

FEDERAL INTEREST DETERMINATION
CONTINUING AUTHORITIES PROGRAM SECTION 103
Coastal Storm Risk Management

**North Cove Shoreline Protection Project
North Cove, Pacific County, Washington**



PREPARED BY:
DEPARTMENT OF THE ARMY CORPS OF ENGINEERS SEATTLE DISTRICT
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CONTINUING AUTHORITIES PROGRAM
FEDERAL INTEREST DETERMINATION REPORT

Section 103 North Cove Shoreline Protection Project
P2# 469356

Congressional Delegation – Senators Maria Cantwell and Patty Murray, Representative Jaime Herrera Beutler (WA-3).

- 1. Authority** –Section 103, River and Harbor Act of 1962, as amended, Coastal Storm Risk Management.
- 2. Location** – The North Cove Shoreline Protection Project is located in Pacific County, Washington (Figure 1). The study area is located on the northern shores of Willapa Bay. (Figure 2). The study area extends for approximately 4 miles of shoreline along Washington State Route 105 (SR 105) in Pacific County between the unincorporated areas of North Cove and Tokeland, Washington. It is primarily composed of low lying coastal plains with residential, agricultural, and commercial properties.
- 3. Views of the Sponsor** – It is anticipated that the non-Federal sponsor will be Pacific County (County). Other key stakeholders with a high interest in the project are the Shoalwater Bay Tribe and the Washington State Department of Transportation. Both the County and the Shoalwater Bay Tribe support further investigation for hurricane and storm damage reduction. This has been demonstrated through coordination of this initial investigation with Pacific County.



Figure 1: Location of City of North Cove within Pacific County.

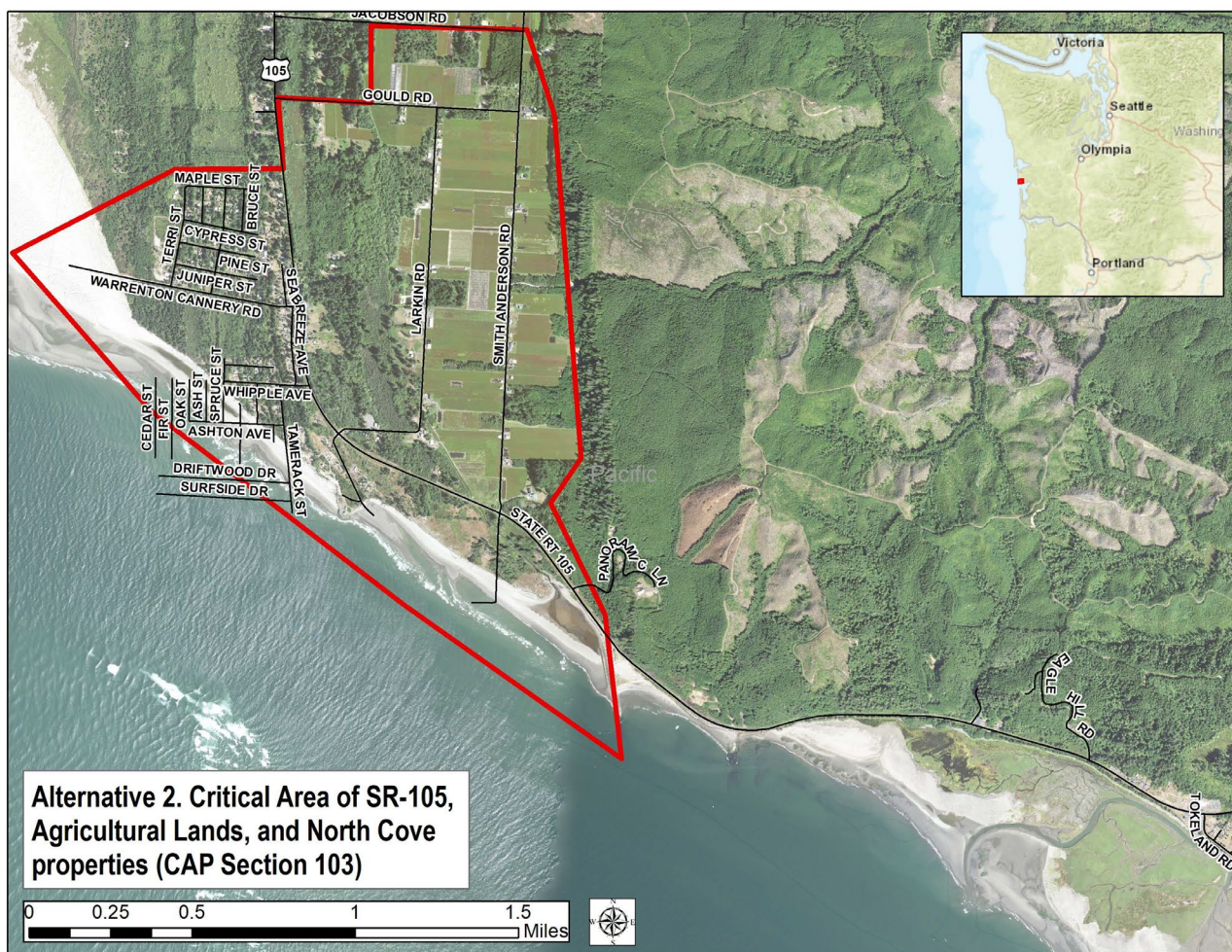


Figure 2: Location of Study Area within Pacific County.

