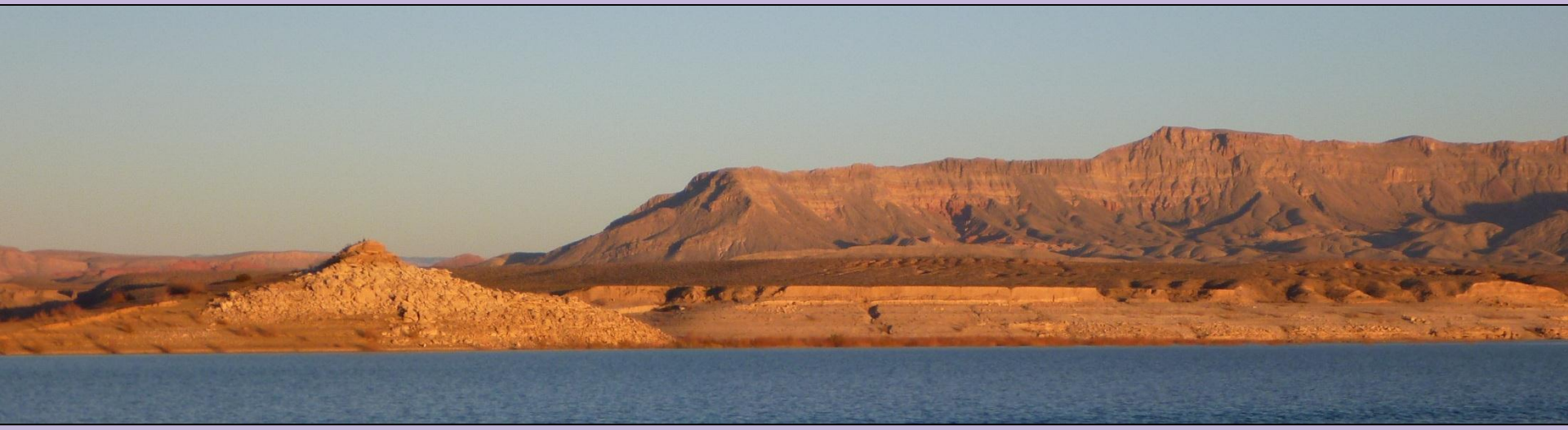
2011–2012 Razorback Sucker Studies on Lake Mead, Nevada and Arizona: Long-term Monitoring and Juvenile Habitat Associations



BIO-WEST, Inc.

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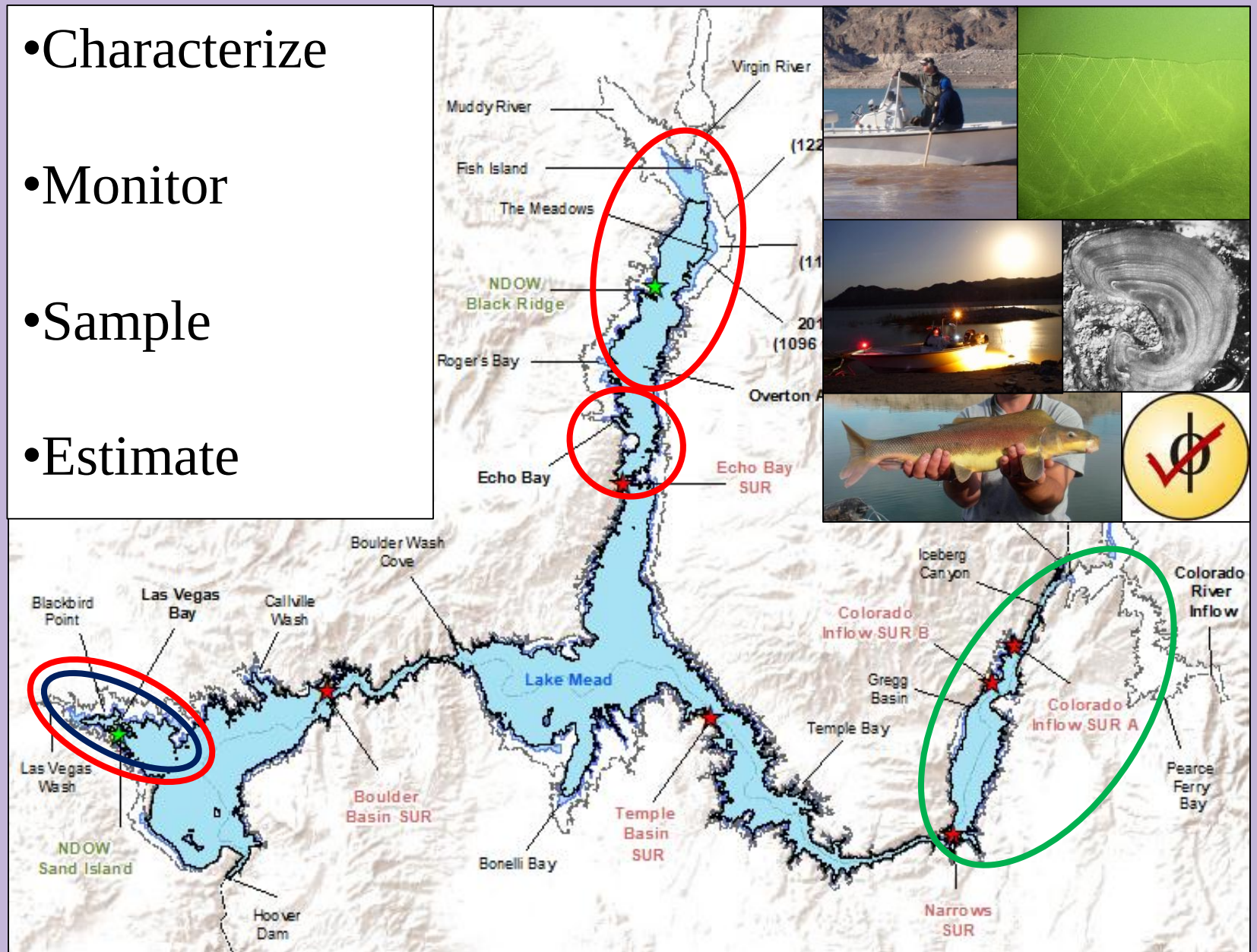
Acknowledgements

