Carpenter Reservoir and Middle Bridge River Fish Habitat and Population Monitoring

BRGMON-4



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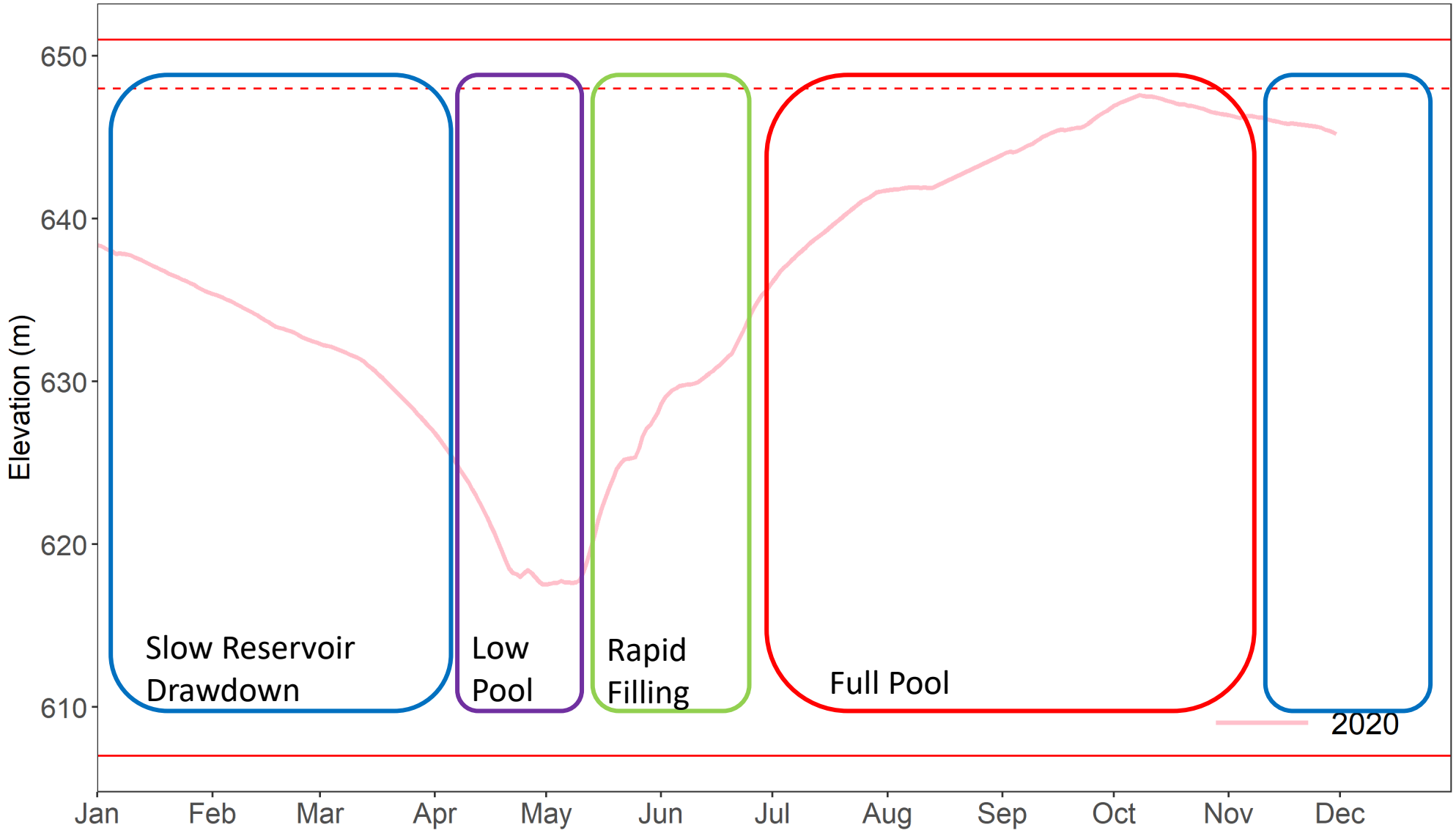
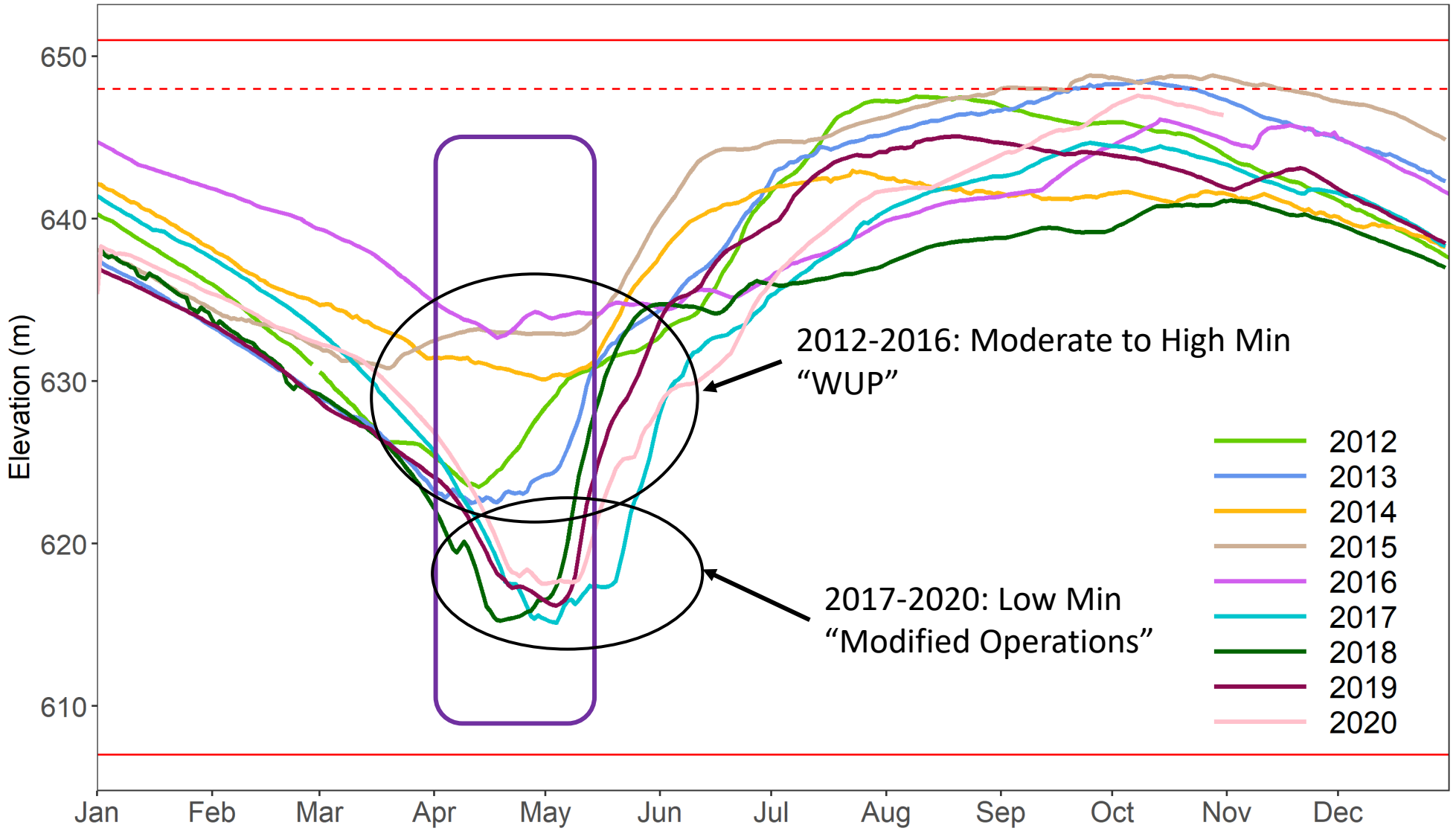
Management Questions

