

GOOSEBERRY POINT VILLAGE

Planning Concepts

Lummi Nation Commercial Company | Lummi Indian Reservation, Washington

Fall 2022, Winter, Spring 2023 | Urban Planning Studio | Western Washington University

A WWU Urban Transitions Studio
and
Sustainable Communities
Partnership Study

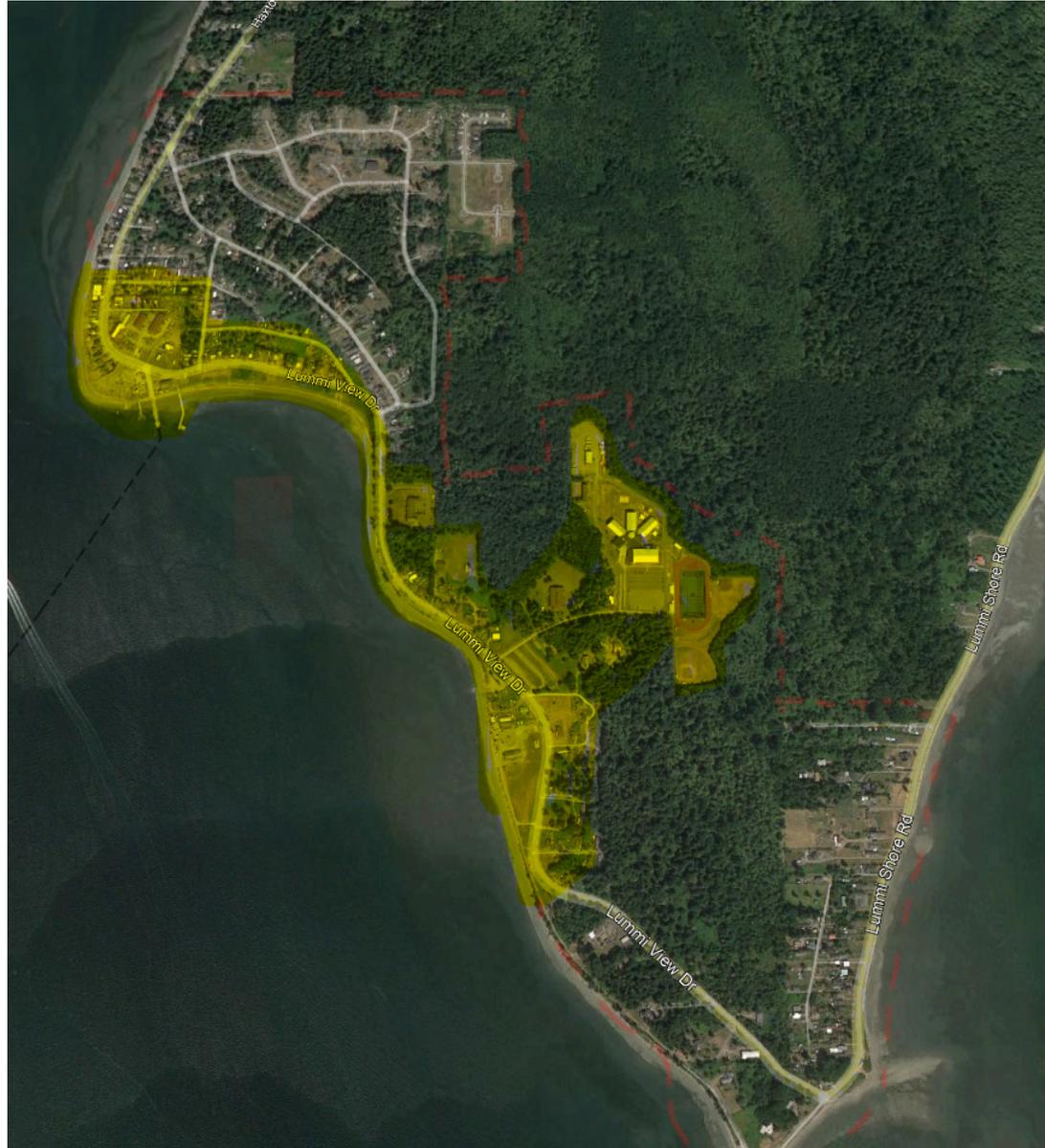
GOOSEBERRY POINT VILLAGE DESIGN CONCEPTS

LUMMI NATION
LUMMI COMMERCIAL COMPANY



College of the Environment
Western Washington University
Bellingham, Washington 98225 USA
2023

A downloadable PDF file of this report is available at:
<https://cenv.wvu.edu/uepp/planning-studio-publications>



*“The best way to predict the future
is to design it”*

Buckminster Fuller

Table of Contents

	Page
Part 1	
1.1 Acknowledgments and Dedication	4
1.2 To the Lummi Nation Community	5
Part 2 (fall 2022)	
2.1 Introduction to the Study Area	6
2.2 Socio-Economic Conditions	7
2.3 Community Conditions	10
2.4 Built Environment	16
2.5 Transportation	21
2.6 Sea Level Rise	25
2.7 Conservation and Shoreline Management	23
2.8 Principles Moving Forward	28
2.9 References	29
Part 3 (winter 2023)	
3.1 Gooseberry Point Design Goals	33
3.2 Strengths and Opportunities	38
3.3 Land Use Analysis: Growth Capacity	39
3.4 Ideation Mapping	40
3.5 Mobility Analysis	41
3.6 Housing Opportunities	44
3.7 Neighborhood Centers	46
3.8 Shorelines Enhancements	49
3.9 Cultural Resources	52
3.10 Fisherman’s Cove Waterfront Village	54
3.10.1 Fisherman’s Cove Concept 1	55
3.10.2 Fisherman’s Cove Concept 2	56
3.10.3 Fisherman’s Cove Concept 3	58
3.10.4 Fisherman’s Cove Concept 4	60
Part 4 (spring 2023)	
4.1 Implementation Strategies	
4.2 Community Engagement	
4.3 Phasing of Development Improvements	

2.1 Introduction to the Study Area

*“Nilh Xwenang Tse Schelangen Este Nexw Xwlemi — a healthy, giving, and prosperous community to strengthen our people through cultural, social, and economic abundance.”
— Lummi Way of Life*

The Lummi people have found nourishment and sustenance from the undulating waters of the Puget Sound and the lush forests of what is now known as Washington State since time immemorial. For the Lummi, a sense of belonging, identity, and tradition is indelibly tied to the earth. The Lummi harvest food from usual and accustomed fishing grounds; salmon and other marine life are a large portion of the traditional diet. While cultural identity was formed over a long period of time, spiritual disconnection was swift. As the modern world expanded throughout North America, the encroachment by white settlers and extractive activities heavily impacted Lummi Nation. In 1855, the Treaty of Point Elliot stripped away their tribal land. As recompense, reservation borders were put in place. Calculated to forever alter the Lummi way of life, the great injustices explicit and implicit in the Treaty of Point Elliot is still felt today.

At present, the Lummi reservation is an semi-urbanized landscape with several centers of tribal activity. Gooseberry Point, located on the south end of Lummi Peninsula, is an important transportation and economic hub for Lummi Nation. As a central hub supporting the Lummi fishing industry, the working waterfront is an essential part of reservation life. Gooseberry Point encompasses the Fisherman’s Cove public boat launch and the Lummi Island ferry terminal operated by Whatcom County.

There are several commercial enterprises in the area, as well as tribal and non-tribal residential properties. The study area includes community resources such as the Stommish Festival grounds, canoe house, basketball court and playground. Other important community resources in the area include the Wex’liem community center, Lummi Nation High School, and Little Bear Creek Retirement Center. In May, a fire destroyed the warehouse building housing several boats. In addition, known cultural resources are located within the study area and will require coordination with Chapter 40 of the Lummi Code and the Lummi Nation Tribal Historic Preservation Office (LNTHPO) prior to any proposed new development. The proposed study boundaries extend from Grove Street to the Stommish Festival grounds.

Rapid Urban Analysis

Socio-Economic Study: Using demographic data and qualitative observations, varying socio-economic conditions were found to be present on Lummi reservation. Future planning needs to address socio-economic conditions and priorities as integral elements of the planning study.

Community: Analysis of historical data, land use practices, community cohesion, and economic opportunity revealed some common themes and patterns of resilience.

Built Environment: Lummi Nation has an excellent grasp on the built environment needs of their community and is actively advancing improvements. The need to plan and prepare for climate change cannot be ignored; rising seas and more frequent and intense rain events will likely impact the reservation.

Ecology: Data was collected on ecological parameters: climate change impacts, local wind, sun, humidity and thermal characteristics, and land features such as topography, geology, and soil types. With large-scale infrastructure changes and the civic redevelopment of Gooseberry Point planned, key stakeholders must understand the complex ecological context.

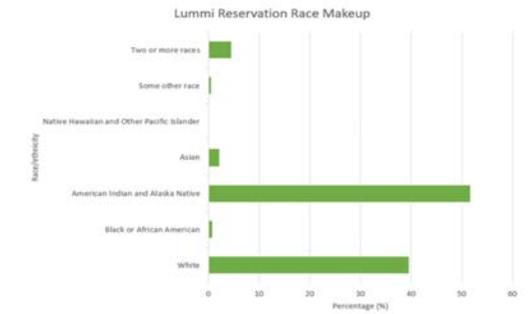
2.2 Socio-Economic Conditions

SOCIO-ECONOMIC

Demographics - Although numbers do not tell the whole story, demographics help inform our initial perspective of the reservation and its social fabric. This section is divided into five demographic categories: people, jobs, housing, economy, and education. The following demographic information was obtained from the 2016-2020 American Community Survey 5-year Estimate (US Census Bureau, 2017).
People: The Lummi reservation has several age demographics which are important to consider for future development. The median age in Lummi is 36.3, although the largest age group is those between 25 to 34, while 848 residents are ages 65 and older (around 15% of the total population). It is important to consider this significant population in younger age brackets as well as the large portion of elderly (65 or over), especially because elders are extremely important to Lummi and often hold a lot of cultural knowledge and say on decisions. Additionally, the Lummi Reservation population ages 0-14 (1,109) makes up roughly 1 out of every 5 residents. This high percentage of the population will be very important assuming the youth will stay on the Lummi Reservation as adults and become a large portion of the population in 25 years.

Several other demographics provide further considerations for guiding development. The population on Lummi Reservation is divided 48% Male (2,634) and 52% Female (2,867). There are 1,096 residents with a disability, out of which only 341 (31%) are 65 years or older. Out of the population with a disability, 124 (11%) are younger than 18 years of age. Disabilities are crucial to consider when planning for available services, accessibility, and transportation, especially for youth.

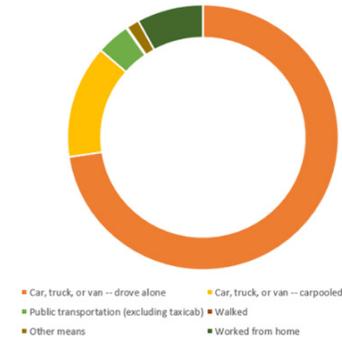
The Census also reports 205 people (+/- 115) whose residence 1 year ago was in a different state, hinting at a possible recent rise in population., however, the margin of error is included to reflect the uncertainty of this increase to population. Finally, Bar Chart 1 demonstrates that slightly over 50% of residents identify as American Indian and Alaska Native (AIAN) whereas roughly 40% identify as White. The rest of the percentages are split between two or more races, Asian or Black (US Census Bureau, 2017). All of these demographics must be considered when planning public spaces, particularly when considering non-tribal interests on tribal land.



Percentage of residents who are a certain race (US Census Bureau, 2017).

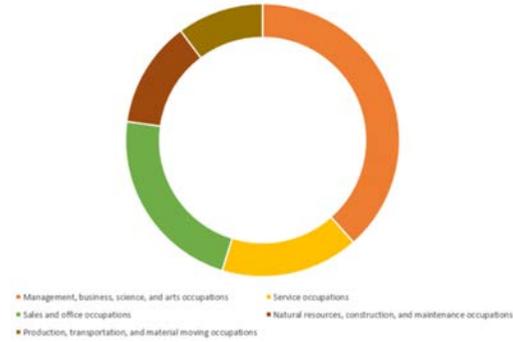
Jobs - Employment rates on the reservation provide some insight into primary workforce sectors. Out of the total population, 2,438 are in the civilian labor force, out of which 2,244 are employed and 194 are unemployed, giving an unemployment rate of 8%. Out of the total working force 173 work from home and 233 are self-employed (these are not mutually exclusive). Additionally, there are 1,437 (59%) private wage and salary workers, as well as 574 (23.5%) government workers. The considerable number of residents who work from home or are self-employed may demonstrate the significance of the unofficial economic sector in the Lummi Reservation.

Commuter Means for Workers 16 and over in Lummi Reservation



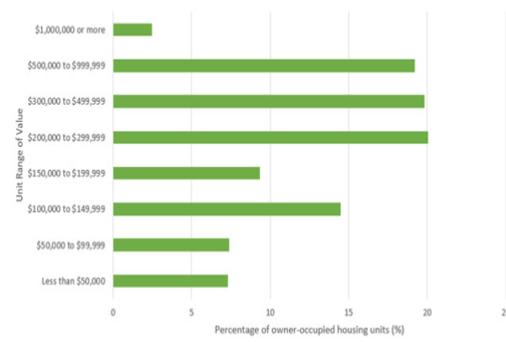
Breakdown of commute transportation means for workers 16 and over in Lummi Reservation (US Census Bureau, 2017).

Occupation in Lummi Reservation



Occupations in Lummi Reservation by relative percentage (US Census Bureau, 2017).

Unit Value of Owner-Occupied Houses in Lummi Reservation



Bar Chart shows value of owner-occupied housing units in Lummi by percentage (US Census Bureau, 2017).

The largest industry employer on Lummi Reservation is educational services, health care and social assistance, followed by public administration as well as manufacturing. The most significant employers point to the importance of the service sector and public sector being two main economic powerhouses for Lummi Reservation (US Census Bureau, 2017).

Housing - Housing demographics within the reservation provide insight into inequities that may be present. There are a total of 2,206 housing units on the Lummi Reservation, out of which 325 (14.7%) are vacant. Out of the occupied housing units

583 (31%) are renter-occupied and 1,298 are owner-occupied, although it is unknown what portion of the latter are tribal members. The average household sizes for owner-occupied and renter-occupied units are 2.79 and 3.11 respectively.

According to the census, roughly 1 in 3 householders (625 householders) of the total occupied units moved into their unit between 2015 and 2018. This Census data could suggest that Lummi Reservation saw a rapid spike in influx of new residents between those years, although a sizable number of them could have moved from within the Reservation. Most residents that

rent housing units pay gross monthly rates between \$500 to \$900, with gross median rent at \$696. This rent cost could suggest that rental housing units are worth much less than most owner-occupied units (especially when observing Chart 5 below), which could indicate a severe socio-economic inequity (US Census Bureau, 2017).

Economy - Economic considerations such as incomes vary greatly between the reservation and greater Whatcom County. The mean household income and benefits on Lummi Reservation is \$76,394 whereas the median is \$56,603 and the mode is \$50,000 to \$74,000 (all numbers adjusted

to 2020 inflation). However, the median for Lummi Reservation is calculated with a higher average household size (2.79 persons per household and 3.11 for owner-occupied and renter occupied respectively), which means it is disproportionate to the Whatcom County average household income. From these statistics, one can conclude that household income is significantly lower than that of Whatcom County.

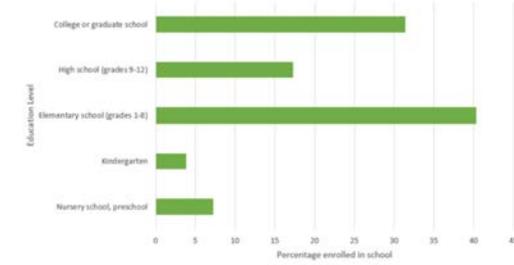
Any suggestions for community development within the reservation should consider the disparities which are illustrated by insurance and poverty rates. Out of the noninstitutionalized Lummi Reservation population there are 618 (11%) residents with no health insurance coverage, out of which 117 (18%) are under the age of 19. Absence of health insurance coverage is important to consider when planning health services availability, especially for youth. Additionally, 15.1% of residents live under the poverty rate, and 19% of families with female householders and no spouse live under the poverty rate. The trend of higher poverty rates for single-mother households also highlights a socio-economic inequity that is important to consider (US Census Bureau, 2017).

Education - Education rates on Lummi Reservation, while not as high as that of greater Whatcom County, demonstrate the

importance of education facilities on the reservation. For the Lummi Reservation population 25 years and older, there is an 89% high school graduation rate, however only an 18.9% percent rate of bachelor's degree or higher. This latter segment of the population is comprised of 350 residents with an associate degree, 452 residents with a bachelor's degree and 225 residents with a graduate or professional degree.

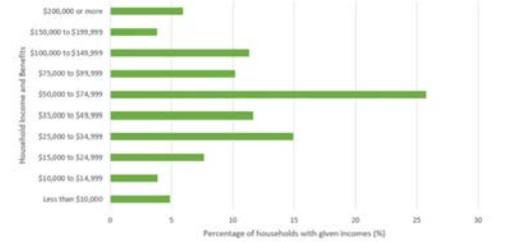
It is unknown what portion of Lummi Reservation residents with graduate or professional degrees are tribal members as compared to non-tribal members. Chart 6 below demonstrates that currently there is a significant portion of residents enrolled in higher education, which could be attributed to the success of the Northwest Indian College (US Census Bureau, 2017).

Lummi Reservation Residents 3 Years and Older Enrolled in School



Bar Chart shows school enrollment for Lummi Reservation residents 3 years and older (US Census Bureau, 2017).

Household Income and Benefits for all Lummi Reservation units

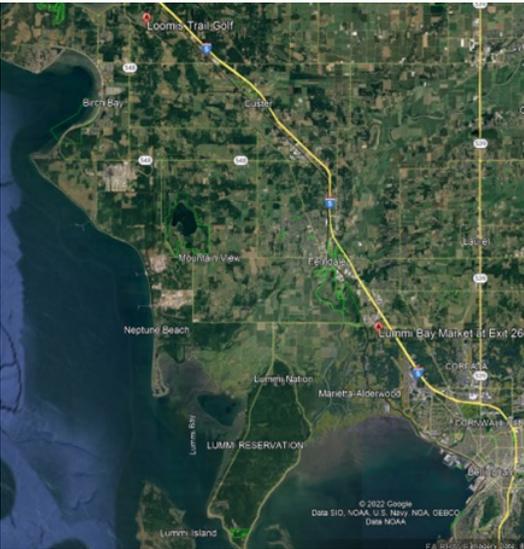


Bar Chart shows household income and benefits for all Lummi Reservation units (US Census Bureau, 2017).

