DESCRIPTION, GOALS, & TIMELINE

PROJECT DESCRIPTION

The Environmental Coalition of South Seattle (ECOSS), with Jones & Jones Architects and Landscape Architects, Anchor Environmental, and People for Puget Sound, will develop a Vision Report for a shoreline salmon habitat restoration program. The Vision Report will consist of a Vision Plan, a Funding and Permitting Strategy, and a Community Stewardship Strategy. The project extends from the Duwamish Waterway Park to the South Park Bridge on the west side of the Duwamish River.

GOALS

A. Assist landowners with design and permitting of salmon-friendly shoreline

B. Offer significant and measurable restoration package to parties interested in restoration

C. Provide limited public access to an improved South Park Waterfront

D. Create a model for public/private partnership for salmon recovery

TIMELINE

Task 1	Research & Reconnaissance	February 21–March 9 2001
Task 2	Common Goals	March 10–21
	Common Goals Workshop	March 21
Task 3	Alternative Plans	March 22–April 18
	Alternative Plans Workshop	April 18
Task 4	Draft Vision Plan	April 19–May 9
	Draft Vision Plan Presentation	May 9
Task 5	Community Vision	May 10–15
	Community Vision Meeting	May 15
Task 6	Vision Report	May 16–July 18
	Vision Report Presentation	July 18

For all the troubles they face, salmon still inhabit the soul of the Pacific Northwest. The fish leave their imprint on the place where we live. In diminished numbers they nonetheless connect ocean denizens and land dwellers in a bond that has been recognized since the days of the first peoples. Just as salmon once brought food for bear, human, and fir tree to the furthest reaches of our watersheds, they tantalize today with the dream of a place in which people can harvest what we need and stand back while the rest of the wild fulfills its own destiny.

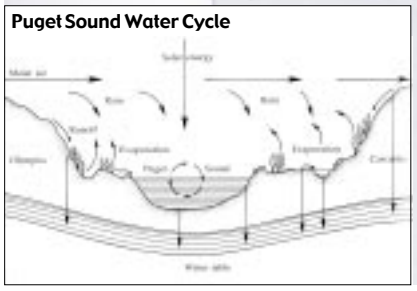
—Salmon Nation: People and Fish at the Edge

funding provided by King County Waterworks Grant Program, Ferguson Foundation, and South Park residents

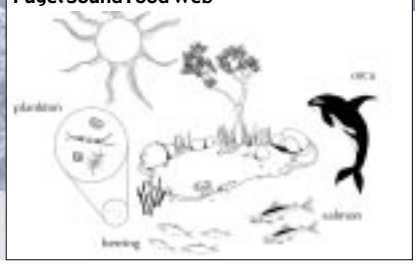
PUGET SOUND PERSPECTIVE

Puget Sound Basin

Puget Sound Water Cycle



Puget Sound Food Web



source: *The Natural History of Puget Sound Country*

Puget Sound—Where Land and Sea Meet

Puget Sound is a semi-enclosed, glacial fjord where saltwater from the ocean mixes with fresh water that falls as precipitation or drains from the surrounding land. Made up of a series of underwater valleys and ridges, Puget Sound is deep, with an average depth of 450 feet. More than 10,000 streams and rivers drain into Puget Sound. Puget Sound is surrounded by 2,354 miles of shoreline, which is a mosaic of beaches, bluffs, deltas, mudflats, and wetlands.

The waters of Puget Sound move in a typical estuarine pattern—seaward at the surface and landward at the lower depths. This circulation pattern is influenced by numerous factors, including the action of the tides, the configuration of waterways, and the presence of freshwater. The difference between high and low tide (from +11.8 to –2 ft MLLW) is nearly 12 feet at Seattle, significantly more than other estuaries. This results in a large amount of water moving in and out of the estuary with the tide.

