



Final Programmatic Report Narrative

September 2022

Washington State Department of Ecology

Restoring Graveyard Spit to Prevent Coastal Erosion in Willapa Bay (WA)

Easygrants ID: 65579

1. Summary of Accomplishments

The team was successful in completing all of the objectives outlined in the grant agreement. In particular, the team completed final engineering designs for the cobble dynamic revetment and restoration of the dune berm along the 3,800 foot stretch of Graveyard Spit. Dynamic revetments are a relatively new nature based approach for addressing erosion in high energy shoreline environments, and the development of these designs required extensive research, collaborative inter-agency teamwork, the incorporation of hydrodynamic wave modeling, and application of results and lessons learned from small-scale pilot dynamic revetments previously completed in and near the project area. Furthermore, the team finalized a set of goals and objectives for the collaborative management of the project site area for post-construction. Prior to this project, agencies and local partners identified potential conflicts between habitat and endangered species recovery, project maintenance and renourishment, and the public use of the site. The site area management plan, agreed upon by all partners, provides a framework for addressing these challenges going forward. Lastly, the team completed the process of drafting the project's environmental documentation and permits. Permit approvals are expected to be in-hand next year to be ready for the project's restoration implementation phase. Once constructed, this project will stand as a landmark achievement for local, Tribal, and state and federal collaboration on an innovative, multi-benefit restoration and hazard resilience project in a severely disadvantaged region that has been experiencing catastrophic erosion impacts for decades.

2. Project Activities & Outcomes

Project Management

- The project team continued to meet to discuss operations, administration, and needs and questions that arose. Meetings occurred at minimum once per month but increased in frequency toward the end of the period of performance.
- Ecology worked with WSDOT and USACE to wrap up the final design and permitting tasks funded through this grant and finalize project deliverables. The project team also began discussions of next steps for how to undertake the implementation phase of the project following the conclusion of this grant.
- Project management coordination throughout the project involved the participation of three government entities (Ecology, WSDOT, and USACE), achieving the first tracking metric of three government entities participating in the completion of the grant tasks. Twenty additional project partners also participated in the project through permitting processes, development and feedback on the Site Area Management Plan, and other consultation and coordination.

Task 1: Hydraulic Engineering

A. WSDOT Engineers will lead the hydraulic design

- WSDOT engineers led bi-weekly design team coordination meetings involving USACE and Ecology engineers and technical staff. Other project partners, including community members and Pacific County representatives also joined these meetings. Designs were refined based on new information and solutions identified.
- Final design and dynamic revetment alignment finished on 6/1/22 and uploaded as an attachment for this report.
- The final hydraulic design report was completed 6/30/22 and uploaded as an attachment for this report.
- The final hydraulic design report provides the information necessary to commence construction of the dynamic revetment and dune restoration system which will provide hazard mitigation and protection for State

Route 105. This achieves the second project tracking metric of number of critical facilities or infrastructure within the radius of enhanced protection (1). This also achieves the third tracking metric of number of properties with enhanced protection (499) by protecting residential properties, cranberry farms, shellfish harvesting habitat on the Shoalwater Bay Tribal Reservation, and Tribal housing, commercial and government facilities, and the Tribal cemetery. The completion of the Site Area Management Plan (Task 4) and Monitoring Plan (Task 5) are ancillary to achieving these tracking metrics as they provide the collaborative goals and framework for the adaptive management of the site in the future.

B. USACE will update existing models to reflect current bathymetry and topography

- The USACE hydrodynamic modeling was completed 6/1/22 and incorporated within the final hydraulic design report. This modeling includes feedback incorporated by the review team on wave runup, longshore transport modeling, and critical mass calculations for a 25-year storm event.
- As reported in January 2022, the team updated the existing Coastal Modeling System (CMS) hydrodynamic and sediment transport model with new bathymetry and topography collected by USACE and Ecology in 2020-2021 of the Willapa Bay entrance channel, Empire Spit, Graveyard Spit, and North Cove shoreline.

