

# Migration Mortality and Overshoot of Mid-Columbia Steelhead

**Next Steps for Monitoring and Management**

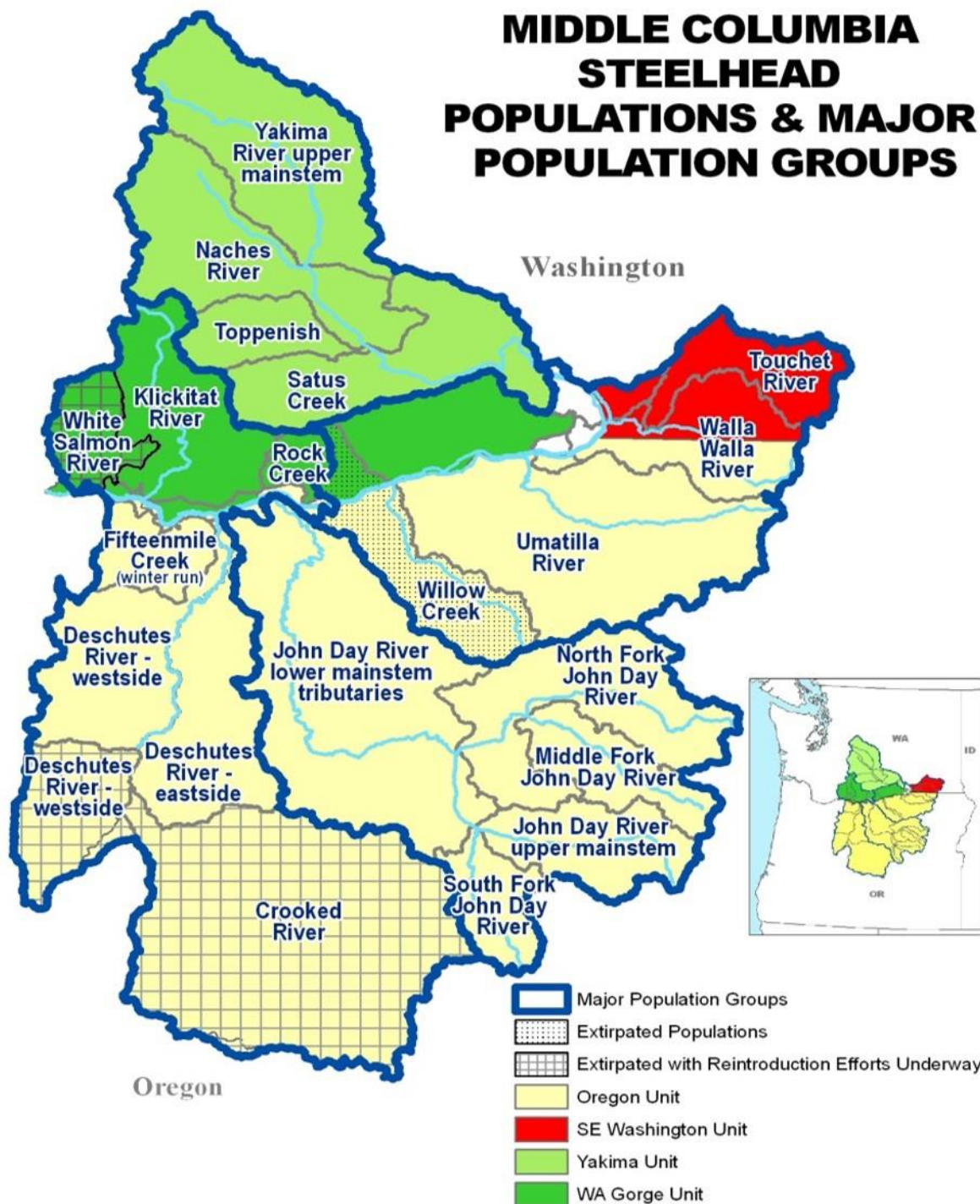
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Photo: J. McMillan

# MIDDLE COLUMBIA STEELHEAD POPULATIONS & MAJOR POPULATION GROUPS



- Recovery Criteria:
  - Abundance
  - Productivity
  - Spatial Structure
  - Diversity

↑ Abundance ↑ SS

↑ SS ↑ Diversity

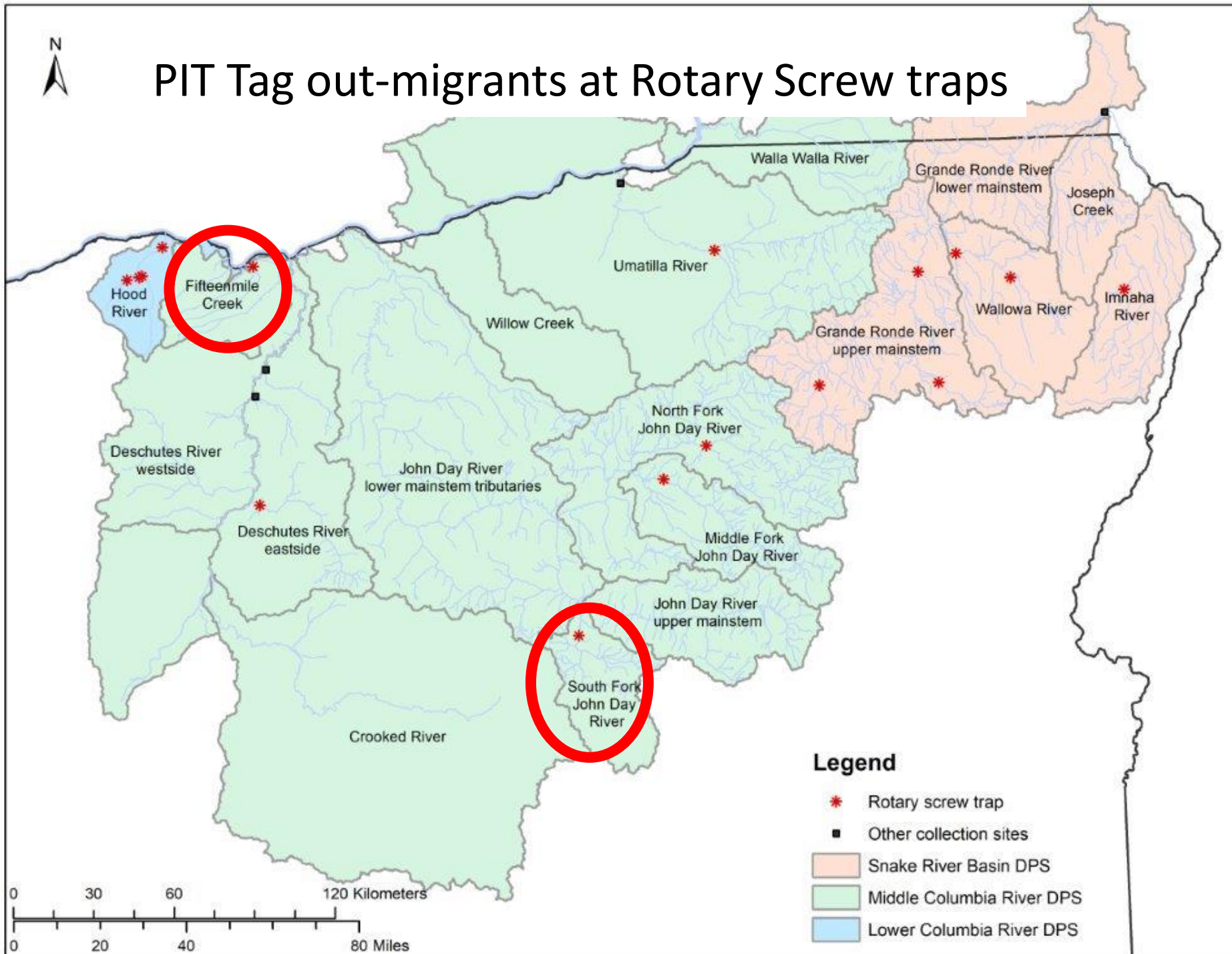
# Adult Migration Success Limits Abundance