Lake Mead Workgroup

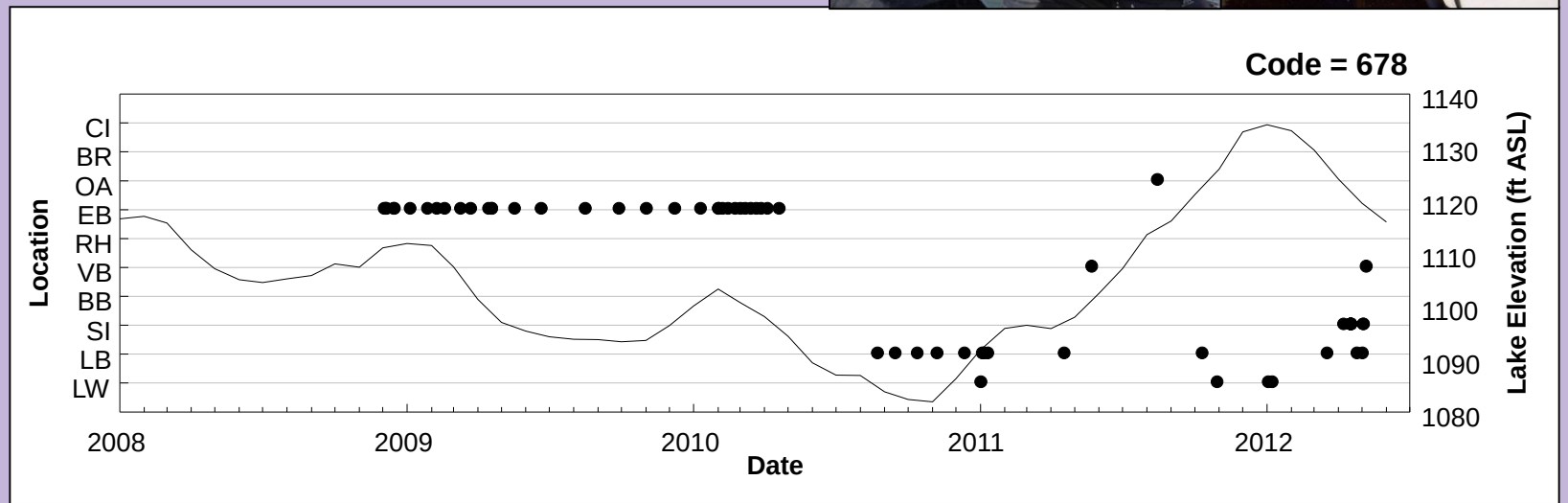
Objectives–Study Area–Methods

- Characterize
- Monitor
- Sample
- Estimate



Sonic Telemetry

- 152 active contacts
  - 14 individuals
- 89,425 SUR contacts
  - 10 individuals
- Relative site affinity
- Lake-wide movement

