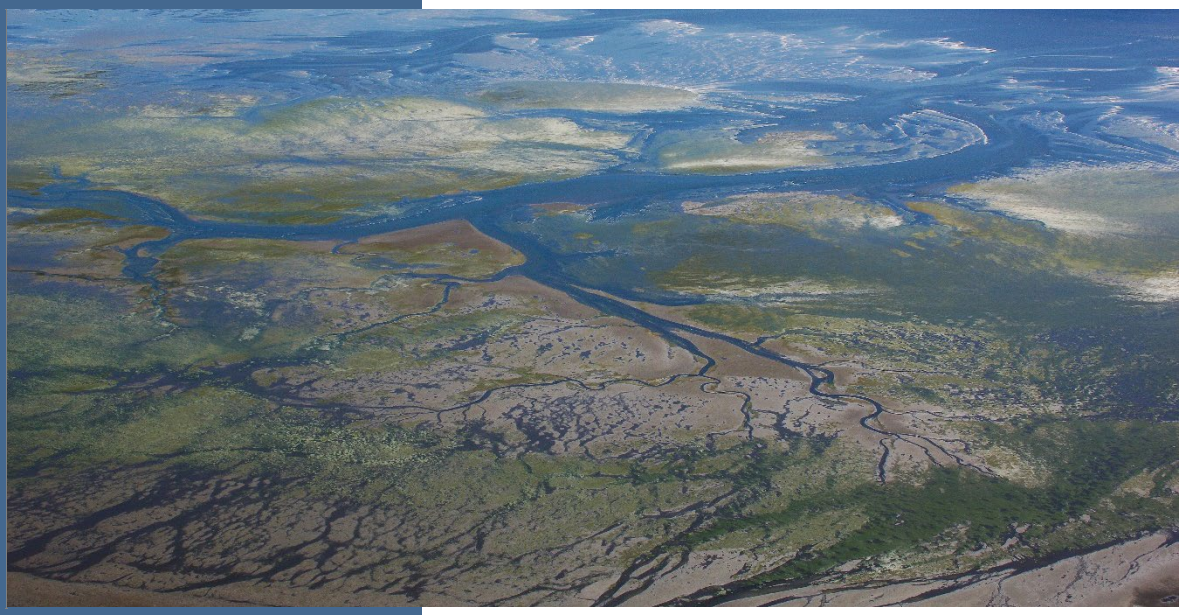

Interim Climate Resilience Planning Guidance for Shoreline Master Programs

A Companion to the Comprehensive Plan Climate Element Planning Guidance

Shorelands and Environmental Assistance Program

Washington State Department of Ecology

Olympia, Washington

April 2024, Publication 24-06-004

DEPARTMENT OF ECOLOGY
State of Washington

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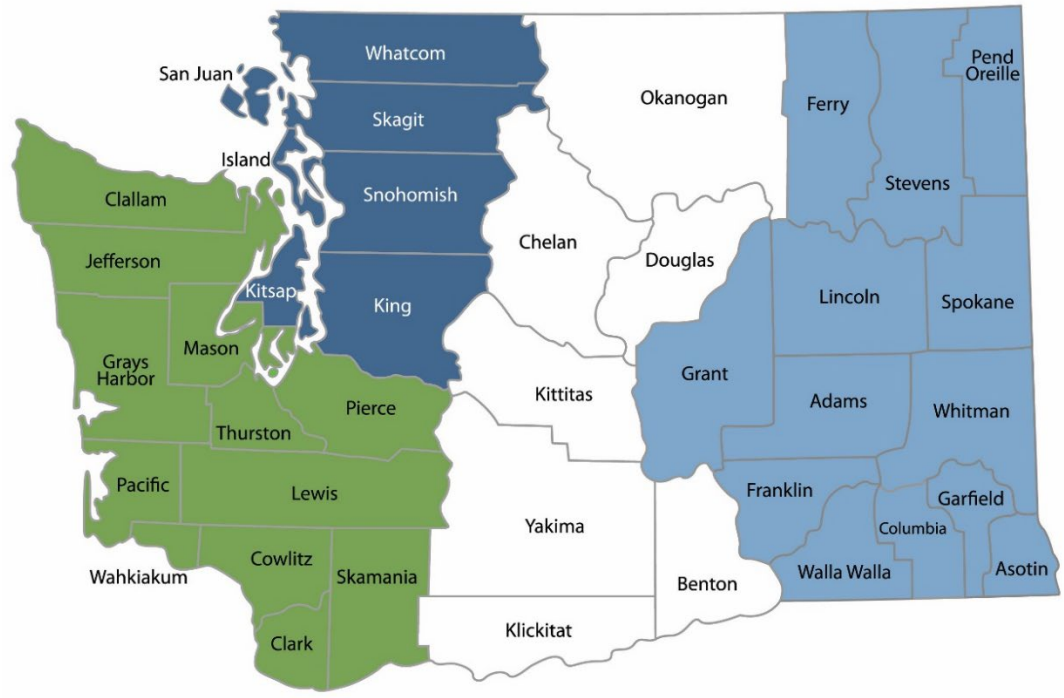
[1] www.ecology.wa.gov/contact

Department of Ecology's Regional Offices

Map of Counties Served



Southwest Region 360-407-6300	Northwest Region 206-594-0000	Central Region 509-575-2490	Eastern Region 509-329-3400

Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

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Cover Note

This Interim Climate Resilience Planning Guidance for Shoreline Master Programs is intended to be a companion to the Department of Commerce's Climate Element Planning Guidance (2023), which was developed in accordance with Engrossed Second Substitute House Bill 1181 (referred to as HB 1181).

The new law directs Ecology to update the shoreline master program (SMP) guidelines (WAC 173-26-171 through WAC 173-26-251) to require SMPs to address the impact of sea level rise and increased storm severity on people, property, and shoreline natural resources and the environment. Additional sections of the administrative rules will need to be amended to align with the updated guidelines. We will publish updated guidance to support implementation of the new guidelines when that process is complete. Therefore, this publication is relevant only for a limited time. There are no SMP periodic review deadlines scheduled during this time. Instead, the audience for this guidance is local governments that are working on comprehensive plan updates, with the goal of supporting complementary climate resilience planning efforts for comprehensive plans and SMPs. This guidance may also be relevant for local governments working on other efforts, such as grant projects and locally initiated SMP amendments.

This guidance contains only recommendations and establishes no new requirements. We welcome feedback on this document to help improve future iterations of climate resilience planning guidance for SMPs. Please feel free to contact us with questions or feedback. We also invite you to visit our website for information regarding Ecology's process to update the SMP guidelines.

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DEPARTMENT OF ECOLOGY
State of Washington

Interim Climate Resilience Planning Guidance for Shoreline Master Programs: A Companion to the Comprehensive Plan Climate Element Planning Guidance

Executive Summary

Communities around Washington are already experiencing the impacts of climate change on ecosystems, the built environment, and human well-being. The purpose of this guidance is to support local governments in addressing the impacts of climate change on shorelines, focusing on plan consistency and how the process of developing a comprehensive plan climate resilience sub-element can inform future updates to shoreline master programs (SMPs). This guidance is a companion to the Department of Commerce's 2023 Climate Element Planning Guidance. This guidance is interim and establishes no new requirements.

The Washington State Legislature passed Engrossed Second Substitute House Bill 1181 (referred to as HB 1181) in 2023, establishing a requirement to address the impacts of climate change in local planning. All cities and counties that are fully planning under the Growth Management Act must develop a climate resilience sub-element during their comprehensive plan periodic update. HB 1181 directs Ecology to conduct rulemaking to update the SMP guidelines. After the updated rules take effect, local governments will be required to address the impact of sea level rise and increased storm severity in their SMPs.

Comprehensive plan periodic updates and SMP periodic reviews take place on alternating ten-year cycles, with one plan under review every five years. Local governments are currently updating their comprehensive plans. The Climate Element Planning Guidance establishes a process for developing a comprehensive plan resilience sub-element. We recommend that local governments consider their SMP as they develop their comprehensive plan resilience sub-element and use this process to inform future SMP updates. For example, local governments can include partners with shoreline planning expertise in their advisory committees and use the comprehensive plan tribal engagement process for early coordination around shoreline planning priorities. Local governments can design and conduct vulnerability and risk assessments so that the findings can be used to inform new or updated SMP provisions.

Consistency between comprehensive plans and SMPs is required, and it is important to ensure that comprehensive plan updates do not create conflicts between plans. We recommend ensuring that climate resilience comprehensive plan sub-elements are aligned with SMP polices and regulations.

This guidance includes additional information about sea level rise and SMPs, including key resources and ideas for addressing sea level rise in different areas of an SMP. For example, local governments may choose to assign preferred sea level rise adaptation strategies in alignment with shoreline environment designations. Policies and regulations for flood hazard reduction and setbacks and buffers can be used to increase the resilience of shoreline development patterns. We also briefly highlight other climate hazards, including drought, wildfire, and riverine flooding that may be important to consider and address in SMPs.

Ecology is committed to supporting locally led efforts to build climate resilience through shoreline planning and working closely with local partners as we develop new requirements.

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Section 1. Introduction

Communities around Washington are already experiencing the impacts of climate change on ecosystems, the built environment, and human health and well-being (Snover et al. 2013). These impacts disproportionately affect overburdened and vulnerable communities (Chang et. al. 2023). Addressing climate change in comprehensive planning is a new requirement for local governments, and soon local governments will be required to address the impact of sea level rise and increased storm severity in shoreline master programs (SMPs). While many local governments throughout Washington have already taken action to plan for and build climate resilience, the coming years will bring a major transformation in how climate change is incorporated into the land use plans that shape communities over the long term.

Adapting to future climate conditions is an unprecedented challenge, and at the same time, it is an opportunity to plan for just, equitable, vibrant, and resilient communities. Furthermore, proactive adaptation may reduce the mounting costs of damage caused by climate-related events rather than waiting to respond until disasters occur or tipping points are reached (Wasley et al. 2023). Ecology strongly supports efforts to build resilience to sea level rise and other climate impacts through shoreline planning, and commends local governments that have already taken voluntary, locally led steps to do so.

The purpose of this interim guidance is to support Washington's local governments in addressing the impacts of climate change on shorelines while Ecology develops new rules establishing how SMPs will address these impacts. This document is a companion to the Department of Commerce's 2023 Climate Element Planning Guidance for comprehensive plans, which provides more detail and supplementary resources, including a glossary. This guidance discusses plan consistency, recommends how the comprehensive plan climate resilience sub-element process can help inform future SMP updates and facilitate integrated climate planning, and highlights some ideas for incorporating climate resilience into SMPs (Figure 1).

