
Archaeological Overview Assessment of the Cassiar Forest Corporation's Forest Development Unit

Prepared for:
Cassiar Forest Corporation



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Executive Summary

This report presents the results of an Archaeological Overview Assessment (AOA) of the Cassiar Forest Development Unit (FDU) area, located near the confluence of the Iskut and Ningunsaw Rivers and in the vicinity of Bob Quinn Lake, in northwest British Columbia (the project area). The project area is located in the Tahltan traditional territory.

This archaeological overview report provides a planning-level evaluation of archaeological assessment and permitting needs for the Project, with a focus on identifying or determining if there are significant archaeological issues that will need to be addressed prior to construction.

The AOA includes a desktop review of readily available publications, an analysis of available maps, design and implementation of an archaeological potential model, and a final report presenting these results. The study is designed to evaluate the archaeological site potential of the project area and to determine if any archaeological sites have been previously identified within, or in close proximity to the project area. Recommendations regarding the need for future Archaeological Impact Assessment (AIA) studies are made.

Results of the study indicate that eight known archaeological sites are located within, or in close proximity to, the project area. It is recommended that development plans aim to avoid impact to these eight previously recorded archaeological sites. To ensure these sites are not indirectly impacted, proposed cutblocks and associated developments should be at least 10 m from the site boundaries and that the trees remaining within and adjacent to these site boundaries are wind firm. However, if it is not possible to avoid impact to these sites, mitigative recommendations may be made as part of the AIA after the sites are revisited.

The AOA model shows archaeological potential in areas in close proximity to hydrological features, in areas adjacent to known traditional use features and aboriginal trails, on elevated and level or gently sloped terrain, in areas of favorable vegetation, and areas possessing a southern aspect. Sloped or featureless terrain, and poorly drained areas were considered indicative of low archaeological potential.

Cutblocks that encompass contiguous pixels of archaeological potential (of approximately 60% or higher) should be subject to ground truthing by a professional archaeologist, in the form of a Preliminary Field Reconnaissance (PFR), AIA, or Archaeological Inventory Survey (AIS). Entire blocks are not necessarily required for survey, but at least with a focus on the areas with archaeological potential. A sample of low potential areas within each block selected for an AIA should be assessed through AIS to continue to test the validity of the model. An archaeological review of future blocks, utilizing new data such as more accurate

digital elevation data, aerial photography, and/or lidar may be considered sufficient to determine whether or not further archaeological fieldwork will be required.

Continued cooperation and coordination with the Tahltan is recommended for any further work and to ensure adherence to the Tahltan Archaeology Standards. This includes the use of a Chance Find Management Plan document, and appropriate archaeological training for machine operators, or those intending to be on site to inspect the blocks during harvesting or road construction. All personnel on site should be familiar with the appearance of obsidian and dacite artifacts, instructed to watch for it, and stop work in the immediate vicinity if it is observed on the ground.

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Introduction

General

This report presents the results of an Archaeological Overview Assessment (AOA) of Cassiar Forest Corporation's Forest Development Unit area (Cassiar FDU), located near the confluence of the Iskut and Ningunsaw Rivers near Bob Quinn Lake, in northwestern British Columbia (BC) (the project area). Kleanza Consulting (Kleanza) conducted this AOA at the request of Cassiar Forest Corporation (Cassiar). The Cassiar FDU encompasses an area of approximately 23,000 hectares (Figure 1). Cassiar plans to develop and harvest the forest landbase within the Cassiar FDU within the next two years.

The report begins with an outline of the scope and objectives of the study, followed by a brief description of research methods. Following this is a section presenting background summary information on the environment, ethnography, history, and archaeology of the project area. This background provides context on the project area pertaining to its biophysical setting, traditional native subsistence and land use patterns, and general history, all of which are relevant to discussions of cultural heritage resources in the region. The results of the study, including the specific findings of the archaeological potential model and relevant information on previous archaeological studies conducted in the project area, are then presented. Finally, recommendations are made with regard to future Archaeological Impact Assessment (AIA) studies.

The project area is located solely within the Tahltan First Nations (Tahltan) traditional territory. Representatives from the Tahltan Heritage Resources Environmental Assessment Team (THREAT), a working group of the Tahltan Central Council (TCC), were informed as to the design and scope of the project, and were asked to provide direction on archaeological protocols and/or permitting guidelines. As a result, the Tahltan specifically requested that the study follow all aspects of the Tahltan Archaeology Standards (Appendix 1).

Objectives and Scope of Work

The purpose of this AOA was to provide information on predicted archaeological site potential within the project area. The study's goals were to gather existing knowledge regarding known and recorded archaeological site locations, historical First Nations land use, and cultural and environmental factors likely to affect archaeological site locations. This information was used to build a model of where potential archaeological sites could be anticipated. This model will be used as a tool to guide future AIA studies.

Specific tasks included: 1) a review of existing archaeological baseline information, including previous archaeological studies within the region; 2) to employ GIS

analysis of environmental attributes and cultural data known to correlate with archaeological site locations in the region; 3) to confirm the validity of the GIS component by observing archaeological potential in the project area through a PFR; and, 4) to present this information in a final report including maps.

The results of the AOA presented in this final report will be submitted to Cassiar, the Archaeology Branch, and the Tahltan. The AOA results will help to determine subsequent AIA studies.

The Project

Several forestry developments are planned for the Cassiar FDU area. The proposed developments include harvesting of standing timber within several cutblock boundaries, by means of grapple and Ground Based System (GBS) or skidder yarding, as well as the construction of several access, spur roads and log dumps.

The location, number, and size of all cutblocks within the project area have not yet been determined; however, several are scheduled for harvest during the winter of 2010/2011. Work is scheduled to begin on proposed cutblocks 1, 2, 3, 7, 12, 13, 14, 15 and 40 before the end of the year. Proposed cutblocks 1, 2, 12 and 13 were evaluated during the PFR to assess the validity of the model (Figure 2). This AOA model will be used to determine which of Cassiar's proposed cutblocks will require future AIAs. Forestry developments within the Cassiar FDU area will be ongoing throughout the next two years, and AIAs will be conducted as required based on the recommendations of this study, as well as those made by the Tahltan.

Archaeological Assessment and Review Process

The Archaeology Branch, Ministry of Tourism, Culture and the Arts, the provincial government agent responsible for the management of archaeological sites in B.C., has established an Archaeological Impact Assessment (AIA) process for industry development and research proponents to evaluate and mitigate the impacts to heritage resources (Archaeology Branch, 1998). There are three main stages in the AIA process: overview, impact assessment, and impact management or mitigation.

The overview is intended to identify areas of archaeological potential and is generally a mapping exercise and desktop review of previous assessments for a proposed development area. Sometimes a Preliminary Field Reconnaissance (PFR) or reconnaissance level survey, is conducted to verify the validity of an overview and from there, recommendations are made with regard to further archaeological impact assessment studies that may or may not be required.

The Archaeological Impact Assessment (AIA) focuses on inventory or identification and evaluation of archaeological resources within a proposed development area. This AIA includes both reconnaissance level and subsurface shovel testing conducted under a Section 14, Heritage Inspection Permit, issued by the Archaeology Branch.

Impact management usually involves the reduction of adverse impacts of a development to archaeological sites, and usually involves site protection (avoidance) by project redesign. In rare cases, sites cannot be avoided and systematic data recovery, or site mitigation is conducted. All sites located in the province that pre-date AD 1846 are protected by the *Heritage Conservation Act* (HCA), and can only be altered under a Section 12 Alteration Permit issued by the Archaeology Branch.

Methods

Background Review

Background research was conducted for the project area, including a review of previous archaeological investigations conducted in the Iskut/Stikine region. A review of local and regional history, prehistory, ethnography and environmental information was also conducted. Literature reviewed and summarized includes published and unpublished documents and reports on file with the Archaeology Branch, as well as other relevant libraries, archives and repositories. A search of the Remote Access for Archaeological Data (RAAD) database (a web-based application administered by the Archaeology Branch) was conducted to determine the number and distribution of known sites within the project area and surrounding region.

Tahltan Traditional Use Study (TUS) and/or Traditional Knowledge (TK) information was sought to incorporate into the AOA background research and ethnography. The Tahltan shared general information regarding the use of the project area for hunting, travel and trade corridors, as well as the approximate location of a village site. This information was incorporated into the model, and is considered confidential and not to be printed or reproduced. If additional TUS or TK data becomes available in the future, it could assist in the planning of future AIA studies.

A National Topographic System (NTS) 1:50,000 map sheet, and 1:20,000 trim maps were analyzed as part of the desktop review, and these were referred to later upon completion of the GIS model to verify the model results.

Tahltan Archaeology Standards

The Tahltan developed a detailed Archaeology Standards document (see Appendix 1) that is to be used as guidelines during environmental assessment projects in their traditional territory. These are offered with the intention of bringing further depth and breadth to the research that is used to predict archaeological potential, and to emphasize or encourage a standard approach for studies conducted in their traditional territory. With these standards, the Tahltan outline five archaeological issues that are considered vital:

1. Ancient continental movement of obsidian from *Ah-zeeth-zaa* (Mt. Edziza), located centrally in Tahltan territory, has been well documented in the

archaeological record (Carlson, 1984). The Tahltan expect all finds of obsidian to be sourced, to determine whether or not they originate from Mt. Edziza. Emphasis on the importance of obsidian trade routes in Tahltan prehistory will be discussed further below.

2. Cairns or Rock Piles are considered archaeological features of high ethnic significance to the Tahltan.
3. Four tephra Layers (of Volcanic Ash), as described by Fladmark (1985) are considered a valuable means of establishing chronological markers or soil horizons in subsurface archaeological sites. The Tahltan encourage attempts by archaeologists to document these layers if found during subsurface testing, as they are considered very valuable.
4. Rock cliffs or cave shelters are considered valuable archaeological sites as they often contain unique dry environments that contribute to the preservation of archaeological deposits.
5. The final item of concern to the Tahltan is the new field of Ice Patch Archaeology and its influence due to climate change. The archaeology of glaciers and ice patches is an exciting new interdisciplinary research frontier contributing new insights into high latitude and high altitude environments (Beattie et al., 2000; Dixon et al., 2004; Dixon, Manley, & Lee, 2005; Farnell et al., 2004; Hare et al., 2004).

GIS Modeling

Archaeological potential modeling consisted of the preparation of a GIS map, indicating known archaeological sites within close proximity, sensitive areas of Tahltan concern (example: trails and traditional use site locations), and assessed archaeological potential following the Archaeology Branch's (2008) provincial standards and guidelines. The objectives of archaeological potential modeling were to develop a set of criteria, or rules, to describe places where archaeological sites are most likely to occur, and to apply those rules across the project area. In the absence of extensive probabilistic archaeological inventory data, model construction generally relies on existing archaeological site data, TUS data, and the collective expertise of the study team and First Nations participants.

An archaeological potential model was created for the project area based on information collected during the background review. This information was obtained from a number of sources including: previous heritage studies conducted in the region and project area (in particular Arcas, 1991; Aresco, 1982; Golder, 2005; Madrone, 2007; Millennia, 1998a and 1998b; Simonsen, 2002a, 2002b, 2005, and 2006); reports on local biogeoclimatic and environmental attributes (Clague, 1985 and 1989; Fulton, 1989; Holland, 1964; Miller and Anderson, 1974; Pojar, Klinka, and Demarchi, 1991; Souther, 1970); ethnographic information on aboriginal settlement patterns (Albright, 1984; Duff, 1964; Emmons, 1911; Teit, 1906, 1912-

15, 1956; Friesen, 1983 and 1985; MacLauchlan, 1981); historic information on European settlement and land-use (Akrigg & Akrigg, 1975; Black, 1955; Newman, 1995; Thompson, 2007); and topographic maps.

Based on this background review, the following variables were chosen for model construction: forest and vegetation cover, slope, proximity to water features, Traditional Use Site (TUS) data, proximity to heritage or game trails, travel passes, proximity to glacier margins, high value moose habitat, fishbearing streams and/or waterbodies, proximity to previously recorded sites, aspect, and exposure to sunlight (see Table 1 below). Each distinct criterion was given a value; these values were combined via GIS raster calculation to determine a score for each distinct 'pixel' (20 m x 20 m unit) within the underlying TRIM data. With these scores, minimum (-20) and maximum (44) limits were set for each raster cell. After ground truthing a preliminary version of the model (Revision 2), the values of each of these variables were reassessed and the model revised to reflect what was observed in the field (Revisions 3 and 4). The criteria used in model construction, the initial values of each variable applied, and the revised sets of values ultimately applied to the model are presented below in Table 1.

Table 1. Criteria used for the Cassiar FDU model with associated values.

<u>Positive Factors</u>	<u>Revision 2 Score</u>	<u>Revision 3 Score</u>	<u>Revision 4 Score</u>
Forest cover age class 8 or 9 (species other than balsam/spruce)	5	5	5
Pine forest cover age class 8 or 9	5	7	10
Slope less than 10%	5	5	5
Trail within 500 m	5	5	5
Lake within 200 m	5	5	5
Double line watercourse within 200 m	5	5	5
Named watercourse within 100 m	5	5	5
Pass (high or low) or travel corridor within 100 m	5	5	5
Previously recorded site within 100 m	5	5	5
Confluence of named creek with double lined watercourse (200 m inland and 100 m from confluence)	5	5	5
Southern exposure of landform is S, SE, SW	5	7	5
Glacier margin within 200 m	5	5	5
Traditional Use Site (TUS) site location within 200 m	3	3	3
Other watercourses, including wetlands within 100 m	3	3	3
Previously recorded site within 500 m	2	2	2
<u>Negative Factors</u>	<u>Revision 2 Score</u>	<u>Revision 3 Score</u>	<u>Revision 4 Score</u>
Slope greater than 100%	-10	-10	-10
Forest cover indicating NCB or poorly drained soils (floodplain deposits)	-10	-10	-10
Balsam/spruce forest cover age class 8 or 9	0	-5	-10
Slope greater than 40% and less than 100%	-5	-5	-5

Using these model parameters (variables) the project area was classified into pixels of binary archaeological potential based on slope, aspect, and the presence or absence of specific landforms such as terraces and knolls. Areas with southerly, southeasterly, or southwesterly aspects were considered favorable for habitation sites, as they tend to have greater exposure to sunlight. A predominantly pine forest cover was considered favorable because it generally indicates sandy and well drained sediments. Areas with slopes of less than 10% were also considered favorable to most archaeological sites, especially on landforms within close proximity to known watercourses. These areas (raster cells) resulted in a model score within the range of 44 to 14. These archaeological potential areas are presented in the model maps as either pixels of red, orange, or yellow, differentiating between high, high-moderate, and moderate potential (Figures 3-19).

In contrast, those areas subject to extensive land disturbances, in areas of slopes greater than 100%, and areas containing balsam/spruce forest cover or vegetation indicating poorly drained soils including basaltic lava and bedrock, are considered less favorable for human habitation. These low potential areas are presented in

Figures 3-19 as the color green, and resulted in a range of values between 13 and -20.

Preliminary Field Reconnaissance

A Preliminary Field Reconnaissance (PFR) was conducted in selected areas of the project to verify the accuracy of the model, and also to document and record the presence or absence of cultural features. Detailed results of the PFR are reported on in the Archaeological Impact Assessment (AIA) reports, submitted to Cassiar (Kleanza, 2010a, b). An initial evaluation of the model was undertaken in Blocks 1, 2, 12, and 13 (Figure 2, 20-23). Survey coverage of the PFR is presented in Figures 20-23, and detailed results of the waypoint are presented in Appendix 2. Further evaluations of the model were made in subsequent visits to the project area (Kleanza, 2010a, b).

The orientation of transects paralleled natural topographic features such as terrace edges, benches, or ridges present in the survey areas, and/or along pre-determined arbitrary bearings and block boundaries. Crew-members were spaced from 5-35 meters apart depending on the relative archaeological potential of the zone. Regardless of archaeological potential; however, spacing between crew-members did not exceed 35 meters.

As transects were walked, crew-members looked for pre-contact and/or historic cultural remains and features including depressions, culturally modified trees, blazes, snares, trail beds, scatters of lithic (stone) detritus or artifacts, fire-altered rock, bone, historic refuse or structural remains. Additionally, other more unique cultural remains such as rock art, human burials, fish weirs, or canoes were also sought. Ground surface exposures such as erosional banks, road cuts, and tree throws were examined where possible.

Efforts were made to systematically record a GPS waypoint every 100 m along transects walked by members of the crew. Transects were chosen judgmentally by the crew, frequently along block boundaries, topographic and hydrological features, and also in low potential areas. At each of these 'model evaluation' points, detailed notes were documented for each area, including descriptive information on the landform, vegetation, in-field potential, and a photographic record was also kept. These model evaluation points were later entered into an excel spreadsheet, and used to compare with the current model potential and model parameters (see Appendix 2). An arbitrary separation between low and high archaeological potential was made between the model values (using the median value) in order to evaluate a preliminary version of the model. By applying this method, crew-members were able to visit areas that scored both low and high model values and assess to assess how accurately the model reflected what was observed in the field.

Model Evaluation

The PFR results, as mentioned above, were used to verify the accuracy and validity of the model, and model variables were adjusted to agree with what was observed in

the field. Known archaeological sites, potential shovel test locations, possible travel corridors and hunting grounds, as well as unfavorable areas judged to possess low archaeological potential were all considered when altering the variables of the model. Using this approach, knowledge of both the archaeologists and First Nations representatives were incorporated into the model. It is worth noting that the accuracy of the digital elevation model (DEM) employed was not precise enough to identify micro-topographic features within the project area. The model could not distinguish smaller features that were observed in the field, and this will be a limitation inherent in the model until a more accurate DEM is acquired.

CMT Sites

According to the Archaeology Branch (2008) CMT sites must be modeled for separately from other site types. Only pre-1846 CMTs are to be modeled, and must be submitted as a separate GIS layer. A model was not created specifically for CMTs; however, following these guidelines, areas with pine, cedar and western hemlock forest cover indicating age class 8 or higher should be considered as potential locations for pre-1846 CMTs.

Reporting

A draft report and model output were prepared for Cassiar and the Tahltan to allow for a review and comment prior to submission of the final report. This report adheres to the standards of the AIA (Archaeology Branch, 1998) and AOA guidelines (Archaeology Branch, 2008).

Background Review

The following section provides a general introduction with descriptions of a broader regional setting for the project area, with a brief summary of biogeoclimatic and environmental factors for the region, followed by a brief introduction to the cultural historical data for the Tahltan, a description of transportation and trade and its importance to the region, historical background and previous archaeological studies.

Location and Physiography

The Cassiar FDU area is located approximately 100 km south of Iskut BC, and is located along the Iskut and Ningunsaw River valleys near Bob Quinn Lake, in northwestern BC (Figure 1). The project area's western boundary follows the eastern bank of the Iskut River, stretching from Estshi Creek in the south, to approximately 20 km north of the confluence of the Iskut and Ningunsaw Rivers. The project area stretches east from the Iskut River, to encompass the area surrounding Bob Quinn Lake and the Ningunsaw River valley.

The project area is within the Physiographic Region of the Boundary Range within the Coast Mountains (Clague, 1989) in a geographic area referred to as the Stikine Plateau (Holland, 1964). During the late Pleistocene (17,000 to 11,000 years before

present (BP)), an ice sheet covered the Stikine plateau, rounding the ridges and summits of former mountains below approximately 1830 m in elevation and depositing a layer of glacial drift (Holland, 1964). Only the highest mountain peaks protruded above the two kilometre thick sheet of ice (Clague, 1985). Crossing the plateau were a number of rivers that preceded the Pleistocene, and formed the main drainage routes for the westward movements of ice. Mt. Edziza, the highest peak (2813 m) was formed during the pre-Pleistocene due to lava and ash eruptions that poured out over the area, the flanks of the mountain were buried under an extensive ice-field (Fladmark, 1985). The base of the mountain has provided sources of good quality obsidian for stone tool technologies for thousands of years (Albright, 1984). Lava extrusions, cinder cone construction, and tephra discharges in the region, have continued up until the late Holocene (Souther, 1970). Fladmark (1985) notes at least 10 recent cinder cones around the flanks of the main peak, each of which could have contributed to pyroclastic and tephra deposits to the surrounding areas. These tephra deposits are considered to be one of five specific and important archaeological issues to the Tahltan.

During the Holocene (11,000 BP to present), volcanic activity continuously affected the geography of the area. Scattered eruptions of cinder cones, have caused sudden changes in several drainages in the Mt. Edziza area, such as the lacustrine terraces of Mess Creek, and the Klastline River, which marks the former extent of the now dry lava dammed lakes that persisted for hundreds of years and may have influenced the locations of early campsites (Albright, 1984). More specifically, in the Iskut River valley, lava flows have dammed both the Iskut River and Forrest Kerr Creek during two separate volcanic intervals, one at 8780 ± 150 BP and another at about 4000 to 5000 BP (Souther, 1970). This volcanic activity may have attributed to the absence of salmon in the upper Iskut and Forrest Kerr Creek (Albright, 1984; Souther, 1970).

Deglaciation was likely well advanced by 10,000 BP and the region was potentially habitable by humans by at least 9,500 BP (Fulton, 1989; Millennia, 1998a). Holland (1964) reports that drumlin-like features in the plateau areas mark the northward retreat of glacial ice, suggesting that the middle Stikine area was ice free earlier than the Atlin region (Albright, 1984).

Environmental stabilization of the region is thought to have occurred approximately 5000 years ago (Fladmark, 1975), and the archaeological record is thought to be at least 10,000 years old. Despite the relative stability, people living near the flanks of Mt. Edziza would have had to contend with fluctuations in climate, movement of ice, and fiery activities of an active volcano (Fladmark, 1985). Following deglaciation, landscapes would have initially been dominated by herbs and shrubs that were adapted to cool-dry environments (Clague, 1989). Miller and Anderson (1974) report cool-dry conditions prior to 8000 BP, leading into the warmer "Thermal Maximum" period between 8000 and 3000 BP. This was followed by the Neoglacial with increased storminess and cooler, dryer conditions by about 2500 BP. This process resulted in first a receding of glaciers during the Hypsithermal (with mean

temperatures about 2 degrees warmer than present), then a re-advancement, culminating with the “Little Ice Age” within the last 200-350 years.

