

Stop #2 - Bəbəuxudi “Dancing place” (Fort Ward) and Xulaʷs “Picking out different faces” (Bean Point): Defense, Food, Transportation and Environmental Consequences

Here, at Fort Ward and Bean Point, we stand at a critical juncture in the narrative of the Salish Sea's maritime history. This locale, once a strategic military outpost, and later a site for industrial aquaculture, offers profound insights into the enduring tension between human utilization of marine resources and the consequent environmental repercussions. The maritime history of this region in the period that spans from the arrival of early European settlers in the 1850s to our present day, is a testament to the complex and often detrimental impact of human activity on the delicate ecosystems of the Salish Sea.



View of Fort Ward & vicinity, including Batteries Vinton and Thornburgh at Ford Ward, and the location of controversial net pens for salmon aquaculture that were finally removed in 2023, ending more than 40 years of salmon aquaculture in the Salish Sea.

As we survey the vicinity of Fort Ward, the remnants of Batteries Vinton and Thornburgh stand as silent sentinels, relics of a time when the defense of the Bremerton Naval Shipyard dominated regional priorities. Their presence serves as a stark reminder of the strategic importance of this waterway, and the associated industrial development that has profoundly shaped the environment. Notably, this location also marks the former site of controversial net pens for salmon aquaculture, a practice finally terminated in 2023, ending over four decades of commercial salmon farming in the Salish Sea. This juxtaposition of military infrastructure and industrial aquaculture highlights the multifaceted nature of human interaction with these waters.

Getting There

For those arriving by kayak from Manchester State Park or other points, the importance of securing your vessel becomes immediately evident. The tidal forces within Rich Passage, amplified by the channel's narrow geometry, demand vigilance. Ensuring your kayak is well above the high tide mark, particularly on the grassy expanses adjacent to the shoreline, is essential to prevent it from being swept away. This practical consideration underscores the dynamic and powerful natural forces at play in this region. Fort Ward Park, now under the stewardship of the Bainbridge Island Metro Park & Recreation District, having transitioned from Washington State Parks in 2011, offers a moment of respite and reflection.



Map of Fort Ward Park. Cascade Marine Trail (CMT) campsite location is shown, along with the main loop trail that connects the remnants of Battery Thornburgh and Battery Vinton (yellow shaded trail). There are picnic facilities, water and a restroom at the south end of the park, which provides an excellent place to picnic, rest or fill up your water bottle.

The park's amenities, including picnic facilities, water, and restrooms, provide a convenient point of pause. The Cascade Marine Trail campsite, with its expansive grassy terrain and unobstructed westward views, offers a particularly compelling vantage point. Here, the interplay of natural beauty and human activity is palpable. As the sun descends, painting the sky with vibrant hues, the ferries traverse Rich Passage, their lights tracing arcs against the twilight. At lower tides, the resonant barks of sea lions echo from their haul-out on Orchard Rocks, a reminder of the diverse marine life that inhabits these waters.



Sunset at the Fort Ward CMT campsite.



Setting up camp at the Fort Ward CMT campsite.

This location is more than a scenic overlook. It is a place where the layered history of human endeavor and ecological consequence converge. From the strategic imperatives of military defense to the economic ambitions of aquaculture, the narrative of Fort Ward and Bean Point is a microcosm of the broader challenges facing the Salish Sea. It prompts us to consider the enduring impacts of our actions, and to contemplate the delicate balance between human progress and environmental preservation.

Formation of Rich Passage

The waterway we now know as Rich Passage holds a history predating European cartography, its significance first understood and utilized by the indigenous Lushootseed-speaking peoples. Their ancestral knowledge, reflected in the passage's original Lushootseed name, spanned millennia before the arrival of European settlers in the 19th century. The transition to its current English name occurred during the United States Exploring Expedition (1838-1842), led by Captain Charles Wilkes. The name "Rich" honors William Rich, a botanist integral to the expedition, a tribute to scientific contribution rather than any discovery of material wealth within the passage itself, although the waterway and its environs is truly blessed with natural riches.

