

MAY 9, 2017

# “We Can” Community Engagement

Welcome

Charlene Nelson

Shoalwater Tribal Council

Lisa Ayers

Pacific County Commissioner District #3

# Agenda

| Time | Topics  | Action | Leader  |
|------|---|--------|---|
| :05  | Welcome & Introductions                                   | Engage | <b>Charlene Nelson</b><br>Shoalwater Tribal Council<br><b>Lisa Ayers</b><br>Pacific County Commissioner       |
| :05  | Agenda and Outcomes Review                                |        | <b>Kelly Rupp</b><br>LeadToResults, LLC   |
| :20  | SR105 Shoreline Maintenance and Repair Plan for 2017      | Inform | <b>Colin Newell</b><br>WA Dept of Transportation  |
| :15  | Shoalwater Bay Tribal Dune Restoration: Program Update    |        | <b>David Michalsen</b><br>US Army Corps of Engineers  |
| :15  | Dynamic Revetment Project: Installation Report and Status |        | <b>David Cottrell</b><br>Grayland Drainage District #1<br><b>Mike Nordin</b><br>Pacific Conservation District |
| :15  | Critical Area & Resource Lands (CARL) Erosion Hazard Area |        | <b>Tim Crose</b><br>Pacific County DCD  |
| :30  | Economic Impact Analysis: Project Update                  |        | <b>Kevin Decker</b><br>WA Sea Grant   |
| :15  | Initiatives update  |        | Lisa  |
| :05  | Homeowner Perspectives                                    | Engage | <b>Tim Pelzel</b><br>Friends of North Cove  |

November 16, 2016

# “We Can” Community Engagement



# Agenda

| Time | Topics   | Action | Leader   |
|------|--|--------|--|
| :20  | Geo-Engineering Assessment   | Inform | <b>Vladimir Shepsis</b><br>Coast & Harbor Engineering, Inc |
| :90  | Perspectives: <ul style="list-style-type: none"> <li>• What's at risk?</li> <li>• What's being done?</li> <li>• Accomplishments?</li> <li>• Challenges, obstacles</li> </ul> | Inform | <b>David Cottrell</b><br>Grayland Drainage District #1     |
|      |  |        | <b>Nick Wood</b><br>Grayland Cranberry Growers             |
|      |  |        | <b>Charlene Nelson</b><br>Shoalwater Bay Tribe             |
|      |  |        | <b>Tim Crose</b><br>Pacific County DCD                     |
|      |  |        | <b>Chad Hancock</b><br>WA Dept of Transportation           |
|      |  |        | <b>Bob Merrill</b><br>Community of North Cove              |
|      |  |        | <b>David Michalsen</b><br>US Army Corps of Engineers       |
|      |  |        | <b>Kevin Decker</b><br>WA Sea Grant                        |
| :15  | Your Input!  |        | Feedback   |

November 16, 2016 Meeting  
Recap

Develop shoreline erosion protection criteria and feasible alternatives.

November 16, 2016 Meeting Recap

Region 1

Region 2

Region 3

Region 1, West Area – Predominately controlled by tidal channel northward migration.

Region 2, Middle Area – Stable channel conditions, but erosive shoreline subjected to impact from waves and localized hydrodynamic effects.

Region 3, East Area – Deepening of the bottom slope that provides increased wave energy propagation to the shoreline.

# David Cottrell

## Grayland Drainage District

November 16, 2016 Meeting  
Recap

Being Done?

### Active Maintenance...

- Placing large wood and rocks at the mouth of the drainage ditch to allow the main drainage to flow while slowing the advance of the erosion from the southeast.

### Buried Rip-rap Revetment...

- will protect from erosion from the southwest ("right flank"). Still vulnerable to the south.

# Nick Wood

## Grayland Cranberry Growers

November 16, 2016 Meeting  
Recap

### At Risk?

#### >1100 Acres

- >13,000,000 lbs production
- \$8,000,000 (annual) crop value

### What if...?

Lowest 300 acres  
permanently destroyed ?

➔ \$2,000,000 (annual) loss  
to local economy



# Charlene Nelson

## Shoalwater Bay Tribe

November 16, 2016 Meeting  
Recap

At Risk?

**Heritage**  
**Public Safety**  
**Natural Resources**





# Tim Crose

## Pacific County

## Dept of Community Development

November 16, 2016 Meeting  
Recap

Focus

### Code Enforcement

- Safety
- Health
- Environment

Service

### Resource

- Permitting assistance
- Liaison with agencies



DEPARTMENT  
OF  
COMMUNITY DEVELOPMENT

# Bob Merrill

## Community of North Cove

November 16, 2016 Meeting  
Recap

### At Risk?

- Homes and Property
- Wetlands and Habitat
- County/state tax base
- PUD Infrastructure
- Environmental pollution

### Being Done?

Community Action  
Petition August 10,  
2016

Recommend (urgent)  
rip-rap stabilization on  
shoreline from  
Bennett property to  
Warrenton Cannery  
Road

### Obstacles?

- Need prepare engineering plans
- Need coordinated government/agency attention

# Dave Ward / Ian Cope

## Grays Harbor PUD



### At Risk?

- ~1300 customers
- Infrastructure (critically) depends on Hwy 105
- >30 poles lost since 2010
- No backup redundancy; service interruptions expected to be extensive

### Being Done?

Removal and repositioning of poles, pads, and transformers to protect grid and prevent spill of pollutants if further erosion



# Scott Johnson

## Pacific County Sheriff's Dept

November 16, 2016 Meeting  
Recap

### At Risk?

- Response time
- Infrastructure (critically) depends on Hwy 105

### Being Done?

Collaborative emergency response agreement with Grays Harbor



Chad Hancock

Washington Dept of Transportation

November 16, 2016 Meeting  
Recap



# David Michalsen

## US Army Corps of Engineers

November 16, 2016 Meeting  
Recap

# Kevin Decker

## Washington Sea Grant

November 16, 2016 Meeting  
Recap

At Risk?

**Economic Loss:** Eroded land, destroyed homes, damaged infrastructure, lost cranberry production, reduced tourism revenue, etc.

Being Done?

### Impact Research:

- Identify priorities of evaluating economic risks
- Assess economic impacts to evaluate policy options
- Identify potential difficulties of analysis & data sources
- \$30K Sea Grant funding to conduct the analysis

Colin Newell



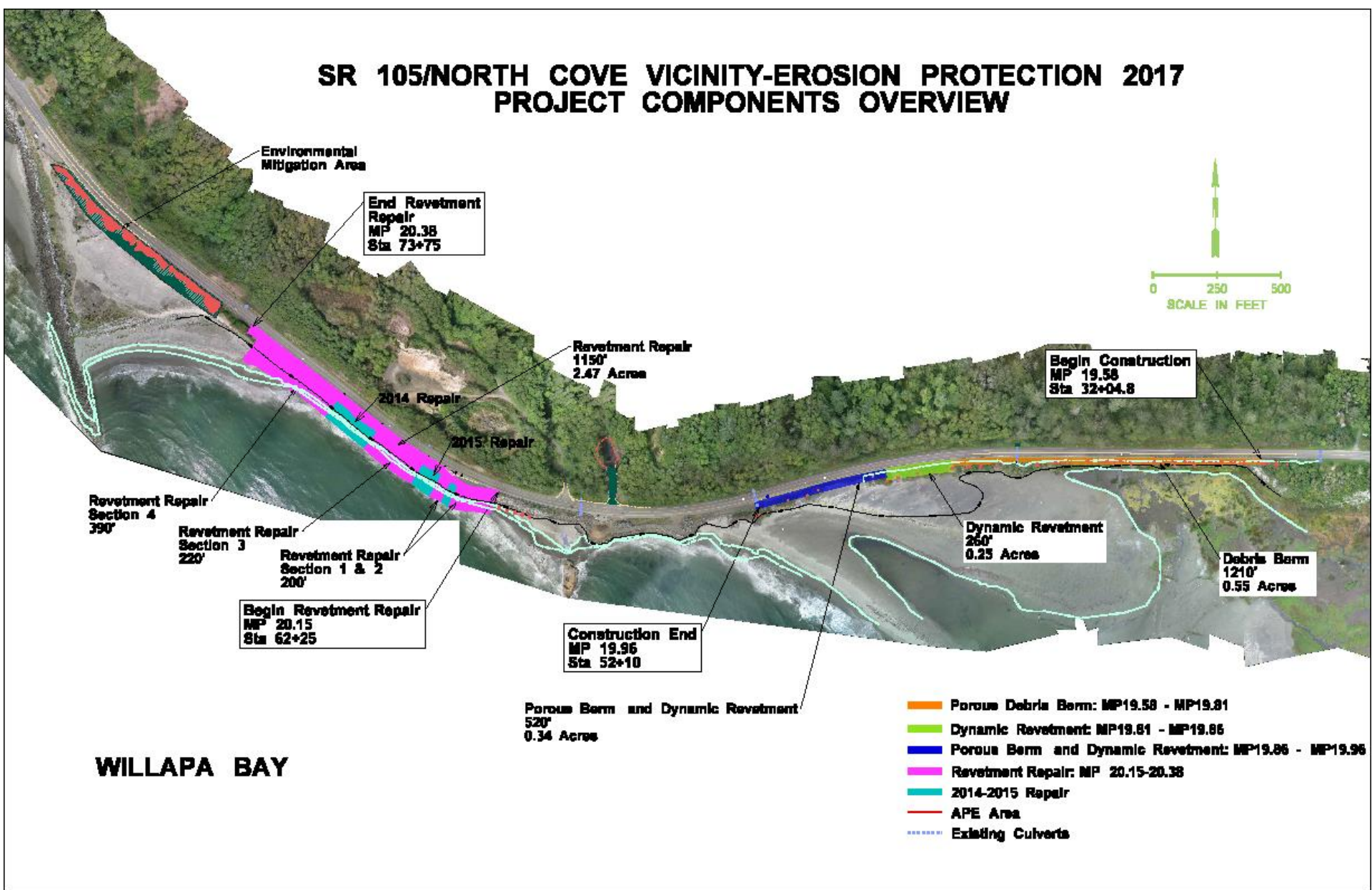
**WSDOT PROJECT UPDATE**

**SR105 SHORELINE  
MAINTENANCE AND REPAIR  
PLAN FOR 2017**

# **PROJECT HIGHLIGHTS**

- **Start Work September 2017, provided permits are obtained**
- **Daytime Work: Safety w/ Rogue Waves working during low tides.**
- **Single Lane Closures**
- **Complete work below OHW, revetment repair areas first**
- **Complete project early 2018**

# SR 105/NORTH COVE VICINITY-EROSION PROTECTION 2017 PROJECT COMPONENTS OVERVIEW

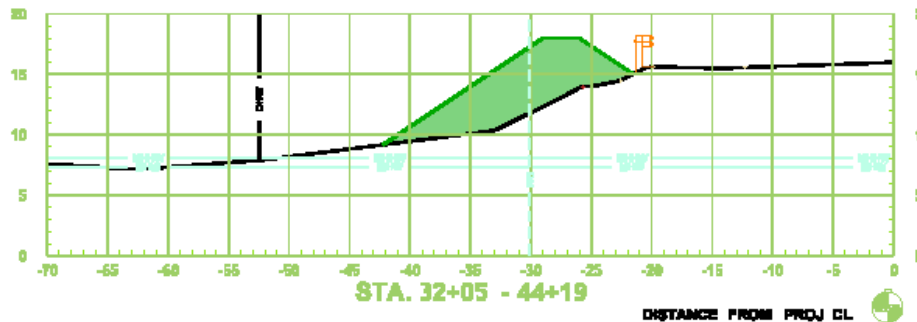




# SR 105/NORTH COVE VICINITY-EROSION PROTECTION 2017

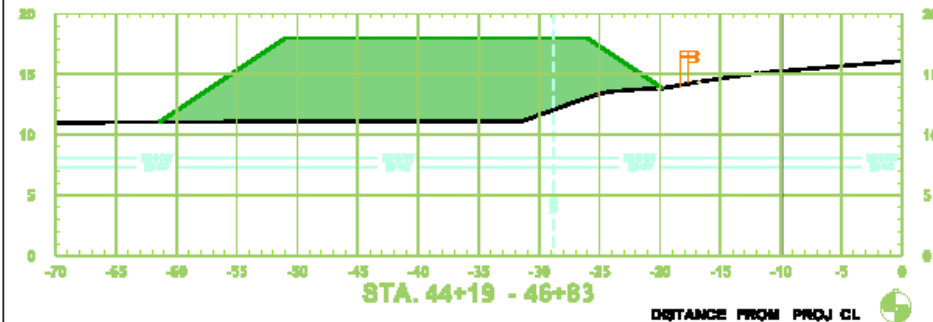
## POROUS DEBRIS BERM MP 19.58-19.81

2-3 MAN ROCK  
EXISTING GROUND



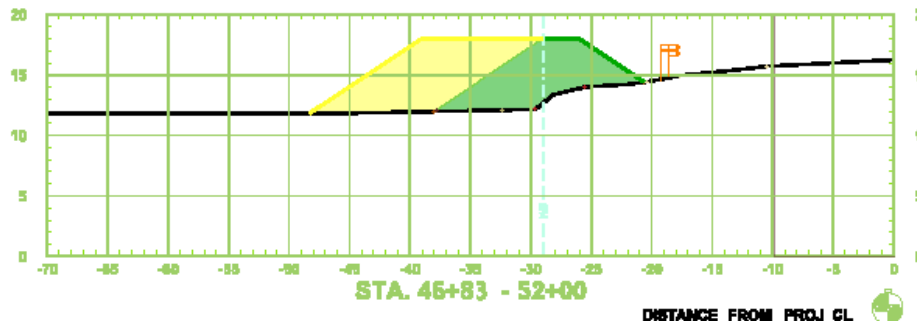
## DYNAMIC REVETMENT MP 19.81-19.86

STREAMBED COBBLES  
EXISTING GROUND



## POROUS BERM AND DYNAMIC REVETMENT MP 19.86-19.96

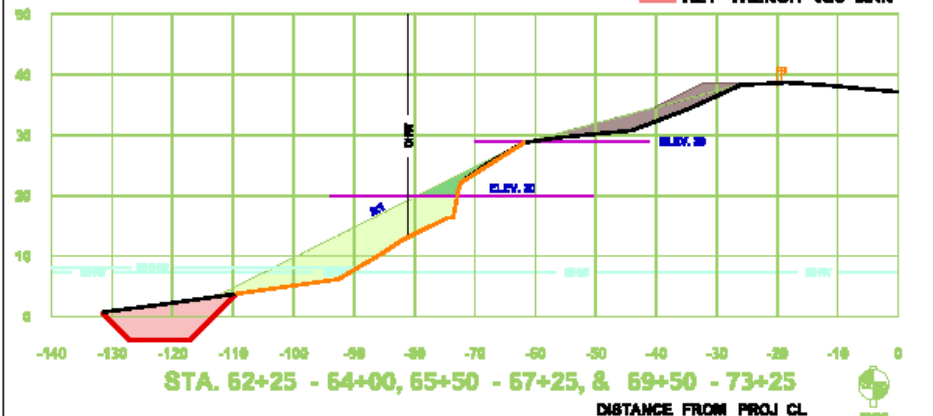
EXISTING GROUND  
2-3 MAN ROCK  
STREAMBED COBBLES



