Monitoring of Alligator Gar (*Atractosteus spatula*) Reintroduced into Merwin Preserve

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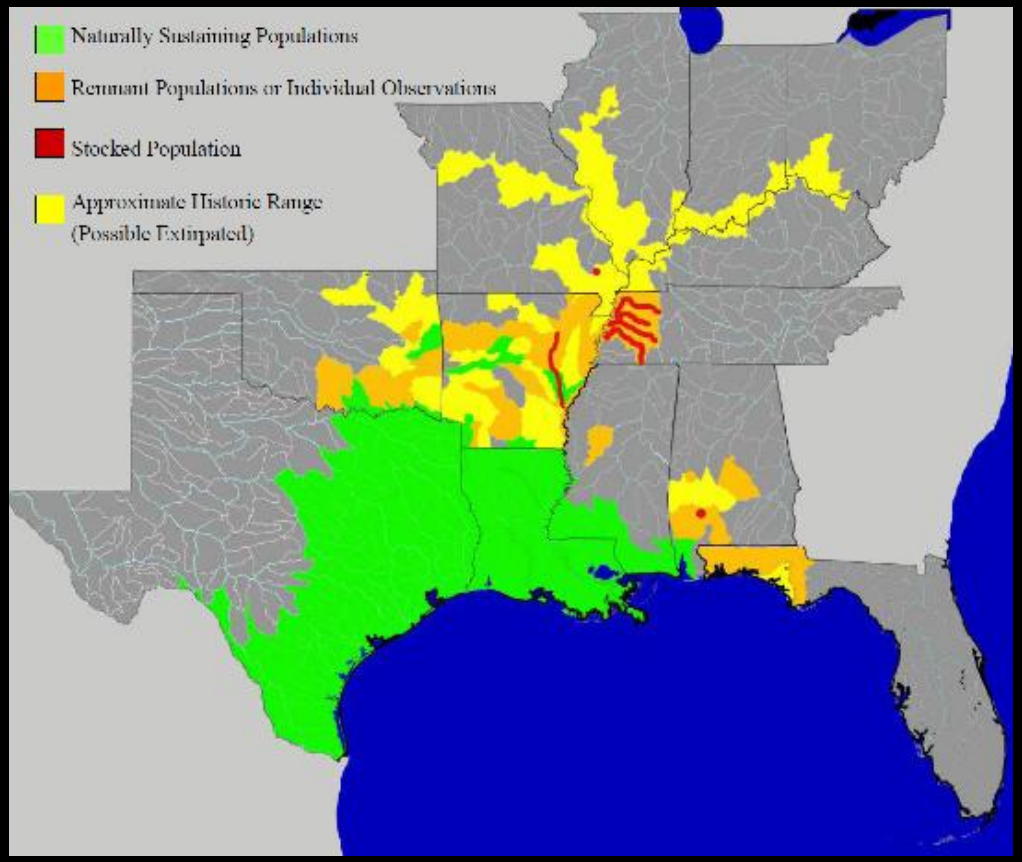
Status

- Populations have declined
- Vulnerable to extinction
- Reintroduction in AL, AR, FL, KY, LA, MS, MO, OK, TN, and TX



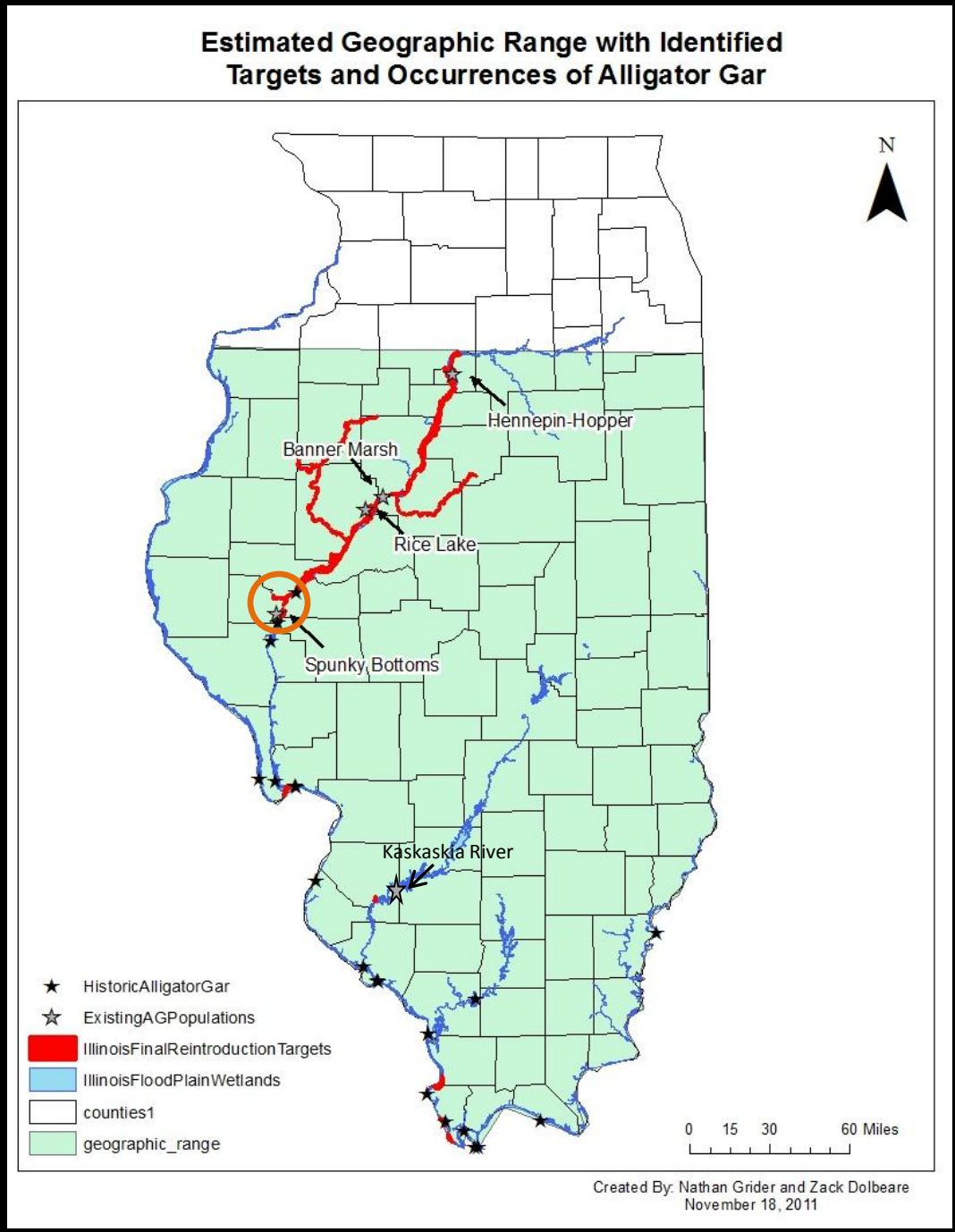
River Monsters

Jeremy Wade and Mark Spitzer with a 7 ft, 111 lb alligator gar

http://colourofautumn1216.blogspot.com/2010/06/river-monsters.html

History In Illinois

- Last vouchered record from 1966
- Delisted in 1994 (extirpated)
- Reintroduction efforts began in 2009 by IDNR



Why Reintroduce Them?

