

Asian Carp

SUPPRESSING DISPERSAL WITH HARVEST

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Goals

- Background
- Modeling & Data
- Harvest as a control option
- Generality



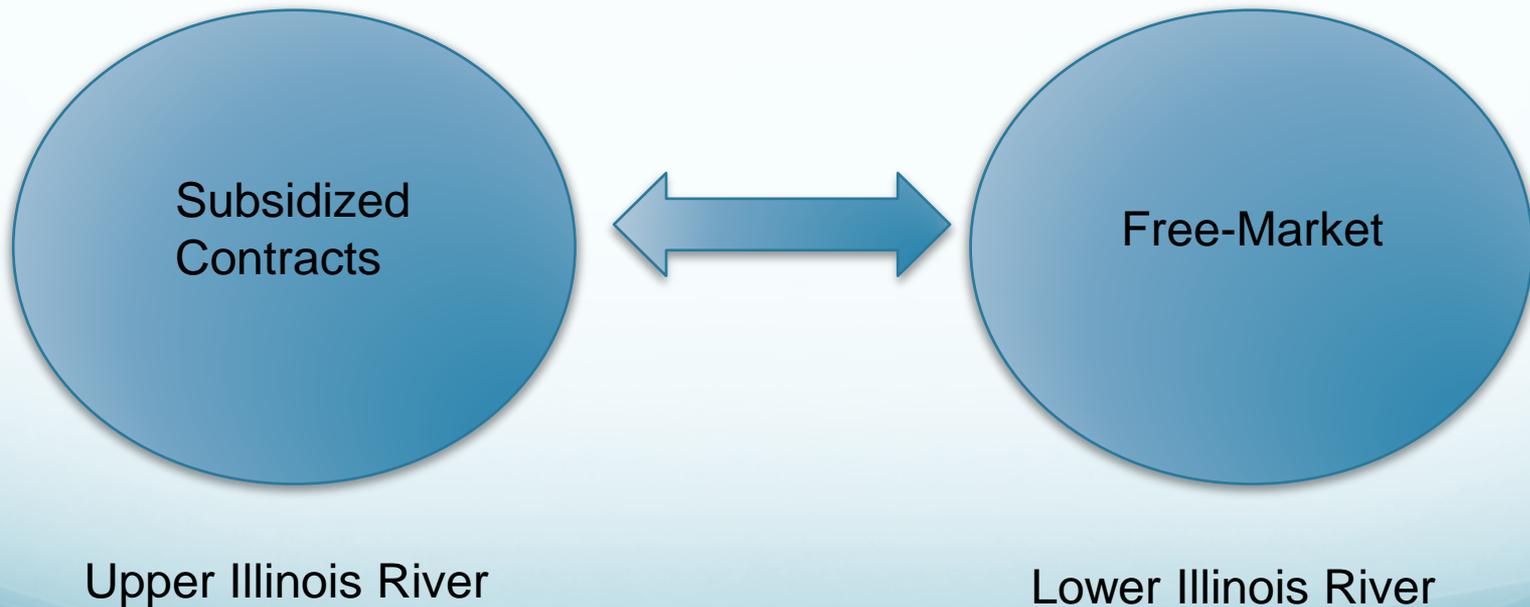
Control Options?

- Space, the scary frontier



Control Options

- Harvest is most immediate
- Will this and other control options work?



Marketing



Export



Marketing



Acceptance?

