Preventing Secondary Spread of Non-Native Warmwater Fish in Lake Tahoe: What are We Doing Now and What's Next?

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- California Department of Fish and Game
- University of Nevada, Reno

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TAHOE REGIONAL PLANNING AGENCY

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Tahoe Keys West Homeowners

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Tahoe Keys Marina Management

Marinas: Tahoe City, Meek's Bay, Sunnyside, Zephyr Cove, Obexer's Marina, Crystal Shore West

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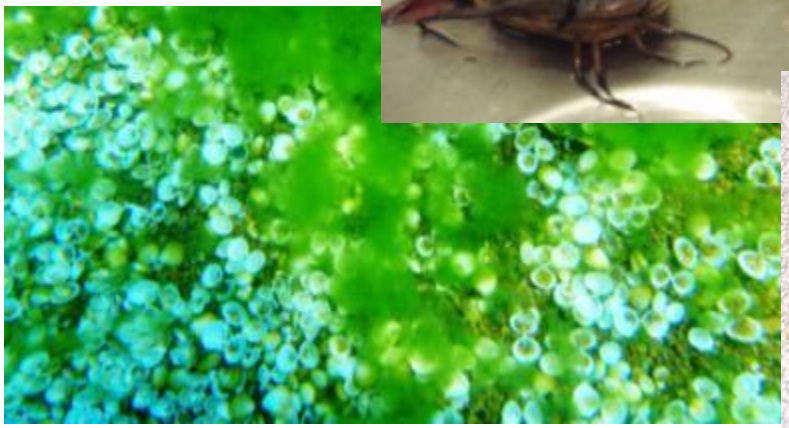
Aquatic Invasive (AIS) and Nonnaitve Species in Lake Tahoe



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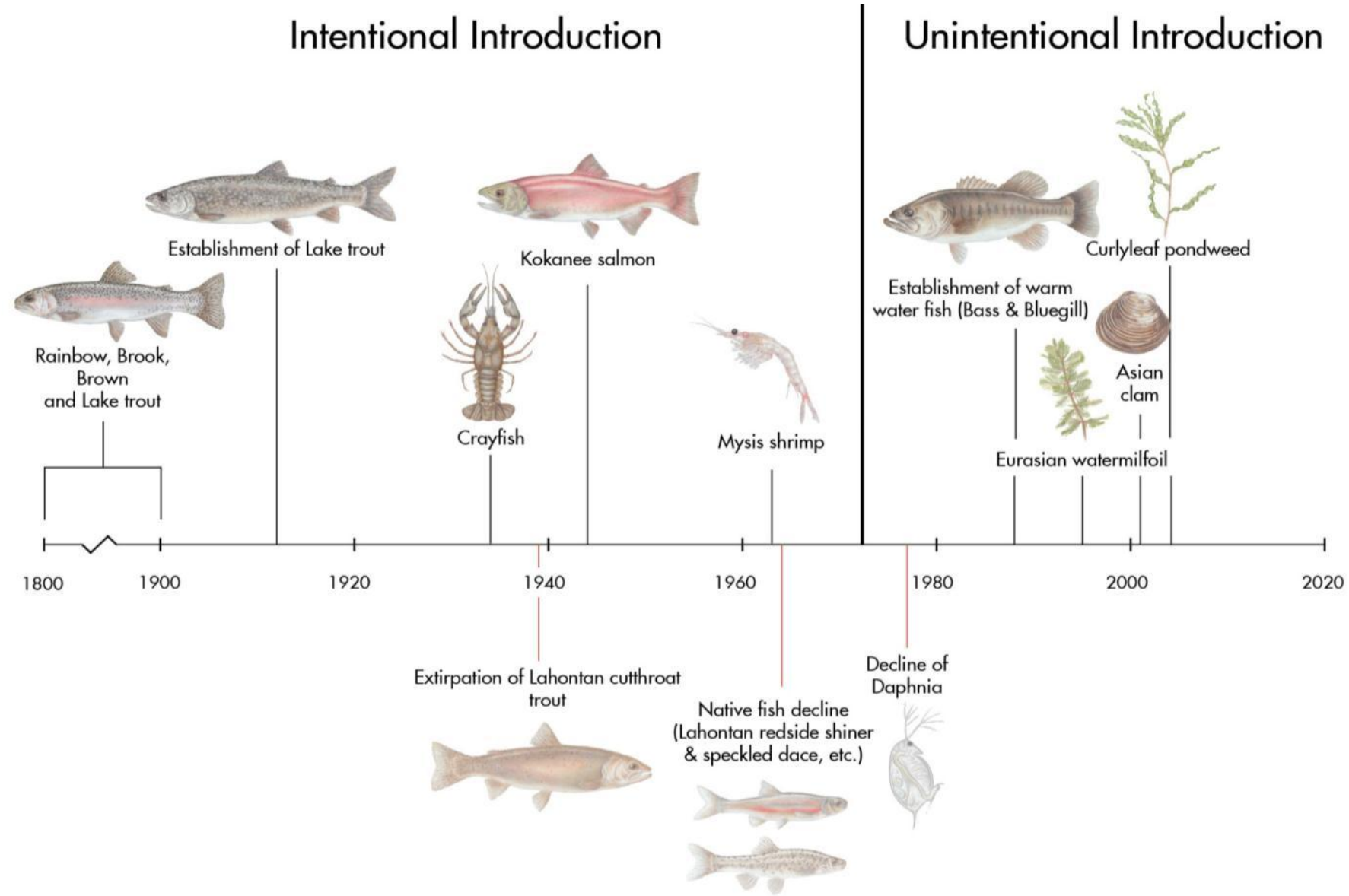
Lake Tahoe Nonnaitve Species Introduction Timeline



