

# Are there any more surprises?

Bioeconomic modeling and adaptive management



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Webinar, August 20, 2020

# Schools of Adaptive Management

## Resilience-Experimentalist

- Uncertainty is difficult to anticipate in advance
- Experiments provide accelerated learning about the system

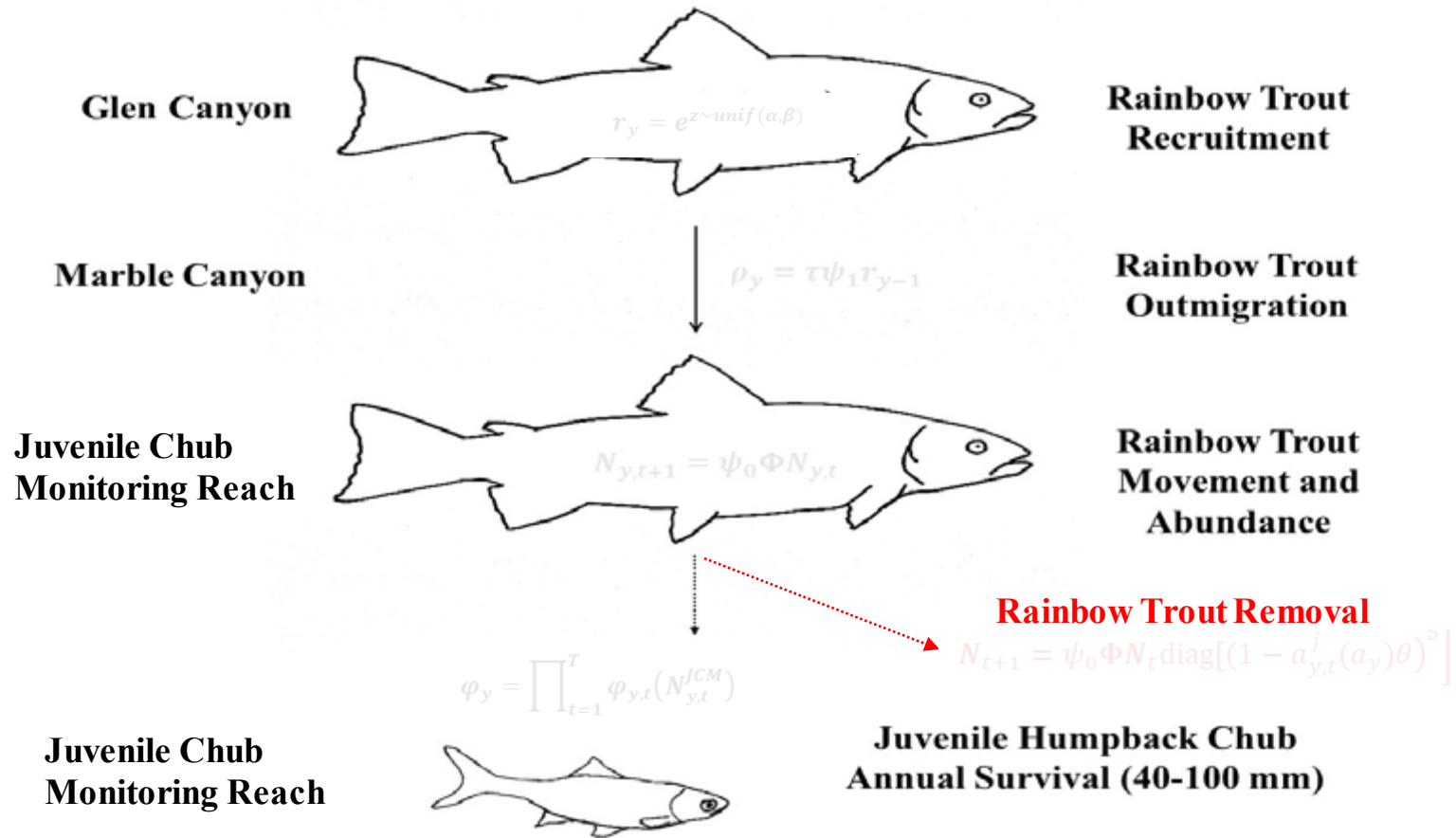
## Decision-Theoretic

- Uncertainties are explicitly estimated and included in predictive models
- Resolve uncertainty to the degree that such resolution will improve management



