



Asian Carp: Other Barriers May Exist

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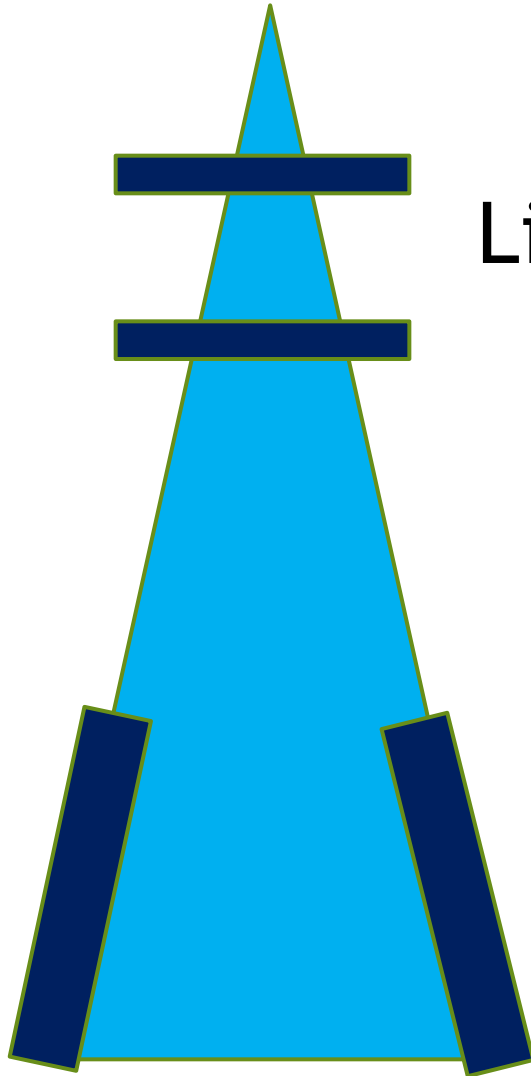
Cast



