Restoration of the Clark Fork River's Trout Fishery: Identifying the Challenges and Focusing on Solutions

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Montana Fish, Wildlife & Parks

Acknowledgements

- Clark Fork River and tributaries
  - Jason Lindstrom, FWP
  - Brad Liermann, FWP
  - Mariah Mayfield, MSU
  - Will Schreck, FWP
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- Photos

Background

- Purpose of recent work
  - Update old data
  - Provide new information (tagging)
  - Use information for restoration planning
- Methods
  - Population surveys (e.g., electrofishing)
    - Abundance, species comp, demographics & population dynamics
  - Tagging
    - Movement, survival and habitat use (life history)
  - Caged fish
    - Effects of water quality on survival

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Methods (cont.)

1) Population surveys
   - Sampled 137 streams
   - >120 mi. of river
2) Tagging
   - Radio tags (Clark Fork)
   - PIT tags (Silver Bow)
3) Caged fish bioassays
   - Young trout
   - Impact and control sites

Methods: PIT Tag

Methods: Radio Tag

Outline

- Silver Bow Creek
  - Survey and inventory
  - Tagging
  - Caged Fish
  - Fishery status
- Clark Fork River
  - Same
- Goals and Priorities
  - Silver Bow Creek
  - Clark Fork River
  - Needs and Priorities

SILVER BOW CREEK

Silver Bow Surveys: Recent History

2002

Below German Gulch Section

Ramsay Section

Rocker Section

Lower Area One Section

Father Sheehan Section

2006

Fish in all sections and first trout in fall sampling

Above Highway 1 Section

Below German Gulch Section

Ramsay Section

Rocker Section

Lower Area One Section

Father Sheehan Section

Browns Gulch

German Gulch

N

2010

- Trout in all sections

Above Highway 1 Section

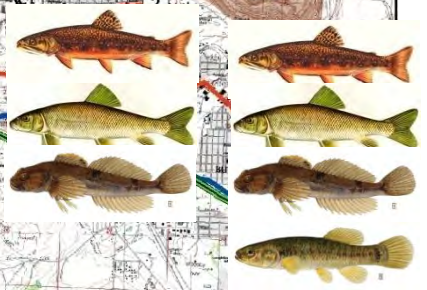
Below German Gul

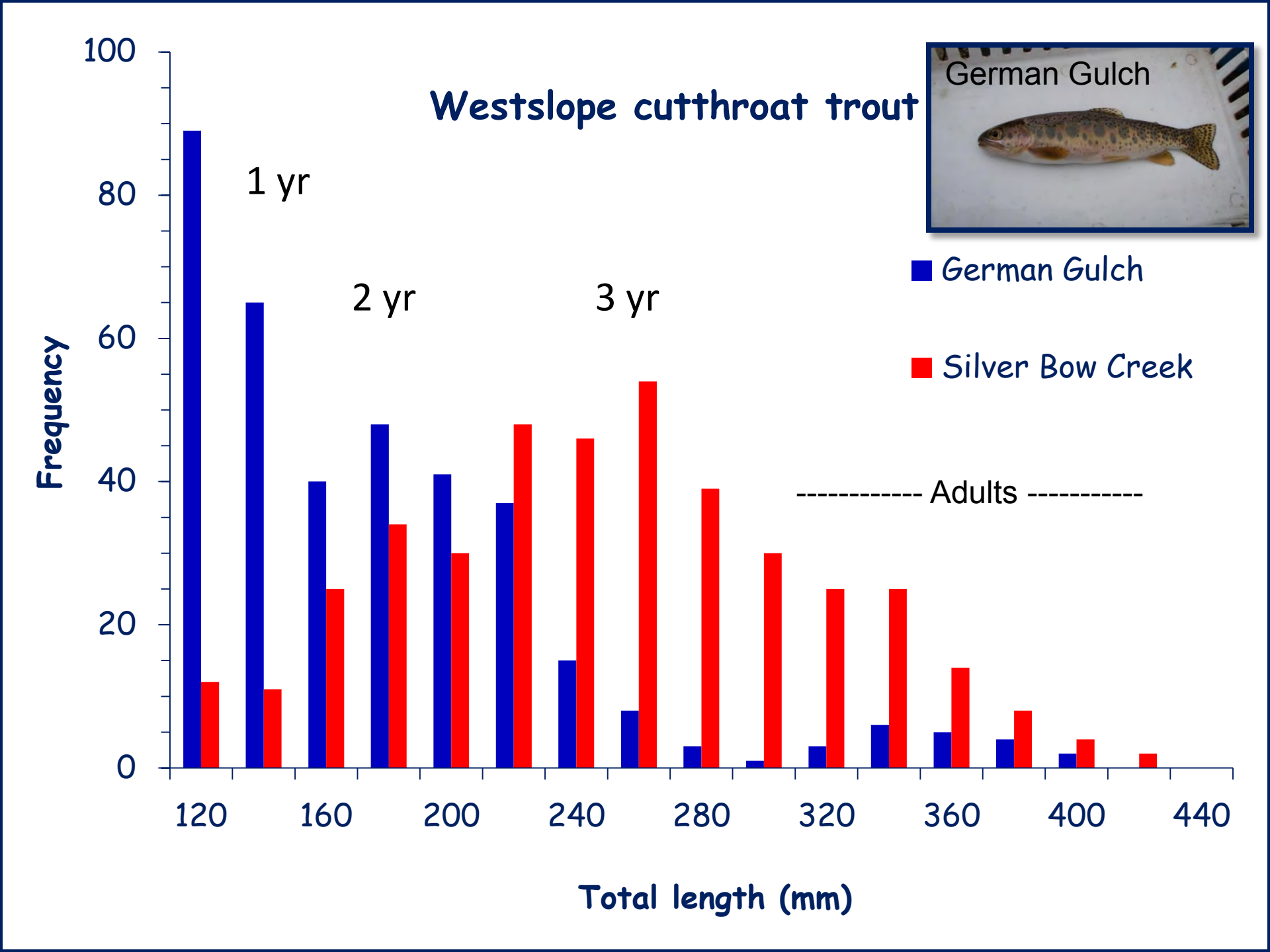
Ramsay Section

Lower Area One Section

Rocker Section

Father Sheehan Section




Westslope cutthroat trout
German Gulch
1 yr
2 yr
3 yr
German Gulch
Silver Bow Creek
---------- Adults ----------
Frequency
Total length (mm)
0
20
40
60
80
100
120
160
200
240
280
320
360
400
440

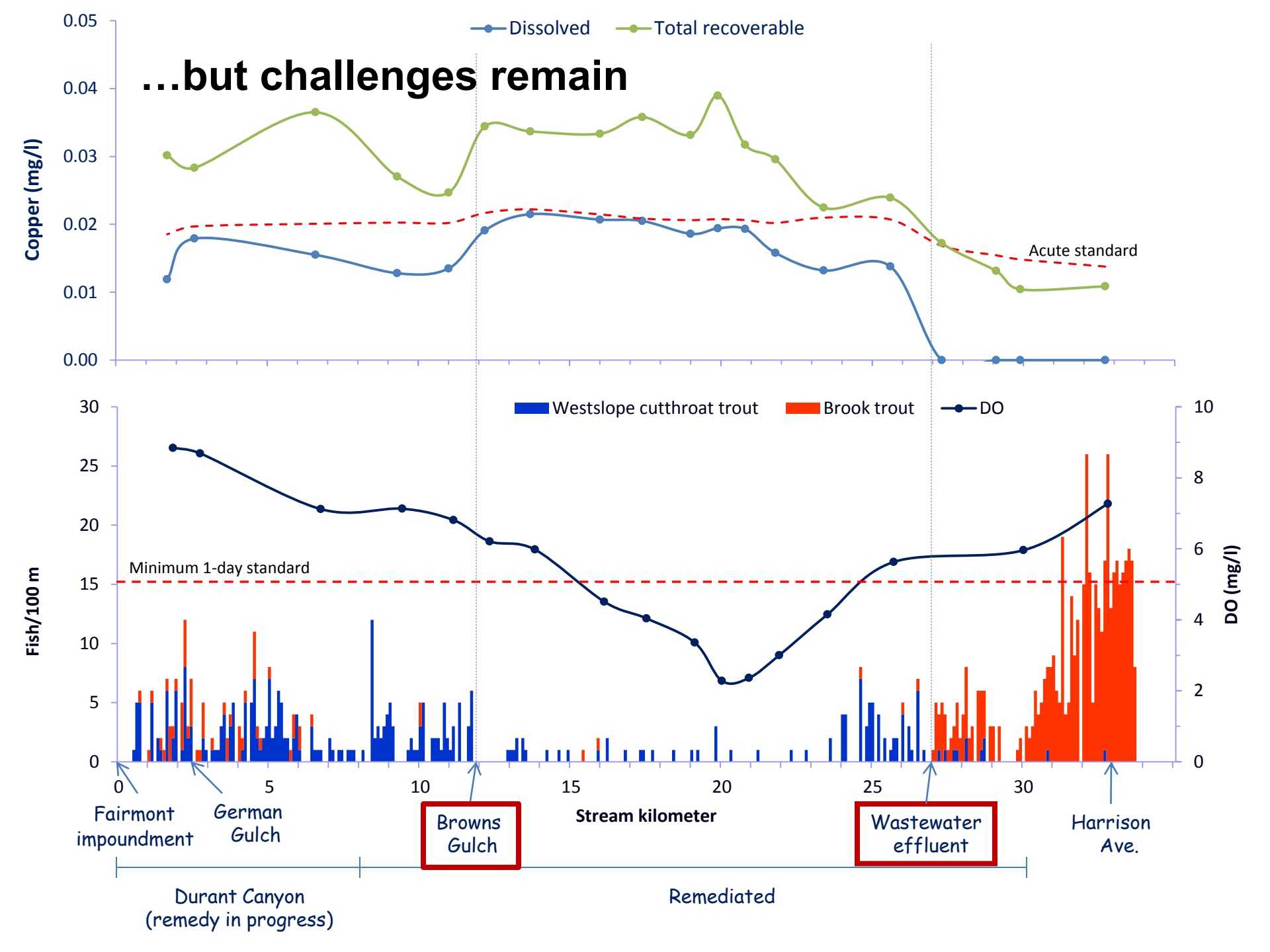
Status: Remediation is Helping…

e.g., upstream of Durant Canyon

Relative abundance of fishes in Silver Bow Creek at Miles Crossing before (2009) and after (2011) remediation. Survey section length was 0.6 km.