The physical formation of Rich Passage is a direct consequence of glacial activity during the Pleistocene epoch, specifically the last ice age, which concluded approximately 10,000 to 15,000 years ago. The Cordilleran Ice Sheet, with ice thicknesses reaching up to 3000 feet, exerted a profound influence on the Puget Sound region. As these massive ice sheets advanced and retreated, they carved deep valleys and channels, fundamentally altering the landscape. The subsequent melting of the glaciers led to a rise in sea levels, inundating these glacially carved channels and creating the intricate network of waterways that define the Salish Sea, including Rich Passage. Over subsequent millennia, tidal forces and currents further refined the passage, shaping it into the navigable channel observed today.

Rich Passage has historically served as a critical navigational route, first for Native American tribes and later for European settlers. Its strategic importance is further underscored by the pronounced tidal effects, a result of the confluence of geographical, bathymetric, and tidal dynamics within the Salish Sea. The passage's relatively narrow width acts as a funnel, amplifying the speed and intensity of tidal currents as water moves in and out of Puget Sound. Furthermore, its role as a conduit between central Puget Sound and southern waters contributes to the substantial tidal flows. The underwater topography, characterized by varying depths and ridges, generates localized turbulence

and eddies, further intensifying these effects. The significant tidal range, often exceeding 12 feet, presents navigational challenges for boaters, demanding adept seamanship. Conversely, the currents play a vital role in shaping the seabed through sediment transport, influencing ecosystems and habitats. The tidal mixing, in turn, facilitates nutrient upwelling, supporting a diverse marine ecosystem. The unique marine characteristics of Rich Passage, stemming from its role as a chokepoint in the Puget Sound tidal system, rendered it a favorable location for both the Bremerton Naval Shipyard and, more recently, salmon aquaculture.

Military History & Environmental Consequences

Here at Fort Ward, we stand amidst the tangible remnants of a military legacy, a chapter in the Salish Sea's history marked by both strategic necessity and enduring environmental consequences. Recall our previous stop at Manchester State Park, where we explored the underwater mining operation, a defensive measure spanning Rich Passage, connecting Middle Point to Bean Point. Now, as we delve into the history of Fort Ward, we will examine the broader environmental ramifications of the region's transition from traditional tribal practices to European-influenced maritime activities, a shift that began in the early 19th century and continues to shape our present.



Fort Ward then and now. Some of the original roads developed for the Fort are still in use, serving residential communities rather than military facilities and housing.

As we explore the gun batteries, these concrete echoes of a bygone era, consider their purpose: the protection of the Puget Sound Navy Yard in Bremerton. These fortifications, positioned strategically across Rich Passage at Fort Ward, Bean Point, and Middle Point, were activated in 1903. Fort Ward's armament, encompassing Batteries Nash, Warner,

Thornburgh, and Vinton, featured an array of artillery, including 8-inch, 5-inch, and 3-inch guns. Middle Point, designed as a fire control center for remotely detonated mines, was intended to host two 3-inch pedestal guns, though these were never installed.

Following World War I, Fort Ward entered a period of dormancy, its guns removed in the 1920s. However, the site's strategic value persisted. In 1938, the Army transferred Fort Ward, including Middle Point, to the Navy. During World War II, Fort Ward served as a vital communications hub, housing a radio station and training school, and overseeing the submarine nets that stretched across Rich Passage. Middle Point, meanwhile, was transformed into the Manchester Naval Supply Depot.

The transition from military bastion to public park occurred in 1958, when Fort Ward was decommissioned. In 1960, Washington State Parks acquired the site, establishing the 137-acre Fort Ward State Park. Middle Point became part of the adjacent Manchester State Park, a 111-acre camping park, though a portion of the reservation remains under Navy ownership.

