Rich Passage
Long Term Beach Monitoring

Property Owner Updates
January 29 & 30, 2020

Jessica Côté, PE
History of passenger ferries on route

1986: Washington State Ferries (WSF) first passenger only ferry

1989: WSF adds faster vessel (24 kts)

1990: Investigation of shoreline damage concerns resulted in slow down (12 kts)

1990s: WSF established wake criterion

1998: WSF acquired 2 larger and faster vessels (37 kts)

1999: Property owners filed class action suit

2003: WSF stopped POF service to Bremerton

2004: Kitsap Transit Rich Passage Passenger Only Fast Ferry Research program began

2012: M/V Rich Passage 1 Validated and Tested
WSF Fast Ferry Wake Wash

Graph showing wake height over period for different conditions and criteria.
Beach Response to WSF POFF

JUL 2001

AUG 2004
Research Program Design (2004 to 2012)
Rich Passage Class Vessels

Waterway Segment | Mode                | Passengers Onboard | Loading | Foil Angle Degrees | Interceptor Percent
-----------------|---------------------|-------------------|---------|--------------------|---------------------
Rich Passage     | Low Wake            | 0 - 50 Light      | -0.6    | 15%                |
                 |                     | 51 - 70 Half      | -0.2    | 15%                |
                 |                     | 71 - 118 Full     | 0.6     | 15%                |
Buoy 4 - Seattle | Fuel Efficiency     | 0 - 118 ALL       | 0.6     | 0%                 |
Measurements from 2004 to 2012

Hydrodynamics
- Wind
- Wakes and waves
- Tidal currents
- Water levels

Morphology
- Sediments
- Beach Profiles
- Beach Photos
- Gravel Transport
- 3D Laser Scans

Environmental
- Biological Habitat
- Noise
Rich Passage Beach Dynamics
Wind Generated Waves

Summer Condition

Winter Condition
Low energy wave environment

- Beach supply limited by structures
- Beaches shaped by large infrequent winter storms
- Beaches shaped by long term exposure to wakes
- Vessel wakes can be significant
- Used long term, high resolution monitoring to capture beach variability
Beach Change 2004 to 2013

![Graph showing volume change over time with data points for Above MTL (off milk) and Below MTL.]

![Images of beach areas at different times: JUL 2001, AUG 2004, OCT 2012.]

Kitsap Transit: Connecting Communities

Blue Coast Engineering
2013 to 2019 Beach Monitoring
Beach Monitoring Methods – Beach Photo Surveys

Extensive coverage of relative change of beach at bulkhead interface.

Figure-003: Photo time series and relative beach elevation change at Site PW_08 on Point White between 2013 and 2018.
Beach Monitoring Methods – Laser Scanning Surveys

Precise measurement of beach elevations along one to two sections of four shoreline reaches
Beach Monitoring Locations
2013 to 2019 Beach Monitoring Timeline

LEGEND
Fall/Winter = October through April  PB = Pleasant Beach
Spring/Summer = May through September  EB = East Bremerton
# 2017 – 2020 POFF Operations

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Monitoring Results

2019
Beach Monitoring Locations:
Point Glover / Port Orchard
Point Glover West

- Most of shoreline shows very small seasonal changes
- Occurs within pockets between groins
POINT GLOVER
VOLUME CHANGE – LASER SCANNING SURVEY
PGW = Point Glover East (Blue)
PGW = Point Glover West (Orange)
Point Glover East

- Most of shoreline shows very small seasonal changes
- Sediment transport driven by precipitation and creek discharge
POINT GLOVER CHANGE RELATIVE TO 2005
Port Orchard

• Minimal change seasonally or annually
• No laser scanning as changes are too small

Figure A-49: Photo time series and relative beach elevation change at Site PO_03 on Port Orchard between 2014 and 2019.
Beach Monitoring Locations: East Bremerton
East Bremerton

- Elevation changes are typically small (± 0.5 ft)
E. BREMERTON

VOLUME CHANGE – LASER SCANNING SURVEY
E. BREMERTON
CHANGE RELATIVE TO 2005
Beach Monitoring Locations: Pleasant Beach
Pleasant Beach

- Changes are small (+/- 0.5 ft)
- Variable from year to year with storm events
Pleasant Beach
CHANGE RELATIVE TO 2005
Beach Monitoring Locations: Point White
Point White

- Most dynamic shoreline reach because of wind-waves
- Seasonal changes can be +/- 1 ft
- Net accretion in 2018 and net erosion in 2019
POINT WHITE

VOLUME CHANGE – LASER SCANNING SURVEY

PWS = Point White South
PWN = Point White North
POINT WHITE

CHANGE RELATIVE TO 2005
POINT WHITE

CHANGE RELATIVE TO 2005
2020 Monitoring

- May and October Beach Photo Surveys and Laser Scanning
- Operational changes:
Questions?