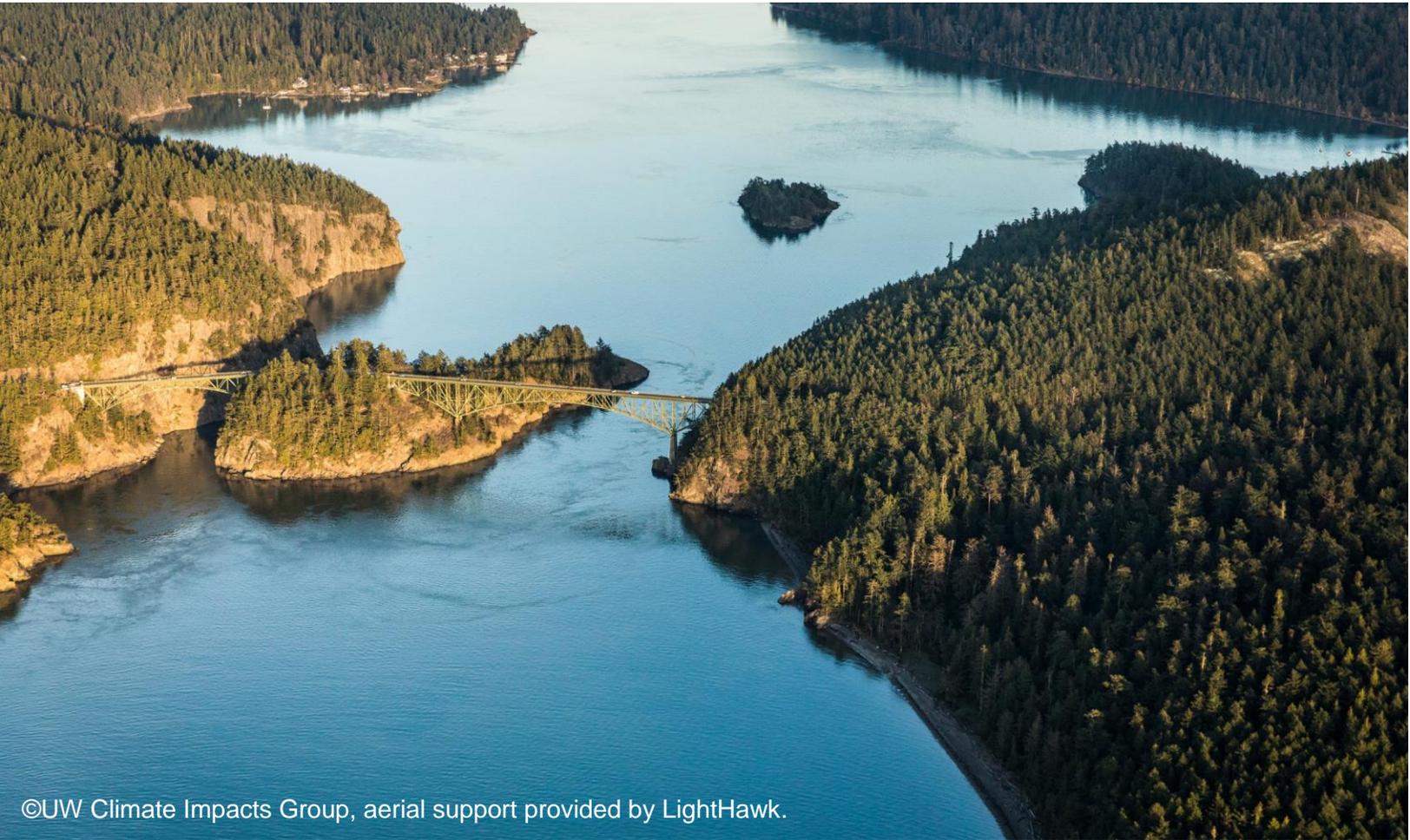


# WASHINGTON STATE PARKS ADAPATION PLAN

June 2019



©UW Climate Impacts Group, aerial support provided by LightHawk.

Prepared by  
The University of Washington, Climate Impacts Group

In Partnership with  
The Washington State Parks and Recreation Commission



## Acknowledgments

---

The authors would like to express their sincere thanks to the members of the Washington State Parks and Recreation Commission staff who participated in project workshops and document review.

**Washington State Parks Project Lead:** Lisa Lantz, Parks Development Division Manager

**Participating Parks staff, listed in alphabetical order:**

Joelene Boyd	Michael Hankinson	Laura Moxham
Steve Brand	Chelsea Hamer	Matt Niles
Jay Carmony	Chelsea Harris	Jessica Norton
David Cass	Peter Herzog	Melinda Posner
Jon Crimmins	Dave Jaquish	Brian Patnode
Andrew Fielding	John Keates	Erik Plunkett
Nikki Fields	Linda Kunze	Shari Silverman
Erik Folke	Lisa Lantz	Mike Sternback
Colleen Foster	Jessica Logan	Kira Swanson
Edward Girard	Alex McMurry	Jamie Van De Vanter
Jason Goldstein	Dan Meatte	Doug Vazquez
Derek Gustafson	Larry Mallo	Brian Yearout
Dan Hahn	Dustin Madden	

**University of Washington Climate Impacts Group**

Harriet Morgan  
Crystal Raymond  
Meade Krosby

**Funding**

Funding for this effort was provided by the Washington State Parks and Recreation Commission.

*Recommended citation:* Morgan, H., Raymond, C. 2019. *Washington State Parks Adaptation Plan*. A collaboration of the Washington State Parks and Recreation Commission and the University of Washington Climate Impacts Group.

## Image Citations

---

### Cover page image:

©UW Climate Impacts Group, aerial support provided by LightHawk.

### Section header images:

**Executive Summary** | *Image Source:* Cama Beach State Park, Washington. Credit: [Photo](#) licensed under [CC BY-NC 2.0](#)

**Section 1** | *Image Source:* Lake Wenatchee, Lake Wenatchee State Park, Washington. Credit: [Photo](#) licensed under [CC BY-NC-ND 2.0](#)

**Section 2** | *Image Source:* Wallace Falls State Park, Washington. Credit: [Photo](#) licensed under [CC BY-NC 2.0](#)

**Section 3** | *Image Source:* Olallie State Park, Washington. Credit: [Photo](#) licensed under [CC BY-NC-SA 2.0](#)

**Section 4** | *Image Source:* Deception Pass State Park, Washington: Picnic Shelter built by the Civilian Conservation Corps (CCC) in the 1930's. Credit: [Photo](#) licensed under [CC BY-NC-ND 2.0](#)

**Section 5** | *Image Source:* Deception Pass. Credit: [Photo](#) licensed under [CC BY-SA 2.0](#)

**Section 6** | *Image Source:* Lime Kiln State Park Lighthouse, Washington. Credit: [Photo](#) licensed under [CC BY-NC-ND 2.0](#)

**Section 7** | *Image Source:* Willapa Hills State Park Trail, Bridges Dedication, Washington. Credit: Washington State Parks, Public Domain



## Executive Summary

### Why an Adaptation Plan for Washington State Parks?

Recognizing the challenges that climate change poses to the agency, the Washington State Parks and Recreation Commission passed a resolution in 2015 directing the agency to develop a climate change preparedness plan. This plan is the critical *first step* in the adaptation planning process; it provides guidance to the agency as it moves through the process of increasing climate resilience.

### How will Washington State Parks be Vulnerable to Climate Change?

The 2017 report, *Preparing Washington State Parks for Climate Impacts: A Climate Change Vulnerability Assessment for Washington State Parks* highlighted six climate-related vulnerabilities that were common across regions and statewide programs. This plan identifies adaptation actions to address these **six cross-cutting programmatic concerns**.

1. **Siting and design of park infrastructure** is likely to be affected by climate change, especially at coastal parks threatened by sea level rise and shoreline erosion, and river parks affected by heavier rain events and flooding.
2. **Park access** or access to specific amenities could be restricted more frequently due to flooding, sea level rise, shoreline erosion, landslides, wildfire and decreasing tree health.
3. **Water features** of parks are likely to experience an increase in demand and lower water quality, requiring enhanced management and maintenance to maintain public safety.
4. **Park visits and revenue** are likely to be negatively and positively affected. Warmer temperatures and a longer dry season may increase visitation in some seasonal parks, whereas less snowpack and more natural hazards may decrease visitation in others.
5. **Historic structures and archaeological sites** could be exposed more frequently and compromised by climate change impacts, including coastal flooding, landslides, and fire.
6. **Natural resources and habitats** may be negatively affected by increasing wildfire and non-native invasive species, and decreasing tree health.

*Washington State Parks is already experiencing climate-related impacts, which will be exacerbated by climate change. River flooding in winter has closed campsites, wildfires in the eastern region have damaged park facilities, and extreme tide events regularly flood coastal beaches.*



## How was the Washington State Parks Adaptation Plan developed?

State Parks staff completed a survey to identify which of the climate vulnerabilities identified in the 2017 Vulnerability Assessment were most important to address in the Adaptation Plan. Then, during two day-long workshops, State Parks staff (38 people) evaluated, selected, and prioritized more than 200 potential adaptation actions that were compiled by the Climate Impacts Group (CIG) from the scientific literature and existing adaptation plans. Staff refined the list to the higher-priority adaptation actions included in this plan.

## What's in the Washington State Parks Adaptation Plan?

The Washington State Park's Adaptation Plan includes **107 potential high-priority adaptation actions** to increase the climate resilience of State Parks' properties, facilities, operations, and state-wide programs. Actions are grouped according to the timeframe anticipated for progress.

**36 On-Going Actions** include actions the agency is already doing which will continue to be important for enhancing long-term climate resilience, as well as actions that staff have started specifically in response to the observed or expected impacts of climate change.

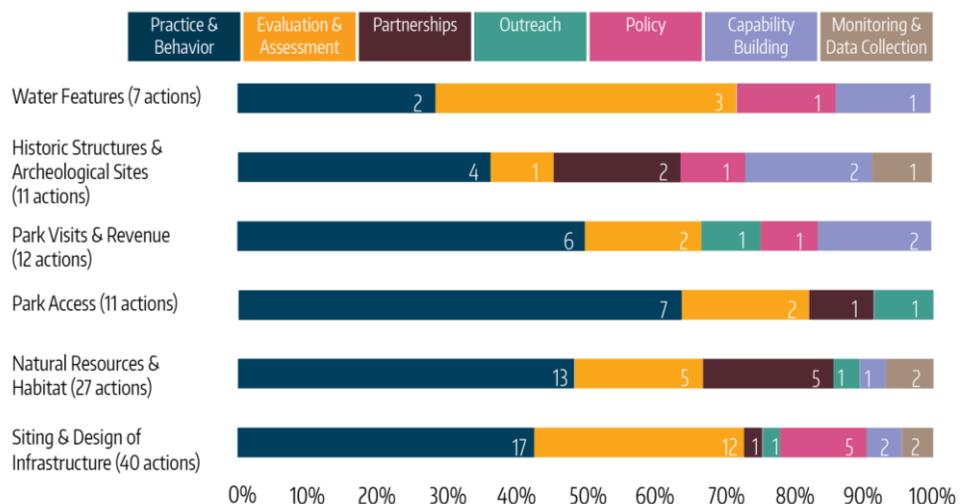
**20 Near-Term Actions** on which the agency will strive to make progress over the next six years.

