Alouette Water Use Plan

Archaeological Impact Assessment

ALUMON#7

Study Period: 2009 - 2010
Report Date:  May 2010

Katzie Development Corporation - Archaeology
BC HYDRO ALOUETTE ARCHAEOLOGICAL MONITORING STUDY FINAL REPORT

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Management Summary

In 2009 and early 2010, Katzie Development Corporation-Archaeology conducted an archaeological overview assessment and preliminary field reconnaissance of the Alouette Lake Reservoir and South Alouette River. This work was completed under the BC Hydro Alouette Archaeological Monitoring Study which is a result of the 2006 Alouette Water Use Plan (WUP) process.

The study area is located in the asserted traditional territory of the Katzie First Nation, Kwantlen First Nation, and Semiahmoo First Nation. The study area is also located in Stó:lō Nation traditional territory. Large portions of the study area have a moderate to high archaeological potential rating and three sites (DiRo-1, DhRo-7 and DhRo-8) have been previously identified (Arcas 1991).

The objectives of this study were to:

- Identify any surficial archaeological remains that may be present within the study area;
- Identify areas within Alouette Lake and on the South Alouette River that have archaeological potential;
- Identify and assess possible impacts of Reservoir operations to any identified archaeological sites or areas with moderate or high archaeological potential; and
- Provide recommendations regarding the need for and appropriate scope of further archaeological studies.

During the course of the preliminary field reconnaissance and subsequent archaeological impact assessment and inventory under BC Hydro’s Reservoir Archaeology Program, five newly identified archaeological sites (DhRo-60, DhRo-61, DhRo-62, DhRo-63, and DhRo-64) were recorded. Several of these sites have moderate scientific significance and all of the sites are considered to be culturally significant to the Katzie First Nation.

Ownership of Intellectual Property

The results of this study are being provided to the Archaeology Branch and BC Hydro. The Katzie First Nation, Kwantlen First Nation, Stó:lō Nation, and Semiahmoo First Nation, however, maintain ownership of all cultural heritage information documented within this study.

Acknowledgements

Katzie Development Corporation-Archaeology (KDC-A) would like to thank Dave Hunter (BC Hydro) for the opportunity to conduct this study. KDC-A thanks Kenny Erickson, Harold Moody, Kennedy Richard, and Scott Gabriel for their assistance with the fieldwork. The opinions expressed in this document are those of the authors. The authors are solely responsible for its contents and any omissions and errors that it may contain.
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1.0 INTRODUCTION

Katzie live in one of the most environmentally and topographically diverse areas of British Columbia’s Lower Fraser Valley, including the Alouette drainage that constitutes the study area. In the past, Katzie access to and control over a diverse and abundant variety of relatively rare resources shaped Katzie socio-economy and influenced their status among neighbouring Halkomelem-speaking Nations. Despite government imposed restrictions on land-base and cultural practice, Katzie have continued to use their lands and waters in pursuit of traditional lifeways. Though some plant foods for which Katzie territory and peoples were renowned, including “wapato” or Indian Potato, no longer grow in most traditional harvest areas, Katzie still actively seek out areas where they can hunt, fish, and gather resources. Though the resource base and access to it is becomingly increasingly restricted, the Katzie continue to assert their aboriginal Title and Rights relatively consistently throughout the territory.

The municipalities within Katzie territory are undergoing an unprecedented period of urban growth. The net result of this rapid development has been a recent and exponential decrease in the availability of lands and resources for Katzie use. Once surrounded by farm lands that supported an accessible but somewhat restricted range of traditional resources, residential and industrial development has restricted both the resources and access to them. Consequently, Katzie are in an increasingly vulnerable situation where the pressures of urban encroachment are making it very difficult to pursue even the most fundamental cultural practices.

Katzie are currently in the process of cataloguing past resource uses while looking for avenues to regain and re-establish resource access. To this end, Katzie actively participate in regulatory processes that affect Katzie territory, resources, and ultimately Katzie people. By participating in the original Alouette reservoir water licensing process (in 1996) and the current Water Use Planning (WUP) review, Katzie continue to assert their stewardship role over their traditional territory.

1.1 Rationale and Objectives

Water use planning is a program designed to find a balance between the needs diverse interest groups with a direct stake in reservoirs. Concerns addressed in Water Use Plans (WUPs) include recreation, domestic water supply, heritage resources, fish, wildlife, and electrical power needs (BC Hydro, n.d.). This report presents the role of heritage and cultural resources of Katzie First Nation in response to consultation on the Alouette Water Use Plan.

As a result of the Alouette Water Use Planning (WUP) process, the WUP committee recognized the importance of archaeological sites to the First Nations with an interest in the area and that the effects of reservoir operations on archaeological sites were a key concern. As a complete archaeological inventory of the Alouette Reservoir had not yet occurred, the WUP committee was unable to fully evaluate the potential effects of operations on archaeological sites. The WUP committee recommended an archaeological impact assessment and inventory be conducted for the Alouette Reservoir.
Subsequently, the Comptroller of Water Rights clarified that only non-intrusive heritage work could be included in an Order issued under the Water Act. Thus, the terms of reference for the Archaeological Monitoring Plan were designed to be non-intrusive to reflect this understanding.

The Alouette Archaeological Monitoring Study was a two-year study intended to address a knowledge gap regarding the number, location, elevation, condition, susceptibility to erosion and relative importance of archaeological sites within the Alouette Reservoir and South Alouette study area. Baseline information on the archaeological resources and potential within the study area and a qualitative assessment of the nature and extent of the impacts to archaeological sites occurring as a result of reservoir operations will be documented in this study.

Baseline data included an analysis of Katzie past, ongoing, and potential use of the Alouette Lake, river, and surrounding landscape. This cultural use knowledge provided data relevant to the formulation of recommendations for archaeological site management, and management recommendations respecting Katzie’s use of the Alouette system.

The Archaeological Overview Assessment (AOA) and Preliminary Field Reconnaissance (PFR) of the Alouette Lake Reservoir and South Alouette River were undertaken as part of the Alouette Archaeological Monitoring Study recommended in the Alouette Water Use Plan. The archaeological research reported herein consists of an AOA and PFR as defined by the British Columbia Archaeological Impact Assessment Guidelines (Ministry of Tourism, Culture and the Arts, 1998).

The PFR of Alouette Lake was undertaken in order to ground truth hypotheses that attempt to capture the relationship between landform types and archaeological potential within and immediately adjacent to the reservoir draw down zone, and to identify the need and appropriate scope of further archaeological field studies particularly those involving long-term erosion monitoring. The PFR of the South Alouette River was undertaken in order to assess its archaeological resource potential, possible impacts to archaeological sites and to identify the need and appropriate scope of further archaeological field studies.

1.2 Report Format

This report is presented in seven discrete sections. Section one provides an introduction to the project including the project rationale and objectives. Section two includes a summary of the physical environment of the study area, including physiography, biogeoclimatic zone, and palaeogeography. Section three is concerned with the cultural setting of the study area and focuses primarily on ethnographic background and culture history of the study area. This section also includes a summary of recorded archaeological sites, and anticipated site types. The overall methodology and procedures for the project is summarized in section four followed by study results in Section five. Site significance is discussed in Section six. Impact identification and assessment is presented in Section seven. The study recommendations and conclusions are presented in Section eight.
2.0 STUDY AREA

2.1 Location

The Alouette Lake Reservoir is located in a steep sloped mid-elevation mountain valley in the Southern Pacific Ranges Ecossection (Demarchi 1996). Prior to the construction of the Alouette Dam at the southern end of Lower Alouette Lake in 1926, Alouette Reservoir was two small lakes joined by a short section of river. The impounded reservoir is 1,643 ha in area, and a tunnel near the north end of the Reservoir discharges into the Stave Lake Reservoir at a 9 MW powerhouse. The original dam was replaced in 1984 by a modern earth fill structure. Circa 1991, the dam spillway was rehabilitated and several metres of fill were placed at the south end of the reservoir near the dam (Arcas 1991). The operating range of the Reservoir is 9.5 m and falls between a minimum of 116 m and a maximum of 125.25 m. Golden Ears Provincial Park occupies the western portion of the Reservoir (Figure 1).

The South Alouette River flows south and west from the south end of Alouette Lake till it reaches the Pitt River. For the purposes of this study, the South Alouette River from the Alouette
Dam to 216th Street was to be studied as it is believed this is the area which is impacted by dam operations (B.C. Hydro 1996). The South Alouette River flows through moderately steep and rocky terrain from the Dam to about 232nd Street where it enters the Pitt Polder. At around this point, the river slows and deepens as it meanders through the Pitt Polder (Figure 1).

The project area is within the traditional territory of the Katzie First Nation, Kwantlen First Nations, Sencot’en Alliance, and Stó:lō Nation/Stó:lō Tribal Council.

2.2 History of the Alouette Dam

In the early 20th century, demands for electric power in British Columbia rose steeply to keep up with exponential population growth. Hydroelectric power was highly billed in the lower mainland of the province, with the mountainous terrain and availability of mountain tributaries. The BC Electric Railway Company (BCER) and others initiated hydroelectric developments in the Fraser Valley early in the century. BC Electric Railway Company, which held the water rights to the Alouette drainage, purchased Western Power, which held the rights to the Stave drainage, in 1921 (Adams 1931). BCER developed a plan to build a dam above Alouette Lake and to divert the waters through a tunnel into the Stave Reservoir (Carpenter 1924 cited in Driver and Spurgeon 1998:83-84). Construction on the dam and tunnel commenced in 1925 and was completed by 1928, when power generation began at the Alouette Power Station on Stave Lake and then onto the Stave Falls generating plant. To provide enough water to the power stations, the majority of the Alouette Lake waters were diverted from South Alouette Lake into the Stave system (Driver and Spurgeon 1998:27). By 1930, this flow represented 28 cubic metres per second (cms) (Carpenter 1927).

Prior to damming, Alouette Lake was two lakes divided by a short river, and fed by the Alouette River. The terrain of this area, today in Golden Ears Provincial Park, consists of high, steep, peaked mountains. The Alouette River drains the southern exposure of Mount Robie Reid, the northern exposure of Mount Martyn, and empties into the northeast end of the lake (Driver and Spurgeon 1998:8). The damming caused the lakes to join as the waters rose about 13.7 metres and flooded the steep-sided valley floor. The channel between the original two lakes was also made deeper to permit passage of construction materials via barge. The dam was accessed by a logging railway extended to the lake for this purpose.

The South Alouette River drains Alouette Lake, following a course from the Maple Ridge highlands southwest to the flats of the Pitt Lowlands (Figure 1). It eventually joins the North Alouette River and then enters the Pitt River close to its confluence with the Fraser River. Whereas the South Alouette River once had moderate flow, damming and dyking reduced it to a trickle for many decades. The dam also prevented anadromous fish from reaching Alouette Lake and thereby disrupted the spawning habitat of sockeye and Chinook, among other species (Driver and Spurgeon 1998:14, 27, Westslope 2010). These runs ceased by 1930, while other species of salmon stopped using the river over the next few decades because of its low water levels (ibid, 25). Dyking of the extensive wetlands of the Pitt Lowlands was intended to prevent annual flooding, but also served to sharply curtail the biodiversity of this region. Public concern about low water levels on the South Alouette River were raised as early as the 1930s, as reduced flow impacted the transport of logs and the water needed for agriculture. An outlet pipe was put into
the dam to increase flow, but it had silted up by the 1950s, at which time the pink salmon run disappeared (Driver and Spurgeon 1998:27).

Ownership of the dam was assumed by BC Hydro in 1962. Continued public concern about water flow in 1971 caused BC Hydro to increase flow from the dam by 0.056 cms in order to ensure a flow in the South Alouette of 0.7 cms (its original flow is estimated at 21.56 cms). Attempts were made in the 1970s to re-introduce pink and chum salmon into the river, and trout into the lake system. The Alouette River Management Society (ARMS) formed in 1993 to advocate for the river. BC Hydro began studies of fish habitat at the same time, and has vastly increased its interaction with stakeholders to manage their concerns. An operating plan was created to improve the relative health and productivity of the river, and the corporation has steadily increased the flow of water diverted into the river. ARMS and BC Hydro reached a permanent agreement in 1996 about the rate of water flow providing a 1.98 – 2.97 cms minimum flow release, and have since collaborated on elements of watershed restoration, particularly the return of salmon to the Alouette Lake Reservoir (ARMS n.d., Westslope 2010, BC Hydro 2006).