The intended audience for this guidance is local governments and consultants working on comprehensive plan climate resilience sub-elements. However, the information may be useful for local governments working on other planning efforts, such as grant-funded planning projects and locally initiated SMP amendments. This guidance is interim, and it does not establish any new requirements for local governments. Climate resilience planning guidance for SMPs will evolve over the coming years, and future publications will replace this version.

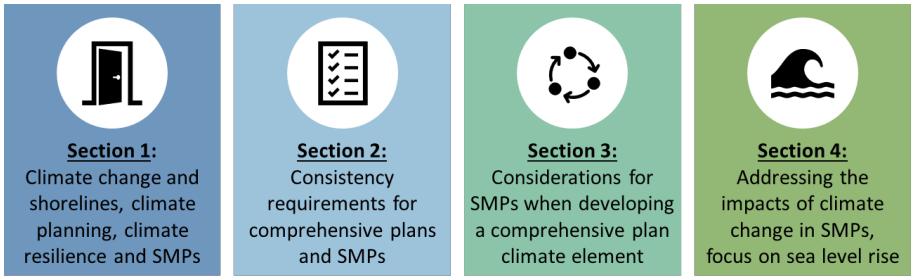


Figure 1. Overview of the sections and contents of this guidance document.

Climate change and shorelines in Washington

Climate change is already impacting marine and freshwater shorelines across Washington (Ecology 2012; Snover et al., 2013; Mauger et al. 2015; Snover et al. 2019; and others). Figure 2 illustrates some of the changes that have been observed and are expected to accelerate as climate change progresses throughout the 21st century, including snowpack and glacier declines, shifting streamflow patterns, sea level rise, and ocean warming and acidification (Roop et al. 2020). These changes are driven by the warming that has already occurred compared to the pre-industrial baseline.

Washington's climate is projected to continue to warm, increasing the frequency and severity of climate hazards. For example, along marine shorelines, many locations show an increasing trend in annual high tide flooding events (Sweet et al. 2018). Importantly, climate change is increasing the likelihood of compound events, such as extreme precipitation coinciding with higher tides, or mudslides following destructive wildfires (Singh et al. 2023). In addition to changing hazard exposure, shoreline jurisdiction will shift landward with sea level rise. The Climate Impacts Group provides more information about climate change in Washington.

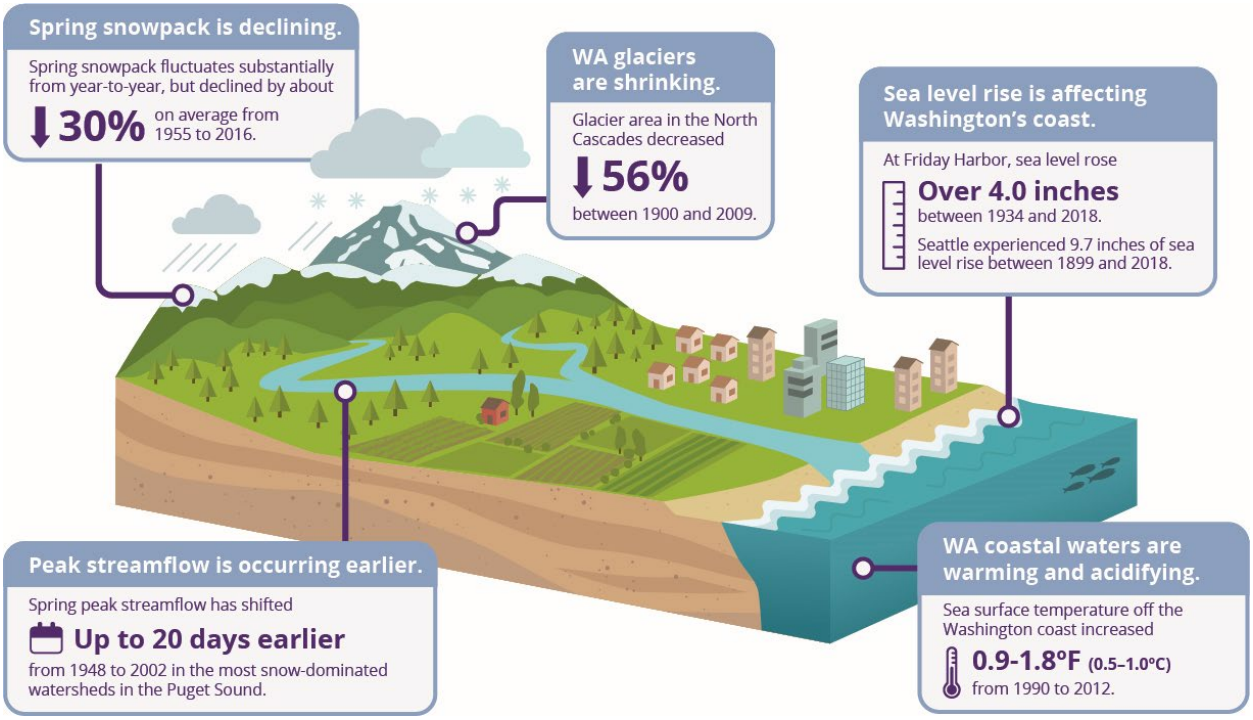


Figure 2. Long-term changes observed in Washington's ocean waters and watersheds reflect the influence of warming and are expected to worsen (from Roop et al., 2020).

Shorelines in Washington are complex social-ecological systems. Shorelines are defined by ecosystems, the built environment, and social context. Increasingly, climate change is reshaping Washington's shorelines across all these dimensions, and impacts will vary depending on unique local factors. Changing conditions and hazards exacerbate shoreline management challenges, and we show some examples below in Table 1 and Figure 3.

Table 1. Examples of climate projections and related shoreline management challenges that could impact existing water-oriented uses, water-dependent recreation, and public access.

Climate Impact	Example Late Century Climate Projection	Potential Shoreline Management Challenge
Sea level rise	2.3 feet of sea level rise in south Puget Sound[3]	Increasing frequency and severity of coastal flooding and more-rapid erosion, posing risks to development along marine shorelines.
Riverine flooding	10-40% increase in peak flows for the Snohomish and Stillaguamish Rivers[4]	Higher streamflows increase the magnitude of flood events and the frequency and extent of flooding, causing greater disruption as well as damage beyond areas that flood today.
Wildfire	Likelihood of wildfire conditions in a given year for a 30-year period increases to 90% in Spokane County[5]	Increasing wildfire activity threatens infrastructure and communities, increases risk of landslides and erosion in wet seasons, and may create challenging vegetation management decisions.

Climate change will affect ecosystems and waterbodies across the state differently. For example, erosion is a priority climate-related hazard along the wave-exposed sandy beaches of the Pacific Coast, while the increasing frequency of flooding may be a higher priority for the low-lying river deltas of the Salish Sea. Likewise, changing hydrology will have different impacts for freshwater systems in the semi-arid Columbia Plateau compared to the coastal rainforest.

Many of Washington's shorelines are already developed, and patterns of existing development and characteristics of the built environment, including the type and age of buildings and infrastructure, also produce different climate risks. For example, older towns built along riverbanks are likely more vulnerable to flooding than newer development built to current regulatory standards. As climate impacts continue to manifest, local governments will be challenged to plan new development to avoid or accommodate hazards. At the same time, local governments will need to make decisions about how to adapt existing development feasibly and equitably. Likewise, planning must encompass restoration and protection of natural systems and habitat, which provide climate resilience benefits and other essential ecosystem services. Integrated planning is essential; development upland, updrift, or upriver can profoundly impact the ecological function and resilience of shorelines.

Shorelines encompass widely ranging social contexts and diverse relationships between people and the land and water. Frontline communities, which include Tribes and Indigenous peoples, communities of color, low-income communities, rural and natural resource-dependent communities, and others, are disproportionately exposed to climate hazards (Ruckelshaus Center 2017; UW CIG and Partners 2018; Chang et al. 2023). Ongoing systemic oppression creates this inequitable exposure and circumstances where frontline communities have fewer resources to adapt (Chang et al. 2023). For example, the combination of habitat degradation and warming water threatens salmon runs, which in turn undermine Indigenous food

[3] Sea level rise projections for near Olympia, 50% likelihood, high emissions scenario (Miller et al., 2018).
[4] River flow projections from downscaled hydrologic modeling for the 2080s (Mauger et al., 2021).
[5] Likelihood of wildfire conditions from fire and vegetation modeling (Raymond & Rogers, 2022).

sovereignty and tribal treaty rights (Whyte 2018). Housing costs and the legacy of redlining may push low-income people of color into neighborhoods that are hotter or more likely to flood. There are many ways that climate injustice plays out across Washington's shorelines. Adaptation actions that prioritize climate justice and direct investments to frontline communities can advance climate resilience across the region (Chang et al. 2023).

Cities and counties will plan for climate resilient shorelines differently depending on their local context, priorities, and values–and bounded by policy and legal requirements. The statewide priorities that underpin our collective response include the following:

- Enable flexible and integrated planning across systems and jurisdictions
- Implement nature-based solutions, including protecting and restoring habitat
- Mitigate risks to shoreline infrastructure through multi-benefit projects
- Protect human health and well-being
- Recognize and reduce the inequitable burdens of climate change
- Uphold and balance the goals of the Shoreline Management Act as shorelines change
- Uphold tribal sovereignty and treaty rights

All government entities must work together to achieve transformative, equitable, and integrated adaptation for shorelines of the state.

Figure 3. Examples of climate-related disasters that illustrate shoreline management challenges. From the top left, erosion in North Cove (Ecology), wildfire near Lake Chelan (Ben Brooks/Flickr), king tide flooding near Tacoma, and flooding in Whatcom County along the Nooksack River (Larry McCarter/Whatcom News).

Climate planning context

Addressing the impacts of climate change in comprehensive planning is now a requirement for many local governments in Washington. This requirement was established with the passage of Engrossed Second Substitute House Bill 1181 (Chapter 228, 2023 Laws; referred to as HB 1181). Over the next several years, local governments will incorporate climate mitigation and adaptation provisions into land use plans (Figure 4). HB 1181 requires the following (see Commerce 2023 for more detail):

- The addition of a climate goal to the Growth Management Act (GMA; RCW 36.70A) and changes to other GMA goals, including transportation and land use.
- Larger, fast-growing counties and their cities to include a greenhouse gas emissions reduction sub-element in their comprehensive plans, and all jurisdictions fully planning under the GMA to include a resilience sub-element in their comprehensive plans.
- Jurisdictions to consider environmental justice across their climate element to avoid worsening environmental health disparities.
- Department of Ecology to update its guidelines (WAC 173-26-171 through 173-26-251) to require that SMPs address the impact of sea level rise and increased storm severity.
- Department of Commerce to create guidance to reflect the new law and support jurisdictions in updating their plans, and subsequently develop a model climate element and adopt by rule minimum standards for compliance with the state law.
- Department of Transportation to maintain a summary of the per capita vehicle miles traveled, and Department of Health to ensure that some types of water systems consider climate resilience.