Modern day climate for the region is influenced by the Interior Cedar – Hemlock zone, which contains the most productive forests of BC’s Interior, and more tree species than any other ecological zone. Abundant rain and heavy winter snows, warm summers and cool, wet winters characterize the zone with Western red-cedar or Western hemlock as the dominant species; while Ponderosa pine, Douglas Fir, western larch, lodgepole pine, and western white pine can also be found (Pojar et al., 1991). The mountain Hemlock zone is the subalpine zone above the Interior Cedar-Hemlock zone and is characterized by short, cool summers and long, wet winters (Pojar et al., 1991). Mountain hemlock, Amabilis fir, and yellow cedar are the most common tree species. A distinct microclimate exists at lower elevations within the project area; the large size of the Stikine River valley allows warm westerly systems to penetrate the area while successive mountain ranges help block cold air entering from the north and east (Albright, 1984).

The valley of the Lower Iskut (as zoned in the Cassiar Iskut-Stikine Land and Resource Management Plan) is broadly u-shaped, the river mostly a wandering gravel bed, which in the upper reaches (entering into the southern end of the Middle Iskut zone) are incised through basaltic lava flows forming a steep canyon with swift water flows (Rabnett, 2008). A Holocene volcanic eruption resulted in the deposition of a massive basaltic lava flow on the south side of the Iskut River at Volcano Creek (Arcas, 1991; Simonsen, 2002a, and 2002b; and Souther, 1970). In its lower reaches, the Ningunsaw River valley is similar to that of the Iskut, with a u-shaped profile and a wide gravel bed (Photograph 1). Closer to its headwater, the Ningunsaw forms a narrow, v-shaped valley.



Photograph 1. The Ningunsaw Valley.

The u-shaped profile of the Iskut and Ningunsaw river valleys are typical of a periglacial environment with broad valley bottoms and steep valley sides, indicating significant glacial advance in this area. Numerous elongated and north-south oriented lakes that parallel the Iskut River indicate glacial scouring of the valley floor. Bob Quinn Lake is an exception in that it is larger and roughly ovoid, suggesting an origin other than scouring through glacial advance like other nearby lakes. Another remarkable local feature is the valley of Devil Creek, a steep and rocky v-shaped valley that forms a natural barrier to the west of the Iskut River (Photograph 2). Before construction of the highway, this fast flowing creek likely would have restricted north-south movement through the area.



Photograph 2. Devil Creek.

Culture History

The following section includes a brief culture history for the Tahltan First Nations, including a brief summary of Tahltan seasonal round and the types of archaeological sites to be expected in Tahltan territory. This is followed by a brief historical background review of European contact, and settlement in the Stikine region. A discussion follows on previous archaeological studies in the region and project area.

Tahltan First Nations

As stated previously, the project lies within the traditional territory of the Tahltan First Nation. Detailed historic ethnographic accounts of the Tahltan can be found in Emmons (1911), Teit (1912-15; 1906; 1956) and Thomson (2007). Later research conducted by Silvia Albright (1984) and Bruce MacLachlan (1981) provides informative ethno archaeological and ethnographic accounts, as summarized below.

The Tahltan are geographically situated between the Coast and Cassiar Mountains, occupying the high plateau of the subarctic cordillera. Tahltan territory stretches from the Stikine River drainage, south to the Iskut River, Dease Lake and River, including the Cottonwood River and upper Rancheria River, bounded in the south by the Nass and Skeena Rivers. Tahltan territory includes several tributaries of the Teslin and Taku Rivers (Emmons, 1911; Teit, 1956; Albright, 1984.)

The Tahltan adapted to living in the cold winter environment of the Stikine Plateau by utilizing hides and furs for warm clothing, which were efficiently procured from animals also used as food (Albright, 1984). Houses were constructed of wood and bark to provide shelter. Tools were formed of wood, bark, lithic materials, and animal bi-products (including bone, antler, horns, and teeth). The flesh of the caribou, moose, buffalo, sheep, goat, bear, lynx, beaver, marmot, porcupine, ground squirrel and rabbits were considered valuable for food (Teit, 1956). Fresh water fish of all kinds, birds such as grouse, duck, geese, swans, and a few other large birds were consumed (Teit, 1956). The Tahltan diet was supplemented by a variety of plant foods, such as roots, berries, and cambium from the hemlock, aspen, and lodgepole pine trees.

Detailed knowledge and understanding of the environment, seasonality of each resource was necessary in order to make decisions about how and when to hunt and gather each resource when they were available (Albright, 1984). The Tahltan were semi-nomadic in their yearly round of subsistence activities, with a pattern of congregation at summer and winter village sites, and dispersal into smaller family groups during the spring and early fall (Albright, 1984).

Albright (1984) uses ethnographic and environmental data to determine the archaeological remains and site types, which are most likely to be expected in the region. She concludes that since most of the material culture used by the Tahltan was made of organic materials, site visibility depends on the accumulation of lithic materials from stone tool use. The greatest concentration of stone tools and debris results from butchering and processing fish, meat, and hides in proximity to habitation structures at major camps; whereas, the procurement of plant resources, smaller mammals and birds, or kill sites of individual large game animals leave little to no archaeological evidence (Albright, 1984). In a boreal forest environment with acidic soils, bone preservation is generally poor; and only the burning of bones in a campfire would aid in its preservation. Round pits excavated into the ground for storage, also referred to as cache pits; were located in the vicinity of the fishing villages. These were used to store large quantities of dried salmon and other dried foods for later use during the winter. Albright (1984:103) expects that the following types of sites would provide the most obvious archaeological visibility (order is from greatest to least visibility):

1. Historic villages and camps with standing structures,
2. Villages and camps with metal from historic/protohistoric occupation,
3. Quarry sites such as those in the Mt. Edziza area,
4. Camp sites in quarry vicinity where reduction activities take place,
5. Major fishing villages, occupied for extended periods of time by large numbers of people,
6. Trading camps occupied by large groups of people, generally at location of resource abundance,
7. Major winter camps, occupied for extended periods of time,

8. Seasonal camps of one to several weeks occupation, e.g. Fishing lakes, marmot snaring camps at timberline,
9. Trail networks,
10. Temporary camps,
11. Other plant procurement or kill sites.

Transportation and Trade

Aboriginal transportation routes and trade of economic resources were vital to the survival of both the early and historic inhabitants of the Stikine region. Trails formed the travel and communication networks of the region; allowing people to travel, trade, interact, and access hunting, fishing, trapping and gathering areas (Carlson & Mitchell, 1997). These ancient pathways, with both major and minor trails, linked and joined the landscape, with at each juncture, a village or camp (Hooper, 1999). Trails often began as travel corridors, which over time were revised slightly by their users until the most efficient, stable and most easily traveled routes were developed (Marshall, 2003). Centuries of foot travel along these routes resulted in well-defined and compacted soil impressions that spanned the province from end to end. In fact, many of these same routes have eventually become the asphalt commuter routes that many of us use today; for example, portions of the Telegraph Trail have become portions of the Stewart-Cassiar Highway (Highway 37 North) (Newman, 1995).

Very few trails have been documented in the region, with the exception of portions of the Telegraph Trail (Kispiox Forest District, 1995; Newman, 1995); as well as sections of the McEwan Creek – Hyland Post Trail, and the Klappan North Trail (Golder, 2008). A potential trail was mentioned by Chief Louie, which runs up the Ningunsaw River, crossing into the headwaters of the Unuk River via Teigan Lake (Arcas, 1991; Kleanza, 2009). During an AIA of the Forrest Kerr Hydroelectric Project conducted by Kleanza in 2009, a trail was identified running along the north bank of the Nigunsaw River, just east of its confluence with the Iskut River and is considered the trail mentioned by Chief Louie.

Both the Millennia (1998a, 1998b) reports and Emmons (1911) describe the importance of trails and the use of foot travel by Tahltan people. Emmons (1911) describes how people rarely used the rivers and streams for transportation, other than to cross, and describes the Tahltan as land travelers, either on foot or facilitated by the use of dog sleds.

Given the central location of Mt. Edziza obsidian, trails could have funneled into the area from surrounding regions, to facilitate the trade of this valuable lithic material. Typically the most likely locations for trails in the region would be along travel corridors already established by migrating animals such as deer, moose or bears. These travel corridors would likely follow either the upper or lower terraces of major waterways, or may follow the high altitude alpine ridges where it is easiest to walk between one mountain peak to the next; or from one valley to another. These

considerations are essential components of an archaeological predictive model, as trails aid in the location of other archaeological sites. The Tahltan consider both trails, and the location of Mt. Edziza obsidian, and how they relate to each other in terms of a regional trade networks very important to the Tahltan archaeological record.

Historical Background

A brief historical review of the region suggests that European contact and development in the region was relatively late compared to other portions of the province. European ships first arrived at the mouth of the Stikine River in 1799, and trade goods were distributed throughout the region prior to actual contact with European traders (Emmons, 1911). With the sharing of goods came the dissemination of foreign disease, which had a significant effect on the Tahltan population (Duff, 1964). Samuel Black arrived in the area in 1824 and was the first European to traverse the upper reaches of the Stikine via the Finlay and Tooodogone rivers (Akrigg & Akrigg, 1975; Black, 1955).

The Dominion Telegraph Line was constructed between 1899 and 1901, after the discovery of gold in the Yukon to facilitate communications with Vancouver and Europe (Miller, 2004). The line was in operation between 1901 and 1936, with telegraph operators stationed at cabins along the line for maintenance (Kispiox Forest District, 1995; Miller, 2004). The line followed the route of the unsuccessful Collins Overland Telegraph Line, which began construction in 1865 (Newman, 1995; Kerr, 1997). Portions of the trail were once a major aboriginal trade route that moved obsidian south and Russian trade goods from Fort Dionysius into the Upper Skeena and Nass River areas (MacDonald and Cove, 1987).

The Telegraph Trail traverses a roughly north-south corridor from the northern limit of the project area to the area north of the Ningunsaw River where it intersects with Highway 37. The trail transects or is in potential conflict with Blocks 4, 5, 8, 9, 21, 22, 29, 30, 31, 32, and 33. Although overgrown throughout the northern portion of the project area, portions of the trail and/or telegraph wire were observed in or adjacent to Blocks 4, 5, and 8 (Photograph 3). The Tahltan expressed concern that construction of the trail occurred on preexisting aboriginal trails (Newman, 1995). Given the straight and even nature of the trail in Blocks 4, 5, and 8, and the steeply sloped terrain and lack of topographic features in this area, it seems unlikely that this is the case in the vicinity of these blocks. No potential travel corridors or evidence of pre-contact use of this area was observed during survey. Nevertheless, it is plausible that aboriginal trails were used in the construction of the Telegraph Trail, and the location of the present day highway seems a more likely location for a travel corridor than the steeply sloped valley walls observed during the PFR.



Photograph 3. Telegraph Wire along the Dominion Telegraph Trail.

Apart from a small amount of mining and forestry development projects, the region remains relatively untouched and isolated from large-scale non-native populations and economic development. Several archaeological investigations have been conducted, in response to proposed development projects, which have resulted in the recording of many archaeological sites in the region.

Previous Archaeological Studies

The following section presents previous archaeological investigations and studies for the area, beginning with those from a broader regional context, and secondly presenting project specific studies with relative findings.

Archaeological investigations in the Stikine Region began in the late 1960's, early 1970's with two inventory surveys conducted by archaeologists Helmer & Mitchell (1972) for the BC Dease Lake extension project. In 1978, French (1980) conducted a heritage study of the Stikine River Basin. In 1977 and 1981, Fladmark conducted investigations in the vicinity of Mt. Edziza and the Spectrum Ranges (1985). Between 1979 and 1981, several studies were conducted in the Upper Stikine, Iskut and Klappan Rivers with regards to the Site 'Z' Stikine/Iskut hydroelectric project (Aresco Ltd., 1980, 1982 & 1983; I.R. Wilson Consultants Ltd., 1984; Magne 1982; Points West, 1981). Aresco (1982) reported the discovery and recording of a collapsed trappers cabin site (HeTq-1), just outside of the project area.

In 1982, Friesen (1983) conducted an archaeological inventory survey of the Upper Stikine River Basin and Spatzizi Plateau, followed by his Masters thesis (1985) on aboriginal settlement patterns in the Upper Stikine River drainage. In 1985, investigations were conducted for the Mt. Klappan Coal Project by Simonsen (1986), and further AIAs were conducted by Aresco (1986). In 1987, an AIA was conducted of the proposed Sulphurets project by Points West Heritage Consulting Ltd. (Points West, 1987). In 1988, an AIA was conducted by Ham (1988) of the SNIP Project located near the confluence of the Iskut and Craig Rivers.

In 1996, I.R. Wilson conducted an AOA for the Iskut Forest Development Plan area, and in 1998 for the Iskut-Stikine Land and Resource Management Plan (LRMP) study area (IR Wilson, 1996; 1998). AOA and AIA reports by I.R. Wilson Consultants Ltd. (1995), and Bjorn Simonsen (1986 & 1997) were also reviewed as part of the broader regional context.

Hall and Prager (2004; 2006) conducted preliminary investigations for the Galore Creek Mine Project. More recently, Rescan (2008; 2009) completed an AIA and subsequent archaeological monitoring as part of the Galore Creek Project, and recorded twenty-three archaeological sites (HgTo-1 to 18, HgTs-4 and 5, HgTr-3 and 4, and HhTt-1). These sites were all lithic sites ranging from low to high significance. Eleven obsidian samples from the sites were all sourced to originate at Mt. Edziza (Rescan, 2008).

Golder Associates Ltd. (2005) completed an Archaeological Overview of portions of the Highway 37 Upgrade, to the east of the project area. This resulted in the identification of several areas of archaeological potential, with recommendations for further AIA work in proximity to the Ningunsaw River and along sections of the Telegraph Trail.

In 1990, an AOA was completed by Arcas Consulting Archaeologists Ltd. (1991) of the proposed Iskut Mine Road. Results from this overview suggests that the area is of an overall low to no archaeological potential due to steepness of slope and subsurface drainage, with a field reconnaissance of the proposed road resulting in the discovery of no archaeological sites. Both banks of the Ningunsaw River, between the road crossing and the Iskut River were surveyed (Arcas, 1991). This location was considered to be of moderate to high archaeological potential following meetings between Arcas and the Iskut Band members which indicated that the Ningunsaw may have been utilized by the Tahltan, containing small campsites for those traveling up the Iskut River and overland to the Klappan and Spatzizi Plateau for hunting (Arcas, 1991). Iskut members also indicated the valley may have been utilized for trapping; but that in general the valley was considered poor in traditionally exploited resources and difficult to access (Arcas, 1991).

Bjorn Simonsen (2002a; 2002b) and Monty Mitchell (Madrone, 2007) conducted archaeological studies for the Forrest Kerr Hydroelectric Project. Neither study found evidence of archaeological resources or features and conclude that the

potential to contain yet undiscovered subsurface archaeological sites or features within the project footprint is very minimal. Simonsen (2005; 2006) notes moderate to high potential for CMT features near the Ningunsaw crossing.

In 2009, Kleanza conducted an AIA of the proposed revisions to the permitted Forrest Kerr Hydroelectric Project, located to the east Iskut River from Forrest Kerr Creek to Bob Quinn Lake area (Kleanza, 2009a). Prior to commencing the AIA, Kleanza conducted an AOA of the project (Kleanza, 2009b). Two archaeological sites were identified during Kleanza's AIA, HeTp-1 and HfTn-2. HeTp-1 is located south of the confluence of Forrest Kerr Creek and the Iskut River, well outside the current project area, and consists of a single circular cultural depression. HfTn-2 consists of a clearly defined trail following the east bank of the Ningunsaw River and is located within the Cassiar FDU area, and will be discussed in detail in the section below. During the AIA several areas of moderate and high potential were noted near the Iskut Rivers confluence with Estshi Creek and Ningunsaw River. Higher elevation areas to the east of the Iskut River valley were generally noted to have low archaeological potential due to uneven, rocky and steep terrain.

Results

The background review of the overview assessment formed the context and basis of the archaeological potential model. Results of the overview and modeling are presented below.

Archaeological Sites

A review of known, recorded archaeological sites was conducted through the Remote Access for Archaeological Data (RAAD) database, administered by the Archaeology Branch (1999). Eight recorded archaeological sites are located within, or on the boundary of, the project area (HfTn-1, HfTn-2, HgTo-5, HgTo-6, HgTo-7, HgTo-8, HgTo-9 and HgTo-13). Eighteen recorded archaeological sites are located within 10 km of the project area (HcTl-2, HcTl-1, HeTk-3, HgTo-1, HgTo-2, HgTo-3, HgTo-4, HgTo-10, HgTo-11, HgTo-12, HgTo-14, HgTo-15, HgTo-16, HgTo-17, HgTo-18, HgTo-19, HgTo-20, HgTo-21).

HfTn-2

HfTn-2 was recorded in November 2009 by Kleanza Consulting during an AIA of the proposed revisions to the permitted Forrest Kerr Hydroelectric Project. Approximately 1 km of trail was recorded, running along a level bench, 10 -20 m east of the Ningunsaw River, just east of its confluence with the Iskut River (Figure 1). The trail appears to extend in both directions beyond the recorded area. The trail was easy to follow, with a well-defined trail bed apparent along most of its route and was clearly marked with yellow and black flagging hung along its center-line and GPS waypoints. Tahltan elder Chief Louie asserts that an old aboriginal trail runs up the Ningunsaw River and crosses into the headwater of the Unuk River via Teigen Lake (Arcas, 1991:114). It is possible the trail recorded during Kleanza's 2009 AIA was part of this same route. Further communication with THREAT personnel

indicates that the Ningunsaw trail that Chief Louie spoke of predates 1846, and that further confidential TUS information on this trail is held at the Iskut Band Office. This site is therefore, considered protected under the *Heritage Conservation Act*.

HfTn-1

HfTn-1 is located southeast of Bob Quinn Lake, on the south end of Echo Lake (Figure 1). This site was originally recorded in 1973 by Paul St. Pierre during the Department of Highway Archaeological Survey (Robinson and St. Pierre, 1973). HfTn-1 was revisited in May in 2009 by Rescan Environmental Services during an AIA of BCTC's proposed Northwest Transmission Line project (Archaeology Branch 2009). The site consists of two small cabins associated with the Dominion-Yukon Telegraph Line. Robert Quinn, a telegraph lineman, apparently lived in these cabins ca. 1920 (Archaeology Branch, 2009). A small campsite and possible duck blind was recorded at the site in 1973 and four fragments of an obsidian projectile point were collected. The cabins have been reported to be in poor condition from 1973 onwards, being partially collapsed and submerged in the lake. Rescan recommended these cabins be avoided during their 2009 AIA, as the Yukon-Dominion Telegraph line was being considered for entry into the Regional District of Kitimat-Stikine's Community Heritage Register and the site may be further protected under local by-laws. Regardless, HfTn-1 is considered a protected archaeological site under the *Heritage Conservation Act*.

HgTo-5

HgTo-5 is a surface and sub-surface lithic site located directly along the project area's west boundary, approximately 380 m north of the confluence of the Iskut River and More Creek (Figure 1). This site was recorded in 2007 during Rescan's archaeological monitoring portion of the Galore Creek Project (Rescan, 2008, 2009). Six obsidian and eleven andesite flakes, and one chopper and 32 flakes of unidentified material were collected from this 92 m by 55 m site during shovel testing and surface collection.

HgTo-6

HgTo-6 is a surface and sub-surface lithic site located just north of HgTo-5, along the project area's west boundary approximately 580 m north of the confluence of the Iskut River and More Creek (Figure 1). This site was recorded in 2007 during Rescan's archaeological monitoring portion of the Galore Creek Project (Rescan, 2008, 2009). A total of 821 andesite flakes, two andesite choppers, two andesite grindstones, and two pieces of fire-cracked rock were collected from shovel tests, an excavation unit, and as surface finds at this time. HsTo-6 measures 19 m by 13 m in size.

HgTo-7

HgTo-7 is a surface and sub-surface lithic site located along the project area's west boundary, approximately 710 m north of the confluence of the Iskut River and More Creek (Figure 1). This site was recorded in 2007 during Rescan's archaeological monitoring portion of the Galore Creek Project (Rescan, 2008, 2009). A total of 190 andesite flakes and one piece of fire-cracked rock were collected from surface and

subsurface components of this site. HgTo-7 measures 100 m by 40 m in size. The top 10-20 cm of this site has been disturbed by the construction of the Galore Creek Road.

HgTo-8

HgTo-8 is a surface and sub-surface lithic site located directly along the project area's west boundary, approximately 830 m north of the confluence of the Iskut River and More Creek (Figure 1). This site was recorded in 2007 during Rescan's archaeological monitoring portion of the Galore Creek Project (Rescan, 2008, 2009). Six obsidian flakes and one, retouched obsidian flake were collected from this 19 m by 13 m site.

HgTo-9

HgTo-9 is a surface lithic site located directly along the project area's west boundary, approximately 1.2 km north of the confluence of the Iskut River and More Creek (Figure 1). This site was recorded in 2007 during Rescan's archaeological monitoring portion of the Galore Creek Project (Rescan, 2008, 2009). This site has been completely destroyed by road construction, and no artifacts remain. One obsidian projectile point and 11 andesite flakes were collected from this 29 m by 12 m site during monitoring.

HgTo-13

HgTo-9 is a sub-surface lithic site located directly along the project area's west boundary, approximately 950 m north of the confluence of the Iskut River and More Creek (Figure 1). This site was recorded in 2007 during Rescan's archaeological monitoring portion of the Galore Creek Project (Rescan 2008, 2009). Fifteen obsidian flakes were collected from a 6.5 by 5 m area during systematic shovel testing. The site was undisturbed and in good condition, and avoidance was recommended by Rescan.

Recorded Sites within 10 km of the Project Area

In addition to these eight sites recorded within, or on the boundary of, the project area, eighteen additional recorded archaeological sites are known within 10 km of the project area.

HgTo-1, HgTo-2, HgTo-3, HgTo-4, HgTo-10, HgTo-11, HgTo-12, HgTo-14, HgTo-15, HgTo-16, HgTo-17, HgTo-18, HgTo-19, HgTo-20 and HgTo-21 are located to east of the project area along More Creek, and to the east of the confluence of More Creek and the Iskut River. These sites were all recorded as part of the Galore Creek Project (Rescan, 2008, 2009) and consist of subsurface and surface lithic scatters.

HeTl-2 and HeTk-3 are both historic telegraph cabins dating to 1897 AD. These sites are located south of the project area adjacent to Highway 37 and were recorded in May 2009 by Rescan Environmental Services during an AIA of BCTC's proposed Northwest Transmission Line project (Archaeology Branch, 2009). Culturally notched trees are associated with both cabins. Rescan recommended these cabins be avoided during their 2009 AIA, as the Yukon-Dominion Telegraph line was being

considered for entry into the Regional District of Kitimat-Stikine's Community Heritage Register and the site may be further protection under local by-laws.

