It’s about time: Investigations into the interior of Canada’s boreal forest, Lac Seul

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Abstract
The boreal forest is a vast region. Therefore, the archaeological record, like anywhere else in the globe, is subject to revision as additional evidence is gathered. By conducting research in the same location over a long period of time, Hyslop was able to alter the methodological approach that he utilized while surveying the shorelines of Lac Seul. His new approach revealed that cultural material existed well into the forested interior away from the water’s edge within the Lac Seul basin in central Canada. This development requires a detailed discussion of the nature of the boreal forest, the manner in which these discoveries were made, and the possible implications for the geographical region. It is important to recognize that this discussion is concerned with the surveying techniques utilized, and not with the excavation techniques.

Keywords
Boreal forest, Lac Seul, Canada, water levels, evidence, surveying, fieldwork

Introduction
The practice of archaeology in the boreal zone, located in the subarctic region of the Canadian Shield, which covers Northern Ontario, is complex and fascinating, but like many other parts of the planet not without its problems.
This region is vast and sparsely populated with a minor network of roads. This has limited accessibility to and movement within the landscape resulting in the perception that the region is remote. Furthermore, the majority of archeological work, currently being carried out in Ontario, is by consulting archaeologists who mitigate the impacts of development on cultural resources. The limited amount of development occurring within the northern boreal forest results limited archeological work being carried out in the Lac Seul region. A few research projects of varying scales were carried out within the Lac Seul basin during the 1960s, 1970s, and the 1980s (see Hamilton, 1981; Lambert, 1981; Smith, 1981; Wall, 1981; Wright, 1962). However, the overall nature of the research carried out within this area has been preliminary. Reid’s (1988) observations regarding the lack of work in this region remain pertinent. In addition, the physical conditions and climatic zone appear to pre-empt any intellectual challenges for many of those who have considered the archaeological record of Northern Ontario (see Colson, 2006; Holly, 2002; Reid, 1988). It is equally crucial to recognize that the boreal forest has continually been utilized and culturally shaped by those who lived here (Andrews and Buggey, 2012; Berkes and Davidson-Hunt, 2006; Johnson and Miyaniishi, 2012).

For example, as Colson (2006) argued shifts in the water levels of lakes and rivers in the boreal forest naturally affect what is discovered about the archaeological record because increases in water levels cause sites to be inundated and possibly missed, as in not found and identified. It is crucial for archaeologists to include in their fieldwork methodology the fact that water levels change, shift, and affect how people perceive the landscape. Some of the archaeologists working in Lake of the Woods have discussed the archaeological record of the region but neglected to mention the fact that water levels can change radically from season to season, year to year, and over longer intervals affecting the discovery, viewing, and even understanding of rock art sites (Dewdney and Kidd, 1962; Pastershank, 1989; Rajnovich, 1989). However, shifts in the water levels of lakes and rivers in the boreal forest impact what can be discovered about the archaeological record. Increases in water levels cause sites to be inundated and possibly unidentified and affect how people perceive the landscape. White and Meyer (1916: 166), the chief engineers of the survey on Lake of the Woods, which occurred between 1913 and 1916, maintained that no exact record existed of the length of time required for “standing water to remove lichen growth.” They argued that, based upon observations made while surveying, a high water mark could be created within a single season. But once a mark was created, it took a number of years to fade since the lichen growth rate was slow so several years of lower water was required for it to diminish, that is grow downwards “to remove the sharpness of the edge of the mark” (White and Meyer, 1916). Clearly, the physical landscape which appears “current” today is quite different from what it was in the past. So, Colson (2006) asserted, based on extensive documentation (White and Meyer, 1916: International Joint Commission, 1917),
that Lake of the Woods' water levels have fluctuated over time and these changes affected the discovery, visibility, condition, and recording of rock art sites. Detailed written information prior to the 1880s does not exist. Furthermore, dramatic fluctuations can occur on water bodies that have been dammed in order to generate hydroelectric power. This was the case during the survey of the Lake of the Woods during 2001 by Colson (2006). The water level in 2001 was approximately 76.20 cm higher than the level considered “normal” by the International Joint Commission of the United States and Canada when the petroglyphs sites were covered by water (Colson, 2006: 26). The International Joint Commission controls and monitors the water level of the Lake of the Woods (Colson, 2006: 26). The increase in water levels of the Lake of the Woods both flooded and destroyed land utilized by the Ojibwa during the 19th century for farming (Holzkamm and Waisberg, 1993). Colson (2006) argues that archaeologists must pay attention to the past use of the area in question and consider whether the water levels and the shapes of the bodies of water have changed. This is crucial when the role(s) of a given geographical region in the past is discussed.

Regarding Lac Seul, Hyslop ascertained from existing documents that the water levels of the lake have risen and are controlled for generating hydroelectric power. Hyslop therefore considered the possibility that the water level has shifted over time and that sites possibly existed in places other than the current lacustrine edges. Lac Seul arguably stood at the one of the crossroads of the North and a detailed survey and analysis of this region’s archaeological record could provide evidence of transcontinental movement and concomitant trading activities. Like Colson had done in 2001, Hyslop incorporated this possibility into his surveys at the methodological level.

