

Developing an Angler Topology to Assess Panfish Angling Community Motivation, Preference, and Satisfaction



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FISHERIES MANAGEMENT

Fisheries Management

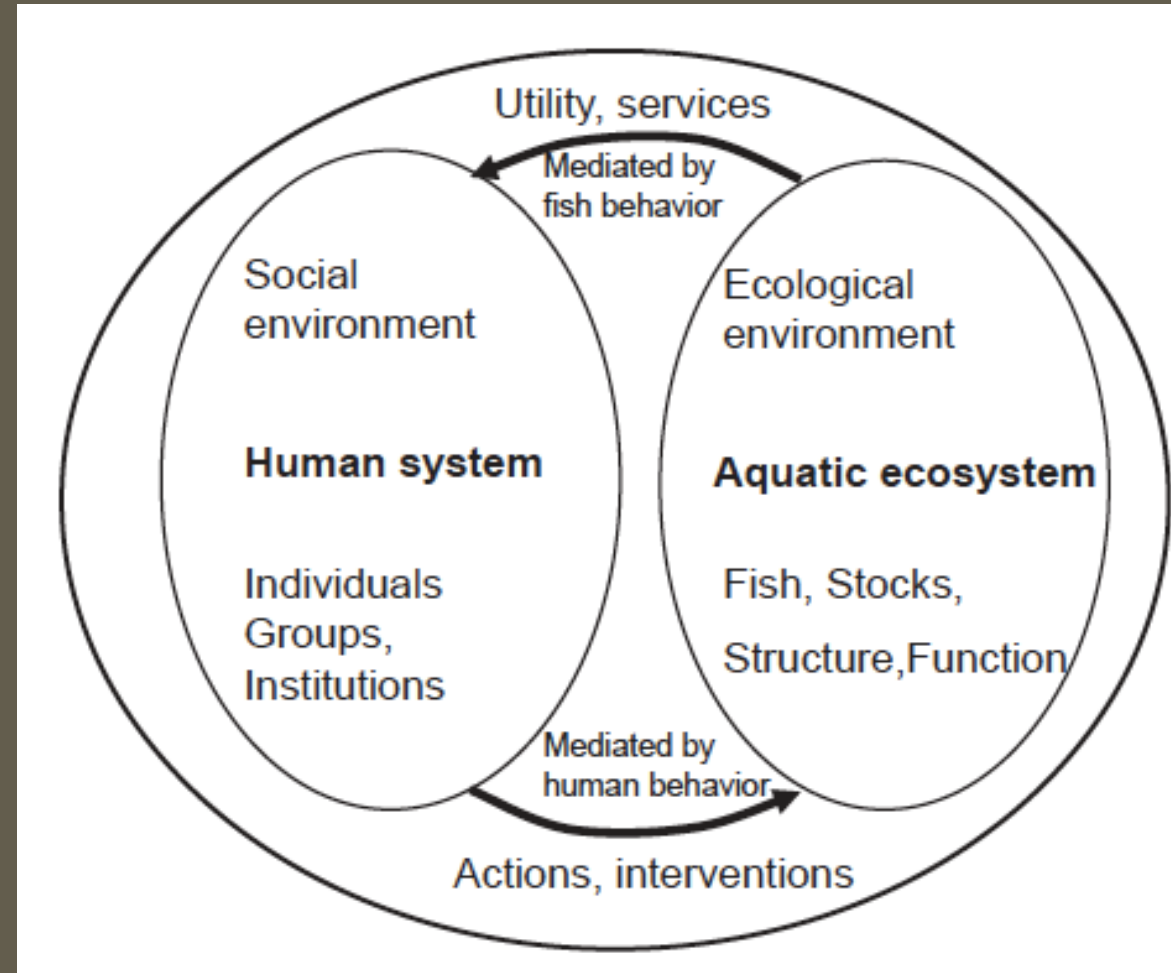
- Ecological Dimension: fish and the ecosystem
- Social Dimension: people
- * Both are integrated

Manage through social-ecological framework

- Identify effort patterns
- Improved predictions

Angling communities are heterogenous

- Differ in motivation and satisfaction
- Varying preferences and subsequent effort



Arlinghaus, R., S. J. Cooke, and W. Potts. 2013. Towards resilient recreational fisheries on a global scale through improved understanding of fish and fisher behaviour. *Fisheries Management and Ecology* 20(2-3):91–98.

ANGLER EFFORT

Angler exploitation one of few variables controllable

- Non-uniform constantly shifting
- Varies waterbody: season, location, and users
- Varies landscape: species, cultures, population densities, and ecosystems

Anglers select for catch and non-catch related factors

- Catch Factors: target species, abundance, harvest opportunity, and size structure
- Non-Catch Factors: proximity, water quality, crowding, amenities, nature, and access

Understanding effort distribution integral in protecting fish stocks



<https://marklassagne.com/bass-fishing-articles/what-is-a-bass-tournament/>

PANFISH

Panfish widely targeted and highly exploited

- High abundance, quick to bite, live in littoral zones
- Low skill, high catch rate, accessible