Fishing capacity in US

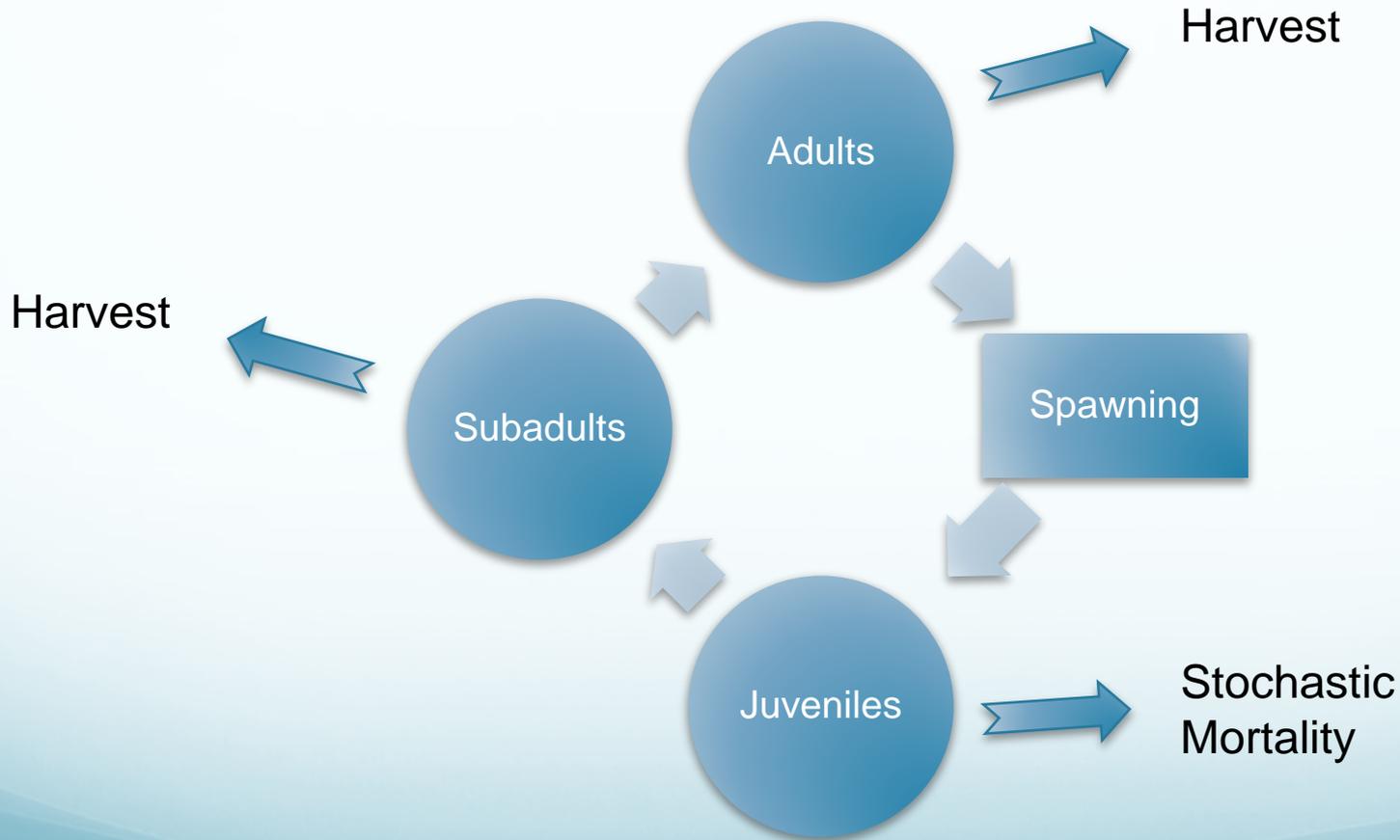


Modeling

- What is our ultimate goal?
- How much fishing?
- What sizes?
- Where do we fish (space)?



“MSU” model



“MSU” model

- In press, “Fisheries”
- Exploitation rate of 70% annually necessary
- All stages (sizes of Asian carp)
- Limitations
 - What is our “real” goal?
 - Realistic stochastic recruitment
 - Specific pools/fishing patterns
 - Immigration
 - Compensatory feedbacks

Modeling Summit



Modeling Summit

- Agreed that the MSU model is sound – add improved parameters...probably won't change results
- New model is needed