Dispersal Framework for Invasive Species



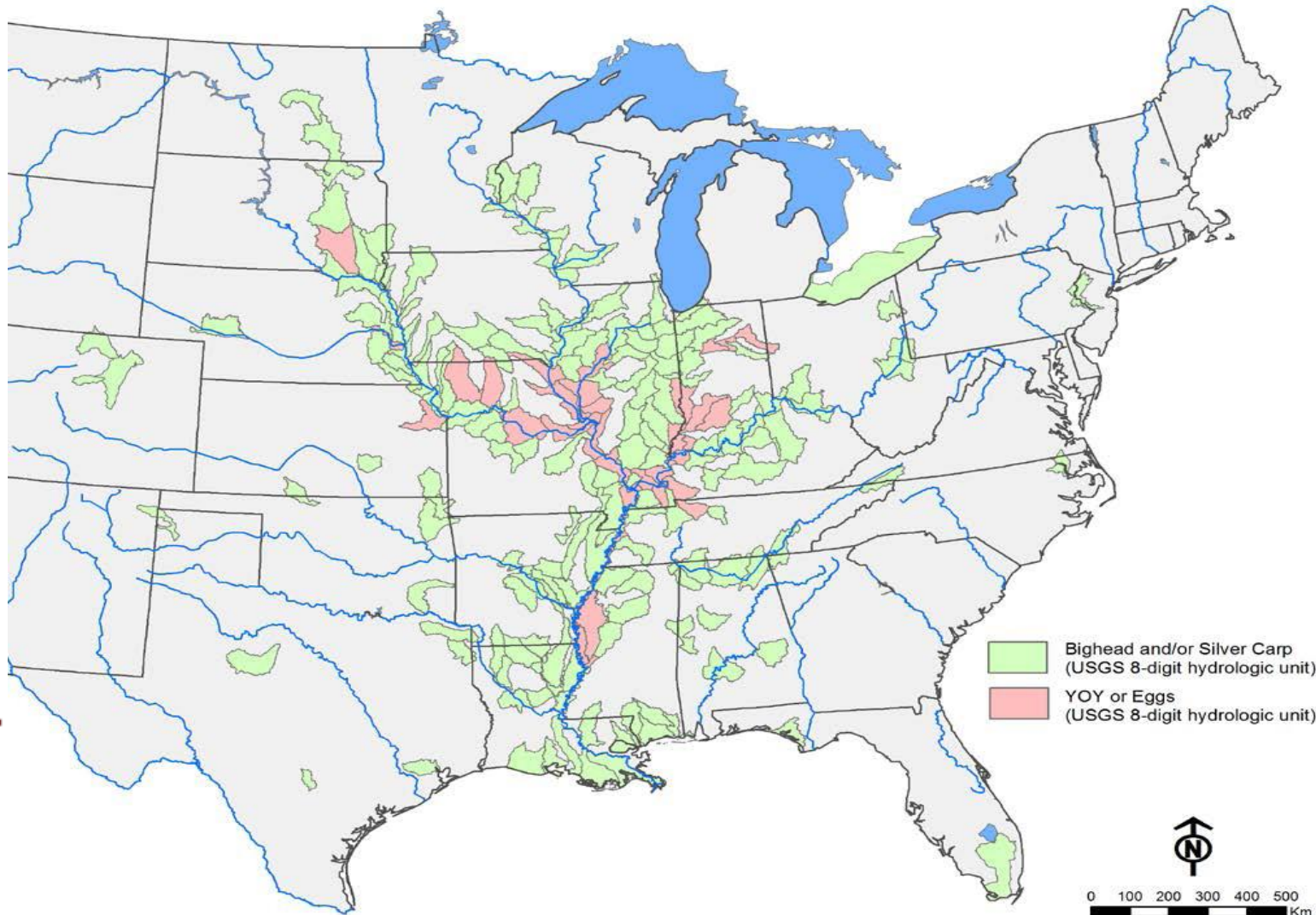
Navigable Rivers of Central US



Limiting Factors: Flow, Dams

