World Wildlife Fund Canada

Interim Submission

to the Joint Review Panel for the Mackenzie Gas Project.

Regarding August 21-2 Topic-Specific Hearing in Norman Wells.

Submitted by:

WWF-Canada

To:
Joint Review Panel, Registered Intervenors

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1. Introduction

World Wildlife Fund is one of the largest independent conservation organizations in the world, with projects in over 100 countries. Our mission is to help build a future in which humans live in harmony with nature. WWF is not an anti-development, anti-hunting, anti-trapping or anti-sealing organisation. Our work focuses on getting the balance right in long-term, truly 'sustainable' solutions that will benefit future generations of people and wildlife, and the vital natural systems upon which we all depend.

In Canada WWF has worked for over 30 years in support of northern communities. In fact, our President Emeritus, Monte Hummel, testified at the Berger Inquiry 30 years ago. Many of the points which Monte, northerners and Justice Berger made then, are still relevant today. For the past decade, WWF has had an office in NWT, led by Bill Carpenter. Bill was formerly with the Métis Nation, and many northerners know him for his pioneering veterinary work in the NWT, rescuing the Canadian Eskimo sled dog breed earlier in his career.

WWF has provided substantial financial, technical and political support to many community conservation projects on wildlife species, toxic chemicals, climate change, traditional knowledge and mapping work, especially for community-initiated protected areas. WWF remains a strong partner in the multi-partner NWT Protected Areas Strategy. We believe firmly that such community-driven initiatives, combined with high quality land and resource use planning, provide the best approaches to seize Canada's world-class conservation opportunities while they still remain relatively intact. WWF has worked with the Mackenzie Gas Project (MGP) team, and with many other companies in Canada and worldwide, to help forge better all round approaches and solutions. For industry, collaborative solutions provide certainty, by avoiding unnecessary conflicts and risks in the future.

As industrial development accelerates in the NWT, WWF has intensified its efforts to help Canada, and especially the north, plan an effective long-term approach, so that northerners can reap the benefits of these development opportunities, while avoiding the mistakes and costs to livelihoods, natural ecosystems and cultures etc. made elsewhere in the world, including in Canada, when well-balanced plans and investments are not made. We believe strongly that as the NWT's Mackenzie hydrocarbon basins are being opened up, a very different, modern and well-balanced approach can and must be taken. This must be prescribed and required once environmental assessments have been completed, ahead of escalations in industrial activity, to ensure that the plan is both sound and fully implemented.

WWF is presenting at this Topic-Specific Hearing of the Joint Review Panel for two main reasons:

1. The focal subjects of 'Conservation Areas and Measures' (Topic 8) and 'Harvesting and Other Land Uses' (Topic 12), are central to our conservation mission in the NWT, in support of the NWT Protected Areas Strategy and numerous community-based conservation initiatives for which we have provided significant technical, financial and capacity support over the past 30 years; and
2. Having provided for the JRP in February our list of 9 main recommendations regarding the EA of the proposed basin-opening Mackenzie Gas Project, we are pleased to be able to respond to the Panel's request to elaborate on some of the remaining points that have not been covered to this point by the Hearings.

The recently revised Guidance for Topic-Specific Hearings, and the specific update on Guidance for Norman Wells, August 21-24, contain a number of specific matters and questions that the Panel seek inputs and discussion at the session. We note that there is some overlap of Topics 12 and 8 in terms of land use and conservation aspects we will cover. WWF hopes that our presentations, written submissions and selected technical and review documents will be helpful at this advance stage to both the Panel and other intervenors.

Much as we did at the Inuvik Hearings on February 20-21, we bring internationally acclaimed expert witnesses to help present and discuss specific points. We also present details of high conservation value areas in the Sahtu Settlement Region in relation to the EIS provided for the proposed MGP, and the terms of reference set by the Panel. This work will be presented by WWF's Senior Manager in the NWT, Freya Nales, who has worked extensively in recent years with Sahtu community and regional issues related to habitat conservation and land use planning. Peter Ewins is WWF-Canada's lead intervenor in the JRP Hearings.

2. Materials to be covered at this Topic-Specific JRP Hearing.

The presentation of 30 minutes follows a logical path, starting with introductions of the speakers and a broad framing of the need for, and experiences with, proactive well-planned approaches to development and conservation measures taken elsewhere in the Mackenzie River Basin. Much of the WWF presentation targets recommendations made to the JRP Inuvik Hearings on February 20th.

Rather than embed colour images throughout this submission, we urge readers to refer to the powerpoint presentation (plus Notes pages) also submitted at this time to the JRP. The key illustrations of the main points here are found in the powerpoint presentation deck.

The presentation then proceeds to consideration of implications of the MGP, and thus opening to markets of the Central Mackenzie Valley hydrocarbon basin, on areas of High

Conservation Value (HCV) in the Sahtu Settlement Region. Based on experiences in Alberta/upper regions of the Mackenzie basin, it is clear that further industrial/oil-gas-coal development etc is very foreseeable, and already accelerating, and therefore conservation measures are discussed in relation to current realities in this sensitive region. Our presentation builds on information that will have already been presented by the multi-departmental government panel at this Hearing.

This section is followed by an in-depth treatment of the need for and role of completed protected areas networks in ecological benchmarking in such regional development situations.

The next section deals with the question of rapid climate change and its broad/ecosystem impacts in the Mackenzie Valley, and the role of completed networks of protected areas and proper land use planning to provide maximum adaptation opportunities for people and natural processes/biodiversity, as well as to maximise ecosystem resilience. This is especially relevant in situations like the NWT where cumulative industrial development and associated impacts/stresses are also operating and building.

In the final wrap-up section, WWF summarises the key points from this presentation, relating to some of the earlier 9 recommendations made to the Panel. We also introduce an interim report to the Panel summarising northerners' views concerning the land and conservation measures, that have been expressed at Hearings from February to early July.

3. Mackenzie Basin Approaches and Frame.

In response to past experience of costly problems, conflicts, and delays in the past, numerous nations and regions have passed legislation and policies to ensure that prior to embarking on major development projects, proper land use planning and precautionary measures are put in place. As a lead G8 nation at the start of the 21st Century, Canada is no exception. In fact, the federal and territorial governments have made numerous public commitments at international, national and regional levels in the past two decades, embed such legal requirements, policies and approaches into development of Canada's northern 'frontier'.

However, in the past decade, there has been remarkably little investment or action on conservation measures in the NWT, or in Nunavut, to match a rapid acceleration of investment and allocations to industrial developments. This is challenging for Canadian society as it looks, through EA, land use planning and other processes, for a new approach to ensure an effective long-term balance, and well-planned approach whereby northerners truly benefit from such regional economic development, yet retain conservation options across the land.

The proposed MGP team has filed information in an EIS and supplementary information, and response to Information Requests. However, while this team of companies remains supportive in principle of multi-stakeholder initiatives like the NWT Protected Areas

Strategy (where CAPP is a welcome member of the steering committee), and Land Use Planning, the EIS has yet to address the EIS Terms of Reference requirement that due to the reasonably foreseeable induced development that would follow an approved MGP, areas of High Conservation Value in the key 16 NWT ecoregions should be identified and the impacts of the MGP and foreseeable development on conservation options/ecosystem integrity assessed. Clearly this topic has to be addressed first in the Environmental Assessment process, hence its place in discussions at this Topic-Specific Hearing, and in related discussions of Land Use Planning. WWF remains firmly committed to ensuring that prior to basin-opening of this large portion of the Mackenzie Basin, the proper sequencing and planning is accomplished.

Just to the south of the NWT, in northeastern British Columbia, this prior sequencing of effective, credible conservation measures ahead of industrial development has already been done. This approach is similar to that taken in the submitted Dehcho Land Use Plan, and in the Inuvialuit Community Conservation Plans and Gwich'in Land Use plan. It should be accelerated and adopted via completion and approvals for high quality Land Use Plans throughout the NWT.