Fishes in Lake Tahoe

Nonnative Warmwater


Black bass


Black crappie


Bluegill


Brown bullhead


Goldfish

Native


Lahontan cutthroat


Mountain whitefish


Speckled dace


Lahontan redside


Tahoe sucker


Tui chub


Paiute sculpin

Coldwater Sport


Kokanee


Mackinaw

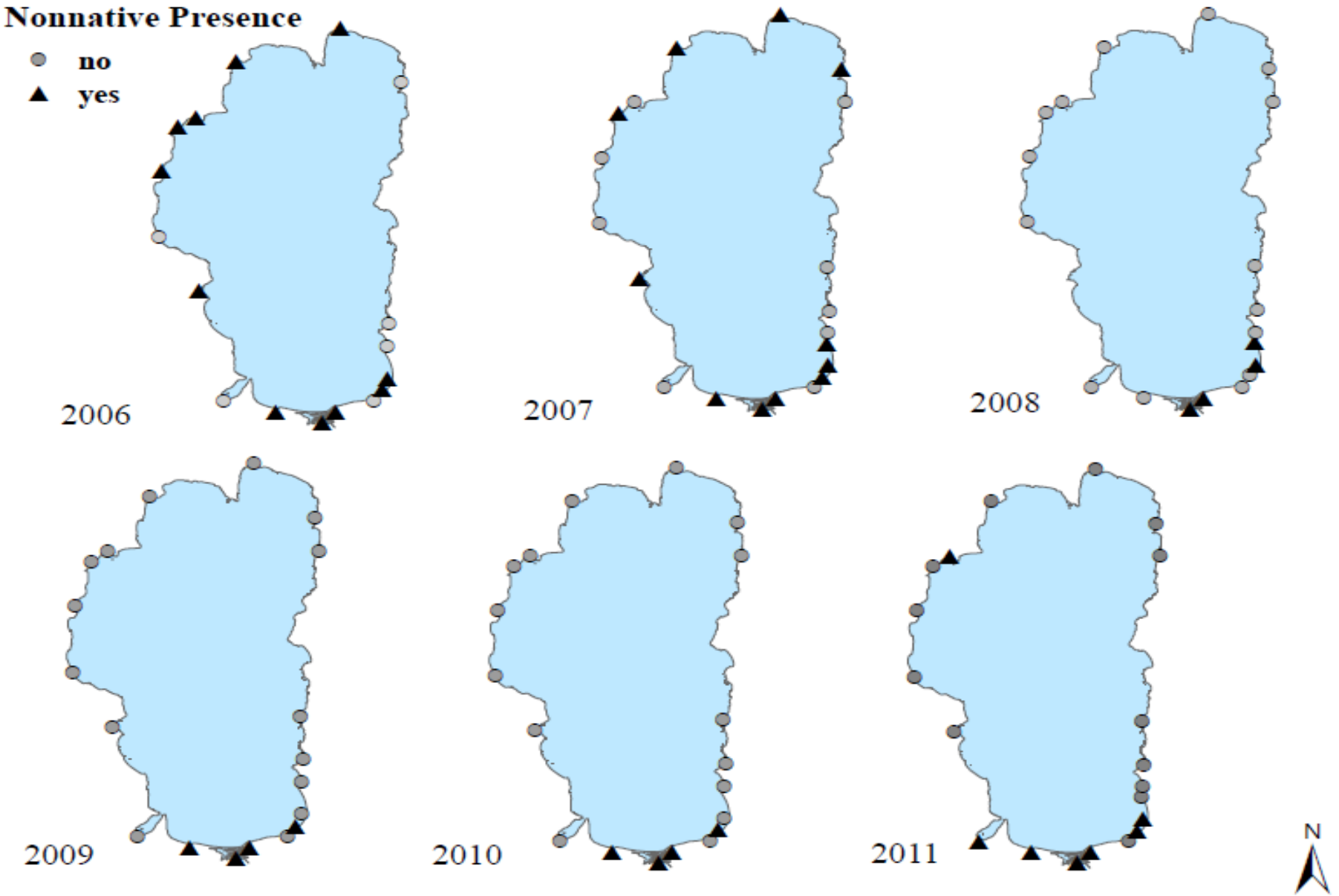

Brown trout


Rainbow trout


Brook trout

Photo credit: U.S. Dept of the Interior, UC Davis Tahoe Environmental Research Center, Dept of Natural Resources

WWNNF are still in limited distribution



Current Status

Climate change
• WT↑ 0.13°C per year since 1992

↑Habitat:
•Eurasian Watermilfoil
•Curlyleaf pondweed

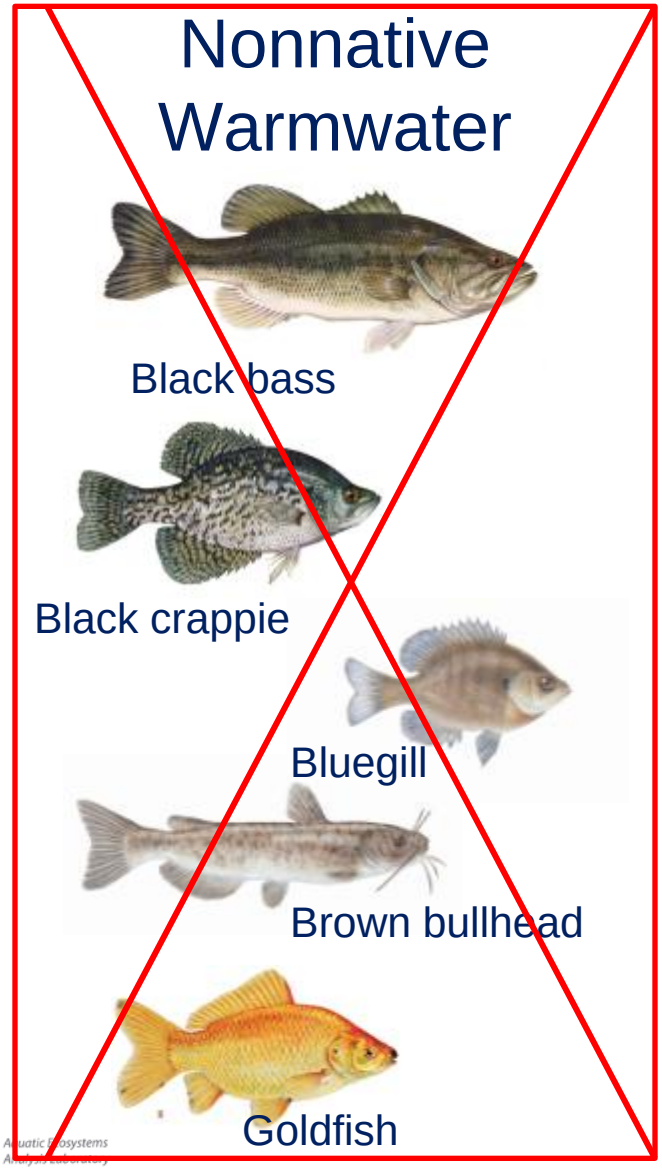
Nonnative food source
• Crayfish

Nearshore water quality↓

Native fish species↓
• 10 fold ↓ since 1960's *(Andrea Caires 15:20 Rm A)*

Thiede 1997, Vander Zanden et al. 2004, Kamerath et al. 2007, Schneider et al. 2009

