

Life history diversity of steelhead parr in the Wind River, WA, as revealed by PIT tagging, instream PIT-tag detection, and trapping

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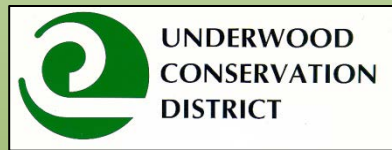
² Washington Department of Fish and Wildlife, Vancouver, WA



Funding by:



Wind River Project collaborators:



Wind River

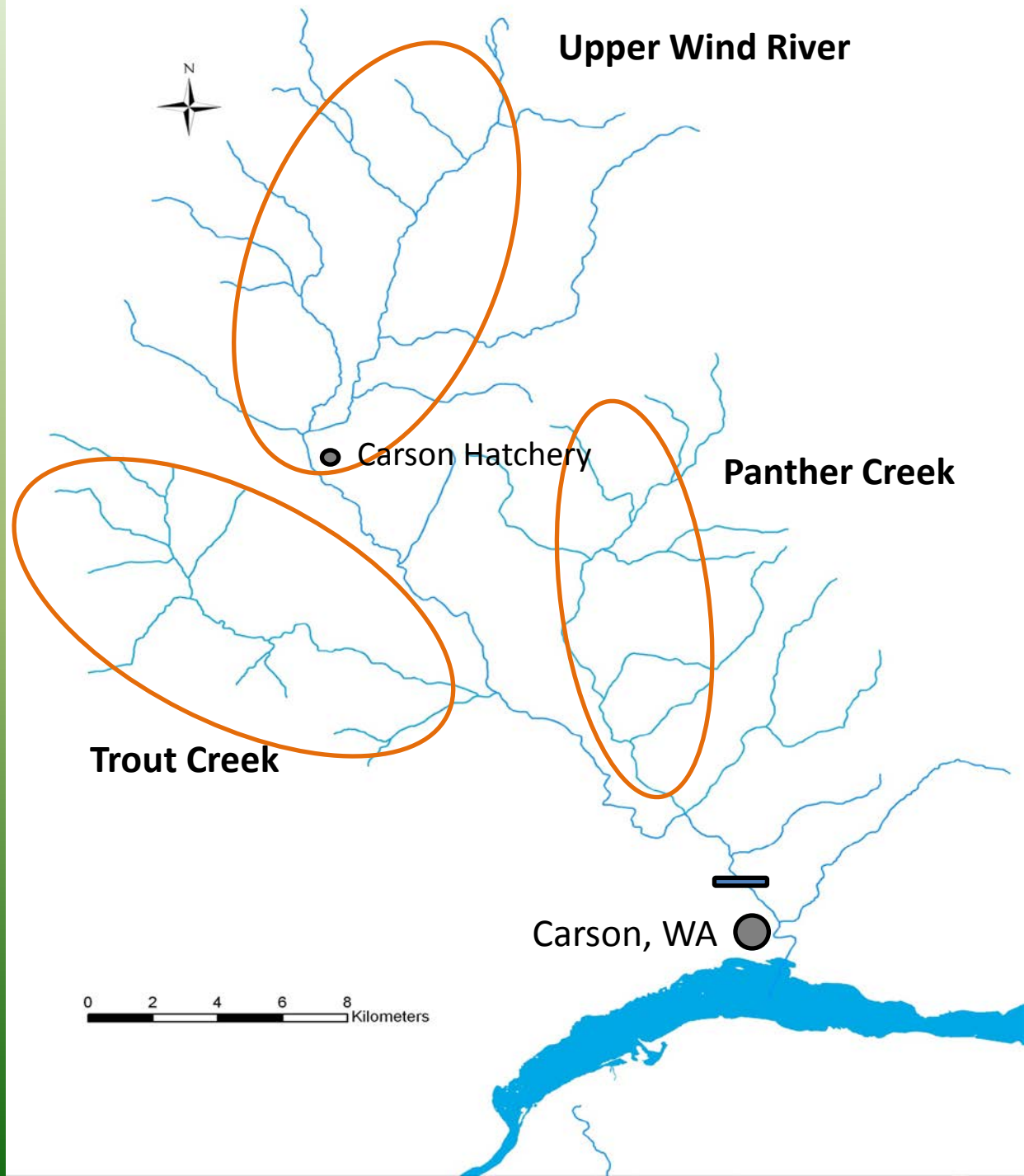
Washington side tributary to Columbia River 16 km upstream of Bonneville Dam. Westside character, rain-dominated flow regime, heavily forested watershed.

Three subwatersheds

- Trout Creek
- Upper Wind
- Panther Creek

Shipherd falls at rkm 3.

