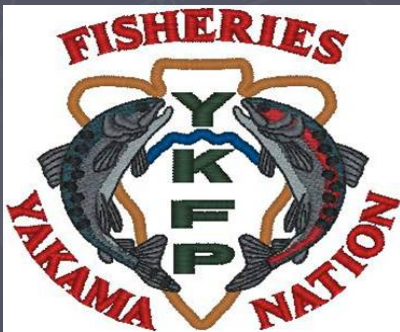


Yakima River Steelhead Status and Trends RM&E Project Overview:

Chris Frederiksen YN
Gabe Temple WDFW



Basis of Project Development

- FCRPS Biological Opinion RPA review
- 2009 Columbia Basin monitoring strategy review
- Yakima River Steelhead Recovery Plan

- Many critical gaps and uncertainties existed
 - Population scale
 - Biological data needed for evaluating VSP parameters

Critical Gaps & Uncertainties

1. **Escapement & spawner abundance-** (i.e., run size) is determined at Prosser Dam, but only at the MPG level (aggregate of all four populations). Spawner abundance lacking for several populations
2. **Productivity-** Appropriate data lacking for Cohort analysis at the population scale.
3. **Spatial structure-** Are mainstem areas utilized? By what population? Spatial/temporal overlap?
4. **Life history (diversity) and demographics-** Limited understanding on life history & temporal/spatial habitat conditions
 - ❑ Resident *O. mykiss* and sympatric population dynamics

Overarching Project Goals

- Collect biological data *specific to each* of the Yakima steelhead populations
 1. Population viability analysis (PVA's)
 - Stock status assessment/review
 - Endangered Species Act (ESA) listing determinations
 2. Inform local adaptive management actions and guide recovery efforts
 - Habitat restoration/protection
 - Framework for future RM&E activities

Biological Objectives

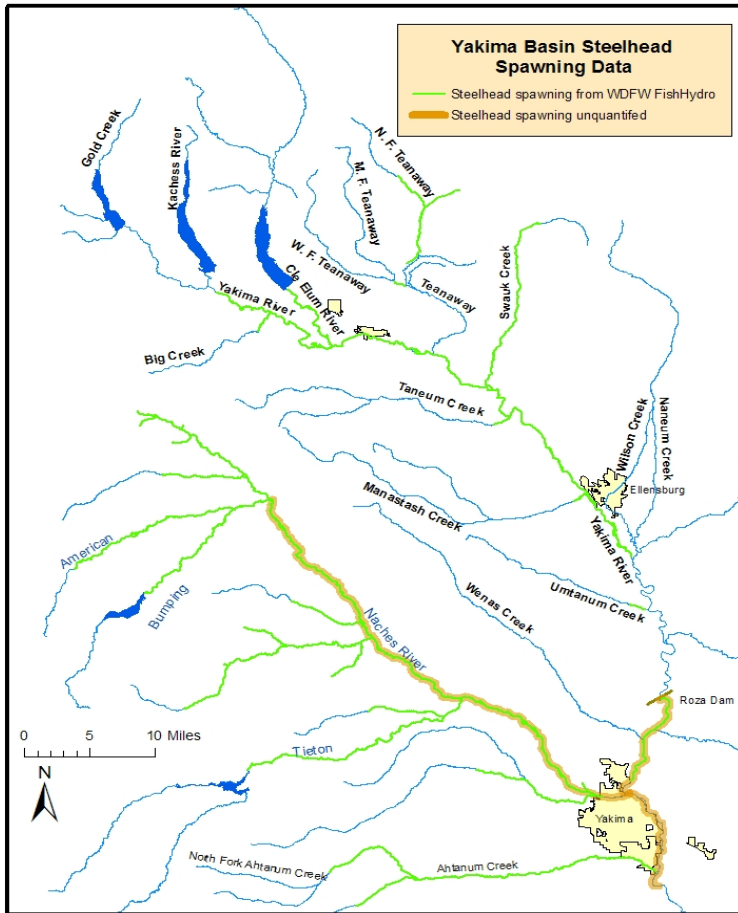
➤ Determine spatial distribution for Yakima steelhead populations

➤ Three year radio telemetry study

- Better define Upper Yakima & Naches spawning distributions

- Clarify extent, distribution, and contribution of mainstem spawners

➤ Supplemental spawner surveys in out years



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????