In the NE BC case, via two Land and Resource Management Plans (LRMPs), Fort Nelson (see Appendix) and Fort St. John, and the Muskwa-Kechika Management Agreement of industry, regional organisations, conservation groups and governments, a substantial regional plan now exists. This brings much desired certainty to industry (with access zoned across 60-73% of the Muska-Kechika area totalling 6.2 Million hectares) as well as all other stakeholder values. Details are provided in the powerpoint presentation, as well as the summary in the National Roundtable on the Environment and the Economy case study (see Appendices).

In addition, the recently released Northwest Territories Environmental Audit 2005 (see http://www.nwtcimp.ca/audit.html) underscores the lack of land use plans in important regions of the NWT (the Sahtu region included) as a very significant void that is adding complexity and uncertainty to environmental management processes. WWF fully supports the rapid acceleration of Sahtu Land Use Planning processes, and approval of strong, effective, well-balanced land use plans founded on proper community inputs, consultation, all available biophysical and socio-cultural information, and leading edge conservation science.

4. Safeguarding High Conservation Value Areas in the Sahtu Settlement Region.

The written submission here follows the powerpoint presentation filed today, July 28th (hard copies and electronic version on CDs), as well as the summary Notes on each of the 22 powerpoint slides. Please refer to this whole sequence to obtain the logical rationale and thread for the information we present in support of the main recommendations on conservation areas and measures.

WWF presents information on High Conservation Value Areas in the Sahtu Settlement Region, as well as a recent time series illustrating accelerating allocations of hydrocarbon resource access in the region. We anticipate that presentations made at this same Hearing in Norman Wells by the government multi-departmental Panel, especially by the GNWT and Environment Canada, will highlight some related aspects of the biological resources and conservation needs to be considered in this region, regarding the EA of the EIS material and especially the escalating induced industrial development plans and activity in the region.

This sequence of slides/map images illustrates two key points:

1. A sequence of steps for safeguarding currently identified HCV areas in the Sahtu region;
2. The urgency of acting now, using the tools already available, to sequence conservation measures ahead of further industrial allocations – because conservation options are already being foreclosed in some areas by induced hydrocarbon exploration and developments.

A very significant issue at this time in the NWT, including in the Sahtu, is the declining status of all Barren Ground Caribou herds. For the Sahtu region this relates particularly to the Bluenose West and the Bluenose East herds (see powerpoint slide #9 illustrating key habitat areas for these herds in the Sahtu region, based on traditional knowledge as well as substantial satellite radio-tracking research summarised in GNWT reports). Recent cessation of sport hunter harvesting of caribou is one of a number of measures now being implemented by the lead jurisdiction, GNWT.

The recently completed Barren-ground Caribou Management Strategy for the Northwest Territories, 2006-2010 (see Appended copy of this 38-page document) recognises the cumulative pressures on NWT caribou (especially climate change, industrial development/infrastructure, and harvesting) and identifies clearly the importance of both Land Use Planning and the NWT Protected areas Strategy (see its Appendix B, page 24) as tools that should be used to help secure caribou conservation in the long-term. WWF fully supports this call for such Conservation Measures, and thereby satisfactory protection of key caribou areas and corridors, to be prioritised now so that effective management of human-induced regional pressures can be achieved. Clearly, global solutions to accelerating climate change will also be needed.

The powerpoint presentation also illustrates the substantial decline in woodland caribou distribution in Alberta, with many local extirpations over the past 100 years or so, paralleling significant development of hydrocarbon fields and other industrial activity in former caribou habitat. As summarised by expert witness Professor Emeritus Gordon Orians at our February intervention, experience shows clearly that beyond some modest thresholds of activity, hydrocarbon field development and associated infrastructure development and self-sustaining caribou populations are in conflict. Given the estimated hydrocarbon potential in some parts of the Sahtu region/central Mackenzie Valley hydrocarbon fields, it is likely that unless very well planned in advance, with known key

areas reserved from industrial activity, significant further declines of barren-ground caribou herds would occur as industrial activity accelerated. WWF assumes and supports continued sustainable harvesting for Sahtu community needs of these caribou herds.

In the next two sections, we provide details of two further very significant roles of completed protected areas networks, when combined with effective long-term land use planning, as conservation measures highly applicable and needed at this stage in a region like the Sahtu, to ensure that a satisfactory balance of ecosystem resilience and conservation values is achieved, as an integral element and condition of regional economic development changes.

5. The Ecological Benchmarking role of completed protected areas networks.

General:

The concept of ecological benchmarks addresses the need to establish reference sites or controls for detecting the impacts of human activity on ecosystem composition and function (i.e., the full suite of organisms and biological and physical processes inherent in natural systems)[1]. This need arises from recognition that our understanding of the dynamics of ecosystems is incomplete, and thus the outcomes of management decisions are uncertain. These uncertainties include direct and indirect effects of resource exploitation on target and non-target species, alteration of key ecological processes (e.g., natural disturbance and hydrological regimes, and predator-prey dynamics), and changes in ecosystem services (e.g., air and water quality) (Schmiegelow et al. 2006). Establishment of ecological benchmarks, combined with application of adaptive resource management (Walters 1986), provides a powerful tool for learning and addressing the uncertainty inherent in the management of natural resources and maintenance of functioning ecosystems.

Ecological benchmarks, akin to ecological baselines in most ecological literature, have been defined in the context of their role as references for the detection of change in ecosystems in the presence of human activity (Sinclair 1998, Szaro et al. 1998, Wiersma 2005, and others[2]), reference sites for restoration (Hunter 1997), and as 'classrooms' for understanding ecosystem processes and the natural state and range of variation of biotic communities and ecosystems (Arcese and Sinclair 1997, Sinclair 1998, Landsberg and Crowley 2004). As such, ecological benchmarks are sites that experience little or no direct human impact at present and in the future (Sinclair 1998, Sinclair et al. 2002, Wiersma 2005) and that are sufficiently large to: 1) maintain and represent natural processes, habitats, and ecosystem dynamics (Sinclair 1998), 2) contain the historic complement of species (Wiersma 2005), 3) prevent the effects of human activity to

[1]Processes are dynamic interactions that occur among and between biotic and abiotic components of the biosphere that act directly, indirectly, or in combination, to shape the ecosystem.

[2] Others include: Fule et al. (1997), Hunter (1997), McIntosh et al. (1997), Timoney et al. (1997), Dayton et al. (1998), Williams and James (1998), Millar and Woolfenden (1999)

penetrate the core of the benchmark (Arcese and Sinclair 1997), and 4) permit monitoring of indicators at an ecosystem scale (Schmiegelow et al. 2006).

The concept of ecological benchmarks is directly applicable to resource development activities, such as those associated with the Mackenzie Gas Pipeline Project. If a goal of this project is ecological sustainability (i.e., maintenance of functioning ecosystems, while permitting the development of forest resources), the role of benchmarks is to serve as reference sites for understanding the dynamics of ecosystems and the response of ecosystems to associated development activities. Resource development activities in the north are occurring rapidly over very large spatial extents. Given incomplete knowledge, learning must occur through management experience (Nudds 1999), which is the foundation of adaptive resource management (Walters 1986). In adaptive resource management, ecological benchmarks are controls for management experiments. Without controls, sliding baselines of reduced naturalness and expectations can occur (Dayton et al. 1998). These have been observed in both terrestrial and marine systems (e.g., Sinclair 1998, Pitcher 2001, Baum and Myers 2004). Such sliding baselines can contribute to the failure to detect the degradation of ecosystems along slow temporal scales until there is a "sudden catastrophic collapse of the original system" (Sinclair 1998), or a loss of resilience to environmental change.

As controls, ecological benchmarks should have the following characteristics:

- Ecological benchmarks must be large enough to capture the full spatial extent of the biological and physical processes being monitored and buffer the processes from the influence of activities outside of the benchmark (Arcese and Sinclair 1997). Processes should be operating free of human intervention, recognising that exogenous influences such as air borne pollutants and climate change are unavoidable.