## REVETMENT REPAIR MP 20.15-20.37

EXISTING GROUND  
GEOTEXTILE

RIPRAP/SHRUB SPALLS  
4-5 MAN ROCK  
5-6 MAN ROCK  
KEY TRENCH W/6 MAN



# **DYNAMIC REVETMENT EXAMPLES**



Cape Lookout State Park  
(Netarts cell)





Cove Beach (Cannon Beach cell)

# **DYNAMIC COBBLE REVETMENT, CAPE LOOKOUT STATE PARK, OREGON**





# COLUMBIA RIVER MOUTH



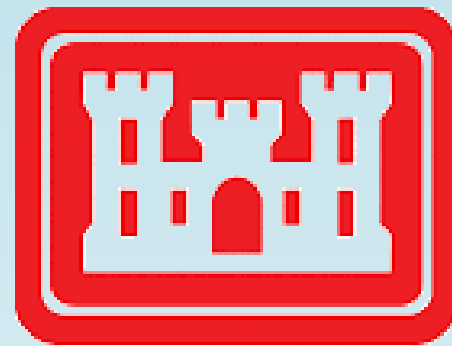
# COLUMBIA RIVER MOUTH



# Questions?



David Michalsen



**US Army Corps  
of Engineers®**

Seattle District

# ***Shoalwater Bay Coastal Storm Damage Reduction Project USACE, Seattle District***

*David R. Michalsen, P.E.*

[david.r.michalsen@usace.army.mil](mailto:david.r.michalsen@usace.army.mil)

*Daryl Downing, Project Manager*

[daryl.s.downing@usace.army.mil](mailto:daryl.s.downing@usace.army.mil)

**WECAN Public Meeting  
9 May 2017**

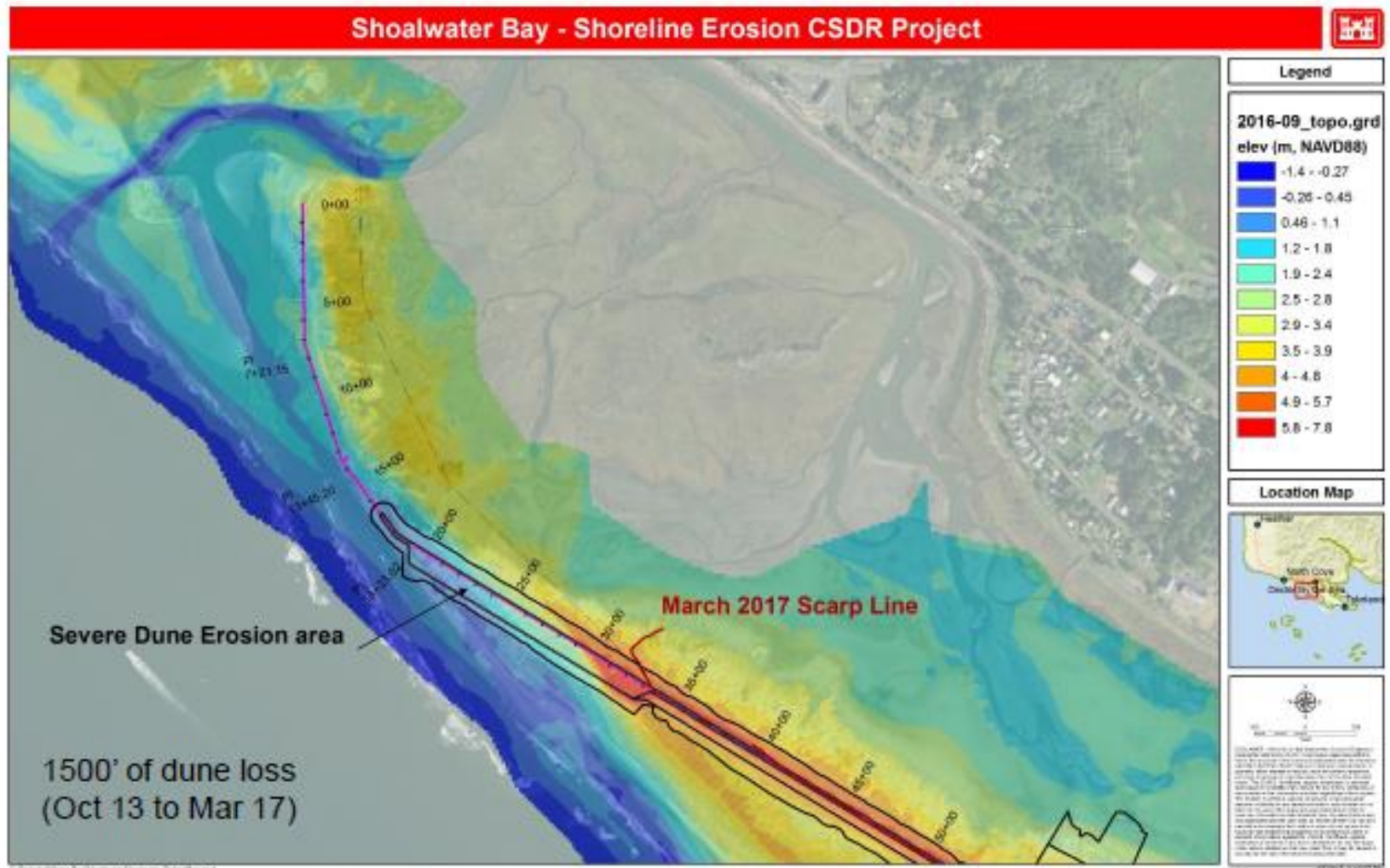


®

US Army Corps of Engineers  
**BUILDING STRONG**®



# Dune morphology





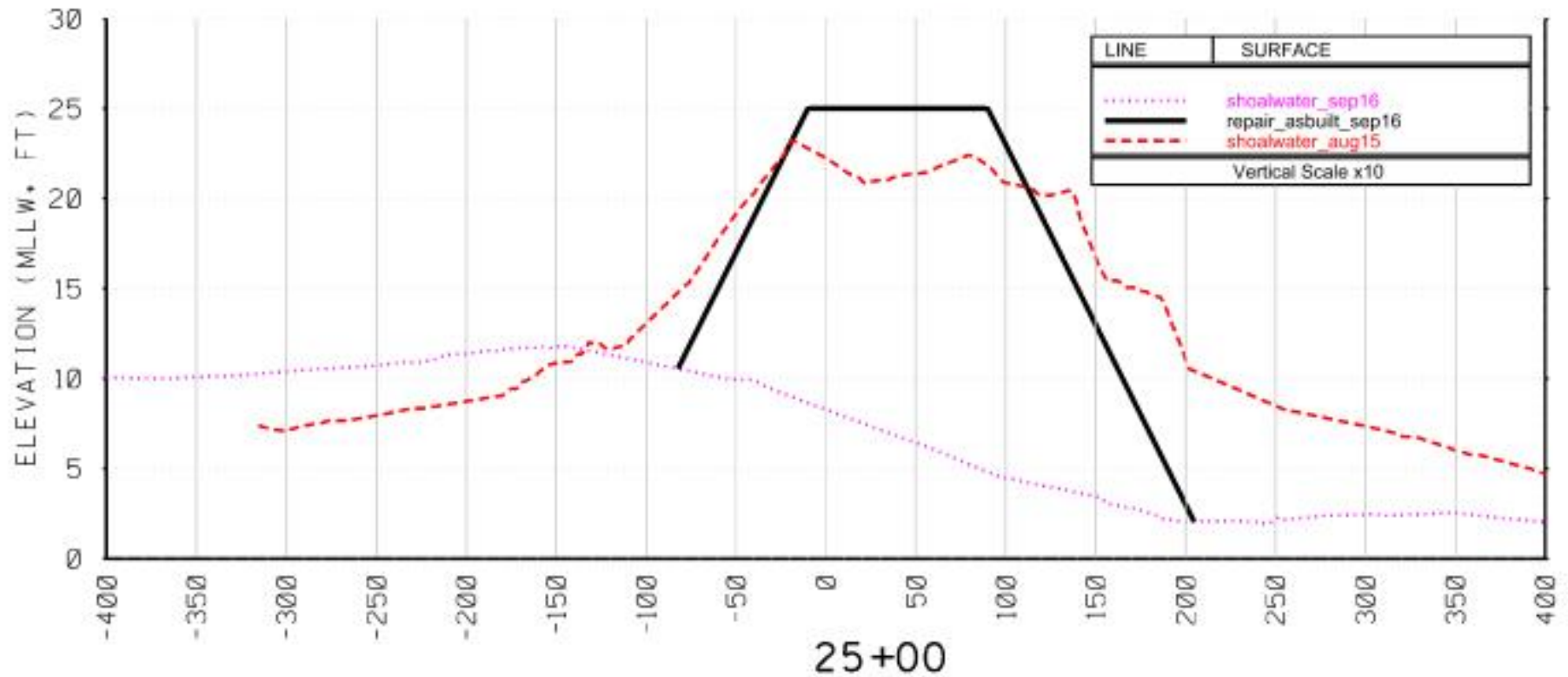
# North Terminus Erosion (July 2014)



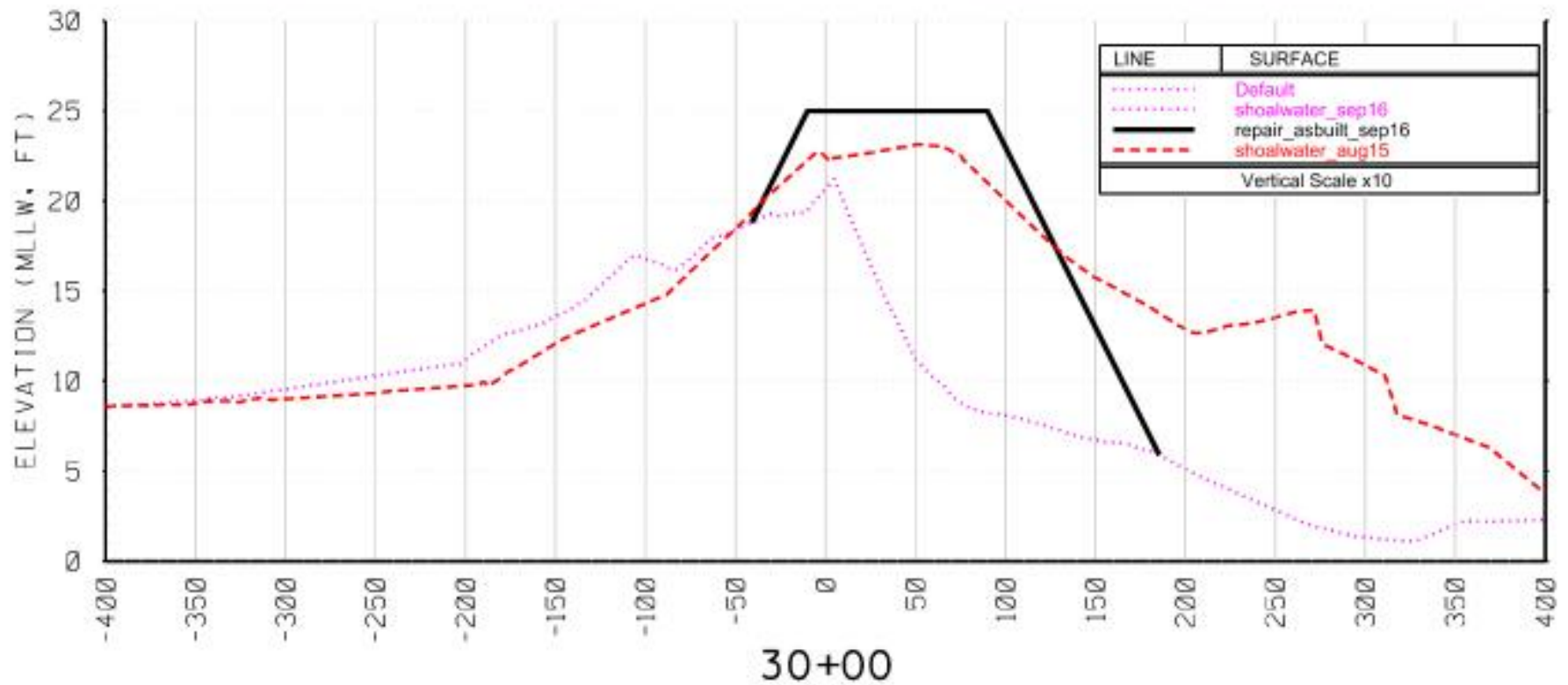
# North Terminus Erosion (Aug 2016)