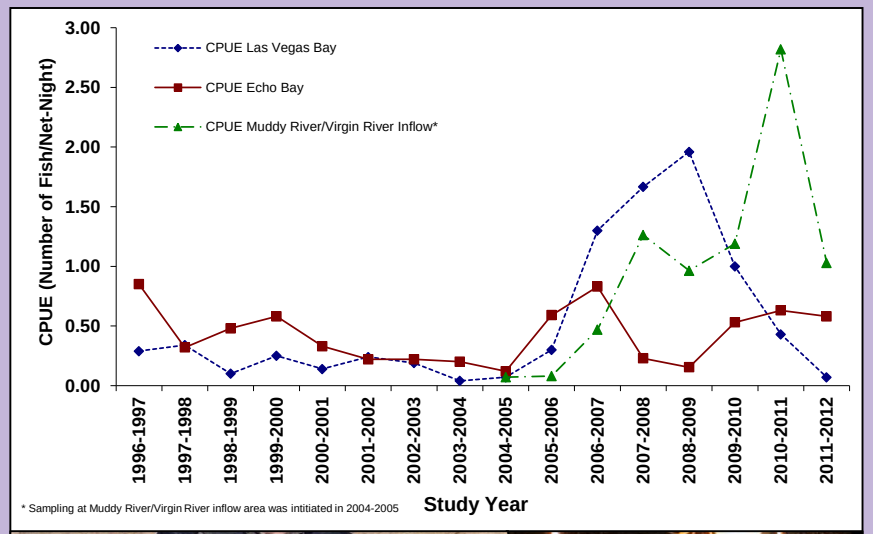


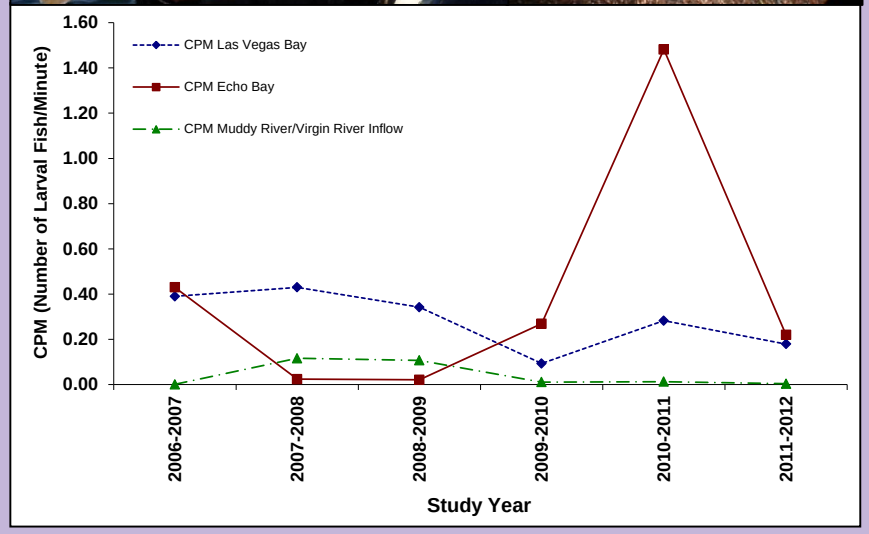
Adult and Larval Sampling

- 92 net-nights
- 53 captures
  - 20 recaptures
  - Total CPUE=0.57

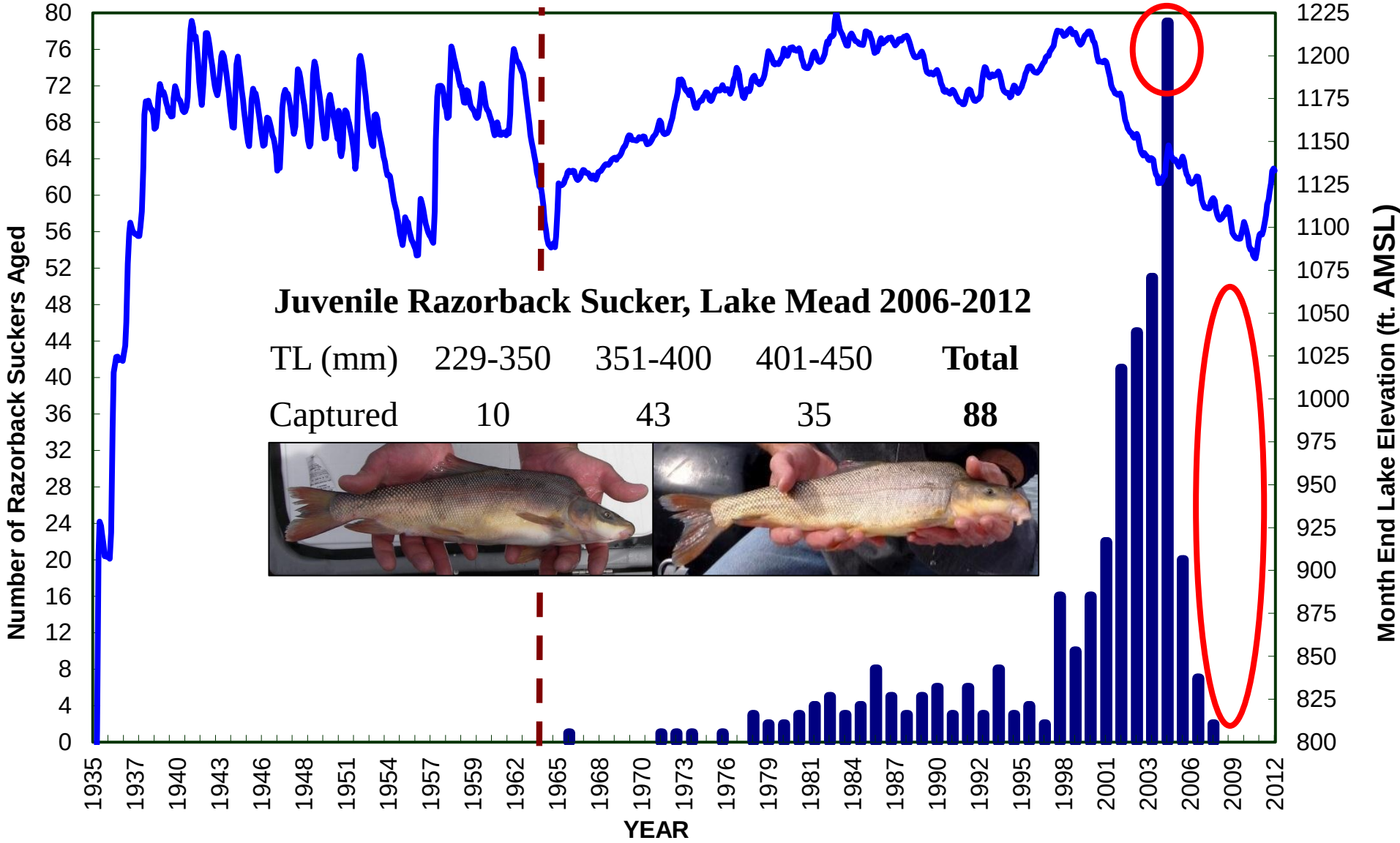
- 4,638 minutes total
- 717 larvae captured
  - Total CPM=0.15

