

Citizen scientists shed light on aquatic foodwebs in Grand Canyon, USA

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JC-WISE
Water Initiative on
Sustainability and Engagement
賽馬會惜水・識河計劃



Glen Canyon Dam, Colorado River



Glen Canyon Dam, Colorado River



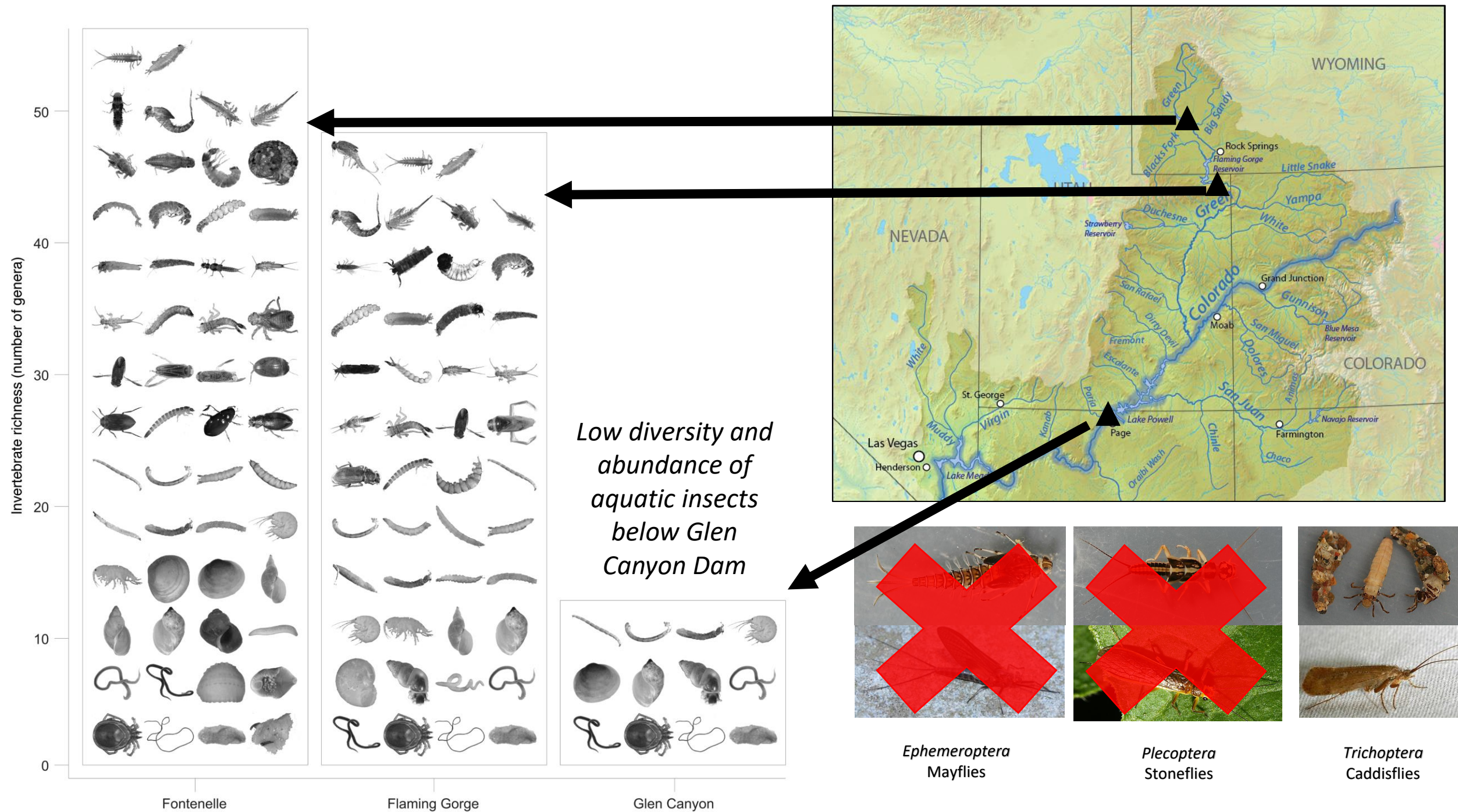
Ephemeroptera
Mayflies



Plecoptera
Stoneflies



Trichoptera
Caddisflies



Sampling in Grand Canyon...



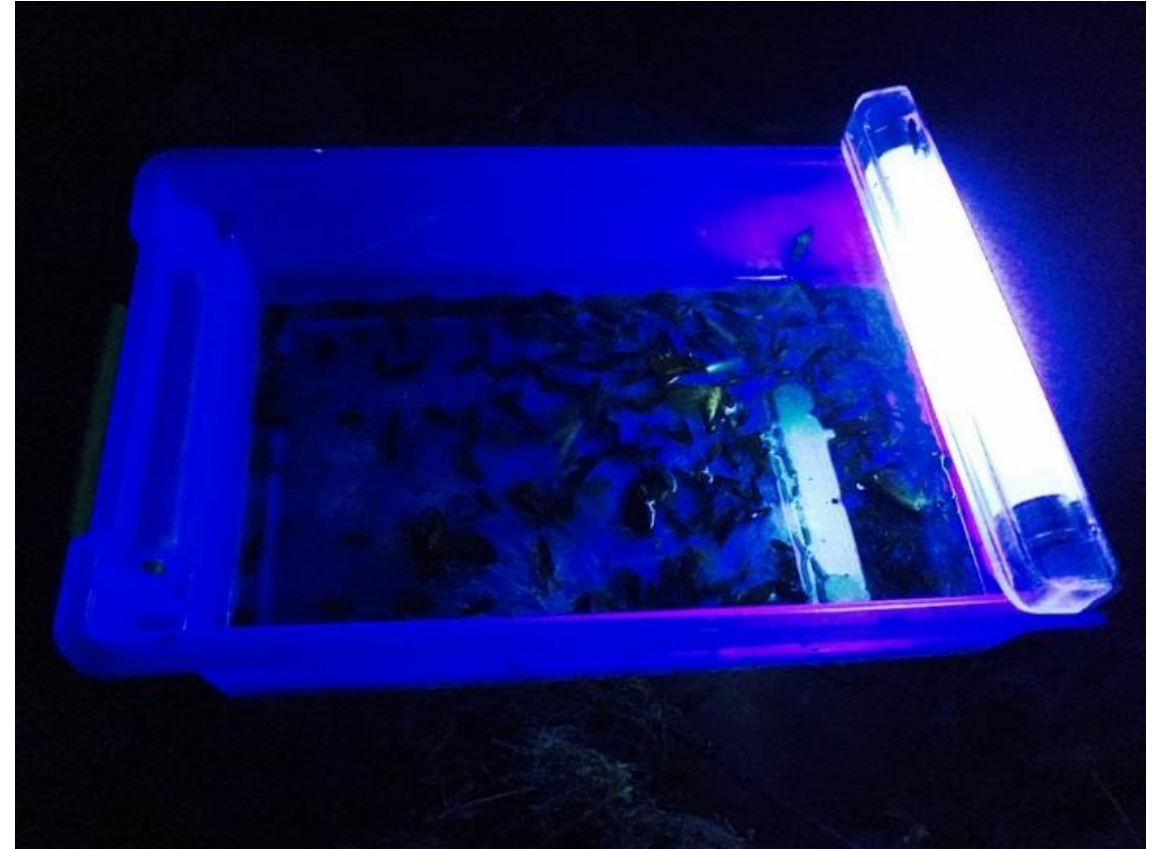
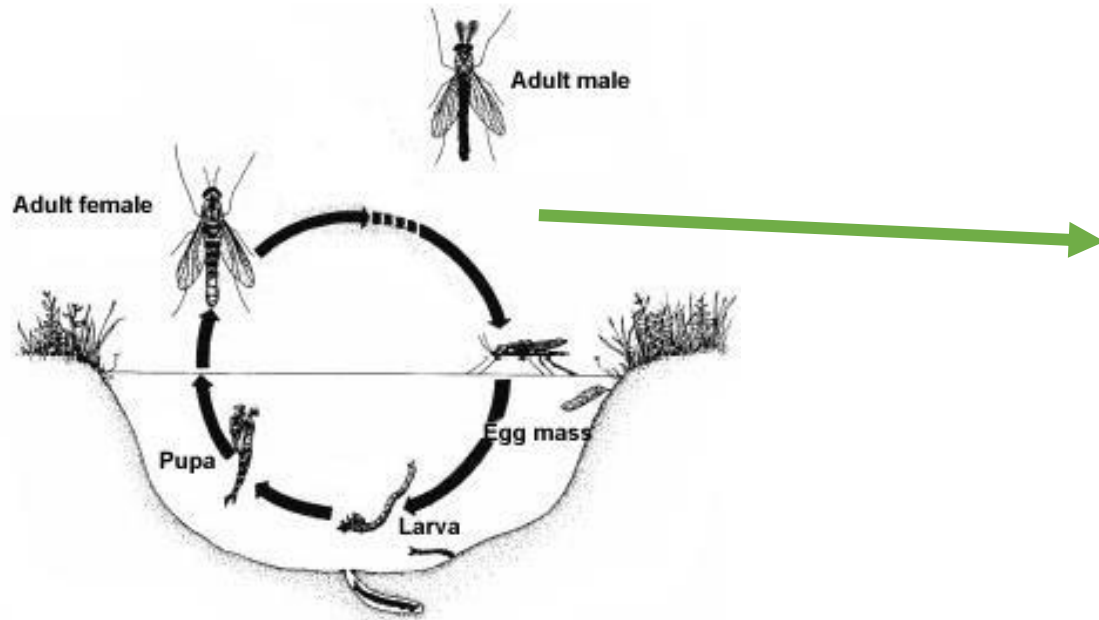
Science trips from our USGS lab
3-5 trips / year