**51 Long-Term Actions** for which the agency expects will take more than six years to make significant progress.

A diversity of actions will be needed to prepare the agency for climate change. Changes to **practices and behavior** are the most common action for all cross-cutting programmatic concerns. Other potential actions identified in the plan include **policies, outreach, partnerships, data collection and monitoring, evaluation and assessments, and staff capability building**.

**Evaluation and assessments** will likely be important to address concerns related to the Siting and Design of Infrastructure and Water Features to increase knowledge of local vulnerabilities and impacts in specific parks.

**Partnership building** will likely be important for effective adaptation for the Natural Resources and Habitats and Historic Structures and Archeological Sites. Climate change poses challenges to



natural and cultural resources that span jurisdictional boundaries and the magnitude of the challenge exceeds the capacity of any one agency to address.

**Policy** changes will likely be important for effective adaptation for the Siting and Design of Infrastructure. Modifying or establishing policies can guide new development in a way that facilitates long-term climate resilience, reducing damage and maintenance costs.

**Building staff capability**, through training and developing the skills of staff, will likely be important for effective adaptation for Park Visits and Revenue and the Historic Structures and Archaeological.

### **How can Adaptation Actions be Incorporated into Regular Business?**

Although the list of 107 potential adaptation actions is long, many actions fit into existing agency practices and can be implemented as a regular part of doing business through the existing policies, plans, and programs of the agency. Examples of existing practices through which adaptation actions can be implemented include:

- Capital Program: Capital Project Design Standards, Guidelines, and Considerations
- Ten-Year Capital Plan
- On-going Systematic Facilities Assessment
- Budget Development
- Expanding Existing Interagency Efforts
- Annual Work Plans
- Project Specific Plans
- Classification and Management Plans (CAMP), Capital Project Pre-Design, and Other Planning Efforts.

### **What are the Next Steps?**

The Washington State Parks Adaptation Plan is only the *first* step forward in the adaptation planning process. Additional steps will be necessary to move from planning to implementation. Although these steps are common to many planning processes, they are often overlooked in climate adaptation planning because it is a relatively new planning process for most organizations. The recommended next steps include:

- Develop an Implementation Plan.
- Assign responsibility and support action by designating a lead person or people from key programs to oversee implementation.
- Explore options to secure funding for adaptation actions identified in the plan.
- Look at metrics and targets that can be used to measure progress over time.
- Update the adaptation plan at regular intervals or as new information becomes available.
- Provide training to staff to better understand impacts and overcome barriers to implementation.



# Table of Contents

---

<a href="#">1 Introduction and Background .....</a>	<a href="#">1</a>
<a href="#">2 Vulnerability Assessment Summary .....</a>	<a href="#">3</a>
<a href="#">3 Adaptation Planning Process .....</a>	<a href="#">6</a>
<a href="#">4 Adaptation Approach .....</a>	<a href="#">13</a>
<a href="#">5 Adaptation Themes .....</a>	<a href="#">16</a>
<a href="#">6 Mainstreaming   Incorporating Adaptation Actions into Existing Practices.....</a>	<a href="#">21</a>
<a href="#">7 Next Steps   Implementation.....</a>	<a href="#">23</a>
<a href="#">8 On-Going Adaptation Actions.....</a>	<a href="#">25</a>
<a href="#">9 Near-Term Adaptation Actions.....</a>	<a href="#">33</a>
<a href="#">10 Long-Term Adaptation Actions .....</a>	<a href="#">39</a>



## 1. Introduction and Background

Washington State Parks is already experiencing climate-related impacts, which will be exacerbated by climate change. River flooding in winter has closed campsites, wildfires in the eastern region have damaged park facilities, and extreme tide events regularly flood coastal beaches. This adaptation plan follows the agency's 2017 vulnerability assessment by identifying potential adaptation strategies and actions to reduce vulnerability to the projected impacts of climate change.

The goal of the Washington State Parks' adaptation planning process was to collectively identify potential adaptation actions the agency can consider as it works to increase agency-wide resilience to the expected impacts of climate change. Increasing climate resilience through adaptation will help to ensure that State Parks can continue to responsibly manage its resources and provide "memorable recreational and educational experiences" to Washingtonians, even as the climate changes.

This adaptation plan was developed in response to a 2015 resolution passed by the Washington State Parks and Recreation Commission directing the agency to develop a climate change preparedness plan. The resolution was motivated by concerns related to the challenges that climate change poses for the agency. This plan identifies adaptation actions to reduce the 20 most pressing climate vulnerabilities identified in the agency's climate change **vulnerability assessment**, *Preparing Washington State Parks for Climate Change (Section 2)*, by enhancing resilience and preparing for the projected impacts of climate change. Beyond the list of adaptation actions, a broader goal of the planning process is to facilitate the integration of climate adaptation into decision-making processes by the agency.

This plan, developed in collaboration between staff of Washington State Parks and the University of Washington Climate Impacts Group, is the *first step* in preparing State Parks for climate change. The plan describes **the process (Section 3)** used to identify potential, high-priority adaptation actions to increase the resilience of State Parks' properties, facilities,



operations, and state-wide programs to climate change. This plan **suggests over-arching principles (Section 4)** for State Parks' approach to climate adaptation that emerged from the process, as well as **common themes for the types of actions (Section 5)** that are likely to be most important for addressing cross-programmatic concerns.

It is important to note that identifying these potential adaptation actions is just the beginning of the adaptation planning process. Over time, the agency can take the **next steps to continue the adaptation planning process (Section 6)** by refining adaptation actions, developing an implementation plan, integrating actions into existing plans, processes, and programs (i.e. mainstreaming), and building staff capability to understand and prepare for potential impacts.

Through the adaptation planning process, State Parks' staff identified **107 potential high-priority adaptation actions**. These actions span a range of activities that are representative of current and anticipated work, including *policy development, partnership building, outreach, data collection and monitoring, evaluation and assessments, and internal staff capability building*.

Of the 107 potential adaptation actions, there are **36 on-going actions (Section 7)** already underway by the agency. These include existing actions that are likely to have benefits for long-term climate resilience, as well as actions that State Parks has already initiated in response to observed impacts of climate change. There are an additional **20 near-term actions (Section 8)** for which the agency will strive to make progress on over the next six years. There are **51 long-term actions (Section 9)** for which the agency expects will take more than six years to make significant progress.



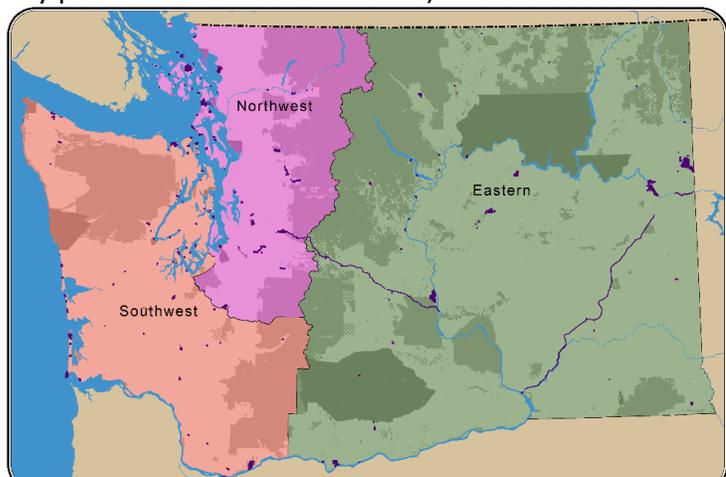


## 2. Vulnerability Assessment Summary

### Vulnerability Assessment Goals & Objectives

In 2015, the Washington State Parks and Recreation Commission passed a resolution directing the agency to develop a climate change preparedness plan. The 2017 report, *Preparing Washington State Parks for Climate Impacts: A Climate Change Vulnerability Assessment for Washington State Parks*, served as a first step in the climate preparedness planning process and is the foundation of the adaptation plan. The vulnerability assessment summarizes the potential impacts of climate change on State Parks' properties, facilities, operations, and state-wide programs.

The potential effects of climate change on State Parks were evaluated for each of the three regions (Northwest, Southwest, and Eastern) and for statewide programs (Planning, Stewardship, and Winter Recreation) (Figure 1). Through a series of workshops, State Parks staff discussed climate-related impacts that are currently affecting parks (e.g., campsite closures due to winter flooding, temporary park closures due to wildfire) and evaluated how projected changes in climate may affect the ability of agency to fulfill its mission to “care for Washington’s most treasured lands, waters, and historic places. State parks connect all Washingtonians to their diverse natural and cultural heritage and provide memorable recreational and educational experience that enhance their lives.” Ultimately, staff identified 44 climate vulnerabilities that are currently affecting, or are expected to affect, State Parks’ properties, facilities, and operations.



**Figure 1.** Washington State Parks regions. Purple areas show the locations of parks within each region. Darker shading indicates tribal reservations and lighter shading indicates national parks and national forests. Figure source: R. Norheim, UW Climate Impacts Group.



## Vulnerability Assessment Results

The vulnerability assessment showed that the agency is expected to be affected by climate change through four primary drivers: (1) changes in precipitation and streamflow, (2) changes in snowpack, (3) changes in ecosystem health and vegetation disturbance (e.g. fire), and (4) sea level rise and related impacts. These climate-drivers are summarized below and more detail can be found in the vulnerability assessment:



### ***Changes in precipitation and streamflow could limit access and damage facilities.***

As temperatures across Washington State continue to rise, a greater fraction of winter precipitation will fall as rain rather than snow, increasing winter streamflows and flood risk in mid-elevation watersheds. Parks staff highlighted the potential for more erosion, landslides, washouts, flooding, and stormwater management challenges as key concerns related to these projections. These impacts may block or limit access to parks, damage infrastructure or facilities, and require relocation of facilities and campgrounds in flood prone areas.



### ***Changes in snowpack could affect winter visitation and revenue.***

Warming temperatures in winter are projected to reduce snowpack and shorten the length of the snow season. Staff identified that these changes are likely to lead to a drop in purchases of Sno-Park permit and snowmobile registrations over time. Lower sales would affect annual revenue for the Winter Recreation Program and may reduce emergency budget reserves, leaving the program more vulnerable to year-to-year variability in snowpack and funding.



### ***Changes in ecosystem health and vegetation disturbance could increase closures and campsite cancellations.***

Warming temperatures, declining summer precipitation, and declining snowpack will stress forests and vegetation in ways that are expected to change the prevalence of insect and disease damage, increase the area burned by wildfire, and increase the extent and intensity of droughts. Increased risk of wildfire is expected to result in more frequent park closures, costly repairs to damaged infrastructure, more campsite cancellations, reduced air quality due to smoke, and diversion of staff and resources. Additionally, forest disturbances from insect and disease outbreaks are expected to amplify existing forest health issues in many parks, potentially increasing the incidence of tree hazards.



