Isi Wipan – Climate: Identifying the impacts of climate change and capacity for adaptation in two Saskatchewan First Nation communities

Final Research Project Report to the Prairie Adaptation Research Collaborative

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ABSTRACT

This report provides an overview of the findings from the Prairie Adaptation Research Collaboration project, *Isi Wipan – Climate: Identifying the impacts of climate change and capacity for adaptation in two Saskatchewan First Nation communities.* Two community case studies were undertaken with attention given to the integrated and interconnected impacts of climate change across various sectors. A holistic framework was used that emphasizes the interconnections between the social, cultural and natural systems. Scientific data on paleoclimate and paleovegetation for the eco region encompassing these two communities is provided. Additionally, Elders from the James Smith and Shoal Lake Cree Nations came together in their respective communities to discuss impacts from climate and environmental changes on the health of their populations. The two Elder forums, or focus groups held in each community, were based on respectful learning and traditional protocols in which Elders share information about climate change with one another and with members of the scientific community. Four basic objectives guided this community case study: To identify what the Elders have experienced in terms of climate and environmental change as suggested by traditions and oral histories; How the changes in the climate and environment impact the health of community members, recognizing that the natural environment is one of the key determinants of health (with health defined as encompassing physical, mental, emotional and spiritual components); For Elders to communicate what features or resources of the traditional territory are highly valued, and to what degree these features or resources at risk to climate and environmental change in their territories; and to identify what enables or constraints communities to adapt to changes. The Elder discussions in response to these questions are identified and discussed in this paper. A number of broad themes emerged from the discussions that indicate how the social, economic and cultural systems were impacted by changes and how the people from both communities demonstrate qualities of resilience, stability and flexibility in the face of changes that were taking place around them.

EXECUTIVE SUMMARY

Two community case studies were undertaken with attention given to the integrated and interconnected impacts of climate change across various sectors. A holistic framework was used that emphasizes the interconnections between the social, cultural and natural systems. The purpose of the research is assess the future impacts of climate change and the capacity for two First Nation communities in Saskatchewan to respond and adapt to those impacts. Smither and Smit (2000) state that "the standard approach is rarely connected to current experience of communities and usually does not relate to the actual adaptive decision making process in communities."

Both communities of James Smith and Shoal Lake are situated in the southern boreal forest and historically depended on the regional ecological community of plants and animals for their economic and survival needs. Through the discussions in the focus groups, the Elders continually spoke of the connections between the natural environment and their social, physical and spiritual well being. Their interaction with the land moulded their traditional environmental knowledge and their social norms that create and maintain healthy communities. The boreal forest, with its lakes, creeks, topography, along with its flora and fauna, provided the array of health needs such as natural foods and water, medicinal plants, aesthetics and spiritual grounding. It is true that the land gave life to the people.

The Elders of James Smith and Shoal Lake said that the ancestors had forewarned their people about the unfolding of environmental and socio-cultural changes. On the environmental front, analysis of the Elders' statements indicates that similar climatic events had happened to both communities. Both communities experienced alternative periods of flood and drought outside the variation considered normal in their territories. The Elders, however, were not unfamiliar with climatic variations and trusted that the flux was an expression of natural patterns and events that the people had to synchronize with. Community systems remained fixed and people unchanged in the face of these historic climatic disturbances. This tenacity to psychologically accept and prepare for climatic fluctuations contributes to and demonstrates socio-cultural stability over the course of their history.

The communities were also impacted by human induced changes to the environment. The communities were more vulnerable to these changes and were indeed culturally harmed by these practices because of their cultural and historic ties to the land. The impact of Industrial activities in their territories was seen as major perturbations that impacted their communities by disrupting balanced connections to the land and its flora and fauna. The loss of pristine forests presaged shifts of consciousness and changing lifestyles. On the socio-cultural level, both communities started experiencing changes in climate and in people around the 1960's. The communities started shifting away from traditional modes of cohesion with the gradual adoption of non-traditional lifestyles that made them susceptible to the erosion of traditional environmental knowledge. The increased adoption of non-traditional lifestyles such as farming, waged labour and increased dependency on outside sources of assistance undermined the communities'

established social networks such as the cultural continuity from the old to the young. It is inevitable that the communities would adopt contemporary modes of living to replace the more traditional subsistence patterns such as hunting and trapping. Indeed, the people adapted to modern conveniences such as vehicles, processed foods and all the luxuries of modern housing. This process of material and cultural adaptation is the unseen and unspoken background to the philosophical and psychological dimensions of change discussed by the Elders.

The Elders from James Smith and Shoal Lake speak of strong philosophies and attitudes that had certainly helped to maintain their communities' equilibrium in the past. Personal reflection for knowledge development and a spirit of cooperation contributed to strong and flexible communities. On the personal level, the cultural promotion of traditional knowledge creates aware individuals and at the collective level, social responsibility promoted communal unity. The systemic philosophies and attitudes of the communities allowed them degrees of manoeuvrability as they negotiated changes taking place around them. The Elders from both communities believe that their people have also shown inherent resilience in light of the changes they have experienced in their histories. Both communities have largely recuperated from the impacts experienced from perturbations such as climatic fluctuations and loss of traditional forests. The Elders believe that psychological development is a prime factor for people to adapt to changing environments. The Elders also spoke of what enables their people to adapt to future events. Developing foresight through traditional means of knowing enhances the capacity to predict how nature will ultimately unfold. This capacity to anticipate future scenarios has the potential to help communities to plan for climate change and its potential impacts.

Overall, the Elders identify issues that constrain their communities' abilities to plan for and adapt to climate change. The James Smith Cree recognize their complicity in the causes of climate change by their adoption of contemporary lifestyles. Cultural continuity in both communities is a concern and Elders place strong emphasis that such continuity is vital for the future of their youth. Both communities also experienced increases in diabetes and other forms of ill health, which they attribute to the shift of diets from natural foods to contemporary forms of processed foods. What community decisions are made regarding the youth will determine the future capacity of both James Smith and Shoal Lake to negotiate the future of climate change. At this juncture, there is urgent need to link Elders with the youth as a way to ensure that cultural knowledge is transmitted. They recognize that traditional environmental knowledge and survival philosophies are default skills people will require in the event of modern crisis.

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1.0 Introduction

Identifying the impacts of climate change and capacity for adaptation in two Saskatchewan First Nation communities builds on the solid foundation of a previous research initiative on climate change s involving First Nations Elders. In 2004, members of the research team assembled First Nation Elders from the 12 communities that comprise the Prince Albert Grand Council in central/northern Saskatchewan to record and assess their observations on climate change in their territories. (Ermine et al., 2005) One of the intended outcomes of that initiative was to develop focused case studies as determined by the information presented by the Elders. Two First Nation communities represented at the meeting, the Shoal Lake and James Smith Cree Nations, identified significant climate change concerns around impacts on water, forest ecosystems, availability of culturally important plants, and livelihood activities. In view of these evident changes, this paper examines the adaptive capacity and future vulnerability of these two communities to changing environmental and resource conditions.

Many First Nations communities are undergoing significant social, economic and political changes that have serious implications for social well being. While some changes are certainly unprecedented, First Nation communities have faced social transitions in the past and also continue to confront environmental and climatic changes taking place in their territories. However, the climate change record, which is based almost exclusively on technology and scientific documentation, has left serious gaps in our understanding of the human responses to various climate and environmental changes. As Smither and Smit (2000) state, “the standard approach is rarely connected to current experience of communities and usually does not relate to the actual adaptive decision making process in communities” (p. 392). The knowledge held by Elders regarding the past experiences and responses, past successes and failures, can be accessed to broaden our understanding of the human response these processes and their impacts on social beings in contemporary contexts. The experience and knowledge of the Elders would aid the historical understanding of social issues and may indeed create valuable inter-generational and cross-cultural communication surrounding the environment and changes thereof.

This paper is an examination of the impacts of climate change and capacity for adaptation in two First Nations communities. First Nations Elders from the Communities of James Smith and Shoal Lake met to discuss these issues in focus group sessions. This paper explores the vulnerability of the two communities, through the perspective of the Elders, to their exposure to climate and environmental changes. The paper presents the responses and the findings from these Elder dialogues. Climate change and biophysical research, through paleoclimate and paleovegetation data, also contributes valuable data to provide the scientific perspective and backdrop to the community discussion. The discussion proposes that additional research is required in socio-cultural responses to climate change in order to develop a better understanding of the human response to modern crisis.

1.1 The Scientific Evidence

Present Climate

The lands of the Shoal Lake and James Smith First Nations in east-central Saskatchewan are contained within the Boreal Transition ecoregion:

> The ecoregion is classified as having a subhumid low boreal ecoclimate. As part of the dominantly deciduous boreal forest, it is characterized by a mix of forest and farmland. It marks the southern limit of closed boreal forest and northern advance of arable agriculture. A closed cover of tall, trembling aspen with secondary quantities of balsam poplar, a thick understory of mixed herbs, and tall shrubs is the predominant vegetation. White spruce and balsam fir are the climax species, but are not well represented because of fires. Poorly drained sites are usually covered with sedges, willow, some black spruce, and tamarack. … The region also provides habitat for white-tailed deer, black bear, moose, beaver, coyote, snowshoe hare, and cottontail.(Narrative Descriptions of Terrestrial Ecozones and Ecoregions of Canada - http://www.ec.gc.ca/soer-ree/English/Framework/NarDesc/canada_e.cfm)

The lands of the Shoal Lake First Nation also include the Pasquia Hills of the Boreal Uplands ecoregion. These mid-boreal mixed coniferous and deciduous forest inlcudes closed stands of trembling aspen and balsam poplar with white and black spruce, and balsam fir. Poorly drained fens and bogs support tamarack and black spruce. Wildlife includes moose, white-tailed deer, elk, black bear, timber wolf, lynx, snowshoe hare, beaver, and muskrat.

The climate of the Boreal Transition ecoregion can be described using data for temperature, precipitation and evapotranspiration from Prince Albert. For the baseline or “normal” period of 1961-1990, the mean annual temperature was 1 º C, ranging from average temperatures of -20 º C in January to 22 º C in July. Seasonal, maximum, minimum and extreme temperatures are plotted in Figure 1.

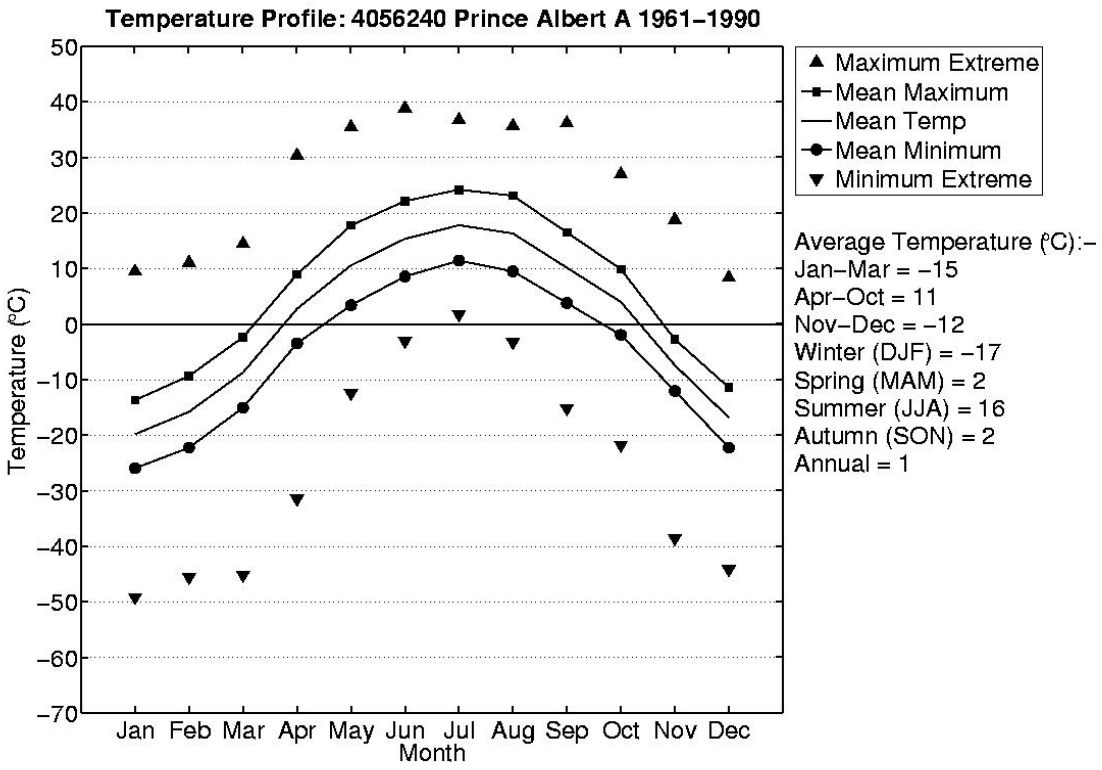


Figure 1. Annual temperature profile for Prince Albert for the normal period 1961-1990 (source: Canadian Climate Scenarios Network - www.ccsn.ca).

Normal (1961-1990) monthly precipitation and evapotranspiration are plotted for Prince Albert in Figure 2. The average annual precipitation for this period was 488 mm. Highest precipitation is in June and July, however, during May through August evapotranspiration exceeds precipitation such that on average a water deficit of 119 mm accumulates in these months. Even more soil and surface water could be lost in these warm months; thus there higher potential than actual evapotranspiration. During the rest of the year, precipitation exceeds evapotranspiration generating a water surplus of 122 mm. As a result, the net annual water budget is nearly balanced, a condition that over the long term supports trees and thus the Boreal Transition ecoregion occupies the ecotone between the grassland of southern Saskatchewan and the boreal forest to the north. In drought years, such as 1961 and 1988, there can be a significant water deficit creating stress for the forest vegetation and aquatic ecosystems.

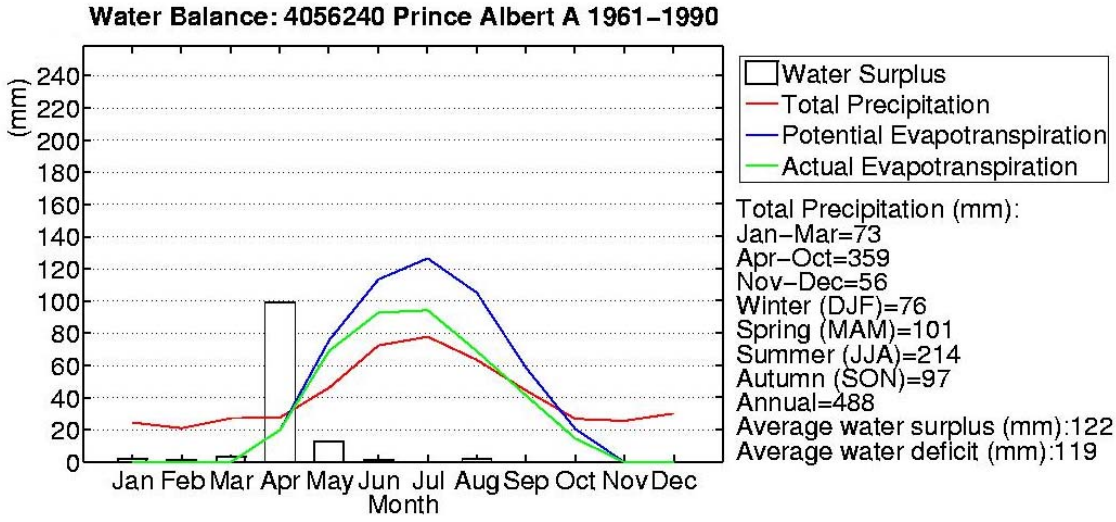


Figure 2. Monthly water balance for Prince Albert for the normal period 1961-1990 (source: Canadian Climate Scenarios Network - www.ccsn.ca).

Paleoclimate

Data for a 30 year period like 1961-90 gives a snapshot of the recent climate; however, climate is always changing. A longer perspective places the current climate in a historical context and gives an indication of the range of climate conditions that have occurred in the past and could reoccur in the future. Rates of climate change and the range of variability is known from the study of geological and biological archives that preserve a measurable response to climate fluctuations. In Saskatchewan, evidence of variations in climate over the past several millennia is preserved in fossil plant pollen (with the migration of the boundary between grassland and forest), other organisms stored in lake sediments (reflecting fluctuations in the level and salinity of lakes), terrestrial sediments (for example, recording intervals of sand dune activity and stability), and variation in the growth of trees as soil moisture fluctuates from year to year (Sauchyn and Velez, In press).

The paleoclimate record in Figure 3 was reconstructed from tree rings collected at two sites in Prince Albert National Park, Boundary Bog and Heart Lakes, and from Patterson Peninsula on the shores of Lac La Ronge. The spruce trees growing at these sites respond to summer precipitation such that tree-ring widths are correlated with precipitation data and indices of drought. In this case, the standardized tree-ring data are correlated with the Palmer Drought Severity Index (PDSI) for the summer months of June to August. The ring-width measurements were standardized by removing trends in the data related to the age of the tree (annual rings get smaller as trees get older) and by expressing ring width as an index with an average value of one.

Some trees in the southern boreal forest approach 300 years in age, but there are relatively few of these old trees, because fire is frequent. With our tree-ring data, we were able to produce a reliable reconstruction of the PDSI back to 1829, by calibrating the

tree-ring data using weather records from Prince Albert. In Figure 3, the dry years (negative PDSI) are shown in red, and years with above average summer moisture (positive PDSI) are shown in blue. This tree-ring record shows the dry years of the 1980s and 1930s which are known from the weather records and the experiences of local residents. However these recent dry spells are not the worst droughts for the past two centuries. The tree-rings indicate that the climate of the Prince Alberta area was drier prior to the settlement of the region by Europeans and the direct observation of climate.

The most severe drought in the tree-ring record is in 1868-69 when the PDSI fell to about – 2.4. These were two very dry years; however, a long drought can have greater consequences than a shorter severe drought. Prolonged droughts tend to have serious impacts on ecosystems and people because there is a sustained drop in the surface and soil water balance eventually exceeding the capacity for ecosystems and communities to cope with a lack of water. The most sustained drought since 1829 was in the first 23 years, 1829-1851, when only two years had a positive PDSI. Perhaps the worst drought, however, was during 1883 to 1893 when negative PDSI was both sustained and relatively severe (– 1 to -2). This drought likely had serious consequences for the ecosystems and communities in the Prince Albert region such that it may be part of the oral history or at least reflected in the adaptive strategies among the aboriginal people.

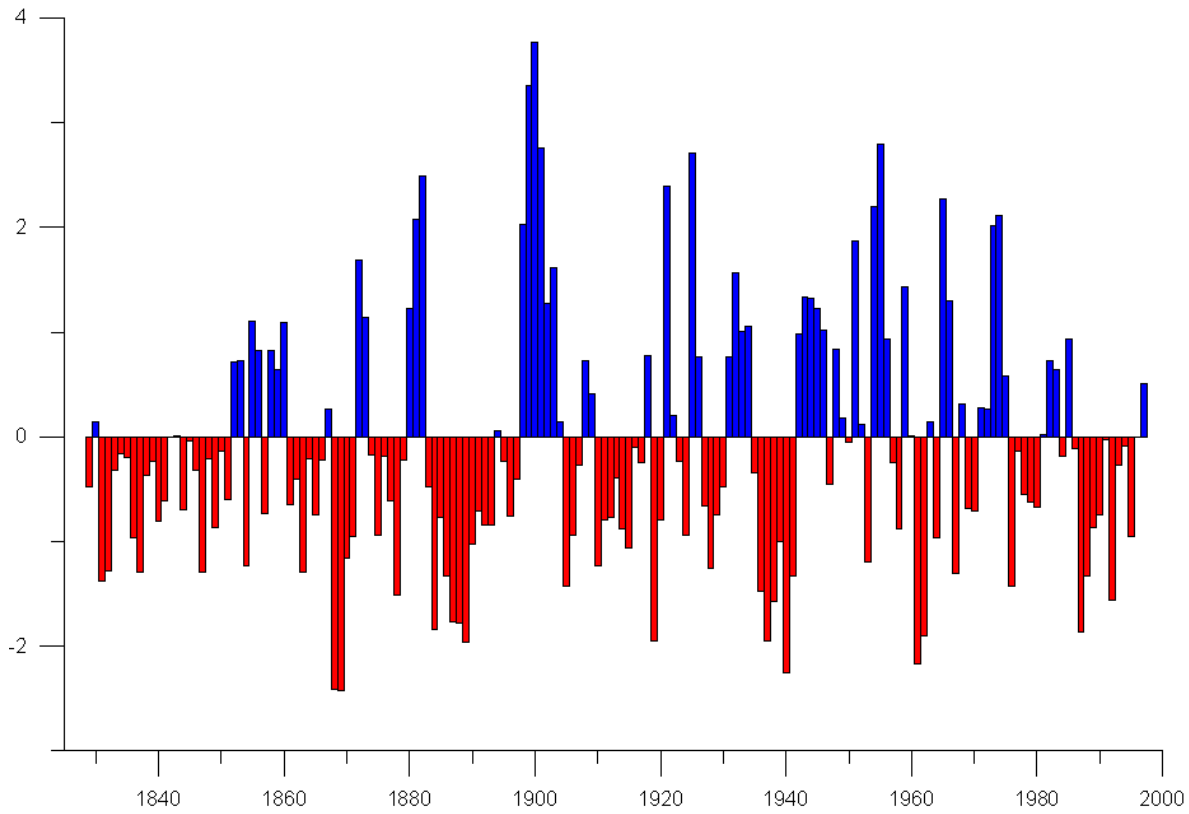


Figure 3. Summer (JJA) Palmer Drought Severity Index, Prince Alberta, 1829-1997. Dry years (negative PDSI) are shown in red, and years with above average summer moisture (positive PDSI) are shown in blue. (Source: D. Sauchyn, unpublished data)

Future Climate

The paleoclimate data indicate that aboriginal people were exposed to a greater range of moisture conditions than the EuroCanadians who came to this region mostly in the 20th century. This natural variability almost certainly will be exceeded in the 21st century as the result of global warming. With the human modification of earth's atmosphere and global carbon cycle, a significant warming trend is now superimposed on the natural cycles. Climate scientists are able simulate this global warming only by driving global climate models (GCMs) with increased concentrations of atmospheric green house gases. There are various GCMs and future concentrations of greenhouse gases must be estimated from emission scenarios. Therefore for various combinations of GCMs and emission (SRES) scenarios, there is a range of plausible future climates.

