

Guidance for Project-Level Climate Change-Related Effects Evaluations

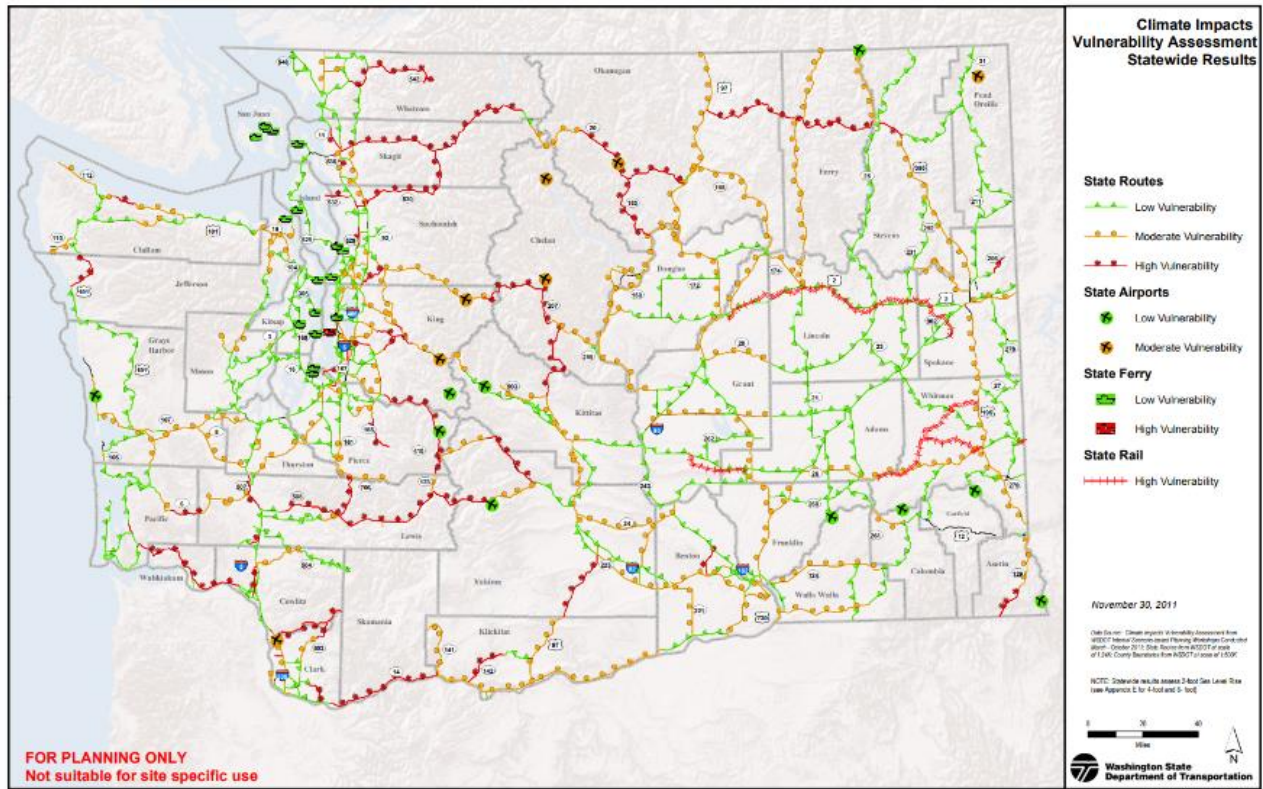


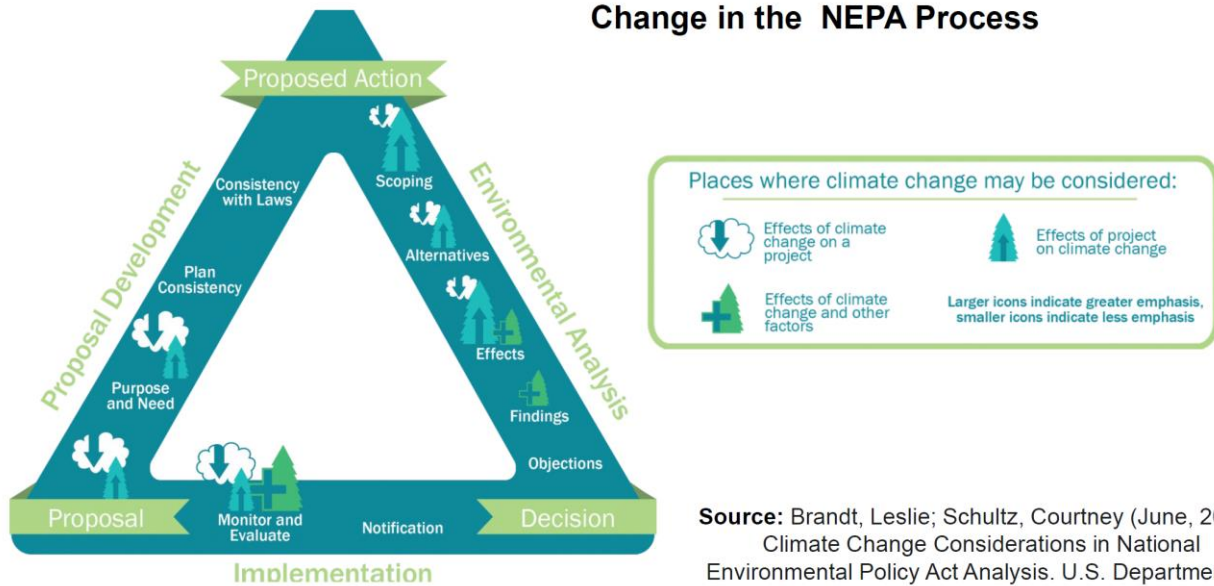
IMAGE: WSDOT's 2011 Climate Impacts Vulnerability Assessment (CIVA)

WSDOT Environmental Services Office Contacts:
Climate Mitigation and Adaptation Branch – Jonathan Olds
NEPA/SEPA Program – Lucy Temple
IT Program – Keisha Chinn

Introduction to the 2024 Version

WSDOT’s Environmental Services Office (ESO) developed the first version of this guidance in 2009 to answer the question: **How should we address greenhouse gas (GHG) emissions and climate change in our environmental documents?** Since 2009, CEQ rulemaking has advanced to include considerations of climate change throughout government agency action process, from proposal development, environmental analysis, final decision making, and through project implementation. Below is a figure from the U.S. Department of Agriculture Forest Service detailing how climate change is considered throughout the National Environmental Policy Act (NEPA) process. For the purposes of this guidance, effects of climate change on a project detailed in the figure represents where climate change-related effect evaluations are to be considered.

When to Consider Climate Change in the NEPA Process



Source: Brandt, Leslie; Schultz, Courtney (June, 2016). Climate Change Considerations in National Environmental Policy Act Analysis. U.S. Department of Agriculture, Forest Service, Climate Change Resource Center. www.fs.usda.gov/ccrc/topics/nepa

This guidance focuses on climate change-related effects evaluations during the proposal development and environmental analysis portion of a project, including the planning and environmental linkages process.

