



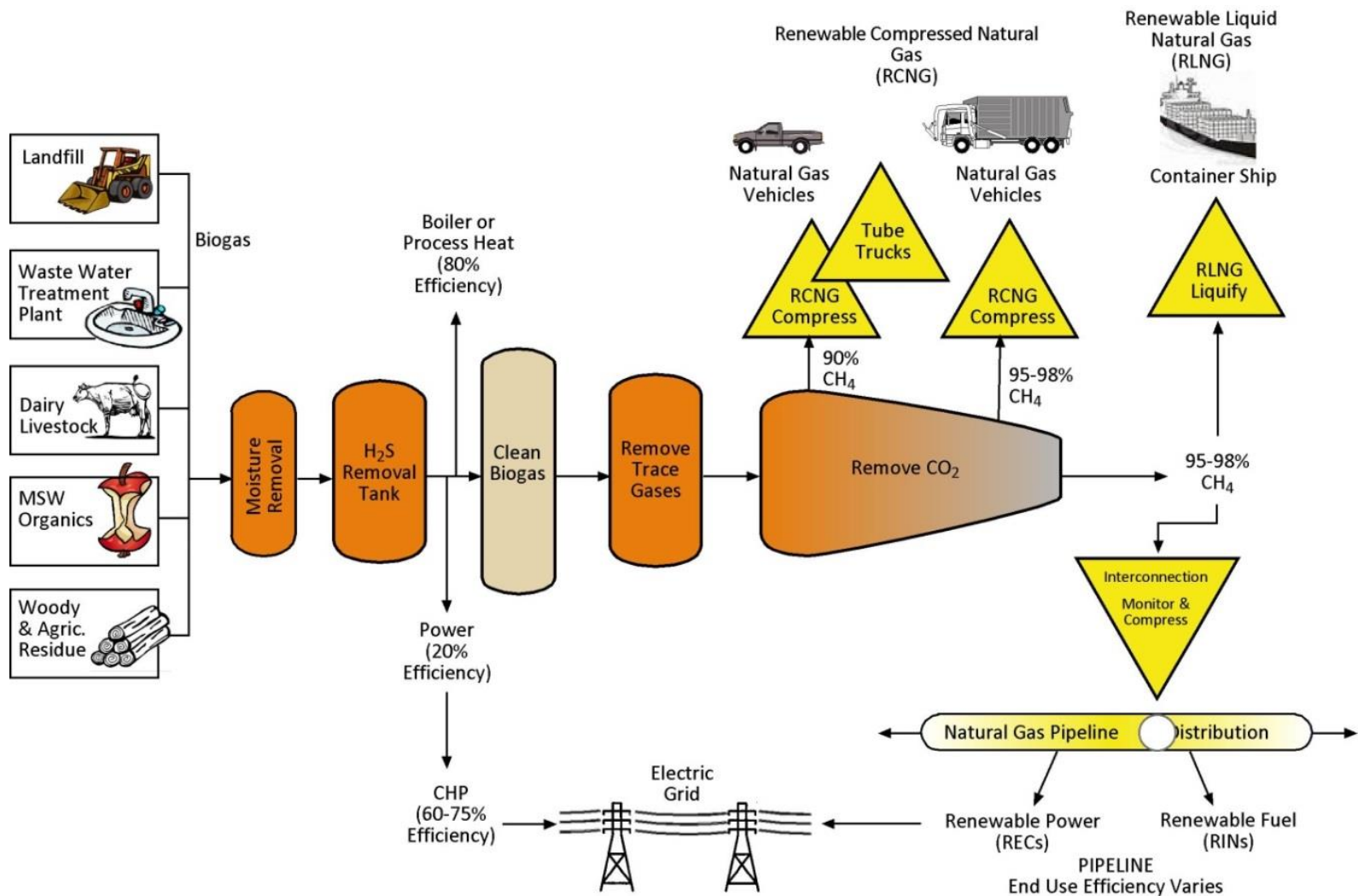
Department of Commerce

Promoting RNG Development in Washington State

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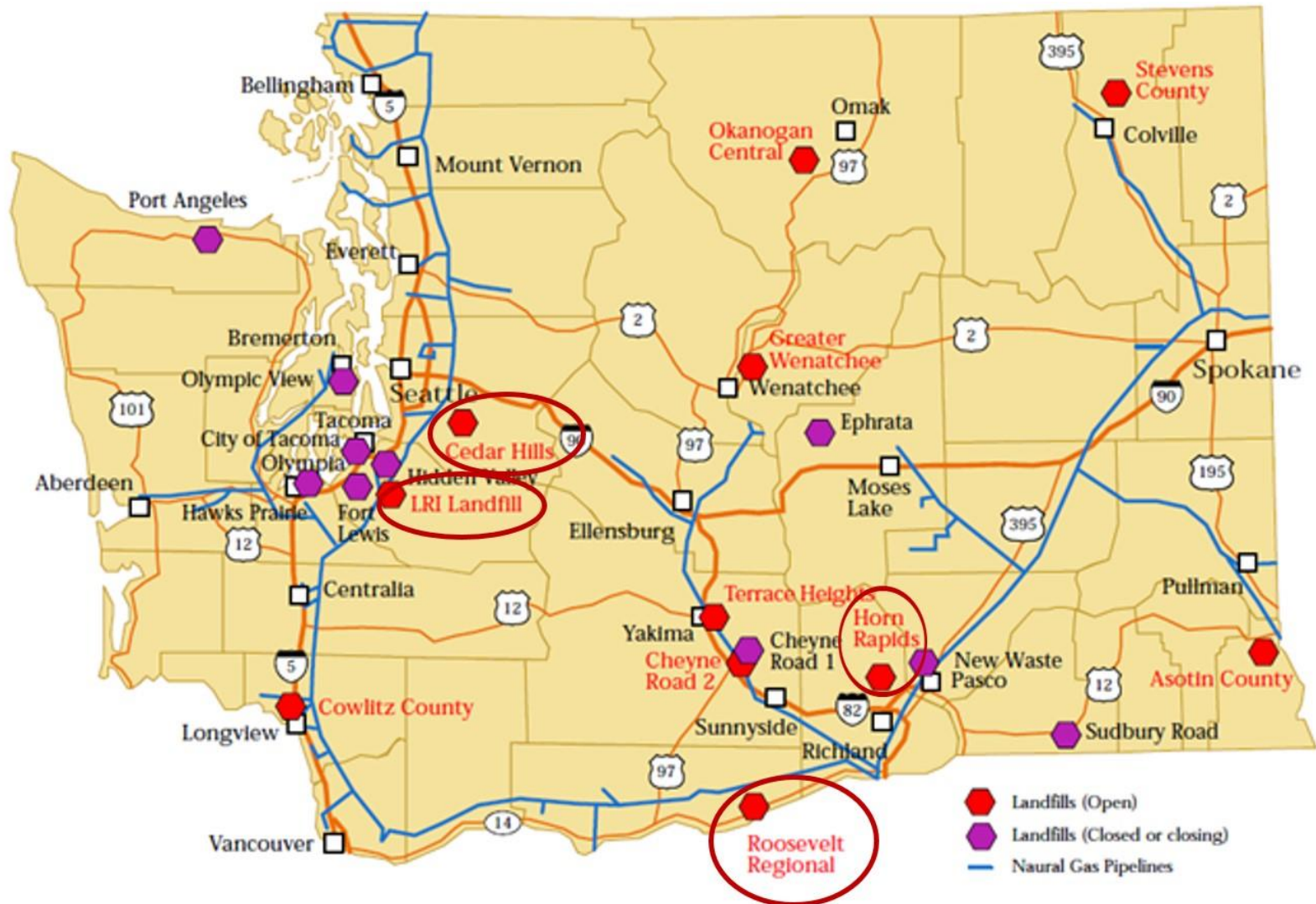
What is Renewable Natural Gas...?



