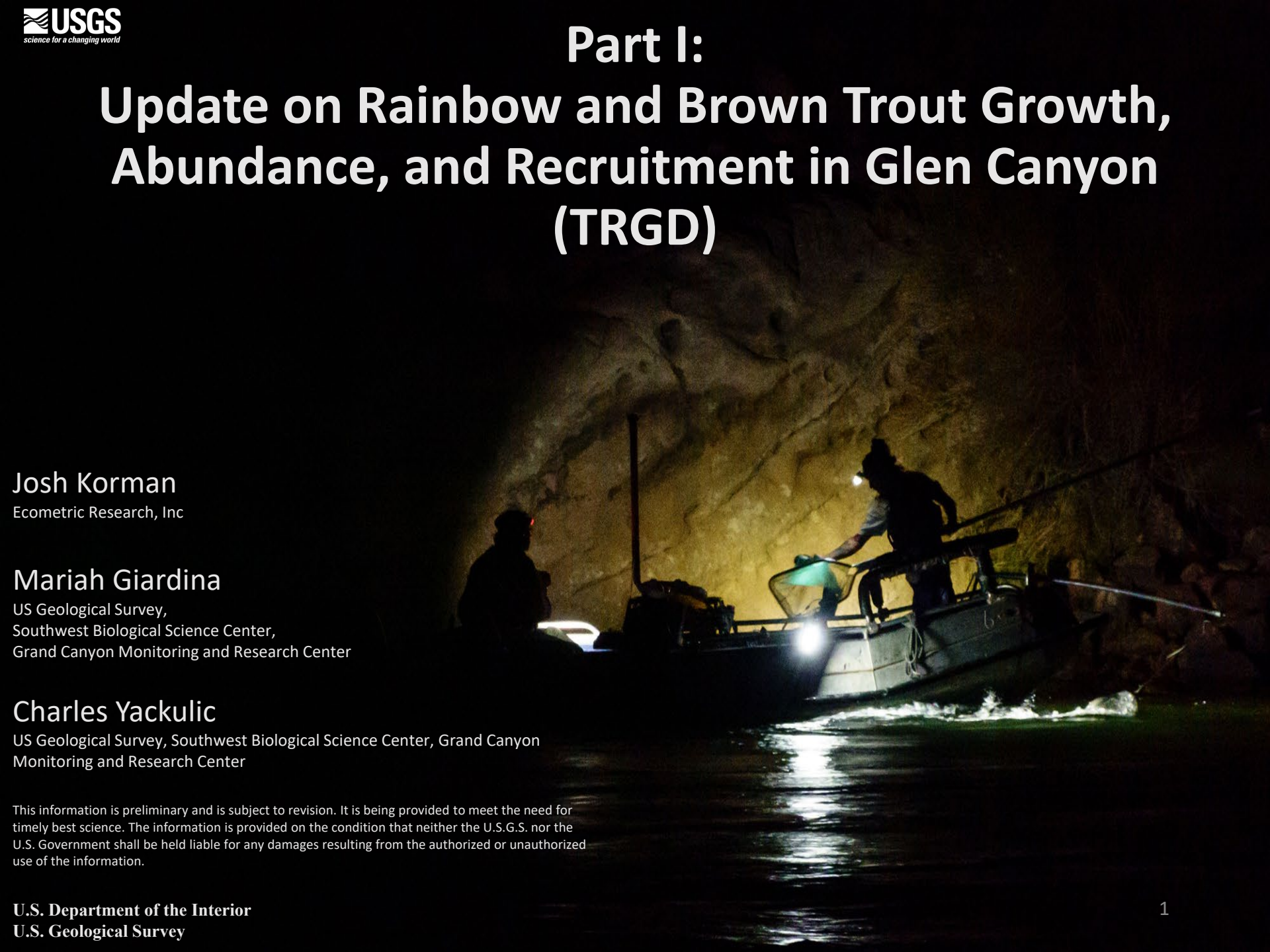
Part I:
Update on Rainbow and Brown Trout Growth, Abundance, and Recruitment in Glen Canyon (TRGD)



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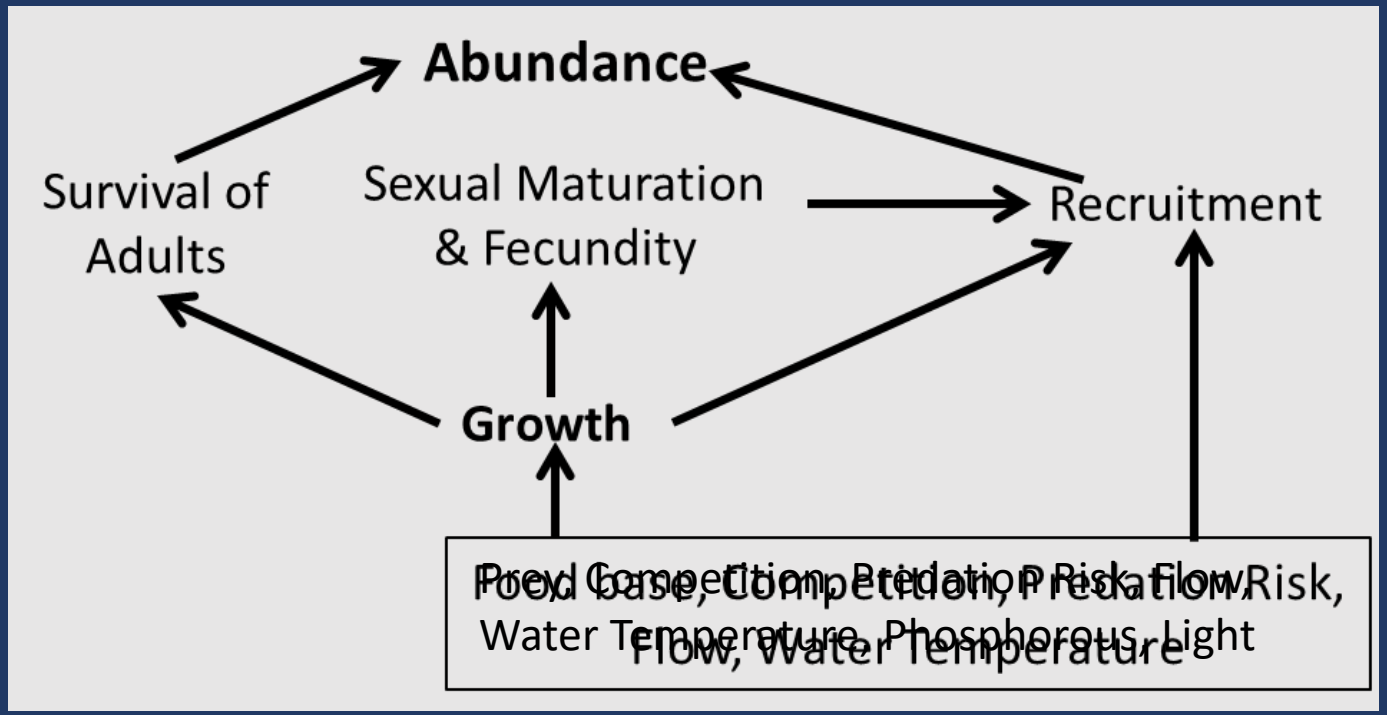
TRGD Objectives

