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Salmon swim past downtown along new 'highway' for fish

SEATTLE WATERFRONT | Since a new seawall was completed in 2017, researchers have repeatedly seen juvenile salmon under piers where they almost never ventured before.

BY DANIEL BEEKMAN
Seattle Times business reporter

Next time you're visiting Seattle's downtown waterfront and gazing out across Elliott Bay toward the majestic Olympic Mountains, look down. You might see a shoal of silvery baby salmon, each about 3 inches long.

You might also see a snorkeler counting fish, because University of Washington researchers are studying habitat improvements built along the city's $410 million new seawall, which stretches 3,100 feet between the Seattle Aquarium and the Colman Dock ferry terminal.

Their observations are preliminary — yet promising. Since the wall was completed in 2017, the School of Aquatic and Fishery Sciences researchers have repeatedly witnessed juvenile salmon swimming under the wooden piers that extend out over the waterfront, where they almost never ventured before.

During the wall's construction, workers added shelves and grooves meant to help algae grow and critters like mussels take hold. They laid rock beds below the wall because young salmon prefer to forage and hide in shallow-water nooks. They even installed translucent glass panes in a cantilevered sidewalk between the wall and the piers to allow light through, down to the water.

Juvenile salmon prefer swimming and eating in sunlight, and the improvements are meant to act like a migratory highway, complete with rest stations and restaurants. Taken together, they represent what might be the most sweeping seawall habitat-restoration project anywhere.

The primary goal in Seattle is to boost the region's culturally iconic chinook salmon, which are listed under the U.S. Endangered Species Act and which southern resident orcas rely on. Not every urban port in the world has chinook, but all have marine creatures under threat.

"This project has really hit the radar screen internationally," said Jeff Cordell, the principal UW research scientist studying the seawall. "I've traveled to Australia to talk about it. We've had people visit from South Korea."

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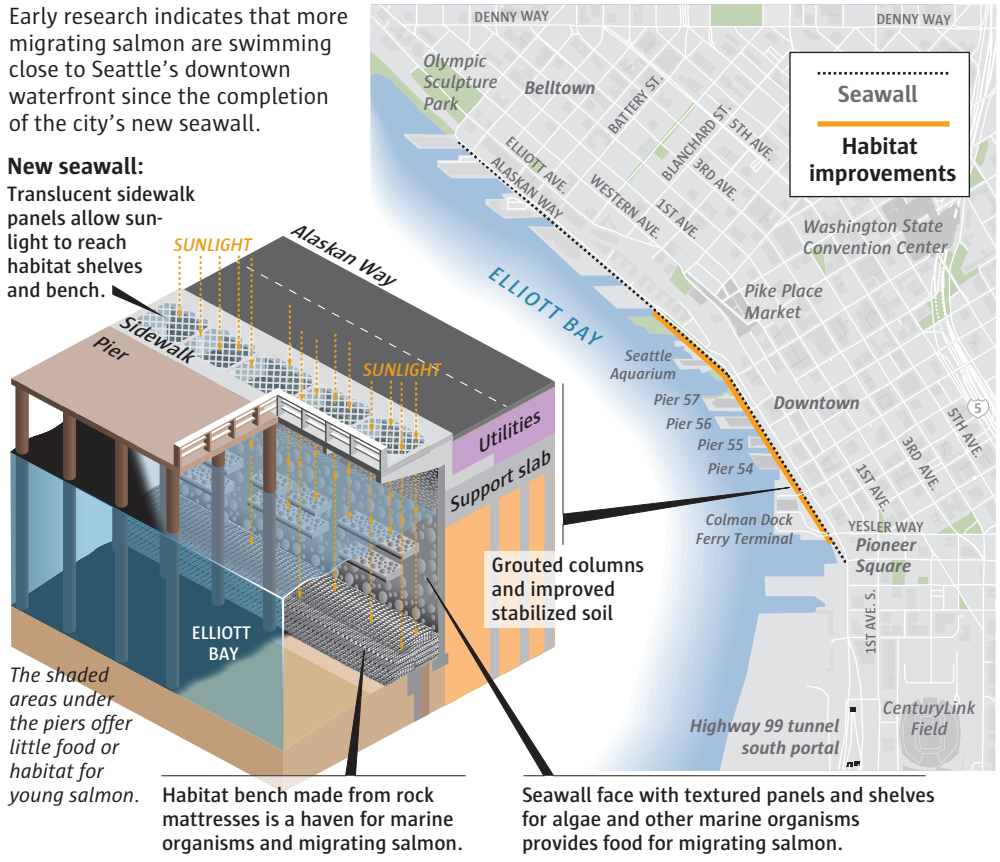
New seawall's habitat improvements are welcoming juvenile salmon

Early research indicates that more migrating salmon are swimming close to Seattle's downtown waterfront since the completion of the city's new seawall.



