Appendix E. Support for Hazards Resilience Projects: Case Studies and Project Participant Feedback

Washington Coast Resilience Action Demonstration Project

Shorelands and Environmental Assistance Program
Washington State Department of Ecology
Olympia, WA

&

Washington Sea Grant
Seattle, WA

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The Resilience Action Demonstration Project (RAD) was a 24-month (2019–2021) pilot program that enhanced local capacity to address coastal hazards issues across Washington's Pacific Coast. The RAD team tested the logistics of the proposed inter-agency Coastal Hazards Organizational Resilience Team (COHORT) and gathered lessons learned for the implementation of a long-term COHORT initiative. In doing so, the RAD team advanced community-driven hazards resilience projects by connecting communities with scientific and technical expertise, coordinated agency support, and funding. Through research, outreach, and targeted support for locally driven projects, the RAD team identified strategies for improving and better coordinating state hazards assistance to Washington's coastal communities, in service of long-term pre-disaster risk reduction and resilient communities.

The RAD was conducted as a partnership between Washington's Coastal Zone Management Program, housed at the Washington State Department of Ecology, and Washington Sea Grant. Many partners and collaborators were instrumental in the success of the RAD. They are listed in the acknowledgments section of the final report.

A Coastal Zone Management Project of Special Merit grant from the NOAA Office for Coastal Management (grant #NA19NOS4190144) provided primary funding for the RAD.

Additional information about the report and its appendices can be found on the RAD webpage,[1] which is hosted by the Washington Coastal Hazards Resilience Network.

Appendix E cover image credit: Henry Bell / Washington Department of Ecology, 2021

[1] https://wacoastalnetwork.com/resilience-action-demonstration-project/

Appendix E Table of Contents

Appendix E List of Figures

Introduction

Purpose of this appendix

This appendix contains case studies on the RAD team's support for three locally led coastal hazards resilience projects, as well as feedback that local project proponents and collaborating community members provided on the RAD team's efforts. The case studies describe the process through which the RAD team engaged with the communities as well as the outcomes and lessons learned from the RAD team's support for each project. The lessons learned from these case studies provide insights on how targeted inter-agency support and technical assistance can bolster local capacity for acquiring funding for hazards resilience projects that address key local priorities.

The feedback from local project proponents and community members consists of a summary of comments provided by individuals that attended a project participant workshop held by the RAD team on April 29, 2021, as well as the results of a follow-up anonymous survey sent to all project proponents and collaborating community members.

The information contained within this appendix contributed toward the main objectives of the RAD, which include field-testing the logistics of the interagency COHORT model, the development of lessons learned for the implementation of COHORT, and the formation of recommendations made by the Washington Coast Marine Advisory Council (WCMAC) and provided to the Governor's Office.

Figure E-1. An extreme high tide event threatens to flood communities in the Baker Bay area. Photo by Guy Glen Jr, Nov 2015.

Methods

Based upon the results of the coastal hazards resilience grant programs analysis (Appendix A), outreach analysis (Appendix B), project inventory (Appendix C), and resilience project principles (Appendix D), the RAD team identified and reached out to eleven project proponents to discuss the possibility of collaborating on locally driven projects and applying for upcoming funding opportunities. These conversations began in August 2020 and helped the RAD team identify three communities that were most prepared to engage in project scoping efforts and apply for funding. The other project proponents were either already working on funding applications and did not need additional assistance, did not have the capacity to collaborate on a project proposal, or were otherwise unable or unavailable to respond to the RAD team's inquiries. Notably, the COVID-19 pandemic strained many communities' staff and resources during this time.

The three communities and the associated coastal hazards resilience projects that the RAD team supported are:

- Port of Ilwaco and Port of Chinook: Baker Bay "Port to Port" Hazards Mitigation and Resilience Plan
- Willapa Erosion Control Action Now (WECAN) and Pacific County: 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 targeted assistance to identify funding opportunities, scope competitive projects that would further resilience, and submit funding requests to help address the communities' immediate hazards needs in line with long-term resilience goals. The RAD team provided this support between July 2020 and May 2021. Federal grant programs awarded funds to support projects in all three of the communities that the RAD supported, resulting in a combined $845,000 in funding for hazards resilience planning and project development across Washington's Pacific Coast.

Case Studies

Port of Ilwaco and Port of Chinook: Baker Bay Hazard Mitigation Implementation Project

Summary

The Port of Ilwaco and Port of Chinook ("Ports") located on Baker Bay in southwest Washington (Figure E-2), identified an immediate need to address flooding and wave overtopping along their marinas' shorelines. These problems were occurring during king tide and storm events and will be exacerbated by sea level rise. Through community outreach, the RAD team identified other related hazards issues along the nearby shoreline. With assistance from the RAD team, the Ports developed a scope of work to both address their immediate needs and conduct a community-driven vulnerability assessment of Baker Bay to identify future resilience efforts and build capacity to work toward them. Local support for this approach was strong, though the hazard mitigation actions and resilience planning elements were eventually divided into separate scopes of work in order to align with the constraints of available funding opportunities. Proposals were submitted to FEMA's 2020 Building Resilient Infrastructure and Communities Program (funding denied) and the National Fish and Wildlife Foundation's 2021 Coastal Resilience Fund (funding awarded).

Figure E-2. Baker Bay and surrounding area, including the Port of Ilwaco and Port of Chinook. Image adapted from Google Earth and produced by Moffatt and Nichol for the Port of Ilwaco in 2020.

Geographic setting and background

The Port of Ilwaco and Port of Chinook ("Ports") are located on the southwest coast of Washington in Baker Bay near the mouth of the Columbia River (Figure E-2). The Ports are located on the northwest and southeast shorelines of the bay and are managed together via an Interlocal Agreement. The two Ports are subject to similar climatic and geologic processes and have similar issues with respect to natural hazards, associated disaster and emergency planning, and regional economic importance.

The Ports are the main hubs for commercial fishing, seafood processing, recreational boating, and vessel haul out and repair in southwestern Washington. Together, the Ports accounted for an average of approximately $21 million in landed fish per year between 2008 and 2017,

making them the second largest port district for landed fish in the state.[2] In 2018, Port activities contributed an estimated $105.9 million in total economic impact to the region and directly or indirectly supported over 1,300 jobs.[3]

Figure E-3. High tides cause flooding at the Port of Ilwaco during a King Tide event on October 15, 2015. Photo by Guy Glenn Jr, 2015.