Biological Objectives

- Generate adult abundance estimates
- Three year radio telemetry study
 - Estimate population specific adult abundance
 - Assess, ground truth GSI techniques for long-term implementation
 - ▶ Run at large disaggregation



Yakima River Telemetry Study 2011-2014

➤ Tagging:

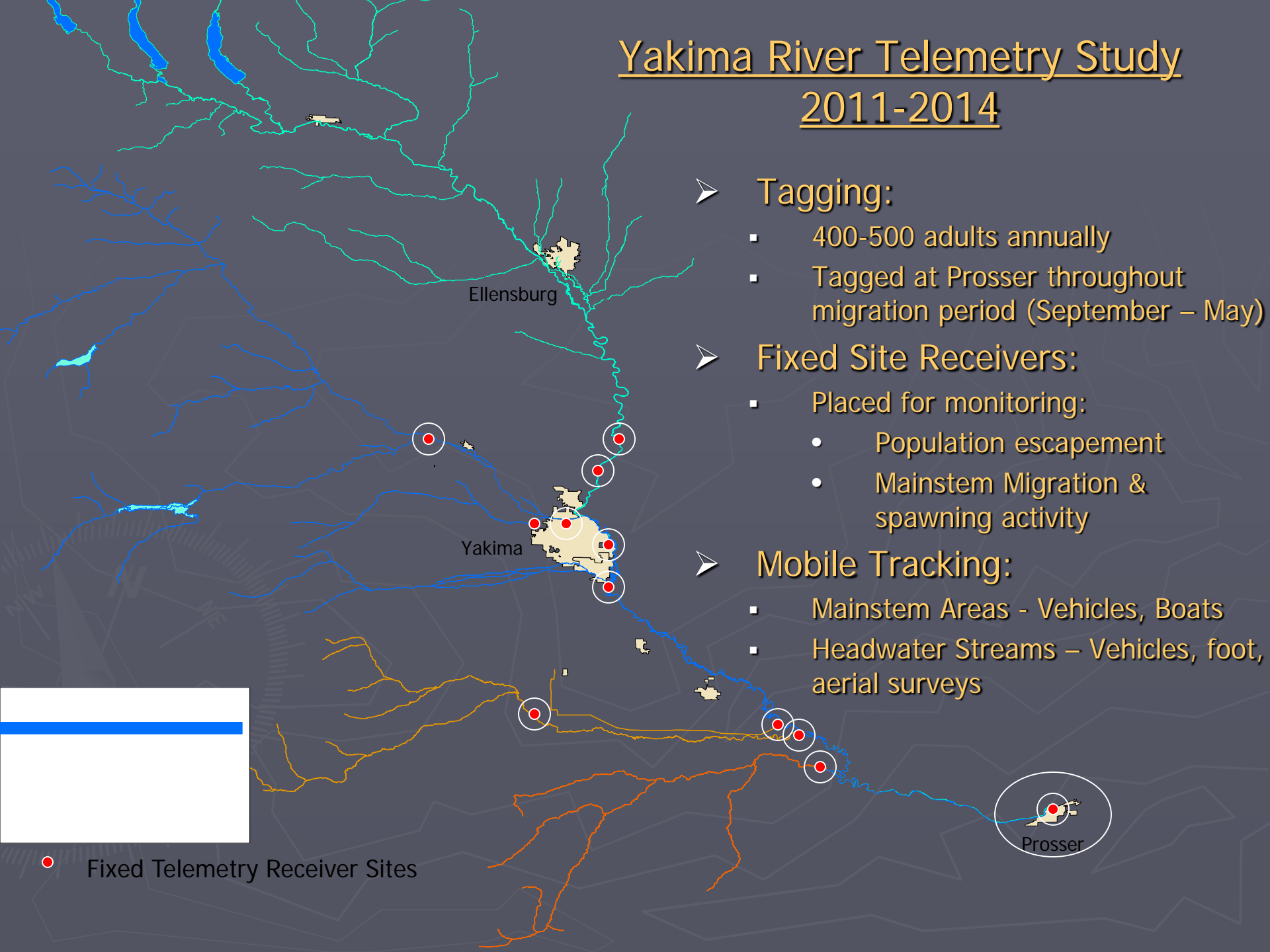
- 400-500 adults annually
- Tagged at Prosser throughout migration period (September – May)