***Sea level rise and related impacts could limit access to coastal parks.***

Sea level is projected to continue rising along Washington’s coastlines. Higher tides and storm surge, increased erosion, and permanent inundation of low-lying coastal areas are expected to disrupt or limit access to park beaches and facilities more frequently. Relocating low-lying facilities and campsites to higher elevations will only be possible if suitable areas exist within a park. Managing erosion is also an ongoing and costly challenge with few permanent solutions.

In addition to these four primary climate drivers, the vulnerability assessment identified five concerns that were common across regions, statewide programs, and climate change impacts. These include (1) the siting and design of infrastructure, (2) park access, (3) water features, (4) park visits and revenue, and (5) historic structures and archeological sites. These cross-cutting programmatic concerns are discussed in greater detail in Section 3.



### 3. Adaptation Planning Process

#### **Adaptation Planning Process**

This plan describes the potential adaptation strategies and actions selected and refined by State Parks staff through a series of workshops in 2018 and 2019. This list of potential actions is the first step in the adaptation planning process and these actions will be refined by the agency over time. As part of the adaptation planning process, staff completed a survey to identify priority climate vulnerabilities, and participated in two workshops to identify, evaluate, and prioritize adaptation actions included in the plan. Adaptation strategies and actions in the plan are organized by the six cross-cutting programmatic concerns.

#### **Cross-Cutting Programmatic Concerns**

Results from the vulnerability assessment showed that while each region, and in some cases each park, experiences climate change uniquely, there were five climate-related vulnerabilities that were common across climate change impact, region, and statewide program. Upon completion of the vulnerability assessment and for the purpose of developing the Adaptation Plan, Parks staff identified the need to include an additional cross-cutting programmatic concern (Natural Resources and Habitats) not initially identified in the vulnerability assessment.

These findings include:

**Siting and Design of Infrastructure:** Climate change impacts are likely to affect the design and siting of park facilities. At coastal parks, sea level rise and increased erosion may influence relocation of parking lots, bathroom facilities, and may require the reconsideration of stairway, road, and trail locations. At river parks, heavier rain events and larger floods are likely to influence facility siting and design, stormwater management, culverts, bridges, and flood protection.

**Park Access:** Visitor access to parks or specific park amenities (e.g., beachfront, hiking trails) could be restricted more frequently. Flooding from sea level rise and storm surge, erosion, landslides, changes in tree health, and wildfire can each prevent access to



parks, campsites, trails or beaches temporarily or permanently. Changes in the location or prevalence of disease or insects can compromise tree health, resulting in more downed or at-risk trees, leading to more closures of campgrounds or other facilities.

**Water Features:** Warming temperatures may increase demand for water features, such as rivers, lakes, beaches, and boating facilities. These features are likely to experience more use and may require enhanced management for maintenance and public safety. Additionally, warmer water temperatures will likely result in increased algal blooms, increased *Vibrio* outbreaks, and reduced water quality that may require the closure of designated swimming areas.

**Park Visits and Revenue:** Climate change impacts could have a range of negative and positive effects on visitation and revenue and will likely vary by park. If river flooding, erosion or tree health concerns lead to campground or trail closures, revenue from user fees are likely to decline. However, warmer summer temperatures may increase summer visitation at western Washington parks, particularly at popular parks and/or parks with water features. A longer warm dry season could increase visitation in the shoulder seasons (spring and fall), causing earlier openings and later closing for seasonal parks. This is likely to increase revenues, but will also involve heavier use and increased costs for operations and maintenance of parking lots, trails, amenities, and facilities such as restrooms and septic systems.

**Historic Structures and Archaeological Sites:** State Parks manage a wide range of historic structures and geologic and cultural sites that could be compromised by climate change impacts. Sea level rise, flooding, erosion, wildfire, and landslides may put more historic facilities at risk of damage, requiring Parks to move, protect, or abandon facilities.

**Natural Resources and Habitats:** As part of the agency's stewardship responsibilities, State Parks manages and restores a variety of habitats, including old growth forests, critical habitat for threatened and endangered species, and areas with unique plant assemblages. Shifts in wildfire, tree health, and non-native invasive species, and other changes may negatively affect the diverse habitats that State Parks manages.

### **Survey of Climate Vulnerabilities to Include in Adaptation Plan**

Prior to the project workshops, State Parks staff completed a survey to identify which of the 44 climate vulnerabilities, identified in the 2017 Climate Change Vulnerability Assessment, were most important to address in the Adaptation Plan. Staff responded to the following five survey questions for each of the 44 climate vulnerabilities.

- How critical is this impact to regular park operations?
- Would addressing this impact also address an urgent problem or need?
- How important is coordination with entities outside of State Parks to addressing this impact?
- How important is more information on timing and magnitude of the impact to addressing the impact?
- How important is outreach and education to addressing this impact?



Of the 27 employees invited to participate in the survey, 14 employees submitted responses, so results of the survey do not represent a census of staff perspectives, but do reflect a sample of perspectives. Survey participants' title and region or program affiliation is provided in Table 1.

**Table 1.** A breakdown of 14 survey respondents highlighting the region or statewide program where they work and their job title.

Region/Statewide Program	Title
Northwest Region	Region Manager
	Region Manager
	Environmental Planner
Southwest Region	Park Area Manager
	Environmental Planner
	Park Area Manager
	Assistant Region Manager
Eastern Region	Region Manager
	Planner
Statewide Programs	Capital Program Manager
	Historic Preservation Planner
	Archaeology Program Manager
	Agency Forester
	Operations Manager

For the survey question - *How critical is this impact to regular Park operations?* – employees selected from the following five options: (1) extremely critical, (2) highly critical, (3) moderately critical, (4) less critical, and (5) uncertain. Staff responses to this question were used to identify the top 21<sup>1</sup> climate vulnerabilities for inclusion in the Adaptation Plan.

### Initial Climate Adaptation Actions and Strategies

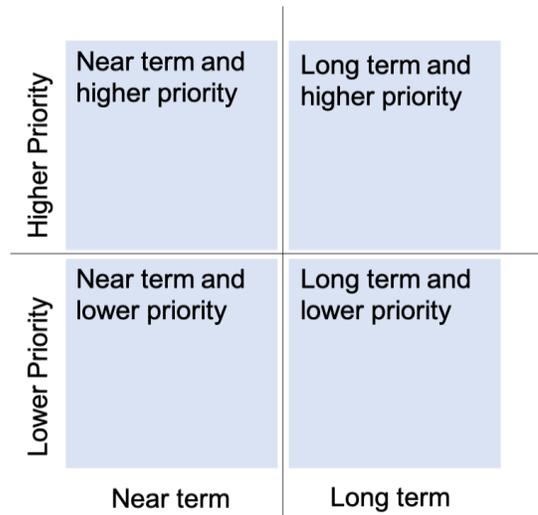
During two, day-long workshops, State Parks staff evaluated, selected, and prioritized more than 200 potential adaptation strategies and actions that were compiled by the Climate Impacts Group from the scientific literature and existing adaptation plans. Staff refined the list down to 107 higher-priority adaptation actions.

The first workshop focused on evaluating an initial set of adaptation actions for inclusion in the plan. For those actions selected for inclusion in the plan, Parks staff modified actions to increase their relevance to the specific activities, programs, and facilities of the agency. Staff also added new actions that were not captured in the initial list compiled by the CIG.

<sup>1</sup> Initially, CIG intended to select the top 20 climate vulnerabilities from the list of 44. However, the 21st ranked climate vulnerability addressed the risk of wildfire to the agency, which came up frequently in the workshop with the Eastern Region during the Vulnerability Assessment process in 2017. Given there were only two survey respondents from the Eastern Region, we thought it best to be inclusive of the wildfire climate vulnerability, which resulted in 21 climate vulnerabilities for inclusion in the Adaptation Plan.



In the second workshop, Parks staff prioritized the refined list of actions to generate a list of higher priority adaptation actions that the agency will be able to consider moving forward with. Parks staff used their expertise to prioritize actions within each of the cross-cutting programmatic concerns. Staff used a simple four-quadrant matrix (Figure 2). Table 2 and Table 3 show the criteria that staff used to inform decisions regarding whether an action was a lower or higher priority (Table 2) and whether an action could be accomplished in the near term or long term (Table 3). State Parks will strive to make progress on *near-term* actions over the next six years, while significant progress on *long-term* actions will take more than six years. As part of this process, staff identified adaptation actions that are already on-going at the agency, as a way to highlight key programs and operations that are also beneficial for increasing resilience to the impacts of climate change.



**Figure 2.** The matrix used to prioritize adaptation actions in workshop 2. The two main criteria used to evaluate each adaptation action are priority and time.

This adaptation plan includes the actions that were classified by staff as a **higher priority** to ensure the agency has a tractable list of actions that address the most pressing vulnerabilities and are most likely to increase resilience. Of the 110 higher-priority actions, 36 were classified as on-going, or actions that are already in progress by the agency. An additional 22 were identified as new near-term actions and an additional 52 were identified as new long-term actions.

Although lower-priority actions are not included in this written plan, they are archived in the Excel-based database provided to the agency as a companion to the written plan. This Excel-based database lists the full set of actions reviewed by Parks staff and includes functions to allow the user to search actions by cross-cutting programmatic concern, action type, and timeframe.



**Figure 3.** Parks Staff in the Siting and Design of Infrastructure breakout group. Staff are placing adaptation actions onto the prioritization matrix and are adding the sticker dots to actions that are currently on-going within the agency.

Most adaptation actions identified in this plan are general actions, rather than project- or site-specific actions. To expand the adaptation planning process, relevant staff participated in a third workshop to review specific impacts related to sea level rise and discuss potential adaptation actions for six parks that currently experience coastal flooding and erosion (Box 1).

**Table 2.** Criteria used by State Parks staff to inform whether an adaptation action was lower or higher priority.

<b>PRIORITIZATION CONSIDERATIONS</b>	
<b>Lower priority</b>	<b>Higher priority</b>
<ul style="list-style-type: none"> <li>• May not be effective at reducing vulnerability</li> <li>• Addresses a single climate vulnerability</li> <li>• Does not address other non-climate risks or priorities</li> </ul>	<ul style="list-style-type: none"> <li>• Highly effective - likely to reduce vulnerabilities</li> <li>• Addresses multiple climate vulnerabilities</li> <li>• Has co-benefits for risks and priorities other than climate</li> <li>• Addresses more immediate climate vulnerabilities</li> <li>• Flexible, can be easily modified in the future to account for uncertainty</li> <li>• Low regrets or win-win actions that will be valuable even if the climate does not change as currently projected</li> <li>• Robust action that will be effective even with uncertainty in projected climate changes</li> </ul>

**Table 3.** Criteria used by State Parks staff to inform whether an adaptation action was a near-term or a long-term action.