- The landscape composition and condition of ecological benchmarks should be representative of the range of natural conditions of the region. For example, the productivity, composition and spatial structure of different vegetation types and aquatic ecosystem components should be adequately represented.

- Human development activities (past, present, and future) should be absent from ecological benchmarks. In some instances, human activities that do not interfere with the process(es) being monitored may be permitted (Sinclair 1998, Wiersma 2005). However, to act as a control, an ecological benchmark must exclude the human activity (treatment) being monitored, as well as activities that could affect related processes.

<u>Specific to the MGP/NWT/Mackenzie Valley situation:</u>
It is clear that changes to ecosystems and ecoregions/Valued Ecosystem Components/High Conservation Values are occurring in the NWT, and that further changes will occur if industrial development accelerates and becomes more extensive.

Since society's understanding of biophysical richness, diversity and processes in this large region are relatively poor, most experts agree that it is wise to take precautionary and well-planned approaches to human-induced change.

Sine the impacts of an MGP and the development it would trigger/induce are impossible to predict with great certainty, one wise and very defensible conservation measure based on scientific theory and principles and practical experiences elsewhere is to set aside before major development a complete representative network of areas free from industrial activity, based on credible ecoregions. This remains possible in the 16 ecoregions in the NWT on which the JRP/EIS for the MGP is focusing.

In this way, provided a significant biophysical monitoring system is implemented fully in the Mackenzie Valley (under the existing CEAMF framework etc.), future changes detected can be evaluated in relation to the MGP and associated/induced hydrocarbon activity, by comparison with changes that may have occurred in comparable/the same ecoregion, as determined by monitoring in ecological benchmark areas (or 'control' sites). Without the ecological benchmark information, many changes to biological components might well be wrongly attributed directly to hydrocarbon activities. Similarly, decisions about mitigation measures and investments over the coming decades will be much more sound and less costly if this benchmark information is at the foundation of the planning for mitigation of cumulative impacts.

6. The Climate Change adaptation and ecosystem resilience role of completed protected areas networks.

This section also links to the powerpoint presentation to be given in Norman Wells, and attached as a powerpoint file to this submission in advance to the Panel. It covers both general regional and thematic aspects of implications of projected rapid climate change and impacts, and also the role and value of habitat and biodiversity conservation measures planned and implemented in advance of foreclosing options via premature development activities. Response is provided to the Panel's prior questions on this important topic.

Issue raised by JRP Member Dr. Peter Usher to CPAWS, Ft. Simpson, May 18, 2006:

"The reason I draw your attention to this assumption of the stability of an ecoregion [under Goal 2], as however you define it, and the effectiveness of selecting a sample area is in relation to climate change…[The strategy assumes that] the features that [WWF/CPAWS and others] are trying to protect stay in the same place and do not take into account landscape level shifts in ecosystem distribution and structure that could be induced by climate change in the next 50 to 100 years, and that the placement and management of reserves and protected areas will need to take into account potential climate change if the reserve systems are to continue to achieve their full potential" (Dr. Peter Usher)

I. Executive Summary:

The following testimony is in response to JRP Member Usher's concerns about the design of protected areas and climate change (above). Guidance from the scientific literature about how to plan for conservation in the face of climate change includes:

- Model how climate and biologic communities might change with changing climate.
- Represent enduring features across environmental gradients in protected areas
- Connect protected areas across regional landscapes and avoid fragmentation of landscapes.
- Incorporate climate change as a factor in the selection of protected areas and provide buffer zones for the adjustment of reserve boundaries.
- Use protected areas to monitor change.
- Limit cumulative, non-climate stresses.

Projected impacts of climate change in the NWT:
Climate change models suggest that land cover in the NWT will shift from taiga to boreal forest and from tundra to taiga and that some areas of current boreal forest will change

into savannah woodland of quaking aspen, balsam poplar, jack pine and mixed tall shrubs and herbs. Other models indicate that temperatures are likely to increase in general with the changing patterns of summer and winter temperature and precipitation being of greatest concern due to the impacts upon the timing of ecological processes such as migrations. The same climate change models also indicate areas that are likely to be most resistant to the effects of climate change and are therefore expected to act as refugia (e.g., areas where species can persist in place while many of the habitats in the surrounding landscape is changing).

NWT PAS – Design will mitigate impacts of climate change:

The goals and methods of the Northwest Territories (NWT) Protected Areas Strategy (PAS) and associated land use planning are based on the best-available conservation science. Goal 2 of the PAS is to protect core, ecologically representative areas within each ecoregion. These ecologically representative areas have been identified based on vegetation classes and enduring features including soils, landforms and elevation. This approach ensures that a range of habitats, even in the face of fire/insect disturbance or climate change, is protected. While the plants and animals using those habitats may change over time with changing climate, the underlying diversity of habitat conditions (i.e, combinations of soil types, aspect and elevation) will remain constant or change at a much slower rate. By conserving a diversity of habitat types based on enduring features, the protected areas coming out of the PAS will help provide a wide variety of ecological niches for changing plant and animal populations which will help mitigate the impacts of climate change. To the degree that protected areas are located in the areas of least change, they will also act as refugia.

Protected areas play an important buffering role against disturbances:

Protected areas play an important role in buffering ecosystems and wildlife populations against the effects of human-caused disturbances, and become especially important when there are several simultaneous disturbances. Maintaining biological diversity can act as insurance for allowing a system to reorganize and develop during, and after, disturbances. Comprehensive protected areas networks are most successful when the entire network can be implemented immediately; when conservation investments must be staged over years, biodiversity loss may be greater and uncertainty grows. It is imperative that the NWT PAS be fully implemented especially in light of the stress climate change will put on NWT ecosystems above and beyond those stresses associated with the proposed Mackenzie Gas Project.

Protected areas serve as benchmarks for adaptive management:

Protected areas, in addition to being a “shock absorber” for climate change, also provide a baseline condition from which change can be measured. They are therefore critically important to evaluate the impacts of developments and climate change and provide an effective community-based platform to monitor changes in species, ecosystems and biodiversity under changing climatic conditions. In such a capacity, they help to limit the liability of potential damages resulting from development as comparable areas under no development can be used to assess the degree to which development is responsible for the changes versus natural background conditions.

Conclusions and recommendations to the Joint Review Panel:

Climate change presents one of the largest ecological uncertainties in human history. There are many unknowns and planning with limited knowledge of the future is difficult. It is important to recognise that the maps showing changes in land cover presented here are based on modeled predictions and that actual changes are uncertain. To accommodate uncertainty, protected areas should be well-connected across the landscape and should be large in size to accommodate larger scale disturbances (especially fire and increasingly insects) that are expected with climate change.

Faced with uncertainty, a precautionary approach is the wisest course of action. A precautionary approach that ensures we have protected the full range of types of habitats means that no matter what changes, or what assumptions we have made, we have at least "insured" some of everything. Change is certain, the type of change is not, and therefore, like a diversified investment portfolio, the safest approach is to hedge our bets and "invest" in a range of habitats. This approach is the consensus of protected area planning experts.

The first step towards developing a network of protected areas that will be resilient to climate change is to recommend as a condition of project approval that the federal government:

- Permanently protect all candidate protected areas under interim withdrawal, which include Sahoyúé ?ehdacho (shown here) as a National Historic Site, Edehzhie as a National Wildlife Area and the South Nahanni Watershed and Nahanni karstlands as an expanded national park reserve.
- Provide interim protection for all candidate protected areas currently identified by communities in the 16 ecoregions of the Mackenzie Valley Five Year Action Plan through the NWT Protected Area Strategy.
- Approve and begin implementation of the Dehcho Land Use Plan, including an additional interim withdrawal to defer new industrial allocations on lands identified as conservation zones.
- Support work towards the timely completion, approval and implementation of an ecologically-representative Sahtu Land Use Plan, including at minimum prior to project approval an interim withdrawal to defer new industrial allocations on lands identified for conservation.

