Streamflow Gaging Network in the Puget Sound Basin

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Background

Puget Sound Stormwater Work Group identified streamflow as an element of status and trend monitoring in small streams

Approach recommended by the WG in 2010 strategy was to use existing gages to the extent possible

Draft report has been completed, final version should be available on-line by June (*http://pubs.usgs.gov/publications/sir20125020*)

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Gage Inventory

- Contacted 23 agencies (federal, tribal, state, county, municipal) as well as multi-agency organization
- Obtained information for all continuous streamflow gages
- Entered information into a geospatial database
- Digitized basins for each gage
- Tabulated gages by location (lowland, urban)

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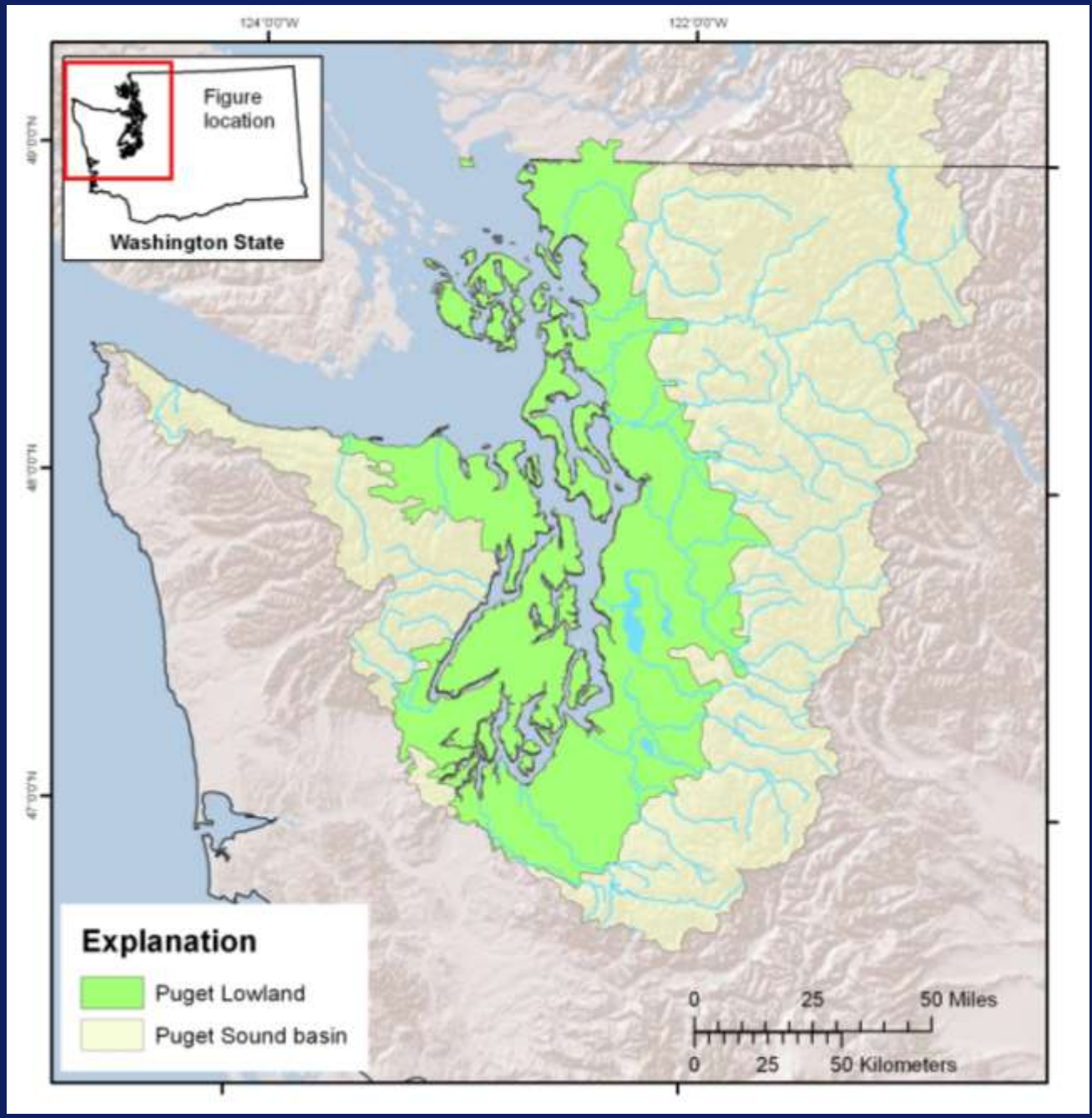
Study Area