There have been several iterations of this guidance over the years. To ensure you are working with the most current version of this document, locate “Guidance for Project-Level Climate Change-Related Effects Evaluations,” on the [Consideration of climate change webpage](#). WSDOT’s project-level guidance for greenhouse gas evaluations is contained with the air quality guidance because they use similar inputs. See “Guidance on Addressing Air Quality, Greenhouse Gas, and Energy for WSDOT Projects”, on the [Air quality, energy & greenhouse gas emissions webpage](#). Another helpful document is “WSDOT’s Guidance for Considering Climate Change-Related Effects in WSDOT Plans and Studies” on the [Consideration of climate change webpage](#).

WSDOT direction

WSDOT's policy is to *prepare NEPA analysis and conduct associated engagement opportunities that facilitate high quality public decisions*. These decisions consider climate change-related effects environmental justice, and equity. Refer to the [WSDOT's Environmental Manual](#) chapters [400](#), [412](#), [415](#) and [460](#).

[WSDOT's Strategic Plan](#) and agency policies support the direction in this guidance. WSDOT's Resilience Goal is to: *"Plan and/or invest resources to improve our ability to mitigate, prepare for, and respond to emergencies; combat climate change; and build a transportation system that provides equitable services, improves multimodal access, and supports Washington's long-term resilience."* Under the direction of the Strategic Plan Resilience Goal Steering Committee, the Climate and Natural Hazard Subcommittee prioritizes actions that reduce risk and build climate preparedness. Members of this subcommittee include staff from regions, modes, and headquarters. WSDOT's ESO representatives on this subcommittee are Jonathan Olds and Susan Kanzler.