1. What are the basic biological characteristics of fish populations?
2. Will the WUP alternative result in positive, negative, or neutral impact on fish populations?
3. What operating parameters contribute to fish productivity?
4. Is there a relationship between Middle Bridge River flow and fish productivity in the reservoir or river?
5. Can operations of be refined to improve fish populations?

How does elevation affect fish?

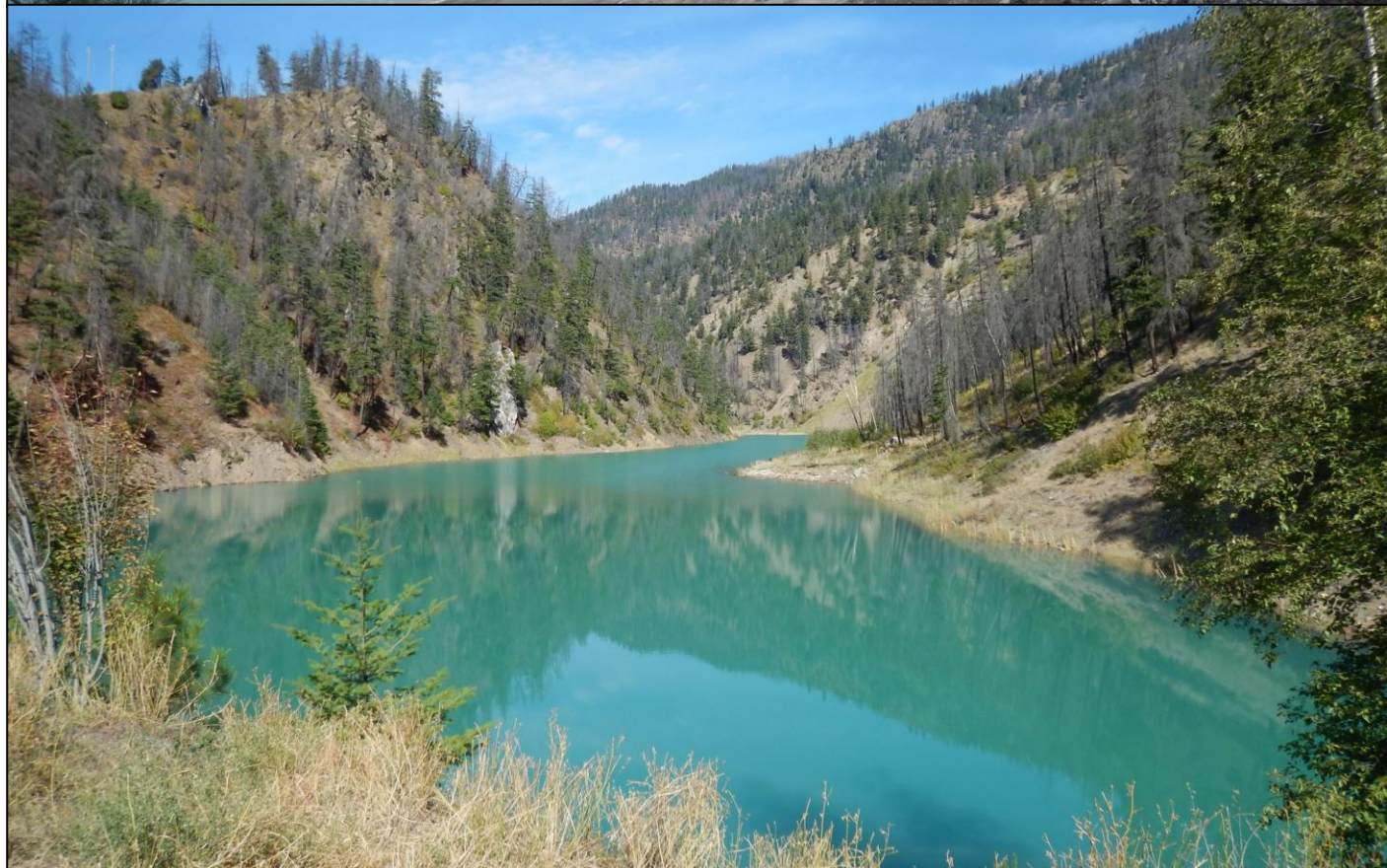


WUP vs Modified Operations



BRGMON-4 Field Methods

- BT mark recapture
- Biological characteristics (length, weight, age)
- Kokanee tributary surveys
- BT movement analysis
- Middle Bridge River Mountain Whitefish spawner surveys