Hazards issues

The Ports are challenged by significant recent damage and increasing risks associated with coastal hazards, including flooding and storm surge events, erosion and infrastructure deterioration, and sea level rise. Through outreach with city staff and local stakeholders, the RAD team learned that the Ports' riprap armoring and steel and timber bulkheads are showing signs of disrepair and are being undermined, particularly due to extreme storm events in 2015 and 2019 that triggered Federal Disaster Declarations (Figure E-3). Failure of these shoreline protections would not only shut down port facilities, but could also result in severe flooding for downtown businesses, homes, and other city infrastructure.

The RAD team also learned about a number of other potential projects to address coastal hazard risks in the surrounding Baker Bay area. These issues include erosion of the shoreline adjacent to the Ports' infrastructure (likely influenced by wave energy effects of hard armoring), deteriorating culverts and tide gates, flooding threats to local roadways and the Ilwaco Airport, and tsunami and earthquake public awareness and emergency response needs. Local stakeholders also noted the possibility for beneficial use of dredge spoils in the area, potentially in collaboration with the US Army Corps of Engineers' work with the Lower Columbia Solutions Group. The summary of hazard risks for the Baker Bay in the Pacific County Hazard Mitigation Plan supports these outreach findings on a broad level.

RAD engagement with the project

Given the potential to combine immediate mitigation actions with broader resilience efforts in the Baker Bay area, the RAD team elected to help the Ports scope a project to address hazards resilience needs in the Baker Bay area as part of the RAD process. In August 2020, the RAD team reached out to the Ports to inform them that the new FEMA Building Resilient Infrastructure & Communities Grant Program (BRIC) presented a potential opportunity to address their hazards issues. Although FEMA had not yet released detailed information on the BRIC criteria and funding allocations, the RAD team understood that the priorities of BRIC

[2] Washington Council on International Trade. The Washington Port System: Gateways to Growth at Home and Opportunities Abroad. May 2021. https://wcit.org/wp-content/uploads/2021/05/FINAL-WCIT-Research_-The-Washington-Port-System_-Gateways-to-Growth-at-Home-and-Opportunities-Abroad-1.pdf

[3] Martin Associates. 2018 Combined Economic Impact of the Port of Ilwaco and Port of Chinook. February 2019.

would be to address immediate mitigation needs and build capacity for future projects. The RAD team believed that a project proposal for the Ports and the surrounding Baker Bay area would match well with this upcoming federal funding opportunity.

Guy Glenn Jr, the manager for the Ports, had not considered the BRIC program as an opportunity for acquiring funding prior to the RAD team's suggestion. However, he liked the idea and brought in a consultant that the Ports had worked with in the past to help oversee the drafting and submission of a proposal for BRIC. Over the course of several months, the RAD team participated in regular working sessions with the Ports and supported the collaborative project scoping and grant-writing phase in the following ways:

Figure E-4. Waves overtop bulkheads and other infrastructure at the Port of Ilwaco on October 19, 2015. Photo by Guy Glenn Jr, 2015.

- Helping to broaden the scope of the project to include examining vulnerability across the Baker Bay shoreline and offering pathways to address multiple other hazards issues within the project, as identified through RAD outreach.
- Identifying and contacting stakeholders who could participate in the outreach and engagement phase of the project.
- Supporting the consideration of natural and nature-based mitigation solutions within the engineering design alternatives.
- Sharing localized sea level rise planning resources[4] to support the proposal.
- Assisting with the development of a scope, proposal narrative, and timeline for a rapid vulnerability assessment, stakeholder workshops and outreach, and final Baker Bay Resilience Report in order to build the region's capacity for implementing additional hazard mitigation projects in a manner that also furthers resilience.

In November 2020, the project team sent a draft proposal for the project to the Washington Emergency Management Division (EMD) for initial review as part of the FEMA BRIC sub-application process. Shortly thereafter, EMD provided helpful feedback on the draft proposal and program funding criteria. BRIC funding available for capacity building activities was much smaller than originally anticipated; the nationwide program focused primarily on the implementation of dirt-turning mitigation projects and relied heavily on FEMA's Benefit-Cost Analysis (BCA) tool. Feedback from EMD indicated that the project proposal would require significant changes to be competitive. As a result, the project team dropped the rapid

[4] These include Sea Level Rise in Washington State—A 2018 Assessment (https://cig.uw.edu/resources/special-reports/sea-level-rise-in-washington-state-a-2018-assessment/) and the Lower Columbia Estuary Partnership's Predicted Impacts to Lower Columbia River Wetlands Due to Project Sea level Rise web mapper (https://lcep.maps.arcgis.com/apps/webappviewer/index.html?id=90de906767444d3b97cebf7491c1d74d)

vulnerability assessment from the final proposal, and the outreach phase for the project was condensed.

The Ports submitted a revised proposal to EMD in January 2021. Although the proposal was not selected for a funding award, the process nonetheless produced a detailed scope of work and laid the groundwork for future collaboration. The Ports continued to pursue funding opportunities to address their hazards mitigation needs and in July 2021, the Ports received a grant and loan from the Washington State Community Economic Revitalization Board to begin work on some of their priorities.

The RAD team's engagement with the Ports led to the development of another grant proposal during the final stages of the RAD. With support from the Ports, Washington Sea Grant and the Lower Columbia Estuary Partnership (LCEP) submitted a proposal to the FY21 National Fish and Wildlife Foundation (NFWF) National Coastal Resilience Fund to conduct a series of outreach and adaptation planning workshops. These workshops will identify and prioritize site-specific project concepts, which will strengthen ecological and community resilience to coastal hazards and climate change in and around Baker Bay and Grays Bay (Figure E-5). The Ports, Washington

Figure E-5. Area of focus for the project proposal submitted to the NFWF National Coastal Resilience Fund. The project will develop a community-based coastal resilience strategy across multiple land uses in Baker Bay and Grays Bay, including their shorelines and tidal portions of contributing streams (yellow). Image adapted from Google Earth and produced by Washington Sea Grant and the Lower Columbia Estuary Partnership in 2021.

State University Extension, and other local organizations will contribute to these efforts. The project proposal submitted to NFWF was successful and $560,000 in total funding will support this project through a combination of awarded funds and matching contributions. This work will build substantial capacity for a series of additional resilience projects in the Baker Bay area.

