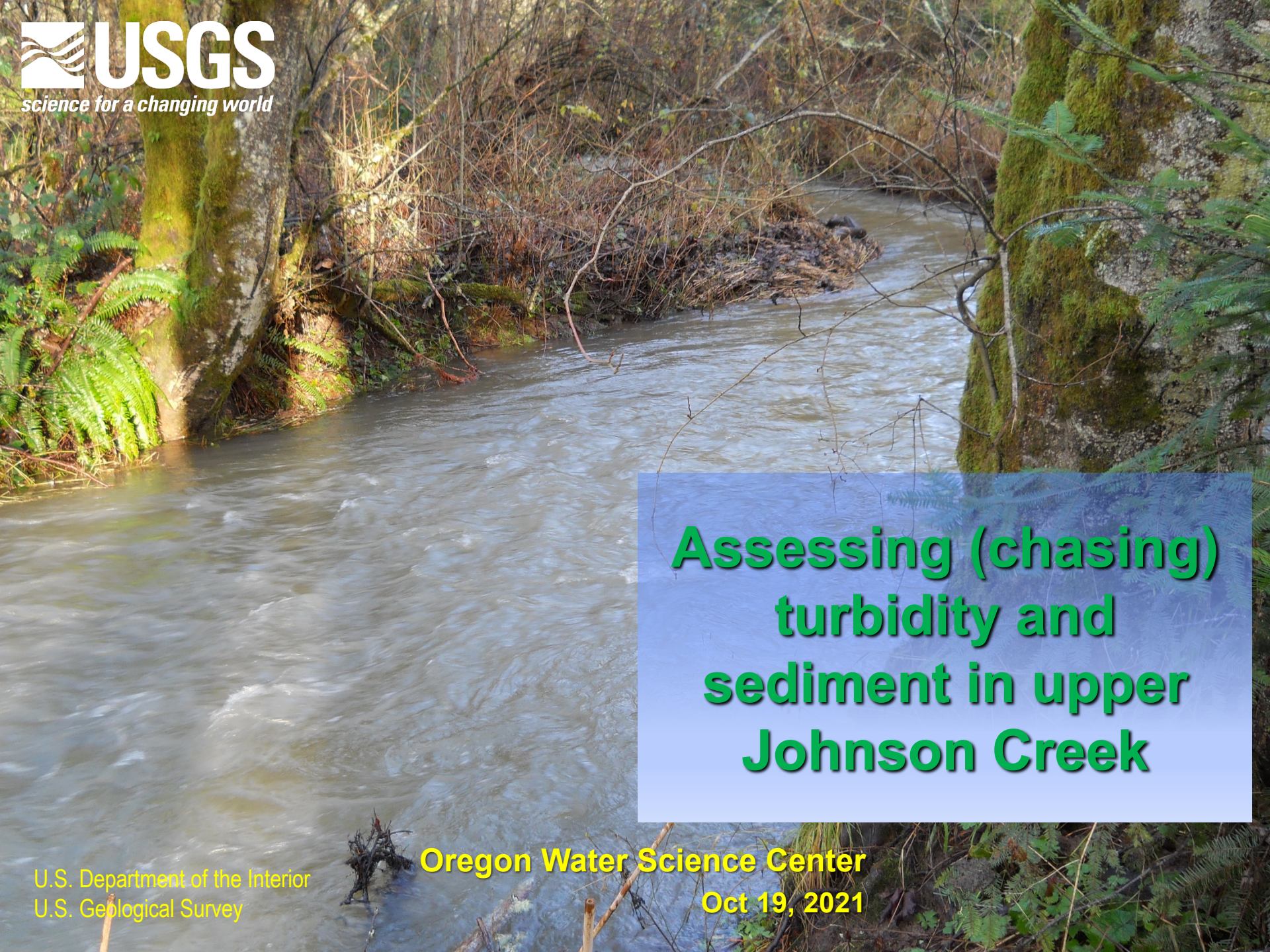

Assessing (chasing) turbidity and sediment in upper Johnson Creek

U.S. Department of the Interior
U.S. Geological Survey

Oregon Water Science Center

Oct 19, 2021

Note: all data and analyses in this presentation are considered preliminary unless stated otherwise

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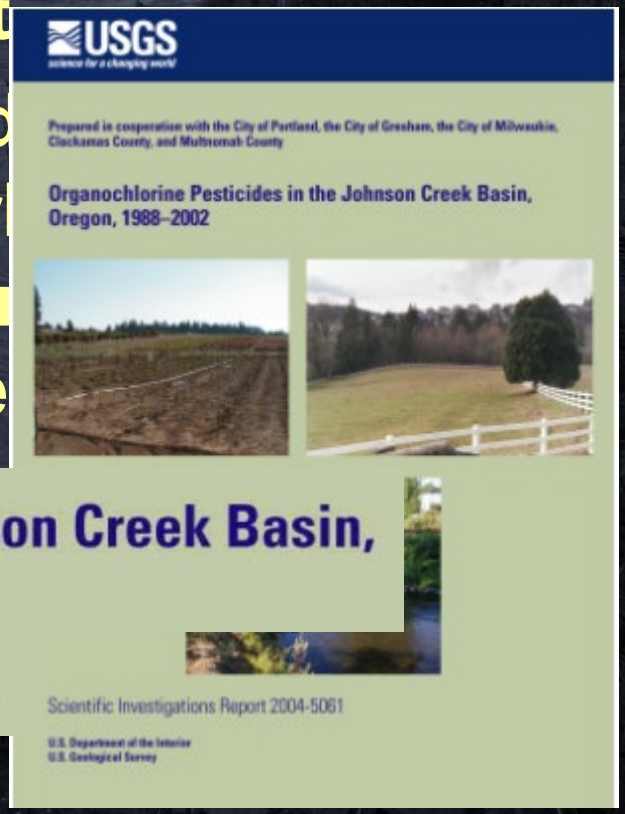
Is sediment bad?

