# Channel Migration Zone Mapping for Johnson Creek

Christina Appleby and Lowell Anthony

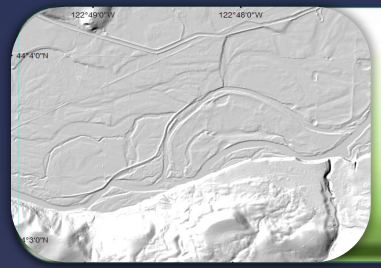
Oregon Department of Geology and Mineral Industries

FEMA

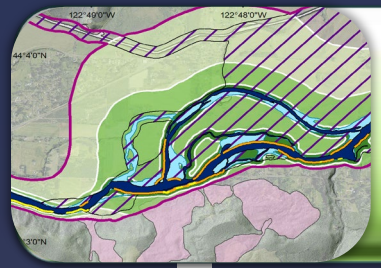


Image: Coe, D.E., 2013. Willamette River Historical Stream Channels, Oregon

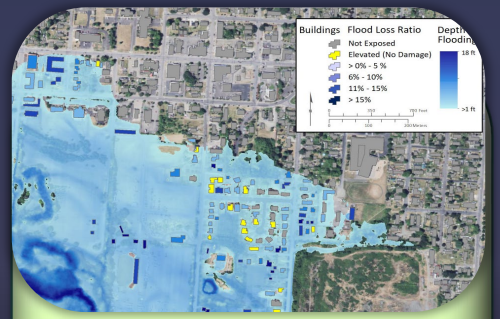
# DOGAMI Goal



**Collect Lidar**



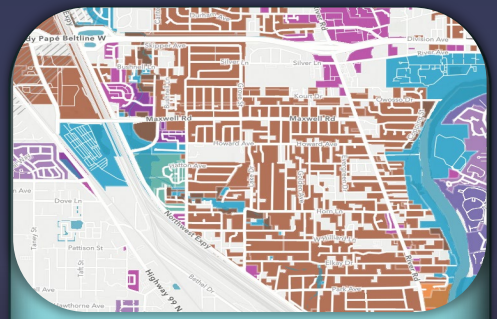