- Increase biodiversity – resist invasion
- Apex predators provide top-down control
- May control “rough fish” and invasive species
- May help prevent stunting of sportfish
- Popular food fish
- Angling and bowfishing

Big Fish Bowfishing Texas™

Merwin Preserve
(Spunky Bottoms)

- Approximately 590 ha
- 100 alligator gar were tagged with passive integrated transponders (PIT), released 9/29/2011
- Average length was 538 mm and weight 886 g


CR-470 N
CR-395 N
La Grange Rd
CR-500 N
12
Illinois River
Twin Ponds
500 m
© 2013 Microsoft Corporation
The Nature Conservancy
Spunky Bottoms
October 1998

Objectives

1) Measure growth rate and compare to data from the southern range

2) Determine condition (fitness) and compare to data from the southern range

3) Investigate prey selection and potential use as a management tool

4) Compare sampling methods used to capture alligator gar

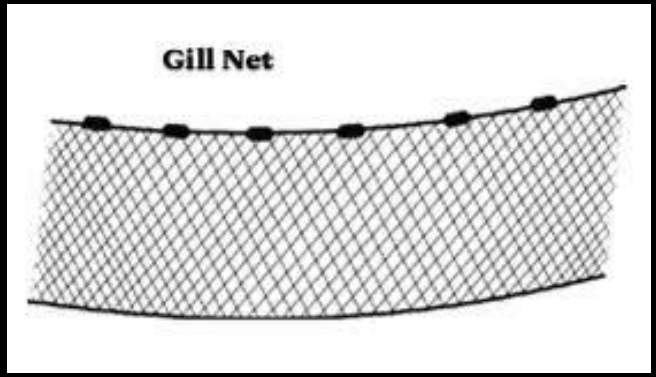
Methods

Sampling

- Sampled May - October = six events
- Sample event = two days and one night of extensive gear effort

Gears

- Modified multifilament gill nets – 3” bar mesh, dyed black
- Experimental monofilament gill nets
- Trap nets, 1.5” mesh
- Mini fyke nets
- DC Electrofishing


Gill Net


Courtesy of Kevin Irons
Fyke nets (shoreline and tandem)

Diet Analysis

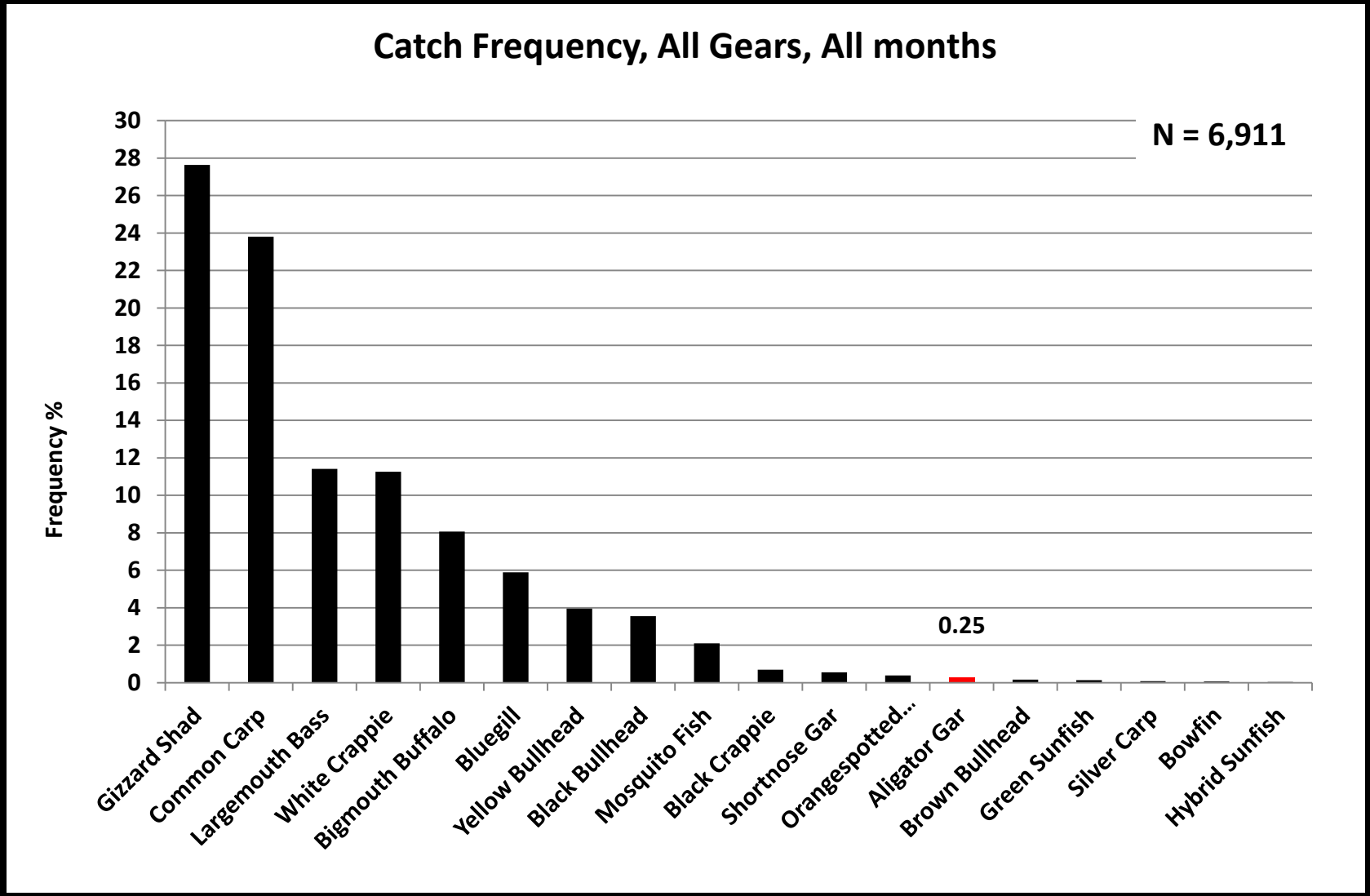
- Gastric lavage
- Strauss (1979) index used to determine prey selection
- Compares abundance of prey items in diet to abundance in environment

  -1 = avoidance/inaccessibility,

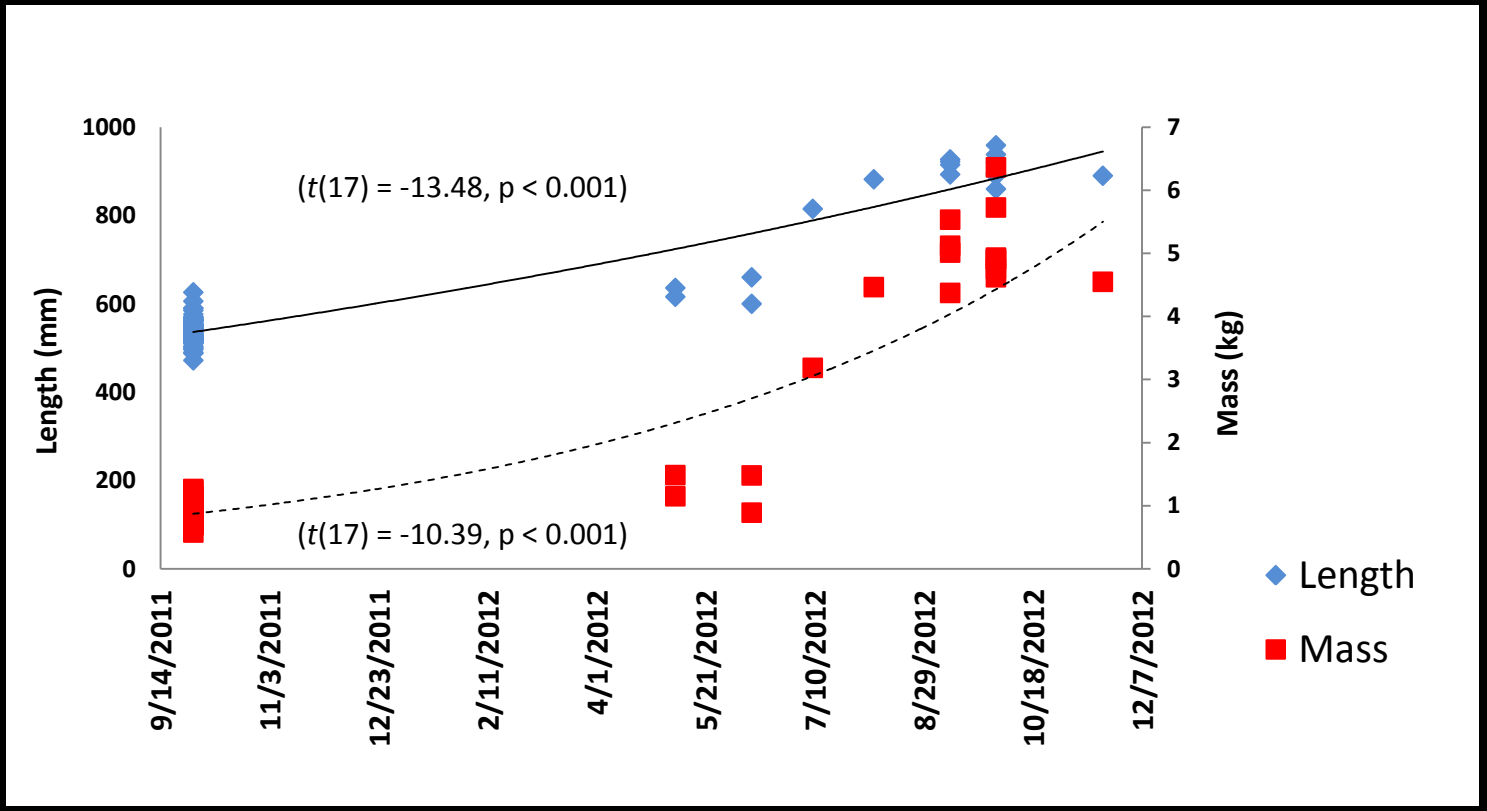
  0 = no selection (opportunistic)