Federal direction

On May 1, 2024, the Council on Environmental Quality (CEQ) updated the NEPA Implementing regulations – issuing a final rule that took effect immediately. This rule directs federal agencies' implementation of the statutory amendments to NEPA made in 2023. While USDOT agencies have not yet issued their implementing regulations, WSDOT project teams should understand and incorporate the direction in the final rule to the best of their ability. The 2024 rule contains new direction that means: WSDOT must pivot from only discussing climate change impacts under cumulative effects in our EAs and EISs to integrating climate change considerations throughout the environmental review.

Highlights from the 2024 final NEPA rule:

- Climate Change is contained in the definition of "Effects or Impacts." CEQ does not define climate change, but the term is used throughout the rule ([40 CFR 1508.1](#)).
- Alternatives analysis now must include documentation of climate change-related effects along with all the other effects ([40 CFR 1502.14](#), [40 CFR 1502.16](#)). Previously, WSDOT considered climate change-related effects (resilience/vulnerability) under cumulative effects, not in the analysis of alternatives (although we have been including greenhouse gas emissions within alternatives analysis).
- Importantly, NEPA Environmental Impacts Statements (EIS) must include:
 - *Climate effects* - "where applicable, climate change-related effects, including, where feasible, quantification of greenhouse gas emissions, from the projected action and alternatives and the effects of climate change on the proposed action and alternatives." [40 CFR 1502.16\(6\)](#)
 - *Adaptation measures* - "where applicable, relevant risk reduction, resiliency, or adaptation measures incorporated into the proposed action or alternatives,

informed by relevant science and data on the affected environment and expected future conditions.” [40 CFR 1502.16\(9\)](#)

- *Environmentally preferred alternative* - Environmentally preferable alternative or alternatives include those that address climate change-related effects, [40 CFR 1502.14\(f\)](#). CEQ also notes that this can be different from the proposed action.
- CEQ clarified the use of reliable data and resources to include Indigenous Knowledge to describe reasonably foreseeable environmental trends including climate change-related changes to the environment, [40 CFR 1502.15](#).
- CEQ provides guidance to agencies on the use of climate change projections. “Where appropriate, agencies shall use projections when evaluating the reasonably foreseeable effects, including climate change-related effects. Such projections may employ mathematical or other models that project a range of possible future outcomes, so long as agencies disclose the relevant assumptions or limitations, [40 CFR 1506.6\(d\)](#).”
- For the first time in NEPA, “Environmental Justice” is defined ([40 CFR 1508.1](#)). This codifies the definition used in recent Executive Orders. It includes people with disabilities and mentions equitable access to healthy, sustainable, and resilient environment.
- CEQ clarified incomplete and unavailable information and requires an EIS to include an explanation when information is lacking ([40 CFR 1502.21](#)).

State direction

Two state laws directly address WSDOT’s obligation to consider climate change-related effects and resilience of state assets.

The first is [Chapter 70A.02 RCW](#), known as the Healthy Environment for All (HEAL) Act. The HEAL Act contains the first state definition of environmental justice, means “*the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, rules, and policies. Environmental justice includes addressing disproportionate environmental and health impacts in all laws, rules, and policies with environmental impacts by prioritizing vulnerable populations and overburdened communities, the equitable distribution of resources and benefits, and eliminating harm,*” [RCW 70A.02.010](#). Climate change is included in the HEAL Act definition for environmental harm. Environmental harm means “*the individual or cumulative environmental health impacts and risks to communities caused by historic, current, or projected:*

- (a) *Exposure to pollution, conventional or toxic pollutants, environmental hazards, or other contamination in the air, water, and land;*
- (b) *Adverse environmental effects, including exposure to contamination, hazardous substances, or pollution that increase the risk of adverse environmental health outcomes or create vulnerabilities to the impacts of climate change;*
- (c) *Loss or impairment of ecosystem functions or traditional food resources or loss of access*

to gather cultural resources or harvest traditional foods; or

(d) Health and economic impacts from climate change,” ([RCW 70A.02.010](#)).

The second is [Chapter 70A.05 RCW](#), Integrated Climate Change Response Strategy. This state law requires the following: *“State agencies shall consider current and future climate change impacts to the extent allowed under existing statutory authority and incorporate climate resilience and adaptation actions as priority activities when planning, designing, revising, or implementing relevant agency policies and programs. Agencies shall consider: The integrated climate change response strategy when designing, planning, and funding infrastructure projects; and incorporating natural resource adaptation actions and alternative energy sources when designing and planning infrastructure projects,”* [RCW 70A.05.040](#).

