

Rana onca Monitoring and Management

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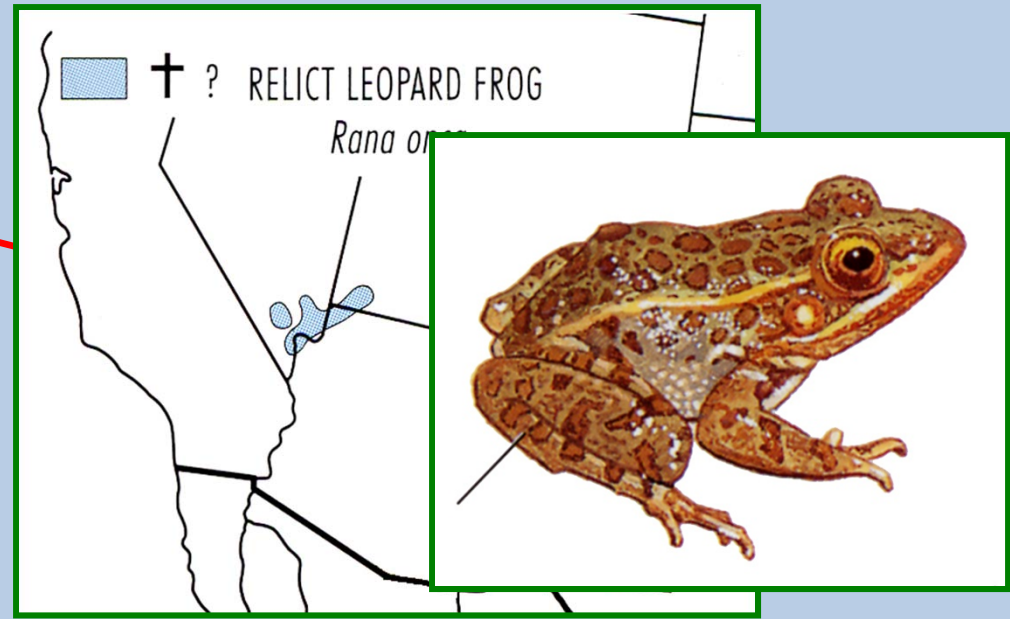


