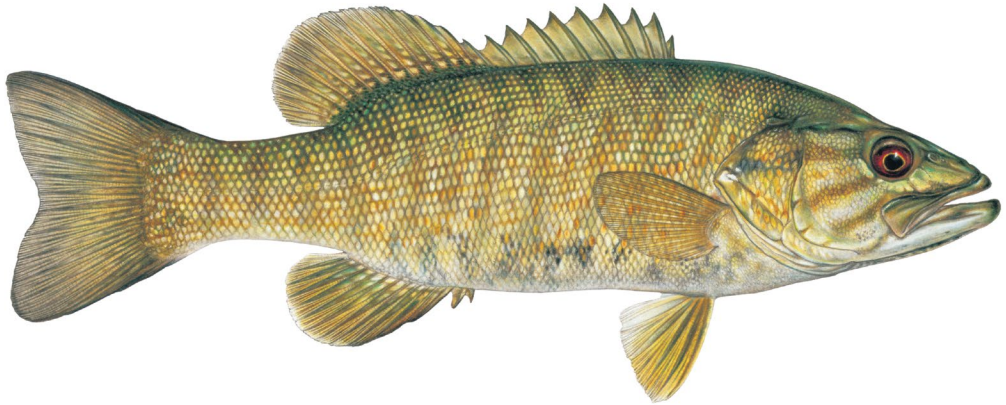
Smallmouth Bass (SMB) Updates



Charles B. Yackulic, Drew Eppehimer,
Kim Dibble, Maria Dzul, Lindsay Hansen,
Brian Healy, Ben Miller, and many others

US Geological Survey,
Southwest Biological Science Center,
Grand Canyon Monitoring & Research Center

