

Use of the Mainstem Columbia River by Walla Walla Basin Bull Trout

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Background

- General decline in bull trout abundance resulted in 1998 ESA listing.
 - All populations in the Columbia River Distinct Population Segment (DPS) listed as threatened.
- Draft Recovery Plan for the Umatilla-Walla Walla Recovery Unit (2002).
 - Identifies improving connectivity between populations as a necessary action to help protect against local extinction events.
 - Helps preserve the genetic integrity of those populations.
- In 2000, the FWS Biological Opinion on the effects of the FCRPS on listed bull trout was issued.
 - Reasonable and Prudent Measure (RPM) 10.A.2.1:
Determine the extent of bull trout use of the Lower Columbia River affected by the FCRPS from the Pacific Ocean to the upstream extent of the McNary Dam reservoir.

Background

- **Phase 1 - The COE funded a PIT detection array near the mouth of the Walla Walla River (2005-2009) to quantify use of the mainstem Columbia River by migratory bull trout.**
- **Phase 2 - The COE funded the second phase of the project in FY2010 to describe spatial and temporal use and migration patterns in the Columbia River.**



Project Goals

- **Provide spatial and temporal data on migratory bull trout use of the mainstem Columbia River.**
- **Determine the extent and timing of movements in the mainstem Columbia River**
- **Describe how bull trout interact with the existence and operation of the FCRPS projects and their associated reservoirs.**

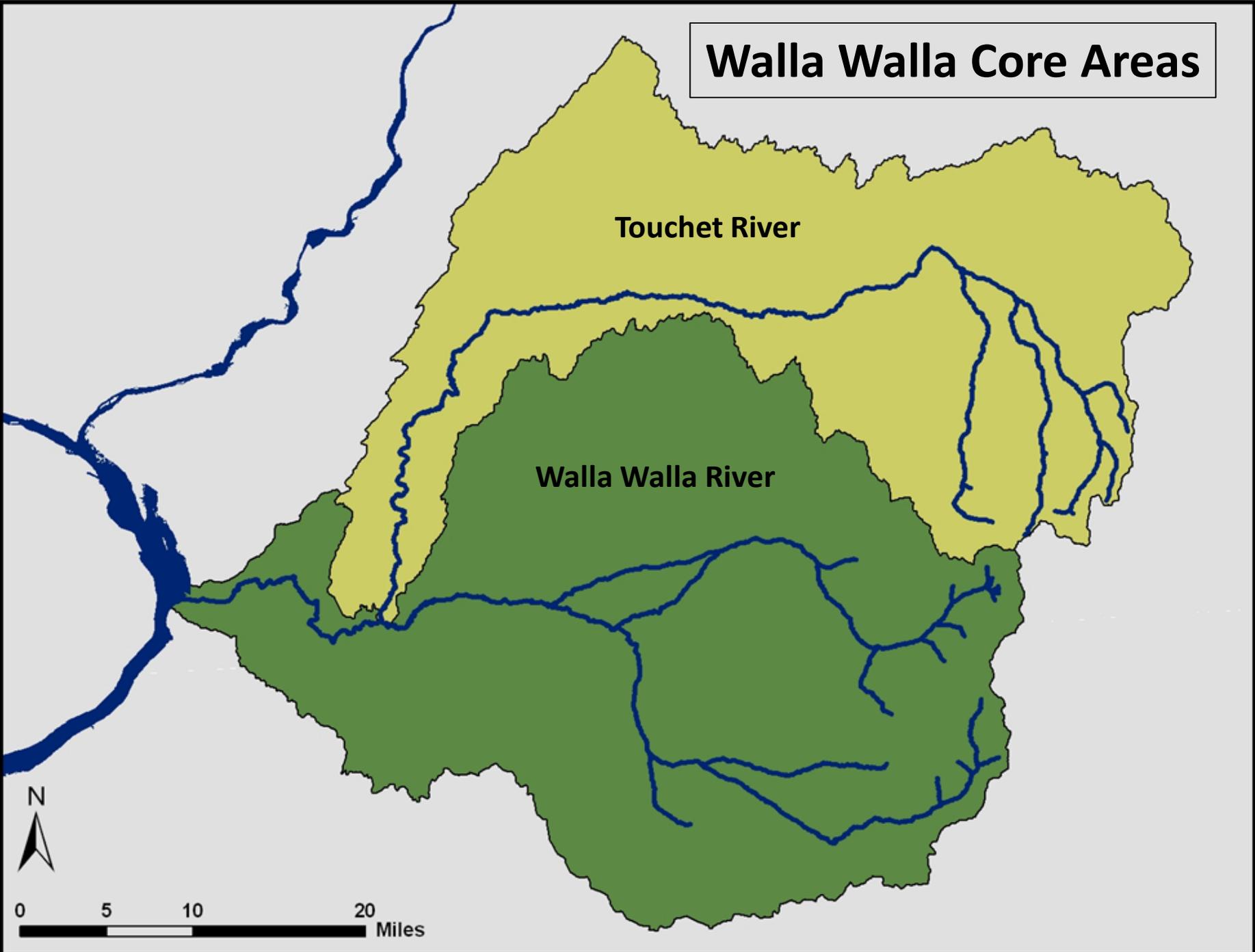


Project Objectives

- **Capture and apply acoustic transmitters to migratory bull trout that are emigrating out of the Walla Walla Basin and monitor movements.**
- **PIT tag Walla Walla Basin bull trout to support the acoustic research including maintaining a tagged population of bull trout for:**
 - **Detection at instream PIT detection arrays,**
 - **Detection at the mainstem hydro projects**
 - **Estimate migratory population size.**



