

Project 1994-054-00

Bull trout life history, genetics, habitat needs, and limiting factors in central and northeast Oregon

In FY02:

- Contract 4101
- Contract 4102
- ODFW
- CTWSRO

Funds = \$ 488 K

Contract 4101 (FY02)

Migratory patterns, structure, abundance,
and status of bull trout populations in the
Columbia Plateau.



- Funds: \$351 K
- Subcontract to USFS
(PNW Lab)

Goals (4101)

- Provide scientific information needed to develop and modify protection and recovery plans for Columbia Basin bull trout.
- Implement a program to monitor the population status of bull trout in the Columbia Plateau Province.

Objectives (FY02)

- Characterize fine-scale population structure in the John Day basin.
- Determine movements of fluvial bull trout of the Umatilla River.
- Compare methods to estimate adult bull trout abundance in Mill Creek.
- Employ EMAP to monitor the status, trends, and distribution of adult bull trout in the Columbia Plateau.

Population structure

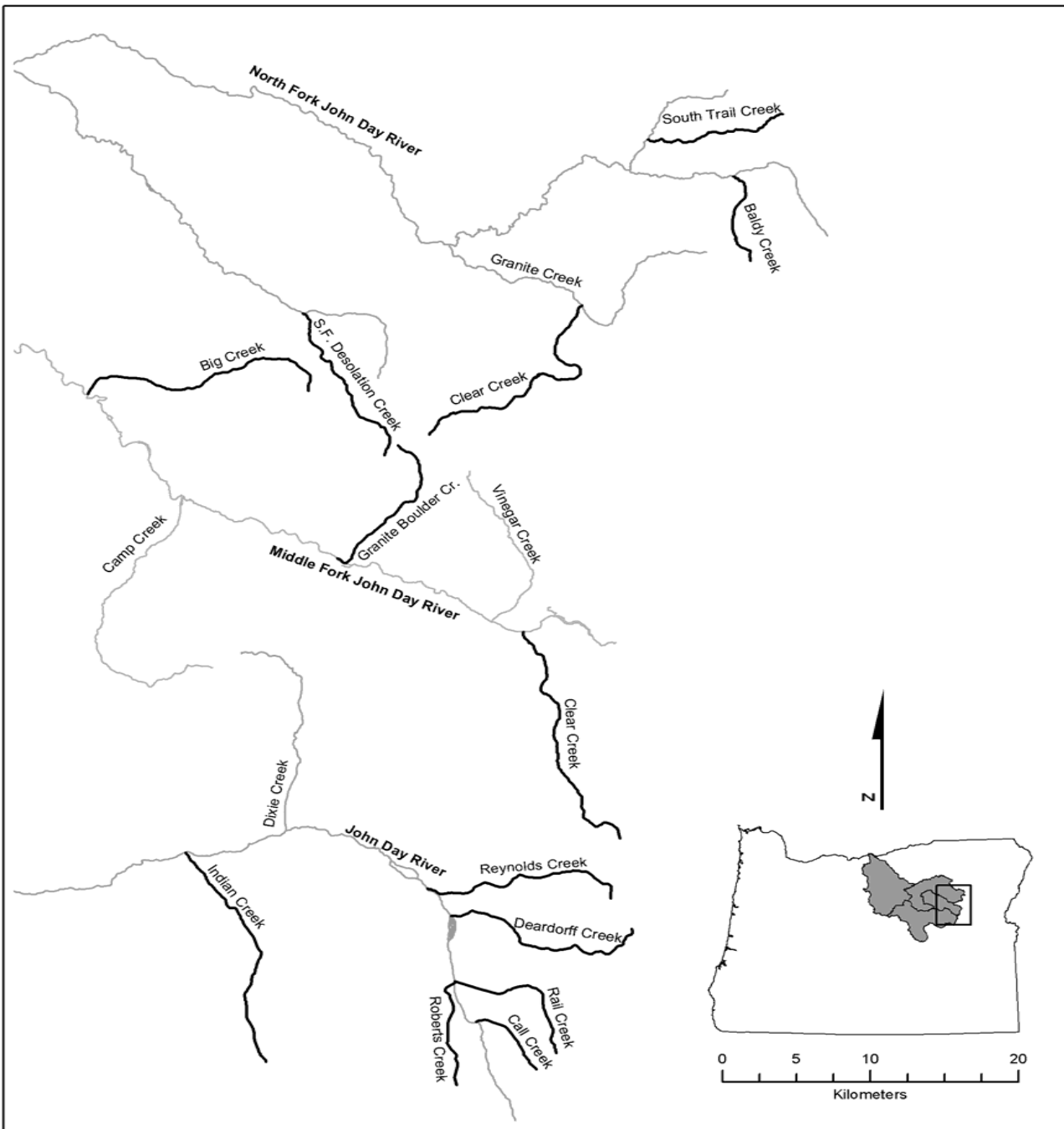
- Broad-scale structure between basins was described by DNA microsatellite analysis of 65 populations (Spruell *et al.* 2003. *Cons Gen*).
- Early analysis used 4 microsatellite loci; 6 more are available.
- Preliminary new analysis and telemetry suggest fine-scale structure within basins.
- Implications for metapopulation theory and population management.