HeTl-1 is located in close proximity to HeTl-2, south of the project area near Highway 37 (Figure 1). This site consists of two bark stripped hemlock CMTs dating to ca. 1828-1838. HeTl-1 was recorded by Golder Associates in 2006 during an AOA of the Upper Bell-Irving Watershed (Golder, 2008).

Archaeological Potential Modeling

Results from the archaeological potential model reveal variable ratings for the project area, with parameters ranging from a score of -20 to 44 (Figures 3-19). A value of 14 was chosen as the dividing line between archaeological potential and low potential, through professional judgment. Raster cells with a score of 14 or higher are considered to be of high archaeological potential. Within this range of 14 to 44, pixels are presented in Figures 3-19 using varying degrees of red, orange, and yellow to reflect a graduated scale of high, high-moderate, and moderate potential.

Raster cells with a score of 13 to -20 are considered to be of low archaeological potential.

Model Effectiveness

According to the Archaeology Branch (2008) AOA models must capture at least 70% of known archaeological site locations within areas of archaeological potential to be accepted by the Province. Unfortunately, our project area only contains 8 known recorded sites within or on the boundary. Revisions were made to the model after field crews evaluated areas identified as possessing low, middle range and high archaeological potential by the model. In this case, there are few known sites within the study area boundaries, and only future examination via pedestrian reconnaissance will determine the validity of the model. Until then, professional judgment is relied upon on using topographic maps, aerial photographs and PFR results as a backdrop for control, and knowledge of potential based on professional experience.

As noted above, the DEM employed in the model could not recognize micro-topographic features and there is a possibility that small features are present in areas the model has classified as having low archaeological potential. Some of these features could be reassessed as possessing high archaeological potential during field reconnaissance.

PFR Results

The field assessment of Blocks 1, 2, 12, and 13 revealed no new archaeological sites, but did result in slight changes to the model to reflect observations in the field. Overall it was felt that the model was over estimating areas of archaeological potential in forests containing a spruce/balsam component. In addition to this, areas with a south facing aspect adjacent to swamp features were given additional weight in the model to increase their predicted potential. More detailed results of the PFR

and subsequent assessments of the model can be found in Kleanza's AIA and PFR reports (Kleanza 2010a, b).

Block 1

Block 1 is located approximately 250 m northwest of Desiree Lake and 750 m east of the Iskut River (Figure 20). This block was selected for survey mainly because the model interpreted archaeological potential in the east portion of the block close to Desiree Lake. The terrain in this block is undulating with some steeply sloping sections. Relatively level sections of the proposed block are poorly drained and no distinct topographic features are present. Forest cover consists primarily of Englemann spruce, subalpine fir, hemlock, and alder, while devil's club, salmonberry, and elderberry make up the understory (Photograph 4). Based on the results of the PFR, the model was adjusted slightly to decrease the value of stands with a spruce/balsam component, which decreased the overall potential of the block to better reflect archaeological potential as observed in the field.



Photograph 4. Vegetation reflecting an overall low archaeological potential in Block 1.

Block 2

Block 2 is located approximately 750 m east of the confluence of the Iskut and Ningunsaw Rivers (Figure 21). This block was selected for survey because it is

located on the high terrace of the Ningunsaw River and because a potential trail or travel corridor was considered present along or adjacent to the western block boundary. Field observations confirm that the topography of Block 2 is dominated by the high terrace of the Ningunsaw River. This feature is undulating with some relatively level sections. Numerous small drainages incise this feature, with overall drainage being generally poor. The terrace has a south aspect and slopes steeply down to the river. Forest cover consists primarily of Englemann spruce, subalpine fir, hemlock, and alder, with some lodgepole pine in well drained areas. Devil's club, salmonberry, and ferns make up the understory. Three areas of high archaeological potential were identified in this block, and the remainder was considered to be of low potential (Photograph 5). Field observations were reasonably consistent with the model, and subsequent changes to the model did not change these results.



Photograph 5. Generally sloping terrain indicative of low archaeological potential in Block 2.

Block 12

Block 12 is located approximately 250 m north of the Ningunsaw River (Figure 22). This block was selected for survey because it is located on the high terrace of the Ningunsaw River, and exhibited an overall moderate potential with some high potential in the southwest section. Topography in Block 12 is also dominated by the high terrace of the Ningunsaw River. This terrace is undulating with some relatively level sections that display poor drainage. One section of the terrace was relatively

level and moderately well-drained, and a small knoll was situated at this location (Photograph 6). Overall the terrace has a southern aspect and slopes steeply down to the river. Forest cover consists primarily of Englemann spruce, subalpine fir, hemlock, paper birch, and alder, with some lodgepole pine in well drained areas. Devil's club, salmonberry, and ferns make up the understory. One area of high archaeological potential was identified in this block on a microtopographic feature not identified by the model. Subsequent changes to the model resulted in an overall lowering of potential for the block, but continues to display high potential in the western section as well as a bit of potential in the central and northeast portion of the block.



Photograph 6. Small knoll exhibiting high archaeological potential in Block 12.

Block 13

Block 13 is located approximately 800 m south of Bob Quinn Lake (Figure 23). This block was selected for survey because the proposed block overlooks wetlands to the southeast and to the north. The terrain in Block 13 is generally undulating with some relatively level terrace features overlooking the wetland to the southeast. These terrace features varied from one to three meters in height and exhibited archaeological potential (Photograph 7). Five areas of archaeological potential were identified in this block, each consistent with the model, in both previous and subsequent changes. Forest cover consists primarily of lodgepole pine, Englemann spruce, subalpine fir, hemlock, and alder, with an understory of Labrador tea,

highbush cranberry, huckleberry, and twinflower. Two blazed trees were observed; however, the trees are quite young and the scars were made by a metal tool, and are therefore considered historic in origin. Based on the results of the PFR, the model was adjusted slightly to decrease the value of stands in the northwest portion of the block with an spruce/balsam component, and increase the model values in the southeast portion that were south-facing and forested with pine. This modified the overall potential of the block to better reflect archaeological potential as observed in the field.



Photograph 7. Terrace feature in Block 13 indicative of high archaeological potential.

Discussion

The Cassiar FDU was very difficult to model for archaeological potential, given that there are very few known recorded sites within the project area with which to evaluate the model results. Results of the PFR indicate that the model was working, but was over predicting potential in areas containing spruce/balsam combinations, and not picking up some of the terrain on south facing slopes adjacent to wetlands.

Results of the AOA indicate that the area is unique in both its physiography, climate, and use of the area prehistorically by the Tahltan. It is likely that the region was utilized for hunting, traveling, and trade, funneling obsidian from Mt. Edziza to surrounding regions. Given that the area is so close to Mt. Edziza, people were more likely to have casually discarded obsidian since it was relatively easy to obtain more nearby. Determining where these obsidian and trail sites are located within the FDU is challenging, but hopefully more knowledge will come forward by Tahltan elders, in combination with further ground truthing of the project area.

More testing will need to be conducted in the FDU, through additional surveys to further verify and update the model.

Given the results of the model combined with results from previous investigations within the study area, the following archaeological site types could potentially be expected for the project area: 1) temporary habitation or subsistence sites; 2) trails and travel corridors; 3) CMTs; 4) andesite and/or obsidian lithic scatters; 5) cultural depressions such as cache pits or cooking pits; 6) rock cairns and other petroforms associated with either burials, traps or hunting.

Recommendations

Known Archaeological Sites

Results of the study indicate that eight known archaeological sites are located within, or in close proximity to, the project area. It is recommended that development plans aim to avoid impact to the eight previously recorded archaeological sites within, or in close proximity to, the project area. To ensure these sites are not indirectly impacted, proposed cutblocks and associated developments should be at least 10 m from the site boundaries and that the trees remaining within and adjacent to these site boundaries are wind firm. However, if it is not possible to avoid impact to these sites, mitigative recommendations may be made as part of the AIA after the sites are revisited.

Subsurface archaeological sites and pre-1846 CMTs are protected by the *Heritage Conservation Act* (HCA) and require permitting through the Archaeology Branch prior to alteration (Archaeology Branch 2009).

The Telegraph Trail transects or is in potential conflict with Blocks 4, 5, 8, 9, 21, 22, 29, 30, 31, 32, and 33. Although overgrown throughout the northern portion of the project area, portions of the trail and/or the telegraph wire were observed in or adjacent to Blocks 4, 5, and 8. Avoidance of the trail is recommended, as it is considered a significant historical feature by the Regional District of Kitimat Stikine as well as the Kispiox and Skeena/Stikine Forest Districts. Recommendations for avoidance are to establish a 50 m no-harvest strip on either side of the trail and a 20 m machine free buffer from the trail when conducting low impact harvest.

Archaeological Potential Model

The AOA model shows archaeological potential in areas in close proximity to hydrological features, in areas adjacent to known traditional use features and Aboriginal trails, on elevated and level or gently sloped terrain, in areas of favorable vegetation, and areas possessing a southern aspect. Sloped or featureless terrain, and poorly drained areas were considered indicative of low archaeological potential.

Cutblocks that encompass contiguous pixels of archaeological potential (of approximately 60% or higher) should be subject to ground truthing by a professional archaeologist, in the form of a Preliminary Field Reconnaissance (PFR), AIA, or AIS. Entire blocks are not necessarily required for survey, but at least with a focus on the areas with archaeological potential. A sample of low potential areas within each block selected for an AIA should be assessed through Archaeological Inventory Survey (AIS) to continue to test the validity of the model. An archaeological review of future blocks, utilizing new data such as more accurate digital elevation data, aerial photography, and/or LIDAR may be considered sufficient to determine whether or not further archaeological fieldwork will be required.

As noted previously, the DEM employed in the model could not recognize micro-topographic features and there is a possibility that small features are present in areas the model has classified as having low archaeological potential. Some of these features may be identified in the field during layout and should either be avoided through movement of the proposed cutblock boundaries, or further assessed by an archaeologist through an AIA.

It is important to recognize that this model is meant to be used as a tool to aid further archaeological investigations in relation to the project, to manage for subsurface archaeological deposits as well as surface features such as rock cairns or cultural depressions. This study does not model specifically for the locations of culturally modified trees (CMTs), which could be found within low potential zones. This model should be updated to include new information that may become available, including TUS/TK data and archaeological site locations within the project area. Additional data on microtopographic landforms, if available in the future through the use of LIDAR, orthophotos or a combination of both would also contribute to enhancement of the model.

Tahltan Archaeology Standards

Continued cooperation and coordination with the Tahltan is recommended for any further work and to ensure adherence to the Tahltan Archaeology Standards. This includes the use of a Chance Find Management Plan document, and appropriate archaeological training for machine operators, or those intending to be on site to inspect the blocks during harvesting or road construction. All personnel on site should be familiar with the appearance of obsidian and andacite artifacts, instructed

to watch for it, and stop work in the immediate vicinity if it is observed on the ground.

Conclusion

This report provides an overview of known cultural heritage resources located within and adjacent to the project area. This report also provides an Archaeological Potential Model to aid future AIA studies for proposed forestry developments within the Cassiar FDU area.

This report was prepared for use by Cassiar, and any third party use is the responsibility of that third party. This study does not constitute a traditional use study, and was prepared without prejudice to First Nations Treaty Negotiations, aboriginal rights or aboriginal title.

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Appendix 1. Tahltan Archaeology Standards

Tahltan Archaeology Standards THREAT

- *Doo donn*, obsidian from *Ah zeeth zaa*, Mt. Edziza.
- Cave or rock shelters
- Cairns – rock piles
- 4 layers of tephra, volcanic ash
- Ice-patch archaeology and climate change
- Potential Villages Sites
- Cache Pits
- Placing research into context of place. Placing research “footprint” on Tahltan Territory Map.

Excerpt from Tahltan Central Council - THREAT position to NovagGold, Galore Creek Project submission.

5.6 Archaeology

We submit the following comments with the hope that they will help to enhance the Galore Creek environmental assessment, and we hope that further data collection will be considered to bring further depth and breadth to the research that is used to predict archaeological potential in an Archaeological Impact Assessment.

Part 1 is a summary of Tahltan archaeological issues presented in response to a previous Environmental Assessment. These issues are presented here with adaptations pertaining specifically to the Galore Creek assessment and study area. Part 2 presents issues specifically related to the text of Chapter 7.14 of the Application.

5.6.1 Part 1 -- Summary of Significant Tahltan Archaeological Issues

The following five archaeological issues are considered vital to Tahltans. They are offered in our effort to contribute a standard that brings broader scope and depth when building upon the baseline data regarding research assessing archaeological potential within our territory. It should be noted that these issues are being “newly” articulated; however, all of them are not entirely “new”. Vera Asp, a member of THREAT, presented the majority of these issues to the archaeological contractor prior to this data collection and research, while employed as the Director of Traditional Knowledge,

Rescan Tahltan Environmental Consultants (RTEC), Summer 2005. These issues are presented here as possible policy or terms of reference in future development of Tahltan Heritage policy.

1. Ancient continental movement of obsidian from Ah-zeeth-zaa – Mt. Edziza

The Stikine River Valley has extremely high archaeological potential; the archaeological “story” extends 10,300 years in the past. The obsidian of Ah-zeeth-zaa- Mt. Edziza, which is centrally located in Tahltan territory, leaves the lithic evidence in the archaeological record continentally (Carlson 1994; Dixon et. al. 2005; Lee 2001; pers. comm., Terry Fifield, Archaeologist, State of Alaska Forest Services, 2006). Mt. Edziza is probably the largest obsidian source in Canada. Native people traveled there over 1,000’s of years to collect its quality volcanic glass (Fladmark n.d.). In *Glass and Ice*, the only archaeological survey on Mt. Edziza, Fladmark writes of his finds of the main obsidian quarry site by saying:

The sheer density of surficial cultural material in the major quarry sites – exceeding many millions of items – is unparalleled in the experience of this investigator, and the equally impressive density of flaking stations and camp sites in the Raspberry Pass and “Artifact Valley” areas around Goat Mountain is not exceeded elsewhere in British Columbia to my knowledge. (1985:205).

Obsidian remains as the resource which produces the sharpest edge possible worldwide, and therefore would have been central to the survival of people and ultimately, the most valued tradable commodity in prehistoric times, prior to the advent of European metal. Roy Carlson (1994) writes of a study he conducted in the 1980s in his chapter *Trade and Exchange in Prehistoric British Columbia*, that obsidian is the best material for demonstrating the existence of long-distance trade (:309). Obsidian has a chemical finger print and therefore is traceable. Carlson conducted an extensive study of known archaeological obsidian assemblages from North American NW archaeological sites. He provided evidence of sourcing of Mt. Edziza obsidian at prehistoric sites in Alaska, Yukon, NWT, Alberta and British Columbia, demonstrating Mt. Edziza obsidian to be one of the most widely distributed materials in the archaeological record.

Since Carlson’s findings there has been additional archaeological research accomplished in SE Alaska with relevance to Mt. Edziza obsidian. Recently Mt. Edziza obsidian was sourced at On Your Knees Cave Site on Prince of Wales Island, Alaska at the 10,300 year soil layer level of the site. Of the obsidian samples found, a large percentage was sourced from Edziza (Terry Fifield, SE Alaska archaeologist, State of Alaska Forest Services, pers. comm. 2006). Lee (2001) researched artifacts recovered from the 1997-1999 excavations at archaeological site 49-PET408 and said they demonstrate that non-local obsidians were obtained and transported within southeastern Alaska during the early Holocene (2001:1). He found that 67% of the obsidian samples could be sourced to Mt. Edziza (ibid:24).

This past summer, Vera Asp participated as a intern in an excavation of a 4,100 year old Tlingit village site, Coffman Cove site 49-PET-067, also located on Prince of Wales

Island, across the strait from the mouth of the Stikine River. Ms. Asp interned with what was dubbed “the dream team”: Pete Bowers, team leader of Northern Land Use Research; Doug Reger, retired Alaska State archaeologist; Madonna Moss, University of Oregon; and Terry Fifield, SE Alaska archaeologist, State of Alaska Forest Services. Each of these team members had 25 plus years of archaeological experience in Subarctic archaeology. During the dig they excavated 25 obsidian samples. They have since been analyzed and are all sourced to Mt. Edziza. (Bowers, *pers. comm.*).

This fall five obsidian artifacts were discovered uncovered along Six Mile River, Yukon, in the territory of the Carcross-Tagish First Nation. It has been speculated that these are also from Mt. Edziza (Beverly Sembsmoen, Director, Lands, Carcross-Tagish First Nation, *pers. comm.*).

The research of Carlson and current archaeological evidence clearly demonstrates utilization of obsidian from present-day Mt. Edziza extensively in prehistoric times by people. And most important to the archaeological record, evidence demonstrates the movement of people and Edziza obsidian in continental directions from the interior plateaus of British Columbia, to multiple sites and dates, including to Prince of Wales Island 10,300 years ago. Therefore, it is the Tahltan position that all obsidian finds in an Archaeological Impact Assessment (AIA) should be *assumed to be sourced also to Mt. Edziza*. We request that an analysis be done on the obsidian to confirm the source. We also expect that such finds should precipitate research into prospective route(s) back to Raspberry Pass to allow a more thorough analysis of potential archaeology sites along that route.

Respectful research and data collection pertaining to continental obsidian movement would greatly contribute to the archaeological record in Tahltan Territory. Also, this research will help in the management and mitigation of the Galore Creek project.

There was limited reference in the application to the potential of this issue in the Galore Creek project assessment. The presented data requires inclusion of a more current archaeological record, for example the new Mt. Edziza obsidian data documented in SE Alaska and the Yukon. The obsidian artifacts located in the study area are sourced in this document to Mt. Edziza; however, few data are collected or reported on the possible routes back to the source. The document describes the nature of the lithic sites, and suggests that their content and their proximity indicate a likely association with the Mt. Edziza-Spectrum Range obsidian deposits.

2. Cairns or “Rock Piles”

Cairns, or “rock piles” are archaeological features that have high Tahltan ethnographic significance and some methods, e.g. flight over the study area, will not produce evidence of them. We have seen photographs from the lower Stikine where these features have been covered by organic material -- soil build up and plant growth.

3. Tephra Layers (Volcanic Ash Layers)

Fladmark (1985:30-36) describes tephra layers (volcanic ash layers) as a means of establishing chronological marker horizons and identifies four layers within this region. Attempts by archaeological consultants to document these four tephra markers in their excavations would make a great contribution to the archaeological knowledge of the Tahltan Territory.

4. Rock Cliff or Cave Shelters

Rock, or cliff, or cave shelters have been located in other regions of Tahltan territory (Fladmark 2005, *pers. comm.*). These archaeological features, and the research findings associated with their excavated contents, have made a tremendous contribution to the archaeological record. These shelters have been demonstrated to be a real useful sediment trap, especially if the floor of the shelter is sloped inwards. Ancient archaeological data have been excavated from these features. In the cases of Charlie Lake Cave site (HbRf39), (Fladmark *et al.* 1988) and On Your Knees Cave site (Site 49-PET-408) (Lee 2001), the research provided extensive remarkable archaeological data, including radio-carbon dates exceeding 10,000 B.P.

5. Ice Patch Archeology and Climate Change

Potential for ice patch archeology within the Galore Creek project area has not been considered in the report. Although ice patch archaeology is in its infancy, there are multiple examples of sites today in Alaska and Yukon, both similar and comparable regions to that of Tahltan territory (Dixon *et al.* 2005; Hare *et al.* 2004; Lee 2001). Dixon *et al.* (2005) conclude that the archaeology of glaciers and ice patches is an exciting new interdisciplinary research frontier contributing new insights into high latitude and high altitude human adaptations, prehistoric technological systems, and new opportunity for paleoenvironmental analyses (2005:141). This article also discusses climate change data collection pertaining to glacier melt etc., and identifies these conditions as providing opportunity to survey for potential artifact collection sites.

In the summer of 2005, Vera Asp submitted documentation of dialogue she had had with Tahltan Elder Jackie Williams of past travel and trade in the lower Andrea Glacier area. He described how the Iskut was the travel route of Tlingit traders of past times, and how they were *allowed* to travel to a *village or gathering, trading place* [within the glacier area] and how the Tahltans would wait there until spring, February or March *when there is a good crust on the snow and they would travel across country up the Klappan and inland with their traded goods*. This is very noteworthy because it addresses past use of this remote, and sometimes thought of as “not occupied or used” area of the Tahltan territory, the ice patches or the glaciers. This is an area that needs significantly more research of trade, trade routes, and land use. Further oral history and archaeological research is needed. Based upon the oral history data we must disagree that there is limited use of the Galore Creek project area.

Much is yet to be gained from the study of high latitude and altitude human lifeways, and certainly there is potential for further investigation of this within the Galore Creek project

study area. In the future, ice patch archaeology in a project footprint will become a natural stage in all preliminary archaeological surveys.

Note: Village Sites and Cache Pits have been recently added.

5.6.2 Part 2 -- Archaeological and Heritage Resources Effects Assessment (Section 7.14 of the Application)

Although NovaGold has made some use of traditional knowledge and land use information in the Galore Creek mine project environmental assessment, it is clear that we, collectively (i.e., Tahltan, governments, proponents), have a way to go in collecting, storing and accessing this information before it can be adequately incorporated into assessments such as the NovaGold assessment in a way that gives it equal weight as “scientific” knowledge. For instance the oral history from Tahltan Elder Jackie Williams noted above could have provided valuable insight into the use of the study area. Based upon our knowledge of the oral history data, we must disagree that there is limited use of the study area.

Page 7-506 states that “some potential for past human uses were identified and marked on maps.” We are interested in further information about how the potential past human uses were identified. What was this based on?

7.14.1.3 -- Spatial boundaries. There is a large statement that past inhabitants were nomadic (note: this is unsourced); that the study area is part of a larger cultural area; and that a larger region must be considered when interpreting study results and assessing site significance. This point has been discussed in great detail by THREAT and certainly we agree. We also recognize that by contributing with documents such as this, there is greater chance of providing a more complete and comprehensive assessment. We also recognize that there are cumulative impacts and risks to archaeological and heritage data by numerous proposed developments within Tahltan territory.

7.14.1.4 -- The temporal boundaries include the past 9,000 years (ibid: 506). This is limited in scope considering the archaeological record of On Your Knees Cave site 49-PET408. Expansion of the temporal range would add breadth and current archaeological record to this research.

7.14.1.5 -- When speaking to the ethnographies of the turn of the century it is stated that, by that time, a considerable amount of integration had already taken place, and many of the elders with traditional knowledge had succumbed to one of the many epidemics. This may be accurate; however, without a source for this information it is difficult to assess.

