



FACET

Previously **D C G** WATERSHED

SEA LEVEL RISE RISK ASSESSMENT – Flood impacts

PACIFIC COUNTY AND CITY OF ILWACO

AUGUST 22, 2024

Agenda

Meeting Objectives

Assessment Process

Preliminary Results

Next Steps

I. Introduction

Pacific County Phase 2 Assessment

Pacific County will continue this assessment by:

Investigating priority topics of concern identified in the Phase 1 assessment, with guidance from a Technical Advisory Committee;

Assessment of coastal and riverine flooding, groundwater, stormwater drainage; and infrastructure impacts

Reviewing planning priorities, strategies, and regulations to mitigate SLR impacts.



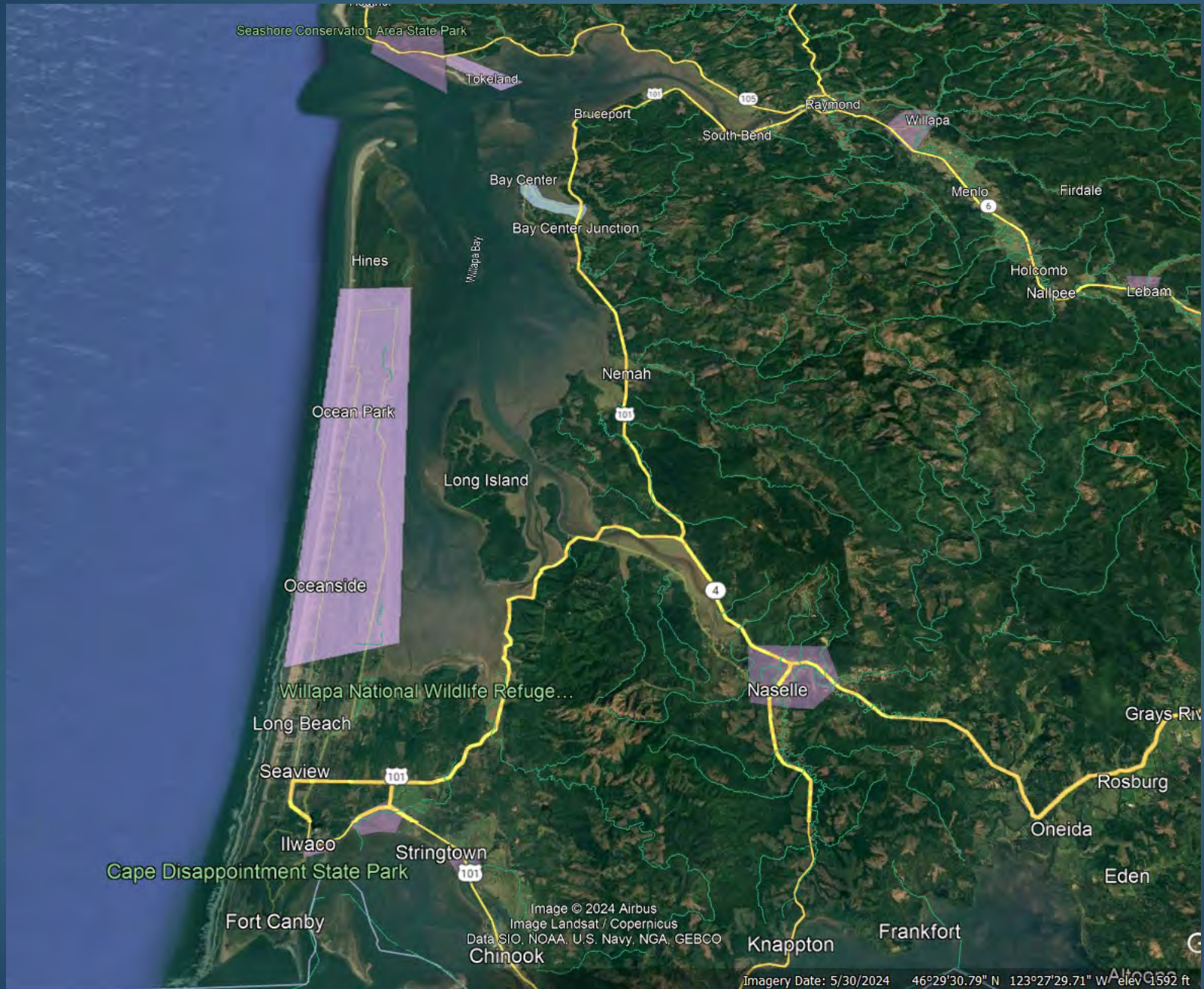
Meeting Objectives

By end of meeting, we will have reviewed focus area delineations, flood analysis methods, and spatial data overlays in GIS to assess increased flood risk and vulnerabilities due to sea level rise.

Today: Long Beach, Naselle, Ilwaco

Other focus areas : Chinook, Tokeland, North Cove, Lebam, East Raymond

II. Focus Areas



III. Flood Analysis

Data Sources

Collected so far

Data Parameter	Source
Well logs (locations, elevations, pump tests, lithology, specific capacity measurements)	City of Ilwaco, WA Dept. of Ecology
Well Water quality tests (chlorides)	WA Dept of Ecology
Surficial geology coverage (4 soil types)	WA Dept. Of Natural Resources
Bare-earth, LiDAR based topography	NOAA, WA Dept. Of Natural Resources LiDAR Portal
Streams	NHD (flowlines) WA Dept. Of Natural Resources, City GIS data
Existing Infrastructure (culverts, tidegates, outflow pipes and retention pond locations, component sizing and condition)	City of Ilwaco Public Works staff and/or Pacific County Public Works, Shoalwater Bay Tribe, WSDOT
On site septic (locations, types)	Pacific County Department of Community Development – Environmental Health records, Shoalwater Bay Tribe
Mapped sea level rise and extreme flood inundation used in Phase 1	Pacific County
Flood coverage maps (areas)	FEMA, City of Ilwaco GIS data
Areas of flooding concern (dates, areas)	Public feedback during meetings, Interviews with City Public Works staff and Emergency Management
Subsurface communication infrastructure (type, locations, salinity, and moisture tolerances)	Public Utility Districts, Vendors, City of Ilwaco
<i>Planned development activities</i>	<i>City of Ilwaco, Pacific County</i>
<i>Projections of atmospheric river changes and modeling of future conditions</i>	<i>University of Washington's Climate Impact Group or Northwest Hydraulics</i>

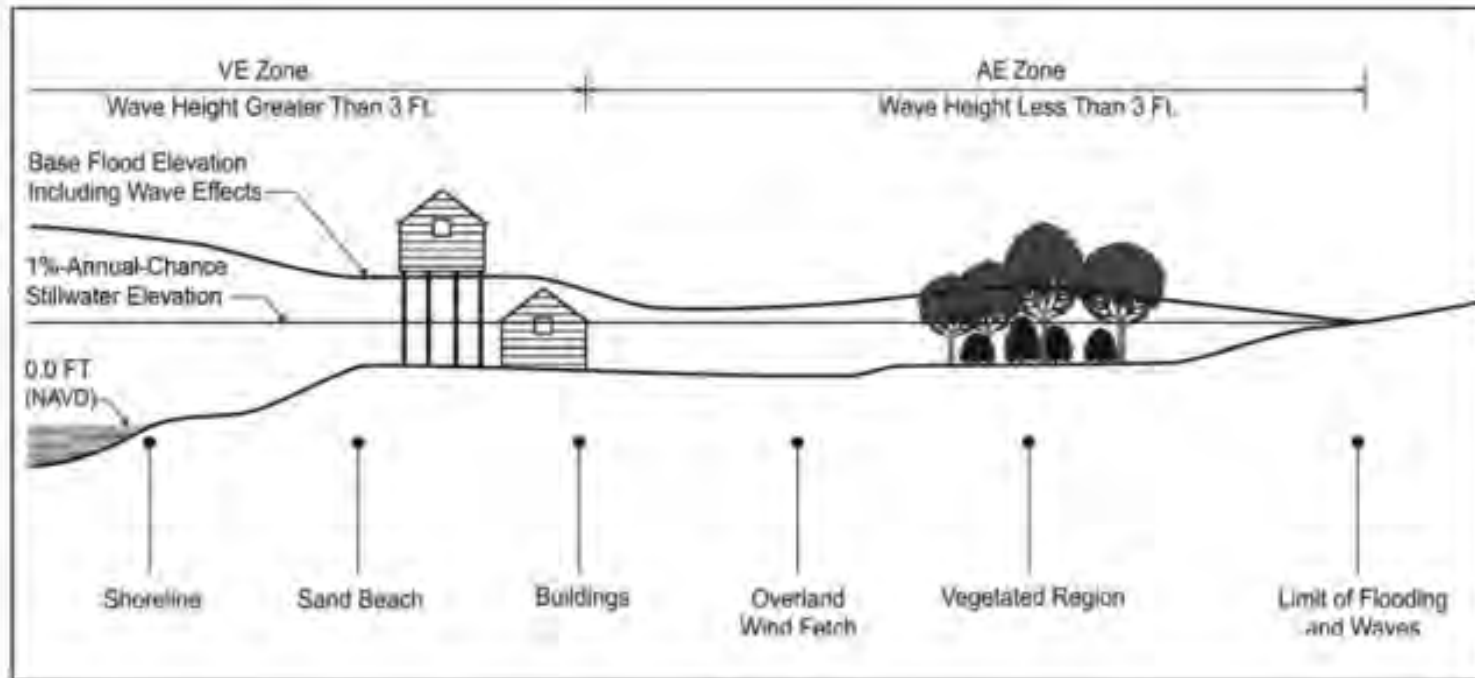


Figure 1 – Transect Schematic

FEMA FIS. Coastal
flooding analysis

Elevations on Mean Lower Low Water

Station: 9439040, Astoria, OR

Status: Accepted (Apr 17 2003)