Lessons learned

- Collaboration across agencies, local jurisdictions, and organizations was vital in the development of a competitive project proposal that would reflect broad community needs and interests. The RAD team's work helped bring parties together to facilitate discussion about hazards resilience in the region, further strengthening existing connections and working relationships. This facilitated the identification and exchange of new data, models, and information for the Baker Bay area between the Ports, LCEP, and other project stakeholders. In particular, regional sea level rise impact studies by LCEP created valuable interactive maps to use in the process of drafting the initial scope of work.
- According to Guy Glenn Jr, the Ports would not have identified or sought out the FEMA BRIC program as a promising funding opportunity without initial encouragement and support from the RAD team. The Ports also looked toward the RAD team to assist them with drafting the scope of work and deliverables for the rapid vulnerability assessment and community engagement workshops on hazards resilience, as they did not have the expertise or capacity to take on these elements of the proposal.
- Continuous dialogue between the Ports and WA EMD was essential during the BRIC pre-application phase to ensure that the project would align with the priorities of the funding program and that all required elements of the proposal were prepared and submitted. WA EMD was supportive of the project's approach to conduct a rapid vulnerability assessment and use existing priorities to identify future resilience projects, but noted that it would not have scored well using FEMA's Benefit-Cost Analysis Tool.
- Although the project proposal submitted to BRIC was not awarded funding, the team's work still produced extremely useful outcomes. State agencies formed stronger working relationships with a network of local entities that are interested in supporting hazards and economic resilience work. In addition to setting the stage for state support and collaboration on community resilience initiatives, a well-outlined scope of work was prepared for future opportunities. The opportunity to leverage this existing scope of work arose sooner than expected. Prior to 2020, The NFWF National Coastal Resilience Fund did not accept proposals for standalone capacity building projects. When the RAD team learned that NFWF's eligibility criteria had changed to accept these types of projects in 2021, Washington Sea Grant partnered with LCEP and was able to rapidly prepare and submit a proposal for resilience planning efforts in the Baker Bay area because of the work that was put into the BRIC submission.
- Local governments and organizations were interested in coastal resilience efforts in the Baker Bay area, but limited local capacity prevented these entities from leading project scoping efforts. This presented an opportunity for state and regional organizations to

aid limited local capacity and support local visions by submitting proposals to further community resilience efforts. To ensure that the efforts are locally driven, the project methodology focuses on substantial and meaningful collaboration with local entities to ensure their perspectives and needs inform the purpose of the work in all aspects. This provides an example of how the proposed COHORT could provide targeted capacity to help under-resourced communities access important funding opportunities.

- There may be a tendency for project developers to use traditional "tried-and-true" approaches to hazard mitigation as opposed to less conventional, nature-based, or reach-wide approaches. The COHORT could provide information and resources to support the consideration of alternative, and potentially more resilient, approaches. In the context of this project, the RAD Resilience Project Principles (Appendix D) helped the RAD team identify opportunities for increasing resilience within the BRIC and NFWF project proposals.

Pacific County & WECAN: North Willapa Shoreline Erosion Mitigation Master Plan

Summary

Beach erosion along the north shoreline of Willapa Bay (Figure E-6) is a chronic problem, averaging 100 feet per year over the past century and causing devastating consequences for the communities of this area. To understand and address this problem, local, regional, state, federal, and Tribal institutions have spearheaded many scientific studies, monitoring efforts, and erosion control projects. However, local community members expressed a need for a strategic plan to coordinate efforts and align project partners and stakeholders within a long-term vision. With support from the RAD team, Pacific County and volunteer leaders of the local community action forum known as WECAN (Willapa Erosion Control Action Now) drafted and refined the scope of work for an Erosion Mitigation Master Plan. Ultimately, a proposal submitted to the FEMA RiskMAP Cooperating Technical Partners (CTP) Program was awarded $135,000 in funding.

Figure E-6. Area of focus covered by the North Willapa Shoreline Erosion Mitigation Master Plan. The area lies along the northern shoreline of Willapa Bay, which is located in Pacific County, Washington. Image via Google Earth, produced by George Kaminsky and Henry Bell for Pacific County in 2021.

Geographic Setting and Background

Willapa Bay is an ecologically productive estuary on the southwest coast of Washington. More than 10 billion cubic feet of water exits the mouth of Willapa Bay between high and low tide, one of the highest tidal volumes in the continental United States.[5] These strong tidal currents, as well as high-energy waves and significant winter storm events, collectively transport millions

[5] US Army Corps of Engineers, Final Environmental Assessment: Shoalwater Bay Shoreline Erosion, Washington. July 2009.

of cubic yards of sediment along on the coastline of the bay's entrance each year.[6] The Erosion Mitigation Master Plan project covers the rapidly eroding northern shoreline of the bay and includes the rural communities of North Cove and Tokeland, the Shoalwater Bay Tribe, and much of Grayland's cranberry farmland (Figure E-6).

Hazards Issues

The shoreline of North Cove, located at the mouth of Willapa Bay, has eroded away at an average rate of 100 feet per year over the course of the past century (Figure E-7).[7] By 2016, 537 parcels totaling 2,018 acres had been lost, with an estimated total value of $20.3 million. In 2017, projections indicated that if no protection measures were taken, an estimated 499 additional parcels totaling 547 acres would erode by 2060.[8]

Figure E-7. View of North Cove from above, at left in 1990 and at right in 2016. The term "Washaway Beach" does not adequately capture how much of the community has been lost. Images via Google Earth.

In recent years, storm surge and tidal actions have threatened to breach the rock revetment defenses of State Route 105, particularly during winter months. This would result in the flooding of nearly 4,000 acres of private and public lands, including lands of cultural, historical, and economic significance to the Shoalwater Bay Tribe and approximately 350 acres of Grayland's cranberry farms. Saltwater inundation of the cranberry beds would cause long-term crop failure, resulting in a direct loss to the local economy of at least $3 to $5 million each year.[9] There are no alternate routes for transit along the northern shore of Willapa Bay, so damage to State Route 105 would compromise utility lines as well as access to schools, the Shoalwater Bay Tribe health clinic, and law enforcement and emergency response services for over 1300 businesses and residences.[10]

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[6] US Army Corps of Engineers. Study of Navigation Channel Feasibility, Willapa Bay, Washington. April 2000. https://apps.dtic.mil/sti/pdfs/ADA378474.pdf