Guidance 2024

This guidance explains how WSDOT’s National and State Environmental Policy Act (NEPA/SEPA) environmental documents should consider the projected climate change.

Who should use this guidance?

All WSDOT projects subject to NEPA and SEPA are required to follow this guidance to ensure that the effects of climate change on their proposed project are understood. As explained below, this does not mean that all projects have to document their findings.

This guidance is written to be used by WSDOT environmental staff. Compliance with this guidance does not require outside expertise or consultant support.

Environmental staff in regions and modes, please keep the following in mind:

- WSDOT’s ESO NEPA/SEPA Program is available to help project teams use this guidance and to answer questions about climate impacts as they relate to our analysis of proposed actions under NEPA and SEPA. ESO’s Climate Change staff and IT program staff may also provide support.
- This guidance satisfies WSDOT’s responsibilities for disclosure related to the NEPA and SEPA processes.
- This guidance does not apply to documents prepared to satisfy the federal Endangered Species Act. Refer to the Biological Assessment (BA) Preparation Manual on the Preliminary design tab of the [Endangered Species Act & Essential Fish Habitat webpage](#).

The 2024 version of this guidance contains new direction regarding the analysis of alternatives and direct effects which will likely require corresponding updates to other Environmental Manual Chapters and technical web-based guidance.

Please note that WSDOT has separate guidance for other actions. Guidance for planning actions and planning and environmental linkages (PEL) studies is located in WSDOT’s “Guidance for Considering Climate Change-Related Effects in WSDOT Plans and Studies” on the [Consideration of climate change webpage](#). PEL studies that need more robust climate analysis may find this project-

level guidance useful. Please contact the [Climate Mitigation and Adaptation Branch](#) to determine which guidance is best for your PEL study.

The HEAL Act Environmental Justice assessment and documentation requirements are outlined in the [Environmental Manual Chapter 460: Environmental Justice](#). Project designers and hydraulics staff follow the direction in the [Hydraulics Manual](#) and [Washington State Ferries \(WSF\) Terminal Design Manual](#) for water crossings and ferry terminals. These documents are regularly updated to reflect design-level climate change-related inputs such as sea-level rise and precipitation changes. Asset managers and other internal experts rely on direction from the strategic plan resilience goal leads.

How should project environmental documentation consider future conditions related to climate change?

All project teams are expected to consider these questions during environmental review:

- “What types of climate change-related effects are likely to occur in the study or project area and surrounding community?”
- “How might climate change exacerbate the impacts my project has on specific environmental resources, tribal resources or minority and low-income populations?”
- “What are ways to increase the resilience of the transportation assets in the project area?”

The answers to these questions will assist the project team in completing a project that will withstand threats, reduce disruptions and be a long-lasting asset to the communities we serve.

What are the environmental documentation requirements?

The extent to which a project team must document these considerations depends on the NEPA/SEPA classification of the proposed action. Each classification is discussed below.

NEPA CEs and SEPA Checklists

For projects classified as NEPA and/or SEPA CEs or that require a SEPA checklist, consideration of climate change-related effects is optional. There are no options for documenting climate change-related effects in the SEPA checklist. Similarly, the Environmental Review Summary (ERS) and Environmental Classification (ECS) forms do not include climate-specific fields to capture this information. If your team compiles climate change-related information, we recommend you summarize it in a memo to the project file, which can be attached to the ERS/ECS forms or included with the SEPA Checklist. If this information includes project commitments that need to be tracked by project design, construction, or maintenance teams, consider how these will be communicated (e.g., WSDOT’s Commitment Tracking System).

NEPA EAs and EISs

Projects that are classified as an EA or EIS must document their consideration of climate change-related effects. Until we learn more from our federal lead agencies, we have a lot of latitude on how and where to document. Climate change-related effects can either be discussed in each

element of the environmental analysis or included in a separate section of the environmental document. A separate section is most appropriate when there are many climate change-related effects that are interrelated across disciplines. Most project teams find it useful to have a separate discipline report or technical memo to document the details of methodology and findings. In some cases where there are few climate change-related effects, a project team can write climate change-related effects entirely within the EA or EIS rather than within a separate technical memo or discipline report. The process points for climate change-related effects are affected environment, alternative analysis, impact assessment, transportation resilience, cumulative effects:

1. Affected Environment

WSDOT expects its NEPA specialists and technical experts to understand that climate science also changes how we describe the “affected environment” in our NEPA EAs and EISs. That means that project teams need to examine the future affected environment and not just rely on what has been observed in the past. See below for guidance on how to locate information about the climate forecast in your project area.

