

Geoweb: Indigenous Mapping of Intergenerational Knowledge

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Montréal, Québec

December 2010

A thesis submitted to McGill University in partial fulfillment of the
requirements of the degree of

Doctor of Philosophy

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ABSTRACT

This thesis examines the transmission of intergenerational cultural knowledge on eastern James Bay Cree lands. Geospatial technologies and the representation of Cree knowledge are explored, with emphasis on the geoweb. A geoweb with two parts, old and new, is theorized as compatible with Cree interests at a landscape level of analysis. Local and traditional knowledge scales also emerge as crucial levels of analysis for the creation and transmission of hybrid forms of knowledge on the geoweb.

The hypothesis that the meme is a viable and valid mechanism (replicator) for the transmission of indigenous intergenerational knowledge on the geoweb is supported. The assertion that the geoweb would be the primary vehicle for the protection and replication of place-memes is also well supported. Evidence for these claims was provided by examining traditional and local toponymic densities and qualitative data, revealing both the capacity and the will, historically and presently, to use geoweb-enabled mapping for local and traditional knowledge preservation and transmission.

RÉSUMÉ

Cette thèse examine la transmission de connaissances intergénérationnelles et culturelles de la réserve des Cris habitant l'est de la Baie James. La technologie géospatiale et la connaissance des Cris sont explorées, avec une emphase sur le Géoweb. Un Géoweb divisé en deux, ancien et nouveau, est théorisé comme étant compatible avec les intérêts des Cris au niveau de l'analyse du paysage. L'échelle de connaissances locale et traditionnelle ressort comme une pièce primordiale pour l'analyse de la création et de la transmission des connaissances hybrides sur le Géoweb.

L'hypothèse soutient que le mème est un mécanisme viable et valable (réplication) pour transmettre les connaissances intergénérationnelles autochtones sur le Géoweb. L'affirmation que le Géoweb sera l'outil principal pour la protection et la réplication de mèmes de lieu est aussi

bien supporté. Les preuves de ces allégations proviennent de l'examen traditionnel et local des densités toponymiques et des données qualitatives révélant à la fois la capacité et la volonté, historiquement et actuellement, d'utiliser la cartographie Géoweb pour la préservation et la transmission des connaissances locales et traditionnelles.

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ACKNOWLEDGEMENTS

I thank my committee and supervisors, including André Costopoulos and George Wenzel, who co-supervised this dissertation. Nadine Schuurman and Raja Sengupta, as part of my committee, gave many useful comments and suggestions during all stages of my work.

In the field, in Wemindji, Dorothy Stewart, Fred Stewart and Don Stewart helped make this work successful. Without their generous assistance and support, this work would not have been possible. Beverly Mayappo assisted in so many ways I cannot list them all. I would also like to thank the community of Wemindji as a whole for being a wonderful place to work and live. I expect it will remain so for many generations to come.

Members of the Department of Anthropology at McGill, of the Society for Technology and Development (STANDD), and in the Computational Archaeology (COMPARCH) Lab helped with many parts of this work at various stages. Thanks especially to Katherine Scott and to Colin Scott, and to the warm and inviting atmosphere created by the graduate students involved in the Paakumshumwaaau protected area project.

I must also thank other individuals who were essential to the completion of this research. Thanks go to Renée Sieber for help during the proposal writing stage, and for helping to get the project started. Sebastien Breau read the proposal and offered insights. Tim Moore and Michel Lapointe were instrumental in keeping this project on track when it ran the risk of derailing, and therefore I owe both of them my deepest gratitude. This project was funded in part by a Warren Fellowship and by a Research Assistantship from McGill University, as well as by funding from a Social Sciences and Humanities Research Council of Canada Grant held by the Department of Anthropology at McGill.

CONTRIBUTIONS OF THE AUTHORS

This thesis contains four manuscripts. Manuscripts 2 and 4 are single authored by G. Lucas Eades. For manuscript 1, “Geospatial Technologies and the Representation of Cree Knowledge,” (in press) G. Lucas Eades is the first author and Renée Sieber is the second author. For manuscript 3, “Place Memes,” (submitted) G. Lucas Eades is the first author and André Costopoulos and George Wenzel are second and third authors, respectively. Data collection and writing were conducted by the first author for all manuscripts (1-4).

The Introduction (Chapter 1) is derived from G. Lucas Eades’ PhD proposal. Due to the modular nature of this dissertation there is some repetition of content between the framing chapters and the manuscripts. For instance, parts of the literature review are derived from the manuscripts to which they pertain. The four manuscript chapters contain minimal overlap with each other: each stands on its own merits and each is intended for separate publication.

The bridges between the manuscripts contain reflections or stories, written before, during or after field work in Wemindji. These bridges were written by G. Lucas Eades and are reproduced here for the first time without significant alteration.

CHAPTER 1: INTRODUCTION

1.1 Background

People have been making maps from time immemorial. The act of making a map is etched into what it means to be a human being. Indigenous peoples, ancient cultures, and modern civilizations alike have histories tied to making explicit, in graphic form, representations of territory, belief, navigation routes or land use (Woodward and Lewis, 1987). The making of maps in sand or on bark is coming full circle in our age of online sites producing ephemeral depictions for short term purposes, such as using Google Maps to find a shopping mall in a strange city.

Behind each and every map, however, lie data, housed in brains, bodies, or, in modern times, in databases (Stea et al. 1996). The externalization and systematization of embodied knowledge and data, and the tight coupling of that externalized data to the map, lies at the root of the development of Geographic Information Systems (GIS), which is defined as the processing, storage and analysis of geographic data (Bernhardsen, 1999, p.2). We are seeing new applications that merge online platforms (such as those on the Internet or on mobile devices) with the spatial analytic and organizing capacities of GIS. Thus, Internet maps produced on Google Maps may be defined as a new type of GIS known as the Geospatial Web (Portugali, 1996; Scharl and Tochtermann, 2007).

Indigenous peoples worldwide are coming to know, to use, and to embrace these digital geospatial approaches, called Geographic Information Technologies (GITs), as their own (Chapin et al., 2005; Chambers et al., 2005; Carlson, 2001; Duerden, 1996; Rundstrom, 1991, 1993 and 1995). New types of user-defined, interactive, online, distributed, and open source GITs are equally being viewed by indigenous peoples in many parts of the world as useful for

promoting their interests (Chapin et al., 2005). Those interests include controlling access to territories traditionally used for hunting, gathering, and fishing, knowledge of which has in the past been transferred from generation to generation orally (Ong, 1982; Sterritt et al., 1998; Cruikshank, 1990). In multimedia environments, which might include moving and still images, text, and audio, the way in which knowledge of the land is transferred may be changed, possibly quite drastically.

Indigenous peoples are adopting GITs and changing them to suit their needs. It is not, however, necessarily unproblematic to do so. Problems are compounded in two ways. First, GIS freezes and decontextualizes traditional situated knowledge (Basso, 1996; Pickles, 1995). Maps act similarly, but with GIS there is also reification (treatment as a material thing) of data within databases (Rundstrom, 1995). GIS turns a crisis of maps (Harley, 1989) into a more fundamental crisis of data (Harvey, 2008). Second, power in GIS acts similarly to military and colonial power to which it owes much of its development. This power is the same form of power responsible for much oppression in indigenous worlds (Blaut, 1993; Blomley, 2003). Both of these aspects of GIS have implications on the promotion of new information and communications technologies (ICTs) and on indigenous lives, especially of young people (Eades and Sieber, 2010).

GIS is but one of the new ICTs with profound effects on indigenous lives. These ICTs can be used in the outdoors in conjunction with activity on the land. The types of applications available through the Geospatial Web are numerous and heterogeneous. I will briefly mention four here, in order to provide some sense of the scope of the geoweb. iPhone location based service (LBS) applications work within hybrid phone-global positioning system (GPS)-internet-camera devices. The service notifies the possessor of the device when he or she is in the proximity of services, stores, or points of interest that match user defined preferences. An indigenous person on the land might furthermore use the camera on such a phone to automatically

locate a photo taken during hunting to provide a virtual community with feedback about their activities. A young hunter in training would then be notified, using a similar device, when he or she is in the proximity of a location in which an important event (such as finding a bear) took place. These photos might be uploaded to a photosharing site such as Flickr and geotagged (including x and y coordinates); others could view geographically specific images. Since they are geotagged, a person could view such visual and spatial information using a digital earth platform (such as Google Earth). These images and the associated digital geography could be viewed from home or in the field. The geospatial web could thus be used in conjunction with traditional ways of being on the land, for example, for wayfinding. Lastly, geoRSS (or a spatialized Really Simple Syndication) allows for geographic information culled from the Internet to be automatically provided to subscribers interested in receiving such information. An example of the use of geoRSS is the integration of point, line and areal data into a blog, which may then be included and automatically mapped onto both Flickr and Google Earth. Both Flickr and Google Earth would be available on the iPhone to act as virtual guides.

The four technologies mentioned (iPhone, Flickr, Google Earth, and geoRSS) have spatial aspects, and the potential to educate and excite youth about their heritage. Ample literature suggests youth are losing their connection to the land (Battiste, 2000; Miller, 2000; Mukash, 2008; Ohmagari and Berkes, 1997). Negative consequences of loss of connection to the land include loss of knowledge essential for self-determination and sustainability; decline in the mental and physical health of indigenous individuals; economic and physical dependence upon imported, processed and packaged goods; and cultural disconnection leading in some cases to apathy or despair (Adams, 1996).

Youth may be losing their connection to the land in part due to technologies that turn youth into passive tourists of their own heritage. The irony is that tools such as location-aware iPhones, geotagging on Flickr, digital earths like Google Earth, and GeoRSS hold the potential to

be very useful for introducing youth to traditional knowledge due in no small part to their popularity.

This popularity and utility suggests a role for geospatial technologies to be used for the transfer of knowledge from elders to youth. For example, Geospatial Web devices could provide augmented seeing, and might allow for re-envisioning the training elders provide to youth as an ‘other’ type of screen: the total screen of elder knowledge in addition to iPhone, mini-screens (Baudrillard, 2002). The two blended together (elder and iPhone screens) could overlay each other to provide indigenous peoples with quite cutting edge GIS capabilities. In the Geospatial Web especially, we see a technology that, while it has the negative potential of creating passivity, that very passivity can be turned to strength, can be rebuilt to promote positive potentials. This brings me to my primary research question.

1.2 Research Question

The primary research question to be explored in this project is the following: What is the role of the Geospatial Web in advancing the transfer of intergenerational indigenous knowledge? Four terms need to be defined from this question. First, the *geospatial web* (hereafter called the geoweb) is defined by Lake and Farley (2007, p. 15) as

an integrated, discoverable collection of geographically related web services and data that spans multiple jurisdictions and geographic regions. In a broad sense, the [geoweb] refers to the global collection of general services and data that support the use of geographic data in a range of domain applications

The geoweb is the geographic application of Web 2.0. The term Web 2.0 (O’Reilly, 2005) is related to the geoweb. Web 2.0 has been defined by Scharl (p. 14) as

a term that describes advances in Web technology governed by strong network effects and the harnessing of collective intelligence through customer-self service and algorithmic data management.

O'Reilly (2005) posits that Web 2.0 represents a break from the implied Web 1.0, a substantive change or leap from the earlier web paradigm. Whereas the earlier paradigm (Web 1.0) focused on one way transmission of information and static web pages, Web 2.0 brought dynamic database-driven web pages that allowed for users to add to, change, or actively shape the content and form of websites (called User Generated Content, or UGC; or Volunteered Geographic Information, or VGI). At the same time a more participatory geoweb has become possible with the advent of Web 2.0. The 'geo' part of web 2.0 enters precisely where geographically related web services are available, database- and user-driven. Thus it is now commonplace for users to create 'mashups.' A user with minimal technical expertise might use data from one source, but present it on a platform hosted by a third party, such as Google. In this way, a map of favourite monuments with geotagged pictures could be publicly posted (on Google Earth or Flickr) for others to interact with as they entered a city for the first time. A tourist with a location-aware device could be alerted to the presence of such data automatically. This would create an automatic participation that could be turned on or off depending on user preferences.

Platform independence means, however, that the website is much less important than it used to be. The website, in Web 2.0 is somewhat irrelevant, while the data becomes prominent. Data can be combined from different sources on any virtual 'background' whatsoever, and on any type of device. This does not, however, mean that the geoweb represents a clean break from

'traditional' GIS, since GIS is defined as the processing, storage, and analysis of geographic data (Bernhardsen, 1999, p. 2). GIS includes software, hardware, and techniques. It is characterized by various kinds of output, from visual display devices to tables and paper maps. The most pervasive metaphor (which is at the same time a technically precise term) of GIS is that of the 'layer.' In most GIS systems, there is a table of contents, which shows 'stackable' layers which can be turned on or off or re-ordered within the stack. Manual or automated analysis of patterns generated by the layering of different geospatial data sets can be either basic or advanced. Basic analysis often involves the use of Boolean logic (using the logical operators 'and,' 'or,' and 'not') to create intersections, unions, or exclusions within and between different data sets. Advanced analysis might include proximity or network analyses based on multiple criteria. Both types of analysis ultimately lend themselves to increased ability for managers, activists, or users to make highly informed decisions (Bernhardsen, 1999). On the geoweb, much of this work now goes on in the background, opaque to the user.

The geoweb and GIS are becoming increasingly integrated. For example, the standard for Google Earth and Maps, are Keyhole Markup Language (kml) files, which are easily transferrable to GIS and ArcGIS (the market leader for traditional GIS). These GIS contain tools for easy conversion between shapefiles and keyhole markup language (kml). Kml files and shapefiles both contain geographic information for specifying points, lines, or areas. Both refer to the real world using similar structures, and with a high degree of precision and abstraction. For instance, one (kml or shape-) file may refer to one and only one type of data. Furthermore, geoweb applications are often set up in a way very similar to GIS. In digital earths and like GIS, a table of contents shows the user which layers are active, and which layers lie on top or beneath which other layers. Two layers may not exist at the same level at the same time. Stacks of layers in the geoweb are increasingly being used not only for storage, visualization, and communication of geographic information, but also for analysis. These aspects of the geoweb are also aspects of

GIS.

There are some important differences, however, between GIS and the geoweb, highlighted by the fact that the geoweb is derived not only from GIS, but also from Web 2.0. An application like Flickr (a social networking site that allows for the sharing, tagging, and mapping of geotagged photos) does not have a table of contents with layers in it, instead relying on a system of thumbnails, tabs, and links. Algorithms and spatial databases, opaque to the user, drive Flickr, allowing for powerful and accessible User Generated Content (UGC). There is no capability for analysis or pattern generation, since this would ultimately run counter to the purposes of Flickr's user base, defined as the casual user with a non- or semi-professional interest in photography. The geoweb is thus a very diverse, diffuse, entity, not conforming to easy definitions. To answer my primary research question it will be necessary to envision the various, distributed geowebs that are not only 'out there,' but also those that are merely potential geowebs, not yet realized by the standard definitions.

The geoweb and, by extension, Web 2.0, is posited here to be a new type of GIS (or GIS/2) (Sieber, 2004). GIS/2 offers a flexible, participatory framework for user-driven geospatial processing and mapping. GIS/2 achieves this through the use of extensible markup languages (xml) and unified modeling languages (UML). Both of these aspects allow for flexible customization of basic GIS structures, for application to specific tasks, especially in progressive and grassroots organizations. The (radical) GIS technician is thus empowered in a way that more 'traditional' GIS did not allow before, since it was defined from the top down (by, for instance, ESRI), and was not very easily customizable. Where customizable features had been possible traditionally, they were subject to the whims of the market. With the advent of GIS/2, progressive organizations could claim partial victory as they seized the new tools for tasks such as local watershed management or environmental monitoring without the mediation of monopolistic corporations. Web protocols are being used to transmit and receive geospatial

information, acting as the infrastructures on which ‘traffic’ travels in cyberspace. In this way, GIS/2 was born and it retains some features of traditional GIS tools (defined above).

However, GIS is more than just a tool. Behind every tool lies science and theory that makes the tool ‘speak’. Both Pickles (1985, 1995, and 2004) and Latour (1987 and 2005) have discussed the ways in which science animates its tools. Behind every inert, seemingly neutral object, lie narratives. These narratives are the discourse through which tools move from being merely things to being objects for discussion, use, and discovery. Science cannot proceed without tools, nor can it proceed without theory. The way these two come together is a complex network informed by chance, power, and history. The same is true for GIS.

In this vein, and in the world of GIS, there are thus two main objects: GISystems (the tools) and GIScience (the science) (Schuurman, 2004). GIScience asks difficult questions, about objects, data structures, and about epistemology. Epistemology refers to the various ‘lenses’ GIS uses for knowing the world. Epistemology (how we come to know) and ontology (theory of existence) are what GIScience is about. The objects viewed by those lenses represent the current paradigm of GIScience. Different generations of indigenous peoples may become objectified within the lenses GIS and the geoweb offer. The representation of indigenous peoples thus may suffer under the tools without a proper calibration of the scientific theory behind the tool, referred to as GISystems.

GISystems are the practicalities of GIS. This is the popular image of what GIS is, including layers, buffers, and networks. GISystems facilitate data storage, analysis, visualization and output. GISystems are rapidly going online and becoming integrated with geoweb platforms such as Google Maps and Google Earth. Both systems and science aspects of GIS and the geoweb animate and inform my primary research question. In other words, I am not planning to simply build a tool and let people use it. This research aims to animate the geoweb through the scientific use of geoweb tools. Specifically, I will use the geoweb as an instance of a new

type of GIS, for asking and answering my primary research question (Wright et al, 1997).

Returning to the definition of terms in my primary research question I note that the term *advance* contains a few assumptions and will need careful definition. Advance seems to imply progress. Both GIS and the geoweb represent a shift from traditional oral to multimedia ways (Karaganis, 2007; Ong, 1982) of enabling that knowledge transfer. I argue that shift need not necessarily represent an advance.

Third, *intergenerational transfer* refers to the passing of information and knowledge from older to younger members of a kinship group or members of an extended family (Cavalli-Sforza and Feldman, 1981). The passing can occur by oral or by multimedia means. Oral means of transfer are spoken in conjunction with performance of an activity so that learning (the successful reception of the information) occurs without any inscription of information. Multimedia means of transfer, on the other hand, involve written or inscribed means for their reproduction, and include image, sound, hypertext, and cinematic means (Ong, 1982; Delueze, 1986; Caquard et al., 2008).

Fourth, *indigenous knowledge* means knowledge that is owned, passed on, systematized, performed, or deemed useful to groups of people who lived in well defined areas before the imposition of state boundaries and continue to live within the state-delineated areas today (Hughes, 2003). Continuity between present and past practices is an essential aspect of indigenous knowledge. A sub-question I will address in this research is the impact of the geoweb on continuity as youth abandon traditional practices by lack of participation on the land, or by moving away from their home towns (Condon et al., 1995). The geoweb might be a means for either strengthening the continuity or for weakening it. The first scenario is in keeping with what Laituri (2002) found in her research favouring GIS for use in marginalized communities. The second, negative, possibility would imply, on the contrary, that the geoweb increases the isolation of youth, while decreasing their participation on the land, thus ensuring

severed continuity. This remains, however, simply a sub-question, secondary to the question of how the geoweb may or may not advance the transfer of intergenerational indigenous knowledge.

The primary research question posed here directly addresses issues at the core of what it means to be indigenous in a rapidly changing, technological world. I turn next to a review of the literature relevant to answering the primary research question posed in this introduction.

CHAPTER 2: LITERATURE REVIEW

The literature review covers background material deemed essential to the main arguments of each of the four manuscripts, each of which, in turn, is directly related to the primary research question. In addition to GIS and geoweb literatures covered in Chapter 1 the following domains of literature are covered: memes; ethnography; and critical cartography.

2.1 Memes

Two aspects of the meme literature are deemed important for answering the primary research question. The meme is posited as a bundle of place based information that forms a unit of cultural inheritance. Through variations and deviations in memes, as they are transmitted between generations, evolution occurs. Without slight differences between memes in time, cultural selection would have nothing upon which to act. In this way, memes are analogous to genes. The major difference between genes and memes lies in the fact that genes are fixed at birth for an individual, while for that same individual his or her knowledge of memes may be very changeable (Distin, 2005). With these facts in mind, I therefore cover adaptive and evolutionary aspects of memes as well and as the literature on cultural transmission and evolution.

2.1.1 Adaptation and Evolution

In the 1970s and early 1980s Richard Dawkins legitimized the concept of the meme (Dawkins, 1976 and 1982). However, genes, not memes, were Dawkins primary interest. In the 1990s there was a resurgence of interest in memes and the creation of a scientific journal (*The Journal of Memetics*, published from 1997 to 2005) devoted exclusively to the study of memetics

(Blackmore, 1999; Dennett, 1995; Brodie, 1996; Aunger, 2002; Distin, 2005). After less than a decade the journal was no longer being published and it seemed as though the meme had seen its day, at least in terms of popularity. In terms of validity, memes have seen a steady trajectory of intellectual respectability up to the present day, despite the waxing and waning of popular opinion.

Distin (2005) is the greatest contemporary champion of the meme, though she is not the most well known meme theorist. Her book, *The Selfish Meme*, systematically and concisely works through many of the issues and stumbling blocks that earlier theorists proved unable to overcome. Most importantly, Distin points out that the meme is as necessary to culture as the gene is to evolution; that memes are particulate units, distributed in space and time; that memes exist both within genetically created minds and outside our brains in external representations; and that we need not fear memes determining our lives any more than we need fear genes determining our lives (Distin, 2005).

A meme is defined as a unit of cultural inheritance, in much the same way as the gene is a unit of biological inheritance (Dawkins, 1982; Distin, 2005). My claim in Chapter 5 will be simply that the meme is a useful and realistic way of explaining how place names are memorized, copied, transferred, and inherited between different generations of Cree individuals. This transmission process is posited to be primarily top-down, but as theorists of cultural transmission and evolution have shown, transmission also has oblique, horizontal and upwards vertical components (Schonpflug, 2009). In order to strengthen my claim in Chapter 5, that place names are transferred memetically, I undertake a short review of the cultural transmission literature next.

2.1.2 Cultural Transmission and Evolution

The field of cultural transmission has come into being quite recently (Shennan, 2002; Boyd and Richerson, 1985; Cavalli-Sforza, 2000; Cavalli-Sforza and Feldman, 1981). Advances

in psychological and methodological aspects are beginning to be published, but that advance is slow due to the complexity and diversity of disciplines involved in such research. With a basis in biology, cultural transmission is favoured by an established mathematical framework derived from the study of genetics (Schonpflug, 2009). Vertical, horizontal and oblique paths have been established as the primary routes for knowledge transfer, corresponding to peer to peer (horizontal), adult or elder to youth (vertical), and from adults or elders to youth who are not direct descendents (oblique). Combinations of types occur in real world situations, and are not limited to individuals directly acquainted with each other. Thus, various media and communications technologies become a form of oblique transmission, for instance, for individuals watching television in a place far from where the depicted images and broadcasts occur.

2.2 Ethnography

The ethnographic literature includes that which specifically examines place names (Basso, 1996; Thornton, 1997; Meadows, 2008). It also includes literature pertaining to human and cultural ecology (Berkes, 2008; Wenzel, 2008) which is relevant to analysis of traditional and local knowledge systems. Lastly, I review ‘reflexive ethnography’ (Davies, 2008) essential to the overall ‘landscape investigation methodology’ used in the field during research, starting in Chapter 4.

2.2.1 Place Names

Hunn (1994 and 1996) has published some controversial findings with regard to place names, and the human ability, individually and collectively, to store and use those place names. I use Hunn’s insights to inform analysis of the ‘toponymic carrying capacity’ of Wemindji residents on an individual basis and together as a whole in Chapter 5. Specifically, Hunn (1994) identified the number 500 as being ‘magic’ in the sense that one human being has the capability

of handling roughly between 300 and 700 place names. This limitation is chalked up to the semantic space needed to store place name information. I accept that there is a limit to the number of place names an individual may interact with meaningfully, while realizing that it would be very difficult to identify the upper limit with any certainty. Assuming that one limiting factor to individual place name capacity is indeed semantic or information space usage in the human brain, I posit that it is the memetic nature of place names that dictates high information usage.

Memes require representational content in order to function. This content includes not only the name of the place, its meaning and the exact location of the place, but also associated image, story, and textual information that form mental maps (Brody, 1981). A place meme is thus a place name plus the additional associated information that is part of most meaningful places. Basso's (1996) observations of the Western Apache corroborate our assertion that there is much more to a place than its name and location. For the Western Apache, place names are rich associations or webs of information which the utterance of the name evokes. Thornton (1997 and 2008) describes how place names go further than names towards being-in-place, dwelling, and life projects. In short what this means is that memes matter for place names.

2.2.2 Human and Cultural Ecology

Human and cultural ecological writings provide a necessary piece of scaffolding for the present study, especially the partitioning of knowledge into old and new that occurs from Chapter 4 onwards. Natural or human ecologies are often described as 'webs' (Carlson, 2008; Nardi and O'Day, 1999). Therefore, in Chapter 4, I named old knowledge as geoweb 1 and new knowledge as geoweb 2, in order to show both compatibility and difference between the two knowledge systems. Both systems work as ecological webs, and there is continuity between them as well. Spatial information processing ultimately comes from human brains. Only later is that

information externalized into sophisticated technological systems (Scharl and Tochtermann, 2007).

This logic is taken one step further in Chapter 5 and, using a concept developed by Berkes (2008), I name geoweb 1 traditional knowledge, and geoweb 2 local knowledge. Traditional knowledge is inherently intergenerational and thus represents old, established, knowledge. Local knowledge is recently generated, not yet transferred beyond one or two generations and thus, for the purposes of this paper, may stand in as a proxy for youth knowledge. Wenzel's (2008) community/settlement distinction is also useful here. In Chapter 5, I describe a process of local knowledge generation, settlement and centralization leading to the creation of new traditions alongside the old traditions.

2.2.3 Reflexive Ethnography

Reflexive ethnography is an ethnography that includes reflection upon the position of the researcher(s) in relation to the 'objects' or the 'others' they are studying. See Davies (2008) for descriptions of ethnographic settings reflected upon by a researcher situated in the context of a local culture. Of particular interest here are participatory and visual approaches which have been adopted as part of the methodology of Chapter 5.

Brody's (1981) classic study of northeastern British Columbian indigenous cultures remains an excellent example of what reflection has to offer ethnography. I adopt Brody's method of thick description and participation in local culture. Brody's writings are explicitly geographical as well. His main arguments are backed up by clear and concise spatial depictions (maps) with layers of information separated on different pages, then combined at the end to bring home the full force of his argument. Brody noted that traditional use studies mapped the extent but not the intensity of indigenous uses of lands. In Chapter 5 I extend Brody's argument into the realm of cultural intensity by examining place names ethnographically and quantitatively.

2.3 Critical Cartography

Like critical pedagogy (Freire, 1970), critical cartography makes maps into co-productions that break down user/producer dichotomies. Thus conceived, the map becomes a device for the assertion of power as much as for the empowerment of the user. But some maps, by their design, preclude empowerment because of the erasures, silences and gaps that they include. In response to such lacunae, indigenous groups have developed counter-mapping, a method for putting back the peoples formerly excluded from maps (Peluso, 1995).

Maps as assertions of power, and the analyses of such maps, have relied upon postmodern theorists, especially Foucault (1990 and 2005). According to Foucault (2005), discourses of power are arranged in formations or groupings that mask their power through the naturalization of statements that always occur in the context of other statements. Statements include verbal utterances, diagrams, art, and maps. In a later work, Foucault (1990) describes power as diffuse and with many handles upon which it is leveraged. Maps are one such handle. Critical cartographers (Crampton, 2003 and 2010; Pickles, 2004; Curry, 1998; Harley, 1989; Wood, 1992) do not confine themselves to maps for their insights. Instead, and in keeping with Foucault's writings on Discourse/Power, the formations of power implicate a whole order of geospatial technologies inside and outside of bodies, machines and territories.

The term 'Discourse/Power' is used here in a conscious effort to avoid entrenched Power/Knowledge terminologies in the Foucault (1980) literature. Discourse/Power represents a bridge between early and late Foucault, whose writings before the mid-seventies focused on discursive formations of knowledge to be uncovered in archaeological fashion (see especially Foucault, 2005), subsequently shifting to a focus on power (Foucault, 1990). By using a hybrid entity (Discourse/Power) to examine maps, I bring together two powerful tools from the Foucault

literature. *The Cambridge Dictionary of Philosophy* (Audi, 1999, p. 321) explains Foucault's decision to shift his focus from discourse to power as being driven by the lack of an account of shifts or changes from one system of knowledge to another, and so

he introduced a "genealogical" approach, which does not replace archaeology, but goes beyond it to explain changes in systems of discourse by connecting them to changes in the non-discursive practices of social power structures

Critical cartographers tend to focus on late Foucault's (1980) *Power/Knowledge* to the exclusion of the discursive and archaeological methods of early Foucault. The creation of a bridge between early and late methods is considered necessary for providing a balanced discussion of both the embedded nature of maps in everyday Cree life and the ways in which those maps challenge existing power structures.

The Cree are critical cartographers, using maps to discuss important local matters, to plan travel on the land, to transfer knowledge about the land from older to younger generations, and to counter-map powerful outside interests and incursions. Mapping is part of everyday life in Wemindji and, as such, has been internalized to the point where the Cree can be referred to as 'critical cartographers,' 'counter-mappers,' or simply 'mappers.' But in applying such phrases to Cree individuals, an uneasy terrain is being navigated. Muller-Wille (2001) and Drummond (2001) both explore paths across such terrain and how naming and toponymy represent both the foreclosing of indigenous interests (because it is inscribed and thus frozen) and an opening of possibilities for the same indigenous groups (because the inscription gives validity in a 'Western' legal context).

The utterance of a place name by an elder in the presence of youth is an instantiation or initiation of knowledge transmission. The inscription (writing down) of that place name on a map is an instance of counter-toponymic discourse (Muller-Wille, 2001; Drummond, 2001, p. 45), especially when done in a systematic way. Place name utterance between generations in conjunction with (counter)toponymic inscription belies a balancing act between technologies of the (Cree) self and (cartographic) technologies of the state (Foucault, 1997 and 2007). This conjunction may become taken for granted in the sense that the rules of intergenerational naming and inscribing become normative, becoming the way things ‘are’ or ‘should be.’ The empowerment associated with the utterance of a place name has come to be associated with an automatic countering of the power of the state to erase or delegitimize processes of oral transmission, knowledge preservation and conservation (Sterritt et al, 1998). In this way, Cree with relationships to the land bolster that relationship using a combination of mapping techniques that embed oral traditions of naming with inscribed, newer ‘traditions’ of a naming that are now involved in maintaining identity in the face of massive change.

In eastern James Bay, because of a long history of interaction with ‘outsiders’ and ‘newcomers,’ with colonizers and state representatives, the Cree must constantly navigate between revealing too much and revealing too little, between naming for themselves in order to keep traditions alive, and naming for others (colonizers, the state) in order to assert power and achieve desired ends in and through the landscape.

In Foucault’s (1997) parlance, a ‘technology of the self’ is a way of disciplining oneself, a procedure that has changed through history from Greek to Roman to Christian times. For the Stoics, technologies of the self included writing in order to list the ways in which the writer had improved himself, the intended audience not necessarily any wider than the reader of his own reflections. Thus writing about oneself strengthened that self and improved it through the process

of self-examination, reflection and action without renunciation. The Christian self is very differently constructed. With Christianity came a renunciation of self through its construction as a sinning entity. This technology of renunciation operates from earliest Christianity to present times and is bolstered by church apparatuses, clergy and power structures. In Christian churches, subjects construct themselves as sinners whose only salvation is to admit to their sins not only to themselves, but to representatives of the church (Foucault, 1997).

Through colonial times, many Cree became Christian, embedding Christian views and values into everyday life (Morantz, 2002, p. 73-96; Carlson, 2008). Indeed, sweeping changes were seen as colonial forces, operating through church, economic and political forces reconfigured the cultural landscape of James Bay, and added a symbolic layer of Christianity and capitalism to the underlying and embedded Cree worldviews and ways of life. Thus a uniquely Cree Christian subject formed at articulation points between those powerful forces mentioned above. As colonial power gave way to state power (Morantz, 2002; Francis and Morantz, 1983), Christian technologies of the self, those created by the bible and the church's insistence on the repentance of sins, were very much a part of the everyday lives of a large number of Cree individuals in James Bay.

Another overlay was provided as state power began to dominate in the north of Canada and direct European colonial domination faded (Morantz, 2002). A technology of the state came to interact with Christian/Cree technologies of the self. This is best illustrated by two examples of State/Cree interaction I observed during the winter of 2010. The first is a GIS place names project taking place in the museum in Chisasibi, Québec; the second is a group interview that included myself, two trapline bosses, and a Cree woman who also provided translation from Cree to English.

The GIS place names project in Chisasibi was brought to my attention by a Wemindji resident, a former co-worker of the museum director in Chisasibi. I met the museum director and discussed a project employing two full time GIS technicians charged with creating and maintaining a database of place names in Chisasibi hunting territories. According to the director, similar projects are taking place in all Cree territories east of James Bay, and they all involve GIS. The outlines of these projects here are schematic. This does not diminish the value of a discussion of their import for the Cree vis-à-vis the State. The State here refers to either or both of Canada and Québec. Cree place naming does not distinguish the two because the act of naming is positive; it is both validated and verified by Cree elders and by the act of placing the name on a map and inscribing it into a database.

The scale of the place naming project is important because it takes up a large portion of the territory controlled by Québec, a broad swath south of Inuvik and north of the urban and agricultural centres of French speaking Québec with European origins. In a more negative sense, then, the act of naming a place by its utterance in conjunction with its inscription on maps and in databases, counters the power of Québec to name those very same places using toponymic commissions, cartographic technologies and personnel. Disciplining technologies of the 'state' of Québec lose absolute authority when countered or supplemented by 'other' names attached to the same points on maps. The same holds true of Cree place naming in relation to Canada. An overarching power, asserted repetitively in the form of circulating representations of its territorial and sovereign reaches, is countered through the simple act of uttering a name passed down through generations going much deeper back in time than what the lines on federal maps convey.