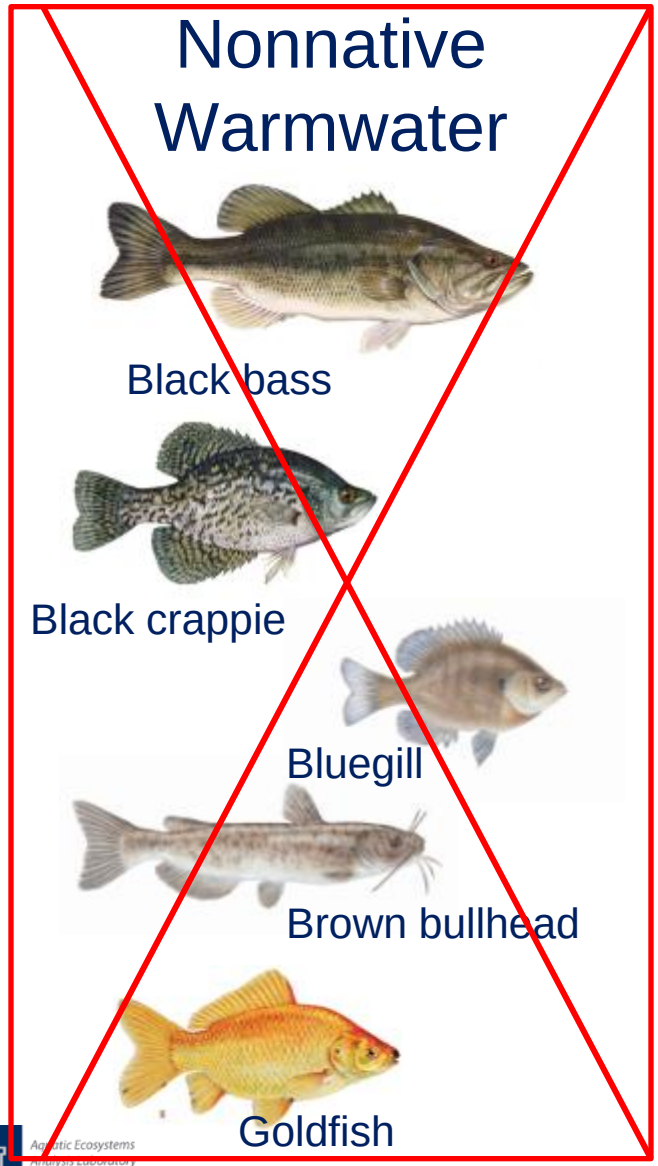
Overall Project Objective



- **Pilot Study**: Determine the feasibility of using mechanical removal methods (electrofishing, gillnetting, and hock and line) to reduce the reproductive population of non-native warmwater fish in Lake Tahoe to a controllable level

Photo credit: U.S. Dept of the Interior, UC Davis Tahoe Environmental Research Center, Dept of Natural Resources

Project Objectives for SY2011



1. Collect baseline information on the composition, abundance and spread of non-native warm water fish within the Tahoe Keys (both east and west basin)
2. Verify the presence of warm water fishes at satellite locations and determine their extent of establishment.

Warmwater Fish Control Pilot Project (2011)

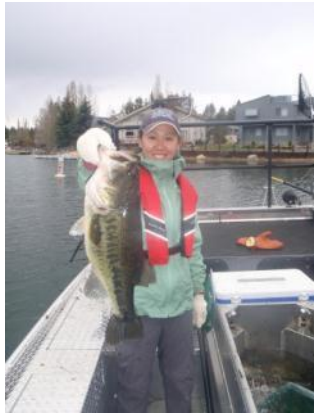
- Between May-Oct, 2011
  - 4 days rotation
    - Primary method: Electrofishing
    - Supplementary method: gillneting, hook and line
- 2 intensive removal events (Blitz):
  - June 7-9 and Sept 27-29, 2011
  - 4-6 e-fishing boats

Site Locations

1. **Tahoe Keys East and West**
2. Ski Run Marina
3. Lakeside Marina
4. Elk Point Marina
5. Crystal Shore West
6. Carnelian Bay (Sierra Boats)
7. Star Harbor
8. Tahoe City Boatworks Marina
9. Sunnyside Marina
10. Obexer's Marina
11. Meeks Bay
12. Emerald Bay
13. Taylor Marsh

Warmwater Fish Control Pilot Project (2011)

1. Effort summary
2. Composition of catch (native and nonnative)
3. Seasonal and spatial pattern/trend of catch (CPUE, size distributions)
4. Diets of dominant species (seasonal and spatial variation/similarity)



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Warmwater Fish Control Pilot Project (2011)

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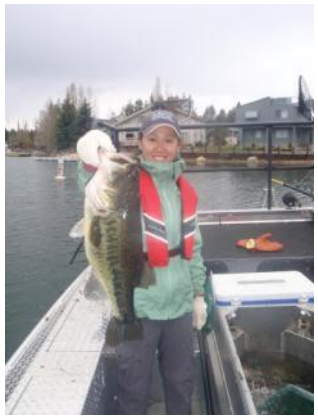