Historic barrier to all salmonids except steelhead



Wind River – Washington State has declared a wild steelhead sanctuary

About one percent hatchery steelhead upstream of Shipherd Falls



Long running four-partner project since late 1990's

UCD and USFS - On the ground restoration, land management. I&E, watershed group coordination

USGS and WDFW - Fish counters – research, evaluation of restoration, document habitat condition

WDFW – yearly smolt and adult estimates

Excellent yearly adult steelhead population estimates back to 2000, adult snorkel survey index for 10 years prior

Great record of fish in-fish out

Long history of smolt trapping...

Historic smolt trapping

1995 - 1998



Four smolt traps

Spring smolt trapping period

Many more smolts at lower trap than accounted for by the three upper traps.

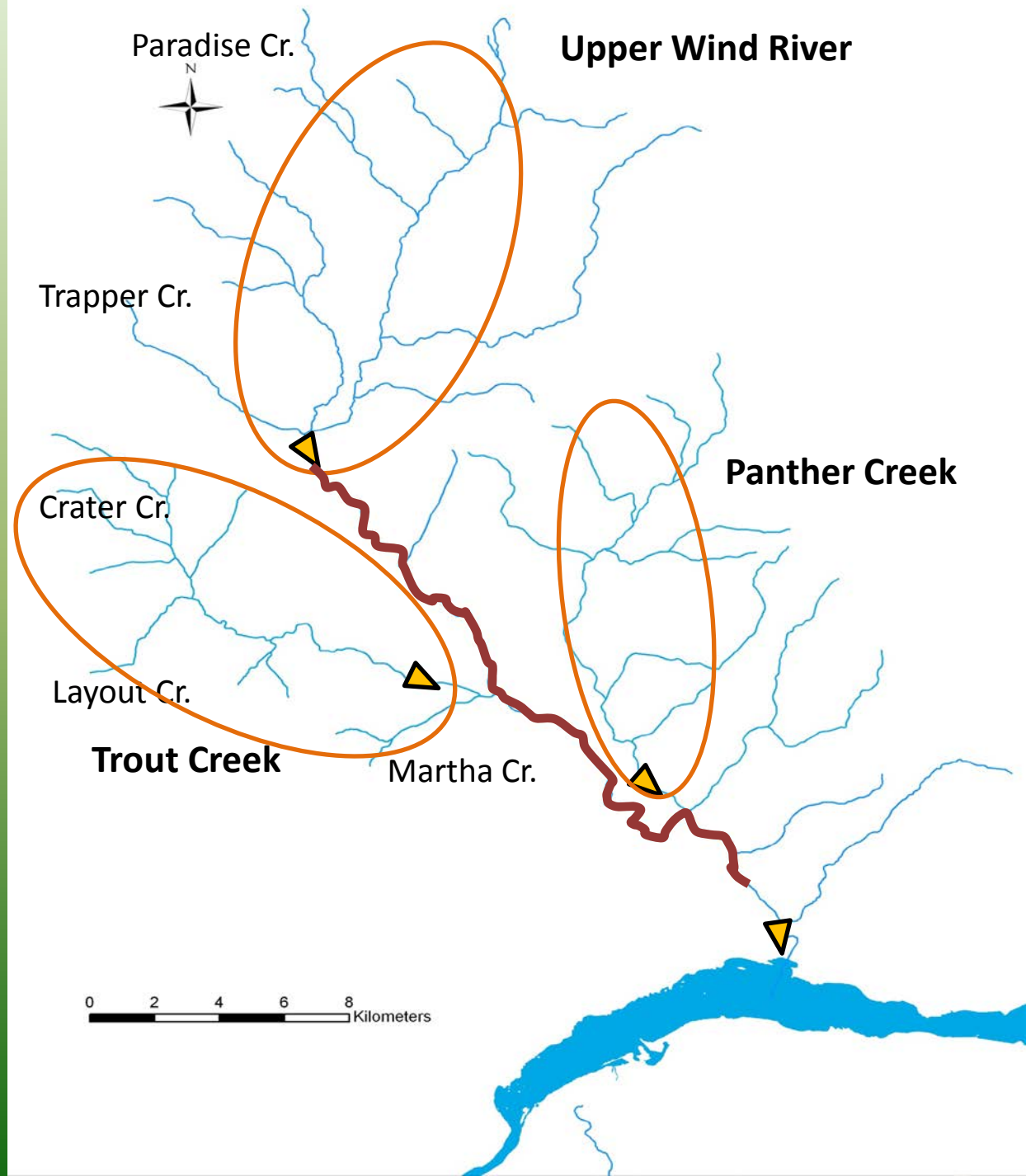
Difference can be 70 – 80% !

