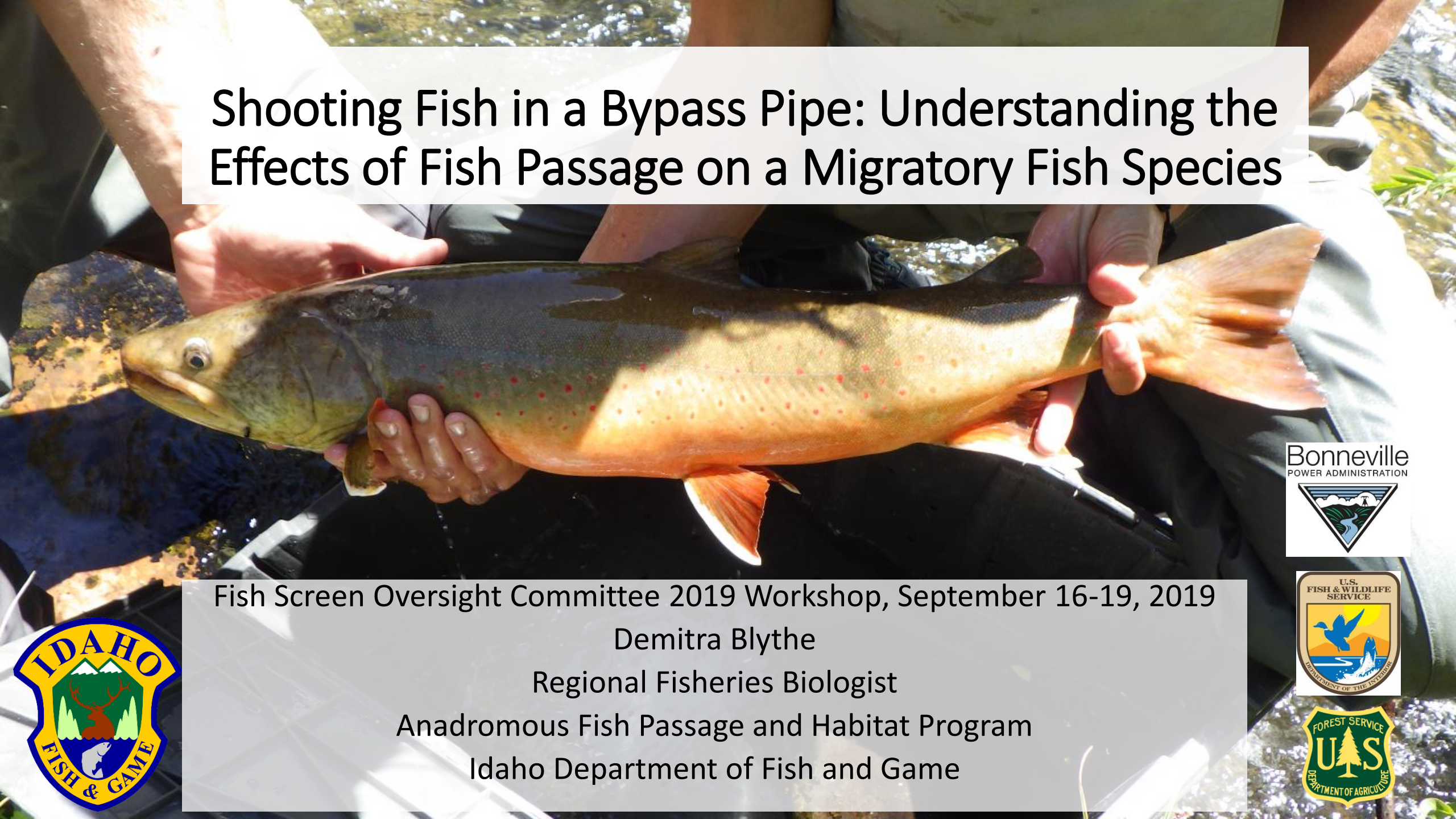
Shooting Fish in a Bypass Pipe: Understanding the Effects of Fish Passage on a Migratory Fish Species

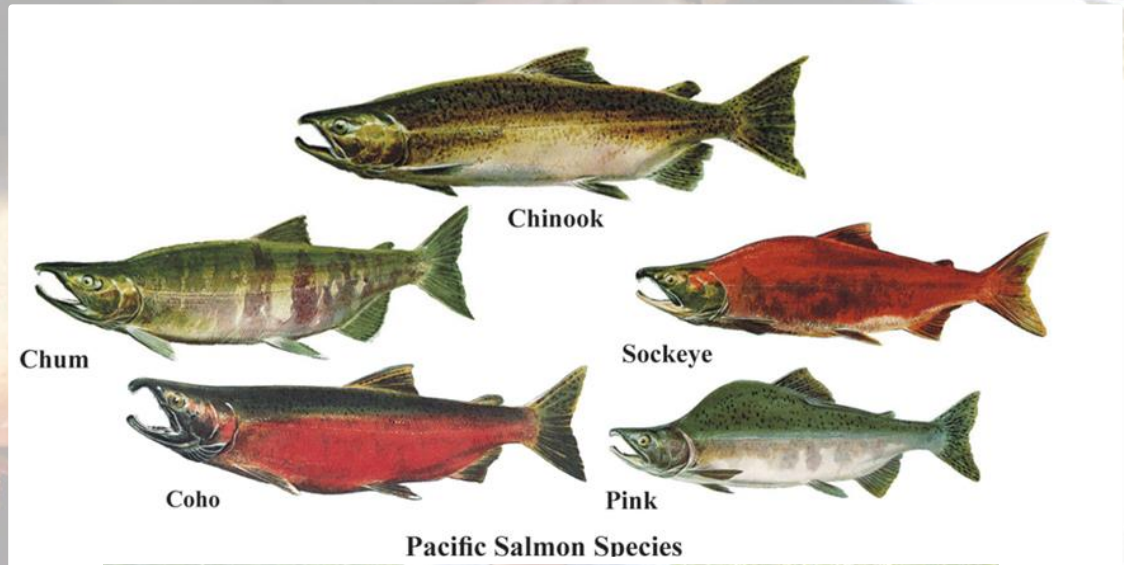


Fish Screen Oversight Committee 2019 Workshop, September 16-19, 2019

Demitra Blythe
Regional Fisheries Biologist
Anadromous Fish Passage and Habitat Program
Idaho Department of Fish and Game

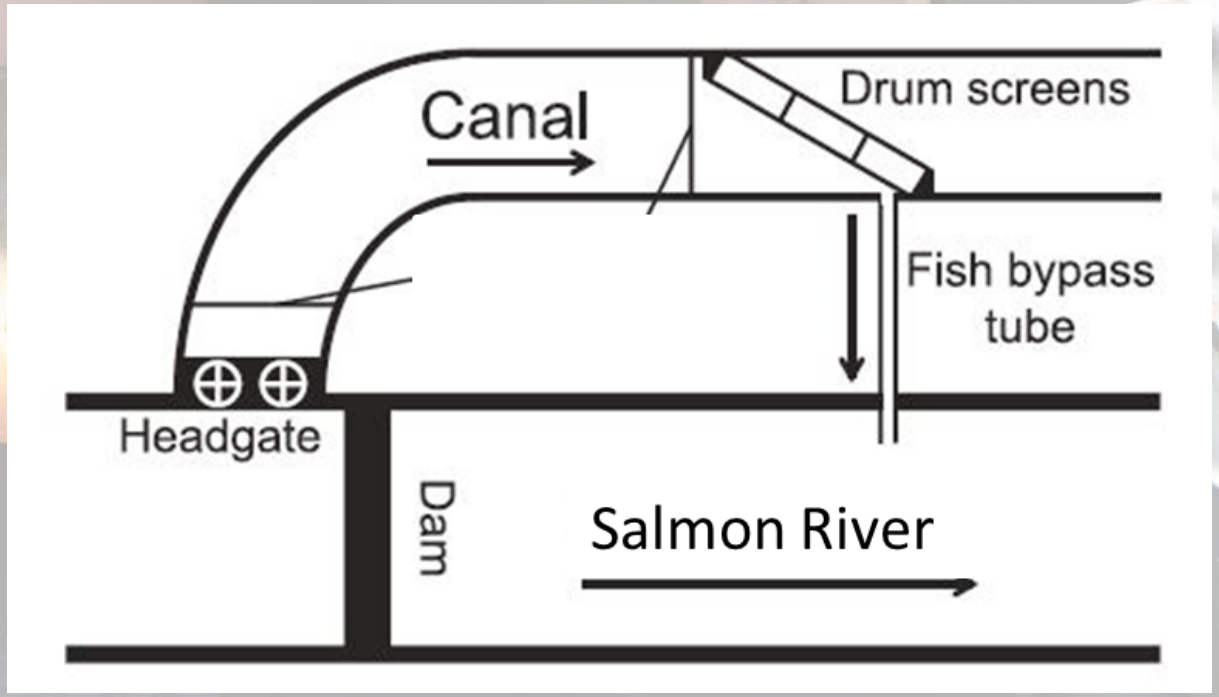
The Why's

- Understanding how we can better Pacific Salmon recovery, migratory (fluvial), and non-migratory (resident) fish populations
- Maintain fisheries for future generations