Commercial and private trips
Year-round ~1,000 trips / year (1,131 in 2021)

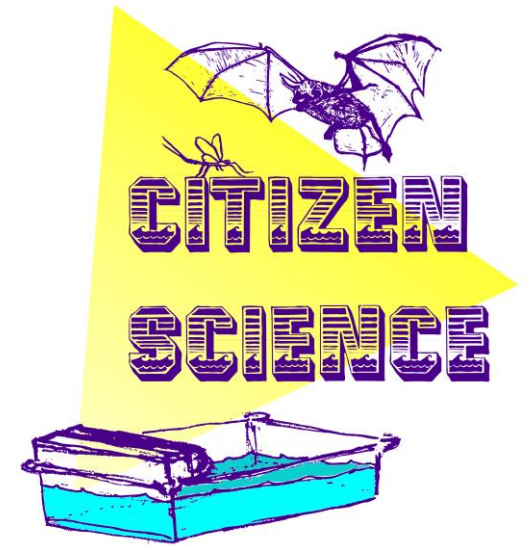
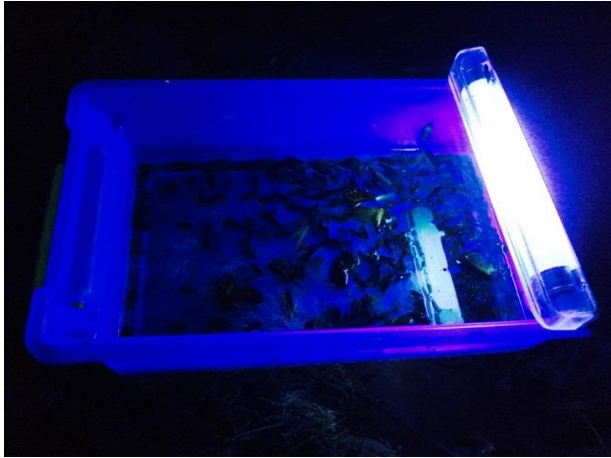


Sampling the foodweb in Grand Canyon...

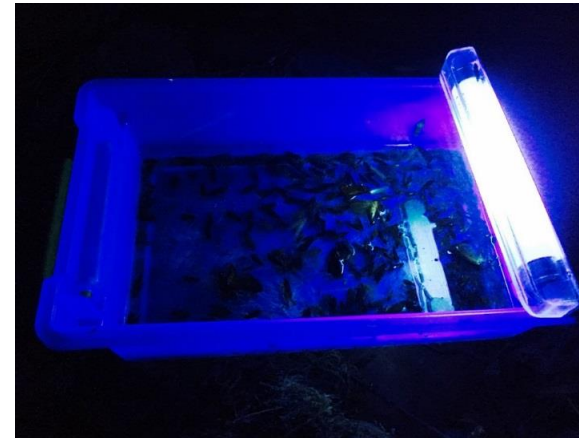
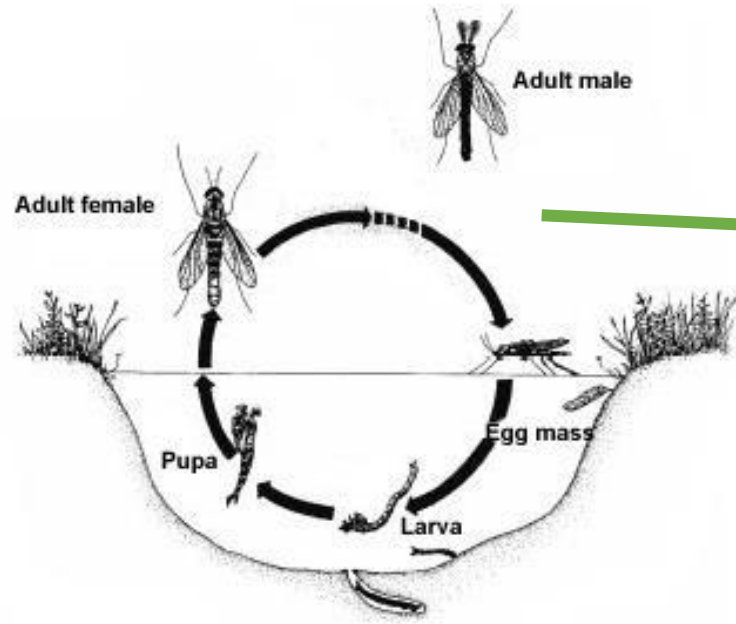
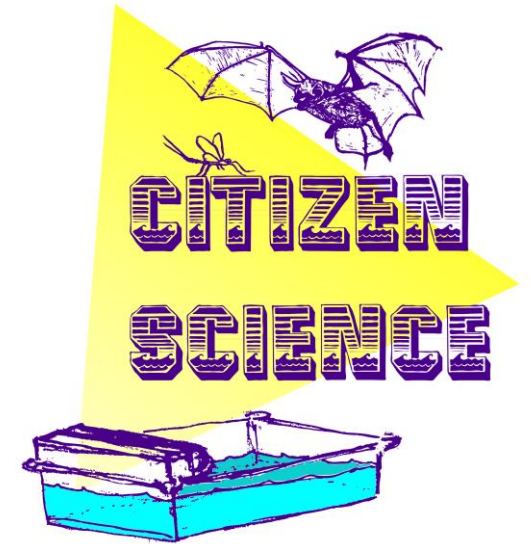
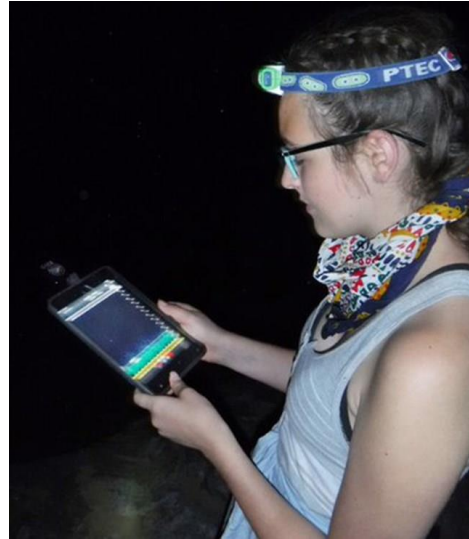
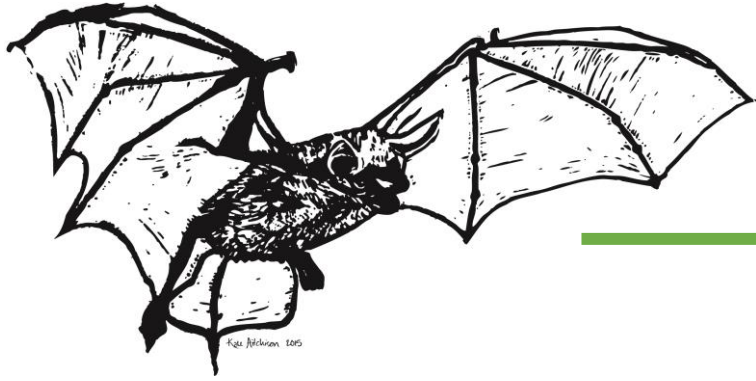