# Dune morphology

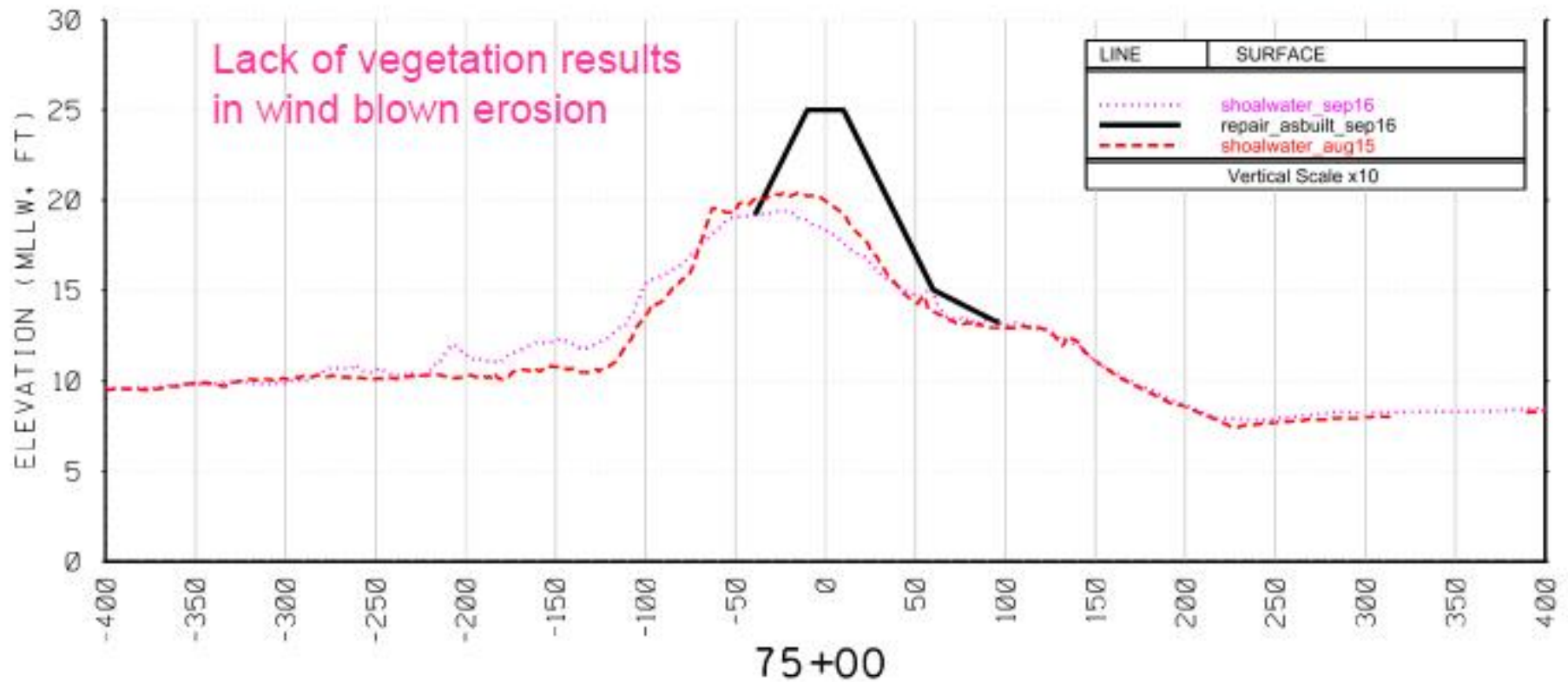


# Dune morphology





# Dune morphology






# Dune erosion (Dec 2015)



Northern terminus

# Dune erosion (Dec 2015)

Seaward scarping



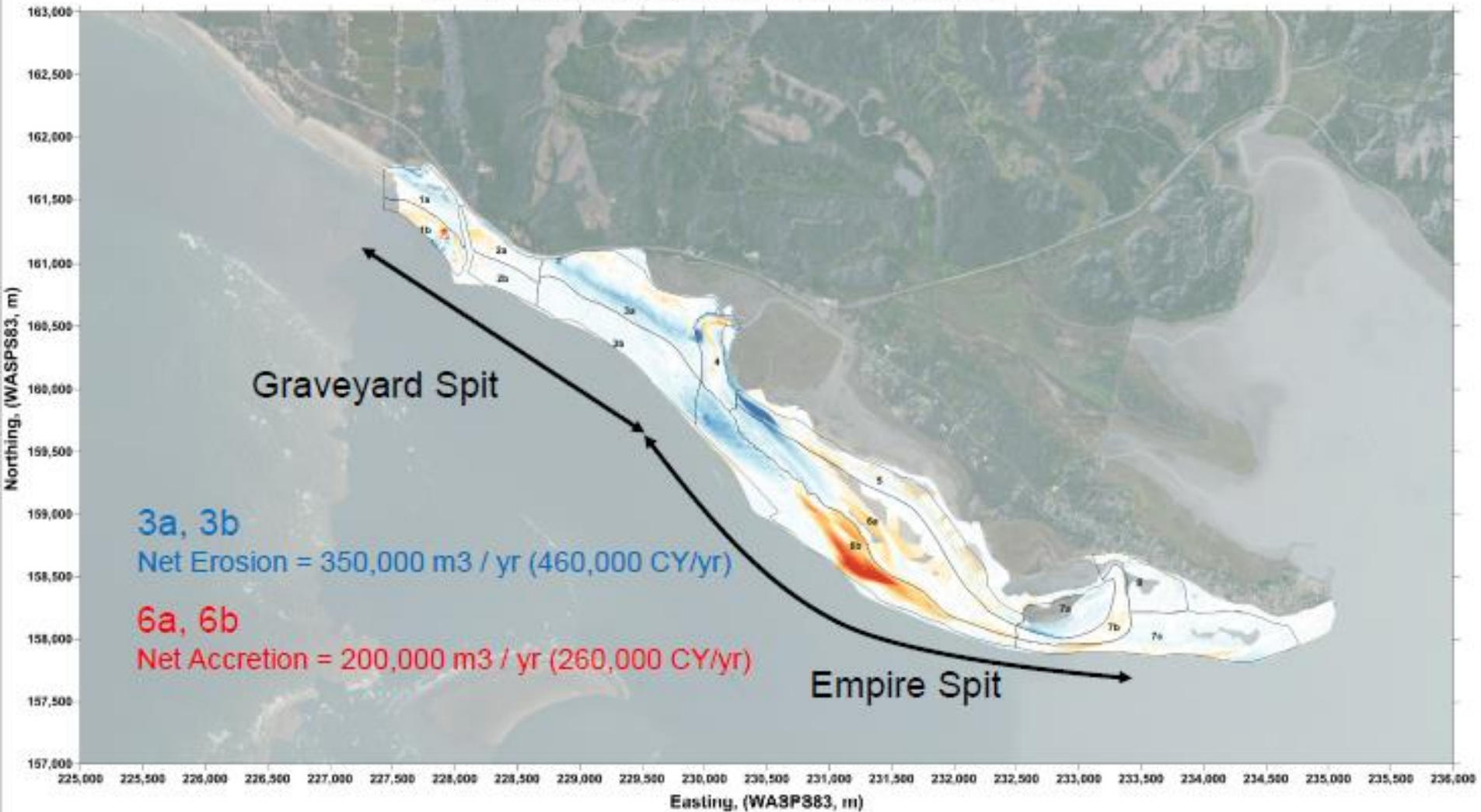
# Dune erosion (Dec 2015)





# Sediment Budget

CMAP/USACE Monitoring Surveys  
Elevation Difference (April 2016 - September 2014)



Erosion (m)      Accretion (m)

-10 -4.5 -3.5 -2.5 -1.5 -0.5 0.5 1.5 2.5 3.5 4.5 10

0 1000 2000 3000 4000 meters (m)

# Sediment Budget

|     |                           | 2014 09       | 2015 04     | Net            | 2015 04       | 2015 08     | Net            | 2015 08       | 2016 04     | Net            | Total Net      |
|-----|---------------------------|---------------|-------------|----------------|---------------|-------------|----------------|---------------|-------------|----------------|----------------|
|     | Sediment Budget Polygon   | accretion (+) | erosion (-) | m <sup>3</sup> | accretion (+) | erosion (-) | m <sup>3</sup> | accretion (+) | erosion (-) | m <sup>3</sup> | m <sup>3</sup> |
| 1a  | drainage_ditch_intertidal | 14,448        | 62,682      | (48,235)       | 23,087        | 19,108      | 3,979          | 17,704        | 47,397      | (29,693)       | (73,949)       |
| 1b  | drainage_ditch_subtidal   | -             | -           | -              | -             | -           | -              | 47,534        | 28,906      | 18,627         | 18,627         |
| 2a  | groin_intertidal          | 39,374        | 17,227      | 22,147         | 23,979        | 28,423      | (4,445)        | 24,380        | 29,676      | (5,296)        | 12,406         |
| 2b  | groin_subtidal            | 6,525         | 7,204       | (679)          | 2,759         | 8,228       | (5,469)        | 11,962        | 7,904       | 4,058          | (2,090)        |
| 3a  | graveyard_spit            | 40,455        | 240,498     | (200,043)      | 70,241        | 52,431      | 17,809         | 77,398        | 263,492     | (186,094)      | (368,328)      |
| 3b  | graveyard_spit_subtidal   | 10,648        | 74,202      | (63,555)       | 7,789         | 59,251      | (51,462)       | 25,884        | 87,870      | (61,986)       | (177,003)      |
| 4   | cranberry_slough_inlet    | 29,228        | 69,846      | (40,619)       | 22,340        | 21,006      | 1,334          | 32,507        | 76,239      | (43,731)       | (83,016)       |
| 5   | constructed_dune          | 113,750       | 61,720      | 52,030         | 28,439        | 104,177     | (75,738)       | 110,459       | 170,755     | (60,296)       | (84,004)       |
| 6a  | empire_spit_intertidal    | 154,338       | 150,398     | 3,940          | 139,827       | 67,997      | 71,830         | 138,989       | 202,648     | (63,660)       | 12,111         |
| 6b  | empire_spit_subtidal      | 241,924       | 139,442     | 102,482        | 81,551        | 179,596     | (98,045)       | 520,665       | 228,839     | 291,826        | 296,263        |
| 7a  | se_dune                   | 7,660         | 97,365      | (89,705)       | 9,409         | 12,589      | (3,179)        | 15,956        | 15,598      | 357            | (92,527)       |
| 7b  | se_dune_intertidal        | 19,949        | 15,020      | 4,929          | 10,895        | 9,087       | 1,808          | 21,736        | 8,239       | 13,497         | 20,234         |
| 7c  | se_dune_subtidal          | 38,143        | 81,229      | (43,087)       | 29,915        | 19,867      | 10,048         | 47,627        | 20,203      | 27,424         | (5,615)        |
| 8   | fisher_inlet              | 9,636         | 24,453      | (14,817)       | 7,272         | 7,202       | 70             | 13,026        | 8,689       | 4,337          | (10,410)       |
| Net |                           | 726,078       | 1,041,288   | (315,211)      | 457,503       | 588,963     | (131,461)      | 1,105,826     | 1,196,455   | (90,629)       | (537,300)      |

84,000 m<sup>3</sup> (110,000 CY) eroded from constructed dune between SEP 2014 and APR 2016





# Shoalwater barrier dune

- Spit to north is rapidly eroding resulting in increased wave energy on north end of dune
- 1,500 feet of dune loss on north end of dune since original construction in 2013
- Completed Project Implementation Report in April 2017 for renourishment through the Emergency Management Program



# Shoalwater barrier dune

- Pending approval and funding at NWD/HQ re-nourishment would occur in Summer 2018



# Other items

- Planning assistance to States (PAS) study  
USACE/WSDOT looking at long-term feasibility  
of shore protection to SR-105 (on-going)
- Discussions with Pacific County/Diking District  
regarding partnering on a shoreline erosion  
project under the Continuing Authorities  
Program (CAP), Section 103.
  - ▶ Purpose to address shoreline recession northwest of  
SR-105 groin





David Cottrell

Mike Nordin



PACIFIC CONSERVATION DISTRICT



Tide Gates

Threatened Shoreline  
Permit Requested

Homes Present

video

CARVIN RD

SMITH ANDER

MILLOW ST



## Buried Revetment

- ~ Hard armor solution[homes present]
- ~ Setback from shoreline
- ~ Riprap set 4' below beach grade
- ~ Sand backfilled and dune-formed







## Dynamic Revetment

- ~ Cobble-sized rock in erosion zone
- ~ Mimics natural shorelines
- ~ Absorbs energy from waves
- ~ Sand and wood accretes
- ~ Redistributes along shoreline



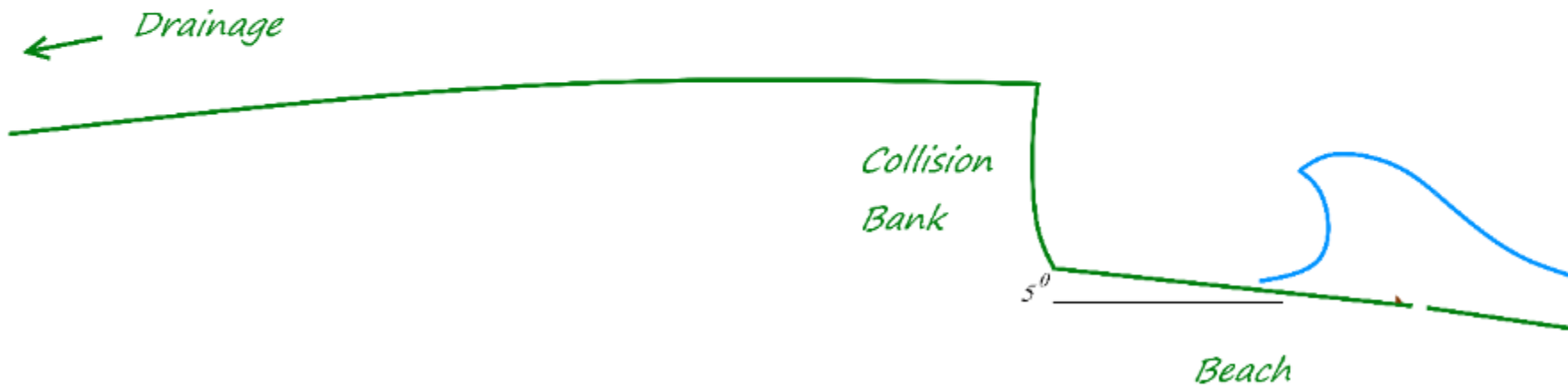


## Natural Shoreline

- ~ More resilient than hard armor
- ~ The ultimate soft shoreline
- ~ Just plain beautiful



