

Largemouth Bass Predation Ecology in the Sacramento-San Joaquin Delta



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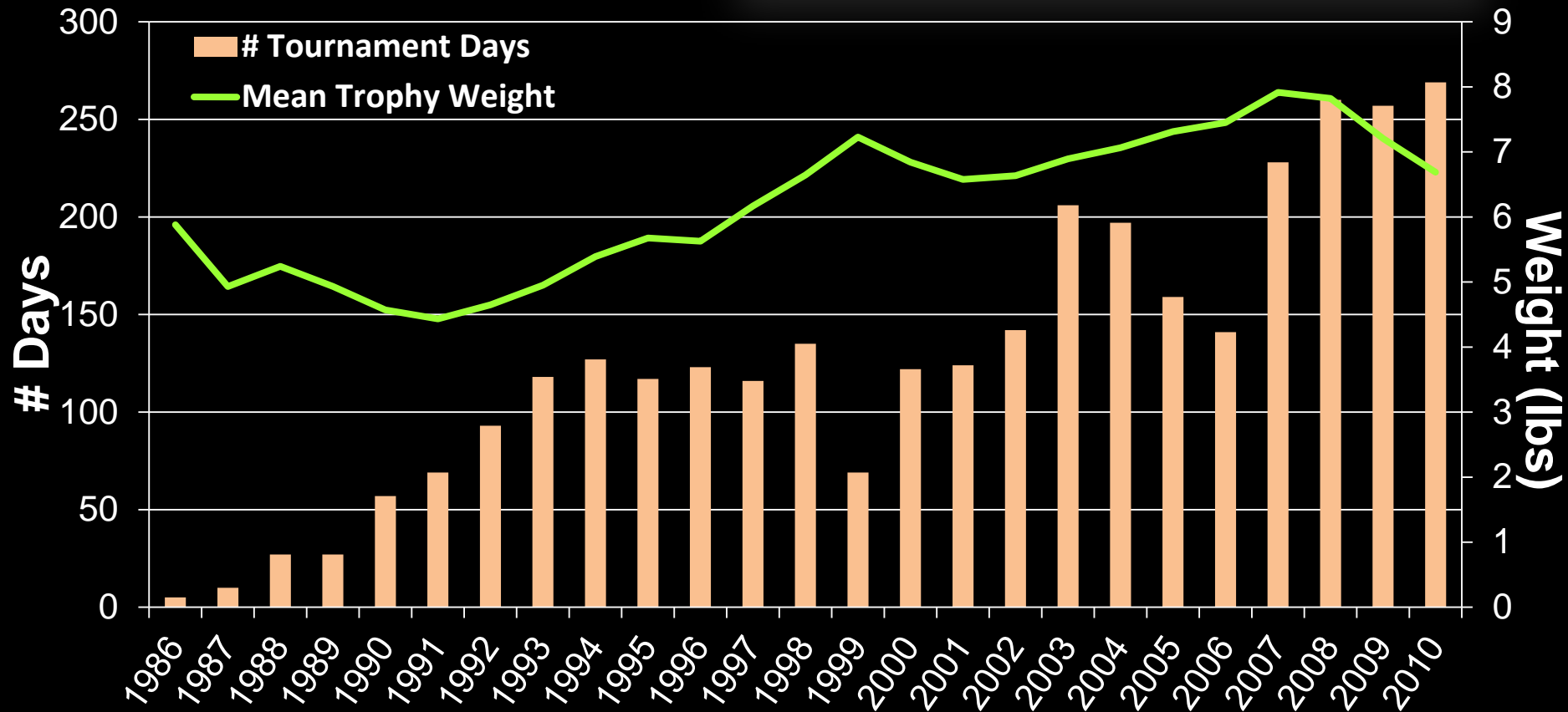


Largemouth Bass have been in the Delta since the early 1900s

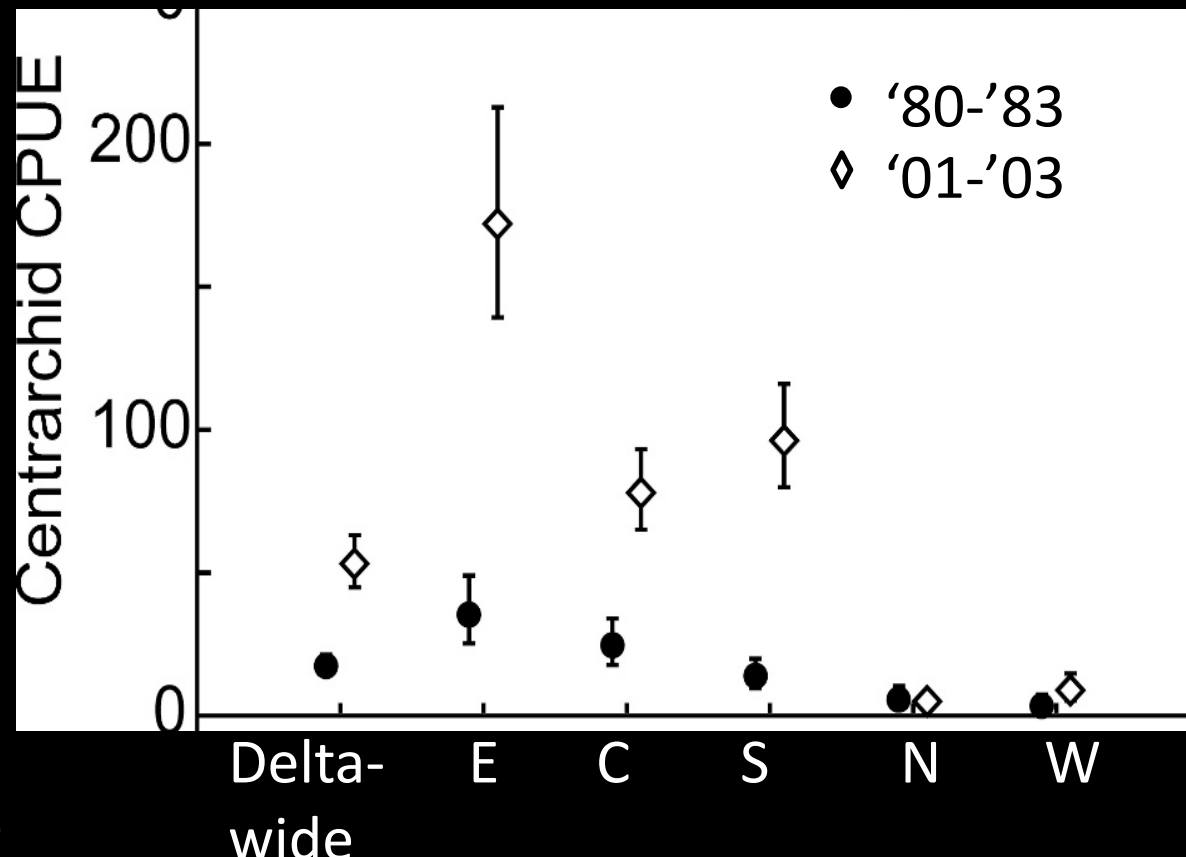
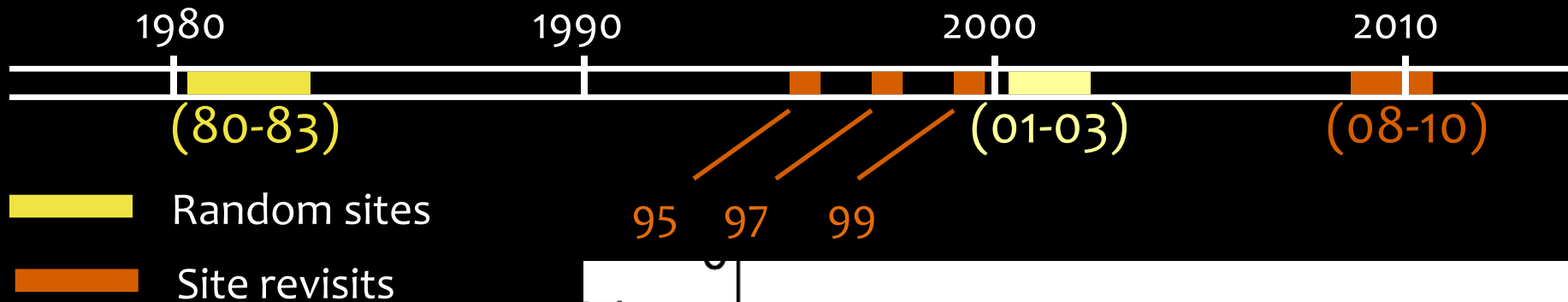