Sampling the foodweb in Grand Canyon...

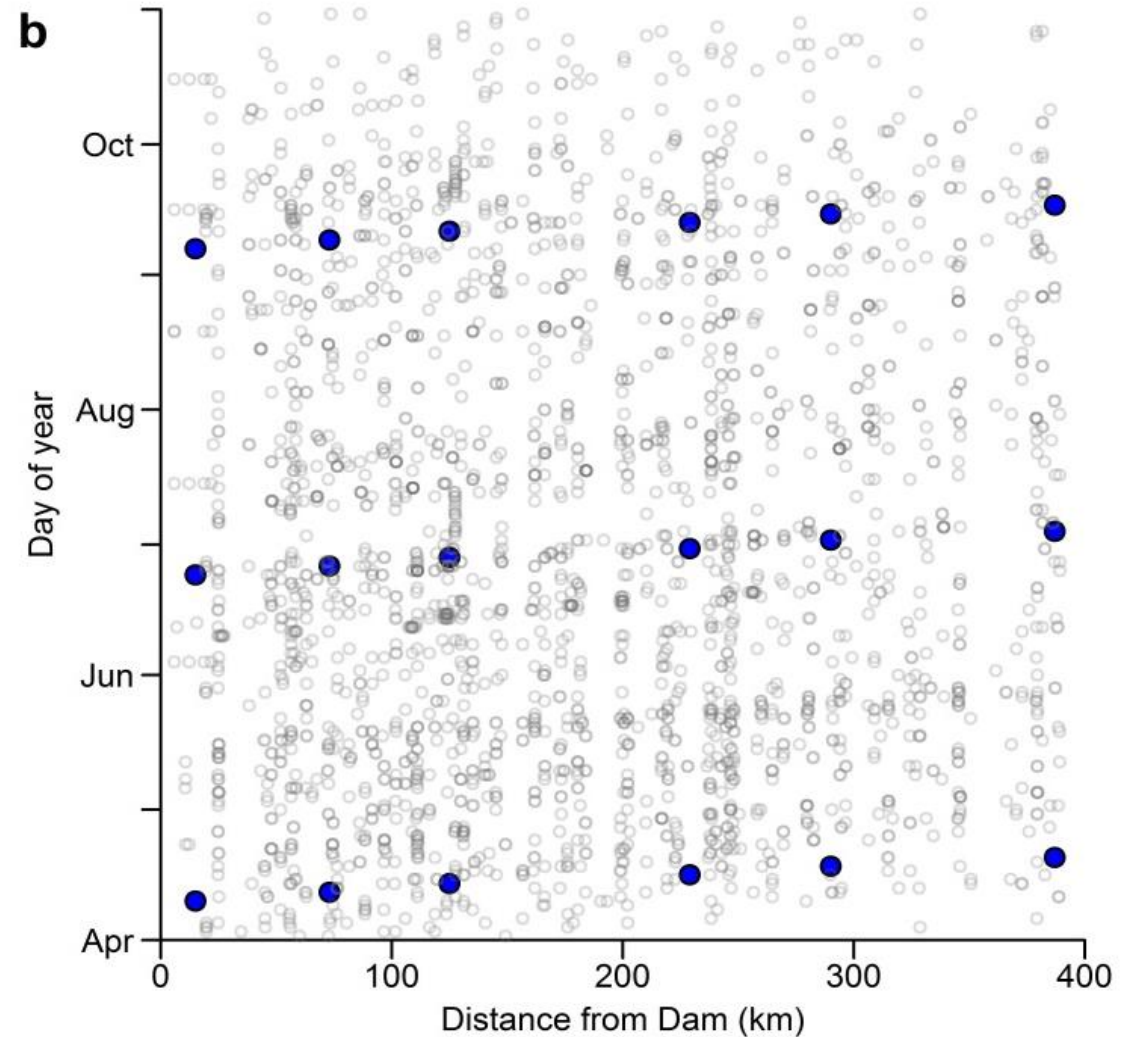


Sampling the foodweb in Grand Canyon...