Existing Conditions:

Willapa Bay is a large estuary on the southwest Washington coast located 28 miles north of the Mouth of the Columbia River and 17 miles south of the entrance to Grays Harbor (Figure 1). Its tidal prism at more than 10 billion cubic feet is one of the largest of all inlets on the coast of the continental United States (Jarrett 1976). The large tidal prism is a result of the broad bay area and relatively large tidal range. Strong tidal currents and energetic waves at the Willapa Bay Entrance collectively act to transport millions of cubic yards of sediment on this predominantly sandy coast. The Grayland beach area saw its first homestead in 1880 with cranberry production introduced in the early 1900s. The Grayland area extends from the Pacific County border, south approximately eight miles, to the town of North Cove.

North Cove is a resort community located south of Grayland, along SR 105 (Figure 2). The original site of North Cove was a sandy peninsula known as Cape Shoalwater (established 1884). The peninsula was once the site of a town, U.S. Coast Guard Station and lighthouse. Severe beach erosion that occurred over the course of a century erased the original site in the 1960s. The name North Cove is now applied to the surrounding community of cranberry farms, resort businesses, and beach homes, which crowd the landscape from Grayland to Tokeland (Pacific County 2018).

Beach erosion at Cape Shoalwater has been a chronic problem since the turn of the 20th century. The 1880 navigation charts show the entrance to be only 3 miles wide. Between 1887 and 1971, Cape Shoalwater receded 11,700 feet northward (Figure 3). By 1971, shoreline erosion had destroyed 3,000 acres of public and private lands including over 30 homes, businesses, a grange hall, a public schoolhouse, a US Coast Guard Station, and twice forced the relocation of the Coast Guard Lighthouse. Washington State Route 105 (SR-105) was relocated landward shortly after 1970 and the prior alignment was lost to erosion by 1978 (USACE 1970; 1978).

Annual erosion rates ranged from 0 to 250 feet per year. Periods of no erosion were attributed to calmer winter storm years when a continuous outer bar would develop from the Middle Entrance to the North Beach Spit (Figure 4). Higher shoreline erosion rates were correlated to strong winter storm years where the channel thalweg would breach (or sever) the outer bar. It was speculated that these breaching events would cut off southerly transport of sand from the North Beach Spit, which supplied the sediment to maintain a dynamically stable Outer Bar. This change in equilibrium would then allow ocean swells to transport sediments from the severed outer bar into the middle entrance and constrict the North Entrance Channel along Cape Shoalwater. This constriction in channel width then increased the tidal currents and caused acceleration of the shoreline recession along Cape Shoalwater (USACE 1971; Terich and Levenseller 1986).