2.3 Community Conditions

History - Historically, territories of the Lhaq'temish (“People of the Sea”) or Lummi Nation, were inhabited for over 11,000 years prior to colonization and stretched from Canada through the San Juan Islands and the mainland known today as Washington State (Lummi Nation Atlas, 2016). Western colonization reduced tribal members’ access to traditional territories and confined tribal nations to areas bound by the 1855 Treaty of Point Elliott. Territories were further constricted with the 1887 General Allotment Act.

Presently, Lummi Nation territories lie mostly within the Lummi Reservation, and include Loomis Trail, Salish Village, Lummi Island, Orcas Island, Lopez Island, and Portage Island (Lummi Nation Comprehensive Economic Development Strategy, 2022). To understand current community structure as it relates to land-use, opportunities for tribal members, and overall cohesion within the community, it is essential to understand historic and lasting effects of settler colonialism, whether through federal, state, or local authority of the United States government, its treaties and laws, and actions of white settlers, has on the Lummi people. Although a few laws were repealed and attitudes altered, the effects these issues have created are lasting and contribute to the fragmentation and isolation of the Lummi Nation community.



European colonization, leading to the signing of the 1855 Treaty of Point Elliott, not only confined Lhaq'temish to reservations, but enforced western religion, forced assimilation, and rejected Lummi traditional and cultural practices and spirituality, altering Lummi community structure (Lummi Nation Atlas, 2016). The cohesion of the community again was besieged with the 1887 Dawes Act (General Allotment Act), allowing already confined reservation areas to be bought by white settlers (Zaferatos, 2022). These acts shaped Lummi Nation’s legal rights in their access to land and ownership of properties. In 1934, Congress passed the Indian Reorganization

Act (IRA) which attempted to “reaffirm tribal self-governance” but even as around half of all tribes adopted an IRA form of constitution, tribal rights of self-governance became limited by the “strict federal oversight over tribal legislative actions” that followed IRA adoption (Zaferatos, 2015). In 1953, during the “Termination Era” (Zaferatos, 2022), the IRA was reversed when laws passed by Congress attempted to terminate tribal governments. This was largely accomplished by “disbanding the political authority of certain tribes, foreclosing their tribal territories, and encouraging the full assimilation of those terminated Indians and their resources into the larger U.S. political economy” (Zaferatos, 2015). By 1967, attempts to control and assimilate Lummi members into western ideals continued.

These laws and policies had direct effects on the mental health of tribal members, and as the author Hillaire (2013) discusses that through the 1960s “some Indians tried to pass themselves off as Mexicans,” while if others were half-native, “they would not claim their Indian side.” Treaties, policies, and laws created by the United States and imposed on the Lummi Nation resulted in community fragmentation, disregard of Lummi traditions and culture, negative mental health of tribal members, loss of traditional lands (impacting fishing,

travel and connectivity), and restriction of opportunities for tribal members. Today on the reservation, these core problems have visible effects. Within development policies that follow Western architecture and land development priorities, the extensive number of fee simple parcels owned by non-tribal members within Gooseberry Point, the minimal housing availability for tribal members, imposed land-use uses such as the presence of the ferry terminal, and diminished access to traditional fishing territories, the growing impediments to the Lummi way of life are evident.

The racism of white settlers and their descendants occurring throughout this period is also present and felt by current Lummi tribal members. The cultural genocide targeted Lummi children and continued until the official opening of the Lummi Nation School system in 2008. In the 1880s, Lummi children were sent to a Catholic mission boarding school in Tulalip as well as the “Stickney Home Mission School for Indians” in Lynden (1880’s Residential Schools | Bellingham Racial History Timeline, n.d.). These residential schools were violent, unsafe, racist, and engaged in the systematic erasure of Lummi culture. The “Lummi Day School” (pictured) was constructed on the Lummi Reservation in 1910 where Euro-American culture and traditions were forced onto Lummi



children (Weymouth, 2019). The closure of the “Lummi Day School” (pictured) was decided by the Ferndale superintendent of schools in 1956, and Lummi children were forced to attend school in Ferndale, where abusive teaching practices continued to target Lummi Nation children (Marker, 2000). Over seven-generations of Lummi children attending such Euro-American schools, harm resulted to their mental health, diminishing their cultural practices, and decreasing their overall well-being (1880’s Residential Schools | Bellingham Racial History Timeline, n.d.).

The forced indoctrination of Western ideologies is a large reason explaining much of the loss in Lummi traditional

language, practices, spirituality, and the social disintegration of Lummi tribal society. Within this context, the Lummi Nation School is a key institution in fostering community resurgence as well as the protection of current and future generations that will attend the school.

Despite severe laws, treaties, forced assimilation, and residential schooling of Lummi tribal members, that the Lhaq'temish have continued to be resilient testifies to the individual and community strength and the hosts of foundational spiritual qualities such as hope, oneness, service, respect, courage, and love the community must draw on. Despite U.S. attempts to eradicate Lummi culture, the traditional diet of smoke-dried

seafood, shellfish, crab, salmon, trout, and other sea mammals continues to be a regular diet and valued resource today (Lummi Nation Comprehensive Economic Development Strategy, 2022). Relative to this, the significant cultural identities connected to fishing for salmon, crab, and shellfish are strong, as they have been since time immemorial. Historically and culturally significant locations within the Gooseberry Point study area, such as the early winter village located near the site of the ferry terminal, are areas that remain very important to Lummi tribal members (Ballew Sr., 2022).

Land - The Lummi Nation has grown economically with the construction and development of new businesses owned both tribally and non-tribally and commerce and other occupational opportunities outside of the reservation. 50% of Lummi Reservation is individual native trust lands, 22% is non-tribal fee land, and 17% is tribal trust. Of the nearly 6,600 people living on the Lummi Reservation, roughly 2,600 of these people are enrolled tribal members, 660 are either related to or live with an enrolled tribal member, and around 3,360 are not tribal members nor are they affiliated with the Lummi Nation. Seventy-eight percent of the Lummi tribal members live on the reservation boundaries. There are approximately 1,900 homes on the Lummi

Reservation, 700 of which are occupied by enrolled tribal members.

Opportunities to incorporate more indigenous planning and designs for future development on the reservation will play a vital role in the improvement of the community cohesion and cultural enrichment of the Lummi people.



Housing Opportunities and Programs on The Lummi Reservation

Transitional Housing Recovery - One of the main struggles facing many tribes today is breaking free from the scourge of drugs and providing rehabilitation and transitional support. Drug addiction related issues have affected everything on the reservation from crime to housing (Golden, 2022). The ravages of drug use in the in the United States is well documented, with methamphetamine drug



overdoses increasing 180% nationally. Differentiated by ethnicity, the highest rate of methamphetamine use disorder is by Alaskan Natives and Native Americans. (Han, et al. 2021). In 2006 the Lummi Tribal Housing Authority established the Transitional Housing Recovery Program to provide a program that ensures a smooth transition for recovering patients in rehab into the community; a clean, safe, and sober housing environment. (HUD). The photo above shows one of the structures designed by Sage Architectural Alliance and



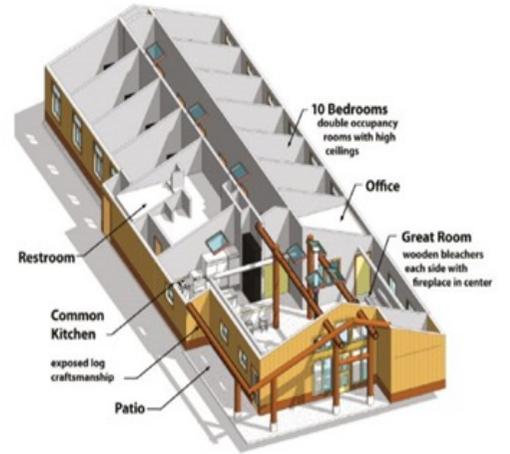
completed in August 2014. The structure provides 3,200 square feet of living space with 10 double rooms, and a common kitchen where occupants can prepare meals.

Sche'lang'en Village - This village was designed as a transitional support system for the community, catering to elders, homeless individuals, victims of domestic violence, and to drug rehabilitation. Designed in 2014, the project provides 45 units that consist of 9 single story 2-bedroom duplexes, 24 two-story 3-bedroom pods, and 12 single story 3 and 4 bedroom triplexes upon completion.

Kwina Village Apartment Project - Providing 72-units, Kwina Village was

constructed on one of the major reservation corridors. The development location was comprehensively planned to provide residents with easy access to community facilities. By providing supportive, benevolent and purposeful community facilities and agencies in close proximity to the clients' homes are imperative to contribute, however insufficiently, to the success of those transitioning from drug use.

Equity and Access - In analyzing equity, this report addresses the levels of accessibility to services and facilities that provide transportation, food security, healthcare, and nature. Much of the information in this regard was gathered through firsthand

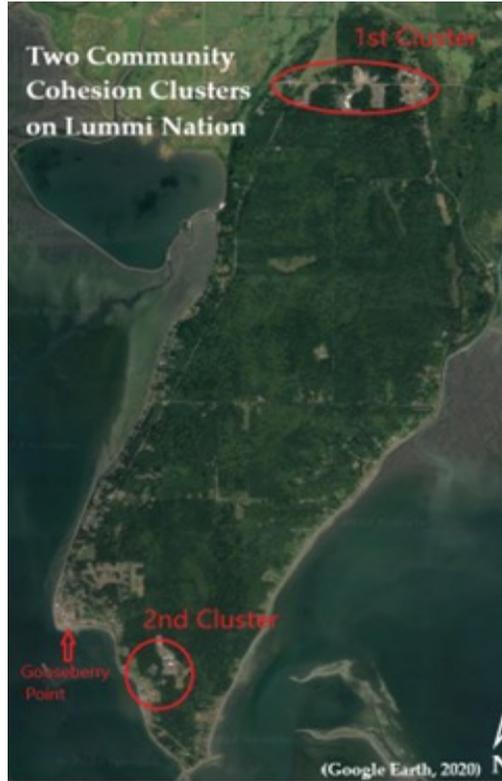


observations of the study area, online map searches and discussions with tribal members from a community tabling event. An online survey created by the class for Lummi member input also provided valuable insights.



Food Security - Gooseberry Point offers a mini mart where snacks and some foods are sold. There are no full service grocery store located on the peninsula. However, there several small businesses selling fresh sea products including Catch NW, located next to the current ferry dock. North of Gooseberry Point on Kwina Road there is a community services building providing boxes of food operating as a food bank. Community responses during the community event at the Wex’liem center food accessibility is an important issue. One respondent stated that they moved off the reservation in part due to the lack of access to groceries and other commercial services which require a 20-minute drive from the reservation.

Healthcare - For healthcare, a clinic on Kwina Road offers services. The Lummi Tribal Health Center provides comprehensive health care including outpatient medical, dental, physical therapy, mental health, preventive healthcare, and public health services. A new building is under construction, although potentially with accessibility barriers, as those living further south on the peninsula require transportation to access this service. For those without a car, public transportation is available, but as noted above, some of the bus stops are harder to access and the frequency of bus trips is limited.



Community Cohesion - Fostering community cohesion can offset the impacts of past federal assimilation policies which continue to impact the community. Spaces of community cohesion strengthen the livelihoods of Lummi people by supporting indigenous culture and identity.

The Gooseberry Point area at the south end of the reservation represents an important opportunity to further concentrate the Lummi community in a well serviced urban district. In area is within close distance to residences, the K-12 Lummi Nation School, the Wex’liem Community Building, and the Lummi Nation Stommish Grounds and has tremendous opportunity to extend housing and services to create a well planned community.

The Lummi K-12 school provides education with the mission of being a space “where students learn through Schelangen (way of life): academics, community and culture.” (Lummi Nation School, 2022). The school is also a venue for drawing the community together in support of the school’s Blackhawk football, basketball, and other sports teams for home games.

The Wex’liem Community Building is a longhouse space for Lummi events, serving as a community gathering venue. The center is also significant as a space for the annual General Council Meetings, On the waterfront’s Stommish Grounds, significant events occur, namely the Lummi Nation Stommish Water Festival. At the festival, groups of community members race canoes, enjoy indigenous songs and dance performances by community groups among other tribal groups.

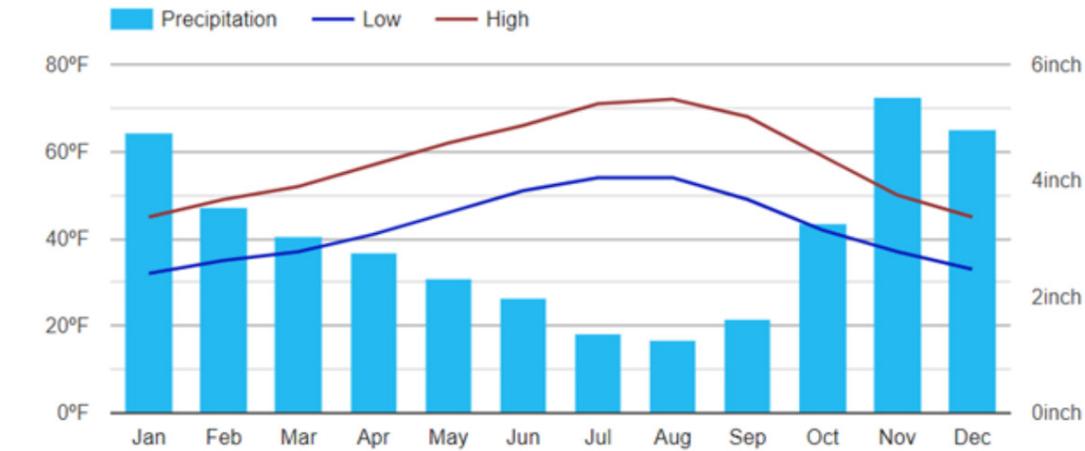


Slahál game at the Lummi Stommish Water Festival, 1980. Photo by Jack Carver. Reprinted with permission from Whatcom Museum of History and Art, Bellingham, Washington, image number 1995.1.044033.

2.4 The Built Environment

Stormwater system - The current Lummi Nation stormwater system involves multiple facilities and has been shown to be impacted by heavy rainfall and flood events. This issue is of concern particularly with climate change threatening to worsen the frequency of these events. The current stormwater system includes a network of facilities. The most recent update of the storm water facility was completed in 2010 and includes culverts, bridges, tide gates, catch basins, roadside ditches, and agricultural ditches (Lummi Indian Business Council, 2016, p. 29).

The amount of rainfall the study area receives in one year is approximately 1,980,934 cubic meters (or about 370 football fields filled one meter high), while 75% of this flow occurs from October through April. Climate change has the potential to make the rainfall season shorter with an increase in volume during the winter months, which could overwhelm the stormwater systems, leading to larger and more frequent flood events (Lummi Nation Natural Resources Department, 2016). Past flood events from heavy rainfall, such as what occurred in 2021 (which had flood heights of up to 6 feet in some reservation areas), have cut off all road access in and out of the reservation (Brennan, 2021). The potential for increased heavy rain events is critical given that 87% of reservation land



Average monthly precipitation for Bellingham, WA used to represent reservation rainfall, given the proximity of the two locations.

area has moderately high to high soil runoff potential (LIBC, 2016). Because of the high runoff potential for many areas, stormwater management is a critical component of future mitigation actions and adaptation to climate change given the impact on flooding and the year-round availability of freshwater (Lummi Natural Resources Department, 2016).

Non-residential buildings - Based on field observations, the majority of buildings within the study area are well maintained and of good to exceptional quality, with little indication of poor structural integrity, or other signs of wear other than weathering on some structures. However, after further

analysis using Lummi Nation reports, there are structural or other vulnerabilities which many of the buildings have in the event of an earthquake, flood, or other hazard. These include risk of liquefaction, flooding due to low elevation, and structural damage from lateral movement. While most of the buildings were built following the establishment of a seismic building code, older structures are more at risk (Lummi Natural Resources Department, 2015).

Marina infrastructure - Infrastructure within the marina area generally ranges from insufficient to very poor condition. Current marina infrastructure generally does not meet the needs of the area and impacts

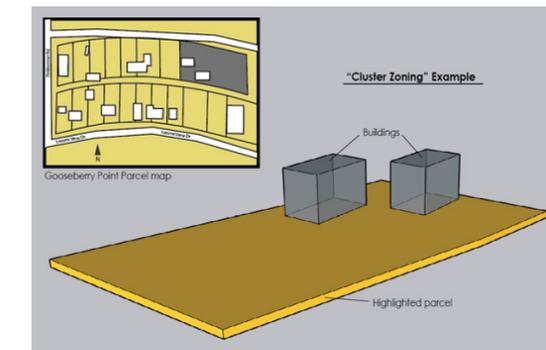
the safety of active transportation. The boat launch, fuel dock, ferry terminal, and fixed pier all show significant signs of weathering or deterioration, with some safety concerns. More specific observations are noted in the Excel spreadsheet.

Land Use - The Lummi Nation's Land Use Development Regulations prioritizes benefits to the current and future needs of the reservation. The standards of quality development can be achieved through implementing effective low-impact land use design, prioritizing the protection of sensitive areas and natural resources, incorporating diverse uses of land to promote economic opportunity, and planning efficient roadways that mitigate traffic while promoting pedestrian and cyclist safety. Planned development applies to residential, commercial, and industrial zones with a parcel size of two acres or larger. Approving a proposed development plan can be a lengthy process. Final decisions are conducted by the Lummi Planning Commission, LIBC, and through other relevant institutions.

The Gooseberry Point area provides a mixed-use region of residential and commercial zones with access to vehicle roadways and pedestrian pathways. Under permitted and accessory uses, existing single-family residences must cluster

buildings within 50% of the proposed lot size. Arrangement of buildings should be concentrated in a pattern that is compatible with site features. To improve the existing conditions of roadways, it is important to consider providing transit opportunities that create linkage in the area for paths and sidewalks with a clear potential for connecting high-occupancy or high use destinations on- and off- site (Lummi Planning Department & Lummi Planning Commission, 2022).