We recommend summarizing the climate projections from UW Climate Impacts Group’s reports or applying their visualization tools. When using the tools, you will need to pick a greenhouse gas scenario. WSDOT uses the “HIGH (RCP 8.5)” not the less likely “LOW (RCP 4.5)”. See the “How do I locate climate change projections for a project area” section below about information and climate modeling tools.

Note: In addition to climate change-related threats, WSDOT’s strategic plan seeks to improve the transportation resilience to non-climate hazards like earthquake, tsunami, volcano, landslides. If your project area contains other natural hazards, these should also be included in the affected environment.

2. Alternatives analysis

The CEQ’s 2024 final rule requires that the “environmentally preferable alternative(s)” address climate change-related effects, see [40 CFR 1502.14\(f\)](#). It is very likely that multiple action alternatives (including the agency’s preferred alternative) would address climate change effects. Consider the lifespan of the proposed actions (reasonable alternatives) and their ability to withstand anticipated climate change-related effects and provide solutions to these challenges. Consideration of climate change-related effects of proposed actions must include an assessment of both current and future projected climate and natural hazards. Generally, we would assume the no action or no build alternative would be less resilient, but this must be evaluated during project level analysis. The alternatives analysis should relay these considerations of climate change-related effects and provide an assessment of how each proposed action addresses these concerns.

3. Impact analysis

Past trends for a specific resource (water, habitat, air) may not be accurate predictions for the future; instead, we need to look at scientifically based projections of the changing climate as part of our analysis. For example, when planning wetland mitigation actions, we must consider both past trends and future issues like saltwater inundation or drought as concerns for long-term wetland viability. We recommend the discipline specialists/study

authors be aware of the climate projections at the start of their studies so that they consider climate threats as they assess environmental conditions of the resources they are evaluating. Remember to ask and answer this question: “How might climate change exacerbate the impacts of the proposed project and its alternatives may have on this resource?” Environmental Manual chapters, procedures and discipline report templates will be updated to reinforce this direction.

4. Transportation infrastructure & community resilience

When describing the benefits of the proposed action, we recommend climate resilience elements be included. New infrastructure projects will be designed to address the anticipated threats to the extent feasible. Reducing the risk of climate and natural hazards is a benefit to our communities and to the natural environment. See Table 1 in the Background section for an overview of climate threats and potential impacts.

Often new projects apply nature-based solutions that provide important resilience co-benefits such as flood storage, streambank protection and wave attenuation. New projects are designed to updated standards that incorporate changes in precipitation, storm events, and sea rise. Fish passage barrier removal projects are good examples of a resilient, nature-based solution.

5. Cumulative effects

Climate change impacts should be addressed under cumulative effects as well as all the above EA and EIS topics. WSDOT has been doing this at the EA and EIS level for many years. The recommended template language is shown below as shaded text and should be tailored to each project.

WSDOT acknowledges that the effects of climate change may alter the function, sizing, and operation of our facilities. To ensure our facilities can function as intended for their planned lifespan, they should be designed to perform under the variable conditions expected as a result of climate change. For example, drainage culverts may need to be resized to accommodate more intense rainfall events or increased flows.

The Pacific NW climate projections are available from the Climate Impacts Group at the University of Washington: <http://cse.washington.edu/cig/fpt/ccscenarios.shtml>.

Washington State is likely to experience the following over the next 50 years:

- Increased temperature (extreme heat events, changes in air quality, glacial melting)
- Changes in volume and timing of precipitation (reduced snowpack, increased erosion, flooding)
- Ecological effects of a changing climate (spread of disease, altered plant and animal habitats, negative impacts on human health and well-being)
- Sea-level rise, coastal erosion, saltwater intrusion

The project team considered the information on climate change regarding preliminary design as well as the potential for changes in the surrounding natural environment.

The project is designed to last (30, 50, 70 Years) years. As part of its standard design, this

project has incorporated features that will provide greater resilience and function with the potential effects brought on by climate change. (Describe the features such as stormwater flow control, bridge height or design, ...)

How do I locate climate change projections for a project area?