Puget Sound Basin with an emphasis on the Puget Lowland



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Inventory results: number of gages

	Puget Sound Basin	Puget Lowlands	Lowland urban area
All sites with active and inactive gages	776	593	406
Gages with 10-year records	306	212	149
Active gages	285	232	157
Active gages with 10-year records	182	135	93

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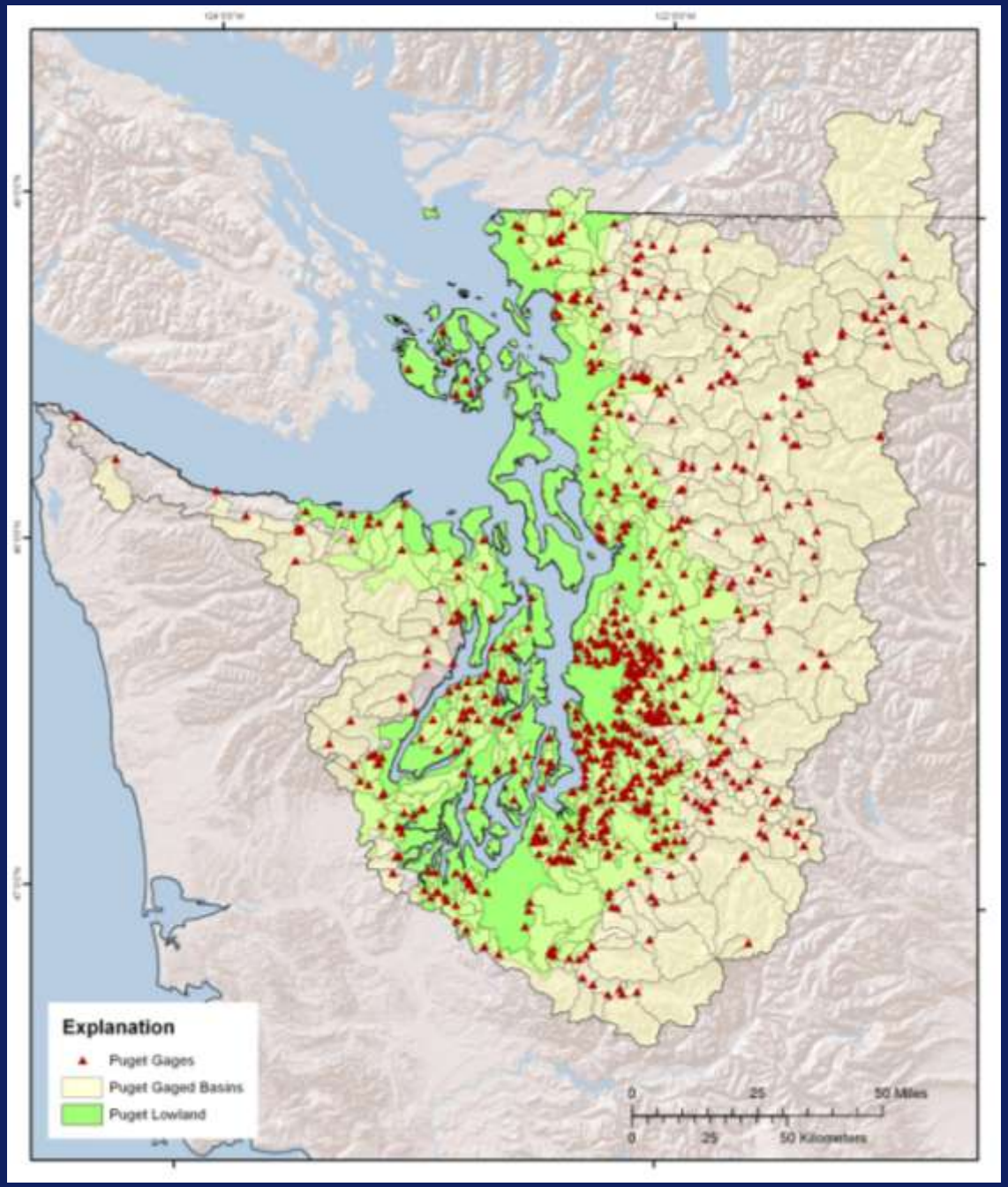
Streamflow gaging locations in the Puget Sound Basin



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Inventory results: area gaged