AMWG meeting
Aug 22, 2024

USGS science for a changing world

Arizona Game & Fish

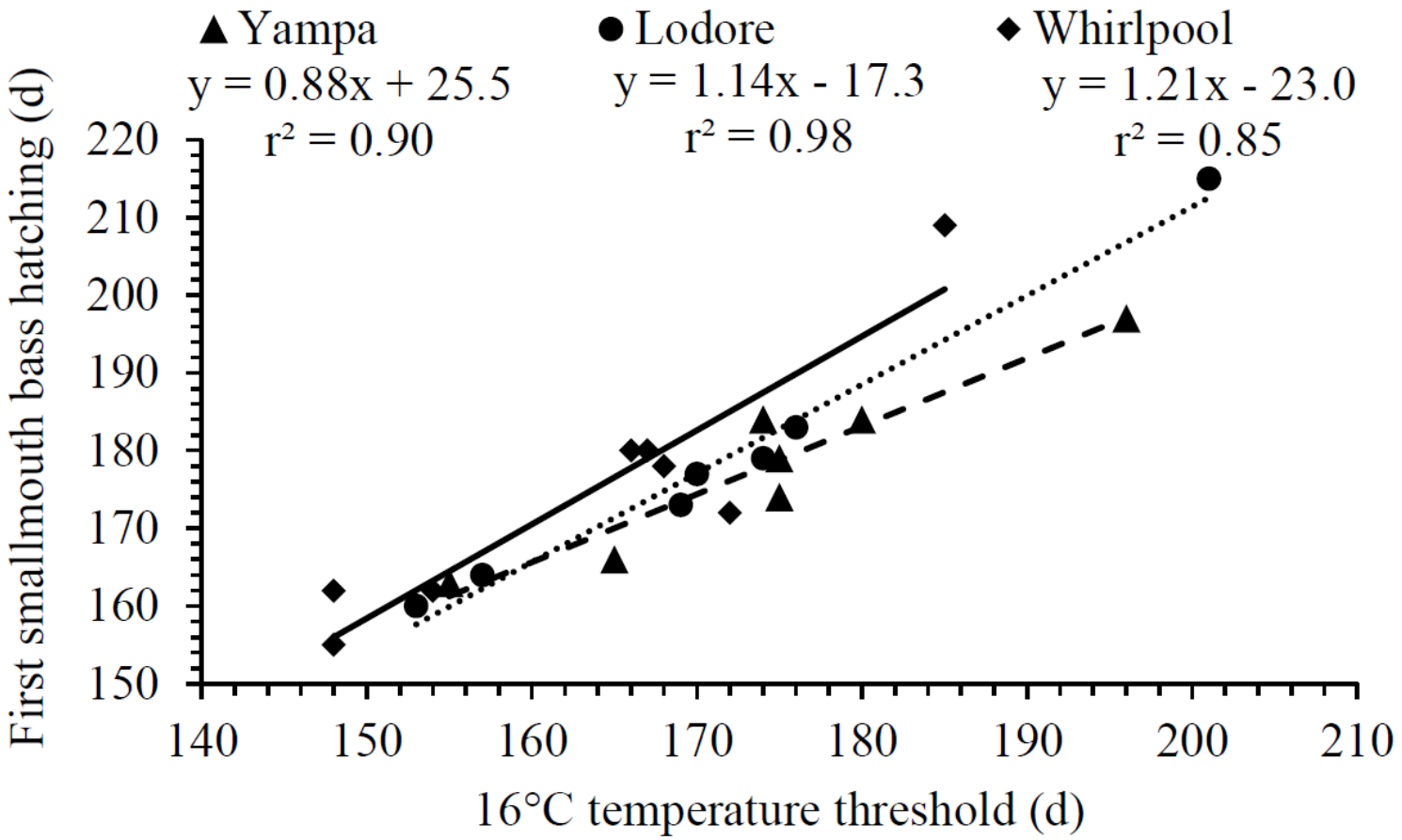
National Park Service

U.S. Fish & Wildlife Service

Preliminary data, subject to change, do not cite

How does temperature affect SMB?

1. Hatch date affected by water temperature.
2. Maximum daily growth closely linked to water temperature and fish size.
3. Size of young of year SMB going into winter determined by hatch date and water temperature post hatch.
4. Overwinter survival of young of year SMB determined by their size (length) and number of days when temp is less than 10° C, but our system has mild winters (very little ability to control this).



(Bestgen and Hill 2016)