C. USACE will complete production runs for design (i.e. water level/wave/sea level rise scenarios)

- USACE completed production runs for design as reported in January 2022. The model was run for a number of storm scenarios to develop the design wave statistics, which WSDOT used to finalize the the alignment, height, and volume of material required for the dynamic revetment and backshore dune proposed for the Graveyard Spit region.

D. USACE will provide assistance for design implementation

- As reported in January 2022, Ecology completed an IAA directly with the USACE to complete the scope of work in the NFWF agreement with the same budget.
- USACE continued to provide assistance for design implementation through incorporation of production runs results and hydrodynamic modeling within the final engineering designs.
- Results determined that a smaller amount of 6-inch cobble material will be needed in the final design than had originally been estimated, which will allow for significant cost savings on the implementation budget.

Task 2: Permitting & Environmental Review

A. WSDOT will be the lead on an Environmental Documentation which will comply with the requirements of the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA).

- NEPA Categorical Exclusions (CE) – Complete under the scope of work for this award
 - NEPA kick-off and start of public involvement at WECAN meeting on 1/11/2021
 - Project update and continuation of public involvement at WECAN meeting 4/22/2021
 - Project update and continuation of public involvement at WECAN meeting 10/21/2021
 - USACE is the federal lead for the project by triggering the Section 404 and Section 10 permits
 - Pre-application meeting with USACE and Ecology on 11/17/2021
 - Confirmed this project will not require a NEPA Environmental Assessment (EA) as previously documented through project scoping.
 - The project's NEPA will be covered by USACE through the Section 404 and Section 10 Individual Permit process.
 - Joint Aquatic Resources Permit Application (JARPA) final draft completed in June 2022, now in review
- SEPA Determination of Non-Significance (DNS) and Checklist signed on 6/23/22 – Complete
 - SEPA DNS Published in The Daily World and Chinook Observer
 - Comments received from Ecology, Washington State Department of Fish and Wildlife (WDFW) and Pacific County Drainage District in favor of the project.
- Permitting – Complete under the scope of work for this award. All permits drafted, undergoing final review prior to submittal.
 - Ecology and Pacific County confirmed this is a coastal VE Zone, there is no floodway, so the project does not need to show “no-rise” regarding impact to mapped FEMA flood elevations/flows. A CLOMR/LOMR should not be necessary. 11/4/2021
 - Shoreline Exemption per RCW 90.58.355(3) – Complete

- Notifications sent on 4/26/22, no comments received
 - JARPA shall be submitted to Ecology for Section 401 Water Quality Certification and Coastal Zone Management concurrence for impacts below High Tide Line (HTL) – Pending
 - JARPA shall be submitted to Environmental Protection Agency (EPA) for Section 401 Water Quality Certification for impacts below HTL on the Shoalwater Bay Indian Reservation – Pending
 - JARPA shall be submitted to WDFW for HPA permit for impacts below the Ordinary High-Water Mark (OHWM) – Pending
 - JARPA shall be submitted to Pacific County for Development Permit – Pending
 - Confirmed with Washington State Department of Natural Resources that this project is outside of their jurisdiction on 8/8/2022
 - Coordination required with Washington State Parks and Recreation for impacts within the Seashore Conservation Area per RCW 79A.05.605 prior to construction phase - Ongoing
- Wetland & OHWM Delineations –
 - Began OHWM delineation in Winter 2020, delineations completed in Summer 2021
- Critical Areas Report –
 - Critical Areas Report completed in June 2022, undergoing review prior to submittal with environmental permits for construction.
- Endangered Species Act (ESA) – Complete under the scope of work for this award. BA has been submitted to USFWS and NMFS.
 - Biological Assessment (BA) drafted by WSDOT in January 2022
 - Pre-BA meeting with U.S. Fish and Wildlife Service (USFWS) & National Marine Fisheries Service (NMFS) held on 12/16/2021
 - Confirmed Formal ESA consultation with USFWS and Informal consultation for NMFS
 - BA was submitted by USACE to USFWS on 7/28/2022
 - USFWS project reference number is 2022-0070833
 - WSDOT submitted BA to NMFS as part of informal consultation on 9/29/2022
 - Western Snowy Plover and Streaked Horned Lark Protection Plan developed by WSDOT, included as an attachment to the BA.
 - Conducted site visit with USFWS and NOAA on 8/31/2022
- Cultural and Historical Resources – Complete under the scope of work for this award. Consultation will continue with Shoalwater Bay Indian Tribe outside this award scope to prepare for project implementation phase.
 - Initiation of Section 106 & APE notice sent on 10/14/2020
 - Met with the Shoalwater Bay Tribe on 11/5/2020
 - Sent APE and Tribal Correspondence to Department of Archaeology and Historic Preservation (DAHP) on 11/20/2020
 - WSDOT cultural resources specialists conducted fieldwork for this survey on 5/27/2020
 - WSDOT finalized Cultural Resources Short Report No. 21-03 on 9/24/2021
 - Based on the results of this survey, WSDOT recommends that no historic properties will be affected by the project.
 - Report was sent to the Tribes on 10/4/2021
 - Quinault Indian Nation and Cowlitz Tribe responded they have no comments
 - Continued consultation with Shoalwater Bay Indian Tribe, for impacts on their Tribal lands. Consultation will continue throughout final submittal of permitting documents and process of seeking funding for implementation phase of the project.
 - As the NEPA Federal lead, USACE will submit the Section 106 information to DAHP for final review – Pending