Population structure

John Day basin (FY02)

- Attempted collection of supplemental samples from 2 streams.
- Collected samples from 3 streams where none had been collected previously, to add analytical power.
- Collected samples from 5 streams sampled in 1995, to test for temporal variation in allele frequencies

John Day basin



Population structure

John Day basin (FY03)

- Collect supplemental samples from 2 streams.
- Re-analyze archived samples collected in 1995 (10 streams) with 6 new microsatellite loci.
- Analyze samples collected in 2002 (8 streams) and 2003 (2 streams) with 10 microsatellite loci.

Fluvial bull trout movements

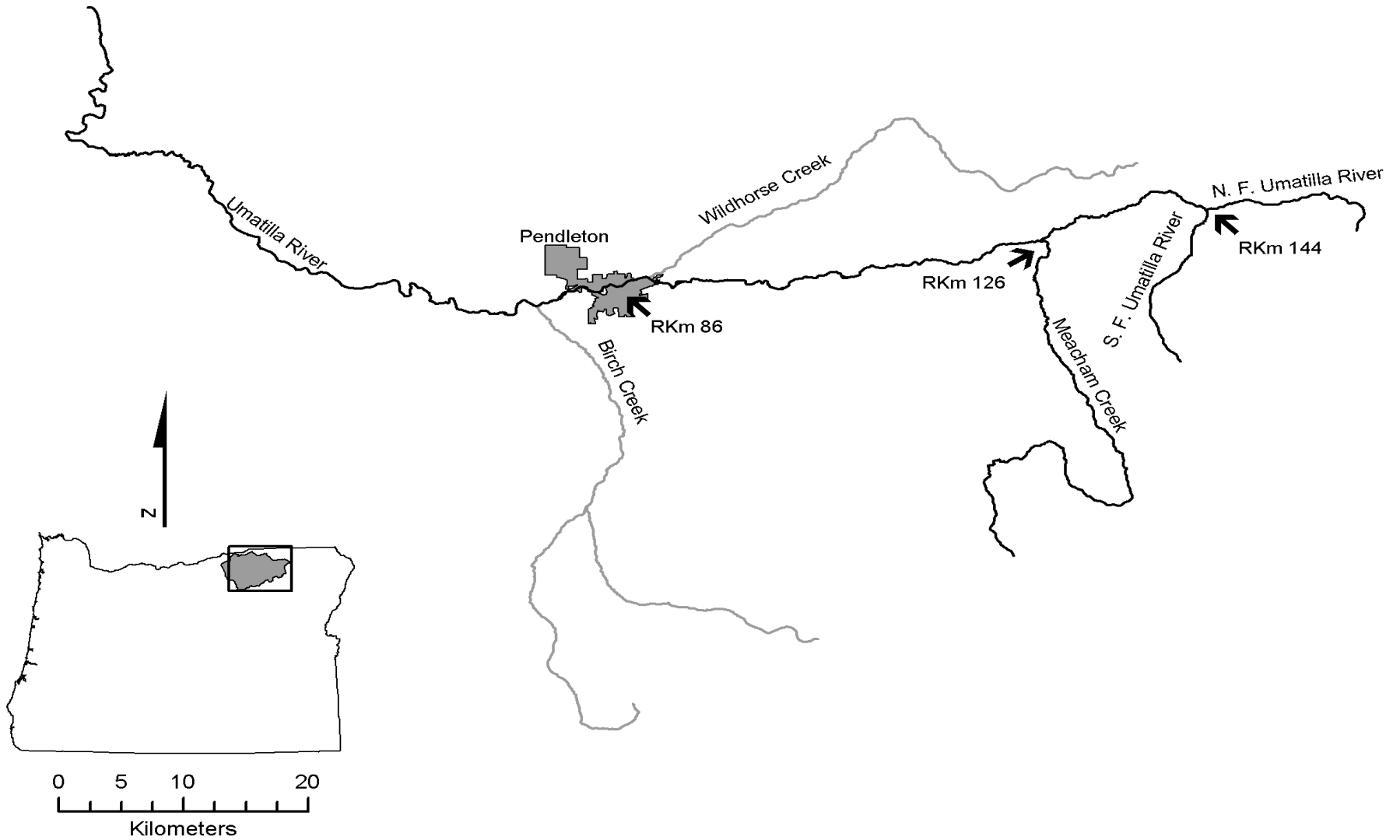
Umatilla River (FY02)

Sub-objectives

Determine:

- areas of seasonal use, particularly over winter
- better description of migratory corridors
- possible use of the Columbia River.