Implies:

Lots of spawning in the Wind below the three upper traps

- or -

There are many parr moving into the downstream reaches



Wind River smolt trapping (WDFW) has documented downstream parr movement during spring.

Number of parr encountered at the upper three smolt traps can exceed the number of smolts encountered there.

Not an unknown phenomenon

Documentation of downstream movements of parr or pre-smolt steelhead

Bjornn 1971 - Lemhi River, Idaho

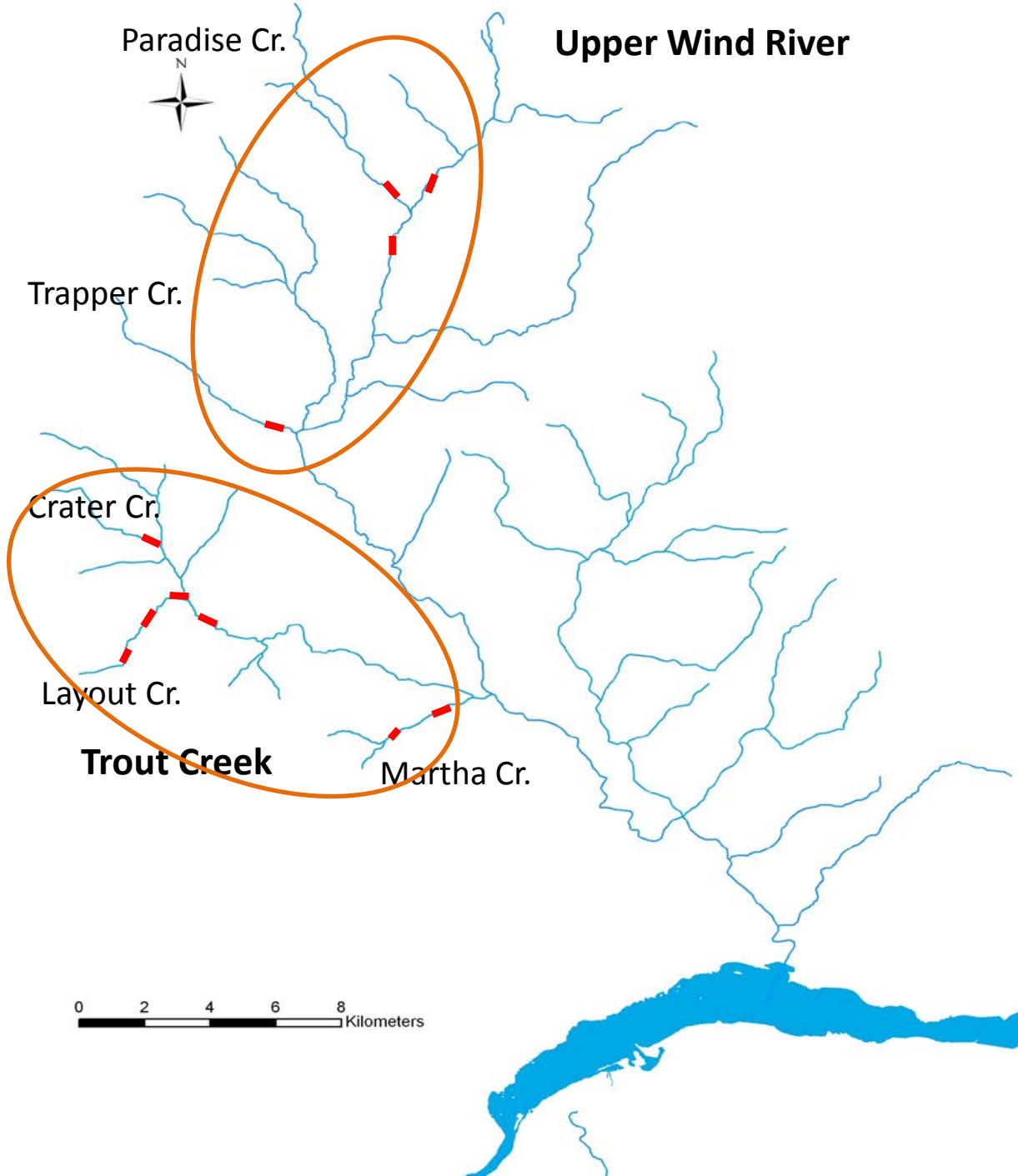
Leider et al. 1986 – Gobar Creek, Washington

Spina et al. 2005 – San Luis Obispo Creek, California

Wanted to know more about the different parr life histories expressed in the Wind River (timing, origin, growth, fate)