[7] Bobbak Talebi, George M. Kaminsky, Peter Ruggiero, Michael Levkowitz, Jessica McGrath, Katy Serafin, Diana McCandless. Assessment of Coastal Erosion and Future Projections for North Cove, Pacific County. June 2017. https://apps.ecology.wa.gov/publications/SummaryPages/1706010.html

[8] Kevin Decker, Washington Sea Grant. The Economic Toll of a Disappearing Community. January 2018. https://wacoastalnetwork.com/wp-content/uploads/2020/11/Economic-Toll.pdf

[9] Kim Patten, Washington State University Extension. Economic Assessment of Erosion and Tidal Inundation Impacts to the Grayland Cranberry Industry. 2019. https://wacoastalnetwork.com/wp-content/uploads/2020/11/Grayland-erosion-impact-to-cranberries-1_9_19-patten-WSU.pdf

[10] US Army Corps of Engineers. Feasibility of long-term shoreline stabilization alternatives between North Cove and Tokeland, WA. October 2018. https://wacoastalnetwork.com/wp-content/uploads/2020/11/WSDOT_SR105_LongTermAlternativeAnalysis_18oct2018_reduced.pdf

In 2015, the Shoalwater Bay Tribe, Pacific County, and Pacific County Drainage District No.1 established the Willapa Erosion Control Alliance Now (WECAN) community forum to provide a means of coordinating action to address the ongoing erosion issues along the north shore of Willapa Bay. Many members of local communities and organizations, as well as the Washington State Department of Ecology, Washington Sea Grant, and other state and federal agencies began participating in WECAN soon after its inception. WECAN members have undertaken a series of efforts to further investigate coastal erosion processes and develop, implement, and adaptively manage innovative and effective nature-based engineering solutions to stabilize stretches of the shoreline (Figure E-8).[11]

RAD engagement with the project

Figure E-8. Approximate extents of ongoing and proposed erosion control projects between North Cove and Tokeland, as of January 2020. Image provided by Mott MacDonald.

The RAD team was already aware of the hazards, corresponding needs, and ongoing projects in the area from their previous work with WECAN. During RAD's outreach phase, the team further explored these needs and issues with members of the local communities, and a strategic erosion plan for the region was identified as a critical gap in the current efforts. WECAN provided an ideal entry point for the RAD team to engage with the issue and work with local, state, federal, and Tribal partners to discuss how to coordinate the many ongoing erosion control efforts and studies in the region.

WECAN members recognized an urgent need to coordinate current and proposed construction and mitigation efforts and align stakeholders to a consensus vision for long-term, multi-benefit protection of this dynamic shoreline. A strategic plan would help maintain project momentum, better integrate best management practices and nature-based solutions, and address gaps and hurdles that could threaten the collective success to date. Together with Kelly Rupp, WECAN's volunteer facilitator, the RAD team led focused discussion of this topic at several WECAN meetings in 2020. A framework was developed to scope a strategic plan that would sustain existing efforts, identify information and action gaps, and build a collective vision for long-term resilience against erosion, storm surge, coastal flooding, and sea level rise.

[11] Washington Coastal Hazards Resilience Network. WECAN Projects. 2021. https://wacoastalnetwork.com/local-projects/wecan/projects/

Due to the volunteer nature of WECAN members and staffing constraints related to the COVID-19 crisis, potential project proponents at the local and county level were unable to lead the process of drafting and submitting proposals for upcoming funding opportunities. As a result, the RAD team stepped forward to lead this process, again soliciting and incorporating feedback from WECAN members. During summer and fall 2020, the RAD team identified several federal programs as potential funding sources, including the FEMA Building Resilient Infrastructure and Communities (BRIC) and NOAA Effects of Sea Level Rise (ESLR) programs. However, rapid timelines and lack of capacity prevented the completion and submission of proposals to the FEMA BRIC and NOAA ESLR programs. FEMA BRIC's total available funding for community and capacity building projects was also much lower than expected, making the final submission of the Master Plan proposal less attractive. Nevertheless, the RAD team developed an initial scope of work for an Erosion Mitigation Master Plan in collaboration with local, state, federal, and Tribal partners. The RAD team delivered this scope of work to Pacific County, the Shoalwater Bay Tribe, and the WECAN forum for use in future funding opportunities.

Shortly thereafter, the RAD team created a WECAN webpage to house and organize all reports, studies, design documents, meeting notes, and other information about WECAN-led efforts. The webpage[12] is hosted by the Washington Coastal Hazards Resilience Network (CHRN), a coastal resilience community of practice that is co-managed by Washington Sea Grant and Ecology. The WECAN webpage proved useful in spurring further conversation around the proposed Master Plan at subsequent WECAN meetings. In early 2021, Rupp and David Cottrell, the commissioner of Pacific County Drainage District No.1, organized a meeting with the Pacific County Board of Commissioners to discuss appointing a lead from the County to provide capacity to pursue additional funding opportunities. The RAD team attended the meeting to answer questions and provide insights on the proposed Master Plan effort. The Board of Commissioners responded very positively and promptly appointed a representative, Rebecca Chaffee, to work alongside Rupp on this initiative.

Figure E-9. David Cottrell, the commissioner of Pacific County Drainage District No. 1, explains emergency protection measures that used natural materials to reduce erosion and mitigate flooding threats around the exit point of the drainage ditch. Photo by Bobbak Talebi, 2017.

Subsequently, the RAD team connected Chaffee and Rupp to FEMA staff responsible for managing the FEMA Cooperating Technical Partners (CTP) Program in Washington. The CTP Program supports partnerships between FEMA and local communities to reduce multi-hazard risk and strengthen the effectiveness of the National Flood Insurance Program. Using the previously developed scope of work as a starting point, Chaffee and Rupp worked with

[12] https://wacoastalnetwork.com/local-projects/wecan/

WECAN members and the RAD team to draft and submit a proposal for the Master Plan to the CTP Program. The RAD team provided technical assistance and other support to help with this process. The scope of work for the Plan involves cataloging project activities and plans, identifying data gaps, and hosting a series of workshops to develop consensus design and engineering solutions in order to generate a shared long-term strategy for erosion control in the region. The proposal was successful and in October 2021 FEMA awarded $135,000 to Pacific County to conduct the project.

