

Yakima River Steelhead Radio Telemetry: A Preliminary Assessment of 2011-2012

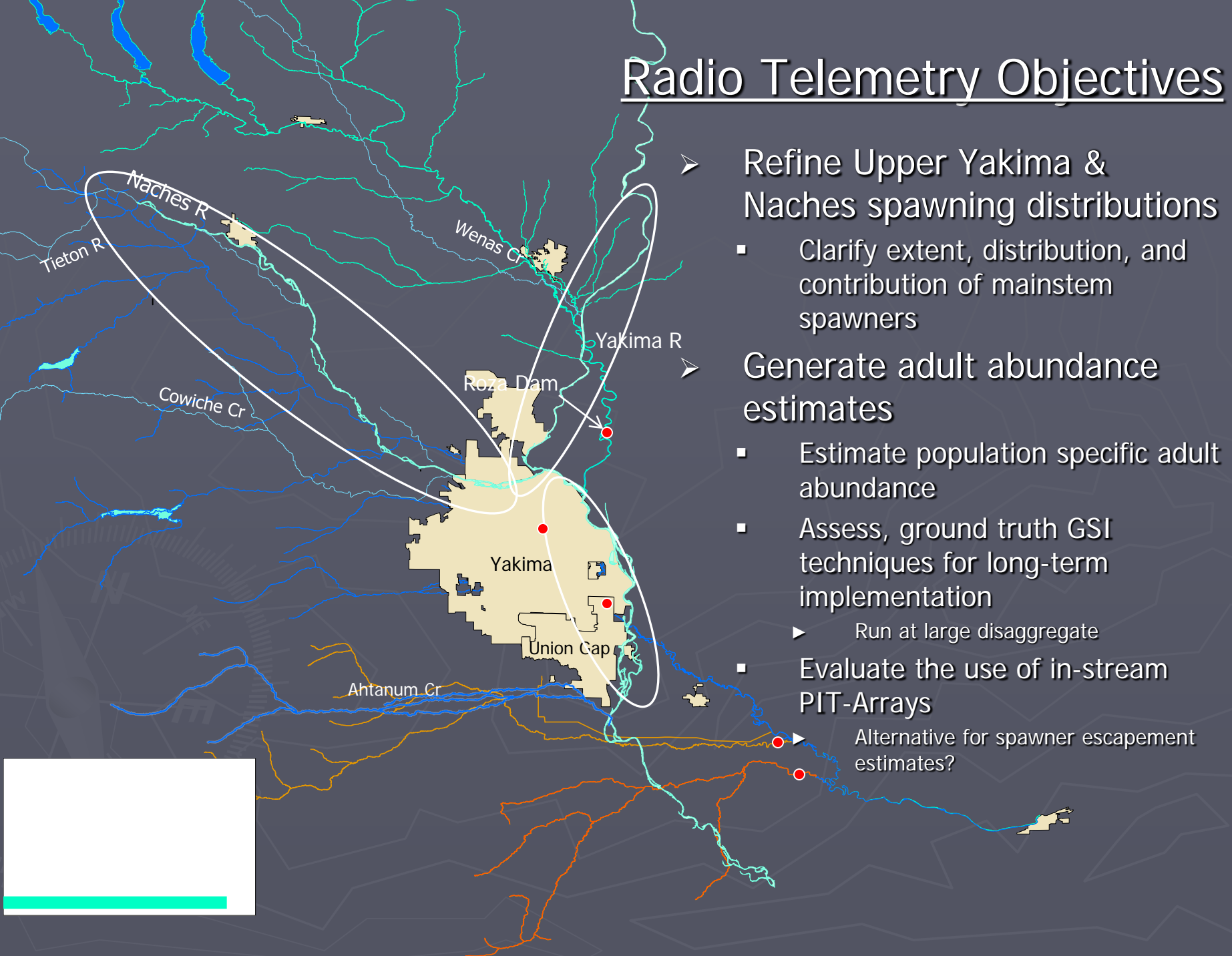
Chris Frederiksen YN



Project Acknowledgements:

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Radio Telemetry Objectives



- Refine Upper Yakima & Naches spawning distributions
 - Clarify extent, distribution, and contribution of mainstem spawners
- Generate adult abundance estimates
 - Estimate population specific adult abundance
 - Assess, ground truth GSI techniques for long-term implementation
 - ▶ Run at large disaggregate
 - Evaluate the use of in-stream PIT-Arrays
 - ▶ Alternative for spawner escapement estimates?

Run size and distribution (2011-12)

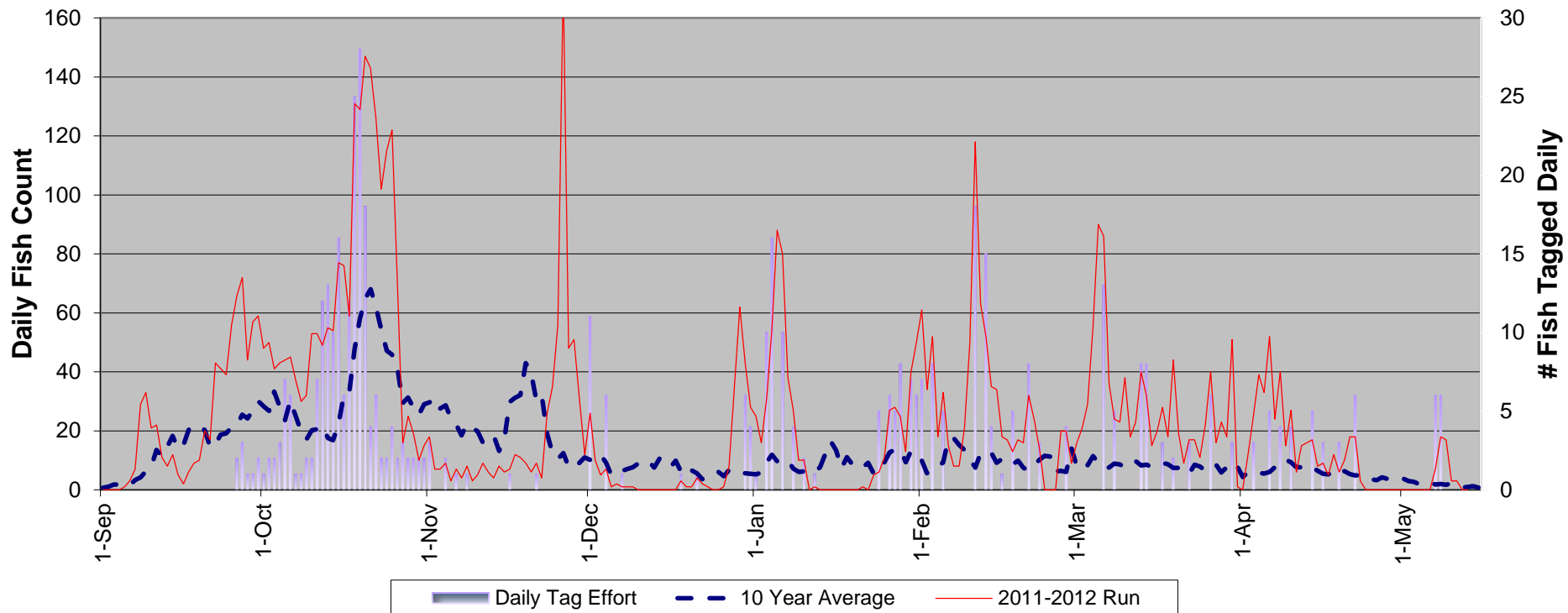
Prosser Statistics (rkm 75.6)

- 6234 total steelhead
 - 6172 wild (96.2%)
 - 152 hatchery (3.8%)
 - ▶ 66.5% F
 - ▶ 33.5% M

Tagging Statistics (715 Sampled)

- 507 radio tagged
 - 493 wild (97.2%)
 - 14 hatchery (2.8%)
 - ▶ 65.8% F
 - ▶ 34.2% M

Yakima Steelhead Run-Timing at Prosser Dam: Recent 10-Year Average vs 2011-12 Run





Females



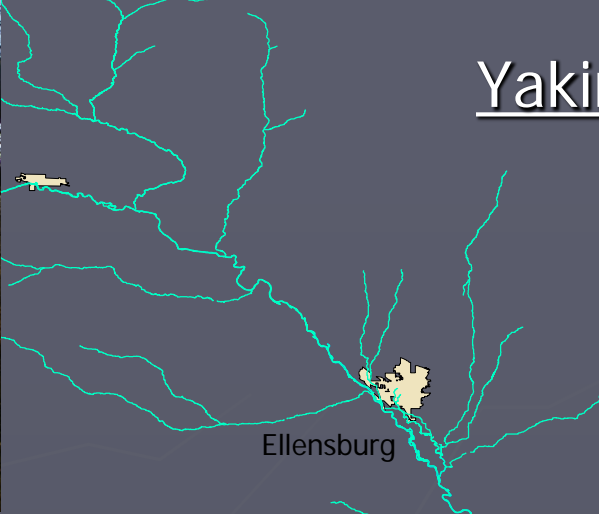
Males



➤ Bio sampling & tagging:

