Use of remote PIT scanners to monitor razorback sucker in Lake Mohave

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Background

- **Razorback Sucker**
  - Long lived (>40 years)
  - Federally listed in 1991
  - Over 200,000 repatriated to Mohave
  - Remote and routine monitoring to track populations

- **Lake Mohave**
  - LCR MSCP Reach 2
  - Between Hoover and Davis Dams
  - Most genetically diverse population of razorback sucker
Remote PIT Scanning Units
River Scanning

- Submersible units deployed 1 week per month
- 5 fixed sampling stations
  - Gio’s Point
  - Black Bar
  - Ringbolt Rapids
  - Boy Scout Canyon
  - Sauna Cave
- Shore based unit
  - Boy Scout Canyon
  - January - September
Liberty Scanning

- Submersible and Destron units during spawning season
- Liberty and Elizabeth J Coves
Basin Scanning

- Submersible units deployed during March roundup
  - Scanners adjacent to nets
  - Carp Cove, Halfway Wash, Tequila Cove, Yuma Cove, Owl Point

- Shore based units
  - Yuma and Tequila Coves
  - November 2014 – May 2015
River Scanning

- 6,385 total scan hours
  - Submersible units – 5,123 h
  - Shore based unit – 1,262 h
- 11,269 total PIT tag contacts
- 1,549 unique razorback sucker
  - 1,534 with marking history
  - 1,526 repatriates
  - 8 wild
Liberty Scanning

- 179 total scan hours
  - Submersible units – 108 h
  - Destron – 71 h
- 6 total PIT tag contacts
- 2 unique razorback sucker
  - 2 with marking history
  - 2 repatriates
Basin Scanning

- 22,829 total scan hours
  - Submersible units – 11,175 h
  - Shore based units – 11,654 h
- 87,445 total PIT tag contacts
- 1,508 unique razorback sucker
  - 1,466 with marking history
  - 1,461 repatriates
  - 3 wild
  - 2 unknown
Cohort Analysis

2015 contact rates for cohorts released in River

- 2009 (46%)
- 2010 (27%)
- 2011 (24%)
- 2012 (2%)
- 2013 (<1%)

2015 contact rates for cohorts released in Basin

- 2009 (58%)
- 2010 (24%)
- 2011 (1%)
Release Size Distribution

Mean release size 36 cm
Population Estimates

- Based on 2014 and 2015 PIT scanning
- Highest estimates since scanning was initiated!
  - Tagged repatriate population – 3,505 (3,279 to 3,756)
    - River subpopulation – 2,039 (1,861 to 2,245)
    - Basin subpopulation – 1,808 (1,635 to 2,009)

- Based on 2014 and 2015 March roundup
  - Tagged repatriate population – 2,230 (922 to 5,963)
Adult Razorback Sucker Survival

- Previous mark-recapture estimates based on netting events ~75%
- Mark-recapture analysis based on PIT scanning 85-90%
- Discrepancy likely due to geographical limitations of netting activities
Stocking Population Dynamics

- Simple population model
  - Stock 10,000 fish a year at three sizes
    - 300 mm
    - 350 mm
    - 450 mm
  - First year survival based on MARK survival estimates for each size class
  - Second year and older fish survive at 75% or 90% annually
Stocking Population Dynamics - 75% survival

- Population size vs. Years of stocking
- Lines represent different sizes: 300 mm, 350 mm, and 450 mm
Stocking Population Dynamics – 90% survival

![Graph showing population growth over years of stocking with different sizes: 300 mm, 350 mm, and 450 mm.](image)
Conclusions

- Lake-wide population estimate based on PIT scanning data highest since scanning began
- Annual adult apparent survival is significantly higher than previously expected, from 75% to 90%
- Reclamation and Willow Beach NFH started a plan to raise bigger fish
  - 8,000 - 10,000 fish stocked per year, most with a TL > 400 mm
  - Decreased larval goal to 18,000 per year
- Over 2,600 larvae were collected from River in 2015
Thanks to our partners for their support

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