Aboriginal Community Land and Resource Management:
Geospatial Data Needs Assessment and Data Identification and Analysis

Volume 1

Aboriginal Mapping and Information Needs:
Experiences from Ten Land Use Planning Processes Across Canada

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1.0 Introduction

Canada is a relatively new country and the lines on our maps are still being drawn. These lines define land title and ownership, and zoning for how these lands are to be managed. Aboriginal communities across Canada are playing a central role in this re-mapping of the landscape. New powers and authority have been granted through land claim settlements and rulings of the courts. Within this context, Aboriginal communities are turning to mapping to re-assert their rights to their lands and their visions for how these lands are to be developed and conserved.

1.1 Land Claims and Mapping

The Royal Proclamation of 1763 outlined a procedure for the Crown to acquire lands from First Nations. Within this context, many historical treaties were made. More recently, many break-through agreements were reached in Canada's North, including:

- the James Bay And Northern Quebec Agreement (1975);
- the James Bay And Northern Quebec Agreement (1975);
- the Inuvialuit Final Agreement (1984);
- the Nunavut Land Claims Agreement (1993);
- the Yukon Umbrella Final Agreement (1993) and the related First Nation Final Agreements (ongoing);
- the Sahtu Dene and Métis Comprehensive Land Claim Agreement (1993);
- the Labrador Inuit Land Claims Agreement (2005); and,
- Nunavik Inuit Land Claims Agreement (2006).

Many of these agreements include devolution to Aboriginal groups of authority to create land use plans and mandates to implement these plans. In the Yukon, for example, each First Nation Final Agreement provides for the establishment of a Regional Land Use Planning Commission to recommend a plan for both settlement and non-settlement lands. Under the Nunavut Land Claims Agreement, the Nunavut Planning Commission (NPC) was created and given the responsibility for land use planning.

Still, after 250 years of treaty-making, negotiations are still ongoing regarding Aboriginal rights and title to the land in many regions across Canada. Most of these, but not all, relate to lands south of the 60th parallel. During the past 30 years, where negotiations to recognize rights have failed, Aboriginal communities have turned to the courts to help resolve issues of title, with much success.

1.2 Legal Context for Aboriginal Mapping

In 1973, the Supreme Court of Canada's Calder case recognized the existence of Aboriginal title as being a form of land authority independent of Canadian law (Calder v. Attorney-General of British Columbia, 1973). In 1979, the Baker Lake case outlined a test for providing Aboriginal title (Hamlet of Baker Lake v. Minister of Indian Affairs and Northern Development, 1979). This test became a catalyst for communities to map their use and occupancy rigorously over their territories, to provide legal documentation of occupation and title. More recently, the 1997 Delgamuukw case emphasized the importance of documenting "evidence of occupancy" as a means of proving Aboriginal title (Delgamuukw v. British Columbia, 1997. Again, central to this documentation is the recording of cultural interactions with the lands, with maps playing a lead role in this legal narrative.

In 2004, the Supreme Court handed down its decision in the Haida, Taku River case (Haida Nation v. British Columbia (Minister of Forests), 2004) This decision flipped land management on its head; any development on Crown land, whether it be a new road, seismic line, well site, mine or tree being cut now requires the government to consult, meaningfully, with Aboriginal communities. These activities are all place-based, and maps are a great tool to communicate place-based values.

The Haida, Taku case also proved to be a double-edged sword for many communities. The onus was put onto communities to share their visions for how their lands are to be developed so these could be included in the decision making process. Inundated with requests to review development plans, the consultation process became characterized by being reactive in nature, fragmented at the parcel level and lacking certainty with regard to what is appropriate and what is not. Many communities have since identified the need for higher-level land use plans that will act as a broader framework and guidepost in the decision making process and help to address these issues.

1.3 External Development Pressures and Mapping

Aboriginal communities in Canada are facing increasing pressure to balance multiple values and interests within their lands. These pressures and demands are a result of devolution of authority under self-government initiatives, resource exploration activities, and the need to provide opportunities for their members while ensuring that lands will continue to be productive in the future. Balancing these complex issues (and often conflicting interests) requires, first and foremost, a process for dialogue. This dialogue needs to be well informed and supported by accessible data and information management tools such as GIS.

For many Aboriginal communities, Land And Resource Management and Community Planning include the recognition of and incorporation of traditional value systems into land management practices. At the same time, there is an increasing need to engage with private industry, either through a consultative process or as partners in co-ventures. Sound-practices for incorporating both traditional and western knowledge systems are vital in local decision making.

By way of example, Inuit Tapiriit Kanatami, a national organization representing all Inuit regions in Canada, has recently established an Inuit Knowledge Centre as part of a strategic plan to reshape research priorities and develop capacities within the Inuit regions. The Centre will focus on, among other things, the collection and analysis of data and knowledge about Inuit. In this example, GIS and mapping have been used as common tools to help manage, analyse and communicate data from an Inuit perspective.

The foundation of all good decision-making is appropriate information. Information is the basis for all levels of development; social, cultural and economic. If development is to be sustainable and appropriate for the Arctic and its residents, then the information base has to be appropriate. Such an information base is one that draws on all available sources of information and knowledge systems. Western science is one such system - so is indigenous knowledge. Working with indigenous knowledge is a commitment to a process which respects it as a knowledge system and cannot be separated from the cultural context within which it operates -- Mary Simon, President, ITK, 1994.

1.4 Land Use Planning - a new "old" tool

In present day Canada, "planning" is often defined as the scientific, aesthetic, and orderly disposition of land, resources, facilities and services with a view to securing the physical, economic and social efficiency, health and well-being of urban and rural communities (CIP, 2000). Within this field of practice, "land use planning" is just one tool used by planners to try to reconcile and balance multiple environmental, economic, and cultural values for how lands and resources are protected and/or developed. Land use planning includes both the land use plan itself and the planning process that is put in place to create the plan.

"Land use" plans are also sometimes referred to as "land management" plans, "comprehensive resource management" plans or "integrated management" plans. The latter two are produced by approaches to planning based on principles of the ecosystem and biodiversity which recognize the interconnections between all living things and their direct relationships to the physical environment. Many Aboriginal Canadians believe that these two approaches closely reflect a traditional land and resource management system that they have been practicing "since time immemorial."

Regardless of the specific term used, all plans are characterized by the spatial weighting of conservation, cultural and economic needs and values, with specific management recommendations made for areas of similar ranking. These areas are often termed "management zones." Plans can be creative in the categorization of zoning, but common zones used in Canadian land use plans include: special management zones; general use zones; conservation zones; and multiple-use areas. A quandary in many Aboriginal land use plans is how to effectively compartmentalize the landscape into zones for land management purposes while at the same time recognizing the holistic interconnections between all systems within a living landscape.

The land use planning process that is used to create the plan is also governed by widely accepted principles and practices. Ideally it is based on an inclusive exercise whereby local communities, stakeholders and governing bodies come together to share their values and visions for how the land (and waters) should be used. Other guiding principles of successful planning processes include transparency, a participatory nature, comprehensive issue identification and the systematic gathering and assessment of descriptive information for a region. As much of this descriptive information is place-specific, mapping and GIS have become critical tools used for managing and assessing information within the land use planning process.

Although Aboriginal communities have been mapping their cultural uses and values since the 1970s (e.g. Labrador Inuit Association's Our Footprints are Everywhere, 1977), the integration of these values with other economic and environmental interests in land use plans is a relatively new practice. Through recent assertions and recognition of Aboriginal Title and Treaty rights, Aboriginal communities in Canada are now active in adapting formal land use planning tools to develop comprehensive plans for their Territories and Treaty areas. Two pioneering projects include the Kaska Dene's comprehensive planning in the 1980s and the Algonquins of Barriere Lake integrative planning in the 1990s.

The collection and consolidation of environmental, economic and cultural data has thus become a mandated necessity for most communities. These data are needed to mitigate risk in the decision making process, to help ensure the protection of sensitive areas while balancing the need for healthy regional economies. However, putting in place the capacity required to oversee information management and mapping programs still remains a challenge in Aboriginal Canada.

1.5 GeoConnections and Matters of Importance to Aboriginal People

Recognizing the growing field of mapping within Aboriginal Canada, the Federal Government targeted Matters of Importance to Aboriginal People as one of four priority areas within Natural Resources Canada's (NRCAN) GeoConnections program. GeoConnections was mandated to develop a Canadian Geospatial Data Infrastructure (CGDI) - standards and tools for geospatial information and information exchange.

GeoConnections recognizes that the advancement of Aboriginal communities relies upon their ability to control and manage their own futures, and has identified Land and Resource Management and Community Planning as one area of high importance within Aboriginal communities. This was emphasized in an October 2006 Survey of Geographic Information Decision-makers prepared by Environics for GeoConnections. Environics noted that top kinds of geographic information related to Aboriginal matters in the next five years include (in order of importance): land use;

traditional knowledge; watershed data; satellite imagery; forest inventory; and public water supply (p.2).

Building on this, in July, 2007 GeoConnections issued a public request for proposals for a data needs assessment and a data custodian / supplier identification and analysis report. The data needs assessment will determine the key geospatial datasets required to support Land and Resource Management within Aboriginal communities. The data custodian/supplier identification and analysis also will be used to determine who the authoritative closest-to-source custodians are for the identified key geospatial datasets required by Aboriginal organizations. GeoConnections notes that the assessment, identification and analysis will be used by the organization "to help in the development of an approach to facilitate geospatial data exchange to support Land and Resource Management and in the development of program activities related to the Matters of Importance to Aboriginal People thematic area for the GeoConnections program".

In December, 2007, Makivik Corporation was awarded the contract to carry out this work. Makivik is the development corporation mandated to manage the heritage funds of the Inuit of Nunavik provided for in the James Bay and Northern Quebec Agreement (JBNQA). Makivik promotes the preservation of Inuit culture and language as well as the health, welfare, relief of poverty, and education of Inuit in the communities.

Our research has produced a two-volume report to meet these objectives. Volume One focuses on capturing high-level stories from interviews with community technicians and leadership regarding their experiences in completing Aboriginal land use plans. Their stories were organized into ten main themes, along with recommendations for each. The themes were:

1. access to data issues;
2. web-based mapping not being used;
3. problems locating and downloading geospatial data;
4. lack of standards and format issues;
5. access issues to satellite imagery;
6. investments needed to support cultural data inventories;
7. geomatics capacity;
8. data confidentiality and protocols;
9. land use planning in context of broader issues; and
10. need to continue the dialogue.

These stories and themes provide the context and a departure point to look at data needs and data sources in more detail. This is the focus of the Volume 2 report.

2.0 Methodology

This study set out to develop a better understanding of the geospatial data needs of Aboriginal groups across Canada and issues surrounding how these data are being used. In short, the objectives were:

- determine the key geospatial datasets required to support land and resource management by Aboriginal communities; and,
- determine who the authoritative closest-to-source custodians are for the identified key geospatial datasets required to support land and resource management.

In meeting these objectives, the project team also recorded other important issues relating to the Aboriginal experience in land use planning. The team felt that it was important to document these issues and report back on some of the major themes that surfaced during the consultations with Aboriginal communities. Volume 1 addresses the issues of the Aboriginal communities, and the objectives of this study are laid out in Volume 2.

2.1 Project Team

Makivik Corporation assembled a project team that had considerable networks in place with Aboriginal groups across Canada. In addition, the team had direct experience in Aboriginal land use planning, mapping and information management. The team included the involvement of Strata360, Hatfield Consultants and PlanLab Ltd.

2.2 Finding the right plans to review

With the team in place, the first task was to search out the Aboriginal groups, communities and organizations that have a land and resource management plan in place or have a mandate to create one. The target was to short-list ten plans in total. The selection process included the need to be geographically representative of concerns in regions across the country (including Atlantic, Eastern, Central, Western and Northern Canada), and culturally representative (Métis, Inuit, and First Nations across Canada).

Team members contacted Aboriginal groups and secured copies of existing plans. Two plans that were confidential - the Algonquins of Barriere Lake and the Tsleil-Waututh plans - were secured and shared internally. During this process, the project team identified a total of seventeen land use plans. Research was conducted to help identify a good sampling of Métis plans; this proved to be a challenge. There was a large sample of plans to draw on from Western Canada, mainly British Columbia, while fewer plans existed in Eastern Canada. Many Aboriginal groups in eastern Canada and southern Ontario are only now beginning to create community plans.

The following table summarizes the final list of plans by region and culture:

TABLE 1:

Short listed plans (and/or groups) by region and culture.

GEOGRAPHIC REGION / CULTURE	INUIT	FIRST NATION	MÉTIS
Atlantic Canada (1)		Forest Ecosystem Strategy Plan for District 19, Labrador / Nitassinan (Innu Nation)	
Eastern Canada (2)		Algonquins of Barriere Lake Comprehensive Land Use Plan, Quebec Whitefeather Forest Land Use Strategy (Pikangikum First Nation, Ontario)	
Central Canada (2)		Asatiwisipe Land Management Plan (Poplar River, Manitoba) The Prince Albert Grand Council's plan for the Athabaska region (Saskatchewan)	
Western Canada (2)		Haida Gwaii Land Use Plan (Haida Nation, British Columbia) The Indian River Watershed Integrated Lands and Resources Management Plan (Tsleil-Waututh First Nation, Southern British Columbia)	
Northern Canada (3)	Keewatin Land Use Plan (Nunavut Planning Commission, Nunavut)	Dehcho Interim Measures & Plan (Dehcho First Nation, NT)	Sahtu Land Use Plan (Sahtu Dene & Métis Comprehensive Claim, NT)

In addition to selecting plans that were culturally and geographically representative, the project team also tried to select plans that included coastal and inland regions, as well as rural and urban-based plans.

It is very important to note that the short listed plans were not selected because they were of exceptionally good quality from a methodological or data-use point of view. The main selection criterion was simply to satisfy a requirement to meet geographic and cultural representation. Once this criterion was met, subjective judgements were made on how to short-list the sample of plans further. The following provides a rational for the final selection:

1. Forest Ecosystem Strategy Plan for District 19, Labrador / Nitassinan (Innu Nation): The Innu plan incorporates Silva Forest Foundation's (Herb Hammon's) ecosystem-based modeling, a special methodology which is unique in Canada. It was identified as a high-profile plan and an important one to include in the review.

2. Algonquins of Barriere Lake Comprehensive Land Use Plan: The Algonquins of Barriere Lake plan is one of Canada's most comprehensive land use plans and therefore an important one to include in the study. A special request needed to be issued in order for the project team to have access to the plan.

3.Whitefeather Forest Land Use Strategy (Pikangikum First Nation): The Whitefeather Forest plan is Ontario's only boreal land use plan. The maps prepared for this plan won the National Cartography Award in 2005 by the Canadian Cartographic Association (CCA).

4. The Asatiwisipe Land Management Plan (Poplar River, Manitoba): This plan was selected as the representative study for central Canada. This plan largely is a park management plan and serves as a supporting document in an application by the community for protection of its lands as a UNESCO Heritage Conservation Area.

5. The Prince Albert Grand Council's plan for the Athabaska region: This plan was selected for its reputation in being a comprehensive land use plan that integrated Saskatchewan's largest cultural land use and occupancy study (1,100 map overlays with over 65,000 mapped sites) with a rich array of biophysical and resource data. This is also a stage 1 of a 3 stage land use study, which will have an impact on almost one-third of the Province of Saskatchewan.

6. The Haida Gwaii Land Use Plan, Haida Nation: This plan is the outcome from a co-chaired land use planning process between the First Nation and the Province of British Columbia. The plan also incorporated data resulting from millions of dollars of research investments from the Coast Information Team, an independent third-party research consortium of world renowned scientists and biologists. The plan is unique in its management prescriptions of cedar and how it represents planning in the midst of a Title case. The plan received a lot of attention within First Nation networks.

7. The Indian River Watershed Integrated Lands and Resources Management Plan (Tsleil-Waututh First Nation): This plan was identified as the most suitable sample plan from a region in close proximity to an urbanized environment. It is more a bioregional atlas than a plan, with economic, cultural, and environmental layers and visions included in the atlas that forms the basis of land use planning. A special request needed to be issued in order for the project team to have access to the plan.

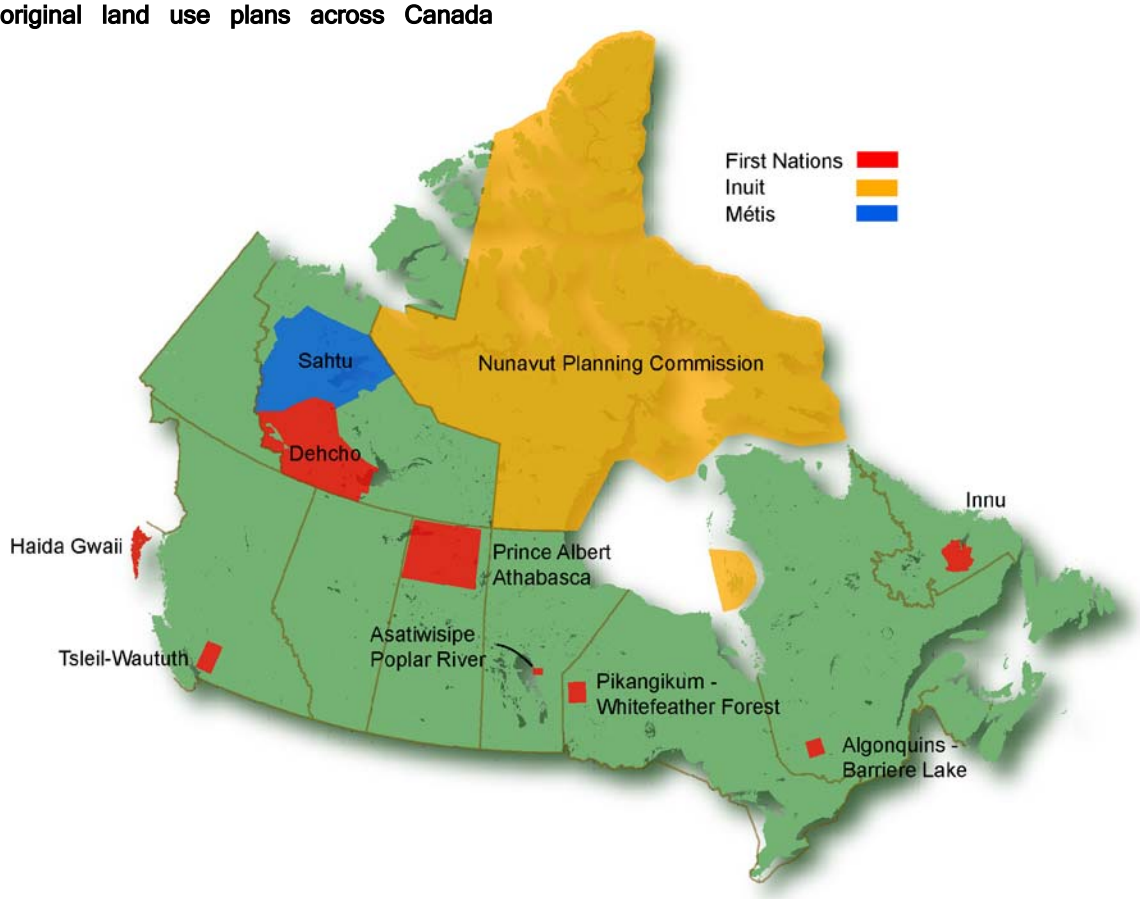
8. The Dehcho Interim Measures & Plan, Dehcho First Nation: This plan combines a rich variety of community-based and external data and is considered to be one of the most comprehensive Aboriginal land use plans in Canada. The group is politically very active right now due to the Mackenzie gas pipeline project.