Dairy Digesters: Stable, Innovating, but Stalled



Landfills: Making Progress



Wastewater Treatment: Emerging Opportunities



2017 Roadmap: RNG Potential

Source	Energy (MMBtu/yr)	Electricity (MWh/yr)	Fuel (DGE/yr)
Landfills	16,519,219	1,738,865	122,364,586
Wastewater Treatment	1,716,062	180,638	12,711,571
Dairies	3,011,250	316,974	22,305,566
Food Processing & Municipal Organics	5,430,198	571,600	40,223,692
Urban Wood Gasification	23,376,197	2,460,652	173,157,015

Current: 8-9% power and direct use, ~20% diesel consumption

Advanced: 16-17% power and direct use, ~37% diesel consumption



2017 Roadmap: Key Findings

Power Sales Model Mature

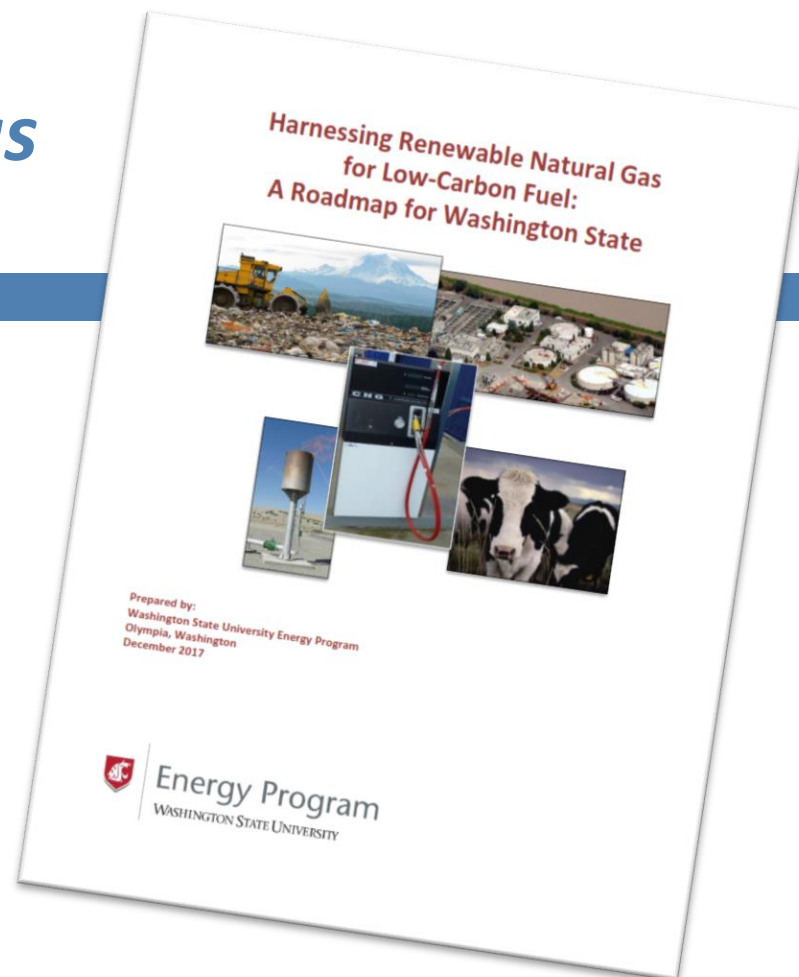
- Utility RPS targets met
- RNG market moving to transportation

Incentives Need an Overhaul

- Previous tax breaks expired
- Definitions dated, conflicting, incomplete

Pipeline Quality Standards

Uncertain Policy Framework



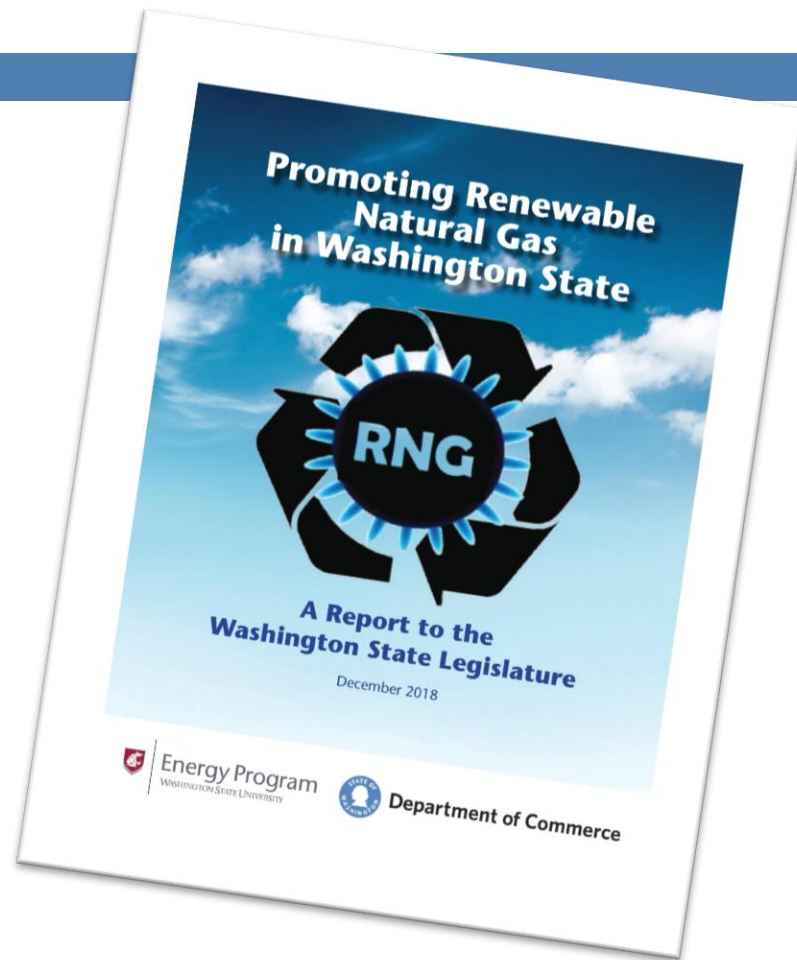
2018 Legislation (HB 2580)

- Restore and expand production incentives
- Broader techno-economic assessment
- Update policy options
- Public sector preferential purchasing
- Regional voluntary pipeline standards



2018 Roadmap: Promoting RNG

- Refine previous production estimates
- Cite economic and environmental benefits
- Integration with natural gas utilities
- Policy options, especially incentives



