Sea Level Rise Vulnerability Assessments

DEPARTMENT OF
ECOLOGY
State of Washington

What is a vulnerability assessment?

Sea level rise vulnerability assessments identify how sea level rise and related hazards will impact people, infrastructure, and ecosystems. Vulnerability is usually defined by three elements: exposure, sensitivity, and adaptive capacity.
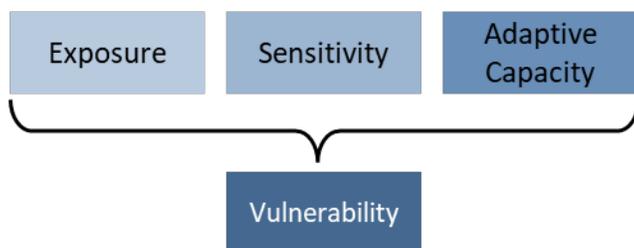
Washington's shorelines are characterized by diverse ecosystems, built environments, and communities. Vulnerability assessments make climate projections meaningful by incorporating local information. For example, a sea level rise mapping tool shows future water levels under a selected scenario, but local information including the type of development in the area and how people may be affected is necessary for decision-making. Vulnerability assessments may also include social vulnerability information to identify inequitable exposure and anticipate barriers to adaptive capacity. Vulnerability assessments provide foundational information for planning and implementation, and are an important early step in building climate resilience.

Figure 6. Results for the south Puget Sound from a parcel-scale vulnerability assessment conducted by Coastal Geologic Services.

Recommendations for sea level rise vulnerability assessments

Identify priority climate hazards: Vulnerability assessments can focus on a single hazard or group of related hazards. Sea level rise vulnerability assessments often assess coastal flooding and erosion, and may also evaluate saltwater intrusion, compound events, and other impacts. The final report should be clear about what was evaluated.

Define the geography: Local governments may focus on a specific sub-area based on known risks, the presence of vulnerable communities or infrastructure, or other top priorities. It should be clear whether some locations were evaluated more rigorously than others, or not at all. Ecology recommends assessing the area that will be exposed to future hazards, rather than limiting the assessment to current shoreline jurisdiction.

Determine objectives and focus: The study should be designed to provide the information needed to inform next steps. Whenever possible, assessments should consider other community and ecosystem assets in addition to the built environment, including public access points, habitat areas, natural and cultural resources, and others. The assets you include should reflect the concerns and values of Tribes, residents, and shoreline users.

Choose scenarios: Teams must select which sea level rise scenarios they will analyze. This requires decisions about location(s), timeframe, emissions scenario, and likelihood. Local priorities and risk tolerance should guide these choices. It is a best practice to evaluate several scenarios to consider the range of potential impacts.

Determine and communicate methodology: Assessments may use a combination of hazard modeling, spatial analysis, and semi-quantitative

and qualitive approaches. Some assessments may focus on exposure and sensitivity only, and others may include adaptive capacity and risk. Reports should state the methodology and any limitations so that future users understand how information can be applied. Local governments should coordinate for consistent methodologies along waterbodies that cross jurisdictions if possible.

Draw from existing information: For shoreline-focused vulnerability assessments, many of the reports and studies produced during SMP comprehensive updates can provide a useful starting point, including shoreline inventory and characterization reports and restoration plans. Increasingly, climate hazard exposure information is available at appropriate scales, and there are now even some regional vulnerability assessments that provide a starting point. Teams may be able to draw from existing information instead of conducting entirely new analysis. Many Tribes have already published vulnerability assessments and adaptation plans that can inform local governments that are beginning the process.

Partner and collaborate with Tribes: Local governments conducting vulnerability assessments should invite Tribes to be partners in vulnerability assessments. Conversations should include preferred modes of communication and participation in project teams; capacity; and preferences around the inclusion or exclusion of cultural resources, reserved lands, and usual and accustomed areas in the analysis. Information provided by tribal partners should be used in vulnerability assessments only with permission.

Engage experts and the public: Vulnerability assessments should engage the public so that community priorities shape the study. Project teams should follow best practices for equitable community engagement, including outreach methods and meeting design. In some cases, local governments may decide to conduct internal assessments; public priorities should still be reflected. Partners with relevant expertise should be engaged to serve on advisory groups.

Consider environmental justice: Teams should work to ensure that processes for forming project teams, engaging the public, and choosing assets to include in the assessment are equitable. Assessments should identify communities experiencing climate hazards and social vulnerabilities, and sensitivity and adaptive capacity assessments should draw from social vulnerability information when possible and appropriate. Online mappers can help with initial identification of overburdened and vulnerable communities but do not replace engagement.

Ensure assessments are relevant and actionable: Some vulnerability assessments identify potential adaptation actions that can be more thoroughly evaluated during adaptation planning processes. Adaptation actions should be locally tailored. Reports should be approachable and easy for a future planner to pick up, understand short- and long-term vulnerabilities, and build upon.

Inform shoreline management: Vulnerability assessments intended to inform shoreline policies should be developed with the SMP in mind. Shoreline jurisdictional area should be highlighted in maps; asset databases should include priority shoreline assets; and shoreline uses, the natural environment, and access should be discussed.

Reach out for assistance: Ecology and partners can provide technical assistance for sea level rise vulnerability assessments.

Additional resources:

- **Support:** Coastal Hazards Resilience Network, Climate Impacts Group, Washington Sea Grant
- **Guidance:** Steps to Resilience, Digital Coast, Coastal Adaptation Panning Guide, Centering Equity in Resilience Planning, MRSC Climate
- **Sea level rise & asset data:** Projections for Washington, CoSMoS, WA Geospatial, Local GIS
- **Environmental justice data:** Health Disparities, Climate and Economic Justice Screening Tool
- **Examples:** Puget Sound, Whatcom County, Coupeville, Jefferson County