Cree technologies of naming, now making use of cartographic technologies introduced by the very states they aim to counter, are technologies of the (Cree) self insofar as they let the Cree individually and collectively 'confess' to the fact they their ancestors lived on and moved on

and had a relationship with a very differently constructed landscape hundreds of years before European explorers and kings had any inklings of what lay on the far shores of their homelands. This so-called confession, using inscriptive cartographic devices of the state, re-iterate the syncretic nature of Cree beliefs (Carlson, 2008). Many Cree believe in the power of maps in the same way that they believe in the power of religion, and they do so in a way that is controlled from within the self and the community. The pan-Cree project of comprehensive place naming in their traditional hunting territories is part and parcel of an ongoing continuity of adoptions of technologies and adaptation of those same technologies (of the self, of the state) to local needs.

The second example of Cree/State interaction I wish to explore took place in the home of a well known and respected Wemindji tallyman. This individual is particularly well known because of his 'old style' of year round (but discontinuous) residence on the land. On an adjacent trapline, another tallyman is responsible for a large swath of land rich in wildlife, recreation opportunities, scenic beauty and many other valuable attributes. These two tallymen are friends, and part of their 'job,' as they see it, is to discuss evidence of incursions of 'outsiders' from mining companies. This evidence ranges from helicopter landing constructions to sightings of aircraft to observation of residual materials such as flagging, waste or tracks.

Sitting at a kitchen table covered in maps, the two tallymen had a discussion while I and my Cree translator listened. One large map depicted traplines; it was a standard locally produced GIS map with colorful lines and polygons showing territories, rivers, bays, topography and other basic features useful for locating and describing events. A second map was also probably produced by GIS, but this one had been made by a mining company, and it was being used here to try and explain why mining companies would want to be exploring in the hunting and trapping territories of these two tallymen. A couple of red 'intrusions' were outflanked by wide swaths of

green, and a very complex legend explained a number of other colours present or not (presumably some existed on other maps in a series of maps not seen here).

Gestures and stories flowed across the maps, punctuated by fingers pointing out particular places where events took place. The descriptions of mining company incursions were meted out slowly and were reiterated a number of times. Interspersed with those observations (and translated to me by the Cree woman beside me) were stories about relatives from past times; about one who died in a particular place, a rough spot on the river, and how she was buried near a large rock. That place was pointed out and its name was spoken, the names of relatives who had survived the ordeal were also spoken. This tragic tale was immediately followed by an inventory of good places to fish or hunt, fingers tracing down waterways to the coast. Jokes were told, themes were returned to over and over again. If a legend of this afternoon could appear on its face, like on a map, it would have looked like a strange and winding thing, not like the square and lined up thing on the garish map we barely looked at, the small one from the mining company.

What our afternoon meeting of a couple of hours represented was positive action to protect Cree interests in the land, of livelihoods and relationships of trust built over generations to protect and conserve the very fragile bounty it hosts, sometimes contains, and sees pass through to other places far and wide and interconnected. Industrial forces are a very recent addition to this landscape, and like state powers, they bring with them disciplining technologies that the Cree are adopting and adapting to their own needs. Thus, these two stories illustrate the power of maps to ‘map onto’ Cree interests, beliefs and continuous transmission of knowledge.

Where critical cartographers posit the possibility of resistance to power, it remains merely a possibility in the literature; in Cree lands and lives, resistance to power is an everyday lived reality. In closing this discussion of critical cartography, I review a few more examples of where the literature falls short of its potential for robust and positive empowerment. For Abrams and

Hall (2006) art and design are produced by transgressive subjects mostly in urban settings. Dodge et al. (2009) have a very theoretical approach, but do include much needed reworkings of participatory mapping. However, some of their material recapitulates that of Abrams and Hall (2006), with a seemingly abject urban art standing for resistance to power structures and grids that confine subjects that have been ‘mapped out’. In a very scholarly vein, Akerman (2009) has guided a volume on cartography that allows for resistance in the form of indigenous maps, but these maps are mostly posited as mappings of the ‘Other’ as opposed to colonial/imperial maps produced at centres and nodes of calculation and power. The common thread from all these volumes is the lack of a robust assertion of empowerment through art and maps, not only from the margins, peripheries and borderlands of empires, but from the very centres of nation-states, cities, and other powerful places alike. In Chapter 6 I address this problem fully.

With the background established in terms of the relevant literature, I now turn to my first question (of how indigenous peoples harness the power of mapping technologies such as GIS and the geoweb) and to an exploration of geospatial technologies and the representation of Cree knowledge.

CHAPTER 3: GEOSPATIAL TECHNOLOGIES AND THE REPRESENTATION OF CREE KNOWLEDGE (MANUSCRIPT 1)

3.1 Geospatial Technologies and the Representation of Cree Knowledge

Geographic Information Systems (GIS) have been used by many indigenous groups in Canada and around the world since at least the 1990s. By the mid-1990s articles and books including summaries or case studies of uses of GIS by indigenous groups for particular regions were frequently being published both within and outside of academia. These studies often included summaries and specifics of the uses of GIS, grouped in various ways depending on a variety of *in situ* needs or concerns, from traditional use studies to material and technical support for land claims proceedings; from the production of databases and documents supporting self-determination, sustainability and identity to the creation of structures of participation aimed at making geospatial information empowering for whole communities rather than just a few individual experts (Duerden, 1996; Brealey, 2002; Craig et al., 2002; Chambers et al., 2004; Eades, 2005).

Given both indigenous uses and more general-level engagements of GIS (including Public Participation GIS or PPGIS) it would seem that something about GIS is compatible with indigenous concerns or interests. Indeed, GIS has been shown to be compatible with the representation of traditional land uses for the purposes of proving continuous land use and occupancy. Often this type of GIS mapping and database creation is entangled with court cases involving provincial or federal governments (Gagnon and Rocher, 2002; Scott, 2001; Sparke, 1998 and 2005; Sterritt et al., 1998), but has arguably just as often to do with asserting an economic place within a globalizing economy (Blaser et al., 2004).

This chapter will first outline a definition of GIS and its various components, the structure of GIS knowledge production, and other technologies that support or play a part in the function of GIS. Second, we delve into matters of knowledge, specifically, how indigenous knowledge is represented by GIS. This takes us into aspects of epistemology and ontology, and the ways in which indigenous and GIS knowledge constructs and building blocks do or do not fit together. Third, knowledge in a GIS environment is intricately caught up in powerful global networks. How the Cree of eastern James Bay are harnessing this power, and adapting it to their own needs, is approached in the final section of this paper, which is a case study on the uses of geospatial technologies for the transfer of traditional and local intergenerational knowledge.

3.2 What is GIS?

Given the pervasiveness and importance of GIS to indigenous communities for the purposes of empowerment, self-determination, and sustainability, it is important to examine precisely what comprises GIS. A definition of GIS is necessary for two reasons. First, we distinguish between what GIS is and what it is not in order to verify whether or not a given technology has a good chance of serving indigenous interest in any given instance. While many non-GIS technologies may in fact be very worthwhile for representing indigenous knowledge systems and claims to territorial use, these very same technologies may lack features essential to the task at hand. For example, the exclusive use of Global Positioning Systems (GPS), without a link to a larger system for organizing the data collected by the GPS would not be sufficient for the purposes of many First Nations or indigenous groups. Often GPS is conflated with GIS, and it must be made clear that these two technologies are not the same, and represent two very different parts of the larger category of technology called Geospatial Technologies (GT). It is not the primary purpose of this paper to explore all the intricacies of GT, but instead, one of our purposes is to identify relevant features of GT as a rapidly developing and expanding field.

As Schuurman (2004) notes, GIS refers to two different entities: GISystems and GIScience. The latter is the theory behind the former. GIScience involves the hard questions, such as how are objects defined in GIS, why do we choose certain data structures in GIS, and who is it that does the ‘knowing’ in GIS? These are questions of epistemology and ontology. GISystems, on the other hand, are the practicalities, and the nuts and bolts, of doing GIS. GISystems are what the popular image of GIS is composed of: layers, maps, and databases. GISystems are the tools that allow for data storage, retrieval, analysis, and output. GISystems are increasingly going online in the form of new software products from traditional GIS vendors such as the Environmental Systems Research Institute, and in the form of free products such as Google Maps and Google Earth (Schuurman, 2004).

We therefore note that in a globalizing world driven by technological change, there is the risk that technologies will evolve into something new. The suite of technologies and approaches referred to as the ‘geospatial web’ (or the geoweb) is a case in point (Bar-Zeev and Crampton, 2008; Scharl and Tochtermann, 2007; Sieber, 2004). That these technologies are new and evolving is not in and of itself a bad thing. However, it is uncertain as to whether or not the geoweb, or parts of it, may, now or in the future, be referred to as GIS. In the meantime, many indigenous groups around the world are increasingly turning to geoweb approaches, such as Digital Earth, in order to show or represent their interests in the land and water (Butler, 2006). In the community of Wemindji, Québec (which is the subject of a case study below, and which will be referred to often in the course of this paper) GIS is a part of a community of local ‘experts.’ These individuals work mostly in the local band office where administrative, environmental, tourism and other offices are located. At the same time, Wemindji is seeing a burst of activity and the increasing use of geospatially enabled technologies such as cellular telephones, satellite dishes and GPS devices by community members outside the band office administration. These

devices hold the potential for integration with each other and with GIS, but this potential has not yet been fully realized in Wemindji.

The functionality of GIS is related to certain ways of knowing. GIS represents a powerful way of knowing the world. But to use GIS is to speak a certain language, that of GIS (Schuurman, 2004). Like an English speaker, the speaker of GIS-language may not realize the empirical tendencies inherent to their 'native tongue.' While GIS may be used to visualize land use or health, the assumptions behind how boundaries are shown, or how health is portrayed may go unexamined. Similarly, an English speaker traveling overseas will be faced with barriers to understanding when arriving in foreign places. It requires a major feat of effort for the English speaker, and similarly for the GIS speaker, to come to terms with his or her own 'way of knowing.' Ways of knowing in GIS are to some extent tied to quantitative and positivist Western science (Rundstrom, 1991, 1993 and 1995). Recognizing the limitations and abilities of GIS, however, only makes it a more powerful tool for representing values. And indigenous peoples are increasingly making use of GIS for representations of their own values and interests in the land and water. These take the form of databases of place names, areas of traditional use such as plant harvesting, hunting, and fishing; and the orchestration of information from a variety of non-indigenous sources about resources and activities impacting their territories and interests therein.

In Wemindji (as in many other places in northern Canada) there is only one GIS expert in charge of such information. This individual also has a wide range of other responsibilities which reduces the amount of time that can be devoted to GIS. We posit here that one reason for this situation is that GIS is a rigidly bounded entity that is cut off from the day to day activities of the whole community. The files and layers of spatial information relevant to the community as a whole are locked in a room. One of the purposes of this paper is to show that such a situation need not arise, especially with the advent of secure geospatially-enabled participatory mapping

systems. Traditional activity on the land is being shaped by new geospatial technologies that would mesh very well with existing GIS in the community of Wemindji.

The traditional territories of indigenous peoples may not look the same in GIS representations as they do on the land. The map can never replace the territory. Rather, map and territory mutually inform each other (Pickles, 2004). GIS and the geoweb represent advances in many ways over traditional cartography, which tended to 'freeze' knowledge onto sheets of paper. GIS and especially the geoweb are more dynamic. However, this is only true in the sense that the geoweb can be more rapidly updated, and does not require printing. An assumption to the geoweb, it must be noted, is that it requires both power and access to computers, no small issues in many places where there are inequalities of access (differential access based on class, race, gender or some other social attribute). Without power or access to computers, GIS may in fact become a disempowering technology. Add to this the fact that the geoweb does indeed freeze knowledge, but in a more subtle and unseen way, in the database. The residents of eastern James Bay, by navigating and being on the land in conjunction with cell phones, GPS and satellite TV, are participating in creating ephemeral maps traced into the surface of the land and water in databases and 'clouds' in distant places.

Indeed, the geoweb, with its incipient GIS-like abilities, may now be envisioned as a new type of performed map, much like older maps, made since "time immemorial" by indigenous groups around the world (Woodward and Lewis, 1998). Maps on cell phones, and on computer screens, are now made in an instant and used for specific purposes after which they leave traces in the memories of our brains and our central processing units. In this way they are like paper maps, simply the map author's representation or depiction of a spatial event or a journey. But they are unlike paper maps which were less readily revisable and imposed different tempos and possibilities of discourse and power. Ultimately, GIS and the geoweb must act in tandem, to

assert and build each other's strengths, while bolstering in areas of weakness. Where paper maps are needed, GIS will be essential. Where freezing is still necessary, but without paper, or long term security of the spatial depiction, the geoweb's database should suffice.

3.3 Knowledge and the Representation of Knowledge

Knowledge is powerful. Knowledge can be used as a tool of power, and it can be both empowering or disempowering. Foucault (1980) explored the first aspect of knowledge (as a tool of power) in depth. Power has many locations, is diffuse, and comes in many forms. If power is thus everywhere how can it be used to advantage? Those in powerful places often have the time and resources to use their power to make money or influence people for their own benefit (Braun, 2002). The less powerful marginalized people of the world, including indigenous people, often have a harder time getting a 'handle' on power. This observation led to theorizations of power as flowing only from the top down. Foucault himself was challenged to explain how his theories addressed this problem, since they often merely described power without theorizing how power might be used to empower the marginalized and oppressed, who, at any rate, already have their own *a priori* and proven knowledge systems from pre-contact times. In post-contact times, however, the question of what knowledge is powerful and in which contexts becomes a much trickier and more complex terrain, a double edged sword with multiple strengths and drawbacks for often embattled minority groups.

In Wemindji older, traditional, knowledge systems working in tandem with newer geoweb and GIS technologies represent a potentially powerful handle upon which to leverage Cree knowledge and interests in the land and water. But old and new knowledge often work at cross purposes too. Elders and adults often express dismay at the direction cell phones and TV

are taking youth. But distraction and disengagement are not inherent to these technologies and it is a daunting and exciting new challenge, that of turning potentially disempowering technologies to advantage, that now faces local educators, parents and mentors in eastern James Bay. The primary author of this paper found, during his two seasons' ethnographic and mapping explorations of the town and surrounding territories, that the community perceived digital devices as having both positive and negative impacts on youth. Phones in schools were a distraction, but on the land the same phones could be used to coordinate and augment traditional activities.

Cavalli-Sforza and Feldman (1981, p. 34) have described a process of diffusion of innovation as occurring through knowledge. Those with knowledge are in a perfect position to benefit from new innovations, regardless of other ways in which innovations spread, such as contact with individuals possessing the innovation. Knowledge and the representation of knowledge on TV, radio, and in newspapers, allows for diffusion of innovations to occur much more quickly. This aspect of knowledge (or perhaps 'connectedness' is a better term) is truly empowering, and it may be occurring in northern towns where Google Earth, social networking, and web 2.0 (Reilly, 2005) are quickly gaining in popularity. Web 2.0 is an internet paradigm wherein users become empowered as producers of information that actively shape the websites with which they interact. Thus, users may now generate content and volunteer information that others may in turn interact with, comment on, tag, or update.

In Wemindji, the internet is a powerful tool for disseminating knowledge about new ways of making maps. Findings indicate that maps are in high demand, especially those depicting specific individual territories and those that display aspects of tradition or community. For instance a three day walk, called *kaachiiwaapechuu* (going offshore) takes place each year, taking participants from the new town site to the former location of the town on an island in Old Factory Bay. *Kaachiiwaapechuu* is an act of remembering that is performed on the land. Again, the

primary author participated in and mapped the walk in 2010, returning with a GPS produced line which was subsequently overlain onto Google Earth imagery and entered into a local art show. This map generated a good deal of interest in Wemindji, and it was seen to dovetail well with local art, most of which was found to be spatial in nature. Additionally, the art demonstrated that the creation of landscape art (or 'landscape maps') by all ages of Wemindji residents represented a mechanism for transmitting traditional knowledge about the land from older to younger Cree individuals. These 'landscape maps' were powerful creations used not only for local empowerment but also as a way to counteract very rapid new technological knowledge that sometimes seems to risk, in all its zeal and unstoppable force, the erasure of old knowledge systems as the community makes way for the new.

Maps act as handles for concentrating or leveraging powerful knowledge. Maps condense and crystallize power. Maps used in this way are often called counter-maps, providing a form of counter-power to hegemonic (dominant) forms of power. An example of a counter-map is the Gitksan-Wet'suwet'en atlas created by two First Nations groups in northwestern British Columbia (Sparke, 2005). The insertion of traditional place names into traditional cartographic products (with contours, legends and texts) served to upset taken-for-granted cartographic categories such as east and west. East/west distinctions in the world of northwestern B.C. Indigenous groups break down as the 'up' direction of the map is west, the direction from which salmon returning from the ocean swim.

Not only maps, but GIS and geoweb approaches to mapping may be used to get a handle on power, to empower, and thus to counter-map. Recent advances on the geoweb make it even easier to upset geographic assumptions. Google Earth provides a very easy interface for shifting the 'up' direction, now in three dimensions. Thus, while GIS is itself a worldview, with its own language and assumptions, it might be used to envision other worldviews that do not share those

assumptions. This requires the GIS user to go beyond GIS as a tool or a system, into the theory of GIScience, and the ways in which GIS can be used not as a tool of hierarchical power, but as an empowering technology for self-determining activity on the land.

3.4 Epistemology, Ontology and GIS

The purpose of this section of our paper is to explore a wide range of compatibilities and differences between indigenous and GIS ways of knowing. This section offers a variety of contexts and frameworks for envisioning how and why indigenous peoples might adopt GIS for their purposes, freely and willingly, or conversely, why they might feel a more subtle or coercive pressure to conform to perceived needs based on what ‘outsiders’ or ‘others’ are doing with GIS. Theories of knowledge may account for an array of similarities and difference between not only knowledge systems, but between the social attributes of particular groups and their relationships not only within Canada, but within a global context as well.

Epistemology is the study of knowledge (Foucault, 2002; Audi, 1999). The mechanisms for maintaining knowledge include but are not limited to the human senses, thought processes, and cultural artifacts such as art and technology. Indigenous epistemologies include all of these ways of knowing, but the specific manifestations are different from dominant or Western epistemologies. Art and technology in indigenous (and, indeed in many non-indigenous) contexts are influenced by traditions and processes taking place in local regions over long periods of time, are symbolically constituted (Preston, 2002). Indigenous technologies, for instance those used in building Cree dwellings such as the *miichiwaahp* (teepee), *shaakiwikimikw* (elongated dwelling), *wiishkichaanichiwaahp* (wigwam), *miihtukaan* (long term dwelling) or *pipunikaan* (winter dwelling), are traditionally very different from technologies used in building skyscrapers

(Georgekish, 1996; Miller, 2000). The tools and materials we use, and the structures that result, at once affect our epistemologies and are products of those epistemologies. While tools and materials are constantly evolving, as seen for instance in the use of metal, processed wood or tarps to make traditional Cree structures, it is the structure that does the epistemological work, and informs the difference, in terms of habitation, that we know.

GIS as a scientific and cartographic tool is implicated in knowledge production. It contains a set of assumptions that construct a context for knowing. GIS operates on our bodies and our brains. It affects how we behave and how we think. Furthermore, there are commonalities between GIS and indigenous epistemologies. There are ways the two can work together for mutual benefit. Both GIS and indigenous epistemologies value vision, clarity, and time (albeit in somewhat different ways). The main difference of course is that GIS is a representation of reality one step removed from direct perception, whereas indigenous conceptions of time are directly embodied through the senses in the course of experience (Rundstrom, 1995; Woodward and Lewis, 1998).

One of the strengths of GIS is its ability to quickly visualize large quantities of data. GIS relies on a metaphor of seeing and depth in order to do so. Maps have also always relied on such metaphors. Thus we see into, and analyze large packets of data through the use of GIS. Three dimensional layers, easy to manipulate in computing environments only add to the power of the software to help the user 'see' spatial data from all angles and viewpoints. Large quantities of data stored over time can accumulate in the computer memory, allowing for a time element to spatial data. In this way, for instance, types of land use can be tracked over time through the use of snapshots take from above by satellites or airplanes.

The human brain is similarly equipped to visualize, and 50% of our brain cells are devoted to such tasks (Schuurman, 2004). We have depth perception, and we have the ability to

remember, and our brains are in some ways structured like maps (see Edelman, 1989 for the discovery that brains are physically structured like maps, a discovery that cannot have contributed to how maps are made since the discovery was made much later in human history than the advent of mapmaking). However, large differences remain between GIS and indigenous epistemologies. The largest one, perhaps, is the ‘view from nowhere’ (Curry, 1998), indicated by the ability, in a GIS environment, to move to any view point instantaneously. This very useful feature of GIS is of course not possible in reality. In GIS, it can lead to a sense of an omniscient and omnipresent objectivity, disembodied from any specific knower. In other words it can lead to a sense of the GIS user having access to god-like powers. The drawback is that those who are all-knowing are beyond questioning, since it is assumed that they know everything. In this way, GIS paradigms harbour the potential for priestly power in the form of experts who know, and in the form of powerful and flashy software and hardware that only adds to an aura of knowingness.

The points just made with regard to GIS all-knowingness must be differentiated from a point about acquaintance by description versus acquaintance by experience. An experienced hunter does not become lost, or knows what to do when he or she becomes lost in part because they know the land from experience so well. But this hunter will also have knowledge from description, knowledge from stories heard. By calling the stories to mind, and acting on that descriptive knowledge, the hunter will fare much better than working from experience alone (especially if the hunter has never been lost before). Knowledge by description has nothing to do with all-knowingness, or god’s eye points of view.

Many of these points were raised by Robert Rundstrom (1991, 1993, and 1995) in a series of papers published in the mid-1990s, pointing out the vast differences and incompatibilities between indigenous and GIS epistemologies. Rundstrom’s insights remain valid and current despite the passage of time. However, in the last few years significant new approaches to the

problem of incompatible epistemologies have appeared. Ontological research into knowledge systems has taken the debate to a more foundational level, to the level of language and worldview (rather than epistemology's focus on knowledge and paradigm).

Ontology is a theory of existence (Quine, 1969; Sartre, 1984 [1943]; Heidegger, 1962 [1927]). Before a knower can claim to know something, one must define the set objects and relations that are available for knowing. The ontological step of defining objects and relations is logically prior to epistemology. There are two senses of the word ontology. The first is philosophical, while the second is an engineering sense of the word. Philosophically speaking, ontology is a way of discussing the world in fundamental terms of what exists and what does not exist. Thus, existentialism is an ontological endeavour. Indigenous worldviews have an ontology describable in this more philosophical sense. Indigenous ontology assumes that the world of animals and people is one and the same, that in fact animals are people, who occasionally give themselves as gifts to human hunters. Animals and humans exist in a relationship filled mixed with respect, tension, and sometimes fear (Nadasdy, 2007). Furthermore, in Cree worldviews, the distinction between animate and inanimate objects is not as important as in Western worldviews. Thus the weather and the physical environment are spoken of in similar terms as those used for living entities (Scott, 1983). These entities guide and give of their knowledge as gifts to the human people inhabiting the world. The concept of 'the gift' is difficult and abstract, and it is the aspect of indigenous ontology that is seemingly the most abstract and the least open to explicit, observable conceptualization (Mauss, 1970). As such, it is also the least compatible with engineering ontology, which relies on the explicitness of concepts (not implicit or spiritual) for its conceptualization.

One significance of Cree worldviews for GIScience might be that spiritual knowledge may be difficult to represent. GIScientists will be challenged to find ways of representing non-

material objects or entities, or those with fuzzy boundaries. Certainly, the GIS world has faced similar issues and attained technical and theoretical solutions to very challenging ontological and epistemological issues (Wilson and Fotheringham, 2008). For example, spatial data presents challenges for databases, since spatial entity types do not easily fit into either relational or object-oriented databases (Shekar and Vatsavi, 2008; Shekar and Chawla, 2003). New ways of producing hybrid data structures can overcome these difficulties by allowing users to define flexible data types.

The second, engineering sense, of the word ontology is more relevant to GIS worldviews. Engineering and computing ontologies are logical theories for conceptualization that are partial and explicit, and they are taxonomies for use in data dictionaries in information systems (Mark and Turk, 2003, p.29). Engineering ontologies are, furthermore, focused on observable properties or attributes of entities (Mark and Turk, 2003, p.29). There is a broad range of literature addressing engineering ontologies (Agarwal, 2005; Egenhofer et al., 1999; Fonseca et al., 2002; Fonseca et al., 2000; Gómez-Pérez and Manzano-Macho, 2005; Goodwin, 2005; Kuhn et al., 2003; Mizen et al., 2005; Schuurman, 2002 and 2006; Uschold and Gruninger, 1996), some of which address not only geographical, but also indigenous domains of knowledge (Mark and Turk, 2003; Smith and Mark, 1998, 2001, and 2003). Lastly, and most confusingly, it has been noted by Fonseca et al. (2002, p. 239) that engineering ontologies are in fact epistemological ontologies, and not 'true' ontologies in the philosophical sense of the word. This fact is the reason why we, in the present paper, are in essence defining ontology twice: once from a Cree perspective, and once from an engineering perspective.

Recent groundbreaking work has made progress towards integrating engineering and Cree ontologies, using the tools of the former to portray the geographical worldviews of the latter. The result has been a catalog of place names useful as an inventory of Cree presence on the land

on the eastern side of James Bay. In the study outlined below, there was less community interest in navigating maps through ontological relationships (such as part-whole) between features (Wellen, 2008) than by pointing and clicking parts of the map. This finding highlights the fact that Wellen's (2008) work was only a start, leaving room for additional significant work on ontological mapmaking and theorizing in eastern James Bay Cree communities, not to mention other First Nations communities in Canada. These points are expanded in the following section.

3.5 Rationale for Using Ontologies to Represent Indigenous Knowledge in GIS

Geospatial ontologies are in the early stages of being used in conjunction with indigenous peoples' knowledge (Wellen, 2008; Mark and Turk, 2003). There are two aspects to this research activity. The first is the exploration of indigenous knowledge systems, using engineering ontologies (sets of pre-defined computer objects) to formalize indigenous names for geographic entities. The second is the protection of that knowledge in a manner compatible with the ontology, which effectively 'freezes' the knowledge once it becomes formalized. This is similar to the way in which maps 'freeze' or reify knowledge. This is a double edged sword, since indigenous knowledge, like all forms of knowledge is constantly changing, adapting, and shifting in response to exogenous forces. Often, the map (or the ontology) will outlive its usefulness.

This points out the fundamental difference between 'incorporating' and 'inscribing' cultures (Rundstrom, 1995). Ontologies are inscribed, once they are frozen, for the purposes of allowing the insertion of indigenous knowledge systems into arenas such as the World Wide Web and the Internet. This will allow for the inclusion of language paradigms other than English or European (Jeanenny, 2007). In theory, once indigenous language systems have been formalized, and once the semantic web (an evolved version of the worldwide web in which web crawlers, or

bits of ‘live code,’ can scour disparate pages of information in normalized language environments) is more well developed, indigenous and local peoples, and not just Western peoples of the metropolises, can also be a part of that virtual revolution.

The issue of including indigenous knowledge on the geoweb becomes more acute each day. Indigenous knowledge loss is occurring at an increasing and accelerating rate each day (Economist, 2004). The use of maps and engineering ontologies to preserve language systems is one tool among many in a toolbox of techniques for preserving threatened language systems. The ‘freezing’ mentioned earlier, is a price worth paying for the preservation of knowledge systems. Many indigenous languages have existed, adapted, and continued since before living memory, and in a dynamic and changing relationship with their cultural and physical environments. Thus the freezing of language in an archive inhibits the flexibility a language needs to survive. But beyond the implied creation of an archive of frozen knowledge, our project provides the possibility for retaining social currency in indigenous knowledge systems. Only by providing opportunities for social currency will knowledge systems attain the latitude for enduring as living socio-cultural phenomena.

3.6 Spatial Ontology: Cree Worldviews

Cree worldviews, as described by Scott (1983 and 1996) and Feit (2007), make no conceptual distinction between the living and the non-living inhabitants of the world, no distinctions between different kinds of living things. In the West, furthermore, animals are seen as radically distinct from humans. In Cree worldviews, animals are seen as different types of person. Animal-humans are thus negotiated with in much the same way as human-animals are, but also differently since animals communicate in distinct and unique ways (Nadasdy, 2007). This does not prevent the

Cree from communicating with animals. Animal-humans communicate with human-animals both non-verbally and verbally in dreams (Cruikshank, 2005).

In regard to what Western society would deem ‘inanimate objects’ or landforms, the Cree have distinct worldviews as well. The cardinal directions are oriented around the flow of dominant winds, ocean currents, etc. The animate and the inanimate are not distinguished formally in Cree conceptualizations. Interestingly, this is somewhat compatible with recent research suggesting that computer technology is often seen as animate (Turkle, 2004). Overall, however, the ontologist wishing to formalize (define in computer language) aspects of the Cree language must deal with two things. The first is the lack of radical separation between humans and other animals, and the second is the lack of distinction between animate and inanimate beings. These two aspects of Cree worldviews are, furthermore, not as distinct as this account has described them. In fact, the cosmos of the Cree is a whole and as such, the seasons, the effects of the seasons on the land, water and plants, and the consequences for human and animal movement and behaviours, all are of a piece and are parts of the cosmological phenomenon of being Cree.

3.7 An Example of a Cree Worldview Represented in a Geospatial Computational Environment

Wellen (2008) undertook the formalization of a particular aspect of Cree knowledge: hydrography (see Figure 3.1). The result is a database-driven website containing a comprehensive set of Cree names for waterbodies and watercourses. This website’s main interface (see Figure 3.2) is an interactive map with pan, zoom, and querying functions for a portion of Cree lands lying in Northern Québec. All information contained in the website and database was verified through member checking, the interviewing of Cree hunters and trappers, and by Wellen’s participant observation with Cree people in their everyday environments.

The result is a user-friendly and approachable example of inclusion of indigenous interests in geospatial web environments (Scharl and Tochtermann, 2007). Wellen's (2008) work is replicable due to the level of documentation and formalization of the methods and results of the hydrographical ontology. It is conceivable, therefore, that in line with the notion of a semantic worldwide web, other indigenous groups like the Navajo of the southwest of 'U.S.A.' or the Nisga'a of 'British Columbia' might represent and put into play their own ontologies on the geoweb.

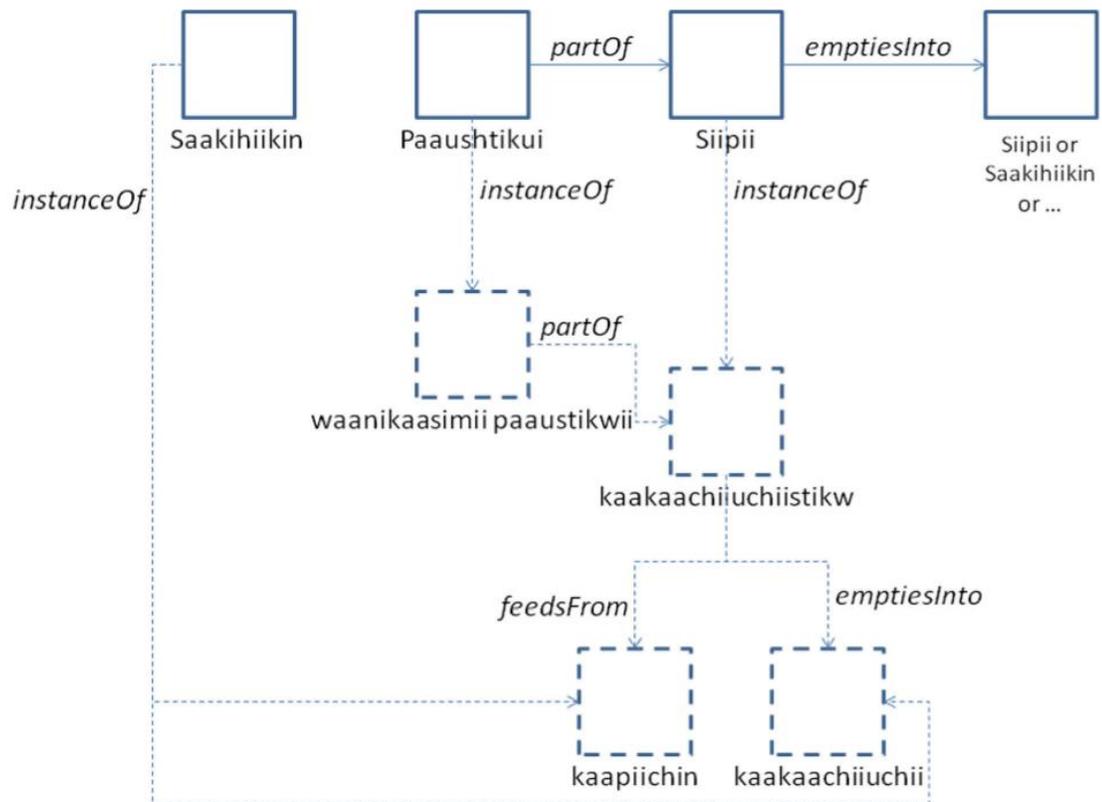


Figure 3.1 Cree Worldview Translated into a Geospatial Environment

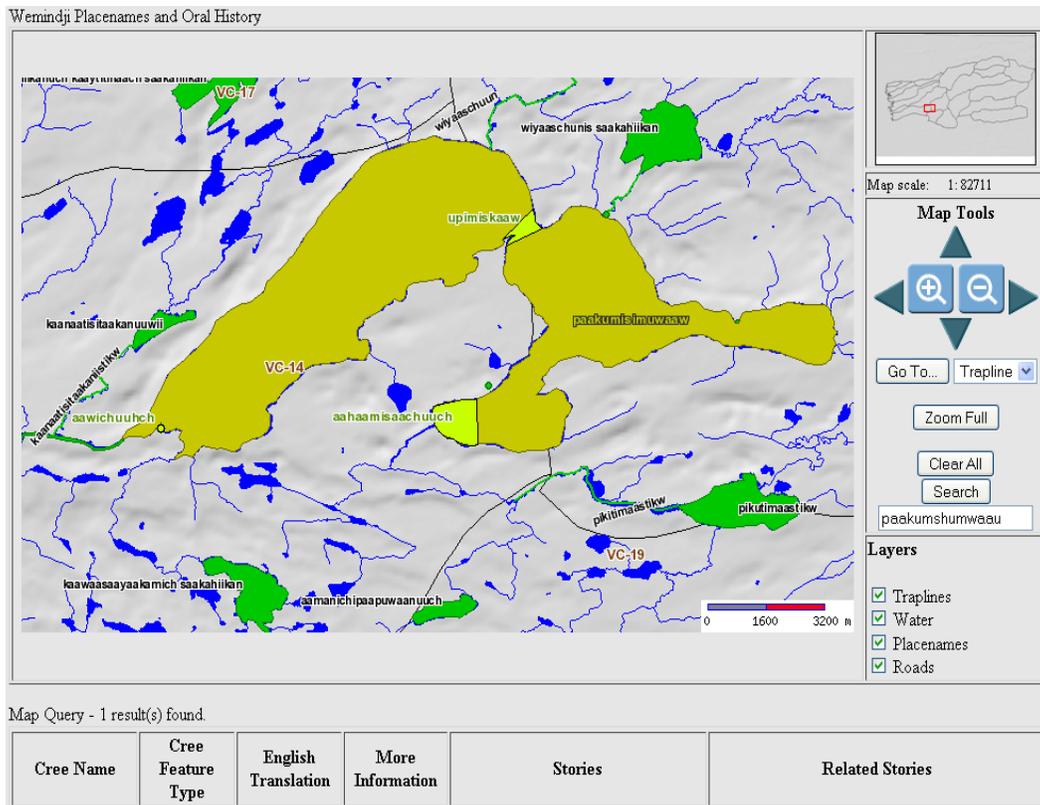


Figure 3.2 Cree Place Names Website Main Interface

Extending Wellen’s inquiries, the primary author conducted research in Wemindji between 2008 and 2010. Ethnography and cartography provided methodological constraints for exploring how and why the transmission of intergenerational spatial knowledge proceeds. A two-part geoweb, one old and one new, provided a platform from which to analyze the primary research question: what is the role of the geoweb in the transmission of intergenerational indigenous knowledge? The results were surprising and, among other things, resulted in the creation, by the primary author, of a geospatially enabled web 2.0 site called “Indigenous Technology and Science” or ITS (figure 6.3).