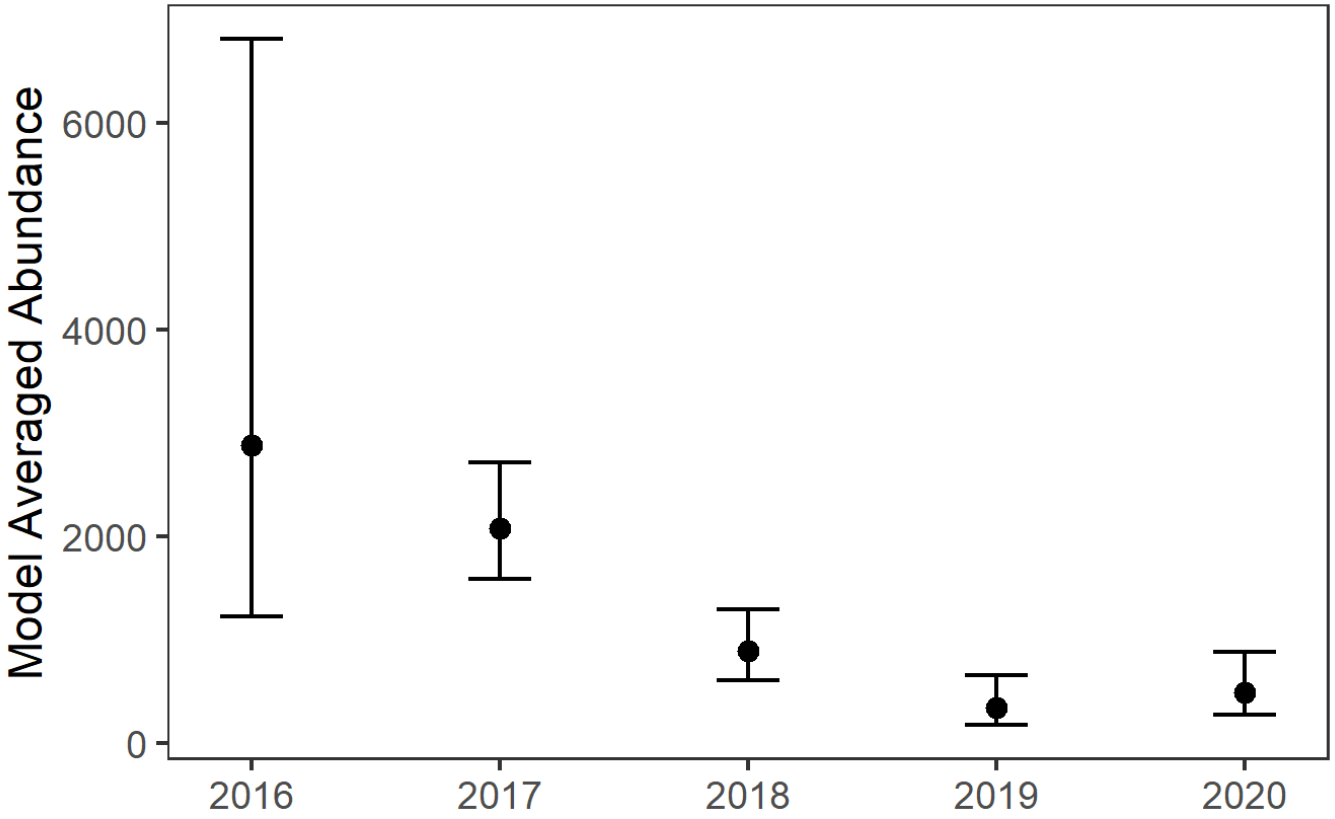


What have we seen so far?

- Overall less habitat volume throughout the year and less food originating in the reservoir
- Declining kokanee and Bull Trout populations
- Potentially declining Mountain Whitefish populations
- Shift to older Bull Trout
- Changes in Bull Trout movement behaviour