- Steelhead trapped at Prosser Dam (rkm 75.6)
 - Right Bank Denil Trap
- Transferred to anesthetic tank for sedation
 - Anesthetized prior to bio-sampling
 - ▶ Length, weight, sex, scales, DNA
 - ▶ Inspected for external marks, tags, injuries
 - Radio Tagging
 - ▶ Lotek Motion sensor Gastric tags
 - ▶ MXFT2-3A-M (16x46mm, 16g)
 - ▶ Placed in stomach through mouth
 - ▶ Esophageal implant tube
 - ▶ Recovery
 - ▶ Placed in adjacent recovery tank
 - ▶ ~20 minutes

Yakima River Telemetry Study: Detection Methods



Ellensburg



Fixed Site Receivers:

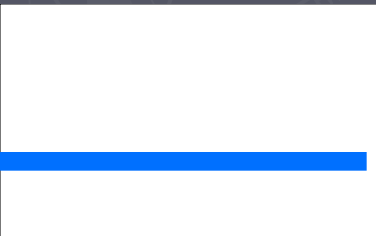
- Placed for monitoring:
 - Macro-reach movement and holding patterns
 - Tributary and population escapement
 - Mainstem Migration & spawning activity



Equipment prioritized for addressing primary objectives!



Yakima



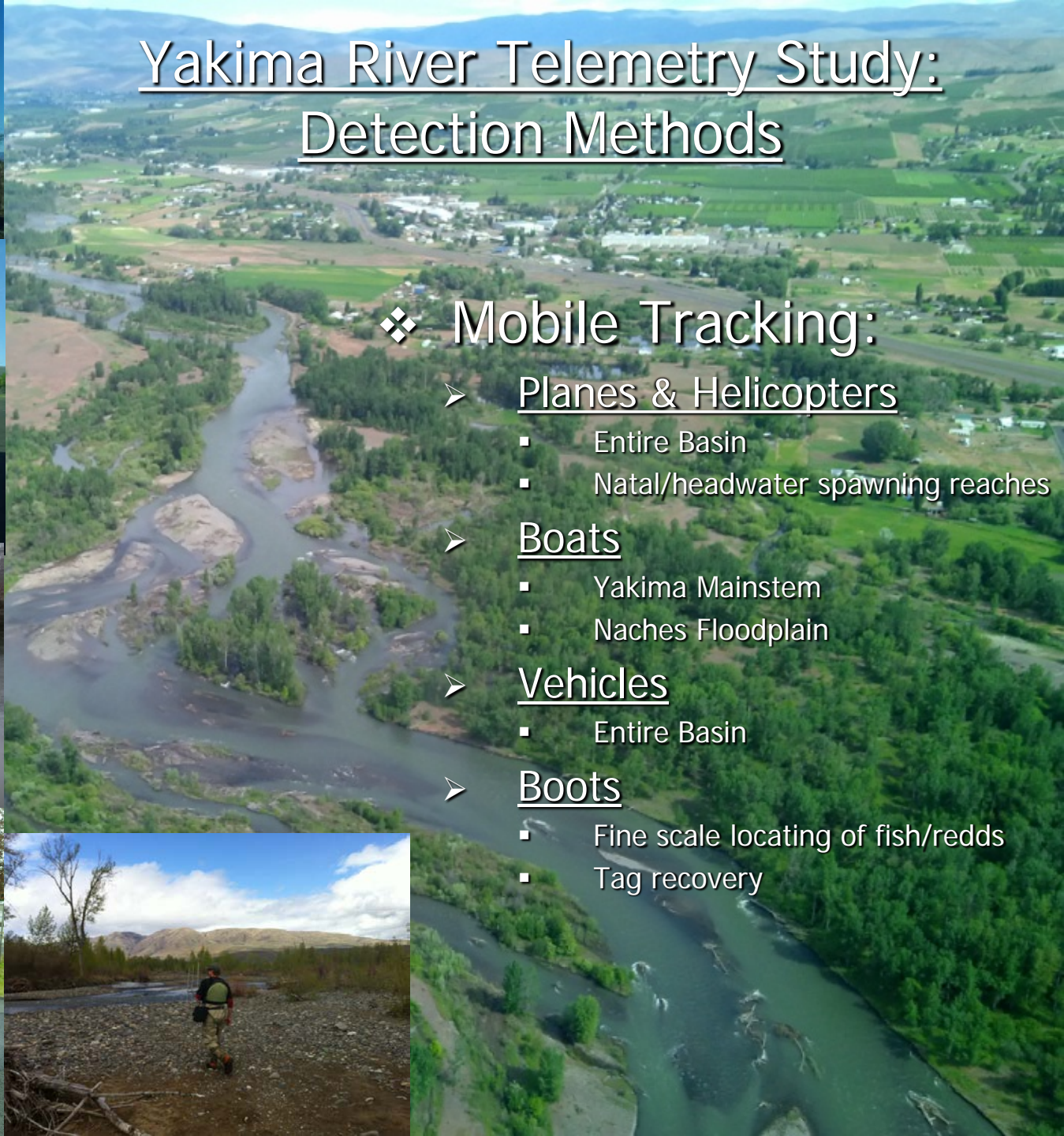
Telemetry Receiver Sites



Prosser

Yak Mouth

Yakima River Telemetry Study: Detection Methods



❖ Mobile Tracking:

➤ Planes & Helicopters

- Entire Basin
- Natal/headwater spawning reaches

➤ Boats

- Yakima Mainstem
- Naches Floodplain

➤ Vehicles

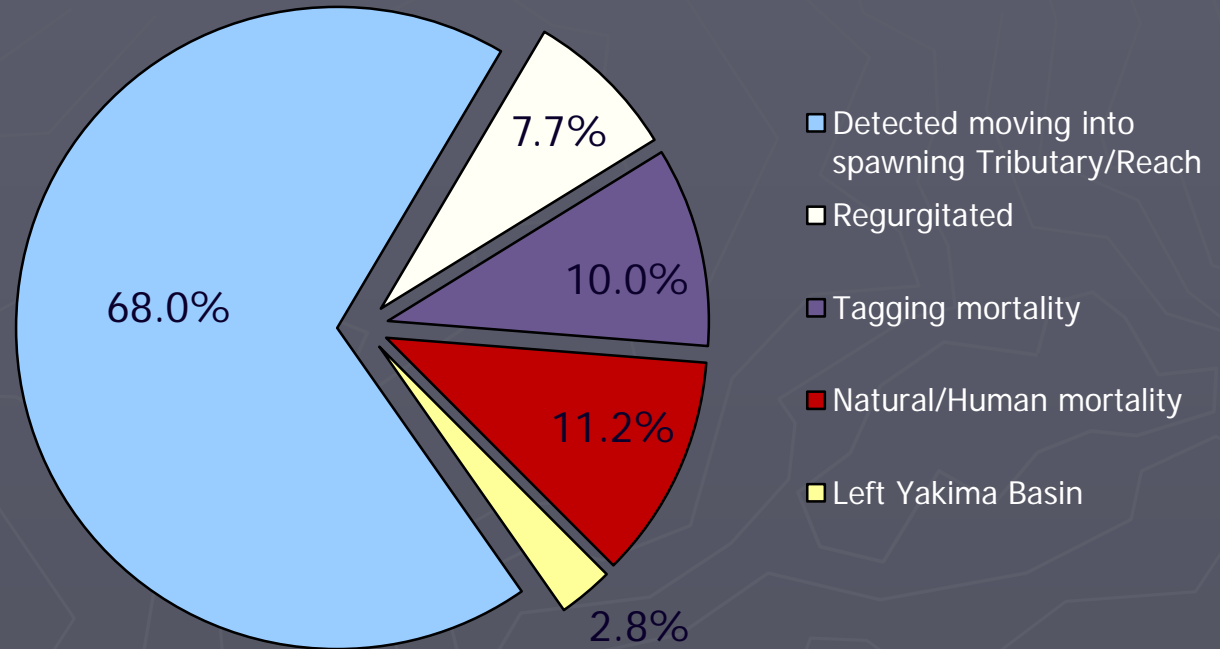
- Entire Basin

➤ Boots

- Fine scale locating of fish/redds
- Tag recovery



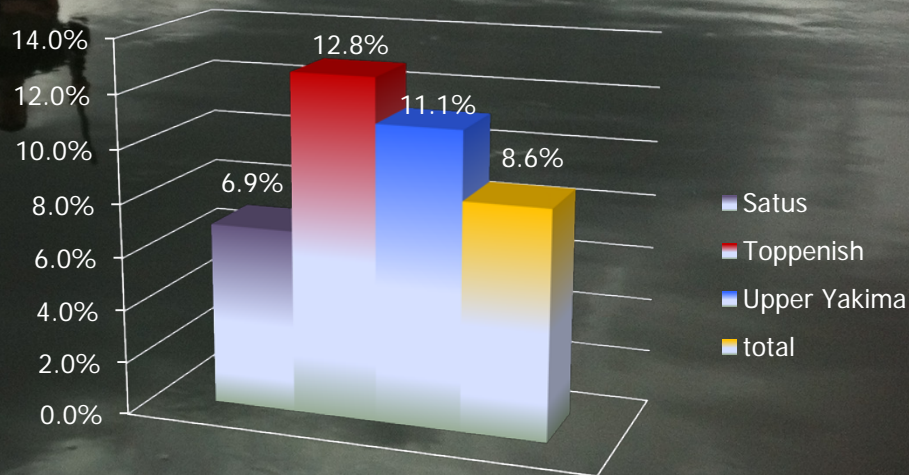
Fate of Radio Tagged Steelhead (N=507)