The Department of Commerce publishes guidance and requirements for how local governments must address climate change through comprehensive planning. The Climate Element Planning Guidance (Commerce 2023) contains requirements for comprehensive plan climate elements, including a resilience sub-element and a greenhouse gas emissions reduction sub-element. Eleven of the state's largest and fastest-growing counties and their cities (with populations greater than 6,000) are required to include the emissions reduction sub-element. All local governments that are fully planning under the GMA are required to include the resilience sub-element, and it is encouraged for all other jurisdictions.

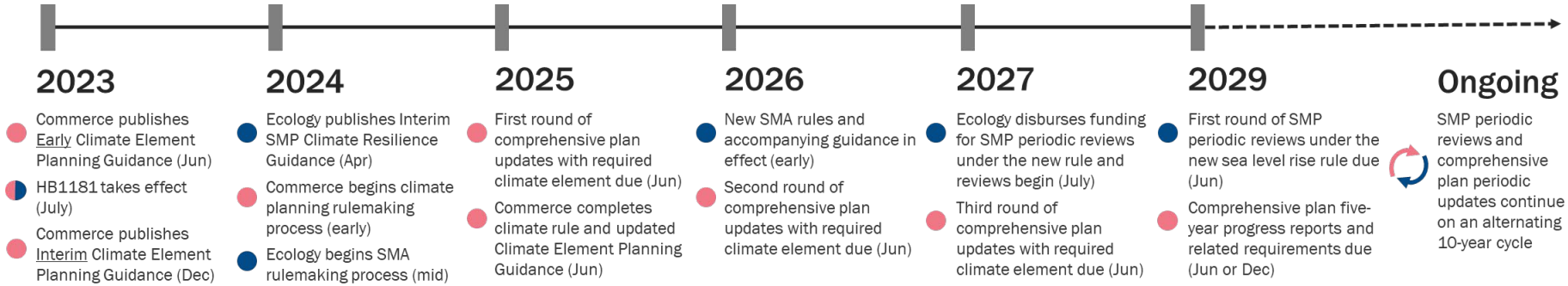
Prior to the 2023 legislation, the legislature funded Commerce and partners to develop an early version of the Climate Element Planning Guidance. Commerce then published the December 2023 intermediate version of the Climate Element Planning Guidance. The agency is currently conducting rulemaking to implement the requirements of HB 1181 fully and permanently; Commerce filed a CR-101, intent for rulemaking, on January 17, 2024. Updated information regarding these efforts is available on the Department of Commerce Climate Program website.

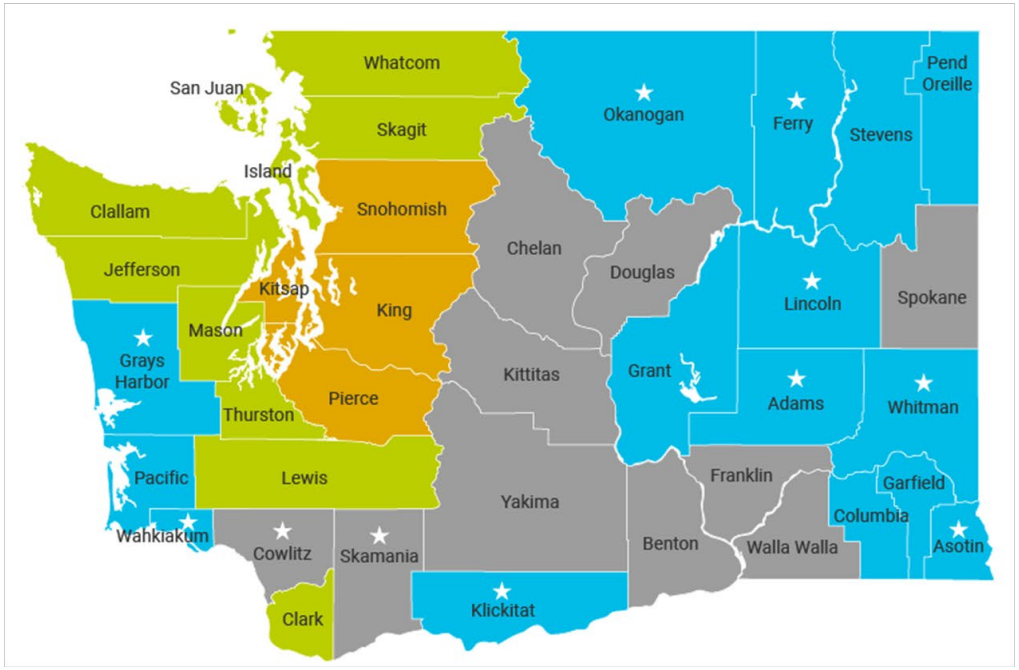
Commerce made approximately $30 million of statewide climate planning funding available during the 2023-2025 biennium to support the implementation of HB 1181. These are formula grants for developing comprehensive plan goals, policies, and development regulation amendments. These grants can also support other related planning projects, including identification of priority climate hazards, vulnerability and risk assessments, and adaptation planning. All of these types of projects may provide foundational information that can inform future SMP amendments. Commerce expects that additional funding will be appropriated during this periodic update cycle.

The Department of Ecology is the lead for developing new requirements for shoreline planning, which we will undertake through a rulemaking process beginning in mid-2024. After new administrative rules are established, local governments will be required to address the impact of sea level rise and increased storm severity in their SMPs during the next round of periodic reviews (RCW 90.58.630). The specific requirement to address the impact of sea level rise and increased storm severity will apply only to jurisdictions with marine[5] shorelines. However, all local governments will be encouraged to incorporate climate resilience provisions into their SMPs, and local governments may determine a need to address climate resilience policy priorities identified through the comprehensive planning process during the next SMP periodic review. The rulemaking process will also amend other areas of the administrative rules to address issues that Ecology has identified through the review, adoption, and implementation of SMPs.

Ecology offered shoreline planning competitive grants for the 2021-2023 and 2023-2025 biennia to support locally identified shoreline planning priorities, including sea level rise vulnerability assessments and other types of projects that prepare local governments to address climate change impacts in their SMPs. Funding for the next cycle of SMP periodic reviews will be available beginning in 2027 with Snohomish, King, Kitsap, and Pierce counties and their cities. Subsequent funding will follow based upon the SMP periodic review schedule as outlined below in Figure 4.

[5]"Marine" means pertaining to tidally influenced waters, including oceans, sounds, straits, marine channels,and estuaries, including the Pacific Ocean, Puget Sound, Straits of Georgia and Juan de Fuca, and the bays, estuaries and inlets associated therewith (WAC 173-26-020).





Timeline Key

Comprehensive Plan Milestones

SMP Milestones

Map Key

Comprehensive Plan Periodic Update Schedule: 2024, 2025, 2026, 2027

SMP Periodic Review Schedule: 2029, 2030, 2031, 2032

Figure 4. Upcoming climate planning milestones for comprehensive plans and SMPs. The timeline shows dates for guidance publication, rule adoption, grants, and update deadlines. The map shows the periodic update schedule; note that the schedule applies to cities as well as counties. Partially-planning counties (marked with a star) and cities are not required to complete a comprehensive plan climate resilience sub-element. Counties and cities with SMPs that include marine shorelines will need to meet sea level rise and storm severity requirement, though other rule updates will pertain to all jurisdictions with SMPs. Note that counties and cities with comprehensive plan updates due in 2024 are not required to fulfill the climate element planning requirements until 2029.

Climate resilience planning and SMPs

Shorelines are managed under the city or county's SMP. SMPs are locally tailored policies that contain use and development regulations for shorelines of the state. SMPs implement the Shoreline Management Act (SMA) and regulate Washington's shorelines for current and future generations (Chapter 90.58 RCW). The SMA has three broad policies: protecting the shoreline environment, promoting public access and enjoyment opportunities, and giving priority to uses that require a shoreline location (RCW 90.58.020). Each SMP contains standards that ensure allowed uses and developments remain compatible with the shoreline environment and SMP and prevent net loss of shoreline ecological function. SMPs are developed by local governments and reviewed and approved by Ecology prior to becoming effective.

Climate planning and implementation activities reduce risk from climate hazards and provide co-benefits for communities. As the mechanism for regulating shoreline development, SMPs are a key lever for incorporating climate resilience in land use planning. Ecology recommends that local governments include SMPs as part of their overall climate resilience planning effort by ensuring that topics and participants focused on shorelines are included. Furthermore, climate planning processes are an opportunity to prioritize environmental justice in land use planning, building on better knowledge of environmental disparities and greater recognition of injustices. During these processes, it is essential to identify and prioritize the needs of Tribes and overburdened communities that experience the impacts of climate change first and worst.

Many local governments have already added sea level rise provisions to their SMPs (Ecology 2021). However, local governments have primarily added policies, and fewer have adopted sea level rise or climate resilience SMP regulations. Ecology has not worked with local partners to evaluate implementation of these provisions, or to assess the extent to which local governments have added climate resilience provisions for freshwater shorelines to their SMPs.

While SMP provisions are an important tool for advancing climate resilience, there are some limitations. Shoreline jurisdiction may be too geographically narrow to comprehensively address climate hazards. In addition, while there are SMA policies that encourage restoring and improving shorelines compared to their existing condition, some of the regulatory authorities of the SMA cannot be applied retroactively. There must be a proposed action (e.g., new use or development, replacement, repair, expansion) for the SMP to apply to existing authorized development and require changes. In practice, much of SMP implementation under the current rules and standards is focused on regulating proposals for new uses and development within shoreline jurisdiction. SMPs can ensure that proposed uses and developments that are allowed or encouraged (i.e. water-oriented uses and public access) consider potential climate impacts and build resilience into their proposals.

Updating an SMP to include climate resilience provisions is only one implementation action a local government may want to take. Local governments should address climate impacts across plans, policies, and regulations, as well as by directly implementing projects, developing programs and voluntary initiatives, and updating their own operating procedures. The SMP should be one piece of a broader climate change adaptation strategy.