CRTR Meeting, 25 January 2011

Background

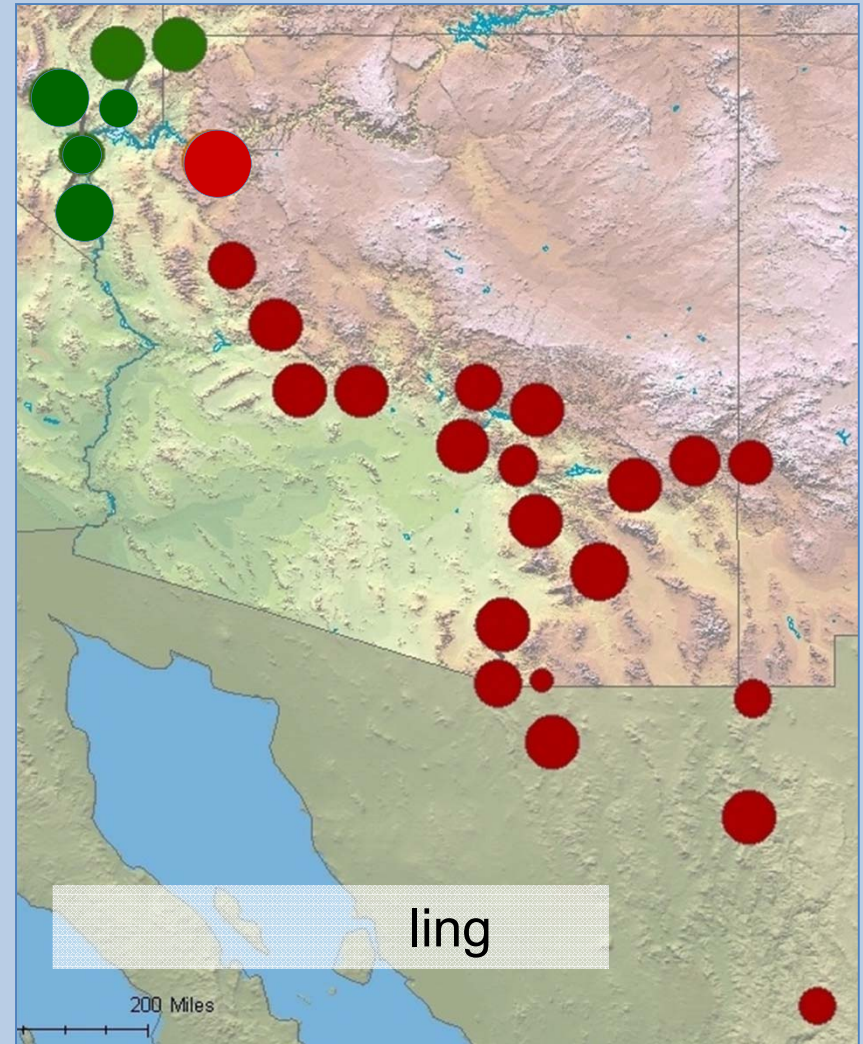
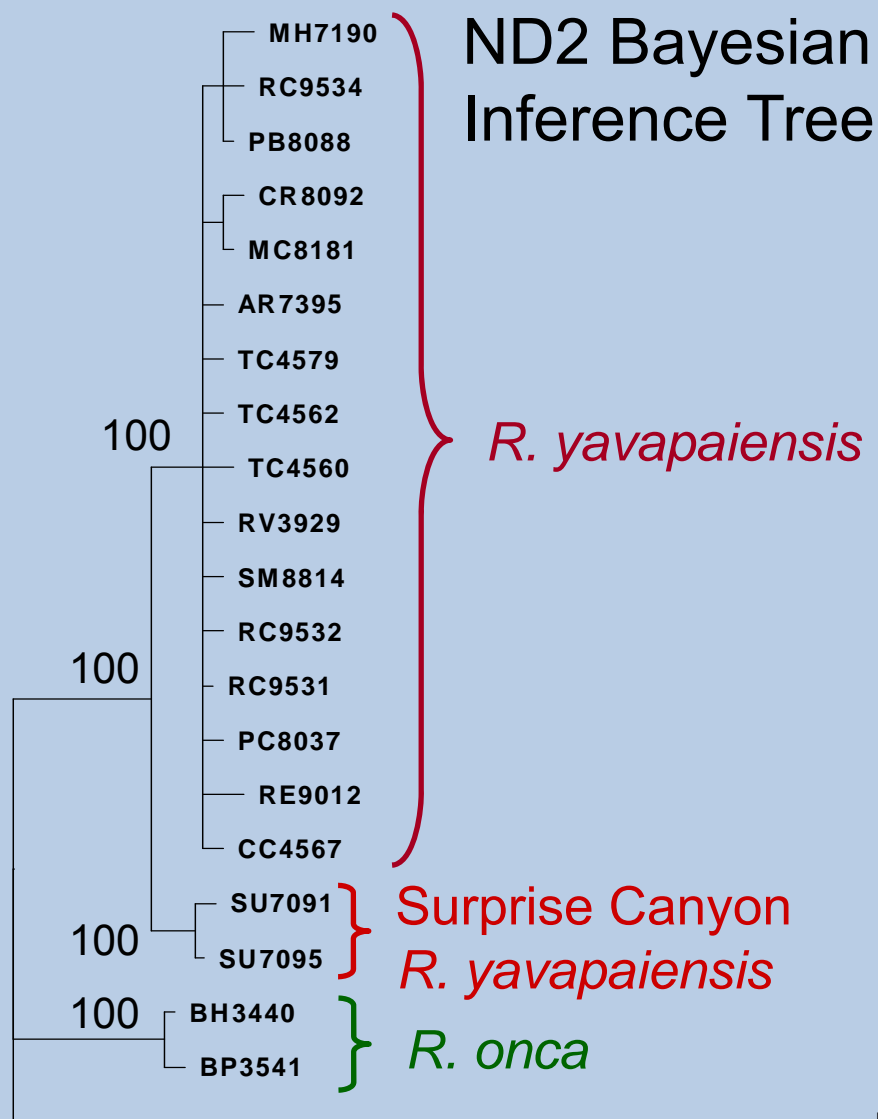
Vegas Valley
Leopard Frog
Rana fisheri

