

Preliminary results of population distribution,
genetic structure and diversity of Coastal
Cutthroat (*Oncorhynchus clarkii*) throughout
Washington and Oregon

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Acknowledgements

Folks that did the actual sample collections!

James Losee, Gabe Madel, Riley Freeman, and others (WDFW)

Jeremy Romer, Jeffrey Ziller, and others (ODFW)

Kyle Martens and others (WADNR)



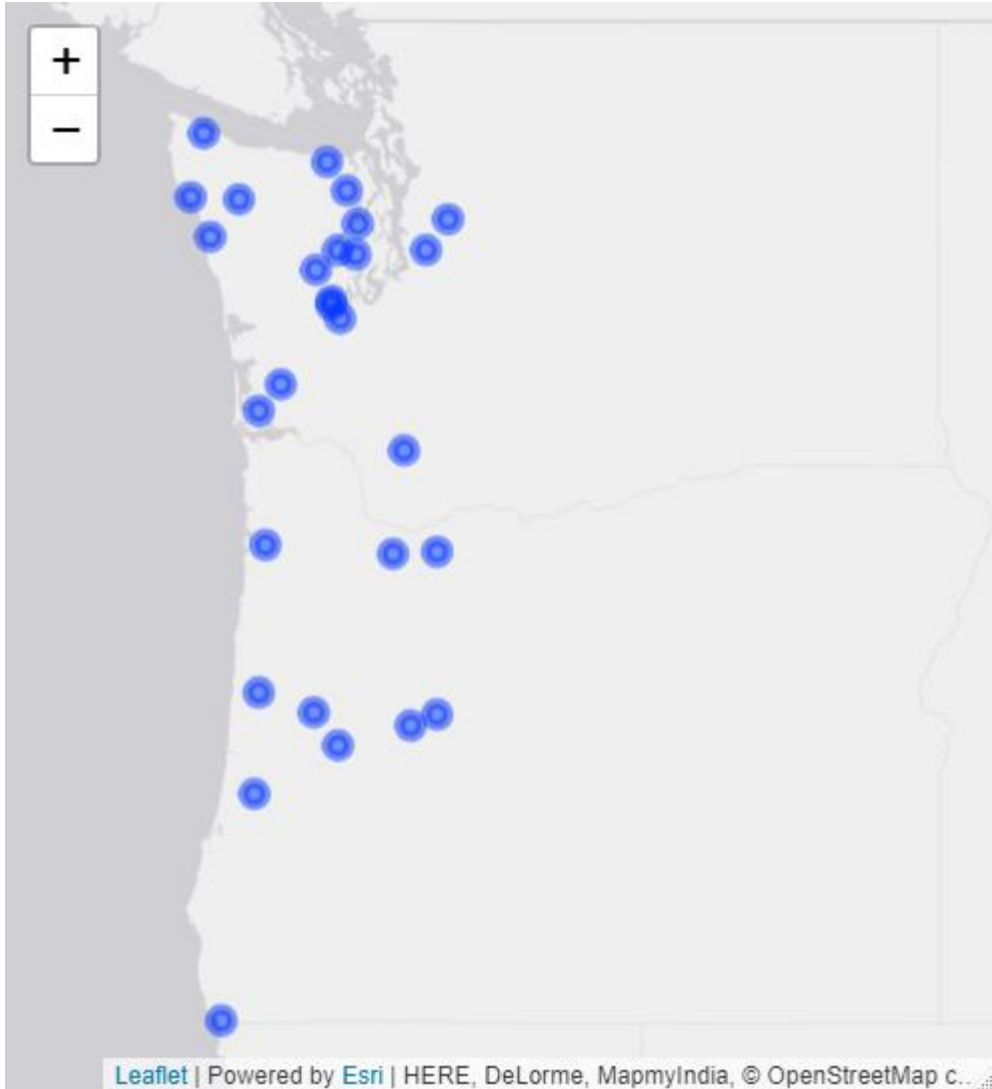
Lab Work

Funding

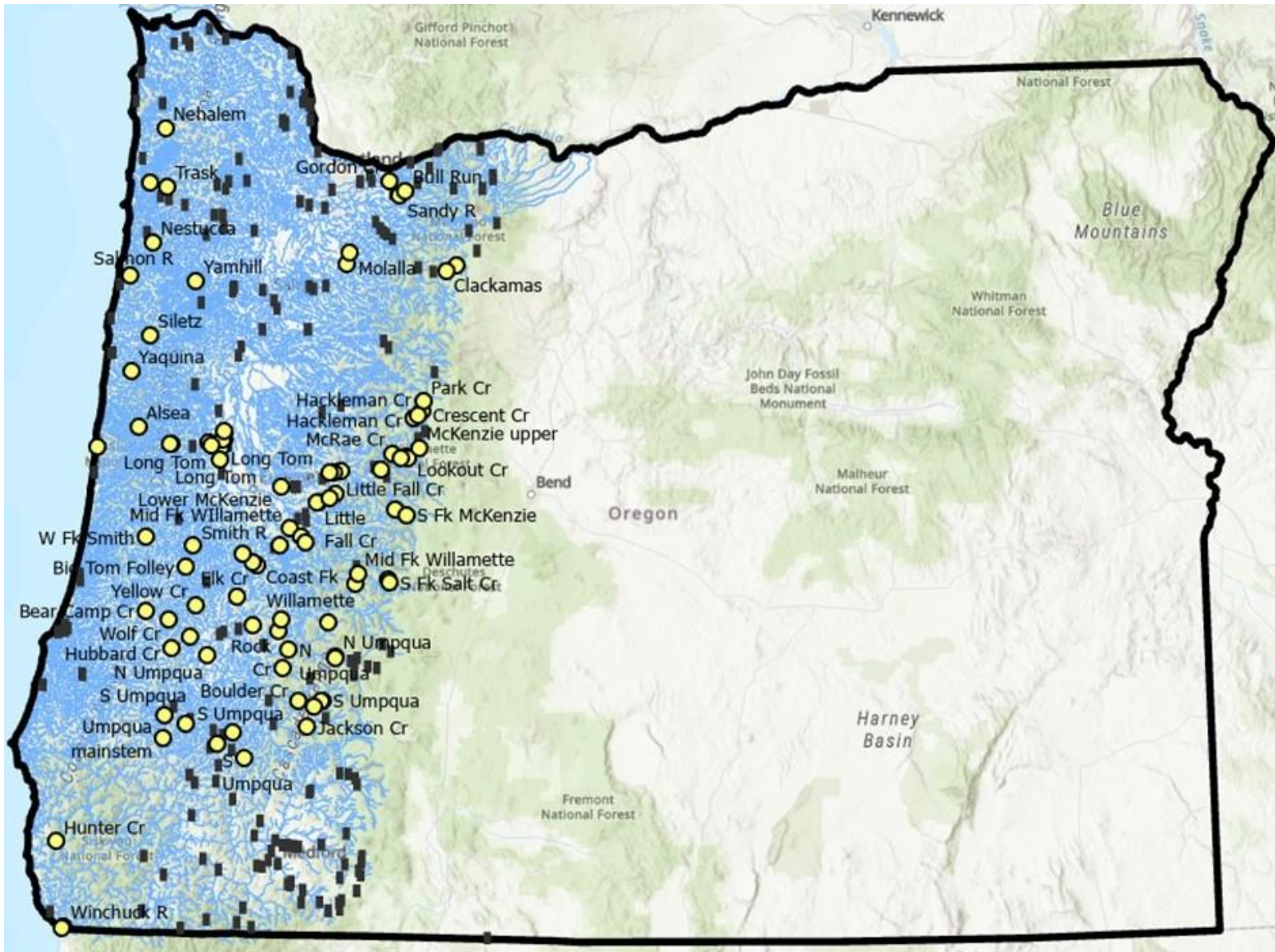
Sam Breaux, Lorne Curran (WDFW)

WA State General Fund

Populations



State	Region	Location
WA	North Puget Sound	Snoqualmie River
WA	Mid Puget Sound	Cedar River
WA	South Puget Sound	Kennedy Creek
WA	South Puget Sound	McLane Creek
WA	South Puget Sound	Skookum Creek
WA	East Hood Canal	Union River
WA	East Hood Canal	Dewatto River
WA	East Hood Canal	Big Beef Creek
WA	West Hood Canal	NF Skokomish River
WA	West Hood Canal	Little Quilcene River
WA	Strait of Juan de Fuca	Clallam River
WA	Strait of Juan de Fuca	Hoko River
WA	N WA Coast	Goodman Creek
WA	N WA Coast	SF Hoh River
WA	N WA Coast	Clearwater River
WA	SW WA Coast	Forks Creek
WA	SW WA Coast	Naselle River
WA	LowerColumbia	Kalama River
OR	NorthernCoast	Trask River
OR	MidCoast	Alsea River
OR	SouthernCoast	Umpqua River
OR	SouthernCoast	Winchuck River
OR	LowerColumbia	Sandy River
OR	LowerWillamette	Clackamas River
OR	UpperWill_MF	MF Willamette River
OR	UpperWill_LTR	Long Tom River
OR	UpperWill_SFMcKenzie	SF McKenzie River
OR	UpperWill_UpperMcKenzie	Upper McKenzie River



Blue = coastal cutthroat distribution

Yellow dots = sampling sites

Black rectangles = substantial dams

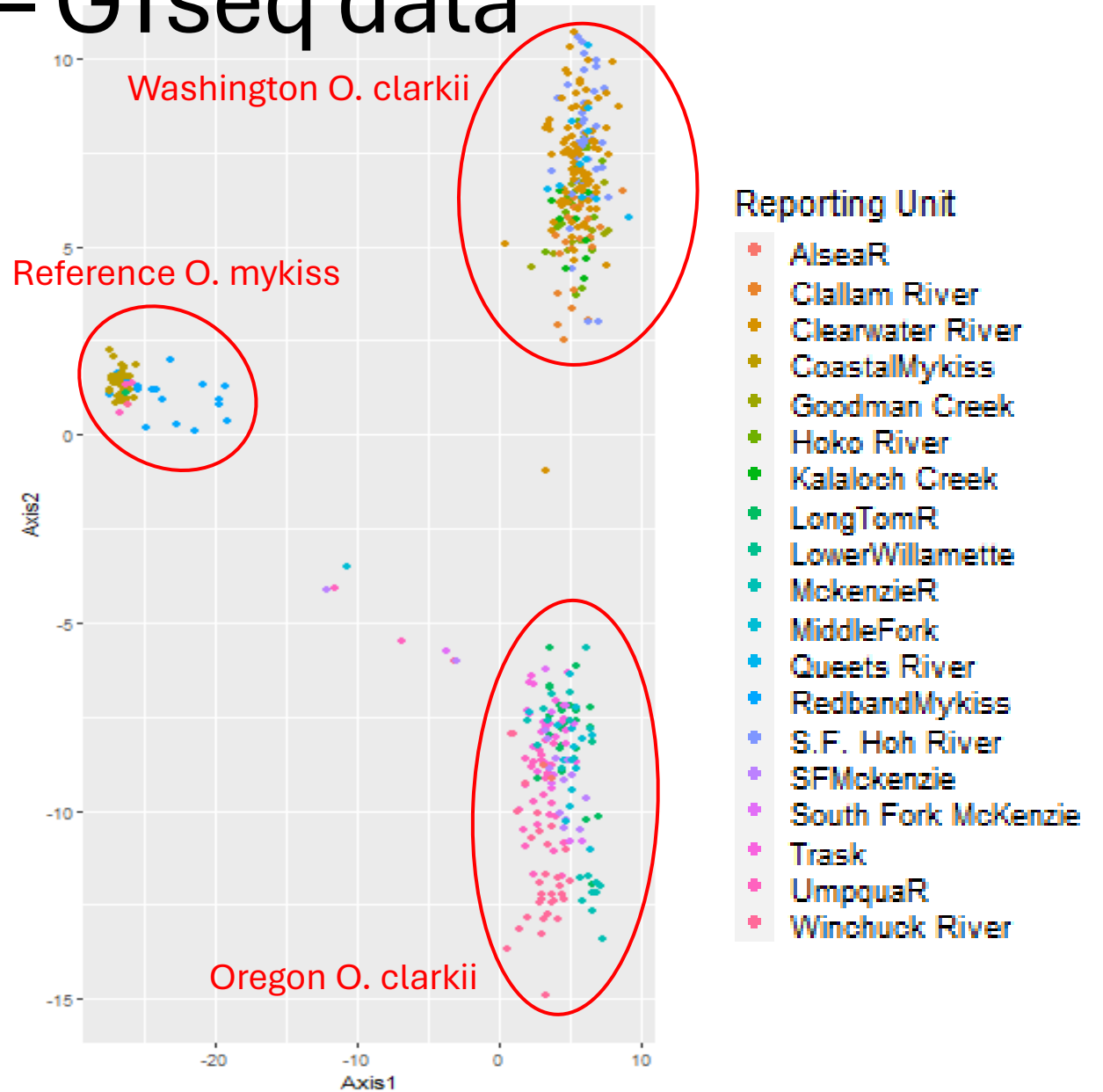
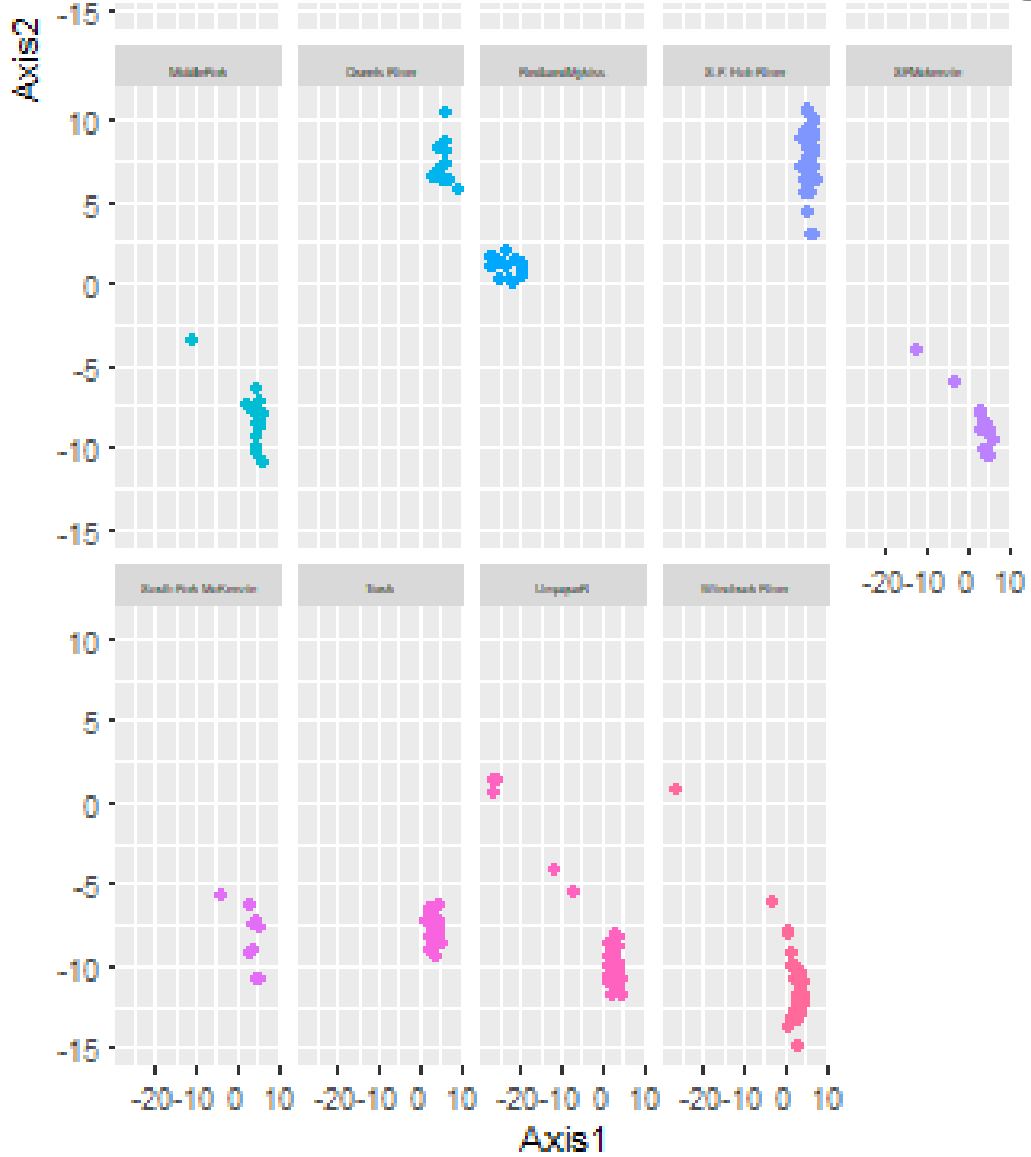
RAD Filtering Process