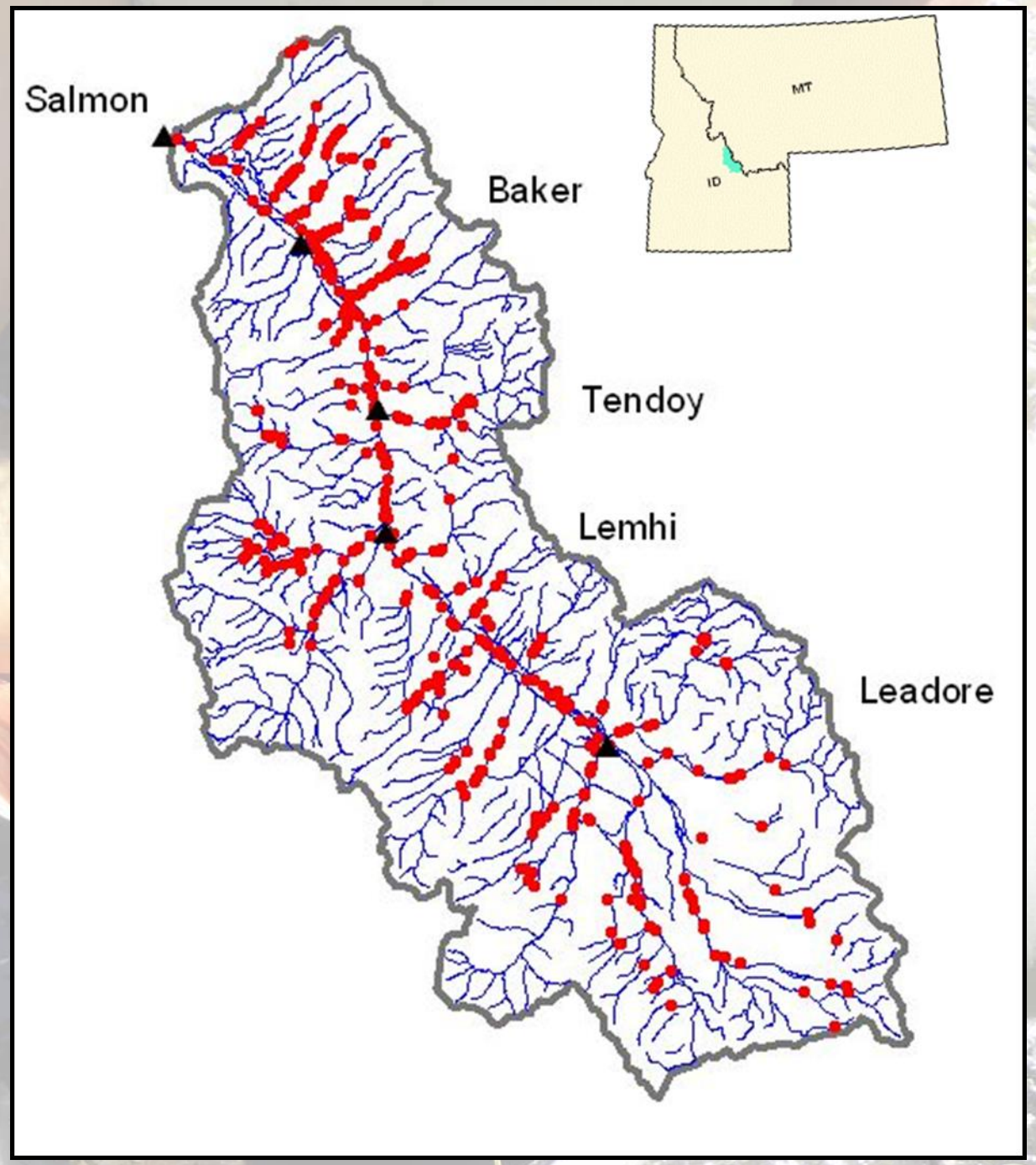
Where Fish Screen Programs Come in…

- Addressing:
  - Migration/passage barriers
  - Habitat loss/degradation
  - Prevent ENTRAINMENT



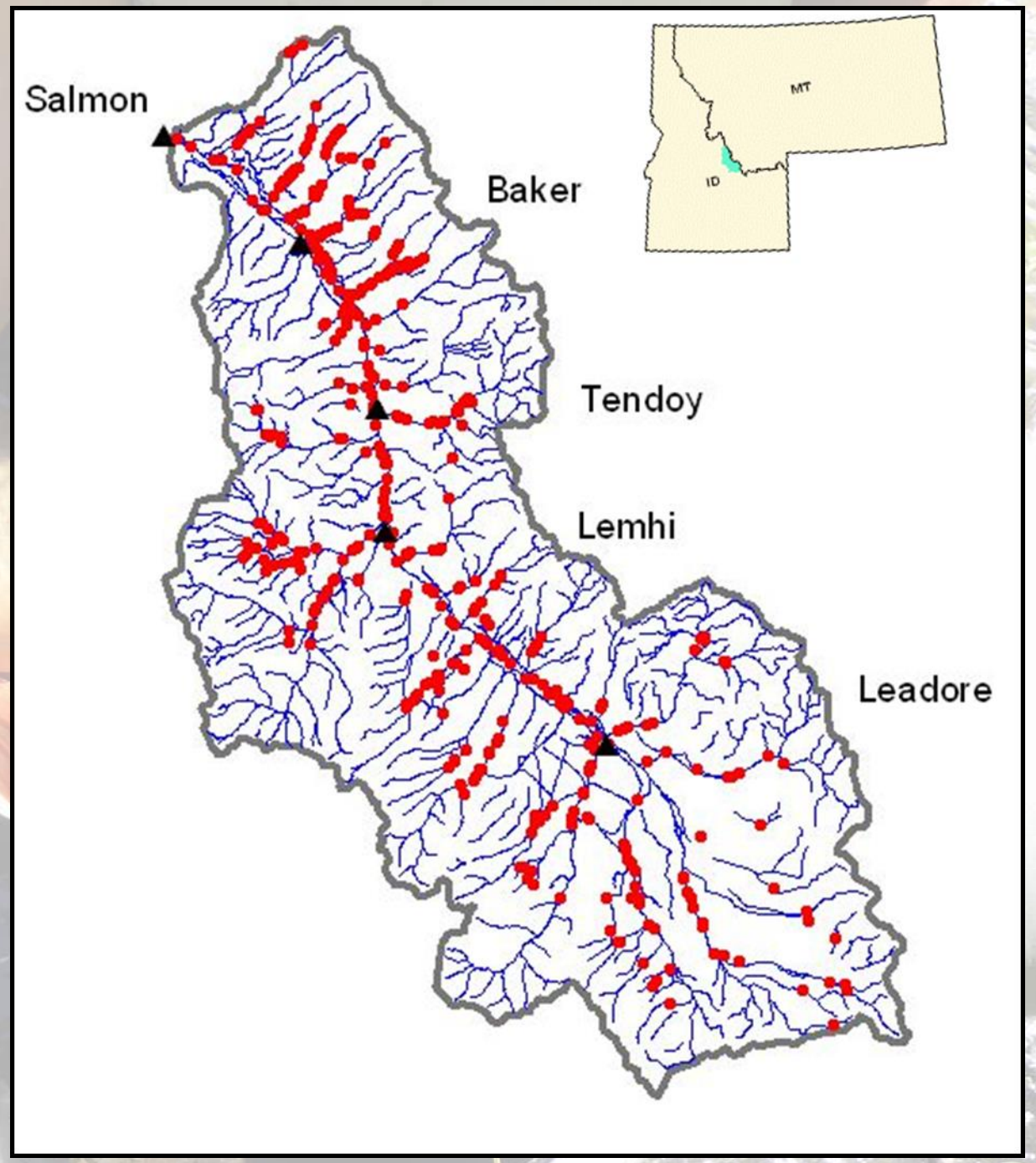
Upper Salmon Fish Screen Program

- Preventing entrainment since 1958…
  - Gebhards (1959)



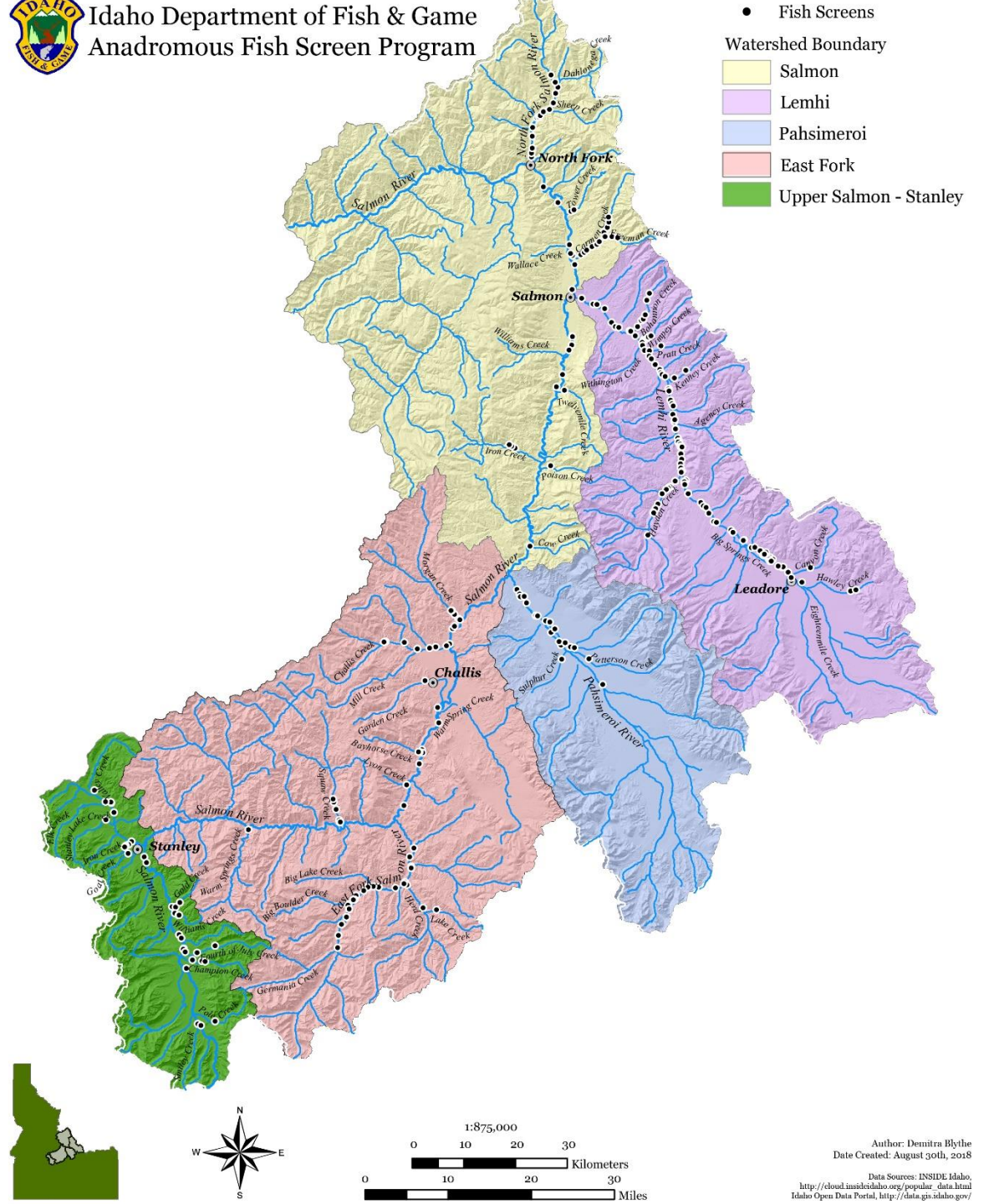
Upper Salmon Fish Screen Program

- Preventing entrainment since 1958…
  - Gebhards (1959)
  - 423,000 lost in irrigation canals



Upper Salmon Fish Screen Program

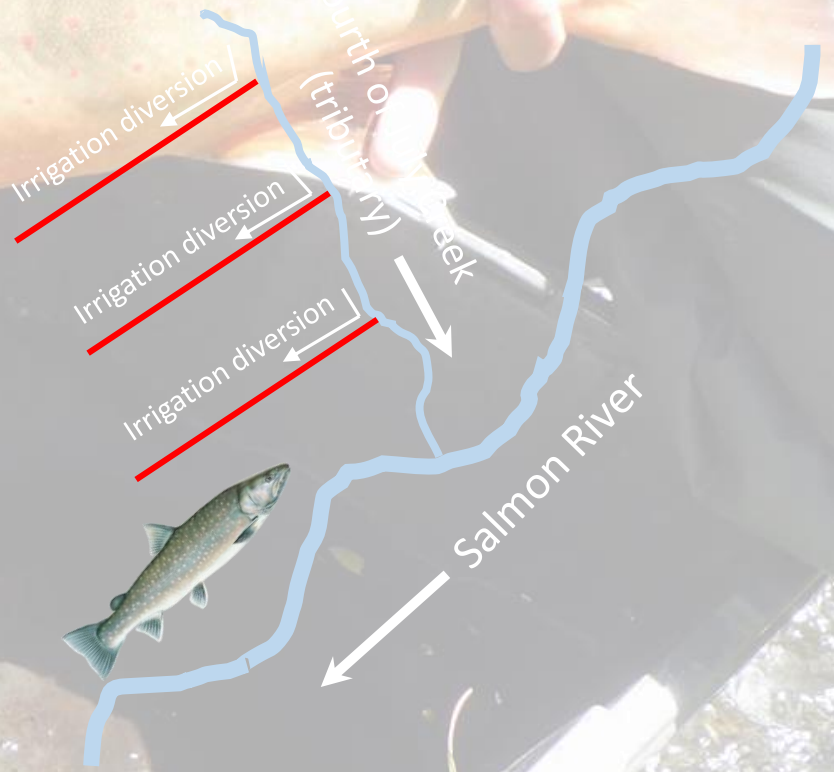
- ~270 screened diversions throughout the Upper Salmon River Basin