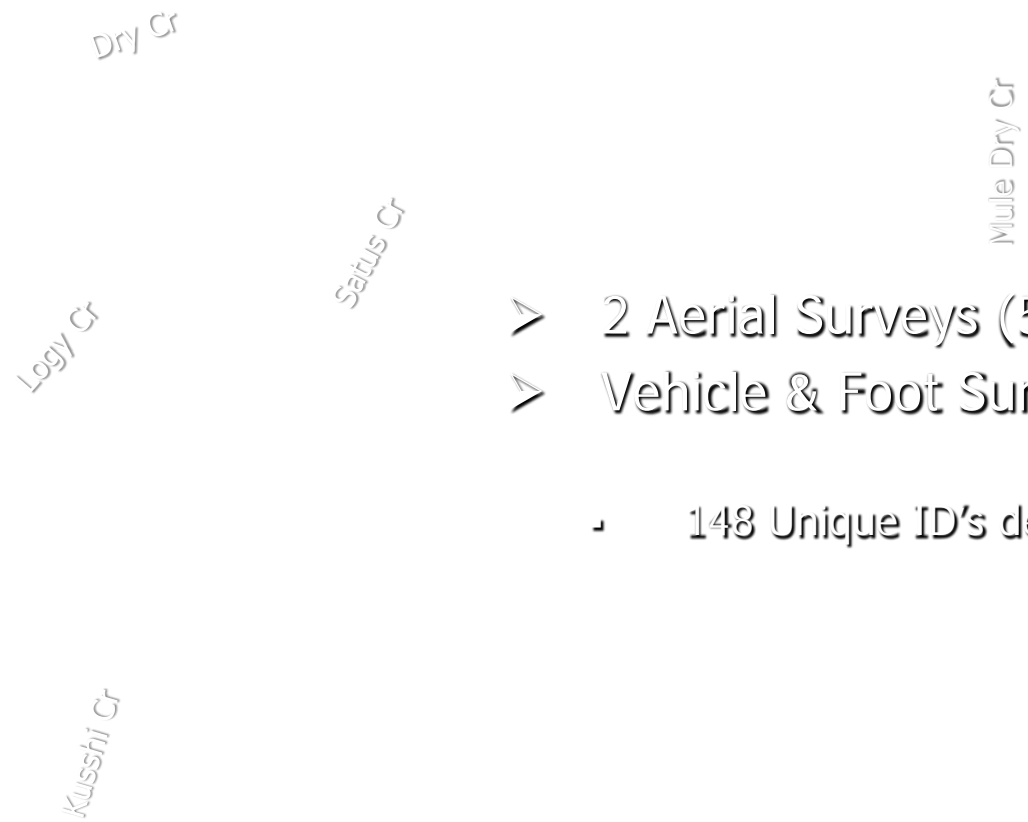
Radio Tag Regurgitation Estimates

- Simultaneous detections of PIT/RT tags
- Sites equipped with Instream arrays & RT Receivers
- Verified with Inactive tag detections and Tag recoveries
- Important part of study!

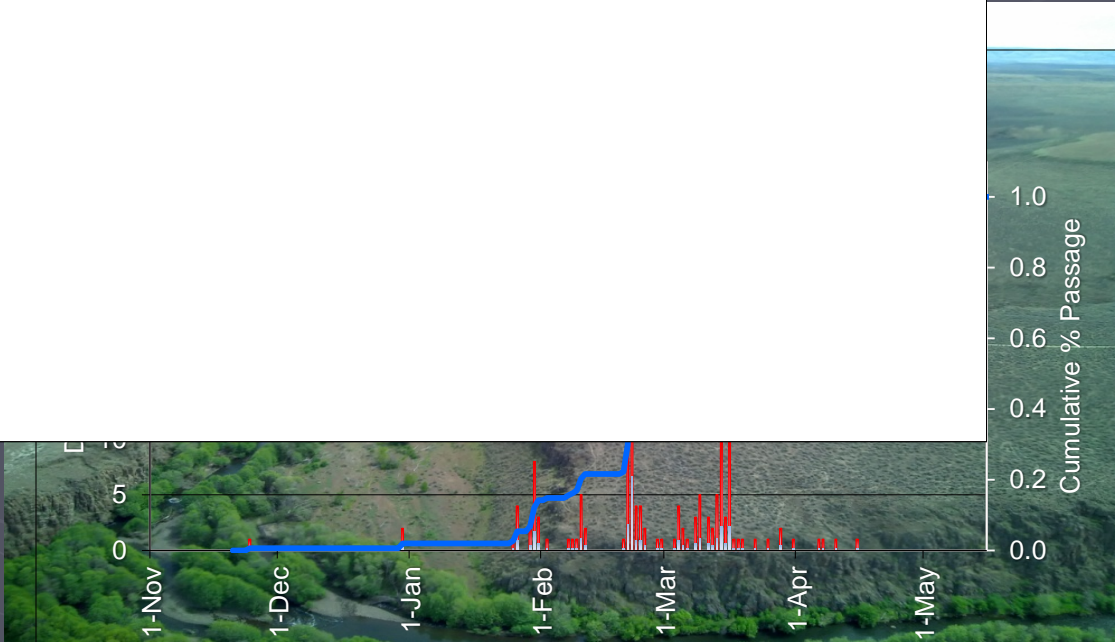
| Tag Regurgitation | | | | |
|-------------------|-----------------------------|--------------------------------|------------|-------|
| PITT Array | # Tags detected (Telemetry) | Total observed (Telemetry/PIT) | Difference | % |
| Satus | 148 | 159 | 11 | 6.9% |
| Toppenish | 41 | 47 | 6 | 12.8% |
| Upper Yakima | 23 | 27 | 3 | 11.1% |
| Total | 212 | 233 | 20 | 8.6% |



