Rainbow Trout Early Life Stage Survey Glen Canyon, AZ

2012 Report

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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
  - Co-occurred with a downstream mechanical removal effort centered around the Little Colorado River
- Has evolved into an informative monitoring effort
- 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
- Hypsometry
- Redd Estimation

Data Collection

Larval/Juvenile Monitoring

- July through September and November
- Electrofishing
  - High Angle
    - Talus
    - Slow Boat Shocking
    - 50m from random start point within each of 20 fixed sites
  - Low Angle
    - Cobble bars, sand bars, debris fans
    - Backpack shocking
    - 30m from random start point within each of 20 fixed sites
- Measure minimum of 50, count the rest
- Otoliths
- Population Estimates
  - Size dependent capture probability

Previous Findings

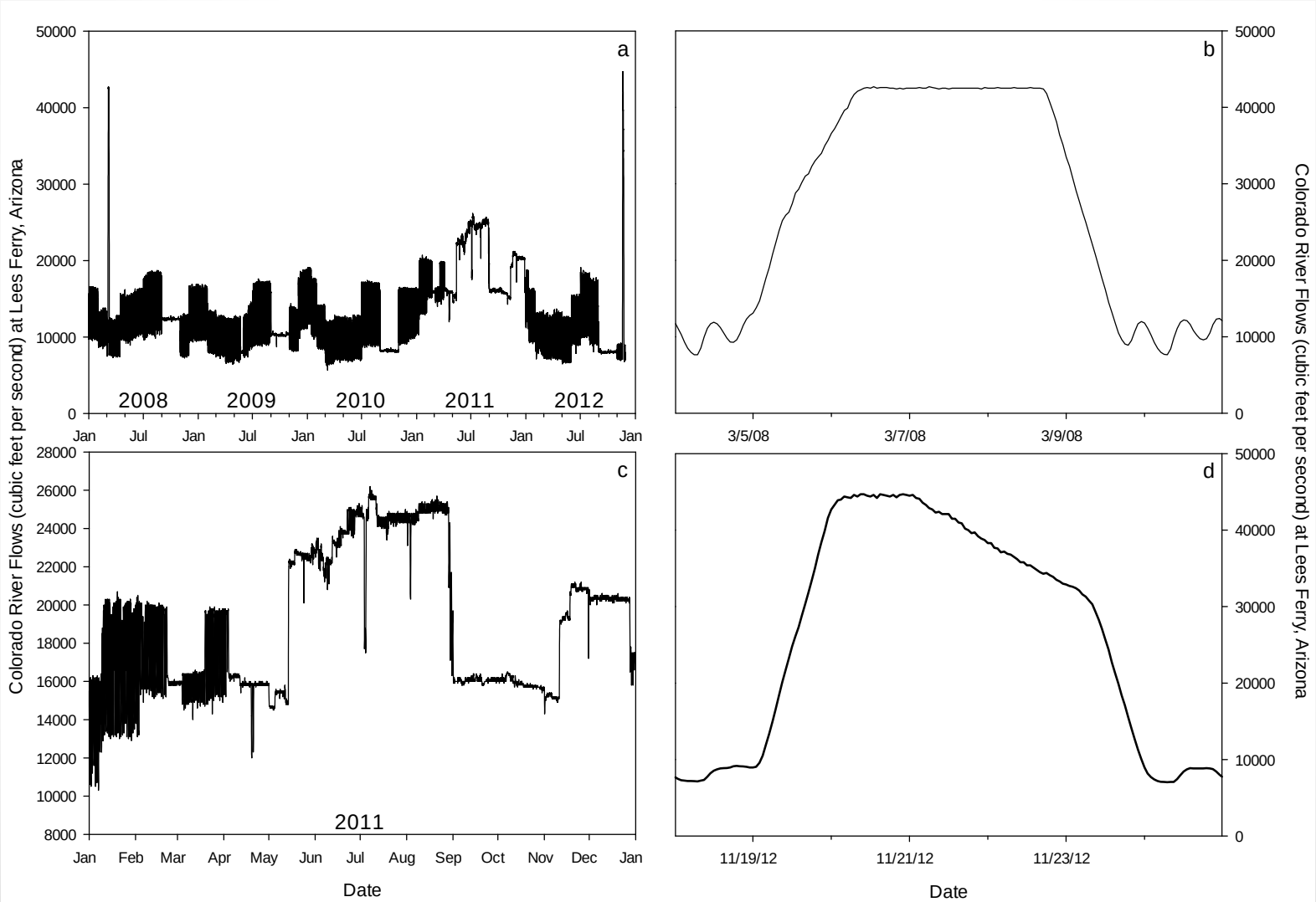
- Effects of Nonnative Fish Suppression Flows
  - Reduced spawning success
    - Compensated for by increased early survival
    - Korman, J., Kaplinski, M. and Melis, T., 2011
- Ontogenetic Shift
  - Low-Angle to High-Angle Habitat
    - Korman, J., Walters, C., Martell, S.J.D., Pine III, W.E. and Dutterer, A., 2011
- Effects of Hydropeaking on Habitat Use and Growth
  - Stayed near low water line
  - Reduced growth
    - Korman, J. and Campana, S.E., 2009
- Effects of Spring High Flow Event
  - Early March – middle of spawning season
  - Greatly increased survival
    - Korman, J., Kaplinski, M. and Melis, T., 2011
    - Melis, T.S., Korman, J. and Kennedy, T., 2011