Delta is now a *world-class*

largemouth bass fishery

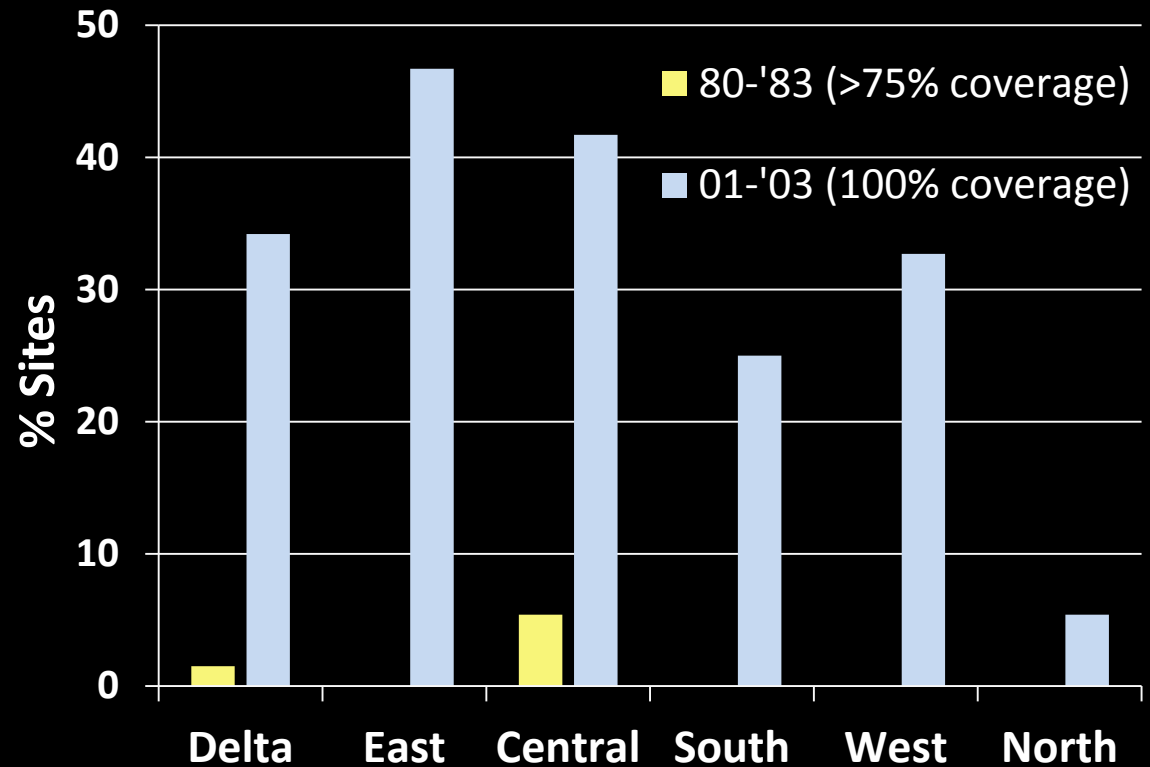


Historical survey data are sporadic but show marked LMB increase



Brown and Michniuk, 2007.
Estuaries and Coasts 30: 186-200.

Concurrent Rise in Invasive Submerged Aquatic Vegetation (SAV)



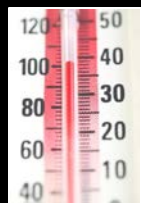
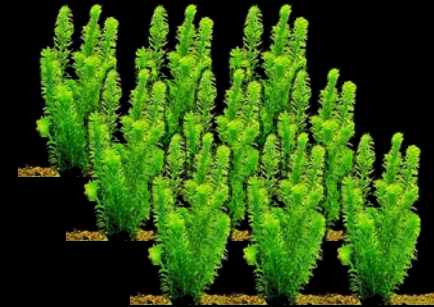
Adapted from Brown and Michniuk, 2007.
Estuaries and Coasts 30: 186-200.

2008: What more do we want to know about LMB?

LMB



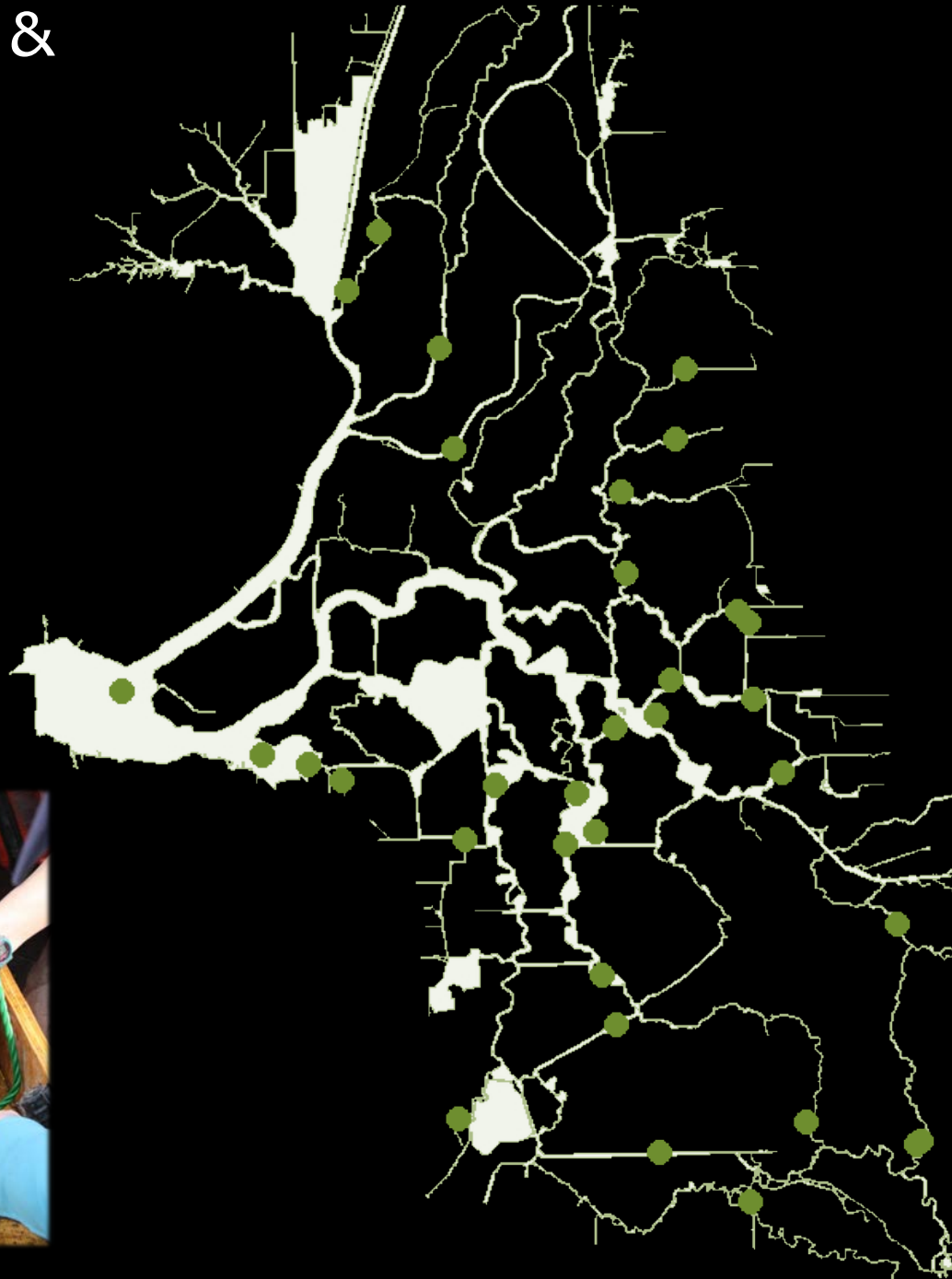
?