- Sediment is associated with the five most frequent causes of stream impairment cataloged on the U.S. Environmental Protection Agency's 303(d) list
- Sediment is associated with ad
  contaminants, which may "sor
  These include many legacy co
  like DDT, PCBs, and chlordane

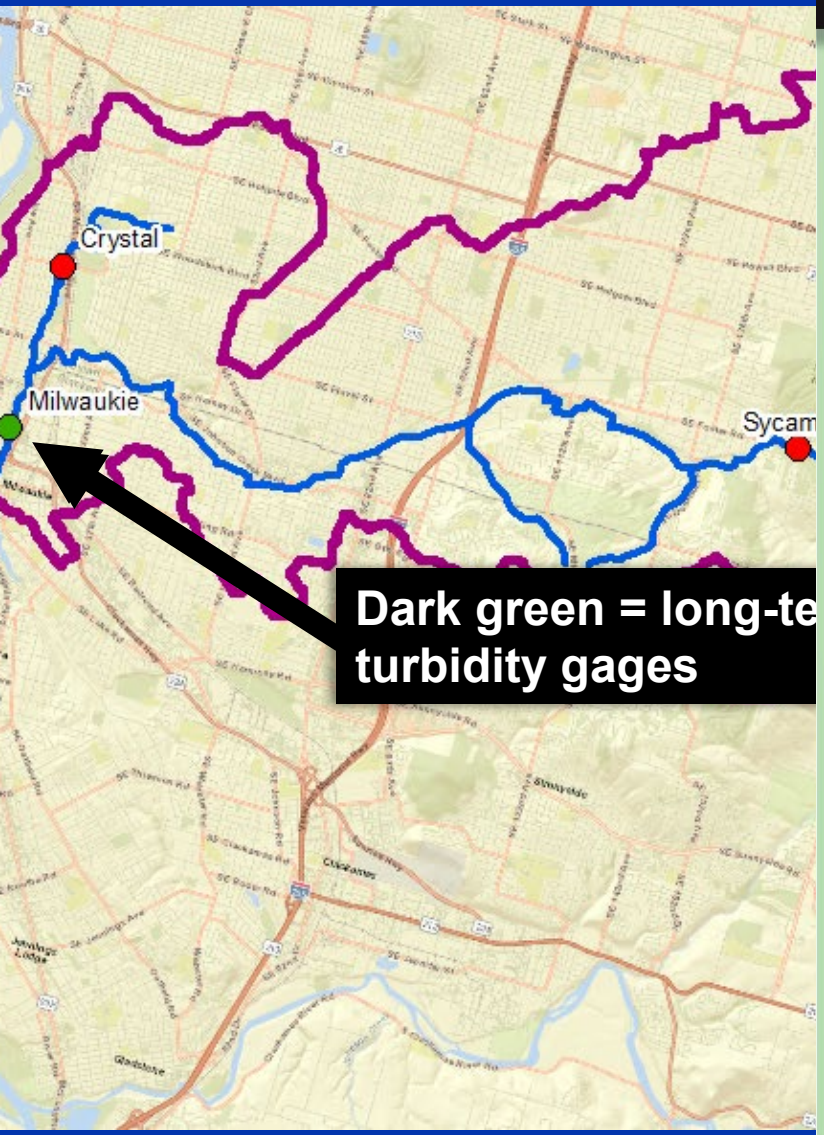


Organochlorine Pesticides in the Johnson Creek Basin, Oregon, 1988–2002

Scientific Investigations Report 2004-5061

Is sediment bad?

- Reduces vision for aquatic invertebrates, resulting in diminished capability for finding food or avoiding predators.
- Disturbs natural vegetation patterns.
- Obstructs fish gills, leading to health issues.
- Transports and distributes pollutants.



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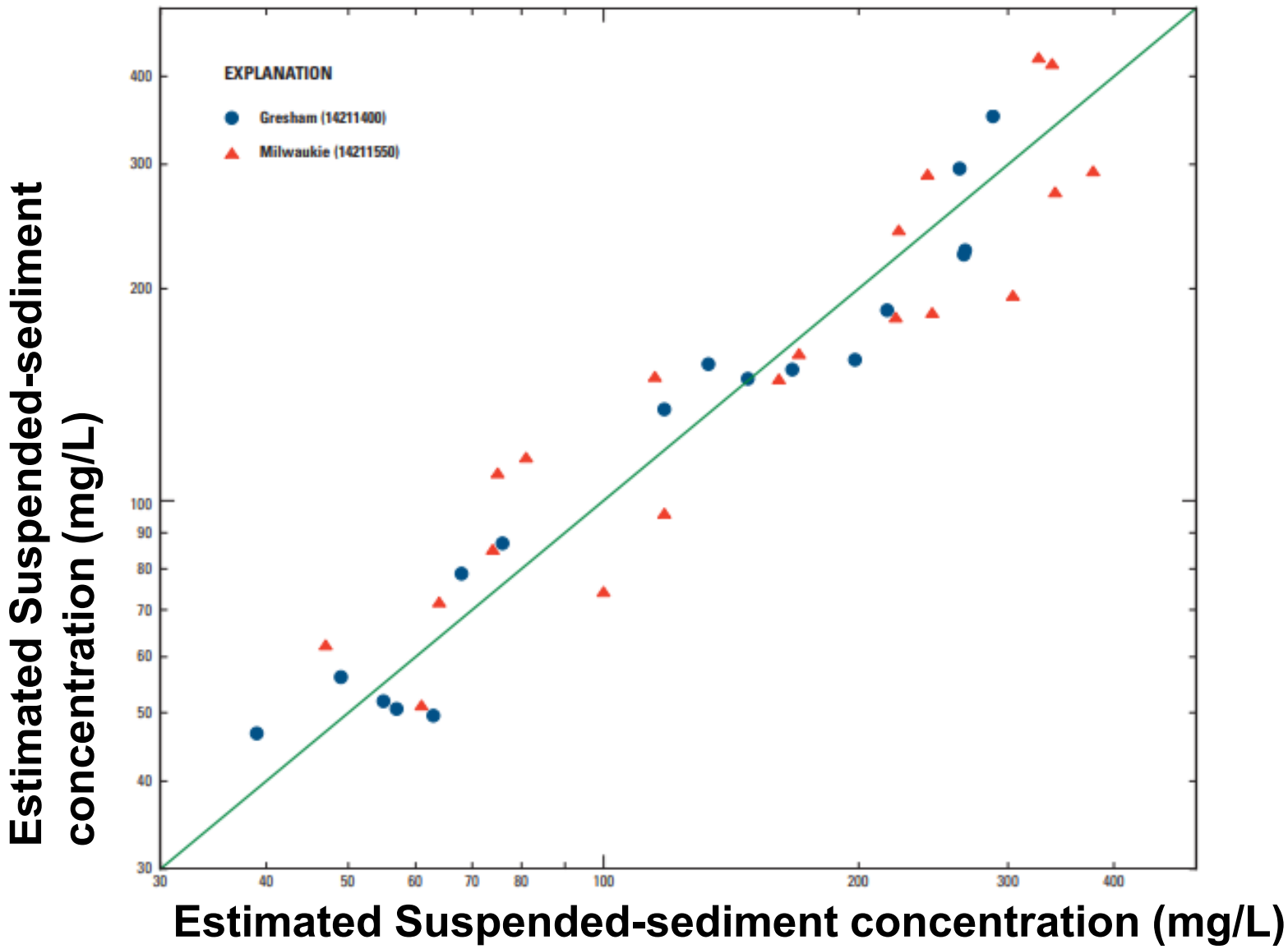
Prepared in cooperation with the Cities of Damascus, Gresham, Happy Valley, Milwaukie, and Portland; Clackamas County Water Environment Services; Multnomah County; and the East Multnomah Soil and Water Conservation District