**Hazard Mapping**




**Risk Analysis**




**Mitigation & Risk Reduction**



**Planning & Regulation**



**Restoration & Conservation**

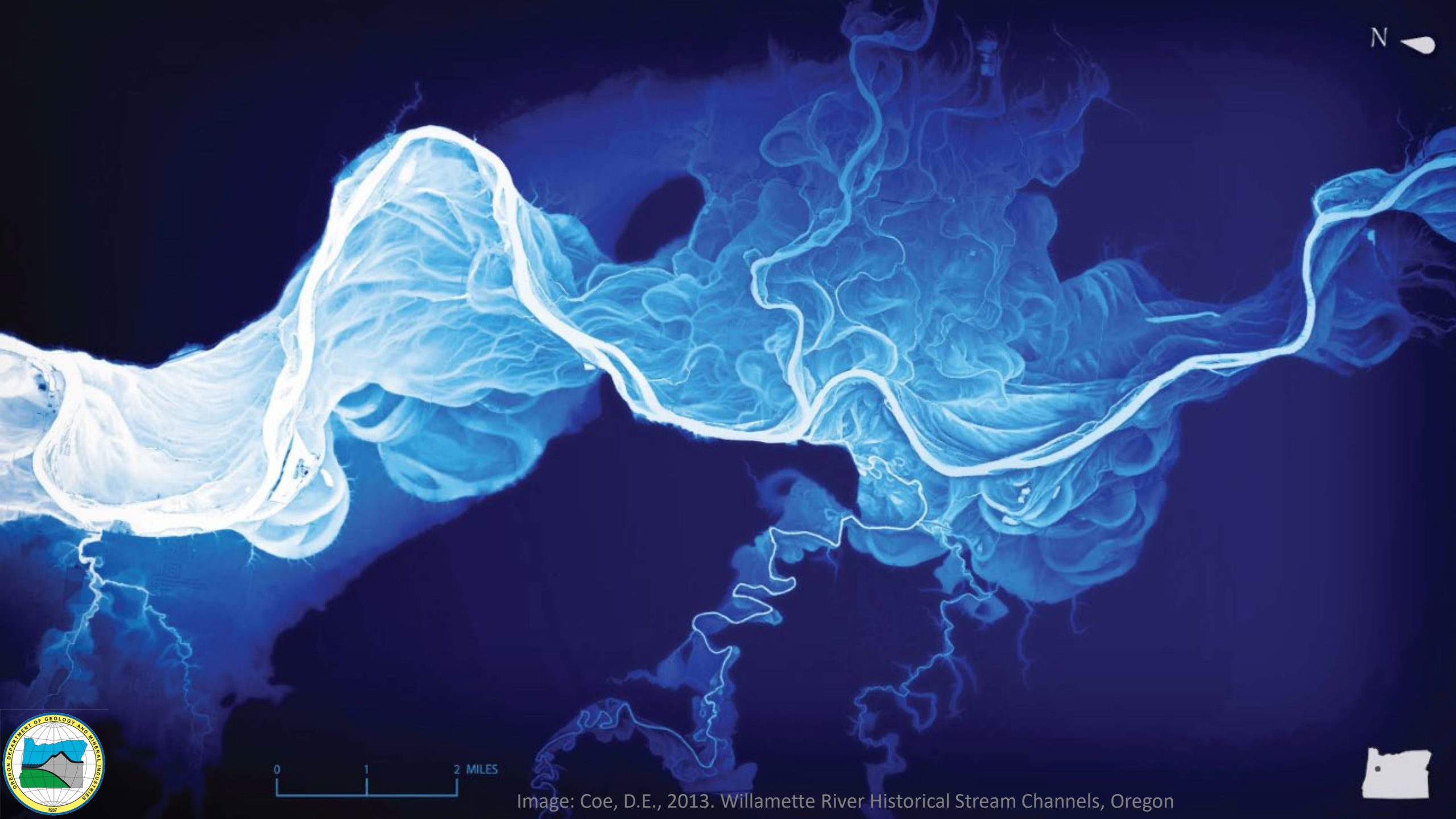



Image: Coe, D.E., 2013. Willamette River Historical Stream Channels, Oregon

# Goal of CMZ Maps

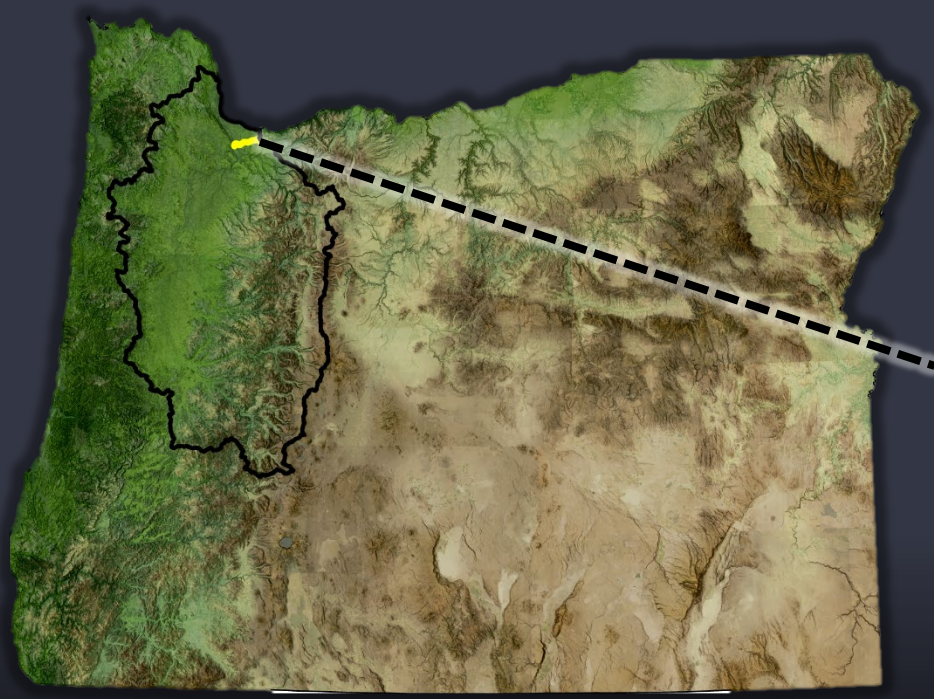
**What this project is….**

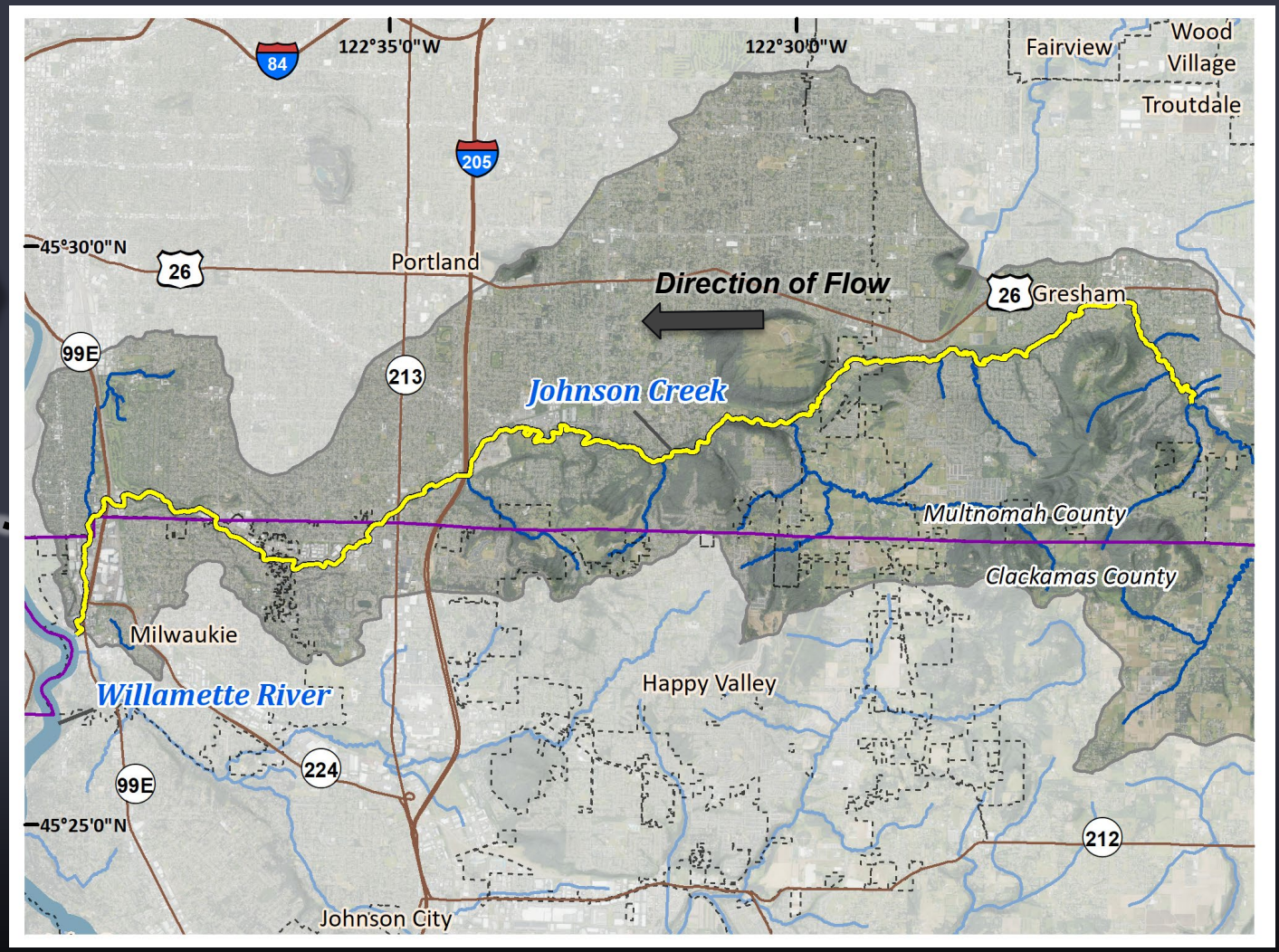
- Planning level maps
- Analysis based on recent historical patterns, aerial photographs, geologic maps, flood maps, and a bit of field work
- Baseline data to understand current changes