Project H, Element 2

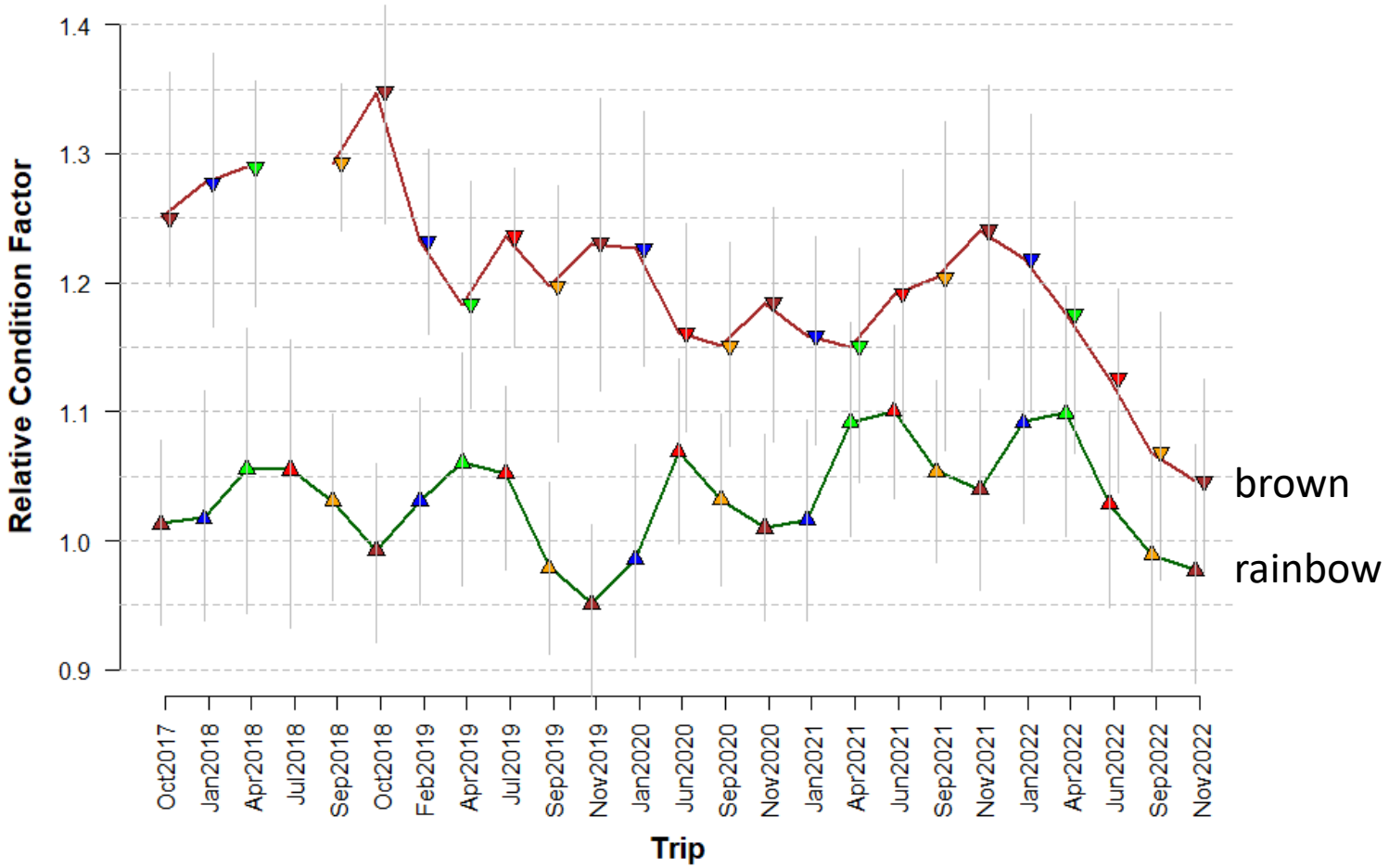
1. Provide reliable estimates of abundance of rainbow and brown trout in Glen Canyon
2. Provide estimates of key vital rates (survival, spawning, recruitment, growth) to understand the causes of fluctuations in abundance to link to GCD operations and other factors.