Suspended-Sediment Characteristics of the Johnson Creek Basin, Oregon, Water Years 2007–10

Scientific Investigations Report 2012–5200

U.S. Department of the Interior
U.S. Geological Survey

USGS



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Stonewall, A.J., and Bragg, H.M., 2012, Suspended-sediment characteristics for the Johnson Creek basin, Oregon, water years 2007–10: U.S. Geological Survey Scientific Investigations Report 2012-5200, 32 p.

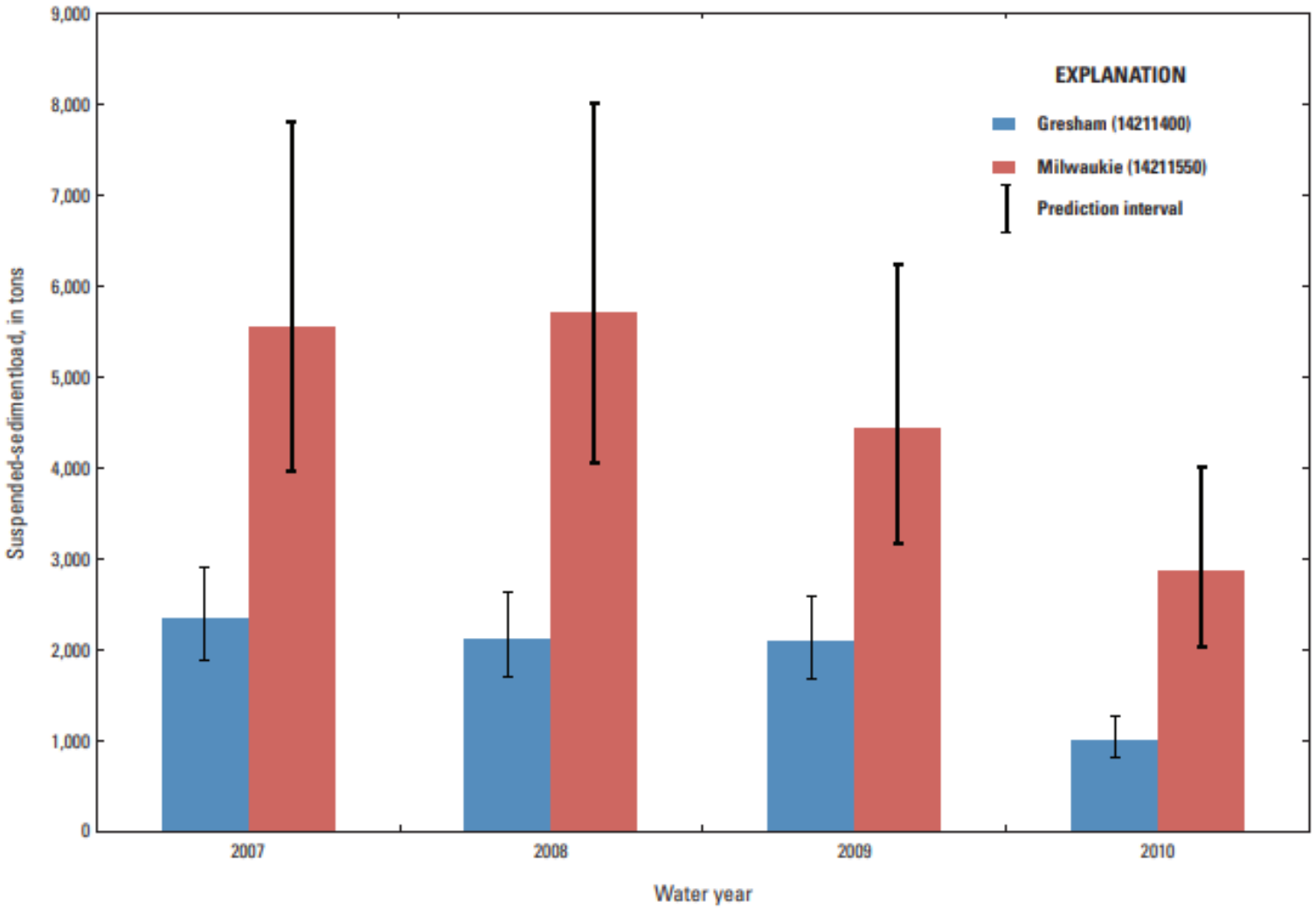
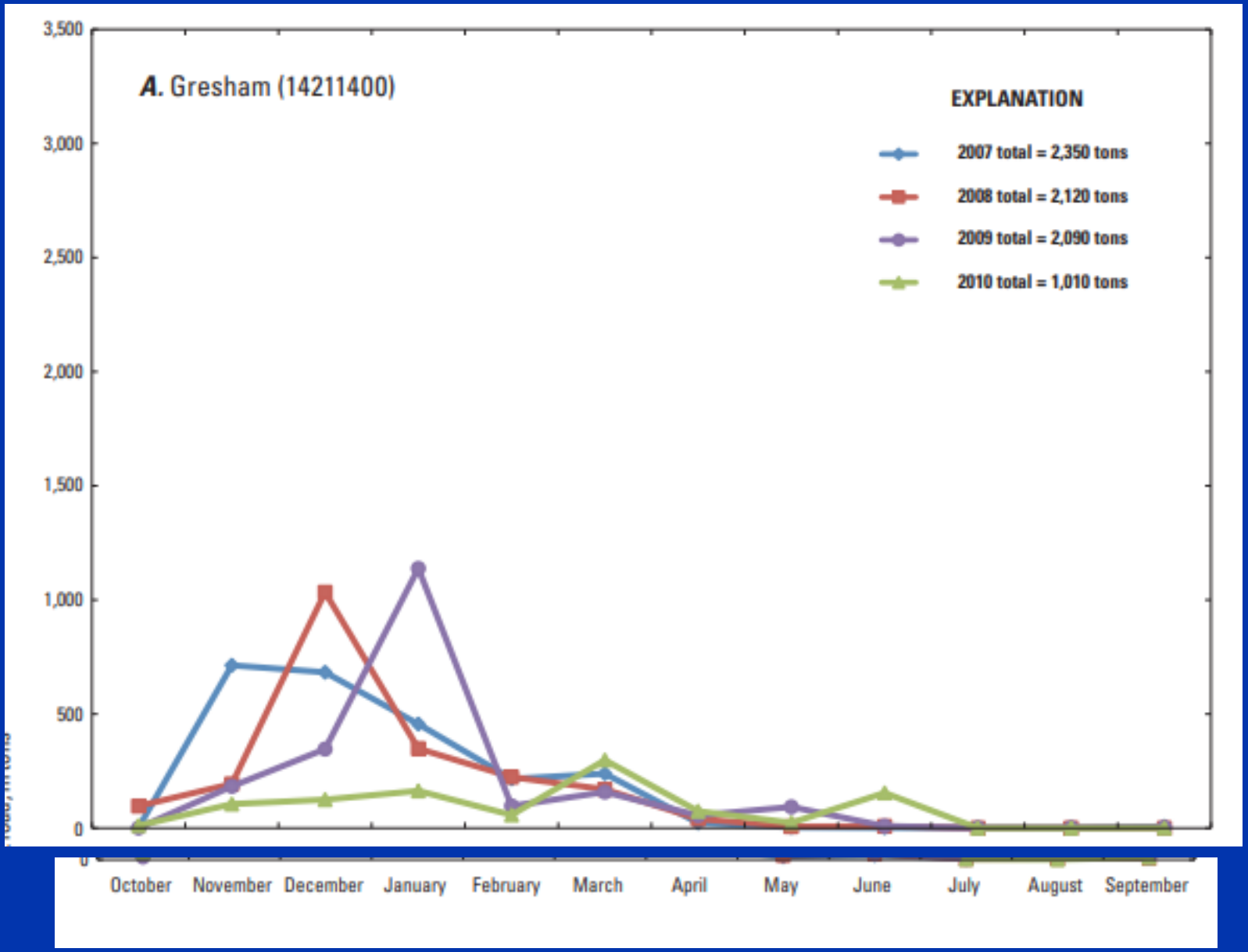


