



Population effect of incentivized harvest on Brown Trout

Charles B. Yackulic¹, Josh Korman², David Rogowski³, Jeff Arnold⁴, and Brian Healy¹

¹ US Geologic Survey, Southwest Biological Science Center, Grand Canyon Monitoring and Research Center

² Ecometric Research

³ Arizona Game and Fish Department

⁴ National Park Service

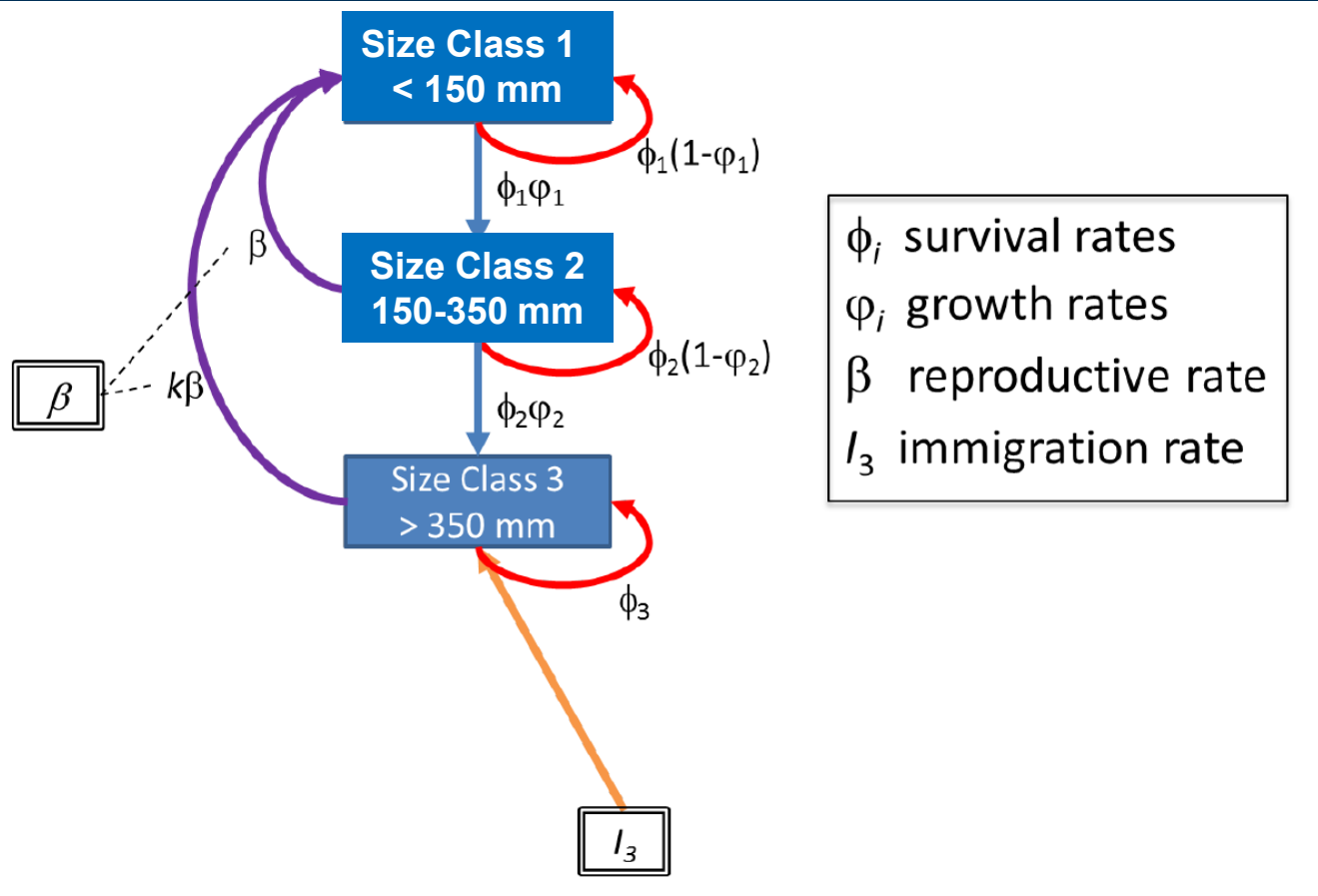