2.3 Biogeoclimatic Zone

The study area falls in the Coastal Western Hemlock (CWH) biogeoclimatic zone, with some internal regional variation. The southern section of the study area is located within the Dry Maritime subzone of the Coastal Western Hemlock (CWHdm) biogeoclimatic zone while the northern section is located within the Very Wet Maritime Submontane subzone of the Coastal Western Hemlock biogeoclimatic zone (CWHvm1; Pojar et al. 1991). The CWH occurs at low to mid-elevations (sea-level to 1000 m above sea level) and is characterized by a cool, mesothermal climate comprised of warm summers and mild winters. Vegetation in this zone and subzone includes a canopy typically dominated by western hemlock (*Tsuga heterophylla*), Douglas fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), grand fir (*Abies grandis*) and an understory of red huckleberry (*Vaccinium parvifolium*), salal (*Gaultheria shallon*), vine maple (*Acer circinatum*), trailing blackberry (*Rubus ursinus*), and various moss and fern species (Pojar et al. 1991).

The CWH typically supports a range of fauna black bear (*Ursus americanus*), grey wolf (*Canis lupus*), cougars (*Puma concolor*), black-tailed deer (*Odocoileus hemionus*), river otter (*Lutra canadensis*), beaver (*Castor canadensis*), various rodents, and over many species of birds, including raptors such as osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*) and red-tailed hawk (*Buteo jamaicensis*) (Brook 1996, Nagorsen 1990). A wide variety of fish species including sockeye (*Oncorhynchus nerka*), chum (*O. keta*), coho (*O. kisutch*) and pink salmon (*O. gorbuscha*), were supported in Alouette Lake, the South Alouette River and Gold Creek. Chinook, sockeye and pink salmon were extirpated due to the construction of the Alouette Dam (Westslope 2010:3).
2.4 Palaeogeography

The northern study area (Alouette Lake) is located in the Coast Mountains which are formed mostly of igneous rocks from the Middle Jurassic to Mid-Cretaceous times (167-91 million years ago) (Monger and Journeay 1994). The repeated glaciations of the Pleistocene scoured the valley into a U-shape, resulting in steep sided landforms. Local mountains are primarily composed of quartz diorite; Mount Blanshard is formed of gabbro (ibid.).

The southern study area (South Alouette River from 232nd Street to 216th Street) is situated adjacent to the Pitt Polder of the Fraser River lowlands, near the bottom of the northward facing slope of the Maple Ridge highland. The majority of sediments in the study area can be traced to the Fort Langley Formation (Armstrong and Hickock 1976) which in turn are glacial and deltaic sediments deposited during the Pleistocene, 2 million to 11,000 years ago.

At the end of the Fraser Glaciation, sea levels were approximately 200 m higher than present. The study area would have been submerged during this time under ice or sea water. Isostatic rebound occurred between 12,000 and 9,000 years before present (B.P.) and, during this time, relative sea levels fell to near their present levels. Locher and Clague (2007:9) report that previous geomorphological and palynological studies indicate that the late Pleistocene landscape of southern coastal British Columbia was suitable for habitation by early maritime/estuarine adapted human populations and that although this evidence alone does not demonstrate that humans inhabited the landscape, it favours that possibility. The possibility that early archaeological sites were buried by fluvial aggradation triggered by sea-level rise during the early and middle Holocene, combined with a low-visibility lithic culture, makes identification of early postglacial occupations difficult. An extensive review of the palaeogeography and glacial history for the area can be found in Locher (2006) and Locher and Clague (2007).
3.0 CULTURAL SETTING

3.1 Ethnographic Background

The First Nations peoples with ties to the study area include the Katzie, Kwantlen (Duff 1952:23), Semiahmoo and Stó:lō First Nations. Traditionally, the Katzie, Kwantlen, and Stó:lō First Nations speak a dialect of a Coast Salish language known as Halq’omeltem, other dialects of which are spoken from Nanoose south to Malahat on Vancouver Island, and on the mainland from the present day Yaletown to the mouth of the Fraser River (Suttles 1955:8). The Semiahmoo, like others in the Sencoten Alliance, speak the Northern Straits language, spoken on Vancouver Island from Saanich Inlet to Sheringham Point through the San Juan and southern Gulf Islands, and on the mainland shore from Point Roberts and Boundary Bay to Deception Pass (Suttles 1990:456).

Traditional Coast Salish culture was characterized by a semi-sedentary lifestyle dependent upon fishing, hunting and plant cultivation for subsistence. These societies were stratified and three social classes existed: a large upper class, a smaller lower class and a very small class of slaves. The primary socio-economic unit was the house group, consisting of one or more extended families in a single house. Kinship was reckoned bilaterally and residence was usually patrilocal (Suttles 1990). Each house group owned its house, ritual property and resource rights. These rights were acquired through inheritance and normally held by the most important members of the household.

Villages were usually comprised of one or more houses and leadership was provided by heads of households and kin groups in the village. Each village was linked through ties of kinship with other villages to form a broad social network.

The availability and seasonality of resources in Coast Salish territory played a major part in population dynamics and settlement patterns. For First Nations groups along the lower Fraser River, these resources would have included: (1) anadromous salmon (Oncorhynchus sp.) and eulachon (Thaleichthys pacificus) runs in the Fraser River and tributary streams; (2) waterfowl, including ducks and geese in nearby wetlands and estuaries; (3) larger land mammals including deer, elk (Cervus canadensis), mountain goats (Oreamnos americanus) and bears; (4) smaller game and fur bearing mammals, including beaver, muskrat (Ondatra zibethicus), mink (Neovison vison) and otters, and (5) plant resources including red and yellow-cedar (Chamaecyparis nootkatensis) trees for timber and bark, various berries (choke cherry (Prunus virginiana), bog cranberries (Oxycoccos oxyccocos) and highbush cranberries (Viburnum opulus), blueberries and huckleberries (Vaccinium sp.), wapato (Sagittaria latifolia), cat-tail (Typha angustifolia) and other plants used for medicinal purposes. A more detailed description of plants that were traditionally used by First Nations people in the region can be found in Turner (1975, 1979, and 1998).

Further ethnographic and archaeological references for the Katzie and neighbouring Nations can be found in Boas (1894), Duff (1952), Barnett (1955), Jenness (1955) and Suttles (n.d; 1951, 1955, 1990).
3.1.1 Ethnographic Overview of Coast Salish Mountain Use

The following section summarizes high elevation use of Coast Salish territories. While cultural practices associated with coastal settlements, resources, and land use patterns have been the primary focus of anthropological research (including ethnography, ethnohistory, and archaeology) in the Pacific Northwest, recent studies have amplified our understanding of the importance and cultural uses of alpine areas (e.g., Bouchard and Turner 1976, Bouchard and Kennedy 1990; Mack 1992; Mack and McClure 2001; Mierendorf 1993; Reimer 2000, 2006, 2007). Following an overview of Coast Salish high elevation land use practices derived from the ethnographic and ethnohistoric literature, we summarize and infer what is known of Katzie uses of alpine areas.

The spine of the Coast Range runs the course of the Northwest Coast. In the past and present, the majority of inhabitants of the region have resided in lowland and coastal areas and harvested the wide swath of resources found in these ecosystems. Coast Salish peoples, among other First Nations, were nevertheless known to use mountainous areas, which provided a wide range of resources and travel routes, and were also the focus of a variety of cultural practices beyond subsistence pursuits. The documentation of these activities has increased in recent years.

The most common uses of mountain areas were for resource collection and extraction. In the Coast Range, primary alpine activities include the collection of lithic materials, hunting, and harvesting plant resources. Many of these activities required specialist knowledge of locations and proper procedures for the treatment and collection of both animate and inanimate resources (Reimer 2006:11). Mid to high elevation base camps were visited in the summer months during harvest seasons, which varied annually (Lepofsky et al 2005).

High country hunting is closely associated with lithic extraction and use. Hunters focused on terrestrial species such as deer, elk, and mountain goat. Mountain goat in particular was considered a highly valued resource (see discussion below). While awaiting prey, hunters often crafted and sharpened tools that left lithic scatters across the landscape. Bouchard and Kennedy (1990:445) suggest that among the Northern Coast Salish, “certain families had their own mountain goat hunting territories.” Families would travel to their mountain camps, where the men would hunt and the women and children would dry the meat for easier packing. In inclement weather, a fire might be set inside the goat’s rib cage as a source of heat and food (Reimer 2000:39). Some camps were open-air while others were repeatedly used rockshelters, where hunters could use rock overhangs to stay dry.

High elevation plant use was also prevalent amongst Coast Salish groups. This included the use of trees, shrubs, and herbs for technologies, basketry, food and medicine. The wood, bark, and cambium of trees such as yellow cedar, silver and grand fir, and mountain hemlock were harvested for food and technologies (Reimer 2000:43; Turner 1998). Berry patches were a highly prized resource that were harvested annually in the late summer to fall and carefully tended. In particular, various huckleberry and blueberry patches were managed through pruning, weeding, and prescribed burning (Lepofsky et al 2005; Turner 1995, 1999). The harvested berries were processed en masse using various methods. Generally, they were laid out in the sun to dry on
mats like raisins or formed into cakes like fruit leather. Berry drying trenches used a smoldering log under the mat to facilitate drying (Franck 2000, Mack 1992, 1998; Mack and McClure 2001).

Medicinal plant collection was a more private pursuit in mountainous regions. Turner and Peacock (2005:115) note that “some medicinal plants were said to be more potent if harvested from remote locations and upland sites.” Medicinal plants that may have been harvested at mid to upland locations include red and yellow cedar, Indian hellebore, yarrow, deer and licorice fern, kinnikinnick, black twinberry, Devil’s club, wild lily-of-the-valley, and various fungi, among other species (Reimer 2000: 43-45; Turner and Peacock 2005: 110-111).

Coast Salish peoples also frequented the mountains for reasons beyond subsistence pursuits. For instance, in the summer months, alpine areas provided respite from the mosquitoes associated with low lying waterways and gave families some space from the close living conditions of the winter season. Some mid elevation locations were associated with territorial defence (Reimer 2007). Reimer (2007) has documented the spiritual uses of alpine areas by Coast Salish groups. In traditional Squamish culture (and presumably other Coast Salish cultures), selected young men underwent extended vision questing as part of the spiritual training, living alone in mountainous areas for many years at a time (Reimer 2007:22). Similarly, young hunters underwent a long period of apprenticeship with older hunters, who guided them through a spirit quest and taught them hunting practices and specialized equipment, mountain travel, and proper etiquette (Bouchard and Kennedy 1976; Duff 1952; Reimer 2000:38-39). Both shamanism and alpine hunting were specialist pursuits in Coast Salish cultures.

Katzie hunting and fishing are documented for the hills and waterways of the Alouette system (Suttles 1955: 14-15). Suttles (1955:10, 16, 19) documented several Katzie place names at the mouth of the Alouette River that refer to houses, fish (sturgeon) and berry (cranberries, blueberries) resources along that waterway. Oral histories, archaeological, and ethnographic records document Katzie’s role as purveyors of important trade goods, and First Nations from near and far would travel to Katzie territory for trading purposes. For example, the ‘Douglas band of Lillooet’ is said to have routinely traveled over the mountains to visit Alouette Lake for hunting and to gather resources at the head of Pitt Lake (ibid, 13, 24). These resources include the collection of upland lilies (*Fritillaria* sp.), either northern rice root or chocolate lily, as well as deer and elk.

The mountain goat held special importance for the Katzie: “the mountain-goat is said to have been a member of the Pitt Lake tribe transformed by the Transformer, so it stands in a special relationship with the Katzie” (Suttles 1955:25). According to Simon Pierre, mountain goats were abundant in the mountains surrounding Pitt Lake, generally staying to graze at high altitudes, but coming to the lake shore to water in summer. Hunters in this territory hunted alone or in small groups with snares or bows and arrows. Goat meat was considered best in summer, and wool was a principal material for blankets, and used extensively as a trade item (Suttles 1955:25). Mountain goat horns were split and shaped into spoons by a wide variety of Coast Salish groups (Bouchard and Kennedy 1976; Drucker 1955; Suttles 1955).

Based on their ethnographic review, Driver and Spurgeon (1998:68) state that “the frequent allusion to trails connecting to the Fraser Canyon Lillooet region, via Alouette Lake and the
mountain valleys and passes through to Pemberton and further, is evidence of activities in the higher elevations [of Katzie territory].” They further note that traditional and pre-contact uses of the Alouette drainage may not be very well reflected in the ethnographic and historic data because of early population decline due to introduced disease (starting in the late 1700s), the limited number of ethnographic ‘informants’, the bias of their knowledge towards the lowlands (as seen above, mountain-goat hunters and medicinal people were often specialists), and the late date of ethnographic documentation (Driver and Spurgeon 1998:67).