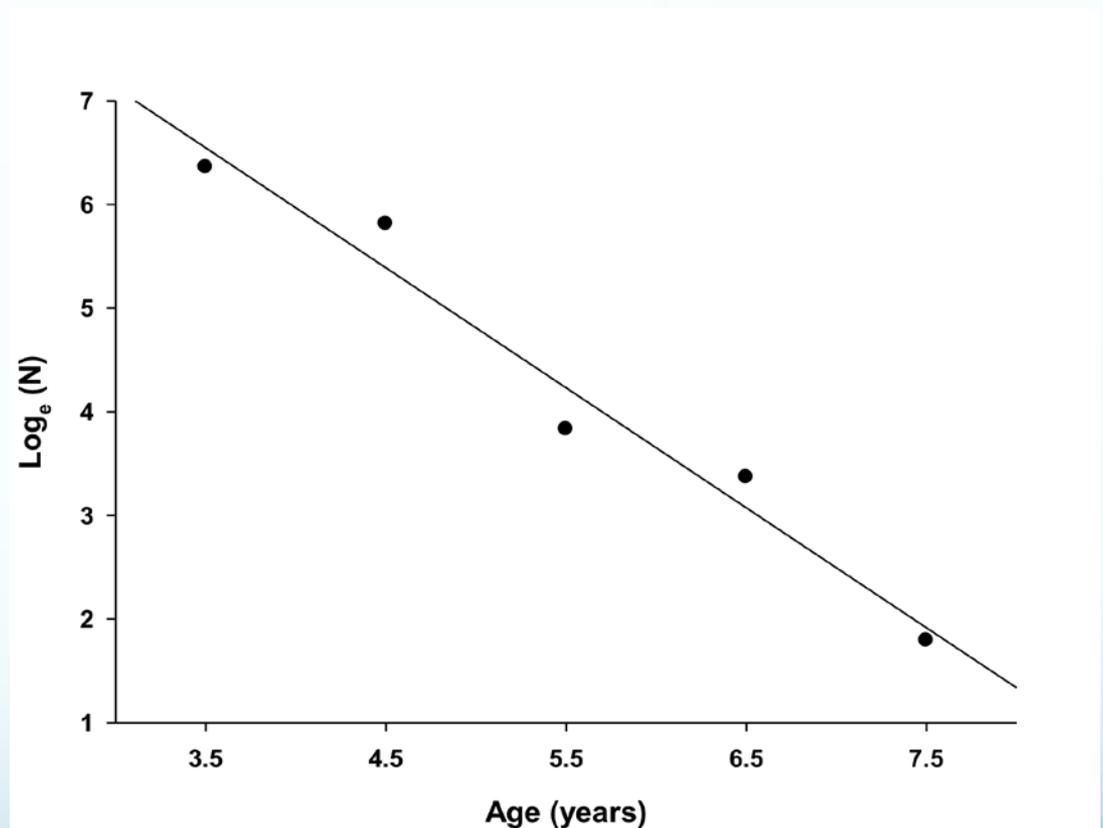
Modeling Summit

- Goal: Dispersal prevention
- Spatially explicit
- Portable
- Data!
 - What we need to collect...
 - Population parameters
 - Density
 - Movement
 - Harvest/control patterns