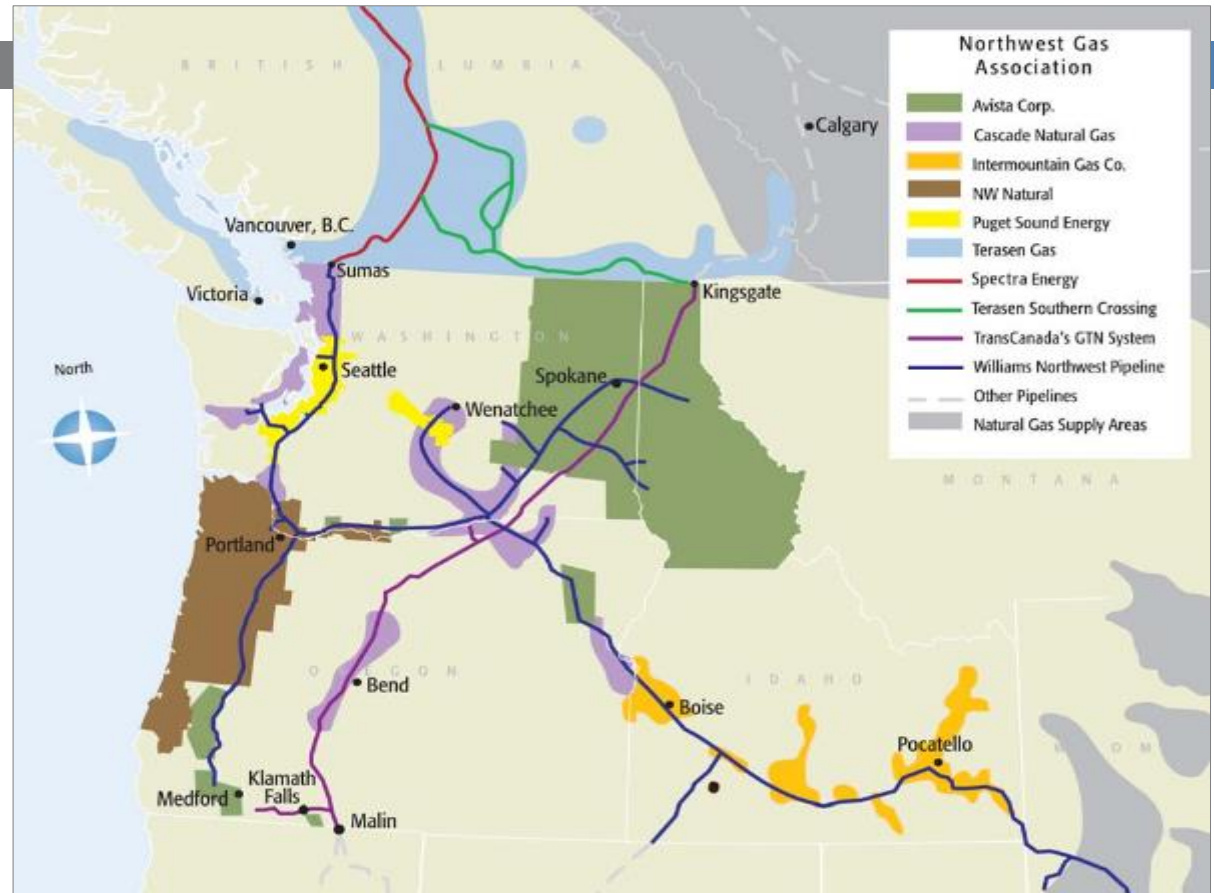
www.commerce.wa.gov/wp-content/uploads/2019/02/COMMERCE-RNG.pdf



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First Step: Better data, focus on pipelines

- Facilities within 5 miles
- Feedstocks within 30 miles
- Public-private partnerships, priorities for public funding
- Data sets dated, incomplete and/or inferred



Start with the larger dairies...



Primary Dairies



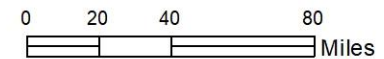
>200 scfm



>100 scfm

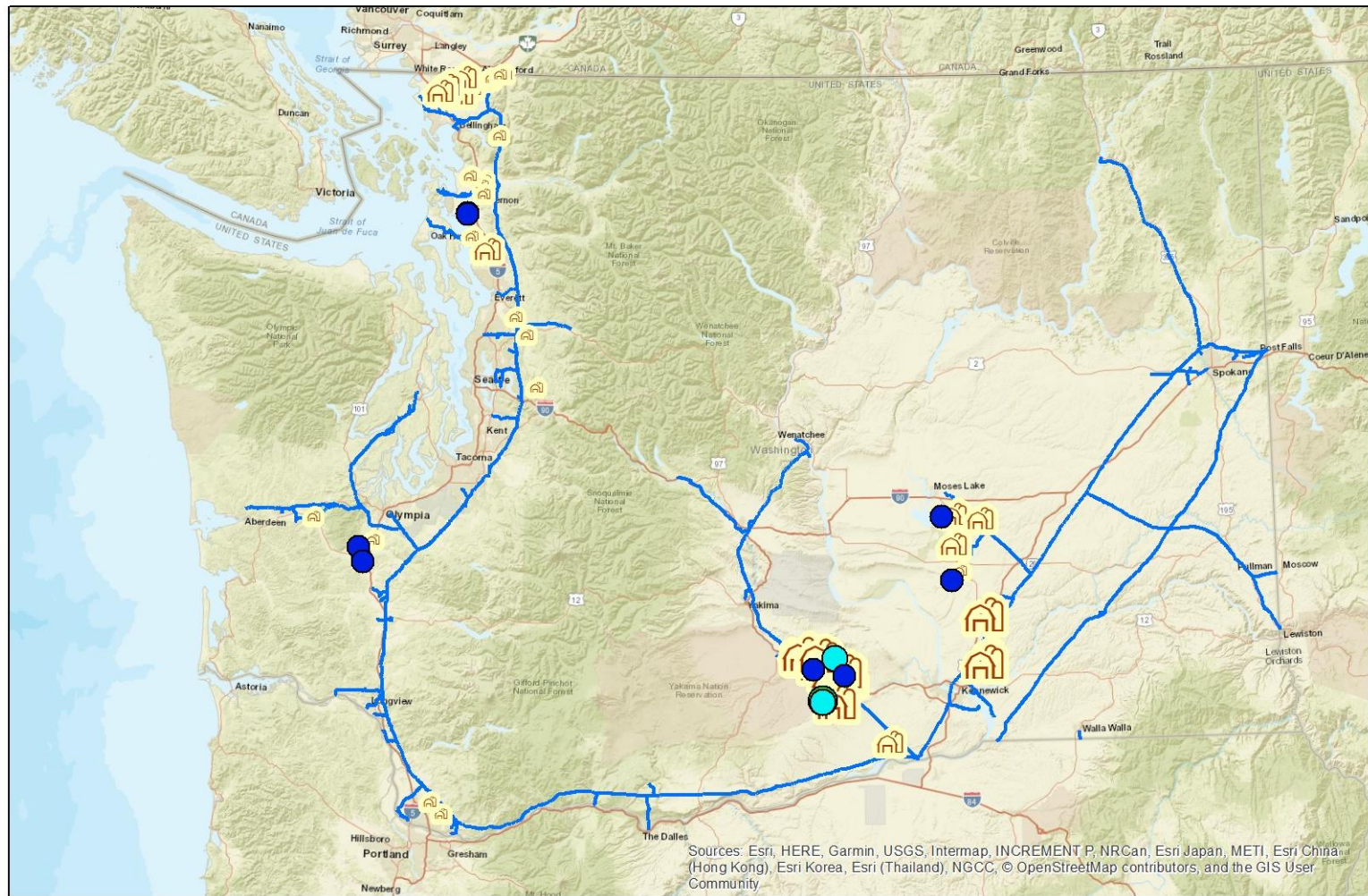


>50 scfm




Source: Washington State Energy Office

...add dairies in close proximity to other dairies...