**What this project is not…**

- Detailed surveys or site-specific analysis
- Doesn’t replace geotechnical engineer or geologist study

# Study area & background

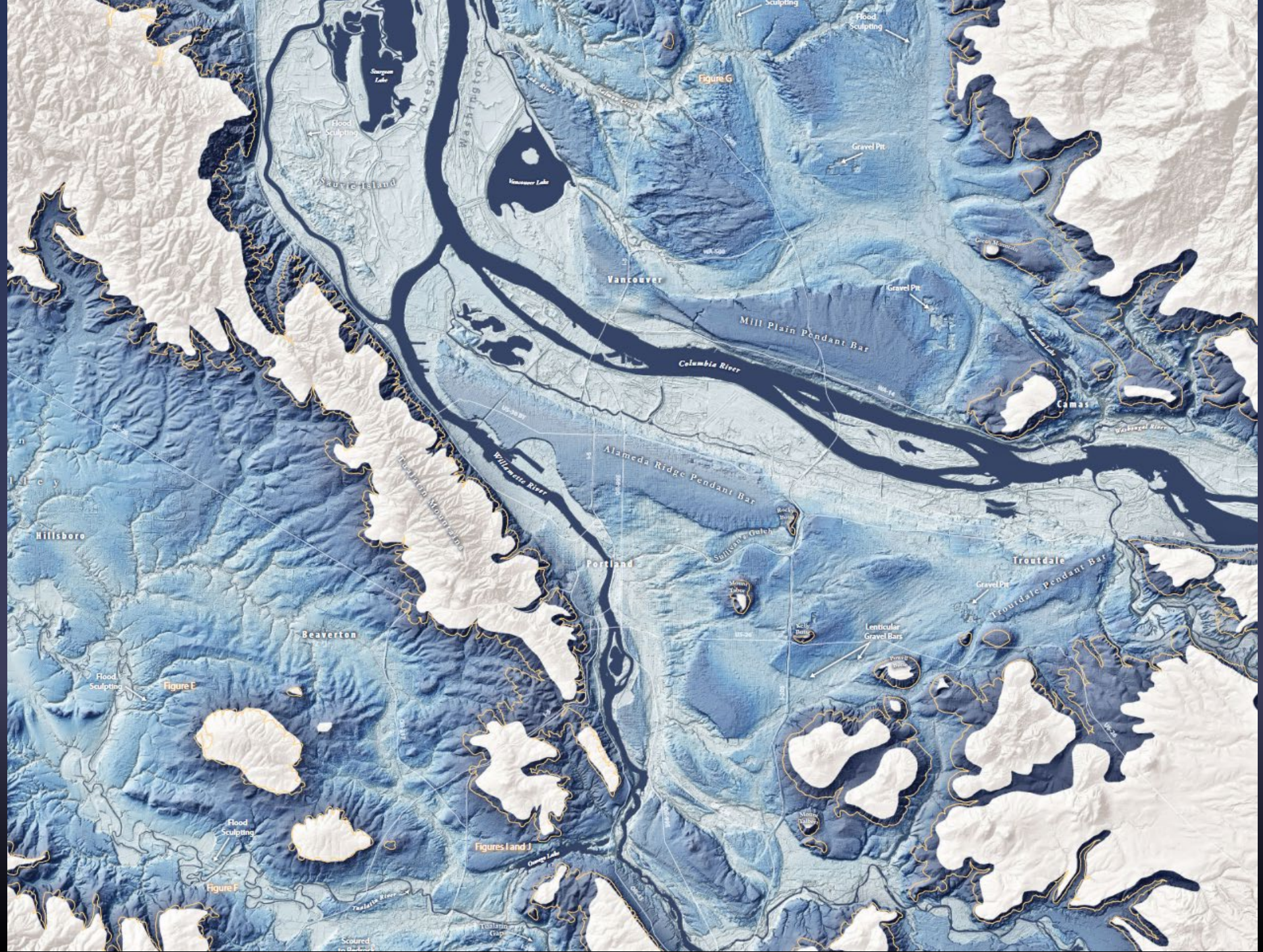




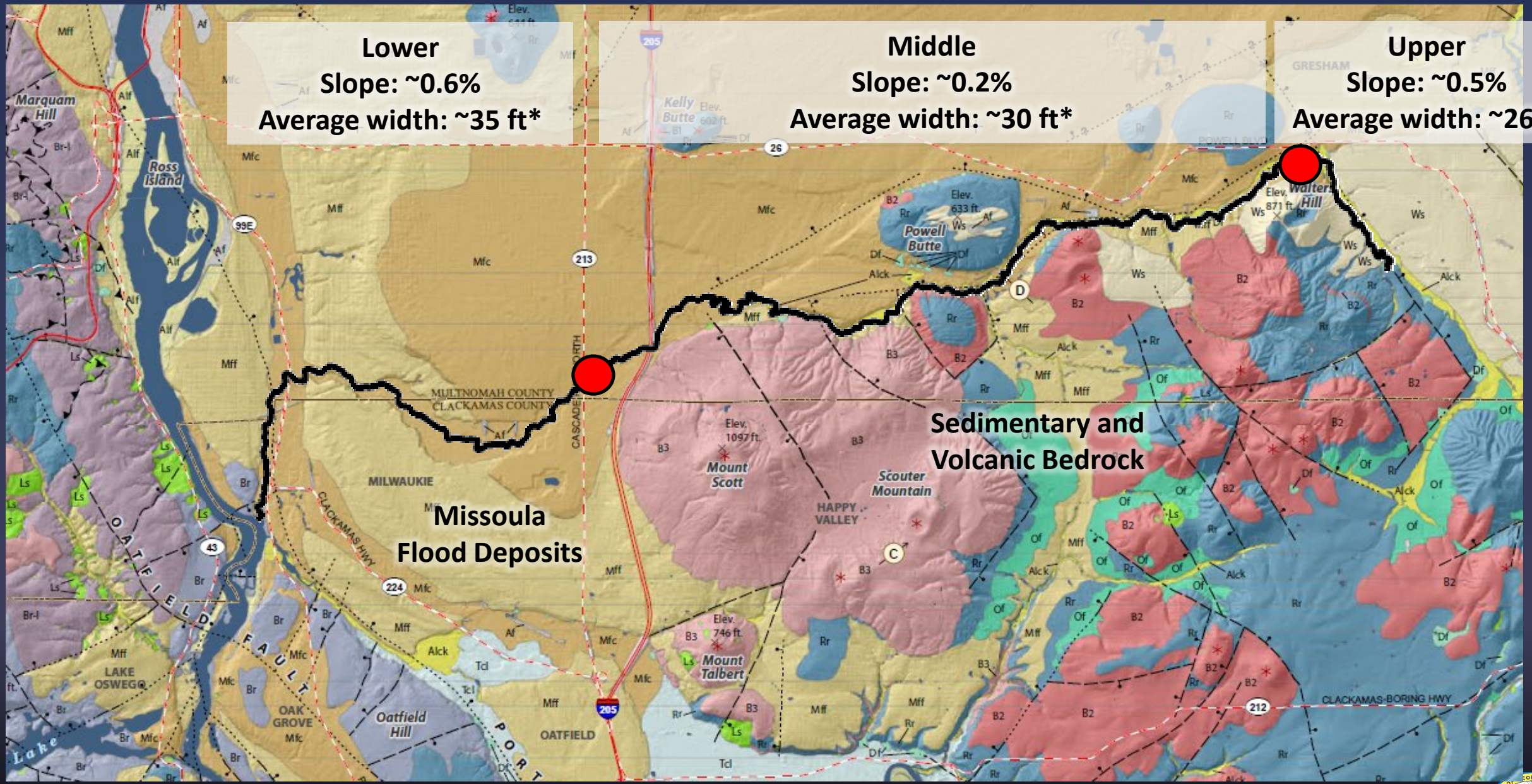
# Missoula Floods

**Burns and Coe, 2012: DOGAMI IMS-36**

**~15,000-20,000 years ago**




DOGAMI, October 2026




DOGAMI, October 2026

Image: Ma and others, 2012, Lidar-based surficial geologic map, DOGAMI, O-12-02

# Human modifications




*View of Johnson Creek near SE Tacoma St in Portland in 1934. Credit: City of Portland, Public Works Admin, January 29, 1934, A2000-025.765.*