Section 2. Comprehensive Plan and Shoreline Master Program Consistency

Any changes to the shoreline provisions within a local government's comprehensive plan must be made through the SMP amendment process outlined in WAC 173-26-100 or WAC 173-26-104. Revised shoreline provisions in the comprehensive plan will not be applicable and enforceable within shoreline jurisdiction until an SMP amendment is processed, reviewed, and approved by Ecology (RCW 90.58.090).

The GMA is intended to serve as the integrating framework for all land use regulations (RCW 36.70A.470). Shoreline management is the 15th planning goal of the GMA (RCW 36.70A.020 and 36.70A.480), establishing a close link between SMPs and comprehensive plans. The goals and policies of a local government's SMP are considered an element of their comprehensive plan, and SMP regulations are considered part of the county or city's development regulations [WAC 173-26-020(26)]. Shoreline management is most effective when conducted in alignment with comprehensive planning [WAC 173-26-191(1)(e)], and SMPs should be integrated with other land use regulations (WAC 173-26-010).

However, changes to the provisions of an SMP must be adopted pursuant to the procedures of Chapter 90.58 RCW and are reviewed for compliance with the policies, goals, and requirements of the SMA and its implementing rules. Even if these shoreline provisions are located within the local government's comprehensive plan or other development regulations, the sole basis for determining compliance is the SMA. In addition, SMPs are required to comply with the internal consistency provisions of RCW 36.70A.070 and 36.70A.040(4).

We are entering a period where local governments will be updating their comprehensive plans to incorporate climate provisions, which, depending on the updates, may have significant implications for their SMPs.

Plan consistency is a priority as local governments work to build climate resilience through comprehensive planning, shoreline planning, related areas of code, and other non-regulatory planning exercises (e.g., waterfront master plans, climate action plans, hazard mitigation plans). There are several areas of consistency that local governments should consider as they conduct their climate planning work.

- Internal consistency: The GMA requires mutual and internal consistency among comprehensive plan elements and implementing development regulations, including SMPs [WAC 173-26-191(1)(e)]. Local governments are responsible for ensuring internal consistency of their plans and regulations.
- Consistency with the SMA: At a minimum, SMP policies must be consistent with the SMA [WAC 173-26-191(2)(a)]. Local governments must also review their administrative and management policies, regulations, plans, and ordinances relevant to lands adjacent

to their shoreline jurisdiction to ensure that adjacent land uses are compatible with the policy of the SMA, its implementing rules, and the local SMP (RCW 90.58.340). Ecology reviews and approves SMPs solely on the basis of their consistency with the SMA and guidelines [WAC 173-26-191(1)(e)].

- Shorelines of statewide significance: Comprehensive plans must be consistent with and in support of the SMA policies for shorelines of statewide significance, which includes marine waters [WAC 173-26-251(3)(e)].
- Consistency among local jurisdictions: The GMA also calls for consistency between the comprehensive plans of neighboring jurisdictions (RCW 36.70A.100).

Local governments should evaluate consistency between shoreline designations, comprehensive plan land use designations, and development regulations using the consistency criteria in WAC 173-26-211(3):

- Provisions must not preclude one another, and when applied in combination, SMP provisions and zoning should not preclude all viable uses.
- Provisions should protect shoreline uses and prevent new uses from locating where they restrict preferred uses.
- Shoreline uses should not be allowed where the comprehensive plan does not provide for sufficient infrastructure.

One of the primary purposes of the SMP periodic review is to ensure that a local government's SMP remains consistent with its comprehensive plan, development regulations, and other applicable local requirements [WAC 173-26-090(2)(d)]. It is the responsibility of local governments to ensure consistency between their SMP and their comprehensive plan and development regulations [WAC 173-26-090(3)]. As part of the next periodic review cycle, local governments will review their new comprehensive plan climate elements and any associated development regulations for consistency. However, it is important that new climate provisions adopted in comprehensive plans do not create conflicts with SMP provisions currently in effect.

Examples of climate provisions and consistency

As local governments develop climate resilience goals and policies for comprehensive plans, potential consistency issues may arise and need consideration. This section outlines some examples where climate resilience provisions identified through the comprehensive plan process may intersect with SMPs. These examples are drawn from the Menu of Measures, which can be found on Commerce's Climate Program webpage. If conflicts between proposed comprehensive plan provisions and existing SMP provisions are identified, they must be resolved prior to adoption of the proposal. If a local government identifies a consistency issue that involves their SMP, staff should contact Ecology for additional assistance and guidance.

Broadly applicable provisions

Local governments may seek to implement climate resilience provisions that are intended to apply throughout the jurisdiction, including the shoreline area. Comprehensive plan policies will

need to be compared to the SMP to assess whether existing SMP provisions are aligned and sufficient, or whether changes would be needed for consistent implementation.

Example: "Protect and restore riparian vegetation to reduce erosion, provide shade, and support other functions that improve the climate resilience of streams."

Shoreline-specific provisions

During a climate resilience planning process, local governments may identify a need to adopt policies or regulations specifically focused on the management of uses and development within the shoreline jurisdictional area. These provisions will require implementation through the SMP. If a local government includes these policies only in an element of its comprehensive plan and does not undertake an amendment to add them to their SMP, the local government would not be able to implement these provisions in shoreline jurisdiction.

Example: "Review required buffers and setbacks for steep slopes and shorelines vulnerable to erosion exacerbated by climate change, and establish new minimums, if necessary, so that improvements are not required to protect structures during their expected life."

Provisions that may conflict with SMP guidelines

Some measures may not be appropriate to apply within shoreline jurisdiction because they are inconsistent with the SMA and SMP guidelines. These provisions may need to be modified to implement the policy of the SMA. The examples below illustrate language that would not be appropriate to include in an SMP as written. In the first example, protection often refers to stabilization, which may not be appropriate in all shoreline locations. In the second example, single family residential use a priority use in shoreline jurisdiction, however, multi-family is not, and may not be allowed in many shoreline environment designations (SEDs). More specificity would be needed to ensure that policies allow for appropriate shoreline uses compatible with the SED, the types of modifications allowed, and the no net loss standard.

Example 1: "Protect significant historic sites prone to floods or other hazards worsened by climate change."

Example 2: "Allow middle housing types, such as duplexes, triplexes, and ADUs,[6] on all residential lots."

General recommendations for consistent climate planning

New requirements for how local governments will need to address sea level rise impacts in their SMPs will not be established until Ecology completes rulemaking to update the SMP

[6]See Guidance for Accessory Dwelling Units in Washington State (Commerce, 2023; page 11) for more detailed discussion of ADUs in shoreline jurisdiction.

guidelines, which is expected to be in 2026. Acknowledging this context, Ecology recommends the following for this interim period:

Planning cycle and task sequencing: SMP periodic reviews and comprehensive plan periodic updates are now staggered so that one of the two plans is up for review every five years. Local governments can use the comprehensive plan update process to gather information and conduct other preparatory steps that will inform the next SMP periodic review (see Section 3). It takes time and resources to conduct vulnerability assessments, develop adaptation plans, and analyze policies and regulations for potential updates. An ongoing planning cycle where research, analysis, and information-gathering occur before the two-year plan review period may help local governments complete reviews on time.

Align plans: Consider your SMP and supporting documents (e.g., inventory and characterization, restoration plan) alongside your comprehensive plan as you work toward developing the climate resilience sub-element of your comprehensive plan. Section 3 of this document describes how to use the resilience sub-element process to prepare for future SMP reviews. This will be more efficient for local governments with limited capacity, avoid duplicating efforts, and lead to better consistency across plans than if resilience planning processes are conducted separately.

Amendment timing: Requirements for addressing the impact of sea level rise and increased storm severity in SMPs are expected to be in place in 2026 in time for the next round of SMP periodic reviews. Ecology recognizes that this presents a challenge for local governments that are currently working on comprehensive plan climate updates without the benefit of updated sea level rise rules for SMPs. Given this context and the evolving nature of climate planning, there is flexibility in how local governments choose to sequence the incorporation of new climate provisions into their plans, as long as they are meeting required deadlines for comprehensive plan periodic updates and SMP periodic reviews. For local governments with an SMP periodic review and comprehensive plan climate update due in 2029, Ecology recommends preparing to conduct the review of both plans concurrently.

Ongoing process: Adapting to climate change is an ongoing process that is never complete. The ten-year SMP periodic review cycle provides an adaptive management mechanism for managing shorelines in the context of climate change. Planning efforts should look well beyond the ten-year cycle and identify key decision points and monitoring mechanisms for ensuring that adaptation progresses over long time frames. Some local governments have found it effective to first focus on developing inward-facing policies and procedures to direct how they conduct business or manage publicly owned properties and infrastructure. Other local governments have focused on conducting vulnerability assessments as a first step before developing new policies or regulations. How local governments approach the ongoing work of managing climate impacts will vary, though the new planning requirements for comprehensive plans and SMPs will bring consistency and clarify minimum requirements.

Section 3: Shoreline Master Programs and the Comprehensive Plan Climate Element Process

The purpose of this section is to recommend how local governments that are developing a resilience sub-element for their comprehensive plan can use the process to inform future SMP reviews and ensure that plans are aligned. The subsections below follow the steps within the Climate Element Planning Guidance (Commerce 2023) and provide additional considerations for shoreline planning. Corresponding section numbers for the Climate Element Planning Guidance are included in parentheses in each header to help readers cross-reference between the documents.

Convening a climate advisory team *(Section 2.1)*

When convening a climate advisory team, include people with shoreline planning expertise and representatives of diverse shoreline stakeholder groups and key partners in shoreline planning. This may include Tribes, shoreline property owners such as port districts and homeowner's groups, industries such as aquaculture and shipping, shoreline recreational users, agency partners, environmental organizations, community-based organizations, and others. This step is a key opportunity for engaging Tribes and representatives of overburdened and vulnerable communities to ensure an inclusive and representative process and outcomes. The Climate Element Planning Guidance lists several best practices for equitable engagement (e.g., compensation, translation, etc.) and additional resources. The guidance document's Appendix A: Climate Justice in Growth Management and the Municipal Research Services Center's Equity and Engagement in Climate Response page provide information to help with convening advisory teams and broader engagement activities.

Public engagement *(Section 2.2)*

SMP reviews have their own formal public process with specific requirements. The SMP formal public engagement process will occur at the time of the SMP periodic review, separate from public engagement under the comprehensive plan process. Local governments should be aware that sequential climate resilience planning processes may cause stakeholder fatigue, and obtaining input relevant to SMPs during the comprehensive plan process could be a strategy for alleviating this challenge.

