



Washington Coast Resilience Action Demonstration Project

Final Report

Authors: Jackson Blalock, Henry Bell, Tressa Arbow, and
Bobbak Talebi

Shorelands and Environmental Assistance Program

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Contact Information

Shorelands and Environmental Assistance Program

Bobbak Talebi
P.O. Box 47600
Olympia, WA 98504-7600
Phone: 360-819-3014

Website¹: [Washington State Department of Ecology](https://ecology.wa.gov)

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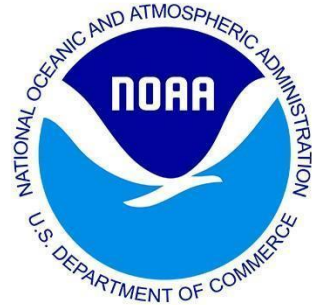


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Principal project managers:

- Paul Dye, Washington Sea Grant
- Bobbak Talebi, Washington State Department of Ecology

Project team members:

- Tressa Arbow, Washington State Department of Ecology
- Henry Bell, Washington State Department of Ecology
- Jackson Blalock, Washington Sea Grant

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- The Washington State Hazard Mitigation Working Group
- The Westport Tsunami Safety Committee

Acronyms and Abbreviations

BIA	United States Department of Interior Bureau of Indian Affairs
BRIC	FEMA Building Resilient Infrastructure and Communities Grant Program
CDBG	Community Development Block Grant
CHRN	Washington Coastal Hazards Resilience Network
CMAP	Coastal Monitoring and Analysis Program (State Department of Ecology)
COHORT	Coastal Hazards Organizational Resilience Team
CRGP	NOAA Coastal Resilience Grant Program
CTP	FEMA Cooperating Technical Partners Program
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
ELP	NOAA Environmental Literacy Program
EMD	Washington State Emergency Management Division
ESLR	NOAA Effects of Sea Level Rise Program
FbD	Floodplains by Design
FEMA	Federal Emergency Management Agency
GIS	Geographic information system
HMWG	Washington State Hazard Mitigation Work Group
JARPA	Joint Aquatic Resources Permit Application
LCEP	Lower Columbia Estuary Partnership
MRC	Marine Resources Committee
NCRF	National Coastal Resilience Fund
NFWF	National Fish and Wildlife Foundation
NFWS	National Fish and Wildlife Service
NGO	Non-governmental organization
NOAA	National Oceanic and Atmospheric Administration
RAD	Resilience Action Demonstration Project
USACE	United States Army Corps of Engineers
WCMAC	Washington Coastal Marine Advisory Council
WCRRI	Washington Coast Restoration and Resiliency Initiative
WECAN	Willapa Erosion Control Action Now
WSDOT	Washington State Department of Transportation
WSG	Washington Sea Grant
WSU	Washington State University

Executive Summary

Coastal hazards resilience on the Pacific Coast of Washington State

Washington's Pacific Coast is defined by its rich cultures, hardworking communities, and vibrant ecosystems. Diverse natural resources underpin an economy that relies on shellfish harvesting, fishing, and timber production, while iconic outdoor destinations enhance well-being and support a tourism industry that draws millions of people to the region each year. The environmental and economic health of the Pacific Coast is of fundamental importance to the state, but coastal natural hazards have long posed severe problems for the region. Planning and preparing for these hazards is a considerable challenge. Climate change impacts, regional economic conditions, and the systemic barriers faced by these small, lower-income communities are making hazards resilience efforts increasingly more difficult.

For many years, the communities and Tribes of Washington's Pacific Coast have expressed a dire need for the state to help address the growing severity of natural hazards, which include flooding, erosion, sea level rise, and an impending Cascadia earthquake and tsunami event. Although there have been many efforts and investments to respond to disaster events, there is a fundamental lack of capacity on the Pacific Coast to scope hazards risk reduction projects and undertake comprehensive planning efforts to support coast-wide resilience. Local staff and community leaders are stretched thin by pressing near-term needs and often do not have time to pursue federal funding opportunities or proactive hazards resilience initiatives.

Despite these challenges, communities are identifying many potential projects and planning efforts that would address long-term hazard risks and bring additional socioeconomic benefits to the region. To take the next step, community members recommend enhancing state agency community assistance programs to help local staff and leaders refine project scopes, access new funding opportunities, and move their ideas off the shelf and onto the shore. Their message is clear: additional permanent capacity and well-coordinated state agency support are necessary to assist local communities in building a thriving, resilient future for the Pacific Coast.

Piloting coordinated inter-agency hazards resilience assistance

The Resilience Action Demonstration Project (RAD) was a two-year (2019-2021) partnership between the Washington State Department of Ecology and Washington Sea Grant that provided multi-organizational hazards assistance to communities and laid the groundwork for future coastal resilience efforts. Funded by NOAA's Office for Coastal Management, the RAD was a direct response to the urgent needs voiced by coastal communities and Tribes to help them build local capacity to address coastal hazards issues while strengthening the long-term social, economic, and ecological resilience of the Pacific Coast. The RAD team piloted a 2017 priority recommendation from coastal communities to establish a "Coastal Hazards Organizational Resilience Team" (COHORT)³ to enhance and integrate coastal hazards resilience initiatives while providing hands-on assistance to scope local projects and apply for funding.

³ See the Ruckelshaus Center's 2017 *Washington State Coast Resilience Assessment*: <https://mrsc.org/getmedia/0498ef44-89e8-46c7-b834-469b992196c6/Washington-Coast-Resilience-Assessment-Report.aspx>

Coastal communities recommended that four state agencies and organizations provide staff for a permanent COHORT. For the purposes of the two-year pilot, grant funding supported staff at Washington Sea Grant and the Washington State Department of Ecology. To elevate existing resilience initiatives and mobilize new efforts, these staff members worked closely with the other proposed COHORT agencies and with the leadership of local governments, coastal Tribes, conservation districts, community organizations, and other state and federal agencies.

The RAD scope of work

The scope of the work for the RAD included three distinct, yet iterative, stages:

- 1. Lay the groundwork for developing collaborative coastal hazards resilience projects.** The RAD team identified potential coastal hazards projects, created a framework for supporting resilience through these projects, and strengthened valuable relationships with staff and leaders from coastal communities and Tribes.
- 2. Deliver coordinated, inter-agency support to jointly produce resilience projects.** The RAD team tested the COHORT concept by delivering a package of collective technical assistance and other forms of support to help three communities scope hazards resilience projects and submit grant proposals. Funding was secured to support projects in all three communities, resulting in \$845,000 in federal funds and local investments for hazards resilience planning and project development across Washington's Pacific Coast.
- 3. Assess the process and identify additional opportunities for supporting coastal hazards resilience.** Working with local, state, federal and Tribal collaborators and the Governor's Washington Coastal Marine Advisory Council (WCMAC), the RAD team identified and refined recommendations for supporting coastal hazards resilience. WCMAC conveyed the recommendations to the Governor's Office and State Legislature in July 2021.

What is the COHORT and what would it do?

An inter-agency "Coastal Hazards Organizational Resilience Team," or COHORT, would work in partnership with staff and community members on the Pacific Coast to strengthen the social, economic, and ecological resilience of communities by providing strategic coordination and advancing projects that address both short-term needs and long-term hazards risks.

Coastal community members recommended the COHORT be staffed by four state agencies and organizations: Washington State Department of Ecology, Washington Sea Grant, Washington State University Extension, and Washington State Emergency Management Division. They were chosen because of their expertise and potential collective impact, but other state agencies would liaise with the COHORT on an as-needed basis or be added as COHORT members in the future.

This proactive approach would address multiple hurdles and opportunities for disadvantaged coastal communities. The COHORT would improve upon the assistance that agencies already provide by tying together related projects and plans, sharing ideas and information, and connecting project proposals with funding opportunities. The COHORT would help integrate local priorities into hazards resilience efforts, supporting local economies and building capacity for future action. In doing so, the COHORT would alleviate local capacity constraints while assisting communities, Tribes, and the state in reducing hazards vulnerability and costs, in comparison to the cost of repairing and rebuilding after hazard events occur.

Outcomes: Resources to support coastal hazards resilience

To support future coastal hazards resilience efforts, the RAD produced the following resources. They are described in detail within the outcomes section of this report.

- **An inventory of more than 175 potential coastal hazard projects**, to facilitate the process of connecting project proponents with technical assistance, resilience-focused project scoping support, potential partners, and funding opportunities.
- **A framework of resilience principles for coastal hazards projects**, to help projects achieve additional benefits, align short-term needs with long-term resilience goals, and ensure competitiveness in eligible grant programs.
- **An initial strategy and detailed catalog of considerations to inform the establishment of a permanent Coastal Hazards Organizational Resilience Team (COHORT)**. The COHORT would operate as a sustained inter-agency coastal hazards resilience assistance program that would build upon the work of the RAD.
- **A series of recommendations for improving coastal hazards resilience**, which focus on increasing local capacity for hazards resilience work and better coordinating state hazards resilience assistance to coastal communities and Tribes.

RAD recommendations for improving coastal hazards resilience

Establish coordinated multi-agency support for coastal resilience

1. Establish the COHORT on a permanent basis.

Directly increase capacity for local resilience leadership

2. Fund resilience-focused staff positions within local jurisdictions, Tribes, and special districts.
3. Through new partnerships, cultivate local educational programming, job training, and employment opportunities focused on existing and emerging industries that further resilience.