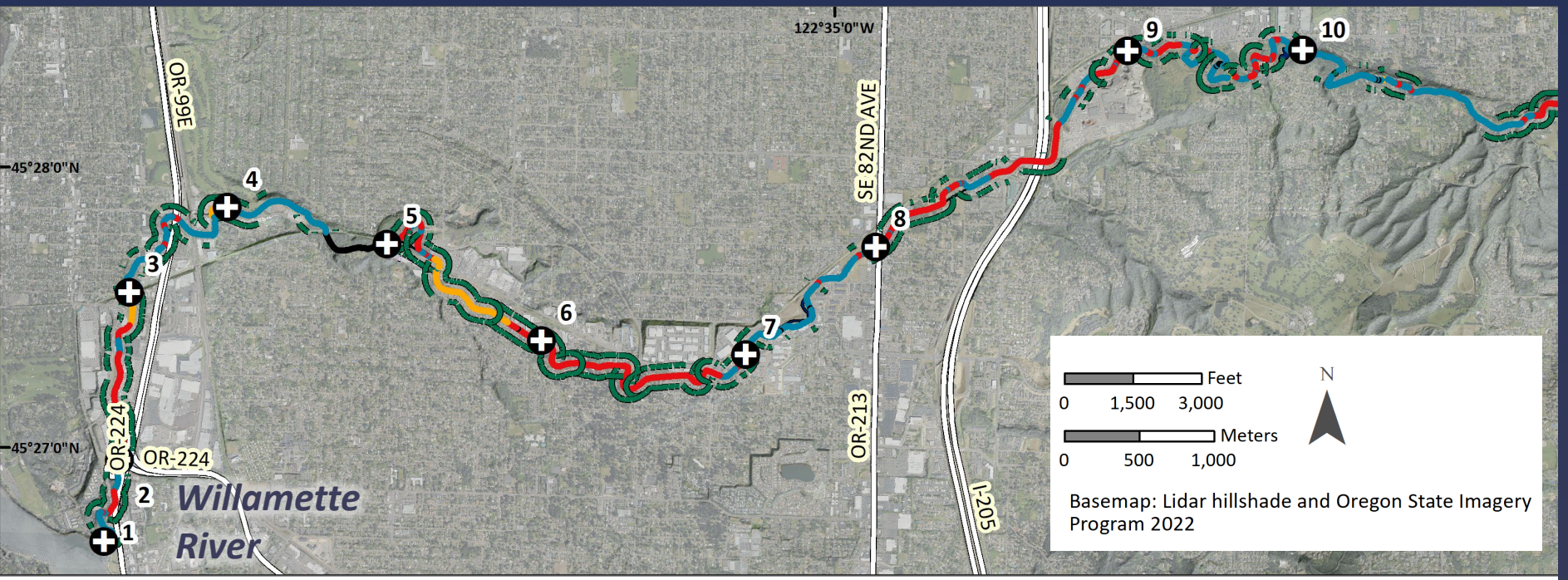


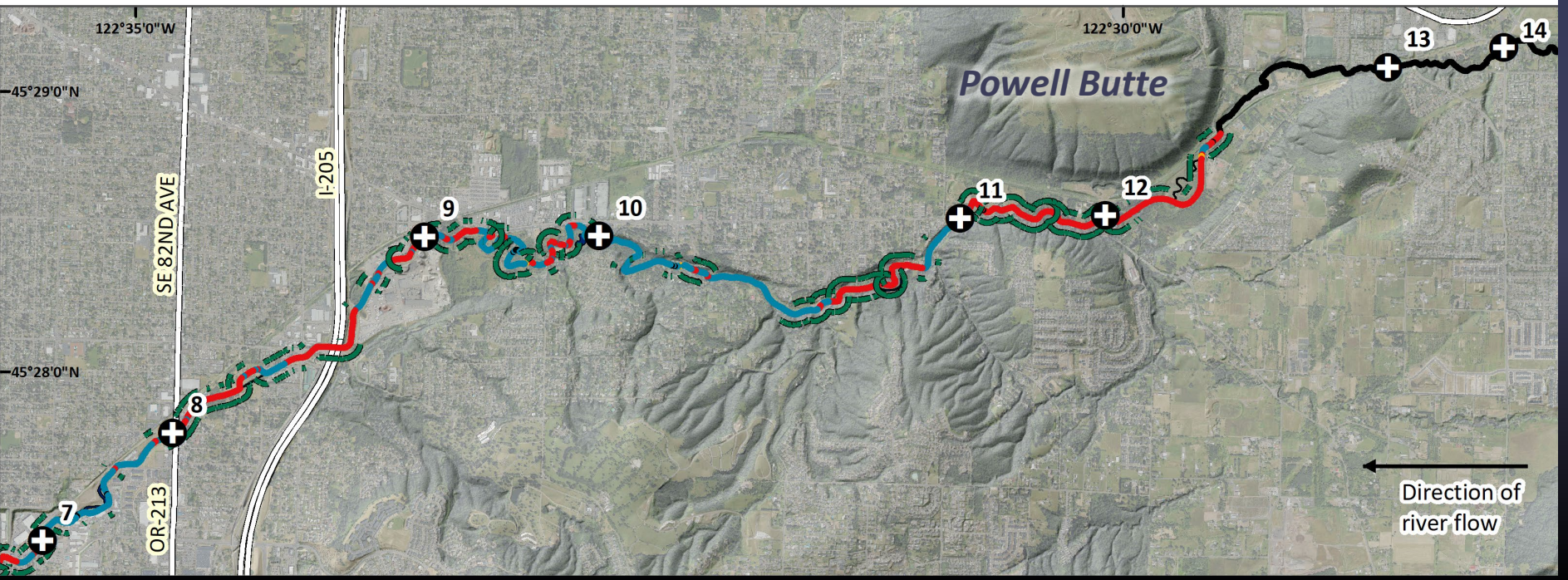

*Rock layout in dewatered Johnson Creek in Portland in 1934. Credit: City of Portland, City Auditor, August 16, 1934, A2000-025.809.*



*Appleby, 2023*

- Straightening and channelization
- Masonry and rock armoring
- Stormwater drainage systems
- Removal of riparian vegetation
- Land use changes