7.14.2 -- The evidence presented and sourced to Ryder and Clague (1989) can certainly be refuted or at least challenged with the new archaeological evidence of On Your Knees Cave, which of course speaks to movement of people and resources from Tahltan territory 10,300 years ago.

The document also makes an unsubstantiated statement by saying that Tahltans originated in the interior and moved into the Stikine region about 300 years ago. What is the source for this information? According to our information, dates have yet to be determined for migration of Athapaskans into the region. Such a statement can be refuted and is inaccurate.

Table 7.14-2 (page 7-518) raises an issue also of great concern to Tahltans -- stewardship, protection and preservation of heritage resources. The document states the need for orientation programs for all employees and site visitors to ensure that the sites are not contaminated. Not having this important training for employees poses a potential risk and mitigating this issue would require such professional development for all employees. There is a need for a training plan and policies to ensure protection of potential sites in the future.

THREAT is interested in the status of the artifacts recovered during this study. The questions are as follows: Where are the artifacts presently? And when will they be given to the repository? (We believe that is the Royal British Columbia Museum in Victoria).

In the future, in an effort to address place and context, it would also be helpful to receive a map of the study area plotted on a Tahltan Territory map.

Finally, it would also be useful to have copies of the references cited included with the document.

This response to the Galore Creek AIA has identified significant gaps in data collection. This has an impact on research methods and objectives, and ultimately results in lack of depth when seeking to predict archaeological potential in an AIA. Additional data collection would add breadth, thus, allowing better determination of the full range of potential risks and impacts to the heritage and archaeological resources in the study area. We appreciate the limited cumulative archaeological data collection within Tahltan territory; however, we also appreciate that together “we”, the collective we, with greater effort, have potential to make a significant contribution to the whole. It is known in archaeological “circles” that there is great archaeological potential within Tahltan territory. The archaeological “story” of the Stikine River Valley is a long way from being told. We submit that an AIA can be a vehicle to contribute to the archaeological record in Tahltan territory.

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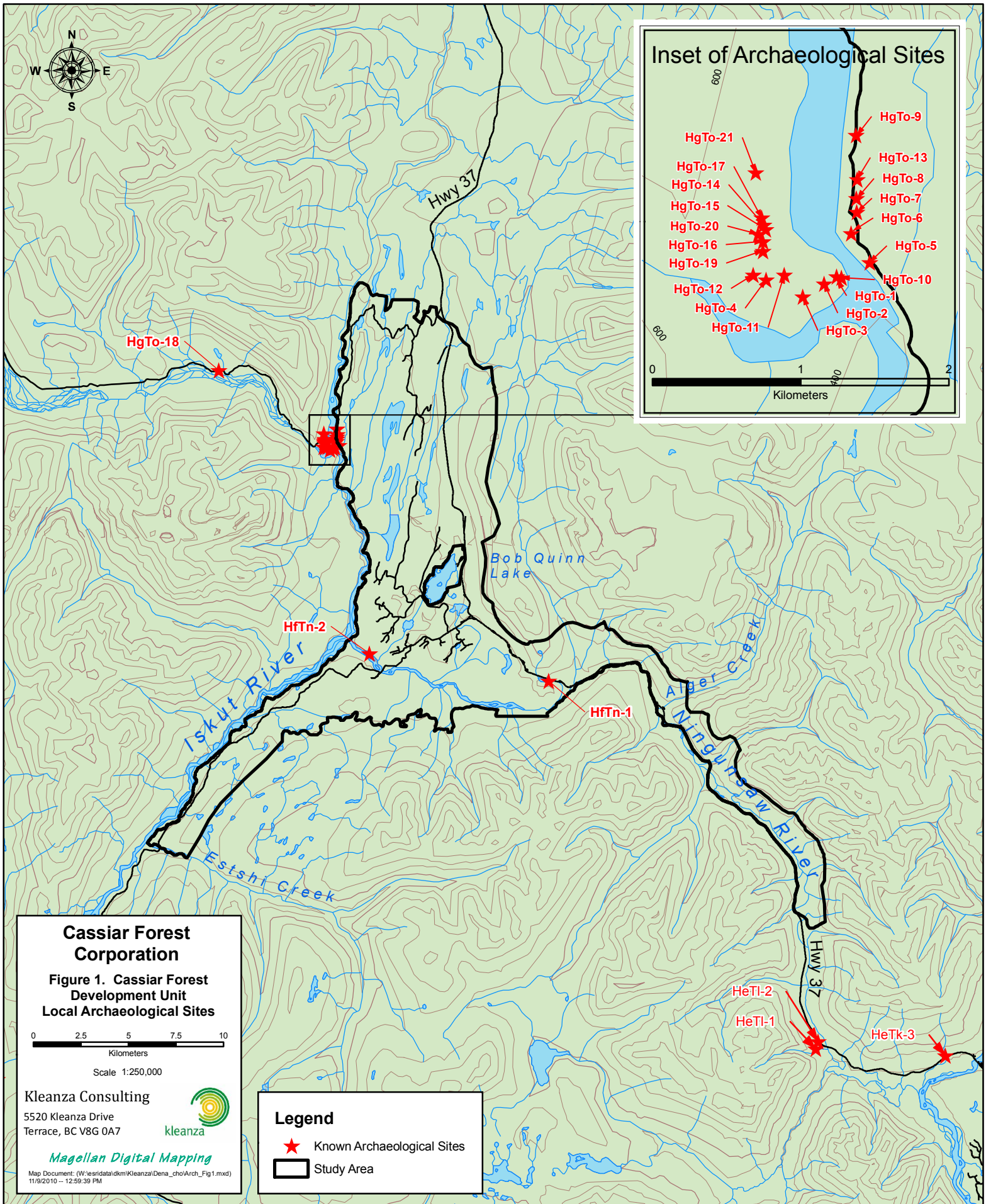
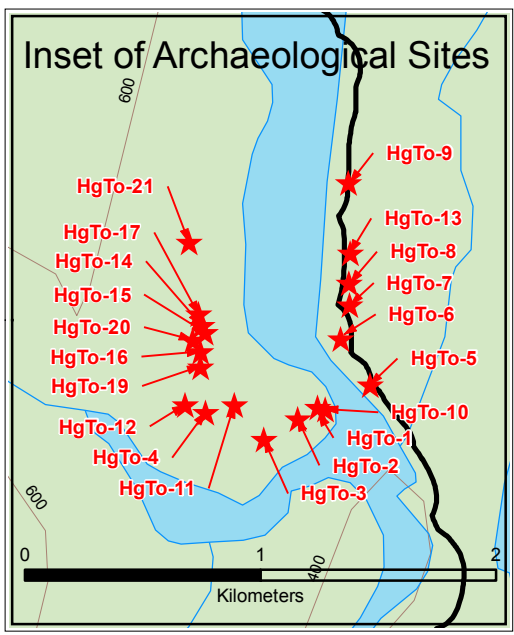
Appendix 2. PFR Results, GPS Waypoint Data

GPS #	NAME	X	Y	RASTERVALU	AVERAGE ARCH POTENTIAL*	LANDFORM DESCRIPTION	PREDOMINANT VEGETATION	PHOTOS - Jo's camera
2	128	422904	6312041	13	13	Where we entered the block - Mike has notes		
2	129	422904	6312041	13	13	Small blaze on a tree	FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses US: some devil's club, thimble berry, false solomon's seal.	69 (SE), 70 (NE)
2	130	419691	6312582	0	1 LOW	Gently sloped (aspect 290 slope = 15 degrees) and featureless Small ridge running at 200degrees, parallel to proposed road. LOW subsurface potential, but may be potential trail location. No physical attributes of trail visible. Down each side of ridge is devil's club, indicating saturation.	FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses US: none	71 (NE), 72 (SW), 73 (S)
2	131	419655	6312417	0	0 LOW		FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees	
2	132	419757	6312247	5	3 LOW	Slope approx 25% down to SE, featureless	FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees	
2	133	419912	6312209	0	1 LOW	Flattish top of poorly defined landform. Some saturation as indicated by vegetation	FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees	
2	134	419890	6312113	5	5 LOW	Sloped (+/- 20%) featureless landform with LOTS of blowdown (on edge of previous clearcut)	FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees	
2	135	419740	6311945	0	1 LOW	Sloped (+/- 20%) featureless landform with good visibility down into the block.	FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees	74 (S), 75 (W)
2	136	420168	6312854	5	5 LOW	Sloped (+/- 20%) featureless landform with good visibility down into the block.	US: some devil's club, thimble berry, false solomon's seal, immature trees FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses	
2	137	420356	6312637	10	11 LOW	Poorly defined undulating and featureless landforms	US: some devil's club, thimble berry, false solomon's seal, very dense immature trees FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses	
2	138	420364	6312552	10	11 LOW	Poorly defined undulating and featureless landforms	US: some devil's club, thimble berry, false solomon's seal, very dense immature trees FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses	
2	139	420417	6312555	10	11 LOW-MOD?	semi-flat bench above minor drainage, approx 10 m x 10 m	US: some devil's club, thimble berry, false solomon's seal, very dense immature trees Drainage veg = devil's club and skunk cabbage FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses	
2	140	420516	6312598	13	13 LOW-MOD?	semi-flat bench above minor drainage, approx 10 m x 10 m	US: some devil's club, thimble berry, false solomon's seal, very dense immature trees Drainage veg = devil's club and skunk cabbage FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses	
2	141	420611	6312695	13	13 LOW	featureless with a slight slope	US: some devil's club, thimble berry, false solomon's seal, very dense immature trees	
2	142	420631	6312730	13	13			
2	143	421796	6311242	10	12			
2	144	421828	6311120	10	10 LOW	15% slope down to the south, poorly defined landform...	FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses US: some devil's club, thimble berry, false solomon's seal, very dense immature trees FC: Sub-alpine Fir, hemlock, spruce, some pine GC: various mosses	78, 79
2	145	421851	6310912	10	10 LOW-MOD?	semi-flat bench above minor drainage, approx 10 m x 10 m	US: some devil's club, thimble berry, false solomon's seal, very dense immature trees Drainage veg = devil's club and skunk cabbage	80 (w), 81 (S)
2	146	421844	6310714	10	10 LOW	Generally flat and featureless with a slight (5%) slope down to the SSE	FC: Sub-alpine Fir, hemlock, spruce, pine, some birch GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees	
2	147	421589	6310731	5	5 LOW	Featureless with a slight slope down to the north, becoming much steeper just outside of block.	FC: Sub-alpine Fir, hemlock, spruce, pine, some birch GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees	
2	148	421358	6310642	15	15 LOW	Featureless and sloping 20% down to the north. A couple of good game trails in the area heading down slope.	FC: Sub-alpine Fir, hemlock, spruce, pine, some birch GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees	82 (N), 83 (E)
2	149	421246	6310480	23	21 LOW	Low potential for subsurface sites - but could be potential trail location - at southern tip of block, which is along a steep-sided ridge - game trails prevalent. Ridge appears to continue and slope down to the SW. Very high above the river.	FC: Sub-alpine Fir, hemlock, spruce, pine, some birch GC: various mosses US: some devil's club, thimble berry, false solomon's seal, immature trees FC: Sub-alpine Fir, hemlock, spruce, pine, some birch, alder, aspen, cottonwood GC: various mosses	
2	150	421525	6310497	18	18 LOW	Undulating landform top, with steep dropoff down to the river.	US: some devil's club, thimble berry, false solomon's seal, immature trees, rose, helibore etc. FC: Sub-alpine Fir, hemlock, spruce, pine, some birch, alder, aspen, cottonwood GC: various mosses	88 (W), 89 (S)
2	151	421779	6310462	13	15 LOW	Slight slope down to the south, then steep dropoff down to river, with poorly defined landform - very high above the river.	US: some devil's club, thimble berry, false solomon's seal, immature trees, rose, helibore etc. FC: Sub-alpine Fir, spruce, some birch GC: various mosses	
2	152	422016	6310501	5	7 LOW	Down into steep drainage area that runs approx N-S. Drops off sharply to south, high above river. Lunch spot!	US: some devil's club, thimble berry, false solomon's seal, immature trees, rose, helibore etc. FC: Sub-alpine Fir, spruce, some birch GC: various mosses	93 (N), 94 (W), 95 (S)
2	153	422207	6310413	5	4 LOW	Undulating and poorly defined with steep dropoff down to the river just outside block boundaries.	US: some devil's club, thimble berry, false solomon's seal, immature trees, rose, helibore etc.	
2	154	422444	6310364	5	7			
2	155	422654	6310370	10	10			
2	156	422555	6310619	15	15			
2	157	422166	6311809	5	5			
2	158	422346	6312006	10	9			
2	159	422516	6312205	5	7			
2	160	422668	6312412	5	5 LOW			
2	161	423009	6312485	8	8 LOW	Flat and semi-saturated, near north end of block.	labrador tea to be added to veg... FC: Spruce, Alder, cottonwood, hemlock US: devil's club, ash, horsetail, etc.	107 (S), 108 (N)
2	162	419850	6310080	26	26 LOW	low-lying floodplain		x2
2	163	419946	6310246	21	22 LOW	Looking down to block from road/push pile, block in this area appears to be floodplain	FC: Spruce, Alder, cottonwood, hemlock US: devil's club, ash, horsetail, etc.	x3

* Please note that where potential of anything other than "LOW" is given, subsurface testing may prove these LOW-MOD spots to be LOW...

GPS #	Block #	NAME	X	Y	RASTERVALU	AVERAGEVALU	ARCH POTENTIAL*	LANDFORM DESCRIPTION	PREDOMINANT VEGETATION	PHOTOS - Mike's camera
3		001	423225	6313154	3	4				
3		002	419500	6312223	5	5				
3	1	1-1	420428	6313128	10	10	Low	Gently sloped, undulating, and featureless terrain with a SE aspect	Pine, spruce, fir, cottonwood, Devil's club, thimbleberry, rose, fireweed, bunchberry, moss	37(SW), 38 (SE)
3	1	1-2	420633	6312961	15	13	Low	Gently sloped, undulating, and featureless terrain with a S aspect	Pine, spruce, fir, Devil's club, high-bush cranberry, rose, Prince's pine, bunchberry, moss	39 (S), 40 (E)
3	1	1-3	420633	6312777	13	13	Low	Gently sloped, undulating, and featureless terrain with a SE aspect	Spruce, fir, hemlock, paper birch, thimbleberry, raspberry, impact weeds	41 (S)
3	2	2-1	419431	6312185	10	10	Low	Slightly sloped terrain with a south aspect; no distinct topo features	Spruce, hemlock, fir, Devil's club, Prince's pine, false Solomon's seal, fern, gooseberry, moss	17 (S), 18 (E)
3	2	2-2	419289	6311982	5	7	Low	Slightly sloped terrain with a SW aspect; low-lying & poorly drained with no distinct topo features	Spruce, hemlock, fir, Devil's club, false Solomon's seal, fern, bunchberry, moss	19 (E), 20 (NE)
3	2	2-3	419071	6311833	15	15	Low	Slightly sloped terrain with a SE aspect; low-lying & poorly drained with no distinct topo features	Spruce, hemlock, fir, paper birch, Devil's club, bramble, bunchberry, moss	21 (SE), 22 (S)
3	2	2-4	418921	6311621	15	15	Low	Sloped terrain with a SE aspect; low-lying & poorly drained with no distinct topo features	Spruce, hemlock, fir, Devil's club, huckleberry, fern, bunchberry, moss	23 (SE), 24 (SW)
3	2	2-5	418928	6311498	13	15	Mod	A small drainage has incised the upper terrace forming a slightly sloped corner terrace	Spruce, hemlock, fir, Devil's club, high-bush cranberry, gooseberry, rose, thimbleberry, false Solomon's seal, fern, bunchberry, moss	25 (S), 26 (E)
3	2	2-6	418981	6311403	18	17	Mod-High	Point terrace displaying gently undulating terrain and a south aspect	Spruce, hemlock, fir, paper birch, cottonwood, Devil's club, high-bush cranberry, gooseberry, moss	28 (S), 29 (W)
3	2	2-7	419181	6311352	20	20	Mod	Linear ridge with an ESE aspect; feature trends NW-SW	Spruce, hemlock, fir, aspen, Devil's club, high-bush cranberry, false Solomon's seal, fern, moss	30 (ESE), 31 (SW)
3	2	2-8	419438	6311362	0	4	Low	Sloped featureless terrain with a west aspect	Spruce, hemlock, fir, aspen, Devil's club, high-bush cranberry, false Solomon's seal, moss	32 (W), 33 (S)
3	2	2-9	419471	6311618	10	9	Low	Moderately sloped, undulating, and featureless terrain with a NW aspect	Spruce, hemlock, fir, cottonwood, Devil's club, huckleberry, moss	34 (NW), 35 (NE)
3	2	2-10	419597	6311867	5	5	Low	Gently sloped, undulating, and featureless terrain with a NE aspect	Spruce, hemlock, fir, cottonwood, Devil's club, false Solomon's seal, fern, moss	36 (NW), 37 (NE)
3	12	12-1	422150	6310864	5	5	Low	Gently to moderately sloped terrain with no breaks or distinct topo features; SW aspect	Spruce, fir, hemlock, aspen, Devil's club, high-bush cranberry, fern, moss	42 (SW), 43 (W)
3	12	12-2	422393	6310803	15	14	Low	Gently to moderately sloped terrain with no breaks or distinct topo features; SW aspect	Spruce, fir, hemlock, paper birch, cottonwood, Devil's club, high-bush cranberry, thimbleberry, moss	44 (SW), 45 (W)
3	12	12-3	422592	6310615	15	15	Low	Sloped and undulating terrain with no distinct topo features; SW aspect	Spruce, fir, hemlock, paper birch, alder, Devil's club, bunchberry, fern, moss	46 (SW), 47 (NW)
3	12	12-4	422782	6310422	15	12	Low	Gently sloped, undulating, and poorly drained terrain with a S aspect; no distinct topo features	Spruce, fir, hemlock, alder, Devil's club, bunchberry, fern, moss	48 (S), 49 (W)
3	12	12-5	422874	6310294	10	10	Low	Moderately sloped and featureless terrain with a SSW aspect	Spruce, fir, paper birch, aspen, rose, thimbleberry, high-bush cranberry, soap, moss	50 (SSW), 51 (NNE), 52 (E), 53 (S)
3	12	12-6	423130	6310364	10	10	Low	Moderately to steeply sloped terrain with no distinct topo features; S aspect	Spruce, fir, pine, paper birch, Devil's club, false Solomon's seal, moss	54 (S), 55 (E)
3	12	12-7	423160	6310184	10	10	Low-Mod	Gently undulating and poorly drained terrace feature; S aspect	Spruce, fir, paper birch, aspen, rose, Devil's club, false Solomon's seal, high-bush cranberry, moss	56 (S), 57 (W)
3	12	12-8	422864	6310120	15	13	Low-Mod	Indistinct terrace characterized by undulating terrain and possessing a S aspect	Spruce, fir, hemlock, paper birch, aspen, pine, rose, Devil's club, high-bush cranberry, moss	58 (E), 59 (W)
3	12	12-9	422705	6310327	10	9	Low	Moderately undulating terrain with no distinct topo features	Spruce, fir, paper birch, pine, cottonwood, rose, high-bush cranberry, moss	60 (SSW)
3	13	13-1	422507	6311611	10	10	Low	Undulating and gently sloped terrain with a south aspect; no distinct topo features	Pine, fir, hemlock, trapper's tea, bunchberry, twinflower, moss	1 (S), 2 (N), 3 (W)
3	13	13-2	422636	6311781	10	10	Mod	Indistinct terrace overlooking a small drainage & wetland	Pine, fir, hemlock, paper birch, trapper's tea, bunchberry, huckleberry, moss	4 (N), 5 (E)
3	13	13-3	422799	6311904	13	12	Mod	Relatively level point terrace overlooking wetland	Pine, spruce, fir, hemlock, bunchberry, twinflower, moss	6 (SE), 7 (SE), 8 (SE)
3	13	13-4	422936	6312070	13	13	Mod	Small knoll overlooking wetland; S aspect	Aspen, spruce, fir, hemlock, blueberry, bunchberry, twinflower, moss	11 (S), 12 (E)
3	13	13-5	423022	6312061	13	11	Mod	Slightly sloped, low terrace overlooking wetland; SE aspect	Pine, fir, spruce, paper birch, trapper's tea, bunchberry, soap, moss	13 (SE), 14 (S)
3	13	13-6	423106	6312415	13	12	Low	Undulating, featureless terrain with a NE aspect	Pine, fir, spruce, bunchberry, moss	15 (NW), 16 (SW)
3	13	13-7	423039	6312310	13	13	Mod	Relatively level terrace adjacent to a wetland; NW aspect	Spruce, fir, pine, paper birch, high-bush cranberry, bunchberry, moss	61 (NW), 62 (SW)
3	13	13-8	422840	6312188	13	13	Low	Low-lying, featureless, and poorly drained terrain	Pine, fir, hemlock, Labrador tea, huckleberry, soap, horsetail, bunchberry, moss	63 (SE), 64 (N)
3	13	13-9	422891	6312456	13	12	Low-Mod	Small (1m) terrace adjacent to wetland; terrain is slightly undulating as possesses a SE aspect	Pine, fir, hemlock, Labrador tea, huckleberry, soap, horsetail, bunchberry, moss	66 (SE), 67 (NE)
3	17	17-1	419981	6310032	23	23	Low	Relatively level floodplain; low lying & poorly drained	Spruce, fir, cottonwood, alder, Devil's club, fern, rose, horsetail	71 (E), 72 (S)
3	17	17-2	420161	6310190	13	13	Low	Sloped, featureless terrain with poor drainage	Spruce, cottonwood, alder, Devil's club, fern, bramble, horsetail	73 (E), 74 (N)

Figure 1. Location of archaeological sites within or adjacent to the study area



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Figure 1. Cassiar Forest Development Unit Local Archaeological Sites