Strong genetic evidence
that this frog was not
R. onca or *R. yavapaiensis*
(manuscript in review)



Drawings and Maps from Stebbins 2003

Background



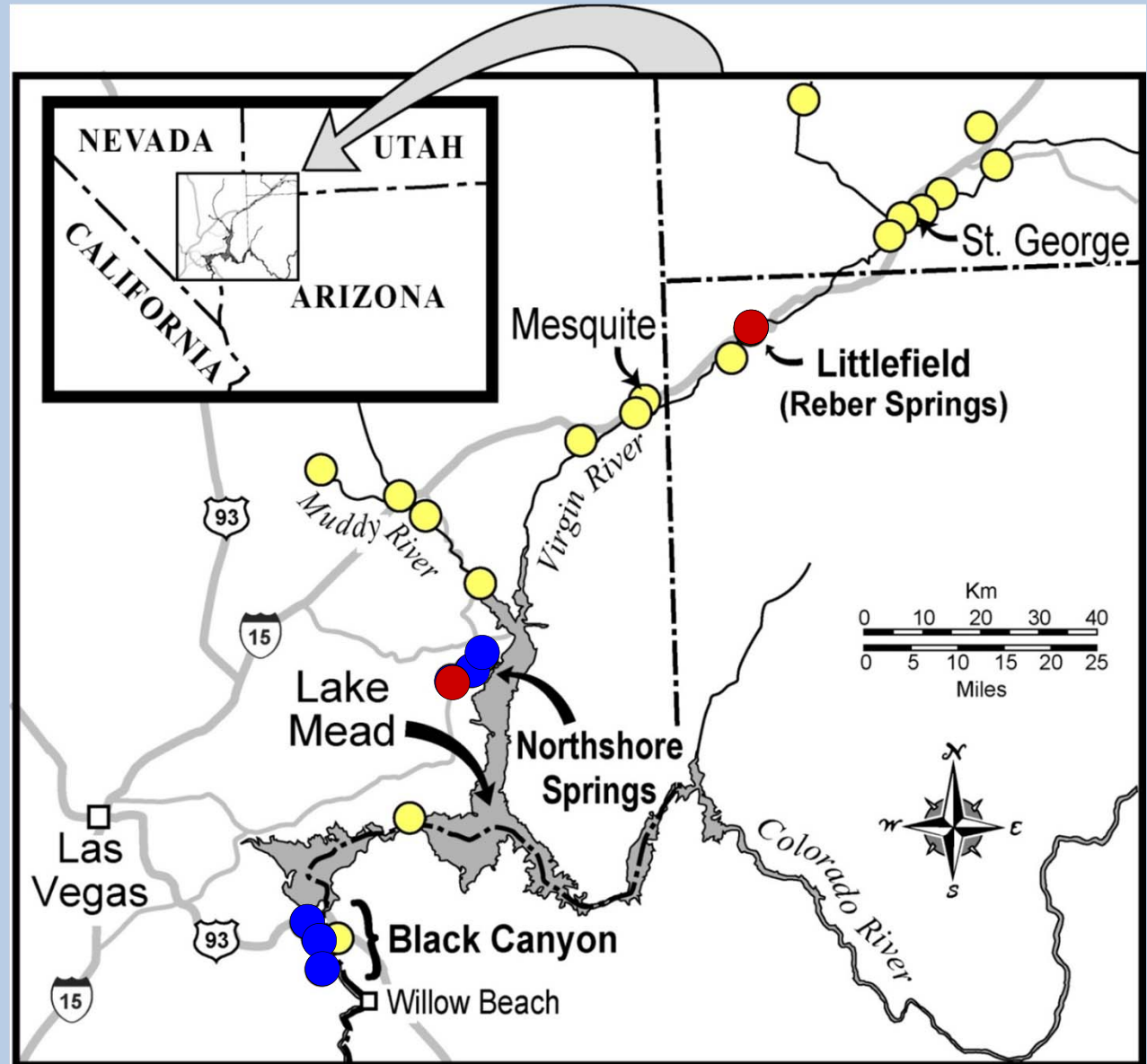
Hemmings et al. 2010

Background

Petitioned for listing under ESA in 2002

~1100 Frogs

Minimum Historical Locations



Bradford, Jaeger, & Jennings 2004

Background

Voluntary CAS signed in 2005

- Monitor populations
- Establish additional populations in existing or created habitat
- Enhance or create habitat
- Manage populations and habitats to promote sustainability
- Investigate species biology and apply findings to management

CONSERVATION AGREEMENT AND
RANGEWIDE CONSERVATION ASSESSMENT AND
STRATEGY FOR THE RELICT LEOPARD FROG (*RANA ONCA*)



FINAL

Prepared by the Relict Leopard Frog Conservation Team

July 2005

Threats