Results 2020: Bull Trout Abundance

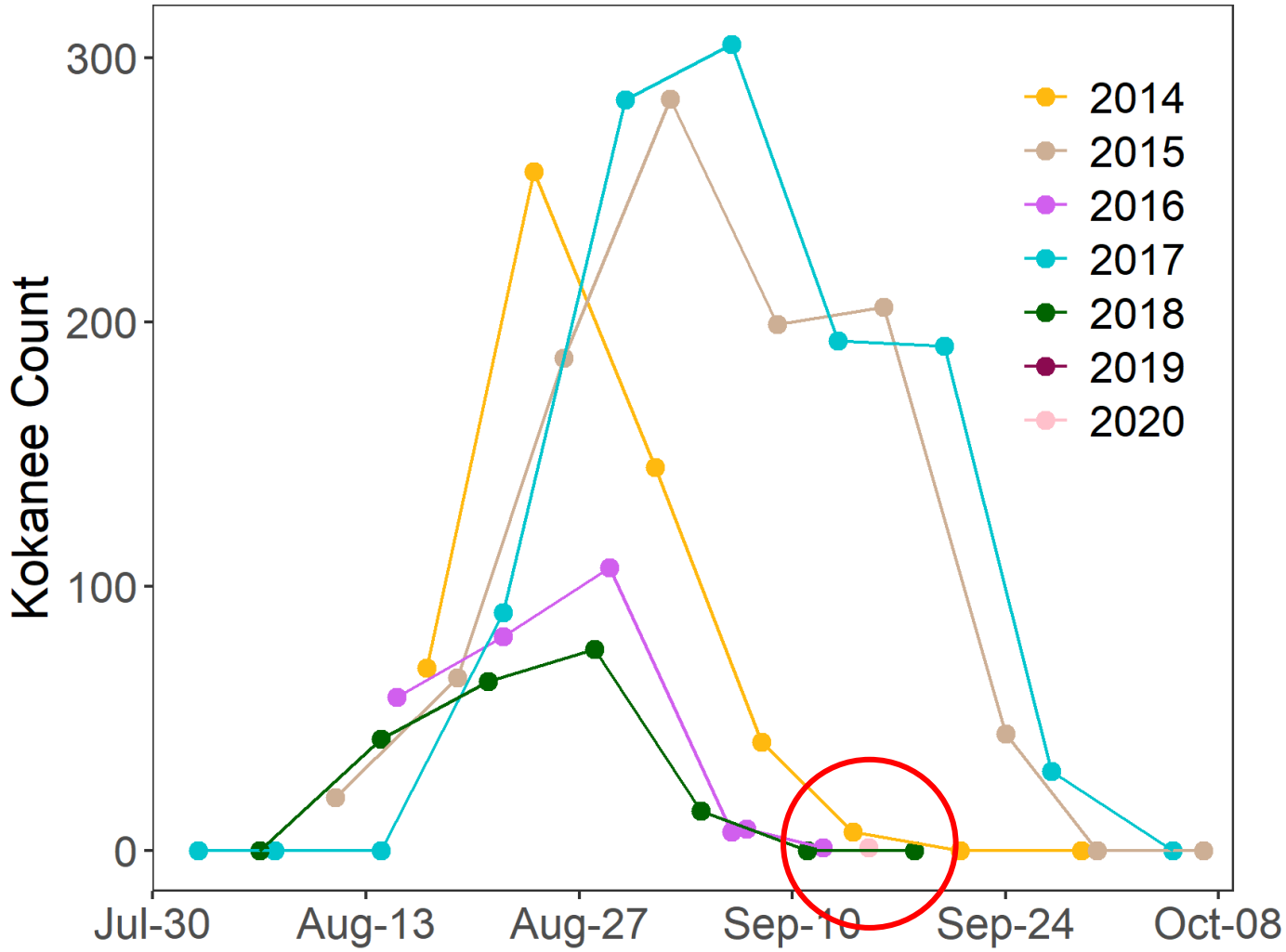
Evidence of decline in adult Bull Trout as a result of modified operations