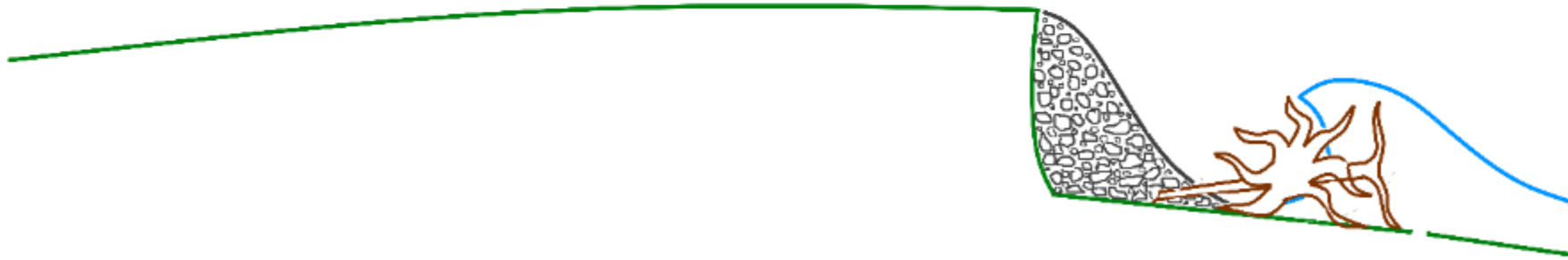
# Typical Bank Profile



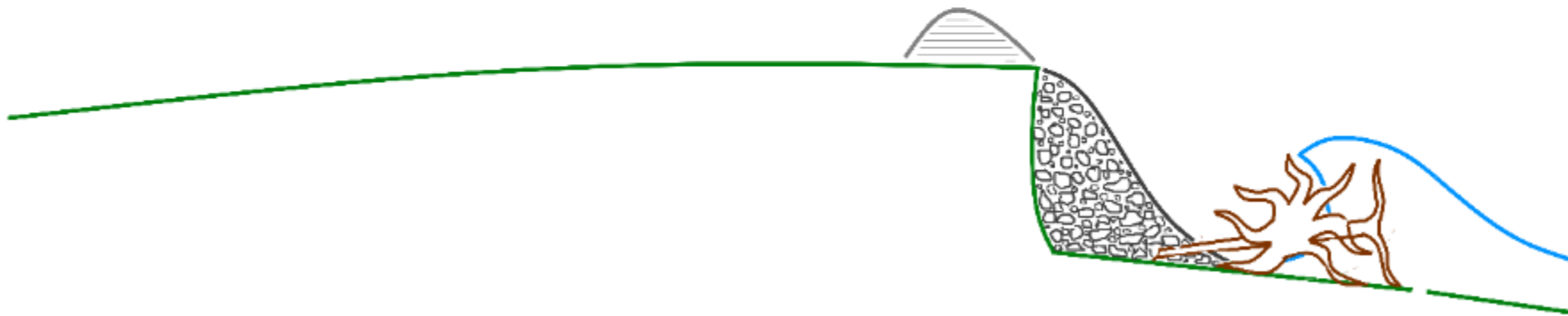


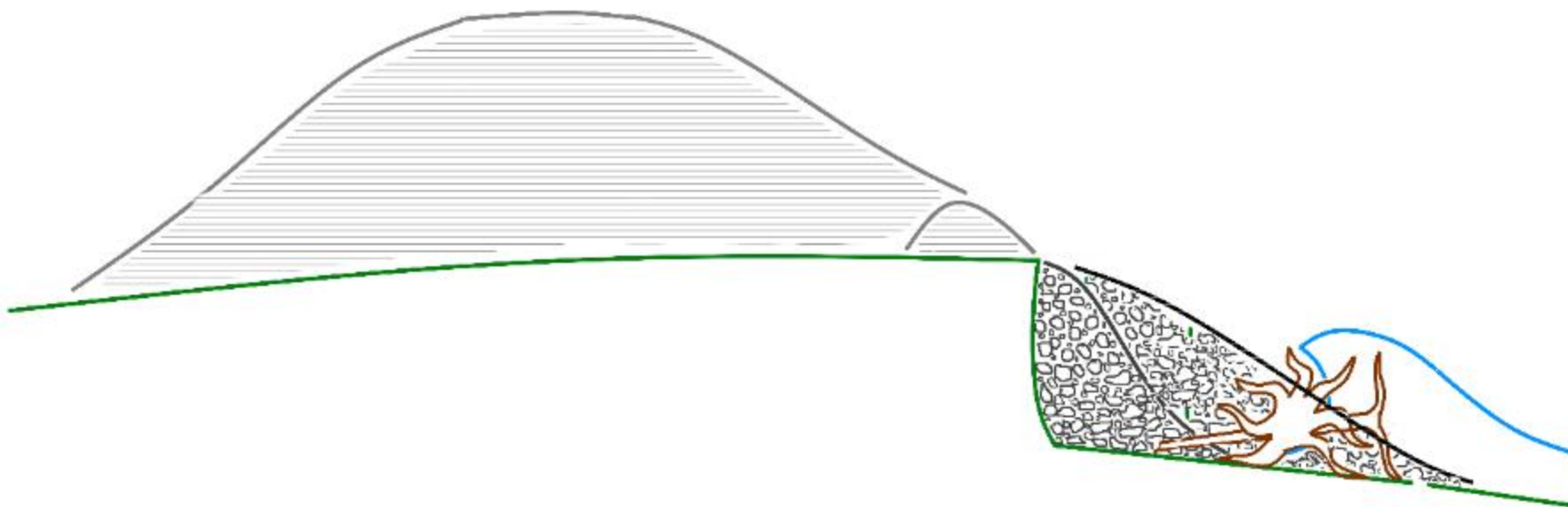




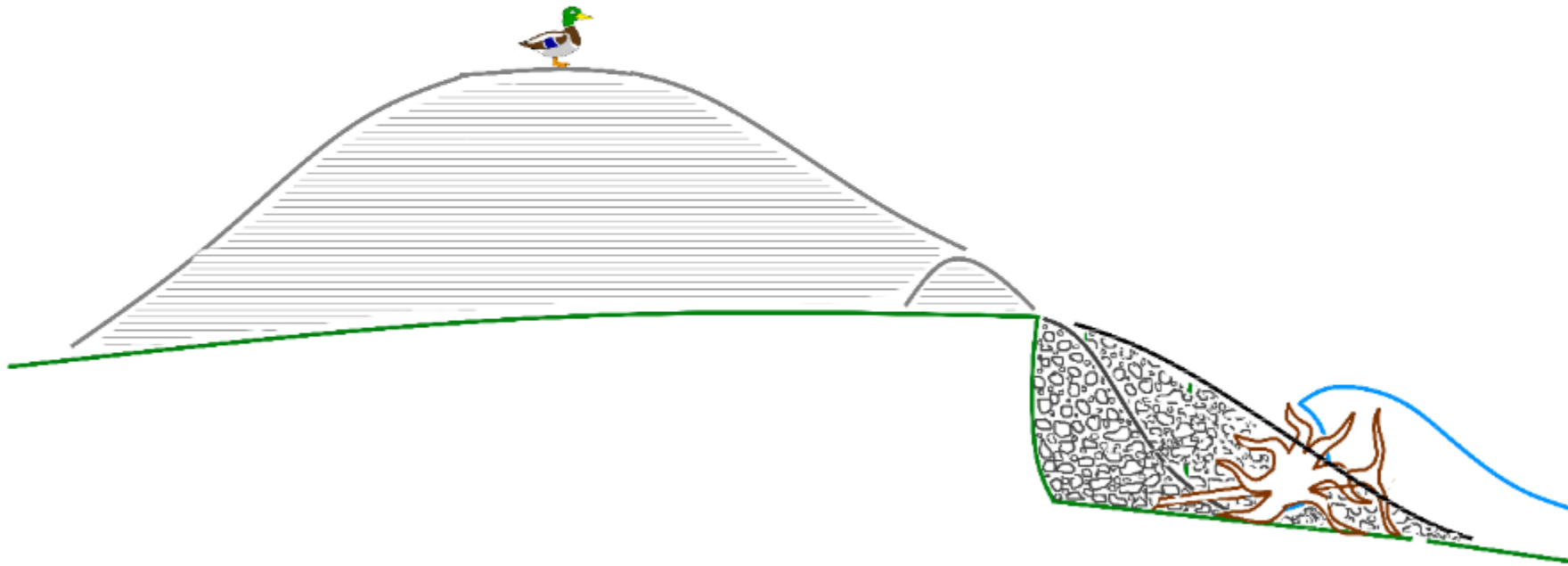














Questions?

Kevin Decker



# North Cove: economic impacts of erosion

DR. KEVIN DECKER

COASTAL OUTREACH SPECIALIST

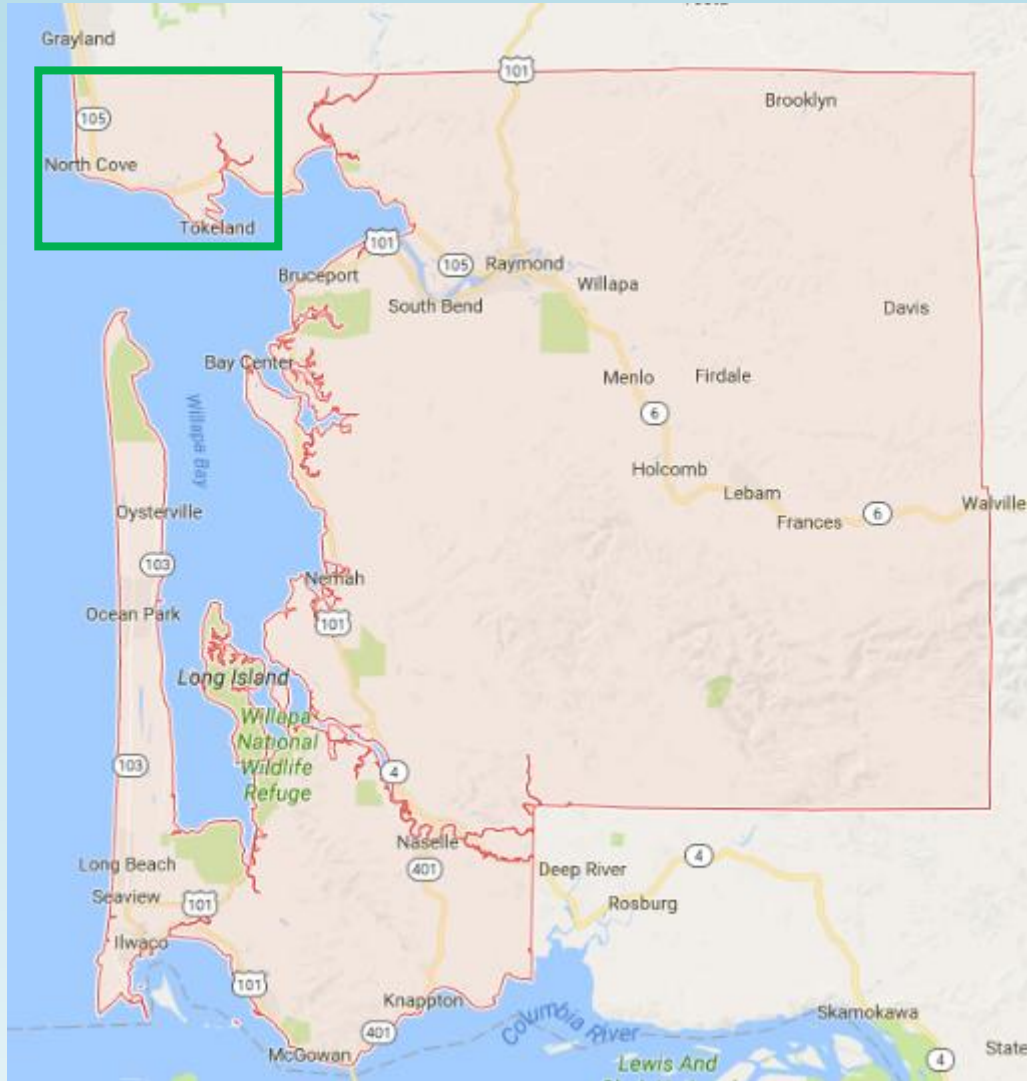


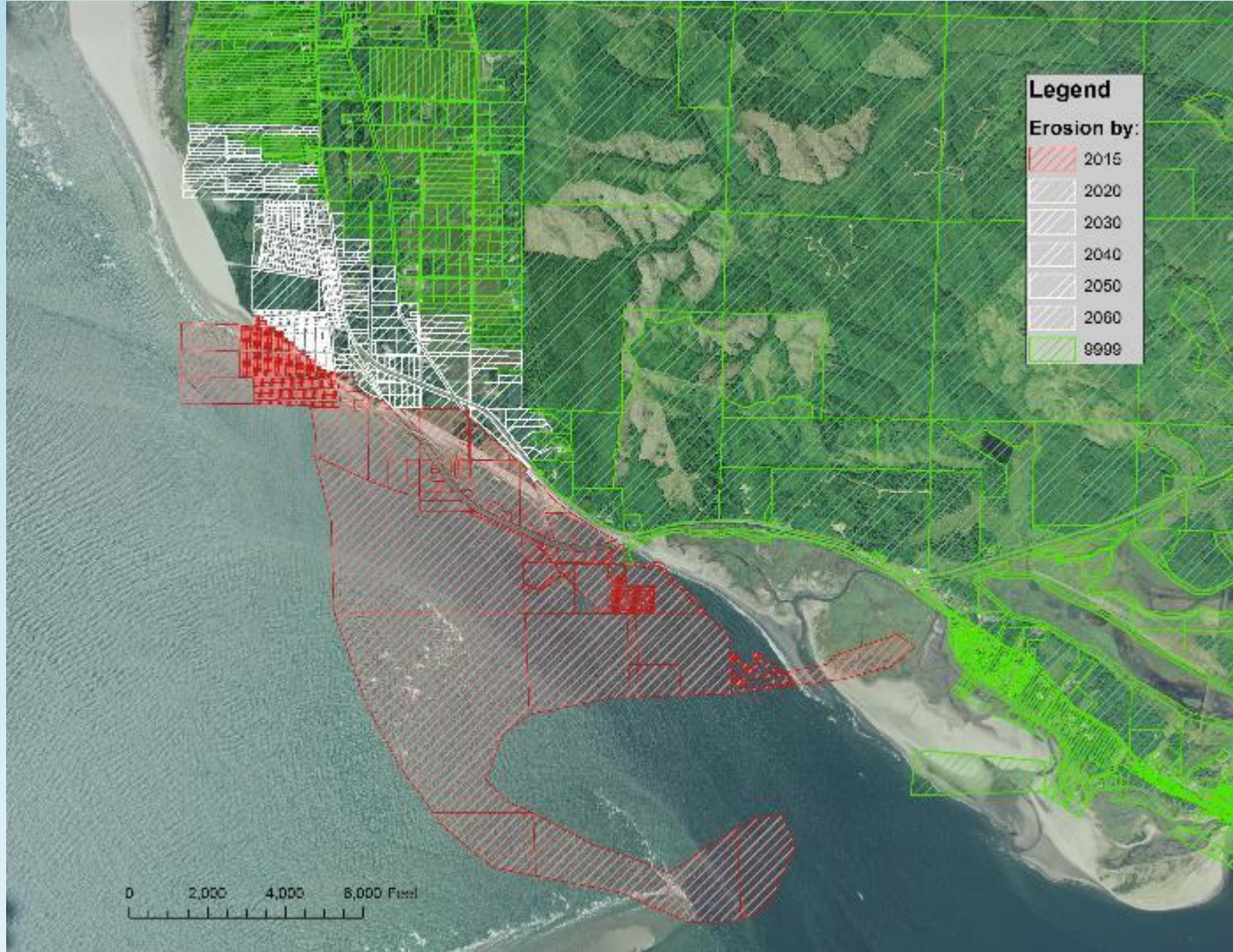
# Goal

Provide information to the North Cove community on the economic impacts of coastal erosion.