1. Screened for non-target species and hybridization
2. 6 RAD libraries (570 samples, 1,768,781 SNPs)
3. Removed loci $>50\%$ missing data
4. Removed samples $>20\%$ missing data
5. Removed loci $>10\%$ missing data
5. Retained loci $MAF \geq 0.05$
6. Removed paralogs
7. Examined R1 vs. R2 quality

Retained 445 samples and 70,602 SNPs

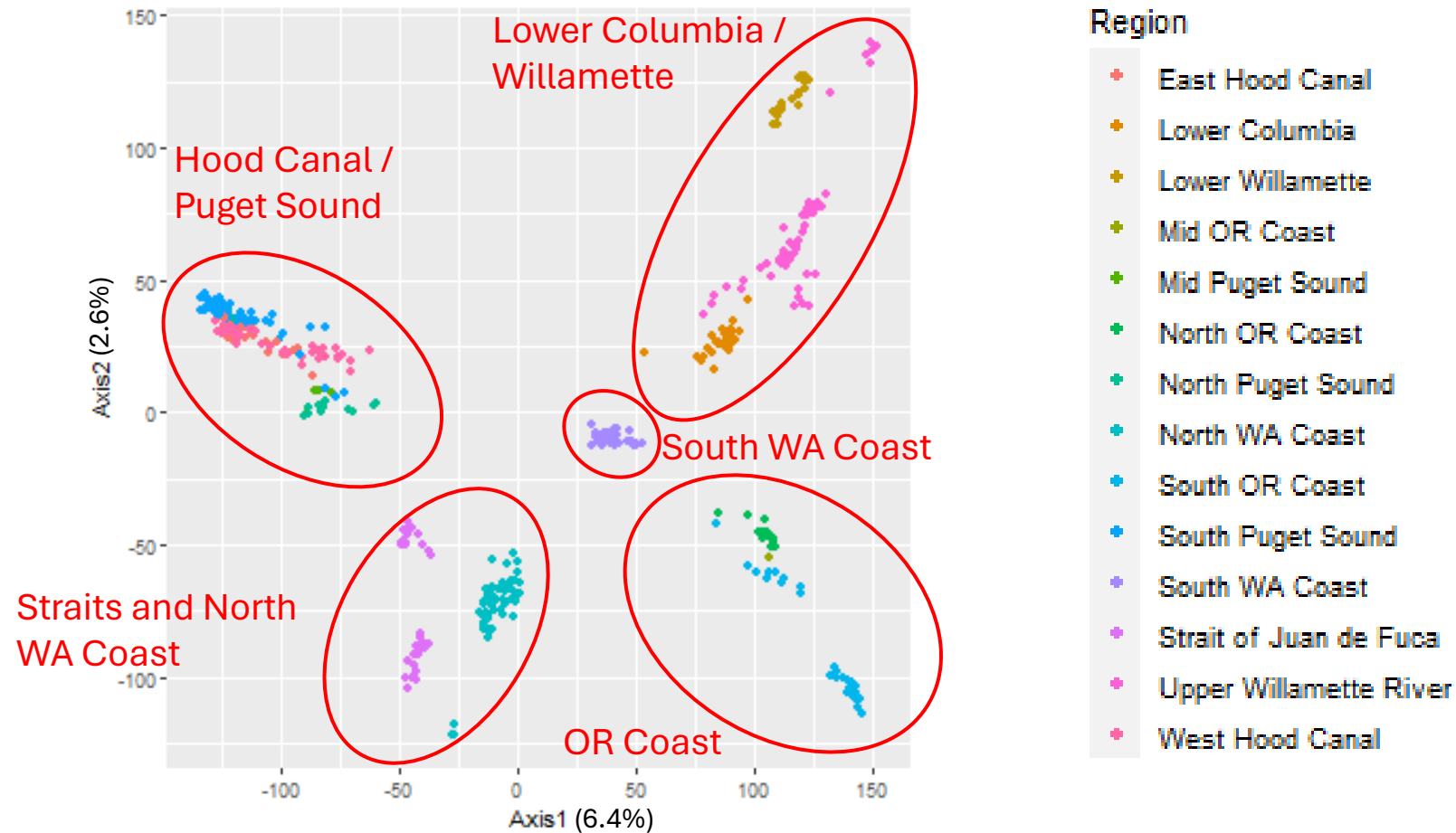


Species ID Screening – GTseq data

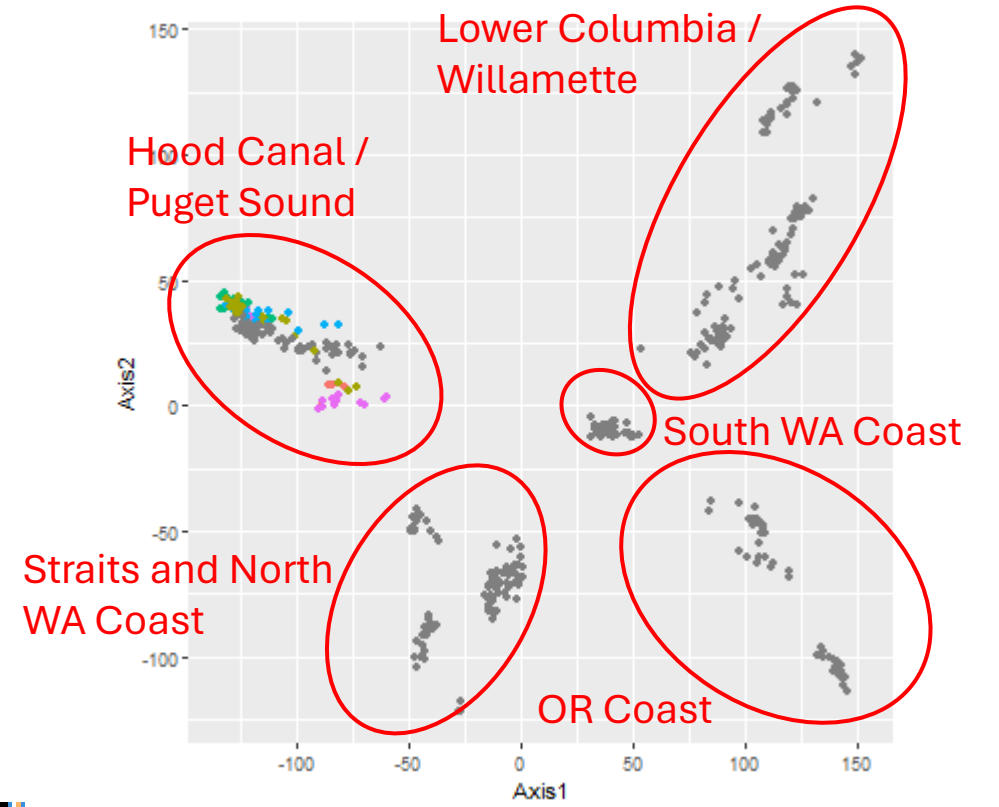
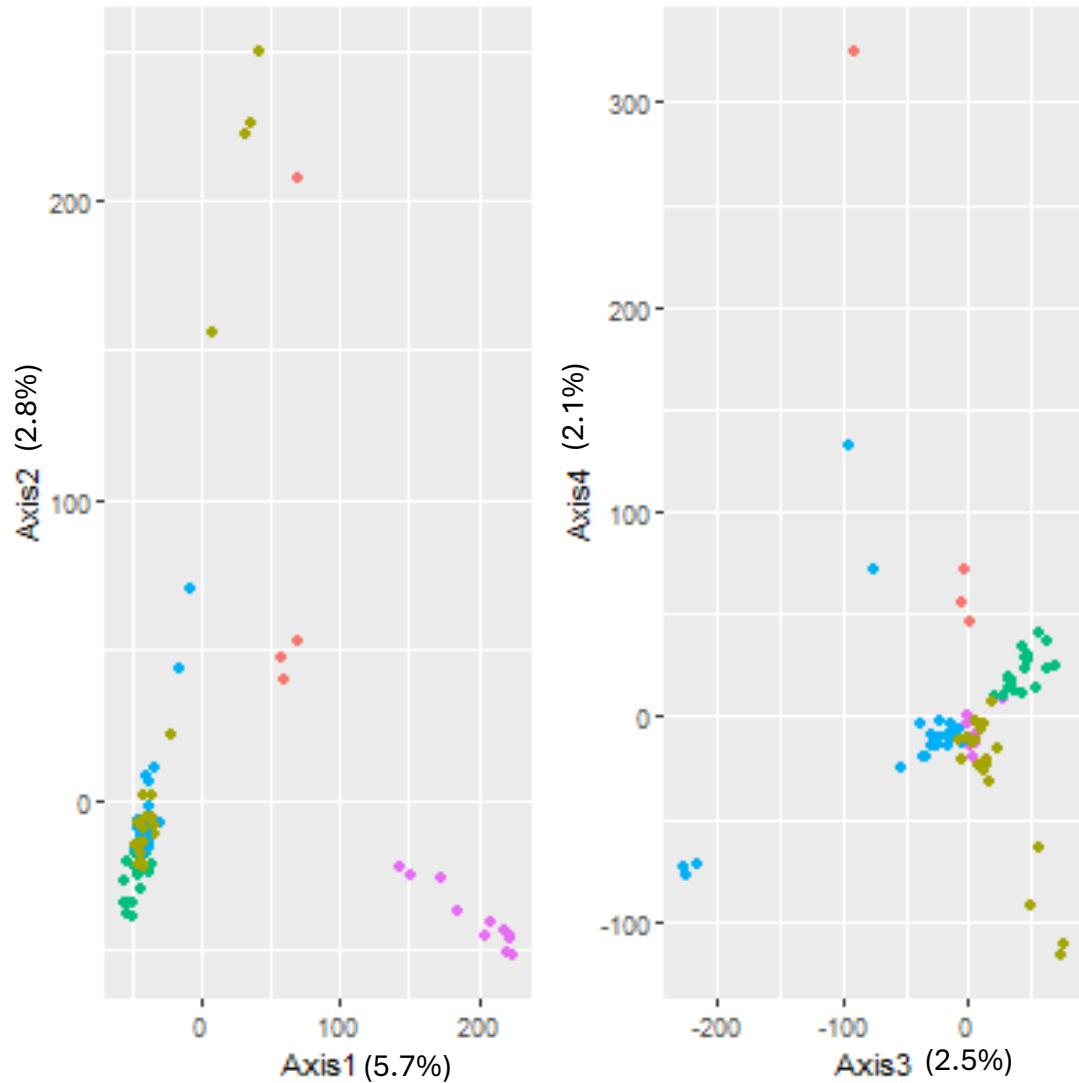