Units: Feet

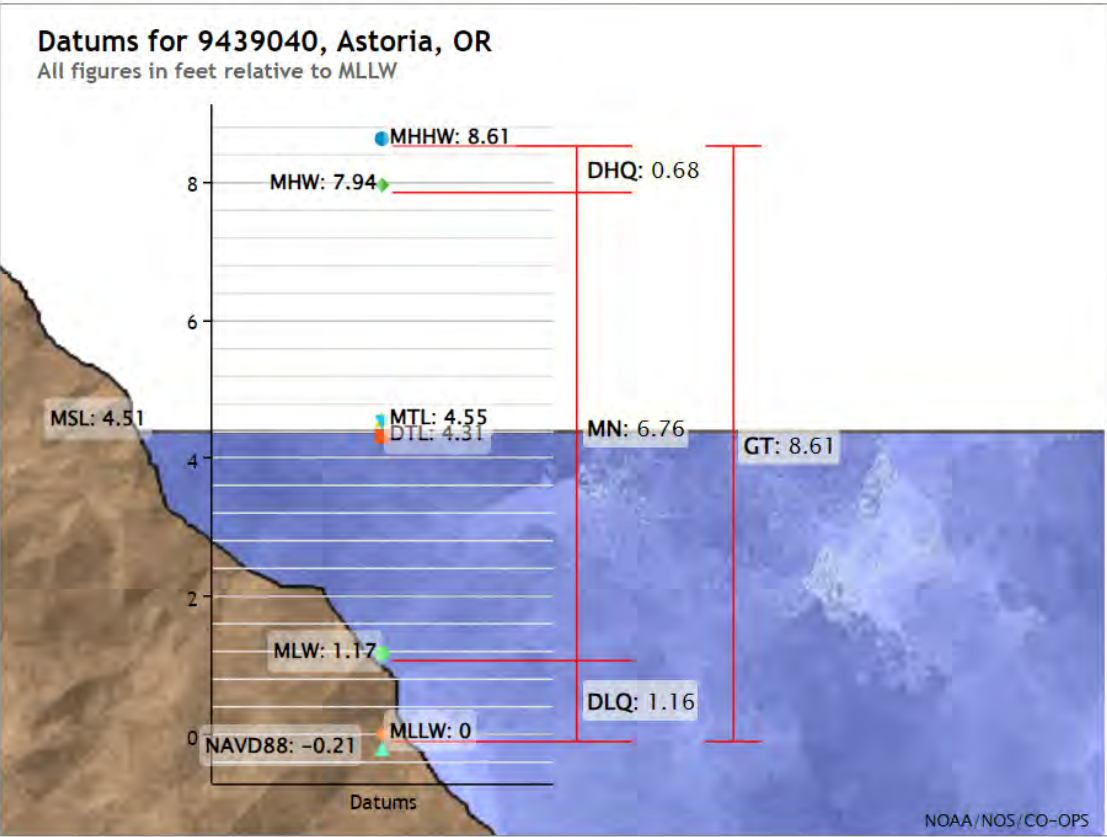
Control Station:

T.M.: 120

Epoch: 1983-2001

Datum: MLLW

Datum	Value	Description
MHHW	8.61	Mean Higher-High Water
MHW	7.94	Mean High Water
MTL	4.55	Mean Tide Level
MSL	4.51	Mean Sea Level
DTL	4.31	Mean Diurnal Tide Level
MLW	1.17	Mean Low Water
MLLW	0.00	Mean Lower-Low Water
NAVD88	-0.21	North American Vertical Datum of 1988
STND	-2.23	Station Datum
GT	8.61	Great Diurnal Range
MN	6.76	Mean Range of Tide
DHQ	0.68	Mean Diurnal High Water Inequality
DLQ	1.16	Mean Diurnal Low Water Inequality
HWI	9.16	Greenwich High Water Interval (in hours)



Showing datums for

9439040 Astoria, OR

Coastal flooding elevations

Long Beach, WA

VE Zone (TWL) 19 to 21 ft NGVD88

Wave Runup 3 ft

King Tide (Ilwaco) 10 ft

Stillwater Elevation 9.7 ft +/- .5

Mean Higher High Tide 8.81 ft

Mean Lower Low Tide 0.21

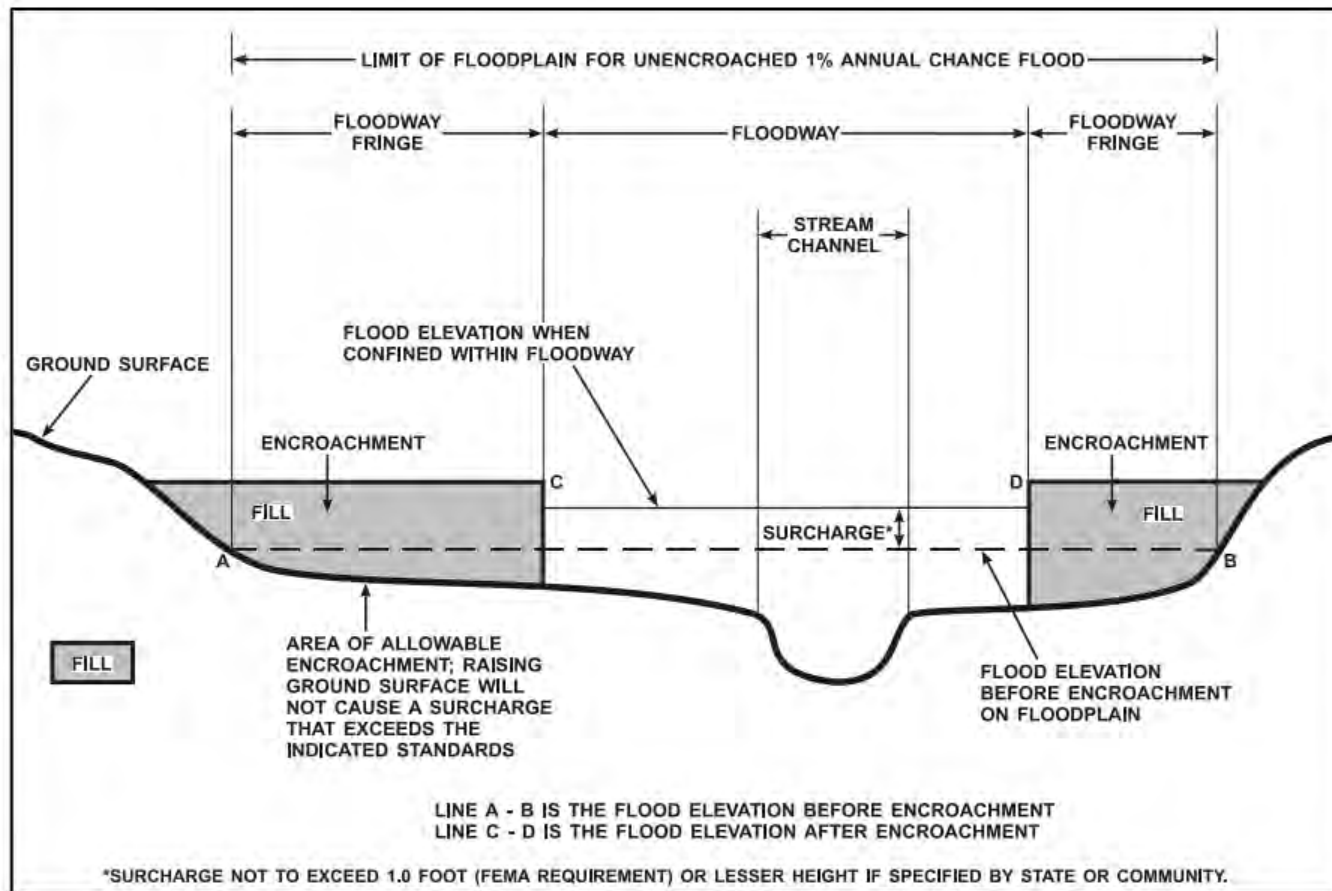


Figure 3 – Floodway Schematic

FEMA FIS riverine
flooding analysis

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
Naselle River								
A	0	2,349	15,530	1.3	15.6	15.6	16.6	1.0
B	3,990	1,321	9,321	2.1	16.5	16.5	17.5	1.0
C	7,990	2,480	15,644	1.2	17.2	17.2	18.2	1.0
D	8,360	298	3,291	5.9	17.3	17.3	18.3	1.0
E	9,180	2,618	21,822	0.8	18.2	18.2	19.1	0.9
F	14,200	1,443 ²	15,447	1.0	18.4	18.4	19.4	1.0
G	16,740	580 ²	4,084	3.8	18.7	18.7	19.7	1.0
H	18,800	329	3,427	4.5	22.0	22.0	22.0	0.0
I	21,330	100	2,055	5.7	25.1	25.1	26.1	1.0
J	23,160	900	5,561	2.1	27.3	27.3	27.9	0.6
K	25,470	181*	1,822	6.5	28.8	28.8	29.4	0.6
L	27,650	165	1,825	6.5	32.6	32.6	33.4	0.8
M	28,850	87	1,059	11.1	34.4	34.4	35.0	0.6