Umatilla River



Fluvial bull trout movements

Umatilla River (FY02)

- Radio-tagged 15 fluvial fish (300 mm or >)
 - 11 from Umatilla R (km 137-144)
 - 4 from N.F. Umatilla R (km 0-3)
- All moved into N.F. Umatilla by end of July.
- Distributed up to Rkm 9 (N.F.) during September and October.
- Recovered 8 tags during November.
- 7 fish over-wintered in Umatilla R (km 118-143).

Contract 4101 (FY03)

Migratory patterns, structure, abundance, and status of bull trout populations in the Columbia Plateau and Blue Mountain provinces.



- Funds: \$371 K
- Subcontracts:
USFS-PNW
U of MT

Objectives (FY03)

- Characterize fine-scale population structure in the John Day and **Grande Ronde** basins.
- Determine movements of fluvial bull trout of the Umatilla and **Lostine** rivers.
- Compare methods to estimate adult bull trout abundance in Mill Creek.
- Employ EMAP to monitor the status, trends, and distribution of adult bull trout in the Columbia Plateau.

Population structure

Grande Ronde basin (FY03)

- Collect supplemental samples from 1 stream.
- Collect samples from 6 streams where none had been collected previously, to add analytical power.
- Collect samples from 4 streams sampled in 1995, to test for temporal variation in allele frequencies
- Analysis of samples to be done in FY04.


Fluvial bull trout movements

Lostine River (FY03)

Sub-objectives

Determine:

- areas of seasonal use
- impediments to migration from water diversions
- temperatures where adults locate
- possible use of the Snake River.



Comparing Methods of Estimating the Abundance of Adult Bull Trout

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Bonneville Power Administration