Walla Walla Core Areas



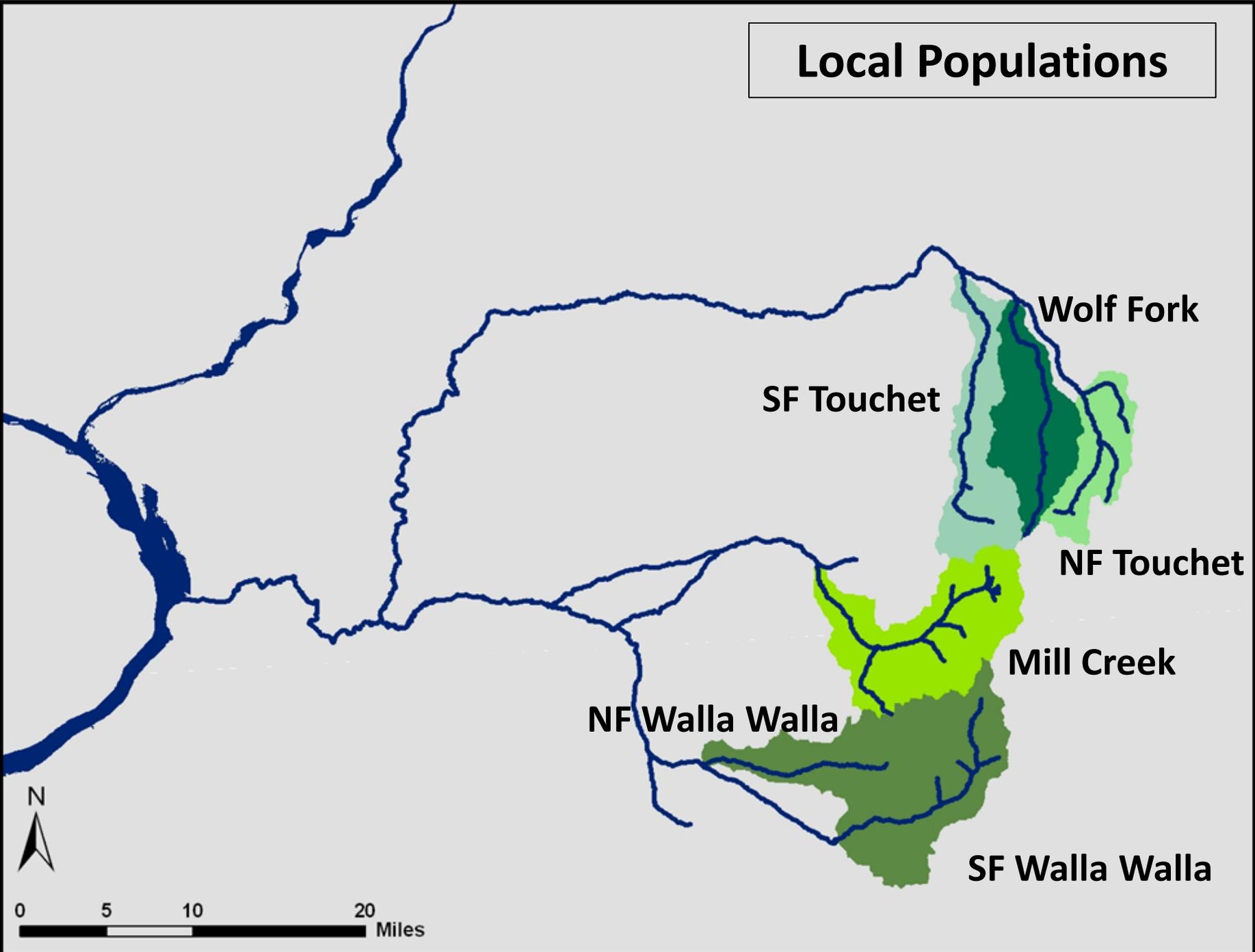
Touchet River

Walla Walla River

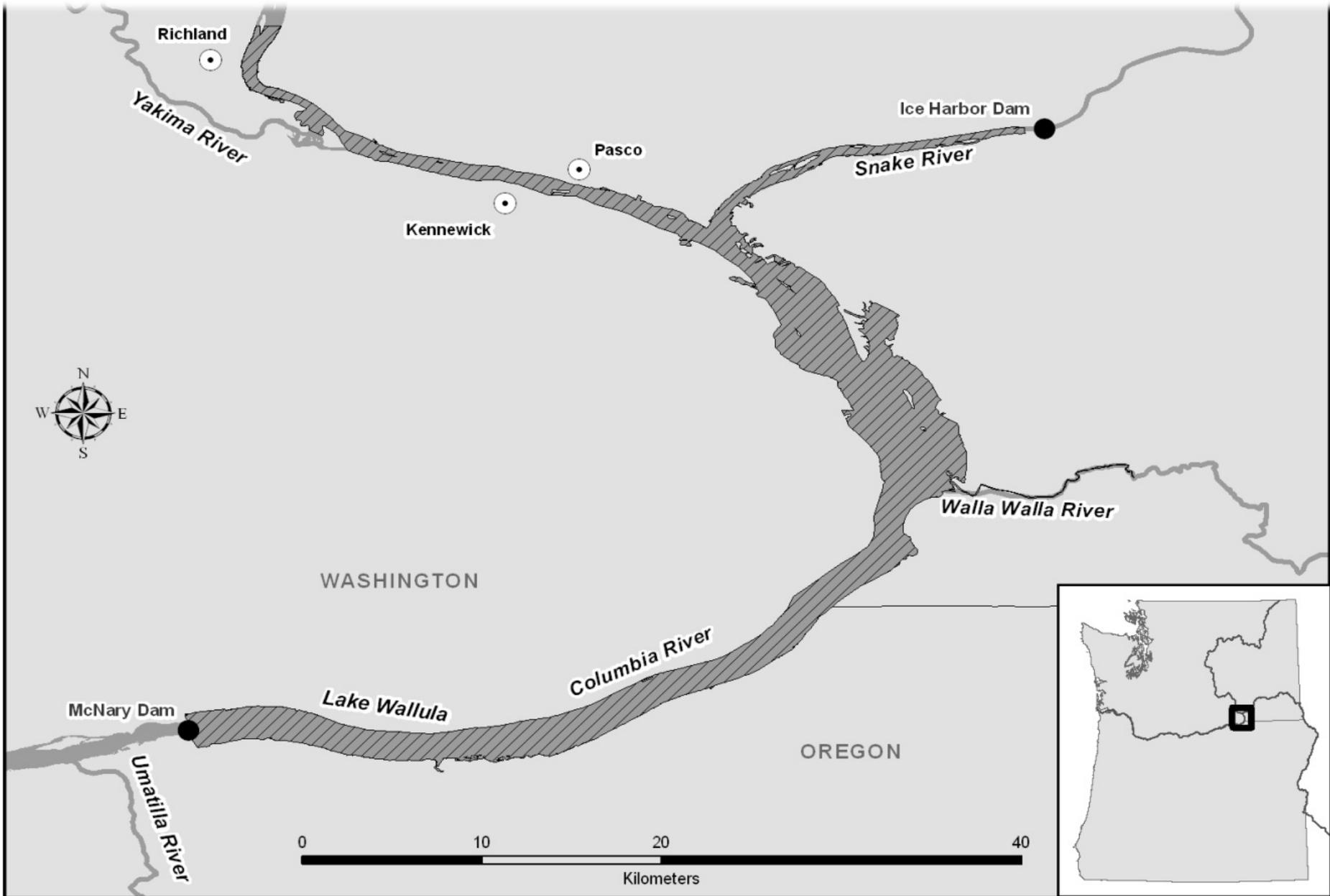
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0 5 10 20 Miles