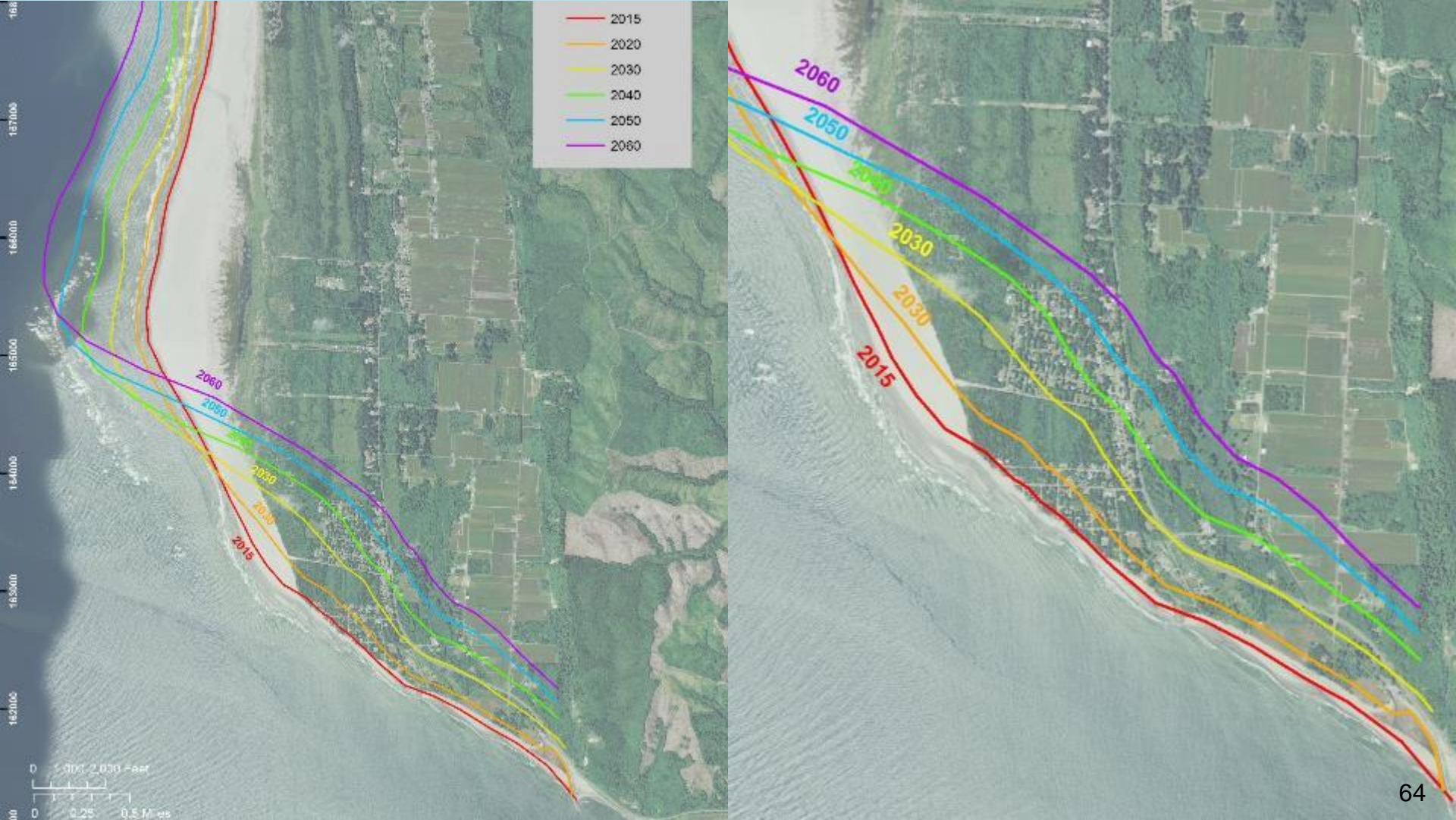
- Identify the economic cost of past erosion
- Identify the potential economic cost of future projected erosion
- Evaluate the economic impacts of the cranberry industry that is at risk to erosion or inundation (forthcoming)











# Property Types

1. Single Family Residential
2. Undeveloped Land
3. Vacation Cabin/Residences
4. Exempt
5. Other
6. Unknown



North Cove Lighthouse, December 27, 1940. Photo by Stan Spiegle.

# Single Family Residential

- 33 single family residences totaling 71.98 acres have been lost due to erosion
- Values calculated using hedonic pricing model
- DV = Sale price,  $R^2 = .4067$ , Observations = 275
- Significant characteristics:
  - Lot size (acres, GIS layer)
  - Condition of the home (Assessor, 1= Low, 2 = Fair, 3 = Average, 4 = Good, 5 = Very Good)
  - # of plumbing fixtures (Assessor, proxy for number of bathrooms, imputed for manufactured - sf<sup>2</sup>)
  - Stick built or manufactured (Assessor)
  - Square footage (Assessor, natural log)
  - Erosion Zone (Ecology, 2015, 2020, 2030, 2040, 2050, 2060, not in an erosion zone)
  - Intercept (not meaningful)



# Single Family Residential

## Non-significant characteristics

- Sale date
- Year built
- Quality
- # of stories
- Decking (sf<sup>2</sup>)
- Foundation type
- Garage (sf<sup>2</sup>)
- Fireplace

## Omitted characteristics

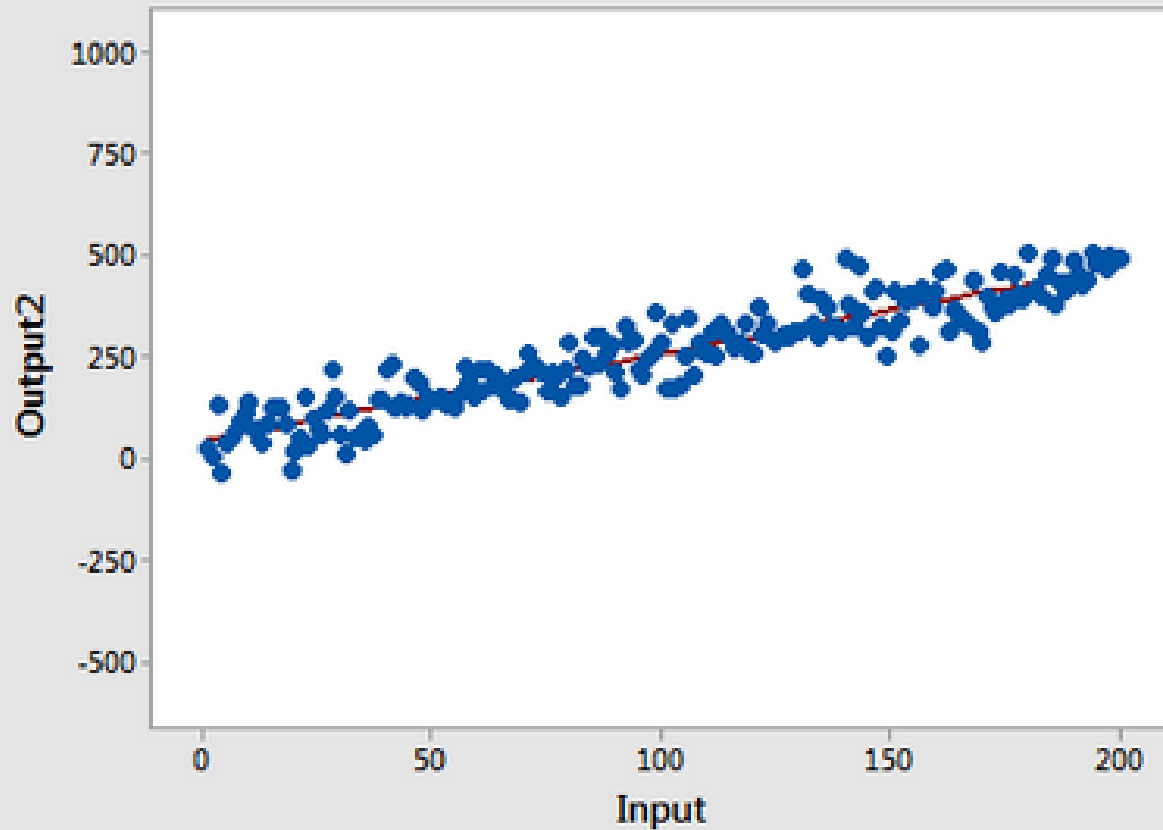
- Bedrooms
- Bathrooms



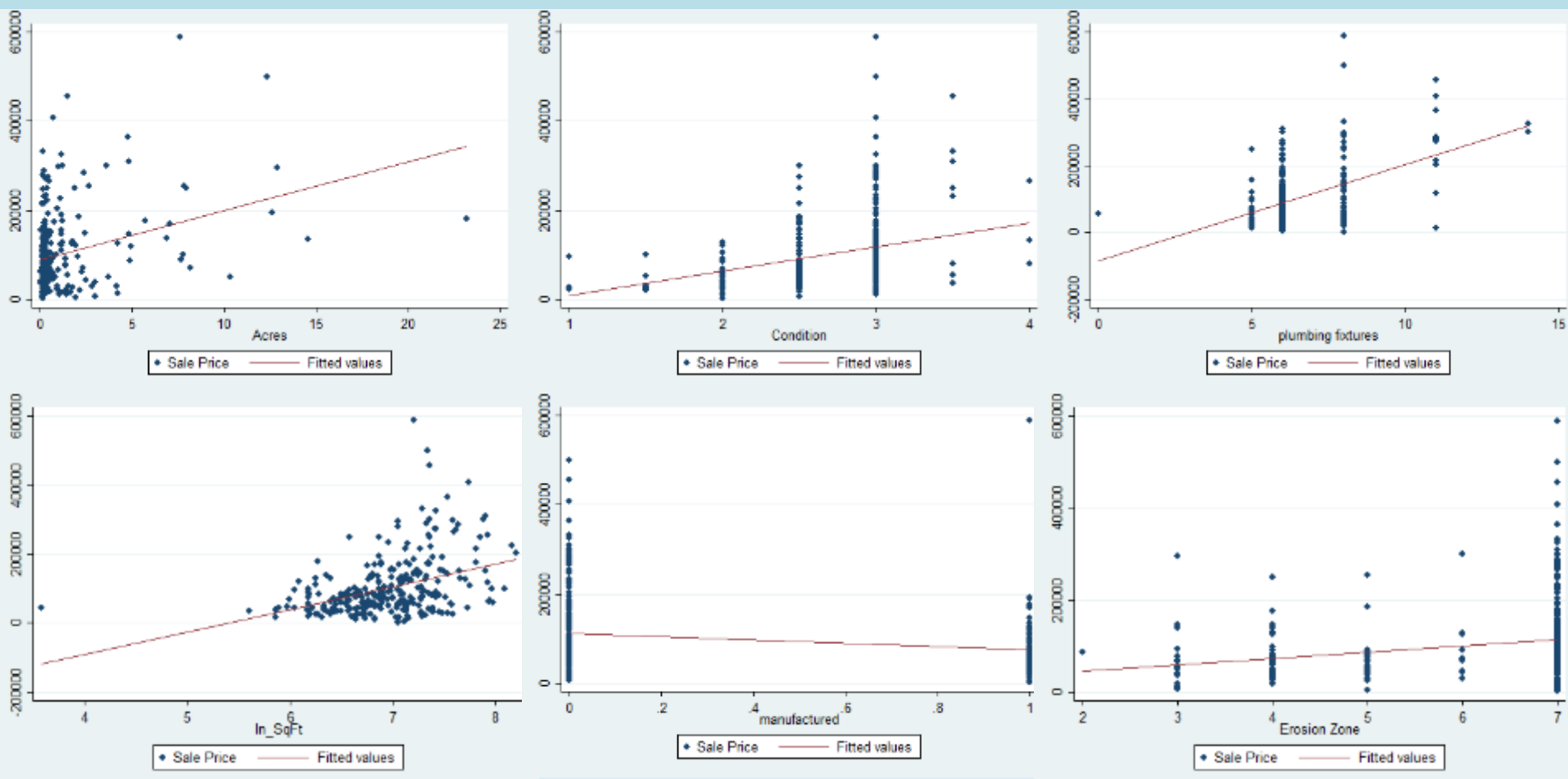
Home falling into ocean at North Cove in Tokeland, WA.  
Photo: Associated Press

### Fitted Line Plot

$$\text{Output2} = 44.86 + 2.134 \text{ Input}$$



|           |         |
|-----------|---------|
| S         | 48.8860 |
| R-Sq      | 86.5%   |
| R-Sq(adj) | 86.5%   |



High level of variability make accuracy of predictions difficult and results in a larger range of estimated value. 69

# Single Family Residential

|                               |                           |
|-------------------------------|---------------------------|
| <u>Not in an erosion zone</u> | <u>Estimated Loss: 33</u> |
| Avg. sale price = \$115,211   | \$3,801,956               |
| Lower limit = \$101,830       | \$3,360,390               |
| Upper limit = \$128,592       | \$4,243,520               |

| An additional unit of... | ... would change a home's sale price by an average of ... | ...plus or minus about... |
|--------------------------|---|---------------------------|
| Acreage                  | \$8,923   | \$5,907                   |
| Condition (1 – 5)        | \$32,083  | \$14,553                  |
| Plumbing fixtures        | \$19,924  | \$8,503                   |
| Square footage (%)       | \$267   | \$223                     |
| Manufactured             | -\$22,420   | \$18,292                  |
| Erosion zone (1 – 7)     | \$6,999   | \$4,620                   |

# Vacation/Cabin Residences

- 18 vacation/cabin residences totaling 3.54 acres have been lost due to erosion
- Values calculated using hedonic pricing model
- DV = Sale price,  $R^2 = .0557$ , Observations = 49
- Significant characteristics:
  - Erosion Zone (Ecology, 2015, 2020, 2030, 2040, 2050, 2060, not in an erosion zone)



# Vacation/Cabin Residences

|                               |                           |
|-------------------------------|---------------------------|
| <u>Not in an erosion zone</u> | <u>Estimated Loss: 18</u> |
| Avg. sale price = \$41,037    | \$738,675                 |
| Lower limit = \$28,019        | \$504,350                 |
| Upper limit = \$54,056        | \$972,999                 |

| An additional unit of... | ... would change a vacation/ cabin sale price by an average of ... | ...plus or minus about... |
|--------------------------|--|---------------------------|
| Erosion Zone             | \$4,035  | \$4,029                   |

# “other” Residential

- 9 “other” residences totaling 1.54 acres have been lost due to erosion
- “Other” residential is typically a shop, garage, shed, or other structure
- No sales data available
- Used an average 2017 assessed value outside of an erosion zone

|                               |                          |
|-------------------------------|--------------------------|
| <u>Not in an erosion zone</u> | <u>Estimated Loss: 9</u> |
| Avg. sale price = \$53,250    | \$479,250                |
| Lower limit = \$27,995        | \$251,958                |
| Upper limit = \$78,505        | \$706,542                |