The Puget Sound ecosystem boasts a diverse collection of habitats. The local marine environment alone supports more than 220 species of fish, 26 species of marine mammals, 100 species of seabirds, shore birds, and waterfowl, and numerous invertebrate and plant species. The vast food web within these habitats links the survival of the smallest plants and animals to that of the largest. Losing any one of the life forms in the web could also affect our own well-being. Much of the promise and potential of this region is based on natural resources and the industries, tourism, and recreation these resources support. While much of the Sound is healthy, rapid growth and development in the region are stressing the system. A steady loss of habitat and alarming declines in some fish and wildlife populations are signs that the very best of Puget Sound is threatened.

Salmon Life Cycle

Incubation

The female salmon chooses a site, digs a nest (redd) with her tail, then deposits eggs. One or more males fertilize the eggs. Each nest contains between 500 and 1,200 eggs. About 20 out of 100 eggs laid may survive to become fry.

Emergence

In late winter, the eggs hatch. Tiny alevins nestled in gravel live on the nutritious yolk "pot belly" on their undersides. While they have a yolk sac, alevins don't need to eat. Once the yolk sac is gone, they must find food quickly or they will starve.

Freshwater Rearing

When juvenile salmon or fry emerge from the redd, they must find food immediately. Most feed on insects as they grow. Salmon fry may spend hours to years in freshwater, depending on the species. Sockeye spend the longest amount of time in freshwater (1-3 years). Pink and chum fry spend the least amount of time in freshwater and immediately move downstream toward estuaries.

Estuary Transition & Rearing

Saltwater meets freshwater in estuaries, making a mix called "brackish" water. When fry enter estuaries, they begin to adapt to saltwater—a process called "smoltification." This major change causes young salmon to become less active and more vulnerable to predators such as birds and larger fish. To survive, young salmon must find places to hide and feed. Ocean-bound young salmon may spend days or months in estuaries and nearshore waters as they adjust to saltwater and grow, getting ready for an ocean journey.

Estuary Ocean Transition

At this stage, juvenile salmon travel from the protective waters of the estuary, along nearshore coastal areas, and into the open ocean.

Ocean Residence

Depending on the species, salmon may feed and grow in the ocean from six months to five years. Most head north, following the coast. They may travel thousands of miles, heading into the Gulf of Alaska and points beyond. While at sea, salmon must evade predators such as larger fish, killer whales, dolphins, sea lions, and seals.

Migration to Spawn

After one to seven years, depending on the species, salmon return to their home stream, river, or sometimes a lake to spawn. What causes adult salmon to move from ocean feeding grounds to their birthplace is not fully understood. Some scientists believe that salmon "smell" their ay home, remembering smells along the way.

Spawning

When salmon enter enter freshwater to spawn, they stop eating. They lose their shiny, silvery colors; males may take on bright body colors, a hooked nose, and large teeth. Females may develop darker colors. Some species, such as steelhead may spawn more than once. Most salmon species die within one week of spawning. The dead salmon are not wasted. Their decomposing bodies add important nutrients to the stream or river. Dead and decaying salmon also provide food for a wide range of wildlife including bald eagles, bear, mink, and river otter.

ECOSS

DUWAMISH RIVERFRONT REVIVAL

a waterfront for salmon and people in South Park

funding provided by King County Waterworks Grant Program, Ferguson Foundation, and South Park residents

JONES JONES

ANCHOR

PEOPLE FOR PUGET SOUND

SALMON'S EYE VIEW OF THE ESTUARY

What is an estuary?

The term estuary comes from the Latin *aestus,* the tide, and *aesto,* boil, from the boiling effect of the rising tide at river mouths where the river and ocean waters meet. The estuary is usually defined as that part of the lower river course that is affected by the mixing of salt water and fresh.

—Encyclopedia of Geomorphology

What is a juvenile salmon looking for in the estuary?