Local Populations

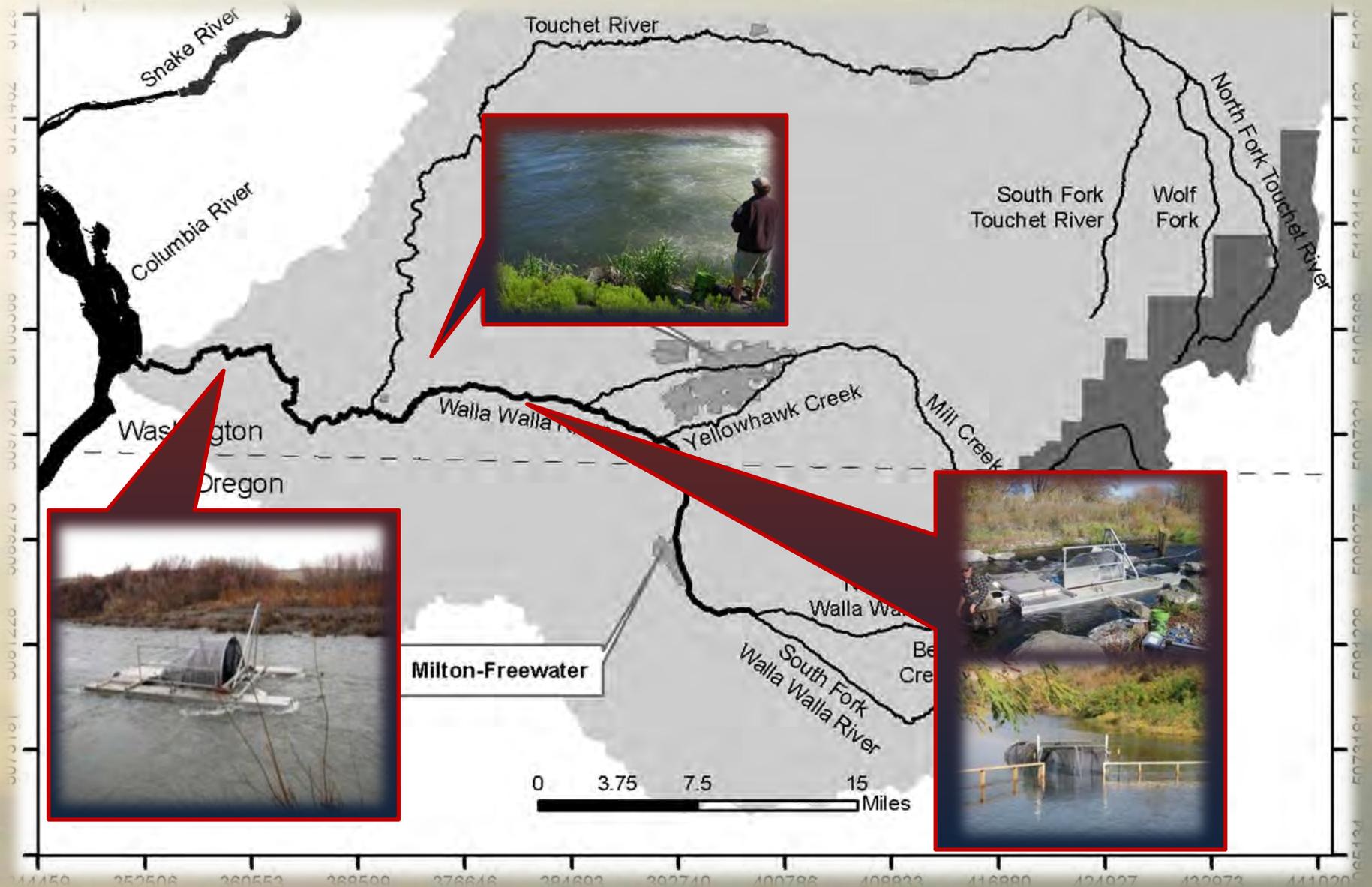


Mainstem Study Area



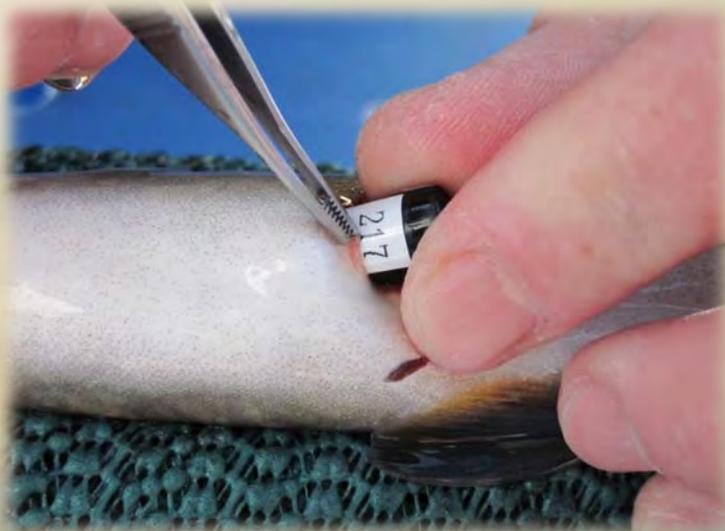
Methods

Capturing Bull Trout - Acoustic Tag Deployment



Methods

Acoustic Transmitter Deployment