Overall Population Structure – RAD data

452 samples, ~ 70,000 SNPs



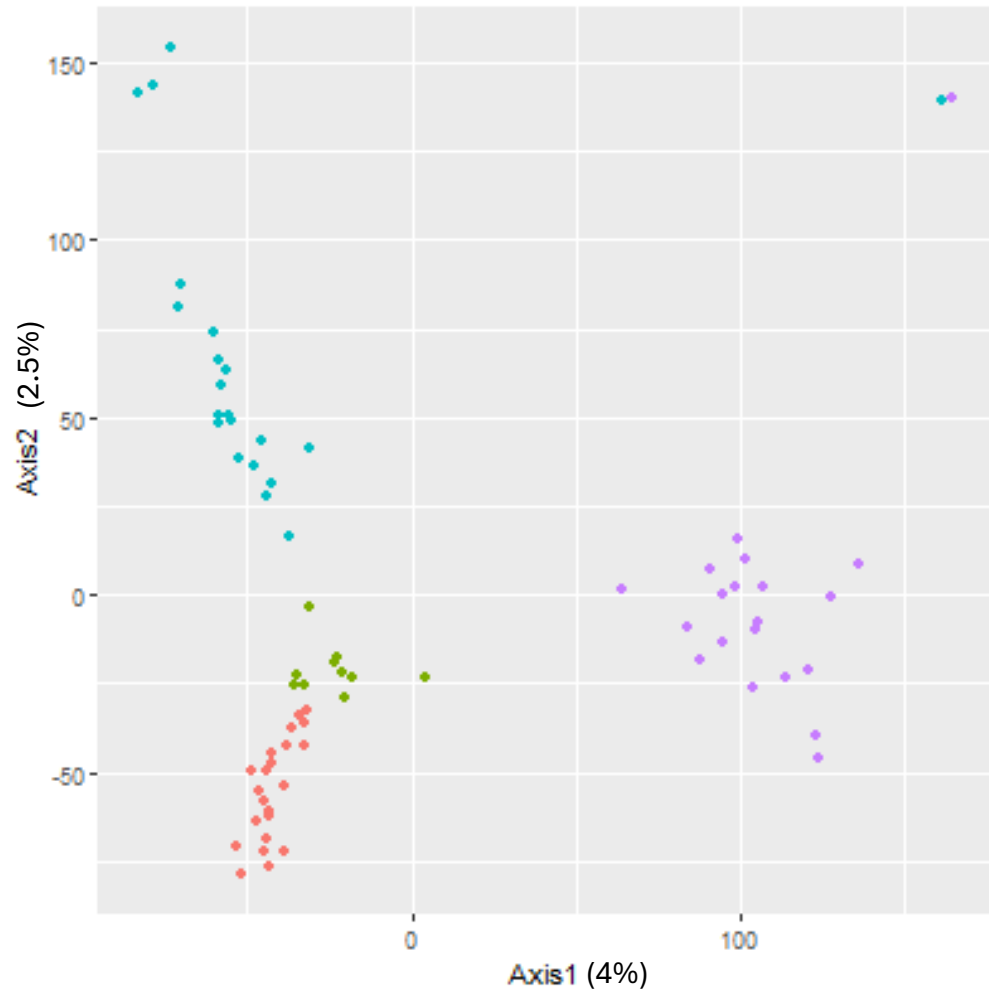
Puget Sound



Location

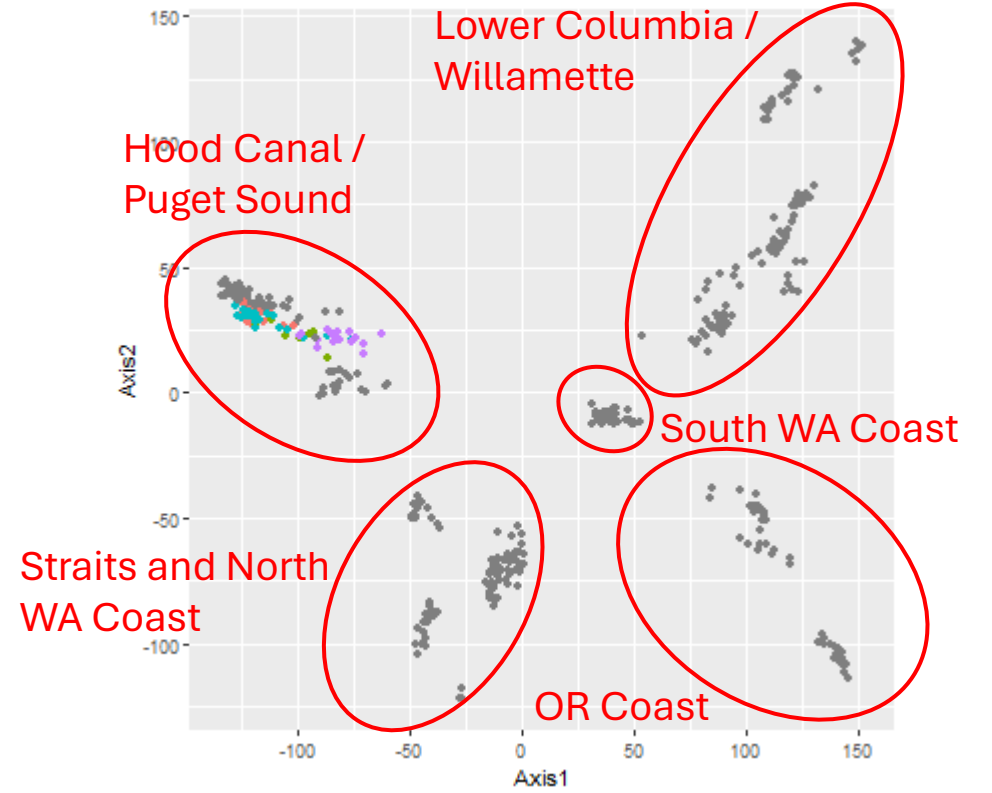
- Cedar River
- Kennedy Creek
- McLane Creek
- Skookum Creek
- Snoqualmie River

Hood Canal

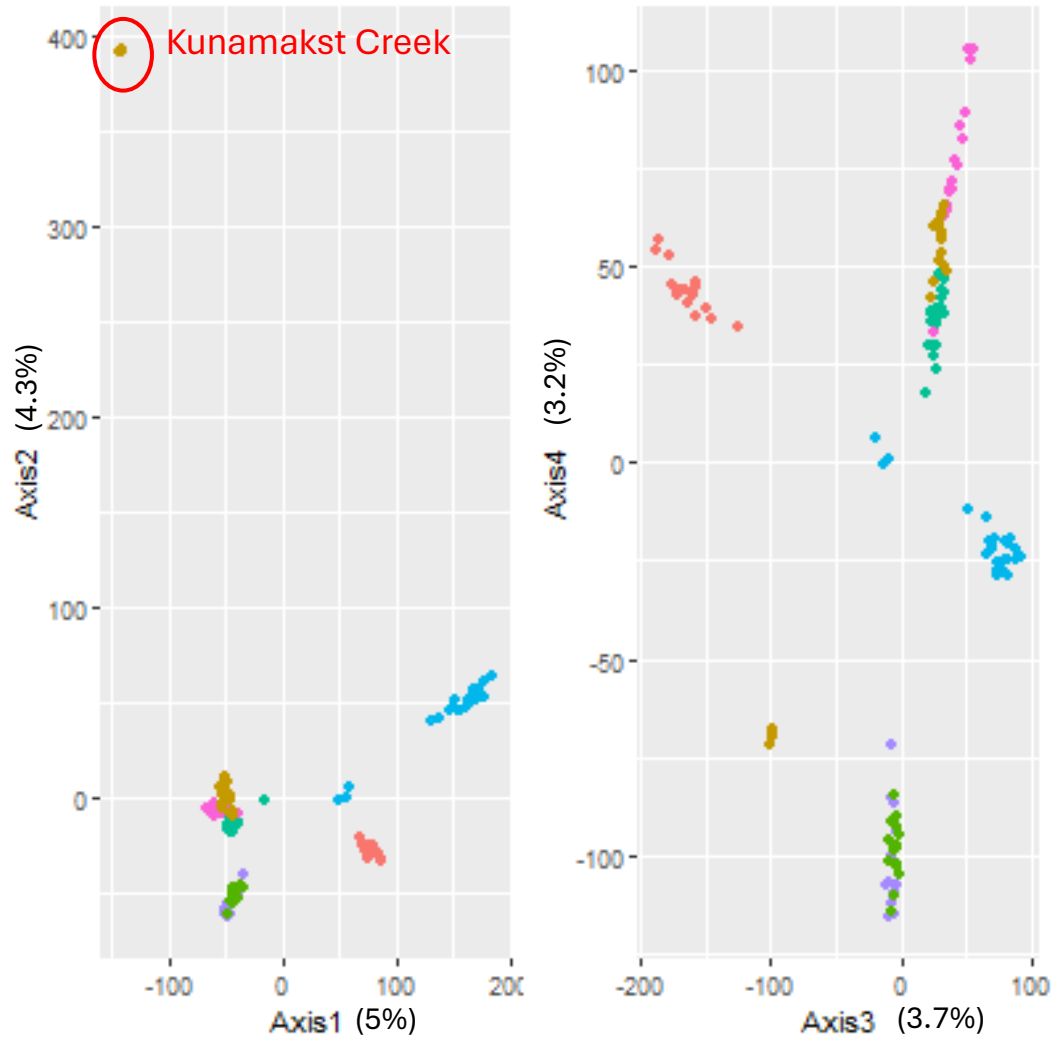


Location

- Big Beef Creek
- Dewatto River
- Little Quilcena River
- NF Skokomish River

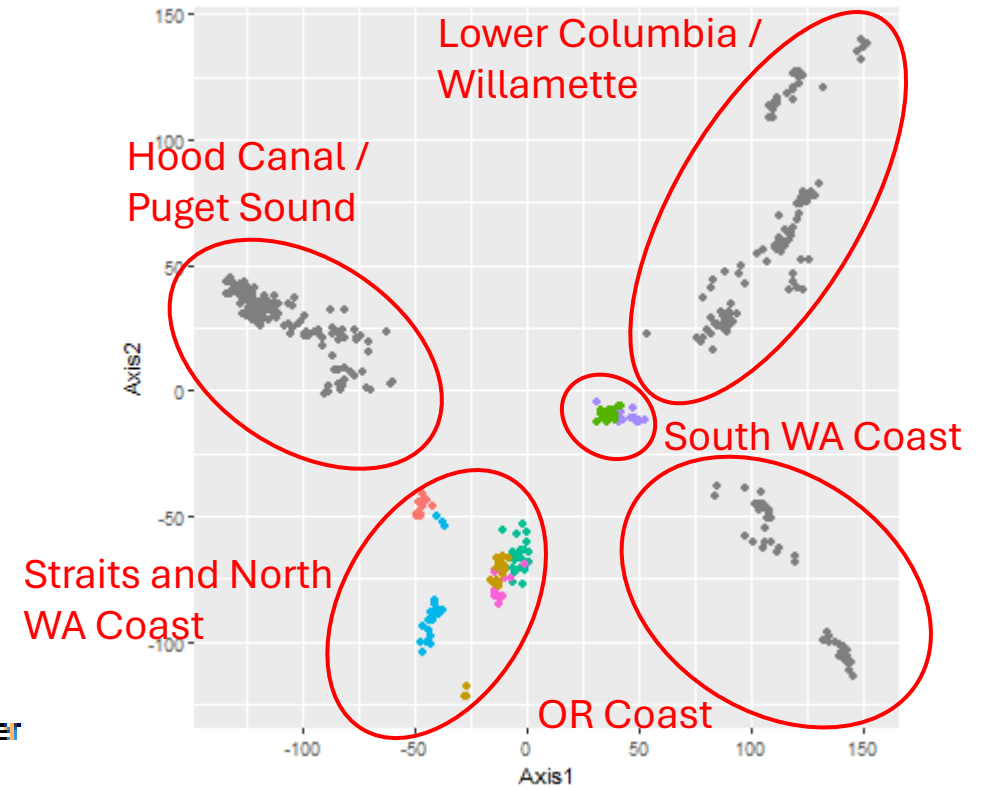


Strait of Juan de Fuca and WA Coast



Location

- Clallam River
- Clearwater River
- Forks Creek
- Goodman Creek
- Hoko River
- Naselle River
- SF Hoh River