Citizen science in Grand Canyon

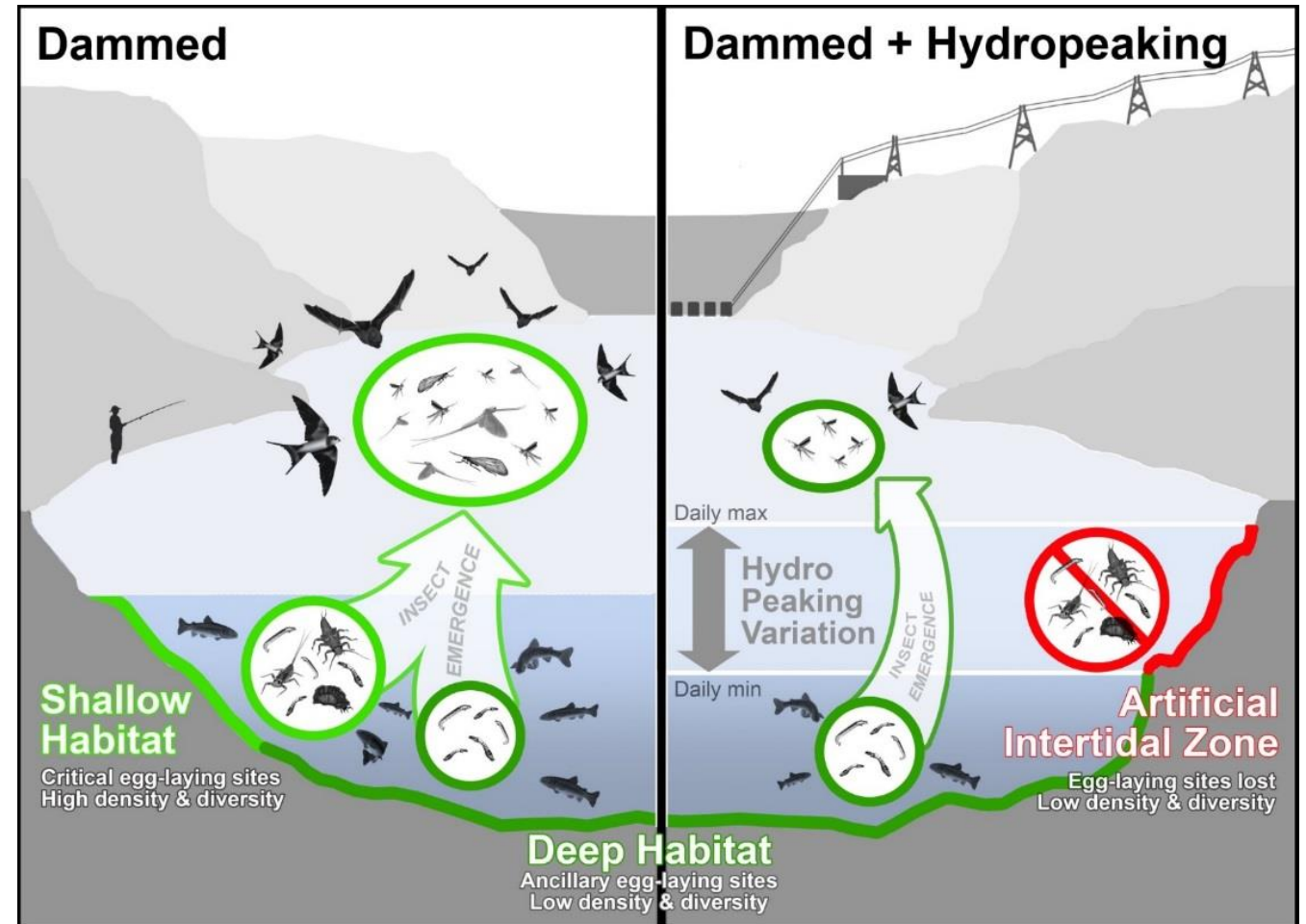
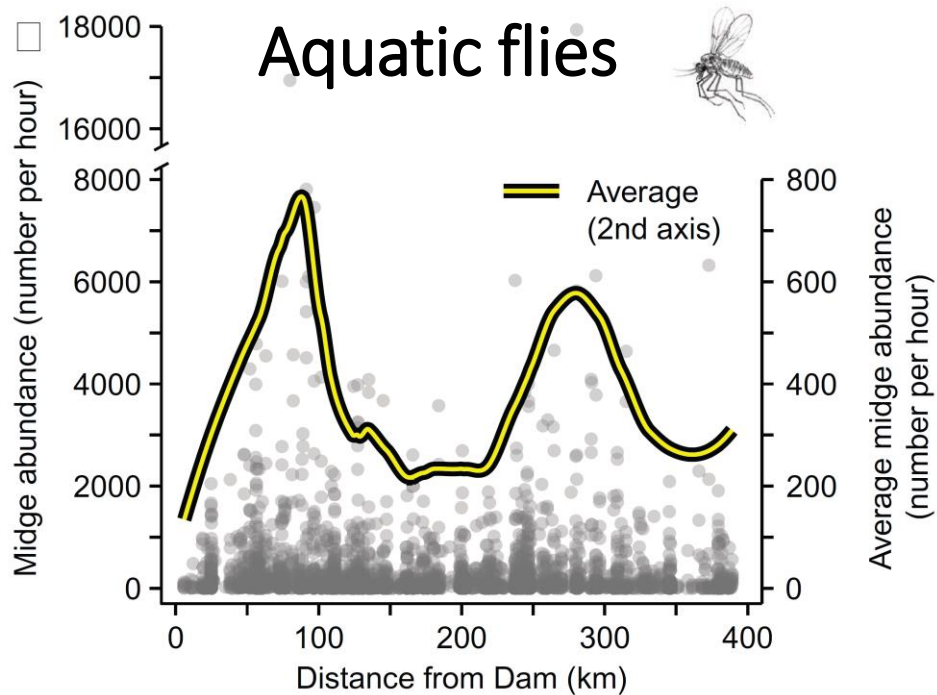
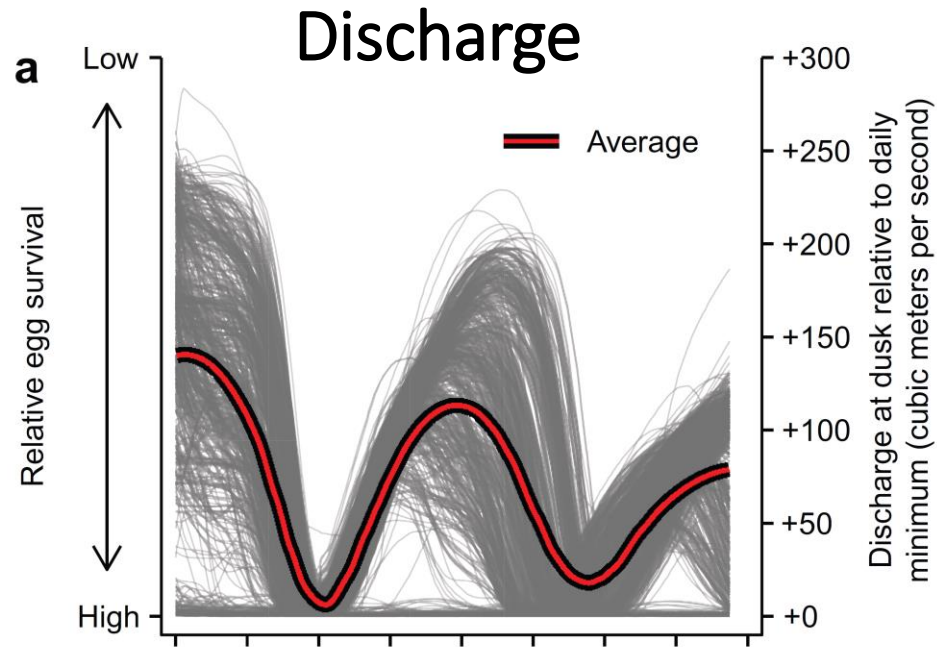
- Started program in 2012
- More than 5,000 light trap samples of bugs collected
- More than 2,000 nights of recording bats