While the exploration of these gun batteries offers a fascinating glimpse into the region's military past, it is essential to consider the broader context of their existence. These fortifications, and the naval infrastructure they protected, represent a period of intense industrial development, a period that has left a legacy of environmental challenges. As we continue our tour, we will encounter further examples of this dynamic, where the pursuit of military and commercial objectives has resulted in significant environmental consequences.

Bremerton Naval Shipyard - EPA's 17th most toxic site in the entire United States

The Bremerton Naval Shipyard, just six nautical miles from the mouth of Rich Passage, stands as a monument to both American naval prowess and the enduring consequences of industrial activity. This Superfund site, now recognized as the 17th most toxic in the United States by the Environmental Protection Agency, tells a story of strategic development and environmental degradation.

Before the establishment of the shipyard, the area that would become Bremerton was a sparsely populated region, dominated by logging and other extractive industries. The absence of a significant naval presence would soon change. The Puget Sound Naval Shipyard, officially established in 1891, nearly a decade after the construction of Fort Ward and Fort Manchester, emerged as a response to the burgeoning need for a dedicated

naval facility on the Pacific Coast. This development coincided with the late 19th-century expansion of the U.S. Navy, a strategic move driven by the anticipation of potential conflicts.

The shipyard's inception began with the construction of a dry dock, a vital infrastructure element for the maintenance and repair of naval vessels. Over time, the facility expanded, evolving into a critical naval installation. Its significance became particularly pronounced during World War I and World War II, periods when the shipyard played a pivotal role in shipbuilding and repair for the U.S. Navy. Today, the shipyard remains the largest of its kind on the West Coast, a testament to its enduring strategic importance.



Historic photo of the U.S.S. New York in 1931, showing the early Navy Yard at Bremerton, WA.



Battleship USS Oregon in drydock, Puget Sound Naval Shipyard, Bremerton, March 2, 1913



"Monterey" gunboat in Port Orchard dry dock. Transcribed from back of photograph: "The Monterey in dry dock... They put the boats in the dock, then pump out the water to paint or clean the bottom which gets covered with barnacles, little muscle shell, sea
Courtesy The Seattle Public Library Special Collections Online (spl_lj_063)



Puget Sound Naval Shipyard, Bremerton, 1902
Photograph by Asahel Curtis, courtesy UW Special Collections (CUR16)



Shift change, Puget Sound Navy Yard, Bremerton, August 28, 1935
Photograph by Richards Studio, courtesy Tacoma Public Library Northwest Room (D403-1)



Navy ship at Bremerton Dry Dock, 1900
Courtesy The Seattle Public Library Special Collections Online (spl_nwp_00851)



Puget Sound Naval Shipyard, 1908
Courtesy Tacoma Public Library Northwest Room Amzie D. Browning Collection (BROWNING-111)



USS Perry (DD-11), destroyer (built 1900, decommissioned 1919), Puget Sound Naval Shipyard, Bremerton, ca. 1916-1917

Views of Bremerton Navel Shipyard in the early 1900's.

However, the shipyard's legacy is also marked by substantial environmental challenges. The site has proven to be a hazardous environment for both workers and nearby residents. The

shipyard's operations since the 1960s, including the handling of nuclear materials from the U.S. nuclear submarine fleet, have led to numerous complaints from families and workers alike. Washington State agencies have levied significant fines, often for acts of pollution described as intentional or negligent.

The shipyard's contamination extends beyond nuclear materials. Asbestos, widely used in naval vessels built before the late 1960s, poses a severe health risk, with documented cases of mesothelioma, lung cancer, and asbestosis among shipyard workers. Additionally, the site is heavily contaminated with PCBs, lead, and mercury, substances used in electrical equipment, paints, and instruments, respectively. These contaminants have infiltrated into the soil, sediments of Sinclair Inlet, waterways, and groundwater.

