



## THE CHALLENGE

Located in the lowlands of the Skagit watershed, the previous City of Anacortes Water Treatment Plant was aging, inefficient, and at risk for flood-related damages projected to increase in the future in a changing climate.

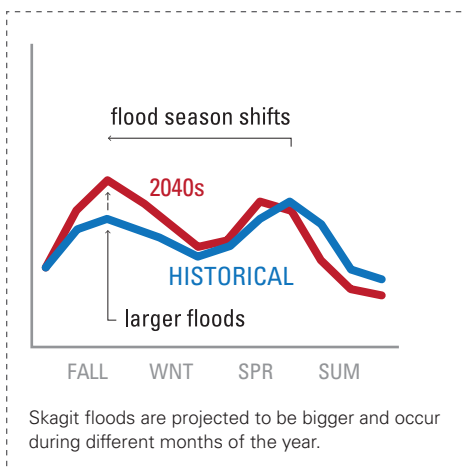
The plant's regional importance is clear—it is the largest single source of potable water in Skagit and Island Counties. It provides 29 million gallons of water each day to approximately 56,000 customers, including the Shell and Tesoro Refineries, the City of Anacortes, the City of Oak Harbor, the Town of La Conner, the Naval Air Station Whidbey, and the Swinomish Indian Tribal Nation. The Anacortes Public Works Department wanted to build a bigger plant for its customers, but they wanted to build a smarter plant too.



*A smarter plant would need to tackle current and future issues such as:*

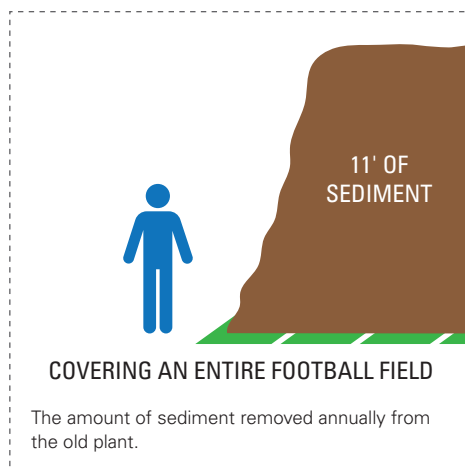
### FLOOD DAMAGE

Critical pieces of the facility that process the water and make it safe for drinking were at risk of flooding. Flood waters would flow over the ring dike that protected the plant and then needed to be pumped out. To make matters worse, floods in the Skagit watershed are projected to happen more often and during more months of the year, resulting in increased risk of damage to the treatment plant.



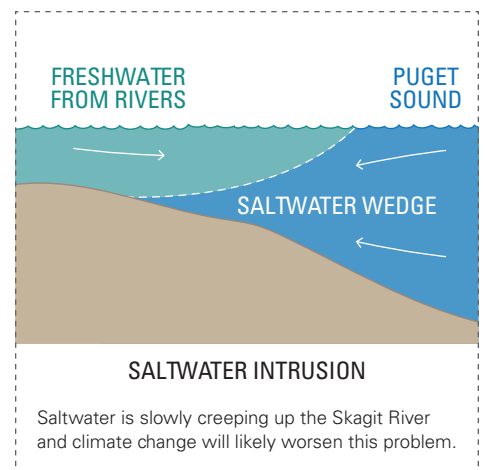
### SEDIMENT

Along with cold crisp waters, the Skagit River carries huge amounts of sediment. Every year, treatment plant employees remove more than 20,000 cubic yards of river sediment so water will be safe for drinking. This is a football field covered with 11 feet of dirt! The *annual sediment load* in the Skagit River is expected to increase significantly as a result of climate change—more than any other watershed in the Puget Sound region.



### SALTWATER INTRUSION

When the tide is high, salty water from the bay travels up the Skagit River. In recent decades, tidal influence has moved up the river, closer to the water intake pipe for the treatment plant where salt water would contaminate drinking water. Of concern is a potential change in the *saltwater wedge*, which is the result of having lower summer flows in the Skagit River and higher sea levels in the bay that pushes the denser seawater farther inland.





New Treatment Plant (2013)

### SC<sup>2</sup> AS A PROVEN RESOURCE

## SC<sup>2</sup> scientists supported City of Anacortes in developing a smarter plant—resilient to climate change.

Scientists from SC<sup>2</sup>, including Eric Grossman, Tarang Khangaonkar, and Alan Hamlet, worked directly with the City Public Works Department for over three years to provide unbiased scientific information the City could use to make smarter investments and weigh the risks of action and inaction. This required new analysis and taking the time for the scientists to understand water treatment operations. Once the scientists understood key thresholds, they designed analyses and studies to answer specific questions City of Anacortes staff had. As a result, the new plant was constructed with design elements to protect it against current and future flood events and the increase in sediment load. In addition, SC<sup>2</sup> performed preliminary modeling of salinity risks to the water intake pipe and found that it is not likely an immediate concern based on currently modeled rates of sea level rise and the lifespan of the plant.

### LOOKING FORWARD TO MORE SOLUTIONS, MORE ACTION

SC<sup>2</sup> is positioned to support communities and decision-makers with water supply infrastructure. In the future, we plan to:

- Develop a better understanding of the future composition of sediment loads in the river (is it mostly silt, sand, or clay?) critical to Anacortes plant maintenance and functions
- Work with other water right holders, such as farmers, to identify climate change pressures on their water supply
- Work with Anacortes on their wastewater treatment plant to make sure that it is also resilient to climate change and sea level rise in particular
- Advance the integrated model of hydrology, glacier melt, and sediment

“It’s really refreshing to see a local community just making practical, common sense, scientifically engineering-driven decisions rather than ideological issues. To me it’s an inspiring example of how if you just focus on science and what it means in your machinery, you get things done.”

— Governor Jay Inslee  
(*Skagit Valley Herald June 9, 2014*)



#### The Skagit Climate Science Consortium (SC<sup>2</sup>)

SC<sup>2</sup> is a nonprofit 501c(3) organization consisting of scientists working with local people to assess, plan, and adapt to climate related impacts. Composed of research scientists from universities and federal, municipal, and tribal governments and agencies working in the Skagit basin, SC<sup>2</sup> members seek to understand how the landscape, plants, animals and people may be affected by changes in the patterns of rain, snow, temperature, storms and tides.

[www.skagitclimatescience.org](http://www.skagitclimatescience.org)

Visit our website to learn more about who we are, what we do, and the various resources we can provide.

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