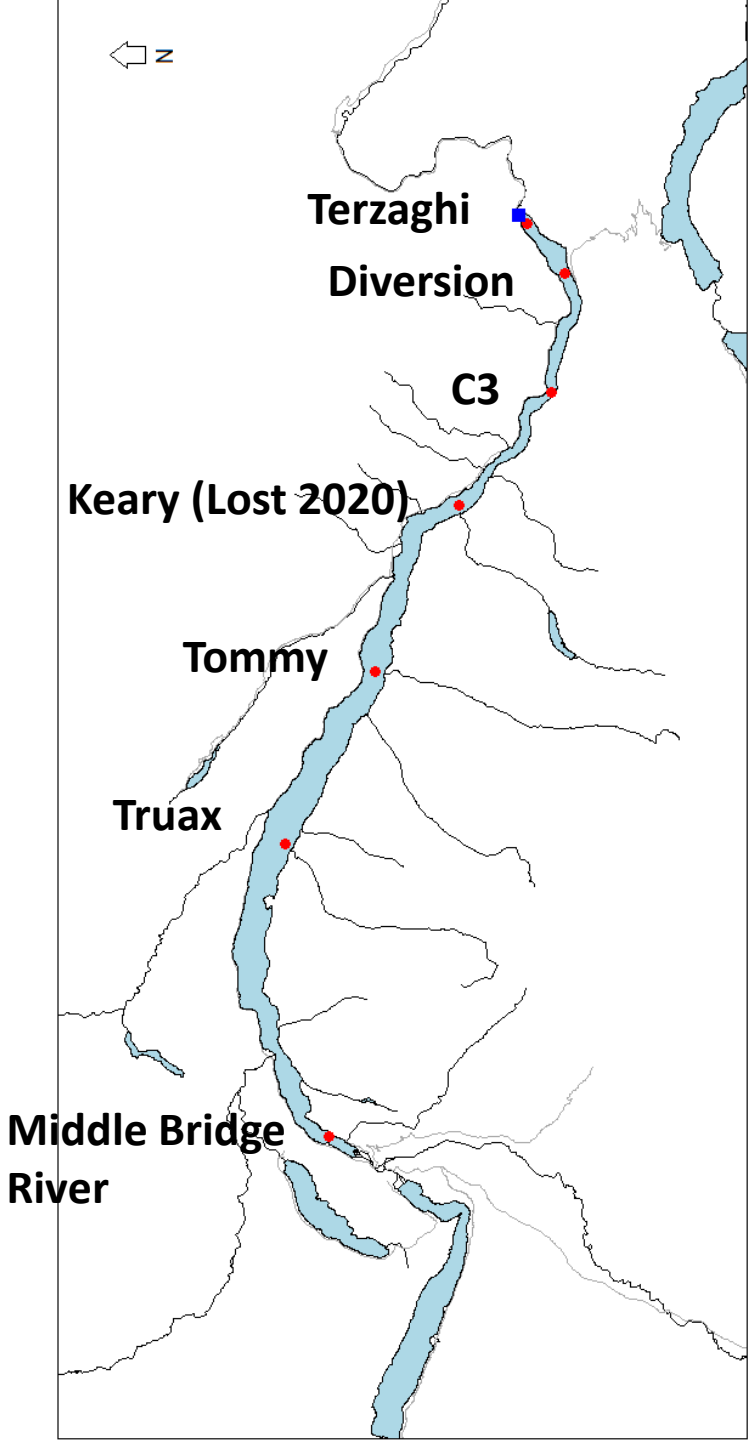
Results 2020: Kokanee Abundance

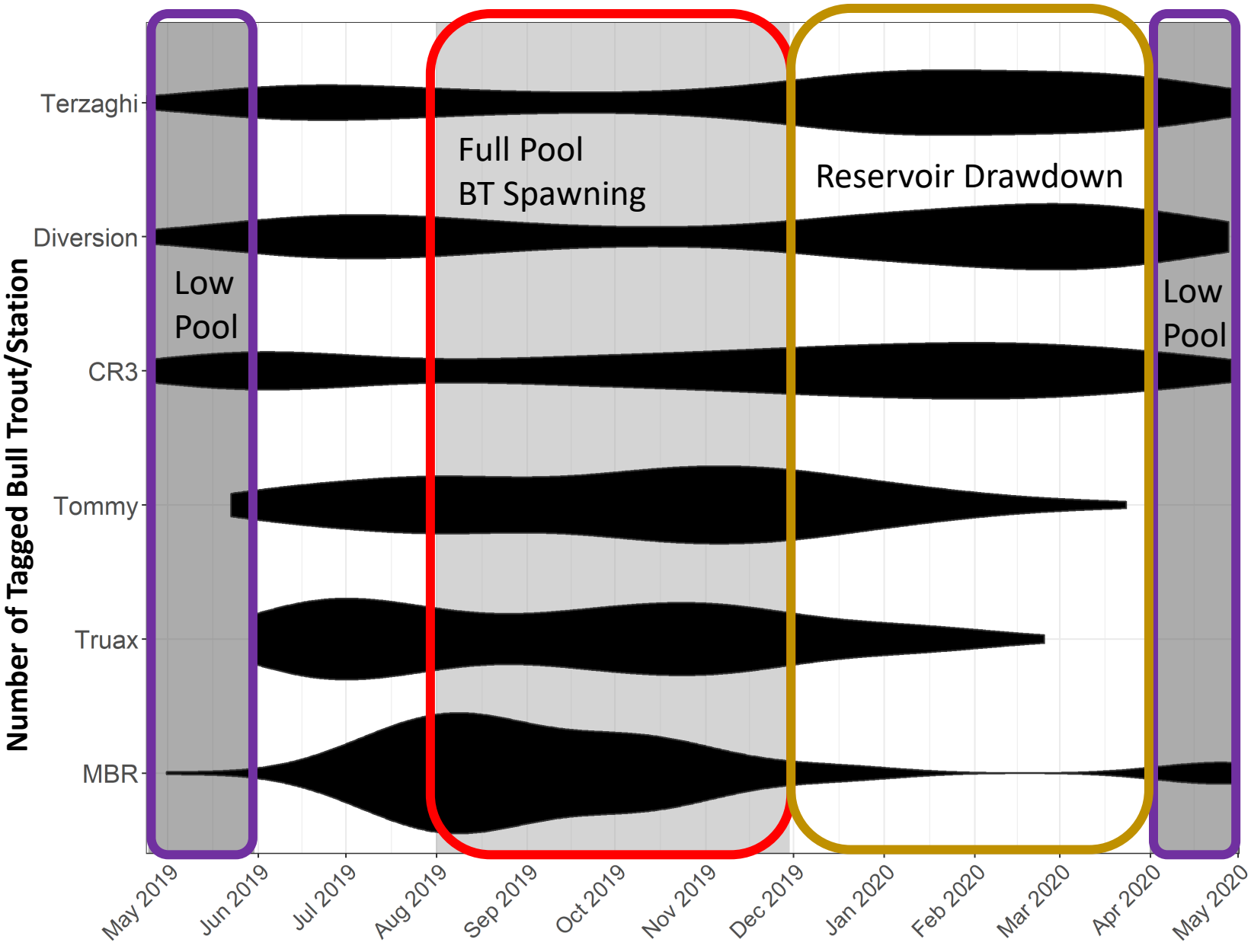
- Spawner Surveys:
  - 2019: 0
  - 2020: 1

- One kokanee captured during mark-recapture
- Kokanee captured by anglers
- Not likely to recover under modified operations