“Two recent population extinctions occurred concomitantly with encroachment of emergent vegetation into pools.”

Bradford, Jaeger & Jennings 2004

“Observations suggest that adults prefer relatively open shorelines where dense vegetation does not dominate.”

Bradford, Jennings and Jaeger 2005

Habitat selection based on radio-telemetry indicates that these frogs prefer more vegetatively open areas.

Harris & Jaeger 2006, unpublished



Burro (and cattle) grazing has been essentially eliminated in the Northshore area in recent years.



Grazed area once favored by frogs at Blue Point Spring, August 2004



Same area, August 2010



abandoned the

Same area during rehab effort in Oct 2010

Photo: Mark Slaughter, BLM

Photo: Joe Barnes



Rehabbing fish-free pond at Blue Point Spring, Jan 2011

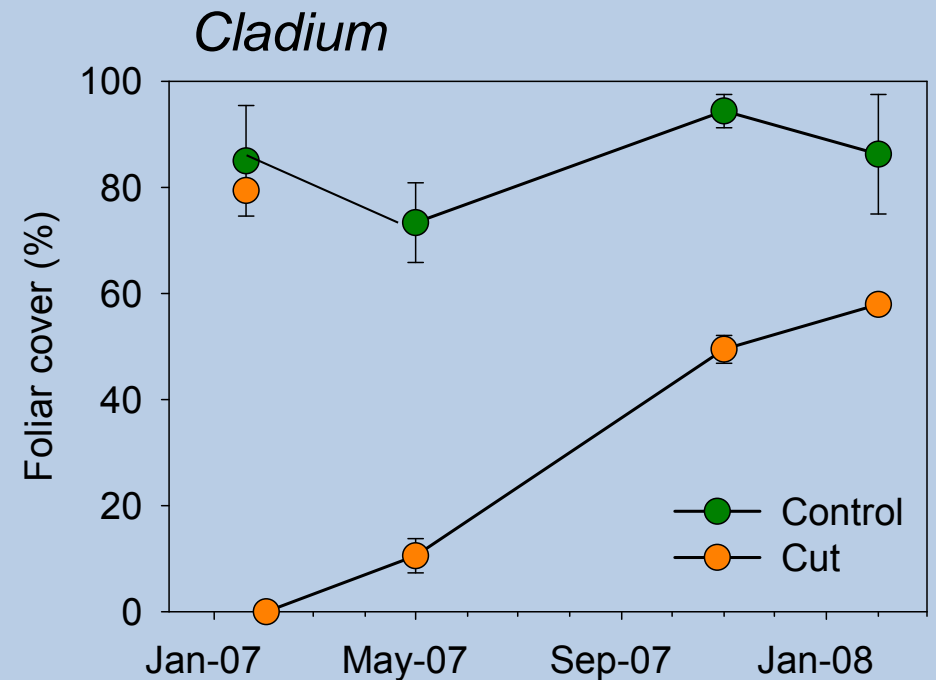
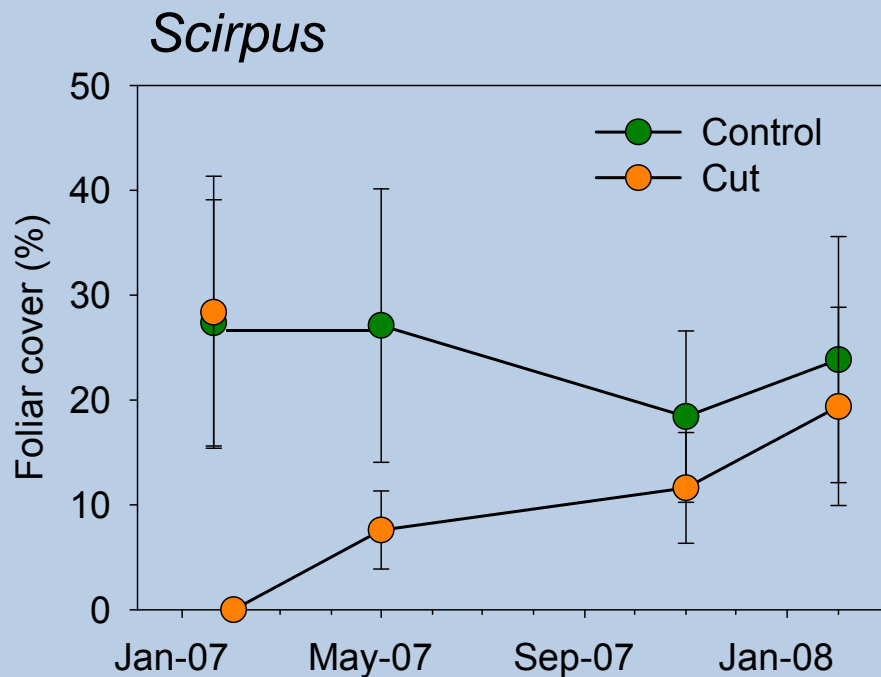