<b>TIMEFRAME CONSIDERATIONS</b>	
<b>Near-term (&lt;six years)</b>	<b>Long-term (&gt;six years)</b>
<ul style="list-style-type: none"> <li>• Feasible in six years</li> <li>• Actions the agency is already doing that can be expanded or scaled up to increase climate resilience</li> <li>• Consistent with 6-year budget timeframe</li> <li>• Socially and politically acceptable now, or will require minimal effort to gain support.</li> <li>• Low regrets or win-win actions that will be valuable even if the climate does not change as currently projected</li> <li>• Flexible, can be easily modified in the future to account for uncertainty</li> <li>• Robust action that will be effective even with uncertainty in projected climate changes</li> </ul>	<ul style="list-style-type: none"> <li>• May require new budget requests or funding</li> <li>• May require additional political, stakeholder, or public support that will significant time to establish.</li> <li>• May require more information on vulnerability and impacts that cannot be gained in less than six years.</li> </ul>



## **BOX 1: Workshop on Adapting to Sea Level Rise in Coastal Parks**

As part of the adaptation planning process, State Parks staff participated in a third workshop specifically focused on sea level rise and related coastal hazards. The workshop, led by Climate Impacts Group (CIG) and Washington Sea Grant, is an example of the capability building and evaluation and assessment actions identified in this adaptation plan. Approximately 20 staff from the Northwest and Southwest regions and several programs attended the workshop.

In the vulnerability assessment and survey, State Parks staff emphasized that the impacts of sea level rise (SLR) on infrastructure (campgrounds, restrooms, septic systems, roads, and trails), habitat, and access in coastal parks as one of the most pressing vulnerabilities facing the agency. Currently, the agency must regularly address damage and closures caused by coastal flooding and erosion. In response to these concerns, the third workshop of the adaptation planning process had three primary goals:

1. Develop a better understanding among staff of the 2018 SLR projections for Washington State (including storm surge and wave runup), which were developed as part of the Washington Coastal Resilience Project.
2. Review park-specific SLR projections and potential adaptation options identified as part of the State Parks adaptation planning process.
3. Brainstorm and discuss potential park-specific responses for addressing impacts related to SLR.

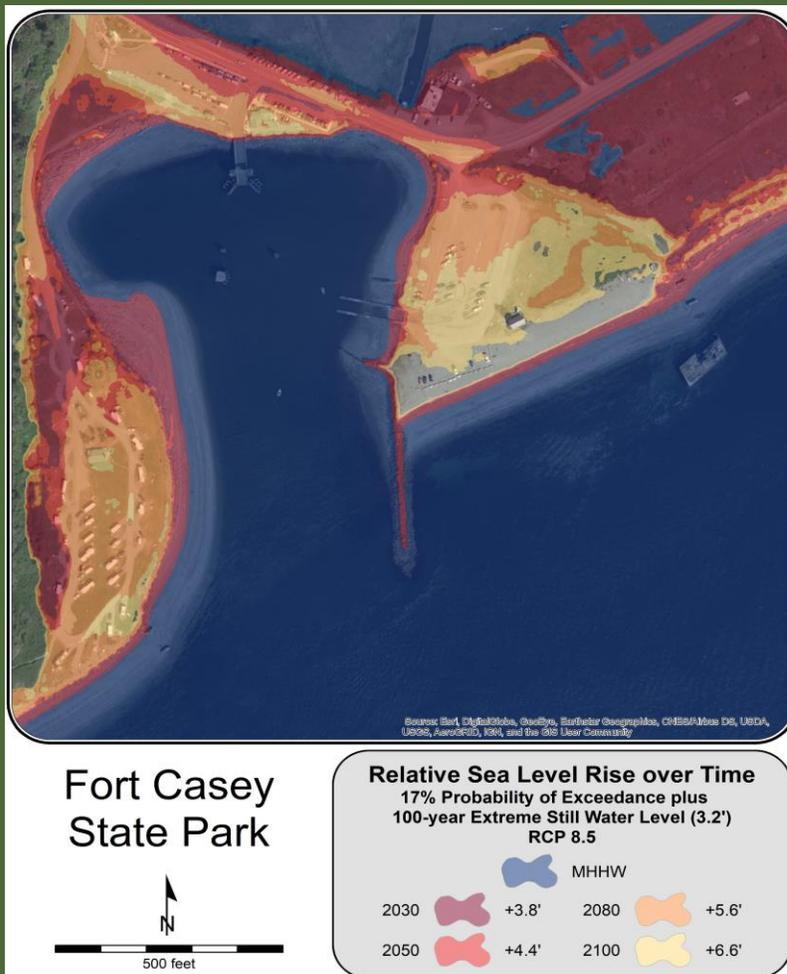
During the workshop, CIG and Washington Sea Grant provided an overview of the 2018 SLR projections<sup>1</sup>. These new projections indicate the probability that sea level will meet or exceed certain levels for each decade through 2150. SLR projections are provided for 172 locations along coastal Washington. For each location, projected future water levels are given for a range of probabilities. These probabilities can be used in a risk management framework to determine a site-specific level of sea rise for the purpose of planning or infrastructure siting and design.

In addition to base sea levels, the workshop also provided information on how to consider extreme water levels associated with coastal flooding. The SLR projections are provided in feet above current water levels, and for planning purposes, these values are typically added to mean higher high water (MHHW). This indicates the elevations that will be inundated on a daily basis as base sea levels rise. However, impacts often happen with more infrequent flooding above MHHW. elevations.



Workshop participants reviewed maps of local sea level rise projections for six state parks: Fort Casey, Fort Worden, Saltwater, Penrose Point, Deception Pass, and Twin Harbors. These parks were selected because they currently experience impacts associated with coastal flooding and erosion, and are expected to have significant sea level rise in the future.

During the workshop, participants reviewed information on extreme *still* water levels for Puget Sound and the outer coast and extreme *total* water levels for the outer coast. Extreme *still* water levels include storm surge, but not wave runup on land. Extreme *total* water levels include storm surge and wave runup, and indicate flood levels on the outer coast where waves are an important process. For example, along Puget Sound where waves are minimal, the 100-year extreme still water level is similar to the 100-year base flood elevation. Sea level rise can be added to total or still water levels indicating approximate new base flood



Box 1, Figure 1. Relative sea level rise for Fort Casey State Park, an example of the park-specific sea level rise projections reviewed during workshop 3. The map shows water levels (in feet above MHHW) include sea level rise for four future time periods and with the 100-year still water level. There is a 17% probability that sea level will reach or exceed these elevations by the time periods indicated. Areas in color would be flooded during a 100-year (1% annual chance) coastal flood event.



## 4. Adaptation Approach

Three suggested over-arching principles for Washington State Parks' approach to climate change adaptation emerged from the process of reviewing, discussing, and prioritizing the adaptation actions in this plan. These *suggested* principles reflect commonality in many of the adaptation actions and can be used to guide how State Parks approaches climate adaptation.

### 1. **Accept that there will be changes in the climate over time and therefore a need to accommodate these changes.**

Most of the adaptation actions broadly focus on *accommodating* changes in the climate over time, while still maintaining essential services and fulfilling the mission of the agency. This is in contrast to an adaptation approach that would focus more on *resisting* changes by emphasizing preservation of services and facilities as is and in place, or relying on historical conditions as the baseline for natural resource management and restoration. A common goal of many of the adaptation actions is to work with or retreat from the projected changes. Although a retreat approach is unlikely to be feasible in all situations, it emerged as an overarching principle that could guide how the agency adapts.

This approach is generally consistent with other approaches the agency is taking to limit development in critical areas. For example, policy-related adaptation actions in this plan suggest accommodating climate hazards by limiting new development and rebuilding of damaged infrastructure in vulnerable areas. This approach is consistent with the agency's existing Critical Areas Policy, which states that new park facility developments shall not be built in critical areas, except where an overriding justification for such development and appropriate mitigation can be provided. In addition, the Critical Areas Policy states that:

*The first and generally preferred agency response to a threat by a natural land change process, such as or landslides or coastal erosion, shall be retreat from that threat rather than construction of protective measures. When threatened by*



*natural land change processes, existing park developments shall be protected only when an economic analysis can reasonably justify the expense to save the development and to mitigate any adverse effects of the protection.*

This approach may require more engagement and communication with visitors, as well as partnerships with local, state, and federal agencies to ensure public support. This plan includes actions focused on increasing the capability of staff to communicate how climate change may affect State Parks over time, as well as the role and limitations of climate adaptation.

**2. Focus on strengthening existing management practices that already have the potential to enhance climate resilience, while recognizing that new actions will also be necessary to manage unprecedented impacts.**

The adaptation planning process can generate an extensive list of potential actions, but many of these can be implemented by slightly modifying or scaling up on-going actions in order to increase their potential to enhance long-term climate resilience. As an agency that is closely connected to managing the natural environment, State Parks is already actively responding to the impacts and challenges associated with a variable climate and natural hazards, including coastal flooding, erosion, and wildfires. By responding to these events, many programs within State Parks already implement actions that can enhance long-term climate resilience. These actions will become increasingly important as climate change worsens extreme weather events and natural hazards.

The potential adaptation actions identified in this plan, particularly for natural resources and habitat management, reflect many of these on-going actions that will increase in importance with the increasing potential for natural hazards. For example, in specific places, the Stewardship Program considers use of plant species from alternative seed zones that will be more resilient to projected changes in climate. However, climate change is expected to cause unprecedented changes that will challenge the status quo and require new actions to minimize adverse impacts. Thus, new potential adaptation actions are also identified in the plan. For example, siting new infrastructure outside of designated sea level rise hazard areas or designing new facilities to higher standards that account for sea level rise.

**3. Proactively adapt to climate change by implementing actions in anticipation of impacts, while recognizing that, in some cases, it may be more cost-effective to respond to lesser impacts as they emerge.**

Overall, the adaptation actions identified in this plan represent a *proactive* approach to climate adaptation; most actions focus on reducing the projected impacts of climate change before substantial impacts occur. Many actions involve planning, designing, or managing for projected future climate conditions. Generally, it will be more cost-effective to do so before impacts happen; however, in some cases, it may be more feasible and cost-effective to reactively adapt as impacts emerge.



Reactive actions would be implemented in response to a climate change impact once it is experienced. Reactive actions include communicating observed impacts of climate change to visitors, which is only appropriate once impacts have been observed. Reactive adaptation actions also can be opportunistic. For example, ecosystem disturbance events (e.g., wildfire and floods) can be opportunities to monitor new areas. Reactive actions may be appropriate if there is substantial uncertainty in if, how, or when an impact will play out. For example, preemptively adjusting staffing to prepare for shifts in the timing and demand for recreation activities would be most effective if done in response to observed changes. However, identifying these actions beforehand can facilitate implementation once impacts occur.





