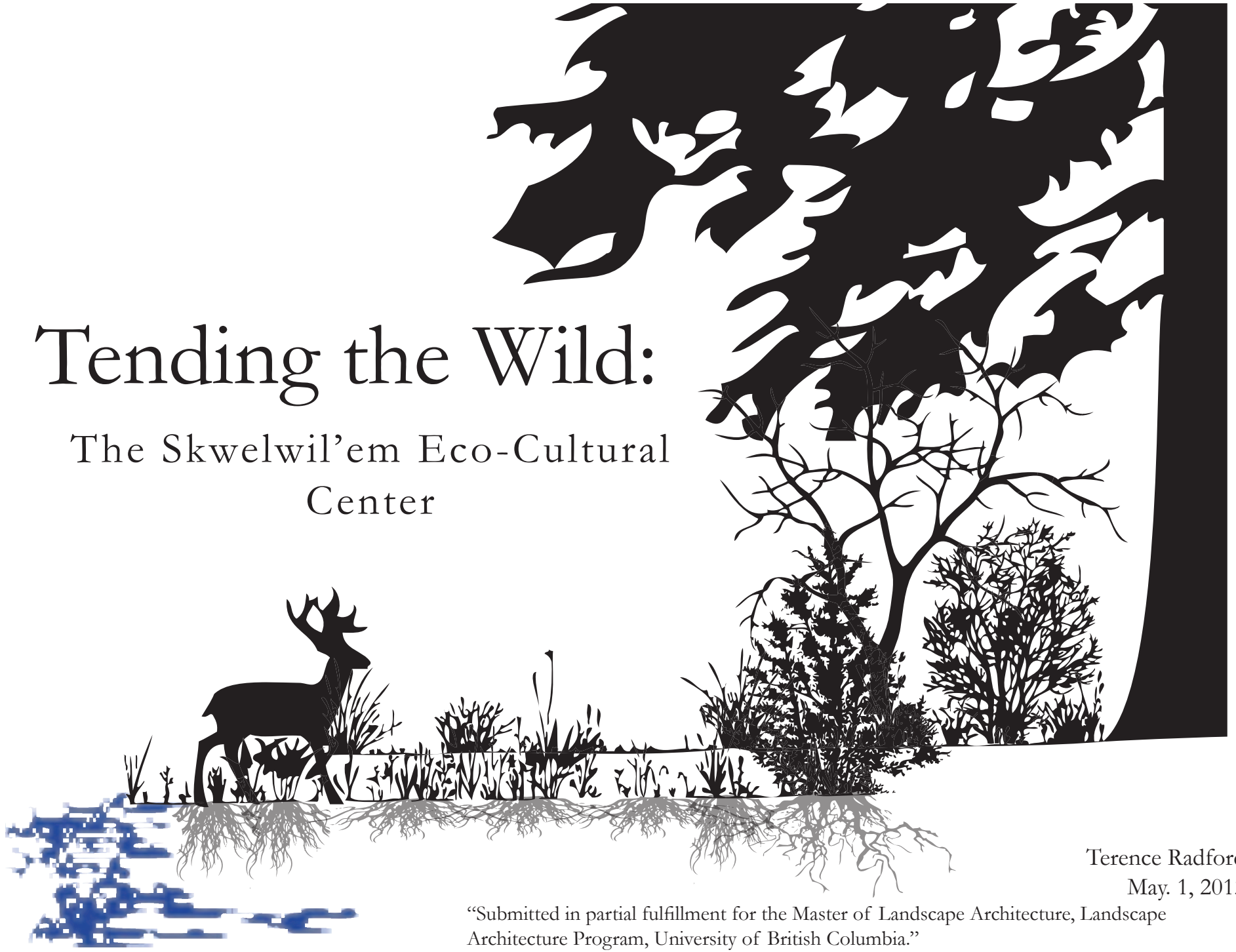
Tending the Wild:

The Skwelwil'em Eco-Cultural Center



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May. 1, 2013

"Submitted in partial fulfillment for the Master of Landscape Architecture, Landscape Architecture Program, University of British Columbia."

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ABSTRACT

Coastal estuaries have suffered globally from industrialization and development. Until now planning and policy has addressed this through restoration and preservation efforts that seek to protect these important ecological areas. However as historic places of dwelling, for indigenous peoples, these often-contested sites highlight current conceptual divides between human occupation and ecological integrity.

As such ***Tending the Wild****: The Skwelwil'em Eco-Cultural Center* explores how the traditons of the Coast Salish people, specifically the Squamish Nation, can serve to not only aid in current restoration efforts but are an integral part of the cultural identity of these locations. The design of the West-Barr log-sort, recontextualizes these traditions into a series of landscape interventions based on historic connections of culture and ecology.

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RELEASE FORM

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Graduation Design Project (GDP) Title

TENDING THE WILD: THE SKWELWIL'EM ECO-CULTURAL CENTER

Terence Radford _____ _____

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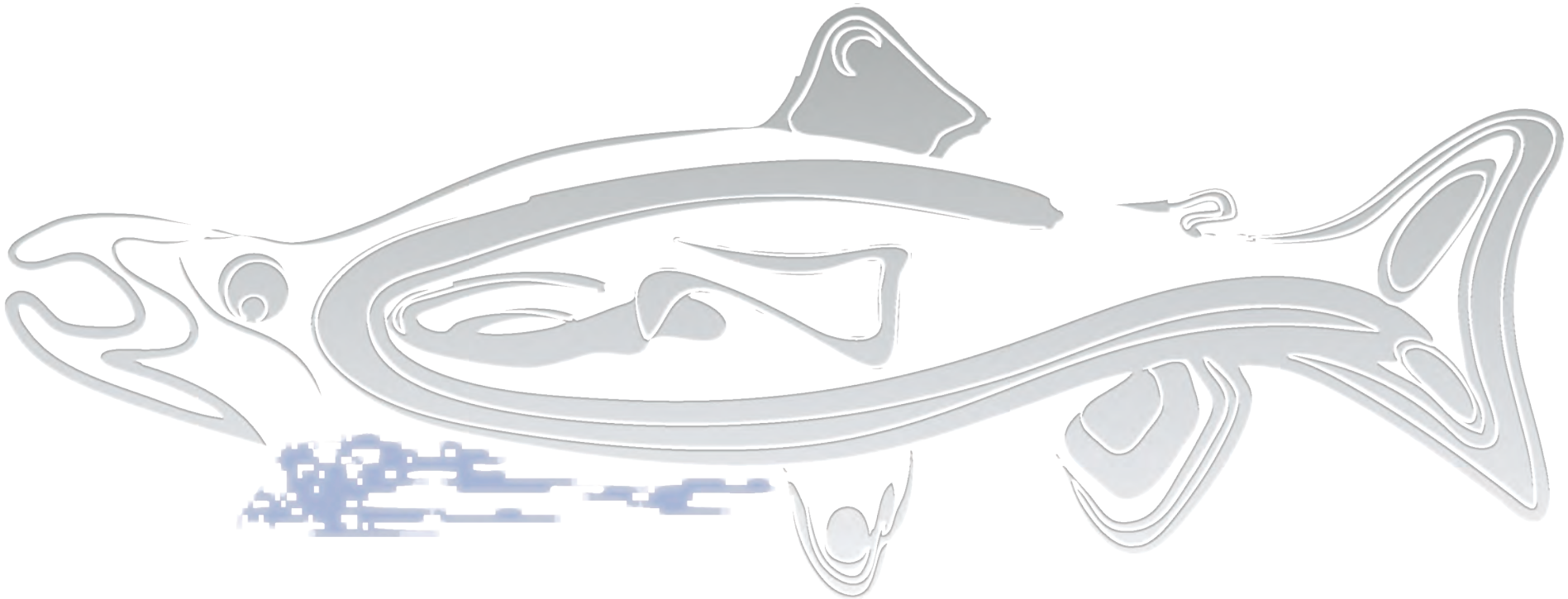
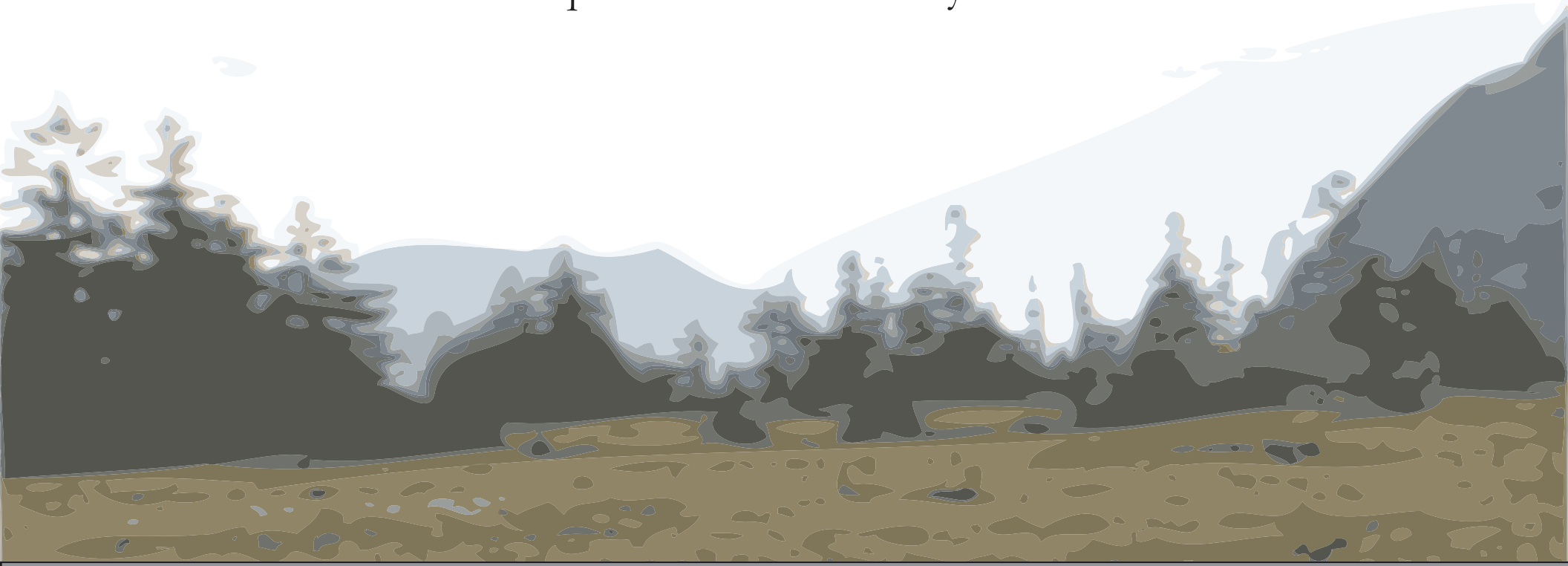


Project Vision:

"The Skwelwil'em Eco-Cultural Center will act as a hub for research, education, and preservation of the ecological and cultural significance of the Squamish River Estuary."



PROBLEM STATEMENT

The management plan of the Skwelwil'em wildlife management area (WMA) focuses on the maintenance and restoration of fish, wildlife, and supporting habitats. (Lower Mainland Region Environmental Stewardship Division: 2007) While the management plan embraces the importance of the ecological integrity and cultural heritage of the estuary there are currently no facilities to support the ongoing management issues outlined within the document. (Lower Mainland Region Environmental Stewardship Division: 2007)

Today development within the valley has necessitated the creation of an extensive dyke system, which has severally altered the natural hydrologic function of both the Squamish and Mamquam River. As a result approximately only 50% of the original estuary is usable to salmon, an important economic as well as culturally significant resource. (Pacific Salmon Foundation: 2005) In response to this there have been ongoing restoration projects to improve intertidal channels to increase viable habitat for salmon especially Chinook salmonids. (Pacific Salmon Foundation: 2005) These projects require ongoing monitoring and maintenance in order to ensure their success.

Further historically approximately 22 village sites were situated within the Squamish Valley below Brachendale on the west bank and the Mamquam River on the east bank. (Hill-Tout 1978) From these the Squamish people managed the estuary to maintain important plant and animal resources, as such the estuary represents a significant cultural resource to them. (Hill-Tout: 1978) However today the Squamish people inhabit a number of disconnected reserve sites and manage only a small portion of the Skwelwil'em WMA, Site A. This is a result of the long held belief that the abundance of the Pacific Northwest Coast was a product of an unmanaged wilderness and as such the Squamish people were relocated

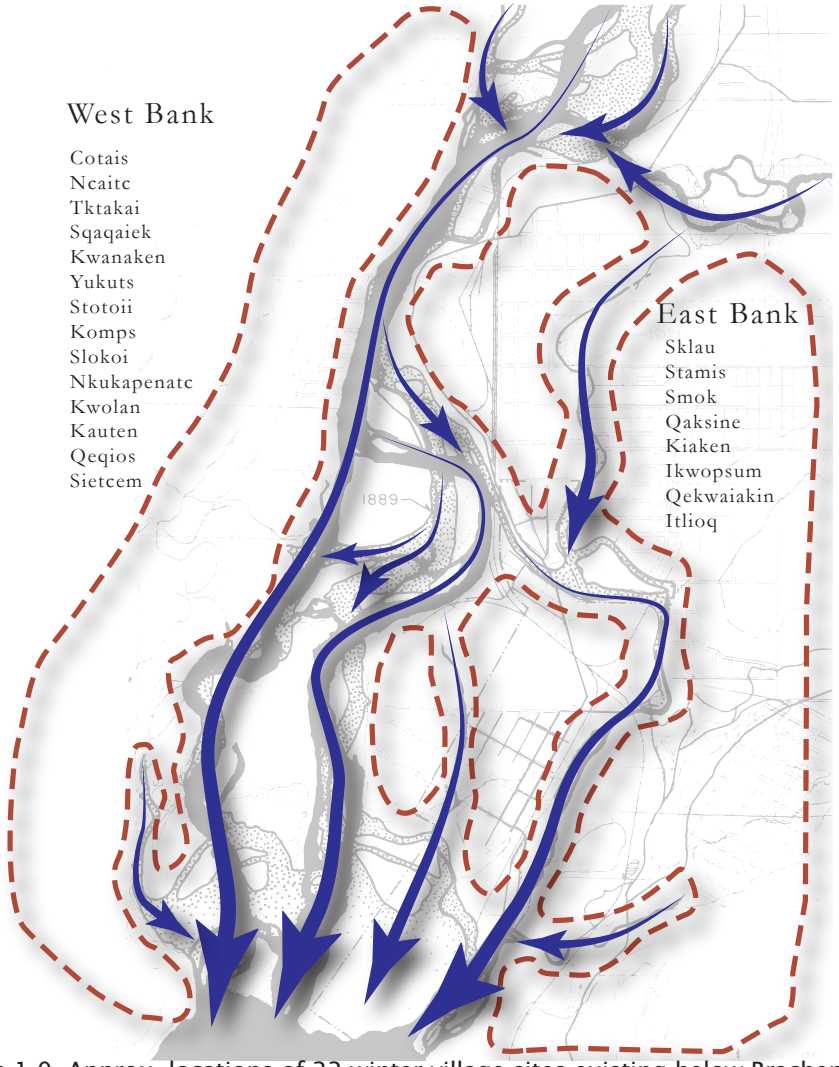


Figure 1.0 Approx. locations of 22 winter village sites existing below Brachendale on the west bank and the Mamquam River on the East Bank during the time of Captain Vancouvers Expedition to the Pacific Northwest (1792).

PROBLEM STATEMENT CON'T.

to reserves so that land could be developed or preserved for economic, aesthetic, or ecological value. (Harris: 2002; Hayes: 2001; Nadasdy: 2003; Simmons: 1993, Turner: 2005) As a consequence the preferential treatment towards land development, preservation, and aesthetics fueled many policies that promoted inappropriate infrastructure, such as the training dyke and hydro corridors, as well as land management strategies, such as fire suppression and conservation, which have had detrimental impacts on traditional resources and resource management practices. (Turner: 1999) However today a growing body of literature has caused a reassessment of the traditional life ways of many indigenous communities and Traditional Ecological Knowledge is now often sought in restoration projects. (Apostol: 2006)

This renewed interest provides an ideal opportunity for the Squamish Nation to not only recover traditional practices within sensitive environments but also take on a leadership role in the promotion and presentation of these often-contested landscapes. As such this paper proposes the design of an Eco-Cultural Center within the Skwelwil'em Wildlife Management area in order to highlight the history of the Squamish Nation within the estuary while facilitating ongoing restoration projects to improve viable habitats.

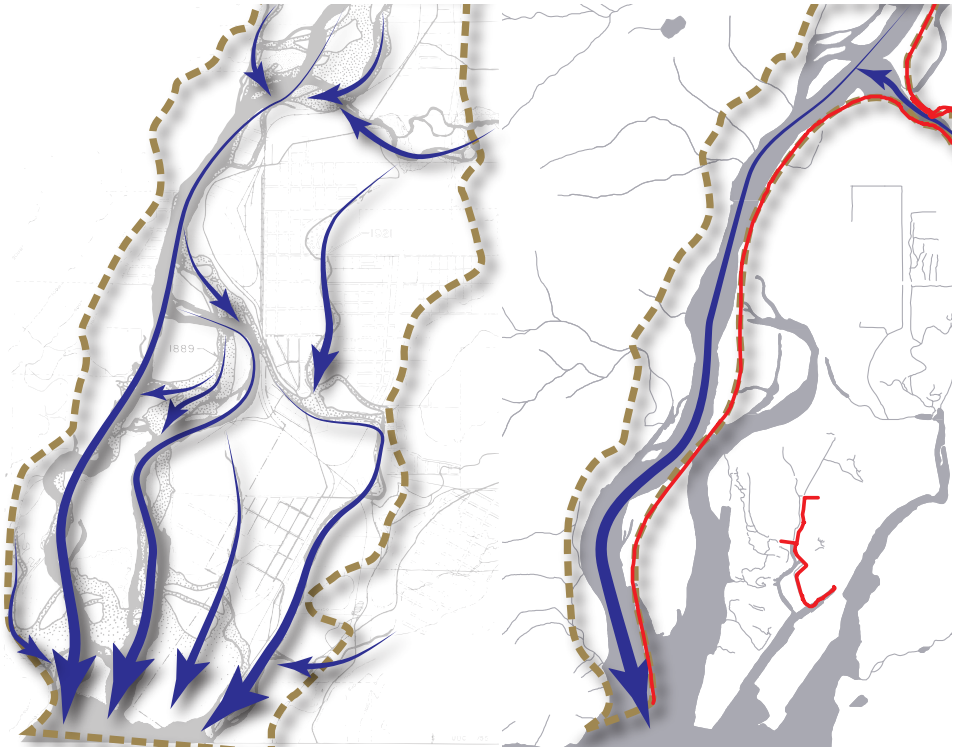


Figure 1.1 Historically the Squamish River occupied a broad floodplain with a complex system of channels. Today the river has been channelized to protect development within the valley from floodwaters.

PROJECT PROPOSAL

Many grassroots projects in British Columbia seek to reestablish traditional practices in order to increase the availability and accessibility of traditional plant resources important to the cultural identity of indigenous communities. (Apostol: 2006, Joseph: 2010) As current wildlife management areas are not managed for traditional plant resources important cultural locations have become degraded. (Turner: 1999) This has resulted in an uphill battle for many volunteer driven initiatives, as reestablishing traditional crops is a long and labor-intensive practice that is fraught with obstacles related to current policy, economics, and preservation strategies that govern current land management projects. In Nature by Design Higgs argues that any definition of Ecological Restoration must include cultural practices as well as historic fidelity and ecological integrity in order to promote good design and ultimately meet the objectives defined in a management plan. (Higgs: 2003) However current restoration projects within the Squamish WMA focus on wildlife habitat and not cultural practices which puts them at risk, as human activities often come in conflict with restoration objectives. (Higgs: 2003) As such this project will explore how the design of an Eco-Cultural Center can facilitate cultural programming within the Skwelwil'em: Squamish Estuary Wildlife Management Ares.

In order to design an Eco-Cultural center the following proposal will examine the history of resource management practices by the Squamish Nation and Central Coast Salish as it appears within current literary resources. It will then discuss current design solutions, precedent studies, for educational landscapes, ecological restorations, and visitor center facilities. Throughout the literature review and precedent studies a number of principles will be identified or summarized to guide the final design. The final section, site description, will synthesize the principles with the analysis of the research study area. A schematic plan will be outlined that suggests the first iteration of possible site and program order relationships.

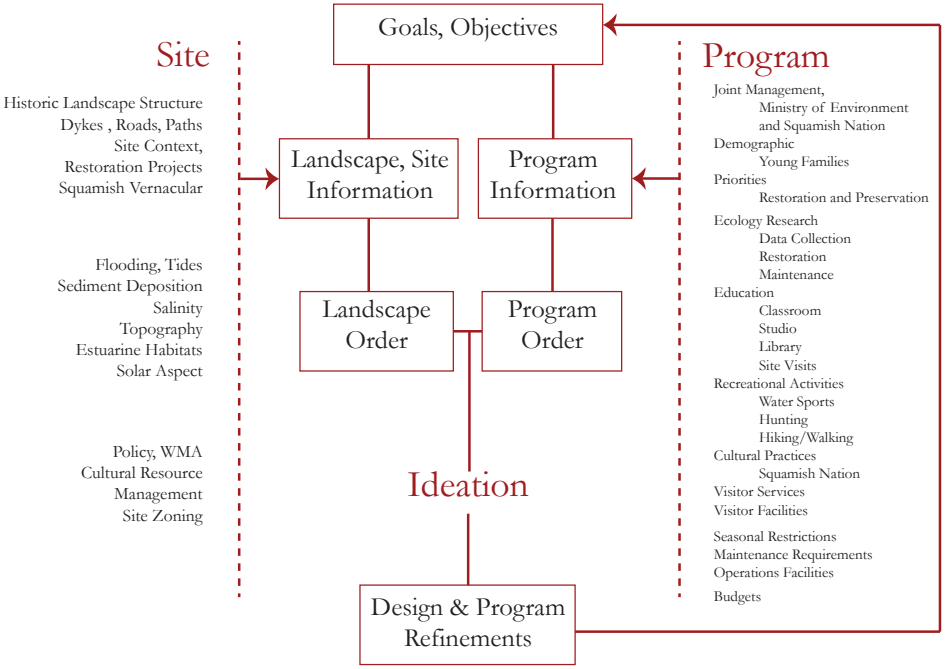


Figure 1.2 Site and program order process diagram. Adapted from Patterson, 2012.

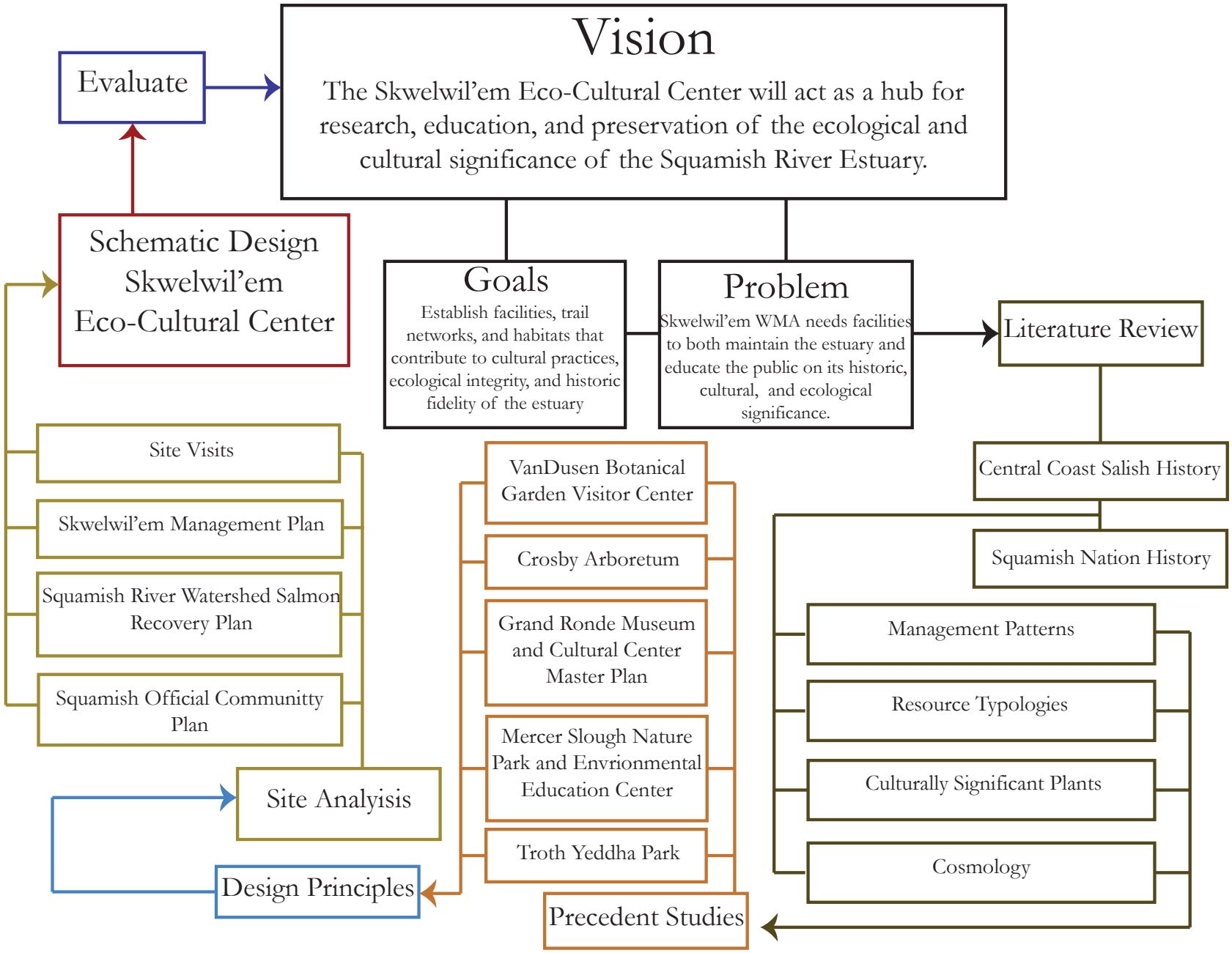
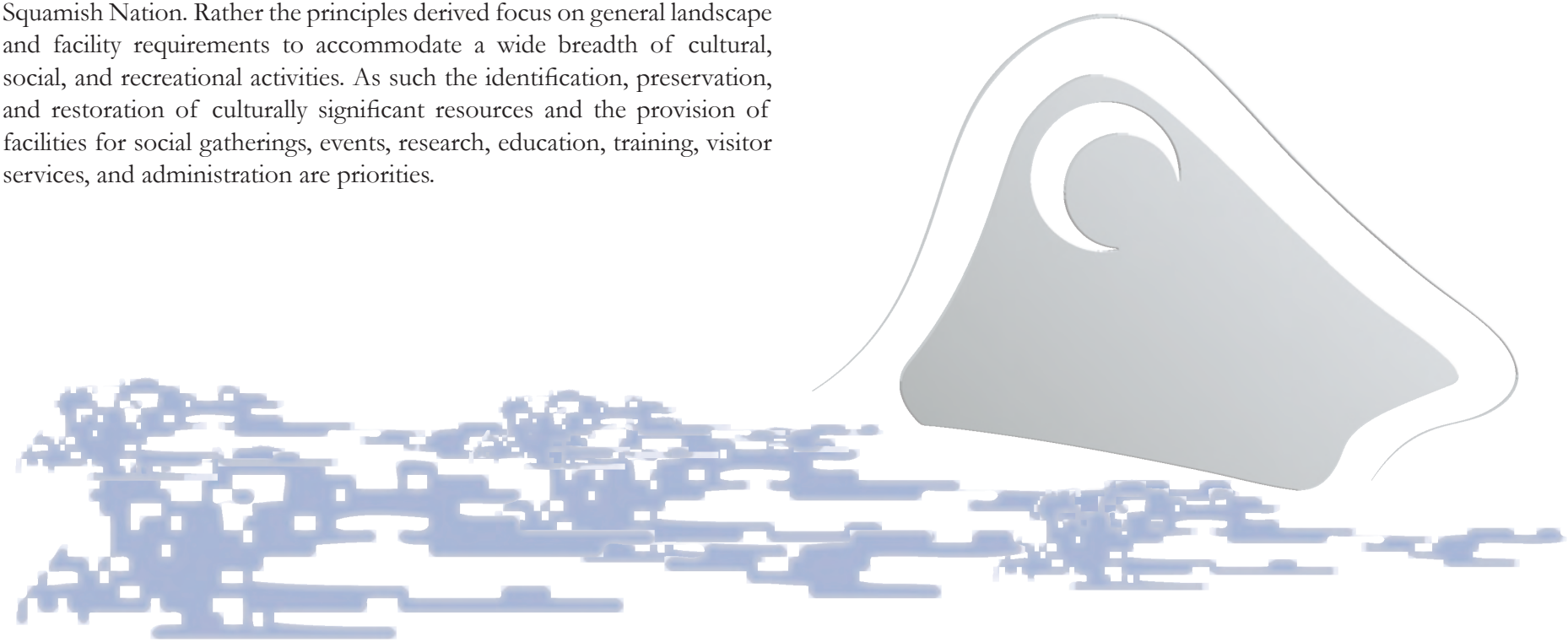


Figure 1.3 Research methodology process for development of Skwelwil'em Eco-Cultural Center proposal.

PROJECT SCOPE

This project looks at the history of Squamish and Central Coast Salish resource management in order to develop landscape exhibits, demonstration gardens, interpretive signage, and visitor facilities to promote educational, interpretative, research, and cultural programming on the history and ecology of the Squamish estuary. The intent is not to recreate or identify historic sites but to provide opportunities for the living culture of the Squamish Nation to practice, train, and promote their identity within their traditional territory. Further it is neither the intent nor goal of this project to design for specific cultural ceremonies, rituals, spirit quests, or cultural journeys as practiced by the living culture of the Squamish Nation. Rather the principles derived focus on general landscape and facility requirements to accommodate a wide breadth of cultural, social, and recreational activities. As such the identification, preservation, and restoration of culturally significant resources and the provision of facilities for social gatherings, events, research, education, training, visitor services, and administration are priorities.