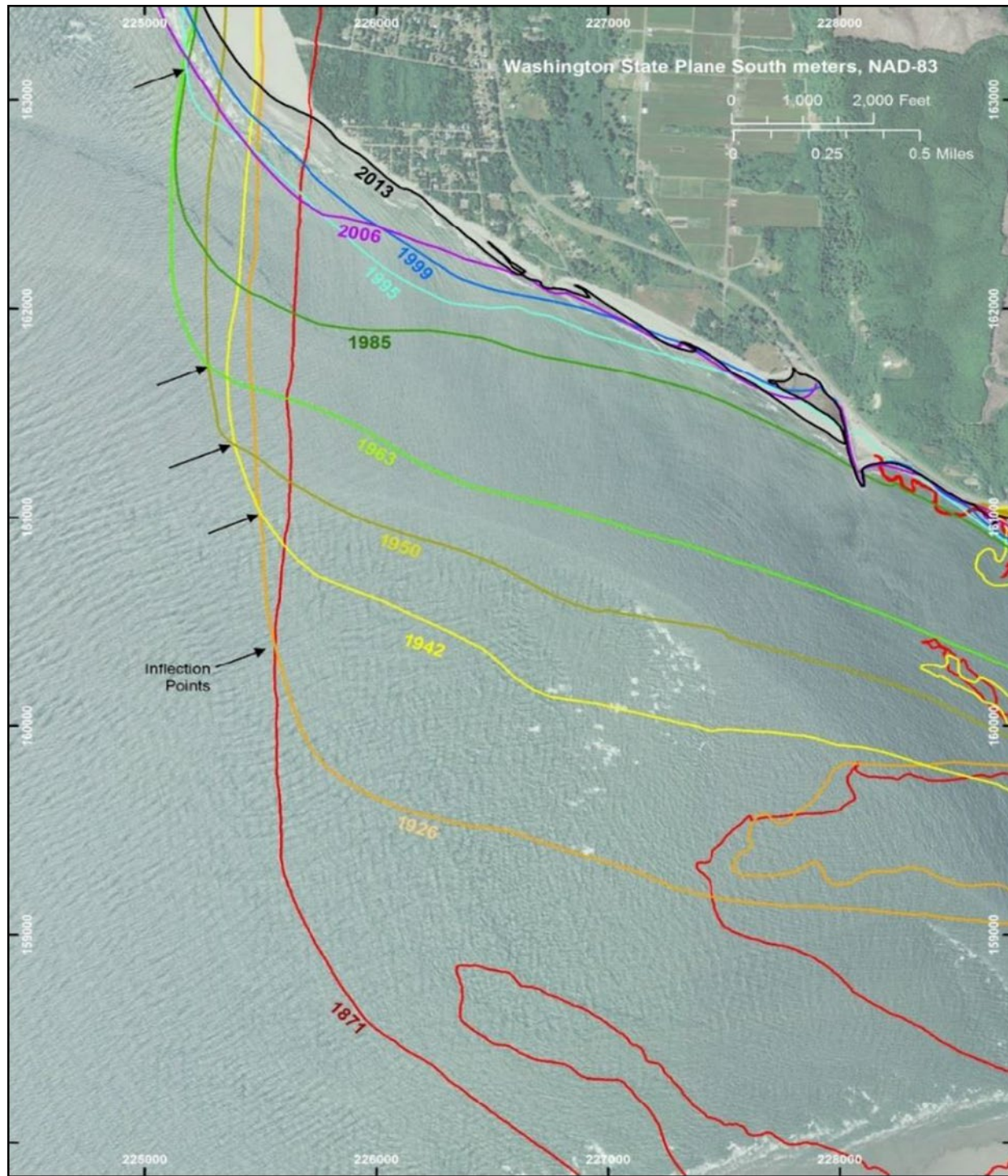


Figure 3: Shoreline erosion associated with the North Entrance Channel migration since 1871.