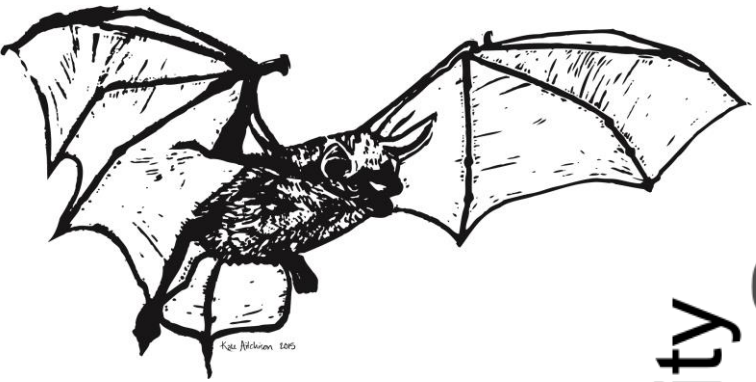


Data quality

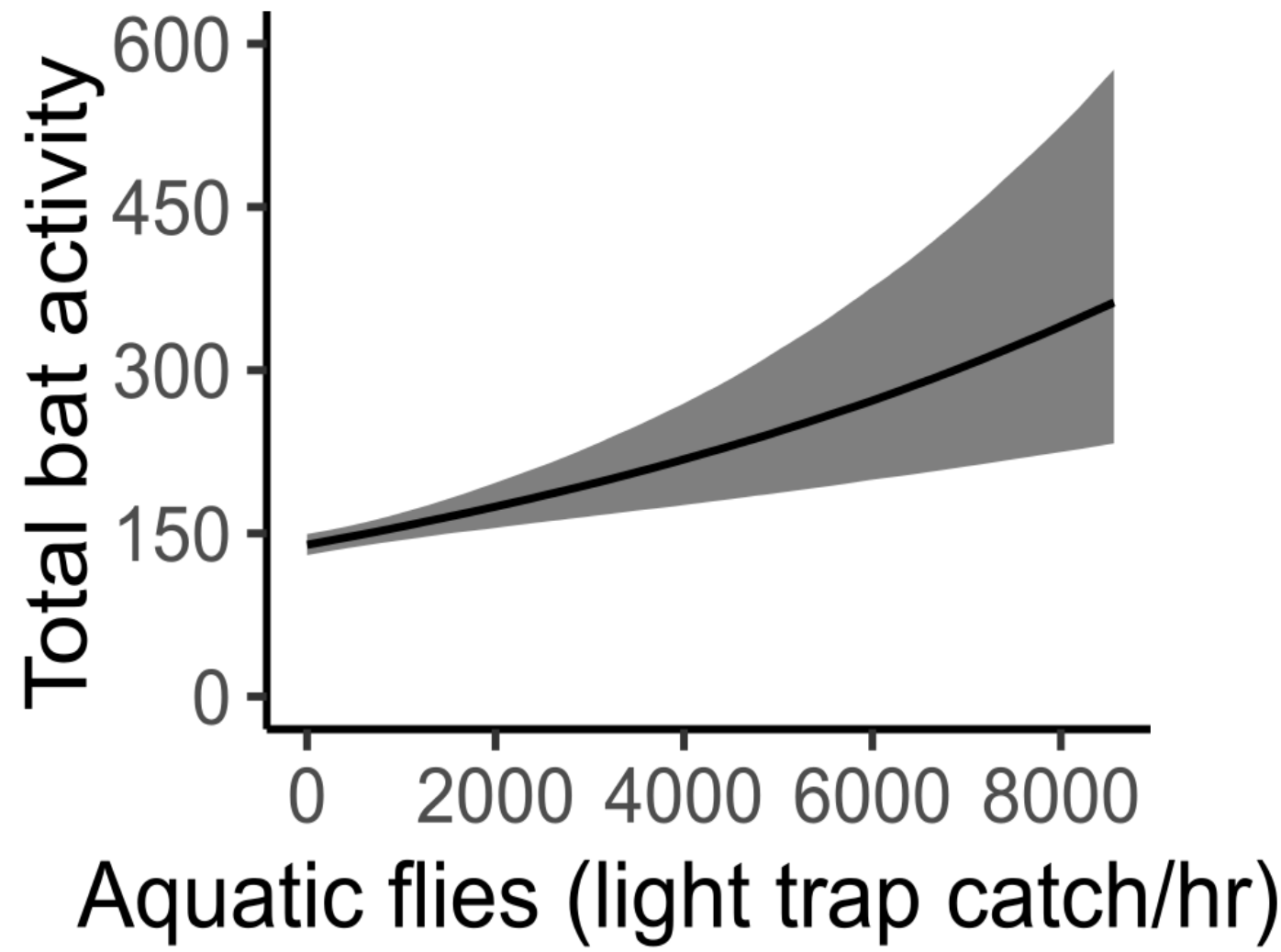


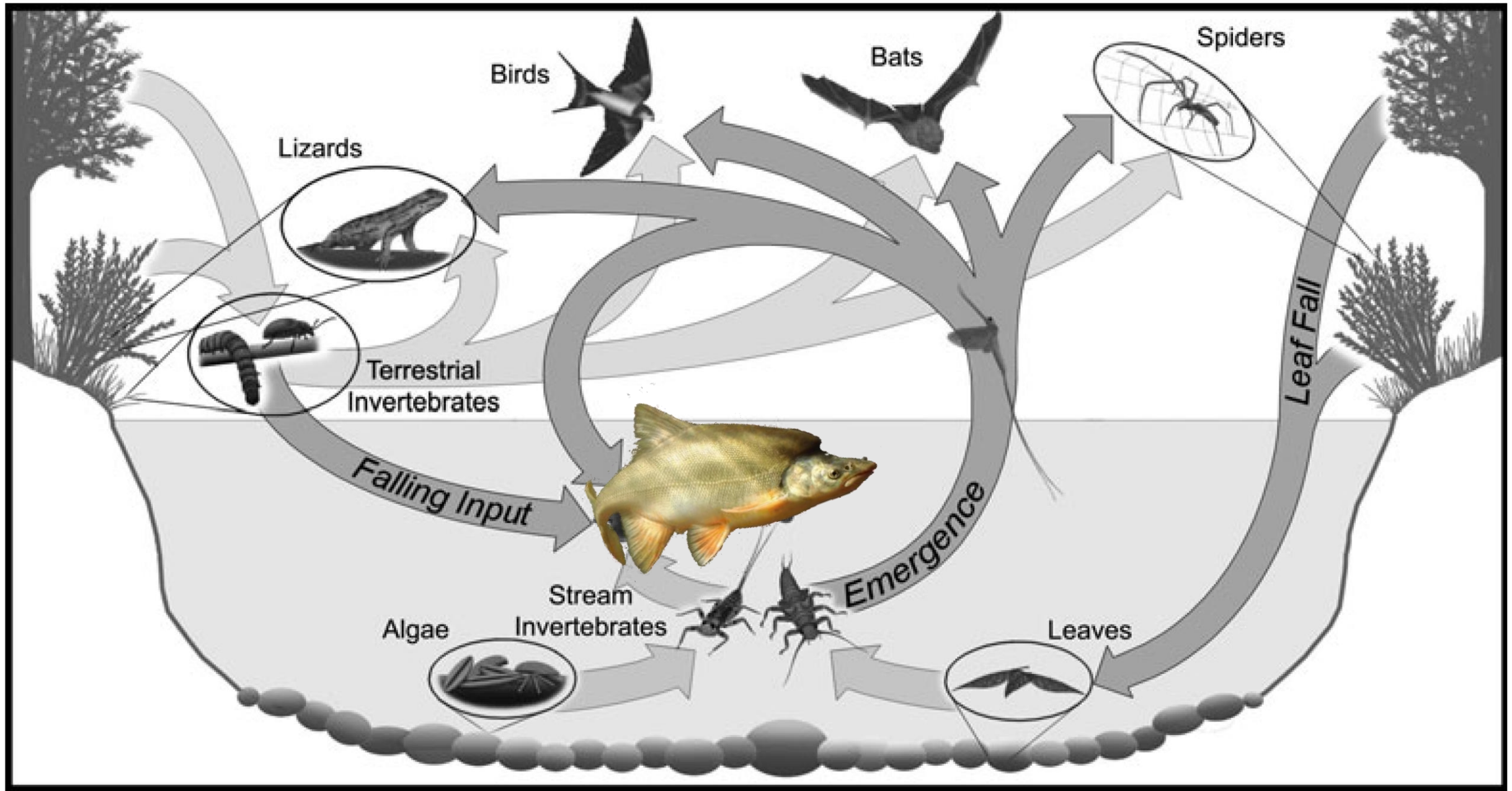
Hydropeaking creates a bottleneck for aquatic insect recruitment