The second and equally important step towards developing a network of protected areas that will be resilient to climate change is to recommend as a condition of project approval that the Government of the Northwest Territories:

- Identify a network of core representative areas that meet the objectives of PAS Goal 2 and that will be resilient to climate change, and bring these proposed protected areas to communities across the NWT.

II. How to plan for conservation in the face of climate change; guidance from the science community

Conservation planning under the reality of climate change is a subject that has only recently been addressed by the science community. Following is a list of recommendations compiled from the recently published literature (Noss 2001, Hannah et al. 2002, Welch 2005) with references (in parentheses) to different parts of this paper where we address each recommendation:

1. Undertake regional level climate change modeling and biome shift forecasting (see Figures 1 to 6 below)
2. Represent enduring features across environmental gradients in protected areas (See explanation of the PAS Goal 2 representation analysis below)
3. Identify biomes that are at risk and practical response planning (see Figures 3 and 4 below)
4. Incorporate climate change as a factor in the selection of protected areas and provide buffer zones for the adjustment of reserve boundaries. (See Recommendations below including Figure 7)
5. Manage biodiversity at a regional scale, including core protected areas and landscape connectivity. Avoid fragmentation (See Recommendations below)
6. Protect climate refugia at all scales if possible (See Figure 8 and Recommendations below)
7. Maintain natural processes and successional regimes (See Section 5 on Benchmarks).
8. Conduct long-term monitoring to seek causality between climate and biodiversity responses at different scales (see section 5 on Benchmarks).
9. Limit non-climatic stressors around protected areas. (See Recommendations below)

III. Projected impacts of climate change in the NWT:

The Arctic Climate Impact Assessment (ACIA 2005) and volumes of other recently published literature confirm that climate change is occurring and explore the mechanisms of that change (see: Chapin et al 2005, Hansen et al 2003, Moritz et al 2002, Overpeck et al 1997, Walsh 1991). The ACIA and other literature have also confirmed that the impacts of climate change are already being felt in the north and that climate change effects are magnified in the north. Furthermore, numerous First Nations communities have documented changes in recent decades. While both the scientific and traditional knowledge communities are certain that climate change is occurring, there remains much uncertainty about how climate change will affect wildlife and ecological systems. Below we briefly focus on the best available projected impacts of climate change on the biological resources and ecological processes in the NWT.

Climate change is expected to have a profound effect on the Canadian North. Climate change is an emerging fact of life in the North, resulting in drastic changes in permafrost,

sea ice conditions, snow cover, vegetation, and wildlife habitats (Chapin 1995, Cohen 1997, Crick 2004, Maxwell 1997, IASC 1999). Indeed, the potential effects extend to all components of the environment ranging from increased erosion of river banks and shorelines, to increased mobility of nutrients and organic and inorganic contaminants, to changes in the quality and availability of traditional foods. (INAC 2005).

Some of the specific impacts to wildlife expected in the north include changes in the timing of bird migration and synchronisation with seasonal events such as glacial melt or ice break-up (Crick 2004), changes in fish species composition in the Mackenzie River Basin with greater frequency of rare species such as Pacific salmon (Tallman et al. 2005), and northward shift in treeline (Hansell et 1998.). Many species, including some that play a keystone role in northern ecosystems (e.g., the collared lemming (*Dicrostonyx groenlandicus*)), will lose important habitats due to climate change (Kerr and Packer 1998). Further possibilities include the decline in abundance and quality of spring and summer forage species for barrenground caribou resulting in a decrease in population size (Lenart et al. 2002). Warmer winters in the north are also allowing the spread of invasive species. In general terms, there are three potential fates for species in the north under climate change: (1) persistence in place if the changing climate remains within the species' tolerance limits, (2) range shifts (migration) to regions where climate is currently within the species' tolerance limits (typically latitudinal or elevational shifts), or (3) extinction (Davis et al. 2005).

Important ecological processes are also projected to change with the changing climate (IPCC 2001, USGCRP 2001). For example, the timing of spring runoff and other aspects of the hydrology of the Mackenzie River have already begun to exhibit signs of change with spring flows arriving earlier with each passing decade (Woo and Thorne 2003). Additionally, climate plays a significant role in determining a region's fire regime. Warmer and drier weather leads to more severe fire behavior, and increases in atmospheric moisture (anticipated in boreal Canada with climate change) could lead to increases in lightning-caused fire ignitions. The interaction of climate change and fire regime is expected to be significant; wildfires are expected to become more frequent, more severe, and larger in size in Canada's boreal zone (CFS: http://fire.cfs.nrcan.gc.ca/research/climate_change/climate_change_e.htm) , with particular increased fire danger in June and July (Stocks et al 1998).

> *"The most important thing is that the land is changing and our people are changing at the same time, because of the relationship we have with the land. We have lived on it for thousands of years, …once we stop hunting and doing those traditional things we are not Dene"* – participant, Deh Gah Got'ie First Nation, 2004. (Guyot et al. 2005)

Aboriginal people throughout the North have been observing changes due to the warming climate (see: Krupnik and Jolly 2002 (eds.) 2002. *The Earth is Faster Now: Indigenous Observations of Arctic Environmental Change*). For example, the White River First

Nation in Beaver Creek, Yukon and the Deh Gah Got'ie First Nation in Fort Providence, NWT have noted common observations related to climate change, including:

- Changes in species composition (new species, changes in bird migration, different plant species, different bird species)
- Changes in water (fluctuations, drying lakes and creeks, rivers, and lands, warmer water)
- Changes in weather (more weather activity, stronger storms, rain before snow, more rain warmer, more evident fluctuations)
- Changes in ice (different break up times, open rivers) (Guyot et al. 2005)

Modeled changes in NWT land cover:

To help address the question of how climate change will impact protected areas in the NWT, we analyzed projected land cover changes over the next 100 years. Figure 1 shows the distribution of land cover types in the NWT in 1990 and the location of proposed protected areas under the NWT PAS[3]. (Note the land cover shown here is from a coarse scale global data set and the cover types do not match those used for the PAS. The important point is how the cover types are projected to change over time).

[3] Analyses of climate, vegetation, fire, and soils data indicate that warming conditions could significantly shift northern vegetation zones further north (Gonzalez et al. 2005). The analyses shown here employed the MC1 dynamic global vegetation model (Daly et al. 2000), the HadCM3 general circulation model (Johns et al. 2003), and the IPCC SRES A2 emissions scenario (IPCC 2000).

The HadCM3-SRES A2 model-scenario combination projects a 250% increase in atmospheric CO2 above the 1990 concentration, causing global surface temperature to increase 3 degrees C and global total precipitation to increase 1300 mm/y.

The dynamic global vegetation model MC1 (Daly et al. 2000), previously used for U.S. vegetation zones (Bachelet et al. 2003), analyzes, for each cell in a geographic grid, five climate variables (temperature (mean, maximum, minimum), precipitation (mean), humidity (relative or specific)) and four soil variables (soil depth, texture, bulk density, rock fraction). MC1 determines the vegetation type and biome, plant biomass, leaf area index, above- and belowground carbon, soil moisture, runoff fire fuels moisture, fire frequency, and area burned by fire. MC1 reads climate data at a monthly time step to run three interacting modules for biogeography, biogeochemistry, and fire disturbance.

Preliminary MC1 results for the United States and Canada indicate potential biome changes on 51% of U.S. and Canada land areas with drastic vegetation shifts in the Arctic. Across the entire U.S. and Canada, for the 125 of 132 ecoregions of area ¾25 000 km2, twenty ecoregions representing 12% of the total land area show a potential 1990-2100 biome change of „0.95.