Species	2009	2011
Westslope cutthroat trout	0	20
Brook trout	1	0
Longnose suckers (≥ 140 mm)	6	1
Longnose suckers (< 140 mm)	26	365


07/28/2011


…but challenges remain
Dissolved
Total recoverable
Copper (mg/l)
0.05
0.04
0.03
0.02
0.01
0.00
Acute standard
Westslope cutthroat trout
Brook trout
DO
Fish/100 m
DO (mg/l)
30
25
20
15
10
5
0
10
8
6
4
2
0
Minimum 1-day standard
0
5
10
15
20
25
30
Stream kilometer
Fairmont impoundment
German Gulch
Browns Gulch
Wastewater effluent
Harrison Ave.
Durant Canyon (remedy in progress)
Remediated

2008 Caged Fish Study - August

▲ Sites

- High mortality related to small rain events

- Survival was high at other sites

Below German Gulch Section

4% Survival
(metals; not remediated)

Lower Area One Section

Ramsay Section

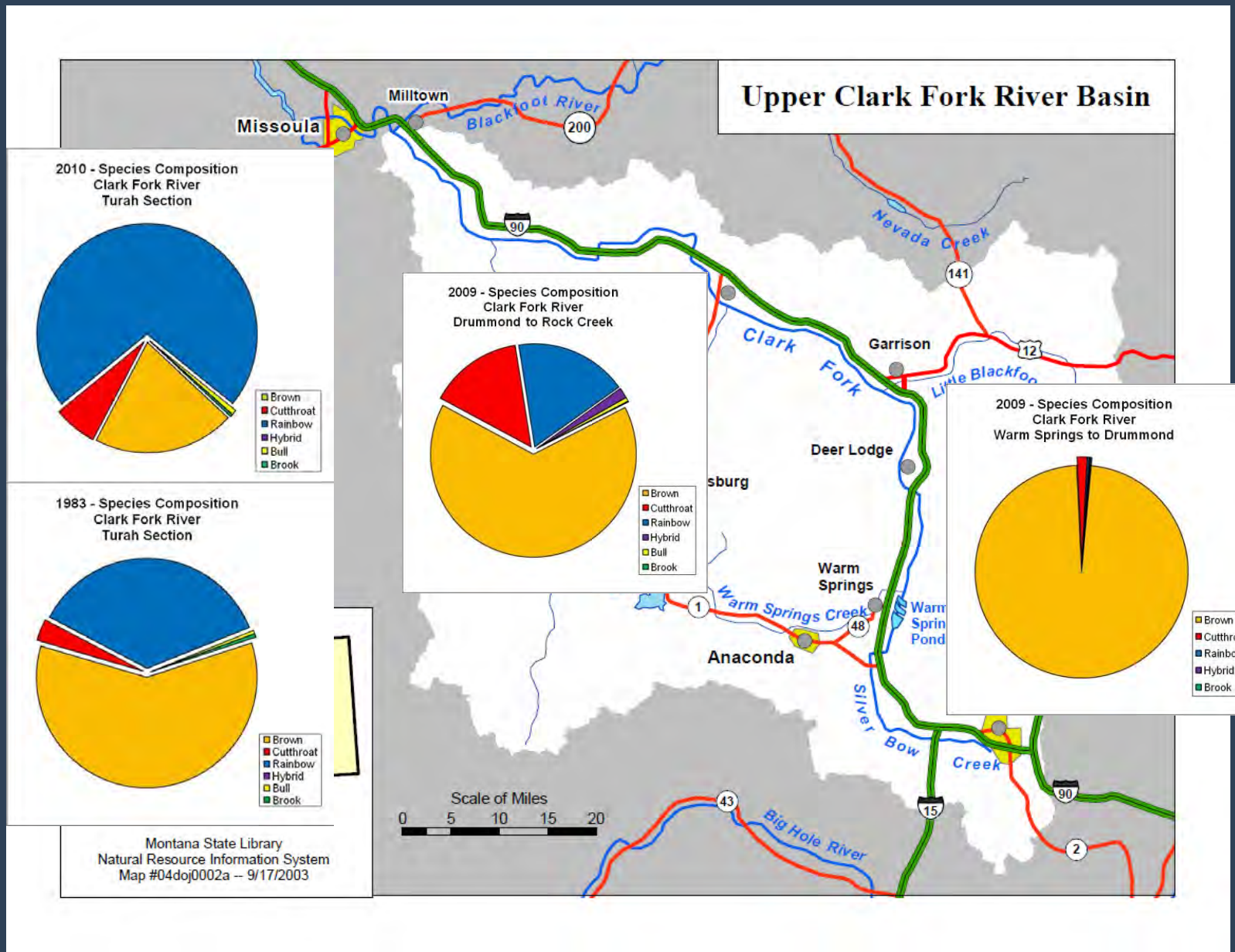
Rocker Section

0% Survival
(metals and ammonia; WWTP)