Figure 4 is a scatterplot of scenarios of annual changes in temperature and precipitation for the 2050s (2040-69) at Prince Albert. While there is a range of projections, all models suggest higher temperatures, from 2 to 6 degrees higher. Similarly there is a wide range of precipitation forecasts, but only one of the 31 scenarios shows decreased precipitation. Thus the global climate models project increased precipitation and temperature with median increases of about 3 degrees and 10%. This represents a significant increase in temperature but modest increase in precipitation and therefore the net result is very likely will be generally drier conditions in summer as more water is lost from soils, lake and wetlands by evapotranspiration during a longer warmer summer.

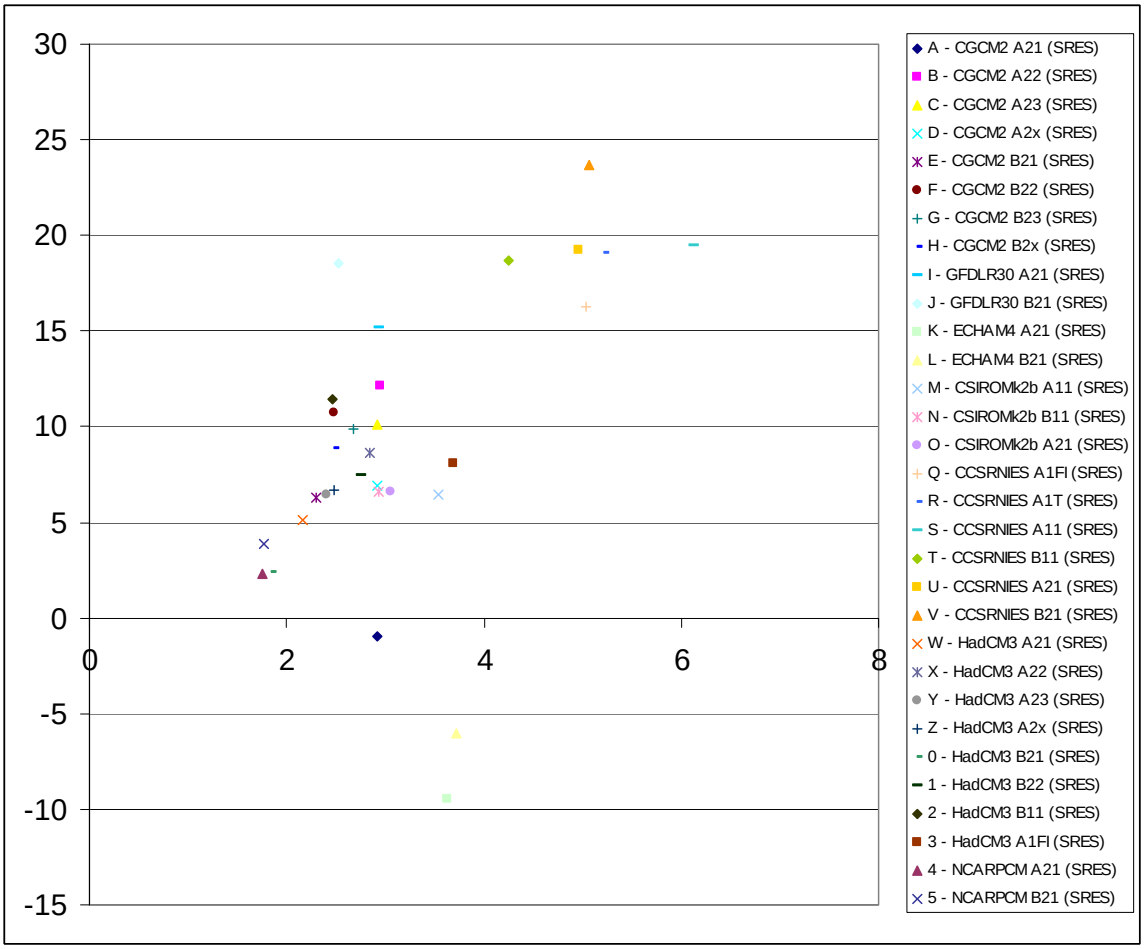


Figure 4. A scatterplot of SRES scenarios of annual temperature and precipitation change for the 2050s (2040-69) at Prince Albert, Saskatchewan; Temperature units are degrees Celsius and precipitation units are percent of 1961-1990. (Source: Canadian Climate Scenarios Network - www.ccsn.ca)

One of the climate change scenarios in Figure 4 is from the version 2 of the Canadian GCM and SRES emission scenario A21. The changes in temperature and precipitation projected by CGCM2 A21 plot near the center of the scatter of climate change scenarios. The changes in temperature projected for all of Canada by CGCM2 A21 are mapped in Figure 5. This map shows the largest increases in temperature are expected for northern Canada. The next largest amount of warming is projected for the southern and central Prairie Provinces. Thus is map indicates that the James Smith and Shoal Lake First Nations can expected 21st century climate warming that is typical or above average compared to the rest of Canada. This map depicts only the exposure of this region to climate change. The ecosystems and communities are particularly sensitive to this change in climate given the transitional nature of ecoregion (Boreal Transition) and the vulnerability of aboriginal communities are described in this report.

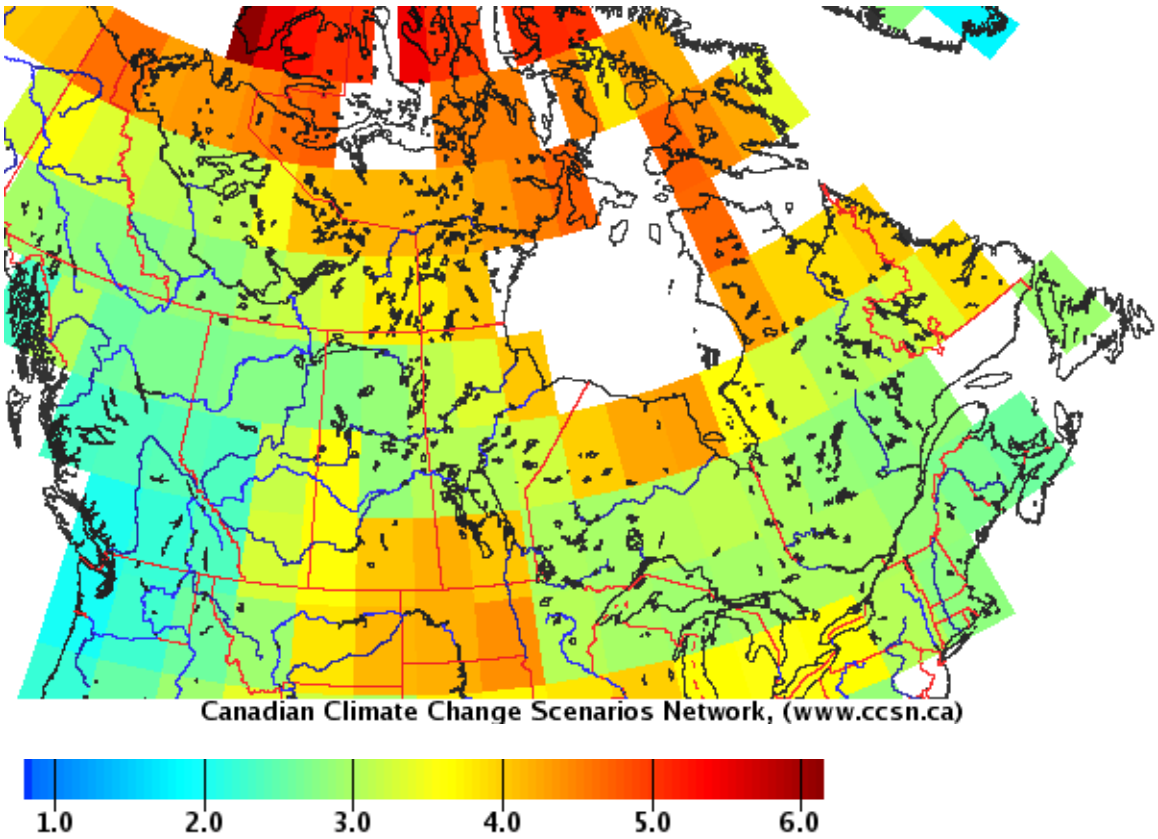


Figure 5. A map of increases in temperature from 1961-90 to the 2050s (2049-60) as projected by CGCM2 A21. (Source: Canadian Climate Scenarios Network - www.ccsn.ca).

Paleovegetation

Both instrumental records and global climate models suggest that there will be changes in several climate variables throughout the different ecoregions of Saskatchewan in the future as global warming is enhanced. Vegetation will respond to these changes in climate, with shifting ecoregion distributions and boundaries (Seppä & Birks 2001 and 2002, Seppä *et al.* 2004). These ecoregion changes will be accompanied by changes in individual species distributions. Predicted effects of the changes in a number of climate variables include a northward shift of the grassland-aspen parkland-southern boreal forest transition zone in response to climate warming caused by increased levels of greenhouse gases (MacDonald *et al.* 1998). To fully understand how the vegetation will change in response to future climate change it is essential to examine how vegetation has responded to changes in climate in the past. Using pollen grains and spores preserved in lake sediments over time, it is possible to determine the distributions of plant species and vegetation types that existed in a particular area at different times in the past (e.g. Bartlein & Webb 1985; Huntley & Prentice 1988; Guiot *et al*. 1989; Bartlein & Whitlock 1993; Guiot *et al*. 1993; Seppä & Birks 2001 and 2002). The shapes and surface features of pollen grains and spores are unique for different types of plants, and therefore the types and abundances of fossil pollen grains and spores indicate the vegetation present

when the fossils were deposited in the lake sediments. When these vegetation records are compared to climate information, it is possible to understand the relationship in the past between plant distributions and climatic variables. The purpose of this component of the Isi Wipan project is to examine how the vegetation in the areas of study has varied in response to changes in climate in the past, both in order to better understand how the vegetation will change in response to future climate changes and to describe the relationship between scientific and traditional ways of knowing about the past.

Core Collection

Sediment cores were collected from three lakes in the grassland-aspen parkland-southern boreal forest transition zone in central Saskatchewan. The lakes span a gradient from 53^{o} 38' N to 54^{o} 39' N, and from 104^{o} 54' W to 106^{o} 38' W. North Flat Lake is located in Prince Albert National Park while lakes L02 and L03 are located in Narrow Hills Provincial Park. Careful consideration was given when selecting the lakes to ensure the lake watershed was not directly impacted by agriculture or recent forest fires, and to ensure that the lakes possess the characteristics which make them optimal for the preservation of a good pollen record. All three lakes are situated in shallow depressions surrounded by forest.

The sediment cores were collected from the deepest part of each lake using a square rod Livingstone piston corer. This type of corer consists of a round tube that is lowered through the lake to the sediments at the bottom and then pushed straight down into the sediments so that the layers of sediment and organic material (including pollen) that have accumulated over the years are preserved in layers inside the tubing. The top of the tube is then covered so that the sediments are held in the tube when it is pulled to the surface. The sediments are then carefully pushed out of the tube in sections, which are sequentially collected.

The top 75 cm of the core from North Flat Lake was sampled for pollen and spores by collecting exactly 1 cubic cm of material at 1 cm intervals. The L02 and L03 cores were sampled by collecting exactly 0.5 cubic cm at 5 mm intervals along the full lengths of the cores. These samples were then processed to remove as much of the non-pollen/spores material as possible using standard techniques (Faegri & Iverson, 1989). The pollen and spores material is stained and mounted on microscope slides in silicon oil. In the preparation, a known quantity of an exotic material (in this case spores of a fern-like plant that does not grow in the region) is added to allow the determination of pollen/spore concentrations in the sample. An age-depth relationship for each of the cores was developed using two types of radioisotope dating (Lead-210 and Carbon-14). Therefore the time period in which each layer of fossil pollen grains and spores was produced and deposited can be determined.

Pollen/Spores—Vegetation—Climate calibration sets

In order to determine the relationship among the pollen/spores that accumulate in lake sediments, the vegetation around the lake, and the climate, a dataset of surface

pollen/spore samples, current vegetation, and current climate conditions is compiled to serve as a calibration set (e.g. Bartlein & Webb 1985; Whitmore *et al*. 2005). The surface sample contains the pollen that was released by the plants around the lake in recent years. Pollen surface sample data are stored in the North American Pollen Database. Surface samples for 174 sites in Alberta, Manitoba, Saskatchewan, Minnesota, Montana, North Dakota and South Dakota were used in this study. Climate data were acquired from the climate station closest to the lake from which each surface sample was taken. Information on the vegetation growing around the lake was compiled from ecoregion maps and vegetation descriptions. This calibration set was then used to infer the vegetation and climate associated with fossil pollen data groups.

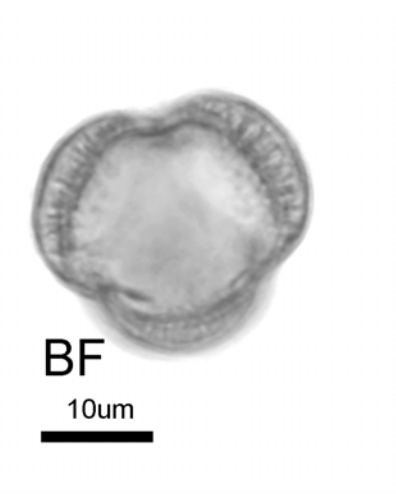
Pollen and Spore Identification

Each type of plant produces pollen that looks different, so it is possible to determine, based on how the grain looks, what plant produced that grain. Pollen and spores have outer protective layers that make the grains resistant to decay, and they can be preserved in lake sediments for many thousands of years.

Spruce (*Picea*)

Pine (*Pinus*)

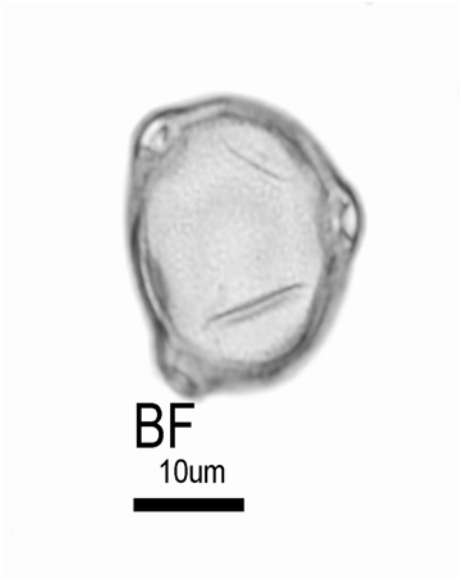
Sage (*Artemisia*)



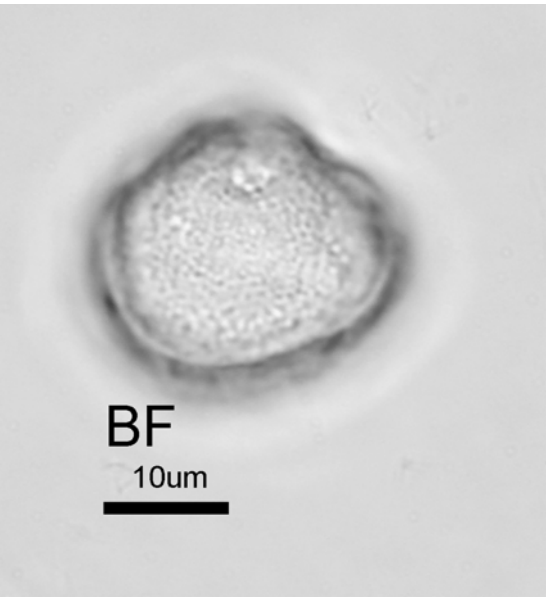
Birch

http://plants.usda.gov

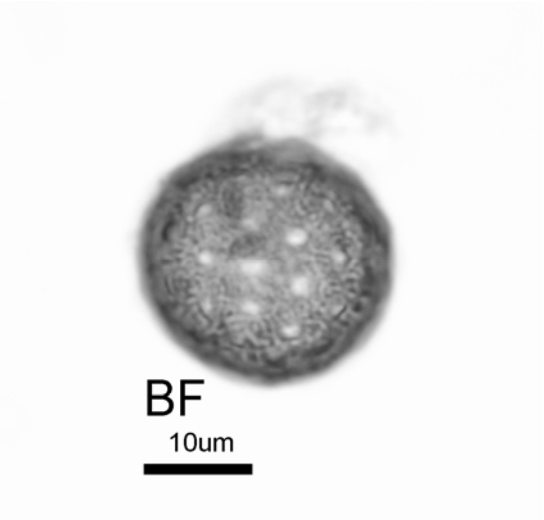
(*Betu*



Poplar (*Populus*)

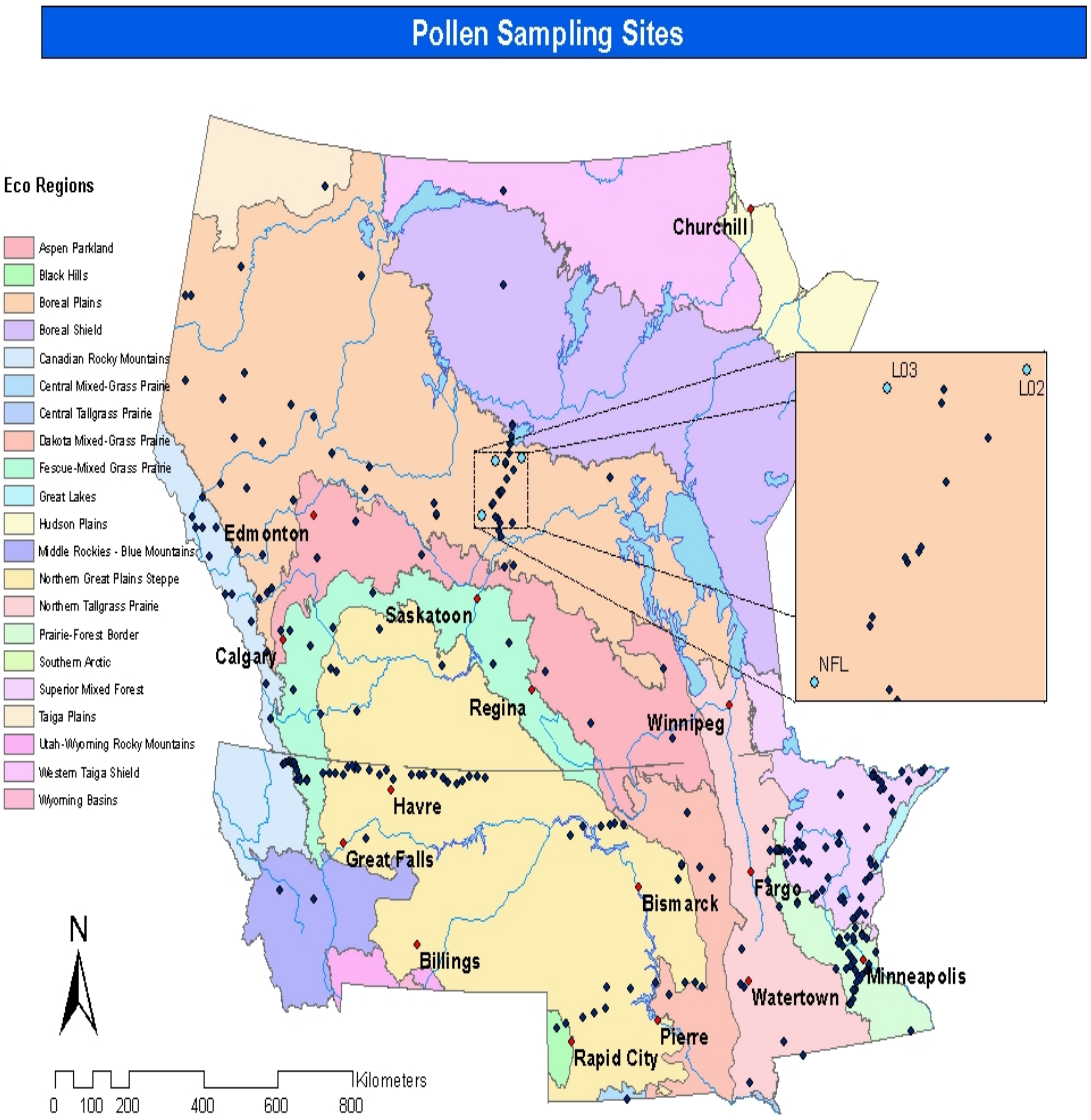


Goosefoot (Chenopodiaceae)



RESULTS and DISCUSSION:

Pollen Surface Sample Sites



The black dots on this map show the locations of the pollen surface samples in the context of the associated vegetation types across Alberta, Saskatchewan and Manitoba in Canada as well as in Montana, North and South Dakota and Minnesota in the United States. The key on the left hand side of the map identifies the vegetation types shown on the map. The red dots show the locations of major cities in the provinces and states. In the magnified portion of the map (smaller square) the light blue dots show the location of the lakes where the sediment cores were taken. Surface pollen sites were chosen to represent the range of fossil pollen groups that might be found at various depths in the lake sediment cores.