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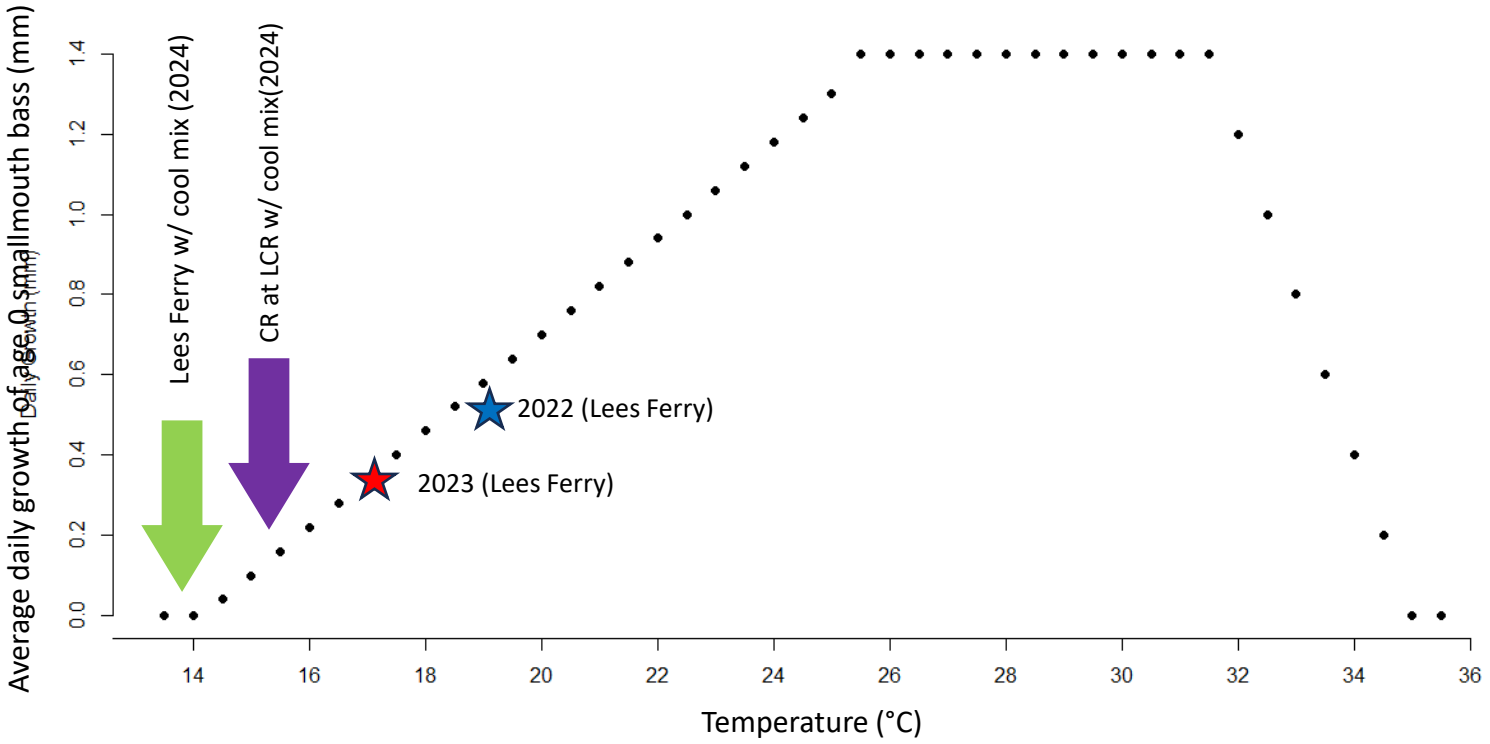

(Data: Shuter et al, 1980; Figure: Dudley & Trial, 2014)

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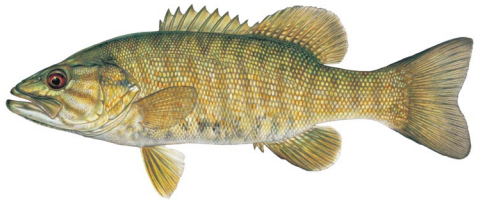

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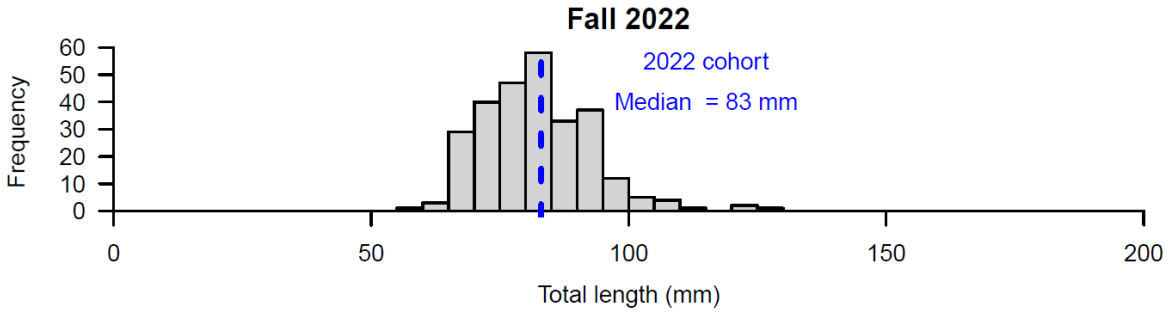