Rehabbing breeding pools at Pupfish Refuge Spring, Nov 2010

Vegetation Responses to Treatments

Jaeger, Graham, & Engel 2009, Unpublished

- *Eleocharis* & *Scirpus* dominated vegetation returned to pre-cut conditions < one-year
- *Cladium* (sawgrass) slower to re-establish < two-years
- Plant species richness and composition unresponsive*



Example Data...All values \pm 1 S.E.

Threats

Introduced Predator
and Competitors

“Unholy Trinity”



Convict cichlid photo: aquariumdomain.com



Some efforts at Blue Point Spring to create experimental fish-free breeding pools and channels...



Blue Point Spring, Jan 2011



Fish-free pond, March 2008, just after veg cutting and filling

Threats

Stochastic Events

Debris flows from storm
in Black Canyon,
October 2006



Willow Beach Oct. 14, 2006

Photo: NPS

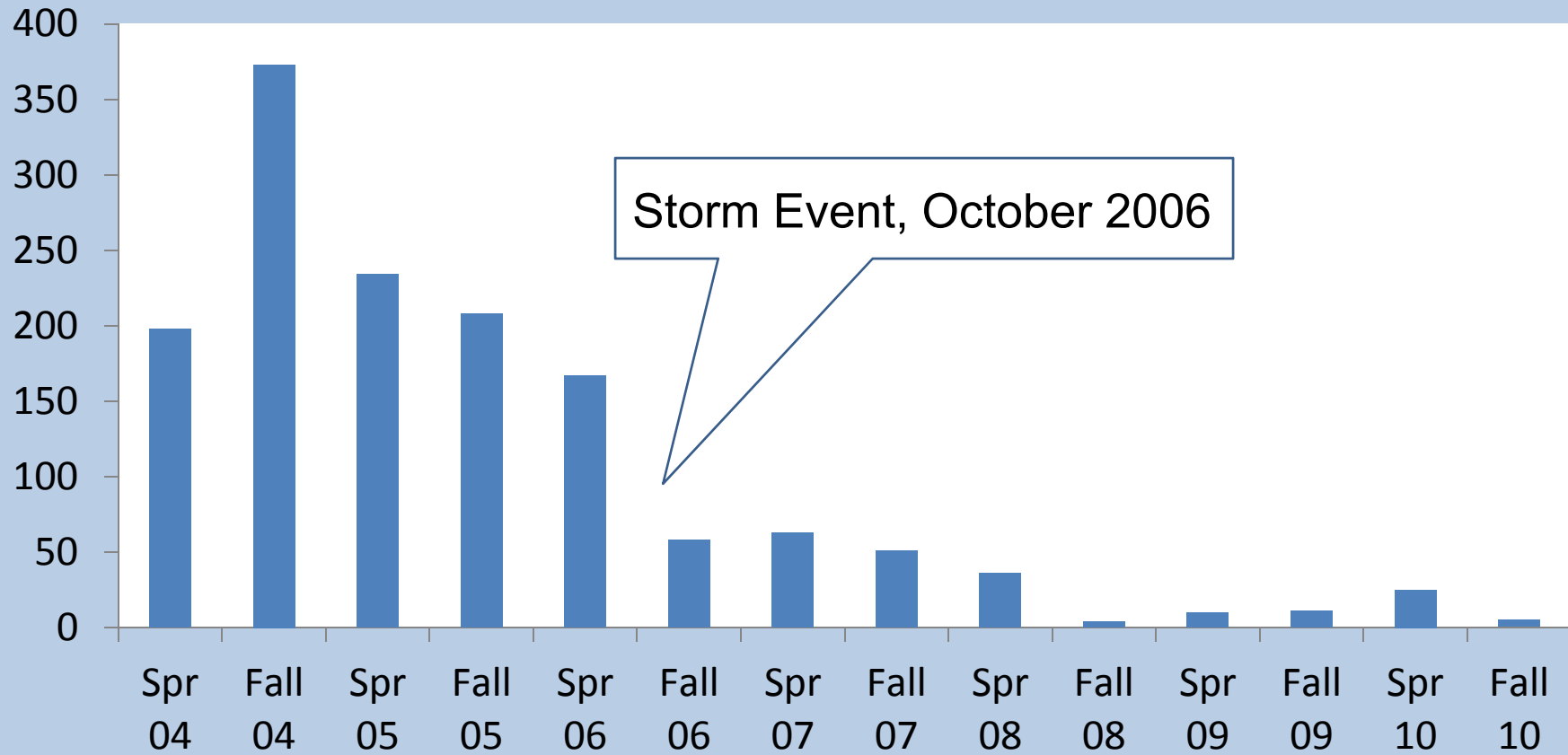
Bighorn Sheep Spring



Fall 2006, after the storm

In the early 2000s, more than half of all *R. onca* occurred at this site (Bradford, Jaeger & Jennings 2004)

Frogs Counted During Nocturnal VES at Bighorn Sheep Spring





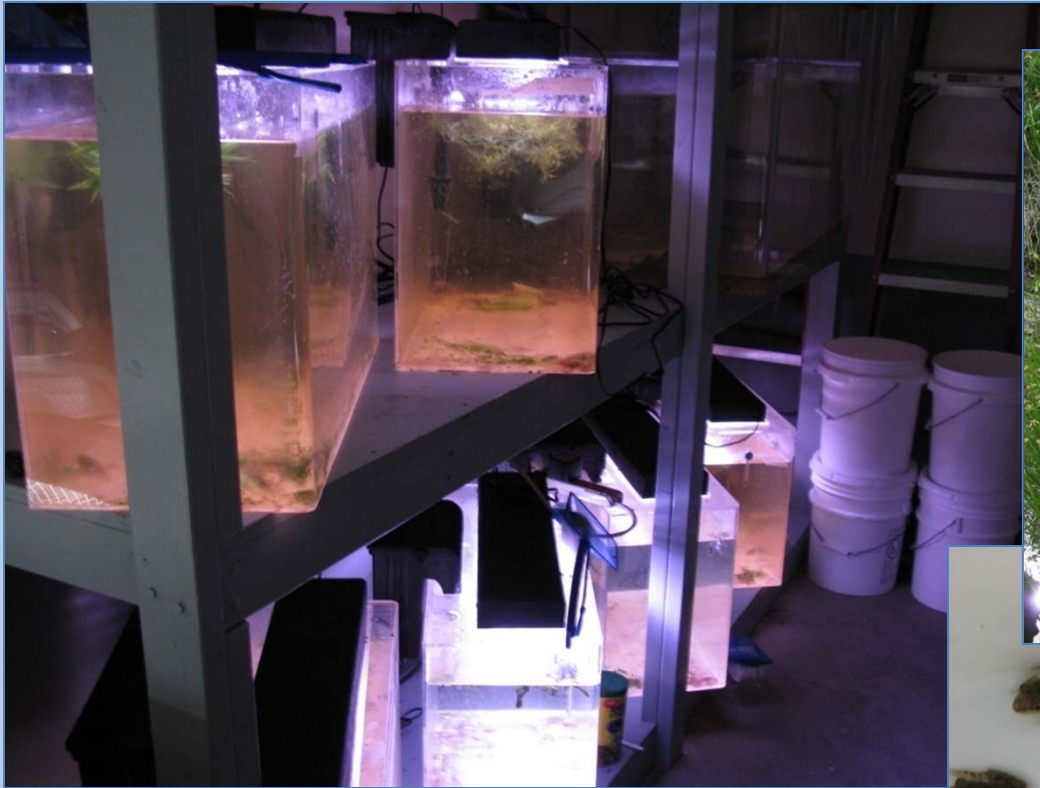
Historical Photo: NPS website



Hossain, 2010. On the empirical relationship between large dams and the alteration in extreme precipitation

Natural Hazards Review

Headstarting, Translocations & Augmentations



Lake Mead 'Frog Lab', 2008

Also raceways at Willow Beach
National Fish Hatchery, and
Lake Mead State Fish Hatchery

Headstarting, Translocations & Augmentations

Year	Frogs Released	Tadpoles Released	Totals
2003	195	0	195
2004	521	1784	2305
2005	261	963	1224
2006	230	1787	2017
2007	592	1365	1957
2008	389	528	917
2009	438	848	1286
2010	30	1236	1266
Grand Totals	2,656	8,511	11,167