- Spawning locations similar to past years





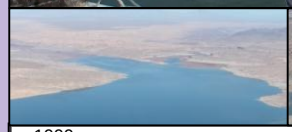
Aging & Recruitment

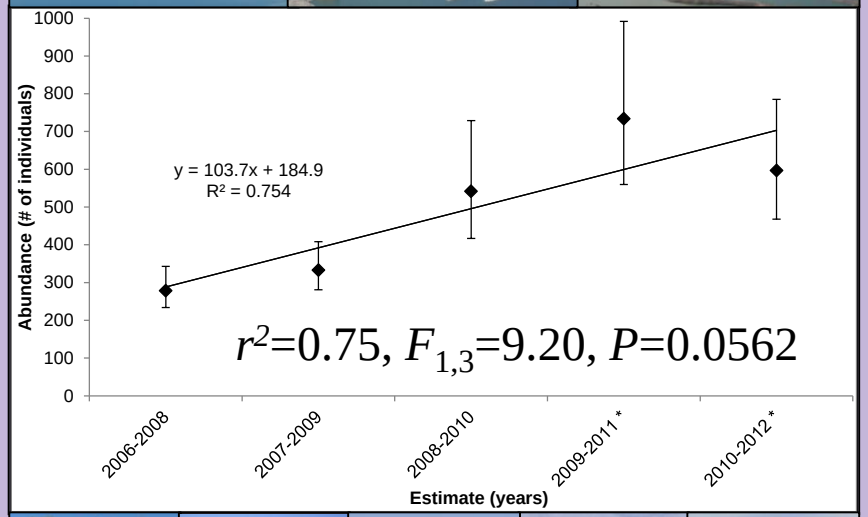


Population & Survival Estimates

- Lincoln-Peterson closed capture model
  - Lake-wide 2010-2012
    - 596 (468-786)
  - Increase in 3-year estimates, 2006-2012

- Cormack-Jolly-Seber model
  - Lake-wide 2010-2012
    - 0.92 (0.87-0.95)





