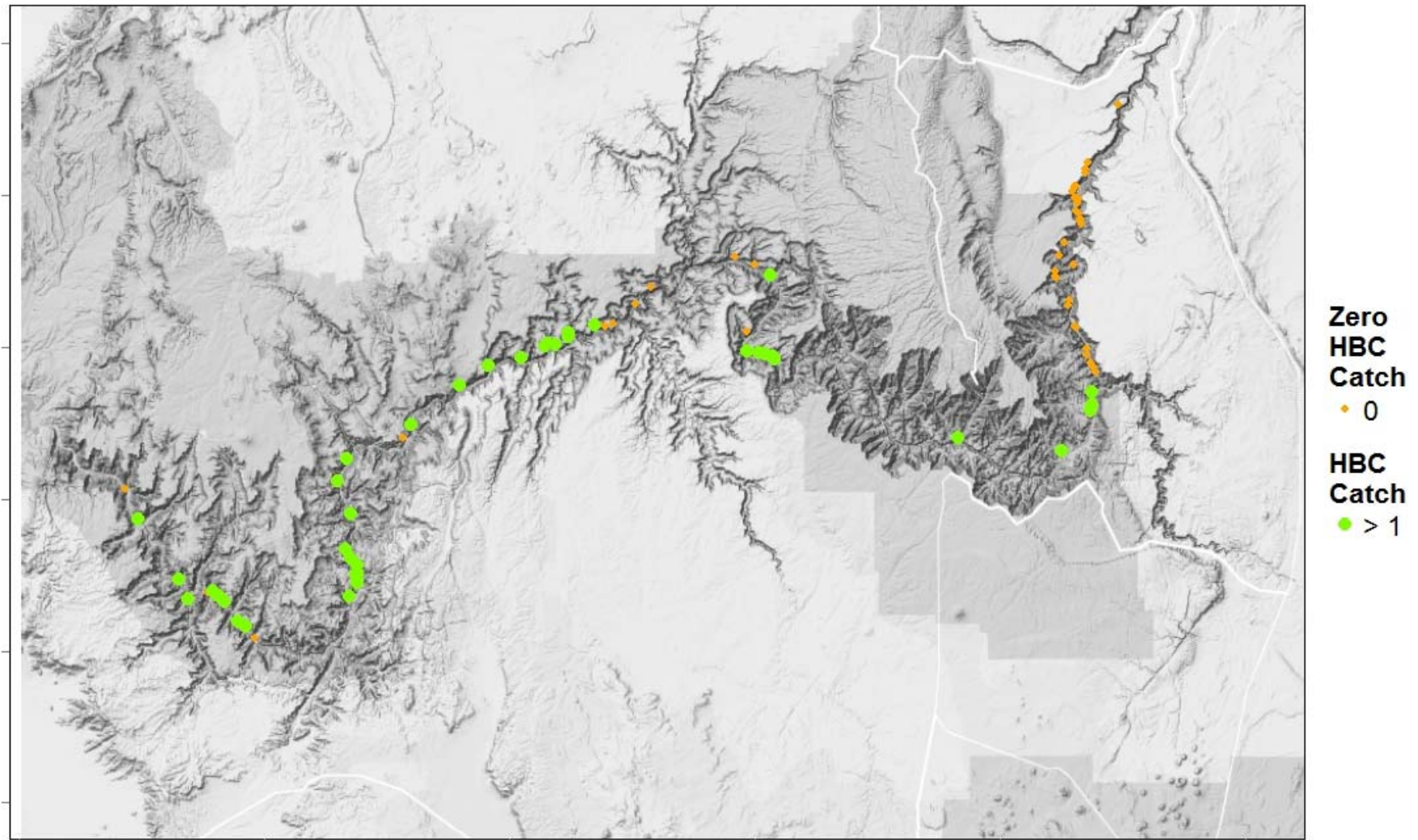