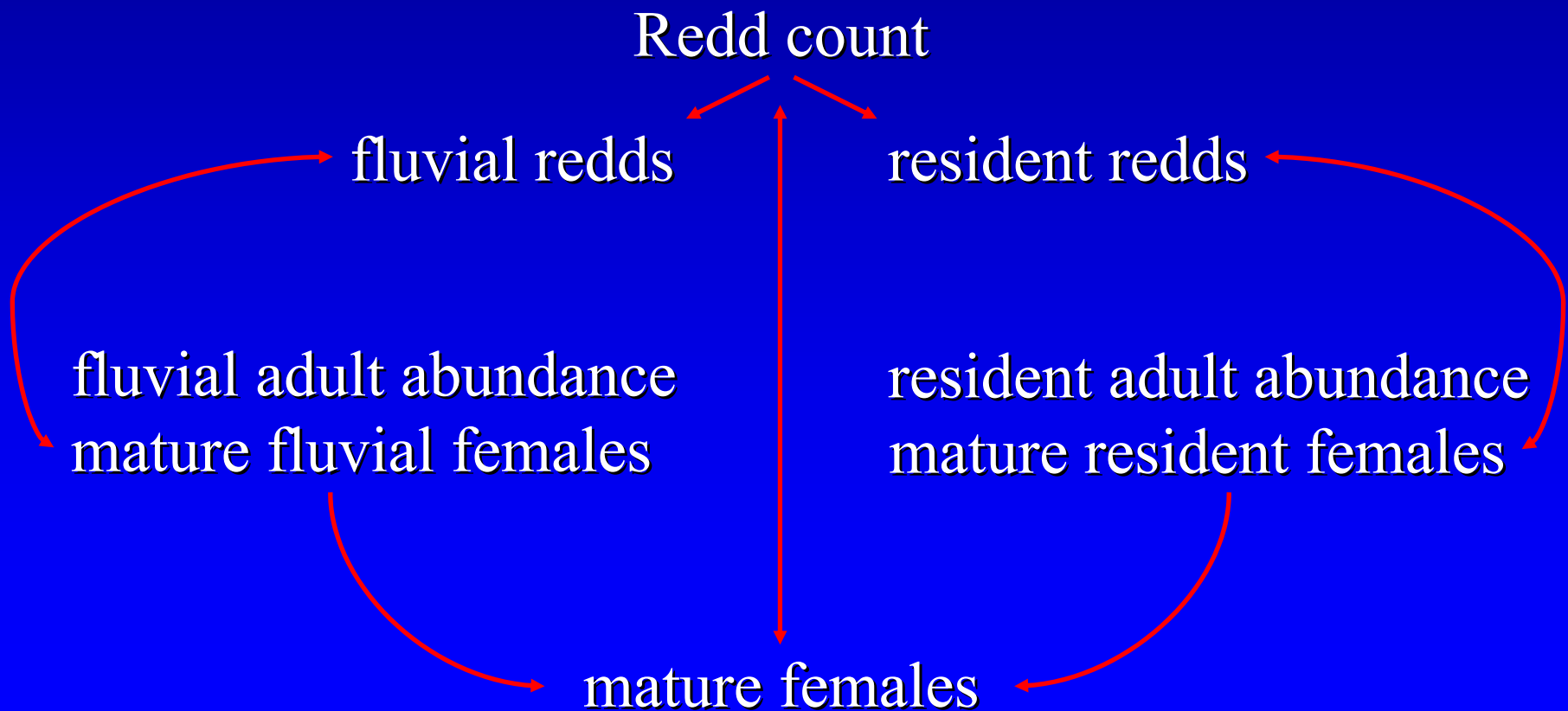
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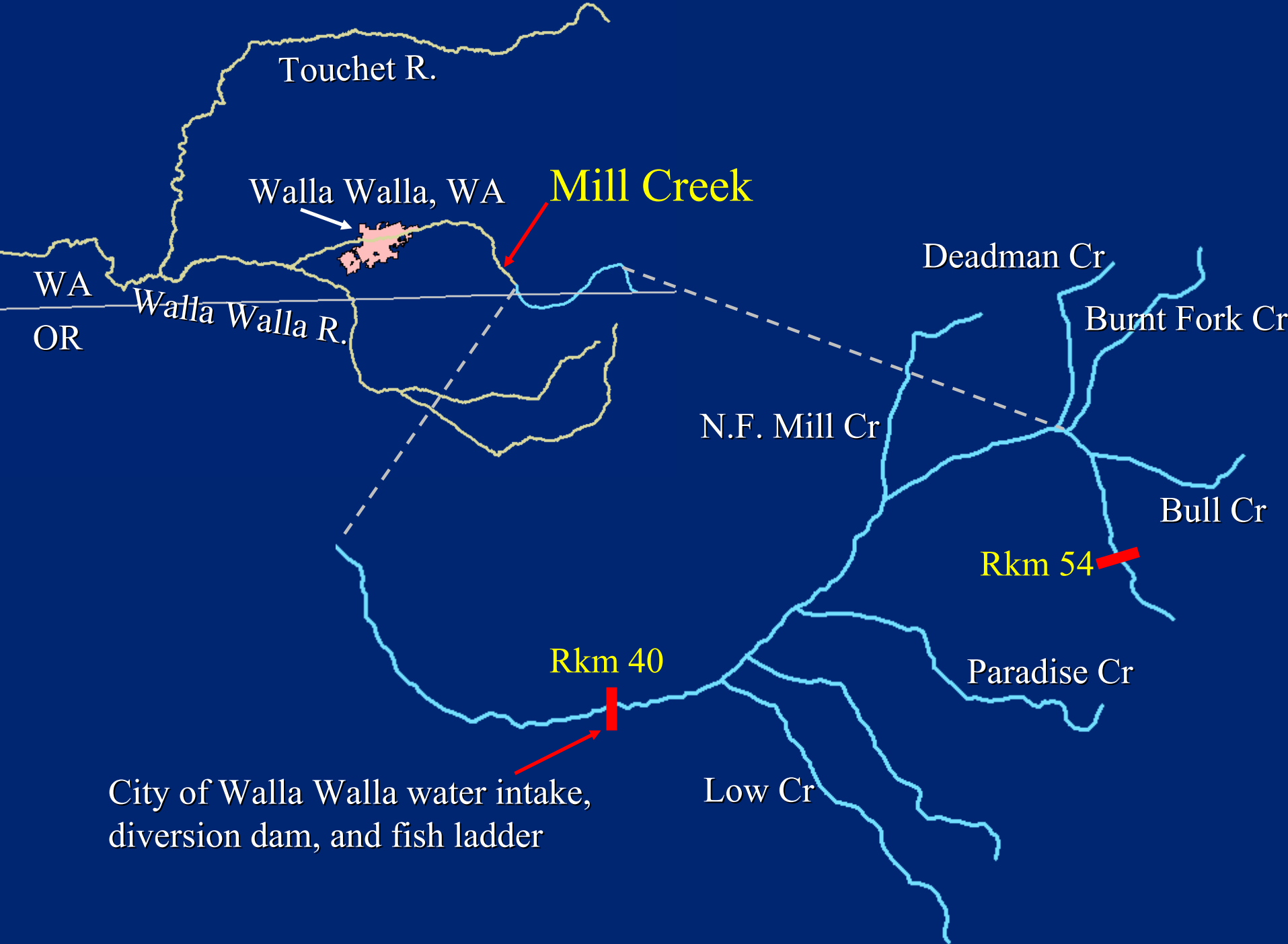
Introduction

- How do we monitor abundance, particularly for populations exhibiting multiple life histories?
- Redd counts have been the primary method used to monitor abundance.
- The validity of redd counts has not been evaluated extensively.
- Redd counts may be related to adult escapement.
- Sampling error may be high.
- More information is needed to evaluate redd counts.