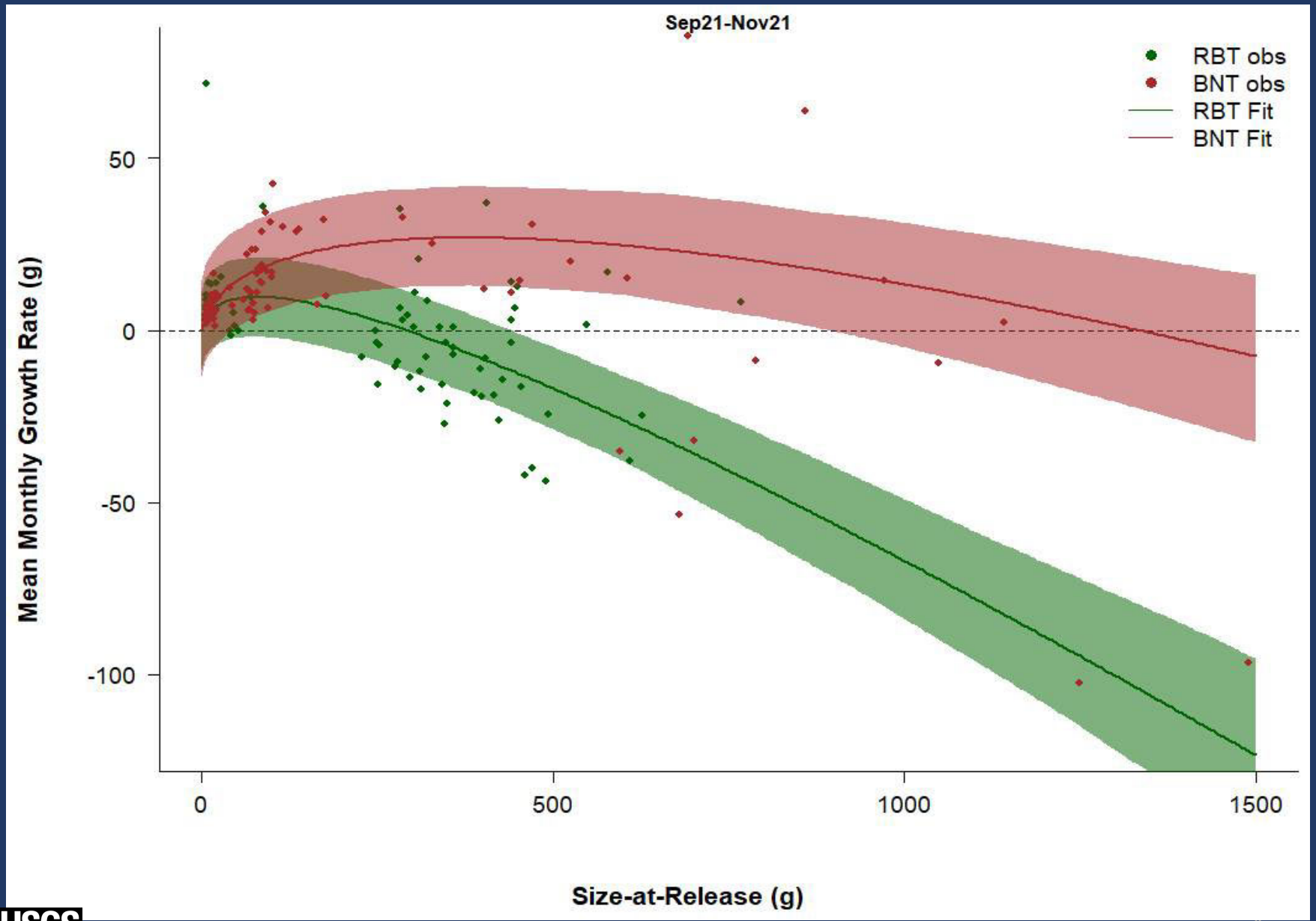
RBT vs BNT Condition Factor

Condition Factor = observed weight/predicted weight

Predict weight from length using RBT length-weight data (for <u>both</u> species, ‘12-’22)



