

## Rockaway Beach Sourcewater Protection Plan Draft Risks Prioritization

08/27/2024

Identifying and prioritizing potential risks will form the foundation for developing strategies to protect drinking water quality. The City of Rockaway Beach identified and prioritized potential risks with guidance from its Sourcewater Protection Plan Team, a team of technical experts helping guide development of the plan, and the Sourcewater Protection Plan Development Advisory Committee, a five-member committee of individuals served by the Rockaway Beach Water District that review plan information and provide community input during the plan development process. The City’s Source Water Assessment (SWA) prepared by the Oregon Department of Environmental Quality and Drinking Water Protection Plans for other water providers in the Mid-Coast region informed the risk identification process.

Risks can be prioritized based on the likelihood of their occurrence impacting drinking water sources and the severity of their impacts to drinking water sources, water quality, and infrastructure. The approach to scoring risks is to define “risk likelihood” as the likelihood of the identified risk impacting the water source and causing the impacts described in the third column of the table. “Risk impact” is defined as the severity of the impact of those risks if they were to impact the water source. For example, highly erodible soils are likely to increase turbidity and contribute sediment to the water source, so the risk likelihood was ranked a 4 (Likely), and the impacts of that risk were ranked as a 4 (Severe) since it severely impacts the water source. The scale of 1-5 shown below was used to rate likelihood and impact of risks for Jetty Creek. A 20-year planning period was used for prioritizing risks.

Likelihood		Impact	
1	Rare/very unlikely	1	Insignificant
2	Unlikely	2	Minor
3	Possible	3	Moderate
4	Likely	4	Severe
5	Almost certain	5	Catastrophic

The two aspects of risk were then combined into an overall risk rating of high, medium, and low using the following table.

Likelihood	Impact				
	Insignificant (1)	Minor (2)	Moderate (3)	Severe (4)	Catastrophic (5)
Rare/very unlikely (1)	Low	Low	Low	Low	Medium
Unlikely (2)	Low	Low	Medium	Medium	Medium
Possible (3)	Low	Medium	Medium	Medium	High
Likely (4)	Low	Medium	Medium	High	High
Almost certain (5)	Medium	Medium	High	High	High