## 5. Adaptation Themes

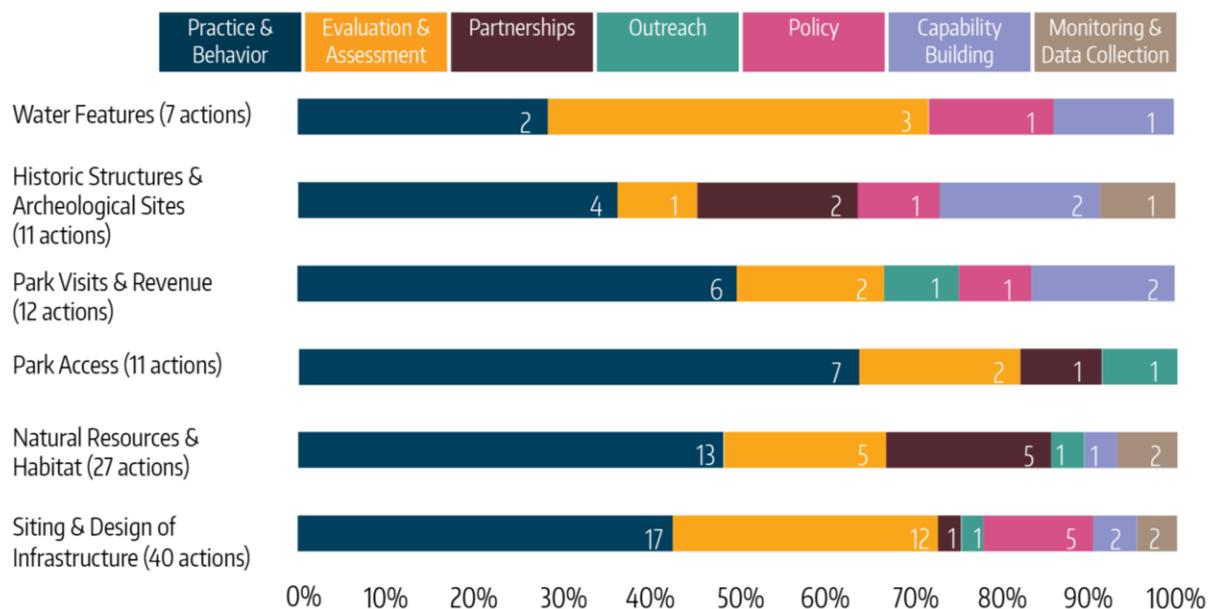
Adapting to climate change will require several different types of actions that address the impacts through different means. Different types of adaptation action (Table 4) are likely to be effective at addressing vulnerabilities for different cross-cutting programmatic concerns.

**Table 4.** This plan includes seven different types of adaptation actions: policy, outreach, partnerships, data collection and monitoring, evaluation and assessments, practice and behavior, and building staff capability. A brief description of each type of adaptation action type and an associated icon are provided.

ACTION TYPE	ACTION DESCRIPTION	ICON
Policy	Develop or amend internal agency policies to reduce vulnerabilities and build climate resilience. Integrate considerations of climate change into zoning or classification of park lands and design standards.	 <b>PY</b>
Outreach	Communicate with visitors to discuss park closure information and explain how climate change may increase the frequency or magnitude of certain climate-related impacts.	 <b>O</b>
Partnerships	Build relationships with volunteers, communities, local governments, other state agencies, and tribes to leverage resources and increase capacity to prepare for climate change. Coordinate with other agencies to share information and land management efforts.	 <b>PT</b>
Data Collection & Monitoring	Collect data on properties, facilities, operations, and statewide programs that can be used to document changes over time. Monitoring can be especially beneficial for detecting slow changes or disturbances that may otherwise go undetected.	 <b>DC&amp;M</b>
Evaluation & Assessment	Conduct fine-scale analyses or assessments to identify vulnerable areas. Identify facilities or infrastructure most vulnerable to projected changes.	 <b>E&amp;A</b>
Practice & Behavior	“On-the-ground” practices that directly relate to increasing resilience to climate change. Actions include specific forest management practices, stabilizing slopes to reduce landslide risk, or relocating vulnerable trails or facilities.	 <b>P&amp;B</b>
Staff Capability Building	Build staff capability to recognize and respond to climate-related impacts. This includes staff training and integrating adaptive management into regular operations.	 <b>CB</b>



Adaptation actions that involve changes in **practice and behavior** were the most common type of adaptation action for all cross-cutting programmatic concerns, reflecting that State Parks considers on-the-ground action to be critical for reducing the impacts of climate change. Additional themes emerged that show which types of adaptations actions (Figure 4) are expected to be most important for the different cross-cutting programmatic concerns.



**Figure 4.** Summary of adaptation actions included in the plan. Actions are grouped by cross-cutting programmatic concerns and color-coded based on the action type (see Table 4 for description of action types). The width of the segments in each bar reflects the proportion of actions of that type; the number of actions for each action tag is shown within each segment. The total number of actions for each cross-cutting programmatic concern is shown on the left side of the figure.

**Evaluation and assessment will likely be important for effective adaptation for the Siting and Design of Infrastructure (30% of actions) and Water Features (43% of actions) cross-cutting programmatic concerns.** Additional evaluations and assessments of local climate impacts can be used to address knowledge gaps and increase understanding of how climate change may impact specific water features and infrastructure. Adaptation actions related to evaluation and assessment in Siting and Design of Infrastructure and Water Features focus on two areas:

- 1. Evaluate State Parks’ assets to identify which are most vulnerable to hazard.** Given limited resources, it may be important to evaluate coastal facilities and protection structures in coastal parks to determine which are most vulnerable to projected changes in coastal hazards and should therefore be prioritized. Adaptation actions focused on prioritization identified the need to consider the demand, criticality, unique character, and historic preservation value of the facility or structure of concern.



- 2. Consider locally-specific assessments.** Finer spatial scale assessments can increase understanding of how projected changes in climate intersect with local conditions of infrastructure and water features. These assessments can help identify where to implement adaptation actions. The 2017 vulnerability assessment found that each State Parks region and, in many cases, each park experience climate-related impacts differently. Future climate impacts on any one park will depend on the specific features, facilities, and geographic location of that park.

---

**Partnership building will likely be important for effective adaptation for the Natural Resources and Habitats (19% of actions) and Historic Structures and Archaeological Sites (18% of actions) cross-cutting programmatic concerns.** Climate change poses challenges to natural and cultural resources that span the boundaries of federal, state, tribal, and local governments. The magnitude of the risks to natural and cultural resources exceeds the capacity of any one agency to address alone. The climate-related impacts to cultural and natural resources experienced by State Parks are similar to those experienced by other state and local agencies, such as Washington Department of Natural Resources, Washington Department of Transportation, and the parks and recreation departments of cities and counties. Partnerships that span these boundaries are likely to be critical for coordinating management and minimizing shared risks. Adaptation actions related to partnership building in the Natural Resources and Habitats and the Historic Structures and Archaeological Sites cross-cutting programmatic concerns focus on two areas.

- 1. Partnerships for coordinating natural and cultural resource management.** Limited internal capacity and funding are barriers that can impede the ability of one agency to effectively build climate resilience. Shared climate risks provide an opportunity to enhance existing collaboration across boundaries by sharing data and pooling resources to address common risks. Several actions related to partnership building highlight the importance of strengthening the management coordination across agencies to enhance resilience of the natural and cultural resources across the state.
- 2. Enriching relationships with tribes to address climate impacts to archaeological sites.** As State Parks considers the next steps to adapt to climate change, enhancing tribal relationships will be even more relevant. Many of the lands currently managed by State Parks were used by tribes for hunting, gathering, or cultural ceremonies before European settlers arrived. Climate-related impacts, specifically higher rates of erosions, may expose previously undiscovered archaeological deposits on park properties. Continuing to build on successful partnerships and consultation with tribes is important in the identification, protection, and management of these discoveries.



---

**Policy-related actions will likely be important for effective adaptation for the Siting and Design of Infrastructure (15% of actions).** Modifying or establishing new policies can guide new development (e.g., facilities, roads, trails) in a way that facilitates long-term climate resilience, reducing costs associated with damage and maintenance. Adaptation actions related to policies focus on three areas:

- 1. Incorporate sea level rise projections into management processes.** Sea level rise will exacerbate current coastal hazards. Incorporating sea level rise projections into relevant coastal management and decision-making processes will bolster the agency's resilience to rising seas and associated coastal hazards.
- 2. Minimize coastal hazards by considering climate change projections when siting infrastructure.** Many federal, state, county, and city policies and regulations (e.g., zoning, setback distances, building code, floodplain management) establish requirements for siting buildings or facilities. However, these regulations rarely consider climate change projections. Therefore, compliance with regulations is unlikely to ensure future resilience of infrastructure. For example, infrastructure may be placed too close to the shoreline if that siting decision is based on the guidance of local Shoreline Master Programs (SMP) that do not account for projected sea level rise. The policy actions in this adaptation plan highlight the potential for the agency to consider going beyond minimum regulatory requirements to reduce risk to infrastructure. Instituting these policy changes would likely reduce facility maintenance and damage, as well as interruptions to access.
- 3. Increase resilience of infrastructure by increasing design standards.** As with the siting of infrastructure, there are opportunities for State Parks to establish policies that support going beyond minimum design requirements (e.g., septic systems, building design) to help reduce the exposure of structures to coastal hazards. For example, increasing pile size will likely reduce the damage of these structures. Additionally, new septic systems could be designed and installed in a way that accounts for higher water table heights.

---

**Building internal capability will likely be important for effective adaptation for Park Visits and Revenue (17% of actions) and the Historic Structures and Archaeological Sites (18% of actions) cross-cutting programmatic concerns.** Building capability can include developing skills among staff, increasing the flexibility of management structures, and increasing the overall ability of the agency to adapt to climate change. Adaptation actions that build agency capability to address the cross programmatic concerns of Park Visits and Revenue and Historic Structures and Archaeological Sites focused on two areas:



- 1. Respond to unanticipated discoveries.** Higher rates of erosion and other natural hazards are expected to reveal additional archaeological deposits on Parks' properties. Responding to this increase in newly discovered sites will require expertise to ensure that artifacts are appropriately identified and protected. Training can increase the capability of staff to recognize and respond to newly discovered sites.
- 2. Increase flexibility of management structures:** Warming temperatures are expected to increase demand for recreation activities during shoulder seasons, which may create staffing challenges. Implementing adaptive maintenance strategies and/or modifying maintenance schedules to accommodate longer use seasons could be used to increase the capability of the agency to respond to increased demand.





## 6. Mainstreaming | Incorporating Adaptation into Existing Practices

This plan provides a list of proposed near-term adaptation actions. While the list is extensive, many actions fit naturally into existing agency practices and can be implemented as a typical part of doing business through existing policies, plans, and programs of the agency. Examples of existing practices that can be used to implement adaptation actions include:

**Capital Project Design Standards, Guidelines, and Considerations.** The Capital Program has design standards, guidelines and considerations that are used in the development of capital projects. Several adaptation actions can be fleshed out and included in this design process. For example, Action 23.1 involves considering developing facility designs that exceed normal design standards in consideration of projected sea level rise. This type of direction could become part of the capital process.

