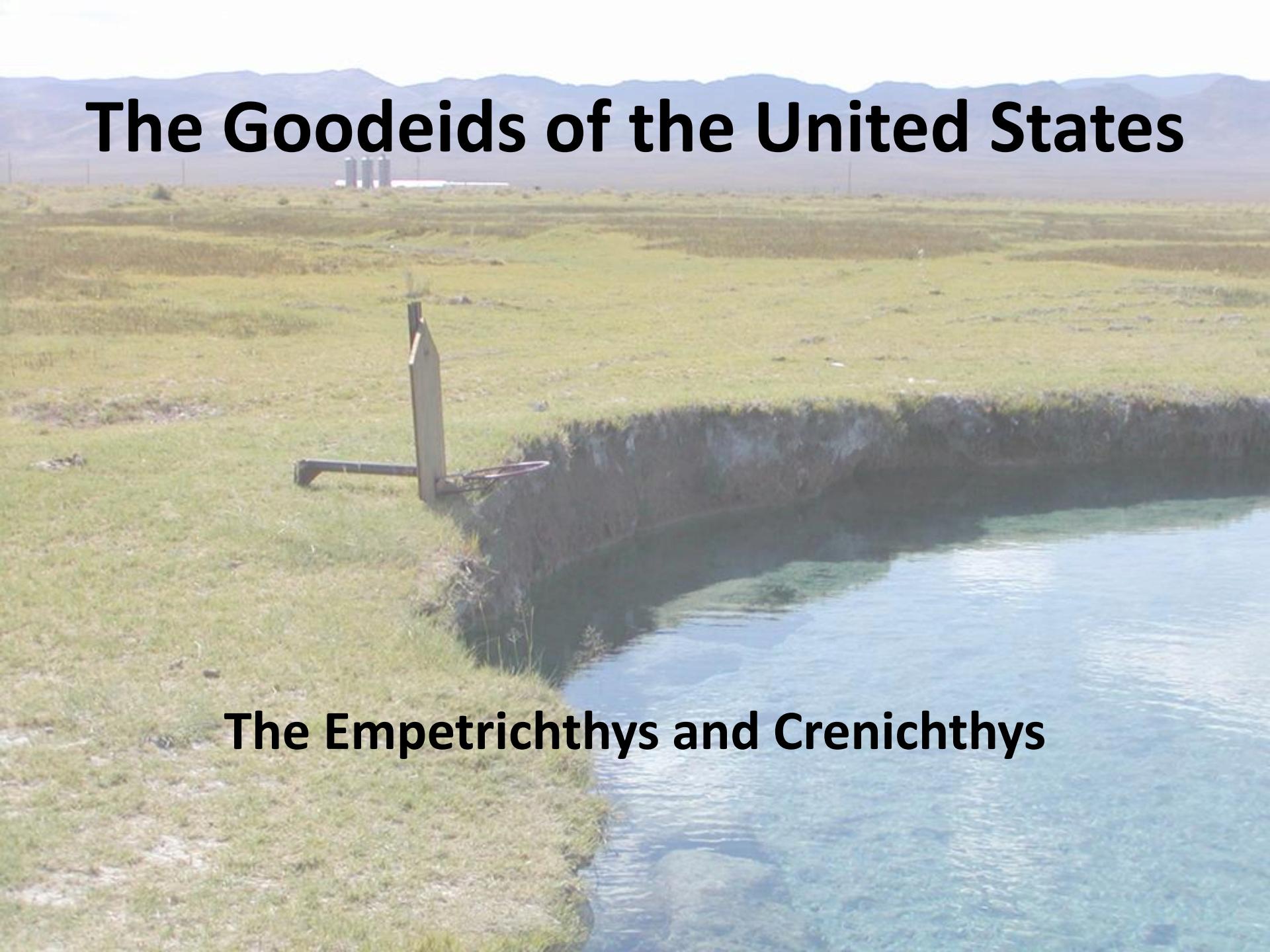


# The Goodeids of the United States



The Empetrichthys and Crenichthys

# Similarities

- Global problems
- Similarities in Management
- Communication



## CONSERVACIÓN DE STOCKS GENÉTICO DE *Aphanianus iberus* (MURCIA)

LIFE04/NAT/ES/000035



### CURSOS LIFE-FARTET FASE DIVULGACIÓN



Región de Murcia  
Consejería de Industria y Medio Ambiente  
Dirección General del Medio Natural