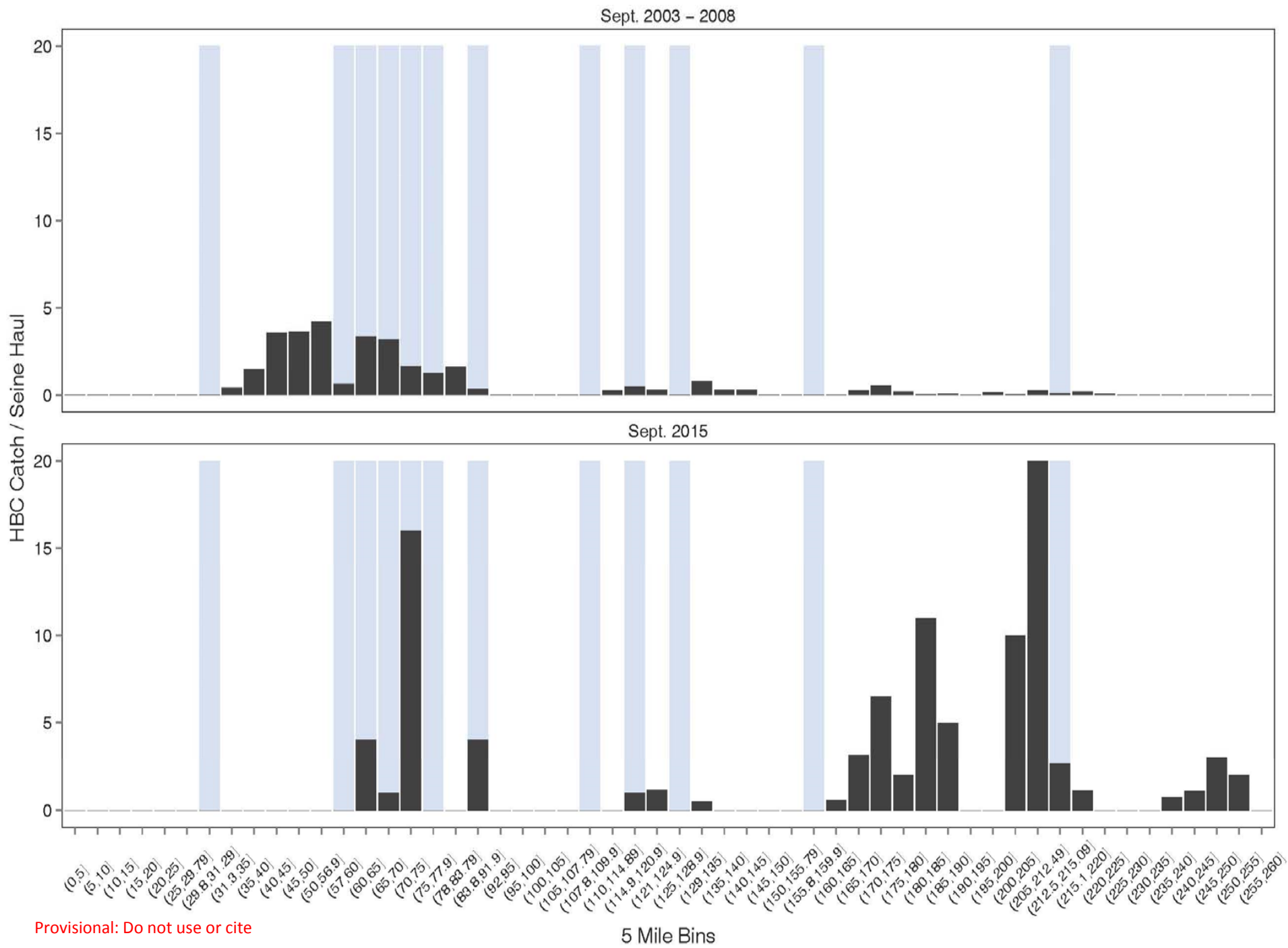