**Ten-Year Capital Plan.** The agency has a Ten-Year Capital Plan that guides capital budget requests. Conducting analyses (such as Action 1.1 that involves a spatial analysis of sea level rise projections to identify vulnerable coastal park facilities) can provide data that feed into the Ten-Year Capital Plan.

**Facilities Assessment.** State Parks has been systematically assessing the condition of its facilities and translating deficiencies into capital budget requests. Several adaptation actions could be incorporated into facility assessment work. For example, inventorying shoreline protection structures and evaluating them in light of sea level rise projections (Action 1.5) could be a type of facility assessment that would then translate into future capital work.

**Budget Development.** The agency has an established process for evaluating funding requests, and adaptation actions requiring funding would be assessed as part of that process. If needed, the agency could potentially bundle adaptation actions into a budget decision package request to the legislature.

**Interagency Efforts.** Because of its relatively small size, State Parks regularly collaborates with other agencies on a variety of efforts. For example, State Parks already works with the Washington Department of Natural Resources and the Washington Department of Fish and Wildlife on forest health issues. It would be straightforward to expand these efforts to include adaptation actions, such as increasing interagency communications regarding shared fire risk (Action 8.3).

**Annual Work Plans.** Many State Parks entities develop annual work plans, ranging from individual program plans to the Director’s Performance Agreement. The Commission- and Director-identified priorities for 2019 include advancing the development of a climate change adaptation plan. Identifying where adaptation actions fit within agency programs and adding them to annual work plans will help keep specific actions moving forward. A wide variety of actions could be addressed in annual work plans, ranging from policy development (Action 21.1) to providing training (Actions 15.3 and 17.1).

**Project-Specific Plans.** Many individual projects, whether habitat restoration or comfort station construction, require project specific plans. Adding climate change considerations into project-specific plans would provide a key means of implementing many of the adaptation actions. For example, including invasive species prevention plans (Action 5.1) makes sense for most on-the-ground projects.

**CAMP, Capital Project Pre-Design, and Other Planning Efforts.** State Parks conducts planning efforts on a variety of scales. Classification and Management Plans (CAMP) provide long-term direction for park development and resource management. Adaptation actions, such as intentionally considering sea level rise and climate change in CAMP (Action 2.3), can readily be incorporated into the planning process. State Parks also conducts other types of planning efforts. For example, the agency is required look at planning alternatives in the form of a pre-design report for all capital projects with an estimated cost in excess of \$5 million. When looking at alternatives, it would make sense to consider actions, such as designating high-exposure, low-lying areas of coastal parks as areas of minimum development (Action 2.4).





## 7. Next Steps | Implementation

The development of this climate change adaptation plan is only the *first* step in the adaptation planning process for Washington State Parks. The goal of this adaptation plan is to identify *potential* adaptation actions that can reduce the vulnerabilities identified in the vulnerability assessment. Identifying potential actions is a critical first step; however, additional steps will be necessary to move from planning to implementation. Although these steps are common to many planning processes, they are often overlooked in climate adaptation planning because it is a relatively new planning process for most organizations.

Recommended next steps for implementing this adaptation plan include the following:

**Develop an Implementation Plan.** One or separate implementation plans will likely be necessary to identify the sequencing and timing of actions, as well as any barriers to overcome to move actions forward. Recommendations 2 through 5 below can be included in an implementation plan or developed separately.

**Assign Responsibility and Support Action.** Designate a lead person or people from key programs as a point of contact for overseeing implementation. This could also involve an interdisciplinary team that regularly meets to consider implementation of the plan. Agency leadership can also play a role by supporting employees to take time to work on implementing the plan.

**Explore Funding for Adaptation Actions.** Many of the actions identified in this plan are modifications to existing plans, programs, and procedures that may be accomplished with little additional funding. Others, including additional specific evaluations and assessments, may require additional funding. Identifying potential funding sources for these actions will be needed.

**Measure Progress:** Look at metrics and targets that can be used to measure and report progress over time, and establish a regular process to do so. This process may also require establishing how progress will be monitored. Although the long-term goal is to



reduce vulnerability and increase climate resilience, more near-term goals and metrics may need to be established to show progress.

**Update the Adaptation Plan.** Identify a mechanism or schedule for updating this adaptation plan. This could be at regular intervals, such as every five years, or in response to major events or new information.

**Provide Training.** Adapting to climate change is a new endeavor for State Parks, and staff will likely continue to need more information or training to overcome challenges and barriers to implementation. Continuing to raise awareness and educate staff about potential impacts and adaptation options over time will increase the overall capacity of the agency to address climate change vulnerabilities.



## 8. On-Going Adaptation Actions

Climate is not an entirely new risk that Washington State Parks is facing. As identified in the vulnerability assessment, by their nature, many park assets and natural resources are sensitive to climate, and staff actively manage climate risks as a regular part of operations and planning. As climate-related risks intensify, current management actions that reduce these risks will become even more important.

**On-going actions** were identified by staff as actions that they are already doing and that they expect will continue to be important for enhancing long-term climate resilience as climate change accelerates. On-going actions also include actions that staff have already started specifically in response to observed or expected impacts of climate change. These on-going actions are highlighted to emphasize that climate adaptation is not only about taking new action, but it also involves continuing or modifying existing management with an intentional awareness of how this management can reduce future climate impacts.

### ON-GOING ADAPTATION ACTIONS | SITING & DESIGN OF INFRASTRUCTURE

**STRATEGY 1.** Increase understanding of how coastal facilities and protection structures could be affected by sea level rise.

Actions	Action Type	Reactive or Anticipatory
1.1: Conduct detailed spatial analysis of sea level rise projections to identify vulnerable coastal park facilities and protection structures, and add items to the 10-year capital plan specifically to address sea level rise.	 E&A	Anticipatory
1.2: Have local staff ready to identify impacts during events and submit documentation during major storms events.	 CB	Anticipatory

**STRATEGY 2.** Reduce coastal hazard exposure by altering where coastal park facilities are sited and how they are designed.

Actions	Action Type	Reactive or Anticipatory
2.1: Integrate coastal flood management and modeling into land use planning (e.g., design infrastructure in areas that do not have a high exposure to future sea level).	 E&A	Anticipatory
2.2: Restrict development in erosion zones consistent with the Critical Areas Policy.	 PY	Anticipatory
2.3: Intentionally consider sea level rise and climate change in Classification and Management Plan (CAMP) and provide instructions for planners.	 E&A	Anticipatory
2.4: Designate high-exposure, low-lying areas of coastal parks as areas of minimum development when considering siting future facilities.	 PY	Anticipatory
2.5: Consider more movable and adaptable infrastructure or design structures with shorter lifespans in vulnerable, dynamic areas. Consider strategic retreat (i.e., removing development from areas vulnerable to coastal flooding) in areas of high flood risk.	 P&B	Anticipatory



**STRATEGY 3.** Increase resilience to riverine flooding by modifying the siting or infrastructure design of at-risk facilities or trails.

Actions	Action Type	Reactive or Anticipatory
3.1: Consider removing or modifying infrastructure to allow channels to migrate within the floodplain.	 P&B	Anticipatory

**STRATEGY 4.** Monitor septic systems in parks to evaluate sensitivity and where impacts are currently being observed.

Actions	Action Type	Reactive or Anticipatory
4.1: Include septic system-related components in facilities planning and include appropriate replacement timeframes.	 E&A	Anticipatory



## ON-GOING ADAPTATION ACTIONS | NATURAL RESOURCES & HABITATS

**STRATEGY 5.** Prevent and control widespread and detrimental outbreaks of invasive species or pathogens, while recognizing the role of native insect and pathogen disturbances in supporting healthy forest ecosystems.

Actions	Action Type	Reactive or Anticipatory
5.1: Include invasive species prevention strategies in all projects.	 P&B	Anticipatory
5.2: Raise awareness to facilitate State Parks' role in early detection, early response for invasions, including training and preparing staff so that they understand the risks of invasive species or pathogen outbreaks and have some preparation in advance.	 CB	Anticipatory
5.3: Prevent the spread of invasive species and pathogens by identifying and targeting known sources and vectors for invasive species (e.g., rock pits, weed-free materials for restoration), and where relevant, comply with USDA Forest Service and National Park Service weed-free standards and regulations to help reduce the potential for weed, invasive species, or pathogen outbreaks.	 E&A	Anticipatory
5.4: Inventory for invasive species regularly to detect new populations and species.	 D&M	Anticipatory
5.5: Coordinate invasive species management, funding and program support between agencies and tribes in the region.	 PT	Anticipatory

**STRATEGY 6.** Increase resilience of forest stands to disturbances by increasing tree vigor and ecosystem health.

Actions	Action Type	Reactive or Anticipatory
6.1: Thin to accelerate development of late-successional forest conditions.	 P&B	Anticipatory
6.2: Plant resistant species or genotypes in locations where species-specific insects or pathogens are a concern.	 P&B	Anticipatory
6.3: Rehabilitate forest plantations by increasing structural and species diversity.	 P&B	Anticipatory

**STRATEGY 7.** Increase forest landscape resilience to large and extensive insect or pathogen outbreaks.

Actions	Action Type	Reactive or Anticipatory
7.1: Design both large and small forest gaps that create establishment opportunities.	 P&B	Anticipatory
7.2: In restoration projects, emphasize use of plant species and genotypes from alternative seed zones that will be robust to climate change.	 P&B	Anticipatory



**STRATEGY 8.** Plan and prepare for more frequent and severe fire and greater area burned.

Actions	Action Type	Reactive or Anticipatory
8.1: Develop and implement a wildfire response manual.	 E&A	Anticipatory
8.2: Plant fire-tolerant tree-species post-fire in areas with increasing fire frequency.	 E&A	Anticipatory

**STRATEGY 9.** Increase resilience of existing vegetation by reducing hazardous fuels.

Actions	Action Type	Reactive or Anticipatory
9.1: Thin and prescribe burn to reduce hazardous fuels in the wildland-urban interface.	 P&B	Anticipatory
9.2: Thin and prescribe burn to reduce hazardous fuels in the wildland-urban interface and consider using more prescribed fire where scientific evidence supports change to more frequent fire regime.	 P&B	Anticipatory

**STRATEGY 10.** Increase vegetation resilience to post-disturbance insect and pathogen outbreaks.

Actions	Action Type	Reactive or Anticipatory
10.1: Monitor post-disturbance insect and pathogen activity.	 D&M	Reactive

## ONGOING ADAPTATION ACTIONS | PARK ACCESS

**STRATEGY 11.** Frequent and open communication with public during closures related to climate impacts.

Actions	Action Type	Reactive or Anticipatory
11.1: Change user expectations with public education, explaining cause of park or trail closures particularly as they relate to climate impacts.	 O	Reactive

**STRATEGY 12.** Increase resilience of trails and roads to erosion and landslides by repairing, replacing, and rerouting trails and bridges with high demand for access.