Lessons Learned

- In summer and fall 2020, the RAD team took the lead in developing the initial scope of work for the Erosion Control Master Plan due to a lack of staff capacity at the local level. During this period, the RAD team was also balancing many other priorities, and missed an opportunity to submit a proposal to the NOAA ESLR program. Upon reflection, the RAD team noted that, if at all possible, a local project proponent, or "local champion" (see RAD Appendix D: Coastal Hazards Resilience Project Principles) directly connected to the project should lead and convene future project scoping and submission processes. The identification of a de-facto "local champion" ultimately led to the success of the proposal submitted to the CTP Program. Despite his volunteer status, Kelly Rupp played an instrumental role in leading the development and submittal of proposal, convening WECAN members to discuss key aspects of the proposed project, and liaising with Pacific County.
- FEMA officials managing the CTP Program in Washington mentioned to the RAD team that they were interested in establishing new partnerships with communities on Washington's Pacific Coast and were interested in any connections that the RAD team could provide. The RAD team reached out to WECAN to gauge interest and held several conversations with each of these parties to understand whether the CTP Program would align well with the needs of WECAN and Pacific County. Following these meetings, the RAD team connected WECAN and Pacific County representatives with FEMA CTP staff to initiate conversations about the submission of a project proposal. The RAD team also provided both parties with key preparatory and background information and joined the initial meeting with FEMA to help facilitate productive discussion.
- During the project scoping and proposal submission process for the FEMA CTP Program, the RAD team provided assistance on several aspects of the proposal to enhance its competitiveness. This included explaining technical language within the funding program criteria to members of the group who were working on the proposal, producing KMZ files of the project area based upon local geomorphology, and providing feedback and review to help align the proposal with the priorities of the funding program.
- To date, local volunteers and community activists have largely been responsible for leading WECAN's efforts to build momentum and sustain collaboration on erosion control projects in the region. The cooperation among local community members and local, state, federal, and Tribal staff has been instrumental in successfully addressing

erosion to date and provides a model for diverse partnership and collaboration on hazards resilience efforts that could be replicated in other areas. However, it is extremely difficult to sustain such efforts without funding. The FEMA CTP program will provide funds in the short term, but WECAN's ability to coordinate efforts and share information could diminish without long-term funding to support the organization and facilitation of the group.

- As demonstrated by the FEMA CTP Program's support for the Erosion Mitigation Master Plan proposal, it is possible to secure funding for resilience planning and capacity building efforts that are crucial for teeing up the success of physical, dirt-moving hazards resilience projects. However, suitable funding opportunities are often lesser-known—local community members and staff were not familiar with the FEMA CTP Program prior to introductions made by the RAD team. In addition, time and resources are required to put together strong project proposals. These tasks require capacity that may be lacking at the local level. Coordinated inter-agency support from the proposed COHORT could help bridge this capacity gap in additional communities across Washington's Pacific Coast.

City of Ocean Shores: Oyhut Bay Erosion Analysis to Support Development of Mitigation Alternatives

Summary

Located just inside of the Grays Harbor North Jetty, Oyhut Bay experiences chronic erosion that threatens homes, public lands, the City of Ocean Shores' wastewater treatment plant, and the City's freshwater supply. Initial projections of erosion trends were included in the 2018 Grays Harbor County Hazard Mitigation Plan, but the City needed a greater understanding of local shoreline processes, erosion trajectories, and potential impacts in order to develop mitigation strategies and assess opportunities for improving hazards resilience. Ocean Shores worked with the RAD team to outline a viable project scope and submit an application to FEMA's Cooperating Technical Partners program to fund this work. FEMA ultimately awarded $150,000 to the City of Ocean Shores to carry out the project.

Geographic setting and background

The City of Ocean Shores lies on a sandspit at the mouth of Grays Harbor in Grays Harbor County, Washington. The geomorphology of this area has been heavily influenced by the construction of the Grays Harbor North Jetty by the US Army Corps of Engineers (USACE). The project area is the Oyhut Bay shoreline, which makes up much of the City's southern shore. Oyhut Bay is bounded by the North Jetty to the west and Damon Point to the east. Within the shoreline area are a City-owned wastewater treatment plant, two State-managed natural areas, a Federal Aviation Administration VORTAC navigational aid, and multiple residential properties.

During extreme high tides, Oyhut Bay is separated from the City's freshwater canal system by approximately 250 feet of land. This canal system runs throughout the City and over the aquifer that supplies drinking water to the City. Oyhut Bay is presently bisected by a submerged remnant jetty, which was used during construction of the North Jetty and is no longer maintained (Figure E-10).

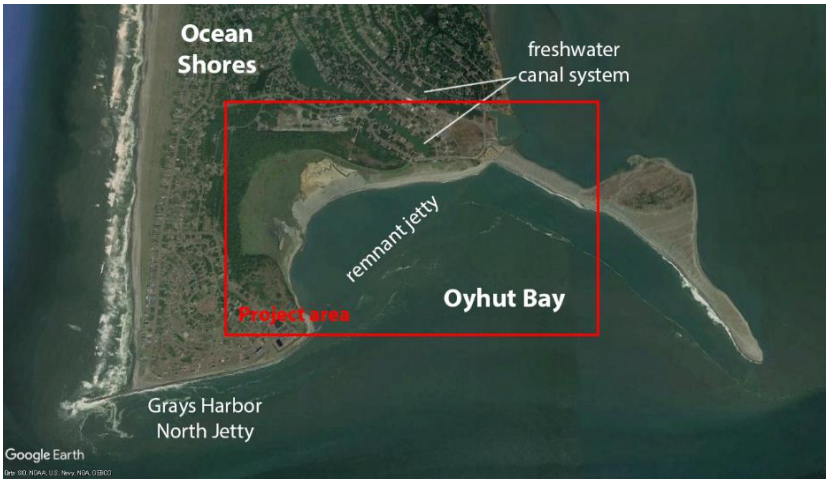

Figure E-10. Oyhut Bay project area map and additional features. Image adapted from Google Earth, 2021.