9. Sahtu Land Use Plan (Sahtu Dene & Métis Comprehensive Claim): The Sahtu plan falls within the Sahtu Dene & Métis Comprehensive Claim, which also accommodates the Métis component of the project.

10. The Keewatin Land Use Plan (Nunavut Planning Commission): The Keewatin Land Use Plan was initially selected for review. This plan was prepared between 1989 and 1991 prior to the signing of the Nunavut Land Claims Agreement (NLCA). It was then updated by the Nunavut Planning Commission (NPC) in conformity with its authority under the NLCA. However, it has always been envisaged that a new and comprehensive planning process be undertaken. The plan accommodates the Inuit representation in the study and covers a large territory. The Keewatin Land Use Plan was initially reviewed by the study team. However, after speaking with NPC officials, it was recommended that the project team review recent requests for proposals which describe data needs for a new Nunavut wide planning process.

Note that the plans selected for this review differed greatly. The plans used different methodological approaches in planning, including an issue-based approach, and ecosystem-based management approach, and a conservation-area design approach. The motivations for initiating the plans also varied greatly - some catalyzed out of conflict (e.g. Poplar River, Dehcho), others through newly acquired rights and management powers (e.g. Sahtu). This is important to note as each plan is unique in its own right, and their differences make it difficult to compare the plans using standardized templates. For example, a plan that is drafted to help manage forest development will use different data / methods than a plan drafted to identify new parks and protected areas.

FIGURE 1:
Map showing Geographic Distribution of selected Aboriginal land use plans across Canada



2.3 Reviewing the Plans

Once the plans were shortlisted, the research team made a decision early-on that the plan review process should look at the context for each plan, not just its content. Mapping and spatial data analysis are simply tools; it was concluded that these tools needed to be put into context. As such, the focus of the plan (e.g. park management plan; integrative land use plan; forest management plan, etc.), the context in which the plan was created (e.g. mandated under a land claim agreement; a tool for conflict resolution, etc.), implementation policy context and capacity issues during and after the planning were all reviewed.

Guidelines were developed for the plan review. It was decided that the review of each plan would be based on two distinct templates: (1) review of plans in the form of a technical annotated bibliography; and (2) review of maps contained in the plans in the form of a data summary spreadsheet.

The Technical Annotated Bibliography

The annotated bibliography template captured the following main themes (see Appendix A for the completed bibliography):

- Land and resource management plan title and date
- Availability
- Lead Aboriginal entity (Inuit, Métis, First Nation)
- Partner organizations
- Project team members. This included technicians, researchers, consultants and their contacts

- Scope of project. This included the following:
    - geographic location;
    - geographic scale of the plan;
    - main methodological approach;
    - policy opening - why the plan was created and the policies in place to support the plan's implementation.
- Focus of the plan
- GIS and mapping technologies used in the planning process. This was added to the review. This information was verified during the community workshops
- Potential datasets and data gaps. This theme included identification of the potential datasets (such as geospatial data mentioned in reports but not actually used on the maps). These potential gaps were identified in broad strokes during the plan review process and the gaps were filled-in during the community consultations process.
- Geospatial data used in plans and maps. This information was gathered using a separate template and in form of a spreadsheet. The process identified the geospatial data contained in the reports as well as separate documents (appendices, larger-scale maps etc), including data sources and formats, spatial layers and data used.

The Data Summary Spreadsheet

Geospatial data can be categorized in a variety of ways, including by source, theme, scale and format. Data can also be categorized by the methods used to collect the data (remotely sensed, field surveys, social research science, etc.). Of these categorizations, "theme" presents the most challenging and requires definitions to clarify its meaning.

For instance, classifying caribou habitat illustrates the complexities of categorizing data. Caribou habitat data can be logically categorized under a natural heritage theme. However, if the information was collected through local interviews with Elders and trappers, would it then be categorized under the cultural heritage theme? What if the data combined local knowledge with Western scientific methods to map the habitat? To answer these questions, some understanding of the methodologies used to collect the data is necessary.

The amount of work involved to research how each dataset within the review was collected was well beyond the scope of this project. Thus, data categories were narrowed down into two principal categories and four thematic categories. The principal categories were: (1) framework; and (2) thematic.

Framework data is the set of continuous and fully integrated geospatial data that provide context and reference information for the country. These are expected to be widely used and generally applicable either underpinning or enabling most geospatial applications (CGDI 2001). These layers include many of the same features that are visible on topographic maps, such as roads, rivers and elevation. Framework data, in addition to natural or man-made physical features, may also include alignment layers used for geometric control.

In Volume 2, Framework data were further sub-classified into meaningful groups to assist in prioritizing

- Administrative Boundaries
- Bathymetry
- Elevation
- Hydrography
- Infrastructure
- National Topographic Datasets
- Nautical Charts
- Provincial Topographic Datasets
- Remote Sensing
- Roads
- Toponymy
- Transportation

Thematic data are those datasets that describe the characteristics of geospatial features, providing information on specific topics, such as water quality, historical flood areas, or health care facility locations (GeoConnections 2007). Thematic data attributes are geospatially referenced so they can be tied to locations on the Earth and can be aligned to

framework data. An example of thematic data is the caribou habitat data discussed above. The four thematic categories were:

1. natural heritage;
2. cultural heritage;
3. biophysical; and,
4. administrative / development.

These categories reflect what the data describe, not how the data were collected. Both framework and thematic data are assigned one of the four categories. Using these categories, the above example of caribou habitat data would fall within the natural heritage theme, regardless of how the data were collected. The following presents definitions for each:

Natural heritage: Data which describe flora and fauna, species and their habitats. An example is caribou habitat. In Volume 2, natural heritage was further sub-classified into meaningful groups to assist in data prioritization. Natural heritage subclasses are as follows:

- Ecology
- Sensitive Areas
- Wildlife

Cultural heritage: Data which describe a community use, occupancy or knowledge system of lands and resources. An example is caribou hunting areas. Readers should note that cultural data include Traditional Ecological Knowledge (TEK). In Volume 2, cultural heritage was further sub-classified into meaningful groups to assist in data prioritization. Cultural heritage subclasses are as follows:

- Archaeology
- Ceremonial & Sacred Sites
- Cultural Toponymy
- Occupancy Areas
- Travel & Trade Routes
- Use & Harvesting Areas

Biophysical: Data which describe landscape features and their processes. An example is slope stability. In Volume 2, the biophysical class was further sub-classified into meaningful groups to assist in data prioritization. Biophysical subclasses are as follows:

- Coastal Zone
- Geology
- Hydrology
- Land Cover
- Weather & Climate

Administrative / Development: Data which describe land management boundaries or modifications to the landscape for conservation / economic development purposes. An example is parks. In Volume 2, administration/development was further sub-classified into meaningful groups to assist in data prioritization. Administrative/development subclasses are as follows:

- Aboriginal Territories
- Agriculture
- Conservation / Protected Areas
- Energy Development
- Fishery
- Forestry
- Land Ownership
- Land use / Land Management
- Mining
- Oil & Gas
- Socio-Economic
- Tourism & Recreation

For each geospatial dataset additional information was captured regarding: the data source (data distributor, not necessarily the data collector); scale; date; format (vector or raster); confidentiality; contacts (for the data provider); and general notes / observations. This information, including the data categories, was summarized in a data summary spreadsheet.

2.4 Workshops with Aboriginal community managers and land planners

The community workshops were coordinated directly by the project team members. The workshops usually consisted of a minimum of three individuals from communities and regional organizations that use or are planning on using geospatial data for land use planning. During the workshops, group interviews were conducted based on a standardized interview guide and a workshop guide (see Appendix B). The interview guide was developed to provide a standardized approach and consistency in collecting user feedback, to support comparative assessments later in the study.

The workshop guide intended to capture the following information for each Aboriginal group:

- geomatics capacity and familiarity with the GeoConnections program;
- identification of existing and potential datasets and data gaps;
- policy issues and potential for data sharing; and,
- land use planning process.

Other supporting material and background information included two PowerPoint presentations. One focused on background information about GeoConnections and the CGDI, while the other explained the preliminary results from the plan review.

In preparation for the workshops, the project team provided all workshop participants with background information to the project, including:

- preliminary research results;
- the workshop guide/questionnaire; and,
- the data summary spreadsheets in draft format for the community's plan.

The above information supported the communities with some context for the project in advance of the workshops and allowed participants to review the existing datasheets in advance.

Workshops or teleconferences were held with nine Aboriginal communities across Canada. The workshop schedule evolved through the process of contacting individual Aboriginal groups by telephone and email. Some of the workshops were postponed multiple times and coordinating some of the community workshops proved to be a challenging task. The following table summarizes the workshop locations and dates for each.

TABLE 2:
Workshops listed by group and consultation date

ABORIGINAL GROUP	LOCATION	DATE
Algonquin of Barriere Lake	North Bay, Ontario	March 14, 2008
Nunavut Planning Commission	Teleconference	March 20, 2008
Innu	Goose Bay (Northwest River), Labrador	April 9, 2008
Dehcho	Teleconference	April 10, 2008
Tsleil-Waututh	Vancouver, BC	April 24, 2008
Sahtu	Norman Wells, NWT	April 30, 2008
Poplar River	Poplar River, Manitoba	May 6, 2008
Prince Albert Grand Council	Teleconference	May 15, 2008
Haida	Teleconference	May 29, 2008
Whitefeather	Cancelled - due to scheduling conflicts	n/a

2.5 Summarizing the Findings and Target Audience

Information collected during these workshops was summarized into a Milestone 2 report and seen as a workshop report in Appendix C. The results were shared with the participating Aboriginal groups, to allow for feedback and validation. All information gathered during community workshops is considered strictly confidential by the project team and was released with community consent to Natural Resources Canada.

A presentation was then prepared for GeoConnections staff and the Aboriginal Advisory Committee in order to review the results and discuss the integration of results into a final geospatial Needs Assessment report.

The final project report has two volumes. The first volume, presented here, deals with the higher-level issues identified during the plan review and the community consultation process and provides recommendations for overcoming these issues. The second volume deals with the geospatial data used in land and resource management plans, and identifies the closest to source data custodians and barriers to data access and sharing.

This report is intended for two audiences, each with its own need: The first audience is Aboriginal communities, which will use the report as a support document to share information on land use planning from across Canada and issues / insights gained from this experience. The second audience is GeoConnections, which will use the report to provide context for their investment into data and information-sharing tools. It is anticipated that GeoConnections will share these findings with its networks of data providers.

It is also hoped that the results of this project can serve as a land use planning first-point of discovery tool for other Aboriginal communities. As many Aboriginal communities in Canada are thinking about initiating a land use planning process for their territories, this final report could serve as a reference document for data, methods, and contacts for what has worked elsewhere. It is recommended that this report be packaged and shared via the Web. However, we recognize that this is not part of the work within the scope of this project.

3.0 Main Issues

Many issues were raised during consultations with the Aboriginal groups. The project team tried to capture high level stories of geomatics-related activities as told by the participating communities. The team acted as a microphone for and, in some cases, an amplifier of community concerns and local issues.

This section begins by summarizing the main issues, organized by theme. Issues are then discussed in more detail and follow with recommendations, where appropriate, for how these issues might be addressed. Quotations from community practitioners are included in certain sections to help provide context for the discussion. The section ends with a summary list of all recommendations, highlighting those that pertain directly to the mandate of GeoConnections.

The following is a list of major issues that were identified during consultations with the participating communities:

1. Access to data issues
2. Web-based mapping not being used
3. Locating and downloading geospatial data
4. Lack of standards; format issues
5. Access issues to satellite imagery
6. Investments needed to support cultural data inventories
7. Geomatics Capacity
8. Data confidentiality and protocols
9. Land use planning in context of broader issues
10. Need to continue the dialogue
11. Other findings

3.1 Access to data issues

BC 1:20,000 TRIM digital data is currently not freely available and special requests have to be made as part of the land use planning process; data is very restrictive and can only be used for land use planning" (Tsleil-Waututh)

"Proprietary data from forest companies like forest inventories or forest plots that describe forest attributes and volumes, cannot be obtained, and some Government data that houses the same types of information has to be continually asked for" (Haida)

"Regular, pre-processed climate and climate change data would be beneficial to the planning process" (Haida)

The groups who participated in the research did not find data access to be a major issue in their work. It was noted that data consolidation and acquisition were time consuming and a complex undertaking, but not a major barrier. Many communities were surprised that the focus of the Geoconnections study was data when breakthrough accomplishments were made in relationships, policy and decision making. Other issues were identified as more urgent priorities, including the building and maintaining of local mapping capacity (see capacity issue), concluding the implementation of plans and responding to development applications on a routine basis within the context of plans.

The apparent importance of the land use plans to the Aboriginal groups also raised questions that have been brought up since the 1970s. Aboriginal groups believe they deserve the same rights to information (data) as their negotiating counter-

parts. Unfortunately, this is not the case. It was discovered that the information required the most by Aboriginal groups is currently information from government and industry relating to development data (oil and gas, mining, forestry). Much of these data are difficult to obtain on a routine basis. Datasets are often obtained in a reactive "ambulance chasing" (Haida Nation) approach, where technicians rush around trying to secure data in response to pending development activity. These data are rarely forthcoming or shared in a pro-active way within the consultation process. It was also noted that there are no clearly defined processes for a community to request access to industry-held data.

Recommendations:

1. Government and industry should make investments that support provincial and territorial government efforts to make available development data (mining, oil and gas, forestry), perhaps with certain use-rights for Aboriginal communities under a consultation-accommodation framework.
2. GeoConnections should work with Statistics Canada to make available Statistics data for free access to Aboriginal communities.
3. Government and industry should work with other data custodians to pre-format and standardize geomatics-related data.

3.2 Web-based mapping not being used

The communities who participated in this study are not using web-based mapping, nor did they identify the need to move into web-based mapping applications. Access to reliable high-speed Internet in some of the communities is still a real issue, along with limited fluency to use computer-based applications. Printed maps and locally-stored data are the primary media for mapping in these communities. Data distribution strategies should be tailored to accommodate this. Local data libraries should be organized by source, where possible, along with completed metadata to help maintain references to data sources.

Internet technologies (email, FTP, etc.) are the chosen method for data sharing. More advanced Internet mapping technologies such as Web Mapping Service (WMS) and Web Feature Service (WFS) are not currently being utilized in Aboriginal communities. This may, in part, be linked to how decision makers want to interact with maps. Google Earth is widely used for visualizing non-sensitive data. The Algonquins recently convened a workshop to look at GeoPDF as a tool for sharing interactive maps internally with their decision makers.

Recommendations:

4. Government and industry should tailor data distribution strategies to accommodate the downloading or consolidating of data locally, not connected to source.
5. GeoConnections should develop data library templates and share best-practices for the orderly management and cataloguing of locally-secured data.

3.3 Locating and downloading geospatial data

> *"From the early stages of land use planning, it was evident that we had to compile our own datasets" (Tsleil-Waututh)*
>
> *"Time is an issue or barrier in accessing existing geospatial data" (Poplar River)*
>
> *"Sometimes there is a significant amount of leg work involved in accessing geospatial data and in some cases, data access agreements have to be signed between us and the data custodian for access permission" (NPC)*
>
> *"There is a lot of time spent on data collection and acquisition" (Haida)*

Many of the Aboriginal groups flagged difficulties in locating data. Locating data is time consuming and requires multiple Internet searches and phone calls to Government, industry and universities to determine what data are and are not available.

About 50 percent of participants had some working knowledge of data discovery portals such as GeoGratis, and GeoBase. These participants, however, noted that the data being shared on these services are not the data that are being searched for, such as sources dealing with mining, forestry, and other development layers, as mentioned above.

Many communities noted that it was difficult to find geospatial data on government websites. It would be useful for all government sites to have a recognizable icon that will lead the user to downloadable geospatial data.

Many communities had to purchase and download framework data in 'tiles' and stitch (assemble) them together manually for their territories. This includes NTDB and DEM data. Federal framework data also lacks pre-symbolized layers, adding to the time and effort required to design cartographic layouts during the land use planning process.

Recommendations:

6. GeoConnections should enhance the downloading tools for federal framework data, on both GeoGratis and GeoBase, to stitch tiles according to a user's defined study area (using NTS map numbers). This includes adding functionality to stitch together DEM data within user-specified boundaries (e.g. a traditional territory), and provide value-added information such as hillshade models.
7. GeoConnections should develop symbolization standards that are shared and packaged with common federal framework data.
8. GeoConnections should encourage the standard use of icons on all government web sites to help lead users to a department's downloadable geospatial data. (Icons could be a link to data in GeoGratis or other data portals).

3.4 Lack of data standards, format issues

> *"Improved data availability and data standardization would help development and planning in the region" (Sahtu)*
>
> *"One of our biggest concerns was that our traditional land falls within Ontario and Quebec and they have numerous standardization issues with forestry data from Ontario and Quebec. Currently the forestry data is different and contains different attributes" (Algonquins of Barriere Lake)*
>
> *"Time is an obvious issue when dealing with different geospatial data formats as there is currently only one geomatics staff that has the adequate training to deal with these problems" (Innu Nation)*

All of the communities who participated in the study use ESRI software for their GISs. This has become the primary software and data standard used by Aboriginal groups across Canada. This is the reality of the geomatics sector. Programs that are tailored to support Aboriginal users need to recognize that the sector is dominated by one brand

of software, and that this is not likely to change in the near future. Issues were identified where data were not provided in an ESRI-based format.

The Algonquins of Barriere Lake identified standardization issues regarding cross boundary (Ontario / Quebec) forestry and mining data. Because of limited sample size of communities, it is difficult to determine if cross-boundary standardization is a localized issue or if it is a challenge faced by many other communities. It would be unrealistic to ask for national standards for mining and forestry data, as this is a provincial / territorial jurisdiction that is tied to unique tenure / licensing regimes.

Recommendations:

9. GeoConnections should take a lead role in facilitating discussions about moving towards common data standards among the provinces and territories.
10. Programs that are tailored to support Aboriginal communities should support the shapefile format.

3.5 Access issues to satellite imagery

> *"We don't regularly use satellite imagery due to the associated high costs of the imagery" (Haida)*
>
> *"The most beneficial additional geospatial data to help develop and implement land and resource planning and management would to be able to access free public releases of updated and current satellite imagery" (Algonquins of Barriere Lake)*

During the review process, satellite imagery was mentioned several times as a wish-list data set. Imagery was not widely used in the land use plans, mainly due to cost barriers. Specific information regarding what types of satellite imagery are required (including resolution and source) was not discussed; however, cost was always associated with all types of imagery.

Imagery was identified as a useful dataset primarily for baseline reference maps, but also to depict changes in land cover. As routine forestry data are not widely available, satellite imagery was identified as a surrogate to help identify and measure what has been developed (e.g. logged). LANDSAT imagery would be an ideal imagery product to meet this need.

With this intended use in mind, there is a need to make available false-colour composite images or post-processed images that highlight different classifications of land cover. The communities that participated in the study did not have imagery analysis capacity in-house. (The Innu was the only group to analyze imagery for its plans). To be useful, the data would have to be routinely updated, perhaps on an annual basis.

Recommendations:

11. Government and industry should work with data custodians to provide free access to satellite imagery, both in raw and post-processed formats (to show changes in forest cover), updated frequently.

3.6 Investments needed to support Cultural inventories

> *"As traditional activities are changing within the region, there is a significant need to update the TEK data within the region" (Poplar River)*

Irrespective of the motivation for planning and the approach to planning, all of the Aboriginal groups made use of zoning in their plans, with priority being placed on cultural interests over commercial interests. All communities relied heavily on cultural data to help inform their land use decisions. This type of data was seen not only in the final ten reviews, but in all seventeen plans obtained. Cultural information studies have different names throughout the country and take different forms, including Traditional Ecological Knowledge (TEK) research, Use and Occupancy Research, Traditional Use Studies, Traditional Knowledge (TK) research, and Inuit Qaujimajatuqangit (IQ).