*** (Highly Heterogenous) Understudied ***

Bluegill

- Thought to be resistant to overfishing
- Decrease in size structure

Crappie

- Poor management track record



ANGLER TOPOLOGY

Fishing community: group of interrelated people sharing common characteristics

Topology: arrangement and relation between motivations and values

Topology Components

- Specialization
- Consumptive orientation
- Centrality to lifestyle
- Fishing experience
- Socio-demographics



<https://www.mercurymarine.com/en/us/dockline/getting-dialed-in-brian-latimer/>



<https://lunaseasports.com/what-are-the-things-you-need-to-go-fishing/>

SATISFACTION

Measure experience quality perception

- Did outcome meet expectations on past experiences
- Conditional to social-ecological dynamics

Outcomes and expectations depend on motivations

- Consumptive-oriented less satisfied
- Non-consumptive meet personal intrinsic demands

Linked to recreational participation



PROJECT DIRECTION

Creel Survey: angler effort, harvest, and socio-demographics

- Insight on motivations and behaviors
- Insight on angler traits & response to social-ecological



<https://www.inhs.illinois.edu/resources/inhsreports/autumn00/creel/>

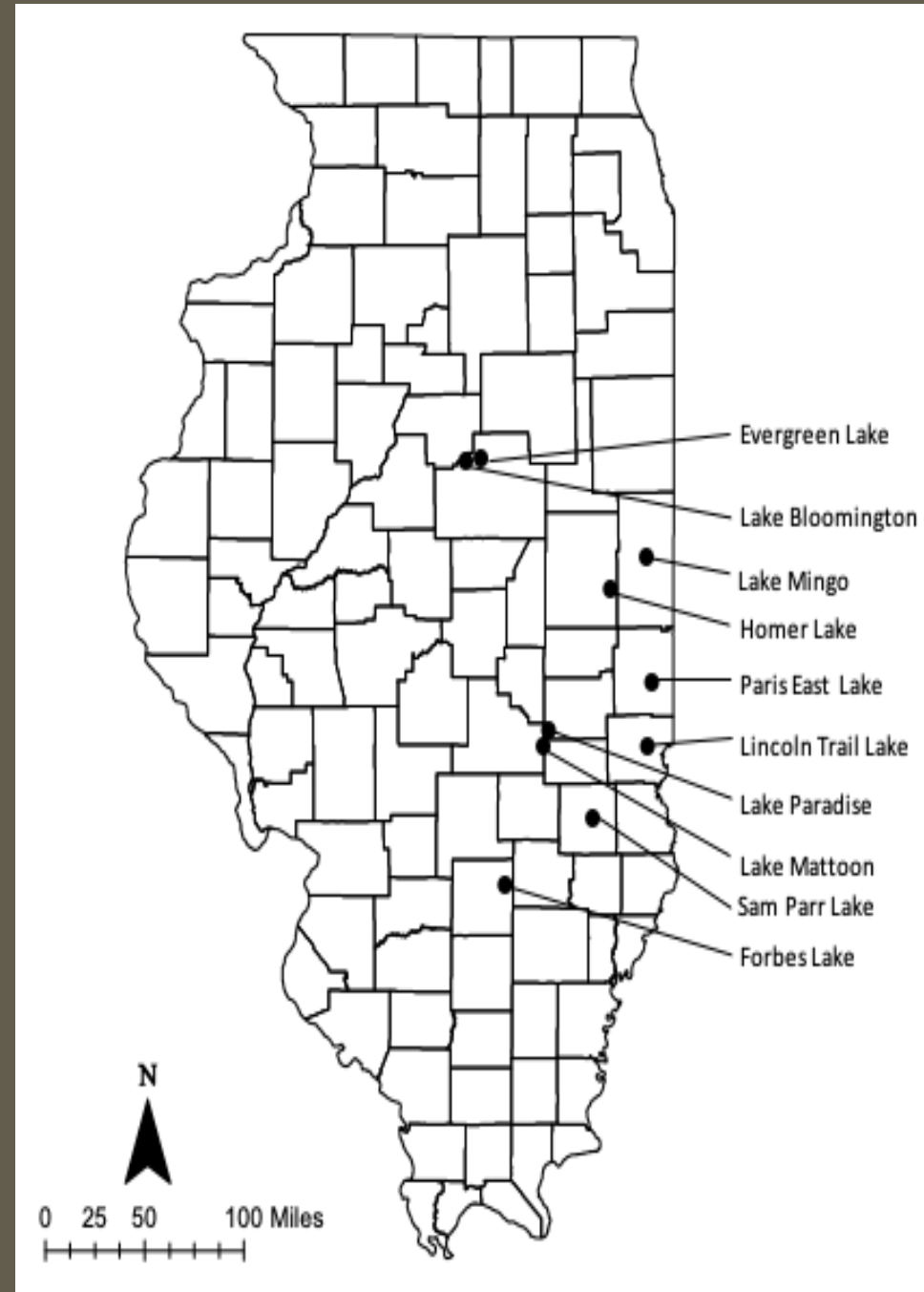
Objectives

- 1) Quantify patterns of effort and exploitation on panfish populations in central Illinois
- 2) Develop an angler topology for central Illinois to compare motivations against panfish angler commitment
- 3) Determine how angler preference and satisfaction relate to angler topology components