CLARK FORK RIVER

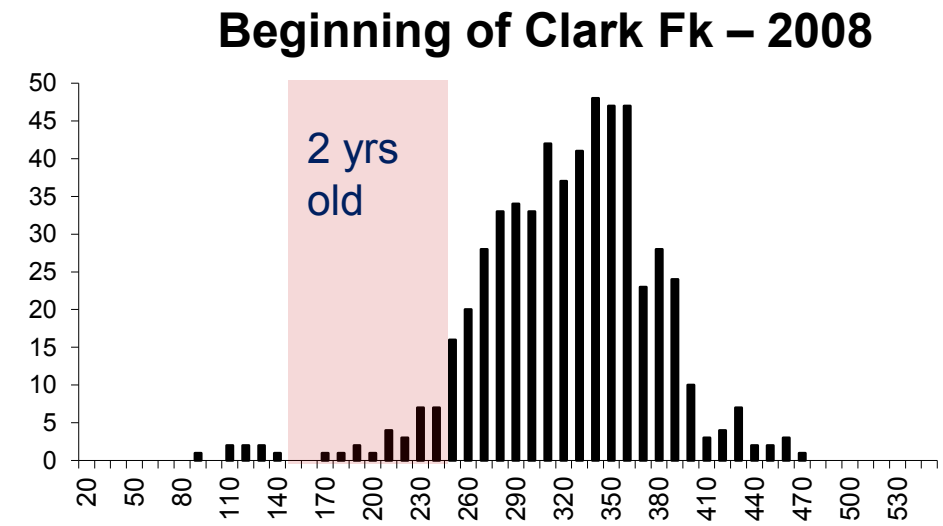
Methods: Clark Fork Survey

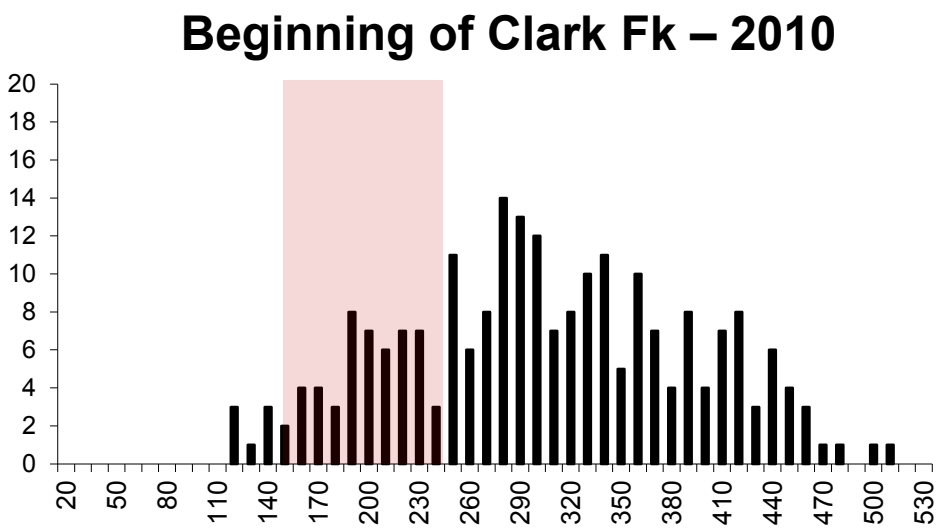
Results: Brown Trout Dominate

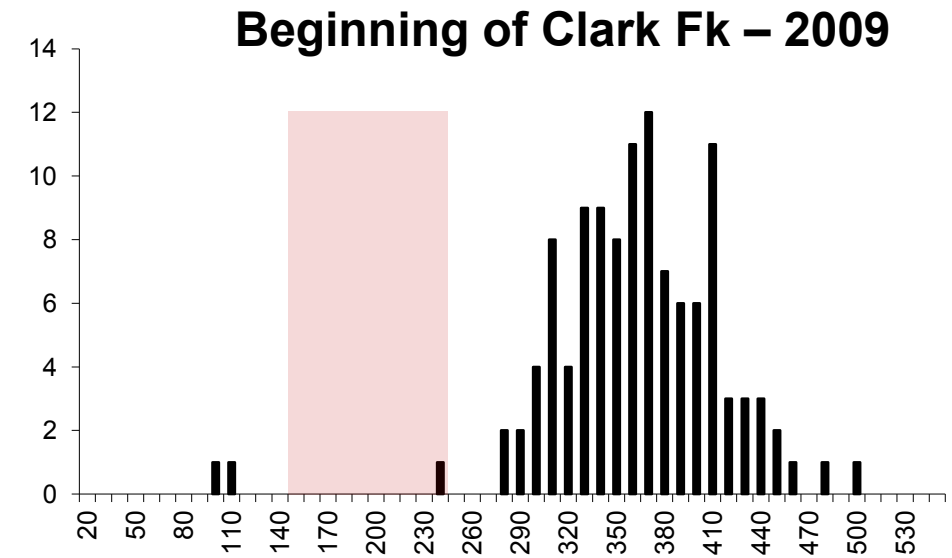


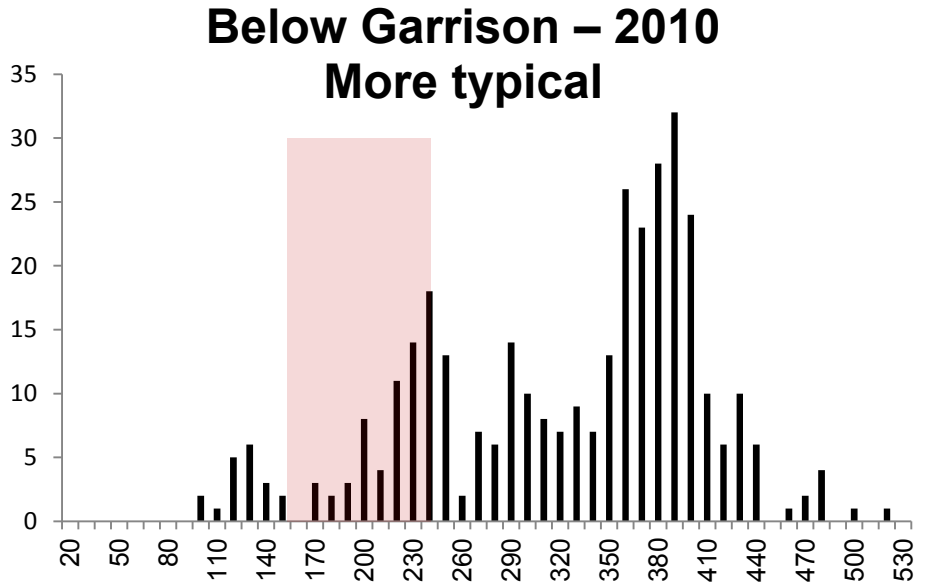
Trout abundance: 1987 vs. 2009

Clark Fork @ Origin: Poor Recruitment





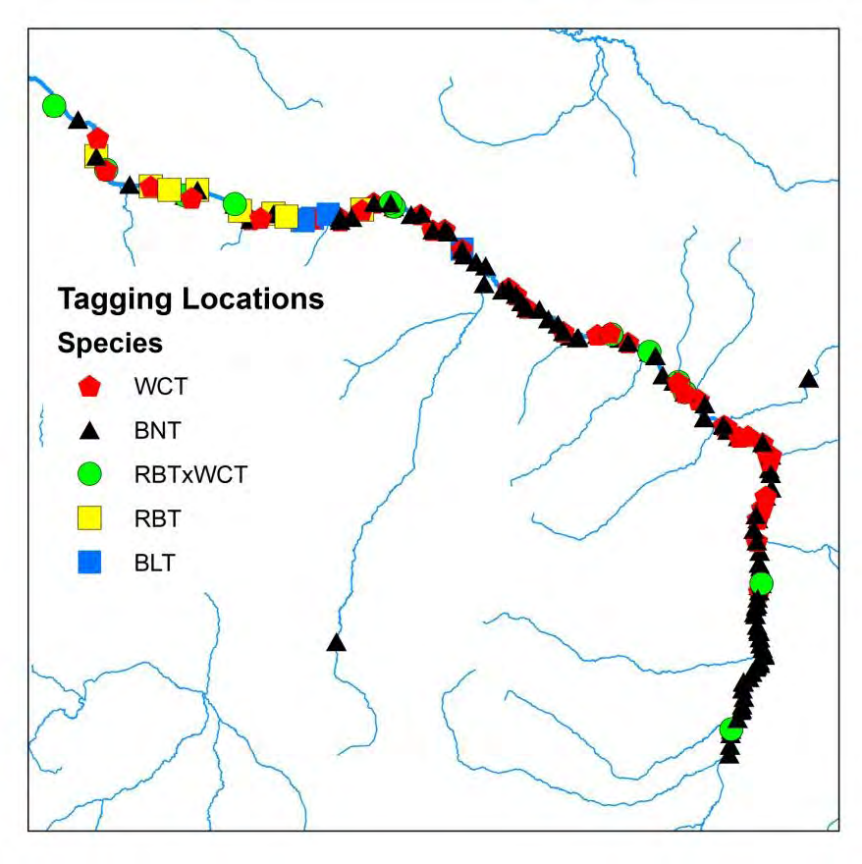




Methods: Radio-Tagging

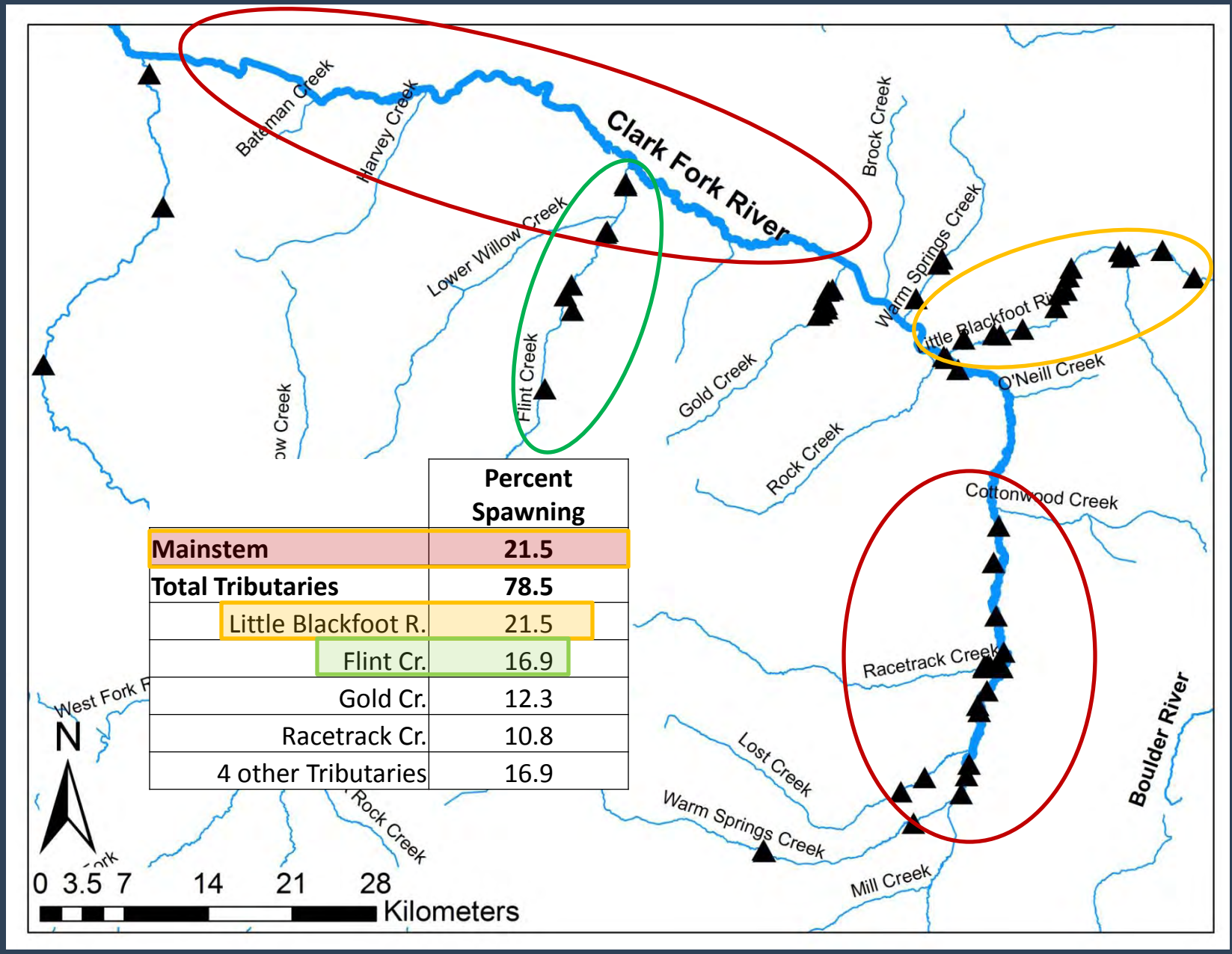
- 269 trout tagged during 2009 – 2011
  - 185 brown trout
  - 57 westslope cutthroat trout