Figure 1: Modeled distribution of land cover types in the NWT in 1990

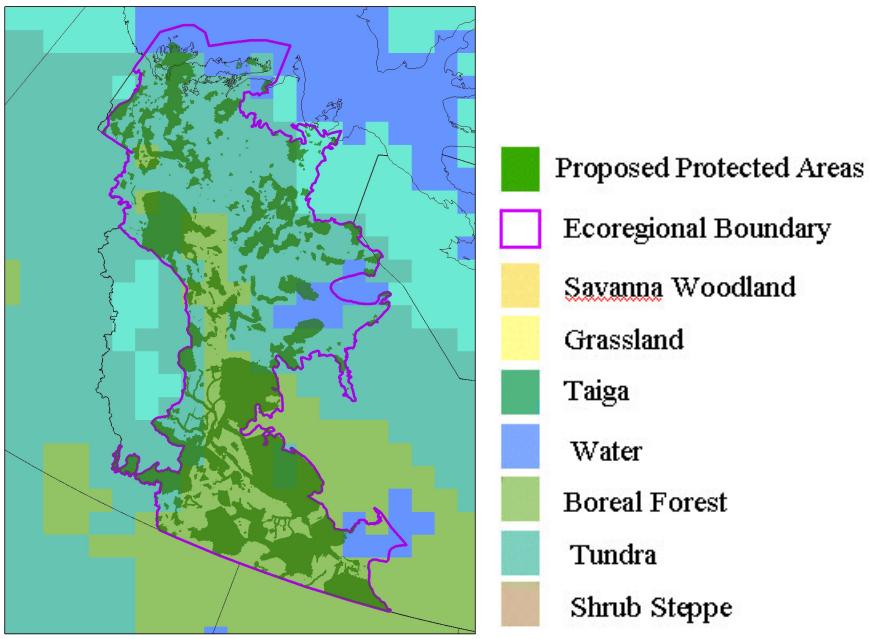
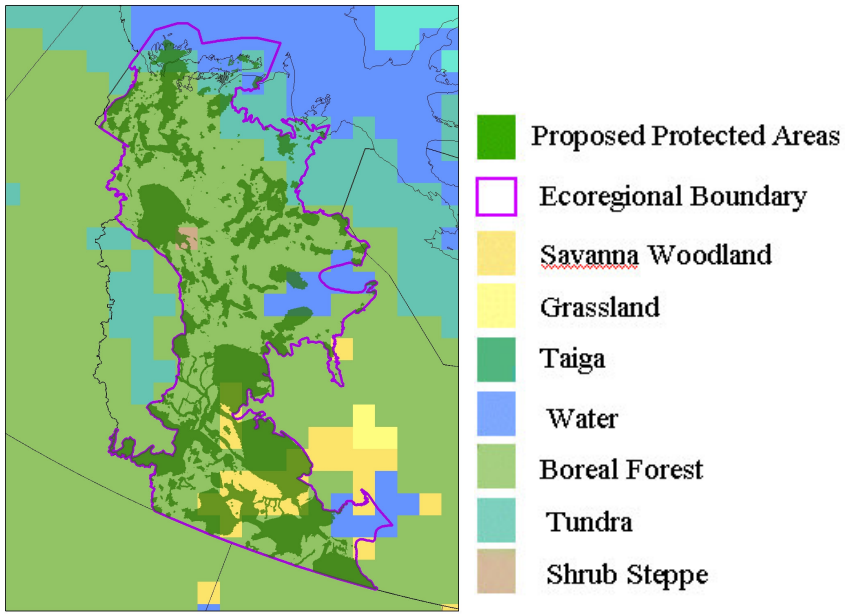


Figure 2 shows the projected land cover for the same region in 2100 using the same model and methods[4].

Figure 2: Modeled distribution of land cover types in the NWT in 2100



Note the following primary changes between the 1990 model and the 2100 model:

[4] Data sources and methods same as above (1).

1. General shift from Taiga to Boreal and Tundra to Taiga.
2. Loss of Tundra throughout the region and outside of the region (such as barrenground caribou coastal calving grounds)
3. Addition of Savanna Woodland to the northwest of Great Slave Lake (The likely vegetation would be quaking aspen, balsam poplar with an understory of mixed herbs and tall shrubs. Jack pine may occur in drier areas. Fire would become an increasingly dominant ecological process in the landscape.)

Furthermore, models run by the Canadian Centre for Climate Modelling and Analysis indicate a number of changes in precipitation and temperature patterns through to 2050 (Figures 3 to 6[5]). Of considerable note is the timing of the precipitation as well as its regional increases and decreases (Figure 3 and 4)

Figure 3: Summer Precipitation Changes

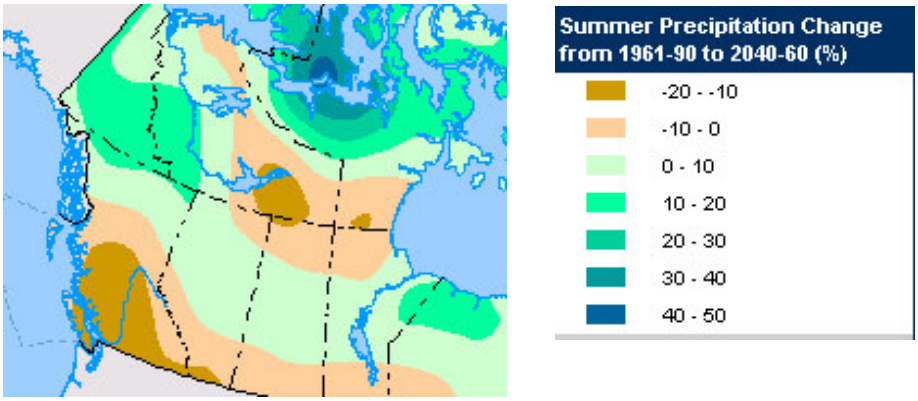
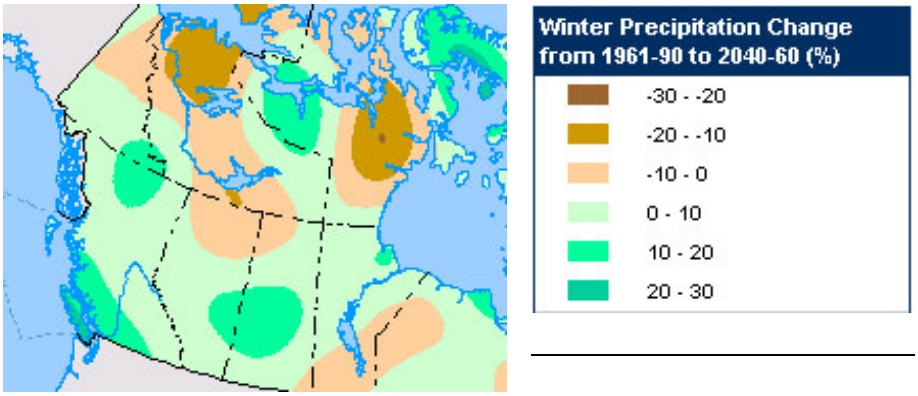


Figure 4: Winter Precipitation Changes



[5] The results for Figures 3 to 6 are "based on climate change simulations made with the Coupled Global Climate Model (CGCM2) developed at the Canadian Centre for Climate Modelling and Analysis of Environment Canada. The projected changes in greenhouse gas concentrations and aerosol loadings are based on the IS92a scenario developed in conjunction with the Intergovernmental Panel on Climate Change to portray one of several possible futures. The output of the model is produced on a grid of 3.75 degrees in latitude and longitude. This represents a grid square of approximately 400 kilometres by 300 kilometres at Canadian latitudes. For forestry and other applications, the Canadian Forest Service of National Resources Canada has derived the changes in climate based on the simulation output with reference to the 1961 to 1990 normals, and interpolated the data over Canada to finer resolution using a multi-step methodology." (from National Atlas of Canada website)