The shipyard's designation as a Superfund site, initially considered by the EPA in 1988 but not formalized until 1993, reflects the severity of the contamination. The EPA cited the need for extensive data collection as the reason for the delay, acknowledging the sheer scale of the facility. Today, ongoing cleanup efforts, including dredging, capping, soil remediation, and wastewater treatment improvements, aim to mitigate the environmental damage.

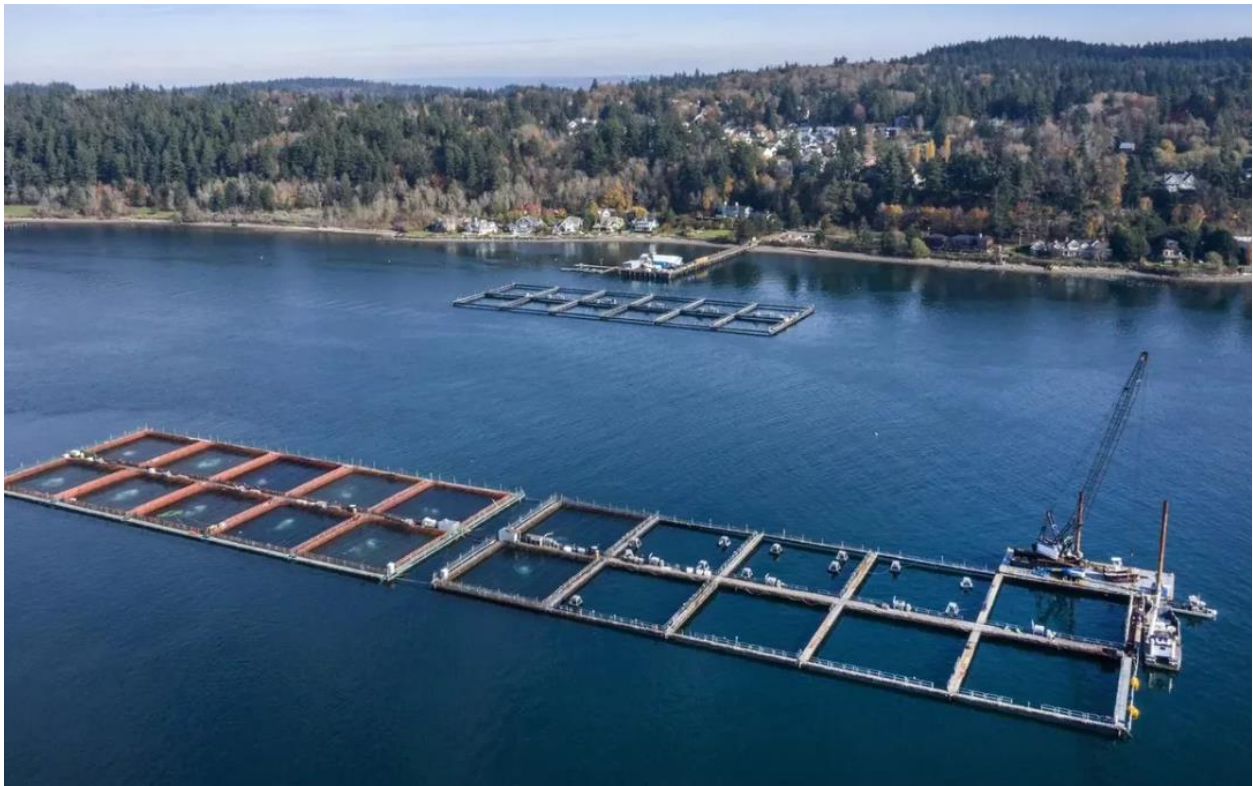
The shipyard's location on land traditionally belonging to the *dx^wsəq^wəbš*, "People of the Clear Salt Water" (Suquamish Tribe) adds another layer of complexity. The Treaty of Point Elliott (1855), while ceding the land to the U.S. government, reserved the tribe's "right of taking fish at usual and accustomed grounds and stations." The shipyard's pollution directly infringes upon these treaty rights, impacting the tribe's ability to exercise their traditional fishing practices.