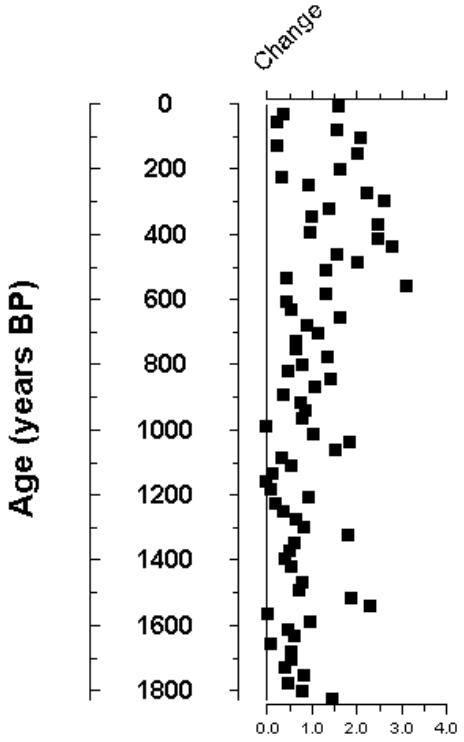
Pollen Records

1. Long Term Picture: The Last 2000 Years (North Flat Lake)

*See Appendix A – diagrams A1, A2 and A3

- prior to 800 years ago there were long periods of when the vegetation changed relatively little over time
- about 800 years ago there was a transition to increased variability over time in vegetation—this is supported by other studies (Woodhouse & Overpeck 1998; Stahle *et al*. 2000, Laird *et al*. 2003; Cook *et al*. 2004)
- this variability includes fluctuations between periods of wetter times and drier times; some of these drier times have been characterized as "megadroughts" by other scientists

Rates of Change



- diagram shows that there has been increased variability in the last 500 years
- greater shifts between samples in the last 500 years
- present predictions suggest that the vegetation change over the next 50 to 80 years will be outside the current range of variability

2. The Last 500 Years: More Detail (L03)

*See Appendix B – diagrams B1, B2 and B3

- timeframe shows in more detail the time before and after European contact, beginning with the fur trade
- mid-1700s a time of prolonged drought

- decreases in pollen suggest a time of drought in the 1850s
- decrease in pollen also appear as a result of the drought in the 1920s and 1930s
- droughts in this area were experienced in southern Saskatchewan – time period were there was the reactivation of the Great Sandhills

3. Transition to Agricultural and Forestry Land Uses: The Last 200 Years

*See Appendix C – diagrams C1, C2 and C3

- diagrams show, in greater detail, the effect of settlement and beginning of agriculture
- Zone 1 shows pre-agricultural forest
    - decrease in pollen production corresponding to the 1850s drought (around the time Palliser was exploring further south in the province)
    - Zone 1 ends when agricultural cereal grains first appear around the turn of the century and there are decreases in forest species pollen as land clearing occurs for farming
- Zone 2 has decreased pollen production particularly in the 1920s and 1930s, probably corresponding to the drought during the Depression but also probably reflecting land clearing for agricultural expansion
    - time line of this decrease also corresponds to development of more intensive agriculture
    - Zone 2 ends with the appearance of Russian Thistle (*Salsola*) another indication of intensive agriculture being well under way and land use changes
- Zone 3 has increases in forest successional species pollen such as Pine (*Pinus*)
    - decreases in pollen in the 1980s corresponds to drought
    - agricultural increase and land use change corresponds to a decrease in forest diversity (decreases in Larch, Willow and Alder and climax forest species) as land clearing progresses; probably also reflects warming and drying in southern boreal forest area
    - also see fewer native grassland species pollen (decreases in grass and Sage)
    - end of Zone 3, from the 1990s, have all pollen types decreasing; this may represent current global warming
- in the areas of the diagram where changes are observed there needs to be further research, especially to observed vegetation and climate changes
- times of change would be periods on which to focus questions for Elders

2.0 FOCUS GROUP METHODOLOGY

The methodology for this project adopted the model proposed by Ford and Smit (2004) to assess the vulnerability of indigenous communities to climate change and risks. Smit and Pilifosova (2003) have suggested that vulnerability is a function of a community's exposure to climate change effects and its adaptive capacity to deal with that exposure. Further, adaptive capacity is understood as the ability of a community to effectively plan for and cope with climate change impacts. Adaptive capacity is shaped by a number of interrelated factors, including the social, political, economic and cultural systems in place. In addition, the degree to which these systems demonstrate qualities of resilience, stability and flexibility will reflect their adaptive capacity (Smithers and Smit, 1997). For indigenous communities in Saskatchewan, adaptive capacity will be inherently linked to cultural traditions, and to impacts of colonization on those traditions. As noted by Ford and Smith (2004), "While indigenous communities have historically demonstrated adaptability to a variety of stresses, their coping abilities have been put under considerable strain by recent climatic and environmental changes" (p. 394). We would also argue that the adoption of contemporary lifestyles to the expense of traditional understandings of the nature and ongoing industrial-based resource exploitation in the region have further strained the coping mechanisms of these communities, potentially placing them in a more vulnerable position in relation to climate change impacts on health and livelihood.

Following the framework proposed by Ford and Smit (2004) this study was divided into two phases. The first phase assessed the current vulnerability of the two communities in relation to climate change by focusing on current exposures and adaptive capacity. The second phase assessed the future vulnerability of these communities by considering climate change projections, and future adaptive capacity based on past experiences and predicted opportunities and constraints.

Phase 1: Current Vulnerability
Documenting Current and Past Exposures

- Interview and focus groups were carried out in each of the two communities to document community members' experiences with and perceptions of climate change risks and impacts. Emphasis was placed on biophysical environment of cultural and economic significance, the aquatic and terrestrial resources and community health impacts.

In designing the interview and focus group sessions, emphasis was placed on Elder participation and knowledge. The interviews were semi-structured and ethnographic in nature. These technique have been successfully used in research documenting indigenous observations on climate and environmental change throughout Arctic North America (Ford and Smit, 2004). The focus groups and interviews were audio taped and later translated. The project lead, Professor Willie Ermine, is fluent in the Cree language and conducted the interviews in the language preference of the participants. The transcripts from the focus group were analysed using the qualitative data analysis software *Atlas.ti* using a grounded theory approach to develop themes and tease out relevant data. Next, all

the data collected were reviewed and units were sorted and assigned to the categories. Units that are selected from transcripts and serve as the basis for defining categories of concerns. The following criteria were followed:
(a) it should be heuristic – that is, the unit should reveal information relevant to the study and stimulate reader to think beyond the particular bit of information
(b) the unit should be the smallest piece of information about something that can stand by itself – that is, it must be interpreted in the absence of any additional information other than a broad understanding of the context in which the inquiry is carried out.
Large-scale maps were available for recording information, as maps stimulated discussion and are a means for documenting data (Berkes, 1995; Huntington, 1998: 238).

In addition, information on past exposures to climate and environment changes were derived from the paleoclimate studies in the regions mentioned above and gleaned from content analysis of the historical records of the Hudson's Bay Company (HBC) for posts nearest to these communities (notably, Fort a la Corne, Nipawin, Touchwood Hills and Cumberland House) to extract historical weather information for the 19th and early 20th centuries. Emphasis was placed on information pertaining to extreme weather events, and climate variability. This information provides the historical context to the current observations and oral histories of community Elders.

Phase 2: Future Vulnerability
Assessing Future Exposures
As noted by Ford and Smit (2004), "assessing future exposure involves collaboration with the climate science community to estimate the likelihood of changes in climatic attributes identified by the community" (p.396). Thus, information on past and current exposures, and the attributes of the local environment that are particularly valued by the community were combined with climate change scenarios for this region to assess future exposures and risks.

The nature of climate change and variability in the forest – grassland transition of east-central Saskatchewan are established from GCM-derived scenarios and paleoclimatic and instrumental records. These studies work to identify thresholds of climate variation, and especially severity and duration of drought, that results in significant changes in the terrestrial vegetation. Historical climate data on a 50 km grid, GIS and remote sensing facilities and a geo-referenced database of soil, topography and land cover are provided by PARC and the Geography Department at the University of Regina. These data and facilities enable the spatially explicit modeling of the climate sensitivity of terrestrial ecosystems such as those at Shoal Lake and James Smith. This regional scale of analysis and interpretation enables the detection of broad scale changes in plant distribution.

Assessing Future Adaptive Capacity

Following the assessment of future vulnerability, a related objective of this project was to work with the two communities of Shoal Lake and James Smith to identify possible barriers to or opportunities for future adaptations to the impacts. The format for identifying barriers and / or opportunities for future adaptations to impacts was in the

form of community presentations and discussions with the focus group Elders. The information gleaned on past responses to climate and environmental change as provided by Elder focus groups. Maps were presented to show potential changes to plant communities of cultural or economic significance, and water levels of the traditional territories. As noted by Smithers and Smit (1997),"the responses of the human systems are both reactive and proactive, incorporating environmental perception and risk evaluation as important elements of adaptation strategies" (p. 133). Presentation of climate change information at these gatherings allowed the communities the opportunity to develop proactive responses to predicted climate change impacts, based on their culturally shaped environmental perceptions and evaluation of the risks they will face in the future.

3.0 BACKGROUND

James Smith Cree Traditional Lands

The Elders of the James Smith Cree Nation brought to the focus group their vast knowledge of their traditional landscapes and a wealth of experience about their history. Most of the Elders approached the discussion on climate change from the touchstone of their traditional life and understandings. Most of the Elders grew up and experienced lifestyles closely connected to the natural environment through trapping, hunting, fishing and other means of their traditional livelihoods. They spoke of their natural environments with some passion as they described an almost carefree existence off a benevolent caregiver. Elder Alice Burns provides the following description:

> It used to be very beautiful and bountiful across the river for moving camp around. I remember that. My father went hunting a lot because he was a hunter. We used to go on berry picking camps, hunting and harvesting of medicine plants. We had a line of camps.

The Elders recounted that the people used to travel far and wide in their traditional territory to exercise their livelihoods. The Cree were in effect imprinting themselves to the natural landscape. The Elders spoke passionately about their relationship with the land bringing out the intimacy of that interaction. That intimacy was up close and personal with tastes and sounds. Elder Alice Burns recalls an event of this nature. She tells us:

> We were once returning home from Nipawin when my older sister got thirsty and my brother-in-law stopped on the wayside. We had wagons you know. He went to get a pail of water from the ditch because my sister was thirsty. Really the sound she made was startling because she had accidentally swallowed a little frog (ha, ha). Presently there is nothing like that anymore (ha, ha). It was because it was dark (ha, ha). There she was blowing on the frog (ha, ha). Yea, it was nice then. There was not any pollution.

The James Smith Cree shared the traditional lands with other life forms. The boreal forest harbored the wildlife they depended on for food and the natural areas also provided for their aesthetics. They approached this relationship with the sacredness it deserved because it was a trust they had with their higher power. According to one Elder:

> As Cree people we were given special gifts by the Savior, the Great Spirit, as they say, he said to me. That is what we were given. The One that owns us did not forsake us. He also gave us those things and looked after us.

The James Smith Cree felt attached to the land and had spiritual faith that their connection to the land would secure their future. This is the understanding of the sacred trust given to them.

Shoal Lake Cree Traditional Lands

According to oral history recounted by the Elders, Yellow Bear was the leader of the Shoal Lake Cree. He led his people out of The Pas area in Manitoba to their present territory of Shoal Lake. It was here that people found abundance in the forests and water that would ensure the life of their children. The land contained everything that the people would need. Gerald Bear recounts this history. He states:

> Yellow Bear also found beauty in this area of Shoal Lake and the hills that was called the Sipanok Fur Lease. There was abundance in this area for netting fish and medicinal plant harvesting. There was abundance for all those things that the Crees could use to ensure the life of their children and for their own lifestyle. All those things like medicine.

The Shoal Lake Cree place a very high value on the boreal forest and other natural resources of their territory. The Elders tell us that the Shoal Lake territory was an abundant homeland. What contributed to its abundance was the boreal forest. According to the Elders, the spruce trees were the medicine for the land and that all the land thrived because of these trees. In all this forested majesty, the Shoal Lake Cree speak of the aesthetics that the forested landscape provided. They saw beauty in their land. One Elder tells us that “everything though was beautiful and for our benefit. All the different types of trees were very beautiful at that place where we were.”

The leader also had consideration for the economic needs of his people. One of the criteria for selecting new land was its ability to sustain a trapping lifestyle. Elder Bear continues, “there was an abundance of martins, there were lynx, all these species that live in that habitat could be found there. Particularly martin was a favourite for trapping over there. This land was in abundance that is why our ancestors moved here.” Water was also a major consideration. In this pristine wilderness the water quality was a special gift that the people acknowledged. Elder Lillian Lathlin recounts the following:

> What we witnessed too is that water was in abundance and pure all the time because of the snow and this water too was good to drink.

> We did not have to boil it. We could drink this water anywhere anytime. This drinking water came from the hills. The creeks originated from the hills. We used to say that we were drinking Wacihk water. That was what they used to say about that water.

A protein diet, acquired from the wildlife in the territory, was the mainstay of the people and hunting was the primary means of this livelihood. Elder Bear tells us that, “there was an abundance throughout, especially in hunting. There were many deer, moose, bear, all those animals. They were there for the taking by the old people.” Trapping was also a vital survival and economic pursuit. Trapping was an important skill that everyone had to have for survival on the land. An Elder tells us that, “people trapped and that was how they provided for their children. They would move their camps around to various places. They had trap lines and that is how they raised their children.” Fishing was also practiced in the territory. For example, Elder Bear tells us that, “there was an abundance in this area for netting fish and medicinal plant harvesting. There was an abundance for all those things that the Cree could use to ensure the life of their children and for their own lifestyle.” There was so much abundance in the territory that the people considered themselves especially gifted.

4.0 RESULTS

4.1 Current Vulnerability

4.1.1 What have the community members experienced in terms of climate change impacts in their territories?

The James Smith Elders tell the story of deep snows and cold weather, of dried up earth and dried up lakes. It told of flooded rivers and treacherous ice flows. The story spoke of massive winds and hail storms so severe it that killed ducks. It spoke of a depleted boreal forest causing a shift of animal range and missing birds and animals. The story is told of human induced climate change but the James Smith Cree also spoke of important cultural resources that offer hope.

In Shoal Lake, the story was similar with accounts of deep snows and the experience of houses half buried from snowstorms, of dried up earth and dried up lakes. It told of flooded rivers and alternatively creeks going dry. The story spoke of missing thunderbirds that brought rain and the declining water quality on the land, it tells the story of an altered boreal forest causing the loss of birds, animals and plants. The story continues with industrial activity virtually wiping out the livelihood of a once independent people. Environmental and socio-cultural changes did indeed happen to the people of Shoal Lake but the Elders also speak of important cultural strengths that guided the people in the past.

James Smith Climate Change

The Elders said that the weather had changed considerably over the course of their lives and outside the range of variation they would consider normal. These changes cause concern. As an example, Elder Albert Sanderson tells us that, “this weather is a constant worry of mine. It is true that it has changed. The weather has changed a lot since I was young. It is considerable.” The Elders remember that the winter norm was cold and deep snow.

The Elders also remember a time when the earth dried up. The lakes went dry because of the drought. The Elders said that the land was so dry that it was no use planting crops, so the farmers in the surrounding area spent their time hunting. Indeed the boreal forest was the saving grace during this time of drought. The drought itself had limited impact on the community people because of their hunting lifestyle. Elder Mervin Burns remembers that “we did not suffer these hard times. We had plenty to survive on that time. There not that much farmland but there was plenty of forestland.”

The Elders also recall times when there was an abundance of water, particularly during the spring thaw and the break-up of ice. The moving lifestyle of the James Smith Cree was at times affected by the Saskatchewan River ice flows. However, the Elders stated that the river ice flows were included in their contingency planning. Elder Burns states that, “the Cree always planned ahead when they got to the river. There were canoes waiting for them there. They left their horses there. They were not taking any chances.” Similarly, the trappers had to contend with the spring thaw and the deepening water levels of the various creeks and rivers in the territory. Deep flooded rivers were difficult to cross with a load of winter’s harvest of furs. Nevertheless this was considered a way of life for the trappers. One Elder tells us that they came home on horseback in the spring crossing all those creeks. All the creeks were flooded and they had a hard time crossing because they were carrying their winter’s harvest of furs. For the James Smith Cree, this was the way of life. The Elders interpreted excessive moisture such as flooding rivers and considerable rains as a positive event. They attribute this as a cleansing and a flushing by Mother Nature. Elder Riley Burns remarked that, “the Creator Mother Earth is cleansing herself, washing herself, to make herself clean of all the mess we made with her.”

Some of the changes to climate had been predicted. Elder Riley Burns remembers his grandmother telling him that, “there will be massive winds, there will be massive rains because there is nothing to hold these back. There are not trees to hold back the forces, she used to say.” Indeed, Elder Albert Sanderson remembers massive winds and torrential rains occurring in his time. The massive wind was so severe that it knocked down trees. He states:

> We never used to see those massive winds but I did see the massive wind come down once where I was working. The massive wind knocked down

> huge trees. It was already a time they started clearing the forests. I used to wonder why these things happened, that the massive winds would come down.

Elder Riley Burns also remembers a hailstorm so severe that it killed ducks. He states:

> After it was over, as we were sitting there in the middle where we were protected from the storm. The tent was opened to reveal the amount of ice that had fallen. It was at that point that my grandfather said that we should be on our way. We then went around picking up the little ducks that had been killed by the hail.

James Smith Environmental Changes

The James Smith Elders talked about the effects of industrial activities and the impacts of disturbed forests in their territory - in the same breath as that of climate change. The alteration of the boreal forest through forestry practices was an environmental perturbation that caused the movement of animals, so important to the Cree lifestyle, from their traditional territories. The James Smith Elders state that the alteration of the boreal forest caused the depletion of animals and birds. Elder Mervin Burns states that, "lots of birds are missing…we have lost a lot of animals and birds." The Elders said that these activities disrupted the natural patterns that took many years to establish. For example forestry and mining activity causes animals to leave their former habitat and start wandering into human spaces. The Elders state that the animals are crossing the river and going south into farmyards. For the James Smith Cree, the clearing of forests was the trigger for the socio-cultural changes that would happen them.

The Elders also said that the change of climate is also a portent for the change of the human being. The alteration of the balance in nature is similar to the slow moral decline of the human species. The Elders state that we need to refocus our humanity and go back to understanding the land. As Elder Riley Burns stated:

> It is just like killing a caribou. It runs in a circular pattern. That is where the human being is also walking. We have lost the way because we are not paying attention to our direction. That is what we have to try and learn. To learn how the land is producing weather.