Wastewater - The Tribal Sewer and Water District in the study area services both trust and fee lands. The sewer treatment facility that services the study area was built in the early 1980s and is a rotating biological contractor system that meets Clean Water

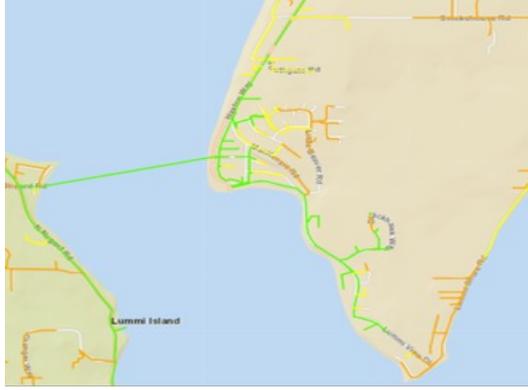


Example of cluster zoning. Buildings can take up a maximum of 50% of proposed lot size (image created by: Ciara Ortiz)

Act requirements, operating at a level of secondary treatment (Lummi Tribal Sewer and Water District, 2022). There is a clause in the sewer code prohibiting carrying storm runoff into sanitary sewers to prevent sewage overflows during flood events. Septic systems also risk failure and the possibility of runoff pollutants critical areas.

Energy Infrastructure - Puget Sound Energy (PSE) is the primary provider of electricity to the Lummi Reservation. The service map below examines the hosting capacity (kW) of the pictured area. Along the stretch of Haxton Way, accompanied by a few residences, Lummi Bay Market, and the WTA ferry terminal, measures at 1,000.01 - 5,000.00 kW on the capacity scale. Moving further inland, with more residences located in these areas, the service capacity decreases to 500.01 - 1,000.00 to as low as 100.01-500.00 kW. The shoreline provides a higher capacity of energy to sustain the residences as well as the operations of the ferry terminal that travels a consistent route to Lummi Island.

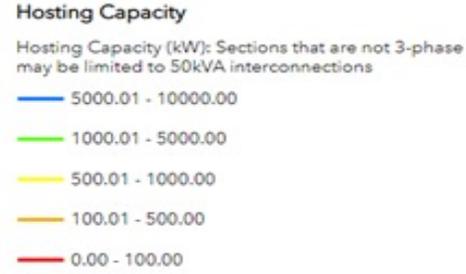
Land Characteristics - The topography, geology and soil types of Lummi Nation all influence current and future development. Gooseberry Point's low-lying topography means much of the study area is in a floodplain with specific areas designated as high flood risk zones.



Puget Sound Energy Map of Gooseberry Point

Topography - The Lummi Indian Reservation encompasses three upland areas and two lowland floodplain areas (Water Resources Division & Lummi Natural Resources Department, 2020), the latter of which Gooseberry Point is a part of. The Lummi and Nooksack River floodplains reside between the northern and southern upland areas (WRD & LNRD, 2020). Future projections for sea level rise suggest much of the study area will be flooded within the next several decades, raising questions of the efficacy and safety of significant development efforts.

Geology - The majority of the Lummi Reservation consists of Ice Age glacial, river, and ocean deposits covered by more recent Nooksack River deposits (Lummi Indian Business Council, 1016; WRD



& LNRD, 2020). Much of the river and ocean deposits consist of “unconsolidated sediments deposited as glacial outwash, glaciomarine drift, glacial till, and floodplain or delta deposits” (WRD & LNRD, 2020, pp. 46). Gooseberry Point is predominantly glaciomarine [Fraser Glacial Marine Drift], which is the geologic layer that formed about 20,000 to 10,000 years ago. This layer consists of unconsolidated clay, silt, sand, gravel and boulders (LIBC, 2016), thus shaping the water characteristics and buildability of the soil.

All soils in the study area are comprised of sandy loam or silt loam. Loam is an ideal soil type for construction due to its optimal combination of silt, sand, and clay. The loam soil type provides a strong base for foundations and experiences limited



Lummi Reservation 100-year floodplain.

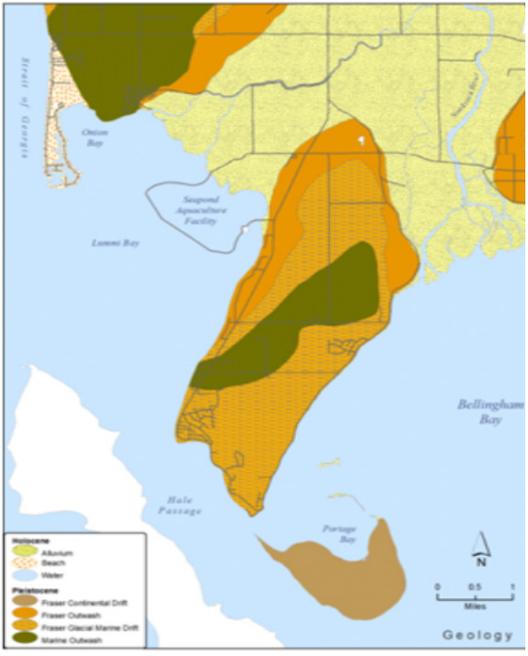
shifting, expanding or shrinking while filtrating water effectively (Uretak Gulf Coast, 2020). Soil prone to liquefaction can include soils with high water content, such as silty or sandy soils (Uretak Gulf Coast, 2020). Soils with higher water content are more vulnerable to liquefaction, posing risks for any structures built upon or adjacent to the site. Liquefaction is a process in which ground-shaking causes soils to move from a

solid to liquid state, resulting in an inability for soils to support weight (WRD & LNRD, 2020).

Gooseberry Point is one of the areas on the reservation vulnerable to liquefaction. Some structures have taken this into account such as the Silver Reef Hotel, Casino and Spa. The study area’s soil type should be carefully considered when developing the master plan, especially as it relates to archaeologically significant sites and whether more elaborate foundations are feasible.

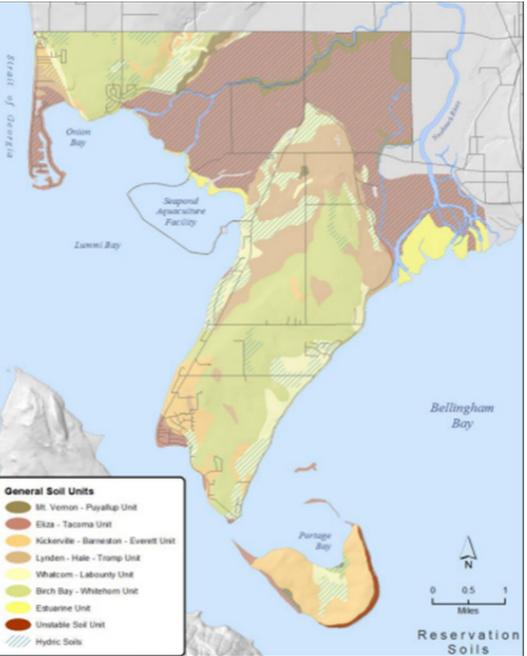
Soils - As seen in the figure to the far right, most of the study area consists of Eliza-Tacoma or Hydric soil. Eliza-Tacoma soil is deep and poorly or artificially drained. Much of the Eliza-Tacoma soil type comes from floodplains, deltas, tidal flats, or areas of low elevation. Hydric soil is seasonally or permanently saturated and characteristic of wetlands (LIBC, 2016).

Soils on the Lummi Reservation can be classified into 4 sections based on runoff potential (Table 1). Most of Gooseberry Point primarily consists of soil type A and has a low runoff potential due to high infiltration rates. The rest of the study area has a greater variety of soil types with a higher runoff potential, including categories C and D (WRD & LNRD, 2020).



Geologic layers of the Lummi Reservation (LIBC, 2016).

Erosion potential - Erosion potential is another important characteristic of the study area, as sea level rise could increase erosion and influence decisions on managed retreat. The northern portion of Gooseberry Point, extending slightly north of Mackenzie Road to south along the Point to just east of the Lummi Island Ferry Terminal, has moderate erosion potential of about -0.3 feet per year (Johannessen, & MacLennan, 2007). Southern Gooseberry Point, or Fisherman’s



Soil units of the Lummi reservation (LIBC, 2016).

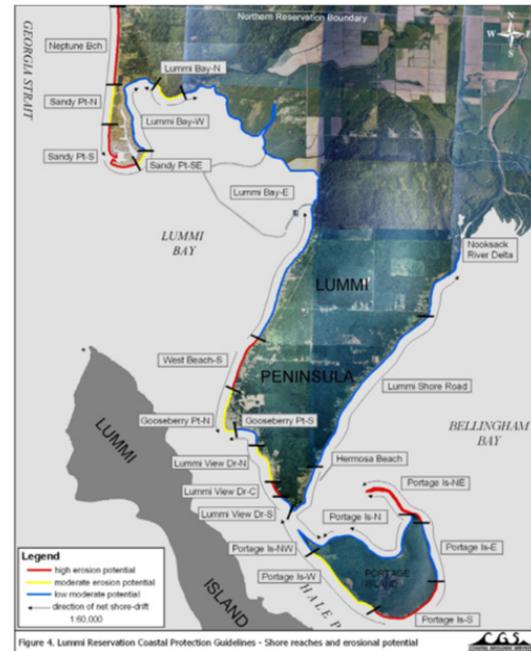
Cove, extending from east of the Ferry Terminal to the Little Bear Creek Assisted Living Facility, has low erosion potential, with a mean erosion rate of +0.9 feet per year. A positive value means this area is accreting [Building up land mass] rather than eroding (Johannessen, & MacLennan, 2007).

2.5 Transportation

Eelgrass Beds - Eelgrass beds were identified as one of the biggest constraints on marine development in Fisherman's Cove. Eelgrass beds serve as crucial habitat for many species.



Eelgrass beds around Fisherman's Cove.



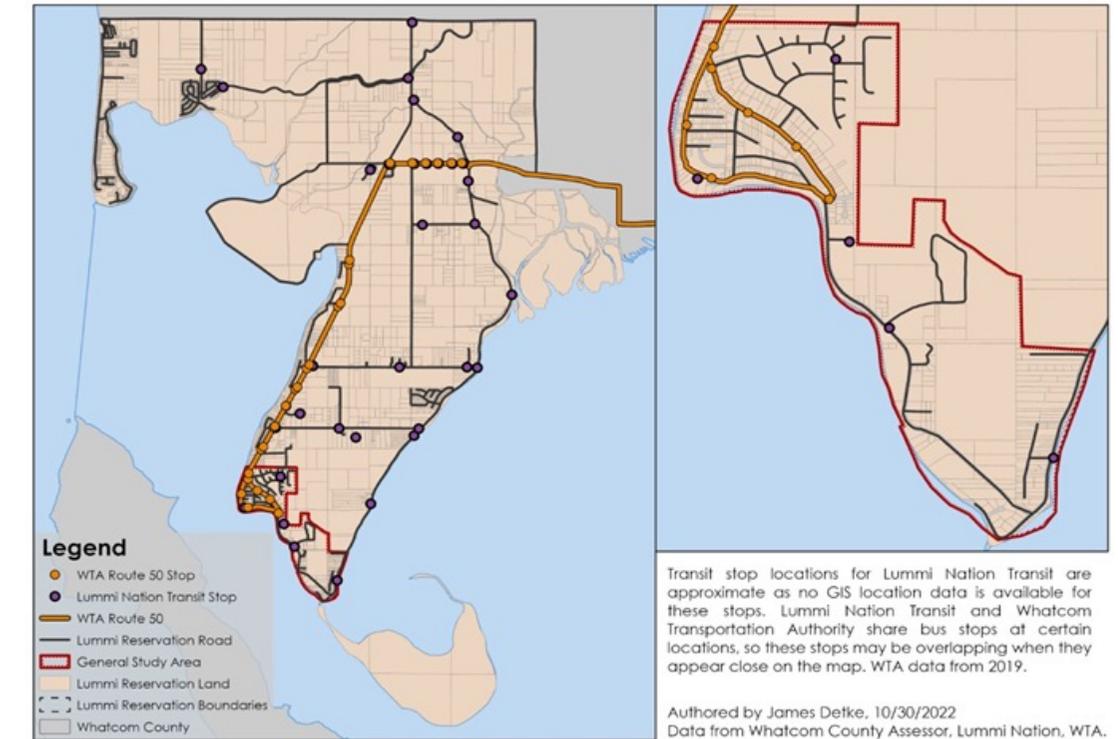
Erosion potential of Lummi Reservation shorelines (Johannessen, & MacLennan, 2007).

In terms of access to public transportation around Gooseberry Point, Whatcom Transit Authority (WTA) and Lummi Nation Transit provide services. The image above shows all the stops that both services provide, with Lummi transit providing a significantly longer route than WTA. An issue identified during visits to the reservation is that often bus stop locations appear unsafe for pedestrians. Bus stops also appeared to lack adequate roofing to shelter waiting passengers from rain or snow. Compared to the WTA however, Lummi Transit provides more stop times. While route 50 of WTA to Gooseberry Point runs every day, the bus only runs from 6:39 AM to 7:54 PM (Moovit).

Transportation connectivity, access to active transportation, and public transit options are essential to every community and are areas for improvement as Lummi Nation has identified in its Strategic Energy Plan, Road Safety Report, and other documents. Transportation accounted for the highest share of energy use, energy cost, and carbon emissions within the Lummi Reservation in 2010 (Kuhlman, 2016).

Transit options for accessing Whatcom County's cities are limited. WTA provides service between Gooseberry Point and downtown Bellingham via Haxton Way and Kwina Road. This is the only option for accessing Bellingham other than using a

Lummi Reservation Transportation: Lummi Nation Transit and Whatcom Transportation Authority



car. WTA's route 50 has 9 stops per day on weekdays, 7 on Saturdays, and 6 on Sundays. Route 50 runs between Gooseberry Point, the Bellingham Airport, and downtown Bellingham (WTA Planning Department, 2022). This route is unlikely to be substantially improved unless Lummi Nation focuses on transit-oriented development and expands housing and services along this route. Lummi Nation Transit primarily focuses on inter-reservation travel but provides

vital service to Ferndale. This is the only transit connection between the Reservation and Ferndale, which is the closest area with necessary services. Lummi Nation Transit runs four trips to Ferndale per day (Lummi Nation, 2019).

One most important and often contentious transportation issue at Gooseberry Point is the operation of the Lummi Island ferry terminal. The ferry location impacts the

2.6 Conservation and Shoreline Management

development of the surrounding area. The proposal for the relocation of the ferry east of its current location would allow for better queuing space and better separation between Lummi fishers and the ferry, Based on interactions and survey results, may community members voiced a desire to relocate the ferry from the reservation.

Lummi Nation Transit operates routes along all the major roads on the reservation, making it possible to get most places using public transportation (Lummi Nation, 2019). Over half of survey respondents were extremely dissatisfied with pedestrian pathways on the Lummi Reservation. The majority of roads have no sidewalks, high road speeds, and little separation between drivers, pedestrians, and cyclists. Haxton Way has primarily been the focus of traffic calming and roadway improvements. Currently, fishing fleets are dependent on trailer launch across beaches and the existing single-lane boat launch, which is restricted in inclement weather, leads to vessel queuing and congestion (Lummi Nation, 2015a).

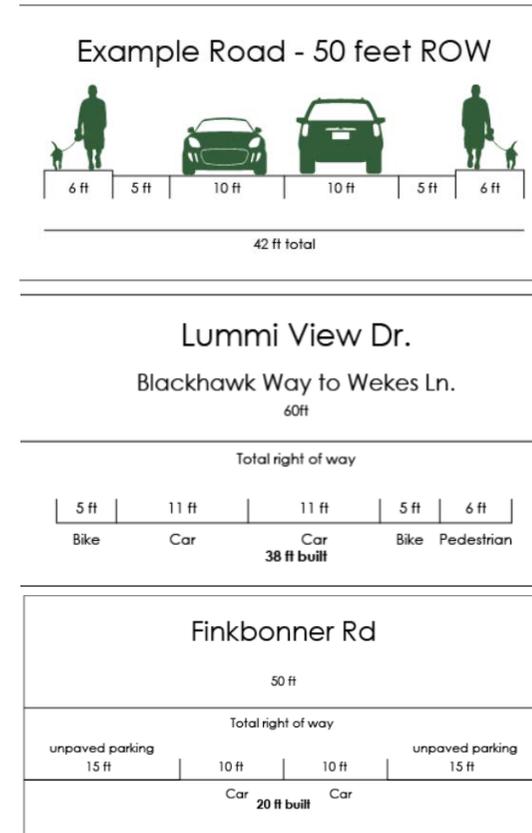
One most important and often contentious transportation issue at Gooseberry Point is the operation of the Lummi Island ferry terminal. The ferry location impacts the development of the surrounding area. The proposal for the relocation of the ferry east

	M-F	Sat.	Sun.
Boardings	233	150	113
Passenger Miles	1,533	987	745
Revenue Miles	271	211	181
Revenue Hours	15	12	10
Boardings per Revenue Hour	16	13	12
Passenger Miles per Revenue Hour	104	86	76

Passenger data for WTA Route 50 connecting the reservation to Bellingham (WTA Planning Department, 2022).

of its current location would allow for better queuing space and better separation between Lummi fishers and the ferry, Based on interactions and survey results, may community members voiced a desire to relocate the ferry from the reservation.

Lummi Nation Transit operates routes along all the major roads on the reservation, making it possible to get most places using public transportation (Lummi Nation, 2019). Over half of survey respondents were extremely dissatisfied with pedestrian pathways on the Lummi Reservation. The majority of roads have no sidewalks, high road speeds, and little separation between



drivers, pedestrians, and cyclists. Haxton Way has primarily been the focus of traffic calming and roadway improvements. Currently, fishing fleets are dependent on trailer launch across beaches and the existing single-lane boat launch, which is restricted in inclement weather, leads to vessel queuing and congestion (Lummi Nation, 2015a).

Several reports published by the Lummi Indian Business Council were reviewed for information on current policies and practices related to the preservation and/or improvement of ecological function. These reports included the Lummi Nation Climate Change Mitigation and Adaptation Plan (CCMAP), the Lummi Reservation Coastal Protection Guidelines (CPG), the Lummi Nation Water Conservation Plan (WCP), and the Lummi Nation Atlas (LNA).

There are approximately 38-miles of marine shoreline within the Lummi Nation Reservation. In their current state, many of the shores within the Reservation are currently armored to prevent (and slow) erosion and shoreline retreat, protecting the established residential and commercial infrastructure (Johannessen, et al., 2007). While the typical goal of shoreline armoring is to create a bulkhead to halt shoreline retreat and protect development, the report notes that the use of bulkheads can exacerbate shoreline erosion as sea levels rise (Johannessen, et al., 2007). This leads to significant degradation and loss of nearshore habitats, impacting shoreline beyond the armored beachfront as well as local marine species and surrounding habitation.