The Suquamish Tribe, acting as stewards of the environment, has taken legal action to protect the health of Puget Sound. Their 2017 lawsuit against the Navy, concerning the hull scraping of the ex-Independence aircraft carrier in Sinclair Inlet, exemplifies their commitment. The settlement, which included a 10-year moratorium on underwater hull cleaning and remediation of contaminated sediments, represents a significant victory for environmental protection and tribal rights.

The Bremerton Naval Shipyard's history underscores the complex interplay between industrial development, environmental stewardship, and tribal rights. It serves as a reminder of the enduring consequences of past practices and the ongoing efforts to address them.

Aquaculture

Continuing the paddle eastward along the shoreline, or via the park road if walking, we arrive at the intersection of South Beach Drive and Fort Ward Hill Road NE. This location, until its recent cessation of operations and removal in 2023, served as the dock supporting the net pens anchored in Rich Passage, where Atlantic salmon were cultivated, most recently under the auspices of Cooke Aquaculture. The aerial view, capturing the net pens' presence before their removal, reveals the scale of this aquaculture operation, positioned strategically within the passage.



Aerial view of the net pens and salmon aquaculture operation in Rich Passage prior to its removal in 2023. View is looking north towards the dock at the end of Fort Ward Hill RD NE on southern Bainbridge Island. From https://www.spokesman.com/stories/2022/nov/18/wa-bans-net-pen-fish-farming-in-state-waters/?utm_source=chatgpt.com

Rich Passage presents a confluence of geological and hydrodynamic factors that rendered it particularly amenable to salmon aquaculture. The region's glacial history, dating back approximately 15,000 years, during the last ice age, sculpted the landscape, leaving behind deep channels and steep underwater slopes. These features provided optimal conditions for aquaculture infrastructure, facilitating temperature regulation, minimizing hypoxia risk, and preventing excessive sediment accumulation beneath the fish pens.

The geological shaping of Rich Passage, through glacial erosion and subsequent sediment deposition, also amplifies tidal flows. This amplification enhances water circulation, ensuring a consistent oxygen supply to the fish pens and aiding in the removal of waste products, thereby mitigating localizing pollution risks. The seabed's composition, a mix of gravel, sand, and clay typical of glacially influenced areas, provides a stable foundation for anchoring aquaculture infrastructure and supports diverse benthic ecosystems that contributes to natural nutrient cycling.

Furthermore, the geological configuration of Puget Sound promotes nutrient-rich waters. The deep basins and narrow passages encourage upwelling, a process that mixes cold, nutrient-dense water from deeper regions with warmer surface water, supplying essential nutrients to the photic zone and supporting plankton growth. This nutrient availability benefited the farmed salmon, fostering natural food webs and creating optimal conditions for aquaculture.

The freshwater input from rivers and streams, flowing through ancient glacial valleys, further contributed to the suitability of Rich Passage for salmon farming. These inputs moderated salinity levels, accommodating species like Atlantic salmon that tolerate a range of salinity conditions, and introduced nutrients that enhanced biological productivity.

These geological and hydrodynamic attributes, acting in concert, "set the table" for aquaculture operations in Rich Passage. Cooke Aquaculture's operations in Washington state, including those in Rich Passage, were estimated to produce approximately one million Atlantic salmon annually before the state's ban on non-native fish farming. These salmon were distributed to regional and international markets, supplying grocery stores, restaurants, and seafood distributors.

However, the presence of these net pens sparked considerable controversy, centered on environmental impacts, public resource utilization, and corporate accountability. Concerns regarding the escape of farmed fish, particularly after the catastrophic net pen collapse at Cypress Island in 2017, which released over 260,000 Atlantic salmon, highlighted the potential for ecological disruption and disease transmission.

