

Evaluation of humpback chub *Gila cypha* egg maturation using ultrasonic imaging and Ovaprim®

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Introduction

- Humpback chub were listed under the Endangered Species Act in 1973.
- Humpback chub are endemic to the Colorado River drainage and adapted to live in fast currents of warm, turbid water.
- Biologists have identified 9 aggregations of humpback chub in the main stem Colorado River downstream of Glen Canyon Dam.
- Little is known about their reproduction in the main stem Colorado River.
- Water temperatures may be too low for female fish to successfully produce eggs and spawn due to hypolimnetic water releases from Glen Canyon dam.
- Ultrasonic imaging is non-lethal and has been used to successfully determine sex and ovarian maturity of a variety of fishes.
- Ovaprim® is a synthetic hormone that induces spawning in ripe females.



Figure 1.— Female (top) and male (bottom) humpback chub captured in the Little Colorado River.

Objectives

- Evaluate use of ultrasonic imaging and Ovaprim® to identify egg development in female humpback chub.
- Document locations of female fish with developing eggs in the Colorado River in the Grand Canyon, especially the main stem.

Sample Locations

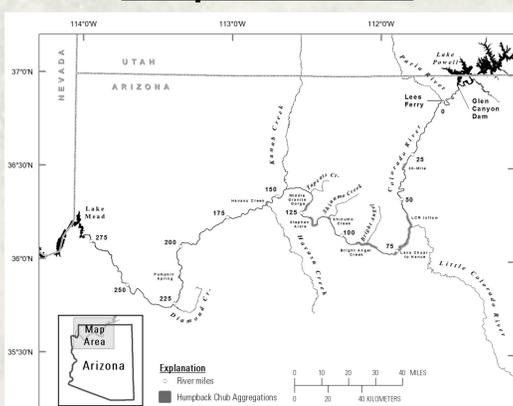


Figure 2.— Humpback chub were sampled in the main stem Colorado River, Little Colorado River, Havasu Creek, and Shinumo Creek. Map courtesy of Thomas Gushue, USGS.

Methods

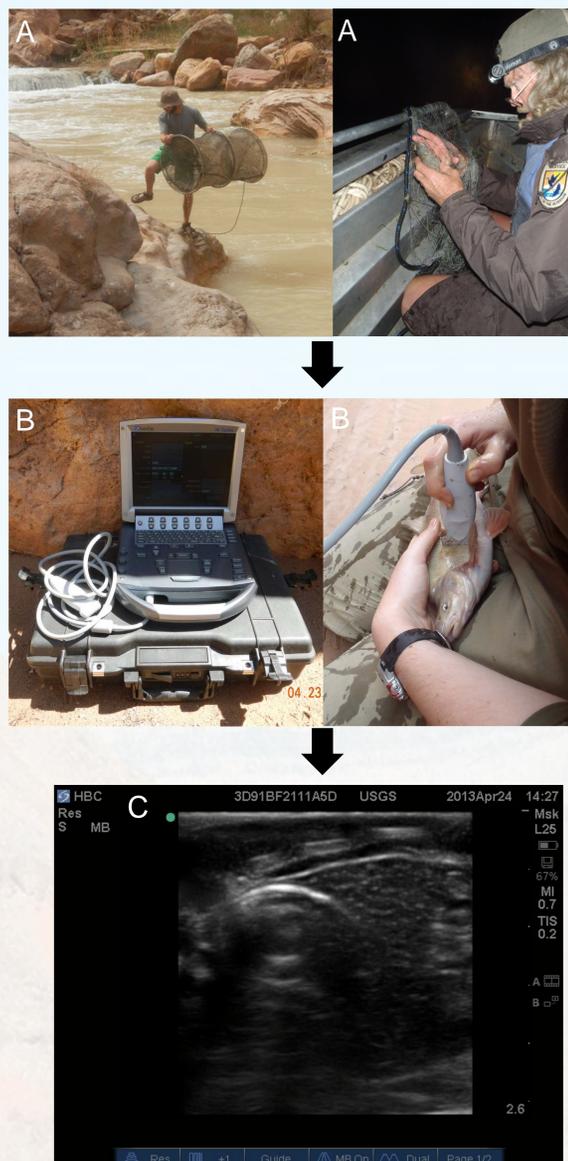


Figure 3.— Hoop nets and trammel nets were used to capture humpback chub (A). These fish were then scanned using ultrasound (B). Video clips and still images of each fish were collected (C).

Results

- Ultrasonic imaging was effective for identifying egg development in female humpback chub.
- For the first time, we documented egg development in humpback chub in the main stem Colorado River and Havasu Creek.



Figure 4.— Ultrasonic image of a female humpback chub captured in the main stem Colorado River. The red ellipse denotes eggs.

Results

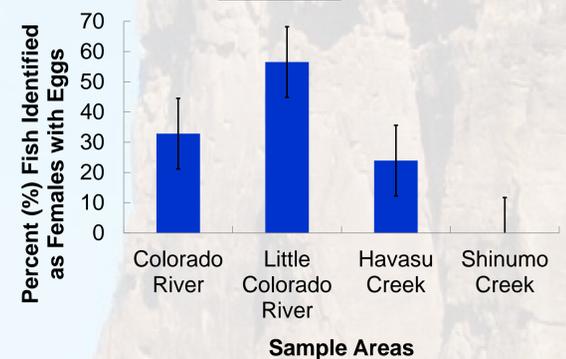


Figure 5.— The percent of fish identified using ultrasonic imaging as females with eggs varied between sample locations. Error bars represent standard error.

Discussion

- Egg development in female humpback chub varies in different sampling locations at different times of year, so repeated sampling is necessary.
- Time of year (i.e. water temperature, photoperiod, etc.) and differing ratios of male to female humpback chub could influence our results.

Future Project Sampling

- In 2014, the same sites in the Colorado River, Little Colorado River, Havasu Creek, and Shinumo Creek will be sampled at different times of the year.
- If permits are approved, a subset of identified female humpback chub will be injected with Ovaprim® and held for up to three days in a net pen to determine if they release eggs.
- If eggs are released, they will be held in the river or taken back to the lab to determine hatch rates.



Figure 6.— Humpback chub being scanned after capture in trammel nets.

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