Washington Coast

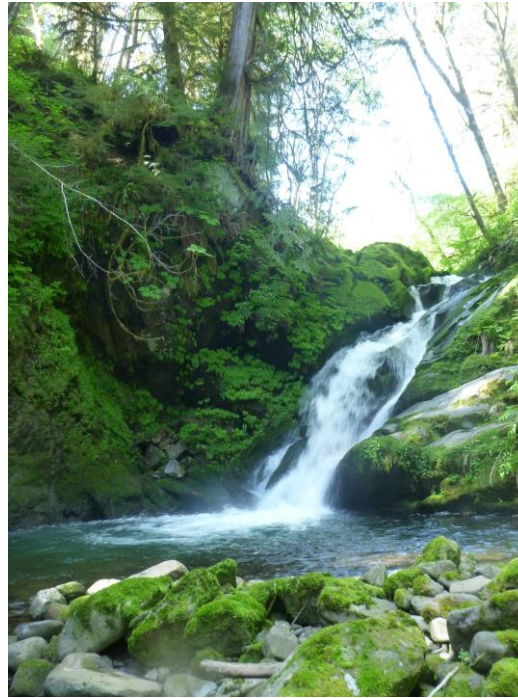
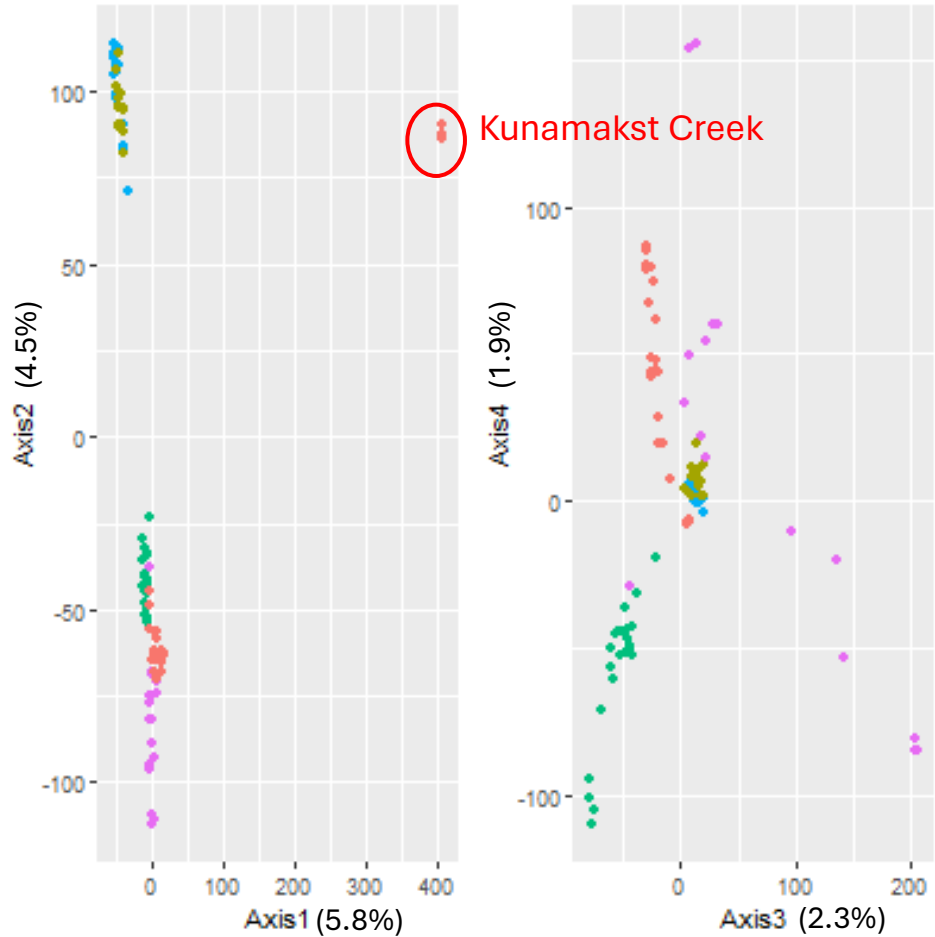
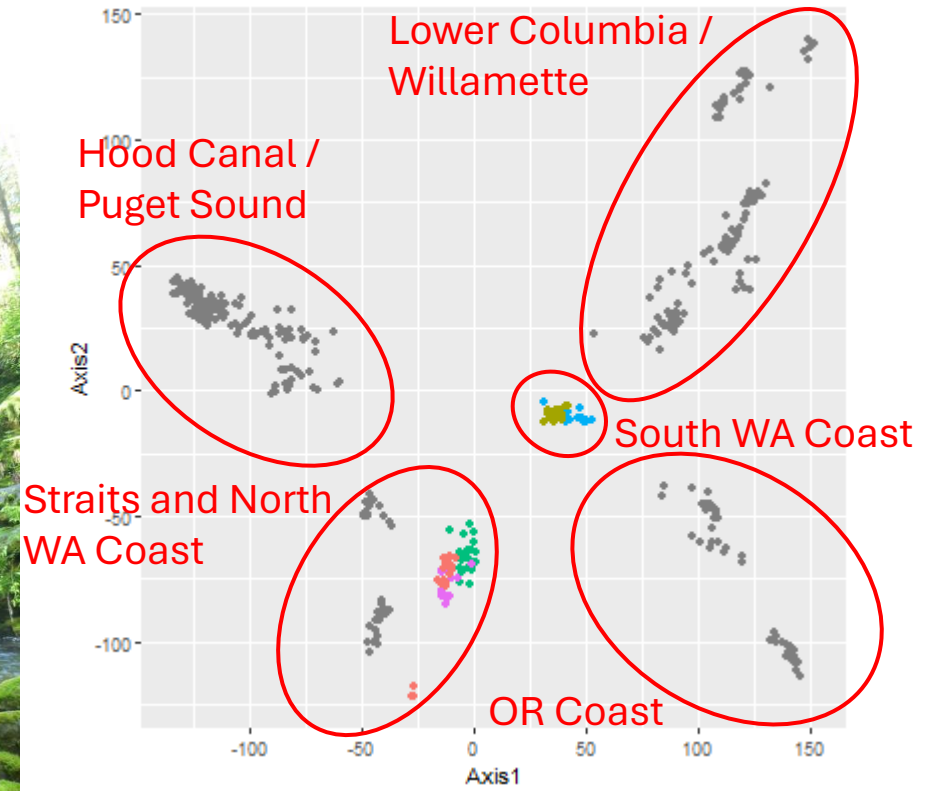


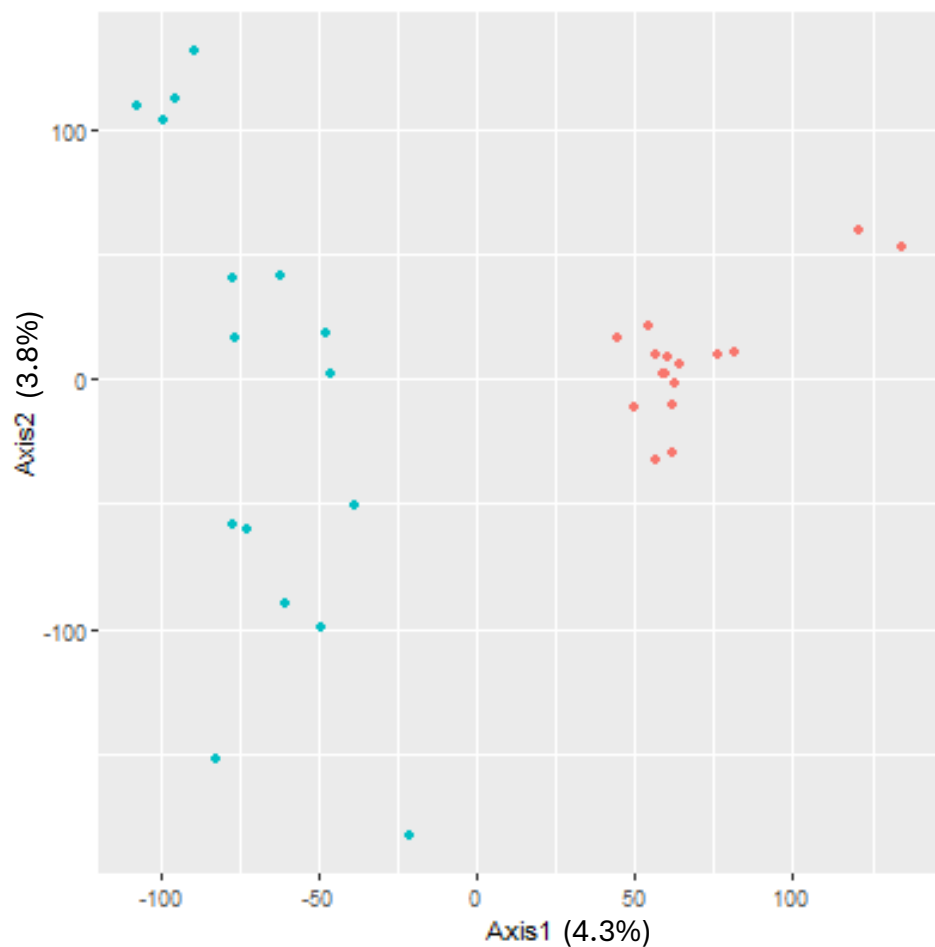
Photo credit: WADNR

Location

- ◆ Clearwater River
- ◆ Forks Creek
- ◆ Goodman Creek
- ◆ Naselle River
- ◆ SF Hoh River