Address gaps in state assistance to improve local hazards resilience support

4. Formally authorize and fund a coast-wide erosion technical assistance program at the Washington State Department of Ecology.
5. Enhance Washington State Emergency Management Division's tsunami program to help communities tackle large and complex tsunami preparedness initiatives, in coordination with Washington State Department of Commerce and local comprehensive plans.
6. Develop and sustain an online coastal hazards data and resilience hub for the state.

Increase local access to funds

7. Develop and fund more competitive grant programs (or adjust existing programs) to focus on resilience planning, capacity building, and community development.
8. Pursue modifications to federal standards to minimize the burden of local matching funds requirements
9. Pursue modifications to federal standards to reduce barriers to competitiveness of rural grant proposals.

Support hazards resilience through planning and policy

10. Carry out updates to the comprehensive and shoreline planning framework to support local sea level rise planning.
11. Require disclosure of coastal hazards risk (including erosion, sea level rise, and tsunamis) in property sales.

Committing to a resilient future for the Pacific Coast

Coastal communities and Tribes are committed to undertaking comprehensive, long-term hazards resilience initiatives. This dedication is evidenced by their leadership and collaboration on many resilience efforts in recent years, including the Resilience Action Demonstration Project. If coastal communities can overcome local capacity constraints to develop competitive project proposals, a significant amount of federal funding is available for supporting resilience: in 2021, the federal government announced large increases in funding to address natural hazards and undertake infrastructure improvements. Robust federal funding support is expected to continue in future years in response to climate change and the increasing severity of hazards events.

The RAD helped create important new momentum for locally led hazards resilience efforts. The communities and Tribes of Washington's Pacific Coast are poised to continue working toward a long-term coast-wide resilience initiative, but the RAD's pilot of the COHORT reached its conclusion at the end of 2021. Many challenges and systemic issues make it difficult for small communities to develop project proposals and fund important hazards resilience work without state assistance. As demonstrated by the success of the RAD, a permanent COHORT is the strongest near-term leveraging action the state can take to increase capacity on the Pacific Coast for developing hazards resilience projects, securing federal funding, and achieving multi-benefit resilience objectives.

In addition to piloting the COHORT, the RAD team identified and outlined recommendations for reducing gaps in local capacity, enhancing key state programs, increasing local access to funds, and addressing other obstacles that currently limit coastal hazards resilience. These recommendations directly reflect the voices of the coastal communities and Tribes that engaged in the RAD process. They provide actionable pathways for tackling these issues and supporting long-term resilience on the Pacific Coast.



Figure 1. Many communities on Washington's Pacific Coast are highly exposed to threats from coastal natural hazards, such as flooding, erosion, sea level rise, and tsunamis. Image provided by Henry Bell, May 2021.

Introduction

Background: Washington's Pacific Coast

Washington's Pacific Coast is home to iconic recreation destinations, vibrant marine industries, an abundance of natural resources, and a rich cultural history. This predominantly rural region stretches across western Clallam and Jefferson counties, Pacific County, Grays Harbor County, and Wahkiakum County (Figure 2). Five federally recognized Tribes have reservations located along this shoreline: the Makah Tribe, the Quileute Tribe, the Hoh Tribe, the Quinault Indian Nation, and the Shoalwater Bay Tribe.

The well-being and culture of these communities and Tribes are intimately linked with the natural environment of the coast. Shellfish growing, commercial fishing, timber exportation, and other marine industries provide important jobs that fuel the regional economy. In 2014, Washington's coastal ports were responsible for 129 million pounds in commercial (non-Tribal) fisheries catches, resulting in a landed value of \$93 million. Shipping at the Port of Grays Harbor supports 1,524 total jobs and generates over \$130 million

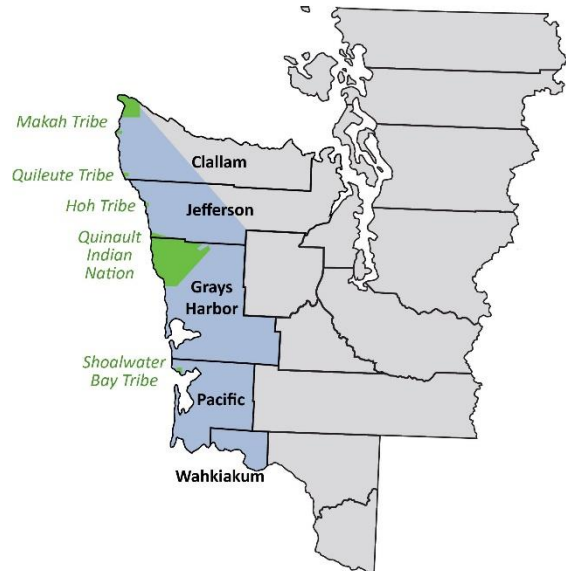


Figure 2. The counties and Tribal reservations of the Washington Pacific Coast, assessed throughout the RAD. Image provided by Washington Sea Grant.



Figure 3. The ports along Washington's Pacific Coast serve as a backbone of the region's economy. Image provided by Henry Bell, September 2021.

in total income.⁴ Further south, the Port of Ilwaco and Port of Chinook annually contribute an estimated \$105.9 million in total economic impact to the region and directly or indirectly support over 1,300 jobs.⁵ Furthermore, shellfish aquaculture on Washington's Pacific Coast provides approximately \$50 million in total labor income each year, primarily in Grays Harbor and Pacific counties. Shellfish beds also provide valuable water quality benefits and function as natural breakwaters to protect against shoreline erosion.⁶

⁴ Martin Associates. (2014). The 2013 Economic Impact of the Port of Grays Harbor.

<https://www.aberdeenwa.gov/DocumentCenter/View/699/Appendix-F-Port-Economic-Impact-Report-pdf>

⁵ Martin Associates. (2018). Combined Economic Impact of the Port of Ilwaco and Port of Chinook. February 2019.

⁶ Taylor et al. (2015). Economic Analysis to Support Marine Spatial Planning in Washington.

http://www.msp.wa.gov/wp-content/uploads/2014/02/WMSPP_2015_small.pdf.

Tourism and recreation—particularly visits to the Pacific Coast’s many state and national parks, campgrounds, and seashores—generate additional important revenue and support thousands of jobs. In 2014, recreation generated \$245.1 million in income and supported 6,531 jobs on Washington’s Pacific Coast.⁷ Overall, Washington residents took approximately 4.1 million trips to the Washington Pacific Coast in 2014 and made an estimated \$481 million dollars in direct expenditures. Recreation was the primary purpose of nearly 60% of those trips.⁸

The region’s coastal and marine ecosystems also make up an irreplaceable part of the cultural history and identity of the Tribes who have lived here for generations. The Hoh Tribe, Makah Tribe, Quileute Tribe, Quinault Indian Nation, and Shoalwater Bay Tribe are federally recognized and possess inherent rights of Tribal sovereignty and self-government. All but the Shoalwater Bay Tribe have treaty-reserved rights to harvest fish, shellfish, plants, and wildlife. Marine and coastal resource management is shared among the Tribes, Washington State, and the federal government.

The communities, cultures, and natural areas of the Pacific Coast make up a fundamental aspect of the state’s historic character and are integral elements of the Washington economy. However, the region faces a considerable challenge. Natural hazards, always a severe problem for the region, are being compounded by the effects of climate change and the systemic barriers faced by small, lower-income communities.



Figure 4. Erosion along Empire Spit on the north shore of Willapa Bay is erasing intertidal habitats traditionally used by the Shoalwater Bay Tribe for subsistence shellfish harvesting and other cultural practices. Tribal housing, commercial businesses, government buildings, and the historic Tribal cemetery are also at risk. Image provided by Henry Bell, September 2021.

⁷ Leeworthy et al. (2016). Market Economic Impacts and Contributions of Recreating Visitors to the Outer Coast of Washington and the Olympic Coast National Marine Sanctuary: Volume 2. <https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/science/socioeconomic/olympiccoast/pdfs/rec-impacts.pdf>

⁸ Point 97 and Surfrider Foundation (2015). An Economic and Spatial Baseline of Coastal Recreation in Washington. <http://publicfiles.surfrider.org/P97SurfriderWACoastalRecreationReport.pdf>

Challenges posed by coastal natural hazards



Figure 5. During winter months, extreme high tides regularly combine with storm surge to damage infrastructure and create safety hazards along Washington's Pacific Coast. The Rialto Beach parking and picnic area is pictured in January 2021 following a severe storm. Image provided by Lisa Nelson.

Given their proximity to and dependence upon the marine environment, the communities and Tribes of this region experience severe impacts from coastal natural hazards. Beach and bluff erosion, landslides, storm surge, wave impacts, and flooding cause significant damage and losses each year, and these problems are being exacerbated by emerging issues such as sea level rise, ocean acidification, and a changing regional economy. These communities must also contend with the impending threat of a catastrophic Cascadia subduction zone earthquake and tsunami event.

communicated the necessity of developing shared goals and strategies, integrating efforts, and facilitating coordination and collaboration in support of coast-wide resilience. They also express the need to identify priority projects across the coast and the importance of finding a better way to connect projects with state and federal funding. In addition to broader coordination along the coast, a number of Tribal representatives expressed their desire to increase coordination among coastal Tribes, local governments, and state agencies.