  +1 = selection

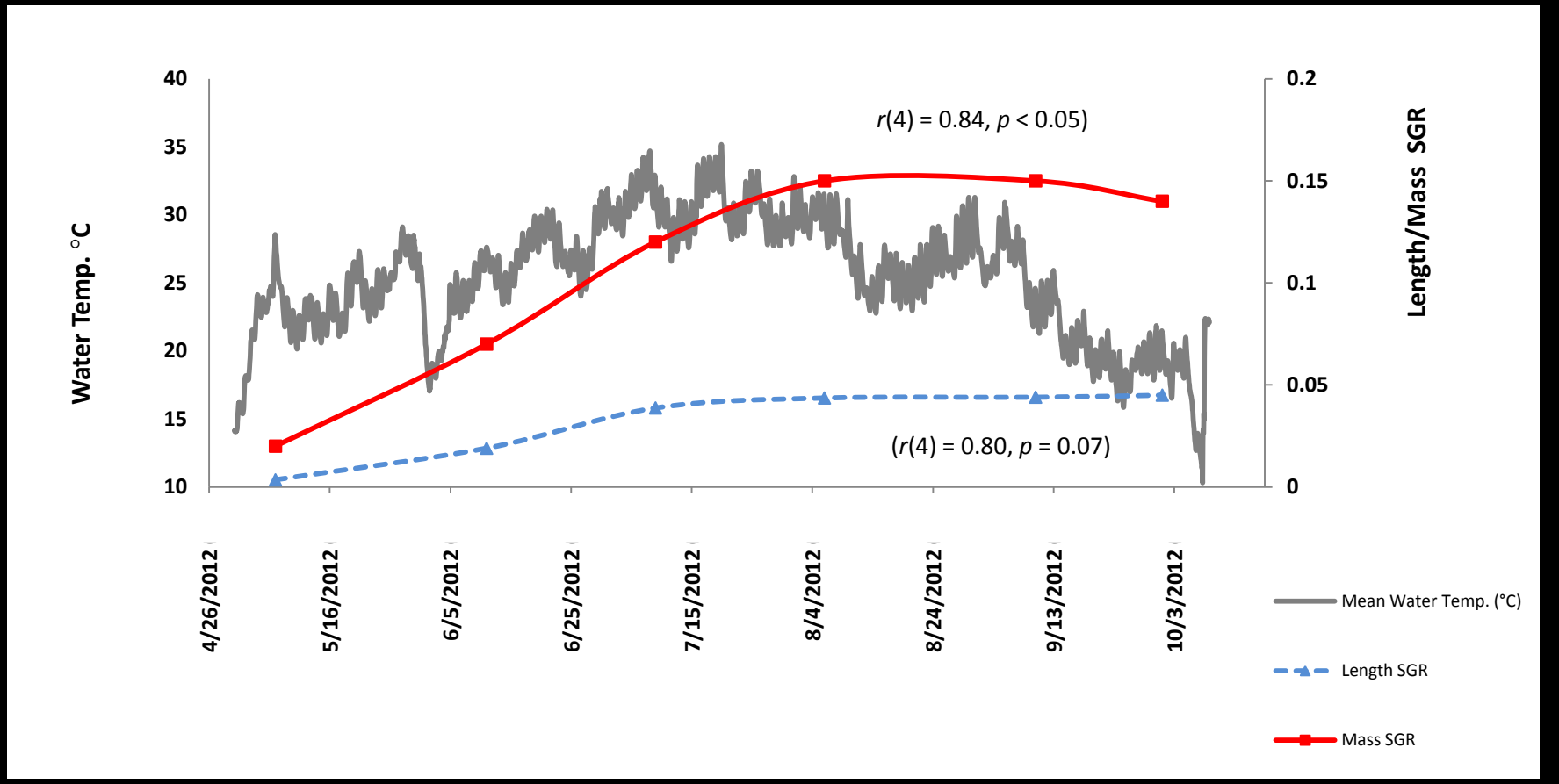
Results


Catch Frequency, All Gears, All months
N = 6,911
Frequency %
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
0.25
Gizzard Shad
Common Carp
Largemouth Bass
White Crappie
Bigmouth Buffalo
Bluegill
Yellow Bullhead
Black Bullhead
Mosquito Fish
Black Crappie
Shortnose Gar
Orangespotted...
Aligator Gar
Brown Bullhead
Green Sunfish
Silver Carp
Bowfin
Hybrid Sunfish