Figure 7. Computed annual suspended-sediment loads for the Gresham (14211400) and Milwaukie (14211550) streamflow-gaging stations, Johnson Creek basin, Oregon, water years 2007–10.

USGS

Stonewall, A.J., and Bragg, H.M., 2012, Suspended-sediment characteristics for the Johnson Creek basin, Oregon,
water years 2007–10: U.S. Geological Survey Scientific Investigations Report 2012-5200, 32 p.

Suspended-sediment load in tons



USGS

Stonewall, A.J., and Bragg, H.M., 2012, Suspended-sediment characteristics for the Johnson Creek basin, Oregon,
water years 2007–10: U.S. Geological Survey Scientific Investigations Report 2012-5200, 32 p.

Current study

- Objective is to “collect sediment and turbidity data to further the understanding of processes that drive sediment transport in the Johnson Creek watershed, and to predict where restoration efforts may result in the greatest reduction in unwanted sediment transport.”
- 3 “Roving” turbidity probes deployed in 1-year increments over 4 years.

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Current study

- Suspended sediment sampling to establish relation between turbidity and suspended-sediment concentration (SSC).
- Started in 2019. Data collection through 2023. Analysis and report by 2024.

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Current sediment study

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Assumptions for preliminary analysis

- If no streamflow data are available, streamflow were estimated using simple drainage area method (will be updated later).
- Missing streamflow and turbidity data were estimated using Random Forest machine learning algorithm. This was also used to estimate data outside of period of record.

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Assumptions for these slides (cont.)

- Used standard relation between turbidity and suspended-sediment concentration (SSC). May break these out into separate equations if warranted in the future.
- All turbidity values in formazin nephelometric units (FNU), all concentrations SSC rather than TSS.

