

Genetic evaluation of steelhead trout in the Rock Creek subbasin of the Middle Columbia River



Rock Creek Fisheries Project



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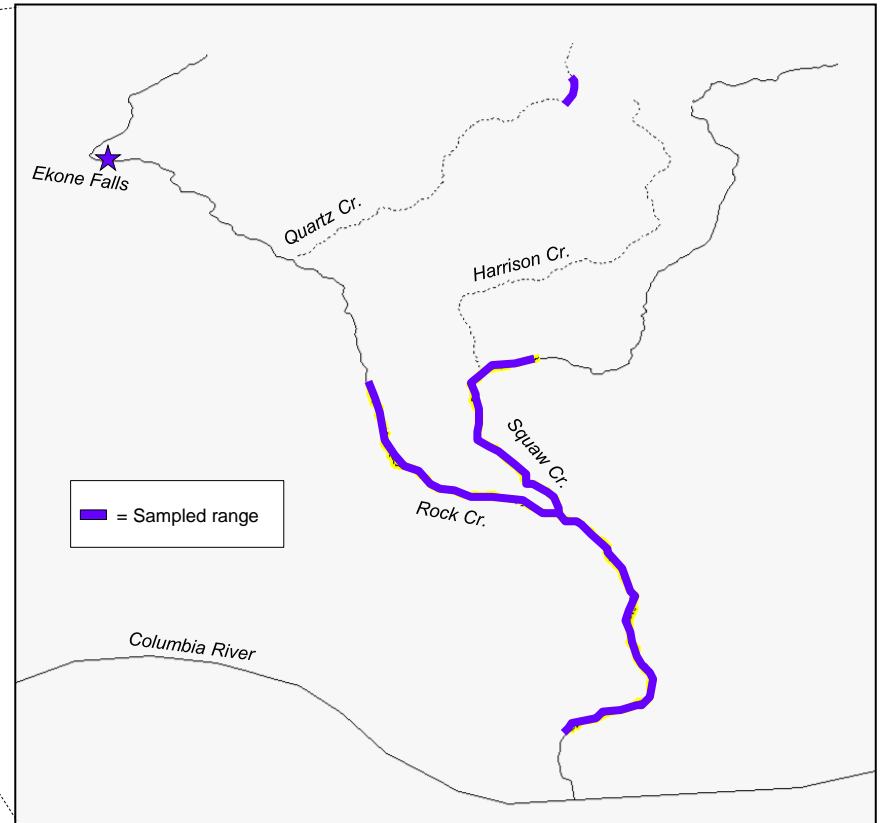
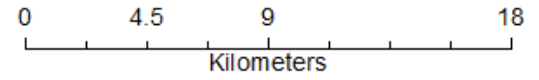
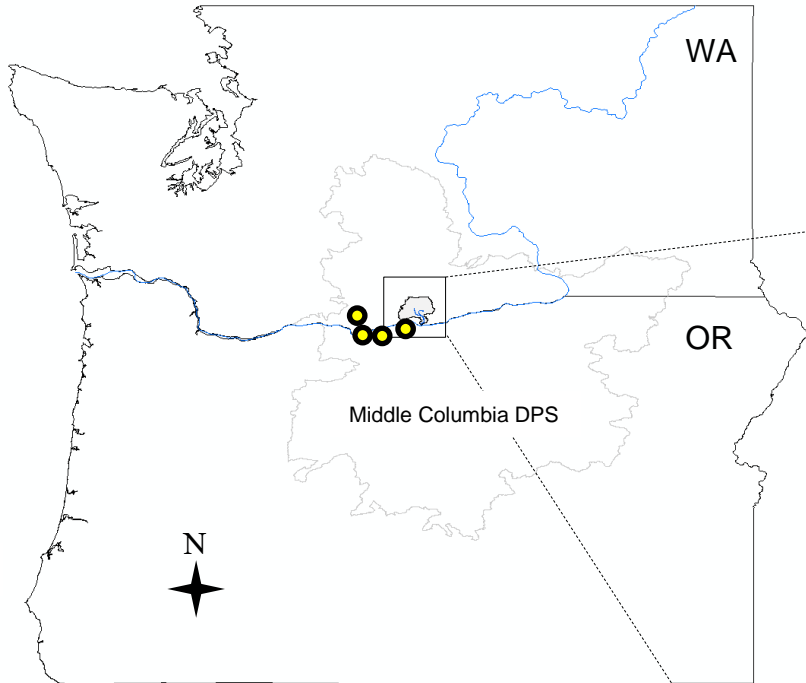
³Yakama Nation Fisheries