Pollution from fish pen waste, including uneaten food, feces, and chemical treatments, posed a risk to seabed ecosystems and water quality. The potential for disease and parasite transmission to wild salmon populations, already vulnerable, raised further concerns. The placement of fish pens in public waters ignited debates about the propriety of private companies profiting from these resources, with many arguing that lease fees were insufficient to compensate for potential environmental damage.

Cooke Aquaculture faced criticism for its handling of the 2017 net pen collapse and its environmental practices, leading to allegations of negligence and public distrust. Tribal and community opposition, citing impacts on tribal fishing rights, ecosystems, and local recreation, further fueled the controversy.

Legislative and regulatory actions, including Washington State's ban on non-native fish farming and the Department of Natural Resources' decision not to renew Cooke Aquaculture's leases, ultimately led to the phasing out of net pen aquaculture in Rich Passage, marking a significant shift in the region's maritime activities.



Protests against the aquacultural operations in Rich Passage. https://www.bainbridgereview.com/news/flotilla-protests-rich-passage-fish-pens/?utm_source=chatgpt.com

Marine Transportation & Erosion

The introduction of high-speed passenger ferries into the maritime landscape of Rich Passage ushered in an era of enhanced commuter convenience, but simultaneously triggered a wave of concern among shoreline residents. While the established car-carrying ferries generated wakes, their impact paled in comparison to the pronounced effects of the newly introduced fast ferries. Specifically, high-speed passenger-only vessels, such as the MV Chinook, were designed for rapid transit, and their hull configurations and high operating speeds produced exceptionally large and powerful wakes.



The MV Chinook.

The narrow confines of Rich Passage, a stretch of water situated between the Kitsap Peninsula and Bainbridge Island, became a focal point of contention. The powerful wakes generated by these fast-moving ferries instigated severe shoreline erosion. As the waves impacted the shore, they gradually eroded sediment and destabilized the banks. This erosive action resulted in the loss of valuable beach habitat, adversely affecting local wildlife, including forage fish that rely on nearshore environments for spawning. Furthermore, the scouring effect undermined trees and vegetation along the shoreline, accelerating habitat degradation.

Beyond the direct erosion of the shoreline, the increased turbulence caused by ferry wakes stirred up sediment in the water column. This sediment disturbance had the potential to negatively impact water quality and the ability of aquatic vegetation, such as eelgrass beds, to thrive. Eelgrass beds are critical habitats, supporting a diverse array of marine life, including juvenile salmon migrating through the passage.

Recognizing the environmental harm caused by ferry wakes, various mitigation efforts have been implemented over the years. These efforts encompassed several key strategies:

- **Research and Monitoring:** Extensive studies, such as the Rich Passage Wake Study, were conducted to analyze wake energy, erosion patterns, and habitat changes. These studies provided critical data to inform and guide mitigation strategies.
- **Wake-Reduction Technology:** The Washington State Ferries (WSF) system introduced the high-speed passenger-only ferry "Chinook" in the late 1990s, but it was subsequently retired due to concerns over wake damage. More recently, WSF has engaged in the design and testing of modified ferry hulls aimed at minimizing wake energy while maintaining operational efficiency.
- **Speed and Route Adjustments:** Ferries traversing Rich Passage have implemented modifications to their speeds and adjusted their routes to reduce wake intensity in sensitive areas. The Kitsap Fast Ferry program, which utilizes lower-wake passenger ferries, has been specifically designed with erosion impacts in mind.
- **Shoreline Restoration Projects:** Efforts to stabilize the shoreline have included the reintroduction of natural sediment, the planting of vegetation, and the construction of engineered barriers to slow erosion. In certain areas, strategically placed logs and boulders have been installed to dissipate wave energy.
- **Policy and Regulation Changes:** Increased environmental oversight and stricter requirements for ferry operations have been enacted to minimize further damage. Ferry designs now undergo wake-impact assessments prior to deployment.