# Undeveloped Land

- 323 undeveloped lots totaling 487.81 acres have been lost due to erosion
- Values calculated using hedonic pricing model
- DV = Sale price,  $R^2 = .1796$ , Observations = 75
- Significant characteristics:
  - Lot size (acres, GIS layer)
  - Erosion Zone (Ecology, 2015, 2020, 2030, 2040, 2050, 2060, not in an erosion zone)
- Average parcel value outside an erosion zone: \$47,217
- Average cost per acre outside an erosion zone: \$7,207

# Undeveloped Land

|                               |                               |
|-------------------------------|-------------------------------|
| <u>Not in an erosion zone</u> | <u>Estimated Loss: 487.81</u> |
| Avg. price/acre= \$7,207      | \$3,515,607                   |
| Lower limit = \$4,518         | \$2,203,728                   |
| Upper limit = \$9,896         | \$4,827,487                   |

| An additional unit of... | ... would change the undeveloped sale price by an average of ... | ...plus or minus about... |
|--------------------------|--|---------------------------|
| Erosion Zone             | \$6,268  | \$5,271                   |
| Acres                    | \$959  | \$300.41                  |



# Exempt Property

- 37 exempt properties have been lost due to erosion
- Exempt properties are exempt from paying taxes. Examples include properties owned by a government or by a charity
- For valuation, exempt properties are treated as undeveloped land
- A total of 400.83 acres of exempt property has eroded

Not in an erosion zone

Avg. price/acre= \$7,207

Lower limit = \$4,518

Upper limit = \$9,896

Estimated Loss: 400.83

\$2,888,749

\$1,810,787

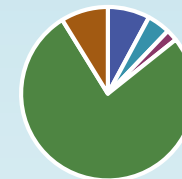
\$3,966,711

# Unknown

- 117 unknown lots have been lost due to erosion
- A total of 1,052.3 acres of unknown property has eroded
- For valuation of unknown properties, value is calculated by assuming properties are proportionally similar to what has already eroded

| Description        | Proportion | Quantity |
|--------------------|------------|----------|
| Single family      | 7.9%       | 9        |
| Vacation and cabin | 4.3%       | 5        |
| Other              | 2.1%       | 3        |
| Undeveloped        | 76.9%      | 90       |
| Exempt             | 8.8%       | 10       |
| Total              | 100%       | 117      |

Sales



- Single Family
- Vacation and Cabin
- Other
- Undeveloped
- Exempt

# Unknown

- Undeveloped land and exempt properties
  - Calculated using acreage and average price per acre outside an erosion zone.
  - Top 5 parcels were considerably larger in size and assumed to be undeveloped land. Total area of 997.07 acres.
  - The average parcel size of 0.4391 acres was assigned to the remaining 85 undeveloped parcels, for a total of 1039 acres.
  - The 10 exempt parcels were also assigned the average parcel size resulting in a total of 4.93 acres.
  - Single family, vacation and cabin, and "other" were valued using average per unit value outside an erosion zone.

# Cost Summary

537 parcels totaling 2018 acres have eroded

Estimated economic impacts to land and homes is \$14 – \$26.7 million.

Average estimation of economic impacts is \$20.3 million

| Description                    | Acres           | Count      | Low Estimate (Thousands) | Average (Thousands) | High Estimate (Thousands) |
|--------------------------------|-----------------|------------|--------------------------|---------------------|---------------------------|
| Residential – Single Family    | 71.98           | 33         | \$3,360                  | \$3,802             | \$4,244                   |
| Residential – Vacation & Cabin | 3.54            | 18         | \$504                    | \$739               | \$973                     |
| Residential – Other            | 1.54            | 9          | \$252                    | \$479               | \$707                     |
| Undeveloped Lots               | 487.81          | 323        | \$2,204                  | \$3,516             | \$4,827                   |
| Exempt Property                | 400.83          | 37         | \$1,811                  | \$2,889             | \$3,967                   |
| Unknown                        | 1,052           | 117        | \$5,863                  | \$8,922             | \$11,981                  |
| <b>Total</b>                   | <b>2,018.00</b> | <b>537</b> | <b>\$13,994</b>          | <b>\$20,346</b>     | <b>\$26,698</b>           |



# Projected Erosion

An additional 499 parcels totaling 547 acres are projected to erode by 2060

| Land Use                           | 2020      | 2030      | 2040       | 2050       | 2060      | Total      |
|------------------------------------|-----------|-----------|------------|------------|-----------|------------|
| Residential - Single Family        | 19        | 35        | 83         | 58         | 18        | 213        |
| Residential - All other            | 7         | 7         | 3          | 8          | 2         | 27         |
| Residential - Vacation and Cabin   | 10        | 8         | 9          | 10         | 3         | 40         |
| Transportation - Communication     | 0         | 0         | 1          | 0          | 0         | 1          |
| Trade - Food                       | 0         | 0         | 0          | 1          | 0         | 1          |
| Resource - Agriculture             | 0         | 0         | 0          | 1          | 0         | 1          |
| Resource - Agriculture Current Use | 0         | 0         | 3          | 3          | 8         | 14         |
| Undeveloped - Land                 | 52        | 38        | 45         | 28         | 21        | 184        |
| Open Space Land                    | 0         | 0         | 1          | 0          | 0         | 1          |
| Exempt Property                    | 4         | 0         | 2          | 3          | 5         | 14         |
| Unknown                            | 3         | 0         | 0          | 0          | 0         | 3          |
| <b>Total</b>                       | <b>95</b> | <b>88</b> | <b>147</b> | <b>112</b> | <b>57</b> | <b>499</b> |

# Assumptions

Transportation – Communication: 1 parcel in an erosion zone. Treated as undeveloped land. No data to provide value on equipment at the site.

Trade – Food: 1 parcel in an erosion zone. Used the 2017 assessor's value of \$157,900.

Resource – Agriculture: treated as undeveloped land

Resource – Agriculture Current Use: treated as undeveloped land

Open space land treated as undeveloped land

Exempt property treated as undeveloped land

3 unknown parcels treated as undeveloped land

Undeveloped land avg. value per acre: \$7,206

# Projected impacts: 2016 – 2060

|   | Lower Limit<br>(Thousands) | Average<br>(Thousands) | Upper Limit<br>(Thousands) |
|---|----------------------------|------------------------|----------------------------|
| <b>Residential - Single Family</b>        | \$21,690                   | \$24,540               | \$27,390                   |
| <b>Residential - All other</b>            | \$756                      | \$1,438                | \$2,120                    |
| <b>Residential - Vacation and Cabin</b>   | \$1,121                    | \$1,641                | \$2,162                    |
| <b>Transportation - Communication</b>     | \$4                        | \$7                    | \$9                        |
| <b>Trade - Food</b>                       | \$158                      | \$158                  | \$158                      |
| <b>Resource - Agriculture</b>             | \$36                       | \$57                   | \$78                       |
| <b>Resource - Agriculture Current Use</b> | \$400                      | \$637                  | \$875                      |
| <b>Undeveloped - Land</b>                 | \$832                      | \$1,327                | \$1,822                    |
| <b>Open Space Land</b>                    | \$22                       | \$35                   | \$48                       |
| <b>Exempt Property</b>                    | \$79                       | \$127                  | \$174                      |
| <b>Unknown</b>                            | \$2                        | \$3                    | \$4                        |
| <b>Total</b>                              | \$25,099                   | \$29,970               | \$34,840                   |

# Projected impacts: 2016 – 2060

|              | Lower Limit<br>(Thousands) | Average<br>(Thousands) | Upper Limit<br>(Thousands) |
|--------------|----------------------------|------------------------|----------------------------|
| <b>2020</b>  | \$2,609                    | \$3,289                | \$3,968                    |
| <b>2030</b>  | \$4,102                    | \$4,921                | \$5,740                    |
| <b>2040</b>  | \$9,296                    | \$10,903               | \$12,509                   |
| <b>2050</b>  | \$6,811                    | \$8,064                | \$9,317                    |
| <b>2060</b>  | \$2,280                    | \$2,793                | \$3,307                    |
| <b>Total</b> | \$25,099                   | \$29,970               | \$34,840                   |

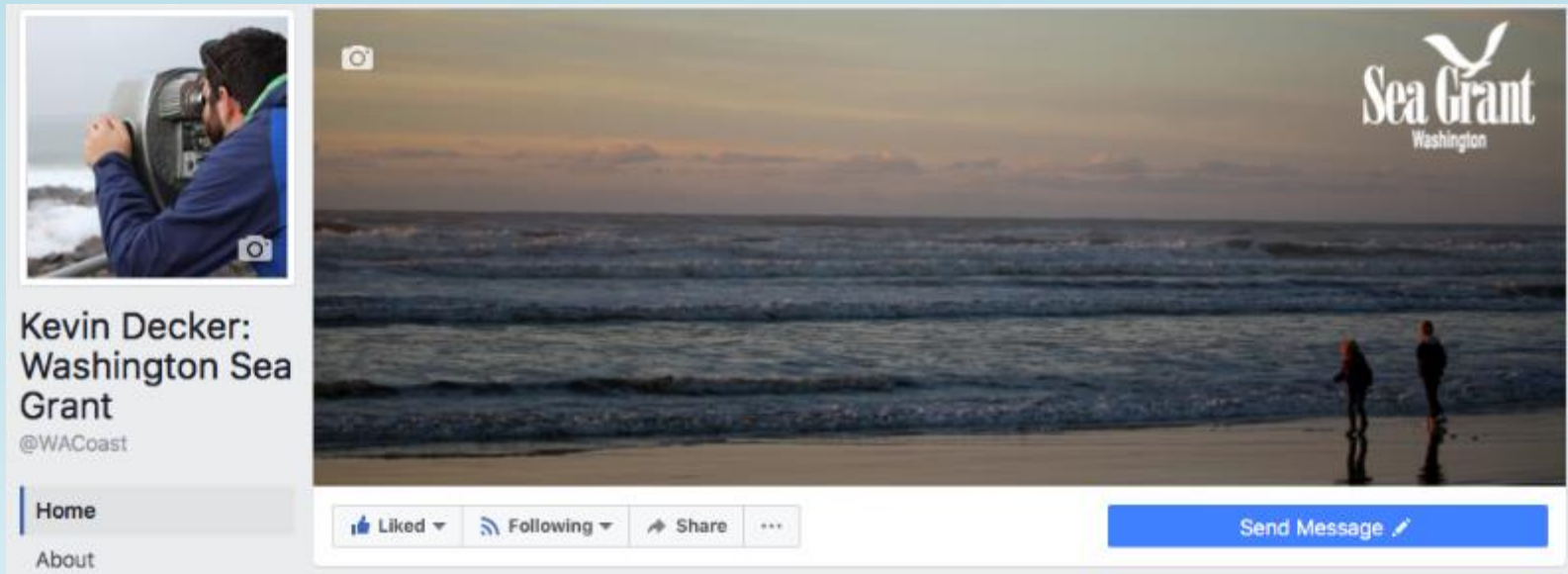
# Property Taxes

- Levy rates are determined by dividing the districts' budgets by assessed value
- Tax revenue is not lost, but the tax liability is redistributed to the remaining population
- Between 2015 and 2060, an estimated \$402,807 of taxes will be redistributed
- Tax district 68 levy rate: \$15.08 per \$1,000 of assessed value
- Tax district 69 levy rate: \$11.34 per \$1,000 of assessed value
- Based on existing tax rates, an estimated \$300K of tax obligation has already been reassigned

| Erosion Zone      | 2015      | 2020     | 2030     | 2040      | 2050      | 2060     | Outside     |
|-------------------|-----------|----------|----------|-----------|-----------|----------|-------------|
| <b>Actual</b>     | \$1,475   | \$1,406  | \$23,932 | \$95,589  | \$58,367  | \$23,955 | \$1,051,860 |
| <b>Estimate</b>   | \$101,396 | \$46,176 | \$66,575 | \$147,156 | \$107,291 | \$35,607 | \$1,054,999 |
| <b>Difference</b> | \$99,921  | \$44,769 | \$42,642 | \$51,567  | \$48,924  | \$11,652 | \$3,138     |



# Thanks!



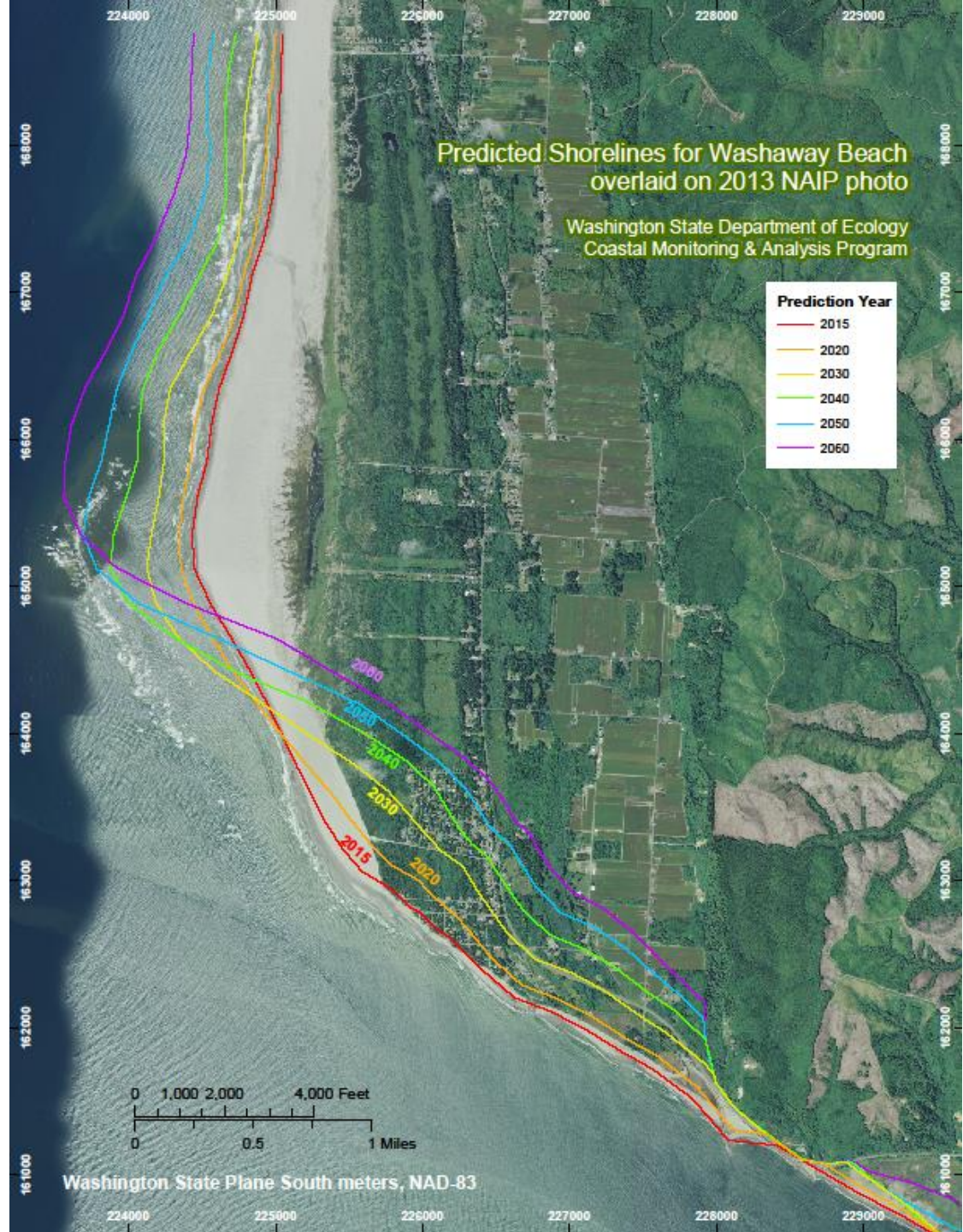
Dr. Kevin Decker  
Coastal Outreach Specialist  
kadecker@uw.edu, 360-538-2521



