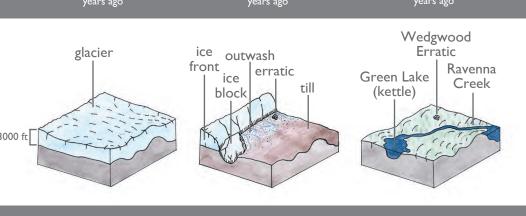


**GLACIAL TOUR** WALK Green Lake, Ravenna

eventeen thousand years ago a 3,000-foot-thick wall of ice encroached from the north. As it spread across the landscape of what is now Seattle, the massive glacier deposited hundreds of feet of sand, clay, gravel, and large boulders. As the ice melted, the moving ice and erosion from glacial streams carved the landscape, leaving behind the region's hill and valley topography, lakes and waterways, and landslide-prone slopes. Coast Salish oral traditions refer to the end of the Ice Age. Today, one of the best ways to appreciate this icy history is to traverse the city's many hills. This tour takes you by many features formed by and during the last time when ice covered Seattle



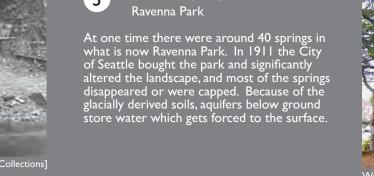
16000

During the time the glacier advanced over and then retreated from Seattle, it left behind several istinct layers. A mixture of sediments called till was deposited beneath the ice. Streams of meltwater washing out of the glacier's ice front deposited sand and gravel called outwash. When the ice retreated, occasionally ice blocks were left behind that became kettle lakes such as Green Lake. The retreating glacier also deposited large rocks called erratics, the most famous of which is the Wedgwood erratic.



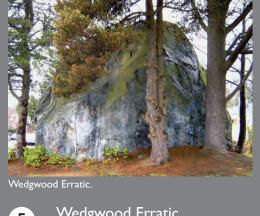
Ravenna Creek

Ravenna Boulevard follows the historic route of Ravenna Creek, which formerly flowed out of Green Lake through Ravenna Park and across what became University Village to Lake Washington. After Green Lake was lowered, the creek was directed into a sewer pipe, leaving only springs and seeps further downstream as source water.



Roller Coaster Topography

As you go east-west across Seattle, you will notice how you go up and down a series of ridges and valleys. The last glaciation produced the city's roller coaster landscape as it carved a series of north-south parallel ridges and troughs. Traveling north-south is generally easier as you travel along these gouges, rather than across.



8th Ave. NE and NE 72nd St. When the glacier that covered Seattle

retreated around 16,000 years ago, it left behind the rock known as the "Wedgwood Rock." Geologists call these glacially carried boulders "erratics"

NE of Yesler Way and 3rd Ave S

Climbing up this grade will highlight why pedestrians, past and present, have referred to this slope up to First Hill as Profanity Hill. Turn back and consider how difficult it is to navigate Seattle's landscape and realize why

early settlers were so eager to regrade the

Jackson St and 3rd Ave S

No longer visible, a sand spit stretched to the west. The sand spit separated the lagoon from the tidelands to the south.

Sand spit



From here you can return to Green Lake and experience the Roller Coaster Topography, or if bicycling, hop on the Burke Gilman Trail downhill, to the south, and connect to the Lake



ogs tend to form in shallow, poorly-drained

glacially-formed depressions. The tendency for flooding, and the settling peat soil, has impacted development around the Ravenna Peat Area, site of Dahl Park and the Picardo P-Patch.

16000

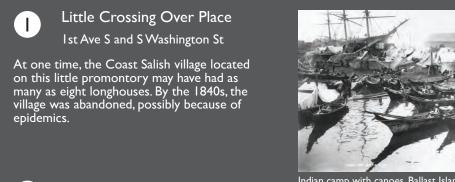


LITTLE CROSSING OVER PLACE WALK BIKE

"Little Crossing-Over Place" is the Coast Salish name for present day Pioneer Square, long a center of human settlement. Formerly a wooded peninsula separated from the mainland at low tide by a sand spit, it was surrounded by the sea and a lagoon fed by a stream flowing from the hills to the east. A major Coast Salish village was located on this promontory. It had a strategic location above a small lagoon, with fresh water, easy access to the Duwamish River and estuary, and direct trail access to Lake Washington. Early Euro-American settlers saw similar advantages in the site, as well as the deep water anchorage just offshore in Elliot Bay. These settlers began to fill the lagoon and Duwamish estuary in 1853, shifting Pioneer Square's western shoreline nearly 500 feet west of its pre-1850 boundary. Vestiges of the deep past are still visible during a walk along the historic streets of Pioneer Square.