Results

Spawning

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total Surveys	Redds Count	Estimated # of Redds
2003			1	1	1	1	1	1		6	2661	2310
2004	1	1	1	2	2	1	2		1	11	3596	2310
2006		1	1	2	2	2	2	1		11	165	90
2007		1	1	1	1	1	1	1		7	1186	1215
2008		1	2	2	2	1	1	1		10	2741	1875
2009	1	1	1	2	2	2	2			11	3107	1697
2010			1	1	1	1	1			5	895	900
2011		1	2	1	2	2	1			9	4433	3062
2012		1	1	2	2	1	1			8	2286	1852
											Mean	1701.2
											SE	291.6

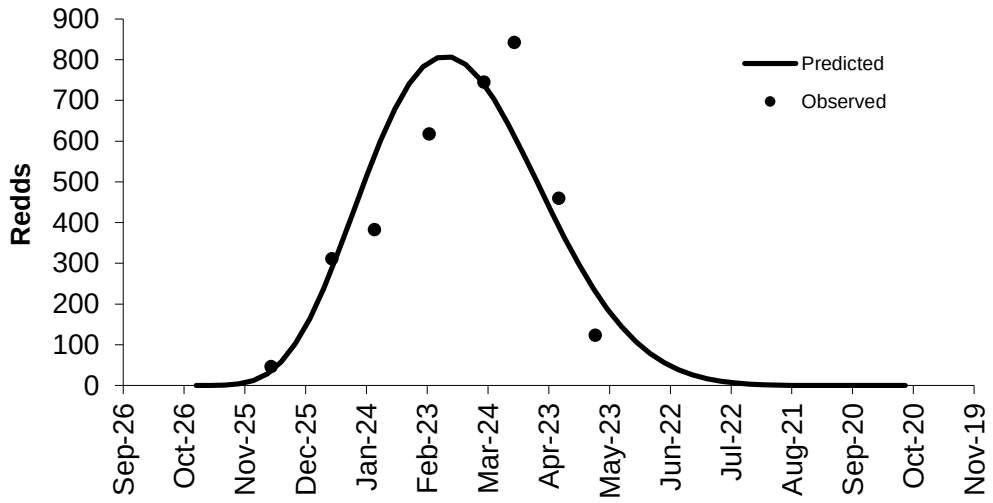
Atypical Flow Events



Results

Spawning - 2011

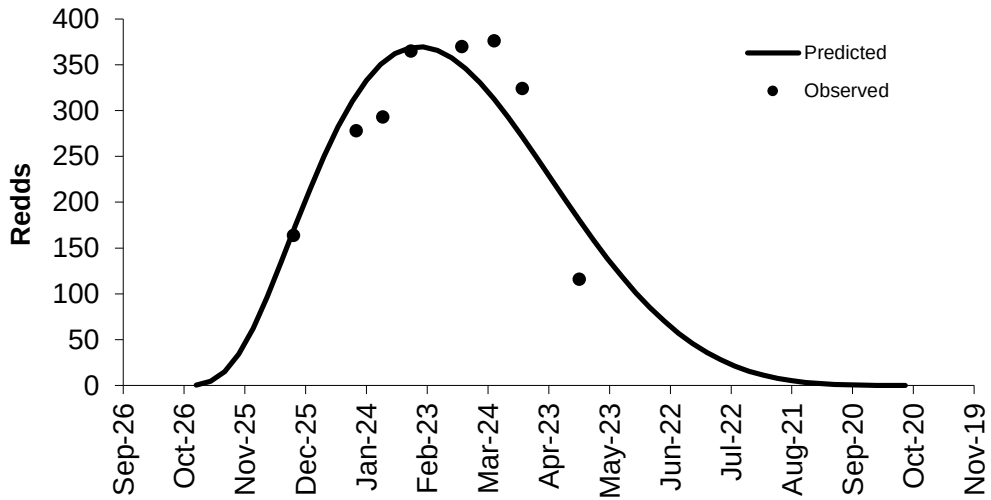
- Redds counted
  - 4433
- Redds Estimated
  - 3062