➤ Fixed Site Receivers:

- Placed for monitoring:
 - Population escapement
 - Mainstem Migration & spawning activity

➤ Mobile Tracking:

- Mainstem Areas - Vehicles, Boats
- Headwater Streams – Vehicles, foot, aerial surveys



● Fixed Telemetry Receiver Sites

Yakima River Telemetry



- Clarify extent, distribution, and contribution of mainstem spawners
- Better define Upper Yakima & Naches spawning distributions

Yakima River Telemetry

➤ Primary Objectives

- Upper Yakima and Naches spawning distributions
- Clarify extent, distribution, and contribution of mainstem spawners
- Estimate population specific adult escapement and spawner abundance
- Assess and ground truth the long-term prospects for using GSI techniques for apportioning total run at Prosser

Yakima River Telemetry

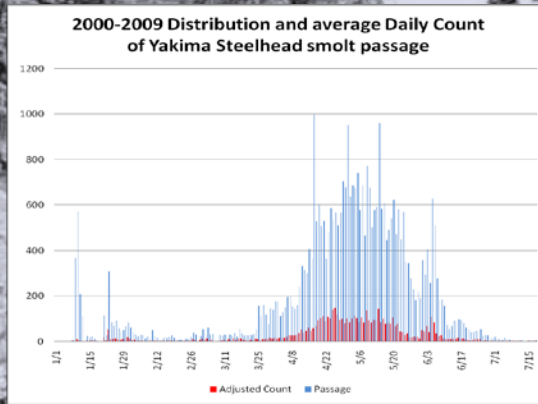
➤ Other Life History Information

- Run timing
- Migration & holding patterns
- Pre-spawn survival
- Spawn-timing
- Redds per female
- Age structures
- Sex Ratios
- Survival to kelting rates

Biological Objectives

3. Generate juvenile abundance estimates

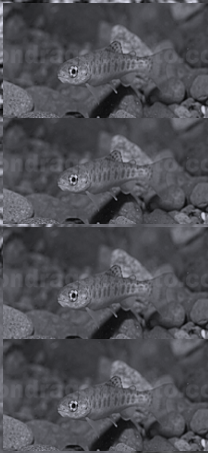
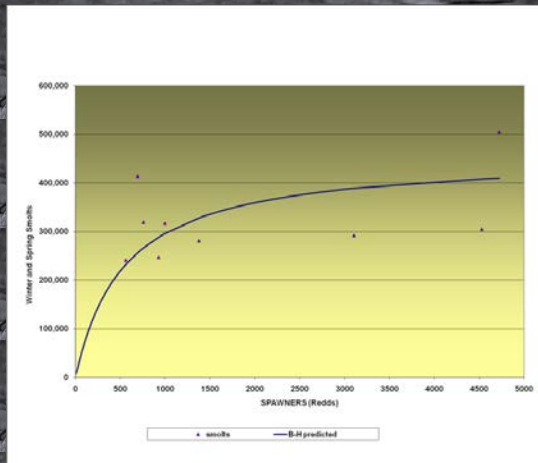
- Estimate population specific juvenile abundance
 - ▶ GSI techniques
- Freshwater productivity