- Low conversion limits abundance for some populations
- Tributary 'overshoot' is one factor influencing conversion
- Methods and results for 2 populations



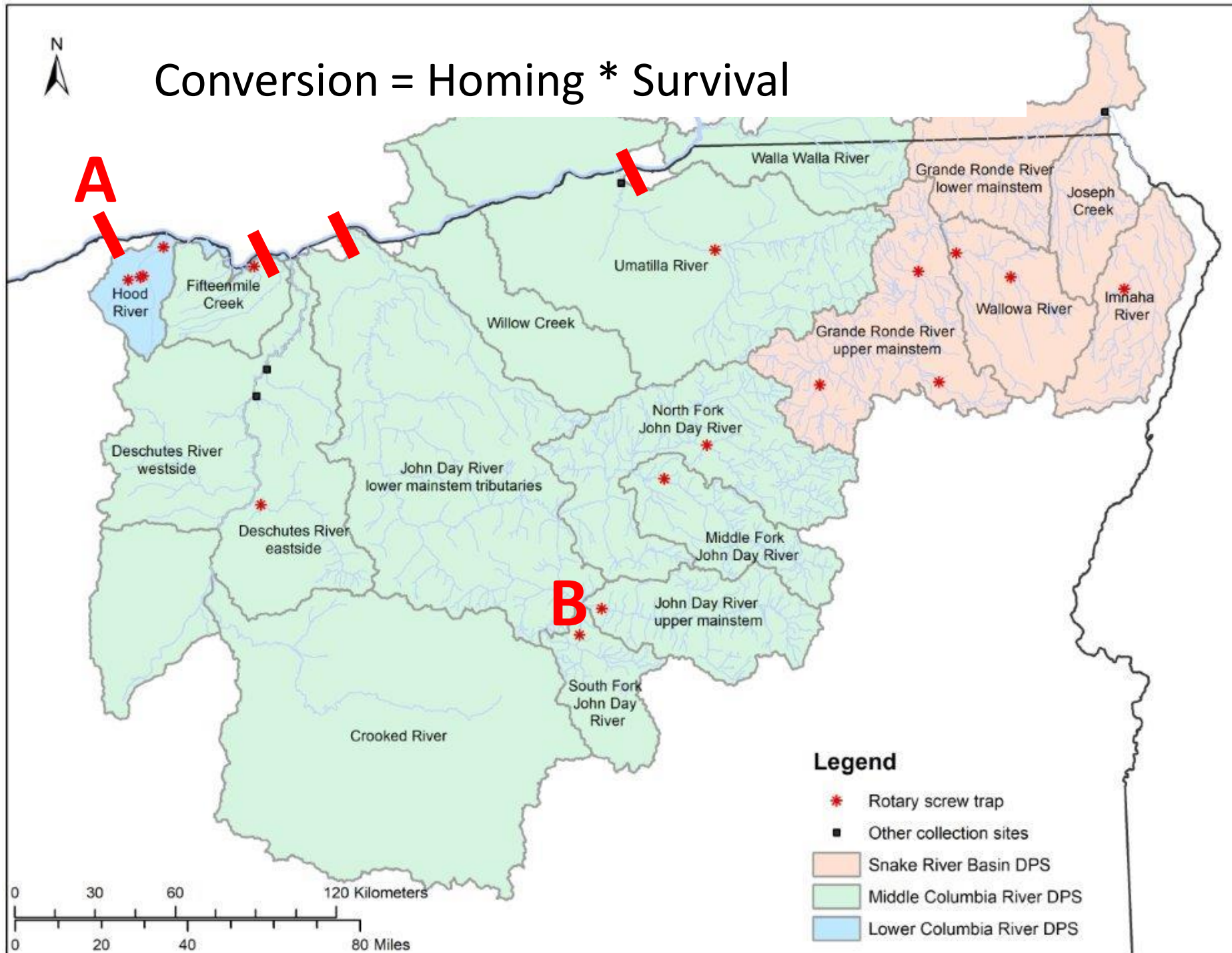