Secondary Dairies

 >200 scfm

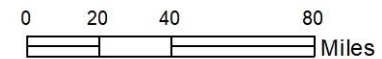
● >100 scfm

● >50 scfm

Primary Dairies

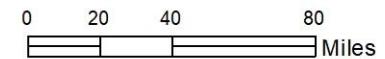
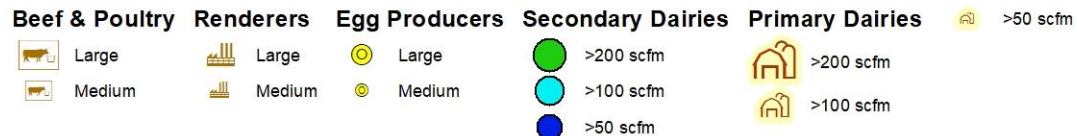
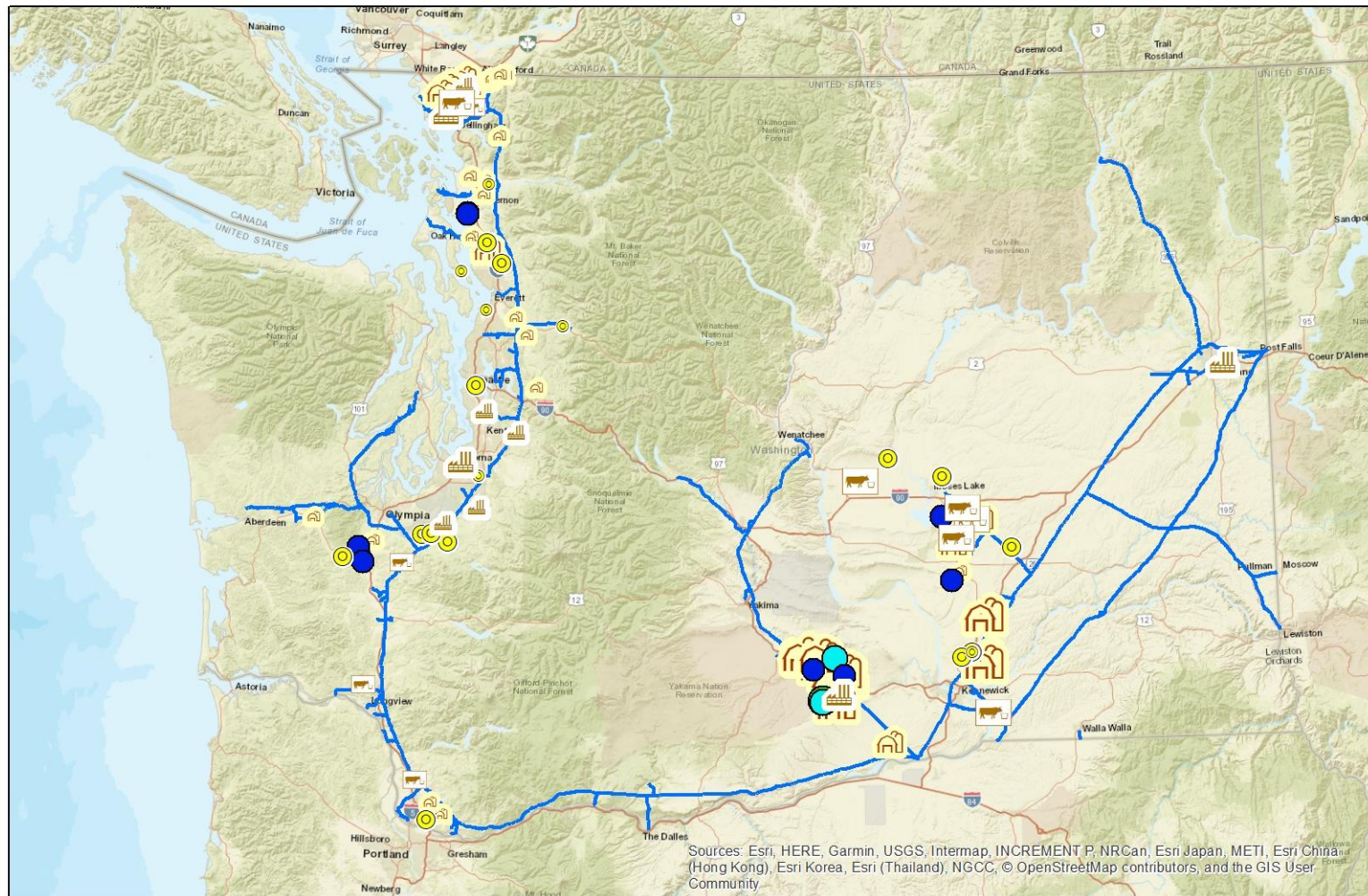
 >200 scfm >100 scfm

 >50 scfm



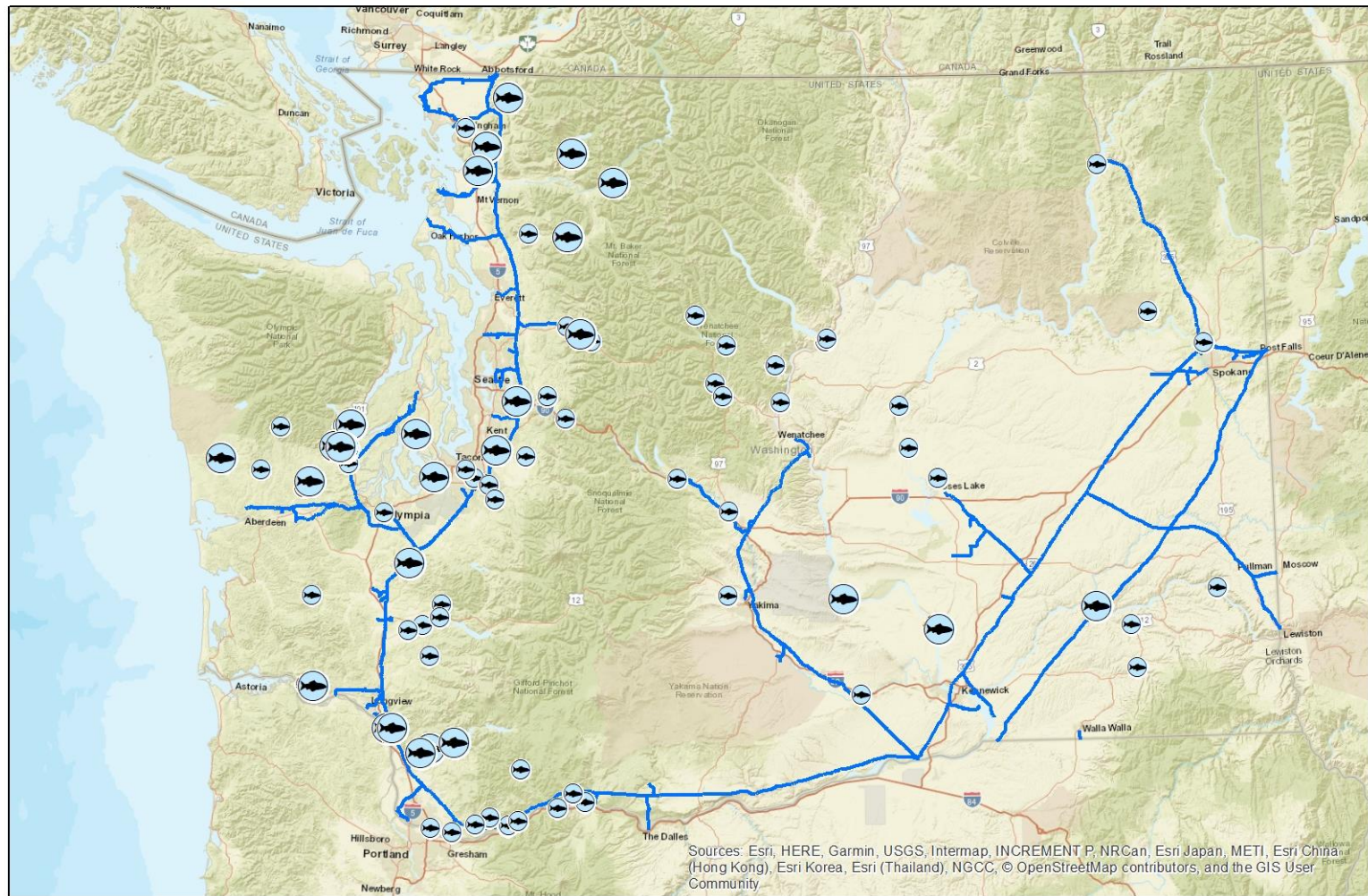
Source: Washington State Energy Office

...other sources of animal waste...





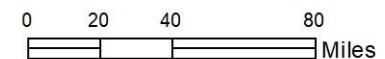
Source: Washington State Energy Office

...don't forget hatcheries...