Hyslop recognized the implications this had with regards to understanding Lac Seul’s archaeological past, particularly that of the Crooked-Pelican region. Hyslop reviewed Wright’s (1967: 41) initial assumptions regarding the inland extension of cultural material at the archaeological site, EaKa-1. Hyslop had, from 1997 onwards, undertaken a range of archaeological fieldwork including shoreline surveys, surface collection, and numerous test units into the interior of the forest away from the lacustrine and riverine edges (Hyslop, 1997, 2003, 2004, 2005, 2006, 2007, 2008, 2009). The data from this work indicated a concentration of sites and/or archaeological materials away from the lacustrine edges in the area of landscape which is frequently overlooked during a field survey. This may happen for a variety of reasons, but it mainly occurs because of time limitations while in the field. Hyslop (1997, 2003, 2004, 2005, 2006, 2007, 2008, 2009) was able to visit the same area during detailed field survey, not only on several occasions over the field season, but also consistently over multiple years. As a result, a longer time frame allowed his research to develop beyond the level of a preliminary analysis. Furthermore, Hyslop’s study of the materials recovered from the test units in this dense landscape challenged Wright’s (1967: 41)
assumptions regarding the inland existence of cultural materials at the site. Hyslop and Colson, like Reid (1988), observed that previous archaeological work in this geographical region tended to survey for archaeological sites which could exist along the shorelines of the water bodies rather than in the landscape away from the lacustrine edges. This tendency has created a bias with regards to the archaeological record for the interior portions of the boreal forest region.

Hyslop’s initial investigations of sites along the eroded shoreline of Lac Seul eventually led him to question whether additional artifacts were contained within the non-eroded portion of the shoreline. Examination of intact soils adjacent to the eroded shoreline on some sites resulted in the discovery of additional cultural material. As a result, the focus of his research changed and he began to investigate areas largely unexplored by earlier archaeologists “far” from the lacustrine edges.

Both Wright’s and Hyslop’s work is discussed in order to demonstrate why the tactic of searching in the dense interior questions Wright’s (1967) conclusions and to explore why archaeological sites have not been searched for beyond the current, modern day, lacustrine edges of the rivers and lakes in this geographical region. But prior to this discussion the term “boreal forest” will be discussed as will the precise geographical location of Lac Seul and its relationship to the Canadian Shield.

**What is the boreal forest?**

Unfortunately, regardless of the physical obstacles involved in exploring and examining this region, larger obstacles appear to frequent the minds of those concerned with the analysis of the archaeological record especially with regards to the nomenclature. This vegetation zone is frequently considered and referred to, in the short hand, as part and parcel of the Arctic and as “the North” (Coates and Morrison, 2008). Coates and Morrison (2008) observed that this region is often perceived as a vague, abstract concept held by those who live in the southern part of the Canada which remains, as in the past, to a considerable degree an artefact of southern creation, a snow-covered tabula rasa, upon which Canadian writers, thinkers and artists have presented fanciful southern visions of the North… The Southern or “outside” view of the North remains, as it has for more than a century, focused on hardship, bravery, curiosity and adventure—the stuff of armchair explorers in southern Canada and elsewhere. (p. 641)

Regrettably, this notion often appears to have affected both the interpretation and understanding of the archaeological record of the boreal zone, especially as it is a cultural landscape which humans have affected since the retreat of the ice
during the Pleistocene Era (Johnson and Miyanishi, 2012: 161). The term “boreal forest” is commonly used by archaeologists who work in this area to refer to the broad circumpolar vegetation zone existing in the high northern latitudes below the Arctic. Brandt (2009: 104) observed that specialists in different fields (phytoclimatology, phytogeography, and phytosociology) have taken contrasting approaches to defining this circumpolar boreal zone. Technically, the phrase “boreal forest” is incorrect since it ought to be called “boreal zone” but it is also known as the subarctic. This zone contains the largest and most significant woodlands and wetland ecosystems of the world as the circumpolar boreal zone consists of about 30% of world’s forests (Zennaro et al., 2014: 1906).

The term “boreal forest” if it is used in the singular form, colloquially refers to the forested area within the boreal zone often because the forests predominate. The boreal forest is a “mosaic of vegetation habitats or patch-types” (Winterhalder, 1983: 28). The vegetation consists of forests, lakes, rivers, and wetlands and treeless terrain such as alpine areas, heathlands in regions where the climate is influenced by the ocean, and grasslands in drier areas. The trees are coniferous (pine, spruce, larch, and fir) and deciduous (poplar and birch). Gardner (1981: 12) described the region as covered by dense spruce forest, open bogs, lichen woodlands, tundra-covered ridge tops, alpine tundra, and wet forested depressions or river valleys. This rich mix of vegetation, and habitat, was for Gardner (1981: 12) and Winterhalder (1983: 32) brought about by a combination of the moisture created by the climate, soil conditions, and the topography. Rich ecological environments include aquatic areas such as rivers and lakes with wild rice, wild fowl, and fish; and more recently, burnt out areas which, archaeologists believe, are constantly being re-colonized by new plants and animals. The natural rate of decomposition of the boreal forest is slow and the buildup of litter hinders the penetration of light to the forest floor. That “litter” causes the build-up of material which obstructs rapid plant growth on the floor of the coniferous forests. This process, referred to as floralturbation, is one which archaeologists ought to be aware of as it affects not only the soil profile but also the regeneration trends, surface characteristics, availability of nutrients and the age of the forest (Schaetzl et al., 1989). The vegetation, Winterhalder (1983: 32) asserted, had an “internal rhythm of disturbance and succession” abetted by snow, wind, and by the cyclical forest fires. Fires in the boreal forest consume vast quantities of biomass as well as nutrients for colonizing vegetation (Senici et al., 2013: 1).

