Hydroacoustic Repeatability in High Savery Reservoir

Presentation at the 2015 American Fisheries Society Meeting
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High Savery Reservoir
482 acres at full pool
7,320 ft surface elevation
Maximum depth: 120 ft
Average depth: 40 ft
First stocked in 2004
- CRC • 107,000 total
  • 5–10K annually
- KOE • 170,000 total
  • 10–15K annually
- TGT • 87,000 total
  • 5–10K annually
Remnant BKT, RBT, and WHS
Why High Savery?

- Small enough to allow for repeatability
- Simple species assemblage
- Potential CRC and KOE brood source
- Trophy TGT fishery

Current state record
May 6, 2012 – 11.07 lb
April 2012 – 7.54 lb
November 2011 – 5.12 lb
June 2011 – 4.06 lb
May 2009 – 3.74 lb
Hydroacoustics Refresher

- Mobile surveys
- Down-looking and side-looking
- Transect = Experimental unit
- Estimate fish density in each 10 ft depth strata
- Partitioned by mid-water curtain nets – 20 ft deep
- Total pelagic population estimate by species
Questions

- How repeatable are the density/population estimates from season-to-season?
  - Is a certain season better for sampling than others?

- How repeatable are the density/population estimates from day-to-day?
  - Do we have enough “coverage” to account for variability?

- If we change our transects with the same coverage, do we get a different result?
How repeatable are the density/population estimates from season-to-season?
- Is a certain season better for sampling than others?

2011
- Spring – First week of June (38°F)
- Summer – End of July (66°F)
- Fall – End of September (57°F)
## Seasonal Variability

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Pelagic Pop. Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>4,178</td>
</tr>
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<td>July</td>
<td>15,679</td>
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### Seasonal Variability - Conclusions

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<th>Month</th>
<th>Non-WHS Species</th>
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- How repeatable are the density/population estimates from season-to-season?
  - +/- 18%

- Is a certain season better for sampling?
  - Spring – As early as possible
    - Closest to long-term average
    - Fewer WHS in the nets and on hydroacoustics
    - Less acoustic noise from algae
Day-to-day Variability

- How repeatable are the density/population estimates from day-to-day?
  - Do we have enough “coverage” to account for variability?

- 2012
  - Spring sampling
  - Four consecutive days
## Day-to-day Variability

<table>
<thead>
<tr>
<th>Day</th>
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<td>1</td>
<td>23,736</td>
<td>109</td>
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<td>19,760</td>
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![Graph showing variability in total pelagic population estimates over days.](image)
Day-to-day Variability

[pictured graph showing population estimates across different wind speeds, with R² = 0.8985]
Day-to-Day Variability - Conclusions

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- How repeatable are the density/population estimates from day-to-day?
  - +/- 10%

- Highly correlated with wind speed ($R^2=0.9$)
  - As wind speed increases, so too does the number of false targets
If we change our transects with the same coverage, do we get a different result?
- Scheduled for spring of 2013
Different Transects

- If we change our transects with the same coverage, do we get a different result?
  - Scheduled for spring of 2013
    - Low water
    - Extremely high densities of WHS
Take Home Messages

- Some variability (+/- 18%) in sport fish population estimates between seasons
  - Could be related to wind speed
- Spring is the optimal time for hydroacoustics
  - Fewer WHS in the nets and on hydroacoustics
  - Less acoustic noise from algae
- Minimal variability (+/- 10%) between days with current coverage
  - Highly correlated with wind speed
- Effect of alternative transect design is unknown
Acknowledgements

- Wyoming Game and Fish Department
  - Kevin Gelwicks and Anna Senecal
  - Fisheries Administrators

- The US Bureau of Reclamation

- HTI (Hydroacoustic Technology Inc.)
  - Patrick Nealson

- My predecessors
  - Dan Yule, Scott Gangl, and Andrew Dux