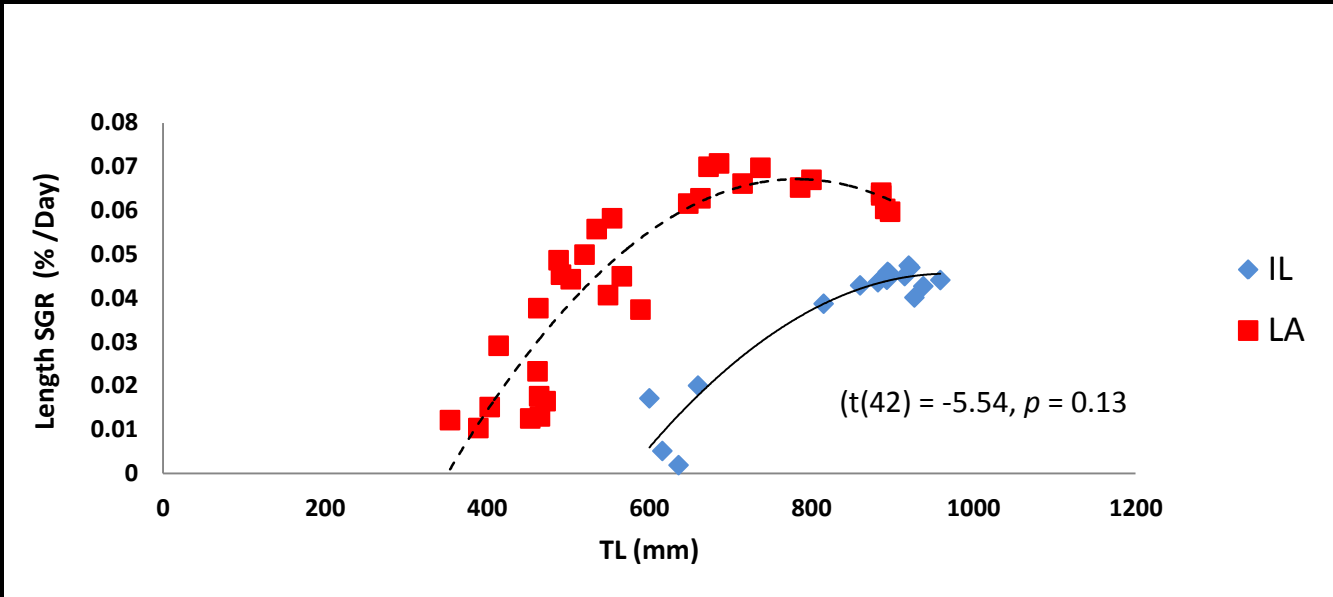
Length and Mass Gain

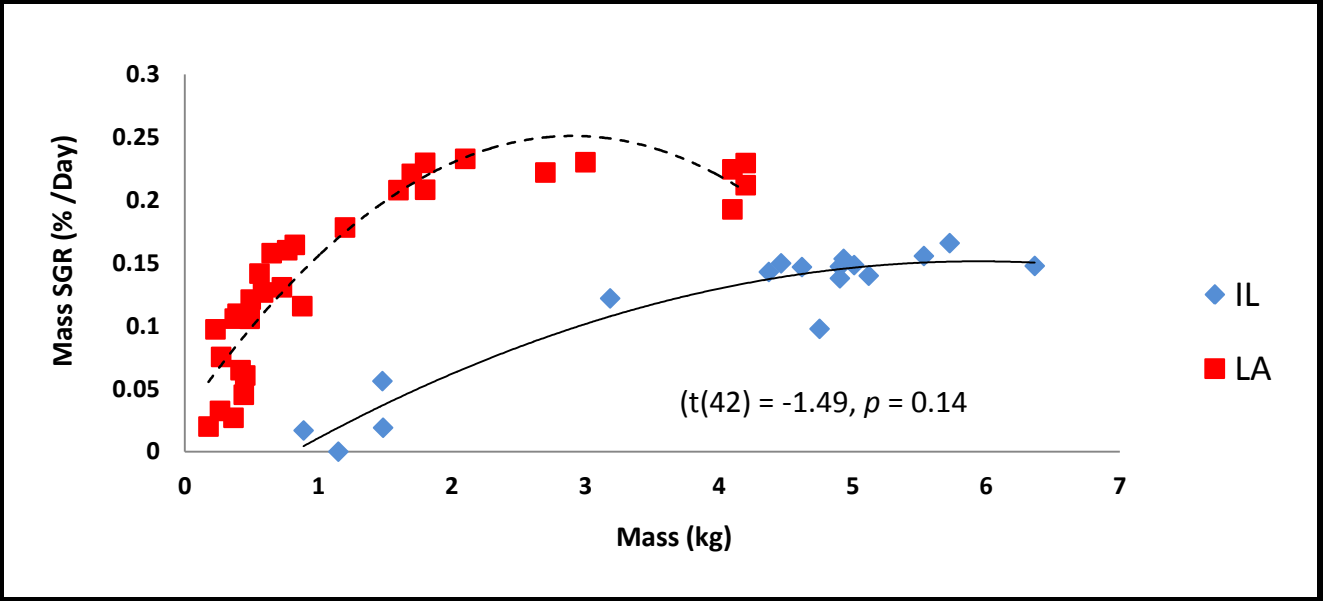


Growth Rates and Water Temperature

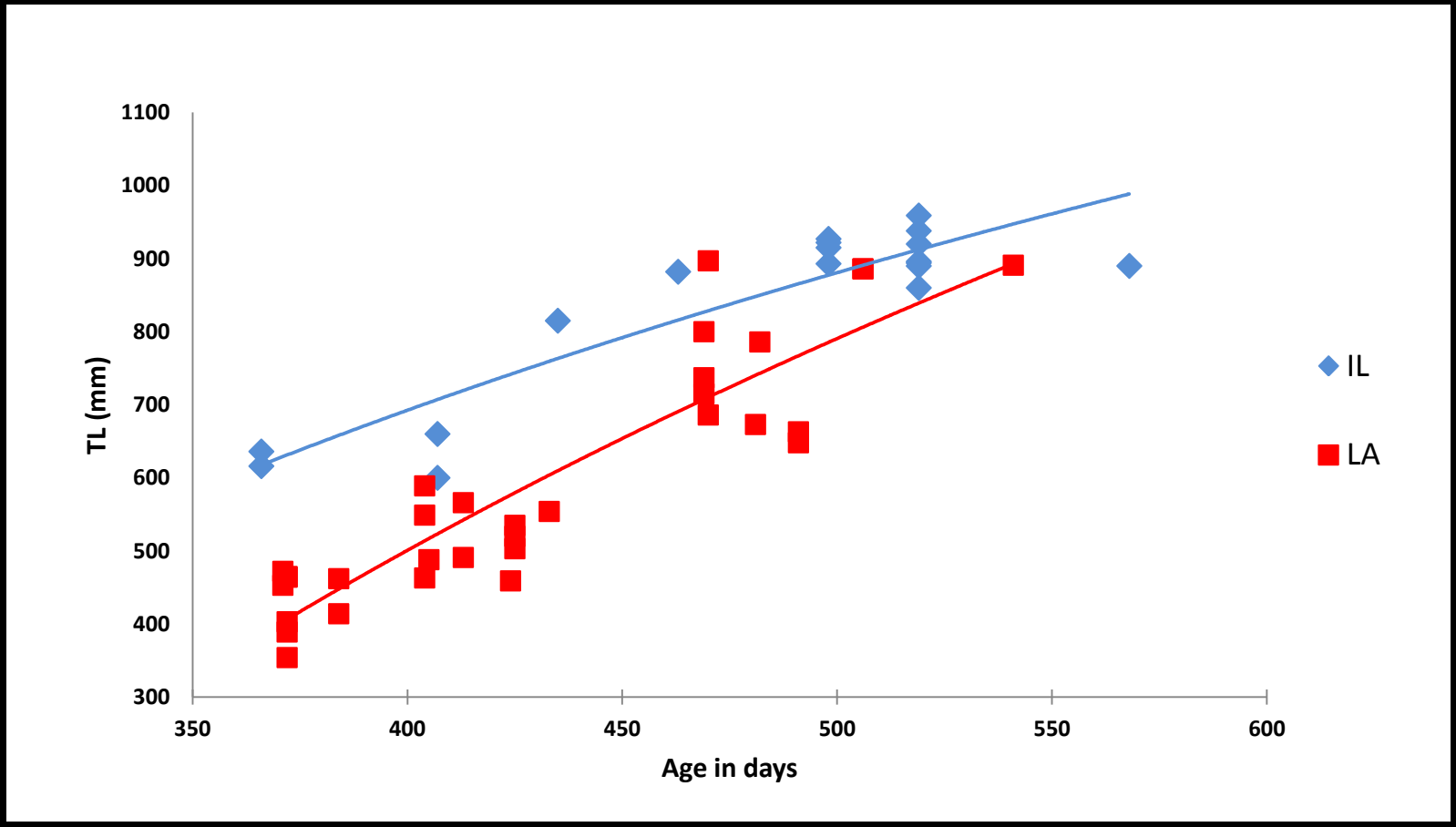


Growth Rate: Illinois and Louisiana

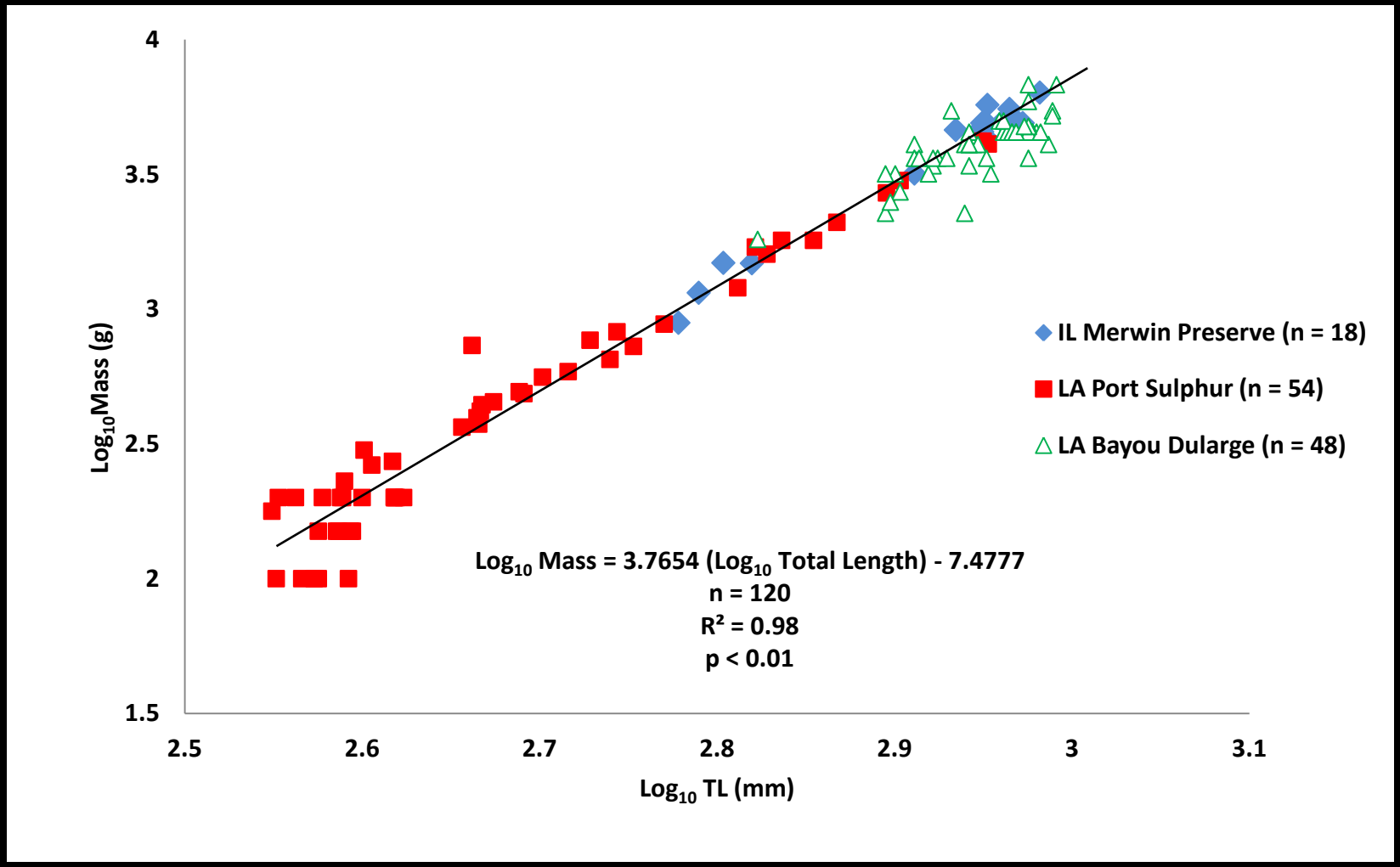