3.2 Cultural Chronology

Archaeological research in the Lower Fraser Valley Region has been going on for over a hundred years. A century of excavations and study have shown that the archaeological record for the lower Fraser Valley is over 8000 years old. In the 1950s, the first long chronology was established for the province by Charles Borden.

Since then, research and excavation methods have improved; environmental processes and relationships are better understood; dating techniques have advanced; and a great deal more excavation has refined the cultural chronologies. The last fifty years have also seen a dramatic increase in industrial, agricultural and, residential development that has contributed to landscape alterations and the irretrievable loss of archaeological sites. While the potential to understand and describe regional chronologies, cultural developments, and influences between and among people that created these sites has increased, archaeologists have fewer opportunities to conduct research because fewer intact sites remain.

Only a few excavations have been undertaken in the Pitt-Fraser–Alouette area, and of those, only a portion is securely dated⁵. Archaeologists must rely on comparative data from neighbouring regions to further their understanding of the archaeology of the study area. Such comparison, in many case, highlight the unique nature of sites in the Lower Fraser Valley.

Cultural traditions, for the purposes of this summary are defined by the way of life of ancient peoples as indicated by their environment and subsistence remains found in archaeological sites, and by the uniqueness of associated types and styles of artifacts.

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⁵For instance, the Pitt Lake pictographs are not dated; the Carruthers site does not have a published radiocarbon date, and in some cases not all components within a site are dated.
### Table 1. Summary of the Cultural History of the Lower Fraser Valley.

<table>
<thead>
<tr>
<th>Period</th>
<th>Time Span</th>
<th>Culture/Tradition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Early Period</strong></td>
<td>9000 – 6500 RCYBP (or 7000 – 4500 BC)</td>
<td>Pebble Tool/Old Cordilleran Tradition (Carlson 1996) Basal sites, Peopling of Lower Fraser, Coast and Canyons; expedient tools, procurement of fine materials; generalized diet with land focus.</td>
</tr>
<tr>
<td></td>
<td>circa 4500-3300 BP</td>
<td>Charles Phase (Mason 1994; Pratt 1992) (also St Mungo at the Delta and Mayne on the Gulf Islands) Increased site size and complexity; semi-sedentary dwellings.</td>
</tr>
<tr>
<td><strong>Middle Period</strong></td>
<td>circa 3300-3500 to 2350 BP</td>
<td>Locarno Beach Phase (Borden 1970, Mitchell 1971, 1990, Matson and Coupland 1995) Social complexity; ground stone and bone are prominent; soft stone carving personal adornment; strategic food resource procurement.</td>
</tr>
<tr>
<td></td>
<td>circa 2400-1500 BP or BC 450 - AD 450</td>
<td>Marpole Phase (Borden 1970, Burley 1980, Mitchell 1985, Fladmark 1982) Large, deep middens; Pre-storage to storage of resources particularly increased prominence of salmon in diet (Croes and Hackenberger 1988). Wide variety of tool types – finer smaller tools, uniform ground slate knives; ‘heavy duty’ wood-working toolkit; seasonal round well developed, artistic expression is at a climax.</td>
</tr>
<tr>
<td><strong>Late and Historic Periods</strong></td>
<td>1500- 200 BP or AD 450 – AD 1750</td>
<td>Developed Coast Salish also Gulf of Georgia Culture Type (Matson and Coupland 1995) Regional variants are Stselax, San Juan, Esílào, and Whalen II. Distinctive characteristics include multifamily households, large populations, social stratification, and presumed ownership of resources.</td>
</tr>
</tbody>
</table>

#### 3.2.1 Pebble Tool/Old Cordilleran Tradition: 9000 – 6500 BP

The *Pebble Tool/Old Cordilleran Tradition* is the oldest known archaeological culture in the Lower Fraser Valley. The bearers of this tradition were the original people to inhabit what is now the study area.

This was a geologically dynamic time. Palaeogeological research tells us that at the beginning of the Holocene, ten thousand years ago, as the huge glacial ice sheets melted, the mouth of the Fraser River was east of what is now Pitt Meadows. The Lowlands of today would have been an estuary, and Pitt Lake a fjord (as well as Coquitlam Lake, and Stave Lake and possibly Alouette Lake). At 9000 years ago, the Fraser River was depositing floodplain silts in the Pitt Meadows,
gradually cutting off the Pitt Valley from the Fraser River, while lowland areas remained underwater (Driver and Spurgeon 1998).

The oldest sites in the region, Glenrose (DhRp-6), Fort Langley, Coquitlam Lake (DiRq-5), and Stave Lake (DhRn-29) are located in areas that would have been de-glaciated early, creating resource-rich ecotones in the Fraser River Delta and ‘refuge’ valley uplands. At the time of their occupation, these areas would have resembled modern mid-coast fjord lands (Matson 1996, Copp and Porter 1992, Wright 1996).

Pebble Tool/Old Cordilleran people that first colonized ice-free areas were sea and land mammal hunters and fishers. Small family groups were mobile ‘foragers’ utilizing diverse and readily available resources, expedient tools like split cobbles or flake tools that give this tradition its name. Inland and coastal sites show that technological adaptations focused on intertidal resources, salt and fresh water fishing, small marine and terrestrial mammal hunting (Carlson 1996; Matson 1996). Because diverse resources were harvested in these seasonal camps, it is assumed that an equally diverse technology had to be present. It is likely that the ubiquitous pebble tools were used to make more perishable technologies (Matson 1996).

Pebble Tool/Old Cordilleran sites contain expedient tools such as cobble choppers, leaf shaped chipped bifaces, scrapers, and burins (Glenrose Cannery DgRr-6). Glenrose Cannery has one of the most informative assemblages of this period on the Northwest Coast. Glenrose is interpreted as a small, seasonally occupied site where the subsistence strategy was a variant on a large land-mammal oriented pattern (Matson 1976). No specialized maritime adaptation is discerned, though foreshore resources, bay mussels and a variety of fish were harvested.

Other early sites are also found west of the study area. An old component at Fort Langley with a date of 8420 +/- 70 BP has a hearth feature associated with a split cobble core and flakes (Copp and Porter 1992). A date of 10,150 years BP on charcoal (most likely from a hearth feature) was obtained from DhRn-29, located in the southeast arm of the Stave Reservoir (McLaren 2008:50). Another important site is the Coquitlam Lake site (DiRq-5). This site is undated, but is reasonably assumed to be from the Early Period (Brown and Oakes 2009). Coquitlam Lake is important because it shows pre-contact use of the high elevation coastal mountain lakes, and what appears to be a hybrid inland/coastal assemblage with unique raw material (ibid.). In addition to the pebble tools common to early sites, biface points and microblades with microcores were also collected at Coquitlam – a presumed northern technology and a younger one. Because inland and coastal technologies are both present here, it suggests to archaeologists that, “[p]erhaps Coquitlam Lake site is the first indication of a hybrid artifact assemblage” (Wright 1996:209). This site indicates the importance of the coast mountain lakes as a connection between the Lower Fraser and the interior.

Landscape changes continued though the end of the Pebble Tool/Old Cordilleran Tradition. Streams and rivers eroded glacial deposits from the mountain valleys and transported them downstream; they slowed as they reached the Lowlands, creating deltas into southern Pitt Lake. The tidal ebbs of Pitt Lake effectively blocked the lower Fraser River waters from draining in the ocean and backed water (and deposition) up the Pitt River channel. The processes of cutting and depositing continued for thousands of years, creating the highlands of Western Maple Ridge, Port Hammond and Pitt Meadows. Radiocarbon dates indicate that the Pitt Lowlands were
infilled by 4700 years ago (Driver 1998). The highlands would continue to be important throughout prehistory as refuges from flood, places to settle, camp, gather and process resources.

3.2.2 Charles Phase 5500-3300 BP (3500 - 1550 BC)

The Charles Phase is defined by type-sites St. Mungo (DgRr-2) and Glenrose Cannery (DgRr-6) on the Lower Fraser River. Regional variants include the St Mungo Culture at the Delta, the Mayne Culture Type on the Gulf Islands, and the Eayem Phase in Fraser Canyon. Compared to older sites, the Charles Culture assemblages show greater complexity. They are larger, have more components and features, have artifacts of varied manufacture and materials, and show the beginnings of intensive resource procurement and sedentism.

Pebble Tool/Old Cordilleran artifacts types continue into the Charles Phase, but appear in different proportions from earlier times. Flaked stone is predominant, in the form of leaf shaped points, pebble tools and expedient flake tools. A number of significant artifacts and features appear during the Charles Phase. These are: bone and antler industries; simple art and sculpture; more substantial dwellings; riverine and marine subsistence strategies that emphasized fish (particularly salmon) and shellfish; a significant woodworking industry, and evidence of increasing social complexity (Matson and Coupland 1995). Shell middens are common in coastal areas but are not a significant feature in Charles period sites in the Pitt River and Fraser Valley.

New tool types (e.g. points with shoulders, drills and scrapers) show novel manufacturing techniques, such as pecking and grinding. A wider range of materials is also evident, including a number of exotic or imported materials, suggesting at least limited trade or mobility (Spurgeon 1992). Ground stone appears in greater frequency, as do abrasive stones, disc beads and simple decorated ground objects, often discs with notches or ‘denticulate’ pieces.

At least three excavated sites near the study area have Charles period components: the Pitt River site (DhRp-21); Park Farm site (DhRq-22) and Fort Langley. It is argued that Port Hammond (DhRp-17) may also have a Charles (or Mayne) component (Carlson 1970). The Pitt River site is located on a highland ridge in the Pitt Lowlands; the Port Hammond and Fort Langley sites are on alluvial ridges parallel to the Fraser River. These sites are above flood danger and offered quiet water access (Spurgeon 1984, Rousseau 2003). The Fraser River and adjoining slough systems provided access to fishing sites as well as travel corridors.

Seasonal resource procurement sites of the Pitt Lowlands (Park Farm, Pitt River) show a unique combined marine/inland resource exploitation pattern also known in the historic period (and see Peacock 1981; Spurgeon 1992) which differs from the classic Charles Phase pattern of coastal marine reliance. The apparent disproportionate number of post moulds, pit features and hearths at Park Farm and Pitt River sites point to intensive resource processing or procurement, and presumably, the capacity for storage (Pratt 1992). As well, the nearby Mauer and Xa:ytem sites have architectural remains that support the interpretation of a shift toward a semi-sedentary settlement pattern; this pattern appears to be under way at the beginning of the Charles Phase, circa 3000 -4950 BP (Schaepe 2003).

Little can be gleaned of Charles Phase subsistence as the faunal assemblages are sparsely preserved at sites within the study area. Sites of similar age elsewhere show the use of both marine and riverine resources. Salmon are the most numerous species preserved, while shellfish either equaled or exceeded both land and sea mammals in economic importance. Sites at Park
Farm and Pitt River have eulachon and sturgeon in addition to salmon. This is not surprising given the local availability of these species rather than the shellfish at the coast.

The appearance of art objects, substantial architecture, ground stone and bone/antler industries indicates that considerable material culture change was underway during the Charles Phase (Pratt 1992). It is expected that social changes, such as labour specialization and social stratification, correlate with these developments, but direct evidence is limited from these sites. Mortuary data is suggestive of social complexity.

3.2.3 Locarno Beach Tradition 3450-2450 BP (BC 1500-500)

The Locarno Beach Tradition was originally identified by Charles Borden as a unique and distinctive occupation of the Fraser River Delta area. Site distribution of the Locarno Beach Tradition has since been extended to Vancouver Islands, the Gulf Islands and south to Puget Sound. All of these regions share a core marine subsistence focus.

The Pitt River (DhRq-21), Telep (DhRp-35) and Park Farm (DhRq-22) sites all have Locarno Beach components, along with other phases, showing that these sites were continually used over thousands of years. These sites have evidence for the gradual development of a ‘collecting’ subsistence pattern from the ‘foraging’ one exhibited in earlier components.

Research suggests that there are continuities in the technological and subsistence systems between the Locarno Tradition and the preceding Charles and the succeeding Marpole Culture types (Matson and Coupland 1995, Mitchell 1971). This continuity is seen in artifact assemblages, features, and faunal remains. In the Lower Fraser region, these continuities are seen in the excavated sites which are small seasonal resource camps where presumably consistent and predictable resources were taken.