Location (top) of beach monitoring studies and annual beach surface changes (right) to assess impact of fast-ferry impacts on shoreline erosion. See <https://www.kitsaptransit.com/uploads/pdf/fast-ferry/2022-rich-passage-long-term-monitoring-report-20230215.pdf> for additional details of long-term monitoring work and results. Public access to beach is possible via NE Beck Rd street end.

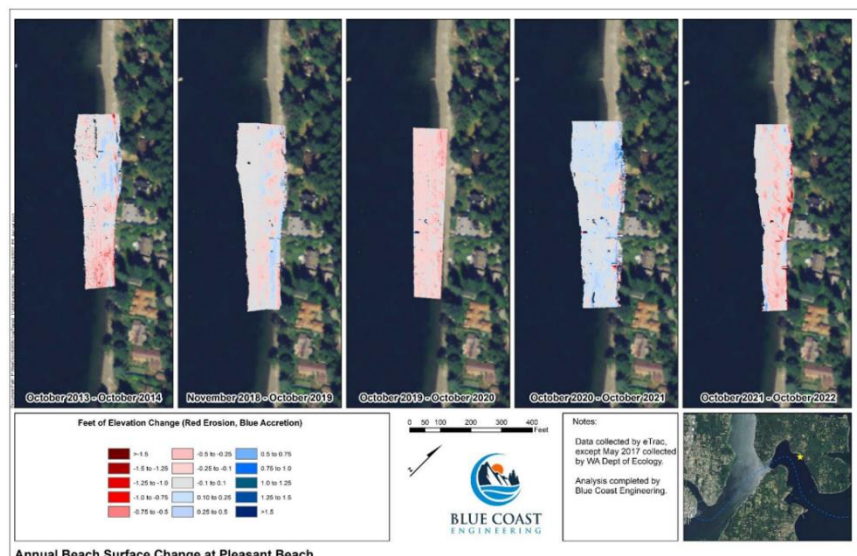


Figure 7. Pleasant Beach annual elevation change from 2013 to 2014, from 2018 to 2019, 2019 to 2020, 2020 to 2021, and 2021 to 2022.

While these mitigation efforts have contributed to reducing some of the damage caused by ferry wakes, ongoing monitoring and adaptive management remain essential to ensuring the long-term health of Rich Passage's shoreline and marine ecosystem.

Development vs. Environment in the Salish Sea

The Salish Sea, a region of profound ecological significance and economic importance, presents a persistent challenge: the tension between development and environmental health. While both economic progress and ecological integrity offer undeniable benefits, their coexistence often necessitates a delicate balancing act. This balancing act, further complicated by the imperative to uphold treaty rights, demands a strategic and collaborative approach.

Moving forward, the foundation of our efforts must be rooted in genuine collaboration, particularly with indigenous communities. Early and sustained engagement with tribal nations, marked by respect for their sovereignty and a commitment to integrating their traditional ecological knowledge, is paramount. This collaborative ethos should extend to all stakeholders, encompassing environmental organizations, local residents, and other interested parties, ensuring that decision-making processes are transparent and inclusive.

Furthermore, development initiatives must be anchored in comprehensive environmental impact assessments. These assessments should rigorously evaluate the full spectrum of potential consequences, including cumulative effects, while giving particular attention to the protection of sensitive ecosystems and treaty-protected resources. To ensure objectivity and rigor, independent experts should conduct thorough reviews of these assessments.

A fundamental shift towards sustainable development practices is essential. We must prioritize environmental protection, adopting methodologies that minimize ecological impact and conserve resources. Investing in innovative technologies and practices that reduce pollution and promote resource efficiency is imperative. Embracing circular economy principles, which emphasize waste reduction and resource reuse, can further contribute to a sustainable approach.