LITERATURE REVIEW

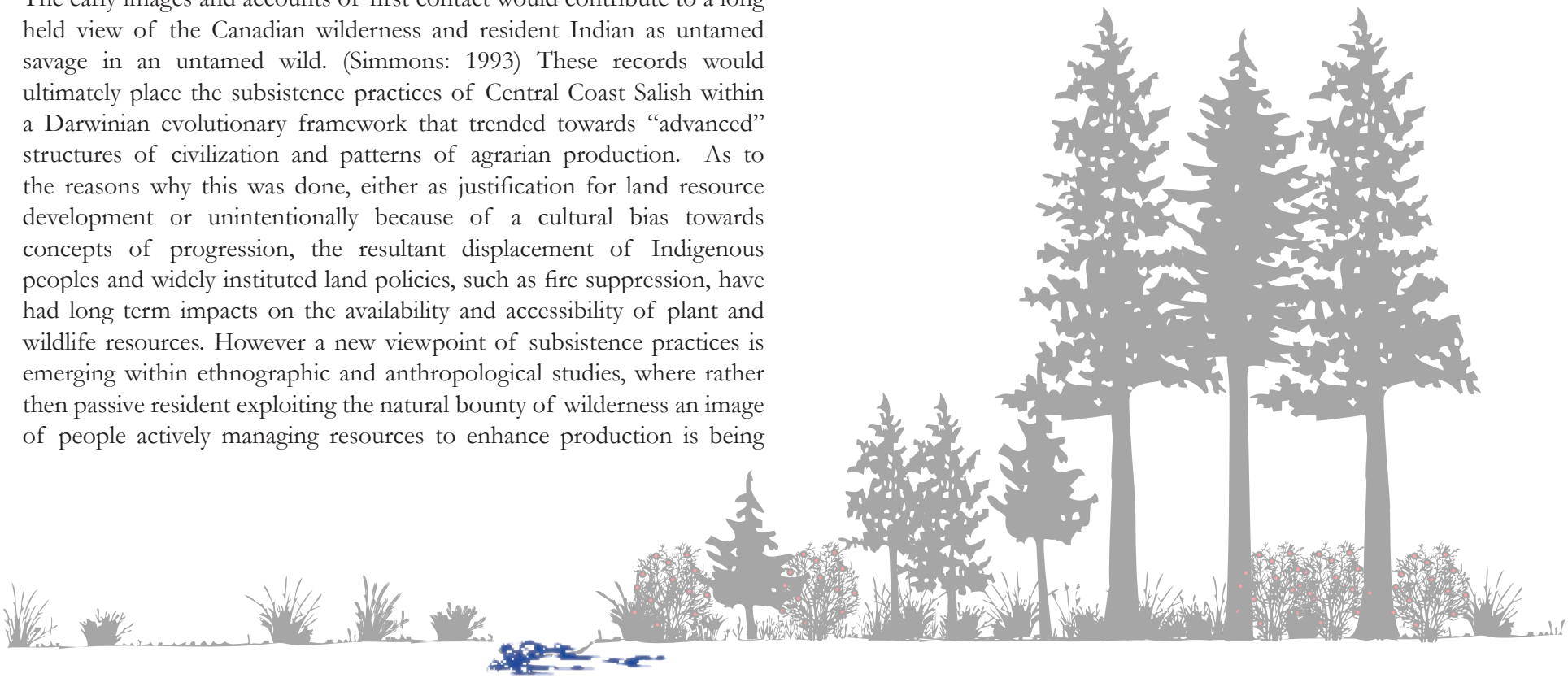
INTRODUCTION

"As we had no reason to imagine that this country had ever been indebted for any of its decorations to the hand of man, I could not possibly believe that any uncultivated country had ever been discovered exhibiting so rich a picture."

Captain George Vancouver, Voyage of Discovery to the North Pacific Ocean and Round the World 1791-1795

The early images and accounts of first contact would contribute to a long held view of the Canadian wilderness and resident Indian as untamed savage in an untamed wild. (Simmons: 1993) These records would ultimately place the subsistence practices of Central Coast Salish within a Darwinian evolutionary framework that trended towards "advanced" structures of civilization and patterns of agrarian production. As to the reasons why this was done, either as justification for land resource development or unintentionally because of a cultural bias towards concepts of progression, the resultant displacement of Indigenous peoples and widely instituted land policies, such as fire suppression, have had long term impacts on the availability and accessibility of plant and wildlife resources. However a new viewpoint of subsistence practices is emerging within ethnographic and anthropological studies, where rather then passive resident exploiting the natural bounty of wilderness an image of people actively managing resources to enhance production is being argued. (Turner: 1999; Winterhalder: 1981; Kuhnlein: 1991; Joseph: 2010; Berkes: 2012; Doolittle: 2000; Driver: 1996; Harris: 2002)

The following sections will deal with patterns of resource management, resource typologies, culturally significant plant species, and cosmology of the Squamish people. Throughout this section principles will be noted to provide a conceptual framework for the design of representative landscape exhibits and facilities.



MANAGEMENT PATTERNS

Design Principle

Create a central node with landscape spaces and facilities

The Okwumuq, village communities, of the Squamish people contained from fifty to several hundred people who were connected hereditarily through a maximum of six generations. (Hill-Tout: 1978) These were typified by a central complex of longhouse structures and landscape spaces. (Vancouver: 1984) Outside of these "central nodes" the Squamish people managed large tracks of land for plant and animal resources. In order to optimize production, ensure consistent harvests, and decrease the time and energy required to collect resources they commonly established a gradation based on management practices, aggregated crops, and rotated crops.

Maintenance Gradients

Design Principle

Create landscape types based on maintenance gradients.

In "Hunting, Gathering, or Husbandry? Management of Food Resources by the late Mesolithic communities of temperate Europe" Marek Zvelebil (Zvelebil: 1996, pg.87) outlines five plant using traditions:

1. Opportunistic and incidental use
2. Systemic and intensive use
3. Management or Husbandry
4. Cultivation of wild species
5. Cultivation of domesticated species.

Design Principle

Aggregate typologies to optimize accessibility

These categories are useful in the discussion of Central Coast Salish land management practices, as all but the latter have been directly documented within ethnographic studies. (Turner: 1995; Turner: 2007; Turner: 1999; Bouchard: 1976; Joseph: 2010; Kuhnlein: 1991) This categorization of using traditions has direct design implications as they allow subsistence practices and the resultant habitat types to be set along a gradient of maintenance intensity ranging from the lowest commitment for opportunistic and incidental use of plants to the highest commitment needed for the cultivation of domestic species. Using the concept of Optimization outlined by Winterhalder as well as the Macarthur and Pianka Patch Choice Model discussed in Optimal Foraging Space (Winterhalder: 1981 p26-30) these categories can be arranged in proximity to settlement

Figure 2.0 Traditional use patterns established maintenance gradients based on management intensity, site aggregation, and site rotation

MANAGEMENT PATTERNS CON'T.

with the latter, cultivation of domesticated species, occurring closest to habitations while the former are arranged as increasing in distance from habitations, with opportunistic and incidental use allowed to be at the greatest distance. The model further suggests the aggregation of landscape resources as to decrease energy input while increasing yield. (Winterhalder: 1981)

Resource Aggregation and Rotation

A resultant mosaic of densely aggregated habitat types is the most commonly accepted landscape pattern for Hunter-Gatherer cultural groups. (Bell: 1999) This pattern is further refined by the extensive evidence that exists for burning practices in British Columbia for the maintenance of berry and root crops. In Time to Burn: Traditional use of fire to enhance resource production by aboriginal peoples in British Columbia (Turner: 1999) root and berry crops are acknowledged to have been maintained on a rotational basis through the use of controlled burning. With an interval of 3-5 years, or until habitats attained a "bushy" characteristic, root and berry resources were burned to maintain optimal and continual production. (Turner: 1999)

Turner further notes in her study that larger trees were rarely if ever burned while younger forests were occasionally burnt for the production of wood fuel. (Turner: 1999) The burning of young forest stands would have reset successional processes to the initial seral stage in which many root and berry crops are found while the maintenance of older forest stands would have experienced periodic burning of the understory to optimize production within the shrub and herbaceous layers. (Turner: 1995; Bouchard: 1976; Kuhnlein: 1991) It is also noted that maintenance practices had seasonality to them with burning in many cases being dependent on either rainfall or the harvest schedule. (Turner: 1999)

While it is now relatively widely accepted that broad scale management practices were occurring there is no evidence for major infrastructure or landform development within the literature. This has been one of the major reasons cited for the misrepresentation of the Pacific Northwest Region as untouched wilderness and the relative lack of interest in the effects of subsistence practices on vegetative patterns and processes. This fact however does raise an interesting point that normal hydrologic and geologic functions were not altered in the production of resources; rather these formed the fundamental basis onto which all resultant landscape patterns were produced.

Its evident that the Squamish valley was undoubtedly comprised of an aggregated mosaic of habitat types based on natural geologic and hydrologic processes. These habitats were in a constant dynamic state, moving between seral stages and subject to periodic purposeful human disturbance. As such the most intensely managed landscapes were located in proximity to settlements while less disturbed habitats were located at some distance from. The aggregation of habitats was primarily based on seasonality; when products were harvested and when maintenance occurred. In order to better understand how these patterns occurred within the study site the following chapter will explore how geologic and hydrologic processes form specific patterns and resultant conditions for specific vegetative communities.

Design Principle

Rotate managed areas through seral stages

Design Principle

Optimize for production

Design Principle

Restore and maintain natural hydrologic function

Design Principle

Create a redundancy of resource types

Design Principle

Design for seasonality

RESOURCE TYPOLOGIES

Ethnographers, such as Boas and Turner, have recorded a wealth of information on the history of resource management in Pacific Northwest Indigenous Traditions but very little in depth information is available on the specifics of Squamish practices. However generalities about resource types are known from the closely related Central Coast Salish and will be drawn from in the discussion of the Squamish. As has been stated in the previous chapter, these typologies were based on natural hydrologic and geologic processes, which defined localized plant communities. These were in turn modified for the production of culturally significant resources based on the needs of an Okwumuq and on economic incentives made available through trade. Currently ethnographic sources outline three distinct types of plant community manipulation, they can be defined as gardens, crops, and wilderness. (Doolittle: 2000, Deur:2005) These three typologies of manipulation are directly related to the plant using traditions mentioned earlier and shall be elaborated upon in the following sections.

Design Principle

Establish three distinct plant community exhibits gardens, crops, and wilderness.

Gardens

The cultivation of wild species is now generally accepted as being practiced by all coastal indigenous groups prior to first contact. (Deur: 2005) Sites related to the cultivation of wild species or "gardens" included such actions as seeding and transplanting of propagules, fertilization and modification of soils, manipulation of hydrologic conditions to improve drainage and irrigation, and the removal of competing species or "weeding". (Deur: 2005) As a result the complexity of natural biotic flora structure was inherently simplified to expand areas for the production of culturally important species. (Deur: 2005) Further it was common practice to trade seeds and propagules between village communities.(Deur: 2005) As such vegetative structures within gardens did not necessarily represent localized plant associations. Perhaps the most relevant garden typology known and related to the study area is the coastal estuarine garden.

Design Principle

Simplify vegetative structure for the production of culturally significant species.

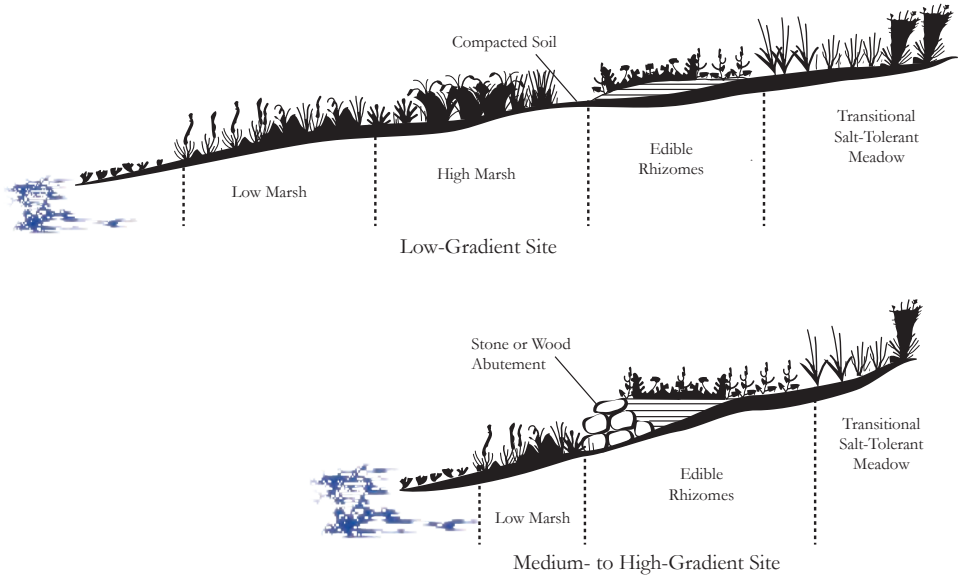


Figure 2.1 Site gradients and moisture regimes were altered to establish "physiomimetic" gardens.

RESOURCE TYPOLOGIES CON'T.

A constructed landscape based on peak tides, flooding, and freshets estuarine gardens were built within upper estuary marsh communities in tidal marsh vegetative structures to increase the production of culturally significant edible rhizomes. (Deur: 2005) Localized groups employed varying methods to control saltwater inundation of gardens based on the gradient of the site and the availability of local materials. (Deur: 2005) For low-gradient sites rock or wood abutments were unnecessary rather soil was regularly turned and mounded with compact soil, marker sticks, or rock mounds demarcating the edges and corners of garden plots. (Deur: 2005 pg.310) In contrast medium- to high-gradient or small natural salt marsh sites were expanded by the construction of rock walls or wood abutments to contain and protect mounded and turned marsh soils from erosive forces. (Deur: 2005 pg.311-312) Further the planting of estuarine gardens often contained multiple culturally important species including but not limited to springbank clover, silverweed, lupin, rice-root lily, and wild carrot while other species, which typically invaded plots by seed or rhizomatous shoots, were regularly removed. (Deur: 2005 pg. 307/309)

In essence the construction of garden plots was physiomimetic, as they were constructed in order to mimic and improve upon the natural conditions that fostered the growth of important species. While the most documented and relevant garden typology is that of estuarine roots it is undoubted that gardens also occurred for the production of berries, fruit, and other significant cultural species. As such, the estuarine garden typology will serve as a conceptual basis for the construction of demonstration gardens based on ethnographic evidence of particular plant using traditions of the Squamish.

Crops

Sites of systemic and intensive use as well as the management and husbandry of plant species, crops were large-scale managed landscapes used for large scale subsistence production. (Doolittle: 2000) Based on localized plant communities and plant distribution crops occupied both open meadows, wetlands, and forest environments along the northwest coast. (Deur: 2005, Acker: 2013, Turner: 2005, Turner: 1999, Kuhnlein: 1991) Pruning, burning, weeding, soil modification, site rotation, seeding, and planting were commonly employed in the active maintenance of crops. (Deur: 2005, Turner: 1999, Turner: 2005, Acker: 2013) Relevant crops for the Skwelwil'em Wildlife Management Area are those which occur in estuarine tidal marsh structures and moist coastal western hemlock forest habitats.

Estuaries were the site of multiple crops grown for food production, medicinal purposes, spiritual purposes, and materials for construction, tools, basketry, and other implements. (Bouchard: 1976, Turner: 1999, Acker: 2013) Crop distribution was based on site gradients, peak tides, flooding, solar aspects, and freshets, which define localized plant associations and habitat distribution. (Mackenzie: 2004) As grasses, sedges, and rushes are considered the climax species of estuarine habitats seral stage rotation was not an active management technique.(Walker: 2003) Tidal flat crops were, however, selectively harvested, seeded, planted, and soil was modified as a product of systemic digging. (Deur: 2005, Kuhnlein: 1991, Bouchard: 1976)

Design Principle

Create vegetative communities base on trade plants.

Design Principle

Use abutments in high gradient or small tidal marsh sites to establish gardens.

Design Principle

Create gardens based on the most culturally significant species.

Design Principle

Establish crops based on in situ plant communities.

Design Principle

Create static estuary crops

RESOURCE TYPOLOGIES CON'T

Design Principle

Rotate young forest crops through seral stages.

Design Principle

Establish root, berry, and fern food crops in mature stands and along forest edges.

Design Principle

Create vertical layers within mature forests.

Design Principle

Pollard mature forests to create an open understory.

Design Principle

Name areas based on culturally significant plants.

In contrast moist coastal forest crops were both horizontally and vertically distributed based on seral stage, site rotation, solar aspects, and localized moisture gradients. (Turner: 1999, Kuhnlein: 1991, Bouchard: 1976) Typically root, berry, and fern food crops were common in open canopy mature stands and along forest edges. (Turner: 1999, Kuhnlein: 1991, Turner: 2005) Young stands of trees, berry, and root crops, in particular, were rotated through herbaceous, shrub, and forest seral stages to produce food, fuel, and tool-making materials. (Turner: 1999) While mature forest environments were actively pruned to both modify trees for harvesting material, such as cedar bark, as well as a result of the systemic harvesting of tree boughs for bathing, ritual cleansing, bedding, basketry, twine, floor covering, tool-making, and many other products. (Turner: 1999, Turner: 1995, Turner: 2007, Turner: 2005, Kuhnlein: 1991, Bouchard: 1976) Additionally these mature open stands were maintained by selective harvesting of the new growth while old growth was harvested as wood became available from windthrow. (Turner: 1999)

Overall crop production was based on localized distributions of in situ plant communities that were managed to optimize production of locally significant species. Through the manipulation of seral stages, selective harvesting, and the modification of vegetative structure both estuaries and moist coastal western hemlock forests were managed for food, medicinal, spiritual, and tool-making materials. As such they constitute "agroecosystems" in which "human-fostered and often genetically simplified environments, (were) maintained by humans to increase the output of valued plants by replicating or enhancing certain naturally occurring conditions." (Deur: 2005, pg.15)

Thus estuaries and moist coastal western hemlock forests were the sites of multiple crops where localized conditions defined strict production capacities and plant associations. Ultimately this can be seen reflected in regional trade economies, which existed and were based on the capacities

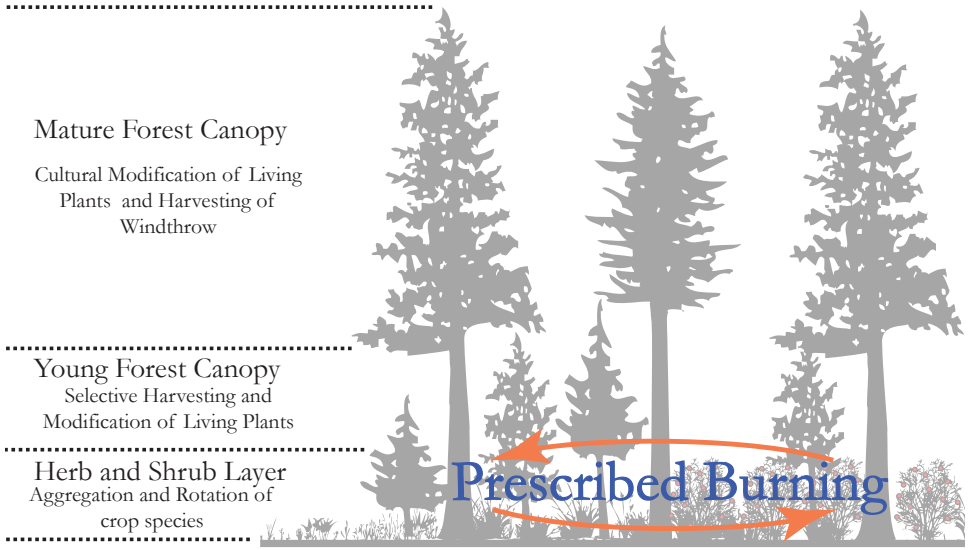


Figure 2.2 Mature forests had distinct management practices based on their vertical layers. The upper canopy was managed to maintain mature trees while the shrub layer was periodically burned and rotated to other crops in order to optimize production.

RESOURCE TYPOLOGIES CON'T

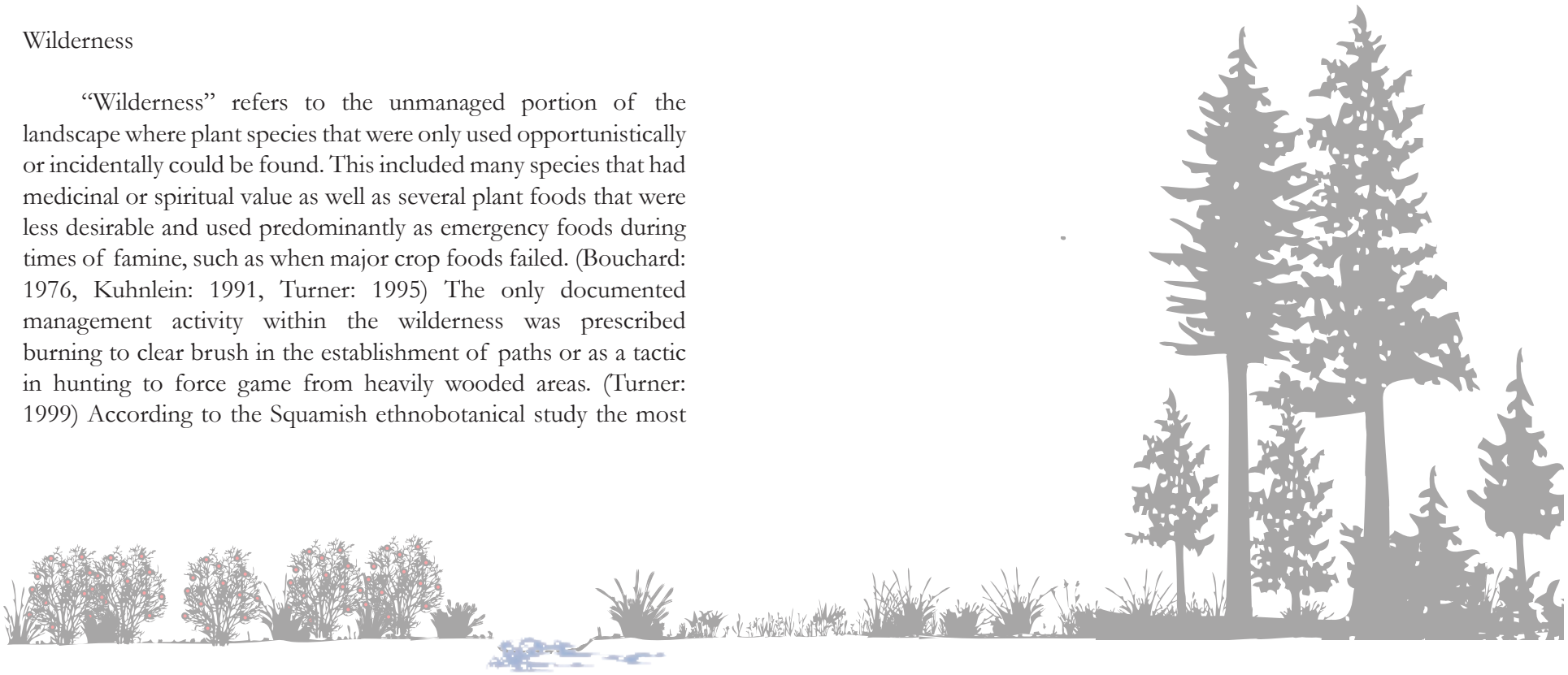
of localized production of plant species. (Bouchard: 1976, Deur: 2005, Hill-Tout: 1978) Further the assignment of traditional names to historic village sites, such as the Chamberlin Island Village named T'ekt'kay, due to its abundance of Vine Maples, serves to corroborate the fact that localized availability was acknowledged as an integral part of a village communities identity and served to promote economic driven production.(Bouchard: 1976)

Wilderness

"Wilderness" refers to the unmanaged portion of the landscape where plant species that were only used opportunistically or incidentally could be found. This included many species that had medicinal or spiritual value as well as several plant foods that were less desirable and used predominantly as emergency foods during times of famine, such as when major crop foods failed. (Bouchard: 1976, Kuhnlein: 1991, Turner: 1995) The only documented management activity within the wilderness was prescribed burning to clear brush in the establishment of paths or as a tactic in hunting to force game from heavily wooded areas. (Turner: 1999) According to the Squamish ethnobotanical study the most commonly unmanaged portion of the Squamish Valley was the Alpine Tundra Biogeoclimatic Zone. (Bouchard: 1976) It should however be noted that the presence of plant species affiliated with medicinal, spiritual, or less desirable food value would have also been present in areas associated with crop production and that the cosmology of the Squamish People would have meant the preservation of these sites. As such the presence of wilderness areas would have bridged all zones of traditional use.

Design Principle

Establish wilderness areas to preserve less significant plant communities in all management zones.



CULTURALLY SIGNIFICANT PLANTS

"Plant everything around your house, everything."
Dominic Charlie, August 4th, 1965
From Squamish Legends "The First People"

Stone and metal work were uncommon practices for Central Coast Salish groups as such plants played an integral role in every aspect of daily life. (Hill-Tout: 1978; Turner: 2007; Turner: 1995; Bouchard: 1976) For the Squamish plants were not only important sources of carbohydrates and greens, to supplement a diet of predominantly game and fish, but were also important in the construction of shelter and in the construction of tools for the acquisition of game and fish. As such we must assume that the amount of biomass removed by village communities would have been enormous. (Bouchard: 1976; Turner: 1995; Turner: 2005, Deur: 2005) Two major design implications result from plant using traditions of the Squamish these are the production of preferred species in vegetative landscape structures and the processing of plant material for use in landscape spaces and buildings within the village community.

Design Principle

Identify plants used for food, medicine, spiritual, tool-making, and construction uses.

Preferential Species

The uses for plants, identified in the ethnobotanical study of the Squamish, can be divided into five categories, those with value for food, medicinal, spiritual, tool-making, and construction. (Bouchard: 1976) However not all plants were valued to the same extent and strong preferences have been recorded for certain species over others in their uses. (Bouchard: 1976)

In the category of food plants 4 sub-categories are evident for the Squamish with a number of different species having been identified as preferred, these are as follows: berry and fruit- red elderberries, salal berries, blueberries, wild crabapples, salmonberries, and wild blackberries; wild Greens- horsetail, lady fern, fireweed, blackcap, cow parsnip, and arrow-grass; tree Cambium- red alder and black cottonwood; and roots- skunk cabbage, blue camas, chocolate lily, bracken fern, licorice fern, wild

Design Principle

Prioritize "keystone" plants preferred for their particular uses.

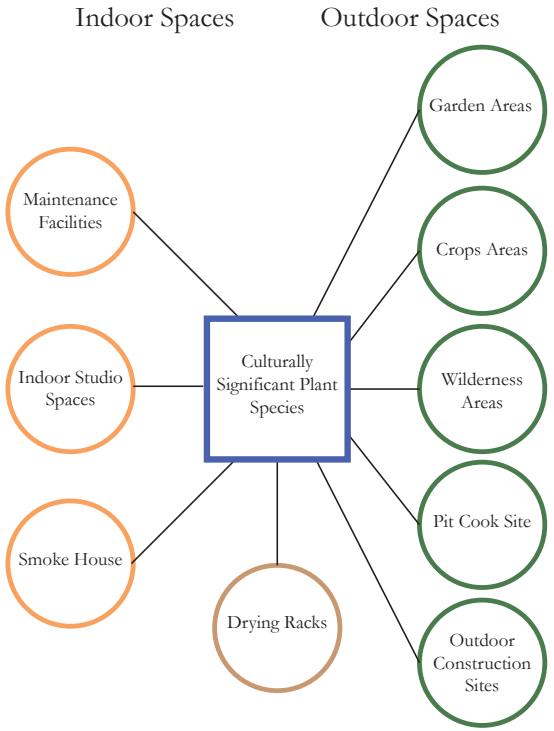


Figure 2.3 The use of plant species required both indoor and outdoor spaces for their production and processing

CULTURALLY SIGNIFICANT PLANTS CON'T.

carrot, arrow-head, and wild onion. (Bouchard: 1976) As a result these plants were the cornerstones of food production within both gardens and crops and as a result played the role of a "Keystone Species" in the modification of vegetative structures to promote the production of these plants. (Deur: 2005) Similar keystone species existed for construction materials, medicinal use, spiritual use, and basketry. A full list of plants known to the Squamish including their traditional names, affiliated plant using tradition, general use, habitat information, and important seasonal considerations can be found in Appendix. 1.

Plant Processing

Aside from the importance of particular species for their uses and the resultant intensities of production the need to process plant material for its intended product must also be a key consideration in the development of an eco-cultural center. A number of facilities existed for this vary task. Digging sheds were commonly situated within or near estuarine gardens, or gardens in general, for the storage of tools and to provide shelter for individuals managing them. (Deur: 2005) While landscape spaces for pit cooking, smoking, and drying were essential to the preparation of edible roots, berries, and seaweeds as well as fish and game. (Bouchard: 1976; Deur:2005) Alternatively the production of basketry and other implements from construction materials was done within the longhouse during the fall and winter. (Turner: 2007; Deur: 2005; Bouchard: 1976) While carving of poles and canoes was started in situ at the harvesting site, these were commonly completed within the common areas of village communities. (Turner: 2007)

To summarize over 140 plant species were identified from the oral traditions of the Squamish people. (Bouchard: 1976) A few of these are identified as nuisance species while others are shown to have been strongly preferred over equivalent plant crops because of aesthetics, ease of use, or taste in some cases. (Bouchard: 1976) The development of these within gardens and crops was undoubtedly a product of local scenarios and preferential treatment. Further their ultimate processing prescribed the development of both built facilities and landscape spaces. Additionally plants had a strong relationship to ceremony, ritual, rites of passage, and cultural journeys. This aspect of the cultural relationship to landscape and landscape products will be elaborated on in the following section.

Design Principle

Create digging sheds near gardens.

Design Principle

Identify sites suitable for pit cooking, smoking, and drying.

Design Principle

Create both indoor and outdoor studio spaces for arts, crafts, and woodworking.

COSMOLOGY

"Thus, in the beginning, the full diversity of life-forms, the biodiversity of the world, is produced from common origins, which, in turn, set the egalitarian grounds of discourse since all life-forms are from the same family. All organisms have origins, experiences, and concerns that are fundamentally the same as those of humans."

Richard Atleo, Umeek of Ahousat 2005

The most significant influence on indigenous resource management within the Pacific Northwest Coast is the worldview shared amongst the individuals of territorial groups. Distinctly different from today's prevailing Western worldview, in which man is seen as exerting dominion over the natural world, the Squamish worldview places human beings in an equalitarian framework with all of creation under the auspices of the creator. (Atleo: 2005) Plants, animals, the landscape, and human beings are all from common ancestry with current forms resulting from historic transformations. (Hill-Tout: 1978)

Design Principle

Base landscape narrative within Squamish cosmology.

"After this they clap their hands and make a noise like a deer, and he instantly loses his original form and becomes a deer, with antlers springing from his head. Thus did Qais create the deer for the Squamish."

Charles Hill-Tout, 1978, pg. 58.

As such rituals and ceremonies served to reinforce complex systems of rights and regulations based on the respect and acknowledgement of historic origins. (Atleo: 2005) As such worldviews cannot be separated from the landscape but serve as a fundamental grounding for human construction of landscape and understanding of it. (Johnson & Davidson-Hunt: 2011) The result is practices like selective harvesting, plant modification, and seeding or transplanting can play key roles in developing landscape characteristics and are defined by our understanding of origin stories. In the following sections the significance of landforms, general requirements for conducting rituals and ceremonies, and the basics of Squamish resource management ethics will be discussed.

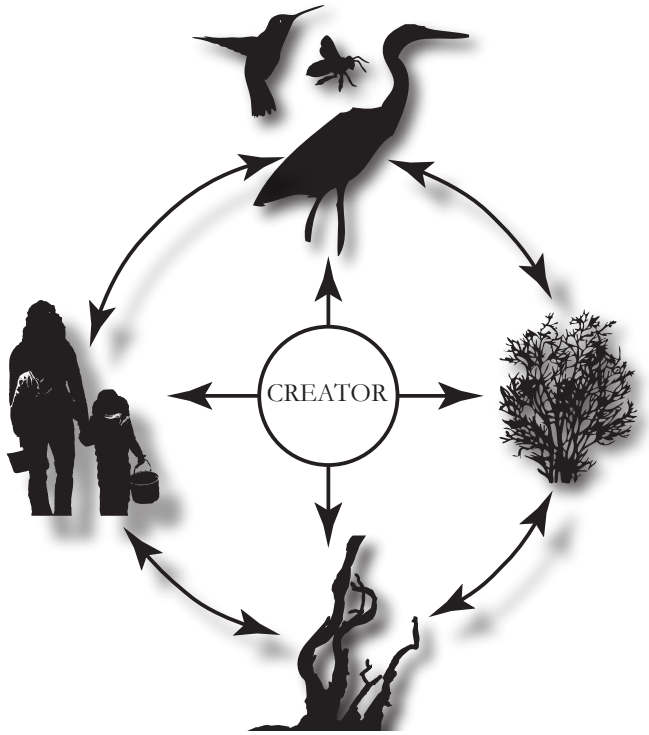


Figure 2.4 Squamish beliefs hold that all things come from common origins with their own unique powers in the spiritual realm.

COSMOLOGY CON'T.