In 2011, USGS instituted parr investigations in two subwatersheds

- 11 sites per year
- two visits per year
- tagging fish with PIT tags





J. Warren



PIT tagged between 1,000 and 1,500 parr steelhead per year

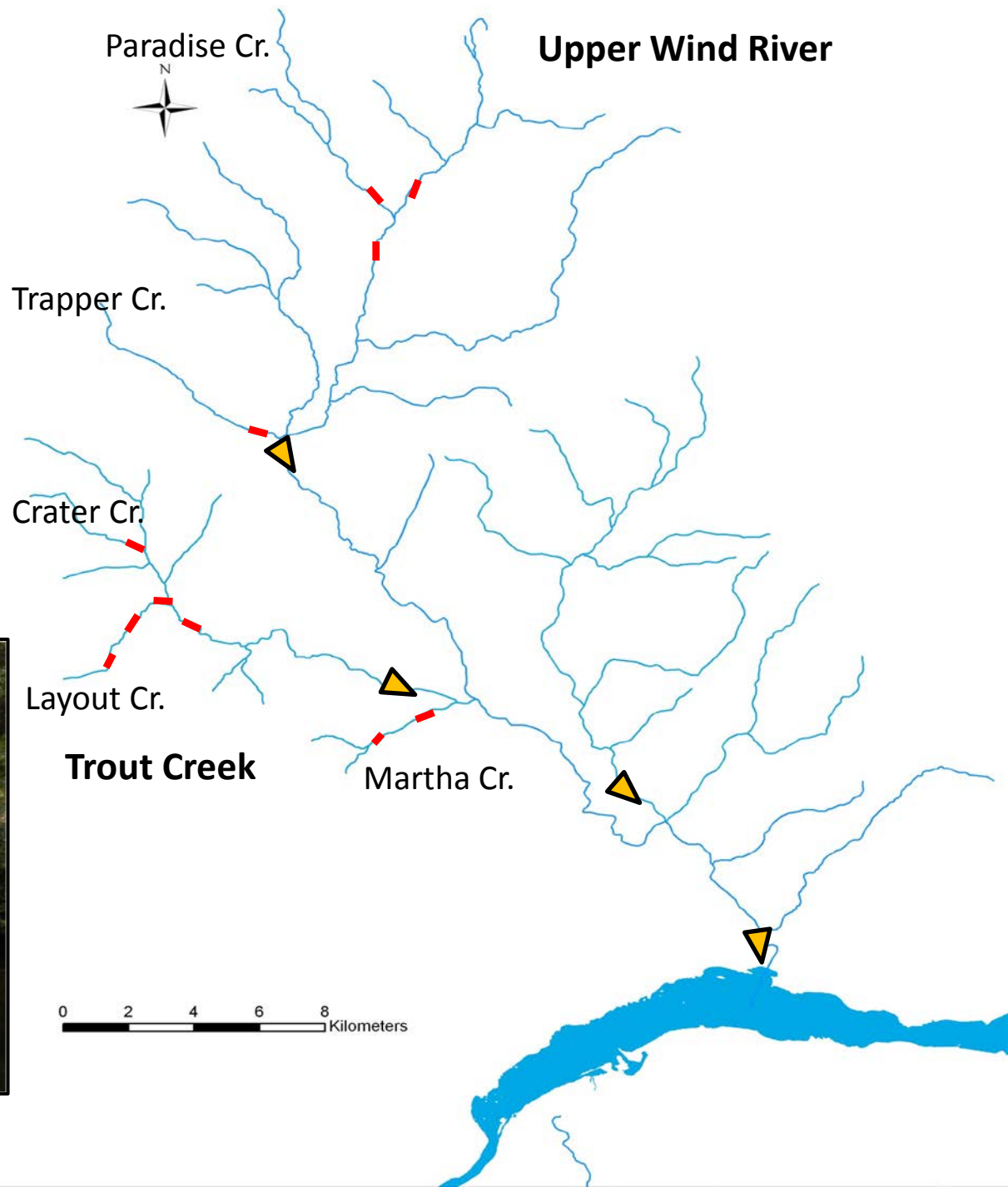
Primarily age-1 fish, increasing proportion of age-0 fish tagged by using smaller tags.

