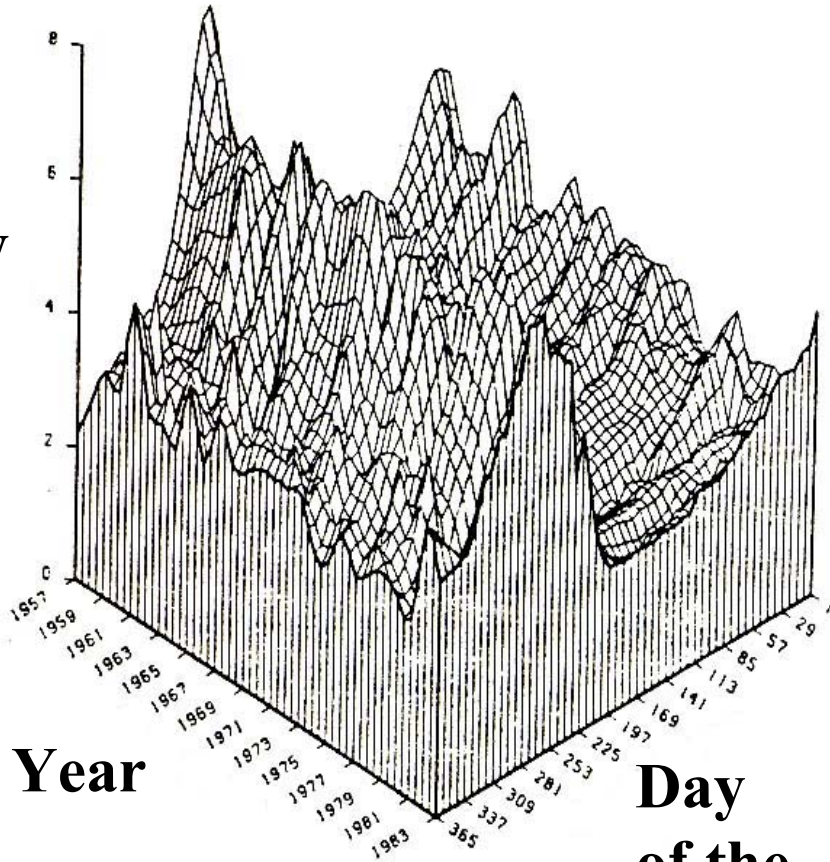


# Ecological impact of a constant flow regime on an aquatic macroinvertebrate community

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California State University, Chico