Faunal remains are generally poorly preserved from this period. At the excavated sites in the region, the remains are often calcined or burnt and in fragmentary condition. Where direct bone remains are absent, subsistence is inferred from artifact or feature function. For instance, processing artifacts (slate knives, microblades), hunting artifacts (harpoons, points), and features such as shell dumps, pits and postholes from drying racks or caches are indirect evidence of fishing, hunting, cooking and processing.

We know from similarly dated sites that subsistence during the Locarno Phase continues to be broadly based. There is, however, a shift toward the intensification of fish, predominately salmon. Other resources include flat fish (flounder and sole), and herring; shellfish (bay mussel); sea mammals, land mammal and birds, particularly waterfowl. Dog is found at Locarno sites, though presumably not as part of the diet. At Pitt/Fraser sites, river fish such as eulachon were also recovered in large numbers. Bay mussel was present in lenses at Pitt River.

Matson (1992) assessed Locarno Beach as the “first culture type in the region to have engaged in the preservation storage of salmon for later consumption” (also see Mitchell 1990). With storage of food came increasingly complex social and economic dimensions such as specialization, social stratification, and ownership. Definite evidence of social complexity is lacking, however, until several hundred years later (Burley 1980).

Artifact categories from Locarno Beach include: hunting tools of flaked basalt projectile points with contracting stems for hafting to spears or dart-throwers; butchering tools as evident by
quartz and obsidian microblades and cores, small utilized cryptocrystalline (chert, chalcedony) flake tools, pebble tools, crudely fashioned slate and sandstone bifaces, faceted ground slate points, wood working tools like nephrite and jadeite celts (Patenaude recovered a celt in Charles layers at Pitt River), sea mussel celts, decorative items such as labrets, small disk beads of slate shale; fishing artifacts like notched or grooved stone sinkers; composite toggling harpoon heads of antler, unilaterally barbed bone points, single and bone points, bird bone needles, and shaped and decorated abrasive stones. There is a general increase in bone tool assemblages during this phase (Gibbon 1998:468).

Decorative objects and status indicators from Locarno Beach are more distinct than in previous phases. Items include carved antler in humanoid and zoomorphic shapes (as collected by Carlson at Pender Island’s Canal site; Patenaude at Pitt River Site). All of the slate knives collected from Locarno dated Pitt River sites are decorated. Also distinctive and enigmatic of Locarno Type is the *Gulf Islands Complex* artifacts (Duff 1956). These are very well made, often polished, items made of soft stone, coal or bone. Their function is unknown but is likely related to social or group identity, or markers of wealth and status (LaSalle 2008). Another possibility is that the polished bones with holes or notches are gaming pieces as comparably described pieces were used historically in the Fraser Valley area (Maranda 1972:93). Other indications of social developments such as ‘class’ or status during Locarno include cranial shaping and labret wearing (Fladmark 1982). There is an increase in the amount of burials, burial inclusions and burial cairns.

Distinctive features of the Pitt/Fraser sites include clay-lined pits (as those at Pitt River and Park Farm); waterlogged components that have open work basketry (of checker twilled and twined varieties); stakes and split cedar sticks that match the similar perishable collections elsewhere such as uncovered twine and cordage, netting, cedar bark and miscellaneous wood objects (Mitchell 1990).

### 3.2.4 Marpole Culture Type 2350-700 BP (BC 450 – 1250 AD)

The Marpole Culture type is considered to be an evolution from the Locarno Beach type (Fladmark 1982, Mitchell 1971, 1990). This culture type is named by Borden after the assemblage from the Great Fraser Midden in the south Marpole region of Vancouver.

Marpole subsistence and social organization appear to have grown out of the earlier Charles and Locarno Phases. While the assemblages are similar to Locarno, the Marpole Phase shows greater evidence for complex hierarchical societies with higher levels of social stratification and greater emphasis on storage of food resources, larger and more elaborate village architecture, and a detectable change in the material culture. Burley (1980) has demonstrated temporal variation in artifact frequencies during Marpole as well as spatial variation between the Lower Fraser, Interior and Gulf Islands and southern Vancouver Island. These artifactual differences may reflect variation in resource exploitation, influence of neighbours through trade, or distinctive settlement patterns.

Diagnostic features of Marpole period sites include processing and storage structures and large post and beam houses with midden between and behind. The Pitt/Fraser sites of Marpole age include Port Hammond (DhRp-17), Carruthers (DhRp-11), and Lasseur.

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7 Although two items were recovered from securely dated Charles components at Pitt River (Patenaude 1984:203).
Artifact assemblages in Marpole show an increase in the variety of tools, but a decrease in the refinement of their manufacture (the most often cited example being a move from toggling to unibarbed harpoons [cf. Burley 1980]). Harpoons are part of a larger antler industry. The frequency of chipped tools decreases, while ground stone increases markedly in frequency, presumably for fish processing, but also plant resources such as wapato (Burley 1980). A significant woodworking tool kit is present in Marpole and is comparable to known ethnographic technologies. Mitchell (1990) refers to this as a ‘heavy duty’ tool kit, including large celts, hand mauls, and antler wedges. These tools point to an increased demand for forest resources, particularly cedar, for housing, carved poles, canoes (such as at Port Hammond), and other monumental constructions. Waterlogged sites of Marpole age have produced a range of organic artifacts like wedges, weirs, basketry, cordage, netting, mats of cedar (Bernick 1998).

The fishing economy is well represented in the artifact data by the appearance of perforated sinker stones, harpoon points and antler and bone points for fishhooks. Other materials suggest textile maintenance and manufacture, small flake scrapers, unibarbed points, awls and needles (as seen at Port Hammond [DhRp-17]).

Several status indicators appear in the Marpole Phase. Distinctive stone sculpture is seen in the form of elaborate seated human figures and decorated tools. Exotic trade goods like native copper, Oregon obsidian, dentalia shells, slate and shell beads are relatively common in the archaeological record. There is a general increase in personal ornament like labrets, ear spools, and pendants. Cranial deformation and ritual items including elaborate burials are evidence of increasingly complex social roles, social stratification and social networks (Matson and Coupland 1995).

3.2.5 Gulf of Georgia/Developed Coast Salish Culture 1500-200 BP (450 AD – 1750 AD)

Gulf of Georgia, or the Developed Coast Salish Culture, is the most recent archaeological culture of the Coast Salish. First named in the 1940s at the Musqueam site, the archaeological distribution of Gulf of Georgia sites shows a more extensive use of the landscape than what was recorded in the historical period (Ham 1992:339), likely due to the devastating impact of the first wave of smallpox in the 1780s (Harris 1994). The majority of materials recovered from the Developed Coast Salish/Gulf of Georgia are from seasonal settlements.

Temporal and areal differences exhibited in the Gulf of Georgia Phase are usually accounted for by differential access to resources (Mitchell 1990:348). These differences are thought to relate to seasonal pursuits and movements of populations within the Halkomelem speaker’s territory (ibid.).

A range of settlement types has been identified for the Developed Coast Salish culture. In the Pitt/Fraser Lowlands, known settlements types include permanent winter villages of plank houses like those recorded at Katzie #IR 1 (eighteen houses in three rows in 1880), Port Hammond, and Katzie IR#2 (DhRp-16), seasonal camps, and resource extraction sites. Seasonal camps housed fewer and more ephemeral structures. As noted by Suttles (1955:15), “‘mat shelters’ [occupied] every bit of level shore or stream bank.” More substantial plank structures could be “identified with several ‘families’ or ‘tribes’.” Other site types include trails, bathing pools and menstruation dwellings, burial mounds, culturally modified trees, fortified and defense sites, weirs, and traps.
Fish dominates faunal assemblages throughout the late phase. The primary species is salmon, followed by sturgeon, flatfish, herring, eulachon and rock cod. Wapiti and deer are dominant land mammals in faunal collections. Bird remains are largely waterfowl, ducks and geese. Sea mammal is not common but is present (mostly seal). Plant foods, including the roots, stems, berries, fruits, and nuts from a wide variety of plant, were important resources. Cranberries, hazelnuts, and wapato were critical resources of the Pitt Polder that were held as individual or family property.

Ham (1992) has designated over one hundred artifact classes for the Developed Coast Salish/Gulf of Georgia culture type. Artifact forms remain consistent from the preceding Marpole Phase, but there is an overall increase in bone, antler and ground slate artifacts. Chipped stone artifacts are rare at some sites, but in others are present as distinctive tiny arrow points. Bentwood boxes, cordage, and basketry are widespread. Trade was extensive and raw materials (nephrite) as well as finished artifacts were traded throughout the region.

The Developed Coast Salish sites of the Lower Fraser/Pitt lowlands are in general agreement with the broader trends but show some anomalies. Some of the discrepancies can be accounted for by the fact that the dated sites are specific resource camps. For instance, the Pitt River site is a berry processing site and burial place. Here, chipped stone tools are in high frequency, ground slate is found in very low frequency, bone and antler tools are few, and there is a high frequency of decorative items like disc beads and labrets (Patenaude 1984: 264). Crowe-Swords (1974), who excavated the Carruthers site, suggests that the ground slate knives found there were for wapato processing rather than fish.

Art was widespread in the late pre-contact period, as would continue into the historic period. Examples from organic materials are few, due to the lack of preservation of materials such as wood or pigment, while stone carving from this period is elaborate. Burial practices were varied and there are indications of status differences (Mitchell 1990:348).
3.3 Previously Recorded Archaeological Sites in the Alouette Lake and South Alouette River Study Area

There are eight (N=8) recorded archaeological sites located within the Alouette Lake study area (Table 2 and Figure 2). See the Reservoir Archaeology Program Archaeological Inventory and Impact Assessment report (Cameron 2010) for further details on the sites located within the drawdown zone of Alouette Lake.

Table 2. Archaeological sites within the Alouette Lake study area.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site location relative to study area</th>
<th>Site type</th>
<th>Project where site was identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>DiRo-1</td>
<td>West side of the Narrows</td>
<td>Lithic scatter</td>
<td>Alouette Dam Spillway Rehabilitation Archaeological Impact Assessment. (Arcas Consulting Archaeologists Ltd. 1991)</td>
</tr>
<tr>
<td>DhRo-7</td>
<td>Southeast end of Reservoir, just east of dam</td>
<td>Lithic scatter</td>
<td>Alouette Dam Spillway Rehabilitation Archaeological Impact Assessment. (Arcas Consulting Archaeologists Ltd. 1991)</td>
</tr>
<tr>
<td>DhRo-8</td>
<td>Mouth of Gold Creek</td>
<td>Lithic scatter</td>
<td>Alouette Dam Spillway Rehabilitation Archaeological Impact Assessment. (Arcas Consulting Archaeologists Ltd. 1991)</td>
</tr>
<tr>
<td>DhRo-60</td>
<td>North of Scout Bay</td>
<td>Lithic scatter</td>
<td>BC Hydro Alouette Archaeological Monitoring Study (Katzie Development Corporation – Archaeology 2010)</td>
</tr>
<tr>
<td>DhRo-61</td>
<td>North of Scout Bay</td>
<td>Lithic scatter</td>
<td>BC Hydro Alouette Archaeological Monitoring Study (Katzie Development Corporation – Archaeology 2010)</td>
</tr>
<tr>
<td>DhRo-62</td>
<td>North of Scout Bay</td>
<td>Lithic scatter</td>
<td>BC Hydro Alouette Archaeological Monitoring Study (Katzie Development Corporation – Archaeology 2010)</td>
</tr>
<tr>
<td>DhRo-63</td>
<td>North of Boat Ramp</td>
<td>Lithic scatter</td>
<td>BC Hydro Reservoir Archaeology Program Alouette Reservoir Archaeological Inventory and Impact Assessment (Cameron 2010)</td>
</tr>
<tr>
<td>DhRo-64</td>
<td>South of Scout Bay</td>
<td>Petroglyph</td>
<td>BC Hydro Reservoir Archaeology Program Alouette Reservoir Archaeological Inventory and Impact Assessment (Cameron 2010)</td>
</tr>
</tbody>
</table>

Artifacts recovered from these sites (DiRo-1, DhRo-7 and DhRo-8) include several projectile points which appear to be similar to those of the Locarno Beach Cultural type or of the Charles cultural type (3500-2500 BP). These sites are believed to be fish procurement and hunting sites (Arcas 1991).