# PIT Tag out-migrants at Rotary Screw traps



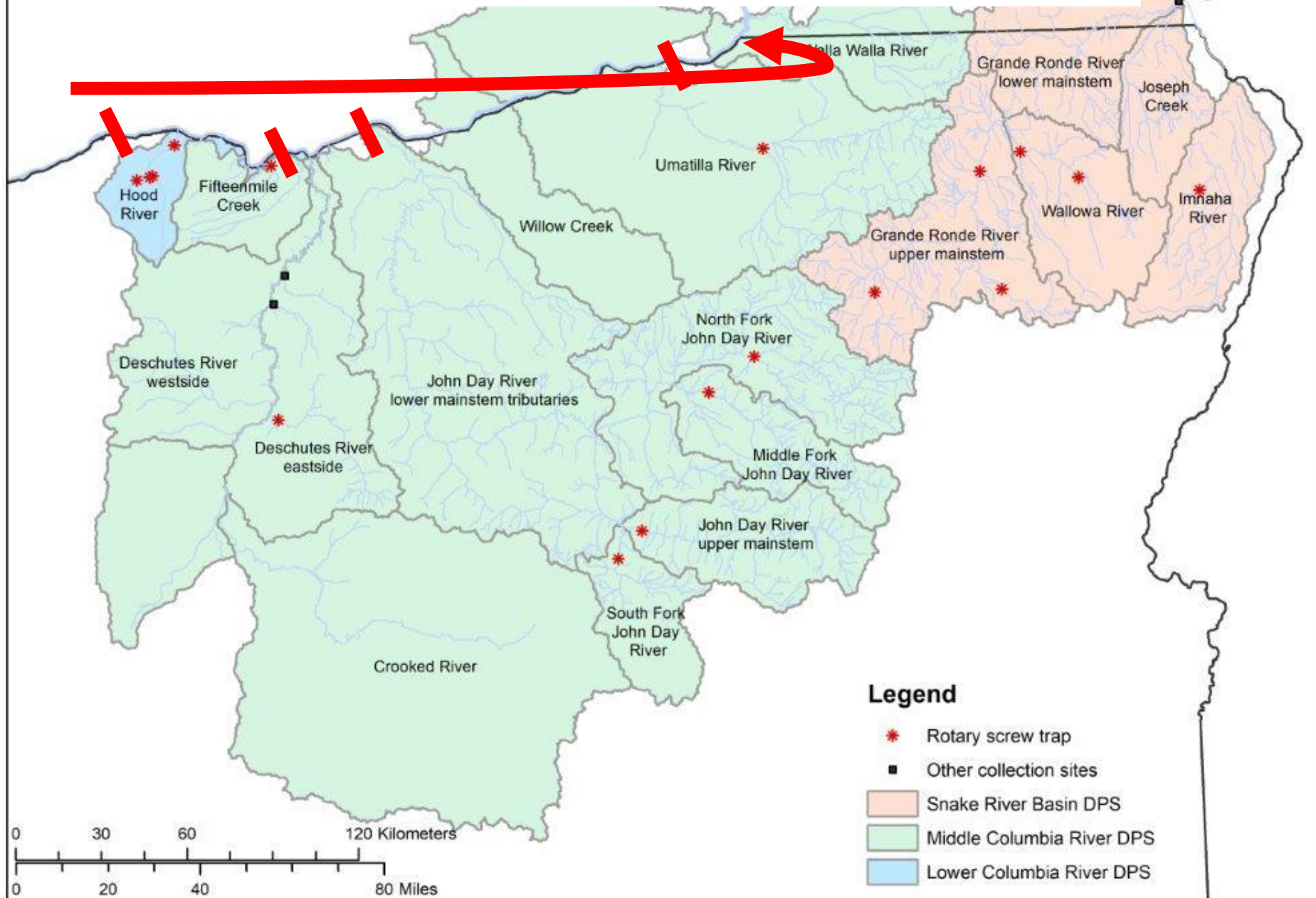


Conversion = Homing \* Survival

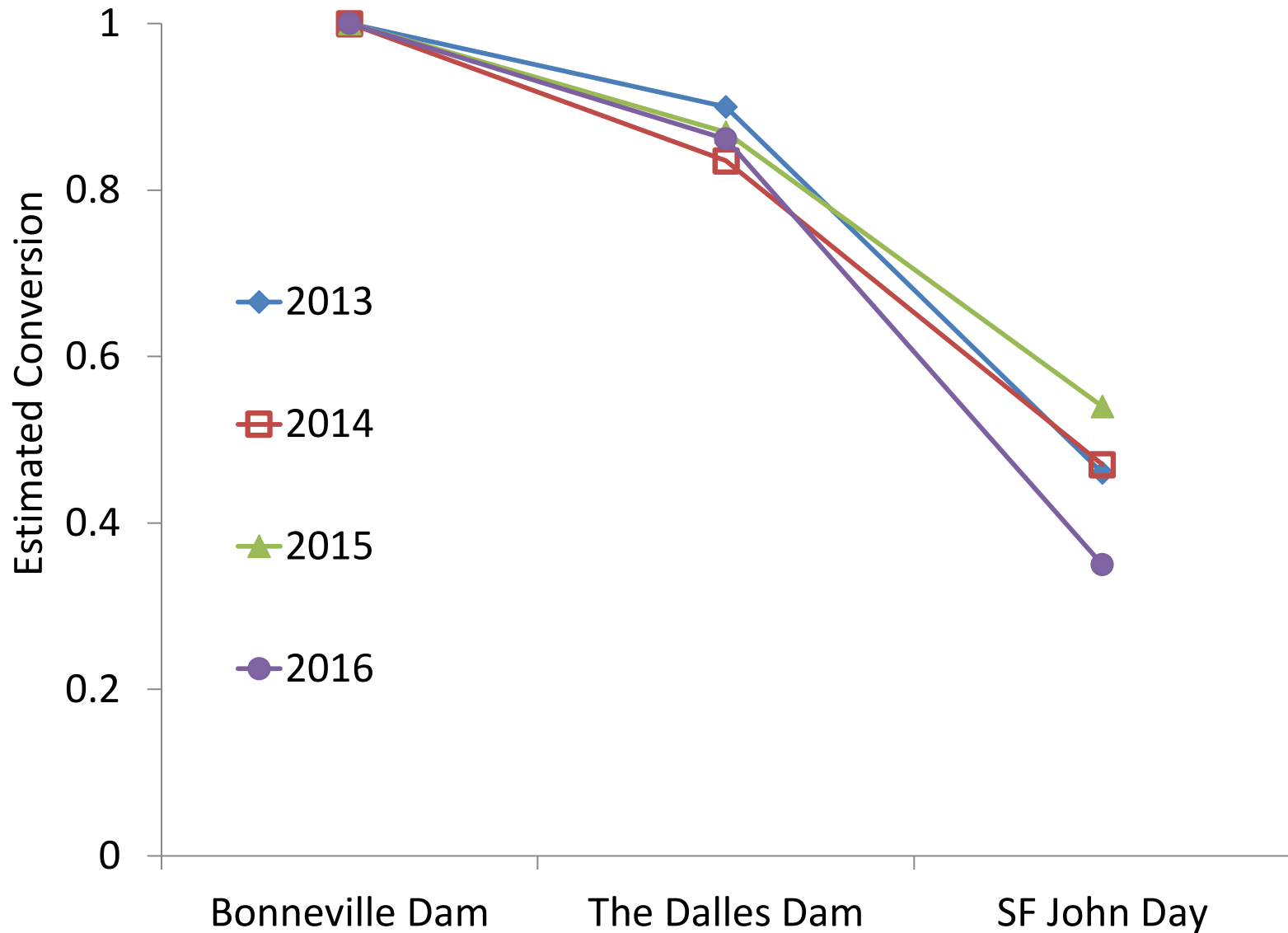




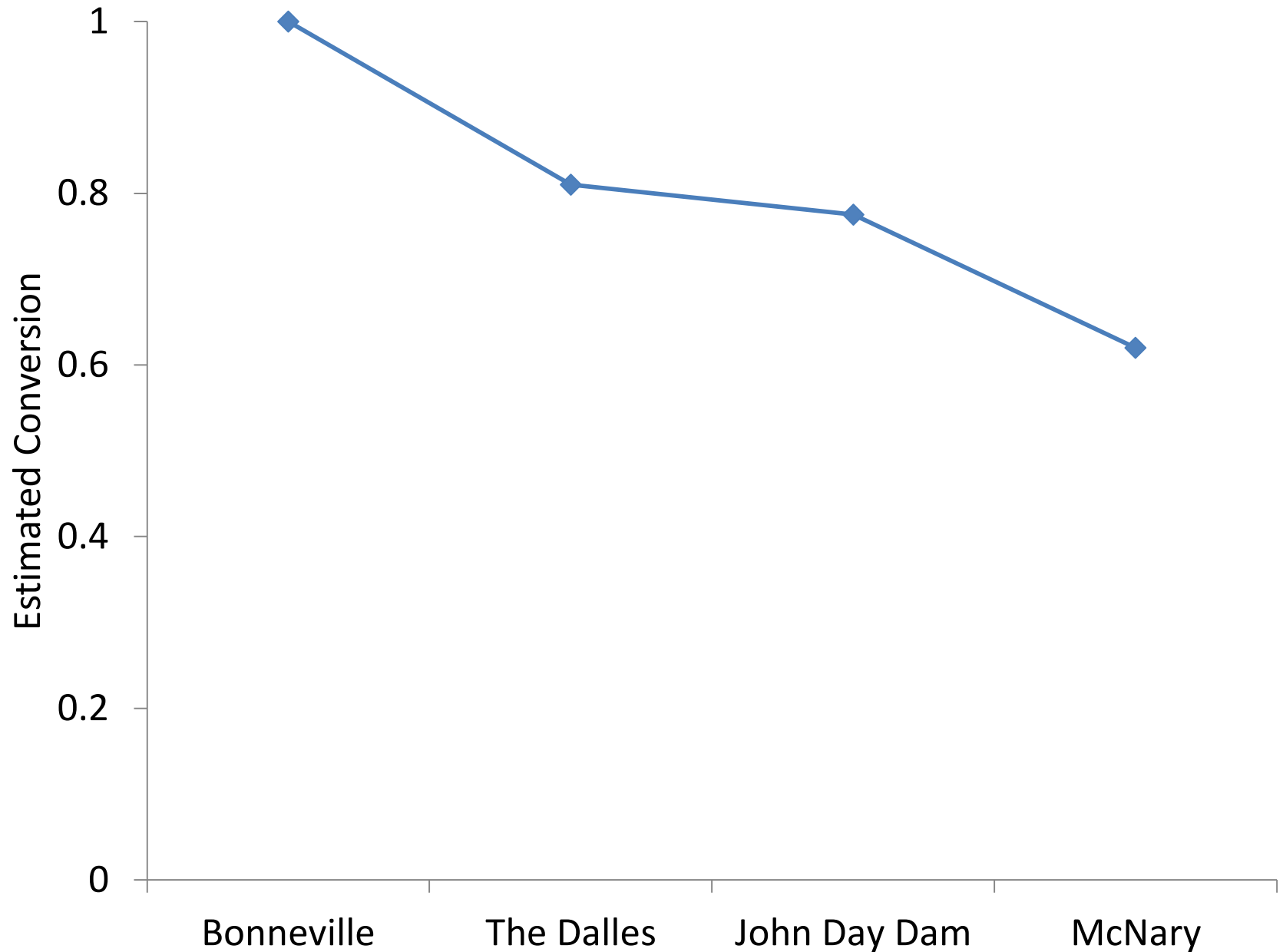
Overshoot = Upstream Detects / Bonneville