CREEL SURVEY DESIGN

2019, 2020, and 2021 at 10 reservoirs in central IL

- Intercept surveys: spring, summer, fall (April – October)
- Lakes ~ 30 cumulative survey events
- Morning (7:30 - 13:30) & evening hours (13:30 – 19:30)
- Additional supplementary mixed modal survey in 2021



Objective 1) Quantify patterns of effort & exploitation on panfish in central Illinois

Lake: _____ Date: _____ Time: _____ Interview #: _____
Circle one: Boat Bank Number in party: _____ Gender: _____ Age: _____

5 Digit Identifier (Month/Day/Angler - ex. 61201 June 12th Angler 1): _____

*How many times this year have you been interviewed at this lake? _____ (If > 0, only ask * questions and measure catch)

*Which town or city have you travelled from to fish this lake today? _____

*What time did you start fishing on this lake today? _____

*Were you targeting a specific type of fish today? If yes, which species? _____

Why did you choose to fish at this lake instead of a different location today? _____

In the last 12 months, approximately how many times have you fished at this lake? _____

In the last 12 months, approximately how many times have you specifically fished only for crappie at any location? _____

In the last 12 months, approximately how many times have you specifically fished only for bluegill at any location? _____

*Are you satisfied with the number of fish you caught or kept today? (circle one): YES NO

*If you are dissatisfied with number of **caught and or harvested** fish, which of the following factors do you feel contributed to the lack of catch? Please check *all that apply*.

___ Bad Fishing Habitat ___ Lack of Experience ___ Not Enough Fish in Lake
___ Fish Weren't Biting ___ Too Many Small Fish ___ Regulations are Too Strict
___ Too Much Fishing Pressure ___ Regulations aren't Protective Enough
___ Other (Please identify): _____

*Other than the number of fish you caught or kept today, were you satisfied with your fishing experience today? (circle one) YES NO

*If you were dissatisfied with your fishing experience by factors **other than catch**, which of the following do you feel contributed most to the lack of satisfaction? Please check *all that apply*.

___ Poor Launch Facilities ___ Lake Surrounding Scenery ___ Lack of Shoreline Access
___ Poor Water Quality ___ Too Many Anglers ___ Pollution Advisory (ex. Mercury)
___ Other (Please identify): _____

Survey Questions:

- Target Species
- Fishing Effort (Hrs)
- # of Spp. Released/Kept
- Trips for Spp. in Last Year

Angling Group	Fishing Effort (Hrs)	% of Total Fishing Effort	% of Total Targeted Taxa	Harvest Rate
Panfish	116,639	35%	30%	45%
Crappie	86,863	26%	20%	48%
Bluegill	19,823	6%	7%	42%

Trips Harvesting ≥ 1 Panfish

Any Species Anglers

46%

Non-Panfish Anglers

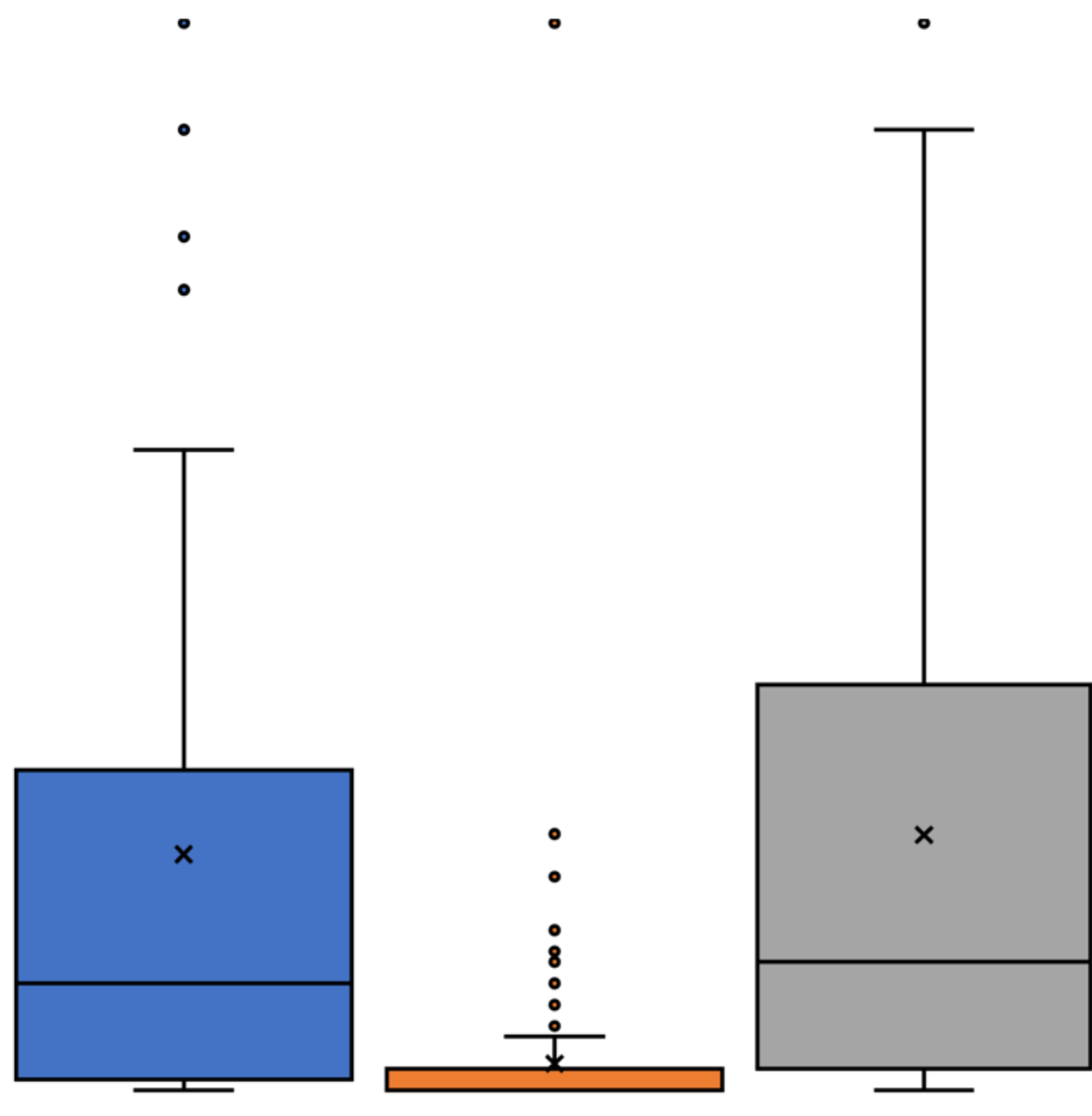
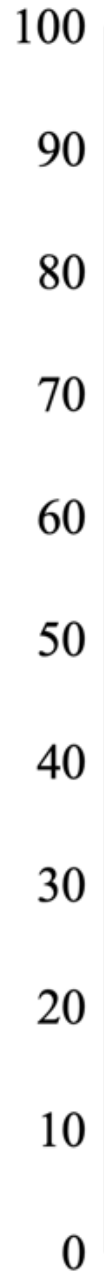
53%