	Puget Sound Basin km^2	Puget Lowlands km^2	Lowland urban areas km^2
Total area	36,666	14,131	3,681
Area with active or inactive gages	29,472	8,258	2,078
Area with active gages	26,993	6,451	1,510
Fraction actively gaged	0.74	0.46	0.41

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Gages on small streams

	Puget Sound Basin	Puget Lowlands	Lowland urban areas
Active gages with drainage areas <25 km^2	125	119	87
Area (km^2)	1142	1019	488
Fraction of basin with small, active gages	0.03	0.07	0.13

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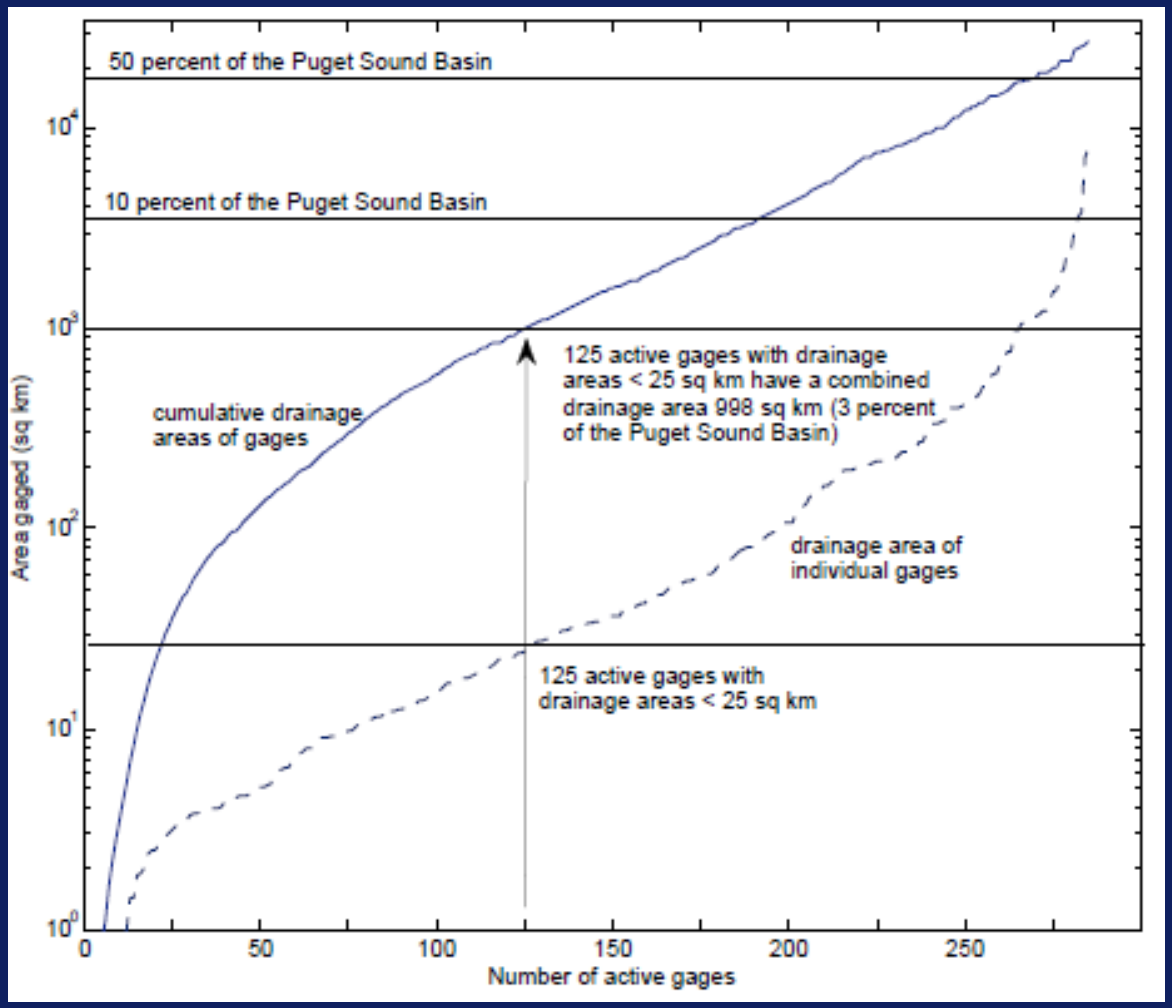
Coverage versus Resolution