- Looked at movement and survival



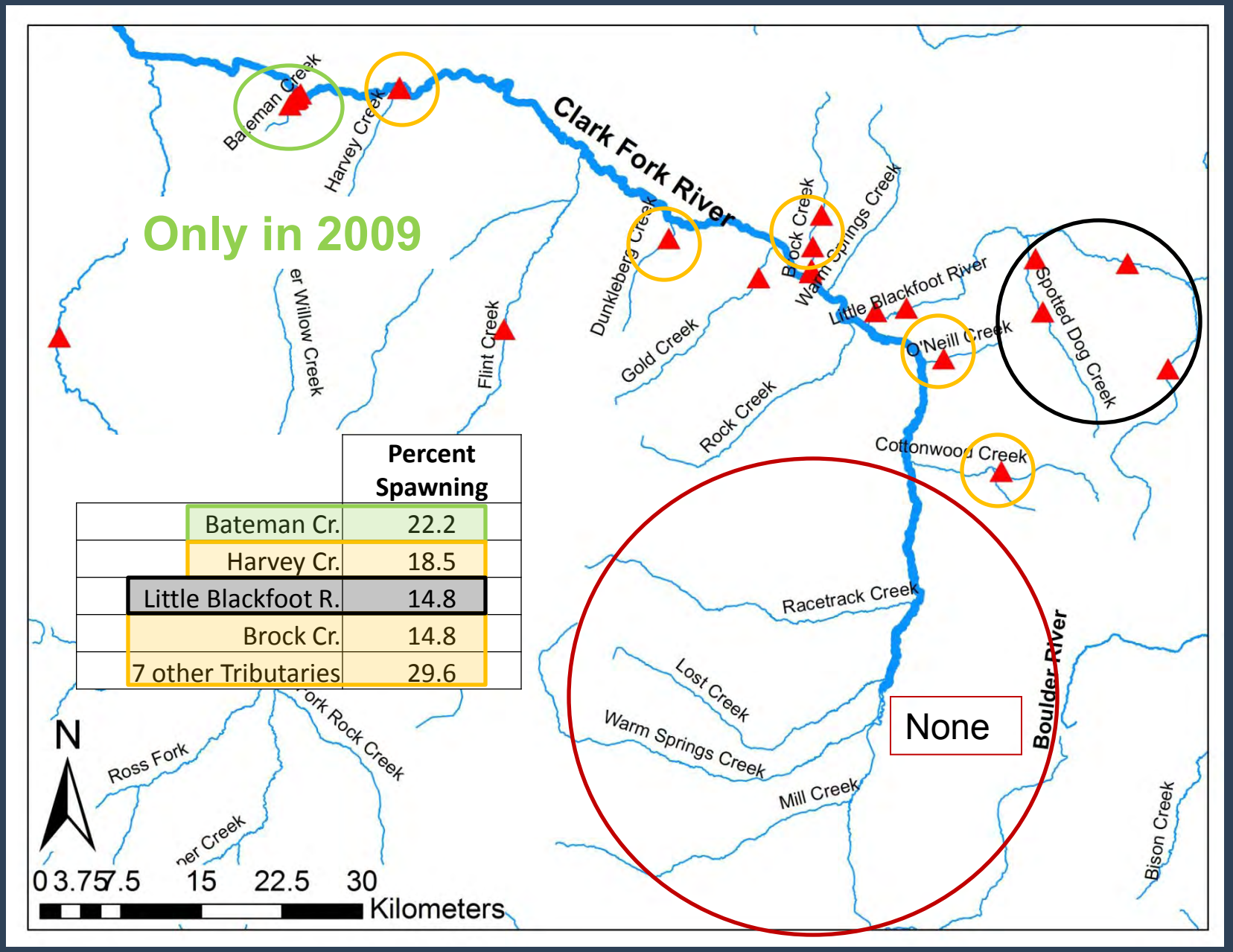

SONY
MONTANA

Results: Brown Trout Spawning Locations



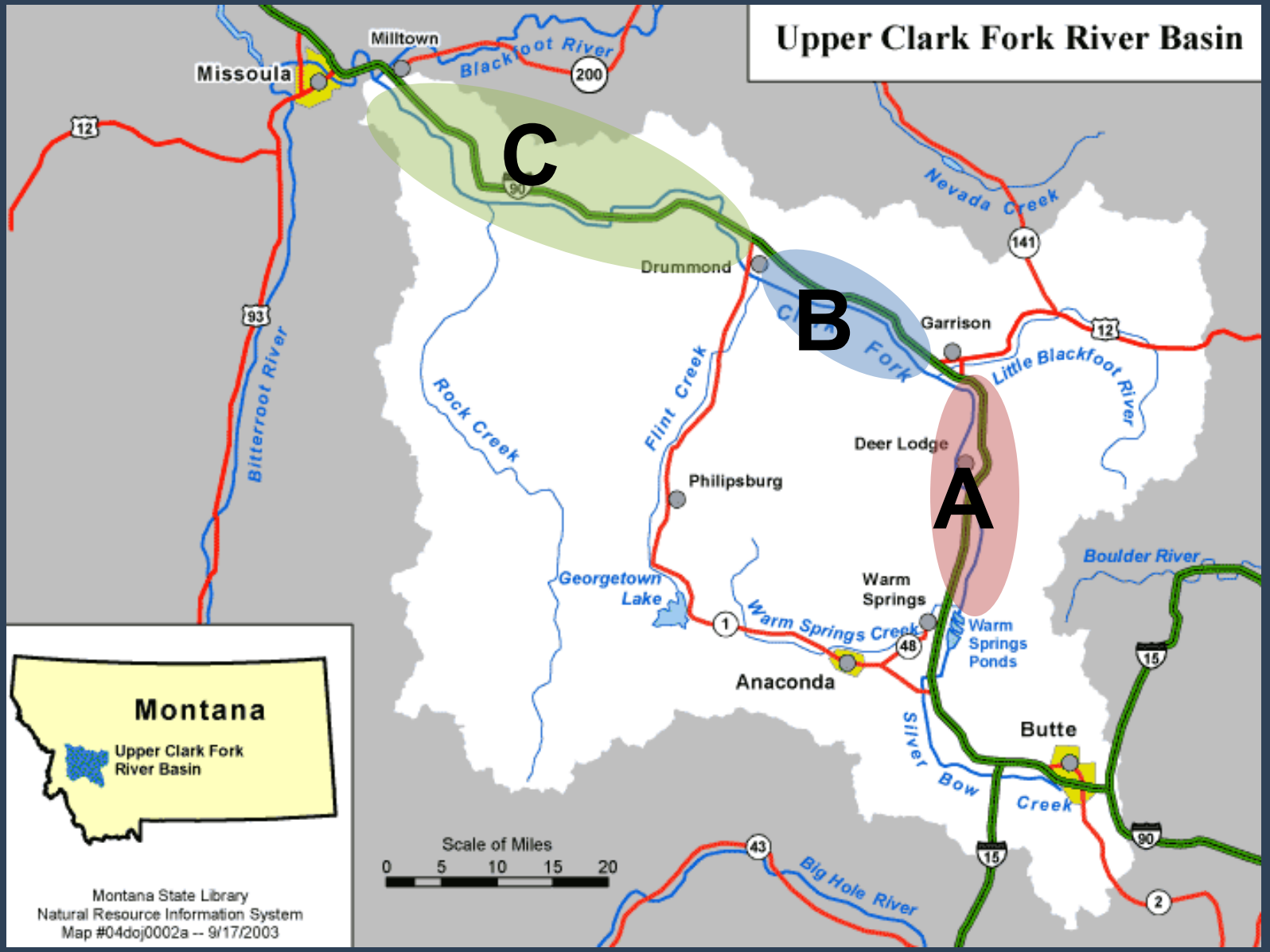
	Percent Spawning
Mainstem	**21.5**
Total Tributaries	**78.5**
Little Blackfoot R.	21.5
Flint Cr.	16.9
Gold Cr.	12.3
Racetrack Cr.	10.8
4 other Tributaries	16.9

Cutthroat Spawning Locations

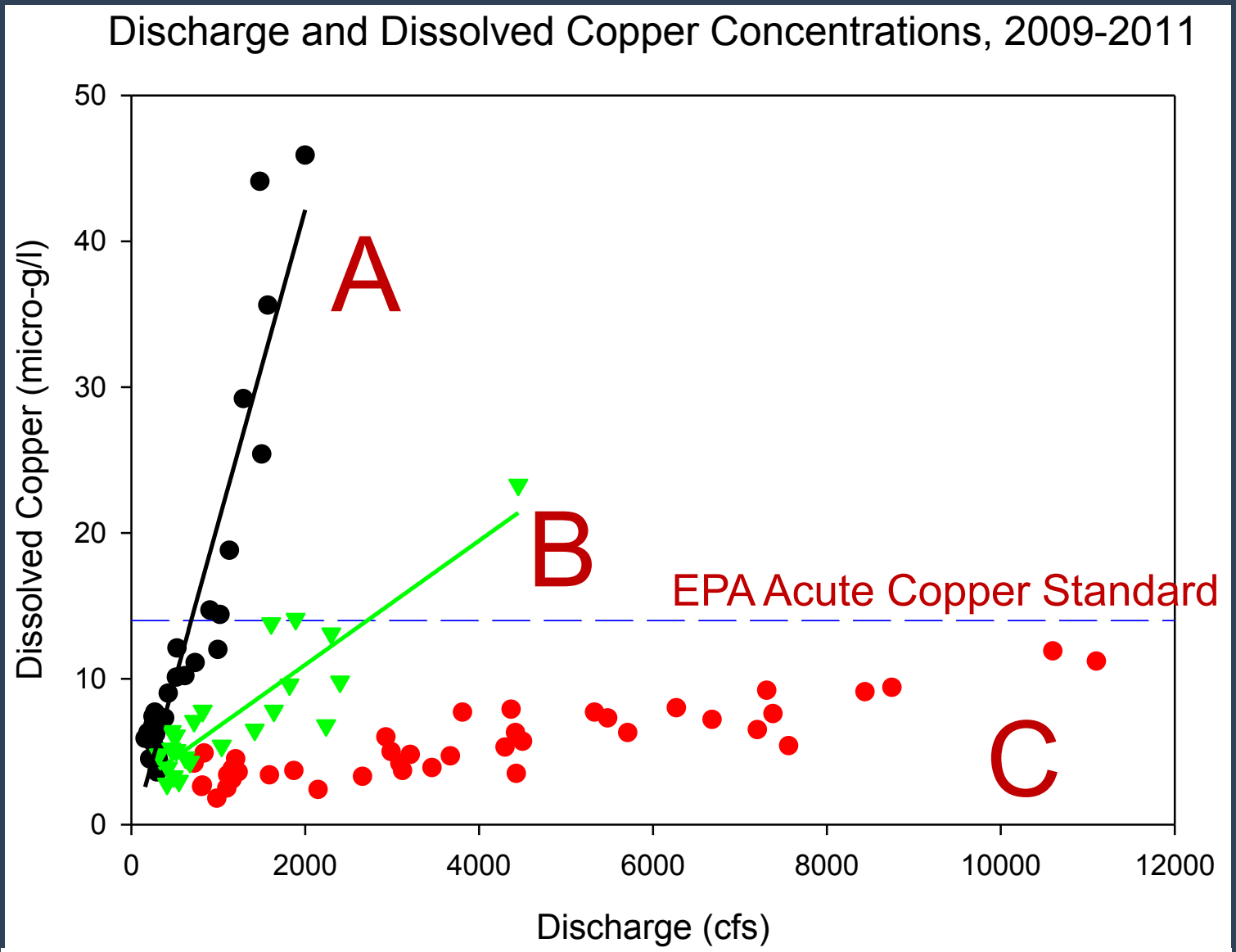


	Percent Spawning
Bateman Cr.	22.2
Harvey Cr.	18.5
Little Blackfoot R.	14.8
Brock Cr.	14.8
7 other Tributaries	29.6

