

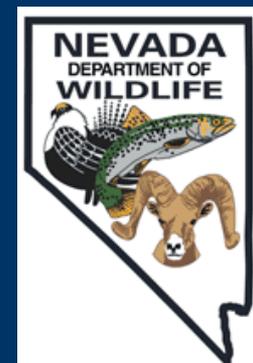
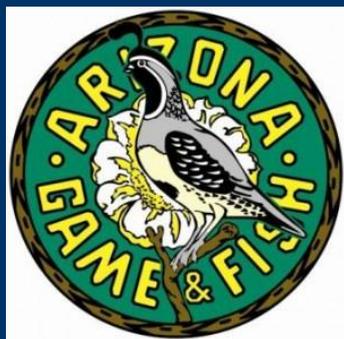
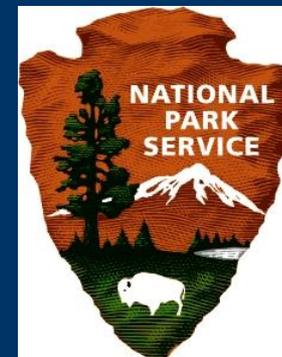
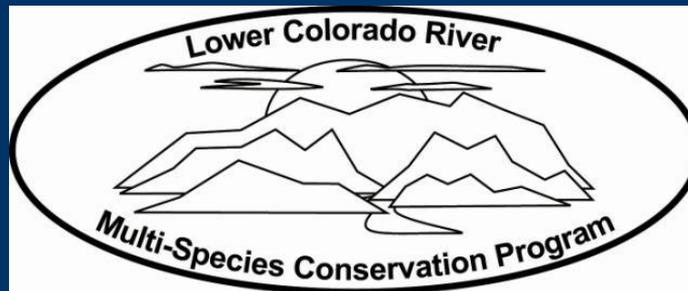
# Population dynamics of razorback sucker in Lake Mohave