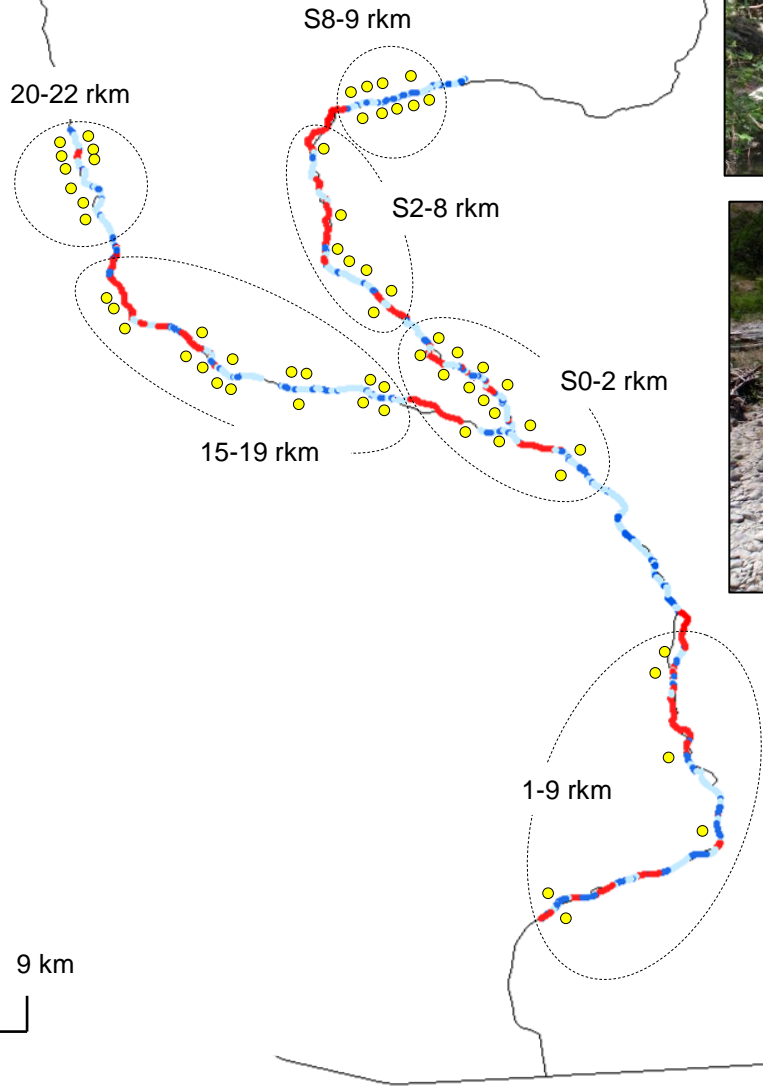


Project objectives & Characteristics of Rock Creek

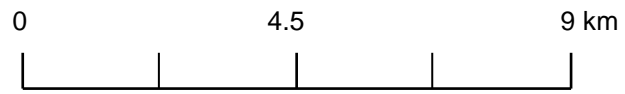
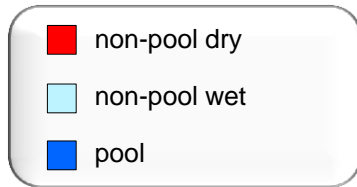
- ⇒ **Overarching objective:** Fish & Habitat Assessment for Prioritization of Restoration and Protection Actions
- ⇒ Limited information available about the status of Rock Creek steelhead, and population trends are largely unknown
- ⇒ watershed has no artificial barriers to fish migration
- ⇒ no directed supplementation activity (i.e. hatchery programs)
- ⇒ straying of hatchery fish from out-of-basin is likely to occur

Rock Creek Subbasin





2011/2012 waypoints
Sept. – Oct.