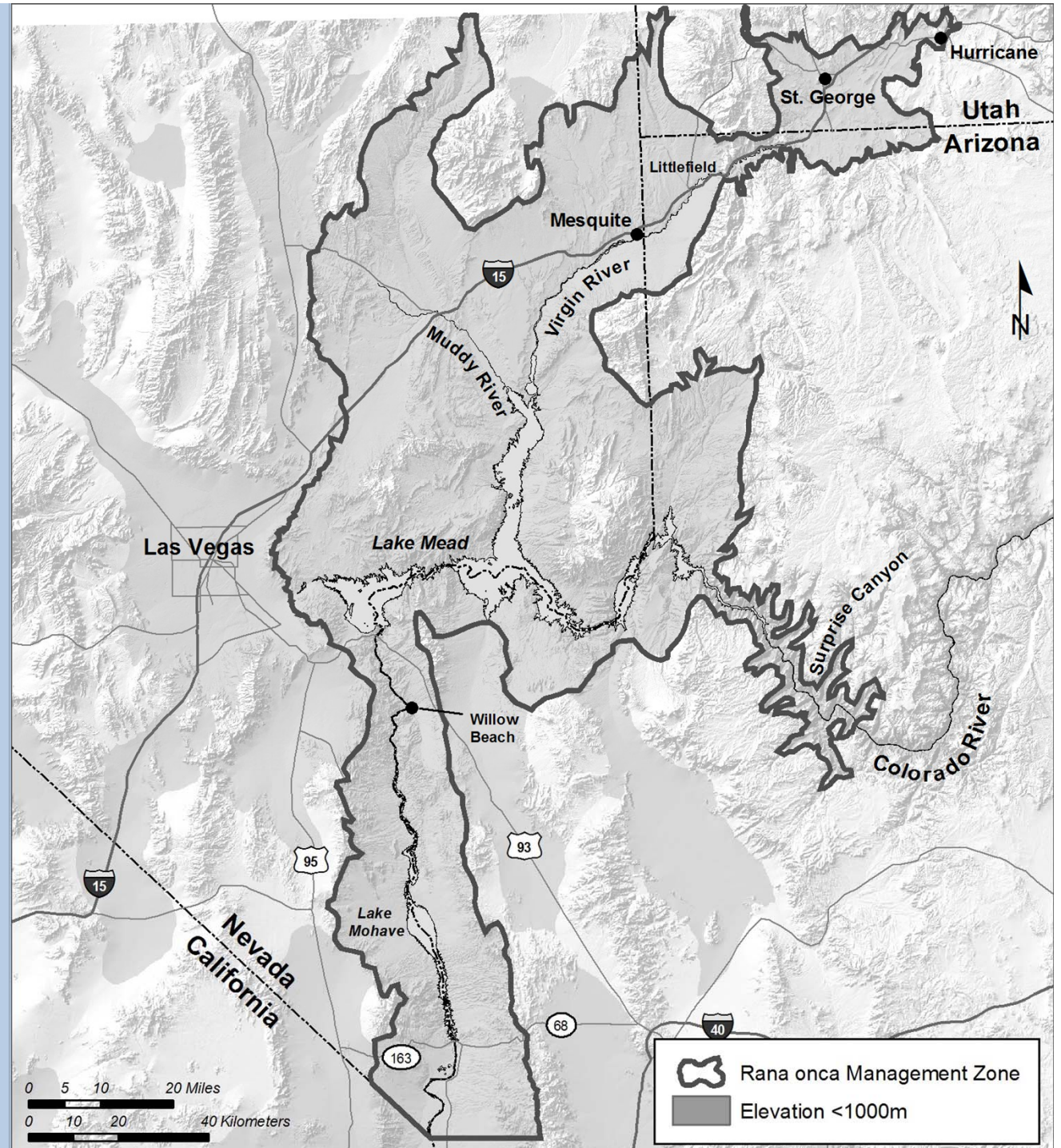
Translocated to 9 experimental sites or returned to augment Blue Point and Rogers springs