0 2.5 5 7.5 10
Kilometers
Scale 1:250,000

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5520 Kleanza Drive
Terrace, BC V8G 0A7

 kleanza

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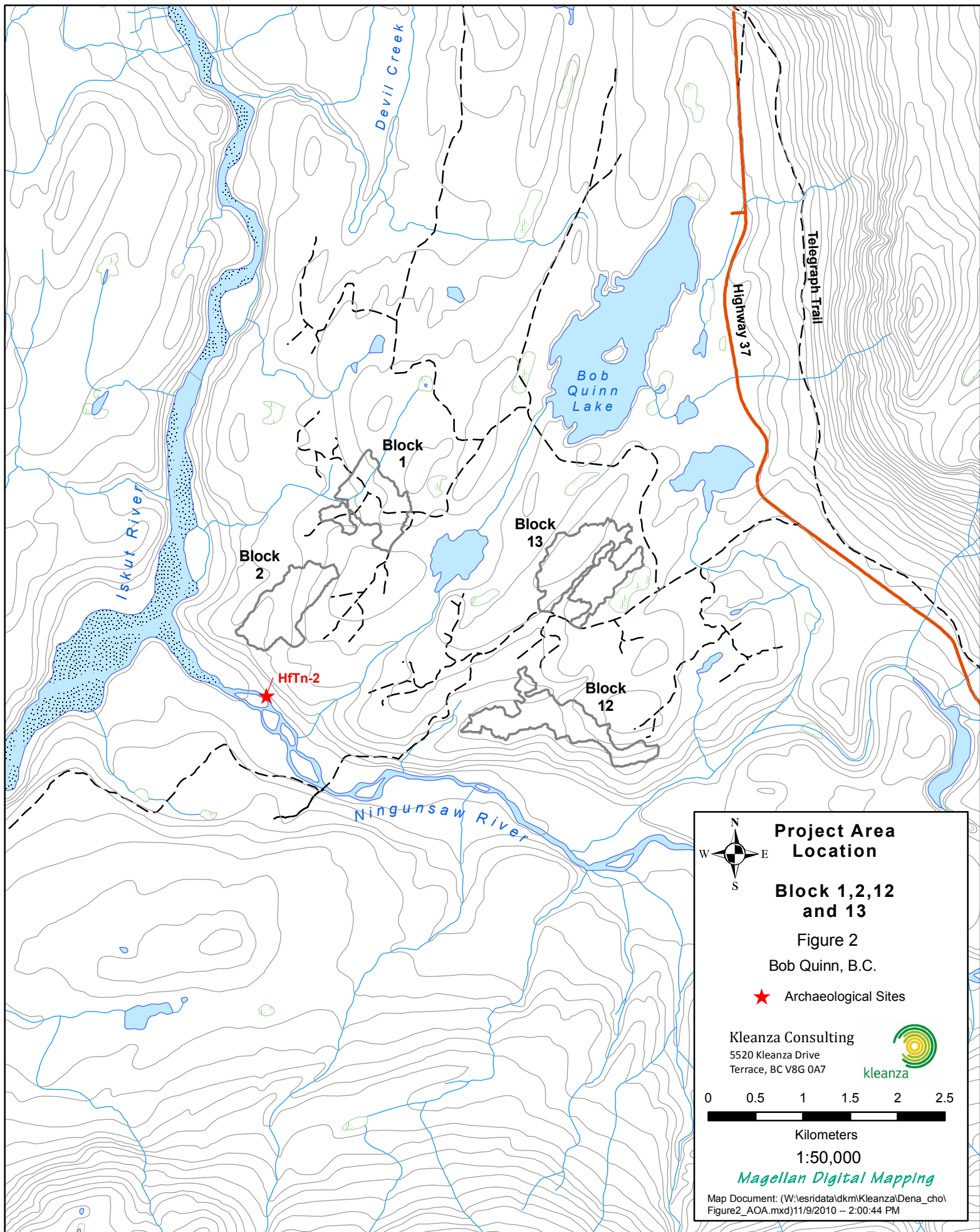
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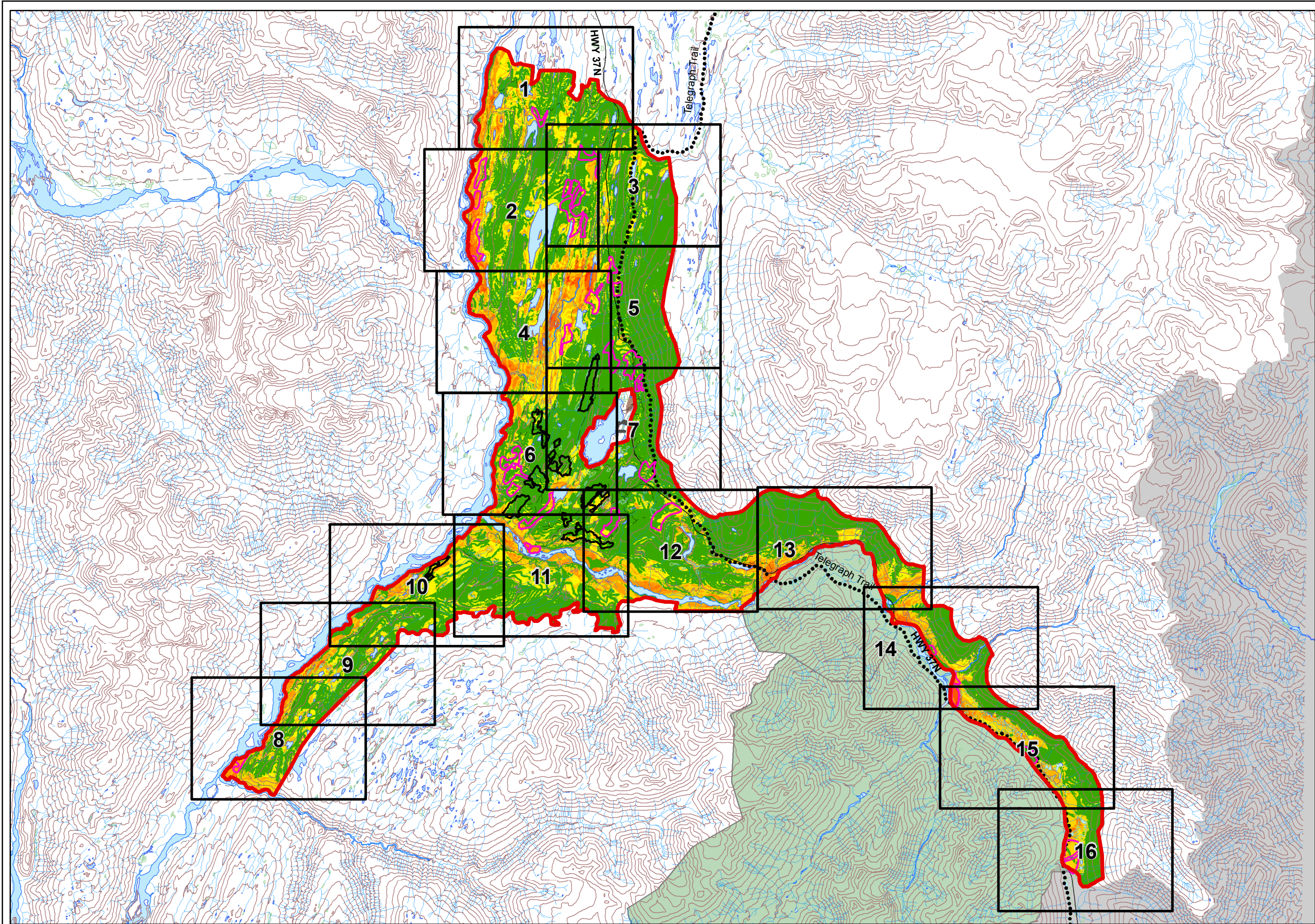
★ Known Archaeological Sites

Study Area

Figure 2. Map showing project area location



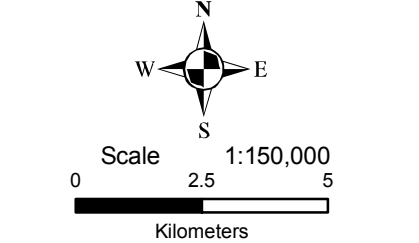
Figures 3-19. Maps 1-16, Model showing archaeological potential in project area.



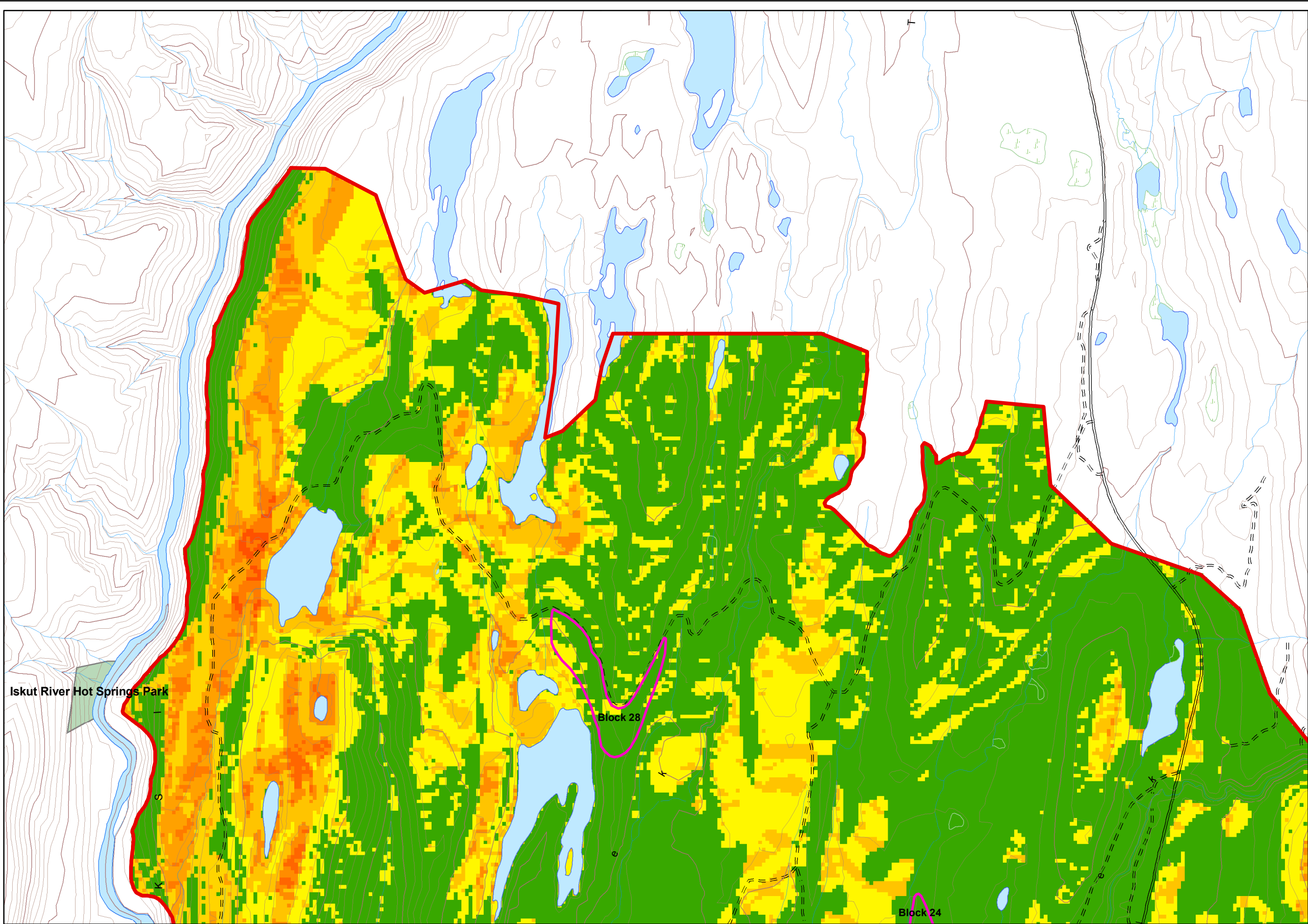
Cassiar Forest Corporation
Archaeological
Assessment Maps
1:20,000 Map Key
Figure 3

Legend	
Forest Development Unit (FDU)	
Proposed Block Boundary (Traversed)	
Proposed Block Boundary	
Paved Road	
Gravel Road	
Private Lands	
No Harvest (Parks & Protected Areas)	
Nass Area (Nisga'a Lands)	
Recreation Trails	
Recreation Sites	
Waterbodies	
Swamps	
Streams and Rivers - TRIM data	
Index Contour (100 m Interval)	

AOA Model Values Indicating Archaeological Potential	
Low Archaeological Potential	
	-20 - 13
Moderate to High Archaeological Potential	
	14 - 22
	23 - 31
	33 - 44



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Archaeological
Assessment Maps
Map 1 of 16
Figure 4

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
 - Proposed Block Boundary
 - Paved Road
 - Gravel Road
 - Private Lands
 - No Harvest (Parks & Protected Areas)
 - Nass Area (Nisga'a Lands)
 - Recreation Trails
 - Recreation Sites
 - Cabin
 - Archeological Sites
 - Waterbodies
 - Swamps
 - Streams and Rivers - TRIM data
 - Index Contour (100 m Interval)
 - Intermediate Contour (20 m Interval)
 - Possible travel corridor (Ningunsaw/Iskut High Pass)

- AOA Model Values Indicating Archaeological Potential**
- Low Archaeological Potential
- 20 - 13
- Moderate to High Archaeological Potential
- 14 - 22
 - 23 - 31
 - 33 - 44

Scale 1:20,000

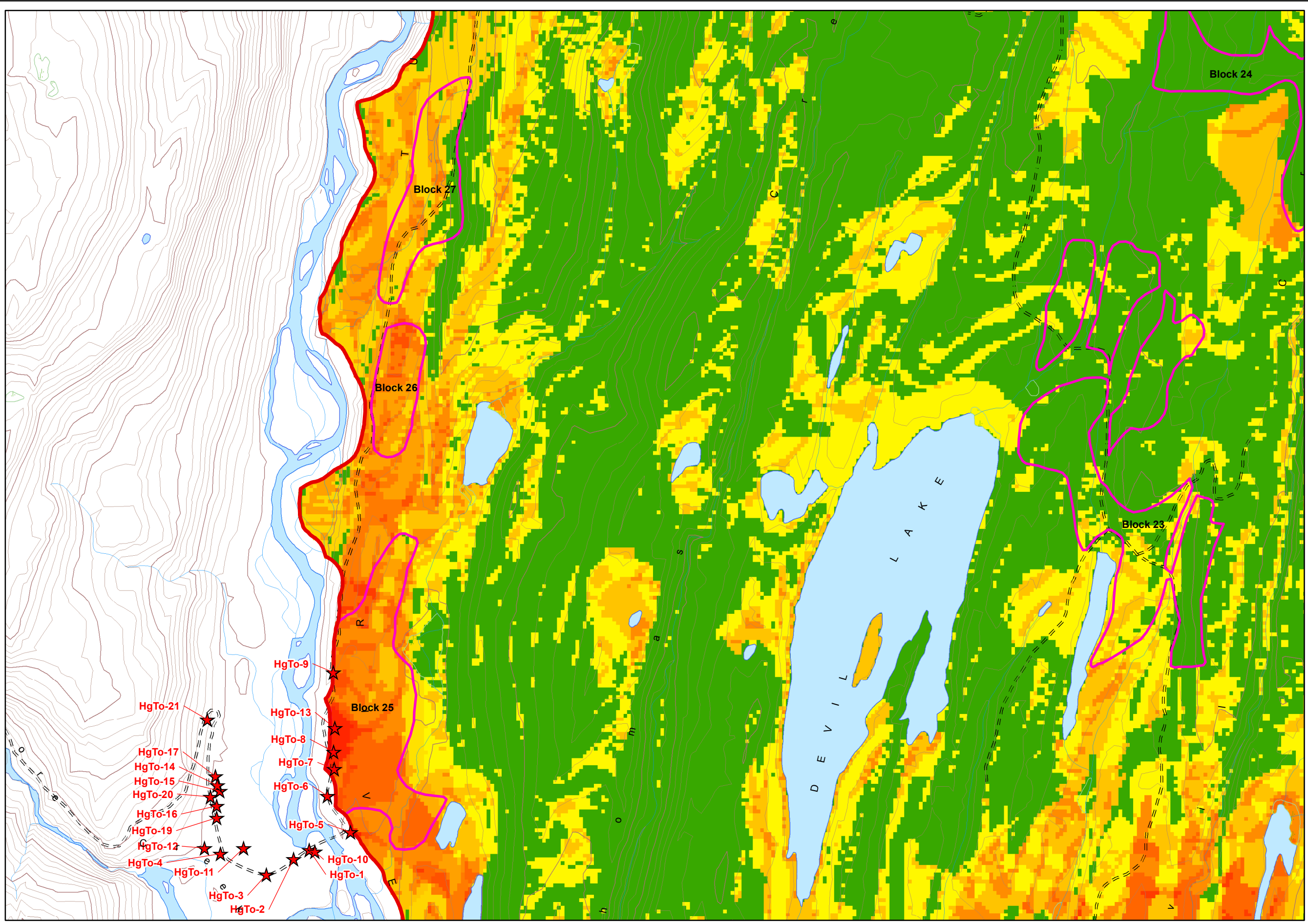
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Archaeological
Assessment Maps
Map 2 of 16
Figure 5

Legend

Forest Development Unit (FDU)	
Proposed Block Boundary (Traversed)	
Proposed Block Boundary	
Paved Road	
Gravel Road	
Private Lands	
No Harvest (Parks & Protected Areas)	
Nass Area (Nisga'a Lands)	
Recreation Trails	
Recreation Sites	
Cabin	
Archeological Sites	
Waterbodies	
Swamps	
Streams and Rivers - TRIM data	
Index Contour (100 m Interval)	
Intermediate Contour (20 m Interval)	
Possible travel corridor (Ningunsaw/Iskut High Pass)	

AOA Model Values Indicating Archaeological Potential

Low Archaeological Potential

-20 - 13

Moderate to High Archaeological Potential

14 - 22	
23 - 31	
33 - 44	

Scale 1:20,000

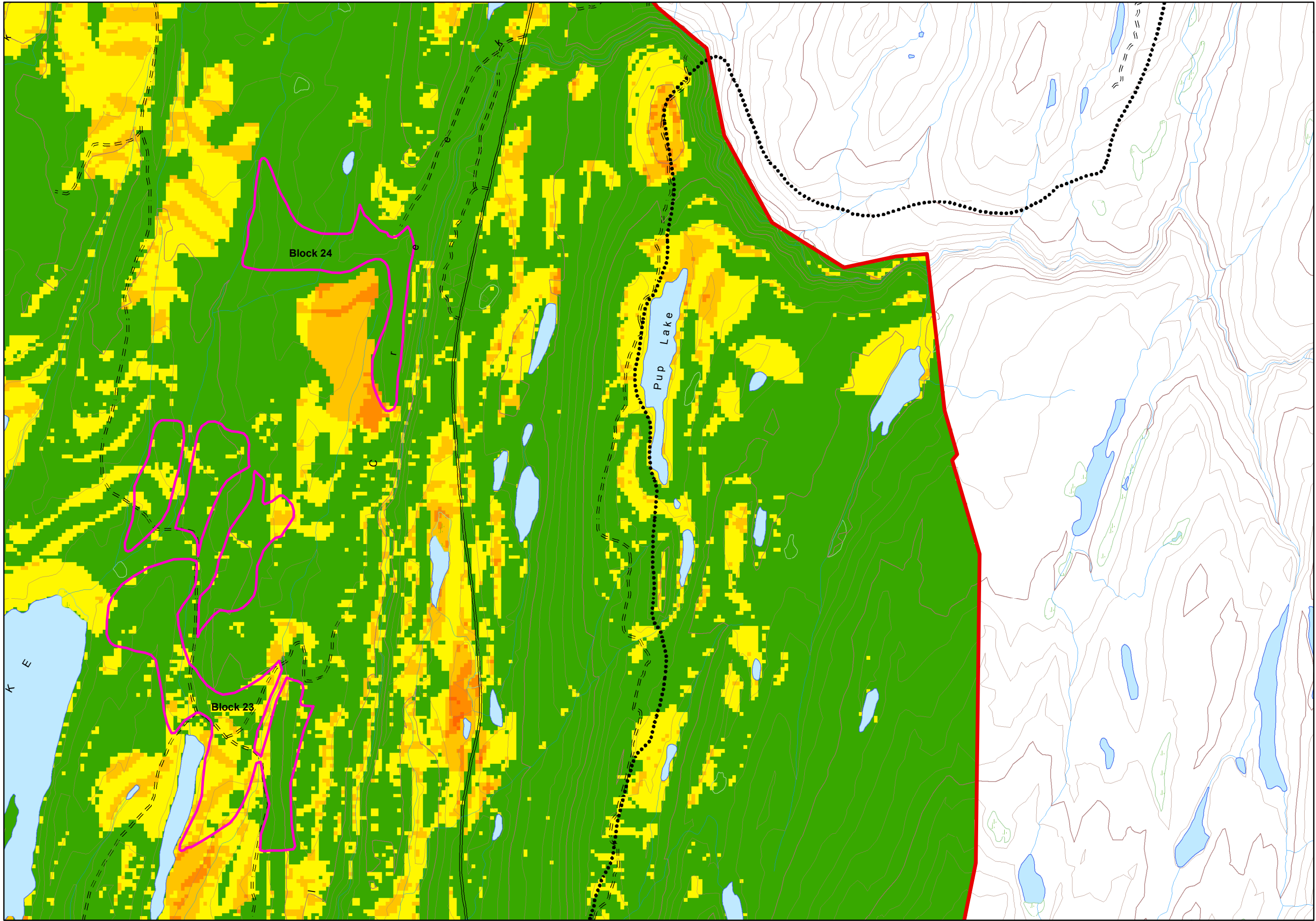
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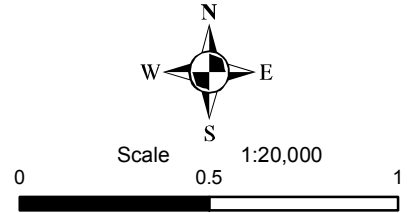
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Archaeological
Assessment Maps
Map 3 of 16
Figure 6

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
 - Proposed Block Boundary
 - Paved Road
 - Gravel Road
 - Private Lands
 - No Harvest (Parks & Protected Areas)
 - Nass Area (Nisga'a Lands)
 - Recreation Trails
 - Recreation Sites
 - Cabin
 - Archeological Sites
 - Waterbodies
 - Swamps
 - Streams and Rivers - TRIM data
 - Index Contour (100 m Interval)
 - Intermediate Contour (20 m Interval)
 - Possible travel corridor (Ningunsaw/Iskut High Pass)

- AOA Model Values Indicating Archaeological Potential**
- Low Archaeological Potential
- 20 - 13
- Moderate to High Archaeological Potential
- 14 - 22
 - 23 - 31
 - 33 - 44