WSDOT project teams are expected to examine available information about climate trends, but where can they find that information? Follow these steps:

1. First, we recommend viewing the results of [WSDOT's 2011 Climate Impacts Vulnerability Assessment \(CIVA\) \(PDF 5.6 MB\)](#) for your project area. This information will alert you to potential vulnerabilities and/or strengths in the existing WSDOT facilities. Although the information has aged, the results remain valid as a qualitative assessment. The GIS layer is maintained by WSDOT located under the [WSDOT - Climate Impact Vulnerability Assessment – Facility GIS web tool](#). The internal GIS layer has the comments from the workshops about the climate threats that lead to the ratings. The information is very easy to access and provides a useful starting place for project teams. **But don't stop there!**
2. Project teams, especially those preparing an EA or EIS, should seek updated climate change data. Federal and state level resources exist. In much of the state, there is local, Tribal, and regional climate data. Local comprehensive plans are being updated now with climate elements. Project teams should determine whether there is regional or site-specific climate information that would be useful or applicable to their project's resilience and the analysis of project-related impacts.
3. When using models and visualization tools, you will need to pick a greenhouse gas scenario. WSDOT uses the "HIGH (RCP 8.5)" not the less likely "LOW (RCP 4.5)". See examples and screenshots below if you are working in coastal areas.
4. Reach out for help. WSDOT' ESO Climate Branch ([Jonathan Olds](#)), ESO IT Program ([Keisha Chinn](#)), and the Hydraulics Office staff can help project teams locate the best available information.
5. See list of regional and federal climate information sources below.

The University of Washington's [Climate Impacts Group](#) develops state-specific climate change information. See their [Climate impacts in brief](#) webpage for a summary of anticipated climate changes in Washington. Federal agencies also provide information on historic climate trends and forecasted climate. As mentioned above, Tribes and regional and local governments also may have climate data.

Resources provided by the University of WA [Climate Impacts Group](#) include:

- [Datasets](#): The Climate Impacts Group [produces hydro-climatic data](#) at various spatial scales for historical and projected conditions in the Pacific Northwest and beyond. These data are available free of charge for use in research and planning. We also utilize [other datasets](#) produced at regional, national, and international institutions in our work, and have included many of those here.

- [Analysis Tools](#): Analysis tools produced by the Climate Impacts Group are designed to help users visualize and interpret climate data.
- [Publications](#): With more than 700 publications on climate variability and change, climate impacts, and adaptation, the Climate Impacts Group publications library serves as a comprehensive resource for those interested in learning more about specific issues.
- [Special Reports](#): The Climate Impacts Group regularly produces or contributes to special reports on regional climate impacts and adaptation. This includes our “State of Knowledge” syntheses, guidebooks, and other unique resources relevant to a wide range of users.

Federal Information:

- [NOAA State Climate Summaries](#)
- [NOAA Data Tools](#)
- [NOAA Climate Explorer](#)
- [Sea Level Trends - NOAA Tides & Currents](#)
- U.S. Army Corps of Engineers [Sea Level Change Curve Calculator](#) tool reports predicted sea level change for three scenarios from 1992 forward. Select the NOAA tide gage closest to your location of interest to view a detailed report.
- FHWA Resources and Technical Guidance: FHWA’s [Sustainability and Resilience website](#)

For a list and description of tools and resources, see the Climate Change Related Effects Tools and Resources Matrix (Excel 42KB) on the [Consideration of Climate Change webpage](#).