Brian Kesner, Abraham Karam, Carol Pacey,  
and Paul Marsh

Colorado River Aquatic Biologists Meeting  
January 8-9, 2013  
Laughlin, NV

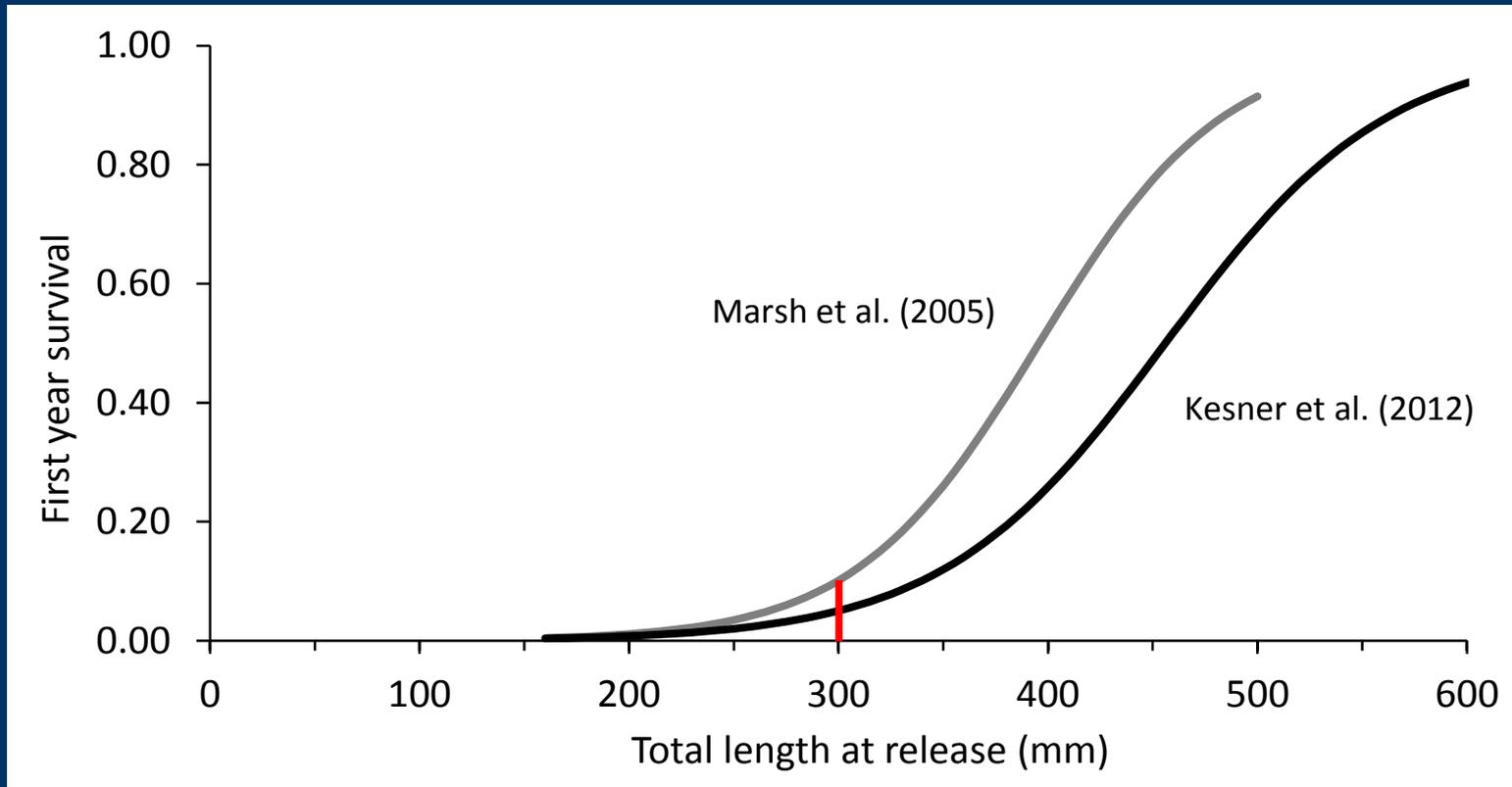


# Acknowledgements

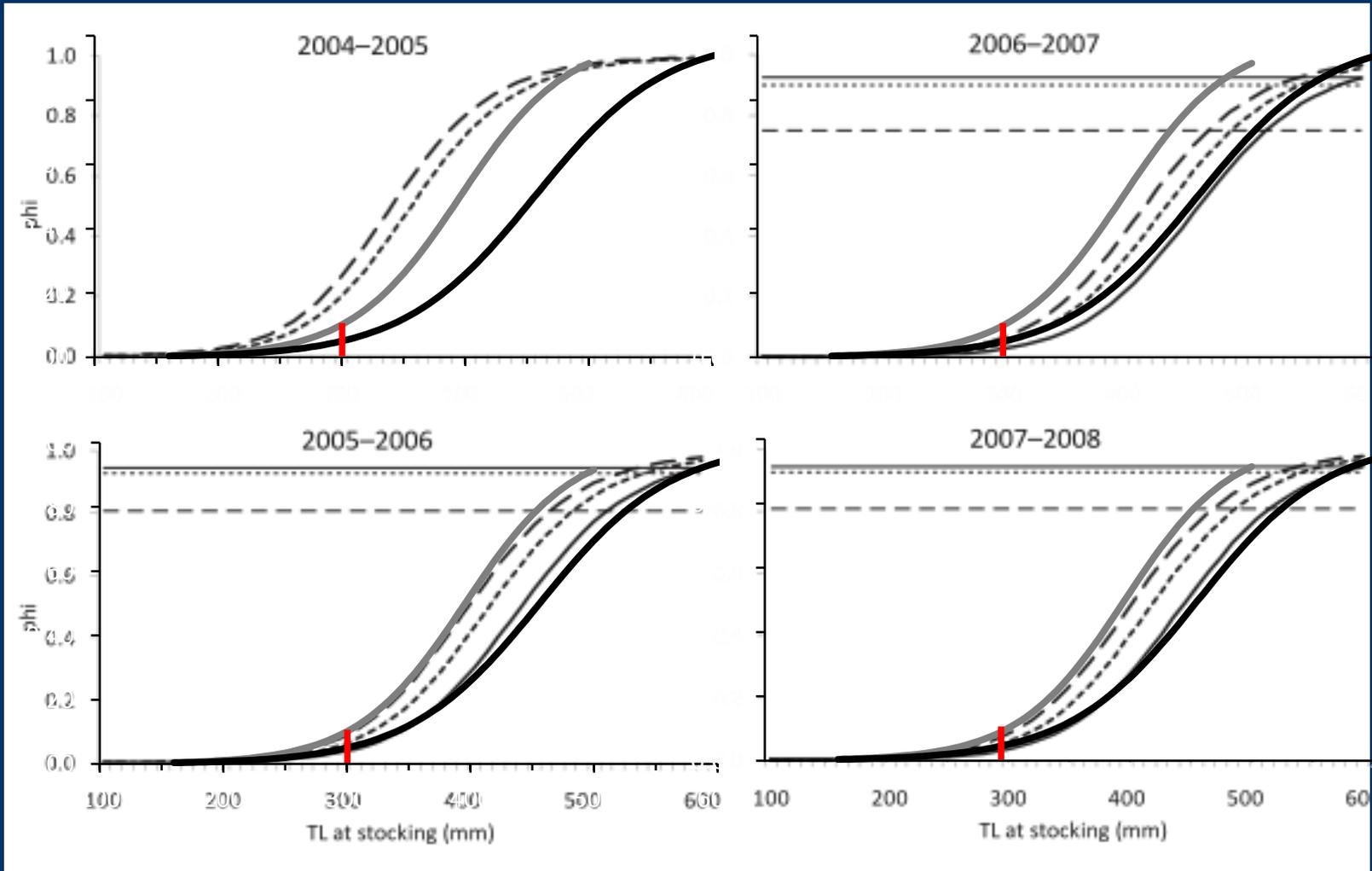




# Lake Mohave 1<sup>st</sup> year survival



# 1<sup>st</sup> year survival (Zelasko et al. 2011)



# Razorback sucker post-stocking survival

- 0.02 to 2.6% in San Juan (277 mm TL)
  - Bestgen et al. 2009
- 9.0% in Upper Colorado River (302 mm TL)
  - Seasonal variation with Spring survival as high as 29%
  - Year to year variation between 3 to 20%
    - Zelasko and Bestgen 2011
- 5 to 10% in Lake Mohave (300 mm TL)
  - Marsh et al. 2005
  - Kesner et al. 2012



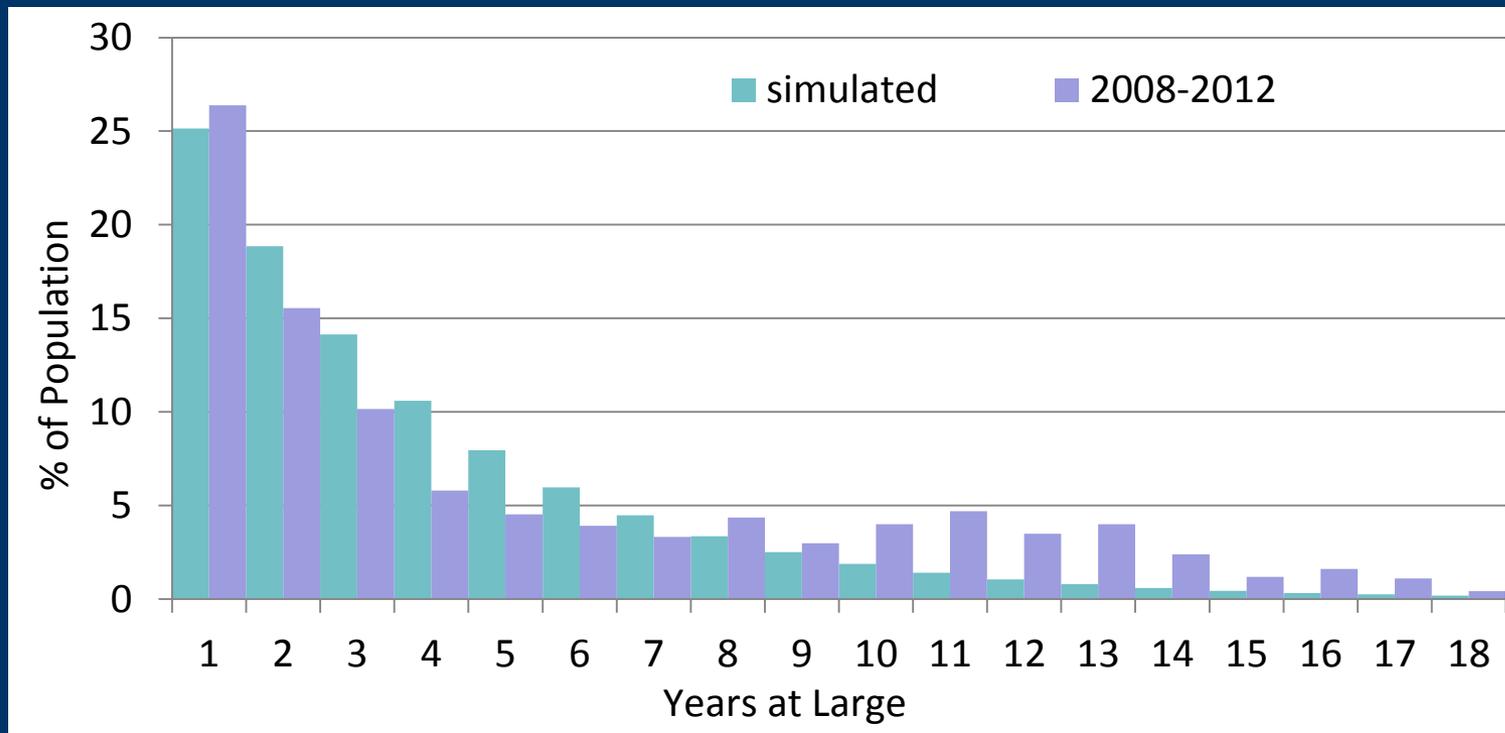
# Razorback sucker adult survival

- 77% annually in San Juan
  - Bestgen et al. 2009
- 71 to 94% in the Upper Colorado River basin
  - Modde et al. 1996; Bestgen et al. 2002; Zelasko and Bestgen 2011
- 75% annually in Lake Mohave
  - Marsh et al. 2005