# Characteristic Flow Regime

**Flow**



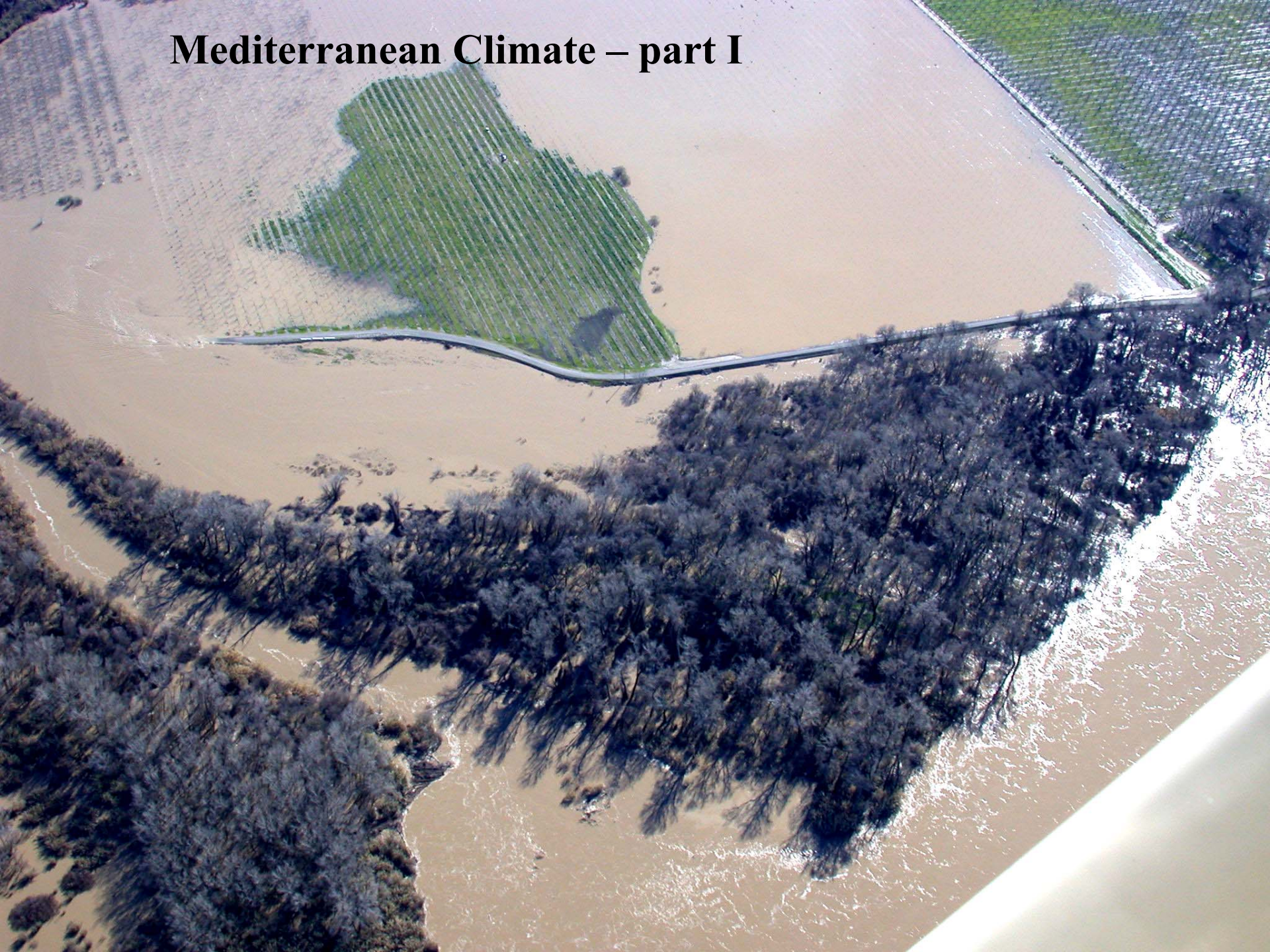
**Year**

**Day  
of the  
year**





# Mediterranean Climate – part I

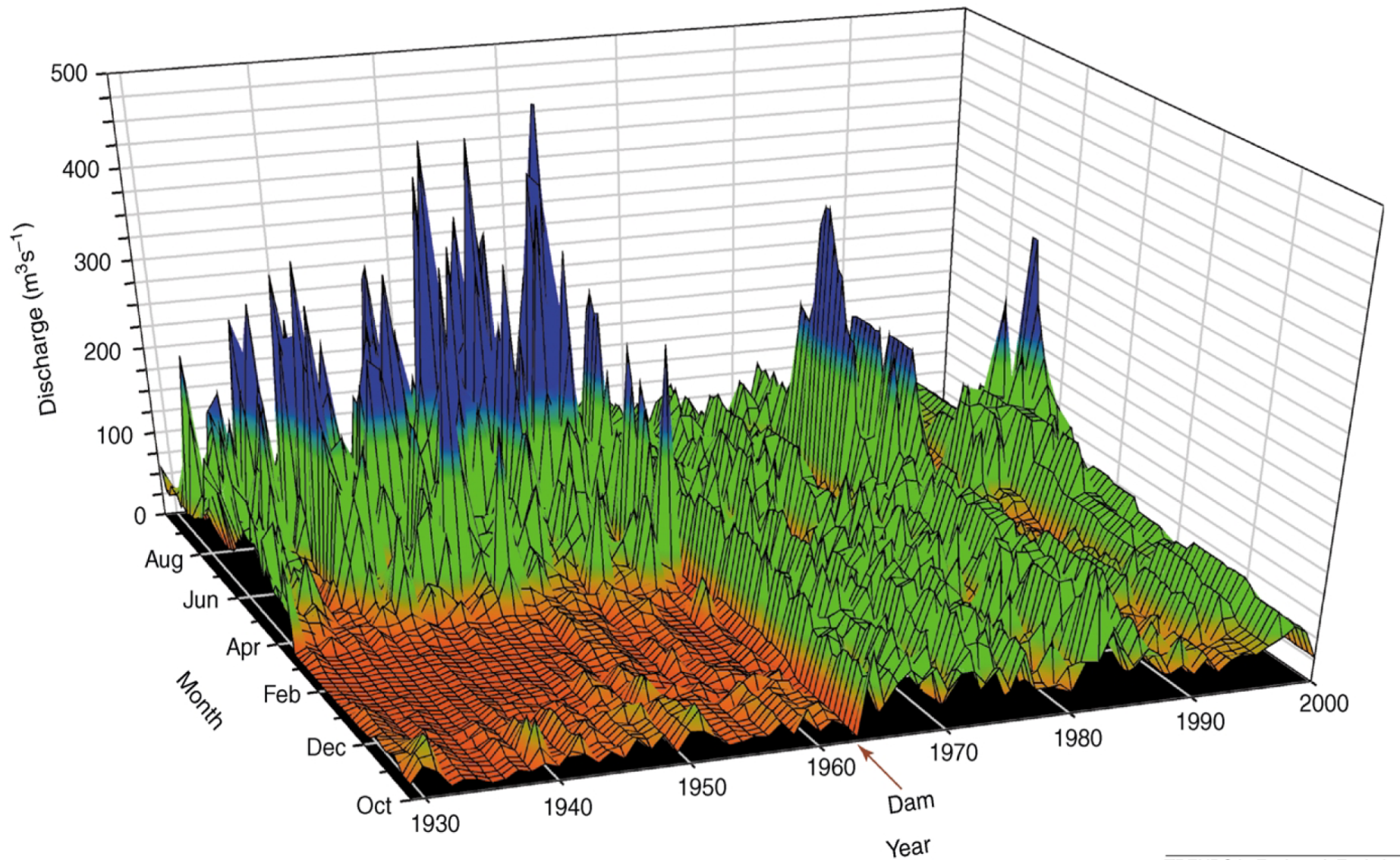




## Mediterranean Climate – part II





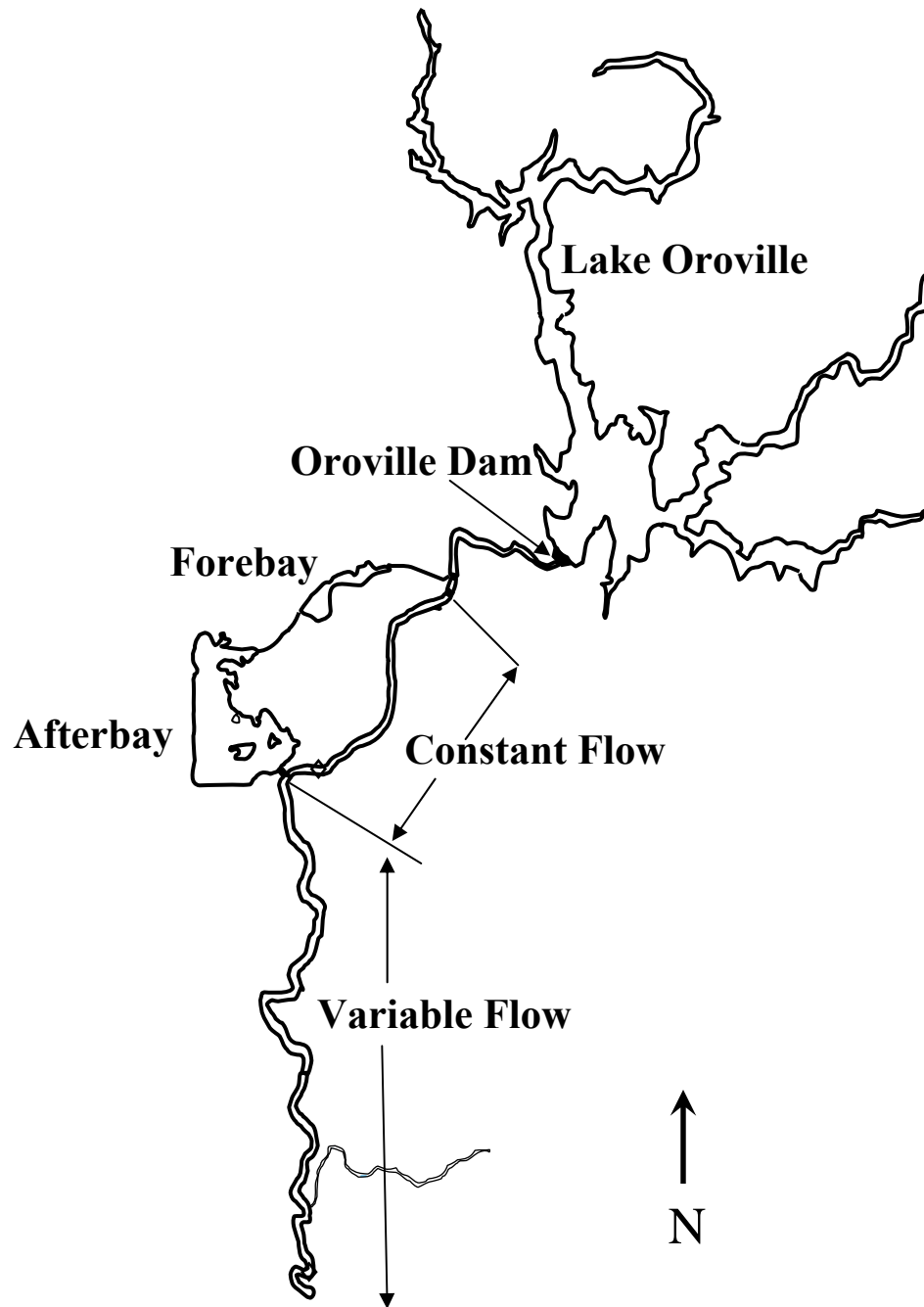


*TRENDS in Ecology & Evolution*