Resource Goals: Invasive Species

Annual Reporting

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Basic modelling framework

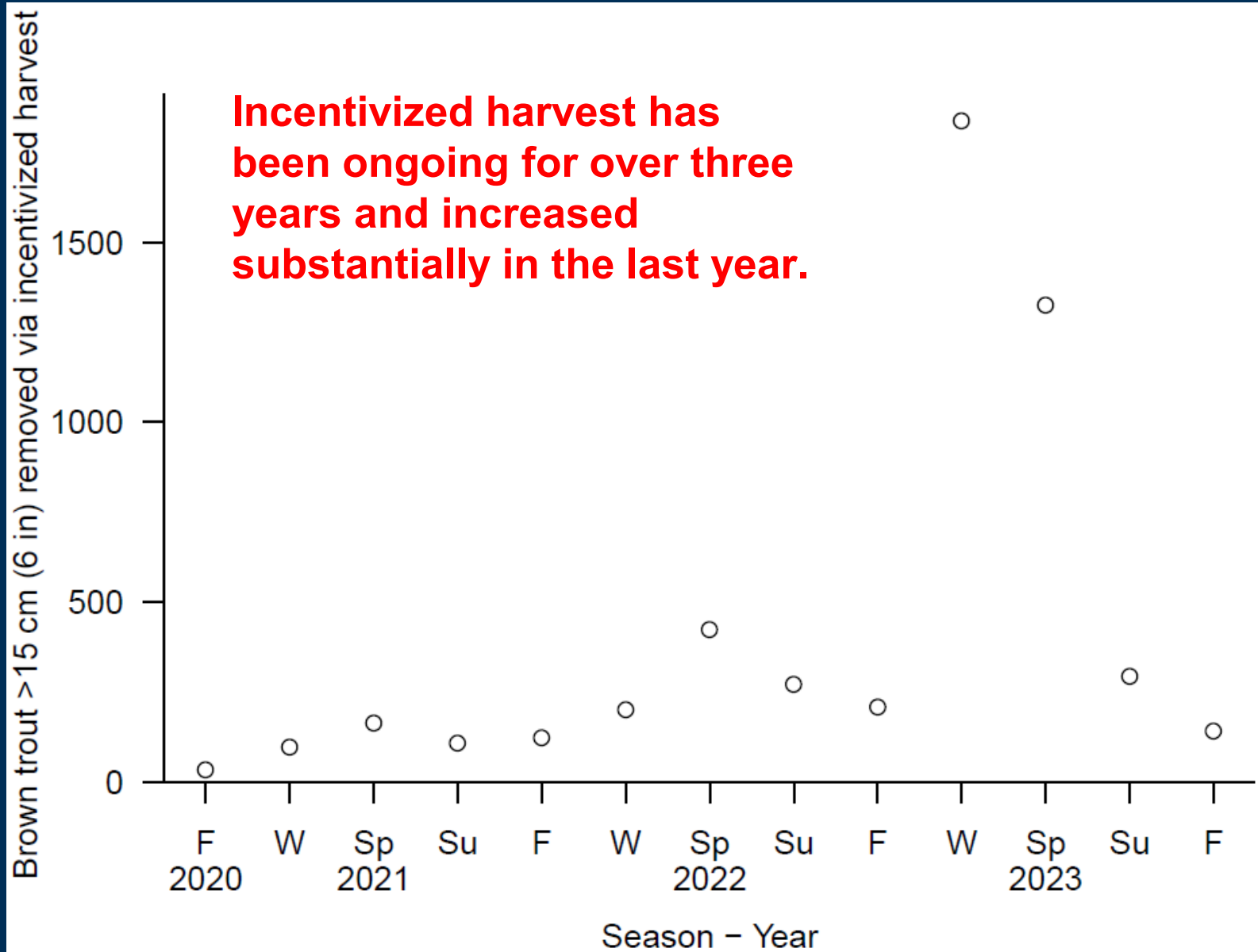


Fit to catch per unit effort data (2000 – present) and mark-recapture data (2012-present)

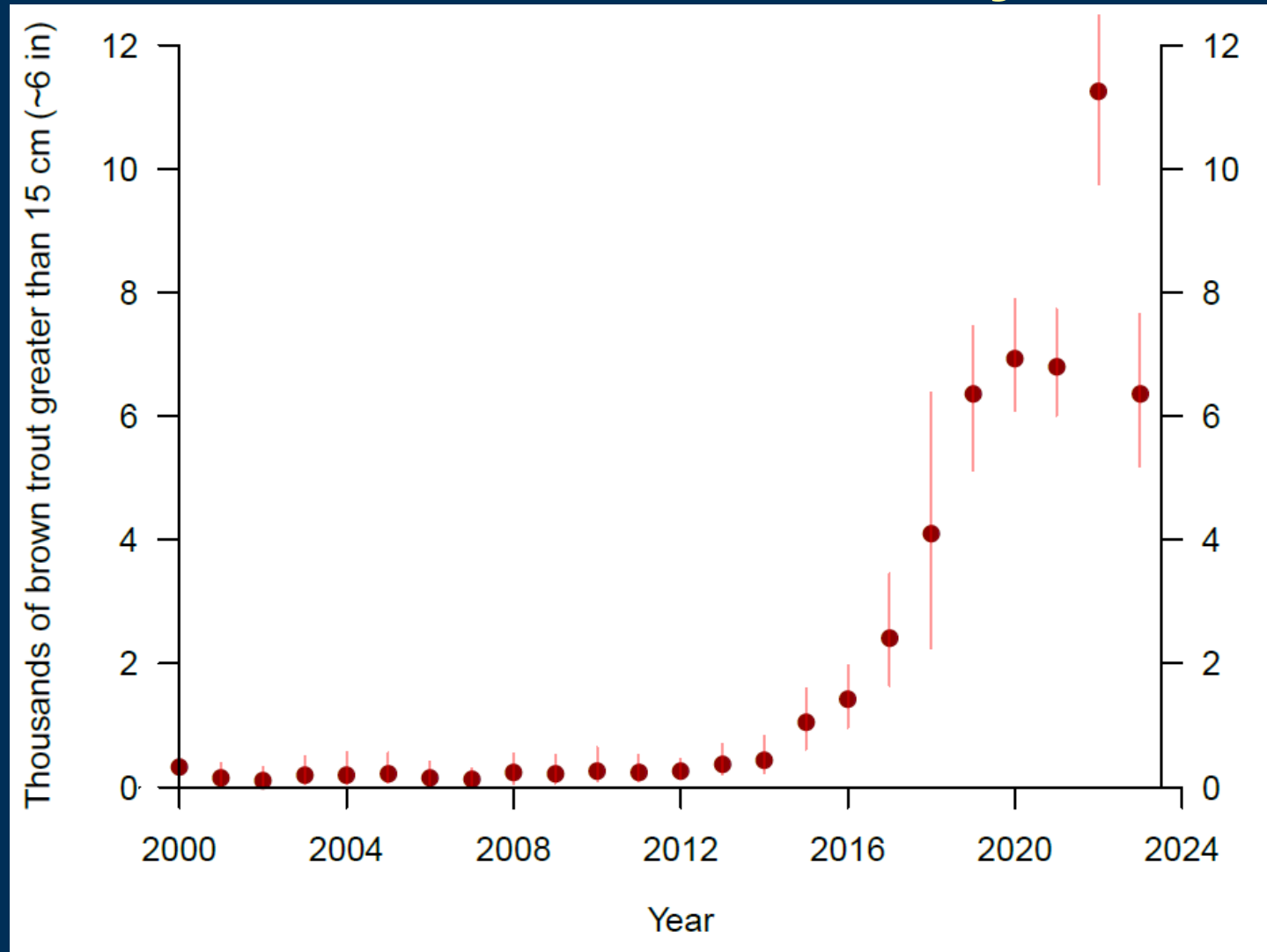
1 mark-recapture site (2012-2016), 3 sites (2017-2020), 2 sites (2021 – present).