Fluvial Salmonid Entrainment

- Multiple native species exhibit a ‘fluvial’ (migratory) life histories

FLUVIAL: Fish spends a majority of its life in a large river, but migrates up small tributaries to spawn



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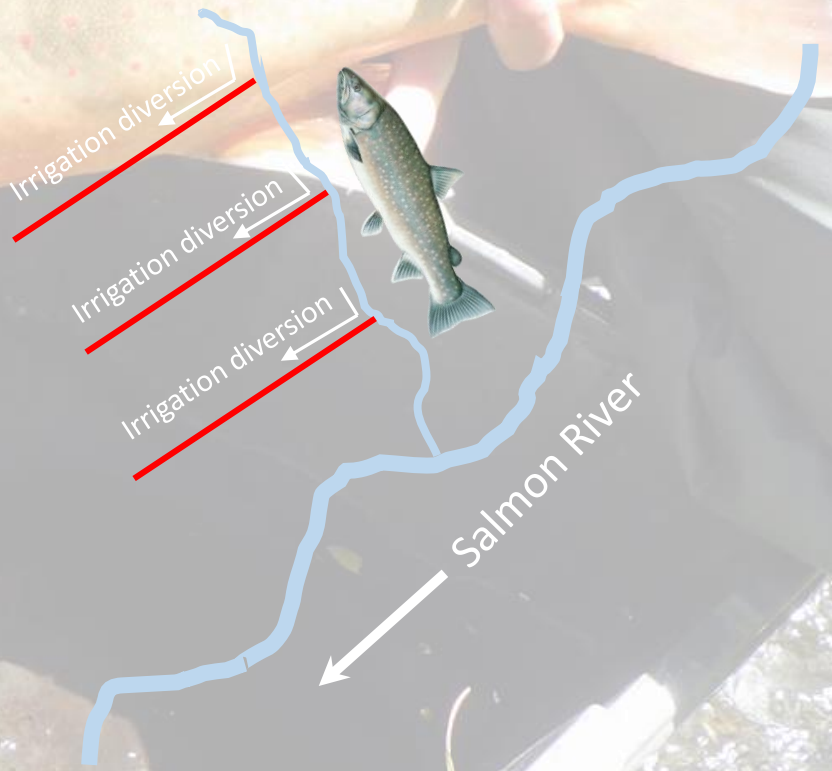
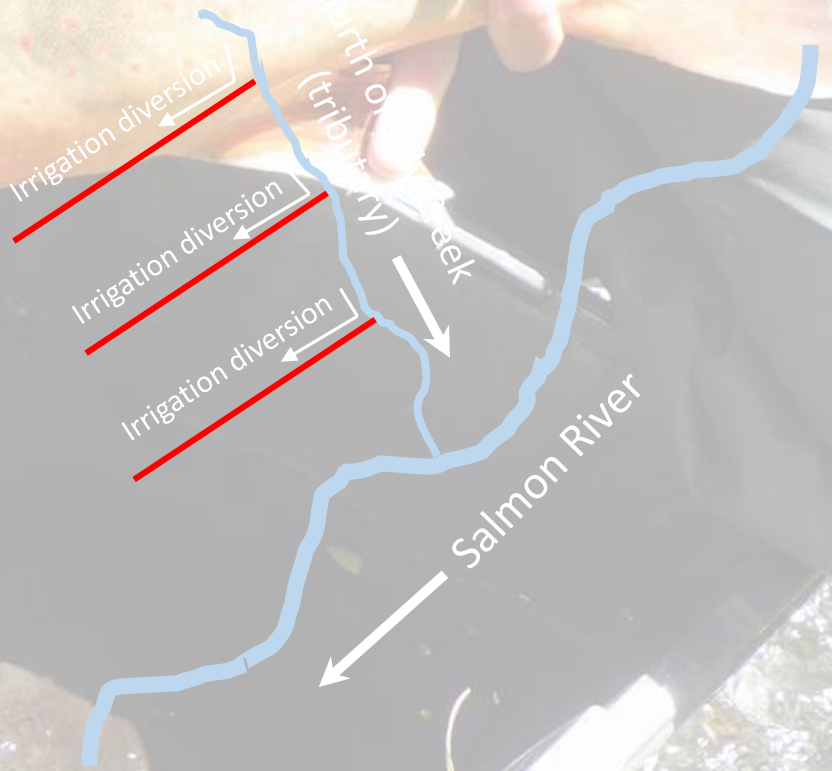


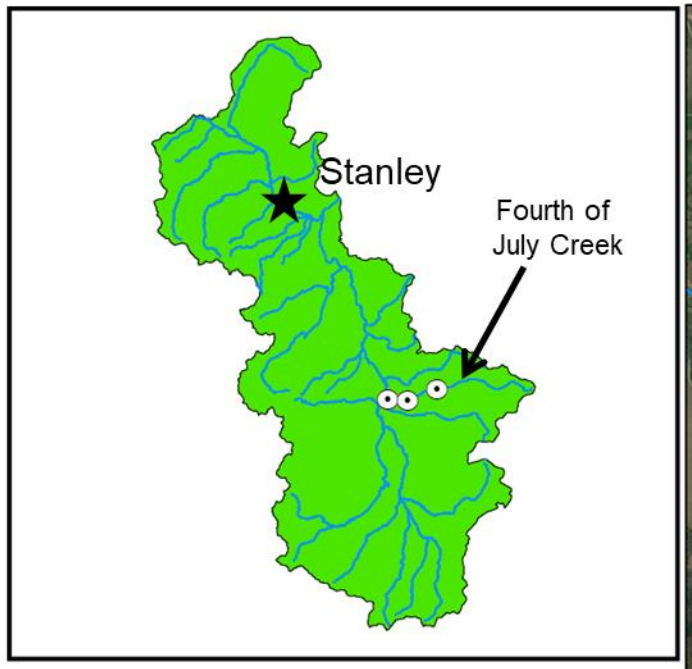
Fluvial Salmonid Entrainment

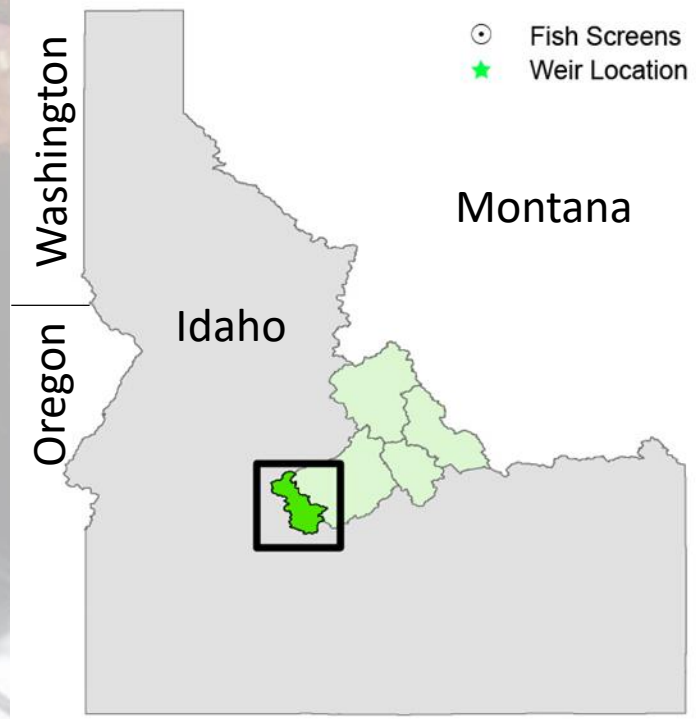
- Multiple native species exhibit a ‘fluvial’ (migratory) life histories
- Example: 79% of adult fluvial westslope cutthroat trout entrained at either screened or unscreened diversions on Skalkaho Creek, Montana (Gale 2005)

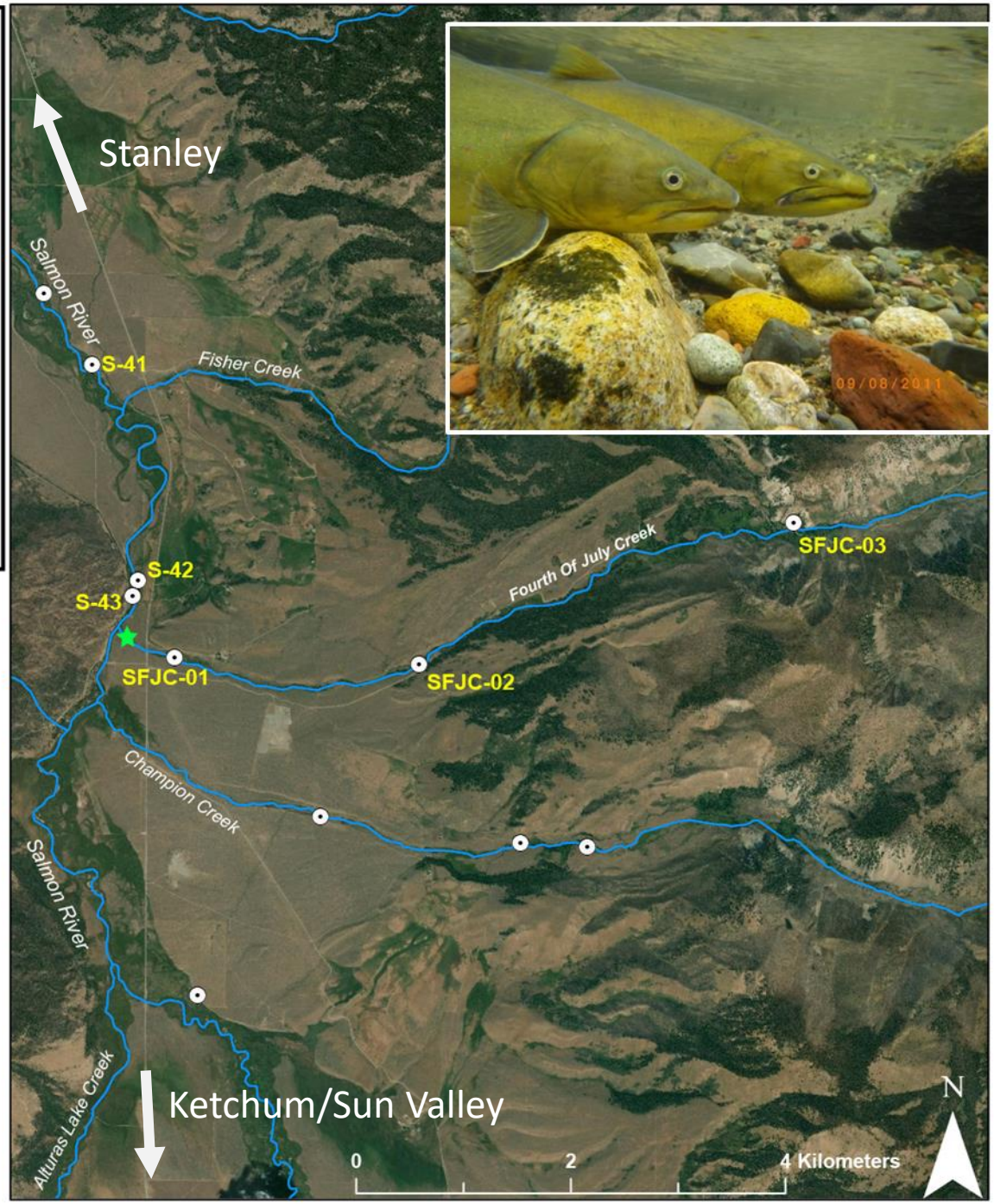
FLUVIAL: Fish spends a majority of its life in a large river, but migrates up small tributaries to spawn