According to the James Smith Elders, we are forgetting the basic condition of our humanity as we scour the issues and solutions to climate change.

Shoal Lake Climate Change

The Elders from Shoal Lake have also experienced climate change that is without precedent in their territories. However, the Shoal Lake Cree were not uniformed about the environmental and socio-cultural shifts that would happen to them. The Shoal Lake Elders talked about their old people's predictions about coming environmental changes

and the socio-cultural shifts that would happen. Elder Lillian Lathlin tells us that, “they predicted that in the past, that strange occurrences would be part of the future. They say that our land is going to dry up.” The Elders knew of these prophecies told by their ancestors regarding the changes that would happen on their land and with their people. Indeed the Elders experienced much of the change in climate in their own life times.

One of the Elder memories of environmental change goes back to a time when the earth was drying up. In fact the name of the lake derives from this time. Elder Lillian Lathlin remembers her father telling her that “our lake went dry at one time and therefore that is where it got its name from – Shoal Lake.” She remembers the narratives that told about the animals suffering in that drought. Her father had told her that the “buffalo came down from the hills because the hills were dry as well. They looked like a string as they came down the hills. They reached the lake where they lay exhausted because there was no water.” There was drought on the land and the lakes dried up. The Elders themselves could not remember this time and that it happened “a long time ago.”

The Elders did remember times when there was considerable moisture on their land. One Elder recalls that, “everything was in abundance long ago because we had quite a lot of moisture coming from the skies.” Elder Lillian Lathlin remembers that, “It used to rain lots in the past. The thunderbirds were also very vocal and pleasing to listen to in the summer time.” Wet years were also marked by excessive snow amounts. Elder Gerald Bear remembers the year 1967 when there was a huge snowstorm in their territory. He states:

> I wanted to talk about the memory of the winter storm of 1967…It stormed considerably that time and there was very little visibility. We were living in this shack with the rest of the household. Half the house was buried in the snow that time. We could not even open the door when we tried to get outside. The snow was clearly visible through the window. The snow was so deep from the storm.

The abundance of moisture had diametric effects on the people of Shoal Lake. On one hand the moisture produced lush vegetation on the land. One Elder recalls that, “everything had a rich growth. That is what I can remember about the growth.” There was also the opposite effect in that the considerable amount of moisture on the land caused by the rains and snow made it difficult for the families to secure their survival needs. Elder Lillian Lathlin remembers that, “it was very challenging if they did not kill anything in their hunting quests. We would go hungry at these times. When the lakes and streams flooded that was when these hardships started happening.” Following the moisture-laden years of the 1960’s, the Elder tell us that they haven’t seen the same significant amounts of moisture. This gradual shift of climatic events from moisture-laden years to the lack of precipitation also presented its own set of problems to the Shoal Lake Cree.

The Shoal Lake Cree have recently started noticing the effects of a gradual shift in climatic conditions on the environment. For one thing, the Elders state that the lack of

moisture on their land resulted in increased cold weather. Elder Lathlin states that, “We are indeed seeing the shift of everything. Everything is starting to happen. The summers are cold and the winters are cold too. The climate is not as it was in the past.” The lack of moisture from the skies results in creeks drying up and the concern that there will not be any water in the future. The lack of moisture is also affecting the trees in the boreal forest. One Elder has noticed that the trees in the territory are drying up and that this never used to happen long ago.

The Shoal Lake Cree were informed long ago about the eventuality of these environmental changes. The Elders talked about their old peoples’ prophecies and how they foretold of the land drying up. Elder Lillian Lathlin remembers:

> That is what the old people used to predict in the past. Just like we said that the land is going to be dry. We see that already. There is not much water in the creeks. When we travel to the Pas, the streams coming from the hills are really dry with only a trickle of water running in them. This is a sign that water is declining and getting polluted.

The climatic events that are discussed above did not seem to have significant impact on the health of the Shoal Lake people. Climatic and seasonal changes to the weather, even if they were unprecedented, were a part of the flux that the people had to live with in the natural environment. It seems that these impacts may not be life altering but nevertheless caused physical hardships such as hunger. For example, on the physical level, climatic events, such as excessive water, impaired community members from pursuing their livelihood activities such as trapping. These excessive amounts that led to flooding made it difficult for trappers and hunters to secure their survival needs.

Both communities of James Smith and Shoal Lake experienced almost similar climatic events in their respective territories. They experienced period of excessive water and alternately periods of drought. They both experienced the loss a pristine boreal forest and the imbalance of wildlife numbers and distribution. Both communities started experiencing changes dating to the 1960s and in both communities the ancestors had forewarned the people about the eventual changes.

4.1.2 How has climate change impacted the health of community members, recognizing that the natural environment is one of the key determinants of holistic health?

From the Traditional Economy of the James Smith Cree

The traditional economy of the James Smith Cree kept the people in good health and any changes to the environment will affect that crucial dependence. The traditional economy consisted mainly of hunting, trapping, fishing and harvesting of natural resources. Community health was maintained by this economy and hunting was the primary lifeline for many of the families. They hunted moose, deer, elk and a variety of smaller animals

that roamed the range of their traditional territory. Trapping was a mainstay for producing income until recently. In fact one Elder recalls that, “it has only been about twenty years since we still had furs to sell.” This seasonal activity of trapping, producing and the selling of furs was the only means of income during a time of no assistance from government. One Elder remarked that, “there was no money. There was no source of income and we had to make our own living in our own ways.” The James Smith Cree also made a living out of the harvest of natural resources in their areas. They not only harvested foods such as berries and medicines for personal use, but also for the sale of those products. For example they harvested Seneca root for its sale value. The Elders also talked about maple production. One Elder tells us that:

> The making of maples sugar too I watched. These were the same elders that brought me up. There was an abundant supply of the Manitoba Maple along the Carrot River. They used to ride around there on a stone boat hauling the sap, gathering the stuff in pails to boil until it forms into sugar. That was another way they lived.

The Elders also discussed utilizing resources from their land to create additional forms of income. The Elders talked of cutting and producing cordwood to sell to the local market. As one Elder recalls, “we lived by the forestry where my grandpa cut the wood, popular wood. Cut them by four feet and would sell the wood.” They also took part in the forest industry by peeling logs. More recently, the Elders talked about newer economies such as carpentry and the introduction of farming and the creation of field crops. Picking roots in these newly created fields and working for local farmers was also a way to make additional income for many. Eventually many families in the community took up livestock farming.

To Impacts from Changes

The Elders state that individualism and individual gain seemed to take hold with the introduction of agriculture and the clearing of forested land. The new focus was now on the creation of individual wealth, the value of money and how to make income from the agriculture. This central shift changed the lives of the James Smith Cree. According to one Elder:

> When they cleared our land, all of a sudden the men woke up. They are called surveyors. Everybody had a surveyor. The Crees are now standing around doing the surveying and claiming the land. That is where all the disarray started. Money was present in that disarray. We gave up this land so we could receive money. We are paying for that today.

The psychological shift that occurred from a life in harmony with nature to market economy was not altogether unforeseen. One Elder remembers the words of the old people that, “money, as it is called, is going to mislead you. She used to say that you will think it is powerful at the same time as you think lowly of your fellow human beings.”

The Elders saw the changes occurring with their people. One Elder stated that, “it is the money that is causing us harm.”

Indeed, the James Smith Cree Elders know that a great socio-cultural shift has occurred in their people. This shift is marked by a discontinuity of a culture. They see the shift in the new ways of the young people. The youth of the community do not know about the traditional past and the passionate relationships the Elders had with the natural world. The young people do not know that their ancestors depended on the land for survival. The Elders anguish over the fact that the knowledge that so passionately guided them is now lost in the minds of the young. One Elder tells us this anguish:

> Life has changed. The children do not even like the taste of dry meat soup anymore. I purchase the dry meat from the old ladies out west to make soup. It is not to be. The children make facials, as they taste the soup even though it is very delicious. They do not find it delicious and that show how their lives have changed form ours. They prefer the taste of hamburgers and do not like the taste of meat.

The Elders suspect that the change of diet has implications on the health of the people. One Elder remarked: “The one thing I am thinking about is the food we used to eat long ago because today there seems to so much diabetes. And I don’t think people used to have diabetes long ago.” An increase in diabetes is one the impacts from a shifted economy and changes in lifestyle for the James Smith Cree.

The Elders feel that they have forsaken the children for the sake of money. Their concern also is that they are starting to lose the youth to various addictions such as to drugs and smoking. Indeed one Elder states that this has already impacted their community youth. He states, there are young women that are having babies with abnormalities. It is because of the use of chemicals such as smoking and drugs.”

Shoal Lake Cree Health Impacts

The Shoal Lake Cree also depended on the natural environment for their health and its maintenance. Since the natural environment is one of the key determinants to the holistic health, any shift in that natural world will be acutely felt. The Elders remember the many experiences they had living in their natural environment and the kind of foods that were readily available in that existence. The land provided a varied menu and many of the Elders talked about the kinds of foods they ate in that traditional environment. They spoke of killing moose, deer, bear, muskrats, beavers and ducks, for their daily cuisine. They also spoke of harvesting muskeg tea and the various kinds of berries and storing them for winter use. Elder Lillian Lathlin tells us that:

> We used to move our camp up to the hills gathering raspberries, chokecherries, blue berries, all the different kinds of berries that were harvested at the time. They dried some of these berries and ate those during the wintertime.

Storing and preserving food during a time before refrigerators was a special skill that the people had. The Elders talked about drying meat and the producing the highly valued and long lasting pemmican that could be made out of the various meats they acquired. They spoke of stored moose grease, or lard, as one Elder called it. The Elders also remembered making duck grease and storing it in different containers for winter use. The Elders experienced the times when they had to dig root cellars where they could store everything like berries and various meats. They also remember observing their old people putting meat into bags and adding salt for preservation. They were also shown how to prepare the food for eating. Elder Phyllis Flett remembers that they also made maple syrup. She recounts:

> She used to go and make maple syrup there. We went berry picking all the different kinds of berries. We made sugar every spring. She never forgot to do this. We spent a week or two in this sugar camp. We pitched the camping tent whenever there were many maple trees.

It is true that the land gave life to the people.

As time marched on, with the advent of new influences, the people slowly adapted to new ways of food preparation. Some families had farms and kept animals such horses that were used for burden and cows that were used for their milk. The Elders remember that people were provided with plows, harrows and disks for creating gardens. The Elders indeed spoke of gardens and the distribution of potatoes to needy families. One Elder said that, “no matter how far these gardens were they were not lazy to go and tend to their gardens.”

It is perhaps during this time that the Elders recall the introduction of rations, or food supplements that the less fortunate families received. Rations, seen as a form of welfare by the Elders, were distributed through a local store. These rations consisted of non-perishable items such as canned meat, bags of biscuits, beans, rice, salt bacon, sugar, baking powder and flour.

The eventual shift in lifestyle brought on by the arrival of contemporary influences to the community of Shoal Lake also has its effects on the health of the people. According to the Elders, a transformed diet resulting from changed lifestyles is a health concern, particularly in how the youth would be affected. Shifting times also marked shifts in health for the younger generations. Elder Phyllis Flett informs us that, “there are many sicknesses now. Sugar diabetes is getting rampant. Diabetes is steadily growing because of leisure living and laziness with nothing to do.” The convenience found in contemporary lifestyles also creates the worry that cardio vascular conditions may increase. Elder Flett also points this out. She states, “with no hesitation they step out and everyone jumps in the vehicle as they leave to go somewhere. They should also occasionally; people should walk, in a right way. It is good for the heart. The heart will work properly.” This shift from natural foods to a rationing and neo-welfare lifestyle had

a long-term effect on the people of Shoal Lake. This was not lost on the Shoal Lake Elders.

Both communities of James Smith and Shoal Lake depended on the natural environment for their economies and for their livelihoods. The shift away from the land caused a cultural discontinuity from the old to the young. The Elders in both communities saw the shift of diets from natural foods to contemporary forms of processed foods. Both communities also experienced increases in diabetes and other forms of ill health, which they attribute to the shift in lifestyles - particularly with the youth.

4.1.3 What features or resources of the traditional territory are highly valued, and to what degree are those features or resources at risk to climate change impacts?

Historically for the James Smith Cree, the medicinal plants growing on that land were the most highly valued resources of the traditional territory. Similarly, the Shoal Lake Cree valued the boreal forest in their traditional territory for all the resources it provided them to sustain their balance and way of life. Any changes to the environment would alter the continuity of how people used the land and its resources for their livelihoods and health maintenance.

Medicines of the James Smith Cree

The medicinal plants of the James Smith Cree were a highly valued resource. The Elders talked about the old people ranging far and wide to harvest medicinal plants that the people used. Elder Riley Burns states that, “there was an old man…he travelled quite a bit with that old man as they went around harvesting medicinal plants long ago. That was what they did.” The knowledge of medicines and which plants to harvest was passed on from the old people through the oral tradition. The old people provided instructions regarding the proper use of the medicinal plants and that the instructions were elaborate with a special emphasis on the plants to be treated meticulously because of their sacred nature. Elder Riley Burns remembers that:

> My grandmother would come to get me whenever she would harvest those medicines. I did not write them down. I would assist her to clean them thoroughly. She handled them carefully on a cloth such as this white cloth here. Her medicines were clean. There weren’t any unclean medicines. She cleaned all of them carefully. These are the medicines that you have to look after she used to say.

The Elders spoke of various medicinal plants that were used for different purposes. The healing properties of the medicinal plants were very powerful. Elder Clifford Sanderson relates the power of the medicines that the James Smith Cree harvested and used. He states, “the Cree medicines are very powerful. The Wiykees is very strong…I was gifted to use the Wiykees to rub with as I recited the sacred prayer.” Indeed the Elders discussed different plants for different conditions. There were certain medicines that were used to

cure cancer. Other medicines were used for the treatment of tuberculosis. The James Smith Cree also used a salt that was dug from ground as medicine. Another Elder recalled a particular medicine that could be used for couples that were infertile. He states:

> Tommy told me that his grandmother used to take medicinal plants at that place called river flats. I will take you there sometimes he had said. He was going to show us that medicine that can be used for those woman and men that cannot have any children, If you want a boy or a girl can be determined by how the root of that plant is picked.

This highly valued feature or resource of the traditional territory is at risk to the impacts of climate change and particularly to the impact of industrial activity in the territory. Industrial activity in the territory prompted one Elder to state that the 'white people' were ruining the natural sites for medicinal plants. He states, "it is true the white people are ruining everything. We are losing our medicinal plants. They aren't that numerous anymore" Clearing of forested areas has also depleted the resource leaving only the natural areas to contain certain medicinal plants the people can use. One Elder stated that, "there are areas that are not cleared where some of the medicines grow." One Elder said that the location of a particular medicinal plant is now a gravel pit. He states, "that area must be all dug up now because there is a gravel pit where that old lady used to harvest her medicines."

Traditional medicines are a vital resource for the James Smith Cree to maintain the health of their people. There is some hope in that the memory of the plants is still with the Elders of the community and also that many of the plants can found in the remaining natural lands of their traditional territory.

Shoal Lake Cree Medicines

Plants used for traditional medicines were a highly valued resource for the people of Shoal Lake. The oral history of the people states that the old leader Yellow Bear came to this area partly because the territory harboured many medicines in their various forms. The people had knowledge about the various plants and according to the Elders, "they knew what the flowers looked like on different plants like the bear bushes and other medicinal roots." Elder Lillian Lathlin also recalls that she used to go around with her mother to dig out plants for their various ailments. She states:

> I used to go around with her as she dug out medicinal plants in the area of forest we were at. They used to say that there were many medicine plants growing. We were treated with those medicines medicinal plants for our various ailments.

Elder Gerald Bear recalls that the people "harvested very good medicinal plants in the Wacihk area for their use. These were the things Yellow Bear came here for."

There were also lakes in the Shoal Lake territory that had medicinal quality. Elder Gerald Bear speaks of a particular small lake that had medicinal water. The narratives of this little lake recount how a large frog lived in that small lake and that it influenced the healing nature of the water. People wading in that water were healed of their condition. Elder Gilbert Flett tells us:

> That water is good. There were two young children that were healed by this water. They used the salt water to wash their faces with. This medicine is good and can be warmed up for use. It is a good little lake. No matter how sick you are with a cold, this water can heal your cold by the next morning.

The Shoal Lake Cree were passionate about their forests and they spoke of their land in ways that honoured its presence. The Shoal Lake people honoured the forests for providing them with abundance and for giving them health and well being. They valued the forests and the medicinal plants in their traditional territory to a high degree. Those forests and all they provided are now at risk to climate change impacts and particularly to human induced changes.

Both the James Smith and Shoal Lake communities placed a high value on the southern boreal forest with its abundance of medicinal plants. The boreal forest harboured the natural resources they coveted to maintain their health. The Shoal Lake Elders spoke of the abundance that placed on their lands for their use. It is also on these sacred lands that the people's medicinal plants grew. Both the boreal forest and the use of medicinal plants contributed to the health of the people and any change in this natural balance made the people susceptible for impacts.

4.1.4 Have the communities experienced significant environmental changes or events in recent times and/or in previous times, as suggested by oral histories and traditions?

The James Smith Cree Elders see that climate change is about human induced changes to the environment, which in turn cause perturbations that affect their people. They talked about industrial activities and the deterioration of water quality. The Shoal Lake Cree similarly discussed the loss of pristine forests as the single most detrimental change that happened in their territory.

Industrial Activities Affecting the James Smith Cree

Industry has also caused significant perturbations to the environment that have stressed the health of the James Smith Cree. They talked about the operation of the Prince Albert Pulp Mill and the effect it had on the taste of fish in the Saskatchewan River. One Elder remarked that "there was somebody that netted fish there…they did not taste good but rather like Lysol. Those gold eyes tasted like that."

The exploration for diamonds and prospect of mining in the territory is also a cause for concern. The James Smith Cree stand to gain economically from mining activity in their traditional territory but the concern for the Elders is how the outside influences will impact their social equilibrium. For example, an influx of money from mining may alter their social equilibrium with the affect on the long term healthiness of the community. According to Elder Riley Burns:

> There is now something else. We are now looking under the ground to see how we can make money out of that. It is true. We will be able to make money out of that rock or what ever it is that is there. We are however also attracting another new sickness from that process.

Another concern with a proposed diamond mine is the effect that such an operation would have on the environment. Some Elders were shown the exploration site and they reported that the total area required for a mining operation would devastate the natural area with no prospect of regeneration once the mining is finished.

Another component of industrial activity is that of farming and specifically the effect of chemicals used in crop spraying. Elders take issue with the notion that spraying is good agricultural practice because is helps develop good crops. However it is the harmful chain of events caused by chemicals that the Elders are concerned with. Elder Riley Burns tells us:

> The white people say that the chemicals sprayed on the land are not harmful. They say that it is good. However, walk those areas after a rain, around those sloughs and you will see the state of the water. That is where the animals will drink from. The flyers will drink that water. We then eat them and we start to get sick because the animals and birds are sick.

The Elders are adamant that industrial activity causes disruption to the natural environment that their local people depend on for their livelihoods. The prospect of continued developments such as mining and nuclear power are disconcerting to the Elders because of their disruptive effects on the natural environment.

Deteriorating Water Quality

Water was the lifeblood of an indigenous people that moved from camp to camp pursuing the livelihoods of trapping, hunting and gathering in their traditional territory. Good, clean water was important for not only drinking but also for other pursuits such as washing clothes. So it is for the James Smith Cree. Elder Alice Burns informs us:

> People used to get water from anywhere at that time. Anywhere. You could even get pails of water from the ditches along the road. One could get water from the forest. That water was really good because it contained leaves. That water was soft and used for washing clothes.

Over the course of the Elders' lives, the water quality in the watersheds of the traditional territory had deteriorated to the point that the water is now unsafe. This has led to a dependency on outside sources of water. For example, the Elders are astonished that water has to be purchased from other sources in order to drink. Elder Alice Burns continues:

> Presently, you cannot even taste water. You have to buy your water presently. The water is very unsafe. All things like that are unsafe. I never used to think that I would have to buy water because we used to take our water from anywhere.

The Elders state that there are several contributing factors to the water deterioration in their territory. One is the preponderance of farm chemicals being used to spray crops in the area. One Elder remarked that, "there are too many chemicals used in agriculture. Those chemicals used in farming are very destructive." Another Elder also pointed a finger at the cattle pasture on their lands as the source of contaminated water. He states:

> The pasture situated on our reserve, that is where we are getting our water from and there are cattle there. They are contaminating our water already. The land around there is being trampled and this polluted water is seeping into our drinking water.

Industrial activity and agricultural practices in the territory are perturbations that the James Smith Cree are contending with. The full impact of these activities is yet to be determined but the people are already seeing the implications of altered environments.