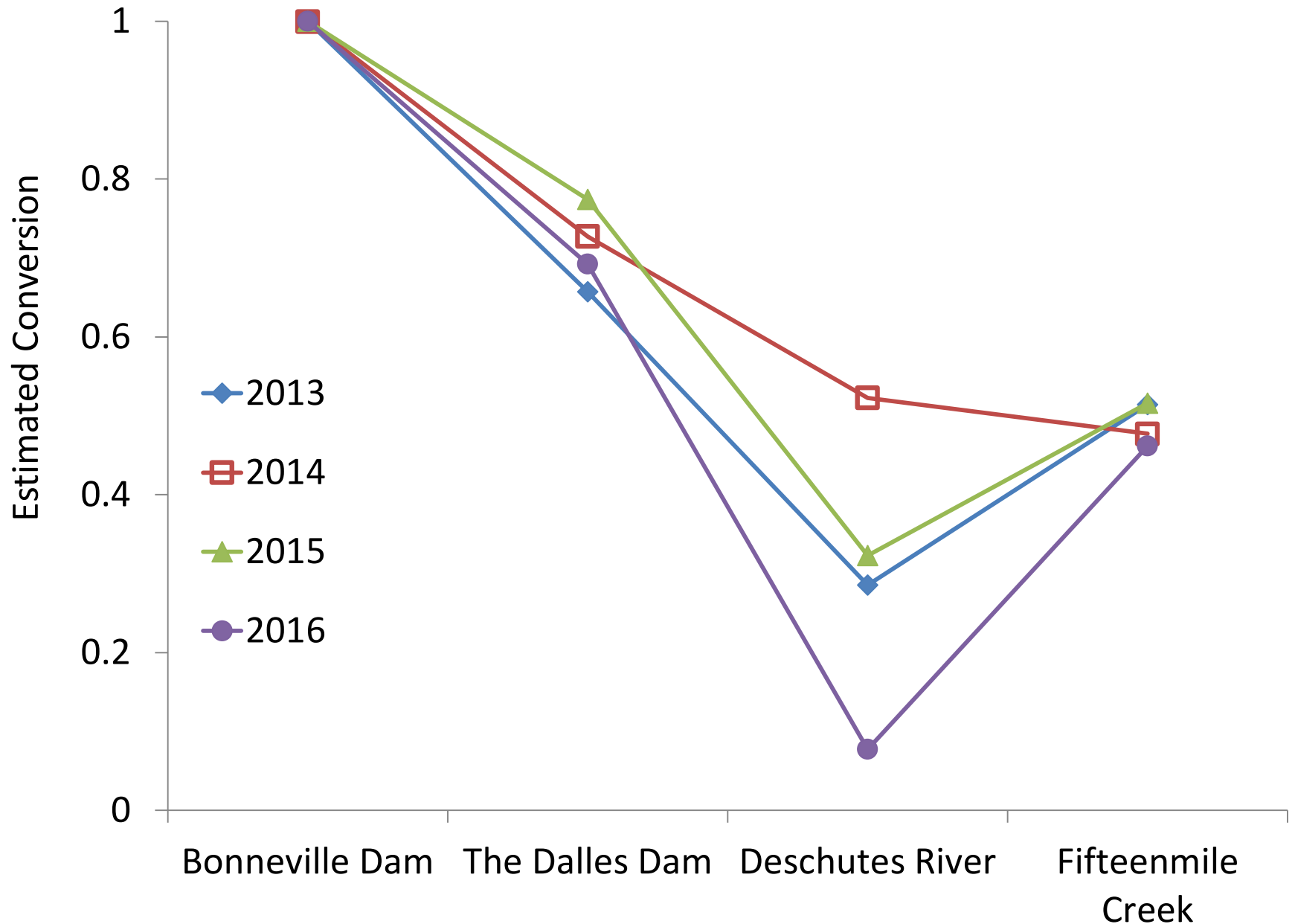
# Bonneville to SFJD Conversion



# 2017 Conversion Through Columbia R.

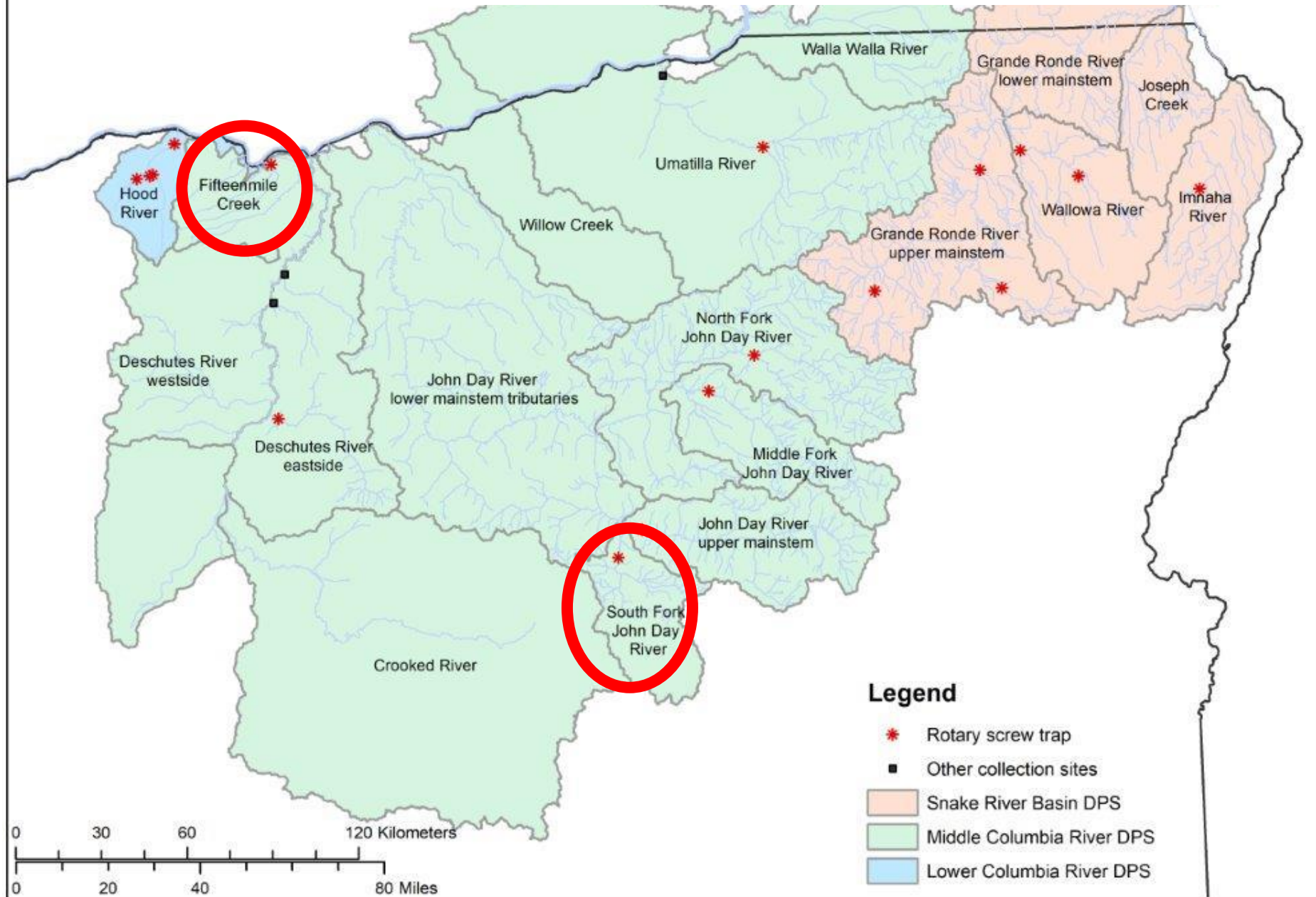