- **A Place to Adjust**—Juvenile salmon move to estuaries for weeks or months as they grow and adapt to salt water before moving out to sea. Here is where salmon make a critical transformation from a freshwater to a saltwater fish, a process called smoltification. Changes in body chemistry, appearance, and behavior occur. When salmon return from the sea as adults, they pause again in estuaries to adapt to freshwater before heading upstream to spawn.

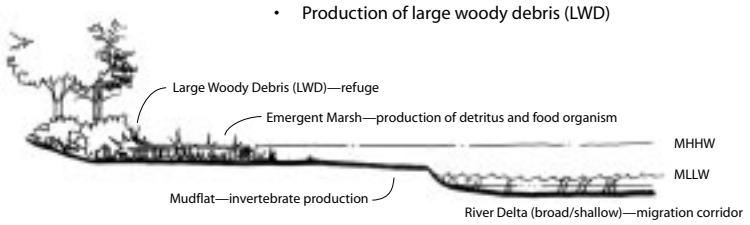
- **Shelter in Shallows**—Because predators such as larger salmon and sculpins tend to avoid the turbid waters often found nearshore, these regions provide some protection for young salmon. Shallow tidal channels with eelgrass and fringing marsh plants offer places to forage and hide.

- **A Rich Food Web**—Juvenile salmon experience the highest growth rates of their lives while in estuaries and nearshore waters. A complex detritus-based food web provides rich and abundant prey. Food production by marsh plants, seaweeds, eelgrass, epiphytes, and sediment microalgae surpasses food production in open waters. Despite the vast range of prey items to eat, juvenile salmon are very selective. The food chosen by young salmon varies with the size and age of the salmon.

Before Development

source: King County DNR

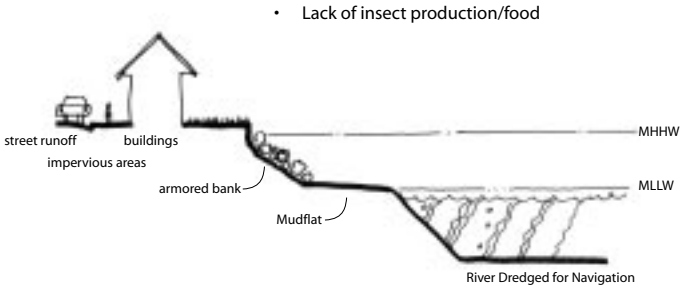
- Evergreen/conifers and deciduous trees & shrubs
- Insect production
- Shade
- Production of large woody debris (LWD)



After Development

source: King County DNR

- Increased runoff
- Lack of habitat structure/refuge
- Lack of insect production/food



What can we do to improve estuaries for salmon?

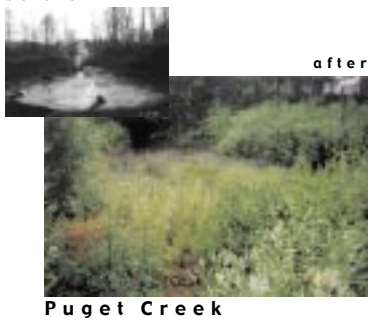
Above the top of the bank:

- **Plant overhanging vegetation in the riparian zone.** This will create food for salmon and increase woody debris deposition for food and refuge from predators.
- **Slow stormwater in vegetated swales.** This will improve water quality by reducing "Combined Sewer Overflows" and allowing sediments to settle before the stormwater reaches the river. These water courses will also collect and convey insects and nutrients to salmon.