Fourth of July Creek → Understanding and Estimating Fluvial Bull Trout Entrainment & Movement





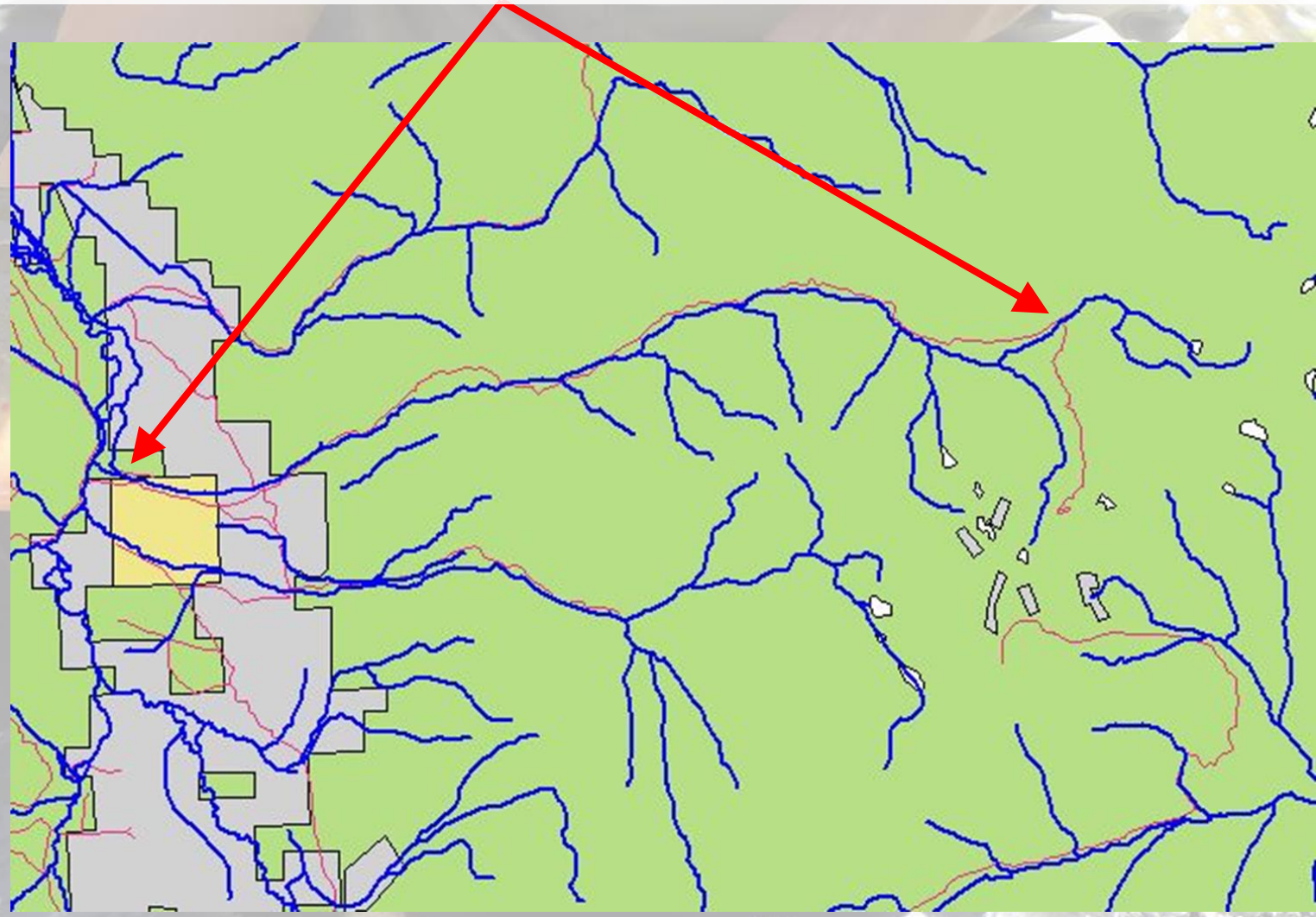


Fourth of July Study Objectives:

- Estimate:
  - Entrainment rates of migratory Bull Trout in Fourth of July Creek
  - Fluvial abundance
  - Migration timing
  - Spawning distribution

Why Fourth of July

- Designated a priority tributary



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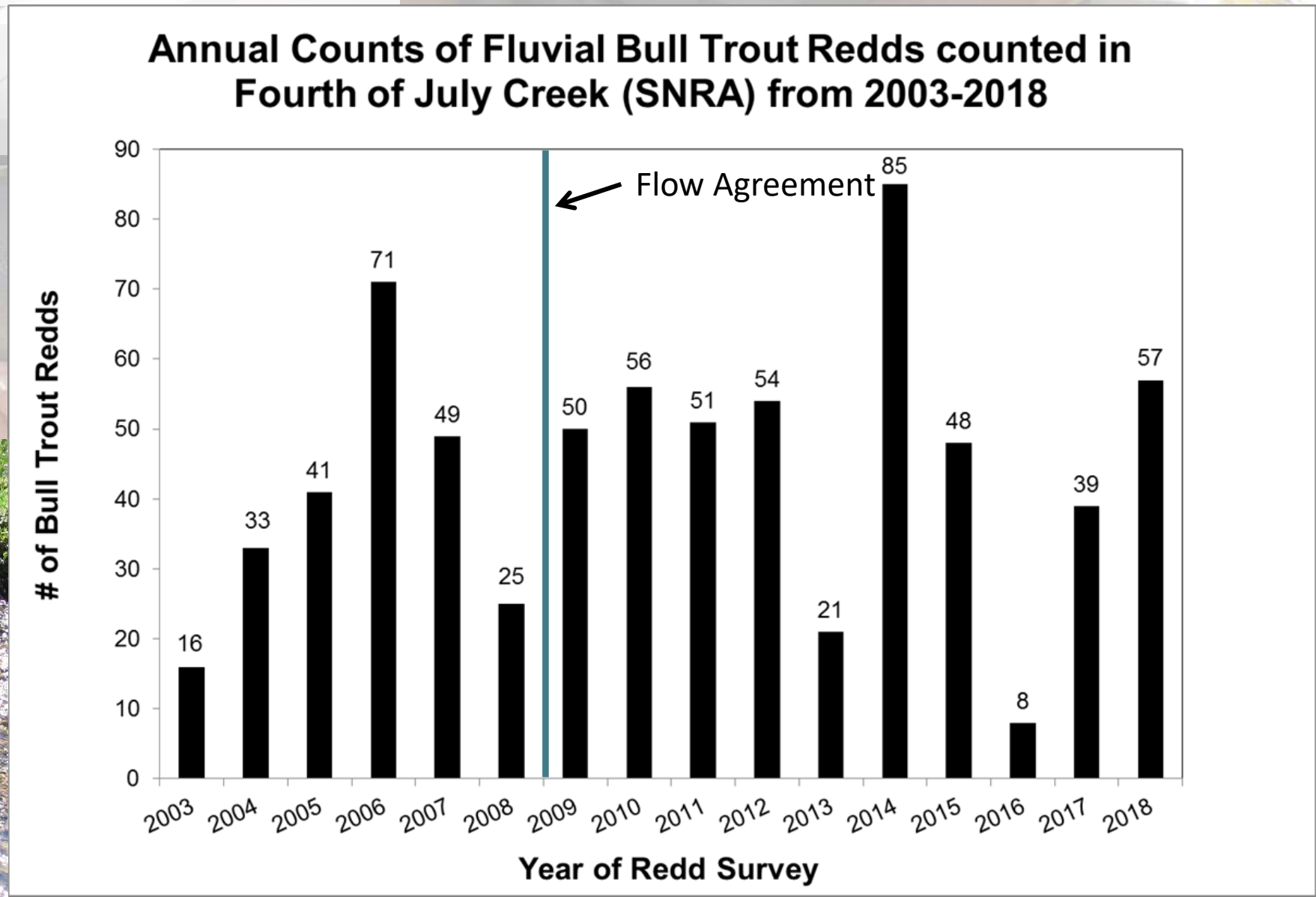
- Designated a priority tributary
- Prior to 2002→lower reaches often dewatered due to irrigation withdrawals

Why Fourth of July

- Designated a priority tributary
- Prior to 2002→lower reaches often dewatered due to irrigation withdrawals
- Potential barriers to migration

Why Fourth of July → Fish

- Appeared to be a fluvial population of Bull Trout



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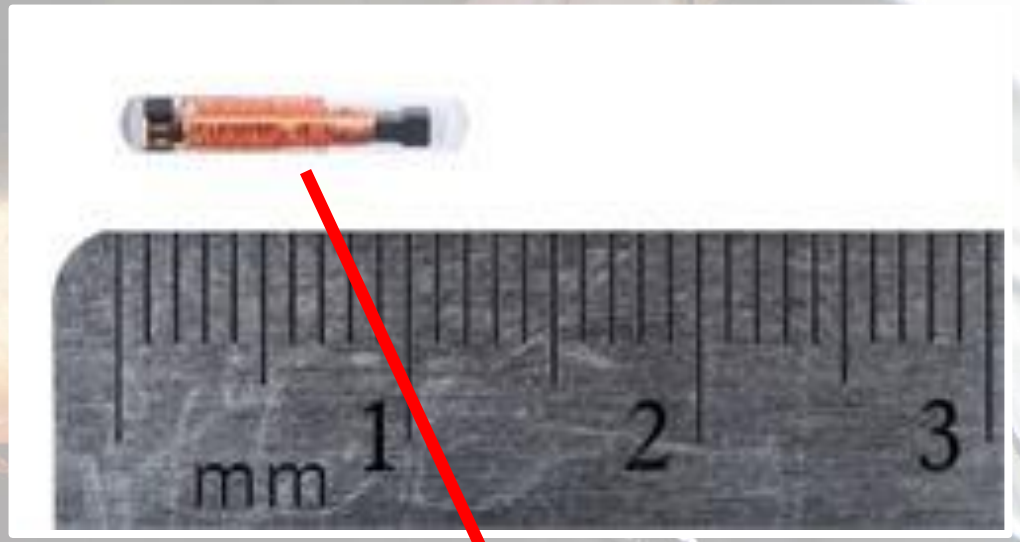
Methods → First, need some PIT-tagged fish…