Figure 5: Summer Temperature Changes

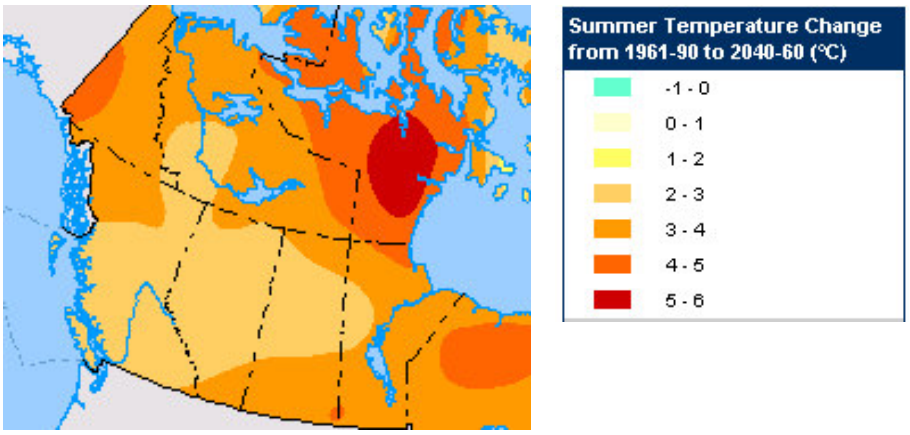
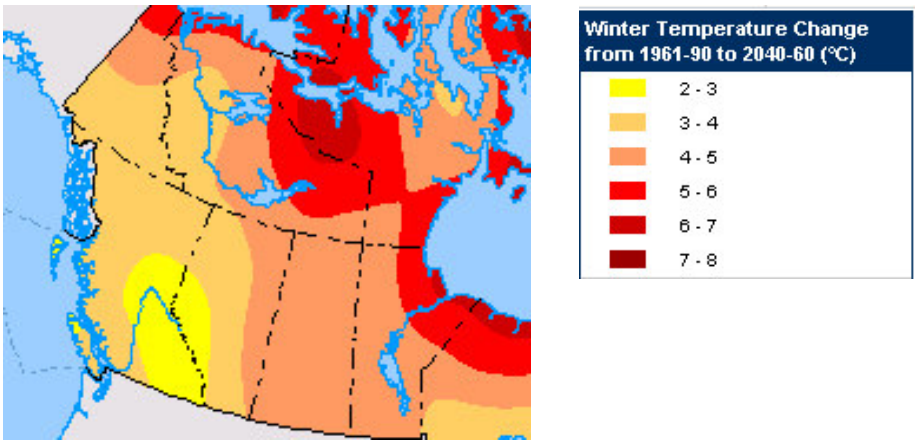


Figure 6: Winter Temperature Changes



These analyses demonstrate some of the changes we might expect due to climate change. Below we discuss how protected areas can be designed to best mitigate these changes.

IV. NWT PAS – Design will mitigate impacts of climate change:

The NWT PAS is comprised of two clear goals:

Goal 1: To protect special natural and cultural areas

Goal 2: To protect core, ecologically representative areas within each ecoregion.

The goals of the NWT PAS clearly reflect the growing understanding about the need for systematic conservation planning (Margules and Pressy 2000) and for the need to plan and manage for the maintenance of viable populations and functioning ecosystem processes across appropriately large, ecologically defined regions (Soule and Terbough

1999, Wisdom et al 2002). In other words, the Goal 1 plus Goal 2 approach is reflects the state-of-the-art of protected areas planning.

With regard to Goal 2, the NWT PAS recognizes that establishing core representative protected areas in ecoregions that are under-represented in existing protected areas will contribute to the conservation of the entire diversity of life forms and their habitats in the NWT. It further stipulates that protected areas be planned and managed to maintain biodiversity and ecological processes, and that an assessment of representation be completed as part of the protected areas planning process.

The NWT PAS Mackenzie Valley Five-Year Action Plan (Action Plan) provides additional detail on the goals and states that "together with buffer zones and connecting wildlife corridors, a network of protected areas in the Mackenzie Valley will:

- safeguard culturally important areas,
- adequately represent the diversity of habitats and landscapes,
- maintain the ecological integrity of NTW ecoregions
- ensure the viability of wide ranging species such as caribou, bears, wolves, wolverine and migratory birds,
- maintain a well-connected natural landscape, and
- act as reference sites to provide a crucial benchmark to properly monitor, assess and mitigate impact of the proposed Mackenzie Valley Pipeline and associated industrial development."

The Action Plan calls for ecologically representative areas to be mapped using a "coarse filter" approach, using biophysical land units and a vegetation layer as a suitable surrogate for biodiversity. The Plan further states that final area selection should not rely entirely on a coarse filter approach, and that other ecological data layers should be incorporated as they are available. This "coarse filter/fine filter" approach has been recommended by scientists (e.g., Kirkpatrick and Brown 1994, Kintsch and Urban 2002, Groves 2003) as a way to represent the biodiversity of a region. The rationale behind the coarse filter approach is that by conserving representative examples of different biological communities and ecosystems that occur within a region, the majority of species that inhabit the region will also be conserved.

Under Goal 2 of the PAS, ecologically representative areas within each ecoregion have been identified based on vegetation classes and enduring features including soils, landforms and elevation. This approach ensures that a range of habitats is protected. While the plants and animals using those habitats may change over time with changing climate, the underlying diversity of habitat conditions (i.e, combinations of soil types, aspect and elevation) will remain constant or change at a much slower rate. **By conserving a diversity of habitat types based on enduring features, the protected areas coming out of the PAS will help provide a wide variety of ecological niches for changing plant and animal populations.**

Figure 7 shows the modeled land cover in 2100 (like Figure 2) but highlights three areas of interest:

1. This area still represents a transition zone. It also captures what is left of the taiga, which may be the only habitat available to the once-tundra dwelling species remaining in the region. For those species unable to migrate further north, this will be their greatest hope. It is also an important caribou calving area and this is likely to continue – if not increase as habitats in this region may be suitable for year-round foraging by 2100 (currently many herds migrate to the edge of the taiga/boreal zone during winter).

2. This is an area of high relief that captures an "island" of taiga in the midst of the boreal. The proposed protected areas in this region will therefore have value not only from a habitat perspective, but also as a climate refugia perspective. This area has acted as a climate refugia in the past (it was unglaciated during the last ice age). Therefore and importantly from a conservation perspective, it has the highest level of endemic plants in Canada. (see: http://atlas.nrcan.gc.ca/site/english/maps/environment/ecology/components/endemicplantdiversity)

3. The region to the north-west of Great Slave Lake is projected to move towards a drier savanna/woodland environment by 2100. Were this to occur, it would be the most significant habitat change to occur in the region. The likely vegetation would be quaking aspen, balsam poplar with an understory of mixed herbs and tall shrubs. Jack pine may occur in drier areas. Fire would become a dominant factor in the landscape. It is of consequence to note that the size of Edehzhie allows it to capture a portion of this changed landscape as well as a portion of the boreal, thus acting as a refugium for species intolerant to the new drier woodland environment.