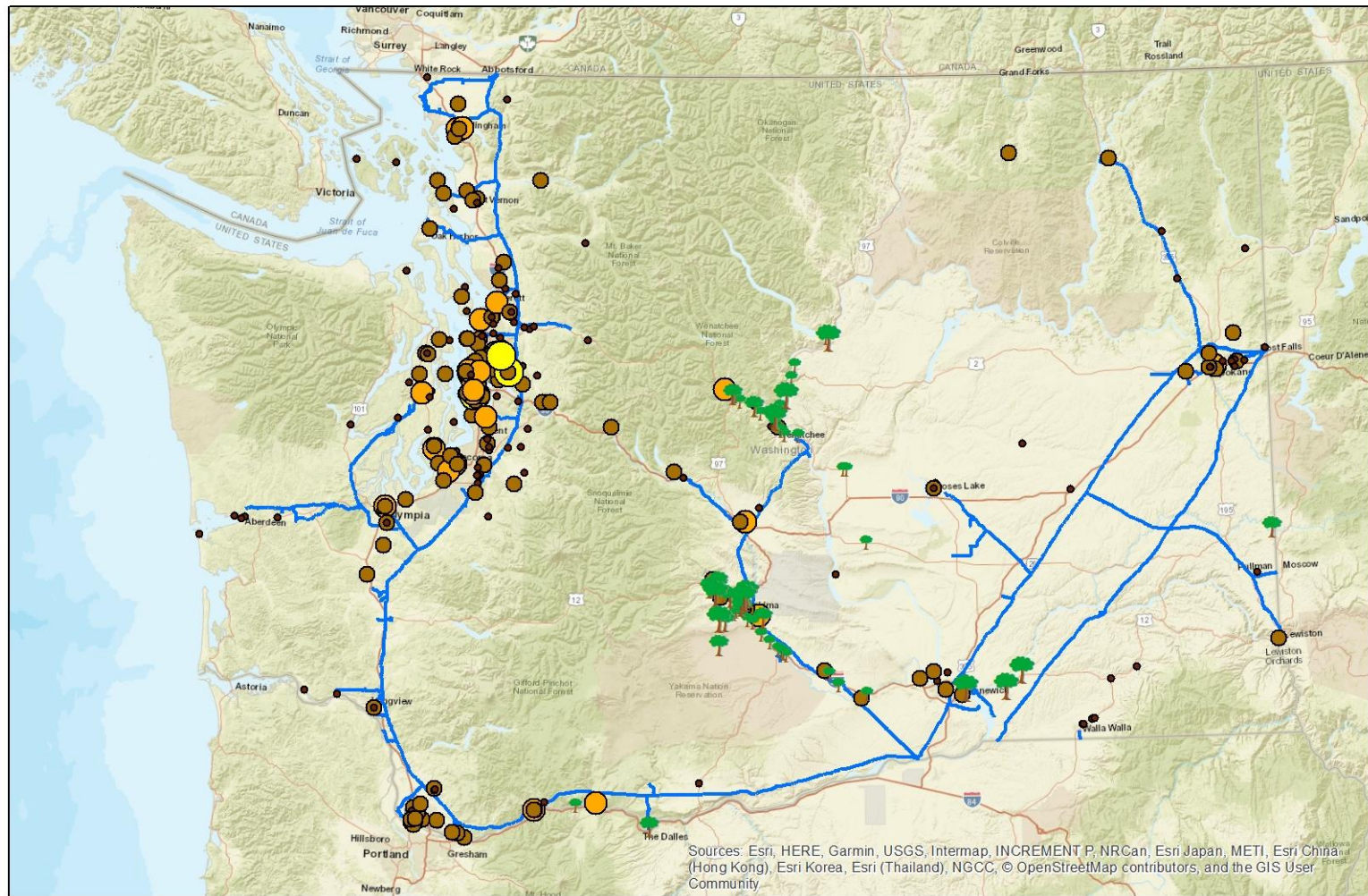
Fish Hatcheries

-  Carcass waste reported
-  No report



Source: Washington State Energy Office

...fruit growers, brewers and distillers...

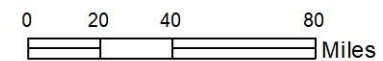


Tree Fruit & Vineyards

- >100k tons/yr and/or >50 employees
- >50k tons/yr and/or >10 employees
- Smaller packers

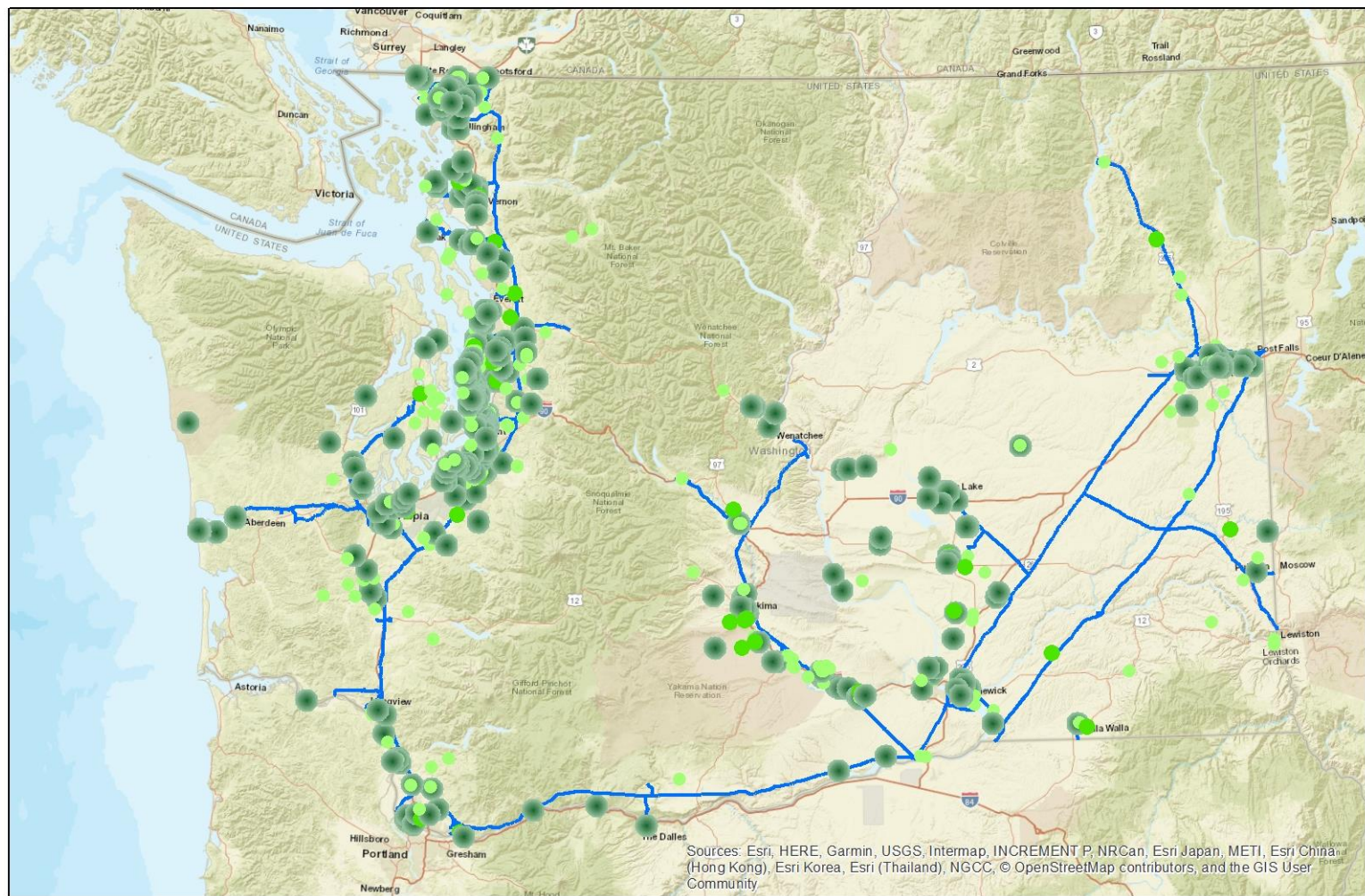
Breweries & Distilleries

- >1m gal/yr beer or >100k gal/yr spirit
- >100k beer or >10k spirit
- >10k beer or >1k spirit
- >1k beer or >100 spirit