Limiting Factors: Levees

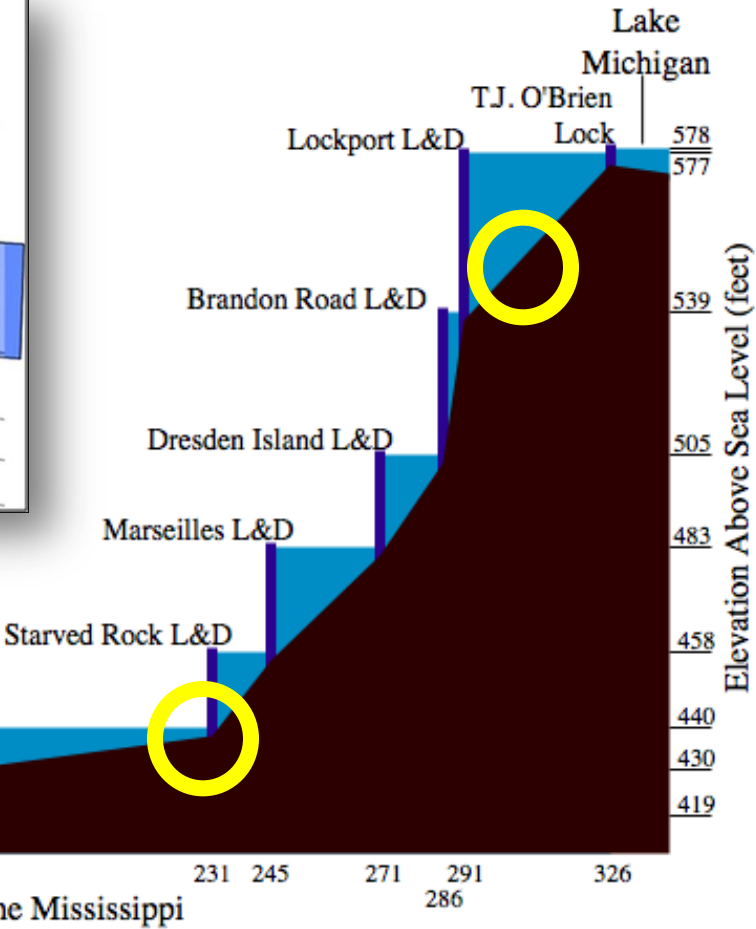
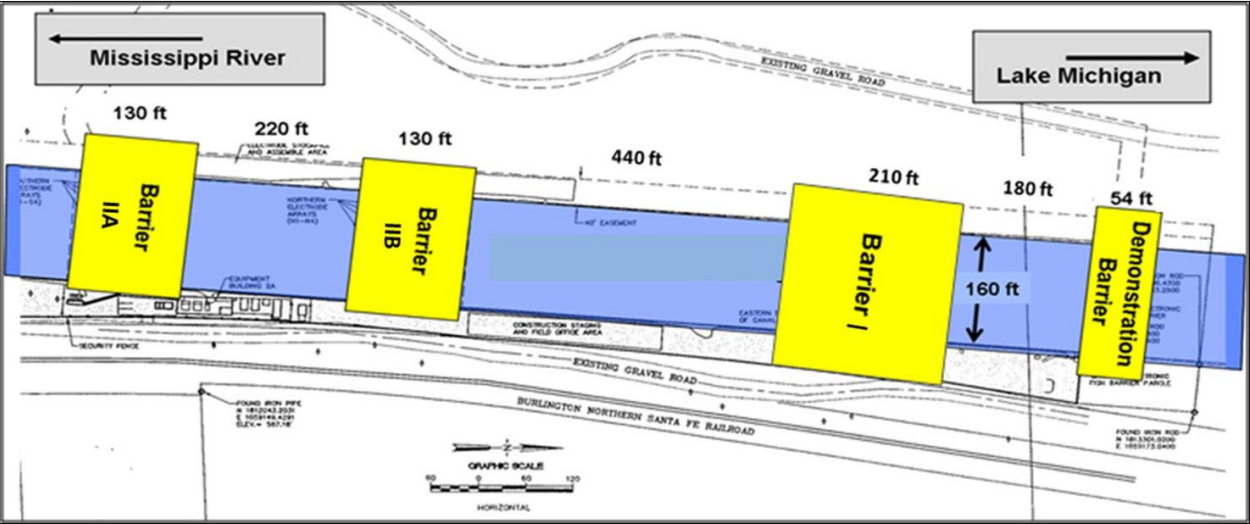
Spread of Carp in Illinois River