Objective

- Compare redd counts to measures of adult abundance in a system supporting fluvial and resident forms.





Fluvial adult abundance

- Trapped fluvial fish at the ladder from June - October.
- Identified mature females using ultrasound.
- Snorkeled area upstream from the dam to count unmarked fluvial adult-sized (≥ 300 mm FL) bull trout.

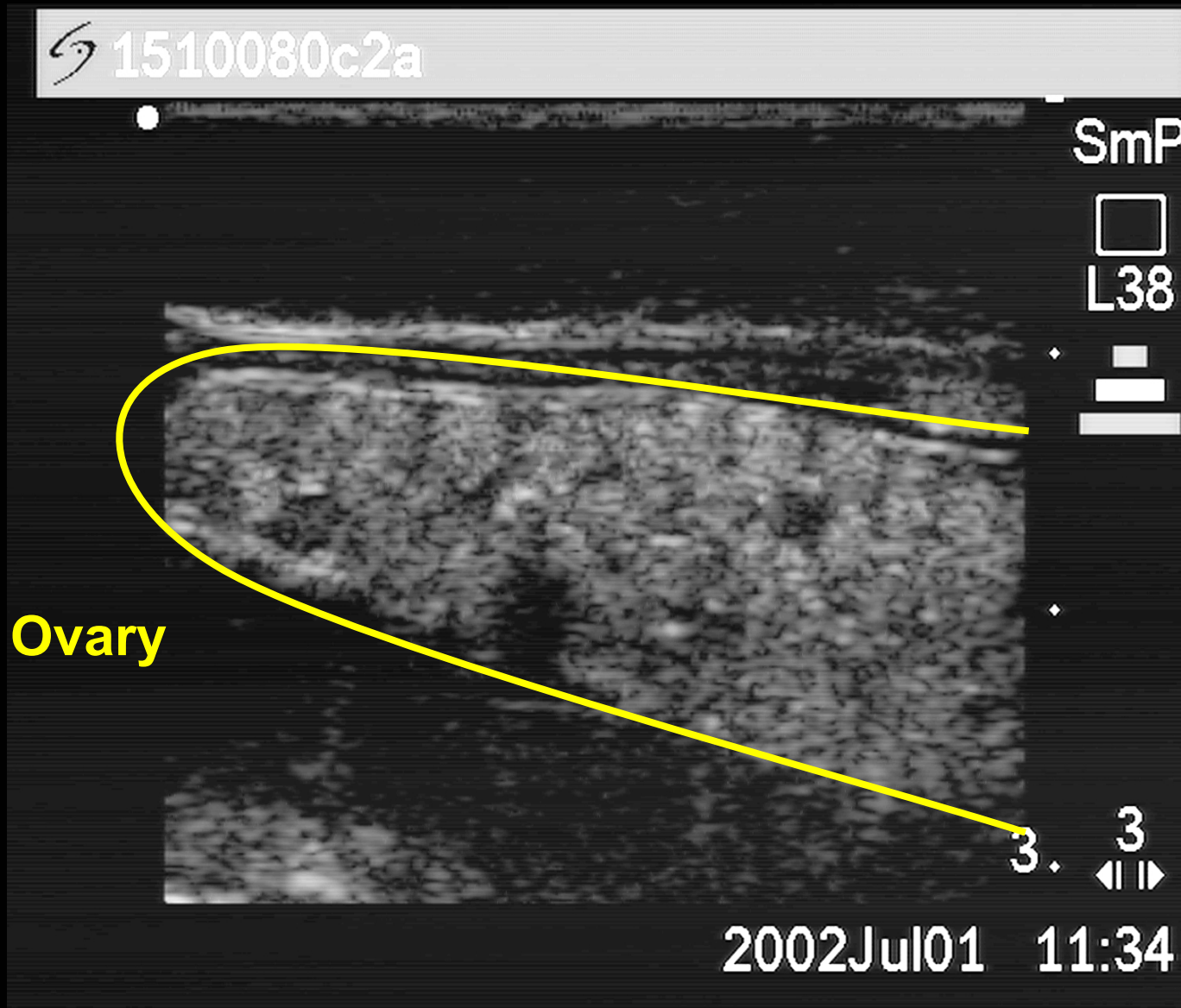
A) trap count of mature females

B) unmarked fish ≥ 300 mm upstream from the dam

C) trap count of mature females/total trap count

$A + B(C) = \text{total mature fluvial females}$

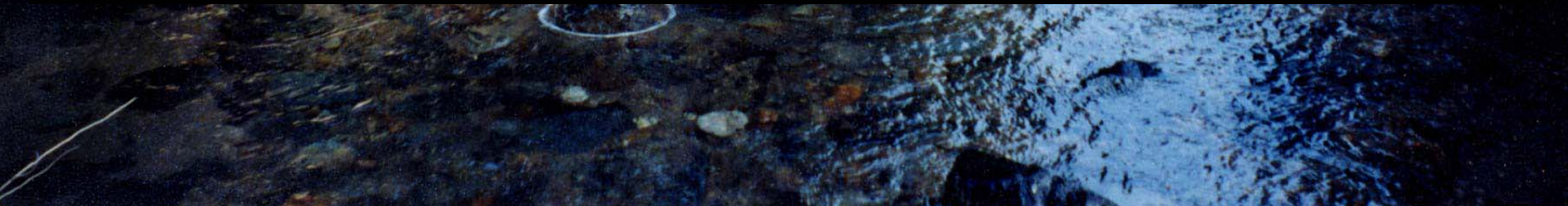
Ultrasound image