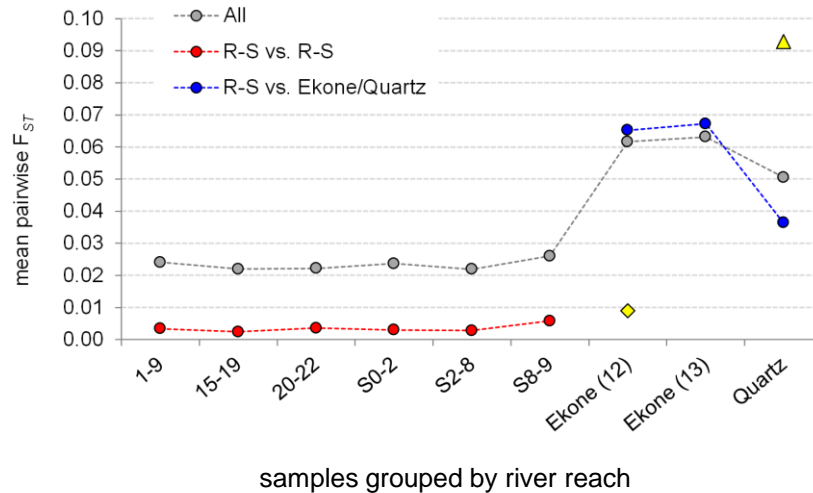
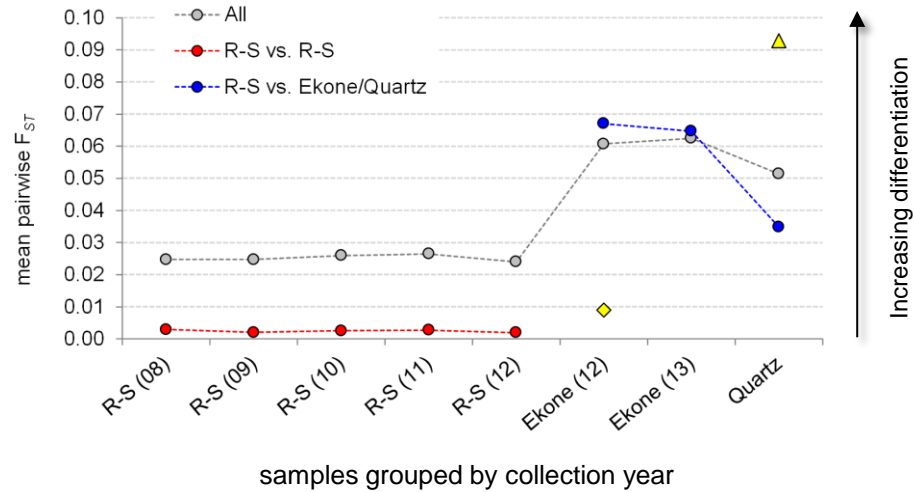


Sampling and among-group variation

sample time		<u>analysis collection (rkm)</u>								year total (n)
year	season	1-9	15-19	20-22	S0-2	S2-8	S8-9	Quartz	Ekone	
2008	Fall	33	0	51	70	0	0	0	0	154
2009	Fall	0	20	11	0	19	8	0	0	58
2010	spring	0	12	0	20	11	11	0	0	54
2011	spring	8	37	25	32	5	12	0	0	119
2011	Fall	13	12	10	10	6	16	0	25	92
2012	Fall	11	12	5	22	48	0	0	0	98
2013	Fall	0	0	0	0	0	0	21	31	52
collection totals (n)		65	93	102	154	89	47	21	56	627

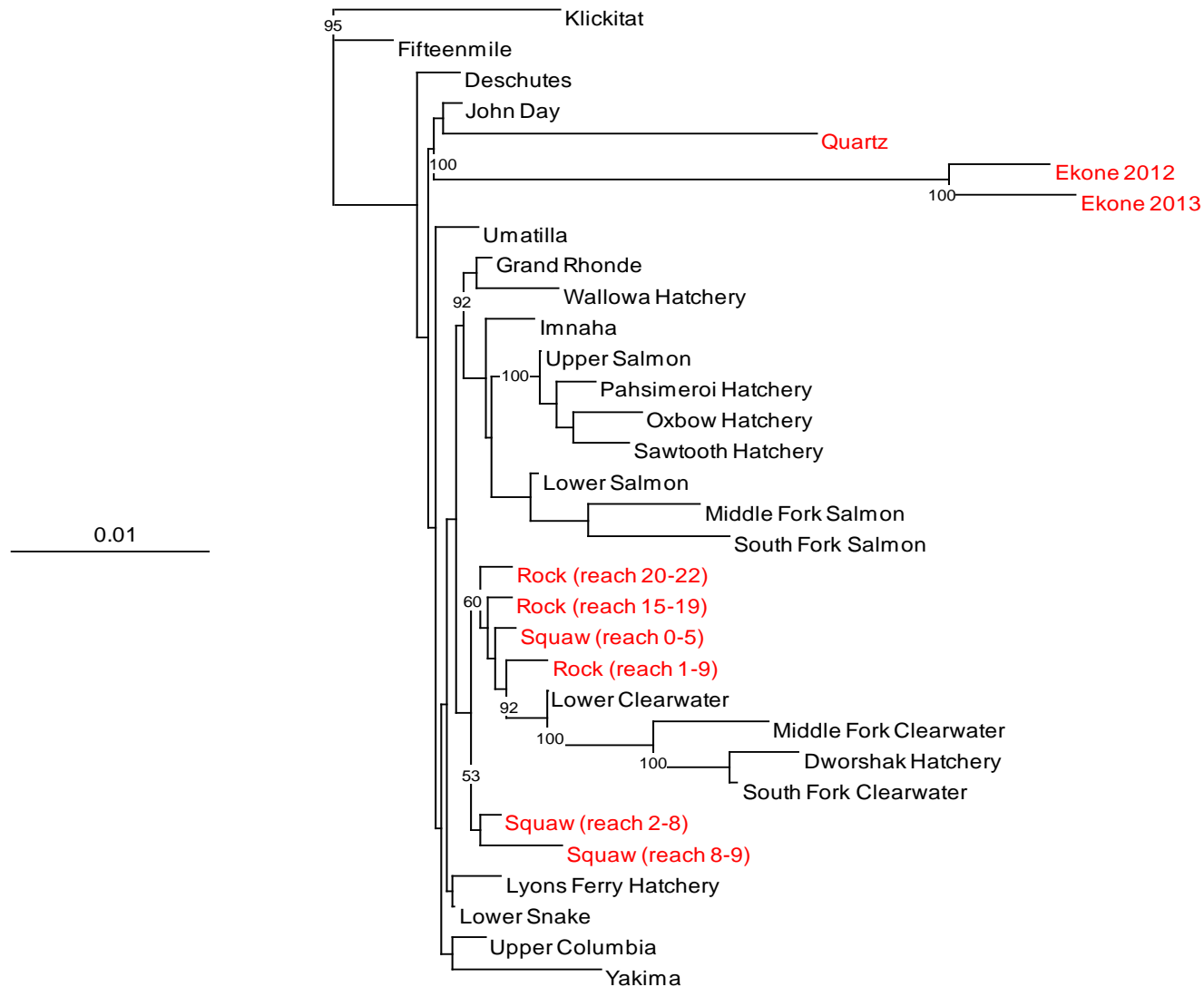
Accounting for temporal & spatial
Variation in analytical approach