- Collect/capture and PIT-tag adult Bull Trout



Methods → First, need some PIT-tagged fish…

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Methods → Second, set up equipment to monitor PIT-tagged fish

- Bypass PIT-tag Reader Antenna

Methods → Second, set up equipment to monitor PIT-tagged fish

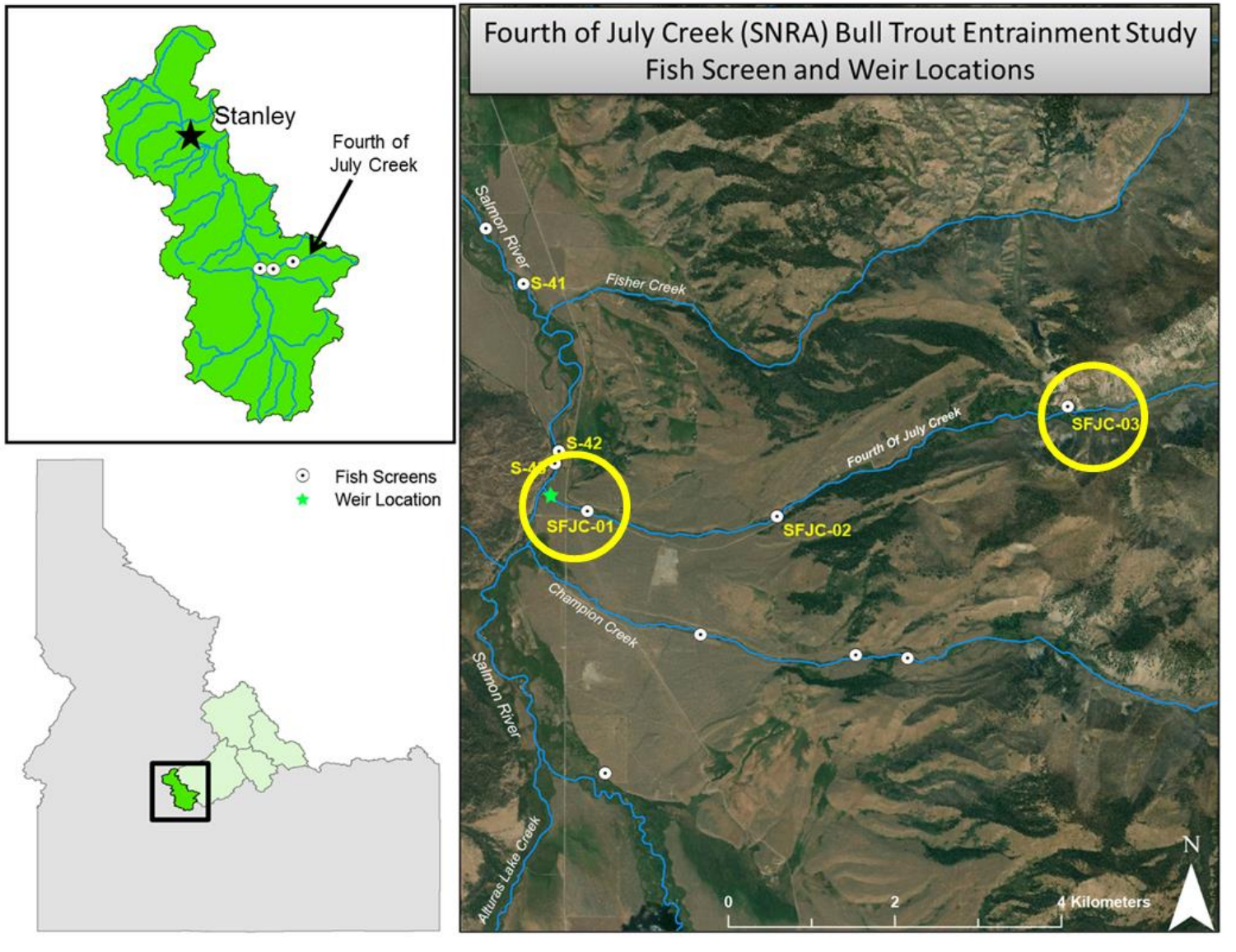
- 2a) System for monitoring PIT-tagged fish going through diversion
  - Bypass PIT-tag Reader Antenna

Methods → Second, set up equipment to monitor PIT-tagged fish

- 2b) System for monitoring PIT-tagged fish moving in mainstem Fourth of July Creek
  - Instream PIT-tag Reader Antenna

Some Totals…

- 2017
  - Total of <u>163</u> Bull Trout tagged in Fourth of July Creek



Some Totals…

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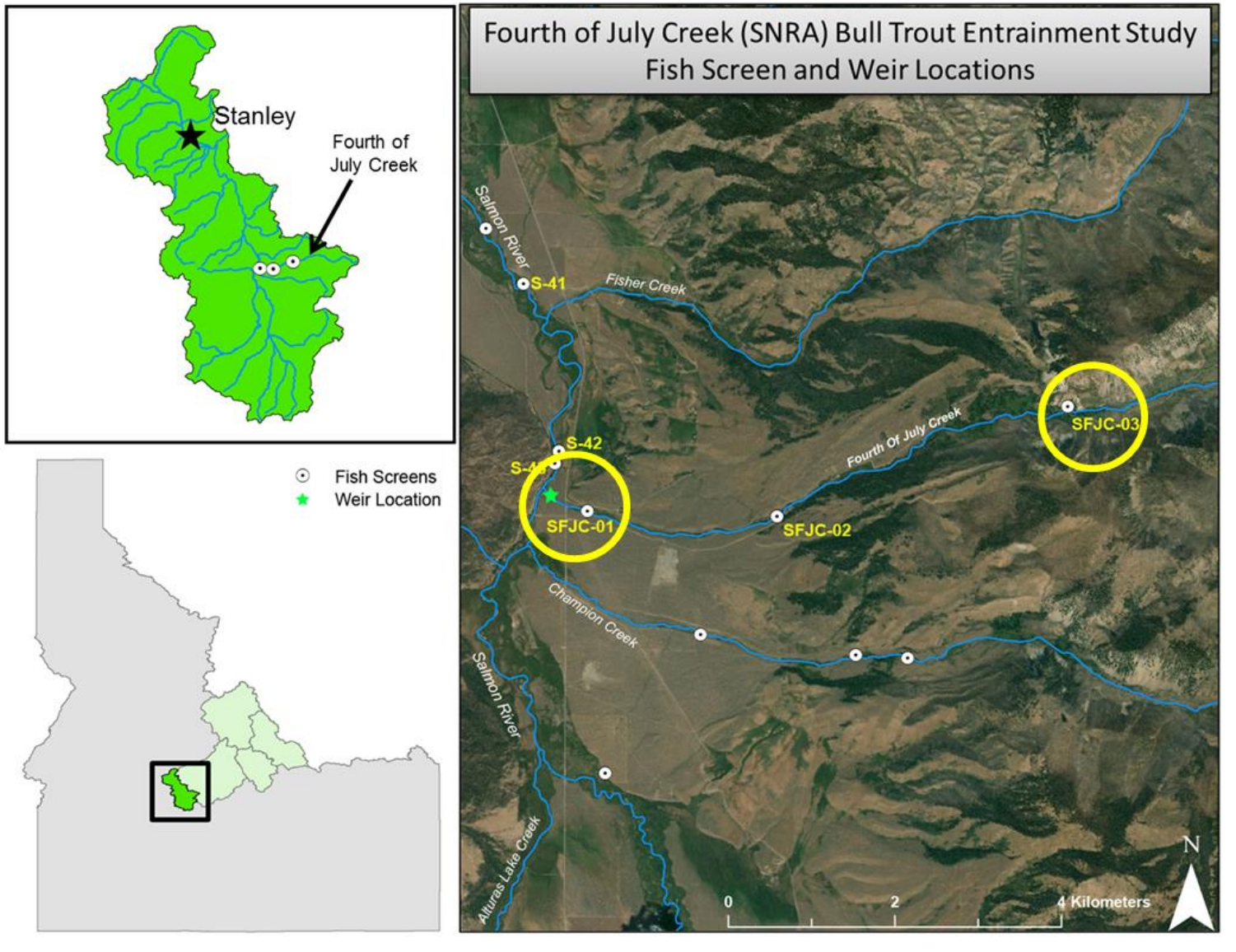
- 2018
  - <u>191</u> New Bull Trout tagged→ bringing total tagged population to 354



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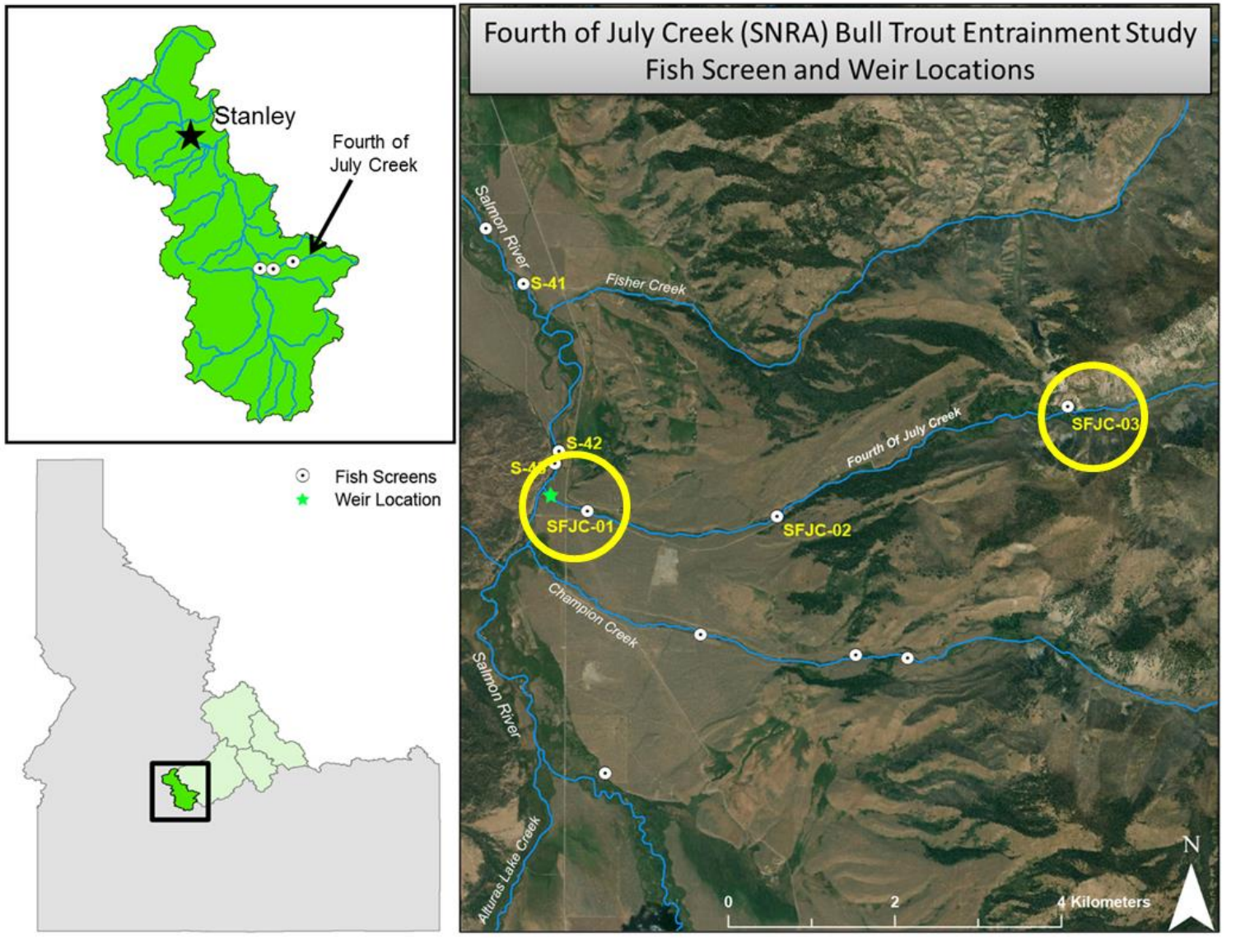