Temperature controls boreal fire activity on centennial timescales (Zennaro et al., 2014: 1918). Zennaro et al. (2014: 1918) asserted that fire on both multi-decadal or shorter timescales was principally influenced by droughts. They maintained that evidence existed that the largest quantity of decadal-scale fire activity occurred during the mid-1600s. Since the last Ice Age, the frequency, size, and severity of the fire has held a key role in vegetation dynamics
(Kasischke and Stocks, 2000). Fires facilitate the clearance of debris, allowing light to fall on the ground but it enables minerals and other nutrients to be released for use by other plants (Kelsall et al., 1977: 15). Intense fires reduce the depth of organic debris and leave mineral soil enriched with nitrogenous ash providing a seed bed for early successional plants (Miller, 2010: 28). This activity, from the archaeologists’ perspective, results in a soil stratigraphy which is “collapsed” since it is compressed as the organics from the forest floor are burned (Hinshelwood, 1996: 63). He cautioned archaeologists about making conclusions based on these cyclical fires as,

Detailed cultural chronologies for boreal forest regions should be advanced with caution since fire contributes to the collapsed stratigraphy. Intense fire events are expected to occur at least once every 150 to 300 years, and often with greater frequency. This is much shorter than the temporal periods generally described for the archaeological cultures of the boreal forest region of northern Ontario. Through frequent, intense burning at archaeological sites, artifacts from occupations which may be very distinct temporally will become a single level at a site. Reoccupations of sites by a group once every two, three or more generations, and possibly on a seasonal rotation will become a single archaeological strata. (Hinshelwood, 1996: 88)

Reid (1988: 191) labeled compressed stratigraphy as a “condition.” He considered it to be a physical problem which archaeologists in the boreal forest had to consider. He observed that this problem of compressed stratigraphy, or “collapsed stratigraphy” according to Syms (1977), was caused by a combination of the slow rate of soil development in conjunction with the fact that locales, which have become sites in the archaeological record, may not have been occupied on a year round basis. Discontinuities, therefore, can form between the mineral and organic soil as the organic material re-accumulates. Periodic burning causes artifacts both on the surface and within the humus to fall to the surface of the mineral soil (Hinshelwood, 1996). Despite the impacts of collapsed stratigraphy, Hinshelwood (1996: 24) noted that areas which do not experience forest fires inevitably experience a sharp decline in the number and variety of their flora and fauna as well as their human population.

Wright (1981: 86) argued that forest fires invariably forced inhabitants to shift their hunting regions and that the profusion of different ecological communities enables varying levels of usable biomasses to coexist. It remains unclear on what basis he made this statement. Hinshelwood discussed at some length the effects of fire ecology on archaeological sites in this region. But not all archaeological sites are shallow (Pilon and Dalla Bona, 2004). Pilon et al. (2000) asserted that sweeping statements cannot be made with regard to archaeological sites within the Central Subarctic. Miller (2010: 67–108), concerned with TEK (Traditional Ecological Knowledge), argued that the indigenous peoples in this region
maintain strong links to the land through livelihood practices and cultural ties. Researchers could benefit from detailed examinations of this information. It is clear from Miller’s (2010) thesis on the Anishinaabe, of Pikangikum, that they hold precise views on the effects of fires on flora and fauna, the people, and the landscape.

Fire, from the biologists’ perspective, not only plays a key role in the regulation of terrestrial ecosystem structure and function but affects the functioning of aquatic ecosystems with respect to cross-habitat transfers of energy and nutrients (Lewis et al., 2014: 1253). Fire releases nutrients and organic matter so that they are available for re-use within aquatic ecosystems. Lewis et al. examined the effects of a natural fire across several trophic levels of boreal lakes. They were determined to establish the nutrient and chlorophyll levels of the lakes as well as fire’s impacts on the macroinvertebrates and waterbirds using pre-and postfire data from burned and unburned areas (Lewis et al., 2014). It was clear that the concentrations of total nitrogen and phosphorus were unaffected by the fire as were chlorophyll levels. This reflected the stable nutrient concentrations. Lewis et al. discerned that the densities of three groups of aquatic invertebrates did not respond to the fire (filterers, gatherers, scrapers) while (shredders, predators) increased. A later study by Lewis et al. (2016) demonstrated that the wildfowl populations remained stable from the pre- to post-fire period. The team analyzed data collected between 1955 and 2014 of more than 1100 fires in the western boreal forest intersected BPOP² survey transects, and many transects which had been burned multiple times. It was observed that these fires had no impact on the waterfowl abundance during the years immediately following the fire when compared to their abundance more than a decade afterwards. It is also clear that insects and windstorms shape unmanaged boreal forests (Bonan and Shugart, 1989; Harper et al., 2015). Harper et al. (2015: 2) argue that boreal forests have distinct edges to them because the tree canopies of boreal forests are more open and shorter with widely spaced trees in comparison with those of tropical and temperate forests.

**Geographical location of Lac Seul**

Lac Seul, the lake itself, is entirely bounded by the Canadian Shield (see the region denoted in the box on the map in Figure 1).

The lake is a crescent-shaped reservoir approximately 150 km long, with a surface area of 1450 km². It is the second largest body of water entirely contained within the province of Ontario and consists of a complex system of open water, bays, narrow channels, and islands (see Figure 2). Lac Seul lies between four regions: the Hudson Bay Lowlands to the north and northeast, the Great Lakes Lowlands to the east, the Mississippi Headwaters to the south, and the Aspen Parkland/Prairie region to the west.
The northern linkage, over an approximate distance of 450 km, connects Lac Seul to the Hudson Bay Lowlands. The Root River flows into the northern section of the lake and a short portage across the height of land leads directly to Lake St. Joseph and the Albany River which flows into the Hudson Bay. The eastern linkage requires using either the Upper English River or the Sturgeon River which both flow into the eastern section of the Lac Seul basin. Yet anyone traveling up either of these rivers must navigate a series of portages, first to reach the height of land and second to cross to the Kopka River which flows east into Lake Nipigon. This linkage, a distance of more than 320 km, connects Lac Seul...
to Lake Nipigon and beyond to the vast lowlands of the Great Lakes. In order to travel to the south of Lac Seul, the water route to be followed entails crossing Minnitaki Lake through Pickerel Arm into Sandy Beach and Hartman Lakes followed by a portage to Wabigoon Lake. The “route” continues south across the height of land into the Manitou River system which eventually flows into the Rainy River. This southern linkage, over an approximate distance of 260 km leads to the mouth of Big Fork River, providing a connection to the Mississippi headwaters. The western linkage, over an approximate distance of 400 km, connects the Lac Seul region to the Aspen Parkland/Prairies region. Water discharges at Ear Falls, on the western section of Lac Seul, into the lower English River which drains subsequently west eventually becoming the Winnipeg River and flows into Lake Winnipeg (Figure 2).