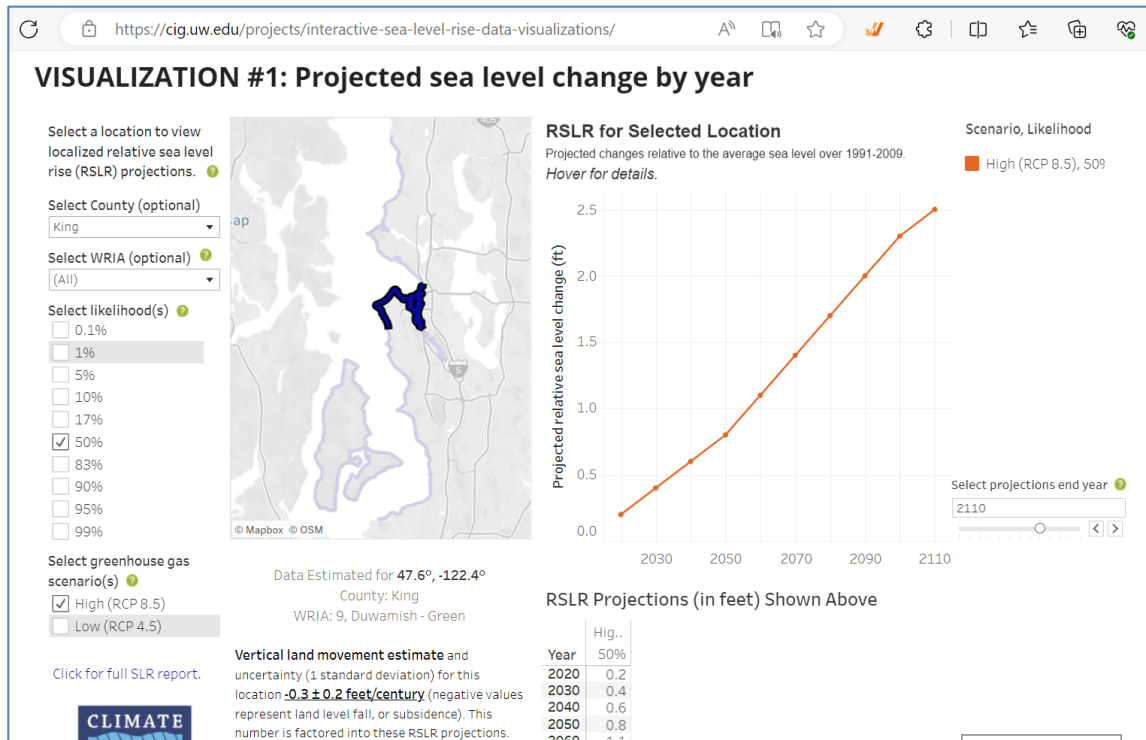
What climate scenario does WSDOT use?

When using the tools, you will need to pick a greenhouse gas scenario. WSDOT uses the “HIGH (RCP 8.5)” not the less likely “LOW (RCP 4.5).”

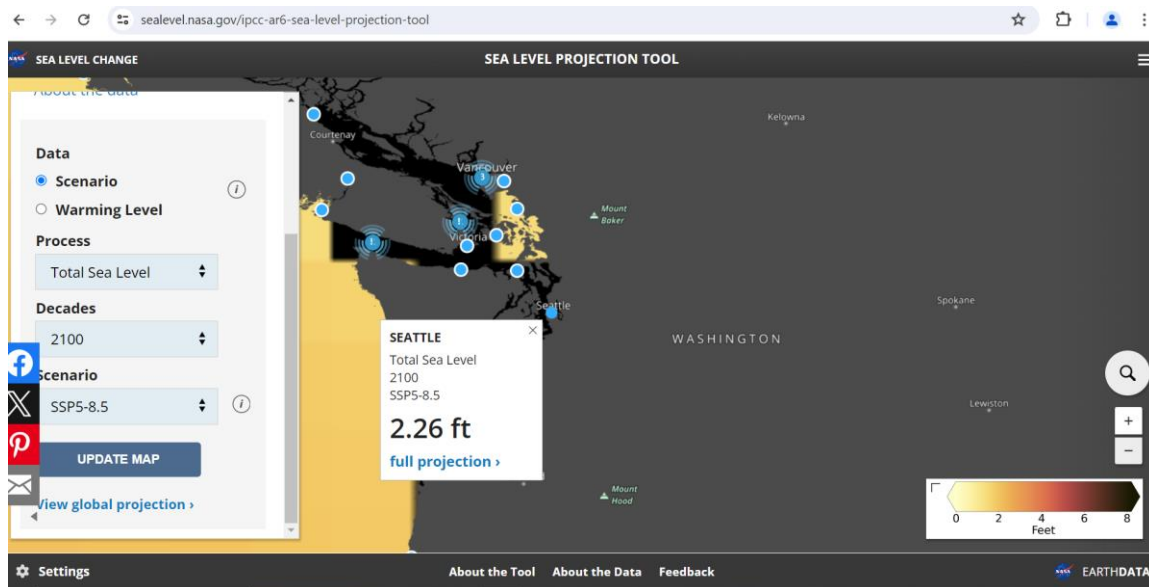
What sea level rise visualization tool does WSDOT use?

As of 2024, we recommend using UW CIG’s [Interactive Sea Level Rise Data Visualizations](#). Below are two screenshots showing outputs from UW’s tool compared to a national tool that is available from NASA. **They both show similar outcomes**, but the UW tool accounts for the unique vertical land movement (subsidence and uplift). It also allows the user to look up any coastline (not just a few points). Note that more detailed/location sensitive mapping of sea level rise is underway in a tool called CosMos that will be made available through UW CIG and SeaGrant in the future.