Shoal Lake Environmental Changes

The oral history indicates that the leader Yellow Bear and his people fled the east because of the forestry clear cutting. The people lived in fear of an industry that would wreak so much havoc to the natural environment. Yellow Bear provided the hope that the people, along with their livelihoods, would be able to elude the forest industry forever by moving into the Shoal Lake area. It is true that for a long time the industry did not arrive in the area and the people lived in general contentment for many years. However, as Gerald Bear tell us "they eventually came." The people knew their lives would be disrupted once again.

Indeed, with the arrival of the forest industry and the practice of clear cutting of forests on their land, the Shoal Lake Cree's culture was immediately impacted. It started with the construction of highway 55 that leads to the communities of Red Earth and Shoal Lake. One Elder tells us that "now there is nothingness ever since the white people built roads." With the construction of the roads, the major assault on pristine forests was underway.

The water quality in the territory was the first to suffer in the disrupted land. The Elders have seen changes happening to water and have clearly indicated that the loss of water quality in the territory was a result of clear cutting. One Elder tells us that, "the water is

presently unclean. This is the result of clear cutting of our spruce trees." According to the Shoal Lake Cree, with forest clear cutting also came the devastation not only to their water but also to their lifestyle and to the habitat of the wildlife they shared the territory with. Elder Bear states that:

> We now know the devastating results of this mass clear cutting of our spruce from the lands…Some animal species are also declining in numbers and getting sick. I know that all the different animals are getting sick because they lack proper feeding.

Elder Emil Flett tells us that birds in particular have disappeared from their territory. He states:

> Birds, robins and killdeer are no more. The nighthawks we used to see in the evening are not around any more. These bird hawks are also in decline. Redwing blackbirds are no more. The yellow-headed blackbirds are also gone. They used to flock around our campfire where we occasionally sat to listen for them. Now there are no more of those. I can't figure it out. They are all decimated.

The last word on this should go to Elder Gerald Bear. He states that, "when the white people broke the forests, they also broke our way of life. Our medicines, animals, birds, everything was destroyed."

The James Smith and Shoal Lake Elders discussed issues concerning industrial activities on their traditional territories. The James Smith Cree were historically affected by farming practices and forestry and the recent emergence of mining activity in their area. The Shoal Lake Cree spoke mournfully of the clear cutting in their territory that virtually wiped out their livelihoods. Deteriorating water quality in each territory was the common by-product as a result of the significant environmental changes that occurred in each community.

4.2 Current and Past Adaptive Strategies

4.2.1 What are some of the ways communities have dealt with environmental change in the past?

The James Smith Elders spoke of survival skills that made the people adaptable to the natural environment. They spoke of default skills such as natural food preparation as an alternative should modern dependencies fail such as the use of electrical power. They believe that these survival skills are still relevant today. The Shoal Lake people also experienced major disruptions in the past. They recount their history about seeking new land in the face of human induced changes to their former environment.

The James Smith Cree: Survival Skills

One of the significantly important way that the Cree of James Smith have dealt with environmental changes in the past is through the development of hardy survival skills to adapt to the vagaries of their traditional territory. The Elders tell us that the hardy survival skills were necessarily a part of the cultural development of the people and they are an example of how the human being can be tuned to the natural environment. Elder Riley Burns tells us that the old people of the past used to look into the future. He said that they were gifted with the knowledge and skills to survive on their lands. The James Smith Cree had all the necessities that they required to live in the place destiny had placed them. Indeed, the James Smith Cree had to make a living in their own unique ways during a time when there was no source of income and only the vast expanse of their territory to live by. Elder Joe Brittain tells us that,

> There were many occasions where I went with my cousin to go trapping. We had great difficulties because everything was challenging at that time. There was no money. There was no source of income and we had to make our own living in our own ways.

One of the requirements for living off of the land was the acclimatization to the prevailing colds of winter. One Elder tells us that the old people used to live outdoors, camping for weeks at a time. He states that the old people used canvas to sleep outdoors in the wintertime. The people became hardened by this kind of life that is now a waning skill in contemporary times.

Knowledge of animals in the natural environment was also an essential skill to have in the life of trappers and hunters. The difference between success and starvation was dependent on a good mind about nature and awareness to the behaviour of animals on the land. Elder Riley Burns remembers the words of his grandfather. He states:

> You will know when to trap and when not to trap. If it is extremely cold you can pull out all your traps because none of the animals will stir. In fact you should also stay put because it is cold he told me. When it turns warm, then that is the time, my grandfather used to say. That is the way to make a life. You have to have a good mind he said. Don't walk around unaware.

Another of the survival skills that the Elders discussed was the ability to improvise or be creative in their interaction with the natural environment. One Elder recalls that they were hunting from camp to camp and they found out that they had no matches. He continues, "It was then that my father would move around with sparks in a pail. They then carried that fire from camp to camp. There were no matches available."

Another of the major skills required for surviving on the land was the ability to process natural foods in an age before refrigerators and superstores. The Elders spoke with pride about their abilities to provide for necessities. As one Elder stated,

> They used to haul meat from across the river and I was part of that activity. It is at that place where they used to pluck the ducks, as they used

> to say. That is where they used to bring many ducks for smoking. They used potato bags for the meat to be smoked in. There were all kinds of meat like ducks, elk and moose. There was an over abundance of hauled goods to bring home like berries and medicines.

The preparation and assembly of food stock was so valued that it became one of the highest priorities for the people. Elder Riley Burns tells us that,

> They were trained and they were taught how to prepare the tribe for food preparation and other things like sewing. This is what my grandmother used to say. When you have a partner always plan ahead. This will be your highest priority. To assemble food stock so that is something happens to you or if you get sick, that food will be in place for your children and grandchildren to eat.

The continuity of planning and preparation skills is still evident in the James Smith Elders. The Elders spoke of food resources that came from their natural environment as they moved from place to place all over their traditional territory. The spoke of eating rabbits, gophers, ground hogs, ducks, deer, moose, along with plants and fruit such as wild onions, blue berries, choke cherries and cranberries. Fish netted off the Saskatchewan River and in the numerous creeks and lakes in the traditional territory was also a staple diet. A high value was placed on the availability of food so that the children and grandchildren would not go hungry.

The development and ingrained attitude of food preparation may have been borne from particularly harsh experiences of winter months with its deep snows or other unforeseen perturbations the Elders had experienced, but nevertheless still relevant today. Elder Mervin Burns provides a rhetorical question in this regard. He states,

> We survived like that too. But today when I talk to my grandchildren and great grandchildren, boy do they ever make a face when I tell them we ate gophers. They think I'm telling lies. What's going to happen to these people if something very desperately happens to this country? When the power goes out the white man is in trouble.

The Plight of the Shoal Lake Cree

One of the ways that the people of Shoal Lake have dealt with environmental change in the past was to move into new territory. The oral history of the people of Shoal Lake, as recounted by Elder Gerald Bear, tells of a people in flight and seeking new land. The Elder tells of the families that were a part of this movement. They came from various homelands such as The Pas, Nelson House and Oxford House in Manitoba. Families such as the Youngs and the Heads were involved in this exodus from the east. It is said that they all followed the old leader Yellow Bear as he fled from white settlers and the forestry activities that were taking place in their old homelands. The Shoal Lake area was their chosen location. Elder Gerald Bear states that old leader led his people into the

Shoal Lake area because it offered them all the natural resources needed to make a living off of the land. They found comfort and abundance in the area.

Other accounts of how the people from Shoal Lake dealt with environmental changes speak about flooding and how the people built houses on higher ground. Elder tells us that, “the houses did not get flooded. We were not evacuated. We stayed on the reserve because our doorsteps were built up high. The doorsteps looked like platforms.” Floods were more of an inconvenience. As Elder Jean Head tells us, people had canoes during flood periods. She states that, “there were floods in two places at Red Earth. It was called Wynock and that is the direction I used to live. It was difficult because we used to cross the river by canoe to go to the store.”

The Elders of the James Smith Cree Nation spoke about the skills that were required to live with nature and without contemporary convenience. They spoke of physical body conditioning required for outdoor living and survival skills such as food preparation without the use of modern luxuries. They recognize that these are default skills people will require in the event of modern crisis such as power failure. The Shoal Lake saw the need for a natural pristine environment to sustain a particular way of life linked to the land. They contended with natural variations in climate and adapted to its predictable vagaries such as building platforms for flooding. Human induced changes to the environment such as forestry were more difficult to handle because it destroyed balance in nature.

4.2.2 What are some of the strengths in the community that contribute to resilience, stability and flexibility?

The James Smith Cree are adaptable. As Mervin Burns states, “we’ve been adapting to this our country for thousands and thousands of years. I think we are adaptable.” The Elders recount the legacy of the old people from the community as a source of inspiration for adapting to eventualities. The Shoal Lake Cree’s resilience comes through in the historical reconstruction of their experiences and they find similar contemporary pride in the strength of their old people.

Old People’s Legacy at James Smith

Most of the James Smith Elders discussed the role and influence of grandparents in their lives. Many of the Elders were either raised or were taught essential skills about life by their grandparents. For example, Elder Alice Burns remembers her grandparents seating them in a circle and telling them narratives. She states that, “they used to discuss many things of significance…My great grandmother, my father’s grandmother, told many narratives. She would seat us in a circle…I remember that well. She used to tell us stories.” Apart from the narratives, the Elders said that observation of their grandparents was also a significant way of learning about the minds of the old people. As another example, Elder Esther Opoonechaw related how she wished that she could have penetrated the mind of her grandparents regarding the predictions for the future. She tells us that, “I wish I knew what they were thinking about the future. I used to hear them

when the other old people used to come and visit. They'd talk long about what they had to talk about. They had lots to talk about." Another Elder relates about how she uses what she observed in the old people. She states, "sometimes I tell the youth about the things I see, the medicines and the foods that were used by the old people." At times, it was the values that the old people had that were significant in the memory. One Elder recounts the generosity of his grandfather. He states, "He gave some fish away. He never sold them, just gave them away."

The Elders related the virtues that the old people had. Elder Mervin Burns described how the value of generosity became intergenerational in his family. He tells us:

> My dad, the old man, used to have a net in the river. It was nothing for him to pull out eighty fish in one setting. He fed the community what he killed. It was his way of making a living and saying thank you to Mother Earth. He gave it back to the people and he learned us how to do that and I passed I on to a couple of my boys.

Another virtue that another Elder noticed in the old people was that of patience and perseverance. Elder Riley Burns states that, "it is however the case that the elders had perseverance to stay for long periods in the places that they stayed. I do not have that perseverance to stay that long in the forest." Another skill that the Elders attributed to their old people is their proficiency and knowledge of the land. The Elders stated that when they were out on the land, the old people knew exactly where to find the best patch of berries, all the water locations, and the feed for the horses and they would camp at these sites for at least a week.

There were many teaching from the old people that the Elders discussed. Many of these teachings were philosophical. For example, Elder Riley Burns tells us that his grandfather taught him to watch his 'path' closely. The Elders were taught by the old people to look at the land closely for predicting the weather. They also related how the old people taught them how to observe animals in the way that they acquired their food. He states that:

> He used to tell me to plan ahead. Watch how the animals live and follow that course of action. It is like this little ant, he always works hard. That is one that always works and it is always for food. Its winter is very long and there are many to feed. That is the way you should be in the future to set things right for your children.

Probably one of the most intriguing example of the old people's skill set is that of "looking into the future." Elder Riley Burns informs us that, "what I learned, the old people were using methods of looking into the future…that is where the men used to make prophecies, they said. There were certain old men that could do that."

The Shoal Lake Cree's Resilience

The Shoal Lake Cree have experienced environmental change through forest clear cutting not once but twice in their history, they have been through frequent floods in their territory, the Elders saw drought in their lifetime, they saw declining wildlife that was the lifeblood of their existence, they know of cultural loss, and they have great concerns over errant youth. Yet the Shoal Lake Cree, represented by the Elders in the focus group, continued to laugh. Is this resilience?

One of the inherent strengths of the Shoal Lake community lies in the knowledge of the community elders. The Elders of the Shoal Lake Cree believe that the survival skill set they have acquired over the course of their life experiences give them resilience and believe that the skills are still relevant today. The experience in skill development was invaluable in contending with what nature had to offer. For the Elders, life was also a memorable experience. Elder Phyllis Flett tells us that "Living off nature was challenging. The challenge of living off nature for our survival is what I continually remember. Everyone here must know the challenge of making a living from nature as we had in the past." It is this survival knowledge that is ingrained in the Elders that offers hope for the safe future of their youth. As Elder Bear states it:

> I am starting to notice these things the way the world gives us. You know it pays to understand so that you can teach your children something in the future, what to tell them in terms of how this land provides for us. It has a lot to offer.

Another strength that the Shoal Lake community can tap into is the inherent psychological attitude to challenge that is a legacy of living in often-harsh environments. The Elders look to the philosophy that guided their old people in the past. The Elders believe in the inherent capacity of the human being to know and to use internal resources to negotiate what life has to offer. Elder Bear remembers hearing the following words:

> If you use that brain that was given to you to use. This includes your strength and all the gifts that were given to you to create your own life, grandchild. My grandchild, use these gifts that were given to you for you to make a life on this earth.

There is the general recognition that the Elders went through challenging times but the Elders also acknowledged the good times. One Elder tells us that, "the old people went with their children and they worked hard but they had fun doing it." The Elders also acknowledge that the learning never stops and that there is some measure of comfort that the community knowledge is not languishing. As one Elder remarked that, "I am just going to school from these elders that I go around with." The Elders find hope in their knowledge and wish that they could go back to those understandings for he benefit of their youth.

The Elders from both communities believe that their people have inherent resilience and are adaptable to contemporary influences. The James Smith Elders speak of the old people's legacy of always planning ahead for eventualities. Self-development was a key

ingredient for the development of attitudes that gave strength to the people. The Elders believe that these skills are latent and that people still have that recourse. The Shoal Lake Cree's resilience comes through in the historical reconstruction of their experiences and they find similar contemporary pride in the strength of their old people. The Elders believe that psychological development is a prime factor for people to adapt to their environments.

4.2.3 What resources do the communities possess in terms of their ability to plan for and adapt to climate change impacts (for example, infrastructure, socio economic conditions, cultural knowledge and practices, etc)

Knowing something of the future would undoubtedly assist societies mitigate climate change impacts. The Elders from the two communities of James Smith and Shoal Lake speak of a legacy from the old people that may assist them in planning and adapting to climate change. The James Smith Elders discuss ways of predicting the future through inherent human capacity and through close observation of animals. The Elders from Shoal Lake also talk about ways that their ancestors planned for the future and how they were able to read signs from nature that told of climate conditions.

James Smith Cree: Future Methods and Giftedness

One of the cultural resources that the James Smith Cree Nation possesses that would assist their ability to plan for and adapt to climate change impacts is their knowledge about the human capacity to predict the future. The James Smith Cree believe that the human has capacity to tap into its giftedness as a way of projecting to the future and particularly for the purposes of mitigating impacts of shifting times. This capacity to use human giftedness is discussed by Elder Riley Burns. He states:

> He used to say to me that if you want knowledge in the future, sit down quietly and think about the changes that will be happening. Why it is happening and how the shifts are happening. As Cree people, we were given special gifts by the Savior, the Great Spirit.

There are some samples provided by the Elders regarding the nature of this giftedness. Elder Burns discussed one particularly gifted old man that could use his human ability to untie himself from bondage. Elder burns tells us:

> That old man was especially gifted and able. He had medicines through his dreams spirits. He was gifted and could untie himself from ceremonial bondage…That was how powerful that old man was. He had a strong character and did not abuse his powers.

Another example of these human abilities is provided with a narrative on dream spirits for divining the future so that the children and the tribe safely meet the future. The Elder relates that, "he had dream spirits and used methods of seeing into the future…these were

the methods by which the old people were shown certain things. They were shown how to lead their children ahead of time. How the tribe would move." Elder Burns also informs us that the human body can also be used to anticipate the future. He states, "we can also feel in our bodies if any of our people is going to get into a serious situation."

This giftedness or human capacity was used for different purposes by the James Smith to assist the people of the community negotiate their future. For example the James Smith Cree used this capacity to foresee the shifting nature or climate change that is happening now. Elder Burns tells that the old people "were shown events of the future. One of our grandfathers was shown the future regarding the children's experience of shifting nature." Another way that they used the human capacity for seeing into the future was to determine the kind of days that would unfold, or the kind of weather that would prevail. The Elders said that, "that is how the old people used to know how the days were going to unfold."

The Elders of the James Smith Cree Nation understand that this method of seeing into the future would also be applicable in our time. They believe what the old people used to say about the future because they knew about the inherent powers. They also believe that the capacity exhibited by the old people would also be applicable by the community people. One of the constraining factors for using these methods to mitigate climate change impacts is that the people are forgetting about these capabilities. According to Elder Riley Burns, people need to be cognizant of how these abilities are to be used. He states: "That was where many of our people got lost, he said. He could see into the future but then he forgot about those capabilities. They thought they were too powerful and forgot to say thank you to the Savior." The Elders also said that the ability to see into the future using the giftedness and human capacity required strength and discipline. He states that, "presently, there aren't any men with the strength that would equal the discipline of those old people. This is what you have to be mindful about he used to say." However, the James Smith Cree see hope. The Elders point out that the human capacity is resilient and that these capabilities of the old people can once again be used for the benefit of the people. Elder Burns recalls the words of his grandfather. He states:

> You will reach old age too and you will see it too, he said. Your mind will be reflective as you get older, he said. It is not as you are presently with your foolish thoughts. Someday you will have careful thoughts too. You will not be foolish forever, he said (ha, ha). I am glad about that because it is a good sign. Am I right (ha, ha)?

Predicting Weather with Animals

Another cultural resources that the James Smith Cree Nation possesses that would assist their abilities to plan for and adapt to climate change impacts is their knowledge of animals particularly for the purposes of predicting the weather. The James Smith Cree Elders discussed one of the most fundamental and promising adaptive strategies - a return to native science in dealing with natural phenomenon. Native science stems from an intricate knowledge of the environment through a history of close connection with the

land and its order. Every living thing runs in that perfect order. According to the Elders, observation and study of nature was common. From this study came the acute knowledge about nature and its various messages, much of which is passed down through the oral tradition. One Elder remembers being told to, "watch these animals. It is in their nature that you can see how the climate will be like." Knowing and being able to predict the weather is particularly important for trapper and hunters that are interacting with natural elements. One Elder recounted that the old people were adamant about observing animals to influence success and survival. One Elder recalls her grandmother's words. She states:

> She told me that is the way you have to try and keep a good mind, especially if you are hunting or when you are trapping. You have to try and understand how that little animal lives. That is the only way you can make some money out of it. Otherwise you will starve if you don't know their habits, she said to me.

The Elders have taken this message to heart. One Elder pointed out that he still continues providing that message to the young people from his community. He states, "I still continue to do that and I tell the young boys how to watch the little animals in their life patterns – for the sake of knowing what the seasonal weather will be like."

The table below summarizes the some of observations and the stated meanings about the weather as discussed by the James Smith Elders:

Observed	Prediction
Skunks hauling lots of hay	Inclement weather
High bee hives	Lots of snow for winter
Low bee hives	Very little snow for winter
Lots of muskrat houses all over	Lots of water in the spring
Squirrels hauling cones early	Early winter
Squirrels hauling lots of cones	Long winter
Horses running wildly	Inclement weather
Horses with backs to wind	Cold and rainy or snowy

Shoal Lake Cree: A Legacy of Planning

One of the resources that the Shoal Lake Cree possess in terms of their hope and ability to plan for and adapt to climate change impacts is the legacy of futuristic thinking left to them by their old people. The Elders talked fondly of how their ancestors knew how to live and survive and how they looked forward into the future in the best interests of bringing in the next generation. The said that the old people were gifted and had visions and dreams that helped them lead the people. Elder Gerald Bear tells us that, "everyone looked to these elders that lived on these reserves for special knowledge, just as we are discussing things here today." One Elder stated that this peculiar interest about the future was all about the children. The Elder states:

> He always predicted his future by looking ahead. He never looked back very much. He was always thinking of his future for his life and how to fend for his children. How he was going to receive blessings.

The old people of Shoal Lake made concerted efforts to understand the signs in their environment so that they could forecast weather days ahead. They also used their knowledge of the natural environment to know what the seasonal climate would be like. It is from this nurtured ability to anticipate unfolding events that the people also came to understand how the knowledge could be used to negotiate the future as well. They created the conditions that would allow them to thrive in that future. For example, Elder Gerald Bear discussed how the old people used to prepare their trap lines way a head of time. He states that, "many of them prepared for the winter. Many of them made everything like making roads for their trap lines where they will be all winter. They had everything. They took care of all the things that they used for their livelihood."