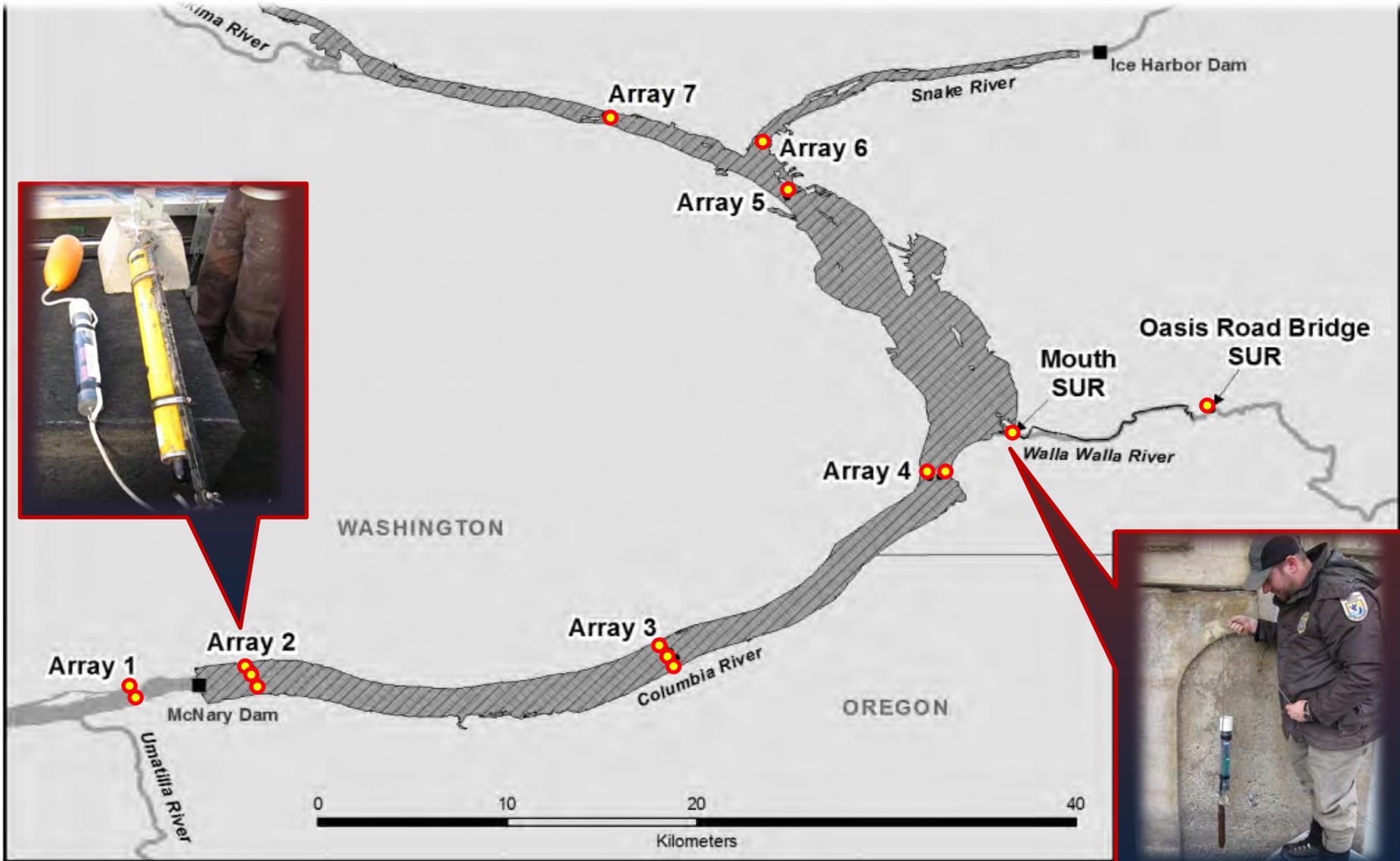
Methods

Monitoring Bull Trout Movements – Mobile Tracking



Methods

Monitoring Bull Trout Movements – Fixed Hydrophone Stations



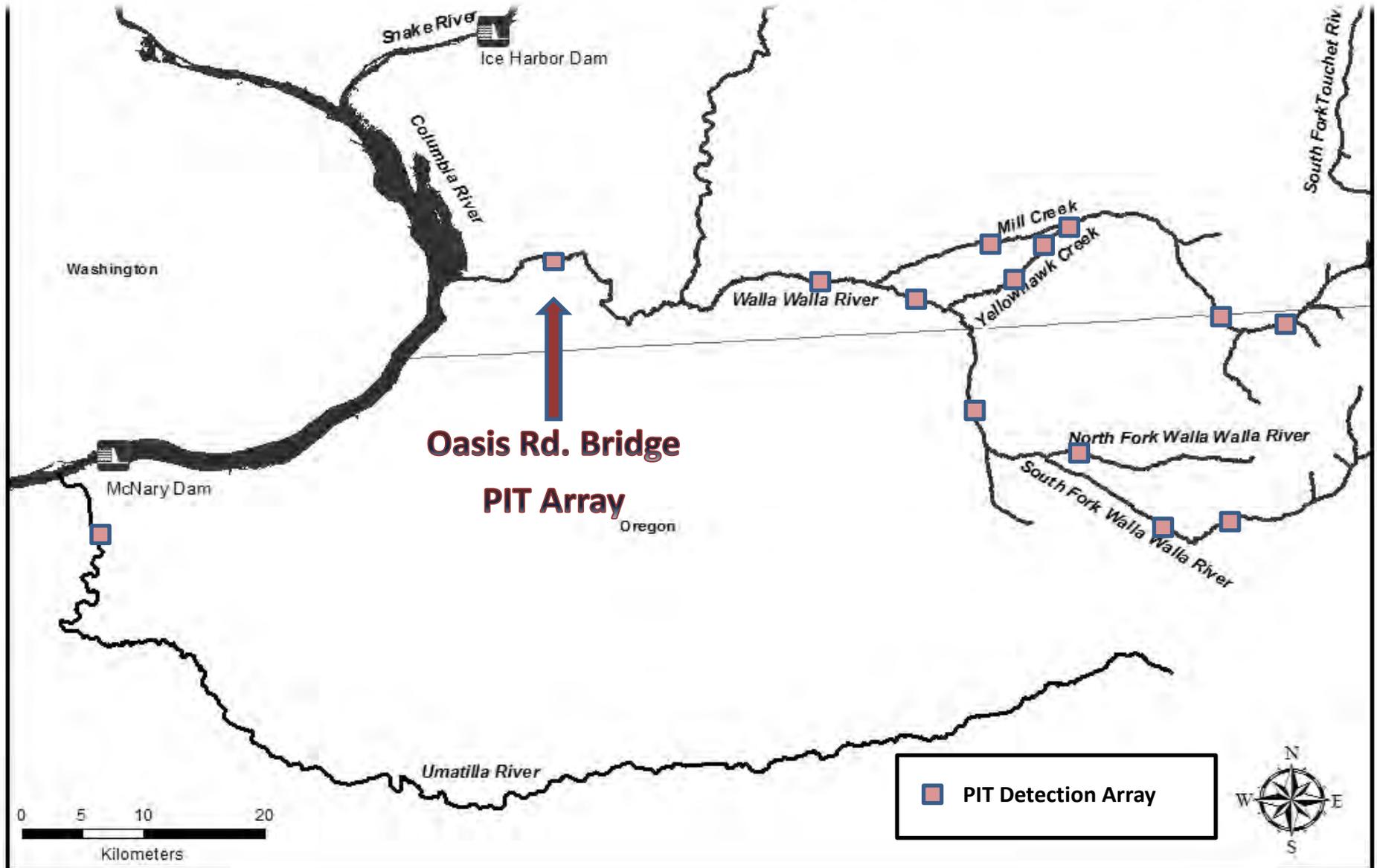
Methods

PIT Tag Deployment – Middle and Lower Basin Areas