Tim Crose

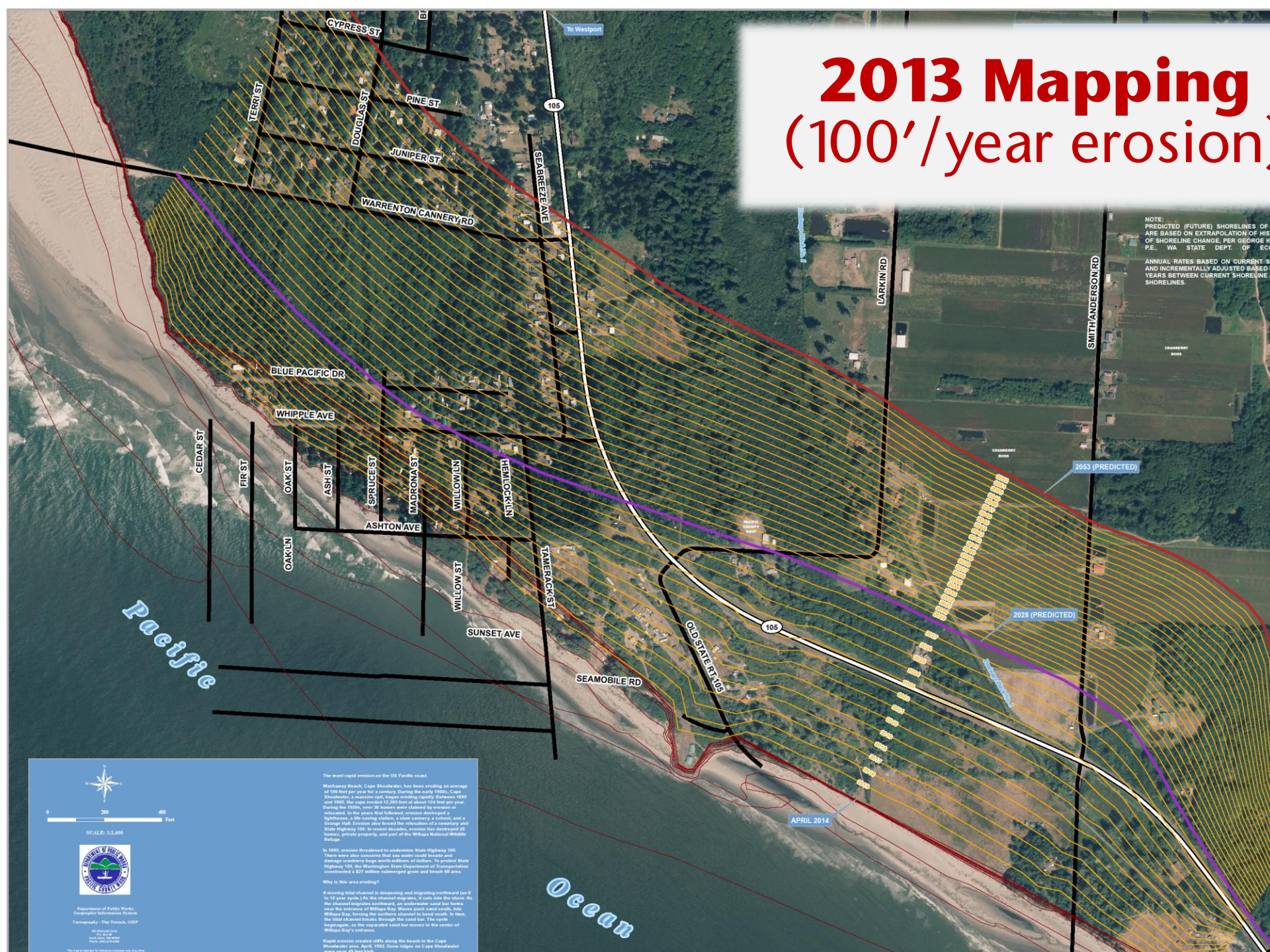


# Dept of Ecology Projections





# 2013 Mapping (100'/year erosion)



NOTE:  
PREDICTED (FUTURE) SHORELINES OF  
ARE BASED ON EXTRAPOLATION OF HIS  
OF SHORELINE CHANGE, PER GEORGE R.  
P.E., WA STATE DEPT. OF EC  
ANNUAL RATES BASED ON CURRENT S  
AND INCREMENTALLY ADJUSTED BASED  
YEARS BETWEEN CURRENT SHORELINE  
SHORELINES

2053 (PREDICTED)

2028 (PREDICTED)

APRIL 2014

The most rapid erosion on the US Pacific coast.

Washaway Beach, Cape Shoalwater, has been eroding an average of 100 feet per year for a century. During the early 1900s, Cape Shoalwater, a massive spit, began eroding rapidly. Between 1930 and 1940, the cape eroded 12,263 feet of about 124 feet per year. During the 1950s, over 30 homes were claimed by erosion or "retreated." In the years that followed, erosion destroyed a lighthouse, a life-saving station, a clam cannery, a school, and a Orange Hall. Erosion also forced the relocation of a cemetery and State Highway 105. In recent decades, erosion has destroyed 20 homes, private property, and part of the Willapa National Wildlife Refuge.

In 1995, erosion threatened to undermine State Highway 105. There were also concerns that sea water could invade and damage nearby logs worth millions of dollars. To protect State Highway 105, the Washington State Department of Transportation constructed a \$27 million submerged groin and beach fill area.

Why is this area eroding?

A moving tidal channel is deepening and migrating northward (as 8 to 12 year cycles). As the channel migrates, it cuts into the shore. As the channel migrates northward, an underwater sand bar forms near the entrance of Willapa Bay. Waves push sand south, into Willapa Bay, forming the northern channel to head south. In time, the tidal channel breaks through the sand bar. The cycle begins again, as the separated sand bar moves to the center of Willapa Bay's entrance.

Rapid erosion created dunes along the beach in the Cape Shoalwater area April 1992. Dune ridges on Cape Shoalwater were eroded off land.



0 200 400 Feet

SCALE: 1:2,400

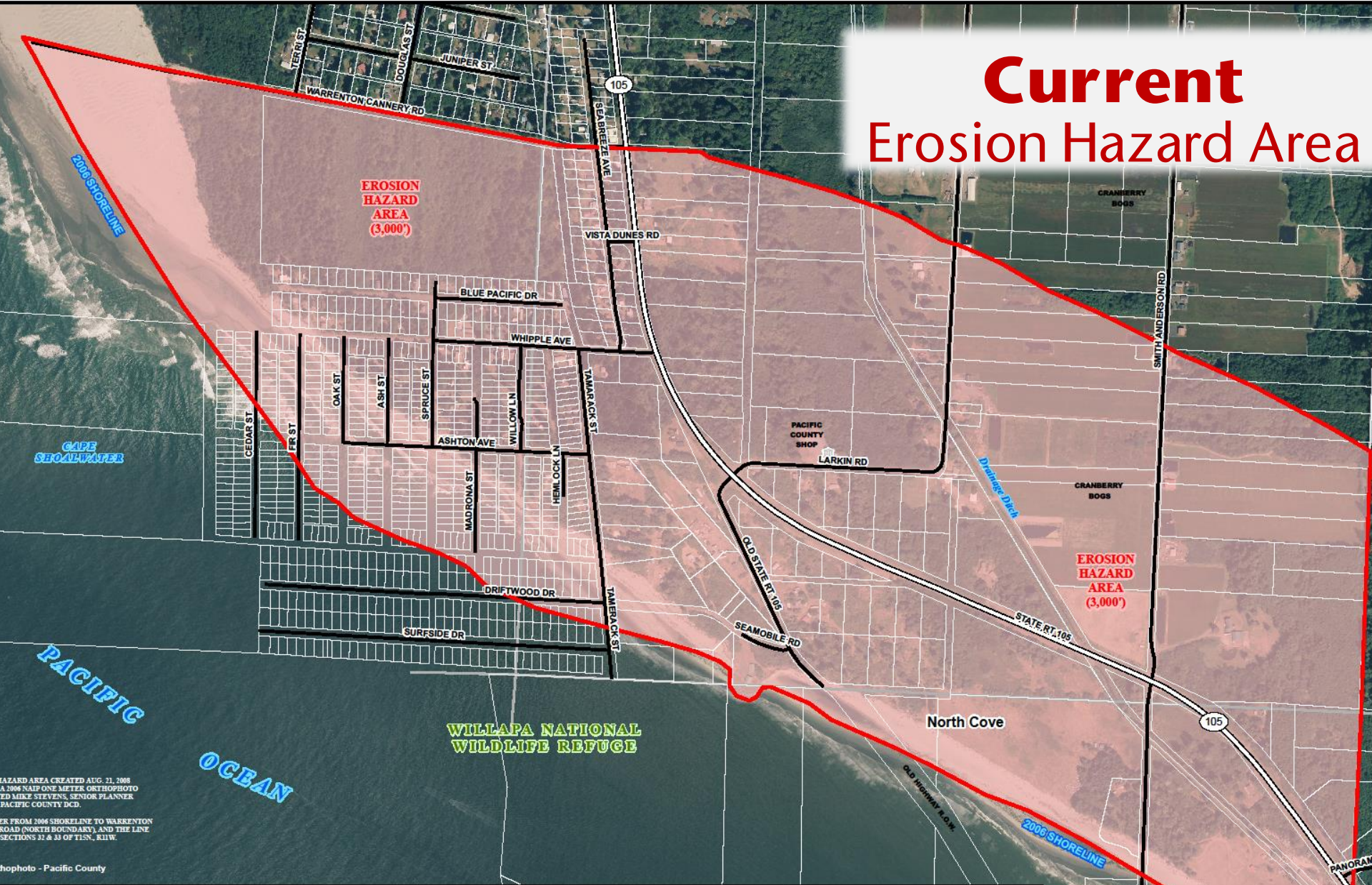


Department of Public Works  
Copyright Reference Service  
Cartography: Tim Trinch, GSP

This map is intended to provide information only and does not constitute a warranty or guarantee of accuracy.

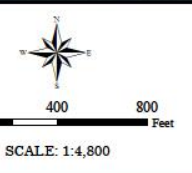


# Current Erosion Hazard Area



HAZARD AREA CREATED AUG. 21, 2008  
 & 2006 NAIP ONE METER ORTHOPHOTO  
 ED MIKE STEVENS, SENIOR PLANNER  
 PACIFIC COUNTY DCI.  
 ER FROM 2006 SHORELINE TO WARRENTON  
 ROAD (NORTH BOUNDARY), AND THE LINE  
 SECTIONS 31 & 33 OF T15N., R11W.

Orthophoto - Pacific County



| Legend                |                        |
|-----------------------|------------------------|
| Emergency Management  | Library                |
| Fairgrounds           | PG Courthouse          |
| Fire Department       | PG DCD                 |
| Gasoline Station      | PG Sheriff             |
| Grange Hall           | PG Shop                |
| Halchery              | PUD                    |
| Hospital              | Park                   |
| School                | Transfer Station       |
| State Patrol          | Telephone Company      |
| Transit System        | Wastewater Plant       |
| Water Treatment Plant | Pacific County Parcels |
| Township Line         | Township Line          |
| Section Line          |                        |
| Roads                 | Hydrology              |
| Lanes                 | Type One               |
| Highways              | Type Two               |
| County Roads          | Type Three             |
| Minor Collectors      | Type Four              |
| Local Access Roads    |                        |
| City Streets          |                        |

**Pacific County**  
 Department of Public Works  
 Geographic Information System

300 Memorial Drive  
 P.O. Box 60  
 South Beach, WA 97008  
 Phone: (360) 875-6308

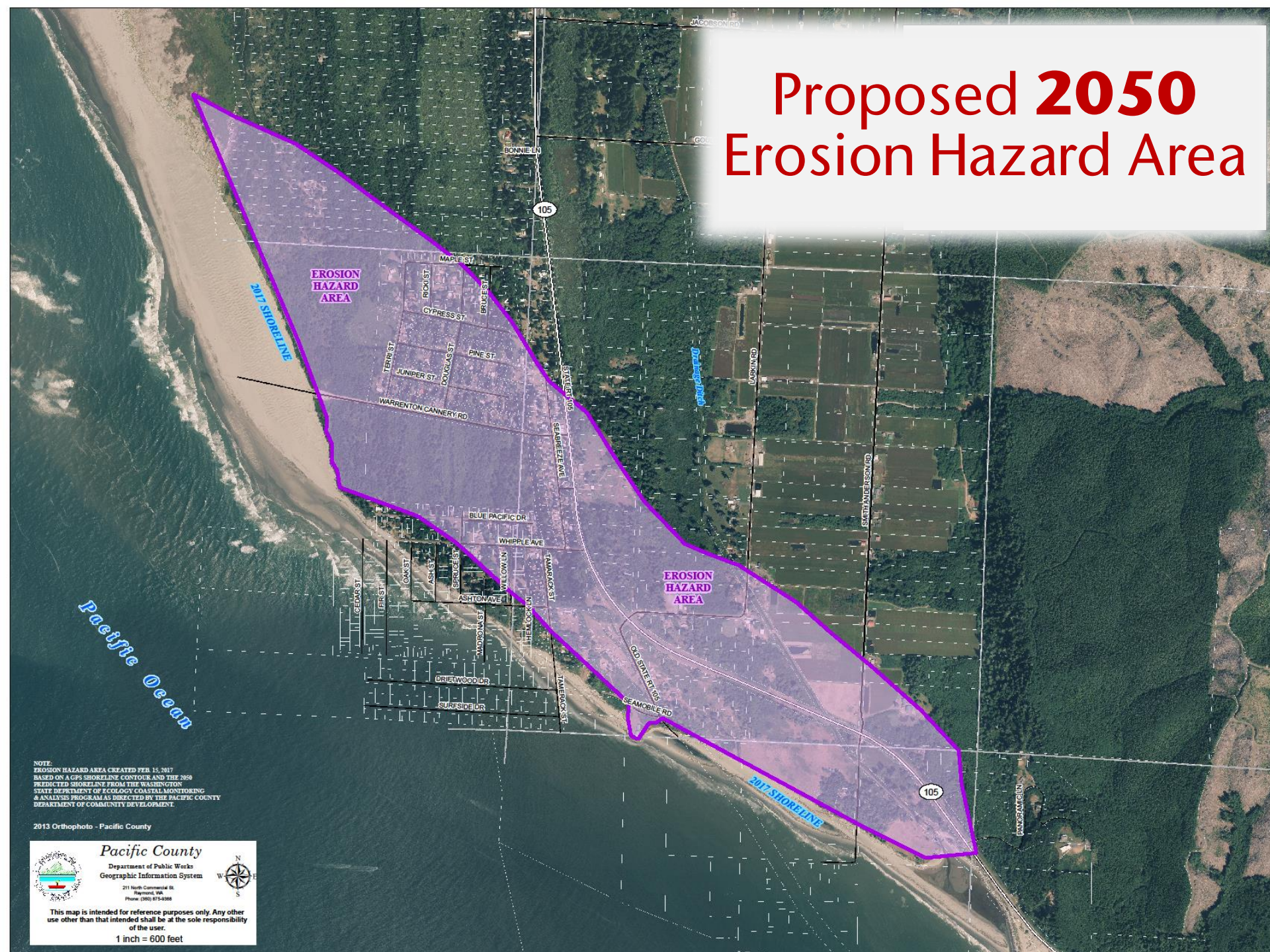
This map is intended for reference purposes only. Any other use other than that intended shall be at the sole responsibility of the user.