Lake Michigan is Threatened



Barriers?



Why Starved Rock?

- Tripp et al. 2013 -
- Gate Configuration Matters
 - Locking Through



Navigation of Talk

- ▶ Density Patterns in the Illinois River
- ▶ Telemetry
- ▶ Predictive Modeling



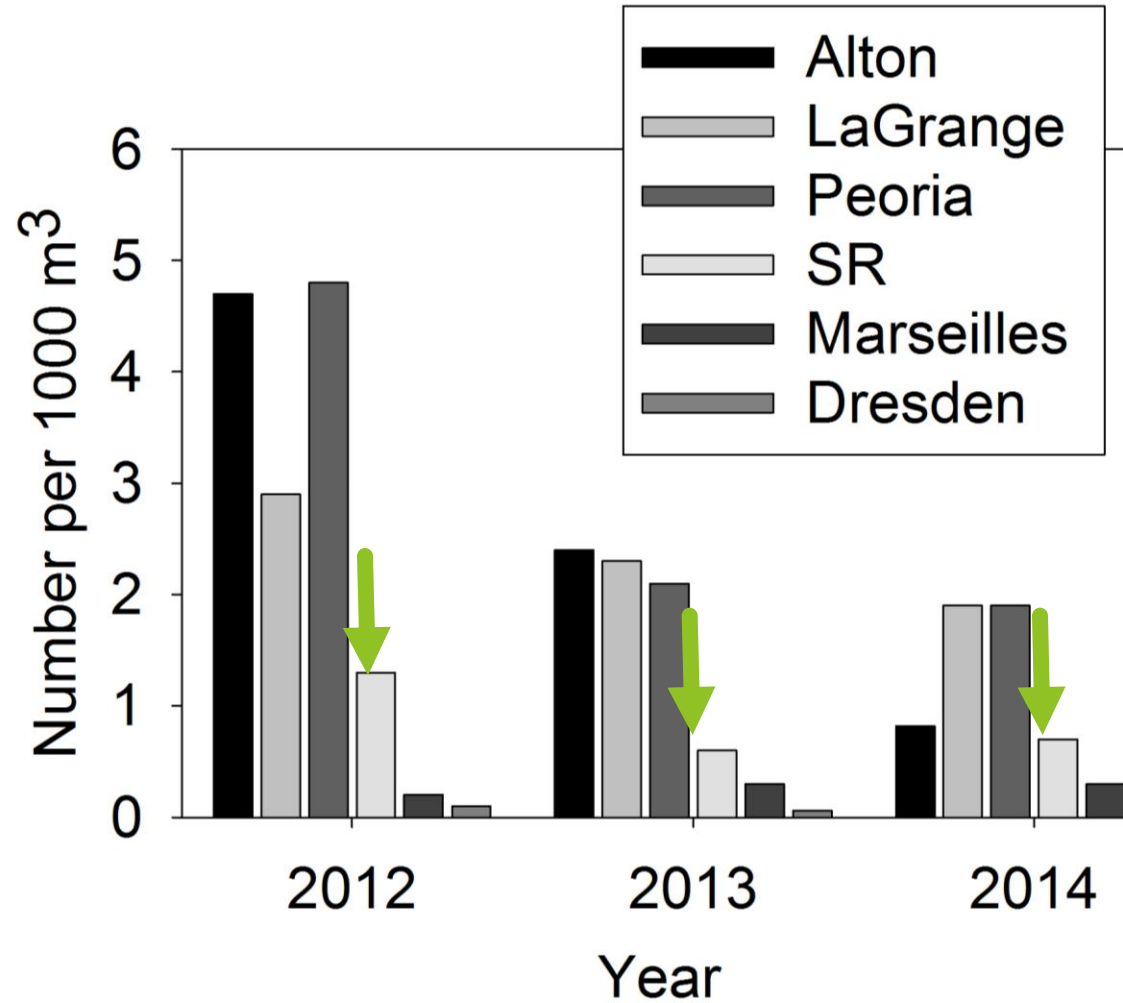
Density Patterns



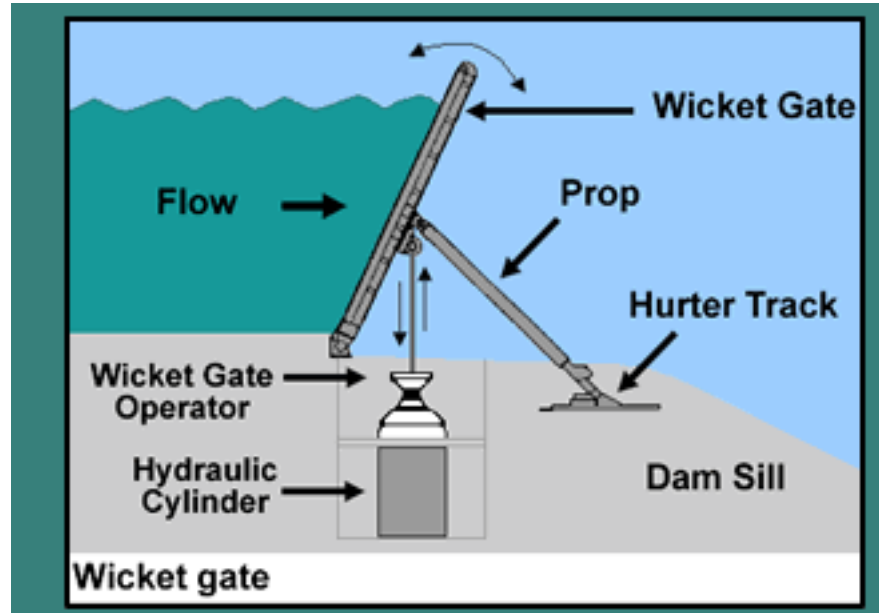
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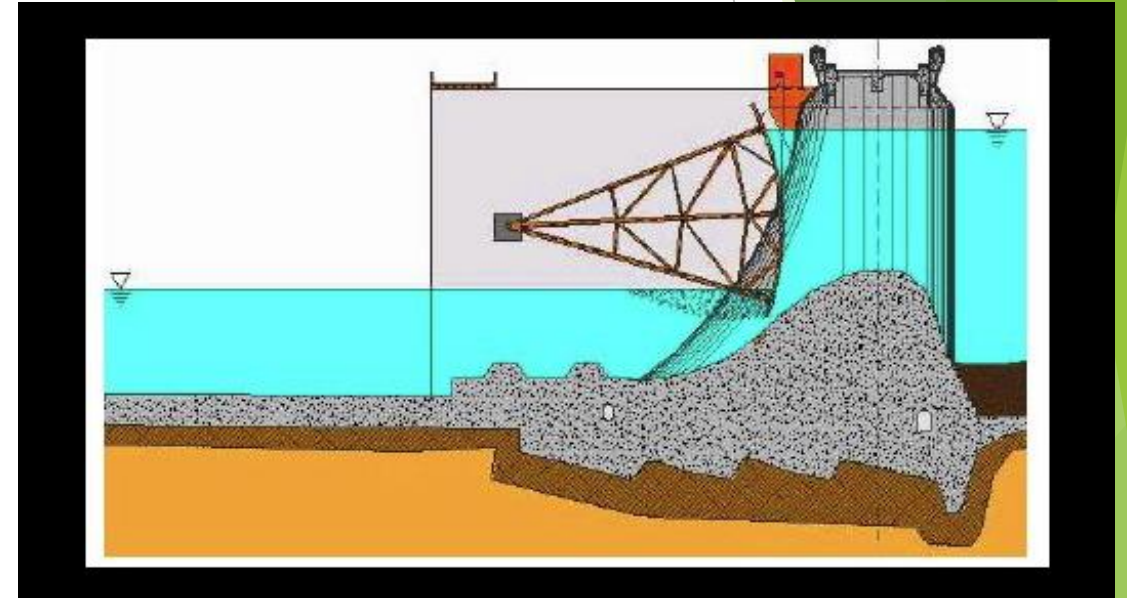
Density Patterns