Modelling assumptions

- Seasonal time step.
- Size and seasonal variation in growth.
- Temporal variation in survival (random effect) informed by a Lorenzen relationship.
- Capture probability allowed to vary by trip and size class (random effect).
- Immigration for large adults allowed to vary for each interval (random effect).
- Recruitment varies between years (random effect).

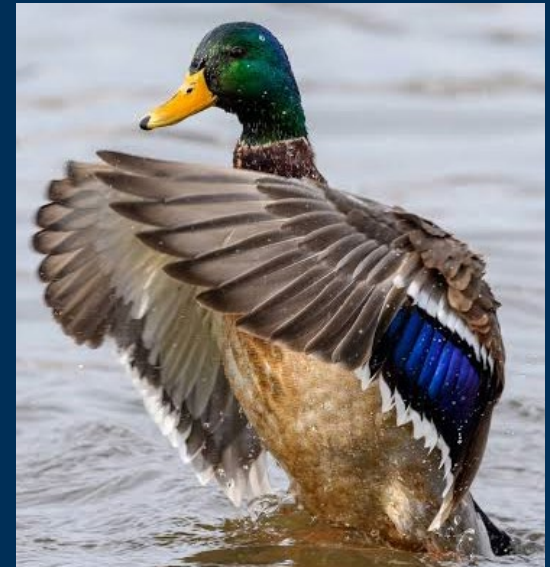


We can see changes in adult brown trout abundance estimates over last year

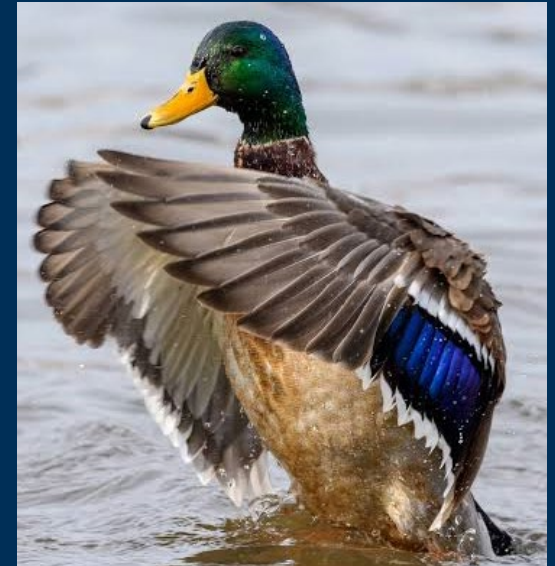
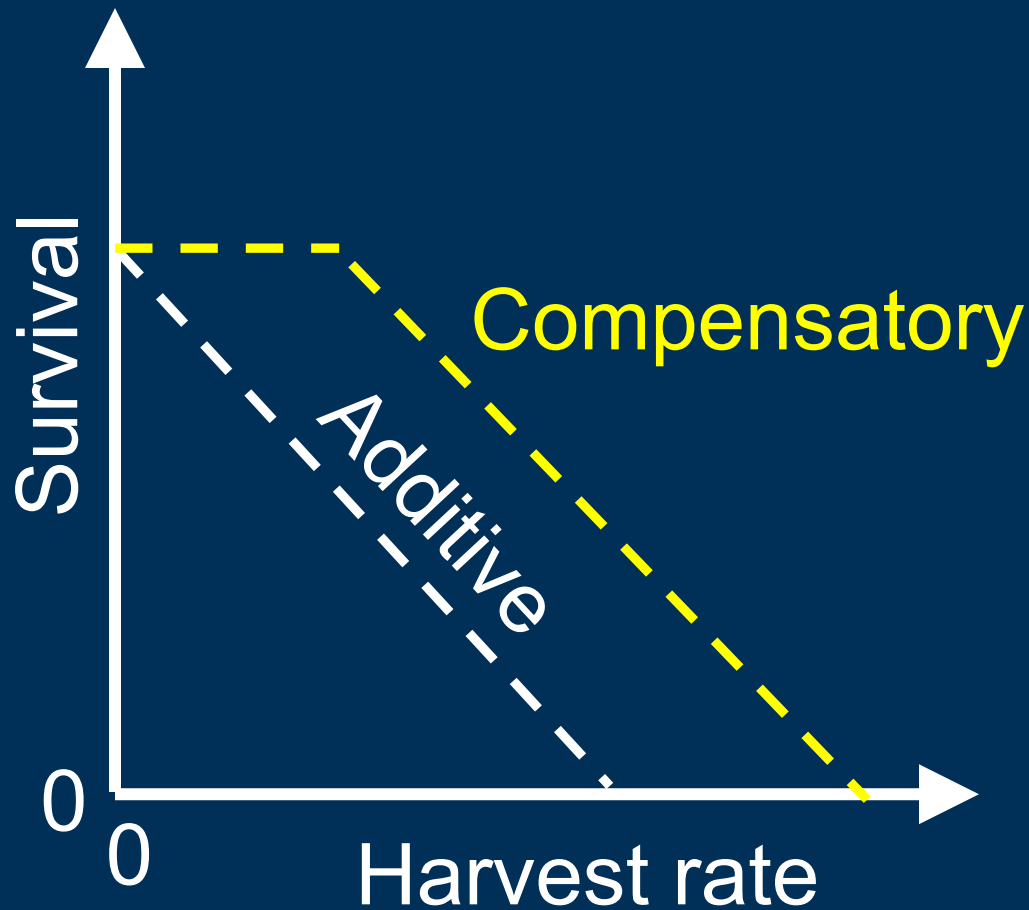


Harvest 101

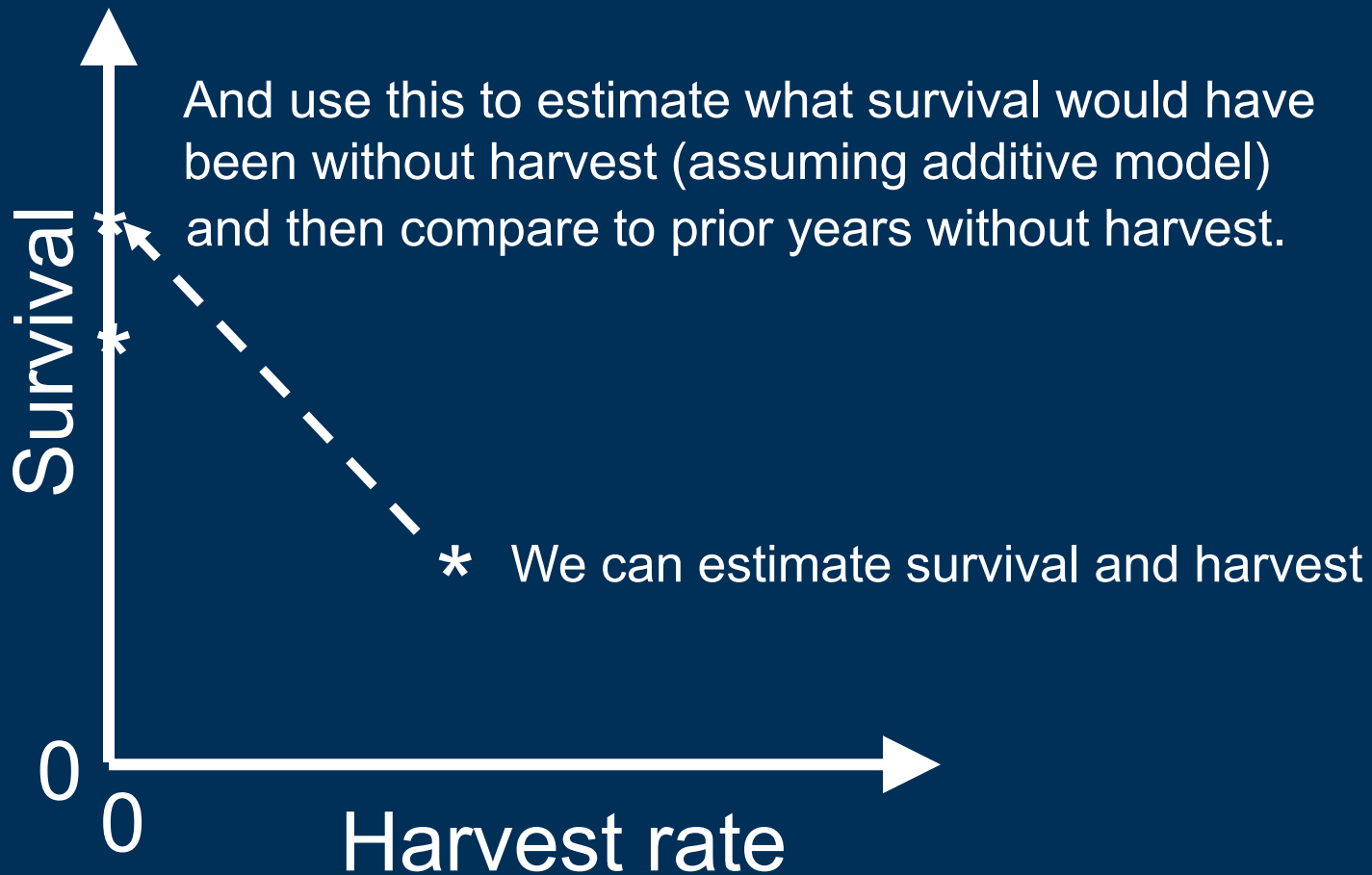
- Is mortality additive or compensatory?
- Is recruitment weakly or strongly density dependent?