Panfish Anglers

77%

Target Species	Days Targeted in Last Year	% of Anglers
Bluegill	0	70%
	1 to 10	21%
	>10	9%
Crappie	0	54%
	1 to 10	25%
	>10	22%

Angler Trips in Last 365 Days



■ Crappie ■ Bluegill ■ Panfish

Objective 2) Develop an angler topology for central Illinois to compare motivations against panfish angler commitment

Supplementary Survey:

- 32% Agreed to Participate
- 58% Actually Responded
- Motivation, Preference, Satisfaction

Section 4. Angler Motivations. Please indicate which best describes you for each of the following by circling the number that best matches your response.

	<u>Strongly Disagree</u>	<u>Disagree</u>	<u>Slightly Disagree</u>	<u>Unsure</u>	<u>Slightly Agree</u>	<u>Agree</u>	<u>Strongly Agree</u>
Fishing is one of the most important activities in my life.	1	2	3	4	5	6	7
I enjoy introducing new people to fishing.	1	2	3	4	5	6	7
Fishing determines much of my lifestyle.	1	2	3	4	5	6	7
My closest friends fish.	1	2	3	4	5	6	7
Some of my best days of fishing have been when I come home empty-handed.	1	2	3	4	5	6	7
I am disappointed when I have no fish harvest to show for my efforts.	1	2	3	4	5	6	7
My goal is to obtain a fresh fish meal.	1	2	3	4	5	6	7
Fishing is a test of skill.	1	2	3	4	5	6	7
I like to fish for the challenge.	1	2	3	4	5	6	7
I spend a lot of time fishing and seeking out quality locations.	1	2	3	4	5	6	7
I plan vacation time around fishing trips.	1	2	3	4	5	6	7
I would rather fish then partake in any other outdoor recreation.	1	2	3	4	5	6	7
I am disappointed if I do not catch a lot of fish on a trip.	1	2	3	4	5	6	7

- Literature topology components and relevant questions asked on my survey

- PCA Analysis

- Cronbach Reliability Test

Centrality to Lifestyle	
Fishing is one of the most important activities in my life	1 - 7
I enjoy introducing new people to fishing	1 - 7
Fishing determines much of my lifestyle	1 - 7
My closest friends fish	1 - 7
Consumptive Orientation	
My best days of fishing have been when I come home empty-handed	1 - 7
I am disappointed when I have no fish harvest to show for my efforts	1 - 7
My goal is to obtain a fresh fish meal	1 - 7
I am willing to drive over 60 miles to a lake if I can harvest a lot of fish	1 - 7
Skill	
Fishing is a test of skill	1 - 7
I like to fish for the challenge	1 - 7
Rate your skill in comparison to other anglers you know	1 - 7
Behavioral Commitment	
I spend a lot of time fishing and seeking out quality locations	1 - 7
I plan vacation time around fishing trips	1 - 7
I would rather fish than partake in any other outdoor recreation	1 - 7
Annual gear expenditures	1 - 4
How often do you fish in an average year	1 - 5
Catch Importance	
I am disappointed if I do not catch a lot of fish on a trip	1 - 7
I go fishing and nothing happens, I keep pushing to catch something	1 - 7
Catching fish is necessary for a satisfying trip	1 - 7
Trophy Orientation	
I would rather catch a few larger fish than a lot of smaller ones	1 - 7
I am more likely to fish a lake with trophy fish opportunity	1 - 7