Landform

Defined by snow covered peaks descending steeply into a low lying floodplain the landscape of Squamish is noted for its mountainous borders and braided river valley. For the Squamish people these always visible landforms defined significant cultural landscapes both within their daily lives and within their origin stories. (Hill-Tout: 1978) Important sites for hunting, plant collection, cultural journeys, spiritual quests, and training these locations served as a significant influences on their cultural identity. (BC Ministry of Environment: 2012a) By far the most important landform to the identity of the valley and its inhabitants is the Squamish River. The River for the Squamish was a vital food source, place of spiritual guests, transportation route, and as such on its banks they historically built villages. (Hill-Tout: 1978) While the mountains along the horizon served as not only important markers for wayfinding they also had human origins as represented within the transformation tales of the Squamish. (Hill-Tout: 1978)

Ritual and Ceremony

Ritual and ceremonial activities of the Squamish were of both large gatherings, such as potlatches, as well as personal activities, such as a young mans kwaiyasot or training for medicine man. (Hill-Tout: 1978) While large gatherings like potlatches were customarily held within the longhouse many rituals such as the kwaiyasot were reserved to locations within the landscape. (Hill-Tout: 1978)

"He had lead an isolated life in the forest, according to the custom of novices, for some time, and had eaten no food for several days."

Charles Hill-Tout, 1978, pg.76.

Often the use of particular plants was affiliated with ritual protocols required to engage with the spiritual realm to attain a desired outcome. (Bouchard: 1976, Hill-Tout: 1978) As is the case of puberty customs for a girl's first menstruation where Rubus sp. Pteris aquilina, and old growth trees are required to attain desired characteristics in womanhood.

"She would also take a quantity of fern-roots of the edible kind (Pteris aquilina) and offer them to the biggest trees she could find. This was supposed to give her a generous nature and keep her from becoming stingy and mean."

Charles Hill-Tout, 1978, pg.43.

Alternatively food dishes, like soapberries, played integral roles in feasting and had their own strict protocols and etiquette. (Turner: 1995; Bouchard: 1976) As such depending on the type of ceremony and ones social status strict menus were constructed, which had affiliated songs and dances. (Turner: 1995) Ceremonies therefore not only required adequate space and facilities for the preparation and enactment of protocols but also relied on the availability of associated plant and animal products in order to carry them out. (Deur: 2005, Turner: 1995) It would therefore follow that the specifics of ceremonies and rituals for each community village would vary depending on the availability of localized resources and would inherently reflect those constraints.

Design Principle

Provide views and chances to experience significant landforms.

Design Principle

Provide both large and small gathering spaces.

Design Principle

Provide space for indoor and outdoor gatherings.

Design Principle

Provide spaces for singing and dancing.

Design Principle

Hold seasonal events based on local products and harvest periods

COSMOLOGY CON'T.

As such ceremony and ritual can be seen as constituting both landscape spaces and built environments for their enactment. The spaces required ranged from those suitable for large gatherings to smaller intimate spaces for individuals and small groups. The protocols governing specific activities were directly related to the availability of landscape products as defined by site constraints. While trade invariably allowed access to unavailable products it also necessitated economic production of resources for trade. It should be further noted that ceremonies and rituals were therefore dependant on season and many customs were related to these annual cycles. As such it was common for times of year to be noted by the availability of a particular landscape product. (Bouchard: 1976)

Design Principle

Represent the traditional legends of the Squamish.

Land Management Ethic

As has been previously stated it was the commonly held belief that all life came from a common ancestry and as such protocols became necessary in order to recognize and respect these spiritual origins. Therefore the procurement of resources for the Squamish people had strict rules and regulations defining the proper methods and customs of harvesting. (Hill-Tout: 1978, Bouchard: 1976) The most pertinent and well documented of these practices have to do with selective harvesting of plants and animals, the cultural modification of plants, and the return of plant and animal material to a site through seeding and transplanting to ensure subsequent generations.

Selective harvesting of plants and animals was a common practice among the Squamish and is well documented in both ethnographic accounts and the cultural narratives represented by myths. (Bouchard: 1976; Hill-Tout: 1978; Turner: 1995; Turner: 2005) The understanding of complex relationships between human beings, animals, plants, and the landscape often guided this practice. In the myth "Te Mentlesaielem (The Son of the Bright Day)" recorded by Hill-Tout the specifics of one such relationship is outlined through the description of the origin of salmonberries. The myth first describes the relationship of 3 animal species, which play integral roles in the ripening of the berry crop.

""Come to me, my grandparents, and help me ripen this fruit!" The grandparents whom he calls upon for this purpose are the titctitcenis, or humming-bird, the skukumkum, or bumble-bee, and the qit, or wren… They all three set to work at once to ripen the berries."

Charles Hill-Tout, 1978, pg.72.

Once this relationship is understood the narrative then explains how a portion of the harvest is left in recognition of the aid received from the grandparents.

"He has not picked all the berries that were ripened and as he leaves he bids them enjoy what is left themselves."

Charles Hill-Tout, 1978, pg.72.

In the ethnobotanical study of the Squamish Bouchard and Turner further elaborate upon this myth to describe how customarily 1/3rd of the salmonberry harvest would be left in gratitude of this act of ripening the

COSMOLOGY CON'T.

berries. (Bouchard: 1976)

In the case of seeding and transplanting this is both presented within purely functional terms, such as the case of Fritillaria camschatcensis or Rice Root, in which the main bulb was replanted to ensure the next seasons harvest. (Deur: 2005; Bouchard: 1976; Joseph: 2010) While in the case of salmon and eulachon this takes on a more mystical relationship where the activity is seen to engage with shamanistic powers to either restore a physical being or draw the physical being into a desired location. (Hill-Tout: 1978) For salmon this practice is explained in the legend of "Qais" as recorded by Hill-Tout to explain the origins of the salmon coming to the Squamish. It involved the return of the carcass to the water so that the physical being of the salmon people could be renewed.

"those who had eaten of the fish had piled it in a little heap by his side, and took them down and threw them into the sea; whereupon the bones were immediately transformed back into the four young people again,"

Charles Hill-Tout, 1978, pg.61

While alternately the legend of "Tsaianuk" recorded by Hill-Tout explains how the Squamish River eulachon came into existence. The legend outlines how the knowledge of a mystical powder containing eulachon bones, seal bones, duck bones, salmon bones, and the powder of rotted red cedar came to be known to the Squamish and how certain members had the power to make eulachon appear in the Squamish River by seeding it with this substance. (Hill-Tout: 1978)

"the people had been aware of the reason of the disappearance of the fish from the river, and had a tradition among them that they would return again some day when the dust bones, which had been hidden away by the father of the twins, should be found and placed in the water."

Charles Hill-Tout, 1978, pg.65

Lastly the practice of culturally modifying plants had roots in Squamish cosmology and numerous landscape products were harvested from living plants. (Turner: 1995; Turner: 2007) The two most notable plant species on which this was practiced were the Red Cedar and Devils Club. (Bouchard: 1976; Turner: 1995; Turner: 2007) For the red cedar the practice of removing cedar bark was reserved to young trees around 1/3 meter in diameter with very few or no boughs below a height of 9m, and was generally practiced by women who specialized in the task. (Turner: 2007, pg.77) While alternately devils club was always harvested by removing growth from the central or main stalk as the plant was considered to be a mother and great care was to be accorded in her treatment. (Bouchard: 1976)

Through their stories, artwork, songs, dances, food, and other cultural protocols the Squamish people conducted elaborate ceremonies and rituals which served to reinforce a land management ethic rooted in their origin stories. (Hill-Tout: 1978, Turner: 1995) As a result particular land management practices were commonly used including selective harvesting, plant modification, seeding, and transplanting.

Design Principle

Present animals and plants with humanistic attributes.

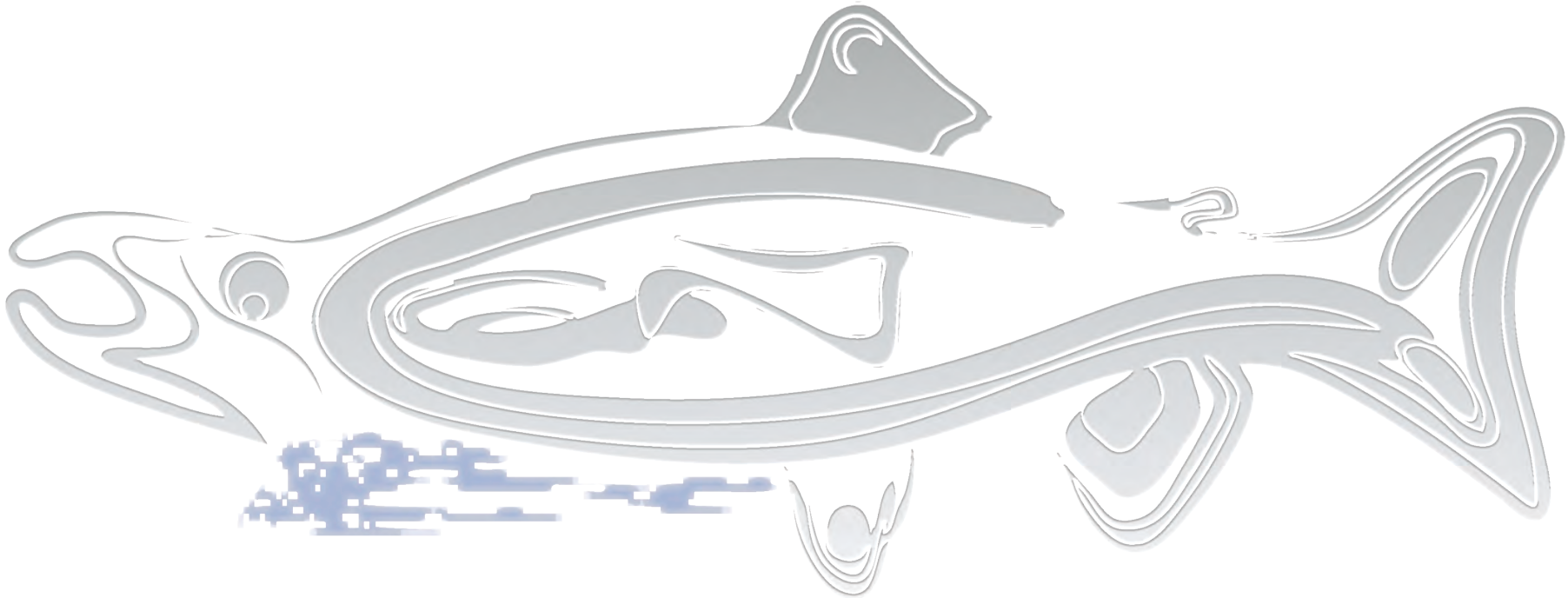
Design Principle

Associate legends with specific sites, animals, and plants.

Design Principle

Show living plants modified by the harvesting of material.

PRECEDENT STUDIES



TROTH YEDDHA PARK
FAIRBANKS, ALASKA

Troth Yeddha Park designed for the University of Alaska at Fairbanks is part of the Jones and Jones architects, landscape architects, and planners living cultures series. Occupying a portion of a large hill where members of the Athabascan cultural group traditionally managed Troth Yeddha, a wild potato, the park and recreation area offers interpretive and commemorative elements that promote the sharing of indigenous knowledge and cultural values. Special attention was paid to cosmology, culturally significant plants, and Athabascan history.

Cosmology

The conceptual layout for the central gathering node is based on the cosmology of the Athabascan culture in which the four cardinal directions and seasonal cycles play significant roles in place definition and cultural identity. A directional axis serves as the basis for the general layout of paths, planting beds, and sculptural elements. While the seasonal cycles are demarcated by four sculptural elements related to the beliefs of the Athabascan people; spring bear, summer moose, fall caribou, and winter wolverine. These seasonal markers, on an outer ring, and the commemorative statues, on an inner ring, demarcate the axis of the four cardinal directions; north, south, east, and west. While narrow bands of paving running from the central stone marker align with the sunrise and sunset of the equinoxes and solstices. Further traditional geometric patterns and floral patterns are used in the paving design to strengthen the definition of edges and transitions between rings.

Culturally Significant Plants

As Troth Yeddha Park occupies a traditional harvesting sight special attention was given to the planting design. In order to portray this significance only native species of grasses and flowers were used in the central gathering area. This plant list was further refined to allow for the interpretation of traditional knowledge by using only those species with traditional uses. The use of traditional plants was also incorporated into the general park design along path edges. This allowed for multiple interpretive opportunities of important plant species while allowing central areas to be maintained for recreational and gathering purposes. Further the naming of the site, Troth Yeddha, is taken from a wild potato that historically grew on the hillsides of the park.

Athabascan History

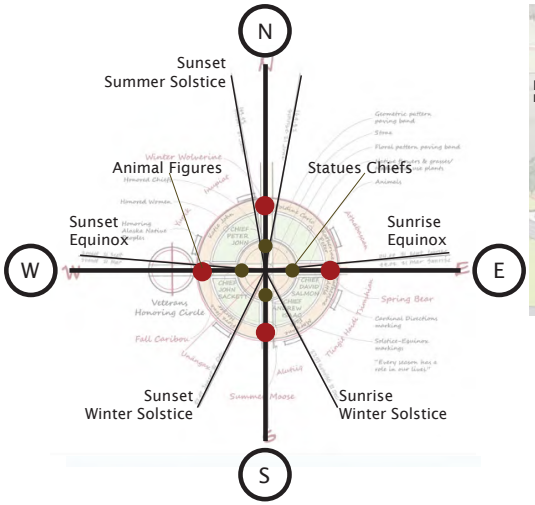


Figure 3.0 Cosmological layout of central gathering node

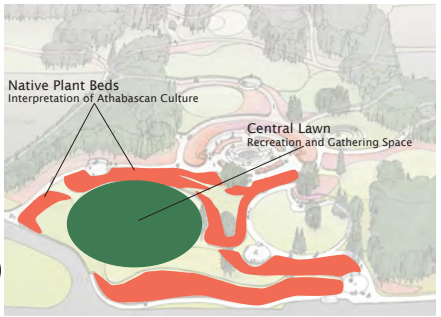


Figure 3.1 Schematic planting plan for interpretive, recreational, and event based programming.

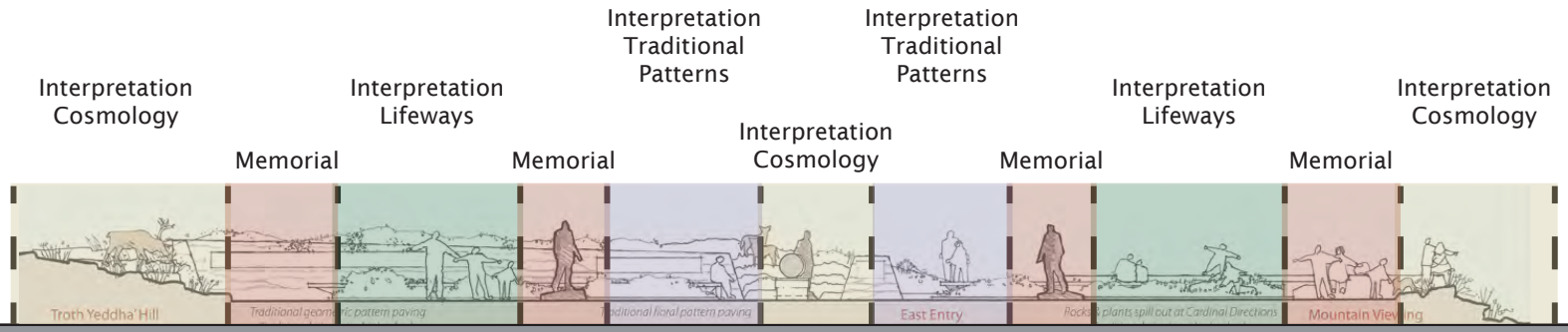
TROTH YEDDHA PARK
FAIRBANKS, ALASKA CON'T.

Representing the heritage of Athabascan culture was seen as not only an opportunity to represent the cosmology and traditional values but also as an opportunity for commemorative features. This was done in the benches honoring Alaskan native groups, in paving to honor important Athabascan women, and also in a series of statues honoring Tanana Chiefs. As the site is currently used as a gathering space by the student body, the historic gatherings of Alaskan native cultural groups was viewed as a programmatic palimpsest. As such the names of these native cultural groups was incorporated into benches in an outer ring along with commemorative paving to important women. While in an inner ring four statues honor the historic chiefs of the Athabascan people. These memorial features along with interpretive programming provide a rich layering of the cosmology, history, and values of the Athabascan culture.

Summary

Troth Yeddha Park brings together a diversity of landscape elements to paint a picture of Athabascan Culture and the significance of the sites history. From the formal layout of the central gathering space to the native plantings and commemorative elements the park engages with the cosmology, history, and the uniqueness of the local region. In so doing it not only provides opportunities for recreational and events programs but also serves to honor the living culture of the Athabascan people through interpretive and commemorative elements. By layering elements the design serves to strengthen physical and conceptual meaning while defining programmatic spaces. While the use of celestial and geographic axis serve to organize site elements and interpret Athabascan cosmology. Finally the site represents a strong programmatic palimpsest from historic cultural exchanges in goods, to current cultural exchanges in knowledge. As such the site maintains its heritage as a site of gathering and socialization.

Figure 3.2 Layering of interpretive and commemorative programmatic elements



MERCER SLOUGH NATURE PARK & ENVIRONMENTAL EDUCATION CENTER BELLEVUE, WASHINGTON

Mercer Slough Nature Park and Environmental Education Center is part of both the Natural Infrastructure and Learning Places series of Jones and Jones architects, landscape architects, and planners. A 320-acre wetland the nature park features seven miles of nature trails as well as a canoe trail providing interpretive and educational opportunities. Located within minutes of Bellevue's city center the parks plan needed to preserve the wetland and protect its sensitive habitats while accommodating public use. As such a 10,000 square foot education center was planned for research, education, and visitor services aimed to promote the heritage and natural environments of Mercer Slough. The site plans incorporated a campus layout for the environmental education center, elevated infrastructure to maintain site hydrology, and a series of interpretive trails featuring the habitats and history of Mercer Slough.

Campus Layout

In order to accommodate the needed 10,000 square feet of facilities Jones and Jones elected for a campus style layout. The clustering of the facilities allowed for easy and convenient access from one of the peripheral park entrances and parking lots. It also minimized site disturbance during construction and provided opportunities for exchange between public, educational, and research based programming. In total four new buildings were constructed and an existing classroom building was incorporated into the education center plan. Based on program public, research, and educational facilities were clustered. The public facilities constituted a visitor center with exhibition space, interpretive displays, and information on the Mercer Slough wetland adjoined via an elevated boardwalk to a registration building which handled administrative tasks related to educational and events programming. Next to this two education buildings were constructed to accommodate classroom style programs related to Mercer Slough and were also connected via an elevated boardwalk. The construction of these two elevated boardwalks also allowed for the design of two viewpoints within the education center complex; the forest canopy and Mercer Slough viewpoints. The separated research facility named the "Wetlab" was built into an existing classroom style building. The research facility accommodates scientific studies which relate to the wetlands including but not limited to monitoring and data collection.

Site Hydrology

As over 100 bird species and several dozen mammals rely on Mercer Slough's wetland complex the hydrologic function of the site had to be

Figure 4.0 Campus layout of the Mercer Slough Environmental Education Center

MERCER SLOUGH NATURE PARK & ENVIRONMENTAL EDUCATION CENTER BELLEVUE, WASHINGTON CON'T.

maintained. In order to accommodate this constraint a majority of the infrastructure was elevated. This included both elevated boardwalks for the trail system and the elevation of the education center complex. As such the education center was sited on an existing hillslope allowing for at grade access onto boardwalks connecting the elevated buildings. The result was a series of "treehouse" style facilities that provided dramatic views over the wetland and direct interaction with the surrounding forest canopy. Boardwalks were also used in sensitive areas were at grade trails could not be established. This provided opportunities for the public to interact with sensitive wetland habitats that would otherwise be inaccessible.

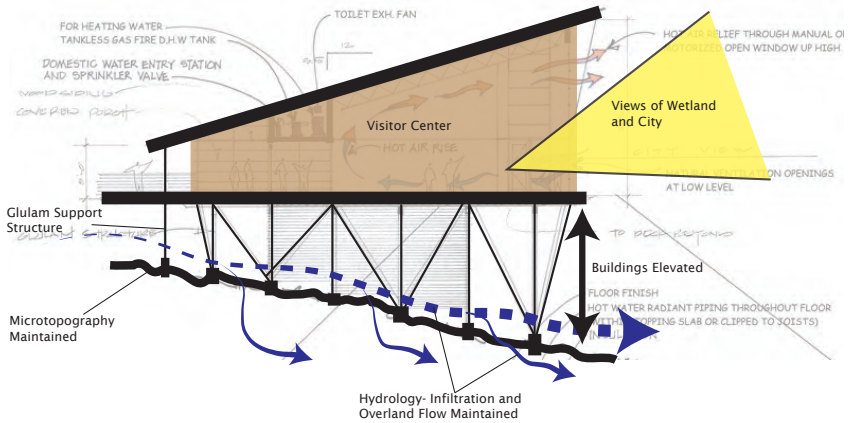
Interpretive Trails

To provide interpretive and educational experiences for the public, Jones and Jones developed a series of trail loops based on the history of Mercer Slough, wetland habitats, and accessibility. As such four major trails were developed; a peripheral loop, nature loop, heritage loop, and water trail. The peripheral loop connects all public facilities and provides a strong edge to the park. The nature loop offers experiences of the parks meadows, forests, and wetlands. While the heritage loop explores the agricultural history of the slough, providing opportunities for markets and current farming practices. Alternately Mercer Slough itself was built into the trail plan as a water trail for exploration of the site and as such a series of docks were created to accommodate this program.

Summary

By clustering facilities, elevating infrastructure, and creating thematic loop trails, Jones and Jones created a sensitive design for Mercer Slough Nature Park. The design maintained hydrologic function while providing facilities and trails that work together to educate and interpret the heritage and natural environments of Mercer Slough.

Figure 4.1 Elevation of facilities maintains hydrologic function and provides viewpoints to city and over wetland.



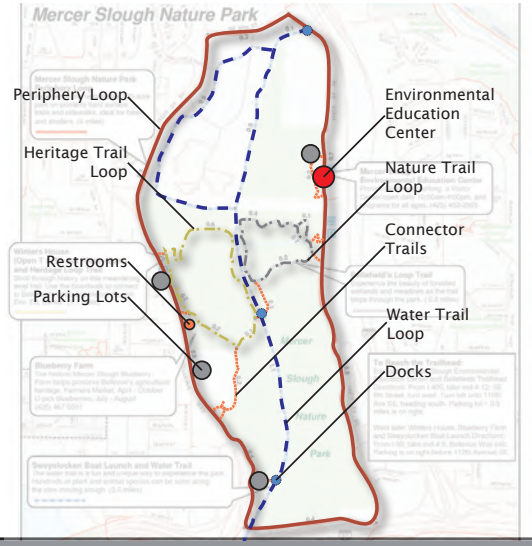


Figure 4.2 Trail network Mercer Slough Nature Park

GRAND RONDE MUSEUM AND CULTURAL CENTER MASTER PLAN, GRAND RONDE, OREGON

The Grand Ronde Museum and Cultural Center master plan designed by Jones and Jones architects, landscape architects, and planners is part of their Living Cultures series. Designed for the confederated tribes of Grand Ronde the plan provides facilities and landscape amenities for the transfer of knowledge from tribal elders to younger tribal members. This was achieved through a conceptual layout based on the cultures cosmology, the creation of facilities and landscape spaces important to their cultural heritage, and the clustering of facilities and landscape spaces to foster varying intensities of use.

Cosmology

As with many other living culture projects by Jones and Jones the layout for the master plan of the Grand Ronde museum and cultural center is based on an axial scheme whereby the four cardinal directions serve to orient the development of facilities and landscape elements. The axis is centered on the museum and cultural center buildings. An identified sacred space is positioned on the western axis. While a view corridor to the Sacred Mountain, of the confederated tribes of Grand Ronde, is identified at approximately a 45º northwest angle. As the Sacred Mountain was a significant landmark in the definition of both place and the identity of the Grand Ronde tribes its alignment to the site and positioning within the northwest quadrant of the axis served to drive many of the design decisions. As such a majority of the landscape elements were positioned within this quadrant. The view of the mountain was then accentuated through the creation of a horizontal landscape in the foreground (wetlands and grasslands), a vertical landscape in the midground (evergreen forest), and the sacred mountain rising to occupy the background. The buildings were then laid out within the central node to provide a view corridor from the main entrance through to the landscape and the mountain. Alternately the sacred space was screened from view by the buildings and the deciduous forest which runs along the western axis.

Landscape Spaces, Habitats, and Facilities

In order to accommodate the various cultural programs related to the preservation, protection, and revitalization of the traditions, history, and art of the Grand Ronde tribes the site necessitated both the creation of built facilities and landscape elements. These included the design of a museum with gallery and curatorial space, a cultural center with an auditorium and classrooms for language and arts programs, and a large multipurpose events space for gatherings and ceremonies. Alternately

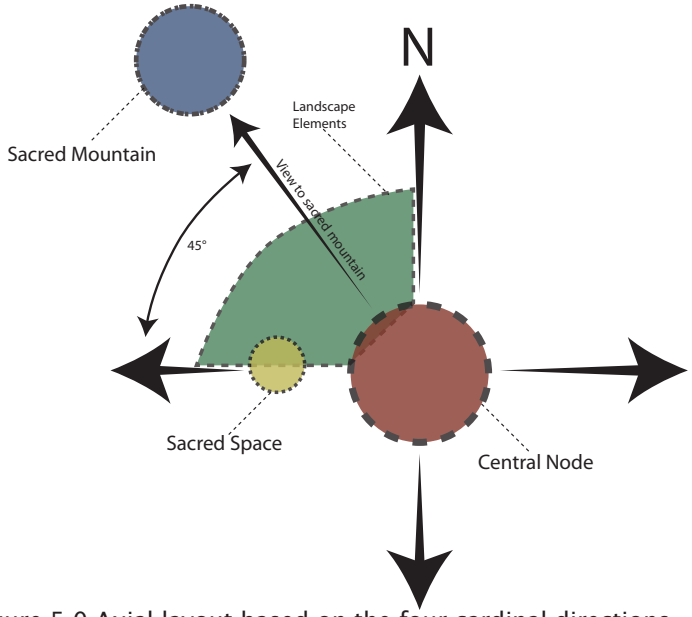


Figure 5.0 Axial layout based on the four cardinal directions and view of the confederated tribes of Grand Ronde's Sacred Mountain.

GRAND RONDE MUSEUM AND CULTURAL CENTER MASTER PLAN, GRAND RONDE, OREGON CON'T.

habitat landscapes were defined containing culturally important plant species needed for and included a deciduous savanna, wetlands, grasslands, and an evergreen forest. Further landscape spaces were needed for gatherings, rituals, recreation, and gardening, which included a sacred area, mowed activity area, and community commons.

Clustering

The plan itself can be divided into three sections based on intensity of use or impact to the environment. As such the following sections can be identified a high intensity use central node, moderate intensity landscape spaces, and low intensity habitat landscapes. Clustered in each of these sections are buildings/facilities, parking, foundation plantings, and small public spaces in the central node; the commons, mowed activity area, and sacred area landscape spaces; and the deciduous savanna, evergreen forest, wetlands, and grasslands habitat landscapes. Further by layering these sections on a gradient the landscape spaces serve to buffer the habitat landscapes from the high impact activities of the central node.

Summary

The Jones and Jones master plan for the Museum and Cultural Center of Grand Ronde brings together landscape and facilities to meet the needs of the living culture of the confederated tribes of Grand Ronde. The plan incorporates the cosmology, habitats, landscape spaces, and facilities required for tribal elders to transfer their knowledge onto young tribal members while accommodating a contemporary lifestyle.

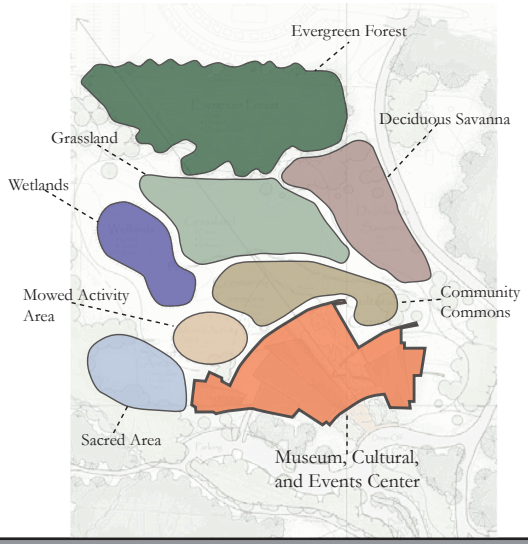


Figure 5.1 Landscape and Facility elements of Grand Ronde Museum and Cultural Center.

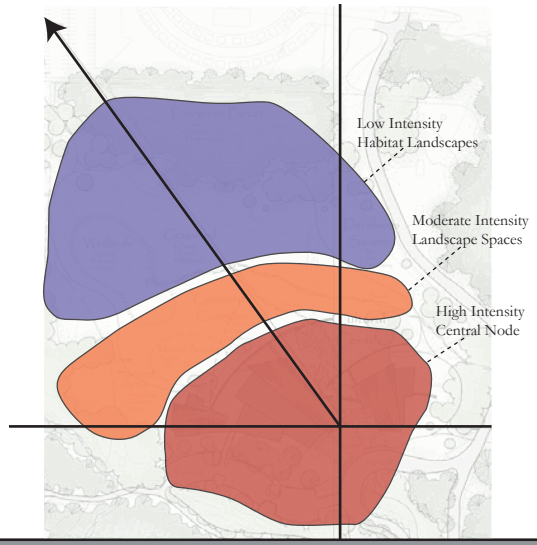


Figure 5.2 Clustering of spaces based on intensity of use.

THE CROSBY ARBORETUM, MISSISSIPPI STATE UNIVERSITY

The Crosby Arboretum is dedicated to educating the public about the Pearl River Drainage Basin ecosystem. By preserving, protecting, and displaying native plants the arboretum can offer both environmental and botanical research opportunities as well as cultural, scientific, and recreational programming. Through its landscape exhibits, thematic trails, and educational programs the arboretum offers activities for all ages and interests.

Landscape Exhibits

A total of four landscape exhibits exist within the Crosby Arboretum. 3 of these exhibits are basic habitats found within the Pearl River Drainage Basin and the fourth is based on the cultural use of plant species or ethnobotany. As such the exhibits include an aquatic, savanna, woodland, and ethnobotanical exhibit. Based on the natural forms found within the native ecosystem the exhibits are maintained according to the natural processes that form them. As such prescribed burning plays a fundamental role in the maintenance of the Savanna exhibit and the arboretum fully embraces controlled burning to establish and maintain the habitat characteristics of this grassland. In order to do this the savanna grasslands and off-site natural areas are burned 3 out of every 5 years. While alternately the woodland exhibit was a grassland in 1982 and has been planted with over 12,000 native trees and shrubs in natural habitat associations. This exhibit is being allowed to progress from a young woodland, as it is now, into a mature stand of oak, hickory, beech, and other hardwoods, which represent its climax stage. Further the aquatic exhibit is constructed of varying depths of freshwater displays required for wetland habitats. The central feature of which is a 2 1/2 acre pond, whose form is derived from the locally occurring beaver ponds. Constructed in 1986 the central pond is also the location of the renowned Pinecote Pavilion, which facilitates nature talks, exhibits, artistic performances and social gatherings. In addition the ethnobotanical exhibit explores the value of plants for medicinal, food, and tool making uses as they exist within the Pine Savanna ecosystem.