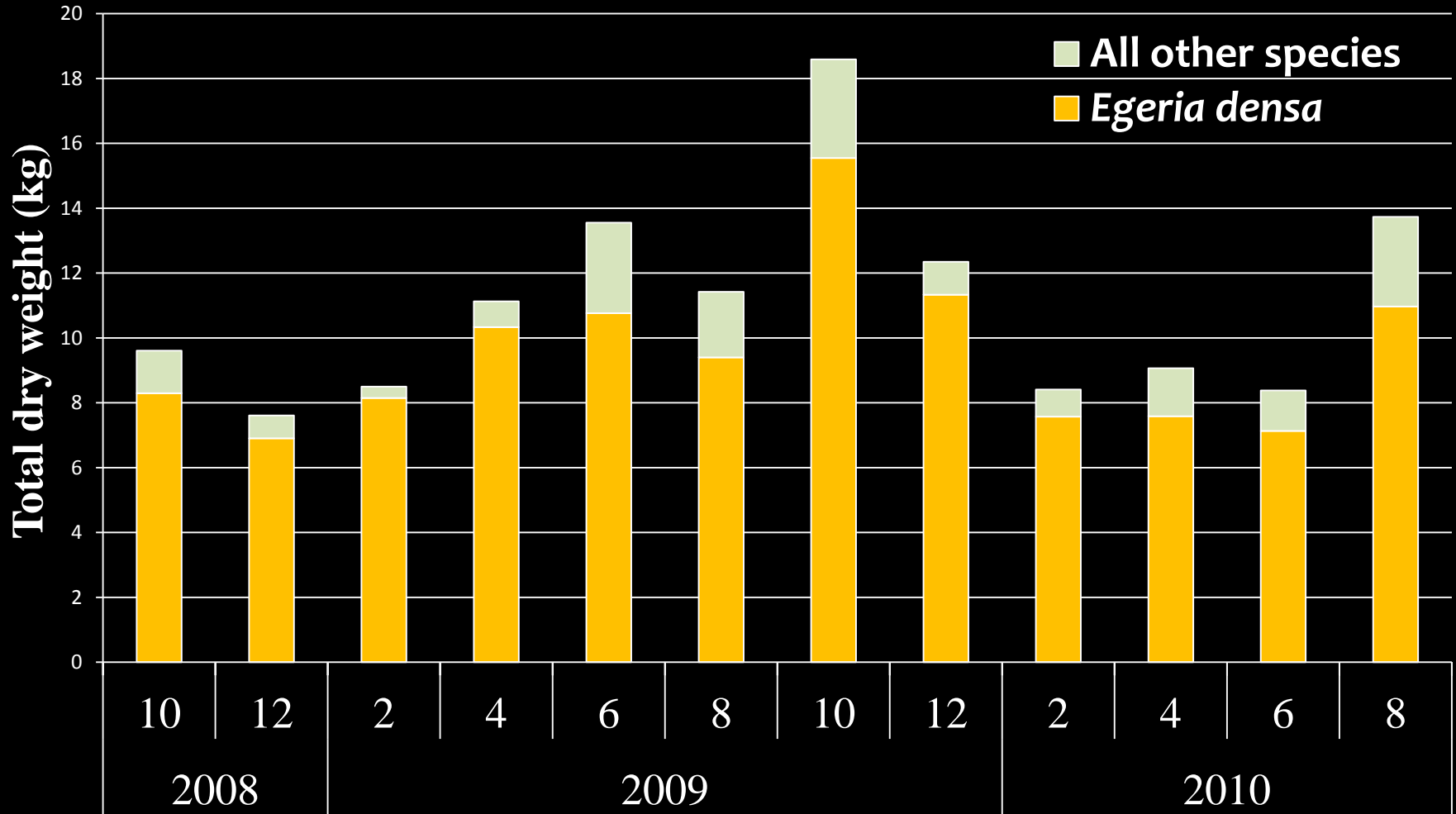
?

Bimonthly fish, vegetation & WQ surveys

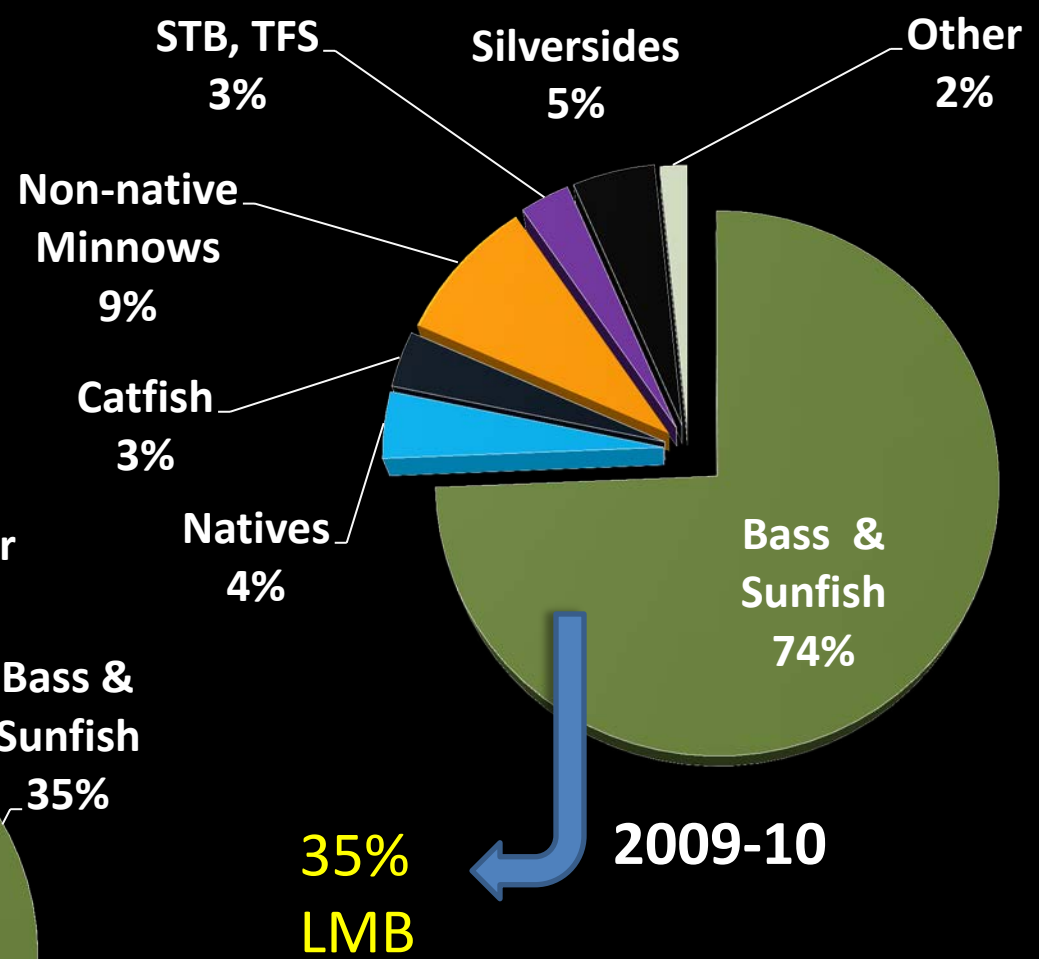
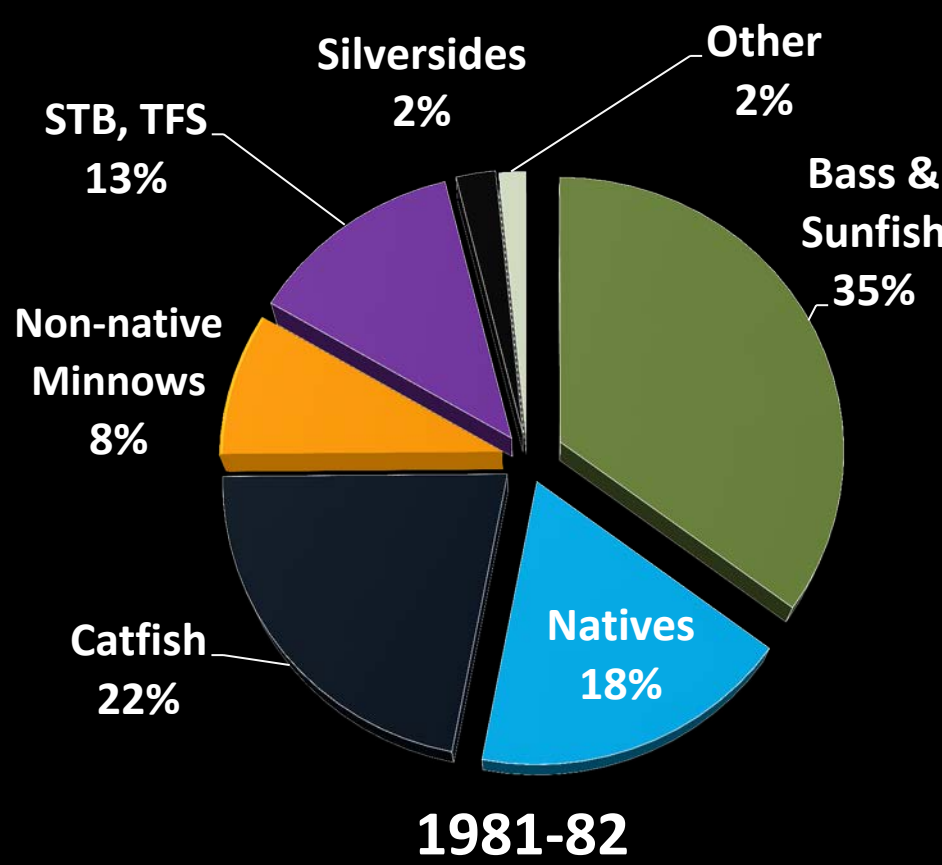
- 33 sites
- Oct 2008 – Oct 2010



Egeria densa dominates the SAV community



Species composition ... then and now



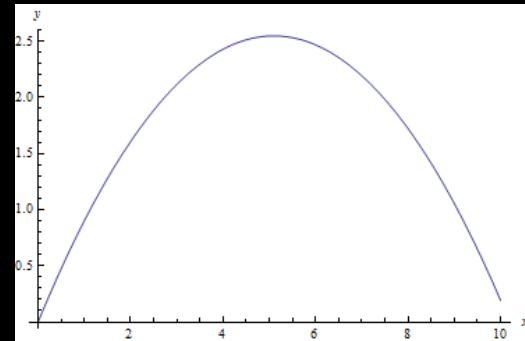
STB = Striped bass
TFS = Threadfin shad

Source: CDFG Resident Fish Survey ('81-'82). UC Davis Study ('09-'10). Catch for months of February, April, June, August.