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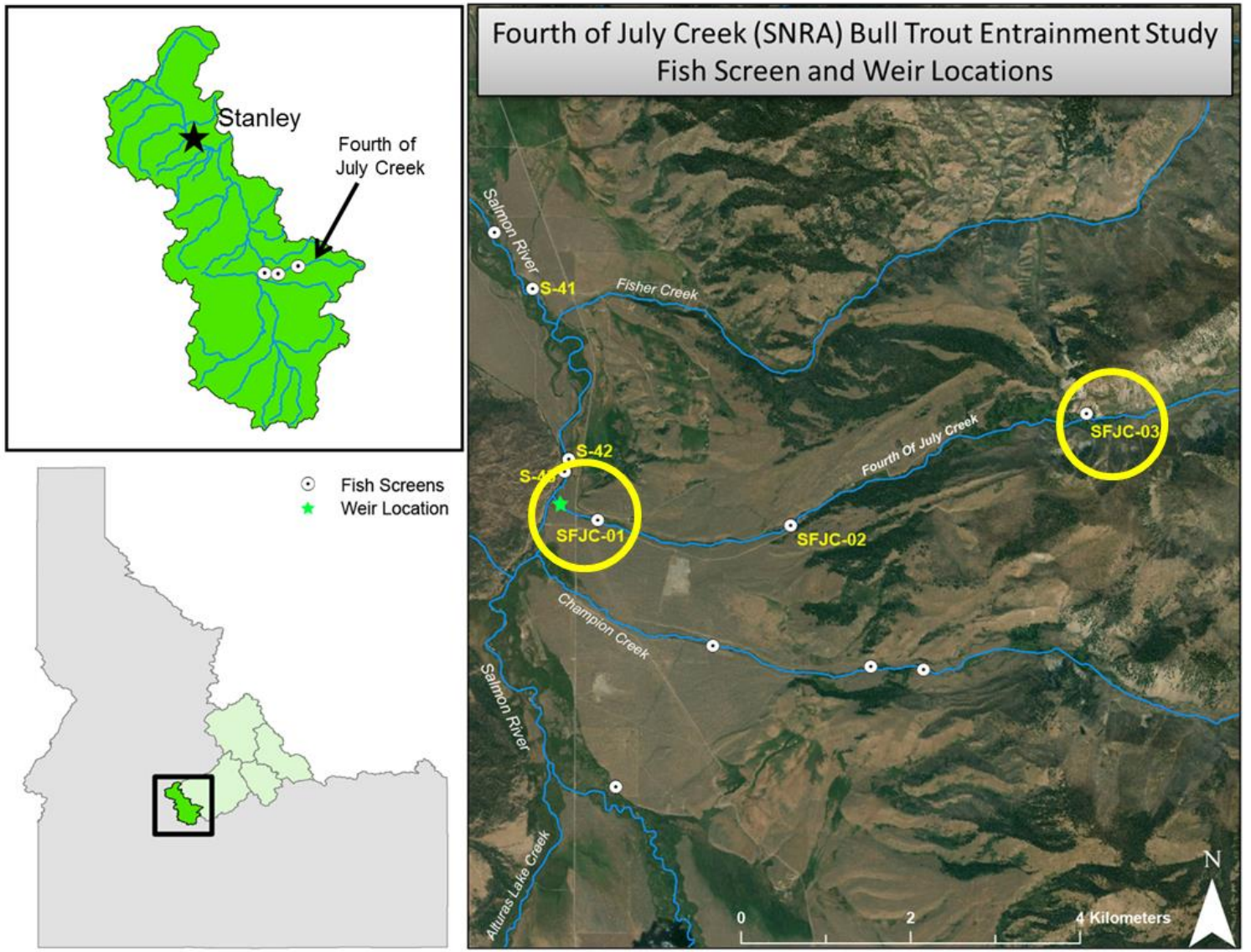

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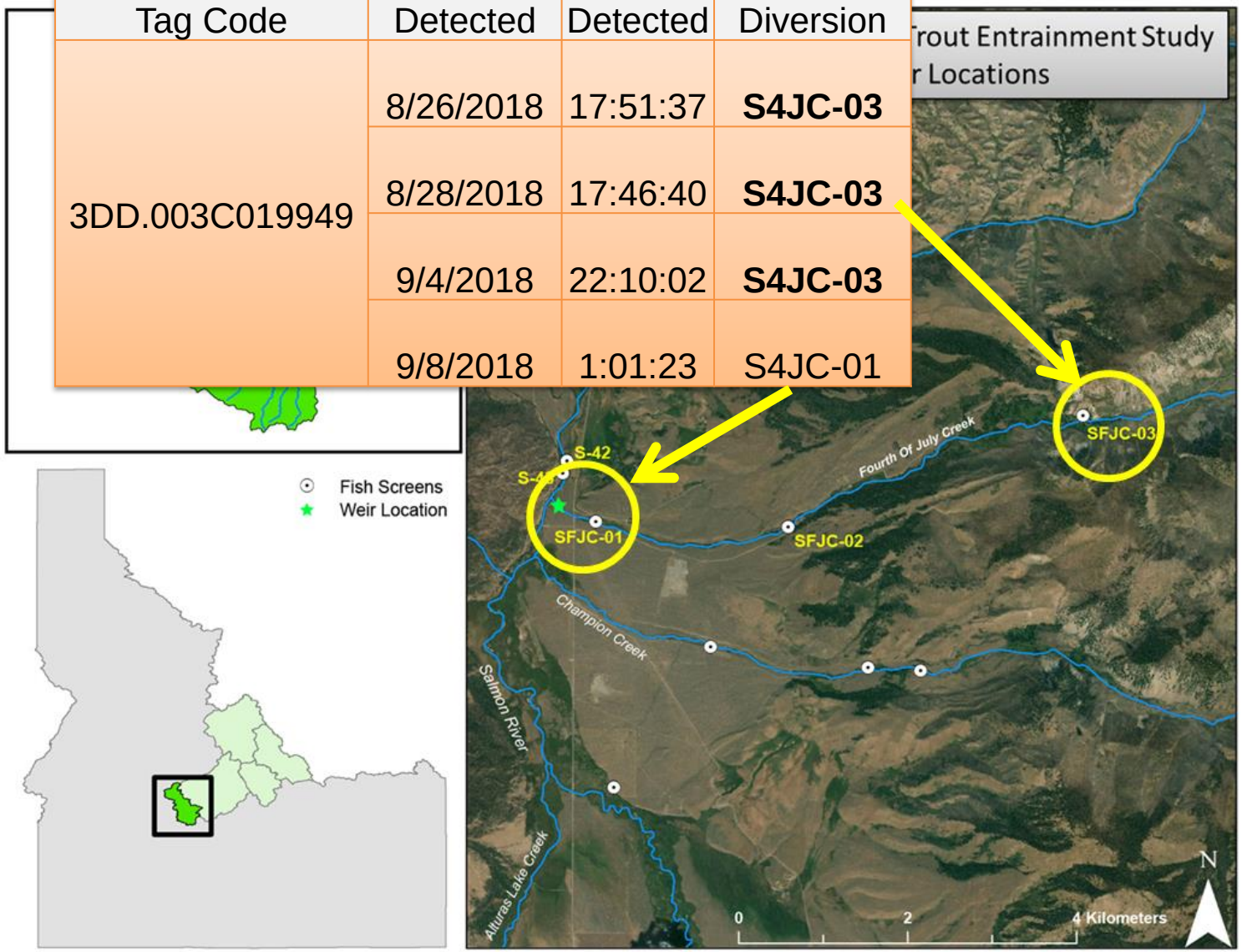
Tag Code	Date Detected	Time Detected	Diversion
3DD.003C019949	8/26/2018	17:51:37	**S4JC-03**
	8/28/2018	17:46:40	**S4JC-03**
	9/4/2018	22:10:02	**S4JC-03**
	9/8/2018	1:01:23	S4JC-01