The shed-style longhouses of this central Coast Salish village are similar, though smaller, than those usually built further south, around Puget Sound, 1866. [Royal British Columbia Museum]



Indian camp with canoes, Ballast Island at the foot of Washington Street, 1891. [UW Digital Collections]

Tidal Stream N of present day Washington Street

A small tidal stream ran into the lagoon that separated the promontory from the rising land to the north and east. This spot was the first to be filled with sawdust from Yesler's Mill at the foot of Yesler Way. Additional sawdust and other debris was used to fill in the lagoon over the next 30 years.



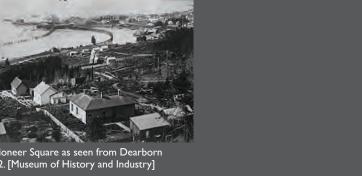
Lagoon

The lagoon provided important resources for people living nearby. Flounder were plentiful here. Peat deposits from the lagoon covered by layers of sawdust and debris can still be found underneath Occidental Park.



and 12th, 1882. [Museum of History and Industry]

Seattle Waterfront and Downtown Beginning in the 1870s, city engineers dramatically regraded Seattle's steep streets to provide easier access for people and horse-powered transportation.



hunting of mastodon and biso

**RIVER TOUR** BIKE CAR

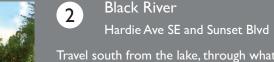
our Seattle's rivers. Although profoundly altered, in recent years the Duwamish River has been undergoing something of an ecological and cultural renewal. The 17 mile river tour goes through one of the few relatively flat areas of Seattle. In August 1916, the Black River, historically the outlet for Lake Washington and the Cedar River watersheds, dried up when the Montlake Cut owered the level of Lake Washington by 9 feet and diverted the flow through the locks. Around the same time, the Duwamish River was straightened from a 14 mile meandering river to a 5 mile navigable waterway. Engineered changes to Seattle's shoreline destroyed the ecosystems and traditional food sources upon which local Native Americans relied. Nearly all wetlands disappeared in the Duwamish Valley. This land became Seattle's industrial and commercial heartland and an engine of economic growth for the city.



historical flow

current flow

Stand at the present-day outlet of the Cedar River to Lake Washington next to the Boeing Plant.
Before 1916, the lake shoreline was about a half mile to the south. The Black River, dried up by the city's reengineering, was then the outlet for Lake Washington. It flowed south to join the Cedar River and then on to the confluence of the White River (now Green River) to form the Duwamish River.



Ballast Island

Pier 48, north of Main St

Ballast Island formed at the end of Washington and Main Streets in the late 1800s, when ships dumped their ballast before taking on

cargo. It became a camping spot for Native American workers visiting Seattle or heading to the hop fields because they were excluded from staying in the city. Ballast Island was covered up in the late 1880s.

Travel south from the lake, through what were once wetlands, past the former confluence of the Black and Cedar Rivers. Follow the now vanished Black River on Hardie Ave SE around an old bend with the former river bank visible and past sites of mer river bank visible and past sites of toric Coast Salish villages

7201 East Green Lake Drive N

reen Lake is a kettle lake, formed by a piece

of ice left behind from a retreating glacier. Sediment then filled in around the ice. Whe

sediment then filled in around the ice. When it melted, the depression left behind created the lake. In addition to the salmon run in the lake's outlet, which we now call Ravenna Creek, the lake was known for suckers and perch. In 1911, the lake level was lowered by 7 feet to create parkland.

Though a longer route, this freshwater spring is well worth the additional miles as an alternative start to the tour. A healing place with a long tradition of use, known for its thermal mineral waters and red mud, this one time private spa is now part of a public park. It is one of Seattle's modern placenames derived directly from Lushootseed.

Licton Springs (optional)

Green River Bicycle Bridge

Pass over the Green River, a few feet upstream of its confluence with what remains of the Black River. The playfields to the south are in what was historically a shallow lake. About 2,200 years ago you would have been in Puget Sound, the river's then-mouth being about ten miles upstream in Tukwila. Volcanic about ten miles upstream in Tukwiia. voica mudflows (lahars) from Mt. Rainier chang that, depositing the sediments that now form the Duwamish River valley bottom a shifting the river mouth northward.



4 North Wind's Weir S 112th St off of Pacific Hwy, Tukwila

At North Wind's Weir, a rock outcropping is visible in the bed of the Duwamish River at low tide. This site has been important to Native people throughout the region. This is also the site of a project to create estuarine habitat for salmon, one of several restoration sites along the river.



Ride a curved street that follows a former oxbow (an abandoned channel). Pass by the former Boeing Plant 2 that "won World War II" by producing bombers. Several Superfund sites are in this area of the Duwamish, polluted from

T-107 Park & Duwamish Longhouse 4705 W Marginal Way & Duwamish Trail

bend in the river. At I-107 Park, artworks by Don Fels explore the site history, which has archaeological evidence of over 1700 years of occupation. Across the street: Duwamish are in this area of the Duwamish, polluted from of occupation. Across the street: Duwamish the river's industrial past. Its cleanup will restore Longhouse & Cultural Center - the first longhouse to be built in Seattle in 110 years.