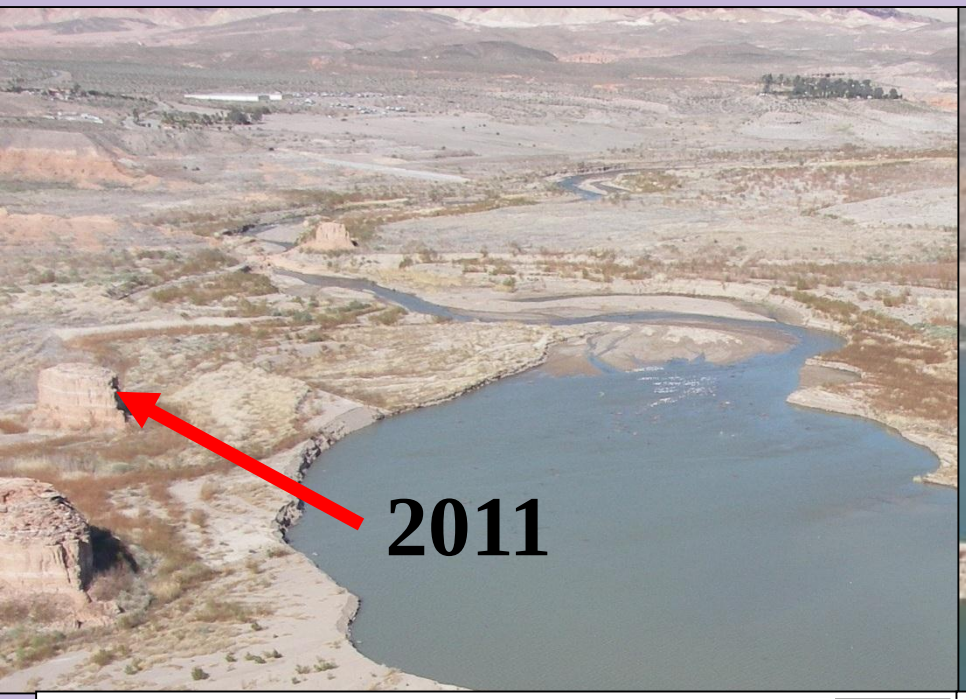
Discussion

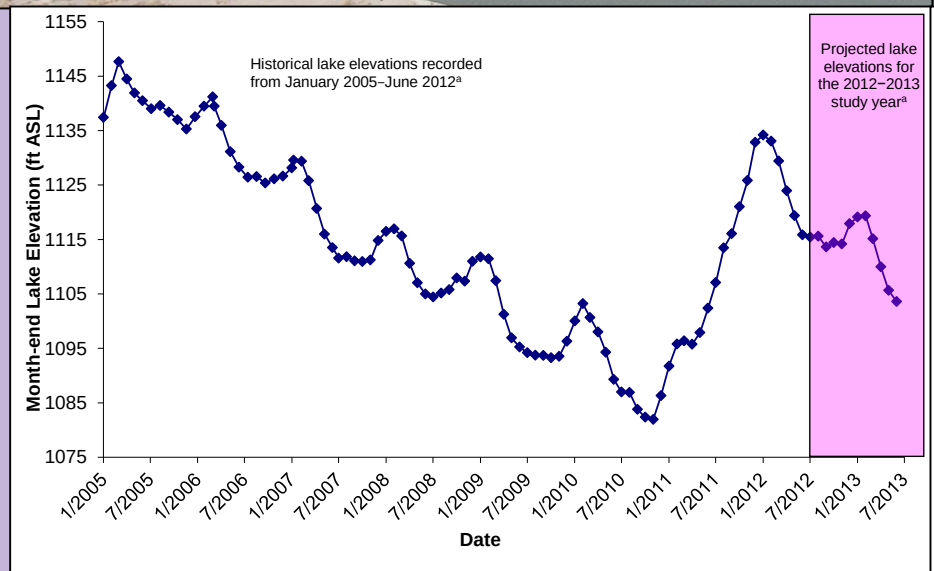
- Biological and physical change at Lake Mead
- Near-annual recruitment with new, wild fish
- Generally increasing population with high rate of survival
- Unique population at Lake Mead
  - Young, recruiting, resilient
- 88 juvenile razorback suckers captured 2006-2012
  - An opportunity currently exists at Lake Mead…

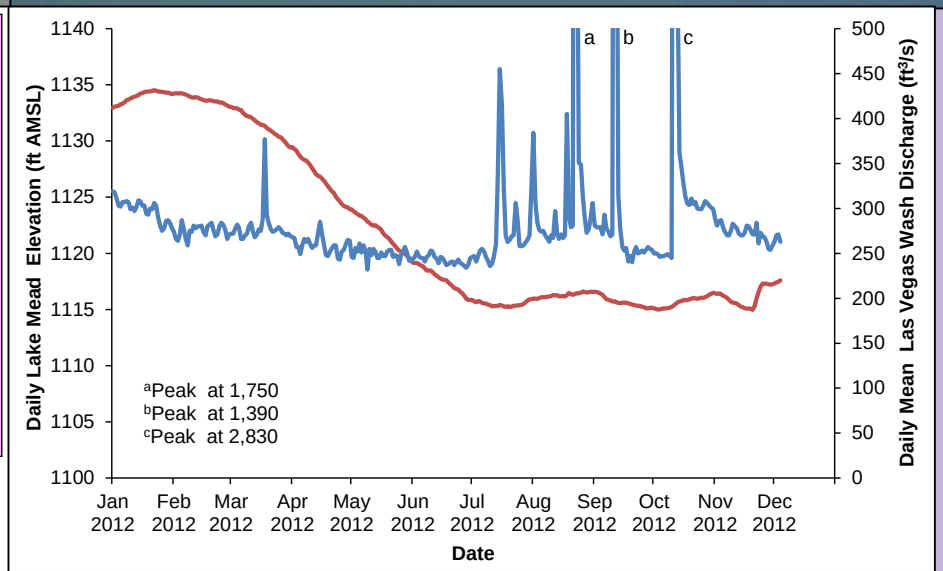
Objectives-Study Area-Methods

- Describe movement patterns and identify potential recruitment habitat
  - Sonic telemetry
- Define associated fish community and sample for conspecifics
  - Multi-method sampling
- Characterize utilized habitat types and quantify physicochemical properties
  - Detailed measurement of water quality and cover and substrate composition
- Explain variation seen in habitat association, seasonal location, and community composition
  - Multivariate analyses
- <u>Define recruitment habitat</u>