Task 3: Area Engineering

A. WSDOT will complete a traffic control plan

- The traffic control plans were completed in June 2022 and are included within the Graveyard Spit Final Plan Set.

B. WSDOT will complete a site survey

- OHWM and ground survey were started on November 16, 2020 and completed on January 8, 2021. Beach area covered is included as an attachment to this final report
- A drone flight survey was completed in May 2021 for the SR 105 alignment. Elevations included as part of the Final Plan Set.
- Survey results and imagery are too large to include as attachments. If this information is needed, please contact and we can arrange a file transfer.

Task 4: Site Management Planning

A. Ecology will work with partners to develop a management strategy that anticipates changes to the site as a result of the project.

- The Site Area Management Plan for the project was completed in June 2022. The plan supports the effective management, monitoring, and maintenance of the project and site area post construction of the dynamic revetment and dune. It was decided that this finalized be deemed “preliminary” to indicate the expectation that the plan may be revised as necessary (in coordination with all project partners) in the lead up to and during the implementation phase of the project.
 - Based upon collaborative project team meetings and discussion with project partners, a draft set of site area management goals, objectives, and priority tasks was developed. It was presented and shared with project partners in early August, 2021. Feedback and additions were incorporated in August and September, followed by additional follow-up questions and a second round of review.
 - A full version of the plan was shared with the project team on June 6, and final feedback and revisions were subsequently incorporated.
- The site management goals and objectives balance potential conflicts between habitat and endangered species recovery, project maintenance and renourishment, and the public use of the site. The final Graveyard Spit Site Area Management Goals are:
 - Prevent further erosion of Graveyard Spit and support the integrity of Empire Spit to protect State Route 105, the Shoalwater Bay Tribe, and nearby communities.
 - Protect and restore sensitive dune, saltmarsh, and intertidal environments and enhance habitat for protected species.
 - Support responsible recreational use and public stewardship of the project site area.
 - Engage in regional coordination and prioritize transparent and collaborative planning and decision-making.
 - Carry out monitoring and adaptive management of the project site area to anticipate and respond to future conditions.
- The Preliminary Site Area Management Plan also summarizes site conditions, historical context, regulatory and site management authorities, existing uses, and anticipated changes to the site. It incorporates relevant findings from the permitting process and references the final hydraulic design report as an accompanying document.

Task 5: Develop a Monitoring Plan

A. WSDOT will work with Ecology and USACE to develop a monitoring plan for the project to inform the final design and construction of the Graveyard Spit project and provide the basis to evaluate its effectiveness compared to no-action. The monitoring will also bridge ongoing monitoring efforts related to the Shoalwater Bay Berm, the WSDOT dynamic revetment, and the North Cove dynamic revetment.