Screenshot #1 of projected sea level change by year is from [UW’s Tool](#):



Screenshot #2 showing sea level projection for Seattle is from [NASA Sea Level Change Portal](https://sealevel.nasa.gov/pcc-ar6-sea-level-projection-tool):



Background Information

Table 1 below was created by WSDOT with the assistance of the UW Climate Impacts Group to illustrate some potential impacts of particular concern to transportation infrastructure. Project teams should consider how their proposed project can withstand threats and minimize impacts and service disruptions.

Table 1: Projected Climate Change and Related Effect on Transportation System Created by WSDOT with assistance of UW Climate Impacts Group

Projected Climate Change	Potential Impacts on State Highways, Rail, and Ferries
<ul style="list-style-type: none"> • Increase in average winter precipitation and more extreme precipitation • Change in timing of precipitation (more rain, less snow) • Change in storm track with some extreme storms with higher than normal snow accumulation 	<ul style="list-style-type: none"> • More rock fall, mudslides, sink holes, roadbed failure, culvert failure • Increased scour at bridges and culverts • Increased streambank and coastal erosion • Increased risk of landslides • Increased large-scale river flooding • More localized flooding due to poor drainage or higher groundwater table • More frequent road closures due to flooding • Severe wind-related road closures • Blown-down trees, signs • Less snow removal, on average (some extreme snows)
<ul style="list-style-type: none"> • Sea-level rise, higher storm surge • More frequent and extensive inundation of low-lying areas (both temporary and permanent) 	<ul style="list-style-type: none"> • Coastal erosion and landslides weaken roadbed and bridge footings • Damage to bridges, culverts, geotechnical assets, stormwater drainage, tide gates, and unstable slopes. • Saltwater corrosion of facilities • Detours around frequently flooded coastlines • Roadways, utilities, and ferry terminal facilities and operations impacted due to inundation
<ul style="list-style-type: none"> • Higher average temperatures • Increase in extreme heat events (heat waves) • Drought and low stream and ground water flow • Wildfire or extreme fire risk 	<ul style="list-style-type: none"> • Adverse impacts on pavement and rail (buckling) • Loss of roadside vegetation (leading to erosion and landslides) • Increased noxious weeds, invasive plants • Wetland mitigation site failure • Hazard/danger trees (burnt) toppling over onto roadways (leading to road closures, power outages, and the loss of life and property) • Other fire related road closures • Damage to trestle bridges (burnt structure)

What is WSDOT’s Climate Impacts Vulnerability Assessment (CIVA), and is it still relevant?

WSDOT’s 2011 Climate Impacts Vulnerability Assessment is a qualitative assessment of risks to our

existing transportation infrastructure from climate change. It is still relevant today as the climate projections have not significantly changed since the assessment was completed.

The CIVA is the starting place for planning- and project-level discussion of climate change. Project teams and planners should consider the information in the vulnerability assessment in addition to examining existing conditions, updated readily available climate data and visualization tools, as well as other identified natural hazards (such as earthquake, tsunami, and geologic hazards).

In 2010 and 2011, WSDOT collected an inventory of department-owned assets and climate change data using GIS. University of Washington climate scientists provided us with climate data. Key points about the CIVA:

- WSDOT leveraged its years of project risk management experience through its signature Cost Estimate Validation Process[®] and Cost Risk Assessment Workshops to develop an appropriate risk assessment method for the climate change analysis.
- Fourteen workshops engaged experts across all regions, state ferries, rail, and aviation.
- The outcome of each workshop is a **qualitative assessment** of the vulnerability agreed upon by participants. It shows high, medium and low vulnerability.

The results are shown in map form in color-code. Red shows high likelihood of vulnerability, yellow denotes roads that could experience temporary operational failures at one or more locations, and green indicates roads that could experience reduced capacity somewhere along that roadway segment. Note that roadway segments shown as having a high impact (red) may not be vulnerable for the whole segment—rather one or two areas along that segment may be vulnerable to catastrophic failure. These vulnerability ratings are qualitative and suitable for planning purposes (not for design-level decisions).

In general, areas shown with locations having a high impact are:

- In the mountains
- Either above or below steep slopes
- In low-lying areas subject to flooding
- Along rivers that are aggrading due to glaciers melting
- In low-lying coastal areas subject to inundation from sea-level rise

The summary Climate Impacts Vulnerability Assessment Report is available online at: [Climate resilience | WSDOT \(wa.gov\)](#).