

Overview of Vulnerability and Risk Assessments

Thurston Regional Planning Council

July 2016

Over the next few months, the project team will complete climate change vulnerability and risk assessments that will help the Stakeholder Advisory Committee evaluate strategies and actions for the Thurston Climate Adaptation Plan. Below is an overview of both assessments.

Approach

The vulnerability assessment will use text, tables, maps, and other tools to explain how the region's climate has changed historically, how it is projected to change during the 21st century, and how such changes affect the vulnerability of our human and natural systems. The vulnerability assessment builds upon the project's Science Summary by showing how roads, municipal water systems, estuaries, and other built and natural "assets" within the project area are vulnerable to the collective impacts of natural hazards exacerbated by climate change (e.g., wildfires, landslides, floods) and existing human-caused stressors (e.g., water pollution, land fragmentation).

Sources

Like the Science Summary, the vulnerability assessment incorporates plausible scenarios of future greenhouse gas emissions. The scenarios were run through global climate models, which were then downscaled to project changes in air temperature, precipitation, and other climate indicators [Figure 1] within Puget Sound-draining watersheds, including Nisqually, Deschutes and Kennedy-Goldsborough.

Several academic and governmental organizations (e.g., the National Center for Atmospheric Research, in Boulder, Colo.) developed the scenarios and maintain the models, which were used in the 2013 Intergovernmental Panel on Climate Change (IPCC) assessment of global climate change impacts and the 2015 University of Washington Climate Impacts Group (CIG) assessment of Puget Sound region impacts.

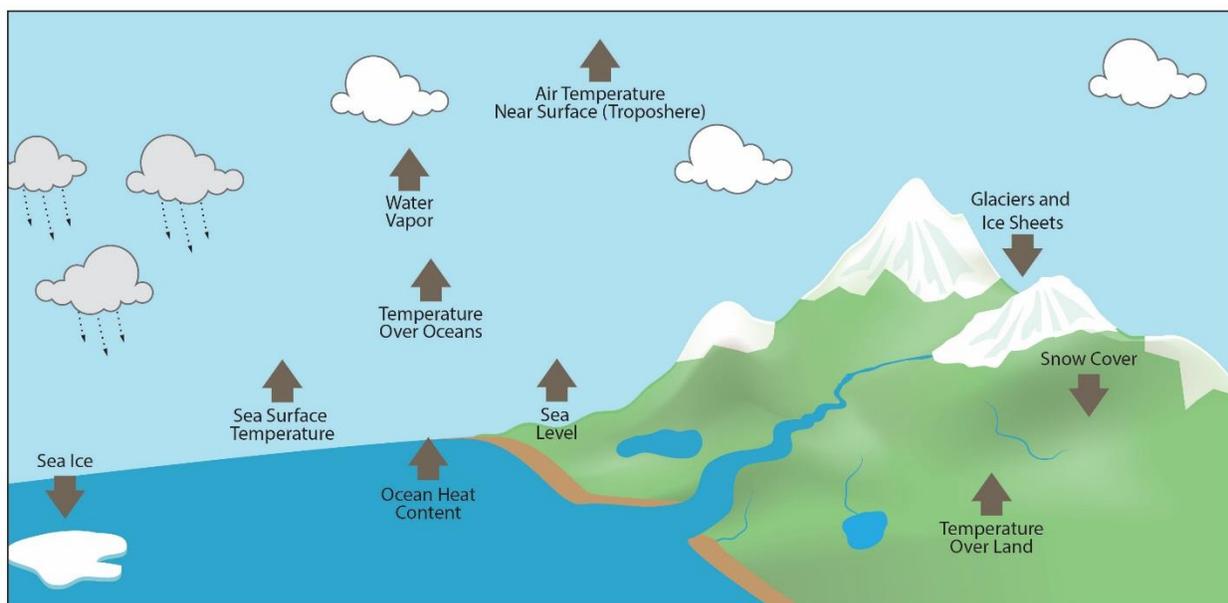


Figure 1: Pictured above are key indicators of the earth's changing climate. Arrows show increasing or decreasing trends based on global observations. **Source:** TRPC, adapted from image in U.S. Global Change Research Program's 2014 National Climate Assessment

The CIG report is the source of most of the data used in the vulnerability assessment, so most maps feature the same emissions scenarios (low and high), spatial extent (project area), and time intervals (historical, 2050s and 2080s). Some maps, tables and graphs focus on different geographies or time periods, however, when more local or regional detail is warranted or emissions scenarios or data differ.