Methods: Survival by Habitat Reach

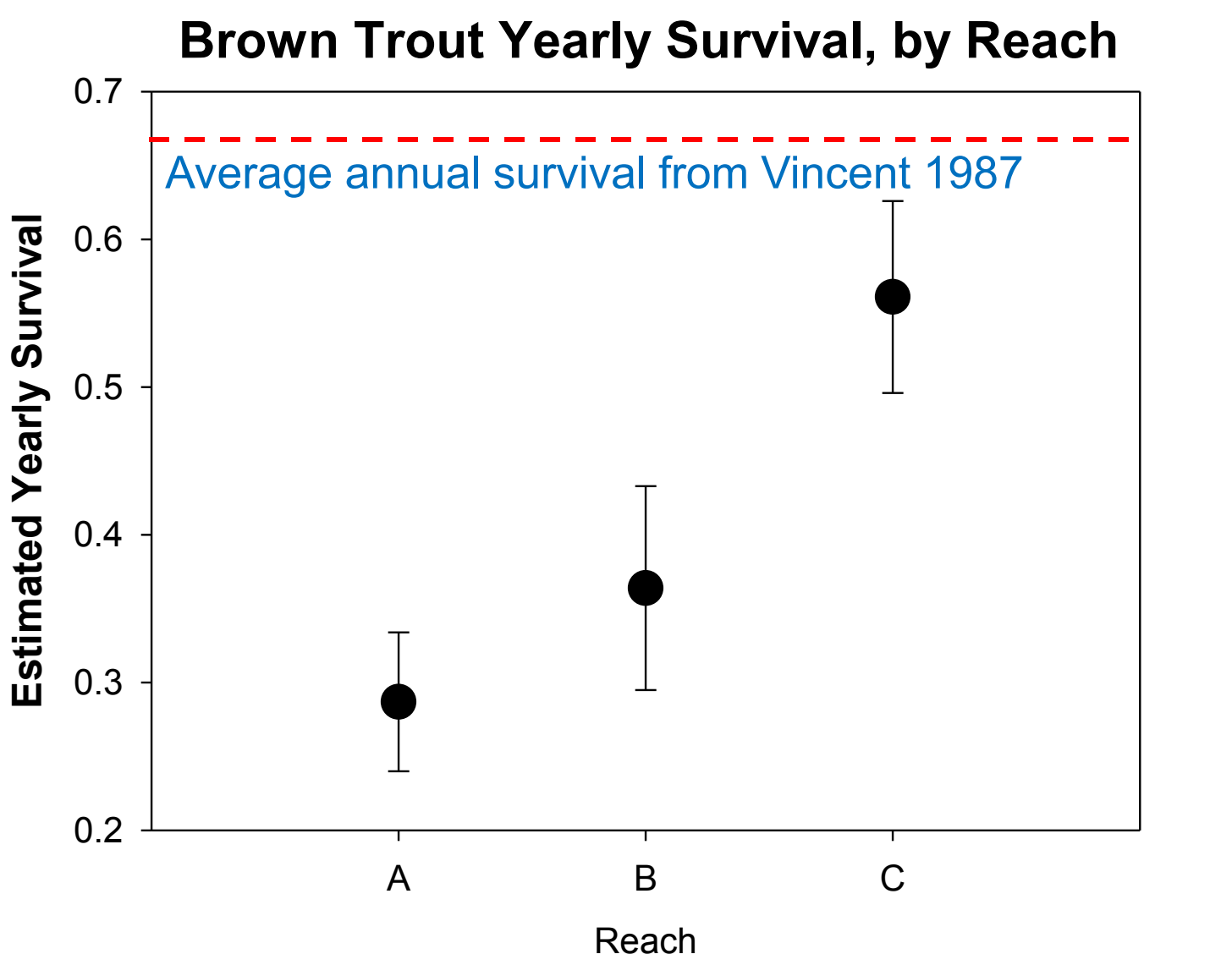


Copper Concentrations

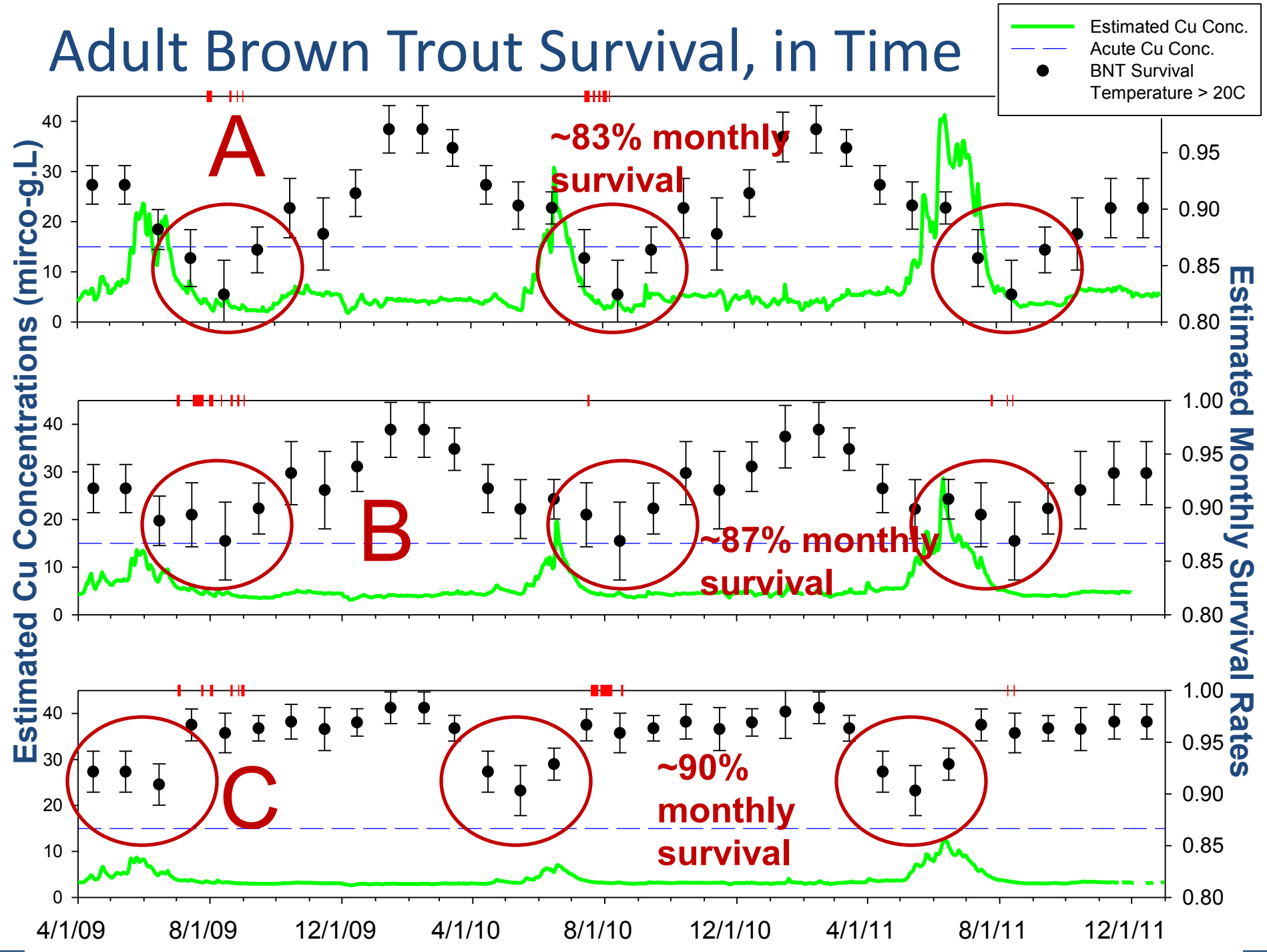


Data obtained from USGS field samples

Adult Brown Trout Survival

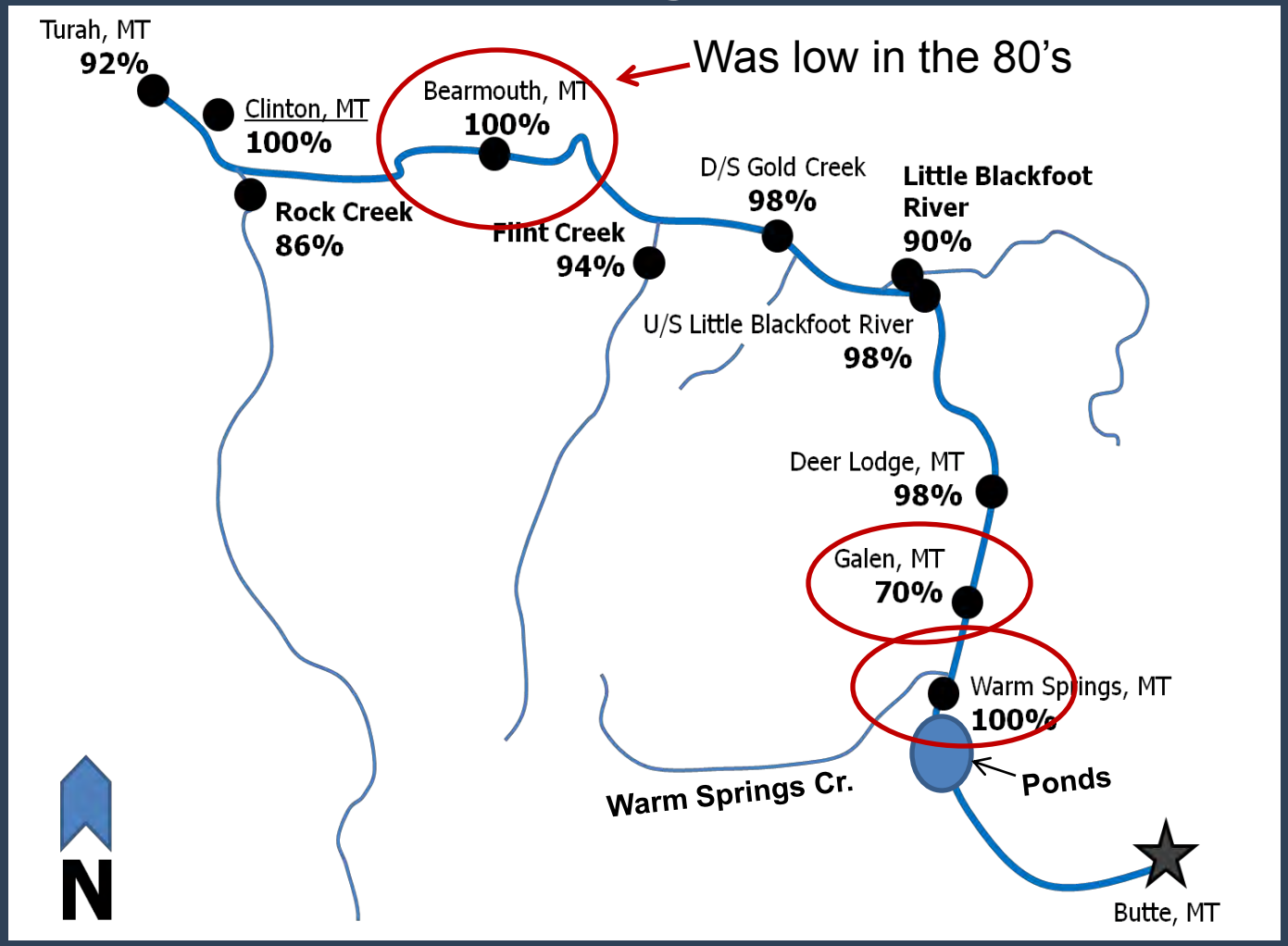


Adult Brown Trout Survival, in Time



Methods and Results:

Survival of Caged Fish 2011



Brown trout – April to early September

Results: 2011 Caged Fish Histology

- Cellular changes
  - Indicative of exposure to heavy metals
  - Most severe at Galen
  - Least severe at Warm Springs (just below ponds)