**North Cove**  
**"Wash-Away" Beach**  
**EROSION HAZARD AREA**

T. 14 N. & 15 N., R. 11 W.




# Proposed 2050 Erosion Hazard Area




NOTE:  
EROSION HAZARD AREA CREATED FEB. 15, 2017  
BASED ON A GPS SHORELINE CONTOUR AND THE 2050  
PREDICTED SHORELINE FROM THE WASHINGTON  
STATE DEPARTMENT OF ECOLOGY COASTAL MONITORING  
& ANALYSIS PROGRAM AS DIRECTED BY THE PACIFIC COUNTY  
DEPARTMENT OF COMMUNITY DEVELOPMENT.

2013 Orthophoto - Pacific County

**Pacific County**  
Department of Public Works  
Geographic Information System

211 North Commercial St.  
Raymond, WA  
Phone: (509) 875-0388

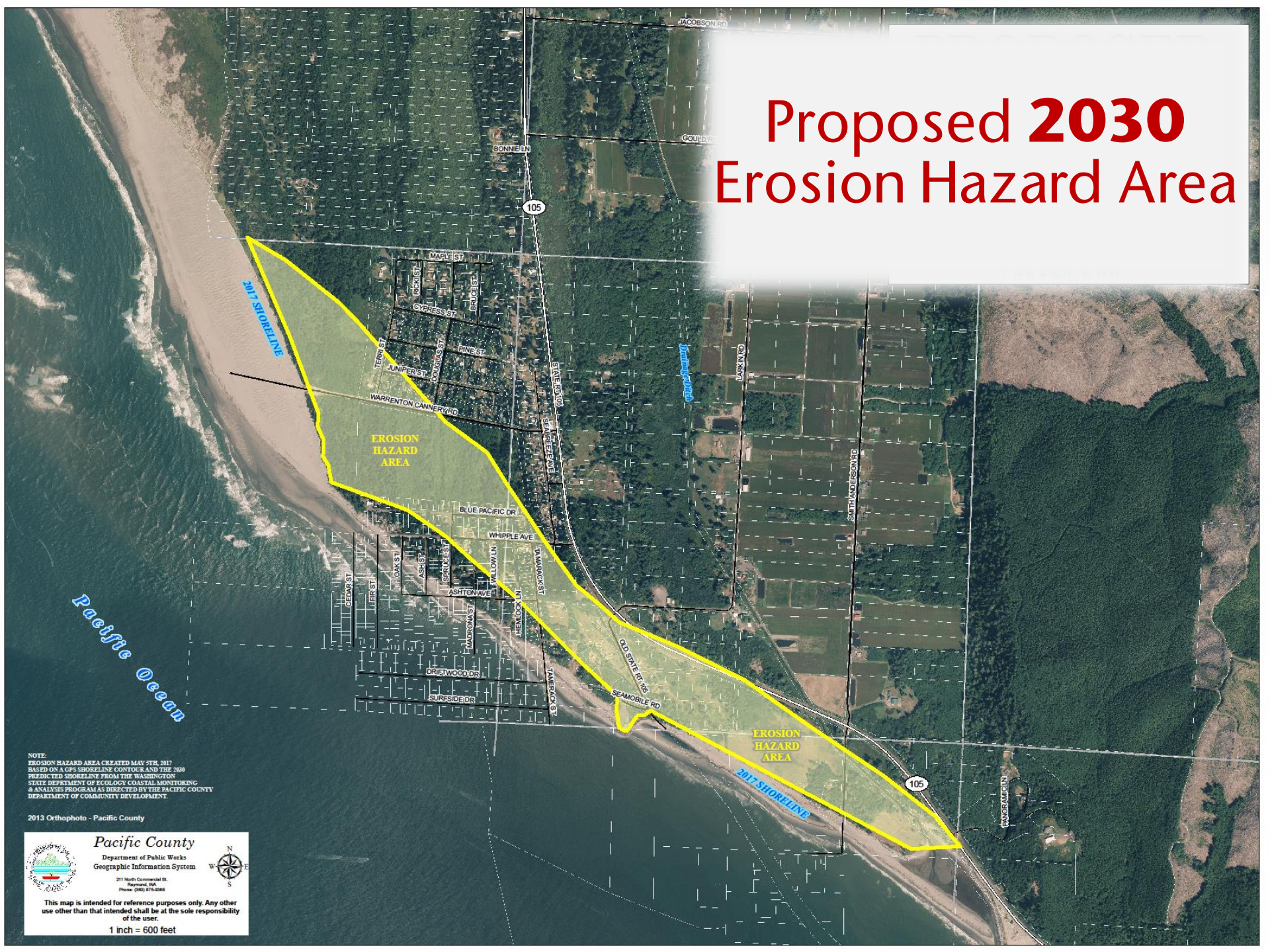


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1 inch = 600 feet



# Proposed 2030 Erosion Hazard Area



NOTE:  
EROSION HAZARD AREA CREATED MAY 27th 2017  
BASED ON A GPS SHORELINE CONTOUR AND THE 2010  
PREDICTED SHORELINE FROM THE WASHINGTON  
STATE DEPARTMENT OF ECOLOGY COASTAL MONITORING  
& ANALYSIS PROGRAM AS DIRECTED BY THE PACIFIC COUNTY  
DEPARTMENT OF COMMUNITY DEVELOPMENT.

2013 Orthophoto - Pacific County

**Pacific County**  
Department of Public Works  
Geographic Information System

211 North Commercial St.  
Raymond, WA  
Phone: (509) 875-0200

This map is intended for reference purposes only. Any other use other than that intended shall be at the sole responsibility of the user.

1 inch = 600 feet



Lisa Ayers



# Legislative Community Project (LCP)

## 2017 Legislative Session Member Requested Local Community Project Information Form

January 5, 2017

**MARSHALL UNIVERSITY**  
SCHOOL OF ENVIRONMENT  
P.O. Box 154  
MORGANTOWN, WV 26506

January 5, 2017

Member Name: **Therese**  
Member House of Representatives:  
314 State Office Building  
Columbus, WA 99004

January 10, 2017

**Washington State**  
Department of Transportation

Member Name: **Therese**  
Member House of Representatives  
314 State Office Building  
Columbus, WA 99004

January 17, 2017

Member Name: **Therese**  
Member House of Representatives  
314 State Office Building  
Columbus, WA 99004



**DEPARTMENT OF THE ARMY**  
FORT MONROE, VIRGINIA

January 15, 2017

Member Name: **Therese**  
Member House of Representatives  
314 State Office Building  
Columbus, WA 99004

RE: Local Community Project "North Village Shoreline Erosion Protection"

Dear Representative Therese:

I appreciate your support for the Local Community Project (LCP) sponsored by Representative Mike for the North Coast and District 1 area of the western shore of Willapa Bay in Pacific County. This coast is a beautiful area with the finest fishing spots in the United States, and the LCP will enable the local community to protect and improve this area to benefit our residents. The Corps of Engineers worked with the Shoreline Erosion Team in 2011 to enter the project and show on the water side of the (University and August Light) through the shoreline in Tolovana, WA. This section of beach is categorized in the Region 1 area as shown in Figure 2 of the Technical Memorandum prepared by Coast and Harbor Engineering. During the design and construction of this project, it became apparent that shoreline erosion would be a great concern for the community. The feasibility of a long-term engineering solution is currently the local community's effort to request the Corps of Engineers regarding shoreline erosion through a pre-federated study proposed in Section 1 and 2 and through TASK 100 in the attached scope of work. I believe the community will be grateful to you for your support of this project.

The agency doing this work is the District's rapid response unit which can determine to beach the remaining portion of 2017 and work in conjunction with the Corps of Engineers to provide and public funds, including the use of Willapa Bay (opening up BEM to annual crop and 150 peak season parking and parking jobs) and 3 months of beach, at various and seasonal opportunities to the Shoreline Erosion Team. There are an additional seven to eight county funds to other maintenance, beach and maintenance costs in districts, which, the Shoreline Erosion Team will also be responsible for over 1.85 million and more.

Thank you for your consideration.

*D. Miller*  
David R. Miller, P.E.  
David Miller

January 20, 2017

**Pacific County Strategic District**  
1233 Grand Street  
Naples, WA 99342

Member Name: **Therese**  
Member House of Representatives  
314 State Office Building  
Columbus, WA 99004

RE: Local Community Project "North Village Shoreline Erosion Protection"

Dear Representative Therese:

The Willapa Strategic District is pleased to support the Local Community Project sponsored by Rep. Therese Miller from the 1st congressional district in the western shore of Willapa Bay. The project is designed to protect and improve the local community's shoreline and to provide a long-term engineering solution to the shoreline erosion problem. The project is currently in the design phase and is expected to be completed by the end of 2017. The project will provide a long-term engineering solution to the shoreline erosion problem and will provide a long-term engineering solution to the shoreline erosion problem.

Thank you for your support of this project.

*D. Miller*  
David R. Miller, P.E.  
David Miller

January 23, 2017

**PACIFIC COUNTY SHERIFF'S OFFICE**  
2001 South 2nd Avenue

Member Name: **Therese**  
Member House of Representatives  
314 State Office Building  
Columbus, WA 99004

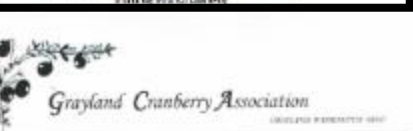
RE: Local Community Project "North Village Shoreline Erosion Protection"

Dear Representative Therese:

The Pacific County Sheriff's Office is pleased to support the Local Community Project sponsored by Representative Miller from the 1st congressional district in the western shore of Willapa Bay. The project is designed to protect and improve the local community's shoreline and to provide a long-term engineering solution to the shoreline erosion problem. The project is currently in the design phase and is expected to be completed by the end of 2017. The project will provide a long-term engineering solution to the shoreline erosion problem and will provide a long-term engineering solution to the shoreline erosion problem.

Thank you for your support of this project.

*D. Miller*  
David R. Miller, P.E.  
David Miller



January 23, 2017

**Grayland Cranberry Association**

Member Name: **Therese**  
Member House of Representatives  
314 State Office Building  
Columbus, WA 99004

RE: Local Community Project "North Village Shoreline Erosion Protection"

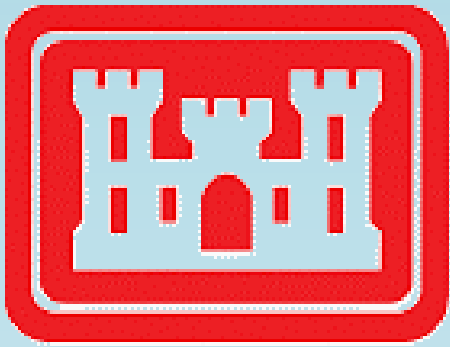
Dear Representative Therese:

The Grayland Cranberry Association is pleased to support the Local Community Project sponsored by Representative Miller from the 1st congressional district in the western shore of Willapa Bay. The project is designed to protect and improve the local community's shoreline and to provide a long-term engineering solution to the shoreline erosion problem. The project is currently in the design phase and is expected to be completed by the end of 2017. The project will provide a long-term engineering solution to the shoreline erosion problem and will provide a long-term engineering solution to the shoreline erosion problem.

Thank you for your support of this project.

*D. Miller*  
David R. Miller, P.E.  
David Miller





**US Army Corps  
of Engineers®**

# Continuing Authorization Program (CAP)

## **Phase 1: Feasibility**

- Propose: extend dynamic revetment
- Matching 50% after first \$100K
- Plan: submit June/July for FY2018 consideration

Tim Pelzel

Friends of North Cove Beach

Thank You!

# Contact Info

[WeCan@co.pacific.wa.us](mailto:WeCan@co.pacific.wa.us)

**Charlene Nelson**

Shoalwater Bay Tribe

[cnelson@shoalwaterbay-nsn.gov](mailto:cnelson@shoalwaterbay-nsn.gov)

**Colin Newell**

Washington Dept of Transportation

[NewellC@wsdot.wa.gov](mailto:NewellC@wsdot.wa.gov)

**Mike Nordin**

Pacific Conservation District

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**Kevin Decker**

Washington Sea Grant

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**Tim Pelzel**

Friends of North Cove

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**Lisa Ayers**

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Department of Community Development

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**David Cottrell**

Grayland Drainage District #1

[cranberrydavid@yahoo.com](mailto:cranberrydavid@yahoo.com)

**David Michalsen**

U.S. Army Corps of Engineers

[David.R.Michalsen@nwp01.usace.army.mil](mailto:David.R.Michalsen@nwp01.usace.army.mil)

**Kelly Rupp**

LeadToResults, LLC

[kelly.rupp@leadtoresults.com](mailto:kelly.rupp@leadtoresults.com)