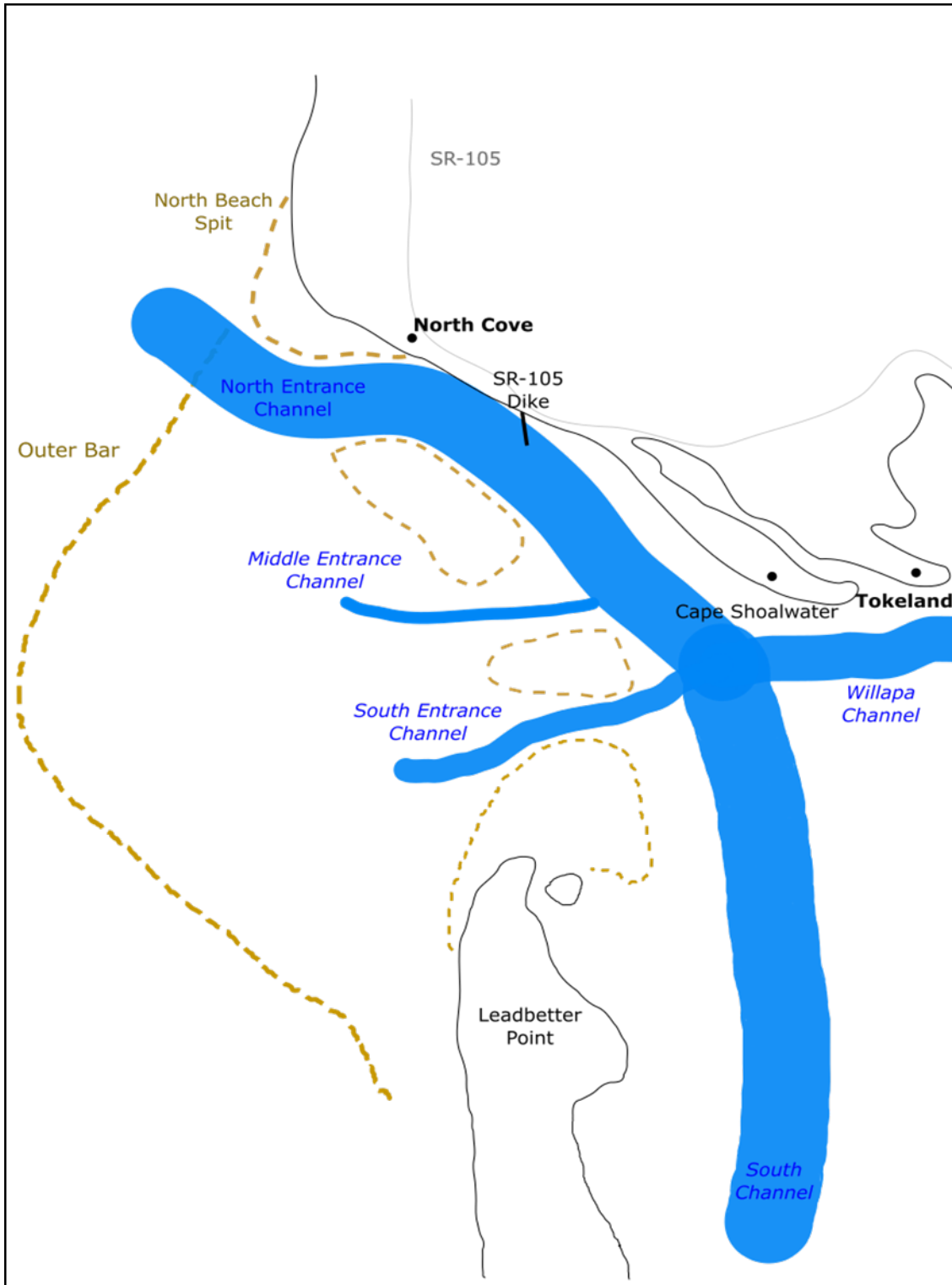


Figure 4: Landform features at the entrance to Willapa Bay

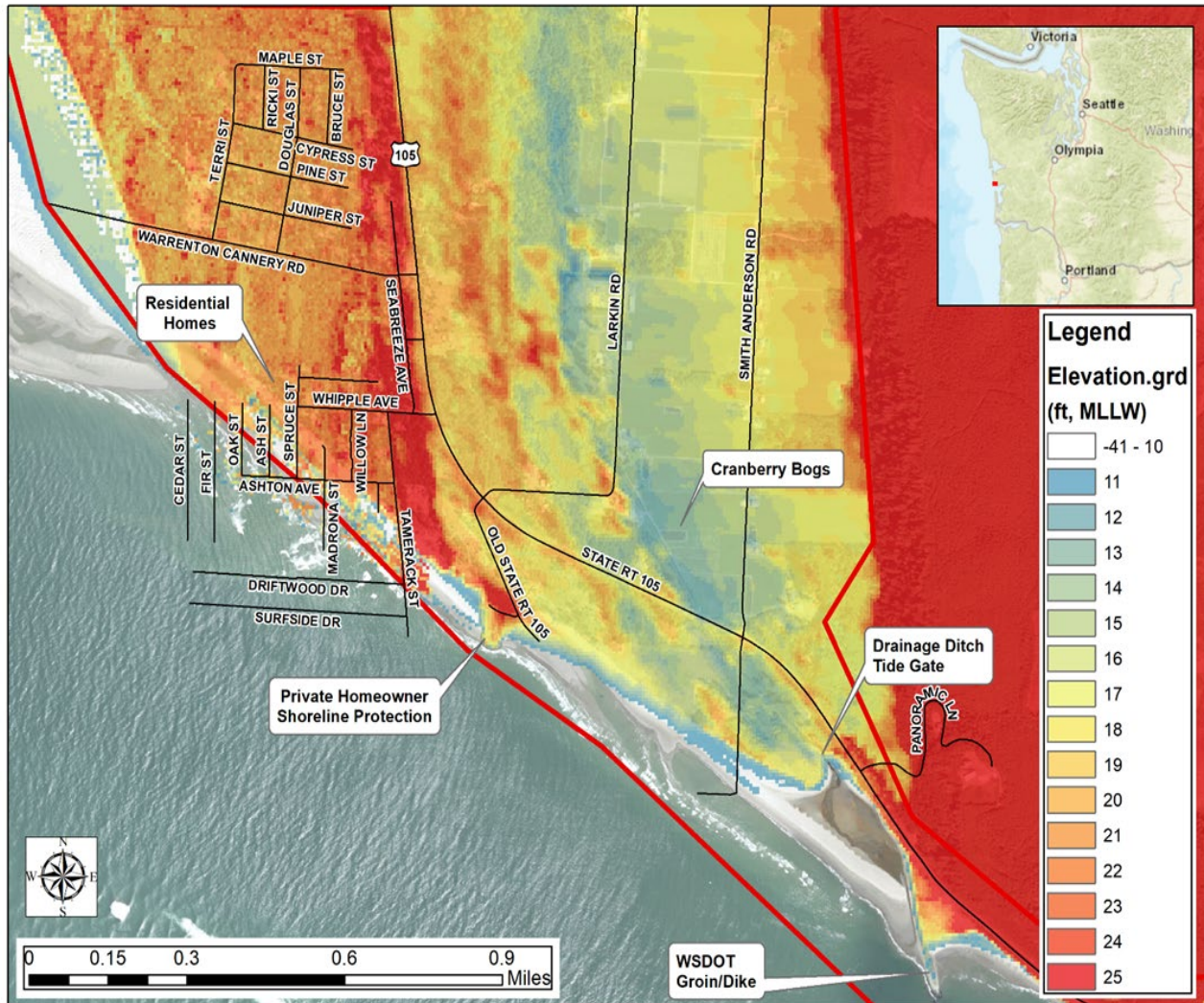


Figure 5: Ground elevations in the North Cove study area.

During the particularly strong winter months the combined effects of high astronomical tides, storm surge, and high wave run up creates a wave impact on the beach berm face (Photograph 1). Over time the berm avalanches and waves move the material offshore. Due to the proximity of the North Entrance Channel any material moved offshore is quickly captured by the currents and deposited north of the inlet. This viscous cycle continues and leads to structures being lost to the Pacific Ocean each winter (Photograph 2).

There is an existing Federal Flood and Coastal Storm Damage Reduction (F&CSDR) project located southeast of the project area. The USACE re-constructed a barrier dune to protect the Shoalwater Bay Tribe in 2013. The nourishment cycle is every 5 years. The first nourishment was completed in 2018.

Scope of the Proposed Section 103 CAP Study

Pacific County is interested in partnering with the Washington State Department of Transportation

(WSDOT) to address coastal storm erosion north of the proposed Section 103 project area; however, there is no formal project plan or funding to address this area at this time.

The existing Federal Shoalwater Bay Flood & Coastal Storm Damage Reduction Project (F&CSDR) that is located southeast of the study area was designed to provide both flood risk management and shoreline erosion protection for the Shoalwater Bay Tribal village. Although they do not yet have the funding, both the State of Washington and the Shoalwater Bay Tribe are addressing erosion on Graveyard Spit south of the proposed Section 103 project area through Grant and State of Washington funding avenues.

The Section 103 study would evaluate alternatives between the existing SR-105 dike and Maple Street to address shoreline erosion and coastal storm inundation. (Figure 2). The potential alternative plan considered for the Section 103 study area is described in section 7 of the FIDR below.