Most of Washington's Pacific coastal communities are small, under-resourced, and overburdened by significant socioeconomic disadvantages⁹ and disproportionate environmental hazards risks.¹⁰ Although these communities have demonstrated impressive leadership and determination in their work to address the impacts of coastal hazards and build long-term resilience, they are at a disadvantage. As hazard events have become more frequent and severe, emergency response efforts are barely helping communities through disasters as they occur. Community members and jurisdictional staff who can

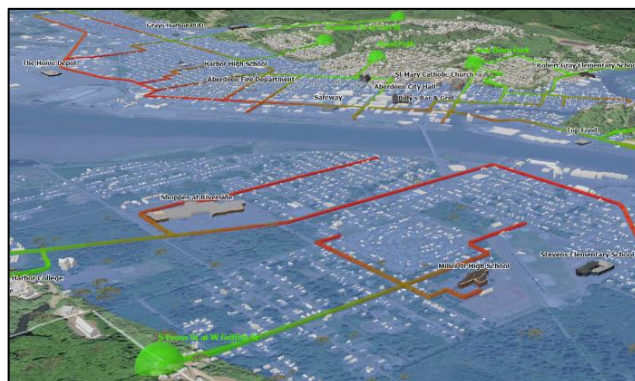


Figure 6. Visualization of potential tsunami flood hazard risk for the City of Aberdeen, Washington. This image is for informational purposes only and is based on a March 2014 study by NOAA and the University of Washington. Provided by FEMA Region X and the Washington State Department of Natural Resources.

⁹ The Economic Innovation Group's Distressed Communities Index ranks nearly all districts on Washington's Pacific Coast as "At Risk" or "Distressed," where data is available. <https://eig.org/dci/interactive-map?path=state/WA>

¹⁰ Washington State’s Environmental Justice Task Force Final Report describes overburdened communities as: “Communities who experience disproportionate environmental harms and risks due to exposures, greater vulnerability to environmental hazards, or cumulative impacts from multiple stressors.” <https://healthequity.wa.gov/TheCouncilsWork/EnvironmentalJusticeTaskForceInformation>

lead projects are stretched thin,¹¹ and their efforts are made more difficult by systemic barriers faced by small and low-income communities. Large areas of the coast have struggled as economic growth has slowed in the forestry, fishing, and manufacturing sectors,¹² and demographics have changed as a result of younger people moving away from the coast.¹³ Coupled with growing costs and the increasing severity of coastal hazards, these significant capacity constraints have prevented communities on the Pacific Coast from sufficiently planning and preparing for future conditions, even as recent research suggests that society saves \$6 for every \$1 spent on hazard mitigation.¹⁴

Moving toward a coast-wide hazards resilience initiative

In response to coastal communities' growing request for a path forward on coast-wide natural hazards resilience, the Washington State Department of Ecology (Ecology) and Washington Sea Grant (WSG) partnered with the office of U.S. Representative Derek Kilmer to commission the [*Washington State Coast Resilience Assessment*](#),¹⁵ which was completed by the William D. Ruckelshaus Center in 2017. Based on 104 interviews with key individuals involved in coastal resilience efforts, this assessment explored interests and perspectives, examined needs and challenges, and provided recommendations and key leveraging actions for improving resilience across Washington's Pacific Coast.

Following the publication of the assessment, Ecology and WSG worked closely with the Governor's Office and other partners to find creative solutions to advance the wide range of actions identified. In March 2018, Governor Jay Inslee added capacity to support these efforts by requesting the assistance of the [*Washington Coastal Marine Advisory Council \(WCMAC\)*](#)¹⁶ to prioritize needs and actions for carrying out the recommendations of the Ruckelshaus Assessment.

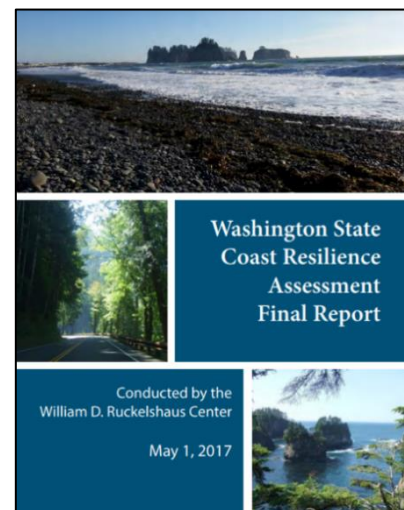


Figure 7. The 2017 *Washington State Coast Resilience Assessment* summarized coastal resilience needs and identified potential paths forward.

¹¹ Counties and Tribes often have just one staff person that manages emergency preparedness. For additional information on the lack of local capacity, see the 2017 *Washington State Coast Resilience Assessment*.

¹² Taylor et al. (2015). Economic Analysis to Support Marine Spatial Planning in Washington. http://www.msp.wa.gov/wp-content/uploads/2014/02/WMSP_2015_small.pdf.

¹³ Butler et al. (2013). Washington's Working Coast: An Analysis of the Washington Pacific Coast Marine Resource-Based Economy. University of Washington, Seattle, WA.

<https://depts.washington.edu/sefsonrc/index.php/washingtons-working-coast/>

¹⁴ Multihazard Mitigation Council. (2017). Natural Hazard Mitigation Saves 2017 Interim Report: An Independent Study – Summary of Findings. National Institute of Building Sciences, Washington, DC.

https://www.fema.gov/sites/default/files/2020-07/fema_ms2_interim_report_2017.pdf

¹⁵ <https://mrsc.org/getmedia/0498ef44-89e8-46c7-b834-469b992196c6/Washington-Coast-Resilience-Assessment-Report.aspx>

¹⁶ <https://www.governor.wa.gov/boards-commissions/board-and-commissions/profile/Coastal%20Marine%20Advisory%20Council%2C%20Washington>

WCMAC decided to prioritize implementing the Ruckelshaus Center's first recommendation to "establish a coast-wide resilience initiative to enhance and integrate efforts." Noting that a core group of people would need to act as integrators to carry out this initiative, the Ruckelshaus Center proposed forming a "Coastal Hazards Organizational Resilience Team" (COHORT), made up of multiple state agencies' staff located on the Pacific Coast. The COHORT would establish formal partnerships, provide technical support and expertise, and facilitate coordination and collaboration around coastal resilience in support of local governments, Tribes, organizations, and community members. In particular, the COHORT would work closely with local leadership on the Pacific Coast to get potential project ideas off the ground by assisting in the development of competitive project proposals and facilitating community connections with state and federal funding programs.

WCMAC asked Ecology and WSG to coordinate a pilot program of the COHORT model. The pilot program would demonstrate the value and benefits of delivering inter-agency support to achieve on-the-ground results for coastal communities. Experiences and lessons from the pilot program could then inform the process of implementing the COHORT on a more permanent basis and with additional agency staff. The pilot was implemented as the Resilience Action Demonstration Project with funding from NOAA's Office for Coastal Management.

What is coastal hazards resilience?

Resilience is often discussed in the context of community response and recovery from major disasters. Resilience is commonly thought of as a community's ability to "bounce back" from adversity to the original state of being, but it can also include a community's capability to evolve and adapt to new and changing conditions. Public health infrastructure, social and economic well-being, and the integrity of ecological systems and physical infrastructure are all generally considered important attributes of community resilience. The William D. Ruckelshaus Center provided a helpful definition for community resilience in the 2017 *Washington State Coast Resilience Assessment*: "A resilient community is able to thrive in the present, adapt to challenges, and even transform as necessary to meet future threats or opportunities."

Using this definition as a starting point, the authors of this report explored how coastal hazards projects can meaningfully support community resilience. The team ultimately developed the following working definition of coastal hazards resilience:

Coastal hazards resilience involves working collaboratively to address immediate and emerging hazards needs while ensuring that efforts fit within a long-term vision that provides local and system-wide benefits to the community, environment, and economy.

For more information, see page 30 of this report.

Purpose of the Resilience Action Demonstration Project

The Resilience Action Demonstration Project (RAD) was a two-year (2019–2021) NOAA-funded hazards assistance pilot program that helped build local capacity to address coastal hazards issues and support long-term resilience across Washington’s Pacific Coast. The RAD was a direct response to urgent needs voiced by coastal communities and Tribes.

The project was a partnership between Washington Sea Grant and the Washington State Coastal Zone Management Program, housed at the Washington State Department of Ecology. The RAD team conducted hazards resilience outreach and research; collaborated with coastal community members and local, state, federal, and Tribal staff; and successfully advanced locally driven hazards resilience projects by connecting communities with scientific and technical expertise, coordinated agency support, and funding.

This work piloted the proposed inter-agency Coastal Hazards Organizational Resilience Team, or COHORT, and developed a strategy for implementing a sustained resilience initiative on the Pacific Coast. The RAD team also identified additional recommendations for improving and better coordinating natural hazards assistance to Washington’s Pacific coastal communities and Tribes. These recommendations directly reflect the views and needs of these communities and collectively present a path forward for addressing deep-seated challenges and enhancing long-term resilience.



Figure 8. Homeowners in Westport assess a nature-based solution to address an eroding shoreline. The COHORT could provide coordinated agency support to help communities like Westport access technical expertise, federal funding, and other resources to assist with hazards resilience efforts. Image provided by Jackson Blalock, 2018.

Scope of Work

The RAD team developed a scope of work for the RAD that focused on three overarching goals, informed by previous partnership work and outreach on the Pacific Coast. The goals reflect community members' recommendation to build local capacity and develop lessons learned through direct action and support for on-the-ground hazards resilience efforts. The goals were:

- Lay the groundwork for developing collaborative coastal hazards resilience projects on the Pacific Coast.
- Deliver coordinated, inter-agency support for locally led projects and provide a strategy for implementing a sustained coastal hazards assistance program.
- Assess the process and develop recommendations for supporting coastal hazards resilience.

To achieve these goals, the RAD team accomplished a series of objectives. Although these objectives were carried out sequentially, the RAD team utilized an iterative process to synthesize the results and key findings of each objective to inform the following steps of the pilot program and produce the project's final outcomes.