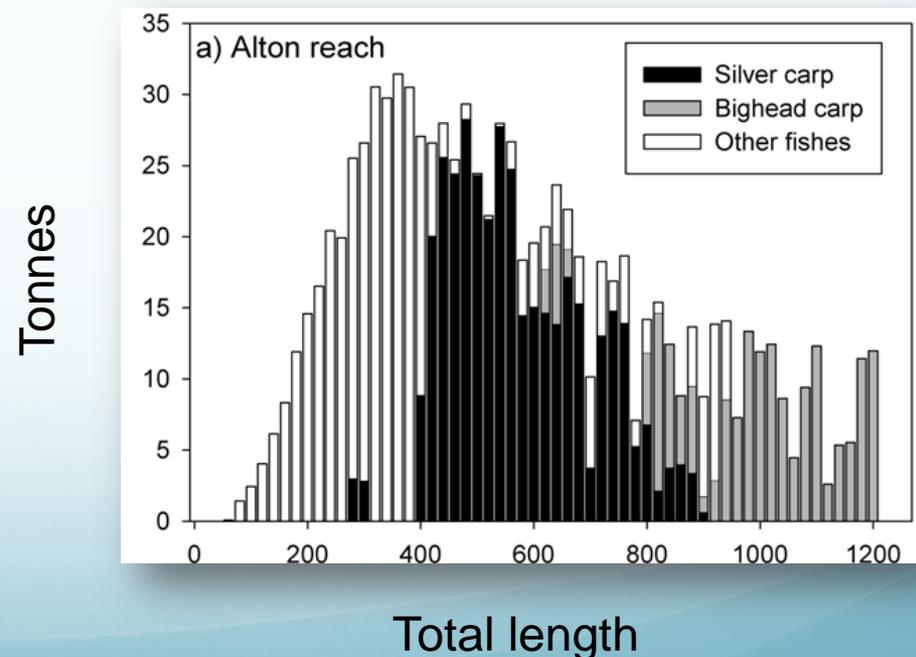
Getting Data

- Focus on Illinois River
 - Population parameters –
 - Commercial fishery plus our sampling



Getting Data

- Density
 - Acoustics (split-beam; side-looking)
 - 2011, 2012, 2013
 - Electrofishing and mark-recapture



Getting Data

- Immigration, emigration, intra-river
- 2011- High water, high movement
- 2012 – Low water, low movement
- 2013 – Intermediate...

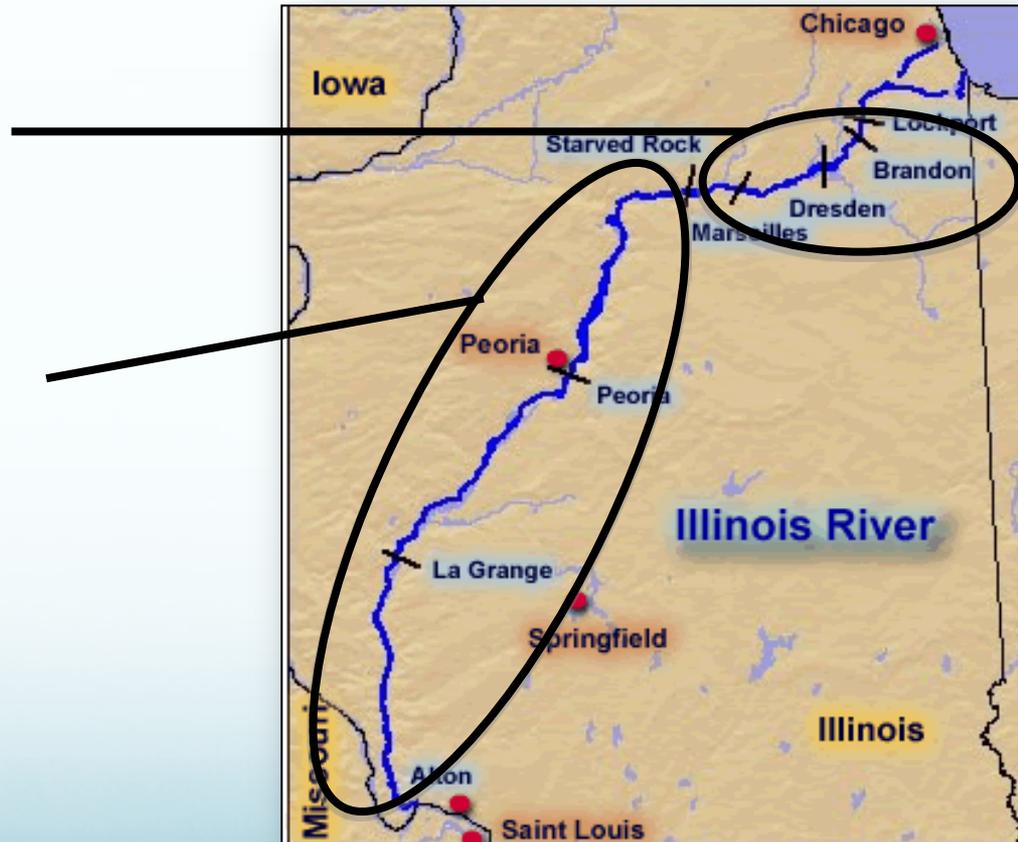


Getting Data

- Harvest “experiments”