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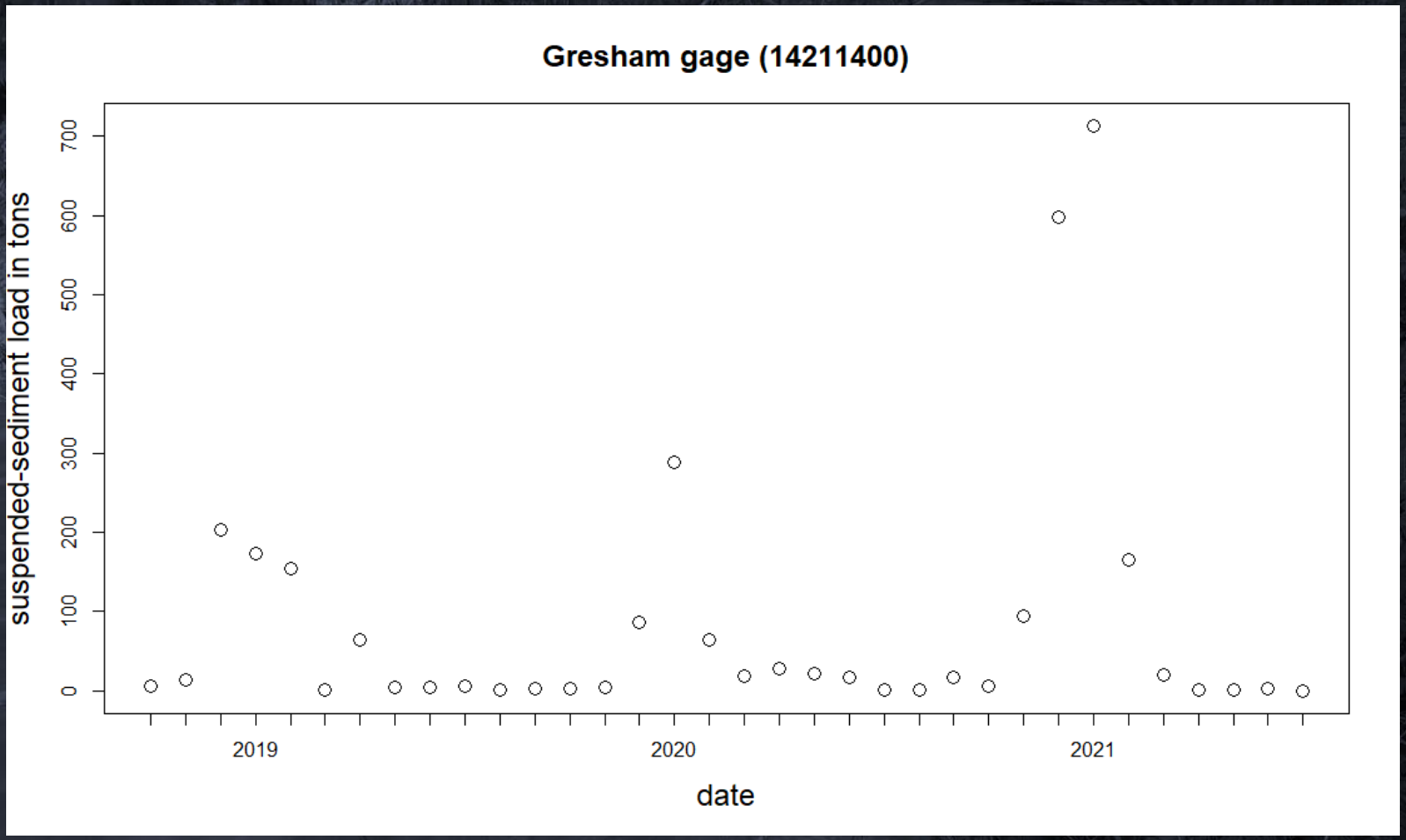
Gresham data from recent years



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Provisional data

Gresham streamflow

Average streamflow is about 32.5 cfs

2020 and 2021 data not official, but average streamflow values likely to be around 22.5 and 28.5 cfs, respectively.

Water Year	00060, Discharge, cubic feet per second
1999	45.4
2000	28.5
2001	13.4
2002	32.6
2003	27.9
2004	26.8
2005	19.7
2006	35.1
2007	37.6
2008	37.1
2009	29.8
2010	32.8
2011	47.1
2012	37.6
2013	35.2
2014	30.5
2015	25.6
2016	41.1
2017	47.9
2018	27.7
2019	23.6