Bats rely on those same flies



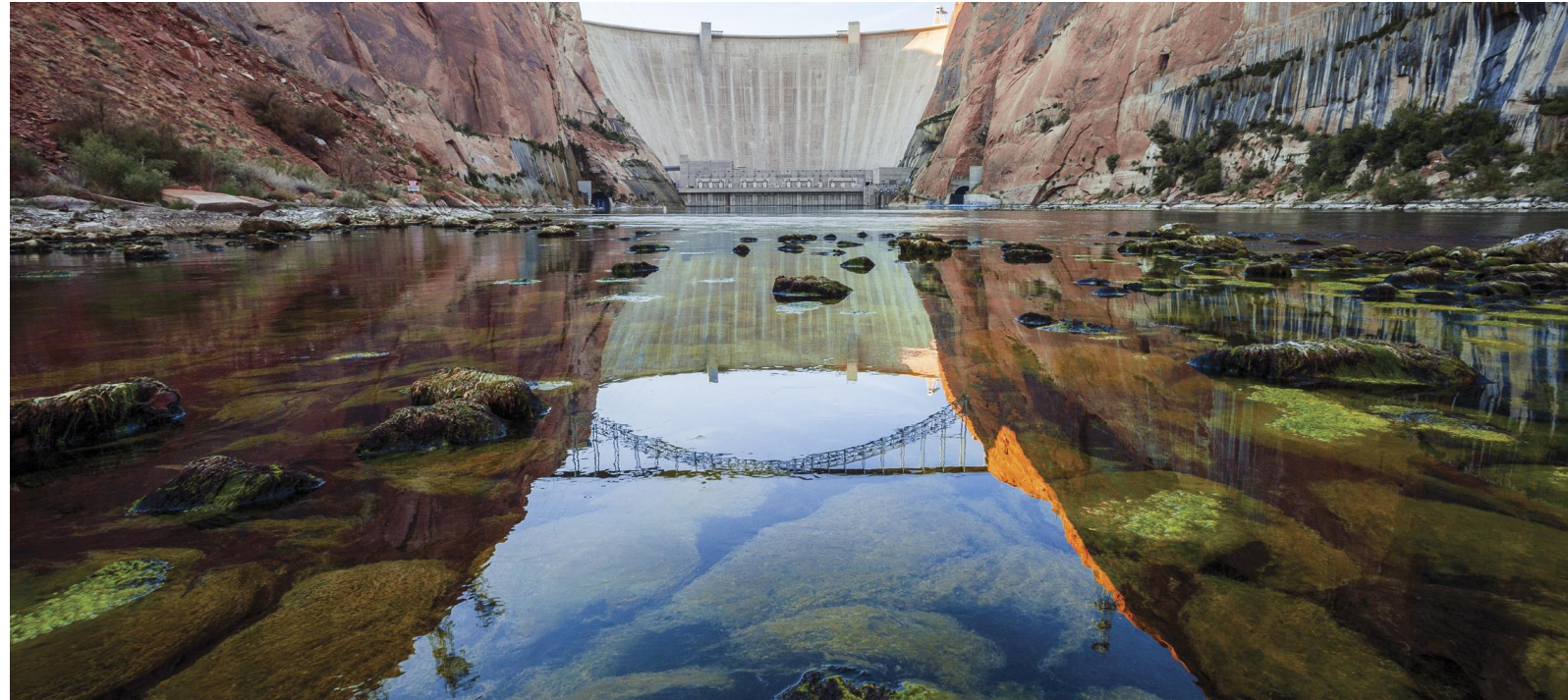




Glen Canyon Dam Adaptive Management Program

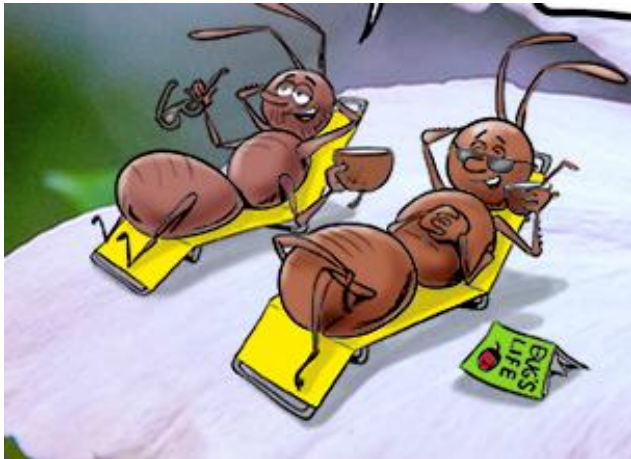
AMP Stakeholders

- 7 State Agencies
- 6 Native American Tribes
- 4 Federal Agencies
- 2 Federal Power Purchase Contractors
- 2 Environmental Non-profits
- 2 Recreational Interest Groups
- Western Area Power Administration
- AZ Game and Fish Department