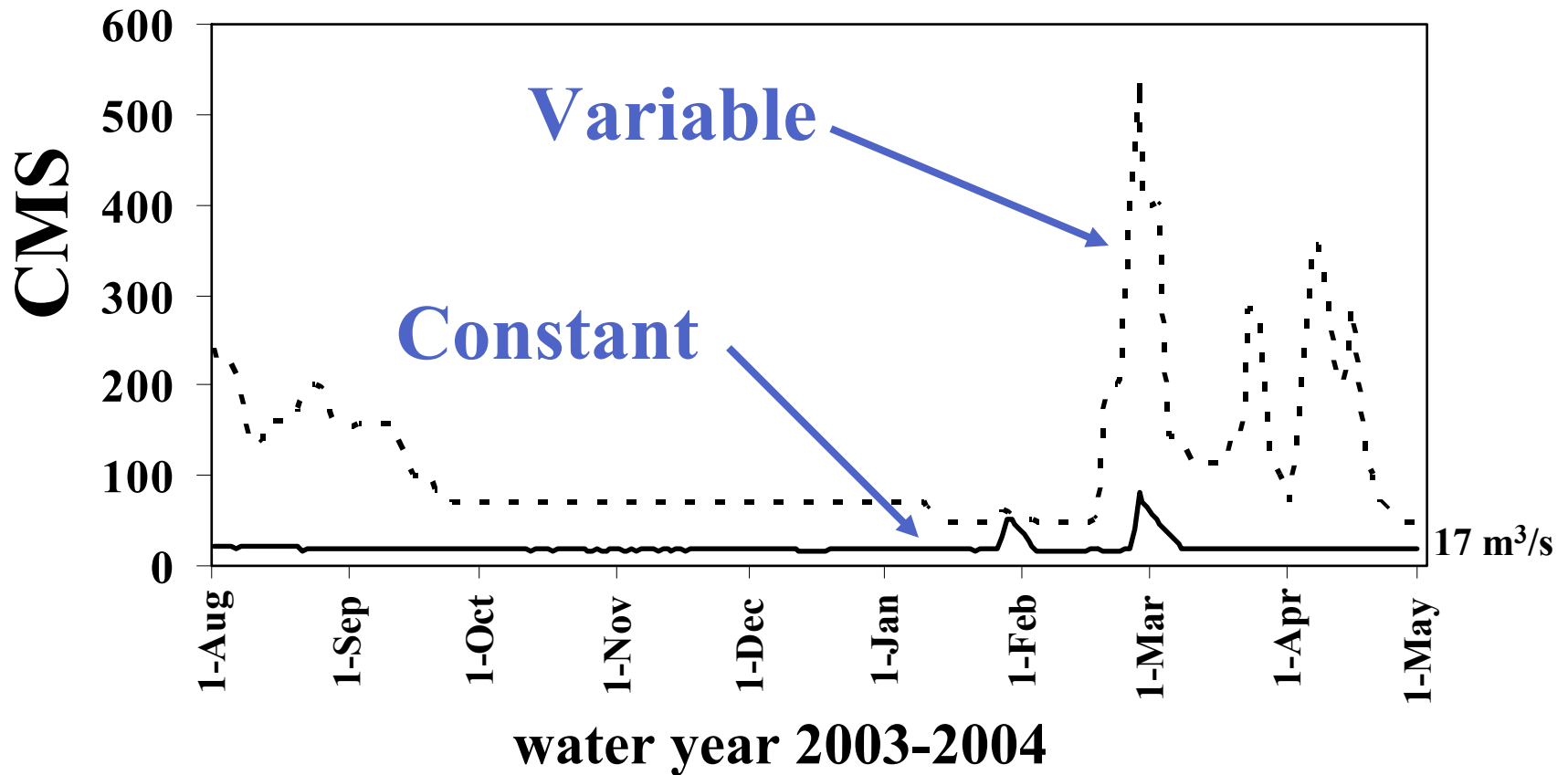
**Green River UT. – below Flaming Gorge Dam**



# Highly Modified Flow Regime



# Feather River Flow Alteration



**remove variation → ecological disturbance**





# Macroinvertebrate Communities

- bio-assessment
- IBI's
- constant flow impact?