¹ Feet above Confluence with Dell Creek

² Width ignores reductions due to islands in floodway

* Mapped Floodway width does not match model

TABLE 13	FEDERAL EMERGENCY MANAGEMENT AGENCY PACIFIC COUNTY, WA AND INCORPORATED AREAS	FLOODWAY DATA
		NASELLE RIVER

Elevations on Mean Lower Low Water

Station: 9439040, Astoria, OR

Status: Accepted (Apr 17 2003)

Units: Feet

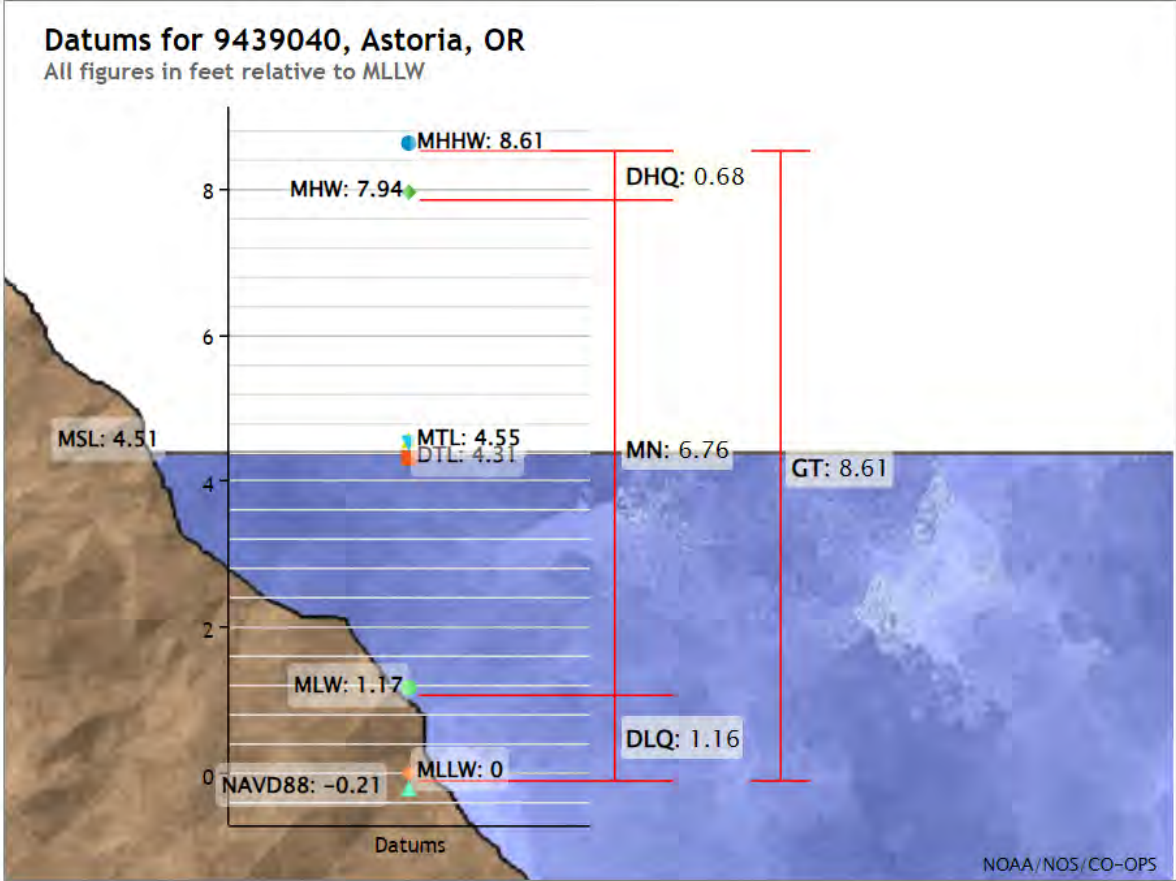
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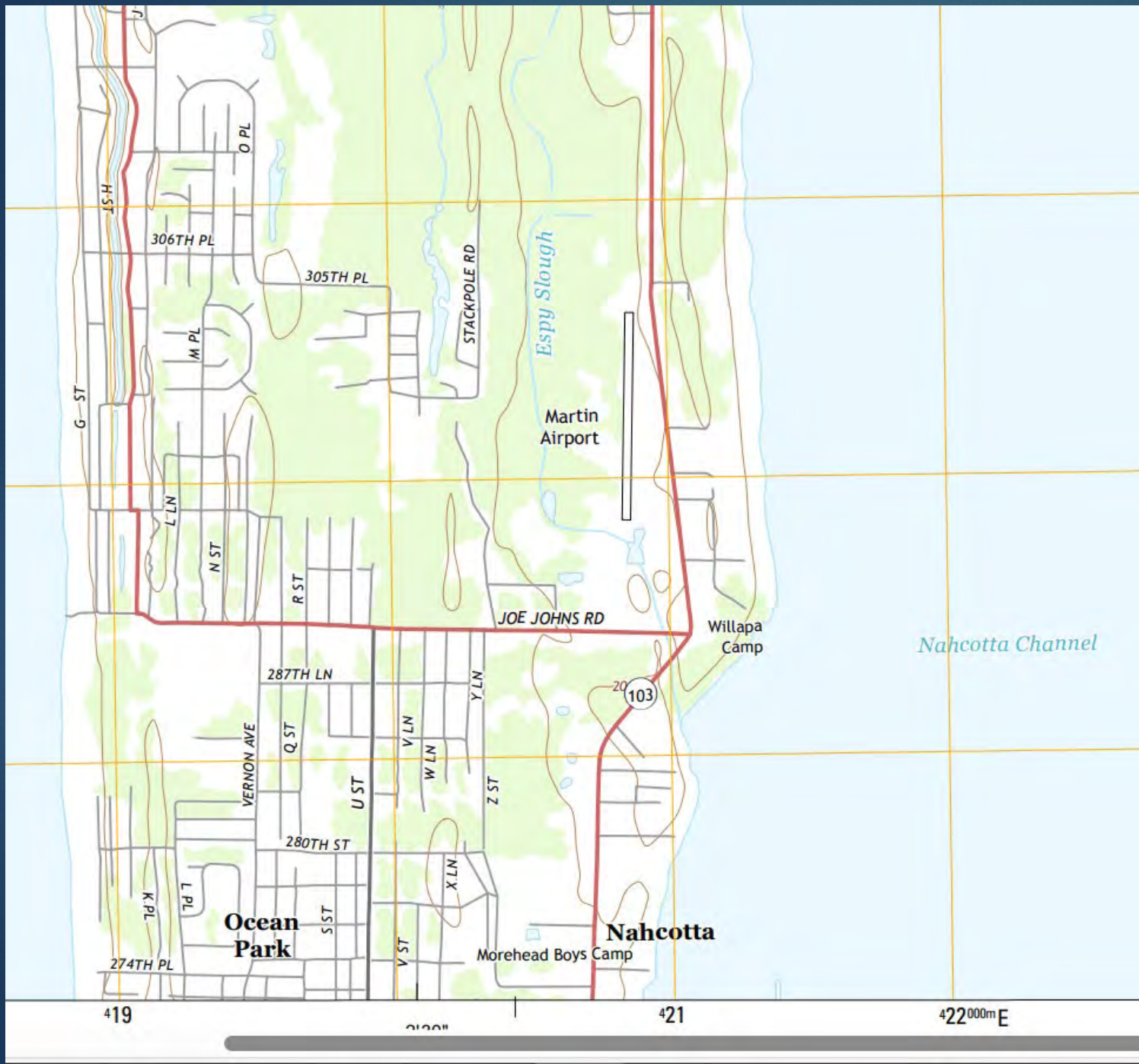
Showing datums for