The Climate Change Mitigation and Adaptation Plan assessed the vulnerability of Tribal coastal resources to climate change



risks [sea level rise, sea water inundation, and storm surge]. The assessment marked both the shoreline and tidelines as highly vulnerable to sea level rise and erosion; active mitigation may be required where accelerated erosion threatens to destabilize important infrastructure (Kuhlman, et al., 2016). However, both of the reports agreed that passive erosion mitigation efforts such as managed shoreline retreat and beach nourishment promote the long-term viability of ecological systems (Kuhlman, et al., 2016 & Johannessen, et al., 2007).

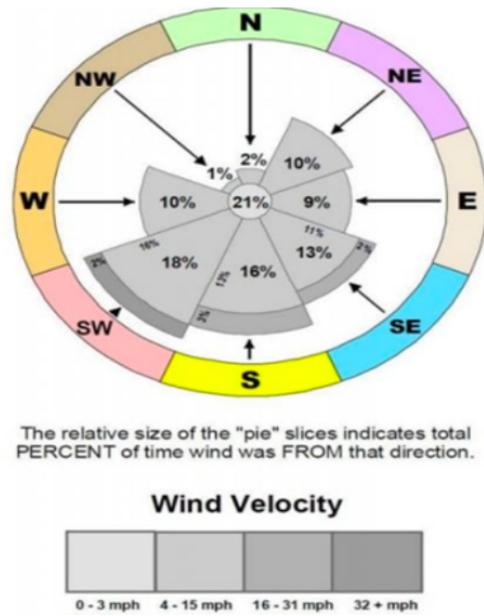
Managed retreat [the accommodation of space to enable shoreline translation] can enable salt marshes, sand dunes, and beaches to transgress (move landwards while maintaining their overall form) (Johannessen, et al., 2007). Beach nourishment with or without composite structures is the only appropriate erosion control method available to actively mitigate

erosion potential without significantly impacting surrounding habitat and ecological features. Applied on a case-by-case basis to beaches within the study area, beach nourishment would include the deposition of graded rock and sand onto beach fronts that face minimal to low risk of erosion.

While beachfront management and erosion control remain a short term concern for both built infrastructure and ecological preservation, sea level rise and the ramifications of a worst case scenario should be considered when establishing long term development plans. The Climate Change Mitigation and Adaptation Plan (2016) report places potential sea level rise at Gooseberry Point to up to three feet. A three foot sea level rise would inundate the study area. In this event, the only viable strategy identified in the Mitigation and Adaptation plan is a managed retreat strategy with shoreline armoring used to protect 'at risk' tribal assets.

Examining Climate Data - The predominant prevailing wind direction in Lummi Nation originates from the south-west (18%), south (16%), and south-east (13%), as depicted below. Winds from the north-west have the lowest angular percentage on average. In general, wind speeds are 0-15 mph but have been known to reach upwards of 32+mph.

2.7 Sea Level Rise

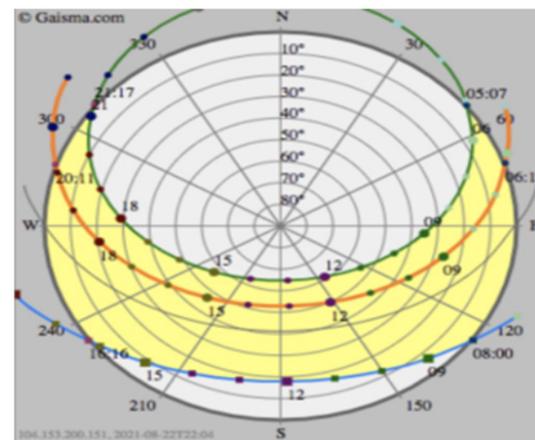


Bellingham wind directions and velocity.
(Climate data Files on Canvas)

Of the south-west winds, 16% lie between 0-15 mph and 2% reach 32+. The average wind speed on Lummi falls around 7-8 mph. Wind direction is not of critical importance to local structural design as wind speeds rarely exceed 32 mph. Moreover, hurricanes or other extreme wind events are not an existing hazard. Wind direction is, however, a consideration to be made when creating a comfortable community space at Gooseberry Point. Knowledge of prevailing winds is quite useful in designing the

orientation of an indoor/outdoor community space on the study area.

Solar angles are another important aspect to consider in determining if the study area is a good fit for the new marina. Solar angles change seasonally. Solar noon, the point in a day where the sun has the highest angle, varies significantly throughout the year (see figure below). During the summer months at Gooseberry Point, the sun reaches a maximum height of 64.7 degrees in the sky while it drops to a maximum height of 18.2 degrees in the winter. Maximizing the energy from the sun is extremely important when deciding the location and height of buildings in a new development. Ideally, developments would coordinate solar angles with the streets or parks to maximize the

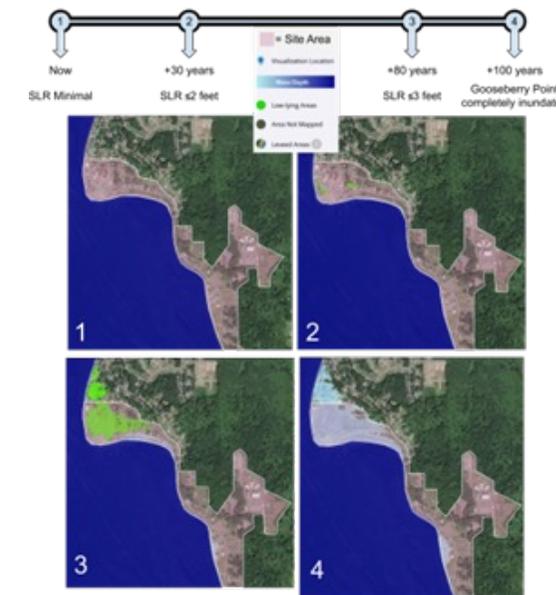


Sun Path Diagram for Bellingham Washington
(Sourced from gaisma.com).

amount of energy [a view plane] (Hack, 2018). Solar angles also play a role in determining the relative temperature on the ground. Creating areas of high albedo can help dispel heat from urban areas; places like forests and parks reflect more heat away compared to the average urban area.

Building height and street width have the largest impact on what percentage of sunlight is blocked. Shading from current development at Gooseberry Point does not significantly impact the surrounding natural environment; the buildings are not tall enough to create large, shaded areas. New developments within the study area should aim to minimize height, maximize solar angles, and limit environment impacts.

Gooseberry Point and Fisherman's Cove are part of a low-lying area of the Lummi Reservation lands and are threatened by sea level rise (SLR) and coastal flooding. The adoption of managed shoreline retreat (MSR) and/or managed shoreline accommodation (MSA) will be crucial to the long-term prosperity of the Lummi fishing industry and future commercial economy. A general timeline for the level of sea level rise at Gooseberry Point is shown below. Managed Shoreline Retreat is a set of



NOAA, 2022), Dronkers et al, 1990

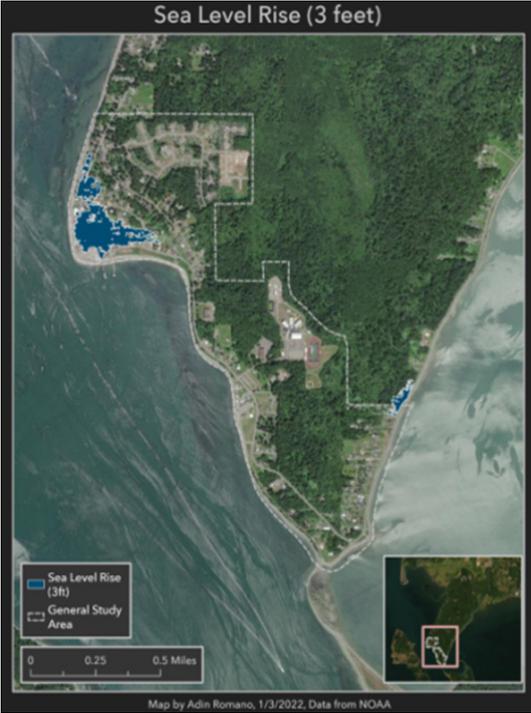
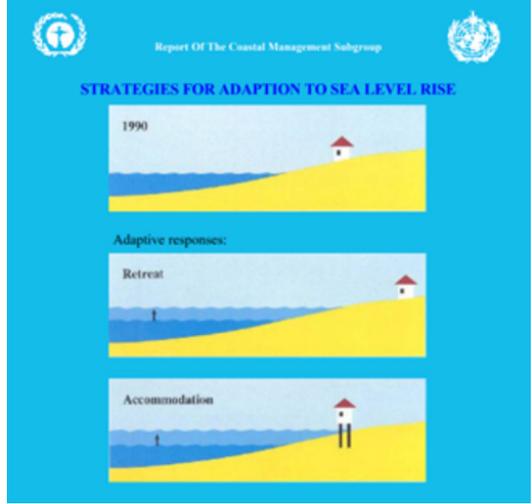
policies and planning principles that seek to move coastal development inland to account for rising sea levels to maintain infrastructure and prevent damage to shoreline properties (Dronkers et al, 1990, p. 6). The Lummi Nation has been moving coastal developments on tribal lands away from areas that will become inundated or flooded due to SLR and coastal flooding, but conflicts are likely to arise when the tribe eventually tries to apply the same strategy to fee lands. Alternatively, Managed Shoreline Accommodation involves the elevation of existing structures while adapting land use and regulations to maintain an area's



functions or to avoid moving the population (Dronkers et al, 1990, p. 7). It is important to note that both MSR and MSA would have potentially negative effects on the cultural resources buried on Gooseberry Point. MSR would mean abandoning those cultural resources to flooding events, possibly incurring a high cultural cost, and MSA could likely disturb those cultural resources and incurring and involve recovery processes (Dronkers et al, 1990, p. 17). One way to prevent damage to shoreline properties is to utilize soft-bank protection, a form of riverbank stabilization that can be applied to marine shorelines. Soft-bank protection uses vegetation, artificial

wetlands, and large wood debris to soften the impacts from storm surge and flooding in contrast to hard-bank protection or shoreline armoring, which uses artificial materials like concrete or riprap (Dronkers et al, 1990, p. 8).

Soft-bank protection allows for the inland migration of coastal wetlands and has minimal effects on coastal environments, whereas hard-bank protections would pose adverse effects on the eelgrass beds and other marine resources (Dronkers et al, 1990, p. 9).



Three foot sea level rise projection.



Three foot sea level rise in Fisherman's Cove.

In the Lummi Nation Climate Change Mitigation and Adaptation Plan (2016), Lummi Nation has stated the concern of coastal sea level rise. While there are no exact projections of sea level rise, it is likely sea level rise will impact Gooseberry Point in the future. The figures above depict the intensity of sea level rise (NOAA's varying levels of confidence in the projections).

Low and High level confidence three foot sea level rise in Fisherman's Cove.



2.8 Principles Moving Forward

Below are three guiding principles that serve to guide further planning studies for the Gooseberry Point planning area:

Guiding Principle 1: Seven generation planning

Planning for the Gooseberry Point area should consider past, present, and future uses, as well as diverse age groups and populations which will use the site. The recommendations presented for the study area should engage with the past (in historical and cultural significance), the present (current community needs and desires), and the future (how would the actions recommended adapt to and/or alter future conditions).

Guiding Principle 2: Adaptability and Resilience

Plans for Gooseberry Point should consider changing community needs as well as climate conditions. The area should build upon community capacity for adaptation, while considering the capacity of the area to continue to serve the tribe with changing conditions such as sea level rise in order to prevent development plans from becoming obsolete. Adaptability regards the ability for residents to continue to use the site to meet their needs.

Guiding Principle 3: Local knowledge

The knowledge of local residents and informed community members in developing plans for Gooseberry Point is central to any planning effort. This requires effective outreach to ensure that community priorities drive the planning process.

2.9 References

Built Environment:

Brennan, N. (2021, November 24). Recent flooding isolated Lummi Nation. Here's how the Tribe continued to provide services. The News Tribune. <https://www.thenewstribune.com/news/state/washington/article255970362.html>

Google. (n.d.) Retrieved November 4, 2022 from www.google.com/maps/@48.7313989,-122.6625574,2043m/data=!3m1!1e3

Kuhlman, K., Lange, M., Freimund, J., & Gabrisch, G. (2016). Lummi Nation Strategic Energy Plan 2016-2026. Water Resources Division Lummi Natural Resources Department. www.lummi-nsn.gov/userfiles/1_Strategic%20Energy%20Plan%20FINAL.pdf

Google. (n.d.) Retrieved November 4, 2022 from <https://www.google.com/maps/@48.7313989,-122.6625574,2043m/data=!3m1!1e3>

Kuhlman, K., Lange, M., Freimund, J., & Gabrisch, G. (2016). Lummi Nation Strategic Energy Plan 2016-2026. Water Resources Division Lummi Natural Resources Department. https://www.lummi-nsn.gov/userfiles/1_Strategic%20Energy%20Plan%20FINAL.pdf

Lummi Natural Resources Department. (2015). Lummi Nation multi-hazard mitigation plan: 2015 update. https://www.lummi-nsn.gov/userfiles/79_MHMP%202015%20Update%20FINAL%20wAPPENDICES.pdf

Lummi Natural Resources Department. (2016). Lummi Nation climate change mitigation and adaptation plan: 2016-2026. https://www.lummi-nsn.gov/userfiles/360_Climate%20Change%20Assessment%20FINAL.pdf

Lummi Planning Department & Lummi Planning Commission. (2022). Lummi Land Use Development Regulations. In Lummi Nation. <https://www.lummi-nsn.gov/Website.php?PageID=422>

Lummi Indian Business Council. (2016). Lummi nation atlas: An overview of the history, natural and economic resources, and culture of the Lummi nation. https://lummi-nsn.gov/userfiles/63_2016LummiAtlas.pdf

Lummi Nation. (2015a). Lummi Nation Fisherman's Cover Working Waterfront: Application for TIGER 2015 Funding Support. https://www.whatcomcounty.us/DocumentCenter/View/48160/LummiFishermansCove_2015TIGER-Application-FINAL

Lummi Nation. (2015b). Title 18 Lummi code of laws solid waste disposal code. https://www.lumminsn.gov/userfiles/393_Title_18_Solid_Waste_Control_and_Disposal_Code_Resolution__2016-014.pdf

Lummi Nation. (2019). Lummi Nation Transit Schedule. www.lummi-nsn.gov/userfiles/459_LummiTransitScheduleREVISED06-20-19.pdf

Lummi Nation. (2022a). Title 15 Lummi Nation code of laws land use zoning and development code. www.lummi-nsn.gov/userfiles/831_Title15LandUseDevelopmentandZoningCode2022-055.pdf

Lummi Nation. (2022b). Title 16 Lummi Nation code of laws sewer and water district code. https://www.lummi-nsn.gov/userfiles/831_Title16SewerandWaterDistrictCode2022-056.pdf

Lummi Nation. (2022c). Lummi Nation

Floodplain Management Plan: 2022 Progress Report. https://www.lummi-nsn.gov/userfiles/72_Activity510MHMPProgressReport2022FINAL.pdf

Lummi Tribal Sewer and Water District. (2022). Lummi Tribal District sewer system. <https://ltswd.com/sewer-system/>

Port of Bellingham Economic Development Division. (2021). Whatcom County Comprehensive Economic Development Strategy (CEDS) 2022 - 2026. www.whatcomcounty.us/DocumentCenter/View/63493/Whatcom-County-CEDS-2022-2026-11052021

Seattle District Corps of Engineers. (2016). Puget Sound Nearshore Ecosystem Restoration: Final Integrated Feasibility Report and Environmental Impact Statement. [wdfw.wa.gov/sites/default/files/2019-06/Puget%20Sound%20Nearshore_Final-Feasibility-Report-EIS_2016_0.pdf](https://www.wdfw.wa.gov/sites/default/files/2019-06/Puget%20Sound%20Nearshore_Final-Feasibility-Report-EIS_2016_0.pdf)

US Department of the Interior Bureau of Indian Affairs. (2012). Tidelands Lease Agreement for Lummi Island Ferry Service. www.whatcomcounty.us/DocumentCenter/View/1178/Comprehensive-Ferry-Lease-Documents-PDF.20FINAL.pdf

US Department of Transportation Federal Highway Administration. (2022). R&T Portfolio: Federal Lands Highway Research.

National Oceanic and Atmospheric Administration. (2022, May 19). NOAA Sea Level

Rise Viewer. Sea Level Rise Viewer. Retrieved December 5, 2022, from <https://coast.noaa.gov/slr/#/layer/slr>

Köster, S. (2021). How the sponge city becomes a supplementary water supply infrastructure. *Water-Energy Nexus*, 4, 35–40. <https://doi.org/10.1016/j.wen.2021.02.002>

Sun, Y., Deng, L., Pan, S.-Y., Chiang, P.-C., Sable, S. S., & Shah, K. J. (2020). Integration of green and gray infrastructures for Sponge City: Water and energy nexus. *Water-Energy Nexus*, 3, 29–40. <https://doi.org/10.1016/j.wen.2020.03.003>

Whatcom Transportation Authority Planning Department. (2022). Whatcom Transportation Authority Route Profiles. <https://storymaps.arcgis.com/stories/d5286729b20b4094b43d83c13ed2f753>.

Socioeconomic

Kuhlman et al., 2016. Lummi Nation Climate Change Mitigation and Adaptation Plan: 2016-2020. U.S. EPA, Water Resources Department, Lummi Natural Resources Department.

Joe, J. et al. (2008), Final Report: Participatory Evaluation of the Lummi Nation’s Community Mobilization Against Drugs Initiative/Bureau of Justice Assistances Indian Alcohol and Substance Abuse Demonstration Project, Native American Research and Training Center, <https://www.ojp.gov/pdffiles1/nij/grants/222741.pdf>

Lummi Indian Business Council. (n.d.). Lummi Nation Opportunity Zone Presentation - City of Bellingham. COB.org. Retrieved October 31, 2022, from <https://www.cob.org/wp-content/uploads/opportunity-zone-presentation-ln.pdf>

US Census Bureau. (2017) “My Tribal Area.” United States Census Bureau, Center for New Media & Promotion (CNMP) <https://www.census.gov/tribal/>

[census.gov/tribal/?aianihh=2070](https://www.census.gov/tribal/?aianihh=2070).

Ecology

Alber, M. & Flory, J. (2005). Environmental effects of docks and marinas. Georgia Coastal 30 Research Council.

First, L., Freimund, J. & Solomon, V. (2004). Lummi Nation water conservation plan. Lummi Water Resource Division.

Hack, G. (2018). Site planning: International practice. The MIT Press. (Vol. 1).