Source: Washington State Energy Office

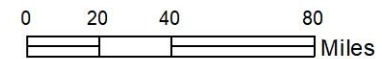
...and plenty of food processors



Food Processors

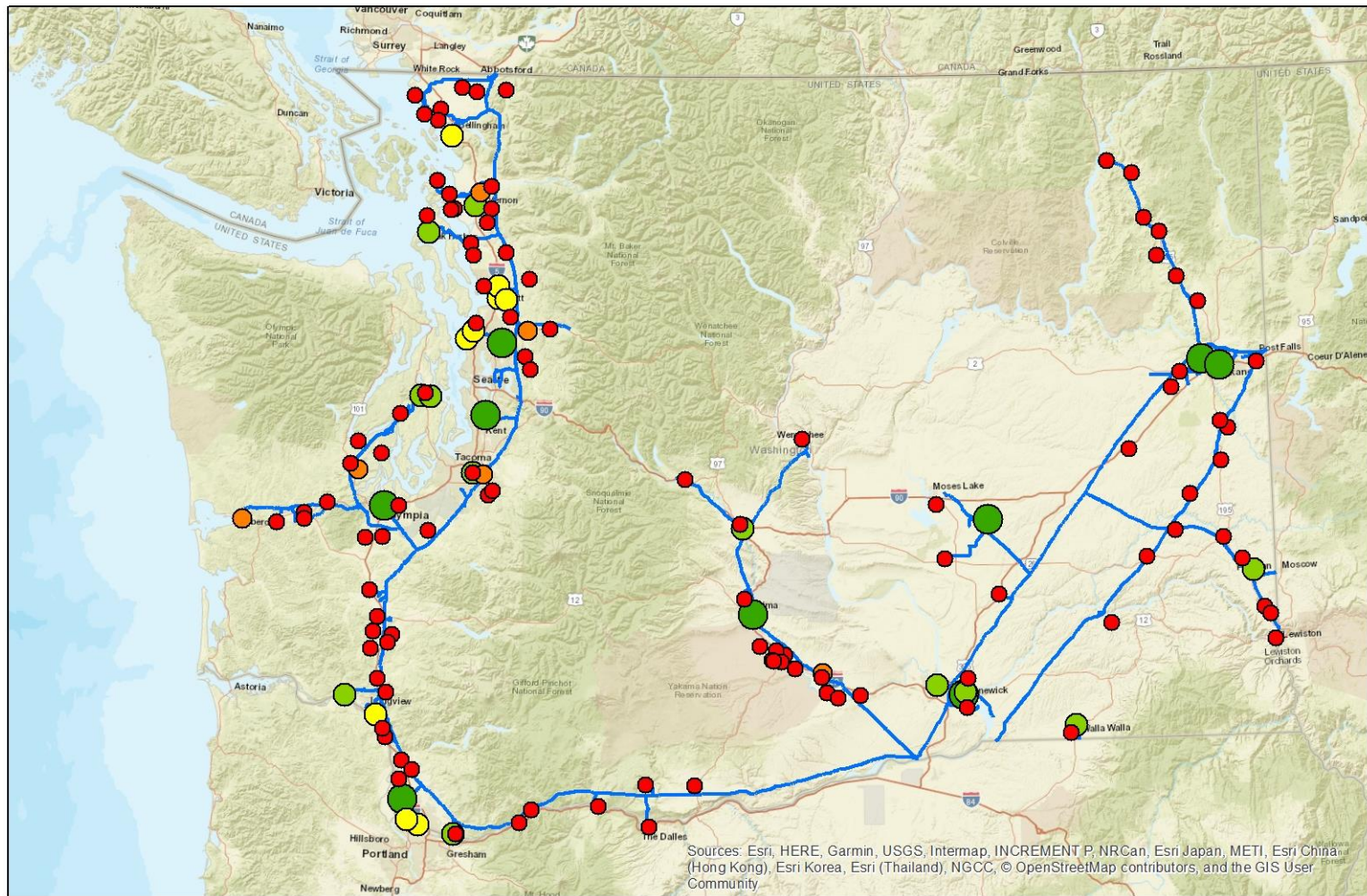
- High sales volume or employment (high energy value)
- Medium sales volume or employment

● Other processors



Source: Washington State Energy Office

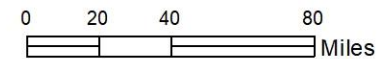
Facilities start with wastewater...



Wastewater Treatment Facilities

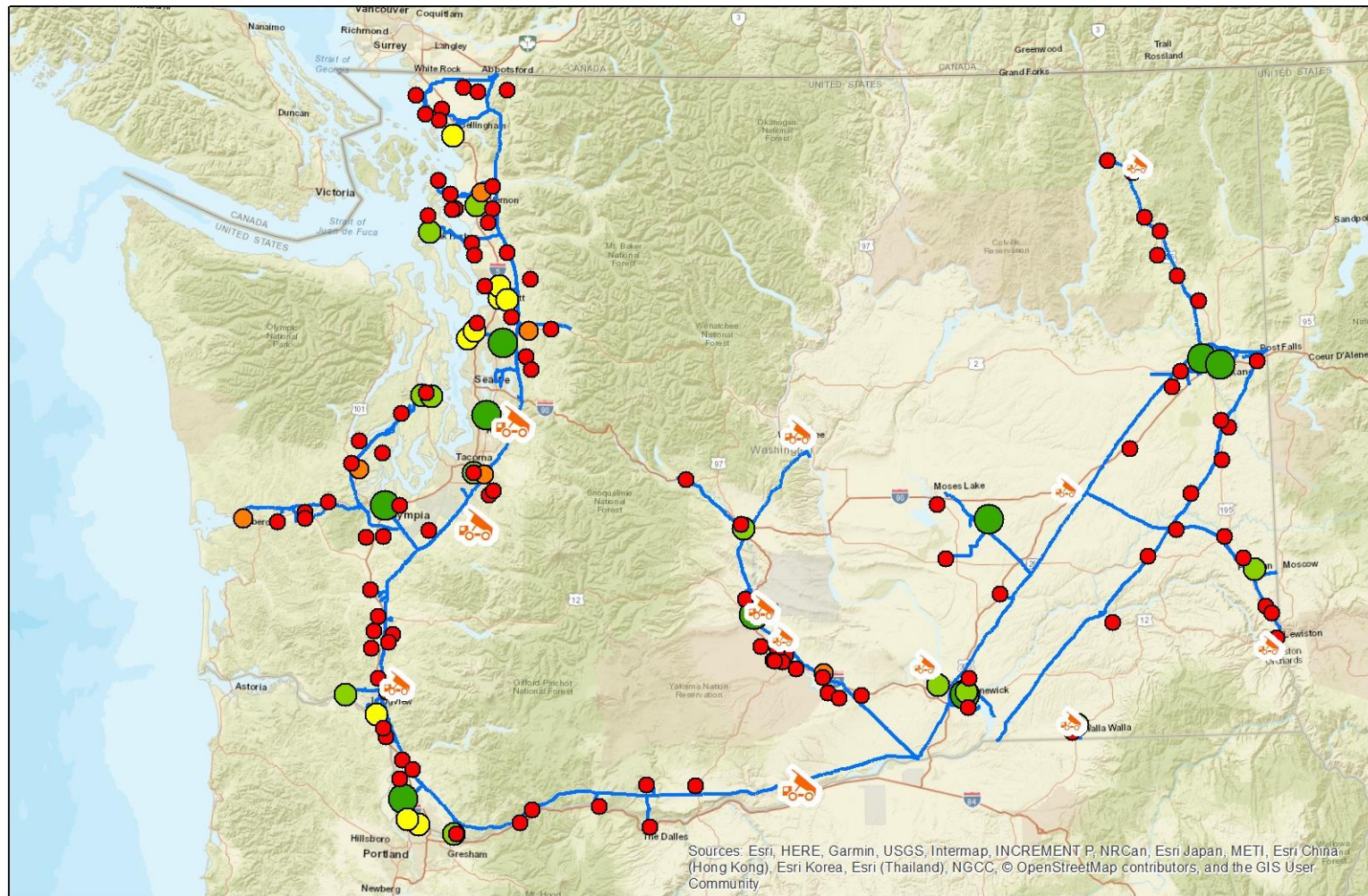
- Digester, >100 scfm and/or biogas capture
- Digester, 30-100 scfm