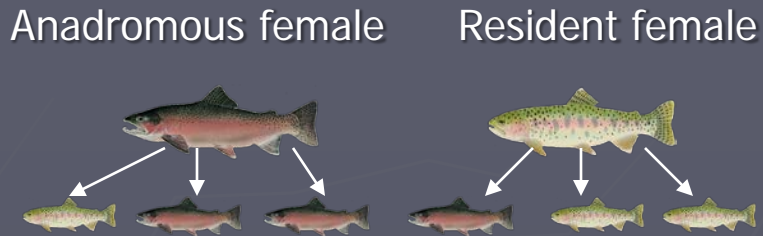
4. Generate productivity

5. estimates

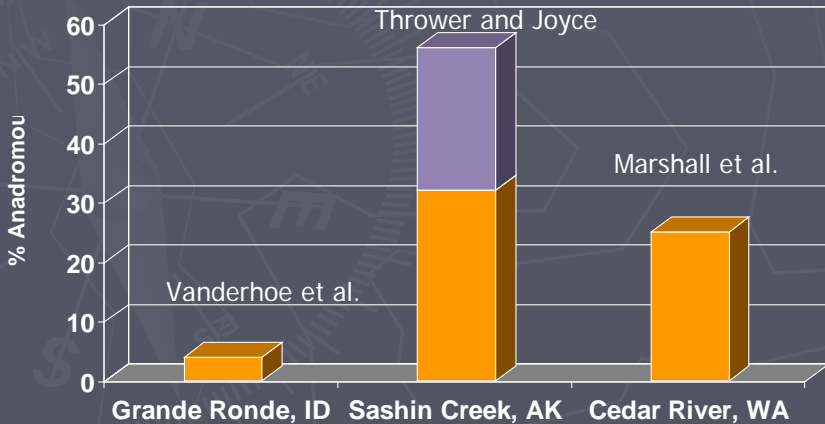
- Estimate population specific productivity
 - Adult-to-adult ratios
 - Intrinsic productivity
 - ▶ Stock recruitment functions



Resident & Anadromous *O. mykiss*



Studies of anadromous production from resident parents



- Evaluate sympatric population dynamics between anadromous and resident forms of *O. mykiss*
 - Degree of sympatry & interbreeding
 - Spawning and mating behavior
 - Determine the base level smolt production from RXR crosses in tributary void of anadromy
 - Determine relative production of anadromous life-history type from fidelity and hybrid crosses
- ❖ Initially focused on the Upper Yakima population