What environmental factors explain largemouth abundance? Bayesian approach to mixed models



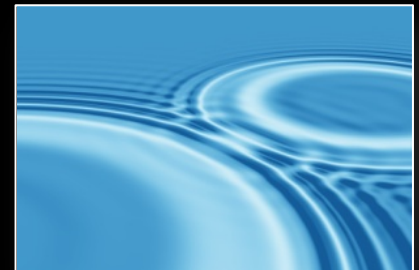
A priori
expectation =



Water temperature



Conductivity



Water clarity (Secchi depth)

What environmental factors explain largemouth abundance? Bayesian approach to mixed models



- Separate models for adults and young-of-the-year





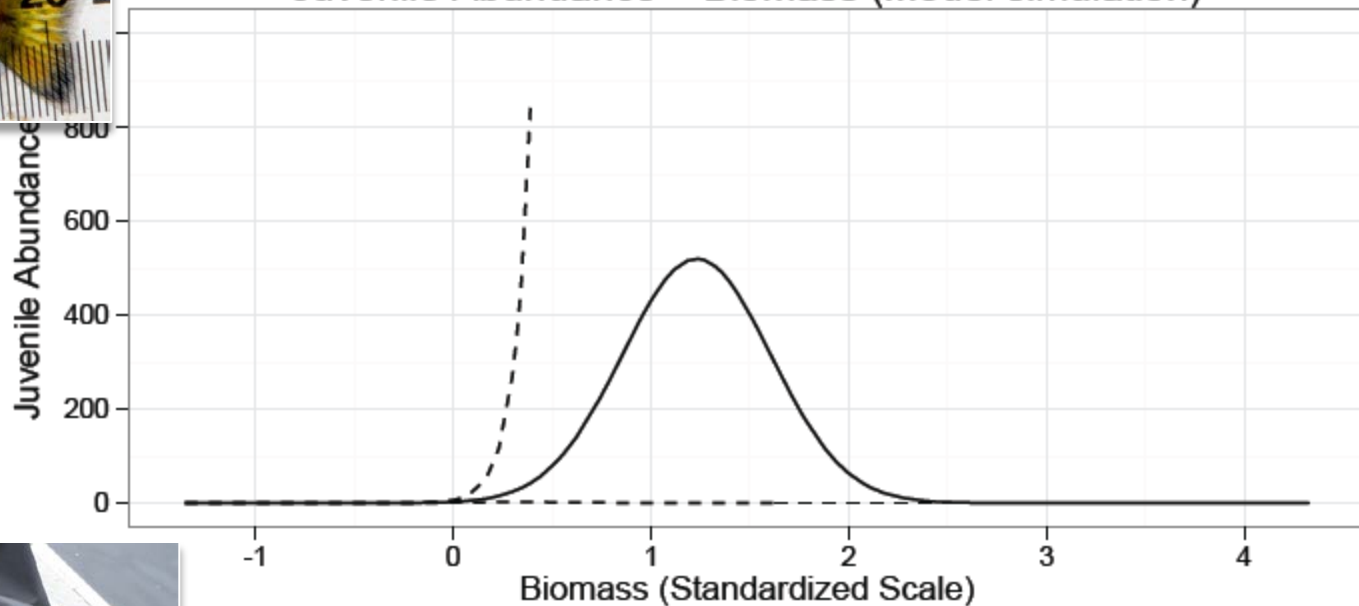
Secchi
Temperature
Conductivity
SAV, degree=1
SAV, degree=2

Age 1 and older		
Estimate	Lower CI	Upper CI
0.081	-0.025	0.199
0.098	0.009	0.182
-0.003	-0.130	0.113
-0.427	-2.526	1.712
-1.021	-2.730	0.838

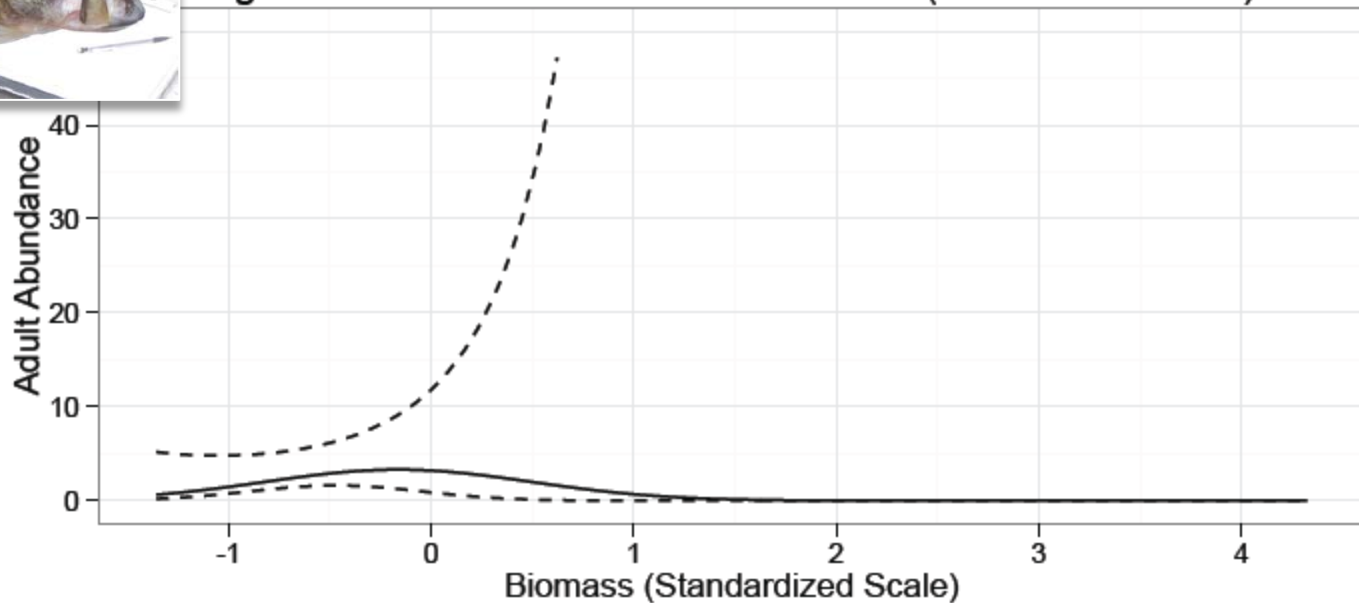
Young-of-the-Year		
Estimate	Lower CI	Upper CI
0.086	-0.117	0.301
0.270	0.106	0.439
-0.265	-0.503	-0.026
8.717	4.966	12.481
-3.668	-6.972	-0.186