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Tahoe Keys: TKW and TKE

TKW1

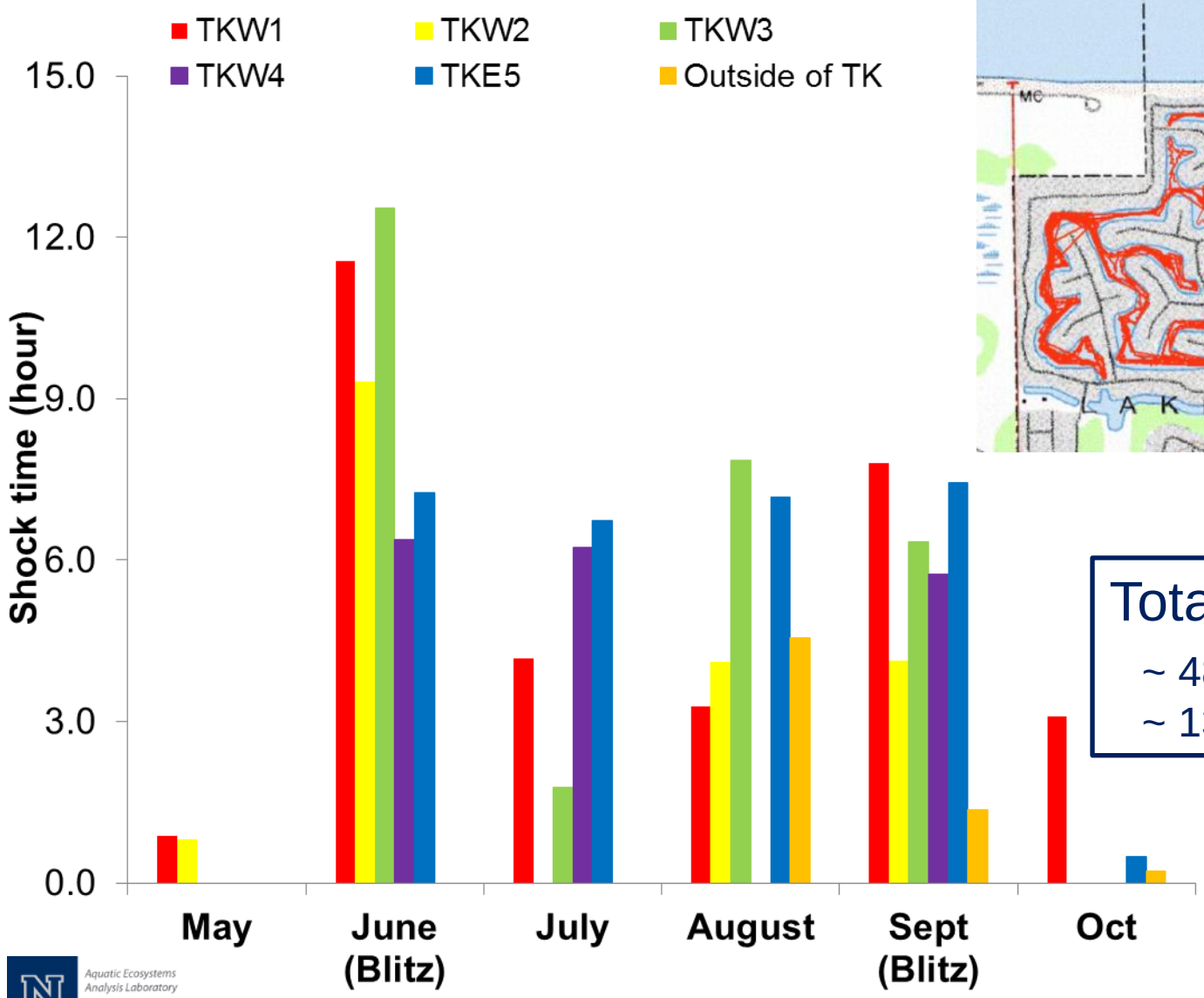
TKW2

TKW3

TKW4

TKE5

Sampling Effort



Total sampling effort:

~ 48 days

~ 132 hours shock time

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Only 2% of native fish was captured by gillnetting

Two mechanical removal methods were tested:

a) E-fishing and b) Gillnetting (8 days)