Local governments can use the comprehensive plan public engagement process to informally gather information regarding the public's shoreline-related climate concerns and priorities to inform future engagement during the SMP review. In addition, the comprehensive plan process may provide insights into equity issues relevant to shoreline management, such as overburdened communities experiencing flooding or erosion, inequitably distributed public access, and others. Any lessons learned from the comprehensive plan process may help inform future engagement for the SMP periodic review.

Tribal engagement *(Section 2.3)*

Local government staff should conduct early and ongoing tribal engagement in comprehensive and shoreline planning processes. Tribes are sovereign nations; therefore, tribal engagement is a separate process from public engagement, and Tribes engage in local government processes at their discretion. The Climate Element Planning Guidance (Section 2.3; Commerce 2023) provides more detail on tribal engagement, including requirements, best practices, and resources for coordinating with Tribes on comprehensive planning.

SMP periodic reviews require specific processes for noticing and engaging Tribes that must occur at the time of the review. However, the comprehensive plan process can provide an opportunity for early informal coordination, relationship building, and learning about Tribes' priorities related to shoreline management and climate resilience. Initiating early engagement around tribal priorities for shoreline management, during the comprehensive planning process or through other avenues, is vital for respectful and effective tribal engagement. For example, tribal input and priorities should be incorporated in vulnerability and risk assessments and other early steps that are the foundation for policies, regulations, and implementation actions. The decisions that local governments make to respond to climate impacts to the shoreline are an opportunity to uphold treaty rights and Indigenous lifeways by protecting and restoring shoreline habitats to sustain salmon and other cultural and natural resources.

Visioning *(Section 2.4)*

Comprehensive plan visioning exercises may help identify priorities for climate resilient shorelines. For example, community members may identify values, places, and specific natural and built assets that support community well-being, local economies, and other functions.

Explore climate impacts *(Section 3.2, Step 1)*

During this step in the resilience sub-element planning process, local governments conduct an initial assessment of climate impacts. The first task is identifying important social, economic, and environmental assets that may be impacted. The second task is exploring hazards and changes in the climate. Climate Mapping for a Resilient Washington (Raymond & Rogers 2022) aggregates county-scale climate projections relevant for Washington and is the required starting point for this task. The next task is to conduct an initial analysis of how hazards will affect identified assets, and the final task is to prioritize climate hazards to address.

This assessment can provide initial indications of how climate change may impact the shoreline areas a local government manages. Local governments should consider shorelines in each of these initial assessment tasks to generate foundational information for shoreline planning efforts and help ensure consistent and integrated climate resilience planning. For example, asset inventories should include the built and natural assets that support water-dependent uses, public access, and ecosystem processes. In addition, teams should identify the climate hazards that currently impact shorelines or will in the future, noting that this step is a broad assessment rather than a detailed analysis.

Audit plans and policies *(Section 3.2, Step 2)*

During this step, local governments review their comprehensive plan and SMP to identify existing climate resilience policies and gaps (i.e., climate hazards that are inadequately addressed), as well as policies that may exacerbate vulnerability or create implementation barriers. Local governments may also find it valuable to review background documents that were part of the SMP comprehensive update, such as the restoration plan, shoreline inventory and characterization, public access plans, and cumulative impacts analysis. Other sources of information that may help identify climate concerns and priorities include climate action plans, hazard mitigation plans, flood hazard management plans, tribal climate adaptation plans, salmon recovery plans, permit history and trends, observations of change, stories of community experience and Indigenous knowledge if shared and safeguarded, and others.

Assess vulnerability and risk *(Section 3.2, Step 3)*

Vulnerability and risk assessments identify how climate hazards will adversely impact people, infrastructure, and ecosystems and can help prioritize policy interventions. Vulnerability is usually defined by three components: exposure, sensitivity, and adaptive capacity. Risk assessment involves considering hazard probability and magnitude of impact. Vulnerability and risk are related yet distinct concepts. Some assessments will evaluate vulnerability only, while others will evaluate vulnerability and risk. Commerce recommends that jurisdictions assess and describe both vulnerability and risk to help align with hazard mitigation planning requirements.

Vulnerability and risk 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; however, local knowledge is needed to contextualize this information with details about the type of development in the area and how people are likely to be affected. Such assessments are also an opportunity to incorporate social vulnerability and related information to identify inequitable exposure and anticipate barriers to adaptive capacity. Conducting a vulnerability and risk assessment is often one of the first major steps in a climate resilience planning process. Vulnerability and risk assessments provide foundational information for planning and subsequent implementation actions.

Conducting a vulnerability and risk assessment is an optional step in the comprehensive plan resilience sub-element planning process, depending on a local government's information needs. However, Ecology recommends that local governments intending to address sea level rise and related hazards in their SMPs conduct a vulnerability and risk assessment to provide the detailed information necessary to inform shoreline management policies and regulations.

Vulnerability and risk assessments can be time consuming. Ideally, local governments will undertake vulnerability and risk assessments in advance of their SMP periodic review to allow time for the findings to be reviewed and considered in the context of shoreline management. Conducting a vulnerability and risk assessment during the comprehensive plan update can provide a key source of information for SMP reviews. Section 4 and Appendix A describe sea level rise vulnerability assessments in more detail.

Pathways and measures *(Section 3.2, Step 4; Section 5)*

The fourth step of the Resilience Sub-Element process provides guidance on developing climate resilience goals and policies. The Climate Element Planning Guidance offers three pathways for the resilience sub-element: 1) revise existing goals and policies; 2) develop new goals and policies; and 3) update your hazard mitigation plan (HMP) and adopt it by reference into your comprehensive plan.

Accompanying Commerce's planning guidance is the Menu of Measures, which is a list of model climate goals and policies (measures). Local governments may select measures from the Menu, revise them as needed to reflect local planning context and priorities, and integrate the goals and policies directly into the comprehensive plan (or a hazard mitigation plan).

Commerce and its partners developed the Menu for comprehensive planning and not specifically for shoreline planning. The Menu identifies the policies that will most likely need to be incorporated into a jurisdiction's SMP, though there may be others with a nexus to the SMP depending on where and how they are intended to apply. Local governments using the Menu to select measures that are intended to be applicable within shoreline jurisdiction should choose provisions that implement the SMA and align with the SMP. Conflicts must be resolved before adopting provisions into the comprehensive plan (see Section 2).

Commerce's guidance provides a pathway to complete the resilience sub-element by updating HMPs to assess climate risks and adoption by reference into comprehensive plans. Looking forward, local governments should be aware that the relationship between the HMP and SMP will need to be different from the adoption by reference pathway that Commerce offers for comprehensive planning. The HMP provides valuable information regarding climate hazards that should inform SMP policies and regulations. For example, climate vulnerability and risk assessments conducted during an HMP update can provide the foundational data for hazard-focused SMP policies. However, adopting the HMP by reference into the SMP would not likely meet future SMP policy and regulatory requirements. The basis for SMP approval is consistency with the SMA and SMP guidelines, and HMPs are not structured to fulfill these requirements.

Integrate goals and policies *(Section 3.2, Step 5; Section 5)*

The final step of the resilience sub-element process involves finalizing goals and policies and determining how to incorporate provisions into your comprehensive plan. The guidance also outlines requirements for updating regulations. Revising the shoreline element of your comprehensive plan requires an SMP amendment. SMP amendments must follow required processes for the provisions to take effect; Section 2 of this document provides more detail on amendment timing and avoiding inconsistent or conflicting plans. These final steps, and the decisions about which goals and policies to include, where to include them, and when to make formal amendments, are critical for consistent climate planning.

Section 4. Addressing the Impacts of Climate Change in Shoreline Master Programs

This section provides suggestions for addressing the impacts of climate change in SMPs, drawn from previous Ecology publications such as Appendix A of the SMP Handbook (Ecology 2010), published reports, and Ecology shoreline planning staff perspectives. This section is written in the context of the current SMP guidelines; note that Ecology is beginning the process to develop new requirements and guidance which will replace this information (RCW 90.58.630). When published, the new guidance will also serve as an update of earlier guidance (e.g., the previously published Appendix A).

Sea level rise planning overview

Figure 5 outlines a generalized process for sea level rise planning. In practice, steps are often iterative rather than sequential. Adopting sea level rise-focused SMP provisions is one type of implementation action that local governments will need to undertake, alongside on-the-ground projects and other planning efforts. The following sections briefly describe sea level rise projections, vulnerability assessments, and adaptation planning.

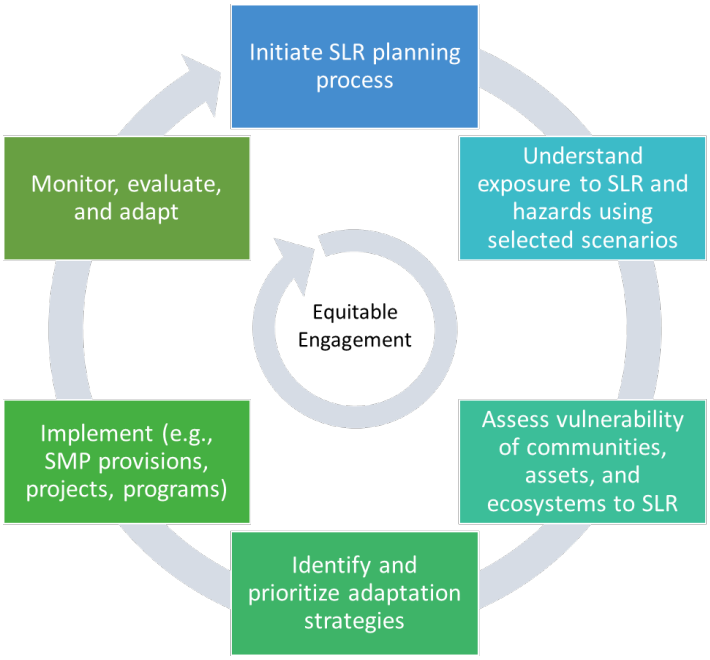


Figure 5. General steps in a sea level rise (SLR) planning process (adapted from Gardiner et al., 2022; California Office of Emergency Services, 2020; and others).