9439040 Astoria, OR

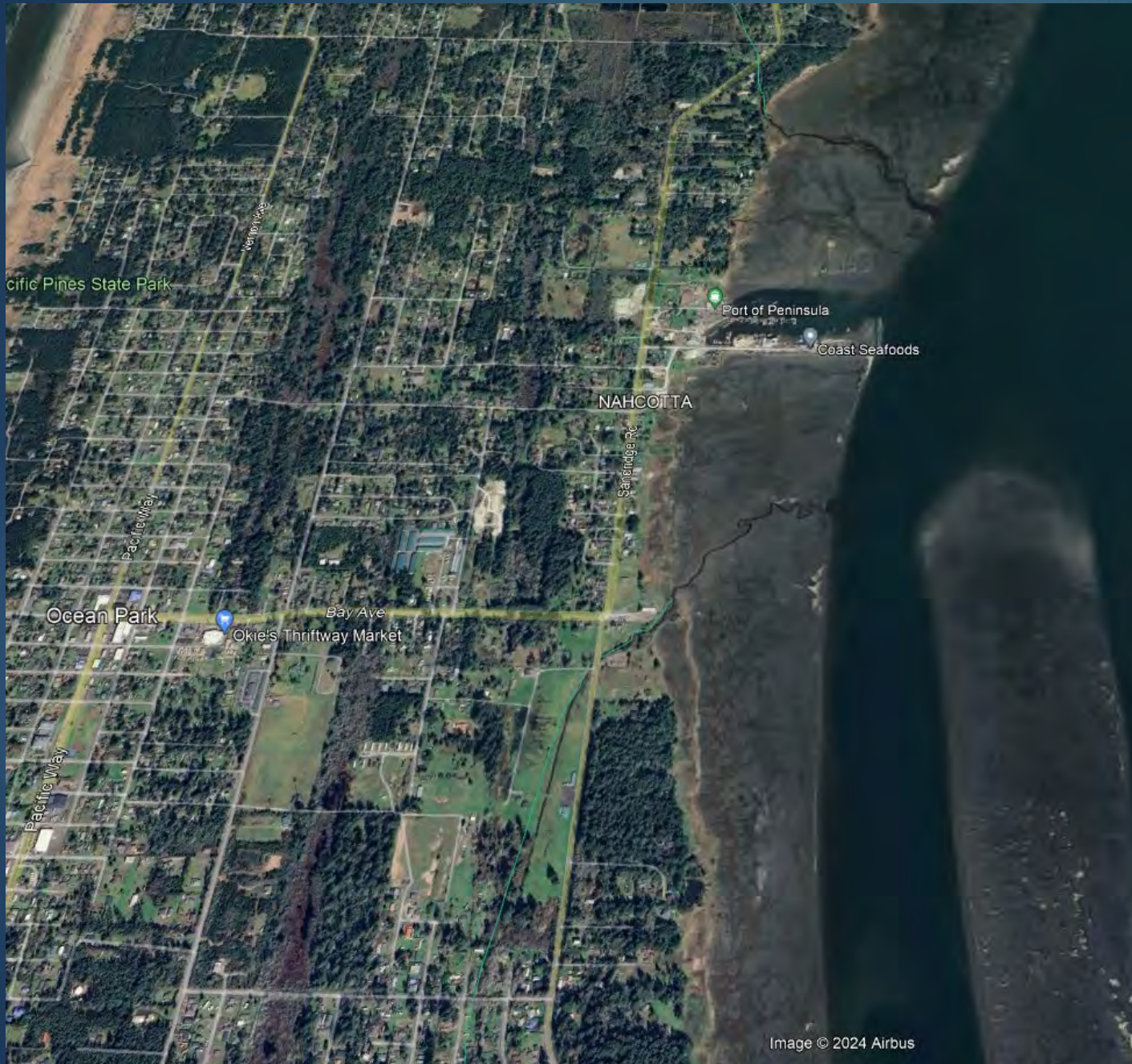
Datums:

MLLW	Mean Lower Low Water
MSL	Mean Sea Level
NAVD88	North American Vertical datum 1988
NGVD 29	National Geodetic Vertical Datum 1929
WGS84	World Geodetic System 1984