It was noted that there is a high cost to collecting these data, including the cost of keeping the data up to date. Funding is needed to support data collection initiatives, primarily cultural data inventories. Funding requirements should be attached to well defined and realistic research and capacity building strategies.

It has been observed by the project team that there is a wide discrepancy in methodological approaches for use and occupancy studies. This situation results in some studies having greater value as inputs for resource management. The best, to the knowledge of the team, have been conducted using methods documented by Terry Tobias, a leading expert in this field.

Recommendations:

12. GeoConnections should formalize a support program to help offset the costs for the systematic inventory and updating of cultural inventories. Methodologies for use and occupancy studies should follow the general guidelines promoted by Terry Tobias in Chief Kerry's Moose and his new upcoming book.

3.7 Geomatics Capacity

> *"The information that people gather is felt to be important, as important is increasing the capacity for people to make their own data" (Innu Nation)*
>
> *"At one time during the planning process, there was geomatics capacity, but it has since diminished" (Poplar River)*
>
> *"Long term committed funding has been our primary barrier to our capacity issue" (Prince Albert)*
>
> *"It has been identified that the future of retaining capacity and staff in geomatics related fields is a concern" (Haida)*

The greatest issue addressed by all of the communities relates to geomatics capacity. High staff turn-over is common in all of the communities. Communities find it difficult to train and retain staff and note that funding is usually tied to short-term projects and the capacity dries up when projects are completed. In some cases, internal geomatics capacity is not being used in operational planning or day-to-day decision making. Exceptions were noted, such as the Tsleil-Waututh, the Haida, and the Innu, where geomatics technology and support play a key role in operation planning.

Of the ten communities surveyed, only three have maintained the internal mapping capacity that was developed for their land use planning. This confirms the personal observations of the project team that the turnover in personnel has littered the Aboriginal landscape with false-starts in the building and maintaining of local capacity. This story is the proverbial "elephant in the room" - an issue that everyone knows, but no-one is talking about. It would be interesting to conduct a post-program study on the old Sustainable Communities Initiative program, where roughly 100 Aboriginal communities were funded through NRCAN to build mapping capacity. This would be a good sample size to ask tough questions, document lessons-learned and share indicators of success within this sector.

Due to the internal capacity issues, there is a heavy reliance on outside expertise. This has both negative and positive consequences. The negative consequence is the lack of integration of these skill sets within the local administrative / decision making bodies. External experts can also divert resources and attention from internal capacity building strategies. Positive consequences of having an external expert include mentoring and skills transfer, continuity, and access to specializations not normally found in small communities.

Without geomatics capacity, dialogue regarding data becomes irrelevant. There needs to be a parallel focus on capacity for both the local and national level.

GeoConnections should consider expanding its capacity programs to invest in local Aboriginal geomatics capacity. However, there is a catch

here: Local mapping programs will fail if they rely only on short-term grants. When these grants end, funding usually stops, leading to staff turn-over, etc. Core funding needs to be committed by each community's leadership. However, an external organization is needed to assist with capacity investments where there is a demonstrated commitment of core funds and long-term planning from the community.

At the national level, investments should be made into training the next-generation of Aboriginal geomatics professionals. Investments at this level could target custom training programs within existing institutions, mentoring and scholarship programs. It was noted, during multiple workshops for those groups with internal geomatics capacity, that training currently was unfeasible because of budgetary restrictions. It is evident that a concern felt across the country is the high cost of operating a fully functional geomatics facility. Aboriginal groups have identified several issues with regards to maintaining geomatics capability within their communities above and beyond the apparent problem of staff retention. Main issues raised were namely the high cost of software, hardware, and data that is usually associated with running a geomatics program.

Software expenses are thought to be high and there is concern about the additional annual costs associated with maintaining the software. Communities were disappointed with the high costs of base software; those that had the capability for advanced spatial analysis felt that the base software is not sufficient and additions / extensions must be purchased and maintained in addition to base software packages.

Many communities were unaware of special pricing from software vendors whereby non-profit or Aboriginal entities are charged Government rates for all software. In addition to the available pricing incentives from vendors, communities also were generally unaware of some of the funding / support programs available for software and hardware.

Recommendations:

13. GeoConnections should increase its programmatic focus on geomatics capacity-related activities.
14. GeoConnections should follow up on the 1990s Sustainable Communities Initiative Program to contact the 100 Aboriginal communities who received capacity funding and document lessons-learned and indicators of success for building and maintaining successful community-based mapping programs.
15. Government and industry should work with existing associations and networks such as the Aboriginal Mapping Network (http://www.nativemaps.org/) to promote Aboriginal geomatics and to promote Aboriginal geomatics support programs.
16. GeoConnections should increase funds available to capacity funding programs, and provide a 50 percent matching of capital acquisitions for software, hardware and data.
17. GeoConnections should build on its phase 1 work supporting the training of the next-generation of Aboriginal geomatics professionals through the promotion of training centres, and provision of scholarships and bursaries for students.
18. GeoConnections should support regional training workshops, where trainers deliver courses to multiple communities at once.

3.8 Data Sharing, Confidentiality and Protocols

> *"Data is shared with other departments and with several Provincial ministries for the land use planning process, but some of the internally collected data is not shared externally where confidentiality and intellectual property rights are of the utmost concern" (Haida)*
>
> *"Data sharing is taking place to a limited extent, mainly due to data confidentiality issues and restrictive licenses attached to some datasets" (Algonquins of Barriere Lake)*
>
> *"All data created by the Nunavut Planning Commission is shared other than TEK data, which is not shared or even displayed without confidentiality agreements…TEK is always confidential and poses confidentiality issues" (NPC)*
>
> *"There are limitations or barriers to data sharing and distribution such as confidentiality, intellectual property and restrictive licenses…data that is confidential are from traditional land use and occupancy studies and of course Traditional Ecological Knowledge (TEK) data" (Dehcho)*

Cultural data are collected and managed by the communities. In some cases, for example the Haida, cultural data are shared and used by industry to support consultations. Cultural knowledge is seen as confidential and communities are hesitant to release the data for use, especially by industry. Rigorous information sharing agreements, consultation protocol agreements and agreements on intellectual property rights need to be developed by all parties who wish to access cultural data.

A principle held by most communities is that the raw digital cultural data are never copied, made public or leave the community. This creates a quandary in public planning processes where cultural values need to be shared and weighted equally with economic and environmental interests. PlanLab calls this the confidentiality quandary, a problem that can be solved through relationship building, participation by the community in all data interpretation, and formal data sharing agreements. This quandary surfaced several time during the meetings.

Templates should be identified and developed to illustrate successful best practices in data sharing agreements, confidentiality agreements, and intellectual rights agreements between communities, government and third parties. Some work has been done through the Crown Lands Referrals Toolbox, a joint project of Ecotrust Canada and the Sliammon First Nation (hosted on the Aboriginal Mapping Network). This could be expanded to include more examples of data sharing agreements, protocols and case studies.

Recommendations:

19. Government and industry should collect and share confidentiality agreements and intellectual rights agreements between communities and third parties via networks such as the Aboriginal Mapping Network

3.9 Land Use Planning in Context of Broader Issues

> *"The preliminary draft land use plan was available in 2003, and the current 2008 draft is still incomplete, however, currently there is no budget to finish the planning process" (Sahtu)*

Comprehensive land claims agreements with Aboriginal groups typically contain regimes for land use planning, wildlife management and development impact review where the Aboriginal group and governments co-manage these responsibilities. There is often a mandate within settled claims for these groups to produce land use plans (NPC, Sahtu).

In other cases, the duty to consult and accommodate Aboriginal interests is motivating many groups to clarify and share their interests with industry. Many groups are taking advantage of the power of land use plans and mapping as a

tool to reassert their Aboriginal rights and control (examples of which include the Tsleil-Waututh, Haida and Algonquins of Barriere Lake). Mapping and land use plans are being used at the highest level to resolve land use conflicts as seen in the Prince Albert, Dehcho, and Algonquin plans and similarly being used to mitigate or avoid land use conflict (Innu and Poplar River). As Haida lawyer Terri-Lynn Williams-Davidson once said, "Aboriginal rights include the right to manage our lands." Land use planning can be regarded as an Aboriginal right, though it has not, to our knowledge, been recognized as such by either the Crown or the courts.

The communities all noted that the planning process was equally or more important than the plan itself to engage the wider community, to build partnerships and to capture local values and visions. The importance of the process of planning should be recognized as a benefit of the GeoConnections program and be included as part of the rationale and justification for future phases.

There was a lack of capacity in the communities to support implementation of the land use plans. Funds are usually allocated for the development of the plan, with very little resources left over to put the plans into action. In some cases, as with the Prince Albert Grand Council (Saskatchewan), the Dehcho (Northwest Territories) and the Algonquins (Quebec), there was a lack of political will in the provincial, territorial or federal governments to implement the plans. This, along with the lack of legal tools to support implementation, has a detrimental effect on the entire land use planning sector. Often, either the plan is on hold due to lack of funding (Sahtu), or the plans are shelved after their creation (NPC).

As previously mentioned, a land use plan can mean a lot of different things depending where and why the plan is being generated. Land use planning is a broad discipline that is difficult to meaningfully reduce its information requirements into a single report. Aboriginal land use planning has also not been regarded as widely successful - there are not a lot of success stories in Canada. Most of the plans reviewed have stalled at the implementation stage because of lack of funding, implementation tools and good will.

In addition to land use planning, information management and mapping capacity are needed by the communities to support treaty negotiations, land claims, negotiations relating to consultation / accommodation, and operational planning. Data collected for one process can (and should) inform the others. In fact, within the Aboriginal context, it is artificial to look at information needs for land use planning alone. Data strategies should be tied to self-governance. In the context of self-governance, communities can run land management programs that encompass a broad range of mapping applications effectively. Efforts should not focus solely on land use planning, but look at the broader information needs of communities that want to govern themselves. It is assumed that the more integrated these data and capacities are into the local decision making model, the more likely they will succeed over the long-run.

Recommendations:

20. GeoConnections should broaden information support strategies to look at what data are required to run Aboriginal land management programs effectively, not just what information is required for land use planning.

3.10 Continuing the dialogue

Dialogue has started - how do we keep it going? The project team feels that there is a gap in the knowledge base regarding methods and tools for Aboriginal land use planning. We recommend that a forum be created to support continued dialogue between the communities for co-learning. This could include a discussion board, website showcasing examples, and other approaches to disseminating knowledge. The Aboriginal Mapping Network could serve this purpose. An Aboriginal land use planning workshop, with a hands-on focus, might also help to fill the gap relating to methods, tools, information and success stories.

Recommendations:

21. Working with Aboriginal organizations, GeoConnections should consider supporting communication using a variety of media to help continue the dialogue that was started with this work. The goal of this should be to help fill the information gap relating to methods, tools, information and success stories. Efforts could include supporting the creation of discussion boards, web sites, and workshops in partnership with organizations that are already committed to this sector.

3.11 Other Findings

Earlier this year, Athyrium Services and Consulting completed a study for the Integrated Land Management Bureau (ILMB) in British Columbia. Its report, Data Parity (2008), looked at the needs of First Nations using GeoBC Gateway, a portal that contains connections to various provincial ministries and directly to the Lands Resources Data Warehouse. Many of the findings in this study echo recommendations made during this study. The following is a list of findings that are common to both studies:

- Aboriginal groups have low budgets for geomatics related activities.
- Aboriginal groups need adequate core budgets for geomatics.
- Aboriginal groups prefer Internet downloads or FTP methods of data delivery.
- Aboriginal groups rely heavily on Provincial data sources.
- There is a general consensus among Aboriginal groups that information is not available in a timely manner.
- There is a high demand among Aboriginal groups for good resolution/accurate basemaps, forest cover, vegetation inventory, satellite imagery, and research data (wildlife studies including inventory and sustain-ability).
- Government should not only provide complete data; it should also allow First Nations to know the full scope of data that are available.
- Government should take into account capacity issues when designing portals, solutions should not add new levels of cost and work to First Nations who cannot afford it.
- Some thought might be given to designing simplified task-oriented tools and training packages, along with providing templates and pre-packaged datasets to shorten the workload in Aboriginal mapping offices.

The next section of the report summarizes the recommendations, ranks them by priority and makes notes for which recommendations might relate directly to the mandate of GeoConnections.

4.0 Summary Recommendations and Conclusions

Ranking the recommendations seen throughout Section 3 is a difficult task, as they address a mixture of actions on a broad and sometimes specific level, some asking for technical actions and some for program support. Therefore, the following is an attempt to classify and rank each recommendation in specific categories which include, a) Program Support to Aboriginals, b) Specific Actions for GeoConnections, and c) Program Support for other Government Departments and Industry. Within each of the categories, recommendations are listed by rank or priority (high priority listed first per category). Recommendations, however, retain their original numbering as found in Section 3.

TABLE 3:
Recommendations: Program Support to Aboriginals

RECOMMENDATION NUMBER	RECOMMENDATION	RANK OF IMPORTANCE
20	GeoConnections should broaden information support strategies to look at what data are required to run Aboriginal land management programs effectively, not just what information is required for land use planning.	1
12	GeoConnections should formalize a support program to help offset the costs for the systematic inventory and updating of cultural inventories. Methodologies for use and occupancy studies should follow the general guidelines promoted by Terry Tobias in Chief Kerry's Moose and his new upcoming book.	2
13	GeoConnections should increase its programmatic focus on geomatics capacity-related activities.	3
17	GeoConnections should build on its phase 1 work supporting the training of the next-generation of Aboriginal geomatics professionals through the promotion of training centres, and provision of scholarships and bursaries for students.	4
18	GeoConnections should support regional training workshops, where trainers deliver courses to multiple communities at once.	5
16	GeoConnections should increase funds available to capacity funding programs, and provide a 50 percent matching of capital acquisitions for software, hardware and data.	6
10	Programs that are tailored to support Aboriginal communities should support the shapefile format.	7

TABLE 4:
Recommendations: Specific Actions for GeoConnections

RECOMMENDATION NUMBER	RECOMMENDATION	RANK OF IMPORTANCE
21	Working with Aboriginal organizations, GeoConnections should consider supporting communication using a variety of media to help continue the dialogue that was started with this work. The goal of this should be to help fill the information gap relating to methods, tools, information and success stories. Efforts could include supporting the creation of discussion boards, web sites, and workshops in partnership with organizations that are already committed to this sector.	1
14	GeoConnections should follow up on the 1990s Sustainable Communities Initiative Program to contact the 100 Aboriginal communities who received capacity funding and document lessons-learned and indicators of success for building and maintaining successful community-based mapping programs.	2
5	GeoConnections should develop data library templates and share best-practices for the orderly management and cataloguing of locally-secured data.	3
8	GeoConnections should encourage the standard use of icons on all government web sites to help lead users to a department's downloadable geospatial data. (Icons could be a link to data in GeoGratis or other data portals).	4
6	GeoConnections should enhance the downloading tools for federal framework data, on both GeoGratis and GeoBase, to stitch tiles according to a user's defined study area (using NTS map numbers). This includes adding functionality to stitch together DEM data within user-specified boundaries (e.g. a traditional territory), and provide value-added information such as hillshade models.	5
7	GeoConnections should develop symbolization standards that are shared and packaged with common federal framework data.	6
2	GeoConnections should work with Statistics Canada to make available Statistics data for free access to Aboriginal communities.	7
9	GeoConnections should take a lead role in facilitating discussions about moving towards common data standards among the provinces and territories.	8

TABLE 5:
Recommendations: Program Support for other Government Departments and Industry

RECOMMENDATION NUMBER	RECOMMENDATION	RANK OF IMPORTANCE
1	Government and industry should make investments that support provincial and territorial government efforts to make available development data (mining, oil and gas, forestry), perhaps with certain use-rights for Aboriginal communities under a consultation-accommodation framework.	1
4	Government and industry should tailor data distribution strategies to accommodate the downloading or consolidating of data locally, not connected to source.	2
3	Government and industry should work with other data custodians to pre-format and standardize geomatics-related data.	3
19	Government and industry should collect and share confidentiality agreements and intellectual rights agreements between communities and third parties via networks such as the Aboriginal Mapping Network	4
15	Government and industry should work with existing associations and networks such as the Aboriginal Mapping Network (http://www.nativemaps.org/) to promote Aboriginal geomatics and to promote Aboriginal geomatics support programs.	5
11	Government and industry should work with data custodians to provide free access to satellite imagery, both in raw and post-processed formats (to show changes in forest cover), updated frequently.	6

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Appendix A

Land and Resource Management Plan Review

Review of Land Use Plans

NOTES:

Note 1: The project team does not have permission to distribute the Tsleil-Waututh bioregional atlas or watershed plan. We also do not have permission to distribute the Algonquin plan.