This section of the report contains brief summaries of each project objective. These objectives correspond to RAD appendices A through H, although important results from these objectives are discussed within the outcomes section of this report. Each appendix contains more information on the methods and results of each objective. Figure 9 provides a broad overview of all RAD goals and objectives.

Analyze coastal hazards grant programs

At the outset of the project, the RAD team conducted an analysis of state and federal grant programs that provide funding for coastal hazards resilience efforts. The team also conducted interviews with people that help to manage and run hazards resilience funding programs. This provided the team with a comprehensive understanding of the common approaches, priorities, and characteristics of these grant programs. These findings informed the RAD team's work throughout the project and, in particular, the development of the resilience principles for coastal hazards resilience projects.

→ *See Appendix A: Analysis of 2020 Coastal Hazards Resilience Grant Programs*

Conduct outreach with coastal communities and Tribes

Beginning November 2019, the RAD team conducted outreach to document the status of existing and proposed coastal hazards projects across Washington's Pacific Coast. The RAD team met with coastal Marine Resources Committees (MRCs), Tribes, local governments, state and federal agencies, and other coastal stakeholders. Common priorities, hurdles, and needs for improving resilience were identified.

→ *See Appendix B: Outreach Analysis*

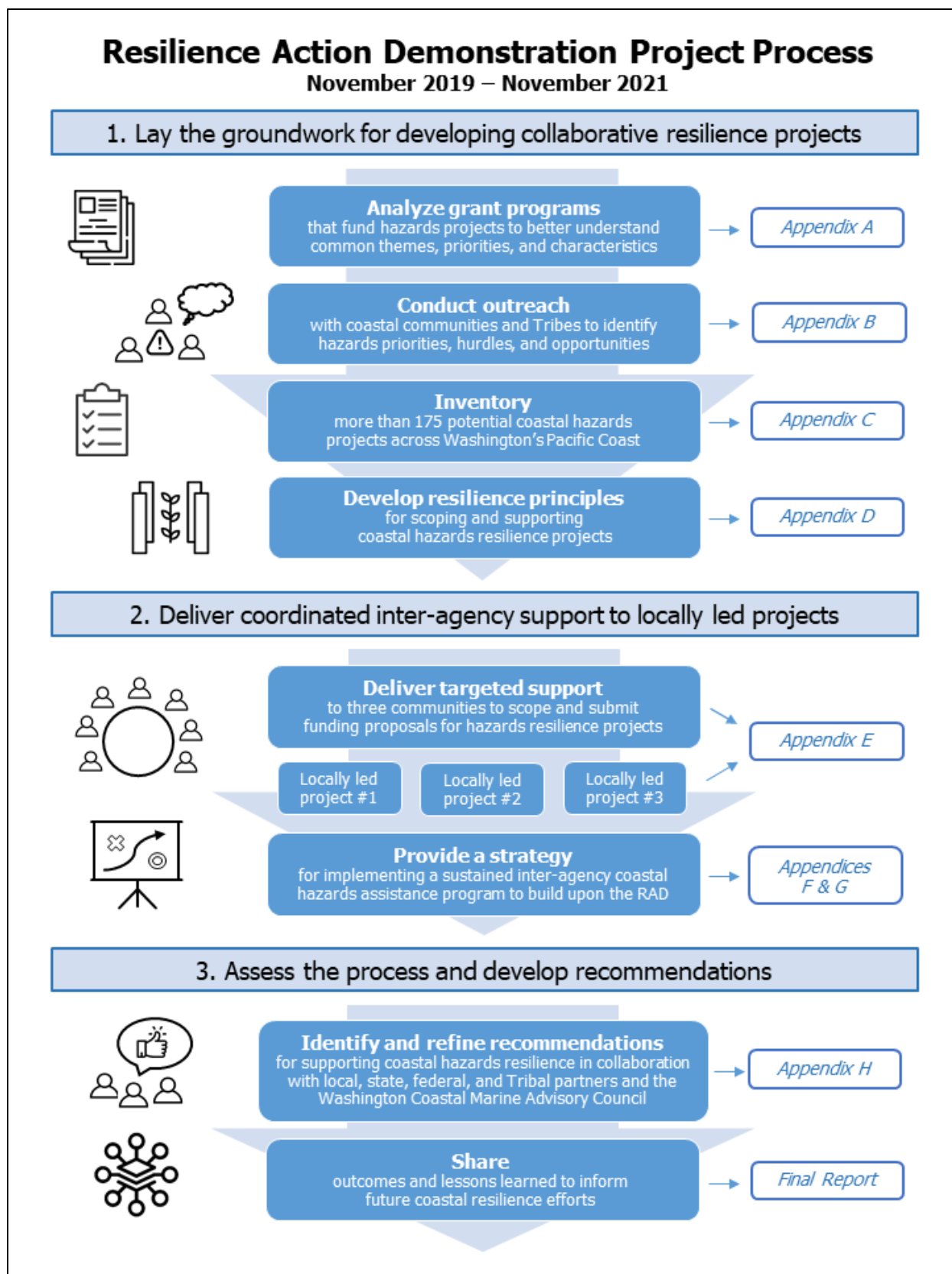


Figure 9. Implementation process for the RAD pilot program.

Inventory potential coastal hazards projects

To compile an inventory of potential coastal hazards projects, RAD team members supplemented their outreach efforts with information from existing documents, including all current hazard mitigation plans and FEMA risk reports for the region. In early 2020, the RAD team held a series of follow-up conversations with local project proponents to further refine the list. This work ultimately produced an inventory of more than 175 “on-the-shelf” projects that are ready for deployment as funding opportunities arise. This inventory was later used to identify specific projects for the RAD team to support.

→ See page 24 of this report and Appendix C: Project Inventory Analysis

Develop resilience principles for coastal hazards projects

Based upon the results of the grant program analysis, outreach analysis, project inventory analysis, and other reports and literature, including the 2017 *Washington State Coast Resilience Assessment*, the RAD team developed a working set of resilience principles for coastal hazards projects. These principles are conditions that, when in place, are likely to support resilience within a project and the larger community. Projects that meet these principles are also likely to be strong candidates for receiving funding awards from hazards grant programs. The RAD team used these principles to assist local project proponents with project scoping and grant writing.

→ See page 30 of this report and Appendix D: Resilience Principles for Coastal Hazards Projects

Deliver targeted support to communities to scope and submit project proposals

Beginning in summer 2020, the RAD team reached out to local project proponents to discuss the possibility of collaborating on the development of hazards resilience projects. These conversations helped the RAD team identify three projects that were most prepared to engage in scoping efforts and apply for funding. The three communities and the associated projects that the RAD team supported are:

- Port of Ilwaco and Port of Chinook: Baker Bay “Port-to-Port” Hazards Mitigation and Resilience Plan
- Pacific County and the Willapa Erosion Control Action Now (WECAN) community forum: North Willapa Shoreline Erosion Master Plan
- City of Ocean Shores: Oyhut Bay Erosion Analysis to Support Development of Mitigation Alternatives

For each project, the RAD team provided assistance with identifying funding opportunities, scoping competitive projects, and submitting funding requests to help address the communities’ immediate hazards needs and long-term resilience goals. The team provided support between July 2020 and May 2021, resulting in \$845,000 in funding secured for hazards resilience planning and project development across Washington's Pacific Coast.

→ See Appendix E: Support for Hazards Resilience Projects



Figure 10. The RAD team provided targeted assistance to support hazards resilience projects in three coastal communities. *Top*: Erosion and flooding along Oyuhut Bay in Ocean Shores threatens homes, public lands, the city's wastewater treatment plant, and its freshwater supply. Image provided by Nick Bird, 2020. *Bottom left*: King tide flooding impacts businesses and port infrastructure along the Port of Ilwaco waterfront. Image provided by Guy Glenn Jr, 2015. *Bottom right*: Severe erosion has destroyed many homes in Pacific County and continues to pose severe risks to North Cove, Tokeland, and the Shoalwater Bay Tribe. Image provided by Casey Dennehy, 2014.

Provide a strategy for implementing a long-term coastal hazards assistance program

To prepare for the potential establishment of a long-term COHORT, the RAD team outlined a strategy for implementing a sustained coastal hazards assistance program that would build upon the RAD pilot program. This was accomplished through research carried out by the William D. Ruckelshaus Center, interviews conducted by the RAD team with staff at the proposed COHORT agencies, and lessons learned from the RAD team's implementation of the pilot program. Collectively, these insights cover technical and operational considerations, inter-agency communication and collaboration details, and potential steps and actions that the COHORT could undertake to increase its effectiveness and improve resilience on the coast.

→ See page 32 of this report as well as Appendix F: Options and Considerations for Implementing the Coastal Hazards Organizational Resilience Team¹⁷ and Appendix G: Strategy and Additional Considerations for Launching the COHORT

¹⁷ Completed by the William D. Ruckelshaus Center in 2019 to inform the implementation of the RAD.

Identify recommendations for supporting coastal hazards resilience

In 2018, Governor Inslee requested that the Washington Coastal Marine Advisory Council (WCMAC) help identify priority needs and actions for carrying out the recommendations of the 2017 *Washington State Coast Resilience Assessment*. In response to this request, the RAD team worked with WCMAC to develop and refine a list of strategies and opportunities for improving and better coordinating agencies' hazards assistance to Washington's coastal communities in support of local and coast-wide resilience efforts.

The RAD produced a set of recommendations that represent findings from the RAD team's work and engagement with communities, Tribes, agencies, and other parties throughout the course of the pilot program. The recommendations focus on increasing local capacity to address hazards resilience and enhancing coordination across state and federal agencies. They are presented in the outcomes section of this report.