IV. Spatial Data Analysis



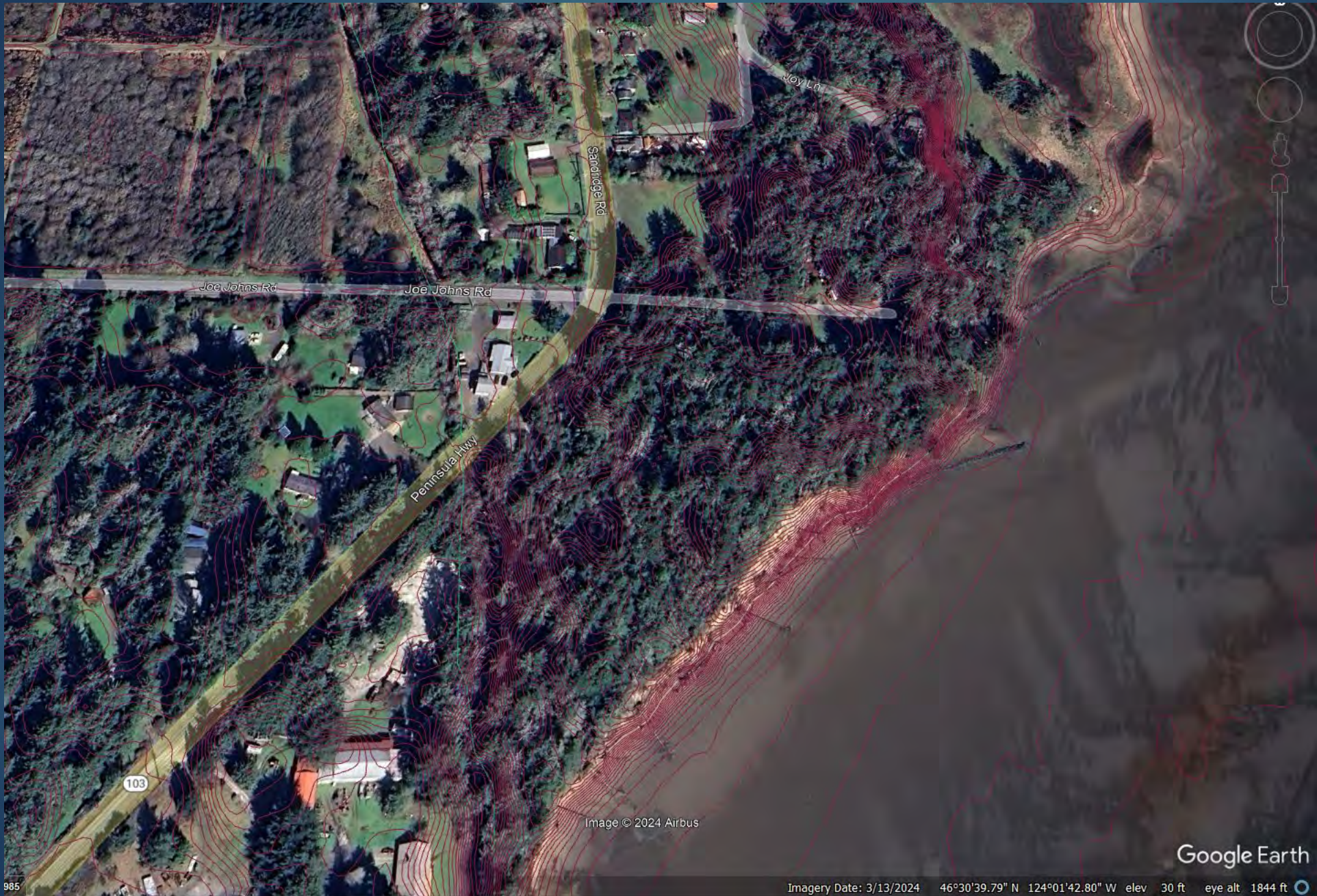
USGS topo

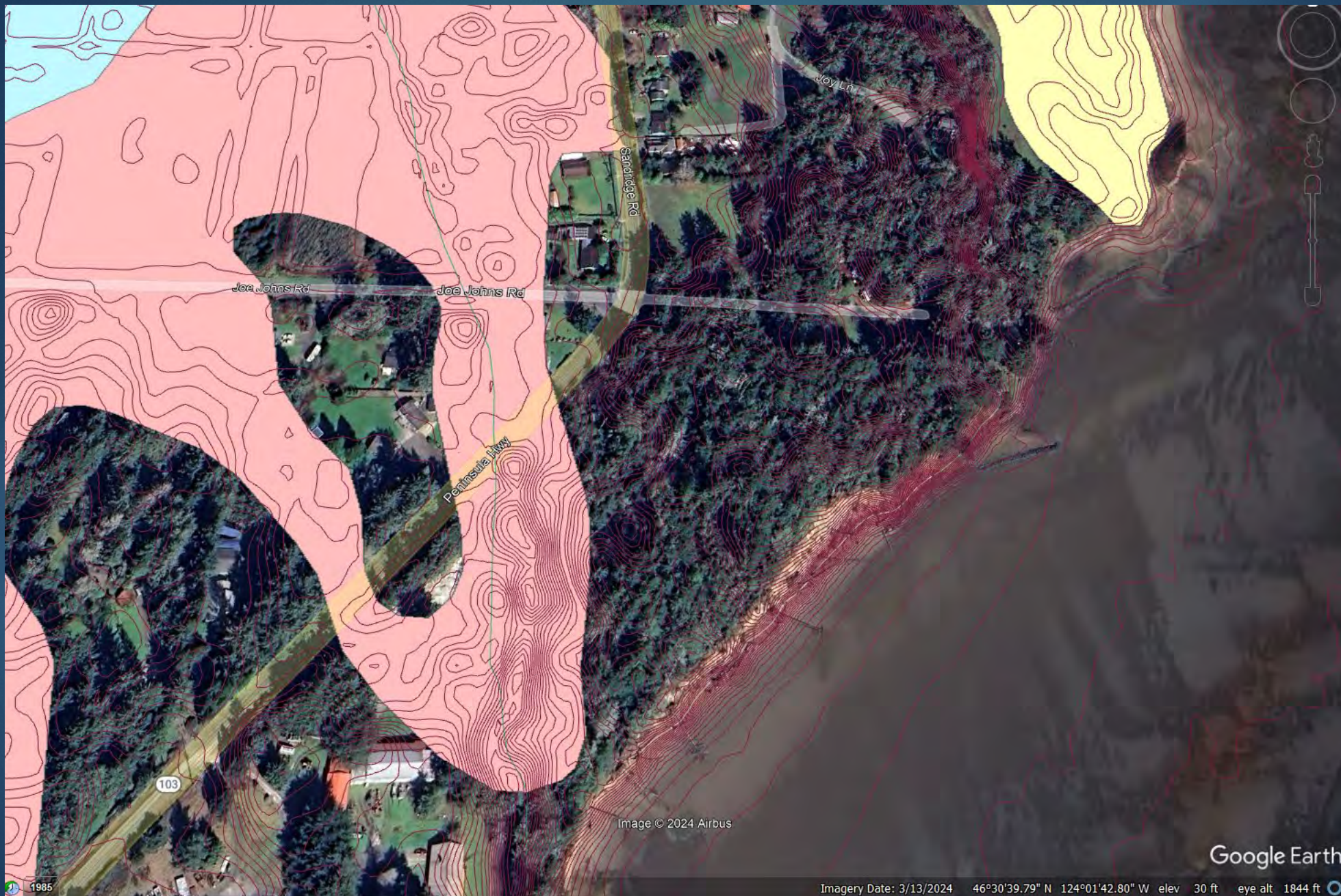


Nahcotta



Espy Slough near Nehcotta







Long Beach Soils



FFAs



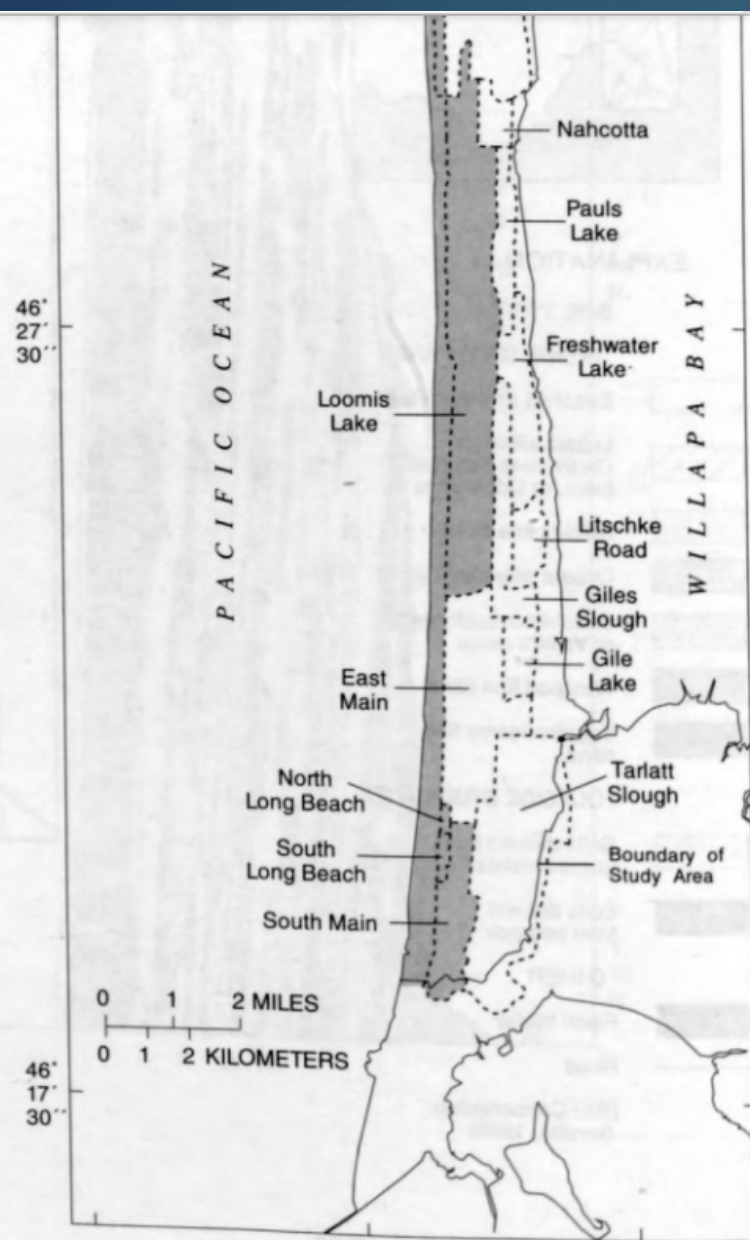
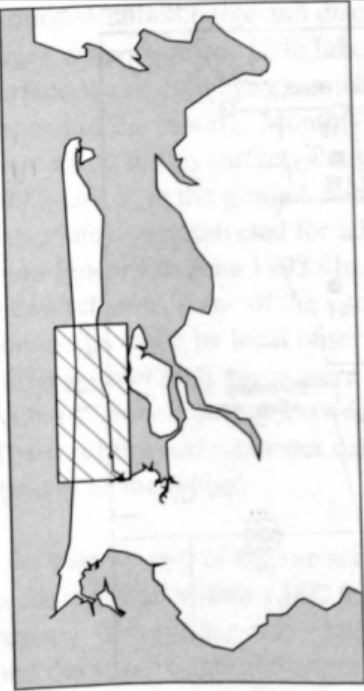


Figure 8.--Surface-water drainage divides and general flow directions.

