Point No Point Estuary Restoration
Groundwater & Surface Water
August 25, 2022
Overview

- Existing Conditions
  - Measurements of surface water
  - Model simulations of surface water conditions
  - Groundwater measurements
  - Conceptual plan view model of groundwater
  - Cross-section diagram of existing surface water and groundwater connections

- Possible Future Conditions
  - Model simulation of surface water
  - Conceptual plan view model of groundwater
  - Cross-section diagram of future surface water and groundwater
18-inch Outfall
23-acre Freshwater Wetland created from Fill
10-acre Freshwater Wetland
Privately Owned
12-inch culvert
Drainage ditches
23-acre Freshwater Wetland created from Fill
Ditched & disconnected “channel”
Point No Point Park
NE Point No Point Rd
2 mi. of feeder bluffs
18-inch Outfall
Trail/ Berm
Lighthouse
Hillview Lane
10-acre Freshwater Wetland
Privately Owned
12-inch culvert
Existing Conditions
Surface Water Measurement Locations

Locations:
- SW-04: Hillview Ln
- SW-03: PNP Rd
- SW-02: Inside Tide Gate
- AP-02
- AMW-01
- AMW-02
- AMW-03
- AMW-04
- AMW-05
- AP-01
- SW-01
Surface water levels in ditches along PNP drain very slowly under normal conditions.
Salinity along PNP Road

- **Inside Tide Gate**
- **PNP Rd**

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<th>Date</th>
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Water Elevation & Precipitation during King Tide

- Water Surface Elevation (ft NAVD88)
- Inside Tide Gate WSE
- Measured Tides

Slide 7
Salinity at Tide Gate during King Tide

- Inside Tide Gate Salinity
- Inside Tide Gate WSE
- Measured Tides

Water Surface Elevation (ft NAVD88)

Salinity (ppt)
Existing Surface Water Conditions
January 2, 2022
Before Heavy Rain

Inputs as yellow arrows

- Point No Point Creek and west drainage ditch flow inputs
- Tides through tide gate
- Internal culverts through Hillview Lane

Blue color represents water depth in feet
Existing Surface Water Conditions
January 3, 2022

Heavy rain generates surface flow from upland and begins to fill upper marsh as it tries to drain into Puget Sound

Blue color represents water depth in feet
Heavy rains continue and fill lower marsh because tide has risen and tide gate is closed more of the time than it is open and rainfall has no limited channels to Puget Sound.
Heavy rains have stopped and tides are lower, but the lack of channels in marsh and small opening through tide gate slows flow into Puget Sound taking 5 more days to see water levels drop.
King Tide event creates overtopping of north beach and east beach
Existing Surface Water Conditions – January 7, King Tide

King Tide event adds more water into the marsh after overtopping of beaches, can not drain and floods road.
Groundwater Measurements—Existing Conditions
Groundwater Water Measurement Locations
Lots of Data

Note: (1) Precipitation data downloaded from Harskile Station - Kitap Hydrologic Database by PUD #1 of Kitzap County from http://kitaphydrodata.knsd.org/PGSFED_RH/N.aspx
Tidal and Surface Water Data Sources: SW-01 (Blue Coast 11/22/2021 - 2/14/2022), SW-02 (Blue Coast 11/22/2021 - 2/17/2022), NOAA (Foul Weather Bluff Station 94445016 1/1/2023 - 5/31/2022)
Groundwater inside of tide gate following tidal signal

West End of PNP Rd has elevated groundwater

Ground Water Measurements during Average Condition

- AMW-01
- AMW-02
- AMW-03
- AMW-05
- AP-01
- Tide (SW-01)
- Tide Gate (SW-02)
Ground Water Measurements during Extreme Conditions
Under current conditions most of the channels in marsh were historically filled and the few remaining are blocked with invasive species so there is little capacity to infiltrate or convey surface water and no capacity to convey ground water, so groundwater table is high and gets even higher during large rain events and fills stormwater ditches as route to try and drain towards Puget Sound.
Under current conditions most of the channels in marsh were historically filled and the few remaining are blocked with invasive species so there is no capacity to infiltrate or convey ground water, so groundwater table is high and gets even higher during large rain events and fills stormwater ditches as route to try and drain towards Puget Sound.
Possible Future Conditions
Levee (2 feet above King Tide)

Levee (5 feet above road)

Future work – interior channel network for drainage and habitat

150 ft wide open channel would have pedestrian bridge for trail access

40-foot culverts and Raise Hillview

Enhance Beach
Initial conditions at low tide prior to intense rain marsh is wet from tidal flow would happen daily.
With restoration tidal flow will be able to enter and exit the marsh through the large tidal channel.
Intense rain and tidal flow fills marsh initially 1 to 2 feet of water.
Possible Surface Water Conditions – January 2-4, Intense Rain

Intense rain and tidal flow maximum marsh water levels reach 4 feet deep but contained within levee.
As tides recede (ebb), both salt water and fresh water can drain out through the large tidal channel.
With restoration marsh can drain nearly completely through the large tidal channel and not flood the road.
During extreme high tide water would be contained within the levee and reestablishing north beach to prevent coastal flooding.
Possible Future Groundwater

With restoration there is more connection and conveyance of water from uplands into Puget Sound, which will reduce flooding and increase capacity of roadside drainage ditches to handle stormwater and infiltrate into ground water.
With restoration there are more channels to convey and infiltrate surface water and groundwater flowing from uplands into Puget Sound, which will reduce flooding and increase capacity of roadside drainage ditches to handle stormwater.
As a reminder under current conditions most of the channels in marsh were historically filled and the few remaining are blocked with invasive species so there is no capacity to convey or infiltrate surface water. In addition, groundwater table is high because there is no path to Puget Sound as there was historically and gets even higher during large rain events and fills stormwater ditches as route to try and drain towards Puget Sound.
Greenbank Groundwater Model Section
Project Next Steps
Next Steps

- Build existing conditions groundwater model & validate against measurements
- Build detailed surface for possible future conditions
- Run surface water model for possible future conditions
- Run groundwater model for possible future conditions
- Analyze models for changes in stormwater drainage needs