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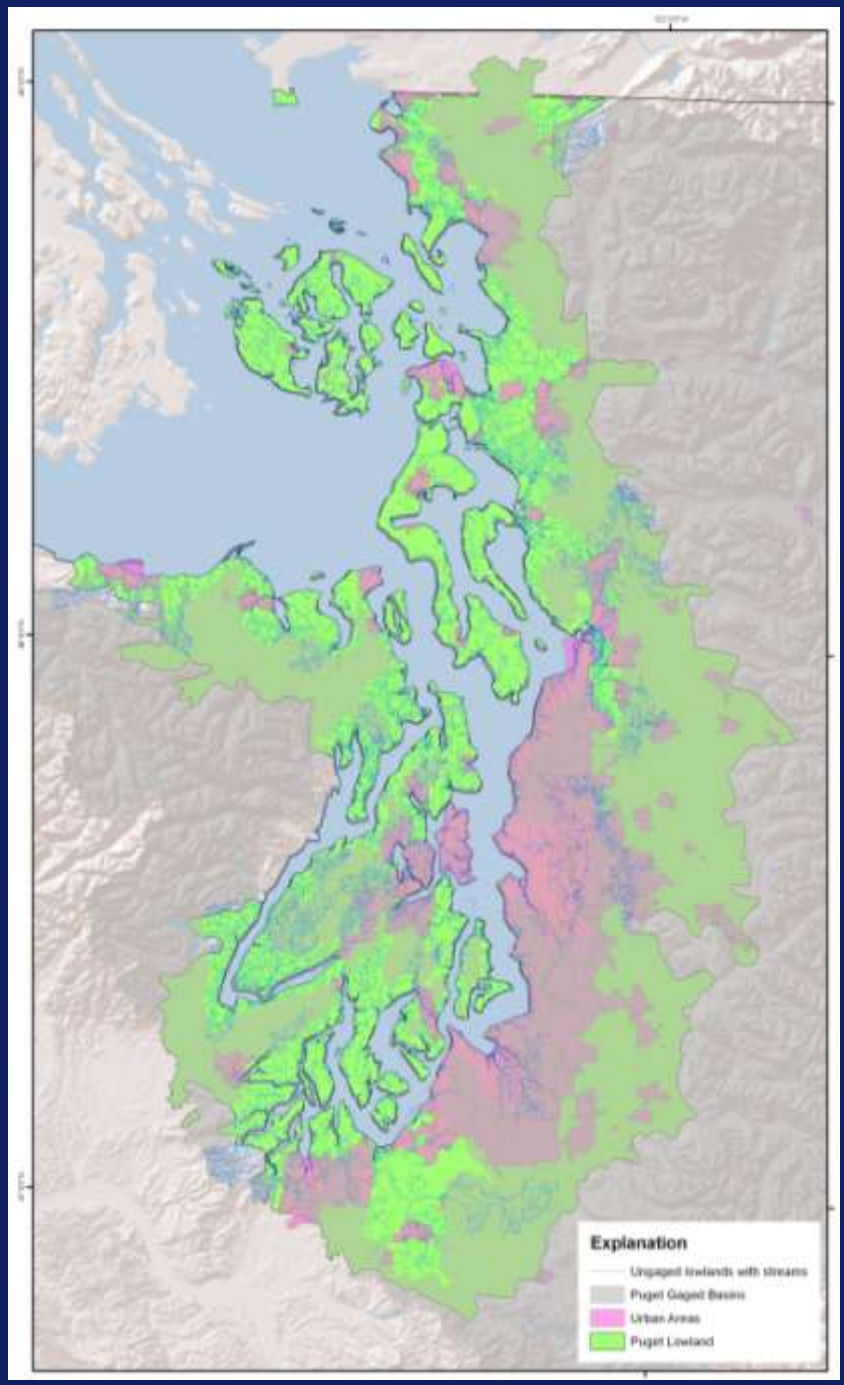
Ungaged streams

Coastal watersheds with small creeks and sloughs draining directly to Puget Sound (for example, Terrell Creek in Whatcom Co., Samish River in Skagit Co., Sequalitchew Creek in Pierce County);

Islands and peninsulas with few streams (for example, Bainbridge Island, Whidbey Island, Key Peninsula, southwest Kitsap Peninsula, north coast of Olympic peninsula);

Large river floodplains and deltas with few streams (for example, Nisqually, Nooksack, Skagit, and Snohomish) or small streams draining directly to large rivers (for example, Eaton Creek and Yelm Creek in Thurston County); and

Urban areas with extensive engineered drainage systems (for example, large portions of Bellevue, Bremerton, Everett, Seattle, and Tacoma).