5. Problems and Opportunities

- a. **Problems:** The study area is expected to continue to present a significant coastal storm flood and erosion risk with associated damages due to flat, low-lying topography with exposure to tidal and wave action flooding from the Pacific Ocean. Backshore topography reaches only a few feet above the high tide elevation (Figure 5). The likelihood of future storms with intensities similar to the February 4, 2006, December 3 2007, and March 10, 2016 storms, along with sea level rise, is placing this section of North Cove at increasing risk for more frequent flooding and shoreline erosion.
- b. **Opportunities:** Given these conditions, shoreline erosion damages predicted for the 50 year planning horizon in the North Cove study area are likely to be substantial. Opportunities for coastal storm damage reduction through a combination of structural and non-structural measures exist in the study area.
 1. Improve sediment delivery down drift of the SR 105 groin/dike.
 2. Establish a stable shoreline plan form shape to minimize erosional hotspots near existing structures.
 3. Reduce coastal storm damage from flooding, sand overwash and debris on SR 105.
 4. Reduce risk of North Entrance Channel migration toward SR 105.

6. Potential Measures and Alternatives– This initial appraisal of Federal interest was performed in accordance with EP 1105-2-58 Continuing Authorities Program. The appraisal involved reviewing existing conditions, communicating with the non-Federal sponsor and local stakeholders, proposing several alternatives, preparing a preliminary design, and conducting a cost and benefits analysis to determine the feasibility of a Federal project for the Pacific County North Cove study area under section 103 authority.

For the purposes of this Federal Interest Determination, both structural and non-structural measures were evaluated in the study area to manage coastal storm damage. Further investigation during feasibility under the CAP Section 103 authority will address other possible alternatives for the study area. These alternatives will include structural and non-structural measures. Coordination with the regulatory agencies and National Environmental Policy Act (NEPA) compliance will also occur during the feasibility study.

Management Measures

A management measure is a feature or an activity that can be implemented at a specific geographic site to address one or more planning objectives. Management measures are the building blocks of alternative plans and are categorized as structural and nonstructural. The following measures were identified for the study area:

Structural Measures

1. Construct Revetment - Reduce offshore sediment loss and dune erosion
2. Increase backshore elevation - Reduce/prevent flood inundation during storm events
3. Construct training dike – Reduce northward channel thalweg migration toward shoreline

Non-Structural Measures

4. Relocation - Relocate properties/structures in high risk areas
5. Acquisition - Acquire properties in high risk areas

The existing Federal Shoalwater Bay Flood & Coastal Storm Damage Reduction Project (F&CSDR) that is located southeast of the study area was designed to provide both flood risk management and shoreline erosion protection for the Shoalwater Bay Tribal village. However, given the documented erosion to the northwest of this area, (Photos 1 and 2) particularly during the strong El Nino Winter of 2015/2016 (Photo 2) it is evident that the area of North Cove could benefit from additional coastal storm and shoreline protection measures. According to EP 1105-2-58, the construction of an adjacent CAP project to enhance the existing project would be policy compliant:

“Using Continuing Authorities Program (CAP) at Projects Specifically Authorized by Congress. CAP authorities may be used to provide additional improvements to a completed portion of a specifically authorized project so long as they do not impair or substantially change the purposes or functions of the specifically authorized project.”



Photograph 1: North Cove, WA shoreline erosion during 18 January 2018 storm event (just south of private homeowner’s shoreline protection).



Photograph 2: Loss of home into Pacific Ocean during 11 December 2014 storm event. (a) Before storm (b) during storm

Real Estate

ER 1165-2-130 states: “All costs assignable to benefits to privately-owned shores, within or downdrift of physical project limits, (where use of such shore is limited to private interests) are non-Federal, except that benefits to private shores beyond project limits, if trivial in amount, are considered incidental for

cost sharing purposes.. Benefits from prevention of losses of developed private lands are treated as storm damage reduction benefits.” Washington does permit some private land-owners to own down to the low-tide line which could present an issue here depending on the particular ownership situation of the beach in question.

The beaches in the study area are a mix of public and privately owned lands. According to the Washington State Department of Ecology’s beach access website, there are public beaches and public access within the project footprint. The privately owned lands have access for the public and therefore Federal participation may be recommended for the protection of developed private shores if the use of such shores is not limited to private interests.

7. Potential Recommended Plan – The potential alternative plan considered for the North Cove area includes a cobble beach or dynamic revetment (Figure 6). The cobble beach functions by absorbing wave energy through movement of the individual cobbles. Additionally wave run-up is significantly reduced by the permeable nature of the cobble thereby reducing the frequency of wave impact on the existing beach berm face. The dynamic revetment would consist of two separate segments. A 5,000 linear foot segment from the private homeowner shoreline protection near Old State Route SR 105 to Warrenton-Cannery Road and a 3,300 linear foot segment from the shoreline protection to the drainage ditch tide gate.

The alternative plan presented in this section provides a basis for the cost estimates and the economic analysis discussed in Section 7. The design is at a preliminary level of detail, using data collected from the United States Army Corps of Engineers (USACE), Washington State, and Pacific County. More detailed analyses will be conducted should the project proceed to the feasibility phase.