Current Status As of 2010

- ~ 6 Natural Sites
- 9 Experimental Sites...7 Extant

**Critical need
for more sites!**

- Jaeger & Drost 2010, Unpublished



Perkins Pond – Latest experimental site

- 372 tadpoles released in May 2010
- 17 adults counted during Fall 2010 survey

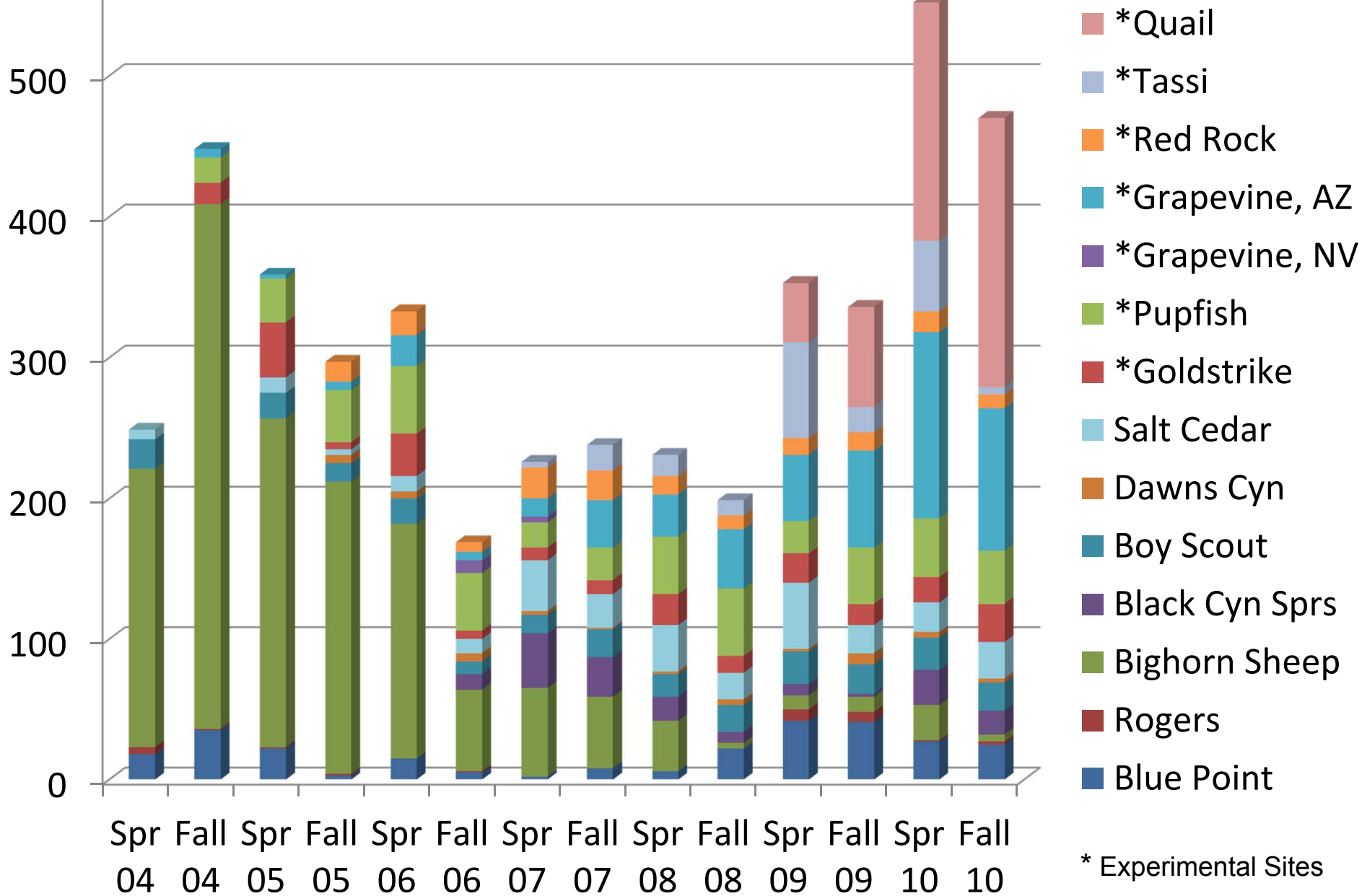


March 2008



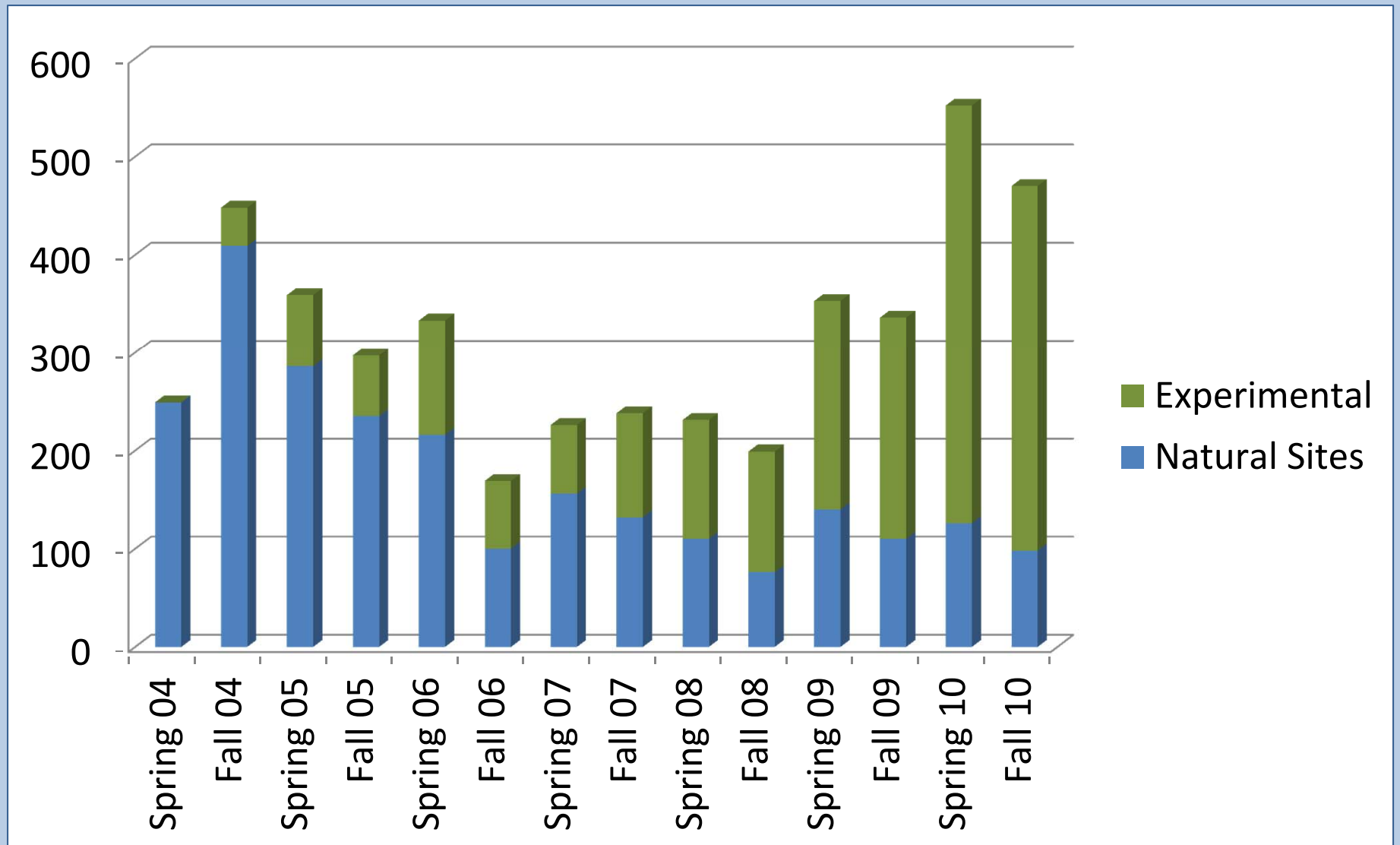
Bullfrog exclusion fence March 2010

VES results for adult & juvenile frogs by site



* Experimental Sites

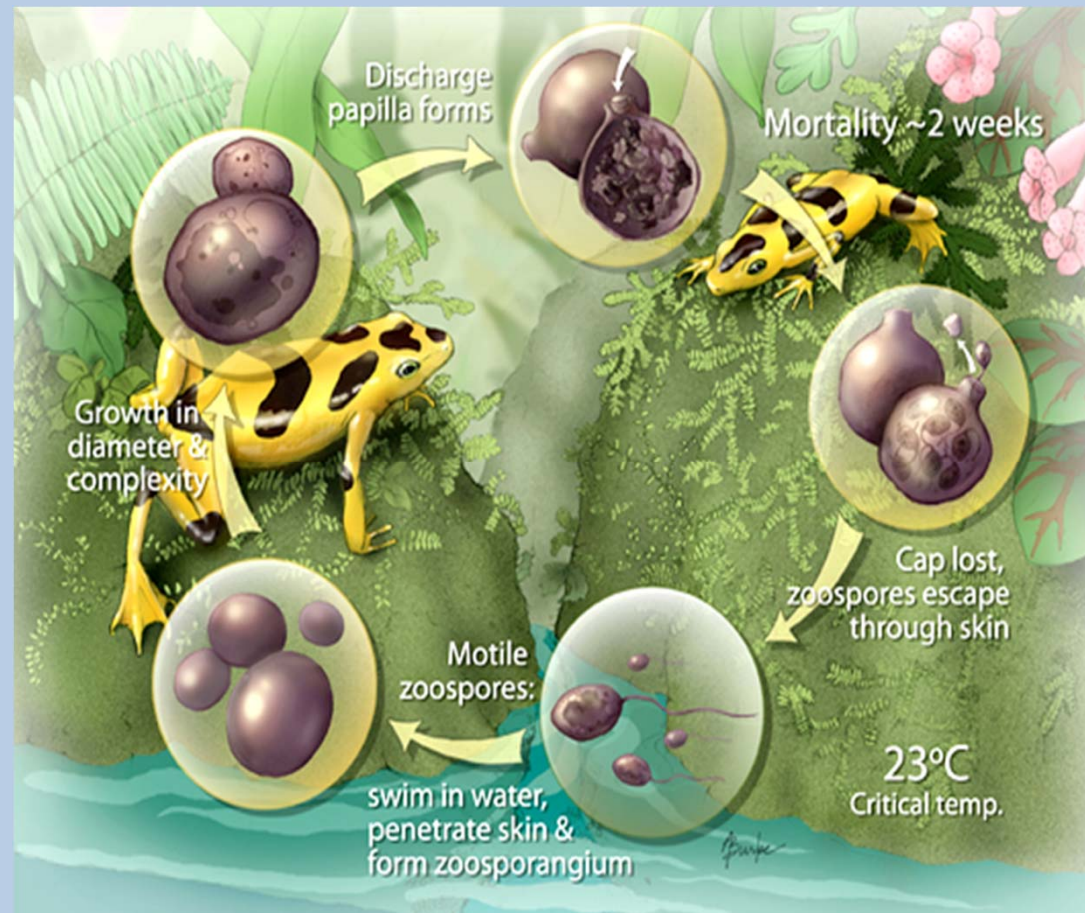
VES results for adult & juvenile frogs



Threats

Emergent Disease

Chytridiomycosis: potentially fatal disease caused by pathogenic fungus *Batrachochytrium dendrobatidis* (*Bd*)



Threats

Emergent Disease

- Lab studies: *Bd* grows and reproduces at temps from 4 – 25°C; most virulent at temps $\leq 23^\circ\text{C}$
- Pathogenicity and virulence significantly declines $> 27^\circ\text{C}$

E.g. Piotrowski et al. 2004

- Field studies: significant negative correlation between *Bd* and water temp
- At *R. yavapaiensis* sites with high *Bd* prevalence, infection rates were extremely low in water $> 25^\circ\text{C}$

Forrest and Schlaepfer, in review

Threats

Emergent Disease

- Thermal springs appear to provide important habitat where amphibians can persist despite the presence of *Bd*

Forrest and Schlaepfer, in review

- *R. onca* now only occurs naturally in thermal springs, all with source temperatures $> 30^{\circ}\text{C}$

Testing for *Bd*

- To date, 99 adult anurans from 9 natural and experimental *R. onca* sites have been tested for *Bd*
(not all these samples were collected with precise water temps)
- Four *R. onca* from Blue Point have tested *Bd*⁺
- These *Bd*⁺ frogs were found downstream from the geothermal source, and 2 of these frogs were at the lowest specific water temps recorded (17.7°C)



'Headstarted' Frog at Perkins Pond

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Acknowledgments

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Photo credits:
mostly Jef Jaeger



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...and many others...