1928 - 1931 Denny Hill Regrade 2

End your tour at the "best view of Seattle," from Jack Block Park. Located just out of this sketch on former tidal flats, the park land was greated from fill dradged from the Duwamich. created from fill dredged from the Duwami River in 1909 along with Harbor Island just to the East. Harbor Island was the largest artificial island in the world at the time.

First known sketch of the Duwamish River, looking upstream toward Mt. Rainier, 1854. [Yale Beinecke Digital Collections]

tools for making cedar canoes and plankhouses in archeological record

20000

14000

13000

12000

earliest shell middens in Seattle 4000

N 45th St

LAKETOUR Lake Washington, Lake Union

Lakes Union and Washington were created during the last glaciation. In the last 150 years, the lakes have been significantly impacted by the construction of the Lake Washington Ship Canal, along with industrial development and intense urban use. Nonetheless it is still possible to get a sense of the lakes before 1850, especially while traveling the water's edge in a canoe, a boat, or on a bicycle. This tour takes you to places along Lake Union and Lake Washington's Union Bay shore that best evoke its pre-settlement past, as well as significant sites of industrial and naval history.



Union Bay Natural Area was once open water surrounded by a freshwater wetland After the lake was lowered by the city's reengineering, the area was filled with construction debris and garbage. The landfill has since been capped and is now a sanctuary for birds and wildlife. Across the bay, Foster Island, a significant Coast Salish cultural site, can be seen. "Little Canoe Hole" was an important village on "Little Canoe Channel" with at least five longhouses and a large fishing weir on Ravenna Creek. Remains of that weir were exposed when Lake Washington was lowered in 1916, but were soon destroyed.



2 Montlake Cut Montlake Blvd NE

People have been crossing this isthmus for centuries, aptly called "Carry a Canoe." For a time there was a small log flume here. In 1916, the 'cut' was dug to connect the two lakes for the ship canal, dropping Lake Washington's level by 9 feet to meet the existing level of Lake Union.



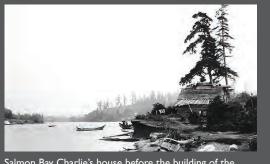
3 Doctor James Zakuse

Zakuse was known as a doctor for his status as a shaman. He and his family were some of a few remaining Coast Salish people living in the Lake region when the University of Washington campus was built beginning in 1894. They later moved to the Lake



4 Industrial Lake Union

Industry has long been a significant part of Lake Union and Seattle history. The lake has transitioned through logging, manufacturing, military, and now biotechnology and hi-tech. Identified as a potential park by the Olmsted Brothers, Gas Works Park was designed by Rich Haag. The park is a seminal reclamation project highlighting the industrial past.



Salmon Bay Charlie's house before the building of the Hiram Chittenden Locks, 1905. [UW Digital Collections]

5 Hiram M. Chittenden Locks

Construction of the locks linked Lake Washington and Lake Union to Puget Sound and the Pacific Ocean. The engineering project had enormous economic, social, and ecologic impacts on the Seattle region, good and bad. Opening up the inland freshwater lakes resulted in the lowering of Lake Washington and the demise of the Black River.

1851 Denny Party settles at Alki 1855 Treaty of Point Elliott 1890s informal regrading 1901-1904 failed Beacon Hill regrade (fill to SODO) 1903 Olmsted Master Plan 1906 White River diverted by flood and log jam 1907 - 1910 Jackson Regrade (fill SODO and Harbor Is) 1908 - 1911 Denny Regrade I (waterfront side) 1909 Harbor Island 1911 Dearborn Regrade (fill of SODO and Harbor Is) 1913-1930s Duwamish River straightened 1916 Lake Washington drops and Black River disappears 1917 Lake Washington Ship Canal opens

ies are well-established, with active management of resources 3000

Wapato processing near the Black River

TIMELINE KEY: physical processes flora and fauna people

duction by Amir Sheikh in collaboration with Brian Collins, Don Fels, Peter Lape, Joyce LeCompte, Coll Thrush, Cynthia Updegrave, and David Williams. We also thank Brian Atwater, Brian Boram, Steve Denton, Jolene Haas, Warren King George, Lorraine McConaghy, Jess Milhausen, Megon Noble, Laura Phillips, Aaron Raymond, and Ken Yocom. Lushootseed is in First Nations Unicode Font developed by UBC's FNEL Program. Art and design by Michael Lewis and Jordan Monez of About Nature. Waterlines, led by Lape, Fels, and Sheikh, is a project of the Burke Museum. Find out more about the project at: www.burkemuseum.org/waterlines, led by Lape, Fels, and Sheikh, is a project of the Burke Museum. Find out more about the project at: www.burkemuseum.org/waterlines. Second edition of 10000, 2016.