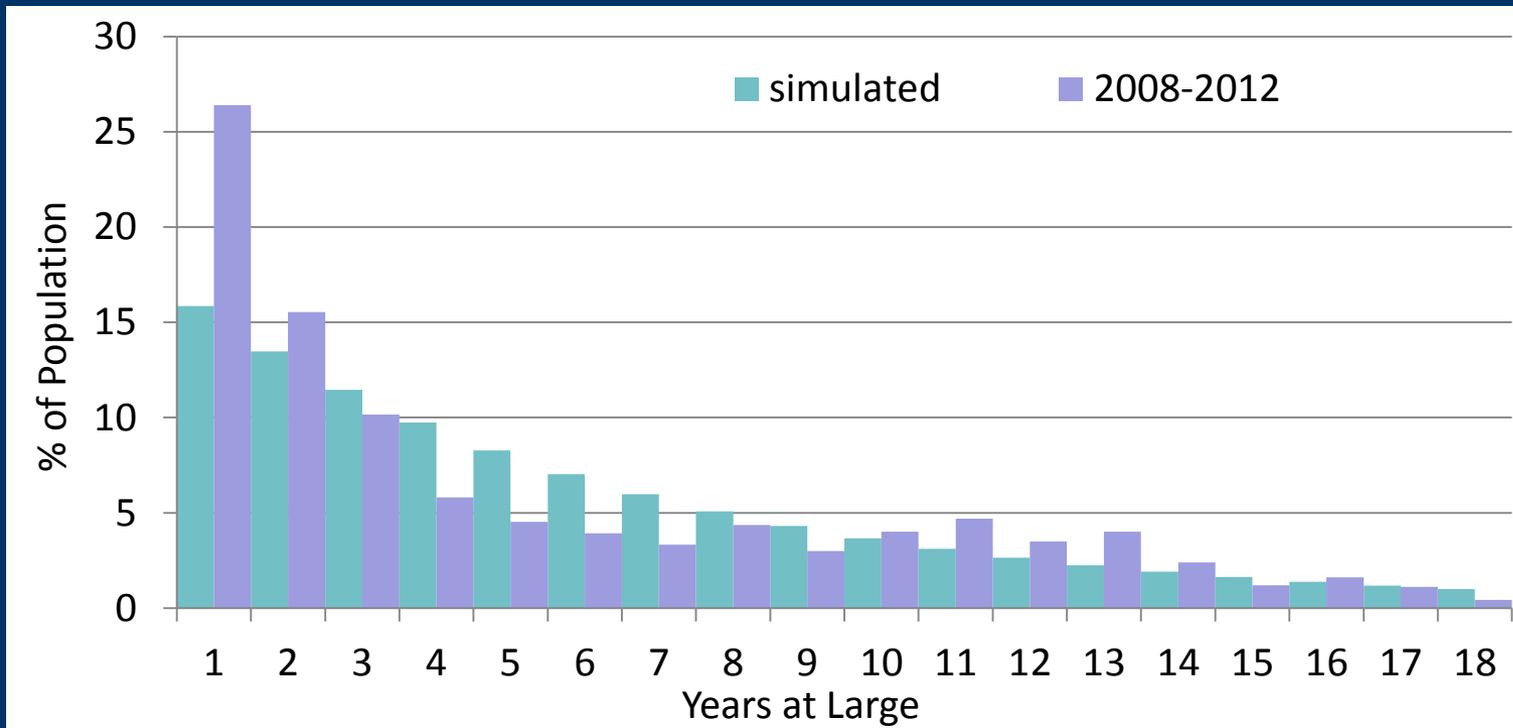
# Lake Mohave age structure

- Simulation based on 75% annual adult survival, 10,000 fish released per year
- 1<sup>st</sup> year survival has no impact on age structure, only on total population size
  - At 10% 1<sup>st</sup> year survival population size is 3,997

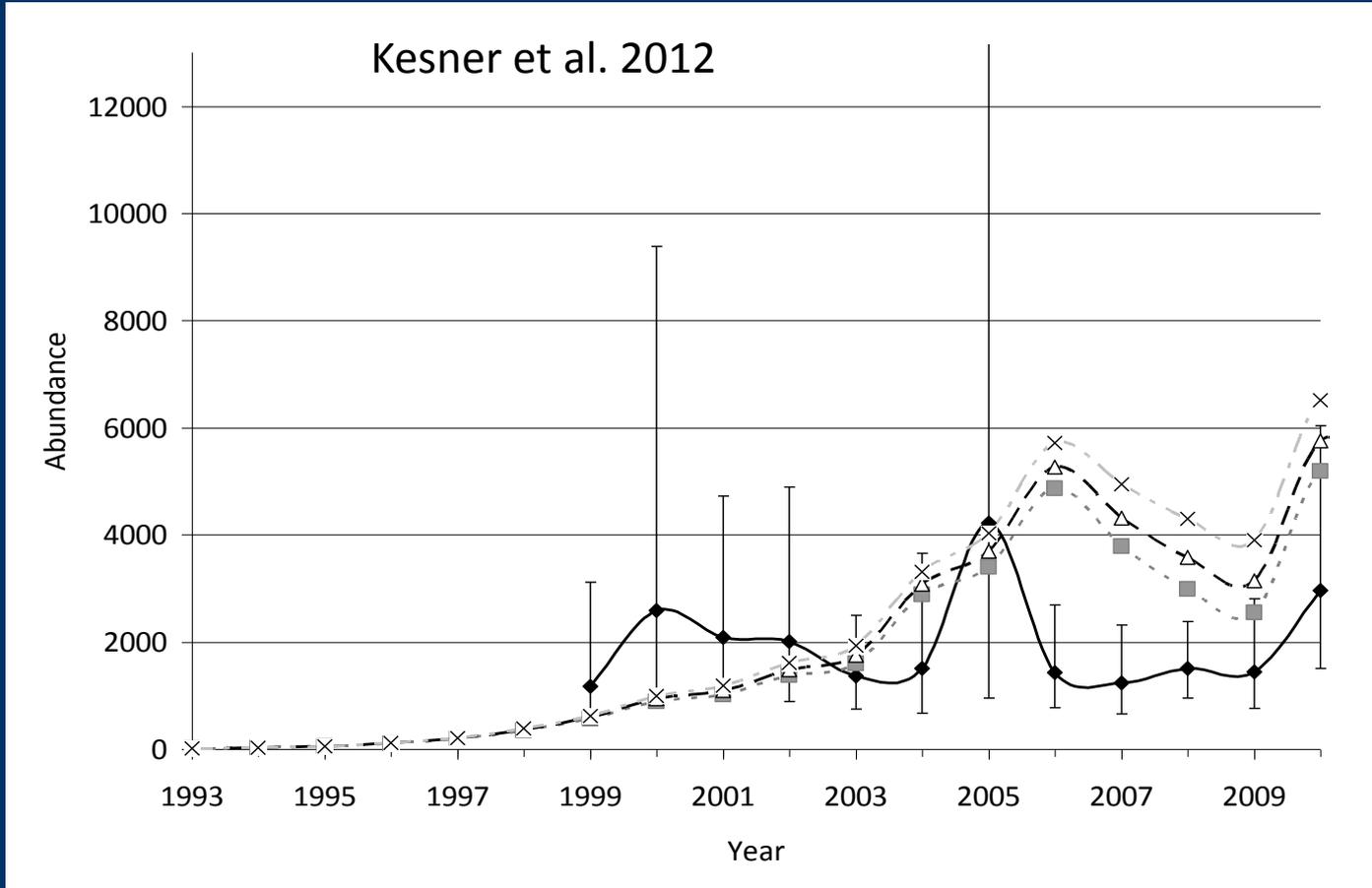


# Lake Mohave age structure

- Simulation based on 85% annual adult survival, 10,000 fish released per year
- 1<sup>st</sup> year survival has no impact on age structure, only on total population size
  - At 10% 1<sup>st</sup> year survival population size is 6,309