Initial findings derived from participatory mapping and participant observation, conducted in 2008, suggest that new local knowledge is beginning to overlay, but not erase,

traditional knowledge held by older individuals. In order to distinguish between the two, but also to emphasize similarities between old and new knowledge, the traditional knowledge 'layer' is named geoweb 1. Newer, local, knowledge, often constrained by epistemological assumptions inherent to geospatially enabled devices such as cell phones, satellite dishes and GPS, is named geoweb 2. Geoweb 1 and geoweb 2 work in tandem in and through landscape by way of place-based memetic mechanisms. Because these mechanisms (called 'place memes') contain both old and new (primarily toponymic) knowledge, they are hybrid entities, acting as bridges between geoweb 1 (traditional) and geoweb 2 (local) ways of knowing. Furthermore, maps and indeed the geoweb (1 and 2) were posited as platforms upon which place-memes are being transferred in eastern James Bay. ITS was created as a 'virtual place' where hybrid knowledge can find a home most appropriate to its hybrid nature.

ITS represents a range of possibilities for mapping intergenerational indigenous knowledge on the geoweb including:

1. A public forum for archiving and discussing events, places or ideas relevant to the Cree of eastern James Bay. This forum is not static but is, rather, open to comment or editing, depending upon the level of access allowed by a site administrator (presently the primary author but intended for a local authority in Wemindji)
2. The creation of a 'node' (or multiple 'nodes') on a map (base provided by Google) embedded into each and every forum entry. Nodes may be viewed individually or collectively (all on one map). Similarly, each participant on ITS has the option of locating on the embedded Google map his or her location.
3. Tagging of topics using two different methods: links on each forum entry to a third party tagging system (del.icio.us); and a tagging module provided by Drupal (the system used for creating the website by the primary author) internal to each forum entry. Tags may be

visualized by topic or as a whole in a 'tag cloud' (a statistical representation of overall tag frequency showing more frequent tags in larger bold fonts).

4. The ability to include the words of elders, living or deceased, by way of web links to mp3 sound files housed in the site's database.

Ontologically, ITS represents an advance over Wellen's static mapping site. From an engineering perspective, ITS has a less formal ontology, in terms of the definition of spatial objects available for inquiry by the user. In other words, objects are not as rigidly defined in ITS as they are in Wellen's placenames map. Furthermore, ITS displaces the authority of the map by including the map alongside text, images and links to recorded narratives. Maps are just one part of a multimedia, multisensory bundle of place based information. Indeed, the purpose of ITS is the mapping, storing and updating (by the community) of information and stories about specific, named, places. Thus, from a philosophical ontological perspective (as opposed to the engineering ontological perspective) ITS operates using 'fuzzy objects' controlled by the user (within limits inherent to Drupal).

The results of the primary author's ethnographic inquiry have been posted to ITS. In addition to daily journal summaries of participation in town life, data include photos and videos derived from two events occurring within a day of each other in Wemindji. Analysis of these materials suggested that the transfer of intergenerational knowledge in Wemindji proceeds in three ways: vertically (between elder and youth), horizontally (youth to youth) and obliquely (between older and younger individuals or from outside influences). The two events mentioned, one an art show and the other a youth public speaking event, provided two forums in which the transfer of spatial knowledge between generations is taking place.

The art show (photos of which are posted on ITS) consisted primarily of 'landscape maps,' a type of oblique view colour drawing of traditional activities, structures and landscapes. These

landscape maps were produced by all ages of Cree participants falling into four categories defined by a local key informant: Children (ages 1-11), Youth (ages 12-34), Adult (ages 35-64) and Elder (65 years and older). The similarity of depiction across age groupings is striking and suggests continuity and learning across generational boundaries.

As mentioned above, the primary author entered a Google Earth map of the local event *kaachiiwaapechuu* into the art show. Alongside the other entries, this map was the object of inquiry primarily by young males seeking to learn about snowmobile routes. This represented only one of two top-down maps (with viewpoints situated perpendicular to the surface depicted). The other map (in addition to the Google Earth map) was drawn by an elder (figure 5.9). The significance of the elder produced map lies in its use of clearly bounded objects, labelling of features, and top-down perspective. It is, in essence, a 'how to' demonstration of map making, publicly available as a model for younger generations.

The public speaking event occurred one day after the art show. The most striking finding resulting from the primary author's participation in, and videorecording of, the event was evidence of vertical *upward* transmission of spatial knowledge. Youth from primary school to high school age used a microphone to broadcast to a packed audience of adults, elders and youth their own opinions on a range of topics from travelling on the land to teaching their siblings about the town (horizontal transmission of knowledge) to the impacts of digital devices on youth. Six speeches were chosen for analysis. We called these speeches 'cartographic utterances' because each of the six speeches contains opinions, musings and knowledge about youthful relationships to space, the land and to each other. These speeches are included as a forum topic on ITS and thus are available to the community at large for commenting, tagging and augmentation.

3.8 Conclusion

It is a nearly universal truth that the indigenous (and indeed all) people have a stake and interest in the land where relationships and dependencies upon the land have been fostered over long periods of time. It is also a nearly universal fact that indigenous peoples, while having adopted and adapted to change since before living memory, are now facing tougher challenges than ever. For indigenous peoples, the lynchpin for survival is survival of culture. One very important aspect for cultural survival is language. Language is itself a universal structure, one of the first to establish itself in the brains and bodies of all human beings (Chomsky, 1965 and 2006). This is not to brush over differences that exist between cultures with very different linguistic structures. It is, however, to point out that, far from promoting a dangerous relativism or parochial view, the arguments for preserving diversity speak to issues of concern for all of humanity and they are communicable across cultural traditions and across generations.

The universal argument for the preservation of indigenous knowledge makes logical sense. It has also received validation from some of the world's most respected institutions, including the United Nations. UNESCO's (2006) convention for the protection of cultural expression is a testament to the work being done to promote endangered knowledges worldwide. We have argued in this paper that indigenous cultures are a part of a tapestry of world knowledge, and the preservation of which is worthwhile, necessary, and pressing. Furthermore, we have argued that the preservation of indigenous cultures will take place most fruitfully and most presciently in online database and virtual environments. This last claim is bound to be controversial. Still we make the claim as humanity lies on the verge of a virtual revolution taking us from the internet to web 2.0 (O'Reilly, 2005) to the semantic web (Wellen, 2008). Value is added to such environments in the form of the preservation of cultural diversity and expression.

The value of indigenous knowledge will be recognized all the more once it is gone. It is our goal to prevent that from happening.

BRIDGE BETWEEN MANUSCRIPTS 1 AND 2

In Chapter 3 we demonstrated that there are fundamental, or ontological, disparities between modern geospatial technologies on the one hand, and indigenous knowledge on the other. The use of modern geospatial technologies, such as the geoweb or GIS, for the purposes of mapping indigenous knowledge always runs the risk of a failure of representation. In order to break through this impasse, the next chapter (Chapter 4) is an examination of a more sophisticated way of constructing the geoweb, one that is deeper, more inclusive, and able to incorporate a wider range of knowledge.

A deeper understanding of the geoweb is achieved by splitting the geoweb into two parts. A realization, that the geoweb is in fact an indigenous construct, drives this move (Carlson, 2008). The assumption here is that the concept of geoweb is broad enough to include much more than internet-based mapping systems. All mapping systems, no matter what type, ultimately stem from human spatial abilities. That the ‘web’ aspect of mapping and space has only recently entered technological parlance is an indication of how deep the disconnect, until recently, has been. And there is still a very long way to go.

The following excerpt was written while I worked in Wemindji in the summer of 2008. It offers a sort of ‘ground truth’ view of the messiness of research, of its many delays and detours. This excerpt is taken from a longer story I wrote immediately upon my return to Montréal later that summer. The inclusion of this writing is an assertion that I am ‘being true’ to reflexive ethnographic practices, by including my own position within the research. By including this position I may better assess how that position comes to inform the outcomes of the research, and thus, help refine future research questions such that they might become more productive.

The GPS was stowed with the luggage, too deep to reach. We set out from Wemindji, six souls in a freighter canoe. These canoes are big, and sturdy, and after a brief stop at a boat launch on the far side of town, we set out for the Bay (Tawich). At that brief stop we had taken on some 'luggage' for family members (relatives of F, the driver of our boat, and D, his sister, also with us that day. Names are shortened to protect their identities). This included food in coolers and in boxes, as well as a stainless steel pot, duct-taped shut, containing a meal for at least six: ptarmigan and dumplings.

A boat is a place without roots, but it is a place that is routed. Our boat was a gathering place of six souls that left the safety of home, innocently believing we were heading for 'the gathering,' a yearly get-together of people from the community and nation of Wemindji. The purpose of the gathering is to remember some of the old places, and to remember communally, through celebration. This celebration includes barbeques, games for kids, a canoe race, bingo, a shooting contest, and a fishing derby, to name just a few activities. The annual general meeting of the Wemindji Band Council, the Tallymen, and other important community members also takes place each year at the gathering.

To that gathering, our smaller gathering set out into the Bay to go see. On a good day, it's a 1.5 to 2 hour journey. We didn't make it there until a full 24 hours had passed. From our bounded notions of safety we set out into an unbounded sea of fog. First, it started to rain. There is a point of land one passes when heading out to the bay, where, on a not so good day, one immediately feels the chill of the Bay. We felt that chill as the rain started in earnest, and each of us, being prepared, put on or zipped up, our raincoats, and donned wool hat and gloves.

There were other boats around us now and then, most going faster than we were. We had to go slow due to our cargo, and due to the fact that our guide is renowned for being very

cautious. With several hundred pounds of cargo, we were grateful to have such a safe and considerate Cree man guiding us.

After about 45 minutes we passed the island where the Tallyman L stays in the summer. On the return journey, six days later, we were to have lunch in a michiwaap (tipi) there. A whole smoked whitefish each, washed down with tea, to the ambience of hushed country radio overlain by the crackling of the CB radio, that further overlain by the crackling of the fire.

But for now we were outside that warm inviting place, trying to make the gathering by nightfall.

Around the bend, the boat cleared the far end of the narrows, and we went back out into the Bay. Here, the trees had been burnt, and the pointed, gray remains were visible on the headlands and the rocky knobs. D, in the back, said, "this place is different."

By this time the rain was getting inside our gear. J went under the tarp in the middle of the boat, to huddle and try to find warmth and shelter among the cargo. I just held my hands together, almost like praying, and put my head down, steeling myself against the rain pelting my face like needled hail in the wind and boat speed. Another boat passed us, coming fast out the gap we'd just left behind, fast into the fog, towards the gathering somewhere out there in the white distance. We plodded on at as full a speed as our weight and cautious guide would allow.

At some point we slowed down. The fog had captured us now, neutralizing us inside its white web. The slow motor muttered into the water. A few small rocks ahead and to the left of us peeking above the water now and then indicated the possible presence of land. We stuck to the land and this further slowed our progress. We tended to go in and out of

each bay rather than cut across the end or opening of each. Thinking an indent in the land to be a gap with a way through, we went this way and that, slowly, occasionally speeding up, getting our hopes up, only to very soon be slowing back down.

Four hours after we'd left F was starting to look peaked. "I have a GPS but it's buried way down," I said. F, always hopeful, glimmered for a moment then shook his head. It wouldn't help us. We headed for shore.

Rowing the final length to shore, I thought to myself, "what is happening?" I'd heard about people having to spend the night outside, in the elements, with the bears and the rain and the bugs, but never in my 38 years had it happened to me. I was not ready to admit this possibility to myself, much less to the others. Besides, on the coast of BC, in the north where I'm from, it may be a much more serious thing. Still, spending the night in the wild in the north has elements of similarity wherever you are.

Within seconds of pulling ashore F had a fire going and a tea kettle ready to go. This brought our spirits up considerably. Each of us set about trying to make ourselves comfortable, peeling off gloves and hats to dry, shedding shoes, picking up a few sticks for the fire. In my zeal to hunker down and dry off, I knocked over the kettle that had been quickly propped on a log within the fire. The water spilled out and became instant steam. Far from being mad, F nodded like he knew it was going to happen anyway, and quickly set about refilling the pot and fixing up a proper place, an angled stick set into the ground, and propped up with a rock. The pot hung from this stick, adjusted to the height of the fire.

I took the opportunity, in the energizing presence of the fire, to walk the few steps back to the canoe to find the GPS. Going under the tarp to where J had huddled to keep warm, I

shifted a few items, heaved and shoved a bit, and retrieved the GPS from where it was stowed, a bag inside a bag, near the top of my backpack.

GPS is fascinating. A good GPS like mine (you pay top dollar for a good one) contains real maps with water bodies, roads, and towns. These maps are condensed to fit the screen, though you can zoom in and out easily. These maps are also constantly shifting, or as one geographer put it, in a constant state of 'becoming.' I'm not sure about the latter way of putting it, since I wonder what it is that the little map is becoming, other than another, new, ephemeral little map.

This story illuminates the context of the next chapter (Chapter 4), which presents the results, in graphic form, of some of the travels and journeys undertaken in the summer of 2008. The research that follows comes directly out of the experiences and research completed during that summer.

CHAPTER 4: TERRITORIAL GEOWEBS (MANUSCRIPT 2)

4.1 Introduction

The purpose of this paper is to present evidence for the following claims: that a new ‘web of place’ has come to overlay (but not replace) an older ‘web of place’ that has existed for at least hundreds of years in Wemindji Cree territory on the eastern shore of James Bay (Carlson, 2008). These two ‘webs of place’ I refer to as geoweb 1 and geoweb 2. The terminology I am using is deliberately re-visionist in that my intent is to displace the currently fashionable geospatial web, or ‘geoweb’ (Scharl and Tochtermann, 2007) towards replacing it with a more time-tested indigenous conceptualization of space and spatiality, comprised of interconnected, storied, distributed ‘services’ that were provided to the original inhabitants of eastern James Bay (and still are today).

The evidence I present to back up these claims comes in the form of data collected using the following methods in tandem: ethnography, participatory mapping, and participant observation, carried out by the primary author in the summer of 2008. Prior to using the three methods listed above for the purposes of ‘landscape investigation,’ I tested the methods in the field in the city of Montréal, Québec, Canada, using a purely hypothetical research question (Eades and Sieber, 2009). While the results of that test were ambiguous, the methods themselves were found to work well in combination. Furthermore, they produced results that were visually, textually, and ethnographically rich. For the purposes of this paper, the three methods (ethnography, participatory mapping, and participant observation) will be dubbed the ‘landscape investigation methodology.’

The ‘landscape investigation’ in Wemindji Cree territory produced results summarized in tables, which categorize observations into place/events and images. The results support the idea of two distinct geoweb layers overlain one on top of the other, with geoweb 1 existing as an ‘unreplaced trace’ beneath a newer, more inscribed geoweb 2. Geoweb 2 is constituted by the use of GPS, cellular telephones, television, and other communications devices. In Aporta and Higgs’ (2005) and Aporta’s (2009) terms, there is also strong evidence for the existence of ‘satellite culture’ in Wemindji Cree territory. However, beyond the obvious presence of satellite TV, cell phones, and satellite enabled internet, I argue for the idea that something more than a changing communications regime exists in the north. I posit that there are, in fact, two dominant changes occurring in northern Canada which, taken together, add up to the emergence of a ‘third space’ (Soja, 1996; Lefebvre, 1991) in the north. This space bridges geoweb 1 and geoweb 2 ways of knowing, operating at the level of landscape. Its key features include:

1. New spatialities of performed mappings (Rundstrom, 1991)
2. Indigenities that are both hybrid and contested (Turnbull, 2000; Niezen, 2009b)

Each of the key elements listed are implicated in the emergence of ‘third space’ in the Canadian north, with lived, perceived and conceived aspects pertinent to the specifics of life lived by the Wemindji Cree continuously in a reciprocal relationship between the Cree people and the land. The landscape is literally the ‘third space’ upon which transactions, both old and new, have taken place up to and including the present time. Specific implications are explored:

1. Landscape as a surface for inscribing various ‘shopping lists’ comprised of what/where tuples (defined below). Modern life has added many new items to traditional diets, and the range of places where staple food are obtained has both expanded (more places to get food) and shrunk (reliance on one or two main sources such as stores).

2. Landscape as 'choros', lying between Curry's (2005) 'topos' and 'geos,' a 'third space' between place (topos) and space (geos) that is constantly being (re)inscribed by (new) spatializing technologies.

I conclude that the very idea of indigeneity (the quality of being indigenous) is forced by spatializing technologies (such as hydroelectric power grids, roads, and central settlements) to create new spaces of adaptation and change over the top, or overlaying, older more traditional spaces, which remain as traces beneath the new. Cultural continuity has been achieved by the Wemindji Cree in spite of technological change, primarily by virtue of their continued focus on, and relationship with, the land. The formal trapline system, descended from and necessitated by the fur trade, has gone some way towards territorializing (creating distinct, bounded units of territory in) Cree lifeworlds. The Cree, consummate trappers of old, have in effect counter-mapped the formal system by trapping it in an informal or anti-system of their own. This system consists of new practices and performed spatialities (qualities of space) that have only peripheral interest in externalizable geospatial technologies, internets, machineries or cartographies. To the extent that these devices (Borgmann, 1984) serve the interests of the Cree and a continued and primary relationship with the land, these geospatial devices have been deemed necessary to adopt for local purposes. Beyond that extent, that of serving interests in the land, these devices show no indication of replacing traditional ways of knowing, being, and dwelling on and with the land. I discuss this assertion more fully in the next section.

4.2 Background: Geoweb 1 and Traditional Ways of Knowing, Being and Dwelling On and With the Land

Chamberlin (2004) has explicated a basic truth of local knowledge, summed up by the title of his book, *If This Is Your Land, Where Are Your Stories?* The title refers to a Gitksan elder's response to government officials' claim to traditional Gitksan territories and lands. If

stories lay foundations for claims to the land, I would suggest an even more basic assertion: that naming is claiming. Specifically, the naming of places, and the stories associated with those places, is a sort of ‘cataloging system,’ an ethnocartography (Blaut, 1974), or a system of ‘tags’ or folksonomy (Smith, 2008) for keeping track of the resources, dangers, delights or dreams each place holds (Sterritt et al., 1998; Brody, 1981; Monmonier, 2006).

In Cree lifeworlds, just as in Gitksan lifeworlds, or in any of the widely dispersed locales where peoples have resided *in situ* since well before the imposition of state boundaries, the same holds true (Hughes, 2003). Basso (1996), working with the Western Apache, noted that places and place-worlds are pictures for each place name, conjured up within the minds of those who interact with, and have a relationship with, the land. The utterance of the place name automatically invokes the picture in such an (indigenous) mind.

Thus, for the Cree, their land was structured as a ‘web of place’ that was pre-territorial, or territorial only to the extent that relationships spanning land in linked and storied associations can (Carlson, 2008). Before contact, such links and associations that spanned land were combined in the human brain (Wood and Fels, 2008), to be performed in the heads and in the hands of respected elders and wayfinders (Davis, 2009). By spanning of land, I mean that each place resonates with each and every other place on the land through the bodily, performed spatialities of its earliest human inhabitants, through the recitation from memory of the stories and pictures associated with each place. In this way, the Cree have always, up to and including today, performed mappings (Woodward and Lewis, 1987). Performed place-based mapping I refer to in this paper as geoweb 1.

The term geoweb 1 is admittedly revisionist, since it takes a current term, the geoweb, and applies it to an older phenomenon making it geoweb 1. This move is deliberate, and is designed to make precisely the following point: current geoweb technologies, sophisticated as

they are from a technical standpoint, are, to an extent, appropriations of older technologies. The geoweb is defined as a distributed set of geographic services that are user-controlled (not dependent upon expert knowledge for their use), and available on the internet. Defined in this way (by including the internet as the service provider) geoweb 1 is transformed into geoweb 2 by the simple inclusion of the internet (Scharl and Tochtermann, 2007).

There are obvious simplifications in my geoweb 1/geoweb 2 distinction, but these simplifications are necessary for the sake of arguing my main point: that geoweb 2 technologies do not necessarily represent advancement for the Cree. Geoweb 2 technologies are, rather, part of a suite of technologies affected by globalization and modernization, and include satellite TV, video games, cell phones, and other devices (Borgmann, 1984).

My point is that geoweb 1 provides the often overlooked foundation for geoweb 2. To forget this is to forget our very selves as place based beings, and it is to forget what we were originally 'programmed' (by evolution) to do: to negotiate through time and space in the most efficient ways possible conducive to survival, success and thriving beyond the mere continuation of existence. Bodies and brains are sophisticated machines capable of making complex topological, proximal, route-finding, and logical calculations that add up to mental maps (Wood and Fels, 2008). In traditional Cree lifeworlds, each and every (non-expert) individual is imparted with such knowledge by looking at, and learning from, other, more experienced, practitioners, by younger people watching how older people do things (Ohmagari and Berkes, 1997). Cree society has, until recently, depended upon such knowledge for its very survival (Preston, 2002).

Before moving to a deeper exploration of geoweb 2, and without belabouring the point, it is worth noting that one of the most drastic changes to Cree life goes hand in hand with the induction of the Cree into a paradigm of 'insecure affluence' (Nordhaus and Schellenberger,

2006). Modernization and globalization are sometimes associated with loss of indigenous knowledge (Scott, 2001; Blaser et al, 2004). Some would, conversely, assert that progress has brought freedom from want and from fears of starvation (Preston, 2002). Regardless of which side has the most weight of evidence in its favor, I posit that the Cree exist within a paradigm of 'insecure affluence', whereby an individual's day to day existence is assured, where food is abundant beyond the ancestors' wildest dreams, but where household purchases also tend toward emulating middle- and upper-middle class aspirations regardless of household income. Trucks, widescreen TVs and expensive gadgetry are not hard to find in the community of Wemindji, Québec. Meeting basic needs, however, does not ameliorate the desire to want more, in keeping with dominant society's values. In this paper, therefore, I focus on how basic needs are met using geospatial technologies and how changing geoweb paradigms have been implicated in supplying the foundation for the possibility of meeting those very basic needs.

4.3 Methodology: Geoweb 2, The Emergence of Methodology and Research Questions

In this section I take a reflexive and sometimes ethnographic look at how I came to develop my research methods, and my overall approach to those research questions, as outlined at the beginning of this paper. The research questions were formulated after much theorization (defined as the exploration of related sets of terms and concepts for exploring research questions) and thus, I place the present research within a grounded theory (Kwan, 2008) framework, one which builds in research questions 'after the fact' or post-theorization. With this in mind I proceed to describe how I came to be involved with this research, which informs how I chose and developed the particular 'landscape investigation' methodology I used in this study (Davies, 2008).

Wellen (2008) produced a 'spatial warehouse' of Cree knowledge, in the form of an interactive map focusing on points, lines, and areas of interest on traditional Cree lands.

Associated with, and linked to, each feature are approximately 175 stories (in mp3 format), collected from various elders by various anthropologists starting in the 1970s. Since Wellen's (2008) interactive map does not allow for user input into map contents, it does not fit the definition of being part of the geoweb, as defined in section 2 (Scharl and Tochtermann, 2007; Kitchen et al, 2009). It is, however, an example of one of many university research projects undertaken in Wemindji Cree territory by researchers from the south (Scott, 1983; Wellen, 2008; Pelonquin and Berkes, 2008).

In the summer of 2008, carrying the files, documentation, and knowledge to 'go online' with Wellen's application, I set out to Wemindji lands with some vaguely defined research questions in mind. My task, I knew, was to take up where Wellen had left off, to bring Wemindji 'up to speed' with the latest the geoweb, GIS, and cartography had to offer, and furthermore, to do so in a way sensitive to the needs of the local community. This would take place within a longstanding research relationship between McGill University and the community of Wemindji.

I arrived in Wemindji with the computer program, but also with much more: I had a self-imposed and admittedly idealistic imperative to take what Wellen had done much further, in essence, to make his application a part of the geospatial web (or geoweb 2). In this way, the original static map made by Wellen would be transformed into a dynamic instantiation of user-driven, participatory cartography. At first all I could manage was to acknowledge the gap between my goal and where I actually was. In 2008, having no real experience (only description up until then) of Wemindji or of the Cree, I set out to minimize the gap, armed with the following intellectual and physical tools: a suite of qualitative research methods; a background in mapping, GIS and cartography; a theoretical knowledge of emerging trends in online, open-source, and free mapping systems, exemplified, for instance, by Google Earth and Google Maps; a camera; a map; a GPS; and a computer.

Like an anthropologist (I am in fact a geographer) I set out to place myself in a listening position, a place where I could learn, build trust, and participate in daily life in Wemindji. I decided at the same time to apply a suite of methods for unobtrusively collecting data which I had tested during the previous winter in Montréal (Eades and Sieber, 2009). After acquainting myself with my hosts, I took every opportunity to participate in everyday activities, including going to work in the mornings, eating together, and travelling to islands in James Bay on the weekends. It became clear that participating in daily life (participant observation) was a key to my success here (but a long way from my goal). At the same time, I carried my GPS everywhere. It became a kind of appendage, and during my travel with local people I kept the GPS in tracking mode (which draws a line matching the path you have travelled), making myself into a human pencil, with the GPS as the inscribing device, making drawings of our paths of travel. This method seemed to bring me closer to my goal, especially in the sense that because I was open about what I was doing with the GPS I was allowing people to see what I was doing, to comment, and to offer input if they felt like doing so. In this way, my GPS drawing activities became a form of participatory mapping, ultimately guided by the desires of my Cree guides and hosts (Kindon et al., 2007; Abrams, 2006).

Lastly, I employed ethnographic techniques (Muller-Wille, 1998), both visual and textual, for documenting features encountered along the paths of the participant-led GPS drawing. As mentioned, I had tested this technique the previous winter using a combination of GPS drawing and ethnography to explore the purely hypothetical and functional task of mapping images of owls or images suggestive of owls in the city of Montréal (Eades and Sieber, 2009). Ultimately, the goal had been to test the ability of the geoweb to ‘capture’ art and emotion. Our findings indicated that the geoweb, much like GIS (Kwan, 2007), was capable of ‘capturing’ or displaying emotion in ways that confounded direct representation. However, applying the ethnographic, participatory, and mapping aspects towards assessing the ability of the geoweb to

serve Cree interests in Wemindji proved to be an undertaking on a much larger scale than that undertaken in Montréal.

After a month of participating in gatherings, work life, home life, and scientific data gathering at a McGill archaeology camp, I had data in the form of participant-led GPS drawings transcribed to Google Earth, journal entries about daily activity, and hundreds of photos corresponding to places visited during that month in the field. Thus, after some birthing pains, my landscape investigation methodology was slowly being validated. The level of reflection and self-analysis involved in my 'search for a method' is not unusual in more recent ethnographic theory (Davies, 2008), and qualitative geography research (Kendon et al, 2007).

Only later did some questions emerge: what is unique about the geoweb (geoweb 2) as distinct from other communication devices such as cell phones and satellite TV? Is geoweb 2 simply another part of 'satellite culture' (Aporta and Higgs, 2005)? What is borrowed and what is new in geoweb 2? How does it change the natures of spatiality, indigeneity, and territoriality? What is the role of the geoweb in the transmission of intergenerational knowledge?

The data already collected served to ground these questions in reality. Next, I describe my results, followed by a discussion in which it will be shown that food and affluence are two of the main factors driving the development of geoweb 2 in Wemindji Cree territory.

4.4 Results

Four main place/events contributed to findings in the form of map images and photographic images. Table 1 summarizes the main events which supplied data for research into geoweb 1 and geoweb 2.

Place/Event	Images
Town	Figure 4.1 (The Northern), Figure 4.2 (NWA)
Gathering	Figure 4.3 (Cell Phone ‘Talking Stick’), Figure 4.4 (Woodland Caribou), Google Earth transcriptions (Figure 4.5)
Old Factory Lake	Google Earth Transcriptions (Figure 4.6)
Travelling on the Land	Google Earth Transcriptions (Figure 4.7)



Figure 4.1 The Northern



Figure 4.2 Natives With Attitude (NWA)



Figure 4.3 Cell Phone 'Talking Stick'



Figure 4.4 Woodland Caribou



Figure 4.5 The Gathering Google Earth Map Image

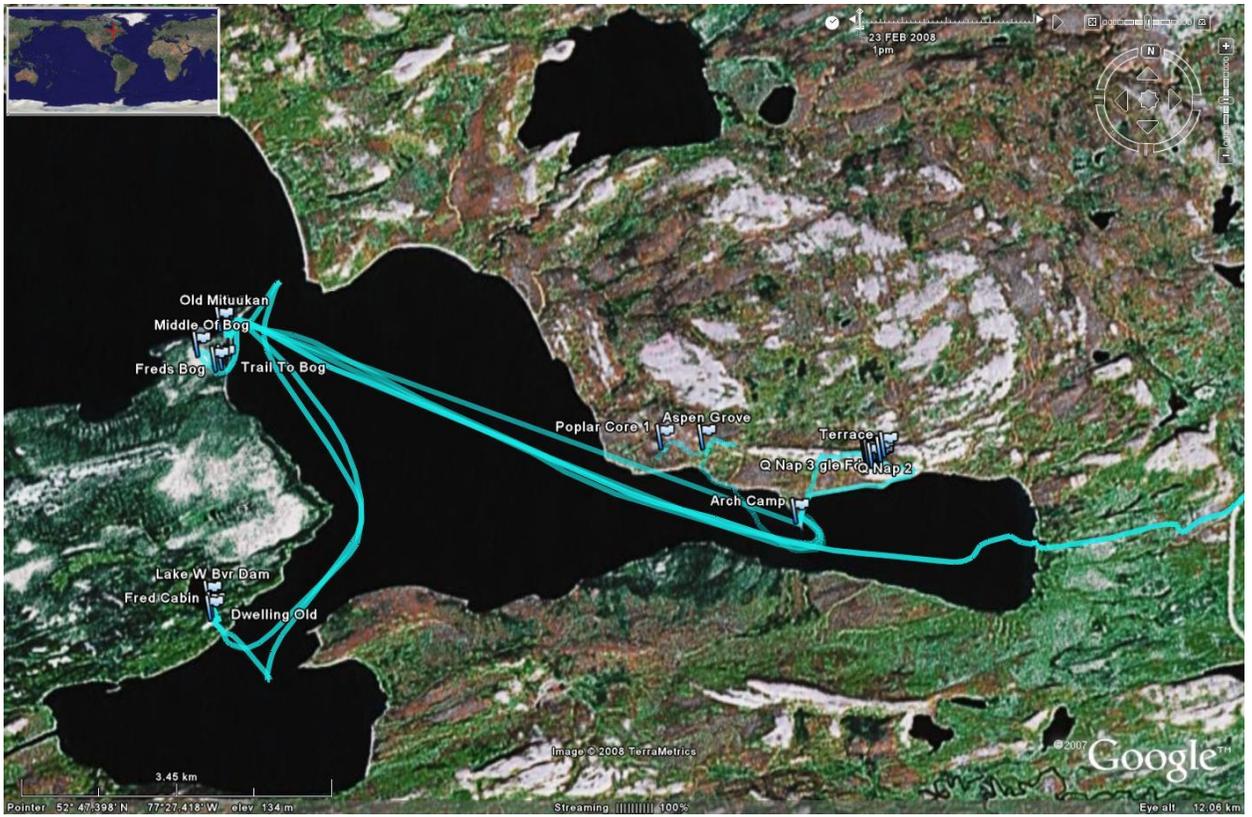


Figure 4.6 Old Factory Lake Google Earth Map Image

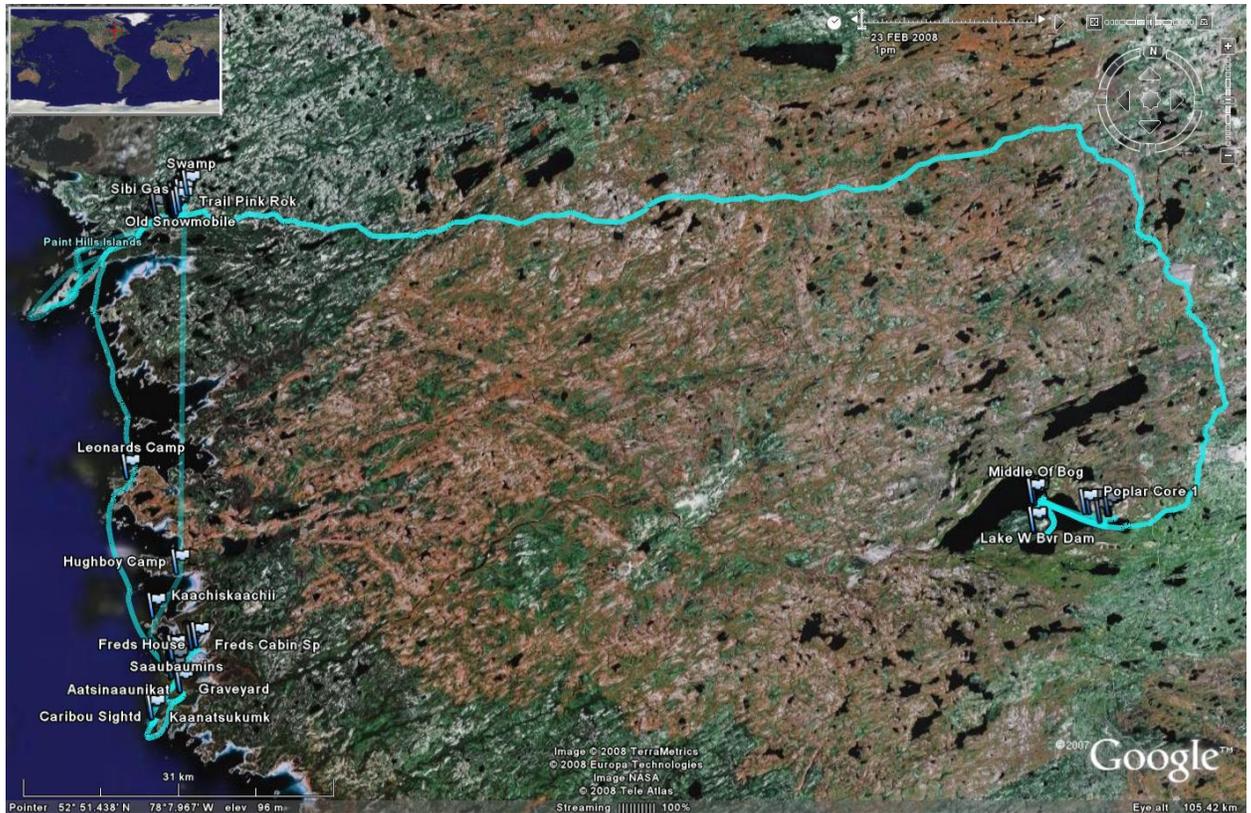


Figure 4.7 Place/Event Locations and Travel Routes, 2008, Google Earth Image

Town, Gathering, Old Factory Lake, and Travel on the Land are the four main events listed. I participated in, and contributed to, each of these places or events by taking part in the activities occurring in each place. ‘Town’ refers to a place that holds a host or a suite of activities, which might be referred to as an event called ‘Town Life’ or ‘Life in Wemindji’, which I partook of for one month. Figures 4.1 and 4.2 refer to ‘Town Life’ as distinct from life on the land. Town life and life on the land are obviously not so easily separated, since planning occurs in town in households and in offices such as the Cree Trappers’ Association. The Northern (Figure 4.1) is a grocery store, the primary stop for a wide variety of staple and luxury foods not only in Wemindji, but all across the Canadian north. Figure 4.2 (NWA) is relevant to the present study insofar as it shows how indigenous spatiality in the north, and even in very small towns, has become urban-centred. This is also indicated by new styles of dress, by preferences in television

shows, video games, and reading material. NWA means ‘natives with attitude,’ graffiti of which I found at least 50 instances in dispersed parts of the town of Wemindji. Thus I suggest that semiotic material life (Scott, 1983) is changing in town just as much as it is on land. The precise nature of urban-based cultural change is, however, beyond the scope of the present study.