In July 2021, WCMAC delivered a hazards and economic resilience recommendations package to the Governor's Office. WCMAC's recommendations package includes many of the recommendations identified in this report and requests that the Governor, State Legislature, and Washington Delegation work with agencies to further detail, prioritize, and implement their recommendations.

→ *See page 35 of this report and Appendix H: WCMAC Coastal Resilience Workshops Report and Recommendations*

Share lessons learned and key findings

Lessons learned and key findings from the RAD are captured throughout this report and its appendices. This report also demonstrates the value of inter-agency coordination to support coastal hazards resilience. The following section describes the outcomes of the RAD that will support the implementation of future local, state, federal, and Tribal coastal resilience efforts.

Outcomes from the RAD

This section provides summarized information on the important results of the RAD pilot program:

- An inventory of more than 175 potential coastal hazard projects, to facilitate the process of connecting project proponents with technical assistance, resilience-focused project scoping support, potential partners, and funding opportunities.
- A framework of resilience principles for coastal hazards projects, to help projects achieve additional benefits and align short-term needs with long-term resilience goals.
- An initial strategy and detailed catalog of considerations to inform the establishment of a permanent Coastal Hazards Organizational Resilience Team (COHORT) that would build upon the work of the RAD and provide sustained hazards resilience assistance.
- A series of recommendations for improving coastal hazards resilience that focus on increasing local capacity for hazards resilience work and better coordinating state hazards resilience assistance to coastal communities and Tribes.

Coastal hazards project inventory

The RAD team developed an inventory of 178 potential coastal hazards projects based upon extensive outreach with coastal communities and additional research. Projects in the inventory are categorized as either physical projects, community development projects, or education projects.

Physical projects will ultimately lead to a specific “dirt-turning” activity. Community development projects aim to create a foundation for decision makers and project proponents to build upon. This can include project scoping, capacity building, strategy development, and planning activities. Education projects aim to increase awareness or understanding of hazards among students and other members of the public. A physical project that includes community development or educational activities in its early stages is still classified as a physical project for

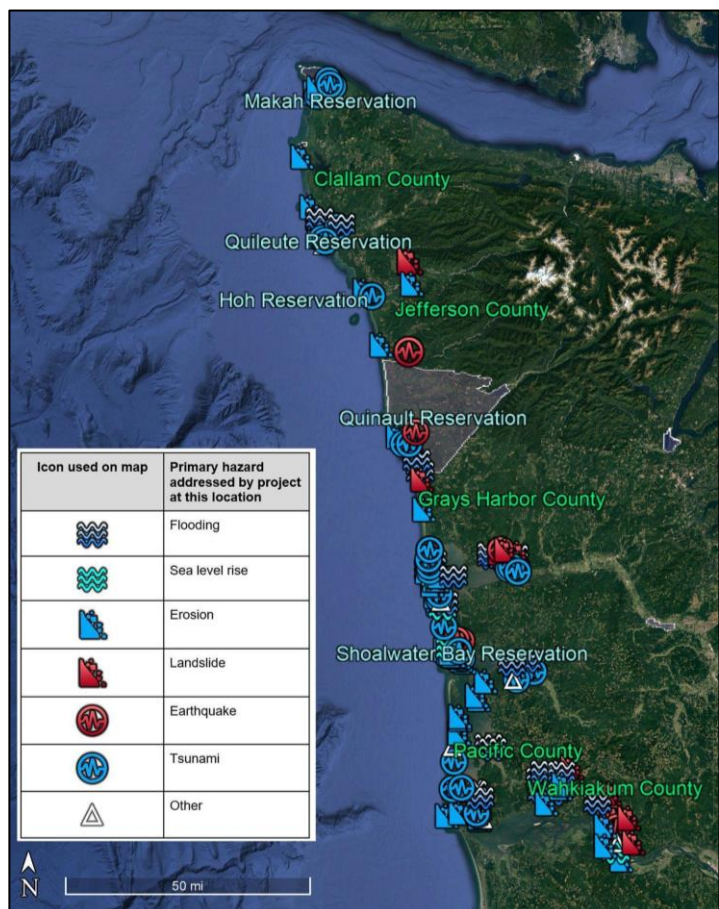


Figure 11. Coast-wide distribution of coastal hazards projects inventoried through RAD. Base image from Google Earth.

the purposes of the inventory. Projects were further classified by the hazard issue they aim to address: flooding, erosion, sea level rise, tsunami, earthquake, or landslide. Some projects aim to address multiple hazards.

The RAD team expects the project inventory (pictured in Figure 11 and analyzed in Appendix C) to be useful to the continued work of coastal resilience practitioners, policymakers, and local and Tribal government staff. State agencies, the proposed COHORT (if implemented), or other organizations may find the inventory particularly useful for connecting projects to available funds, related projects, and other resources.

See the callout box below for more information about the projects in the inventory. Due to the sensitivity of some projects and private information contained within the project inventory, the full list of projects is not published in this report.

What work might the COHORT support?

For more information, see Appendix C: Project Inventory Analysis.

The COHORT would help communities scope and address coastal hazards resilience issues, bringing increased funding and technical support to local efforts, such as:

Flooding, erosion, and sea level rise adaptation

Flooding and erosion projects are a critical need for many communities on the Pacific Coast. These types of projects address chronic flooding and erosion issues that threaten life and property and prepare communities for rising sea levels. They include nature-based solutions, strategic projects spanning multiple related nuisance flooding issues, and traditional hard armoring of shorelines. Flooding and erosion projects are being developed by both Tribal (Makah Tribe, Quileute Tribe, Quinault Indian Nation, Shoalwater Bay Indian Tribe) and non-Tribal communities (Ocean Shores, Aberdeen, Hoquiam, Westport, South Bend, Raymond, Pacific County, Port of Ilwaco, Wahkiakum County). Rough cost estimates for these projects range from \$100,000 for small-scale, nature-based projects, to \$1 million for modifying existing shoreline infrastructure, and up to \$50 million for coordinated erosion/flood management infrastructure spanning several miles of shoreline.



Figure 12. Nature-based erosion control in Chinook, led by the Pacific Conservation District. Image provided by Jackson Blalock, 2018.

Tsunami adaptation

Tsunami adaptation is a critical need for multiple communities on the Pacific Coast. These types of projects include vertical evacuation structures, planning and implementing upland relocation of core infrastructure and facilities (schools, hospitals, eldercare facilities, fire/police, small businesses, and homes), and evacuation route planning and communications. Specific projects are being developed by both Tribal (Quileute Tribe, Hoh Indian Tribe, Quinault Indian Nation, Shoalwater Bay Indian Tribe) and non-Tribal communities (Ocean Shores, Aberdeen, Westport, Long Beach, Pacific County). Rough cost estimates for these projects range from \$2.5 million for a single-function tsunami vertical evacuation tower to \$65 million for upland relocation.



Figure 13. The Quileute Tribe is currently working to relocate their Tribal School out of the tsunami hazard area, as part of the Move To Higher Ground project. Image provided by Tony Overman/*The Olympian*, 2021.

Earthquake and landslide adaptation

Earthquake and landslide adaptation projects are critical for emergency response. These types of projects include support for seismic retrofit of public utilities and transportation infrastructure as well as landslide hazard mitigation along highways. These projects are being developed by both Tribal (Makah Tribe) and non-Tribal communities (Ocean Shores, Hoquiam, Jefferson County, Pacific County), with potential for Washington State Department of Transportation (WSDOT) involvement or leadership in many of these efforts. Rough cost estimates for these projects range from \$500,000 for basic seismic retrofit projects to \$6 million for development of seismically resilient water supply infrastructure.



Figure 14. WSDOT works to address a landslide on State Route 401, along the shoreline of the Columbia River estuary. Image provided by the *Wahkiakum County Eagle*, 2021.

Socioeconomic resilience

Projects that support socioeconomic resilience are needed in order for Pacific Coast communities to engage future generations in the development of resilient infrastructure, climate adaptation, environmental management, and cultural sustainability. These types of projects include the construction of environmental education centers, the creation of school-to-job pathways, and the development of industries that support climate resilience. These projects are being developed by both Tribal (Quinault Indian Nation, Shoalwater Bay Indian Tribe) and non-Tribal communities

(Grays Harbor Marine Resources Committee, Pacific Conservation District, WSU Extension—Wahkiakum County), among others. Rough cost estimates for these projects range from \$20,000 for locally relevant educational programming to \$2 million for development of educational programs and infrastructure to adapt fishing fleets and up to \$4 million for an environmental education center.



Figure 15. Educators from Education Service District 113 attend a sea level rise curriculum development training in Aberdeen, hosted by Washington Green Schools. Image provided by Jackson Blalock, 2018.

Takeaways from the project inventory analysis

In many coastal communities, the limited staff capacity that exists is often directed towards addressing immediate hazard mitigation needs. The potential projects identified in the inventory reflect many of these needs. However, the capacity and momentum behind these projects can be leveraged and supported by various state agencies (via the proposed COHORT or other coordinated efforts) to address these immediate needs, while also incorporating project elements that contribute toward the improvement of local and system-wide resilience.

The main takeaways from an analysis of the full project inventory are provided below.

➤ Project type

- The project inventory contains 100 projects categorized as physical projects, 59 as community development projects, and 22 as education projects. Although the RAD identified a relatively low number of education projects, previous outreach across the Pacific Coast during the Washington Coastal Resilience Project¹⁸ found that education-related projects were seen as a priority for addressing hazards in a more resilient fashion. Additional state support could be targeted to connect educational programs to local coastal hazards issues and resilience-related topics.