Wickets Versus Tainters



Lower
River



Upper
River

Navigation of Talk

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River Telemetry

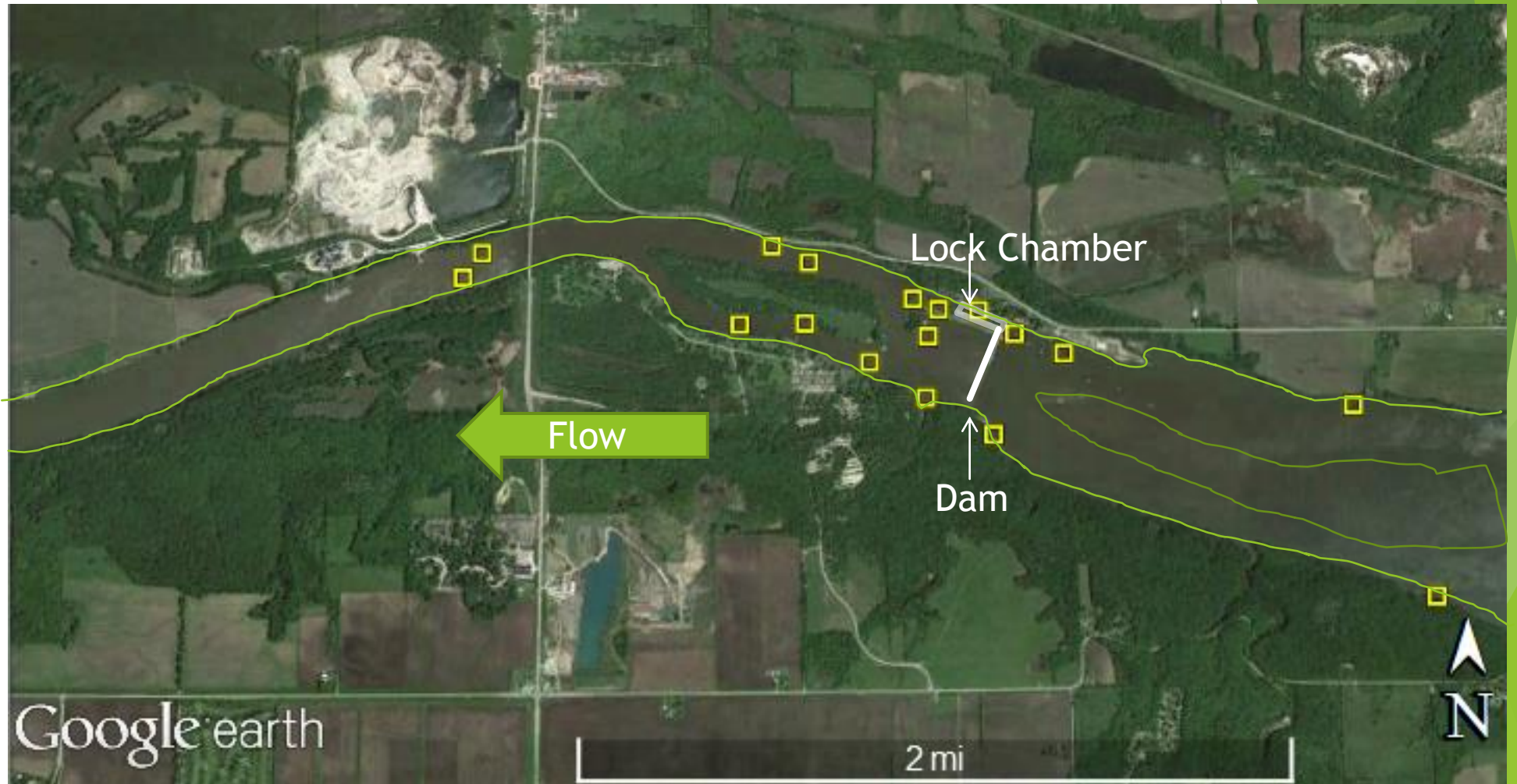


709 Asian Carp
(2:1 Silver:Bighead)



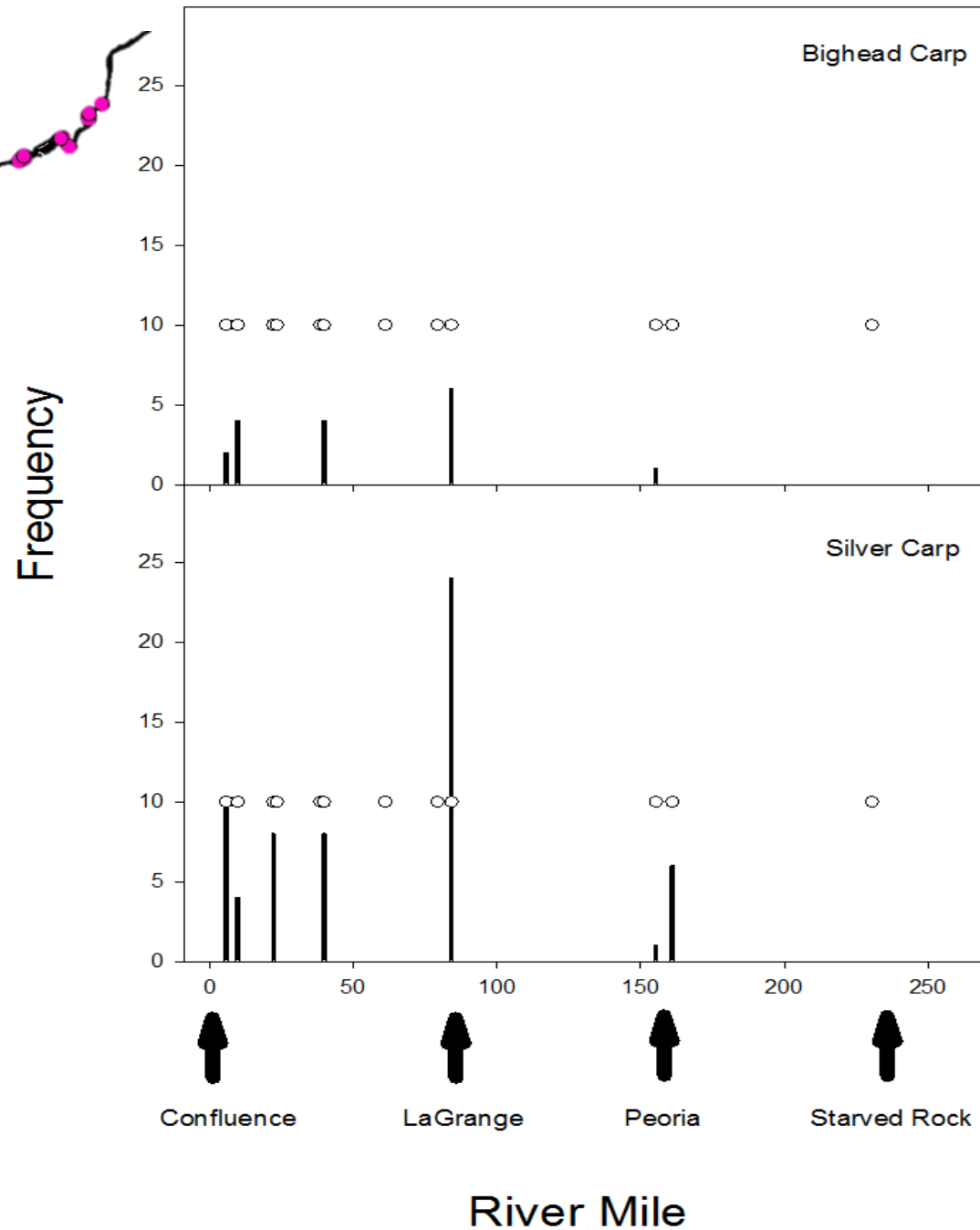
Starved Rock Telemetry

May 2015 -
416 Tagged
Silver Carp



Whole River