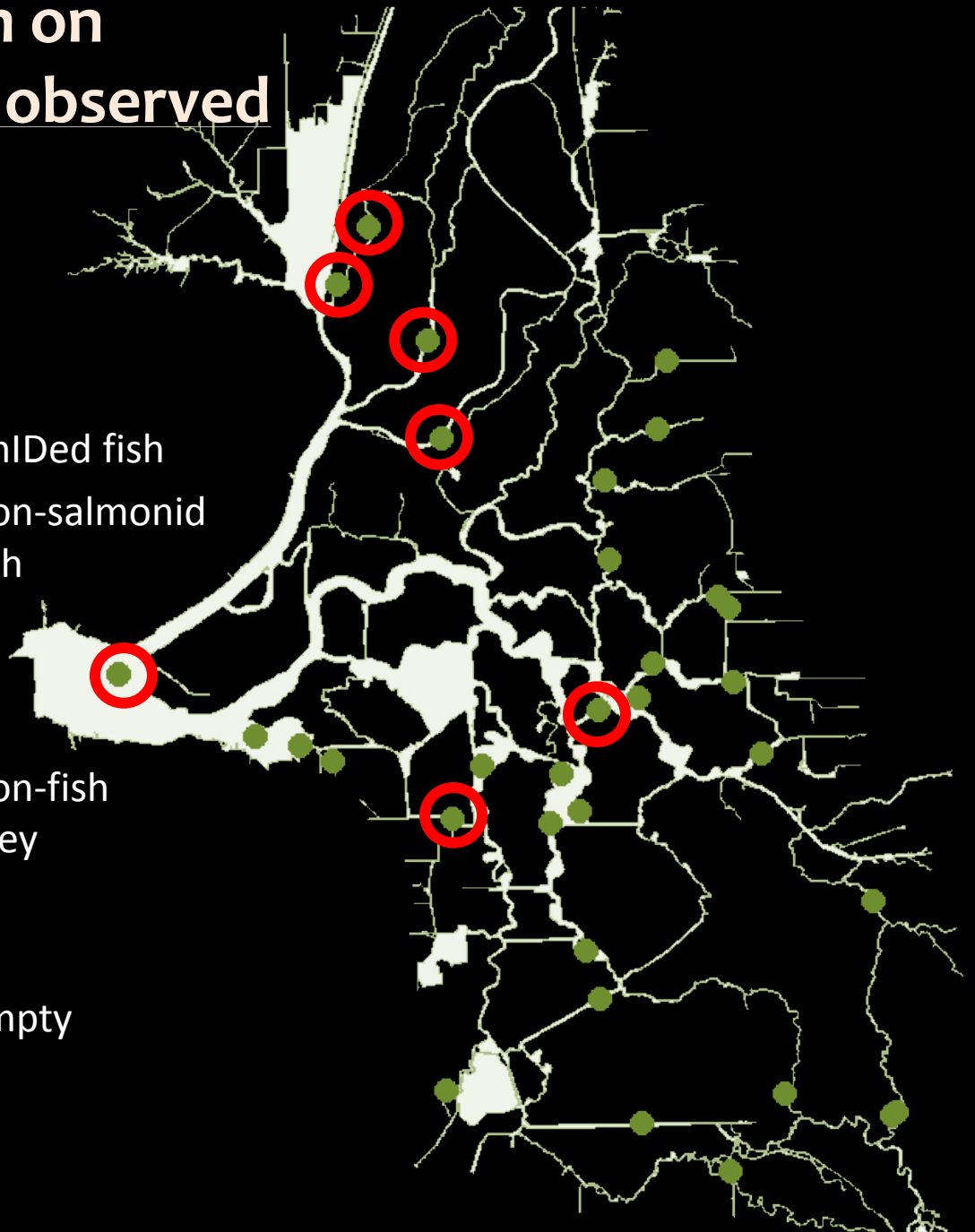
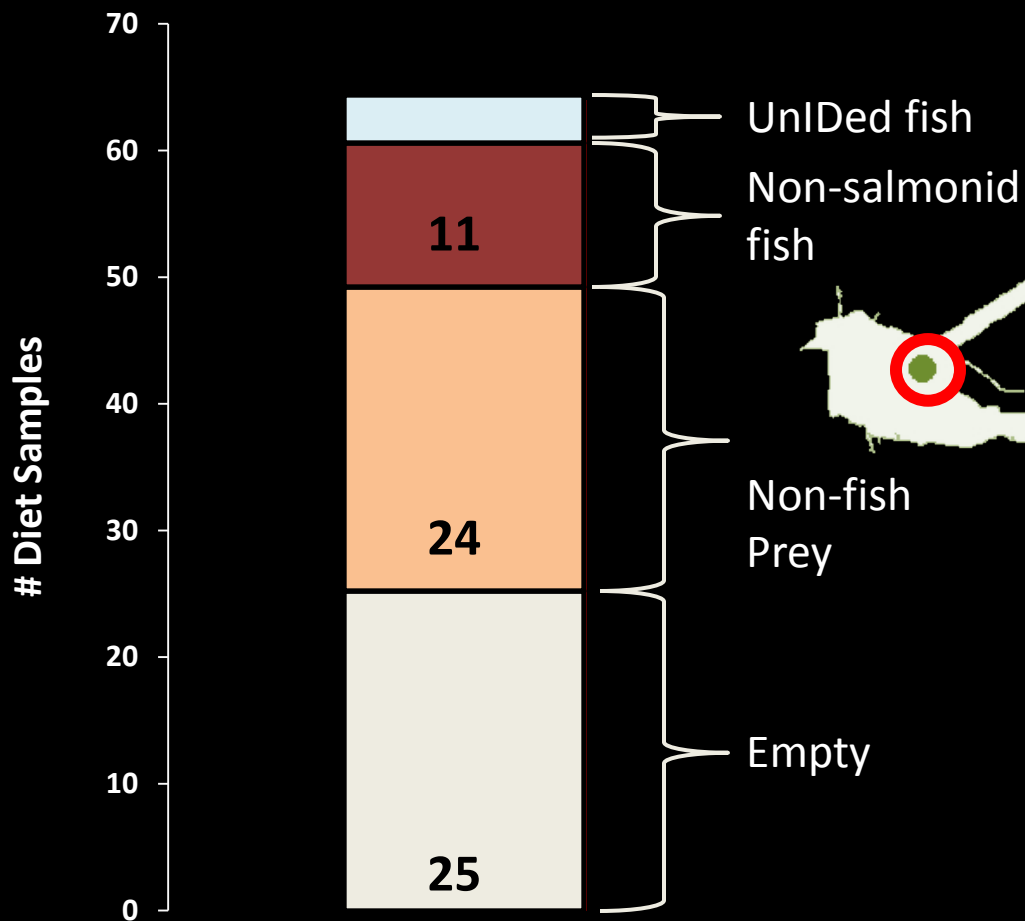
Juvenile Abundance ~ Biomass (Model simulation)



Age 1 and older Abundance ~ Biomass (Model simulation)