Below the top of the bank:

- **Reshape shoreline to create refuge and feeding areas in the intertidal zone.** Bowls, bays, sloughs, benches, coves, lobes, and side channels will provide suitable elevations and protection for estuarine habitat.
- **Replace portions of riprap and substrate** with materials such as rootwads and geotextiles that are more conducive to estuarine habitat.
- **Plant estuarine vegetation.** This will create food for salmon and provide them with refuge from predators and a place to rest during acclimation to salt water.

before / after



Puget Creek

Seaboard Lumber

Turning Basin

Hamm Creek

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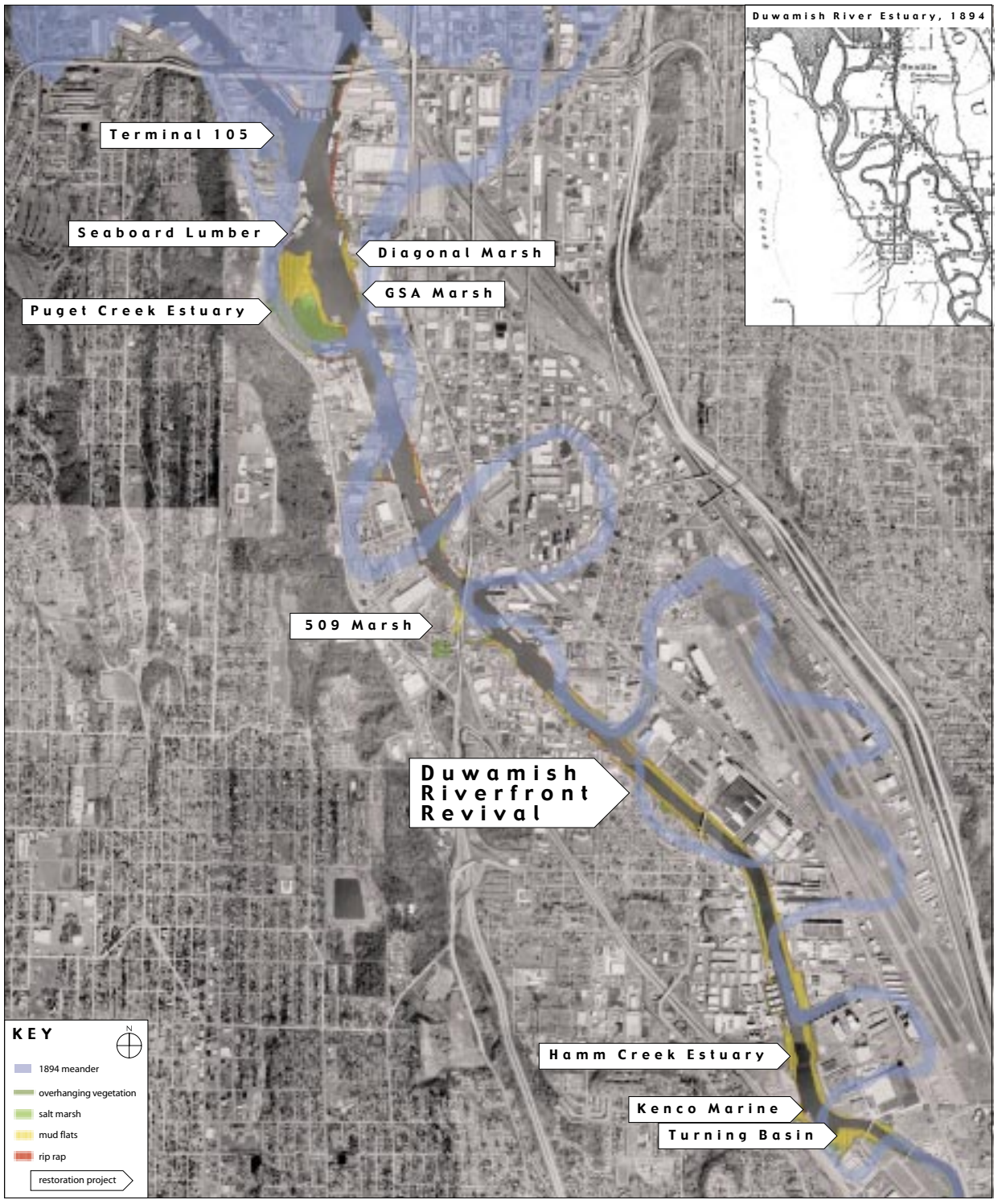
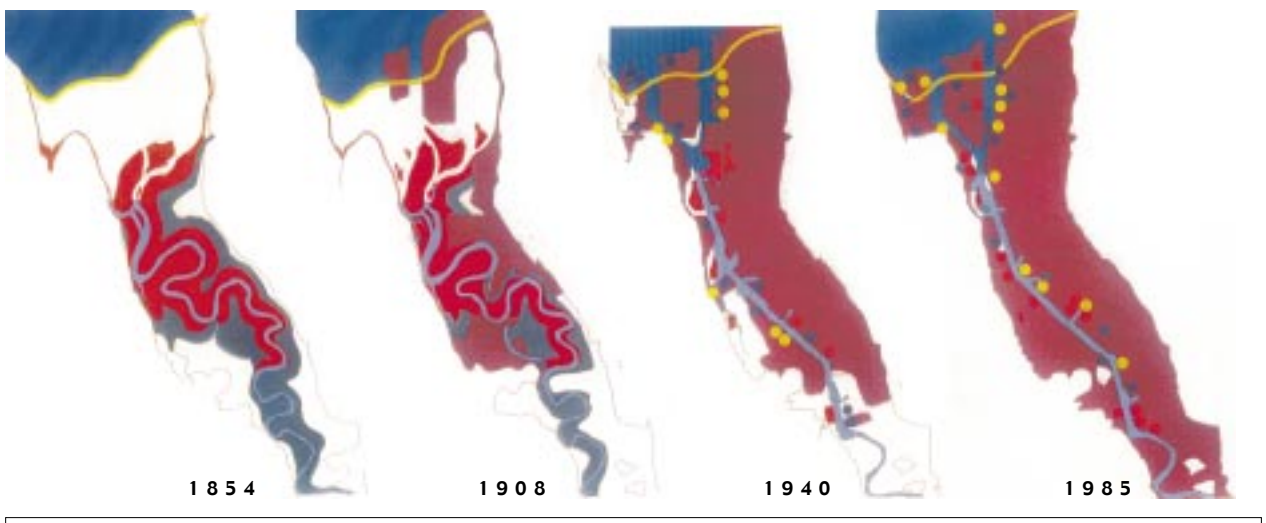
DUWAMISH RIVER CONTEXT