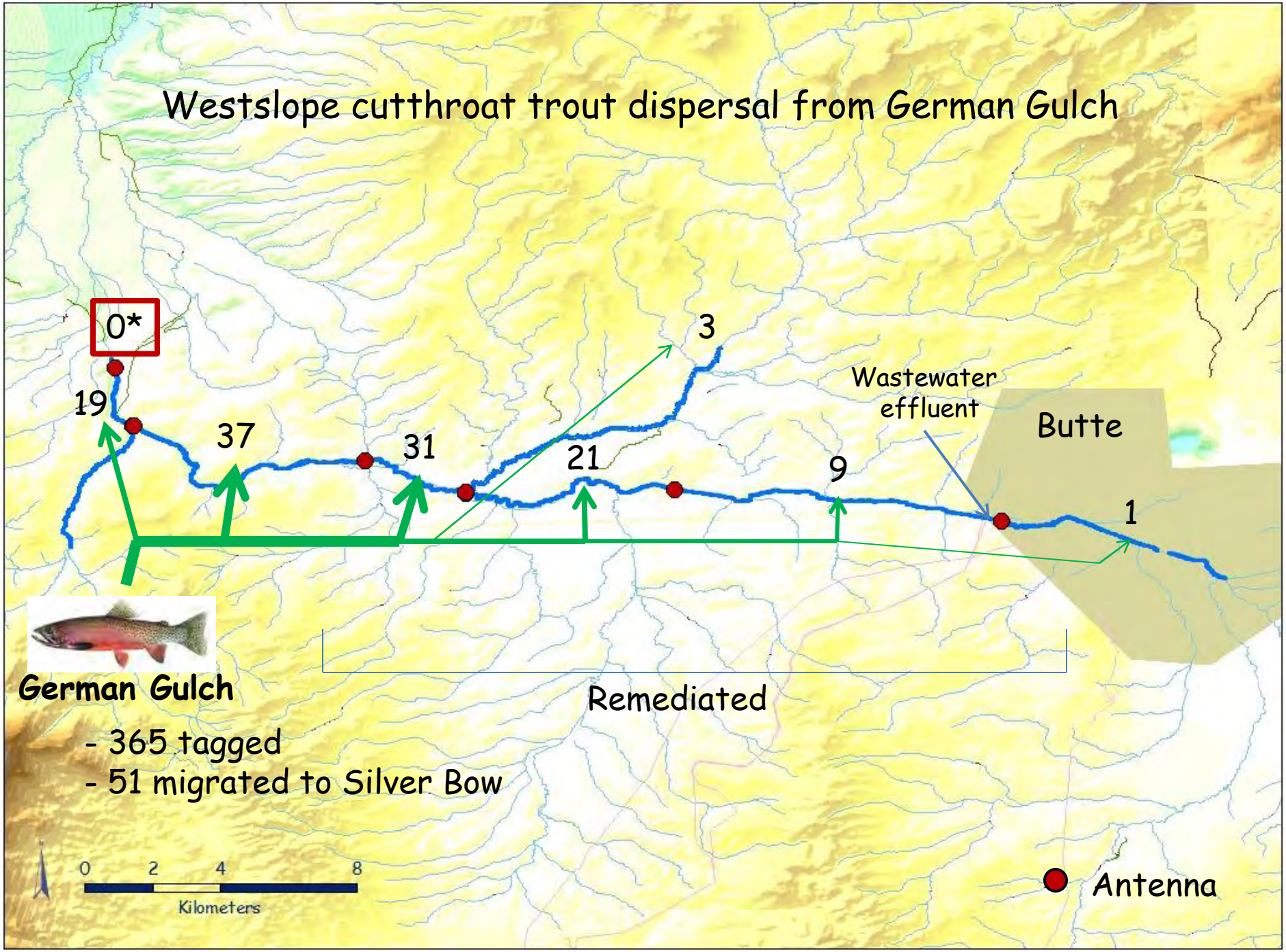
GOALS AND PRIORITIES

Fishery Goals

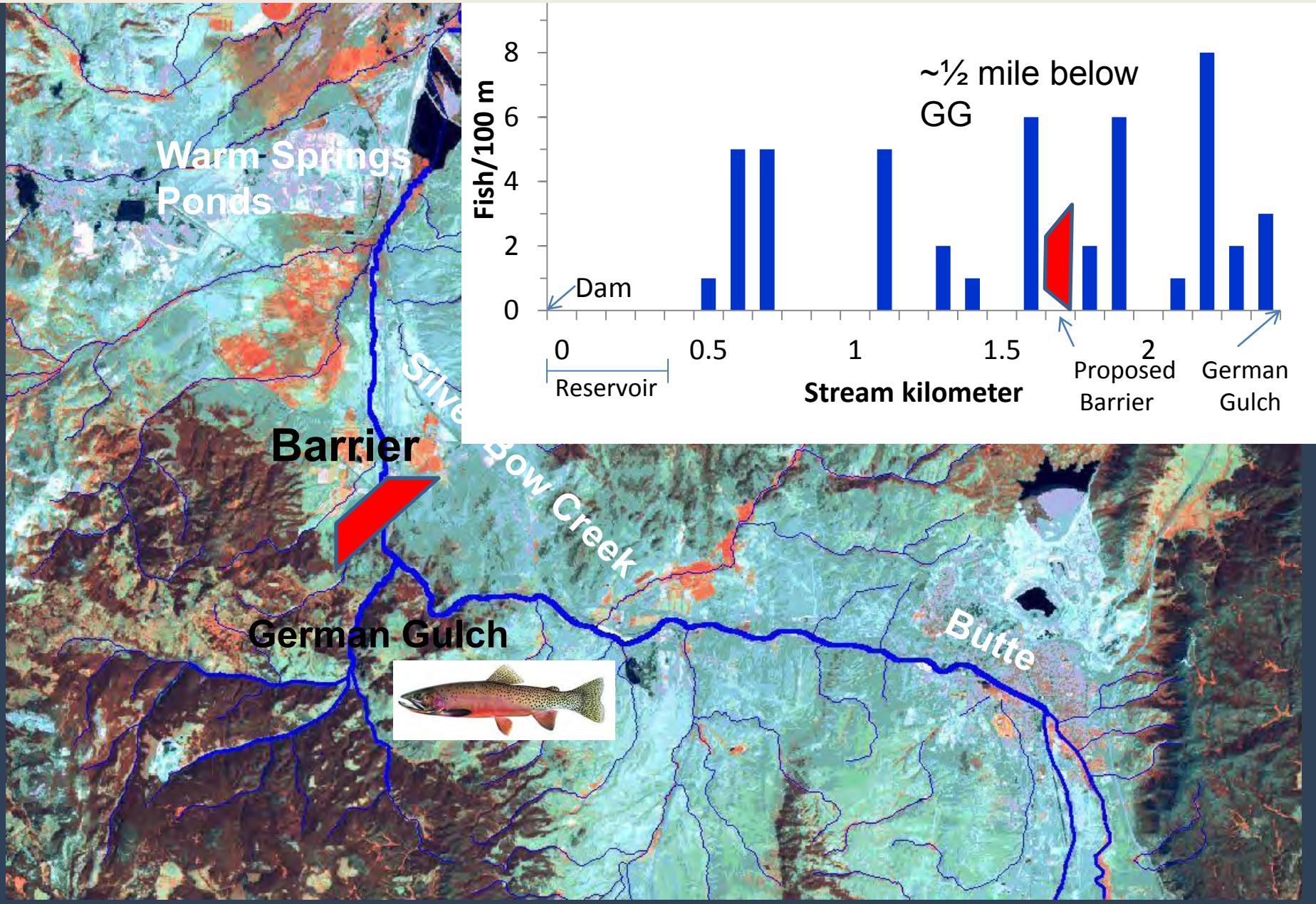
- Restore trout fisheries in CFR and SBC
  - Replace with tributary fisheries
- Improve native trout populations
  - Protect and expand where habitat is suitable

Silver Bow Cr: Restoration Potential

Westslope Cutthroat Trout from German Gulch


Westslope cutthroat trout dispersal from German Gulch
0*
19
37
31
21
3
9
1
Wastewater effluent
Butte
German Gulch
- 365 tagged
- 51 migrated to Silver Bow
Remediated
0 2 4 8
Kilometers
Antenna