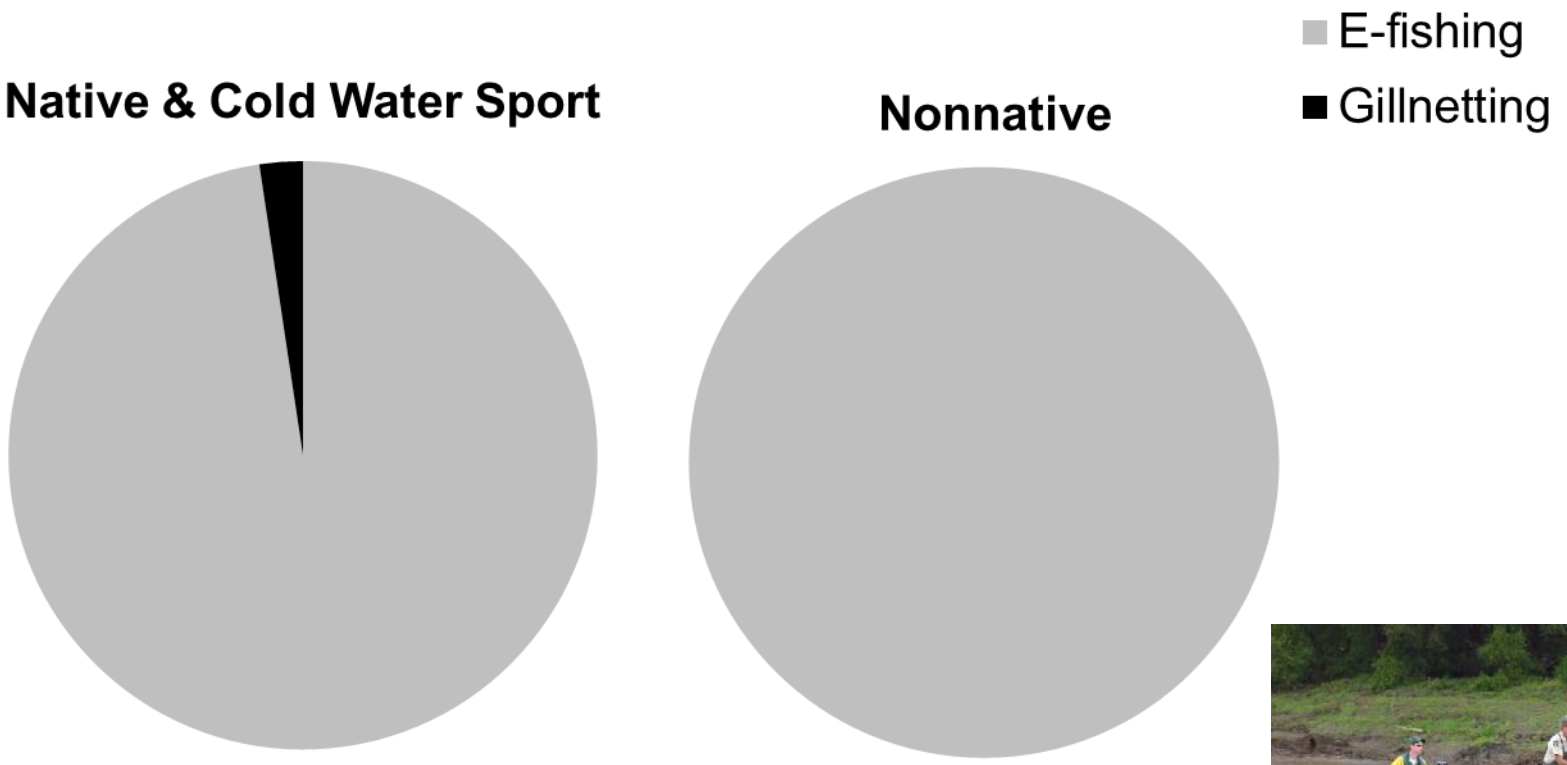

Photo credit: http://www.tn.gov/twra/fish/Reservoir/fishcomsurv/fishcomsurv.html

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~12500 WWNN Fish Removed in SY2011

- Total weight processed: **2239lb** (1017796g)
- Largest LMB: **21.4 inches; 7lb**
- Found WWNNF (LMB and BG) near Camp Richardson

First voucher specimen of **Smallmouth bass**

- Female with eggs- 0.4lb; 15.5 inches; 2.3lb

Species of great concern because:

- Aggressive predator
- Effective competitor to salmonids species
- Can tolerate cooler water temperature
- Prefers clearer water and deeper water depth

Warmwater Fish Control Pilot Project (2011)

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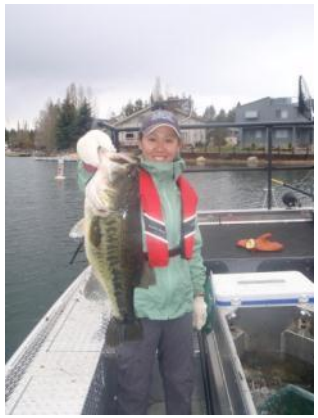

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Dominant Nonnative Species: LMB and Bluegill

Dominant Native and Coldwater Sport Fish: Tahoe Sucker and Tui Chub

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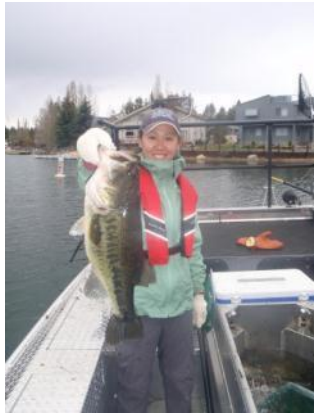