## Risks to Jetty Creek Drinking Water Source

Risk Category	Risk	Risk and Impacts Description	Risk Likelihood (scale of 1-5)	Risk Impact (scale of 1-5)	Risk Prioritization Score (high, medium, low)
Natural Hazards	Highly Erodible Soils	Eighty percent of the stream miles (18.58 mi) within 500 feet of the stream in the source water area contain soils with high erosion potential (USWA, 2016). Highly erodible soils contribute sediment and potential contaminants at a higher rate to the water source, increasing turbidity and decreasing water quality. Steep slopes are present in the watershed, and significant rain events are expected in the wet season, which increase the risk of highly erodible soils transporting sediment to the stream. High stream turbidity impacts water supply operations and active management is required annually to mitigate the impacts. The City has experienced sediment build-up in front of the fish screen at the off-channel settling pond upstream of the Water Treatment Plant (WTP). High turbidity events in Jetty Creek have required the City to shut off the WTP and the fish screen.	4	4	High
Natural Hazards	Landslides	Landslide deposits (non-rock material) are mapped near the intake and in the mid-watershed in the Updated Source Water Assessment (2016). Landslides can increase turbidity in the water. There are many steep slopes in the watershed, and several small landslides have been observed. Landslides closed a road near the watershed in 2015, and reportedly impacted the Rockaway Beach water system temporarily. Nearby water systems have had their infrastructure impacted by landslides in recent years, as well.	3	3	Medium
Natural Hazards	Drought and Low Streamflows	Drought and low streamflows put the City at risk of water supply shortages and decreased drinking water quality. Impacts on water supply are exacerbated because the City's water demand is the highest in summer when streamflows are at their lowest. Low streamflows can increase water temperatures. Low streamflows can also lead to a higher concentration of contaminants or nutrients, as well as increase the likelihood of algae growth. Climate change is projected to cause more frequent and severe droughts and lower streamflows, which increases the impacts of other risks, such as high stream temperatures, greater concentration of sediment and any contaminants, decreased dissolved oxygen, and increased algae and bacteria counts.	5	5	High
Natural Hazards	Climate Change	Climate change exacerbates existing risks to the drinking water source. Climate change is projected to cause more frequent and severe droughts and lower streamflows, which increases the impacts of other risks, such as high stream temperatures, greater concentration of sediment and any contaminants, decreased dissolved oxygen, and increased algae and bacteria counts. Lower streamflows reduce water supply when municipal water demand is highest. Increasing temperatures and droughts also increase the risk of wildfires in the watershed. Climate change is projected to increase winter precipitation, which can increase erosion and sediment transport to streams. Storms are also likely to increase in severity and frequency, increasing the risk of flooding and sediment transport to streams. Communities on the Oregon Coast, including Rockaway Beach, are federally designated as disadvantaged, due in large part to projected impacts of climate change (Justice40 Climate and Economic Justice Screening Tool 2023).	5	5	High
Natural Hazards	Earthquake	The entire Oregon Coast is at risk of a severe Cascadia Subduction Zone (CSZ) earthquake (The CSZ is the fault that runs along the Oregon Coast) earthquake. Less severe earthquakes could also occur. The effects of a major earthquake could include, but are not limited to, destruction of water system infrastructure, landslides, and potential contamination of drinking water. An earthquake could trigger a tsunami that could exacerbate these impacts and could produce additional impacts (see tsunami risk description below).	3	5	High
Natural Hazards	Tsunami	Rockaway Beach is at a higher risk of a tsunami than Tillamook County as a whole (Tillamook County NHMP, 2023). The water treatment plant and public works building are in the tsunami inundation zone (for a CSZ M9.0-med tsunami) and have a greater than 50% probability of moderate to complete damage from a CSZ earthquake (Tillamook County NHMP, 2023). A tsunami could destroy vital infrastructure and result in water supply shortages, potential saltwater intrusion, and other contamination of drinking water.	3	5	High