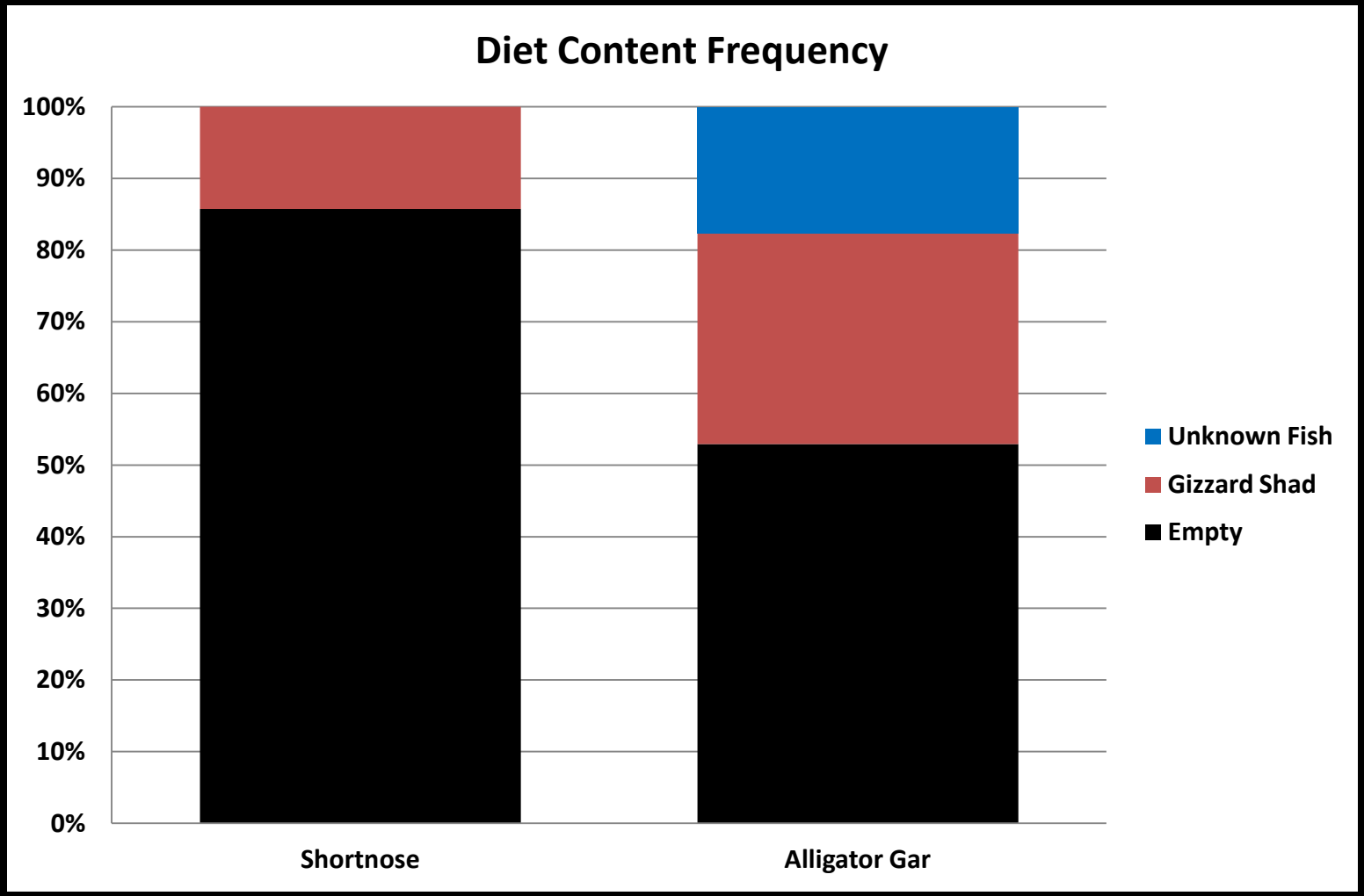
Length Gain: Illinois and Louisiana



Body Condition: Illinois and Louisiana

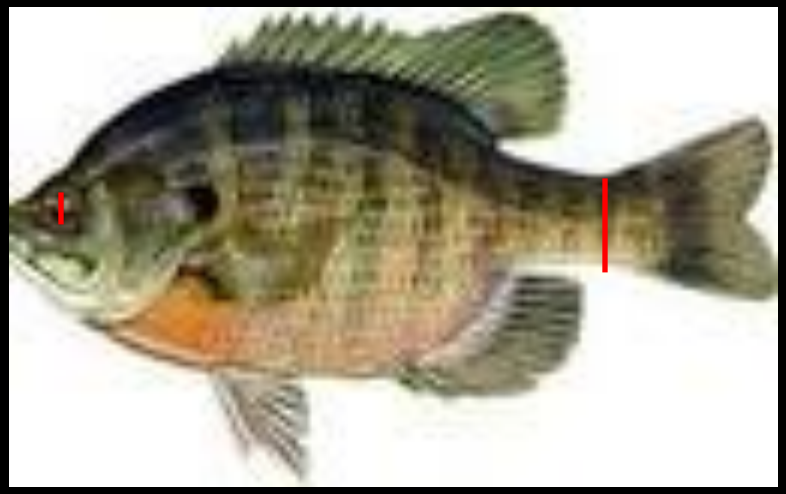


Diets

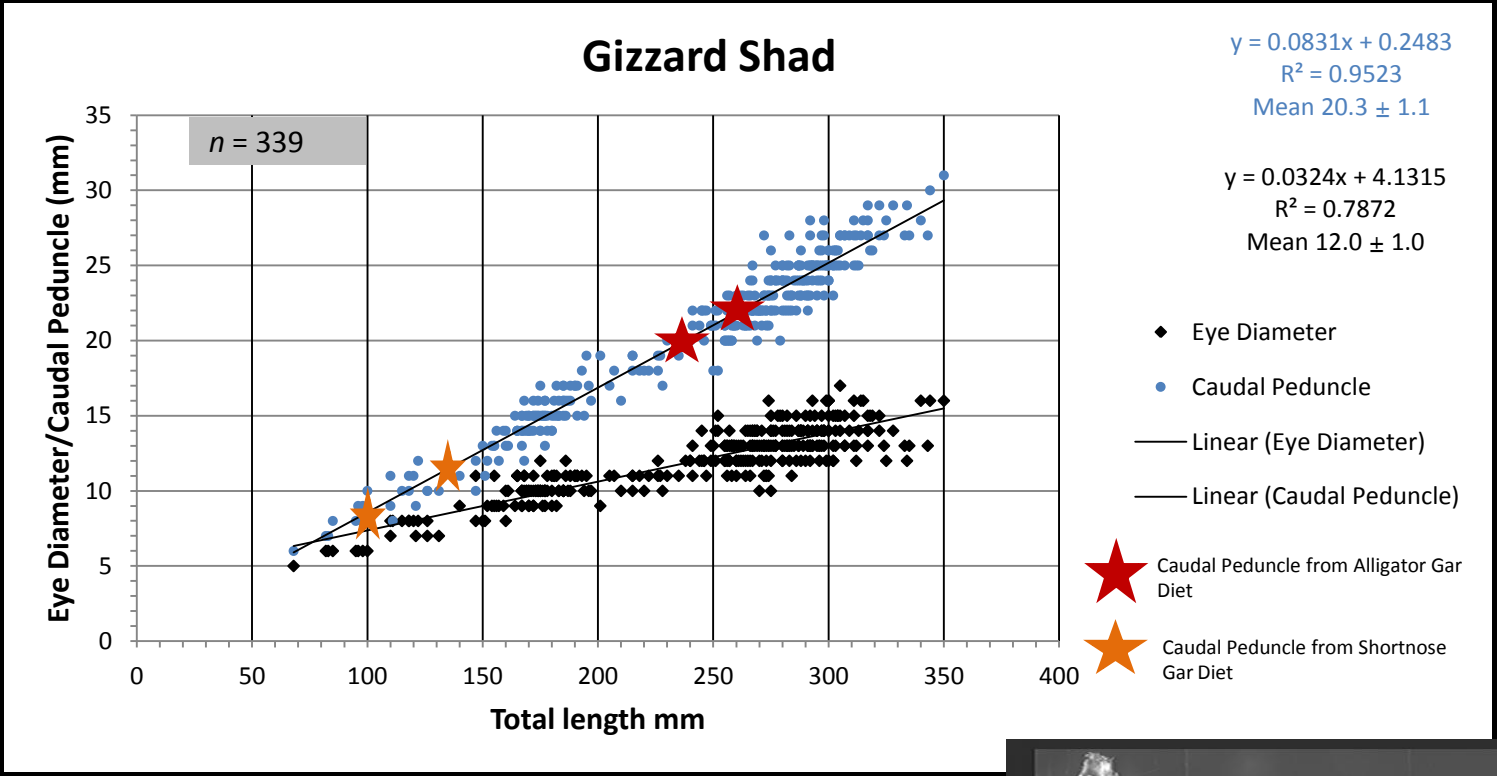

Diet Content Frequency
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Shortnose
Alligator Gar
Unknown Fish
Gizzard Shad
Empty

Estimating Prey Length from Remains

- Knowing prey size allows us to estimate predator impact
- How do we estimate prey length from diet remains?
- Use linear relationship of eye diameter or caudal peduncle to total length (Scharf *et al*. 1997).