# Drift samples



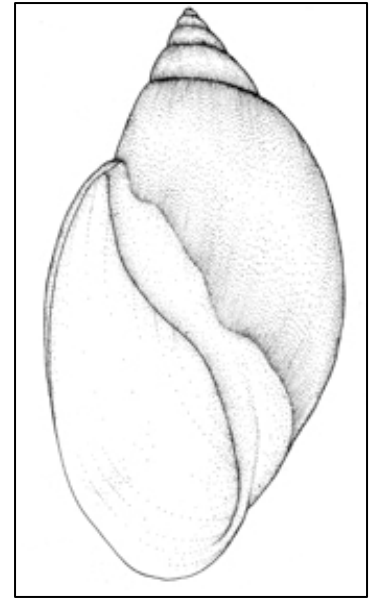
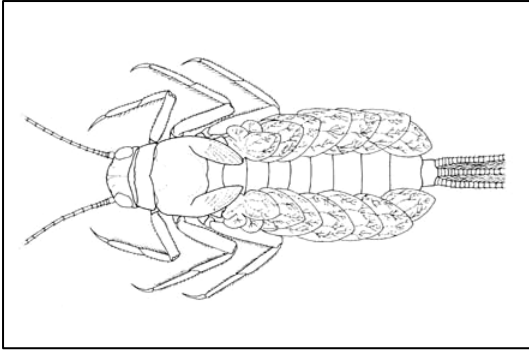
# Benthos samples



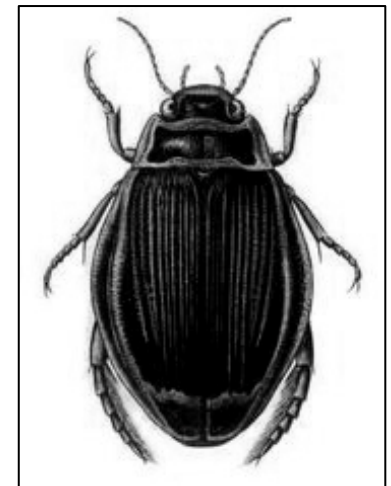
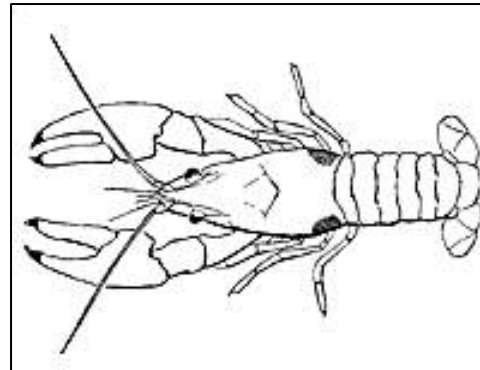
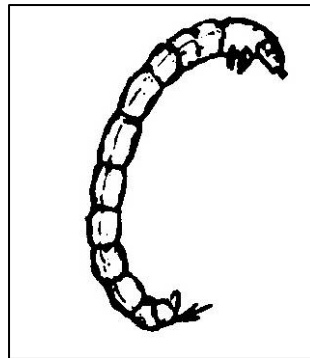
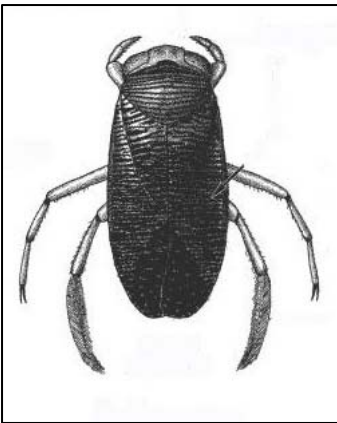


- composite samples/site
- 4 sites/flow treatment
- 3 seasons in year
- ID'd to genus/sp.
- CPUE

# Two Endpoints



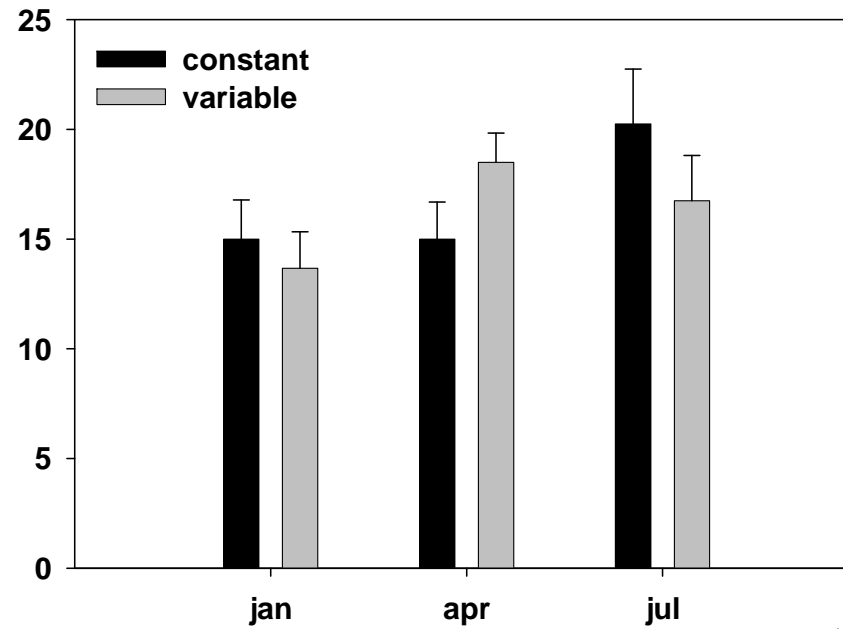
- **gen. community properties (richness, diversity etc.)**
- **specific community membership (ordination - NMDS)**





