

# Rainbow Trout Early Life Stage Survey Glen Canyon, AZ

2014

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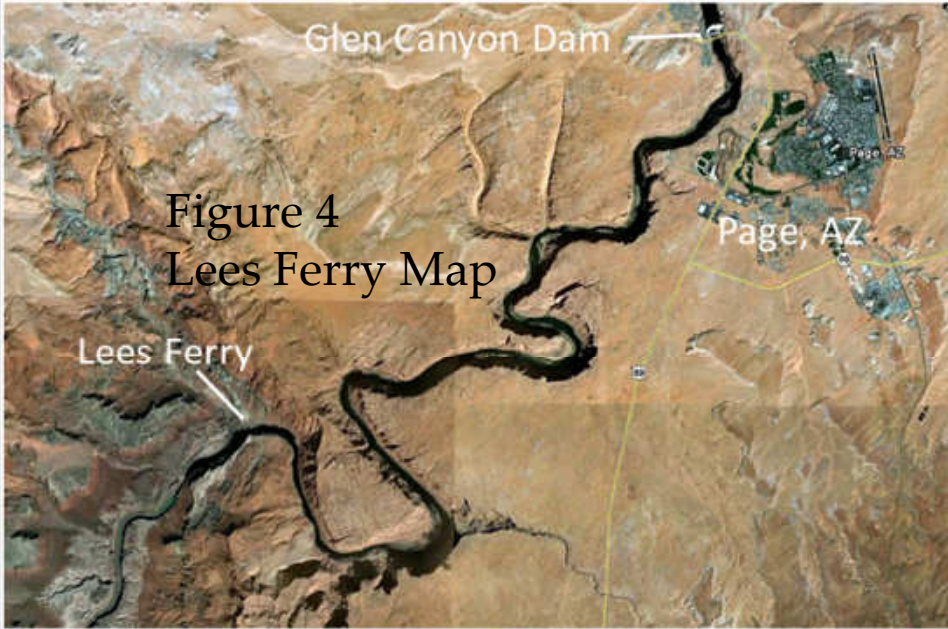


Figure 4  
Lees Ferry Map



# Rainbow Trout Early Life Stage Study/Survey

- Initiated in 2003 as part of a nonnative fish suppression project
  - Using dam release flows to suppress spawning success in Glen Canyon
- Has evolved into an informative monitoring program
- Follows the development of the age-0 population from spawning activity through recruitment to juvenile life stage





# Data Collection

## Spawning – Redd Surveys

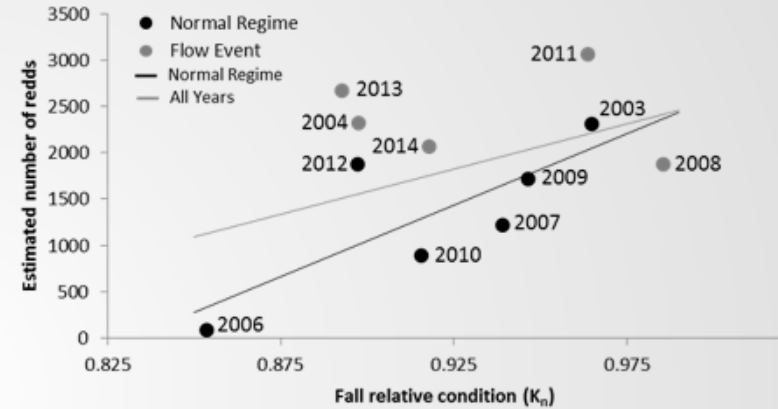
- December through May
- Rapid assessment transects
  - Shallow water
    - By foot or from bow of boat
  - Deep water
    - Clear bottomed Kayak
- Counts → Estimate of redds created through the season



# Results

## Spawning

- 2011 Equalization Flows
  - Increase in spawning habitat availability
- Fall HFEs 2012-2014
  - Increase in spawning habitat quality?



