a higher smoking rate and a higher heavy use of alcohol as compared to the rest of Canada. Heavy use of alcohol is associated with adverse health outcomes, accidents as well as family and social adverse impacts. **Trend:** • While a reduction in the smoking rate would be desirable for the NWT population since smoking is a risk factor for respiratory and cardiovascular disease as well as cancer, there is little to indicate that smoking rates are declining, especially in the smaller NWT communities. **Gaps:** • Obesity and physical inactivity data collection needs to be enhanced as these are important health indicators.
	Environmental Factors	▲	✔	**Current Condition:** • All communities in the NWT have access to potable drinking water except for Colville Lake which is a small community of about 135 people in the Sahtu Region. Colville Lake does not have a formal/organized water supply and treatment system and is on a permanent boil water advisory. • All communities in the NWT have a sewage collection/disposal/treatment system except for Colville Lake. **Gaps:** • All communities in the NWT have a sewage collection/disposal/treatment system except for Colville Lake.
SOCIO-ECONOMIC AND COMMUNITY WELLNESS				
Population	Population change	▲	✔	**Current Condition:** • While the population of the NWT began to decline in 1997, a trend that continued until 2001, the 2004 population represented an increase of 1.4% compared to 2003. • Positive migration occurred in 2001, 2002 and 2003, following several years of negative migration. **Trend:** • While the population of the NWT began to decline in 1997, a trend that continued until 2001, the 2004 population represented an increase of 1.4% compared to 2003. • Positive migration occurred in 2001, 2002 and 2003, following several years of negative migration.
	Five Year Population Mobility – Intra-Territorial and Inter-Provincial	—	?	**Current Condition:** • According to the 2001 census, of the people moving between communities in the NWT, 2.6 times more of them moved from outside of the NWT (inter-provincial) as compared to from within (intra-territorial). • Of the total people who relocated from somewhere in Canada the vast majority moved to a larger centre (61% to Yellowknife, 13% to the Beaufort Delta, about 14% to the South Slave, and the remainder divided among the Sahtu, Dehcho, and North Slave). • According to the 2001 census, of the people in Yellowknife who didn't live there in 1996, 83% were inter-provincial migrants.
	Population Share by Community Type	— to ▼	? to ✘	**Current Condition:** • Between 1976 and 2003 the share of the NWT population residing in Yellowknife increased from 26.6% to 44.6% of the total population of the NWT. In the same period, the smaller communities reported a declining percentage of the total population of the NWT. **Trend:** • There is no reason to believe that the current condition is changing.
Education	Population 15 Years and Older with at least High School **NWT**	▲	✔	**Current Condition:** • The percentage for the whole of the NWT is quite similar to that for Canada, but when compared to the rate for smaller communities it is almost twice as much. • Since 1989, the rate has increased in all regions of the NWT with the highest increases being recorded in the North Slave, South Slave and Dehcho regions. **Trend:** • In 2004, rates of 70% or higher were recorded in Fort Smith, Hay River, Inuvik, Norman Wells and Yellowknife while rates of 35 or less were recorded in Colville Lake, Déline, Fort Liard, Holman, Kakisa, Nahanni Butte, Rae Lakes, Trout Lake, Wekweti and Wha Ti.
	Population 15 Years and Older with at least High School **NWT Smaller Communities**	▼	? to ✔	
	High School Graduation Rate	▼	✔	**Current Condition:** • A lower proportion of the population in the NWT than in the rest of Canada has attained secondary school education however, the rate of graduation improved from 37.5 graduates per 100 eligible students in the 1994/1995 school year to 44.6 graduates per 100 eligible students in the 2000/2001 school year. **Trend:** • The NWT high school graduation rate was less than half the rate recorded for Canada in 1994-95 through 1996-97 but has been increasing over the years to a rate of 45.3% in 2003-04.
Crime and Safety	Violent Crime Rate	▼	✘	**Current Condition:** • The NWT violent crime rate is dramatically higher than Canada's. For instance in 2003, the NWT rate was 600% higher than the rate for Canada as a whole. **Trend:** • There is no reason to believe that the current condition is improving. **Gaps:** • Shelter admission data are collected by the NWT Department of Health and Social Services. Similar data are not available at the community level, for Canada or other provinces and territories.
	Rate of Juvenile Crime	▼	✘	**Current Condition:** • In 2003, the NWT three year average rate for juvenile male crime was almost 230% higher than Canada's rate while the NWT three year average rate for juvenile females was 340% higher. **Trend:** • There is no reason to believe that the current condition is improving.

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Valued Component	Indicator	Current Condition	Trend	Comments
	Shelter Admissions	▼	✘	**Current Condition:** • The number of women and children being admitted to shelters in the NWT between 1999-00 and 2002-03 increased by 15.5% while the rate for children increased by 5%. **Trend:** • There is no reason to believe that the current condition is improving.
Housing	Percentage of Households in Core need **NWT**	—	?	**Current Condition:** • Between 1996 and 2004 there was a 17% decline in the percentage of households that were in core housing need. • In 2004, the highest housing need was recorded in the North Slave region although the percentage in this region declined significantly since 1996. • With the exception of Yellowknife, all regions have a rate that is higher than the NWT rate and smaller communities have a higher percentage across all time periods. **Trend:** • There is no reason to believe that the current condition is improving.