Photo credit: Amy Martin

# Chub and Trout Modeling

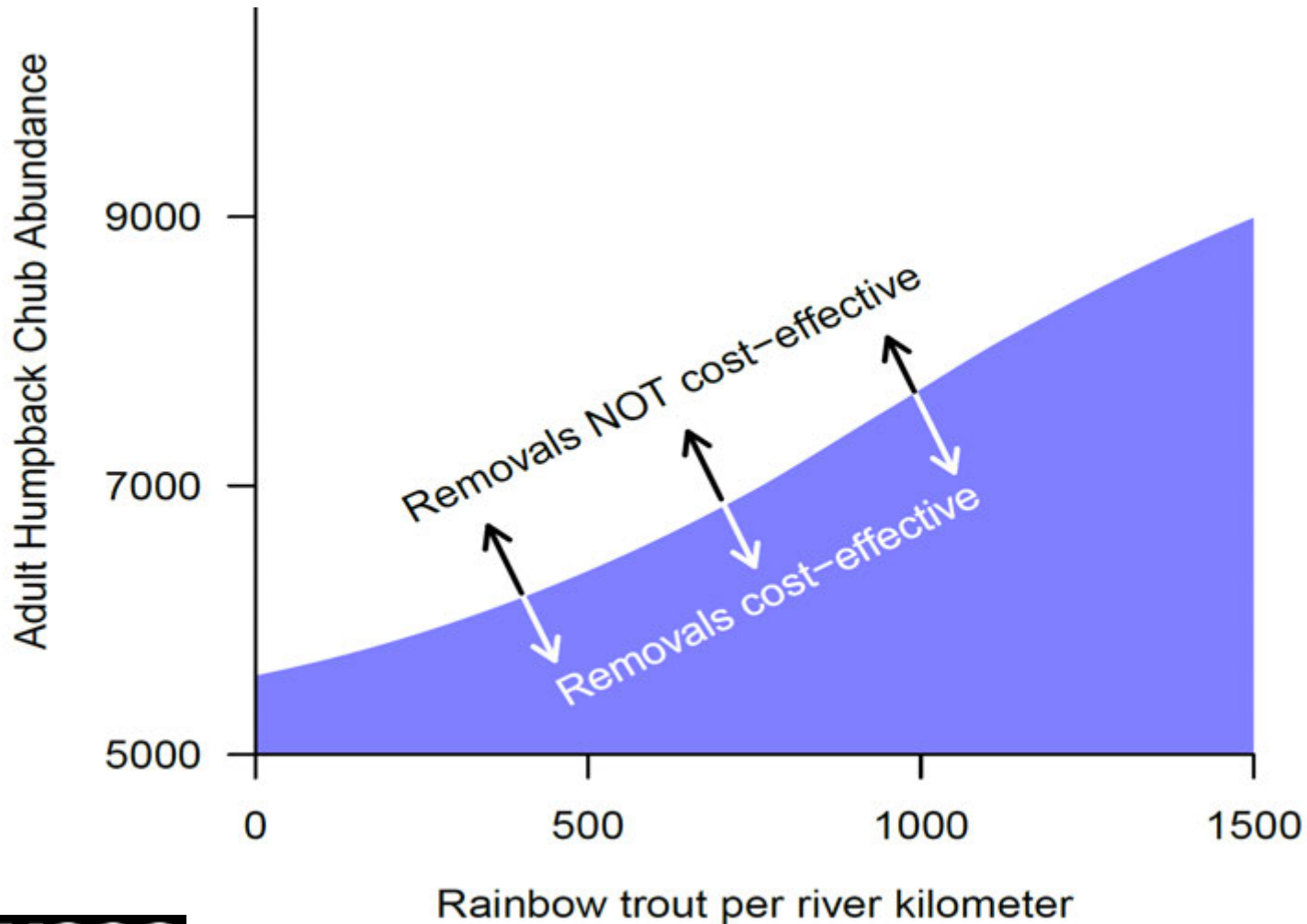


# Modeling Objective

Develop a bioeconomic model to identify cost-effective management strategies for rainbow trout that achieve conservation objectives for the humpback chub.