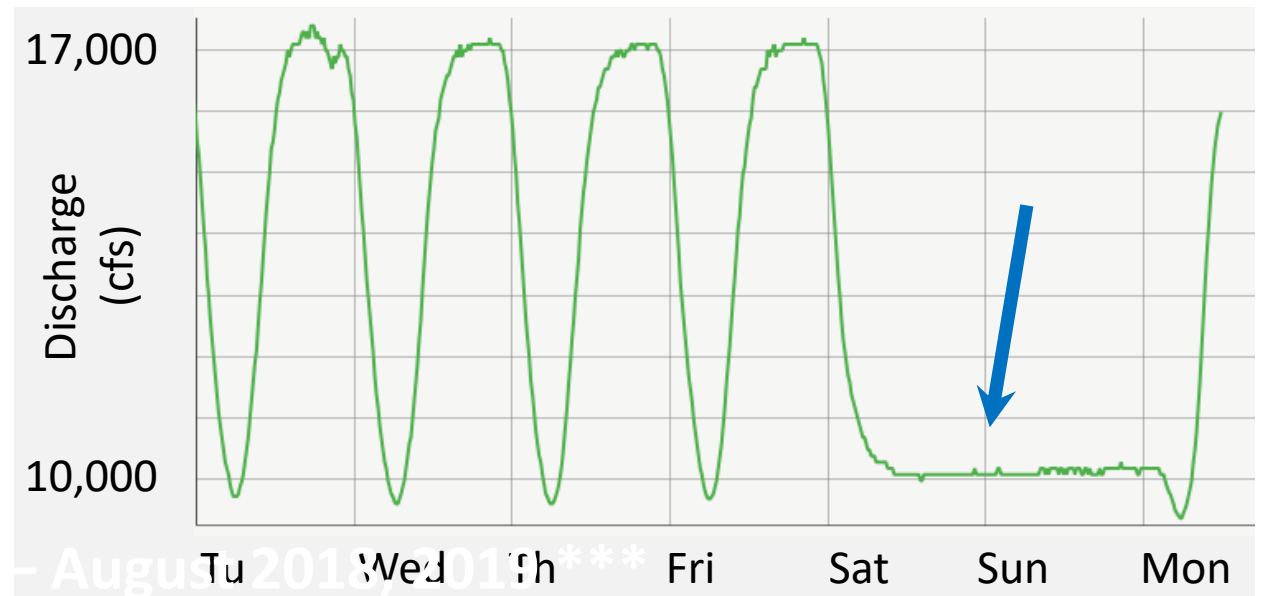


Flow experiment: Bug flows

*Finally a
weekend off!*



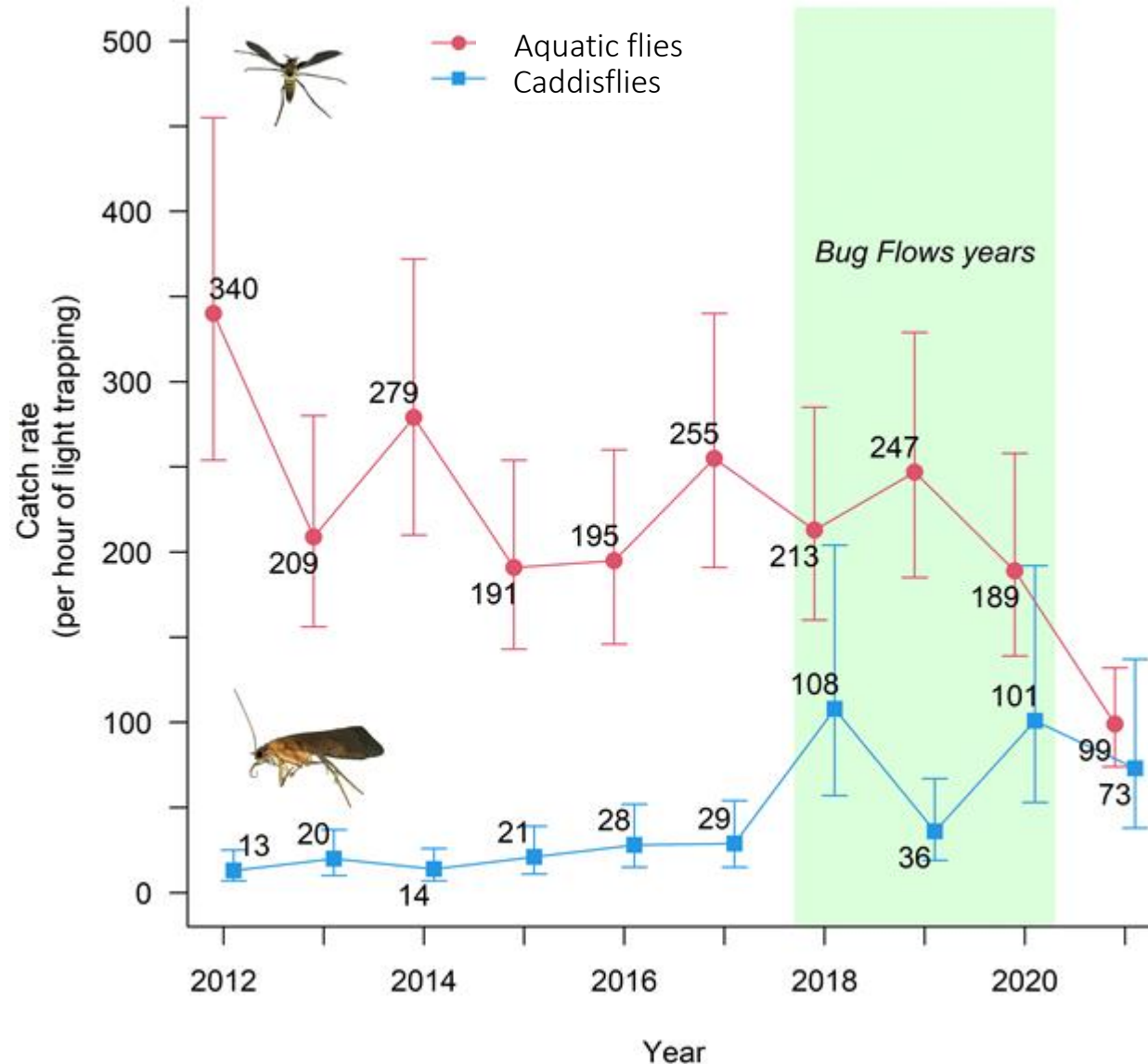
- “Give bugs the weekends off!”
- Stable, low flows on summer weekends
 - Eggs laid on weekends won’t dry/die