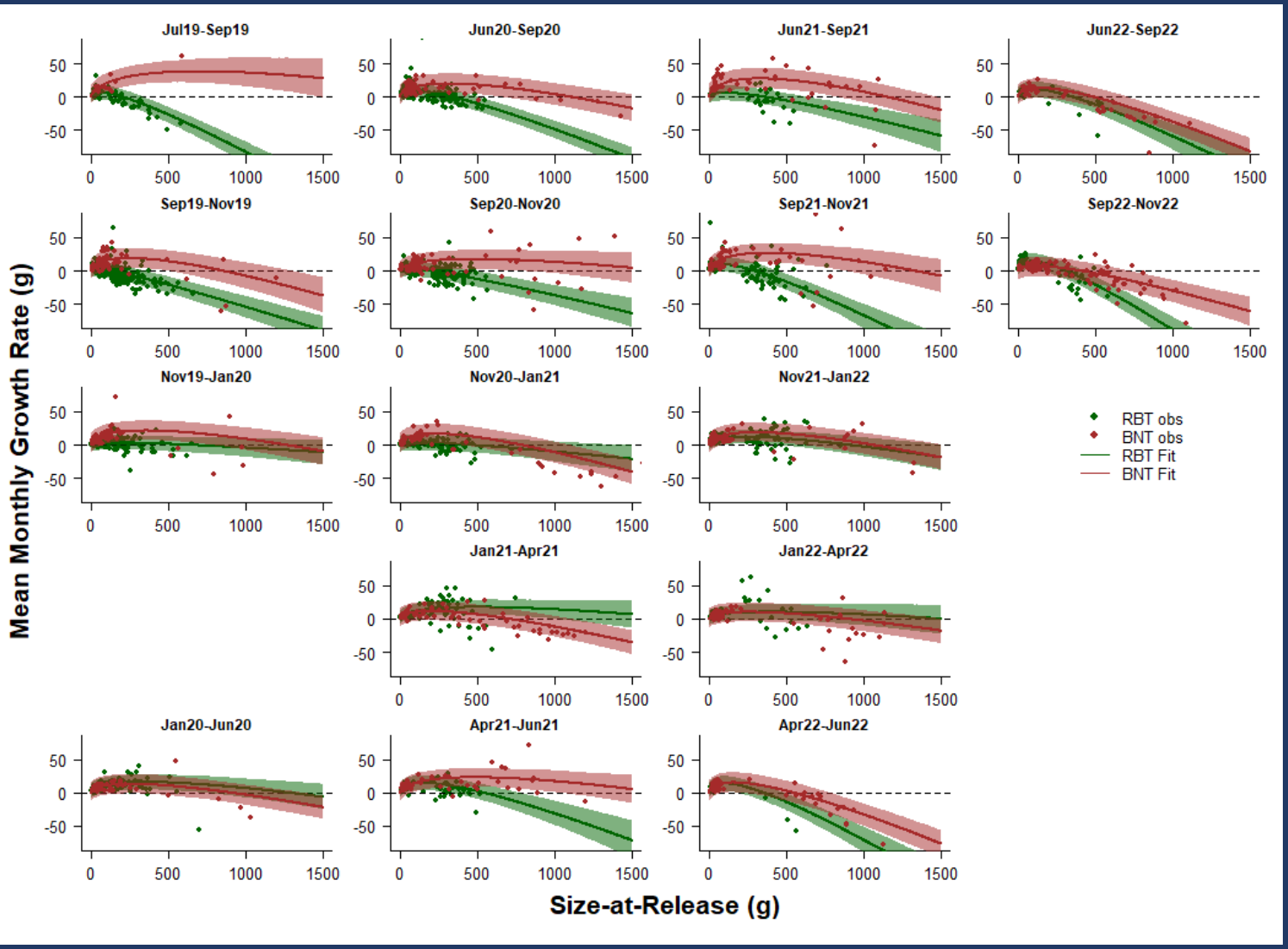
RBT vs BNT Growth Rates (Weight)



Preliminary data, do not cite

RBT vs BNT Growth Rates (Weight)