A person wearing a blue cap and a backpack is visible in a forest setting, looking down. The background is filled with tall, thin trees and green foliage.

Resident adult abundance

- Used Hankin and Reeves-type methods to get population estimates for fish 125-299 mm FL.
- In mainstem: glides and riffles were block-netted and electrofished to get removal estimates.
Pools were snorkeled; diver counts were calibrated.
- In tributaries: riffle/pool units were block-netted and electrofished.
- Density estimates were expanded to estimate abundance of bull trout 125-299 mm FL.

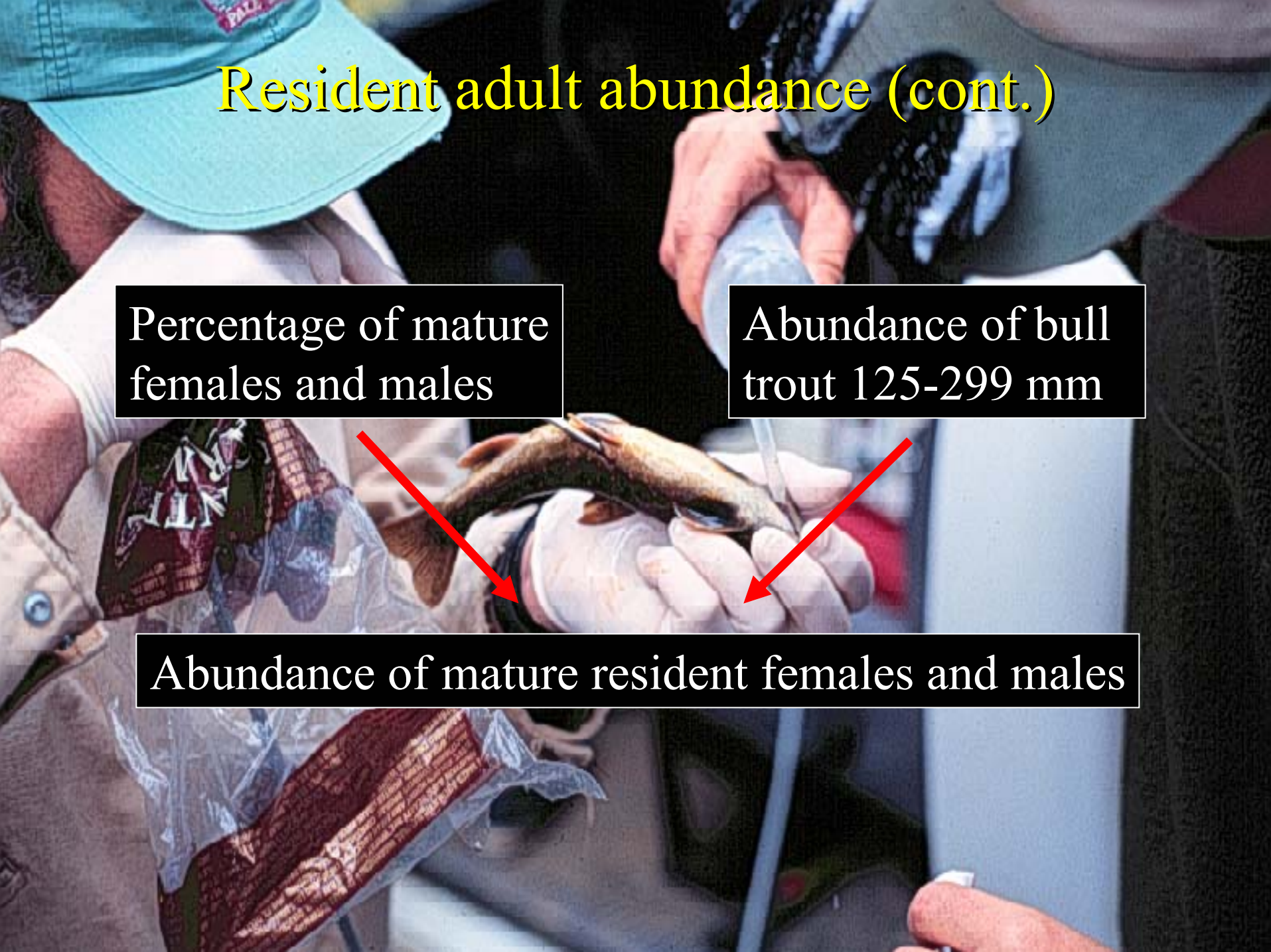


Resident adult abundance (cont.)