Satus Cr

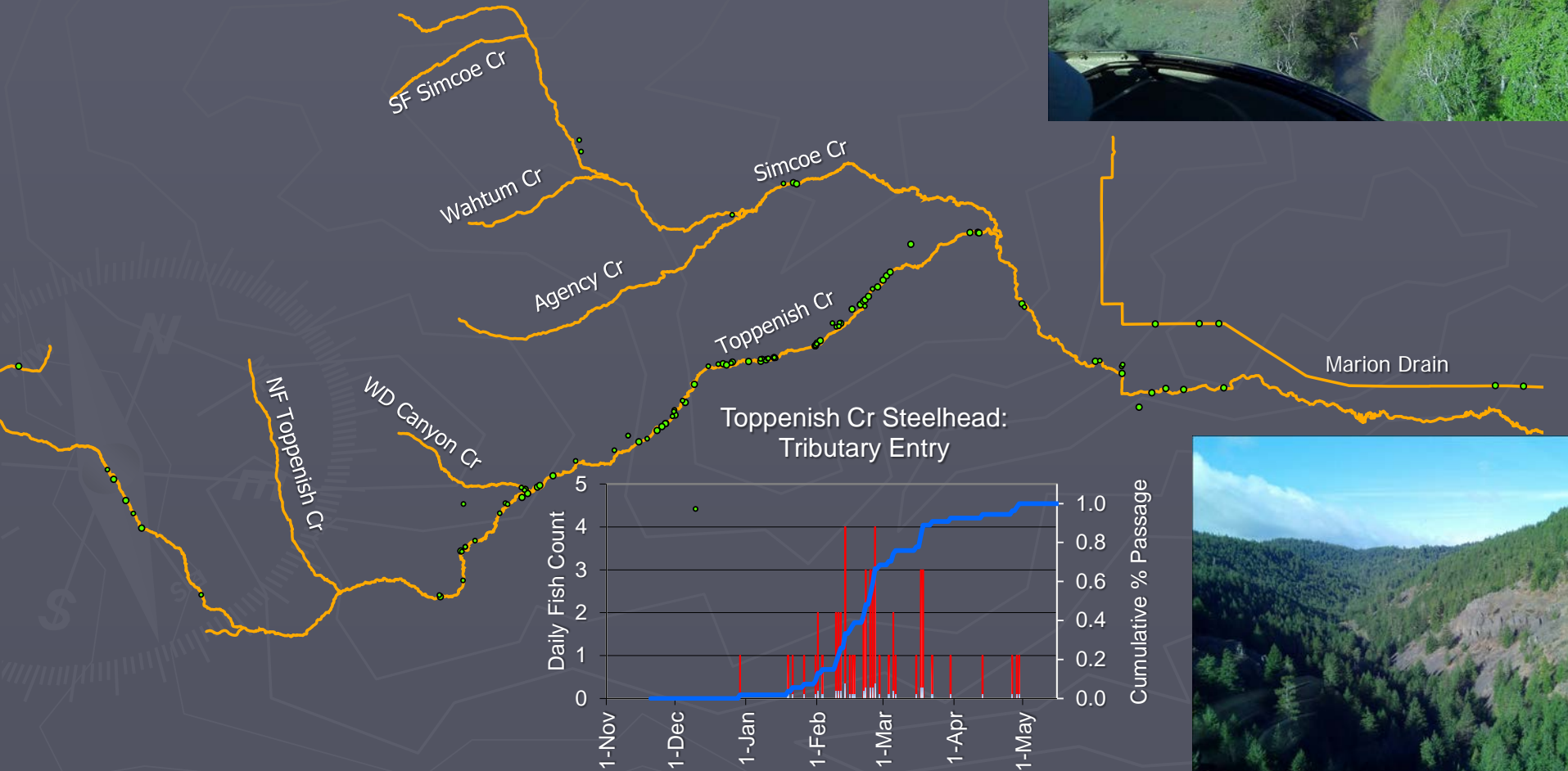


- 2 Aerial Surveys (5/2, 5/18)
- Vehicle & Foot Surveys (Jan-Apr)
 - 148 Unique ID's detected



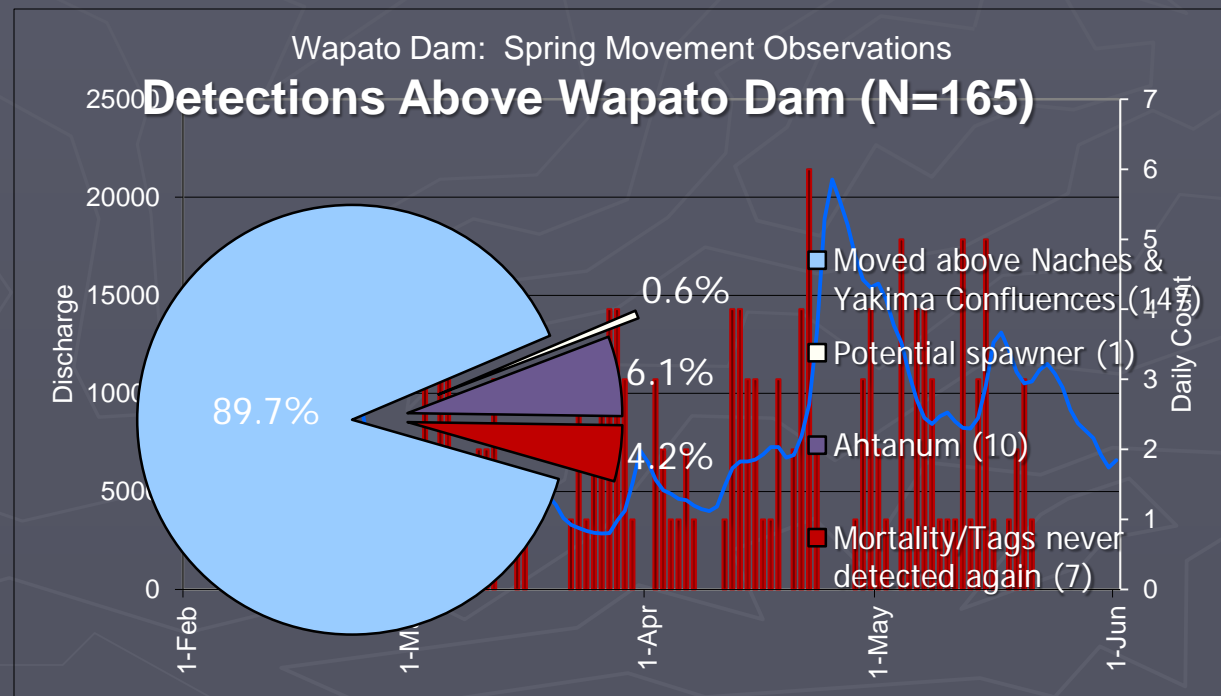
Toppenish Cr

- Two Aerial Surveys (4/27, 5/18)
- Vehicle, Foot Surveys (Feb-May)
 - 53 Unique ID's Detected
 - 4 in Marion Drain
 - 4 in Simcoe Cr



Yakima River: Gap to Gap Mainstem

- Surveyed ~ once a week (3/15-5/31)
 - Boat, Car, and Plane
 - Spring movement/upstream Migration: (2/11) – (5/31)
- **Little to no spawning occurred in the reach**



Ahtanum Cr

- Aerial + Vehicle Surveys
- 12 unique ID's detected
 - 1 male later detected in Naches
 - 1 male later detected in Cowiche