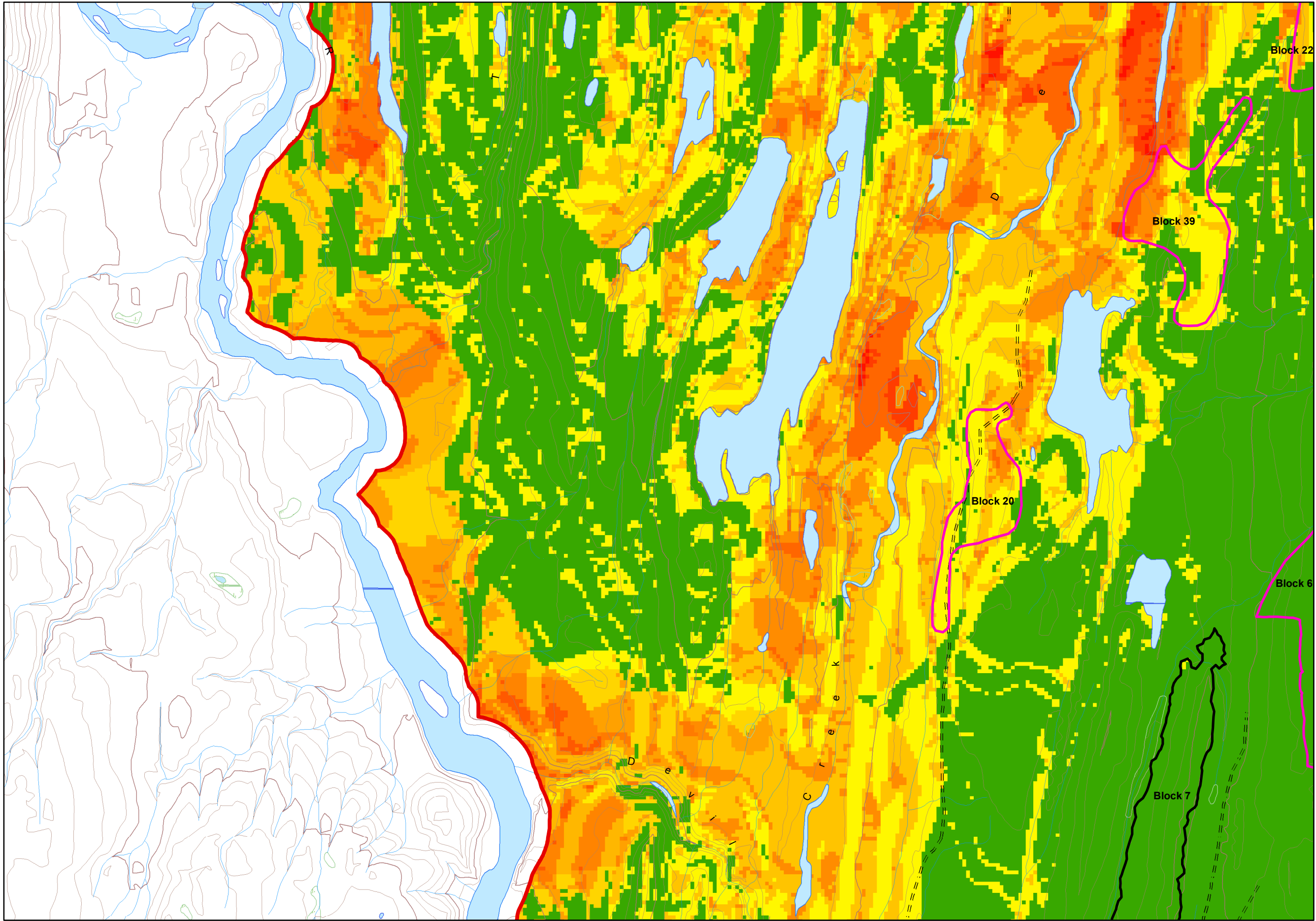


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Archaeological
Assessment Maps
Map 4 of 16
Figure 7

Legend

Forest Development Unit (FDU)	
Proposed Block Boundary (Traversed)	
Proposed Block Boundary	
Paved Road	
Gravel Road	
Private Lands	
No Harvest (Parks & Protected Areas)	
Nass Area (Nisga'a Lands)	
Recreation Trails	
Recreation Sites	
Cabin	
Archeological Sites	
Waterbodies	
Swamps	
Streams and Rivers - TRIM data	
Index Contour (100 m Interval)	
Intermediate Contour (20 m Interval)	
Possible travel corridor (Ningunsaw/Iskut High Pass)	

AOA Model Values Indicating Archaeological Potential

Low Archaeological Potential

-20 - 13

Moderate to High Archaeological Potential

14 - 22	
23 - 31	
33 - 44	

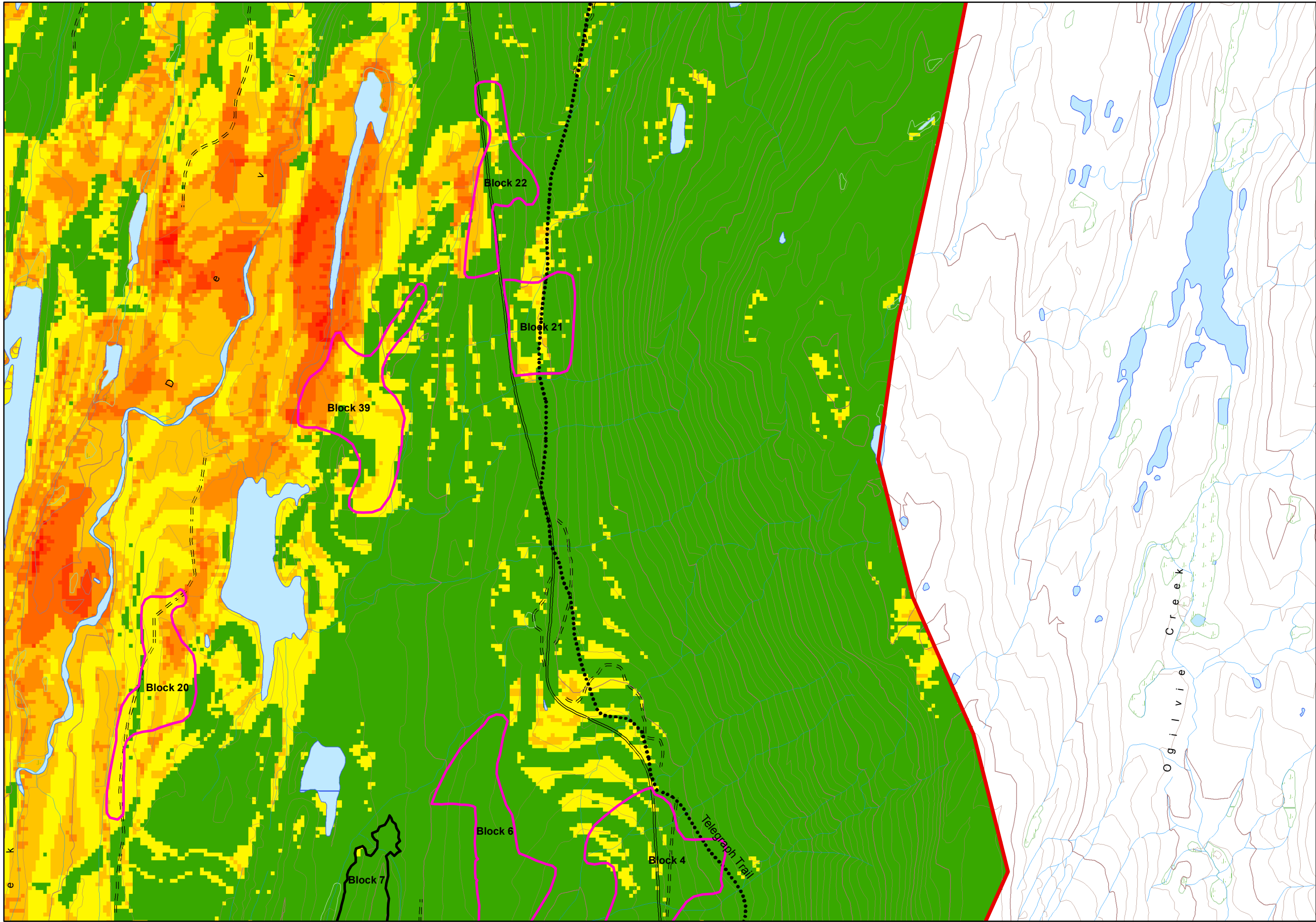
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Archaeological
Assessment Maps
Map 5 of 16
Figure 8

- Legend**
- Forest Development Unit (FDU)
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 - Proposed Block Boundary
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 - No Harvest (Parks & Protected Areas)
 - Nass Area (Nisga'a Lands)
 - Recreation Trails
 - Recreation Sites
 - Cabin
 - Archaeological Sites
 - Waterbodies
 - Swamps
 - Streams and Rivers - TRIM data
 - Index Contour (100 m Interval)
 - Intermediate Contour (20 m Interval)
 - Possible travel corridor (Ningunsaw/Iskut High Pass)

- AOA Model Values Indicating Archaeological Potential**
- Low Archaeological Potential
- 20 - 13
- Moderate to High Archaeological Potential
- 14 - 22
 - 23 - 31
 - 33 - 44

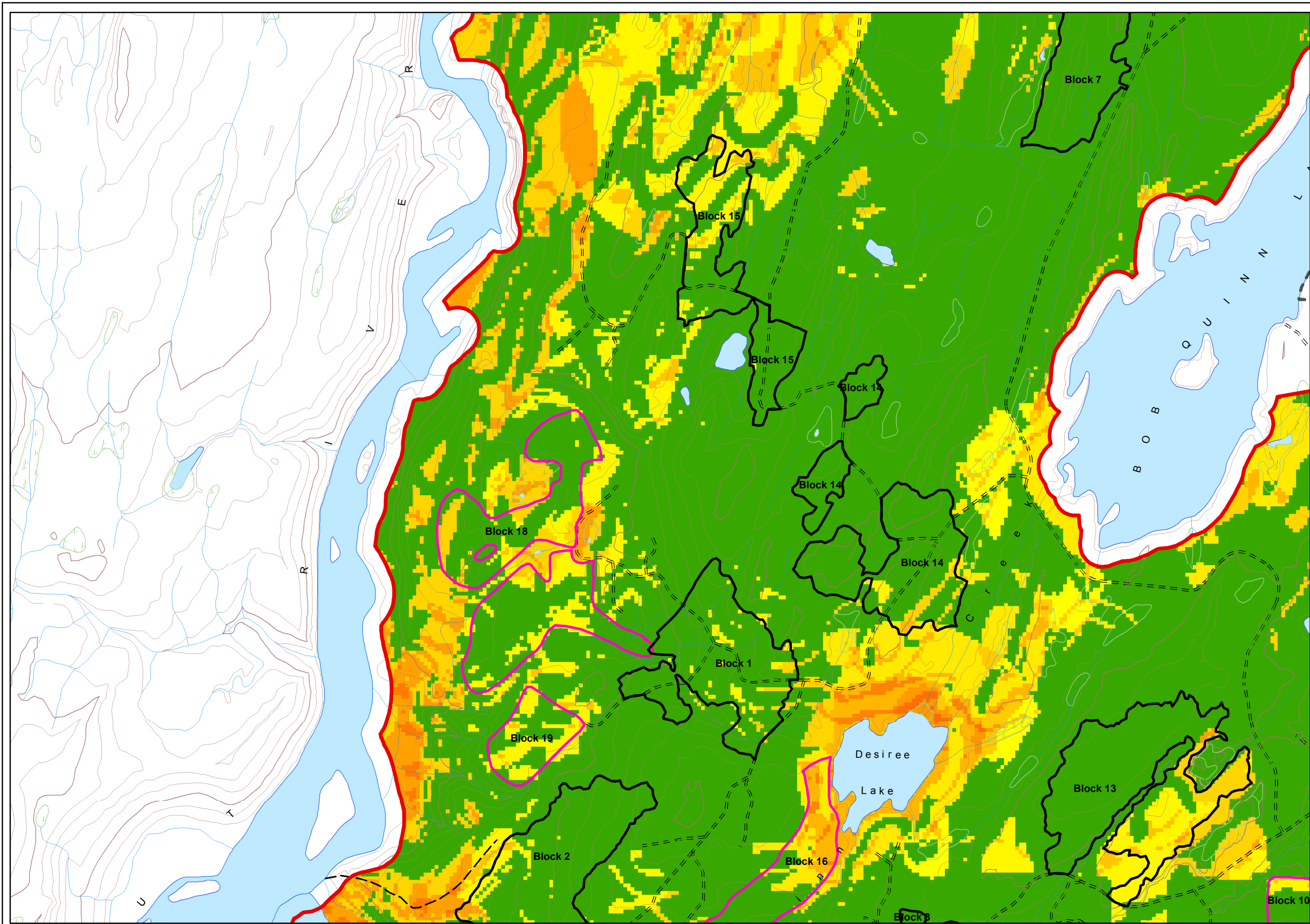
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Projection: Nad 83 UTM Zone 9

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Archaeological
Assessment Maps
Map 6 of 16
Figure 9

- Legend**
- Forest Development Unit (FDU) [Red outline]
 - Proposed Block Boundary (Traversed) [Black outline]
 - Proposed Block Boundary [Pink outline]
 - Paved Road [Double line]
 - Gravel Road [Triple line]
 - Private Lands [Brown fill]
 - No Harvest (Parks & Protected Areas) [Light green fill]
 - Nass Area (Nisga'a Lands) [Grey fill]
 - Recreation Trails [Dotted line]
 - Recreation Sites [Dashed line]
 - Cabin [Cabin icon]
 - Archeological Sites [Red star]
 - Waterbodies [Blue fill]
 - Swamps [Green wavy lines]
 - Streams and Rivers - TRIM data [Blue line]
 - Index Contour (100 m Interval) [Thin brown line]
 - Intermediate Contour (20 m Interval) [Thick brown line]
 - Possible travel corridor (Ningunsaw/Iskut High Pass) [Dashed line]

- AOA Model Values Indicating Archaeological Potential**
- Low Archaeological Potential
- 20 - 13 [Green]
- Moderate to High Archaeological Potential
- 14 - 22 [Yellow]
 - 23 - 31 [Orange]
 - 33 - 44 [Red]

North arrow pointing North (N), West (W), East (E), South (S).

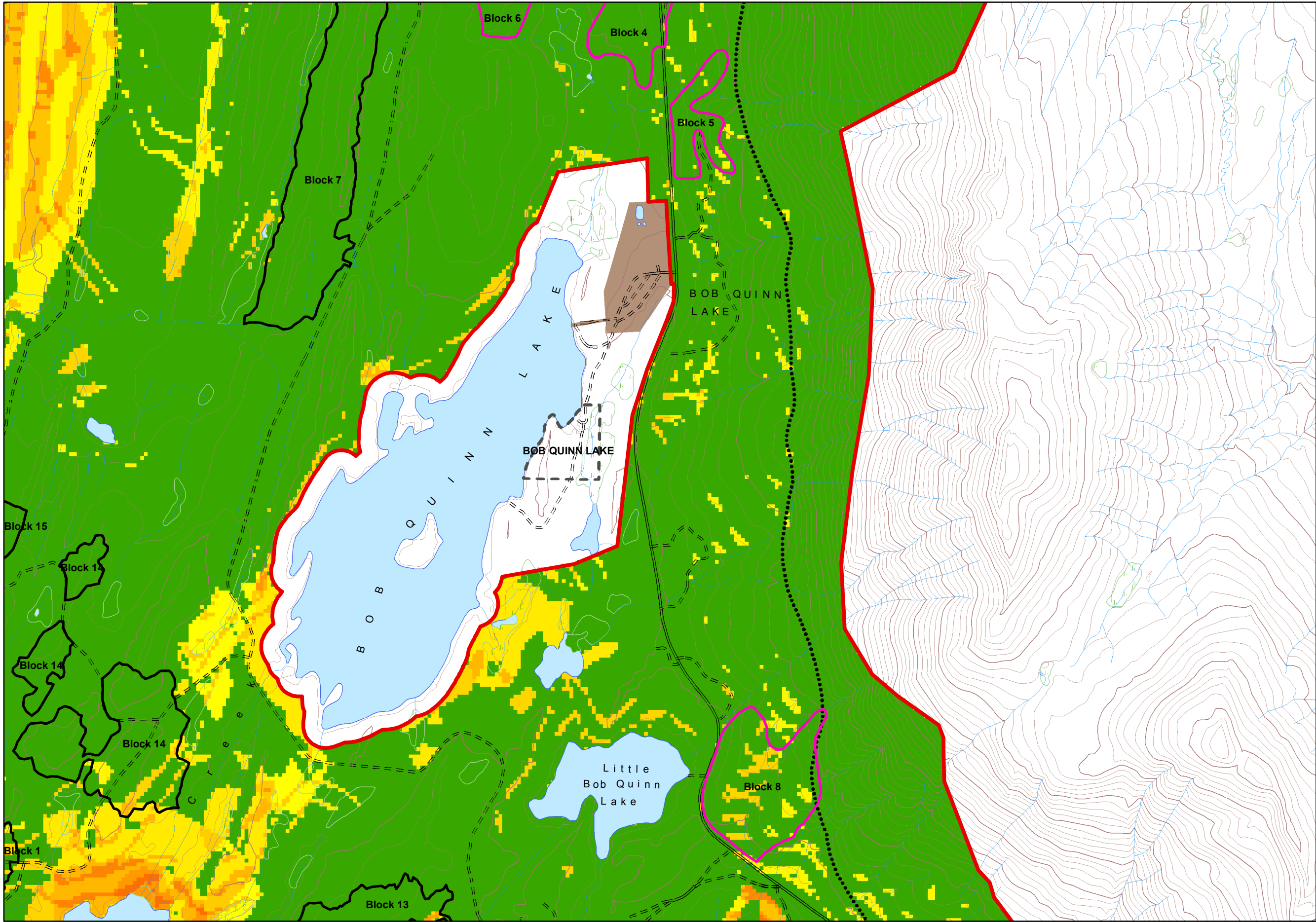
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Projection: Nad 83 UTM Zone 9

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Map 7 of 16
Figure 10

- Legend**
- Forest Development Unit (FDU) [Red outline]
 - Proposed Block Boundary (Traversed) [Black outline]
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 - Paved Road [Double line]
 - Gravel Road [Triple line]
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 - Nass Area (Nisga'a Lands) [Grey fill]
 - Recreation Trails [Dotted line]
 - Recreation Sites [Dashed line]
 - Cabin [Black arrow icon]
 - Archeological Sites [Red star icon]
 - Waterbodies [Blue fill]
 - Swamps [Green wavy line fill]
 - Streams and Rivers - TRIM data [Blue line]
 - Index Contour (100 m Interval) [Thin brown line]
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- Moderate to High Archaeological Potential
- 14 - 22 [Yellow fill]
 - 23 - 31 [Orange fill]
 - 33 - 44 [Red fill]

North arrow pointing North (N), West (W), East (E), South (S).

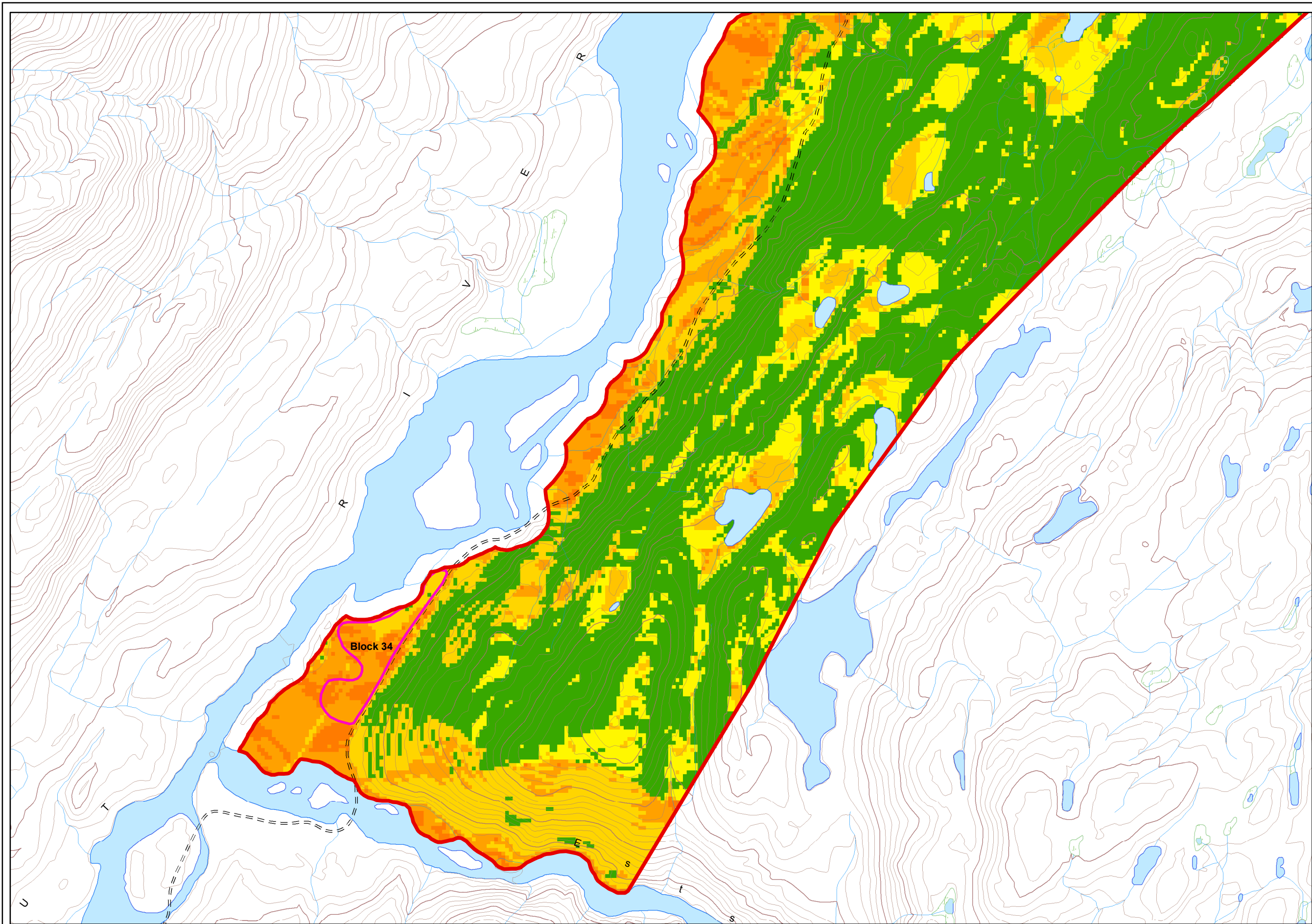
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**Cassiar Forest Corporation
Archaeological
Assessment Maps
Map 8 of 16
Figure 11**