Duwamish River Estuary



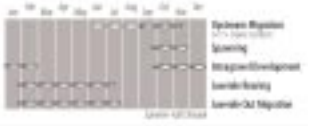


KEY

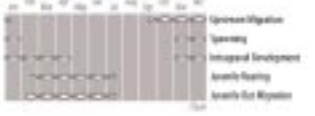
MLLW contour | deep water | medium depth water | shallows and flats | tidal marshes | tidal swamps | developed floodplain and shorelines

Duwamish Salmon

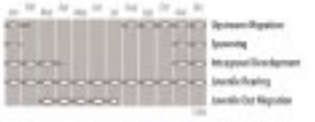
Chinook



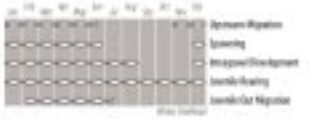
Chum



Coho



Steelhead



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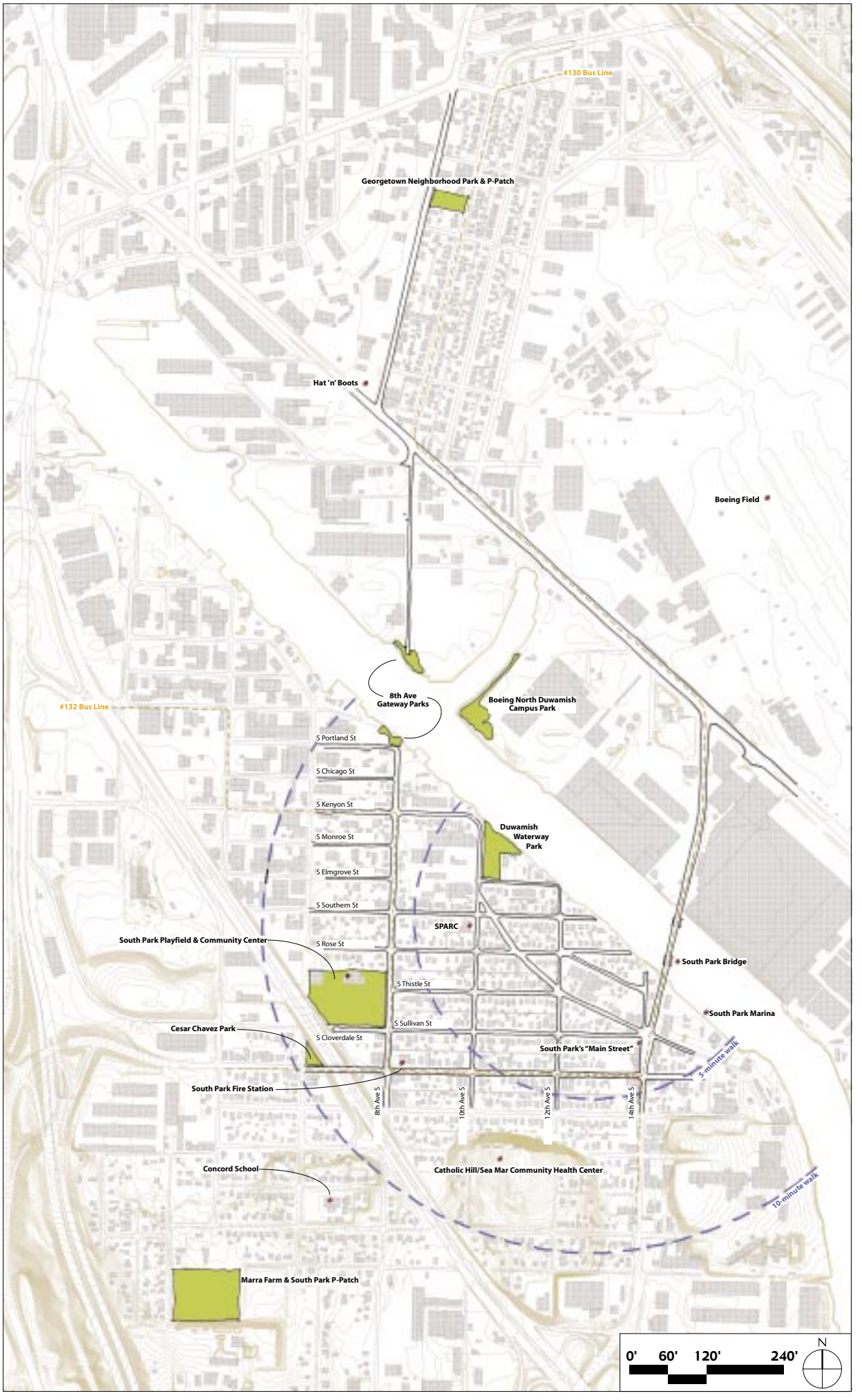
SOUTH PARK NEIGHBORHOOD CONTEXT

Urban Open Space & Circulation



Landmarks


South Park Community Center

Marra Farm


Sea Mar Community Health Center


Concord School


South Park Bridge


Boeing Field


Hat 'n' Boots

Man did not weave the web of life; he is merely a strand in it. Whatever he does to the web he does to himself.