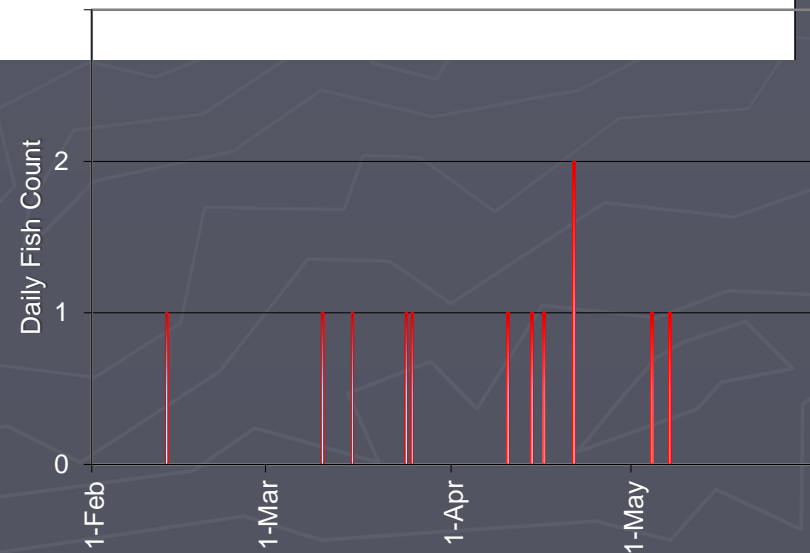


North Fk

South Fk

Female

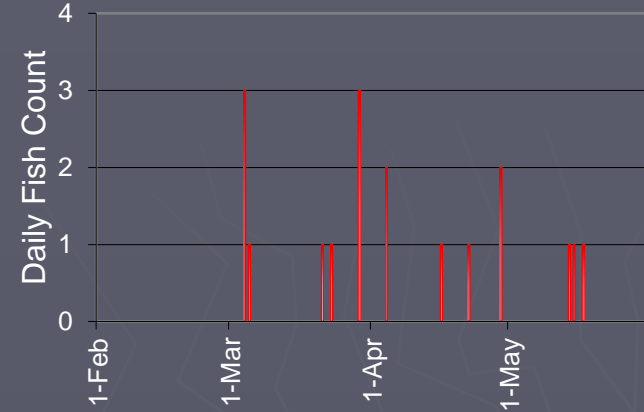
Ahtanum Cr Steelhead:
Tributary Entry



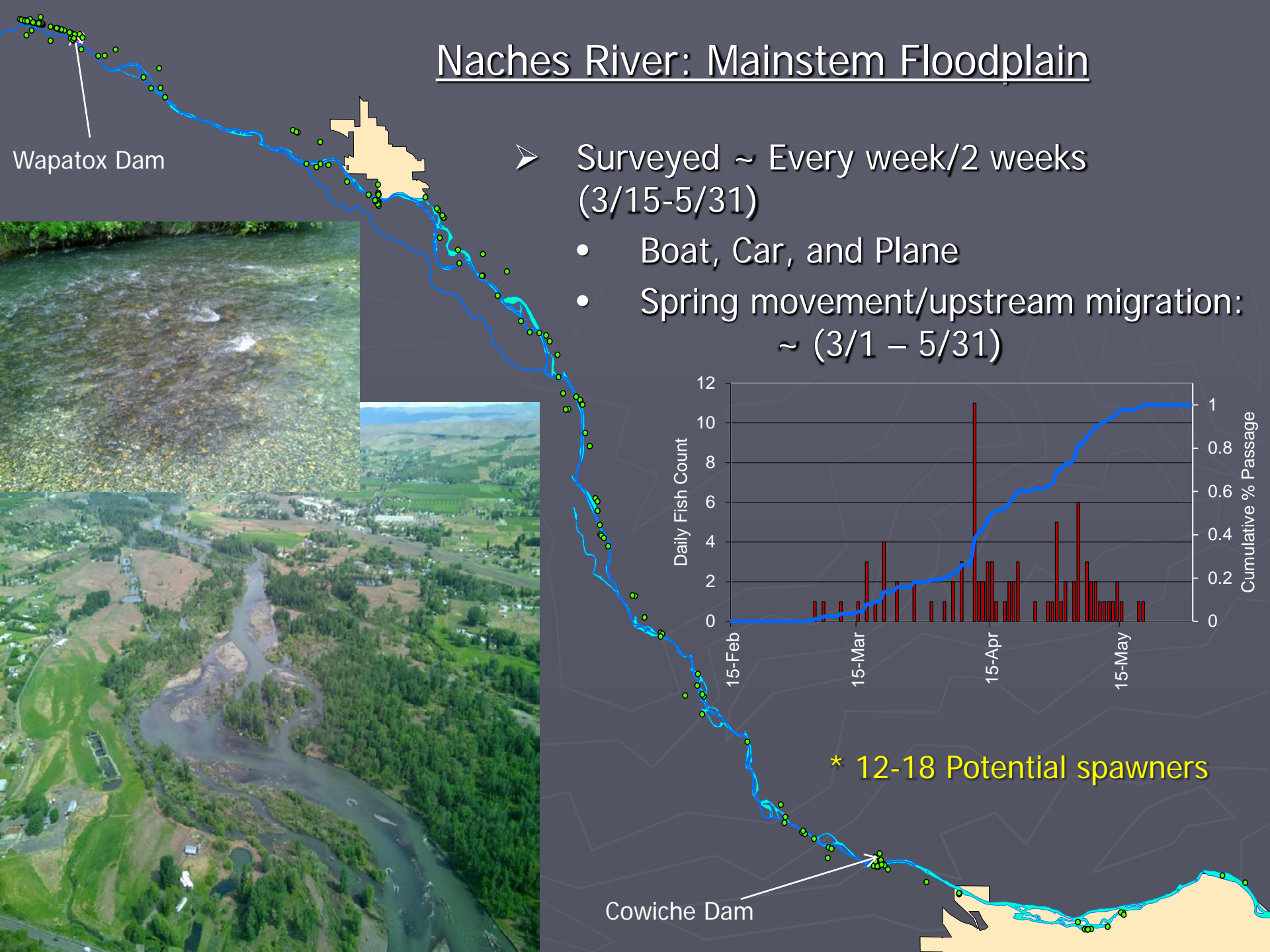
Cowiche Cr

- Aerial + Vehicle + Foot Surveys
- ~18 Unique ID's detected
 - ~16 spawners

Cowiche Cr Steelhead:
Tributary Entry

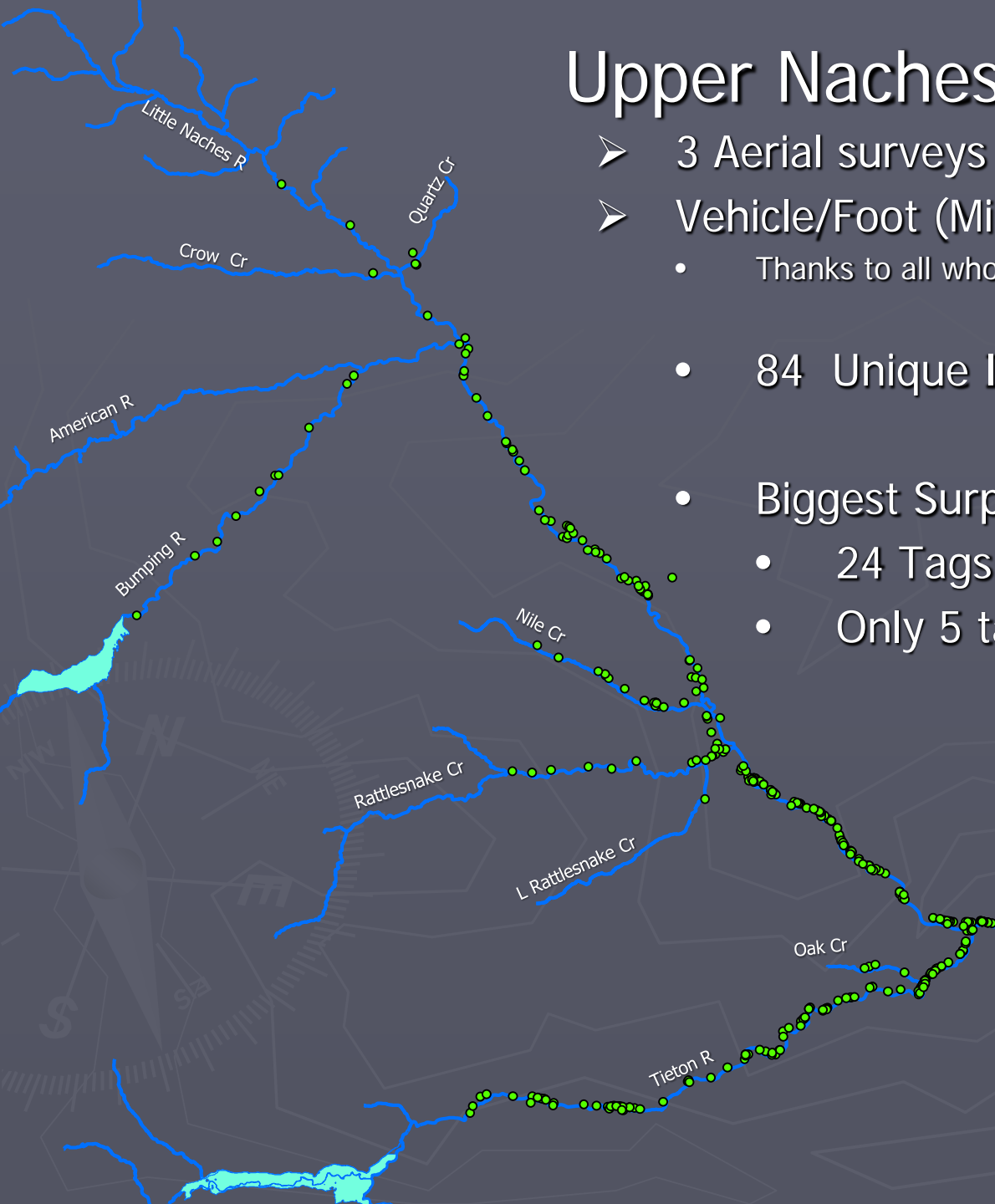


Naches River: Mainstem Floodplain

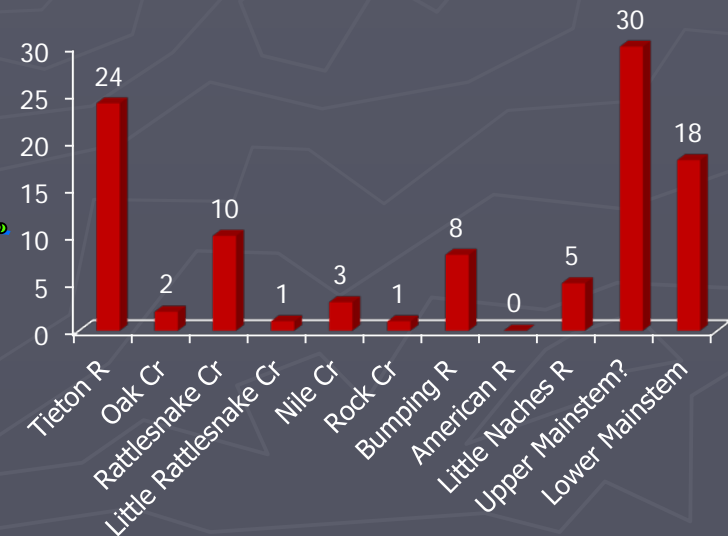


Upper Naches R

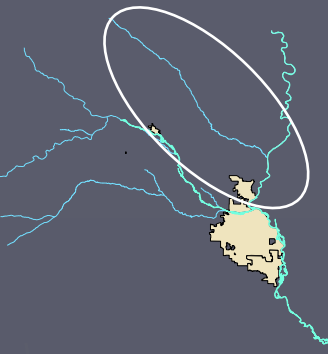
- 3 Aerial surveys conducted (5/11, 5/24, 6/1)
- Vehicle/Foot (Mid March- June)
 - Thanks to all who helped!
 - 84 Unique ID's above Wapatox
 - Biggest Surprises:
 - 24 Tags in the Tieton!
 - Only 5 tags in the Little Naches??



