

# Chute Falls Humpback Chub Translocations Objectives, Effectiveness and Future Work

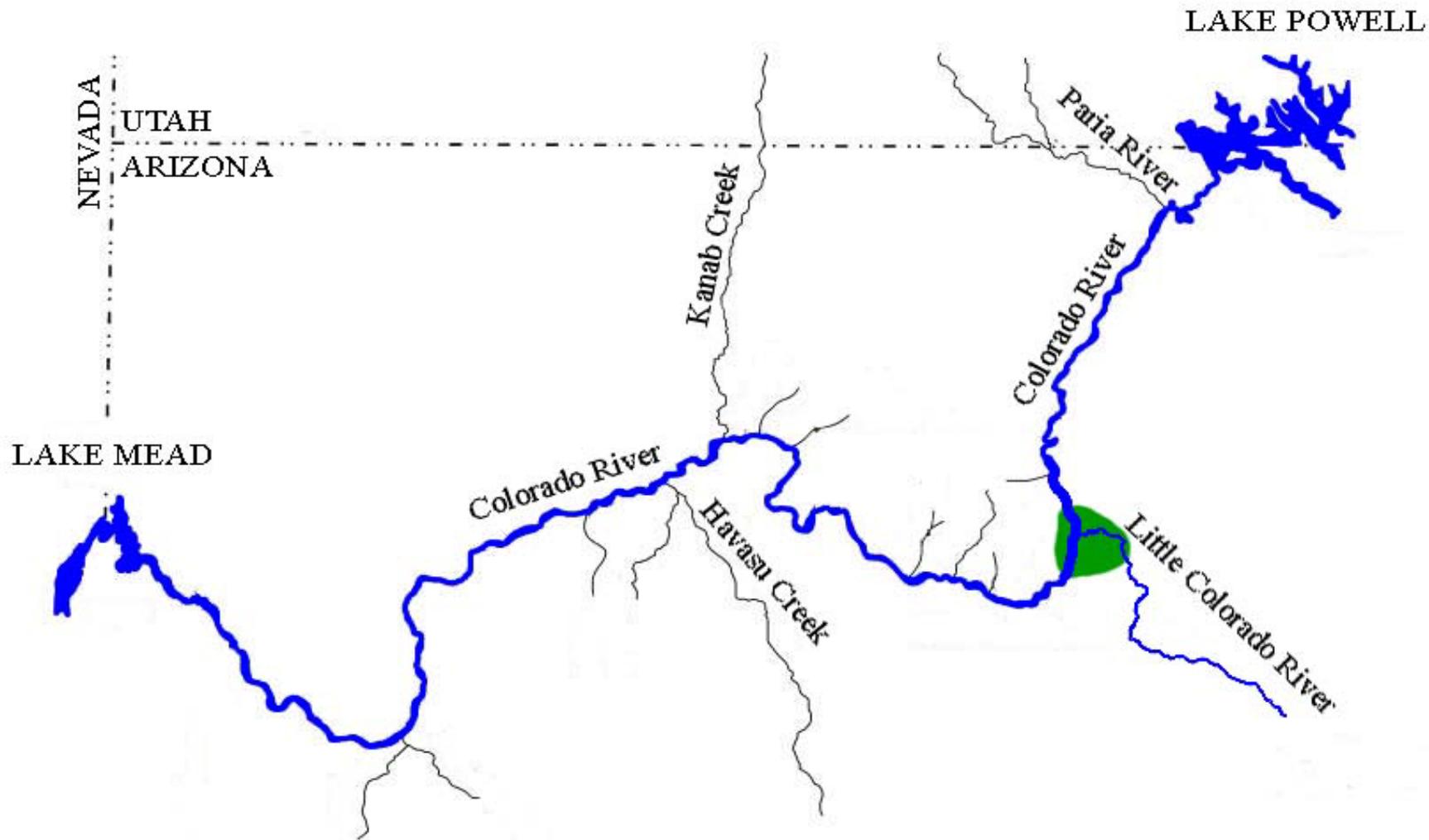
22 January 2013

Kirk Young - USFWS

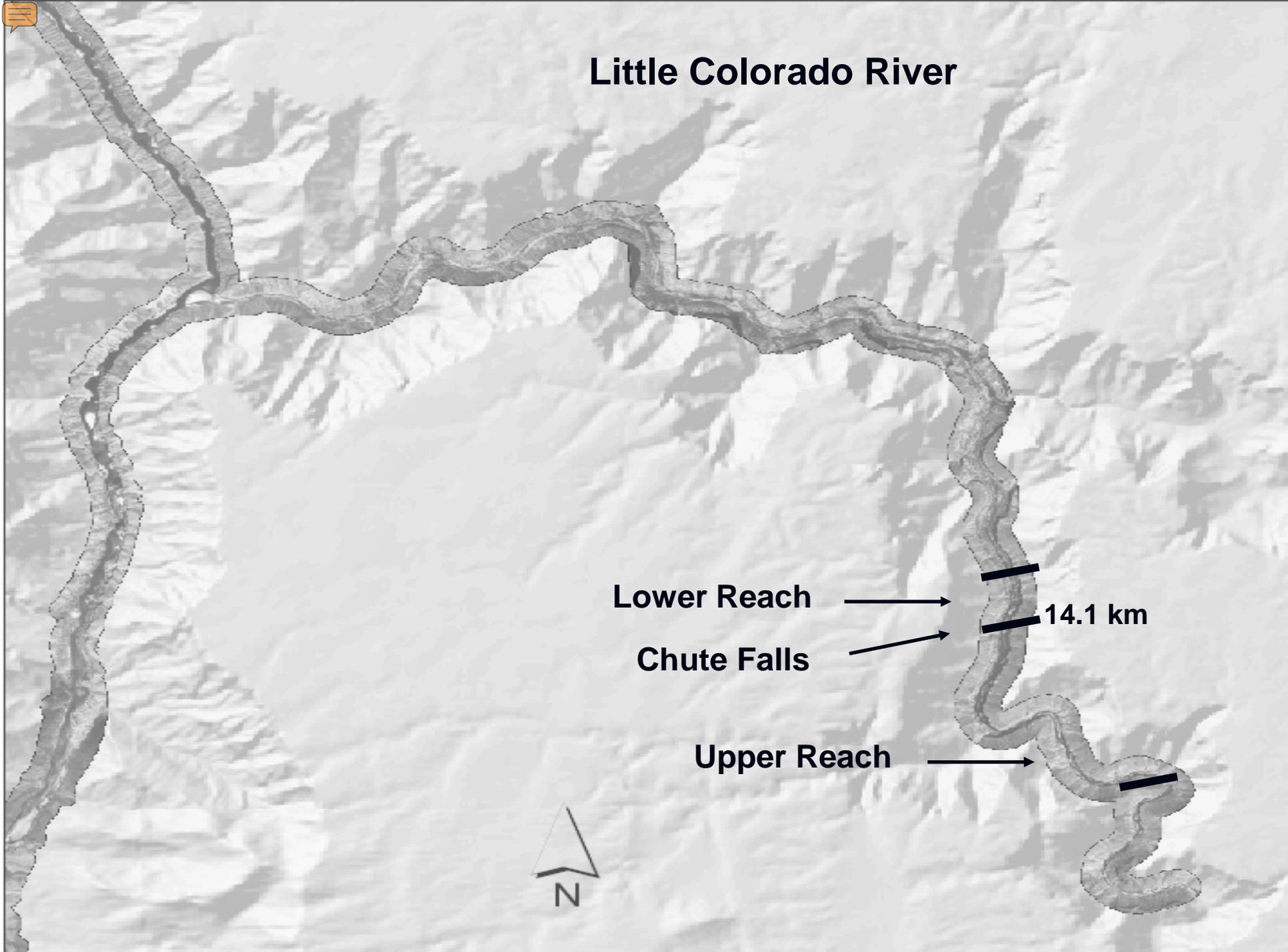
# C.F. Translocation Outline

- Background
- Project Objectives
- Results/Knowledge and Effectiveness
- Future Work





# Little Colorado River



**Lower Reach**



**14.1 km**

**Chute Falls**



**Upper Reach**



# Background

## Chute Falls:

- No HBC above Chute Falls – fish barrier
- High CO<sub>2</sub> levels – prevent HBC?
- High productivity and higher winter Temps

## Translocation:

- Translocations began 2003; 8 to date
- 2,060 HBC over 10 years
- ~1,217 PIT tagged
- Annual Monitoring – Hoop Nets



# Objectives

## 2003-2005 Translocations

- Determine if HBC can survive and remain above Chute Falls;
- Determine if HBC grow (given increased food availability, but potential detrimental impacts from CO<sub>2</sub>);
- Determine if HBC can recruit to adulthood;
- Determine if HBC spawning population will develop.