- The Adaptive Management Plan and Monitoring Plan were completed and included in the Final Hydraulic Design report. The premise of the Adaptive Management Plan is to use monitoring, feedback structures, and anticipated courses of action to respond to changing conditions on the spit and with the components of the dynamic revetment. Monitoring will be conducted annually, at the end of the typical storm season, April 1, and after significant storms. A significant storm is defined as wave heights exceeding the 5 year storm wave heights.
- Additional environmental monitoring objectives and adaptive management approaches to be taken were included within the Site Area Management Plan.

B. Ecology will monitor the geomorphic condition changes of Graveyard Spit over time to inform future design modifications and construction quantities that may differ from estimates made during the engineering and permitting phase.

- Ecology's Coastal Monitoring & Analysis Program (CMAP) regularly monitors erosion and sediment transport on beach areas in the region surrounding Graveyard Spit. Based on Ecology's most recent monitoring of Graveyard Spit from 2014-2021, Graveyard Spit is currently eroding at an average of 107 feet per year. WSDOT's final engineering designs aim to account for the anticipated rate of future retreat but additional design modifications may be needed prior to construction if there are significant changes as a result of erosion or storm surge. CMAP will continue to monitor the area in the interim.
- WSDOT will secure funding for additional CMAP monitoring during the implementation phase of the project to monitor geomorphic changes and the condition of the dynamic revetment.

3. Lessons Learned

The Graveyard Spit Restoration and Resilience Project is untraditional in that it is a locally led project that is managed by the Washington Coastal Zone Management Program (housed at Ecology) and the Washington State Department of Transportation. The state agency collaboration on this project provides a model for proactive coastal resilience assistance to underserved and low-capacity communities that seek to build resilience to coastal hazards. Underserved and disadvantaged communities experience disproportionate environmental stressor burdens and high cumulative impacts, as well as disproportionate impacts from climate change. The collective poverty rate for the communities along the north shoreline of Willapa Bay is 29.3% and the median household income is \$41,200 – approximately \$30,000 below the state average. In addition, this area has one of the highest rankings in the state for unemployment percentage, social vulnerability to hazards, and costs associated with transportation, according to EJScreen. The same inquiry indicated the percentage of the population is between 37-44% People of Color. Intervention and financial support to address the protection and restoration of Graveyard Spit has been necessary to support continued existence of the communities of this area as well as critical habitat for species of ecological concern. Although dynamic revetments have been implemented successfully in the Pacific Northwest and elsewhere, the use of this technique is relatively new. This design for Graveyard Spit proposes the most extensive dynamic revetment structure built to date in order to protect underserved communities that have experienced some of the most devastating impacts of erosion our nation's history. The collaborative processes outlined in the Site Area Management Plan and Hydraulic Design Report's Adaptive Management Plan present important learning opportunities for the broader adoption of nature-based solutions and the development of best management practices for implementation across the state and country. Upon completion of the construction and restoration phase, this project demonstrate how multi-benefit coastal resilience objectives can be achieved through interagency coordination between Ecology, WSDOT, USACE, and local and Tribal partners to jointly develop a local solution that meets state and national interests.

The Graveyard Spit project's success is highly dependent on both technical engineering knowledge and local knowledge. The Shoalwater Bay Tribe as well as local community members and organizations, including Pacific County Drainage District #1, the Pacific Conservation District, and Washaway No More, have been instrumental in leading this effort in partnership with other members of the Willapa Erosion Control Action Now (WECAN) community forum. Community members involved in this project regularly witness changes along North Cove's shore and use their observations to adjust the North Cove dynamic revetments and inform future phases of work. This experience, combined with scientific monitoring conducted by Ecology's Coastal Monitoring & Analysis Program (CMAP) on the North Cove dynamic revetments, have contributed valuable information on the performance and reliability of the dynamic revetment approach in Washington State. These results have informed the development and implementation of the Graveyard Spit Restoration and Resilience Project. Adaptive management will play an ongoing role in the Graveyard Spit project, and lessons learned from the nearby North Cove dynamic revetment supported the development of management and monitoring plans for this project.