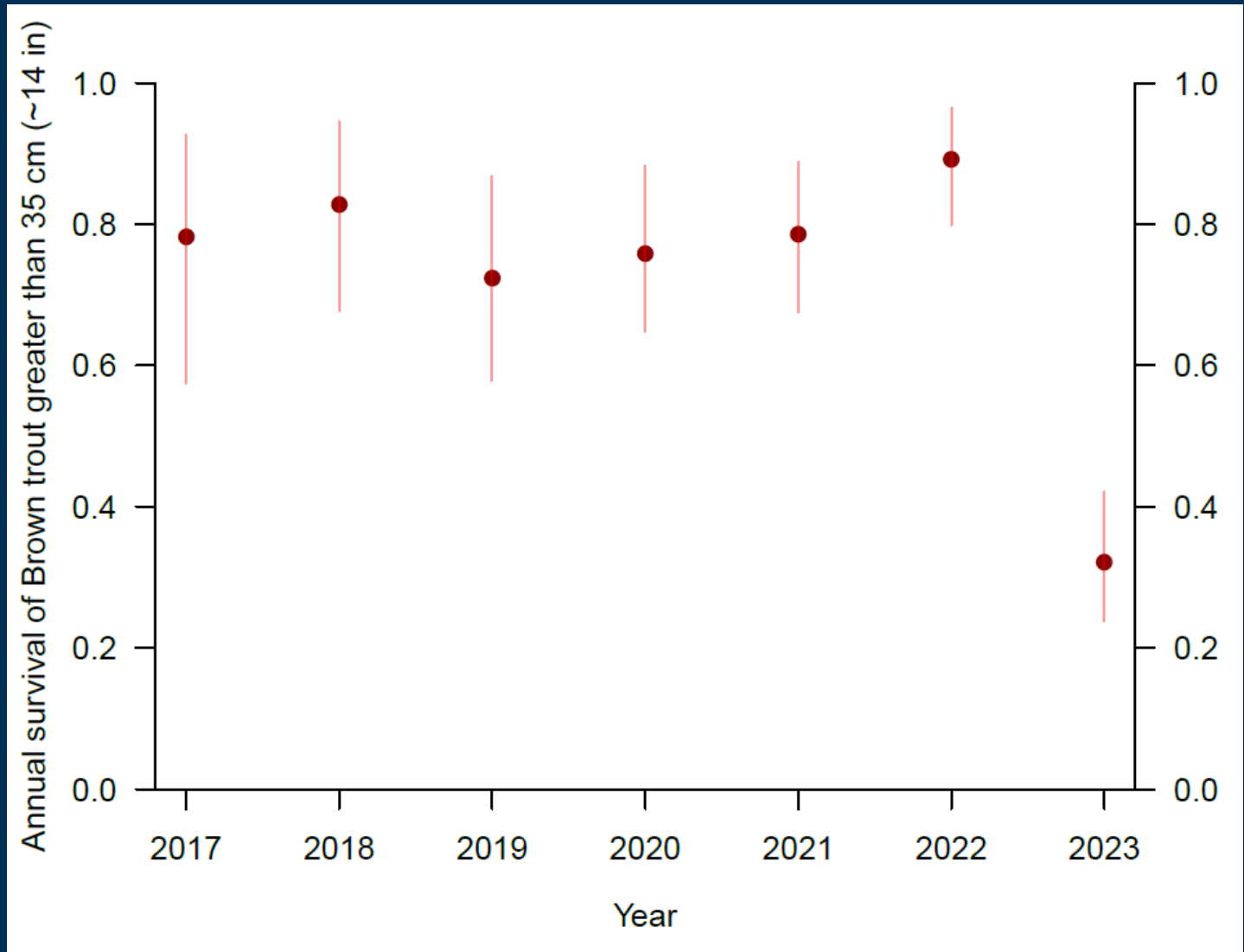
But are declines entirely because of harvest?