For additional information, the Coastal Hazards Resilience Network curates a library of recommended reports, case studies, and other helpful information. The University of Washington Climate Impacts Group is a key climate data provider for the state; the Climate Impact's Group website houses many of the publications from the Washington Coastal Resilience Project highlighted in the Coastal Hazards Resilience Network library. Key sea level rise publications for Washington include:

- Localized sea level rise projections for Washington State (Miller et al. 2018)
- Data viewer for accessing projections (Lavin et al. 2019)
- Guidance for mapping sea level rise inundation (Norheim et al. 2018) and assessing extreme water levels (Miller et al. 2019)
- Guidance on choosing sea level rise projections (Raymond et al. 2020)
- Parcel scale sea level rise vulnerability assessment for Puget Sound (Coastal Geologic Services 2022) and accompanying social vulnerability index (Fleming & Regan 2022)
- Management options for responding to sea level rise (Miller et al. 2022)

In addition to the reports and data sources above, there are many sea level rise and climate change resources available online from federal government agencies and other entities.

Sea level rise observations and projections

Sea level is rising at many locations throughout Washington, and rates of rise are projected to accelerate over the coming decades. At the Seattle tide gauge, sea level has risen by about nine inches since the start of the record over 100 years ago. By 2100, sea levels will likely rise about 1.5 to 2.5 feet under a high emissions scenario along the state's coastline, though much higher amounts are possible (Miller et al. 2018). Sea level rise projections are not uniform across the Washington coastline. Due to the geology of our region, some areas are uplifting, and others are subsiding, which results in a range of relative sea level rise rates (see Table 2 for examples).

Table 2. Projected relative sea level change for 2100 (feet, averaged over a 19-year period) for example locations in Washington.[7]

Location	Vertical Land Movement	GHG Scenario	Central Estimate (50%)	Likely Range (83-17%)	Lower Likelihood, High Magnitude (1%)
Tacoma	-0.5 +/- 0.2	Low	2.1	1.5-2.7	4.6
		High	2.5	1.9-3.3	5.3
Neah Bay	1.1 +/- 0.3	Low	0.5	-0.1-1.2	3.1
		High	1	0.3-1.7	3.8
Taholah	0.3 +/- 0.5	Low	1.3	0.6-2.1	3.9
		High	1.7	1.0-2.6	4.6

The Washington Coastal Resilience Project developed localized, probabilistic sea level rise projections for 171 locations around the coast that incorporate vertical land movement (Miller et al. 2018). These are the most widely used projections for the state and are currently recommended by Ecology for use in shoreline planning. These projections can also be used for other applications such as restoration planning and project design. Climate data are evolving continuously; in 2022, federal agencies released new sea level rise projections for the country (Sweet et al. 2022). Practitioners in Washington may see these projections cited in various reports and tools. However, Ecology currently recommends using the Miller et al. (2018) projections because they use higher-resolution measurements of vertical land movement than the federal projections. For many locations, the differences between the projection data sets are relatively minor, particularly for planning purposes and when considering nearer time horizons.

Sea level rise projections can be paired with other water level data to model the extent of future coastal flooding and other impacts. Models are only one source of information about potential impacts and future conditions for coastal communities in Washington. Observations

[7] Projections are provided for three "probabilities of exceedance" for 2100 (2090-2109) under two different greenhouse gas (GHG) scenarios. Projected changes are assessed relative to contemporary sea level (table and description adapted from Miller et al. 2018).

and community experiences of hazards can provide detailed and locally relevant information and help identify the most urgent priorities. For example, community climate action groups are monitoring high water levels to understand the conditions that produce flooding at hyper-local scales, and members of the public contribute observations of king tides and storm surge around the state to the MyCoast website. Projections alone do not provide information about the sensitivity and adaptive capacity of people, ecosystems, and the built environment; this information must be drawn from place-based knowledge, community and site-scale information, and local expertise.

Local governments and partners face choices regarding which sea level rise projections to use in assessments, planning, and project design. Raymond et al. (2020) provides guidance on how to select sea level rise projections, considering factors including location, time horizon, greenhouse gas scenario, and probability. When conducting vulnerability assessments and other studies, it is a best practice to evaluate a range of sea level rise scenarios to consider the range of possible future impacts, and to incorporate other drivers of coastal hazards such as storm surge.

Selecting sea level rise amounts for specific planning and project contexts will depend on local factors. Applying a risk management framework is a useful approach for structuring these decisions. For example, investments in critical infrastructure should be risk averse and plan for higher-magnitude, lower-likelihood sea level rise scenarios. Less consequential and more adaptive projects (e.g., trails) may be more risk tolerant and plan for more likely amounts of sea level rise. Given the breadth of shoreline uses and developments managed under SMPs and that SMPs encompass both planning and regulatory elements, local governments may need to consider and allow for different levels of risk tolerance. However, many types of shoreline development have long lifespans and may have limited adaptive capacity, so Ecology supports local governments that choose to take a precautionary approach as they plan for shorelines of the future. A precautionary approach means planning for and providing adaptive capacity for reasonable higher-magnitude sea level rise scenarios in acknowledgement of uncertain future conditions.

Assessing vulnerability to sea level rise

Sea level rise will shift shorelines; worsen coastal hazards such as flooding, erosion, salinization, and groundwater rise; and drive changes and losses of coastal ecosystems (Oppenheimer et al. 2019). For example, researchers have estimated that the December 2022 coastal flooding event that impacted many communities in Washington was exacerbated by sea level rise. This is because sea level rise adds to the already high water levels that occur during severe storms, low-pressure systems, and seasonal high tides, causing flooding in areas that have historically stayed dry.

Diverse ecosystems, built environments, and communities characterize Washington's marine shorelines. Sea level rise and the hazards it exacerbates will have different impacts depending on local factors. Sea level rise vulnerability assessments provide foundational information to

inform adaptation planning and implementation actions that reflect local conditions and values (see Section 3).

Ecology has identified some recommendations and best practices for local governments that are undertaking sea level rise vulnerability assessments to inform shoreline planning, summarized below.

- Local governments and consultant teams should ensure that assessments are designed to inform shoreline planning, including by reviewing and drawing from the supporting information used to develop SMPs (e.g., inventory and characterization) and considering impacts to the shoreline environment, public access, and uses.
- Scope, determine, and communicate which sea level rise-related hazards will be evaluated, the geographic extent of the study, natural and built environment assets that will be included, study methods, and which sea level rise scenarios will be assessed.
- Invite partnership and active coordination with Tribes and conduct robust and equitable public and partner engagement.
- Vulnerability assessments should consider social vulnerabilities that may affect sensitivity and adaptive capacity of people and communities.
- Identified adaptation strategies should be locally relevant and actionable.

Please see Appendix A describing sea level rise vulnerability assessments for more detail. Ecology and partners are available to provide technical assistance on this topic.

Adaptation planning

Adapting to sea level rise poses a fundamental challenge for society, and particularly for coastal management. Sea level rise adaptation is typically organized under the broad strategies of protect, accommodate, avoid, retreat, with sub-strategies and various actions aligning with each of these categories. Frameworks vary in how they organize and define these options, and communities may choose different terminology, such as relocation instead of retreat. Sea Level Rise and Management Options for Washington's Shorelines (Miller et al. 2022) lays out four approaches for responding to sea level rise: protect using hard structures; protect using soft shore techniques; adapt in place or accommodate; and make space along the coast (Table 3). While some options are inherently more natural than others, nature-based elements can be incorporated across the gray-green infrastructure spectrum.

After completing a sea level rise vulnerability assessment, local governments can then develop an adaptation plan that defines preferred options (Figure 5). Sea level rise adaptation plans must be informed by local conditions, values, and priorities. Adaptation planning within shoreline areas must also align with state and federal laws and policies. Adaptation strategies may be implemented through the SMP (Table 3), as well as through other local plans and codes, and by creating programs and executing projects. The nature and scale of identified adaptation actions will determine which planning, project, programmatic, and regulatory approaches a local government uses. For example, relocation should be community led and conducted under

focused programs. However, there may be some aspects of relocation programs that have an SMP nexus, such as redevelopment restrictions.

Table 3. Sea level rise management options and areas of an SMP where policies and regulations may be incorporated, summarized from Miller et al. (2022) with additions.

Response Approach	Example Management Options	Relevant Areas of SMP
1. Protect: hard defensive structures	Seawalls, bulkheads, revetments, dikes	Shoreline modifications
2. Protect: soft shore techniques	Beach nourishment, gravel berms, vegetation enhancement, large wood	Shoreline modifications
3. Adapt in place: accommodation	Elevate structures, floodproof living areas, raise critical systems	Shoreline modifications, general provisions (flood hazard), shoreline uses (e.g., residential development)
4. Making space: retreat or avoidance	Relocating structures from a site or broader scale, voluntary buyouts, setbacks, restrictions on new structures, redevelopment requirements	Avoidance may be addressed in shoreline environment designations, critical areas provisions, and residential and commercial development provisions. Relocation should be a broader, programmatic approach.

Sea level rise adaptation plans may take a variety of forms, from high-level strategies that are then implemented through functional plans, to detailed roadmaps. To manage long-term uncertainty, some communities are applying an adaptation pathways approach. Under this framework, planners identify a sequence of manageable steps and key decision points that are monitored and revisited over time as conditions change. This can facilitate implementation of near-term actions while planning for future needs (e.g., Perrin-Martinez et al. 2022; Clark et al. 2020; Clark et al. 2019).

Sea level rise adaptation planning should meaningfully involve overburdened and vulnerable communities and propose actions that meet their needs. Planning efforts must also engage Tribes, and proposed adaptation actions must uphold tribal sovereignty and treaty rights and should reflect Tribes' adaptation priorities.

Incorporating sea level rise adaptation provisions into SMPs

The following sections provide suggestions for addressing the impacts of sea level rise across different areas of an SMP. Incorporating these ideas could involve reviewing and updating SMP provisions to reflect sea level rise vulnerability assessments and identified adaptation actions, as well as focusing on implementation of and compliance with existing provisions.

The suggestions below are organized under the typical content areas of an SMP. They are primarily relevant for sea level rise and associated hazards; other climate hazards are discussed briefly in the following sub-section. While these sections are organized topically (i.e., sea level rise and other climate hazards), climate changes and related hazards do not act on shoreline

areas independently. Compound events occur now and are likely to become more common as each type of hazard becomes more frequent and severe (e.g., compound flooding caused by riverine, coastal, and surface flooding; erosion and flooding following wildfire; etc.).

This section does not provide examples of climate resilience SMP provisions that are currently in effect. For examples of sea level rise provisions, see Ecology (2021) which documents lessons learned from local governments incorporating sea level rise into SMPs, or contact Ecology. Note that we have not worked with local governments to evaluate the implementation success of provisions currently in effect. Furthermore, local context is key, and climate resilience provisions are not necessarily transferrable from one jurisdiction to another because shorelines and communities are unique. Policies and regulations should be science based and informed by assessments, local priorities, and needs.