Methods

Monitoring Bull Trout Movements – PIT Detection Arrays

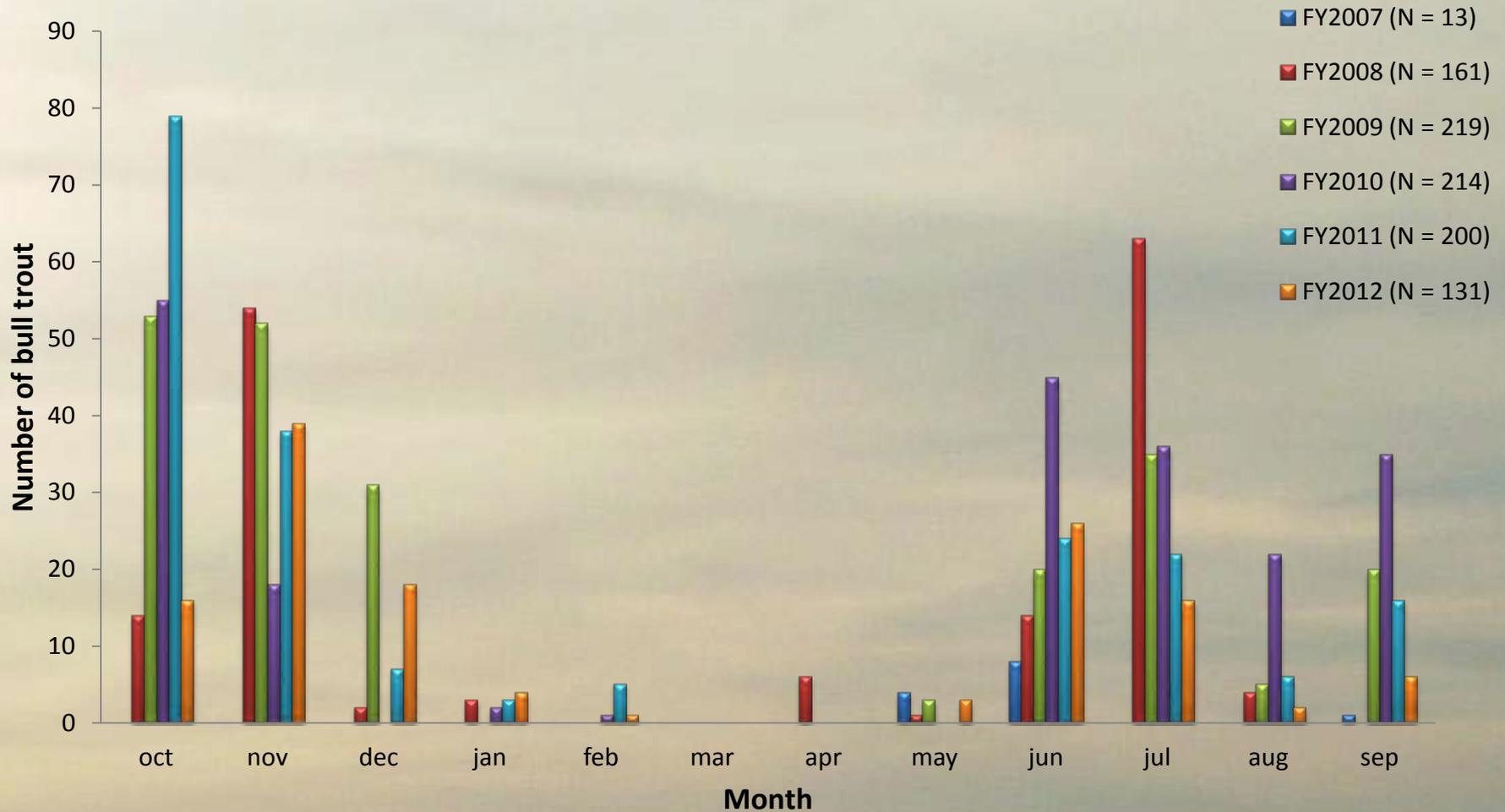


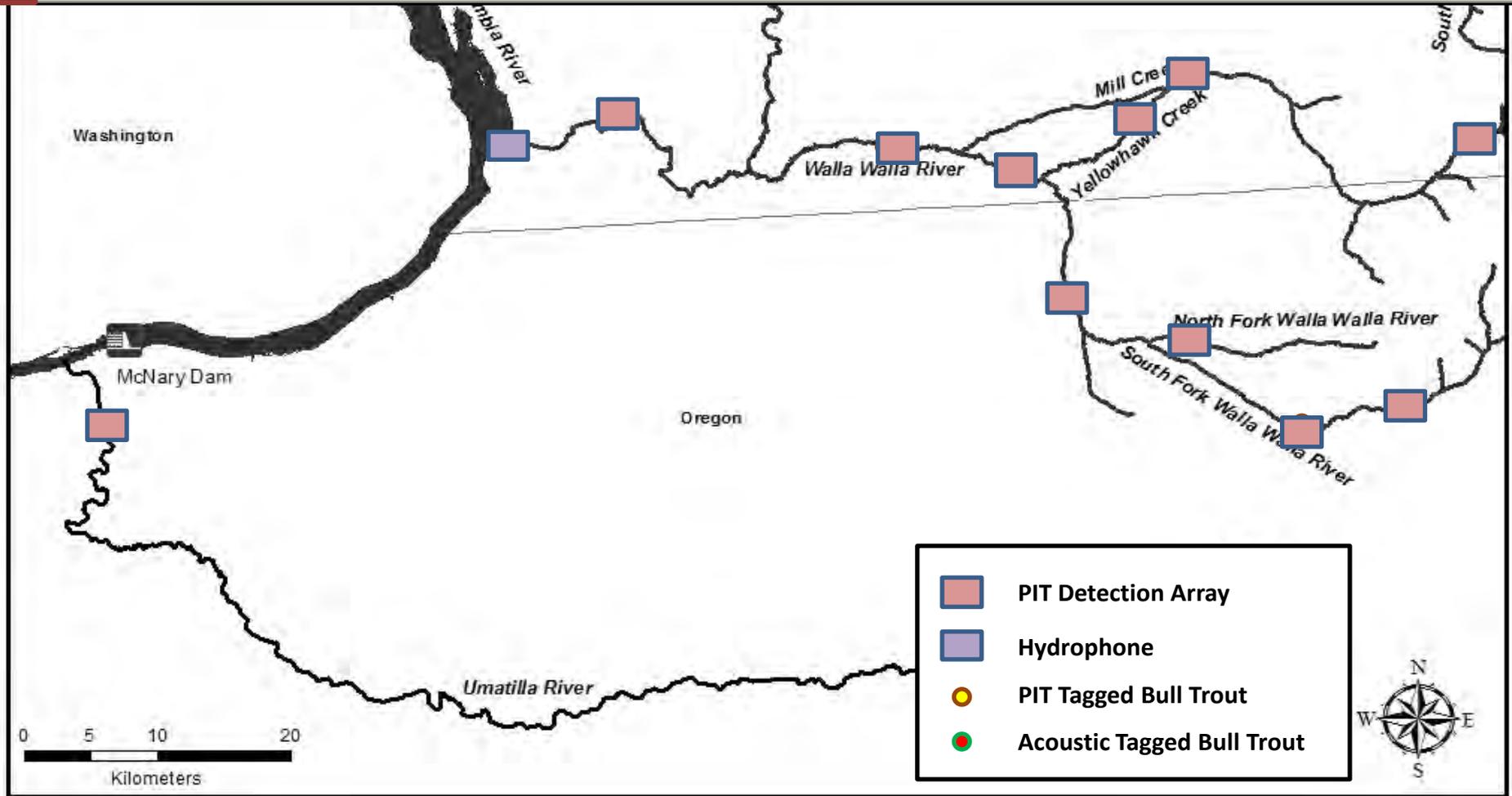
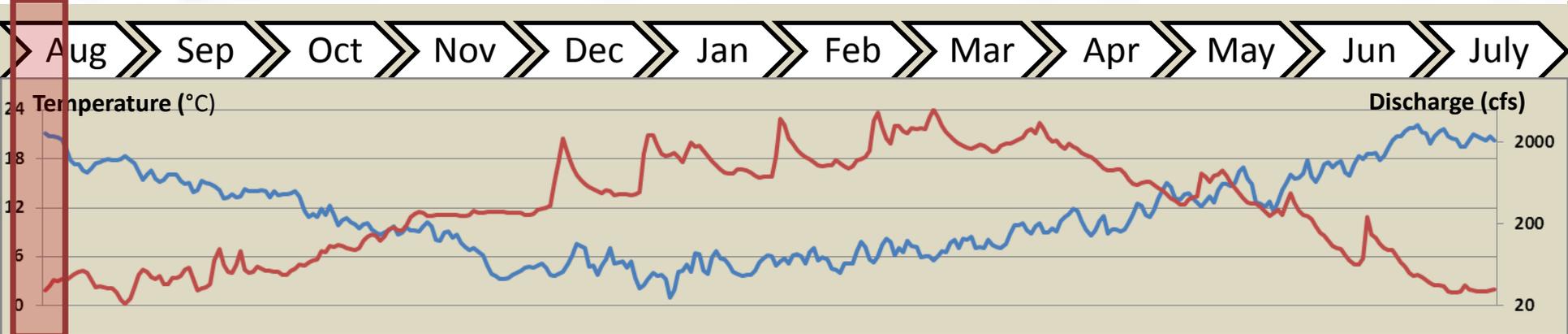
Oasis Rd. Bridge PIT Detection Array