Upper River

Lower River



Harvest – Upper River



- > 0.5 million pounds out of the non-commercial reaches for 2012
- Focused on Marseilles
- Evaluated change in populations with tagged fish

Harvest –Upper River

Reach	Bighead carp (N)	Silver carp (N)	Grass carp (N)	Total harvested	Total AC (lbs)
Dresden	76	13	1	90	644
Marseillies	12,126	8,744	75	20,945	329,623
Starved Rock	4,358	19,875	223	24,456	238,177
Total	16,560	28,632	299	45,491	568,444

Harvest – Upper River

- Releases
 - 279 bighead
 - 34 silver
- 49% returned by fishers
- 76% exploitation rate
(very efficient fishing)
- But....

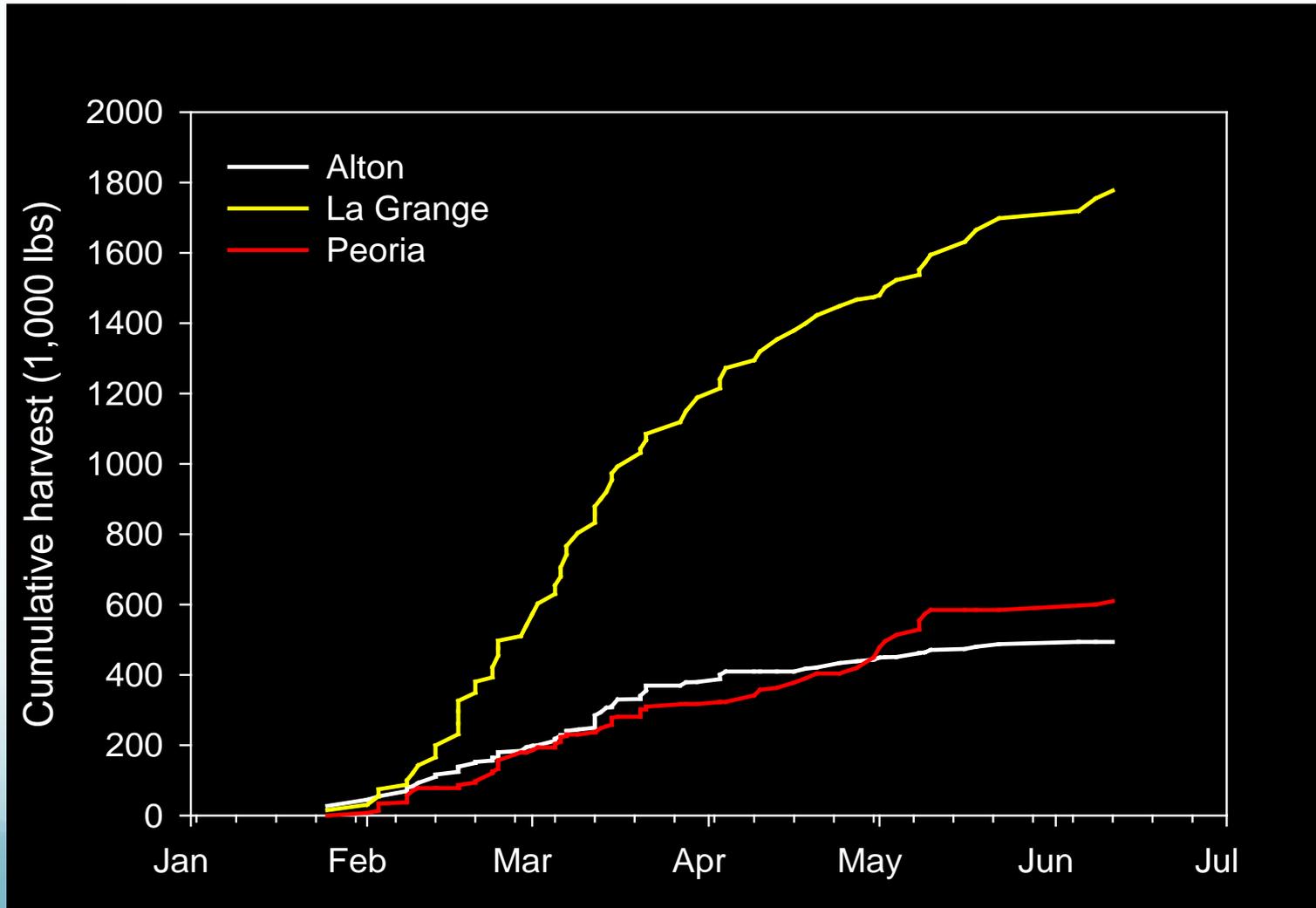


Harvest – Lower River

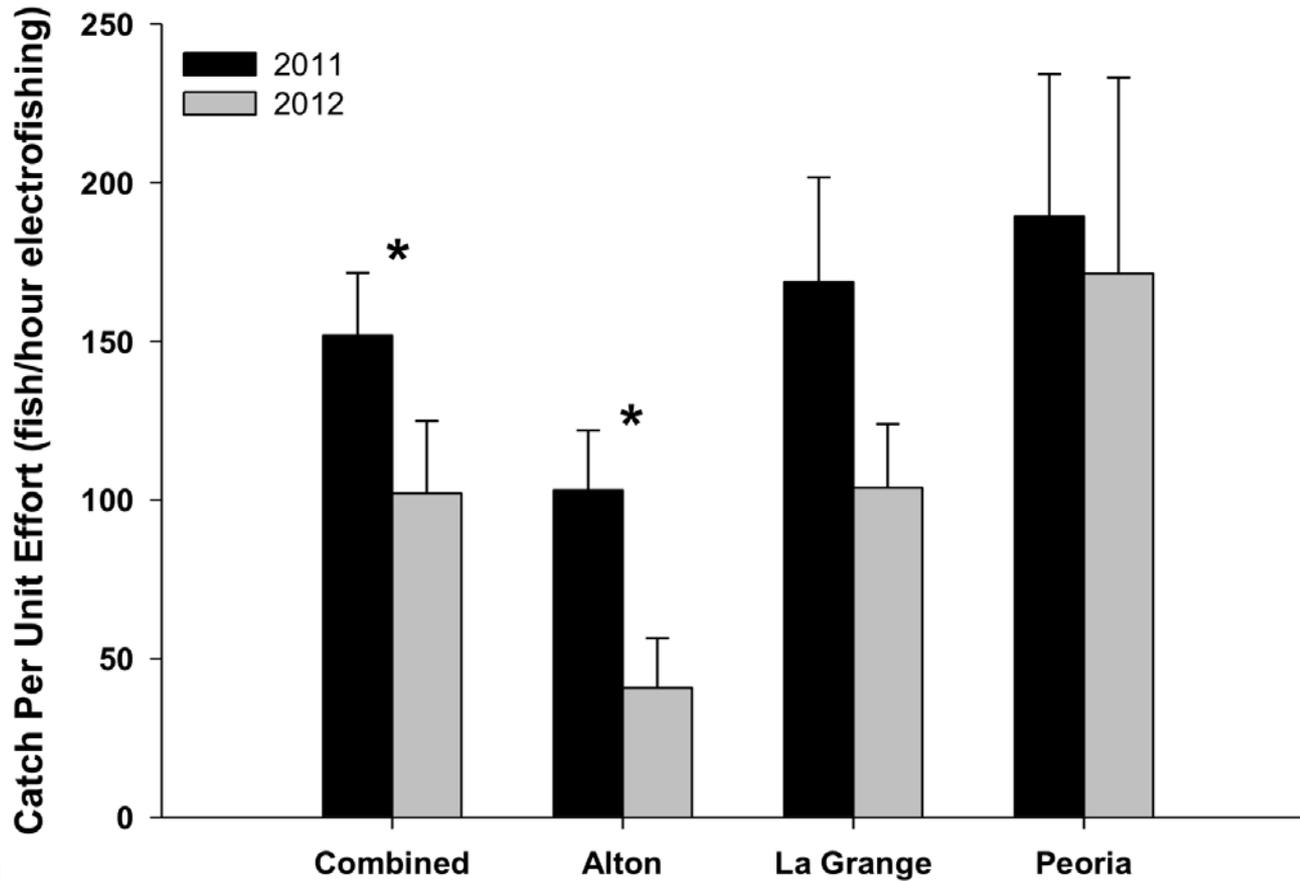


- “Lower” river
- Fishing experiment in spring 2012