# Bonneville to Fifteenmile Conversion

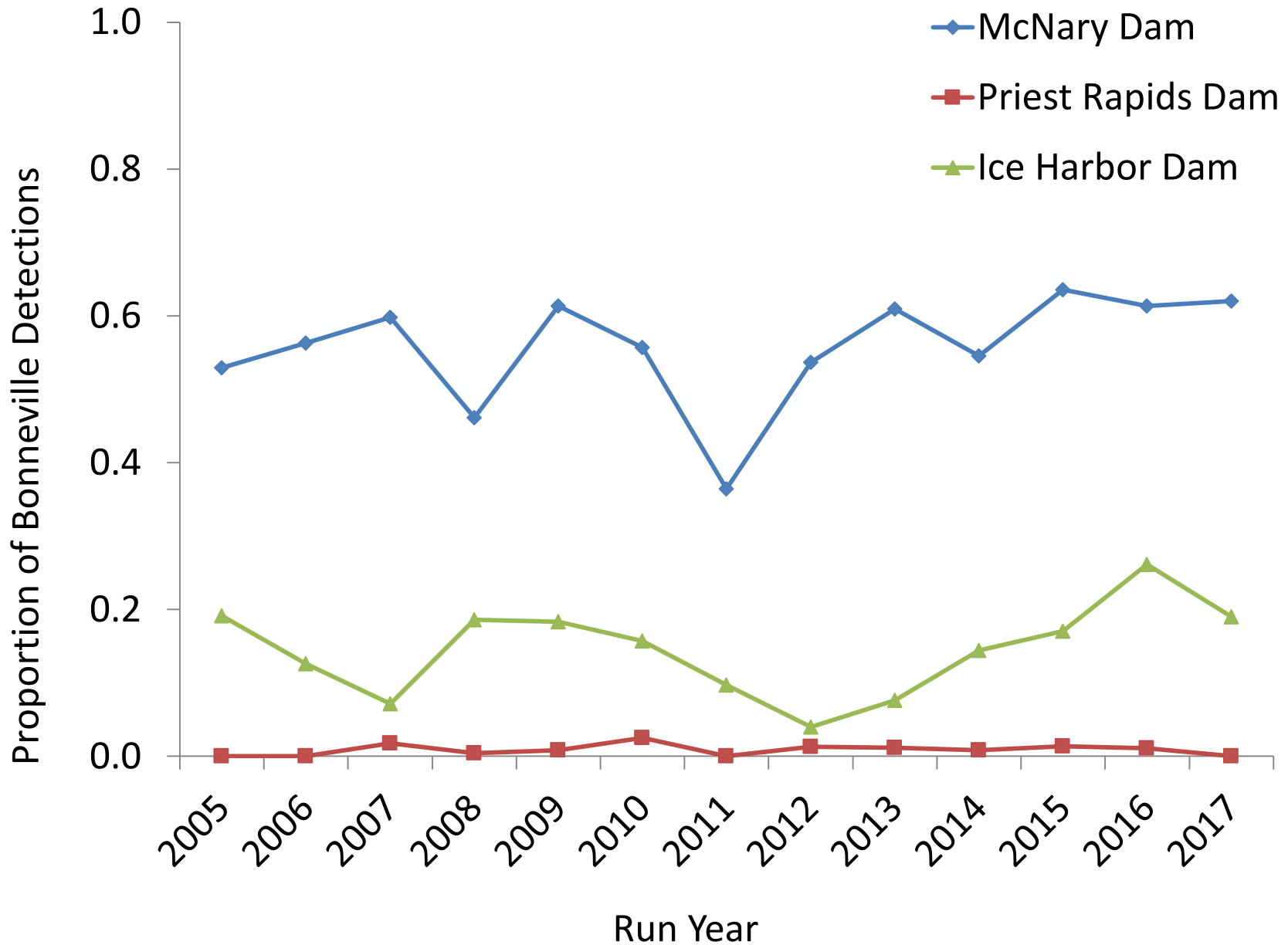




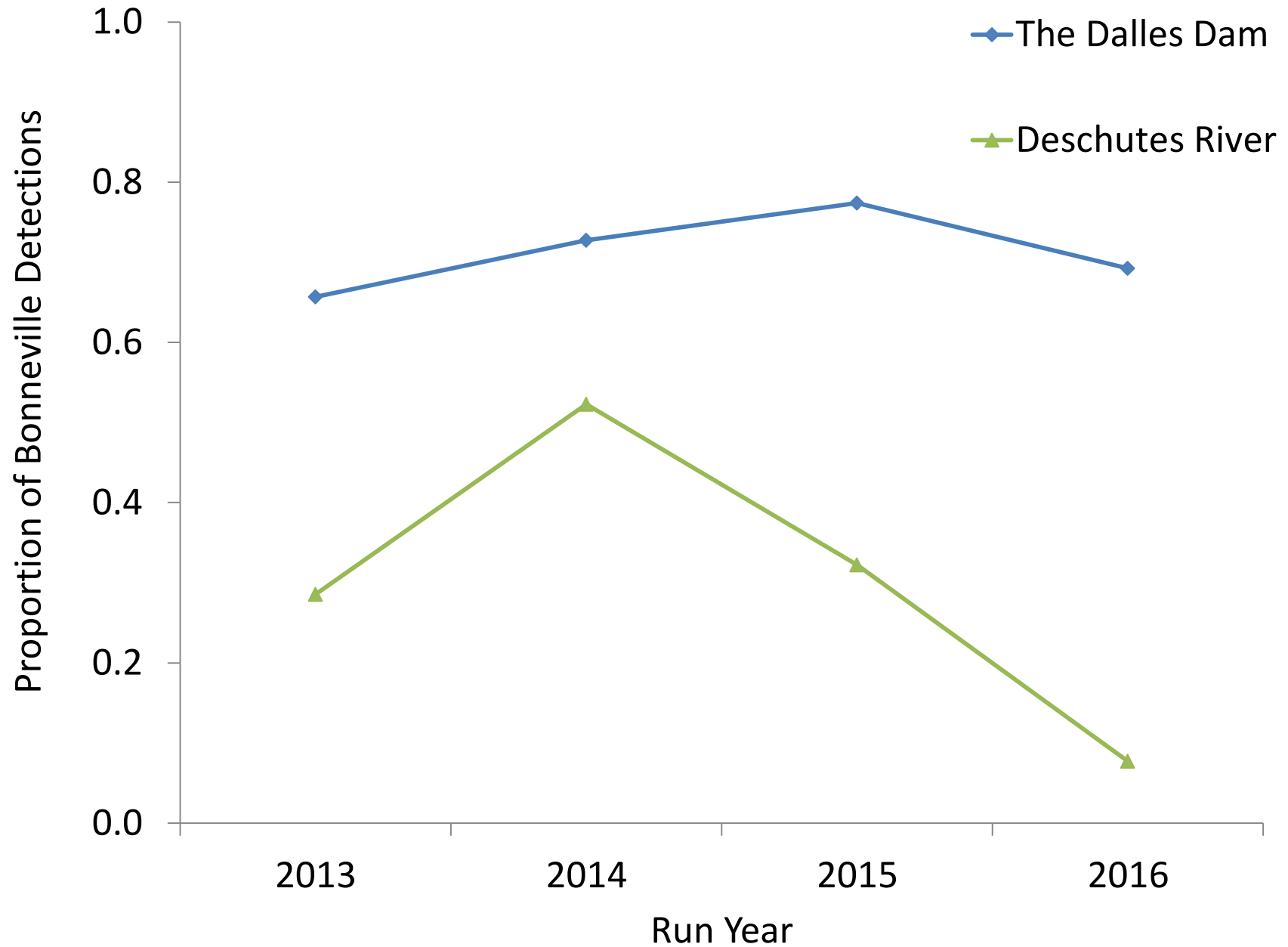
# Similar Conversion, Different Distances -> Mainstem