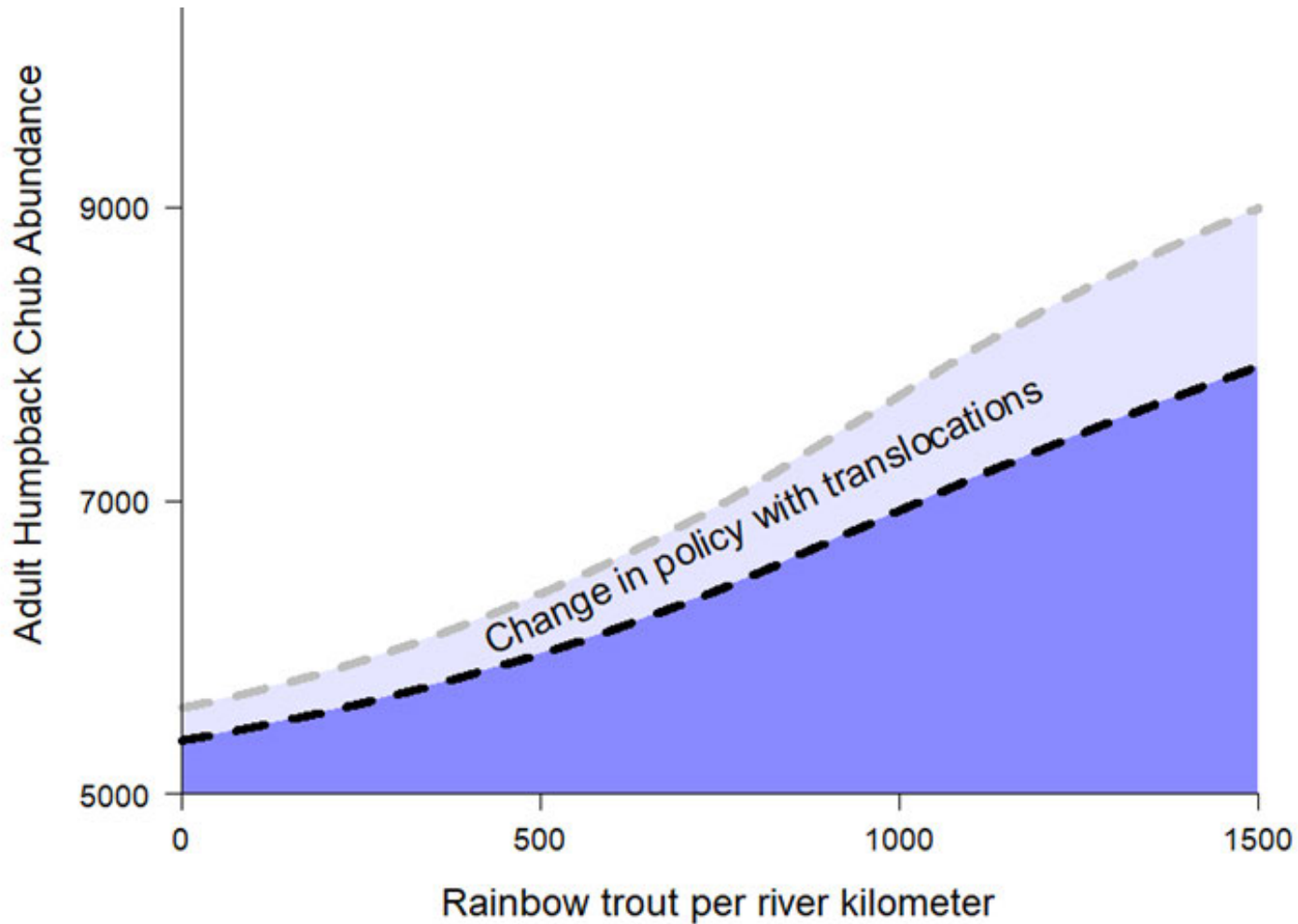
# Bioeconomic Model Results



# Model Extensions: Translocations

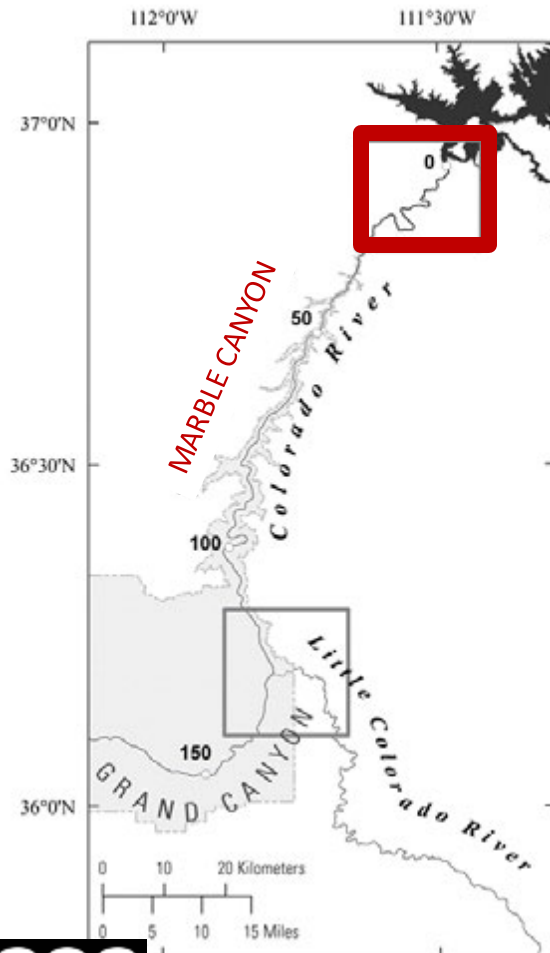


# Humpback Chub Translocation



Preliminary data – do not cite

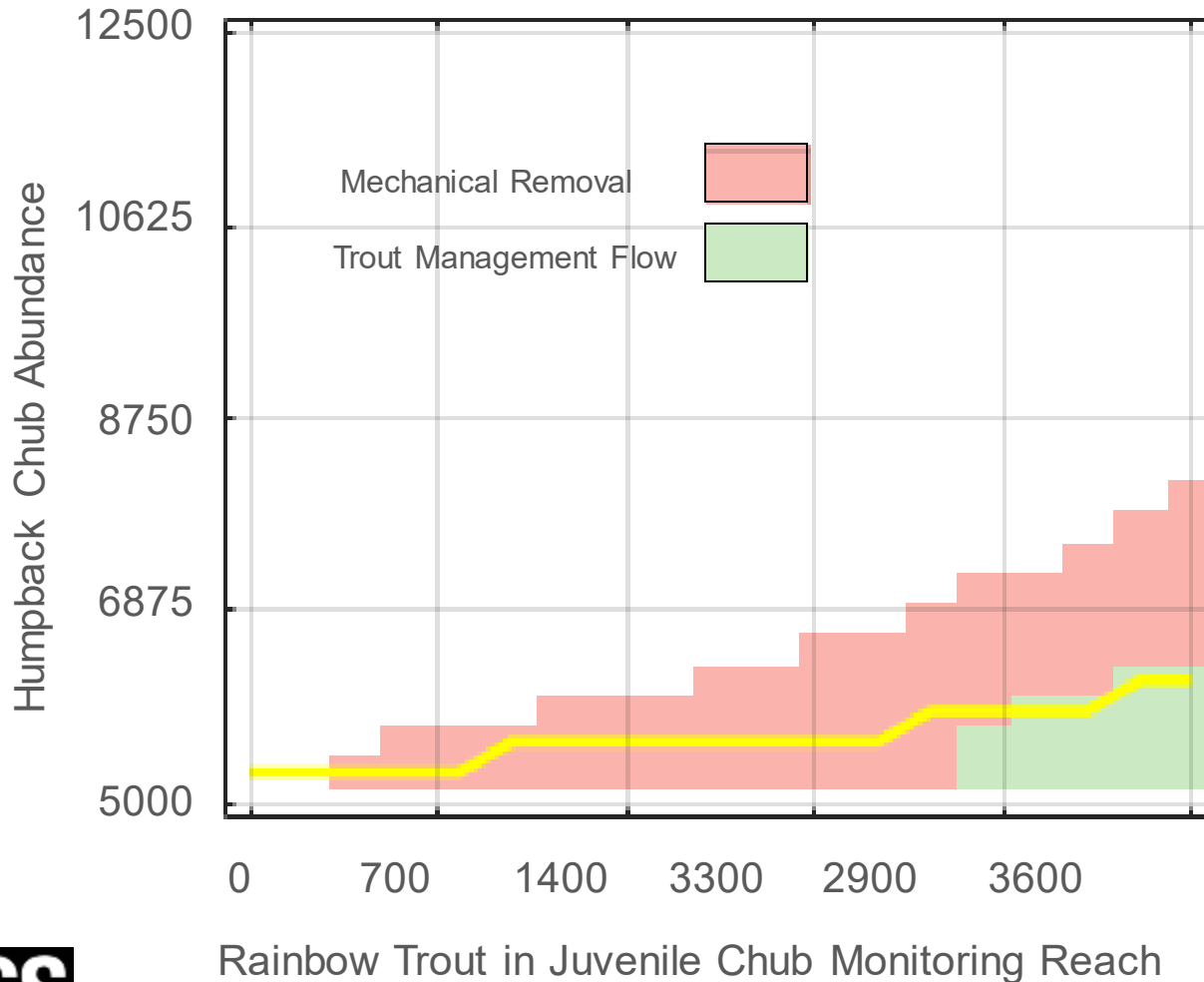
# Model Extensions: Trout Management Flows



<https://www.nytimes.com/2016/05/22/opinion/unplugging-the-colorado-river.html>



# TMF Model Results



# Future Applications: Brown Trout



An aerial photograph of a vast, deep canyon with distinct horizontal rock layers. A river winds through the canyon, appearing as a bright green line against the reddish-brown and tan rock. The canyon walls are steep and show signs of erosion. The background shows a flat, arid landscape under a clear sky.

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