Shoreline jurisdiction

Shoreline jurisdiction is the area where the SMA and the SMP apply and is defined in the SMA (RCW 90.58.030). The ordinary high water mark (OHWM) is used to determine shoreline jurisdiction and is the reference point for many types of shoreline regulations (Ecology, 2016).

Ordinary high water mark: The OHWM is not a fixed elevation or location; the OHWM and the shoreline jurisdiction move as the shoreline changes over time due to erosion, accretion, shoreline modification, and changing water levels [RCW 90.58.030(2)(c)]. The marine OHWM will shift landward as marine water levels rise. OHWM is assessed at the time of a proposed development, which should provide up-to-date information for siting planned development. Local governments should ensure that planning and project decisions are aligned with accurate and current OHWM rather than previous patterns of development. Local governments could consider establishing a priority to monitor changes to the OHWM to identify where shorelines are shifting most rapidly.

Uses adjacent to shoreline jurisdiction: Local governments have the authority to review land use policies and regulations adjacent to shoreline jurisdiction to ensure that uses are consistent with the SMA and SMP (RCW 90.58.340). Local governments may identify a need to consider land uses adjacent to current shoreline jurisdiction that are likely to be within shoreline jurisdiction in the future and guide land use decisions in these adjacent areas accordingly. This consideration is particularly relevant for locations with rapid shoreline change.

Regulating the 100-year floodplain: Local governments have the option to extend shoreline jurisdiction to encompass any portion of or the entire 100-year floodplain [RCW 90.58.030(2)(d)(i)]. This approach may allow local governments to manage the approximate sea level rise exposure area under their SMP in cases where the floodplain aligns with this area.

Lands necessary for critical area buffers: Local governments may also include in its SMP lands necessary for buffer for critical areas [RCW 90.58.030(2)(d)(ii)]. This option allows local governments to extend shoreline jurisdiction to include buffers necessary to protect any critical area located within their shorelands.

Shoreline environment designations and zoning overlays

Shoreline environment designations (SEDs) are classifications of shoreline areas that reflect local shoreline conditions and provide the framework for implementing shoreline policies and regulatory measures differently along shoreline reaches [WAC 173-26-191(1)(d) and WAC 173-26-211]. SEDs provide the zoning framework for shorelines.

Aligning resilience strategies with SEDs: SEDs can be a tool for building resilience by incorporating information about climate hazards into policies that guide where and how shoreline development can occur in specific places. Local governments can review and consider updating SED classifications or modify the uses allowed within certain SEDs to reflect identified vulnerabilities. In SEDs with high exposure to sea level rise and related hazards, uses and developments may be limited to those that can accommodate impacts. SEDs may also be used to assign adaptation strategies. For example, restoring sediment sources and marsh habitat could be the preferred strategy for a "natural" environment, while improving an existing seawall could be a preferred strategy in a "high intensity" environment. There is also the option to create new types of designations; this could be explored to designate highly vulnerable areas or specify adaptation strategies that may not be desired more broadly (e.g., increasing height limits to allow elevation of structures).

Zoning overlays and interactions with SEDs: Zoning overlays or climate-informed zoning are examples of land use tools that can support climate resilience. This approach is beginning to be tested in some cities and can be used to restrict development in vulnerable areas, incentivize development in preferred areas, require more stringent building or review standards in flood-prone areas, and other measures. For example, King County has established a coastal high hazard zoning overlay based on projected future water levels that has specific requirements for elevating new and substantially improved structures. If considering this approach, it is important to recognize that the SMP already provides the zoning framework for shoreline areas through SEDs. If a local government is implementing a climate resilience zoning overlay through the comprehensive plan or other mechanism, it will be important to review for consistency with the SMA when applied within shoreline jurisdiction. This includes a need to ensure that the combined set of overlay zoning, general, and SED-specific shoreline regulations do not conflict or preclude all reasonable uses and continue to implement the policy of the SMA (RCW 90.58.020).

Parallel shoreline environments: Local governments may designate parallel SEDs to divide the shoreline into parallel segments with different characteristics [WAC 173-26-211(4)(c)(ii)]. Chapter 13 of the SMP Handbook includes a section on parallel environments that may be helpful in considering this option (Ecology 2009). This mechanism could be explored where hazard exposure varies at a fine scale, such as a low-lying area backed by higher-elevation land.

General SMP provisions and contents

SMPs contain goals, policies, and regulations that apply throughout the shoreline jurisdiction or to places that have specific characteristics, regardless of the SED. These include goals and

policies for archaeological and historic resources; critical areas; flood hazard reduction; public access; shoreline vegetation conservation; and water quality, storm water, and nonpoint pollution (WAC 173-26-221). SMPs may also contain a section of overarching goals and policies that reflect high-level objectives. SMPs are not required to contain goals, but many local governments choose to do so to reflect community priorities.

Sea level rise goals: Sea level rise resilience goals can bring attention to the issue and lay groundwork for future action. Setting goals can be an opportunity to unite the public around desired outcomes, build buy-in before implementing regulatory responses, and provide authority for working on an issue. Local governments that have established sea level rise goals have identified benefits to this approach, including raising awareness of the issue, engaging the public and creating a common vision, establishing direction for future policies and regulations, prioritizing resources, enhancing coordination, aligning decision-making, and improving access to funding (Ecology 2021).

Flood hazard reduction: Provisions for frequently flooded areas and flood hazard reduction apply throughout the shoreline area regardless of the SED [WAC 173-26-221(3)]. Reviewing existing flood provisions compared to projected future coastal flooding is an important step in resilience planning. Local governments have the option to consider sea level rise when classifying frequently flooded areas (WAC 365-190-110). However, designating and managing critical areas based on projected future conditions is an approach that has not been incorporated into any local SMP provisions to date.

Setbacks and buffers: SMPs establish shoreline buffer and setback requirements to protect shoreline ecological function, conserve native vegetation, protect structures from shoreline hazards like erosion and landslides, and provide for aesthetic qualities. Sea level rise assessments can provide data and analysis to inform updates to buffers and setbacks on marine shorelines. Buffers and setbacks help ensure that new structures are built outside of hazard areas and with sufficient space to allow shoreline functions, including habitat, to migrate. Local governments can evaluate projected exposure to future flooding and erosion to determine appropriate setback and buffer widths. Implementing larger setbacks may be a challenge on existing small lots, and other measures may be needed, such as requiring structure elevation, more-stringent building standards, or seeking buyouts. Local governments should avoid SMP provisions that enable reductions to buffers and setbacks along marine shorelines that are exposed to sea level rise, such as common line setbacks, administrative buffer reductions, and buffer averaging if these allowances could increase future risk or be inconsistent with shoreline stabilization provisions of the SMP. While buffers and setbacks are an established part of the regulatory structure of SMPs, imposing these development restrictions to address future flooding and erosion risk due to sea level rise is an emerging area (Miller et al. 2022). A strong record based on data and analysis is needed to support the designation of setbacks for coastal hazards. This is one reason why Ecology recommends conducting sea level rise vulnerability assessments.

Public access: Protecting public access to the state's shorelines is one of three major policies of the SMA (RCW 90.58.020). Public access means that the public can reach and enjoy the water's edge, travel over water, and view the water from nearby [WAC 173-26-221(4)]. The SMA requires SMPs to include a public access element to provide for access to publicly owned shorelines and a recreational element to preserve and enlarge recreational opportunities [RCW 90.58.100(2)(b) and (c)]. The GMA (Chapter 36.70A RCW) also uses the word "element" for discrete components of a comprehensive plan. However, under the SMA local governments are not required to address SMP elements listed in the SMA and SMP guidelines as discrete sections. The elements may be addressed throughout master program provisions rather than used to organize the master program. The process to address shoreline public access may need to be integrated with other relevant comprehensive plan elements, such as transportation and recreation. Sea level rise has significant implications for shoreline public access. Local governments should include public access locations in sea level rise vulnerability assessments and plan for future access. This effort could include creating or updating a shoreline public access plan as described in WAC 173-26-221(4).

Nonconforming use and development standards: In some circumstances existing uses, developments, and lots become nonconforming with regards to the SMP regulations as the result of SMP comprehensive updates and amendments. SMPs usually include provisions to address these situations in a manner consistent with achievement of the policy of the SMA. If an SMP does not address nonconforming uses, developments, and lots, the default provisions of WAC 173-27-080 would apply. Local governments may want to identify separate nonconforming regulations for existing development that is vulnerable to climate hazards to ensure replacement, expansion, and other redevelopment reduces risk to these uses and developments. For example, local governments could require that nonconforming development located in a sea level rise hazard area be relocated outside of the hazard area at the time of replacement rather than allowing it to be replaced in the same location. Nonconforming development standards will be a key lever for adapting existing structures over time.

Shoreline modifications

Shoreline modifications are structures or actions that change physical characteristics of the shoreline in support of or in preparation for a shoreline use. Modifications include stabilization, piers, fills, dune management, dredge, and other actions (WAC 173-26-231). Some types of sea level rise management options are shoreline modifications (e.g., protection-focused strategies). SMPs already determine which shoreline modifications are allowed, conditionally allowed, or prohibited in each SED; local governments may want to revisit these allowances based on results from vulnerability assessments and other climate resilience planning efforts. Any changes to modification provisions must still comply with applicable requirements in the SMP guidelines.

Miller et al. (2022) describes many of these approaches and compares the effectiveness; financial, social, ecological implications; and risk of maladaptation. Their analysis found that hard defensive structures are associated with rising costs and diminishing risk reduction benefits as sea levels rise. Any measure that is designed to keep infrastructure in potentially

hazardous zones carriers a risk of maladaptation. In many cases, shoreline modifications are implemented at the parcel scale; attempting to address coastal hazards parcel by parcel may not be effective and could produce unintended consequences for neighbors. Coordinating at the community-scale usually leads to more successful outcomes.

Nature-based solutions and design requirements: Adaptation planning will identify actions and projects for local governments and private landowners to implement along a shoreline. Nature-based solutions–which can be broadly defined as actions or practices that incorporate natural features or processes into the built environment to promote resilience–can achieve multiple benefits in shoreline areas while reducing risk from climate hazards. Local governments may need to consider whether nature-based approaches like dynamic revetments, upland berms, living levees, beach nourishment, and other modifications intended to mimic the natural dynamic are appropriate for their shorelines. This may require SMP amendments to ensure these shoreline stabilization, restoration, and enhancement options are allowed within the SMP or preferred over hard, non-dynamic options. Planning-level consideration of nature-based solutions can help to identify potential adaption strategies and ensure that these options, if appropriate, are included in future project scale alternative analyses. However, this planning-level exercise would not alleviate the project-scale requirement for demonstration of need, geotechnical studies, or no-net-loss analysis. Nature-based solutions must align with the natural systems and processes in an area; interventions that are nature based in one location may not mimic natural conditions along shorelines with different characteristics.