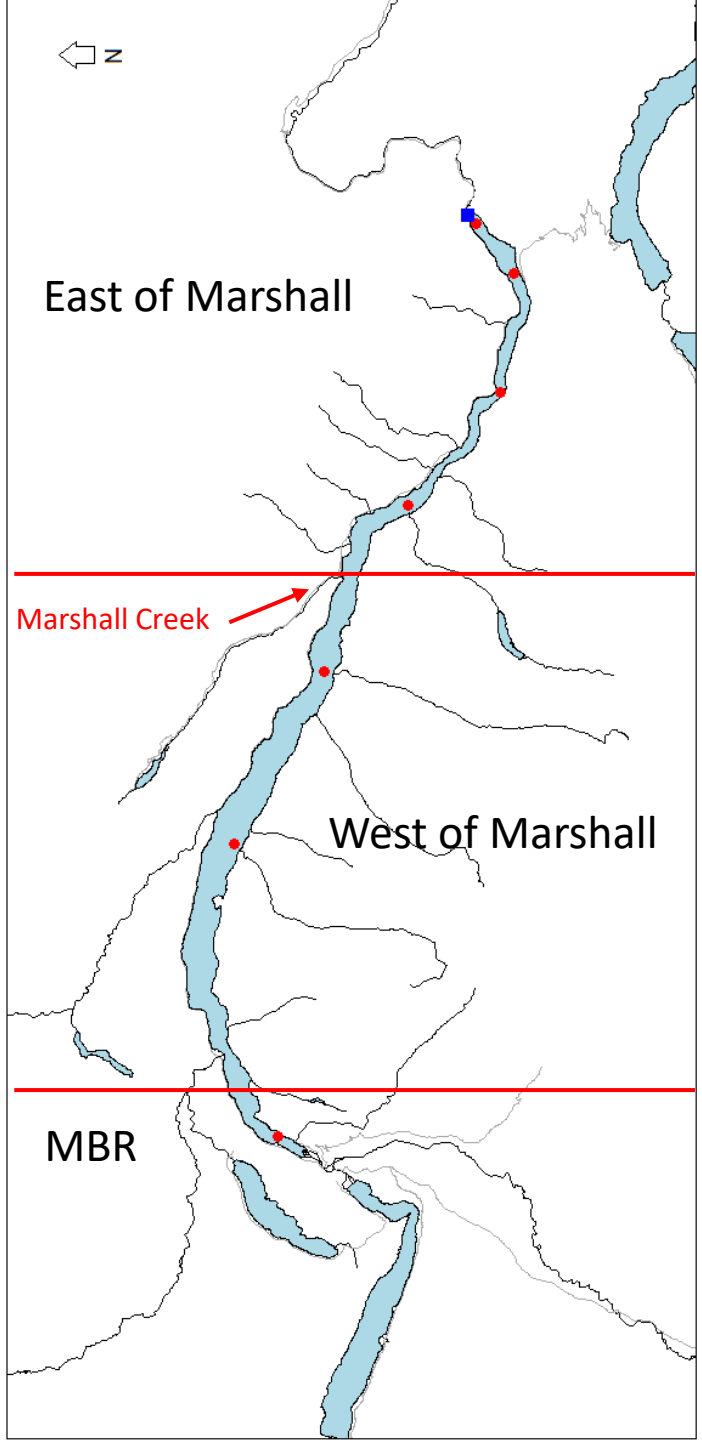


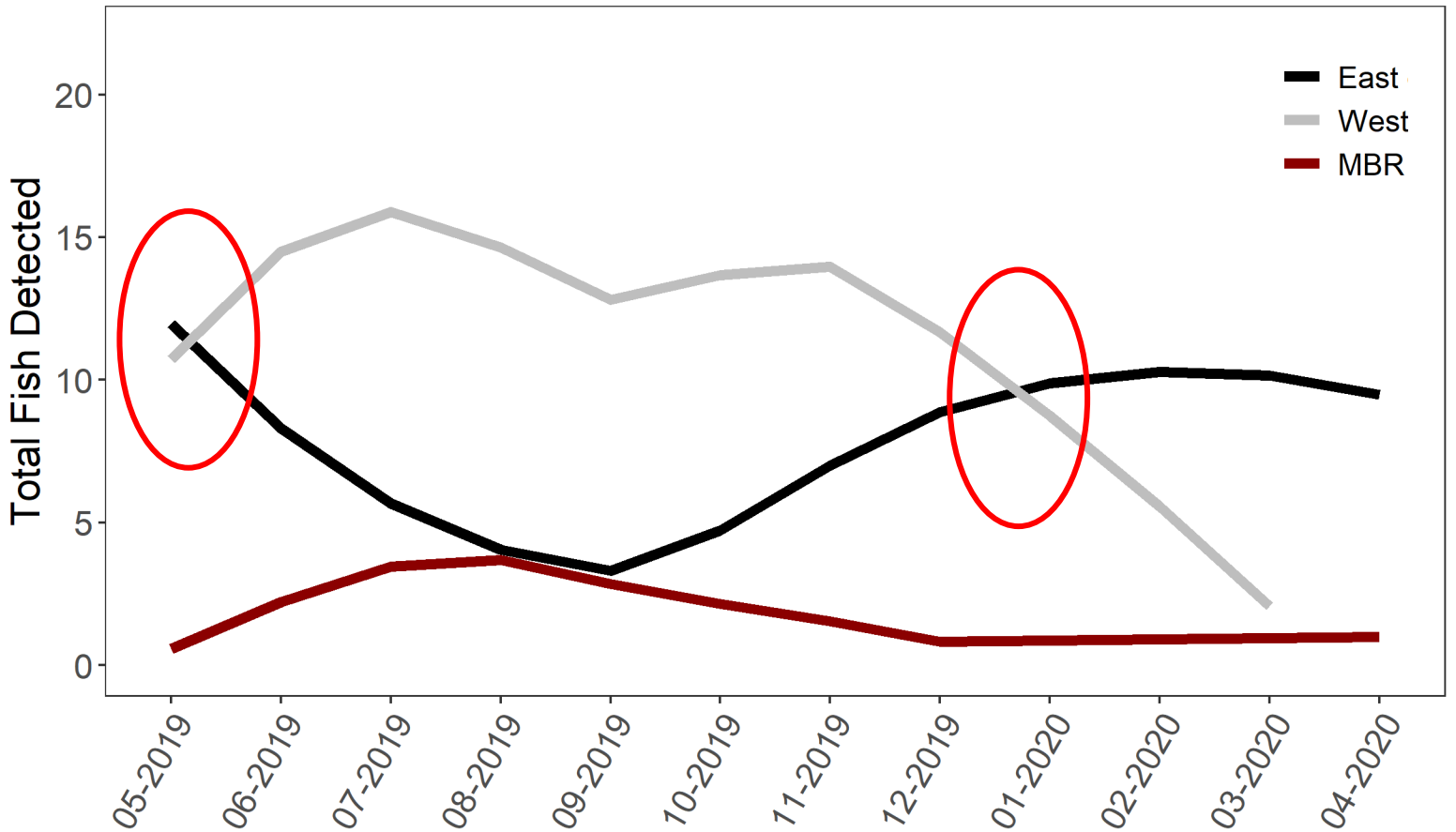
Results 2019: Bull Trout Movement





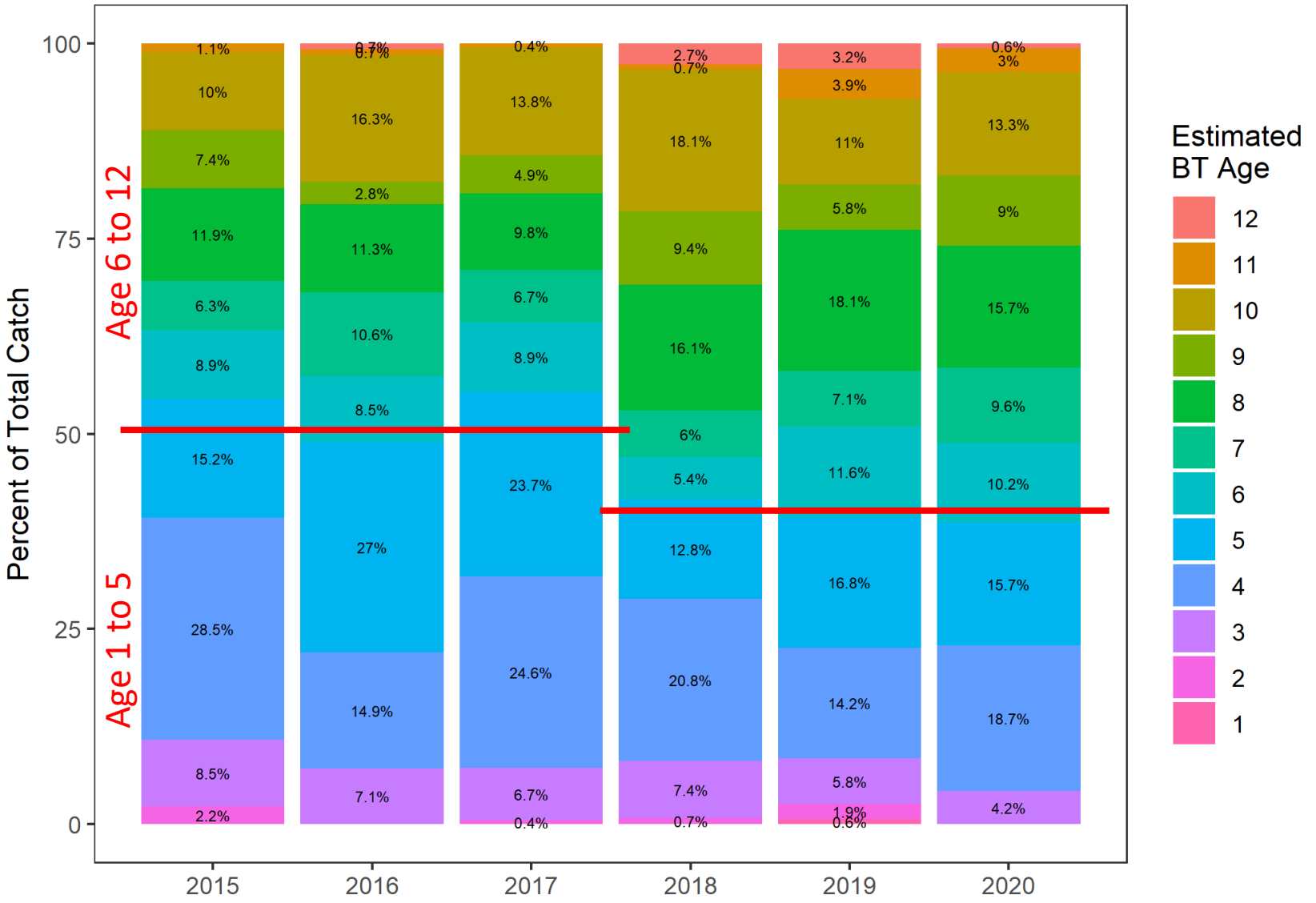
Results 2019: Bull Trout Movement





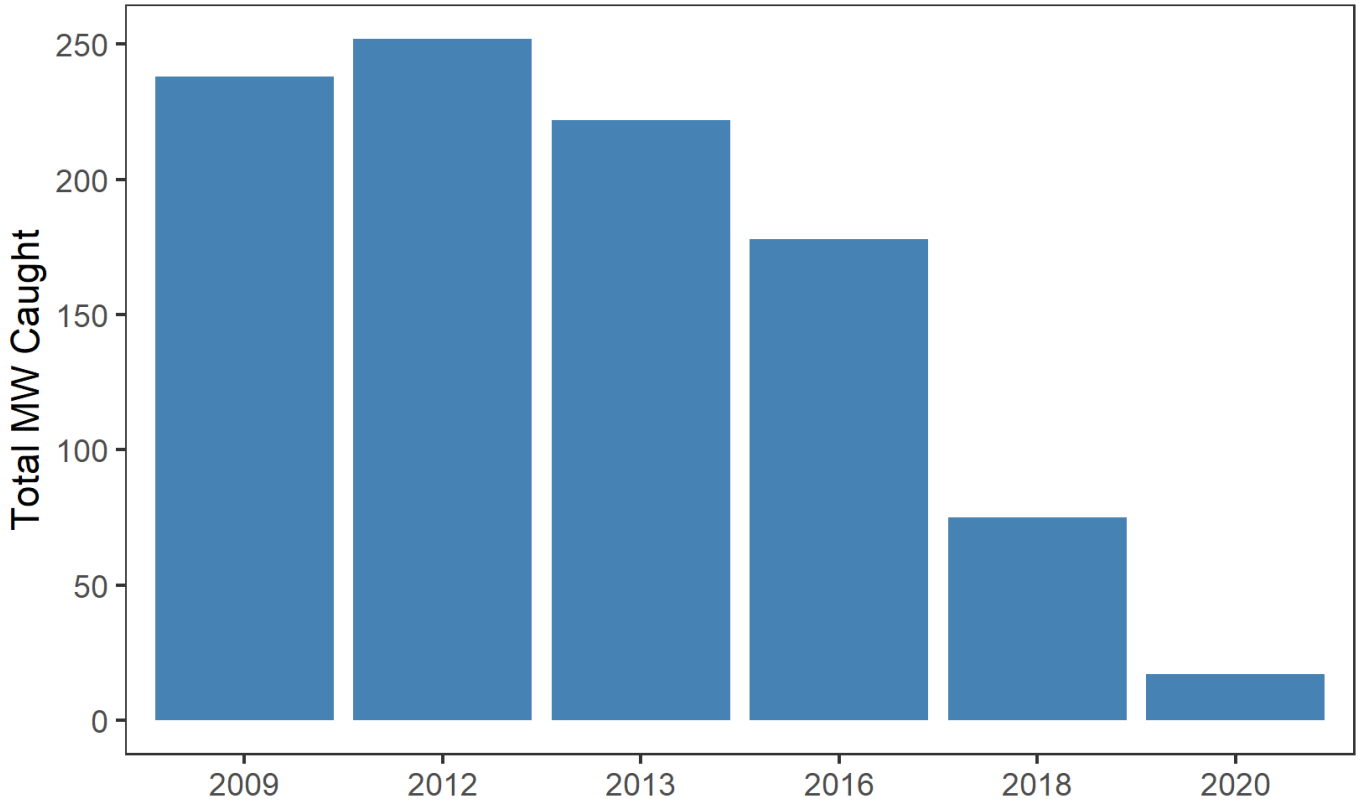
Results 2020: Larger/Older Bull Trout

Mean fork length and age of Bull Trout captured during mark-recapture has increased since mod-operations.



Results 2020: Mountain Whitefish Spawner Index

- Weekly angling
- Total MW caught
- Reflects number present and angler ability



Management Questions

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Management Questions

What are the basic biological characteristics of fish populations?

- Developed a database of biological characteristics:
  - Bull Trout
  - Rainbow Trout
  - Mountain Whitefish