There are ten (N=10) previously recorded archaeological sites located within a 4 km radius of the study area (Table 3 and Figure 3). At a basic interpretive level, these site types reflect ancestral peoples’ reliance on a broad diet of plant and animal, terrestrial, marine, riverine and estuarine resources and include: a) habitation sites with cultural depressions, post-hole moulds and shell middens; b) seasonal campsites or food processing sites with post-hole or stake moulds, lithic scatter and shell middens; c) plant processing and cultivating locations with FCR features, palaeoethnobotanical evidence, wooden and lithic artifacts and associated post-hole moulds; and d) wood processing sites with tools such as adzes, wedges, celts.
Sites nearby the study area that have undergone more intensive investigations include: the Carruthers Site (DhRp-11), the Telep Site (DhRp-35), and DhRp-52.

Table 3. Archaeological sites in proximity to South Alouette River study area.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site location relative to study area</th>
<th>Site type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DhRp-11</td>
<td>3.1 km northwest of 216th Street bridge</td>
<td>habitation, mounds, surface and subsurface lithics, FCR, west site</td>
</tr>
<tr>
<td>DhRp-34</td>
<td>2 km south of 216th Street bridge</td>
<td>random isolated find</td>
</tr>
<tr>
<td>DhRp-35</td>
<td>3.4 km southwest of 216th Street bridge</td>
<td>habitation, mounds, surface and subsurface lithics, FCR, west site</td>
</tr>
<tr>
<td>DhRp-50</td>
<td>3.4 km southwest of 216th Street bridge</td>
<td>lithic scatter</td>
</tr>
<tr>
<td>DhRp-51</td>
<td>3.4 km southwest of 216th Street bridge</td>
<td>lithic scatter</td>
</tr>
<tr>
<td>DhRp-52</td>
<td>2.6 km southwest of 216th Street bridge</td>
<td>habitation, mounds, surface and subsurface lithics, FCR, west site</td>
</tr>
<tr>
<td>DhRp-65</td>
<td>2.8 km northwest of 216th Street bridge</td>
<td>lithic scatter</td>
</tr>
<tr>
<td>DhRp-83</td>
<td>1.4 km southwest of 216th Street bridge</td>
<td>subsurface lithics, FCR</td>
</tr>
<tr>
<td>DhRp-86</td>
<td>2.9 km southwest of 216th Street bridge</td>
<td>lithic scatter, FCR</td>
</tr>
<tr>
<td>DhRq-41</td>
<td>3.4 km southwest of 216th Street bridge</td>
<td>lithic scatter</td>
</tr>
</tbody>
</table>
Figure 2. Alouette Lake Known Archaeological Site Locations.
Figure 3. Archaeological sites in proximity to the South Alouette River study area.
4.0 METHODOLOGY AND PROCEDURES

4.1 Background Research

Prior to conducting fieldwork, the study team engaged in an extensive background research program designed to assess existing documentary information pertaining to past uses of the study area. Several sources of information were consulted during this phase of the study including: the Archaeology Branch Site Inventory Forms, consultant reports, BC Hydro aerial photographs and bathometric maps, Google Earth, historic photos and other relevant published and unpublished reports, theses and dissertations. Documents, field notes and maps from the Surveyor General’s Office, Ministry of Forests and Ministry of Lands in Victoria were also examined. In addition, a visit was made to the Maple Ridge Museum and the curator, Valerie Patenaude, was consulted.

4.2 Communications with First Nations

During the early planning stages of this project, representatives from the Katzie First Nation, Kwantlen First Nation, and the Stó:lō Research and Resource Management Centre were contacted by phone and email. The Katzie First Nation was involved through the employment of field crew and direction from the Katzie Development Corporation (KDC). A field assistant was also employed from the Kwantlen First Nation for the South Alouette River part of the fieldwork, though no one was available for the Alouette Lake fieldwork part of the fieldwork. Katzie members have also been involved in the background research for this project.

4.3 Archaeological Potential Assessment

Prior to fieldwork, documentary research was conducted which included analysis of Google Earth images, historic photos at the Maple Ridge Museum, TRIM II data and air photos and bathometric data provided by BC Hydro. Unpublished archaeological reports of studies conducted in the Alouette Lake area, site forms retrieved from the Archaeology Branch, and various reports and maps of Alouette Lake copied from the Surveyor General’s Office in Victoria were also reviewed. This research led to the development of archaeological hypotheses about the pre-contact use of different land forms which were to be tested in the field.

Areas of the Alouette Reservoir were judged to have high archaeological potential due to the presence of suitable landforms and the proximity of available water and fish resources, a southern aspect, and locations along trail systems that carry possible associations with mountain goat hunting expeditions into the alpine surrounding the Alouette Lake Reservoir. See Figure 4 for a map of archaeological potential and impact areas within the Alouette Lake area. Three previously identified sites (DiRo-1, DhRo-7, DhRo-8) had been recorded in the drawdown zone of the Alouette Lake Reservoir. All three sites are located on fairly level land surfaces which are in close proximity to water and fishing resources. Two (DiRo-1 and DhRo-8) of the three identified sites have a southern aspect. A landscape hypothesis was created to assist with future location of archaeological sites in the reservoir. The null hypothesis is that "There is no difference in archaeological potential between different landscape features" and the alternate hypothesis is that "Landforms with level surfaces or a gentle sloping (~5%) southern aspect in
close proximity (~50 m) to water and fishing resources have greater potential for archaeological sites than areas that do not exhibit these attributes".
Figure 4: Archaeological potential and impact areas within the Alouette Lake study area (from 1:50,000 NTS Map 92 G/8, Stave Lake, NAD 27).
One previously identified site (DhRo-7) has been recorded immediately upstream of the Alouette Dam though this site is now considered to be destroyed by Alouette Dam construction and improvements. There are no previously recorded archaeological sites along the 16 km of the South Alouette River from the south side of the Dam to 216th Street. The South Alouette River has not been surveyed by archaeologists; however, the Water Use Planning Consultative Committee felt that areas with archaeological potential exist along the river because this waterway was traditionally and presumably in pre-contact times used by Katzie people and their ancestors [Alouette Archaeological Monitoring Program Terms of Reference]. Aspects that may contribute to archaeological potential include water and fish resources, and the likelihood that the Alouette River was a preferred travel corridor between the Pitt River and Alouette Lake area.

4.4 Archaeological Field Assessment

The Preliminary Field Reconnaissance (PFR) of Alouette Lake Reservoir was undertaken as part of the Alouette Archaeological Monitoring Study recommended in the Alouette Water Use Plan. The archaeological research reported herein consists of a Preliminary Field Reconnaissance (PFR) as defined by the British Columbia Archaeological Impact Assessment Guidelines (Ministry of Tourism, Culture and the Arts, 1998). The PFR was undertaken in order to ground truth hypotheses that attempt to capture the relationship between landform types and archaeological potential within and immediately adjacent to the reservoir draw down zone, and to identify the need and appropriate scope of further archaeological field studies, particularly those involving long-term erosion monitoring.

4.4.1 Alouette Lake

The PFR for Alouette Lake took place on March 31st, April 6-9th and April 13th, 2009. The field crew consisted of field director Ian Cameron, MSc, RPCA, archaeologist Kennedy Richard, BA and archaeological technician Ken Erickson, all of Katzie Development Corporation – Archaeology. Kwantlen First Nation was invited to participate but personnel were not available. BC Parks supplied a boat and operator which allowed the field survey to reach areas accessible only by boat. Tom Blackbird (BC Parks Area Supervisor) and Brian Roberts (BC Parks Ranger), offered useful advice and information regarding the history of the Reservoir.

The Alouette Reservoir drawdown area was examined by boat and pedestrian survey (Figure 2). The pedestrian survey consisted of a three-person field crew traversing selected areas of the drawdown zone. GPS tracks were recorded for all areas assessed from the boat and by pedestrian traverse. Exposures (e.g., drawdown zone, game trails, tree throws, sparsely vegetated areas, rocky outcrops, and creek banks) were examined for the presence of cultural materials and other evidence of past human settlement and land use. Bedrock exposures and large boulders were examined for rock shelters, seams of flakable lithic raw materials, and pictographs and petroglyphs. Trees, including stumps, of various species were examined for the presence of cultural modification. Shovel testing was not conducted as the PFR was not undertaken under a permit issued under the Heritage Conservation Act.
4.4.2 South Alouette River

The PFR took place over four days between August 20th and August 27th, 2009. The field crew consisted of field director Ian Cameron, MSc, RPCA, archaeological technicians Ken Erickson and Harold Moody, all of Katzie Development Corporation-Archaeology, and Scott Gabriel of the Kwantlen First Nation.

The South Alouette River survey consisted of survey by water using two inflatable rafts with two crew members in each raft. The banks of the river and adjacent riparian areas were assessed for their archaeological potential as the rafts navigated down the River from the Alouette Dam to 216th Street in Maple Ridge. Due to private property access issues, survey was constrained to the river channel and cutbanks. Where possible, bedrock exposures and large boulders were examined for seams of workable lithic raw materials, and pictographs and petroglyphs. Cutbanks were also examined for changes in sediment that might be indicative of anthropogenic soils. Trees of various species were observed for potential for the presence of cultural modification.

4.5 Reporting

Following the completion of the fieldwork for the preliminary field reconnaissance, this final permit report was produced that: (1) identifies the proponent and the First Nations involved, (2) identifies the objectives of the AOA and PFR, (3) describes the study area, (4) describes the methods and the results of the fieldwork, (5) provides an evaluation, (6) provides a site significance assessment, (7) makes recommendations, and (8) provides maps showing the site locations, survey coverage, and site boundaries. This report will be distributed to the Archaeology Branch, BC Hydro, the Katzie First Nation, Kwantlen First Nation, Semiahmoo First Nation, Stó:lō Research and Resource Management Centre, Alouette River Management Society and District of Maple Rige.
5.0 STUDY RESULTS

5.1 Archaeological Field Assessment

5.1.1 Alouette Lake

Areas chosen to test the landscape hypothesis included the head of Alouette Lake where the Alouette River enters the Lake, the mouth of Moyer Creek, Camper’s Beach and an area extending 1.3 km north, the area south of the boat launch on the west side of the Reservoir, Scout Bay and an area extending one km to the north (Figures 4 and 5). All of these locations had southern aspects, proximity to potable water, trail systems and fish and some also had suitable landforms (i.e. benches, beaches, terraces). The east side of the reservoir across from the Boat Launch and four minor creek drainages on the northeast side of the reservoir were examined to test the null hypothesis.

Three previously recorded sites (DiRo-1, DhRo-7 and DhRo-8) were identified during an earlier study (Arcas 1991). These sites were revisited and two were found in settings that support the alternate landscape hypothesis. DhRo-7 appears to have most of the attributes necessary to support the alternate landscape hypothesis (proximity to water and fish resources, level slope) but not be verified as the site has been destroyed (Arcas 1991, Cameron 2010). In an area chosen to test the alternate landscape hypothesis, three newly identified archaeological sites (DhRo-60, DhRo-61 and DhRo-62) were located. These sites are several hundred metres north of Scout Bay on the west side of the Alouette Reservoir (Figure 2). Scout Bay is south of Viking Creek and accessible by a marked trail from the Parkway. The sites consist of small lithic scatters within the drawdown zone. The elevation of the Reservoir during field survey was between 121.25 m and 122.5 m. Two sites (DhRo-63 and DhRo-64) were identified during fieldwork for the Reservoir Archaeology Program Alouette Archaeological Inventory and Impact Assessment (Cameron 2010). Both of these sites are located in settings that support the alternate landscape hypothesis. No sites were found in the areas chosen to test the null hypothesis. Due to the water elevations in the Alouette Reservoir during field survey (over 121 m), the null hypothesis cannot be rejected with confidence.

The majority of the eastern Alouette Reservoir drawdown area appears to have low potential for the presence of archaeological sites as the terrain is rockier and steeper. There are, however, several small areas around drainages or alluvial fans on the eastern shore of Alouette Lake that have moderate archaeological potential for archaeological remains below the water level during field survey. No forest utilization sites (comprised of culturally modified trees or CMTs) were identified in the examined portions of the drawdown zone.
Figure 5. Survey coverage (from 1:50,000 NTS Map 92 G/8, Stave Lake, NAD 27).
Figure 6: Projectile point located at newly identified site (DhRo-61) north of Scout Bay.

Figure 7: View west to DiRo-1.
Figure 8: View southwest at north end of Alouette Reservoir.