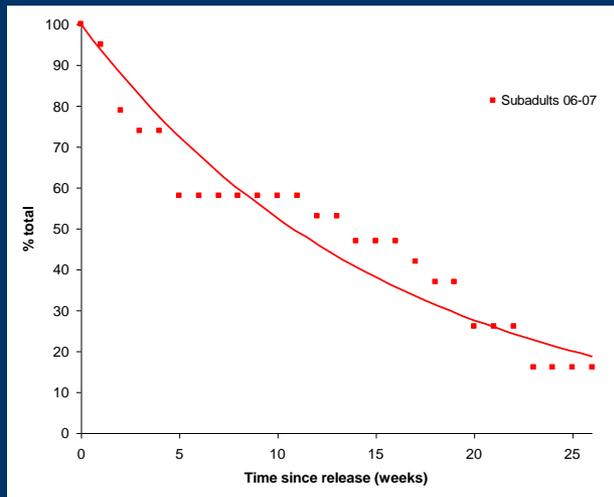


# Lake Mohave simulation

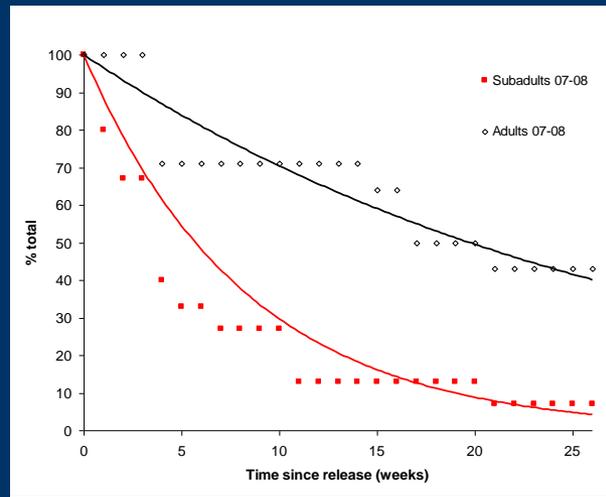


# Lake Mohave 1<sup>st</sup> year survival

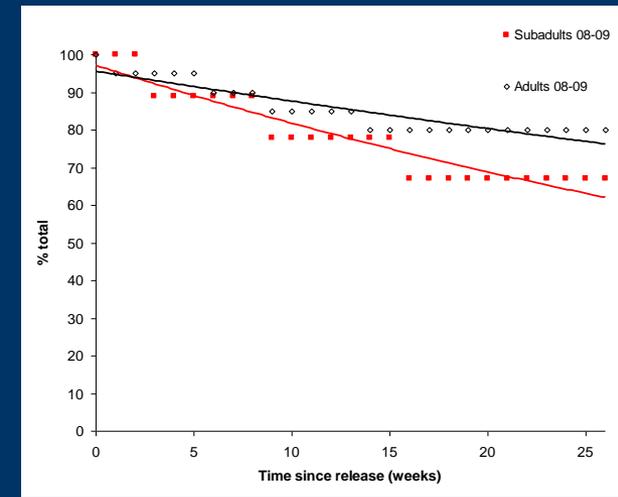
2006



2007



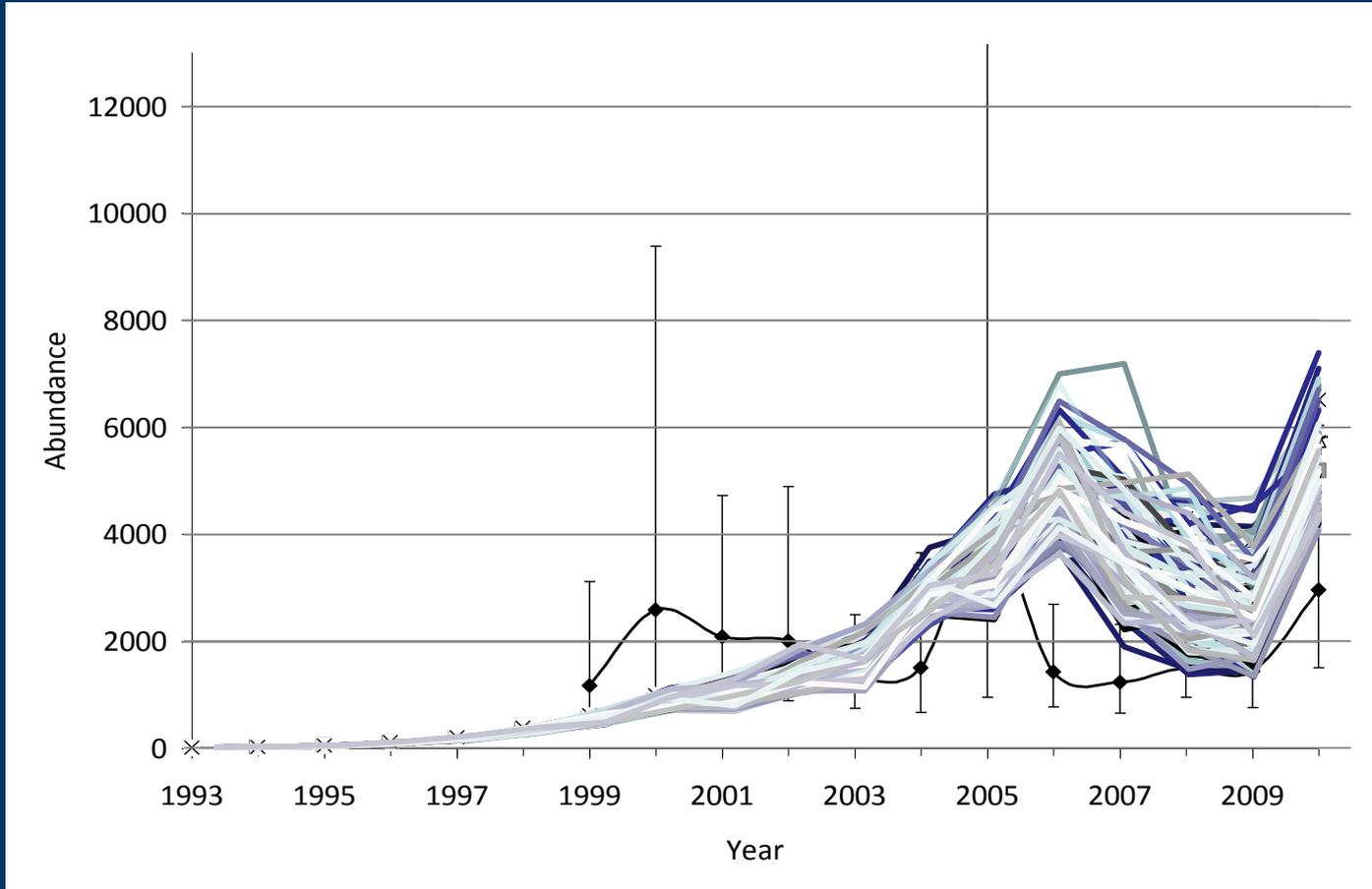
2008