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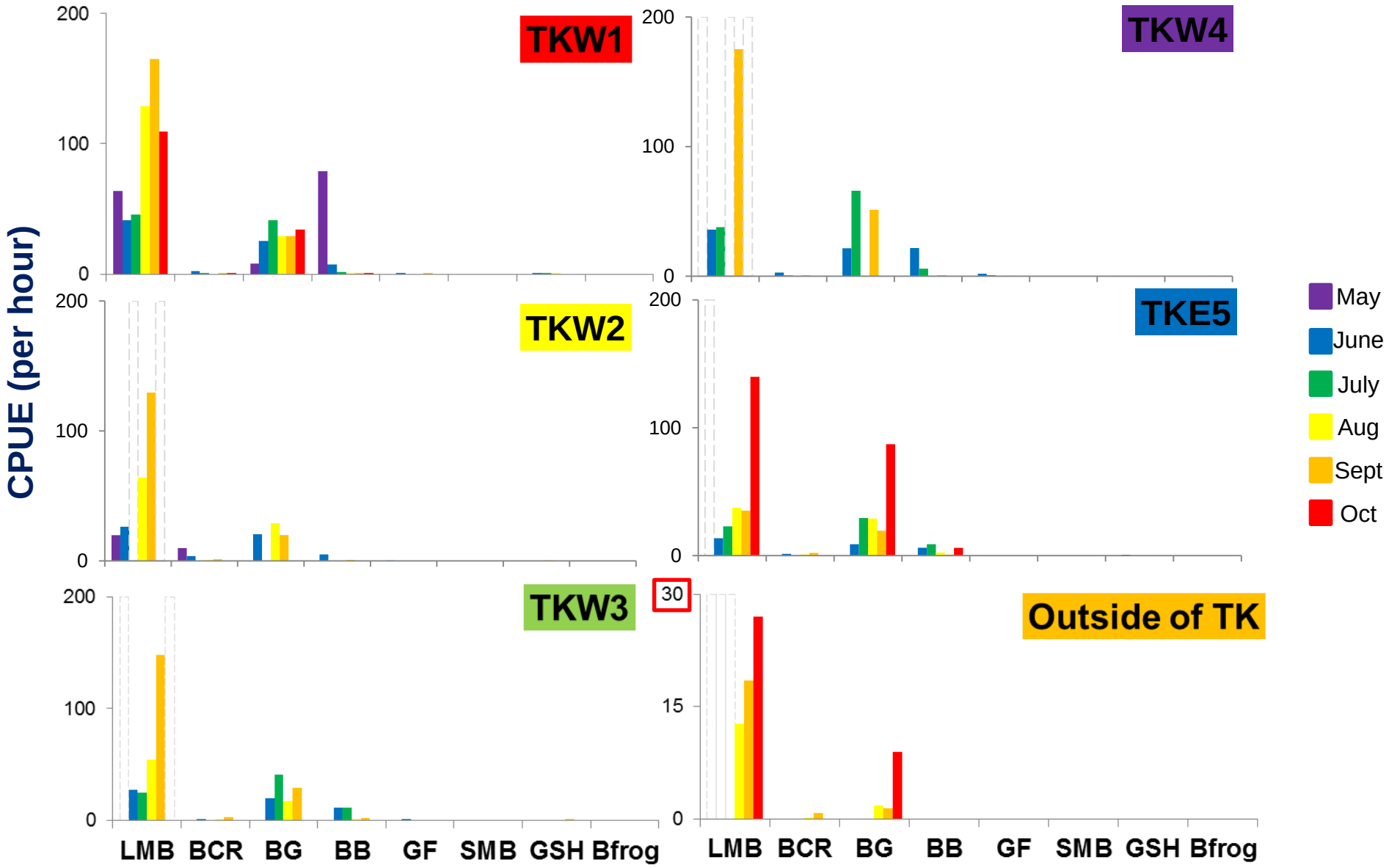
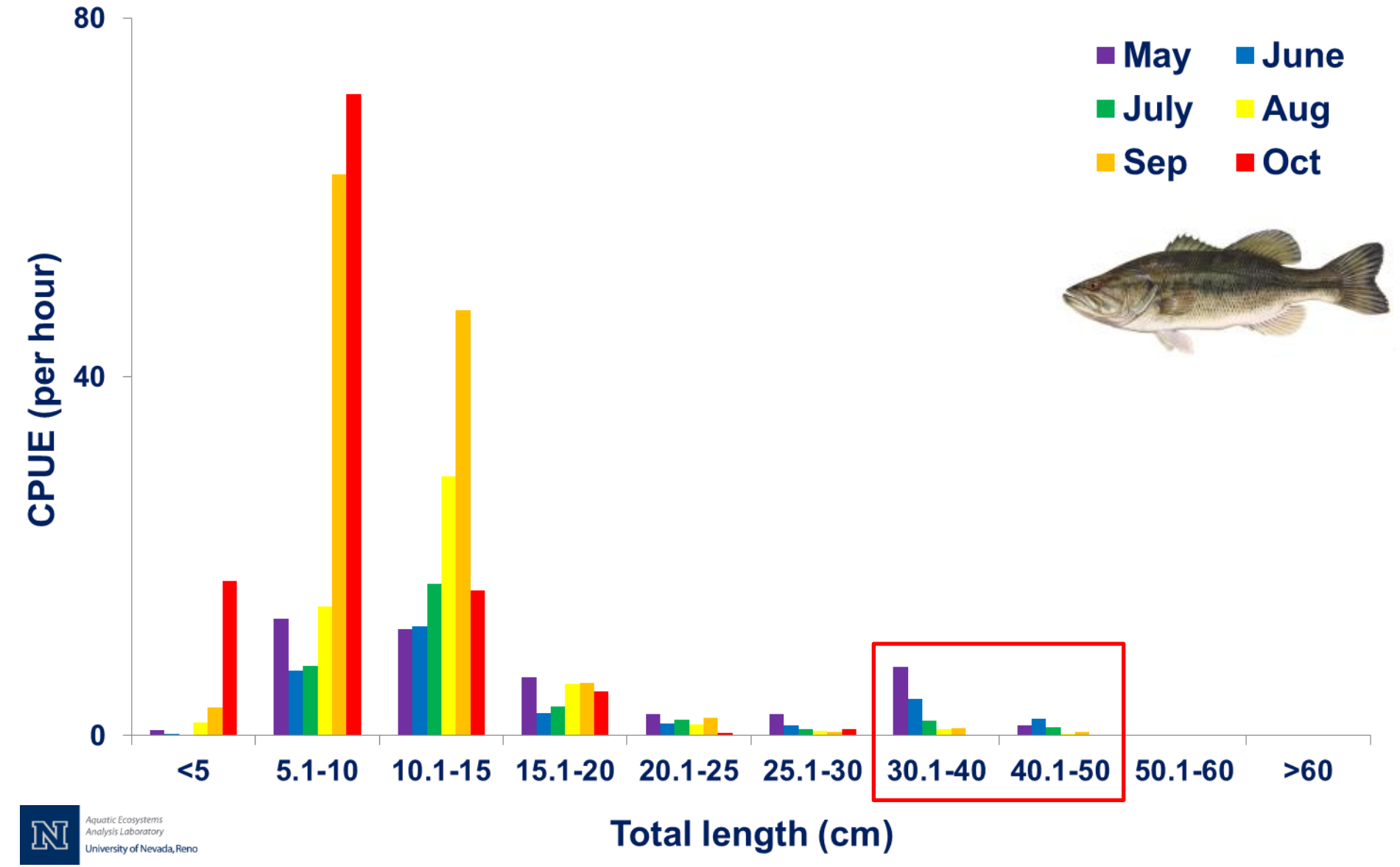
Distribution: No Significant Spatial Pattern in TK