Hazards issues

The Oyhut Bay shoreline once extended farther south than at present, but has experienced chronic erosion as the shoreline retreats northward from the general area of the remnant jetty. Initial projections of erosion trends in the project area were included in the Grays Harbor County Multi-Jurisdiction Hazard Mitigation Plan 2018 Update (Figure E-11). This work was

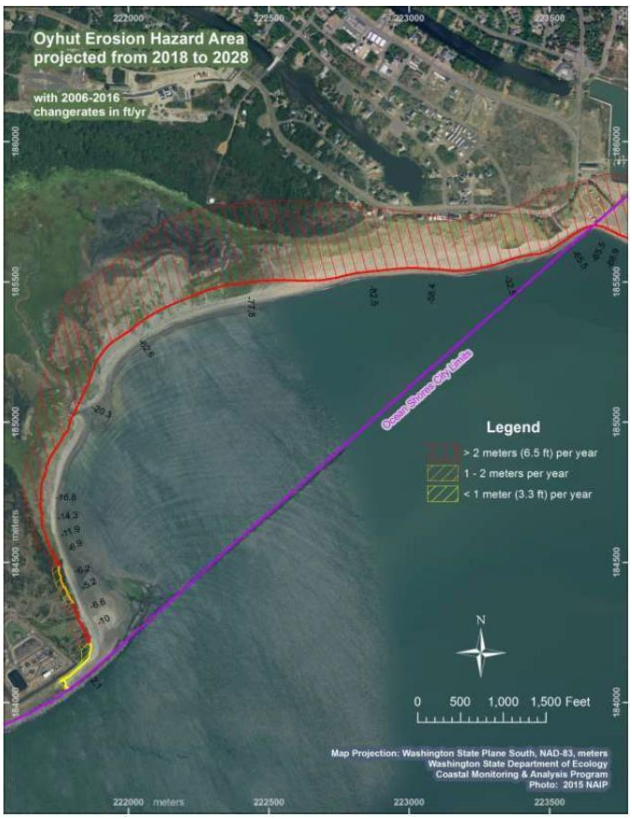

Figure E-11. In 2018, erosion trends were projected 10 years to 2028. In 2021, the projected erosion (in red) is already occurring. Image from Grays Harbor County Multi-Jurisdiction Hazard Mitigation Plan 2018 Update.

conducted by the Washington State Department of Ecology and was based on historical progression of erosion with an outlook of 10 years (to 2028). The projected erosion is now occurring.

Erosion along Oyhut Bay puts homes, habitats, and public infrastructure at immediate risk and will likely increase with projected sea level rise. If erosion continues unabated, saline waters may be introduced into Ocean Shores' freshwater canal system, potentially contaminating the City's drinking water supply. The proximity of the North Jetty to Oyhut Bay directly influences the erosion in this area. Wave overtopping during storm events has contributed toward erosion along the landward side of the jetty on the bay's western shore, extensive backshore flooding, and the formation of swash channels, which serve to further transport sediment along the shoreline.[13] Resulting localized erosion in this area is threatening the City's wastewater treatment plant, which is located at the southwestern corner of Oyhut Bay.

RAD engagement with the project

During the initial outreach phase, the RAD team interviewed Nick Bird, Public Works Director for the City of Ocean Shores, and Crystal Dingler, Mayor of Ocean Shores. These discussions highlighted multiple hazards issues and efforts across Ocean Shores, including several within the Oyhut Bay area. These issues and projects are catalogued in the RAD project inventory (Appendix C). At the time, the City was unable to effectively address these issues due to their scale and complexity as well as limited staff capacity.

Winter 2020–2021's king tides impacted homes along Oyhut Bay (Figure E-12), leading homeowners and Bird to contact Ecology about emergency repairs. The RAD team was informed of this and began talking with Bird about addressing these needs in combination with a long-term approach to erosion, with the goal of avoiding continued impacts and future emergency repair expenses. These conversations produced a set of actions to better

[13] US Army Corps of Engineers, North Jetty Major Maintenance Design Analysis. January 2000. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.200.3589&rep=rep1&type=pdf

understand these issues and to develop adaptation options. These actions also connect with related hazards issues identified by Bird and Mayor Dingler during the RAD team's initial outreach.

Figure E-12. Woody debris remains in the yards of homes along Oyhut Bay following 2020–2021 king tides. Photo by Jackson Blalock, 2021.

Conversations between Ecology and FEMA highlighted an upcoming application round for FEMA's Cooperating Technical Partners program (CTP). The RAD team worked closely with the City of Ocean Shores to synthesize previously proposed ideas, scope and refine a viable project in accordance with FEMA's criteria, and complete the CTP application. This work entailed multiple strategic discussions with City staff; connecting City staff to content experts at Ecology, FEMA, and engineering firms; and drafting language and graphic content for the application. The City of Ocean Shores' proposal was submitted in February 2021. FEMA accepted the proposal and subsequently awarded $150,000 to the City for the project.

Lessons learned

- Hazards impacts led property owners and jurisdictions to undertake immediate emergency repairs, though these did not address the root of the problem nor were they sustainable or resilient courses of action. However, this momentum provided a valuable opportunity for the local community to better understand issues at hand and develop a long-term strategy for the area being impacted. In the wake of emergencies, it is likely that state agencies and other regional organizations may be well-suited to initiate conversations with communities about addressing immediate needs while furthering long-term strategies.
- City of Ocean Shores staff mentioned that the RAD's resilience principles (Appendix D) were helpful for understanding how to think through and scope a more resilient project that would also score well in a competitive funding program. While the resilience principles were primarily used internally by the RAD team, there appears to be great value in sharing these outwardly and iteratively revising them through continued local use and feedback.
- City of Ocean Shores staff stated that "RAD provided a bridge to programs we hadn't heard of, and we were selected for funding... none of that would have happened without you." Most local community members were not familiar with the FEMA CTP program. Similarly, FEMA officials managing the CTP program in Washington said that they were interested in making new connections with potential partner communities on Washington's Pacific coast. The RAD team held early conversations with each of these

parties to understand whether the CTP program would align well with the needs of the City of Ocean Shores. Following these meetings, the RAD team connected the City with FEMA CTP to initiate the conversation around the submission of a project proposal. The RAD team also provided both parties with key preparatory and background information and joined the initial meeting to help facilitate productive discussion.

- The RAD team's status as state agency staff allowed them to bring locally sourced perspectives into detailed conversations with hard-to-reach content experts at state agencies, in order to develop a scope of work that was detailed, actionable, forward thinking, and in service of local priorities.
- While the City of Ocean Shores had experience applying for and managing federal grant funds, the RAD team was able to provide direct assistance writing parts of the grant proposal related to hazards mitigation, technical information, resilience, and connecting the immediate erosion impacts to broader issues in the area.