Actions	Action Type	Reactive or Anticipatory
12.1: Leverage volunteers to help increase trail maintenance to increase resilience (e.g., repairing and rerouting trails in vulnerable areas).	 PT	Anticipatory

DRAFT



## ON-GOING ADAPTATION ACTIONS | PARK VISITS & REVENUE

**STRATEGY 13.** Maintain sufficient water supply to meet demand.

Actions	Action Type	Reactive or Anticipatory
13.1: Attribute causes of potable water loss to determine appropriate response.	 E&A	Reactive

**STRATEGY 14.** Increase resilience to low water supply conditions (and potentially higher costs) through increasing water conservation.

Actions	Action Type	Reactive or Anticipatory
14.1: Continue to install waterless urinals and low-flow toilets, sinks, and showers. Look into waste treatment alternatives to flush toilets.	 P&B	Anticipatory

DRAFT



## ON-GOING ADAPTATION ACTIONS | HISTORIC STRUCTURES & ARCHAEOLOGICAL SITES

**STRATEGY 15.** Increase capacity to respond to possible increased rate of unanticipated discoveries due to climate impacts (e.g., erosion).

Actions	Action Type	Reactive or Anticipatory
15.1: Consider opportunities to partner with tribes to address possible rise in unanticipated discoveries associated with climate impacts.	 PT	Anticipatory
15.2: Work with tribes regarding traditional cultural properties and significant properties.	 PT	Anticipatory
15.3: Increase training for rangers and other Parks staff to identify potential sites and follow unanticipated discovery procedures and/or park closure protocol.	 CB	Anticipatory
15.4: Use disturbance events (e.g., clearing of vegetation by fire, clearing of shell middens by floods) as opportunities for monitoring previously recorded sites and conducting surveys in previously un-surveyed areas.	 D&M	Reactive

**STRATEGY 16.** Use structural elements and site management and design strategies that reduce exposure of historical structures to climate impacts.

Actions	Action Type	Reactive or Anticipatory
16.1: Continue, when appropriate, wrapping historical structures in fire-resistant materials in anticipation of fire and stay informed about technological developments in protective materials.	 P&B	Anticipatory

## ON-GOING ADAPTATION ACTIONS | WATER FEATURES

**STRATEGY 17.** Increase public understanding of the water quality issue.

Actions	Action Type	Reactive or Anticipatory
17.1: Increase training for park staff to ensure they are able to explain the rationale behind swim beach closures to park visitors.	 CB	Anticipatory

**STRATEGY 18.** Consider how increasing risk of outbreaks of water-borne illnesses will affect the siting of new facilities and the opening times of existing facilities.

Actions	Action Type	Reactive or Anticipatory
18.1: Ensure facilities can be closed during outbreaks of water-borne illnesses.	 P&B	Anticipatory

**STRATEGY 19.** Increase resilience of boat launches to seasonal fluctuations in water level.

Actions	Action Type	Reactive or Anticipatory
19.1: Actively engage Wash. Dept of Ecology and local governments to proactively affect Shoreline Master Programs, the Growth Management Act, and other new regulations for Parks in-water development.	 PY	Anticipatory

## 9. Near-Term Adaptation Actions

These adaptation actions were identified by Parks staff as actions that can be implemented in the near term (0-6 years). Included in the table is the type of adaptation action (Table 4) and whether the action is on-going or not, and whether the action is anticipatory or reactive. The numbers of the strategies are continued from the tables in the previous section when there are additional actions for the same strategy.

### NEAR TERM ADAPTATION ACTIONS | SITING & DESIGN OF INFRASTRUCTURE

**STRATEGY 1.** Increase understanding of how coastal facilities and protection structures could be affected by sea level rise.

Actions	Action Type	Reactive or Anticipatory
1.3: Enhance the Facility Inventory and Condition Assessment Program (FICAP) to include marine/over water facilities and shoreline protection structures, and establish damage evaluation metrics in FICAP system.	 P&B	Anticipatory
1.4: Identify long-term monitoring programs to increase knowledge of patterns, characteristics, and rates of change to coastal park facilities and shoreline protection structures. Use lidar to create a baseline and prioritize monitoring locations for proximity to water. Modify existing maintenance plans to include sea level rise and not just health and safety.	 D&M	Anticipatory
1.5: Inventory shoreline protection structures to determine which ones need to be kept and which structures could be eliminated, and use sea level rise projections to identify which sites are most vulnerable.	 D&M	Anticipatory

**STRATEGY 20.** Monitor septic systems in parks to evaluate sensitivity and where impacts are currently being observed.

Actions	Action Type	Reactive or Anticipatory
20.1: Conduct a statewide septic system assessment and evaluate alternatives in areas at risk from sea level rise.	 E&A	Anticipatory
20.2: Conduct a threshold analysis of the storm sewer network to determine sensitivity to different types of storm events.	 E&A	Anticipatory

**STRATEGY 21.** Reduce potential impacts to septic systems by altering where and how septic systems are designed.

Actions	Action Type	Reactive or Anticipatory
21.1: Update policy to ensure that new septic systems are sited and designed to minimize impacts from sea level rise by considering future seasonal high water table projections.	 PY	Anticipatory



**STRATEGY 22.** Avoid siting coastal facilities in areas of the coast susceptible to coastal hazards.

Actions	Action Type	Reactive or Anticipatory
22.2: Site high-cost facilities outside of base flood elevation that considers sea level rise projections.	 P&B	Anticipatory

**STRATEGY 23.** Use structural elements and site design strategies that can tolerate inundation and reduce direct exposure to coastal hazards.

Actions	Action Type	Reactive or Anticipatory
23.1: Consider developing facility designs that exceed normal design standards in consideration of projected sea level rise.	 E&A	Anticipatory

**STRATEGY 24.** Increase resilience of trail system by siting trails away from sites likely to experience increased erosion rates.

Actions	Action Type	Reactive or Anticipatory
24.1: Site trails further from streams and rivers on sites with stronger parent material, and avoid siting trails in areas that will require bridges.	 P&B	Anticipatory

**STRATEGY 25.** Allow for increased landslide frequency by relocating roads and structures.

Actions	Action Type	Reactive or Anticipatory
25.1: Collaborate with partners to compare date of current damage with data on soil moisture and landforms to identify sensitive areas.	 PT	Anticipatory

**STRATEGY 26.** Consider sea level rise projections in SEPA analysis documents.

Actions	Action Type	Reactive or Anticipatory
26.1: In SEPA analysis, document whether or not sea level rise is expected to exacerbate the effects of a proposed project on environmental elements.	 E&A	Anticipatory
26.2: In SEPA analysis, document how the project will be designed to be resilient or resistant to SLR impacts in the project narrative.	 E&A	Anticipatory



## NEAR TERM ADAPTATION ACTIONS | NATURAL RESOURCES & HABITATS

**STRATEGY 5.** Prevent and control widespread and detrimental outbreaks of invasive species or pathogens, while recognizing the role of native insect and pathogen disturbances in supporting healthy forest ecosystems.

Actions	Action Type	Reactive or Anticipatory
5.6: Have a response plan in place to respond to high potential impact diseases or outbreaks.	 E&A	Anticipatory

**STRATEGY 8.** Plan and prepare for more frequent and severe fire and greater area burned.

Actions	Action Type	Reactive or Anticipatory
8.3: Increase interagency communication between Parks, tribes, and other regional natural resource managers regarding shared fire risk.	 PT	Anticipatory



## NEAR TERM ADAPTATION ACTIONS | PARK ACCESS

**STRATEGY 27.** Maintain on-site drinking water supplies to reduce interruption of services at coastal parks.

Actions	Action Type	Reactive or Anticipatory
27.1: Increase water conservation efforts in parks that are at-risk of saltwater intrusion.	 P&B	Anticipatory
27.2: Identify which parks are at risk of saltwater intrusion into ground water supply.	 E&A	Anticipatory

**STRATEGY 28.** Accept loss of (abandon) some coastal facilities as sea levels rise or acquire upland parcels to facilitate coastal habitat migration inland.

Actions	Action Type	Reactive or Anticipatory
28.1: In low-lying coastal zones, where appropriate, consider allowing existing facilities (e.g., coastal day-use areas, RV parks) to transition to estuaries or salt marshes as sea levels rise.	 P&B	Reactive



## NEAR TERM ADAPTATION ACTIONS | PARK VISITS & REVENUE

---

**STRATEGY 13.** Maintain sufficient water supply to meet demand.

Actions	Action Type	Reactive or Anticipatory
13.2: Understand water resources portfolio to determine where additional resources are needed.	 E&A	Anticipatory

---



## NEAR TERM ADAPTATION ACTIONS | HISTORIC STRUCTURES & ARCHAEOLOGICAL SITES

**STRATEGY 15.** Increase capability to respond to possible increased rate of unanticipated discoveries due to climate impacts (e.g., erosion).

Actions	Action Type	Reactive or Anticipatory
15.5: Increase staff capability to address assessment, evaluation, and consultation needs for new sites.	 CB	Anticipatory

**STRATEGY 29.** Identify climate risks to individual historical structures and archeological sites.

Actions	Action Type	Reactive or Anticipatory
29.1: Use sea level rise projections to identify structures that fall within estimated inundation zones, and prioritize actions for structures at greatest risk.	 E&A	Anticipatory

## NEAR TERM ADAPTATION ACTIONS | WATER FEATURES

No near-term actions identified for the water features cross-programmatic concern.



## 10. Long-Term Adaptation Actions

The tables below include adaptation actions identified by Parks staff that can be implemented in the long term (>6 years). The tables also identify the type of adaptation action (Table 4) and whether the action is anticipatory or reactive. The numbers of the strategies are continued from the tables in the previous section when there are additional actions for the same strategy.

### LONG-TERM ADAPTATION ACTIONS | SITING AND DESIGN OF INFRASTRUCTURE

**STRATEGY 1.** Increase understanding of how coastal facilities and protection structures could be affected by sea level rise.

Actions	Action Type	Reactive or Anticipatory
1.6: Prioritize where protection actions are taken based on a suite of factors including demand, criticality and need, and historic preservation.	 E&A	Reactive
1.7: Provide training to Parks staff who will be making observations for the FICAP system to increase consistency across the agency.	 CB	Anticipatory

**STRATEGY 3.** Increase resilience to riverine flooding by modifying the siting or infrastructure design of at-risk facilities or trails.

Actions	Action Type	Reactive or Anticipatory
3.2: Consider increased use of engineered logjams to redirect flows.	 P&B	Anticipatory
3.3: Consider increasing the height of bridges above waterways.	 P&B	Anticipatory

**STRATEGY 20.** Monitor septic systems in parks to evaluate sensitivity and where impacts are currently being observed.

Actions	Action Type	Reactive or Anticipatory
20.3: Prioritize efforts to eliminate the need to treat sewers by connecting to local systems, including commenting on updates to local plans such as growth management act to address sewer needs. Consider working towards exceptions to local management plans to get sewer connected to local plans.	 P&B	Anticipatory

**STRATEGY 21.** Reduce potential impacts to septic systems by altering where and how septic systems are designed.

Actions	Action Type	Reactive or Anticipatory
21.2: Identify potential sites for septic system redesign or elimination in hazardous areas and limit new development that will rely on septic systems in hazardous areas.	 E&A	Anticipatory



**STRATEGY 30.** Reduce coastal hazard exposure by retaining sediment on beaches, reducing erosion, and focusing on natural and nature-based features.