Planning was a key process in creating conditions that would make their families thrive in the natural environment. This planning included the harvesting and preparation of food resources and the processing of value-added materials such as hides to prepare for on-coming seasons. The plans for the future were not written down as one Elder said. Rather planning was the elaborate nexus between knowing about the natural environment, carefully studying the patterns of nature, and anticipating the best way to raise a family in with that knowledge. Elder Gerald Bear tells us that:

> It is as if they had written plans for their future except it was formulated in their minds. They did not put these plans on paper. However, today, all the plans for starting something are written down. Our grandfathers and grandmothers kept all these things in their minds. How they are going to raise their children. Our grandfathers and grandmothers were not stupid."

It is from this futuristic thinking that the Elders said that the old people prepared their families for the future. It is also this same process of trying to anticipate the future that is still evident in the community. The Elders see the youth embracing contemporary conveniences and there is general concern they will be negatively conditioned and forsake the more important survival skills. Elder Phyllis Flett tells us the following:

> Presently, these youth that are the coming generation are gifted with everything. It is wishful that they would listen and understand us about the challenges we had of living in nature in our past. Presently they should think ahead regarding the future. There is nothing that should be taken for granted as an easy life in that future. Life is easy now.

The Elders see the urgency of the cultural continuity and an environments ethic in the youth of their community. One Elder states that "it is true we are looking for good health and well being in overcoming that what ails us in our past. We all have to be healthy for the sake of our children's future.

Practice of Reading Nature

Another of the resources that the community people possess in terms of their ability to plan for and adapt to climate change impacts is their knowledge of weather patterns and the ways of predicting it. The Elders said that the old people before them had many ways of predicting weather patterns. Elder Gerald Bear tells us that:

> Some of the old people said long ago that they could predict things based on their body. They were able to feel things. They knew how to feel. It is like their bones were conditioned and they knew it was a sign of inclement weather.

The Shoal Lake Cree recounted some of the ways of predicting the weather. These are summarized in the chart below.

Observed	Prediction
Evening sky is red before sunset	Next day not nice
Winter clear night, stars numerous	Cold night, land freezes
Aurora borealis	Windy and turning warm
Reddish aurora borealis	Will be warm
Echo in the evening air	Wind direction
Wind from east	Rain
Beaver hauling mud for lodge	Rain
Beaver hauls lots of mud	Lengthy rains
Coyote evening howls	Very windy
Dandelions close petals	Rain
Leaves turned over	Windy and rainy
Red sunrise and fades quickly	Inclement weather
Birds keep still	Inclement weather
Body aches	Changing weather

The Elders also use the notion of body sensing to predict weather. They spoke of body pains and as one Elder stated, “It is true that people can feel their bodies if there is going to be some kind of weather.” The Elders also suspect that this ability to predict weather with body sensing is now hampered by body ailments or sickness such as diabetes. However, another Elder said that the same body ailments could also be used to predict weather. He states that, “those that were sick with arthritis felt pains when the weather was going to be inclement.” Body sensing has also been used to anticipate the arrival of someone. As Elder Gerald Bear tells us, “they used to say that they could feel their breasts when a friend or someone is going to arrive.” The ability to read nature extended in other areas of the Shoal Lake Cree life. As an example, Elder Bear tells us that “The domestic dogs that we live with, you may have heard them with a strange howl. The cats may also be very noisy. It is a sign that we are going to loose somebody.”

Being able to predict how nature is going to unfold is a valuable resource according to the James Smith and Shoal Lake Cree. This kind of knowledge has the potential to help communities to plan for or to anticipate climate change and its potential impacts. The Elders from the two communities of James Smith and Shoal Lake discussed the ways of seeing into the future that is a legacy of their old people. The inherent human capacity to know and to plan out life's pathways would indeed assist communities to negotiate a safe future especially events as unpredictable as climate change.

4.2.4 What are some of the constraints to the community's ability to plan for and adapt to climate change impacts?

The Elders identify two issues that constrain their communities' abilities to plan for and adapt to climate change. The James Smith Cree recognize their complicity in the causes of climate change by their adoption of contemporary lifestyles. According to the Shoal Lake Elders, the people of Shoal Lake would be hampered to negotiate their future without some element of cultural continuity.

The Complicity of the James Smith Cree

One of the main constraints that could undermine the James Smith community's ability to plan for and adapt to climate change impacts lies in their complicity to the causes of these changes. The Elders recognize their complicity in the degradation of the land. One Elder said that, "it is not only the white people that destroy things, we also destroy ourselves." The Elder also extend this complicity by the way they have embraced mainstream lifestyles. As Elder Mervin Burns stated, "we're helping with the pollution too don't forget that. We're driving the vehicles that raise bad air. Every time you buy a newspaper, every time you use paper, you're helping destroy Mother Earth." Another Elder states that the fault for climate change is also local. The clear cutting of the local forests is an example. He states, "this climate change is our fault. We are baring the earth. That is why things are happening the way they are because we are baring it." The Elders also recognize their complicity in the destruction of water and fish in their territory through the creation of pastureland in sensitive areas. Elder Riley Burns tells us the following:

> These cows, these fishes that you talked about in the creek. It's those cows and the farmers that killed those fish. There should be fences fine hundred yards or a thousand yards away from the river bank. That's where these fences should be. But us we got a pasture right? We kill them. We made a change in their life for them.

The Elders also recognize that much of what happened was unfortunate and that it was the price for keeping up with progress. However, as one Elder stated, the children will have to live with the destroyed land. He states, "those are our mistakes. The white man now says, hey it looks good. But we are paying that for our children. We are leaving everything for them."

Shoal Lake Cree Constraints

One of the constraining factors for the community to deal with adaptation to climate change lies in the lack of cultural continuity from the old to the young. The vital links that enhanced knowledge transmission are eroding and this is a concern of the Elders. The Elders remember that discipline was a major factor in teaching youth about knowledgeable ways in the past. Presently, the Elders are concerned that the youth turn away from their cultural teachings about survival. The Elders blame the shift in attitudes to the effects of social assistance on the youth. As one Elder stated:

> Young people can't be coaxed to work today. They would say that they couldn't do the work and I'm on social assistance anyway. There was no welfare in my time. Young people were more than willing to work at anything for a living."

The Elders stated that they were often dismayed by undisciplined youth in cases where the Elders have tried to teach the young about particular survival skills. As one Elder related:

> We tried making hides but were unable to because the fleshers were too lazy. They all tried their hand at scraping the hair off the hide. Pretty soon they all got tired of it. They should have never quit in the middle of the work. They should have completed the job."

It is to be certain that the lack of cultural continuity, particularly the lack of survival skill sets, exhibited by the youth can become a constraining factors for the community to deal with adaptation to climate change.

Overall, the Elders identify two issues that constrain their communities' abilities to plan for and adapt to climate change. The James Smith Cree recognize their complicity in the causes of climate change by their adoption of contemporary lifestyles. According to the Shoal Lake Elders, the people of Shoal Lake would be hampered to negotiate their future without some element of cultural continuity.

4.3 Assessing Future Vulnerability

4.3.1 What are the enabling and constraining factors in the community for adaptation to climate change as identified in the study

The Elders from the two communities of James Smith and Shoal Lake place strong emphasis on their youth. For the James Smith Cree, the youth represent both the enabling and constraining factors in their ability to deal with the future of climate change. The Shoal Lake Elders identify youth concerns as well but they also see their own independence as a way to their future.

James Smith Constraints

The Elders of the James Smith Cree Nation have a sincere concern for the youth of their community in light of the shifting and changing times. To the Elders of the James Smith Cree, the attitude of young people from the community is one of the constraints to the community's ability to plan for and adapt to the changes taking place. As Elder Mervin Burns questioned, "our young people, are they going to make it through? One of their concerns is that they see disrespect in the youth of today. Elder Alice Burns continues, "I sure pity them but sometimes we just can't say nothing to them because they think they know more than you." Another Elder also stated that, "it is difficult to tell the young people something because they get offended." The Elders concerns are reflected in the prayers. As Elder Orva Brittain tells us, "It is so that I don't ever forget about them and I think of them at nights when I say my prayers."

Another major concern that the Elders have about their youth is that there is no up-take of traditional knowledge. Elders said that they youth do not believe them when they discuss traditional knowledge and its value to the people. One Elder said that "our youth, in their future, do not believe me when I tell them about the past. How differently the people lived from the path we walk today. They do not believe." Another Elder remarked that the youth have lost touch with nature. He states that "I often look at my children and wonder if they even know it is windy outside. Those are the things but the children do not believe them even if they are told about them." The Elders also blame themselves for the state of youth in their community. They realize that they were complicit in loss of culture. As one Elder stated, "I am guilty of neglecting the teachings I received".

Enabling – Teaching the Youth

To the Elders of the James Smith Cree, the young people from the community also represent possibility and one of the key enabling factors in the community's ability to plan for and adapt to the changing climates. The Elders wishes are clearly evident in the words of one Elder. He states "for young people not to discount anything. For them to think highly of what they are told, what they are taught, for them to keep that in mind." The Elders see discussion of socio-cultural and environmental issues as playing an important part in shaping the future for the young people. Some of the Elders related how they were teaching their children about the environment and the ways of survival in their territory. Elder Riley Burns tells us that, "I still continue to do that and tell the young boys how to watch the little animals in their life patterns – for the sake of knowing what the weather will be like." The Elders are also cognizant of the need to be able to live in two worlds, the traditional Cree life and the in the mainstream society. Elder Riley Burns continues:

> These are the things I am trying to teach my grandchildren. It is nice to live where we are living presently. This old man told me if you want to make culture, a present day culture, take the white man's culture today. He's got three good things, two for sure. A car and he's got a hospital. Those are good things. And let's take our culture, take the good ones.

> We've got our medicine bag and we know how to help people to help ourselves. Those are the things.

The Elders also see the value of education. One Elder said that, "the young people have to be addressed by educated people. These educated people that have been trained to look after young people. They have to turn them around." Ultimately, the Elders believe in themselves and that they have the capacity to lead the children and that the community as a whole is able to adapt to changing circumstances. Elder Mervin Burns has the final word on this. He states:

> So that's our people that walked there in that time and we've been adapting to this country for thousands and thousands of years. I think we are adaptable. If we're not our young people are in trouble.

Shoal Lake Cree: Enabling - Youth teachings

One of the enabling factors that the community possess that may assist them with adaptation to climate change lies in the youth's up take of survival skills. The Elders saw examples of how the old people used to live. They followed these examples very closely in their own struggles in making a living and raising children in their own time. It is these environmental skills that the Elders want the younger generation to know about. The Elders gave examples of these and how they want the next generation to follow cultural patterns such as how to prepare traditional foods. Elder Jean Head informs us that, "I remember taking part and being shown how to prepare these for eating. I am grateful now all the skills that were left for me because I can pass on these teachings to my children as they are growing up" The Elders realize that their time on earth is limited and that they consider the knowledge that they carry important enough to be passed on to future generation and to all other human beings. Elder Gerald Bear relates the following message to his fellow Elders in the focus group:

> Our children are out and about now. We have to help them my friends for as long as we are living. We have to help our children and our fellow human beings. This is what will be good. We cannot give up on the children and we have to help them when they request our assistance and for our knowledge."

This knowledge is derived from an experience in living off the land and facing challenging times and these are skills sets that kept the people strong and resilient. How much influence the Elders and the people from Shoal Lake can exert on the youth to take up the continuity of cultural practices and particularly survival skills will perhaps determine their overall ability to adapt to climate change.

Indeed, one of the constraining factors for the community to deal with adaptation to climate change lies in the lack of cultural continuity as reflected by youth. This is a concern of the Elders. The Elders remember that discipline was a major factor in teaching youth about knowledgeable ways. Presently, the Elders are concerned that the youth turn

away from their teachings about survival. The Elders blame the shift in attitudes to the effects of social assistance on the youth. As one Elder stated:

> Young people can't be coaxed to work today. They would say that they couldn't do the work and I'm on social assistance anyway. There was no welfare in my time. Young people were more than willing to work at anything for a living."

The Elders stated that they were often dismayed by undisciplined youth in cases where the Elders have tried to teach the young about particular survival skills. As one Elder related:

> We tried making hides but were unable to because the fleshers were too lazy. They all tried their hand at scraping the hair off the hide. Pretty soon they all got tired of it. They should have never quit in the middle of the work. They should have completed the job."

It is to be certain that the lack of cultural continuity, particularly the lack of survival skill sets, exhibited by the youth can become a constraining factors for the community to deal with adaptation to climate change.

Degree of independence established

The community's ability to be independent is affected by the actions of government and industry. One Elder remarked that, "we are at a time when it is starting to be dangerous on our lands. Our land is not pristine anymore. We cannot eat just anything anymore. We are not at liberty to do the things that need to be done."

People had independence through the ventures such as the 'rat farm' and the land provided for all their needs. This independence started changing with the introduction of modernity and particularly with the introduction of social assistance. The youth no longer believed that they had to work for a living.

Government and its implementation of industrial agenda, particularly in the area of forestry further eroded the people's ability to be independent. This was not unforeseen by the people of the community. Elder Gerald Bear tells us that:

> It is true what he said at the time. The white people would start to run your lives. The white people would start to govern your land. You are going to lose everything on your land, the abundance of your land, is what he said. It is true. The land has nothing now. The young people do not have the resources.

The imposition of government policy in the area of social assistance and the industrial agenda is one of the constraining factors for the Shoal Lake Cree to adapt to climate change.

What community decisions are made regarding the youth will determine the capacity of both James Smith and Shoal Lake to negotiate the future of climate change. Cultural continuity in both communities is a concern and Elders place strong emphasis that such continuity is vital for the future of their youth. At this juncture, there is urgent need to link Elders with the youth as a way to ensure that cultural knowledge is transmitted.

4.3.2 What community specific philosophies or cultural attitudes would hinder or influence adaptation strategies

The Elders speak of important philosophies and community attitudes that would influence a strong response to adaptation strategies. The James Smith Cree Elders identify deep personal reflection as way to knowing and possibly as a way to mitigating impacts from natural crisis. The Shoal Lake Cree see the strengths in their community and identify cohesiveness as a strategy forward.

James Smith Cree: Philosophy

One of the community specific philosophies that would influence adaptation strategies is the philosophy itself. One of the poignant examples given by the Elders that aptly describe the James Smith Cree philosophy about climate change is its similarity to the adaptation to old age. Old age is very personal thing to contend with and that it is largely a psychological project that each person must perform. By way of this example, the Elders are telling us that our responses to climate change also have to be very personal. It demands no less. Elder Riley Burns describes this. He states:

> There's one thing that really bugs me. They call it climate change as I hear today. But you know what? The human body changes as you get old…it was never like that. I was reminded this morning about climate change. This is one of my biggest changes that I have here (ha, ha). You know it is hard arriving at old age. There's a lot of changes just like the climate changes where we have to make changes in our life.

It is this idea of a personal universe, the inwardness, or the soul searching that drives the philosophy of the James Smith Cree and perhaps the most thought provoking for adaptation strategies. One of the ways to tune into the human capacity for understanding change is to contemplate in silence. Elder Burns describes the teaching he received from his grandfather. He remembers that, "He used to say to me that if you want knowledge in the future, sit down quietly and think about the changes that will be happening. Why it is happening and how the shifts are happening." The Elders clearly understood the value of these teachings and practiced them in their daily lives. As Elder Riley Burns relates:

> There are instances when circumstances overwhelm me and that is when I go to the forest. I drive to that forest taking some tobacco for an offering. I think carefully about what is happening, Why am I having difficulty and

> why is the negative mind overbearing me? That is where I go to sit so that the energies can rearrange.

This practice of cultural traditions tunes the body to feel the energies of place and to develop body senses for beneficial use. Indeed one Elder informs us that, “we can also feel in our bodies if any of our people is going to get into a serious situation. This is what He gave to us. He also gave us a way to worship. He gave us the sweat lodge, to a man, for the purposes of healing and to think carefully about the road that is travelled.”

The Elders discussed the philosophy of their culture that teaches them about inwardness and the capacity to know. Elder Riley Burns informs us that walking the culture of the old people is like walk through the beautiful forests. In essence, the forest was their culture and it was a spiritually clean place if approached the right way. He states:

> I knew now what it meant, what my culture really was as I walked my path. It was a spiritually clean place. That is the first thing I see once I closed my eyes. Where I was walking was a very beautiful place. Other people were walking there as well. That is where they used to walk a long time ago. That forested place that was talked about here today. It is exactly the same.

It is this philosophy that the Elders see as a possible mitigating factor to issues of climate and weather. Learning from place leads solutions to our human dilemmas. As one Elder recounted:

> We can’t really see far ahead into the future. But if we take that course of action, we will start to know and recognize how we can help one another. There are many ways that we can learn a lot, even from plants, even trees, when you walk through the forest. You know things as you walk carefully and silently. There is nothing blocking your mind. That is the only way you can think properly of your fellow human being and about yourself.

Learning from place and paying attention to our natural surrounding also leads to knowledge about the climate changes. One Elder said that, “we have lost the way because we are not paying attention to our direction. That is what we have to try and learn. To learn how the land is producing weather.” This knowledge of weather and feeling for its eventual form was evident in the old peoples lives. As one Elder relates that his grandfather warned them to go home because severe weather was coming. It was a nice sunny day and they were told to prepare the camp by securing the tent and making ditches to prevent flooding. The Elder continues, “they tied willows in a fashion that would cover the horses. My father was also holding the horses. It is at that point that the hail dropped making an incredible noise.”

Another of the community specific philosophies that would influence adaptation strategies is that of knowledge of and the capacity to mitigate weather. Probably the highest value of the Elder narratives is that human beings are capable of influencing

weather conditions. The Elders reminds us that the old people used to have ways of manipulating weather phenomenon. Elder Bertha Twist, for example, tells us that:

> There was a storm coming and you could hear the wind and the hail, thunder and lightning. My dad told his grandsons, my sons were small at that time, their grandpa picked up this axe and there was a block of wood there and he hit the axe on that clock of wood towards where the storm was coming. That storm split, it went around the cabin.

These are the community specific philosophies or cultural attitudes of the James Smith Cree Elders that might influence adaptation strategies.

Shoal Lake Cree: Cooperative Spirit

One of the community specific cultural attitudes or philosophies that would influence adaptation strategies is history of the cooperative spirit in the community of Shoal Lake. The history oral informs us that the people from Shoal Lake nurtured the spirit of cooperation in the people. This particular work ethic was important not only for maintaining unity but also as way for looking after needy and for the survival of the group. This cooperative spirit was nurtured and taught to the very young. Elder tells us that, “the men and the women and the children of age all worked. Everyone worked. Nobody sat idle and watched. All used their strength and mobility to work.” Children were involved in these community efforts and as one Elder remembers, “children were good workers in those days too.”

The community leanings towards an egalitarian existence were nourished by family practices of sharing. Elder Ron Head informs us that his family practice was to plant crops of potatoes so that they may be shared with other families. Emil Flett also tells us the following:

> In the fall, the whole community would join together harvesting potatoes like this. The whole community would go around helping each other. They would then store those potatoes. Some would put away some for winter use. As spring came they would uncover their stored potatoes for replanting.

The cooperative spirit in the community was also evident in the way people assisted each other in hauling home the animals that have been killed by hunters. One Elder tells us that, “the people would ask each other after they got home where they made their kill and they would tell each other where they killed the moose. They formed cooperative work crews to go out and get the meat.”

Perhaps the most important example of this cooperative work spirit is found in the economic venture that is known as the ‘rat farm.’ This business venture was a breed and trap operation that the communities of Red Earth and Shoal Lake jointly founded. As a business venture, the operation was meant to assist not only the trappers but was also the

basis for assistance to the less fortunate in the community. Elder Gerald Bear informs us about this venture:

> The two reserves Red Earth and Shoal Lake had what they call a 'rat farm.' That was where this money was taken from to help out the needy…Some people earned quite a bit of money out of that operation. These were the ones that kept up the work involved in trapping. The money came back to the community because the breeding stock was good and well planned. Some of us raised our children through that process including myself as a trapper.

What kind of strategies the Shoal Lake Cree undertake for adaptation to climate change might be informed by this history of cooperation in their community. Indeed, as they look to the future, the Elders from Shoal Lake focus their gaze on the young and ponder the task necessary to negotiate the future and how that might be a collective effort as well.

The Elders from the two communities of James Smith and Shoal Lake have strong philosophies and community attitudes that would assist them with adaptation strategies. Personal reflection for knowing and a cooperative spirit as a whole are vital attitudes for communities to have as they ponder the realities of climate change and its potential impacts.

5.0 DISCUSSION

The purpose of the research was to assess the future impacts of climate change and the capacity for two First Nation communities in Saskatchewan to respond and adapt to those impacts. Two community case studies were undertaken with attention given to the integrated and interconnected impacts of climate change across various sectors. A holistic framework was used that emphasizes the interconnections between the social, cultural and natural systems.