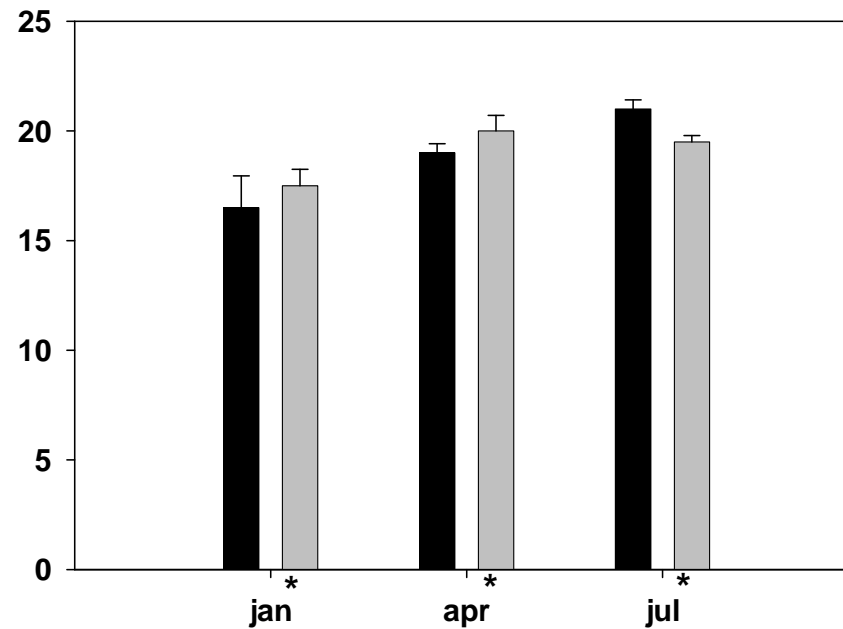
# Drift

Avg. species richness



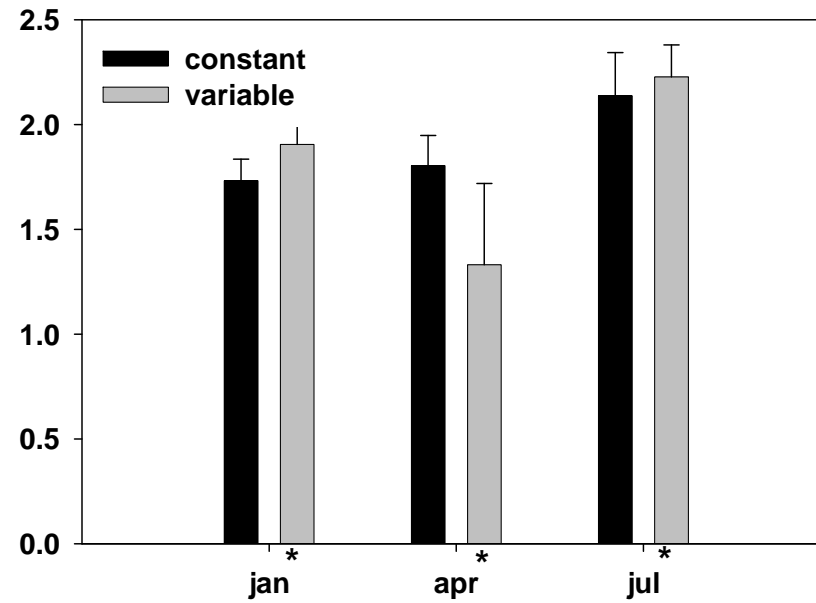
\* significant @  $\alpha = 0.05$

# Benthos



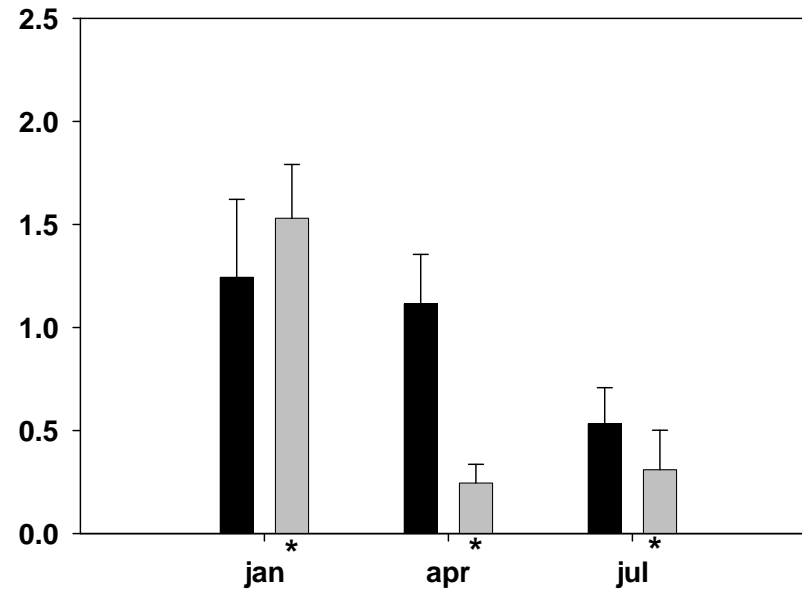
# Drift

Avg. Shannon Diversity



\* significant @  $\alpha = 0.05$

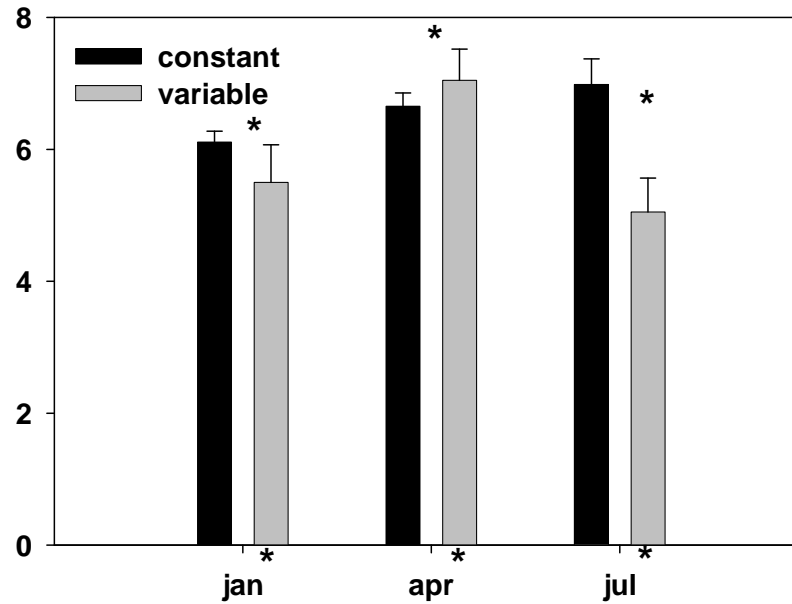