Sampling and among-group variation

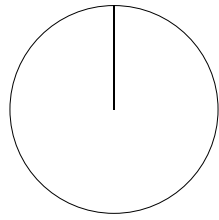


Rock Creek relationship in CRB: genetic distance topology

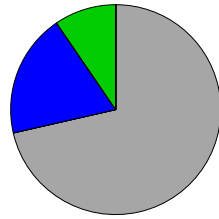
clusters and horizontal distances are important



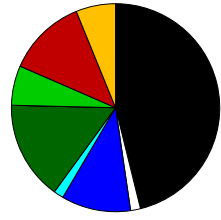
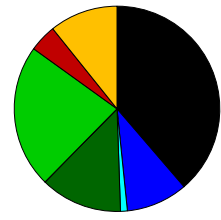
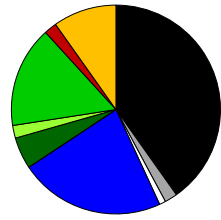
Stray influences: “self”-assignment testing



Ekone

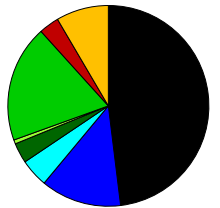
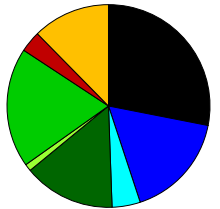
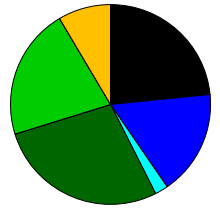
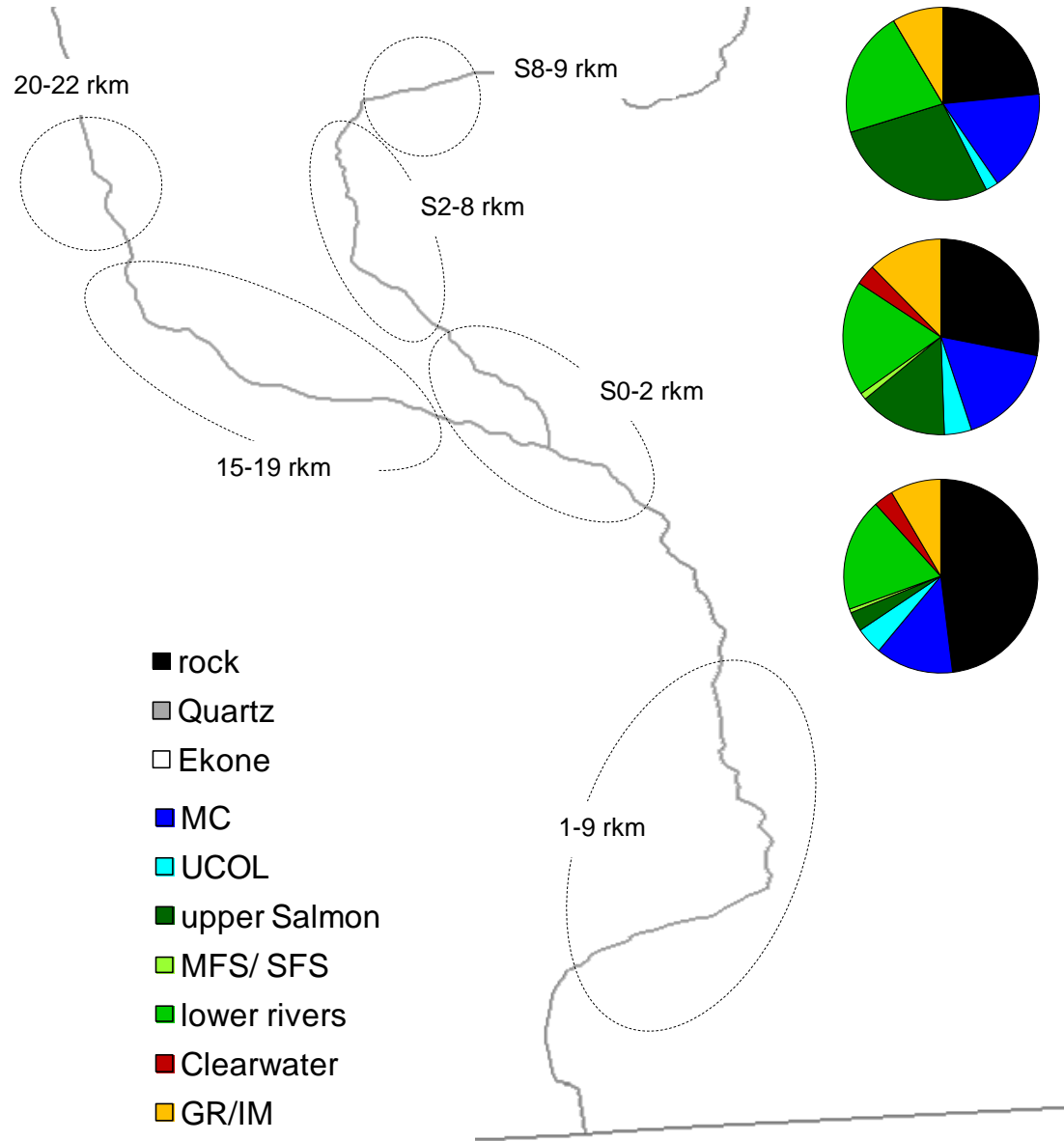


Quartz



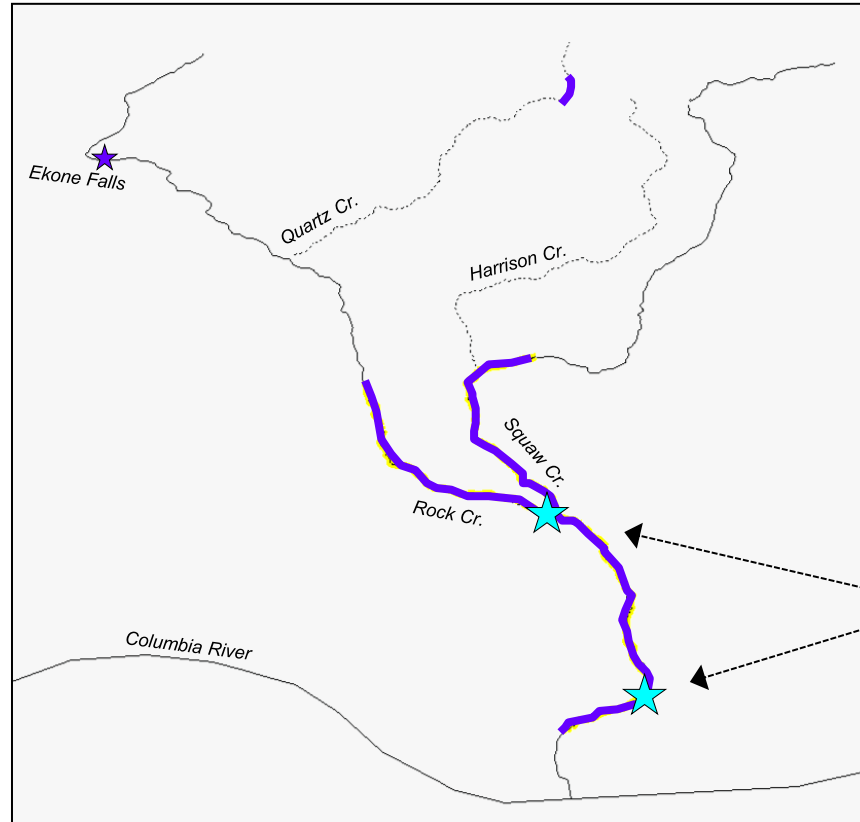
self-assignment probability

1-9	64.5
15-19	61.4
20-22	56.4
S0-2	65.1
S2-8	61.4
S8-9	57.0
Quartz	95.0
Ekone	100.0