The background to this discussion on climate change is the ever-present worldview as informed by the Elders in the focus groups. This worldview is formed and guided by a distinct knowledge tradition with its insights, values, interests, as well as social, economic and political realities of the community people over the course of their history. This worldview is reflected in the philosophies that the Elders discussed in relation to the environment and physical climate. These perspectives provided insights into how people confront significant cultural and social changes taking place in their lives and about inner capacity of a people to withstand and to adapt to changing circumstances such as those presented by climate change. The value of the Elders' philosophies is that they provide a comprehensive addition to the concept of climate change and how related social issues are examined. These philosophies also guide the nature of psychological coping mechanisms. It is the case that the Elders relate to climate change as a broader process that goes beyond the rigorous western scientific hypotheses and measurements.

Timeframe is another important element in determining the adaptive capacity of a community. Both of these communities have experienced significant cultural changes in a

relatively short period of time. These changes include the peoples' shift from hunting gathering and trapping societies to the contemporary forms of livelihood. This massive cultural change is in itself an adaptation process and speaks volumes about the capacity of the two communities to respond to change. Ford an Smit (2004) suggest that the analysis of current vulnerability requires a timeframe to establish how far back in time the study should go when analysing risks and community response (p. 396). For the Elders, the glimpse into the oral history of their ancestors to the growing daily concern for the youth is all connected and is a relevant part of the process of continuity of community strengths and for determining future adaptability. This timeline provided by the Elders is valuable for an analysis of how previous generations coped with hazards against socio-cultural and natural environmental changes and the question of its continuity in the present. For the Elders, many of the traditional coping skills and detailed traditional knowledge that gave the old people flexibility are still relevant and remain strong in memory.

Most of the Elders in the focus groups discussed climate change from the touchstone of their traditional understandings as gleaned from their own ancestors and from practical experiences in their own lives. There is continuity of cultural thought from previous generations to the Elders' knowledge in the present. The results from this study indicate that the two communities of James Smith and Shoal Lake are in crucial periods of their history in terms of how this continuity will be maintained into the future. Both Shoal Lake and James Smith will have to find solutions regarding their youth and the decisions that they make now will determine the capacity of both communities to adapt to future changes. Intergenerational communication needs to happen so that the knowledge of the past, the survival skills and those special insights about human capacity can be transmitted to the young people of the communities.

In the background to these discussions about philosophy and history were the unspoken words about the socio-cultural changes that the people went through in a relatively short period of time. The communities went through significant changes as they shifted from traditional subsistence economies to the contemporary lifestyles. As stated, this in itself is adaptation. However, it is the coping mechanisms such as the philosophy and the psychological capacity that guided the people through tumultuous changes that seem most insightful and substantial to discussions of global climate changes. Mitigation of climate changes through material reconstruction will not offer the final solutions. Change is largely a psychological event and must be addressed from that perspective. However it is the same cultural change, from a subsistence economy to contemporary convenience that also undermines the peoples' capacity to adapt to changes of the climate and environmental nature. Shifts of lifestyles from nature orientations to urbanized mainstream lifestyles detract the peoples' continuing knowledge about the natural environment. How much the people retain knowledge of the land would determine their responses to changes and enhance their coping strategies. The Elders from the two communities of James Smith and Shoal Lake have strong philosophies and community attitudes that would assist them with continuing adaptation strategies.

6.0 CONCLUSIONS

Two community case studies were undertaken with attention given to the integrated and interconnected impacts of climate change across various sectors. The purpose of the research was to assess the future impacts of climate change and the capacity for two First Nation communities in Saskatchewan to respond and adapt to those impacts. Through the discussions in the focus groups, the Elders continually spoke of the connections between the natural environment and their social, physical and spiritual well being. On the environmental front, analysis of the Elders' statements indicates that similar climatic events had happened to both communities. Both communities experienced alternative periods of flood and drought outside the variation considered normal in their territories. Community systems remained fixed and people unchanged in the face of these historic climatic disturbances. This tenacity to psychologically accept and prepare for climatic fluctuations contributes to and demonstrates socio-cultural stability over the course of their history.

The communities were also impacted by human induced changes to the environment. The communities were more vulnerable to these changes and were indeed culturally harmed by these practices because of their cultural and historic ties to the land. The Elders from James Smith and Shoal Lake speak of strong philosophies and attitudes that had certainly helped to maintain their communities' equilibrium in the past. Personal reflection for knowledge development and a spirit of cooperation contributed to strong and flexible communities. The Elders believe that psychological development is a prime factor for people to adapt to changing environments. The Elders also spoke of what enables their people to adapt to future events. Developing foresight through traditional means of knowing enhances the capacity to predict how nature will ultimately unfold. This capacity to anticipate future scenarios has the potential to help communities to plan for climate change and its potential impacts.

What community decisions are made regarding the youth will determine the future capacity of both James Smith and Shoal Lake to negotiate the future of climate change. At this juncture, there is urgent need to link Elders with the youth as a way to ensure that cultural knowledge is transmitted. They recognize that traditional environmental knowledge and survival philosophies are default skills people will require in the event of modern crisis.

Paleovegetation Conclusion

1. Increased variability and rates of vegetation change in the last 500-800 years
2 But vegetation change has been the rule rather than the exception.
3 Models forecast changes and variability that will exceed the current observed variability.
4 Pollen record shows a clear effect of agriculture and forestry on the native vegetation.
5 At high resolution in the small forest surrounding lakes it is sometimes hard to sort out climate from land use changes.
6 More work is needed to correlate the scientific record with observations by Elders and other people.

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APPENDIX A

Diagram A1

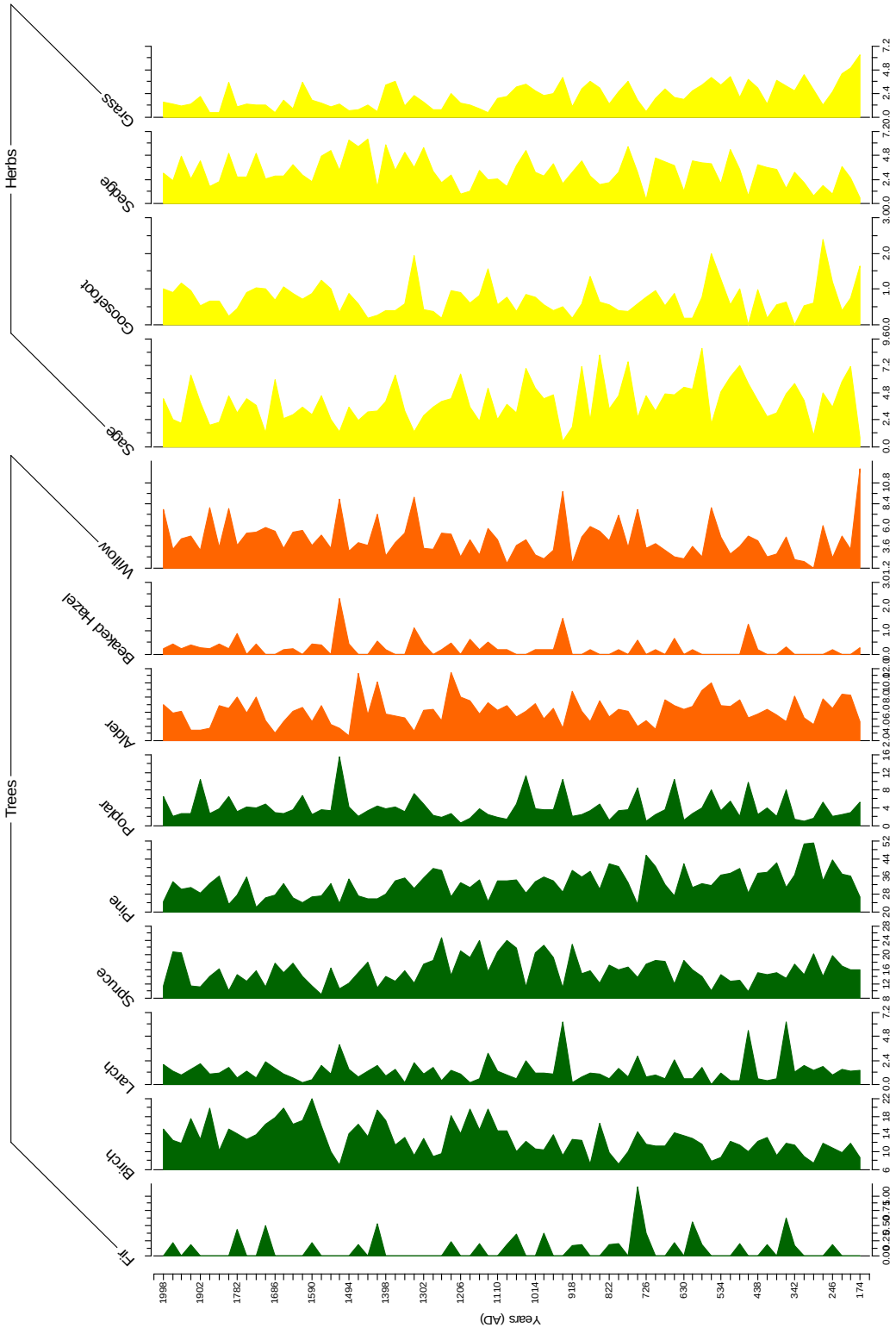
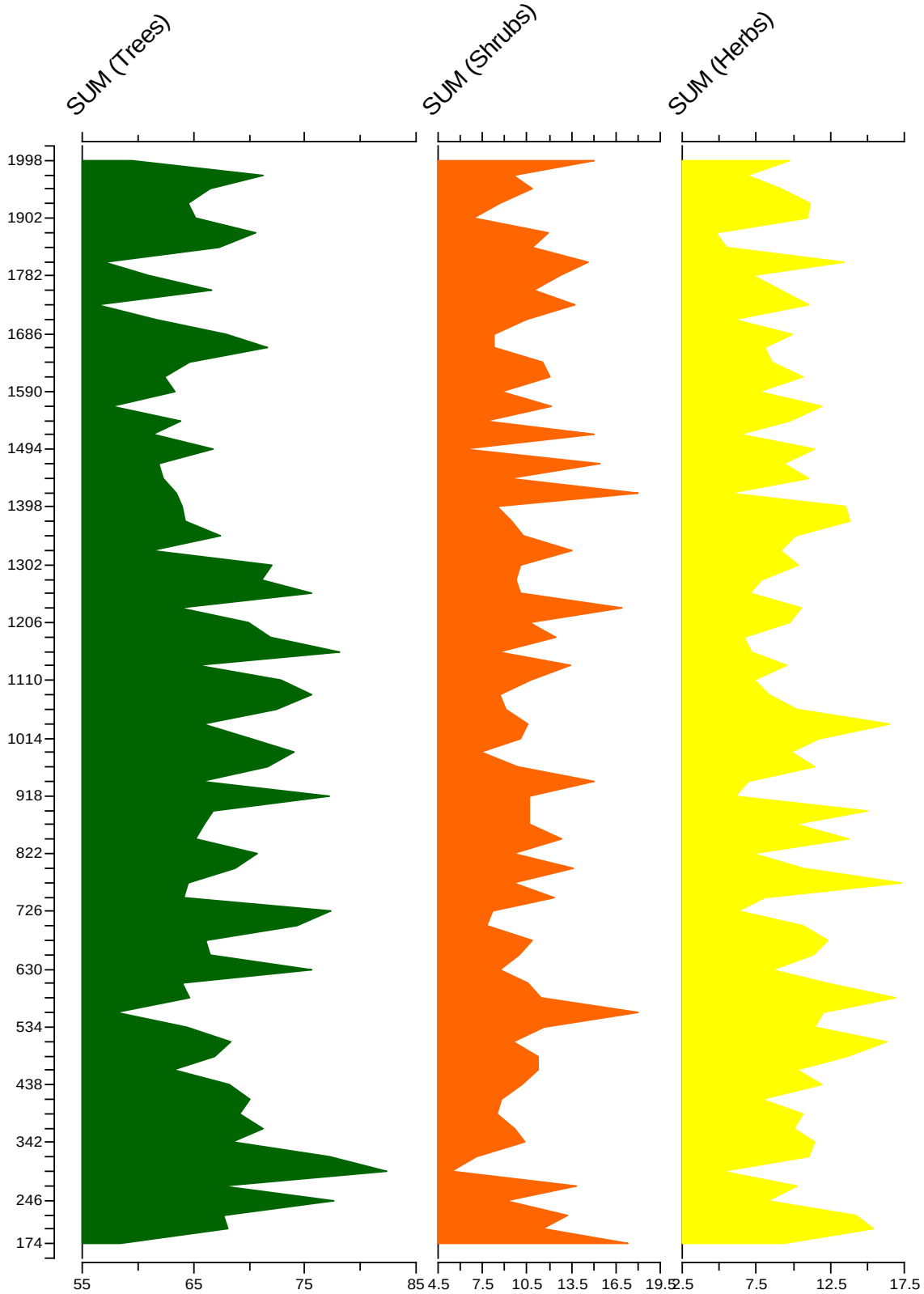


Diagram A2


SUM (Trees)
SUM (Shrubs)
SUM (Herbs)
1998
1902
1782
1686
1590
1494
1398
1302
1206
1110
1014
918
822
726
630
534
438
342
246
174
55
65
75
85
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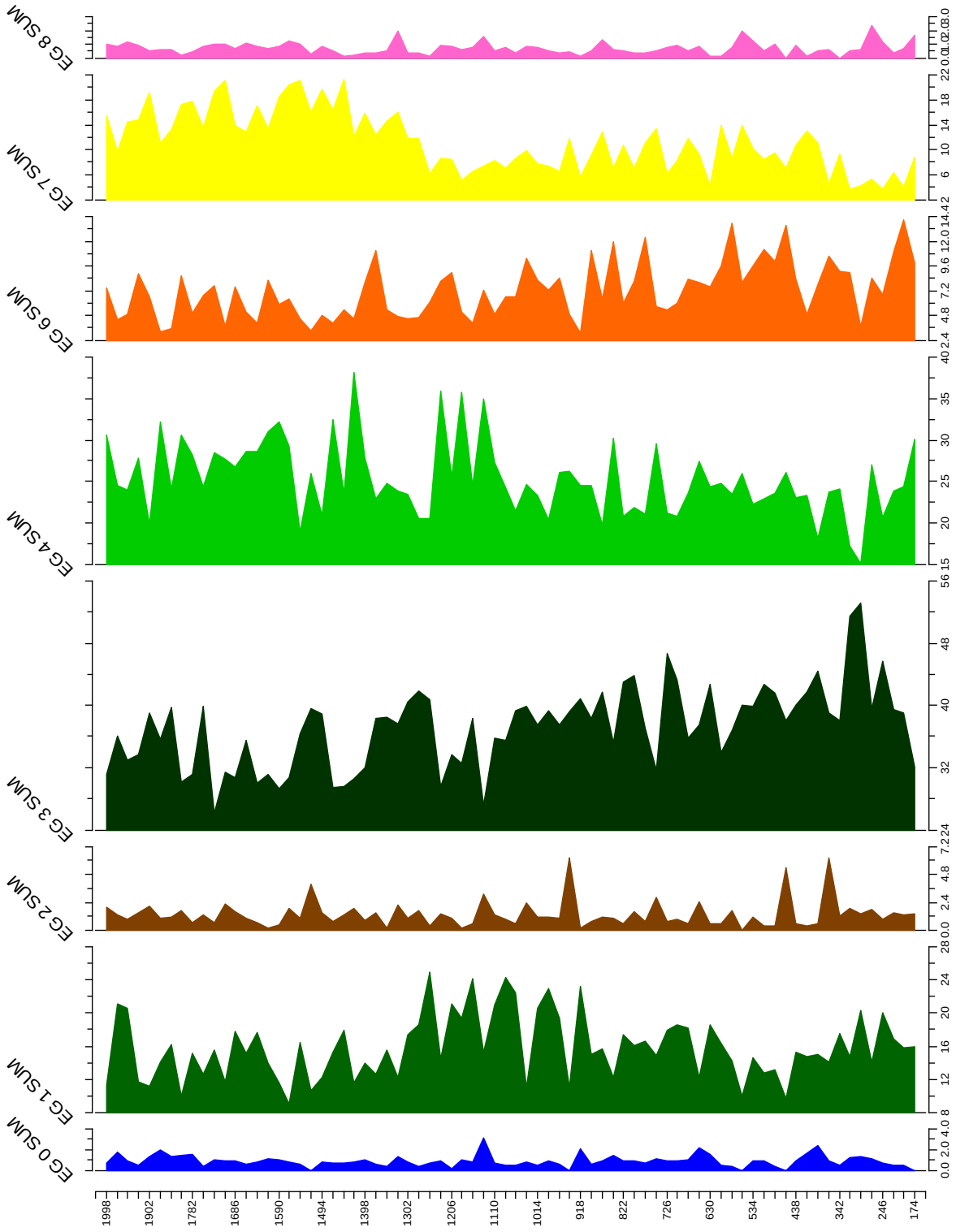
19.5
2.5
7.5
12.5
17.5

Diagram A3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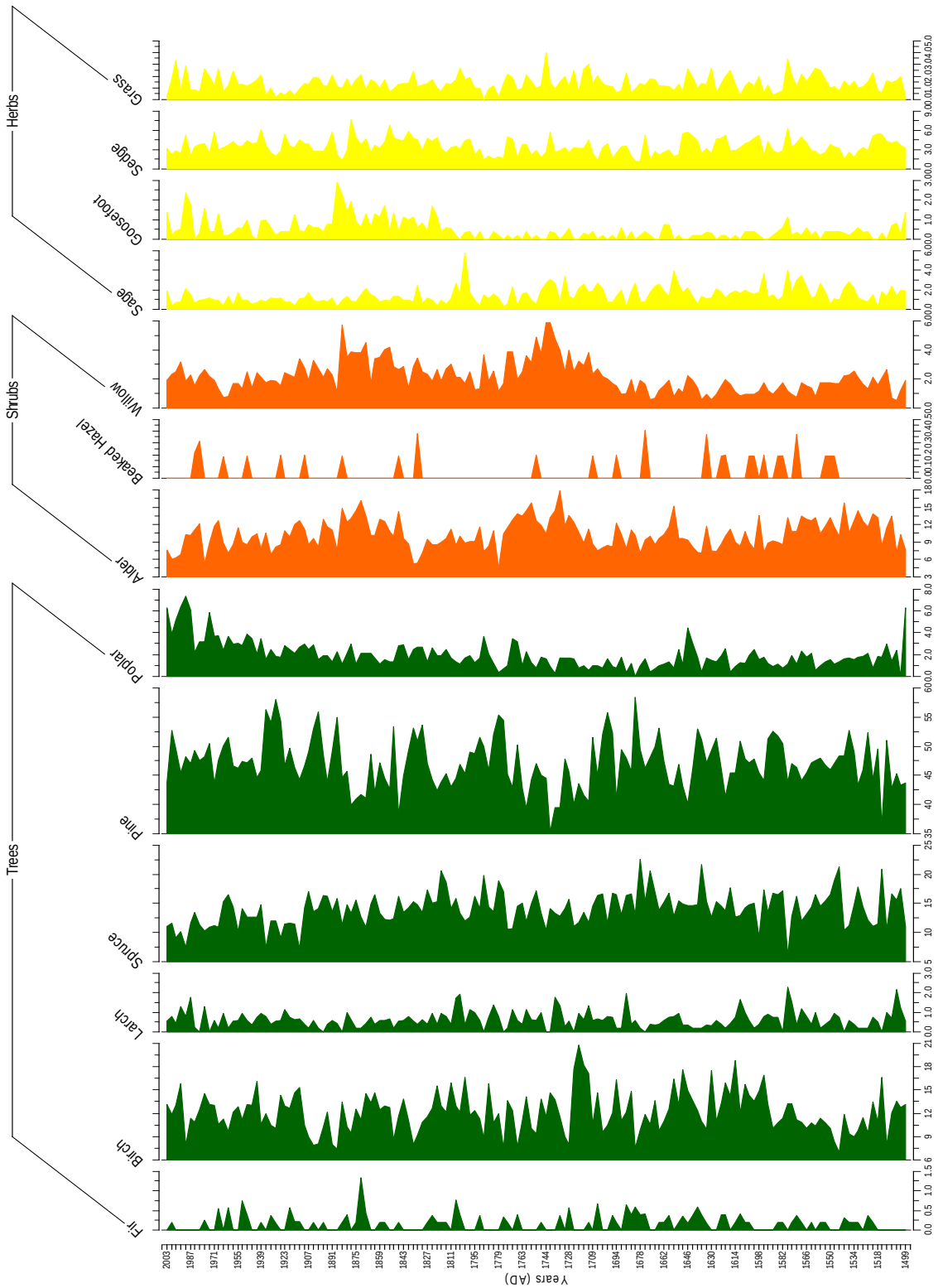
EG 7 SUM
EG 6 SUM
EG 4 SUM
EG 3 SUM
EG 2 SUM
EG 1 SUM
EG 0 SUM
1998
1902
1782
1686
1590
1494
1398
1302
1206
1110
1014
918
822
726
630
534
438
342
246
174