Opportunities to re-contact PIT-tagged steelhead as parr or smolts

Generate fish histories for individuals

- Growth
- Movement timing
- Survival to smolt stage
- Survival to adult stage

Recaptures



Instream detections

Series of PIT-tag interrogation systems

Tributary / headwater sites

N = 3



Mid-subbasin sites

N = 2

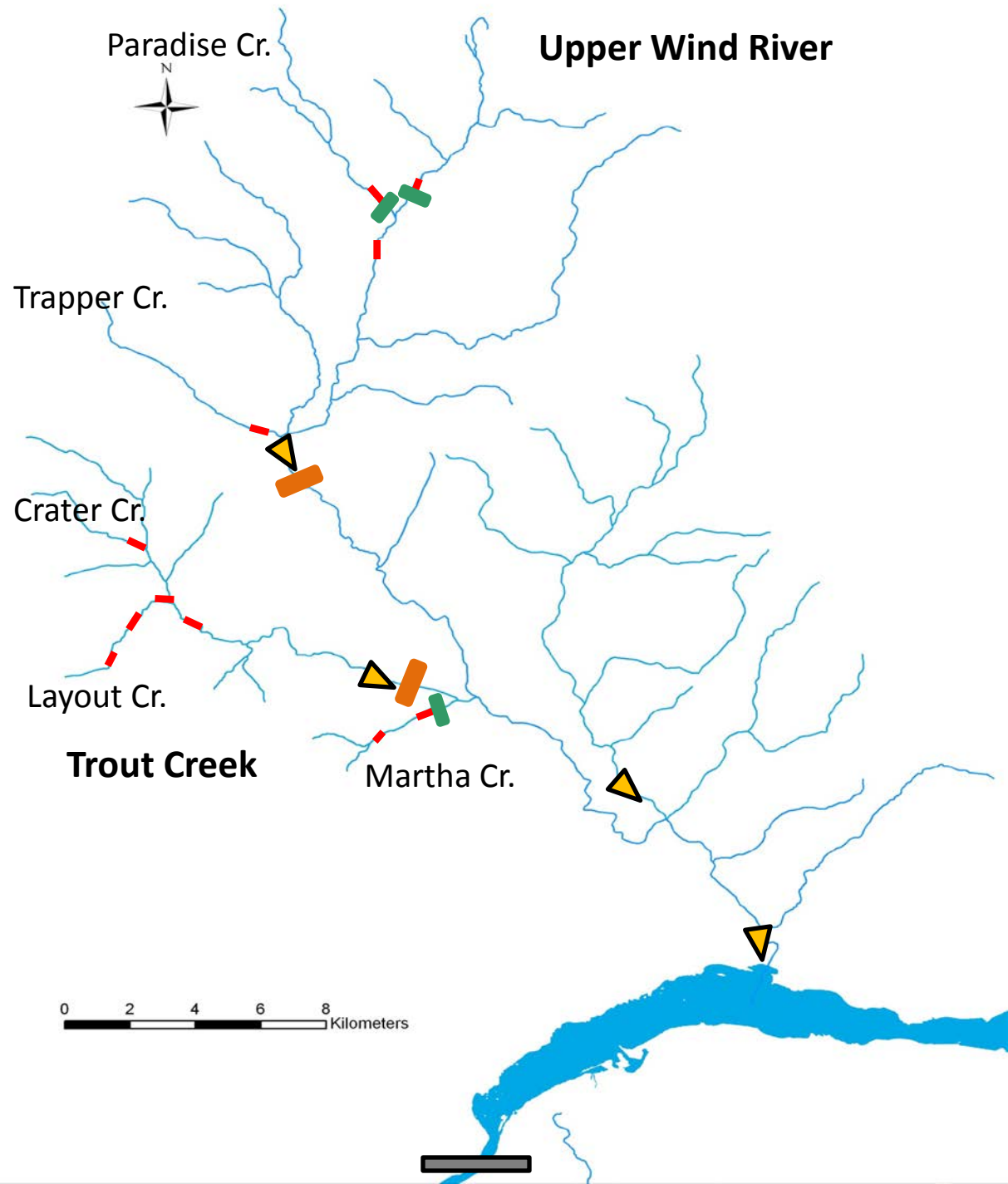


Instream PIT-tag detections

Tributary / headwater sites

Mid-subbasin sites

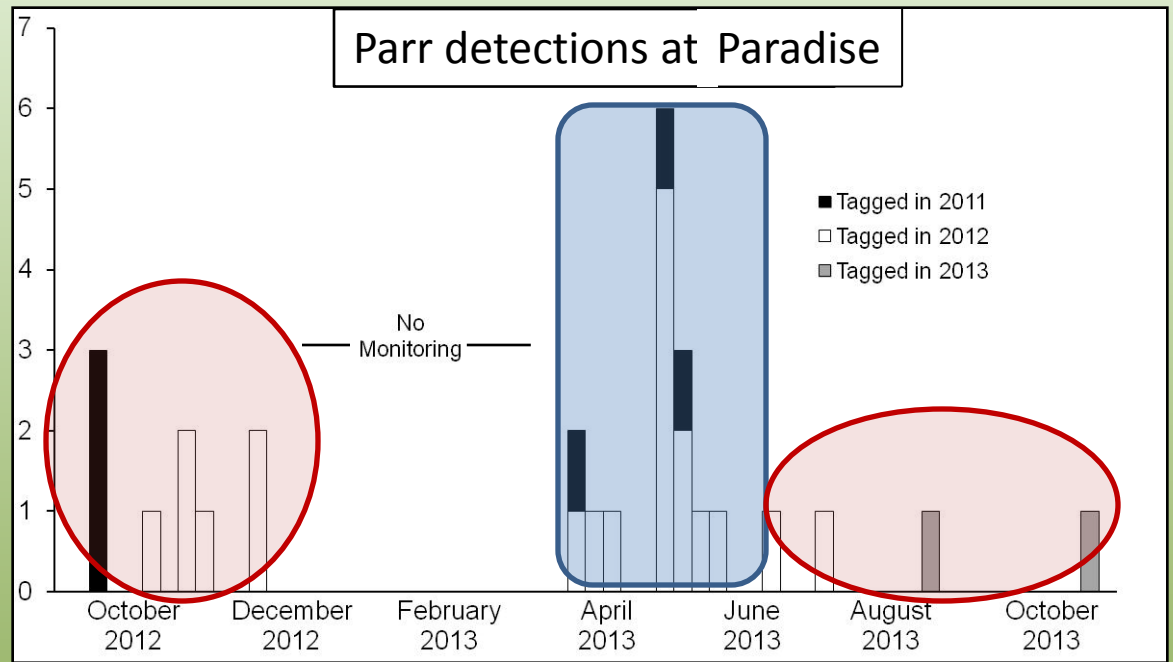
Columbia River