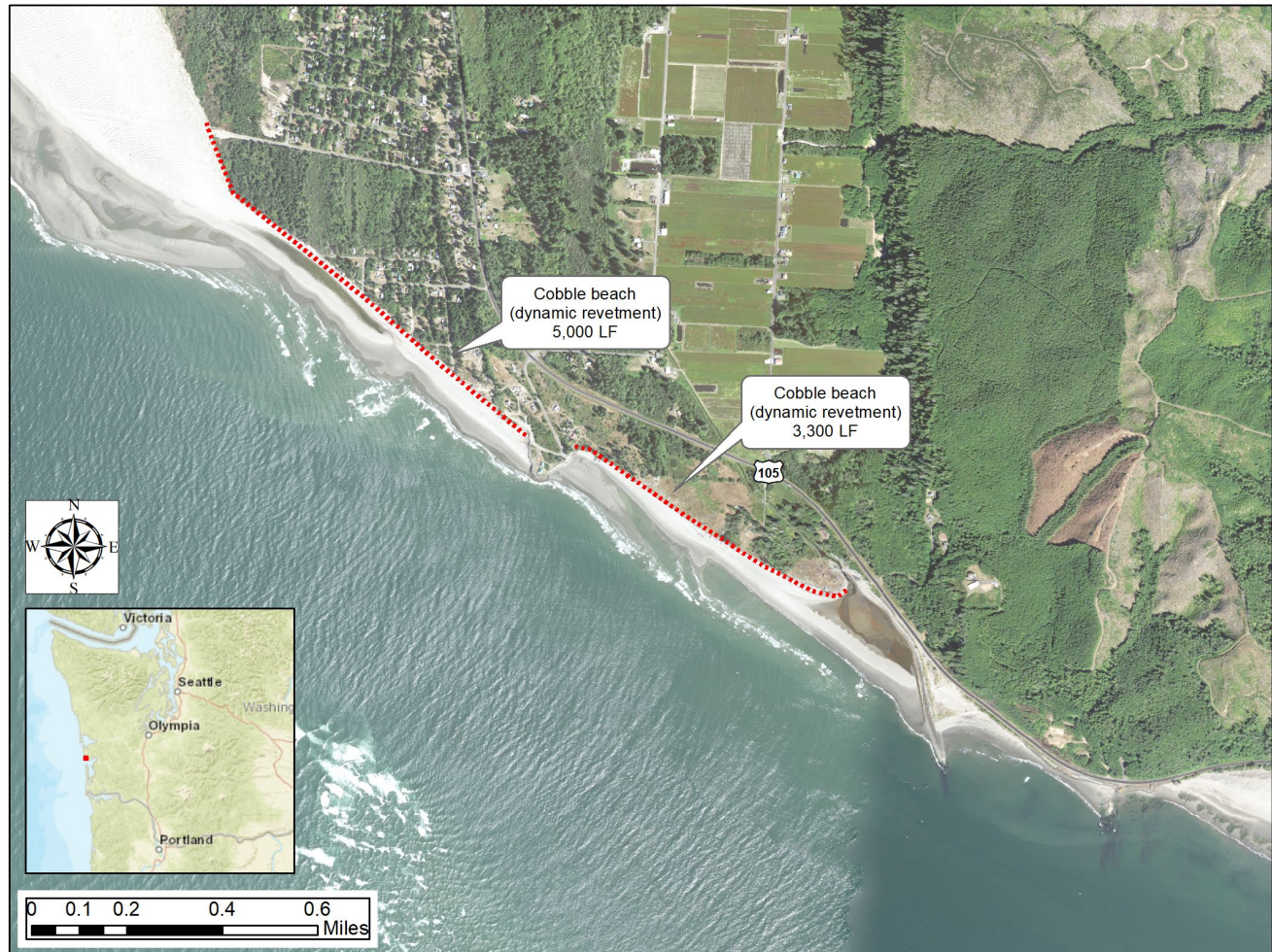


Figure 6: Location of proposed cobble beach (dynamic revetment).

The dynamic revetment would be entrenched to +5 feet MLLW and a 1-foot filter layer would be constructed to minimize settlement of cobbles into the existing sand. The crest height of the dynamic revetment would be +19 feet MLLW with a crest width of 30 feet. A side slope of 1 horizontal on 7 vertical would be constructed based on the equilibrium beach profile of a cobble beach for the given wave environment. The gradation of the cobble would be a 8-inch minus cobble or quarry spalls. Approximately 175,000 tons of cobble and 35,000 tons of filter layer material would be required.

The proposed dynamic revetment location was selected to provide coastal storm damage reduction for the study area that is most severely impacted by storm events because of the low ground surface elevations in the area and the shoreline proximity to SR 105. The project is assumed to reduce inundation damages from storm surge and wave run-up for structures and agricultural land in the study area. However, actual damages that occur during storm events would be influenced by storm duration, tides, wave action, and interior drainage, which warrant additional investigation in the feasibility study.

8. Economic and Financial Data for Potential Recommended Plan

Economic Data

This preliminary economic assessment examined the potential project costs and economic benefits of constructing a coastal storm damage reduction project in the study area that would reduce storm damage risks to public health, safety, and property in the North Cove study area associated with coastal flooding from storm events.

Costs

As captured in Table 1 and Table 2, the most recently updated cost of constructing a dynamic revetment intended to prevent further erosion and protecting SR 105 along with most of the residential area in North Cove is estimated to be \$7,996,000. Cobble nourishment is projected to be needed every 10 years, and cost \$1,012,000 at each occurrence. This brings the total project costs up to \$13,057,000. Annual costs were determined using FY 2019 Federal interest rate for water resources project of 2.875 percent; and the total annual cost in the table below is rounded to the nearest thousand.