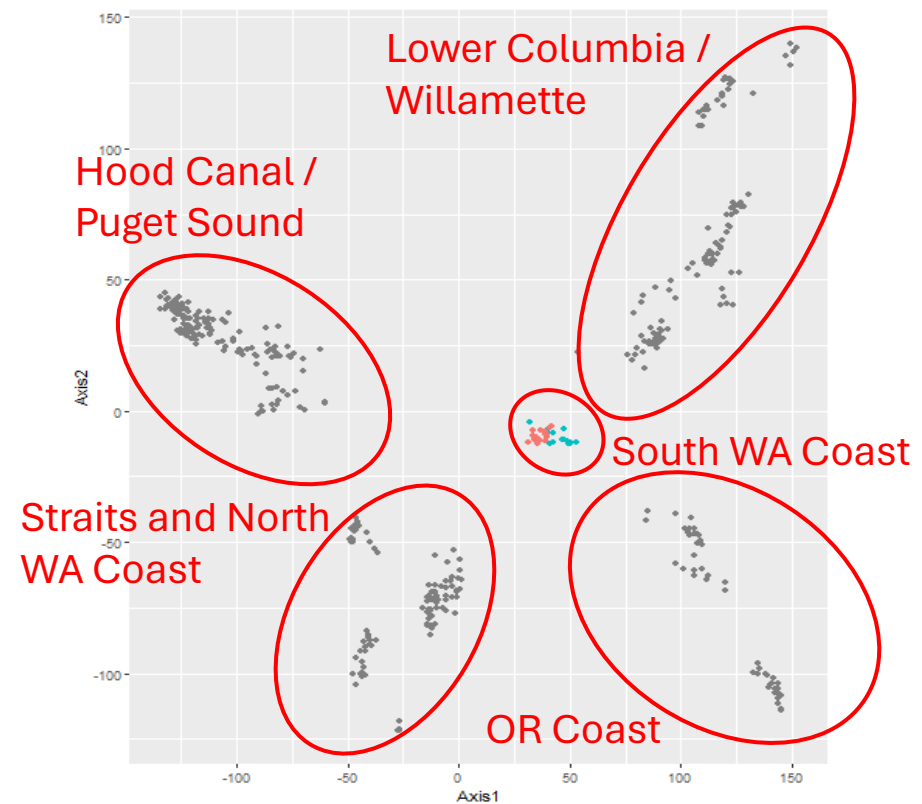


South Washington Coast

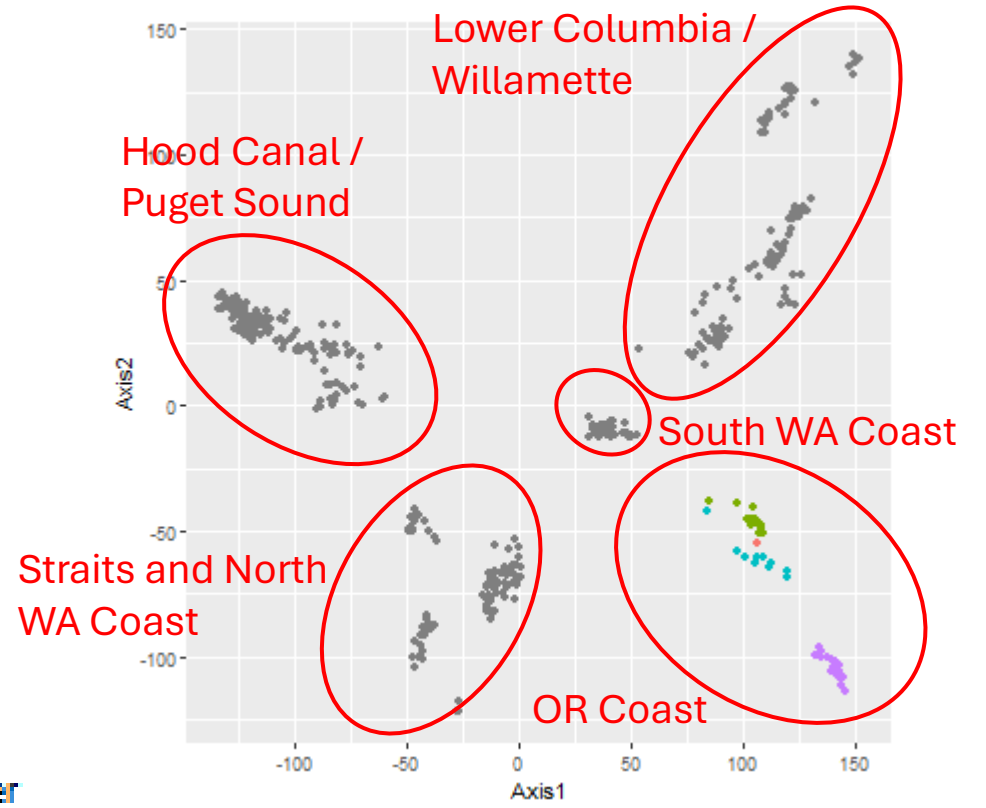


Location

- Forks Creek
- Naselle River



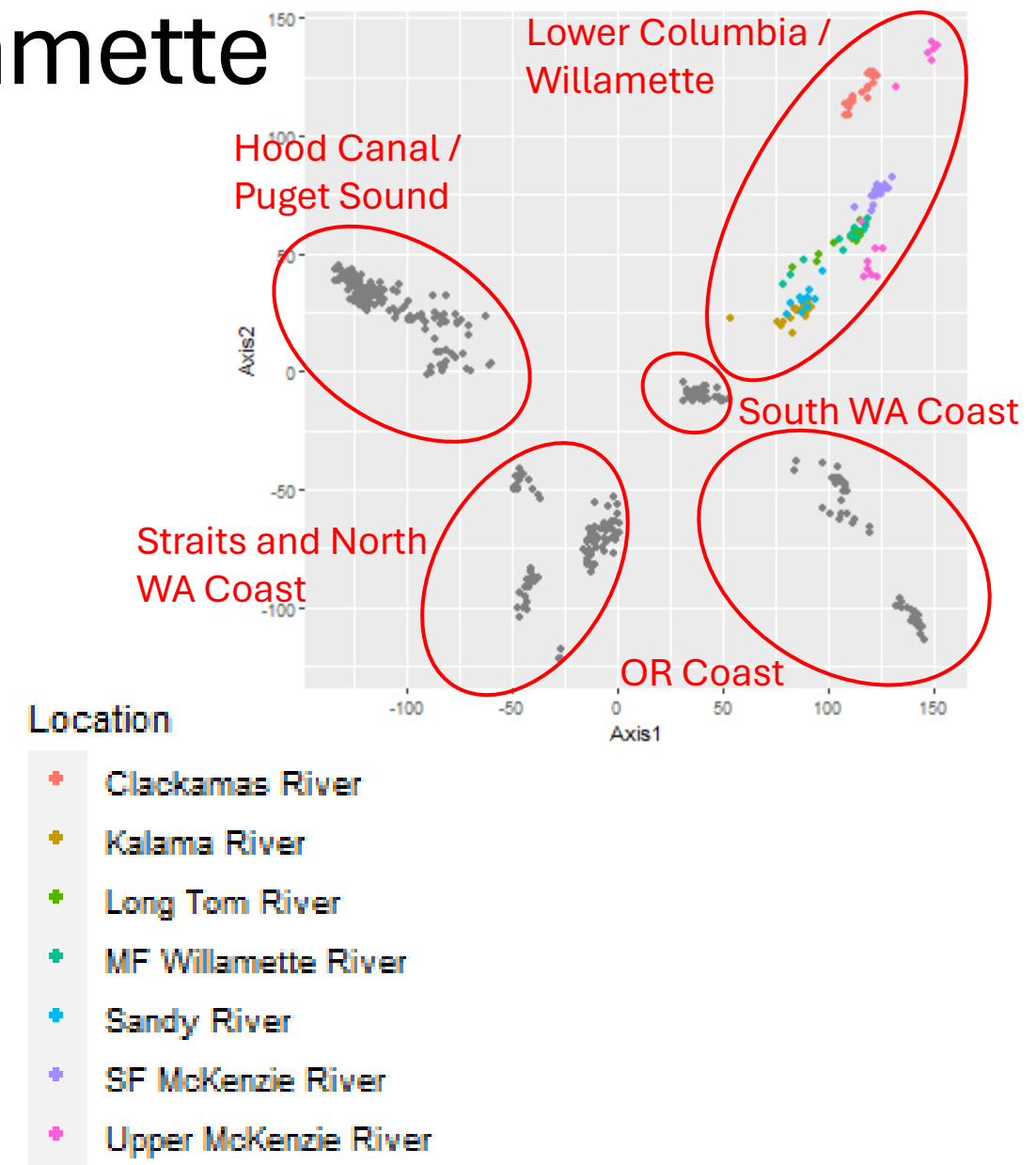
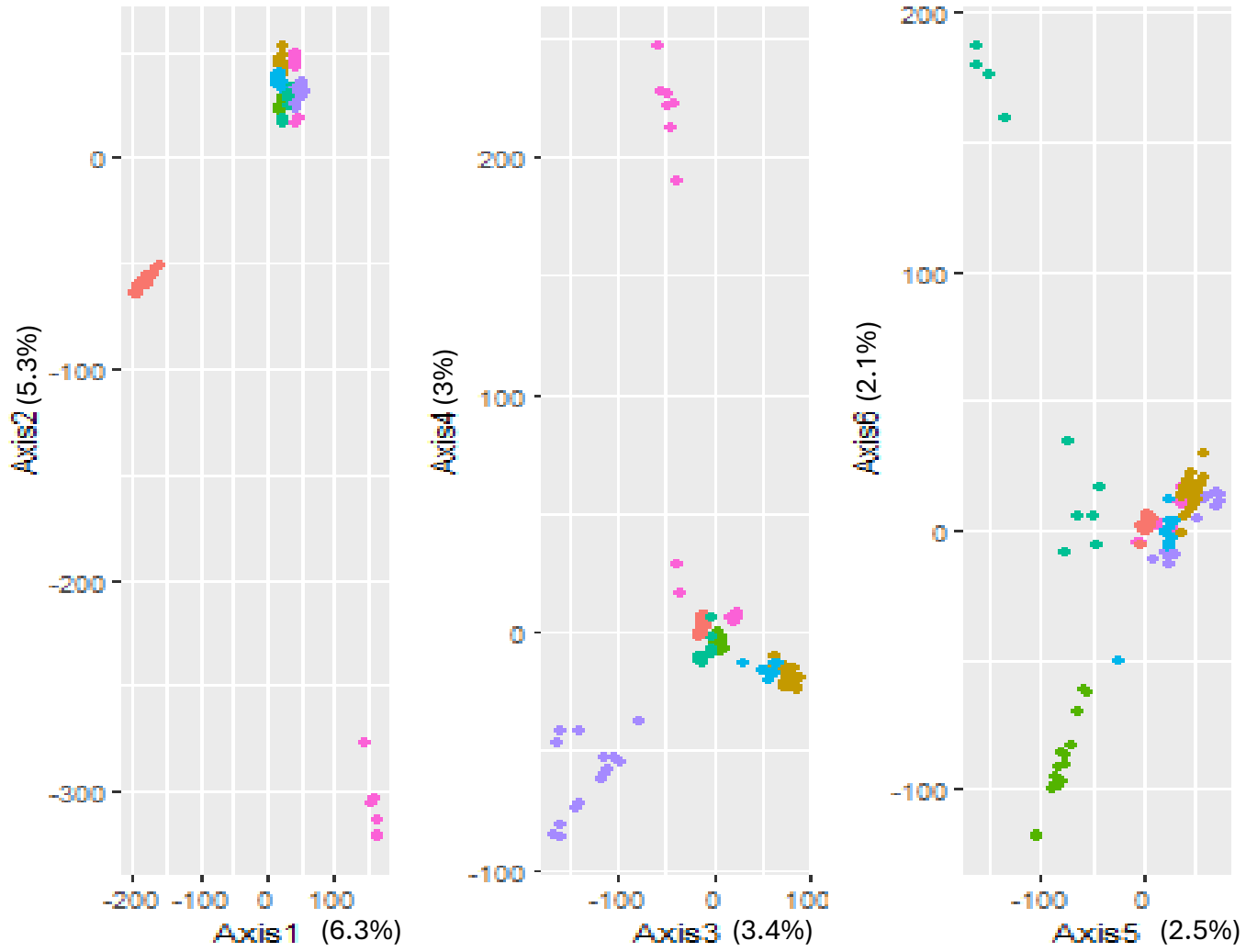
Oregon Coast