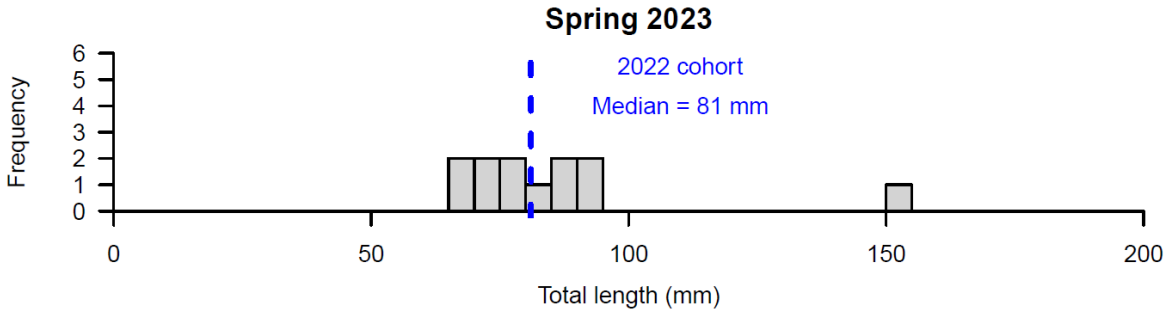

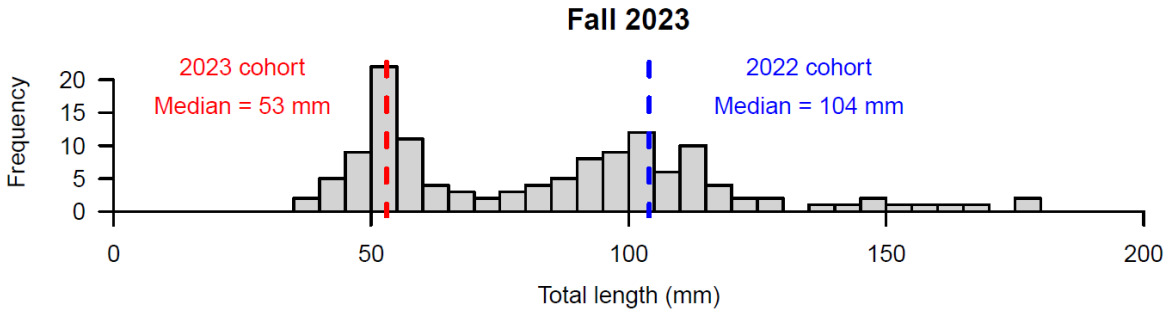

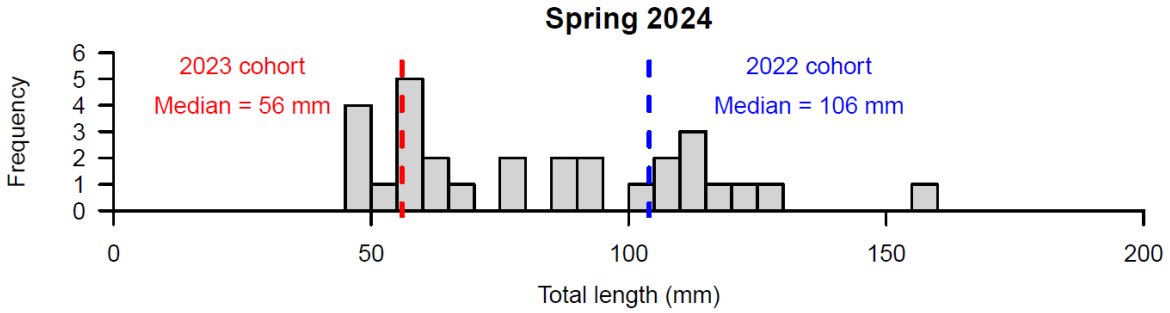

Data: Nonnative fish database

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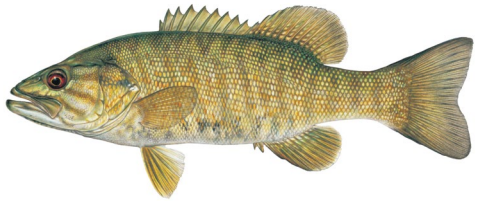