Risk Category	Risk	Risk and Impacts Description	Risk Likelihood (scale of 1-5)	Risk Impact (scale of 1-5)	Risk Prioritization Score (high, medium, low)
Natural Hazards	Severe Storms	<p>Severe storms increase the likelihood of rapid runoff, erosion, flooding, and high stream turbidity, which puts drinking water quality at risk. As discussed in the highly erodible soils risk description, high turbidity has been a continual concern for the City as it impacts the City's ability to run the WTP. The impacts of severe storms may be more severe in combination with other risks, such as areas prone to landslides, recent timber harvest, or burned areas.</p> <p>The area has experienced severe storms in recent years. December 2015 storms caused significant riverine flooding east of Highway 101. A combination of sand-blocking outlets and high tides meeting large volumes of runoff from the higher ground caused road closures. January 2021 saw coastal flooding events, landslides, and debris flows in the area.</p> <p>Climate change is projected to increase winter precipitation as well as lead to more frequent and severe storms, which could increase runoff and streamflow during these events.</p>	4	3	Medium
Natural Hazards	Wildfire	<p>Wildfires remove vegetation and damage soils, which increases runoff and erosion and decreases water infiltration and retention in the soils. Firefighting chemicals could potentially impact water quality. Per- and polyfluoroalkyl substances (PFAS) are components of some firefighting foams used to extinguish liquid fires but is not a concern for forest firefighting. Water used for fire suppression could be taken from Jetty Creek, reducing the City's available drinking water supply.</p> <p>Anticipated increases in the annual number of hot, dry days due to climate change could increase the risk of wildfires in the watershed.</p>	2	3	Medium
Natural Hazards	Volcanic ashfall	<p>Volcanic ashfall from a Cascade volcanic eruption is identified as a low risk to Lincoln County in the NHMP (2023), but it could affect Rockaway Beach. The effects of volcanic ash would be significant for water quality and could damage water infrastructure (NHMP, 2023).</p>	1	3	Low
Forestry Activities	Clearcut harvesting	<p>The source watershed is 100% private forest land with two landowners (USWA, 2016). The USWA (2016) identified clearcut harvesting with a rotation of under 35 years as a potential risk in the source water area. The USWA specified clearcuts southeast of the City's intake as a risk. Aerial imagery from 2000 to 2024 shows that nearly the entire drinking water source area has been clearcut within the 24-year time period. Some portions of the Jetty Creek Watershed will reach a harvesting age in approximately 15-20 years. Forest thinning or partial harvesting typically does not occur in this watershed because it leaves stands vulnerable to blowdown from high coastal winds.</p> <p>Clearcut harvesting may impact runoff and streamflow (and thereby stream temperatures), soil properties and moisture retention, sediment transport, and stream turbidity. Factors such as elevation, slope steepness, and direction of slope can influence the degree of impact of timber harvesting. Jetty Creek has a history of erosion and high stream turbidity post-harvest. The impacts on streamflow vary depending on the season of the year, the length of time since harvest, and the specific harvesting location and practices used. The period during regrowth when streamflow would be reduced during the summer low-flow season is a primary concern. Shorter harvesting rotations (e.g., 40 years) would be more likely to impact water quantity than longer rotations (e.g., 80 years).</p> <p>The updated Oregon Forest Practices Act rules include changes to management practices intended to decrease the impacts of forestry harvesting on watersheds.</p>	5	3-4	High
Forestry Activities	Pesticides (including herbicides)	<p>Pesticides, herbicides, and fertilizers used in forestry may enter waterways and contaminate water quality. DEQ has reported detections of herbicide residue (sulfometuron-methyl) in Rockaway Beach's drinking water before treatment at the WTP (USWA, 2016).</p> <p>The method and timing of chemical applications influence the level of risk to drinking water. For example, applications on steep slopes in sparsely vegetated areas increase the risk of contaminating the creek. Aerial spraying is potentially a greater risk to water quality than other application methods. Fertilizers are not used by landowners in the Jetty Creek watershed. Pesticides/herbicides would typically be used 1-2 times in a 40-to-50-year rotation. Chemical applications are regulated by several public agencies, and applications are not allowed within required buffers of streams. The revised Forest Practices Act rules increase stream protections regarding pesticide/herbicide use.</p>	5	4	High
Forestry Activities	Access Roads	<p>Building, maintenance, and usage of roads, particularly wet weather haul, may contribute to erosion and stream turbidity. Pesticide use on roadsides may contribute contaminants to the stream. Roadside applications would typically occur on a 3-4-year cycle, at least in the upper watershed. Updated Oregon Forest Practices Act rules and best management practices can help reduce these impacts. Heavy use of access roads to a rock quarry in the watershed, described under the borrow pit risk, also poses a risk to water quality.</p>	2	2	Low

Risk Category	Risk	Risk and Impacts Description	Risk Likelihood (scale of 1-5)	Risk Impact (scale of 1-5)	Risk Prioritization Score (high, medium, low)
Forest Activities	Riparian Impacts	Timber harvesting activities could affect soils and vegetation along streams, resulting in increased erosion and stream turbidity. Reduced vegetation could lead to an increase in stream temperatures and potentially an increase in algae growth and bacteria counts. Invasive plant species on streambanks could affect erosion susceptibility and water quantity. Timber harvesting near streams can increase the likelihood of blowdown that could impact riparian areas. The updated Oregon Forest Practices Act rules increase riparian buffer zones based on stream classifications and add protections for non-fish-bearing streams. While new standards are likely to reduce riparian impacts, legacy impacts from previous timber harvests may be present.	2	2	Low
Forestry Activities	Borrow Pit	A small, likely inactive (identified as inactive in the 2002 SWA) borrow pit east of the intake used for local logging roads is a potential risk to drinking water. Spills or leaks of waste or chemicals from mining operations could impact water quality (SWA, 2002). There may be another active rock quarry in or near the watershed that poses a potential risk to water quality, but more information is needed to determine whether the quarry is within watershed, and if so, to characterize the risk from this quarry.	1	1	Low
Municipal	Vandalism	Vandalism or sabotage would include deliberate damage to the intake or the water treatment facility and deliberate destruction or contamination in the watershed that impacts the water source. Vandalism could impact water quality or quantity.	2	4	Medium
Land Use	Unauthorized camping	Camping is not allowed on the properties within the watershed, but it can be difficult to prevent people from accessing and camping on the land. Camping poses risks to the source water area including: water quality contamination due to improper disposal of garbage and human and animal waste and vehicle pollution; and wildfires from campfires.	3	2	Medium
	Recreation	Hiking, horseback riding, and possibly other recreational uses in the source water area pose potential risks to drinking water, such as erosion and water contamination from garbage and human and animal waste.	3	2	Medium
Demands on Water Supply (outside of watershed)	Development	New development will add to water demand. Ensuring the City will have an adequate water supply is a growing concern. Demand exceeding supply during dry years has already become a concern for the City. The City manages this risk separately from the risks to the watershed itself, but development is an important concern for the ability to supply water in the future.	4	4	High
Demands on Water Supply (outside of watershed)	Tourism	Tourism increases water demand substantially in the summer. Ensuring the City will have an adequate water supply to meet summer demand is a growing concern. Tourism may increase, in part due to hotter and drier summer conditions anticipated from climate change. The tourist season has already begun to increase in length, as year-round short-term rentals are growing in popularity as opposed to seasonal vacation homes.	4	4	High