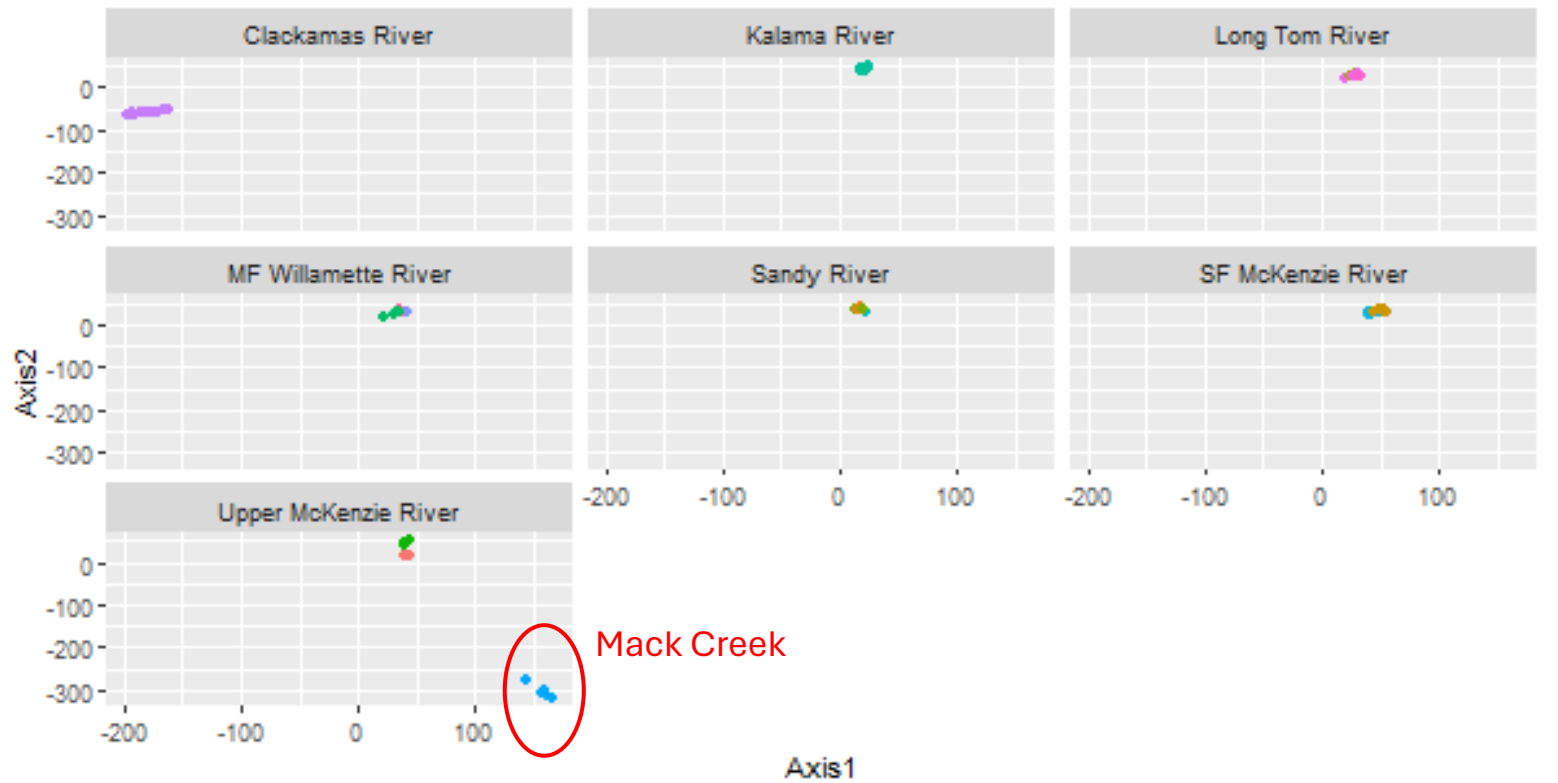
Location

- Alsea River
- Trask River
- Umpqua River
- Winchuck River

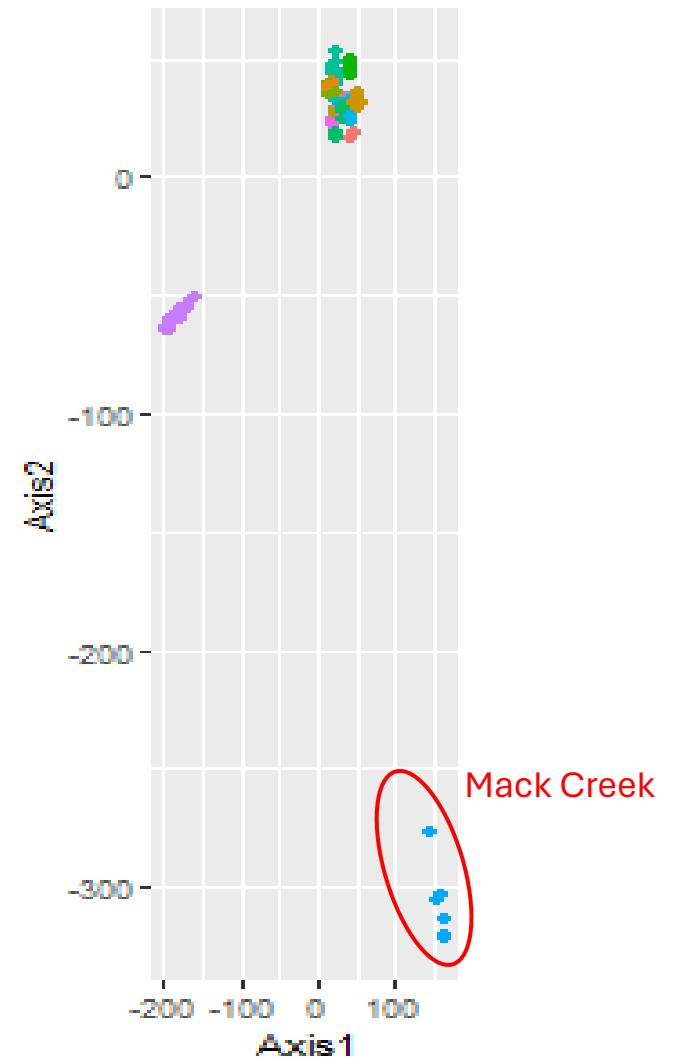
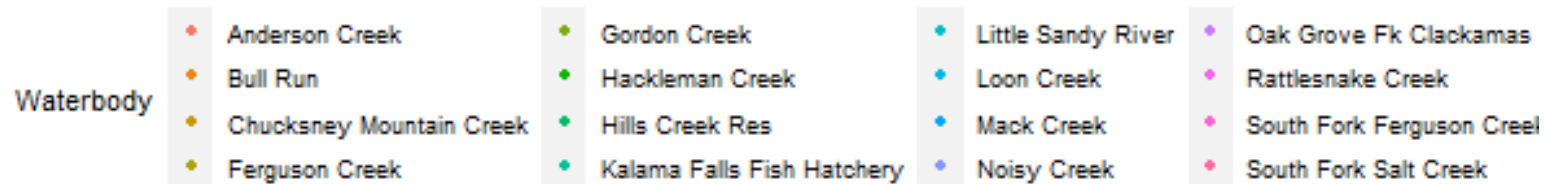
Lower Columbia and Willamette



Lower Columbia and Willamette

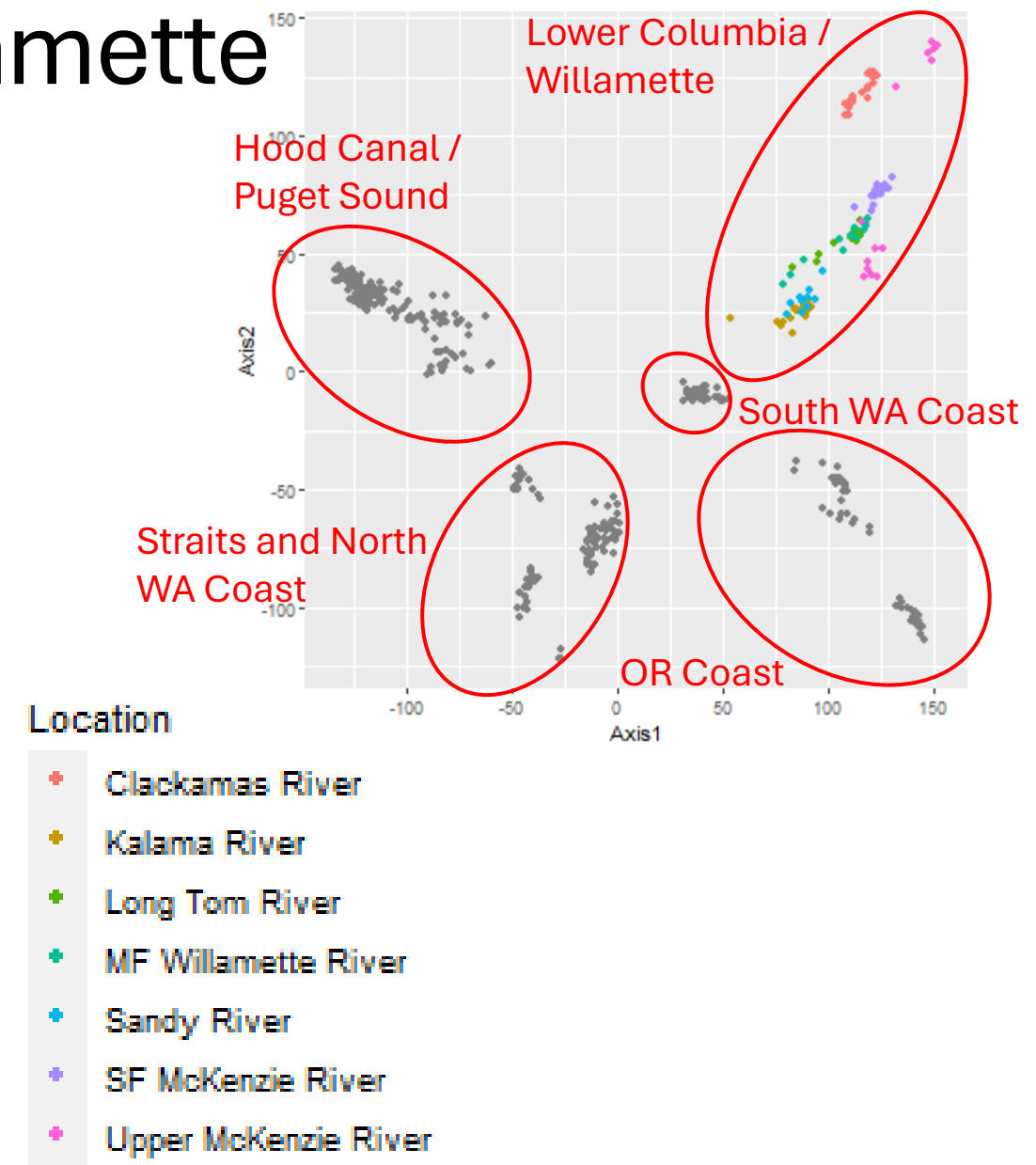
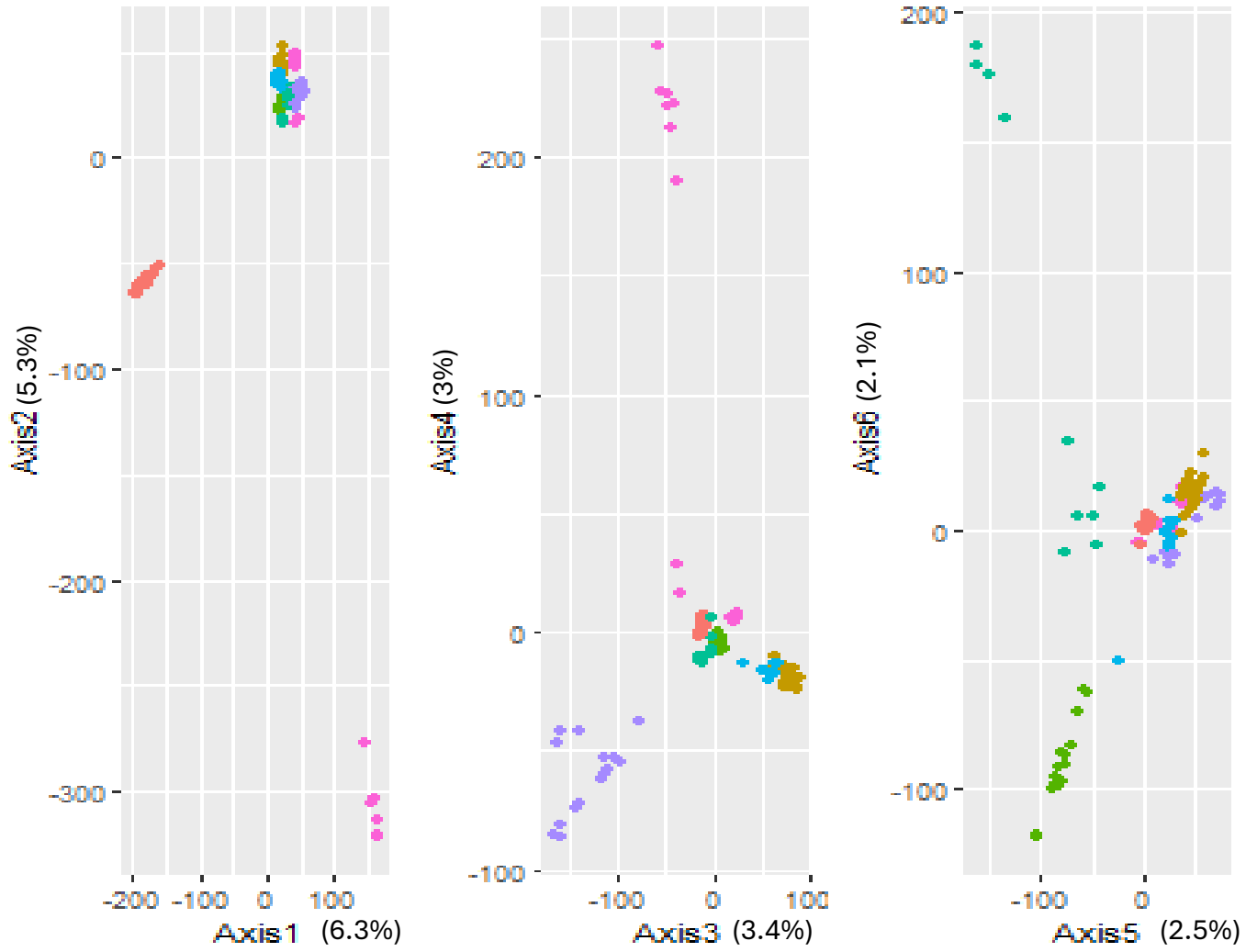


