
Zachary Shattuck, Brandon Albrecht, and Ron Rogers
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

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Lake Elevation (ft ASL)

Date

Code = 678
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

Juvenile Razorback Sucker, Lake Mead 2006-2012

TL (mm) 229-350 351-400 401-450 Total
Captured 10 43 35 88
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)

$y = 103.7x + 184.9$
$R^2 = 0.754$

$r^2=0.75, F_{1,3}=9.20, P=0.0562$
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
• Define recruitment habitat
Lake Mead Conditions

Historical lake elevations recorded from January 2005–June 2012^n

Projected lake elevations for the 2012–2013 study year^a

^nPeak at 1,750
^nPeak at 1,390
^nPeak at 2,830

^aProjected lake elevations for the 2012–2013 study year
Sonic Telemetry

- 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

• More data is needed

• 141 years; and yet, still so many questions