- rock
- Quartz
- Ekone
- MC
- UCOL
- upper Salmon
- MFS/ SFS
- lower rivers
- Clearwater
- GR/IM

Stray influences: Tagging data & GSI



No adult weirs
2 PIT tag arrays

Stray influences: Tagging data & GSI

PIT-tag detections in Rock Creek	tagged as	#
Bonneville Adult Fish Facility	Adult	13
Columbia River (COLR5)	Adult	1
Irrigon hatchery	Juvenile	1
Hagerman Hatchery	Juvenile	1
Lower Granite	Juvenile	12
Clearwater hatchery	Juvenile	1
Magic Valley Hatchery	Juvenile	2
John Day	Juvenile	2
Priest Rapids	Juvenile	1
Trout Creek, Deschutes River	Juvenile	1
IMNTRP-Imnaha screwtrap	Juvenile	1
ORPHAN	Juvenile	13

barged

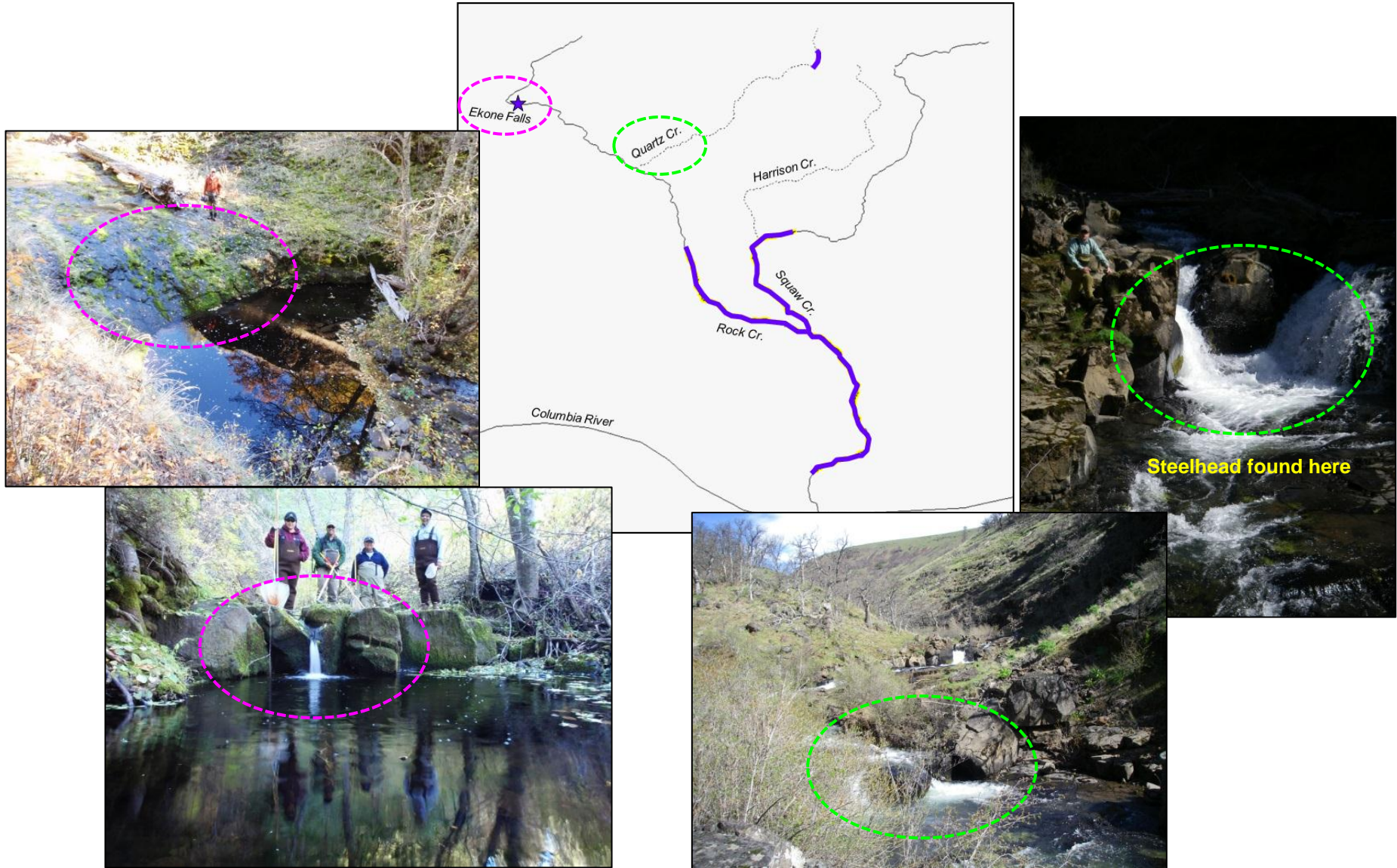
GSI reporting group	Probability
Mid_Columbia	0.9363
Mid_Columbia	0.9709
Upper_Salmon	0.8041
Mid_Columbia	0.3923
Grande_Ronde	0.7218
Upper_Salmon	0.9286
Upper_Columbia	0.9554
Mid_Columbia	0.3506
Lower_Clearwater	0.4918
Lower_Clearwater	0.4918
Upper_Salmon	0.5801
Mid_Columbia	0.8139