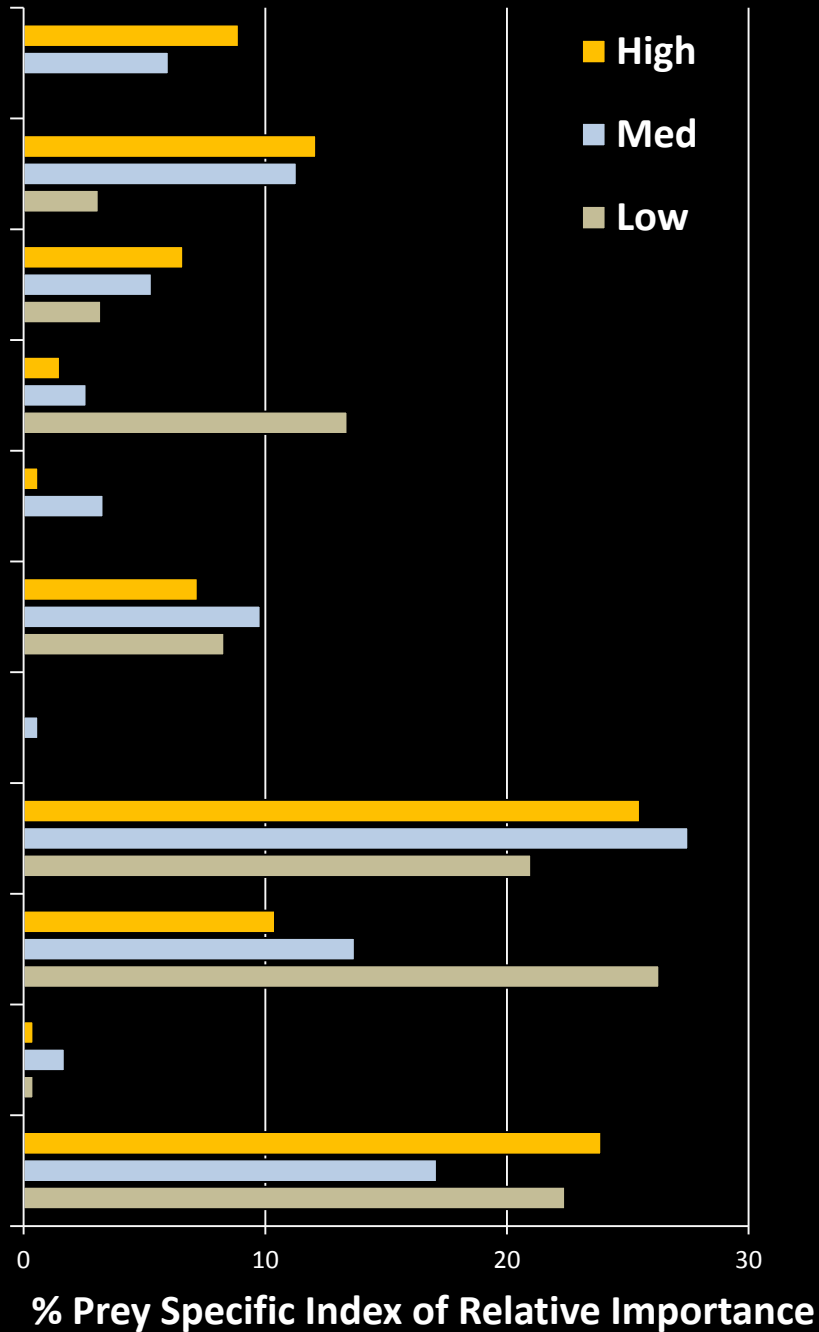
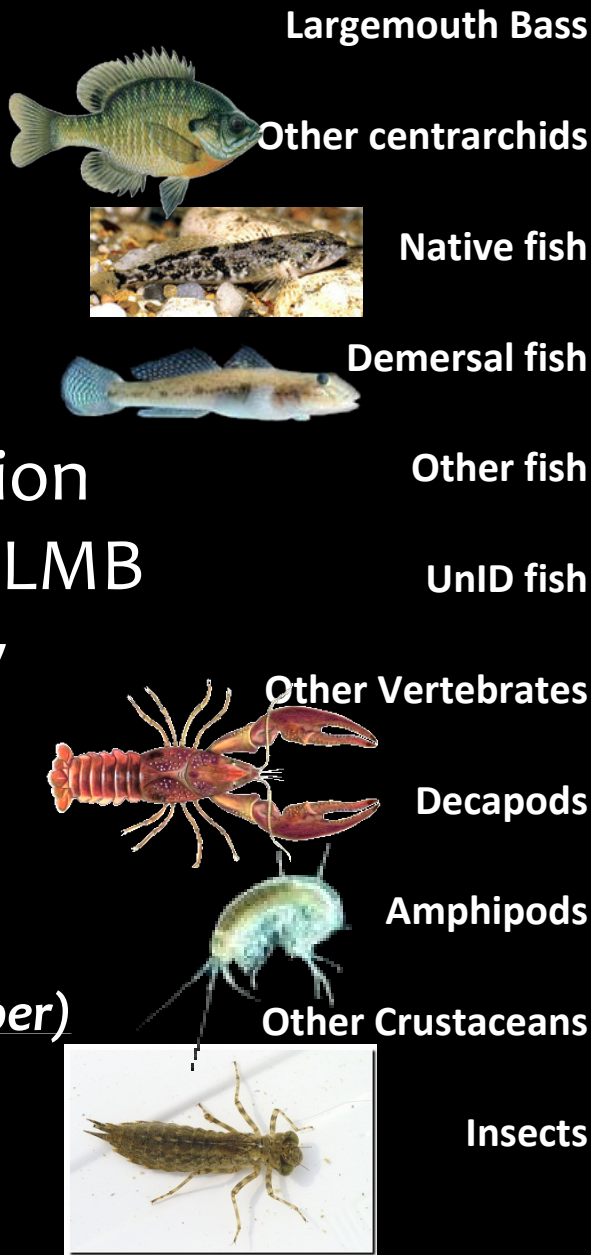
Largemouth Predation on Chinook Salmon: NOT observed despite co-occurrence



Diet Composition of Piscivorous LMB by SAV density

SUMMER
(June, August, October)

N (LOW) = 71
N (MED) = 181
N (HIGH) = 161

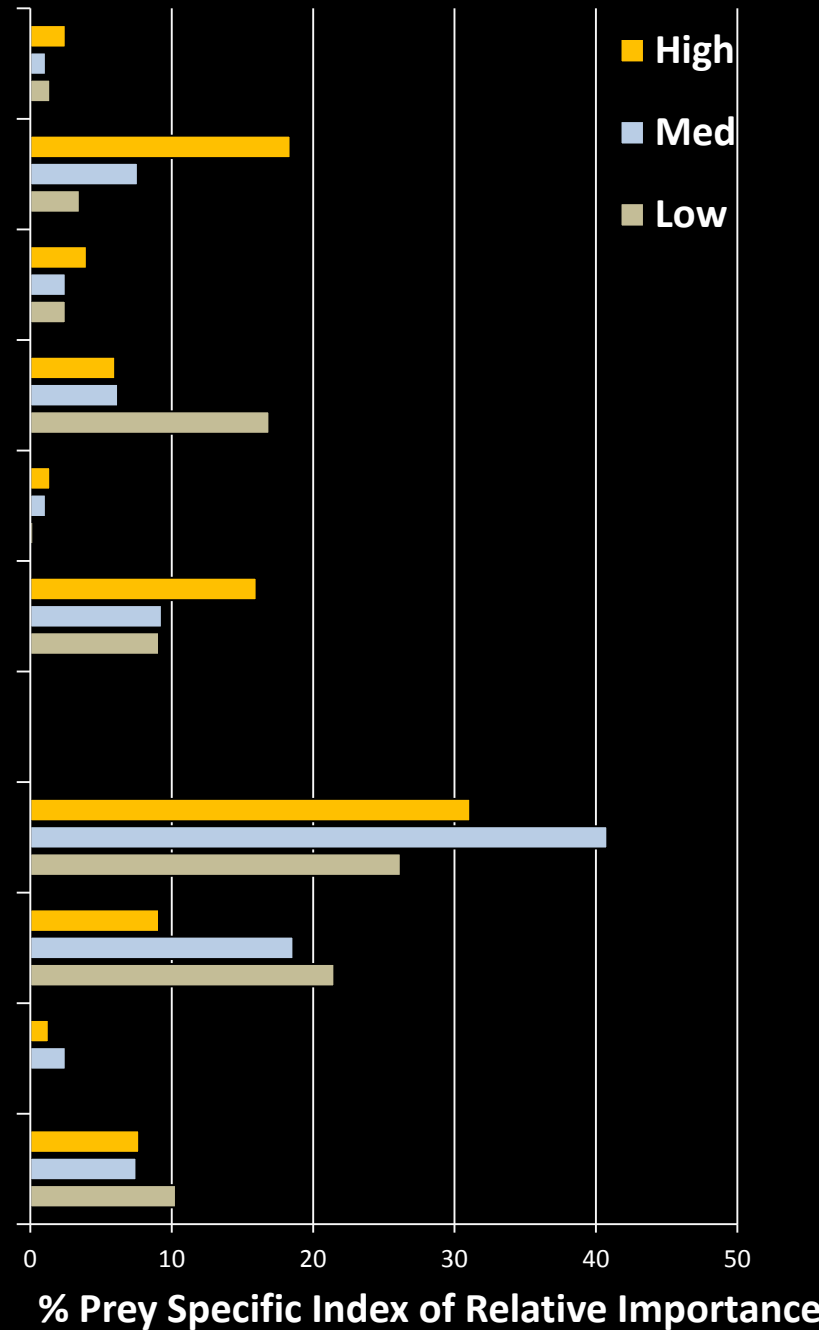
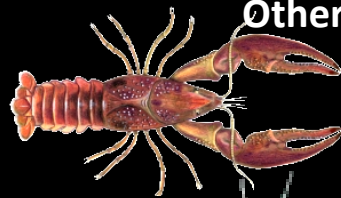
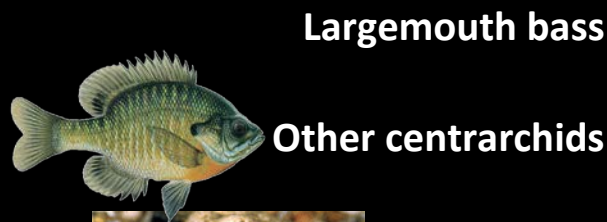