Spatial Look at Seining 2015 Results



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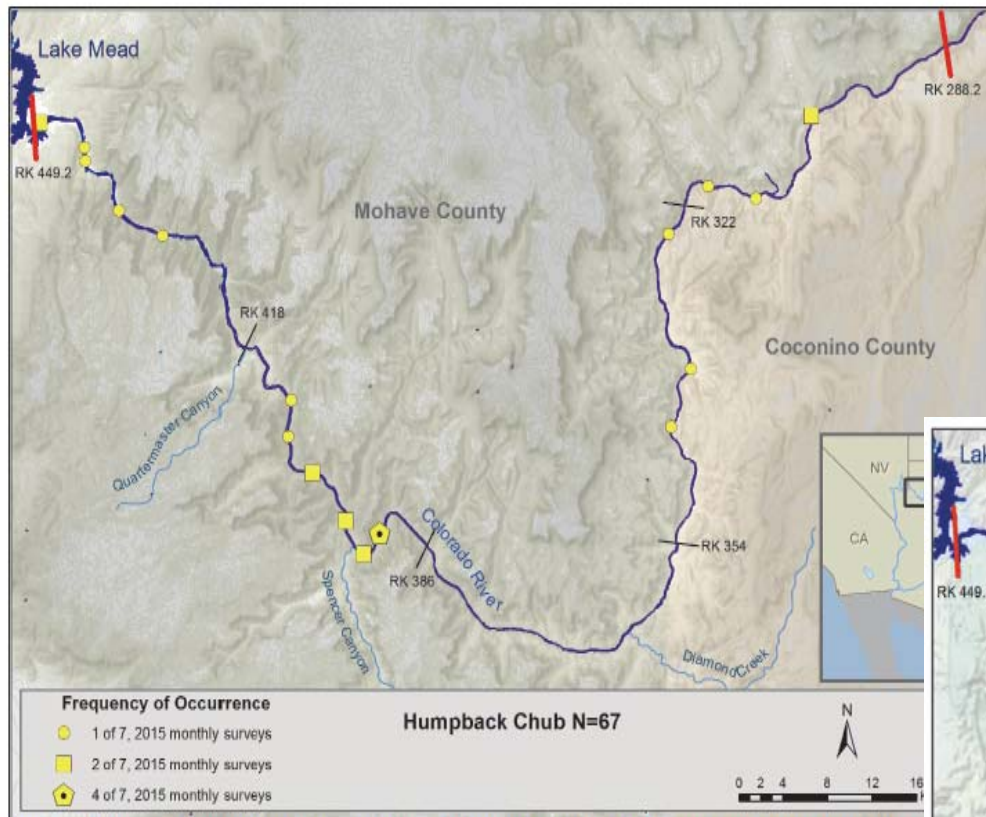


Figure 2.28. Frequency of occurrence of larval Humpback Chub at the generalized random tessellation stratified (GRTS) segments during the 2015 larval survey.

Albrecht et al. 2014;2015 (Bio West;
ASIR)

