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Seattle 2220: Our Ancestors' Planning Legacy

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The following essay reflects on Seattle's present and past. It was written by an architect living in the year 2220.

From my vantage, atop the newly restored, expanded Bell Harbor International Convention Center, I find it difficult to imagine that much of the activity and prosperity before me might not exist without the convictions and actions of past generations.

Early in the twenty-first century, as worldwide energy and drinking-water shortages and catastrophic weather events first crept into the news, the rising ocean seemed far from Seattle residents' minds. At the time, the city was confronting other climate change issues, especially greenhouse gas reductions. Largely on account of citizen interest, Seattle achieved carbon neutrality in 2050, twenty years later than its original 2030 target, but a decade before America's other then-largest cities. Perhaps it was pride in this accomplishment mixed with visionary thinking that spurred city leaders to plan for ever-rising seawater.

The decision did not come easily. Lengthy debate focused on prioritizing the city's needs and concerns. As the world's atmospheric carbon dioxide exceeded 500 parts per million, global average temperatures increased to four degrees above year-2000 levels. Despite advances in alternative fuels and energy sources, the world's remaining coal-fired power plants pumped out more than enough carbon dioxide to compensate. After summer pack ice first disappeared from the Arctic in 2009, and then permanently in 2020, scientists predicted that melting glaciers would eventually cause sea levels to rise higher and faster than earlier forecasts. The rate would eventually double, bringing an increase of nearly seven meters over year-2000 sea levels by 2200.

Across the United States cities took different approaches to the challenge. New Orleans elected to retreat, and its population was gradually evacuated and dispersed. Cities around the Chesapeake Bay mostly chose to raise ever-higher seawalls against storm surges. Like Seattle, San Francisco elected to stay and adapt; outside its old downtown, many of its neighborhoods remained above high-water lines.

The crisis has been global. Pacific islands have been inundated, and coastal cities everywhere have had to choose from the same list of options: defend, retreat, or

adapt. In the early decades of the twenty-first century Seattle had to weigh its options: defend itself with seawalls that would periodically need to be raised; retreat to higher ground and let the ocean progressively reclaim low-lying neighborhoods; or adapt and devise ways to accept rising water as a challenge, not a catastrophe.

Our Choices

In hindsight, it is clear how right the city's decision has been. A seawall would have had to be constructed above the waterfront, and then it would have had to be raised over time. The city's piers would also have had to be raised or abandoned. These steps presented cultural as well as technical problems. The waterfront was a significant place, a center of land and water-based activity; a seawall would have cut off views of it and severed the city's connection with Puget Sound.

One proposal envisioned broadening the seawall to include a public park and boulevard that would connect to the new piers. But this plan would have required millions of yards of fill. While it was being built, tourism dollars would have dwindled, and it would have meant demolishing many buildings in the Pioneer Square Historic District. Seattle also had to deal not only with Puget Sound but with the Duwamish River, a topological circumstance which prevented a simple ocean-barrier solution.

A progressive retreat from the water was likewise considered. But this implied reactionary planning, devalued properties, and costly emergency measures. Leaders correctly foresaw that this option would threaten insurance companies, public coffers, and the long-term viability of our commercial waterfront.

As debate dragged on, storms began flooding the shops and businesses along the city's piers, hastening calls for action. The sense of urgency was heightened when federal emergency-flood-assistance programs were terminated shortly before New Orleans was evacuated, and when state assistance disappeared after the first insurance crisis.

Some argued that the city could lose its economic base entirely, and should be evacuated before the losses proved catastrophic. However, supporters of adaptation countered that economic restructuring could be based on activities that would survive rising waters. Faced with so many cities retreating or evacuating entirely, Washington State also needed a viable urban center to support its economy.

Advocates further argued that adaptation presented an opportunity to plan with the ocean as a friend rather than an enemy. This was the path Seattle selected after much debate.

Opposite: Seattle's Pioneer Square in 2220. Image by studio/216.