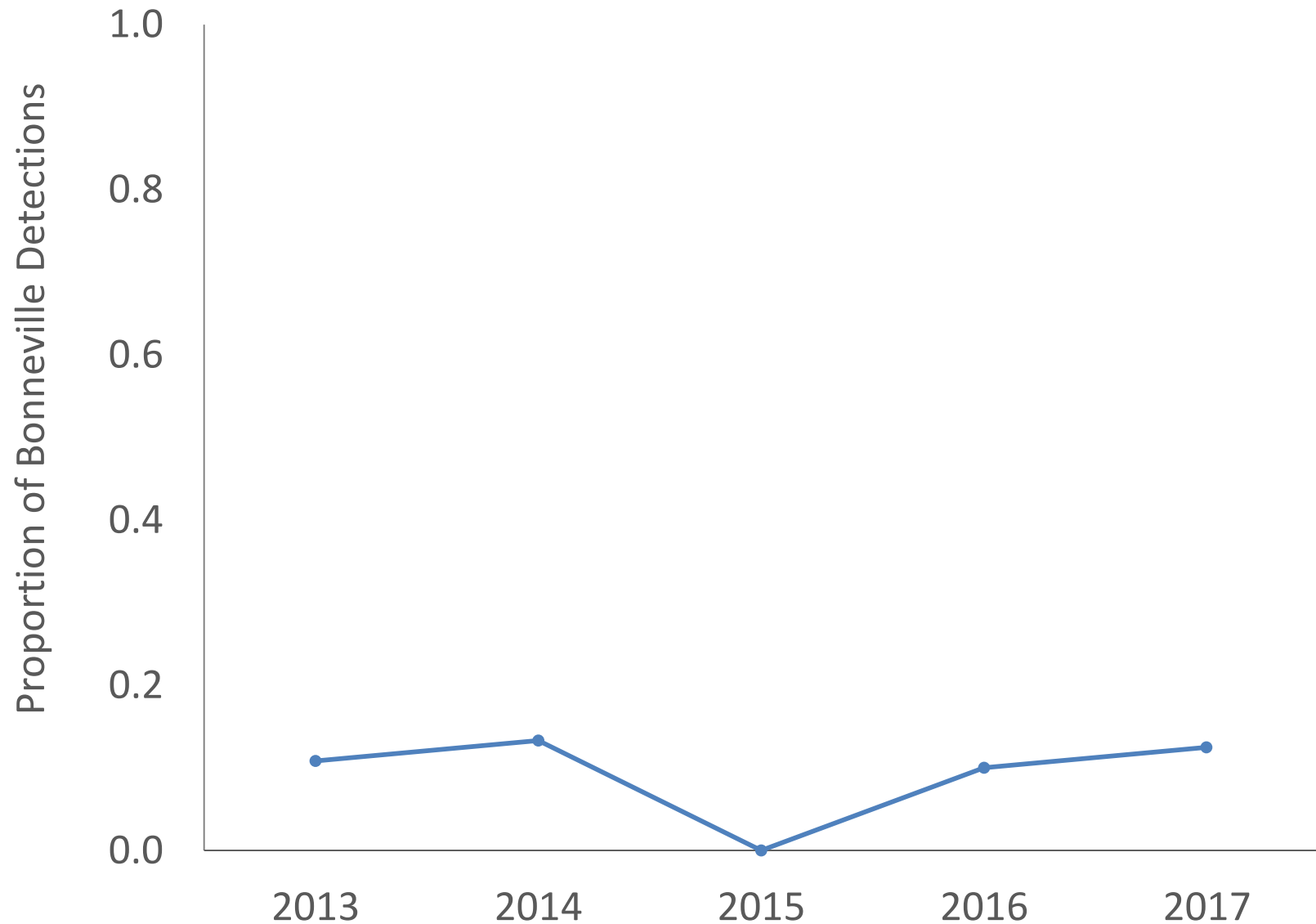
# John Day River Overshoot



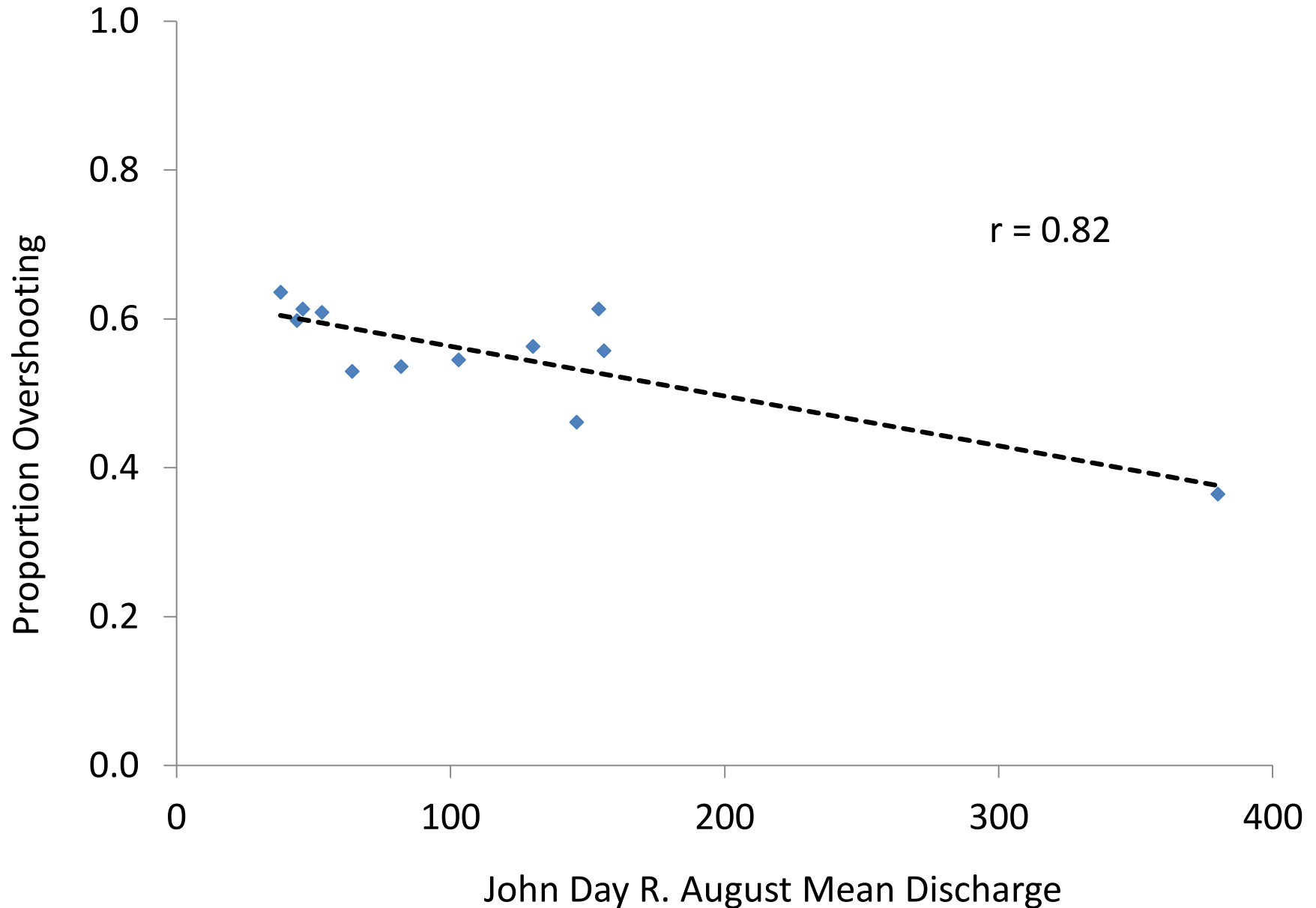