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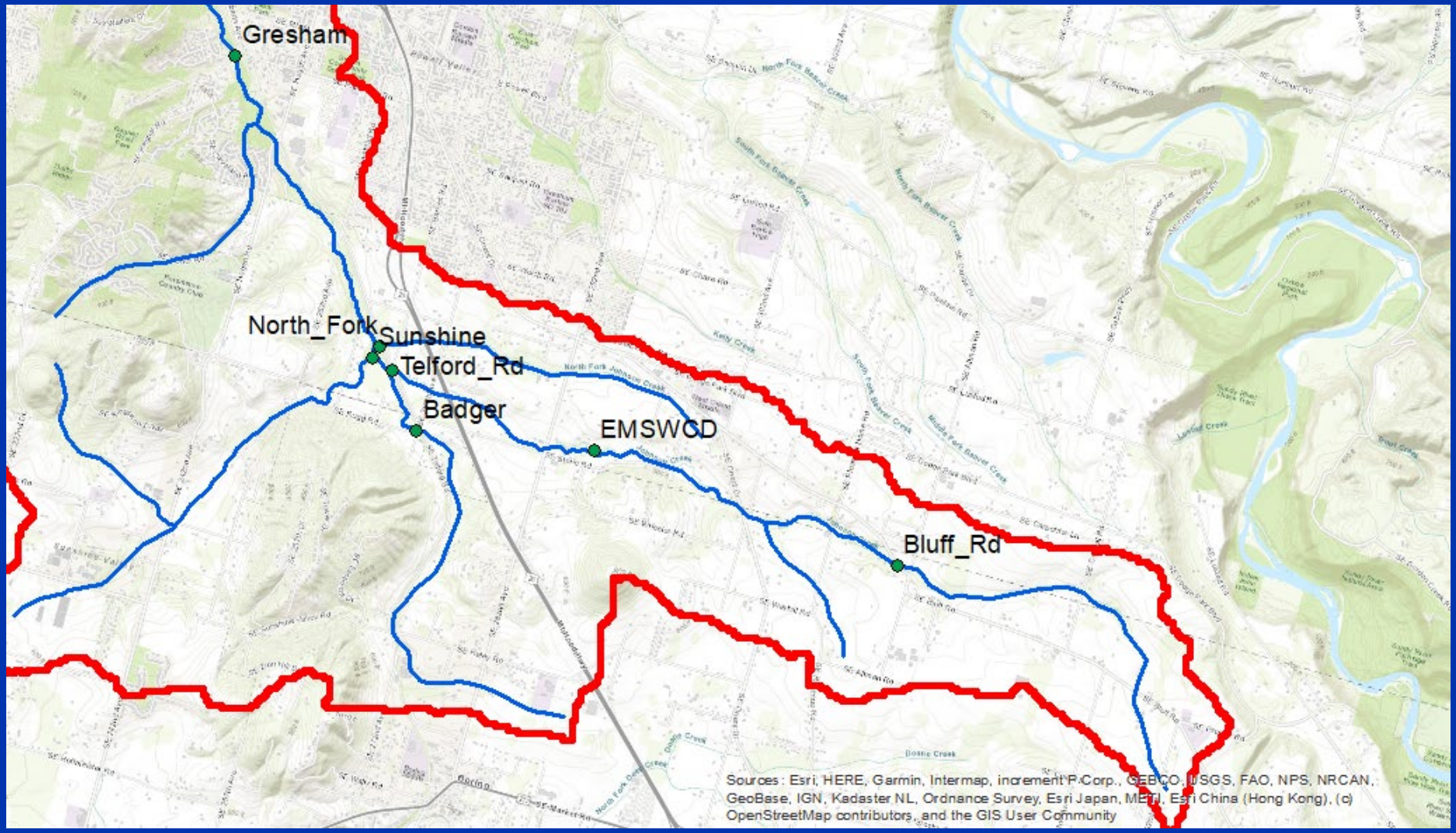
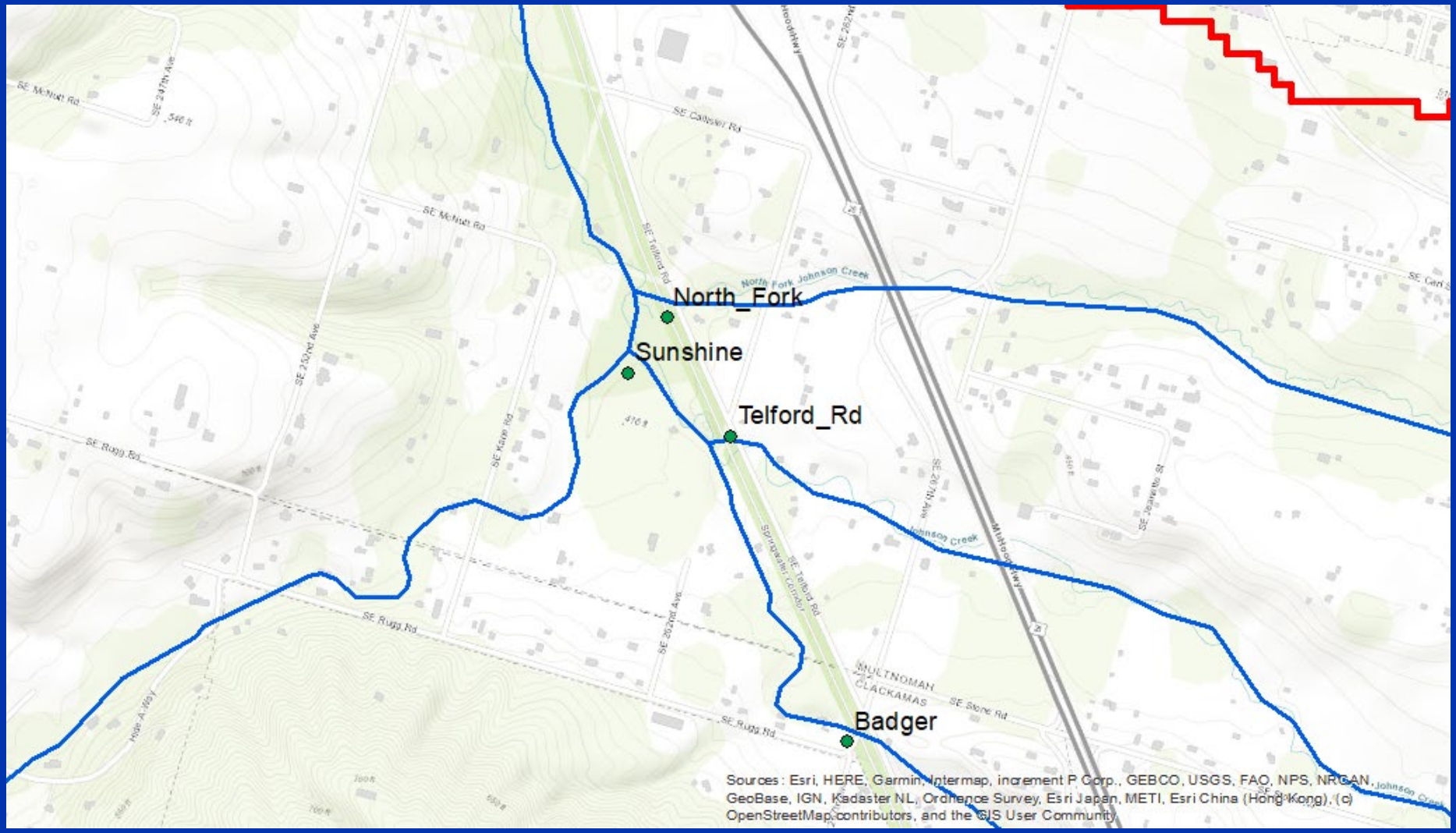

Gresham
North_Fork
Sunshine
Telford_Rd
Badger
EMSWCD
Bluff_Rd
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