2019-20 2020-21 2021-22 2022



Summer

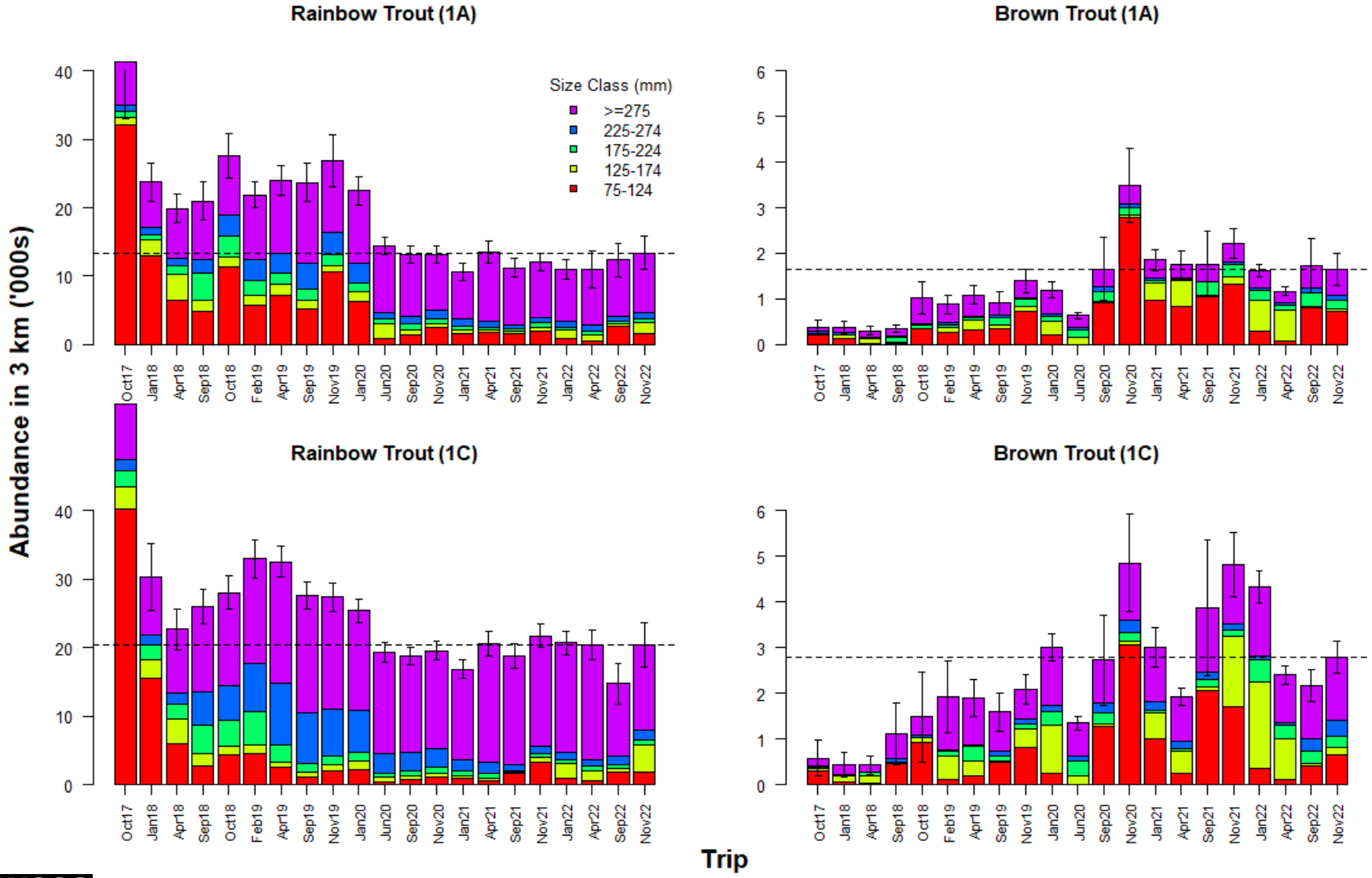
Fall

Late Fall

Winter

Spring

RBT and BNT Abundance by TRGD Reach



Summary

Growth

1. Growth of larger RBT have been lower since spring 2022, leading to reduced condition.
2. Growth rates of larger BNT during spring, summer, and fall intervals of 2022 were considerably lower compared to earlier years, leading to a steep decline in condition of larger fish.

Abundance

3. Abundance of RBT is still relatively stable, but recruitment is low so population is dominated by older/larger fish (vulnerable to collapse)..
4. Collapse of RBT in winter 2023 not likely because larger fish went into 2022-low growth period (fall) in good condition (unlike 2014 when condition was low prior to high temperatures/low DO leading to collapse)
5. BNT abundance may have stabilized – recruitment in 2022 was lower than in 2020 and 2021, and lower condition could indicate that lower recruitment rates will continue.

Part II:
Modelling Brown Trout Population Dynamics in Glen Canyon

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Objectives

Project H: Salmonid Research and Monitoring

- H.4. Brown trout population modeling

Resource goals:

- Monitor trout population dynamics in Glen Canyon
  - Possible impacts on other resources
- Reduce uncertainty of population response to experimental flows and other drivers

<u>This talk:</u>

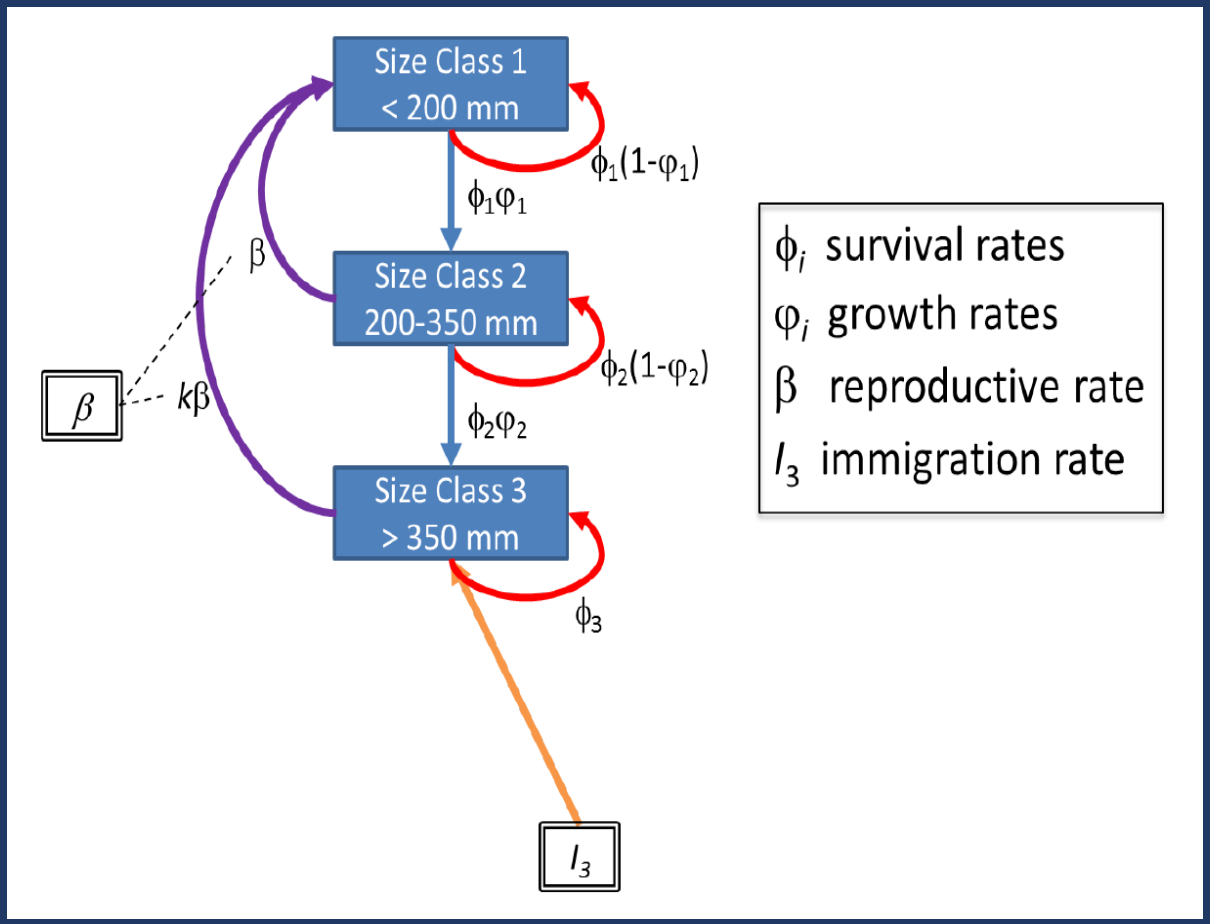
- Brown trout abundance
  - Runge Model
- Downstream catch summary