Five Components	% Variation
Centrality to Lifestyle	20%
Catch Importance	14%
Angling Skill	13%
Importance of Challenge	11%
Consumptive Orientation	9%
Total Explained	68%

Panfish commitment related with my topology components using a Pearson correlation (Adjusted P-Value = 0.01)

	Panfish Commitment		
Component	N	R	P
Lifestyle Centrality	159	0.168	0.035
Catch Importance	159	-0.055	0.494
Angler Skill	159	0.262*	0.001*
Challenge Importance	159	0.029	0.719
Consumptive Orientation	159	0.275*	0.001*

Objective 3) Determine how angler preference and satisfaction relate to central Illinois angler topology components

After Cronbach Reliability Test

Fishing Opportunity	
Amount of different types of fish available to catch	1 - 7
Amount of fishable habitat structure in Illinois lakes	1 - 7
Amount of fishing lakes within a 60 mile radius of your home	1 - 7
Amount of shoreline fishing access on Illinois lakes	1 - 7
Fishing Quality	
Angler Crowding	
Amount of other anglers encountered on Illinois lakes	1 - 7
Lake Aesthetics	
Amount of trees surrounding Illinois lake shorelines	1 - 7
Water quality of Illinois lakes	1 - 7
Amenities	
Illinois lake launch facility cleanliness and maintenance	1 - 7

Satisfaction index score related with my topology components using a Pearson correlation (Adjusted P-Value = 0.01)

Satisfaction Index			
Component	N	R	P-Value
Lifestyle Centrality	123	0.095	0.295
Catch Importance	123	0.046	0.611
Angler Skill	123	0.117	0.199
Challenge Importance	123	0.168	0.063
Consumptive Orientation	123	0.251*	0.005*

Preference questions of interest to management related with my topology components using a Pearson correlation

Fishing Regulations

I am more likely to fish a lake with Bluegill bag limits

I am more likely to fish a lake with Crappie bag limits

A 10 in. minimum length limit on Crappie

Fishing Opportunity

I'm willing to drive over 60 miles if I think I will catch more

I am more likely to fish a lake with trophy fish opportunity

I am more likely to fish a lake I can catch multiple species

(Adjusted P-Value = 0.002)

Preference	Centrality	Catch	Skill	Challenge	Consumption
Bluegill Bag Limits	0.25*	-0.08	0.14	0.17	0
Crappie Bag Limits	0.21	-0.16	0.2	0.14	0.02
10 in. Crappie MLL	0.27*	-0.28*	0.24	0.19	-0.15
Drive > 60 Miles	0.34*	0.08	0.31*	0.25*	0.26*
Trophy Opportunity	0.44*	0.1	0.34*	0.31*	-0.08
Multiple Species	0.1	0.13	0.07	-0.01	-0.01

DISCUSSION

Higher response rates due to wealth & education? (*Proximity)

Objective 1)

- Panfish harvested by all groups
- Crappie anglers more specialized (location dependent)

Objective 2)

- Topology motivations explain heterogeneity (68%)
- > Panfish commitment, > skill & consumptive nature

Objective 3)

- > Satisfaction with IL fishing for consumptive anglers
- > Centrality to lifestyle, > panfish regulation support
- > Skill & challenge importance, > pursuit for high catch and trophy opportunity



QUESTIONS?



Literature Review on the Effectiveness of Harvest Regulations to Improve Size Structure and Growth for Inland Recreational Fisheries

Authors: Tommy Hill

Dr. Joe Parkos

Dr. Anthony Porreca

Dr. Cory Suski



BACKGROUND

Overexploitation negatively impacts fish stock structure and growth

- Truncates size and age classes
- Limits the abundance of mature spawners
- Alters growth patterns
- Changes life histories



Harvest regulations are a common management tool for correcting the effects of harvest

- Regulation success has been inconsistent
- Confounding ecological effects influencing size structure
- Poor study design limits evaluation abilities

OBJECTIVES/METHODS

1. The magnitude and direction of the effect of different regulation types on fish size structure and growth
 - Compare weighted effect size for size structure responses against regulation types
2. Duration of regulation evaluation periods relative to speed of target species' life history
 - Compare study duration against species maturation ages
3. Whether other ecological factors potentially shaping growth and size structure were accounted for during harvest regulation evaluations
 - Compare ecological covariates against weighted effect size for size structure responses