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1 fish entrained 4X

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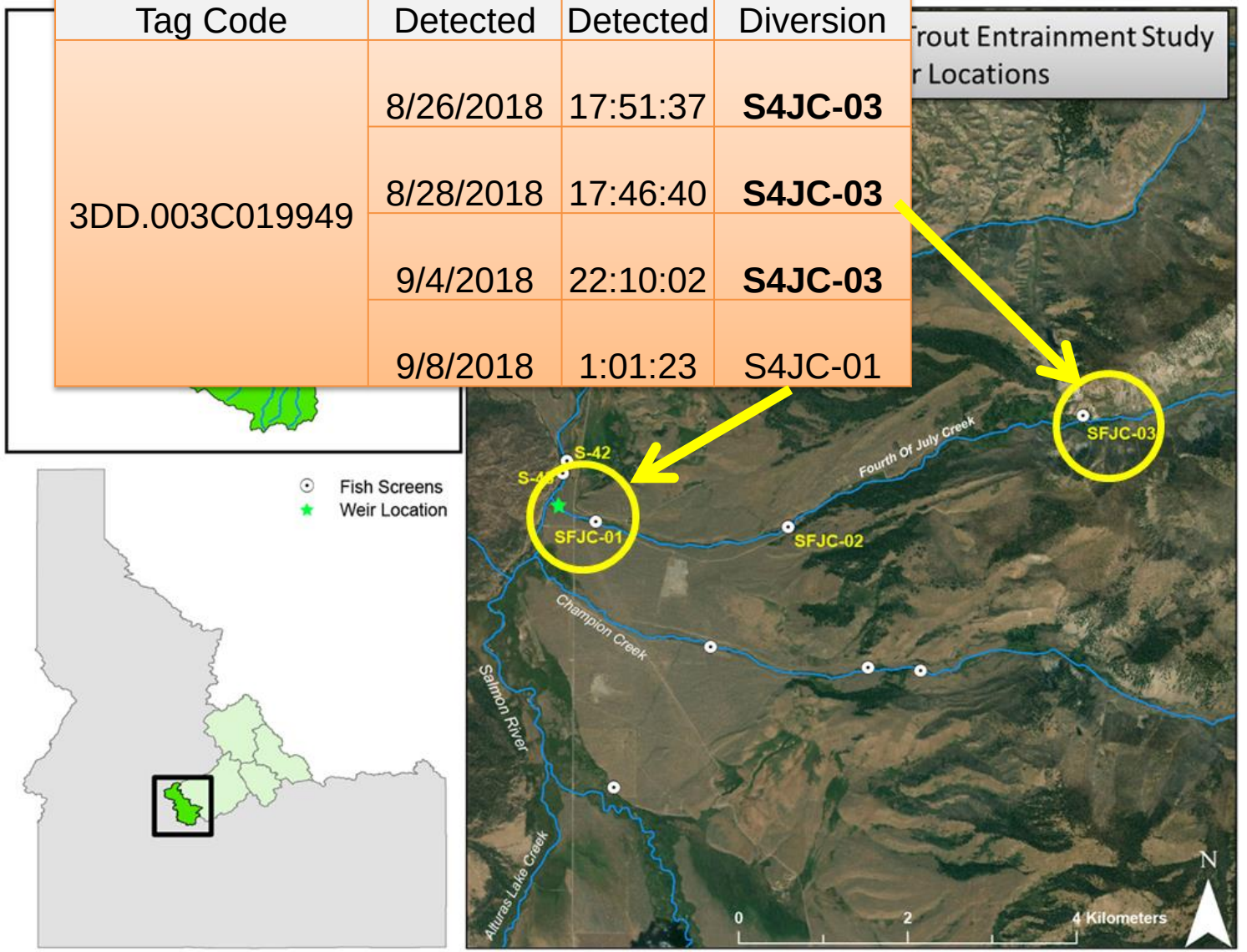
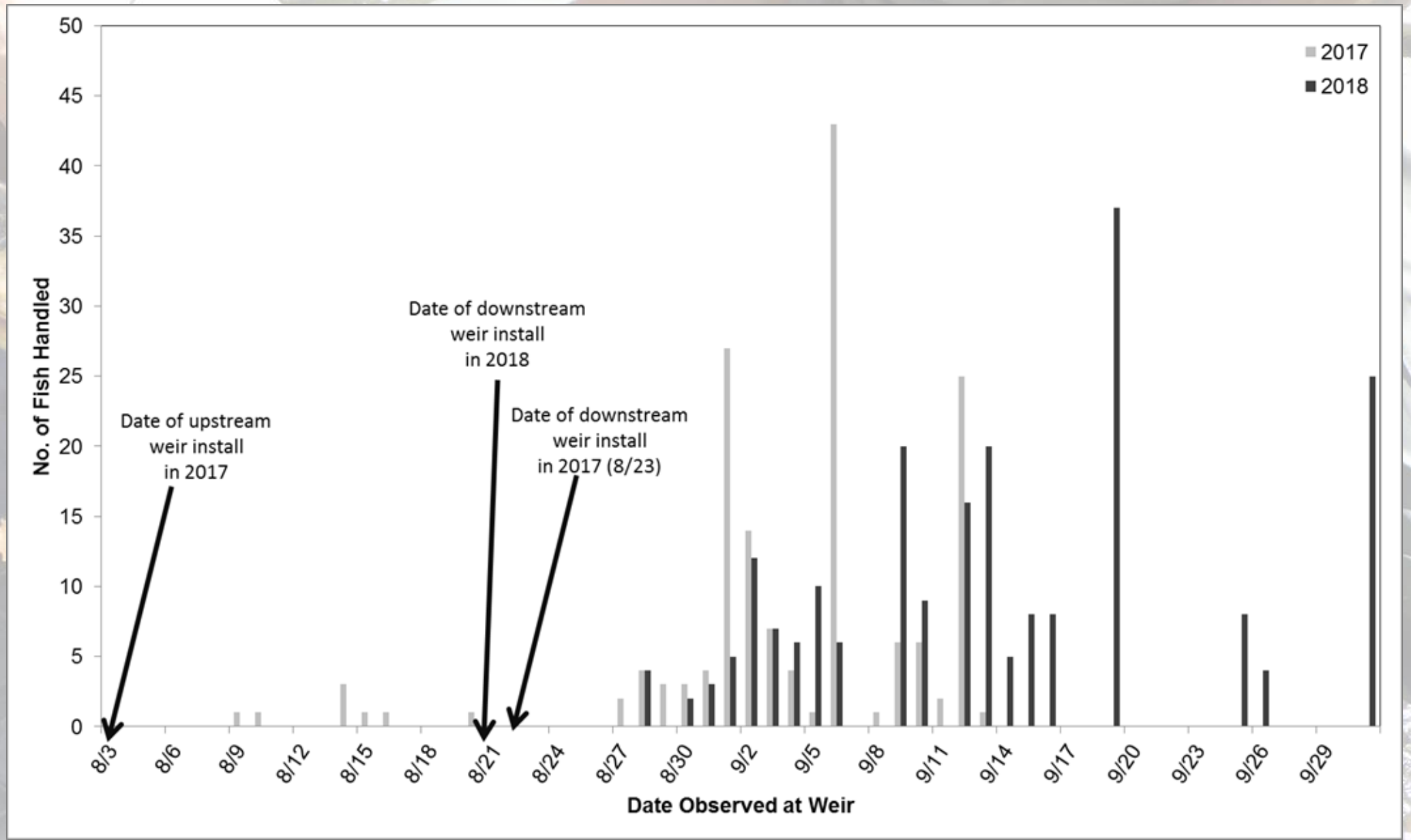
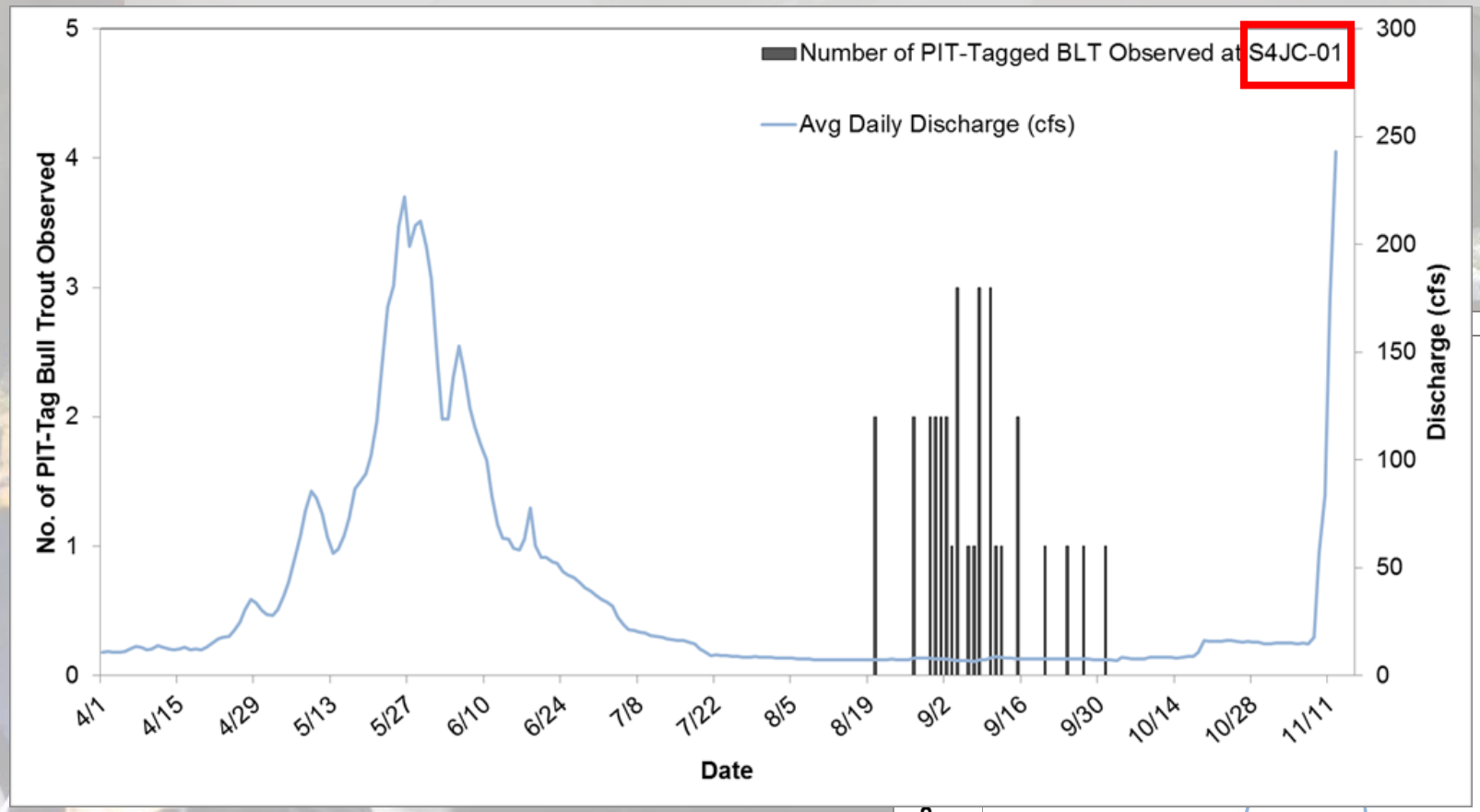
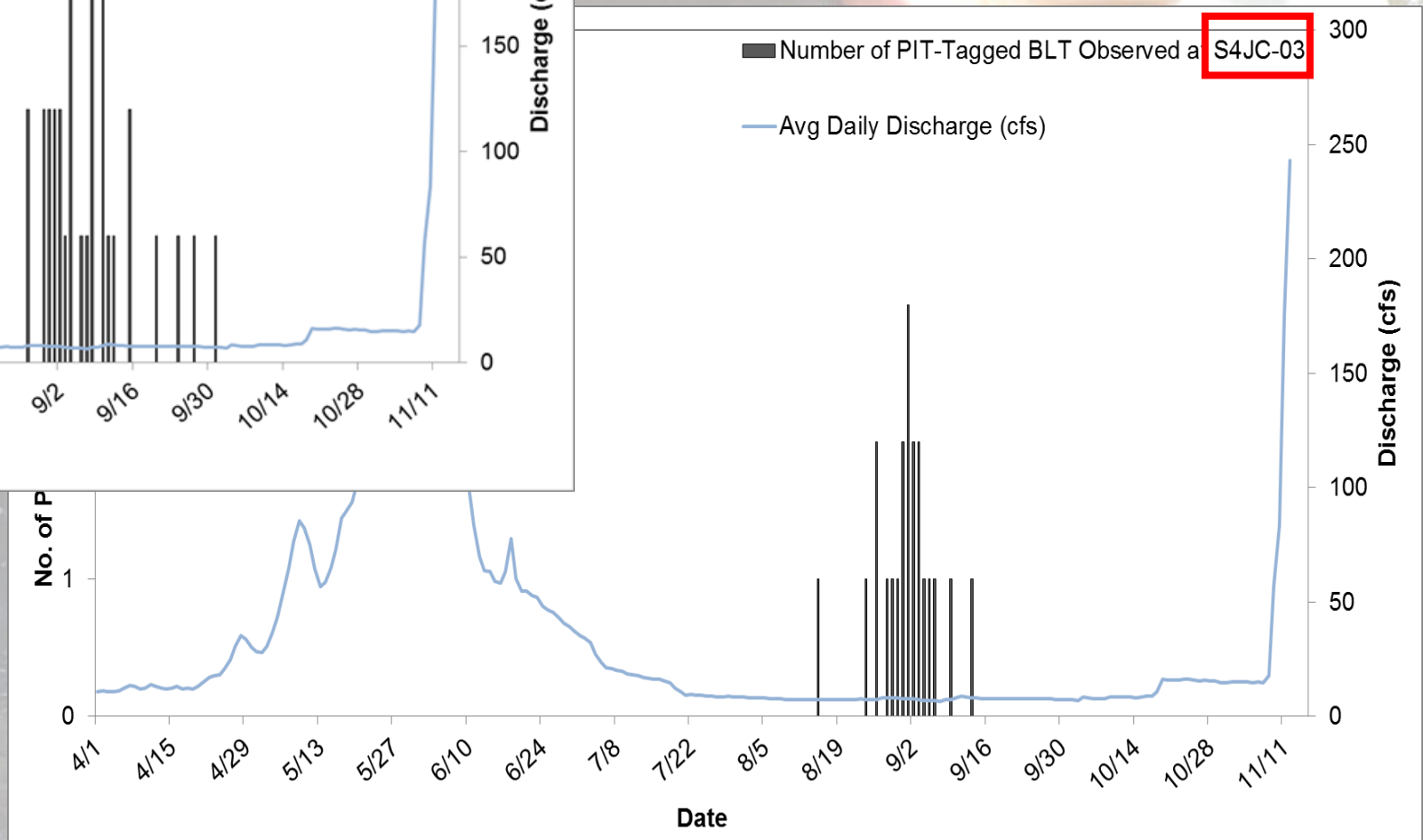