Sources: ESri, Seattle Department of Transportation

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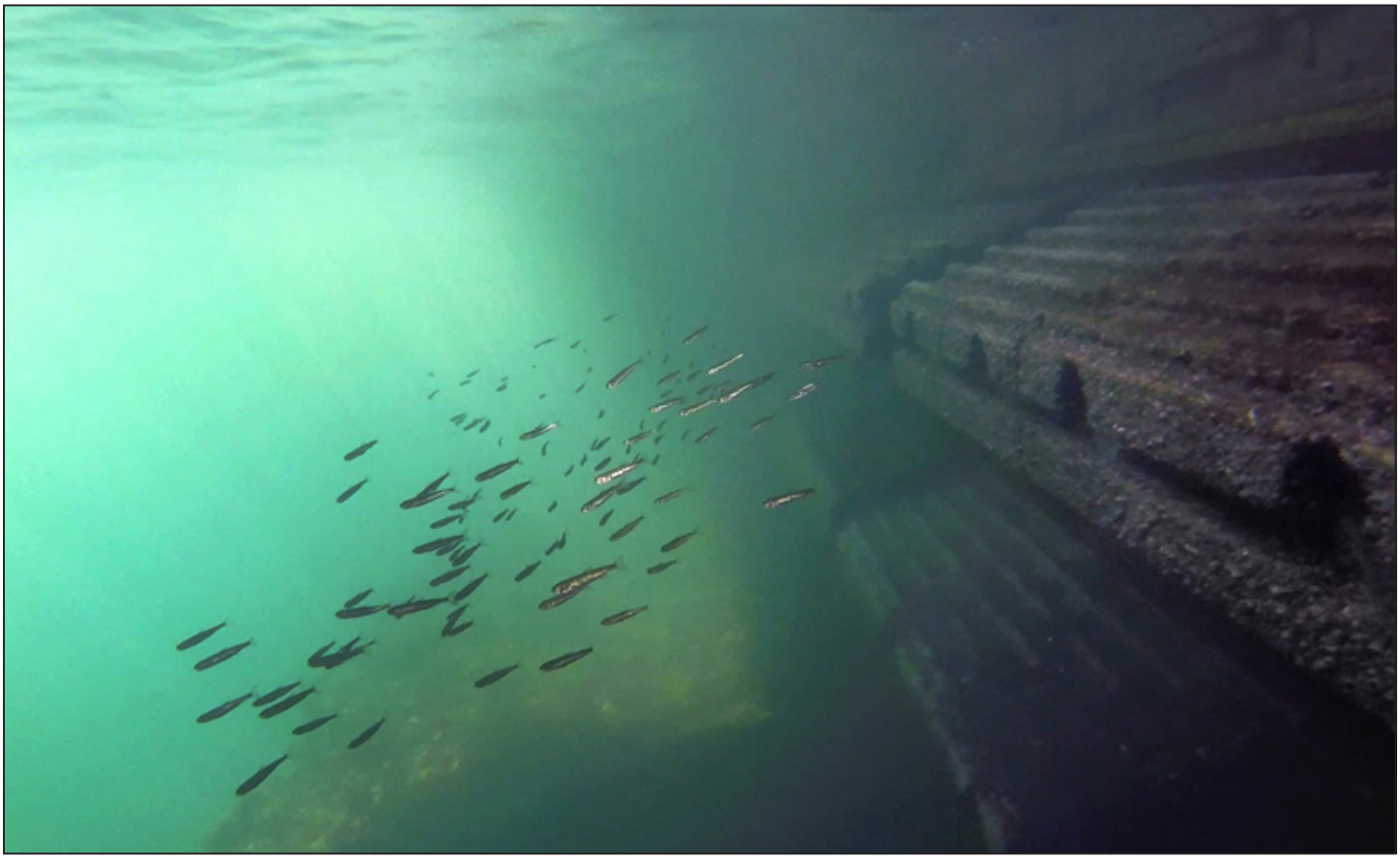

MIKE CAPUTO / UNIVERSITY OF WASHINGTON

Juvenile chum salmon swim along the new Seattle seawall, designed with features to help them survive and migrate past downtown. For example, next to the salmon are textured shelves that are home to snacks such as algae and mussels.

Seattle has wreaked havoc with its shoreline as the city has grown, replacing a natural, sloping beach with seawalls, dumping pollutants into the water and anchoring colossal ships in Elliott Bay. Salmon have never completely abandoned the downtown waterfront, however, and early research indicates the new seawall is easing their passage.

The more they eat and grow as they migrate from the Duwamish River and other waterways to the open Puget Sound and beyond, the better chance they have to survive at sea and return to mate. The UW team saw an estimated 10,000 juvenile salmon of various species on a single day of surveying last May and as many as 300 chinook on another day the same month.