# Benthos





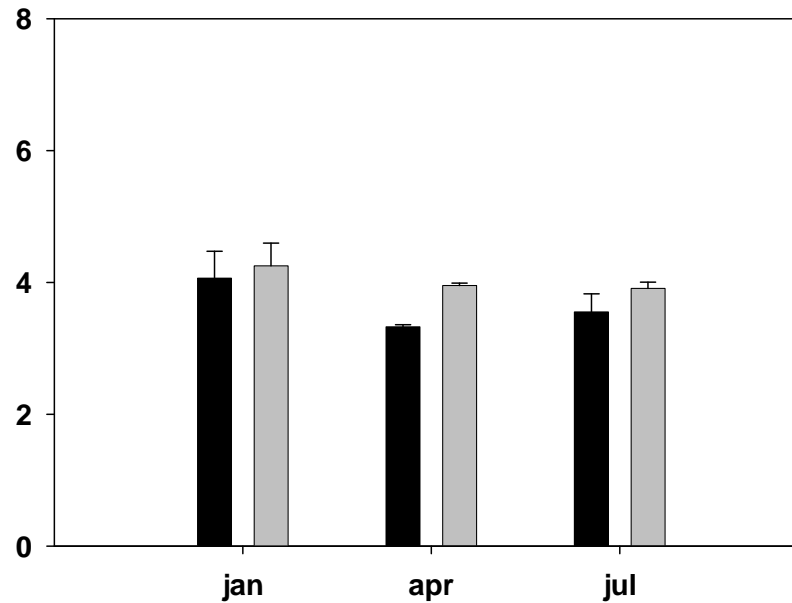
# Drift

Avg. Hilsenhoff Score



\* significant @  $\alpha = 0.05$

# Benthos





- general measures

→ no difference





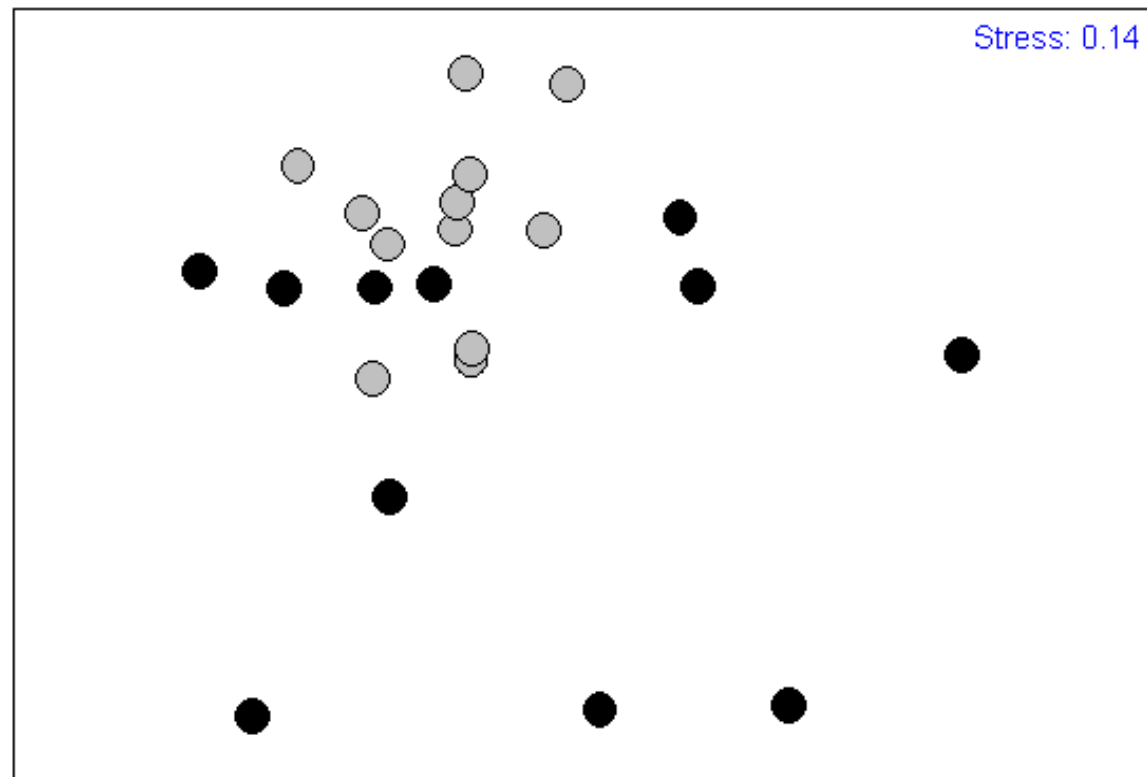
# NMDS Plot – Drift

between flow groups  $p=0.001$

between seasons  $p=0.001$

● **constant**