Mack Creek

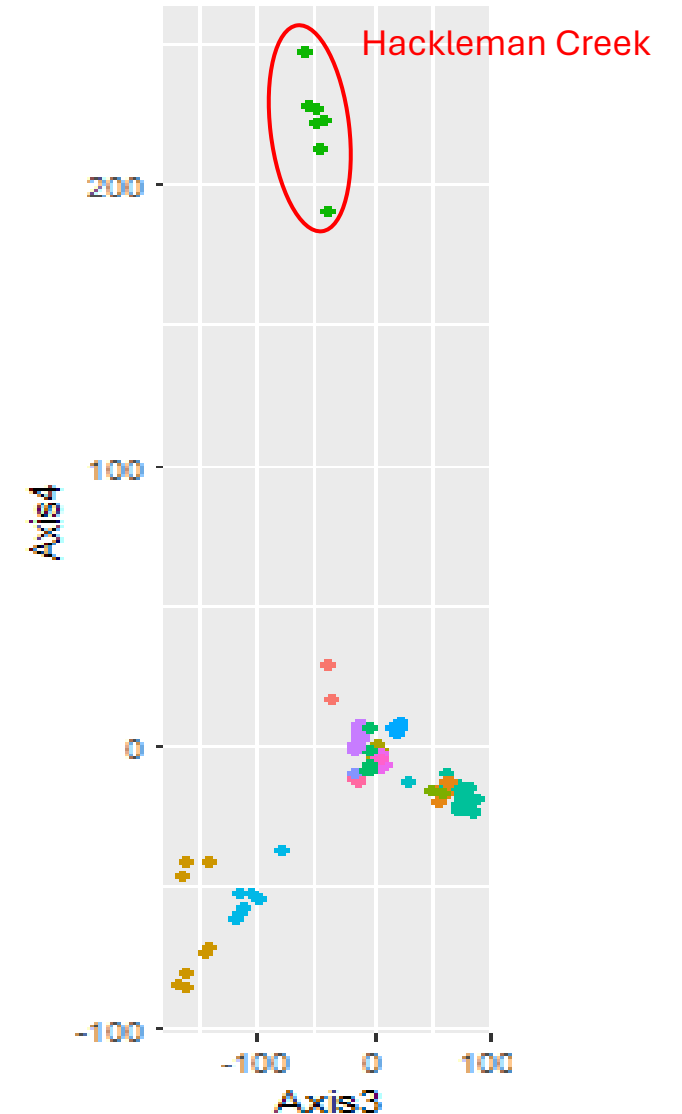
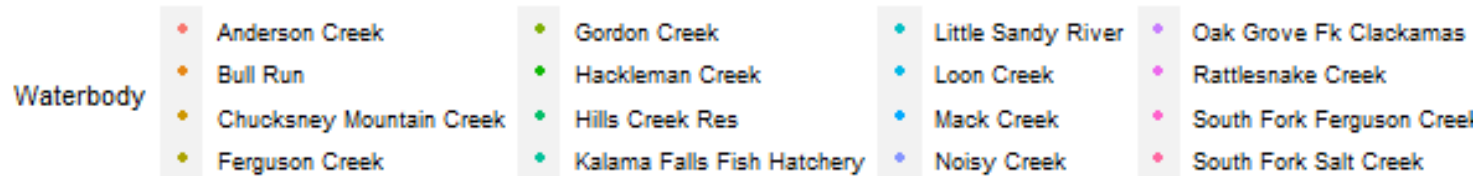
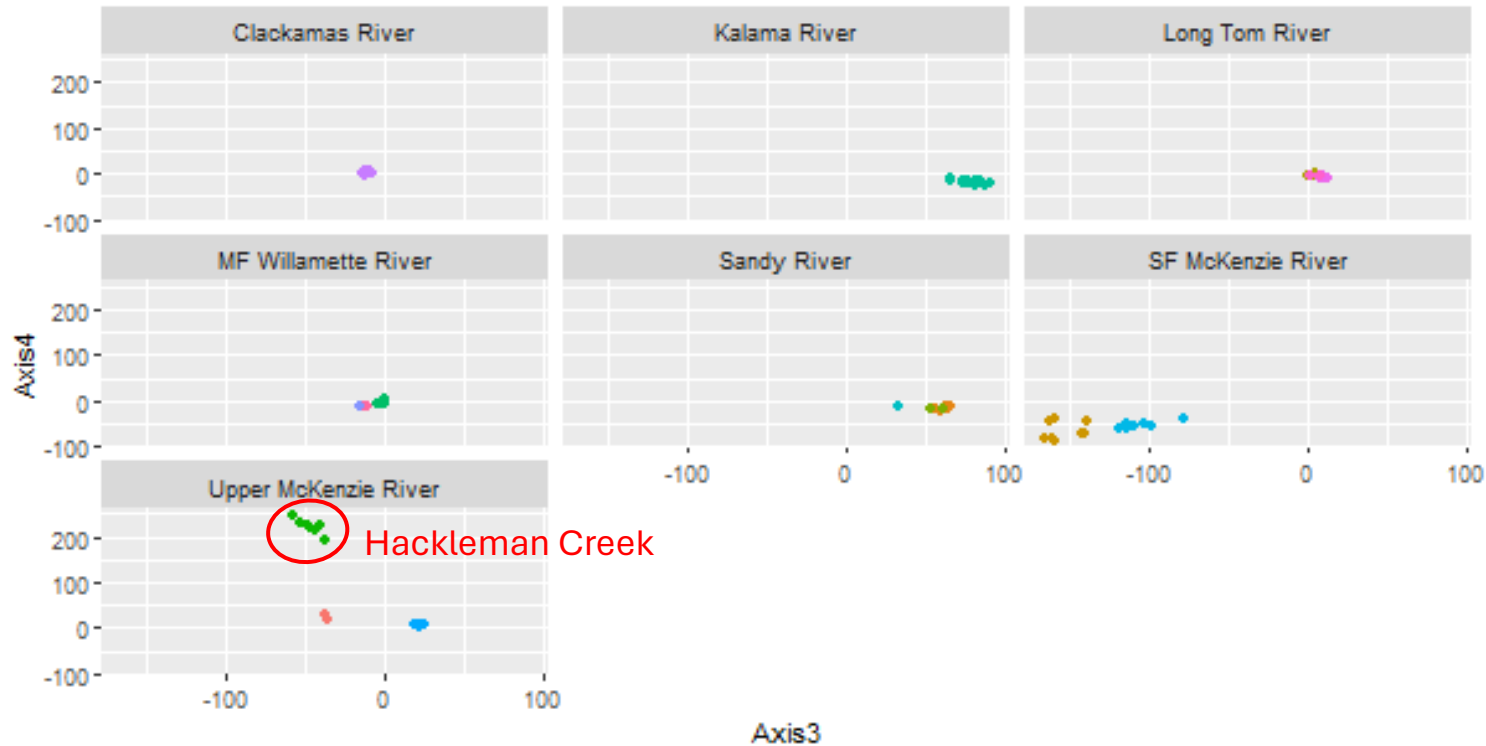


Mack Creek

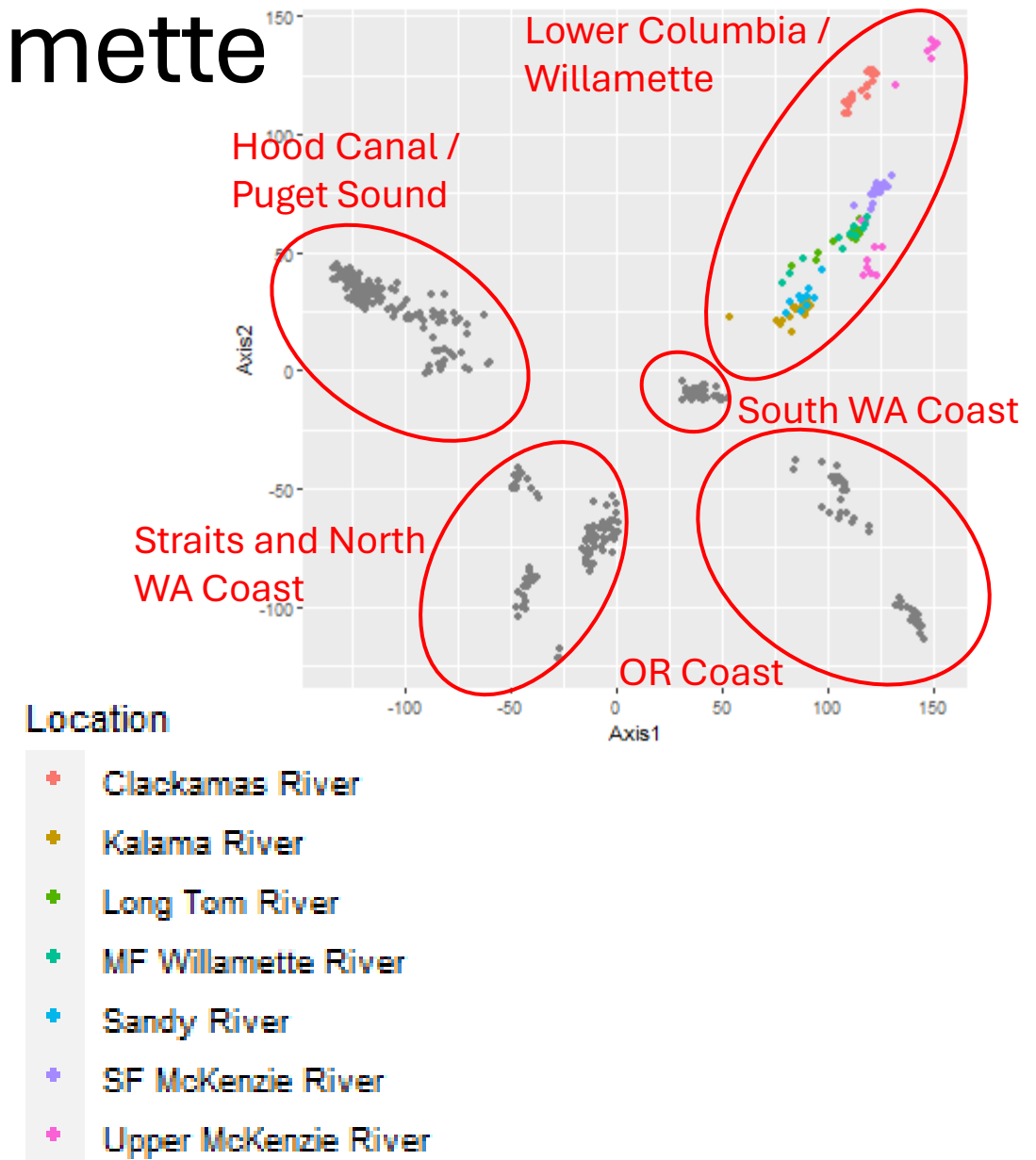
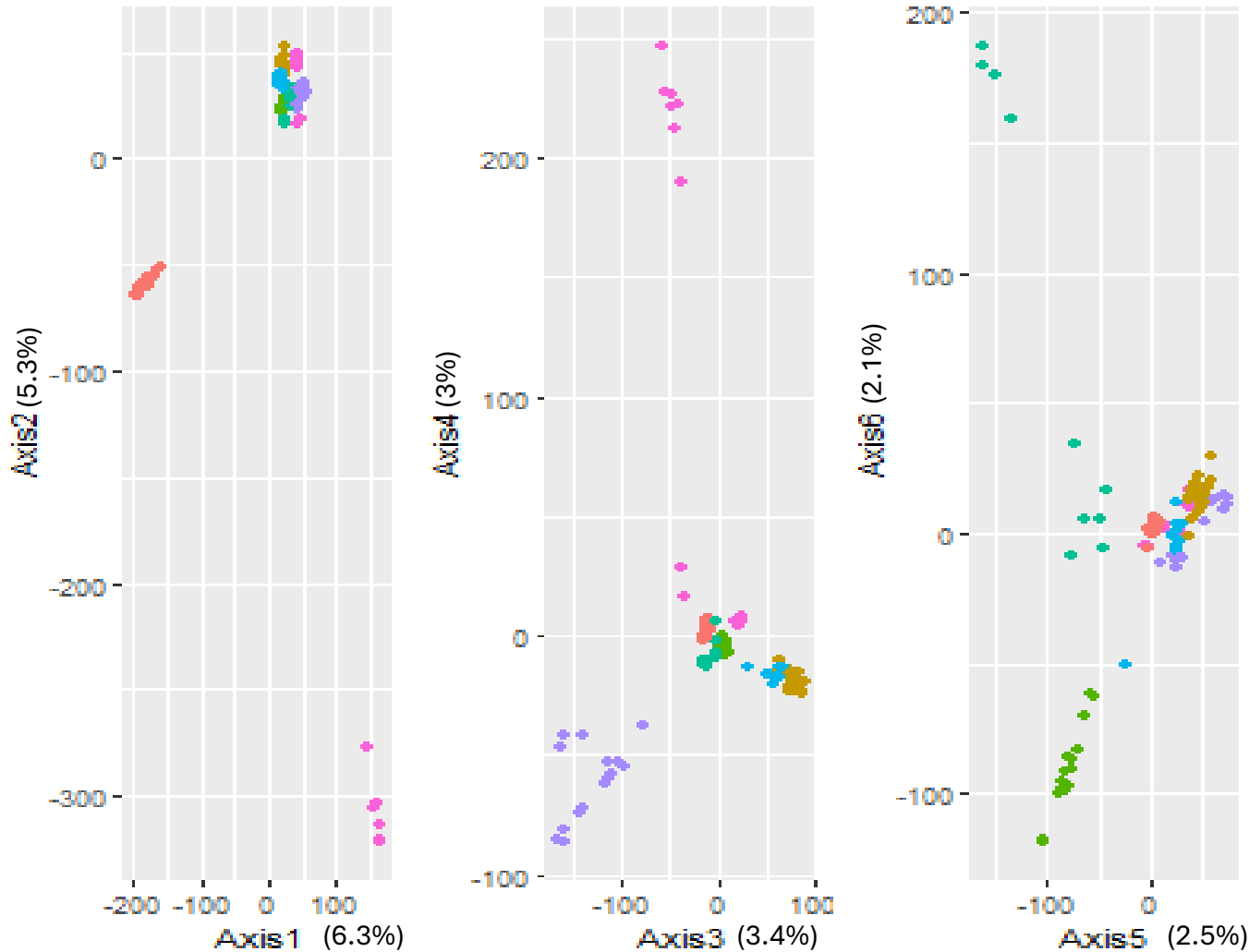
Lower Columbia and Willamette