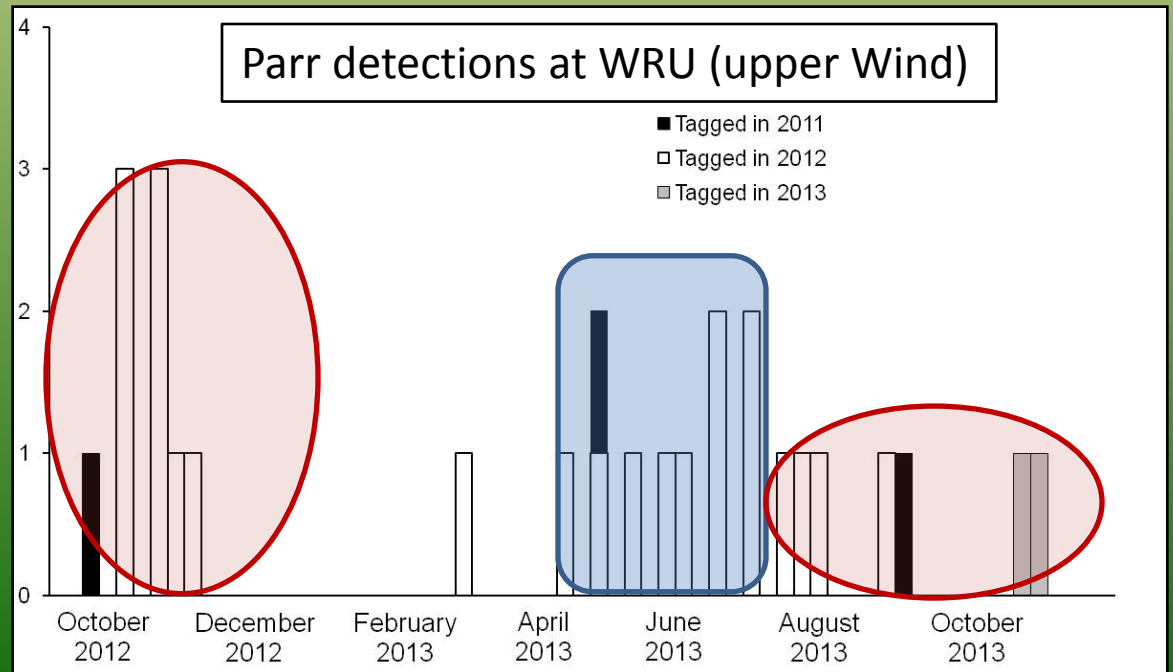
Watershed	Year	Number tagged	Re-contacted through November 2013			
			Smolt trap	Instream recapture	Detected at PTIS	Detected in Columbia R.
Trout Creek	2011	494	7	46	6	4
Upper Wind	2011	497	0	52	11	8
Trout Creek	2012	628	9	69	37	6
Upper Wind	2012	623	6	74	46	7
Trout Creek	2013	813	-	63	5	-
Upper Wind	2013	644	-	46	7	-



Tributary / headwater



Mid-subbasin



Documenting:

Three Subwatersheds:

There is considerable downstream parr movement during spring.

Canyon/mainstem rearing strategy.