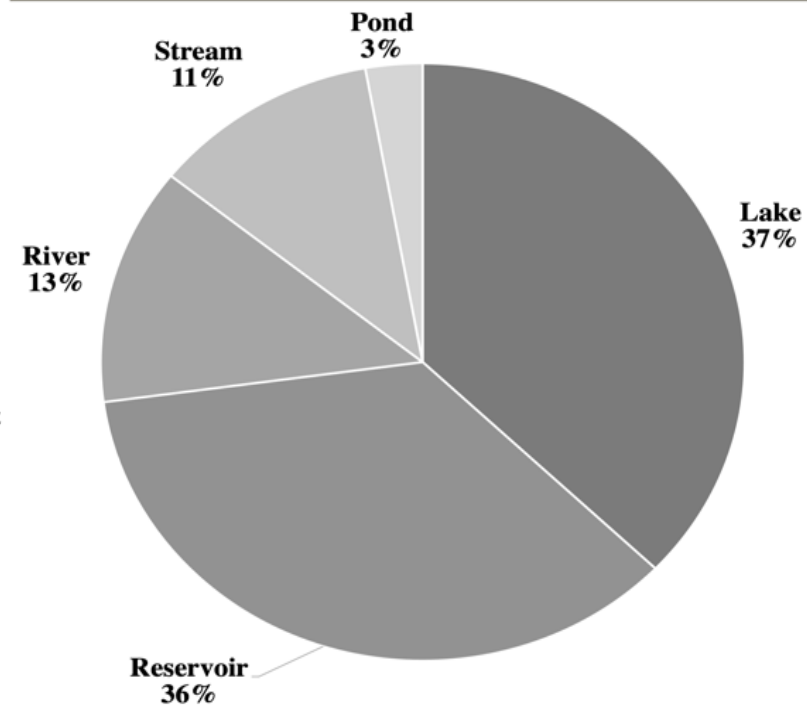
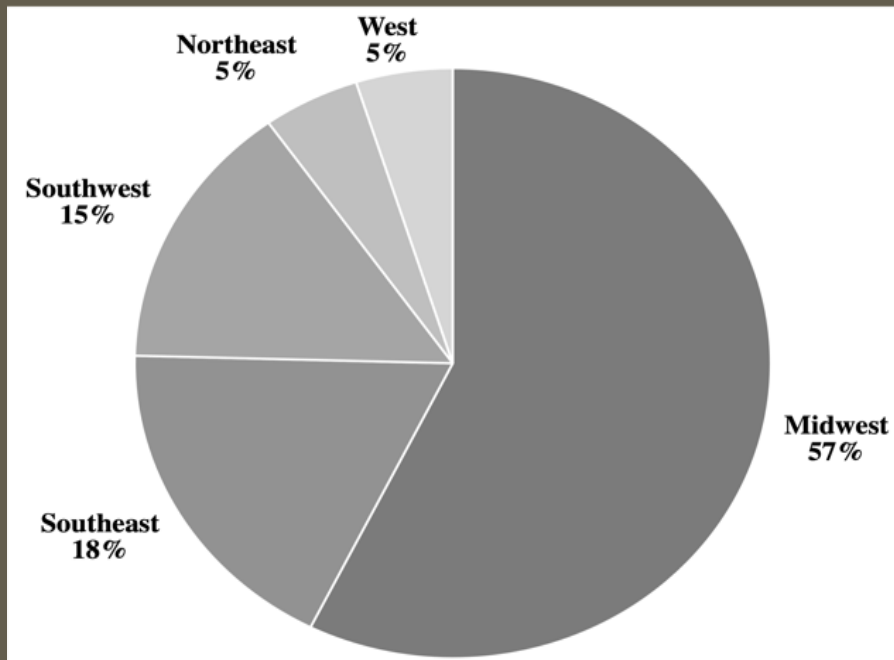
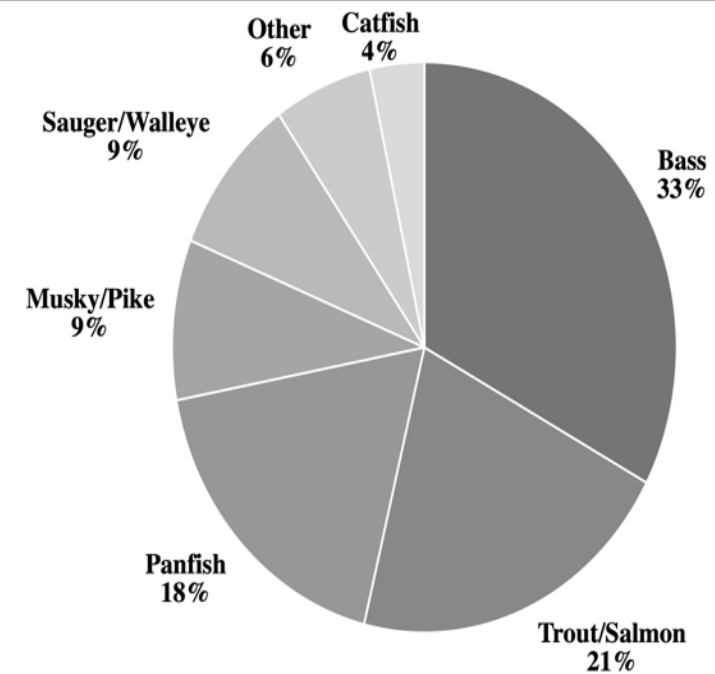
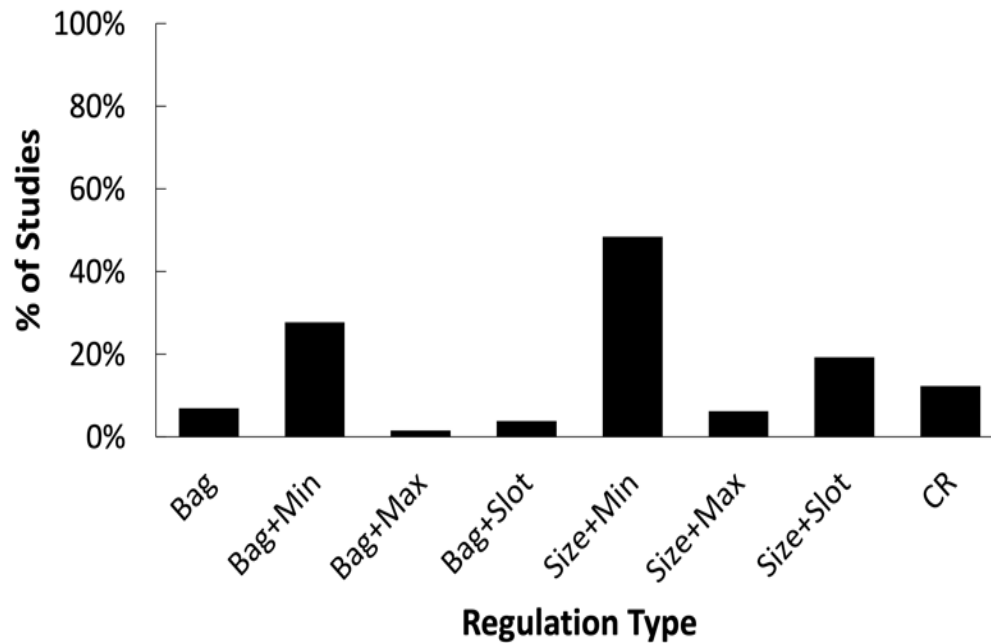
Search Engine	
Web of Science	Google Scholar
length limit AND fishery OR anglers	fish “length limit” regulations
size-limit AND fishery OR anglers	fish “size-limit” regulations
bag limit AND fishery OR anglers	fish “bag limit” regulations
slot-limit AND fishery OR anglers	fish “slot-limit” regulations
protected slot AND fishery OR anglers	fish “protected slot” regulations
angler OR angling AND regulation	angler regulations
harvest regulation AND recreational fisheries	recreational fishing harvest regulations