Wright (1995: 261) asserted that the water systems in the Canadian Shield functioned as travel routes. With regards to Lac Seul, the travel routes are in four compass directions creating an interconnected travel network between Lac Seul and regions elsewhere in North America (Hyslop, 2009). The geographic and physical location of Lac Seul enabled it to be a transportation hub connected via an extensive network of rivers and lakes which functioned as “highways.” Birchbark canoes were used during the summer months to move down bodies of water which served as transportation corridors. During the

Figure 2. Lac Seul in the Winnipeg River Drainage Basin (Copyright: Hyslop, 2008).
winter, people traveled on foot, using snowshoes over snow-topped ice. Food resources were closely tied to these bodies of water. Essentially, the abundant resources and strategic geographic location result in Lac Seul having a high potential for archaeological sites.

Lac Seul lies in the Severn Upland region of the Precambrian Shield, often referred to as the Canadian Shield, which is characterized by undulating topography caused by the interaction between underlying bedrock formations and late Pleistocene glacial activity (Ministry of Natural Resources, 1980). The bedrock underlying the area is called the English River Gneiss Belt and it is characterized by plutonic granitics (Ministry of Natural Resources, 1980: 2). The lake itself is a remnant of glacial Lake Agassiz, a large glacial lake formed from the meltwater of the retreating Wisconsin ice sheet (Anfinson, 1990: 150; Teller and Thorleifson, 1983). The major portion of the Lac Seul area overburden consists of glaciaolacustrine deposits and colloidal clays deposited during glacial melting. The land around Lac Seul became free of melt water sometime between ca. 9000 years ago, during the McCauleyville phase and ca. 8300 years ago, during the Stonewall Phase (Elson, 1967: 84, 89). To the south and west of the area is the Lac Seul moraine, approximately 500 km in length, formed when the glaciers were at a standstill during their long retreat. The moraine was subsequently modified by wave action.

If the relative size of the lake is taken into consideration, it is possible to posit that the combined archaeological research conducted on the lake to date probably represents a small amount of information on likely precontact human activity in the area since the majority of artifacts have been recovered through surface collection from its eroded shoreline. As indicated previously, it is likely that the fluctuating lake levels may have avertedly influenced the discovery of sites made by archaeologists surveying the shores of lakes.

Written records indicate that the water level of Lac Seul is higher today than it was in the past. A dam was constructed in 1929–1930 at Ear Falls, the outlet for Lac Seul, to generate hydro-electric power for regions to the south and west. Water levels during this episode rose approximately 5 m to create a reservoir ensuring a steady flow of water to the Winnipeg River in Manitoba (Lake of the Woods Control Board, 1994: 12). The water level is controlled by the Lake of the Woods Control Board with a maximum height regulated at 357.2 m ASL (above sea level). According to Map 16L9, the total shoreline of Lac Seul measured approximately 2974 miles (Ministry of Natural Resources, 1967). To put some perspective on this statistic, 4800 km is the physical distance between Toronto, Ontario and Victoria, British Columbia.

Unfortunately, these raised water levels possibly caused the destruction of older shorelines and possibly the damage to or loss of archaeological sites. Tragically, this destruction is ongoing as the water levels continue to fluctuate for the generation of hydroelectric power. This factor severely skews, that is, influences, the range of archaeological sites that can be identified and investigated.
Hyslop’s fieldwork between 1991 and 2009 identified an additional 17 sites in the Crooked-Pelican area. Archaeologists who work in the Northern Ontario boreal forest frequently utilize predictive models (inductive and/or deductive) in order to “predict” the cultural heritage that exists below the surface of the soil (e.g., Dalla Bona and Larcombe, 1996; Hamilton, 2000; Oetelaar and Meyer, 2006). Hamilton (2000: 44–48) critiqued such archaeological models and their implementation in this area asserting that archaeologists often relied too heavily on ethnographic data used in conjunction with what he termed “unrepresentative archaeological survey data” in order to construct models of settlement strategies. Land-use models for this region, which utilize lake and riverine archaeological surveys, automatically eliminate alternative interior land use strategies. Clearly, this kind of potential oversight easily leads to problematic interpretations. Hamilton (2000: 48) admonished archaeologists to be wary of depending heavily on expectations informed by either existing ethnographic or archaeological information.

Hamilton, as he worked in the same geographical region as Reid (1988), was probably aware of a similar concern raised by Reid (1988) 12 years earlier when he argued that his colleagues and subsequent archaeologists must move beyond the preliminary observations and conclusions of the discipline as practiced in this part of Ontario and adopt (a) more realistic parameters for their research designs and (b) field methodologies that are pertinent to the boreal forest. Both of Reid’s recommendations are more than reasonable and clearly justifiable. Hamilton argued this same point because each field technique used to survey and record sites offers its unique challenges. Hamilton (2000) stated that settlement in the subarctic was “always associated with the water-based transportation and communication corridors, and their productive habitats” (p. 45). His statement is well supported by evidence provided by Dalla Bona and Larcombe (1996) and later by Oetelaar and Meyer (2006). The tendency for sites to be found in proximity to water is evident in those areas connected with the major river valleys. But as Hamilton (2000) and Dalla Bona and Larcombe (1996) observed, the record as constructed by archaeologists merely emphasizes places used during the summer months to the relative exclusion of those potentially used during the winter months. This emphasis risks skewing, that is influences, the record.