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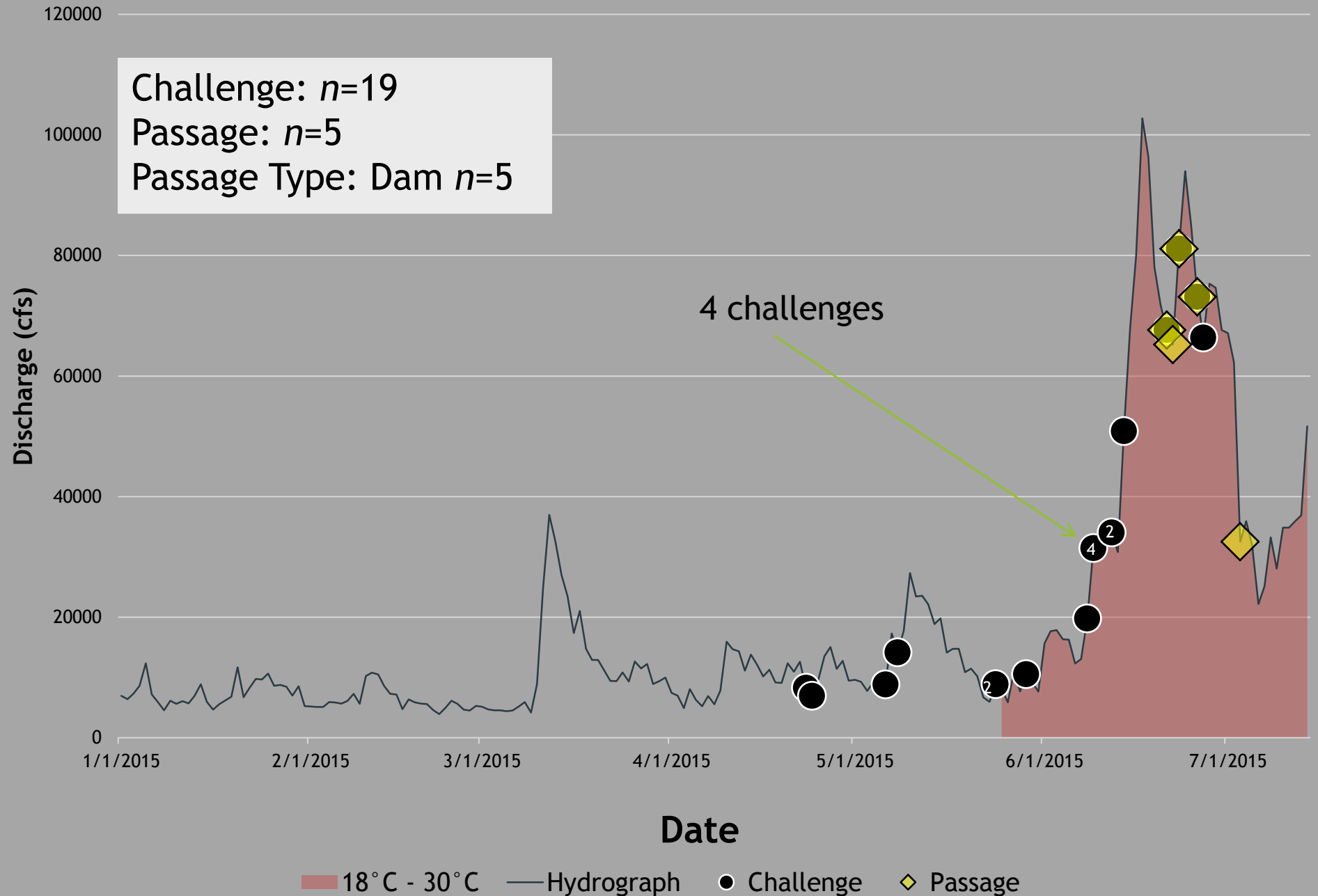
Probabilities

		Movement to:					
		Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden Is.
Movement from:	Pool 26	0.57	0.21	0.21			
	Starved Rock		0.03	0.15	0.79	0.03	
	Marseilles			0.05	0.13	0.73	0.10
	Dresden Is.					0.40	0.60

2015

Starved
Rock As
A
Barrier?

Challenge: $n=19$
Passage: $n=5$
Passage Type: Dam $n=5$



Carp Movement

- ▶ Rare Through Starved Rock (1%)
- ▶ Temporal Scale Matters
- ▶ Flow Matters
- ▶ Lock Unimportant
- ▶ Gate Configuration?



Navigation of Talk

- ▶ Density Patterns in the Illinois River
- ▶ Telemetry
- ▶ Predictive Modeling



Model Goal

Suppress Up
Here?

If Only 1 % Get Through Here

How Much Removal Necessary
Down Here?