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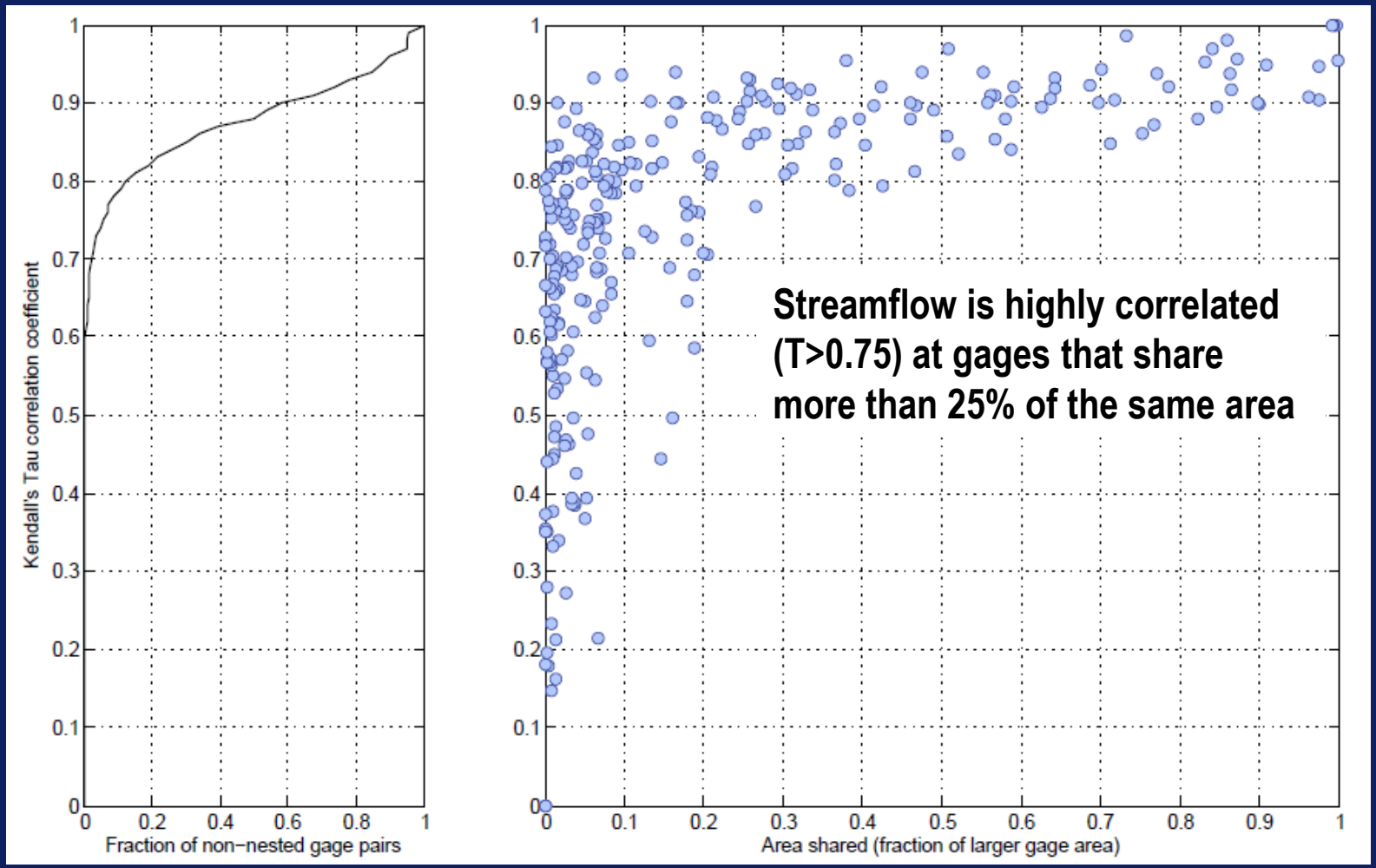
Correlation of streamflow between gages



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Conclusions

Spatial coverage of the gaging network is extensive (46% of the Puget Lowland, 41% of urban area)

Expanding coverage will require many gages on small streams

Resolution of gaging network is limited in Puget Lowland: 119 gages with drainage areas < 25 km2 , which cover ~1000 sq km (7 percent of area)

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Possible Next Steps

Identify highest priority gages (long records, representative locations, potential index stations)

Identify streamflow metrics to be used for monitoring

Assess approaches for estimating metrics at ungaged sites (models, miscellaneous measurements)

Re-evaluate gaps based on above considerations

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