Results

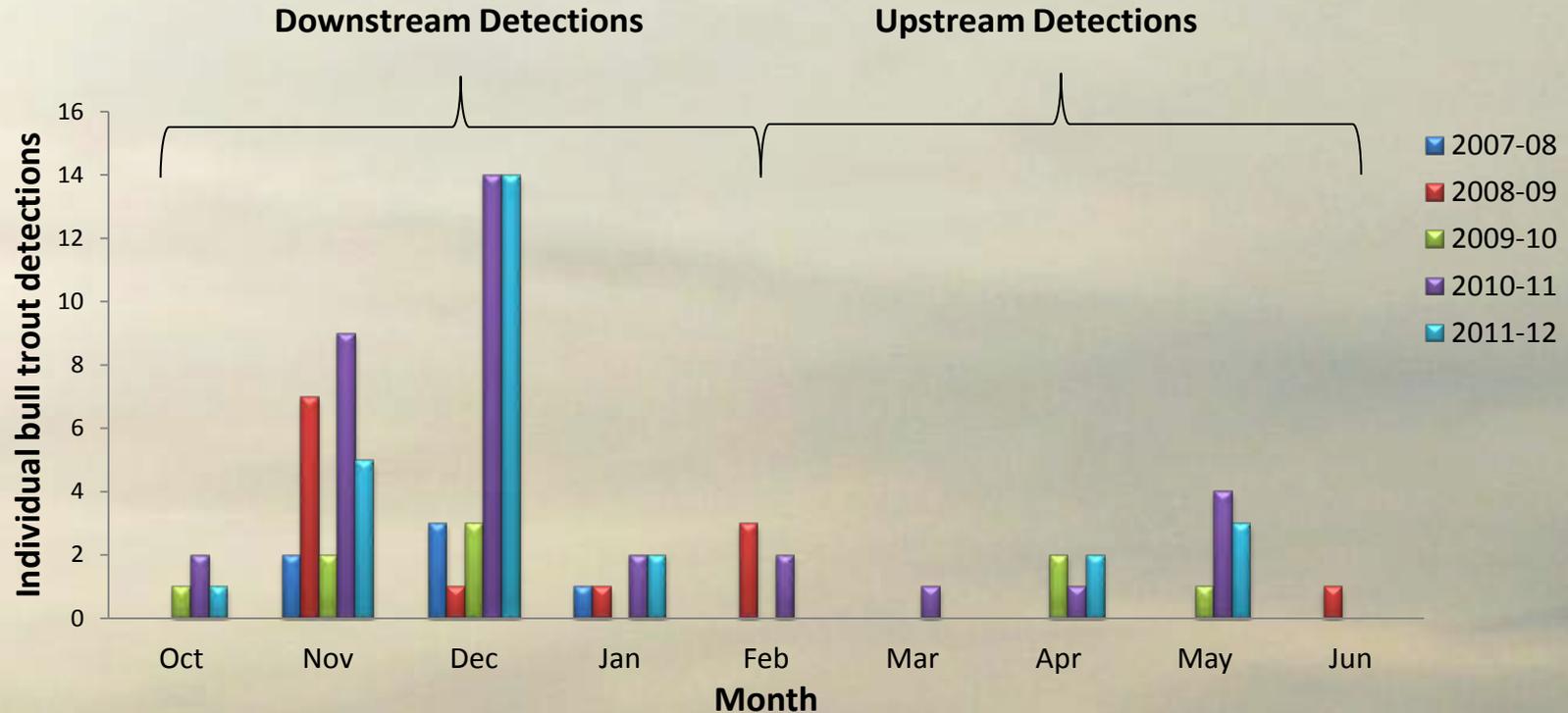
PIT Tag Deployment – Middle and Lower Basin Areas





Results

Oasis Rd. Bridge PIT Detections



- Bull trout generally enter the Columbia River from October through February and return to the Walla Walla River from February through June.
- Most bull trout enter the Columbia River during November and December.
- Bull Trout entering the Columbia River averaged 280 mm (215 – 435 mm)

Results

Mainstem Dam PIT Detections

Tagging Site	Detection Location	Tagging Date	Detection Date
Walla Walla River	McNary juvenile bypass	7/30/2008	4/15/2009
Walla Walla River	McNary adult ladder (Oregon)	10/23/2008	05/25/09 & 06/19/09
Walla Walla River	Priest Rapids adult ladder (east)	1/28/2009	7/5/2009
Walla Walla River	McNary adult ladder (Oregon)	10/24/2012	6/26-29/2012

Results

Estimated Migratory Population Size

- Population estimates developed from PIT detections, mark ratios, and physical detection efficiency of PIT array.

Migration Year	Number PIT Tags Detected	Seasonal PDE	PIT Tagged Outmigrants Adjusted for PDE	Proportion Outmigrant Population Tagged	Estimated Number of Outmigrants	95% CI
2007/08	6	0.97	6.2	0.125	49.5	6-96
2008/09	12	0.58	20.7	0.174	118.9	38-203
2009/10	6	0.91	6.6	0.286	23.1	6-46
2010/11	29	0.66	43.9	0.167	263.1	59-466
2011/2012	23	0.96	43.7	0.526	45	23-72
Totals	76	--	121.1	--	500.4	132 - 883