Johannessen, J. & MacLennan, A. (2007). Final Lummi Reservation coastal protection guidelines. Coastal Geologic Services, Inc.

Liu, J., Dietz, T., Carpenter, S., Alberti, M., Folke, C., Moran, E., Pell, A., Deadman, P., Kratz, T., Lubchenco, J., Ostrom, E., Ouyang, Z., Prvencher, W., Redman, C., Schneider, S., Taylor, W. (2007). Complexity of coupled human and natural systems. *Science*, 317: 1513-1516.

Lummi Indian Business Council. (2016). Lummi Nation Atlas

Lummi Indian Business Council. (2022). Lummi Nation Atlas

Lummi Nation. (2022.). from <https://www.lummi-nsn.gov/>

Nguyen, N. T. H., Friess, D. A., Todd, P. A., Mazor, T., Lovelock, C. E., Lowe, R., Gilmour, J., Ming Chou, L., Bhatia, N., Jaafar, Z., Tun, K., Yaakub, S. M., & Huang, D. (2022). Maximizing resilience to sea-level rise in urban coastal ecosystems through systematic conservation planning. *Landscape and Urban Planning*, 221.

Taylor, T. (2022). Lummi Nation comprehensive economic development strategy. Office of Economic Policy.

Uretek Gulf Coast. (14 April, 2020). Soil for your building foundation. <https://uretek.gulfcoast.com/types-soil-for-building-foundation-dirt/>

Water Resources Division & Lummi Natural Resources Department. (16 February, 2016). Lummi Nation climate change mitigation and adaptation plan.

Water Resources Division & Lummi Natural Resources Department. (2020). Lummi Nation multi-hazard mitigation plan. 2020 update.

Wendt, P. H., R. F. Van Dolah, et al. (1996). Wood preservative leachates from docks in an estuarine environment. *Archives of Environmental Contamination and Toxicology* 31: 24-37. 31

Walker, R., Jojola, T., & Natcher, D. (2013). Reclaiming indigenous planning: Reclaiming indigenous planning. McGill-Queen's University Press.

Community

Ballew Sr., Tim. (2022). “Intro to Salish Sea with Tim Ballew, Sr.”. Western Washington University. Lecture.

Brennan, Natasha. (2021). “We are the land' Washington Tribes Celebrate Indigenous Peoples Day, Highlight Climate Crisis” Indian Country Today. <https://indiancountrytoday.com/news/we-are-the-land>

Building a house of healing. FOUNDATION. (n.d.). Retrieved December 10, 2022, from

<https://foundation.wvu.edu/building-house-healing-longhouse-western>

Census profile: Lummi reservation CCD, Whatcom County, WA. Census Reporter. (n.d.).

Retrieved December 10, 2022, from <https://censusreporter.org/profiles/06000US5307391760-lummi-reservation-ccd-whatcom-county-wa/>

Home. SAGE Architectural Alliance. (n.d.). Retrieved December 10, 2022, from

<https://sagearchalliance.com/lummi-nation-mens-transitional-housing/>

Google Earth. 2020. <https://earth.google.com/web/search/2665+Kwina+Rd,+Bellingham,+WA>

Guardian News and Media. (2022, March 30). The indigenous tribe fighting back against the addiction epidemic. The Guardian. Retrieved December 10, 2022, from <https://www.theguardian.com/us-news/2022/mar/30/lummi-nation-fights-addiction-epidemic-care-program>

Hillaire, Pauline R..R. A Totem Pole History : The Work of Lummi Carver Joe Hillaire, edited by Gregory P. Fields, Nebraska, 2013. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/www/detail.action?docID=1477350>.

Han B;Compton WM;Jones CM;Einstein EB;Volkow ND; (n.d.). Methamphetamine use, methamphetamine use disorder, and associated overdose deaths among us adults. *JAMA psychiatry*. Retrieved December 10, 2022, from <https://pubmed.ncbi.nlm.nih.gov/34550301/>

Indian Leadership for Indian Health (2022).

<https://www.npaih.org/member-tribes/>

lummi-nation/#:~:text=County%3A%20Whatcom%2C%20population%20117%2C200.,living%20on%20the%20Lummi%20Reservation.

Jojola, T., & Shirley, M. (2017). Indigenous Planning: Replanting the Roots of Resistance. In *The Routledge Handbook of Community Development: Perspectives From Around the Globe* (1st ed., pp. 325–339).

Jones, A. D., Hester, R. T., Hou, J., Lawson, L. J., & McNally, M. J. (Eds.). (2017). *Design as democracy : Techniques for collective creativity*. Island Press.

Lummi Nation. (1998). Constitution and Bylaws of the Lummi Tribe of the Lummi Reservation, Washington as Amended. <https://narf.org/nill/codes/lummi/Constitution.pdf>.

Lummi Nation. (n.d.). Retrieved November 6, 2022, from <https://www.lummi-nsn.gov/Website.php?PageID=215>

Lummi Nation. (2021). NPAIHB - Indian Leadership for Indian Health. <https://www.npaih.org/member-tribes/lummi-nation/>

Lummi Nation Atlas. (2016). LIBC (Lummi Indian Business Council.) https://lummi-nsn.gov/userfiles/63_2016LummiAtlas.pdf

Lummi Administration Building. LIFAC Reports and Additional Information. (n.d.). Whatcom County, Washington. Retrieved November 6, 2022, from <https://www.whatcomcounty.us/3149/LIFAC-Reports-and-Additional-Information>

Lummi Nation Climate Change Mitigation and Adaptation Plan (p. 149). (2016). Lummi Indian Business Council. https://www.lummi-nsn.gov/userfiles/360_Climate%20Change%20Assessment%20FINAL.pdf

[nsn.gov/userfiles/360_Climate%20Change%20Assessment%20FINAL.pdf](https://www.lummi-nsn.gov/userfiles/360_Climate%20Change%20Assessment%20FINAL.pdf)

Lummi Nation Comprehensive Economic Development Strategy (2022). https://www.instructure.com/courses/1591210/files/95890611?module_item_id=16645962

Lummi Nation School (2022). <https://www.lummi-nsn.org/onlinelearning.org/>

Lummi Tribal Housing Authority. HUD.gov / U.S. Department of Housing and Urban Development (HUD). (n.d.). Retrieved December 10, 2022, from https://www.hud.gov/program_offices/public_indian_housing/ih/codetalk/onap/nwonap/lummi

Lummi Nation. (n.d.). Transportation. Planning | Transportation. Retrieved December 9, 2022, from <https://www.lummi-nsn.gov/Website.php?PageID=459>

Lummi Nation. (n.d.). Lummi Tribal Health Center. Retrieved December 8, 2022, from <https://www.lummi-nsn.gov/Website.php?PageID=433>

Michael Marker (2000) Lummi identity and white racism: When location is a real place, *International Journal of Qualitative Studies in Education*, 13:4, 401-414, DOI:10.1080/095183900413359.

Moovit. (n.d.). 50 route: Schedules, Stops & Maps - 50 Downtown (updated). Gooseberry Pt & Downtown Whatcom Transportation Authority. Retrieved December 8, 2022, from https://moovitapp.com/index/en/public_transit-line-50-Seattle_Tacoma_Bellevue_WA-522-1719605-23121728-0

Northwest Indian College (2022). Our Community <https://www.nwic.edu/about-nwic/community/>

Richardson, A., & Galloway, B. (2011). Nooksack Place Names: Geography, Culture, and Language. UBC Press, 40. Sacred Sea | for a living Salish Sea. (n.d.). Sacred Sea. Retrieved November 6, 2022, from <https://sacredsea.org/>

Sche'lang'en village Lummi Nation Housing Authority. United for Youth. (n.d.). Retrieved December 10, 2022, from <https://www.unitedforyouth.org/best-promising-innovative-work-underway/schelangen-village-lummi-nation-housing-authority>

United for youth. (n.d.). Retrieved December 11, 2022, from <https://www.unitedforyouth.org/sites/default/files/2021-05/Sche%27lang%27en%20Village.pdf>

Vinish, Kirk. (2022) “ Gooseberry Point Ferry Doc Relocation Project”. Lummi Nation Administration Building.

Zaferatos, Nicholas. (2022). “Native American Reservation Sovereignty, Conflict, and Political Pluralism.” Western Washington University. Lecture.

Zaferatos, N. C. (2015). Planning in Native American Reservation Communities: Sovereignty, Conflict and Political Pluralism. In Cities and the Politics of Difference: Multiculturalism and Diversity in Urban Planning. University of Toronto Press.



3.1 Gooseberry Point Neighborhood Design Goals

The goals and principles supporting the planning concepts presented for the Gooseberry Point study area reflect those gleaned from community plans, surveys, and interviews conducted during the study period. Community planning goals and visions contribute to fostering a materially and spiritually prosperous community to achieve the Lummi Nation’s desired future. The happiness, health, and well-being of the entire community is therefore a foremost goal in this vision.

The interconnection between environment, economic and social systems, individual members and the entire community and its institutions, are an inherent planning goal sought in this study. The goal of the study is to identify alternative concepts for the development of Gooseberry Point, over the course of generations, to promote economic and community well-being, while anticipating and responding to environmental threats associated with climate change.



Architectural Elements Respecting Traditional Design

- Use of local materials, natural colors, and natural/open lighting
- Use of internal courtyards, porches, and other social spaces to foster greater community interaction
- Developing outdoor spaces to include community gardens, indigenous plants, and community facilities (i.e. a community fish smokehouse)
- Feature local artwork as elements of building structure
- Out-buildings providing for storage of equipment



A building entrance combining both traditional and modern architectural elements.



Traditional



Contemporary



Modern

Cultural	<ul style="list-style-type: none"> • Preserve and manage cultural resources to meeting the social, environmental, spiritual, and economic needs of present and future generations • Promote cultural classes on canoe making, totem carving, wood carving, basket weaving, storytelling, herbal medicine, etc. • Encourage creation of cultural and ceremonial facilities including smokehouses, sweat lodges, family ceremonial buildings, churches, cemeteries, and other cultural constructions • Develop a tourist industry that educates non-tribal members on Lummi culture while safeguarding environmental, natural, and cultural resources from the impacts of tourism
Economic Development	<ul style="list-style-type: none"> • Work with Lummi fishers, artists, and farmers to develop a public market • Broaden the employment options available in the fishing sector • Foster fishing industry advancements through infrastructure modernization • Consolidate fractured/divided land holdings in trust and fee lands • Strategically locate economic villages to increase access to jobs for tribal residents • Strengthen employment opportunities for tribal members • Provide a diverse array of employment options that support traditional culture and values, including full-time, part-time, seasonal, mentorships, and internship employment • Expansion of the Gooseberry Point Marina, Lummi Bay Market, and the boat launch to provide job opportunities for unemployed tribal members
Food Security	<ul style="list-style-type: none"> • Recognize food sovereignty as a right to the people to define and have access to healthy and culturally appropriate food that comes from the land • Improve food access and local entrepreneurial options by creating rentable spaces for businesses and adding a grocery store.
Natural Resources	<ul style="list-style-type: none"> • Protect, maintain, and enhance environmentally sensitive habitats • Develop a plan to protect people and property from damage during flood events • Use the Lummi Nation’s relationship with the natural environment as a model of stewardship to sustain water and resources for generations • Maintain and enhance coastal wetland habitats • Facilitate shoreward migration of coastal wetlands though land acquisition and removal of hard shore protection (e.g., bulkheads, dikes, sea walls) or other barriers to tidal flow • Limit lands in the 100-year floodplains to low intensity land uses. • Mitigate risk of storms, especially storms fueled by west to northwest winds • Facilitate managed retreat through land acquisition, zoning changes, development restrictions, and/or other regulatory tools as appropriate

<i>Cultural</i>	<ul style="list-style-type: none"> • Preserve and manage cultural resources to meeting the social, environmental, spiritual, and economic needs of present and future generations • Promote cultural classes on canoe making, totem carving, wood carving, basket weaving, storytelling, herbal medicine, etc. • Encourage creation of cultural and ceremonial facilities including smokehouses, sweat lodges, family ceremonial buildings, churches, cemeteries, and other cultural constructions • Develop a tourist industry that educates non-tribal members on Lummi culture while safeguarding environmental, natural, and cultural resources from the impacts of tourism
<i>Economic Development</i>	<ul style="list-style-type: none"> • Work with Lummi fishers, artists, and farmers to develop a public market • Broaden the employment options available in the fishing sector • Foster fishing industry advancements through infrastructure modernization • Consolidate fractured/divided land holdings in trust and fee lands • Strategically locate economic villages to increase access to jobs for tribal residents • Strengthen employment opportunities for tribal members • Provide a diverse array of employment options that support traditional culture and values, including full-time, part-time, seasonal, mentorships, and internship employment • Expansion of the Gooseberry Point Marina, Lummi Bay Market, and the boat launch to provide job opportunities for unemployed tribal members
<i>Food Security</i>	<ul style="list-style-type: none"> • Recognize food sovereignty as a right to the people to define and have access to healthy and culturally appropriate food that comes from the land • Improve food access and local entrepreneurial options by creating rentable spaces for businesses and adding a grocery store.
<i>Natural Resources</i>	<ul style="list-style-type: none"> • Protect, maintain, and enhance environmentally sensitive habitats • Develop a plan to protect people and property from damage during flood events • Use the Lummi Nation’s relationship with the natural environment as a model of stewardship to sustain water and resources for generations • Maintain and enhance coastal wetland habitats • Facilitate shoreward migration of coastal wetlands through land acquisition and removal of hard shore protection (e.g., bulkheads, dikes, sea walls) or other barriers to tidal flow • Limit lands in the 100-year floodplains to low intensity land uses. • Mitigate risk of storms, especially storms fueled by west to northwest winds • Facilitate managed retreat through land acquisition, zoning changes, development restrictions, and/or other regulatory tools as appropriate

<i>Climate Change</i>	<ul style="list-style-type: none"> • Promote a reduction to the causes of climate change • Increase Lummi Nation capacity to prepare for climate change impacts • Increase the adaptive capacity of Reservation-wide natural, social, and built systems • Implement strategies of the Lummi Nation Climate Change Mitigation and Adaptation Plan • Modify building and land use codes to consider flooding risks and mitigation measures • Maintain and expand shellfish enhancement on tribal tidelands
<i>Tribal Village and Urban Form</i>	<ul style="list-style-type: none"> • Create 5-minute walking districts, mixed use areas and place-based character districts • Build on existing energy around Stommish Grounds, Lummi School, Wex’liem building, Fisherman’s Cove, marina, and marine commercial businesses to create holistic neighborhood with job opportunities to meet local needs • Consider gateways to the community from the water • Encourage site and building design consistent with creating a walkable environment • Promote interconnected networks of parks and open spaces supporting a neighborhood structure of dense, compact, mixed-use districts • Promote mixed-use villages with a diverse range of housing types • Incorporate amenities in residential villages, such as community spaces, green features, community gardens, and small business spaces
<i>Architectural Design</i>	<ul style="list-style-type: none"> • Incorporate traditional Lummi design methods and values in future developments • Promote multi-generational and transitional housing applying traditional design themes • Build infrastructure to support festivals at Goosebury Point and the Stommish Grounds • Promote a working fishing village at incorporating a marina • Encourage sustainable, low-impact development that optimizes the balance between conserving resources and the highest and best uses of land for community benefit • Encourage creation of cultural and ceremonial facilities including smokehouses, sweat lodges, family ceremonial buildings, churches, cemeteries, and other cultural uses • Development should honor past settlement
<i>Housing</i>	<ul style="list-style-type: none"> • Provide different types of housing including transitional homes and elder housing • Create future housing at a scale and intensity that accommodates future demand for residential and commercial development and services • Support forms of housing that facilitate a strong sense of community • Encourage accessory buildings and other forms of housing that are more affordable to those with lower incomes

3.2 Strengths and Opportunities

The research identified five categories of strengths and opportunities in the Gooseberry Point area. These strengths include the Lummi fishing industry, commercial development, urban village development, cultural facilities, and natural resources.

The Lummi fishing industry is one of the communities' greatest strengths. With a well-established fishing culture, established treaty fishing rights, and the largest fishing fleet of any tribe in the United States, fishing plays a vital role to the cultural and economic development of the Lummi community. Development opportunities to capitalize on this strength include expansion of marina facilities that include boat moorage, storage, and repair facilities; fish processing expansion to support the industry; and a community fish market making fish products more available to regional markets. In addition to a fish market, commercial development opportunities can expand on the new Lummi Bay Market, establishing a full-service grocery store to better provide for community food needs.

These economic elements, when combined with future housing and urban village development, would increase connectivity, emphasize walkability, and create more housing opportunities, while ensuring local access to work opportunities and resident services. Combined, these elements contribute to building a stronger community and sense of place, while encouraging closer bonds between youths, working adults, and community elders.

Finally, the development concepts presented in this report, inclusive of fisherman's facilities, housing expansion, and community services, are designed with an emphasis in expanding environmental resources to enhance the Gooseberry Point waterfront while mitigating climate change impacts and enhancing the robust natural resources available to the tribe.