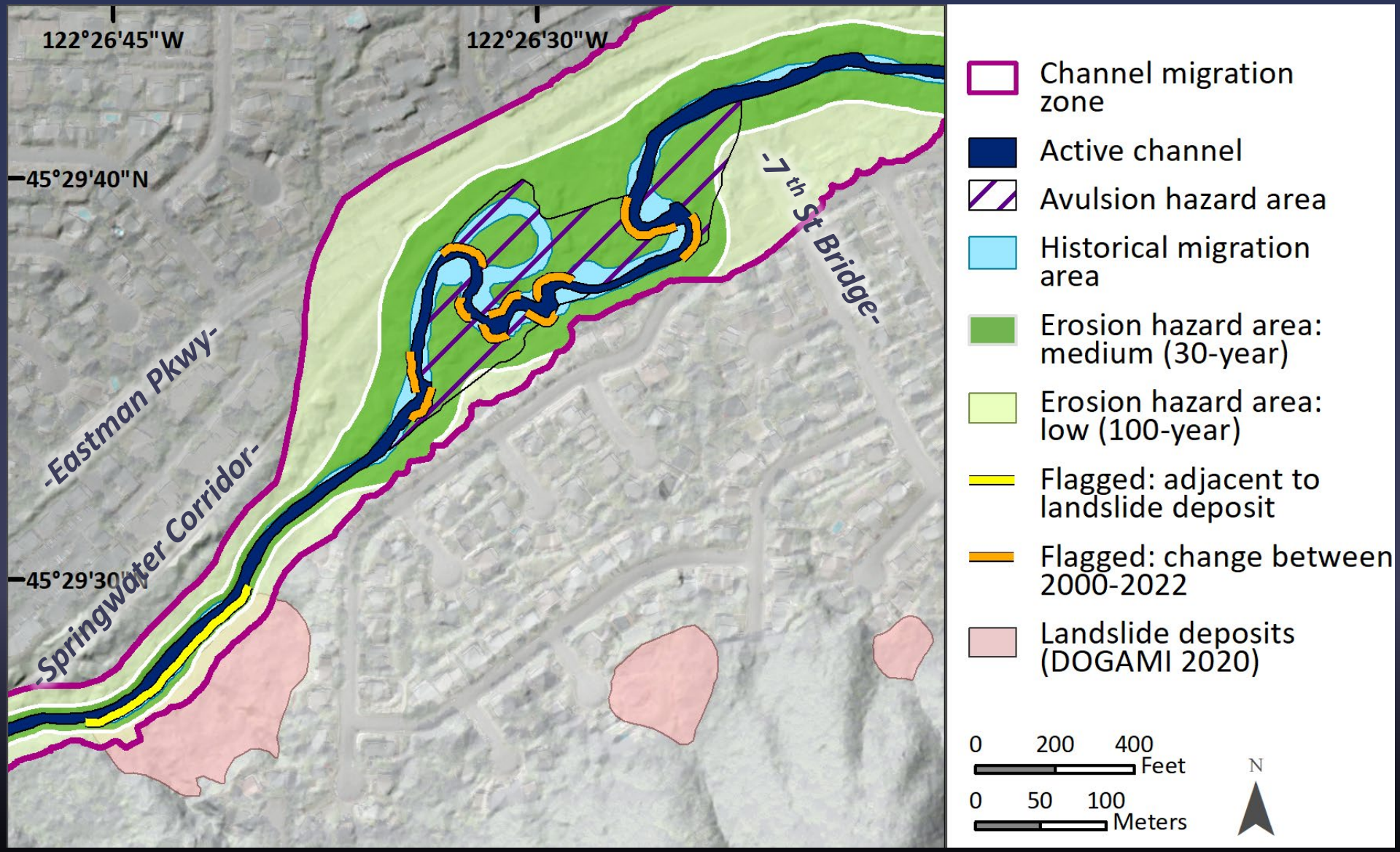

# Channel Bed and Bank

- Armored bank
- Non-armored bed
- Suspected armored bed
- Armored bed
- Other

(City of Portland, 2007)

DOGAMI, October 2026

# Channel Migration Zones



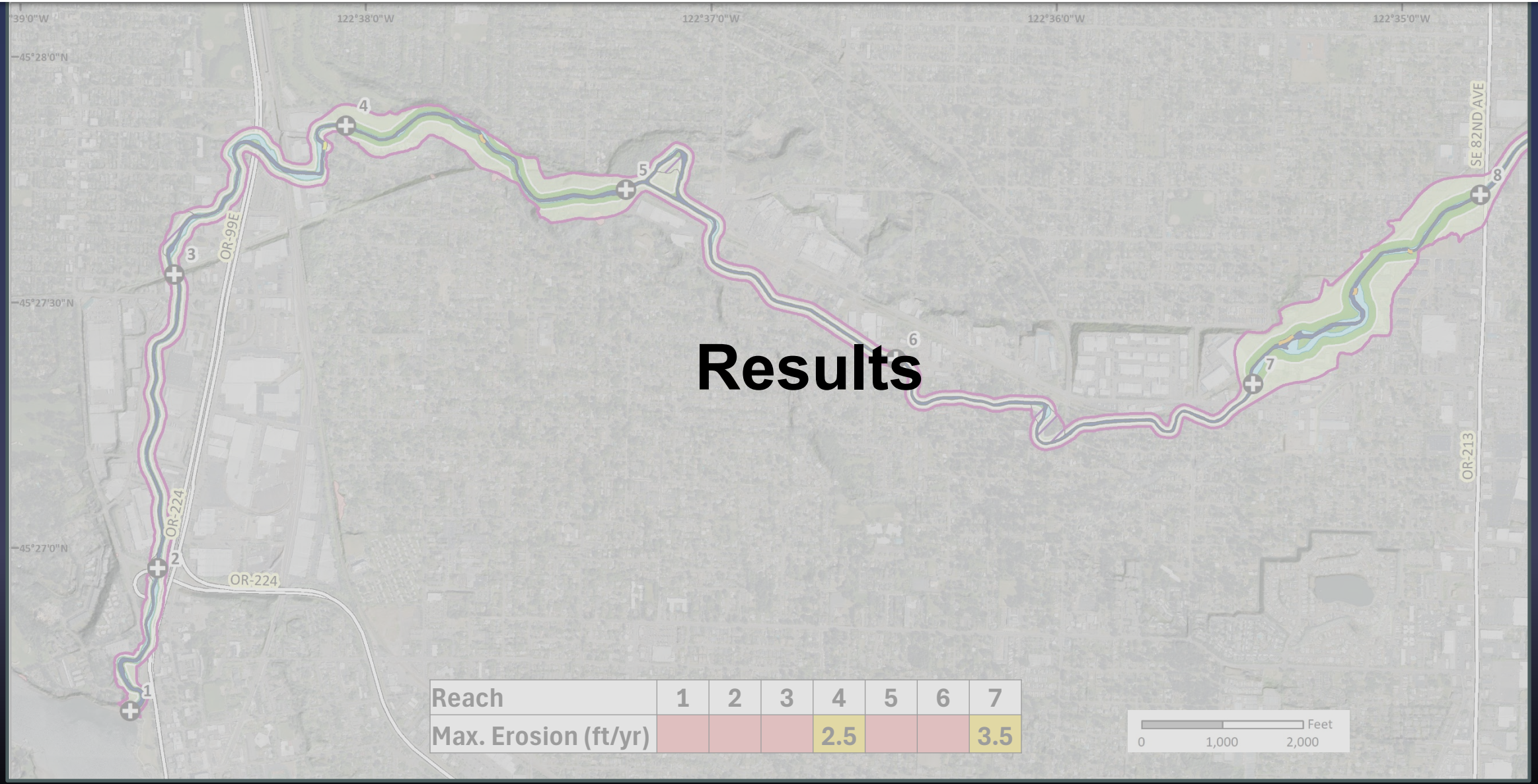
# DOGAMI Publications & GIS Data

Appleby and Anthony, 2024, Channel migration zone maps for Johnson Creek, Multnomah and Clackamas Counties, Oregon