Table 1. Plan Cost Estimate

Description	Estimated Amount*
Planning, Engineering and Design (PED)	\$80,000
Construct dynamic revetment	\$7,996,000
Construction Supervision & Administration (S&A)	\$160,000
Total Estimated Amount**	\$8,236,000

Table 2. Project Costs

Annualized Cost Calculation	Proposed Alternative*
First Cost of Construction*	\$8,236,000
Capital Recovery Factor (CRF)	2.96%
Average Annual Costs	\$321,000
Interest During Construction (IDC)	\$227,900
Periodic Cobble Nourishment - Operation and Maintenance Cost (O&M)	\$89,000
Total Annual Cost of Proposed Alternative	\$410,000

*2019 Price Levels

Periodic Nourishment Costs

Based on new monitoring data from a pilot project performed in 2018 by the Washington State Conservation Commission, Pacific Conservation District, the periodic nourishment requirement is anticipated to be much lower the originally assumed. Particularly in the region bound between

two existing longshore barriers (i.e. groins). The revised total project cost would require the sponsor to cost share future nourishment costs which are above the \$10 million federal participation limit.

Per ER 1165-2-130, Section 7 paragraph e, "Projects with short low-profile groins included to maintain a shore alignment, but not to materially prevent littoral drift from nourishing downdrift beaches are eligible for periodic nourishment. Federal assistance for periodic nourishment may continue throughout the economic life of the project, but a specified period of time up to 50 years after initiation of construction must be recommended in planning reports" The proposed alternative meets this guidance as it is renourishment to maintain protection and to reduce erosion risk while providing ancillary benefits of nourishing down drift beaches.

Benefits

Three sources of benefits were looked at for this Federal interest determination report. First, as erosion proceeds, it will progressively take properties and buildings with it. These buildings were valued at over \$12 million in total, however, the total value of lost property was found to be less than the cost of property buy outs and relocation of residences. These costs are estimated to be approximately \$3 million. This is equivalent to \$91,000 in average annual benefits.

The next source of benefits is the loss of land use, and one time crop loss for the cranberry bogs as SR 105 is eroded, and the bogs are exposed to daily tidal inundation. The loss of crops is estimated to be just over \$3 million, and the loss of croplands is estimated to be \$1 million, and together equates to \$128,000 in average annual benefits.

The final source of lost benefits for this project is the SR 105 itself. SR 105 had an average daily traveler's count of 2800 just north of the project site, 1900 just south of the project site, and 1900 metered at the project site. 95% of those are passenger vehicles, with the remaining 5% being from commercial trucks. The cost per mile for passenger vehicles is estimated to be \$0.56, and \$1.69 for commercial trucks. Erosion of SR 105 would cause the diversion of these daily travelers an average of 10 miles as they accommodate the impassible road and either travel to a different town to take care of their business, or travel around the peninsula to get to their original destination.

While the majority of traffic is every day passenger vehicles, it's estimated that most of these travelers would adjust to the loss of the roadway by finding alternative routes. Those in the project area locally however, would be impacted continuously during the road outage. Using the difference between through traffic and traffic that is picked up north of the project site, it's estimated that approximately 225 daily travelers are local, and would be continuously impacted. A temporary road bypass would take 30 days to construct according to WSDOT engineers. The added miles, and time delay from loss of SR 105 for 30 days is estimated to cost approximately \$72,000.

In addition to the time and travel delays, WSDOT has stated that erosion of the current alignment of SR 105 would trigger the need to relocate the road to the highlands further inland from the coast. The new alignment would most likely cut through the cranberry bogs, bypassing the sections at risk along with the section of road which provides access to residents currently at risk. The project location is one of two locations on the current alignment that is threatened by coastal erosion. Just south of the Section 103 project location, there is another vulnerable area of SR 105 which WSDOT has been planning to reinforce and protect. North of the project location, SR 105 is set further back from the beach, and is not in danger of being eroded. The relocation of the road would take an estimated 10 years, and when it was studied in 1997, was estimated to cost \$40 million. After updating to 2019 dollars, the estimated total to relocate the road is \$76 million in its entirety, however without the effort by WSDOT to defend other sections of the road, only local access would be available from the north. While the full value of the road may be realized as benefits, this is dependent on other actions to be performed by WSDOT, therefore only half of the total estimate amount of benefits will be counted in this Section 103 evaluation, or \$38 million. These damages are associated with \$1,010,000 in average annual benefits.

Counting all three sources, the total benefits available for this project is \$45 million. All benefits are seen starting in year 8 of the project, the year 2030, as that is the estimated point at which erosion of the beach would begin to impact houses and undermine the integrity of the current alignment of SR 105. The cost to relocate the road is accrued over the subsequent 10 year period at a steady rate of \$3.8 million a year. The average annual benefits over the life of the project is estimated to be \$1,232,000. The summary of NED benefits and the resulting benefit-cost ratio BCR are shown in Table 3 below.

Table 3. NED Benefits and BCR

Calculation of NED Annual Benefits	Proposed Alternative*
Annual Without-Project Damages	\$1,232,000
Annual With-Project Damages	\$0
Annual Benefits	\$1,232,000
Annual Costs	\$410,000
Annual Net Remaining Benefits	\$822,000
Benefit-to-Cost Ratio	3.0

Other Social Effects for North Cove

Other social effects (OSE) for this project include social vulnerability and social connectedness. This portion of Pacific County is considered economically depressed and is composed of historically underserved communities including the federally-recognized Shoalwater Bay Tribe.