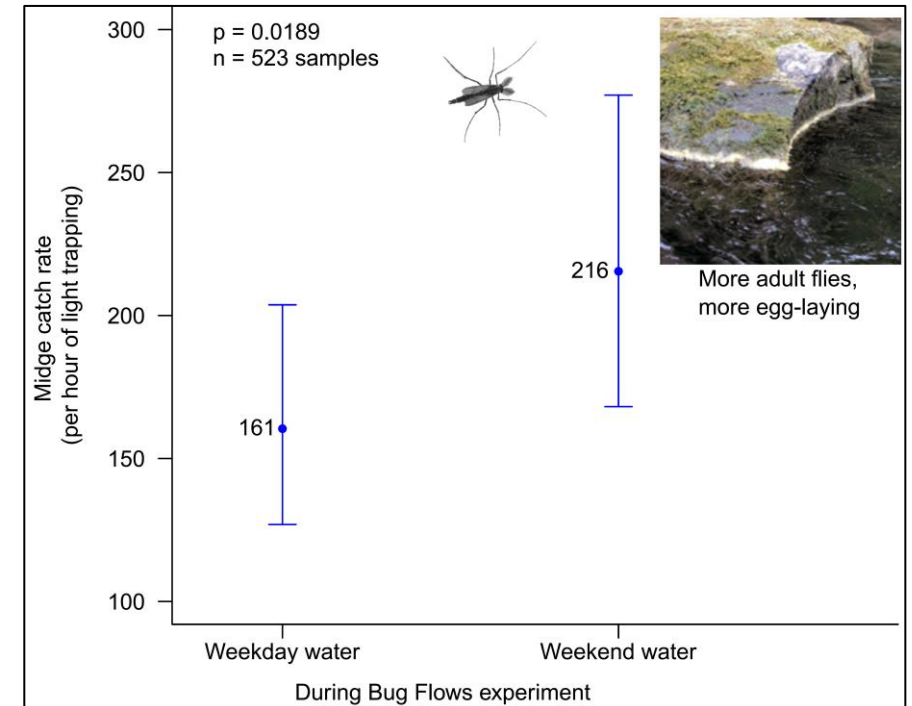
Bug flows happened! 2018 – 2020



Insect response to bug flows

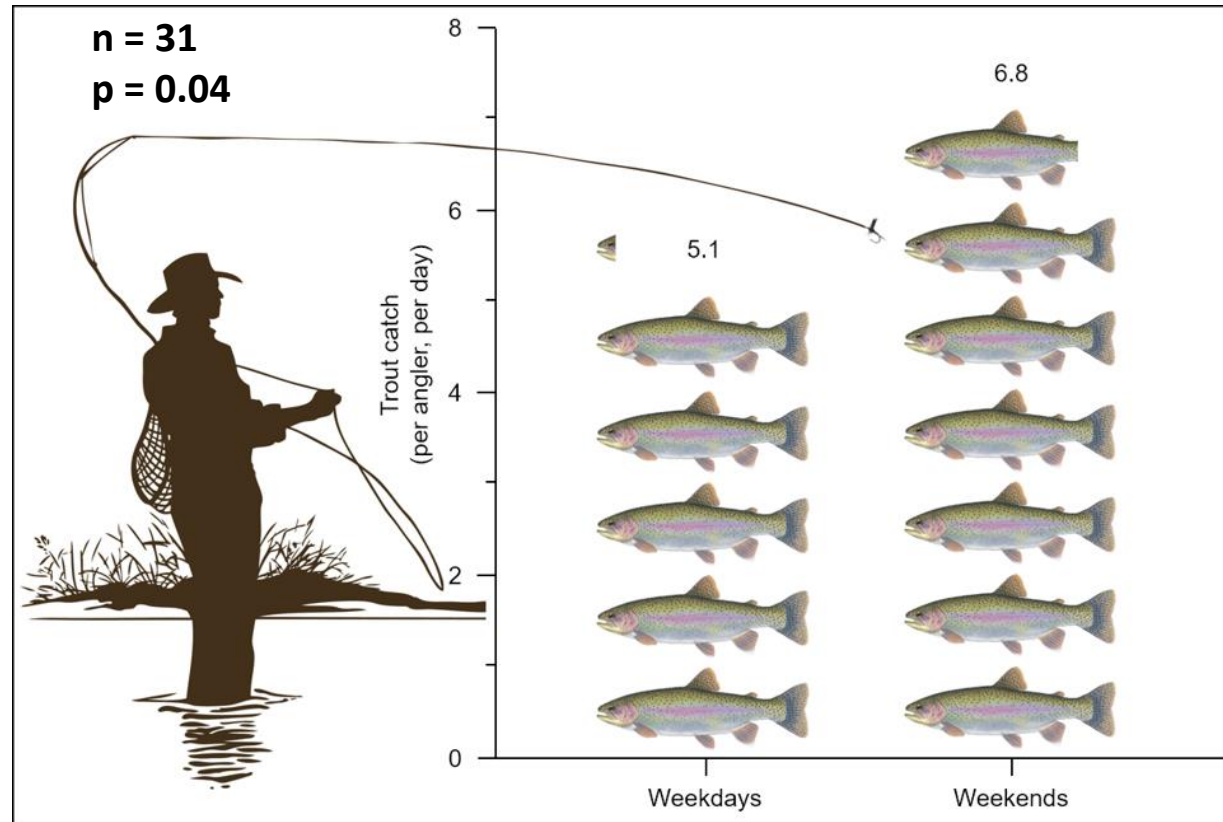


- 400% increase in caddisflies 2/3 years
- 41% increase in GPP on weekends
- More flies emerging on weekends



Preliminary data, do not cite

Bug Flows = Better Fishing



drought colorado river



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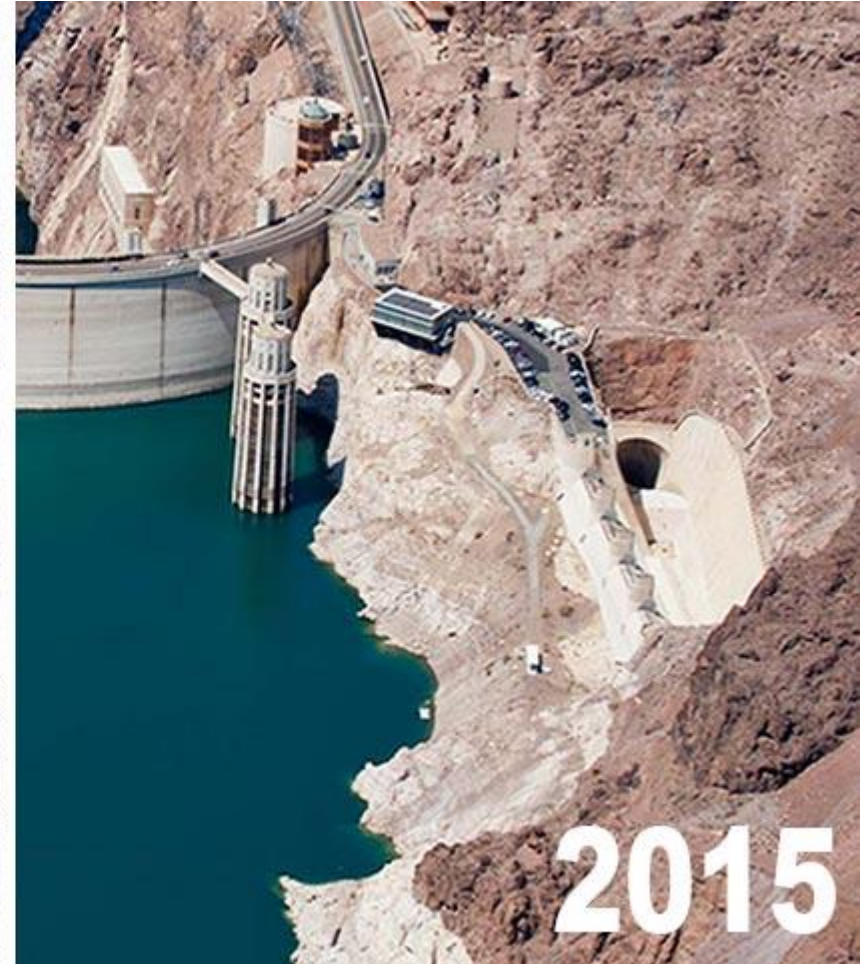
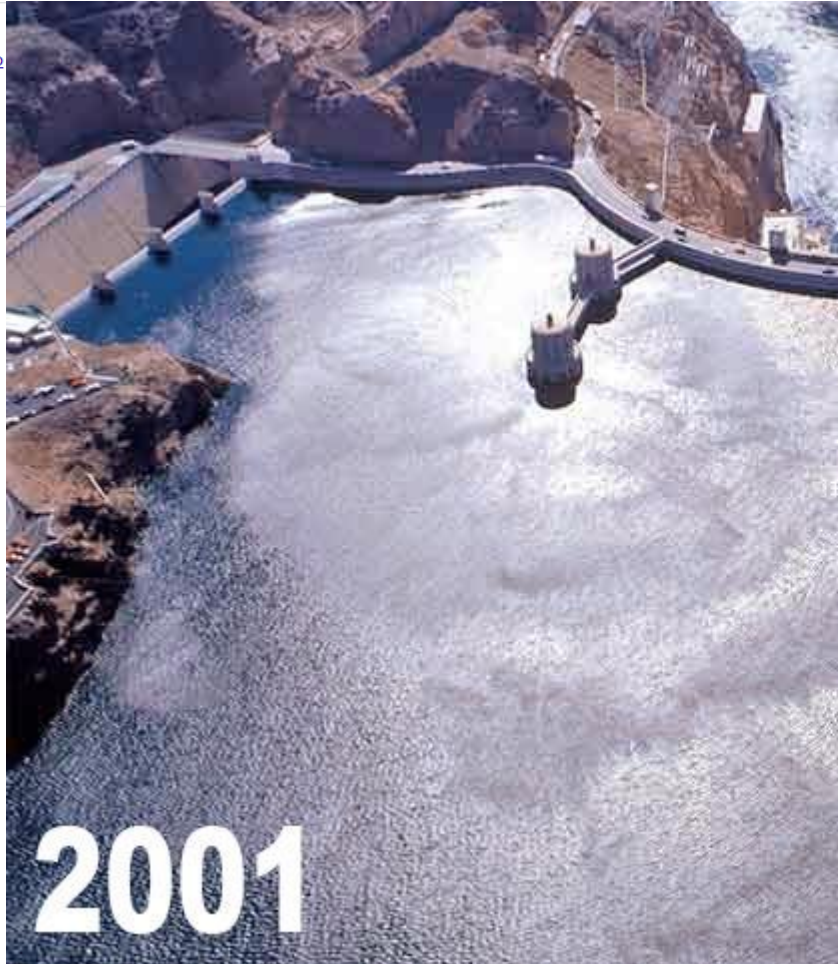
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