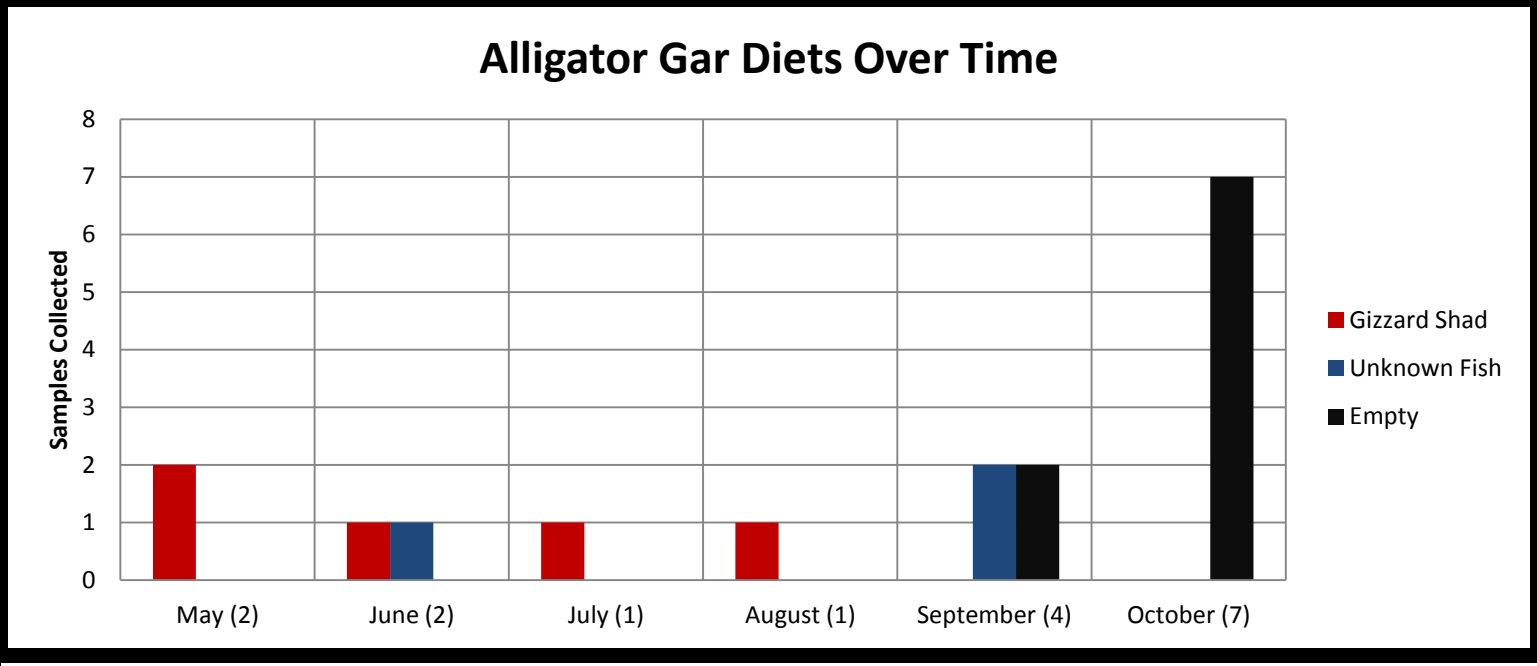


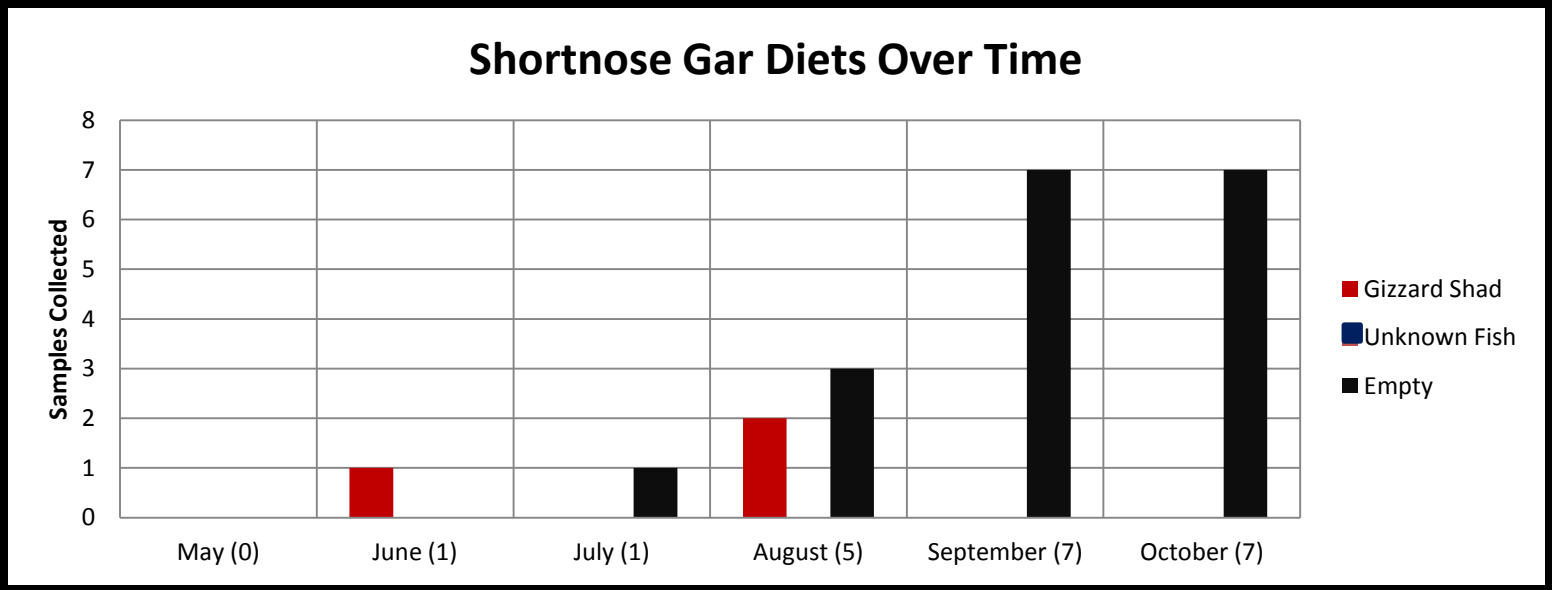
Prey Size selection



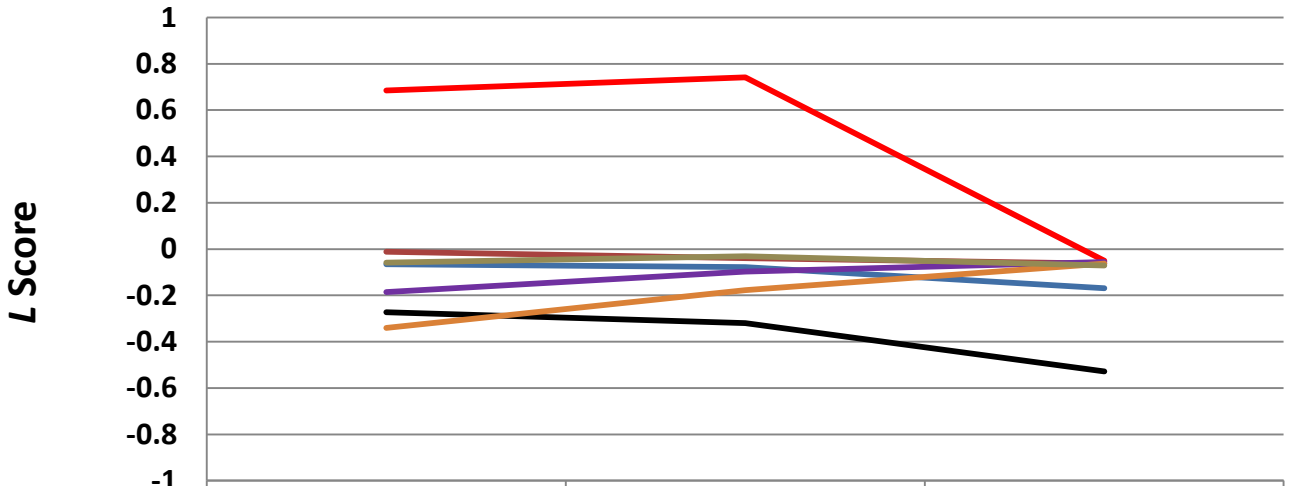
41% of Predators Length

Diet Contents Over Time





Food Selection Index



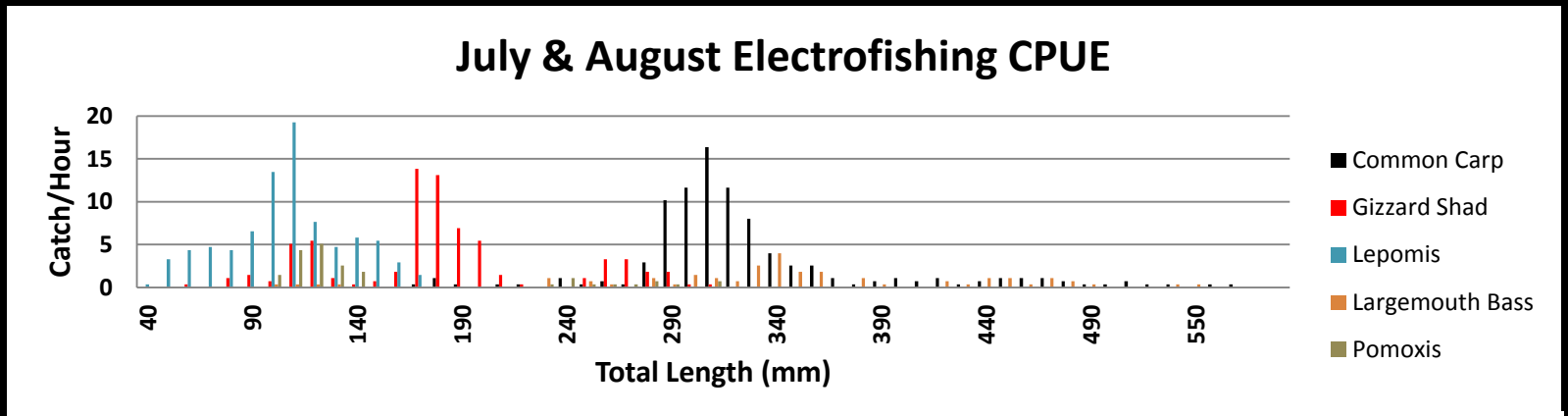
	May/June	July/August	September/October
Ameiurus	-0.0649	-0.078	-0.1688
Bigmouth Buffalo	-0.0119	-0.0395	-0.063
Common Carp	-0.2727	-0.3192	-0.529
Gizzard Shad	0.68515	0.74139	-0.0504
Largemouth Bass	-0.1862	-0.0968	-0.0554
Lepomis	-0.341	-0.1774	-0.063
Pomoxis	-0.0586	-0.0305	-0.0705

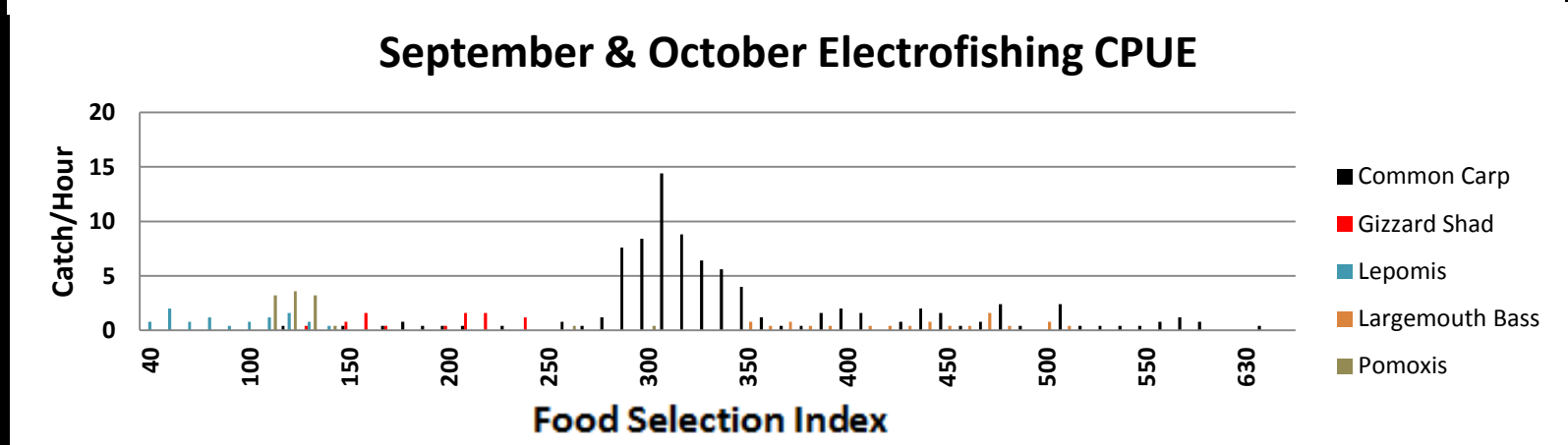
+1 = Selection

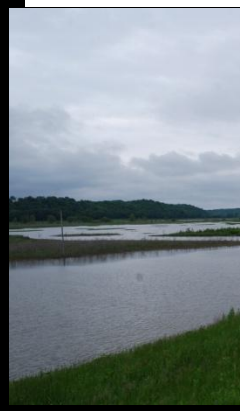
0 = No selection (opportunistic)