Background

- 2014-2016 observed increase in BNT - primarily in adult size classes
- 2017 – AMWG asked for an investigation of causes and implications of brown trout expansion in Glen Canyon
  - Impact on HBC downstream
  - Evaluate management options
- Open File Report (2018)
  - Runge, M.C., Yackulic, C.B., Bair, L.S., Kennedy, T.A., Valdez, R.A., Ellsworth, C., Kershner J.L., Rogers, R.S., Trammell, M.A., and Young, K.L., 2018, Brown trout in the Lees Ferry reach of the Colorado River—Evaluation of causal hypotheses and potential interventions: U.S. Geological Survey Open-File Report 2018–1069, 83 p., https://doi.org/10.3133/ofr20181069.
- Ongoing monitoring in Glen Canyon
- Experimental management
  - Incentivized harvest
  - TMF lit review and hypsometric analysis

Model from Runge Report

- Goes back to year 2000
- Utilizes TRGD data, supplemented by AZGFD
- Includes all of Glen Canyon



Runge, M.C., Yackulic, C.B., Bair, L.S., Kennedy, T.A., Valdez, R.A., Ellsworth, C., Kershner J.L., Rogers, R.S., Trammell, M.A., and Young, K.L., 2018, Brown trout in the Lees Ferry reach of the Colorado River—Evaluation of causal hypotheses and potential interventions: U.S. Geological Survey Open-File Report 2018–1069, 83 p., https://doi.org/10.3133/ofr20181069.

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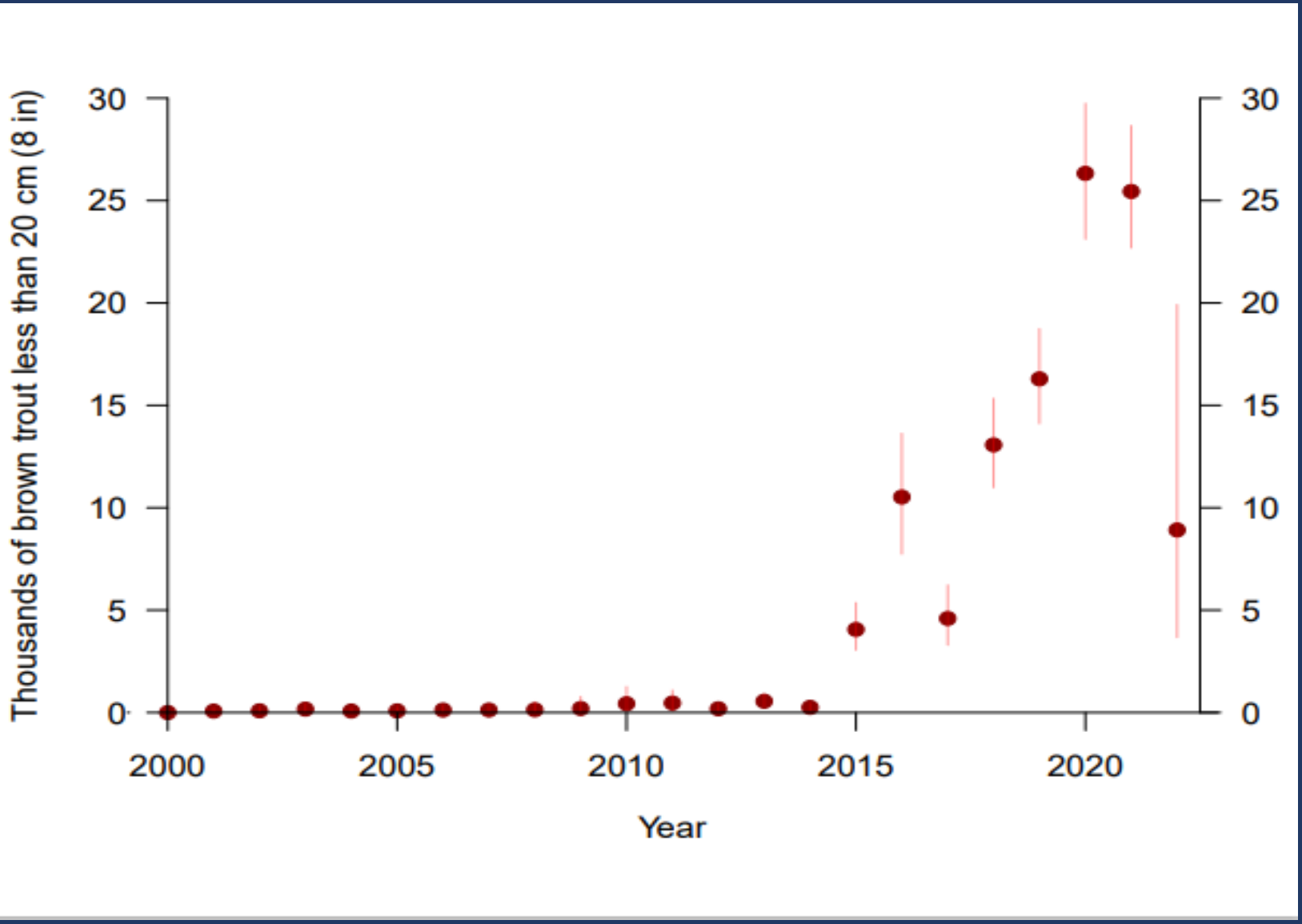
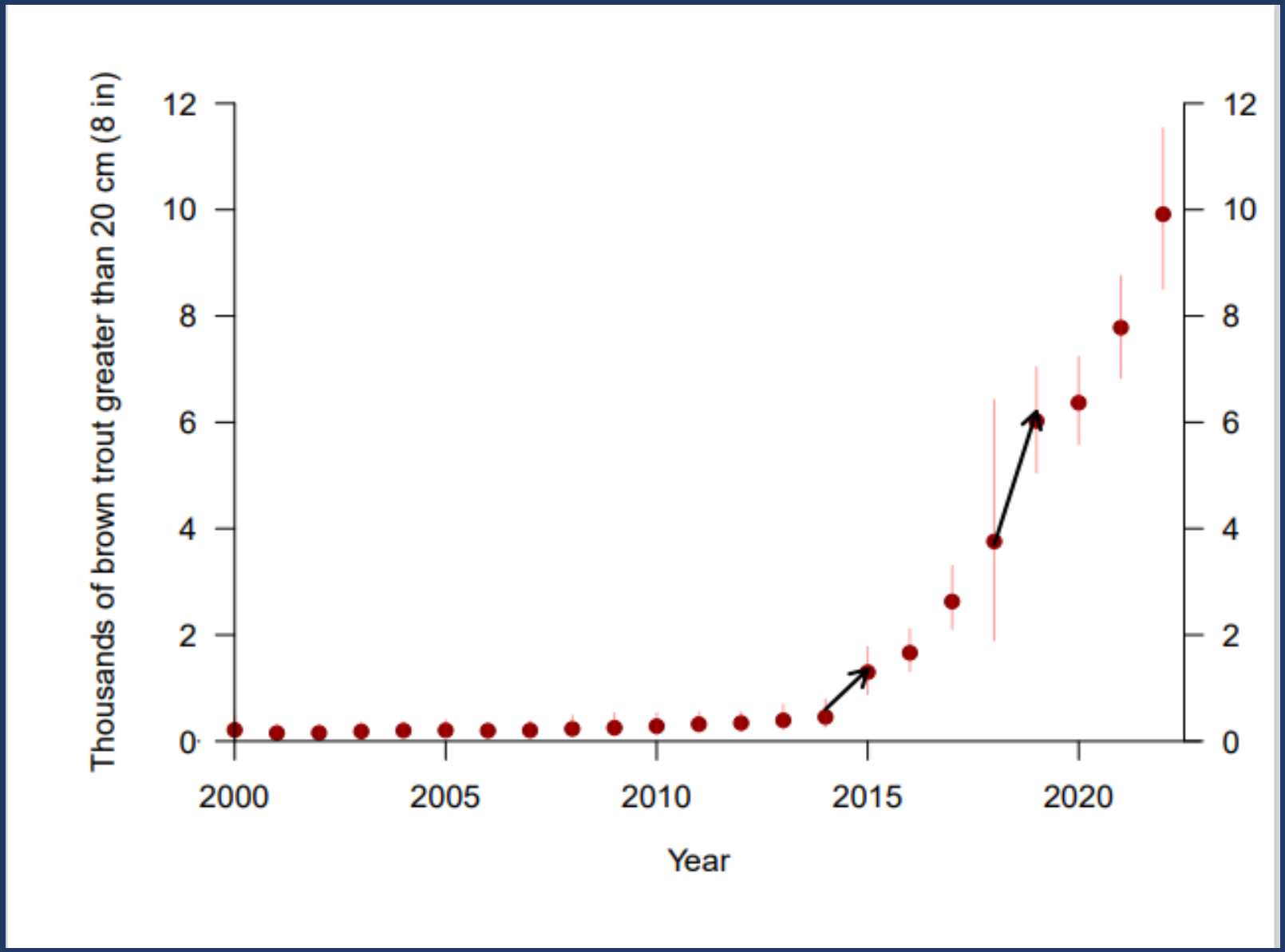
BNT Abundance Estimate for Size Class 1