GOOSEBERRY POINT VILLAGE

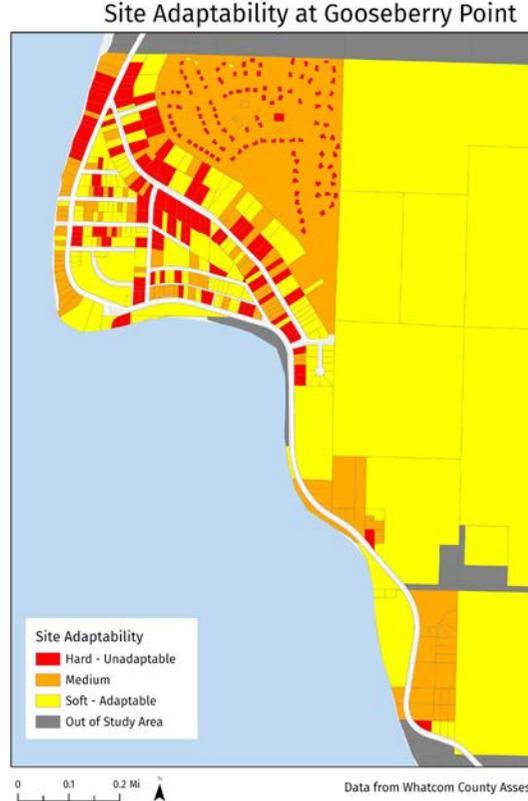
	Opportunities	Strengths
Fisheries Industry	Space to improve and expand facilities supporting fishing industry Opportunities in reviving/expanding fish processing facilities Expansion opportunities for community fish buying and processing	Well-developed fisheries industry Established economic development leadership and staffing Extensive treaty fishing U&A
Market Opportunities	Opportunity to establish food and arts marketplace Overcome food desert with new grocery store	Availability of Lummi youth services Strong sense of cultural identify and belonging Expansive arts and craft workers Strong artistic community Existing Fisherman's Cove assets
Urban Village Development	Development of pedestrian / multi modal transportation systems Increase high-speed internet access Expansion of urban utilities Opportunities to expand housing Opportunities to create community spaces Emphasis on walkable village centers with mixed uses	Lummi capacity to provide public housing Availability of urban utilities Lummi policies supporting sustainable development Concentration of tribal housing at Gooseberry Point
Natural Resources	Restore Gooseberry Point shorelines habitat Emphasize natural shoreline restoration to minimize hazards from climate change.	Technical expertise in Lummi natural resources Current facilities supporting aquaculture
Cultural Development	Spaces that support community values Create integrated pedestrian pathways Expand recreational shoreline facilities Market opportunities for Lummi artists Community gardens to promote self-sufficiency	Established shellfish and fish harvesting tradition Culture, language, food bank programs, and inclusive community development Strong governance and administrative systems Expansive educational facilities and labor force

3.3 Land Use Analysis: Growth Capacity

The first step in the study was to analyze the existing conditions at the site. This involved performing quantitative analysis of each parcel contained in the study area. Students used the Whatcom County Assessor's data on land value and improvement value to determine which sites were "soft", "medium", or "hard". A soft site is preferred for development and has a relatively low improvement value compared to the land value, indicating that the parcel is relatively underutilized. A hard site is a developed site with the value of the improvement exceeding the value of the land. A medium site is characterized as having potential for adapting reuse to a higher economic use or conversion to a natural use when sites are vulnerable to inundation.

Student considered qualitative factors by conducting field work to further evaluate the conditions of each parcel in the study area and compare those observations to the data from the qualitative analysis. One example of how qualitative analysis considered a site as "medium" rather than "hard", and therefore, adaptable to other uses, is by recognizing how certain properties, such as those located north of Fisherman's Cove, are subject to severe coastal flooding. In consideration of Lummi Nation policies that prohibit the construction of protective seawalls, the qualitative analysis considered the threat of sea level as a significant factor for recommending such sites for coastal restoration despite the qualitative analysis' findings that many waterfront properties would otherwise be considered "hard sites."

Based on this analysis, the study identified potential locations on approximately 140 upland acres that could be suitable for the location of future housing development and related urban development.



Site Adaptability at Gooseberry Point

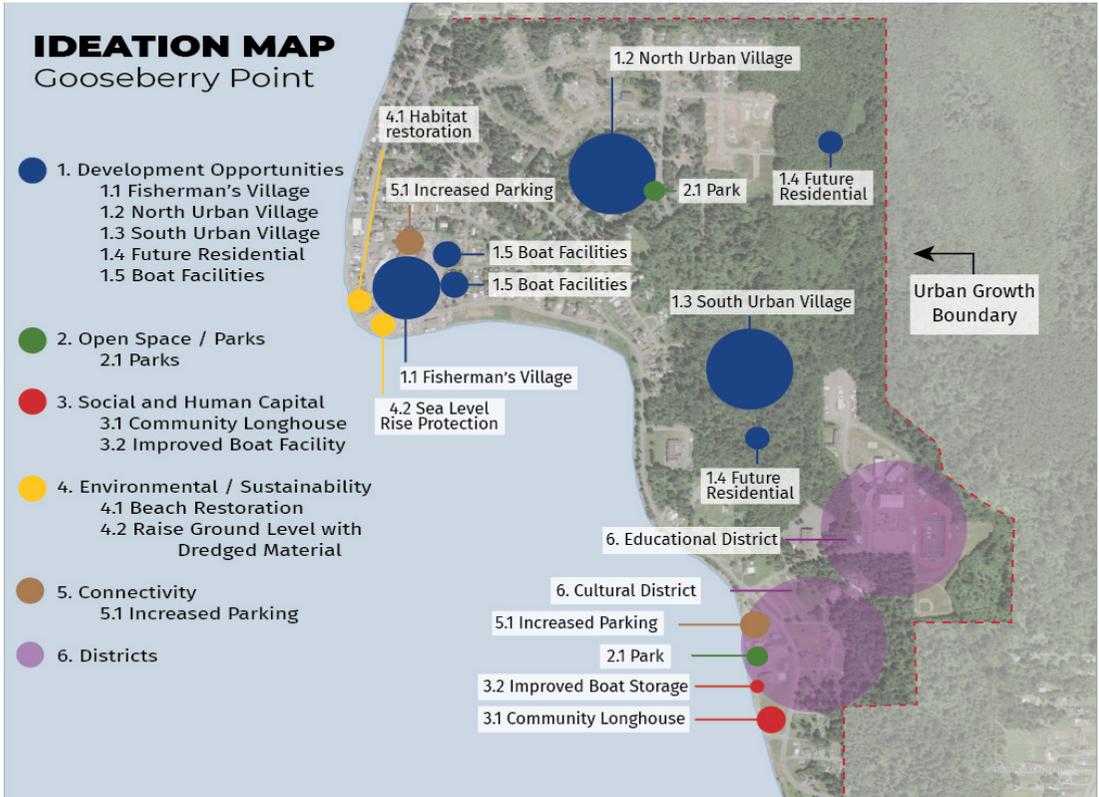
3.4 Ideation Mapping

Development Opportunities

The ideation map shows an urban growth boundary (UGB) that concentrates development within the Gooseberry Point Urban Village and provides a clear separation from other areas of the reservation to preserve rural zones and natural resource areas. Within the urban boundary, three urban village concepts are presented to concentrate neighborhood services and higher density housing in locations that serve current and future residents. While the north and south villages are primarily focused on housing and services within walkability to residents, the Fisherman's Village center concept caters to the reservation's fishing industry. The south village concept is presented as a future development concept as the north village grows and migrates toward southern areas of Gooseberry Point Village.

Districts

Towards the southern portion of the Gooseberry Point Village, the ideation map highlights two districts designated primarily for educational and cultural services. Lummi Nation School is currently located within the educational district and provides additional space for expansion or to support other educational needs. In the cultural district, centered around the Stommish Grounds, the



ideation map suggests further improvements to include an expanded canoe storage facility, a community longhouse as well as increased parking spaces and a park.

Shoreline Restoration

Along the entire Gooseberry Point shoreline, the ideation map identifies several recommendations for habitat restoration, protection from sea level rise, and public access opportunities along a recommended shoreline berm that includes a walking trail.

3.5 Mobility Analysis

Circulation Map

Gooseberry Point would benefit from more reliable transportation, safer pedestrian/bicycle access, and new routes to accommodate denser, mixed-use development in an urban village setting. With a long term view focused on a 7-generation planning model, multimodal transportation would help to develop a more sustainable, equitable, and livable community in the Gooseberry Point area.

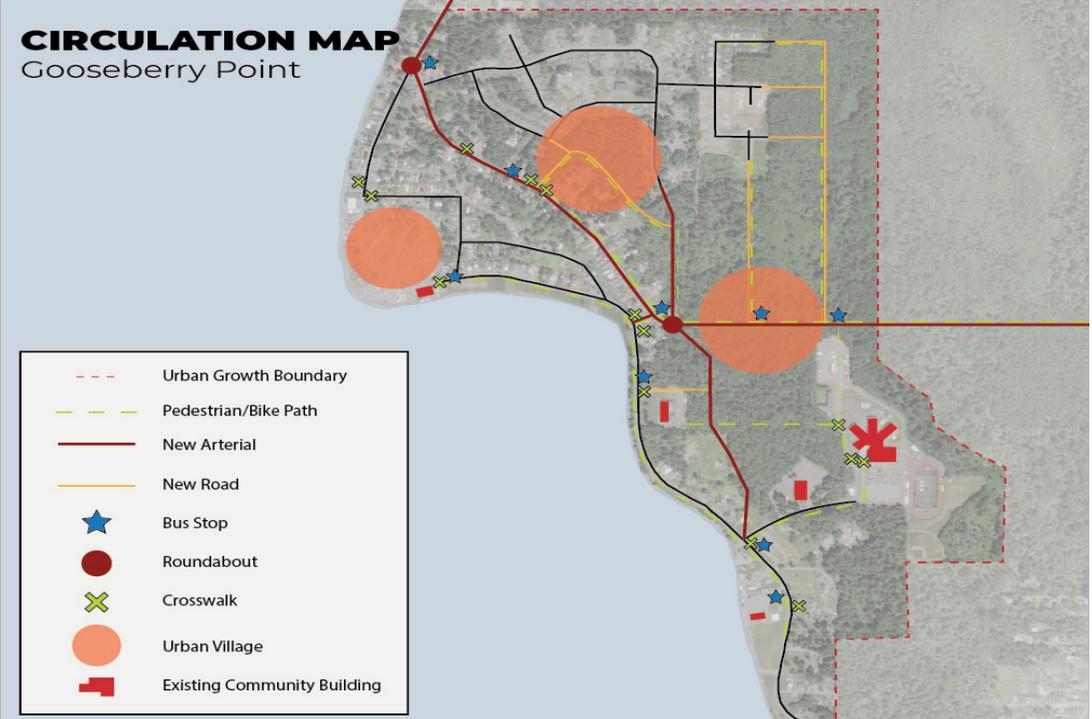
Converting MacKenzie Road as an Arterial

The circulation plan recommends rerouting the main arterial from Lummi Bay Drive to MacKenzie Road in order to provide a bypass around Fisherman's Cove. Rerouting the arterial would limit the impacts of sea level rise and would enable the Fisherman's Cove area to become a thriving economic and cultural center for the Lummi Nation. Current projections suggest 3-5 feet of sea

level rise, which would threaten land areas south of MacKenzie Road if reduction measures aren't implemented. Based on conversations with the community, concerns were also raised about the safety of Lummi Bay Drive, as there have been reports of vehicular speeding and unsafe conditions for pedestrians/bicyclists. Rerouting the arterial through MacKenzie Road would provide an opportunity to build raised crosswalks and implement traffic calming measures to make the corridor safer for pedestrians.

A system of new roads is also suggested to the east and south of the MacKenzie development. These roads could be designed in a compact grid, to support future housing development, and the location of mixed use neighborhood centers supporting walkable neighborhoods, where groceries and essential services are located within a 15-minute walking distance to existing and future housing. An east-west arterial road is also recommended to connect the Gooseberry Point Village with Lummi Shore Road and diverting flow rise, which would threaten land areas south of MacKenzie Road if reduction measures aren't implemented.

Based on conversations with community members, concerns were also raised about the safety of Lummi Bay Drive, as there have been reports of vehicular speeding and unsafe conditions for pedestrians/bicyclists. Rerouting the arterial through MacKenzie Road would provide an opportunity to build raised crosswalks and implement traffic calming measures to make the corridor safer for pedestrians.



Circulation Map

A system of new roads is also suggested to the east and south of the MacKenzie development. These roads could be designed in a compact grid, to support future housing development, and the location of mixed use neighborhood centers supporting walkable neighborhoods, where groceries and essential services are located within a 15-minute walking distance to existing and future housing. An east-west arterial road is also recommended to connect the Gooseberry Point Village with Lummi Shore Road and diverting flow through traffic around the southern tip of the Lummi peninsula.



Safe Routes to School

Public Transportation

The circulation plan includes recommended improvements to public transportation in the study area. Access to a robust and reliable public transportation network would get more cars off the road, allowing for equal access to opportunities while helping the Lummi Nation meet their long-term sustainable development goals. Public transportation also offers a dependable means of travel for youth, elders, and individuals with disabilities, allowing them to meet their travel needs with ease. The circulation plan includes numerous bus stops connecting neighborhood centers, the Fisherman’s Village, the assisted living facility, and the Stommish Grounds with tribal services located on Kwina Road.

Pedestrian/Bike Paths

Based on recommendations in the 2022 Draft Lummi Nation Community Plan, the circulation plan includes protected bicycle paths and pedestrian walkways connecting housing to services, recreational facilities, educational centers, and the Fisherman’s Cover working waterfront. Strengthening the area’s non-motorized transportation system would support a transportation network that connects destinations and services the community uses daily.

Improved pedestrian connections would also provide safer routes to school for the students and staff who live nearby. Developing a series of pedestrian and bicycle infrastructure systems in the Gooseberry Point Village would promote equitable and sustainable modes of transportation as well as foster public health benefits and increased social interaction.



Raised Crosswalk (NACTO, 2013)



Public Transportation

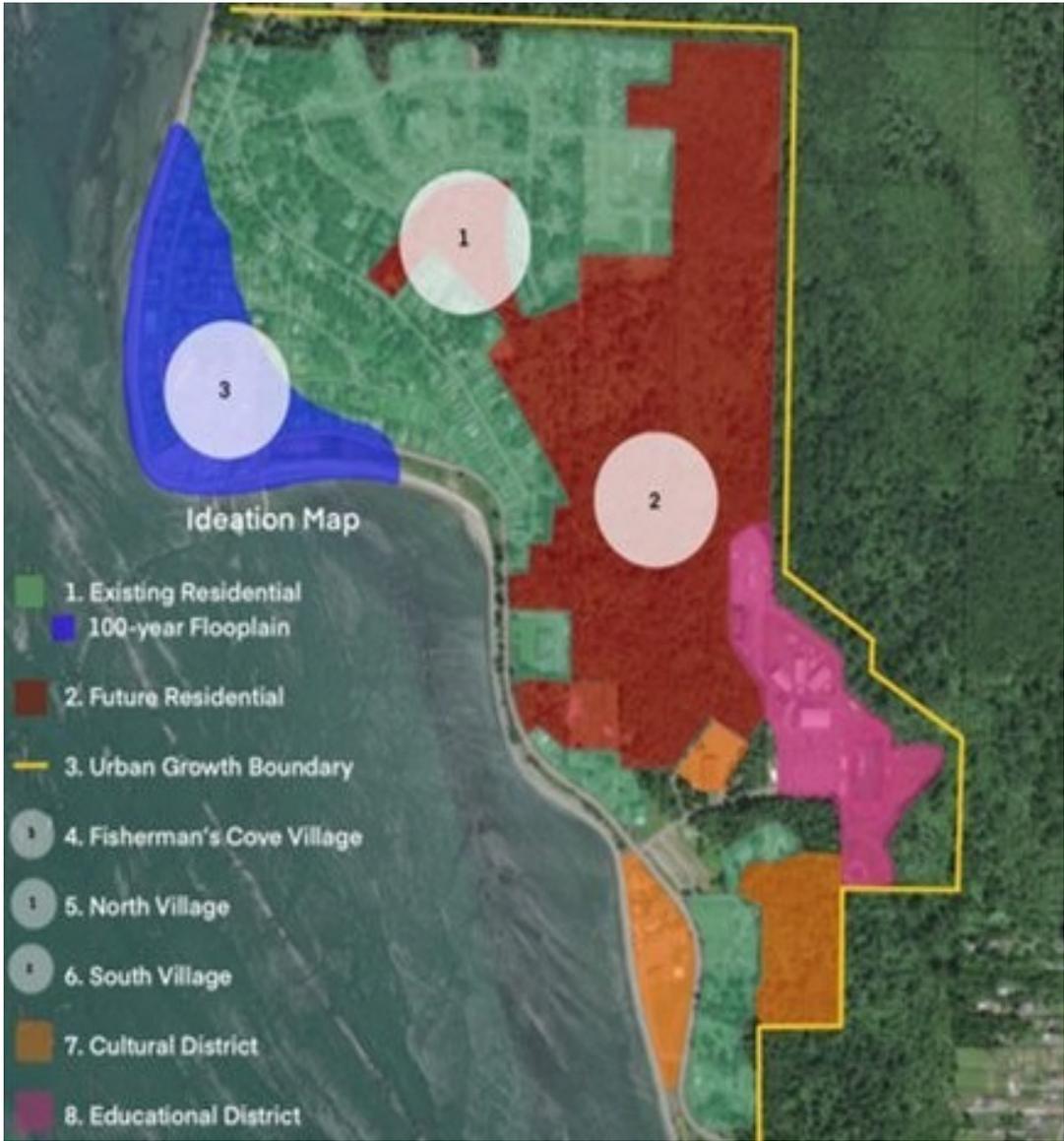


Protected Bike Lane

3.6 Housing Opportunitites

Future Housing Districts

An analysis of the study area was conducted during the initial project stages. The site contains approximately 140 acres of largely undeveloped land. Much of it is suitable for development supporting future housing and neighborhood-based services as well as the creation of economic development opportunities. Two locations were identified as preferable for neighborhood village centers: A north village center within the current residential districts east of Fisherman’s Cove and a south village center within the future residential development.



Calculating Housing Unit Capacity

The Lummi Draft Community Plan projects a housing need over the next 20 years of 500 multi-family units and 200 single-family units. Although 700 units will support the growing reservation population, the capacity for future housing within the study area greatly exceeds the 20-year projected need. An interactive model is presented in the tables here, in which different densities are allocated as a percentage of the total site acreage. Assuming that approximately 140 acres are available for future residential development in the Gooseberry Point Village study area and within which two village centers, each containing about 14 acres. The remaining 112 acres are recommended for a wide range of housing development densities to include single-family, multi-family, transitional, and generational housing types. The tables assume a higher density allocated to the neighborhood centers where mixed use development is recommended.

Based on the model, Lummi Nation can meet projected 20-year housing needs utilizing only about twenty percent of the designated land area. A full build out of residences in the study area may satisfy tribal housing demand over many coming decades.

	Single-Family Residential	Generational Housing	Village Center
Average Density (Units/Acre) for housing types	12	24	48
Allocation of Housing Densities Ranges (% of approximately 140 available acres)			
	10-20%	60-70%	20%

Housing Type	Percent Allocated of 140 Acres	Total Units
Single-Family Attached: Rowhouses	10%	168
Generational Housing: Cottage Townhouses Transitional	70%	2,352
Village Center: Mixed Use, Apartments	20%	1,372
Total Infill Housing capacity at 7-generation buildout		3,892 units

Housing Type	Percent Allocated of 140 Acres	Total Units
Single-Family Attached: Rowhouses	50%	840
Generational Housing: Cottage Townhouses Transitional	30%	1,008
Village Center: Mixed Use, Apartments	20%	1,372
Total Infill Housing capacity at 7-generation buildout		3,220 units

3.7 Neighborhood Centers

North Urban Village Concept

Adjacent to the Mackenzie housing development, a vacant site of approximately 14 acres in size was identified as an ideal site to establish a North Village Neighborhood Center. Village centers are mixed use areas providing commercial services and serving as a community center for the surrounding neighborhood (see figure below). A diverse village center creates a high-density neighborhood where essential services are accessible to residents within a short 15-minute walking distance. Overall the North Village Concept emphasizes mixed-use development, community space, and pedestrian connectivity.