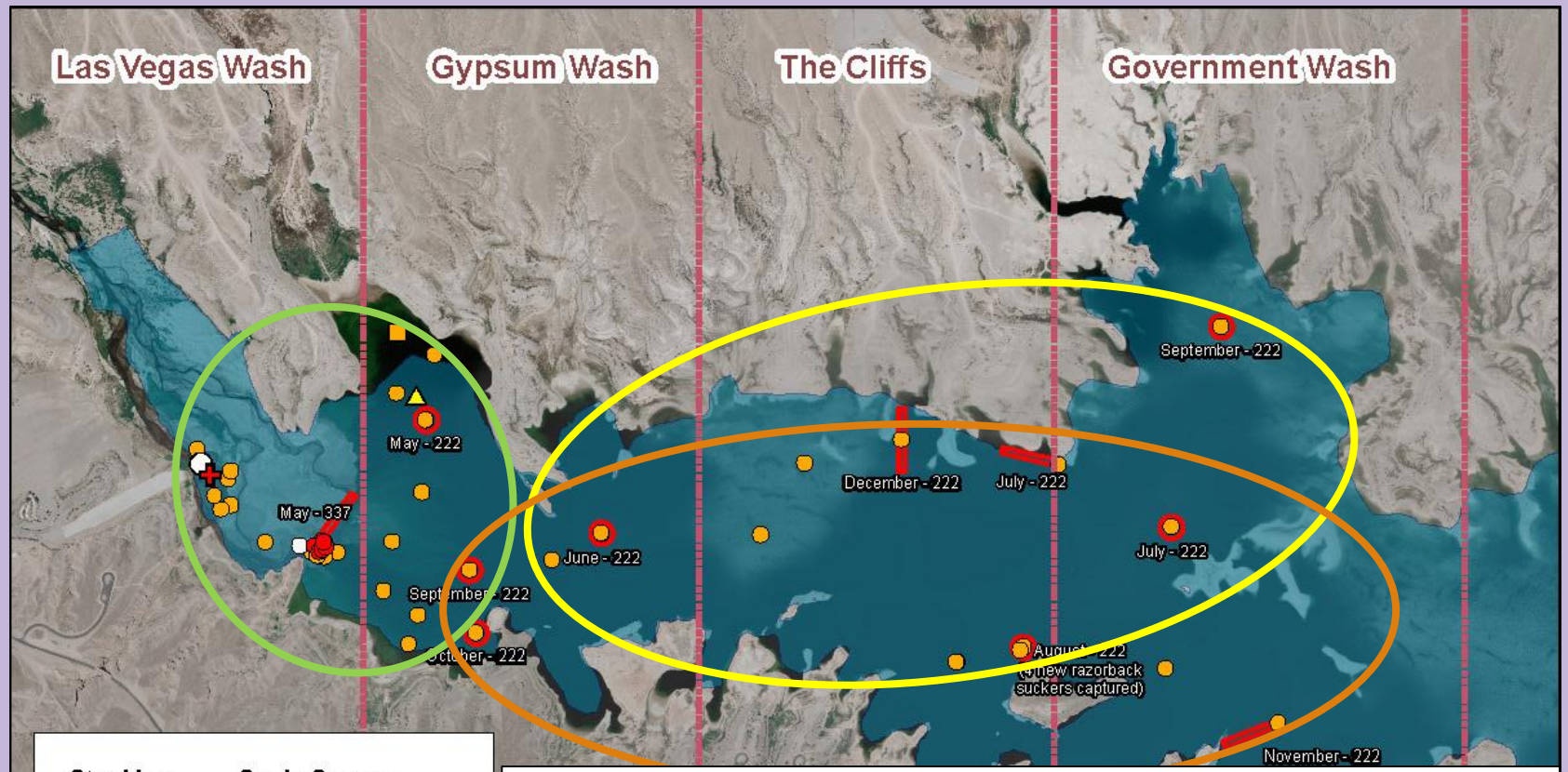
Lake Mead Conditions







Sonic Telemetry



Stocking Location		Sonic Survey Result	
	222		222
	337		337
	368		368
	452		

2012 High Lake Level (January Average: 1134.2' AMSL)

Habitat Assessment

20m x 200m 72m

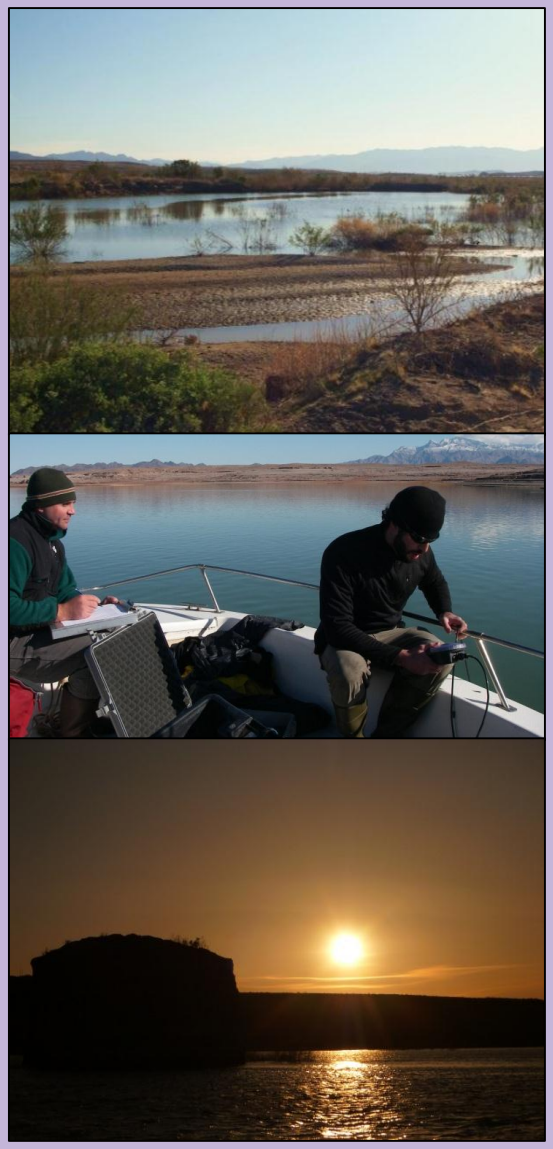
- 4 sonic juveniles (340-425 mm TL) Feb-Dec 2012
  - 47 active contacts, 615 SUR contacts
- Generally a seasonal shift from shallow areas with IV adjacent to Las Vegas Wash (Feb-Apr) to deeper areas with turbidity outside of Government Wash (May-Sep)
- Transitional movement throughout Las Vegas Bay during fall (Oct-Dec)