Figure 7:

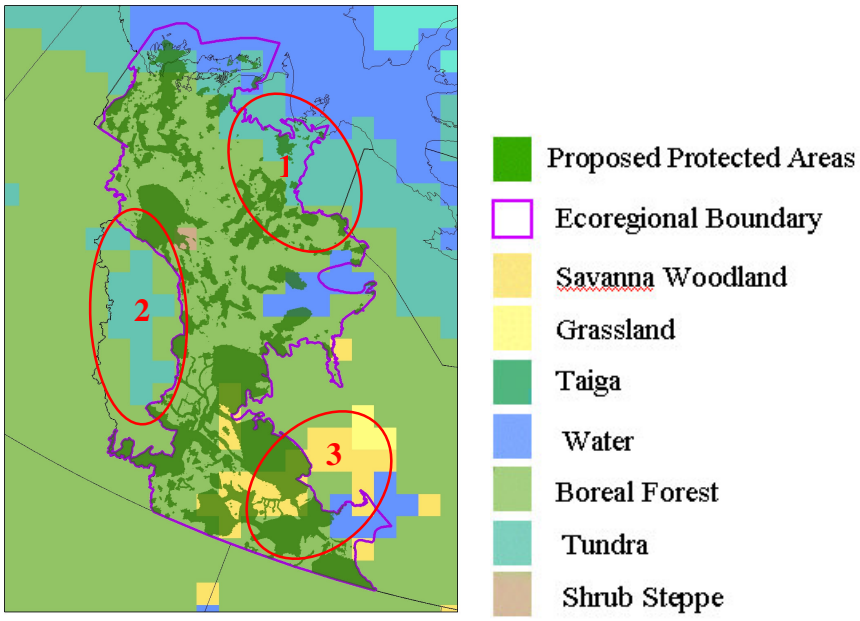
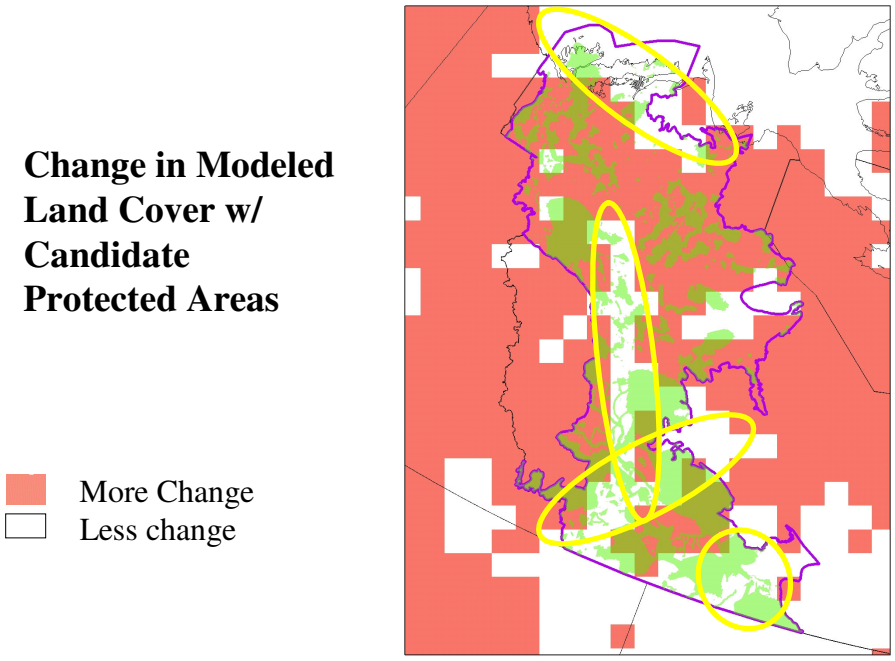


Figure 8 highlights two areas within the NWT where we might expect to see less change in land cover due to climate change[6]. Areas that are projected to change the least are most resilient to the effects of climate change and area expected to act as refugia for species (e.g., areas where species can persist in place while many of the habitats in the surrounding landscape is changing).

Figure 8:



The yellow ovals in Figure 8 represent areas of little change. This is important for several reasons:

1) These transparent areas indicate areas of greater resistance to the impacts of climate change. Resistant and resilient habitats are important areas to capture wherever possible in a protected areas network as they represent core areas that species can continue to use as peripheral habitats change.

2) Several important Goal 1 protected areas lie within these regions, as do areas that would further meet Goal 2 (ecologically representative areas). Concentrating additional areas under PAS Goal 2 within these regions would strengthen the resiliency of the protected areas network relative to climate change. This again highlights the importance of the ecologically representative areas called for by Goal 2 of the PAS. It also highlights the joint importance of Goal 1 and Goal 2 collectively.

[6] See data sources and methods under (1) above.

3) Finally, it is important to note that this area is also largely congruent with the Mackenzie River – highlighting the resiliency and importance of protected areas near the river (as well as the Liard and Willowlake Rivers). The larger the protected areas in this region of little change, the greater their capacity to act as refugia. This area also has high oil and gas potential & exploration –highlighting the need to put conservation first before development precludes all options.

Translating maps into numbers:
Change levels:

- 41% of protected areas undergo no shift in habitat type.
- 59% of protected areas undergo shifts in habitat type.

Likely dominant vegetation type captured in proposed protected areas	1990	2100
Tundra and Alpine	1%,	0%
Taiga	48%	4%
Boreal	48%	80%
Savanna Woodland	0%	13%
Shrub Steppe	0%	1%

In summary, the NWT PAS methods are based on sound conservation science and will help mitigate the impacts of climate change because they include core areas that are representative of enduring features. To the degree that protected areas are located in the areas of least change (see Figure 4), they will also act as refugia.

V. Protected areas act as buffers against other human caused stresses:

"A good network of large protected areas at the core of biosphere reserves may be wild nature's best climate change shock absorber" (Welch 2005)

Most ecosystems are subject to natural disturbances (e.g., fires and floods) that occur across a range of scales in time and space. Natural disturbances tend to be pulse disturbances with characteristic sizes and frequencies. Human activities tend to transform these pulse disturbances into chronic disturbances (Bengtsson et al 2003) and contribute to the creation of compounded stresses on ecosystems (Paine et al 1998). Sustaining healthy ecosystems requires that functional groups of species remain available for renewal and reorganization. Maintaining biological diversity can therefore act as insurance for allowing a system to reorganize and develop during and after disturbances.

A fully implemented network of protected areas is a dynamic tool for sustainable management of ecosystems in the face of change (Elmqvist et al. 2004). Further, comprehensive protected areas networks are most successful when the entire network can be implemented immediately; when conservation investments must be staged over years, biodiversity loss may be greater and uncertainty grows (Meir et al. 2004). Indeed, it is imperative that the NWT PAS be fully implemented especially in light of the stress climate change will put on NWT ecosystems above and beyond those stresses associated with the proposed Mackenzie Gas Project.

VI. Benchmarks & adaptive management in the context of accelerating climate change

Protected areas, in addition to being a "shock absorber" for climate change, will also provide a baseline condition from which change can be measured. They are therefore critically important to evaluate the impacts of developments and climate change and provide an effective community-based platform to monitor changes in species, ecosystems and biodiversity under changing climatic conditions (Maciver & Wheaton 2005).

"*Protected areas offer a limited defence against problems posed by rapid environmental change and protected areas will themselves need to be changed and adapted if they are to meet the challenges posed by global warming*" from Markham, A, N Dudley and S Stolton (1993); Loh, Jonathan (1997); Malcolm, Jay R and Adam Markham (1997);

Adaptation means adjustments in practices, processes, and structures. It can be spontaneous or planned, and can be carried out in response to or in anticipation of changes in conditions (Smit et al. 2001).

In that light, some experts have raised the issue of adjusting the edges of protected areas in the future as habitats and species move in response to climate-induced changes (see Burns et al. 2003; Elmqvist et al. 2004; Lemieux & Scott 2005; Scott & Lemieux 2005). This is an option that WWF is open to, providing it can be done in a manner that is agreeable to all parties involved, and in particular, local communities.

We hope to work with communities to develop adaptation plans, as part of the land use planning process, between and within protected areas to help local peoples respond to the changes that are already occurring and that are projected to increase.

VII. Conclusions

> *"There are risks and costs to a program of action. But they are far less than the long-range risks and costs of comfortable inaction"* - John F. Kennedy

Climate change presents one of the largest ecological uncertainties in human history. There are many unknowns and planning with limited knowledge of the future is difficult. It is important to recognise that the maps showing changes in land cover presented here are based on modeled predictions and that actual changes are uncertain. To accommodate uncertainty, protected areas should be well-connected across the landscape and should be large in size to accommodate larger scale disturbances (especially fire) that are expected with climate change.

Faced with uncertainty, a precautionary approach is the wisest course of action. A precautionary approach that ensures we have protected the full range of types of habitats means that no matter what changes, or what assumptions we have made, we have at least "insured" some of everything. Change is certain, the type of change is not, and therefore, like a diversified investment portfolio, the safest approach is to hedge our bets and "invest" in a range of habitats. This approach is the consensus of protected area experts[7].