The Gathering refers to an event that happens on Frenchman’s Island in James Bay (at the mouth of the *paakumshumwaaau* river) once a year to celebrate the relocation of the town of Wemindji. During my stay at the gathering in July of 2008 I noticed individuals with cell phones standing very still in particular spots, reciting shopping lists to other individuals on the receiving end (usually in town). One individual went as far as to tie his cell phone to stick in order to hold the cell phone in the exact spot where reception was good. Figure 4.3 shows a man standing on the roof of a shed talking into his cell phone modified in this way. This adaptation of satellite technology was observed to be commonplace at The Gathering. It is an interesting and indicative instance of geoweb 2 (cell phones) mixing with geoweb 1 (The Gathering). The Gathering is an instance of geoweb 1 due to its association with a specific place of traditional activity, and due to the stories associated with it and places nearby. These stories have to do with land rising due to isostatic rebound, necessitating an entire community moving away from a rapidly emerging (and thus unnavigable by boat) landscape, to its new location to the north, at the mouth of the Maquatua River.

Figure 4.4 shows a woodland caribou, very near to the site of The Gathering, as an example of a traditional location (geoweb 1) of a potential food source. This caribou was spotted first far off by our *uuchimaaau* (tallyman, or boss) Cree guide, and then we in the boat, researchers and relatives of the guide, spotted the caribou, and he was ‘presented’ to us in order for us to photograph the animal in its natural surroundings. The caribou must have, in the mind of the *uuchimaaau*, been ‘registered’ as to its location and attributes, but for many of us in the boat, it

was more of a tourist attraction. The story that was told to us by our elder Cree guide, and then translated by his younger sister, was of a caribou that came over to an island in winter, then stayed through into the summer, and had the run of the island to himself.

Old Factory Lake (shown in Figure 4.6) is a complex site, traditionally known as *paakumshumwaau*, located at the conjunction of three different trapline territories. I spent several days at this lake both with an *uuchimaau* and with a crew of archaeologists. This site is included in my results since it is a place that is changing very rapidly both physically and culturally. Physically, isostatic rebound is causing the lake to shrink and become shallower. At the same time prehistoric sites including campsites, quarries, and burial mounds are rising along with the land. These ancient sites are being dated and mapped using GIS software and GPS devices. Thus, geoweb 1 technologies (nets of associated places and stories) are being mapped using geoweb 2 scientific techniques and technologies.

Culturally, the formalization of the trapline system by the Hudson's Bay Company, particularly in this area, has been cause for some conflict, due to the rich diversity of wildlife residing here. The trapline boundaries, thus inscribed by trapping and economic interests, increase territoriality (or action based on discrete pieces of inscribed territory). For example a conflict arose during my stay at Old Factory Lake between two abutting families vying for work with the archaeology crew. The dispute was resolved peacefully, but only after some verbal negotiation on the part of crew leaders and trapline bosses. The full details of this story are beyond the scope of the present study, though they arise from my ethnographic writing and participant observation.

Taken as a whole, the results of my 'landscape investigation' in the summer of 2008, yielded results on two different levels corresponding to particular places (in the case of the photographs, Figures 1-4) and abstract spaces (in the case of the Google Earth transcriptions,

Figures 4.5, 4.6 and 4.7). Place versus space based knowledge investigations are fairly commonplace in geographic inquiry (Curry, 2005). The discussion which follows will not analyze data according to a place/space dichotomy, but instead according to the geoweb 1/geoweb 2 dichotomy outlined above. In this discussion a bridge entity, landscape, is posited to resolve the geoweb 1/geoweb 2 dichotomy into more workable lists or tuples corresponding to what resources may be found in the landscape, and exactly where each item is to be found at a particular time.

4.5 Discussion

In keeping with Abler et al. (1971) and their observation that modeling involves integrating two or more established sets of theories or laws, I assert that my mapping of geoweb 1 to geoweb 2 is also a modeling between the theories behind those two paradigms as outlined above. Where my mapping ‘touches down’ is in the landscape-as-bridge concept mentioned in part 1. Landscape-level analysis ‘grounds’ this discussion in a realistic scientific theory by asserting that foundational knowledge is real, that it is accessible empirically, and that it can result in law-like statements about society at smaller scales of analysis (Bhaskar, 1974; Davies, 2008).

Figure 4.8 shows a mapping between geoweb 1 and geoweb 2 that is ‘many-to-many.’ In terms of food security, this means that each food item may be secured in many places, and that each place may contain many food items. A database metaphor provides the concept of many-to-many, and also the means for resolving it. When a many-to-many relationship occurs in a database, it must be resolved into two ‘one-to-many’ relationships, which join together in a ‘bridge entity’ containing tuples, or a set of records which is a hybrid of the original two tables. Figure 4.9 shows how the concept of landscape provides the bridging mechanism for resolving the geoweb 1/geoweb 2 many-to-many relationship.

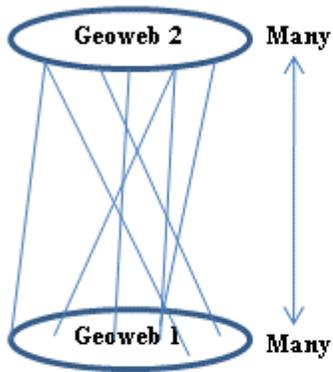


Figure 4.8 Geoweb 1 and Geoweb 2 and

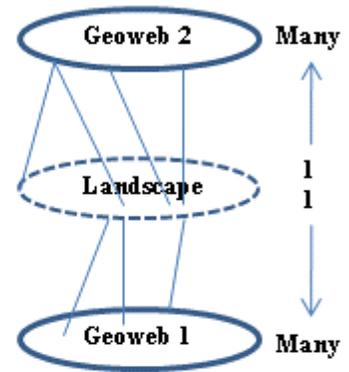


Figure 4.9 The Role of Landscape

What this means in real terms is that, although the geoweb paradigm may be shifting (from geoweb 1 to geoweb 2), the foundation for its constitution (landscape) remains relatively stable. Geoweb 1 represents traditional, indigenous ways of knowing. In terms of food, geoweb 1 refers to food from the land, such as goose, caribou, ptarmigan, bear, beaver, and berries; whereas geoweb 2 refers to food from the store, such as eggs, milk, bacon, apples, or juice. Modern Cree families obtain food from both geoweb 1 and geoweb 2 networks, both from the land and from the store. They do so in terms of communication about what food is located where, and how to get it. Communication is strategic, in the sense that it makes a difference, in terms of securing food, what type of communication technology is used (Carlson, 2008).

To return to the database metaphor, the landscape bridge entity contains what/where tuples. For instance: milk/The Northern, eggs/The Northern, apples/my friend's boat, bacon/my brother's house, ptarmigan/Walrus Island, caribou/Long Island, fish/mouth of the Maquatua River, or fish/Grandma's michiwap (teepee). Figure 9 shows that these tuples refer to geoweb 1 → Landscape and geoweb 2 → Landscape interactions. Thus the diet of a typical Cree person at the gathering or in town consists of a mixture of traditional foods obtained from the land, and imported foods obtained from the store (See Figure 4.1).

There is certainly affluence in terms of food security in Wemindji territory. Food is available from more sources than in traditional times, making it more reliable throughout the year (Preston, 2002). An apparatus of machinery now complements the land in terms of providing for that affluence. Power grids supply the means for operating cell phones, the internet, and television, all of which simultaneously create and provide the means for obtaining new foods. The land is thus transformed and made hybrid by the addition of power grids across the traplines and hunting and fishing lands of the Cree. This represents a reconfiguration of indigenous spatiality, which would be easily visible on satellite images or in a geographic information system. In this way, geoweb 2 dominates geoweb 1 (Hornig, 1999).

Conversely, traditional food harvesting which uses ways of knowing involving place names on the land, is aided by tools such as GPS, GIS, and cell phones (Aporta and Higgs, 2005). In this way, geoweb 1 counter-maps geoweb 2, because it is the land and knowledge of the land which dominates during the process of securing traditional foods on the land. Where to go to get particular types of food on the land is information stored in the heads of the *uuchimaaau*, or tallymen, elder individuals responsible for taking care of discrete pieces of territory historically formalized by interactions with the Hudson's Bay Company (Morantz, 2002).

Between two extremes lies a space where neither geoweb 1 nor geoweb 2 dominates, called 'third space' (Soja, 1996). Third space has lived, perceived and conceived aspects that effect mobility, spatiality and indigeneity. The Google Earth images show the fluid nature of travel on the land and within various locales. The nature of this fluid spatiality is driven by the motor and by freighter canoes, which have the ability to transport up to 6 people, gear and food from town to the gathering in Wemindji territory. Thus, a smooth space opens up, whereby the motor powering the canoe makes travel much easier and smoother than it was traditionally (Preston, 2002). Space is compressed by decreased travel times, and by safer travel. Thus the

lived reality of travel is conceived by both the presence and construction of outboard motors, or of motors generally, on all types of vehicle. On the perceptual side, motors seem to compress space, since it takes much less time to get to places where food is harvested or where gatherings take place.

Cell phones also inhabit third space insofar as they make communication much easier across long distances. The recitation of shopping lists on cell phones held in precise locations are a hybrid construction with local conceptions such as where to place the satellite dish for reception, and the construction of the talking stick itself (used to hold the cell phone in place in order to get reception). Fluidity and space compression are perceived to occur through the use of such devices, which in fact hide the background from which they arise (Borgmann, 1984). In other words, local people are not involved in the making of the devices, only in their use for local purposes. Adoption of tools is followed shortly by adaptation as in the case of the cell phone ‘talking stick,’ used to secure food supplies in a remote location.

Thus the use of a cell phone or a GPS unit is both a hybrid and contested form of ‘being indigenous.’ An outsider unfamiliar with Cree life, but familiar with stereotypes of natives as ‘noble savages,’ might assume that the adoption of any modern technologies amounts to a surrender of the claim to authentic indigeneity. The faulty logic in this case would fall on the side of geoweb 1. On the other hand, a constructivist view might see indigenous life as a thing of the past, already swept away by modernization, development, and the introduction of new technologies. This view would fall on the side of geoweb 2 (see Niezen, 2003, 2009a and 2009b for a very good overview of the entire range of positions just mentioned).

The hybrid landscape concept I propose in this paper avoids both extremes, and allows for negotiated identity formations to occur for both young and old Cree individuals. Elders might see the land as net of place, each place containing distinct possibilities and potentialities in

resonance with other, connected, places on the land. Youth might see the land as a place somewhat distant from their everyday lives in town, attending school, playing, and interacting with family at home. Ultimately the successful transfer of knowledge from elders to youth will ensure geoweb 1 ways of knowing survive within, beneath, or as supplement to geoweb 2 ways of knowing. The photos and maps produced during the summer of 2008 indicate that visual methods will be effective in facilitating that transfer. Photos and maps create their own 'net of place' that, carefully overlain atop, and working in tandem with, older ways of knowing the land, can act of vehicles for carrying that valuable information.

4.6 Conclusion

Curry (2005) theorized that 'choros' or landscape level knowledge is shrinking in our age of geospatial technologies including cartography and GIS. For Curry, 'choros' lies between 'topos' and 'geos,' or place-based and space-based ways of knowing, respectively. I suggest that there is evidence of a lack of 'choros' or landscape level conceptualization in previous research on indigenous spatiality and mapping (Rundstrom, 1991) which amounts to the hollowing out of indigenous ontology. Indigenous subjectivity and identity speak otherwise when experienced 'on the ground.' Observations from the summer of 2008 suggest 'choros' or landscape level indigenous thinking and acting are both sufficient and necessary conditions for life in modern conditions of rapid cultural change. Space-based ways of knowing from GPS, GIS, and cell phones, complement place-based ways of knowing as handed down from the elders. Two types of knowledge thus work in tandem in sophisticated ways productive of new positive and performed identities in traditional lands. Television, the internet, and the media play a productive part in indigenous identity construction as well.

I conclude with the following observation: food in many ways epitomizes the (re)configuration of spatiality in Wemindji Cree territory. In order for this statement to hold

generalizable truth, other studies are needed in other First Nations communities in Canada, focused on broad examinations of spatiality that are qualitative and ethnographic in nature. Quantitative studies, while valuable in their own right, do not hold the same capacity to make law-like statements about humanity at the scales required (Davies, 2008; Bhaskar, 1974). Law-like, or definitive statements, such as the nature of food security in Wemindji Cree lands is defined by both traditional and modern ways of knowing facilitated by landscape level thinking, are true at the scale upon which the study was carried out. It is my hope that more research is forthcoming to confirm or deny the assertions and claims I make in this paper. It is certainly my intention to take up that call.

BRIDGE BETWEEN MANUSCRIPTS 2 AND 3

Chapter 4 presented a more sophisticated viewing of the geoweb than that posited by mainstream GIScientists and web designers. The strength of the approach, splitting the geoweb into two parts, was seen as providing a more flexible and inclusive framework for both old and new knowledge systems.

In chapter 5, we go further, positing geoweb 1 and geoweb 2 as corresponding to traditional and local knowledge, respectively. This move leads to a quantitative exploration of similarities and differences between traditional and local knowledge by sorting a database of old and new place names by category and type. Here, the meme is brought in to our theorization as the most appropriate vehicle for carrying such a rich, dense array of information between generations. The repercussions and consequences of positing ‘place memes’ as the primary units of cultural information are explored through ethnographic means.

We also use reflexive ethnographic methods in order to complement the quantitative approach. By reflecting on our positions as researchers we are better able to sort out subjective from objective data. Not that the former is excised. On the contrary it is embraced and examined from all angles. For instance, the following excerpt is from the primary author’s journal, written immediately before leaving for field work in winter 2010. It shows my nervousness about how I will be perceived in Wemindji:

I am a researcher from McGill University in Montréal, Québec, Canada, and I will be perceived as such, regardless of my position in the McGill hierarchy. I will refer to myself as a “researcher from the McGill Department of Geography,” not as a student, not as a PhD candidate. Perhaps I will refer to myself as a teacher as well, in the appropriate

situations, because a teacher is also what I am, by experience and by inclination.

Referring to myself as a researcher, while not strictly true since I am still a postgraduate student, is a way of avoiding unnecessary self-denigration of my own goals and aspirations. Ultimately, upon successful completion of doctoral work at McGill, I will become a 'real' researcher. To say I'm 'only' a doctoral student is an unproductive distinction likely to be lost in translation in any case.

Beyond my position relative to McGill, a position that does not even begin to exhaust my identity-construct, other aspects of myself will be relevant to those with whom I work in the field in Wemindji, Québec, Canada. I am a 'newcomer' (Trigger, 1985) in two senses. First, as a white male born in the state of New Mexico and descended from Europeans born in Prussia and Ireland; second as a 'westerner' from British Columbia, internally and willingly displaced from my hometown on the northwest coast near Alaska, to this new (for me) province of Québec in which the primary language is French, with significant minority English and Cree speaking communities. I feel myself linguistically 'outside' in both francophone and Cree-speaking communities when living and working in Montréal and Wemindji respectively.

Paradoxically perhaps, I have 'insider' status in two ways. First, as a Canadian citizen who has lived in Canada since the age of three years old, also completing all of my primary, secondary, high school, university, and post-graduate work in various parts of Canada, including Terrace, BC; Victoria, BC; Prince George, BC; Ottawa, ON; and Montréal, QC. As a Canadian I have moved steadily east, often against a tide of west-moving Canadians seeking work in the tar-sands or trying to find the solace of the coast. These are precisely the reasons why I left. The overly melancholy climate and a crude (I

felt) focus on timber and mining in the north were two of the main reasons why I left the west coast.

Second, I have identity as a ‘northerner.’ I spent my formative school age years on the north coast of BC up around 54 degrees latitude. I identify my home as a snowy, remote place close to the ocean and far from any big city. This description of Terrace, BC, my hometown, could fit Wemindji, Québec in terms of latitude, climate, proximity to the coast and distance from major cities (Terrace is a 17 hour drive from Vancouver; Wemindji is a 17 hour drive from Montréal). In both places the presence of First Nations groups is visible and known in the community. Of course, the climate of Wemindji is harsher than BC’s north coast, because it is farther inland. And in Québec, on the east coast of James Bay there is no mistaking that the Cree have the upper hand, that you are a guest on their land despite the heavy presence of hydro-electric and mining developments. (In Terrace, you have to go into the Nisga’a territories, two hours’ drive north, to get a similar feeling). These differences and hesitations in mind, the ‘near north,’ a category encompassing both Terrace, BC and Wemindji, QC, a place of resource extraction, sometimes a place of isolation, but of warmth as well, I am happy to call my home.

Or one of many homes it would seem. No matter where I am, where I’m living or visiting at the time, I’ve had people say to me, “you’re coming back aren’t you?” This means I’m welcome back, of course, but it also means there’s doubt in the mind of the speaker: my host, a parent, or a friend. Because of this doubt I perceive to exist in the minds of others, I wonder if my transience doesn’t sometimes have a negative effect on the people I care about. Isn’t transience a natural state of being under globalization? If so, does it make transience excusable, in the sense of leaving behind those who may need

our emotional, physical or financial support? What if those in need are similarly transient, or spread out? Members of my family reside in BC (northern and southern), Oklahoma, Texas, Oregon, and California.

This is relevant to Wemindj because the phenomenon of young people leaving the community to follow opportunities is an issue in the north. There is a ‘brain drain’ flowing from the north of Canada to the southern cities huddled along the U.S. border, and beyond into the U.S. itself. I am a young person who left the north.

But the hope is that after some time away (perhaps a long time away) some of the young people will return to ‘give back’ to the north that has given so much to them. The north in this sense is both the people who reside in the north, and the landscape on which they reside and with which they have a long standing relationship.

So, finally, going to Wemindji feels like going home to place that is not home. I am returning to the north to help some friends, some research collaborators, with projects they have identified as important, such as mapping and place names, and working to preserve both the cultural heritage and the living knowledge of a place that is threatened by rapid cultural change and unchecked development. At the same time I am not yet returning home and, in fact, I am not really sure what it means to ‘return home’ any more.

As the next chapter (Chapter 5) makes clear, I had little reason to worry. Not only did the research go very well, but the community was extremely generous, to the point that I had no chance to feel out of place, inappropriate, or excluded.

CHAPTER 5: PLACE MEMES (MANUSCRIPT 3)

5.1 Background and Introduction

In this paper we examine the role of the geoweb in the transfer of intergenerational indigenous knowledge. The geoweb is defined as distributed geographic services that are controlled by the primary users of those services and that reside within both traditional performed mappings and in more modern inscribed and internet mappings (Carlson, 2008; Scharl and Tochtermann, 2007; Eades, n.d.). We found that the geoweb facilitates the creation, transmission, and inheritance of place-memes, or discrete bundles of place-based information, including stories, images, and maps.

In order to make this claim, memes are posited as robust, real and valid cultural constructs appropriately applied in a wide variety of disciplines, including geography (Dawkins, 1982; Distin, 2005). Furthermore, our conclusions rely upon an expanded definition of the geoweb, as outlined in an earlier paper by one of the primary authors (Eades, n.d.). A geoweb capable of handing place-memes in the way described is a geoweb that is flexible enough to contain both old and new knowledge as well as hybrids of old and new. Thus, there are two geowebs: geoweb 1, which has existed since ‘time immemorial’; and geoweb 2, which includes cutting edge technologies, such as TV, the internet, and cell phones, for distributing geographic services on an as-needed basis.

These two geowebs come together and mesh in landscapes. Landscapes are places where traditional (intergenerational) knowledge, in the form of place names mentioned in oral narratives, remains a living presence in eastern James Bay Cree territory (Carlson, 2008). In landscapes too, newly generated local knowledge results in a dense layer of settlement that is

spatially restricted in terms of the town of Wemindji (where our research took place), but that is also wide open in terms of a booming ‘satellite culture.’ Culture that is literally beamed in from the heavens may be singularly constitutive of geoweb 2 in the near future, if not now (Aporta and Higgs, 2005; Aporta, 2009; Scharl and Tochtermann, 2007). New geographic services, bundles of text- and image-based information, and, as we will demonstrate below, memes, are being generated in and through the circulations, both old and new, of this expanded vision of the geoweb as ‘satellite culture.’

Evidence for these claims was gathered in two ways: through ethnographic research and participation in community life in Wemindji, Québec in February and March of 2010; and through analysis and evaluation of the status of the meme as a legitimate and indeed essential part of research into cultural transmission.

This paper is structured as follows: first, some background on the community of Wemindji in order to situate the reader and contextualize our observations. Second, literature reviews of both ethnographic work, with special focus on reflexive ethnography, and the meme literature from Dawkins (1976) to Distin (2005) (with a few stops in between).

Following the literature review is a description of the methodology followed in the course of answering the primary research question. An iterative ethnographic methodology included participant observation in home life and in symbolic (commemorative) activities on the land; participatory mapping during those land-based activities; and group mapping in a variety of settings in the town of Wemindji. A long results section presents a series of optics (Colin Scott, personal communication) for viewing how, ultimately, the primary research question was answered. These maps, graphs, and diagrams demonstrate that two geowebbs in fact exist and mesh in and around Wemindji and its landscapes. Thus, geoweb 1 and geoweb 2 are revealed to correspond to traditional and local knowledge systems, respectively (Berkes, 2008).

Both traditional (intergenerational) knowledge and local knowledge generation are depicted as distributed points ‘tagged’ with names, meanings, and representational content. Place names old and new show commonality in terms of content and category across generational lines. Indeed, place-names with a high degree of content and the ability to become a permanent part of local geographies, gain the moniker of ‘place-meme’ according to our analysis.

The discussion section goes in depth into meme theory by way of introducing ‘cognitive loads’ at both individual and group levels. As Hunn (1994 and 1996) has shown, there are constraints on the ‘carrying capacity’ of place-based knowledge that both the land and its inhabitants may hold. These constraints operate at two levels, the individual level and the group level. These constraints force a dynamic of over- and under-determination of the toponymic carrying capacity in Wemindji Cree territory.

The evolution of the town of Wemindji over time is posited as a driving force behind a shift from an ‘overdetermined’ group and cognitive toponymic load in the mid twentieth century, to the present day ‘underdetermination,’ following a rise in the population of Wemindji. The situation of underdetermination creates ‘toponymic space’ that is being rapidly being filled in by new place-memes arriving via ‘satellite culture’ and roads. This claim is backed up by numerical and qualitative data collected in the field.

In conclusion we note that hybrid knowledge is viable and is indeed essential to the survival of traditional knowledge systems. The conceptual and material framework provided by the geoweb (1 and 2) is solid and flexible enough to carry hybrid place-memes with large amounts of informational content and widely disparate formats ranging from orally transmitted stories to photographs and other images, and especially, maps. This takes geography beyond the traditional place name, a construct that could only hold so much, usually a name, a meaning, and a precise location. In the changing and complex technological milieu of Canada’s north,

traditional place-name cultural constructs are necessary but no longer sufficient to capture the nature of northern place-based knowledge.

Throughout this paper maps are demonstrated to be the primary vehicles for carrying place-meme complexes that are both durable cultural artifacts (Thornton, 1997) and ever-evolving nodes in continuous use over times spanning from pre-history to the present time.

At the close of this introduction and before moving to the literature reviews we briefly mention the unique contributions this work makes to the disciplines of geography and anthropology. First, we undertake a spatialization of cultural transmission. With a few exceptions (see Cavalli-Sforza, 2000) most studies ignore the spatial aspects of passing on cultural traits. Specifically, the transmission of toponyms is an understudied aspect in this field (Schonpflug, 2009). Second, we re-insert (spatial) memetic mechanisms into intergenerational knowledge transfer. Theorists tend to shy away from positing discrete, ‘selfish’ entities as ‘units’ that parents pass on to offspring or that engineers in a drawing room pass to each other. Such an explicitly particulate characterization is often deemed either unnecessary or unsupported by evidence (Shennan, 2002). We posit that recent work in memetics, especially by Distin (2005), rescues the meme from obscurity. Therefore we embrace the meme and describe below how the concept is especially applicable to the intergenerational transfer of place names via the geoweb.

5.2 Literature Review

5.2.1 Memes

Two aspects of the meme literature are deemed important for answering the primary research question which can be stated in as follows: what is the mechanism for transferring intergenerational place-based geographic information? The meme is posited as a bundle of place-based information that forms a unit of cultural inheritance. Through variations and deviations in

memes as they are transmitted through generations evolution occurs. Without slight differences between memes in time, cultural selection would have nothing upon which to act. In this way, memes are analogous to genes. The major difference between genes and memes lies in the fact that genes are fixed at birth for an individual, while for that same individual his or her knowledge of memes may be very changeable (Distin, 2005). With these facts in mind, we therefore cover adaptive and evolutionary aspects of memes as well and as the literature on cultural transmission and evolution.

5.2.1.1 Adaptation and Evolution

In the 1970s and early 1980s Richard Dawkins legitimized the concept of the meme (Dawkins, 1976 and 1982). However, genes, not memes, were Dawkins primary interest. In the 1990s there was a resurgence of interest in memes and the creation of a scientific journal (*The Journal of Memetics*, published from 1997 to 2005) devoted exclusively to the study of memetics (Blackmore, 1999; Dennett, 1995; Brodie, 1996; Aunger, 2002; Distin, 2005). After less than a decade the journal was no longer being published and it seemed as though the meme had seen its day, at least in terms of popularity. In terms of validity, memes have seen a steady trajectory of intellectual respectability up to the present day, despite the waxing and waning of popular opinion.

Distin (2005) is the greatest contemporary champion of the meme, though she is not the most well known meme theorist. Her book, *The Selfish Meme*, systematically and concisely works through many of the issues and stumbling blocks that earlier theorists proved unable to overcome. Most importantly, Distin points out that the meme is as necessary to culture as the gene is to evolution; that memes are particulate units, distributed in space and time; that memes exist both within genetically created minds and outside our brains in external representations; and that we need not fear memes determining our lives any more than we need fear genes determining our lives (Distin, 2005).

A meme is defined as a unit of cultural inheritance, in much the same way as the gene is a unit of biological inheritance (Dawkins, 1982; Distin, 2005). Our claim in this paper is simply that the meme is a useful way of explaining how place names are memorized, copied, transferred, and inherited between different generations of Cree individuals. This transmission process is posited to be primarily top-down, but as theorists of cultural transmission and evolution have shown, transmission also has oblique, horizontal and upwards vertical components (Schonpflug, 2009). In order to strengthen our claim that place names are transferred memetically, we undertake a short review of the cultural transmission literature next.

5.2.1.2 Cultural Transmission and Evolution

The field of cultural transmission has come into being quite recently (Shennan, 2002; Boyd and Richerson, 1985; Cavalli-Sforza, 2000; Cavalli-Sforza and Feldman, 1981). Advances in psychological and methodological aspects are beginning to be published, but that advance is slow due to the complexity and diversity of disciplines involved in such research. With a basis in biology, cultural transmission is favoured by an established mathematical framework derived from the study of genetics (Schonpflug, 2009). Vertical, horizontal and oblique paths have been established as the primary routes for knowledge transfer, corresponding to peer to peer (horizontal), adult or elder to youth (vertical), and from adults or elders to youth who are not direct descendents (oblique). Combinations of types occur in real world situations, and are not limited to individuals directly acquainted with each other. Thus, various media and communications technologies become forms of oblique transmission, for instance, for individuals watching television in places far from where the depicted images and broadcasts occur.

5.2.2 Ethnography

The ethnographic literature includes that which specifically examines place names (Basso, 1996; Thornton, 1997; Meadows, 2008). It also includes literature pertaining to human and cultural ecology (Berkes, 2008; Wenzel, 2008) which is relevant to our analysis of traditional

and local knowledge systems. Lastly, this literature review includes ‘reflexive ethnography’ (Davies, 2008) essential to the overall ‘landscape investigation methodology’ used in the field during our research.

5.2.2.1 Place Names

Hunn (1994 and 1996) has published some controversial findings with regard to place names, and the human ability, individually and collectively, to store and use those place names. We use Hunn’s insights to inform our own analysis of the ‘toponymic carrying capacity’ of Wemindji residents on an individual basis and together as a whole. Specifically, Hunn (1994) identified the number 500 as being ‘magic’ in the sense that one human being has the capability of handling roughly between 300 and 700 place names. This limitation is chalked up to the semantic space needed to store place name information. We accept that there is a limit to the number of place names an individual may interact with meaningfully, while realizing that it would be very difficult to identify the upper limit with any certainty. Assuming that one limiting factor to individual place name capacity is indeed semantic or information space usage in the human brain, we posit that it is the memetic nature of place names that dictates high information usage.

Memes require representational content in order to function. This content includes not only the name of the place, its meaning and the exact location of the place, but also associated image, story, and textual information that form mental maps (Brody, 1981). A place meme is thus a place name plus the additional associated information that is part of most meaningful places. Basso’s (1996) observations of the Western Apache corroborate our assertion that there is much more to a place name than its name and location. For the Western Apache, place names are rich associations or webs of information evoked by the utterance of the name. Thornton (1997 and 2008) describes how place names go further than names towards being-in-place, dwelling, and life projects. In short what this means is that memes matter for place names.

5.2.2.2 Human and Cultural Ecology

Human and cultural ecological writings provide a necessary piece of scaffolding for the present study, especially our partitioning of knowledge into old and new. Natural or human ecologies are often described as ‘webs’ (Carlson, 2008; Nardi and O’Day, 1999). Therefore we named old knowledge as geoweb 1 and new knowledge as geoweb 2, in order to show both compatibility and difference between the two knowledge systems. Both systems work as ecological webs, and there is continuity between them as well. Spatial information processing ultimately comes from human brains. Only later is that information externalized into sophisticated technological systems (Scharl and Tochtermann, 2007).

We take this logic one step further and, using a concept developed by Berkes (2008), we name geoweb 1 traditional knowledge, and we name geoweb 2 local knowledge. Traditional knowledge is inherently intergenerational and it represents old established knowledge. Local knowledge is recently generated, not yet transferred beyond one or two generations, and for the purposes of this paper, it may stand in as a proxy for youth knowledge. Wenzel’s (2008) community/settlement distinction is also useful here. We describe a process of local knowledge generation, settlement and centralization leading to the creation of new traditions alongside the old traditions.