Table of Contents

1. The Innu Nation: Forest Ecosystem Strategy Plan for Nitassinan, District 19 (March 10, 2003)

Project title and date;	Forest Ecosystem Strategy Plan for Nitassinan (District 19). March 10, 2003
Availability	http://www.innu.ca/forest/sec4.htm
Lead Aboriginal entity;	Innu Nation
Partner organizations;	Innu First Nation and the Government of Newfoundland & Labrador
Project team members;	Innu Nation: Jay Forsyth and Larry Innes Department of Forest Resources and Agrifoods (DFRA): Keith Deering and Len Moores GIS support: Dwayne Golding, Scott Higgins and Lacina Coulibaly
Scope of Project a) Geographic location;	District 19 contains seven million hectares of land in south-central Labrador. The strategic plan pertains directly to District 19A, a land area comprising 2.1 million hectares surrounding Goose Bay, bounded by the Mulligan and Red Wine Rivers to the north, the extent of the Kenamu River watershed to the east, the extent of the Gulf watershed to the south, and longitude 61'45' to the west.
b) Geographic scale of the plan;	The Innu Plan is unique in that the planning team broke the large planning unit down into three distinct scales: the landscape scale (or regional scale) at 1:250,000 to 1:50,000; the watershed scale at 1:50,000; and the stand level (or operational level) at 1:12,500. The planners used each level as a "filter" to identify and protect the ecosystem structures and functions which are best reflected at these different map scales (Appendix 4).
c) Main methodological approach;	This Strategy Plan follows an Ecosystem-Based Planning approach, which requires a careful representation of ecological, cultural and economic values. Ecosystem-Based Planning is a relatively new approach to forest management in Canada. It is based on protecting, maintaining, or where necessary restoring, fully functioning ecosystems at different spatial scales over long time frames. The EBP approach of "priority decision-making" ensures that ecological and cultural values are considered first, forming a protected land base framework. Outside of the protected land base, areas are identified for sustainable economic development and management decisions. Following this approach, the Strategy Plan is organized into three main chapters, reflecting Ecological, Cultural, and Economic Landscapes. An additional chapter also was added to include research and monitoring requirements.

d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	On January 30, 2001, the province of Newfoundland & Labrador and the Innu Nation signed a historic agreement. The Province of Newfoundland & Labrador recognized the significance of the unsettled Innu Nation land claim in this District and how decisions made under this plan could affect Innu interests. Accordingly, the Forest Process Agreement was designed to enable and facilitate effective communication, information sharing, and the resolution of issues between the Province and the Innu Nation concerning interim planning and management, the development of sustainable forestry practices, and ecosystem-based management plans. The Forest Ecosystem Strategy Plan for District 19 is an important result of that agreement.
Focus of the plan;	To create an ecosystem-based forest management plan for District 19 that protects ecological and cultural integrity, productive capacity, resiliency and biodiversity while advancing economic opportunities for the sustainable development of forest-based industries.
GIS a) Mapping technologies used;	GIS were used in this plan to help organize the spatial layers to illustrate landscape and cultural priorities. These were overlaid to create Ecological Protected Area Networks (EPAN) at three different levels of planning, and a Cultural Protected Areas Network. Once these areas were defined, maps were created highlighting the total land base within the planning area that will be available for timber harvesting. The land base analysis was generated through a priority decision-making approach, described in more detail in Appendix E of the plan.
b) Potential datasets / missing data;	The aerial photos used in the forest inventory are outdated. It is also suggested that viewshed maps (how the landscape appears from one spot) be created to identify and protect aesthetically important locations.
c) Non-spatial data used;	A summary of the community consultations is included in the appendices. Other non-spatial data used include demographic statistics of forestry workers, as well as tables and graphs describing annual forestry harvests over time.
d) Data used in plans and maps;	See spreadsheet

2. The Haida Nation: Strategic Land Use Plan for Haida Gwaii / Queen Charlotte Islands (September 13, 2007)

Project title and date;	Strategic Land Use Plan for Haida Gwaii / Queen Charlotte Islands September 13, 2007
Availability	http://www.haidanation.ca/ http://ilmbwww.gov.bc.ca/lup/lrmp/coast/qci/index.html
Lead Aboriginal entity;	Haida Nation
Partner organizations;	Haida Nation and the Province of British Columbia
Project team members;	A twenty-nine person committee, the Community Planning Forum. (CPF involved various stakeholders, including representatives from environmental organizations and the forestry industry.) Mapping provided by the Haida Nation, the Province of British Columbia (was Ministry of Sustainable Resource Management, now the Integrated Land Management Bureau), the Coast Information Team, the Gowgaia Institute, Cortex Consulting and others.
Scope of Project a) Geographic location;	The Queen Charlottes are an archipelago of 150 islands, eighty kilometres from the central British Columbia mainland. The islands have a unique ecology of massive old growth forests and species found nowhere else, earning this area the title of the “Galapagos of the North”.
b) Geographic scale of the plan;	The Haida plan is a study set at a landscape or regional scale, with management targets and recommendations set at the scale of the watershed (1:50,000).
c) Main methodological approach;	Fundamental to the planning process was the agreement that the Haida Nation would develop a Land Use Vision to inform and guide the development of the Land Use Plan for the Islands. The Vision includes six maps requiring priority protection: significant tsuuaay (cedar) forests, riparian areas important for tsiin (salmon), habitats important for taan (bear), kil (plants), xiit’lit (birds), and sk’waii (beach). Consistent with this vision, the planning process adopted an ecosystem-based management (EBM) planning approach to ensure the existence of healthy, fully functioning ecosystems that will fulfill spiritual and cultural needs and support community and economic wellbeing for current and future generations. All of the management recommendations in the plan are connected to this framework and are grouped in accordance with the three key components of EBM: (1) Ecosystem Integrity; (2) Spiritual and Cultural Values; and (3) Community and Economic Wellbeing.

d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	Interest in developing a strategic Land Use Plan for the Islands dates back more than a decade. Concerns with land and resource management practices and community sustainability led to the Islands Community Stability Initiative (ICSI) in 1995. The ICSI consensus report included recommendations for protected areas, determination of sustainable harvest levels, tenure reform, and a community resource board. In the late 1990s, the Provincial Government attempted to initiate a Land and Resource Management Planning process. The model for the process was not supported by the Haida Nation, and the process never began. It was not until 2001, when the Council of the Haida Nation and the Province of British Columbia agreed to co-design and co-manage a process, that the foundation was laid to begin a strategic land use plan on the Islands. Two protocol agreements were signed in April of 2001 that provided this foundation: the General Protocol on Land Use Planning and Interim Measures (Appendix A), and the Haida Protocol on Interim Measures and Land Use Planning between the Council of the Haida Nation and the Province of British Columbia. The Haida Gwaii / Queen Charlotte Islands Land Use Planning process was unique in that it was co-managed by the Council of the Haida Nation and the Provincial Government. No other strategic land use plans in the province have had a First Nation as a partner in process design and implementation.
Focus of the plan;	The plan and management recommendations embody the notion of “respect for all living things” found in the Haida Land Use Vision. It is defined as a collaborative, strategic approach to managing human activities that seeks to maintain healthy, fully functioning ecosystems including human communities. The following goals and principles were agreed to as the basis for developing all of the Land Use Plan recommendations that follow in this document: (1) Protect, maintain and restore ecosystem integrity; (2) Maintain spiritual and cultural values; (3) Enhance sustainable economic opportunity within the inherent limits of the land to provide opportunity; and (4) Foster social and community wellbeing.
GIS a) Mapping technologies used;	GIS were used extensively for this plan, with data and spatial analysis provided by the Haida Nation, the Province of British Columbia, the Coast Information Team, the Gowgaia Institute, and others. A variety of software was used for the analysis, with ESRI products used as the main mapping platform.
b) Potential datasets / missing data;	The plan notes that a complete inventory of monumental cedars, terrestrial ecosystem maps, cultural surveys, and the assessment of viewscapes are needed to refine the plan.
c) Non-spatial data used;	The Environmental Conditions Report fed into the planning process. It is a prediction of future climate and environmental effects should current forestry practices continue. Economic monitors (from logging and its lack of value-added exports, to harvest volume of non-timber forestry products such as mushrooms) are an example of other non-spatial data used in the plan.
d) Data used in plans and maps;	See spreadsheet

3. Pikangikum First Nation: Keeping the Land: a land use strategy for the Whitefeather Forest and adjacent areas (June, 2006)

Project title and date;	Keeping the Land: A Land Use Strategy for the Whitefeather Forest and Adjacent Areas, June 2006
Availability	http://www.whitefeatherforest.com/the_initiative/cb-lup-strategy.php
Lead Aboriginal entity;	Pikangikum First Nation
Partner organizations;	The Pikangikum First Nation and the Ontario Ministry of Natural Resources with mapping support from the Taiga Institute.
Project team members;	Alex Peters (General Manager, Whitefeather Forest); Andrew Chapeskie (Taiga Institute); John Sills, Ontario Ministry of Natural Resources
Scope of Project a) Geographic location;	Pikangikum First Nation (population: 2,200) is a remote-access community located approximately 100 kilometres north of Red Lake in north-western Ontario. The Whitefeather Forest is a northern boreal forest area traditionally used by the people of Pikangikum. The Whitefeather Forest planning area covers 1.3 million hectares north of Red Lake.
b) Geographic scale of the plan;	This is a regional plan, with base maps illustrated at a scale of 1:275,000. Designated land use maps are displayed at larger scales.
c) Main methodological approach;	Pikangikum's vision for "Keeping the Land" expresses a desire to maintain their customary stewardship responsibilities on its ancestral lands. In support of this vision, the Land Use Strategy addresses the following goals: (1) ensure Pikangikum First Nation customary stewardship responsibilities for Keeping the Land; (2) guide the protection and orderly development of lands and resources; (3) secure resource-based economic development and employment opportunities for the community; and (4) harmonize proposed new land uses with existing and customary land use practices. Zoning was used as a primary tool for designating specific sets of land use and management policies at the landscape level. Designations are implemented through either policy or regulation. There are three primary land use designations and one special land use category described for the WFPA: (1) General Use Areas; (2) Enhanced Management Areas; (3) Dedicated Protected Areas, and (4) Cultural Landscape Waterways.

d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	The Whitefeather Forest Initiative, as part of the larger Northern Boreal Initiative, is a collaborative effort between the Ontario Government, Pikangikum First Nation, environmental groups such as the Taiga Institute, and industry partners. WFI is the first community-based plan for development North of the 50th parallel developed under the auspices of NBI, a planning initiative established in 2000 in response to First Nations' requests for input and economic sustainability in the forestry industry.. An Environmental Bill of Rights (EBR) Environmental Registry posting in November 2006 gave notice that MNR and Pikangikum First Nation will seek the required Environmental Assessment Act coverage for forest management on the Whitefeather Forest through a request to the Ministry of Environment (MOE) for a declaration order. A major amendment to Crown Land Use Policy will implement the land use direction for the establishment of protected areas, enhanced management areas and general use areas as described in the approved strategy.
Focus of the plan;	While the plan attempts to balance forest and economic development interests with conservation and cultural uses, the main thrust of this plan is ecological sustainability, which ties in to cultural and economic sustainability. Protecting caribou habitat involved a considerable amount of the research that went into the plan.
GIS a) Mapping technologies used;	The maps prepared for the plan won a national cartography award in 2005 by the Canadian Cartographic Association (CCA). The plan also won the MNR's People Recognizing Innovation Dedication and Enthusiasm (PRIDE) award in 2007. A large spatial Indigenous Knowledge Database was constructed, drawn from the input and experience of community Elders. A Vegetation Resource Inventory was used in combination with local and traditional knowledge to determine current and suitable caribou habitats.
b) Potential datasets / missing data;	The Indigenous Knowledge Database is still under construction.
c) Non-spatial data used;	Detailed caribou whereabouts were expressed graphically. Audio files exist from Elder workshops, trapper interviews and other community consultations.
d) Data used in plans and maps;	See spreadsheet

4. The Dehcho First Nation: Respect for the Land: the Dehcho land use plan (June 2, 2006)

Project title and date;	Respect for the Land: The Dehcho Land Use Plan, June 2, 2006
Availability	http://www.dehcholands.org/home.htm
Lead Aboriginal entity;	Dehcho First Nation
Partner organizations;	The plan was drafted by the Dehcho Land Use Planning Committee. It is pending approval by the governments of the Northwest Territories and Canada.
Project team members;	Heidi Wiebe, Paul Wilson, Monika Templin, Priscilla Canadien & Sophie Bonnetrouge. Note that a lot of GIS work was undertaken by Petr Cizek. Committee Members: Herbe Norwegian, Chair Petr Cizek, Dehcho First Nations representative Tim Lennie, Dehcho First Nations representative Ron D. Antoine, Government of the NWT representative Adrian Boy, Government of Canada representative
Scope of Project a) Geographic location;	The Dehcho territory is located in the southwest corner of the Northwest Territories. It is surrounded by the Sahtu Settlement Area and the Tlicho (Dogrib) Settlement Area to the north, the Treaty 8 territory to the east, Alberta and British Columbia to the south, and the Yukon Territory to the west. It covers approximately 215, 615 square kilometres, and is home to approximately 7,000 people. The Mackenzie River, or Dehcho (meaning big river), dominates the landscape, carrying water from Great Slave Lake (Tucho) to the Mackenzie Delta.
b) Geographic scale of the plan;	This is a regional scale study, with most maps represented at 1:275,000. Land use zones are designated and displayed at finer scales, including management prescriptions at the site or operational level.
c) Main methodological approach;	Extensive research was initiated to document the ecological and cultural values of the Dehcho territory and the potential for various land uses – agriculture, tourism, oil and gas, mining and forestry (see Appendix 6). Dehcho First Nations also provided a summary of traditional land use and occupancy information from an extensive mapping project conducted between 1996 and 2002. An Economic Development Assessment Model was developed and research was undertaken to develop cumulative effects indicators and thresholds. Community consultations included an additional day to map community interests in forestry, tourism, oil and gas, mining, agriculture, discuss issues and clarify critical areas for Conservation (p. 87). Through an iterative mapping process, land use zones were developed to describe five key land categories and their primary use: (1) Conservation Zones; (2) Special Management Zones; (3) General Use Zones; (4) A Protected Areas Strategy Zone; and (5) A Special Infrastructure Corridors.

d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	The Dehcho Interim Measures Agreement (IMA) was signed in 2001 to address the concerns of the Dehcho First Nations regarding resource development pressures (in particular, the Mackenzie Valley pipeline development) within the Dehcho territory while they negotiate a Final Agreement (claim). In the interim period leading up to a final agreement, the IMA provides for significant Dehcho First Nations participation in land and water regulation in the Dehcho territory with the Northwest Territories. The Dehcho Land Use Planning Committee was established through the IMA with the mandate to develop a Land Use Plan for the Territory. Until there is a Final Agreement, the Plan will be implemented by the Parties under policy direction from the appropriate Ministers. Governments are expected to carry out their duties in conformity with the approved Land Use Plan. The land use restrictions will be implemented through a new set of land withdrawals under S.23 of the Territorial Lands Act. That is, all Conservation Zones and those Special Management Zones that prohibit certain land uses will be included in a new set of land withdrawals that will replace the existing ones (p.5). The Plan is intended to advance the negotiation of agreements on land, resources and governance between Canada, the GNWT and the Dehcho First Nation(s). Accordingly, approval and implementation of the Plan is without prejudice to any positions that may be taken, or agreements made in those negotiations.
Focus of the plan;	The purpose of the Plan is to promote the social, cultural and economic well being of residents and communities in the Dehcho territory, having regard for the interests of all Canadians (p.86).
GIS a) Mapping technologies used;	The reliance on GIS for this plan was considerable. Sixty-eight maps were included in the Background Report, ranging from the designated land use zones, mining, predicted temperature change, corridor density analyses, and species habitats. A community mapping session was conducted and the resulting maps were digitized into a GIS. Most of the mapping was done in the community by Petr Cizek.
b) Potential datasets / missing data;	Data pertaining to mineral development potential studies are identified as gaps, possibly filled by completed Non-renewable Resource Assessments (NRA) and Mineral and Energy Resources Assessments (MERA). Up to date satellite photos would help with determining vegetation classifications and better depict caribou habitat. Food harvests are also mentioned as ideal datasets that could be tabulated for each community.
c) Non-spatial data used;	Models were used to assess the economic cost of not developing a specific resource site, as well as potential economic benefit to a community of development. Cumulative Effect Analyses were used to determine how developments such as roads and hydro-corridors interact with and impact wildlife populations. Community demographics, including future population and employment predictions were used substantially in the Background Report.
d) Data used in plans and maps;	See spreadsheet

5. Nunavut Planning Commission: Keewatin Regional Land Use Plan (June 20, 2000)

Project title and date;	Keewatin Regional Land Use Plan June 20, 2000
Availability	http://npc.nunavut.ca/eng/regions/Keewatin/getplan.html * Other land use plans from the Nunavut Planning Commission can also be found on the http://npc.nunavut.ca website by viewing each region
Lead Aboriginal entity;	Nunavut Planning Commission (NPC)
Partner organizations;	The plan was designed by the Nunavut Planning Commission and approved by the Governments of Nunavut and Canada.
Project team members;	Bob Lyall, Louis Pilakapsi, Peter Suwaksiork, Bob Aknavigak, Loseeosee Aipellie, Jobie Nutaraq and Akalayok Qavavau. Luke Suluk provided mapping support.
Scope of Project a) Geographic location;	The southern boundary of the Keewatin planning region is the 60th parallel. However, it is acknowledged that Inuit in the Keewatin have an aboriginal interest in an area of northern Manitoba and northern Saskatchewan. It is also acknowledged that the Dene in northern Manitoba and Saskatchewan have an aboriginal interest in the southernmost part of the planning region. These interests have been reflected in the preparation of the plan and will be further defined through the land claim process. The western boundary of the planning region is the boundary of the Nunavut land claim settlement area (p.8).
b) Geographic scale of the plan;	The plan is regional in scope, with a recognition that impacts are not limited to the boundaries of the study area (e.g. air pollution from China and elsewhere).
c) Main methodological approach;	This regional land use plan is not like a municipal plan that allocates restrictive uses to specific land areas. Given the regional nature of the plan, and given the level of actual development and of resource data at the time, the former Planning Commission – which was created for the purposes of carrying out this work – decided that this method of resource and land use allocation for the Keewatin region was inappropriate (p.26). The NPC instead dealt with the major land and resource issues that were raised by the communities (e.g. non-renewable resource development should have no significant adverse effects on the environment, wildlife or wildlife habitat (p.55)), and government and industry, by proposing a series of recommended actions to be taken by governments, communities and land users. Note that this is a revised plan, with the original Keewatin Regional Land Use Plan drafted between 1989 and 1991, before the NLCA came into effect.

d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	The NPC is established under the NLCA, and the federal law called the Nunavut Land Claims Agreement Act. Under the NLCA, the NPC is responsible for land use planning in the NSA (p.23). The NPC is not a permitting agency; land use planning under the NLCA is a policy-making function, the regulatory effect of which is intended to be broad. This understanding of the NPC's mandate is confirmed by s. 11.3.1 of the NLCA, which defines a land use plan as a "document ... for the establishment of objectives and guidelines for short-term and long-term development" (p.2). However, it is important to note that all development project proposals must be reviewed by the NPC for conformity with land use plans (where they exist) before the Nunavut Impact Review Board can proceed with screening. (Part 3: s.12) The original plan was designed to be integrated with the Nunavut Land Claim Agreement. The NLCA is now being implemented and there is a requirement to ensure that all existing land use plans comply with its provisions. To that end, a process was developed to review this plan and ensure that it complied with the Agreement (p.2). The NPC's mandate under the NLCA is not only based on public policy, it is also based on the recognition of the treaty rights of Inuit (p.24).
Focus of the plan;	The primary purpose of land use planning in the Nunavut Settlement Area shall be to protect and promote the existing and future well being of those persons ordinarily resident and communities of the Nunavut Settlement Area taking into account the interests of all Canadians; special attention shall be devoted to protecting and promoting the existing and future well being of Inuit and Inuit Owned Lands (p.3).
GIS a) Mapping technologies used;	The plan focused more on broad issues and their recommendations, rather than landscape and cultural values of specific areas. As such, the plan did not use extensive mapping or data in the planning process. Contained within the plan are four maps: (1) spring walrus harvesting; (2) polar bear denning; (3) caribou calving grounds; and (4) heritage sites.
b) Potential datasets / missing data;	Community mapping sessions detailing archaeological camps, travel routes, migrations of wildlife were conducted. Data also were collected depicting abandoned mines and possibly contaminated sites requiring cleanup, which will be prioritized based on severity of pollution. Satellite photos suggesting wildlife habitats are also forthcoming.
c) Non-spatial data used;	Community demographics and projections were taken from Statistics Canada and Nunavut's Bureau of Statistics.
d) Data used in plans and maps;	See spreadsheet

6. Poplar River First Nation: Asatiwisipe Aki Management Plan (June, 2005)

Project title and date;	Asatiwisipe Aki Management Plan June 2005
Availability	http://www.poplarriverfirstnation.ca/poplar_river_land.htm
Lead Aboriginal entity;	Poplar River First Nation
Partner organizations;	The Anishinabek of Poplar River, with support from Whelan Enns Associates Inc., Hilderman Thomas Frank Cram Landscape Architecture & Planning (mapping and technical support), the Natural Resources Defence Council, and Manitoba Conservation and others.
Project team members;	The Land Management Plan Project involved a large team consisting of Ed Hudson, Sophia Rabliauskas, Noel Bruce, Ray Rabliauskas, Vera Mitchell, Kelsie Bruce, Irma Hudson, Alex Hudson, Cornelius Bruce, Arlene Bruce, Ernest Bruce, and Elders: Victor Bruce, Francis Valiquette, Marcel Valiquette, John C. McDonald, Albert Bittern, Abel Bruce, Alec Hudson Sr and Raymond Valiquette. The planning firm Hilderman Thomas Frank Cram was enlisted to help prepare the plan; specific credit was given to Art Hoole and Rob Nedotiafko.
Scope of Project a) Geographic location;	The plan addresses the entire 861,718 hectares of the Poplar River Anishinabek Traditional Territory, between 50 and 55 degrees north latitude and extends East from Lake Winnipeg to nearly the Ontario border. The community of Poplar River is 400 km north of Winnipeg. The plan is largely a park management plan, seeking permanent protection of the area.
b) Geographic scale of the plan;	This is a regional land use plan, with maps grounded in the scale of 1:250,000.
c) Main methodological approach;	The plan describes the lands and resources from a cultural and biophysical perspective, combining local and scientific knowledge. The plan then presents management laws, provisions and policies for how these values are to be protected.
d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	This plan is an outcome of successive efforts by the Poplar River First Nation to assert its rights in the protection of its Traditional Territory. In 1998, Manitoba Government signed an MOU with the Assembly of Chiefs and the Manitoba Keewatinowi Okimakanak regarding protected areas. Through this agreement, Poplar River nominated protected lands in 1999. With interim protection in place, Poplar River initiated a management planning process to ensure the long-term protection and stewardship of the entire traditional territory. Most of the area is considered open provincial Crown lands with the interim protection of the park reserve in place until late 2009. The plan also serves as a supporting document in an application by the community for protection as a UNESCO Heritage conservation area.