Priority: Restoring a Cutthroat Fishery

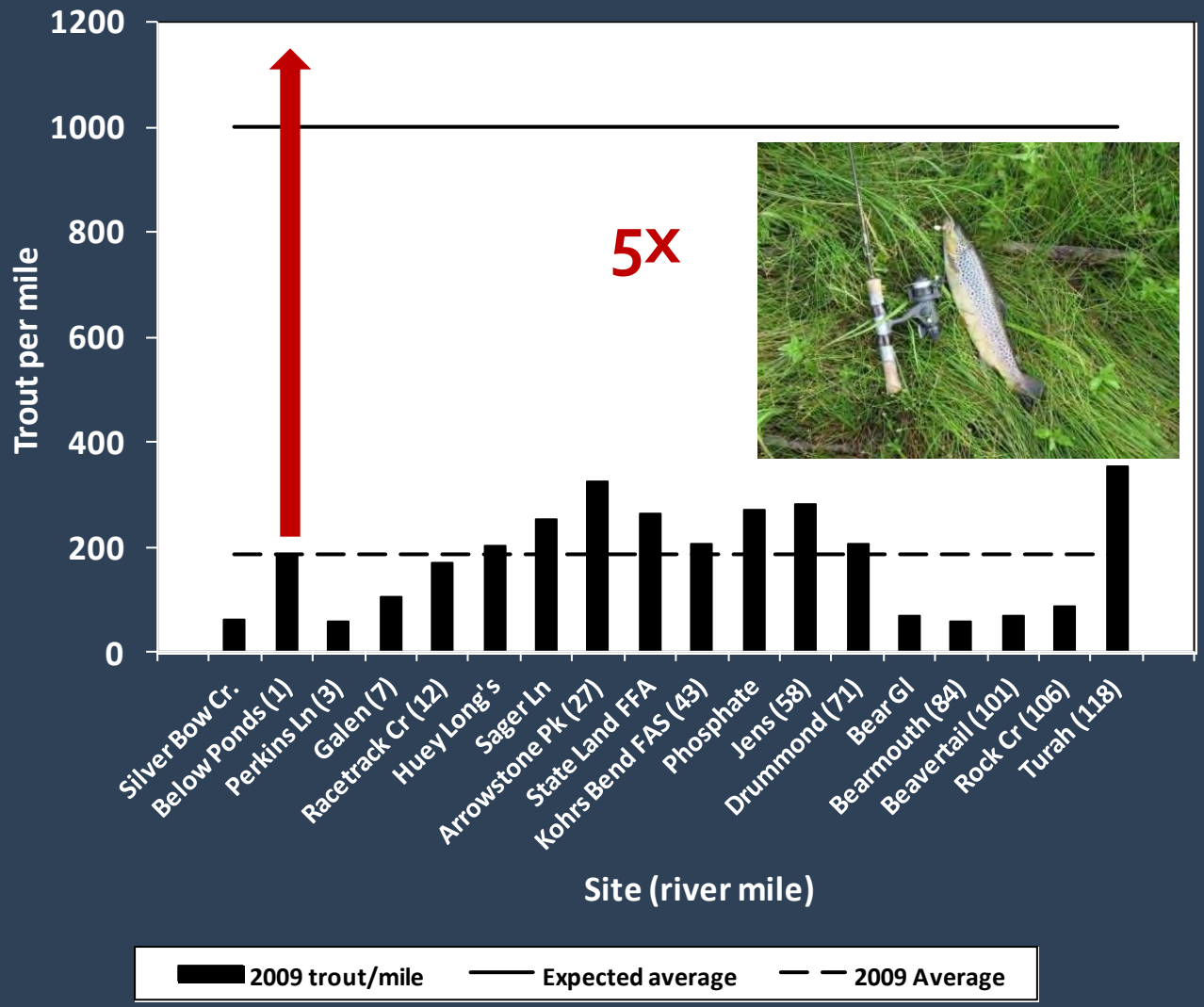


Priority: Improve Treatment of Waste Water

Nutrient and Metals Overload

Rain and snowmelt runoff, not all captured

Clark Fork River: Restoration Potential

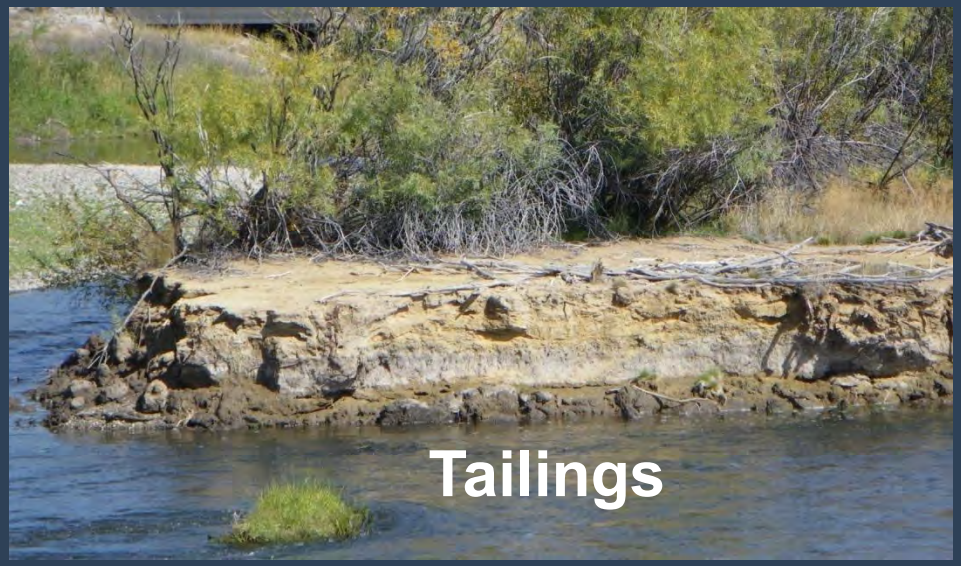


Priority: Restore the Clark Fork River Trout Fishery

Native trout: **Currently:** 1 – 4%
Objective: 10%

Blackfoot ~ 25%, Bitterroot ~ 10%
Clark Fk below Rock Cr ~ 7%

Priority: Conserve Bull Trout in Silver Lake System - Similar at Harvey Creek



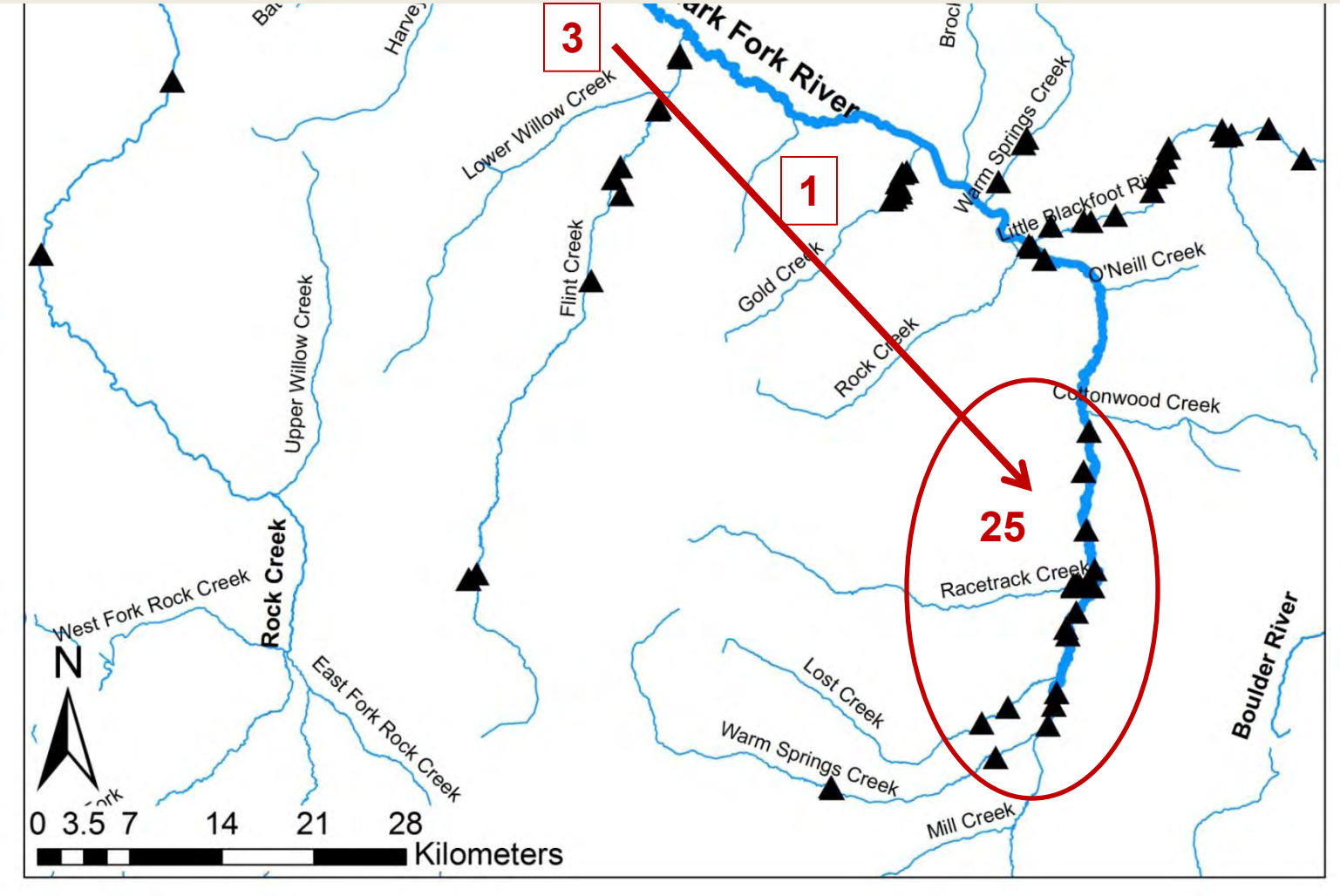
Clean water
(Superfund cleanup)

More water:
90 cfs to Deer Lodge

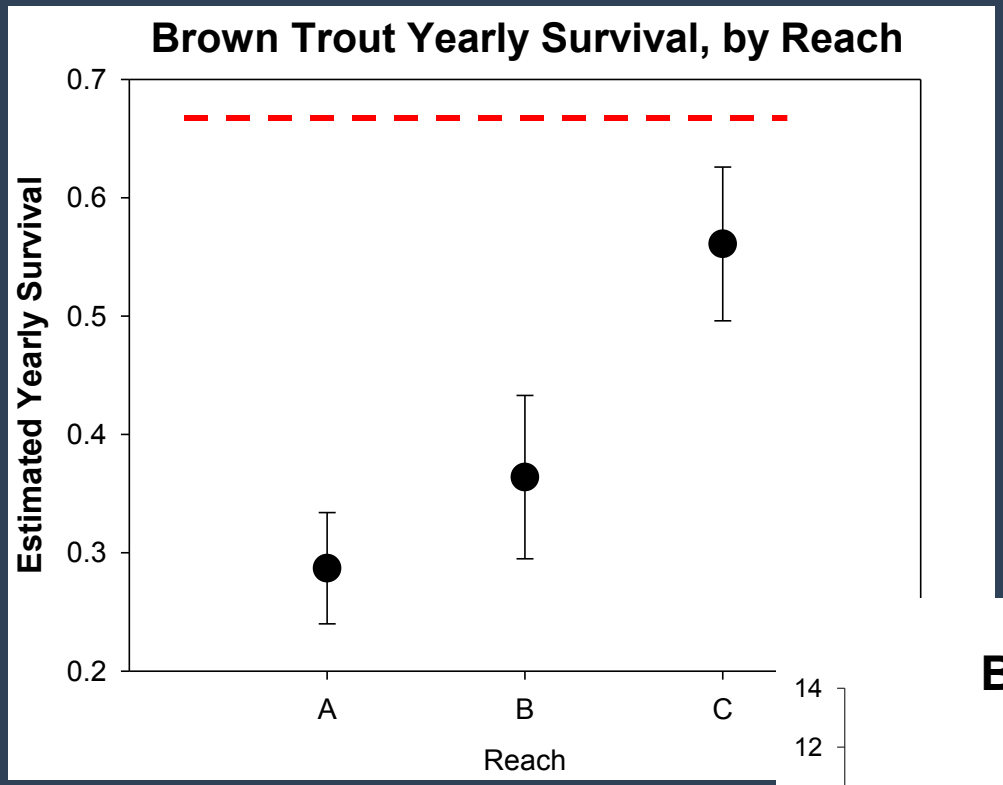
- Racetrack Cr
- Silver Lk / Basin Cr Res.
- Milltown water right

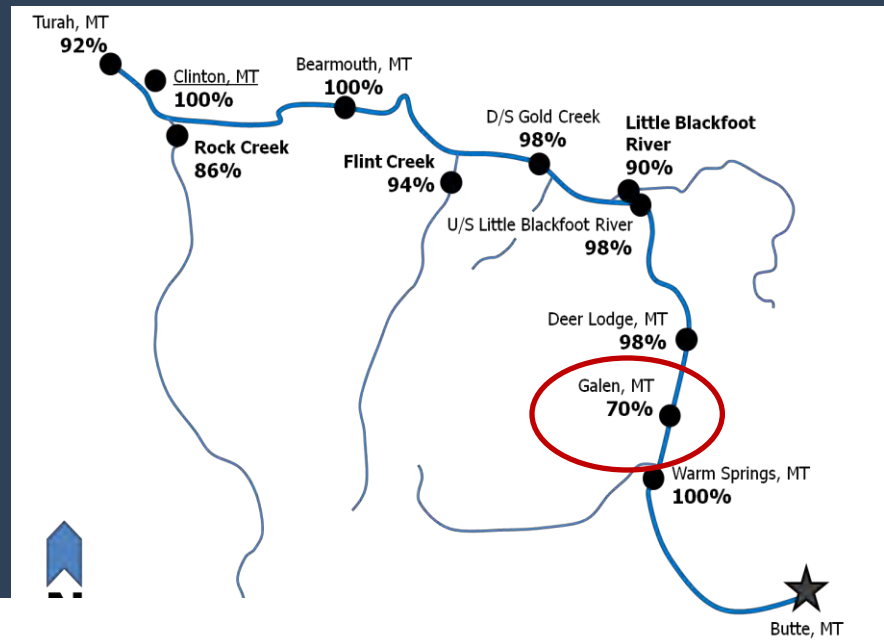
Priority: Fix the Sink

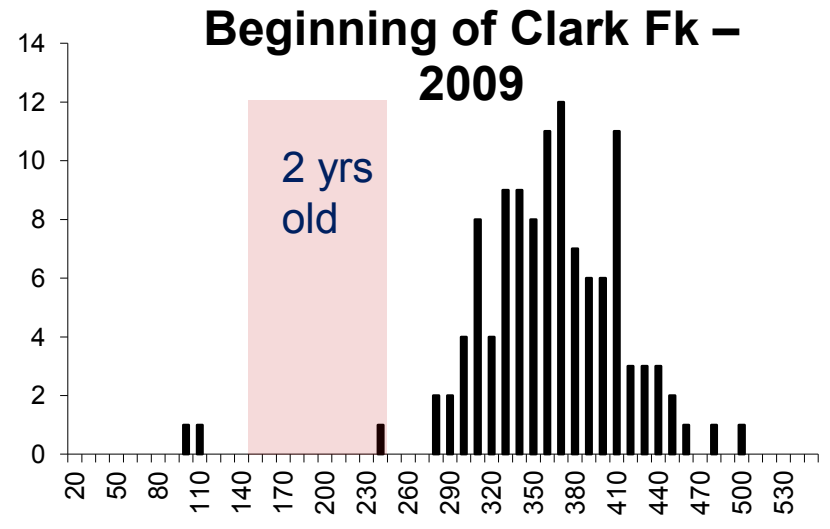
- Trout are drawn to the area for spawning…



…but, survival is poor







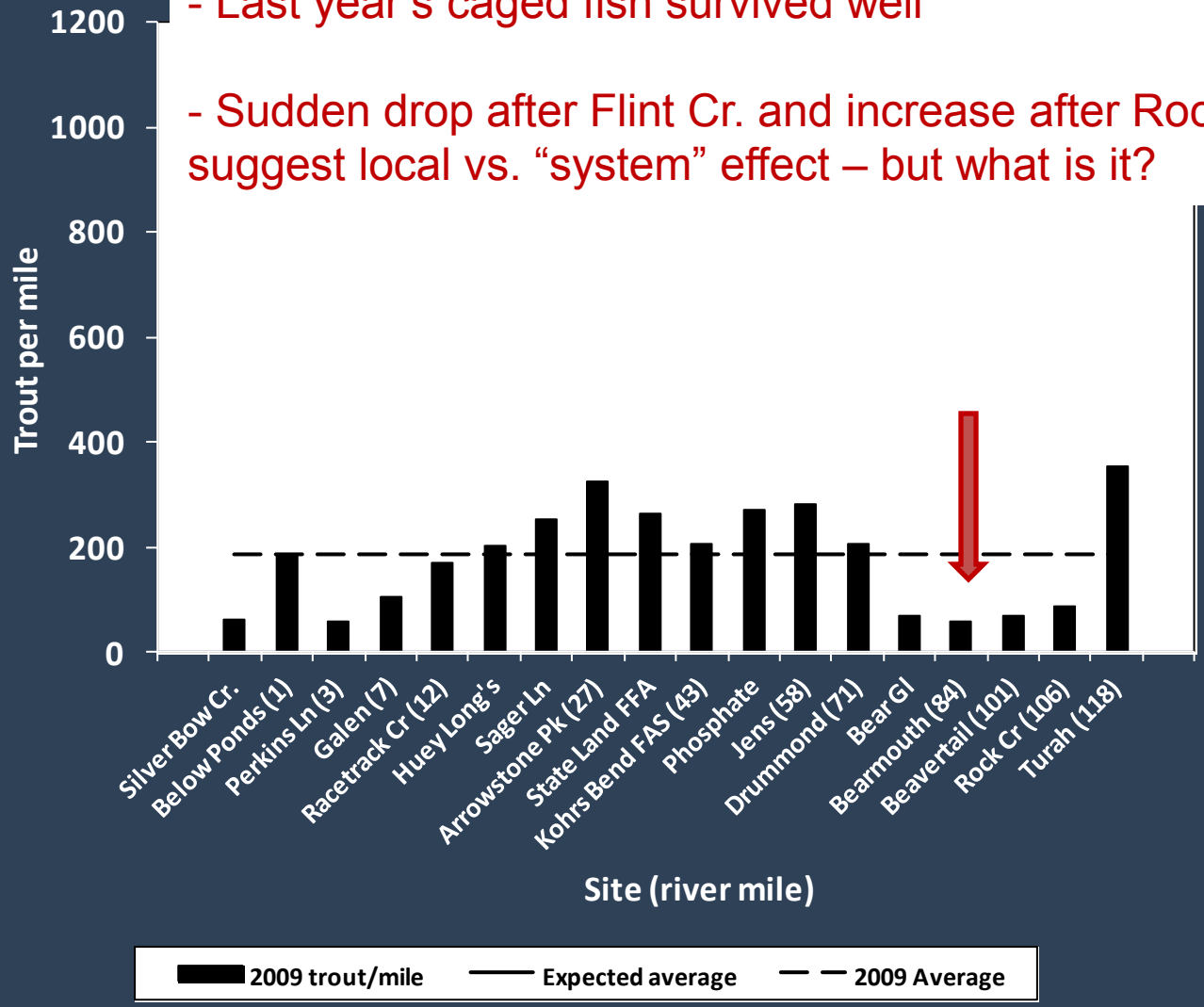
A dilemma: why are numbers so low?