Long Beach drainages



EXPLANATION

----- Line of section for figure 13

E—E' Line of section for figures 18 - 24

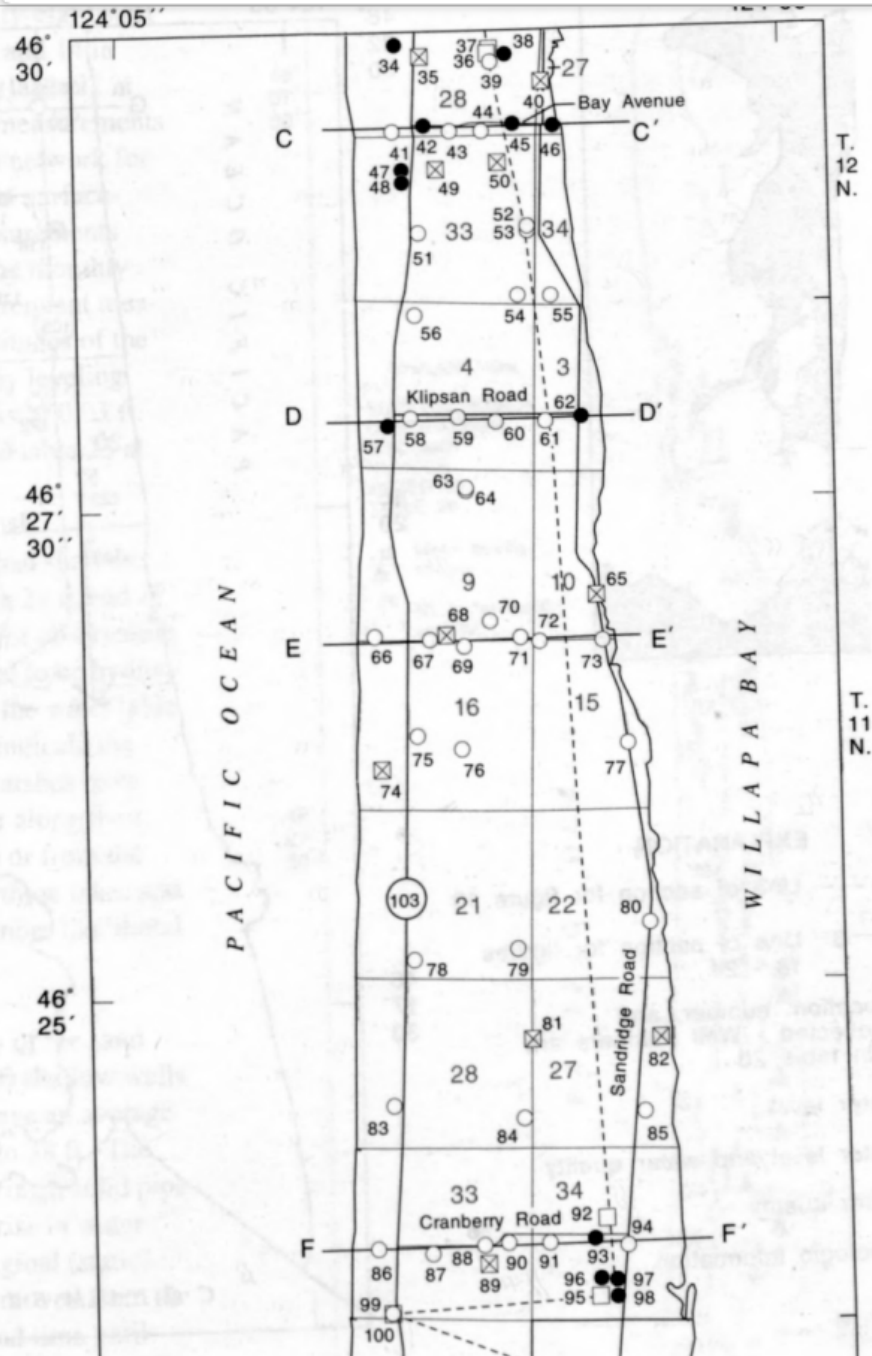
Well location, number, and data collected - Well numbers are listed in table 20

○⁵⁴ Water level

●⁶² Water level and water quality

⊠⁷⁴ Water quality

□⁹² Lithologic information



Long Beach Wells

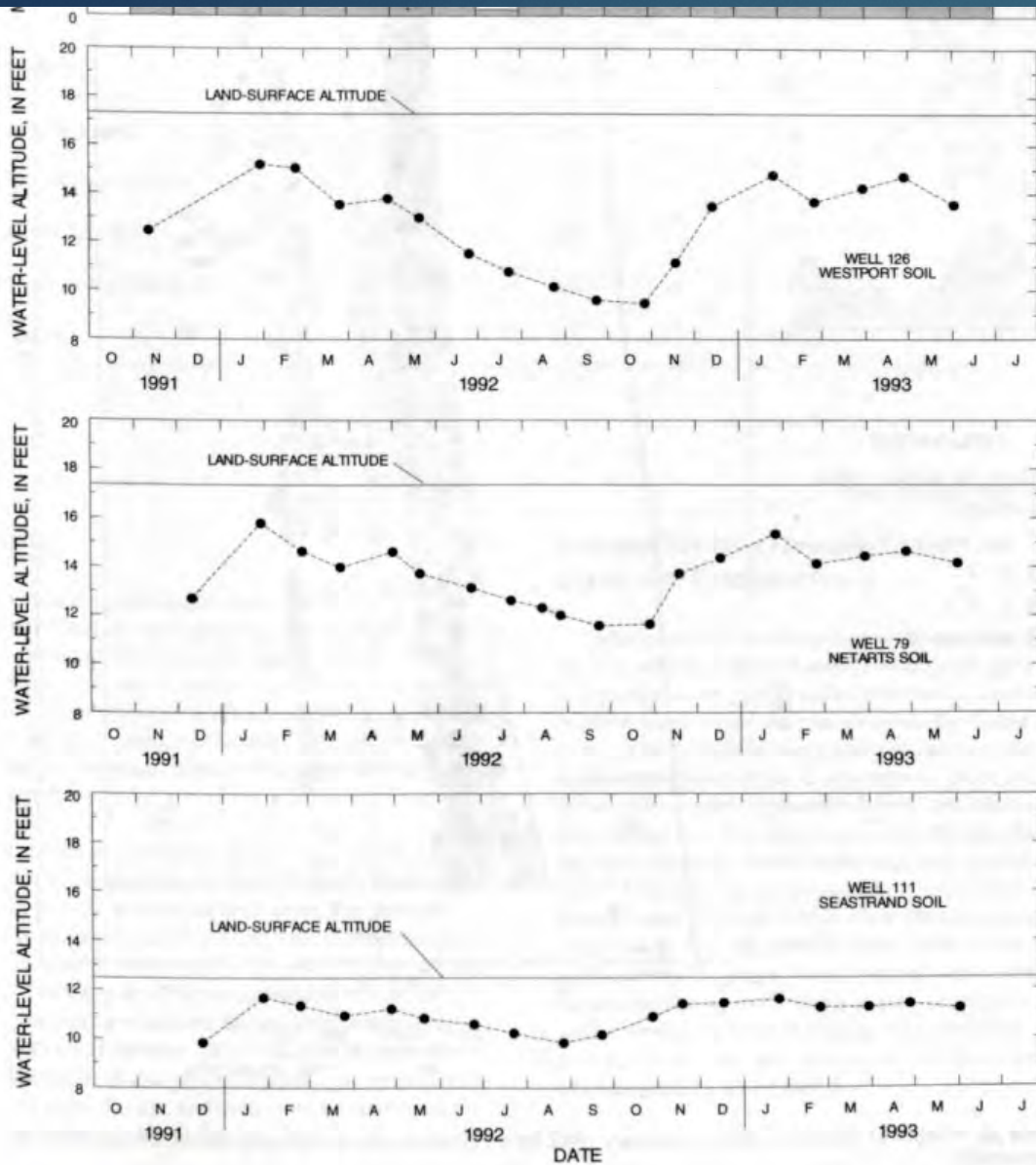


Figure 27.--Relation between monthly precipitation and seasonal changes in water levels in selected wells, Long Beach Peninsula, Washington.