APPENDIX B
Diagram B1



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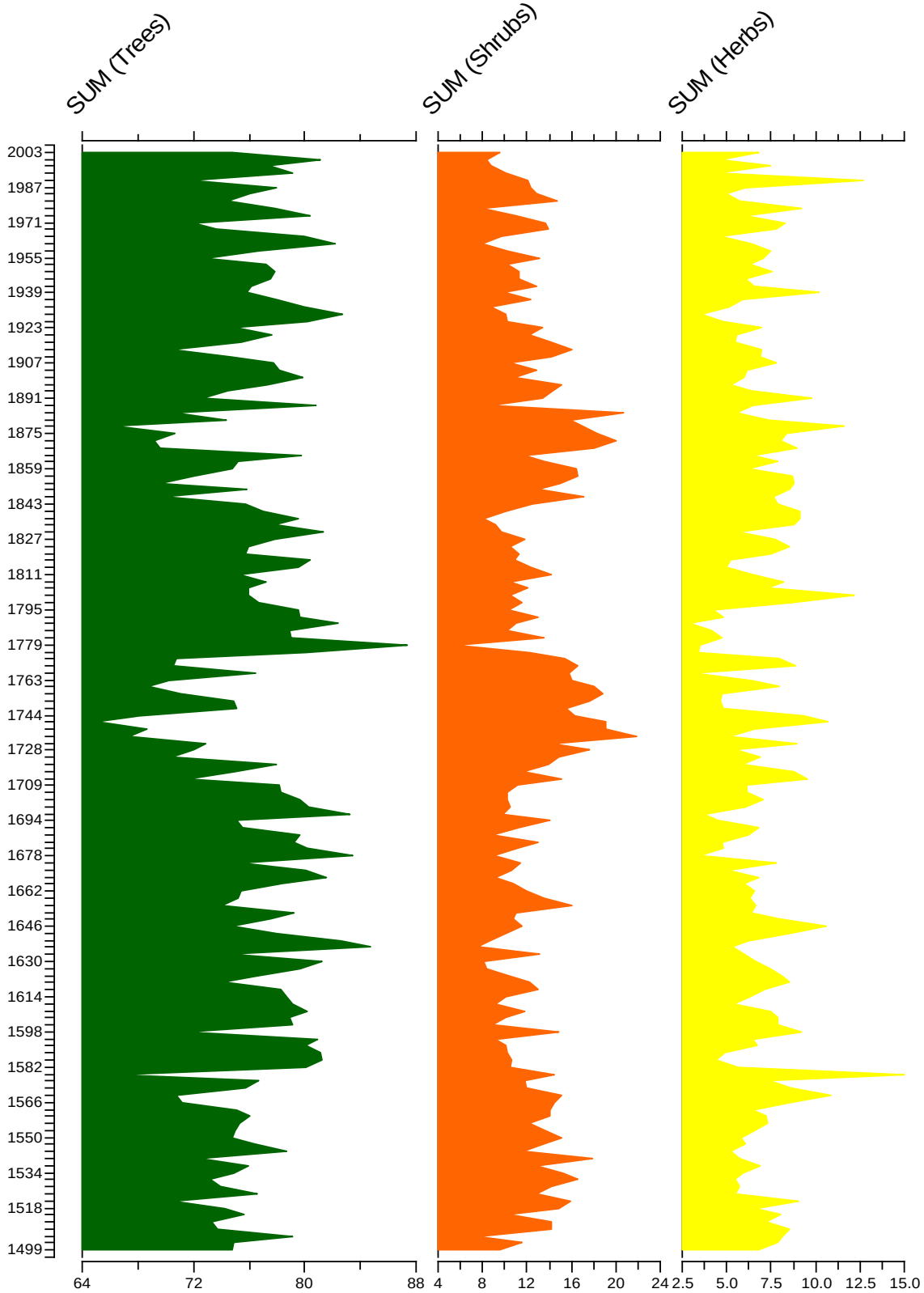
SUM (Trees)
SUM (Shrubs)
SUM (Herbs)
2003
1987
1971
1955
1939
1923
1907
1891
1875
1859
1843
1827
1811
1795
1779
1763
1744
1728
1709
1694
1678
1662
1646
1630
1614
1598
1582
1566
1550
1534
1518
1499
64
72
80
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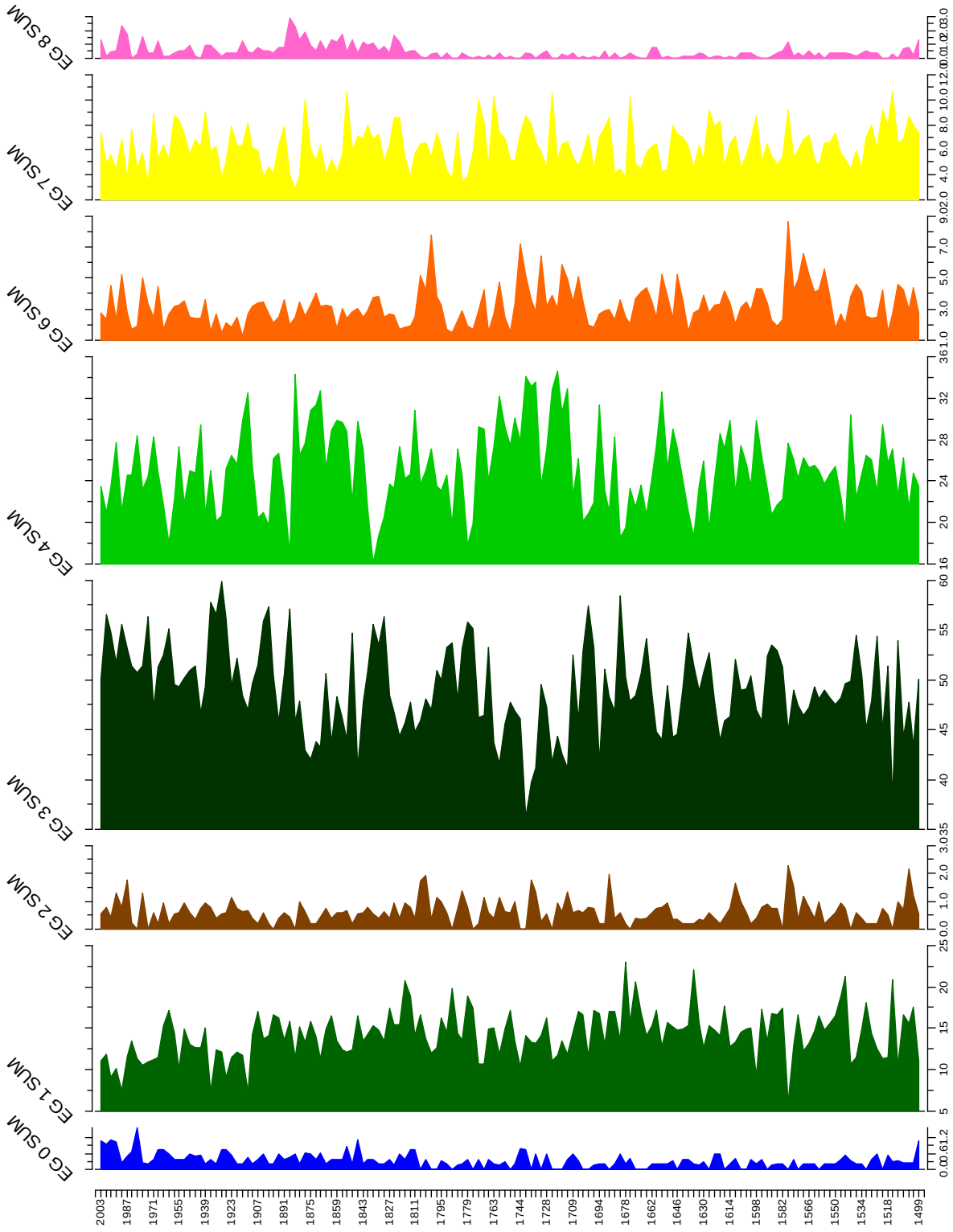
10.0
12.5
15.0

Diagram B3


EG 8 SUM
EG 7 SUM
EG 6 SUM
EG 4 SUM
EG 3 SUM
EG 2 SUM
EG 1 SUM
EG 0 SUM
2003
1987
1971
1955
1939
1923
1907
1891
1875
1859
1843
1827
1811
1795
1779
1763
1744
1728
1709
1694
1678
1662
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1630
1614
1598
1582
1566
1550
1534
1518
1499

APPENDIX C
Diagram C1

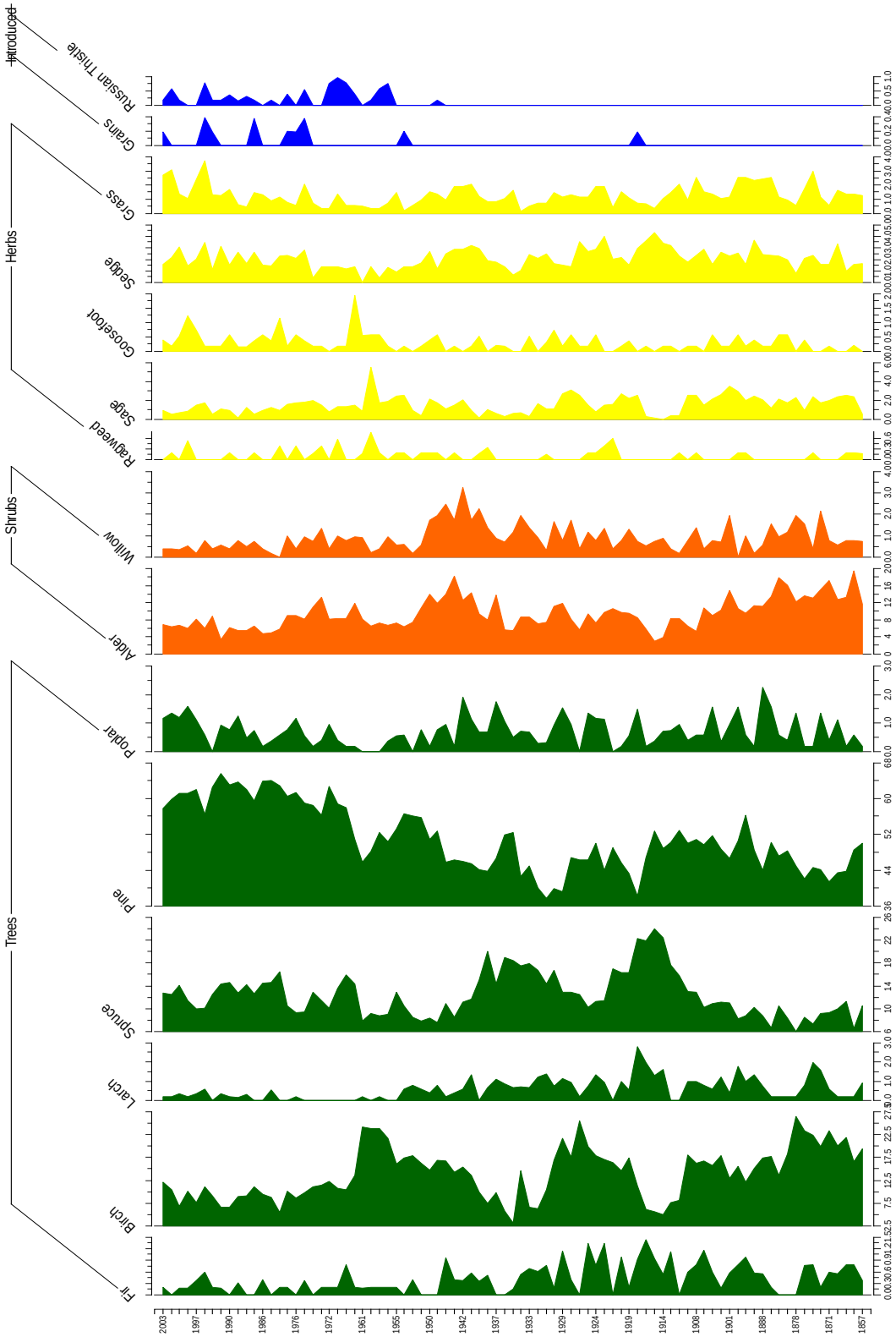
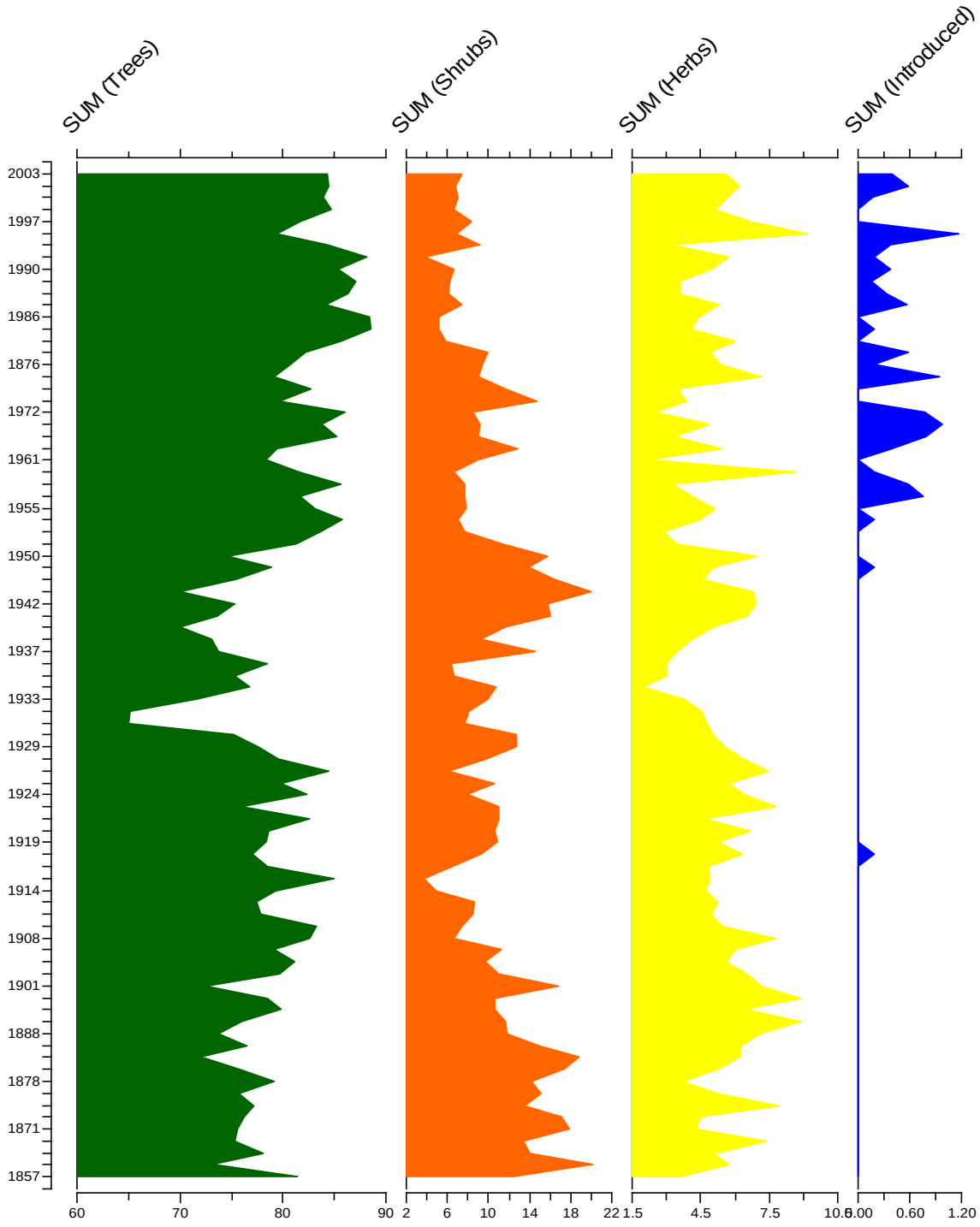


Diagram C2


SUM (Trees)
SUM (Shrubs)
SUM (Herbs)
SUM (Introduced)
2003
1997
1990
1986
1876
1972
1961
1955
1950
1942
1937
1933
1929
1924
1919
1914
1908
1901
1888
1878
1871
1857
60
70
80
90
2
6
10
14
18
22
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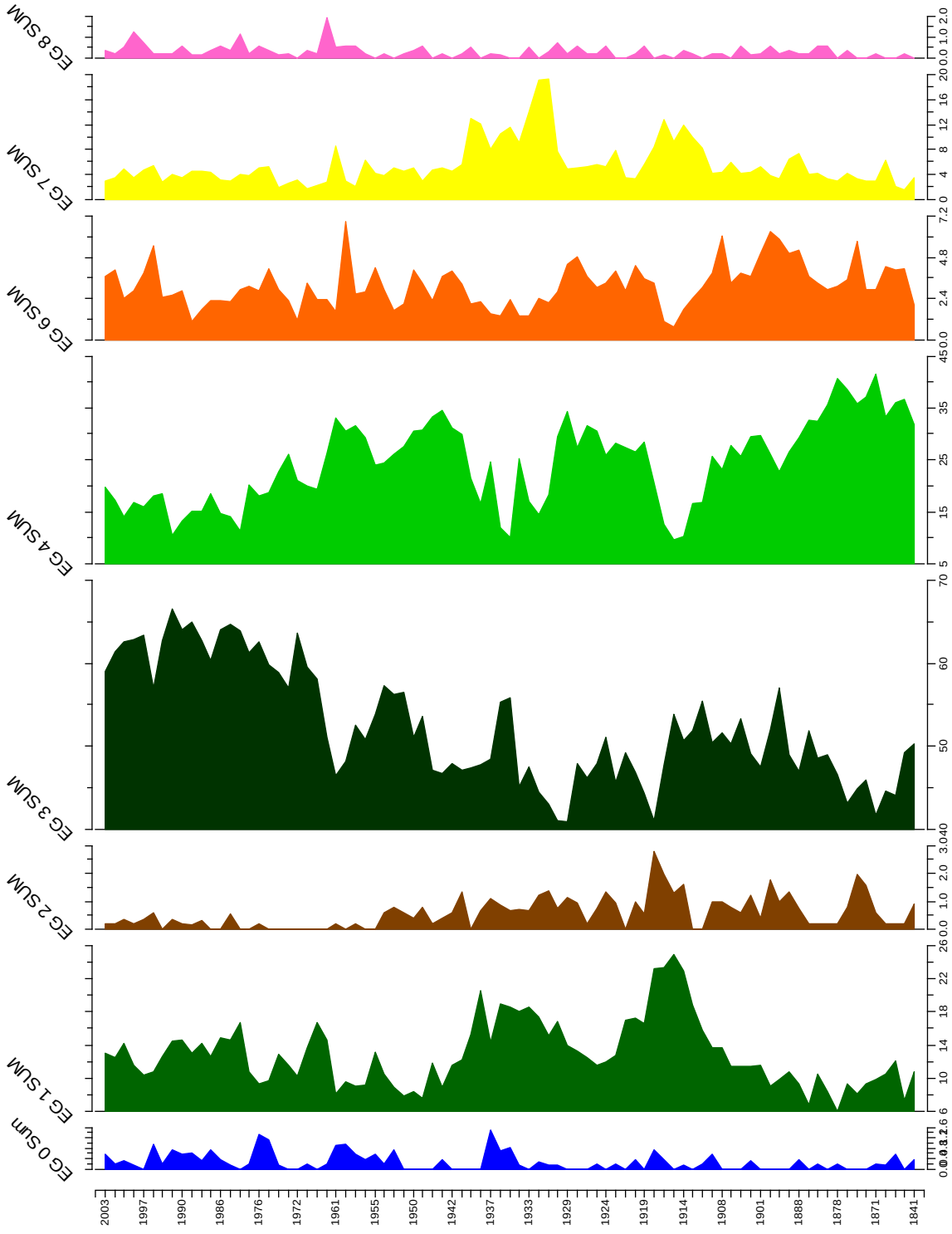
10.5
0.00
0.60
1.20

Diagram C3


EG 8 SUM
EG 7 SUM
EG 6 SUM
EG 4 SUM
EG 3 SUM
EG 2 SUM
EG 1 SUM
EG 0 Sum
2003
1997
1990
1986
1976
1972
1961
1955
1950
1942
1937
1933
1929
1924
1919
1914
1908
1901
1888
1878
1871
1841