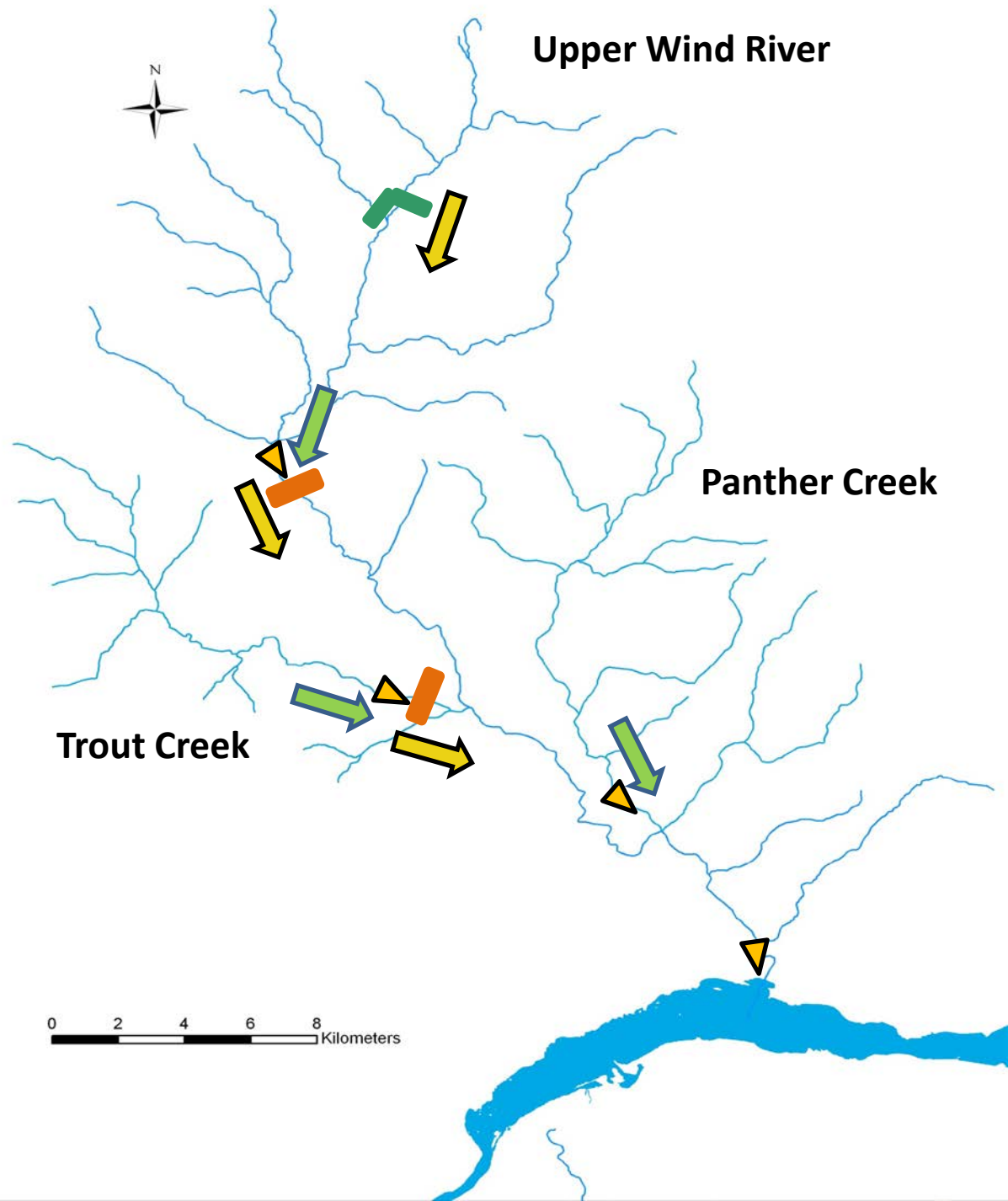
Tributary and mid-subbasin scales:

There is spring downstream parr movement, but also during summer and fall.

Canyon/mainstem rearing strategy?

Typical parr, natal rearing, age-2 smolt.