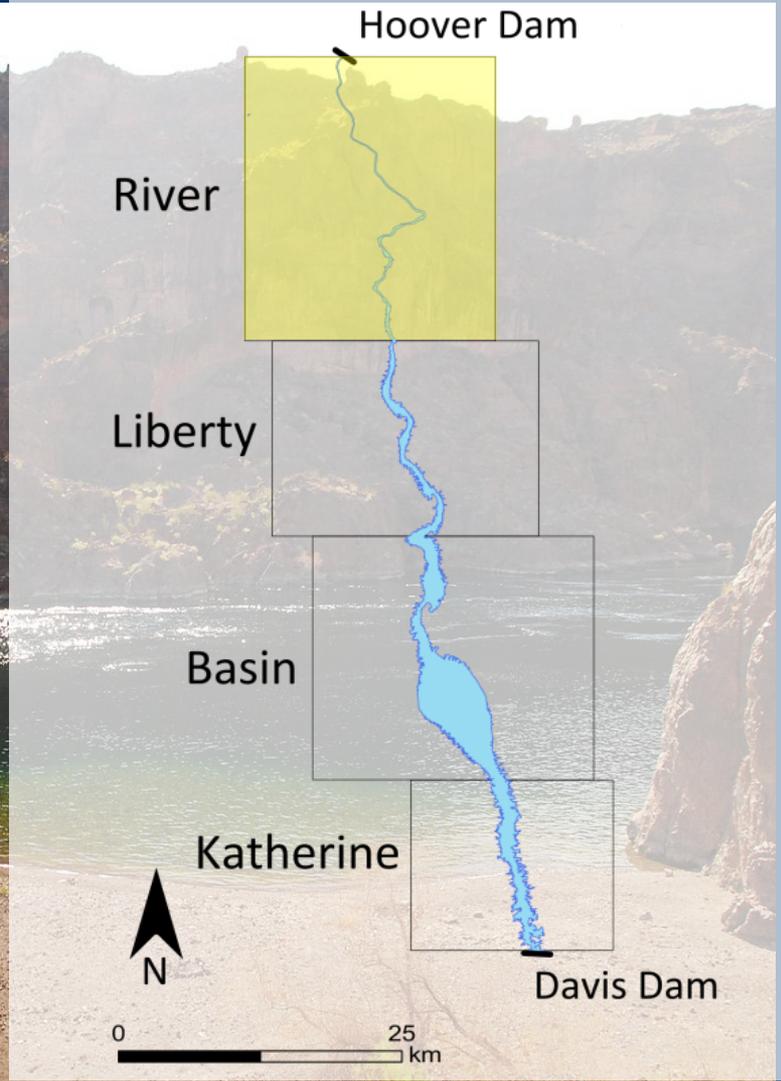
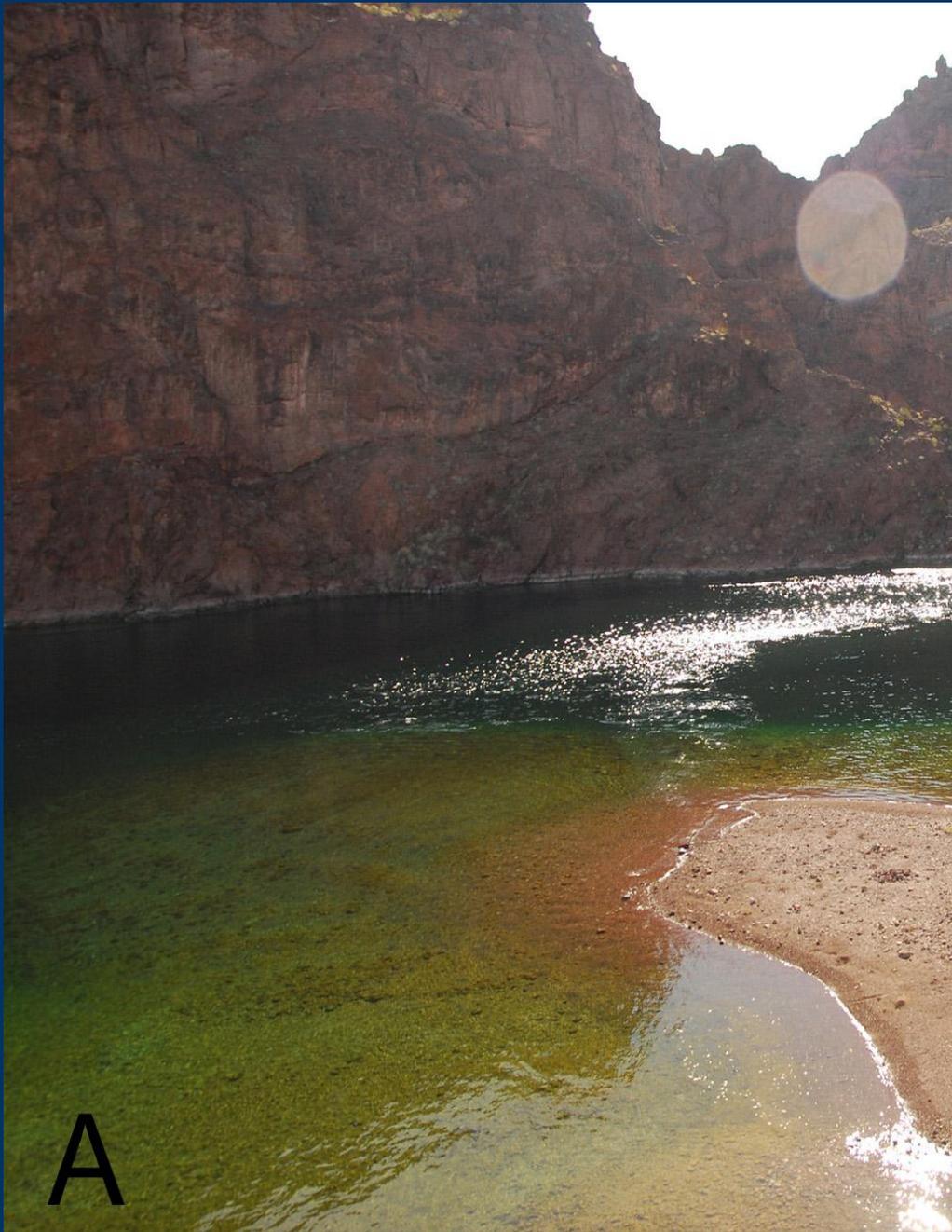


- Poor six month post-stocking survival  
[7 to 67% subadults] [36 to 80% adults]
- Large variation in survival between years
- In 2009 no post-stocking mortality was recorded