¹⁸ <https://wacoastalnetwork.com/washington-coastal-resilience-project/>

- Erosion-, flooding-, and tsunami-related projects were by far the most common hazard issues inventoried. By supporting these projects, state agencies can also assist communities in addressing earthquake, landslide, and sea level rise hazards, as these issues are commonly interconnected.
- Most tsunami-related projects are further along in the project-development process than erosion- and flooding-related projects. This indicates that tsunami-related project assistance should be primarily focused on project design and implementation and that erosion- and flooding-related project assistance should be primarily focused on problem identification and project scoping.

➤ Local vulnerability and disproportionate impacts

- Of all coastal census tracts along Washington’s Pacific Coast,¹⁹ 47% are classified as “highest vulnerability” by the Center for Disease Control’s Social Vulnerability Index.²⁰ These census tracts also represent the coast’s largest linguistically isolated and low-income populations.²¹ Coordinated inter-agency assistance efforts (such as the COHORT) could use existing data and additional outreach to examine the environmental justice implications of hazards risks and impacts on the Pacific Coast. This could inform targeted assistance from the COHORT to communities and Tribes that are most disadvantaged in their ability to address hazards resilience issues.
- Grays Harbor, Pacific, and Wahkiakum Counties have disproportionately high percentages of residents living in floodplains when compared to all other counties in Washington. This presents ample rationale and opportunity for community engagement and project development around flooding issues. The COHORT could help lead these efforts.
- Pacific and Wahkiakum Counties have a disproportionately high number of coastal hazards projects for their populations. This may be due to a higher exposure to coastal hazards, a higher rate of response to the RAD team’s inquiries, more concerted efforts to identify coastal hazards risks, or a combination of these factors when compared to other counties.

➤ Project jurisdiction and coordination

- A large number of potential projects span multiple jurisdictions. The proposed COHORT could provide vital cross-jurisdictional coordination to support these projects.
- The project inventory contains many projects that are adjacent to one another and aim to address related issues; however, RAD outreach indicated that in some cases there is a lack of collaboration between project teams. This highlights a piecemeal approach that may result from conducting emergency response or repair projects, rather than developing plans that address issues across a geography in a holistic and

¹⁹ Including all cities and unincorporated census tracts along marine shorelines or tidal portions of streams

²⁰ <https://www.atsdr.cdc.gov/placeandhealth/svi/index.html>

²¹ Based on census tract-based data from U.S. EPA’s EJSCREEN Environmental Justice Mapper, relative to other census tracts across the Pacific Coast of Washington: <https://ejscreen.epa.gov/mapper/>

coordinated manner. Developing overarching plans and coordinating adjacent projects could leverage the expertise and perspectives of a variety of partners, improve cost-effectiveness, and promote proactive adaptation efforts that provide long-term, multi-benefit solutions.

- Projects most frequently lie in the jurisdiction of Tribes, counties, incorporated cities, and WSDOT. WSDOT was often mentioned by project proponents as a potential state agency partner (approximately 10% of the entire project list). Although WSDOT was not listed as a potential COHORT state agency by the 2017 *Washington State Coast Resilience Assessment*, the COHORT would likely have to work closely with WSDOT to support many of these projects.

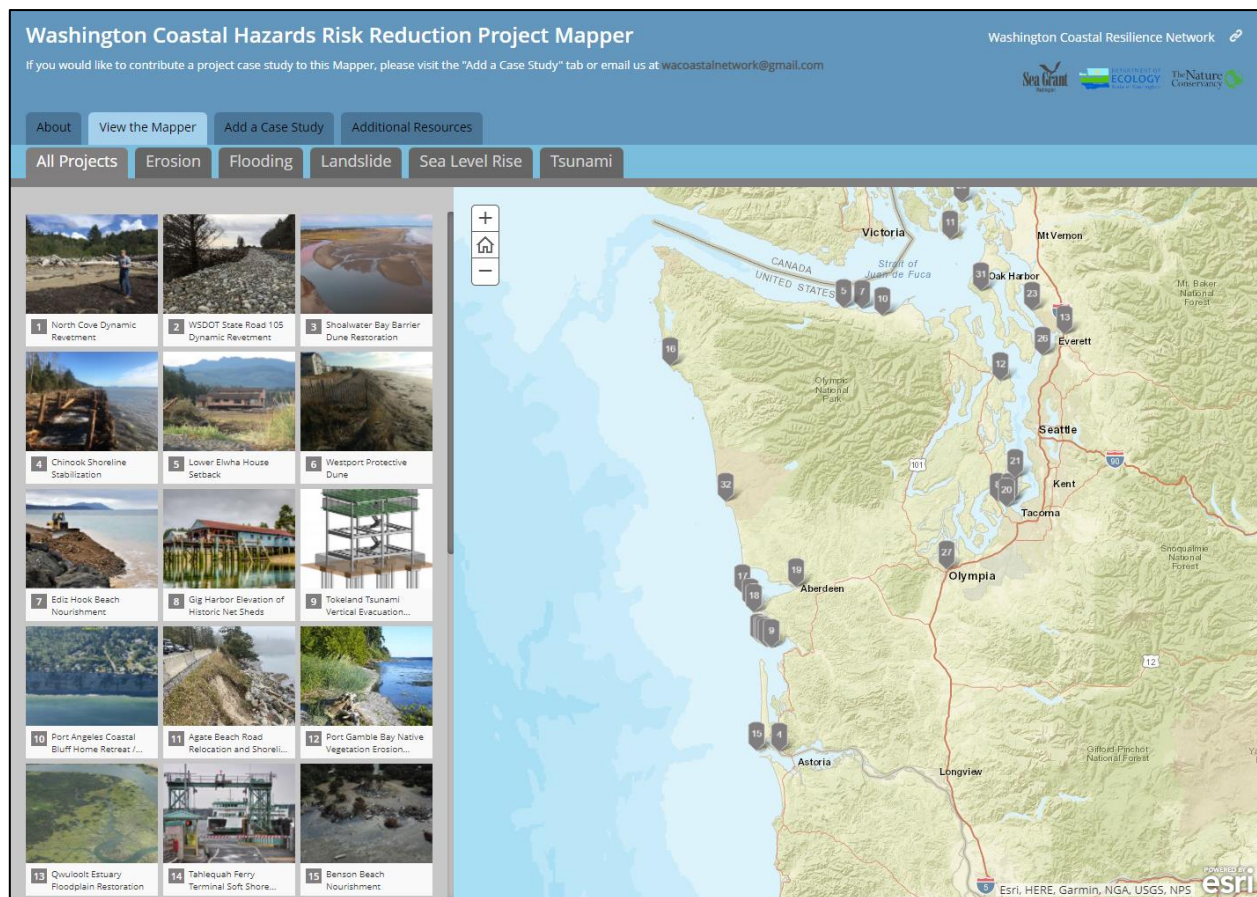


Figure 16. The Washington Coastal Hazards Project Mapper (accessed via wacoastalnetwork.com) shares case studies and lessons learned for innovative projects that address hazards issues similar to those listed in the project inventory. The Department of Ecology and Washington Sea Grant currently provide support the Mapper. The COHORT could leverage and expand resources such as this one in order to advance information sharing and cross-jurisdictional coordination. Image provided by the Washington Coastal Hazards Resilience Network.

Resilience principles for coastal hazards projects

Reducing risk and increasing coast-wide resilience to shoreline hazards does not only involve preserving critical infrastructure and natural resources. It also means considering and seeking avenues to support the health, safety, welfare, and livelihoods of all who live in, work in, and visit coastal communities. Given that ongoing and future hazards impacts directly affect the long-term prospects for social and economic well-being on the coast, the RAD team settled upon the following working definition of coastal hazards resilience:

Coastal hazards resilience involves working collaboratively to address immediate and emerging hazards needs while ensuring that efforts fit within a long-term vision that provides local and system-wide benefits to the community, environment, and economy.

The resilience principles for coastal hazards projects expand upon this definition and were developed based on the RAD team's outreach and research. The principles are conditions that, when in place, are likely to support resilience both within a project and within the greater community. These principles informed the process of scoping locally driven projects throughout the course of the RAD and were continually revised throughout the pilot program's duration.



Figure 17. RAD's resilience principles seek to further resilience by incorporating multiple benefits within coastal hazards mitigation projects. Photo of Grayland Beach State Park and cranberry bogs by Gus Gates/Surfrider Foundation during 2020 king tides. Aerial flight provided by LightHawk.

Project proponents and partners offered positive feedback on the principles during project scoping exercises and at a RAD-hosted workshop in April 2021. Project proposals that incorporated elements of the resilience principles were also largely successful. For these reasons, the RAD team expects the principles to continue to be useful to coastal hazards project proponents, state agencies, and other project partners and stakeholders. The resilience principles can help projects address both short- and long-term priorities, achieve multiple benefits, and incorporate constructive collaboration in support of coast-wide resilience. The projects also likely to be more competitive for a variety of grant funding programs. In

addition, grant program managers who wish to promote resilience through their grant programs may find that the coastal hazards resilience principles provide useful elements to incorporate into their funding guidelines and scoring criteria.

Depending upon the goals and context of any specific project, some principles may be more applicable than others. The RAD team considers these principles to be a living document and intend to revise them based upon further use and feedback. Suggestions for improving these principles are welcome. Please send comments to the authors.

Summary of coastal hazards resilience project principles

For more information, see Appendix D: Resilience Principles for Coastal Hazards Projects.

What is a coastal hazards resilience project?