USGS


North_Fork
Sunshine
Telford_Rd
Badger
SE McNutt Rd
SE 242nd Ave
SE Rugg Rd
SE Kane Rd
SE 262nd Ave
SE Telford Rd
North Fork Johnson Creek
Johnson Creek
MULTNOMAH
CLACKAMAS
SE Stone Rd
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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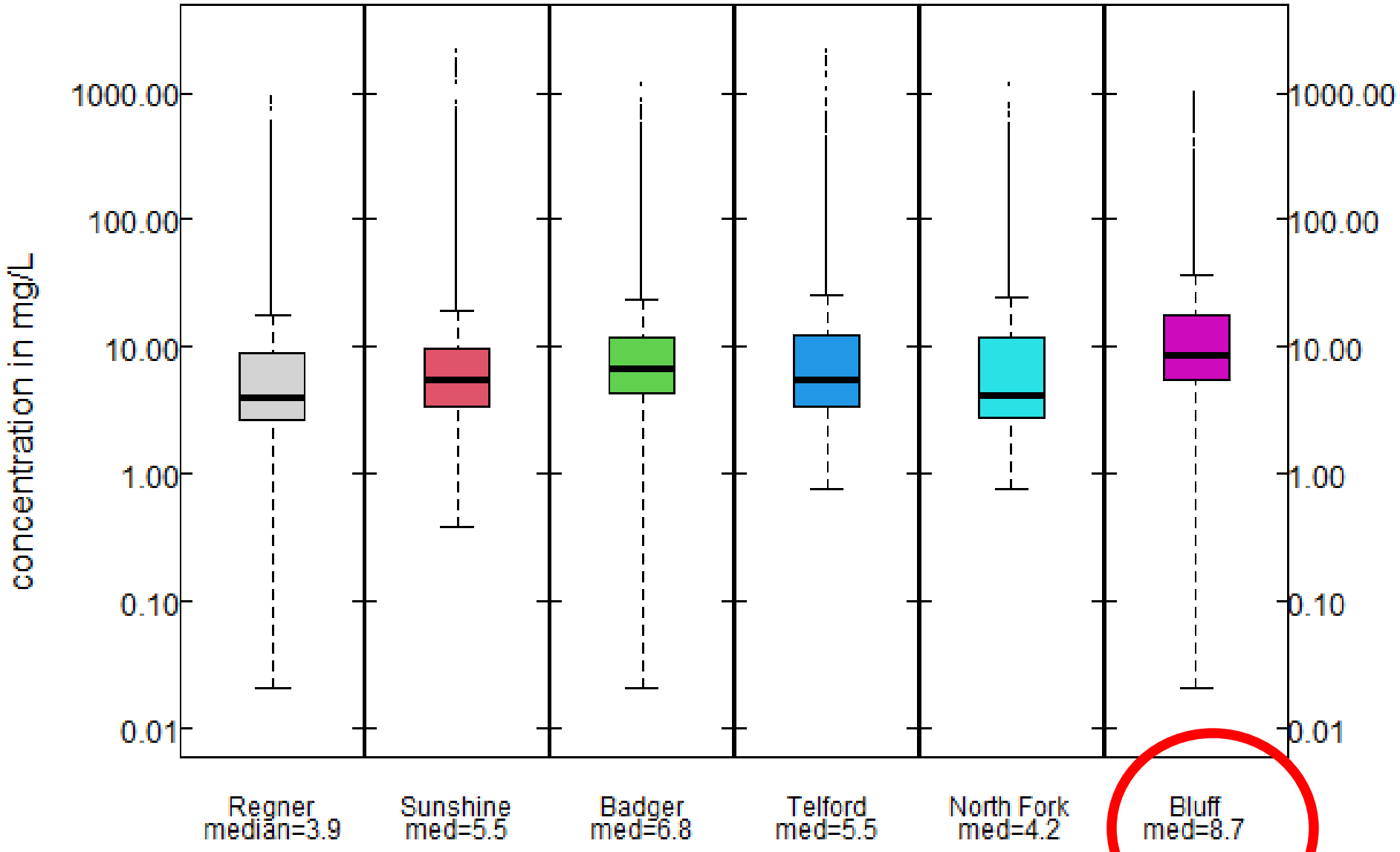
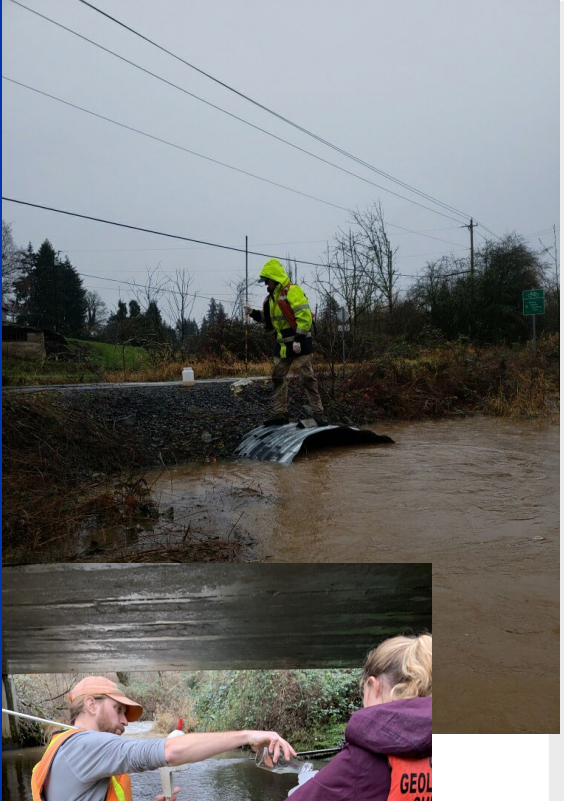
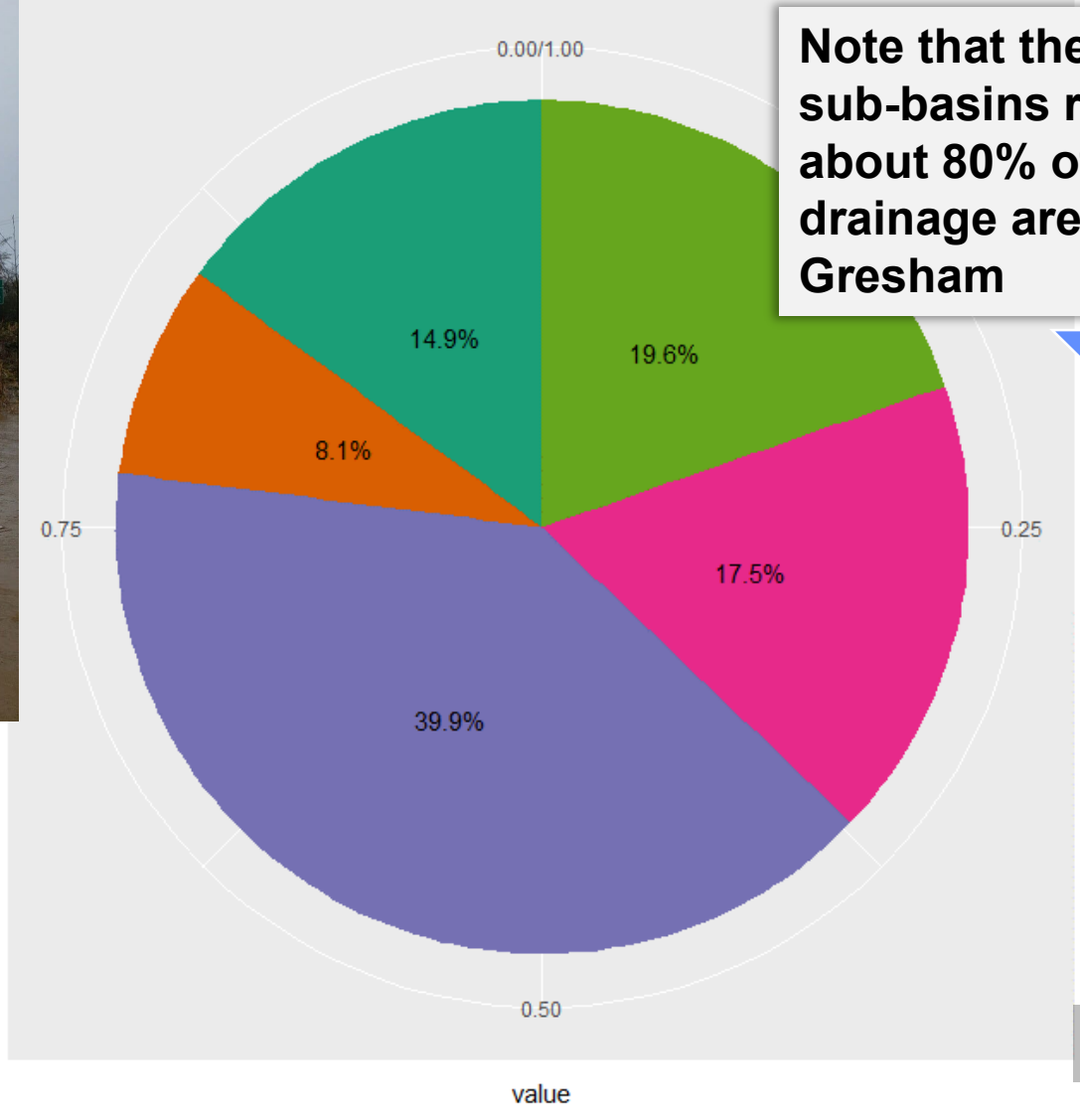
Suspended-sediment