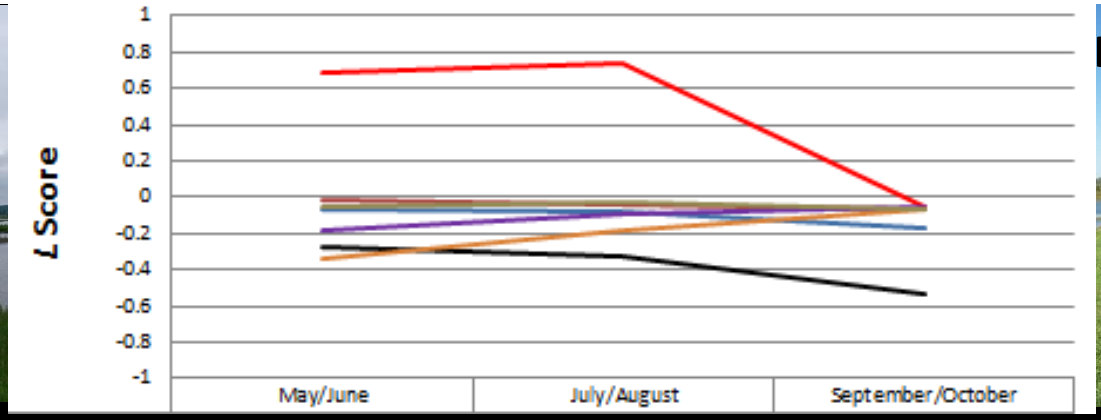
-1 = Avoidance/inaccessibility

Prey Abundance Over Time

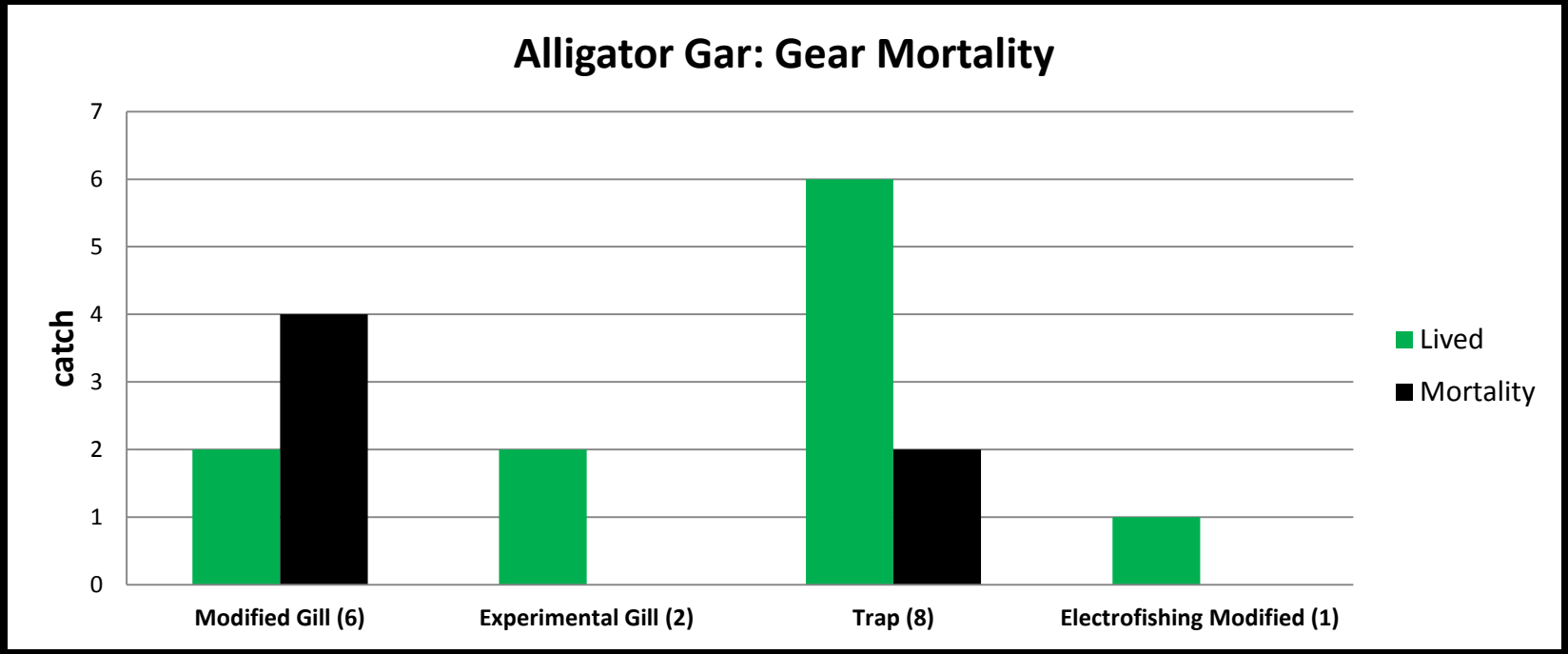








Recapture Success and Mortality



- May – August:
  Mortality = 50%

- September – October
  Mortality = 38%

Discussion

Objective 1 & 2

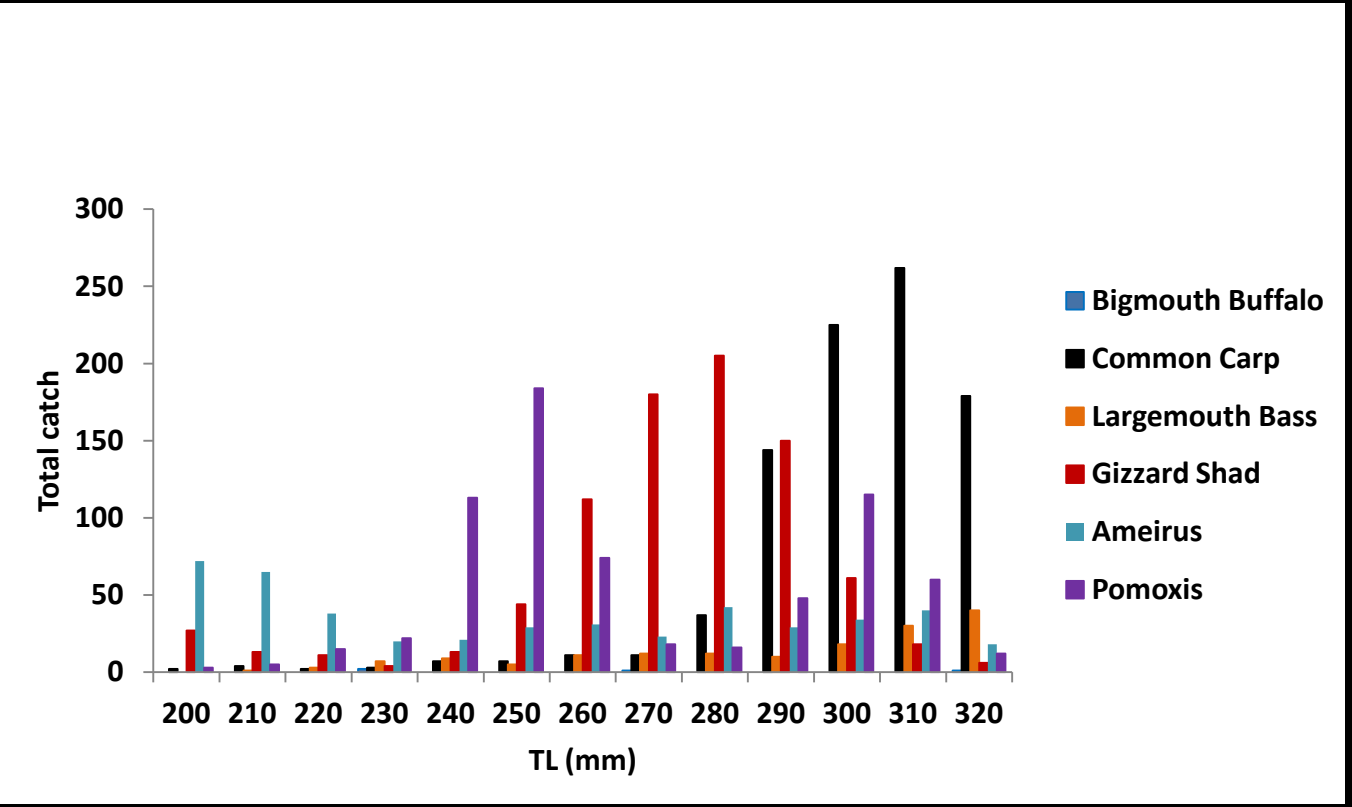
- No significant difference in growth rate or condition compared to Louisiana
- Factors that effect growth rate: salinity, temp., prey, and habitat

Objective 3

- No sportfish found in diet.
- Did they eat a few? Probably.
- Selection or opportunistic feeding on gizzard shad?

  "Optimal Foraging Theory"

Some Diet Predictions



Abundance of potential prey items at Merwin Preserve within the preferred prey size range (200 – 320 mm) of 137 – 183 cm alligator gar described by Goodyear (1967).

Discussion

Objective 4

- Trap nets and modified gill nets worked best
- Modified gill nets produced less bycatch, but higher mortality
- Sampling in September & October is recommended

DC Electrofishing

- 3,500 watt generator (small boat) = no Alligator Gar
- 5,000 watt generator (big boat) = 8.5 hours produced 1 Alligator Gar @ 30 cycles/sec & 7 amps

What's Next?

- Continue reintroduction and monitoring
- Consider further harvest restrictions
- Public education and outreach
- Maybe develop catch and releasing fishing opportunities in dedicated waters

  Could help fund continued conservation work!


Bass Pro Shop - Springfield, MO

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