Simplest Prediction

- ▶ Acoustics estimate below Starved Rock: 743,435 carp (Glover, MacNamara, et al.)
- ▶ 7,434 carp immigrate to upper river per year
- ▶ Reduce carp in the lower river by 70% will reduce migration of fish per year to about 2,000
- ▶ Control at dam



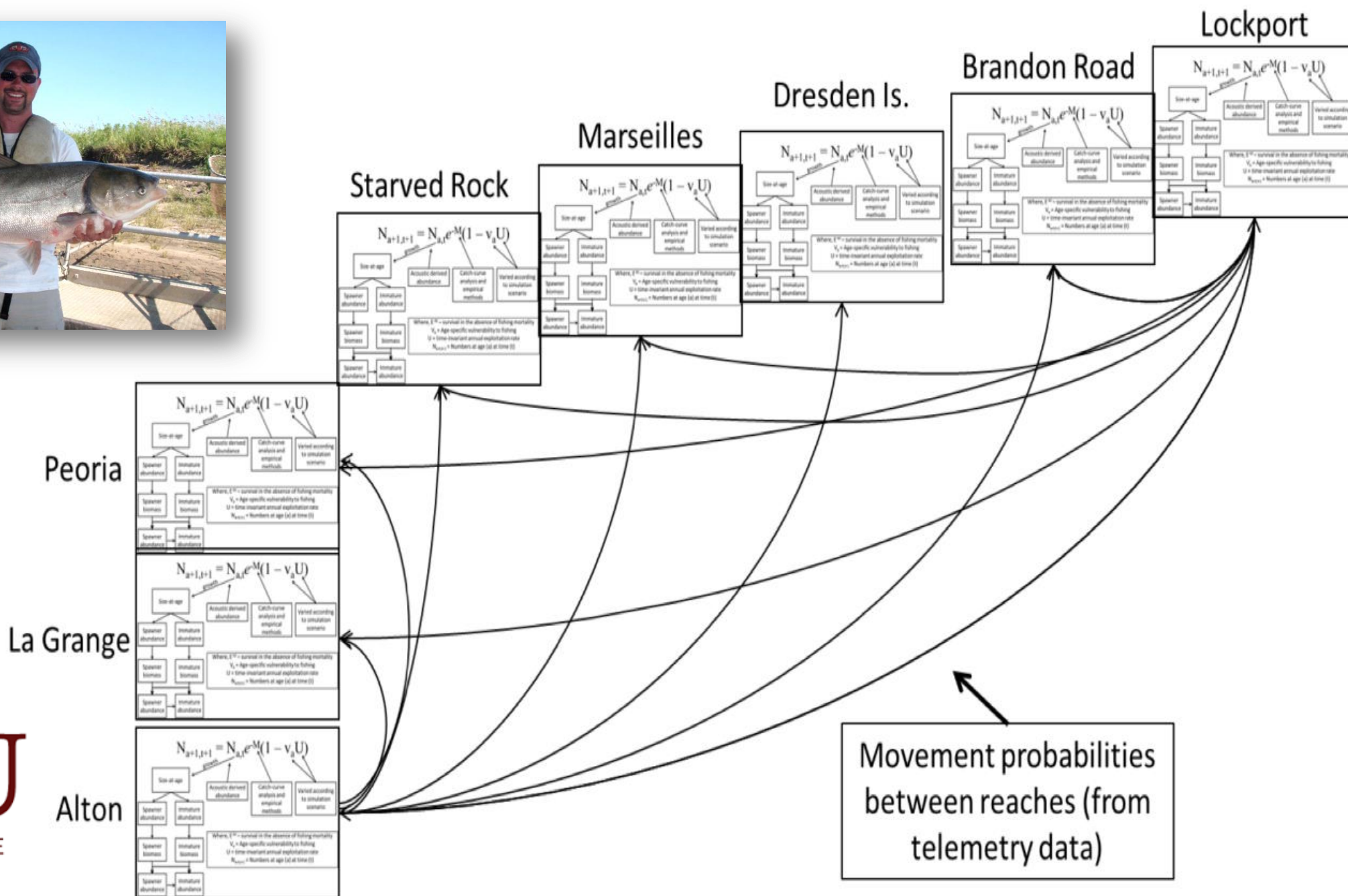
More Complicated

- ▶ We know more fish are upstream - > 18,000 carp removed each year (about 50% mortality)
- ▶ Other dams?
- ▶ Variability in movement?
- ▶ Recruitment?
- ▶ Migration into Illinois River from Mississippi River?





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Will We Get There?



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