# Objectives

## 2006-current

- Conduct mark/recapture population estimates – 2 reaches (>CF and LA to CF) to determine:
  - Migration patterns
  - Growth rates
  - Spawning activity
  - Assess overall benefit to LCR HBC



# Results

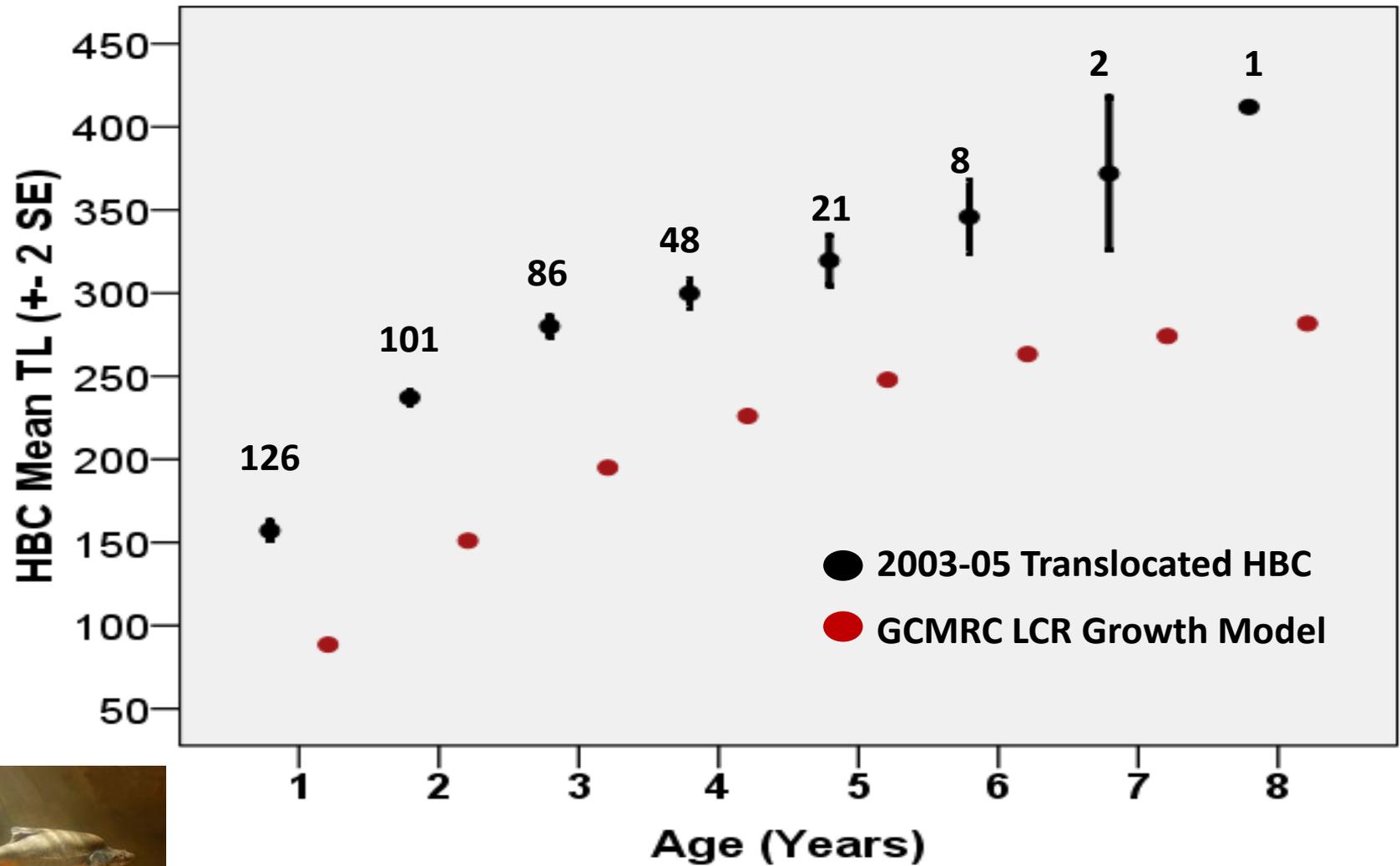
## Survival

- Several HBC found above CF  $\geq 4$  years (6 years - max)
- Fish detected upstream to rkm 17.89
  - $>3.5$  km above CF; 1.5 km above release site
- Most fish vacated  $>CF$  during 2009-2010 Exodus