Fortunately, in addition to being precautionary, we do have some information and well-informed guidance to help us through this process:

- Some of the best thinkers in conservation science have provided guidance for planning in this era of climate change.
- We can predict with increasing accuracy some of the changes to expect with the changing climate.
- A protected areas network built around ecologically representative core areas selected based on enduring features is the best way to build in resilience to climate change.
- We know that protected areas act as buffers against human-caused stresses and are of greatest importance as the number and intensity of stresses builds.
- We know how to identifiy and establish benchmark areas, to monitor changes in ecosystems and to manage in an adaptive fashion.

[7] See: (Halpin 1997; Hannah et al. 2005; Hannah et al. 2002; Loh 1997; Maciver & Wheaton 2005; Malcolm & Markham 1997; Markham et al. 1993; Meir et al. 2004; Noss 1983, 2001; Pyke et al. 2005; Pyke & Fischer 2005; Soto 2001; Wiersma & Urban 2005)

VIII. Recommendations to the Joint Review Panel regarding Climate Change/adaptations:

The first step towards developing a network of protected areas that will be resilient to climate change is to recommend as a condition of project approval that:

- The federal government:
  - Permanently protect all candidate protected areas under interim withdrawal, which include Sahoyúé ?ehdacho (shown here) as a National Historic Site, Edehzhie as a National Wildlife Area and the South Nahanni Watershed and Nahanni karstlands as an expanded national park reserve.
  - Provide interim protection for all candidate protected areas currently identified by communities in the 16 ecoregions of the Mackenzie Valley Five Year Action Plan through the NWT Protected Area Strategy.
  - Approve and begin implementation of the Dehcho Land Use Plan, including an additional interim withdrawal to defer new industrial allocations on lands identified as conservation zones.
  - Support work towards the timely completion, approval and implementation of an ecologically-representative Sahtu Land Use Plan, including at minimum prior to project approval an interim withdrawal to defer new industrial allocations on lands identified for conservation.
- The Government of the Northwest Territories:
  - Identify a network of core representative areas that meet the objectives of PAS Goal 2 and that will be resilient to climate change, and bring these proposed protected areas to communities across the NWT.

7. Interim report on northerners' views expressed to the Joint Review Panel on looking after the land.

Although WWF's work in NWT communities over the past 30 years, in support of community conservation initiatives has repeatedly heard concerns from northerners about the need to look after the land for future generations, we are well aware that in the frenzy today of economic opportunity, some commentators seem confused about WWF's views. WWF remains strongly supportive of conservation of land values in the north, including sustainable hunting, trapping, fishing etc, and in a well-planned long-term balance with economic development, provided that conservation measures are correctly sequenced and implemented fully.

So, beyond the Introduction restated in this submission, WWF decided to complete an initial analysis of the JRP Hearings transcripts to see what northerners had been expressing to the JRP from February to early July concerning the land, environment and conservation measures. This interim report is contained in the Appendices to this submission, and was completed for WWF by Teresa Lee.

In the 255 presentations made by 'northerners' at the 42 JRP Hearings, 78% (i.e. 3 out of 4) northerners expressed concerns about the environment, and 35%, over one third, made specific mention that land protection and conservation measures are needed. We take this as a strong indication that this topic is today still of great importance to northerners, as it was 30 years ago during the Berger Enquiry, and as it is expressed in the core principles of all Land Claims settlement agreements signed to this point.

8. Summary Recommendations regarding Conservation Areas and Measures.

In conclusion, we hope that today's three focal presentations and supporting materials are helpful to the Panel regarding EA considerations of 'Conservation Areas and Measures'.

WWF submits to the Panel that consistent with existing legislation, policies and public commitments and expectations, there is an overwhelming case for adopting and requiring a new approach to any further opening of NWT hydrocarbon basins. WWF recognises that a world-class well-planned regional approach will help maximise the overall benefits, and minimise the adverse impacts and costs. But this does require governments and key decision-makers to wholeheartedly take the new approach, be accountable for existing commitments, and to conduct in advance proper planning and assessment, including Strategic Environmental Assessments at the regional scale. The work of the JRP is very helpful to Canada and northern people in making this transition to a new, progressive approach.

Progressive and effective implementation of conservation measures and tools already available can help bring much sought certainty to all parties, embedded as conditions to any approvals and recommendations for the proposed Mackenzie Gas Project. Investment in these significant Conservation Measures has been strongly recommended by a number of review bodies and strategic initiatives recently, and WWF echoes these calls.

To help achieve this new showcase approach, WWF believes that the Joint Review Panel should recommend:

- **Approval of high quality Land Use Plans for the Dehcho and Sahtu regions;**
- **Implementation of the NWT Protected Areas Strategy Action Plan by 2010, and as a first step move interim protected areas to permanent protection, and candidate areas to interim protection;**
- **Steps to ensure that the opportunity for a satisfactory network of protected areas remains intact, and is not pre-empted by industrial allocations.**

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10. Appendices:

1. WWF Nine Recommendations to JRP in February 2006 Hearing.
2. Muskwa-Kechika Management Area Backgrounder.
3. Muskwa-Kechika Management Area case study: National Round Table on the Environment and the Economy.
4. Fort Nelson, BC, Land and Resource Management Plan (Summary).
5. Sinclair 1998: Benchmarking review paper
6. Schmiegelow et al. 2006: Review paper on Benchmarking.
7. Barren-Ground Caribou Management Strategy for the NWT, 2006-10. Govt. of the Northwest Territories. 2006.

Appendix 1. WWF initial nine recommendations to the JRP, Feb. 2006.

These recommendations are:

1. ***That the Cumulative Effects Assessment and Management (CEAM) Strategy and Framework, and Blueprint Actions be utilised and resourced fully, with strong engagement from industry including the MGP Proponents, to develop and implement a suite of effective mitigation measures.***

2. ***That well-balanced, long-term land use plans be completed and approved for the Sahtu and Dehcho regions in the NWT prior to any major decisions on the MGP, or associated development projects affecting these regions.***

3. ***That in order to satisfactorily meet conservation commitments made in the NWT, especially in the 16 ecoregions directly or indirectly intersected by the proposed MGP pipeline, no new allocations to industrial exploration or development access be granted until habitat conservation measures such as the interim protection of a network of culturally and ecologically significant areas (essentially VECs using the EIS terminology) be completed.***

4. ***That the five-year NWT Protected Areas Strategy (PAS) Action Plan be fully implemented by 2010, meeting commitments made by all PAS partners and the federal and territorial government responsible Ministers to reserve an adequate and representative network of special cultural and ecological areas in the 16 Mackenzie Valley ecoregions identified by the Action Plan and recognised by the Joint Review Panel and other key government agencies.***

5. ***That an adequate network of large natural areas free from regional/local industrial activity and impacts be available as benchmark reference areas in comparable ecoregions, from which to satisfactorily monitor and assess any environmental impacts attributed to the MGP pipeline and future induced industrial activity.***

6. ***That a robust network of protected areas be established as anchor areas of high conservation value before any further industrial allocations or major decisions are made, in order that ecosystem resilience to the stresses and uncertainties resulting from rapid climatic change be maximised.***

7. ***That a well-resourced and sustained, transparent environmental monitoring regime be put in place upon any MGP approvals, along with sufficient posted bonds from the MGP Proponents and subsequently induced development projects in the region, to ensure that ecosystem impacts are***

both detected and then promptly and satisfactorily addressed by development project partners, and not by the general public at some later date.

8. ***That the federal government integrate into the NEB, JRP and Board approvals processes for the Mackenzie Valley a full Strategic Environmental Assessment approach before finalising any approvals of the basin-opening MGP, consistent with the 1999 cabinet directive on SEA.***

9. ***That a final public interest decision be made on the basin-opening MGP proposal in the context of a progressive, robust, specific, clear and effective national and/or continental sustainable energy strategy. Development of the Canadian sustainable energy strategy should be initiated immediately.***