Actions	Action Type	Reactive or Anticipatory
30.1: Where feasible, consider beach nourishment or replenishment to temporarily provide protection from coastal hazards by increasing the distance between facilities and protection structures and waves when lower cost alternatives are not available.	 P&B	Anticipatory
30.2: Consider replacing shoreline armoring with living shorelines through planting more native vegetation.	 P&B	Anticipatory
30.3: Consider land swaps to move park facilities upland.	 P&B	Anticipatory

**STRATEGY 31.** Modify dock structures to increase resilience to sea level rise.

Actions	Action Type	Reactive or Anticipatory
31.1: Consider changing requirements to include the use of larger than standard structural elements (e.g., pilings, pile caps, cross member bracings, and stringers) to mitigate against pile section loss over time due to corrosion and impact damage.	 PY	Anticipatory

**STRATEGY 32.** Leverage partnerships to communicate with users about damage related to climate impacts and build volunteer capacity for maintenance.

Actions	Action Type	Reactive or Anticipatory
32.1: Change user expectations with public education.	 O	Anticipatory

**STRATEGY 33.** Plan and prepare for more frequent landslides an erosion.

Actions	Action Type	Reactive or Anticipatory
33.1: Avoid siting trails and footbridges on steep slopes, unless site is especially unique for public visitation.	 P&B	Anticipatory

**STRATEGY 34.** Increase resilience to landslides by protecting roads and structures from higher landslide frequency.

Actions	Action Type	Reactive or Anticipatory
34.1: Stabilize slopes mechanically or with vegetation to reduce landslide risk.	 P&B	Anticipatory
34.2: Compensate for landslides by reducing weight (e.g., human structures or debris) on the top of a slope.	 P&B	Anticipatory



**STRATEGY 35.** Allow for increased landslide frequency by relocating roads and structures.

Actions	Action Type	Reactive or Anticipatory
35.1: Locate new construction or reroute roads away from areas of high landslide risk.	 E&A	Anticipatory

**STRATEGY 36.** Increase resilience of trail systems to saturated soils.

Actions	Action Type	Reactive or Anticipatory
36.1: Reroute high-risk trails that experienced past problems with saturated soils.	 P&B	Anticipatory

**STRATEGY 37.** Exceed current Americans with Disabilities Act (ADA) standards to help ensure compliance under higher future sea level elevations.

Actions	Action Type	Reactive or Anticipatory
37.1: Establish elevation requirements with design guidelines for trails and infrastructure, and ensure that associated modifications (e.g., ramps, elevators, etc.) comply with ADA standards. Recognize that disabled populations may be more vulnerable to interruptions and access, therefore prioritize upgrades to meet ADA standards.	 PY	Anticipatory

**STRATEGY 38.** Use structural elements and site design strategies that can tolerate inundation and reduce direct exposure to coastal hazards.

Actions	Action Type	Reactive or Anticipatory
38.1: Stabilize banks near resources and trails with vegetation or environmentally appropriate armoring.	 P&B	Anticipatory
38.2: Consider modified slope protections and erosion-control designs.	 P&B	Anticipatory



## LONG TERM ADAPTATION ACTIONS | NATURAL RESOURCES & HABITATS

**STRATEGY 5.** Prevent and control widespread and detrimental outbreaks of invasive species or pathogens, while recognizing the role of native insect and pathogen disturbances in supporting healthy forest ecosystems.

Actions	Action Type	Reactive or Anticipatory
5.7: Partner with other resource management agencies to identify and prepare for low-probability but high impact extreme events to prevent widespread outbreaks of invasive species or pathogens.	 PT	Anticipatory

**STRATEGY 8.** Plan and prepare for more frequent and severe fire and greater area burned.

Actions	Action Type	Reactive or Anticipatory
8.4: Manage forest restoration for future range of variability in fire severity and area burned.	 P&B	Anticipatory

**STRATEGY 39.** Reduce fire risk at the wildland urban interface.

Actions	Action Type	Reactive or Anticipatory
39.1: Support the establishment of fire buffer zones throughout the primary wildfire risk zones (wildland fire interface) to reduce flashpoints and fuel loads that may contribute to potentially damaging wildfire.	 P&B	Anticipatory
39.2: Coordinate and enhance collaboration with WA Dept. of Natural Resources and the National Fire Protection Association to get FireWise certification for areas Parks is particularly focused on protecting.	 PT	Anticipatory

**STRATEGY 40.** Increase monitoring of species and habitats that are expected to be sensitive to climate change.

Actions	Action Type	Reactive or Anticipatory
40.1: Where appropriate, install interpretive signs that explain how climate change is projected to affect plant and animal populations.	 O	Anticipatory

**STRATEGY 41.** Increase habitat connectivity and permeability.

Actions	Action Type	Reactive or Anticipatory
41.1: Maintain and restore corridors between areas of declining climatic suitability and areas of stable or increasing climatic suitability.	 P&B	Anticipatory
41.2: Maintain and restore corridors that span elevation gradients, to ensure that species have the ability to disperse into cooler habitats as the climate warms.	 P&B	Anticipatory
41.3: Where appropriate, acquire key land parcels, increase use of conservation easements and cooperative agreements to increase habitat connectivity.	 P&B	Anticipatory
41.4 Collaborate with adjacent landowners to expand habitat and create corridors, which may facilitate species dispersal into more suitable habitat as the climate warms.	 PT	Anticipatory



## LONG TERM ADAPTATION ACTIONS | PARK ACCESS

**STRATEGY 12.** Increase resilience of trails and roads to erosion and landslides by repairing, replacing, and rerouting trails and bridges with high demand for access.

Actions	Action Type	Reactive or Anticipatory
12.2: Consider rerouting trails highly susceptible to erosion and flood risk in locations that eliminate the need for trail bridges.	 P&B	Anticipatory
12.3: Consider relocating bridges to more stable locations (e.g., higher, or parent material).	 P&B	Anticipatory

**STRATEGY 27.** Maintain on-site drinking water supplies.

Actions	Action Type	Reactive or Anticipatory
27.3: Develop a plan that highlights response actions if Parks' drinking water supply is contaminated by saltwater intrusion.	 E&A	Anticipatory

**STRATEGY 28.** Accept loss of some coastal facilities (abandon) as sea levels rise or acquire upland parcels to facilitate coastal habitat migration inland.

Actions	Action Type	Reactive or Anticipatory
28.2: Consider a land acquisition program where upland parcels are purchased to facilitate inland migration of buildings, facilities, structures.	 P&B	Anticipatory
28.3: Consider closing and abandoning park facilities temporarily due to prolonged or high frequency flooding.	 P&B	Reactive

**STRATEGY 42.** Improve access to coastal parks during flood events by rerouting access roads, increasing road redundancy, and modifying design features.

Actions	Action Type	Reactive or Anticipatory
42.2: Consider moving or modifying access roads and trails above a base flood elevation that includes sea level rise projections.	 P&B	Anticipatory



## LONG TERM ADAPTATION ACTIONS | PARK VISITS & REVENUE

### STRATEGY 13. Maintain sufficient water supply to meet demand.

Actions	Action Type	Reactive or Anticipatory
13.3: Increase water storage with artificial storage infrastructure (e.g., water towers).	 P&B	Anticipatory
13.4: Identify actions to address saltwater intrusion into potable water sources.	 P&B	Reactive
13.5: Consider constructing new wells, cisterns, and reservoirs for increased water storage.	 P&B	Anticipatory

### STRATEGY 14. Increase resilience to low water supply conditions (and potentially higher costs) through increasing water conservation.

Actions	Action Type	Reactive or Anticipatory
14.2: Institute gray water recycling and surface and rain water collection where feasible.	 P&B	Anticipatory

### STRATEGY 43. Modify plant and species management strategies to minimize water demand and maximize water retention.

Actions	Action Type	Reactive or Anticipatory
43.1: Where appropriate, reduce turf area and shift to more drought-tolerant vegetation or use turf management practices that reduce water demand for irrigation.	 P&B	Anticipatory
43.2: Combine changes in practices with visitor education and outreach to manage visitor expectations about green turf.	 O	

### STRATEGY 44. Increase flexibility and capacity for managing recreation resources to meet shifting demand.

Actions	Action Type	Reactive or Anticipatory
44.1: Implement adaptive management - alter management as the length of the recreation season changes.	 CB	Reactive
44.2: Evaluate maintenance schedules to accommodate longer use seasons and manage deferred maintained.	 CB	Anticipatory
44.3: Develop creative budget strategies to support longer or overlapping use seasons; pursue additional grant funding and partnerships and opportunities for new fees; leverage outfitting and guiding funds.	 PY	Reactive



## LONG-TERM ADAPTATION ACTIONS | HISTORIC STRUCTURES & ARCHAEOLOGICAL SITES

**STRATEGY 16.** Use structural elements and site management and design strategies that can reduce exposure of historical structures to climate impacts.

Actions	Action Type	Reactive or Anticipatory
16.2: Consider removing or deflecting stress from the resource; examples include engineered logjams to reduce shore erosion, upstream re-vegetation to reduce flood hazards, or changes in adjacent forest management to reduce wildfire risk.	 P&B	Anticipatory
16.3: Consider, where appropriate and/or feasible, raising the historical structure to protect against projected flood levels, or relocating or facilitating the movement of a resource to a less vulnerable location.	 P&B	Anticipatory
16.4: Explore options for long-term solutions to protect structures in place. For sites where not already protected, consider the addition of a cap over an archeological site or other protective measure.	 P&B	Anticipatory

**STRATEGY 45.** Accept and prepare for loss of historical structures or sites if subject to extreme change that is expect to cause loss.

Actions	Action Type	Reactive or Anticipatory
45.1: In consultation with Tribes and others, consider documenting sites (e.g., potentially full excavation, recording oral histories, collecting seeds) or structures (e.g., photographs, measured drawings) and preparing for loss, where the resource will be subject to change that is likely to destroy or remove all portions of the resource.	 PY	Anticipatory



## LONG TERM ADAPTATION ACTIONS | WATER FEATURES

**STRATEGY 18.** Consider how the increasing risk of outbreaks of water-borne diseases will affect the siting of new facilities and the opening times of existing facilities.

Actions	Action Type	Reactive or Anticipatory
18.2: Site new infrastructure away from sites vulnerable to increased incidence of water-borne diseases.	 P&B	Anticipatory

**STRATEGY 46.** Increase resilience of boat launches to seasonal fluctuations in water level.

Actions	Action Type	Reactive or Anticipatory
46.1: Complete a risk assessment to evaluate where boat launches are vulnerable to draw down and sea level rise.	 E&A	Anticipatory
46.2: Complete a risk assessment to evaluate coastal marine facilities.	 E&A	Anticipatory
46.3: Complete a risk assessment to evaluate inland marine facilities.	 E&A	Anticipatory