# Results

## Growth



# Results

## Spawning

Above CF:

- > 200 HBC in Spawning Coloration (116F; 99M)
- 6 Females (ripe, gravid or spent)
- 142 males ripe
- 3 YOY (54-63 mm) in 2007
- Spawning appears to occur, probably transient; fish could be moved out by spring freshets



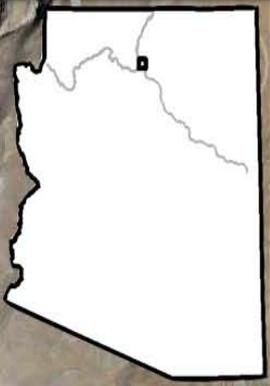
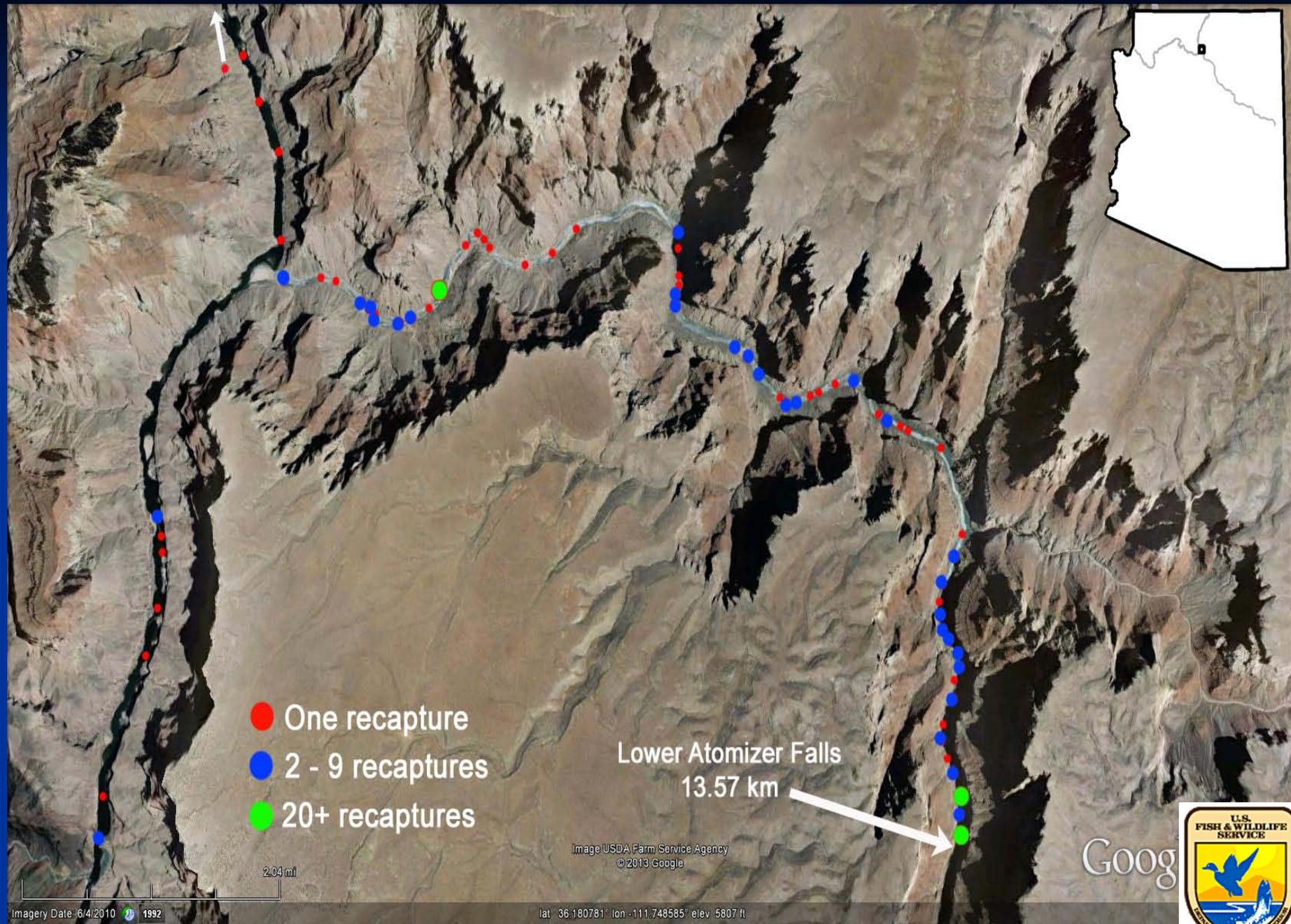


# Results

## Migration Patterns

- Chute not barrier  
5 fish surmounted;
- Movement  
throughout, including  
Colorado R.