# Lake Mohave simulation

## Annual variation in adult survival





A

Photo by Abraham Karam

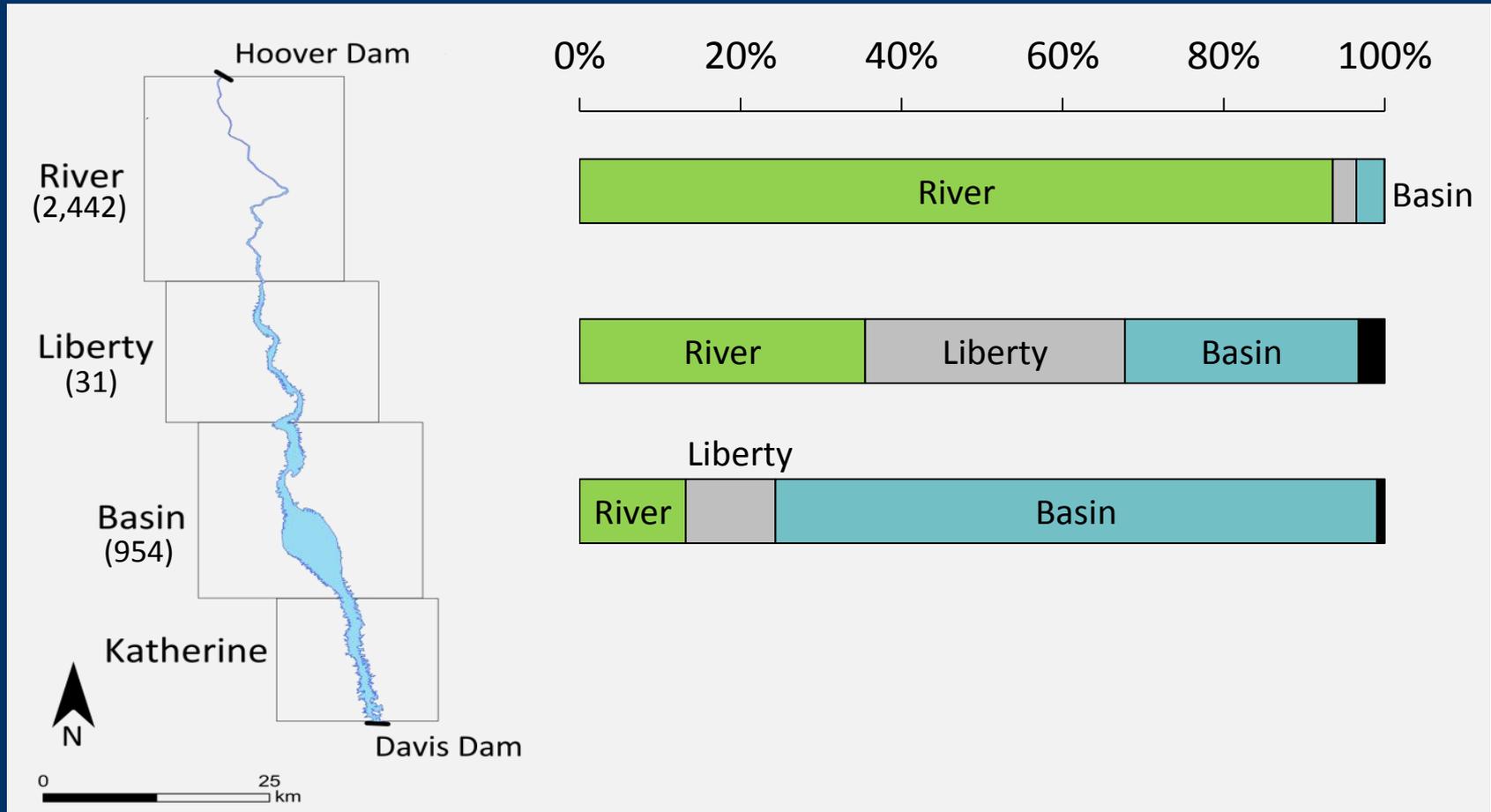


# PIT scanning in 2011 & 2012

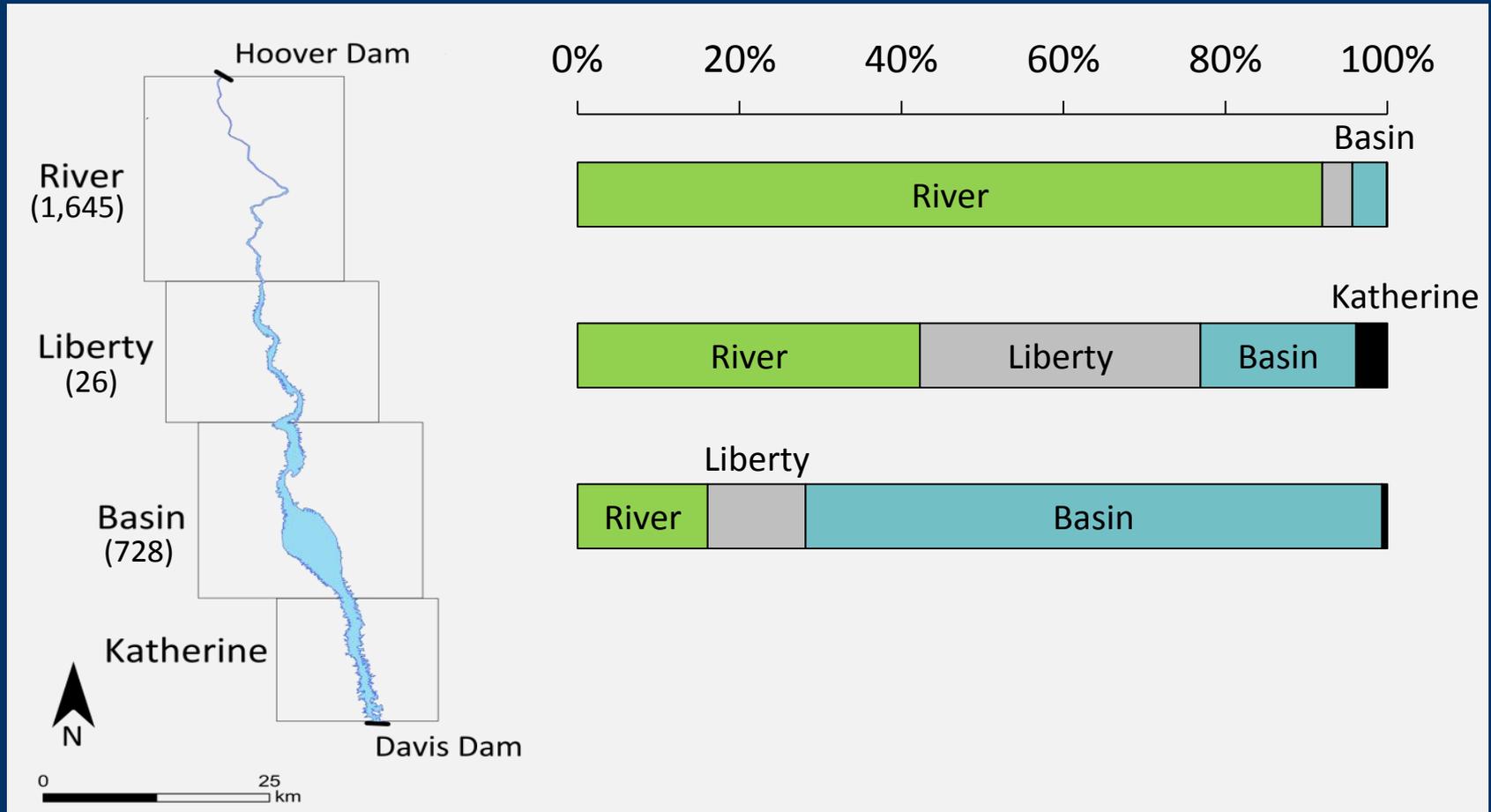
- River PIT scanning
  - 730 individual razorback sucker in 2011
  - 1,934 individual razorback sucker in 2012
- Basin PIT scanning
  - 321 individual razorback sucker in 2011
  - 854 individual razorback sucker in 2012
- Total fish scanned in 2012 (2,748) exceeded the population estimate for 2011 (2,577)