The Thurston region, while diverse geographically, does not exist within a bubble. Dams, glaciers and snowpack within Pierce County, for example, affect the timing and volume of the Nisqually River and the adaptive capacity of its estuary. So, when useful, the assessment takes a wider look at impacts and assets within other Puget Sound watersheds and counties.

Organization

Water defines both the geography and organization of the Thurston Climate Adaptation Plan and its assessments. The Troposphere — the vulnerability assessment's first section — focuses on air (temperature, quality) and precipitation (timing, volume and type) because they are fundamental components of the hydrologic cycle [Figure 2]. Subsequent sections of the assessment — Freshwater Ecosystems, Marine Ecosystems, and Terrestrial Ecosystems — explore the vulnerability fish, plants, animals — as well as humans and the infrastructure we build.

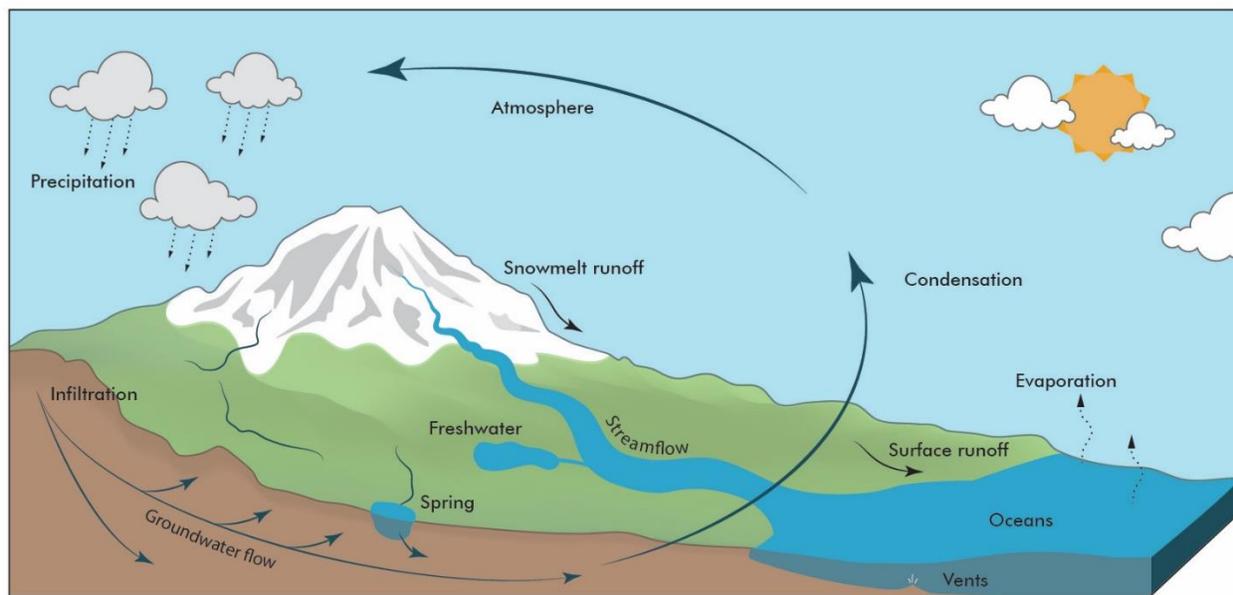


Figure 2. This illustration of the hydrologic cycle, also known as the water cycle, shows how water between moves continuously in the form of liquid, vapor and ice on, above, and below the earth's surface. **Source:** TRPC, adapted from USGS infographic

Next Steps

The project team is scheduled to complete the vulnerability assessment in September and a risk assessment in December. The risk assessment — modeled after a U.S. Environmental Protection Agency approach — will assess the probability and consequence of local climate change impacts identified in the vulnerability assessment.

In late 2016 and early 2017, the Stakeholder Advisory Committee will use the assessments to develop and prioritize adaptation strategies and actions. Climate change is projected to exacerbate the risk of natural hazards (floods, landslides) that already affect the region and may introduce new risks (diseases, invasive species) to ecosystems that are already under stress. During the strategy and action planning phase, it will be beneficial to consider how recommendations can address multiple risks or have co-benefits such as mitigating (reducing) greenhouse gas emissions or protecting air and water quality.