Amphibian Conservation and Fisheries Management, the Role of Habitat

Taylor Cotten AZGFD
Non-Native Fish Introductions and the Decline of the Mountain Yellow-Legged Frog from within Protected Areas

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THE EFFECTS OF PREDATORY FISH ON AMPHIBIAN SPECIES RICHNESS AND DISTRIBUTION

Stephen J. Heanar* & Robert T. M’Closkey

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Predation by Introduced Fishes on Endangered Humpback Chub and Other Native Species in the Little Colorado River, Arizona

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Center for Environmental Studies and Department of Zoology, Arizona State University
Tempe, Arizona 85287-3211, USA

Michael E. Douglas
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Tempe, Arizona 85287-1501, USA

Predation by Nonnative Fish on Native Fishes in the San Juan River, New Mexico and Utah

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Albuquerque NM 87131
Present address of KBG: Department of Zoology, University of Oklahoma, Norman, OK 73019
Problem:
Maintain and manage fisheries without undermining amphibian conservation.
Lower Colorado River Amphibian Distribution and Habitat Use Study

- Two MSCP candidate species

- Determine current distribution along the LCR and quantify habitat characteristics where individuals are found.
Study Organism

- *Lithobates yavapaiensis*  
  (Lowland Leopard Frog)
- Spring Breeder
- Variety of habitats with semi-permanent water
- Do well with periodic flooding
Background

- Lowland Leopard
  Frogs not observed on main channel of the LCR since 1974
- Lack of formal surveys and coordinated search effort
- Thought to be extirpated from the Colorado River
Survey Methods
Three techniques:

- Spotlighting and visual surveys
- Auditory surveys
- Dip net and funnel traps targeting tadpoles and aquatic predators
Quantifying Habitat

- Within three days of a sighting quantify ten meter radius around observation point and at least one non-site

- Water characteristics

- Vegetation composition and density line intercept
Results

- Over 200 hours of nocturnal surveys conducted
- Funnel trap clusters were deployed at over 180 different locations, and logged over 90,000 trap hours
- Healthy populations of *L. yavapaiensis* persist on Planet Ranch and the upper section of the Bill Williams River.
## Results Continued…

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Why the upper Bill Williams River?
Table 6. Model averaged estimates and standard errors for parameters included in logistic regression combined local models.

<table>
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<tr>
<th>Parameter</th>
<th>Unconditional Parameter Estimate</th>
<th>Unconditional Standard Error</th>
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<tr>
<td>Maximum.Depth</td>
<td>-0.0978</td>
<td>0.0415</td>
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<tr>
<td>Minimum.Depth</td>
<td>-0.3492</td>
<td>0.2337</td>
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<td>Em</td>
<td>-0.0776</td>
<td>0.0337</td>
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<td>Grass</td>
<td>-0.0590</td>
<td>0.0526</td>
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<td>Cambarids</td>
<td>-0.7232</td>
<td>1.5464</td>
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Table 11. Parameter Estimates, Standard Error, and intercept for the most well supported regional combined model

**Model #50**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Standard Error</th>
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<tr>
<td>Maximum.Depth</td>
<td>-0.1041</td>
<td>0.04025</td>
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<td>Discharge</td>
<td>-1.08458</td>
<td>0.64609</td>
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<td>0.71265</td>
<td>0.41603</td>
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<td>Open.Terr.</td>
<td>0.02346</td>
<td>0.03084</td>
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Habitat!

- Braided side channels with shallow water
- Mixed vegetation
- Open areas, relatively less invasive plant species
- Beaver activity and periodic flooding...
Other surprises?
Similar findings in recent literature

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The effect of fish and aquatic habitat complexity on amphibians

Tibor Hartel · Szilárd Nemes · Dan Cogălniceanu · Kinga Öllerer · Oliver Schweiger · Cosmin-Ioan Moga · László Demeter

Habitat Structural Complexity and the Interaction Between Bluegills and Their Prey

Larry B. Crowder; William E. Cooper

Conclusions

- Amphibian populations can persist in the presence of introduced fish predators as a result of specific habitat characteristics.

- Management efforts for amphibians should consider habitat quality as well as introduced predators.

- Implications for native fish restoration?
Questions

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Jonathon Miller AZGFD
Mike Ingraldi AZGFD
David Grandmaison USFS
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