Incorporate sea level rise information into modification design: Any new or retrofitted shoreline modifications should be designed and built using sea level rise projections to ensure they function for their intended lifespan.

Alternatives to armor: Landowners may increasingly seek structural or hard shoreline stabilization to protect against accelerating erosion and more-frequent coastal flooding. Policies and regulations should continue to discourage these approaches and shift toward natural and adaptive options with fewer negative ecological impacts. Local governments should place a stronger emphasis on elevating or relocating structures to avoid structural stabilization and flood-control measures. SMPs generally prohibit new development that would require structural shoreline stabilization over the life of the development [WAC 173-26-221(2)(c)(ii) and WAC 173-26-231(3)(a)]; these provisions should be implemented and enforced, and sea level rise should be factored into this analysis. Local governments should include provisions that require a geotechnical analysis demonstrating that proposed development is sufficiently set back such that stabilization will not be needed for the life of the structure, including consideration of climate projections.

Adaptation provisions for structures: Some types of shoreline modifications must necessarily be located in or near the water (e.g., piers, docks, access stairs, etc.). Local governments should consider regulations for how such structures must be maintained and adapted over time to ensure that they do not become future hazards or detritus as water levels rise. In addition, local governments should consider that shoreline modifications are only allowed where demonstrably necessary to protect allowed primary structures or support allowed uses, and

modifications themselves should not become the justification for stabilization or other modifications.

Habitat and natural systems enhancement: SMPs include provisions fostering habitat and ecosystem enhancement projects. Habitat and ecosystem enhancement projects are activities proposed and conducted specifically for the purpose of establishing, restoring, or enhancing shoreline functions and habitat. These projects should be planned and designed for sea level rise. In addition, local governments should include provisions emphasizing that implementing restoration actions can enhance resilience to sea level rise while improving ecological function. In addition, restoration plans developed for comprehensive SMP updates may benefit from future updates to ensure they contain multi-benefit restoration projects that provide climate resilience benefits.

Shoreline uses

Shoreline use provisions contain requirements regarding specific uses within the shoreline jurisdiction, including agriculture, aquaculture, boating facilities, commercial and residential development, and others (WAC 173-26-241).

Vulnerability-based use provisions: Vulnerability assessments can provide local governments with information about where existing shoreline uses are vulnerable to the impacts of sea level rise. Avoiding adding new uses and developments in exposed areas should be a primary objective of sea level rise planning. Use provisions combined with SEDs can be used to restrict incompatible uses and developments in vulnerable areas and incentivize them in appropriate areas.

On-site sewage systems: Residential is the most common shoreline use, and on-site sewage systems, often referred to as septic systems, are a common option for wastewater treatment along rural shorelines. Local governments should avoid permitting new septic systems in areas that are likely to be exposed to coastal flooding or erosion associated with future sea levels. Septic system components can be exposed and damaged by erosion and scour, while associated drain fields can be rendered inoperable when surrounding soils become saturated. As applicants frequently get septic approval before shoreline permits, the problem of septic systems and sea level rise may need to be addressed in partnership with local health departments and the Washington Department of Health. Incentive programs may be necessary to address existing systems vulnerable to sea level rise.

Public facilities and utilities: The SMA directs local governments to plan for public facilities and utilities necessary for shoreline uses allowed and fostered by the SMP. SMPs should include provisions to help ensure that roads and transportation systems, utility infrastructure, and other public facilities are planned for, designed, and sited to avoid impacts from sea level rise.

Considerations for other climate hazards

Climate change is affecting shorelines around Washington in many ways. Wildfire, riverine flooding, drought, other hazards, and compound events have significant implications for

shoreline management. As cities and counties assess local assets' climate vulnerability and risk during the comprehensive plan process, we recommend identifying all climate-exacerbated hazards that may impact the use and development of shoreline areas, in addition to sea level rise. Priority hazards and impacts will vary among communities depending on their location and other local factors. Beginning to identify the full breadth of climate impacts and emerging or anticipated management challenges is a first step toward addressing challenges through planning and implementation.

The descriptions below provide brief examples of climate projections for Washington (summarized from Snover et al. 2013; Mauger et al. 2015; Queen et al. 2021; Raymond et al. 2022; Raymond & Rogers 2022) and potential shoreline management issues. Ecology anticipates developing additional guidance in the future around these areas.

Drought

Projected changes: Drought frequency, particularly in lower elevation areas and during summer months, is projected to increase. Summer streamflows are projected to decrease for most streams, and spring snowpack is expected to decrease much faster than it has historically.

Potential impacts: In many watersheds around the state, seasonal water availability is changing as peak flows shift earlier in the year due to earlier snowmelt and more rain-dominated hydrology. Water levels in freshwater systems are expected to be lower in the summer. Seasonal and interannual drought conditions will negatively impact ecosystems and salmon habitat and reduce seasonal water availability for agriculture, residential use, and other uses.

Examples of potential shoreline management issues:

- Changes in riparian and wetland vegetation.
- Increased importance of riparian vegetation conservation measures as low flows and high temperatures stress fish and shellfish resources.
- Potential challenges meeting water supply needs for new and existing shoreline uses (noting that the SMP is not the mechanism for managing water resources).
- Long-term drought conditions could produce fluctuating lake levels, wetland areas, and streamflows, potentially contributing to shifts in the ordinary high water mark and shoreline jurisdiction.

Extreme Heat

Projected changes: Average temperatures and extreme highs are projected to increase across the state, with more-significant increases expected for central and eastern Washington and lower elevations in the Puget Sound region.

Potential impacts: Increasing temperatures and extreme heat events pose health risks to people, including people who live, work, recreate, and practice cultural traditions along shorelines. High temperatures can also negatively impact fish, shellfish, and other wildlife.

Examples of potential shoreline management issues:

- Increased value of and demand for public access to shoreline areas on hot days.
- Increased importance of riparian vegetation, wetlands, and overall hydrologic connectivity to reduce the impacts of extreme heat on waterbodies and ecosystems.

Extreme Precipitation

Projected changes: Heavy rainfall events are projected to be more severe, and the number of days with more than an inch of rain are projected to increase.

Potential impacts: Extreme precipitation events contribute to compound flooding events that can endanger people, damage structures, and increase erosion along shorelines. Increased intensity of surface runoff may exacerbate erosion of bluffs and steep banks and increase the likelihood and magnitude of landslides. High river flows and landslides can degrade habitat and negatively impact species.

Examples of potential shoreline management issues:

- Increased need to manage surface water to reduce risk of flooding and erosion.
- Increased importance of regulating development within flood prone areas to reduce exposure to flooding and channel migration.

Riverine Flooding

Projections: Winter streamflows and increases in heavy rainfall events are projected to increase; projected changes depend on watershed type, but flood risk is projected to increase in most watersheds. Studies project that most locations within the Columbia River Basin will experience increases in flood magnitude under climate change.

Potential Impacts: Where peak flows are projected to be higher, flood frequency, intensity, and extent may increase. Flooding is a major risk to the built and natural environment, human health and safety, and community well-being. Channel migration can occur quickly during floods or high-water events, and future flooding patterns under climate change may further affect channel migration. The potential for flooding and channel migration is higher after wildfire due to vegetation loss and other factors.

Examples of potential shoreline management issues:

- Gradual or abrupt departure from established flooding patterns can pose major risks to infrastructure and human safety, increasing the importance of using climate information to inform planning.
- Increased importance of regulating development within flood prone areas to reduce exposure to flooding and channel migration and protecting the ecological function provided by frequently flooded areas.
- Increased need for detailed channel migration zone studies.

Wildfire

Projected changes: In general, length of fire season, fire frequency, and area burned are expected to increase across many areas of the state, though some areas may see decreases.

Potential impacts: Forest ecosystems in many parts of Washington are fire adapted, and fire is a natural part of the landscape and ecological processes. However, the increasing frequency and intensity of wildfire has negative impacts on the environment and communities. Wildfire smoke is a public health concern during the summer; wildfires can pose significant life safety concerns for people; and fires can damage or destroy homes, businesses, and public infrastructure. Wildfires burn riparian vegetation, and in some settings, valley floodplains may provide a natural burn path due to topography. Loss of riparian vegetation due to wildfire can increase the likelihood of stream avulsions as stream conditions are less stable. When burned areas are subsequently exposed to heavy precipitation, large quantities of sediment and debris flow into streams from the surrounding land area. These dynamics will influence stream bed elevation, shoreforms, the location of the OHWM, and ecological functions.

Examples of potential shoreline management issues:

- Wildfire risk reduction strategies and post wildfire response actions can conflict with SMP vegetation conservation standards and protective buffer requirements.
- Increased risk of compound and sequential events such as wildfire, extreme precipitation, erosion and landslides, channel migration, and flooding.

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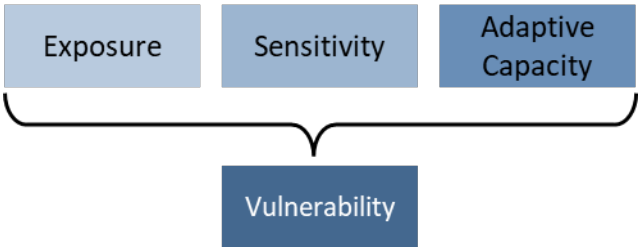
DEPARTMENT OF ECOLOGY
State of Washington

Appendix A: Interim Climate Resilience Planning Guidance for SMPs

Sea Level Rise Vulnerability Assessments

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.

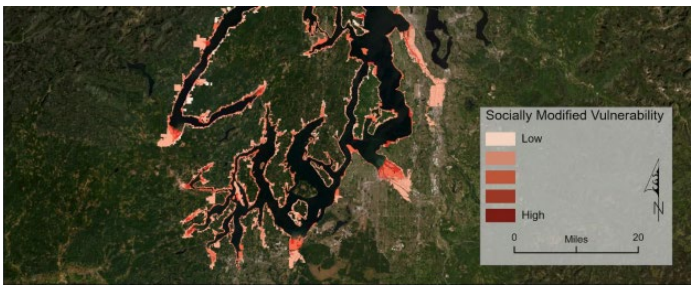


Figure 6. Results for the south Puget Sound from a parcel-scale vulnerability assessment conducted by Coastal Geologic Services.

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

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