# Results

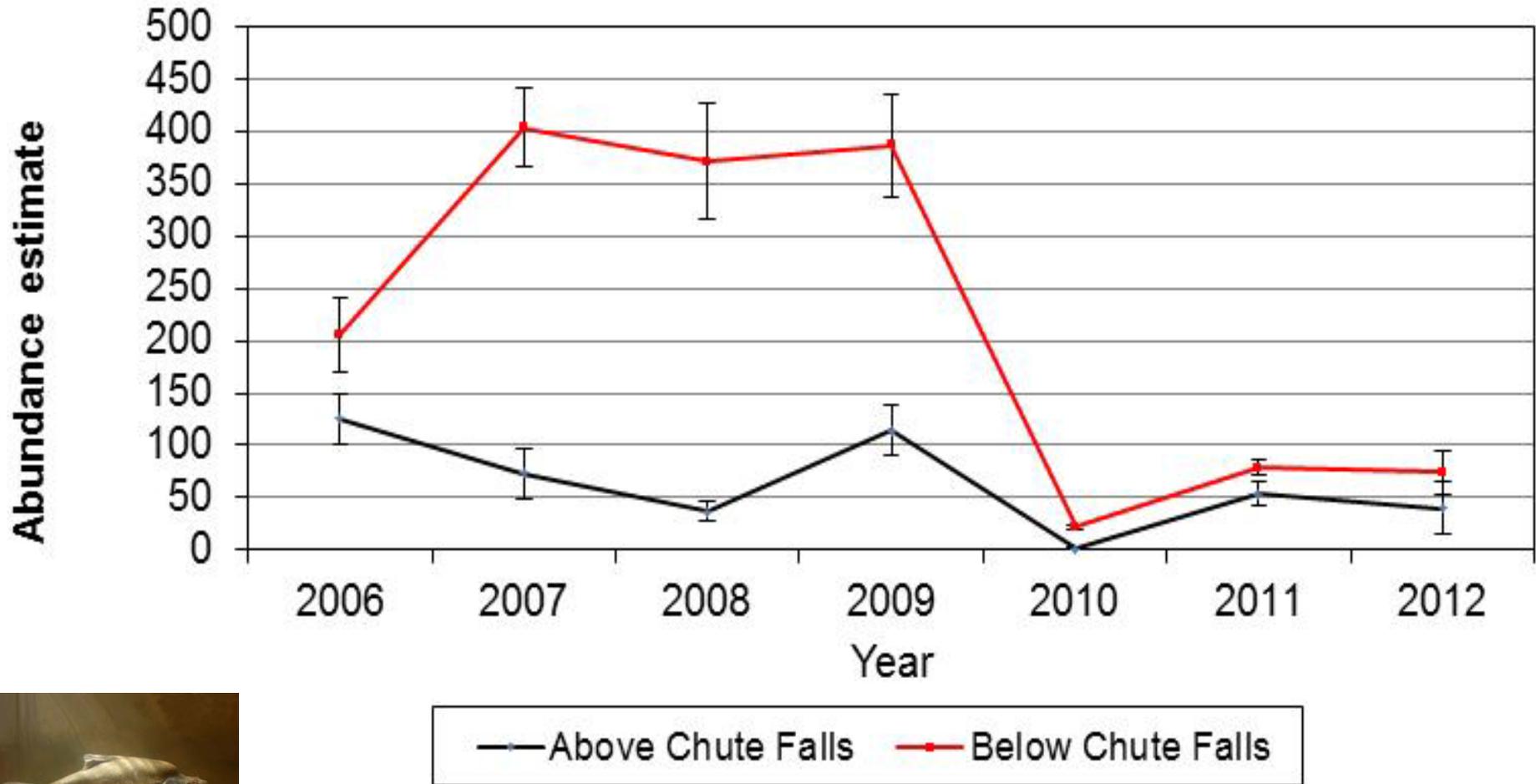
## What is Benefit to LCR HBC

- Not fully quantified yet, but potentially large
- Pop Estimates and Survival/mortality estimates key

Here's what we know.....