Ethnographic research undertaken by Rogers and Rogers (1959) indicated that the annual subsistence cycle of the inhabitants involved both winter and summer residences. Oetelaar and Meyer (2006: 363) noted that both Hamilton (2000) and Dalla Bona and Larcombe (1996) had made similar observations. While these river systems provided the only feasible avenues of transport throughout most of the year, the freezing and breaking-up of the ice on these rivers and lakes also impeded their use. These waterways were crucial to the movement of people through the dense vegetation of the boreal forest. Rogers and Rogers (1959) observed that the annual subsistence cycle required a winter
and summer residence. Food resources were closely tied to these bodies of water. Wright claimed that humans could not have survived solely on the migratory fowl or other seasonal resources; therefore, fish and caribou were almost certainly fundamental components of their diet (Wright, 1981: 90).

Drainage patterns and large bodies of water served as focal points for settlements, subsistence, and related trading activities. But at the same time, it is crucial to remember that for the past century the water levels of the many lakes and rivers may have been affected by man-made dams. These affect, both directly and indirectly, the movements of people and other fauna. Archaeologists interested in specific regions of the boreal forest consequently must use the ethnographic record of the specific region rather than “borrow” from those of other geographic regions. They also must remember that activities and locales utilized during the winter may differ from those used during the summer. This point must be articulated because unspoken “givens” from the perspective of those archaeologists who work in this part of the globe are not necessarily givens from the perspective of those who work in other geographic regions. Indeed, the possibility exists that archaeologists in the boreal forest of Russia may be dealing with similar issues. Therefore, it is crucial to state what the “givens” are for those archaeologists who work in the boreal forest of Canada.

Past population figures for aquatic and other fauna are difficult to gauge in Northwestern Ontario as a whole since the highly acidic soils destroy the faunal remains that archaeologists traditionally use to generate such population data. Wright (1981: 90) observed that bone is rarely found, although the neutralizing effects of ash from hearths found at the Heron Bay site, a Laurel site on the north shore of Lake Superior, managed to preserve some bone tools and refuse. It is likely that both wild rice and the resources provided by aquatic environments were vital to the economies of Late Pre-contact and earlier populations in Northwestern Ontario (Meyer and Hamilton, 1994: 98).

**Hyslop’s discoveries**

Hyslop uses the label “Crooked-Pelican Area” in order to indicate a specific geographic area of Lac Seul which has a 2.5 km radius and includes Pelican Falls and Crooked Rapids in the EaKa Borden zone. The distance from Pelican Falls to Crooked Rapids following the river is approximately 8 km. A total of 35 sites have now been identified within this area. The large number of sites in close proximity represents a distribution pattern of high density. These data contradict the perception of the boreal forest being a sparse and remote hinterland. Hyslop observed that water level fluctuations, occurring as a result of the use of Lac Seul as a reservoir basin for the generation of hydro-electric power, have caused a high rate of shoreline erosion. Consequently, the data to be recovered from sites found at the shoreline constantly changed. For example, artifacts
collected from initial visits by Hyslop to the sites called Eaka-6 and Eaka-9 initially indicated single cultural affiliations representing the Archaic period (Hyslop, 1991). But subsequent visits to both sites over multiple years revealed the presence of cultural material from both the Middle and Late Woodland periods.

The process of erosion repeatedly exposes and buries artifacts in a reservoir basin. Consequently, the recovery of cultural material during a single visit inevitably causes inaccurate conclusions regarding the nature of any archaeological sites found (Hyslop, 2007; Malasiuk, 2001). Similar observations have been made on surveys conducted along water bodies within the Churchill River diversion (Riddle, 2000; K. Brownlee, 2007, personal communication). As a result, a region such as the Lac Seul reservoir basin ought to be continuously monitored for the existence of cultural material. Hyslop has undertaken this task with respect to the archaeological sites within the Crooked-Pelican area over a period of 20 years. The ability and dedication of Hyslop to carry out a long-term research project in a focused area has led to the identification of what he has called “sub-areas” at 15 of the sites. A sub-area is designated when an artifact, or a discrete scatter of artifacts, is discovered in a location other than where artifacts were initially observed on a given site. The distance from the original find is far enough to indicate a distinct activity area, but not so far away so as to justify its designation as a separate site. The identification of a new sub-area of a site potentially increases its overall size; multiple sub-areas have been discovered at the following sites: EaKa-1, EaKa-2, EaKa-3, EaKa-6, EaKa-7, EaKa-9, EaKa-10, EaKa-13, EaKa-19, EaKa-35, EaKa-36, EaKa-37, EaKa-44, EaKa-45, and EaKa-49. Therefore, not only is there a high concentration of sites within the Crooked-Pelican area, but the existence of sub-areas may indicate that some are much larger sites. Perhaps they are part of one very large site which extends along the shoreline over a length of approximately 1 km. This is evident from the annotated photograph of the sites in the Crooked-Pelican area in Figure 3.

The original archaeological sites are indicated, in Figure 3, with Borden numbers on top of a shape with an “a” inserted. Remaining smaller shapes denote “sub-areas” where additional clusters of artifacts were discovered at some distance from the original site. The specific smaller shape “type” indicates the association of the sub-area back to the original site.