	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total surveys	Total redd count	Estimated # of redds
<b>2004</b>	1	1	1	2	2	1	2		1	11	3596	2316
<b>2006</b>		1	1	2	2	2	2	1		11	165	90
<b>2007</b>		1	1	1	1	1	1	1		7	1186	1215
<b>2008</b>		1	2	2	2	1	1	1		10	2741	1875
<b>2009</b>	1	1	1	2	2	2	2			11	3078	1713
<b>2010</b>			1	1	1	1	1			5	891	896
<b>2011</b>		1	2	1	2	2	1			9	4433	3062
<b>2012</b>		1	1	2	2	1	1			8	2296	1875
<b>2013</b>		1	1	2	2	1	1	1		9	3613	2668
<b>2014</b>		1	1	2	2	2	1	1		10	3471	2069
											<b>Mean</b>	1778

# Data Collection

## Larval/Juvenile Monitoring

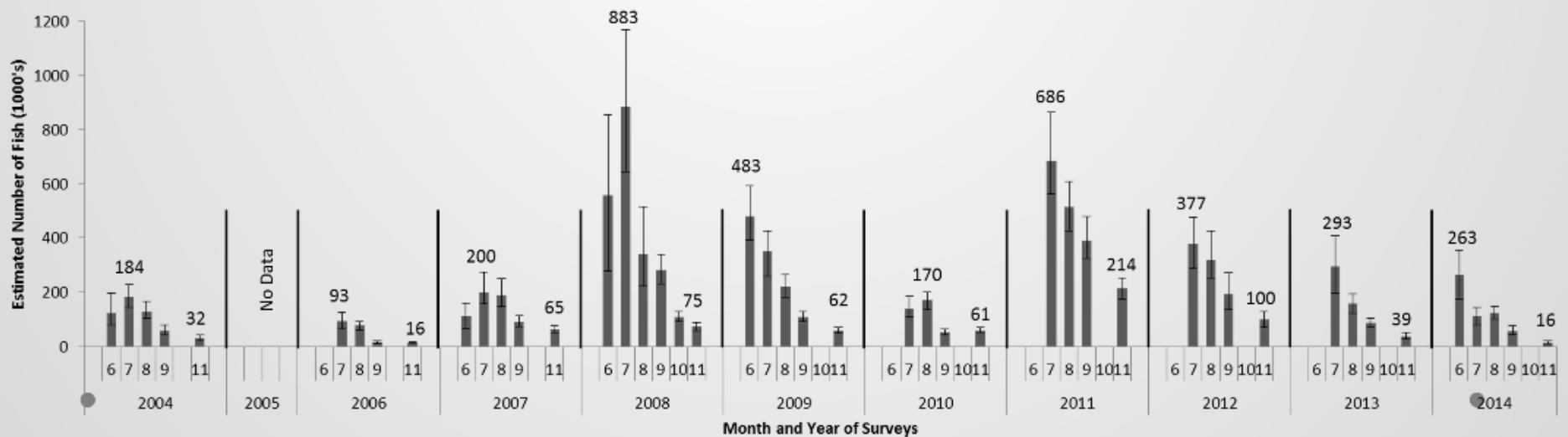
- June through September and November
- Electrofishing
  - High angle
    - Talus
    - Slow boat shocking
    - 20 50m sites
  - Low angle
    - Cobble bars, sand bars, debris fans
    - Backpack shocking
    - 20 30m sites
- Population and mortality estimates



# Results

## Larval/Juvenile Monitoring

- Peak occurred in June
  - Big difference between June and July
- Low estimate in November
  - Low water and lots of veg – decreased capture probability likely



# Results

## Larval/Juvenile Monitoring

- Mortality estimates
  - Important to catch the population peak (June vs July)

<b>Year</b>	<b>"Peak" Population Estimate (Thousands)</b>	<b>November Population Estimate (Thousands)</b>	<b>Mortality Rate for "Peak"-November (% day<sup>-1</sup>)</b>
2008	883	75	0.0086
2009	483	62	0.0083 (0.0070)
2010	170	61	0.0042 (0.0034)
2011	686	214	0.0043
2012	377	100	0.0055
2013	293	39	0.0074
2014	263	16	0.0107 (0.0074)



# Conclusion

- Fall HFEs may be affecting spawn
  - Doesn't necessarily lead to an increase in recruitment
- Peak abundance occurs earlier (June) in some years
  - Affects mortality estimates
  - June trip now part of sop
- No confidence in low November estimate
  - Expanding macrophytic vegetation distribution confounded capture rate
  - Mark-recapture element will be part of sampling regime in future years