Thematic Trails

13 trails have been constructed to allow self-guided tours of the landscape exhibits and are divided into 5 programmatic categories habitat interpretation, cultural interpretation, childhood education, memorial, and gateway trails. The interpretive habitat trails include the pond, north savanna, south savanna, pitcher plant bog, woodland, and slough journeys

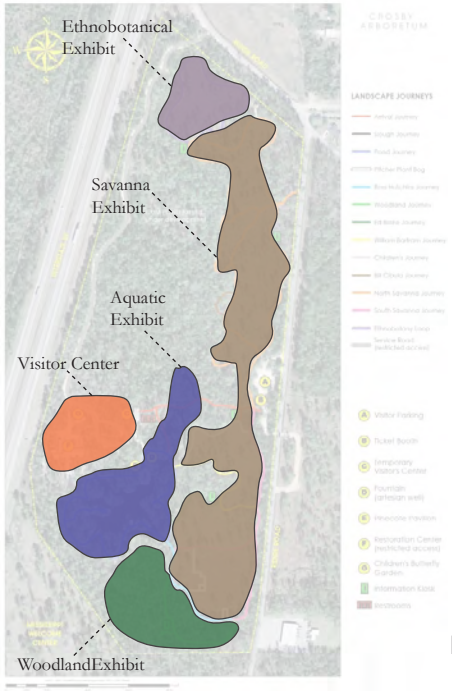


Figure 6.0 Crosby arboretum landscape exhibits and visitor center

THE CROSBY ARBORETUM, MISSISSIPPI STATE UNIVERSITY CON'T.

meant to educate visitors on the wildlife and plant communities of wetland, woodland, and savanna ecosystems. The memorial trails include the Ross Hutchins, Ed Blake, William Bartram, and Bill Cibula journeys which commemorate individuals who made significant contributions to the understanding of the Pearl River Drainage Basin ecosystem. The gateway trail or arrival trail is meant to welcome guests with a short introductory walk, which connects to the visitor center to the main entrance. The childhood education trail or children's journey is directed at signage and interactive environments meant to engage children in active learning. While the interpretive cultural trail or ethnobotany loop is meant to engage visitors through signage with the cultural significance of plant species for medicinal, food, or tool making value.

Educational Programming

The educational programming at the Crosby Arboretum has two distinct sets of activities related to the landscape exhibits and the visitor center facilities. These can be divided as site visits to the exhibits and curriculum based activities at the visitor center. Visitor center activities include watching presentations, viewing displays, reading & writing, wood & metal work, and arts & crafts. While activities held in the exhibits include guided walks, wildlife viewing, plant identification, plant collection, seeding, transplanting propagules, and yoga. By combining these activities staff, visiting professionals, and educators are able to create a wide range of workshops, lectures, and training programs for the public.

Summary

Through their landscape exhibits, thematic trails, and educational programs Crosby Arboretum provides cultural, scientific, and recreational programming. These serve to promote, protect, and educate the public on the Pearl River Drainage Basin ecosystem.

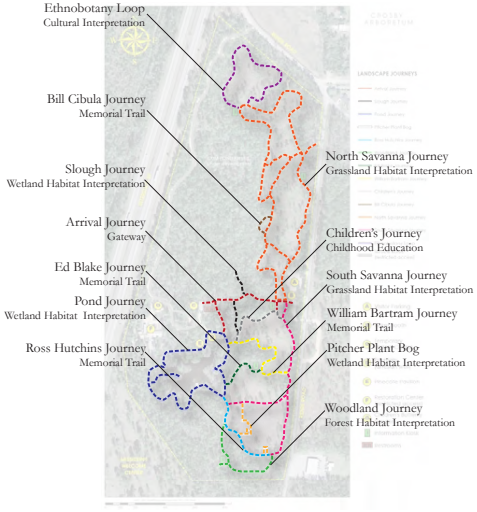


Figure 6.1 Thematic Trail System Crosby Arboretum

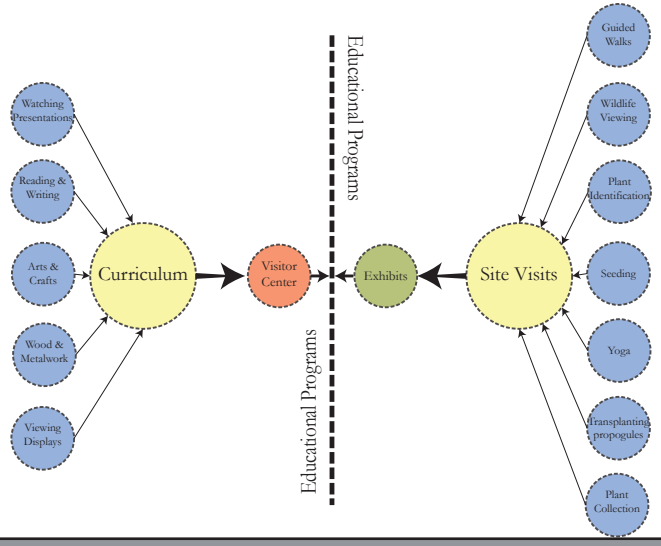


Figure 6.2 Schematic layout of Crosby Arboretums education programs

VANDUSEN BOTANICAL GARDEN-VISITOR CENTER, VANCOUVER, BC

The VanDusen botanical garden visitor center completed in 2011 is meant to excite, educate, and inspire visitors about the world of plants. Designed to facilitate volunteer services, interpretation, education, visitor services, and staffing; the center aims to promote learning as well as cultural and social activities. Through the creation of a multi-use facility, by aiming to meet the "Living Building" concept, and its inspirational built form Busby Perkins + Will and landscape architect Cornelia Hahn Oberlander create a functional, beautiful, and sustainable addition to the gardens.

Multi-use Facility

Rather then a campus style layout VanDusen botanical garden's visitor center is a multi-use facility that accommodates 5 distinctly programmed spaces. Included in these spaces are a mechanical room, storage, volunteer services, and a loading bay in staff and volunteer spaces; a cafe, restrooms, reception area, and garden shop with indoor and outdoor areas in visitor service spaces; a central atrium, arrival hall, and curatorial room in exhibition and curatorial spaces, 2 function rooms and a great hall in the events spaces; and a classroom and library in the educational spaces. These spaces occur clustered in private, semi-private, and public areas allowing the center to control visitor access and movement through the center. As such the private areas are located at the north end of the building with easy access to the street for the loading bay. The semi-private areas are located on the south end providing views into the gardens for the events spaces, which are intended as rentals for social and cultural events. While the public areas occur through the center of the building and serve to focus visitor traffic from the arrival hall past reception and into the gardens. As such the building allows for a range of programmatic activities including social gatherings, events, educational, exhibits, welcoming, dining, shopping, and maintenance to occur within a single structure.

"Living Building" Concept

In order to create a sustainable building that represented a balance between nature and the built form the VanDusen botanical garden's visitor center aspired to attain the status of a "Living Building". In order to attain this the building had to meet a number of criteria based on the site, energy, materials, water, indoor quality, and beauty and inspiration. At the site level this was done through demonstration gardens, on the collection and treatment of stormwater, and the integration of a green roof into the buildings design. In order to attain net-zero energy the building used solar hot water, a solar chimney, geoexchange, a radiant slab, heat pump, electrical inverter, and photovoltaics. While attaining net-zero water was

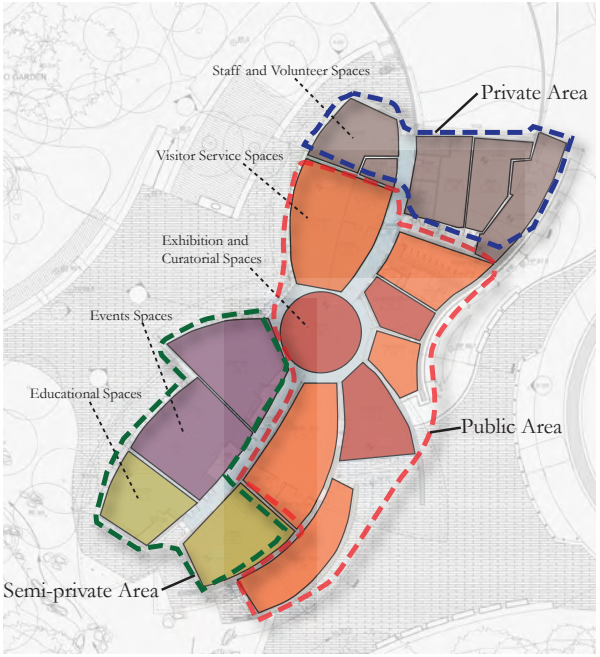


Figure 7.0 Programmatic layout of visitor center facilities

VANDUSEN BOTANICAL GARDEN- VISITOR CENTER, VANCOUVER, BC CON'T.

done through rain water collection, storage, and treatment as well as the use of a black water reactor and percolation field. Materials were selected based on the criteria of being safe, healthy, and responsible for all species. The indoor quality was designed to be healthy for all people while the built form aspired to be beautiful and inspirational.

Inspirational Built Form

The final built form of the visitor center is derived from a number of sources of inspiration Busby Perkins + Will and landscape architect Cornelia Hahn Oberlander drew from. The most prominent of these was the design of the buildings roof which was inspired by the flower of a native orchid species. While other sources contributed to the overall master plan of the visitor center and included the use of plants to clean water, fun and beauty in the design of water collection features, visible roof structures, and art in nature. However the roof is arguably the crowning achievement. In order to create the roof the project pushed the boundaries of technology and construction. It used current three dimensional modeling software, rhino and revit, to create the final design, which was then used for the construction process. As such 50 different prefabricated panels were built of curved glulam beams from the three dimensional data. These were then assembled on site to create the final building.

Summary

The VanDusen Botanical Garden visitor center facilitates educational, social, and cultural programming for its 22-hectare garden. Through the design of a multi-functional building, aspiration to be a "living building", and its inspirational built form the center has accommodated an increase in visitor services and provided valuable staff and volunteer space.

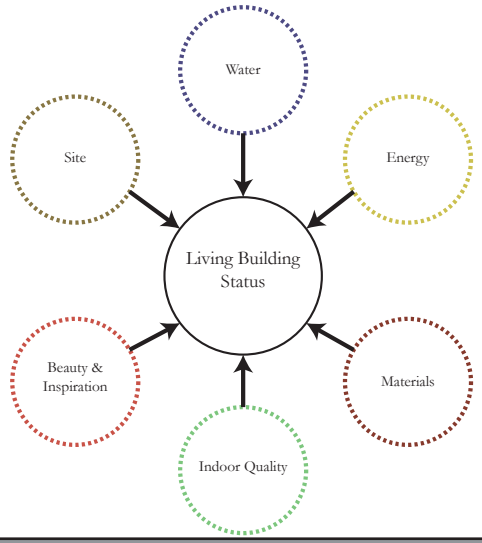
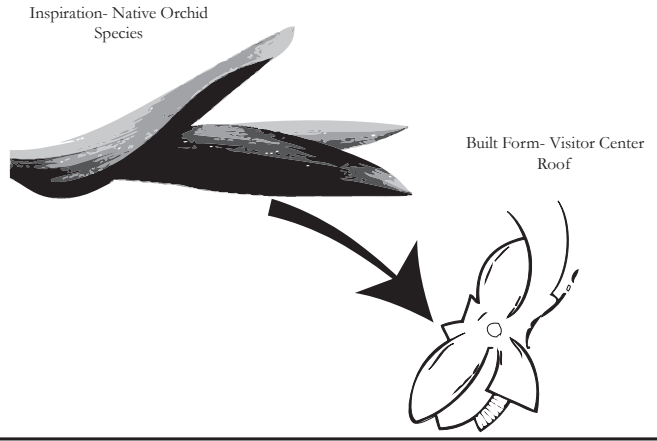


Figure 7.1 Elements related to the "living building" concept.

Figure 7.2 Native orchid used in design of visitor center roof



SITE DESCRIPTION

REGIONAL CONTEXT

Skwelwil'em Squamish Estuary Wildlife Management Area (WMA) is located at the head of Howe Sound in the Squamish river valley. The 673-hectare Skwelwil'em WMA is approximately an hours drive from Vancouver on highway 99 and provides habitat for fish and wildlife while serving as a valued amenity for outdoor recreation. The Squamish river valley lies within the coastal mountains and is typified by steep valley walls rising to snow covered mountain peaks with a low lying valley bottom prone to frequent flood events.

Habitat Corridor

Howe Sound and the Squamish river valley act as a natural corridor for fish, birds, and wildlife migration from the interior regions to the coast. As such a wide range of migratory birds use the Squamish Estuary on their annual migrations between summer and winter habitats. (Lower Mainland Region Environmental Stewardship Division: 2007) While chinook salmon use the estuary as an important stopover in their salmonid stage and it is therefore integral to maintaining commercial fisheries stocks. (Pacific Salmon Foundation: 2005) Further deer and black bears are known to frequent the area in search of food as it is an integral access point to marine resources. (Site Visit: 2012)

Rivers

Skwelwil'em WMA is typified by tidal marsh and riparian ecosystems. As the deposition point of four major rivers being the Cheekye, Cheakamus, Mamquam, and Squamish Rivers into Howe Sound both longshore and run-off watershed systems serve to form the Skwelwil'em WMA. Further the installation of a training dyke to channelize the Squamish River, for flood control has resulted in the creation of both river dominant and tidal dominant deltaic fronts.

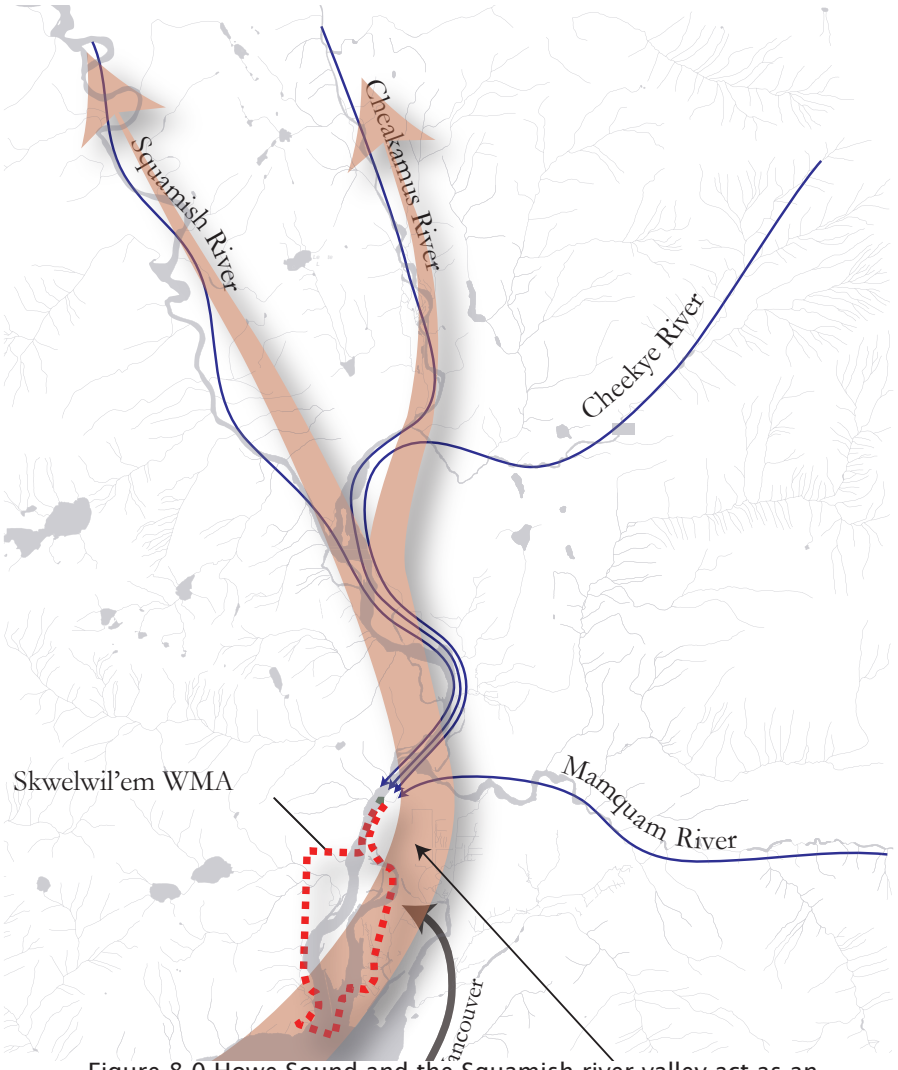


Figure 8.0 Howe Sound and the Squamish river valley act as an important habitat corridor for wildlife migration to and from the interior and coast.

REGIONAL CONTEXT CON'T.

Protected Areas and Wild Spirit Places

The Skwelwil'em WMA fits into a network of protected areas including Brackendale Eagles Provincial Park, Baynes Island Ecological Reserve, Tantalus Provincial Park, and Stawamus Chief Provincial Park. This collection of protected areas, along with others nearby, contributes significantly to the biodiversity of the Squamish river valley. (Lower Mainland Region Environmental Stewardship Division: 2007) While the Skwelwil'em WMA also contributes to a network of Squamish Nation wild spirit places including Nch'kay, Kwayatsut, Su7, Payakentsut, Este'uwilh, Nexw-ayantsut, and Nsiiyx-nitem Tl'a Sutich which protect cultural sites and land resources significant to the Squamish people. As such they contribute to the living culture of the Squamish people ensuring access to plant and animal resources. The Skwelwil'em WMA plays further roles in a number of regional, provincial and national environment strategies and recovery plans including:

-Greater Georgia Basin Steelhead Recovery Plan
-Squamish River Salmon Recovery Plan
- Peregrine Falcon Recovery
- Protection and Recovery of Species at Risk
-Migratory Bird Convention between Canada and United States.

Figure 8.1 The installation of the training dyke has resulted in both a tidal and river dominant deltaic front.

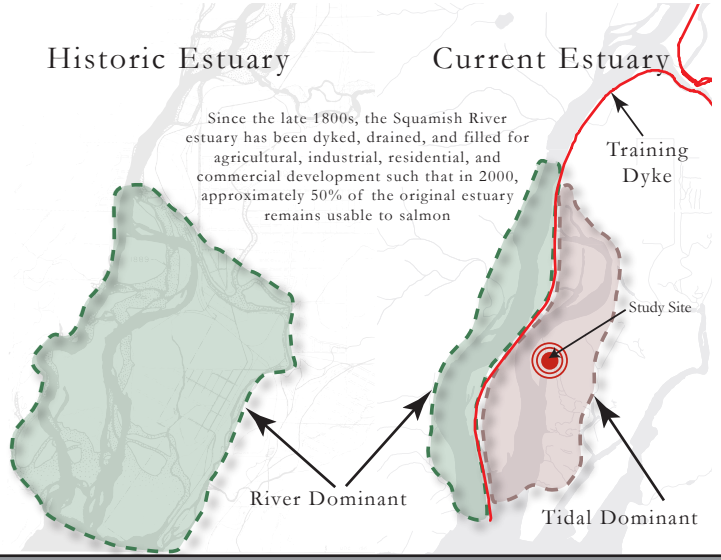
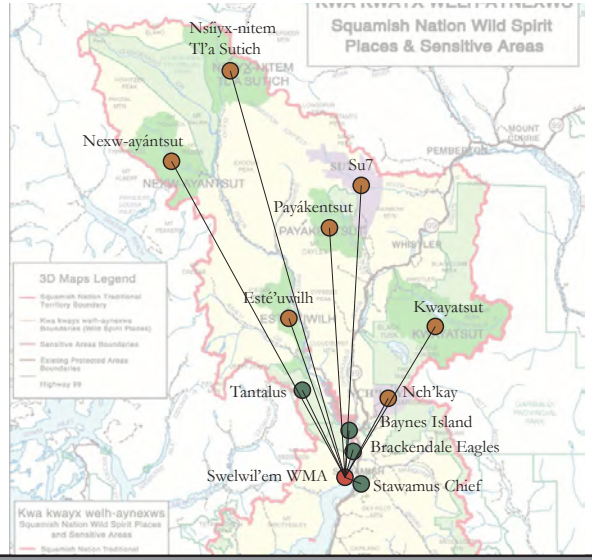


Figure 8.2 Skwelwil'em WMA fits into a network of protected areas including wild spirit places, parks, and ecological reserves.



SITE ANALYSIS

The research site is located within the Skwelwil'em WMA and is bordered on the east by the CN rail line, north and west by the Central Channel, and south by the old south dyke trail. The site measures approximately 60-hectares and is comprised of the log-sort, uplands meadow, and site A landscape units. As such current stakeholders include the Squamish Nation, Provincial government, Federal government, Squamish Estuary Conservation Society, and the municipality of Squamish.

West-Bar Log Sort

The West-Bar log sort is located on the southern boundary of the research site and is accessible via log-sort road and the old south dyke trail. The site is used currently for the storage and sorting of lumber but the lease is due to expire on October 13, 2014 at which time the site is set for restoration back to productive wetland habitat. Due to the sites industrial use it has disturbed/contaminated soils, was elevated to minimize flooding, and has an access road. It therefore represents an excellent opportunity for future development of facilities in conjunction with the proposed restoration. As such this site has been identified for the development of facilities for the Skwelwil'em WMA Eco-cultural center.

Uplands Meadow

The uplands meadow is a collection of tidal marsh and riparian woodland habitats. This area is prone to frequent flooding and has been bisected by log-sort road. Its western and northern boundaries are defined by central channel and a large sediment bar occurs along its western edge.

Site A

Site A occupies the eastern half of the research site and is bounded

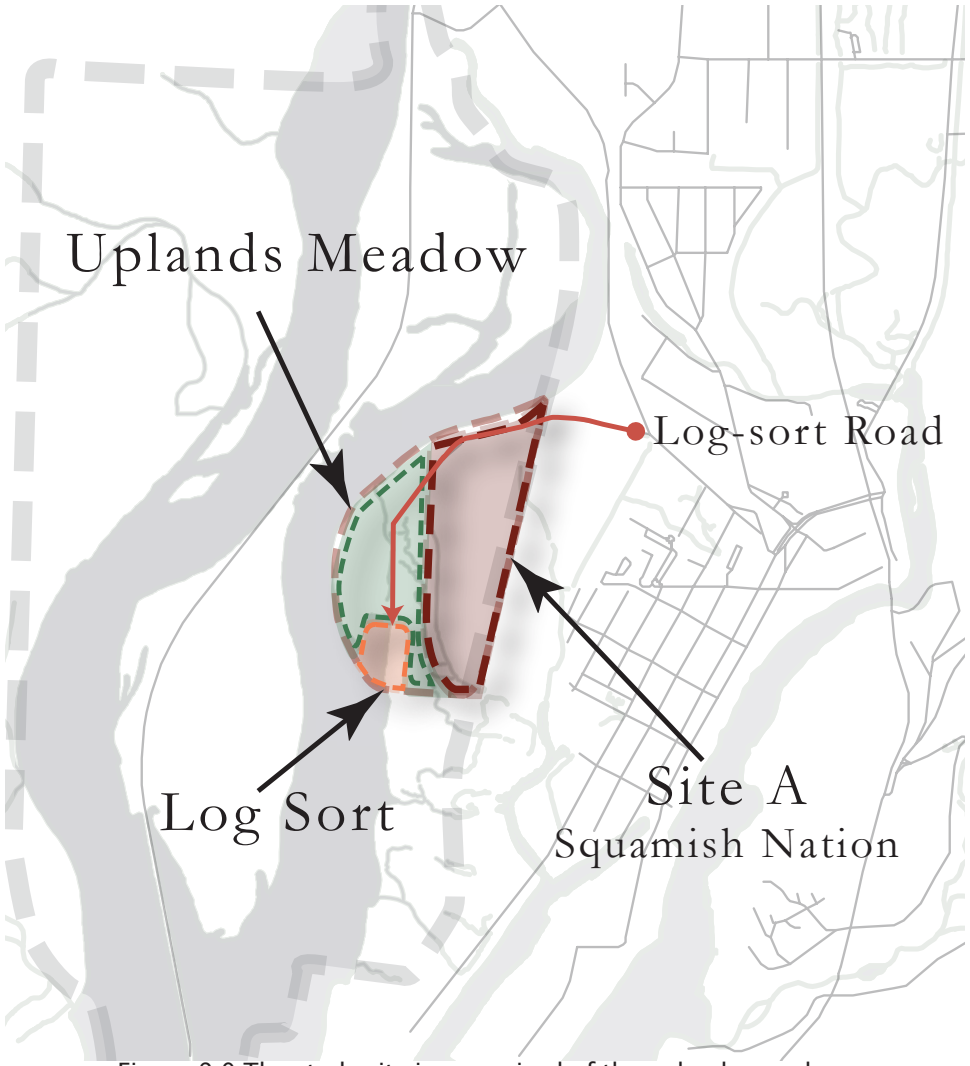


Figure 9.0 The study site is comprised of the uplands meadow, log-sort, and site A landscape units accessible via log-sort road.

SITE ANALYSIS CON'T.

on the east by the CN rail line, north by central channel, and south by old south dyke trail . Also a collection of tidal marsh and riparian woodland habitats site A is managed by the Squamish Nation. The site has had trace amounts of mercury contamination found along its eastern boundary due to industrial use of a nearby site by Nexen. While the assessment noted no unacceptable risk so long as soil was not disturbed it suggested continued monitoring of the WMA in general. (Lower Mainland Region Environmental Stewardship Division: 2007)

Path Network

A total of four trails are currently within the study area, these are the Swan, Cattermole Creek, Old North Dyke, and Old South Dyke trails. Two trail heads exist to access the study site and both have information boards with park notices and general information. Neither trail head would be considered aesthetically appealing or inspirational in any way.

Hydrology

Hydrology within the study site is tide dominant and comprised of a central channel and a number of small intertidal drainage channels. Total tide fluctuation within Squamish is 4.92m or 16.1ft. (Fisheries and Oceans Canada: 2012) As the estuary is predominantly within the tidal zone frequency and duration of inundation is the primary determinant of plant distribution. (Mackenzie: 2004) As such a strict gradient is established from

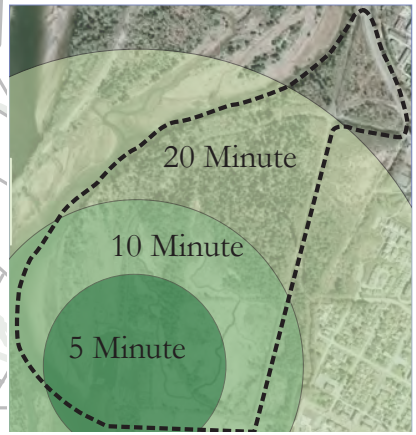
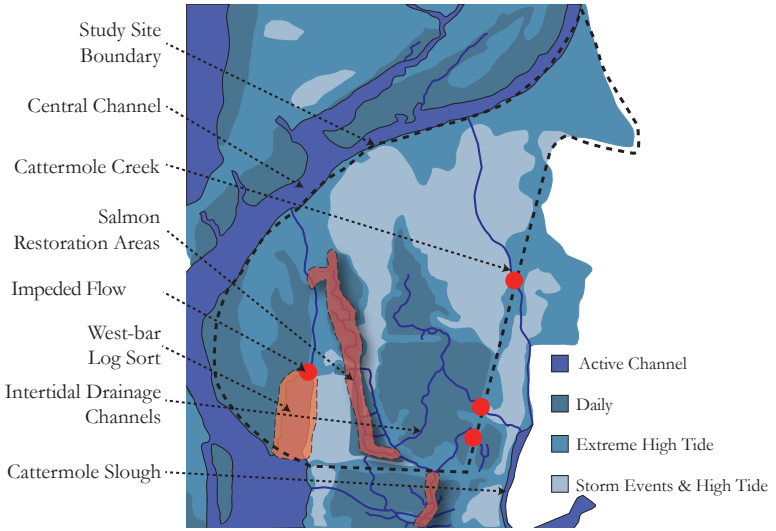


Figure 9.1 (Left) Existing path network on study site. 9.2 (Above) 5, 10, and 20 minute walking distances.

Figure 9.3 Stream network and frequency of inundation.



SITE ANALYSIS CON'T.

low tide mark to high tide mark where both the frequency and duration of inundation decrease as we near high tide mark. As such the site has frequently inundated sites (daily), infrequently inundated sites (seasonal high tides, storm surges, and wave run-up), and rarely inundated sites (combined extreme tide and storm surge or wave run-up events). However according to the ministry of environment sea level is estimated to rise up to 1.2m in some locations on the BC coast. (BC Ministry of Environment: 2012b) As this happens rarely inundated sites will experience longer and more frequent inundation.

Vegetative Structure

Four distinct vegetative structures can be identified within the study site these are floodplain woodland, swamp woodland, tidal marsh, and developed landscape areas. (Adams: 2002) The tidal marsh areas are comprised of both a lower estuary marsh with single species dominant vegetative zones along a vertical gradient, and an upper estuary marsh with high complexity where vegetative zones are more dependent on grade, soil composition, and available moisture. (Adams: 2002) Within the 4 areas a total of 7 plant communities have been identified as Ruppia maritima (widgeon-grass), Carex lyngbyei (Lyngby's sedge), Lathyrus palustris-Potentilla anserina (marsh peavine-Pacific silverweed), Agrostis stolonifera-Rumex crispus (creeping bentgrass-curled dock), Sonchus arvensis-Aster subspicatus (perennial sow-thistle-Douglas' aster), Juncus effusus/Alnus rubra (common rush/red alder), and Thuja plicata-Tiarella trifoliata (western red cedar-foamflower. (Page: 2004; District of Squamish: 2012)

Ruppia maritima Community

Ruppia maritima (widgeon-grass) is a montypic community used extensively by waterfowl for grazing. (Page: 2004) This community occurs at the lowest elevations in the study area and is most prominant in restored intertidal drainage channels.
Dominant Species: Ruppia maritima.

Carex lyngbyei Community

Carex lyngbyei (Lyngby's sedge) forms monotypic stands in the lower

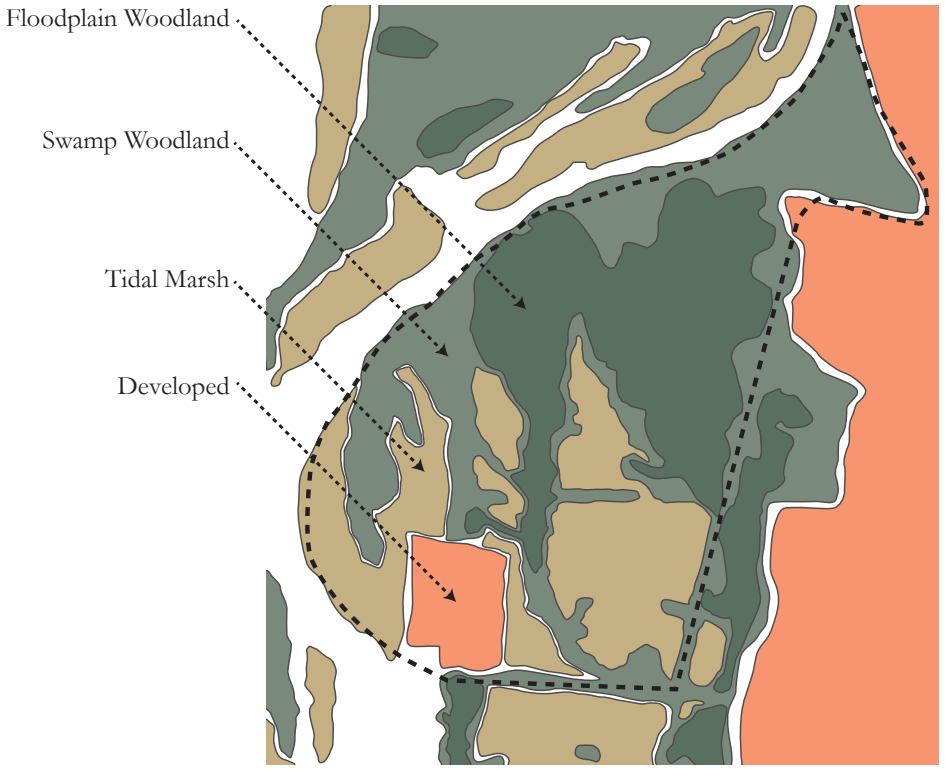


Figure 9.4 Skwelwil'em WMA vegetative structures

SITE ANALYSIS CON'T.

estuary marsh and is also a major component of the upper estuary marsh. It occurs above the Ruppia maritima community and is more prevalent in the southern portion of the study area and along the banks of intertidal drainage channels. (Page: 2004)
Dominant Species: Carex lyngbyei.
Other Species Present: Hierochloe odorata, Chenopodium rubrum var. rubrum, Atriplex patula, Triglochin americanum, Hordeum brachyantherum, Deschampsia caespitosa, Potentilla anserina ssp. pacifica, Typha latifolia, Ranunculus cymbalaria, Sonchus arvensis var. arvensis, Eleocharis palustris, Lathyrus palustris, and Aster subspicatus.