The village centers foster tribal employment and entrepreneurial opportunities by directly serving the Gooseberry Point residents. In congregating uses, the urban village reduces reliance on travel to service daily needs such as groceries, healthcare, and childcare.



Mixed-use developments combine local business and high-density residence to create and service an immediate customer base. Mixed-use centers confer economic benefits

Neighborhood villages also centralize community gathering activities, promoting a strong sense of place. Public gathering spaces with murals or interactive art can



Housing Overview



Compact development

Variety amongst housing types meets diverse needs, allows for efficient use of space through densification, and promotes compact community development. A one-bedroom, one-bath unit is a suitable housing alternative for single people and young or retired couples. For larger families, multi-bedroom housing comes in the form of both single-family detached dwellings and multi-family housing. A shed style roof design is a traditional design element in multi-family apartment complexes that are suitable within the mixed-use village centers.



Housing Types

Single Family Detached:

The single family detached form for housing represents the least dense housing type, but can provide higher densities by reducing the lot size requirements and considering townhome styles where single family homes abut to adjacent homes, eliminating side setbacks.



Single family detached

Transitional Housing:

The illustrations below depict the Men's Transitional Housing project located on the Lummi Reservation. Transitional housing is a housing model accommodating primarily houseless residents on a path towards more permanent shelter.



Transitional housing

Transitional housing deserves to be more extensively utilized as Lummi Nation begins to develop a thorough plan for housing. This housing type acts as a solution to houselessness and can be replicated in cottage housing projects as well as in the



3.8 Shoreline Enhancements



The cottage form of housing is appropriate in creating more affordable “missing middle” housing by efficiently clustering single-family homes around a common public space. The grouping of housing and the addition of extended family housing is reflective of traditional villages. The cottage housing site plan often incorporates off-site parking along with shared common areas for community gatherings. Other shared amenities may include a community fish smoking facility and community gardens.

Cottage Housing:

Smaller single-family units are shown in cottage-housing style, promoting extended family group living. These cottage units are simple to construct but include additional design features like porches. They are clad in wood siding and have shed style roofs. Large windows maximize natural interior lighting and establish a relationship between home interiors and exterior views. Front porches allow for conversational seating arrangements, turning porches into outdoor extensions of the house and promoting social interactions between neighbors.



Mixed Use:

Mixed use contains housing and commercial space in one building. The image below depicts shops on the first floor with housing on upper floors and reflects an example of a neighborhood center suggested for the North site. Mixed use allows for the ultimate in walkability - just step out of your building at you are at work, stores, and restaurants. It also allows for greater density, promoting community cohesion and access to services.



Mixed use with housing above retail

Physical shoreline resilience: berms, raising elevations

An integral element required in planning the future of Gooseberry Point is to emphasize climate mitigation strategies and shoreline resilience to protect the area from sea-level rise and inclement weather events that become increasingly common over the next several decades.

Included in this study’s findings are a several alternative development strategies that include the construction of a berm, the raising of future buildings on stilts, and to mitigate the effects of sea-level rise while turning the environmental threat into an opportunity to enhance the coastal habitat. The challenge is to propose development concepts that both revitalize the working waterfront and simultaneously protect and enhance critical areas from future inundation and flooding events. A diagram depicting a design of a protective berm and the concepts of building structure on stilts is illustrated below and to the right.

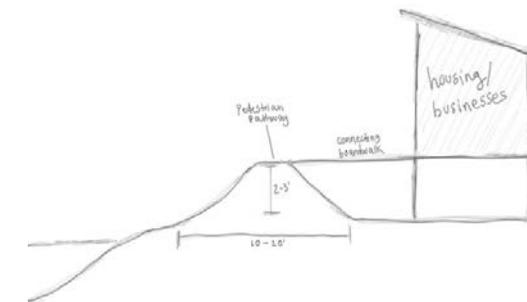


Diagram of a protective berm



This image depicts the possible effects of a “no action” alternative -- a projection of sealevel rise of over 3 feet that would inundate



Gooseberry Point for shoreline protection and flood mitigation

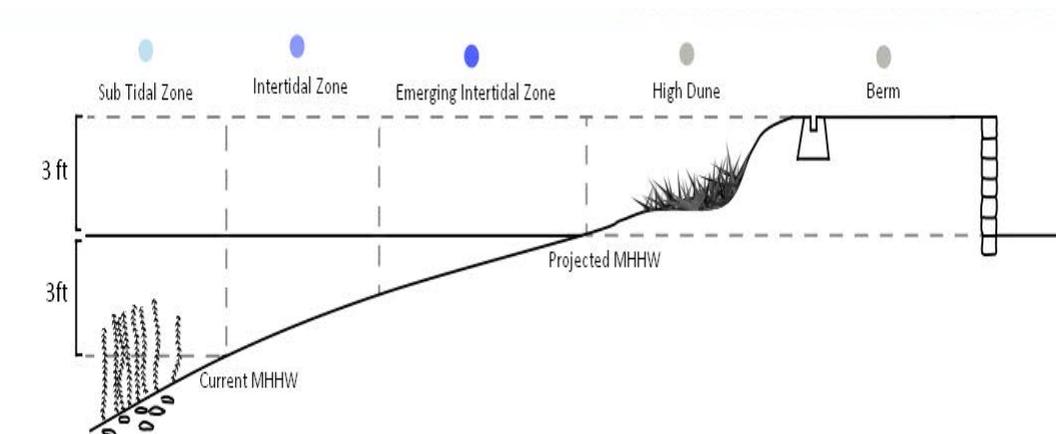


Diagram shows differing habitat zones

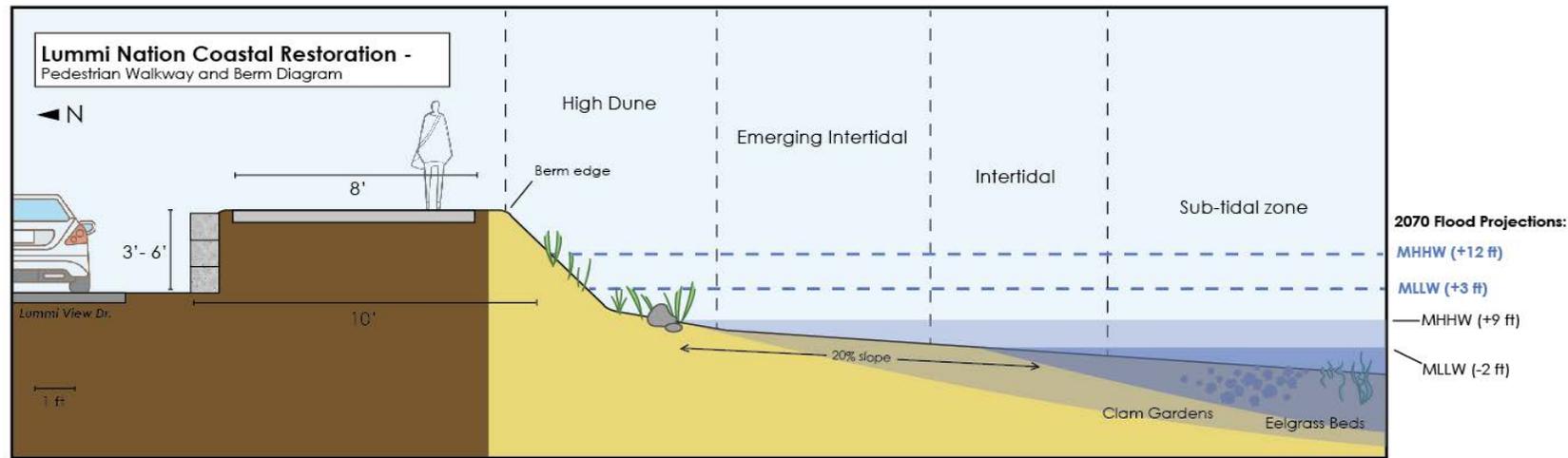


Diagram shows differing habitat zones

Habitat Restoration

This concept focuses on the mitigation of sea level rise and future flooding with the application of managed shoreline retreat. By leveraging an elevated pedestrian pathway along Haxton Way and Grove Road, connecting to Lummi View Drive, this concept establishes a new shoreline berm that would protect the residential neighborhoods located within the 100-year floodplain. This concept also creates the opportunity for significant shoreline habitat restoration. The model below shows a net gain of approximately two acres of subtidal zone, five acres of intertidal zone, and six acres of emerging intertidal

habitat. Additionally, this plan features the expansion of commercial opportunities.

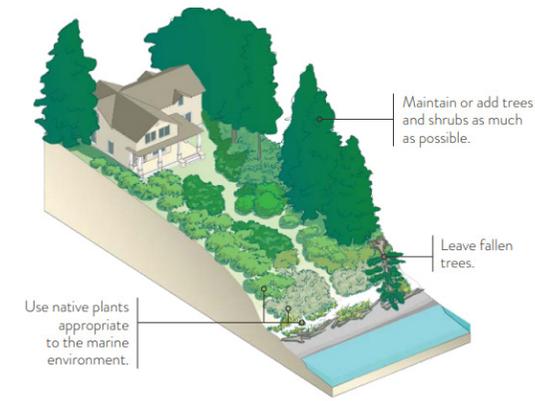
Habitat Zones

Sub-tidal zone - The sub-tidal zone (low tide) will become an area for existing eelgrass beds in Fisherman's Cove to migrate inland with sea level rise. This provides more habitat for the species reliant on eelgrass beds for protection.

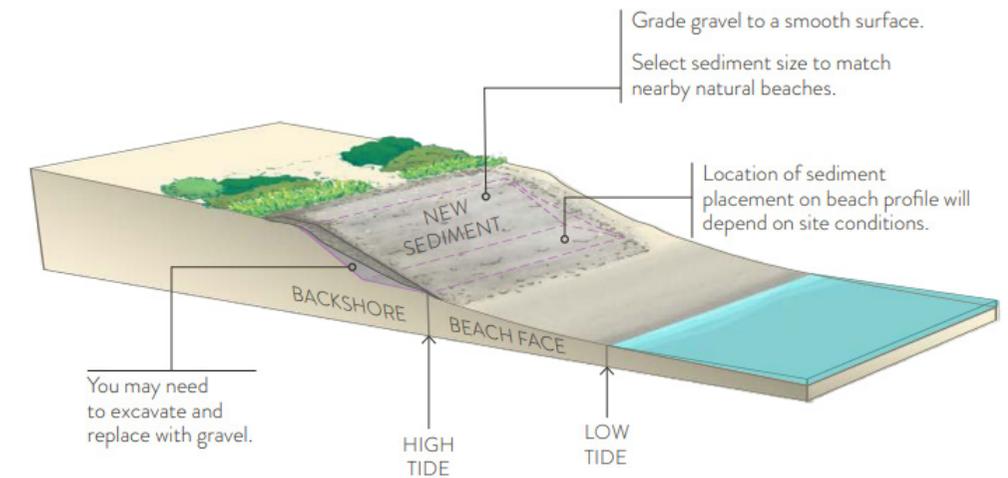
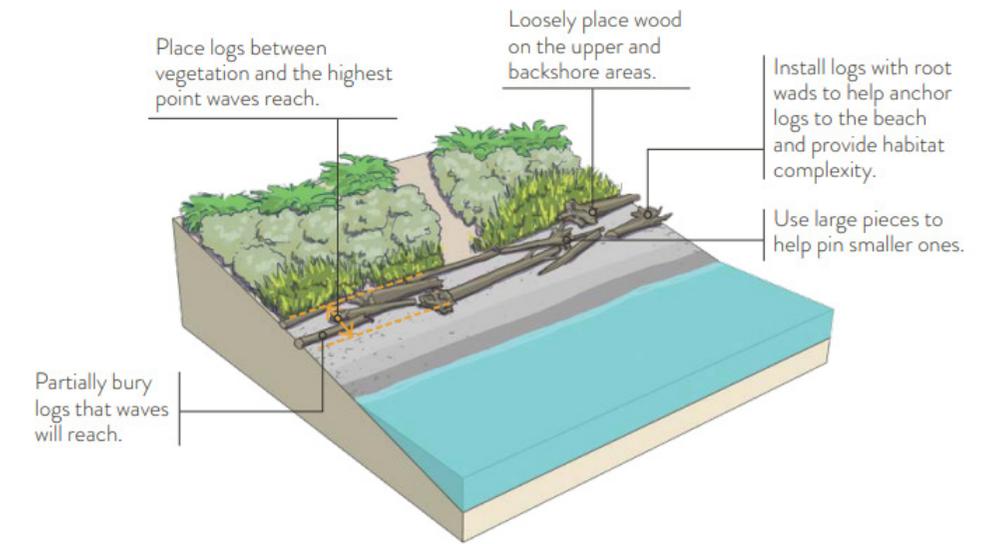
Intertidal Zone - The intertidal zone (mid tide) provides habitat for shellfish and crustacean species. Restoration methods

to be implemented could consist of rocky outcrop deposits and large woody debris to absorb the force of storm surges and provide anchor points for mollusks.

Emerging Intertidal Zone - The emerging intertidal zone (high tide) provides habitat to semiaquatic and terrestrial species. Restoration methods for this zone could consist of re-sloping, planting of native vegetation to further absorb storm surge and protect coastal properties.



Restoring coastal habitat



3.9 Cultural Resources Management

Archaeological Narrative

Each of the development concepts presented include a variety of new buildings and construction practices that would inevitably have varying degrees of impact on cultural resources. These development methods range from little to no manipulation of the natural environment (building on top of existing land) to extreme impact that include dredging and grading. When the effects of development encounter cultural and archeological artifacts, it is important to proceed with an investigation to determine the nature of cultural resources expected to be found and the determination of tribal preferences with respect to how best to ensure the preservation and protection of those cultural resources.

Cultural resources, according to Lummi Nation, includes, but is not limited to, four major types: language, including traditional named places and oral histories and traditions; traditional cultural properties; historic sites; and archaeological resources. “Cultural resources” also refers to any material remains of past, present, or future human life or human activities which are of historic significance, and/or cultural or archaeological interest.

Such material includes pottery, basketry, weapons, weapon projectiles, tools, structures or portions of structures, pit

houses, rock paintings, rock carvings, intaglios, talus slide depressions, cairns, sea caves, inland caves, graves, human skeletal remains, or any portion or piece thereof. The Sche’lang’en Department is authorized to take the following actions promoting cultural resources and historic preservation efforts (Title 40: Cultural Resources Preservation Code 40.02.090):

- (a) Develop and make available to tribal agencies information and advice concerning professional methods and techniques for identifying, preserving, stabilizing, improving, restoring and maintaining cultural resource sites and historic properties.
- (b) Advise tribal agencies in the evaluation, identification, preservation, stabilization, improvement, restoration, and maintenance of historic and cultural resource properties;
- (c) Encourage, in cooperation with the Cultural Commission, public interest and participation in cultural resource management/archaeology, and historic preservation.
- (d) Conduct studies in various areas such as the adequacy of the Lummi Tribal laws and federal, state and local laws pertaining to tribal cultural resources and

archaeological and historic preservation activities.

(e) Prepare and submit to the Secretary of the Interior a plan describing the functions of the Department, as the THPO, proposes to assume with respect to the tribal lands as provided in the National Historic Preservation Act. 16 U.S.C. 470a(d)(2).

(f) Employ professional and support staff and/or independent contractors to fulfill the purposes of this Code and provide the services the Department is designated to perform.

An Archeological Approach - The Process

Whether a site contains archeological artifacts or not, it is considered best practice to avoid excavating a site unless there is overarching reason to do so. In such a case, archaeological experts would be retained to proceed with the following steps in analyzing a site:

Historical & Cultural Assessment -

The archaeological study focuses on understanding the historical and cultural context within a given area. This finding influences subsequent steps and depends on whether an archaeological team does or does not proceed with excavation.

Excavation - This step evaluates a small percentage of the site. Before utilizing heavy machinery within a site, the “shovel test” is used to find articles buried in the ground. A small and shallow shovel test pit (STP) or a series of bore holds are dug, in portions of the site. If artifacts are present, the following steps in the process.

Processing - The last stage of the archaeological study consists of carefully processing any artifacts found during the excavation. This phase consists of cleaning, analyzing, and identifying the artifacts.

The discovery of a burial site receives special consideration and is beyond the scope of this study. However, within the context of the Lummi Reservation, the shoreline area of the study site at Fisherman’s Cove is not known to be a burial site.

OPTION 1: Conduct an archaeological study and remove the cultural artifacts from the ground; place objects in a museum, a cultural center, or in a school display.

- Enables community members access to these objects for educational purposes
- Protects these objects from becoming inundated by water or developed upon that will inhibit retrieval in the future.

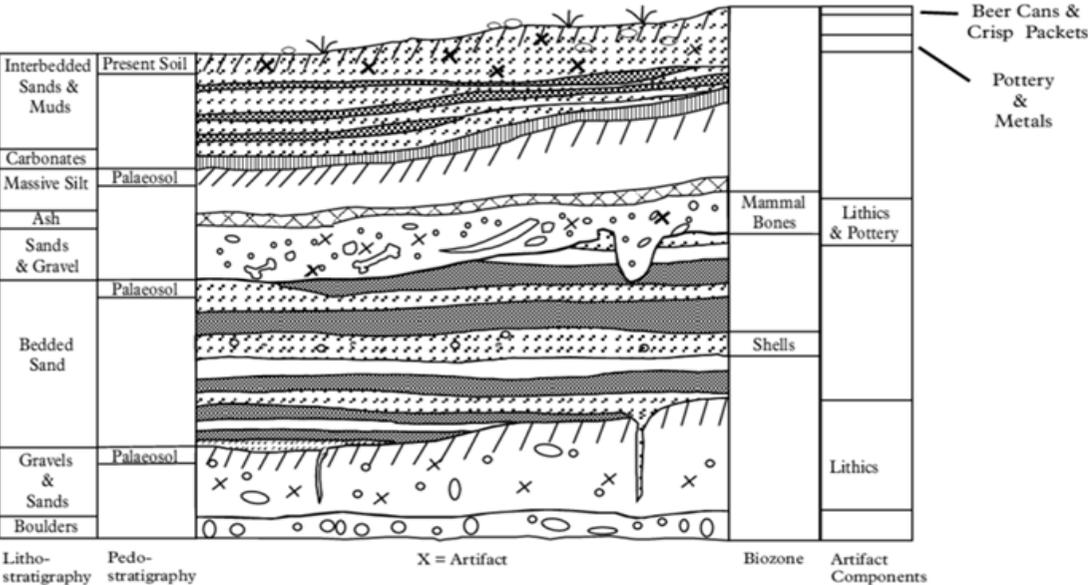


Diagram illustrates the stratification of soil and earth in relation to where archeological artifacts may be found (within the study area’s historical contexts).