Results

Spawning - 2012

- Redds counted
  - 2286
- Redds Estimated
  - 1852

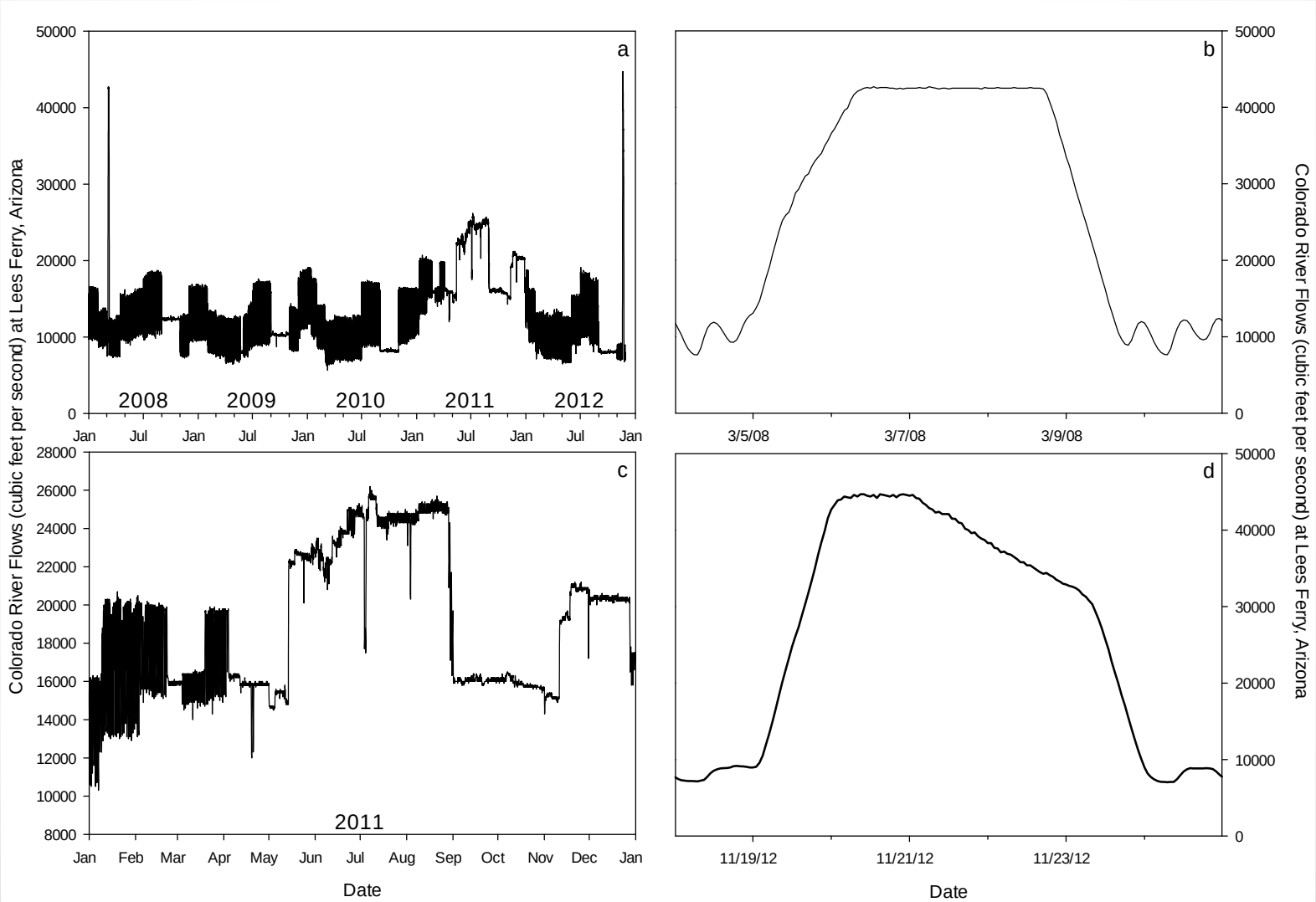


Results

Larval/Juvenile Monitoring

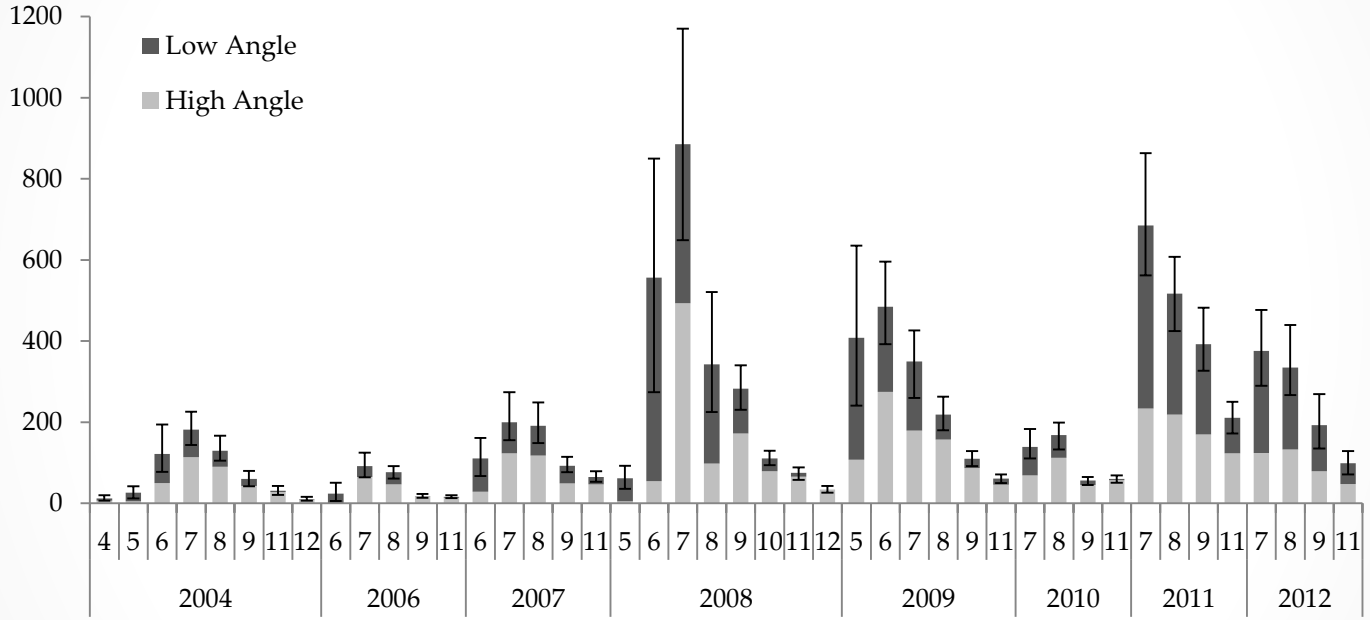
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2003			L	L		L	L		
2004	LH	LH	LH	LH	LH	LH		LH	LH
2006			L	LH	LH	LH		LH	
2007			LH	LH	LH	LH		LH	
2008		LH	LH	LH	LH	LH	LH	LH	H
2009		LH	LH	LH	LH	LH		LH	
2010				LH	LH	LH		LH	
2011				LH	LH	LH		LH	
2012				LH	LH	LH		LH	