Lathyrus palustris-Potentilla anserina Community

The Potentilla anserina (Pacific silverweed) and Lathyrus palustris (marsh pea) community are indicative of sites with seasonal flooding. (Page: 2004) This community marks the transition zone between the lower estuary marsh and the upper estuary marsh.
Dominanr Species: Lathyrus palustris, Potentilla anserina ssp. pacifica, Galium trifidum, and Hordeum brachyantherum.
Other Species Present: Agrostis stolonifera, Chenopodium rubrum var. rubrum, Juncus articus, Festuca sp., Bidens amplissima, Sonchus arvensis var. arvensis, Aster subspicatus, Elymus repens, Typha latifolia, Atriplex patula, and Triglochin americanum.

Agrostis stolonifera-Rumex crispus Community

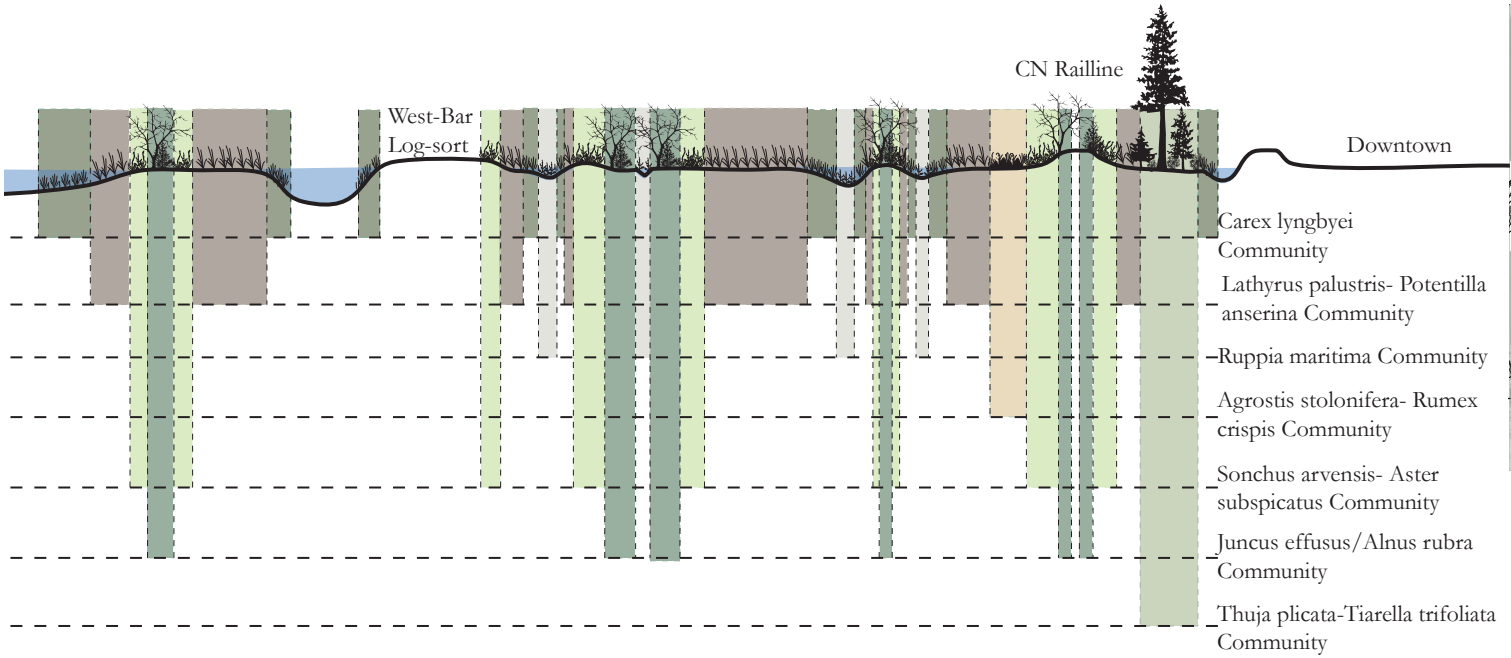


Figure 9.5 (Left) Plant community distribution from west to east. 9.6 (Above) Section line through site.

SITE ANALYSIS CON'T.

The Agrostis stolonifera (creeping bentgrass) and Rumex crispus (curled dock) community is common throughout the study area but is most prevalent on wetter areas of the upper estuary marsh. (Page: 2004) It tends to form patches dominated by creeping bentgrass and is most prominent on the eastern side of the study area near the BC Rail line. (Page: 2004)
Dominant Species: Agrostis stolonifera, Rumex crispus, Typha latifolia, and Atriplex patula.
Other Species Present: Potentilla anserina ssp. pacifica, Lathyrus palustris, Achillea millefolium, Myrica gale, Triglochin americanum, Bidens amplissima, Chenopodium rubrum var. rubrum, Aster subspicatus, Sidalcea hendersonii, Sonchus arvensis var. arvensis, and Vicia gigantea.

Sonchus arvensis-Aster subspicatus Community

The Sonchus arvensis (perennial sow-thistle) and Aster subspicatus (Douglas' aster) community includes a variety of wildflowers, is the most species rich, and has a wide variability in plant distribution.(Page:2004) It occurs within seasonally flooded areas in the upper estuary marsh but does not undergo daily tidal flooding and is assumed to be sensitive to hydrologic changes. (Page: 2004)
Dominant Species: Sonchus arvensis var. arvensis, Achillea millefolium, Sidalcea hendersonii, Angelica lucida, Conioselinum pacificum, Maianthemum dilatatum, Aster subspicatus, and Elymus repens.
Other Species Present: Picea sitchensis, Rubus spectabilis, Ranunculus cymbalaria, Epilobium ciliatum, Plantago major, Triglochin americanum, Vicia gigantea, Deschampsia caespitosa, Festuca sp., Atriplex patula, Epilobium angustifolium, Fritillaria lanceolata, Lonicera involucrata, Poa pratensis, Senecio species, Solanum dulcamara, Symphoricarpus albus, Rosa nutkana, Bidens amplissima, Chenopodium rubrum var. rubrum, Galium trifidum, Myrica gale, Potentilla anserina ssp. pacifica, Anaphalis margaritacea, Athyrium felix-femina, Claytonia sibirica, Dicranum scoparium, Dodecatheon pulchellum, Eleocharis palustris, Eurhynchium oreganum, Gaultheria shallon, Heracleum lanatum, Hordeum brachyantherum, Hypochaeris radicata, Isothecium stoloniferum, Juncus articus, Juncus bufonius, Lactuca muralis, Malus fusca, Plantago maritima ssp. juncoides, Polygonum persicaria, Polystichum munitum, Prenanthes alata, Quercus species, Rhamnus purshiana, Rhytidiadelphus loreus, Rumex acetosella, Ruppia maritima, Salix species, Spergularia species, Tsuga heterophylla, Lathyrus palustris, Agrostis stolonifera, Phleum pratense, Alnus rubra, Calamagrostis canadensis var. canadensis, and Carex lyngbyei.

Juncus effusus-Alnus rubra Community

The Juncus effusus (common rush) and Alnus rubra (red alder) community occurs within the swamp woodland area and is found on recently created berm crests as well as floodplain forest margins. (Page:2004) Transitional to shrub thicket and young forest the community contains a variety of weedy species, including common nonnative species. (Page: 2004)

Dominant Species: Juncus effusus, Calamagrostis canadensis var. canadensis, Alnus rubra, and Holcus lanatus.
Other Species Present: Phleum pratense, Rubus armeniacus, Sambucus racemosa, Agrostis stolonifera, Rubus spectabilis, Vicia gigantea, Lonicera involucrata, Rosa nutkana, Sonchus arvensis var. arvensis, and Potentilla anserina ssp. pacifica.

Thuja plicata-Tiarella trifoliata Community

The Thuja plicata-Tiarella trifoliata community occurs on inherently nutrient-rich sites that provide additional moisture and nutrient inputs. Usually this community features a well developed deciduous shrub layer

SITE ANALYSIS CON'T.

(devil's club, balck gooseberry, thimbleberry, salmonberry, and elderberry), herb layer including both ferns and herbs, and a moss layer. While the tree layer of old-growth stands usually includes a variable number of western hemlock, western redcedar, and depending on climate, Douglas-fir, Pacific silver fir, or Sitka spruce may also be present. (Klinka: 1996) This community occurs within the floodplain woodland area.
Dominant Species: Thuja plicata, Hylocomium splendens, Rhytidiadelphus loreus, Tiarella trifoliata, Tsuga heterophylla, Vaccinium parvifolium.

Visible Landforms

A number of significant landforms are visible from the West-bar Log-sort, these are Mount Murchison, Mount Garabaldi, Round Mountain, Mamquam Mountain, and the Stawamus Chief. The foot of Mount Murchison is the most visible feature creating a visual wall west of the site.

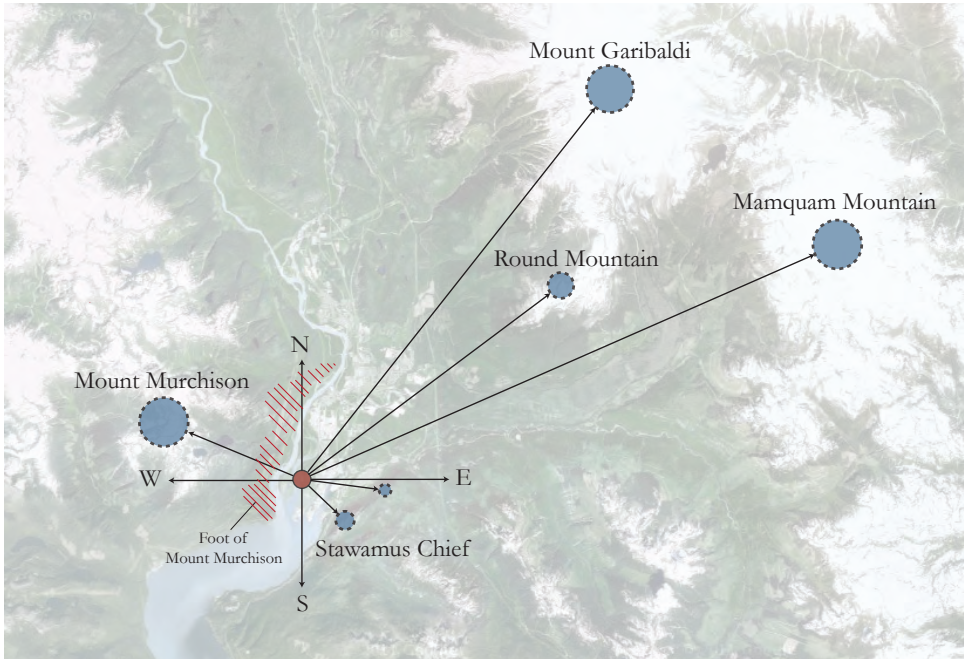


Figure 9.8 (Above) Locations and desire lines to visible mountain peaks from the West-bar log-sort

Figure 9.7 (Below) Panorama from the south end of the West-bar log-sort

SCHEMATIC PLAN

The schematic layout of the Skwelwil'em Eco-Cultural Center is laid out in the following five sections: Maintenance Gradients, Axial Orientation, Landscape Exhibits, and Trail Network.

Maintenance Gradients

The Skwelwil'em Schematic Plan is based on a gradation of high, moderate, and low maintenance areas. High maintenance areas include paths, facilities, demonstration gardens, outdoor gathering spaces, activities areas, information kiosks, and the access road. Moderate maintenance areas include educational/interpretive interventions, restorations, monitoring/ research stations, sacred spaces, wildlife viewpoints, and outdoor classrooms. While low maintenance areas include limited access and no access wildlife zones.

Axial Orientation

The arrival route, central node, and sacred space are aligned along a north-south axis. The layout of facilities will be oriented to maintain desire lines to notable mountains in the surrounding landscape. While the views to Round Mountain, Mt. Garabaldi, and Mamquam Mountain are aligned such to provide a horizontal foreground and vertical midground.

Landscape Exhibits

4 distinct landscape exhibits are defined to support the interpretation, education, and preservation of culturally significant landscape resources. The woodland exhibit will include a variety of woodland crop interventions based on traditional management techniques and culturally significant plant species found within floodplain and swamp woodland areas of the estuary. This area will provide opportunities for self-guided walks, educational site

Figure 10.0 Low, moderate, and high maintenance landscape areas

SCHEMATIC PLAN CON'T.

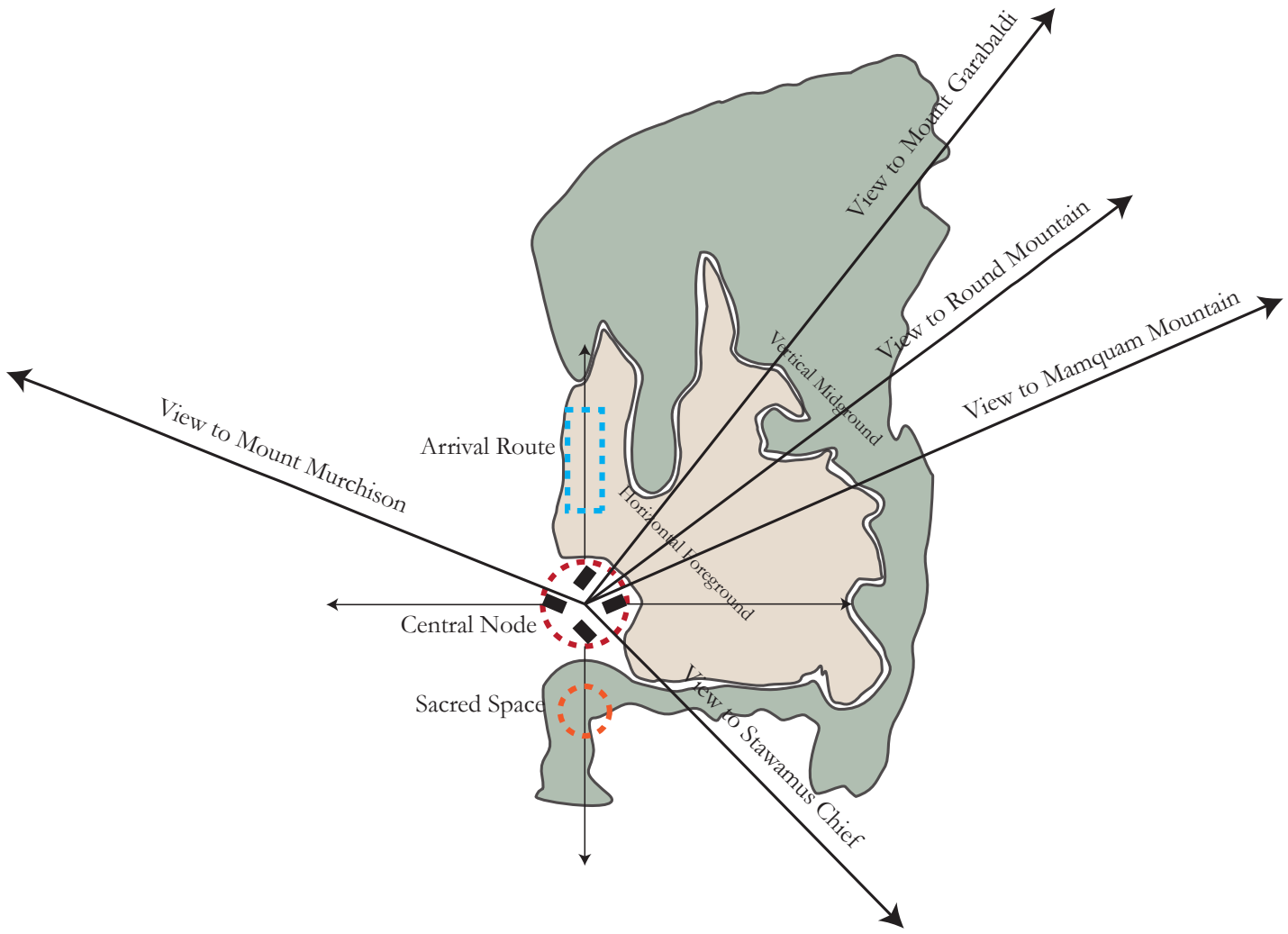


Figure 10.1 Axial schematic layout based on views and cardinal directions

SCHEMATIC PLAN

visits, research, guided walks, wildlife viewing, and plant collection. The central marsh exhibit will feature both upper estuary marsh and lower estuary marsh crop interventions. This area will provide opportunities for self-guided walks, guided walks, educational site visits, plant collection, research, wildlife viewing, and hunting. The West-Bar exhibit will feature both upper/lower estuary crop interventions as well as access to central channel with opportunities for water based recreation. This area will provide opportunities for guided walks, self-guided walks, educational site visits, plant collection, fishing, hunting, water sports, wildlife viewing, research, and eel-grass restoration. The intertidal channel restoration will feature demonstration projects related to increasing salmon populations and historic information on the history of the estuary. The area will provide opportunities for water sports, self-guided tours, guided tours, research, restoration, fishing, plant collection, educational site visits, and wildlife viewing. The garden exhibit will feature demonstration gardens on plant species with significance as food products, medicine, or spiritual use. Located within the central node this area will also house educational, research, administrative, and visitor center facilities. As such this area will provide opportunities for self-guided walks, guided walks, plant collection, education, research, administration, dining, shopping, restrooms, water sports, and wildlife viewing.

Trail Network

7 trails explore the four landscape exhibits these are the childrens trail, woodland trail, central marsh heritage loop, tidal marsh loop, periphery loop, and chiefs memorial loop. Children will actively engage with the landscape of the estuary on this trail with opportunities to dig in the mud, touch the water, and learn about the birds, fish, and animals that call the estuary home. Continue on to the central marsh heritage loop and learn about the history of agriculture in the estuary along the historic north dyke.

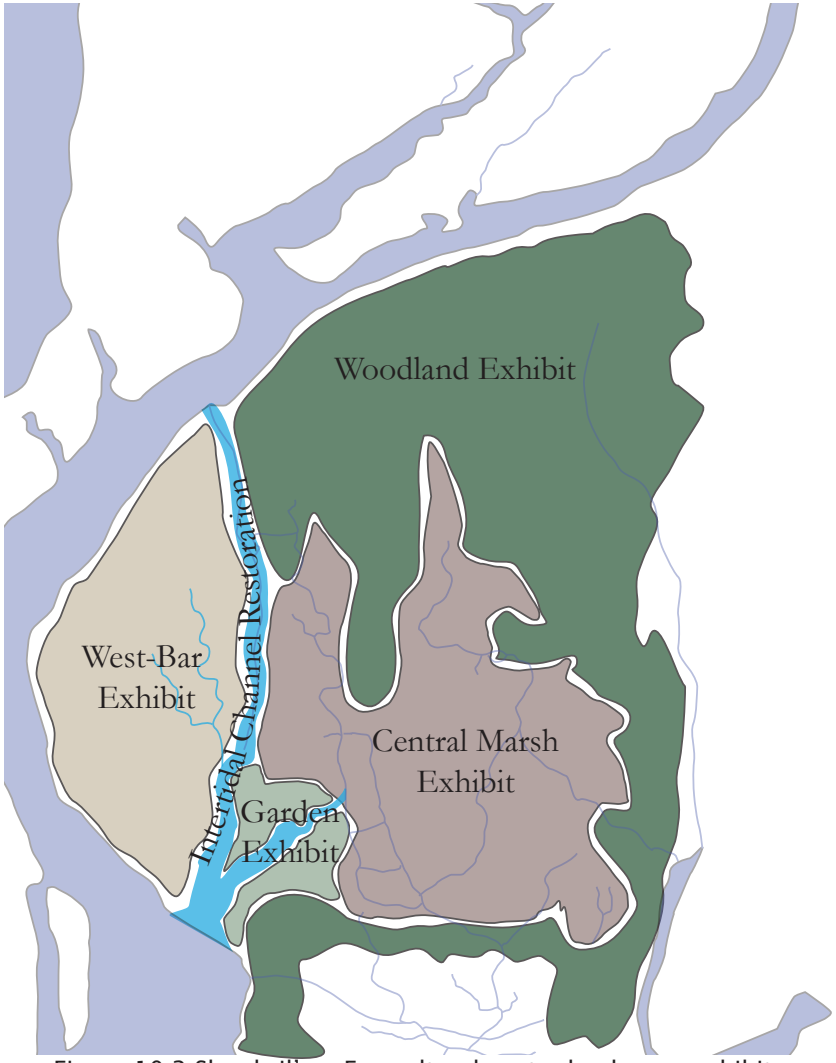


Figure 10.2 Skwelwil'em Eco-cultural center landscape exhibits.

SCHEMATIC PLAN CON'T.

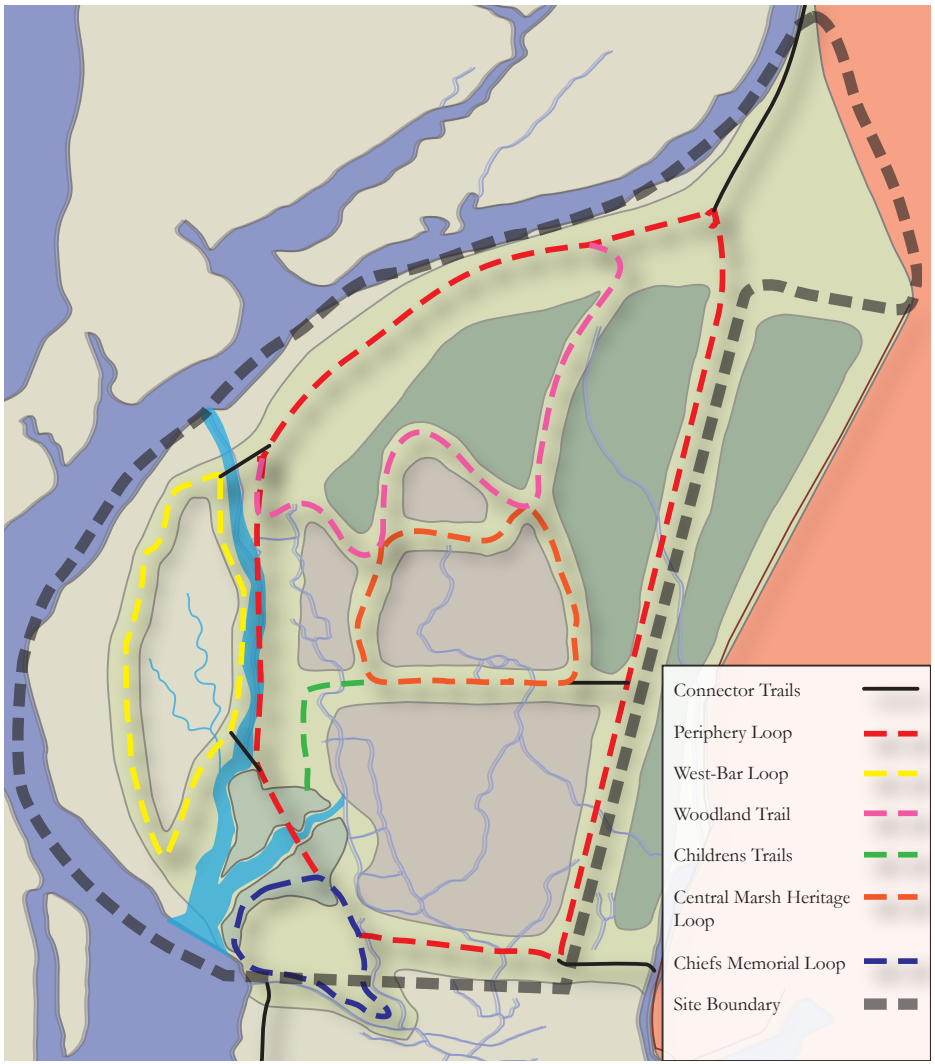
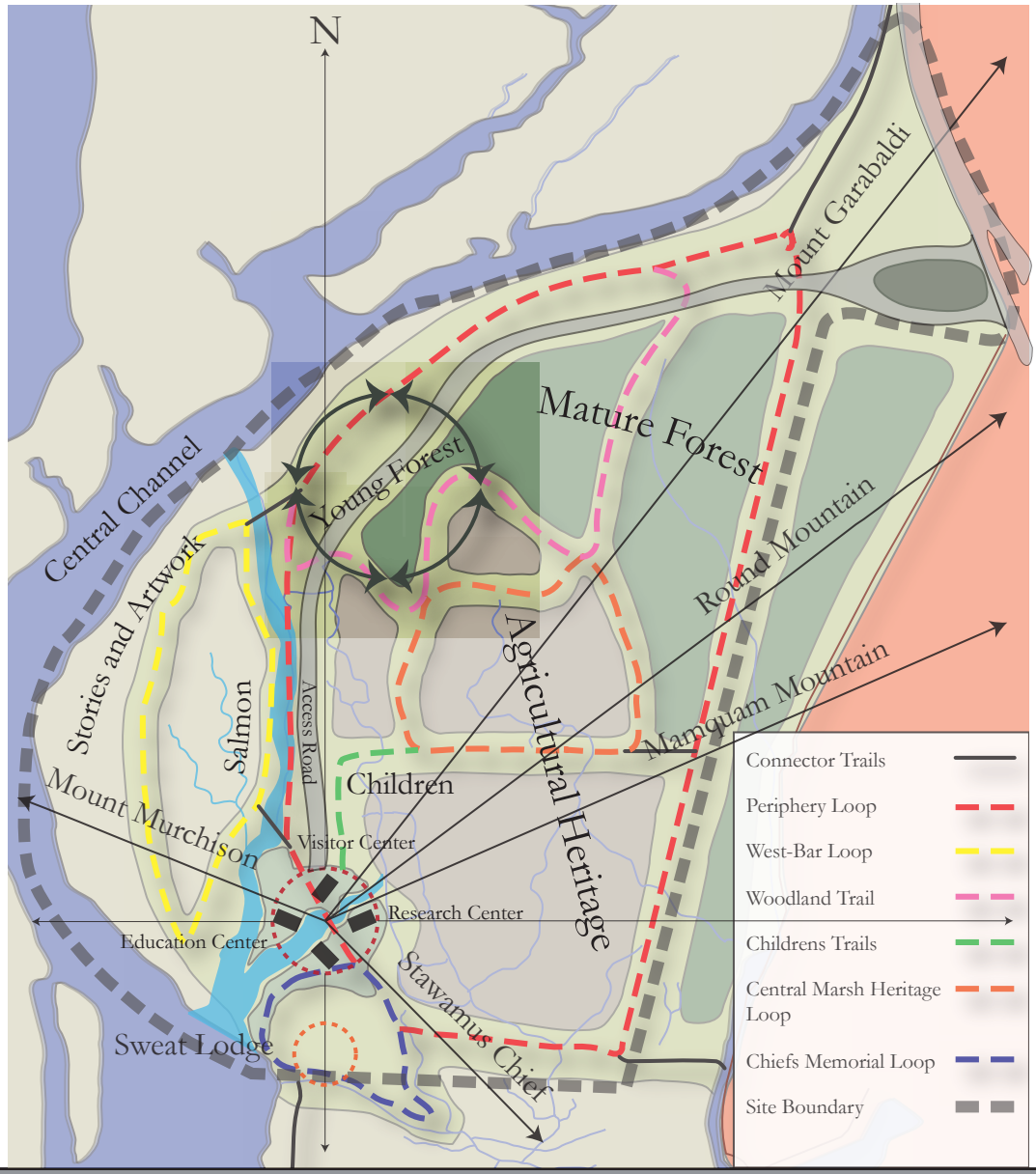


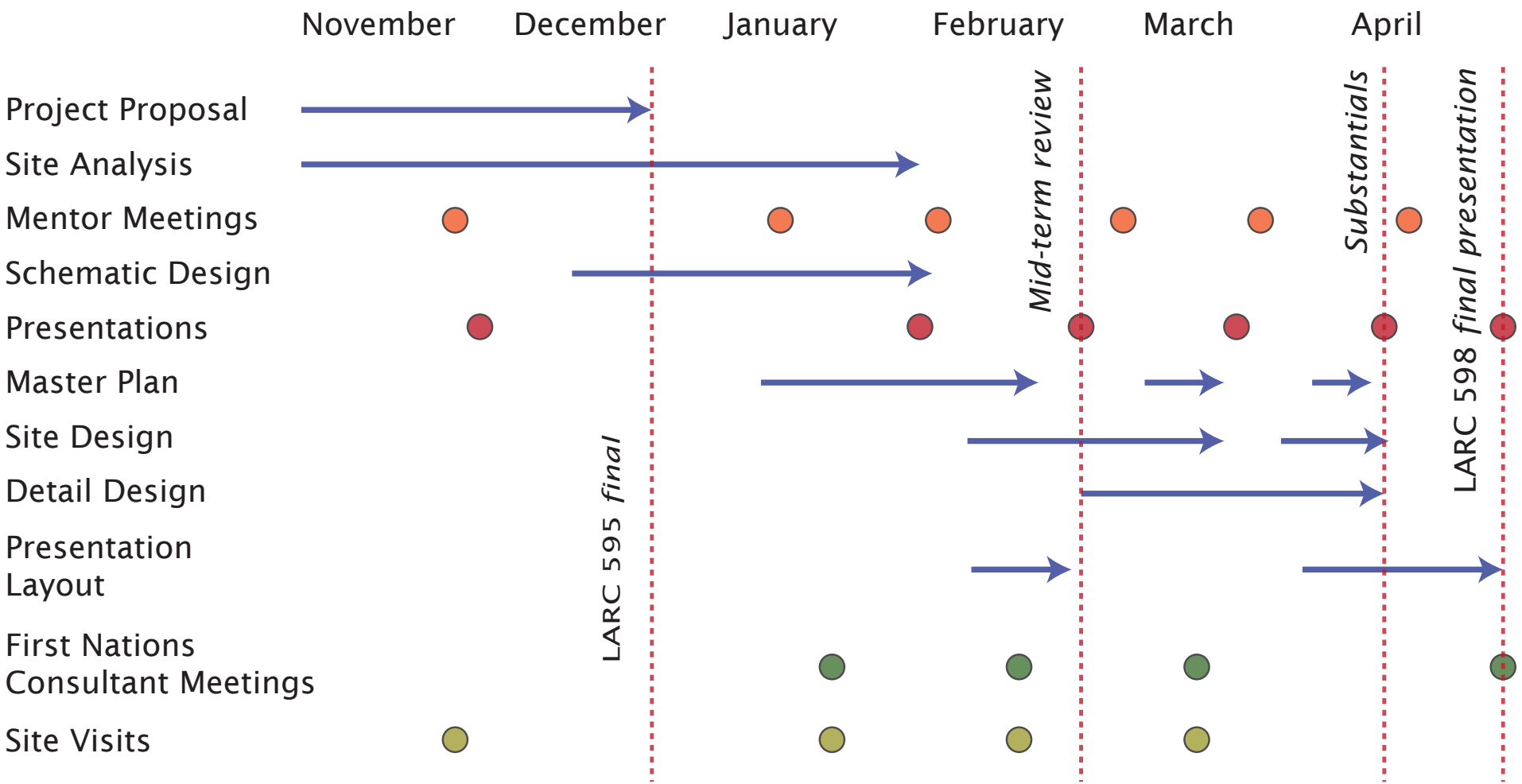
Figure 10.3 Trail network for Skwelwil'em Eco-cultural Center

Experience the traditional lower and upper estuary crops of the Squamish in demonstration exhibits and through interpretive signage. Or connect on to the woodland trail to explore the life of a coastal forest. Journey through the stages of development from wetland meadows to shrub thickets and young forests. See the mature forest and learn about the vertical structure of forests and how material can be harvested from living plants. On your way back to the visitor center cross over the restored intertidal channel and take the West-Bar loop. Learn about salmon restoration projects along the restored channel or explore the western boundary along central channel. Interpretive signage and art retells the old squamish legends and maybe a few new ones. If your not to tired once back at the visitor center see if the chiefs memorial loop is open. Dedicated to the ancestral chiefs of the Squamish people this trail commemorates important Squamish men and women while also providing access to the sweat lodge.