RAD Project Participant Feedback

Summary of RAD project participant workshop on resilience recommendations

On April 29, 2021, the RAD team held an online workshop with project proponents and other community members with whom the RAD team collaborated with on hazards resilience efforts. These project proponents and community members are collectively referred to as "RAD project participants." The purpose of the workshop was to solicit feedback and discussion regarding the RAD team's support of coastal communities' resilience efforts and gather input on the draft set of potential hazards resilience recommendations that the RAD team was preparing to present to WCMAC. Approximately ten attendees participated from the Shoalwater Bay Tribe, the City of Ocean Shores, WECAN, Pacific County, the City of Westport, and the Pacific and Grays Harbor conservation districts.

The RAD team began the workshop by reviewing the goals of the conversation and providing brief background information on the RAD, including the rationale for the RAD project and its primary goals. The majority of the workshop was then spent reviewing and discussing the list of draft recommendations for supporting hazards resilience. Participants were asked to speak freely throughout the workshop and offer any advice, ideas, and feedback that came to mind.

The following is a list of draft hazards resilience recommendations that were presented to the workshop participants at the time, along with accompanying discussion points and suggestions that were raised by the project participants. For more information on the revised hazards resilience recommendations that were later delivered to WCMAC for their consideration and discussion, refer to the WCMAC Workshop Summary Report and Recommendations (Appendix G).

Draft recommendation #1: Establish a Coastal Hazards Organizational Resilience Team (COHORT)

- Participants expressed that the RAD team served as a vital "bridge" or "link" to help local communities access funding opportunities that they otherwise would not have even known about, such as FEMA's Cooperating Technical Partners (CTP) program. Participants noted that this should be a key role of the potential future COHORT.
- The RAD/COHORT were also described by participants as a "map" or "toolbox" that "brings everything together" to help communities access information, make connections with specific personnel and build new relationships, or otherwise bridge capacity gaps. One participant mentioned that having a team like this available would help them avoid having to "guess at how to get to these things."
- Participants further noted that locating COHORT members on the Pacific Coast was a strong selling point because it would help the member agencies better understand local needs and more directly support local capacity.

Draft recommendation #2: Directly increase local capacity for resilience work

- Participants strongly agreed that lack of local capacity is a massive hurdle. Often, the most qualified individual on a city or county's staff does not have time to apply for grants for hazards mitigation and resilience. If local jurisdictions had a staff member that could focus on addressing mitigation and tying services together to achieve multiple benefits, it would be extremely helpful. As one participant explained, "I don't have the time or ability to pursue these grants. [A dedicated staff position] focusing on hazards mitigation alone within my office would be huge. Probably the best idea I've ever seen come out of Washington Sea Grant…"
- Participants discussed the role that coastal Marine Resource Committees (MRCs) could play in supporting resilience in the region and agreed that additional funding would be required. At present, MRCs' limited capacity does not allow them to focus on resilience due to a lack of sufficient funding and coordination across MRCs.
- Regarding MRCs, recommendations from participants included hiring a full-time coordinator for each MRC, appointing a coast-wide coordinator to improve collaboration between MRCs (and enhance collaboration with Northwest Straits Marine Resources Committees), and "strategic restructuring" or the exploration of alternative models for how the MRC program is run.

Draft recommendation #3: Support local resilience training, job opportunities, and innovation to create a pipeline of programs that build local capacity for resilience-related industries

- A "train-the-trainer" approach was discussed, where a local contractor would train local staff (in this case, on coastal hazards resilience work). A participant from the Shoalwater Bay Tribe noted that they were exploring this idea in order to train planners and other staff.
- Several participants emphasized the importance of bringing resilience concepts into local educational programming. They recommended that professionals from resilience-related fields should be brought in to talk about the opportunities that exist.

Draft recommendation #4: Formally authorize an erosion program at the Department of Ecology

- Consensus arose around the need for the state to support existing local leadership for coastal resilience work. Participants agreed that state assistance for coastal hazards resilience should deliver tangible products and meaningful action, as opposed to creating additional process-oriented constraints or "red tape." They suggested rewording the proposed recommendation to indicate that it is a "technical assistance" program that would expand the current capabilities of Ecology's Coastal Monitoring and Analysis Program (CMAP).

Draft recommendation #5: Enhance WA EMD's tsunami to help communities tackle large/complex tsunami preparedness initiatives, in coordination with WA Department of Commerce's Community Development Block Grant Program and local comprehensive plans

- Participants broadly agreed that this recommendation was necessary to assist certain communities with overcoming significant challenges to undertaking large tsunami preparedness projects. In particular, participants supported the idea of exploring opportunities for more multi-benefit vertical evacuation projects.

Draft recommendation #6: Fund and sustain a centralized website that orients and connects communities and hazards practitioners to data on coastal hazards and applicable resilience-related information

- Participants suggested a variety of beneficial services that a centralized website could supply, such as a list of useful links, resources, and references for grant applications; a tool for local jurisdictions and advocates to communicate hazards information to local constituents and encourage activity; an opportunity for coastal communities to "tell their story" and demonstrate their needs up and down the coast (similar to the Coastal Hazards Risk Reduction Project Mapper[14]); and a central place to house a list of current and ongoing resilience-related work to promote more collaborative and coordinated efforts. One participant explained, "there is a lot of value in showing where the problems are and demonstrating the needs up and down the coast."
- A participant from the Shoalwater Bay Tribe mentioned that all of the Tribes on the coast are working on the issue of upland relocation. They explained that it is really beneficial to share perspectives about the different ways that Tribes manage their areas, but that this information can be difficult to access if someone doesn't have an existing relationship with the planners or people involved in this work.

Draft recommendation #7: Develop and fund more competitive grant funding programs (or adjust existing programs) with a focus on resilience planning and capacity building

- Participants agreed that this recommendation should emphasize capacity building and resilience planning aspects. A new funding program should focus on getting projects "shovel-ready" so that they can access mitigation or construction funds from existing grant programs (particularly those available at the federal level).
- One participant stated that the biggest hurdle is applying to funding programs because it takes a lot of time and resources that local communities do not have. For this reason, participants agreed that a new grant program should provide technical assistance, application coaching, and reimbursements for work undertaken to put the application proposal together.

[14] https://waecy.maps.arcgis.com/apps/MapSeries/index.html?appid=cb81314d6fb44e0187e7980a1f0cd32b

Draft recommendation #8: Pursue modifications to federal standards to minimize the burden of local matching funds requirements

- Participants agreed that matching requirements are a very difficult obstacle to overcome when applying for federal funding programs. One participant noted that many people visit the Pacific Coast and highly value it as a tourism destination, so state funding to assist with matching requirements for coastal resilience efforts could be justified because the Pacific Coast provides benefits and services to people from across the state and beyond.