1. It is a physical project, community development effort (capacity building, strategy development, planning, etc.), and/or educational activity.
2. The project reduces a community's vulnerability to coastal hazards and environmental change.
3. Project proponents and the greater community work together to include resilience characteristics, listed below.

What makes a project more resilient?

4. It addresses immediate concerns, aligned with a long-term vision.
5. It incorporates place- and process-based design by considering past, present and future conditions and engaging with adjacent areas and interconnected systems.
6. It supports additional community benefits, such as economic development, food sovereignty, and access to housing.
7. It provides system-wide benefits, listed below.

How can a project provide system-wide benefits?

8. It explores creative and new options for funding and coordinating investments in community resilience (including matching funds), such as local improvement districts, public-private partnerships, and grant support beyond existing resilience-focused programs.
9. It uses innovative approaches, such nature-based solutions and adaptive management techniques, and shares lessons learned.
10. It supports or builds local capacity.
11. It spans multiple jurisdictions, management regimes, and land uses, with an emphasis on collaboration among Tribes, counties, cities, and private landowners.

Who is involved in the project?

12. A strong local advocate or champion is involved in leading the project.
13. Collaboration, consultation, and/or partnership takes place with local, state, and federal agencies, Tribes, and relevant committees and institutions that have technical expertise related to the project.
14. At the outset of the project, specific consideration is given to ensure that all people affected by the activity, including multiple generations and underrepresented groups, can substantively participate throughout the project development process.
15. Throughout the project, strong outreach, engagement, and project communications connect project partners, affected parties, the general public, and other interested audiences.

Strategy for launching the COHORT

The RAD team developed an initial strategy and detailed catalog of considerations to inform the establishment of a permanent Coastal Hazards Organizational Resilience Team (COHORT). The COHORT would operate as a sustained inter-agency coastal hazards resilience assistance program, building upon the work of the RAD.

Appendix F: Options and Considerations for Implementing the COHORT and Appendix G: Strategy and Additional Considerations for Launching the COHORT highlight specific considerations and opportunities for inter-agency coordination and action in support of coastal hazards resilience. The RAD team synthesized these considerations into a series of actionable first steps to implement upon launch of the COHORT. These steps are described below and are meant to be supplemented by the information in Appendix F and Appendix G. The information contained here and in the aforementioned appendices is intended to be applied by Washington State agencies to inform the development of COHORT work plans and logistical arrangements.

Synthesis of the COHORT implementation strategy

When identifying funds, staff, and the organizational structure for the COHORT launch, COHORT agencies²² should:

- Fund a dedicated permanent FTE from each agency to participate as COHORT staff. Ensure that COHORT staff have a regular on-the-ground presence in coastal communities to better understand local perspectives and build relationships.
- Establish a shared office space on the coast to promote team collaboration and enable opportunities for community and student engagement.
- In each agency, assign a designated unit manager or supervisor to support the respective COHORT staff member operationally; and assign a higher-level individual in each agency to provide leadership, conflict resolution, integration, and communication that support the COHORT at the agency level.
- Develop an inter-agency leadership team composed of the designated unit managers/supervisors to support the COHORT partnership objectives, resolve conflicts, and provide guidance. See Appendix F for additional details.
- Identify an administrative lead agency. The administrative lead agency would be responsible for managing the core administrative functions of the office. See Appendix F for additional details.
- Within the administrative lead agency, designate a half- or full-time operations coordinator to handle logistics, basic communications, office finances, technical support and website maintenance, and essential administrative duties. This could also be achieved through an existing position or through fellowships.

²² Washington Sea Grant, Washington State Department of Ecology, Washington State Emergency Management Division, and Washington State University Extension

In order to develop a common vision for the COHORT's activities, the COHORT should:

- Develop formal inter-agency agreements or MOUs/MOAs among all participating agencies. The agreement would: bind all agencies to the partnership; define the roles and responsibilities of the participating agencies and their staff; set out principles for coordination, collaboration, and communication; identify fiscal responsibilities; and create internal management structures.
- Develop a charter to guide the work of the COHORT and establish its goals and intent with the member agencies. The charter would lay out the COHORT's purpose, mission, and staff roles and responsibilities. See actions described below for additional detail on these items. The charter would incorporate the "Guiding Principles" stated in the *Washington State Coast Resilience Assessment*.
- Designate time for COHORT staff to get to know each other's skills and approaches, the goals and needs of their respective agencies, their existing connections to communities of the Pacific Coast, and their perspectives on furthering resilience in order to create a productive working environment. Incorporate findings into the COHORT's work plan, with a focus on assets to leverage and gaps to fill.
- Develop a clearly communicated and actionable understanding of resilience²³ for external communications, COHORT project evaluation, and other uses.
- Develop a shared evaluation tool for tracking progress on coastal resilience efforts and assessing how hazards projects are supporting resilience.
- Develop a community advisory structure for oversight of the COHORT, with guidance from Tribes, local jurisdictions, and other coastal community interests. WCMAC can initially provide the primary community advisory structure for the COHORT. See Appendix F for more details.

To improve inter-agency coordination and functionality, the COHORT should:

- Identify an information-sharing platform that all COHORT staff can use to facilitate their work on common projects.
- Use this information-sharing platform to create and maintain a file management system to track active projects; a database of local priorities, potential projects, opportunities, assets, and hurdles (see RAD's project inventory); a database for relationship tracking; a database for documenting lessons learned and additional insights; and documentation of how COHORT activities further resilience on a case-by-case and integrated basis.

²³ See Appendix D: Resilience Principles for Coastal Hazards Projects and "Guiding Principles" described in both Appendix F: Options and Considerations for Implementing the COHORT and the Ruckelshaus Center's *Washington State Coast Resilience Assessment*: <https://mrsc.org/getmedia/0498ef44-89e8-46c7-b834-469b992196c6/Washington-Coast-Resilience-Assessment-Report.aspx>

- Schedule frequent (for example, every other week) standing internal meetings for the COHORT to provide updates, gather group feedback, and discuss strategy. Continuous project-specific communications will be necessary in addition to regular group check-ins.
- Develop a central website or webpage²⁴ as a tool for communities to learn about and connect with the COHORT. The website can be expanded over time. Designate how updates will occur and how the COHORT will communicate website needs with the operations coordinator or other individuals providing technical support.
- Consider additional communication needs identified in Appendix F.

When determining which projects to provide initial assistance to, the COHORT should:

- Use the RAD's inventory of potential projects as a starting point to identify projects that can contribute to resilience and are ready to move forward, as well as projects that will require additional relationship-building, scoping efforts, or other support.
- Continue to update the project inventory by identifying additional needs, determining how these needs can be addressed, and connecting with those who should be involved.
- Identify opportunities to build trust with communities, with focused attention on supporting communities with limited local capacity.²⁵
- Ensure that the COHORT balances assistance across a diverse range of project types, physical scales, timelines, and communities. Regularly assess the net impact of the COHORT's ongoing and emerging activities to ensure COHORT goals are achieved and activities complement one another when possible.
- When common themes arise across multiple projects (such as the need to involve a specific non-COHORT participant), document these findings and adapt the COHORT's activities and strategy accordingly.

²⁴ The Washington Coastal Hazards Resilience Network website (www.wacoastalnetwork.com) was regularly referenced during the RAD as a logical vehicle for sharing information about the COHORT and engaging with communities.

²⁵ Capacity limitations will be context-specific. For coast-wide issues, opportunities, and other capacity-related themes, see Appendix D, Appendix G, Appendix H, and the *Washington State Coast Resilience Assessment*.

Recommendations for supporting coastal hazards resilience

The following recommendations for supporting coastal hazards resilience were developed over the course of the RAD. They focus on directly supporting local capacity, improving and better coordinating state hazards resilience assistance, and addressing other key challenges.

The recommendations directly reflect the views and needs of communities and Tribes on the coast. Hundreds of community members contributed to the development of the listed recommendations through interviews conducted by the Ruckelshaus Center, extensive RAD outreach with Marine Resources Committees, Tribes, local governments, and state and federal agency staff, as well as other coastal stakeholders and project proponents that the RAD team worked in partnership with over the course of the pilot program.

In July 2021, the Governor's Washington Coastal Marine Advisory Council (WCMAC) delivered a package of coastal resilience recommendations to the Governor's Office and State Legislature that includes many of the RAD recommendations described here. WCMAC's recommendations package and the process undertaken to develop those recommendations are described in detail within Appendix H: WCMAC Coastal Resilience Workshops Report and Recommendations.

Establish coordinated multi-agency support for coastal resilience

1. **Establish the COHORT on a permanent basis.** The RAD's pilot of the COHORT model found strong support for the COHORT's services and was successful in helping local staff overcome capacity hurdles. This is a key near-term action that Washington State can take to further coastal resilience across the Pacific Coast.

The COHORT would align multi-agency resources and expertise, spearhead information sharing, enhance collaboration, and coordinate strategic investment and technical support for hazards resilience projects and programs along the Pacific Coast of Washington.

The Ruckelshaus Center identified Washington Sea Grant, Ecology, Washington State University Extension, and Washington State Emergency Management Division as potential core COHORT agencies that would have dedicated staff in local offices on the Coast and mutually agreed-upon goals. The COHORT could liaise with Washington State Department of Transportation, Washington State Department of Commerce, and the U.S. Army



Figure 18. Staff from state and federal agencies meet to discuss a coastal hazards resilience project on the Willapa Bay shoreline. The COHORT would establish a formal partnership among key state agencies to coordinate strategic support for resilience projects on Washington's Pacific Coast. Image provided by Chelsey Martin / Washington State Department of Transportation, 2020.