- No digester, >30 scfm
- Digester, 10-30 scfm
- Others



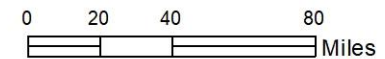
Source: Washington State Energy Office

...add open landfills...



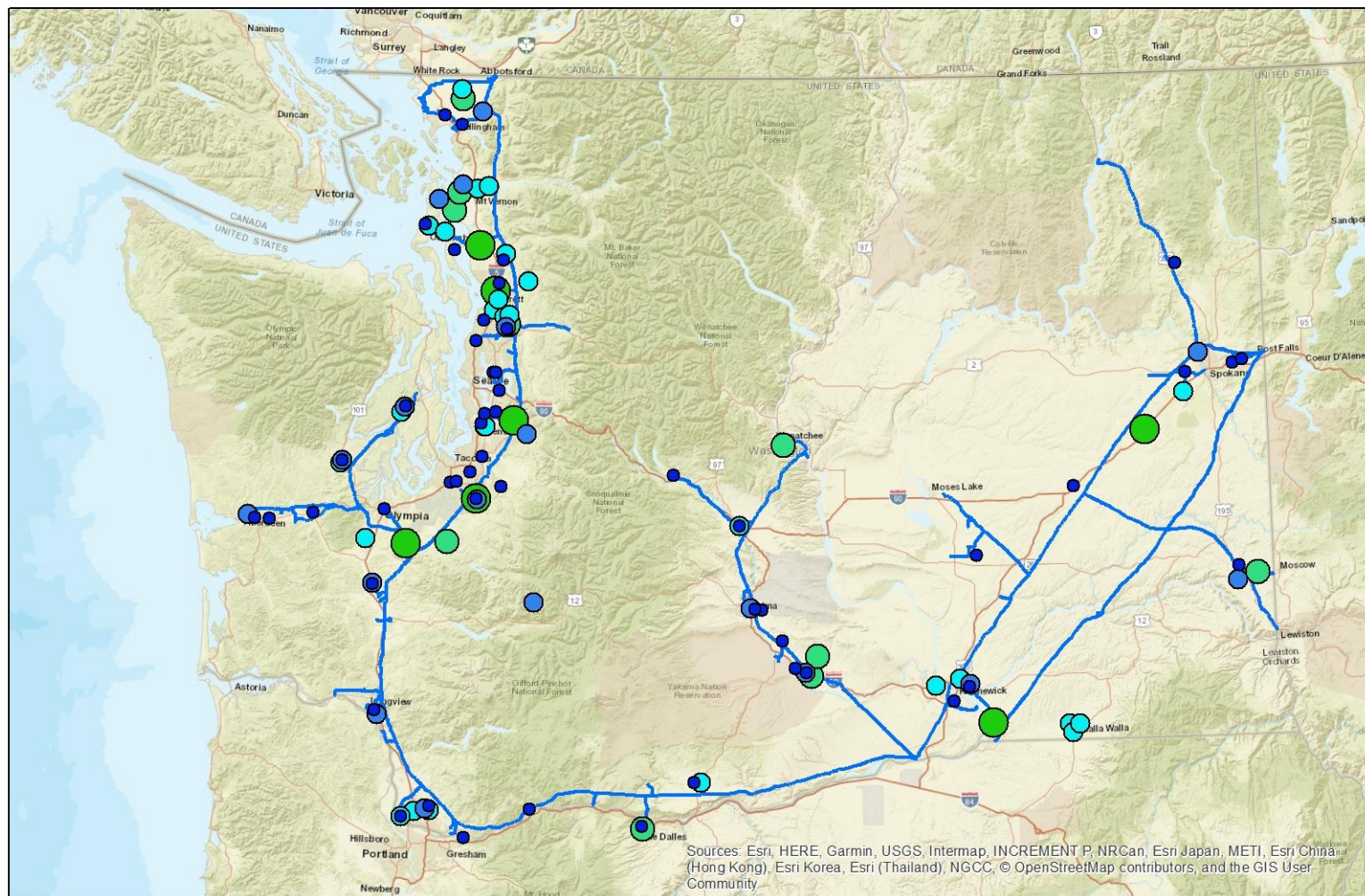
Open Landfills

-  >300 scfm
-  >1,000 scfm
-  <300 scfm



Source: Washington State Energy Office

...and composters, other public infrastructure



Other Infrastructure



Compost (>50k tons/yr)



Compost (>10k tons/yr)



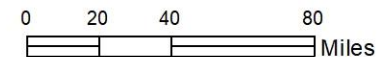
Compost (<10k tons/yr)