Focus of the plan;	The goal of the plan is to protect the land from industrial developments and to sustain natural ecological processes for present and future generations (p.5). The plan has a strong conservation focus, with only small scale economic development supported in the vision. “The Traditional lands are to remain free of forestry, mining, hydro and other industrial developments (p.6)”.
GIS a) Mapping technologies used;	Mapping was primarily used to inventory local environmental and cultural values. Some analysis was done where moose sightings and kill sites were overlaid and correlated with a provincial forest inventory to develop a moose habitat suitability index.
b) Potential datasets / missing data;	None mentioned.
c) Non-spatial data used;	Demographics were used to predict what the community makeup might be in the future. An extensive native species list and associated habitat condition is included in the plan’s appendices.
d) Data used in plans and maps;	See spreadsheet

7. The Sahtu Land Use Planning Board: Sahtu Land Use Plan Draft 1 (February, 2007)

Project title and date;	The Sahtu Land Use Plan Draft 1 (February, 2007)
Availability	http://www.sahtulanduseplan.org/website/web-content/index.html
Lead Aboriginal entity;	The Sahtu Land Use Planning Board was created by the Sahtu Dene and Metis Comprehensive Land Claim Agreement (Section 25.2) and empowered by the Mackenzie Valley Resource Management Act (Part 2). The Board is responsible for developing and implementing a land use plan for the Sahtu Settlement Area. The Sahtu Land Use Planning Board is an independent institution of public government.
Partner organizations;	The Sahtu Planning Board is comprised of two members nominated by the Sahtu Secretariat Inc. and one member nominated by each of the territorial and federal governments. A chairperson is nominated by the other four members. Most of the mapping for the plan was supported by the Sahtu GIS Project. The Project was established to equally involve each of the co-management boards set up under the Sahtu Dene and Metis Comprehensive Land Claim Agreement (1993) and the Government of the Northwest Territories.
Project team members;	Planning Board: Barry Hunter (Senior Planner); Susan McKenzie (Natural Resources Specialist); Deborah Simmons (Community Liaison); Sahtu GIS Project: Alasdair Veitch, Environment and Natural Resources Government of the Northwest Territories Project Manager of the Sahtu GIS Project
Scope of Project a) Geographic location;	The plan is focused on balancing development and conservation interests in the region, which impacts several communities in a region comprised of 30 large watersheds.
b) Geographic scale of the plan;	The plan is regional in focus, organized into three Sahtu Settlement Area Districts: (1) Déline District; (2) K'ahsho Got'ine District; and, (3) Tulita District. The total Sahtu Settlement Area is 283,588 square kilometres.
c) Main methodological approach;	The Sahtu Land Use Planning Board began its planning by working with communities, industry and other stakeholders to define their goals and visions and to identify issues. Meetings, open houses, workshops and household interviews were held with over 700 people from Sahtu communities, industry and environment groups. While the Sahtu Land Use Planning process is primarily community focused, the Board held discussions with resource and tourism industries, as well as environmental groups. The vast majority of people wanted to see a balance between development and conservation (p.10). Once the values were recorded and inventoried through mapping, the planning team then categorized the landscape into three main management zones: (1) Conservation Zone; (2) Special Management Zone; and, (3) Multiple Use Zone. Management directives were then created for what is, and is not, permitted in each zone with ecological and cultural justifications for each.

d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	This Sahtu Land Use Plan is established under the authority of the Mackenzie Valley Resource Management Act (1998), with the objectives and principles guided by the Sahtu Dene and Metis Comprehensive Land Claim Agreement. The Agreement introduced a new system of land and water management for the Sahtu settlement area. This is a system of co-operative management or co-management, aimed at ensuring direct and meaningful participation of Sahtu residents in the management and regulation of their land and resources. This is in contrast to the previous system where the federal and territorial governments were the primary management authorities and Sahtu residents were largely excluded from decision-making about the land (p.10).
Focus of the plan;	Maintaining a balance between development and conservation was the most commonly expressed vision. Residents saw the need to develop resources for the security of future generations. They also recognized that conservation is key to ensuring land is sustainable. This is largely reflected in the use of zoning to identify large areas to be set-aside for conservation priorities.
GIS a) Mapping technologies used;	The Board built a comprehensive library and Geographic Information System (GIS), in partnership with the Sahtu GIS Project, that describes the natural, social, and cultural resources of the Sahtu. Land Use Mapping projects identified trails and types of land use. People were generous in providing detailed information, including identifying harvesting and cultural areas, providing traditional names and stories about their trips on the land (p.11). Note that the Sahtu GIS Project has also worked on an atlas for the region called, “The Sahtu Atlas: Maps and Stories from the Sahtu Settlement Area in Canada's Northwest Territories” (2005).
b) Potential datasets / missing data;	Wildlife, fish, caribou, bedrock geology, hydrocarbon potential, oil and gas licensing, and mineral potential maps were identified as needing additional work to inform the plan.
c) Non-spatial data used;	None to mention.
d) Data used in plans and maps;	See spreadsheet

8. The Prince Albert Grand Council: DRAFT Athabasca Land Use Plan, Stage 1 (March, 2006)

Project title and date;	DRAFT Athabasca Land Use Plan, Stage 1
Availability	http://www.environment.gov.sk.ca/Default.aspx?DN=77e08791-38ff-4b6c-bbd3-79c2af8320cc
Lead Aboriginal entity;	The Prince Albert Grand Council
Partner organizations;	The Athabasca land use plan represents a partnership between the Saskatchewan government and the seven Athabasca communities of Camsell Portage, Uranium City, Fond du Lac, Stony Rapids, Black Lake, Hatchet Lake and Wollaston Settlement. The partners have agreed to work together on the planning and management of land and renewable resources in the Athabasca region of northern Saskatchewan.
Project team members;	Athabasca Interim Advisory Panel members: Hatchet Lake: Paul Denechezhe, Phillip Josie, Angus Tsannie, the late Baptiste Besskkaystare, Adam Benoanie, Bart Tsannie Black Lake: Modest Bigeye, Ambrose Sandypoint, Billy Sandypoint, Donald Sayazie, Phillip Sayazie, Jimmy Laban, Antonette Donard Fond du Lac: Louie R. Mercredi, Billy Adam, Bart McDonald, Georgie McDonald, Leon Fern, the late August.Mercredi and Germain Adam Stony Rapids: The late Edwin Mercredi, Georges T. Mercredi Uranium City: Dennis Landan, James Augier, Jimmy Mercredi Wollaston Post: Terri Daniels Camsell Portage: Gabriel Stenne Canadian Parks and Wilderness Society: Alan Appleby Saskatchewan Mining Association: John Tosney Saskatchewan Northern Affairs: Dorothy MacAuley, Carol Rowlett Saskatchewan Environment: John Schisler, Dianne Allen Prince Albert Grand Council: Don Deranger, Edward Benoanie, Emile Hansen, Diane McDonald
Scope of Project a) Geographic location;	The planning area is located in the Northern-most part of the province of Saskatchewan. The Stage 1 planning area is a 50 km wide road corridor covering a 15,000 square kilometres. It includes the northern portion of Highway 905, and runs along both sides of the seasonal road from Points North to Stony Rapids, and along the winter road between Stony Rapids and Fond du Lac. This plan does not affect Treaty and Aboriginal Rights, and allows existing dispositions to continue.
b) Geographic scale of the plan;	This study is unique in that the scale of the planning is set to a 50 km buffer (25 km on each side) along a road corridor (stage 1), encompassing 15,000 square kilometres of land and water. Stage 2 will add another 21,722 square kilometres and stage 3 will add 79,278 square kilometres. Combined, this is a large regional scale study affecting a large portion of Northern Saskatchewan.

c) Main methodological approach;	The Panel oversaw a diverse group of planners and residents in through a six stage planning process: (1) initiation (meeting with communities, communication strategy, etc.); (2) definition of goals and objectives; (3) collection and analysis of information; (4) finding solutions that could resolve issues; (5) discuss and agree upon recommendations; and (6) write up and approval of the land use plan. It is worth noting that stage 3 brought saw the completion of an comprehensive traditional use and occupancy research initiative, where 415 people were interviewed (approximately 20 percent of the adult population) from the region. This research resulted in a level of TLUO information unprecedented in Saskatchewan: 1,100 map overlays with over 65,000 mapped sites and places and hundreds of hours of audio cassette recordings (Appendix 7). Issues were prioritized and specific actions and policies were developed to address each issue. Land use zoning was used as an outcome of layering multiple priority values onto the landscape. The zones are: (1) special management areas; (2) conservation areas; (3) community and infrastructure areas; and (4) multiple use areas. Within each zone, the Panel made recommendations regarding the permitted use of each area. Management and implementation recommendations were made to conclude the plan.
d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	In 1995, the Canadian Coast Guard eliminated dredging and navigational aids on the Athabasca River and Lake Athabasca, thereby making the barging of supplies into the region more difficult and uncertain. In response, the Canadian Coast Guard, the Athabasca communities and the province worked together to build a new service road to the region. This opened in 1998. Given that this road would bring increased development and changes to land and water activities, Athabasca leadership and the Saskatchewan government developed The Agreement (see Appendix 11). It mandates the preparation of a land use plan that aims to minimize the negative impacts of development and increase the benefit to people in the region. It also mandates the establishment of a local management structure, exploring options for delegating the Minister's authority (p.18). The Agreement created an Interim Advisory Panel (IAP, the Panel), with the majority of seats allotted to people from the region. The Panel's role is to steer the development of the plan; this document is a product of their work. In signing The Agreement, the provincial government committed to explore options to delegate renewable resource management decisions to a local management structure (p.21). The plan has been approved by the Advisory Panel and widely supported by environmental and community groups; the plan is waiting approval from the Province of Saskatchewan.

Focus of the plan;	Planning for the region is conducted in three stages. The Stage 1 planning area covers a 15,000 square kilometre area, 25 km on each side of the Athabasca seasonal and winter road, including the northern portion of Highway 905. When a Stage 1 plan is finalized, the AMS will be established to manage the Stage 1 area and planning will commence for the Stage 2 area (21,722 square kilometres). Stage 3 (79,278 square kilometres) expands planning and management to the entire region after five years from the commencement of Stage 1 planning (p.18).
GIS a) Mapping technologies used;	Thousands of maps were created for this study, developed by the Grand Council, the province, interest groups and consultants. Most groups used ArcView 3.x. CPAWS used GIS to map areas of interest for potential new protected areas using an overlay technique looking at: (1) enduring features; (2) ecological factors; (3) ecological features; and (4) cultural use and occupancy. Buffers and corridors were mapped to ensure linkages and connections between protected areas.
b) Potential datasets / missing data;	None to mention.
c) Non-spatial data used;	Detailed background history of people and the region, with some population and census statistics discussed in the background documents. Other non-spatial information includes narrative on global warming, acid rain, abandoned mines and species inventories for the region.
d) Data used in plans and maps;	See spreadsheet

9. The Algonquins of Barriere Lake - Draft Report, Kiackinapikok Traditional Management Area (KTMA) Integrated Resource Management Plan (January, 2006)

Project title and date;	**Draft Report, Kiackinapikok Traditional Management Area (KTMA) Integrated Resource Management Plan**
Availability	The land use plan is unavailable to the public
Lead Aboriginal entity;	The Algonquins of Barriere Lake
Partner organizations;	This plan falls under the purview of a trilateral agreement between the Algonquins of Barriere Lake, the Government of Canada and the Government of Quebec. Research and technical support for the plan was done in partnership with a variety of individuals and organizations, including Arbex Forest Resource Consultants (Arbex).
Project team members;	Technical Team Members Anne Bugnet ing.f. MRN Bruce Byford R.P.F. Arbex Ltd. Dorothy Dobrik Arbex GIS Benoit Dion MRNFQ Peter Douglas Elias Ph.D. Advisor - Algonquins of Barriere Lake Hector Jerome Algonquins of Barriere Lake Michel Segouin ing.f. Produits Forestier Domtar Anouk Pohu ing.f. MRN Michele Rodrick M.Sc.F. Arbex GIS Technical Team Advisors Willie Nottaway Algonquins of Barriere Lake Eugene Nottaway Algonquins of Barriere Lake Jean-Paul Rat Algonquins of Barriere Lake Michel Thusky Algonquins of Barriere Lake Sue Roark-Calnek Ph.D. SUNY Geneseo (Emerita) Russell Diabo Advisor - Algonquins of Barriere Lake David Nahwegahbow Advisor - Algonquins of Barriere Lake Pierre Larue ing.f. MRNFQ Plan Reviewers Clifford Lincoln Special Representative - Algonquins of Barriere Lake Chief Harry Wawatie Algonquins of Barriere Lake Jean Fink MRNFQ
Scope of Project a) Geographic location;	The Kiackinapikok TMA (KTMA) is located in the northwestern portion of the Trilateral Agreement Territory in northwestern Quebec. It centres approximately on the Reservoir Dozois at 47 30' latitude and 77 00' longitude. It encompasses 106,392 ha within the La Verendrye Wildlife Reserve, which includes the eastern part of the Reservoir Dozois, and it extends north to south from just north of Lac Kitchener to the southern tip of Baie La Verendrye of the Reservoir Dozois. East to west, Kiackinapikok extends from the northern edge of lac Barriere to the eastern shore of Lac Cocokwan. Highway 117 forms the southwest boundary of the TMA (p.12).

b) Geographic scale of the plan;	The geographic unit of this plan is based on a traditional management unit – one of seven family-based management areas within the ABL Traditional Territory. These TMAs are consistent with watershed-scale studies, although the boundaries of this plan follow traditional administrative boundaries instead of height of land.
c) Main methodological approach;	The research is unique in Canada as it is the only study to fully integrate the usual habitat and biophysical studies with a comprehensive assessment of cultural research, including toponomy studies, use and occupancy research, social customs, traditional ecological knowledge, sensitive areas mapping (SAS), and harvest surveys. The study also takes into account an inventory and management of important species and their habitats, including moose, marten, snowshoe hare, ruffed grouse, pileated woodpecker, black bear, eagle and osprey, heron rookeries, spawning sites and rare species. The plan develops target operational goals for four themes: (1) traditional integrity; (2) sustainable development; (3) healthy forest ecosystems; and (4) diversity of use. Through a constraint-mapping approach, the study presents 5 scenarios regarding harvest restrictions, and management prescriptions for areas of concern. This plan is one of seven integrated resource management plans drafted for each traditional management area. These plans have yet to be harmonized into a single territory-wide management plan.
d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	In the early 1990s, commercial forestry in the ABL territory came in direct conflict with the community's traditional uses and the need for sustainable management of habitat, lands and waters. To resolve this conflict, a deal was reached between the Algonquins and the Governments of Quebec and Canada called the Trilateral Agreement. Thought to be the first of its kind in North America, the Agreement set out a work plan and funding to create a 20-year Integrated Resource Management Plan (IRMP) that harmonized forestry operations with environmental concerns and the accommodation of traditional indigenous culture and activities for the Territory. These IRMP's are still in draft format and have yet to be fully adopted by Quebec and Canada.
Focus of the plan;	To provide for sustainable development of the Kiackinapikok (Gull Lake) Traditional Management Area, including its forest ecosystems and wildlife; to provide for the traditional integrity and development of the Algonquins of Barriere Lake (Mitchikanibikok Inik); and to provide for the economic interests of local and regional economies (p.l0). The plan balances cultural, environmental and economic interests, with a strong focus on setting forest management and forest development targets.
GIS a) Mapping technologies used;	Most of the data management, mapping and analysis for this study were done by Arbex Forest Resource Consultants in Ottawa using ESRI-based software. Additional scenario modeling was done using Remsoft software.
b) Potential datasets / missing data;	Refinements and testing of habitat models was identified as an area requiring additional study.

c) Non-spatial data used;	The plan incorporates information derived from a regional socio-economic studies, including extensive forest harvesting and forest economic valuations.
d) Data used in plans and maps;	See spreadsheet

10. The Tsleil-Waututh Nation – Indian River Watershed Integrated Land and Resource Management Plan (In Progress, 2008)

Project title and date;	Indian River Watershed Integrated Land and Resource Management Plan
Availability	The land use plan is unavailable to the public
Lead Aboriginal entity;	The Tsleil-Waututh Nation
Partner organizations;	The British Columbia Integrated Land Management Bureau
Project team members;	Tsleil-Waututh First Nation Chief Leah George-Wilson; Ernie George (Sr.); Richard George (Sr.); Michael George; Edward Thomas; Josh George; Jason Forsyth; Evan Stewart; Rita Negan; Pano Skrivanos; Dr. Doug Aberley; and Chris Knight Province of British Columbia Integrated Lands Management Bureau Peter Jones; Arlette Malcolm; ; Ministry of Forests and Range David Hails, Andre Germain Ministry of the Environment Jennifer McGuire
Scope of Project a) Geographic location;	The Indian River Watershed is the heart of the Traditional Territory of the Tsleil-Waututh. It is located at the head of the Indian Arm off of Burrard Inlet, 30 km northeast of Vancouver, British Columbia.
b) Geographic scale of the plan;	The Plan is set at the scale of the watershed at 21,882 hectares in size (SRMP2 – Overview).
c) Main methodological approach;	At the foundation of the Plan is the Bioregional Atlas, with close to 40 maps that tell the story of the watershed. Building on this comprehensive inventory, the Plan layers cultural values on top of watershed integrity and biodiversity values to develop a network of 'reserves' and land use zones, including a special management zone and an integrated forest management zone. The Plan sets out management objectives and actions for the protection of cultural and biodiversity values within these management zones, with additional sections looking at economic development opportunities and implementation mechanisms to help put the Plan into action. Specific topics addressed in the Plan include (Agreement, 2005): (1) identification of Tsleil-Waututh Nation cultural features, and strategies to manage or protect these features; (2) access management, including utility corridors; (3) protection and enhancement of salmonid habitat; (4) measures to conserve any red or blue-listed species, or regionally important wildlife; (5) identification of Tsleil-Waututh Nation economic opportunities including potential tourism opportunities, local energy supplies, and economic infrastructure; (6) identification of opportunities to improve forest productivity and the economic

	viability of forestry; (7) a forest health strategy; and, (8) mineral exploration and development.
d) Policy opening – why the plan was created and the policies in place to support the plan implementation;	The Indian River watershed is among the most heavily impacted areas in the province. Historic logging practices, hydro transmission line construction and industrial activities in Burrard Inlet have had major adverse effects on the watersheds ecological integrity (NTC Article Draft Feb 13-08). In the late 1990's, the Tsleil-Waututh Nation (TWN) launched an initiative to bring together, Crown agencies and stakeholders that were active in the watershed. The initiative was aimed at bridging jurisdictional overlaps, increasing awareness of TWN traditional and contemporary cultural land use and occupancy, and to develop protocol agreements that fostered restoration of the watershed. As part of this initiative, the TWN brought these parties together at a landmark Watershed Restoration Conference in 1999. In December 2005, the Nation and the Province of BC signed a Partnership Agreement for the collaborative development of an integrated land and resource management plan for the watershed, led by the Nation. The policy window for the creation of this plan came through the government to government process associated with the Sea to Sky Land and Resource Management Plan. Tsleil-Waututh saw these negotiations as an opportunity to place their longstanding vision for the watershed into action. To date, it is the only collaboration of its kind in the Province of British Columbia (SRMP1-Introduction).The Plan is currently being drafted.
Focus of the plan;	The purpose of the Plan is to: (1) identify a vision, values and goals for the watershed; (2) develop management objectives that are a showcase for sustainability; (3) clarify the direction of the Sea to Sky LRMP; and (4) incorporate Tsleil-Waututh interests into the Sea to Sky LRMP planning process (SRMP1-Introduction). The goal of the Plan is to address the following themes (IRW Plan Structure Sept 11-07): (1) cultural protection; (2) watershed integrity and restoration; (3) biodiversity protection; (4) economic opportunity creation; (5) safety and access facilitation; and (6) jurisdictional collaboration.
GIS a) Mapping technologies used;	All mapping for the Bioregional Atlas and the Plan was carried out by Tsleil-Waututh in the Treaty Lands and Resources Department (TLR). The TLR uses ESRI's ArcGIS software, supported by other graphics and design software. The data for the Atlas were gathered from a variety of sources, traditional government data, and enriched with TWN land use and occupancy information, local knowledge and field reconnaissance. All maps generated during this process were reviewed by TWN elders, technical staff, leadership and community members. The maps created by the Tsleil-Waututh transcend traditional GIS-based maps. The community has integrated text, illustrations and photos to tell stories using traditional cartographic tools. These maps become individual annotated bibliographies where all 'expert' knowledge (including local knowledge) is

	summarized by theme within the Atlas. When combined, the Atlas becomes a comprehensive knowledge bank to support planning and decision making.
b) Potential datasets / missing data;	More detailed hydro Riparian and assessment information
c) Non-spatial data used;	The Plan and the Bioregional Atlas combine a wealth of non-spatial data, summarizing key findings in text and pictorial formats on the maps. Each map contains input from Tsleil-Waututh community members.
d) Data used in plans and maps;	See spreadsheet

Appendix B

Community Workshop Guide

COMMUNITY CONSULTATIONS GUIDE:

The objective of this project and questionnaire is to collect information on key data requirements for land and resources management from Aboriginal groups across the country, with specific reference to identifying the types of data used and which data themes, resolution and coverage are required or desired.