Corps of Engineers, and work on an as-needed basis with the Washington State Department of Health, University of Washington Climate Impacts Group, Washington State Office of Superintendent of Public Instruction, and other state and federal agencies.

Directly increase capacity for local resilience leadership

2. **Fund resilience-focused staff positions within local jurisdictions, Tribes, and special districts.** This additional capacity could enable local jurisdictions to move beyond the current emergency response paradigm of “putting out fires” and take additional proactive hazards planning measures. These staff members could engage in cross-jurisdictional collaboration, lead local working groups to address specific topics, and increase jurisdictions' participation in all other recommendations described in this document.



Figure 19. The RAD team attends a Wahkiakum County MRC meeting to engage in coastal hazards issue identification and project scoping. Image provided by Tressa Arbow, Nov 2019.

Suggested staff include designated resilience planners and project coordinators, GIS/data specialists, and hazard mitigation coordinators.

As a separate but complementary action, fund a full-time coordinator in each Coastal Marine Resources Committee (MRC), establish a coast-wide MRC coordinator, and explore strategic MRC restructuring. This will enable MRCs to better support coastal resilience efforts and help them shape multi-benefit hazard solutions.

3. **Through new partnerships, cultivate local educational programming, job training, and employment opportunities focused on existing and emerging industries that further resilience.** This would increase local innovation, generate opportunities for economic growth on the coast, and encourage future generations to pursue careers and livelihoods close to home. As part of these efforts, resilience concepts could be integrated into school curricula, college courses, and other programs. These efforts could also help identify, support, and compensate local project champions and community leaders who are integral to the success of coastal hazards resilience efforts.

Address gaps in state assistance to better support local hazards resilience efforts

4. **Formally authorize and fund a coast-wide erosion technical assistance program at the Washington State Department of Ecology (Ecology)** to support local data needs, planning, and solutions. Currently, no state agency is directed to assist communities with erosion issues. This action would expand Ecology's Coastal Monitoring & Analysis Program (CMAP) to carry out localized erosion data collection and monitoring across the coast, providing vital information necessary for managing erosion and flood hazards and creating more actionable risk assessments. This work is currently carried out in a limited capacity by CMAP, but CMAP is currently supported in large part by competitive funding and does not have the capacity to fulfill coast-wide data and analysis needs.

The program could facilitate a coast-wide working group on coastal erosion and flooding, providing a forum for agencies and communities to make inquiries, share information, and develop actions that address erosion-related issues in a resilient manner. In addition, the program would help develop strategic partnerships that leverage federal funding and address state and local priorities. The program could also develop a resilience-focused regional sediment management strategy.

5. **Enhance Washington State Emergency Management Division's tsunami program to help communities tackle large and complex tsunami preparedness initiatives, in coordination with Washington State Department of Commerce's Community Development Block Grant program and local comprehensive plans.** These initiatives would likely include upland relocation, multi-benefit public-private partnerships for vertical evacuation, or integrated infrastructure across an area. Assistance could include regulatory flexibility, funds for land acquisition and assessment, planning assistance, and other strategies.



Figure 20. The Quinault Indian Nation is in the process of relocating the Village of Taholah a half-mile upland to avoid tsunami, flooding, and sea level rise hazards. Upland relocation is a long and complex process that requires considerable funding as well as significant coordination across agencies and authorities. Image provided by Gus Gates/Surfrider Foundation, 2020. Aerial flight provided by LightHawk.

6. **Develop and sustain an online coastal hazards data and resilience hub for the state.** Fund the development, maintenance, and continued outreach needed to sustain a centralized website that orients and connects communities and hazards practitioners to data on coastal hazards; past, present, and planned resilience activities; and applicable resilience-related information. This could leverage existing resources, such as the WA Coastal Hazards Resilience Network (CHRN), the Washington Department of Natural Resource’s Geologic Information Portal, Ecology’s Risk MAP program, and the Office of the Chief Information Officer’s Geospatial Open Data Portal, to aggregate information from state agencies and other relevant groups.

Increase local access to funds

7. **Develop and fund more competitive grant programs (or adjust existing programs) to focus on resilience planning, capacity building, and community development.**²⁶ This would assist coastal communities in bridging the gap between known hazards needs and scoping “shovel-ready” resilience projects. Provide adequate funds and resources to engage diverse communities in these activities and include equity criteria to ensure that rural and under-resourced communities are competitive.



Figure 21. A sea level rise planning workshop in Aberdeen brought dozens of coastal community leaders together to discuss steps for building hazards resilience, hosted by WSG and Ecology. Image provided by Bobbak Talebi, 2018.

8. **Pursue modifications to federal standards to minimize the burden of local matching funds requirements** for funding programs that are designed to support hazards resilience actions. Matching requirements for federal grant programs present a considerable obstacle for small and rural coastal communities that are seeking funding to address hazards issues.
9. **Pursue modifications to federal standards to reduce barriers to competitiveness of rural grant proposals.** This would include exploring avenues to address low-population area hurdles for Benefit-Cost Analyses, creating or enhancing advance payment mechanisms, and establishing funding “set-asides” for rural or underserved communities based on geography, income, or population parameters.

²⁶ In 2021, the Washington State Department of Ecology launched the [SMP Competitive Grant Pilot Program](#) to provide funding for local governments to advance shoreline planning and capacity building activities. The initial funding round received 27 applications for a total request amount of \$1,512,699, surpassing the program’s total available funds by \$685,699 and providing a demonstration of need for additional funding in this area.

Support hazards resilience through planning and policy

10. As part of the state's climate change response, **carry out updates to the comprehensive and shoreline planning framework to support local sea level rise planning.**²⁷ This would involve developing guidance through a collaborative process, adopting requirements for local governments to address sea level rise, and providing local governments with the funding, resources, and tools necessary to do so.
11. **Require disclosure of coastal hazards risk (including erosion, sea level rise, and tsunamis) in property sales** to reduce public liability and promote coastal hazards adaptation. This would also require disclosure of whether the property has ever received disaster aid. Disclosures would rely upon updated maps and delineation of hazards zones.



Figure 22. Threats from present and future coastal hazards affect properties across the Washington Coast. However, these hazards are not always disclosed during sales. Image provided by Gus Gates / Surfrider Foundation, 2020.

²⁷ This opportunity was identified through conversations with WCMAC with the purpose of affirming coastal stakeholders' support for the adopted ESSB 5092 - CONF REPT By Conference Committee (See Commerce Budget Proviso: <http://leap.leg.wa.gov/leap/Budget/Detail/2021/scoH-1633.3.pdf>)

Conclusion

In 2021, the federal government announced large increases in funding for natural hazards resilience and infrastructure improvements. As the impacts of climate change take hold and hazards events increase in frequency and severity, accessing federal funds will become increasingly vital for community resilience. Washington's Pacific Coast communities and Tribes must be positioned to overcome capacity gaps and systemic barriers in order to take advantage of these funding opportunities.

Although the RAD pilot program has reached its conclusion, the RAD team's efforts have helped create momentum for locally led coastal hazards resilience efforts. The team's outreach and engagement with coastal communities identified more than 175 potential coastal hazards risk reduction projects in various stages of the project development process. Many of these potential projects are adjacent to one another or aim to address related issues. Their success requires collaboration between local, state, federal, and Tribal entities and is dependent upon access to funding. The project inventory is by no means an exhaustive list, but it nonetheless demonstrates an imperative to address coastal hazards in a more comprehensive fashion. It also provides immediate opportunities for the state to continue to engage in support of local efforts.

The RAD also produced a set of principles for supporting coastal hazards resilience projects. The resilience principles provide a framework for coastal hazards projects to consider and address issues relating to broader social, economic, and environmental dynamics. These principles were instrumental in aiding the development of competitive, resilience-oriented grant proposals that secured \$845,000 in funding for coastal communities. Feedback from local communities indicates that the principles are an excellent starting point for translating abstract resilience concepts into helpful, easy-to-understand considerations that generate on-the-ground results.

Resilience across the Pacific Coast of Washington is encumbered by many challenges and systemic issues. It is often difficult for coastal communities and individuals to dedicate the time and resources necessary for proactive planning when they already have a difficult time keeping up with present needs. Nonetheless, coastal communities are poised to continue working toward a long-term, coast-wide resilience initiative.

As demonstrated by the findings of the Ruckelshaus Center's 2017 *Washington State Coast Resilience Assessment* and the success of the RAD pilot program, a fully funded COHORT is the strongest near-term leveraging action the state can take to directly increase capacity on the coast for achieving multi-benefit resilience objectives. The Governor's Coastal Marine Advisory Council recommended establishing the COHORT in a letter to the Governor and State Legislature dated July 29, 2021, and the RAD has outlined a strategy and provided key considerations for the implementation of the COHORT in Appendix F and Appendix G. The next steps are to fund and launch the COHORT to build upon the work of the RAD.

Funds to support local resilience-focused staff positions would further set up local communities for success and enable the proposed COHORT to be even more effective in improving coast-wide coordination and collaboration. In addition, the RAD identified and outlined other opportunities for reducing local capacity gaps, enhancing key state programs, increasing local access to funds, and addressing other obstacles that currently limit coastal hazards resilience. These opportunities directly reflect the voices of the coastal communities and Tribes that engaged in the RAD process and provide actionable pathways for tackling these issues and supporting long-term resilience on the Pacific Coast.



Figure 23. Erosion is a chronic issue across Washington's Pacific Coast. The COHORT would help communities access funding and develop long-term, multi-benefit solutions for hazards problems such as these. Image provided by the Washington State Department of Ecology's Coastal Monitoring & Analysis Program, 2018.