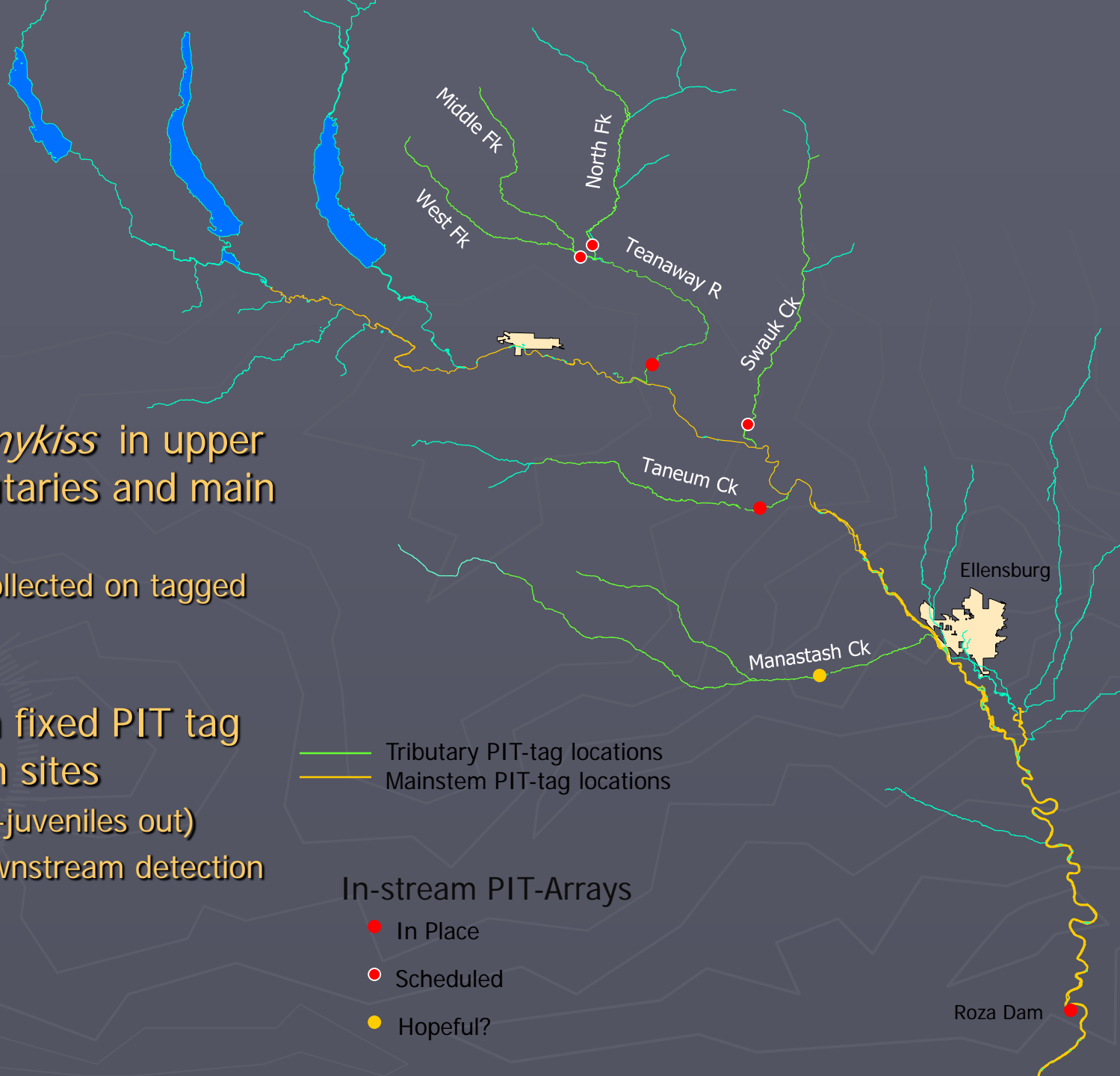
➤ PIT tag *O. mykiss* in upper Yakima tributaries and main stem

➤ Bio-data collected on tagged juveniles

➤ Monitor with fixed PIT tag interrogation sites

➤ (adults in-juveniles out)