5.2.2.3 Reflexive Ethnography

Reflexive ethnography is an ethnography that includes reflection upon the position of the researcher(s) in relation to the ‘objects’ or the ‘others’ they are studying. See Davies (2008) for descriptions of ethnographic settings produced by researchers situated in the context of local cultures. Of particular interest here are participatory and visual approaches we have adopted as part of our methodology described below. As well, we examined our positions as researchers in the field in order to get a ‘handle’ on what we brought to the situations we were seeking to describe, thereby noting the potential changes we might be introducing to those very situations.

Brody's (1981) classic study of northeastern British Columbian indigenous cultures remains an excellent example of what reflection has to offer ethnography. We adopt Brody's method of thick description and participation in local culture. Brody's writings are explicitly geographical as well. His main arguments are backed up by clear and concise spatial depictions (maps) with layers of information separated on different pages, then combined at the end to bring home the full force of his argument. Brody noted that traditional use studies mapped the extent but not the intensity of indigenous uses of lands. We extend Brody's argument into the realm of cultural intensity by examining place names ethnographically and quantitatively as outlined below.

5.3 Methodology

The methodology used in this study was primarily ethnographic. However, it also included an analysis of an existing database of 898 place names in Wemindji Cree territory previously used in a study by Wellen (2008) on the ontologies of Cree hydrography. In the course of ethnographic field work, 78 new place names were also collected in the town of Wemindji. Local and traditional knowledge systems were partitioned according to the designations 'old' and 'new.' Old place names are those found in the legacy database provided by Wellen (originally collected by Colin Scott and his colleagues in the 1970s and 1980s). New placenames are those found not only in the town of Wemindji, but also in other towns and cities in the region, including Chisasibi, Radisson, and Val d'Or. The importance of these local and regional place names has to do with changing patterns and processes of spatial interaction in eastern James Bay.

Old and new place names (or traditional and local place names in our parlance) were sorted by category and by type. Place categories include the way in which places are named, for instance, descriptively, or the association of the name with an historical event or myth. Place type, on the other hand, simply refers to the type of object the place represents, such as a lake, a road, or a dwelling. The database of traditional names provided Cree place types, which were translated directly into English for sorting. The same database required the creation of categories and subcategories for the sorting of places into different ways of naming or describing places. Afbale and Beeler (1996, p. 189) guided us with respect to four main categories of place for indigenous peoples in North America: descriptive, human, locational, and historical/mythical. Subcategories were guided by the nature of the material itself, and the subcategories so identified are presented in the Results. For local (new) place names, sorting was guided by Randall's (2001, p. 7) ten categories of place naming, also presented in the Results.

Our landscape investigation methodology includes participatory and group mapping, participant observation, and visual ethnography (Pink, 2007). This suite of qualitative tools complements a descriptive quantitative approach with respect to the database of old and new place names. Through participant observation, contexts and conduits for spatial information learning in Wemindji were identified. These are discussed further in the Results. The identification of contexts and conduits has consequences for the creation of new spatial information formations in youth.

Participatory and group mapping occurred in conjunction in two separate venues. Participatory mapping can be a solitary pursuit but, paradoxically, often others are present. For this reason we put participatory and group mapping together in one category. An example is the use of global positioning systems (GPS) devices during activity on the land. During the primary author's participation in a traditional three day walk, held each year in February, and named

kaachiiwaapechuu (going offshore), a GPS device was periodically used to measure the remaining distance to the end destination. At first this involved only one person (the primary author). As the walk progressed other participants became involved, asking about the remaining distance, and asking questions about the device itself. At the end of this walk, the GPS track was displayed as a map upon a base layer of Google Earth satellite imagery. The map was subsequently entered into a local art contest, in which primarily young males interacted with the map and, again, asked questions about the nature of specific places depicted on the map.

Furthermore, the 1:50,000 map of the three day walk fit the context of the art contest very well. By this we mean that the art entered in the contest primarily depicted activity the land. The majority of the art took the form of landscape drawings, or oblique view maps, of particular places. An intergenerational aspect was also apparent in the different categories in which individual art works were entered. Both the walk and the subsequent art contest were documented in photographs, forming part of the visual ethnographic component of this research (Pink, 2007; Sletto, 2009).

Participant observation formed the ‘backbone’ of the research methodology. Observations of daily life with families and individuals provided a broad and deep swath of data that was recorded by the primary author in daily journal entries. These observations generated results in terms of identifying the primary spatial inputs into the daily lives of youth, and by comparison with activity on the land, how those inputs of spatial information are changing and even creating new traditions in and around Wemindji.

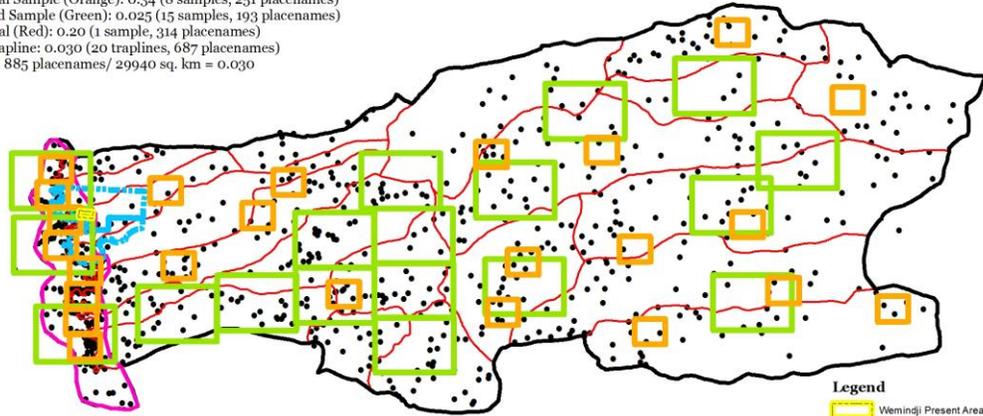
5.4 Results

Figure 5.1 shows the results of an initial sampling of place name densities in Wemindji Cree territory. Samples of toponyms were initiated at visually identified ‘hotspots’ with

subsequent iterations (15) using a random sample method. In addition to coastal and inland areas of cultural intensity, category I lands and the town of Wemindji were also identified as culturally intense. Category I lands are defined by the James Bay and Northern Québec Agreement (JBNQA) from 1975. While inland and coastal density figures and indications of intensity are useful, they will not be used in the present study. Instead, initial toponymic density sampling led to the identification of local and traditional knowledge areas shown in Figure 5.2.

Methods of Sampling Toponymic Densities

Average Toponymic Densities (Cross Checked):
 Coastal Sample (Orange): 0.34 (8 samples, 251 placenames)
 Inland Sample (Green): 0.025 (15 samples, 193 placenames)
 Coastal (Red): 0.20 (1 sample, 314 placenames)
 By Trapline: 0.030 (20 traplines, 687 placenames)
 Total: 885 placenames/ 29940 sq. km = 0.030



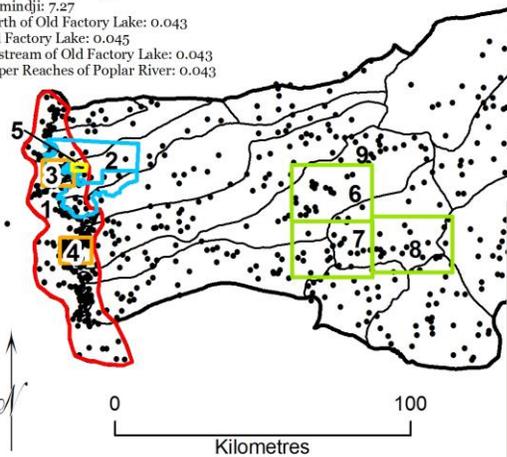
Method of Sampling:
 Initial areas of cultural intensity identified visually.
 Boxes drawn around areas identified as culturally intense.
 Coastal areas of intensity sampled at 93 sq. km. for entire coast
 Inland areas of intensity sampled at 515 sq. km. around Old Factory Lake and randomly inland (15 iterations)
 Coastal boxes applied randomly to inland areas as cross check (15 iterations). Result 0.034 (vs. 0.025 with larger boxes).
 Inland boxes applied randomly to coastal areas as cross check (3 iterations). Result invalid due to excessive coverage into the bay.



Areas of Above Average or Increased Cultural Intensity*

*Toponymic density 50% or more above average

- Key:
1. Coastal Density: 0.20
 2. Category I Density: 0.079
 3. Paint Hills Bay: 0.53
 4. South Moar Bay: 0.53
 5. Wemindji: 7.27
 6. North of Old Factory Lake: 0.043
 7. Old Factory Lake: 0.045
 8. Upstream of Old Factory Lake: 0.043
 9. Upper Reaches of Poplar River: 0.043



Projection/Datum: UTM Zone 17, NAD 83 Cartographer: Luke Eades Date: March 14, 2010

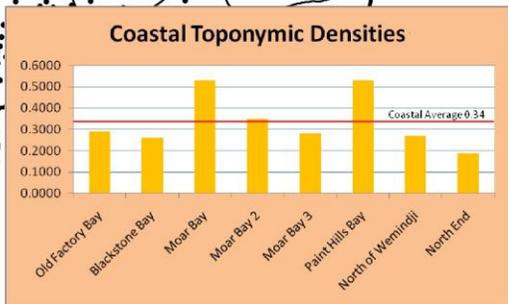
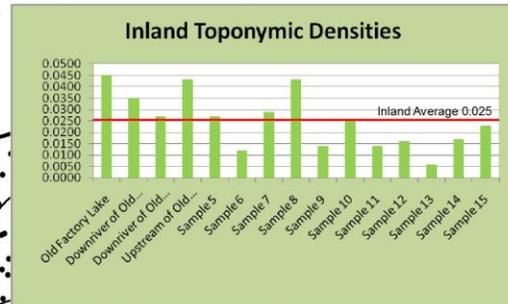


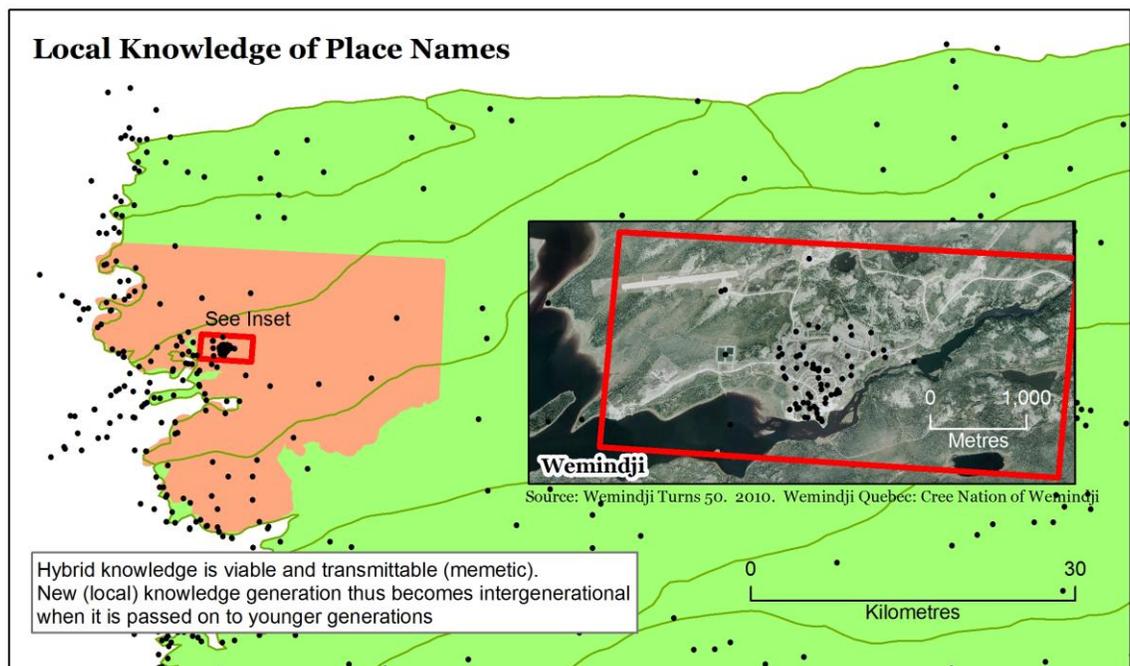
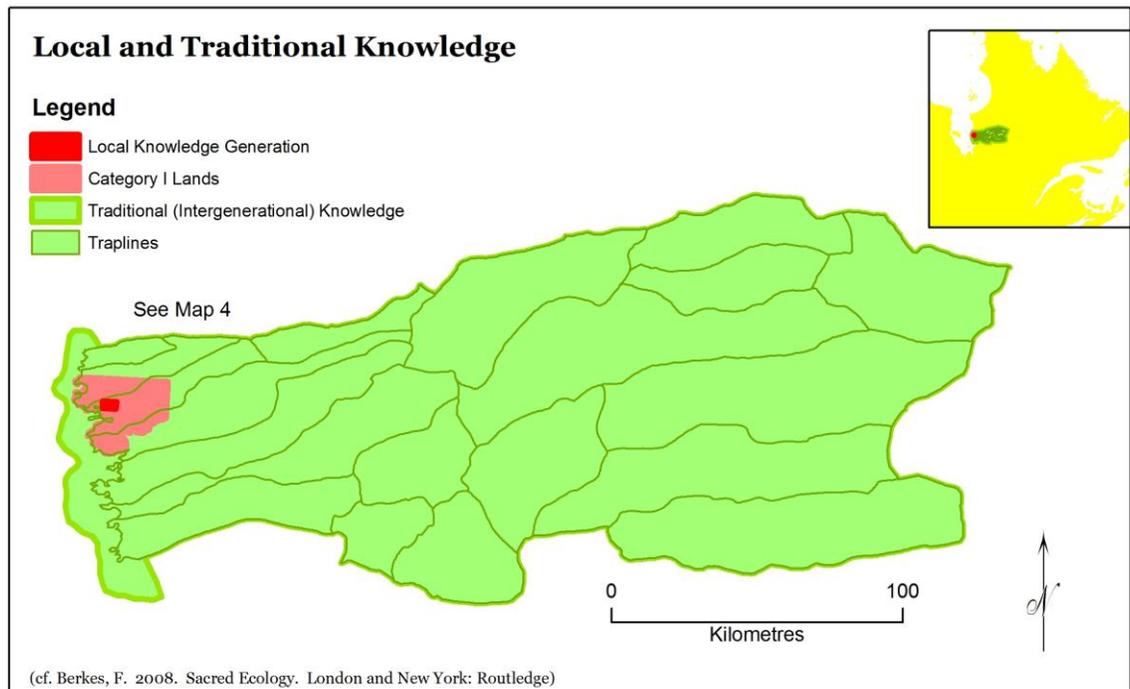
Figure 5.1 Coastal and Inland Toponymic Densities

These areas correspond to Berkes (2008, p. 222) identification of local knowledge as knowledge that is being newly generated; and traditional knowledge as that which is intergenerational. Traditional knowledge, while robust, is subject to potential loss as cultural change proceeds through local knowledge generation. However, as stated on Figure 5.2, hybrid knowledge is viable as local adaptations tend to incorporate traditional insights and systems and ways of knowing and being. Thus, continuity of indigenous knowledge exists within rapid cultural change. To provide evidence for this claim, and for the claim that toponymic knowledge is memetic, Figures 5.3 and 5.4 were created after the categorization of all local and traditional place names. Categorical knowledge indicates that toponymic knowledge has both representational and relational content, two criteria for meme status according to Distin (2005). More than this, however, status as meme requires copying, transmission and inheritance of ‘instructions’ for using toponymic knowledge in consistent, repeatable ways. Ten types of place meme are explored in the discussion section.

Figure 5.5 shows change in developed area in the town of Wemindji. Local knowledge generation is indicated on previous figures as ‘town’ toponyms, which stand in for youth knowledge. Figure 5.5 indicates the change in youth knowledge over 25 years, with developed area assumed to be directly related to the number of toponyms. Using this assumption, Figures 5.6, 5.7, and 5.8 were generated.

Figure 5.6 shows a constant level of traditional place names, assuming toponyms to be durable cultural artifacts (Thornton, 1997), with little to no knowledge loss over the last 50 years. Evidence for no knowledge loss exists in the form of place name verification during participant observation and participatory mapping on portions of Wemindji Cree territory during February and March 2010, and from personal communication with key informants and elders in Wemindji. Presently, loss of knowledge of traditional place names may in fact be occurring, but it is

assumed that this loss, if occurring, is still in the early stages. Furthermore, hybrid knowledge is assumed valid in this study, which would in effect preserve traditional knowledge by attaching it to locally generated knowledge systems, preserving traditional knowledge in slightly altered forms. An example of this is the naming of local places using commemorative names of important individuals in Wemindji history.



Projection/Datum: UTM Zone 17, NAD 83 Cartographer: Luke Eades Date: March 16, 2010

Figure 5.2 Local and Traditional Place Names

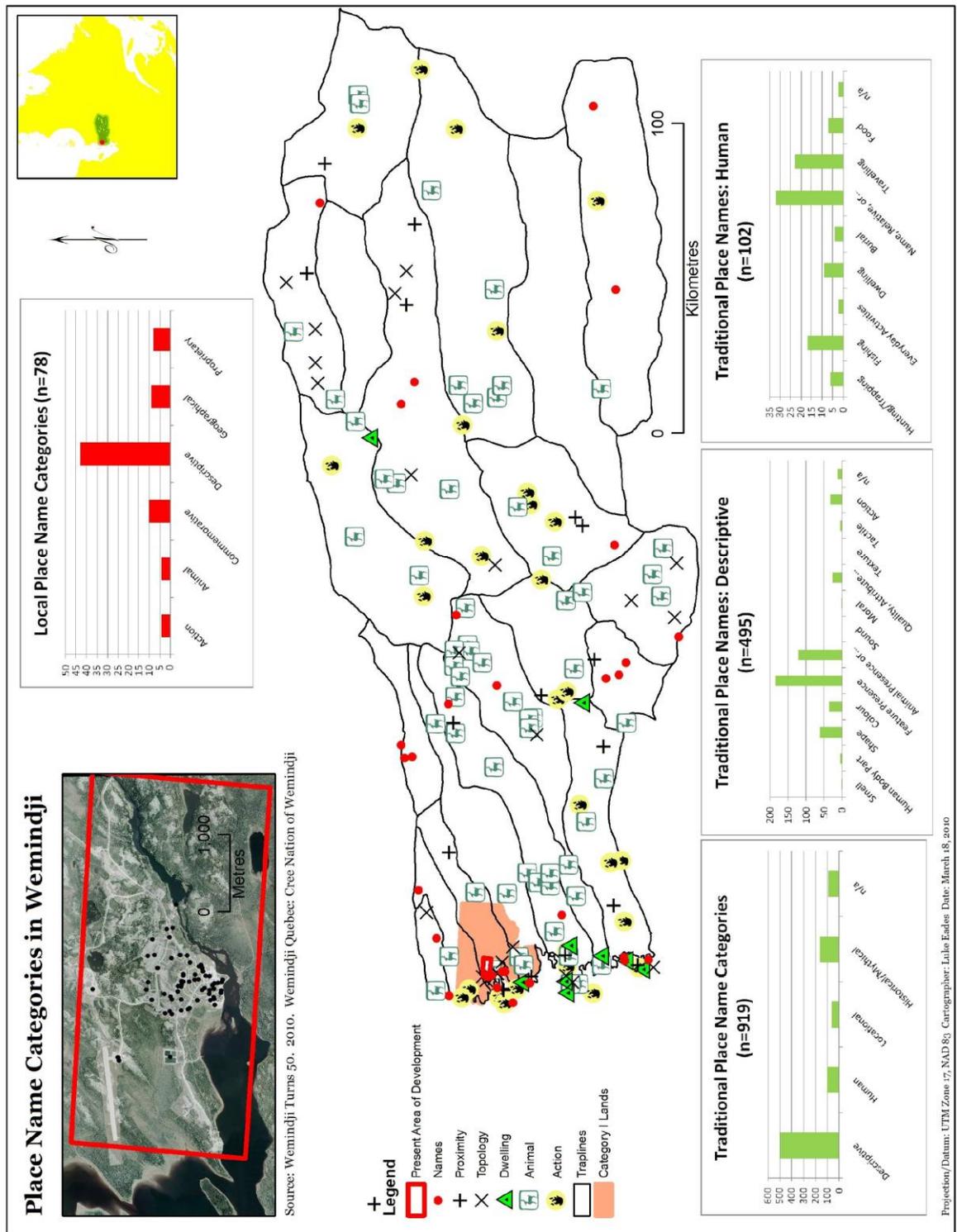


Figure 5.3 Place Name Categories

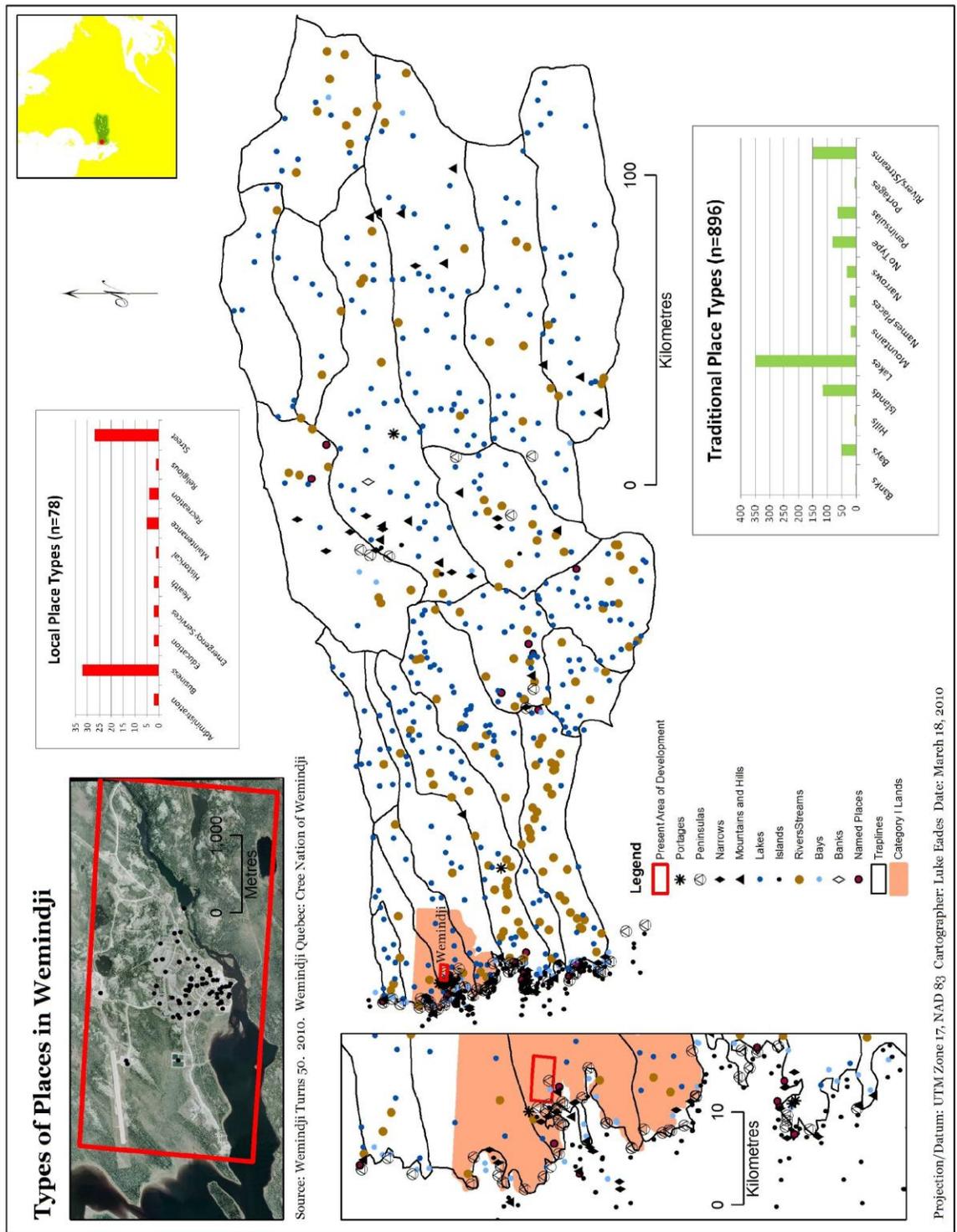


Figure 5.4 Place Name Types

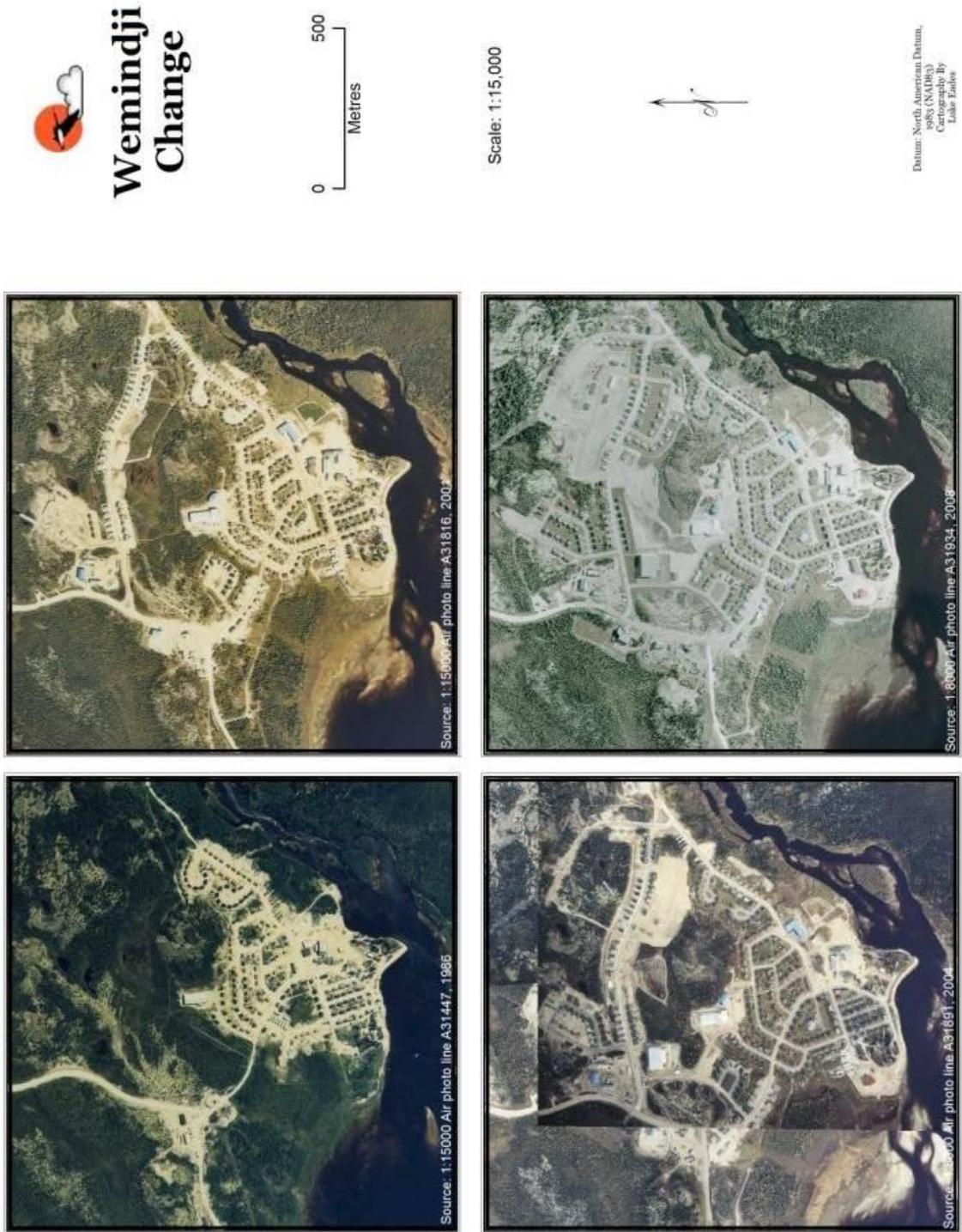


Figure 5.5 Wemindji Change

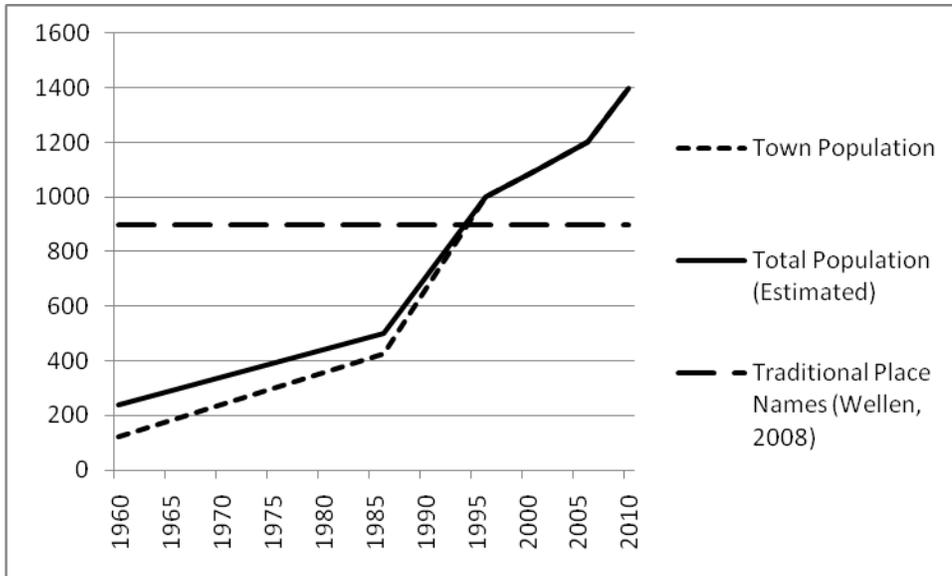


Figure 5.6 Population and Place Names vs. Time

Figure 5.6 also assumes gradual movement of families from permanent residence on the land to permanent residence in town. A key informant provided a list of 30 families who made the move to the newly established town of Wemindji in 1960. Assuming 4 persons per household, 120 individuals made the move at that time. Another key informant provided evidence that perhaps only half of the families made the move at that time, leaving another estimated 120 on the land. Gradually, however, all families eventually made the transition to town life. This does not preclude continued activity on the land, nor does it preclude seasonal residence on the land.

Along with rapid population growth and movement another shift has occurred. As indicated by Hunn (1996, p. 21) population density roughly corresponds to toponymic density for most North American ‘Indian’ or ‘First Nations’ indigenous populations. Figure 5.7 shows that this applies equally to the Wemindji Cree, but with some caveats. First, while the number of toponyms is assumed to be constant, the population has drastically increased. Therefore, a shift from an ‘overcapacity’ in which toponymic density is higher than population density to an

‘undercapacity’ in which population density is higher than toponymic density. This observation is shown on the dashed line labelled ‘Difference.’

Figure 5.8 shows the increase in the number of town place names measured directly by counting placenames in Wemindji using locally generated materials (a local publication and directory, verified by construction workers in town); by proxy, using Figure 5.5 (Wemindji Change) to measure the area of development and assuming the number of place names to be proportional to that area; and by interpolation where there was no data.

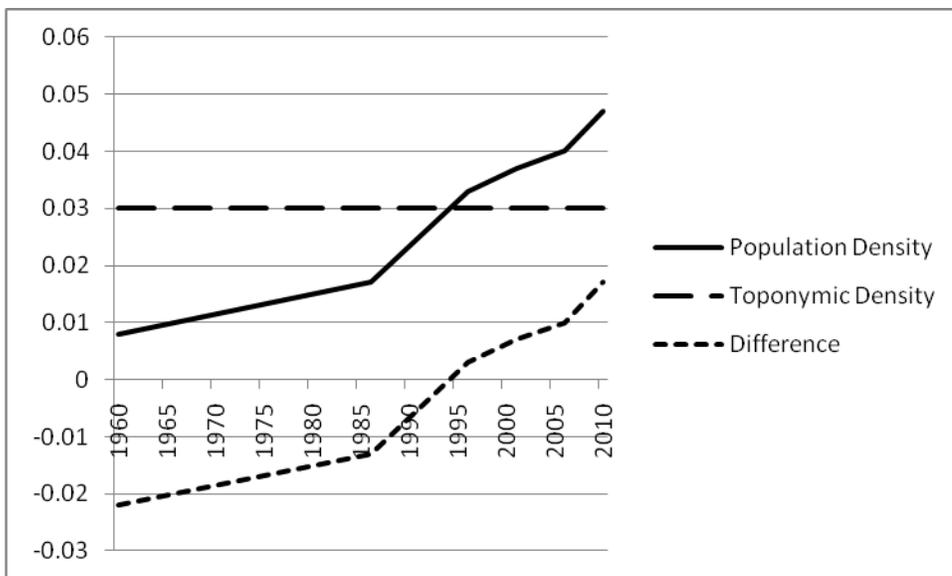


Figure 5.7 Population and Toponymic Densities vs. Time (per sq. km)

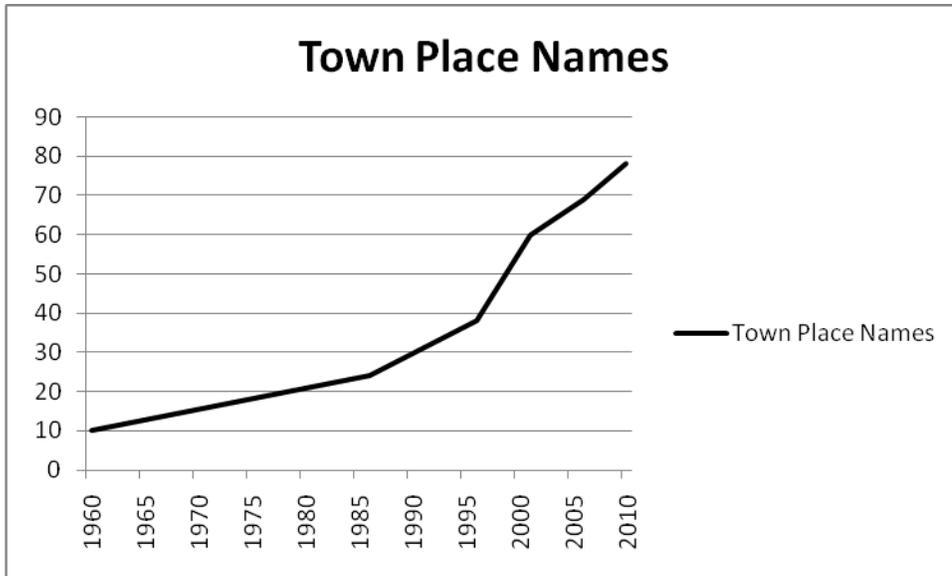


Figure 5.8 Town Place Names vs. Time

The ethnographic portion of this research provided a suite of qualitative results that complements the quantitative results well. The qualitative results took two forms. First, participation in a traditional annual activity, called *kaachiiwaapechuu* (going offshore) resulted not only in validation of the primary researcher’s activities in Wemindji, but verification of place names and associated images and stories. “Places Along the Way” were recorded visually during the course of the walk, through photography, and the posting of photographs on Facebook, where several Cree informants interacted with the primary researcher. Similarly, “Islands in the Bay” were documented and posted in the same way.