Large LMB: Spring and Summer; Small LMB: Fall



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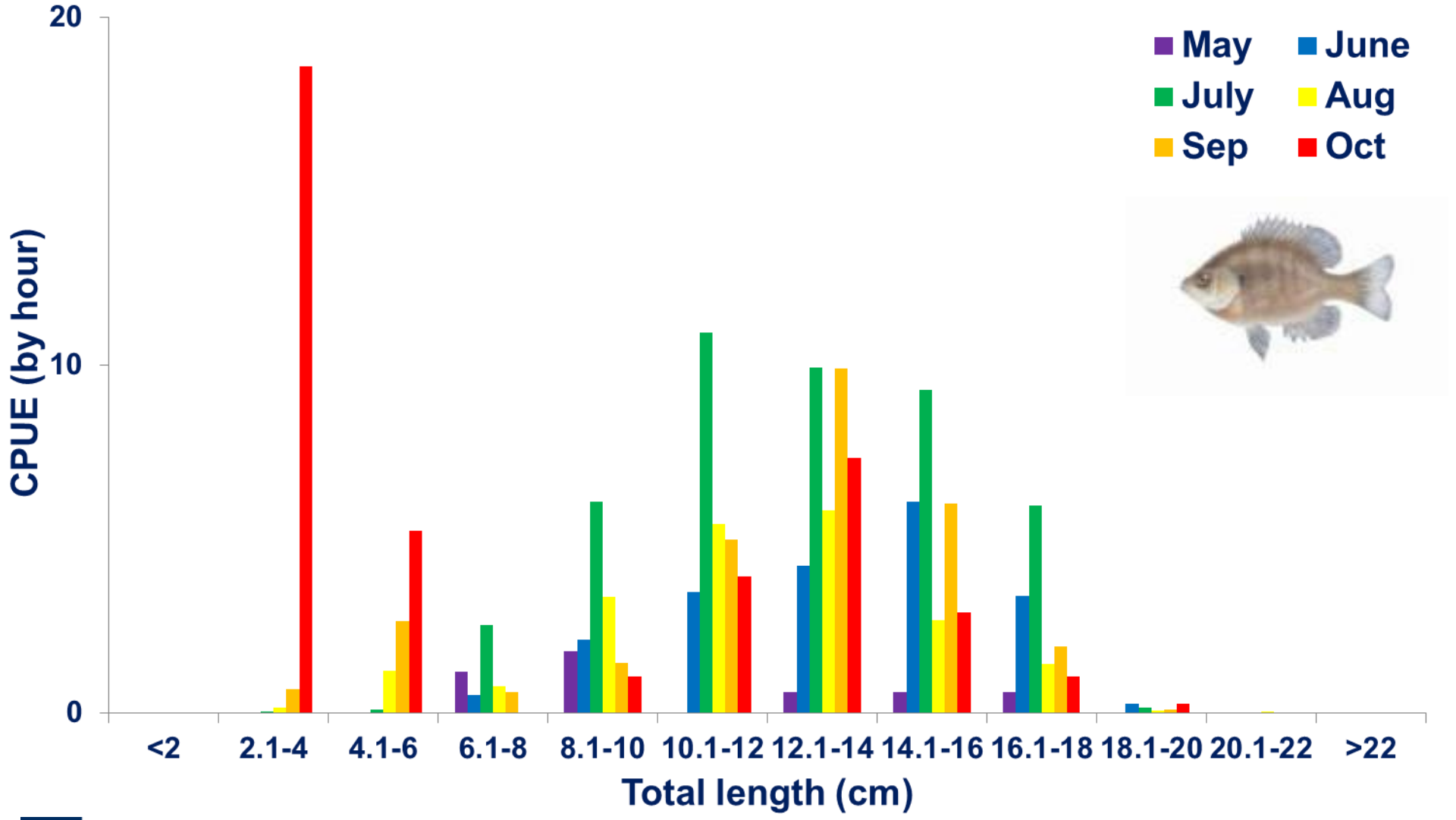
Large BG: Summer and Early Fall; Small BG: Fall



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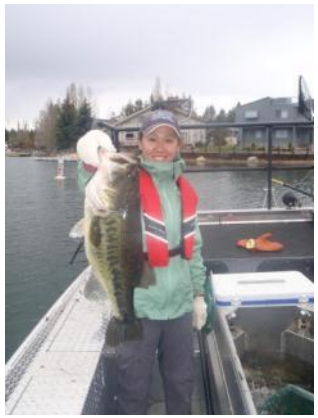