Draft recommendation #9: Pursue modifications to federal standards to reduce barriers to competitiveness of rural grant proposals

- Participants expressed a strong need for the availability of advance payment mechanisms for funding programs. Participants explained that their communities often harbor significant concerns about tackling new projects that rely on funding programs to reimburse them. Their communities may not able to cover all invoices upfront, which causes delays with getting started and can make it difficult to complete projects within the allotted timeframe. Participants noted several examples where communities decided not to apply to funding programs because of this issue.
- Participants agreed that federal funding programs that require a benefit–cost analysis often put rural communities at a disadvantage. They noted several recent examples where this requirement reduced their competitiveness or prevented them from receiving funding from programs within FEMA and the US Army Corps of Engineers.
- One participant suggested that tourism numbers should be incorporated into benefit–cost analyses, not simply year-round populations.

Project participant survey

Overview

At the conclusion of the RAD project participant workshop, an anonymous web-based survey was distributed to all RAD project participants in order to further evaluate the RAD team's engagement with and support of local hazards resilience projects. The survey consisted of seven questions and aimed to gather feedback and reflections regarding successes, lessons learned, and opportunities to improve upon the RAD team's work. The survey results were also used to inform the development of the hazards resilience recommendations delivered to WCMAC (Appendix G). Nine project participants completed the survey, which was conducted by Washington State University's Division of Governmental Studies and Services in coordination with Washington State University Extension and the RAD team.

Survey results

1. What were the benefits of working with WA Sea Grant and WA State Dept of Ecology ("RAD team") to support your coastal hazards resilience project? Please check all that apply.

Options	Number of respondents that selected the option*
Provided technical assistance (such as web support, access to scientific reports/data, translating jargon, etc.)	5
Informed us of funding opportunities	7
Helped us with scoping a more resilient project (e.g., emphasis on long-term vision or multi-benefit aspects)	5
Provided extra capacity to get proposals drafted and/or submitted	6
Connected us to potential project partners or agency personnel who helped with the project	5
Changed our approach to addressing hazards and/or resilience issues in our community	2
Other (please specify below)	2

Responses to "other":

- Thinks progressively to find solutions for combinations of communities rather than just 1.
- Big picture thinking and hub creation.

*No survey respondents omitted all choices.

2. Please further explain the options you selected above (optional).
    - I am fairly new to working with the "RAD" team and have not yet fully captured all the work and resources that the team has provided to the Tribe.
    - Sea Grant staff have been a pleasure to work with, are very supportive of the initiatives in our community, and we hope to work further with them in the future!
    - WA Sea Grant was instrumental in assisting the City of Ocean Shores to submit an application for the CTP Risk Mapping FEMA grant. They assisted us in making the connections with the appropriate staff for application and providing information to execute the executive summary. Further, they have connected us to a group of entities that are facing some of the same risks. This workgroup is an ideal place to discuss solutions, remedies, and upcoming issues and share our own experiences.

3. What were the difficulties or frustrations of working with the RAD team? Please check all that apply.

Options	Number of respondents that selected the option
Limited expertise of the RAD team on specific topics relevant to your project	1
RAD team's focus on long-term issues did not match local priorities	0
RAD team was missing involvement/participation from a key agency or partner that would have helped support your project	0
Funding to pursue project(s) did not come through	2
RAD team did not have local trust necessary to effectively collaborate	0
Other (please specify below)	1
None	5

Responses to “other”:

- We entered the discussion a bit late.

4. Please further explain the options you selected above (optional).

    - I have not experienced any difficulties or frustration. I am thankful that the Tribe received a letter of support for an application we submitted.
    - Funding didn't come through, but that wasn't RAD's fault.

5. In your opinion, how helpful would the following potential recommendations for supporting coastal hazards resilience be? Please rank each recommendation below on a case of not helpful (1) to very helpful (5).

Potential Recommendation	Average ranking
Implement a sustained resilience program for state agencies to coordinate with one another to support local projects, increase local capacity, and connect communities to funds through staff based on the Pacific Coast (COHORT - Coastal Hazards Organizational Resilience Team).	4.22
Increase and sustain local staff capacity to focus on resilience.	4.22
Support local educational organizations to create a pipeline of educational and job training programs that build capacity for resilience-related industries on the Pacific Coast.	4.22
Dedicate a state agency to lead a coastal erosion and flooding working group for the Pacific Coast, similar to the Tsunami Work Group led by EMD.	3.78
Dedicate a state agency to perform localized erosion data collection and monitoring across the coast, which will provide basis for better risk assessments.	4.00
Support a program to help communities tackle large/complex tsunami preparedness projects, such as upland relocation.	4.44
Create and provide sustained funding for an online Washington State coastal hazards data and resilience hub, where communities can access usable information.	4.56
Develop and fund more state grant funding programs (or adjust existing programs) to focus on resilience planning and community development.	4.78
Minimize the burden of local matching funds requirements when communities apply for state or federal funding programs.	4.89
Reduce barriers to competitiveness of rural grant proposals.	4.89

6. What other recommendations would you suggest for state funds and agency staff (existing or new) to better support coastal hazards resilience on the Pacific coast? (Optional)

    - I realize that the State has Tribal Liaisons for many of its agencies, and in most cases, they have been a great resource. In this time of COVID, it may be challenging to set up meetings to have them come to the reservation and get a "boots-on-the-ground" experience, but it would be helpful if these meetings occurred.
    - I really appreciated the insight from other Marine Resource Committees in the region. Coordinated support of MRCs in the region and coordinated efforts with those outside of our region would be extremely beneficial to our endeavors. Perhaps another avenue of

contracting with the State would behoove us due to the timely process it takes to get our documentation through WDFW.

7. What other additional comments would you like to share about your collaboration with the RAD team? (Optional)

    - I think all the work you are doing is amazing. I can't wait to learn more about the resources you will be supplying to the Tribe.
    - Thank you for not wasting our time. :) You guys are awesome.
    - Thank you for providing support and coordination in our area. We rely heavily on these experts. Our small city does not have resources such as these within our staffing capabilities so the support and outreach provided by the RAD team are invaluable.
    - Good Team, the correct people. It makes a big difference having people that really understand what it means working with us folks on the coast. RAD lets us have a share in driving the bus (so to speak), instead of the State coming in and asking us to ride to their predetermined destination.