The questions are divided into three parts. The first part deals with the existing and currently available data, the second with geospatial data that is needed but not yet available and the third with current and potential uses of geospatial information.

1. Does your Aboriginal organization have in-house geomatics capacity?
   Yes No

2. Are you familiar with?
   GeoConnections and CGDI
   GeoBase
   Geogratis
   GeoConnections Discovery Portal

PART 1: Existing and currently available data (data used for LUP)

3. Do you feel that the geospatial information you currently use meet your needs?
   Yes No

4. Were there problems in locating and getting hold of necessary geospatial information?
   Yes No

4a. If yes, which types of existing information? (*Please specify*)

5. What would you say are the main barriers in accessing existing geospatial data?

6. What geospatial data your organization has, is there any new data relevant to land use planning that you have acquired in the mean time is not listed? We documented the geospatial data used in the land use plan (*see EXCEL data sheet)*;
   Yes No

6b. If yes, please specify which data?

7. <u>Documenting geospatial data that is already available:</u> (*For each geospatial dataset, we would like to compile the following information through use of the provided EXCEL template; see: Geospatial Data Template).*

PART 2: Geospatial data that is needed but not yet available

8. For your land use planning, were there other geospatial information you feel was needed, but was unavailable at the time?
   Yes No

8.a If yes, what types of information? [Please identify]

8b. If yes, why were the data unavailable? (*Cost, licensing, etc*.)

8c. If yes, who do you think can supply the missing data? [*Data custodian*]

9. If an online information system were developed for accessing and retrieving geospatial data, from your standpoint:

   a) What types of information should it contain to meet your needs?

   b) What method of information delivery would suit your needs?
   Internet
   Email
   Hardcopy
   Other

10. Do you use Earth Observation (EO) data (satellite images and aerial photographs) and EO derived information?
   Yes No

10a. If yes, please specify?

PART 3: Sharing of geospatial data

11. Do you share the data you collected for your land use plan either externally or internally within your organization?
   Yes No

11a. If no, what are the limitations (barriers) to data sharing and distribution?
   Confidentiality and intellectual property
   Restrictive licenses
   Technical
   Lack of availability in suitable formats
   Lack of knowledge that geo-spatial data exists
   Other

11b. If yes, please specify how?
   Internal network
   Internet
   E-mail
   CD-ROM / storage devices
   Hard-copy paper maps
   Other

11c. If yes, on what level is the data shared?

Internally within your organization
Between other organizations belonging to the same Aboriginal group
Externally, between organizations outside the Aboriginal group

12. What additional geospatial data, or services, tools and policies you think would be required to help develop and implement land and resources planning and management?

13. Are there any additional comments you would like to make regarding this project?

Geospatial data template:

7. Documenting geospatial data that is already available: (*For each geospatial dataset, we would like to compile the following information through use of the provided EXCEL template. Your answers should follow the suggested categories):*

   7a. Dataset name

   7b. Format of the data (digital, paper, coordinates table)
   Digital Paper Coordinates Other

   7c. Coverage (regional or local)
   Local Regional Other

   7d. Scale (Accuracy)
   Local Watershed Regional Other
   5-20K 20-50K 50-250K Other

   7e. Data category
   Framework data (Base data) Thematic

   7f. If category is thematic, please identify the data theme
   Natural Heritage
   Cultural Heritage
   Biophysical
   Administrative / Development

   7g. Status of data - *(e.g. currency/age of dataset and completeness)*

   7h. Do you regularly obtain (by purchasing / downloading) available updates of data?

   7i. What is the dataset structure?
   Vector Raster Other

   7j. Please, identify the data source
   Internal (TEK) External (specify) Other

   7k. How and where existing data is stored? [*Stored internally (= capacity) or externally*]
   Internally (GIS capacity) External (specify)

   7l. Is your data accompanied by Metadata?
   Yes No

   7m. Does you data contains attribute data and to what extent?
   Yes, extensive Yes, limited No

   7n. Do you consider your data confidential?

Appendix C

Community Workshop Notes

1. Algonquins of Barriere Lake

North Bay, Ontario; March 14, 2008.

1.1 Workshop participants:

NAME	TITLE	ORGANIZATION
Brenda St-Denis	Mapping Coordinator	Wolf Lake First Nation
Pierre Giaro	Forester	Wolf Lake First Nation
Hilda Chief	Mapping Assistant	Algonquin Nation Secretariat
Nadine Gaudaur	Coordinator	Algonquin Nation Secretariat
Mario St-Georges	Fisheries consultant	Algonquin Nation Secretariat
Linda McMartin	Mapping Coordinator	Timiskaming First Nation
Jessica Tuske	Mapping Technician	Algonquins of Barriere Lake
Russell Diabo	Consultant, planner	Algonquins of Barriere Lake
Dorothy Dobrik	Mapping Technician	Arbex Forest Resource Consultants (by phone)

1.2 Geomatics capacity and familiarity with CGDI

The Algonquins of Barriere Lake currently do not have in-house geomatics capacity; however, they have recently joined the Algonquin GIS Users Group, a network managed by the Algonquin Nation Secretariat (ANS), serving its three member communities. More recently, the ANS has supported the hiring of a local technician from the Barriere Lake Community (Jessica Thusky), with the goal of incrementally developing local mapping capacity within the community. Until now, however, all mapping has been carried out through a consultancy (Arbex Forest Resources) based in Ottawa. About 50 percent of the workshop participants were familiar with GeoConnections, CGDI, GeoBase, GeoGratis, and the GeoConnections Discovery Portal.

1.3 Availability of geospatial data

The group noted that its information needs are not currently being met. Access to information (cost, proprietary information, etc.) is the primary barrier. Data wish-list included: standardized forestry data; wildlife habitat data (moose habitat); fisheries data;and satellite imagery. The group shared its frustrations in accessing existing geospatial data, including a reluctance of government agencies, especially the Province of Quebec, to share data, and lack of capacity in the community to manage and access spatial data.

No new datasets have been added since the development of the land use plan. During the planning process, new data inventories were initiated to fill data gaps, including: community cultural use and occupancy data; moose habitat and fisheries habitat; and wildlife distribution data. LANDSAT images are the only remote sensing data being currently used by the Algonquin.

An on-line information system, if developed, would have to contain the following geospatial datasets: framework data (base data); satellite imagery; forest stand data; and wildlife harvesting data. Internet was identified as the preferred medium for data access.

1.4 Data sharing, policies and issues, additional needs

Data sharing is taking place to a limited extent, mainly due to data confidentiality issues and restrictive licenses attached to some datasets. Geospatial data are shared via the Internet, email, CD-ROM, and in form of hard copy maps. There is an interest in data sharing within the organization as well as within different organizations belonging to the same Aboriginal group. For example, some of the datasets, such as mining related information, are common to all communities and should be shared within the Aboriginal group. Other information, such as wildlife information and harvest levels, is specific to each community and may not be shared outside the community.

The group identified both LANDSAT and RADARSAT data as a primary data need. From the Cree GeoPortal example that was presented during the workshop, the Algonquin have found the cabins application, the harvest database, and the reporting activities feature to be the most useful tools that could benefit their communities.

The meeting participants were initially interested in GeoConnections intent for this project and wondered if data resources will be standardized across the country and between the provinces. One of their biggest concerns was that some of the ANS member community traditional territories fall within Ontario and Quebec and they have had numerous standardization issues with forestry data from Ontario and Quebec, e.g. currently forestry data is different (contains different attributes, etc.).

With regard to WMS services, the Algonquins feel that they could use services for tourism planning and ecotourism activities. However, they have flagged capacity issues. In particular, they suggested that those who are comfortable with the Internet may not actually be the community members getting out on the land; people who use the Internet are disconnected from the land, while elders who are connected to the land are disconnected from the Internet. The Algonquins do see the importance of registering data on-line; in fact, they recognize the importance for all types of data and information. They also indicated that this may not be something that would use on a daily basis. WMS and web capability might be a future goal. However, each community would have to agree to have data stored centrally and some clear agreement on data sharing and trust issues must be put in place. Possibilities of storing data centrally are still unclear as the needs of one community may not necessarily mean there are the needs of another community (i.e. one community affected more by mining, while another community more affected by forestry).

1.5 General Meeting Notes

During the land use planning process, geomatics capacity did not exist within the community; the Algonquins had a multi-disciplinary team from the start including external consultants. They chose family harvesting units to sub-divide the land into management zones. Meetings were held with family groups. At the beginning, communities were very reluctant in putting lines on maps, preferring fuzzy boundaries.

The Algonquin plan currently is not available to the public.

Scenarios initially were defined to help identify management zone priorities. Sensitive Area Sites (SAS) were chosen from ones selected for an interim development moratorium put in place to stop forestry companies from cutting before any rules changed. SAS mapping was group oriented rather than individual; this was done so that no items were missed as group contribution is viewed as more productive than individually oriented processes.. From the beginning of the planning process, communities were told that land areas could not be protected unless the planning team was told where they were.

The Algonquins started mapping in the 1980s with Terry Tobias, and much of the natural heritage data seen in the land use plan came from that exercise. The majority of the administrative / development data came from the province. These data were shared by the Government and integrated with the cultural data. However, cultural data were not given to the Government.

The Province of Quebec was reluctant to give forestry data to the Algonquins (e.g. the annual allowable cut). This was similar to the Aboriginal groups reticence to provide cultural data to the Province. It is evident that there is a lack of trust between the parties. In addition, there is a lack of sharing of strategic planning data by the Government of Quebec. The Algonquins feel that this is an important issue, as the law says that Aboriginal groups have a right to participate at the strategic planning level and not just the operational level. While it may be evident that the Government of Quebec does not take the Algonquins land use values into account, Barriere Lake has a consultation process to try to account for some of these problems.

The Algonquins of Barriere Lake noted that their process was dominated by foresters, and that the foresters started taking over early within the process. Forestry activities were the focus, as they had the highest impact on hunting and wildlife.

The Barriere Lake Trilateral Agreement has a wildlife region within it. The Agreement initially was put in place to reconcile forestry operations and sport hunting and fishing within the region. There were three phases of the Agreement. Phase 1 was a data collection phase, phase 2 was the preparation of a draft IRMP, and phase 3 was implementation. Currently, the communities agree with some of the recommendations. The guiding principles of this document are to promote the continuation of a traditional way of life, sustainable development, conservation, versatile resource use, and adaptive ecosystem based management.

Representatives came from the multi-disciplinary team to discuss what the research program would look like. Some of the initial programs included a TEK program, sustainable development of natural resources program (sub program of forestry and wildlife), and an economic / social development program. The TEK study was designed by an anthropologist. Social customs, toponymy, and sensitive areas mapping were recorded. This phase included an Elder's field trip to revive the memories of the Elders. The TEK program (to document Algonquin ecological and social knowledge) facilitated harmonization of Algonquin and non-Algonquin land use regimes that were consistent with the interests of the Algonquins of Barrier Lake. A large GIS database exists but has never been published.

A trilateral office existed in Hull, Quebec. All contracts and consultants had to be reviewed by this office. An economic template was created that allowed the group to determine how much money was being made every year in the Trilateral Agreement territory.

There are seven traditional management areas within the Trilateral Agreement area. Mapping of forestry activities has taken place in all seven management areas. There have been a lot of improvements since the agreement, and now the land is more stabilized. However, there are still areas of concern, such as: burial sites; ceremonial sites; heritage sites; occupancy sites; sugar bushes; heron rookeries; cedar eco sites; and moose hunting areas. Each of these have a prescription of how they are dealt with and with what code of conduct.

The Province of Quebec came up with a list of proposed IRMP indicators. This, however, was quite different from the indicators that the Aboriginal groups come up with. As it is a co-management plan, the indicators that were finally identified by both the Algonquins and the province were given priority for data collection at different time intervals. For example, some datasets are updated every year, others every 5 years, and others every 10 years.

The project team reviewed the Forestry plan. However, the Algonquins also have a Wildlife Plan in place. This plan is made up of five species-based management plans (moose, bear, furbearers, small game, and fish). Wildlife is very important to the Algonquins, and the wildlife plan reflects priorities such as conservation and preservation of a traditional way of life. Goals are set based on population status and users' needs and cultures. There is a population monitoring program, a harvest program, and guidelines for habitat conservation, with goals of improving wildlife distribution, and respecting preferential hunting rights.

Each of the five wildlife plans include numerous topics, including issues and concerns of the Algonquins and the Ministère des Ressources naturelles et de la Faune **(**FAPAQ), scope of the management plan, habitat, past and current harvest, sustainable harvest, and recommendations. The plans consistently make a number of key recommendations, including that good baseline data be used, harvest data be shared, population density be maintained at the optimum sustainable harvest level, and that females and calves be protected in the low density areas.

The Algonquins wondered whether GeoConnections has the mandate to make available data such as mining and forestry data. In the area of internal data sharing, the Algonquin are working on information sharing protocols, both within the ANS, and externally with third parties.

2. Nunavut Planning Commission (NPC)

Teleconference, March 20, 2008

2.1 Workshop participants:

NAME	TITLE	ORGANIZATION
Heidi Wiebe	Land Use Planner	Nunavut Planning Commission
Adrian Boyd	Senior Policy Advisor	Nunavut Planning Commission
Brian Steele	Manager, Information Systems	Nunavut Planning Commission

2.2 Geomatics capacity and familiarity with CGDI

The NPC has developed and maintained in-house geomatics capacity for a period of time and staff is familiar with GeoConnections, CGDI, GeoBase, GeoGratis, and the GeoConnections Discovery Portal.

2.3 Availability of geospatial data

The NPC does not feel that its current geospatial information meets its land use planning needs. It is currently assessing its information needs in relation to the release of the three RFPs (Cumulative Impacts Management Framework, Wildlife Resource and Habitat Values, and Socio-demographic and Economic Sector Analysis). NPC indicated that most of the data that will be needed for the Nunavut Land Use Plan (NLUP) originates outside of the organization.

There were past problems with access to information, namely, data were costly and the request process was often time consuming and lengthy in duration. Data reside with many different organizations, including universities, government departments, etc. One initial problem is identifying who actually has the data; after this a request must be made. Sometimes there is a significant amount of leg-work involved in accessing geospatial data, and in some cases data access agreements have to be signed between the NPC and the data custodian.

NPC has identified that it has a need for both vector and raster earth observation (EO) data and derivatives of EO products used for such studies as cumulative effects assessment. NPC has no issue with using derived EO products from other sources and has indicated that usually these derived products are easier to obtain than the actual EO data as it is expensive and time consuming to derive its own products. That being said, it is a rare situation for the NPC to use satellite imagery and satellite imagery derived products.

2.4 Data sharing, policies and issues, additional needs

Data are shared internally within the NPC and any data from external sources that are requested by Nunavut communities are always passed on to the custodian of the data. All data created by the NPC are shared other than TEK data, which are not shared or even displayed without confidentiality agreements. TEK is shared internally without these agreements. The NPC will derive TEK based products (generalize TEK) and will share the data after generalization. One reason that this is done is that under the Nunavut Land Claim Agreement (NLCA) NPC must keep public records. TEK is always considered confidential. TEK is collected at the NPC and at other organizations (such as the Wildlife Board). With the release of the current RFPs, NPC have indicated that the consultants hired will identify any possible sources of TEK.

There are many data requests from proponents in the south that try and access NPC data that is put on their website for general use. It is felt that Internet sharing and a combination of other sharing methods such as FTP is ideal. However, NPC has released data in the past on CD-ROM upon request. The NPC does not release its data to another organization to control or update. However, it feels that there is no problem with proponents accessing the data within their site. Internet delivery of data still poses a problem within Nunavut as not everybody has access to an Internet connection.

One issue raised by NPC staff was that there are a lot of existing datasets that are not being utilized. These include spatial data from studies and research that is never shared by universities and development corporations working in the north. NPC staff feel a worthwhile project may be to acquire or compile all of the past studies into a database.

Projects completed in the north are usually done by co-management boards comprising First Nations, territorial and federal governments, so the future NLUP will be a public document.

One issue with existing data is that they are very general, aggregated data that do not contain specific details (for example, mineral potential data).

NPC stated that data portals (such as those offered via GeoConnections) should maintain data in standard ESRI file formats (such as the shapefile or geodatabase) and allow for downloads with different projections such as a Lambert projection.

Severe data gaps seem to exist in a region the size of Nunavut. Many of the data are regional / project based studies (for instance studies from universities). One deliverable from the released RFPs was to have the consultants map and demonstrate the extent of each available dataset. This will allow the NPC to identify the data gaps already evident in much of the available data. The concept of data gaps is important to the NPC, as in some cases it simply means there has never been a study in an area. For example, if there is a data gap in mining potential information, it doesn't mean an area has no mining potential, but rather may mean that it has not been studied as of yet. Data usually are only collected in areas where there is a development pressure. Data gaps identified by the consultants during the RFP projects will be recommended to the Nunavut General Monitoring Plan (NMP) where the focus is on what needs to be monitored (social, economic, environmental, etc.). There is also a requirement of the NLCA that mandates future research and data / information gaps.

NPC has no need or direction to create a data warehouse. However, there needs to be some way to pull all the data together so that they are available to the public, communities, researchers, and development companies. Data management and sharing is a priority and concern, and the NPC does not want to duplicate data (i.e. all custodians should maintain their own data). It is as important that it can distribute a list of data and source information for Nunavut so that people know where to obtain these data.