Another traditional activity was identified, but not participated in, and was deemed a useful construct for inclusion in the present results. *Nasiipapechuu* means going from inland to offshore, and runs perpendicular to *kaachiiwaapechuu*. These traditional activities and constructs involved participants of all ages from young school children to young adults, adults and elders. Learning on the land thus occurred and can be posited to have facilitated intergenerational knowledge transfer, at least during these specific activities. The implications of these observations are discussed below.

Finally, a GPS track of *kaachiiwaapechuu* was produced at 1:50,000 scale and entered in a local art contest. Primarily young males interacted with the map, in essence to ‘gather intelligence’ about certain places for hunting or fishing, and how to get to those places. The entry of this map into the art contest acted as a final validation stage for this project, in terms of community engagement and acceptance of the project. Afterwards there were many requests for copies of the map, which was produced on-demand for community members. Also of interest are the age categories used during the art contest which were as follows: Children are under 13 years old; Youth are 13 to 34 years old; Adults are 35 to 64 years old; and Elders are 65 years or older.

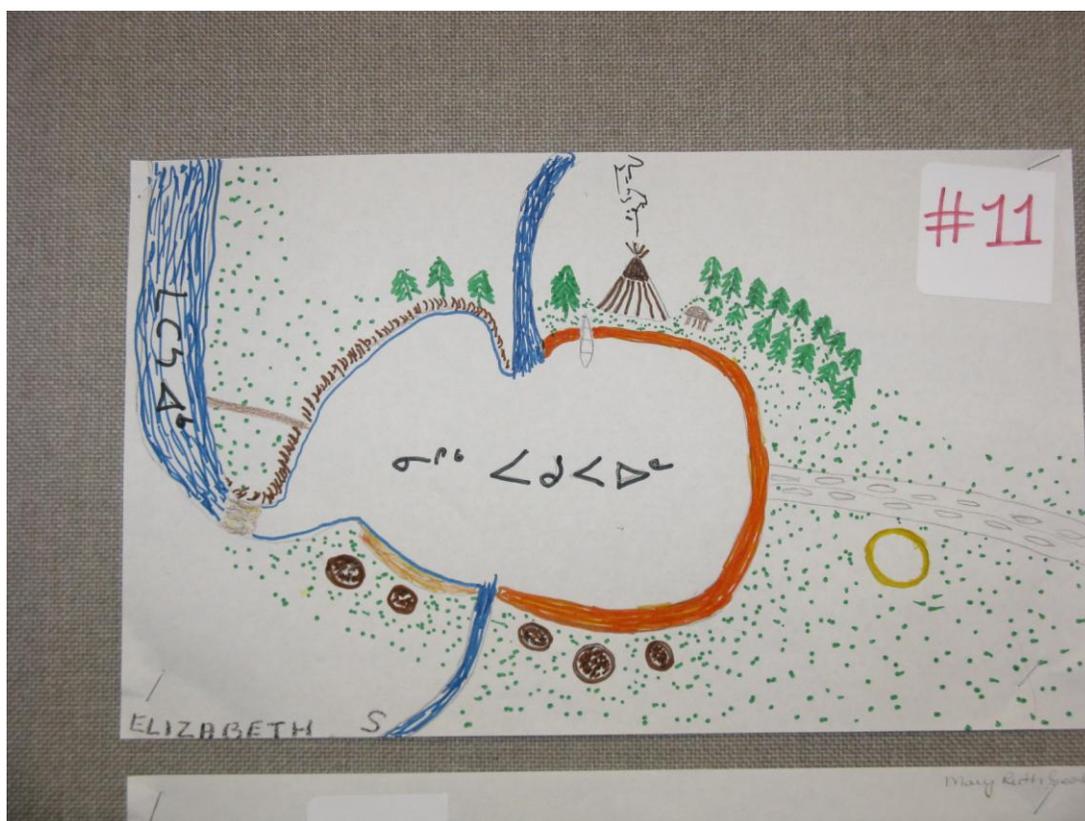


Figure 5.9 Map Drawn by an Elder

The art contest provided a means of qualitatively assessing intergenerational knowledge transfer. All age groups produced mainly landscape drawings of traditional activity on the land.

These landscapes are posited to be maps with viewpoints oblique to the depicted surface. Only one map was produced at an angle perpendicular to the depicted surface. This one example is included here to show an elder produced depiction of traditional activity on the land. The homogeneous nature of the art produced in the contest indicates a procedural quality to this place based art. These implicit procedures are instructions and are another example of inheritable place memes, as discussed below.

5.5 Discussion

Figures 5.9 and 5.10 show (albeit in different ways) mechanisms for cultural transmission in Wemindji. The particulate and distributed nature of toponyms (local and traditional) lend themselves well to transmission both orally (geoweb 1) and through ‘satellite culture’ (geoweb 2). Through contexts and conduits place names come to exist both in the brains of young people, and as external representations, on maps. Furthermore, there is an instructional or procedural aspect to places that indicates places and their names can reasonably and logically be posited to be memes.

Figure 5.11 is an elaboration on the strengths and weaknesses of contexts and conduits in relation to each other, and in tension with the aims and aspirations of young people (thus “When I Grow Up”). “Satellite culture” provides inputs from a wide range of sources towards all aspects of growing up in Wemindji. Even traditional activities are demonstrated to be hybridized through the use of cell phones and other geospatially enabled devices. For instance a young person who wants to be a trapper when he or she grows up will be as equally affected by ‘outside’ forces as the young person who goes abroad for training in a career of their choice.

Figure 5.12 provides a list of copyable, inheritable procedures for constructing place memes in the same way regardless of location or time. Part of the reason why these constructs

are place memes is that they can be depicted on maps. Our depiction of *kaachiiwaapechuu* is but one example of a geoweb 2 enabled (produced using GPS and Google Earth) hybrid combined with traditional knowledge. That this walk is done every year in the same way as it was traditionally done attests not only to the viability of hybrid knowledge, but to its durable nature.

Figure 5.12 also shows what we call ‘meta-representations’ of places. It is the ‘meta’ level of the categories that takes them beyond the representational specificity towards applicability in a wide range of settings. Distin (2005) points out that the ability to de-contextualize representations (in our case individual places) and apply them in new contexts is uniquely human, and uniquely cultural (as opposed to genetic). The human mind has the capacity to do such work. But the cost, according to Hunn (1994 and 1996) is that the semantic space available for such operations is quickly used up due to the sheer amount of information involved.

Examples of meta-representations include styles of movement (parallel to shore, perpendicular to shore); depiction of life on the land through drawings; wayfinding to particular places; safety; identification with places abroad via rooting for a team; and aspirations for the future that involve completing training in specific places. All of these aspects are shown on Figure 5.12, along with the routes by which individuals come to know and construct their own specific and meaningful representations.

Conduits and Contexts for Spatial Information Learning in Wemindji

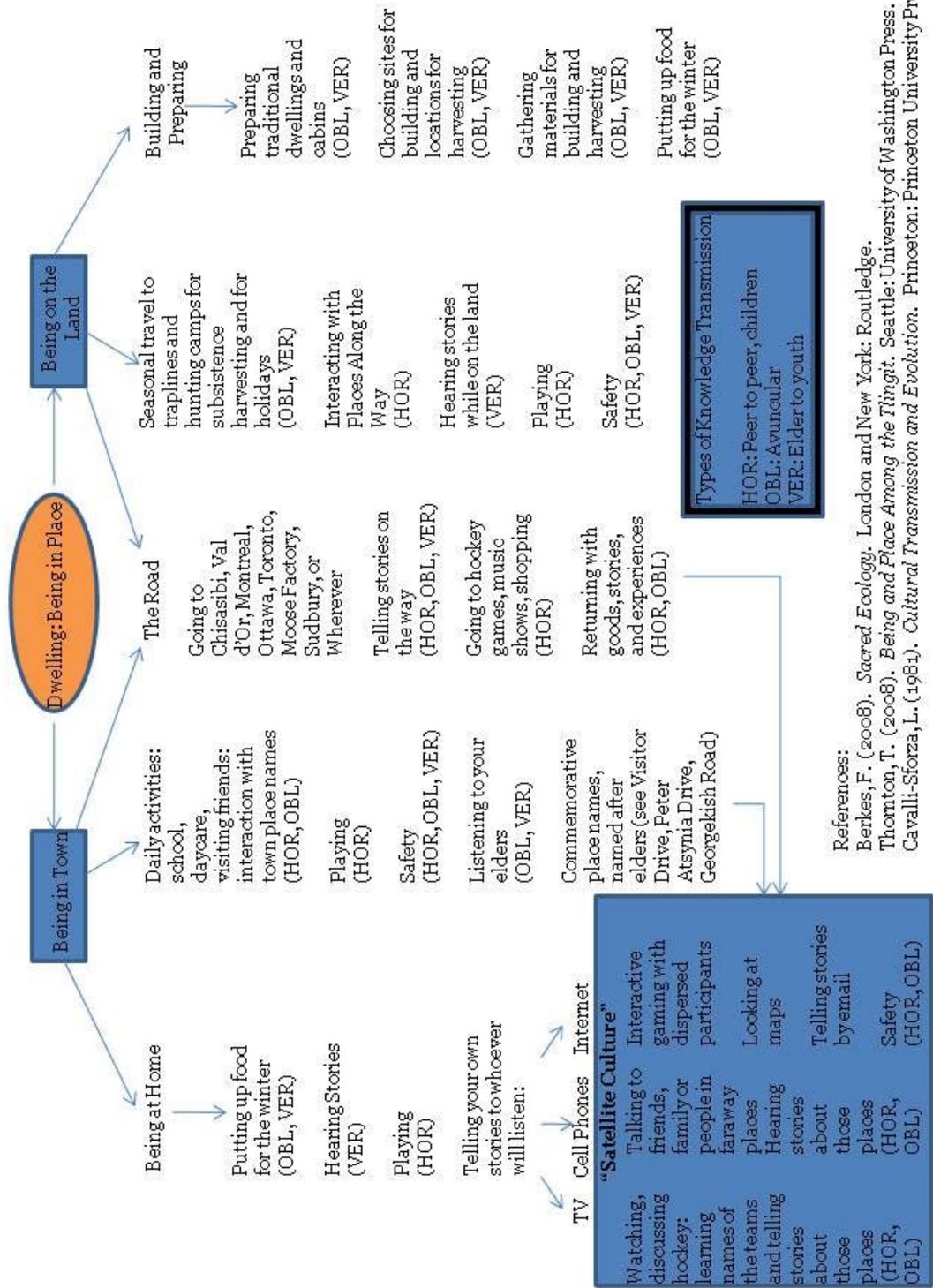
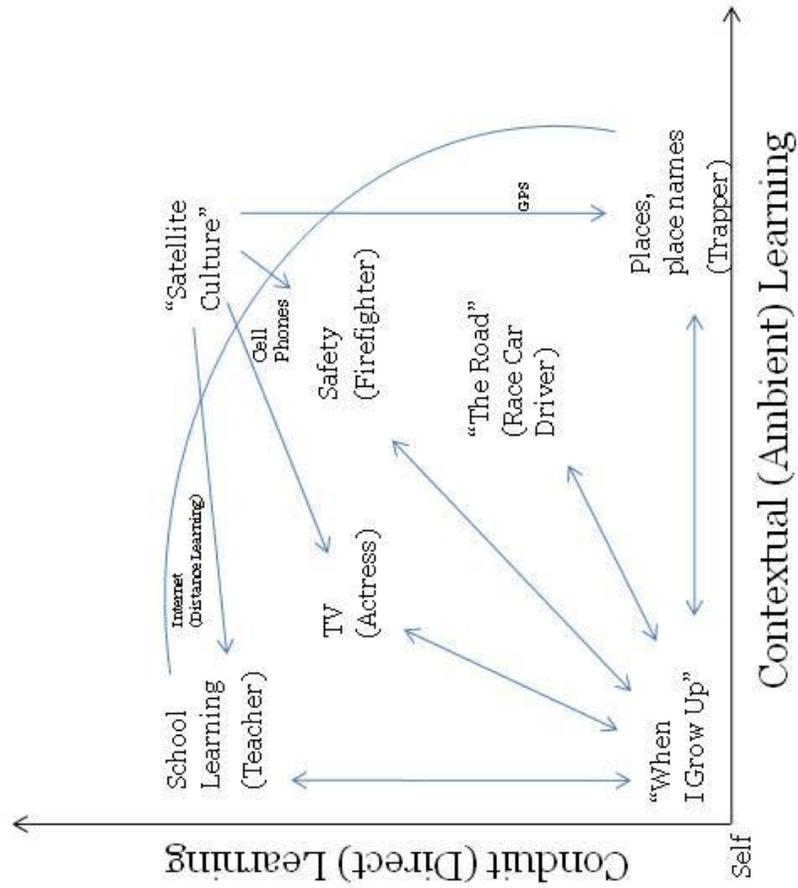


Figure 5.10 Conduits and Contexts

Conduits v. Contexts



1. School: Abstracted, theoretical, inscribed knowledge
2. Safety: Learning by trial & error, and by watching others
3. Places, Placenames: Contextual, performed, lived learning

Figure 5.11 Conduits vs. Contexts

1. *Kaachiiwaapechuu* Conduits: snowmobile trail, stories
2. *Nasiipapechuu* Conduits: river, road, stories
3. “How to Get to ___ from Wemindji” Conduits: maps, stories (examples: Val d’Or, Chesasibi, Radisson)
4. “Places Along the Way” Conduits: paper or geoweb 2 maps, stories
5. “Islands in the Bay” Conduits: paper or geoweb 2 maps, stories
6. “Be Careful of...” Conduits: ‘texting’, The Weather Channel, Internet (examples: caribou on the road; ice on the road; time/timing/connections; rapids; unsafe drivers)
7. “My Favourite Team is...” Conduits: TV, direct experience of the place with which the team is associated;
8. “When I Grow Up...” Conduits: school, parents (examples: nurse, teacher, trapper)
9. “Draw a Picture” Conduits: art contest, TV, activity on the land (example: oblique view)
10. Individual Places as Memes

Figure 5.12 Examples of Place Memes

5.6 Conclusion

The role of the geoweb is the facilitation of the transfer of place-memes. The geoweb is especially appropriate for intergenerational spatial knowledge transfer due to its flexible and

versatile nature. In other words both geoweb 1 (traditional) and geoweb 2 (local) have the ability to incorporate information bundles including images, stories, texts and maps.

The memes that are carried by geoweb 1 and geoweb 2 mechanisms are replicable, representational, relational, and procedural. This differentiates the meme from random specificity about places, and brings intergenerational knowledge on the geoweb into the realm of the meta-representational.

Both qualitative and quantitative measurements provide evidence for the robustness and applicability of the geoweb to place meme transfer and hybrid knowledge construction between generations. The geoweb furthermore provides a device for capturing place names beyond Hunn's (1996) toponymic carrying capacity. New place names and memes are rapidly proliferating, especially in regional towns and centers such as Chesisibi, Radisson and Val d'Or in large part via "satellite culture" devices such as cell phones, the internet, and GPS.

BRIDGE BETWEEN MANUSCRIPTS 3 AND 4

The conclusion reached in Chapter 5 was that the role of the geoweb in the transfer of intergenerational indigenous knowledge is as the carrier of place memes. While that conclusion is definitive with regard to the primary research question posited in Chapter 1, it is possible to push the idea further, to test this finding against different data. Therefore, Chapter 6 is an exploration of the meme tested against a competing explanatory paradigm, that of Discourse/Power. The data used in this test was gathered during the winter of 2010 in Wemindji in two different venues occurring within a day of each other. The first was an art show and the second was a public speaking event. Reflexively, I also took the bold step of entering a map into the art contest (mentioned in both chapters 5 and 6). Below, I describe in words what that map depicts. The text offers a counterpoint to the map, hinting at ways in which different representations of the same data might reveal slightly different perspectives:

My three day walk began at the Old Clinic on a Monday, surrounded by people from the community of Wemindji, some of whom I knew. Others were new acquaintances.

There were people all around me offering support, giving advice and helping out by packing the sleds or loaning out snowshoes, hats, and other equipment.

Before setting off, I shook many hands, a whole line of hands, and as I shook those hands, I looked up into the smiling, supportive faces of friends and new acquaintances.

There was some nervousness of course: we wanted to get it just right, those of us who were staying no less than those setting off on this journey from Wemindji to Old Factory Bay, a journey I came to think of *Nashababechju*, for that is what was written on the side

of one of the blue plastic bins of food that came along for the ride. In my mind I thought of *Nashababechju* as "the walk." (This turned out to be the wrong name. The correct name is *kaachiiwaapechuu* but I didn't find this out until after the walk).

Finally we set off, we were: three youngsters; three longtime residents of the community, all three adult Cree women; three younger women who have lived here for a shorter time ('newcomers'); a young male Cree trapper; myself; and two dogs helping to pull the sleds.

As we lit for the far shore of the Maquatua River, our line spaced itself out on the snow, snow that was in good condition for walking, and nicely packed down by the snowmobile that was just rounding the corner below *Miiyipinuuchi* (hill near Wemindji). Nestled in the sled behind the snowmobile was part of our load, which would be waiting for us that evening on our first stop.

There was a long way to go before we would see that snowmobile, or its treasures, again.

Our first day of walking was mostly over land. After two short jaunts across frozen, slim inlets, we crossed marshes, swamps, and forested lands; our destination for the day was to be the north end of Moar Bay.

Following that packed track, its ridges and ski marks at right angles, watching the pattern of that path flow beneath my feet, I quickly fell into a rhythm. My breathing became regular and intense. I glanced up now and then to take in my surroundings. Already, I could see all kinds of animal tracks in the forest around me: rabbit and squirrel mostly; later I would see moose and wolf tracks on bay snows.

Settling in to my rhythm, I started to enjoy myself even more. I was ready, I could feel it in my bones, and this was the test. I was actually on my way, and I was doing fine. I was

warm, well fed, in good company. All those days of preparation had paid off, and were crystallized in this moment of contentment and well-being.

I had some advantages on this walk. I have always been a walker and a hiker. I might even call myself a bit of a nomad, but really more of a solitary walker of the streets of Montreal, where I live, or of the mountains of British Columbia, the place I call home, way way north of Whistler (for some reason people tend to think of Whistler as northern BC), up near Prince Rupert, in the granite coastal mountains, fjords, and rivers where the Tsimshian people still fish for salmon and eulachon.

I thought a lot about my different homes as I walked, thought about how for the next few weeks Wemindji would be my home, as I stay here and do research with McGill University, and I would get to see the beginning of spring and hopefully the beginnings of the spring goose hunt.

At that moment I felt lucky to always have a home wherever I may be, with good people all around looking out for me. I vowed to do my best to return the favours, to give thanks, and to never take anything for granted.

The day continued to wind along into late afternoon. Taking turns pulling or pushing the sled, or taking rests by just walking and talking to keep the others company, we began to get a little restless to reach camp.

We were beginning to feel a bit weary, individually and collectively. Up and down, around, our lunch break with hot tea over a crackling spruce fire already far behind us, we wandered into the dusk out at the top end of Moar Bay.

One of our dogs had been set free, and we saw him running free on the ice just a bit later on in the late gloaming dusk of ice, free of his sled load for now, as we sped away on the

snowmobile that had come to pick us up and span the remaining distance between us and our destination.

The last to get on the sled, the farthest ahead, was M, a steady hardy walker.

It seems we had taken a wrong turn somewhere. No matter: there was a warm cabin nearby with welcoming, friendly people willing to share their home on the land with us for this one night.

I must have looked a tad bit dismal, because when I entered that cabin after being dropped off, just about everyone in the room started laughing, especially the kids. It didn't help that my glasses fogged up in the warm air from the little woodstove in the middle of the room. One kid said "my stomach hurts from laughing so hard!" I said, "glad to oblige," before settling in for the night by the far blue wall, under a trapline map with pink overlays. These would colour my dreams.

Day two we found our way eventually to *Aamuutaayiminaanuwich*, a place where they eat strawberries in the summer. I would not know this until we got there and asked about this name, written on my GPS screen (I had uploaded a database of 898 Wemindji place names before leaving).

Though it would be a short day of walking, it would prove to be one of the hardest, for three reasons. First, we were already tired out from the day before, a long day by any measure. Second, we were right in the middle of the walk, day two of three, and only the beginning of day two at that. Last, and most importantly, we were to spend most of that day doing long crossings of frozen Moar Bay, two long sections that were psychologically taxing.

I found (and later others confirmed this) that crossing a very long section of open snow with only a far shore for bearings was mind-wearying.

The harder I walked the farther away the shore ahead seemed to be. It actually seemed to be receding even though I was walking towards it. It was like being trapped in Zeno's paradox with the remaining distance endlessly chopped in half ad infinitum, but reaching the actual shore a logical impossibility.

This is a demoralizing state of mind, and you just have to push your way through it.

I had my stride, I had my rhythm, but I was a bit wobbly, a bit tired. Still I pushed on, and the remaining memory of the walking portion of the second day is of a bit of a struggle both psychological and physical. We were each a little bit isolated that day too, strung out along the track, stragglers struggling along.

There were moments of social time too, stopping to talk under the hot sunshine that bounced off the snow to our now browning noses, to sunglassed eyes.

We took a bit of a rest at a small island (*Minishtikw*), now connected by ice and snow, me and one of the young kids sitting on a snow covered rock looking out over the sun glancing traces of dune and diminutive tree, the bay a dull glow now of blue in the distance.

The afternoon plane from Wemindji, an Air Creebec plane, propelled itself unobtrusively overhead as we set off once again, its white underbelly setting off for destinations south of us, the cities and the paved roads and the people we had left behind for now.

The last stretch of Moar Bay was a killer. I was hot and alone when I rounded the corner that unexpectedly revealed an extensive camp with many buildings, houses, and accoutrements all glistening welcomingly in the late afternoon sun.

I didn't realize it then, but after that I was fine. I settled in again, found a space for my things, then set out fairly soon to explore my new surroundings.

I put on a dry parka, dry moccasins, and snowshoes and walked around now and then until spectacular sundown. It was one of the prettiest I have ever seen, the sun itself like a strawberry behind red osier, just calling out to be picked and eaten. I took a picture.

On our last day we came to *chiptukw*, or ghost dwelling, at a camp a little further south on the point. That the place seems haunted by ghost and sad stories lies in contrast to the bright, optimistic place I found full of children's laughter and all kinds of activity from putting up and cooking food, feasts of moose stew, cinnamon bannock, to buckets of tea and coffee.

But I'm getting ahead of myself.

The third day was a challenge. It was going to be a long one. By this time we were hearing stories of how in past times people used to do this walk all in one day. At first I was incredulous. Such was my naiveté. Later I came to see how it could be done by a self-reliant solitary walker with only himself to coordinate.

I had to psych myself up for the last day of walking, because, according to my GPS, it was about 20 km to where we wanted to be. Moreover, we still had to cross Blackstone Bay. But we were smarter now, with two days experience under our belts.

We took only what was absolutely necessary. We kept light. I decided, for the first time, to hike the day in moccasins. I was not disappointed. It is a wonderful experience I would recommend to anyone. I would certainly try it again. While hiking, I have never felt that grounded, even though the ground was covered in two feet of snow.

On this last day (for me) of the hike, we passed through hilly terrain with patches of burn on the drumlins, and pockets of old growth between. We saw fir trees, and M told me the name of those trees with bubbles of pitch on the trunks and with differently shaped needles from ubiquitous black spruce.

Finally, we made Blackstone Bay, a place I visited in 2008 when I was lost in the fog with some others on the way to the Gathering. Not so much lost as delayed due to caution. But that is a whole other story. I'll tell you about it some time.

Despite that being summer, and this winter, the memory of seeing fat garter snakes seething orange beneath fields of Labrador tea was vivid in my mind. Now the green of cargo canoes lay subdued beneath thick coats of snow, monochrome blue, and white, and thick spruce on the shore.

Another hard crossing lay ahead, but I knew the lay of the land now, and had been here before. Psychologically it made a difference.

Conserving energy, sticking together, and a planned lunch break of ham and grilled cheese sandwiches by another spruce fire made a big difference.

There was no stopping us now. We were fewer but more determined. J and two of the youngsters had stayed behind at the last camp, the strawberry eating place.

We were headed now up a narrow channel, the home stretch to Old Factory Bay. Good feeling was mounting all around as we anticipated another warm welcome and the end of this leg, the way down to Old Factory.

One last big hill over the spiny hump of the point, down past some solar panels and we had arrived, again, in a welcoming sunshine amid a camp full of people.

The rest is history. I'm so thankful to have been included on this walk. That is why I told you this story today. Thank you for listening.

The cartographic representation of this walk, the map, was that with which the community of Wemindji was able to interact. It is to that time, and the research I conducted during that time, the insights I was able to generate, and the conclusions I reached, that I turn next.

CHAPTER 6: MAPS AND MEMES (MANUSCRIPT 4)

6.1 Introduction

In this paper I examine the question of whether or not the meme represents an advance on Discourse/Power theoretical frameworks for analyzing imperial and/or indigenous maps. Memes are posited to represent an advance over many aspects of Discourse/Power analyses, supplying explanations for phenomena that a Discourse/Power framework is simply not able to provide. The latter mode of inquiry has been extremely useful during a period of profoundly productive research starting with Harley's (1989) application of deconstruction and power analyses to cartography. At about the same time Wood (1992) produced his famous and still often cited work on *The Power of Maps*. This project has most recently culminated and perhaps found its limit in two recent works, Pickles (2004) *A History of Spaces* and the volume edited by Akerman (2009) entitled *The Imperial Map*. This paper is in many ways a review of these two books.

The Akerman (2009) book is the only volume to fully address a persistent problem for what came to be called 'critical cartography', namely the problem of the erasure or denigration of indigenous inhabitants of the spaces depicted on maps. That volume does so using the tools of a Discourse/Power theoretical lens. The strength of the approach used in *The Imperial Map* in terms of scholarly rigour and in terms of explanatory power is apparent in the tightly integrated arguments spanning multiple authors. These authors stick very close to the map, namely, paper maps produced both by emerging nation states and by the indigenous populations they sought to colonize when the interests of those nation states hubristic and imperialistic drives necessitated the production of maps for controlling and organizing distant spaces.

In Eades et al. (n.d.) we argued for the meme as applied to place names, resulting in an empirically grounded theory of the place-meme. This paper extends the scope of “Place Memes” using new theoretical lenses and additional data obtained in the community of Wemindji during February and March of 2010. To provide background I turn next to a review of materials used in building the case for the meme as a powerful lens and explanatory device when applied to local indigenous knowledge from multiple generations of Cree individuals residing in the region of eastern James Bay.

6.2 Literature Review

A brief literature review of the relevant streams of academic writing provides a background and framework for answering the primary research question posed in the introduction: what is the role of the geoweb in the transfer of intergenerational indigenous knowledge? Two literatures are reviewed: memes and critical cartography. The latter, as outlined in the introduction, implicitly includes Discourse/Power literature, since this has been the dominant literature used by critical cartographers from the late nineteen eighties (Harley, 1989; Wood, 1992) until the present time.

6.2.1 Memes

Though meme theory is relatively new, there is a growing body of literature that starts with Dawkins (1976 and 1982) and ends, for our purposes, with Distin (2005). Dawkins (1976) invented the term ‘meme’ as an analog to the gene deemed useful for illuminating biological mechanisms of evolution and the transmission of traits and phenotypes. The meme is a unit of cultural transmission, posited as similar to the gene but applicable in the realm of culture. Much

has been made of the meme and whether or not it is appropriate, correct, or useful to use memes to explain cultural transmission (Blackmore, 1999; Dennett, 1995; Brodie, 1996; Aunger, 2002; Shennan, 2002). Until Distin's intervention (2005) there seemed to be a consensus within academia that the meme was obsolete, no longer a useful tool for scientific investigation. This assessment proved to be hasty, as demonstrated by Distin in the wonderfully parsimonious work *The Selfish Meme*. Distin dispels all previous hesitations and confusions about where memes reside (both in minds and in the world), about their viral nature (memes go viral when transmission is horizontal), and about the implications of the particulate and distributed nature of the meme. Memes, like genes, are discrete entities; but unlike genes, individuals do not have a fixed set of memes upon birth. Individuals may interact with and create enormous numbers of ever changing meme-complexes, in the form of ideas, diagrams, skills, survival techniques, and most importantly for our purposes, maps. Eades et al. (n.d.) demonstrated that maps act as platforms for transmitting complexes of data about place-memes.

Of special interest here are scholarly writings on memes that explicitly incorporate maps, geography or cartography (Paul, 2009; Schrempp, 2009). Very few examples of such a literature exist. The most interesting and relevant is "Mapping the Meme" by Davi Johnson (2007) who works in the field of communication studies. Johnson (2007) posits the meme as an alternative to the historical 'ideograph.' The ideograph is implicated in historical materialist criticism and critical thought ranging from Marx to Latour. By contrast, the meme offers a mechanism that is more conducive to geographical materialist criticism. Memes may come to supplement ideographs in critical thought and thereby strengthen critical claims to be legitimate alternatives to mainstream hegemonic power structures.

Lastly, the meme implicates another very new field of inquiry, that of cultural transmission (Cavalli-Sforza and Feldman, 1982; Cavalli-Sforza, 2000; Shennan, 2002;

Schonpflug, 2009; Boyd and Richerson, 1985). The meme represents an improvement over Discourse/Power analyses precisely because it offers an intergenerational account of both imperial and indigenous mappings.

6.2.2 Critical Cartography

Like critical pedagogy (Freire, 1970), critical cartography makes maps into co-productions that break down user/producer dichotomies. Thus conceived, the map becomes a device for the assertion of power over space (and the inhabitants of that space) as much as for the empowerment of the user. But some maps, by their design, preclude empowerment because of the erasures, silences and gaps that they include. In response to such lacunae, indigenous groups have developed counter-mapping, a method for putting back the peoples formerly excluded from maps (Peluso, 1995).

First, maps as assertions of power, and the analyses of such maps, have relied upon postmodern theorists, especially Foucault (1990 and 2005). According to Foucault (2005), discourses of power are arranged in formations or groupings that mask their power through the naturalization of statements that always occur in the context of other statements. Statements include verbal utterances, diagrams, art, and maps. In a later work, Foucault (1990) describes power as diffuse and with many handles upon which it is leveraged. Maps are one such handle. Critical cartographers (Crampton, 2003; Pickles, 2004; Curry, 1998; Harley, 1989; Wood, 1992) do not confine themselves to maps for their insights. Instead, and in keeping with Foucault's writings on Discourse/Power, the formations of power implicate a whole order of geospatial technologies inside and outside of bodies, machines and territories.

Where critical cartographers posit the possibility of resistance to power, it remains merely a possibility in most cases. For example, in Abrams and Hall (2006), art and design are produced by transgressive subjects mostly in urban settings. Dodge et al. (2009) have a very theoretical

approach, but do include much needed reworkings of participatory mapping. However, some of their material recapitulates that of Abrams and Hall (2006), with a seemingly abject urban art standing for resistance to power structures and grids that confine subjects that have been ‘mapped out’. In a very scholarly vein, Akerman (2009) has guided a volume on cartography that allows for resistance in the form of indigenous maps, but these maps are mostly posited as mappings of the ‘Other’ as opposed to colonial/imperial maps produced at centres and nodes of calculation and power. The common thread from all these volumes is the lack of a robust assertion of empowerment through art and maps, not only from the margins, peripheries and borderlands of empires, but from the very centres of nation-states, cities, and other powerful places alike.

The focus on Discourse/Power constrains critical cartographers from transgressing their own theoretical boundaries. The meme is here posited as a powerful device, that, coupled with the map, will empower indigenous individuals and groups. The remainder of this paper is dedicated to demonstrating this claim.

6.3 Methodology

Two types of data, ‘cartographic utterances’ and ‘landscape maps’ are each examined (and cross-examined) from two different perspectives: ‘Discourse/Power’ and ‘the Meme’s Eye View.’ Cartographic utterances consist of six statements made by six individuals during a public speaking contest held in Wemindji, Québec on March 25, 2010. These statements were chosen for their illumination of cartographic and spatial issues facing the youth of Wemindji today. Cartographic utterances are examined from both Discourse/Power and Meme’s Eye View perspectives in order to evaluate the strengths and challenges of each toward answering the primary research question. The six cartographic utterances are derived from the following youth speeches: “*Matuuskach*,” “Camping/Blackstone Bay,” “Going for a Walk,” “Digital Devices/1,”

“Time in the Bush,” and “Digital Devices/2.” Four of the participants were females, including three in high school and one in elementary school; while two were young (primary/elementary) boys.

Landscape maps consists of six works of art (see Appendix 2) from each of six categories (children 0-12, youth 13-34, youth/adult, adult 35-64, adult/elder, and elder 65+) of art entered into an art contest held in Wemindji, Québec on March 24, 2010. In addition to the six works of art from local contestants, I examine a map entered into the same art contest by the primary author of this paper. This 1:50,000 map, entitled *kaachiiwaapechuu* depicts the course of a three day walk in which I participated alongside children, youth, adults and elders from March 8-11, 2010. It provides a contrast to the locally produced art in terms of examining different kinds of oblique and normal (perpendicular) view maps from both Discourse/Power and meme perspectives. It also verifies intergenerational knowledge occurrence ‘on the ground’ through commemorative activity on the land.