Diet Composition of Piscivorous LMB by SAV density

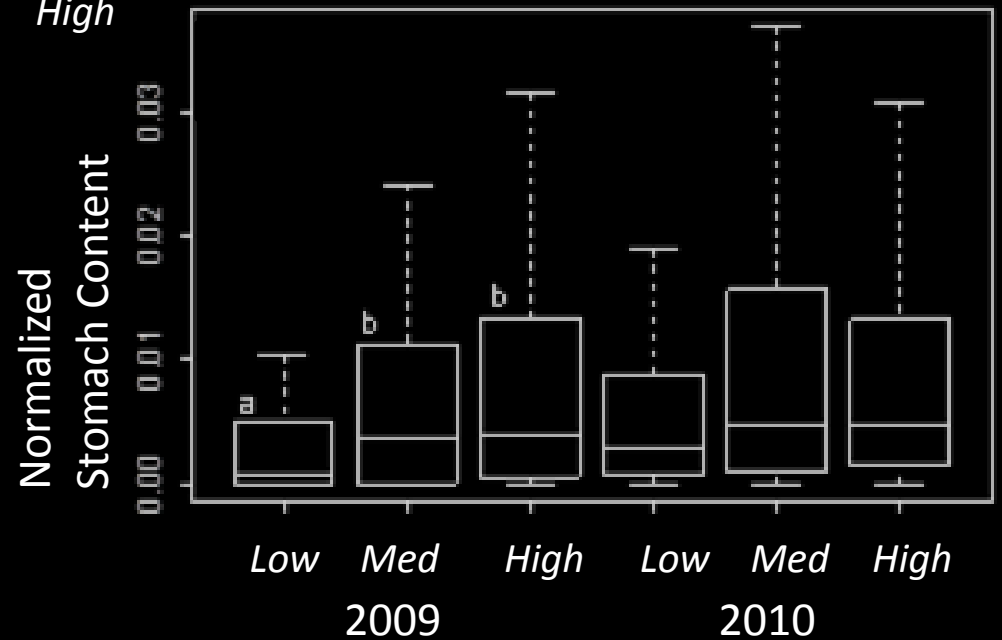
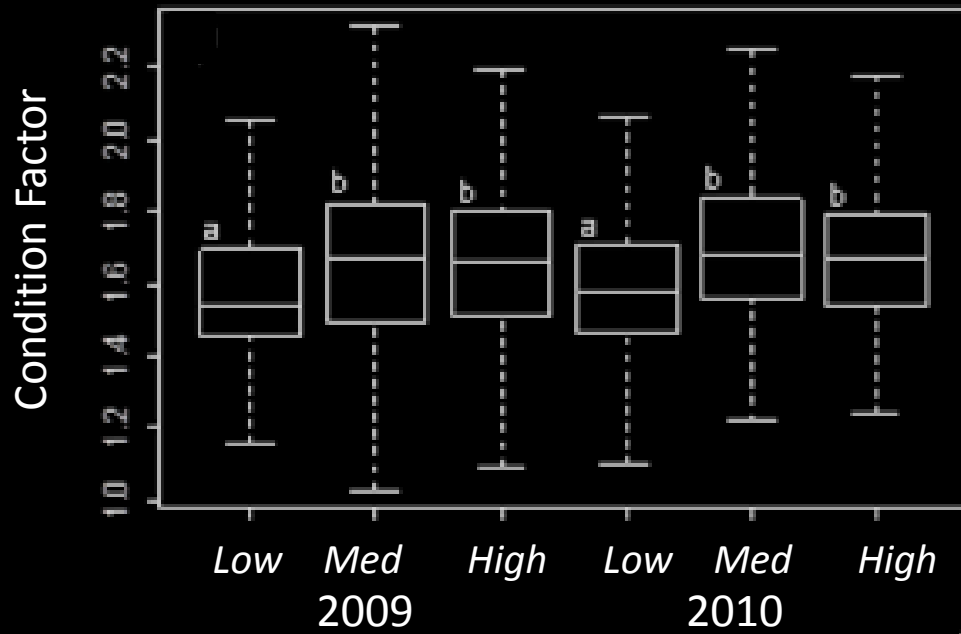
WINTER

(December, February, April)

N (LOW) = 78
 N (MED) = 103
 N (HIGH) = 157



More SAV = Fatter & Fuller Bass



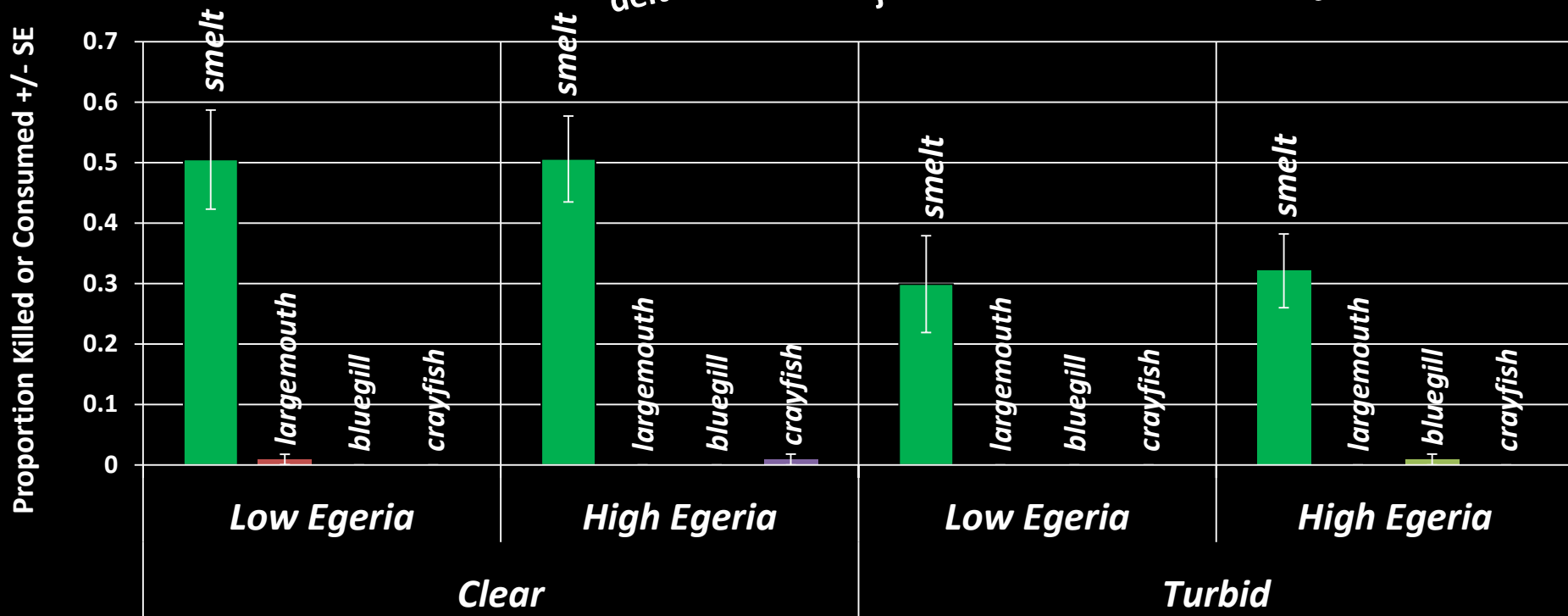
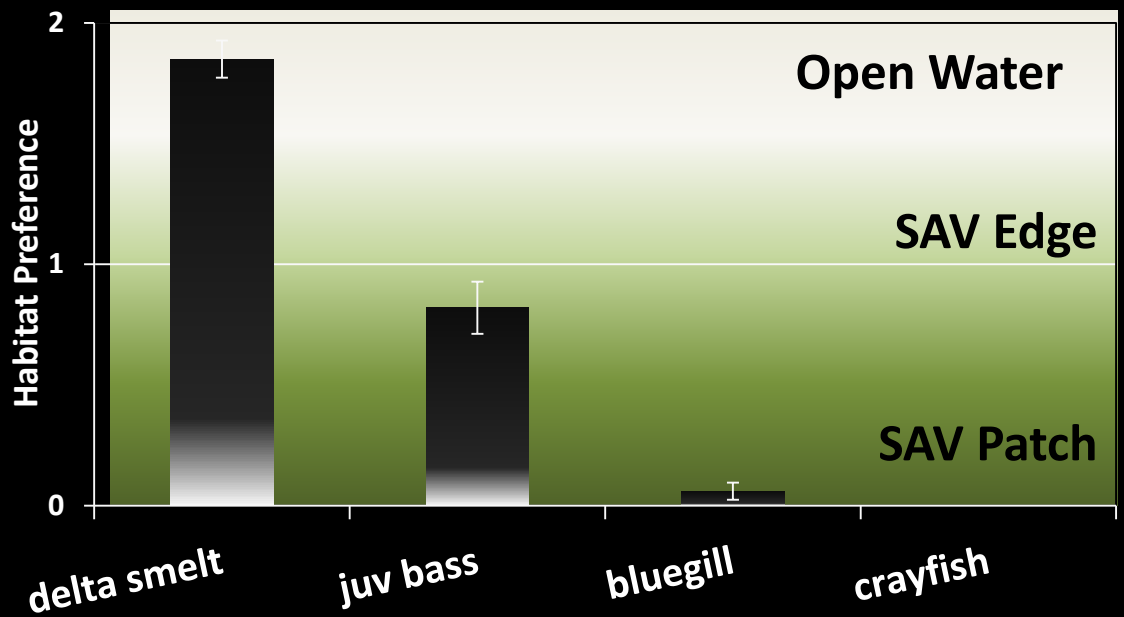
From the field to the lab:

1. Does *Egeria* biomass density affect WHERE adults feed?
 - Prey choice?



2. Additional effects of turbidity?

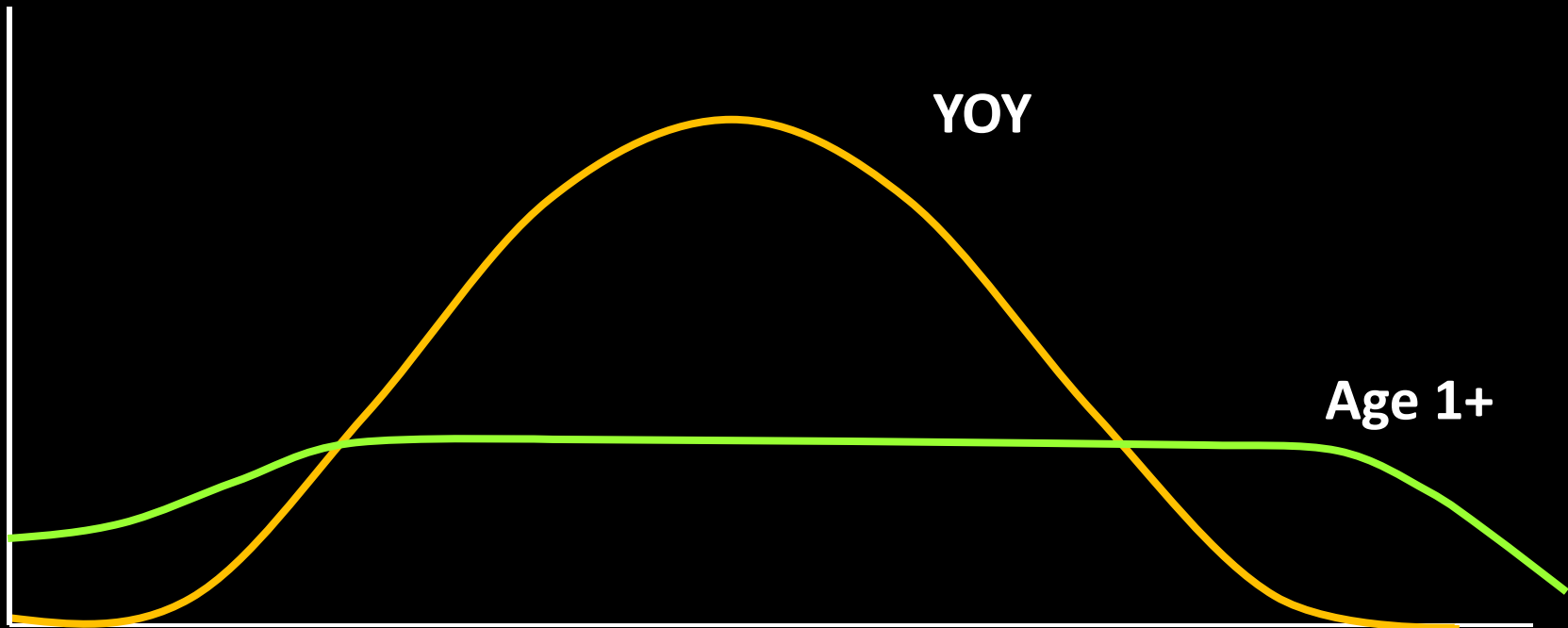
12 Replicates Each Combination:		<i>Egeria</i> Biomass Density	
		Low	High
Turbidity	Clear		
	Turbid		



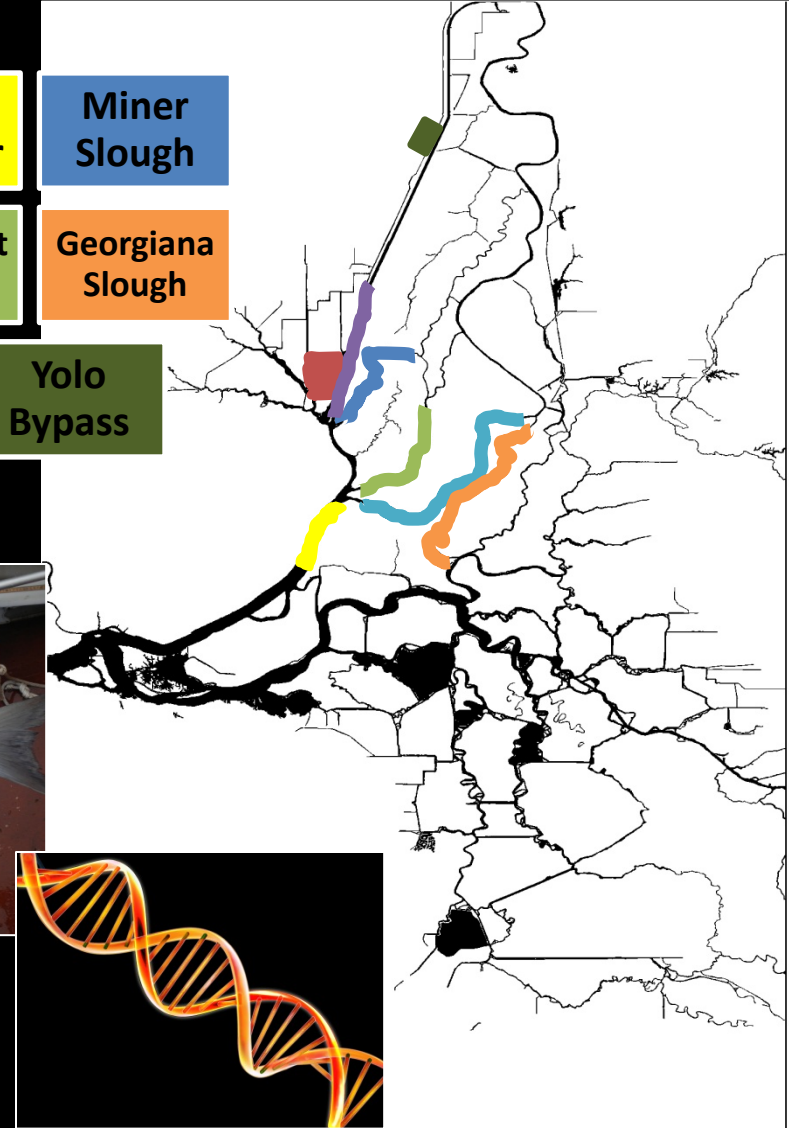
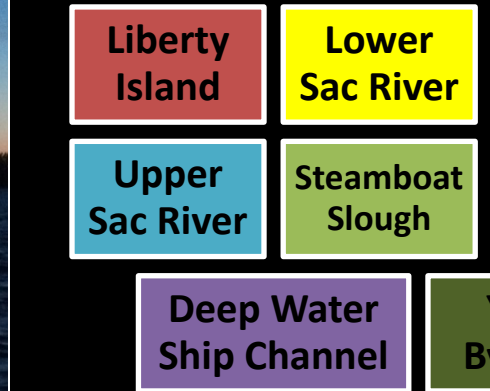
LMB

YOY

Age 1+



New Work: Using genetics to examine predation



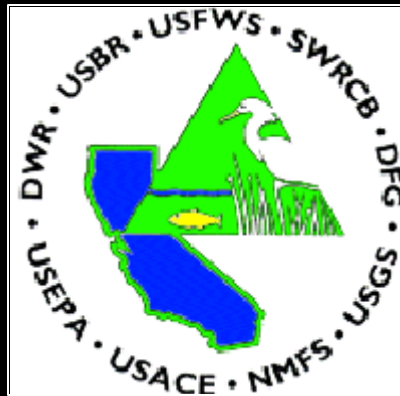
Project Leads: Brian Schreier (DWR); Melinda Baerwald (UCD)

Many Thanks

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Diet Sample Analysis

Talene Baghdassarian, UCD
Bryn Evans, UCD
Michael Vella, DWR
Caily Nelson, DWR



CDFW Resident Fish
Survey Data provided
by Larry Brown, USGS

LMB Tournament Data
Kyle Murphy & Kelly
Souza, CDFW
Jared Frantzich, DWR

Electrofishing Vessel: California
Department of Fish & Game
Marty Gingras, Curtis Hagen