2.5 General Meeting Notes

The NPC was interested in why we were performing a national / Canada wide study as it stressed much of the planning process is very regional. It was understood that the project scope is Canada wide with a good cross section both geographically and by Aboriginal group. However, each review would be based solely on the extent of the land use plan in question.

The NPC was the only study participant with a land use planning process underway. Three plans were created in the past, but at that time the NPC was not in the process of creating a Nunavut wide plan. The maps currently used in the Keewatin land use plan were included for illustrative purposes and should not be used as a geospatial data guide. In December 2007, the NPC issued three Requests for Proposals (RFPs) that identified multiple sources of data. The Project Team was interested in how the NPC identified the data and it was discovered that the data were chosen due to the knowledge of each Department, previous knowledge in planning processes (Heidi Wiebe worked on the Dehcho plan) and some preliminary preparatory work for the RFP. NPC maintains its own data. Products derived from these data and from the land use planning process are made available to the public.

Previous planning processes in Nunavut were done on a region by region basis. The NPC is now shifting to a Nunavut-wide approach as the previous region by region case was an unmanageable cycle (6 planning regions, 5 years to complete 1 plan, updating, etc.). The new Nunavut wide approach will have regional components based on Regional Inuit Association (RIA) Boundaries. Feedback will be obtained from each regional Inuit Association. The new process likely will have community specific information or chapters for each region embedded in the plan. The older plans, because they are signed documents that are part of the NLCA and implementation of the NLCA, cannot be discarded, but must be reflected in the new planning process. It was stressed that the land use plans are not just policy documents. They have legal effect once approved by the Government of Nunavut and Canada and those governments are bound under law to implement them. NPC will be the first gate keeper, and governments also have to make sure that their activities conform to the land use plan.

3. Innu

Northwest River – Goose Bay, Labrador; April 9, 2008.

3.1 Workshop participants:

NAME	TITLE	ORGANIZATION
Valerie Courtois	Environmental Planner	Innu Nation
Patrick Ashini	Forest Guardian	Innu Nation
Guy Playfair	Technical Coordinator	Innu Nation
Paul Pone	Forest Guardian	Innu Nation
Marlyce Shangreaux	GIS Analyst	Innu Nation

* Marlyce Shangreaux was completing a Master's Degree and participated/corresponded by phone and email throughout the process

3.2 Geomatics capacity and familiarity with CGDI

The staff at the Innu office is familiar with GeoConnections, CGDI, GeoBase, GeoGratis and the GeoConnections Discovery Portal and has in-house capacity for geomatics. However, currently the staff member responsible for geomatics is studying in University in Winnipeg, Manitoba. Other staff members, such as the Forestry Guardians, are familiar with basic geomatics techniques and collect and create spatial datasets on a regular basis.

The Innu believe that mapping capacity in-house with one full-time staff member is not enough. To address this, they have put in place internal training programs. Forest Guardians take notes and GPS coordinates in the field and then create their own maps. The Innu also believe that on-line data and applications are useful for staff to explore and "store their memories" visually.

Currently, the Innu have obtained Arcview 3.2 libraries of data from the provincial government. Unfortunately, the library is only usable in ArcView 3.2 and they do not have staff time, the resources to pay someone, or a volunteer to commit long term to figure out how to migrate the library into version 9.0+ of ESRI software. The Innu use SELES models (Spatially Explicit Landscape Event Simulator models) for determination of forest resources (e.g. wood supply) and there are serious limitations built into the library. For example, the boundaries between certain map sheets were visible and these are supposed to be administrative only. As well, staff suggest there are classification accuracy issues. These data gaps also have effects on the models; as the data are not seamless, model results are affected.

3.3 Availability of geospatial data

New data and software have been downloaded. For instance, Digital Elevation Models (DEMs) obtained from GeoBase and 3DEM software (freeware) enabled staff to stitch DEM files together to make one contiguous DEM that allows creation of raster viewsheds (among other things) easier and quicker. 3DEM allows staff to save different DEMs as GeoTiffs and handles re-projections. The DEM files have been downloaded because the previous contour and elevation data were too coarse. Innu staff members also mentioned that Google Earth, although it is not formally a data product, has become an important universal tool / language that everybody understands, and could serve as some kind of gateway or common ground at the community level.

Some data that are needed by the Innu staff include digital orthophotos and any high resolution satellite imagery that can be obtained. The Innu currently use paper aerial photos from the 1990s. The Innu Cultural Land Use Data is currently being examined as part of the GIS staff member's thesis topic at university, with the goal of giving adequate privilege to these cultural data.

In addition to downloading data from portals such as GeoGratis and GeoBase, the Innu obtain data from the local Natural Resources Canada (NRCAN) office in Northwest River. This usually provides data via FTP links. However, some data that are collected by NRCAN are recorded on paper 1:50,000 maps with pen and Letraset cabin locations. The Innu rely on TEK for cabin locations as they feel the data collected at NRCAN are not adequate. Cabin and cabin locations are a problem in the forest management areas as some settlers do not register their cabins. There are also data disparity issues within the forest management zones. Forestry data for forest management unit 19A is more complete than for areas 19B and 19C. From 1987 to 1991 an aerial survey inventory was taken for 19A only; therefore, 19B and 19C do not have the same level of detailed information.

The Institute for Environmental Monitoring and Research (IEMR) has the best source of satellite imagery products for Labrador. IEMR relies on satellite imagery instead of older methods (field studies) because of insurance concerns. For this reason, the Innu have a limited supply of Ikonos and Quickbird data. The IEMR has used Ikonos for ecosystem classification and have built their own tools for manipulating and analyzing the data. This has generated interest from other organizations such as the Canadian Space Agency (CSA) and NRCAN. The Innu would not have used satellite imagery within the land use plan unless they received it through partnership initiatives or if it was freely available on the Internet.

With the free and widely used Google Earth, data activities and data gathering has increased within the region. Children have been successful in collecting road intersections and communities have participated in archeological studies. The information that people gather is felt to be important, as is increasing the capacity of people to make their own data. The Innu feel it is an excellent exercise in geography.

The Innu have also shown interest in climate and meteorological condition data. There are climate change issues that need to be addressed in the forest management areas and at the Labrador scale. One opinion is that the climatic data should be able to be viewed and analyzed at multiple scales (e.g. rainfall may be important at small scales but wind might not be). In addition, datasets that include climate change indicators may be important so the Innu can evaluate internally the effects on the climate from what is being done within the forest management zones. This would be important to realize carbon budgets within the region.

With respect to climate change data, the Innu feel that some bird species data would be a very useful layer for climate change as some species are indicator species. Songbirds for example, would be easy to inventory. Species data such as songbirds and other species such as porcupine, partridge and caribou, have no habitat indices in the region. Other data such as caribou migration are available on-line from the Government of Quebec, but cannot be integrated with other data as pre-made maps are the only method of delivery of caribou locations. There are currently research and publication issues associated with caribou movement data from the Government of Quebec.

Surface geology data is needed within the forest management zones as the geology determines the water regime in the forest and affects the fire cycle in the region.

3.4 Data sharing, policies and issues, additional needs

Problems seen in other regions with data sharing between the province and the Aboriginal groups are also a problem in the Innu region. However, as with other groups such as the Haida, staff has personal relationships with some government staff and data are shared via the groups. For example, an insect study completed by NRCAN was obtained, though NRCAN did not want the data shared.

One of the biggest problems with data sharing is that there are so many different formats and always a mountain of tasks to overcome to be able to use data. Recently, the Innu have struggled with MapInfo files and how to convert them for use with ESRI products. Time is an obvious issue when dealing with different geospatial data formats as there is currently only one geomatics staff that has the adequate training to deal with these problems. Other staff have only basic geomatics training and were trained in-house. Incompatibilities between software and even between different versions of software from the same vendor are a problem area (i.e. ArcView 3.2 libraries not being well adapted to ArcGIS 9.0+). Leading or commonly used software such as ESRI products are very expensive in terms of upgrades, support licenses, patches, training, maintenance, and add-ons.

Staff has also felt that the software vendors are evolving too rapidly and that it is difficult to keep up with software associated problems and patches. For example, staff attended a conference where the ESRI representative indicated that ArcGIS 9.2 service pack 4 was being worked on and that version 9.3 was to be released in June 2008. At this time, the ESRI representative indicated that the user interface for 9.4 would be different. Staff members wonder how they will have time to learn at this speed and still perform their actual job duties.

Scale and scale issues are a widely agreed upon problems; an eco-site classification manual is currently being developed by the Innu and NRCAN. This manual will describe different zone sizes such as ecoregion and ecozone.

Lastly, there is concern about the high price of equipment, software, and data necessary to have geomatics capabilities. The Innu feel that it is difficult to gain access to geomatics due to these high costs and are fortunate that they have been involved in using and retain the capacity within the region to use geomatics applications.

3.5 General Meeting Notes

The Innu have some history with GeoConnections. Larry Innes was involved with GeoConnections initiatives up until 2003. They are well aware of GeoConnections funding programs. However, their projects are mainly funded through academic sources and partnerships. Many of the forest models used are created under interest from academia. A hardship was discovered when using models for the forest management areas. If there are gaps in the data, then the model results are affected. However, it is still acknowledged that forest and ecological modeling helps in planning decisions. Some models now being used (Silva2, SELES, Woodstock Stanley) are fully spatial oriented but very expensive (upwards of $30,000 for one license).

To a certain degree, the initial land use planning process had a motivation of asserting aboriginal rights, titles, and treaty recognition within the area. The plan is not only about the trees, but also about protecting woodland caribou. The Innu realized after the planning process the power of the land use plan they had created. The plan and data are constantly re-examined and re-evaluated through five year operating plans that are routinely updated and reconfigured.

One item of interest to the Innu was the ability to collaborate and talk about geomatics issues with other Aboriginal groups. They would like to see a geomatics or Aboriginal user's forum.

4. Dehcho

Teleconference, April 10, 2008.

4.1 Workshop participants:

NAME	TITLE	ORGANIZATION
Petr Cizek	Director of Dehcho Land Use Planning Committee	Dehcho First Nation

* Petr Cizek has been an Environmental Consultant to the Dehcho Nation since 1996.

4.2 Geomatics capacity and familiarity with CGDI

The Dehcho Land Use Planning Committee does not currently have in-house geomatics capability. However, some staff members that were involved with the land use planning process are familiar with GeoConnections, CGDI, GeoBase, GeoGratis, and the GeoConnections Discovery Portal.

4.3 Availability of geospatial data

The Dehcho feels that the geospatial information that is currently used does not meet its needs for land use planning. There are problems in locating and getting a hold of necessary geospatial information. Some of the data identified as problematic to obtain are accurate vegetation classification, forest resource inventory, and downscaled climate change scenarios. (University of Victoria research center provides 10km x 10km downscaled data but in a non-standard GIS format, http://www.cics.uvic.ca/scenarios/data/select.cgi.) NTDB Digital Elevation models at 1:50,000 scale were not available in the study area at the time the plan was being produced. In addition, the NTDB vectors at 1:50,000 scale were excessively expensive at the time the plan was being produced. No new data relevant to planning have been acquired by the Dehcho that were not listed in the maps provided in the land use plan.

4.4 Data sharing, policies and issues, additional needs

The main barrier to accessing existing geospatial data is the reluctance of government agencies to share data, especially the Government of the Northwest Territories (GNWT).

As previously mentioned, during the planning process the Dehcho determined that accurate vegetation classification and forest resource inventory were needed but were unavailable. It is felt that these data were unavailable as the GNWT did not have the technical capacity to produce accurate vegetation and forest resource inventories. Currently, there are more accurate vegetation classifications available from Ducks Unlimited and NRCAN Earth Observation for Sustainable Development.

The current data distribution systems such as GeoGratis and GeoBase are entirely sufficient to meet current delivery needs. The Internet is currently the only mode of geospatial data delivery that suits Dehcho needs.

The Dehcho acquired full Indian Resource Satellite (IRS) coverage at a 5 metre resolution and digitized disturbances at an expenditure of approximately $750,000, as no other data were available at the time. LANDSAT products are used as well. However, they do not compare favourably to the 5 metre resolution earth observation data. Dehcho feels that free public release and access to updated and current LANDSAT and RADARSAT data would help develop and implement land and resources planning and management.

The Dehcho currently shares some data that were collected for the land use plan, both internally within the organization and externally. However, there are limitations or barriers to data sharing and distribution such as confidentiality concerns, intellectual property rights and restrictive licenses. Data are shared mainly via the Internet, email, and via media such as CD-ROM and other storage devices. Data that are confidential are from traditional land use and occupancy studies and Traditional Ecological Knowledge (TEK) studies. The IRS imagery licenses that were purchased do not permit the redistribution of the imagery outside the planning committee, the Dehcho First Nations, the GNWT, and the federal government.

No additional data have been acquired since the completion of the final draft plan in June 2006.

5. Tsleil-Waututh

Vancouver, British Columbia; April 24, 2008.

5.1 Workshop Participants

NAME	TITLE	ORGANIZATION
Evan Stewart	Natural Resources Management Coordinator	Tsleil-Waututh Nation
Pano Scrivanos	GIS Coordinator	Tsleil-Waututh Nation
Rita Ngan	GIS Analyst	Tsleil-Waututh Nation
Micheal George	GIS Mapping Technician	Tsleil-Waututh Nation
Ken Marshall (sitting in)	CGDI Content Analyst	GeoConnections Secretariat

5.2 Geomatics capacity and familiarity with CGDI

The Tsleil-Waututh Nation (TWN) prides itself on its geomatics and GIS capability and feels that this capability is a powerful tool for decision analysis, providing information about what is on the land, issues regarding jurisdictional boundaries, electoral boundaries, culture, and helping to manage multiple stakeholders. TWN has asserted itself as a management authority over their Traditional Territory and believes in the inter-connectivity between community, land, culture and environment. TWN acts as a conduit to bring parties actively engaged in development projects throughout the region that wouldn't normally sit together to the table . Fourteen of the nineteen projects for development for the Olympics are within the TWN territory.

5.3 Availability of geospatial data

B Burrard Inlet Lower Fraser Bioregional Response Plan (BRP) is a TWN initiative that will try to compile many data sources (some of which are believed to be out of date) that was brought on by the oil spill in the harbour 240 L by Kinder Morgan Canada. This led to a huge emergency response under the jurisdiction of the National Energy Board. Oil got into the storm drains, and from the beginning TWN set the tone on how tragedies such as this would be looked after. Planning that uses the most up to date data sources is needed for such events. TWN is currently working on data sharing agreements. The Ministry of Environment has determined that it needs a plan and information for emergencies such as this. TWN has taken the initiative to contact every stakeholder with geospatial data and conduct a massive inventory with a goal of making a data warehouse that would include any type of spatial data that can be useful for response planning. Currently, TWN has more data than everybody else within the area and it feels that other people will have an interest in this system.

TWN does not have many uses for image analysis. |In addition to the land use plan, TWN created a bioregional atlas of the area and has completed archeological mapping. Access to data was an issue in the beginning. However, now TWN has a custom data sharing agreement with the Integrated Land Management Bureau (ILMB). Most of the current data in use have come from the ILMB and TWN has to contact ILMB when it needs new data updates. It is stressed that the group has had to build relationships with each of the data providers. At the watershed level, the standardized data from ILMB currently meet planning needs but there are many data that do not exist (e.g. Roosevelt elk data). TWN will not use data that do not have any metadata or if it do not have an idea of who created the data.

5.4 Data sharing, policies and issues, additional needs

Data sharing agreements are in place with a number of organizations who request data. However, the sharing agreements are unique in that they depend on the data that are shared and to which project they will be used or connected. Some policies exist regarding confidentiality and how the data will be used. For confidential data, information may only be included, referenced or circulated by an organization with the written consent of TWN. For any historical and/or cultural data, TWN retains editorial control over the depiction of history, culture and projects in any reports or documents produced by an organization relating to the community or the traditional territory. TWN is not responsible for the accuracy of any data that are shared. Any data provided by the Nation cannot be sold or distributed without expressed permission from the Tsleil-Waututh.

5.5 General Notes

The chief of the TWN is also the director of the Treaty Lands and Resources Department. The department supports the treaty and treaty contents. The TWN consists of both a Traditional council, and a DIAND council; this is an innovative way to govern. The TWN includes four departments. The Administrative / Public Works Department works on the reserve while the Treaty Lands Department and Resources Department work both on and off the reserve. All TWN departments also interact actively with the urban area.

From the early stages of land use planning, it was evident that the TWN had to compile its own datasets. The TWN is different from any other organization studied as many times other municipal governments come to the TWN for mapping and for data. Unlike other groups in BC, TWN stated that the BC provincial government and, to some extent, the federal government are much more amenable to sharing datasets. TWN is very proactive in the area of data collection. An example project is the orthorectification of historical photos to determine change over time. The TWN GIS office acts as a conduit for all users, including internal and external users and parties interested in data for the settlement region, which includes a traditional territory of Vancouver, West Vancouver, and to the Fraser River.

TWN partners with many companies and government departments, as its plan came about after a co-management agreement with government that not only includes the provincial level, but the municipal level. The group is involved in many activities besides planning, including resource based initiatives, fisheries development, community planning, protected areas management, cultural initiatives, economic development, and condominium development. Revenue that is generated by some of these projects goes back to the people. TWN prides itself on finding innovative ways to manage complex issues with a holistic approach of balancing between values and sustainability.

6. Sahtu

Norman Wells, NWT; April 30, 2008.

6.1 Workshop participants

NAME	TITLE	ORGANIZATION
Murray McKnight	Board Advisor	Sahtu Land Use Planning Board
Alasdair Veitch	Wildlife Biologist, Supervisor Wildlife Management	Government of the Northwest Territories, Environment and Natural Resources
Phil Spencer	GIS Technician	Government of the Northwest Territories, Environment and Natural Resources

6.2 Geomatics capacity and familiarity with CGDI

There is in-house geomatics capacity available at the Sahtu as well as familiarity with the GeoConnections initiatives. The geomatics capacity for the Sahtu Region lies in the Government of Northwest Territories Department of Environment and Natural Resources. The Sahtu Land Use Planning board has focused much effort on data collection, which has included contacting over 100 Government departments, community organizations, corporations, and contracting professionals to create data layers when information gaps are identified.

6.3 Availability of geospatial data

It is felt that the current geospatial data do not meet Sahtu needs. Problems were identified in obtaining the existing data, mainly NAD 83 based topographic data, higher-resolution satellite imagery, and higher-resolution DEMs. Bandwidth limitations were identified as the main barrier to accessing existing geospatial data.

Since the development of the land use plan, no new datasets have been acquired for the purpose of land use planning, but it is felt that there is a need for high-resolution imagery and DEMs. Cost is the main reason that these data are still missing and the Sahtu do not know who could supply the missing information. Satellite imagery is currently being used to a limited extent; primarily LANDSAT imagery is used, and IKONOS to a lesser extent as determined by current availability.

If an on-line information system was developed for accessing and retrieving geospatial data, it should contain the following information in order to meet the needs of the Sahtu: parks; mineral/oil and gas potential/licenses/tenures; DEMs; planimetric and topographic features; bathymetric data; high-resolution imagery; traditional territories and traditional knowledge data; political boundaries; karst features; infrastructure; wildlife data (migration, population probability distributions and habitat). Internet and FTP access were identified as the preferred delivery mechanism for geospatial data exchange.

6.4 Data sharing, policies and issues, additional needs

Currently, geospatial data are being shared internally within the organization as well as externally with other non-Aboriginal organizations. Data sharing takes place through use of the internal networks, Internet, email, and CDROM, or in form of hardcopy maps.

Improved data availability and data standardization would help development and planning in the region.