OPTION 2: Leave the cultural objects buried and return the land to its natural state.

- Based on NOAA flood projections, objects will become inundated by rising ocean water and will inhibit future retrieval attempts.
- Requires the future removal of harmful objects and surfaces from the area (i.e. asphalt and septic/sewer systems) to reintroduce the land into the coastal/intertidal ecosystem.



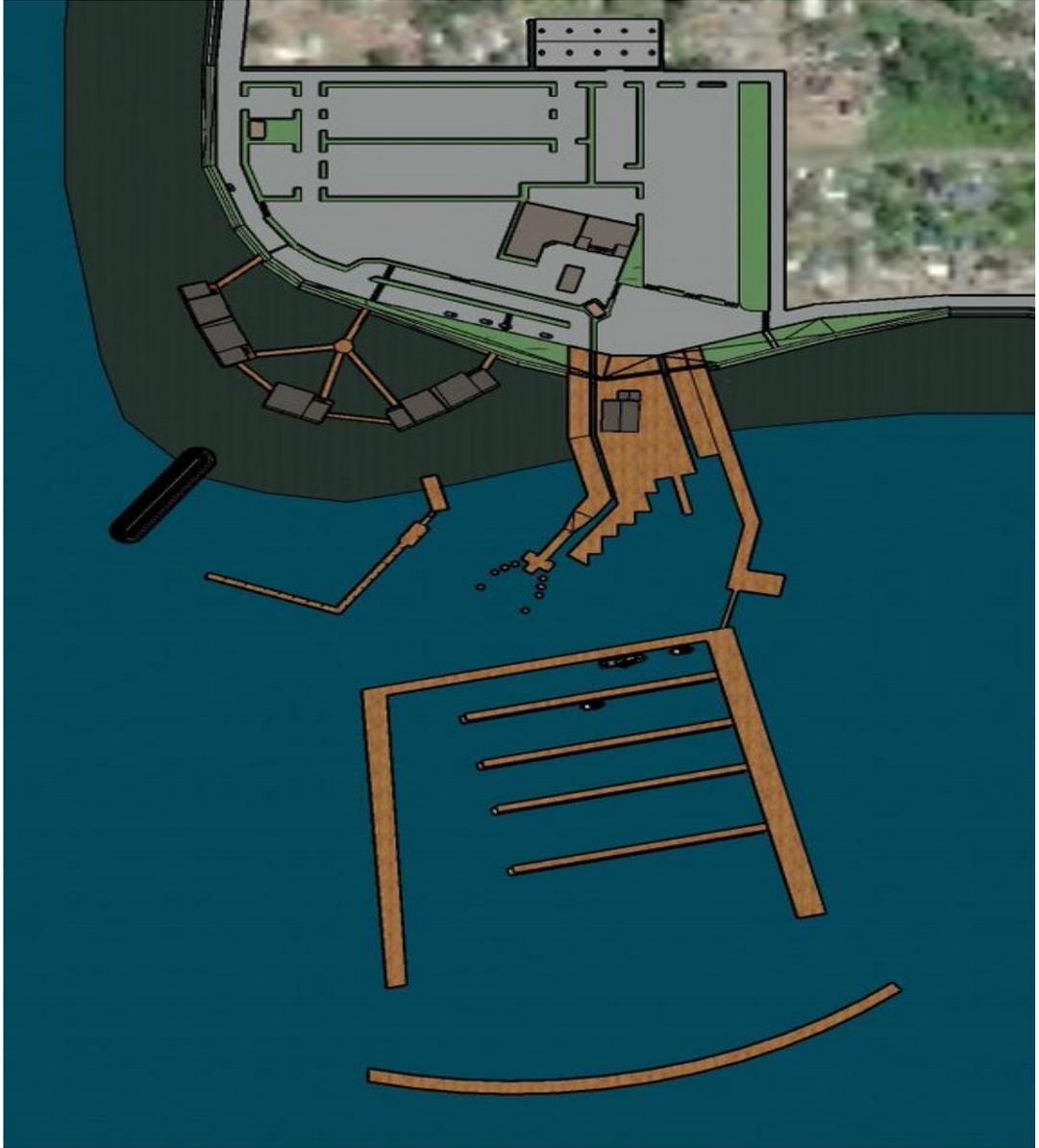
Indigenous artifacts on display in a museum.

3.10 Fisherman's Cove Waterfront Village Concepts



3.10.1 Fisherman's Cove Concept 1: In-Water Marina

The first concept for Fisherman's Cove presented in this study emphasizes the application of the tribe's existing plans for an in-water marina. To support expansion of the working waterfront, concepts for mixed-use, urban village centers, additional cultural facilities, and commercial development were evaluated for development in upland areas. Emphasis was placed upon researching climate mitigation measures to protect the study area from the impacts of forecasted sea-level rise due to climate change. Remediation actions that include the placement of a shoreline berm and/or elevated buildings on-stilts in critical areas are proposed. Graphic illustrations are presented illustrating preliminary ideas depicting how future development at Fisherman's Cove might occur.



3.10.2 Fisherman’s Cove Concept 2: Upland Marina

The concept of an upland marina in the Fisherman’s Cove Village involves dredging the area to create a protected marina with improved boat launch, facilities for fisher people, commercial space, and parks. Constructing an upland marina at this site would impact culturally significant areas located at Fisherman’s Cove. Dredging the area to build an upland marina would require archeological analysis to determine what cultural resources are at the site if this is not known. While any development at Fisherman’s Village would require understanding the cultural resources at the site, this option would result in the greatest disruption.

An upland marina has the potential to increase coastal habitat, furthering the goals outlined in Lummi Nation plans. A well-managed marina can expand upon existing marine habitat with minimal impact. This is particularly desirable due to eel grass and other marine life located adjacent to the site. The upland marina concept includes boat slips, storage, and repair sites for larger boats.



Waterfront Commercial Facilities



Inland Marina and Supporting Facilities

As outlined in the Lummi Nation Community Plan (2022), there is a desire to improve boating access in this area with a new boat ramp nearby with fuel and boat supplies that support and allow expansion of Lummi’s fishing fleet. The upland marina concept provides in-water boat storage and lockers for smaller boats on land. This concept assumes that the Fish Processing (cannery) and Fisherman’s Cove Bay Market is maintained. A floating fueling dock has been provided in the upland concept to allow for boats to refuel while still in the water.

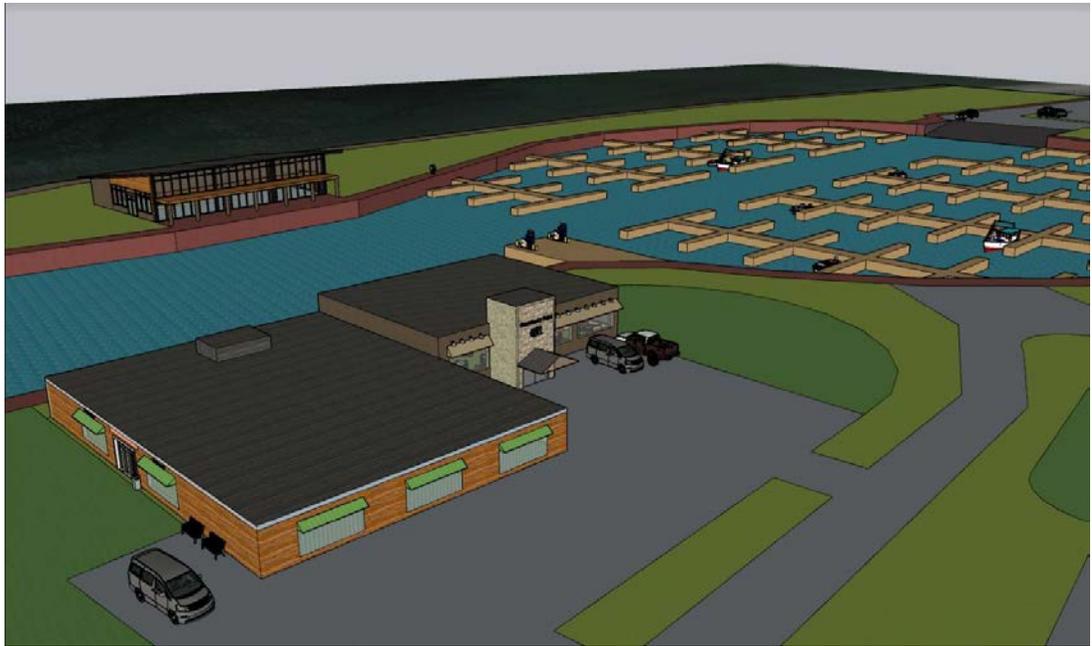


Boat Gas Station Example

Commerical facilities surrounding the upland marina area provide the community with walkable areas to interact and increase economic opportunity in Fisherman’s Cove. Community members have voiced interest in seeing future development in Fisherman’s Cove where commercial use is devoted to social spaces, locally owned businesses that support Lummi Nation tribal members, boat tours, entertainment venues, community centers, parks, and other commercial spaces that support social interaction.

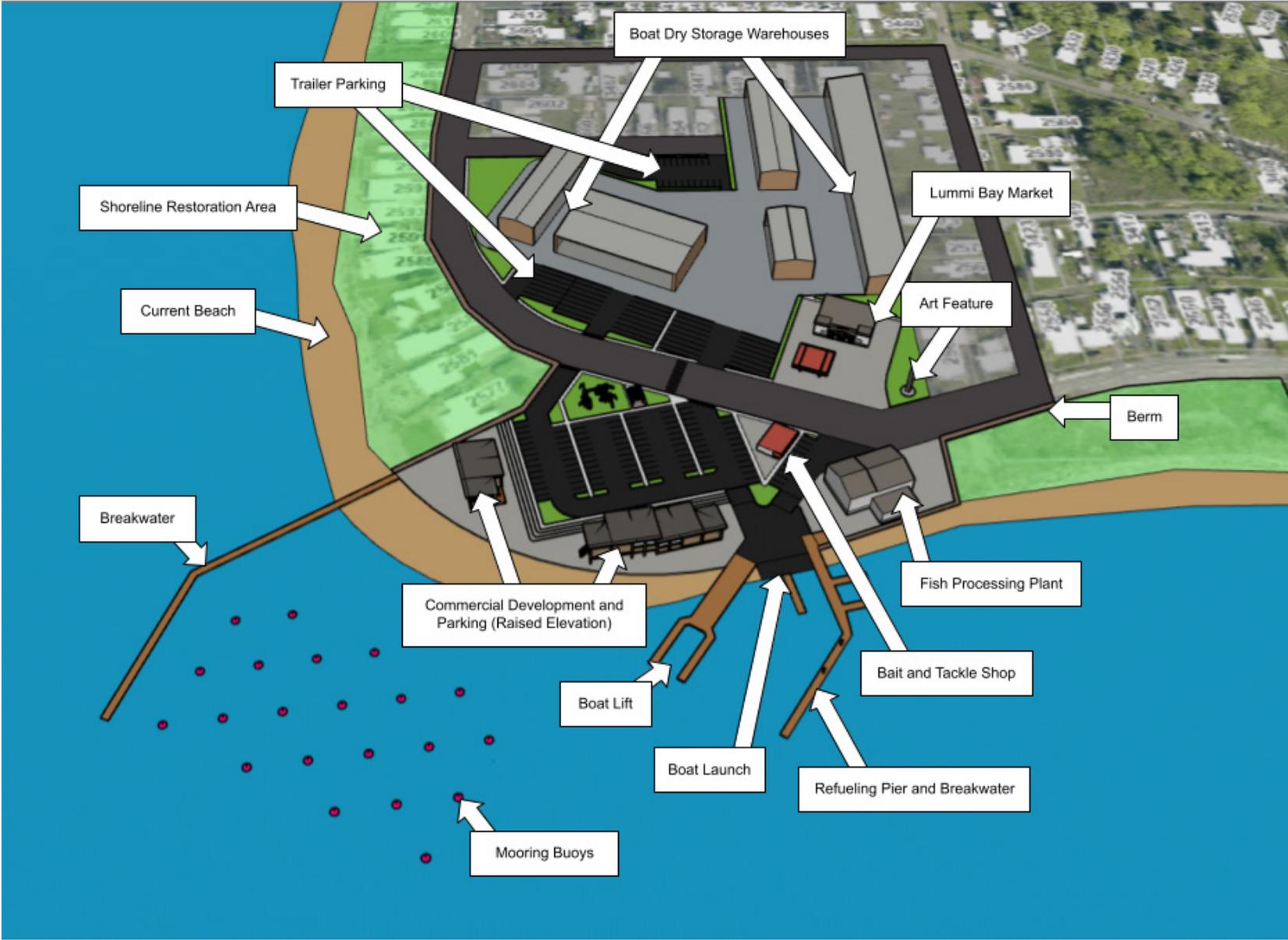


Marina Example



Additional Commercial Facilities

3.10.3 Fisherman's Cove Concept 3: Dry Storage



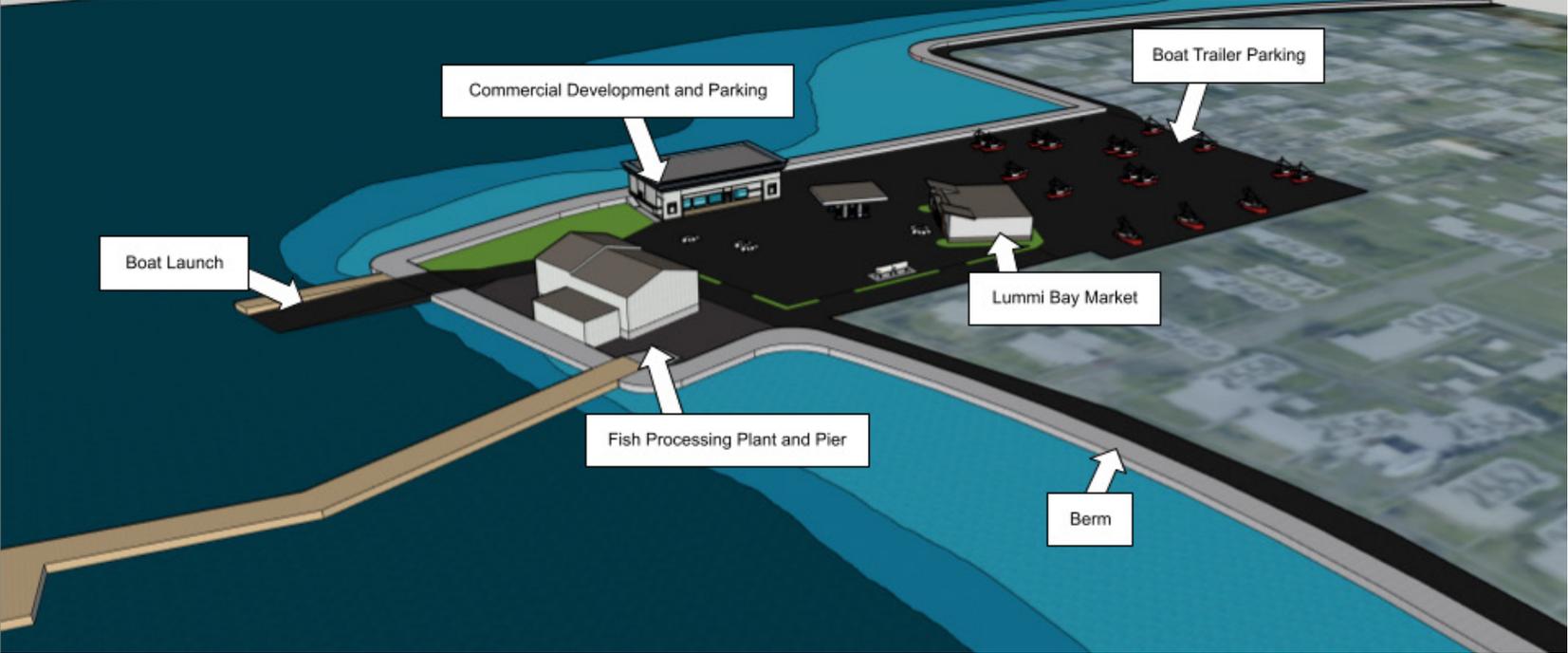
Dry Boat Storage Marina

The Upland Dry Storage Marina concept explores the potential to renovate and expand the current boat storage of Fisherman's Cove Marina, enhancing access to and from the waterfront. This model highlights the opportunities provided by the vacant land areas surrounding Lummi Bay Market. The image below shows several commercial buildings providing a wide range of services to enhance the local economy while also supporting both the tribal fishing fleet and local resident needs.

Open green space areas are included to provide the community with recreational activities and a covered picnic area. Additionally shown are details of dry storage units which provide approximately 62,400 square feet of dry storage. To improve access to the waterfront, this model features a renovated high-capacity boat launch and a boat lift capable of launching boats from the dry storage units.



3.10.4 Fisherman’s Cove Concept 4: Shoreline Retreat



Managed Shoreline Retreat

This development concept shown above emphasizes the mitigation of sea level rise and future flooding inundation with the application of managed shoreline retreat. By providing an elevated pedestrian pathway along Haxton Way and Grove Road, connecting to Lummi View Drive, this planning concept establishes a new shoreline berm to protect the residential areas located within the 100-year floodplain.

This concept creates an opportunity for significant shoreline habitat restoration and the inland migration of eelgrass beds. This model shows a net gain of approximately two acres of sub tidal zone (permanent low-tide habitat), five acres of intertidal zone (mid-tide habitat), and six acres of emerging intertidal habitat (high-tide habitat). To accommodate the need for boat storage and egress to and from Fisherman’s Cove, this

plan includes approximately one acre of boat storage and a boat launch. Additionally, this plan features the expansion of commercial services along the new pedestrian pathway adjacent to the Lummi Bay Market. To accommodate boat storage at Fisherman’s Cove, the plan provides approximately one acre of boat storage and an improved boat launch.

A WWU Urban Transitions Studio
and
Sustainable Communities Partnership
Study

Gooseberry Point Community Design Concepts

Lummi Indian Nation

Lummi Commercial Company
Lummi Indian Reservation, Washington

Western Washington University
Department of Urban and Environmental Planning and Policy
2023