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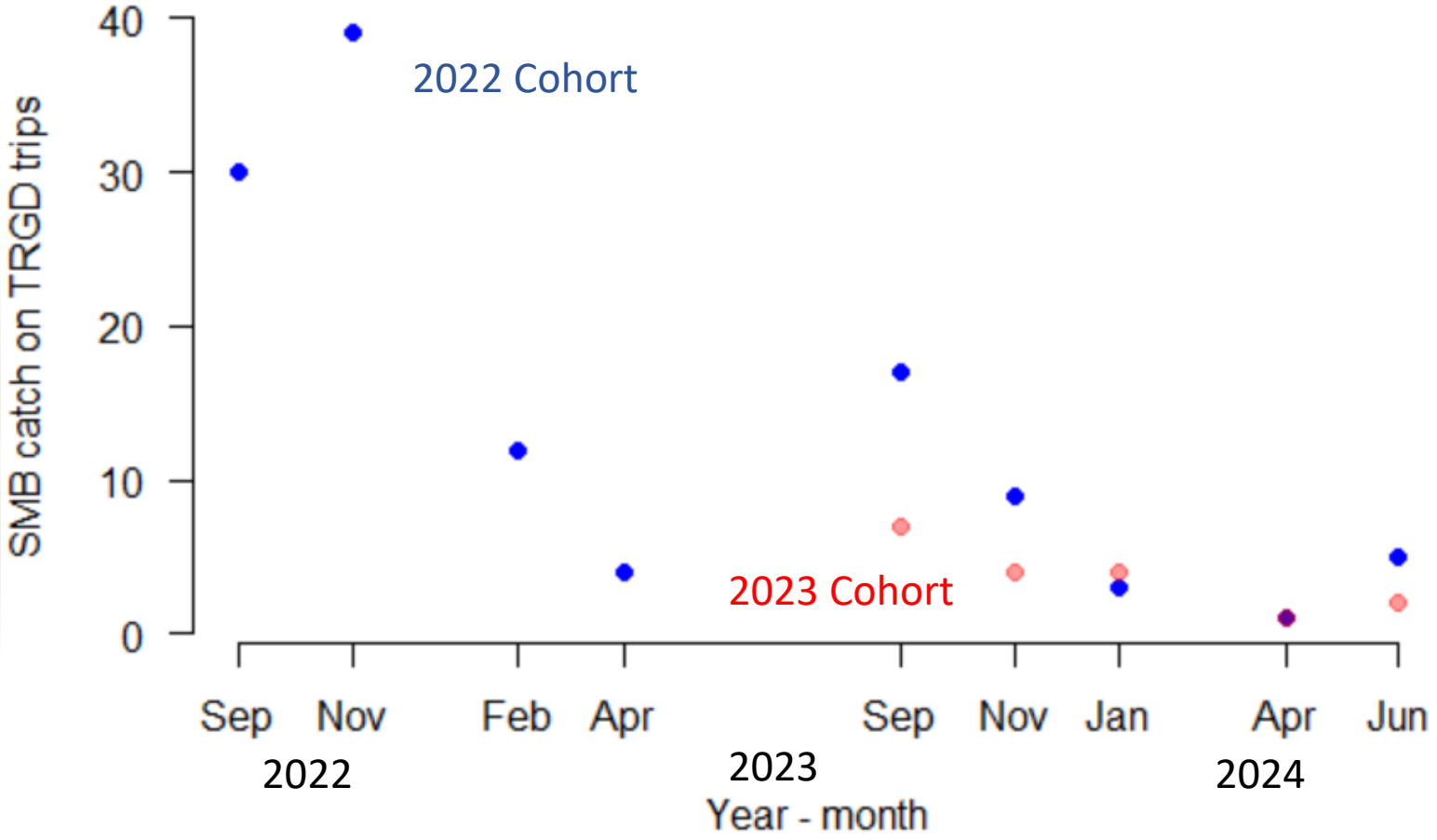