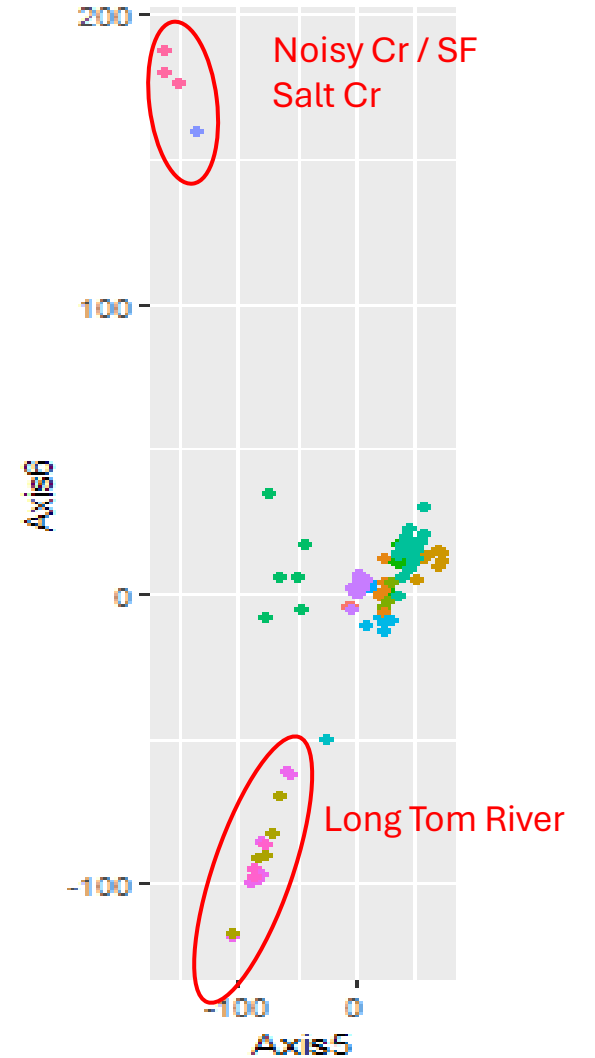
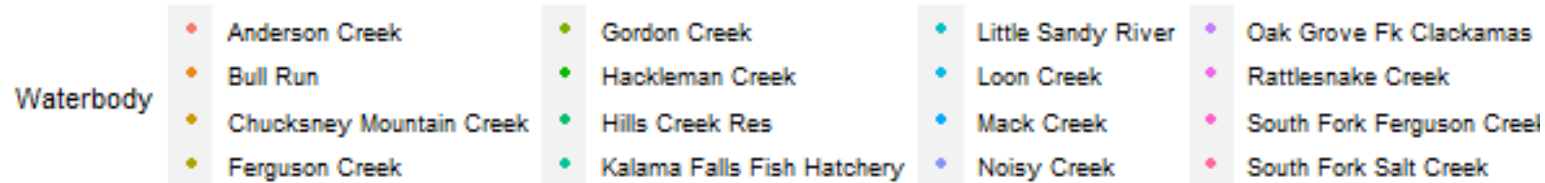
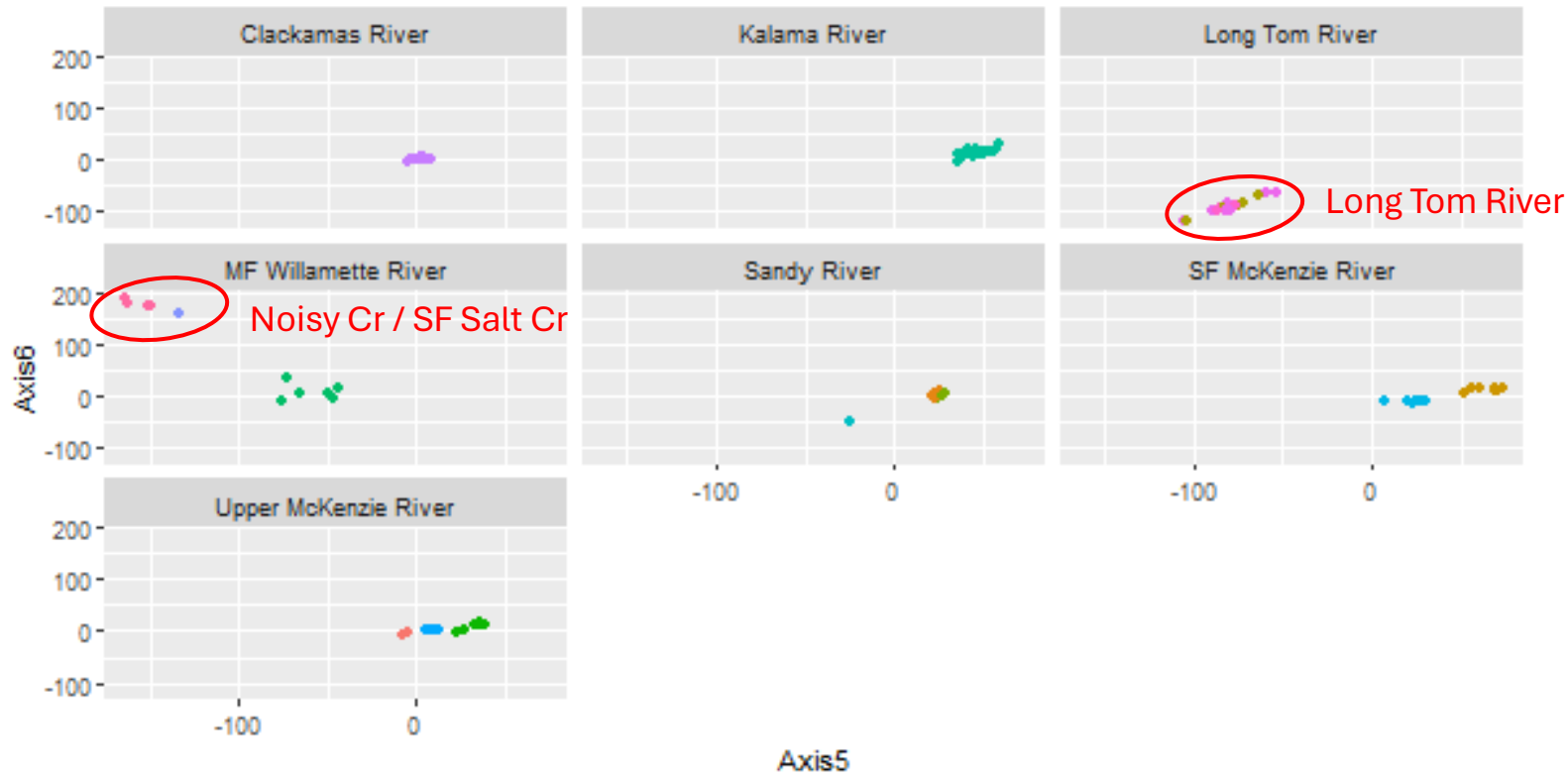
Lower Columbia and Willamette



Lower Columbia and Willamette

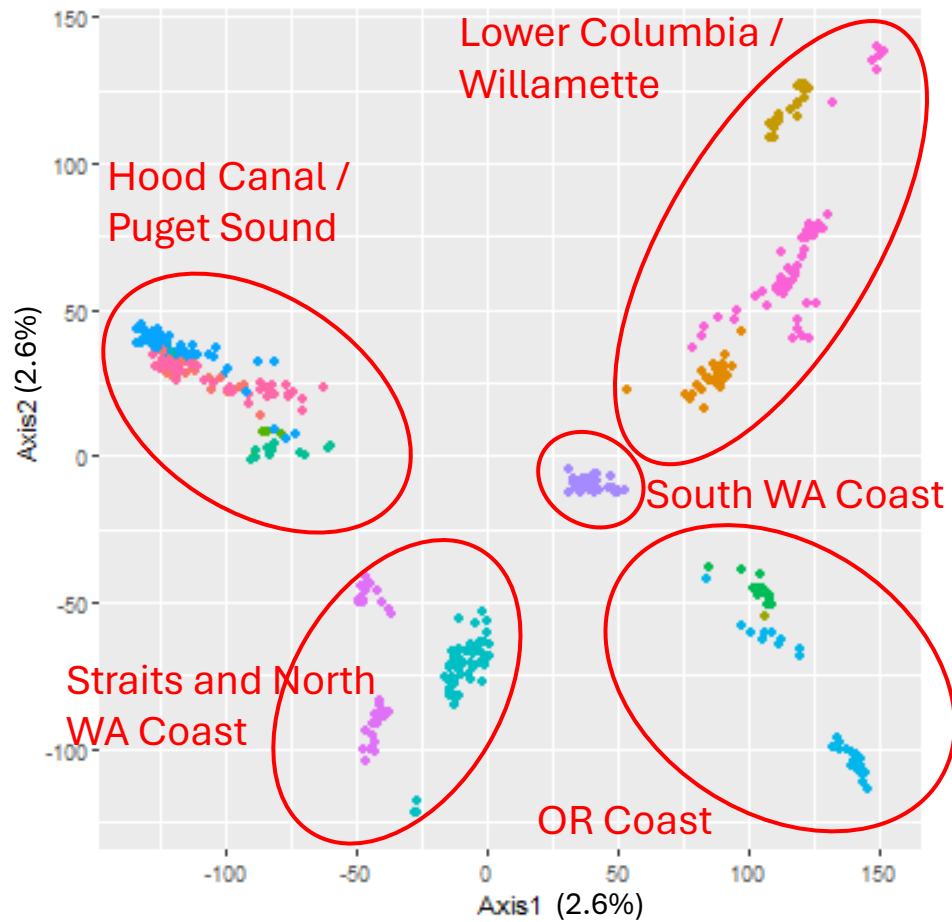


Lower Columbia and Willamette



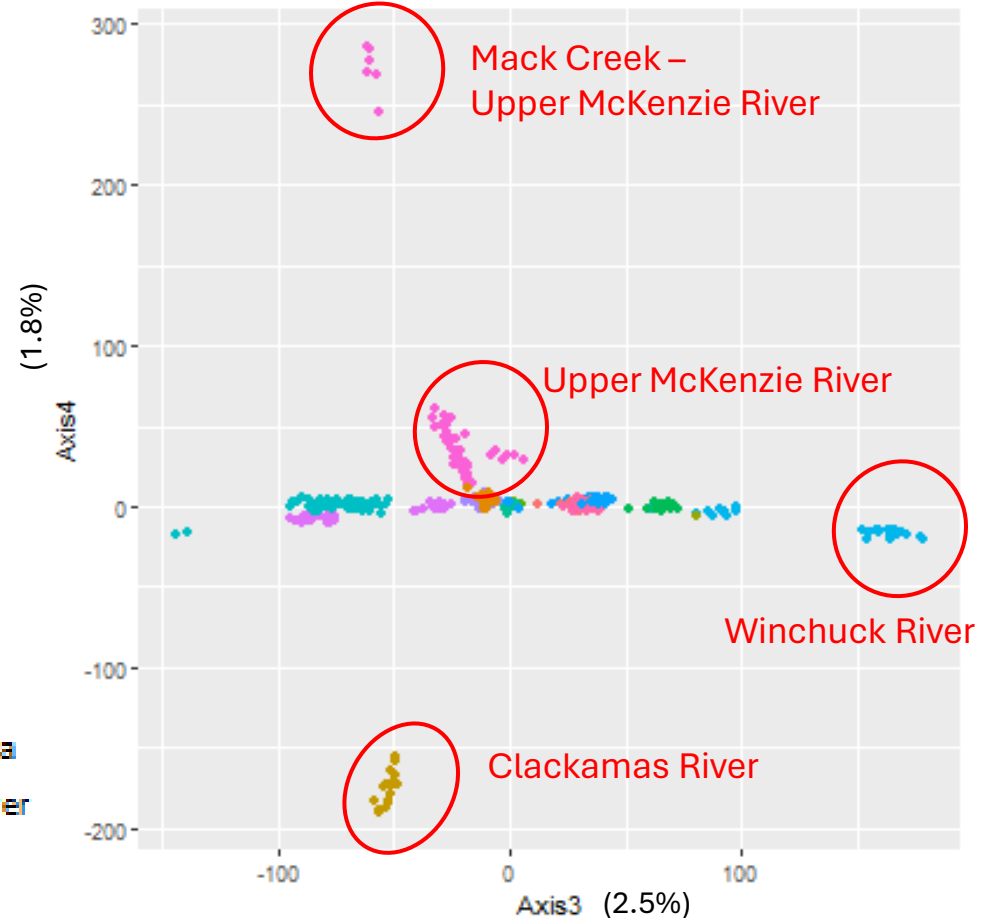
Overall Population Structure

452 samples, ~ 70,000 SNPs



Region

- East Hood Canal
- Lower Columbia
- Lower Willamette
- Mid OR Coast
- Mid Puget Sound
- North OR Coast
- North Puget Sound
- North WA Coast
- South OR Coast
- South Puget Sound
- South WA Coast
- Strait of Juan de Fuca
- Upper Willamette River
- West Hood Canal



GTseq Panel Development



Photo credit: James Losee

- Develop panel of SNPs to differentiate populations.
- Generate Statewide Baseline - population representation and overall resolution.
- Make panel available for use.

Main Takeaways

- Structure –
 - Geographic regions
 - Within regions
- Management Tool -
 - Mixed fisheries
- Research Tool -
 - Population distribution
 - Movement patterns
 - Population diversity