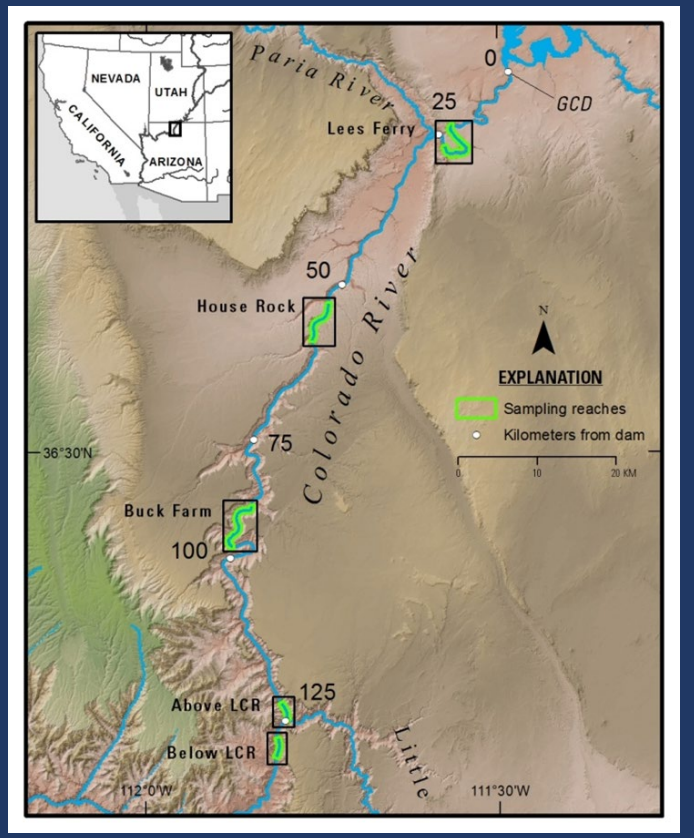
BNT Abundance Estimate for Adult Size Class