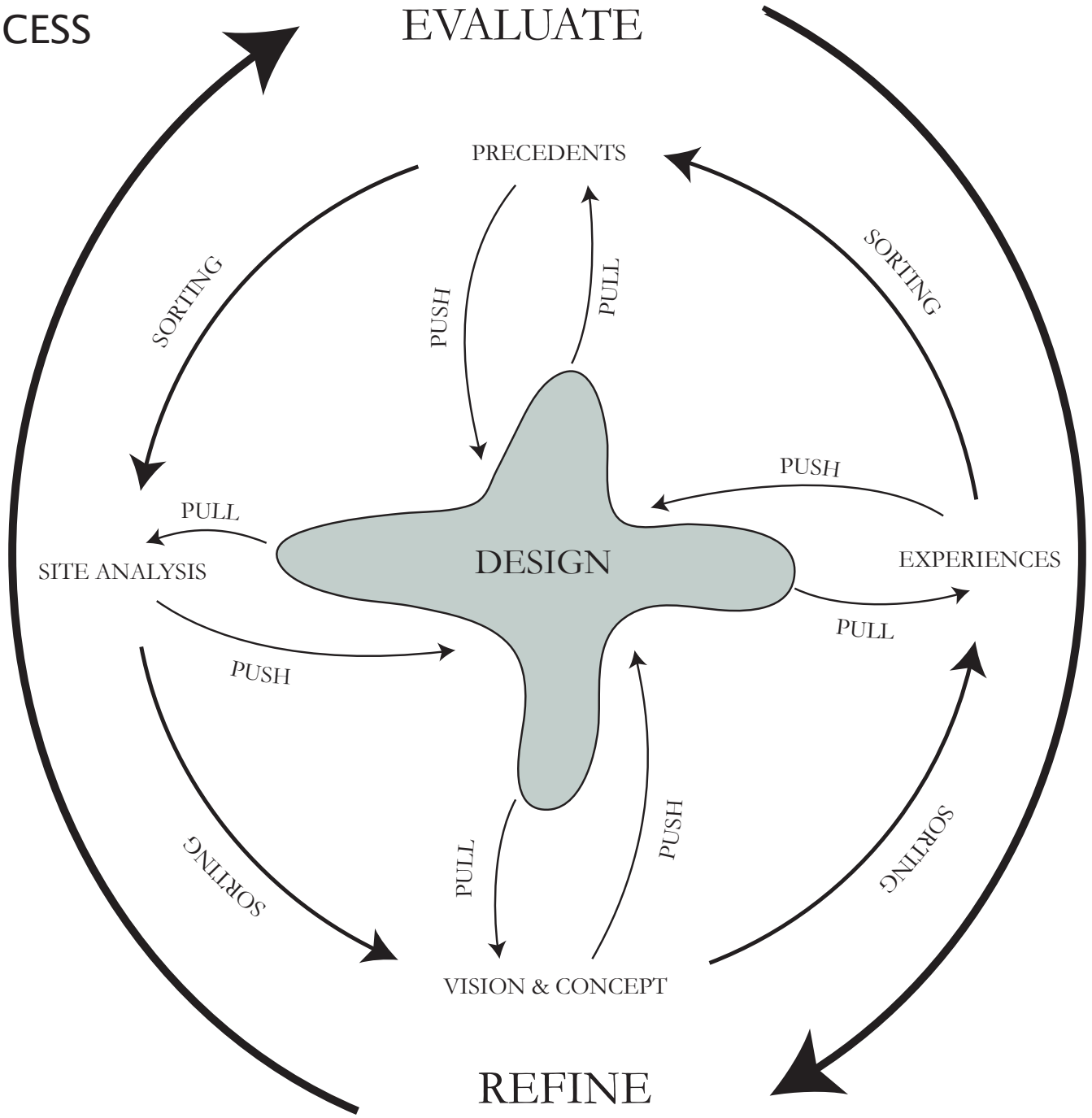
SCHEMATIC PLAN

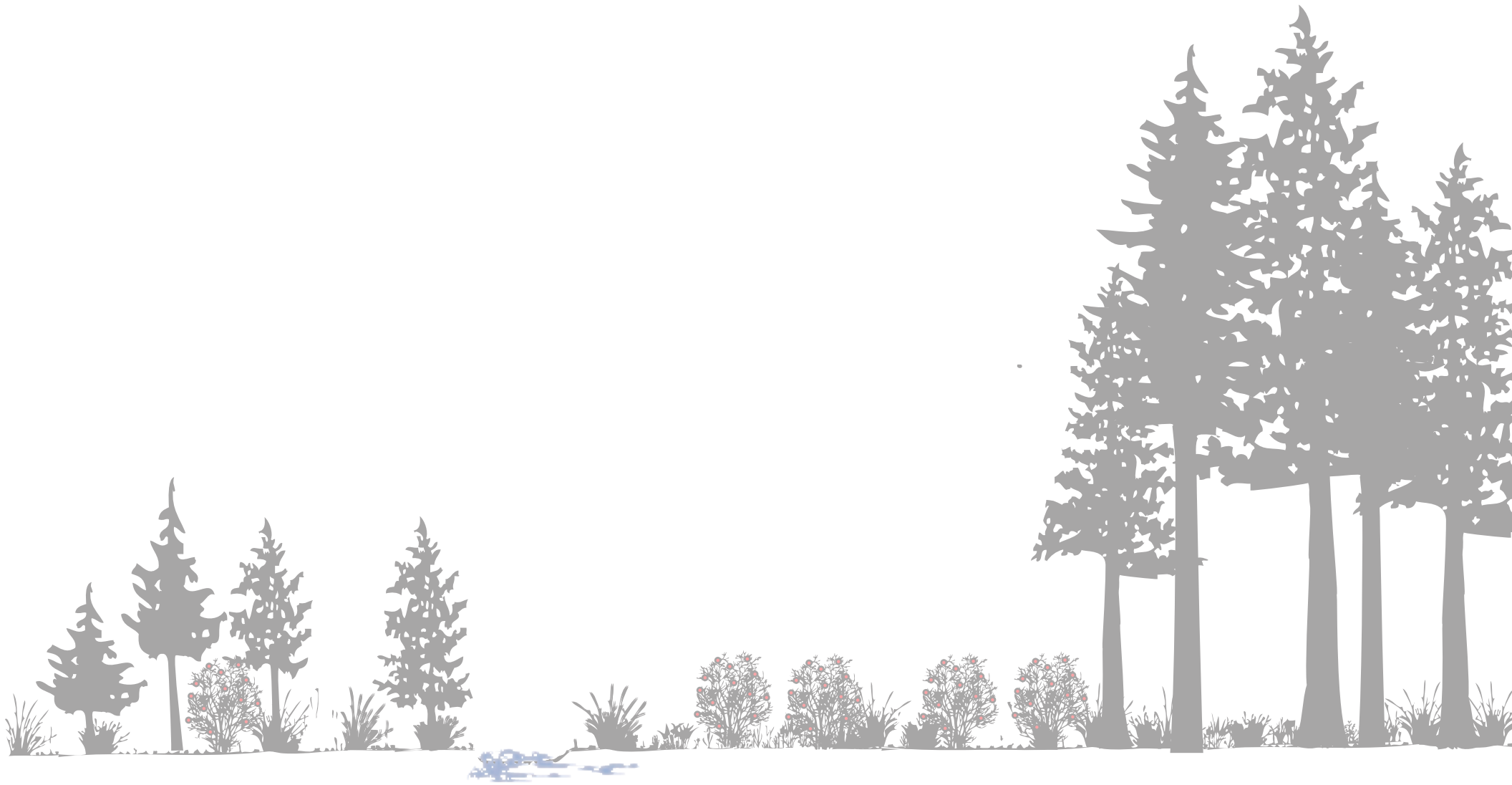


PLAN OF WORK

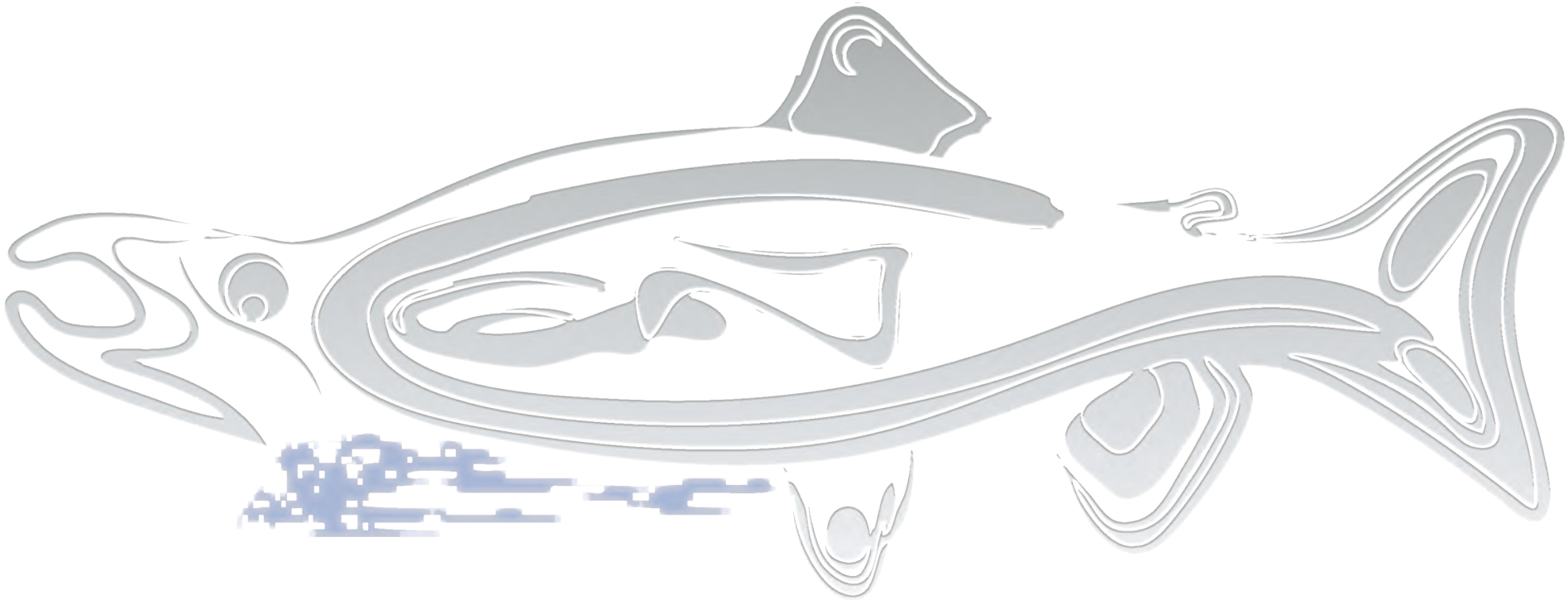

November
December
January
February
March
April
Project Proposal
Site Analysis
Mentor Meetings
Schematic Design
Presentations
Master Plan
Site Design
Detail Design
Presentation Layout
First Nations Consultant Meetings
Site Visits
LARC 595 final
Mid-term review
Substantials
LARC 598 final presentation

DESIGN PROCESS





SITE DESIGN



DESIGN PROCESS

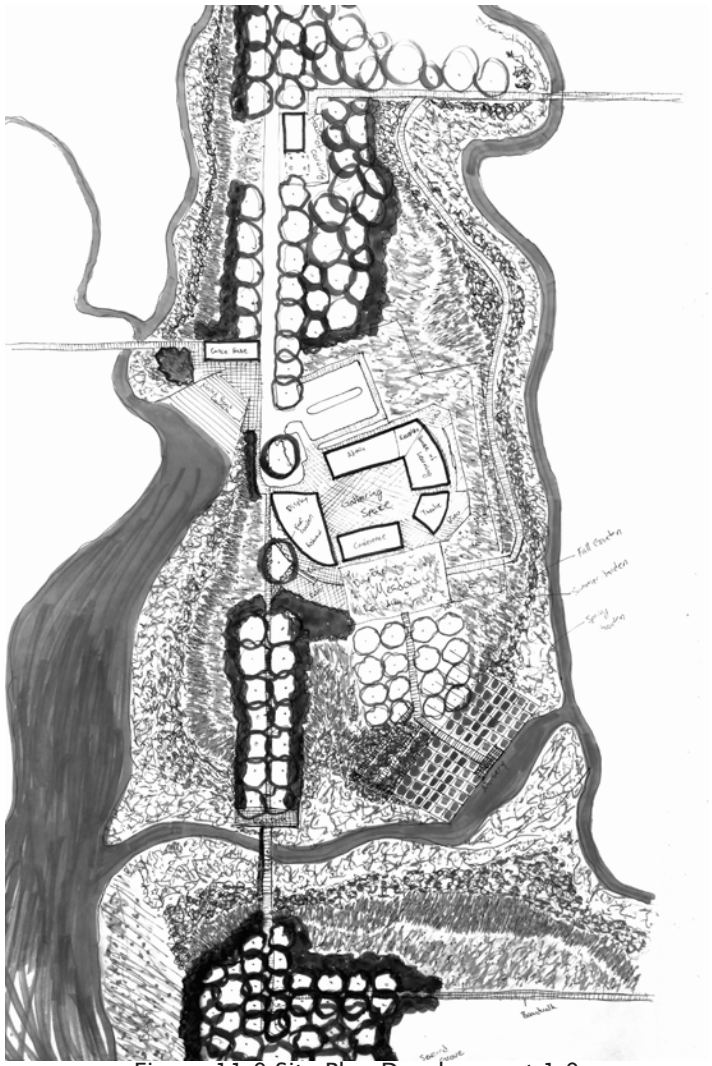


Figure 11.0 Site Plan Development 1.0

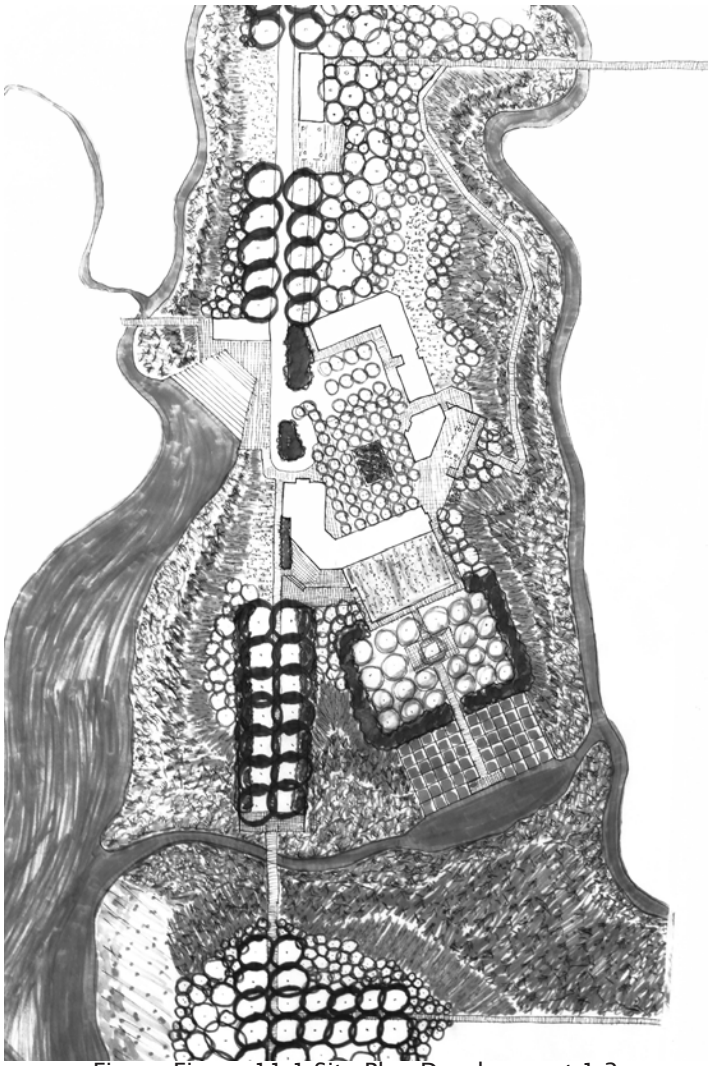


Figure Figure 11.1 Site Plan Development 1.2

DESIGN PROCESS CON'T.

Figure 11.3 Site Plan Development 1.3

Figure 11.4 Site Plan Development 1.4

SKWELWIL'EM ECO-CULTURAL CENTER SITE PLAN (LHASEM VILLAGE COMPLEX)

The Skwilwel'em Eco-Cultural Center- Lhasem Village complex is comprised of 7 conceptual areas defined as the Lhasem Village Gateway, Lhasem Village, Orchard, Garden, Nursery, Interpretive area, and Sacred grove. The design of these areas is based on an axial scheme derived from the four cardinal directions, views to sacred mountains, pedestrian and vehicular circulation.

AXIAL ALIGNMENT

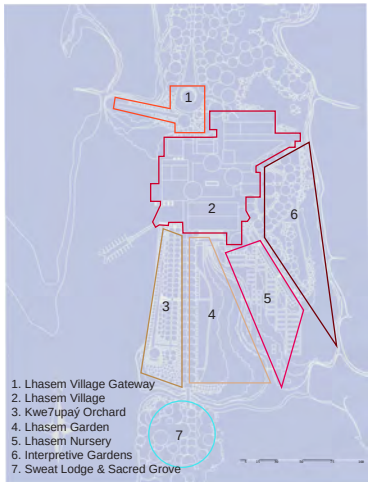
The axial scheme for the design is based on the four cardinal directions North, East, South, and West. Used to define the major circulation routes, building layout, and positioning for the four site totem poles the scheme is based on the traditional importance of the cardinal directions as they are represented within the medicine wheel. As such the four totems are defined as a Northern gateway pole for welcoming terrestrial arrivals, an Eastern pole marking the education district and the alignment to Garabaldi Mt., a Southern pole marking the Sacred grove and sweat lodge, and a Western gateway pole for welcoming marine based arrivals.

VIEWS TO SACRED MOUNTAINS

View corridors were established to the sacred mountains of the Squamish people in relation to the central welcoming plaza and the primary nodes within the site. These were overlaid onto the axial alignments to inform site circulation and promote larger connections to the landscape of Squamish. As in the Schematic Layout these view corridors addressed site lines to the Stawamus Chief, Mamquam Mt., Round Mt., Garabaldi Mt., and Murchison Mt. The view to Garabaldi Mt. and the Stawamus Chief were considered to be the most important and defined both the alignment of the Stawamus Chief boardwalk and the alignment of a site line from the Lhasem Boat Dock through the education district.

Figure 12.0 Site Plan Skwelwil'em Eco-Cultural Center

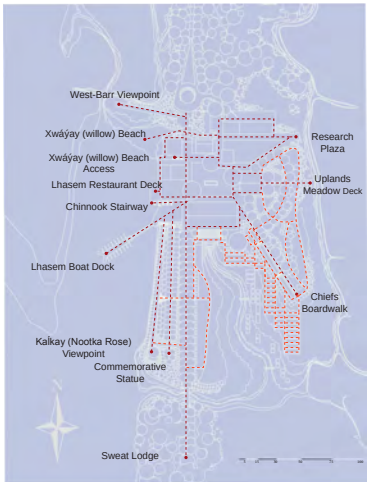
SKWELWIL'EM ECO-CULTURAL CENTER SITE PLAN (LHASEM VILLAGE COMPLEX) CON'T.



SKWELWIL'EM ECO-CULTURAL CENTER AREAS

AXIAL LAYOUT

VIEWS TO SACRED MOUNTAINS



PRIMARY AND SECONDARY PATHS

VEHICLE CIRCULATION

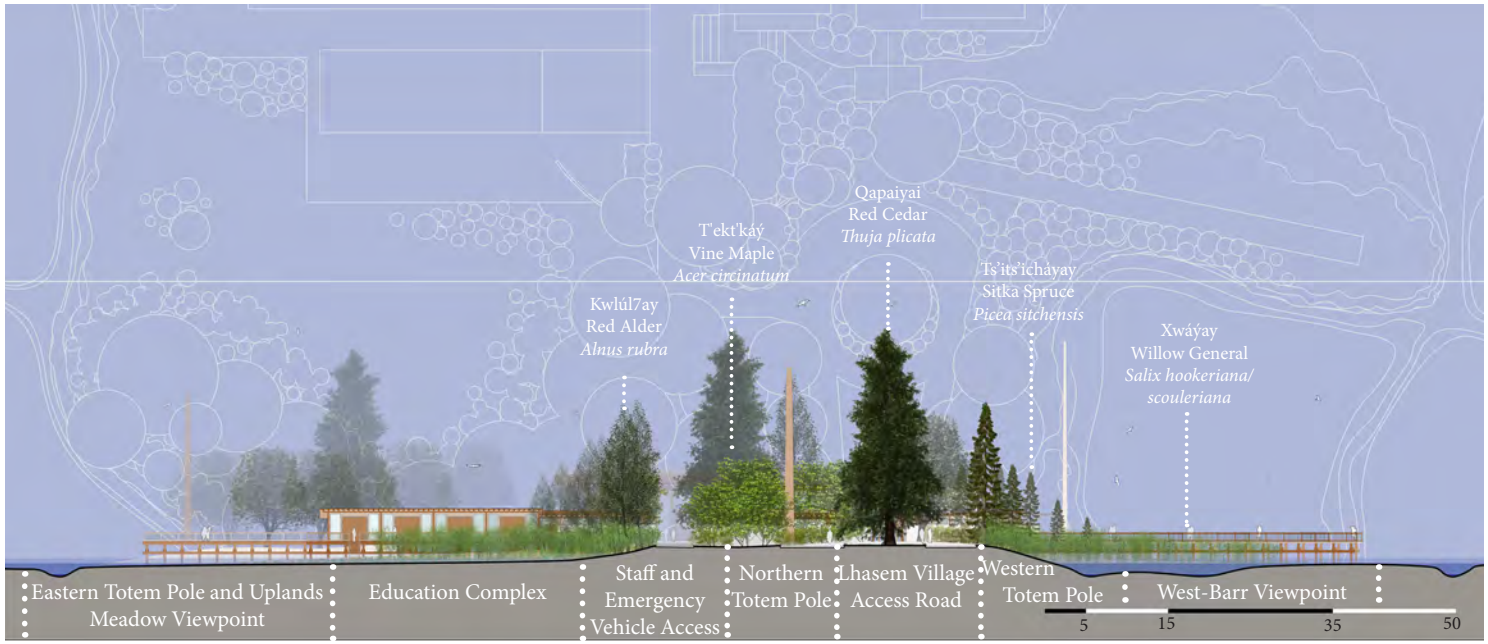


Figure 12.2 and 12.3 (Top) Masterplan Diagrams (Bottom) Lhasem Village Entrance

LHASEM VILLAGE GATEWAY

The Lhasem Village Gateway is conceived of as the primary point of entry into the site. Arriving from the parking area located at Bailey rd. via the Lhasem Village shuttle quests are welcomed to the Village complex by a central interpretive feature honouring the historic importance of the Western Red Cedar. Guests then have the opportunity to proceed out to the West-Barr viewpoint from which they can watch canoes proceed up central channel into the estuary from Howe Sound and into West-Barr Log Sort Bay.

Alternately guests can enter directly into the village complex by passing through the village wall garden, over Xwáýay (willow) Beach Bridge, onto the reception deck, and into the arrival room. From the arrival room guests have direct access to the reception building which house all pertinent visitor information and reception services for registration to classes, lectures, guided tours, and other visitor amenities. The reception building is also the primary location for rest room facilities.

Figure 12.4 Xwáýay (*willow)* Beach

LHASEM VILLAGE GATEWAY CON'T.

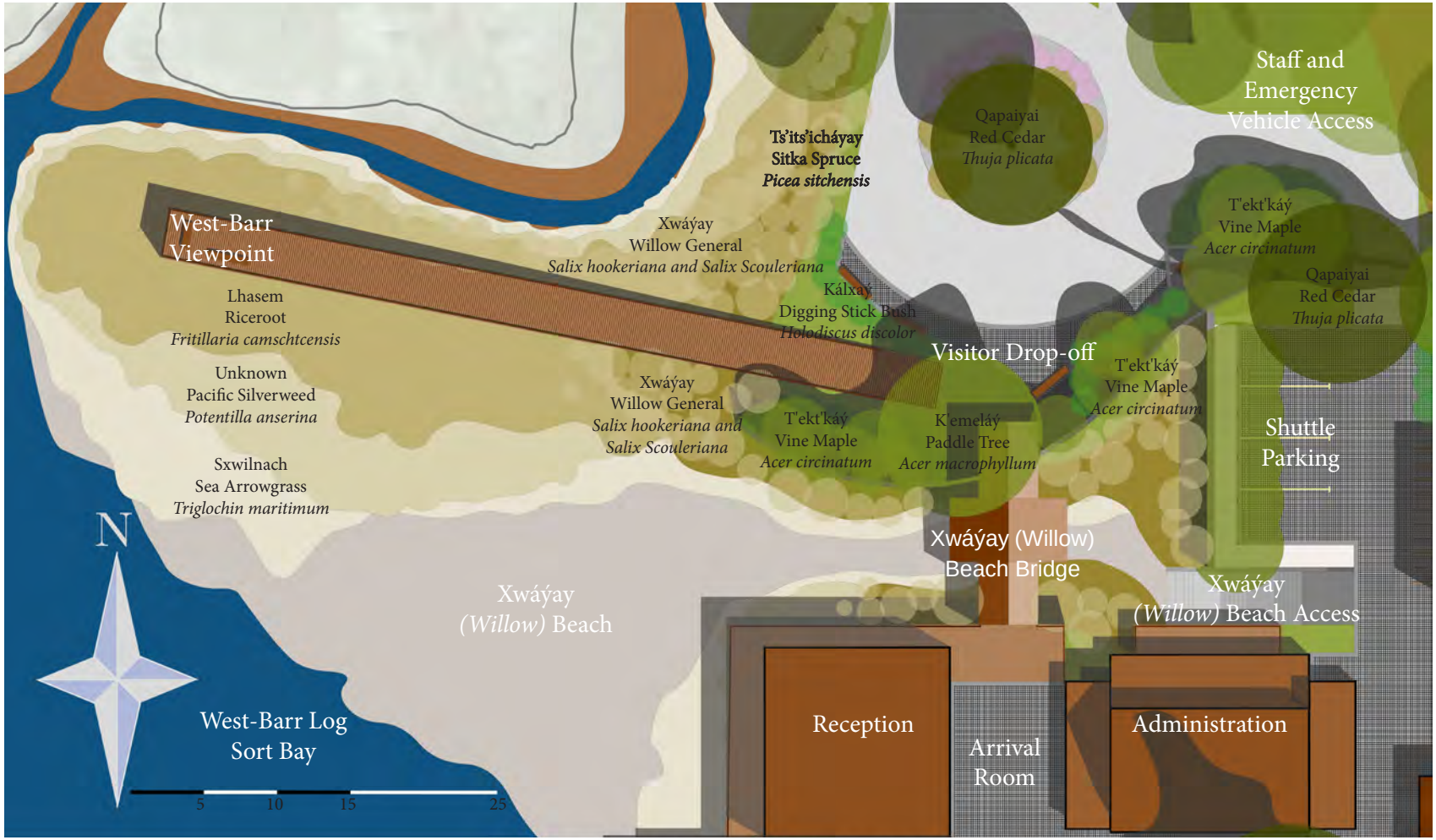


Figure 12.5 Lhasem Village Gateway

LHASEM VILLAGE GATEWAY CON'T.

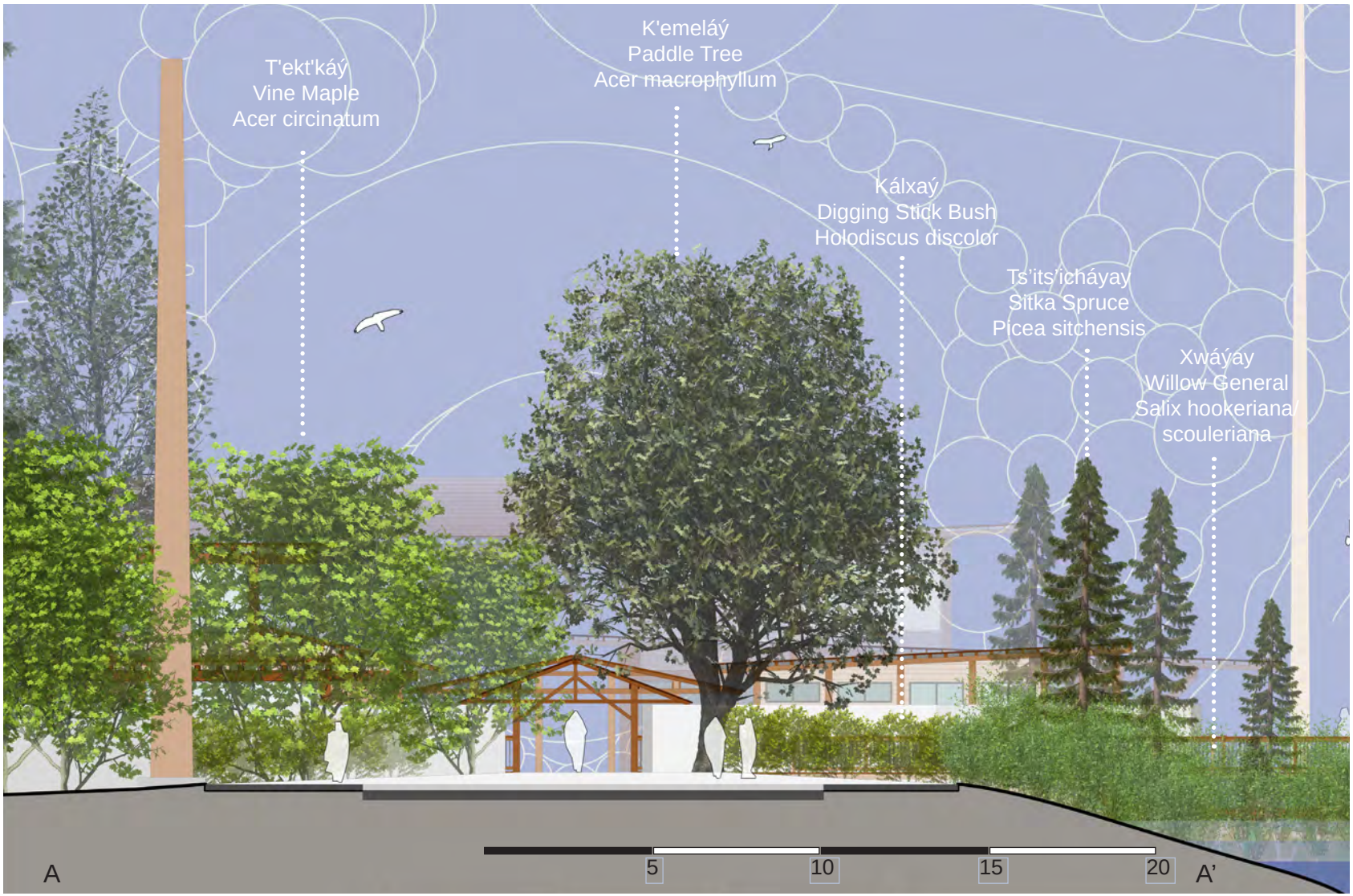


Figure 12.6 Lhasem Village Gateway Village Wall Welcoming Garden

LHASEM VILLAGE GATEWAY CON'T.