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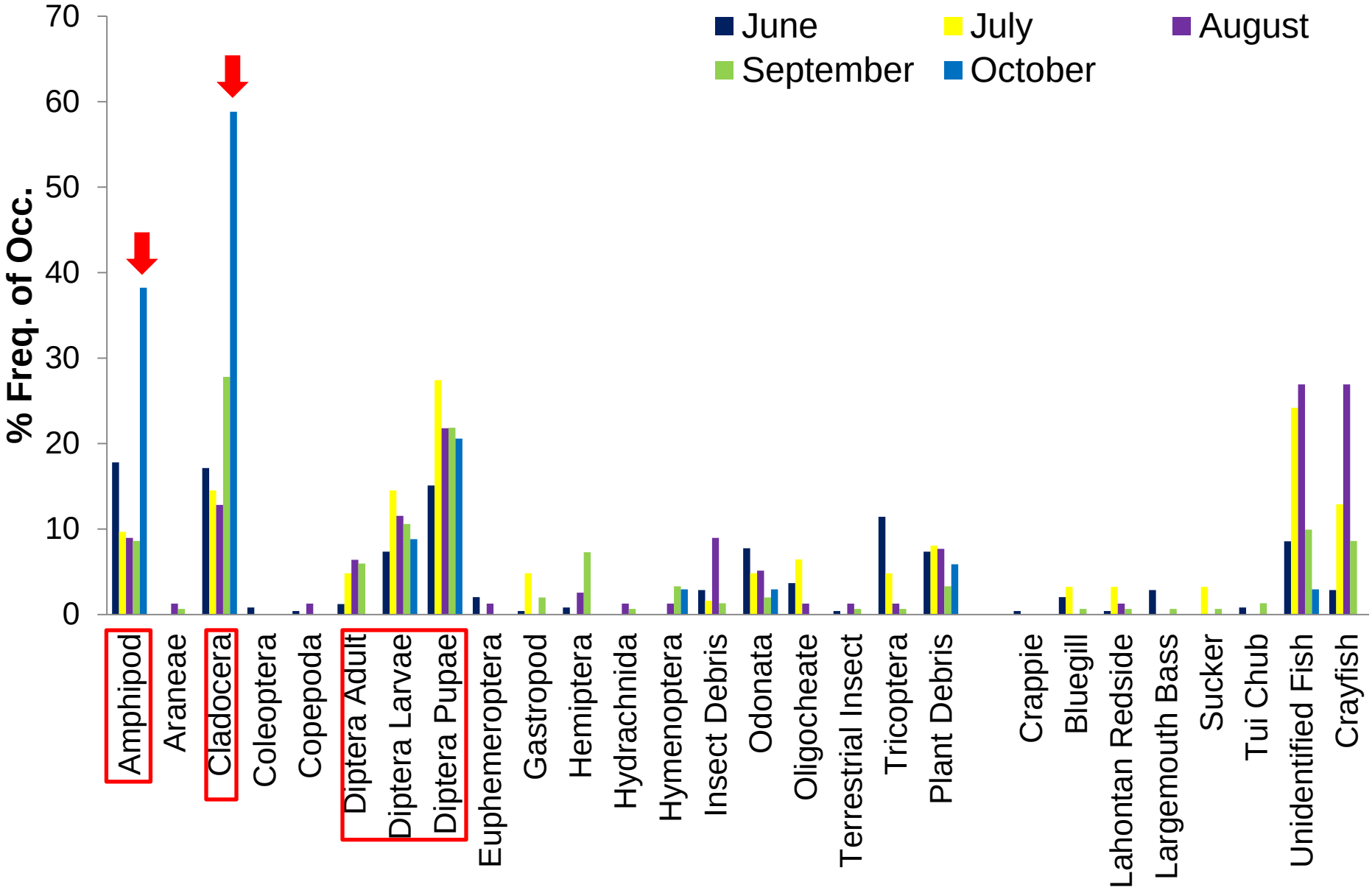
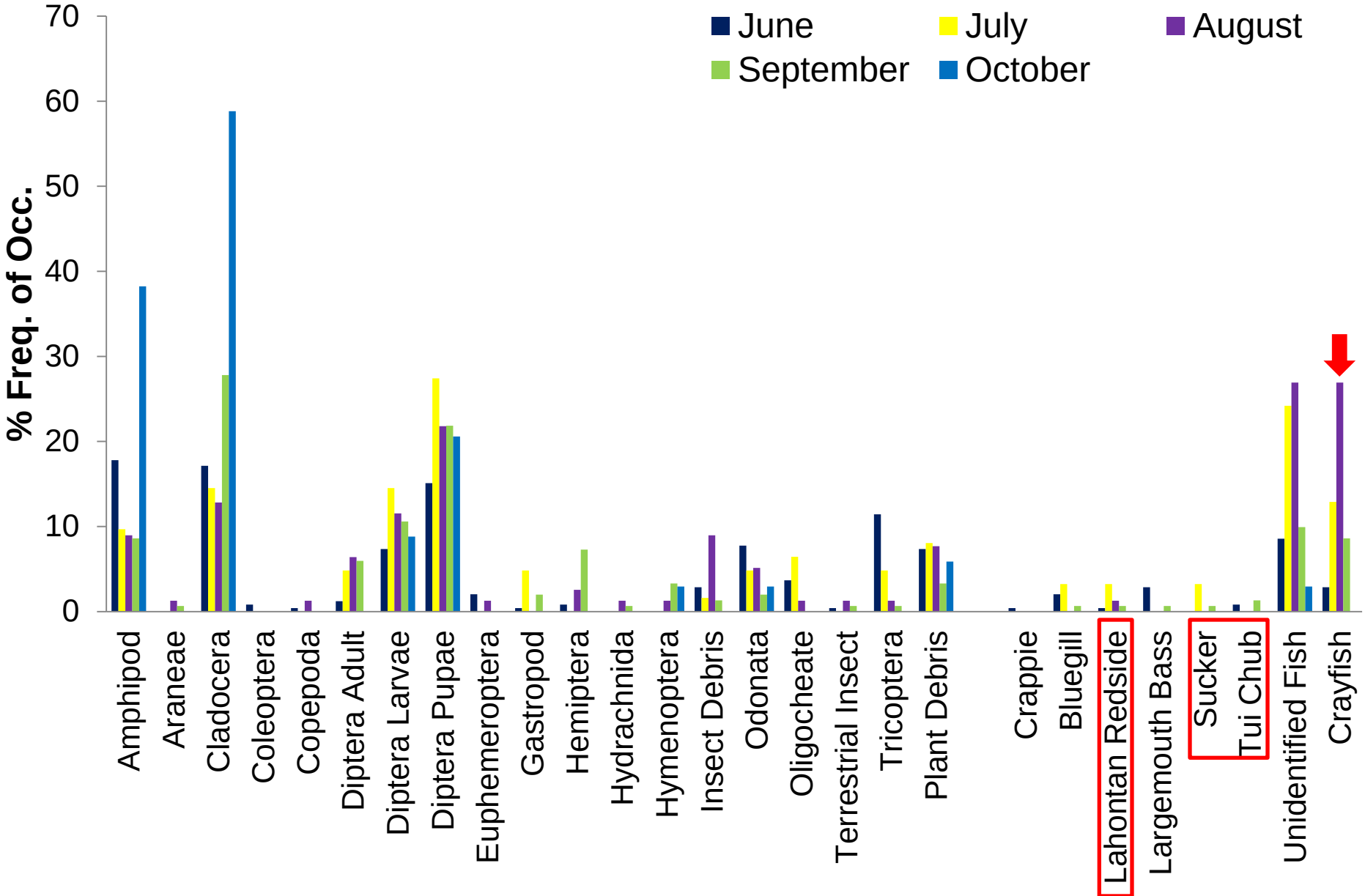
LMB Diet: Compete with native fish for food



LMB Diet: Predation pressure on native fish



What's Next for 2012

1. Continue removal effort in the Tahoe Keys and other satellite locations
2. Community responses to mechanical removal:
   a. Changes in abundance and population demographic structure of nonnative warmwater fishes
   b. Native fish recovery progress in treated areas



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SY 2011 Project Summary

- Distribution of WWNNF in Tahoe Keys is extensive
- New sites with WWNNF were identified during exploratory surveys
- Electrofishing (NOT gillnetting) is effective at capturing WWNNF

Smallmouth bass: New Species of Concern

- Aggressive predator
- Effective competitor to salmonids species
- Can tolerate cooler water temperature
- Prefers clear water and deeper water depth
- Thrive in gravel or rocky substrates

Can be more successful in Lake Tahoe than LMB

Extra Slides