	Percentage of Households in Core need **NWT Smaller Communities**	▼	?	
	Percentage of Households with 6 or More Persons	**Value Judgement**	**Value Judge-ment**	**Statistics:** • The percentage of NWT households with six or more persons was more than twice the percentage of Canadian households; however, the gap between Canada and the NWT decreased between 1981 and 2001. NWT smaller communities had a higher percentage of households with six or more people than was recorded for the NWT as a whole. **NB –** An assessment of the current condition and trend is not possible as this is a value judgement.
Families and Children	Number of Lone Parent Families	— to ▼	✘	**Current Condition:** • The 2001 percentage of lone parent families was 15.7% for Canada and 21.0% for the NWT. • The 2001 percentages were highest in Colville Lake and Trout Lake (50%) and the communities of Aklavik, Fort McPherson, Lutsel K'e, Tsiigehtchic, and Wha Ti had rates of 35% or higher. • The lowest 2001 rates were recorded in Fort Liard (14.3%) and Yellowknife (15.8%). **Trend:** • There is no reason to believe that the current condition is improving.
	Children Living in Low Income Families	**Value Judgement**	**Value Judge-ment**	**Statistics:** • Between 1997 and 2002, the percentage of children living in low income in the NWT was quite close to the Canadian rate. However, the NWT smaller communities rates were consistently five to ten percentage points higher than elsewhere in Canada. **NB –** An assessment of the current condition and trend is not possible as this is a value judgement.
	Child Protection Investigations	—	?	**Current Condition:** • Recorded by the NWT Department of Health and Social Services, the data have been stable at about 2500 for the 2000-2003 period. • Uncertainty about the current condition and trend exists because there are no community data or comparable data for other parts of Canada.
	Population Dependency Ratios	—	?	**Current Condition:** • The dependency ratio for children 15 years and younger declined between 1991 and 2004 across Canada, the NWT, the NWT smaller communities and all NWT regions. • Conversely, the dependency ratio for those aged 60 years and older increased in the same time period, for Canada, the NWT and NWT communities.
Income and Employment	Average Employment Income	▲ to —	✔ to ?	**Current Condition:** • Between 1995 and 2002, the average employment income in the NWT as a whole was consistently higher than the Canadian rate by between $4500 and $8400, depending on the year. • In 2002, the NWT smaller communities had an average employment income 41% lower than the rate for the NWT and 27% lower than Canada. **Trend:** • With the disparity between smaller communities and the larger centres it is difficult to determine the trend.
	Income Disparity	▼	✘	**Current Condition:** • Income disparity in the NWT is much higher than in Canada – almost 17 points higher in 2002. • The average family income in the NWT is high compared to the rest of Canada; however, there remains a significant discrepancy in average income between the Aboriginal and non-Aboriginal population. **Trend:** • There is no reason to believe that the current condition is improving.
	Employment Rate	—	?	**Current Condition:** • In 2004, the NWT employment rate was about 5% higher than Canada's rate, while the rate for NWT smaller communities was 20% lower than the NWT rate. **Trend:** • Employment rates have been slowly increasing since 1986 for all regions except the South Slave and Yellowknife, where slight drops were noted between 1986 and 2004. • The North Slave region (exclusive of Yellowknife) had the lowest employment rate of 37.3%, almost 40 points lower than the NWT rate in 2004.
NWT Economy	Gross Domestic Product (GDP)	▲	✔	**Current Condition:** • In 2003, the NWT economic growth on a constant dollar basis was 10.6% compared to 1.7% for Canada. **Gaps:** • Traditional activities supported communities prior to the wage economy, but many of these activities lack an economic valuation (e.g., hunting for food) and therefore standard economic measures do not provide a full picture of the importance of traditional activities. • A full understanding of the shift from traditional economy to modern economy is not well known.

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Valued Component	Indicator	Current Condition	Trend	Comments
	Consumer Price Index (CPI)	▲	✔	**Current Condition:** • The consumer price index for the NWT increased by 0.6% between 2003 and 2004 while Canada's index changed by 1.8% in the same period.
Aboriginal Culture	Aboriginal People 15 Years of Age and Over Able to Speak an Aboriginal Language	—	✘	**Current Condition:** • In 2004, the percentage of Aboriginal people able to speak an Aboriginal language was 18 points higher in NWT small communities than in the NWT as a whole. This difference has remained fairly stable since 1989. **Trend:** • The percentage appears to be declining across time in all areas, but the most dramatic decline appears to be in Sahtu where between 1989 and 2004, there was a drop of 27 percentage points. • The Beaufort-Delta and Yellowknife regions have the lowest (24.8% and 25.3% respectively). **Gaps:** • Changes in cultural practices are not addressed. • Need to define and develop methodology as to changes in Aboriginal cultural practices. • Traditional activities supported communities prior to the wage economy, but many of these activities lack an economic valuation (e.g., hunting for food) and therefore standard economic measures do not provide a full picture of the importance of traditional activities. • A full understanding of the shift from traditional economy to modern economy is not well known.
	Use of Harvested Meat and Fish	▲	✔	**Current Condition:** • The percentage of households using harvested meat or fish increased between 1994 and 2004 in both the NWT as a whole and in the NWT smaller communities. • Need to document harvest statistics and quantify the economic value of traditional foods and materials to residents.