The urgency for these protection measures cannot be overstated, as recent storm surges and tidal actions now threaten to breach the remaining defenses of SR 105 and could result in catastrophic flooding of nearly 4,000 acres of private and public lands. This includes loss of cranberry farms supporting \$5M in annual crop value and 350 peak-season farming and processing jobs. This also includes Native American lands of cultural and historical significance to the Shoalwater Bay Tribe. There are no alternate routes for cross country transit or utility infrastructure, thereby compromising access to electricity, schools, the Shoalwater Bay Tribal health and wellness center, and law enforcement for over 1300 businesses and residences and significantly impacting the economic stability of the region.

Economic Assessment Conclusion

The economic criteria necessary for Federal participation, as documented in the Section 103 authorization, require that the benefits afforded by the Coastal Storm Risk Management project must exceed the project costs. The economic analysis for the study area in North Cove identified a scenario with a BCR equal to 3.0. The benefits accrued for this report are not comprehensive. Additional benefits are available with further analysis, however are not necessary for justification of further study of the scenario, and would be completed during a feasibility study. Therefore, it is recommended that the study continue into the Feasibility Phase.

9. Views of Federal, State and Regional Agencies – This project has not been coordinated with Resource Agencies at this time. During the feasibility study, the appropriate level of Resource Agency communication will be completed. Agencies that could have an interest in the project include, but are not limited to WSDOT and the Shoalwater Bay Tribe.

10. Status of Environmental Compliance – The project must comply with all applicable laws and regulatory requirements. An Environmental Assessment (EA) will be prepared to evaluate potential effects of the project on the environment. Factors addressed by the evaluation include, but are not limited to, public safety, water quality, wetlands, threatened and endangered species, noise, socioeconomics, fish, wildlife, cultural and historic properties, federal trust responsibility, consultation and coordination with tribal governments.

The National Environmental Policy Act (NEPA) process will be concluded prior to construction, pursuant to requirements in ER-200-2-2. This process includes compliance with all applicable laws and regulations to include the Endangered Species Act, Clean Water Act, National Historic Preservation Act, Coastal Zone Management Act, Magnuson-Stevens Act, Migratory Bird Treaty Act, Executive Order 11988 on Floodplain Management, and Executive Order 11990 on the Protection of Wetlands. At this time, the Corps' obligations under NEPA appear that they can be adequately addressed in an EA and result in a Finding of No Significant Impact (FONSI).

11. Significant Effects – This alternative is not expected to result in any major environmental impacts. Impacts associated with the construction process, such as noise and air quality issues, would be temporary in nature. Any impacts from alternatives considered during the feasibility study would be fully evaluated in the associated NEPA document.

12. Implementation Schedule - Table 5 provides milestone estimates for the North Cove Shoreline Protection Project CAP Section 103 feasibility study.

Table 4: Milestone Table - CAP Section 103

Milestone	Schedule (Day-Month-Year)
FIDR Submittal to MSC	13 Sept-2019
FIDR Approval	20-Sep-2019
CW130-FCSA Execution	15-Nov-2019
CW150-Draft Feasibility Report Submittal to MSC	12-Oct-2020
CW150-Final Feasibility Report Submittal to MSC	20-Nov-2020
CW170-Feasibility Report Approval	18-Dec-2020

13. Independent External Peer Review (IEPR) - NWS has coordinated with the USACE National Planning Center for Coastal Storm Risk Management to discuss a risk-based decision analysis. At this initial level of investigation, it will be assumed that Type 1 IEPR will occur for a study of the study area. A review plan will be prepared early in the feasibility phase to document this risk-based decision. The costs associated with a Type I IEPR have been included with the estimated feasibility costs.

14. Conclusion/Determination of Federal Interest

It is in the Federal interest to pursue a feasibility study for coastal storm risk management in the North Cove study area under the authority of CAP Section 103. This Federal Interest Determination has identified at least one potential solution to reduce the coastal storm risk to public health, safety, and property in the study area in North Cove. The economic analysis of the identified alternative, cobble beach, has resulted in a BCR equal to 4.50.

The District analyzed the feasibility of a General Investigation to address the scale of the problem, other CAP authorities such as Section 14 Emergency Streambank and Shoreline Erosion protection and concluded that CAP Section 103 would be best to address the problems and opportunities within the study area by using the four criteria described in the P&G: completeness, efficiency, effectiveness and acceptability.

A CAP Section 14 authority would not meet these criteria including the completeness factor

because it would leave all of the residential houses exposed under the Section 14 option. The General Investigation option is not feasible under the same criteria because it would not be considered efficient due to the amount of time needed to conduct a General Investigation Study.

Based on the specified coastal storm damages and erosion problems, a BCR greater than 1, an identified solution that is of a scope appropriate for CAP Section 103 authority, and the identification of a willing and capable sponsor, there is sufficient justification to warrant Federal interest in the continuation of a feasibility study. In order to proceed with the study, the Federal government and the non-Federal sponsor (Pacific County) will need to execute a Feasibility Cost Sharing Agreement (FCSA) that will designate the funding responsibilities for completion of the study. The costs of the feasibility study above the first \$100,000 (full-Federal) would be cost shared 50/50 between the Federal government and the non-Federal sponsor.

Attachment:

1. Sponsor letter