# Abundances of Humpback Chub $\geq 200$ mm above and below Chute Falls



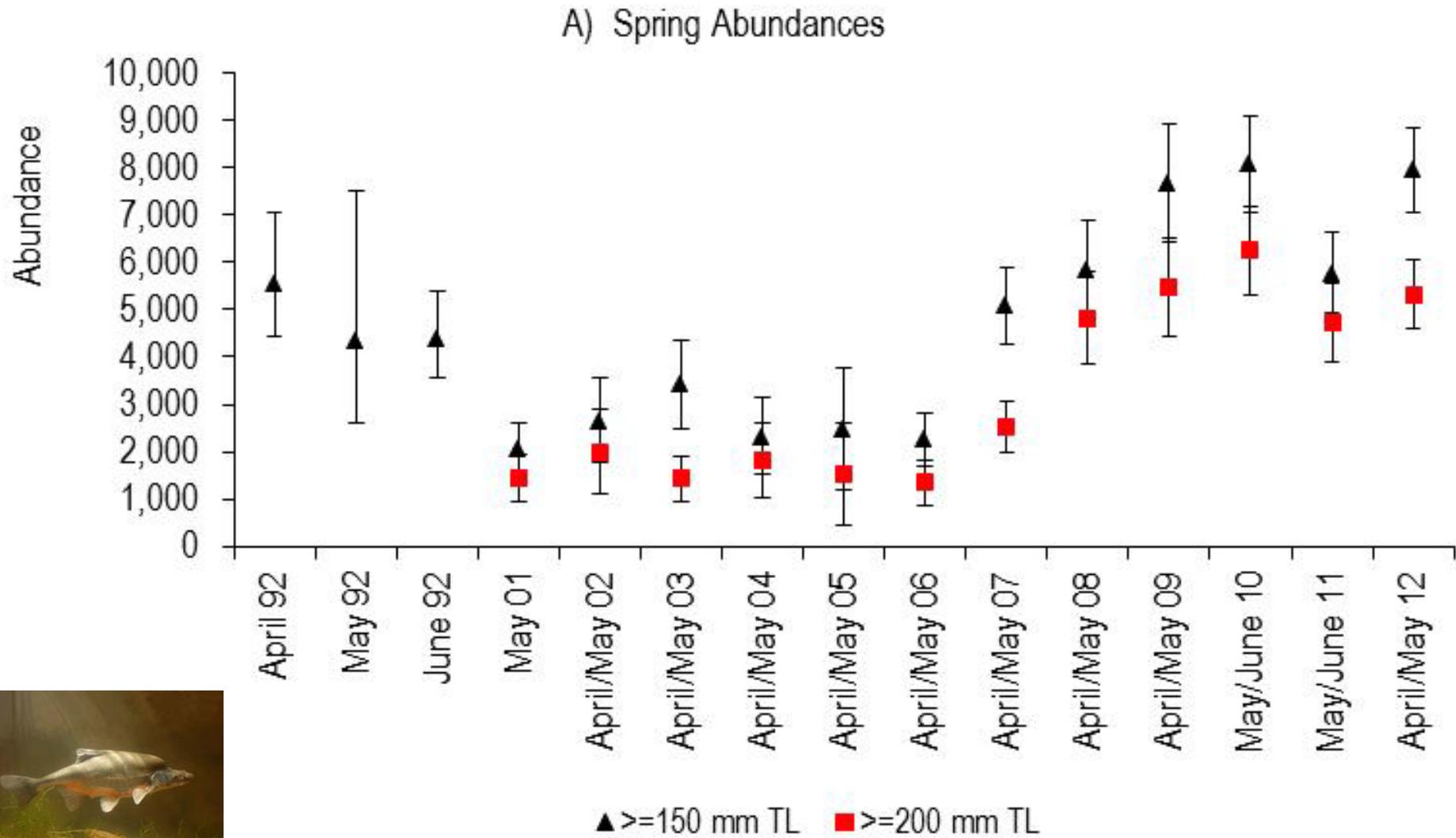
June 2010



October 2012



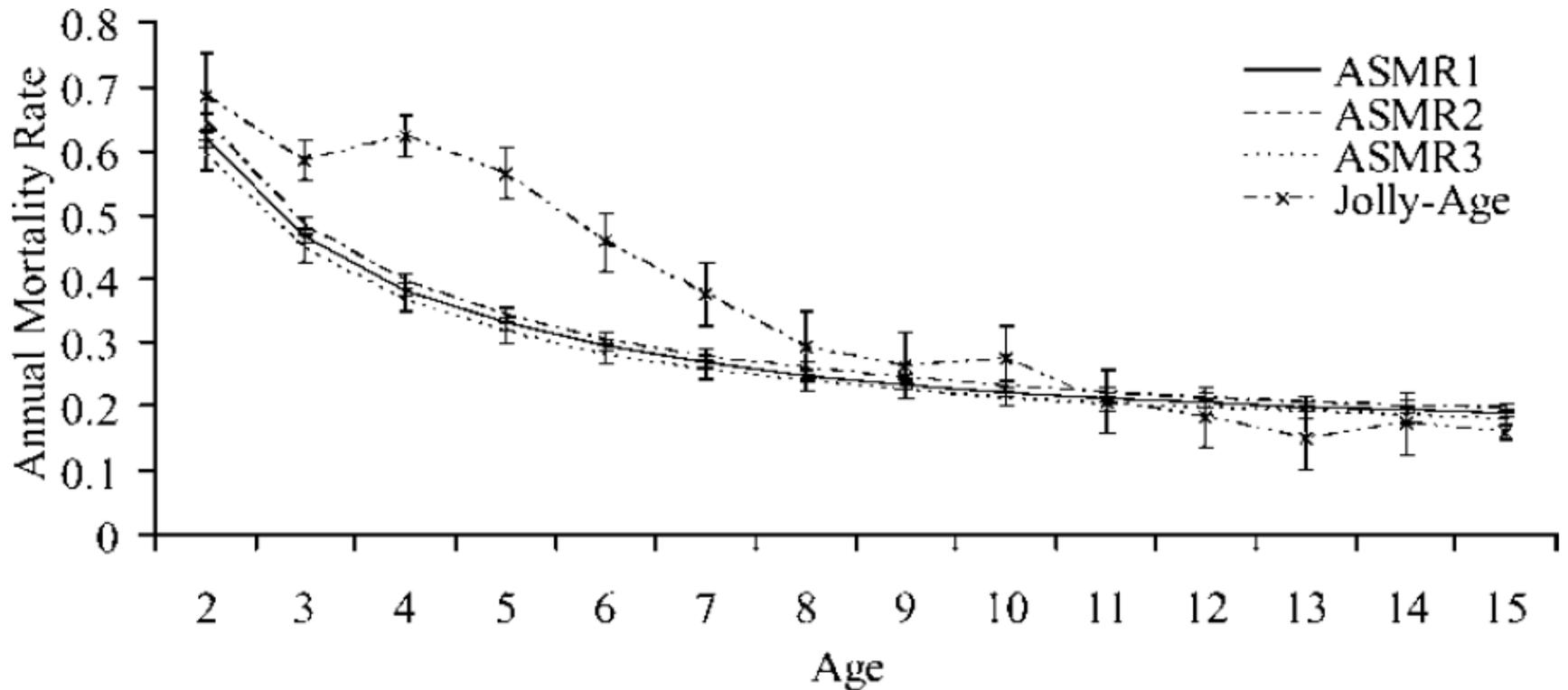
# LCR - Spring Abundance of HBC $\geq 150$ mm and $\geq 200$ mm



# Results

## Mortality/Survival rates?

Coggins et al. 2006: 68% mortality/32% survival age 2;  
Age 0 & 1 mortality > but not quantified