Several state- and federally-listed species are present in the project site area, including western snowy plover and streaked horned lark. The Pacific coastal population of the western snowy plover is listed as threatened under the Endangered Species Act and is listed as endangered by Washington State. This population nests above the high tide line on a variety of beach and dune types including coastal beaches and dune-backed beaches such as Graveyard Spit. Pairs and individuals have been observed in the Graveyard Spit area annually since 2013. Meanwhile, coastal erosion has continually created, shifted, and destroyed habitats in this dynamic system. Erosion at North Cove and along the shoreline of Graveyard Spit

and Empire Spit has reduced the width of these beaches, which are some of the few nesting areas for these threatened species on the Washington coast. Erosion, inundation, and infilling during extreme high tides and storm events has also reducing the extent of sensitive saltmarsh habitat. Willapa Bay is also an important shorebird feeding area during the spring and fall migrations. Without the Graveyard Spit Restoration and Resilience Project, there is a high risk that erosion will continue and the existing habitat for many protected species will be lost. This has presented an interesting challenge for the project team, which has sought to develop a nature-based solution to the erosion while minimizing impacts to these important species. During the final engineering design and environmental permitting phase of the project, the team searched for an emergency solution to the erosion to stabilize the spit and protect critical nesting habitat in the interim prior to the completion of the full project. Interim stabilization would provide for an easier design process --- if the spit continues to erode, the project footprint may have to be altered after environmental permits are acquired, potentially requiring further delays to amend the permits. There were many conversations about the merits and tradeoffs of taking immediate action (with the intent of protecting critical habitat) as well as the potential impacts of such action on threatened species. Ultimately, environmental permitting requirements prevented the implementation of an interim solution. This raises the question of whether more flexibility is needed for the permitting of emergency nature-based solutions if the benefits to threatened species outweigh the relative risks and adverse impacts. This is a question that project proponents and environmental regulators will increasingly have to wrestle with as shoreline environments change rapidly due to sea level rise, increasing storm severity, and other climate change stressors.

4. Dissemination

Toward the end of the project duration, the team largely focused on external efforts on the work of identifying and applying for grants for construction and restoration implementation funding. However, the team did present and share lessons learned to various audiences. Throughout the project duration, the project team regularly presented results and milestones to the public Willapa Erosion Control Action Now (WECAN) community forum via webinars and to stakeholders participating in the Erosion Control Master Planning process for the north shore of Willapa Bay, led by Pacific County. This included sharing lessons learned, challenges, and decision making throughout the process. Feedback and input was also solicited and incorporated into the final designs and Site Area Management Plan. Furthermore, the project team presented on progress and lessons to NFWF in October 2021. Ecology also regularly shared and discussed project updates, challenges, successes, and lessons learned through Washington Coastal Zone Management Program contacts at NOAA's Office for Coastal Management and with the Coastal States Organization.

5. Project Documents

Include in your final programmatic report, via the Uploads section of this task, the following:

- 2-10 representative photos from the project. Photos need to have a minimum resolution of 300 dpi and must be accompanied with a legend or caption describing the file name and content of the photos;
- report publications, GIS data, brochures, videos, outreach tools, press releases, media coverage;
- any project deliverables per the terms of your grant agreement.

Photos, outreach tools, and project deliverables have been uploaded and are listed in the Project Photos and Documents document.

POSTING OF FINAL REPORT: *This report and attached project documents may be shared by the Foundation and any Funding Source for the Project via their respective websites. In the event that the Recipient intends to claim that its final report or project documents contains material that does not have to be posted on such websites because it is protected from disclosure by statutory or regulatory provisions, the Recipient shall clearly mark all such potentially protected materials as "PROTECTED" and provide an explanation and complete citation to the statutory or regulatory source for such protection.*