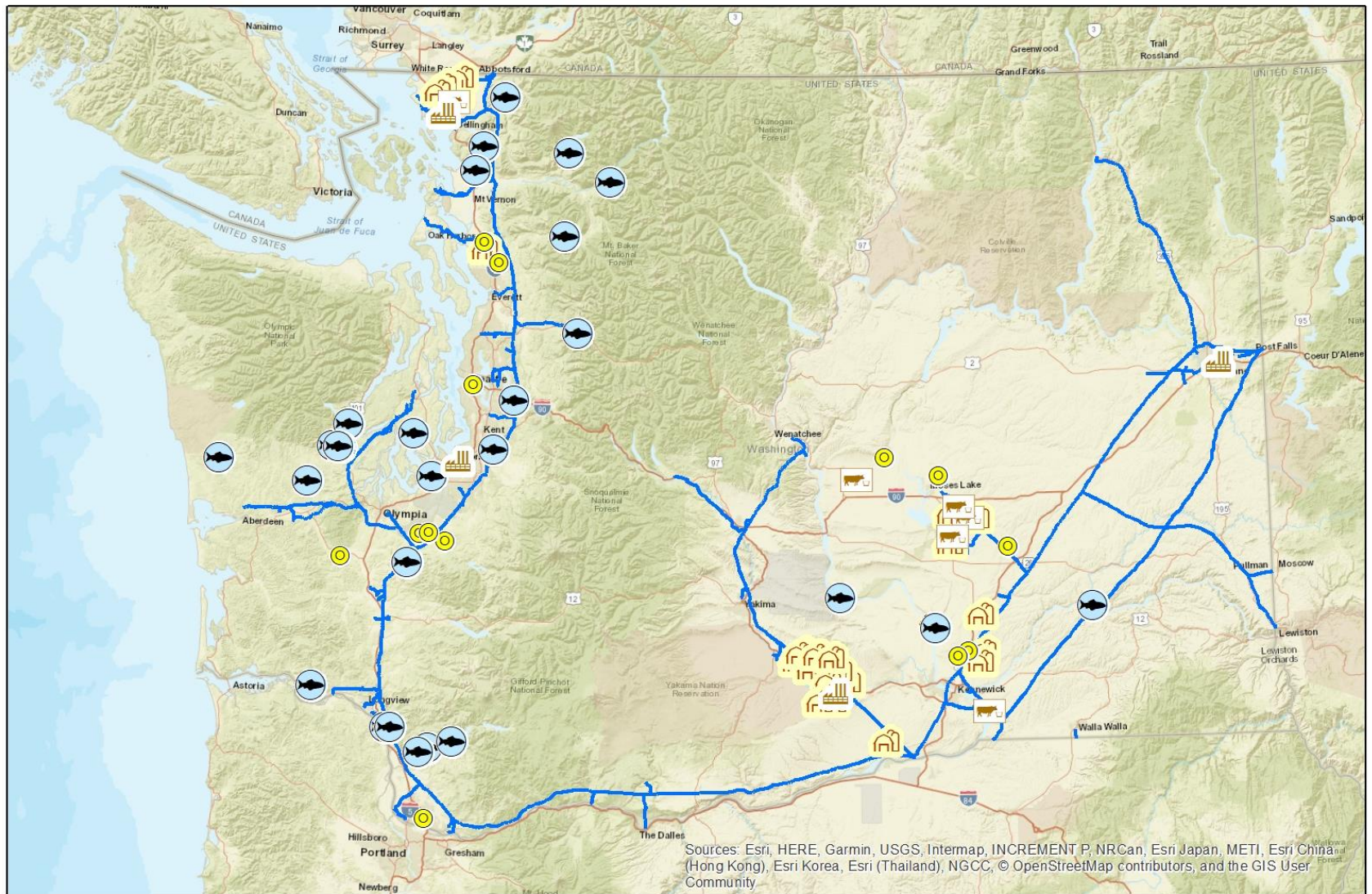
Closed Landfill



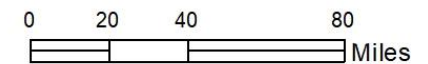
Transfer Station



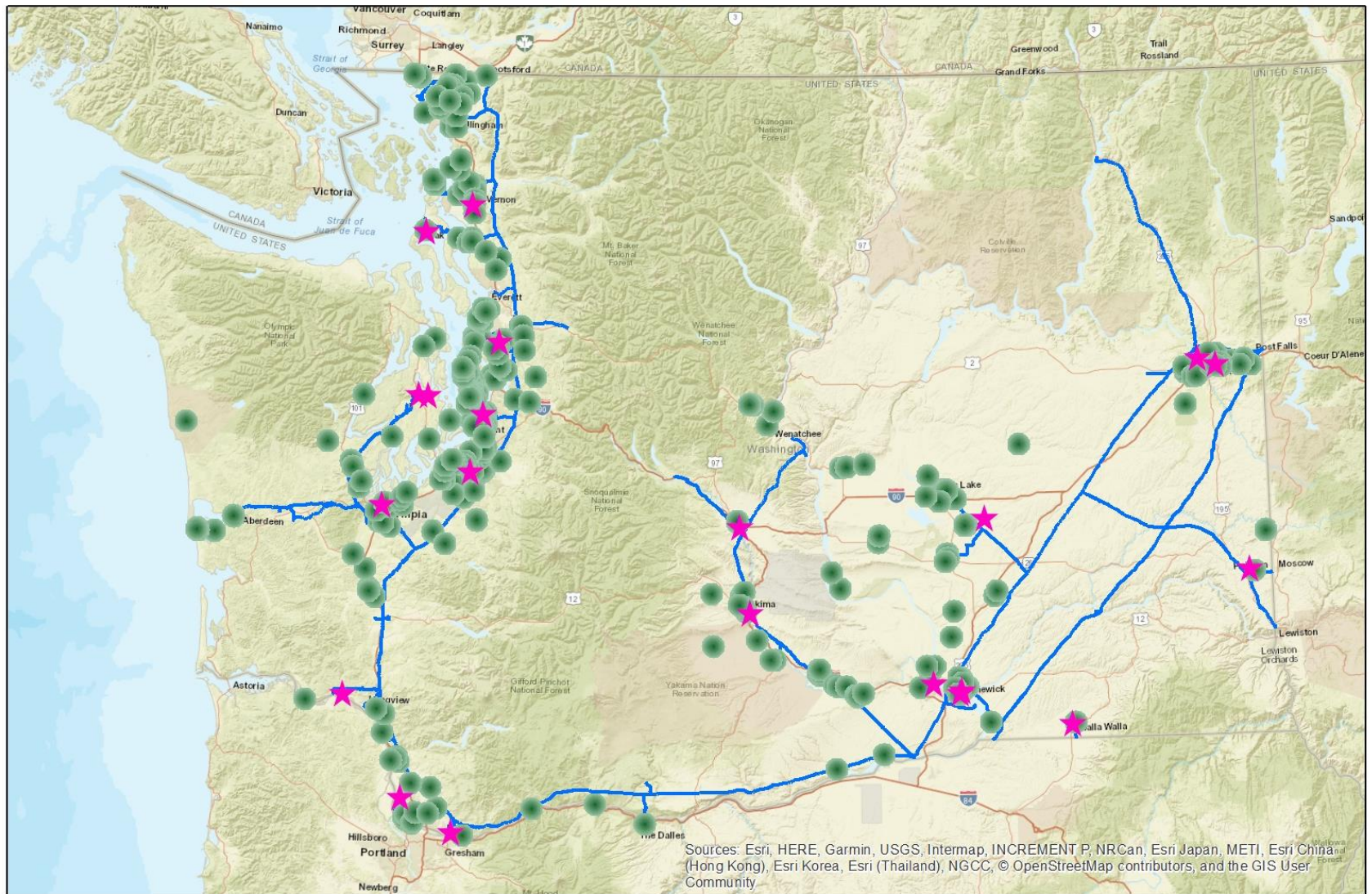
Source: Washington State Energy Office



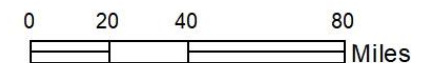
High Volume Animal Waste



Source: Washington State Energy Office



**High Volume/Value Food Processors
(relative to wastewater treatment with AD)**



Source: Washington State Energy Office

2018 Roadmap: RNG Potential

Current (Cedar Hills LF, Roosevelt LF, South WWTP): 1.3%

- All currently “wheeled” into California CNG transportation market

Near-Term (~5 years, ~\$680 million CAPEX): 1.8%

- One LF, two WWTPs, and eight dairies generating power converted to RNG
- Three landfills in Chelan, Cowlitz and Yakima counties
- Nine WWTPs w/digesters in Benton, Clark, Grant, King, Snohomish, Spokane and Yakima counties
- 19 additional dairies statewide (primarily Yakima, Grant/Adams and Whatcom counties)
- 50% of post-consumer organic wastes in King, Snohomish and Pierce counties

Medium-Term (5-10 yrs): 1.9%

- Five landfills in Asotin, Benton, Grant, Yakima and Walla Walla counties
- 27 WWTPs, nine of them (including Post Point) upgraded with digesters
- ~200 dairies with adequate biogas potential
- Balance of post-consumer organic wastes from central Puget Sound, plus food waste for next 14 counties with highest RNG potential
- Significant diversion of food processing residuals, AD added to composters



New Initiatives

- **Natural Gas Conservation Standard:** Gas utilities identify and acquire all available and cost-effective measures; UTC to establish targets by 2022
- **RNG Programs:** Utilities may propose RNG program for compliance, must offer voluntary RNG service
- **Low-Carbon Fuel Standard:** State vs Puget Sound
- **Public Preferential Purchasing:** RNG and nutrients
- **State-level Pipeline Standards:** UTC exploration
- **Clean Energy Fund:** \$1m Dairy Digester Grants
- **Food Waste Reduction Plan:** 2020





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