Figure 12.7 Lhasem Village Gateway Xwáýay (willow) Beach Bridge

LHASEM VILLAGE

The Lhasem Village complex is organized around Qapaiyai (Western Red Cedar) welcoming plaza, designed in consultation with a member of the Cowichan Tribe. Qapaiyai welcoming plaza is based on clear site lines to West-Barr Log Sort Bay and the Lhasem Boat Dock. Designed to accommodate large ceremonial gatherings such as tribal journeys, the primary point of entry was considered to be Lhasem boat dock. On arriving by canoe visiting tribes ascend onto fishermans dock greeted by the western pole. Proceeding into Qapaiyai welcoming plaza guests face Northeast to Garabaldi Mt. and the eastern pole. Within Qapaiyai plaza a large fir pit designed for the preparation of ceremonial feasts greets visitors. Qapaiyai plaza itself has a clear central space for ceremonial dances around the fire pit while overhangs from the surrounding buildings and cedars provide covered spaces for watching the events. The Grande Hall itself allows for the walls to be opened creating a clear visual connection to the gardens.

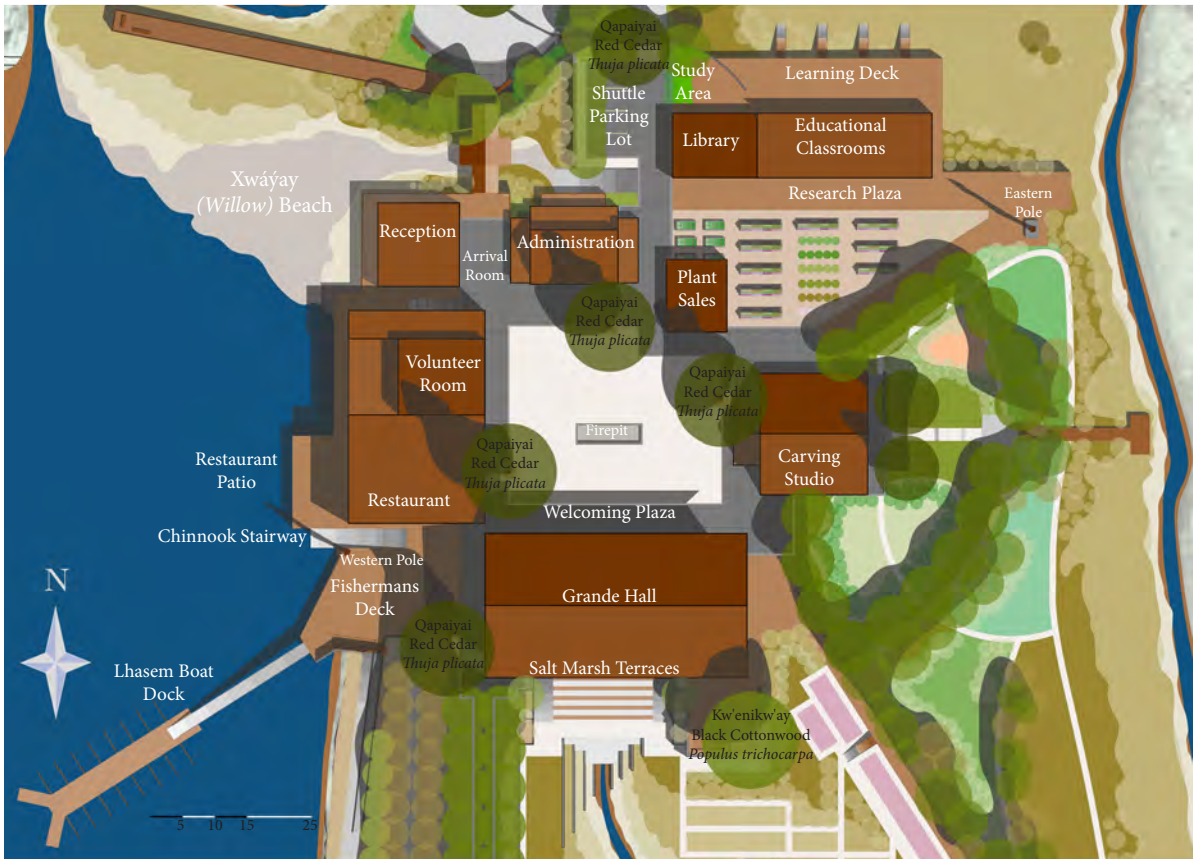


Figure 12.8 Lhasem Village

LHASEM VILLAGE CON'T.

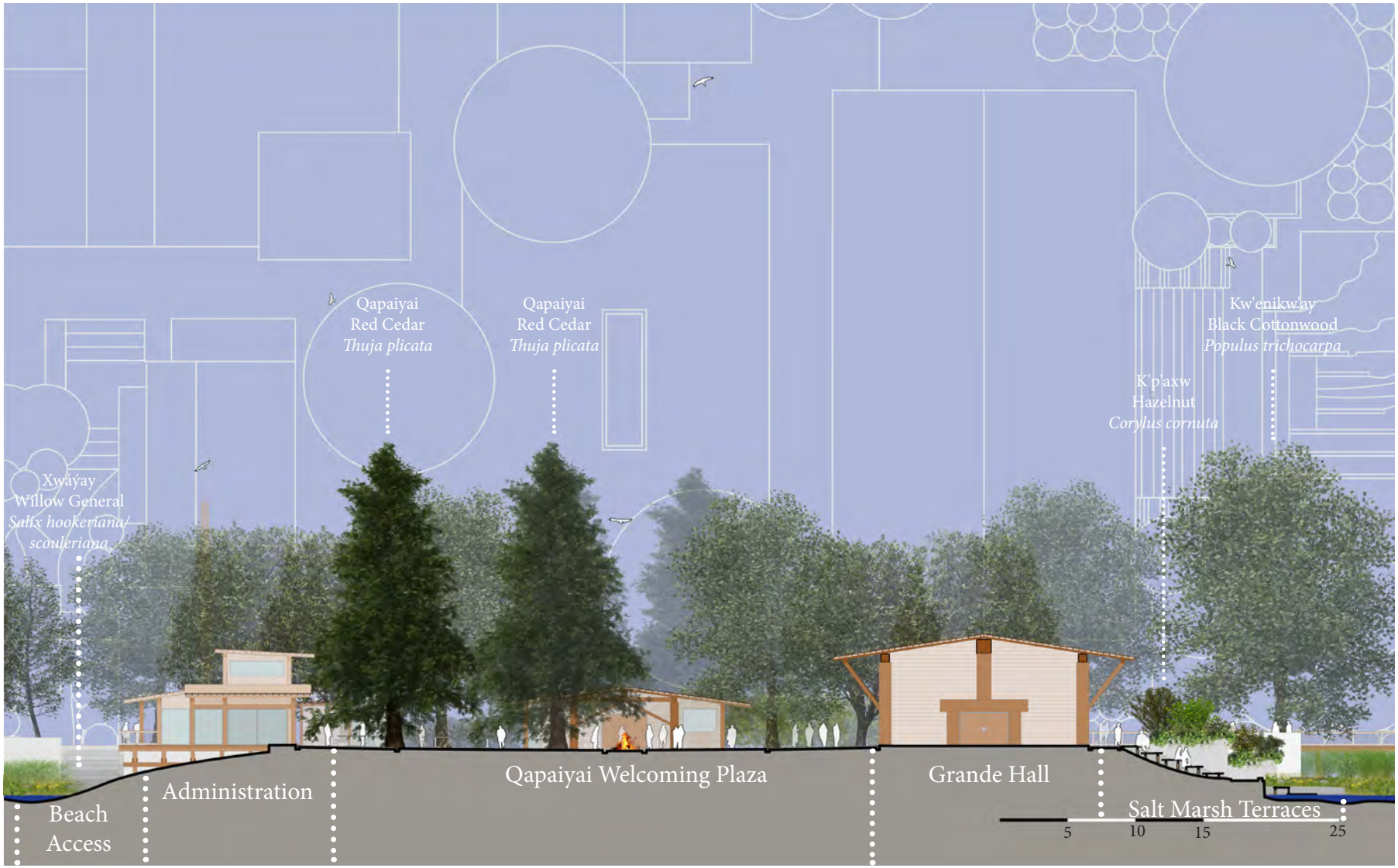


Figure 12.9 Lhasem Village Qapaiyai (Cedar) Welcoming Plaza

LHASEM VILLAGE CON'T.

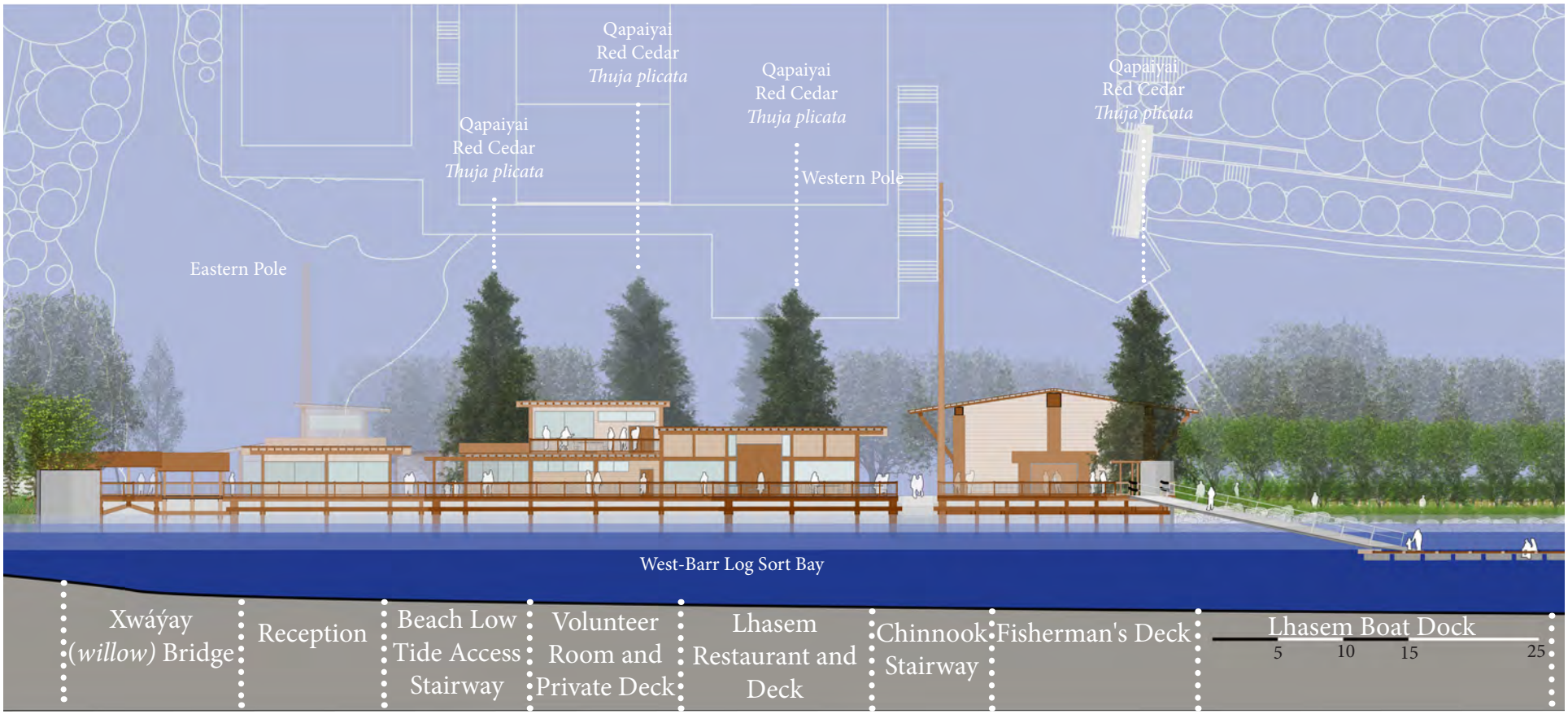


Figure 12.1 Lhasem Village

LHASEM VILLAGE CON'T.

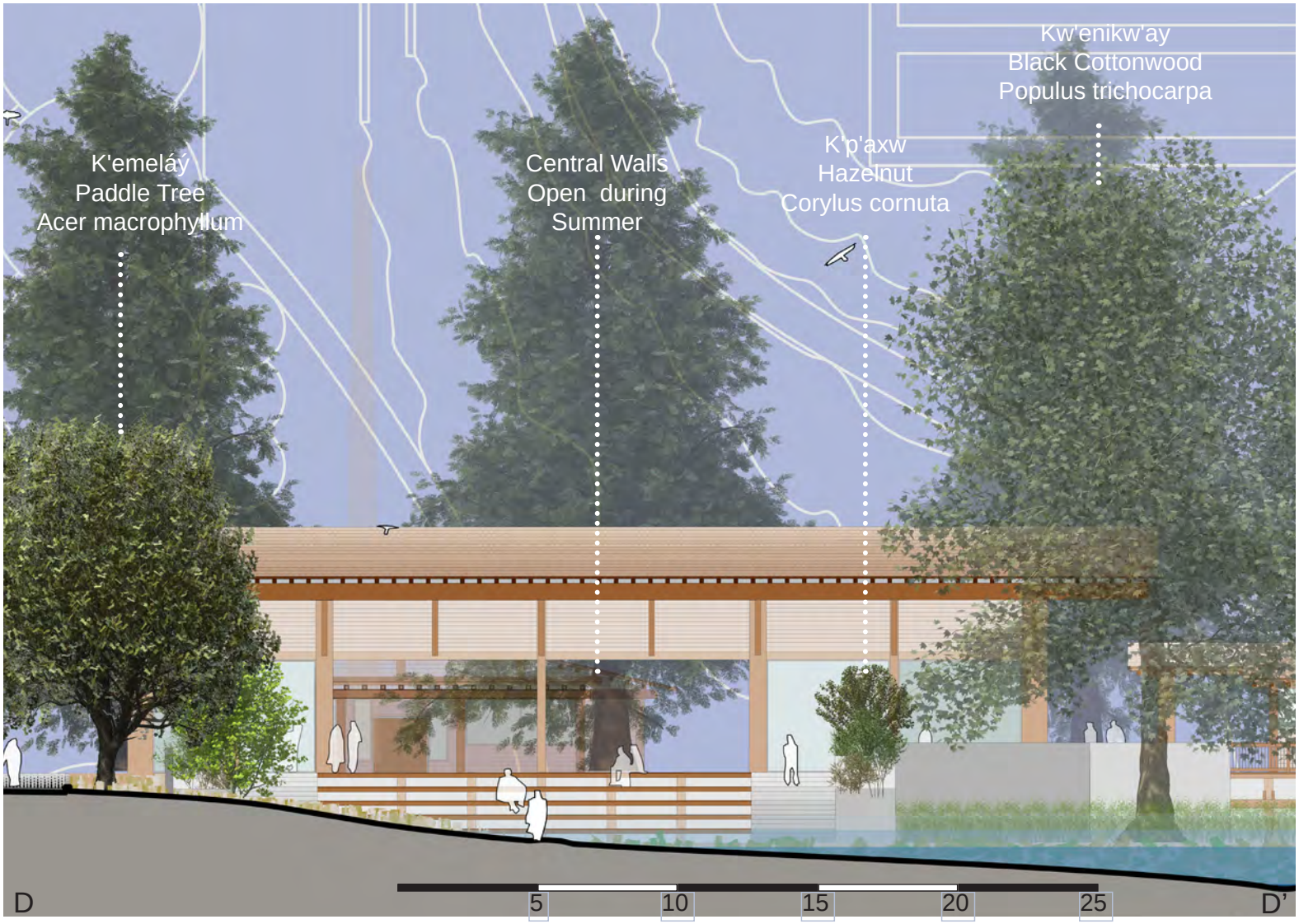


Figure 12.11 Lhasem Village Grande Hall and Learning Terraces

LHASEM VILLAGE ORCHARD, GARDEN, AND NURSERY

Lhasem village orchard, garden, and nursery have a symbiotic relationship with the village complex. Designed for the production of significant species for the Squamish Nation the orchard, garden, and nursery functionally serve to ensure the availability of food plants and plant materials for ceremonial uses. They further serve as a significant resource for Lhasem Restaurant allowing for the production of traditional dishes and contemporary renditions for site visitors.

Site visitors experience the orchard, garden, and nursery primarily from K'emeláý (Paddle Tree) Allee and the Stawamus Chief boardwalk. K'emeláý Allee runs as the axial backbone of the site connecting the arrival journey into the Sacred grove and terminating at the sweat lodge. Visitors enter a dense planting of Big Leaf Maple which create a closed canopy while layers of Salmon Berry and Vine Maple serve to screen the larger landscape. Perpendicular paths draw visitors down into the orchard or garden allowing glimpses to West-Barr Log Sort Bay or the gardens tidal channel. Meant as a spiritual journey K'emeláý Allee becomes an introverted space meant to be self-reflective. Alternately the Stawamus Chief boardwalk is designed to be extroverted connecting to the larger landscape and providing broader views of the estuary and bordering mountains. Stairwells allows visitors to descend down into the nursery and explore the propagation of estuarine species. A distinct change in material on these stairwells marks the extreme high water mark of the estuary.

Planting for the Orchard, Garden, and Nursery was derived from transects of existing traditional plants within the estuary. While the path network is based on the necessitated hydrologic conditions for these plants. Primary and secondary paths thusly exist at higher elevations while ephemeral dirt paths would be established to access particular crops as needed.

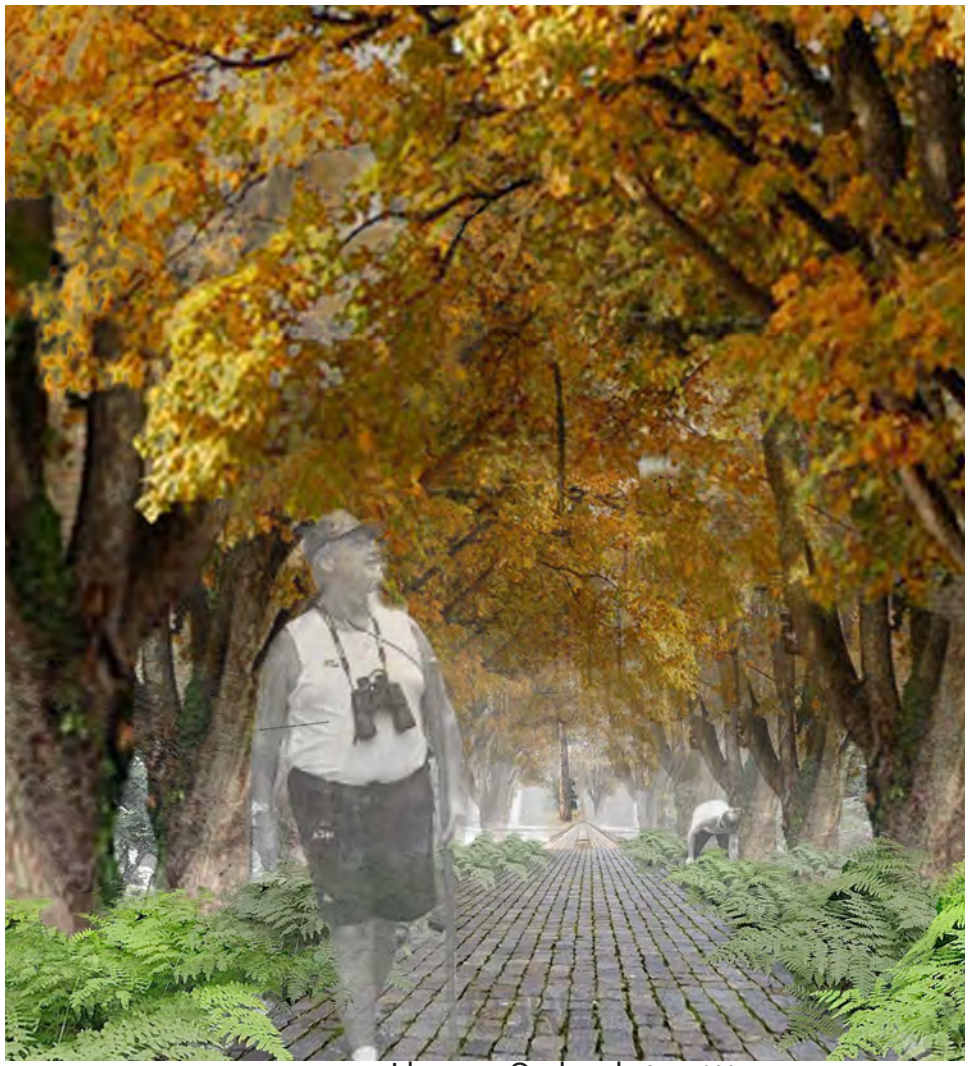


Figure 12.12 Lhasem Orchard K'emeláý (Paddle Tree) Allee

LHASEM VILLAGE ORCHARD, GARDEN, AND NURSERY CON'T.

Figure 12.13 Lhasem Village Orchard, Garden, and Nursery

LHASEM VILLAGE ORCHARD, GARDEN, AND NURSERY CON'T.

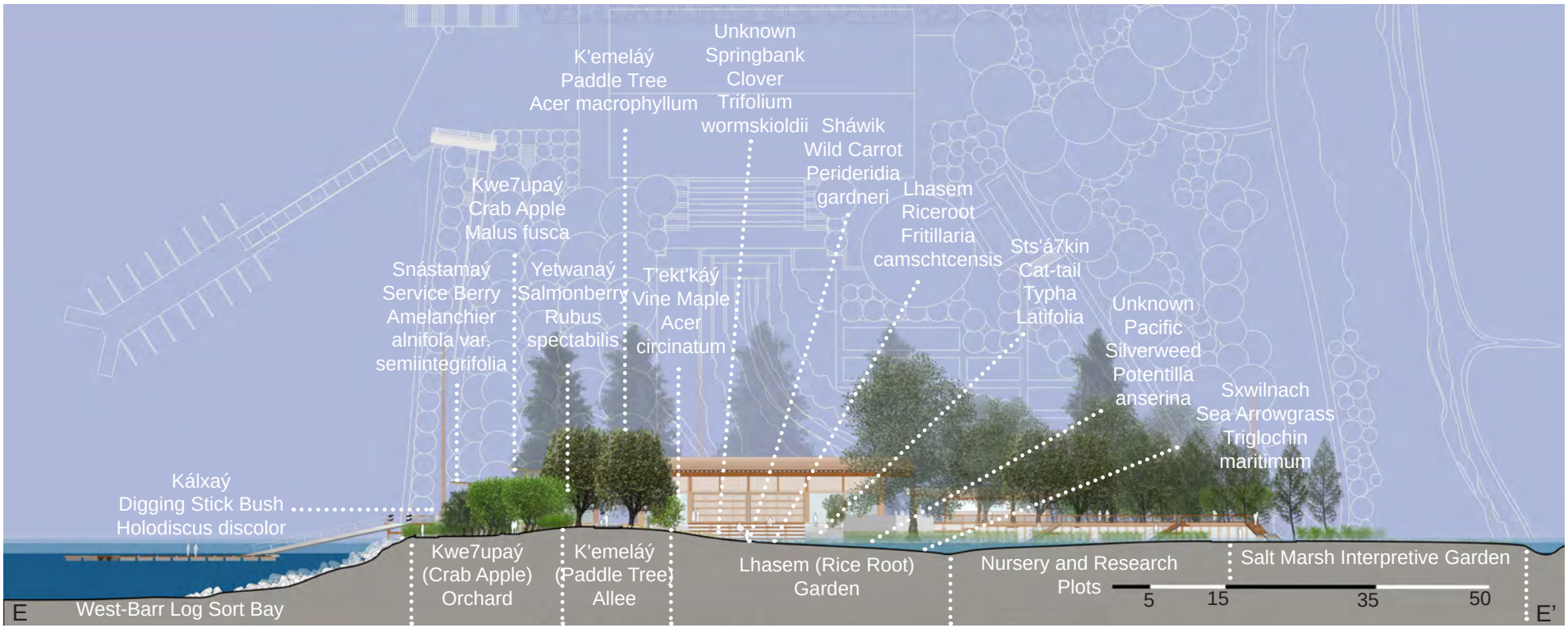


Figure 12.14 Kwe7upaý Orchard, Lhasem Garden, and Lhasem Nursery

LHASEM VILLAGE ORCHARD, GARDEN, AND NURSERY CON'T.

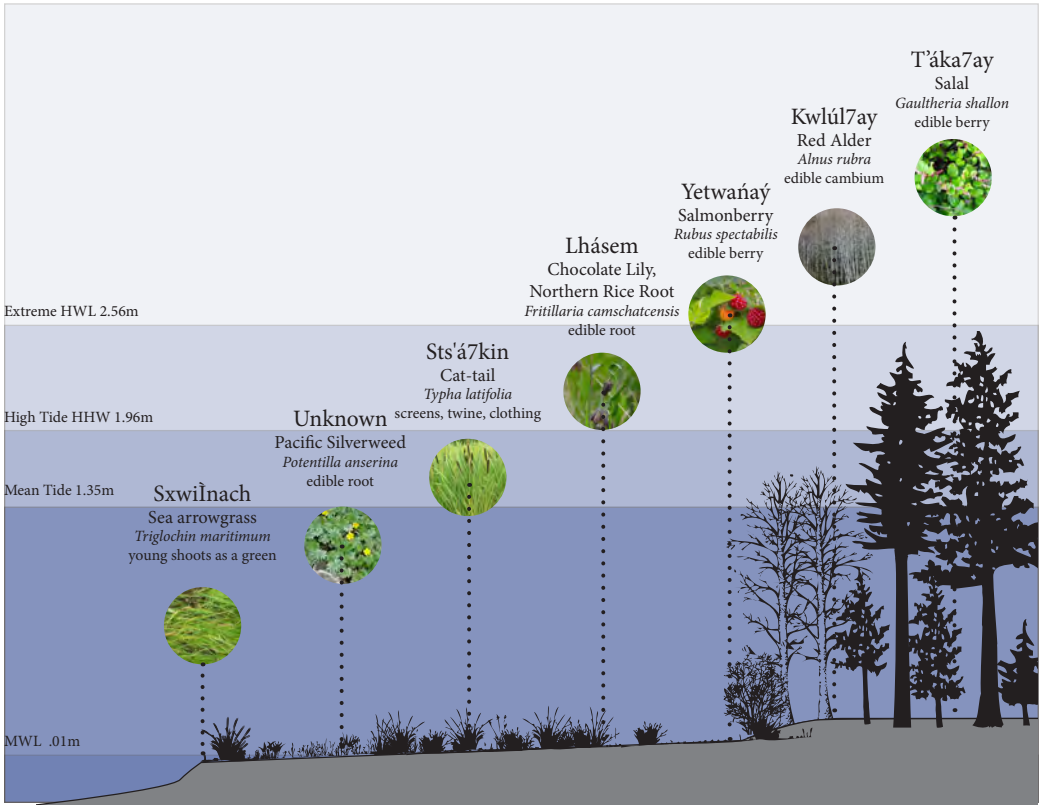


Figure 12.15 Idealized transect of existing traditional plant distribution.

Figure 12.16 Lhasem Village Site Hydrology

LHASEM VILLAGE INTERPRETIVE GARDENS

The Lhasem Village Interpretive Gardens are conceived of as an educational and research resource for the exploration of traditional plant management techniques. Designed as a series of unique landscape rooms the interpretive gardens allow for self-guided walks by visitors to Lhasem Village as well as being an actively managed landscape used by the education department to conduct research into the ecological value and best management practices of estuarine and forest plant communities.

The upper forest communities are located within an open canopy of Big Leaf Maple and Cottonwood focusing on the production of berries, roots, medicinal, and spiritually significant plant species. While the lower communities separated by a red alder, crab apple, and willow shrub thicket are devoted to estuarine roots, basket grasses, and general salt tolerant meadow species.

Visitors enter the interpretive gardens either via the Stawamus Chief boardwalk or from the carving studio. The carving studio access acts as the primary point of departure aligned to Mamquam Mt. on an eastern alignment. As visitors descend into the uplands meadow garden they experience a thinning of the forest environment into the flat terraces of the tide dominant salt marsh. On arriving at the uplands meadow deck visitors then have the opportunity to experience the recently restored intertidal channel. From this axial path visitors can also follow any of the gardens gently curving paths which draw the viewer into each unique room. Interpretive signage and digital apps explain the management techniques and general plant information to visitors. While ongoing scheduled demonstrations provide opportunities for a more engaging experience and opportunity to learn some of these techniques.

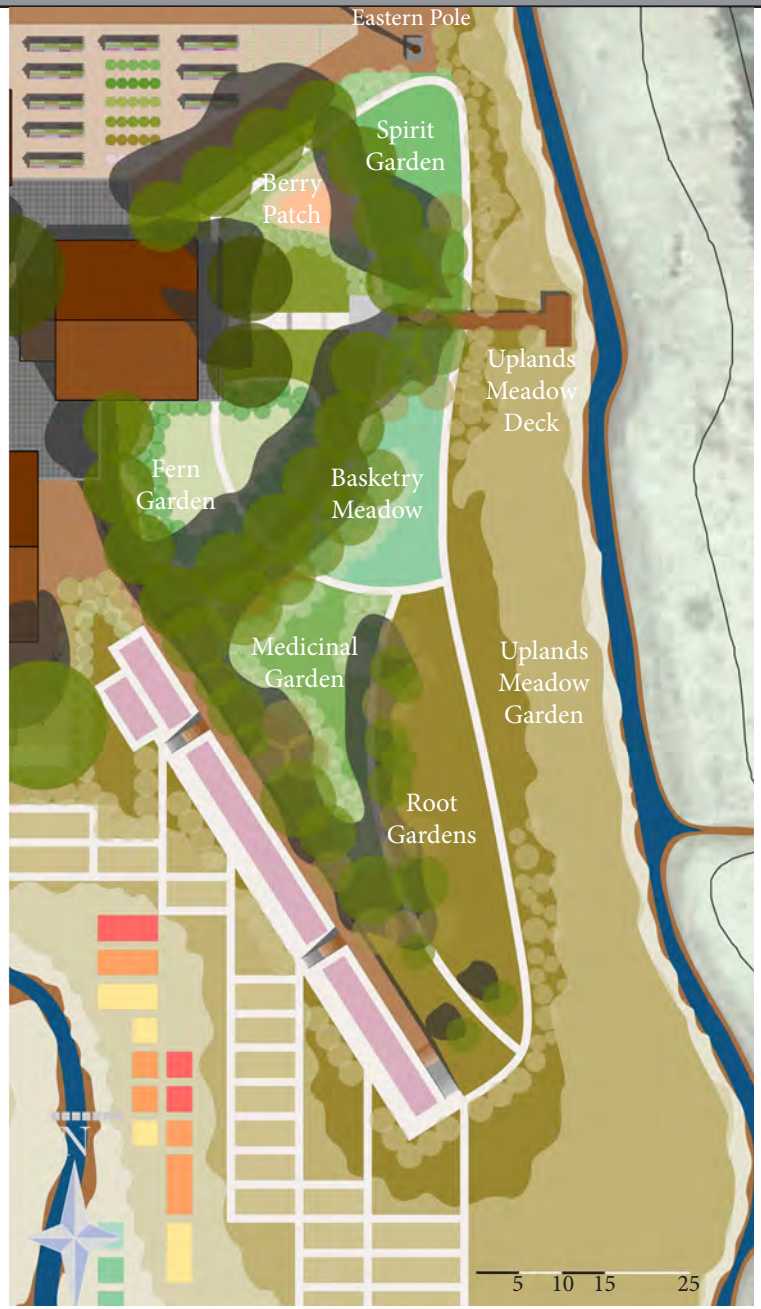


Figure 12.17 Lhasem Interpretive Gardens

LHASEM VILLAGE INTERPRETIVE GARDENS CON'T.