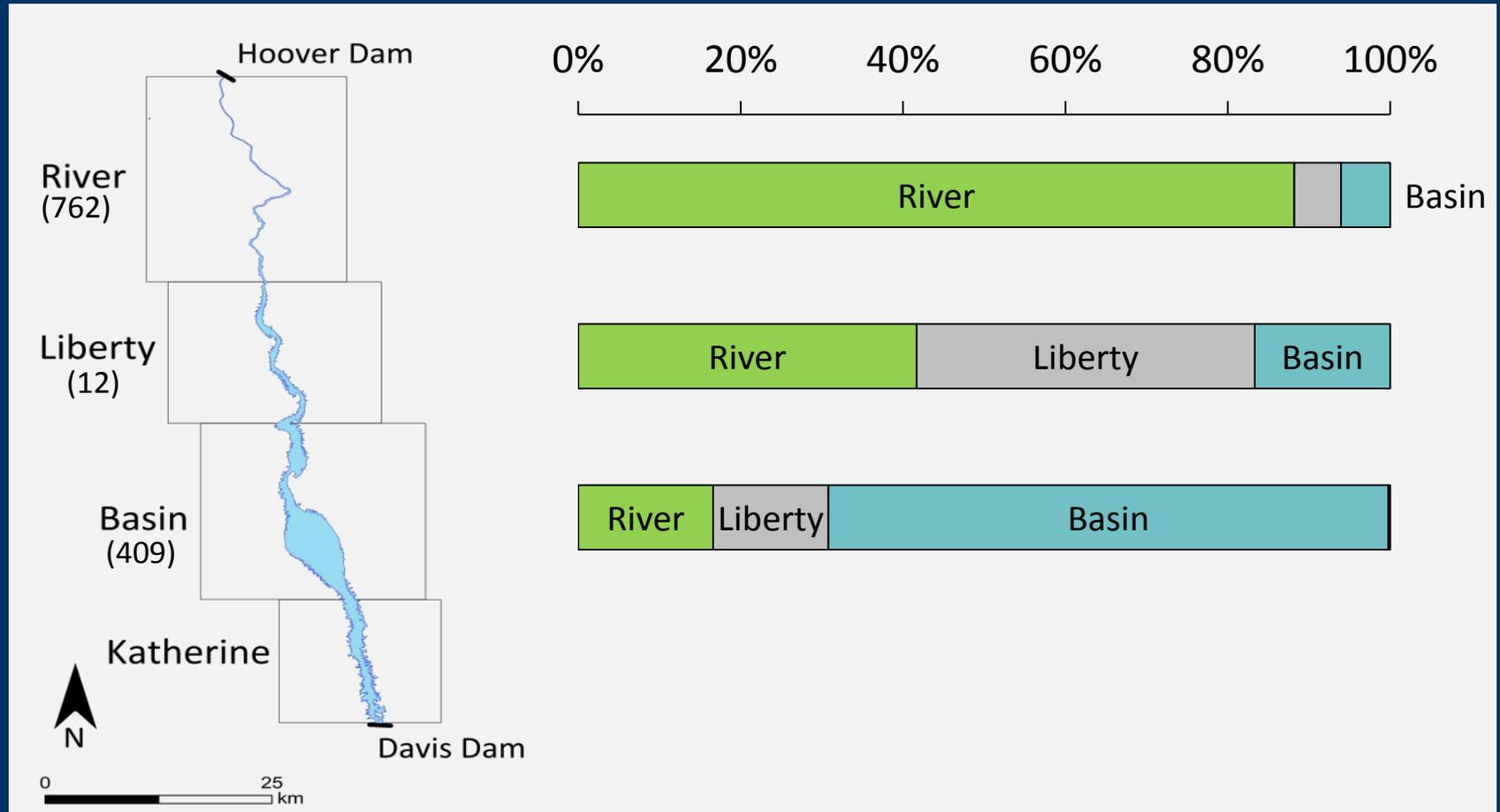
# Razorback sucker site fidelity - One year post-release