Long Beach Groundwater elevations

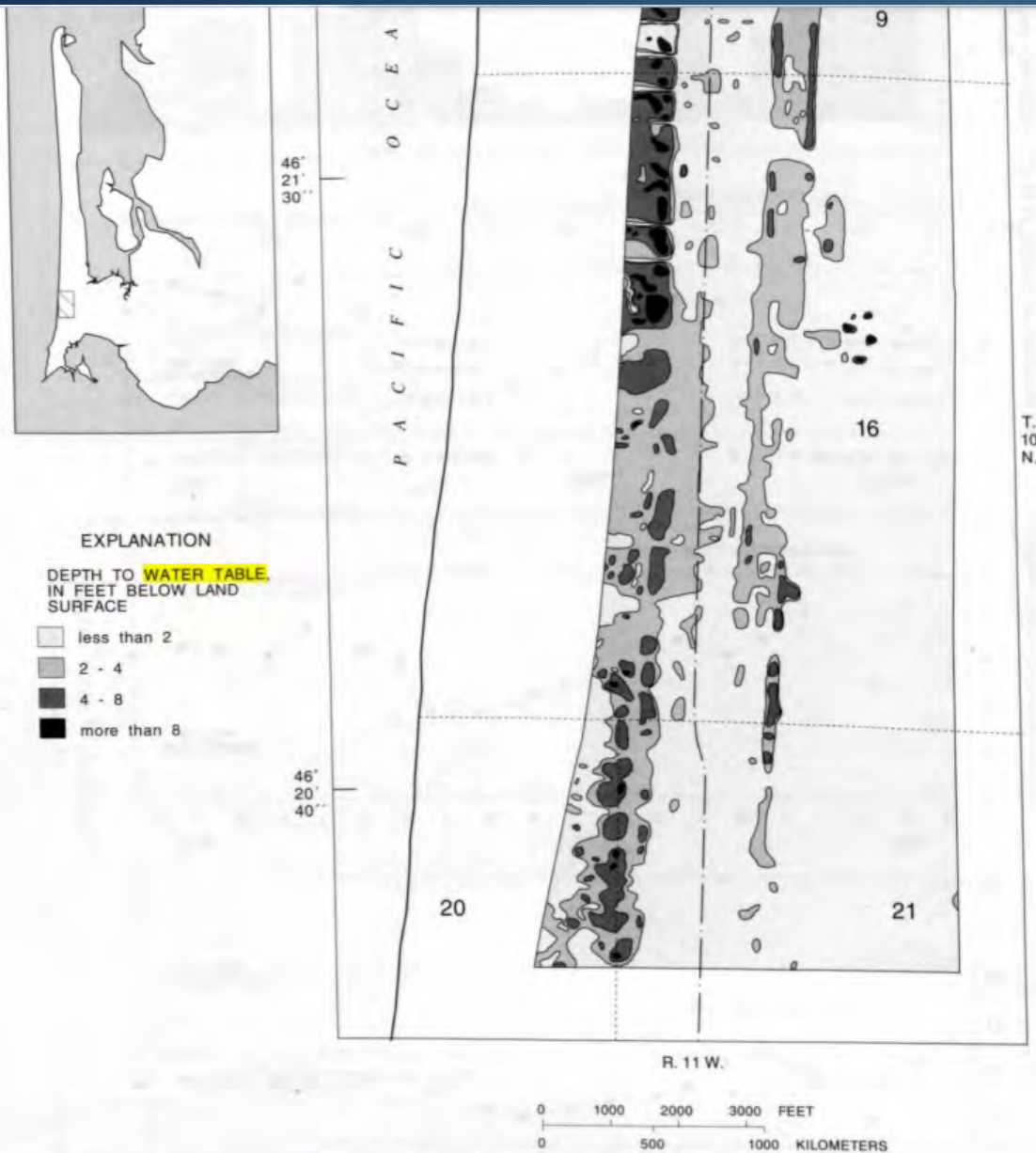
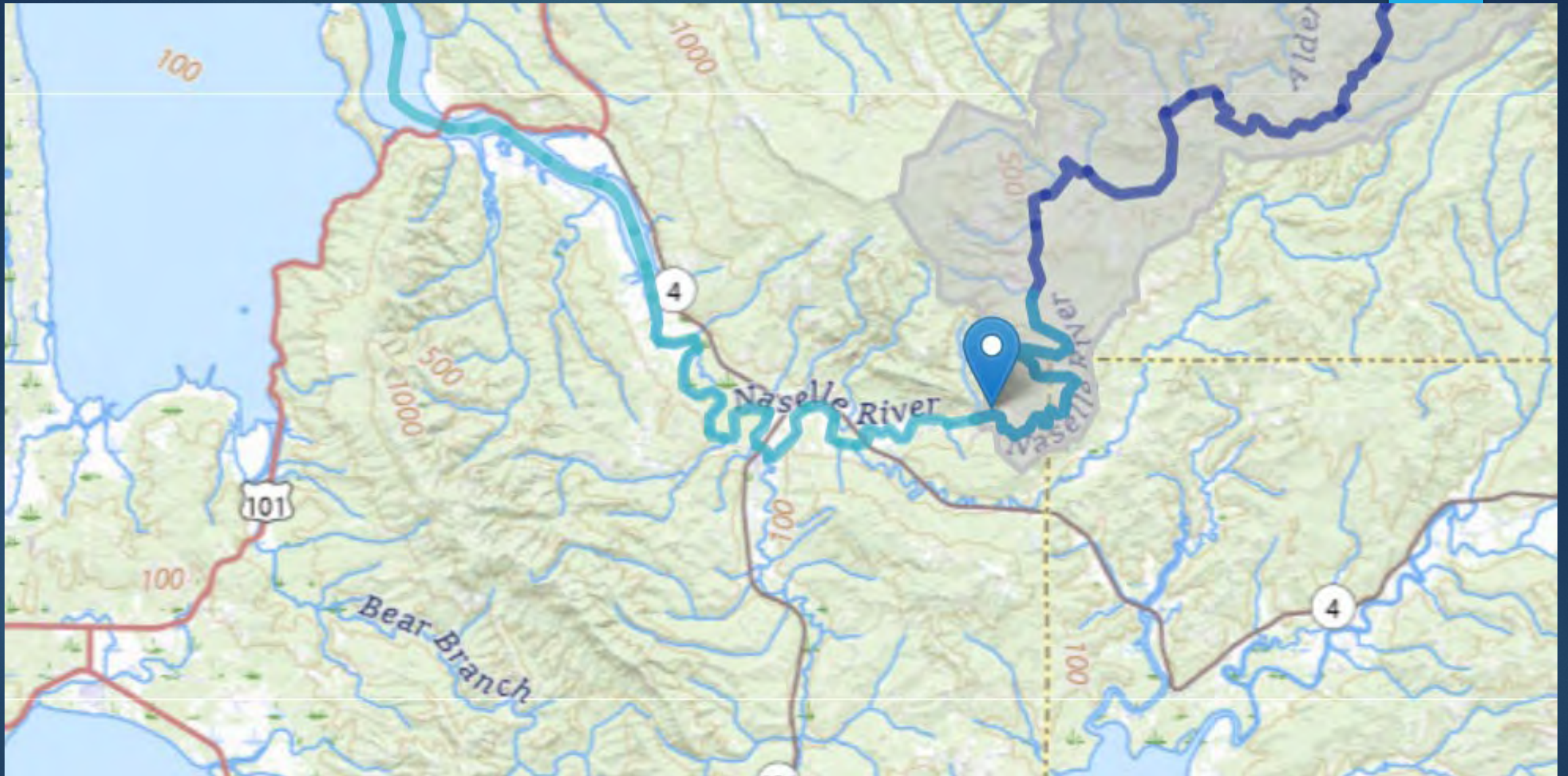


Figure 28.--Depth to the **water table** in January 1992 for a selected area of the Long Beach Peninsula, Washington.

Long Beach
Depth to
groundwater



USGS Gage. Naselle River nr Naselle

August 20, 2023 - August 19, 2024
Discharge, cubic feet per second

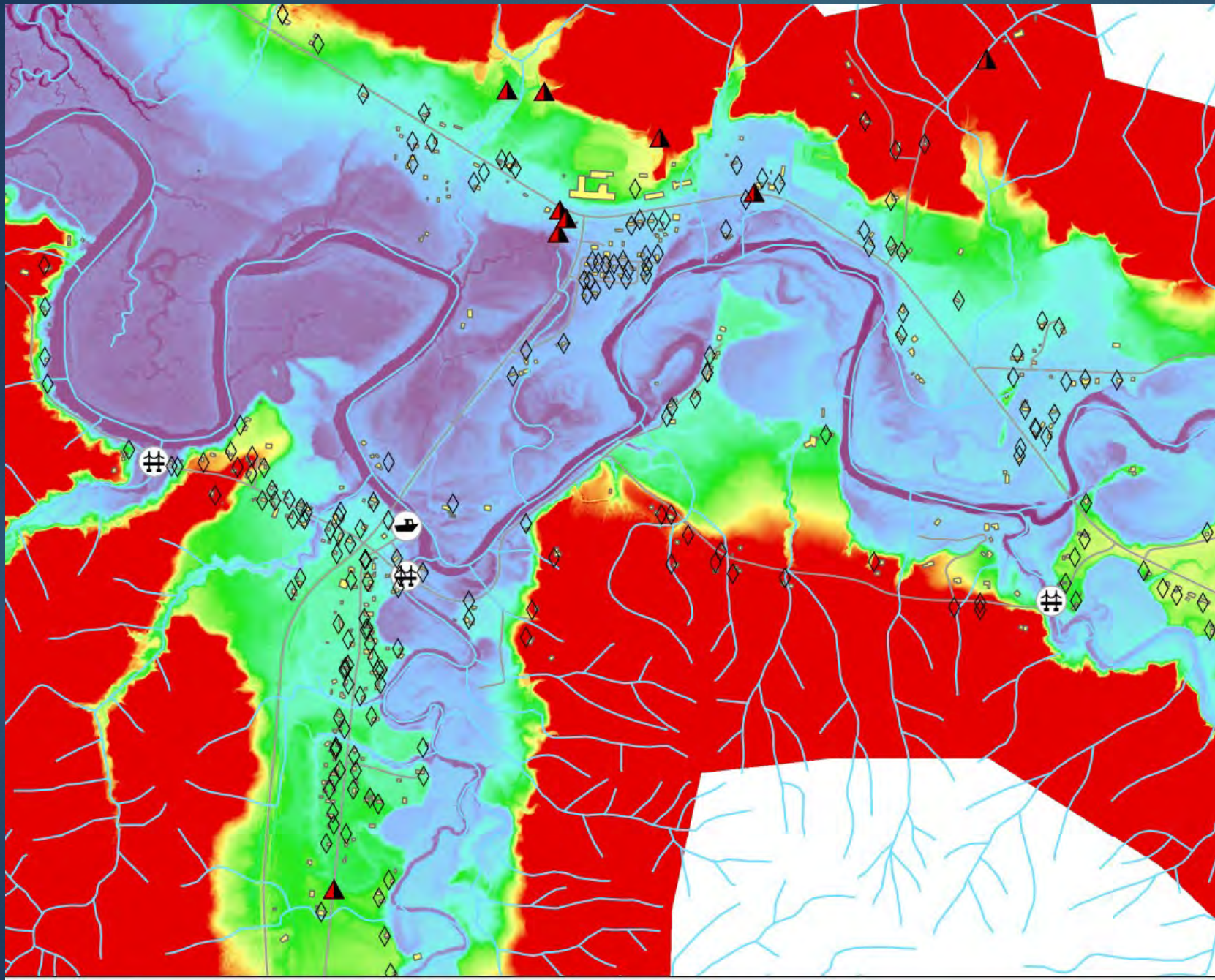
42.6 ft³/s - Aug 19, 2024 02:30:00 PM PDT