Lastly, a website developed by the primary author serves as a repository and public display of locally produced works of art and youth public speeches. Entitled “Indigenous Technology and Science, James Bay,” the website shows compatibility with memes due to the ability to bundle together a wide range of place-based materials. The materials so bundled are available to contemporary and future generations interested in their own heritage and in the effects of rapid cultural change.

6.4 Results

Figures 6.1 and 6.2 show the results of analysis of two types of material from two theoretical angles. Figure 6.3 is a screen shot of the Indigenous Technologies and Science (ITS) web site where the original art show and public speaking event materials may be viewed in their entirety. ITS is intended not only as archive, but also as vehicle for protecting and disseminating cultural material for future generations. Both landscape maps and cartographic utterances display memetic qualities. This means both have attributes which lend themselves to being copied, imitated, reproduced, and inherited. Memes are particulate and distributed through both venues. For instance, a recurring theme in the public speaking event, especially for children, was playing with and teaching younger siblings (see the first three Cartographic Utterances, Figure 6.2). The explanatory power of Discourse/Power is evident, but adding the Meme's Eye View to the analysis moves us beyond issues of identity construction and contested boundaries. The same holds true for Landscape Maps (Figure 6.1). In these maps perspective, identity, and power are natural subjects when viewing these maps from a Discourse/Power aspect. The Meme's Eye View adds cultural transmission of values; use-value of the drawings themselves; and a sense of time passing.

For youth speakers, issues revolved around being in school as (explicitly or implicitly) opposed to being on the land (see the last three Cartographic Utterances, Figure 6.2). Two youth speakers discussed the impacts of digital devices on student success rates. There was disagreement on this point. iPods were viewed, by one individual, as just as 'bad' as cell phones in terms of how they distract students from class lesson plans and activities. This student was forbidden by her parents to take any devices to school with her, an edict she declared that she was happy to comply with, since she enjoys school so much. Another individual offered a somewhat different perspective. She felt that the iPod helps students concentrate because it blocks out the

chaos around them. Her own personal experience confirmed this observation: once she knew what she had to do, it was best for her to put on a playlist of her favourite songs (picked ahead of time in order to avoid distraction) and get to work. This same individual believed cell phones to be a major cause of student disengagement from school. She noted however that cell phones have positive benefits in terms of safety (in the case of a fire or a physical attack on an individual); and in terms of education: her little sister was learning to read because of ‘texting.’

Examining the two differing perspectives on digital devices from both Discourse/Power view and the Meme’s Eye View, it seems the two paradigms have complementary, if very divergent, explanatory power. Discourse/Power would note boundary issues revolving around personal and public space, and the need to negotiate on an uneven terrain of power between different generations, between non-Cree teachers and Cree students, and between one’s conception of oneself and the reality of the situation. On the other hand, the meme’s eye would reveal the validity of transmitting knowledge about boundaries, their value, and usefulness. This knowledge would be available for transmission through as many generations as selected by individuals interested in harnessing the power of personal and public boundaries. Thus the idea of ‘boundary’ is a meme that is constantly selected by individuals (in terms of property), states (in terms of defining citizenship), and philosophers (in terms of defining objects). The boundary is not going to go away any time soon.

Landscape Maps (Art Show, March 24, 2010)

D/P = Discourse/Power Perspective
M.E. = Meme's Eye View

<p>Child (0-12)</p> <p>D/P: Use of perspective and stereotype to define "Indian" (self) Identity.</p> <p>M.E.: How tipis look their shape and their geometry, all are depicted in this landscape map. How to build a tipi village.</p>	<p>Description: Five tipis on a shoreline at increasing distance from the viewer. This is a low angle oblique view, possibly from the rock shelf onshore, top right. The sun is shining brightly and a goose is passing close by from the top left. Art and design on tipis.</p>
<p>Youth (13-34)</p> <p>D/P: Logo-like similarity reveals development of identity at individual and group levels.</p> <p>M.E.: Instructions on what to include in logo-like depiction: wildlife, traditional objects, nature, action.</p>	<p>Description: Four drawings. Two show a wolf howling within or above sun-like disc. In a third the disc rises behind an activity-filled village [inspired by a Tim Horton's ad]. Bottom right, an ornamented individual sits with a round (disc-like) drum which he/she is beating.</p>
<p>Youth/Adult</p> <p>D/P: A long distance to travel to adulthood. Liminal space means an identity gap to be filled in.</p> <p>M.E.: Transference and continuity between generations. Development to more sophisticated and inclusive (logo-like) depictions.</p>	<p>Description: Gap between youth and adult entries. Kaachiwaapechuu (long walk) map in the middle.</p>
<p>Adult (35-64)</p> <p>D/P: Ironically, with responsibility comes a seeming flattening of perspective. Duty and focus rule the day.</p> <p>M.E.: Maturity of vision. Inclusion of responsibility and action taken. Traditional activity outside (not inside).</p>	<p>Description: An adult wearing moccasins is spreading a blanket to dry in the sun. It is winter and the sun is shining. Behind and to the right is a tipi. A slope and mountains top left in the distance.</p>
<p>Adult/Elder</p> <p>D/P: Distance/decay/fading of logo-like identity.</p> <p>M.E.: Continuity of concern and responsibility across generational lines.</p>	<p>Description: Adult and elder categories blend into each other. Five adult drawings and fifteen elder drawings. Tipis visible in almost all drawings. All oblique/side view with one exception: an elder map.</p>
<p>Elder (65+)</p> <p>D/P: Powerful knowledge is authoritative in this map, as it takes a 'god's eye' view from above.</p> <p>M.E.: How to make a map. Label features. Top down. Preservation of knowledge for future generations.</p>	<p>Description: A top-down view map. Cree syllabics give the name, as labels, of a lake and a river. Tipi with smoke coming out the top hole. Circular objects on the shore.</p>

Figure 6.1 Landscape Maps

**Cartographic Utterances
(Public Speaking, March 25, 2010)**

D/P = Discourse/Power Perspective
M.E. = Meme's Eye View

<p>"Matuuskach" (Child) D/P: Learning through surface, play, and lightness.</p> <p>M.E.: Children teach each other what they learn. This is one form of preserving and copying spatial knowledge (that associated with a particular place).</p>	<p>Description: Playing and learning with peers. Serious activity (hunting) incorporated into play. Camping and activity on the land. Horizontal transmission of cultural knowledge.</p>
<p>"Camping/Blackstone Bay" (Child) D/P: Learning through surface, play, and lightness.</p> <p>M.E.: Children teach each other what they learn. The presence of elders creates a context for learning traditional knowledge. Inheritance of knowledge takes place on the land.</p>	<p>Description: Camping with elders for significant amount of time (18 days). Learning games with friends. Vertical, oblique and horizontal transmission during time on the land.</p>
<p>"Going for a Walk" (Child) D/P: Learning through surface, play and lightness.</p> <p>M.E.: Olders brothers pass what they know on the their younger siblings. Town-based knowledge is deemed important in this context. Place names in town are just as important as those on the land.</p>	<p>Description: Horizontal transmission and play taking place in town, outside, and through movement. A young boy enjoys spending time with his younger brother.</p>
<p>"Digital Devices 1" (Youth) D/P: New devices are part of a power structure, negotiated across gender, class, and race lines.</p> <p>M.E.: Parents teach children values. Setting of boundaries can be challenged, but are also a form of transmittable knowledge.</p>	<p>Description: Cell phones and music players are transgressing boundaries resulting in student failure and drop-out. Vertically transmitted edicts used to enforce boundaries are heeded by some (those who like school) but not others.</p>
<p>"Time in the Bush" (Youth) D/P: The land is a powerful construct, to be negotiated through statements about the land. These must fit a certain template in order to be intelligible.</p> <p>M.E.: Time on the land has become a meme for learning traditional ways. The act of being on the land is itself a valuable recipe.</p>	<p>Description: Learning takes place by doing and by demonstration. Subjects like math are best learned through action and activity on the land. Time on the land (2 weeks) should be mandatory for high school students.</p>
<p>"Digital Devices 2" (Youth) D/P: Boundaries within the realm of devices are contested and shifting. There is no right answer.</p> <p>M.E.: Devices are tools like any other. They are open to both use and abuse. Devices are newcomers we can adopt and adapt to new uses and productivities.</p>	<p>Description: Cell phones are a major impediment to learning but good for safety. Children can start to learn to read by 'texting' (horizontal and oblique transmission). iPods aid learning by helping students block Distractions. iPods make space.</p>

Figure 6.2 Cartographic Utterances

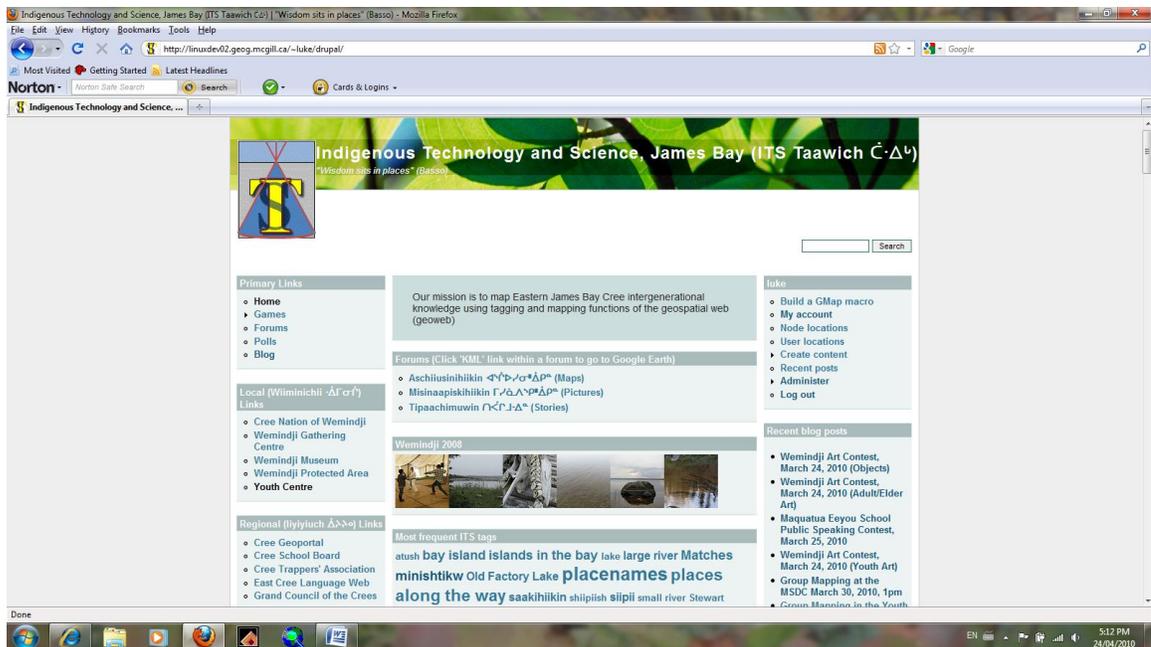


Figure 6.3 Indigenous Technology and Science Website

Of special interest is the second youth speaker (or the fifth speaker on Figure 6.2), whose chosen topic was “Time in the Bush.” This individual very eloquently and convincingly described how learning by demonstration (by doing) is at least as valuable as classroom learning, and that high school students would therefore benefit from at least two weeks mandatory time in the bush as a prerequisite for graduation. It is worth quoting her at length for the insights she offers towards answering our primary question:

Cree people were living in the bush for about ten thousand years; learning by doing what they needed to do in order to survive...some of the kids are not graduating because they find it boring and frustrating just sitting in one place for years and years...just can't learn right sitting in one place...all day. A wise person once told me, and I quote, “the best way to learn is by doing.” Learning not necessarily includes listening, not reading, not

writing and not necessarily by speaking even. For example, math. Wouldn't it be more easier to learn concepts hands on? For many students wouldn't it make more sense to demonstrate their math skills by calculating how many hours it would take to canoe ride from x to y? Or measuring how much food they need to feed x number of people for x amount of days? We need math to build our camps and geometry for tipis, tents and other structures.

Discourse/Power explanations of the previous statements might embed them in discursive formations in which math is but one discourse among many, implicated in disciplining subjects not only in physical institutions, but on the land. While perhaps valid, it is worth adding the Meme's Eye view to this picture. Thus, math is a valuable tool for learning traditional ways of knowing and being on the land. There is no better classroom than the outdoors (the bush, or the land), and there are no better teachers than our elders, uncles, aunts, parents, brothers, sisters, and friends.

As all of the Cartographic Utterances have demonstrated, children and youth are interested in cultural transmission. The Landscape Maps bring this point home with equal force. First, there is a locally defined categorization of age groups. Thus, children are 0-12 years old, youth are 13-34 years old, adults are 35-64 years old and elders are 65 years old or older. The very layout of the art show seems to visually confirm vertical transmission of knowledge, flowing from the right side of the room (where the elder art was hung) to the left (where youth art was hung). Furthermore, the juxtaposition of adjacent age categories was revealing. Children and youth were close together; youth and adults were far apart; adults and elders were close together. This may be interpreted as a liminal space or bridge traversed by youth in their quest to become adults. The landscape maps (drawings from oblique angles) depict various struggles, tasks, and lessons involved in making that journey (see Figure 6.1).

On the other hand the art show, taken as a whole, indicates continuity between all generations, as the oblique view landscape map tends to dominate. Indeed it is posited as a meme, a sort of 'how to' guide for making a drawing, with the further implication that drawings are tools for passing information between elders and youth (vertical transmission); between members of the same generation (horizontal transmission) as seen by their grouping; and of course oblique transmission from older people to youth who are not their children.

A logo-like meme appears between youth and adult categories, but fades away in child and elder categories. This could be interpreted as an attempt to gain powerful knowledge by turning it into symbols, more easily manipulated and used for effect. This would not be a wild interpretation of the logos youth and elders presented in the art contest (see Figure 6.1, the second and third categories down). But it is one sided. The Meme's Eye view must note that logos have transmitting power because they are condensed representations of the land. In all drawings, there is a use of perspective (of which many a Discourse/Power theorist would be critical, since perspective implies distance which is itself a power structure used by historians to create disciplinary subjects). Perspective is also an incredibly powerful meme. It can imply wisdom, journeys, and knowledge gained.

Of particular note is one map made by an elder that uses a top down, perpendicular perspective from above (for a description see the last entry on Figure 6.1). Many people to whom I showed this map assumed it was made by a child or youth. While it does seem to have a simplistic quality in terms of bright colours and iconic objects, it is a sophisticated map. First, it displays the use of a top down perspective (sometimes called 'god's eye' view or 'view from nowhere') described by critical cartographers such as Curry (1998). Second, it includes feature labels in the form of Cree syllabics. This indicates the use of old style Cree, which is preserved through Cree syllabics because of when they were invented. Interestingly, some adults were

unable to translate the labels for me because they had lost their ability to read the syllabics which were learned as children but not practiced as adults. Third, the elder map is a meme for drawing maps. It is an example of how to make a map and it can be copied or imitated. This does not imply copying the exact picture, but rather copying the angle of viewing (top-down), keeping objects discrete and clear, and labelling features.

The last two relevant results to briefly present are the *kaachiiwaapechu* 1:50,000 map which I entered into the art contest; and the Indigenous Technology and Science Website. My intentions for inserting these materials into the local context are as follows. The long map of *kaachiiwaapechuu* was produced with multiple participants during a traditional activity after which the map is named. The name means “going offshore.” During the course of my stay in Wemindji, and through participation in the three day walk, I learned that there is great interest in GPS and in paper maps. Thus, I combined a GPS track of the three day walk and a screenshot of Google Earth imagery to produce a map that the community can use, discuss, and reproduce. I came to see *kaachiiwaapechuu* as a meme that exists in the brains of a cross section of Wemindji minds, and now as an externalized diagram.

The map, which is a collage of four 8.5” X 11” sheets strung end to end and mounted on cardboard, was inserted between the youth and adult categories during the art contest. It came to be in high demand by community organizers and was thus reproduced on demand, for a variety of purposes including aesthetics, planning of the walk and general information, during my stay in Wemindji. The files reside in the computers of some key informants giving them the ability to reproduce it themselves as they see fit. During the art contest, primarily young males interacted with the map, looking for camps, snowmobile tracks, specific places, and other features. They were in essence ‘gathering intelligence’ for future trips down the coast. This journey can only be done in winter when James Bay is frozen.

By inserting the long map into the art contest, I was introducing another top-down map. A critical perspective on this particular cartographic instance might posit the producer of such a map as a controlling authoritative entity seeking to gather abstract information into his domain. This was certainly not my intention. The community itself embraced the map, which not only validated my project as a whole, but created a tool for verifying the places, routes, and resources the map depicts.

In the same way, the ITS site was produced by an outsider (myself) and introduced into the community. But the conception, development, and creation of ITS was guided by values identified by the community of Wemindji itself. Participant observation in community life in 2008 and 2010 revealed photography and stories to be highly valued methods of sharing information. Maps were also identified as being of keen interest to all ages of Wemindji residents, but especially young males, and adults and elders of both genders. ITS is part of the geoweb (Scharl and Tochtermann, 2007; Eades, 2010) with inherent mapmaking capabilities. Thus events such as the art show and the public speaking event are included on blogs and forums on ITS. Blogs and forums are referred to as nodes, and each node appears on a Google Map within each blog or forum entry.

Furthermore, ITS blog and forum entries can bundle together photos, texts, and links to audio files. They have the further ability to pull information from other sites such as Flickr (for photos) and del.icio.us (for tags). All of these features have been utilized on the present ITS site. The site is conceived as a long term project for preserving and disseminating locally generated and traditional knowledge (or geoweb 1 and geoweb 2 knowledge). Indeed, it is a strength of the geoweb, and of the internet in general, that it does not discriminate between knowledge systems. Furthermore, it allows for hybridization of knowledge. These and other topics are worthy of a more lengthy discussion, to which I now turn.

6.5 Discussion

The meme, the basic unit of cultural transmission, is ‘interested’ in the continuation of its traits through time. It stands the test of time by being more ‘fit’ than its competitors. More fit means more conducive to cultural survival. Thus, cartographic utterances and landscape maps perpetuate the idea of the land, of being and dwelling ‘there’ (the place depicted) in ways reminiscent of the artist’s ancestors. In this way, cartographic representations come to be primary vehicles for the vertical downward transmission of cultural knowledge.

The utterances of young public speakers similarly emphasize the land, but in a more questioning mode, challenging the status quo and in effect producing vertical *upwards* transmission, in which elders and adults in the audience learn of the aspirations, challenges, hopes, dreams, and knowledge of youth. Horizontally transmitted memes are also revealed through utterances related to teaching and learning by playing with friends and siblings (as in the first young boy’s learning to hunt by playing with his friend at *matuuskach*; or by the second boy walking around town teaching his little brother about local places). Horizontal transmission in this case is revealed in an act of upward vertical transmission represented by youth public speaking (to elders).

Thus there is a double representation, or meta-representation evident in the (cartographic) utterances of the very young (children). The ability to meta-represent is posited as an innate ability of the mind, which is an extension of, and is loosely coupled with, the gene-defined brain (Distin, 2005; Blackmore, 1999). I would take this further: in the present cases of art and public speaking, it is the ability to *map* (somewhat like imitating, but not the same) between generations (vertical transmission) and between individuals of the same generation (horizontal transmission), that is at the heart of the meta-representing, memetic, human mind. Distinct and different from

mimesis (cf. Blackmore, 1999), mapping is more appropriate ground for discussing the meme and cultural transmission.

Both literally and as metaphor, the map, and more precisely, the act of *mapping*, is both performed and inscribed in bodies and brains. This positing of maps as memes and of memes as mappings itself maps onto the concept of the geoweb, in which the geoweb is distributed and user-controlled, and includes old (geoweb 1) and new (geoweb 2) (Eades, n.d.). The high school student (quoted in the results) who discussed math as demonstrated by activity on the land was describing a representation of geoweb 1 thinking (high school students being required to be on the land as part of their graduation requirements) and a meta-representation or mapping, and, again, upward vertical and horizontal, utterance. In other words, she is re-representing a spatial concept for the benefit of and for copying by her peers, her elders, and younger people.

Cavalli-Sforza (2000) points out that this type of knowledge transmission is one to many (1:M), which is a very effective form of communication and learning. A microphone in a crowded hall (Wemindji community center) is no longer cutting edge technology but it remains one of the most effective means of transmission and communication, and is certainly favoured by the Cree, to the point where public speaking and community gatherings for decision making have become a local tradition.

In closing this discussion I would like to point the reader towards Figure 6.4. The diagram brings together statistical data, medical reports, and information provided by key informants. Its intent is not to definitively answer all questions about knowledge transfer or cultural change, but rather to suggest some historical contexts that might shape the look and feel of locally produced knowledge.

Ages and Stages of Knowledge Acquisition by Description, Imitation, and Experience

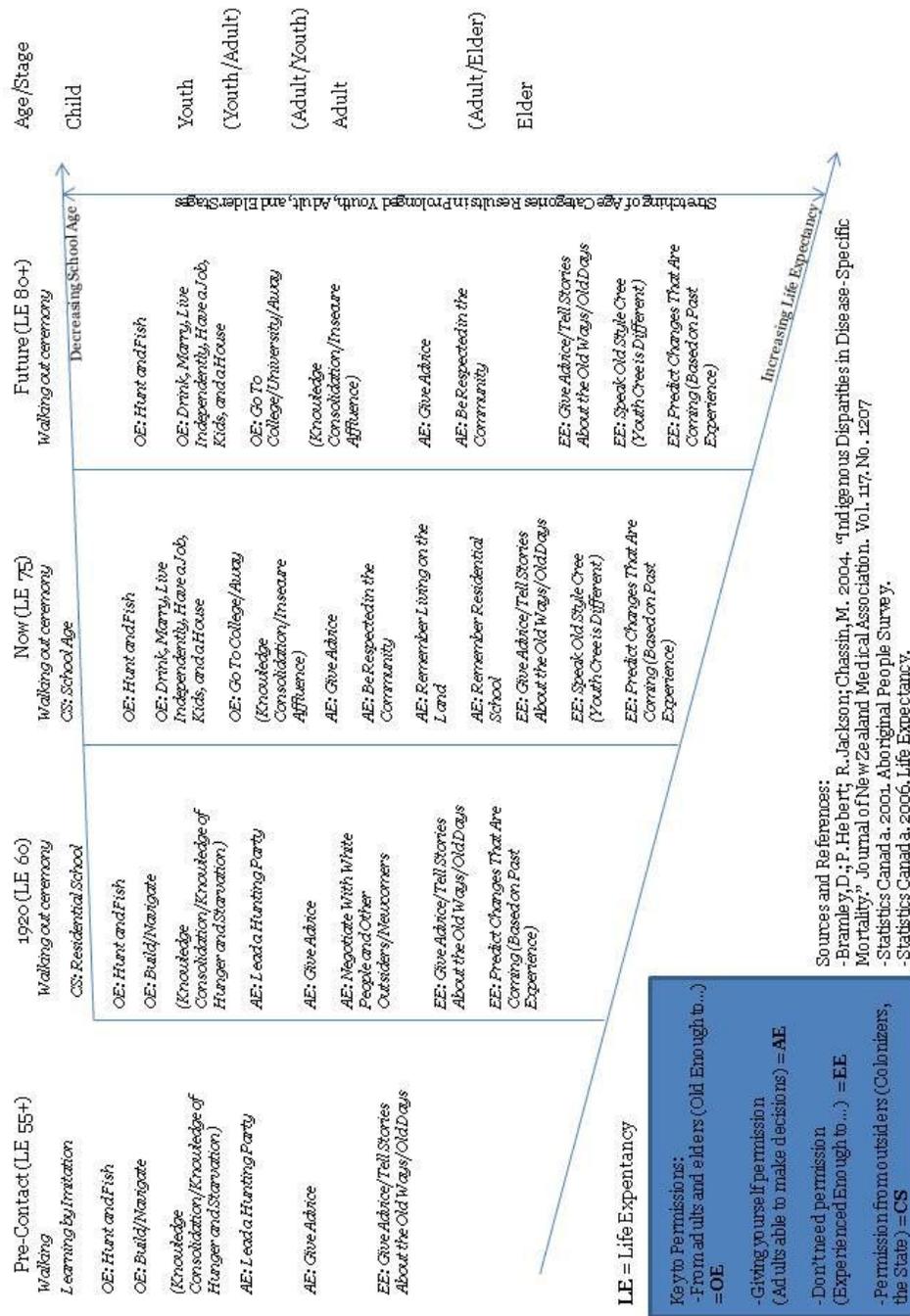


Figure 6.4 Ages and Stages

6.6 Conclusion

As noted by Johnson (2007), the meme is an improvement over Discourse/Power in a number of ways. It should be used alongside Discourse/Power to strengthen the field of critical cartography. Not only power, but empowerment, would thus enter the purview of cartographers interested in challenging the status quo. As demonstrated in this paper, the people of Wemindji are using maps, mappings, art, and public speaking for the purposes of empowerment, local discourse and decision making, and communication.

As the analysis of data in the form of cartographic utterances and landscape maps have shown, these two forms of representation are being used locally for the enhancement and enablement of knowledge transmission in horizontal, oblique, and vertical directions. The latter (vertical) was shown to occur in both downward and upward directions, implying that elders are teaching youth and that youth are teaching elders. This bi-directional movement of memes was facilitated by multiple technological contexts such as broadcasting (the use of the microphone), posting (art on walls in an art contest), and the geoweb (posting multi-media components on the ITS site).

The geoweb component of this research is intended as both supplement to, and additional support for local knowledge production and transmission. In this regard it has been deemed successful. However, only through the continued use and development of geoweb technologies and features, such as tagging, posting, blogging, 'texting' and many other features, will the full potential of the geoweb be realized. Whether or not this comes to fruition, only time will tell.

CHAPTER 7: CONCLUSIONS

In the end it mattered very little if I was a teacher, a student, or a researcher. It mattered much more whether or not I was willing to listen. My training at McGill had not really prepared me to listen; more to tell my own story to whoever would listen; to be factual, prompt, and skeptical of false claims.

Those skills I learned at McGill are useful in the context of McGill. When I arrived in the north I felt out of context. Often I had to 'shut myself up' in order to hear what was going on around me in my new context. Much was happening around me all the time; I didn't realize much of it until later; even then much was lost.

For me, I don't know Cree. But this did allow the Cree to speak more freely at times, switching to Cree now and then in my presence in order to say things more comfortably, more precisely and without my judgment intruding.

I wrote these words upon my return to McGill in the spring of 2010. They seem to represent progress over my reflections prior to leaving for the field in terms of less anxiety, in terms of lessons learned. In parallel, progress was made from the outset of this dissertation, through four separate but linked arguments in the manuscripts, with outcomes both theoretical and applied.

While memes, place names, and maps have been the central focus, it is representation of knowledge that emerges as the thread that binds all these arguments together. In Chapter 3 representation was explored in terms of geospatial technologies and their ability to offer concordance with indigenous knowledge systems. The geoweb was posited to be an advance

over GIS towards that goal. The specific representation invoked was a static web application incorporating Cree place names.

The argument in chapter 3 was necessary but not sufficient for answering the primary research question: What is the role of the geoweb in the transfer of intergenerational indigenous knowledge? Chapter 4 invoked a more sophisticated, two part geoweb able to incorporate both old and new knowledge. Geoweb 1 and geoweb 2 had explanatory power and represented an advance over the unitary geoweb model. Chapter 4 advanced the theoretical component of the main argument of this thesis: that the geoweb is able to facilitate knowledge transfer. The question remained, what is the mechanism of that transfer? In other words, how does it work?

Chapter 5 introduced the mechanism of transfer, the meme. Central to the workings of the meme are representations. Without representations memes do not work. Diagrams, stories, texts, and images thus do the work of making memes. Each of these representations is further incorporated into meta-representations, or bundles of place-based information. While representations have contexts, meta-representations have the ability to be de-contextualized, or applied in new situations. Thus the meme becomes mobile, and capable of being carried between generations. Chapter 5 described many aspects of how place defines memes, but it did not answer the question of how memes capable of being carried between generations are in fact carried.

In Chapter 6, maps and the geoweb are posited as the vehicles for carrying spatial memetic information between generations. Evidence was presented to corroborate the argument that memes represent an advance over dominant cartographic discourses. While memes were demonstrated, through an examination of materials produced in a local art contest and youth public speaking event, to be an advance over critical cartographic discourses, a hybrid approach was deemed most productive. Cartographic utterances and landscape maps are two types of

representation being produced *in situ* for the purposes of transmitting hybrid knowledge, with local and traditional (new and old) components.

In summary, this thesis has examined the transmission of intergenerational cultural knowledge on eastern James Bay Cree lands. Geospatial technologies and the representation of Cree knowledge were explored, with emphasis on the geoweb. A geoweb with two parts, old and new, was theorized as compatible with Cree interests at a landscape level of analysis. Local and traditional knowledge scales also emerged as crucial levels of analysis for the creation and transmission of hybrid forms of knowledge on the geoweb.

The hypothesis that the meme is a viable and valid mechanism (replicator) for the transmission of indigenous intergenerational knowledge on the geoweb is supported. The assertion that the geoweb would be the primary vehicle for the protection and replication of place-memes is also well supported. Evidence for these claims was provided by examining traditional and local toponymic densities and qualitative data, revealing both the capacity and the will, historically and presently, to use geoweb-enabled mapping for local and traditional knowledge preservation and transmission.