Atypical Flow Events



Results

Larval/Juvenile Monitoring



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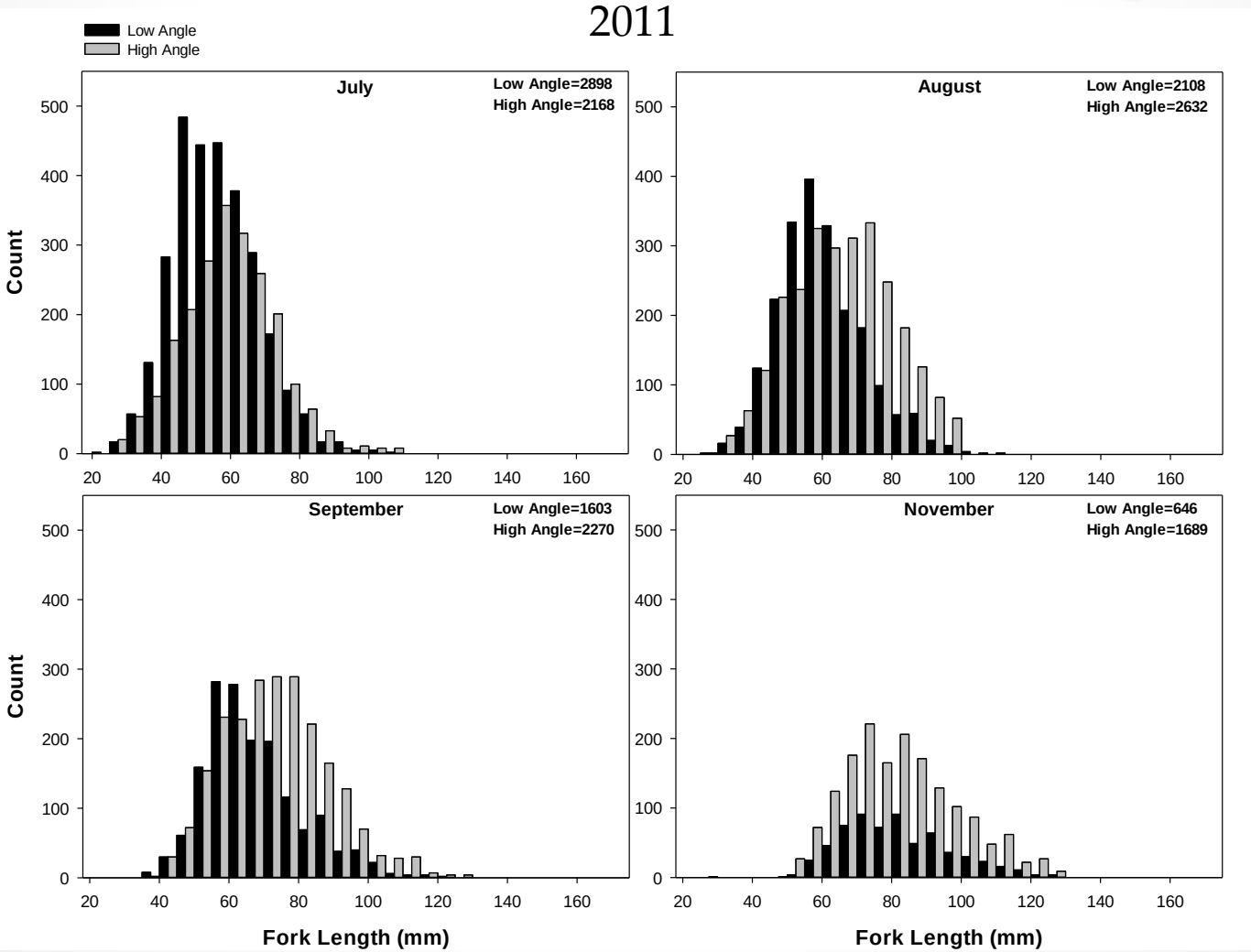
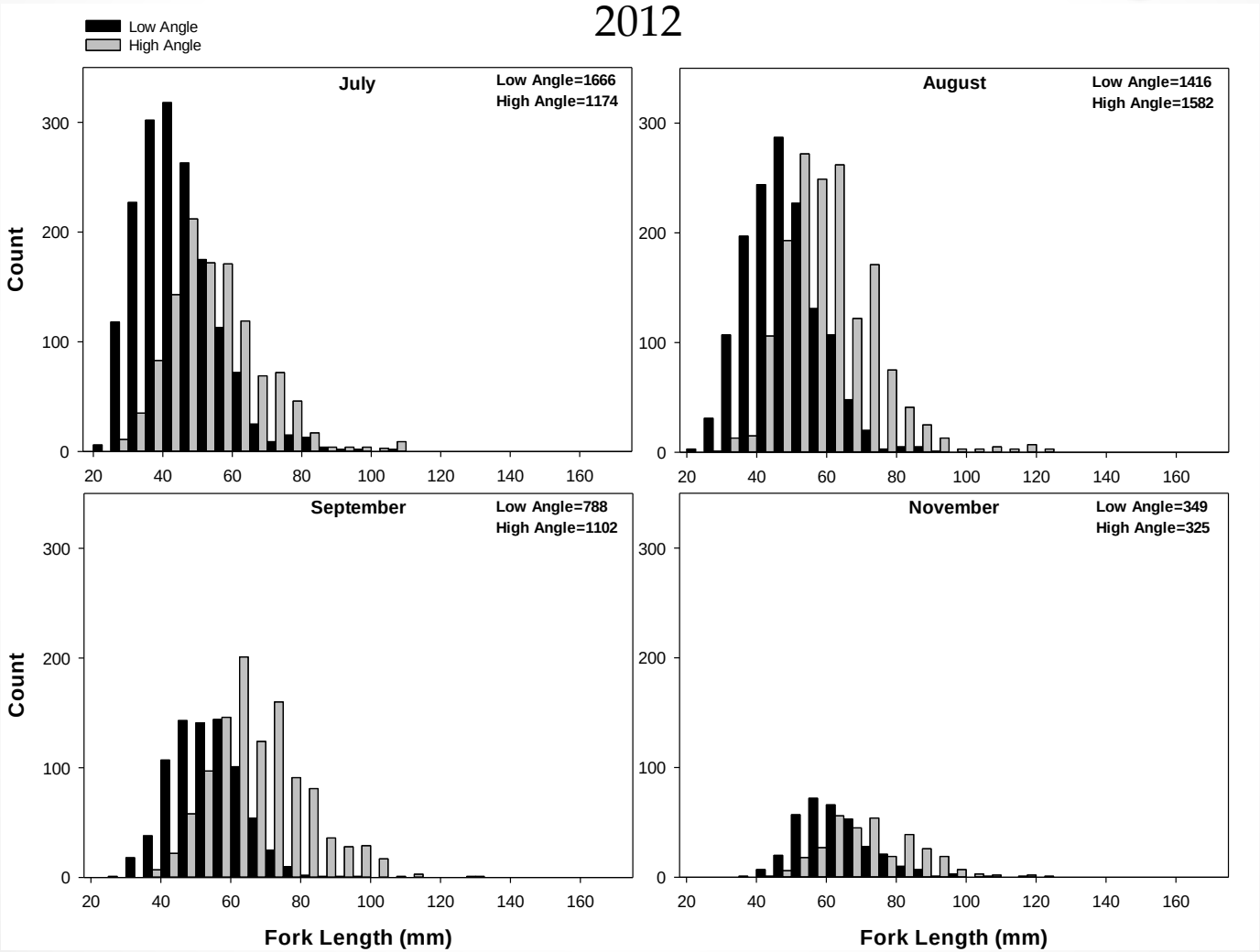
Larval/Juvenile Monitoring