} Rock Cr.

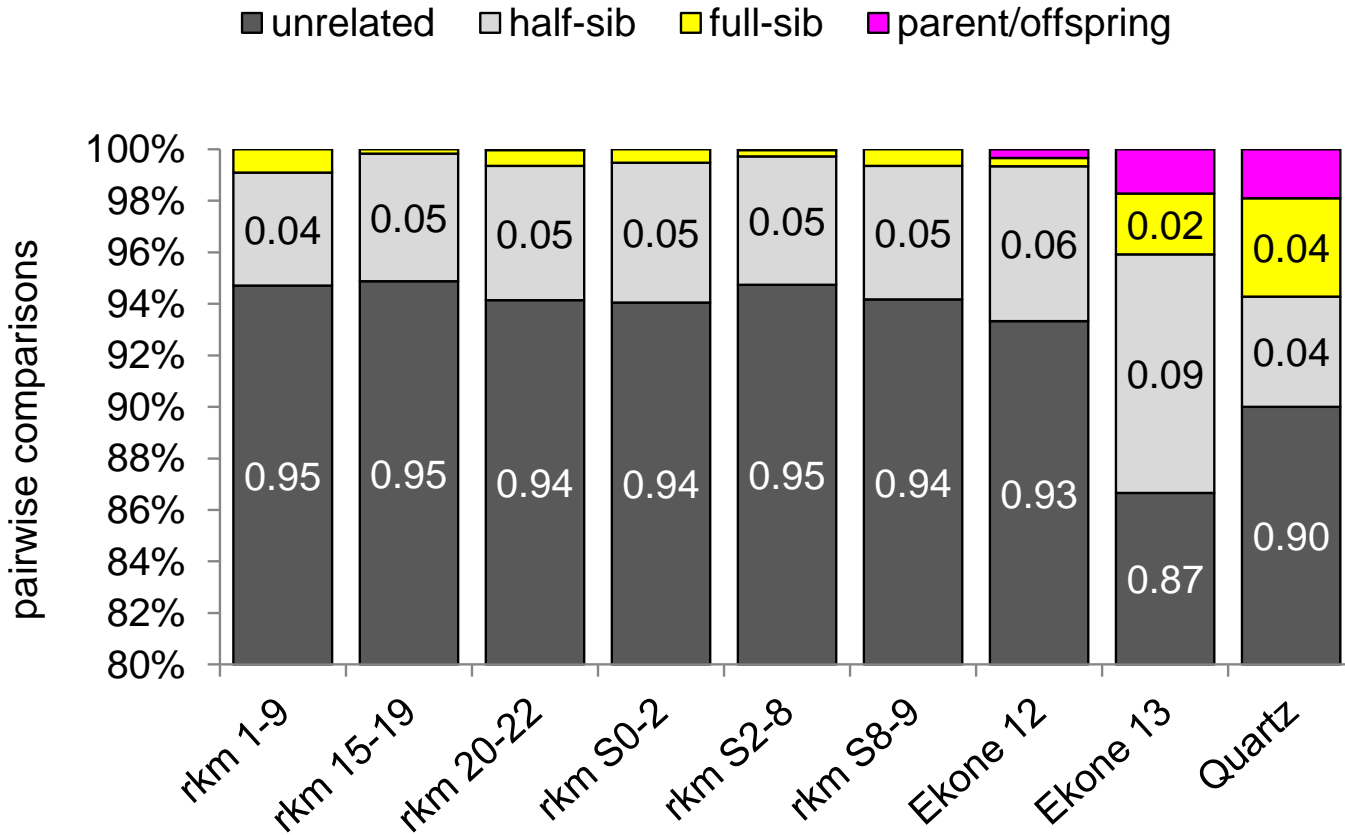
GSI assignments:
Adult fish found in Rock Creek

Date	RKM	1st rank	Prob.	2nd rank	Prob.
4/12/2011	15-19	Deschutes	78.2	15mile	20.9
4/13/2011	15-19	15mile	98.2	UCOL	0.8
4/25/2012	20 - 22	Deschutes	94.2	UCOL	4.0
5/6/2013	?	15mile	99.9	DES	0.1

Demographics: Isolation? predominantly resident?