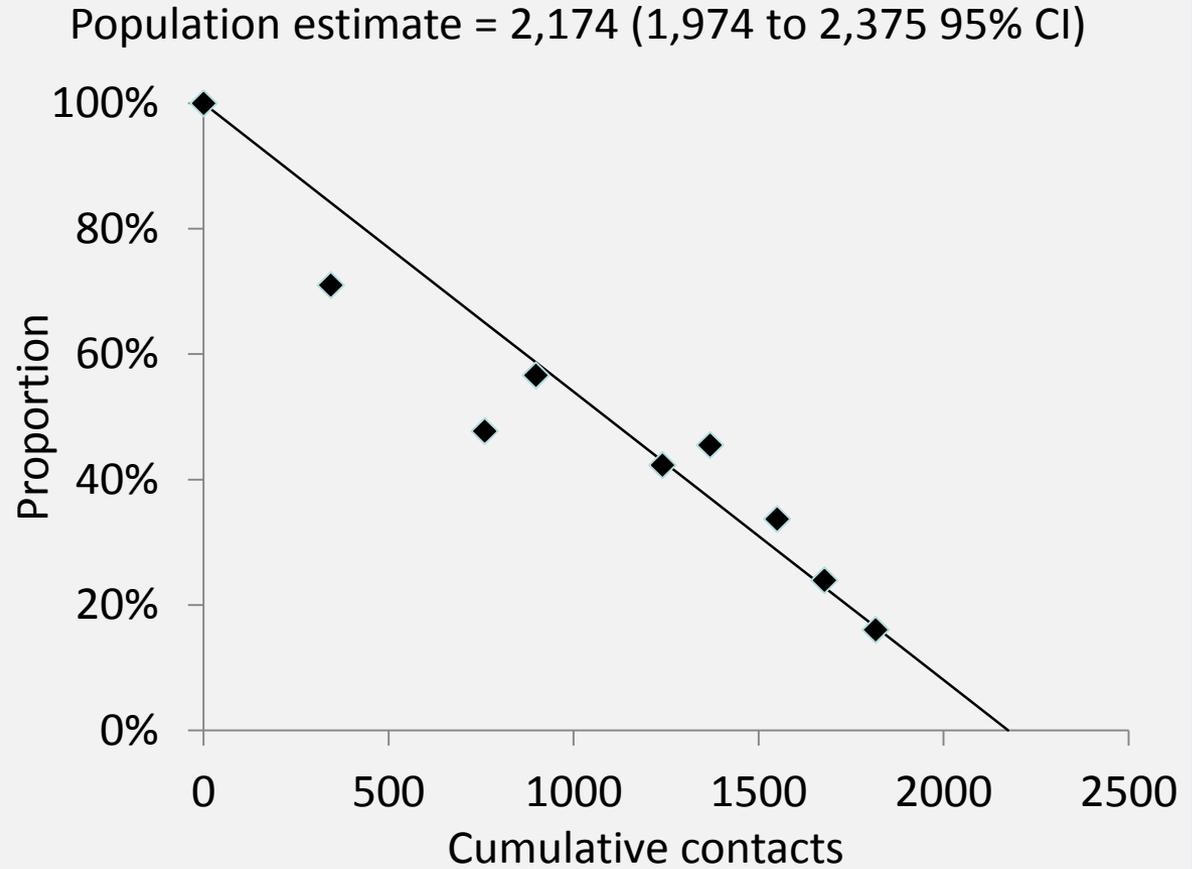
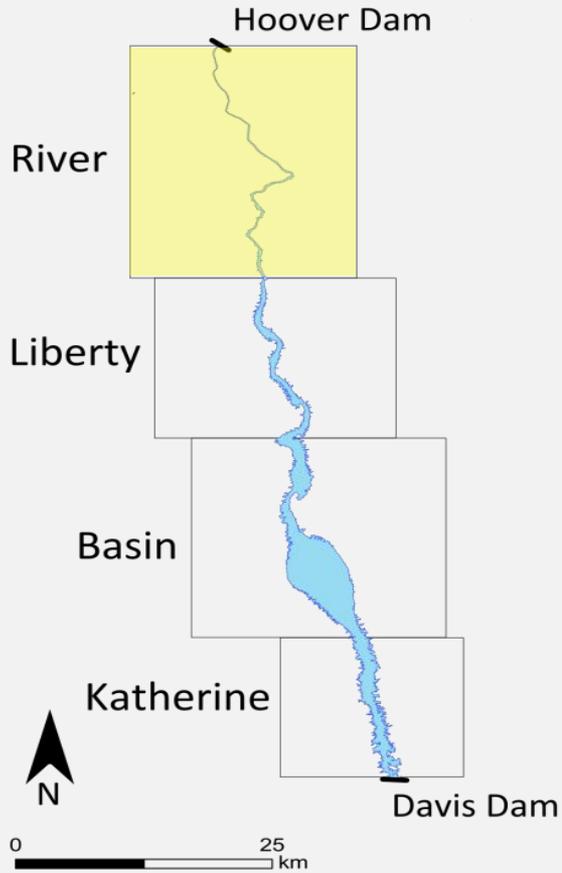
# Razorback sucker site fidelity - Two years post-release



# Razorback sucker site fidelity - Three years post-release



# Depletion population estimate



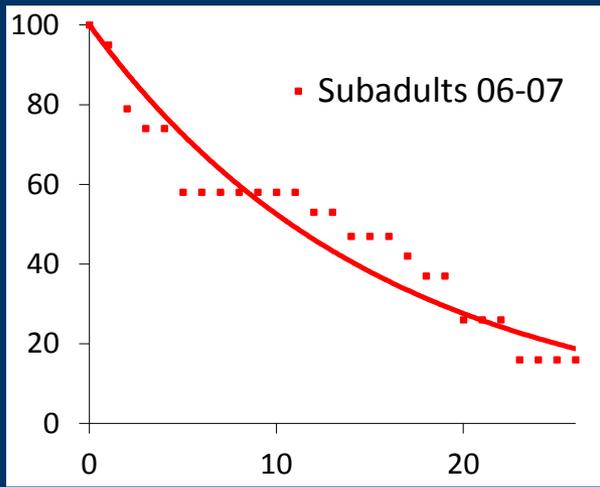
# Annual cohort returns

Released				Scanned 2011			Scanned 2012			
Year	Zone	mean TL	Count	mean TL	Count	% Contacted	mean TL	Count	% Contacted	
2008	River	461	102	487	13	12.7%	494	24	23.5%	74.4%
	Liberty	480	51	539	6	11.8%	513	9	17.6%	
	Basin	454	642	467	13	2.0%	491	35	5.5%	
2009	River	402	6290	441	483	7.7%	438	690	11.0%	26.0%
	Liberty	378	3336	390	42	1.3%	393	84	2.5%	
	Basin	387	2860	458	83	2.9%	470	222	7.8%	
	Kath	493	27	-	-	-			0.0%	
2010	River	370	5583	446	149	2.7%	445	405	7.3%	12.9%
	Liberty	329	1584	358	4	0.3%	347	9	0.6%	
	Basin	405	1827	465	106	5.8%	471	180	9.9%	
	Kath	479	117	510	4	3.4%	488	5	4.3%	
2011	River	396	2503	-	-	-	431	632	25.2%	33.7%
	Liberty	339	2341	-	13	0.6%	352	6	0.3%	
	Basin	366	2502	475	2	0.1%	460	115	4.6%	
	Kath	470	2	-	-	-	-	-	-	

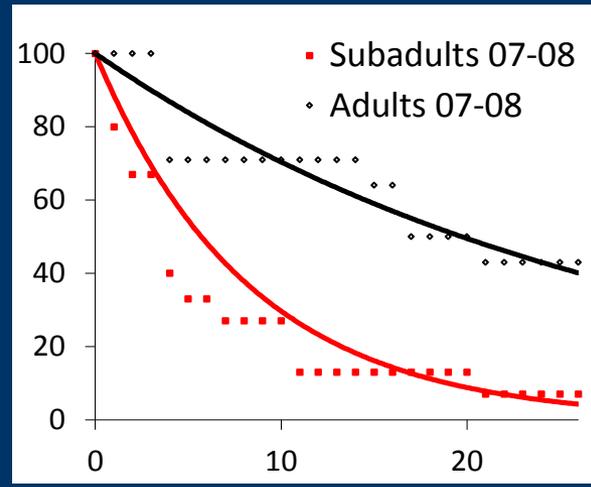


# Lake Mohave 1<sup>st</sup> year survival

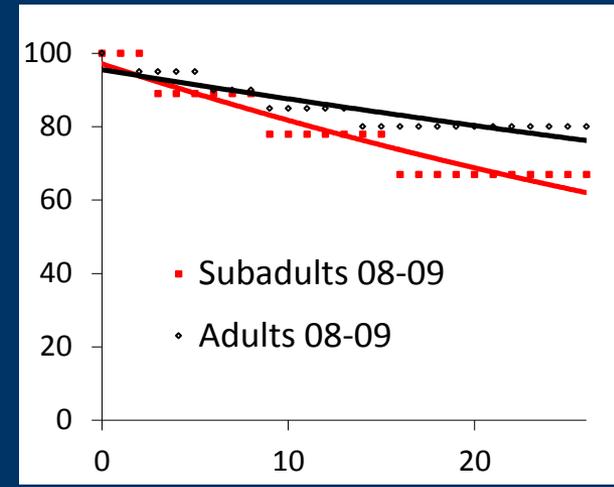
2006



2007



2008



- Poor six month post-stocking survival  
[7 to 67% subadults] [36 to 80% adults]
- Large variation in survival between years
- In 2009 no post-stocking mortality was recorded  
Only large adults released