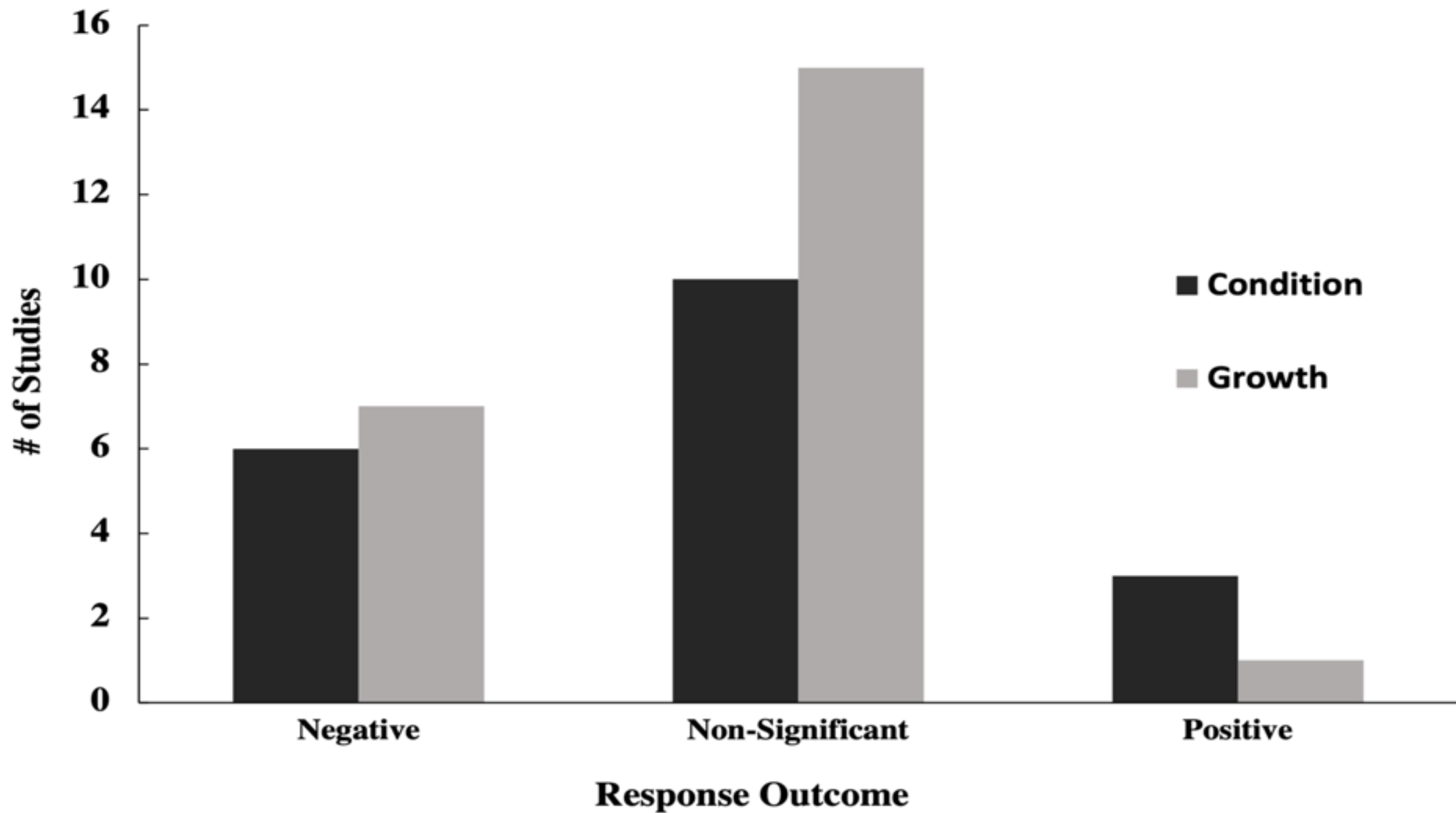
- **130 Studies**
- **70 Field based**
- **34 Effect Size Papers**
- **51 Effect Size Results**
- **23 Growth Results**
- **19 Condition Results**