Figure 9: View east to DhRo-8 at Gold Creek
5.1.2 South Alouette River

A segment of the South Alouette River was surveyed, 14.5 km long and approximately 25 m wide (36.25 hectares). Due to river hazards and blockages, a 1.5 km long segment, extending north from 249th Street (Alco Park) for 1.5 km was not surveyed. No archaeological sites were identified within the river channel and cutbanks examined during this assessment. However, we observed an area of high archaeological potential along that portion of the river that extends from 232nd Street to 216th Street. This area is predominantly flat and many landforms suitable to finding archaeological sites (terraces, benches) exist on both sides of the river. Within this area, a black organic silty clay layer (Figure 13) is visible in the cutbanks of the South Alouette River at 216th Street and extending several hundred metres east of 216th Street. No artifacts were observed within this layer and given its consistent makeup and extent, it is possible the layer could be the remains of one of several forest fires that are known to have regularly swept through the area historically.

The portion of the South Alouette River from the Alouette Dam to 249th Street appears to have low potential for archaeological sites including culturally modified tree (CMT) sites. Here the terrain is rocky, steep, and has been previously logged. No forest utilization sites comprised of CMTs or areas of potential for CMT sites were identified during the river survey. The portion of the river that extends from 249th Street to 232nd Street has low-moderate archaeological potential due to the moderately sloped rocky terrain that is periodically interrupted by low-elevation flat areas adjacent to the river channel (Figure 12). While there is no residential development from Alouette Dam to 249th Street, such is not the case from 249th Street to 216th Street. The South Alouette River appears to be actively eroding, and cutbanks between 232nd Street and 216th Street have recently collapsed into the river.
Figure 10. Survey coverage, archaeological potential and impact area on the South Alouette River.
Figure 11: View southwest of South Alouette River between 249th and 232nd Streets.

Figure 12. View south of South Alouette River between Alouette Dam and 249th Street.
Figure 13: View south of black organic layer in cutbank eroding into South Alouette River several hundred metres east of 216th Street.

5.2 History of Land Use

5.2.1 Katzie Land Use and Occupancy Study

Ethnographic documents suggest that Katzie hunters used the Alouette River and Alouette Lake areas as seasonal fishing and hunting areas (Suttles 1955), and contemporary Katzie clearly identify the Alouette Lake and River as their traditional territory. Traditional uses are reflected in the Katzie Land Use and Occupancy Study (KLUOS) database housed at Katzie First Nation (KFN). Traditional use information is recorded in the following sources: ethnographers Diamond Jenness (1936, 1955 and n.d.) and Wayne Suttles (1955); contemporary interviews (ca. 2002 to 2004) with Katzie Band members who referred to specific resource-use polygons in the TRIM maps from the KLUOS study; and traditional use information in the following reports (James 1998; Woodcock 1996). The traditional land use information for Alouette Lake and the South Alouette River are summarized in Table 4. The following summary is divided into thematic categories related to different subsistence practices, camp locations, trade, and spirituality.
Table 4: Traditional land use information for Alouette Lake and the South Alouette River from the Katzie Land Use and Occupancy database

<table>
<thead>
<tr>
<th>Activity/Entity</th>
<th>Location</th>
<th>Description</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing</td>
<td>Alouette R</td>
<td>&quot;where people go to get fish&quot;</td>
<td>Jenness 1936:35</td>
</tr>
<tr>
<td>fishing/Swanset</td>
<td>Alouette R</td>
<td>&quot;the place where people shall work in the mud…&quot;</td>
<td>Jenness 1936:12</td>
</tr>
<tr>
<td>Fishing</td>
<td>Alouette R</td>
<td>&quot;where people go to get fish&quot;</td>
<td>Jenness n.d.:32</td>
</tr>
<tr>
<td>summer basecamp/shelter</td>
<td>Alouette R</td>
<td>summer dwellings of the Alouette division of the Katzie; the site was somewhere near the mouth of the North Alouette.&quot;</td>
<td>Suttles 1986:19</td>
</tr>
<tr>
<td>water route/other</td>
<td>Alouette R</td>
<td>&quot;ducks, geese and deer&quot;</td>
<td>R. B. Interview</td>
</tr>
<tr>
<td>Fishing</td>
<td>Alouette R</td>
<td>&quot;coho, rainbow trout, cutthroat trout,&quot;</td>
<td>R. B. Interview</td>
</tr>
<tr>
<td>plant gathering/wapato</td>
<td>Alouette R</td>
<td>&quot;wapato&quot;</td>
<td>W. P. Interview</td>
</tr>
<tr>
<td>tree root digging/cedar</td>
<td>Alouette Park</td>
<td>&quot;gathered cedar root&quot;</td>
<td>A. P. Interview TUS:6</td>
</tr>
<tr>
<td>Habitation</td>
<td>N Alouette River</td>
<td>the dwelling site on the North bank near Sheridan Hill.&quot;</td>
<td>Suttles 1986:19</td>
</tr>
<tr>
<td>fishing weir</td>
<td>S Alouette</td>
<td>Weirs and traps were built on the North and South Alouette Rivers close to the spawning grounds of the fish. The weir consisted of a row of posts driven into the bottom of the steam, against which sections of woven cedar limbs were tied.&quot;</td>
<td>Driver and Spurgeon 1998:38</td>
</tr>
<tr>
<td>Fishing</td>
<td>S Alouette</td>
<td>South Alouette I fished ah the whole, the whole thing South Alouette. I fished there for trout. LC: &quot;Polygon number six.&quot;</td>
<td>GM TL Interview</td>
</tr>
<tr>
<td>Fishing</td>
<td>Alouette</td>
<td>Neaves Road was a popular place. Yeah it goes all the way from the Pitt straight down. Right down Dewdney</td>
<td>GM TL Interview</td>
</tr>
</tbody>
</table>
Fishing:
The majority of traditional use references in the KLUOS database for the Alouette Lake and the South Alouette River refer to fishing (Table 4). Both oral histories and contemporary Katzie Elders echo this focus for the Alouette system. In fact, Jenness’s (1936:35; n.d.: 32) informants stated that the Alouette River is where Katzie people “go to get fish.” Fish species found in these waters before the dam was built include: lamprey, white sturgeon, Dolly Varden, cutthroat, lake and rainbow/steelhead trout, kokanee, coho, chum, and pink salmon, eastern brook char, mountain whitefish, brown bullhead, largescale sucker, Coast Range sculpin, longose dace, carp, peamouth chub, redside shiner, three spine stickleback, squawfish (Driver 1998:24 after Quamme 1996; Swain 1989; Griffith and Russell 1980; Neuman 1987; ARMS n.d.). References to specific fish caught and consumed in this area include: coho salmon (Oncorhynchus sp.), rainbow trout and cutthroat trout (Salvelinus spp.). Contemporary Katzie suggest that the whole of the South Alouette was good for coho, rainbow trout, and cutthroat trout. One contemporary Katzie individual specified that “weirs and traps were built on the North and South Alouette Rivers close to the spawning grounds of the fish. The weir consisted of a row of posts driven into the bottom of the stream, against which sections of woven cedar limbs were tied." Halq’emeylem names are documented for specific fishing sites, including locations of ancient weirs and traps, as well as types of fish utilized (Jenness 1936:35, Suttles 1955:19).

Hunting:
While records of Katzie land use practices are often focused on the Pitt Lowlands, there is consistent evidence for hunting in the mountainous areas in northeastern Katzie territory and around Alouette Lake (James 1998:44 after Suttles 1955). Terrestrial species such as deer, elk, mountain goat and black bear were hunted around Alouette Lake. A variety of weapons and techniques were used, including bow and arrow (and in earlier times spears), pitfall traps and nooses. When hunting at night these animals were attracted by the use of pitchwood torches (Suttles 1955:p cited in James 1998:42). Waterfowl, including ducks and geese, were also typically hunted in this area.

Plant Harvesting:
Mountain huckleberries and blueberries (Vaccinium sp.) were the primary plant resources harvested near Alouette Lake (Suttles 1955:p cited in James 1998:44). Several ethnographic and contemporary references include specific harvest locations for wapato (Sagittaria latifolia). Wapato is a carbohydrate rich tuber that was very important to pre-contact Halq’emeylem peoples for local consumption and trade (Spurgeon 2001). A contemporary interest is re-surfacing in the Katzie community with the recent re-introduction of experimental wapato gardens.

Redcedar, western yew (Taxus brevifolia), and western hemlock (Tsuga heterophylla) were harvested in the Alouette region. Contemporary Katzie identified specific harvest locations for redcedar (Thuja plicata) roots. Cedar root was traditionally used in the manufacture of baskets, rope, fish traps and binding materials (Woodcock 1996) and continues to be used for many of these same purposes. Between 1915 and 1931, the South Alouette was used to transport timber from logging activities; presumably, pre-contact Katzie used this waterway for the same purpose, to bring dressed logs and planks downriver to their settlements at the mouth of the Alouette River.
As suggested in the ethnographic overview, many medicinal plants would have been available in the mid to upland regions surrounding Alouette Lake, and may have been collected by specialists. Numerous medicinal plants were recorded by Suttles (1955) based on his interviews with Katzie elder Simon Pierre. Unfortunately, this source rarely clarifies where specific species were harvested. Interest in medicinal plants continues with contemporary Katzie plant specialists.

Camps:
Katzie dwelling and habitation sites are recorded near Alouette Lake and along the North Alouette River. These include “summer dwellings of the Alouette division of the Katzie; the site was somewhere near the mouth of the North Alouette,” as well as a “dwelling site on the North bank near Sheridan Hill” (in Suttles 1987:19).

Trade:
It is clear that Katzie territory held prime trade items that were very much in demand by other First Nations. Trade routes through Katzie territory are mentioned in various historical documents, including two possible routes from above Stave Lake to Alouette Lake and on to Pemberton. These are referenced in a map and letter by George Turner (1877) based on information from First Nations informants (Spurgeon 1998:85 after BCEEM 1926 n. 12; Nickols et al 1972:65; Suttles 1955:1).

The primary trade item brought from the mountains was likely mountain-goat. The range of mountain goat is limited to a section of the Coast Range and they were therefore only available to certain Nations. Mountain goat wool was traditionally used to produce clothing and blankets. According to Suttles, the wool was pulled off after the hide had hung for a while (Suttles 1955 cited in Woodcock 1996:31). Another source states that wool was also gathered from the ground after it had shed from the live animals (Wells 1969). It has been suggested that the downriver Coast Salish, including the Katzie, developed a clothing style that combined Interior and Coastal elements (Jenness 1955:7). Table 5 gives an overview of objects traded between Halkomelem-speaking communities and surrounding First Nations, focusing on mountain goat products, a resource which was once plentiful in the Alouette Lake region.

Table 5: Goods traded between Coastal and Interior First Nations of BC

<table>
<thead>
<tr>
<th>Upriver Salish supplied:</th>
<th>Coast Salish supplied:</th>
<th>Salish supplied:</th>
<th>Downriver Salish supplied:</th>
<th>Coast Salish supplied:</th>
<th>Island Salish supplied:</th>
<th>Coast Salish supplied:</th>
</tr>
</thead>
<tbody>
<tr>
<td>dugout canoes</td>
<td>soopolalie oil</td>
<td>eulachon and salmon</td>
<td>Elk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dried salmon</td>
<td>dried Saskatoon berries</td>
<td>wild potatoes</td>
<td>Seal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rush mats</td>
<td>Indian hemp</td>
<td>goat-wool blankets and sealskin</td>
<td>camas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>goat-wool blankets</td>
<td>lithic materials such as basalt, chert and nephrite</td>
<td>clams (dried and fresh)</td>
<td>dried clams</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Barnett 1955; Darwent 1998; Suttles 1955.
**Ceremonial/Sacred:**
The closest spiritual place name to the study area is at the bend of the South Alouette River at a Transformer rock site at Davis’ Pool (Suttles 1955:16, 19; place name #77). Suttles reports that a one-legged man was turned to stone there, and then became the master of all fish that ascended that waterway. While not attached to a specific place name, mountain-goats and the places from which they were hunted were spiritually important to the Katzie (cf. Suttles 1955:25). Pictographs and petroglyphs, which often infer spiritual activity, are also present in the area.

### 5.2.2 Historical Use

The study area has been the focus of a number of historic uses, in addition to the continuity of Katzie use as discussed above. James Douglas, the first governor of British Columbia, notes that the surrounding district is full of arable land and settlement should be encouraged (Douglas 1860 in Driver and Spurgeon 1998). After settlement began in nearby Maple Ridge, the Alouette drainage began to be used for its economic resources, namely water and timber.