  - Kokanee

Management Questions

Will the WUP alternative result in positive, negative or neutral impact on fish populations?

- Neutral effect of N2-2P

- Negative effect of modified high flow operations
  - Increased entrainment
  - Decreased productivity/food availability
  - Decreased habitat availability

Management Questions

What operating parameters contribute to fish productivity?

- Elevation affects fish productivity
- Consistently low reservoir elevation in the spring may result in lower growing season productivity (less food)
- Slow reservoir filling and/or low summer elevations
  - Restrict access to spawning tributaries
  - Reduce preferred habitat volume

Management Questions

Is there a relationship between Middle Bridge River flow and fish productivity in the reservoir or river?

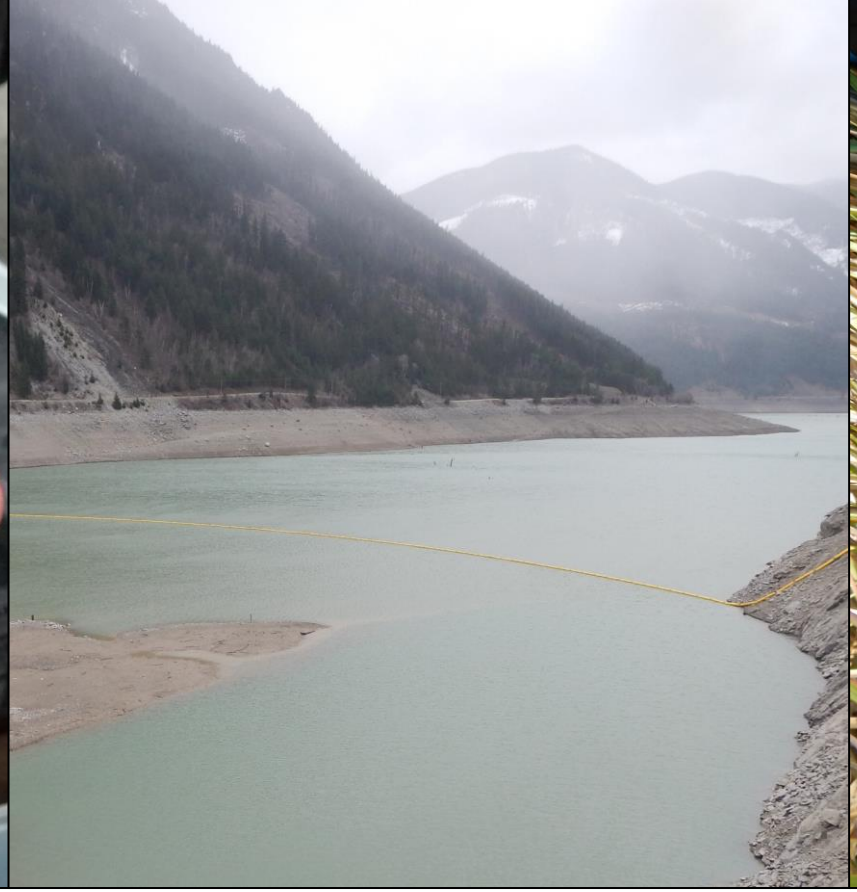
- Timing of stage decreases do not indicate substantial risk of Mountain Whitefish egg dewatering, or Bull Trout and kokanee redd dewatering

- Evidence of a potential decline in Mountain Whitefish spawner abundance

Management Questions

Can operations of be refined to improve fish populations?

- Operate the reservoir more like a lake to improve productivity of lake fish
- Increase minimum elevations to reduce stranding and entrainment risks



Year 9 and 10

Continue:

- Bull Trout abundance sampling
- Electroshocking bio sampling
- Kokanee spawner Surveys

Revisit:

- Monthly tributary electroshocking

Year 9 and 10

New Methods:

- BT stomach content analysis
- Kokanee shoreline electroshocking
- Physical habitat monitoring