Resident



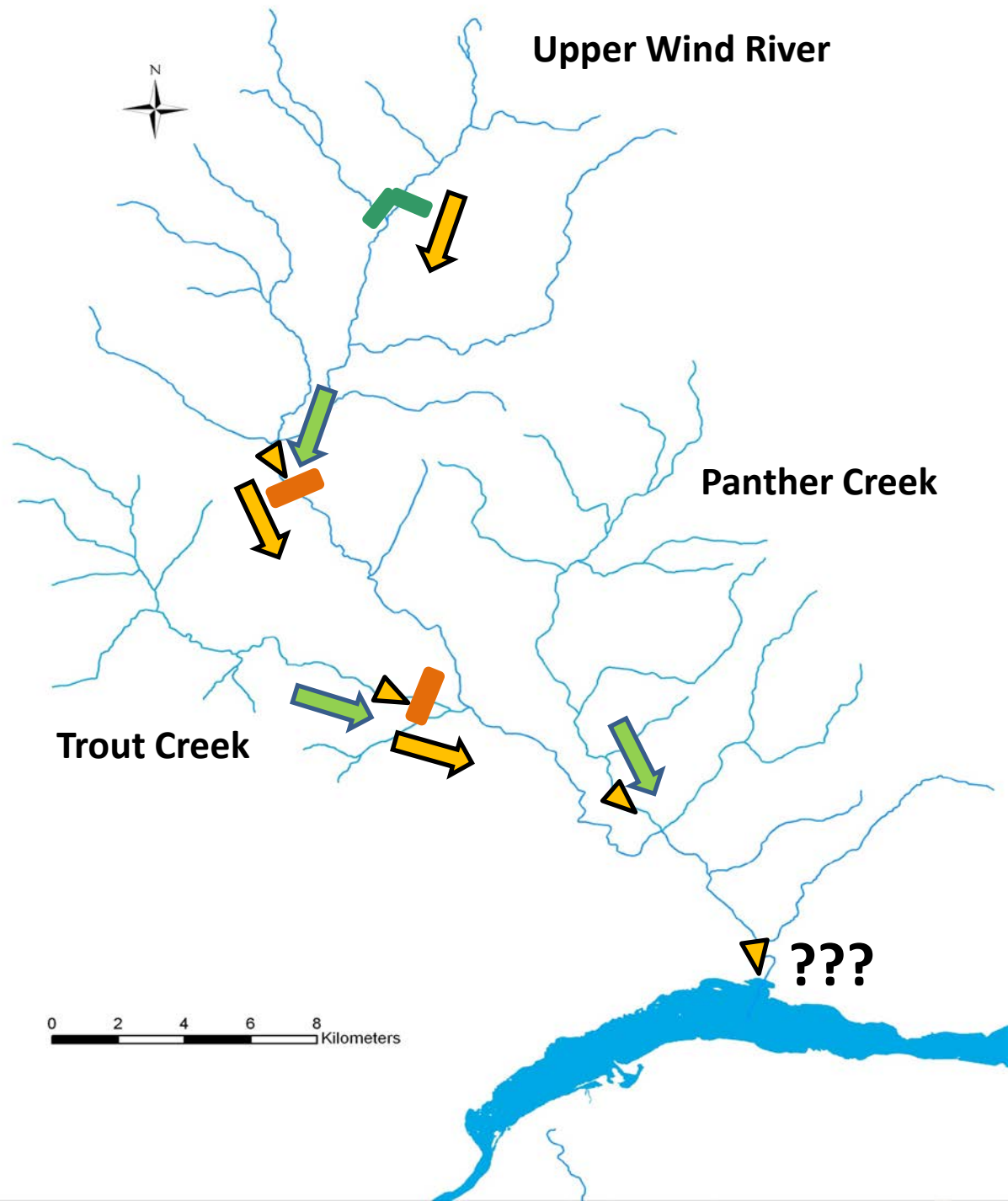
Fish In - Fish Out Fish Out - Fish In

Relying solely on smolt data, or spring monitoring of juveniles, might not tell the whole story given plasticity of steelhead life histories and rearing strategies

Might be missing some fish out

Parr leaving subbasin ???
Spring? Other times???

Quinn 2005 – juvenile steelhead
At Bonneville Dam all months
of the year



Where are we going?

In the Wind:

Continue to track PIT-tagged fish – fill in our capture/re-contact histories.

Factors driving parr migration – constant through time and at different densities?

Including adult detections at Bonneville Dam.

Investigating growth data and potential relationship to movements.

Continue to tag more fish

Add instream detection - one mid-subbasin site planned for 2014.

Would be great to have an additional detection site near the mouth.

WDFW is developing a life stage specific survival model for Wind Data.

Start incorporating parr information.

General thoughts

Steelhead parr life-histories and research on alternatives to typical has been overlooked and deserves more attention.

Parr monitoring incorporated into long-term steelhead research program.

Important to understand and conserve the contributions that various life-history strategies bring to populations. Diversity is critical when faced with:

Changes in management of fisheries, water, or **Climate Change**

Gorge is exciting place to investigate steelhead life-history diversity.

Manageable size rivers and tributaries with opportunities for tagging and for instream PIT tag detection. Growing infrastructure for PIT-tag detection.

Rivers have a diversity of species present and hatchery actions/influences.

Where do those parr go?