Percentage of mature females and males

Abundance of bull trout 125-299 mm

Abundance of mature resident females and males



Redd counts

- 3 surveys spaced evenly throughout Sep and Oct.
- Measured redd lengths and widths.
- Measured redds in the Little Minam River (resident population above a barrier).
- Developed rule for assigning redds in the Mill Creek drainage to fluvial or resident females.



Abundance of fluvial adults

- Trap count: 88 mature females, 89 “others,” and 3 uninspected fish. Total = 180.

90 mature females

- Snorkel count: 10 of 16 bull trout ≥ 300 mm FL were unmarked. Expanded number = 32 fish.

Fluvial adult escapement = 212 fish

$90 + 32 (0.49) = 106$ mature fluvial females

Resident adult abundance

Maturity status of bull trout < 300 mm FL

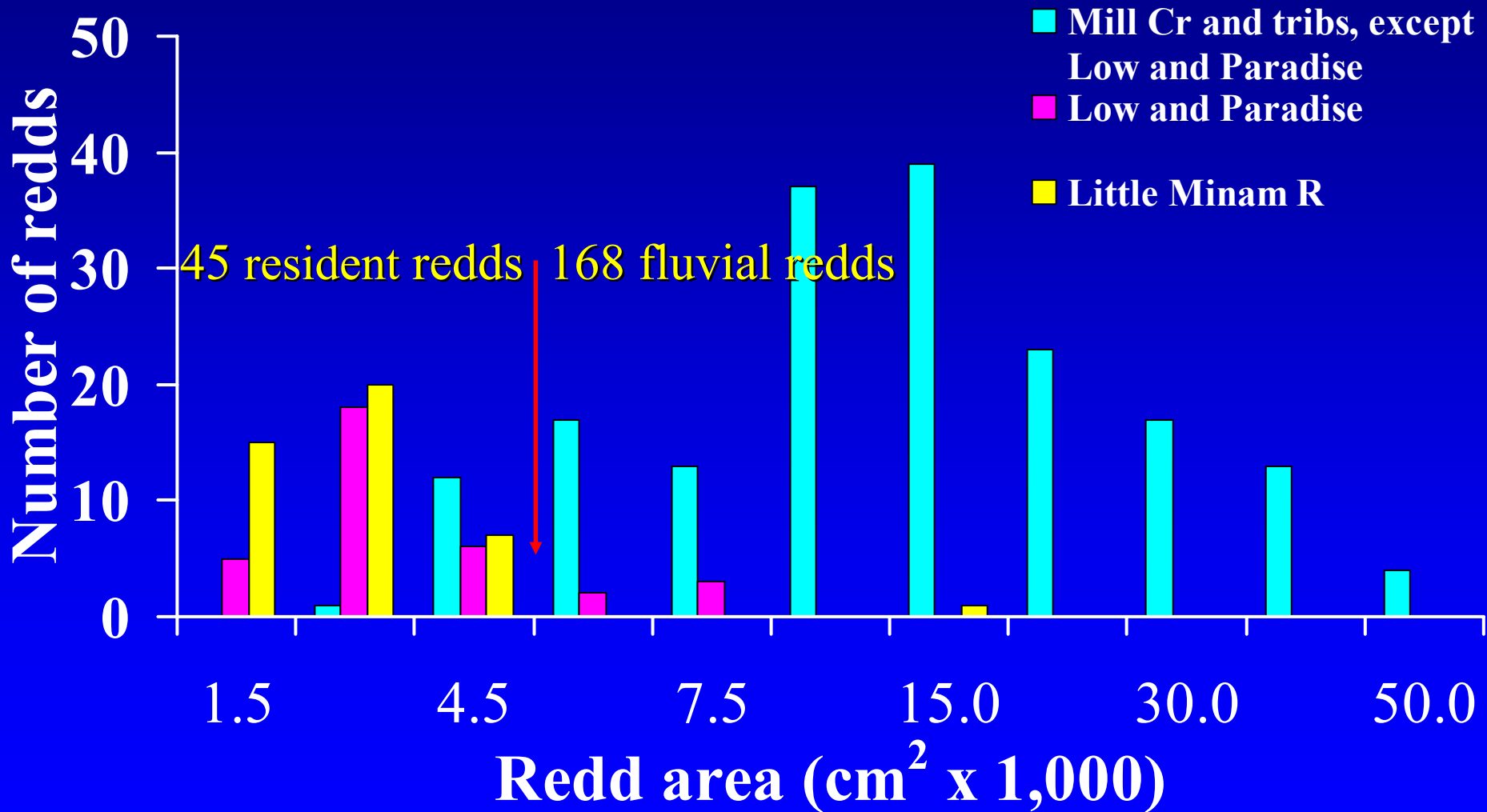
Stream	Mature		Immature	Total
	Female	Male		
Mill Cr	0	12	32	44
Low Cr	0	0	0	0
Paradise Cr	0	0	3	3
N. F Mill Cr	0	0	0	0
Burnt Fork Cr	0	0	0	0
Bull Cr	0	1	6	7
Total	0	13	41	54