![Figure 14: Low water at Alouette Lake post-dam](image)

**Logging:**
While selective logging began with the first European settlers, the first commercial logging in the area adjacent to Alouette Lake occurred around 1915 and continued into the mid 1930s (Walker and Pogue 1941). The primary forest cover in the old growth forest was a combination of red cedar, Douglas fir and hemlock. Records from this time show redcedar and Douglas-fir trees with diameters in excess of seven feet, highly valuable to commercial logging companies (Figures 14 and 15).
In order to facilitate the movement of timber from the area, the Abernathy-Lougheed logging company constructed a logging railway in 1918, increasing access to the lake and opening the area for further speculation. This railway, stretching ten miles from Haney along a spur connected to Alouette Lake, crossed the Alouette River several times and was associated with nine logging camps, two of which were located at the south end of the lake (Nickols et al. 1972 in Driver and Spurgeon 1998:82-84). Logging was ongoing through the 1920s (Figure 17) in areas that had not previously been burned, although a large swath of the lake had already been subject to a major forest fire in 1868 (http://www.mkrf.forestry.ubc.ca/general/history.htm). Localized fires were common along the lake, as an account from 1923 notes that a large section on the east side of the study area had been burned some 30 years prior.
Two major fires in 1926 and 1931 (Figure 16) were particularly damaging, leading to the end of commercial logging, although some limited portions of the area were logged for the next five years. A forest cover map (Figure 18) made in 1940, designed to indicate the potential for future logging, shows the various areas that were logged and/or burned each year (Walker and Pogue 1941), noting establishment dates for much of the second growth forest that is part of the contemporary use of the region, particularly the UBC research forest and Golden Ears Provincial Park.
Figure 18: 1940 North Shore Forest Cover Map (refer to BC Forest Service Map original for Legend)
Hydroelectric:
During the early part of the twentieth century, the BC Electric Railway Company was exploring possibilities to meet their growing power demands from nearby regions. Several other local lakes were dammed from 1900-1920, including the nearby Stave Lake, as the electrical companies saw runoff from the mountainous regions around these lakes as a useful source of hydroelectric power. Attention turned toward the Alouette and Stave Lake drainages after the BC Electric Railway Company acquired the rights by purchasing Western Power in 1923 (Driver and Spurgeon 1998:83). While their plan was initially to divert water from the area behind the dam to a powerhouse on the lower Alouette River, the plan was changed to build a tunnel at the north end of the area, which would drain the Alouette Lake into the Stave drainage and increase power generation through via the Stave Reservoir.

This project commenced in 1924 (Figure 19) with the construction of a dam at the south end of the lake raising the water level of the lake 45 ft to allow for water to drain through the tunnel at the north end (BC Electric Co. n.d. in Driver and Spurgeon 1998:84). The large scale of the project led to a subsequent deepening of the channel between two lakes and extension of the existing logging railway to the dam site. The dam had long-lasting negative impacts to the fish runs that were a vital part of Katzie livelihood, as the various species of salmon were unable to migrate past the dam. All seven species of salmon that were present in the lake were either severely depleted or rendered extinct by the constriction of flow and the presence of the physical dam itself (http://www.alouetteriver.org/history-watershed.html).
Non-Industrial:
Along with commercial issues of logging and hydroelectric generation, there were some non-industrial uses of the area, notably a few small cabins built near the shore (Figure 20). A 1924 map prepared to facilitate the construction of the dam notes a cabin built at the juncture between the two lakes. Other uses proposed for the area include a possible trail passage from the interior near Pemberton in 1877, referencing an “Indian informant”, as this was one route used by the Katzie to connect to interior communities (Driver and Spurgeon 1998:85). The 1940 forest cover map also shows various trails around the shores of the lake (Walker and Pogue 1941).

In summary, the study area has been the focus of a variety of industrial and non-industrial uses since European contact. Logging and the use of the lake for hydroelectric purposes have had lasting impacts on both land and water-based resources of the area.

5.3 Current Land Use

Contemporary uses of the study area include recreational activities, research, ongoing hydroelectric generation, and the reintroduction of various species of salmon to Alouette Lake.

Recreation:
The earliest use of the study area as parkland began in 1927, when a portion of the area was designated as Garibaldi Park. This was followed in 1932 by the establishment of Golden Ears Park, which became a separate provincial park in 1967 (Alouette River Management Society n.d.). Golden Ears Provincial Park, named for the twin peaks of Mt. Blanchard, is a 62,540 hectare park surrounding much of the southern portion of Alouette Lake and is a popular location for hiking, swimming and camping. Current seasonal activities in the park include climbing, cycling, horseback riding, boating, fishing, waterskiing, windsurfing and backcountry hiking (BC Parks n.d.). It is a popular family destination for people living in the nearby Lower Mainland, and the day-use beaches and campgrounds become very crowded in the summer months. There are three established campgrounds from the south end of Alouette Lake to the Gold Creek drainage and extensive trails both along the Lake and into the adjacent mountainous
regions. Wilderness camping is also a common activity on the west side of the south portion of the lake, near the upper drainage of Gold Creek (Figure 21).

![Golden Ears Park Map](image)

**Figure 21: Golden Ears Park Map**

The Golden Ears Park boundary extends along two kilometres of the eastern edge of Alouette Lake, while the area further northeast of this location is an unmanaged recreation reserve. Recreation reserves are designed by the Crown for “the use, recreation and enjoyment of the public” (Dewdney-Alouette Regional District Planning Department 198:21). Under the Forest Act, the Minister can “enter into an agreement with any person providing for the development of recreation sites and recreation trails” (ibid:22).

**UBC Malcolm Knapp Research Forest:**
In 1949, the University of British Columbia was granted a portion of the study area to support forestry research, comprising 5151 hectares of mostly second growth timber (Driver and Spurgeon 1998:84). This area is used “as a facility for research, demonstration, and education in the field of forestry and allied sciences” (http://www.mkrf.ubc.ca/general/about.htm), although it is also managed as a recreation facility. Some old growth remains in the forest, although the majority of the stand was established after fires in around 1880 and 1930, providing a range of forest environment appropriate for study. Selective sustainable harvesting is
conducted in the forest to maintain the recreational and research areas. A research camp was constructed along the banks of Loon Lake and remains in use today as an outdoor education facility (ibid). Projects conducted throughout the history of the research forest have ranged from forest management to forensic entomology, with a more recent focus on sustainability and measuring impacts of forest practices (http://www.mkrf.forestry.ubc.ca/research/index.htm).

Watershed Management:
Impacts from the continued use of the Alouette Dam for hydroelectric purposes has influenced some current uses of the study area, as the dam has been criticized for severely reducing the flow of the Alouette River and preventing salmon from reaching their spawning grounds. After assuming ownership of the dam in 1962, BC Hydro agreed in 1971 to release an additional flow of 0.056 cms, ensuring that the South Alouette would have a minimum flow of 0.7 cms (Driver and Spurgeon 1998:27-28). This was followed by the establishment of a fish hatchery at a correctional institute located on the Alouette River and the subsequent release of chum and pink salmon (ibid; Alouette River Management Society). Once the Alouette River Management Society (ARMS) was established in 1993 following increased public concern about the state of the river, a programme for reintroducing various species of salmon to the study area was accelerated and an agreement was reached in 1996 to increase the flow of the river to a single low level outlet release varying between 1.98 and 2.97 cms depending on reservoir head (Dave Hunter Pers. Comm. Sept. 10, 2010). Since this time, ARMS has been active in many aspects of stewardship of the entire watershed, building the Rivers Heritage Centre and participating in outreach and education (ibid). The current mandate for ARMS is watershed enhancement and restoration, and the group was instrumental in establishing the first Water Use Plan in British Columbia. In particular, ARMS is involved with an ongoing project in conjunction with BC Corrections, Katzie First Nation, BC Hydro, District of Maple Ridge, DFO and MOE to reintroduce sockeye salmon to the watershed (ARSRP 2008).

Figure 22: Debbie Miller of Katzie First Nation releasing sockeye spawn
In 2007, sockeye original descendants from when the dam was built, returned to Alouette Lake to spawn. This has led to the increased demand for a fish ladder to be built to facilitate ongoing salmon migration. Through the ARSRP initiative, ARMS and several other partnership organizations have established a trap-and-truck program to bring returning sockeye salmon across the dam location and release them into the lake (Balke 2009). The current sockeye re-
introduction plan involves relying on WUP mandated spring Alouette Dam surface spillway release flows to allow outmigration of Alouette Reservoir kokanee smolts (ARSRP 2008). These kokanee smolts are descendents of the originally extirpated sockeye and when provided an outmigration route to the Alouette River have been confirmed to return to the Alouette River as adult sockeye 2-3 yrs later. The studies to enumerate both outmigrating kokanee smolts and returned adult sockeye are covered through Alouette WUP monitoring commitments.

In summary, current land use of the study area includes ongoing recreational, research, and conservation activities. Golden Ears Park is a popular day-use and overnight-use outdoor destination and a variety of research projects take place in the UBC Malcolm Knapp Research Forest. Finally, the activities of the Alouette River Management Society, in collaboration with the Katzie First Nations, have led to the reintroduction of key salmon species to the watershed.

5.4 Katzie Future Land Use

The Water Use Planning process requires that BC Hydro consider the priorities of stakeholder groups in their operational planning and implementation. In some cases, the priorities of the stakeholder groups, and indeed the operational requirements of the reservoir, may supersede Katzie priorities. For example, in maintaining high pool levels to meet the needs of summer recreational users, Katzie heritage sites and resources (including culturally significant plants) may be impacted as recreationalists hike into or otherwise disturb forested areas above the high pool line. Alternatively, if low pool conditions were maintained, then these impacts might be restricted to areas below the high pool line (i.e. previously impacted areas). Further, by operating Alouette Lake as a reservoir, the scouring effects of changing water levels has impacted Katzie’s physical heritage (i.e. archaeological sites) and the cultural landscape of the general area. The Alouette Lake was known to have functioned as a gateway into upland mountain goat hunting areas. Trail heads and camping areas that likely existed below the high pool line have been eroded by BC Hydro operations. Concomitant food (especially plant and fish) resources that existed in the littoral zone and within the lake itself have also been compromised by BC Hydro operations (see earlier discussion of fish extirpation). The combined effects of multiple years of scouring and landscape alteration represent a cumulative impact that Katzie seeks to better understand, and in partnership with BC Hydro, address in the future.

Proposed mitigative strategies intended to address these and other Katzie resource access concerns include:

- conduct an inventory of existing culturally-significant resources (plant, fish, ungulate where feasible) that are being impacted directly or indirectly (e.g. recreationalist impacts to culturally-significant plants in upland areas) by BC Hydro operations;
- assess the level to which the resources are being impacted and where possible, assign impact attribution (e.g. primary, secondary and cumulative impacts);
- design strategies (e.g. compensation areas, enhancement, erosion control) to mitigate further impacts; and
- Work with BC Hydro to implement those strategies.
6.0 SITE SIGNIFICANCE EVALUATION

The Archaeology Branch considers site significance assessments as a major component of the impact assessment process. However, it should be pointed out that the Archaeology Branch significance assessments do not reflect Katzie First Nation’s values when it comes to their cultural heritage. Indeed, the Alouette should be viewed as a cultural landscape where the archaeological sites are just one element of the watershed’s significance to this and future generations of Katzie. Future access to ancient resource areas and resources is just as significant to Katzie – especially given the context of Treaty negotiations – as the archaeological sites.

Assessments of this nature are suggested by the Archaeology Branch in order to ensure that appropriate management recommendations are implemented. The British Columbia Archaeological Impact Assessment Guidelines (Archaeology Branch 1998) defines several types of significance in relation to archaeological sites. As per the guidelines, the scientific, public, ethnic, economic, and historic significance of the sites identified were assessed and rated as high, moderate, or low. Definitions of the types of significance assessments conducted are as follows:

**Scientific Significance** is based on the potential of a site to contain evidence that could substantively increase knowledge, its ability to contribute to various scientific disciplines, and contribute to an understanding of local and regional prehistory.

**Public Significance** is based on the potential of a site to be used by the public in an educational, interpretative, or recreational capacity.

**Ethnic Significance** is determined by local cultural groups, primarily First Nation(s) and refers to the traditional, social, or spiritual importance of a site. The Katzie First Nation, Kwantlen First Nation, Stó:lō Nation and Semiahmoo First Nation consider all archaeological sites within their asserted traditional territories to be of high ethnic significance.

**Economic Significance** refers to the potential financial benefits that could be derived from the public’s use of a site as an educational or recreational facility.