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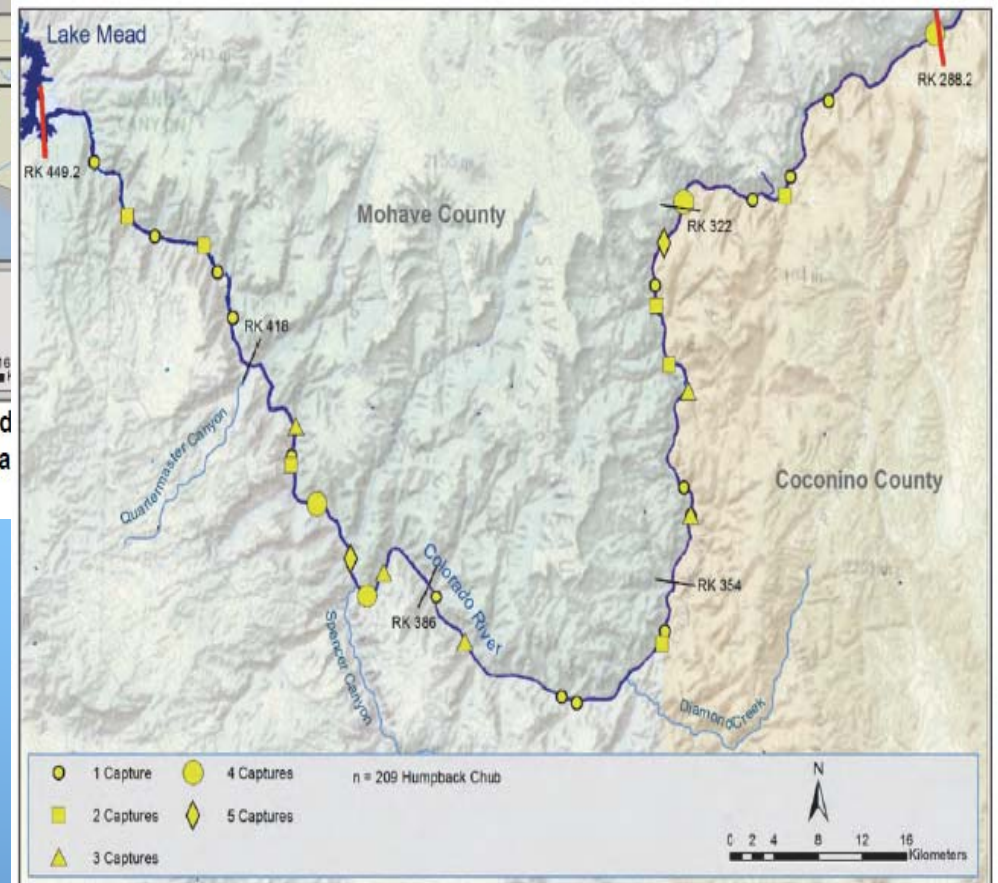


Figure 2.19. Frequency of occurrence of larval Humpback Chub (May–September) at the Generalized Random Tessellation Stratified (GRTS) segments during the 2014 larval fish survey.