Estimated no. of mature resident females = 0

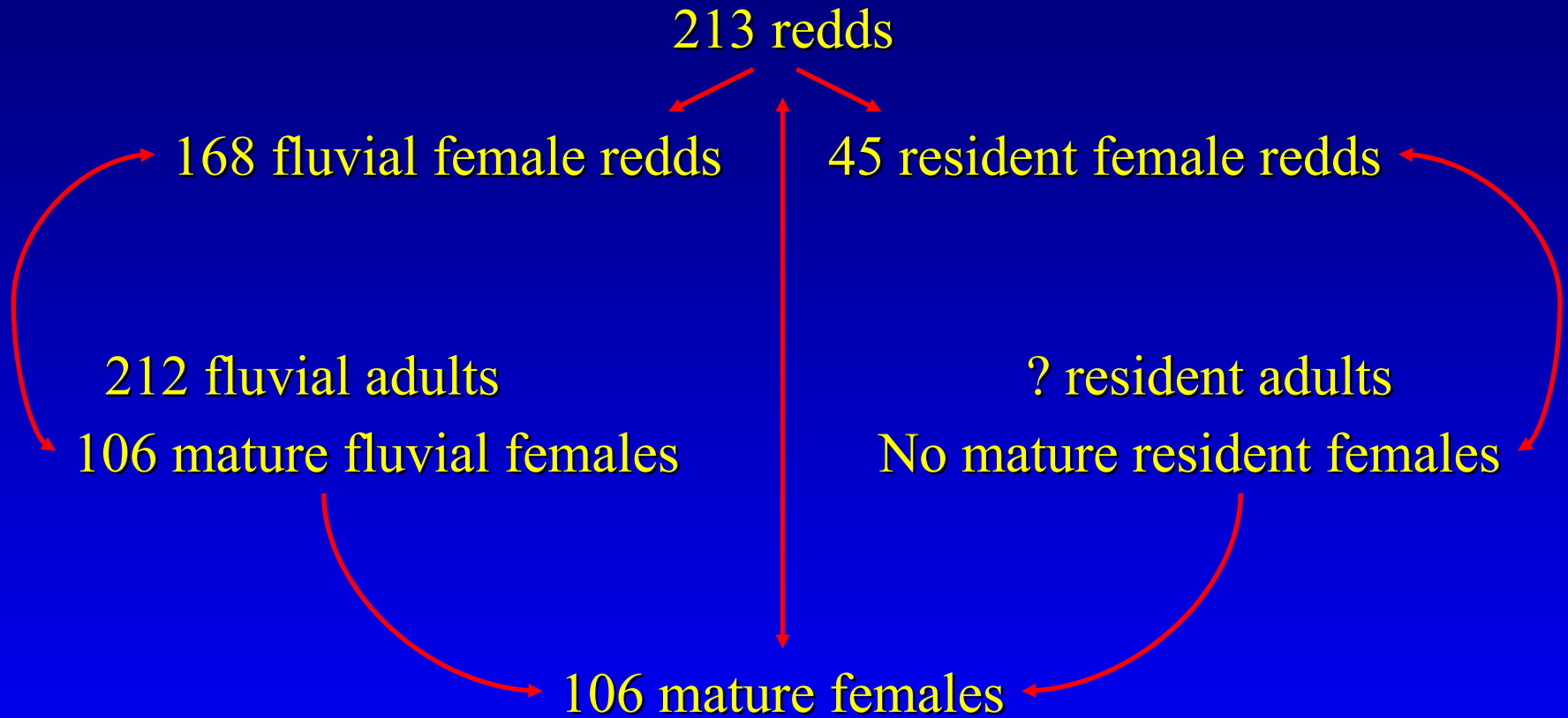
Redd counts

Stream	No. of redds
Mill Cr	161
Low Cr	32
Paradise Cr	5
N.F. Mill Cr	12
Deadman Cr	0
Burnt Fork Cr	2
Bull Cr	1
Total	213

Area (cm²) of redds made by fluvial and resident females



Tying it all together



Adjustments for 2003

- Eliminate potential for fish to jump the dam.
- Snorkel all pools.
- Increase sampling effort in Low Creek.