- Response via standard sampling

Harvest – Lower River



Harvest – Lower River



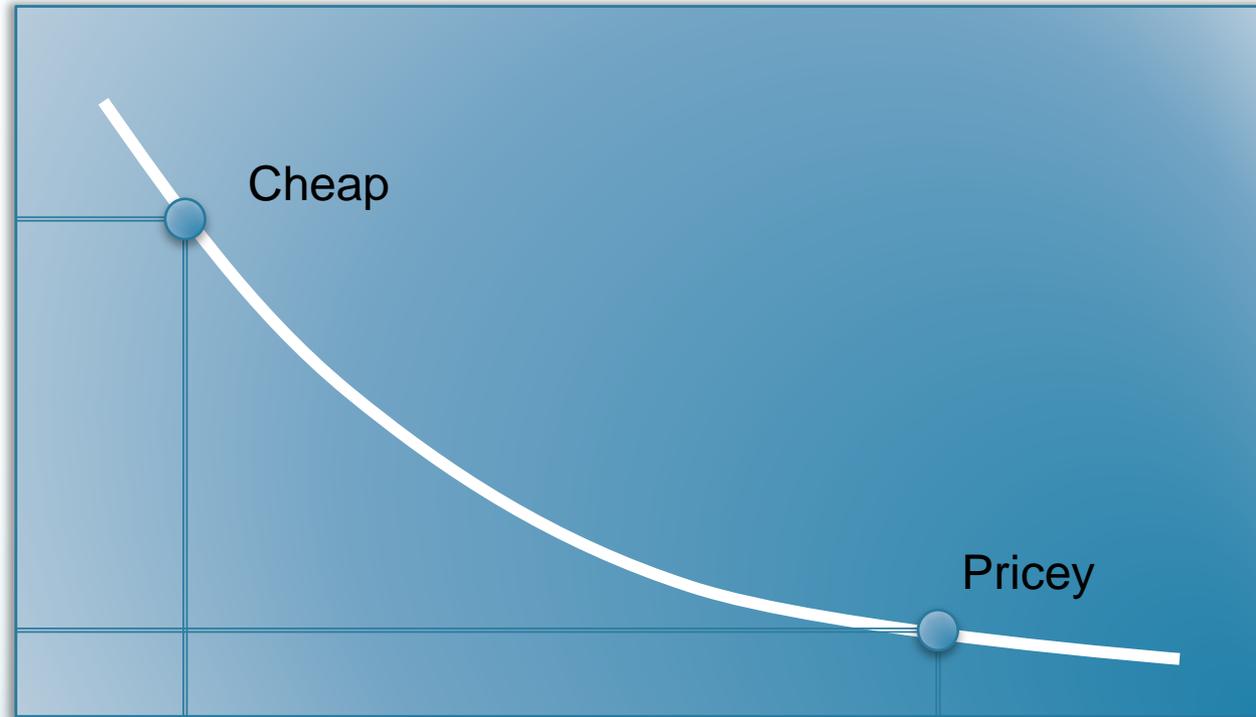
Harvest- Lower River

- Skewing toward males (14% more than females)
- No apparent recruits from 2011 & 2012 (and few from 2010)...
- THIS is the time for fishing to be amped up for control



Model Hopes

Probability Reach
Edge of Range



Fishing Effort