USGS

Sources of Gresham gage sediment by percentage





Note that these four sub-basins represent about 80% of the drainage area at Gresham

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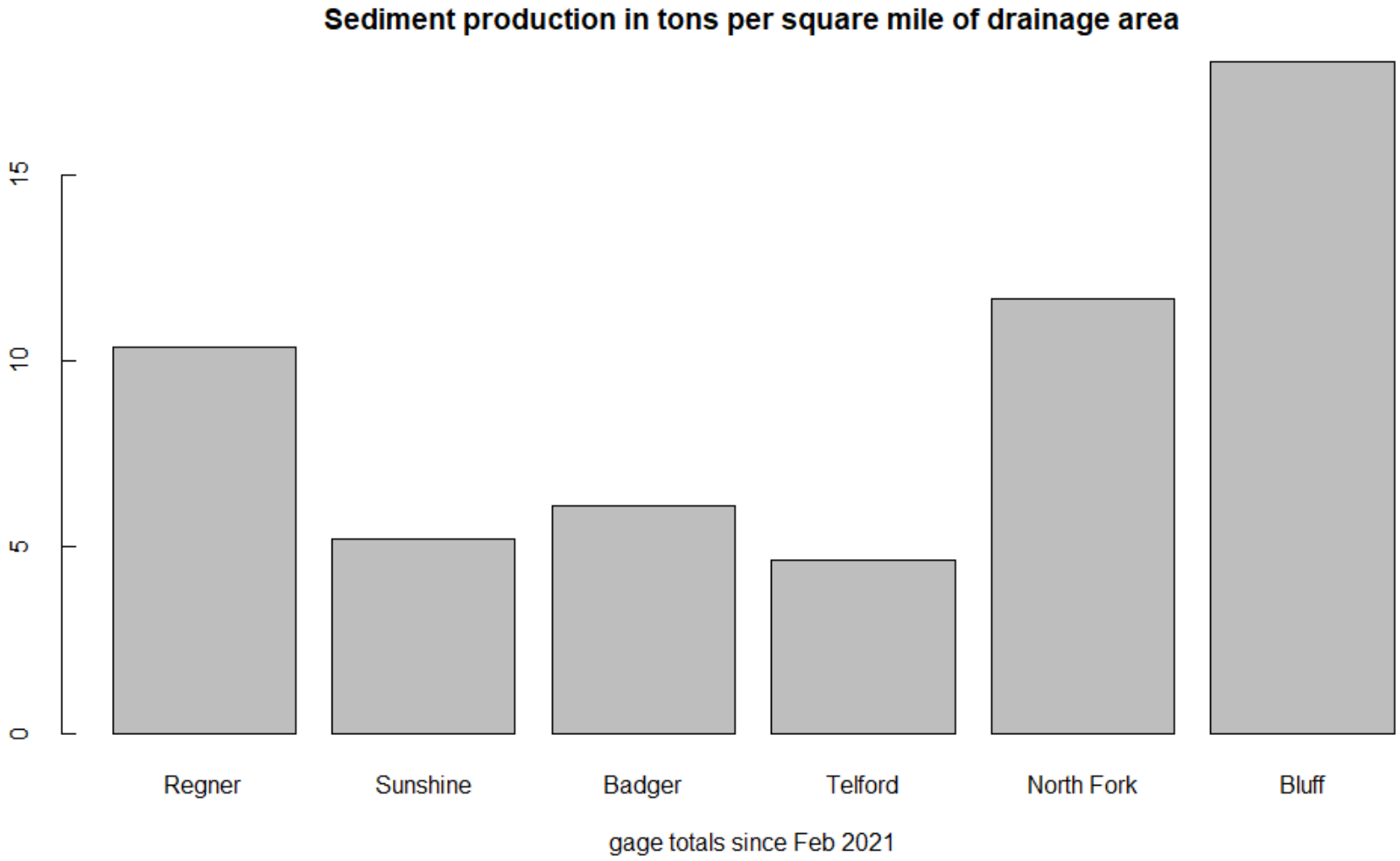

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Provisional data


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Gages and sampling locations planned for WY 2022

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End