Covariates	
Natural Mortality	Age Maturation
Recruitment	Primary Productivity
Prey	Water Quality

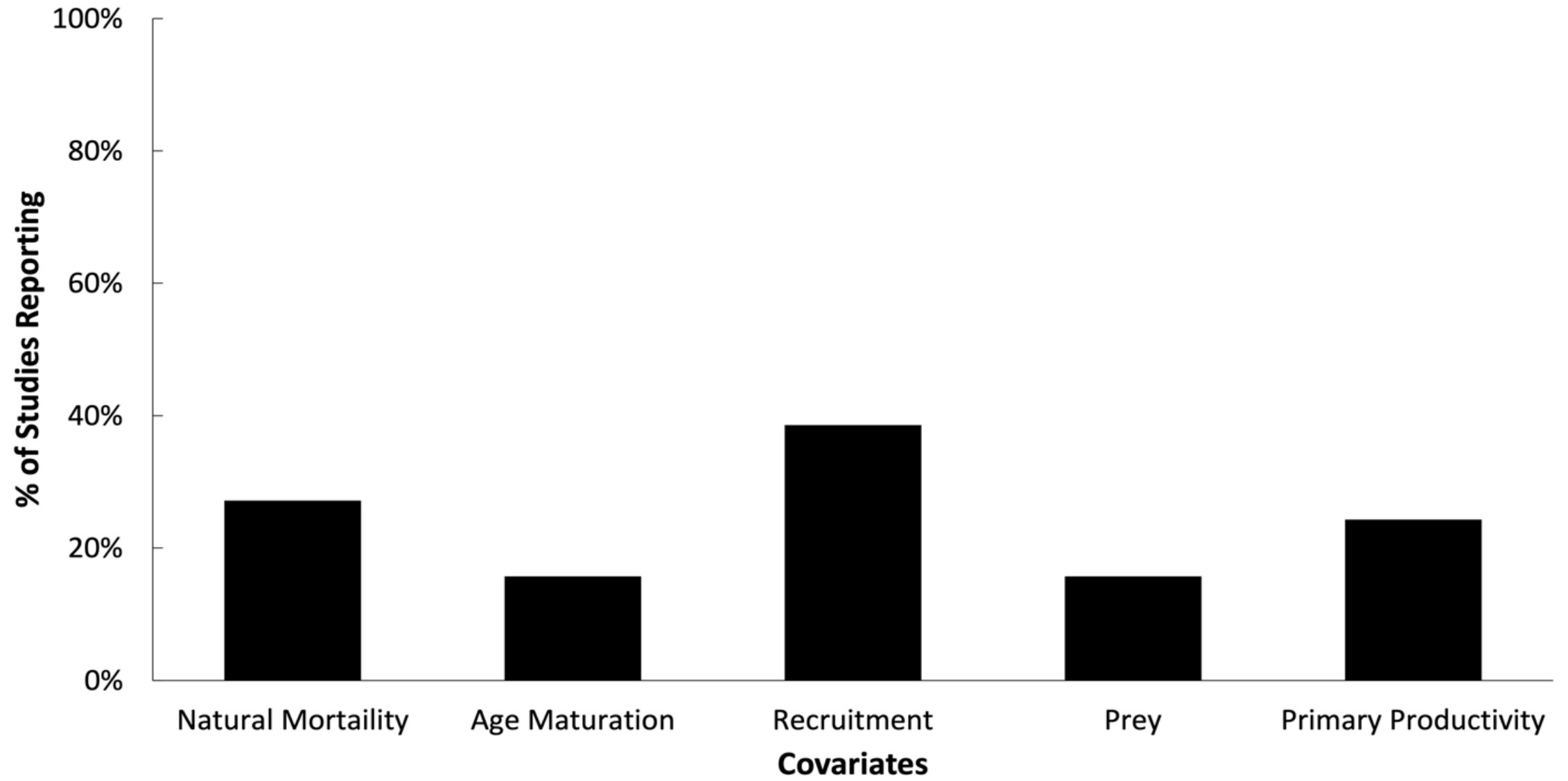
Field Study Design

Pre/Post	50	71%
Control	4	6%
BACI	16	23%





Species	Avg. Study Post-Period	Avg. Maturation Age
Bass (Largemouth, Smallmouth, Rock, Spotted, Striped)	5	3
Bull Trout	3	5
Musky	8	5
Northern Pike	12	4
Panfish (Crappie, Bluegill, Perch)	7	3
Trout (Rainbow, Brown, Brook, Grayling, Cutthroat)	4	3
Walleye	9	3
Whitefish	4	4



QUESTIONS?