Naches N=102



Yakima Mainstem & Wenas Cr



➤ Upper Yakima (Above Roza Dam)

- 20 adult steelhead detected (Apr-May)

- 3-4 fish spawned below Roza

➤ Wenas Cr

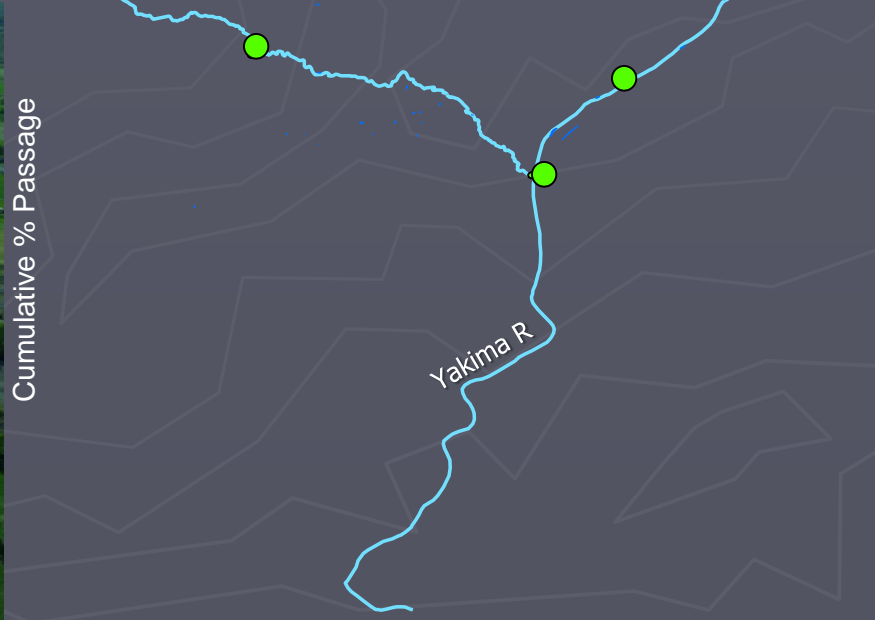
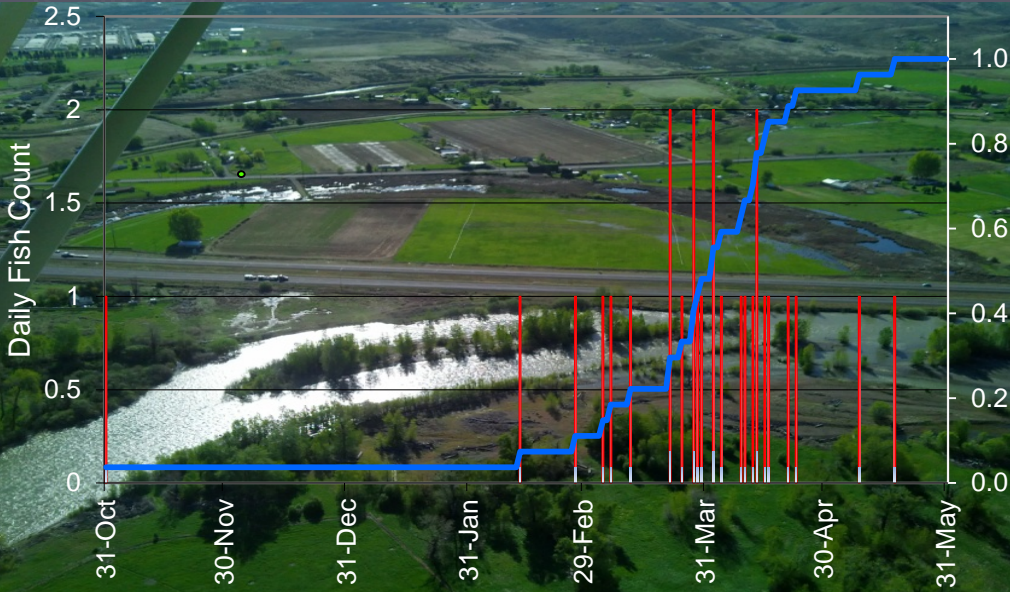
- Two Aerial Surveys (4/2, 5/11)

- Vehicle Surveys (Apr-May)

- 3 fish detected

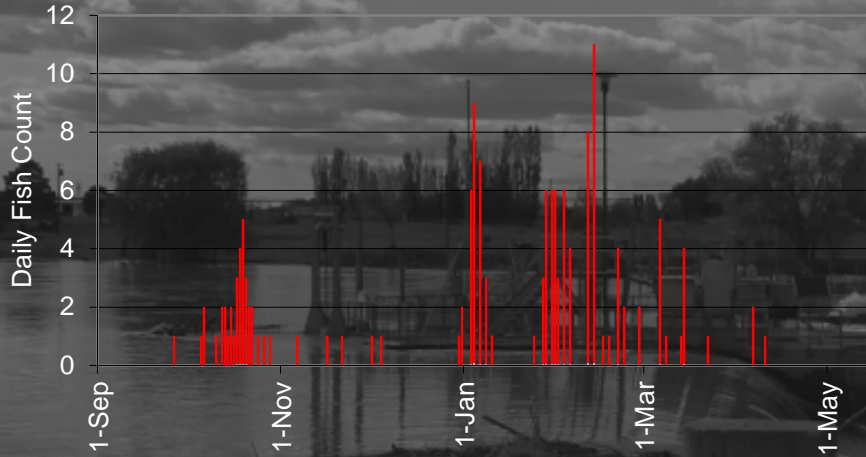
Upper Yak Steelhead:
Arrival below Roza Dam