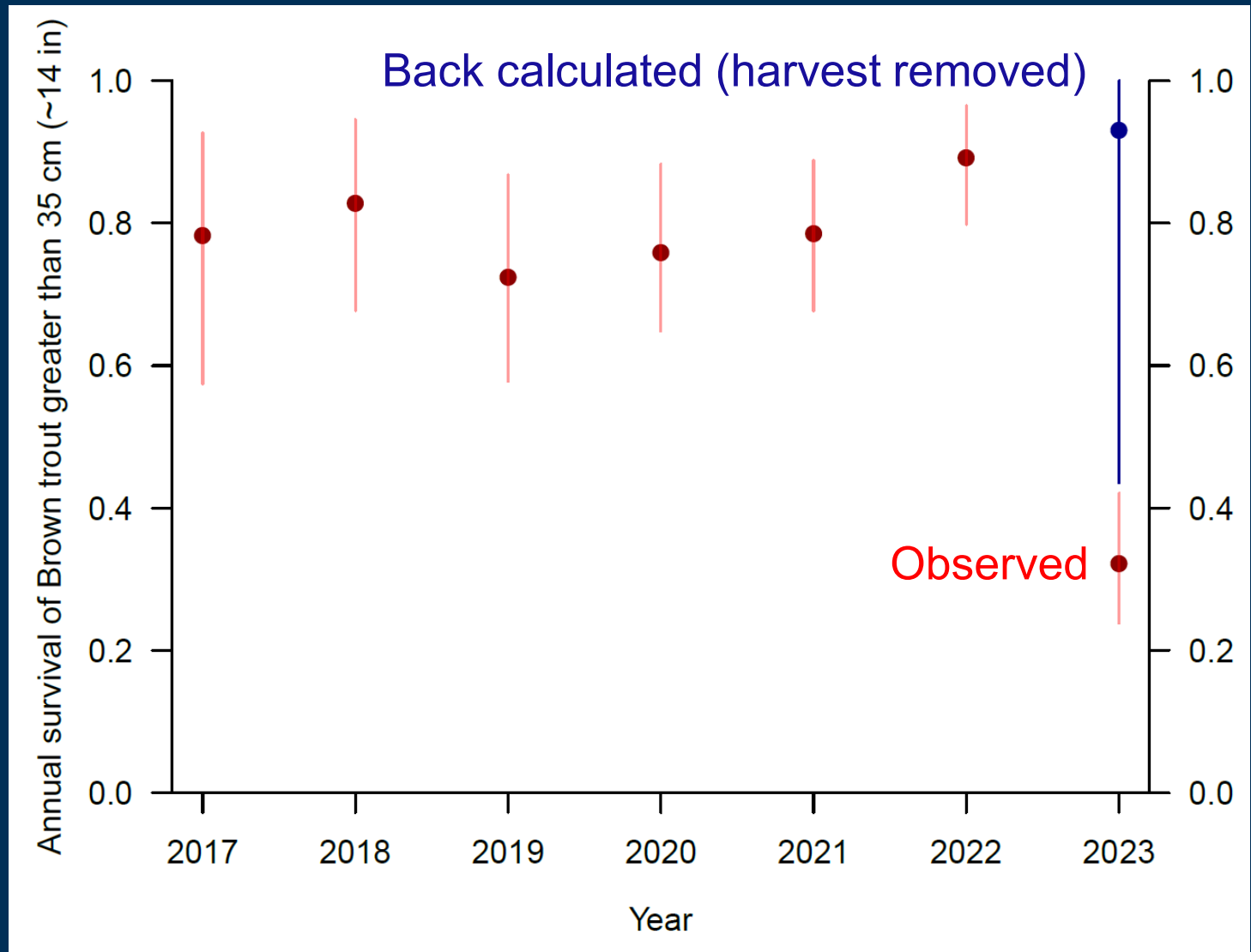
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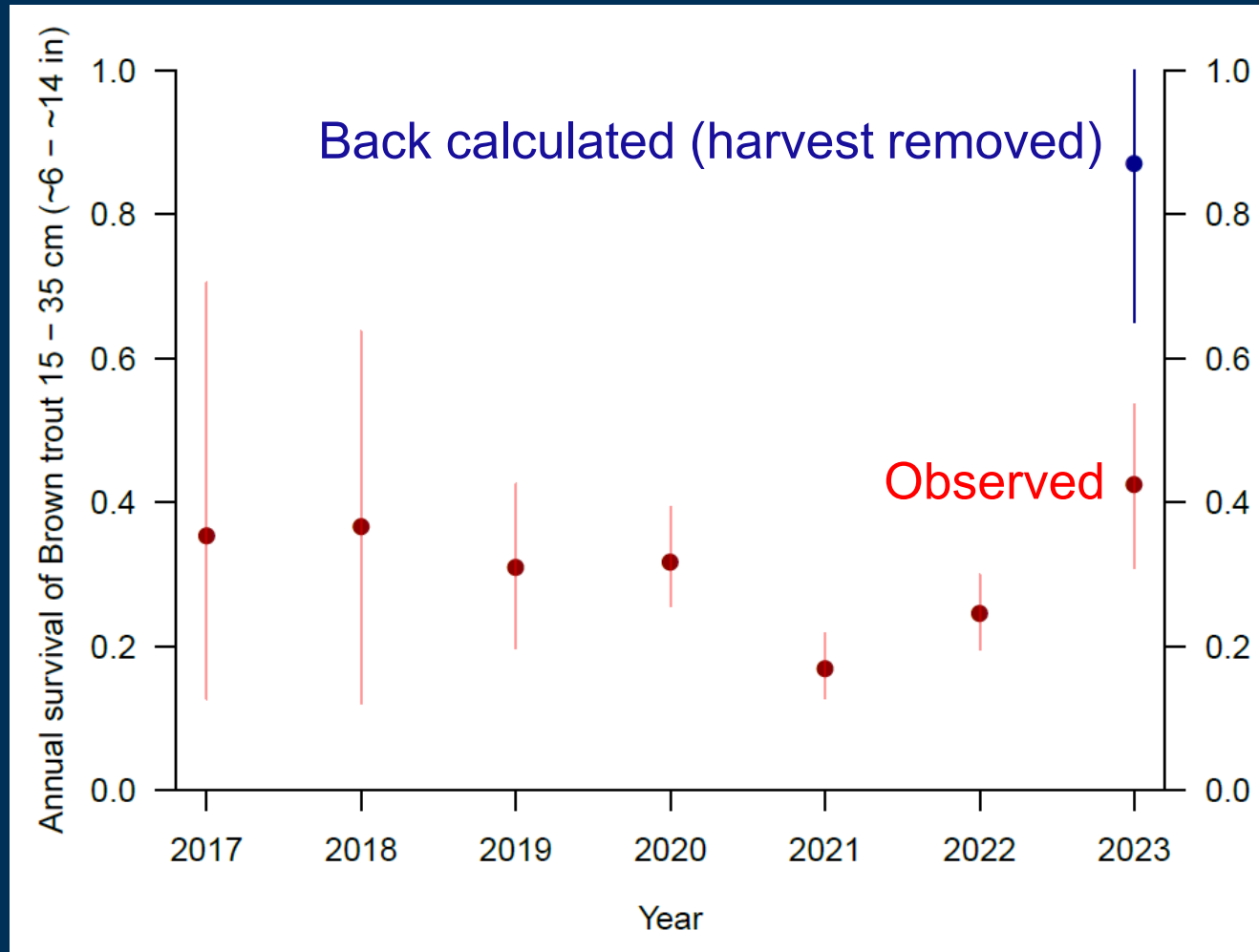
We see lowered survival of large adult Brown Trout over last year