➤ Other downstream detection points

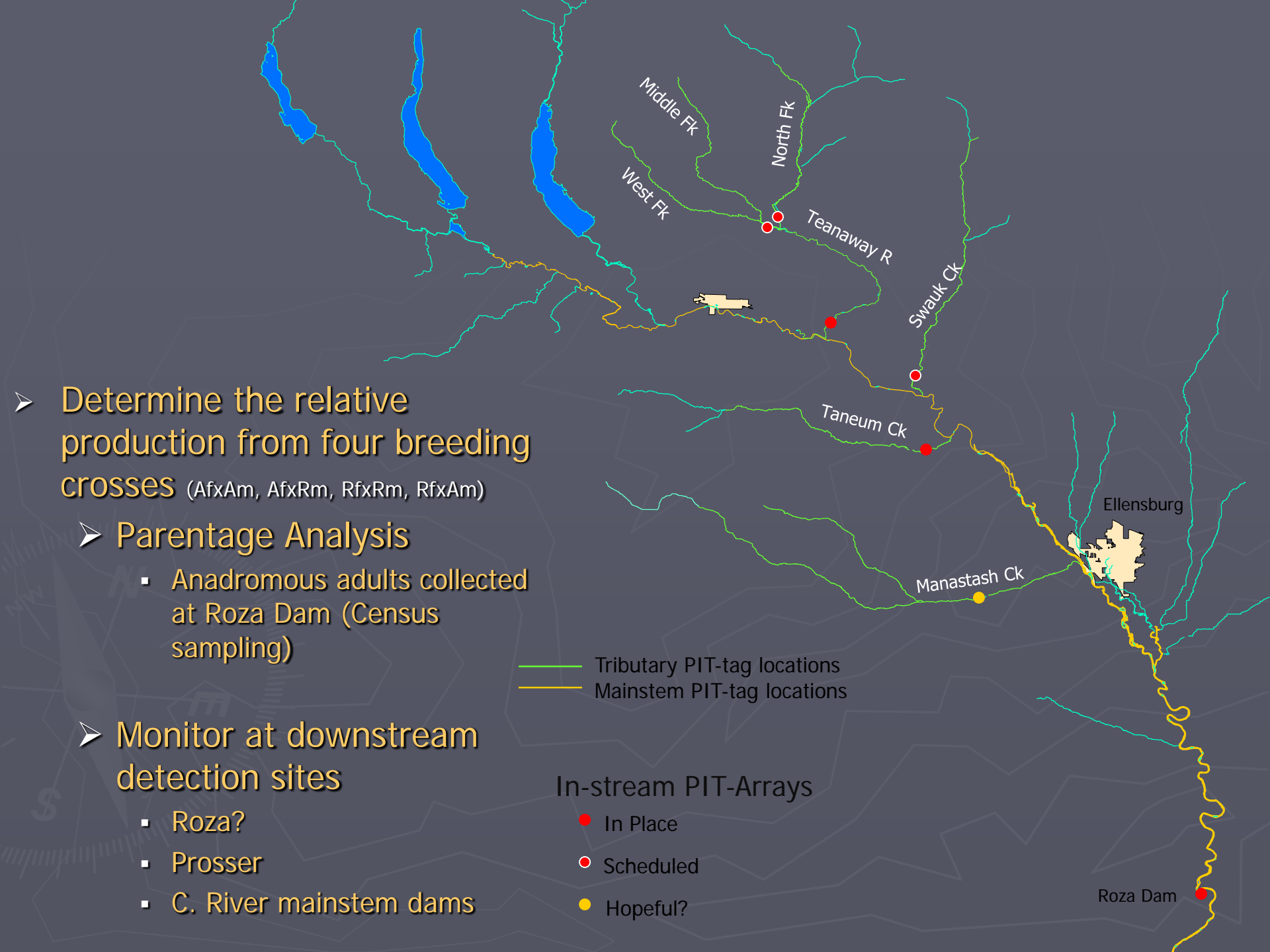


— Tributary PIT-tag locations
— Mainstem PIT-tag locations

In-stream PIT-Arrays

- In Place
- Scheduled
- Hopeful?

Roza Dam



➤ Determine the relative production from four breeding crosses (AfxAm, AfxRm, RfxRm, RfxAm)

➤ Parentage Analysis

- Anadromous adults collected at Roza Dam (Census sampling)

➤ Monitor at downstream detection sites

- Roza?
- Prosser
- C. River mainstem dams

— Tributary PIT-tag locations
— Mainstem PIT-tag locations

In-stream PIT-Arrays

- In Place
- Scheduled
- Hopeful?

Roza Dam

Why is this Important?

- Resident/anadromous interactions is a critical uncertainty identified in several recovery documents that could either facilitate or hinder steelhead recovery in the Yakima (e.g. Mid-C and Yakima Basin steelhead recovery plans, WDFW steelhead management plan, etc.)
- Facilitate- If resident fish parents contribute substantially to steelhead production
- Hinder- If resident/anadromous interaction reduces the proportion of migrants
- Bottom line- We just do not know

Questions?

What about the Naches?