Results

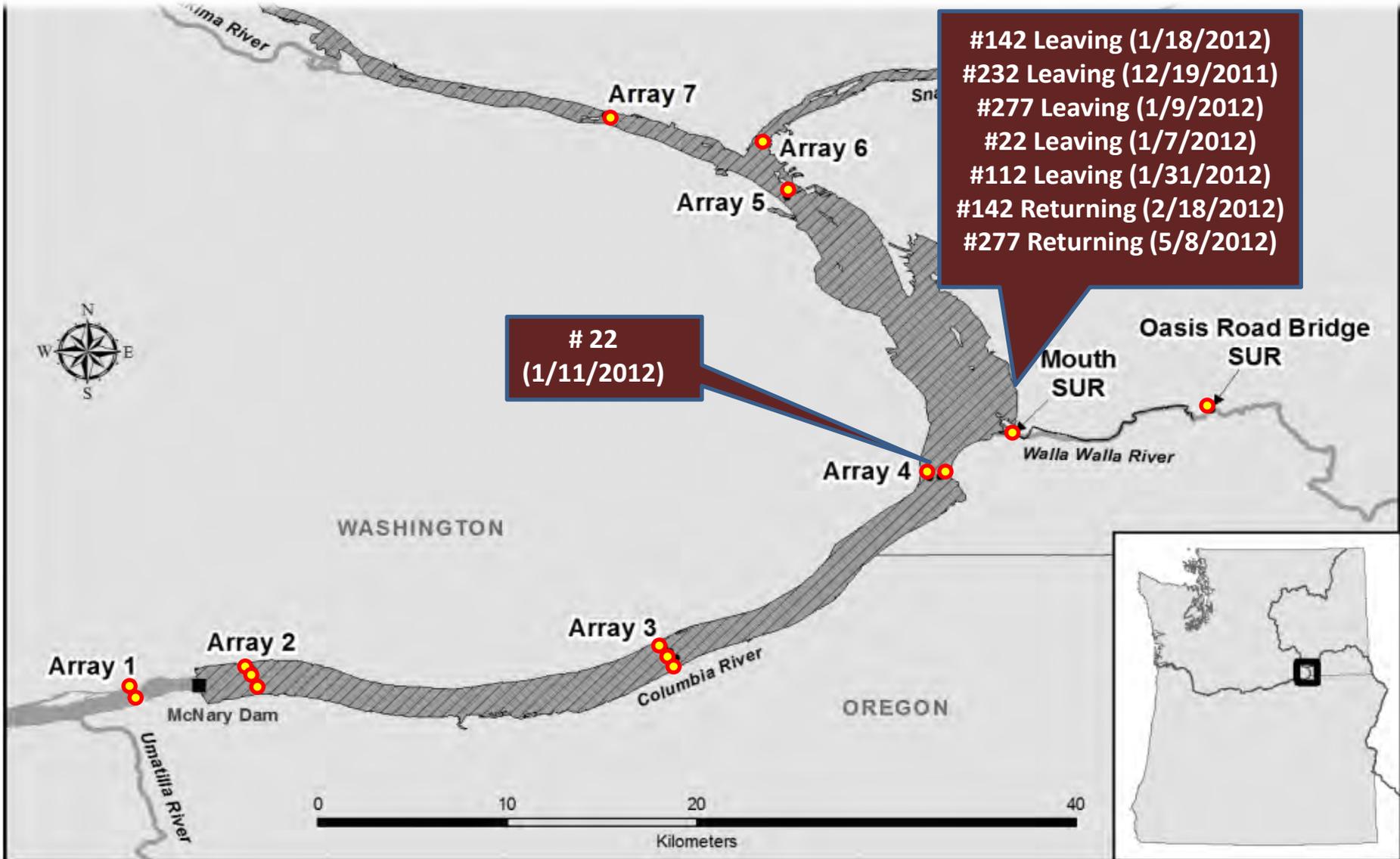
Capturing Bull Trout - Acoustic Tag Deployment

Migration Year	Pierce's RV Park Screw Trap (rkm 9)	Lowden (CTUIR) Screw Trap (rkm 51)	Fyke Nets	Beach Seine	Lower River Angling	Total Number of Acoustic Tags Deployed
2010/11	3	9	0	0	0	12
2011/2012	2	10	0	0	3	15
Totals	5	19	0	0	3	27



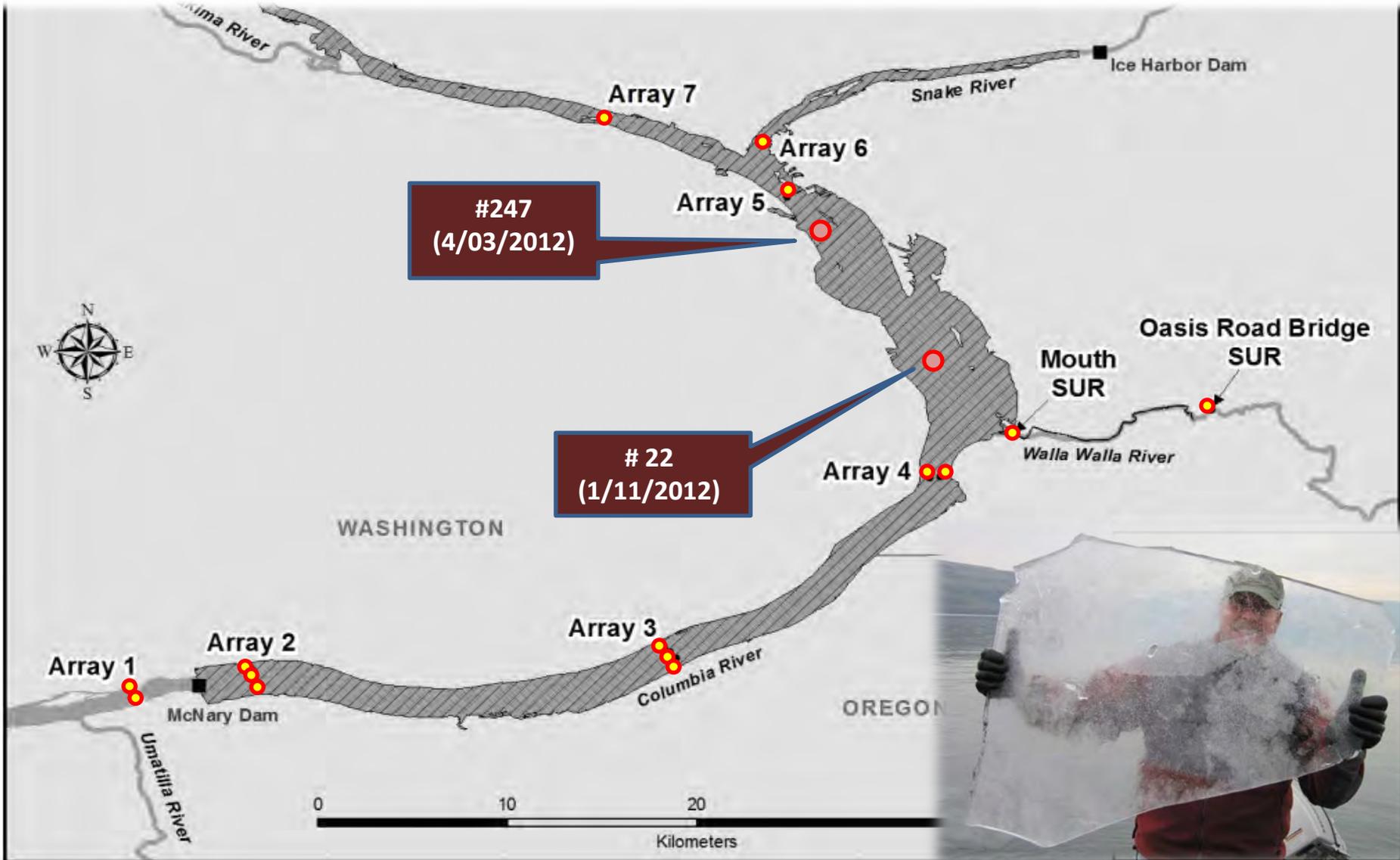
Results

Monitoring Bull Trout Movements – Fixed Hydrophone Stations



Results

Monitoring Bull Trout Movements – Mobile Tracking



What We Know...