# Fifteenmile Creek Overshoot



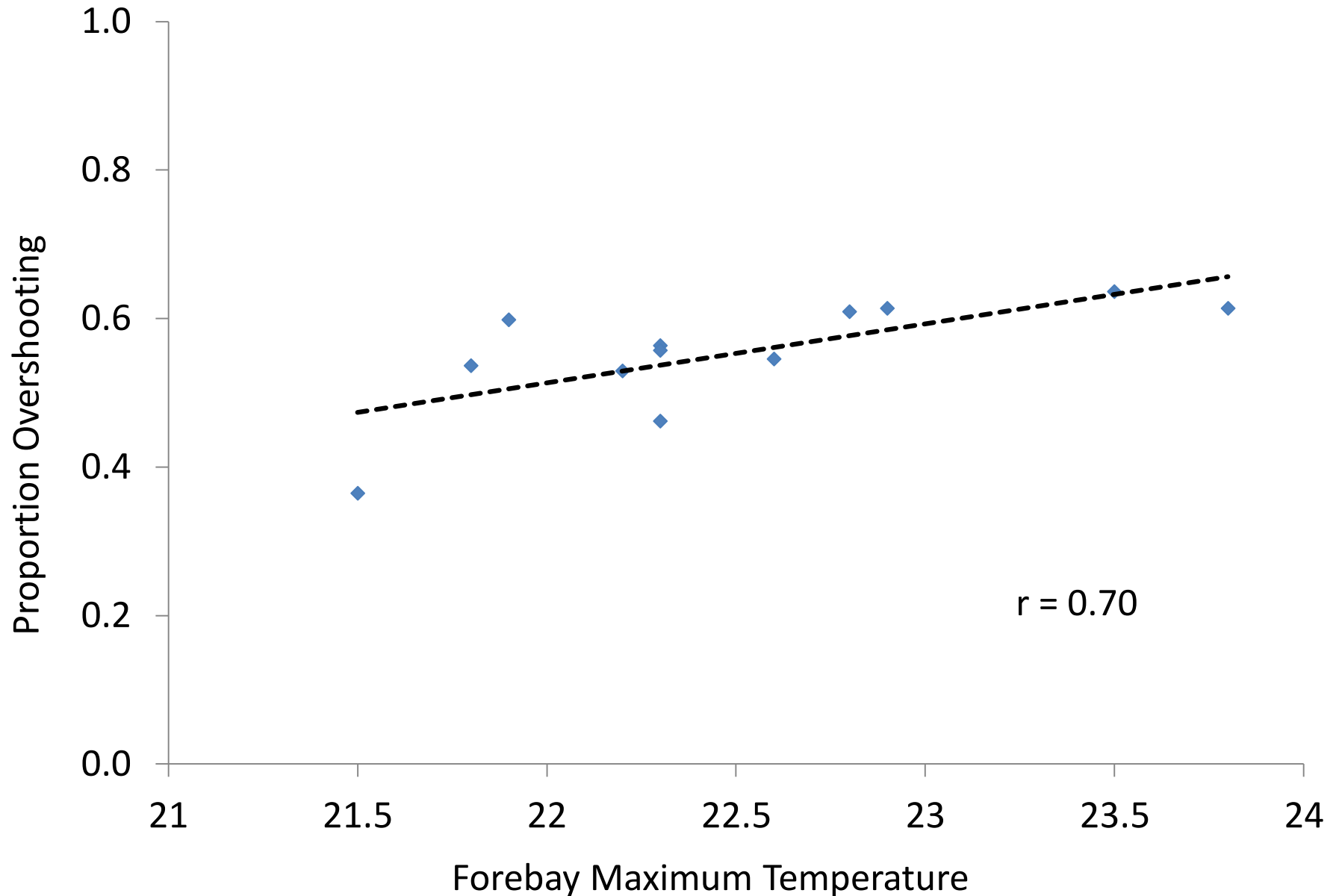
# For Comparison... Yakima Overshoot to PRD