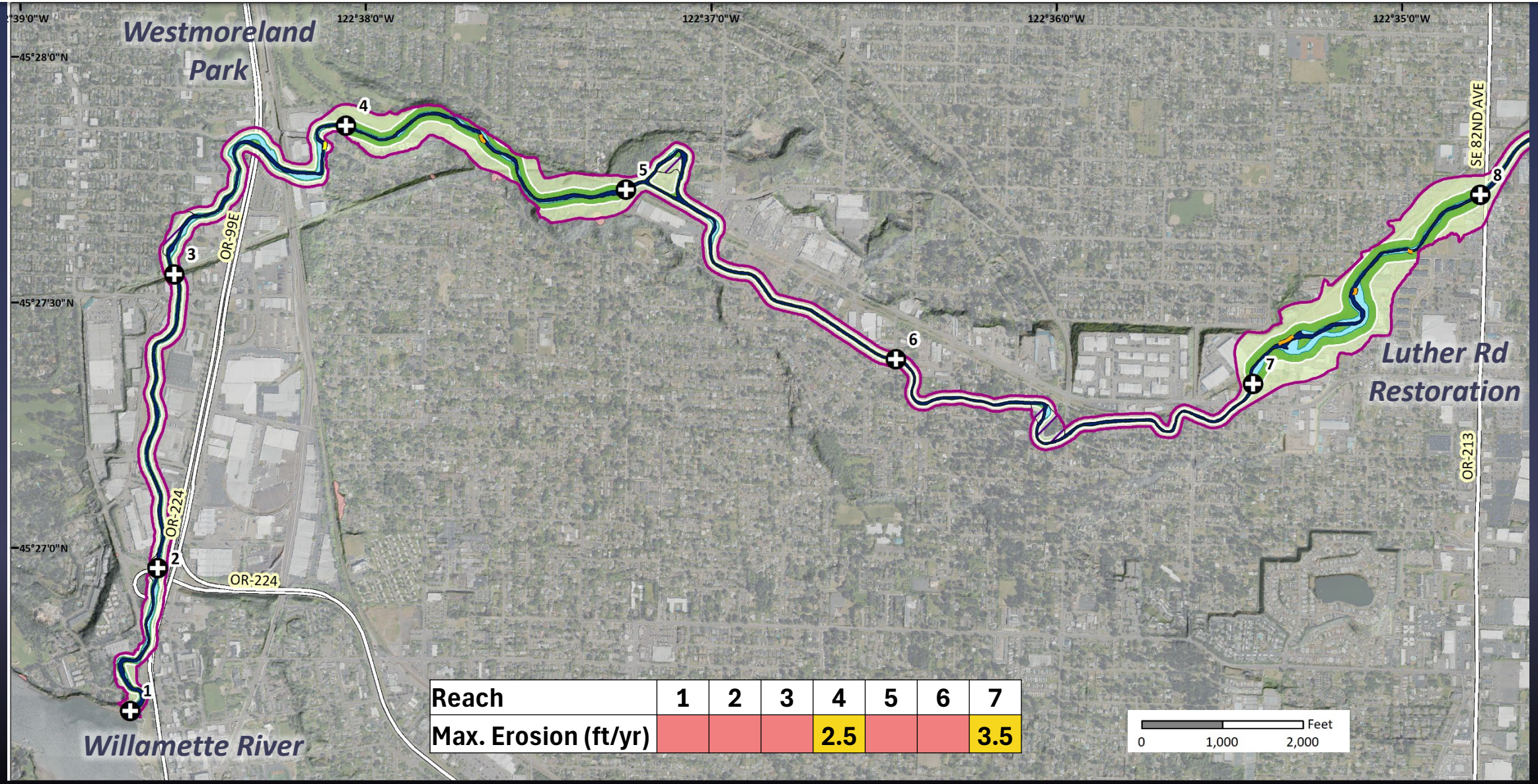
https://www.oregon.gov/dogami/pubs/Pages/ofr/p-O-24-05.aspx

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*christina.appleby@dogami.oregon.gov*