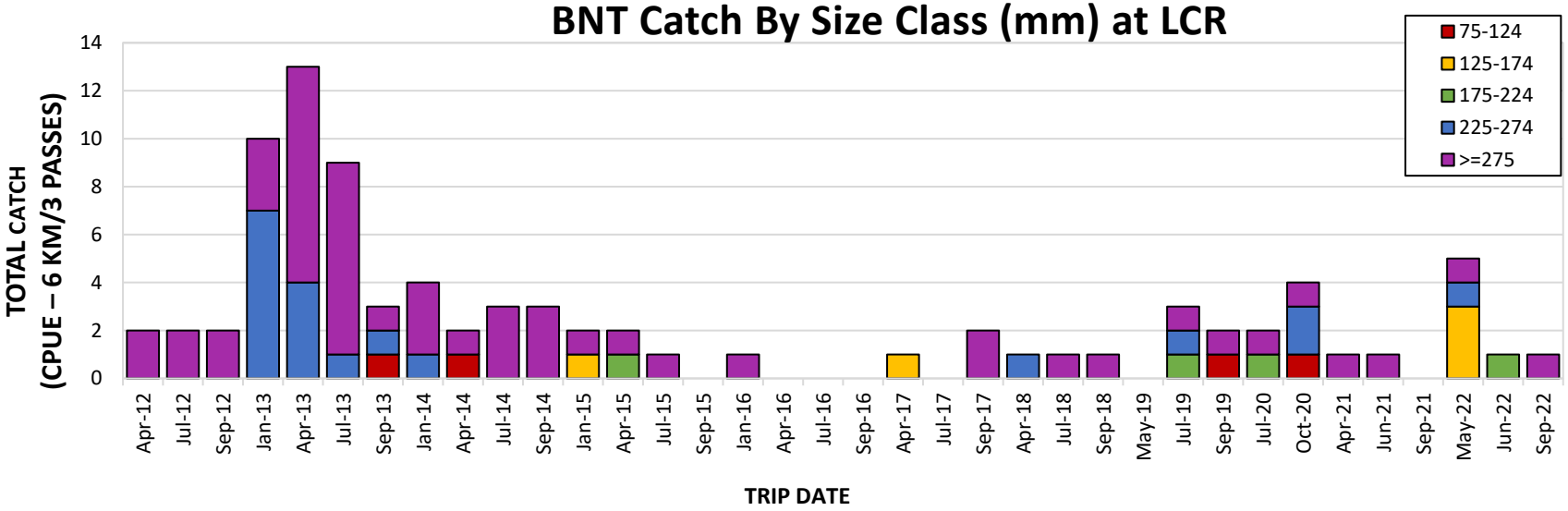


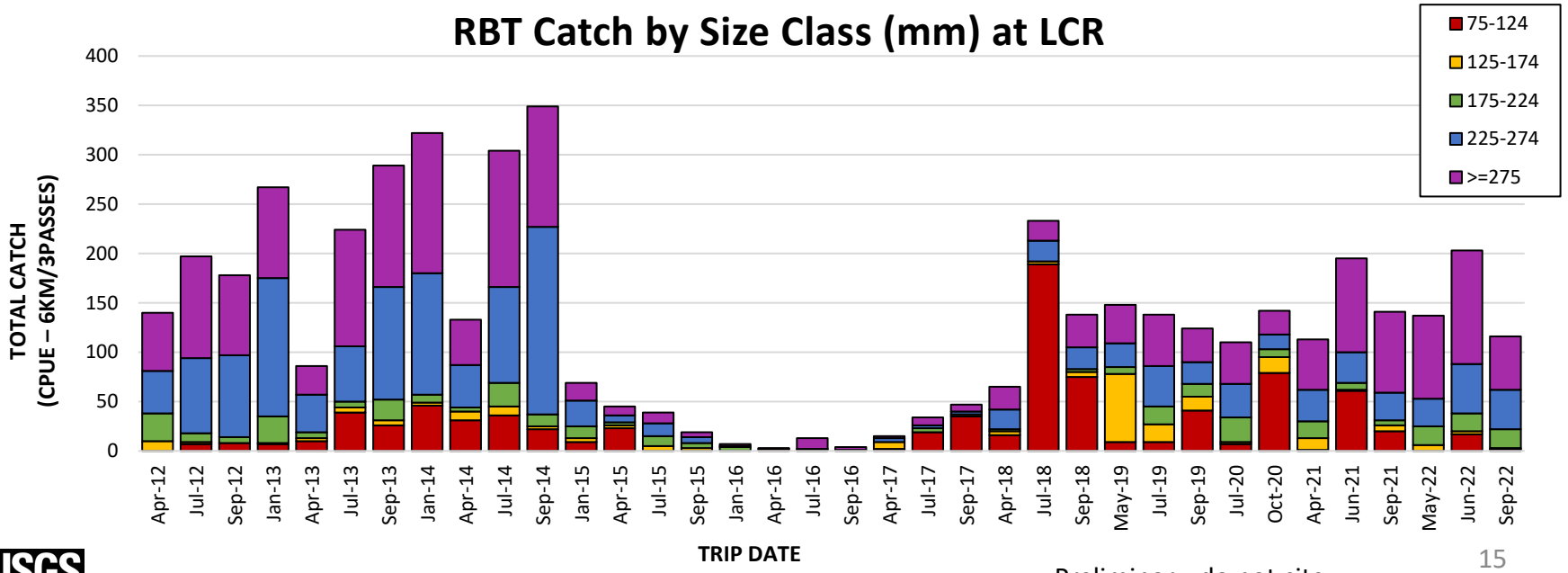
Houserock

- Gateway
  - Residual from Natal Origins study
- 1 pass - CPUE
- Pulse on downstream movement

	June/July			Sept/Oct	
	BNT	TOTAL		BNT	TOTAL
2021	1% (6)	718		15% (22)	1507
2022	1% (9)	797		17% (20)	1192







Preliminary, do not cite

Summary

- BNT adult abundance is increasing
  - TRGD shows decreasing condition factor
- Abundance of smaller size class decreasing
- Low catch numbers at LCR and Houserock


Questions?