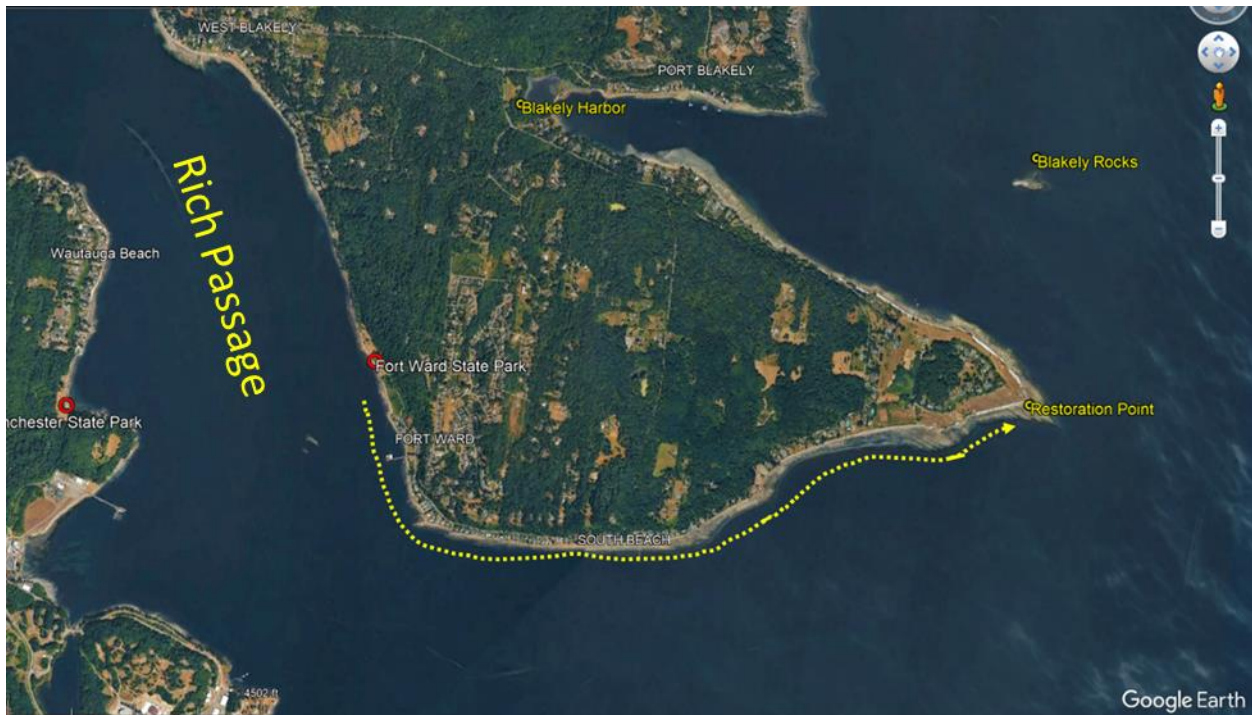
Strengthening regulatory frameworks is equally critical. Environmental laws must be rigorously enforced, and violators held accountable. Regulations should be continuously updated to reflect the latest scientific understanding and best practices. Crucially, legal protections for treaty rights must be fortified, ensuring their full consideration in all development decisions.

Effective governance necessitates a collaborative approach. Co-management agreements between government agencies and tribal nations can facilitate shared decision-making, ensuring that indigenous perspectives are integrated into resource management. An adaptive management strategy, which allows for adjustments based on new information, can further enhance flexibility and responsiveness.

Finally, mechanisms for conflict resolution are indispensable. Mediation and negotiation can provide avenues for resolving disputes between conflicting parties, fostering mutually acceptable solutions. Independent dispute resolution panels can offer impartial recommendations, ensuring fairness and transparency. By adopting these strategies, we can strive to achieve a harmonious balance between economic development, environmental stewardship, and respect for treaty rights.

As we continue our journey eastward, towards Restoration Point, let us reflect on the development that has shaped the Salish Sea since European settlement. By critically examining the impacts of this development, we can glean valuable insights for navigating the challenges that lie ahead, ensuring that our maritime heritage is one of both prosperity and sustainability.

Your Journey to Stop #3



Paddling route from Ft. Ward (Stop #2) to Restoration Point (Stop #3).