● **variable**







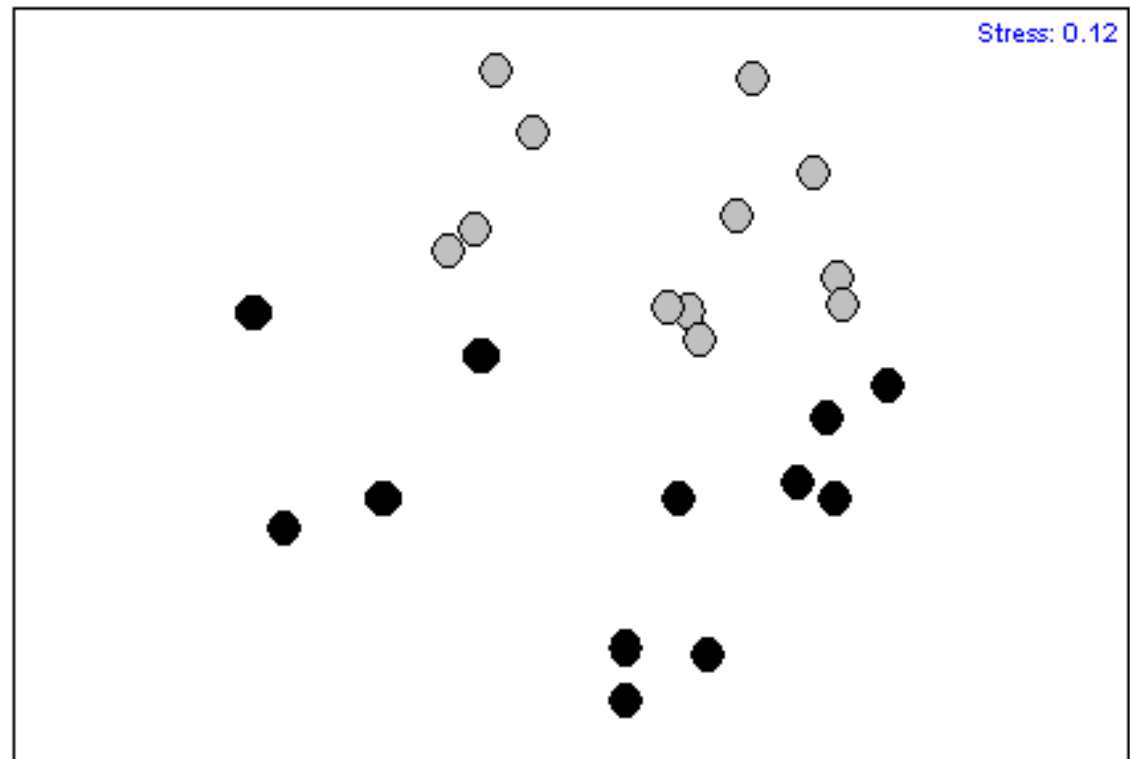
# NMDS Plot – Benthos

between flow groups  $p=0.001$

between seasons  $p=0.001$

● **constant**

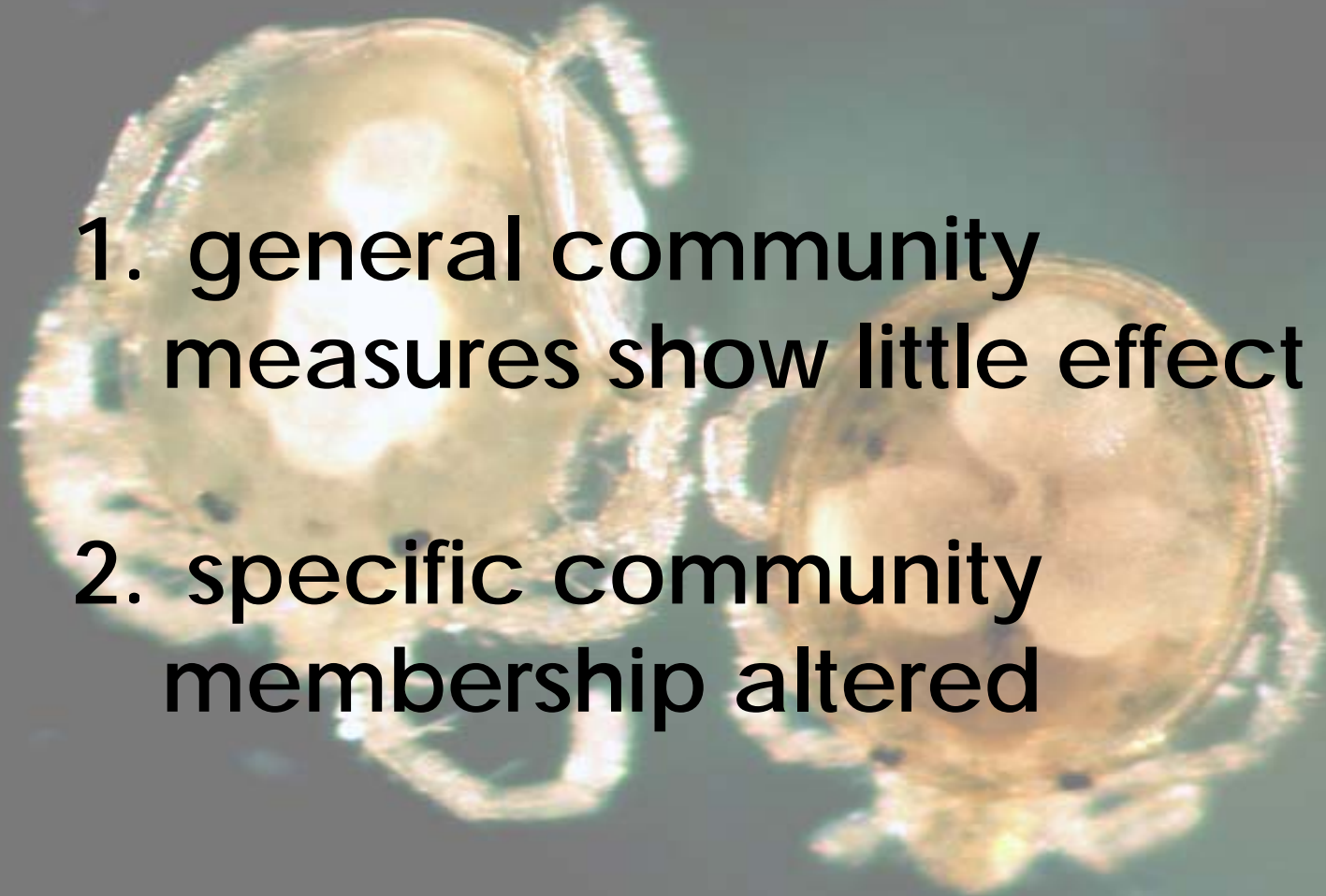
● **variable**



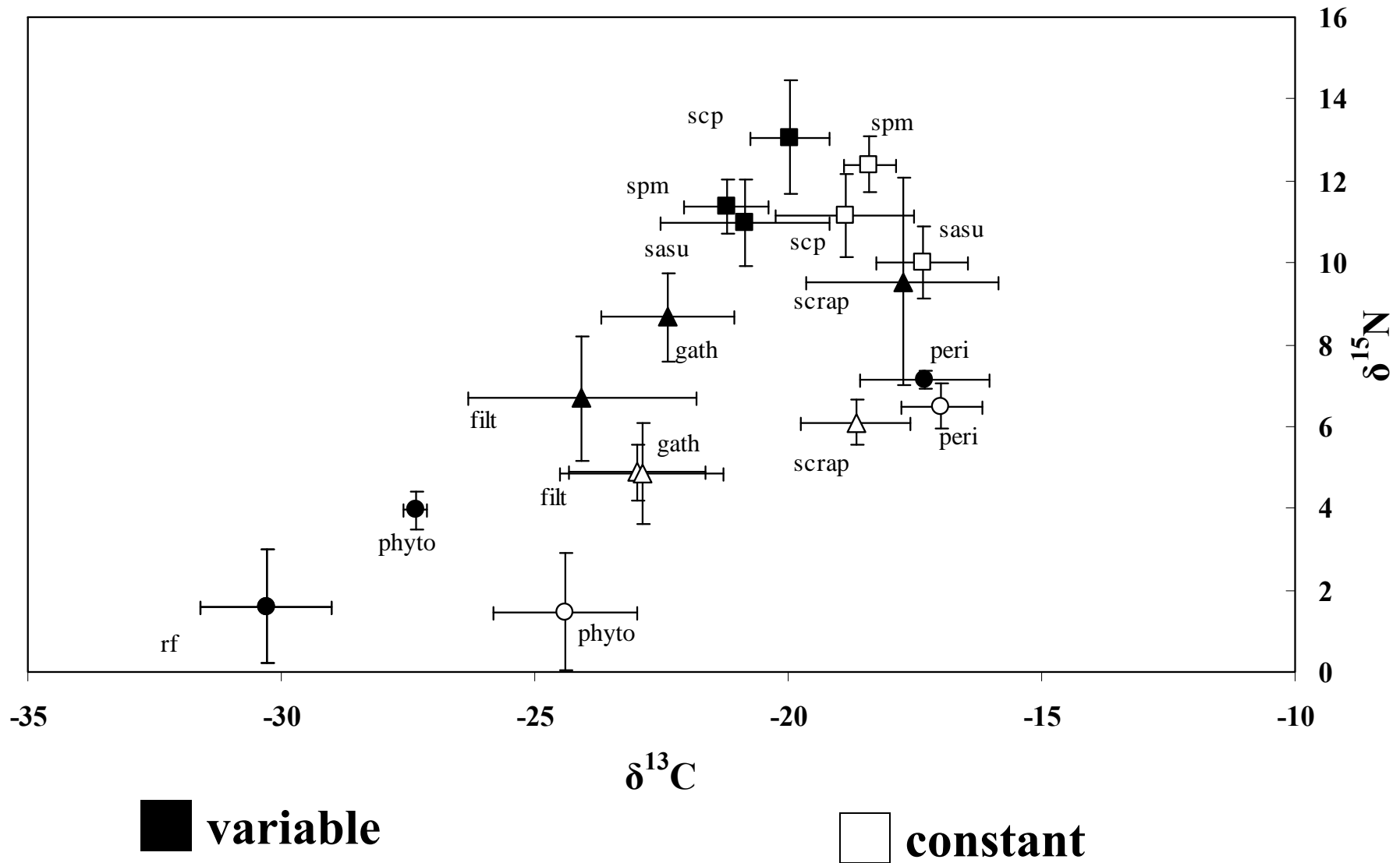


# Results

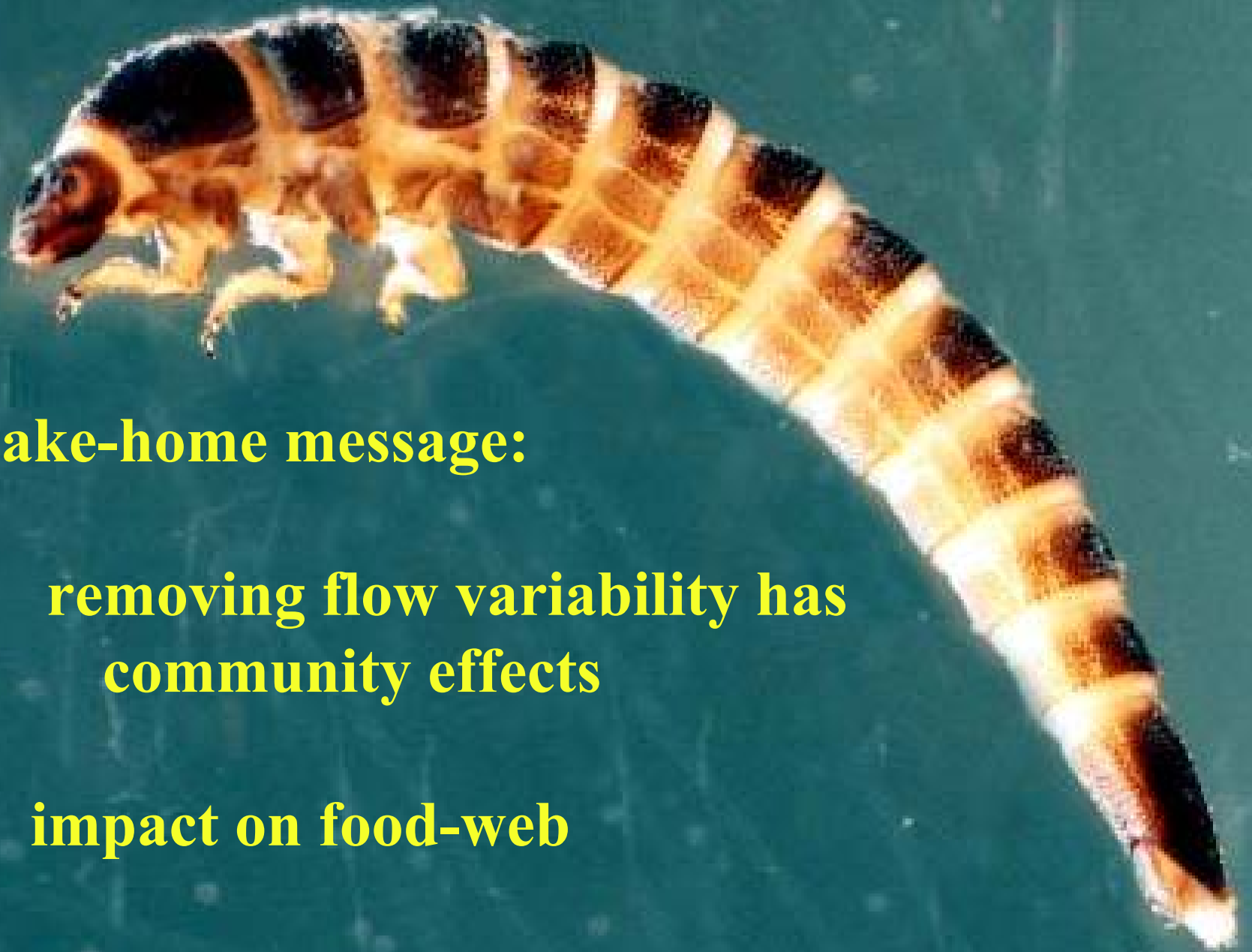
1. general community measures show little effect
2. specific community membership altered



# stable isotope food-web data







## **Take-home message:**

- **removing flow variability has community effects**
- **impact on food-web**

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**Thank you**