Excavations on Lac Seul were undertaken at EaKa-1, known as the Pelican Falls site (Wright, 1967) and at EaKa-3 by Wright during the summer of 1962 but published a few years later (Wright, 1972). An excavation was also carried out on Lac Seul at EdKh-1 located beside the Wenesaga Rapids (Hamilton, 1981). This work was undertaken due to the large volume of artifacts recovered at the site in 1979 as a consequence of the eroding bank, on the shoreline, and additional artifacts which were recovered from a test pit placed within an undisturbed portion of the site, EdKh-1 (Smith, 1981). Hyslop conjectured that
archaeological sites on Lac Seul, initially identified by the existence of culturally material observed on the eroded shoreline, may extend back into the forested interior. Hyslop, based on the high number of artifacts recovered from the eroded shoreline, undertook a series of shovel tests 25 cm$^2$ in size, at 5 m intervals on an off-set grid at EaKa-6. This work revealed that an intact portion of the archaeological site, covering an area 25 × 25 m, extended further back away from the shoreline well into the interior forest (Hyslop, 1993). This led Hyslop to conduct interior investigations at the Pelican Falls site (EaKa-1), because a vast quantity of archaeological material had been collected during surveys of the surface of the site between 1991 and 1997. Hyslop started to test the interior of the forest, away from the shoreline, in 1997 following an exhaustive review of the field notes which Wright had made during his 1962 field season at the archaeological site labeled EaKa-1. Hyslop posited, based on the location of the material surface that he collected along the shoreline, that Wright’s transect had clipped the corner of the site. He observed Wright’s statement in *The Laurel Tradition and the Middle Woodland Period* where he wrote that

[T]he concentrated cultural debris does not appear to extend inland farther than 30 feet, although an undetermined portion of the site is under water during the low water level and the remainder of the site is beneath the water surface during the high water level. (Wright, 1967: 41)

Wright’s observation implied that he had either excavated a transect or that he had conducted some archaeological testing within the woodland away from
the shoreline at the time of his field work in 1962. Wright’s comment, quoted above, indicates that he considered that the site extended right up to the existing vegetation line but not beyond it. Hyslop also discovered from his detailed review of Wright’s 1962 field notes, that Wright conducted his fieldwork in the zone of the shoreline where considerable erosion had already occurred. The zone of erosion is defined as the area of shoreline between the high water mark and the current water level. In this location, Wright (1962) excavated an area $10 \times 10$ ft and labeled it square A.

Sq. B ($10' \times 10'$) opened to N. of Sq. A.—produced about half the amount of material found in Sq. A suggesting that the site peters out rapidly as advance inland. (p. 2)

It was from this activity that Wright estimated the inland extent of the site although, in all fairness, his research time at the site was less than a week. However, it appears Wright did not conduct any fieldwork above the zone of erosion into the forested interior portion of the site (Hyslop and Colson, 2011). Hyslop (1991, 1992, 1994, 1995) pondered the question whether either a new transect or any new interior fieldwork could yield any additional cultural material.

Consequently, in 1997, Hyslop excavated seven test pits measuring $25 \text{cm}^2$ in size at 5 m intervals on an off-set grid close by to the site. He increased the size of further test pits was increased from 25 to $50 \text{cm}^2$ after deliberation with other archaeologists who worked in Northwestern Ontario (S. Hamilton, 1998, personal communication). Hyslop abandoned using the offset grid pattern after his 2002 field season since the cumulative high number of positive results (40 out of 44 test pits were positive) provided sufficient evidence that such a grid was no longer necessary (Hyslop, 2003). Hyslop (2009) argued that the excavated test pits completed at EaKa-1, in fieldwork conducted between 2002 and 2009, confirmed the existence of an intact interior portion of the site covering a minimum area of $5000 \text{m}^2$ (See Figure 4).

This stands as an example of why thorough testing of the interior landscape, away from the shoreline of Lac Seul, is important since the data presented above indicate that the site could be much larger once the remaining area of the interior is tested for the presence of cultural remains using test pits.

As discussed, there are areas within the vegetation adjacent to clusters of existing cultural deposits indicated by the spots on the map in Figure 5. Additional information may possibly emerge once the testing of the ground beyond the water’s edge is complete.

**Discussion**

Hyslop has conducted archaeological investigations into the interior vegetation of the landscape of the Lac Seul region, which appears to be an area largely
Figure 4. The test pits undertaken in the vegetation behind Wright’s site called EaKa-1 and EaKa-36 (Copyright: Hyslop, 2008).
unexplored by archaeologists. The question becomes why is the forested interior portion often given less scrutiny by archaeologists working in this region? First, the strategy of surveying the edges of lakes and rivers may have developed because it is well known, from ethnographic data and indigenous informants, that lakes and rivers were the “highways.” The shoreline, therefore, represents an area where it is highly likely to find cultural material. Second, the shoreline in this geographical region represents “low hanging fruit” for archaeologists in terms of accessibility and work location compared to the dense understory of the boreal forest. The task of venturing beyond the shoreline into the interior among the trees may be daunting, perhaps even onerous, so that work in this area is less commonplace than surveying the edges of rivers and lakes on the shorelines. Third, detailed investigation of the interior landscape, away from the lakeshore, is time consuming. However, while difficult, examination of the interior landscape is absolutely crucial for compiling an accurate data set for the boreal forest. Other methodological and theoretical problems exist with regard to understanding the archaeological record of the boreal forest zone, and not just that of the Lac Seul region. This ought not to be an excuse for anything less than a rigorous approach. Analysis of the data acquired by Hyslop over a sustained period of time within the Crooked-Pelican area led him to undertake a far greater in-depth survey of the forested area, away from the shoreline.