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
 - Proposed Block Boundary
 - Paved Road
 - Gravel Road
 - Private Lands
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 - Waterbodies
 - Swamps
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- 14 - 22
 - 23 - 31
 - 33 - 44

Scale 1:20,000

0 0.5 1 Kilometers

Projection: Nad 83 UTM Zone 9

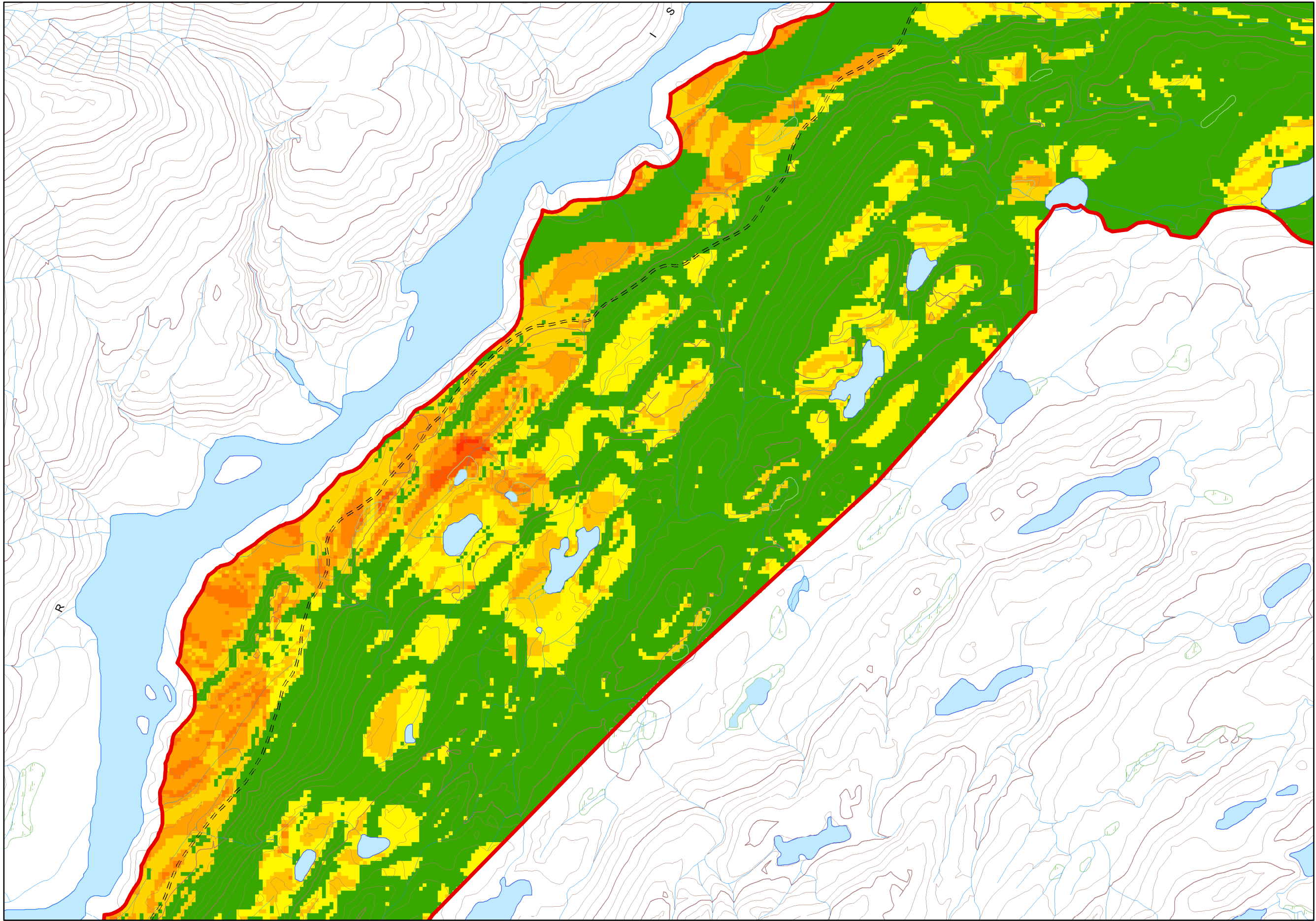
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Map 9 of 16
Figure 12**

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
 - Proposed Block Boundary
 - Paved Road
 - Gravel Road
 - Private Lands
 - No Harvest (Parks & Protected Areas)
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- AOA Model Values Indicating Archaeological Potential**
- Low Archaeological Potential
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- Moderate to High Archaeological Potential
- 14 - 22
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 - 33 - 44

Scale 1:20,000

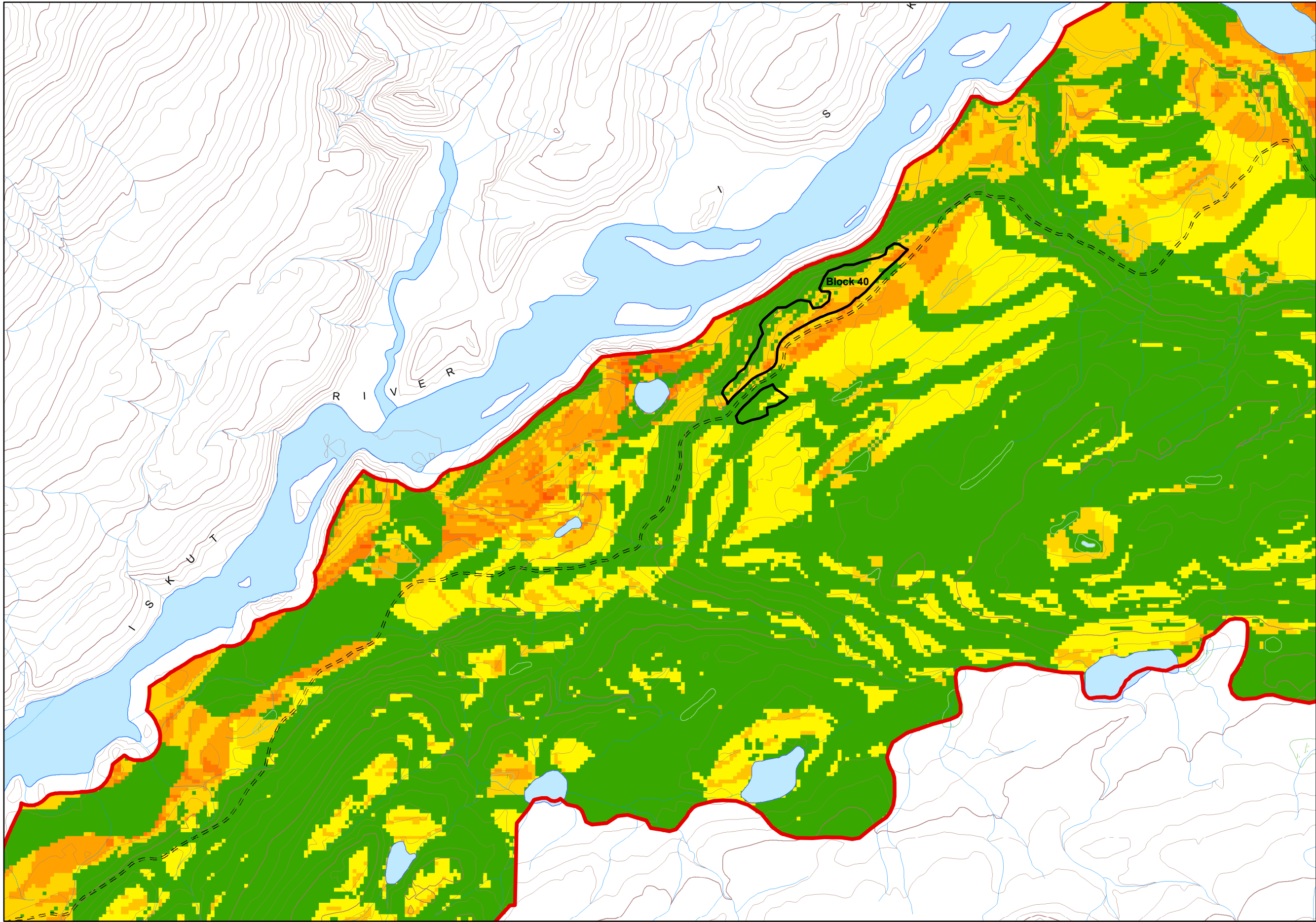
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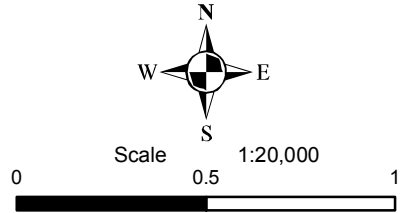
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Archaeological
Assessment Maps
Map 10 of 16
Figure 13

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
 - Proposed Block Boundary
 - Paved Road
 - Gravel Road
 - Private Lands
 - No Harvest (Parks & Protected Areas)
 - Nass Area (Nisga'a Lands)
 - Recreation Trails
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 - Cabin
 - Archeological Sites
 - Waterbodies
 - Swamps
 - Streams and Rivers - TRIM data
 - Index Contour (100 m Interval)
 - Intermediate Contour (20 m Interval)
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- AOA Model Values Indicating Archaeological Potential**
- Low Archaeological Potential
- 20 - 13
- Moderate to High Archaeological Potential
- 14 - 22
 - 23 - 31
 - 33 - 44

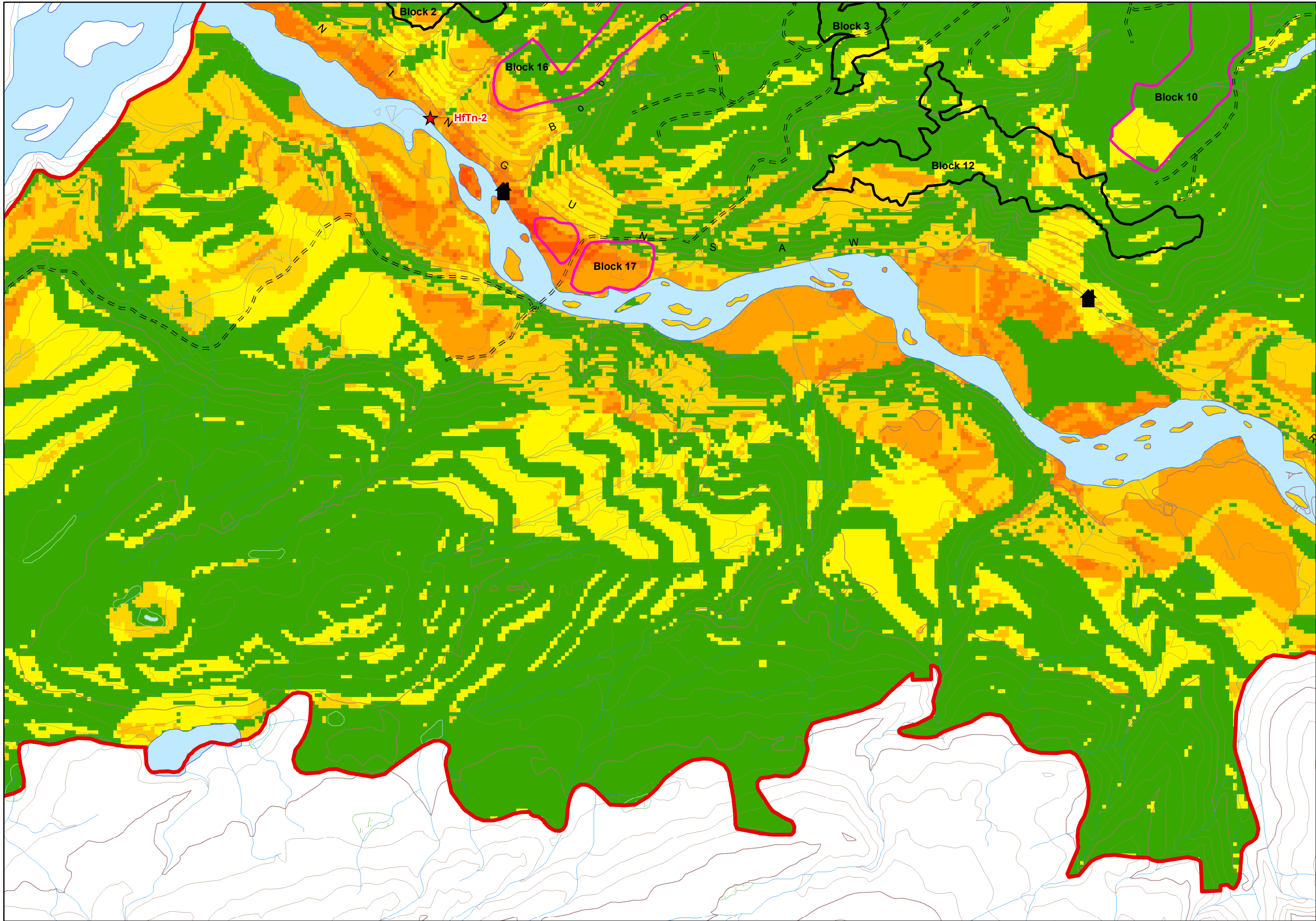


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Cassiar Forest Corporation
Archaeological
Assessment Maps
Map 11 of 16
Figure 14

- Legend**
- Forest Development Unit (FDU) [Red outline]
 - Proposed Block Boundary (Traversed) [Black outline]
 - Proposed Block Boundary [Pink outline]
 - Paved Road [Double line]
 - Gravel Road [Triple line]
 - Private Lands [Brown box]
 - No Harvest (Parks & Protected Areas) [Green box]
 - Nass Area (Nisga'a Lands) [Grey box]
 - Recreation Trails [Dotted line]
 - Recreation Sites [Dashed line]
 - Cabin [Black arrow]
 - Archeological Sites [Red star]
 - Waterbodies [Blue box]
 - Swamps [Green box with wavy lines]
 - Streams and Rivers - TRIM data [Blue line]
 - Index Contour (100 m Interval) [Thin grey line]
 - Intermediate Contour (20 m Interval) [Thin grey line]
 - Possible travel corridor (Ningunsaw/Iskut High Pass) [Dashed line]

- AOA Model Values Indicating Archaeological Potential
- Low Archaeological Potential
- 20 - 13 [Green box]
- Moderate to High Archaeological Potential
- | | |
|----------------------------|-------------------|
| [Yellow box] 14 - 22 | [Orange box] |
| [Light orange box] 23 - 31 | [Dark orange box] |
| [Red-orange box] 33 - 44 | [Red box] |

North arrow pointing North (N), South (S), East (E), West (W).

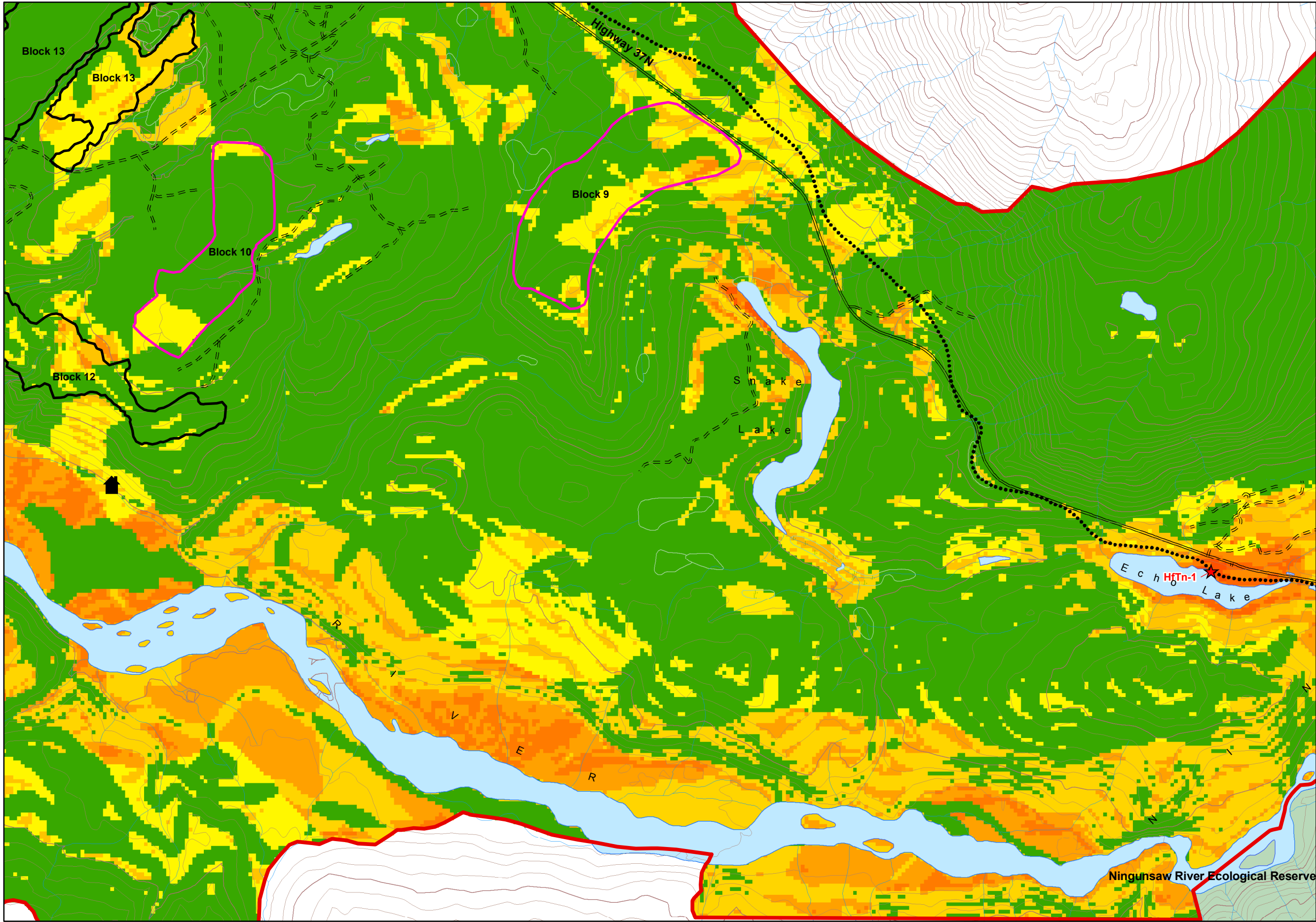
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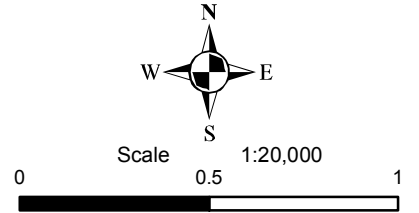
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Assessment Maps
Map 12 of 16
Figure 15

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
 - Proposed Block Boundary
 - Paved Road
 - Gravel Road
 - Private Lands
 - No Harvest (Parks & Protected Areas)
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- AOA Model Values Indicating Archaeological Potential**
- Low Archaeological Potential
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 - 33 - 44

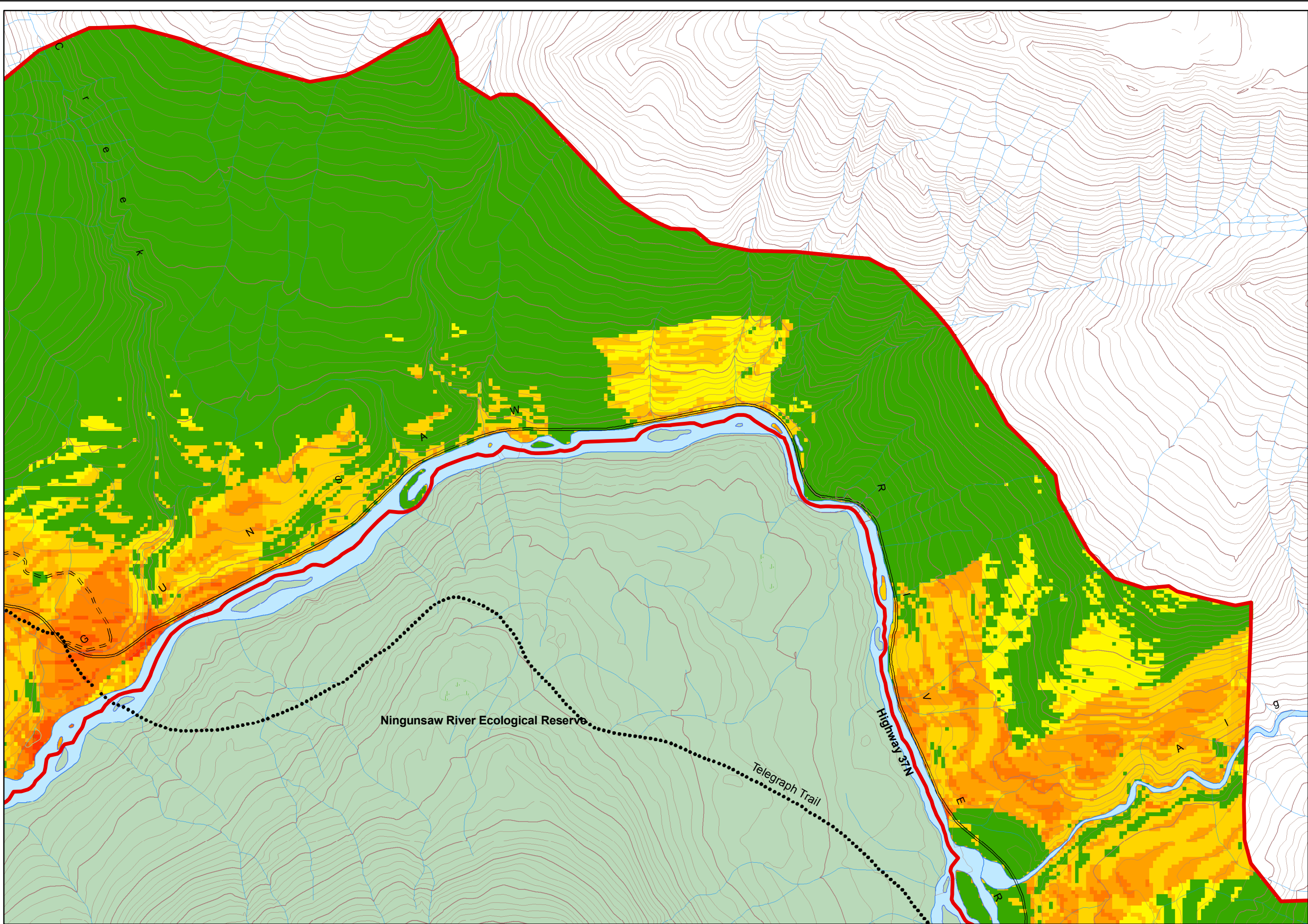


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Cassiar Forest Corporation
Archaeological
Assessment Maps
Map 13 of 16
Figure 16