Results

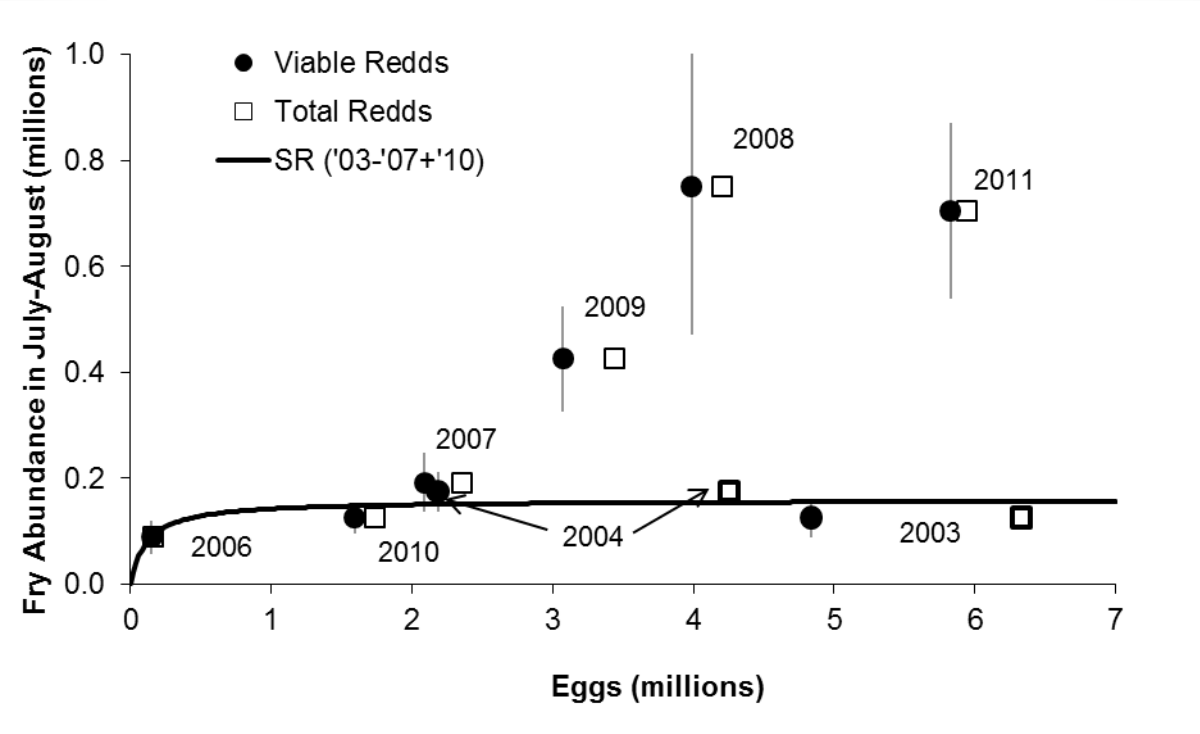
Larval/Juvenile Monitoring



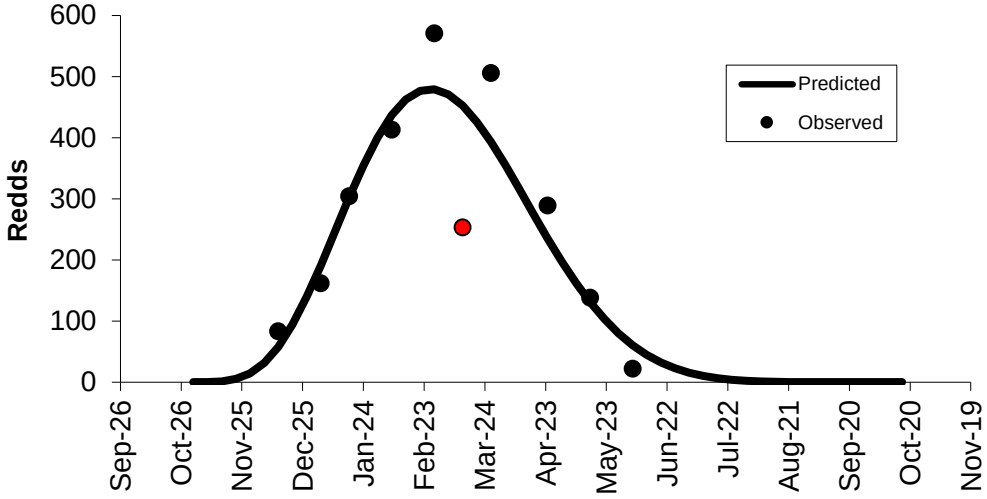
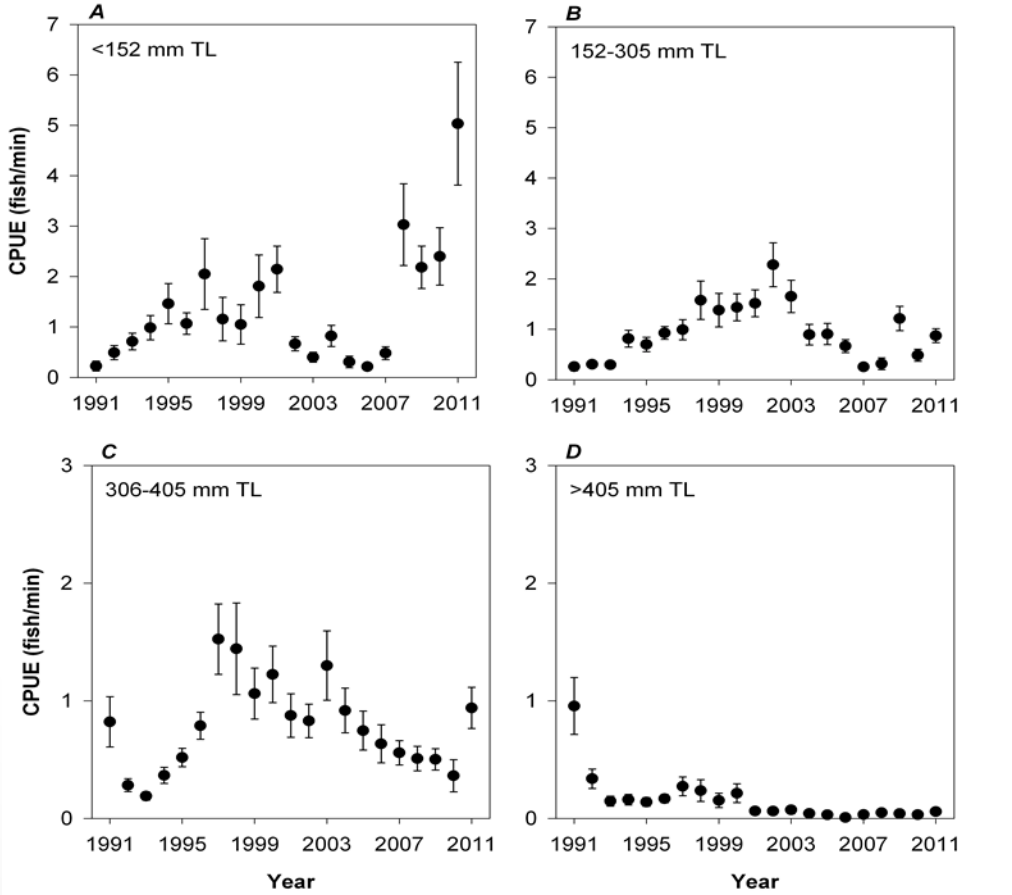
Current Understanding: Management by Flow

- Unsuccessful at suppressing population with increased fluctuation
  - Compensatory early survival
- Spring "floods" may increase early survival
  - Cleans spawning gravels
  - Resets/shift food base
- More water = More fish
  - Increased spawn
  - Increased survival

Larval/Juvenile Monitoring



Larval/Juvenile Monitoring



Larval/Juvenile Monitoring AZGFD