Hyslop identified the issue of searching beyond the shorelines of a lake as he drew on the shoreline survey conducted in 1962 by Wright (1963, 1967, 1972). Wright identified 13 sites, labeled EaKa-1 through EaKa-13, and included data he gathered from excavations at two of these sites in subsequent publications.

Figure 5. Possible interconnections within EaKa-1 and between the sites and sub-sites (Copyright: Hyslop, 2008).
Hyslop determined from his detailed review of Wright’s field notes and from his own extensive knowledge of this area that these excavations were not conducted into the forested interior portion of landscape, away from the shoreline, at these locations.

Additional research was conducted on Lac Seul as part of the West Patricia Land Use Study (WPLUS) under the aegis of the Regional Archaeologists, Reid and Ross. Fieldwork was conducted at the west end of the Lac Seul by Lambert (1981) and at the east end of the lake by Wall (1981). The overall goal of the WPLUS was to conduct an intensive shoreline survey, some testing of the interior of the forested landscape was expected to be undertaken (Reid and Ross, 1981: Appendix A: 311). Shovel tests and some work in the interior of the forested landscape were carried out as part of the Lac Seul surveys. However, the majority of the sub surface investigations occurred in areas which were considered as “disturbed areas” (Lambert, 1981: 146) and in “undisturbed areas” but nearby artifact concentrations on the surface usually just behind the beach ridge (Wall, 1981: 161, 168). The focus of these surveys shifted to the collection of artifacts, what is technically called “surface collection” with minimal attention to the interior of the forest area because it was decided that the increased water levels of Lac Seul as a consequence of flooding had severely damaged the sites (Lambert, 1981; Wall, 1981). It appears as if the majority of cultural material was thought to exist either at or below the current water levels. This was also the perception at Wenesaga Rapids, an archaeological site in the interior of the forested area which was excavated.

This site, while being approximately 60 to 80 percent destroyed by erosion, is distinctive in the sense that it possessed a narrow band of virtually undisturbed archaeological remains…with the most attractive and, therefore, most heavily utilized shoreline camp areas being destroyed by the rising water levels and now being part of the seasonally flooded beach area. (Hamilton, 1981: 147)

Hyslop had initially shared the perception that many sites on Lac Seul were totally destroyed and that any portions which were intact were peripheral when he started to undertake field work on the lake. However, as argued here, Hyslop’s ability to undertake fieldwork over a long period of time has enabled him to undertake detailed study of the forested interior of the landscape, at some sites. It is clear from the data obtained at some locations that the erosion, while extensive, has only damaged the peripheral edges of the sites. Indeed, in some instances, it is evident that large areas of undisturbed land exist representing the majority of the site which occurs well into the interior forested area away from the lacustrine edges. Hyslop’s discoveries create a new understanding of the archaeological record for Lac Seul. His discoveries provide additional evidence for the proposition that Lac Seul was a hub for trade and cultural interaction.
during the pre-contact period. Lambert’s (1981) data also support this hypothesis.

[T]here is substantial evidence to suggest that the prehistoric inhabitants of Lac Seul experienced influences from outside the Shield. This observation is based on the occurrence of several exotic materials including native copper, jasper-taconite, and obsidian. (p. 182)

Wright (1972: Plate xiv, figures 20, 21, 22, p. 119), Reid (1980: 11), Hamilton (1981: 47–48), and Hyslop (1994, 1995, 1997, 2005) recovered artifacts made from native copper and both Wall (1981: 160) and Wright (1972: 23) viewed a private collection owned by Dean Starratt, a local collector from Hudson, Ontario which contained a large quantity of native copper artifacts from the Lac Seul region. These include a copper fish hook, three barbs, and one gaff, all of which dated to the pre-contact period, from a site which Wright subsequently examined and called EaKa-3 (Wright, 1972: 23, 27). Lambert (1981), Wendt and Romano (2008), and Wright (1995) observed that the source of native copper has been identified in the Lake Superior region, located south and east of the Lac Seul region. But other researchers have observed that not all artifacts would necessarily have originated from the Lake Superior/Great Lakes region (Dussubieux and Walder, 2015; Levine 2007a, 2007b; Martin, 1999; Mathur et al., 2014). Therefore it is possible to posit the idea that the recovery of copper artifacts in the Lac Seul region indicates both interaction and trade between individuals from the Lake Superior region and peoples from other regions during the pre-contact period. Other artifacts were found made from materials which do not originate in the Lac Seul region such as jasper-taconite and Knife River Flint. Their discovery supports the argument that the Lac Seul region was connected with other regions through trade (Hamilton, 1981: 29; Hyslop, 1994, 1997; Lambert, 1981). Outcrops of higher quality jasper-taconite occur in close proximity to the Lakehead Complex (Fox, 1975, 1980; Hinshelwood, 2004; Ross, 1997) while Knife River flint is sourced from quarries in North Dakota (Hamilton, 1981; Lambert, 1981).

Artifacts which stylistically resemble those from other geographic and cultural regions have been found in the archaeological record of Lac Seul. Examples include projectile points that are classified as the Oxbow and Snyder types (Hyslop, 1991, 1994, 2007; Lambert, 1981). Lambert (1981: 183) suggested that these Oxbow points represent a connection to the Plains region located to the west, while the Snyder points are a characteristic of the Hopewell culture, found to the south of Lac Seul. Other artifacts such as polished “grooved gouges” have been found which are indicative of a trading relationship with the Great Lakes-St. Lawrence cultures to the east (Wright, 1995: 125).
These artifacts have been found along the eroded shoreline of the lake (Hyslop, 1991, 2003) and were observed in collections recovered within the Lac Seul region (Reid, 1980: 11).