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APPENDIX 1: Numerical Data on Place Names

Toponymic Densities

Coastal	# of place names	area	toponymic density	Average
Old Factory Bay	27	93	0.2900	0.34
Blackstone Bay	24	93	0.2600	
Moar Bay	49	93	0.5300	
Moar Bay 2	33	93	0.3500	
Moar Bay 3	26	93	0.2800	
Paint Hills Bay	49	93	0.5300	
North of Wemindji	25	93	0.2700	
North End	18	93	0.1900	
Cross Check				
Coastal cc1	8	93	0.0860	0.034
Coastal cc2	8	93	0.0860	
Coastal cc3	4	93	0.0430	
Coastal cc4	2	93	0.0220	
Coastal cc5	4	93	0.0430	
Coastal cc6	1	93	0.0110	
Coastal cc7	1	93	0.0110	
Coastal cc8	4	93	0.0430	
Coastal cc9	2	93	0.0220	
Coastal cc10	0	93	0.0000	
Coastal cc11	4	93	0.0430	
Coastal cc12	1	93	0.0110	
Coastal cc13	3	93	0.0330	
Coastal cc14	2	93	0.0220	
Coastal cc15	3	93	0.0330	
Inland				Average
Old Factory Lake	23	515	0.0450	
Downriver of Old Factory Lake	18	515	0.0350	
Downriver of Old Factory Lake 2	14	515	0.0270	
Upstream of Old Factory Lake	22	515	0.0430	
Sample 5	14	515	0.0270	
Sample 6	6	515	0.0120	
Sample 7	15	515	0.0290	

Sample 8	22	515	0.0430	
Sample 9	7	515	0.0140	
Sample 10	13	515	0.0250	
Sample 11	7	515	0.0140	
Sample 12	8	515	0.0160	
Sample 13	3	515	0.0058	
Sample 14	9	515	0.0170	
Sample 15	12	515	0.0230	0.025
Cross Check				Average
Inland cc1	91	515	0.1800	
Inland cc2	50	515	0.0970	
Inland cc3	66	515	0.1300	Invalid
Wemindji Coast	314	1543	0.20	0.2

By Trapline				Average
VC 9	15	203	0.0740	
VC 10	18	469	0.0380	
VC 11	42	594	0.0710	
VC 12	41	1197	0.0340	
VC 13	76	1435	0.0530	
VC 14	55	1203	0.0460	
VC 16	9	516	0.0170	
VC 17	56	1549	0.0360	
VC 18	33	942	0.0350	
VC 19	20	574	0.0350	
VC 20	21	2065	0.0100	
VC 21	57	3177	0.0180	
VC 22	31	1515	0.0200	
VC 23	35	1100	0.0320	
VC 24	34	1177	0.0290	
VC 25	8	971	0.0082	
VC 26	20	1772	0.0110	
VC 27	48	3260	0.0150	
VC 28	37	2443	0.0150	
VC 29	31	2659	0.0120	0.024
Town of Wemindji	80	11	7.27	7.27
Wemindji Inland and Coast	885	29940	0.03	0.03

Place Types and Categories

Traditional Place Name Categories	Frequency	Code	Percentage	Total
Descriptive	497	D	54.1%	
Human	102	H	11.1%	
Locational	64	L	7.0%	
Historical/Mythical	162	M	17.6%	
n/a	94	n/a	10.2%	919
Traditional Place Names: Descriptive	Frequency	Code	Percentage	Total
Smell	2	sm	0.4%	
Human Body Part	5	bp	1.0%	
Shape	63	sh	12.7%	
Colour	36	co	7.3%	
Feature Presence	185	fp	37.4%	
Animal Presence or Animal Part	123	ap	24.8%	
Sound	1	so	0.2%	
Moral	3	mo	0.6%	
Quality, Attribute or General Appearance	27	qu	5.5%	
Texture	0	te	0.0%	
Tactile	6	ta	1.2%	
Action	32	ac	6.5%	
n/a	12	n/a	2.4%	495
Traditional Place Names: Human	Frequency	Code	Percentage	Total
Hunting/Trapping	6	hu	5.9%	
Fishing	17	fi	16.7%	
Everyday Activities	2	ed	2.0%	
Dwelling	9	dw	8.8%	
Burial	4	bu	3.9%	
Name, Relative, or Person	32	na	31.4%	
Travelling	23	tv	22.5%	
Food	7	fo	6.9%	
n/a	2	n/a	2.0%	102
Traditional Place Names: Locational	Frequency	Code	Percentage	Total
Proximity	20	pr	31.3%	
Topological Relationship	25	to	39.1%	
Part/Whole Relationship	0	pa	0.0%	
Configuration	8	cn	12.5%	
Order	9	or	14.1%	
Object Location	2	lo	3.1%	64
Traditional Place Names: Historical/Mythical	Frequency	Code	Percentage	Total
Traumatic Event	20	tr	14.2%	

Animal Activity	61	an	43.3%	
Event or Story Involving Humans	47	ev	33.3%	
Isostatic Rebound	1	is	0.7%	
Spirits and Other Creatures	12	sp	8.5%	141
Traditional Place Types	Frequency	Code	Percentage	Total
Banks	1		0.1%	
Bays	49		5.5%	
Hills	5		0.6%	
Islands	116		39.1%	
Lakes	350		39.1%	
Mountains	20		2.2%	
Names Places	21		2.3%	
Narrows	33		3.7%	
No Type	82		9.2%	
Peninsulas	64		7.1%	
Portages	5		0.6%	
Rivers/Streams	150		16.7%	896
Local Place Names: Categories	Frequency	Code	Percentage	Total
Action	4	ac	5.1%	
Animal	4	an	5.1%	
Commemorative	10	co	12.8%	
Descriptive	43	de	55.1%	
Geographical	9	ge	11.5%	
Proprietary	8	pr	10.3%	78
Local Place Types	Frequency	Code	Percentage	Total
Administration	2	ad	2.6%	
Business	32	bu	41.0%	
Education	2	ed	2.6%	
Emergency Services	2	em	2.6%	
Health	2	he	2.6%	
Historical	1	hi	1.3%	
Maintenance	5	ma	6.4%	
Recreation	4	re	5.1%	
Religious	1	rl	1.3%	
Street	27	st	34.6%	78

Toponymic Versus Population Densities

Year	Source	Town Population	Total Population (Estimated)	Traditional Place Names (Wellen, 2008)	Wemindji Territory Area (Population Density)	Toponymic Density	Difference	Town Place Names	Town Area (sq. Km)	Source
1960	Beverly Mayappo, Personal Correspondence	120	240	900	30000	0.008	0.03	-0.022	10	0.11 Aerial Photograph of Development
1966	Aerial Photograph of Development	426	500	900	30000	0.017	0.03	-0.013	24	0.28 Aerial Photograph of Development
1996	Statistics Canada	1000	1000	900	30000	0.033	0.03	0.003	38	0.46 (Interpolated)
2001	Statistics Canada	1100	1100	900	30000	0.037	0.03	0.007	60	0.65 Aerial Photograph of Development
2006	Statistics Canada	1200	1200	900	30000	0.04	0.03	0.01	69	0.75 (Interpolated)
2010	Wemindji Web Site	1400	1400	900	30000	0.047	0.03	0.017	78	0.85 Wemindji Turns 50 and Cree

APPENDIX 2: Visual Ethnographic Materials

Art Show, March 24, 2010

All Categories



Figure A1. Overview of Art Show



Figure A2. Overview of Art Show and Feast

Children (Kids), Age 12 and under



Figure A3. Children's Art Category

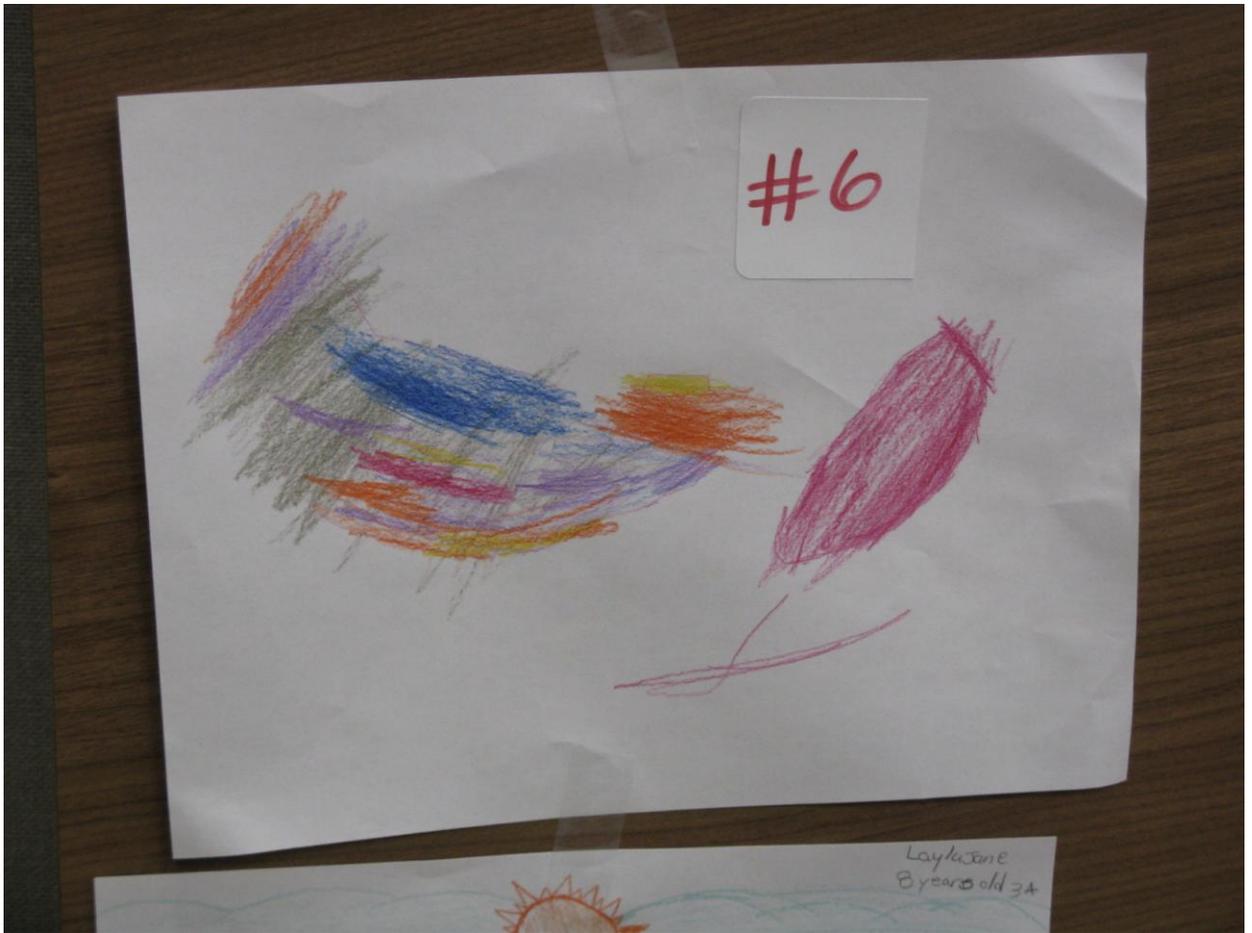


Figure A4. Children's Art Example 1



Figure A5. Children's Art Example 2

Youth, Age 13-34

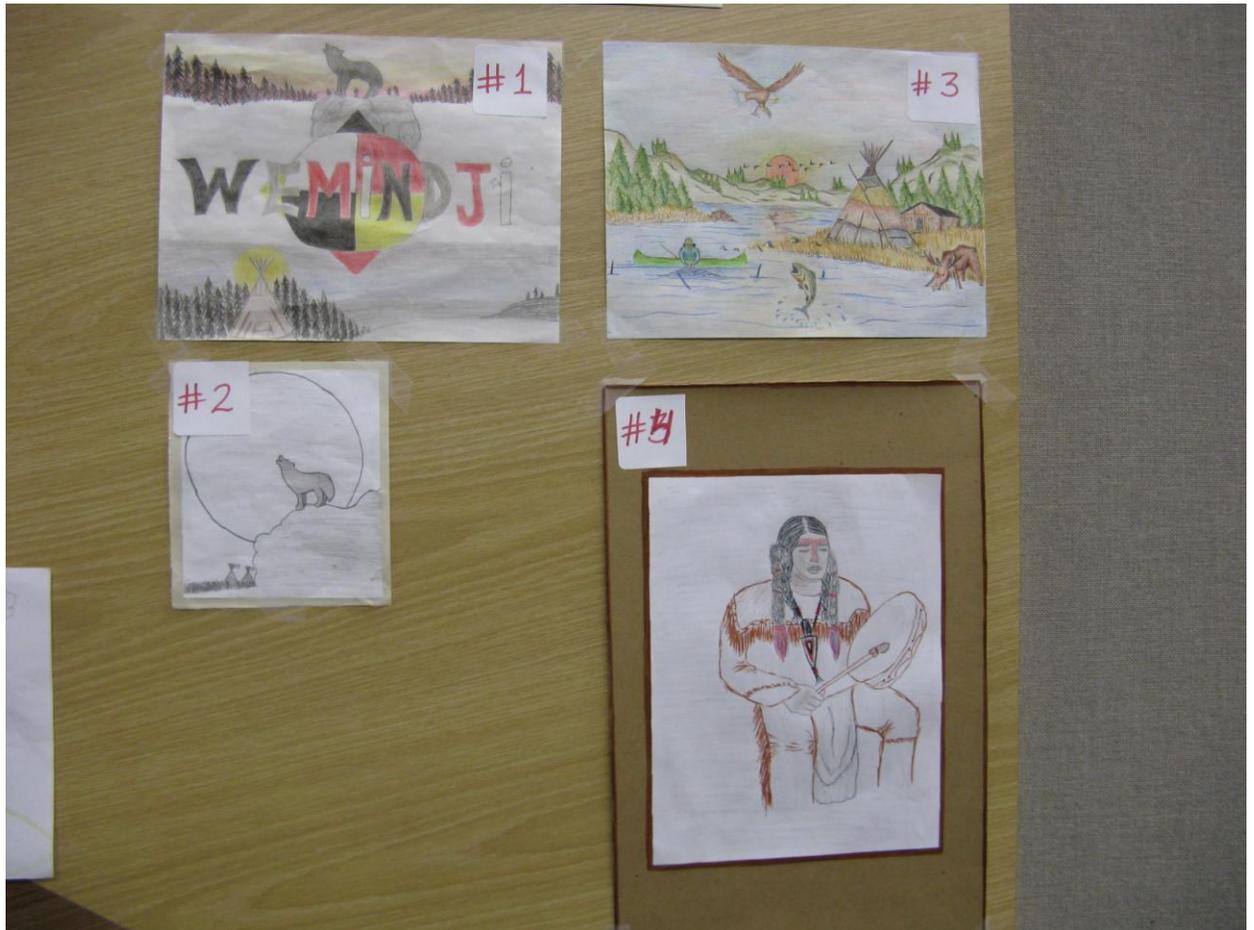


Figure A6. Youth Art Category

Youth/Adult



Figure A7. Youth/Adult Art Category

Adult, Age 35-64



Figure A8. Adult Art Category



Figure A9. Adult Art Example 1

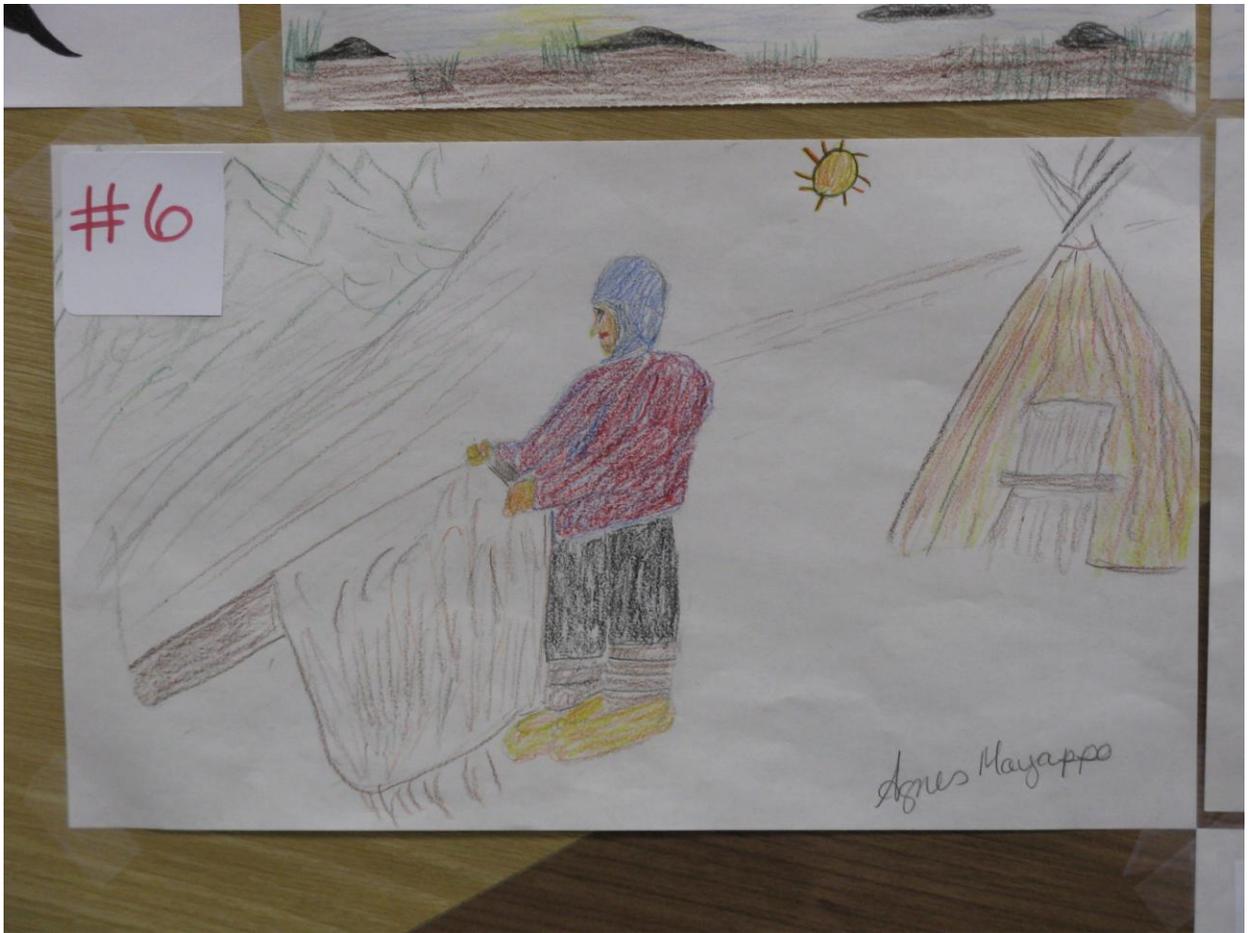


Figure A10. Adult Art Example 2



Figure A11. Adult Art Example 3

Adult/Elder



Figure A12. Adult/Elder Art Category

Elder, Age 65 and over

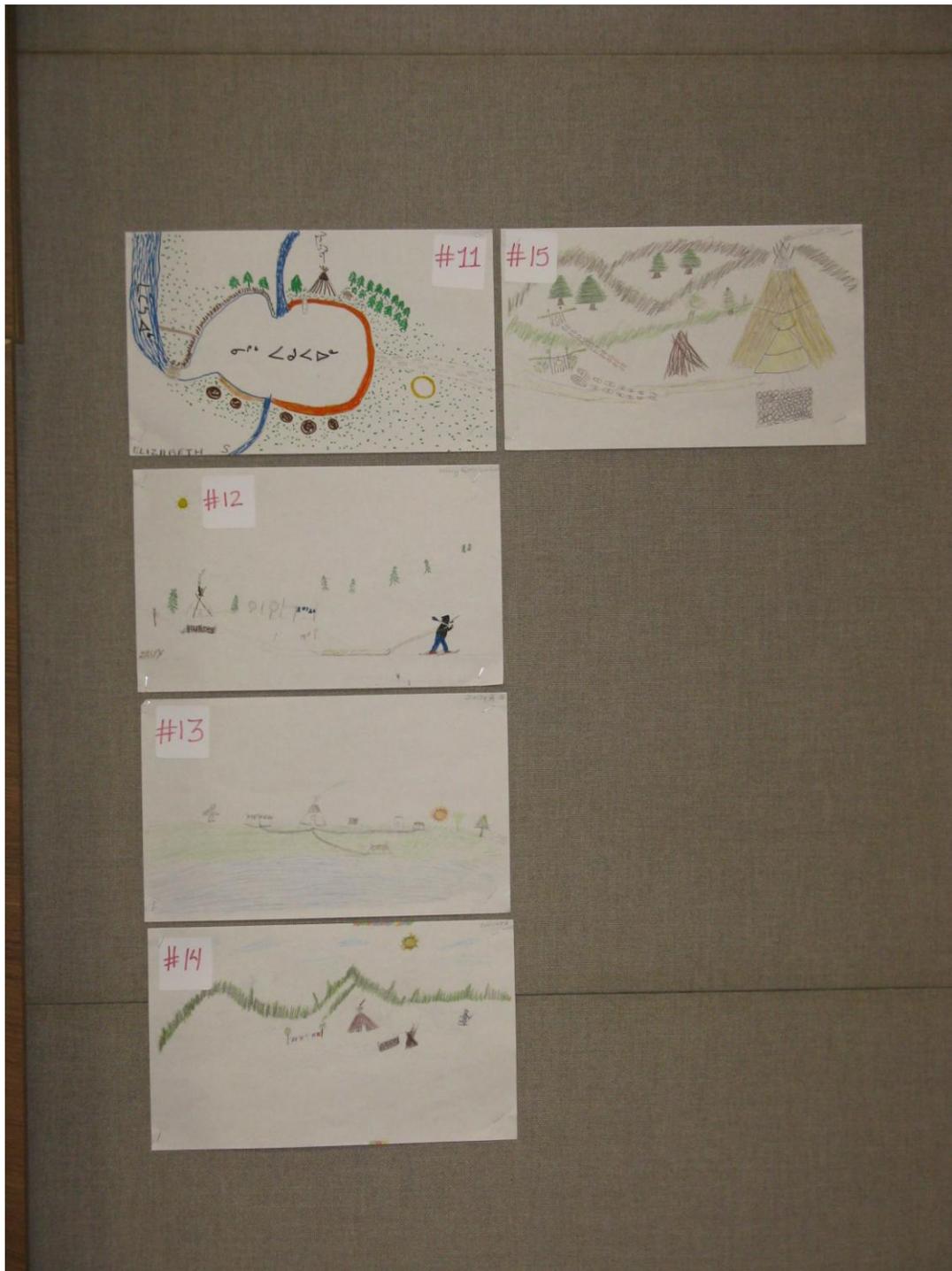


Figure A13. Elder Art Category

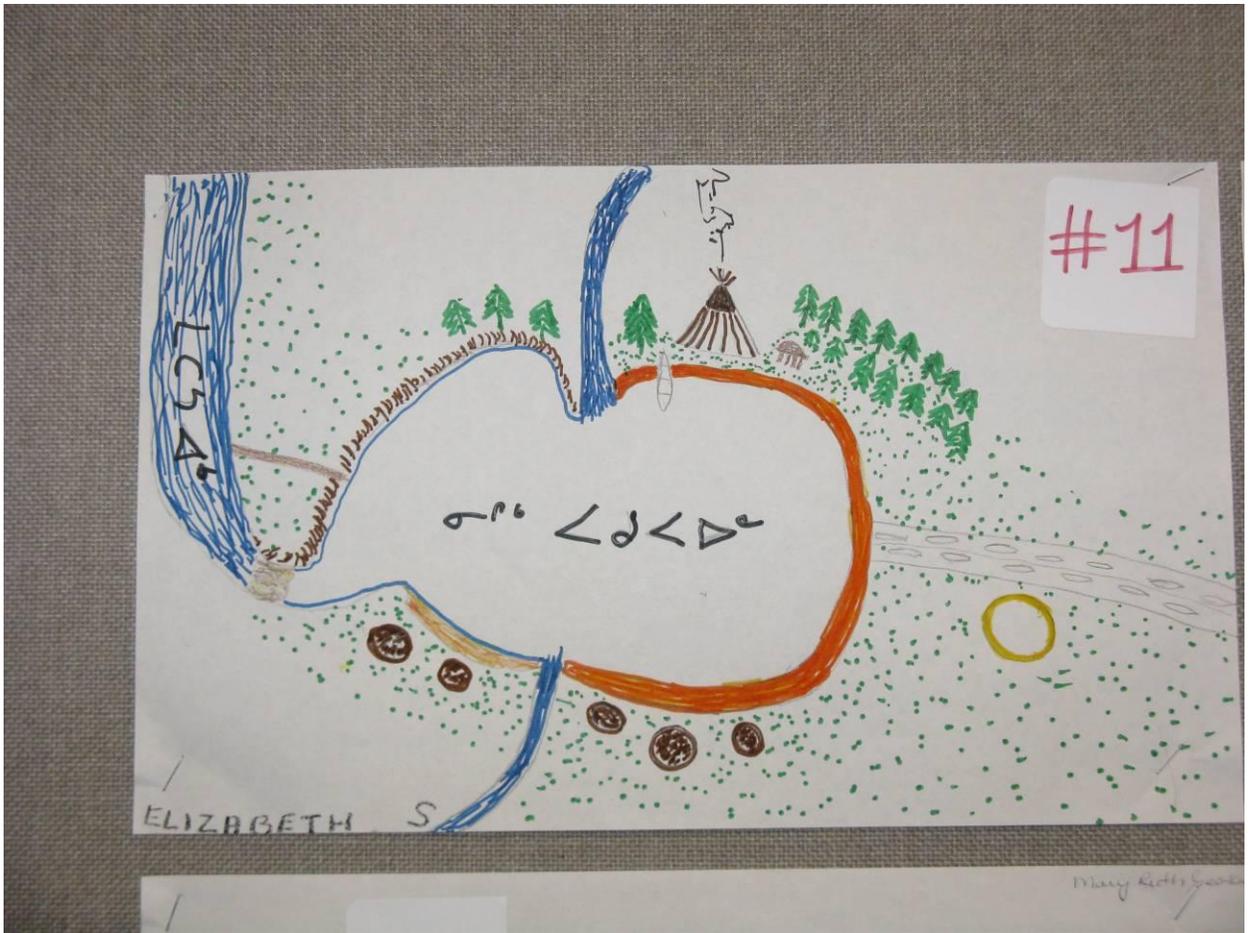


Figure A14. Elder Art Example 1



Figure A15. Elder Art Example 2

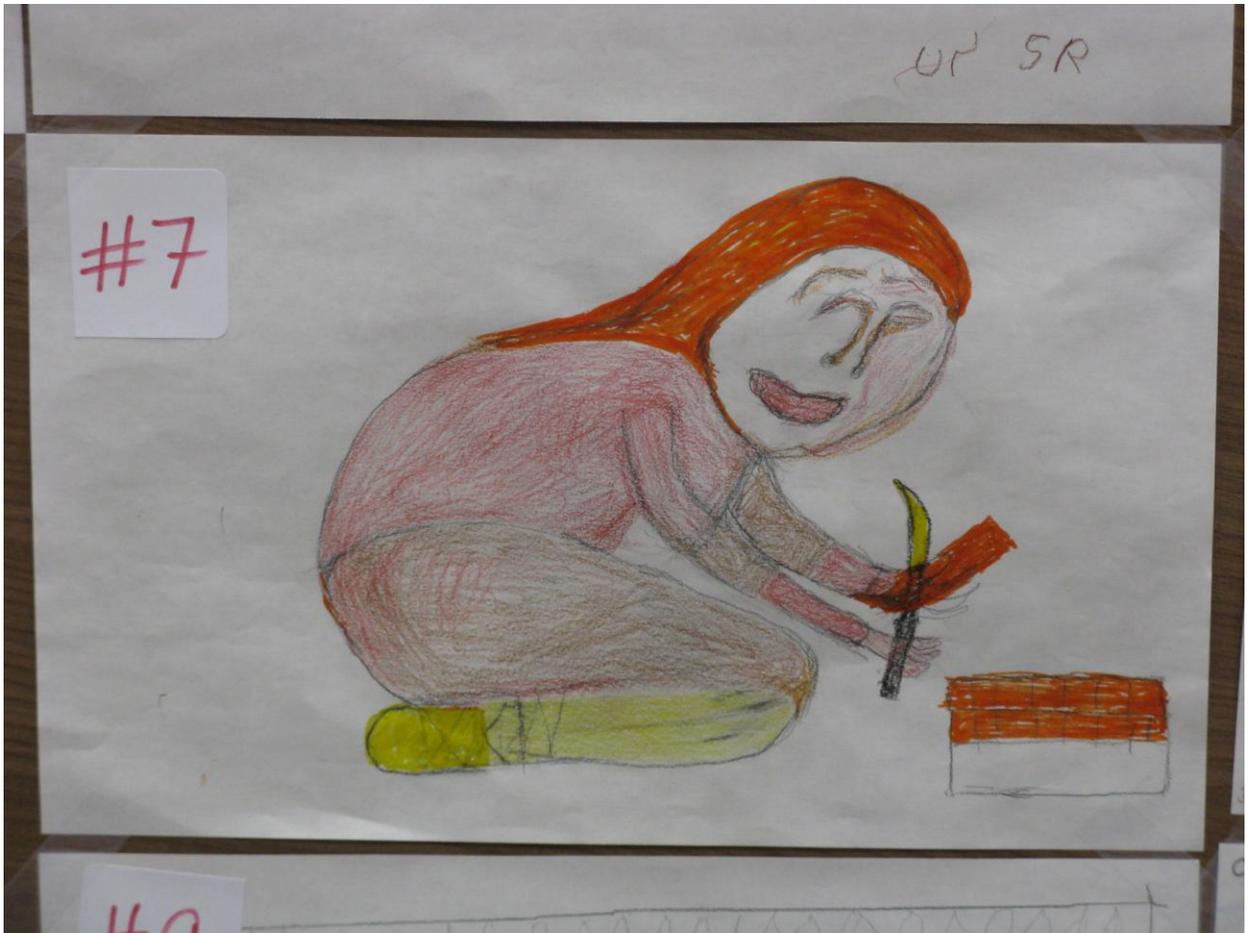


Figure A16. Elder Art Example 3

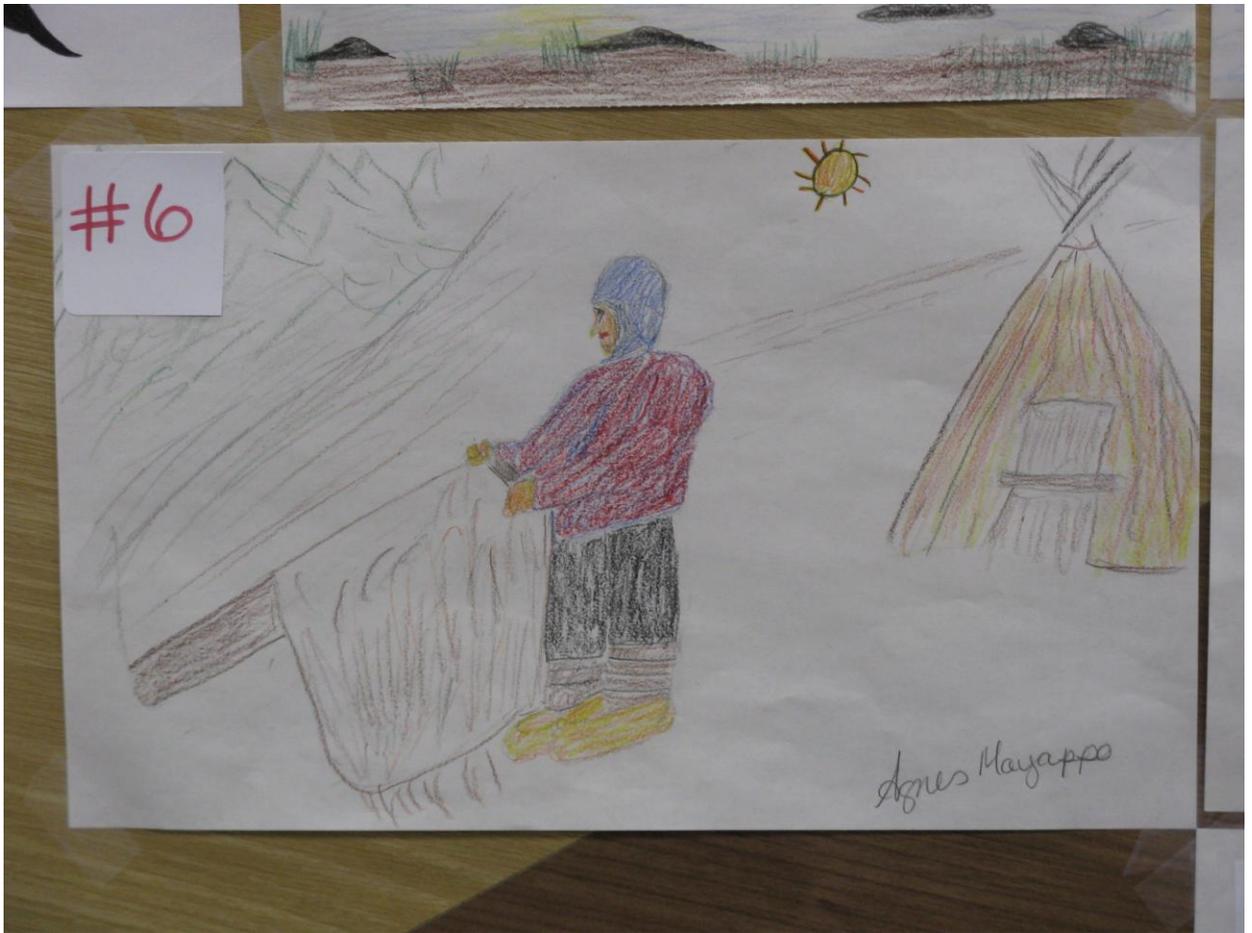


Figure A17. Elder Art Example 4

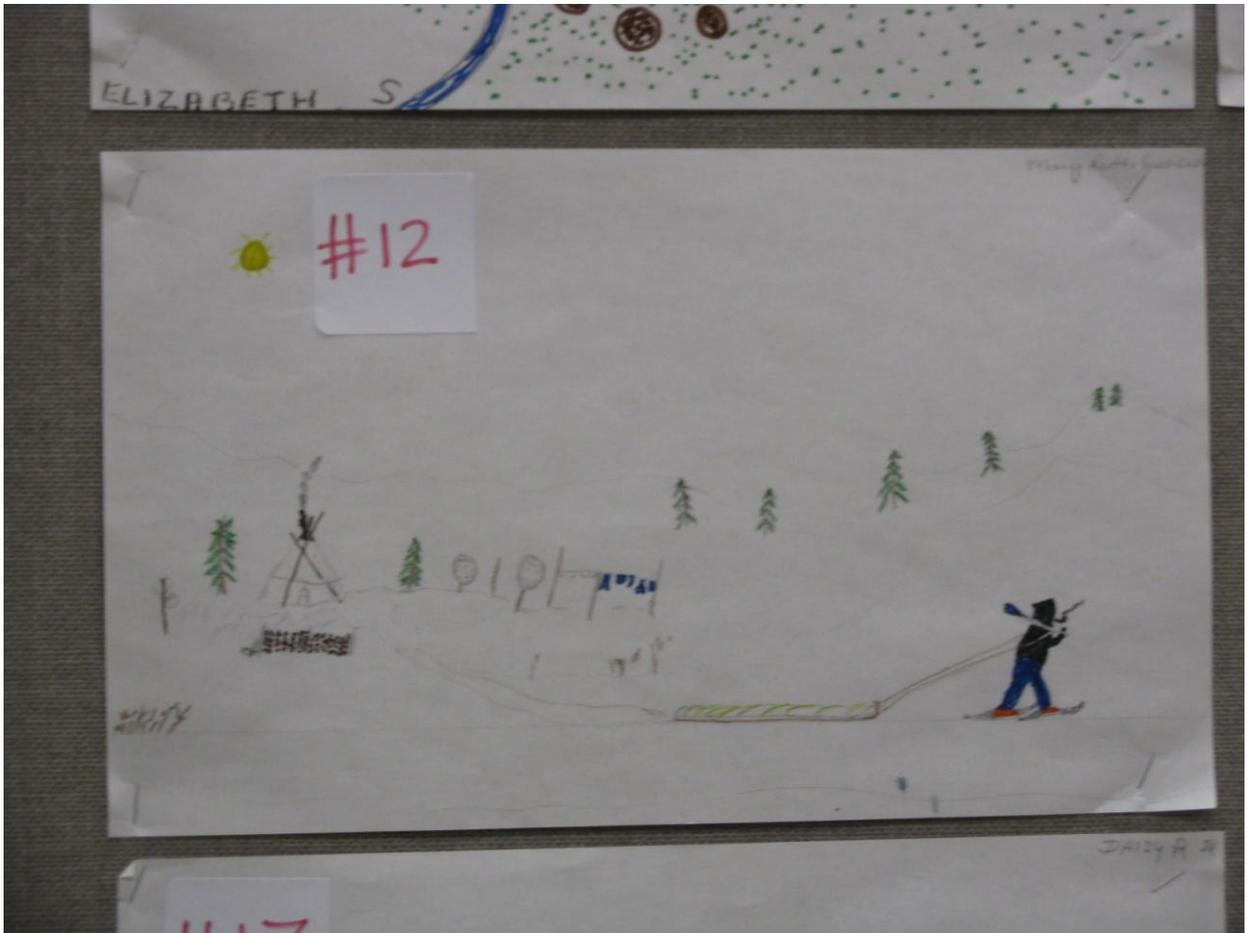


Figure A18. Elder Art Example 5

Art Objects (Youth/Adult)



Figure A19. Art Objects Youth/Adult Category



Figure A20. Art Objects Example 1



Figure A21. Art Objects Example 2



Figure A22. Art Objects Example 3



Figure A23. Art Objects Example 4



Figure A24. Art Objects Example 5



Figure A25. Art Objects Example 6

APPENDIX 3: Ethics Agreements

Ethics clearances and agreements fall under two existing project headings:

1. SSHRC-CURA (Community University Research Alliance) “Protected Area Creation, Culture, and Development at the Cree Community of Wemindji, James Bay, Québec” SSHRC #833-2001-1028
2. SSHRC Aboriginal Research Grant “Building Knowledge Based Partnerships for Environmental Protection, Cree Cultural Survival and Community Education at Wemindji, James Bay, Québec” SSHRC #856-2004-1049

Ethics clearance specific to this project was received from the Research Ethics Board at McGill, covering April 2008 to February 2011, REB File # 196-0208.