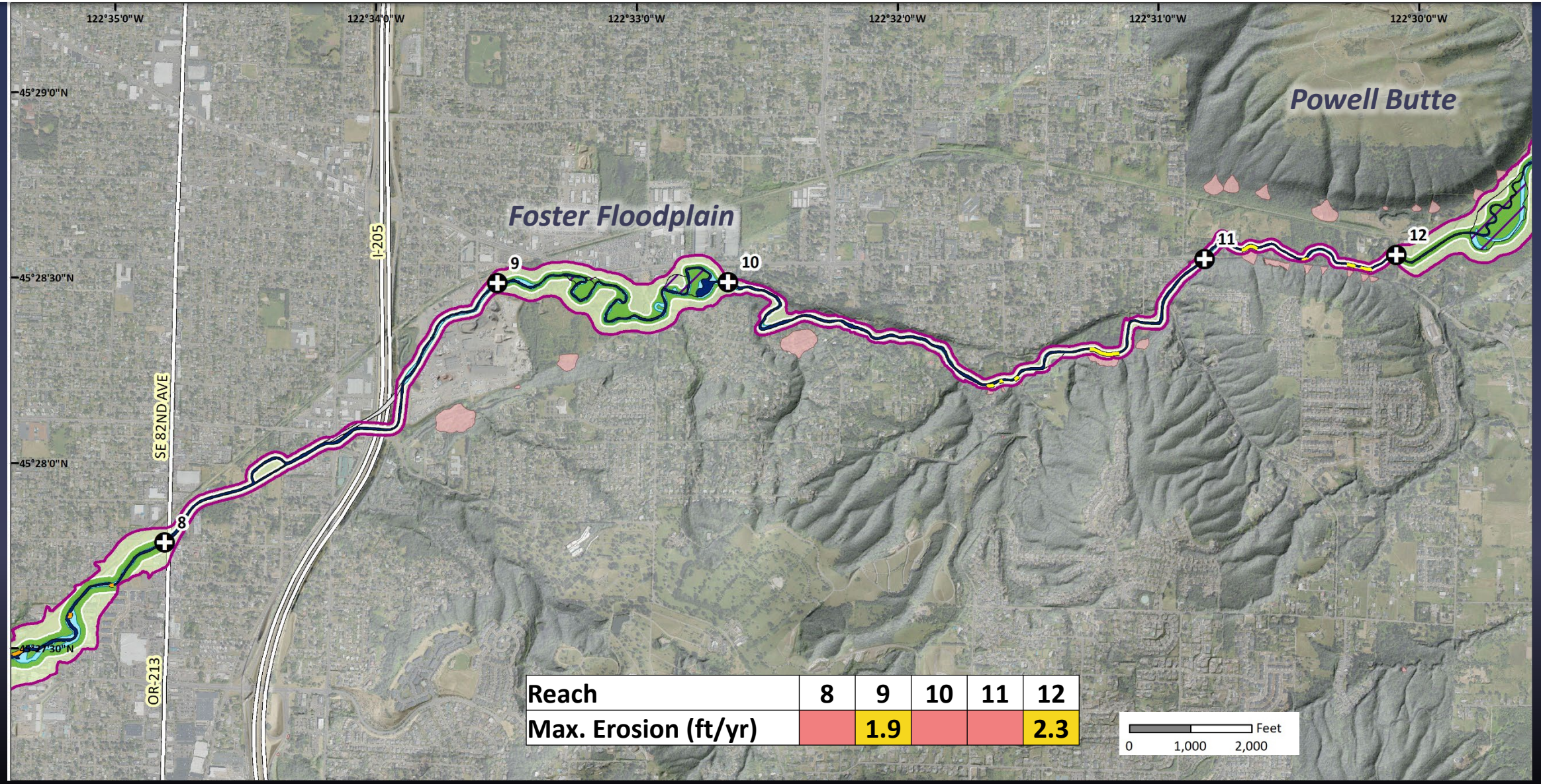
# CMZ Maps


122°39'0"W
122°38'0"W
122°37'0"W
122°36'0"W
122°35'0"W
45°28'0"N
45°27'30"N
45°27'0"N
OR-99E
OR-224
OR-224
SE 82ND AVE
OR-213
1
2
3
4
5
6
7
8
Results
Reach 1 2 3 4 5 6 7
Max. Erosion (ft/yr) 2.5 3.5
Feet
0 1,000 2,000

# CMZ Maps - lower

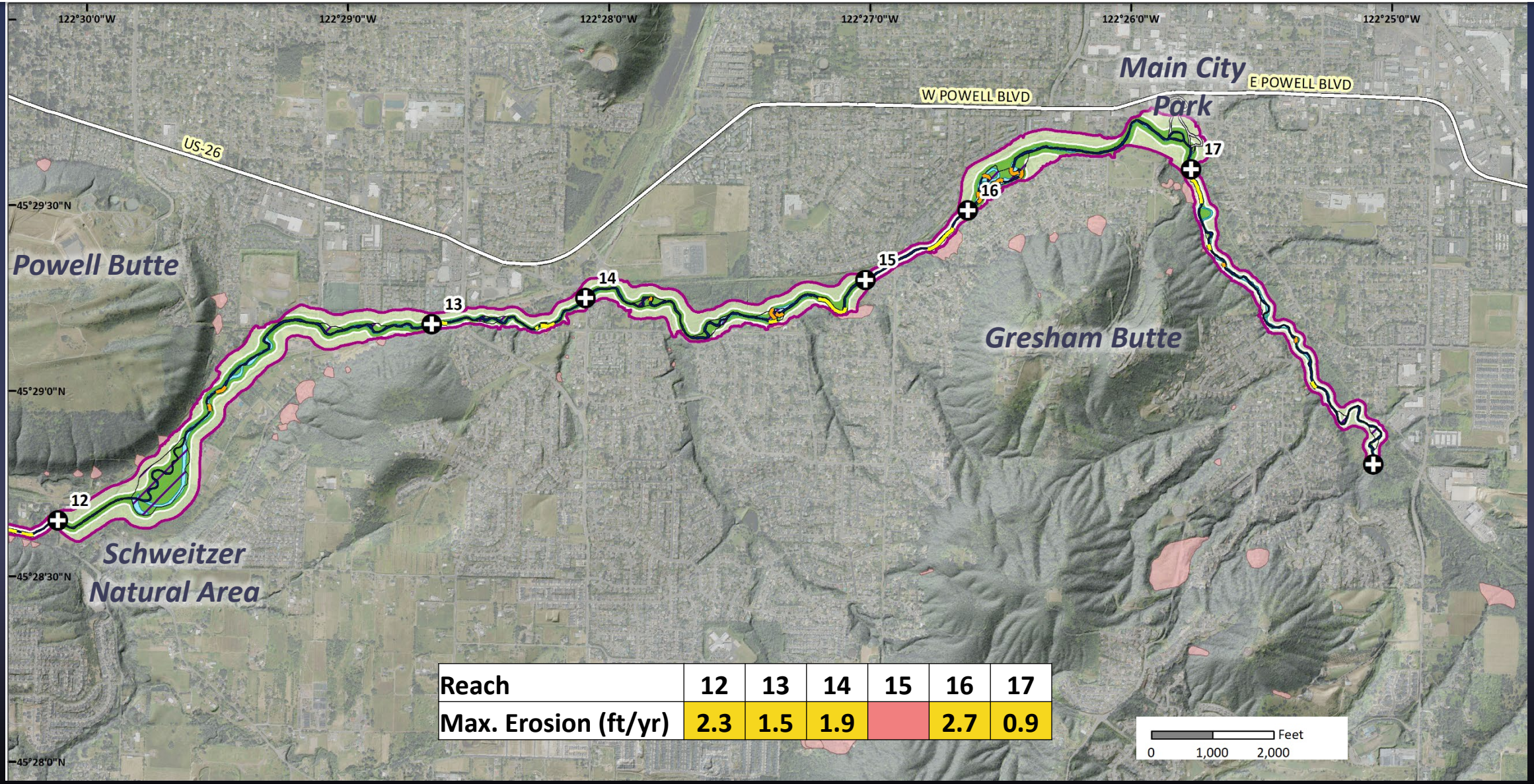


# CMZ Maps - middle




| Reach | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|
| Max. Erosion (ft/yr) | | 1.9 | | | 2.3 |

# CMZ Maps – middle and upper




| Reach | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|
| Max. Erosion (ft/yr) | 2.3 | 1.5 | 1.9 | | 2.7 | 0.9 |

# Limitations and Data Updates

- Baseline data for future studies, highlights areas for monitoring
- Current and future changes: In-stream restoration projects, climate change
- Update maps in 20-30 years, review after major floods