Roza Dam

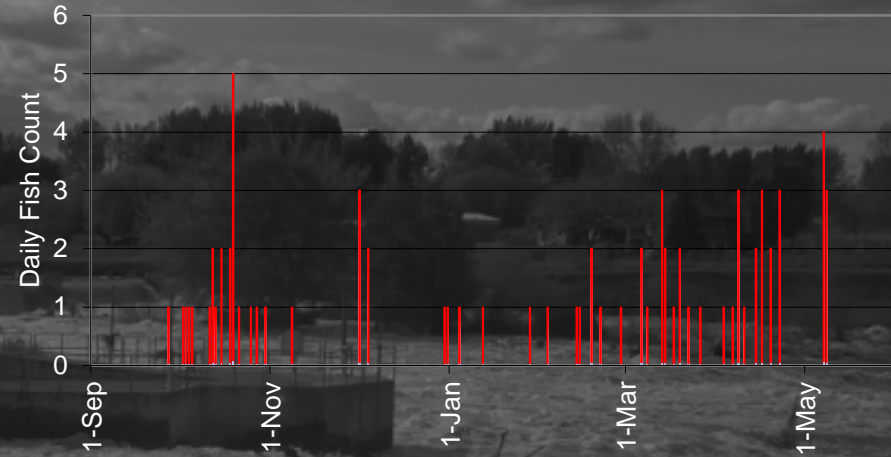


Population Run-timing: Prosser Dam

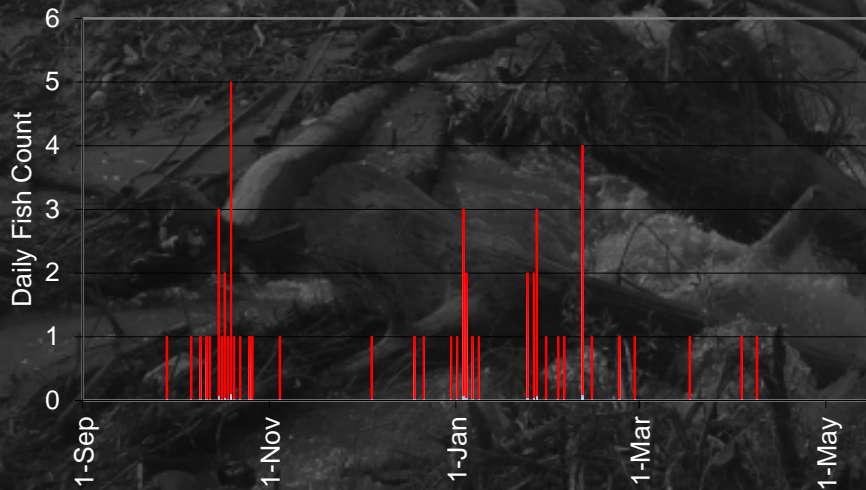
Satus Cr



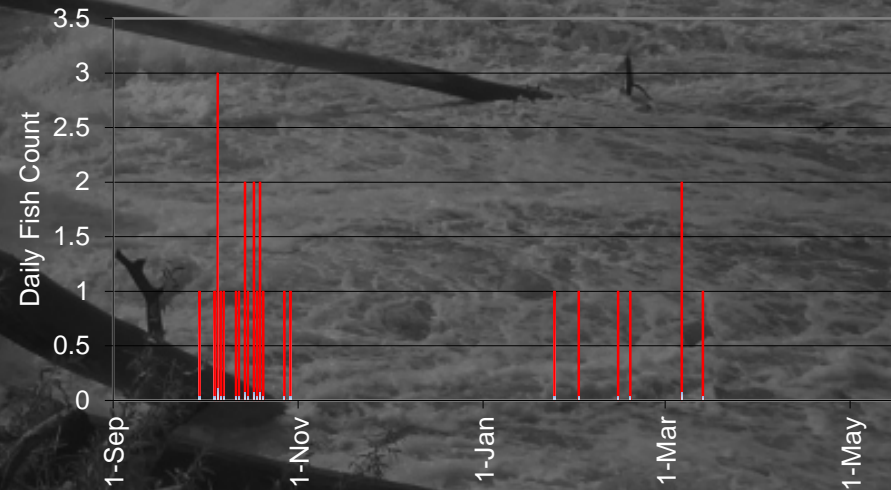
Naches R



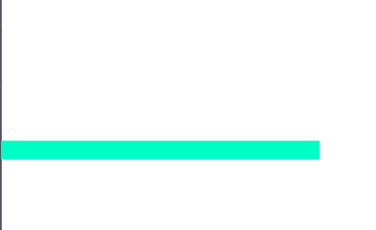
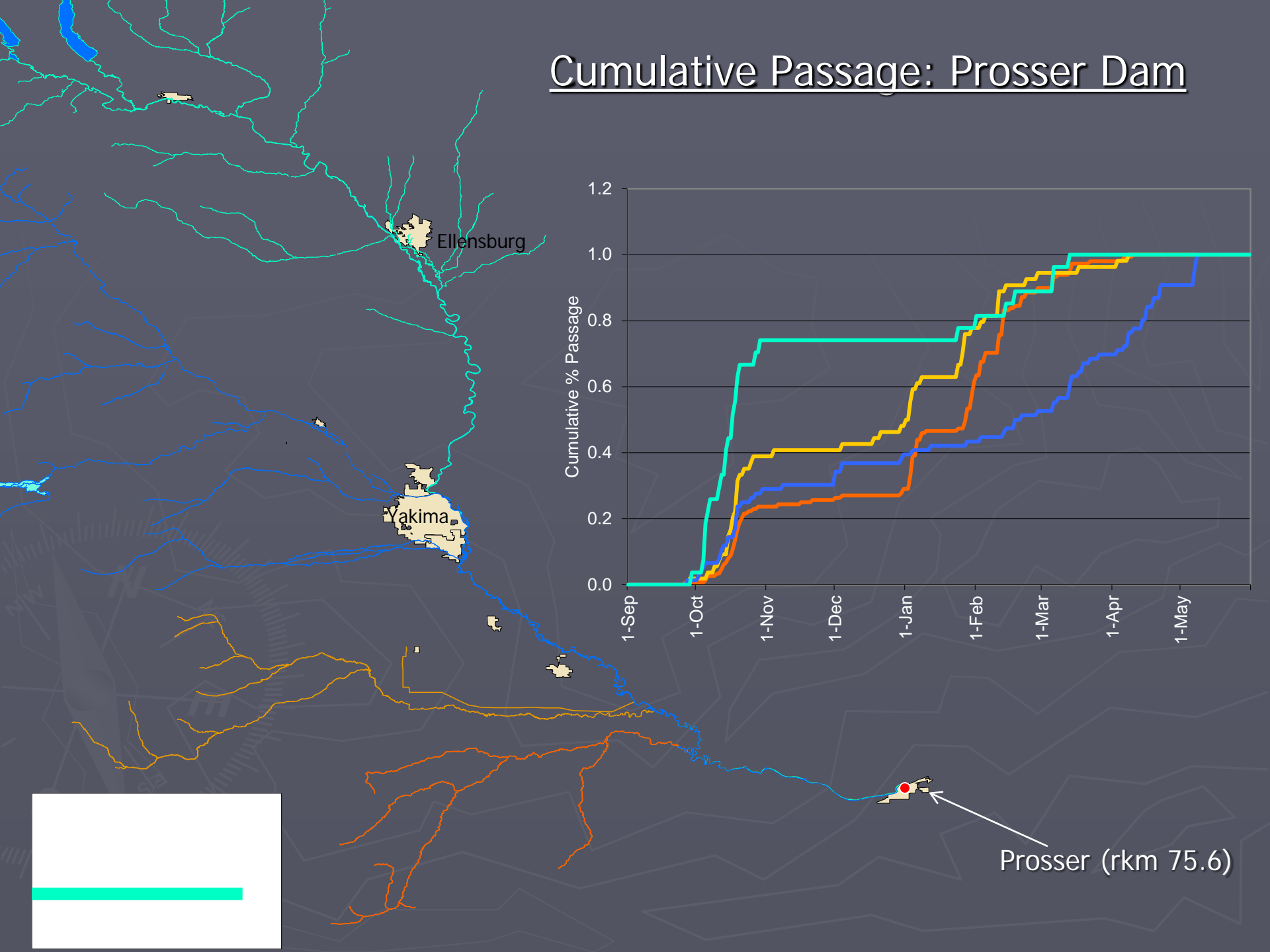
Toppenish Cr



Upper Yakima

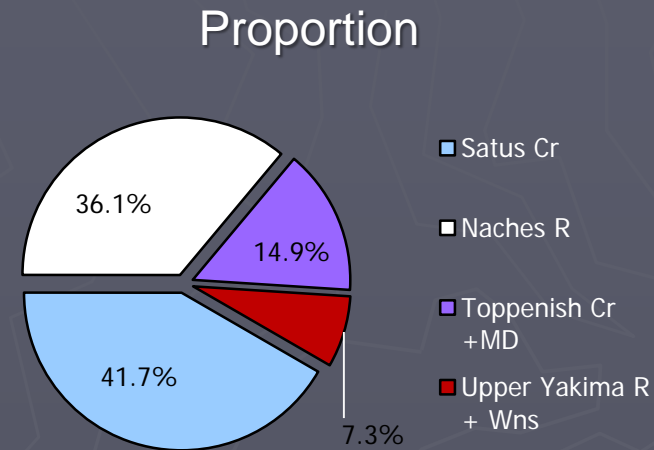
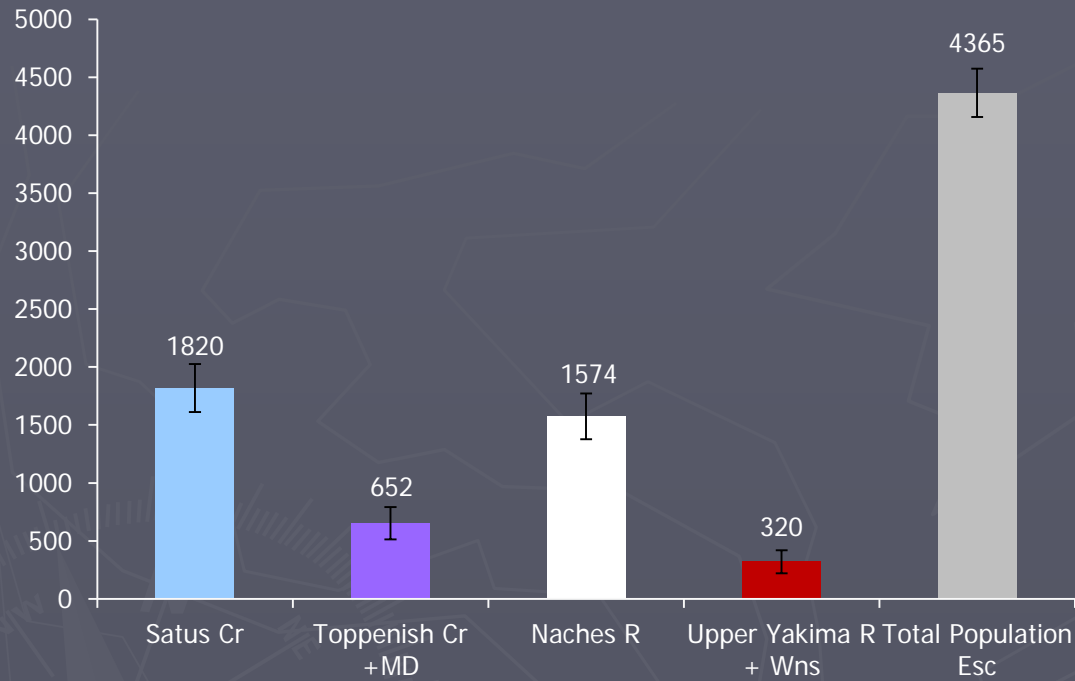