Fish Sampling

- May-Dec 2012
- 4 new, wild fish 8/8/12
  - 480-540 mm TL, 6-7 years old
  - 40-76 ft, silt bottom with vegetation near mouth of Government Wash
- Dominated by gizzard shad, striped bass, red shiner, largemouth bass
- Differences in fish community seemed to be driven by cover

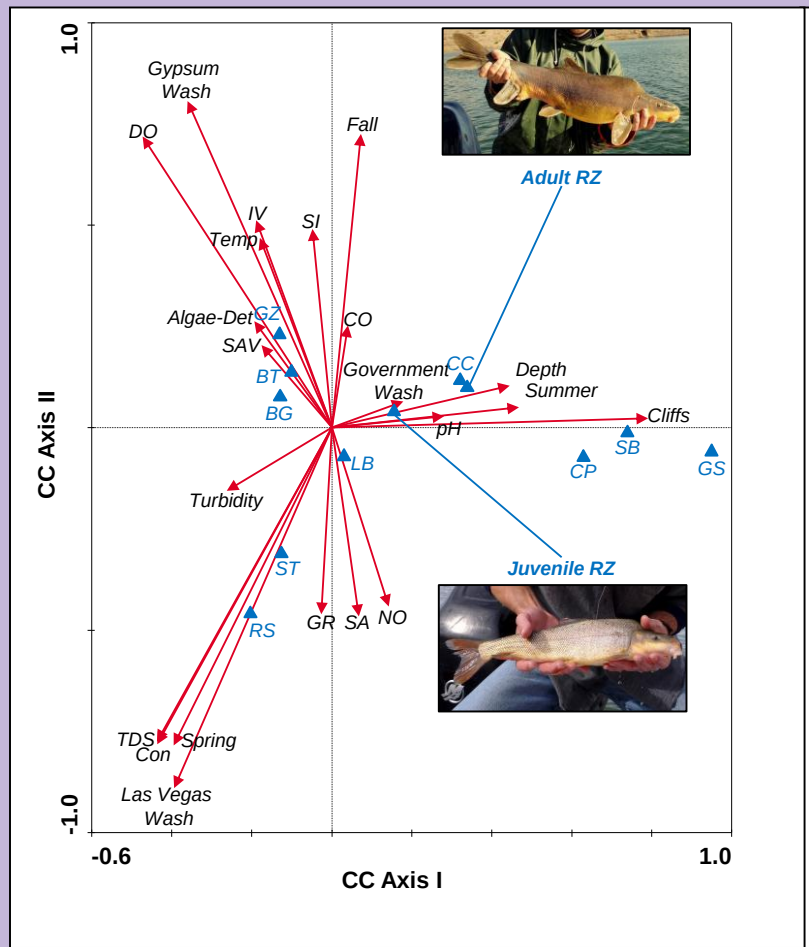
Physicochemical Quantification

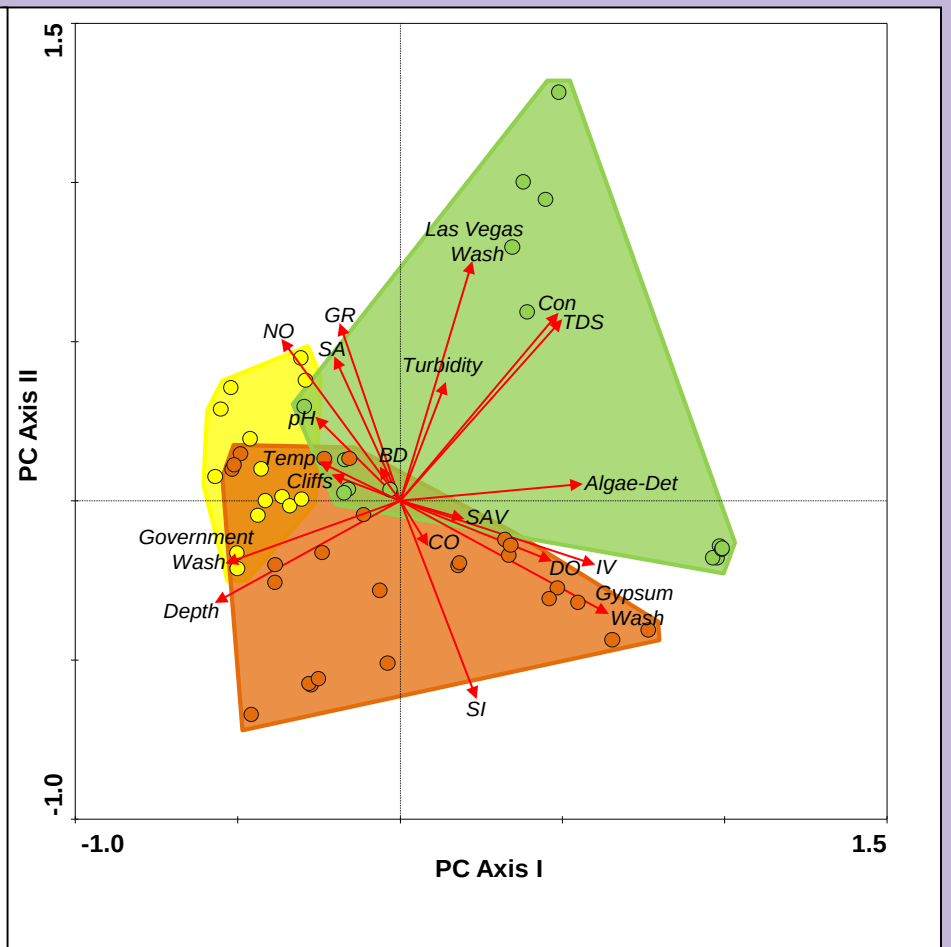
- 55 habitat replicates measured May-Jun 2012
  - Primarily located in Government Wash (~36%)
- Inshore habitat
  - Shallow, silt, IV, algae and detritus
- Offshore habitat
  - Deep, variety of substrate, no veg cover, limited algae and detritus
- Range of monthly means
  - 17.7-29.4 ˚C (Dec-Aug)
  - 8.0-17.2 mg/L (Nov-Oct)