The discovery and analysis of carbonized food residue hints at the possibility of a high level of interaction, possibly trade, between occupants of Lac Seul and those from elsewhere where maize was more prevalent. Boyd et al. (2008) analyzed the carbonized food residues on ceramic sherds from archaeological sites. Starch phytooliths within the sample obtained from a rim sherd, assigned to the Late Woodland period, from EdKb-1 located in the Wapesi River in the Lac Seul region (Hyslop, 1994) was identified as maize (*Zea mays*; Surette, 2008). This information has profound implications for our understanding of the past settlement of Lac Seul and represents another important source of evidence for interaction within the region. It also suggests that more information can be gleaned by taking a more rigorous approach when conducting archaeological research in the boreal forest. It reinforces that the tactic taken by Hyslop to examine the landscape covered in vegetation away from the water’s edge is valid. It is possible that when Wright first discussed the Canadian Shield region that he recognized the enormous expanse of landscape to be considered by archaeologists causing him to write

[T]his difficulty of component isolation is the single most serious limitation facing Canadian Shield archaeology. (Wright, 1995: 262)

Wright made his observations from the perspective of an archaeologist based from an extensive study of the archaeological record across Canada undertaken during a relatively short period of time. He, unlike Hyslop, did not have the luxury of the time conducting fieldwork in the Lac Seul area. Wright was also one of the first archaeologists to formulate the initial cultural framework regarding the boreal forest zone in Ontario. This early synthesis was heavily dependent upon the work of a few archaeologists including Evans (1961), MacNeish (1954, 1958), Wilford (1941, 1955), Dawson (unpublished, 1974, 1976a, 1976b, 1980, 1981, 1983), and Wright (1963, 1967, 1968a, 1968b, 1972). The work of Dawson and Wright revealed the existence of a cultural history within the region spanning a time period of several millennia. These individuals opened the avenues for subsequent research by others in the area and their pioneering efforts must be applauded. Subsequent research will inevitably challenge some of their original assumptions. It is always a good idea to acknowledge one’s predecessors in a discipline, profession, as it is on their shoulder’s that one can proceed but one also has to recognize that they were working in a specific time and place. Hyslop, unlike many other archaeologists, has had the advantage of conducting pluri-annual fieldwork surveys in one region over a long period of time.
Conclusion

Obviously, new thoughts and new questions occur when areas are re-examined by archaeologists who take different approaches to conducting archaeological work. Hyslop’s examination of the sites in the Crooked-Pelican area revealed that sites can exist away from the edge of bodies of water as he recovered cultural material well away from the riverine and lacustrine edges. This, along with his ability to carry out focused research in the same area pluri-annually, has challenged some accepted beliefs regarding the archaeological record of the boreal forest in the Lac Seul region. Indeed, despite the damage to archaeological sites on Lac Seul resulting from the relatively recent rise in its water level, it is clear from the overall collection of cultural material recovered from this basin. It can be posited that the Lac Seul basin was a possible hub for trade and cultural interaction linked via the rivers and lakes as conduits to other regions in North America. Hyslop rightly recognized that the forested interior away from the shoreline was an area which was conventionally, only minimally, tested by archaeologists, ought to be examined in more detail. It is essential in order to acquire a better understanding of the region despite the increased challenge and time commitment required to working in the interior of the boreal forest particularly when it is compared to conducting archaeological fieldwork along the shoreline. Hyslop’s discoveries contradict the commonly held perception that the boreal forest is archaeologically “sparse” (e.g., Holly, 2002). It is a good idea to present new data despite the challenges involved in presenting conflicting evidence. Real temptations may exist to ignore either the discovery of empirical evidence or realization of a concept but empirical evidence from the archaeological record cannot be “shoved back” once observations are made. New evidence and information requires that one to challenge even the key tenets and beliefs regardless of how uncomfortable it might be. When confronted with commonly held views regarding the archaeological record of a geographical region, the research must continue since new discoveries regarding previously established facts can in reality assist one to comprehend an existing situation that remains perplexing.

It is with this in mind that we suggest that more work must be conducted with regard to the archaeological record of the Lac Seul region so that its precise role in the settlement and occupation of North America can be ascertained. The new data from the Crooked-Pelican area suggest that new ideas and new questions can arise providing that archaeologists take different methodological approaches to archaeological research than those adopted by their predecessors. Additional investigation, including drawing on detailed analysis of the appropriate ethnographic record, could permit a more comprehensive understanding of the region so that the archaeological record can be securely tied with that of the period covered by historical records.
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Notes
1. A Borden number is the method by which archaeological sites are labeled in Canada so that the artifacts from them can be tracked. These numbers enable sites to be discussed without indicating their precise physical location. The system was devised by Charles Borden in 1952.
2. Waterfowl populations across the western boreal forest of North America have been monitored annually since 1955 by the Waterfowl Breeding Population and Habitat Survey (known as BPOP). This survey is widely considered the most extensive wildlife survey in the world.
3. Archaeological surveys were undertaken prior to the Churchill River diversion which included the widening of the river around South Indian Lake, a lake, in northern Manitoba. This was one of a number of diversions of the Churchill River Diversion project, implemented between 1973 and 1977, in order to generate hydroelectric power. Water was diverted from the Churchill River, gaining economic advantages, into the Burntwood and Nelson River systems so that existing generating stations could be used rather than new plants having to be built on the Churchill River. The Churchill River basin is approximately 283,350 km² and lies north of the Saskatchewan and Nelson River basins. Its headwaters are in east-central Alberta adjoining the Athabasca River drainage basin on the north and west.

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