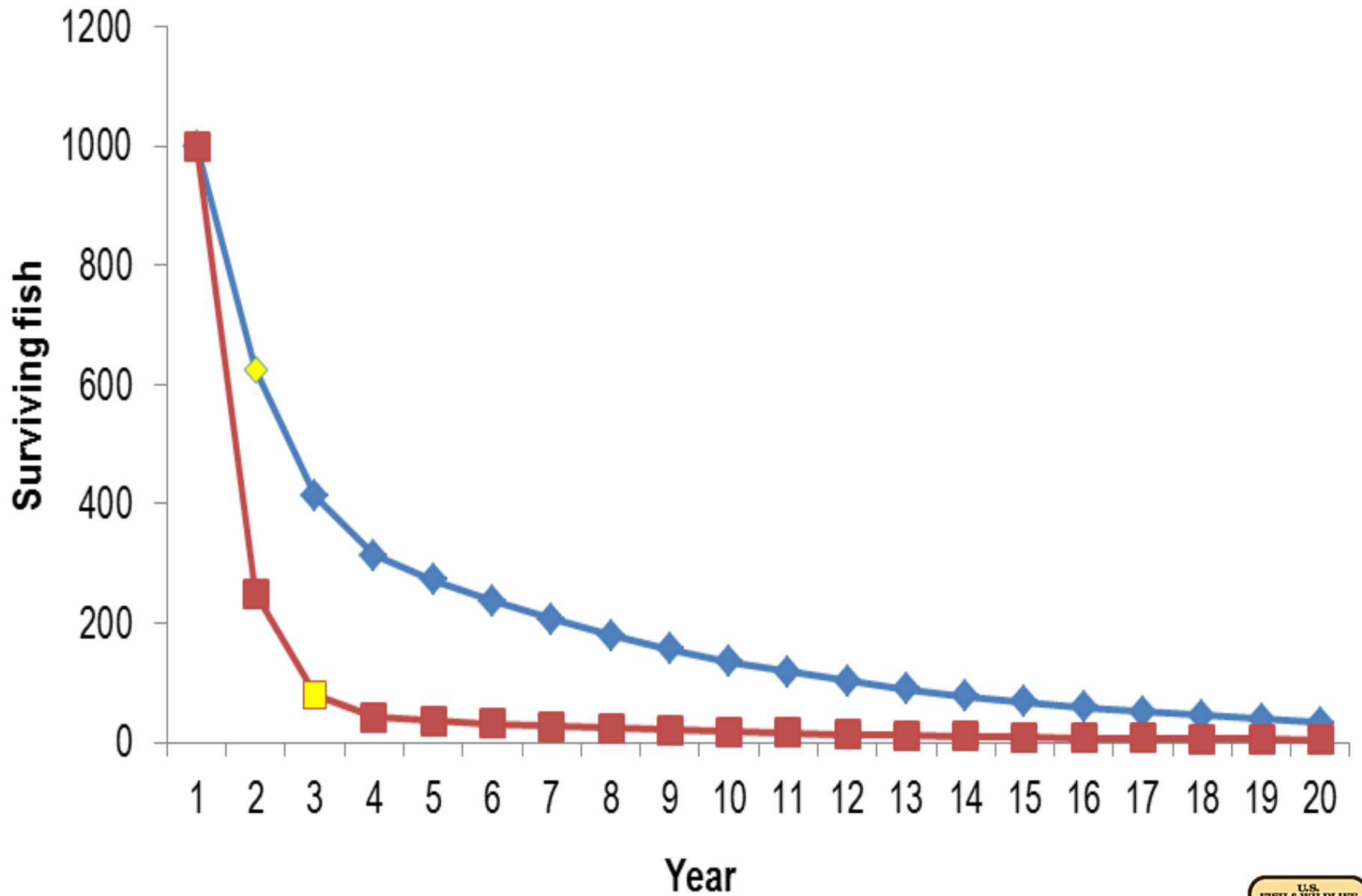
# Results

## Benefit to LCR HBC

Survival Rates, monitoring data -- AGE 1 Fish:

Trans YR	Number	Recap YR	Recap Number	% Survival
2008	299	2009	214	>71%
2010	109	2011	50	>46%
2011	96	2012	59	>61%
Coggins et al. 2006 (age 2)				<32%





—◆— 0.5 Coggins et al. (2006)     —■— Coggins et al. (2006)



# Results

## Benefit to LCR HBC

- Assuming survival is Greater @ CF:

Scenario: → 1/2 LCR Mortality (Coggins); → 1000 fish translocated @ age 1		Age 2	Age 3	Age 4
		After 1 YR	After 2 YRS	After 3 YRS
Chute Falls (50% LCR Mort.)	# Survive	625	413	314
Little Colorado (Coggins et al. 2006)	# Survive	250	80	42



# Results

## Chute Falls Translocation – Knowledge Summary

- Fast Growth - Adult at Age 2 vs. Age 3
- High Survival
- High Potential to recruit to adult
- Some evidence spawning may occur
- Evidence for good retention during most years
- Populations susceptible to stochastic events (interruption/emigration)
- Appears to be one of few tools available to directly increase adult population if needed in future



# Needs

- Refine Survival/Mortality & Recruitment to adult
- Define Optimal Translocation Densities
  - YOY translocation
  - Age 1
- Understand Spawning Component
  - Natural Recruitment
  - Fidelity
  - Genetics



# Thank You Questions?