Cumulative Passage: Prosser Dam



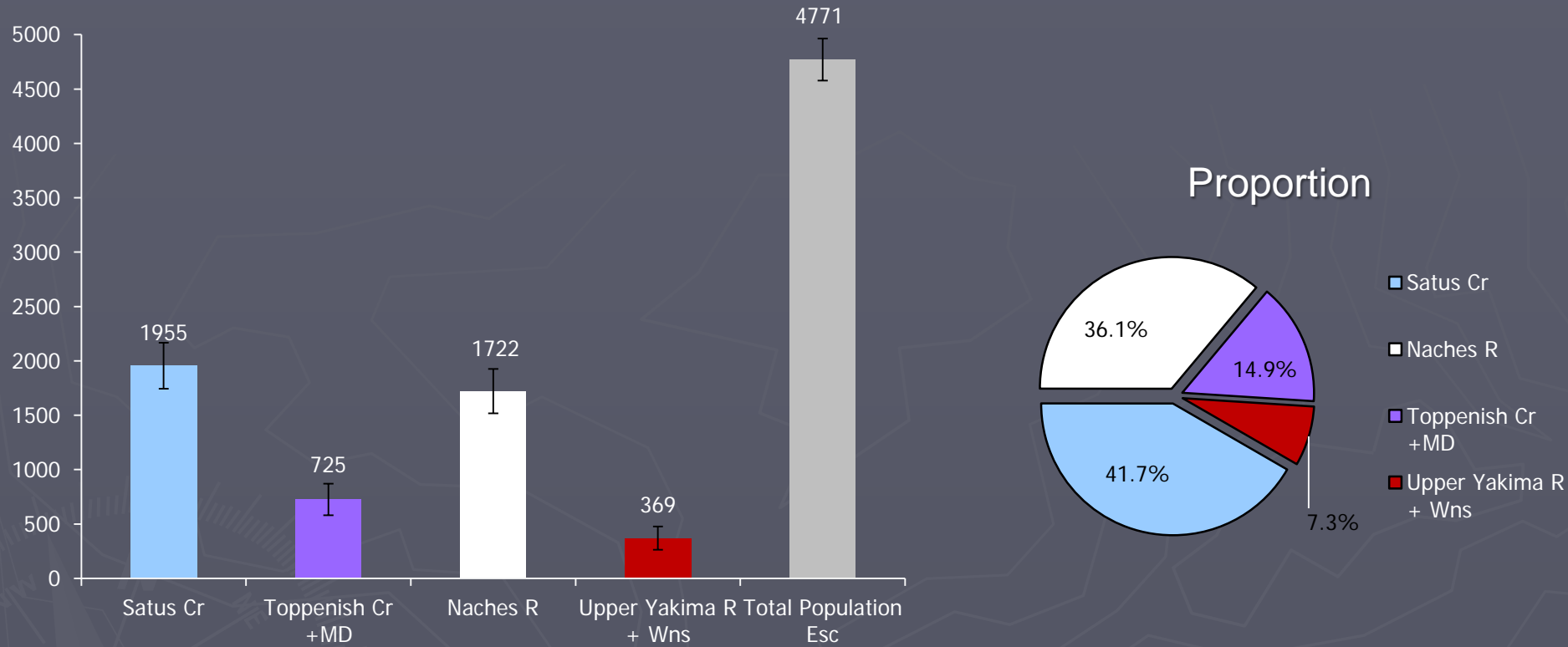
Prosser (rkm 75.6)

Population Estimates: Base Escapement



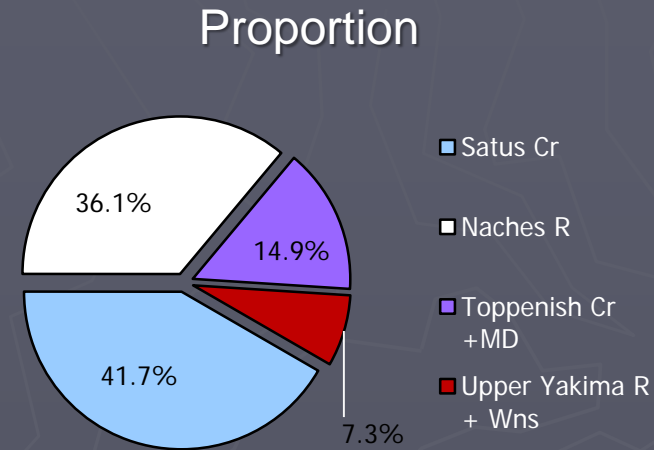
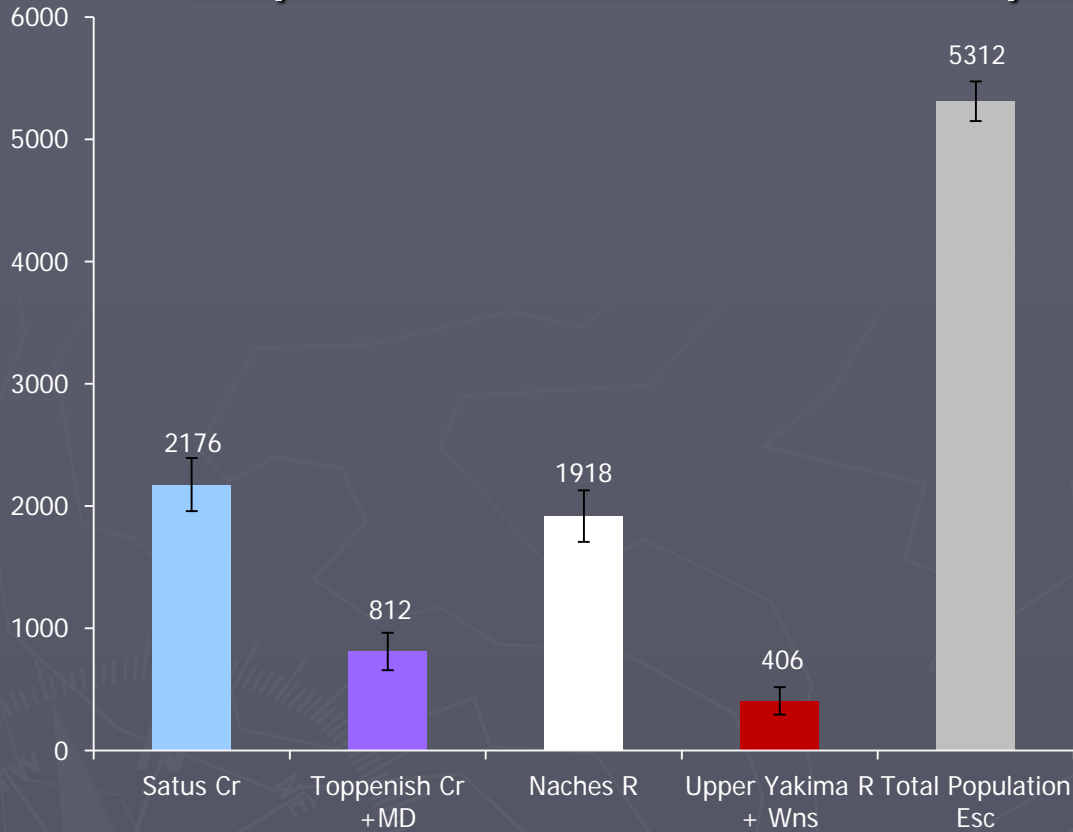
| Population | Abundance | CI ($\alpha = .10$) |
|----------------------|-----------|-----------------------|
| Satus Cr | 1820 | +/- 207 |
| Toppenish Cr +MD | 652 | +/- 139 |
| Naches R | 1574 | +/- 197 |
| Upper Yakima R + Wns | 320 | +/- 100 |
| Total Population Esc | 4365 | +/- 209 |

Population Estimates: Expanded w/TR



| Population | Abundance | CI ($\alpha = .10$) |
|----------------------|-----------|-----------------------|
| Satus Cr | 1955 | +/- 211 |
| Toppenish Cr +MD | 725 | +/- 146 |
| Naches R | 1722 | +/- 204 |
| Upper Yakima R + Wns | 369 | +/- 107 |
| Total Population Esc | 4771 | +/- 193 |

Population Estimates: Expanded w/ TR +TM



| Population | Abundance | CI ($\alpha = .10$) |
|----------------------|-----------|-----------------------|
| Satus Cr | 2176 | +/- 217 |
| Toppenish Cr +MD | 812 | +/- 153 |
| Naches R | 1918 | +/- 210 |
| Upper Yakima R + Wns | 406 | +/- 112 |
| Total Population Esc | 5312 | +/- 162 |

That's all Folks!