**Historic Significance** refers to the possible association of a given site with an important historic person or event.

It should be noted that a full evaluation of the cultural and ethnic significance of the archaeological sites (DiRo-1, DhRo-7, 8, 60-64) is beyond the scope of the current study and could be determined in consultation with the Kwantlen First Nation, Stó:lō Nation, and Semiahmoo First Nation. The Katzie First Nation considers all archaeological sites to have high cultural and ethnic significance. The scientific significance ratings for the eight sites recorded or revisited are as below.
Table 3. Scientific Significance of archaeological sites located in the Alouette Reservoir.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Stratification</td>
<td>Max</td>
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<tr>
<td>Depth of Cultural Deposits</td>
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</tr>
<tr>
<td>Chronologically Sensitive Cultural Items</td>
<td>1</td>
</tr>
<tr>
<td>Materials for Absolute Dating</td>
<td>1</td>
</tr>
<tr>
<td>Association with Ancient Landforms</td>
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</tr>
<tr>
<td>Quantity and Variety of Tool Types</td>
<td>2</td>
</tr>
<tr>
<td>Distinct Intrasite Activity Areas</td>
<td>2</td>
</tr>
<tr>
<td>Cultural Features</td>
<td>2</td>
</tr>
<tr>
<td>Distinct Floral or Faunal Remains</td>
<td>1</td>
</tr>
<tr>
<td>Exotic Cultural Items and Materials</td>
<td>2</td>
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<tr>
<td>Rare Site</td>
<td>2</td>
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<tr>
<td>Integrity of site</td>
<td>3</td>
</tr>
<tr>
<td>Contains Data Useful to Palaeo-environmental Studies</td>
<td>1</td>
</tr>
<tr>
<td>Contains Data Useful to other Scientific Disciplines</td>
<td>2</td>
</tr>
<tr>
<td>Scientific Total</td>
<td>25</td>
</tr>
</tbody>
</table>

Though DiRo-1, DhRo-8 and DhRo-64 score fairly low following the guidelines provided above (Archaeology Branch Archaeological Site Assessment Guidelines 1996), the author considers them to have moderate scientific significance, based on the following criteria:

- are fairly rare mid-elevation transitory sites;
- evidence of tool manufacture, variety of tool types and/or contain a significant cultural feature (petroglyph); and
- although the true scientific significance of these sites has been most likely destroyed by the erosional forces of the reservoir, there is still a possibility that cultural deposits are under water.

No historic artifacts were located within any of the sites and for this reason, the historic significance of the sites is considered to be low. As most of the sites are located within a provincial park or by a rustic marine campsite (where DiRo-1 is located) and are easily accessible (via the reservoir or trail systems), the public significance of the sites is considered to be low-moderate due to the accessibility of the sites versus the disturbed context of the sites and general absence of distinctive cultural features which could be used in an interpretive role. The petroglyph boulder at site DhRo-64 is the obvious exception. Economic significance is evaluated in special cases where the site may be of a potential economic benefit, but this was not considered warranted for the sites.
7.0 IMPACT IDENTIFICATION AND ASSESSMENT

The following is a brief description of specific impacts to each archaeological site within the drawdown zone of the Alouette Reservoir. These impacts may include mechanical processes such as fluctuating shoreline, outflow erosion, rainfall erosion, siltation, saturation and slumping. Human impacts may include collection of surface artifacts, damage through recreational use and damage by works in Golden Ears Provincial Park. At the north end of the Alouette Reservoir, the roots of some stumps have been exposed up to 2 m below natural levels and other stumps nearby have been covered by silt. This demonstrates the variable aggradation and erosion which has occurred throughout the reservoir affecting the archaeological sites within the drawdown zone. It is highly doubtful that archaeological remains located at most of the sites (except DhRo-64) are in situ. See Table 2 for a brief review of the archaeological sites listed below.

**DiRo-1**

This site is located at a popular camping spot within Golden Ears Provincial Park. The site has been heavily modified by recreation use including the use of campfires, trampling and digging within the site. DhRo-1 is also located at the narrows on Alouette Lake which is a high energy flow area where water flows swiftly above the old river channel between upper and lower Alouette Lake. This high energy flow combined with the fluctuating shoreline has greatly damaged the integrity of the site. Rainfall erosion is evident at the north end of the site where the northern boundary is demarcated by a seasonal stream which frequently overflows its channel onto the site.

**DhRo-7**

This site has been destroyed by spillway construction at the Alouette Dam (Arcas 1991).

**DhRo-8**

This site is located at a popular beach area and beside the Gold Creek Camp Ground within Golden Ears Provincial Park. The site has been heavily modified by recreation use including the use of campfires, trampling and digging within the site. The site has also been heavily modified by fluctuating shorelines and outflow currents as it is located on an alluvial fan jutting into Alouette Lake. Shoreline fluctuations appear to be heavily influenced by BC Hydro reservoir operations.

**DhRo-60**

This site is located on a point of land north of Scout Bay and is being eroded by fluctuating shoreline as well as by outflow currents. This area appears to have low to moderate recreational use as it is several hundred metres from any trail head. The area has been impacted in the past by forestry operations.

**DhRo-61**

This site is located north of Scout Bay and is being eroded by fluctuating shoreline and rainfall erosion. This area appears to have low to moderate recreational use as it is several hundred metres from any trail head. The area has been impacted in the past by forestry operations.
**DhRo-62**

This site is located north of Scout Bay and is being eroded by fluctuating shoreline and rainfall erosion. This area appears to have low to moderate recreational use as it is several hundred metres from any trail head. The area has been impacted in the past by forestry operations.

**DhRo-63**

This site is located north of the boat launch and is being eroded by fluctuating shoreline and rainfall erosion. This area appears to have moderate recreational use as it is approximately fifty metres from a trail head. The area has been impacted in the past by forestry operations.

**DhRo-64**

This site is located south of the Scout Bay trail head and is being eroded by fluctuating shoreline and rainfall erosion. This area appears to have moderate recreational use as it is approximately one hundred metres from a trail head and camping platforms are located within fifty metres. The area has been impacted in the past by forestry operations. The petroglyph does not appear to have been intentionally damaged but may have suffered the effects of water erosion.
8.0 Management Recommendations and Concluding Remarks

8.1 Alouette Lake

Three newly identified protected archaeological sites (DhRo-60, 61, and 62) were located along the southwest shoreline of the Alouette Reservoir during the preliminary field reconnaissance (PFR). Two more sites (Dhro-63 and 64) were identified during the Alouette Reservoir Archaeology Program’s archaeological impact assessment (AIA) and inventory under Permit 2009-032. Two previously recorded sites (DiRo-1 and DhRo-8) were revisited during the PFR and during the AIA and inventory and additional artifacts were recovered. The location of previously identified site (DhRo-7) was revisited; the site is believed to be destroyed by modifications to the Alouette Dam around 1991.

All sites except DhRo-64 (petroglyph) consist of lithic scatters. It is likely that the lithic scatters are the remains of hunting and/or fishing camps. Ethnographic and traditional use sources mention the Alouette Lake area as an important hunting, fishing and resource gathering area for the Katzie First Nation (Driver and Spurgeon 1998) and the Kwantlen First Nation (Duff 1952). The presence of rock art (DhRo-64 petroglyph) indicates that Alouette Lake was also a spiritually important area to the local First Nations. The archaeological remains pre-date 1846 and are therefore protected under Section 13 of the Heritage Conservation Act.

To test the null and alternate landscape hypotheses, we recommend further testing of a larger sample to reduce the likelihood that other previously unaccounted for factors may be contributing to the observed correlation.

Because the reservoir elevation was rising when the newly identified sites were located, we recommend they be revisited for further survey and subsurface testing when future reservoir levels are lower than 121 m. In particular, we recommend that the eastern shore of Alouette Lake be surveyed again by boat to determine if suitable landforms exist at lower water elevations. The previously identified sites at the Narrows (DiRo-1, Figure 2) and Gold Creek (DhRo-8, Figure 4) were revisited and it was noted that additional artifacts have eroded out of these sites. In order to make appropriate management recommendations regarding erosion control based on observed rates of impact, we recommend these sites be revisited during the next low drawdown.

As a result of the PFR survey and subsequent AIA and inventory, we make the following general recommendation for the Alouette Water Use Plan. Based upon the location of five newly identified archaeological sites (DhRo-60, DhRo-61, DhRo-62, DhRo-63 and DhRo-64), further artifacts eroding out of two known archaeological sites (DiRo-1 and DhRo-8) and several areas with potential for the presence of archaeological deposits on the western shore of the Reservoir, it is recommended that further survey and testing be conducted for the Alouette Reservoir under a permit issued under Section 14 of the Heritage Conservation Act (1994), with particular emphasis placed on surveying areas that are exposed and at a lower water elevation (preferably below 120 m).

There is a high level of recreational pressure on the Alouette Lake shoreline that results in impacts to inland areas. The study team has observed that the degree to which recreational users...
penetrate inland areas is directly tiered to water levels, that is, when water levels are raised to over 123 m in spring/summer, inland impacts increase. The presence of Golden Ears Provincial Park is also a key factor in the recreational use of the area and its related impacts. Since there has never been a systematic inventory of inland areas that border the Alouette shoreline, we are unable to determine whether archaeological sites are being impacted. Consequently, the study team recommends that an archaeological testing program be carried out in inland areas in order to a) determine the inland extent of known or previously unrecorded archaeological sites, and b) determine appropriate management schemes for each site recorded during the inventory.

With respect to resources that are of Katzie cultural significance that may be impacted by reservoir operations, we also recommend that the above archaeological project include an inventory of culturally significant resources and resource areas. These could include plant resources, areas appropriate for ceremonial activities, inland and alpine access points and trails.

### 8.2 South Alouette River

Given the results of the PFR survey, we present the following recommendations to the Alouette Water Use Plan. Based upon the high archaeological potential assigned to the area of the South Alouette River between 232nd Street and 216th Street, we recommend that periodic surface surveys of the area be conducted following periods of high water or similar erosional events, and that if archaeological materials or matrices are observed eroding from the river banks, that an Archaeological Impact Assessment be conducted so that site deposits can be defined and appropriate management strategies presented for implementation. It should be noted that this will be less feasible on private lands abutting the South Alouette River.

In summary, we put forth the following recommendations:

1) Further testing of the alternate and null landscape hypotheses in the Alouette Reservoir;

2) Revisit known archaeological sites at lower reservoir levels;

3) Conduct additional archaeological survey of lands exposed at low reservoir levels;

4) Carry out additional archaeological inventory and impact assessment work above the active erosion zone as defined under the Reservoir Archaeology Program to assess impacts related to recreational users;

5) Include studies of culturally significant resources and resource areas such as wapato harvesting areas, fishing locations, trails and alpine hunting locations; and

6) Conduct repeated surveys downstream between 232nd Street and 216th Street on the South Alouette River.
8.3 Management Strategies

There are four principle strategies available to manage conflicts between archaeological sites and hydro projects in British Columbia, as described in the BC Archaeological Guidelines (Archaeology Branch 1998). These strategies are:

(1) Site conservation by avoidance is the most effective strategy for significant sites or portions of sites threatened with destruction. However, it is recognized that this is not possible for the majority of hydro operations. For the best possible solution, it is suggested that a discussion with BC Hydro regarding the elevation range of sites and normal operating range of reservoir levels take place during the Archaeological Management Plan development.

(2) Mitigation in the form of systematic data recovery (i.e., archaeological excavation) is usually recommended for vulnerable, significant sites, or portions of sites which cannot be protected by other strategies.

(3) Archaeological monitoring, as one condition of a Site Alteration Permit, is another type of mitigation, often recommended for construction within sites or portions of sites to ensure that appropriate emergency impact management actions are carried out if unanticipated, significant archaeological remains are encountered.

(4) Lastly, compensation refers to direct monetary payments made by a development proponent to finance the costs of data recovery or other archaeological investigations on parts of a site not directly affected by a particular activity or development.

All users of this report should also be aware that: (1) archaeological remains in BC are protected from disturbance, intentional or inadvertent, by the Heritage Conservation Act; (2) in the event that archaeological remains are encountered, all ground disturbance in the immediate vicinity must be suspended at once; (3) it is the individual’s responsibility to inform the Archaeology Branch, Katzie First Nation, Kwantlen First Nation, Stó:lō Nation and Semiahmoo First Nation, as soon as possible, about the location of the archaeological remains and the nature of the disturbance; and (4) the Heritage Conservation Act may incur heavy fines and imprisonment for failing to comply with these requirements. If archaeological remains are encountered, individuals must adhere to the BC Hydro Emergency Heritage Procedures.
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