6.5 General notes

The complexities of the Sahtu land use planning process are evident through the many iterations of maps. The Sahtu Settlement Area is split into three districts with a total area of 283,171 square kilometers, and consists of the Sahtu-Deline, the Sahtu-Tulita, and the Sahtu-K'Asho Got'ine districts. The population in the 2006 census was 2,600. The settlement area is a diverse habitat that contains the Mackenzie Mountains, the Mackenzie Valley, and Great Bear Lake. There are five Sahtu communities in the three districts, ranging from a population of 100 in Colville Lake to a population of 800 in Norman Wells. Economies within the communities vary from game hunting, fishing and trapping, to employment at ESSO / Imperial Oil.

The Sahtu Dene & Metis claim of 1993 was the fundamental document that the planning initiative followed. The direction was for co-management of the land and companion legislation. The preliminary draft land use plan was available in 2003, and the current 2008 draft is still incomplete. Currently there is no budget available to finish the planning process. Some of the staff who were extensively engaged in the plan, championing it, unfortunately are no longer working on the plan.

The region is very diverse and the potential for resource development in the Sahtu is immense. The land use plan provides for better clarity and certainty for developers wishing to develop the region. The plan started from the ground up with community engagement. The current framework for the plan approval (following adoption of the plan), requires the Planning Board to submit the plan to the First Nation of the settlement area, then the Territorial Minister, and finally the Federal Minister.

The Sahtu Secretariat Incorporation (SSI) is the incorporated legal version of a government in the region. The SSI is formed from the land owners, which are the three Districts Land Corporations that own the land.

The plan has specific provisions dealing with exceptions to the plan; "Where so authorized by the plan, consider applications for exceptions to the plan." This is one of the key clauses of the plan. It takes into account things unforeseen during the plan development process, for example the discovery of coal deposits. Unlike amendments to the plan, this clause does not need to go through a long revision process. Exceptions are made near boundaries, e.g. boundaries may be drawn on a map where the actual boundary has a width of a few kilometres, so an exception is included dealing with these types of issues.

Developing the plan was a challenge as it required the balancing of many competing interests. The entire area includes a region of co-ownership including Crown lands and Aboriginal lands. However, the plan applies to all land no matter what its ownership details.

7. Poplar River

Poplar River, Manitoba; May 6, 2008.

7.1 Workshop participants:

NAME	TITLE	ORGANIZATION
Sophia Rabliauskas	LUP Team	Poplar River First Nation
Ray Rabliauskas	Land Management Coordinator	Poplar River First Nation
France Valiquelt [?]	LUP Team	Poplar River First Nation
Albert Better [?]	LUP Team	Poplar River First Nation
Ed Hudson	LUP Team	Poplar River First Nation

7.2 Geomatics capacity and familiarity with CGDI

Poplar River does not currently have in-house geomatics capacity. At one time during the planning process there was geomatics capacity but it has since diminished. The community realizes the need for in-house capability.

Likely because of the lack of geomatics capacity, the community was not aware of GeoConnections, CGDI, GeoBase, GeoGratis and the GeoConnections Discovery Portal.

7.3 Availability of geospatial data

Poplar River community members feel that the geospatial information they currently have did meet the needs of the planning process. There is an interest in additional research such as carbon sequestration, cores, and dry land research. They are currently looking for funding to complete some outstanding research interests. During the planning process they felt that there were no problems getting the necessary geospatial information, but said that time was one issue or barrier in accessing existing geospatial data. Since the planning process has been completed, the community data were lost in a system crash, and a second available copy is currently stored with the consultants who were hired during the process and must be accessed from them. The data currently reside at Whelan Enns & Associates. At the time of planning, a combination of TEK from the community and scientific data from government and consultants were all that was needed and available.

As traditional activities are changing within the region, there is a significant need to update the TEK data within the region. This information will be bound to confidentiality agreements.

Delivery of data that would suit the community's needs would be via the Internet and in hardcopy format.

LANDSAT data were used during the planning process. However, this imagery was used simply as a background to display information. There was no EO derived information used in the planning process.

7.4 Data sharing, policies and issues, additional needs

Data are not shared regularly either internally or externally. There are some confidentiality and intellectual property rights issues associated with TEK, but these have not come into play because nobody has ever asked for the data, i.e. data sharing is not impeded by restrictive licenses, technical problems or lack of availability in suitable formats, but by lack of knowledge that the geospatial data exist.

Poplar River will soon have a road that will be built to access the community. Currently it is working on land use plan implementation and a park (protected area, world heritage site). Additional work is needed to generate ecotourism and tourism opportunities in the area. The community has a population of approximately 1,200 people, and 400 others live off the reserve. There is a lot of Internet access within the community with a relatively fast connection (approximately 100 homes have high speed satellite Internet connections).

Current mapping in the region is done through the province. The community is currently working with consultants in order to update some datasets and to make better maps of the available existing information that will be compiled in a map atlas. There is a need to develop local GIS capacity within the community. There was some training in the past which consisted of one week of training per month for seven months. The community has found it exceptionally difficult to retain geomatics capacity in the region mainly because of budgetary issues. There is interest in applying for GeoConnections funding.

The land use plan was completed in 2005 and is now in the implementation stage. The community is supposed to be reviewing the plan summary. Currently, there are some present issues within the region, such as hydro line corridors, forestry and logging, fish resources, and mining. There is currently no inventory of mining interests within the region, and the community is interested in researching and acquiring mining tenure maps. Scientific datasets are obtained from consultants. Data completed in house were largely for TEK studies and cultural inventories; some of this information is marked on maps but with no identification as to what it represents. The TEK study methodology and questions were determined in partnership with the community and the mapping was largely completed by the province. Virginia Perch did the TEK study and archeology. Data on traditional place names is continually maintained and added to a database. One issue with respect to coverage during the planning process was that only the core area was mapped; none of the overlap areas with other communities were completed. Some gaps exist in Poplar River's use and occupancy study and in some cases sub information such as pictograph locations is missing.

Data interpretation was a real issue when developing the plan. The community identified the need to include all interpretations of the data within the plan. Updated satellite imagery may be useful for future planning in the territory.

Putting boundaries on maps proved to be a very political issue during the planning process, both in compartmentalizing the community's landscape into management areas and managing neighboring Nations values. This issue remains where the community is still working on shared or overlapping areas with neighboring jurisdictions.

8. Prince Albert Grand Council

Teleconference, May 15, 2008.

8.1 Workshop participants:

NAME	TITLE	ORGANIZATION
Diane McDonald	Land Use Coordinator	Prince Albert Grand Council

8.2 Geomatics capacity and familiarity with CGDI

The Prince Albert Grand Council (PAGC) and member communities have found it difficult to maintain internal mapping capacity through the Athabasca Land Use Office. Long-term committed funding has been the primary barrier to maintaining capacity. All of the member communities have had GIS capacity at some point in time, but continuity has been an issue. Diane McDonald notes that it would be good to tie the costs of developing / maintaining mapping capacity directly to the costs of participating in consultations. PAGC under the Athabasca Land Use Project currently doesn't have a GIS technician on staff.

PAGC currently relies on PACTeam Canada for mapping support. All data currently resides at the PAGC office on behalf of the Athabasca communities.

8.3 Availability of geospatial data

There are some data that PAGC is unable to access, for instance outfitter licenses and allocation for hunting, fishing, and recreation. These data were not available to the community for the plan and for the plan update in 2007. Other data previously requested from the Province (namely the Supervised Forest Classification Layer)has not been received..

Mining related data including roads and trails were obtained directly from industry within the region. All mining tenure data, dispositions and mineral potential analysis were accessed directly from Saskatchewan Industry and Resource Department. In addition, abandoned mine sites have been provided by Saskatchewan Department of Environment.

Trapper's Fur Blocks and members were provided by Conservation officers, and the department of Environment. Other data provided by the Province included archeological data, commercial fishing licenses and allocation, and fire history data. A data sharing agreement was drafted with the province outlining conditions surrounding the sharing of community use and occupancy data per the Panel's confidentiality agreement.

Communities participated in data collection processes. Travel routes were captured in the use and occupancy interviews held in 2002. Over 420 community members participated in the study. Additional interviews for the new Athabasca land use plan and protected areas planning initiative may also take place. Critical habitat analysis and species of importance were identified by the communities. The Panel Coordinator developed a methodology and completed the interviews in 2007. PACteam Canada digitized the data on behalf of the PAGC. In 2002, caribou data were derived from the Caribou Management Board.

In addition to the previously described data obtained from the provincial government, the province also supplied data relating to non-timber forest products; this was largely mushroom harvest potential. All other non-timber forest products were accessed through the use and occupancy study. Fish spawning data were derived through community interviews as they were not collected by the province.

8.4 Data sharing, policies and issues, additional needs

A series of conflict mapping analyses was undertaken to prioritize land use activities. This was done through a series of consultations and public meetings in the communities using paper maps and GIS . There is an interesting correlation between the priority cultural areas identified by the communities and the priority biodiversity sites identified by non-governmental organizations (NGO's), biologists and provincial technicians.

PAGC provided advice on their methodologies and planning expertise to Poplar River, Manitoba and, more recently, to Grand Rapids, Manitoba as part of the CIER Aboriginal Leadership Workshop held in Winnipeg November 2007. As well, it has engaged Fort Chip First Nations in overlap and water management inter-provincial issues on the Athabasca River Basin.

8.5 General notes

The PAGC completed a land use plan in March, 2006. Despite the support and endorsement from all seven member communities, the plan was not approved by the Athabasca communities because there were outstanding issues unresolved by the Province of Saskatchewan. A new land use plan is being initiated, building on the previous work by the Athabasca Interim Advisory Panel and PAGC, with a focus on updating the old plan's main land-use zone and policy recommendations to suit the vision of the Athabasca residents. A new Athabasca land use vision was recently approved by three First Nations and four provincial communities and will be forthcoming on the PAGC web site – see: http://www.pagc.sk.ca/Depts/depts.asp?department=Athabasca%20Land%20Use&Link=Home.

After the completion of the Stage I land use plan, the Athabasca Panel and PAGC consolidated and updated a rich and varied geospatial data library, including biological, cultural and administrative data, for the next phase of planning and development of the Athabasca land use plan.

The Web-based mapping portal includes a list of data and associated metadata in FGDC format (see: http://www.pagc.sk.ca:8080/downloads/). A Web-based mapping application for use by community members, government and industry was developed by the Athabasca Land Use Project using ArcReader to access the data library. The thematic mapping project and web based mapping was supported by GeoConnections, CBI, First Nations Forestry Program, Northern Lights Casino and PAGC, was created as a gateway for use primarily by industry and government in consultations. The site is available for viewing at: http://www.pagc.sk.ca/alup/project1.asp. A MapViewer was developed by PAGC to fill in the capacity gap to assess development applications and to create new maps without GIS skills.

9. Haida

Teleconference, May 29, 2008.

9.1 Workshop participants:

NAME	TITLE	ORGANIZATION
Bill Beldessi	Manager, Implementation	Haida Nation
Marguerite Forest	Haida Mapping Coordinator	Haida Nation
Nick Reynolds	Joint Technical Team	Haida Nation
Sonia Rice	Joint Technical Team	Haida Nation

9.2 Geomatics capacity and familiarity with CGDI

The Haida Nation currently has in-house geomatics capacity., However, the future of retaining capacity and staff in geomatics-related fields is a concern. ESRI products are currently being used, including two ArcEditor licenses and one ArcInfo license used by two full time technicians and from two to four part-time positions. A GIS technician focusing on databases has just been relocated, and a partially funded remote sensing position is currently vacant. The Haida Nation has been successful in hiring summer students to help out with their mapping.

Staff members are familiar with GeoConnections, CGDI, GeoBase, GeoGratis and the GeoConnections Discovery Portal. However, they do not use them on a regular basis as available downloads really do not have the type of data that are needed on the Queen Charlotte Islands.

9.3 Availability of geospatial data

The Haida Nation feels that the current geospatial information that is used and housed at the mapping office currently meets its basic needs, but that it may not meet future needs. For example, BC 1:20,000 TRIM digital data currently is not freely available and special requests had to be made for these data as part of the land use planning process. The data licence is very restrictive;the data can only be used for land use planning.

There were many problems in locating and getting the necessary geospatial information where it exists. A lot of time is spent on data collection and acquisition. Proprietary data from forest companies (forest inventory, plots) that describes forest attributes, volumes, etc. cannot be obtained by the Haida, and some government datasets that include the same types of information have to be requested on a regular basis. Additional data of interest to the Haida Nation do not exist, namely a vegetation resource inventory data (inventory for the entire island), which is currently being created. In addition, Terrain Resource Information Management (TRIM) data are currently being used, but there is consensus that the current TRIM data (including the Digital Elevation Model) is of poor quality and the mapping group is awaiting TRIM2 data.

The Haida Nation also believe that the legal system mapping on the island should be done at a consistent scale; different forest tenures have used different Terrestrial Ecosystem Mapping(TEM) standards.

LIDAR data are also understood to be better than TRIM data, but the group is well aware that these are very costly to obtain. These data have been identified as important in the region due to the nature of LIDAR and the benefits of having two different modes (point scatters), especially in forest canopy areas.

Forest licensees in the region are extremely reluctant to perform surveys regarding timber values and cultural values. The Haida Nation believes that these types of surveys need to be completed island wide rather than as done now; currently a survey is completed for the various cut blocks or identified future development areas.

The main barrier to accessing existing geospatial data is the continual (and routine) requests and related follow-up that must be initiated with the government. In addition, the development companies often are reluctant to share data, and many gaps exist in the Islands' data inventory. Despite being co-managers of the islands, the Haida still face data access issues. The provincial government has very restrictive data access and use policies. In addition, it does not make sense that some of the data (TRIM and TRIM2, for example) have been collected with public funding, but there are provincial policies in place that require users to pay for data use. Data use restrictions are another concern when using provincially supplied ; for example, TRIM cannot be used for tourism maps.

There is also some disparity between different First Nation groups in British Columbia. Some groups have developed procedural relationships that get funding to pay for studies such as cultural values surveys. However, this is not consistent throughout the province. The Haida have been less fortunate in this regard as none of the cultural values surveys on the Queen Charlotte Islands have been funded by provincial funding sources.

There are numerous data--a short list of approximately 200 additional datasets have been identified--that the Haida feel are relevant to land use planning. Some datasets have been acquired for the land use planning process that were not identified by the Project Team because of their absence from the plan. Some higher profile data sources such as SPOT data that have been acquired for all of British Columbia are not readily available to the mapping group. Other datasets such as aerial photographs compiled in the last couple of years (orthorectified and stereo) have been completed by the BC Government, but are only available to proponents who pay for the data.

During the initial planning phases, Ecotrust Canada worked with the Haida Nation to develop a mapping / GIS needs assessment and build local mapping capacity. This formed the basis for its current mapping program. The initial funding was from a US source, but the Haida Nation now receives support from Ecotrust Canada.

Consistent forest cover data for the entire island was needed, yet unavailable at the time of the Haida plan. Historical cover data is still unavailable. The historical component is now being filled in using historical photos and cut block records. The Haida Nation feels that the province should have maintained this throughout the years.

Missing or unavailable data can be supplied by numerous sources identified by the Haida, including the province, companies, and the Haida itself. The Haida Nationhas identified lack of funding as a barrier to data availability and has stated that the lack of investment in consistent island wide data inventories has led to an approach of “ambulance chasing” data collection. Forest companies, for example, will use their own crews to collect cut block information but when archeology is required, the data collection is contracted out.

If an on-line information system were developed for accessing and retrieving geospatial data, the most important data source that it should contain is high resolution satellite imagery. Data currently available on some of the download portals do not meet the specific needs of the Haida Nation. However, it still feels that some First Nations in BC that are just starting out in their mapping would benefit from existing data portals.

Data portals and other digital delivery methods are the only methods currently used within the mapping group. Hard copy data have been difficult to integrate. This is a current problem with some of the developers on the island. For instance developers sometimes send PDF and accompanying text to the Haida, which is difficult to deal with and integrate with current systems. There are some provincially driven websites that allow the Haida to get regularly updated development plans (though only approved plans); these are unique to BC and not necessarily easily available. The Haida Nation feels that data portals do not provide updated data in a timely fashion.

The Haida Nation does not use satellite imagery regularly because of the associated high costs of the imagery. Of the available freely downloadable imagery such as LANDSAT, there is currently not much use for information at the available resolution (30 m) as it is not suitable for forest cut blocks and cut block updates. The Haida would use higher resolution imagery if it was available and routinely updated.

9.4 Data sharing, policies and issues, additional needs

Data collected by the Haida are shared regularly internally, for example with the Heritage Department. Data are also shared with other departments and with several provincial ministries for the land use planning process, but some of the internally collected data are not shared externally where confidentiality and intellectual property rights are of the utmost concern (for example TEK). Data that have associated confidentiality issues and intellectual property rights are shared internally. When sharing them internally, the Haida mapping technicians usually transmit data via an email attachment.

The Haida Nation currently does not have the in-house capacity to carry out intensive imagery analysis. Access to classified images of high resolution imagery would be useful.

The Haida Nation is also in the process of developing a Marine Use Plan, in which the BC government is involved. Some of the data obtained for this process originate from the federal government, including the Department of Fisheries and Oceans (DFO) nautical charts and bathymetric data. Nautical charts were not obtained directly from the federal government but were obtained through other means. DFO provided fisheries data that capture species and harvest information. However, these data are provided in a coarse, aggregated format that is not suitable for planning purposes. The Haida Nation has also mentioned that this type of data (coarse, aggregated) is also a problem with census data in Canada, some forestry data where the quantitative data gets separated from the spatial data, and economic and socio-economic data where population on the Queen Charlotte island is aggregated improperly.

Sea surface temperature (SST) data from the Pacific Science Center (Sydney BC), which are collected from buoy data ,are also used. These data are not published freely on the web and are obtained by specific request. The Haida noted that the Pacific Science Center is a federal entity.

Climatic data would also be an asset to the Haida. Data have previously been downloaded from Environment Canada via its web portal, but these data require a lot of processing. Climate change data would also be an asset as these would allow Haida mapping to determine any consequences of tree species distribution changes. Along with having up-to-date climate and climate change data, historical climate information would also be an asset. It is unfortunate that universities are not doing any climate change work on the island, and the government has cut back on climate monitoring stations on the island. Previously, there were five stations across the island, none of which operated for a long time. Three stations were discontinued and two remain. More regular, pre-processed climate and climate change data would be beneficial to the planning process. A few researchers in the province have done climate projections, but the data cannot be found and would be beneficial to obtain from a single place.

In addition to climate stations, currently there is only one hydrological station (stream flow) on the island. The Haida Nation does not know if the station is operated by Environment Canada or the BC government.

A wind modeling study from BC Hydro was completed on the Queen Charlotte Islands, but the Haida have never found / heard of the data since. Some wind modeling data were obtained through the University of British Columbia, but these were data previously run through different models. It would be beneficial for the Haida Nation to obtain the original data so that it can run models and have the ability to change model parameters as it sees fit.

During the planning process, modeling was used to complete estimattion of forest (1800 forest cover) and projected forest cover (2200). However, the Haida Nation has never been able to access the data. Other such missing data that have never been obtained by the Haida include paleo-ecology data that was funded through federal research grants. These data include lake-core information.

Lastly, the Haida Nation indicated that it is unfortunate that there are provisions in funding agreements that do not permit some Aboriginal groups to have access to data collected on their traditional land. Fortunately, it has some close relationships with scientists who have been researching on the Queen Charlotte Islands for quite some time, and are able to access data from the research but is not able to use the data for other projects because of restrictive funding agreements. One such project is a sea level rise project where vulnerability to erosion was studied using LIDAR data. This project was completed using precise coastal elevation data that the communities would love to have.