Sea Level Rise in Puget Sound

Greenhouse gas emissions are increasing. Atmospheric carbon dioxide levels are approximately 383 ppm and rising. If this level reaches 450 ppm or higher, as predicted, our planet's temperature could rise more than two or three degrees centigrade above preindustrial levels. Current research suggests this increase could create a global "tipping point" followed by cataclysmic climate change.

The use of coal-fired power plants worldwide will negate mitigation efforts designed to forestall or prevent the rise in carbon dioxide.¹ China alone, each week, currently produces emissions equivalent to the yearly output of two five-hundred-megawatt coal-fired power plants.² The ice on Greenland and Antarctica is melting

at record rates because of a combination of forces including increased air temperatures, warmer sea water, and moulines and cracks that allow surface water to reach underlying rock, lubricating the advance of glaciers. If these mammoth glaciers reach the sea as large masses rather than through gradual melt, sudden sea-level rise is possible.³

Mitigation measures such as sustainable construction materials and alternative fuels will not prevent waters from rising. The Puget Sound region must plan now to avoid insurmountable impacts later. Proactive planning is under way for estuaries and other coastal habitats.⁴ The regional discussion continues in scientific journals, waiting for consensus on the modeling methods to be used in assessing impacts to Puget Sound's developed coastal areas. I must echo Nicholas Stern: "The benefits of strong and early action far outweigh the economic costs of not acting."⁵

Our Accomplishment

We can be proud of the things we have done. The first may have been the decision, in 2020, to enact a program of zoning that moved setbacks and building heights back from the sea every twenty years. The strategy laid the groundwork for converting at-risk buildings into a series of terraces and parks connected by pedestrian bridges.

Eventually, officials rezoned every structure whose ground elevation was within twenty meters of the year-2000 sea level. Such forward thinking allowed owners of businesses and residences to adapt as properties changed hands, or to seek new locations away from the rising flood zone. Land conservancies and tax incentives offered further opportunities for threatened property owners to relocate to higher ground in return for new parklands. Gradually, it also produced today's stepped building forms that echo the city's hills.

Along the city's edge, in the later decades of the century, piers were converted to float like docks, rising on poles and connected by floating bridges to the landscaped terraces at the shore edge. City infrastructure for sewer, water, and power was also relocated concurrent with the demolition of the old viaduct. As a result of these measures, no reaction time was needed when the waters surged a full meter over the old seawall in 2100.

As water rose in the last century to a continuous level above the old wall and Alaska Way, it had minimal impact on the commercial area. In Pioneer Square, now flooded, businesses remain determined to maintain the historic district. Lower floors are sealed off when they become uninhabitable, and water and power are supplied from floating pedestrian bridges. Connected by bridges and small watercraft, the district's reinforced brick walls support the rooftop parks and restaurants we all enjoy, while the flooded levels have become fish habitat.

South Seattle, of course, has been a different story. Faced with the impossibility of building a seawall across the Duwamish basin, the river's banks had to be armored with dikes. The impact on adjoining residential and industrial areas was huge. Businesses largely evacuated to higher ground and better city access. But the area's residents are a resilient lot, and consider neighborhoods in the "Walled City" special on account of their large population of artists.

Outside the Duwamish dikes, Seattle's seaport has adapted to rising water with floating docks and cranes on adjustable stilts. The electric-powered trains that serve it run silently beneath the city, nearly parallel with the old Metro tunnel, and emerge onto a connecting causeway.

Mass transit has also adapted. In 2100 monorail service

was extended to connect the city with its piers; it now brings tourists and services to the city's floating businesses. Pedestrian bridges, including the one beneath my feet, link the piers and monorail stations to the city's hills and downtown areas, creating the water-centric character that we have come to cherish.

None of this adaptation would have occurred without a fusion of foresight and investment. The business community can be credited with recognizing and responding early to the imperatives of climate change. Had they been reticent in accepting the city's adaptation strategy, we would be suffering the same fate as so many other coastal cities.

Instead, Seattle leads the nation in progressive coastal planning. From my vantage, I can look west to the spot where what was once known as Alki Beach lies submerged. Then I can look east and south to our glistening city and its landscaped and terraced waterfront park, an international symbol of coastal adaptation.

Notes

Editing credit to Meg Matthews, M.Phil., Cambridge University.

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