

# Integrated Planning in Action

## 2015 Plan to Protect Seattle's Waterways

Seattle, Washington

Elliott Bay with Seattle skyline. Photo courtesy of Seattle Parks and Recreation.

Seattle, Washington, is the largest city in the Pacific Northwest, with a population of more than 700,000. This seaport city is located in King County, sandwiched between Puget Sound—the second largest estuary in the United States—and Lake Washington. Seattle operates a combined sewer system and a separate storm sewer system.<sup>1</sup> The combined sewer system brings stormwater and sewage to one of the six wastewater treatment facilities owned and operated by King County. The storm sewer system discharges about 13 billion gallons of stormwater per year. These facilities and systems discharge to Puget Sound, Elliott Bay, Lake Washington, and the Lower Duwamish Waterway.

### Challenges

Between 2007 and 2010, about 200 million gallons of sewage entered Seattle's local water bodies every year through combined sewer overflows (CSOs) and unauthorized discharges. Both CSOs and stormwater discharges add metals, total suspended solids, nutrients, bacteria, and organic compounds to local waterways. In 2013, the city agreed to reduce CSO discharges to meet the Washington Department of Ecology's limit of one overflow per outfall per year. The consent decree required Seattle to develop a CSO long-term control plan (LTCP) and complete construction of CSO projects by 2025. It also gave Seattle an alternative: develop an integrated plan and potentially extend the CSO project construction deadline, but only if the integrated plan results in significant water quality improvements beyond what the CSO projects under the LTCP would have achieved alone.

### Integrated Planning in Action

In 2013, Seattle began to develop two plans: an LTCP with CSO projects and an integrated plan with both CSO and stormwater projects. The city engaged the public throughout the planning process. Seattle made information available through community updates, briefings, animations, visualizations, website videos and updates, and an email listserv. The city solicited input through public information meetings, scoping sessions, online questionnaires, and emails.

Seattle identified potential stormwater projects to include in the integrated plan, then ranked these projects based on water quality impacts and other criteria (see details in the box below). The city then compared the highest-ranking stormwater projects with the lowest-ranking CSO projects.

Using this analysis, Seattle developed an integrated plan with three stormwater projects that it determined

<sup>1</sup> Storm sewers and storm sewer systems can also be referred to as municipal separate storm sewer systems (MS4s). Stormwater discharge permits can be referred to as MS4 permits.



**Seattle  
Public  
Utilities**

EPA Region 10

700,000 population



would provide better public health and environmental benefits than the CSO projects alone. Modeling showed that these stormwater projects would remove larger quantities of PCBs (polychlorinated biphenyls), fecal coliform, phosphorus, and other pollutants. They include:

- Reconstructing city rights-of-way to include bioretention basins (a green infrastructure practice) that infiltrate stormwater to reduce the amount discharged and remove pollutants.
- Building a facility to treat stormwater from a largely industrial area.
- Increasing street sweeping on major roads to minimize stormwater contamination.

The integrated plan also included several large, more effective CSO projects—such as sewer system improvements, CSO storage facilities, and a new tunnel—that were expected to lead to significant reductions in pollution. The plan deferred completion of six other small CSO projects beyond 2025.

Seattle’s analysis concluded that the integrated plan would achieve greater water quality benefits than the LTCP. Even with certain CSO projects deferred, the stormwater projects would treat a much larger volume of stormwater than the deferred CSO projects, resulting in greater reductions of total suspended solids, metals, bacteria, and other pollutants. For example, Seattle estimated that the integrated planning projects would remove 110 more pounds of zinc per year than the LTCP projects alone. The city projected that enhanced street sweeping would keep an estimated 40 tons of total suspended solids out of waterways every year.

Seattle estimated that the integrated plan would cost a total of \$592 million over 20 years, including both capital and operation and maintenance costs. Stormwater projects accounted for \$88 million—about 15 percent of the total cost. The integrated plan included \$450 million in non-deferred CSO projects and proposed to defer \$54 million in CSO projects until 2028–2030, which is later than the consent decree and LTCP. The integrated plan was ultimately more expensive than the LTCP option, but it extended CSO project implementation by four to five years, and the proposed stormwater projects were predicted to

## Seattle’s Selection Process for Integrated Plan Projects

To choose projects for the integrated plan, Seattle:

- Modeled pollutant reduction of each project
- Estimated each project’s effectiveness at reducing human and animal exposure to bacteria and other harmful pollutants
- Determined how close each project would be to planned stormwater projects
- Ranked stormwater and CSO projects based on water quality impacts, proximity to existing stormwater projects, performance risk, operation and maintenance costs, and community values
- Compared the benefits of prioritized stormwater projects and lower-volume CSO projects to ensure that the stormwater projects would achieve significantly higher benefits

achieve greater water quality benefits than the deferred CSO projects.

## Results

EPA and the Washington Department of Ecology approved the *Plan to Protect Seattle’s Waterways in 2015*. The city’s CSO discharge permit, issued in 2016, required two of the three proposed stormwater projects (i.e., bioretention in city rights-of-way and street sweeping) and deferred the six small CSO projects in accordance with the schedule identified in Seattle’s integrated plan.

As of 2018, the city reduced CSO discharges by 41 percent. During 2018, the street sweeping program removed nearly 60 tons of total suspended solids. Seattle finished constructing right-of-way bioretention in one area in 2017 that was designed to reduce CSO discharge volume by one million gallons per year. This green infrastructure project also benefits the community by increasing pedestrian activity, calming traffic, improving aesthetics, and increasing public awareness of how impervious surfaces affect stormwater. In April 2020, Seattle Public Utilities received a \$192 million Water Infrastructure Finance and Innovation Act loan to help finance an underground storage tunnel recommended in the plan. This storage tunnel is designed to reduce CSOs at 6 outfalls, and its construction is expected to create over 1,000 jobs.