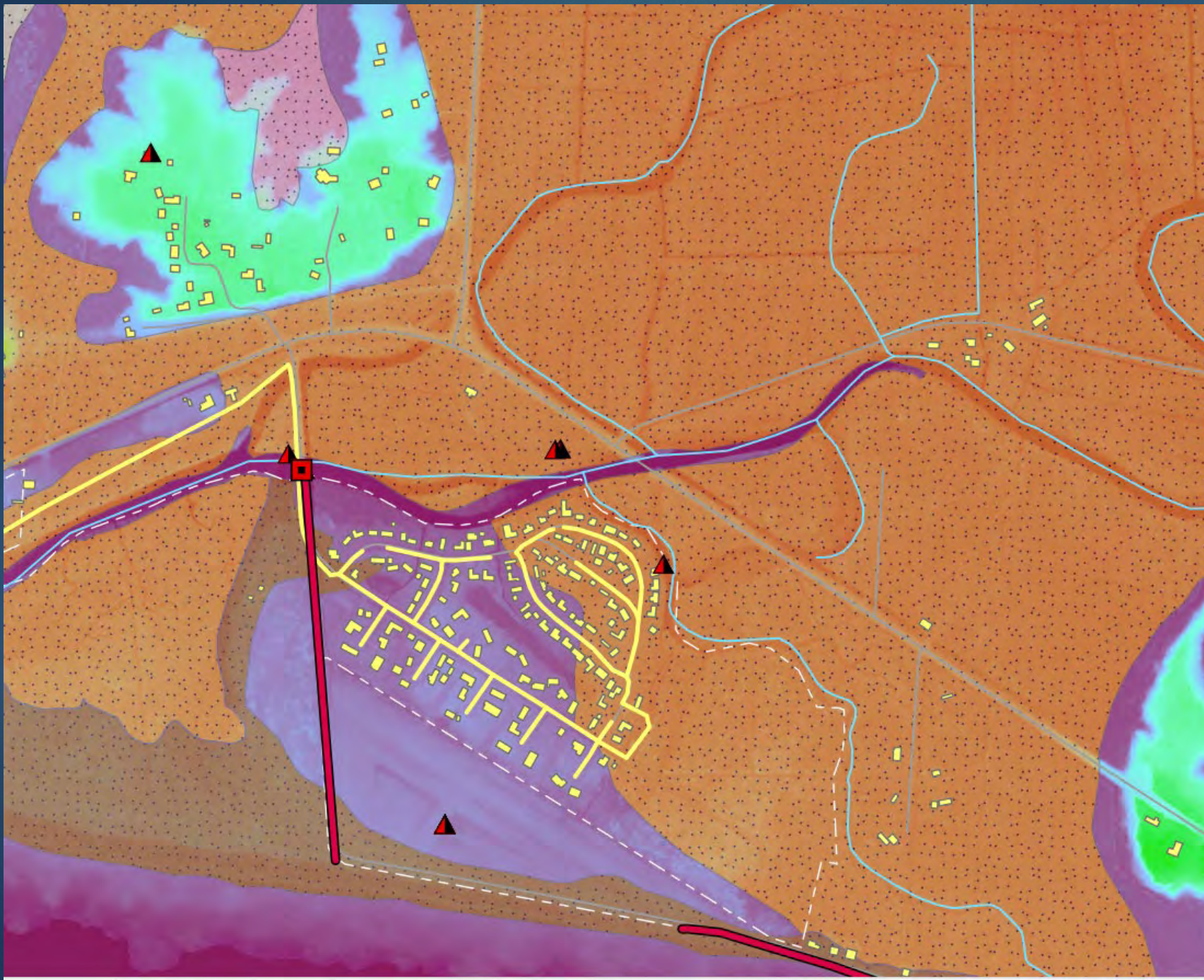
Naselle River near Naselle WA

Relative Elevation Models

- ▶ Future conditions hydrology in a spatial context
 - ▶ Traditionally, hydrology models look at river channels only, not floodplains or soils
- ▶ REMs standardize DEMs for groundwater and river levels
 - ▶ Height Above River (HAR) rasters
 - ▶ Enhances relic channels and floodplains
- ▶ [pre and post maps]



Naselle
River REM



Wallacut
River
REM

Related Studies

- ▶ Baker Bay Maps
- ▶ Contours
- ▶ Discussion with UW research – not aligned timewise and scale is very different
- ▶ CoSMoS – Pacific County will be released mid 2026 – not aligned and expected to be used as screening tool.

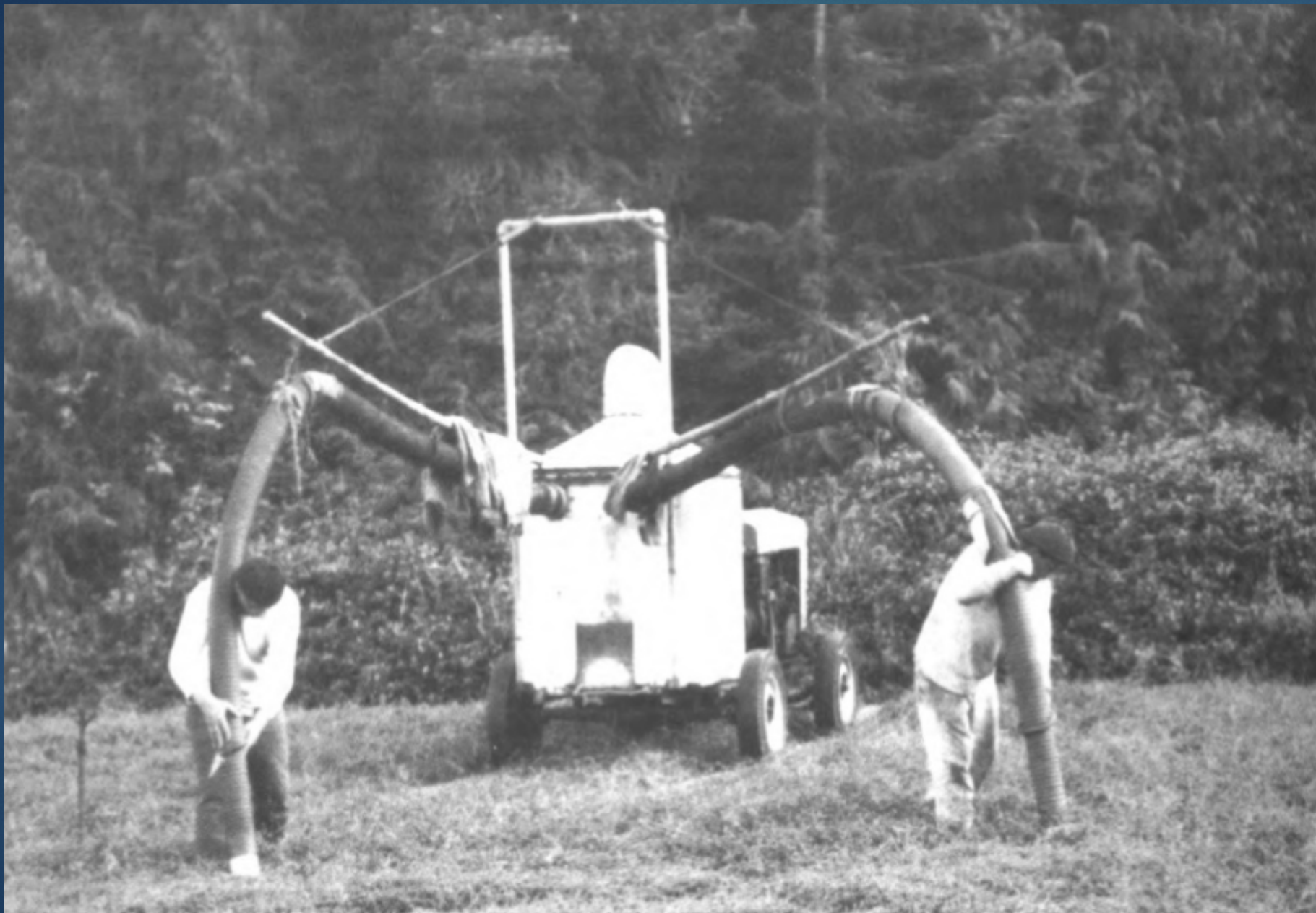
Next Steps





Discussion





Suction pickers harvesting cranberries