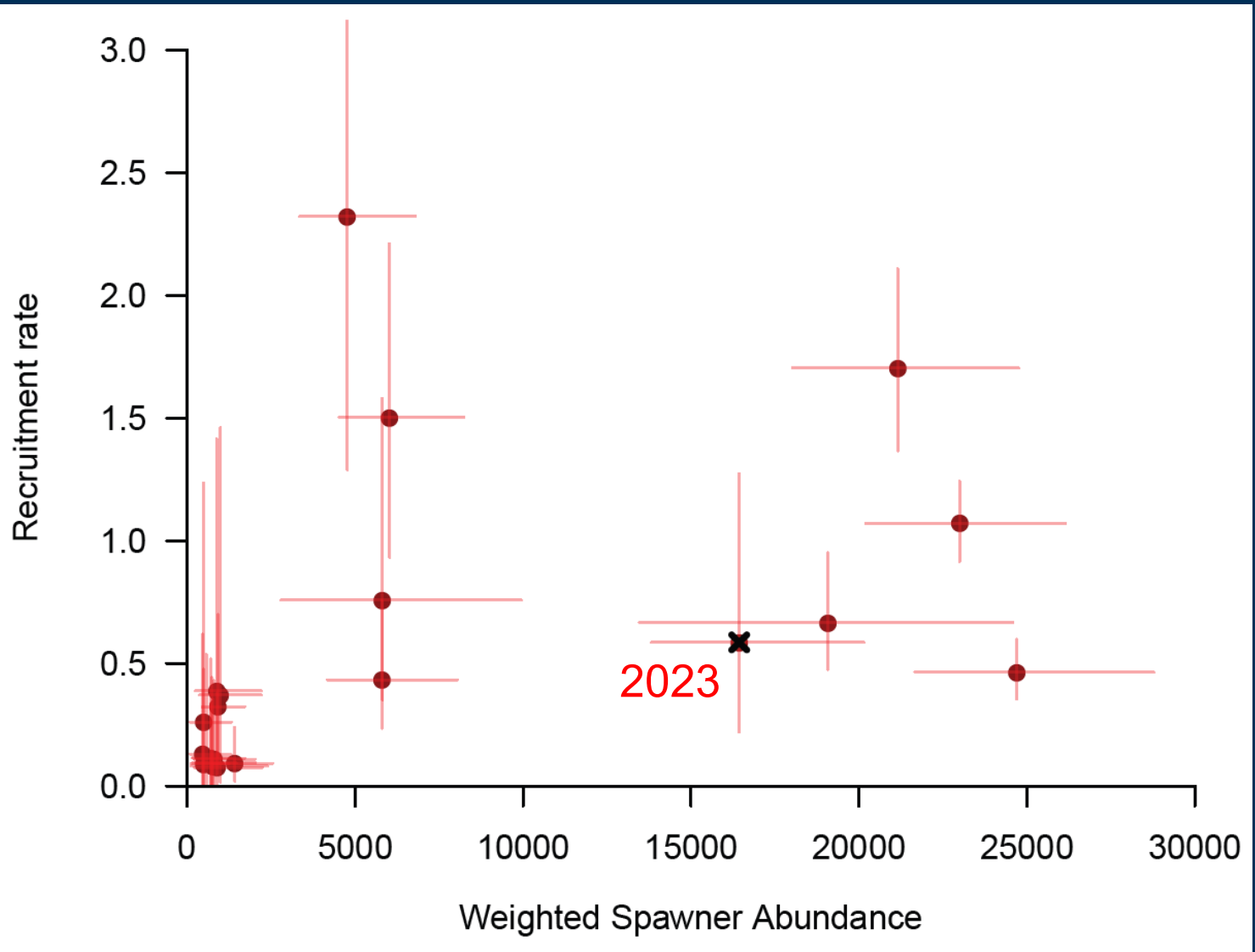
Which appears to be mostly additive



However, for small adults, there appears to have been fairly strong compensation

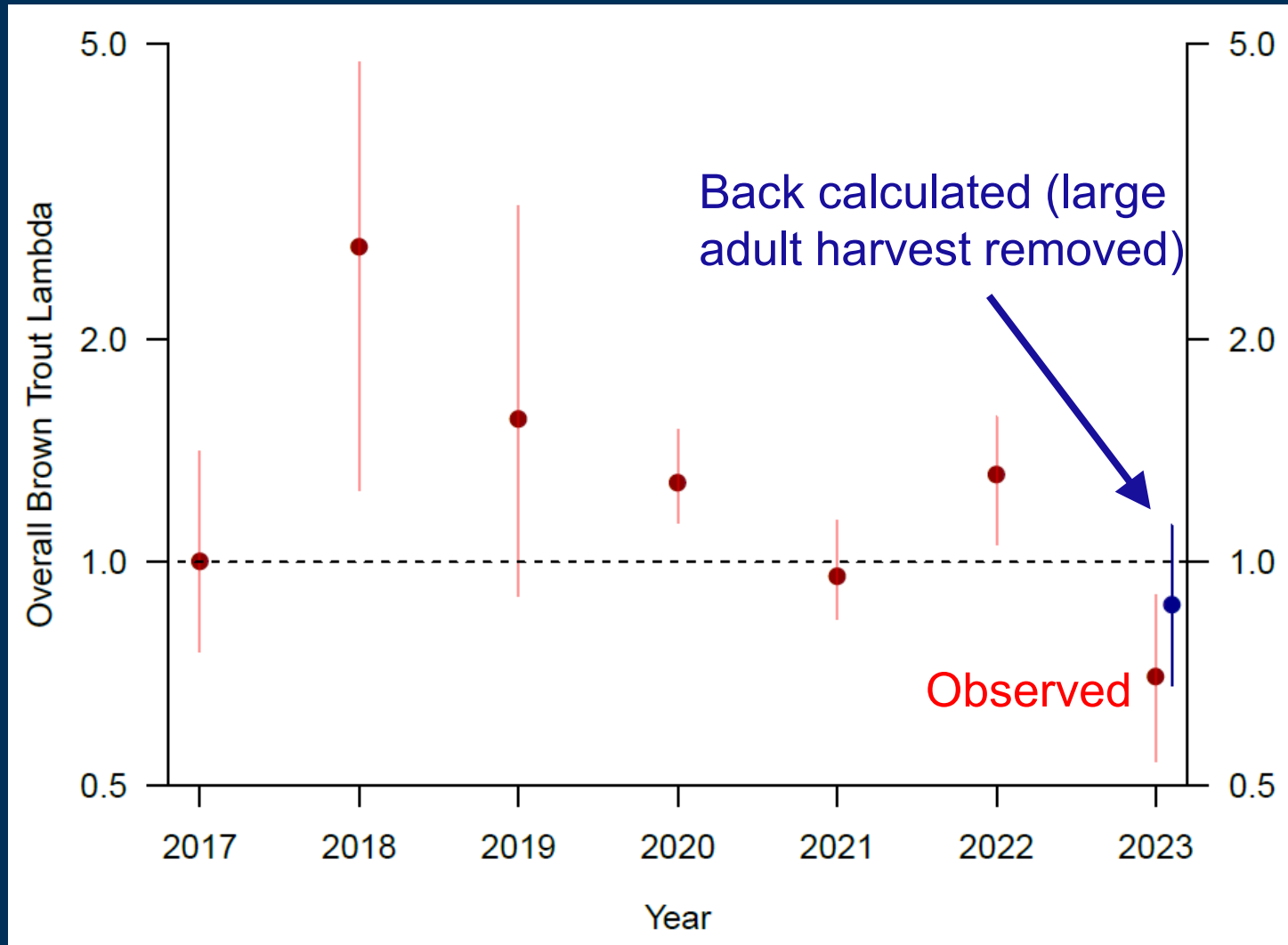


Little evidence of density dependent recruitment (at moderate spawner abundances)



Preliminary data, do not cite.

What does this mean for asymptotic Brown Trout population growth (λ)?



Take home messages

- **Adult Brown Trout population declined significantly in 2023, a significant portion of which can be attributed to incentivized harvest.**
- **Rigorous analysis of incentivized harvest (and other removal efforts) benefits from accurate estimates of vital rates (recruitment, survival, etc.)**

Questions

cyackulic@usgs.gov