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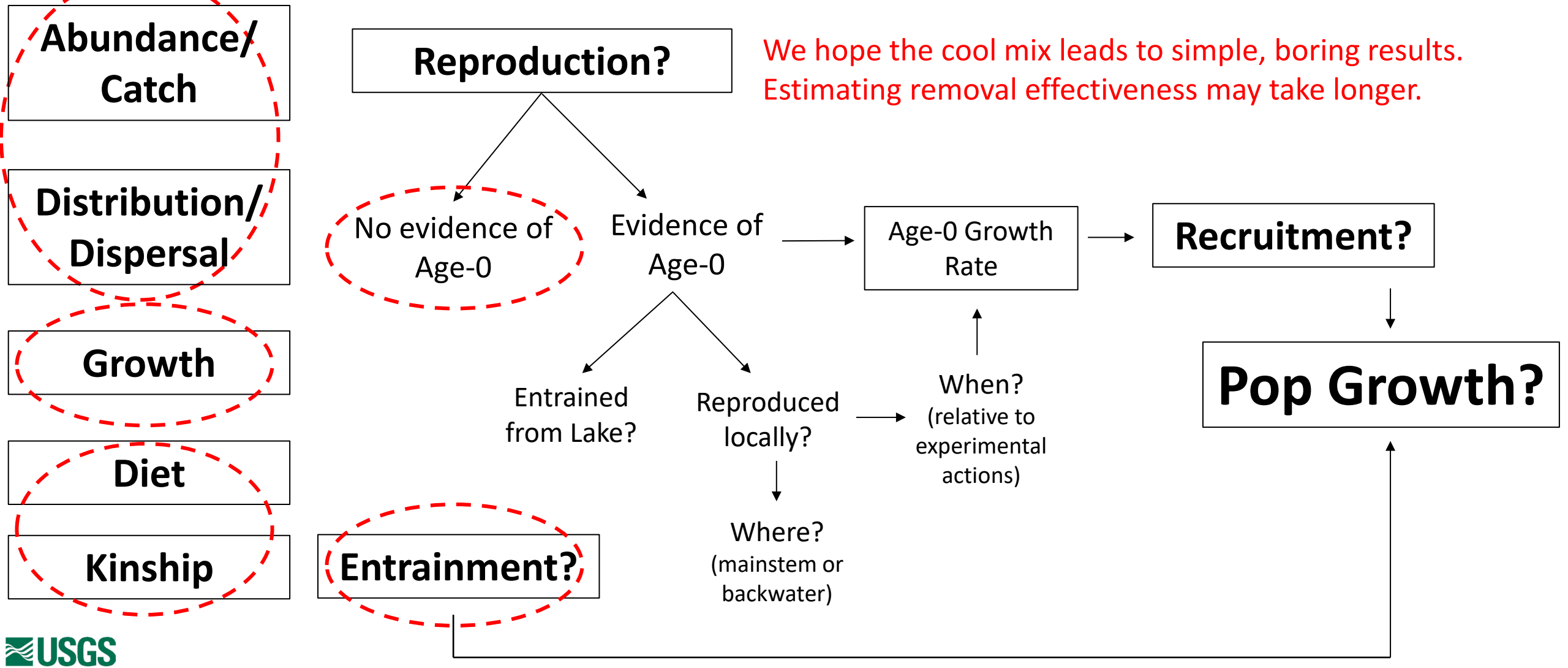
SMB Research and Monitoring

Determining the effectiveness of removals & flow experiments



We hope the cool mix leads to simple, boring results.
Estimating removal effectiveness may take longer.

And we have planned research if there is evidence of recruitment.

- Update SMB forecasting tools, if new information available, e.g. lab trials (I.4)
- Close-kin mark-recapture model (I.4)
- Occupancy model (G.1, I.4, N.1)
- Determine effectiveness of management actions (I.4, I.5)

SMB Modeling

Abundance/ Catch

CPUE using fish trip data
Close-kin mark-recapture analysis (I.2)

Distribution/ Dispersal

Occupancy/catch by river mile using fish trip data (I.4)

Growth

Modal progression analysis of fish trip data

Diet

SMB diet data (F.4)

Kinship

Kinship analysis (I.2)