Weir Results for 2017-2018



Bypass Results for 2018 at Fourth of July-01 & -03





2019 Preliminary Results

- Weir Totals:
  - 84 fish passed through, ~25 Recaptured (2017 and 2018)

2019 Preliminary Results

- PIT-Tag Reader Totals
  - Bypasses
    - S4JC-01→ 30 individual fish
    - S4JC-03→14 individual fish
    - Both -01 & -03 → 5 (of 44 observed) fish

2019 Preliminary Results

- PIT-Tag Reader Totals
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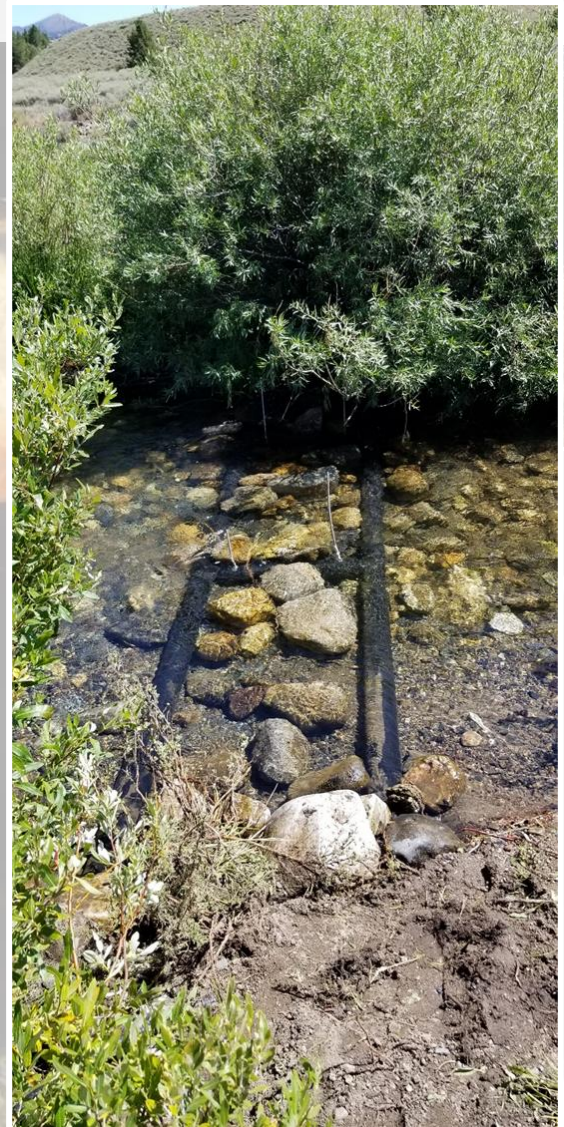
    - S4JC-01→ 30 individual fish
    - S4JC-03→14 individual fish
    - Both -01 & -03 → 5 (of 44 observed) fish
  - Instream Array
    - Only observed at array→3
    - Observed at All (S4JC-01, -03 and Array)→ 3
    - Observed at S4JC-01 and Array→12
    - Observed at S4JC-03 and Array→1



2019 Preliminary Results

- Entrainment (thus far…)
  - 44 fish total observed (between S4JC-01 & -03)
  - S4JC-01→40% observed tagged entrained
  - S4JC-03→7% observed tagged entrained
  - All: S4JC-01, -03→6.8% observed tagged entrained

Conclusions

- Fish passage (screens) appear beneficial for highly migratory native fish (e.g., Bull Trout, Westslope Cutthroat)

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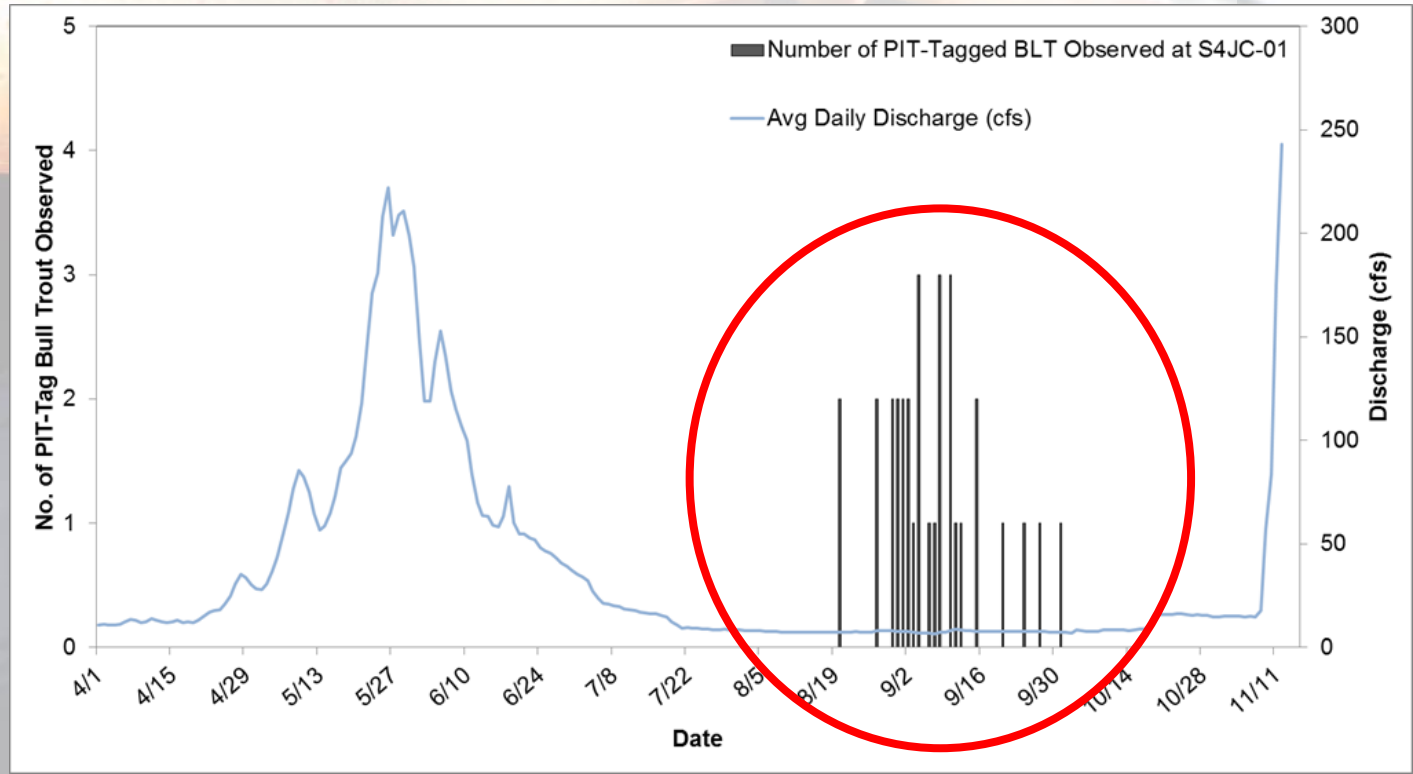

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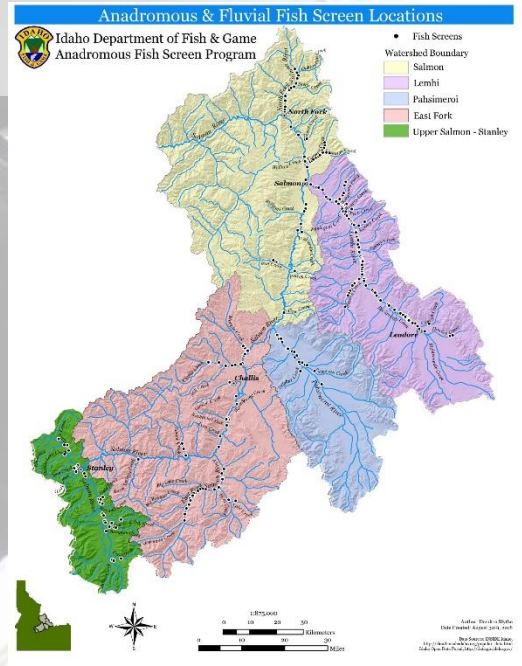
  - Impacts for anadromous



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- Benefits for juveniles (2 tagged from 2019 already passed S4JC-03)
- Incentives for 20-year flow lease agreement
- Informs other states where irrigation diversions may be an issue
  - Costs low ($100,000 - $125,000), benefits great

Bottom line…

- Keep up the great screening work we all do!

Acknowledgements

- Paddy Murphy, IDFG Screen Program Coordinator
- Windy Schoby, IDFG Staff Biologist
- Bonneville Power Administration (BPA)
- USFS - SNRA
- USFWS – Jody Brostrom
- Heidi Messner, Brad Warland, Kristina Morben, Tucker Hamilton →Screen Shop Technicians who help/helping operate!

Questions?