"We're lucky. We haven't decimated them to quite the point where they're no longer here at all," UW research scientist Jason Toft said. "So now we're just trying to make little improvements for them."

Studying the seawall

Built to protect Seattle from Puget Sound tides, the old seawall was erected between 1916 and 1936 with a concrete face supported by landfill and timbers. A stretch between Virginia and Broad streets hasn't yet been replaced.

The new seawall is about 5 feet tall and 25 feet thick, supported by grout injected into the ground up to 40 feet upland and fronted with a concrete face up to 19 feet tall. It was initially supposed to cost $300 million, but the price tag grew over time. The work lasted four years.

The project was mostly funded by a 30-year, $290 million bond measure that voters approved in 2012, with then-Mayor Mike McGinn and the City Council citing stability concerns. In 2002, engineers assessing damage from the Nisqually earthquake had determined that the wall's timbers were being eaten away by small, wood-chomping crustaceans called gribbles. The city warned that the structure had a 1-in-10 chance of failing during a quake.

The nature-friendly design elements represented about 2% of the new seawall's total cost, project manager Jessica Murphy said. The city was required to engage in habitat restoration in order to comply with U.S. Army Corps of Engineers permits and other requirements.

Every year, juvenile salmon leave the streams where they hatch and head to the ocean. They hug the shore, where they can munch on small invertebrates and avoid predators. They're "visual feeders" that need light to forage.

When the old seawall was in place, "We'd see them between the piers in the sunlight and then they'd school around the edges of the piers but not go underneath," Toft said. "They'd hit the shadows, then circle back around."

The UW researchers, who surveyed certain waterfront areas before the new seawall was built, returned with their snorkels to the same areas last spring and summer. They were hoping to see

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COURTESY OF BOB OXBORROW

The new Seattle seawall was designed to help juvenile salmon survive. Its wall structures and underwater shelves are built with cobbled textures that are helpful to salmon and organisms they eat. For instance, the overhead walkway is a light-penetrating surface made with blocks of glass because juvenile salmon prefer swimming and eating in sunlight.

salmon interacting with the habitat improvements. But they didn't know quite what to expect.

"I remember the first time I saw a juvenile salmon below a pier, under those glass blocks," Toft said. "I had a handheld camera, so I took a video. There were some chum salmon swimming and feeding like you'd see them do in a more natural setting. That was super cool."

In January, the researchers completed their Year 1 report, based on snorkel surveys last March through October. Pink and chum salmon and shiner perch were the fish they saw most along the new seawall, with the salmon mostly present in April and May. They also saw some chinook.

More salmon showed up between than under the piers. But more were present under the piers than previously, clustered in the shallow, illuminated areas created by the new sidewalk and the rock beds.

Though not yet quantified in a report, that change "indicates that a proportion of the juvenile salmon along the seawall are using the corridor under the piers lit by (the panes)," according to the Year 1 study.

The researchers also took light measurements, surveyed algae and invertebrates along the new seawall and used scuba equipment to scan at lower depths for bottom dwellers.

Light levels were higher under the piers with the sidewalk panes, the textured seawall is providing suitable habitat for algae and invertebrates, and the rocks are providing suitable habitat for crabs.

While the researchers have more work to do before they can declare success, they're observing similar behavior this year, and they have three years to hit their target: a statistical increase in salmon along the corridor.

"We're pretty encouraged by what we see," Cordell said.

It was about 8 a.m. on a cloudy Thursday earlier this month when graduate student Bob Oxborrow and research assistant Juhi LaFuente pulled on dry suits. They hit the water between Pier 54 and Pier 55, next to an Argosy Cruise ship crammed with youngsters about to embark on a nautical field trip.

"You hear a lot about salmon later in their lives, when they're adults and they're food for orcas," LaFuente said. "The little guys are important, too."

Up above the water, tourists and commuters walked, jogged and biked along the cantilevered sidewalk, pausing to chat and snap photos. Down below, Oxborrow and LaFuente snorkeled slowly in search of baby chinook, jotting notes on waterproof clipboards.

Most days, "No one is looking down at the water and thinking there are baby salmon right here," Toft said. But sometimes when the researchers are at work, "People lean over (and notice) … You see their eyes light up."

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STEVE RINGMAN / THE SEATTLE TIMES

Divers from the University of Washington sometimes attract attention while studying juvenile salmon on Seattle's waterfront.

COURTESY OF BOB OXBORROW

UW research assistant Juhi LaFuente surveys fish and other creatures along Seattle's new seawall, which was designed to help juvenile salmon migrate.

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STEVE RINGMAN / THE SEATTLE TIMES

UW graduate student Bob Oxborrow treads water below the new Seattle seawall designed to help juvenile salmon survive. He's measuring the light coming from the overhead walkway made with blocks of glass.