**Risks to Groundwater Drinking Water Source**

The City also has groundwater wells that supplement the water supply during late summer when Jetty Creek flows are low. The Updated Source Water Assessment (DEQ, 2016) identified several risks to groundwater sources, including sewer lines, septic systems in areas of residential high-density housing, transportation corridors, and sites with potential chemical contaminants. Other risks to groundwater include saltwater intrusion, aging infrastructure, and chemical use. Groundwater could also be impacted by potential natural hazards identified in the Jetty Creek risks section, including earthquakes, tsunamis, climate change, and storms. This Source Water Protection Plan focuses on the City’s primary source of supply, Jetty Creek, but the City plans to investigate its groundwater wells more extensively in its Water System Master Plan, currently in development. The Master Plan will look at stressors on water supply like projected demand increases and research possible approaches for providing a reliable water supply into the future. For this reason, the groundwater risks were not ranked in priority. The following table describes each groundwater risk identified.

<b>Risk Category</b>	<b>Risk</b>	<b>Description and Impacts</b>
Natural hazards	Saltwater intrusion	OHA has issued at least three alerts of sodium detections in the City’s groundwater (USWA, 2016). Sodium from seawater impacts water quality. In addition to introducing salt, seawater can transport other pollutants to groundwater. With sea level rise due to climate change, this risk is likely to increase.
Municipal	Sewer lines	Sewer lines through residential areas pose a contamination risk to groundwater.
Municipal	Septic systems	Above ground storage tanks and large capacity septic systems serving more than 20 people are potential sources of contamination. Septic systems, particularly aging ones, can leach contaminants into the groundwater.
Municipal	Residential high-density housing	High-density housing with septic systems can result in a higher concentration of contaminants leaching into groundwater in these areas.
Municipal	Aging infrastructure	Aging wells, pipelines, and other components of drinking water infrastructure put the ability of providing groundwater at risk.
Municipal	Dike	A dike between Nedonna and the Nehalem River has likely not been maintained in several years, which could put groundwater quality at risk if the dike failed.
Transportation	Roads, highways, and railroads	Several transportation corridors (e.g., Port of Tillamook Bay Railroad, Highway 101, and a few roads owned by BLM, ODOT, the City, and the County) present risks to groundwater sources. Vehicles may deposit contaminants that can infiltrate into groundwater sources via stormwater runoff. Herbicide use along highways, roads, and railroads has also been identified in the groundwater source area, which could potentially contaminate groundwater.
Industrial	Mercury storage site	Mercury is possibly stored at a site uphill from Nedonna Beach, posing a potential risk to the groundwater in Nedonna Beach if a leak were to occur. More information is needed.
Other	Stormwater	The USWA identified stormwater from Nedonna Wave PUD (Planned Unit Development) as a potential source of pollution in its Site Information System (SIS). Stormwater runoff has the potential to transport pollutants to the groundwater.
Other	Chemical use	Herbicides used in residential yards, runoff from waste, etc.