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
 - Proposed Block Boundary
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- Low Archaeological Potential
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 - 33 - 44

Scale 1:20,000

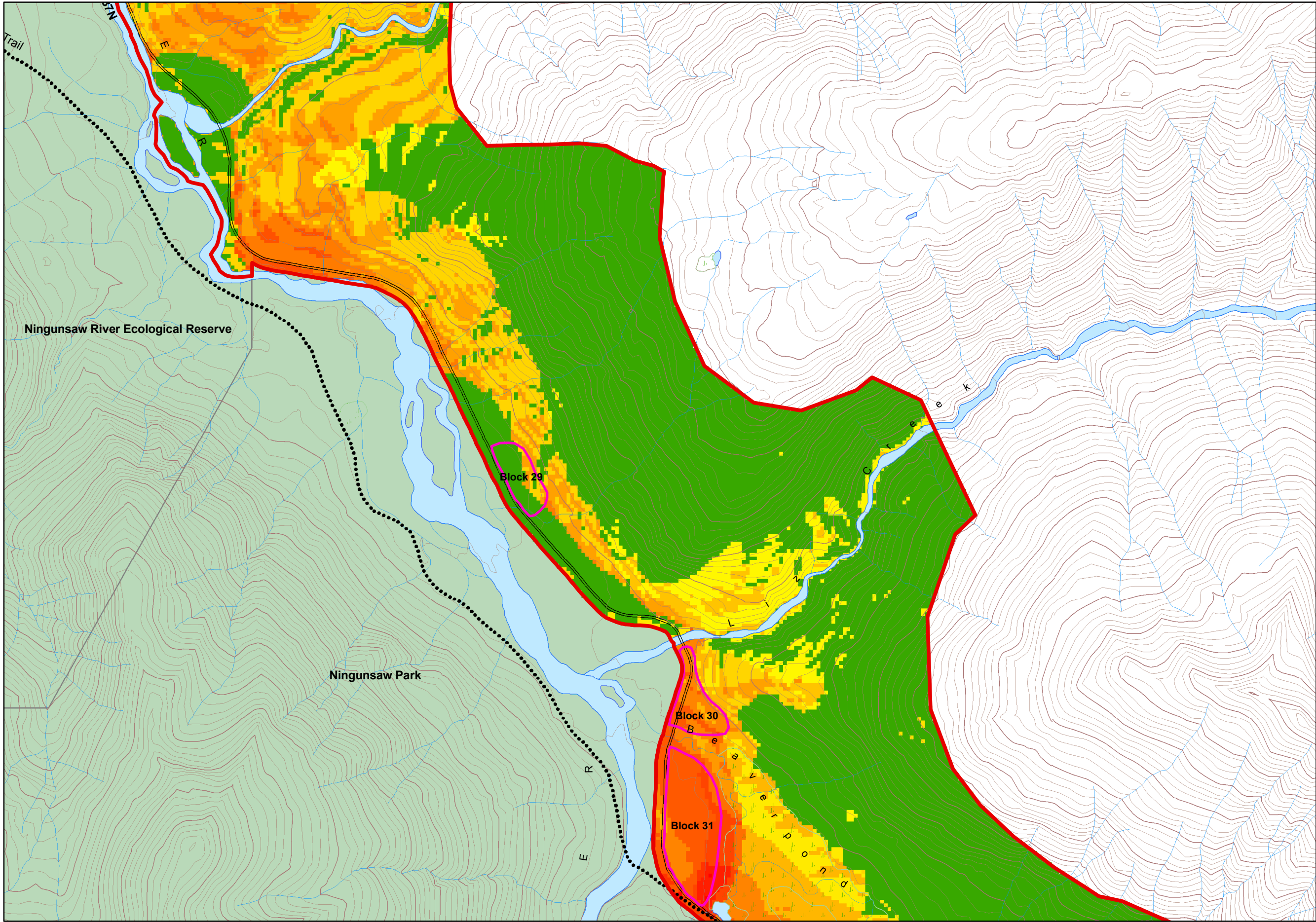
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Projection: Nad 83 UTM Zone 9

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Archaeological
Assessment Maps
Map 14 of 16
Figure 17

- Legend**
- Forest Development Unit (FDU) [Red outline]
 - Proposed Block Boundary (Traversed) [Black outline]
 - Proposed Block Boundary [Pink outline]
 - Paved Road [Double line]
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 - Nass Area (Nisga'a Lands) [Grey fill]
 - Recreation Trails [Dotted line]
 - Recreation Sites [Dashed line]
 - Cabin [House icon]
 - Archeaological Sites [Red star]
 - Waterbodies [Blue fill]
 - Swamps [Green wavy lines]
 - Streams and Rivers - TRIM data [Blue line]
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- 14 - 22 [Yellow fill]
 - 23 - 31 [Orange fill]
 - 33 - 44 [Red fill]

North arrow pointing North (N), West (W), East (E), South (S).

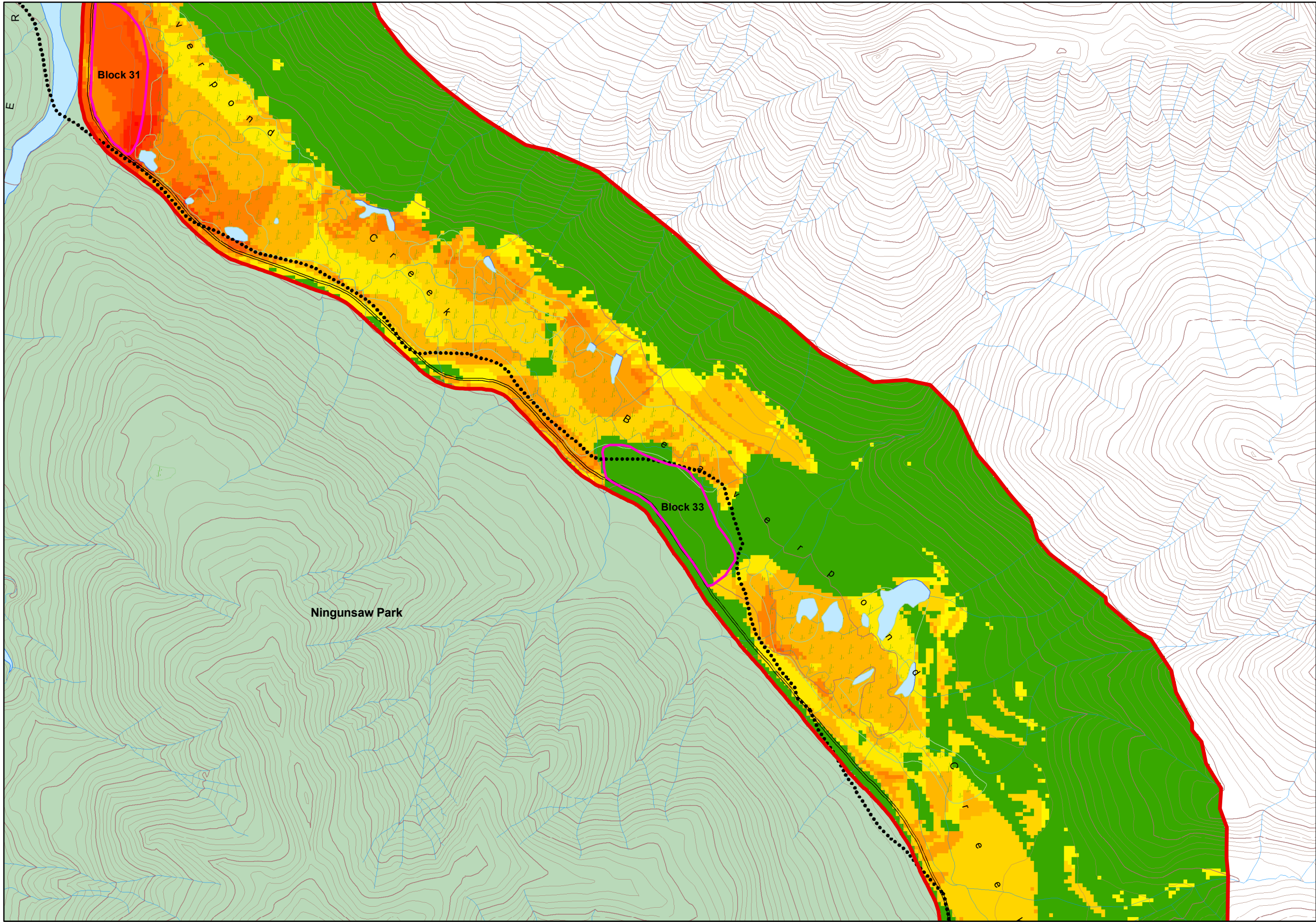
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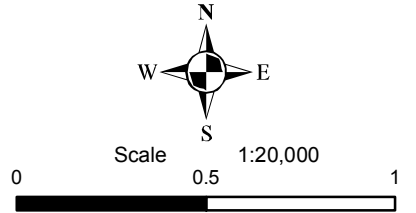
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Assessment Maps
Map 15 of 16
Figure 18**

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
 - Proposed Block Boundary
 - Paved Road
 - Gravel Road
 - Private Lands
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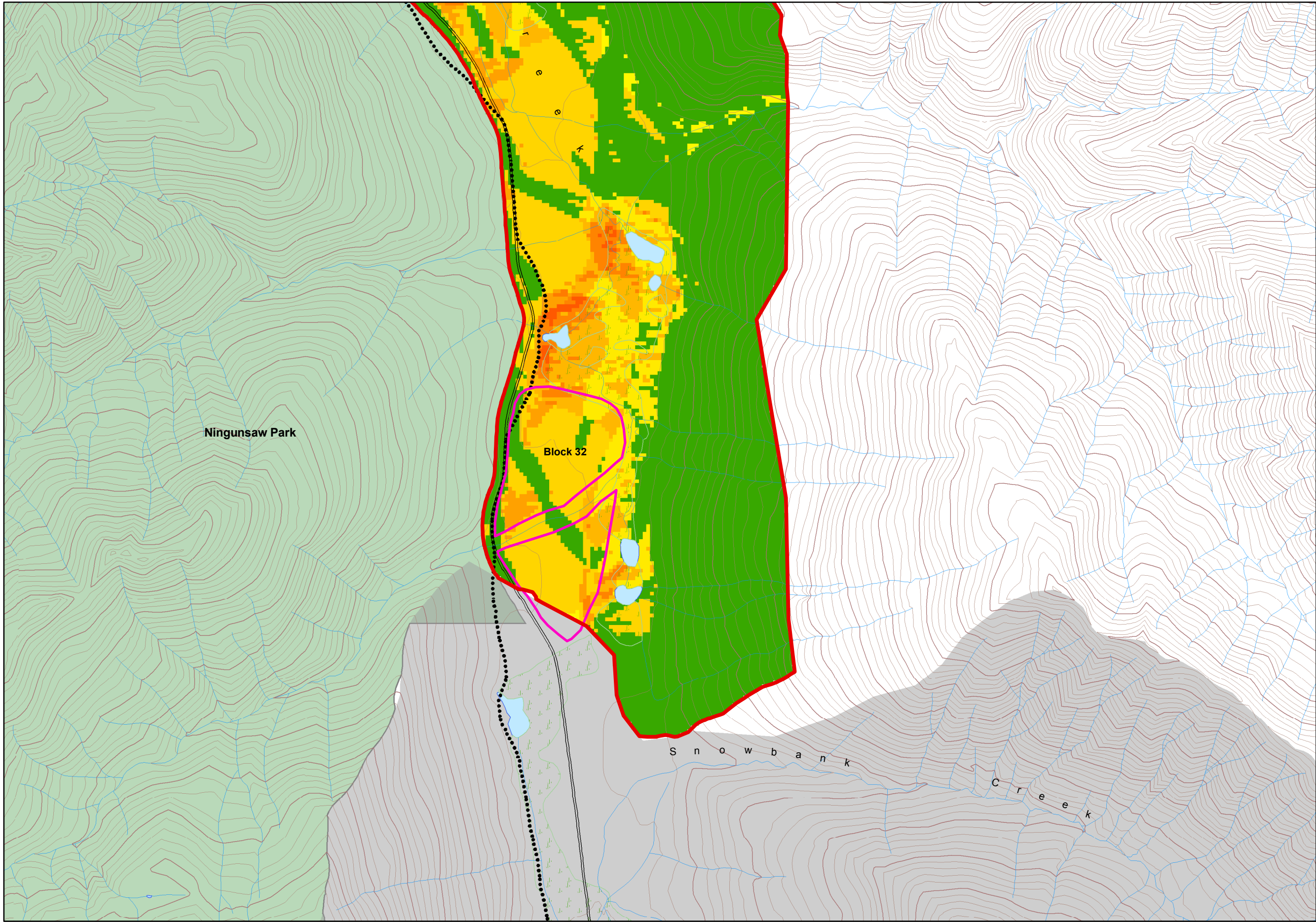


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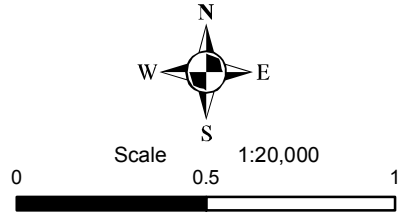
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Assessment Maps
Map 16 of 16
Figure 19

- Legend**
- Forest Development Unit (FDU)
 - Proposed Block Boundary (Traversed)
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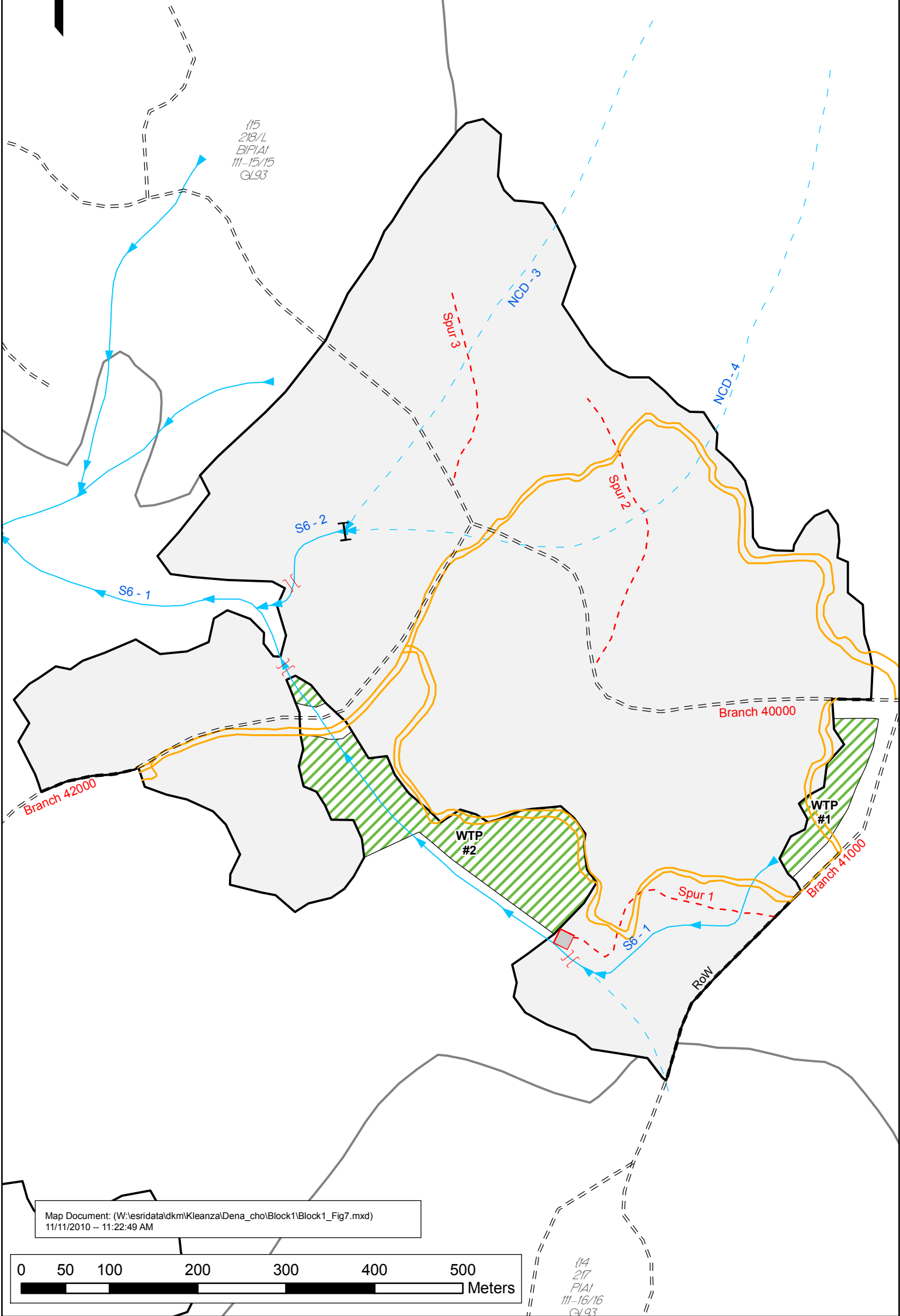
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Figure 20. Block 1 survey coverage



Location of Survey Transects

Block 1

Figure 20

SETTING NO.	Block 1
OPERATING AREA:	Bob Quinn Creek
TENURE:	
Longitude: 130° 18' 44"	Latitude: 56° 57' 11"
Photo #:	C.P.: 100
Revision No. & Date:	October 08, 2010
Associated RP # / Amendment #:	N/A
Scale: 1:5,000	Ref. map: 104B.099
TOTAL AREA (ha) DESCRIPTION	
Gross ha. : 51.0	Merchantable. : 40.0
NP Natural. :	Previously Harvested: 0.8
NCBR. :	External WTP: 3.6
RP/Built Road :	ROW : 6.6

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Cassiar Forest Corp.

Mapping by:
Fortech
Prepared by: W. Rolston, Magellan Digital Mapping

Location of Survey Transect Center
Waypoint Location and Number

Rigging Tree
WTP Boundary
MWR
Cruise Plot Line
Cruise Plot with CMT
Cruise Plot without CMT

Falling Boundary
Timber Type Boundary
Built Road
Proposed Road
Skid Trail
MTS Trail
Road Permit
BEC

Stream Classifications
Riparian Class
Reach Boundary
Non Classification Drainage
Classified Stream (No-Fish)
Classified Stream (Fish)
Falls

OGMA
Swamp
Slide
Boulders
Rock Bluff
Break
Ridge
Base of Hill
Avalanche Chute

Figure 21. Block 2 survey coverage

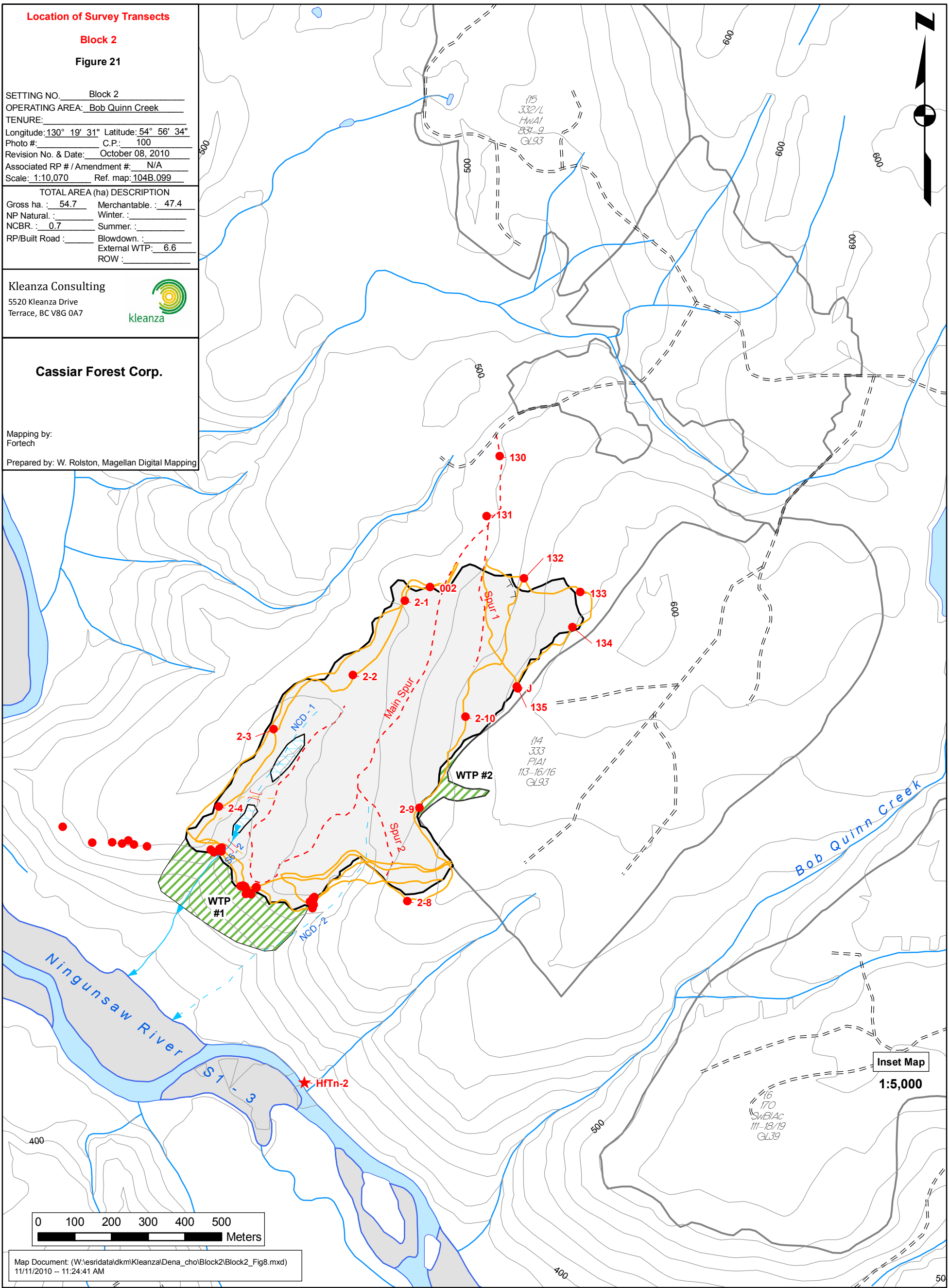


Figure 22. Block 12 survey coverage

Figure 23. Block 13 survey coverage