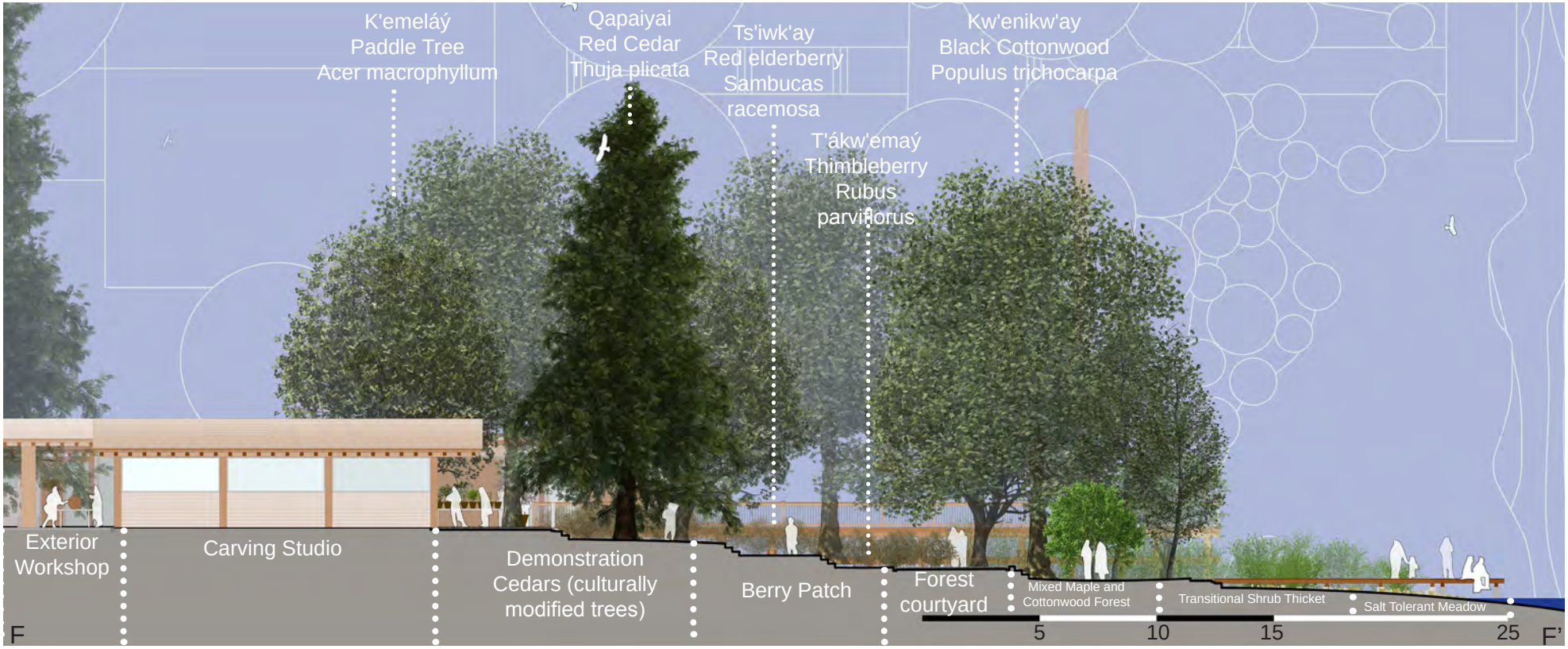
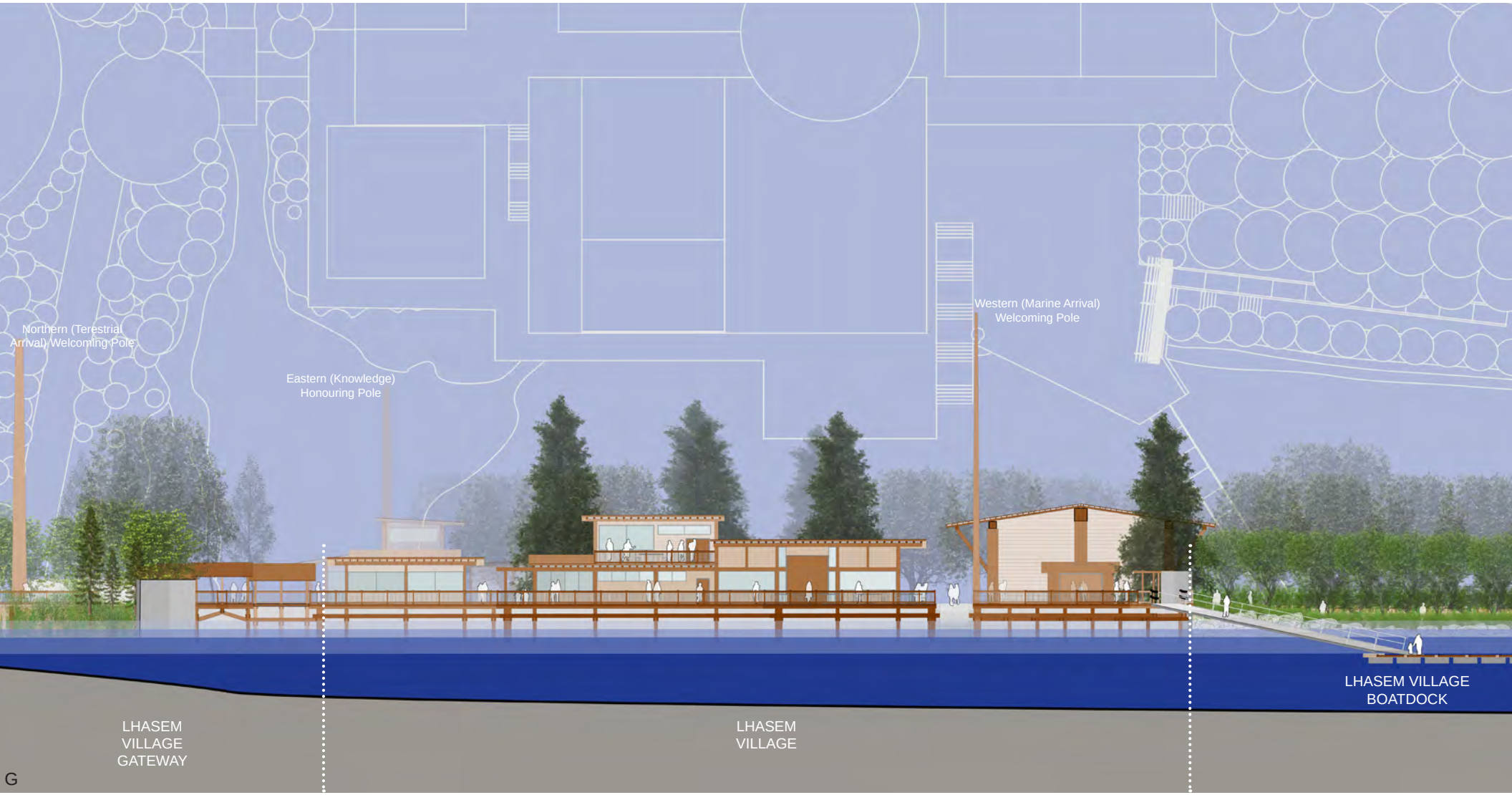


Figure 12.18 Interpretive Gardens Transect

LHASEM VILLAGE ELEVATION



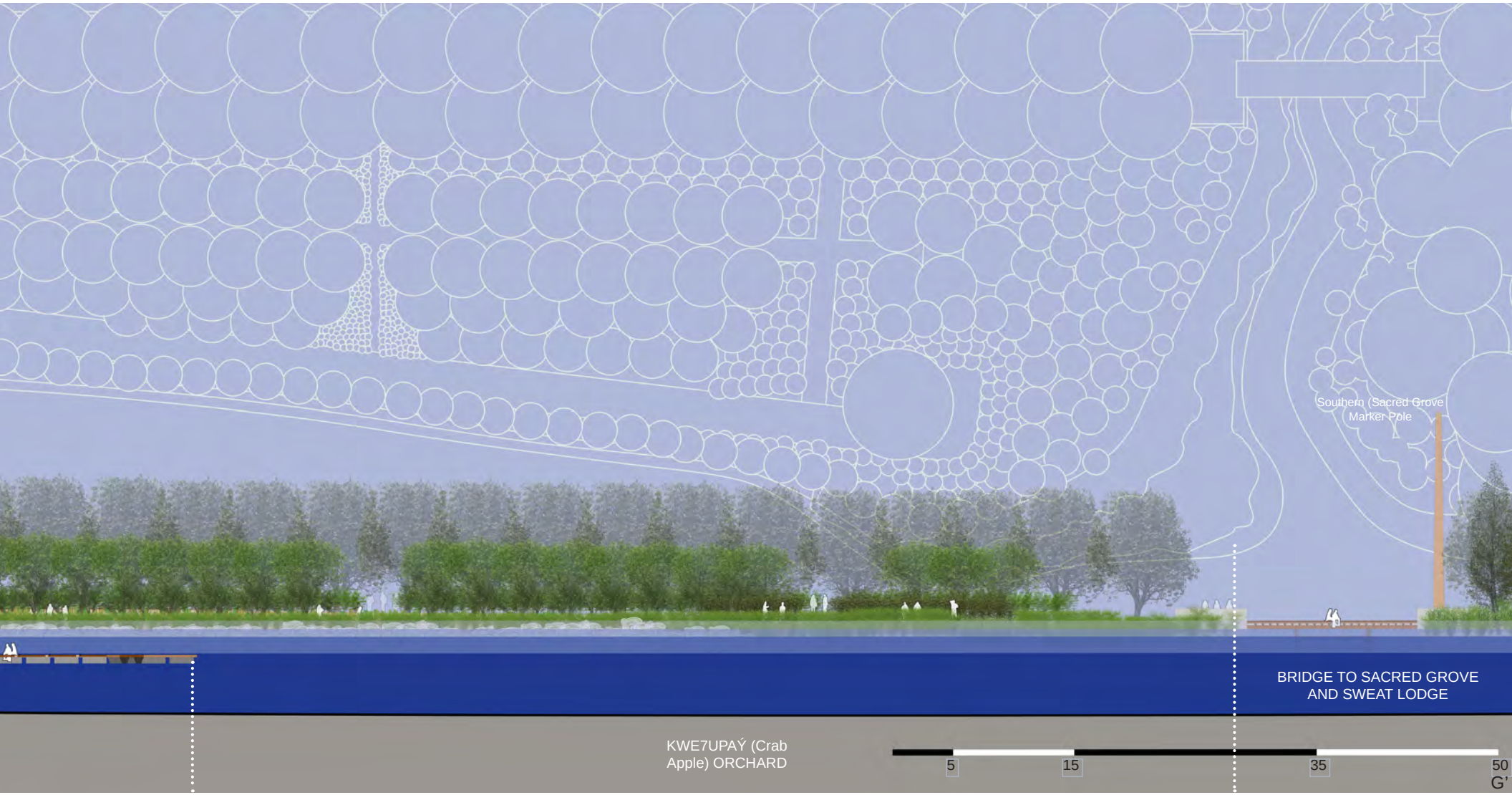


Figure 12.19 Western Elevation Skwelwil'em Eco-Cultural Center

APPENDIX & BIBLIOGRAPHY

APPENDIX


Northern Rice Root

Squamish Plant Foods and Plant Technologies

Squamish Name	Latin and Common Name	Usage	Use	Location	Harvested
Lhásem	Fritillaria camschatcensis, Chocolate Lily, Northern Rice Root	Cultivated wild species	Food	Between the high marsh and salt tolerant meadow above the line of peak tides and floods	Summer May-July
Sx̱wiÍnach	Triglochin maritimum, Sea Arrowgrass	Systemic and intensive	Food	Tidal Flats	Spring March-May
ts'áx̱i7	Calamagrostis canadensis, Bluejoint reedgrass	Systemic and intensive	Basketry	Wet Meadows, open woods, and streambanks	Spring May-June

Kw'úḵwiḵw	XXXXX, Sea Wrack	Opportunistic and Incidental	Deodorant	XXXXX	XXXX
Kw'uṁ	XXX, Bull Kelp	Systemic and intensive	Twine/Rope	XXX	XXX
Sḵw'úmay	Bull Kelp Blades				
Te sḵ'ō'mai	Bull Kelp Leaves				
Lhéḵ'es	XXXX, Red Laver	Opportunistic and Incidental	Food	XXX	XXX
mimts'	XXXXX, Old Man's Beard	Opportunistic and Incidental	Medicinal	Grows on the Sitka Willow	All Year
Unknown	XXXXX, Lung Lichen	Opportunistic and Incidental	Medicinal	Grows on the bark of the Grand Fir	All Year
Tseḵwlh Caq°λ	XXXXX, Indian Paint Fungus	Systemic and intensive	Medicinal and Pigment	Grows on White Pine	All Year

Sḵ’étl’ḵ’etl’ Tawx̱-tu-a’laqap	XXXX, Bracket Fungi	Opportunistic and Incidental	Spiritual and abrasive	XXXXX	All Year
Máḵwan	XXXXX General Mosses/Sphagnum Moss	Systemic and intensive	Toiletry, bedding, and Medicinal	XXXX	All Year
Sx̱eṁx̱em	Equisetum telmateia/ E. hiemale, Horsetail	Systemic and intensive	Basketry and Abrasive	XXXXX	Summer May-October
S-x̆ə’m-x̆m	Equisetum arvense, Horsetail	Systemic and Intensive	Food	XXXX	Spring March-May
X̱ank̲	XXXX, Lady Fern	Management and Husbandry	Food and cleansing	XXXXX	Spring March-May
Pála pála	XXXXX, Deer Fern	Opportunistic and Incidental	Medicinal and game	XXXXX	XXXXX
Tl’esiƥ	XXXXX, Licorice Fern	XXXXX	Medicinal and spiritual	XXXX	XXXX
Tsx̱álem	XXXXX, Sword Fern	Systemic and intensive	Food, spiritual, and cover	XXXX	XXXX

Sqō̲tluk	XXXXXXX, Bracken Fern	Management and Husbandry	Food and medicinal	XXXXX	XXXXX
Sqō̲’tlak̲	Bracken Fern Rhizome				
Sk̲awítselh	XXXXX, Wapato, arrow-head, indian swamp potato, and arrow leaf	Cultivated wild species	Food	Significant trade item acquired from the Fraser RIver Valley	Fall October-November
Qoq’ō̲’les	Wapato- Edible Root				
Ch’úukw’a	XXXXXXX, Skunk Cabbage	Opportunistic and Incidental	Medicinal	XXXX	XXXX
WeÍ	XXXXX, Tule	Systemic and intensive	Mats	XXXX	Summer/Fall August-November
Shách’els	Scirpos microcarpus, Cut Grass	Opportunistic and Incidental	Medicinal	XXXX	XXXX
Tl’e̲tl’	Phragmites commonis, Common Reedgrass	Systemic and intensive	Basketry	XXXXX	XXXXXX

Ḵweláwa	Allium cernuum, Nodding Onion	Management and Husbandry	Food	XXX	XXXX
Ḵulā'wa	Nodding Onion- Edible Rhizome				
Spánanexw	XXXXX Blue Camas	Cultivated Wild Species	Food	Wet Meadows to dry meadows	Summer May-August
Pepsená7	XXXXX, Wild Lily of the Valley	Opportunistic and Incidental	Food	XXXXX	XXXX
Ḵwnalhp	Veratrum viride, Indian hellebore	Systemic and intensive	Medicinal	XXXXX	XXXX
Unknown	Streptopus amplexifolius, Twisted Stalk	No Uses Known	Nuisance	XXXXX	XXXXX
Ḵ'elhmáy	Chamaecyparis nootkatensis, Yellow Cedar	Systemic and intensive	Tools	Montane Forest	All Year
Kwéxwmay	Abies amabilis, White Fir	Systemic and intensive	Medicinal and flooring	XXXXX	All Year

Qapaiyai	Thuja plicata, Red Cedar	Management and Husbandry	Food, shelter, tools, fuel, medicinal, spiritual, clothing, basketry, bathing, and flooring.	Wet Forest	All Year
X̱ápay̓ay	Standing Red Cedar				XXXXX
X̱̆a’p-a̱i̱ʔ-a̱i̱	Young Red Cedar				XXXXX
X̱pay̓	Red Cedar Wood				XXXXX
T’áyamay̓	First Growth Red Cedar				XXXXX
T’á’yamai	Red Cedar Leaves				XXXX
Súkw’em	Red Cedar Outer Bark				XXXXX
Sléwey̓	Red Cedar Inner Bark				XXXXXX

T’ú7xwaȳ	XXXXX, Grand Fir, Balsam Fir	Opportunistic and Incidental	Medicinal	XXXX	XXXXX
Ts’its’icháyaȳ	XXXXX, Sitka Spruce	Systemic and intensive	Medicinal, spiritual, bathing, and bedding	XXXXX	XXXX
Tsutzē̲tcai’ē	Sitka Spruce Boughs				XXXXX
Ts’aẏts’ayk̲ay	XXXXXXX, White Pine	Opportunistic and Incidental	Medicinal	XXXXXX	XXXXX
K̲wáẏtsay	XXXXX, Western Hemlock	Systemic and intensive	Medicinal and Spiritual	XXXXX	All Year
X̲we7ítaȳ	XXXXX, Western Yew	Management and Husbandry	Tools and medicinal	XXXX	XXXXX
X°Əʔitaiʔ	Western Yew Hardwood				
Ták̲a7lh	XXXX, Brome Grass	No Uses Known	Nuisance	XXXX	

Ch'say̓	XXXXX, Douglas Fir	Management and Husbandry	Fuel, tools, medicinal, and spiritual.	XXXXX	XXXX
Ílilay	Douglas Fir Sapling		Tools		XXXX
K̲wek̲wel-háy̓	Douglas Fir Second Growth- Young		Tools, fuel, medicinal, and spiritual		XXXXX
Slay̓	Douglas Fir Bark		Fuel		XXXXX
Ts'i7ch	Douglas Fir- Rotted Powder		Fuel and Medicinal		XXXXX
Unknown	Xerophyllum tenax, Bear Grass	Systemic and intensive	Basketry	Obtained by trade from Washington State, USA.	XXXX
Sts'á7k̲in	Typha latifolia, Cat-tail	Management and Husbandry	Twine, clothins, and shelter	XXXXX	XXXXX
Unknown	Goodyera oblongifolia, Rattlesnake plantain	Opportunistic and Incidental	Medicinal	XXXX	XXXXXX

Lhamáy	Phyllospadix scouleri or Phyllospadix torreyi, Surf grass, Sea-grass	Systemic and Intensive	Food	XXXXX	XXXXX
Chélem	Zostera marina, Eelgrass	Systemic and intensive	Food	XXXXX	XXXXX
T'ekt'káy	Acer circinatum, Vine Maple	Systemic and intensive	Tools and medicinal	XXXX	XXXXX
K'emeláy	Acer macrophyllum, Broad-leaved Maple, Paddle Tree	Management and Husbandry	Medicinal, fuel, and tools	XXXX	All Year
Yúla7	Heracleum lanatum, Cow Parsnip, Indian Rhubarb	Systemic and intensive	Food	XXXX	Spring May
Kexmín	Lomatium nudicaule, Indian Consumption Plant	Opportunistic and Incidental	Medicinal and spiritual	XXX	XXXXX
Kus'minq	Indian Consumption Plant Root				XXXX
Tákˌa7lh	Osmorhiza chilensis, Sweet Cicely	No Known Use	Nuisance	XXXX	

Sháwiḵ	Perideridia gardneri, Wild Caraway, Wild Carrot	Cultivated Wild Species	Food and spiritual	XXXXX	Summer July-August (marked) Spring February-March (Harvested)
Si:ikw	Apocynum cannabinum, Indian Hemp	Systemic and intensive	Twine	Obtained by trade from Fraser River Valley, Yale, BC.	Summer July
Si7́semachxw	Achillea millefolium, Yarrow	Opportunistic and Incidental	Medicinal	XXXX	xxxx
Iy7iýu7ts	Cirsium brevistylum, Indian Thistle	Opportunistic and Incidental	Spiritual	XXXX	XXXX
Lheḵ'lhḵ'aťachxw	Indian Thistle first year basal leaf rosette				XXXXXX
Ch'átiyay̓	Oplopanax horridum, Devils Club	Systemic and intensive	Medicinal and pigment	XXXXx	XXXXX
Xe̱t'tánay	Asarum caudatum, Wild Ginger	Opportunistic and Incidental	Medicinal	XXXX	XXXXX
Kwlúl7ay	Alnus rubra, Red Alder	Management and Husbandry	Tools, food, pigment, medicinal, spiritual, and fuel	XXXX	All Year Spring February-May (Eaten)

Séliyáy	Berberis aquifolium or Berberis nervosa, Oregon Grape	Management and Husbandry	Food and medicinal	XXXXX	XXXXX
Seliy	Berberis nervosa Berries				XXXXX
K̲welhi7n	Betula occidentalis, Western Birch	Systemic and intensive	Twine	XXXXX	XXXXX
K̲’p’ax̲w	Corylus cornuta, Hazelnut	Opportunistic and Incidental	Food	XXXX	Fall October-December
Sxwelawú7	Brassica campestris, Garden Turnip	Cultivated Domestic Species	Food	An introduced species from Europe which was heavily cultivated in the late 1800’s-1900’s	XXXXX
Kítu7 tl’a stéwak̲in	Lonicera ciliosa, Orange Honeysuckle	Opportunistic and Incidental	Spiritual	XXXXX	
Titinústenay	Lonicera involucrata, Black Twinberry	Opportunistic and Incidental	Medicinal	XXXX	XXXXXX
Sk̲w’ilk̲w’elem tl’a elk̲ay	Black Twinberry Berry				XXXX

Ts’iwḵ’ay	Sambucas racemosa, Red Elderberry	Cultivated wild species	Food, medicinal, and tools	XXXXX	All Year
Sts’iwḵ’	Red Elderberry Berry				Spring April
Ts’exwts’exwáy’	Symphocarpos albus, Snowberry, Waxberry	Opportunistic and Incidental	Medicinal, tools, and washing	XXXXX	All year
Ts’éxwts’exw	Snowberry Berry				XXXXX
Kwú7kwuwelsay’	Viburnum edule, High-bush Cranberry	Opportunistic and Incidental	Food	XXXXX	XXXX
Kwú7kwuwels	High-bush Cranberry Berry				
Xwusumay’	Shepherdia canadensis, Soapberry	Systemic and intensive	Food	Obtained by trade from Lillooet.	XXXX
Sxwusum	Soapberry Berry				

Unknown	Cornus canadensis, Bunchberry	XXX	XXXX	XXXX	XXXXX
L’ə̌l’na̱’tc	Bunchberry Flower	XXXXX	XXXX		XXXXX
Tlə̱tlna̱’tc	Bunchberry Berry	Systemic and intensive	Food		XXXX
Lhúlhuk̲w’ay	Arbutus menziesii, Arbutus	Systemic and Intensive	Medicinal and spiritual	XXXXX	All Year
Tl’iḱw’enay̓	Arctostaphylos uva-ursi, Kinnikinnick	Opportunistic and Incidental	Food and Smoking	XXXXX	XXXX
Tl’iḱw’en	Kinnikinnick Berry				
Iy̓álk̲pay̓	Vaccinium alaskaense, Alaska Blueberry	Management and Husbandry	Food	Coastal Coniferous Forests	Fall September-October
Iy̓álk̲p	Alaska Blueberry Berry				

T'áḵa7ay	Gaultheria shallon, Salal	Cultivated wild species	Food and medicinal	XXXX	XXXXX
T'áḵa7	Salal Berry				Late Summer August-September
Tem-t'áḵa7	Time of the Salal Berry				
Máḵwam	Ledum groenlandicum, Labrador Tea	Systemic and Intensive	Food, Beverage, and medicinal	XXXX	XXXXX
Ú sa7ay	Vaccinium membranaceum, Mountain Bilberry	Systemic and intensive	Food	Montane Forests	XXXX
Úsa7	Mountain Bilberry Berry				XXXXX
Lhewḵímay	Vaccinium myrtilloides, Canada Blueberry	Management and Husbandry	Food	Found with V. uliginosum and V. oxycoccus in sphagnum bogs	XXXX
Lhewḵím	Canada Blueberry Berry				

Xwix́wikw'ay	Vaccinium ovalifolium, Oval-leaved Blueberry	Management and Husbandry	Medicinal and Food	Coastal Coniferous Forests	XXXX
Xwix́wikw'	Oval-leaved Blueberry Berry		Food		XXXXX
K̲wemchúl̓say	Vaccinium oxycoccus, Bog Cranberry	Management and Husbandry	Food	Found with V. uliginosum and V. myrtilloides in sphagnum bogs	Fall September-December
K̲wemchúl̓s	Bog Cranberry Berry				
Sk̲w'ek̲wchsáy̓	Vaccinium parvifolium, Red Huckleberry	Management and Husbandry	Medicinal and food	Tidal Flats	All Year
Sk̲w'ek̲wchs	Red Huckleberry Berry		Food		Summer July-August
Múl̓semay̓	Vaccinium uliginosum, Bog Blueberry	Management and Husbandry	Food	Found with V. mystilloides and V. oxycoccus in sphagnum bogs	XXXX
Múl̓sem	Bog Blueberry Berry				

P’aats’ay	Ribes bracteosum, Stink Currant	Opportunistic and Incidental	Food	XXXXX	Fall September-December
Sp’aats’	Stink Currant Berry				
T’emxwáy	Ribes divaricatum, Common Wild Gooseberry	Manaagement and Husbandry	Food and medicinal	XXXX	All Year
T’emxw	Common Wild Gooseberry Berry		Food		XXXX
Ilhtenáy	Ribes lacustre, Swamp Gooseberry (Mature Shrub)	Management and Husbandry	Food	The two growth stages of this plant are found growing together. Considered to be cousins.	XXXXX
Kelíplhkay’	Swamp Gooseberry First Growth Stage		No Uses		
Kwílayusay	Ribes sanguineum, Red-flowering Currant	Opportunistic and Incidental	Food and medicinal	XXXX	All Year
Kwílayus	Red-flowering Currant Berry		Food		Fall October-December (Last to produce Berries)

X̲ach't	Epilobium angustifolium, Fireweed	Systemic and Intensive	Food and Cloth	XXXX	Spring February-May (Young Shoots- Food) Summer June-September (Seeds- Cloth)
Slhí7lhawi̓n̓ tl'a wex̲és	Plantago major, Broad-leaved plantain, Frogs' Seat	Opportunistic and Incidental	Medicinal	This plant was introduced from Europe.	XXXXX
Unknown	Polygonum persicaria, Knotweed	Opportunistic and Incidental	Soap	XXXX	Only used while flowering
X̲ex̲ep'shínay̓	Rhamnus purshiana, Cascara	Opportunistic and Incidental	Medicinal	XXXXX	All Year Spring February-May (Considered Better Quality)
Snástamay̓	Amelanchier alnifolia var. semiintegrifolia, Saskatoon Berry	Systemic and intensive	Food and tools	XXXX	All Year
Snástam	Saskatoon Berry Berry		Food		XXXXX
Pápu7ten	Aruncus sylvester, Goatsbeard	Opportunistic and Intensive	Medicinal	XXX	XXXX
Unknown	Geum macrophyllum, Large-leaved Avens	Opportunistic and Incidental	Medicinal	XXXXX	XXXXX

Schi7́iáy̓	Fragaria chiloensis, Wild Strawberry	Cultivated wild species	Food	XXXX	XXX
Schi7́i	Wild Strawberry Berry				
K̲álx̲ay̓	Holodiscus discolor, Oceanspray, Ironwood, Digging Stick Bush	Management and Husbandry	Tools and medicinal	XXXX	All Year
Smélhx̲weláy̓	Osmaronia cerasiformis, Indian Plum	Opportunistic and Incidental	Food	XXXX	XXXX
Smélhx̲wel	Indian Plum Berry				
T'elemáy̓	Prunus emarginata, Bitter Cherry	Management and Husbandry	Medicinal, basketry, and binding	XXXX	All Year
T'ə'lm	Bitter Cherry Fruit		No Uses		
T'eĺem	Bitter Cherry Bark		Basketry and binding		XXXX

K̲we7upáy̓	Pyrus fusca, Wild Crabapple	Management and Husbandry	Food, medicinal, and tools	XXXX	XXXX
K̲we7upá	Wild Crabapple Fruit		Food		XXXX
K̲alḱay	Rosa nutkana, WIld Rose	Systemic and intensive	Food	XXXX	Buds XXXX Hips XXXX
K̲alḱ	Wild Rose Buds and Hips				
Ts'k̲w'umáy̓	Rubus leucodermis, Blackcap	Cultivated Wild Species	Food	XXXX	Spring February-May (Shoots- Food) All Year (Leaves- Beverage)
Ts'k̲wu'ú7em	Blackcap Berry		Food		Berries XXXX
T'ák̲w'emay̓	Rubus parviflorus, Thimbleberry	Systemic and intensive	Food, medicinal, and smoked	XXXXX	Spring February-March (Young Shoots- Food) March-October (Leaves and Stalks on plants> 1 year old for medicinal use) Summer XXX (Berry- Eaten)
St'ák̲w'em	Thimbleberry Berry	Systemic and intensive	Food		

Yetwanáy	Rubus spectabilis, Salmonberry	Cultivated wild species	Tools	XXXX	All Year
Yetwán	Salmonberry Berry (Ruby)		Food	Pairing Polypodium glycyrrhize (Licorice Fern) with Rubus spectablis (Salmonberry) is said to strengthen the potency of P. glycyrrhiza roots for medicinal purposes.	Spring May
Sepik̲	Salmonberry Berry (Gold)				Spring May-June Tem-yetwán - Time of the Salmonberry (May)
Stsá7tsk̲ay	Salmonberry Young Shoots				Spring March-April Tem-tsátsk̲ay- Time of the Salmonberry Shoots (April)
K̲w'elemxwáy	Rubus ursinus, Trailing Wild Blackberry	Management and Husbandry	Medicinal	XXXXX	March-October (Leaves- Medicianl)
Sk̲w'élemxw	Trailing Wild Blackberry Berry		Food		Summer July-August (Berry- Food) Tem'k̲w'élemxw- Time of the Blackberry (July)
Alila7áy	Rubus idaeus, WIld Raspberry	Opportunistic and Incidental	Food	Moist Maritime Mountain Hemlock Zone	XXXX
Alíla	Wild Raspberry Berry				

Ú7xw̱kw̱sáy̓	Spiraea douglasii, Hardhack	Systemic and Intensive	Tools	XXXXX	All Year
Mamakw'útsin	Galium aparine, Galium triflorum Bed Straw	No Known Use	Nuisance	XXXX	
P'ep'elk̲'máchxw	Populus tremuloides, Trembling Aspen	No Uses Known		XXXXX	
K̲w'eniḱ̲w'ay	Populus trichocarpa, Black Cottonwood	Systemic and Intensive	Food, medicinal, spiritual, and pigment	XXXX	Spring March-May (Cambium- Food) XXX (Seeds- Medicinal) All Year (Bark- Pigment/Spiritual)
X̲wáy̓ay	Salix sitchensis, Salix hookeriana, Salix scouleriana, Sitka Willow, Willow General	Systemic and Intensive	Binding and spiritual	XXXXX	All year (Withes- Binding) April-October (Leaves- Spiritual)
Sp'utĺ'am	Nicotiana tabacum, Tobacco	Systemic and Intensive	Medicinal and Spiritual	This was an introduced crop but it is known to have been cultivated by the Haida pre-contact in gardens	XXXXX
Sk̲auts	Solanum tuberosum, Garden Potato	Cultivated Domestic Species	Food	Introduced in 1850 by the early 1900's everyone had a potatoe patch.	Summer June-September
Ts'ex̲ts'ix̲́	Urtica dioica, Stinging Nettle	Cultivated Wild Species	Food, spiritual, medicinal, and twine	XXXX	February-March (Shoots- Food) October (Stalks- Twine) All Year (Roots- Spiritual and Medicinal)

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