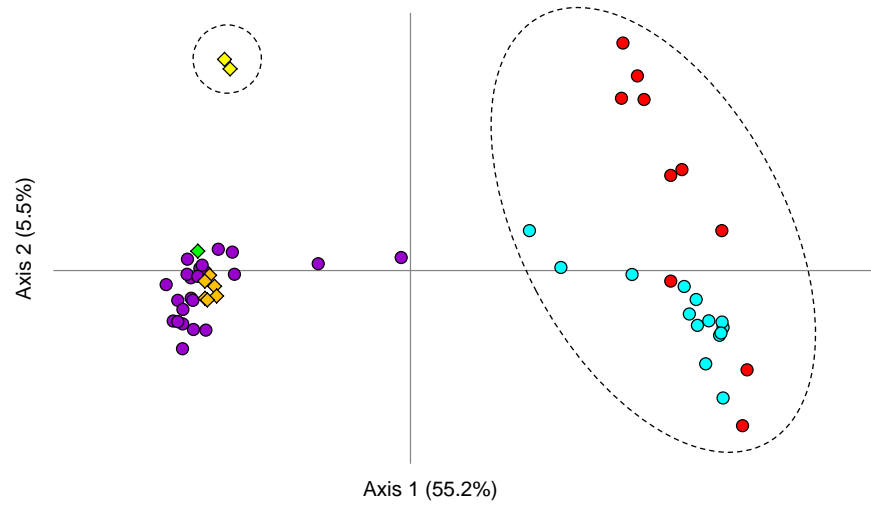


Demographics: small populations? relatedness?

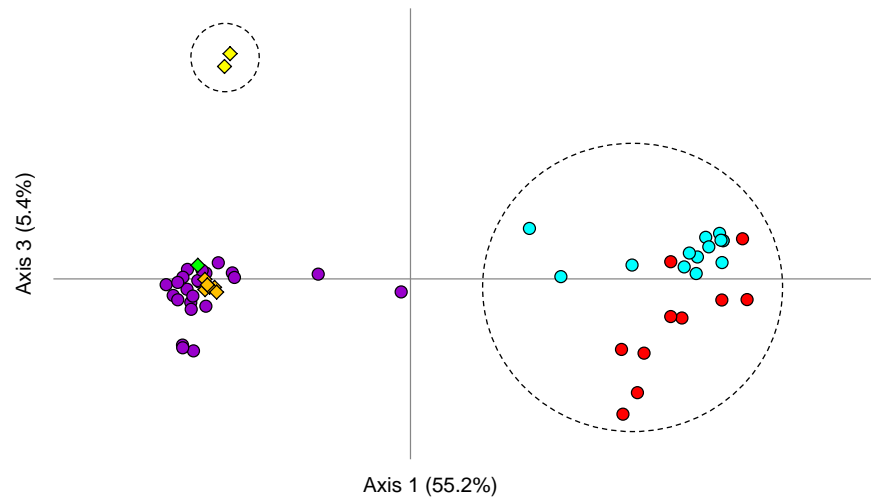


Demographics: influences from other stocks/stocking?

straight ahead perspective



downward perspective



- Inland lineage
- Coastal lineage
- Coastal (Willamette)
- ◆ Rock/Squaw
- ◆ Quartz
- ◆ Ekone Falls

Conclusions.....

- ⇒ **Overarching objective:** Fish & Habitat Assessment for Prioritization of Restoration and Protection Actions
- ⇒ Straying is prevalent up to about rkm ~27 (Quartz)
- ⇒ Upper basin population aggregates are well differentiated, Likely resident, putatively extant local.
- ⇒ Probably no full barriers to anadromy, but combination of upstream distance coupled with habitat patchiness and highly dynamic flow conditions limit migration both directions
- ⇒ Difficult to declare with certainty, but appears there is no local or “remnant” Rock Creek stock of anadromous steelhead remaining. (at least not without significant out-of-basin introgressive influences)

Questions



Bonneville Power Administration



Field crews from USGS & Yakama Nation

CRITFC technical staff, Jon Hess for GSI assistance

Baseline: WDFW, NOAA, ODFW, USFWS, Nez Perce, CTUIR
The Confederated Tribes of the Warm Springs,
Confederated Tribes and Bands of the Yakama Nation