Length Frequency-- HBC

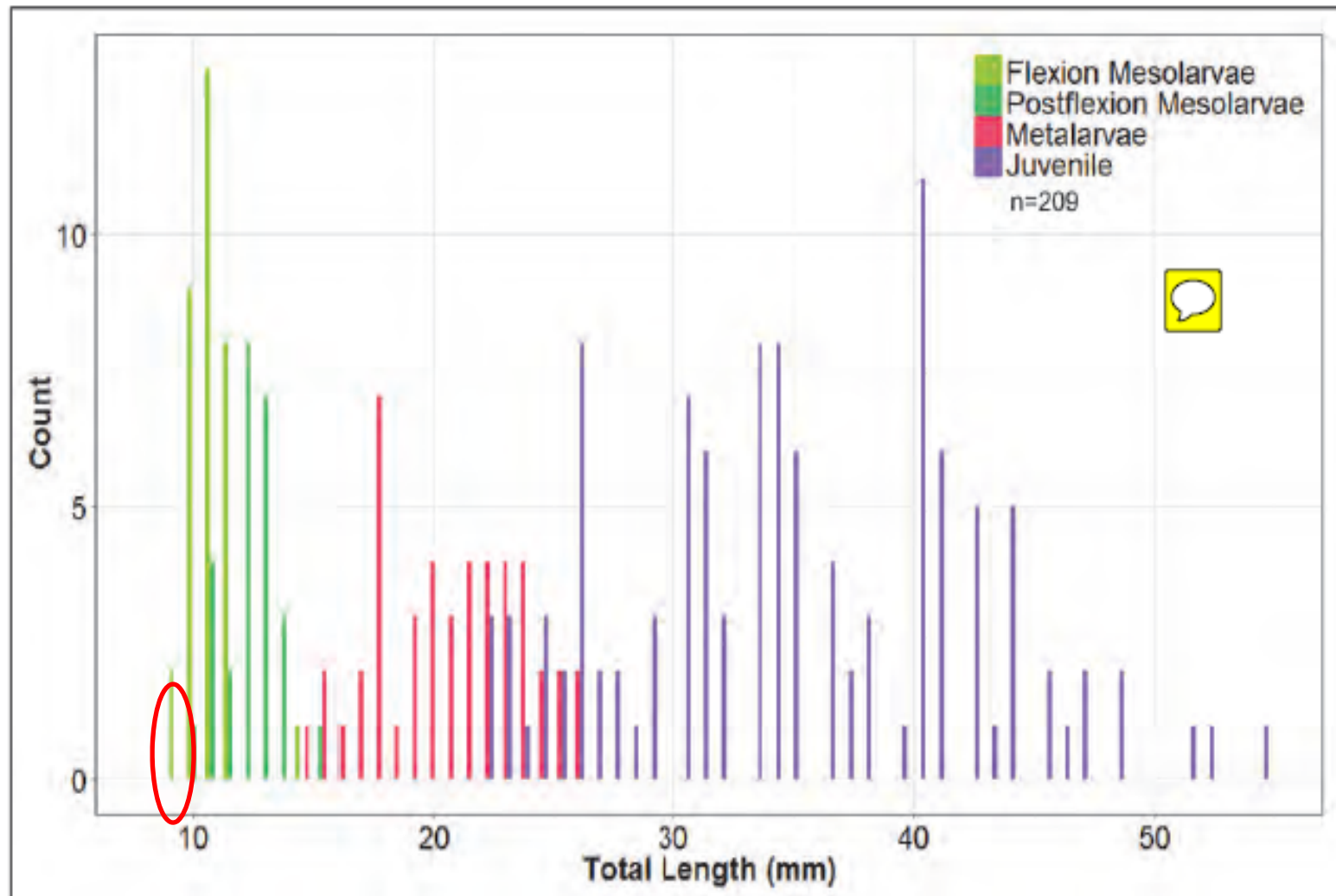


Figure 2.18. Histogram depicting the total length distribution by count of age-0 Humpback Chub captured during the 2014 larval fish survey.

How Old is a 9-10mm fish?

Uncertain, but here's a guess:

- Size at hatch – 6.7-7.4 mm; doubles in 21-28 days (conforms with Robinson and Childs 2001) (Hammond 1982)
- Growth 0.29mm/day Robinson and Childs (2001)
- Thus 9mm fish 5-8 days??
- 10mm fish 8-11 days??

What's happening?

- Hyp 1: Warm water (~ 2003 +) increased survival of young fish drifting/swimming out of LCR – Direct drift;
- Hyp 2: Warm water (~ 2003+) increased survival of young fish drifting/swimming out of LCR. Migration and Reproduction;
- Hyp 3: Warm water and low predator loads have facilitated spawning and initial survival at sites in W Grand Canyon – mainstem aggregations, Havasu, throughout W GC. Reproduction & Critical Mass
- Hyp 4: Combinations of above and ?

A few Questions--

- Where are fish originating/spawning taking place?
- Does this represent recruitment & population expansion or a population sink?
- Are mainstem HBC separate populations or a continuous population with variable densities?
- Are W GC fish genetically similar to LCR or are they differentiated (or bottlenecked)?
- Limiting factors for self-sustaining population?

What can we do to better understand these changes?

- Revisit use of otolith microchemistry to identify off-channel spawning;
- Use Judas Fish - Sonic tagged HBC released into W GC to determine habitat/geographic use/movement during spawning;
- Increase surveillance of younger fish via seining (planned for 2016);
- RBT NO-like effort?



Photo by D. Van Haverbeke