- Bull trout migrate from the Walla Walla Basin to the Columbia River from October through February and return from February through June.
- An estimated 500 bull trout emigrated from the Walla Walla Basin to the Columbia River since 2008 and varies from year to year.
- Walla Walla Basin bull trout use deep water habitat (40 – 60 ft).
- Bull trout encounter and pass through the hydro projects.
 - Downstream passage
 - Likely during fall/winter (through turbines).
 - Upstream passage
 - Late spring /early summer (fish ladders)
- Wall Walla Basin bull trout can (and do) connect with other populations.

Connectivity with the Umatilla River

- A bull trout that was PIT tagged in the Walla Walla River was recaptured at Three Mile Falls Dam in the Umatilla River this spring.
- 8 bull trout in recent years have been captured while passing upstream at Three Mile Falls Dam.
- Decided to have genetic samples analyzed (WDFW Genetics Lab). Assignment tests revealed:
 - None had originated in the Umatilla River.
 - 7 of the 8 were from the Walla Walla River.
 - 1 was from the Tucannon River.
- This is an indication of how we think populations are structured and how they interact with each other throughout the Columbia Basin.
- Umatilla River population has decreased from > 100 redds to only around 15 redds.



Concerns...

- Most of the bull trout that migrate from the Walla Walla Basin to the Columbia River never return.
 - Only 17 of 76 total PIT tagged bull trout returned (20%).
 - 7 of 13 acoustic tagged bull trout returned (54%).
- None of the Walla Walla Basin bull trout detected at mainstem hydro projects returned to the Walla Walla River or were ever subsequently detected elsewhere.
- Unable to determine through acoustic telemetry if bull trout have problems finding/negotiating upstream and downstream passage routes at hydro projects.
- Avian predation.

Avian Predation on Migratory Bull Trout



Recovery Location	Dominant Avian Species	PIT Tags Recovered
Foundation	Cormorant	36
Badger	White Pelican	13
Crescent	Tern / Gull	3
Swallows Nest Park	Cormorant (roost)	2
Island 18	Gull	1
Totals		55

Avian Predation on Migratory Bull Trout

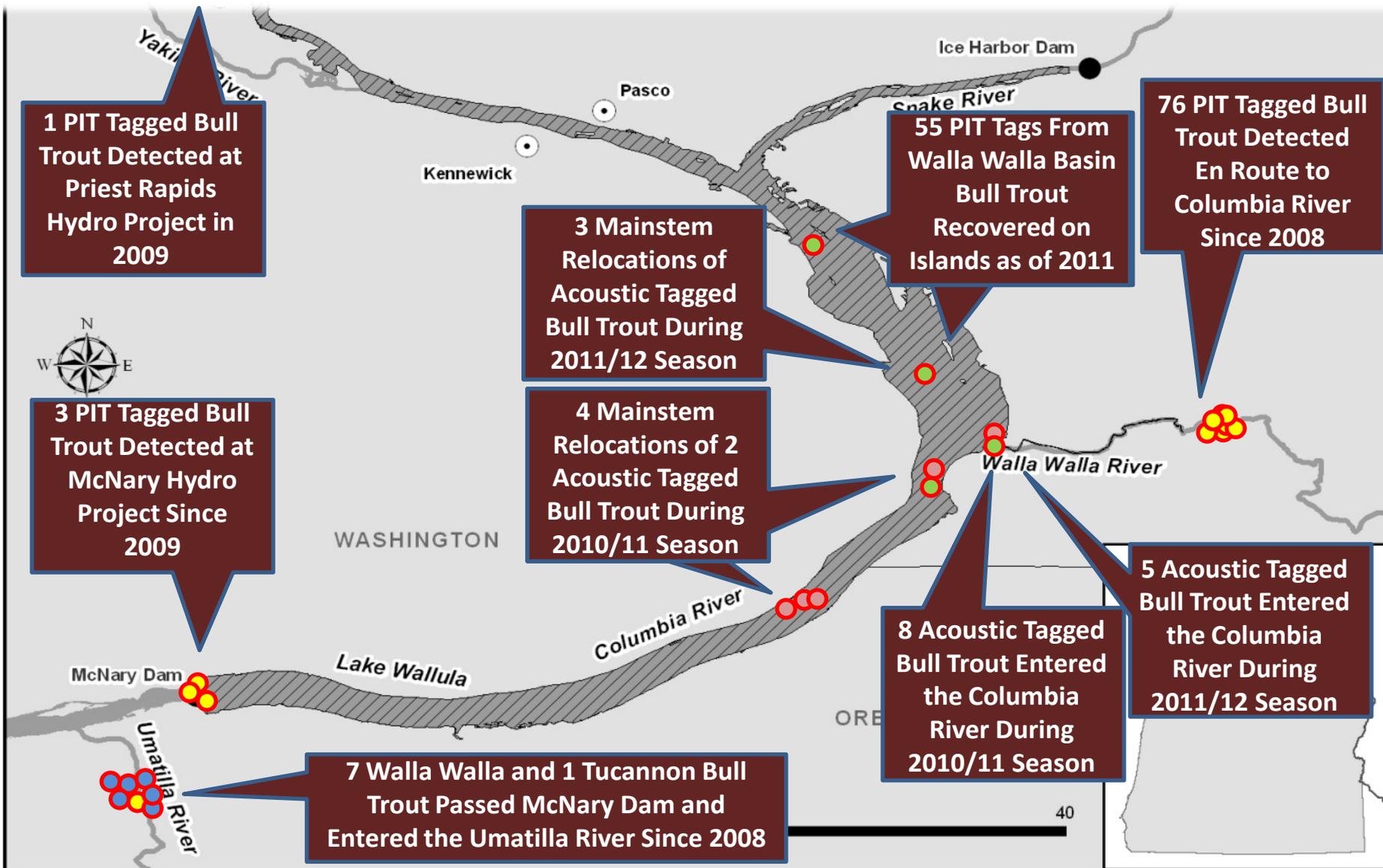
Tagging Year	Migratory Bull Trout Tagged (FWS)	Tags Recovered on Islands	Percentage Recovered on Islands
FY2008	161	5	3.1 %
FY2009	219	14	6.4 %
FY2010	214	11	5.1 %
FY2011	200	4	2.0 %
Totals	794	33	4.2 %

- Detection histories indicate that consumption occurs in lower Walla Walla Basin and Columbia River.
- Number of PIT tags recovered is a minimum
 - Not all tags make it back to the islands.
 - Not all tags that make it back are recovered.
 - Not all bull trout are PIT tagged.
- Mostly adult (or near adult) sized fish affected (164 – 410 mm, 256 mm avg.)



Summary

Use of the Columbia River By Walla Walla Basin Bull Trout



Thanks to COE – Walla Walla District Staff



Mike Berger



Carla Hurlbert



Terry McCall



Dean Holecek