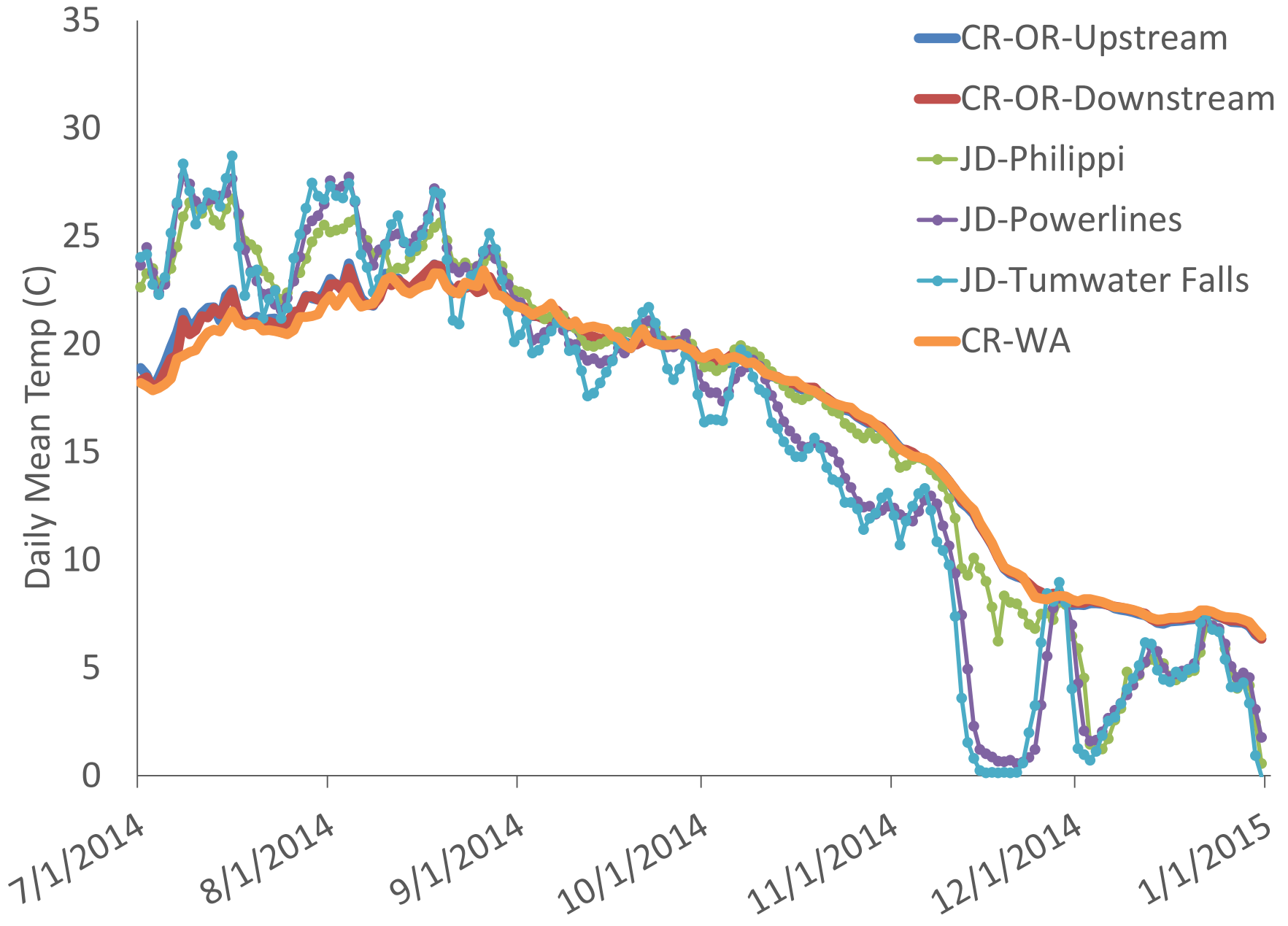
# Flow-Overshoot Relationship



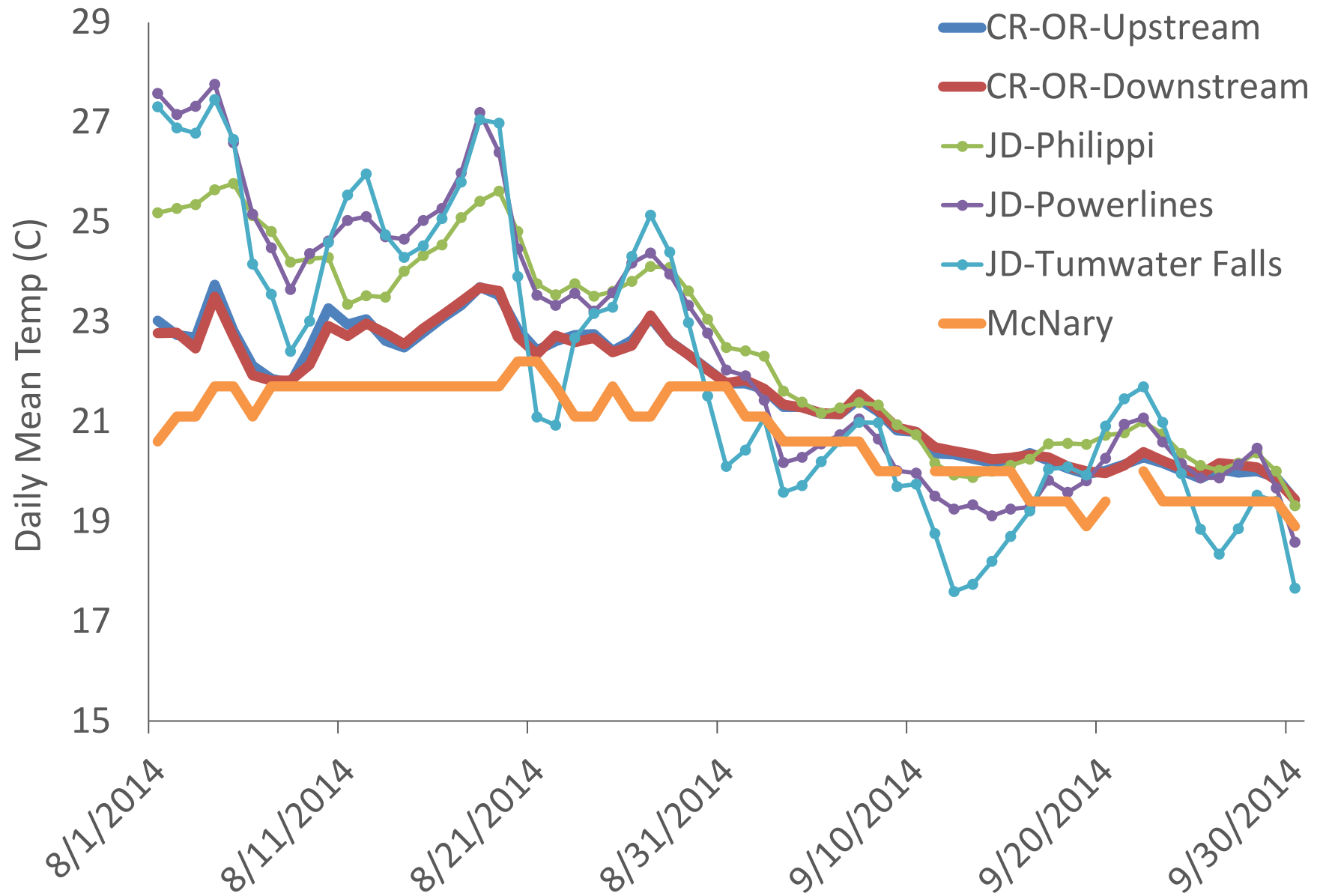
# Temperature-Overshoot Relationship



# Peer Pressure to be “Cool?”



# Behavioral Thermoregulation?



# Does Side Matter?

## Bank of Detection

South

North

***Total***

## Outcome

Direct Entry to JDR

7

0

**7**

Fallback from McN to JDR

8

8

**16**

No Obs in JDR

16

12

**28**

***Total***

31

20

51

# Next Steps-Conversion

- What should the 'goal' be?
- Are there Skeena or Fraser conversion data...?



# Next Steps-Overshoot

- Best long-term solution is to reduce overshoot
  - Eliminate energetic cost of 34% longer migration
- Test environmental correlates
- John Day Fall spill—why North?
  - South side attraction flow?

# Taking the Next Steps...

- 31% of John Day PIT adults from ISEMP
- Need to replace that tagging effort
  - Recent years < 100 PIT adults
- More tags = quantitative test of management
  - Add active tags to recaps at BONAFF?

# Taking the Next Steps...

- **Individual fine-scale migration behavior**
  - John Day Pool
  - The Dalles Pool when sluiceway is “off”
- **Do tagged John Day adults:**
  - 1) Not enter the river mouth
  - 2) Enter and then leave (temperature?)
  - 3) Enter and die prior to JD1
  - 4) Enter and hold successfully until crossing JD1