—Chief Seattle

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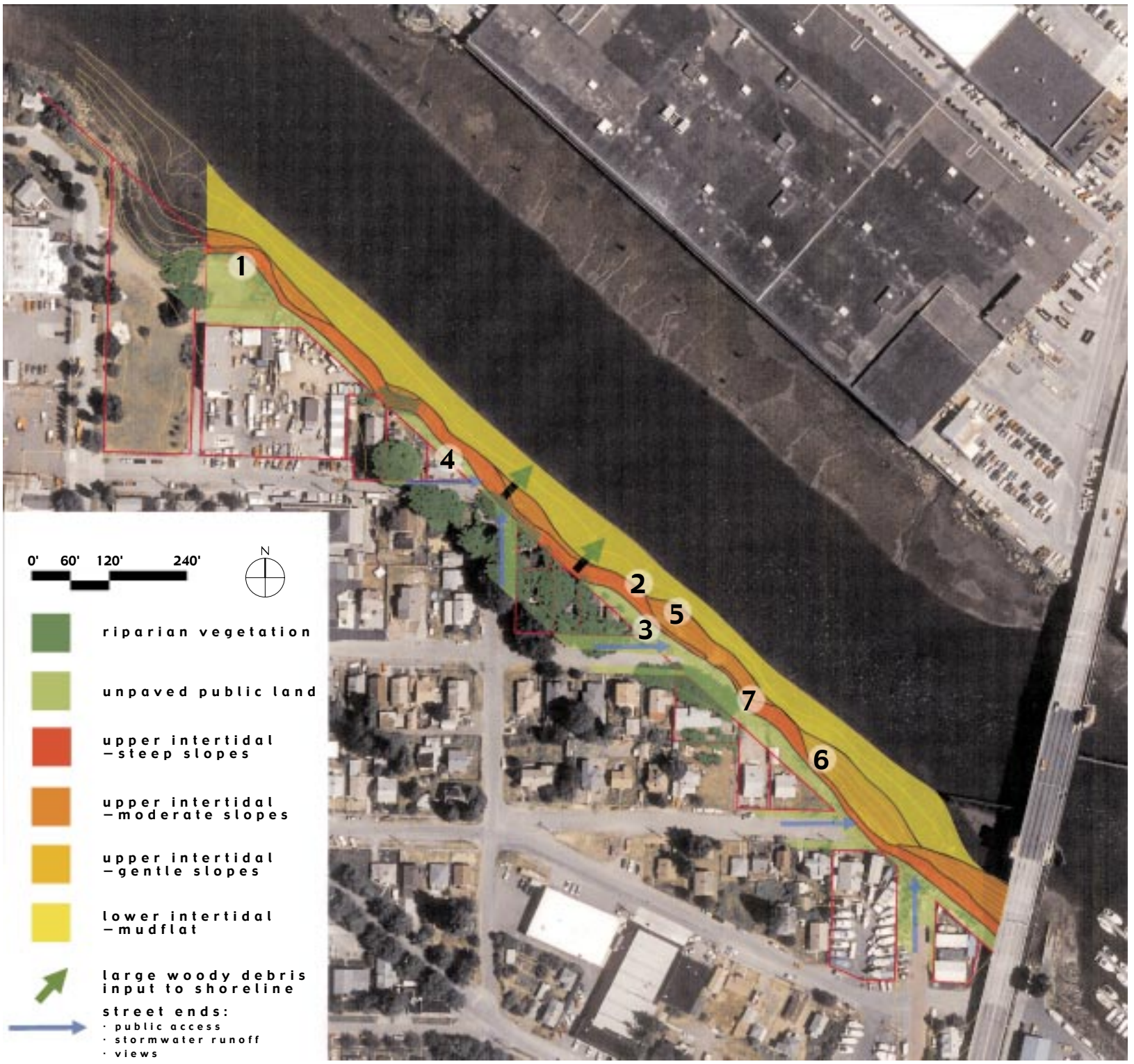
SITE CONDITIONS

Project Area



Duwamish Waterway Park 1

outhanging vegetation and varied bank substrate 2

street end 3

typical failing bank 7

typical steep bank 4

storm sewer outfall 5

typical mudflat 6

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