  - 1.0-35.8 NTU (Dec-Oct)

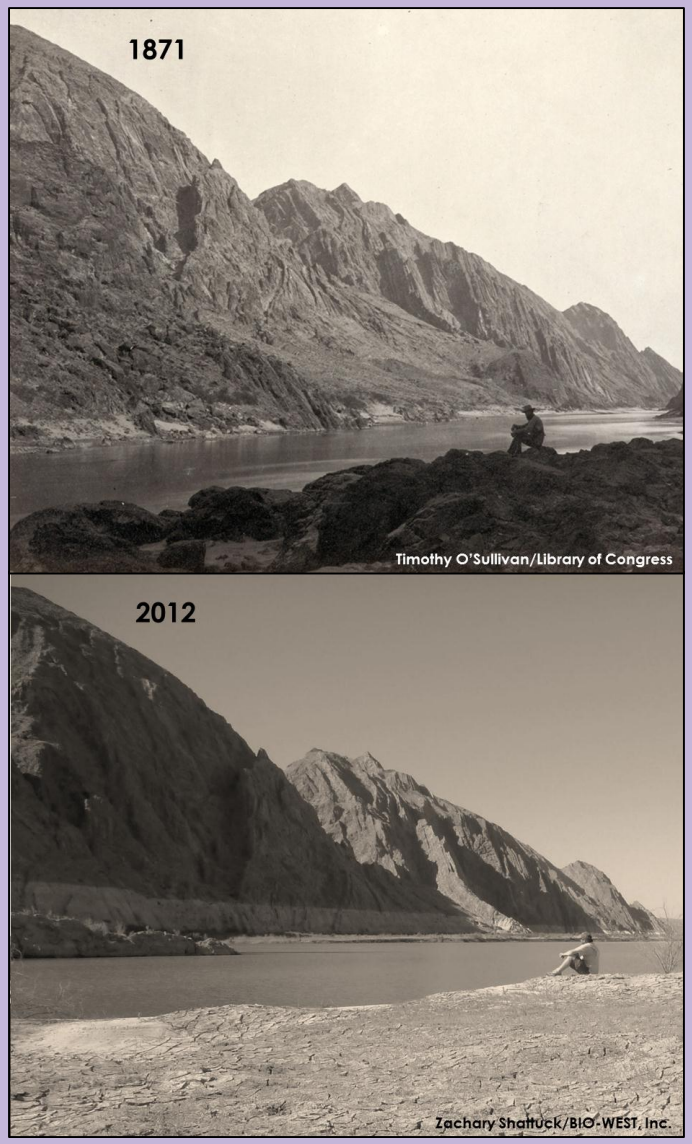


Multivariate Analyses

- CCA explained 99.1% of variation seen in fish assemblage
  - Environment=22.3%, season=0.5%, site=5.2%
    - All pure effects were significant in post-hoc Monte Carlo permutations (P<0.001)
- PCA explained 38.0% of variation in environment and site
  - Axis I=22.8%, axis II=15.2%
    - Both axes explained a significant amount of variance in post-hoc broken-stick criterion (P=0.05)





Discussion

- We now have a better understanding of razorback sucker recruitment habitat
- Cover in the forms of IV and turbidity still appear to be vital
- <u>More data is needed</u>
- 141 years; and yet, still so many questions