- As low as Silver Bow Creek!

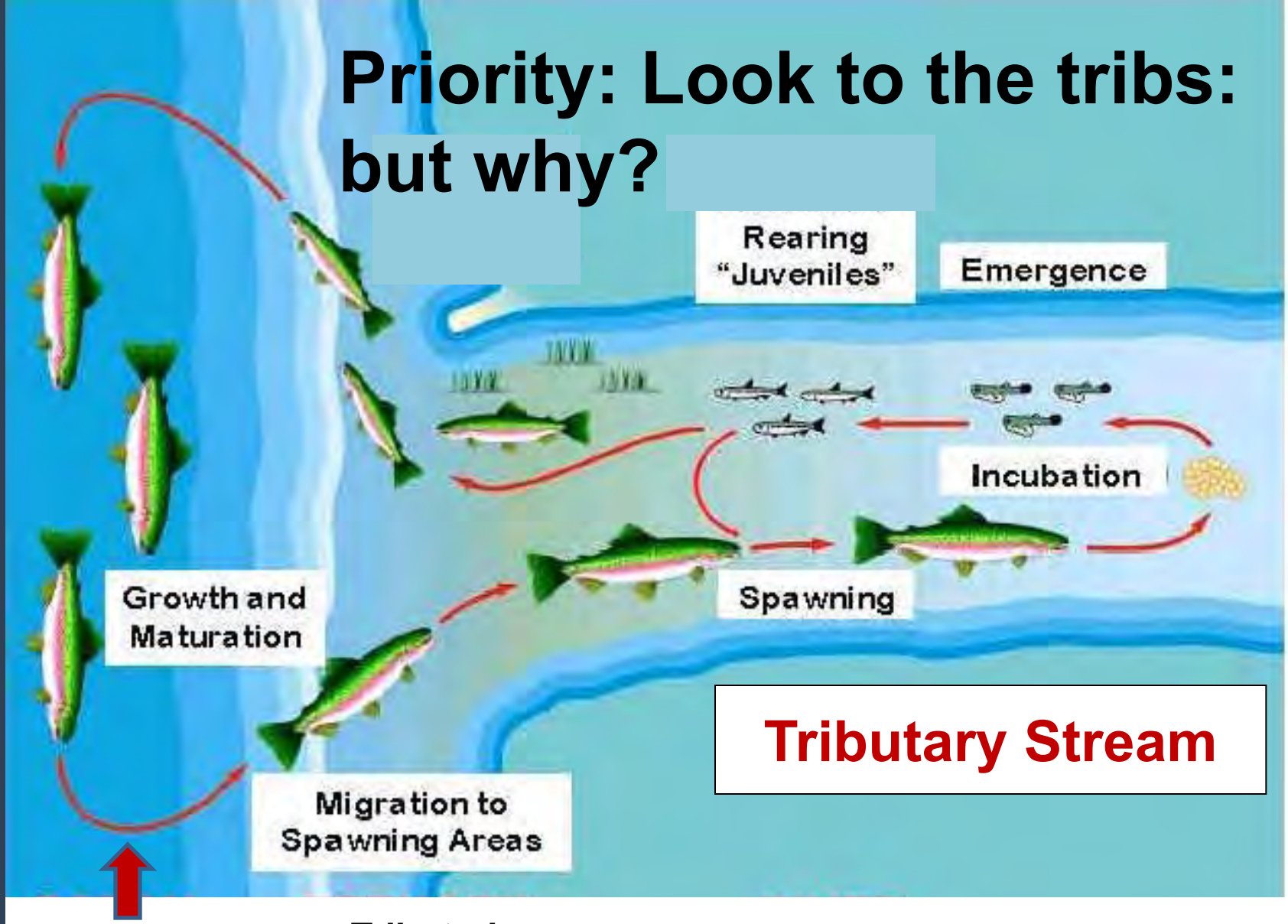
- Past caged fish showed low survival, but…

- Last year's caged fish survived well

- Sudden drop after Flint Cr. and increase after Rock Cr. suggest local vs. "system" effect – but what is it?



Priority: Look to the tribs: but why?



Mainstem River

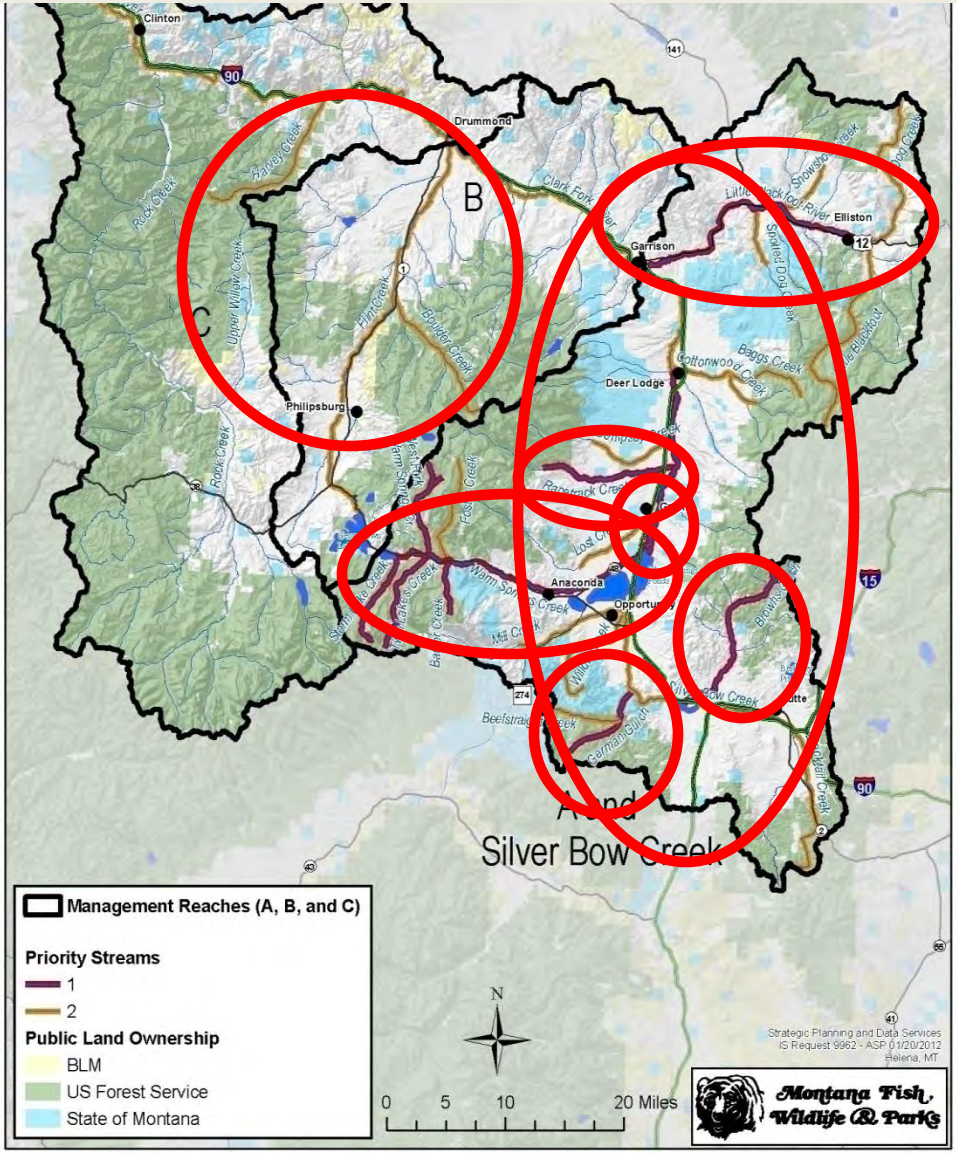
Tributaries are:

1) biologically connected to the mainstem &
2) native and rec. fisheries themselves (e.g., LBF)

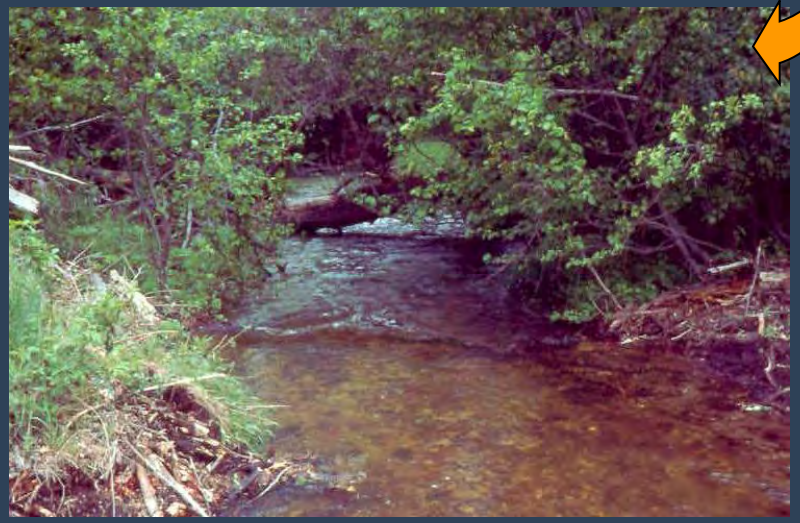
137+ prioritized to 28 streams

+ water for CFR abv. Deer Lodge (p. 1) & elsewhere

Priority	Streams
1 (n = 11)	Browns Gulch German Gulch Racetrack Cr. – Lower Little Blackfoot R. – Lower Warm Springs Cr. – Lower Warm Springs Cr. – Upper Storm Lake Cr. Barker Cr. WF Warm Springs Cr. Twin Lakes Cr. Instream flow CFR above Deer Lodge
2 (n = 19)	18 streams + mainstem instream flow



ributary abitat \estoration – \i pari an areas and ater



ributary abitat \estoration –

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Conclusions

- SBC: Trout are responding to remediation, but we need to improve treatment of wastewater.
- CFR: Galen to Warm Springs is important for trout but has high mortality, making it doubly important to address effectively.
- Biological data has refined our approach to restoring the fishery, and given us a better picture of what's possible.
- Fishery goals are achievable, attaining them is up to us.

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