Museo de la Ciencia y el Agua 09/28/2012

- **Crenichthys – Springfish**

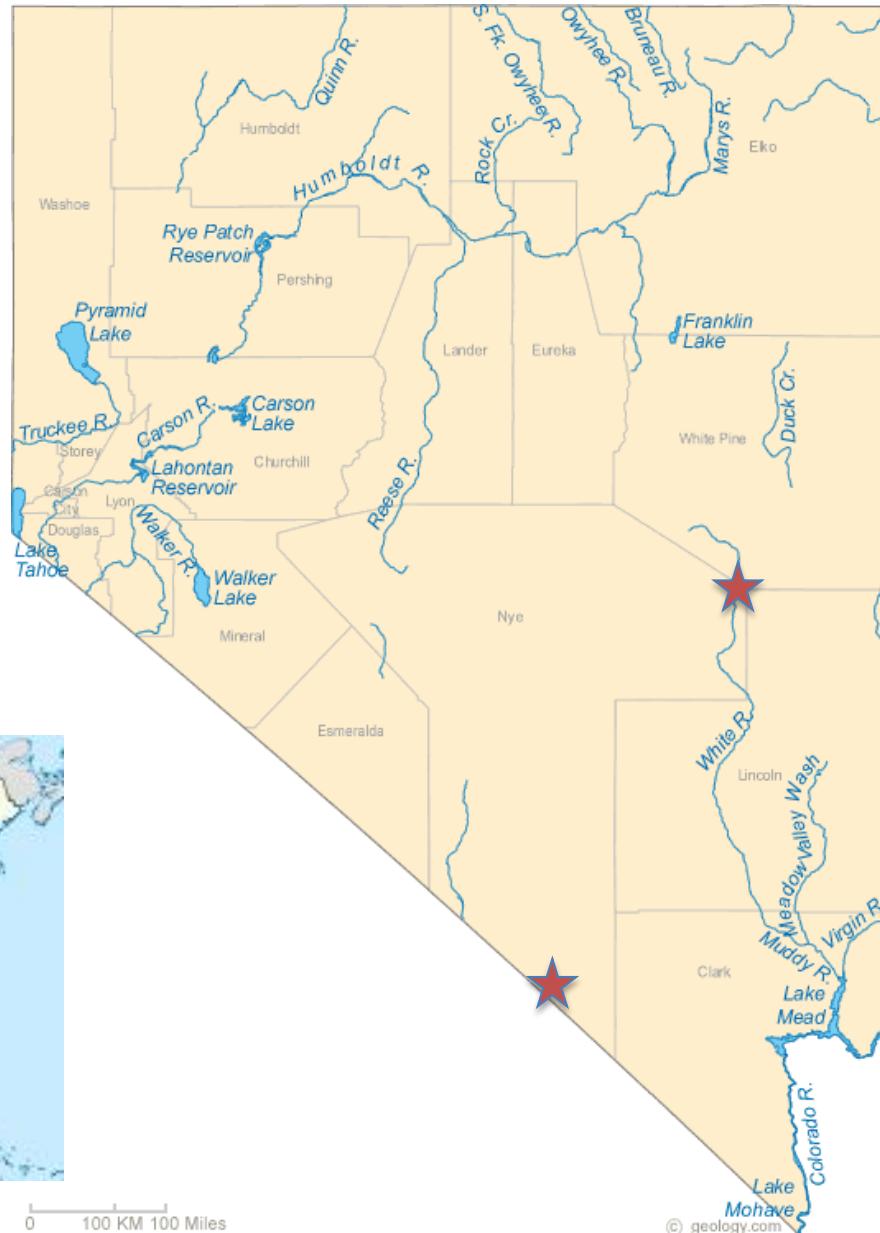


- **Empetrichthys - Poolfish**



# Nevada Rivers

- ~500 Km wide



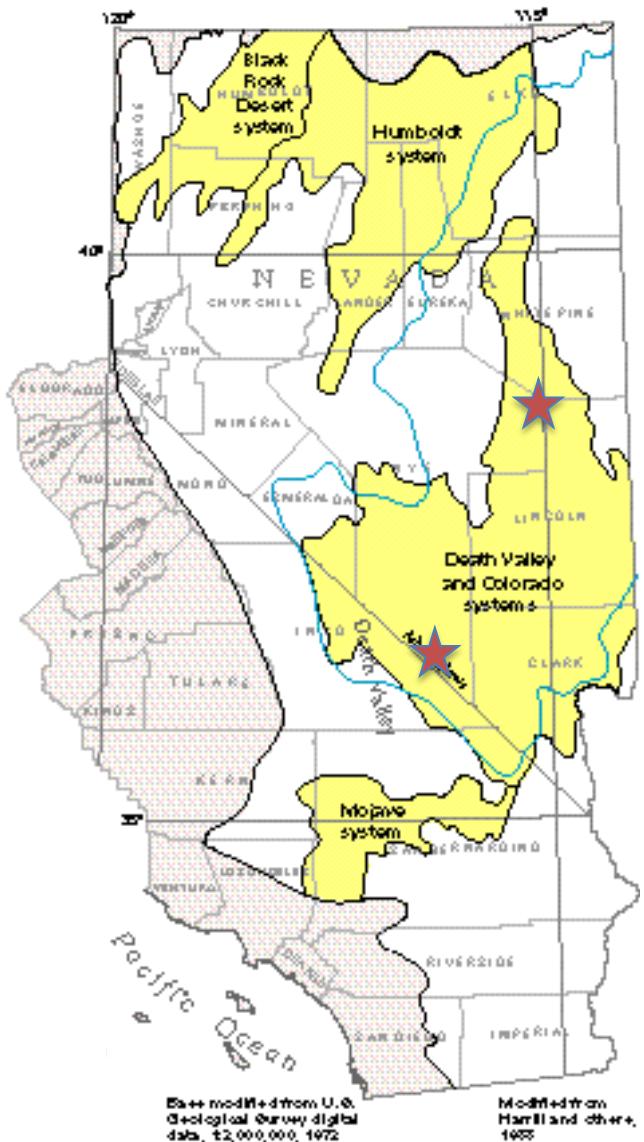
0 100 KM 100 Miles

© geology.com

# Extensive Carbonate Aquifer



Photo: USGS-BRD



Base modified from U.S.  
Geological Survey digital  
data, 1:2,000,000, 1972

Modified from  
Hamill and others,  
1988

# Drying and divergence

- Pleistocene lakes and tectonics
- Desertification

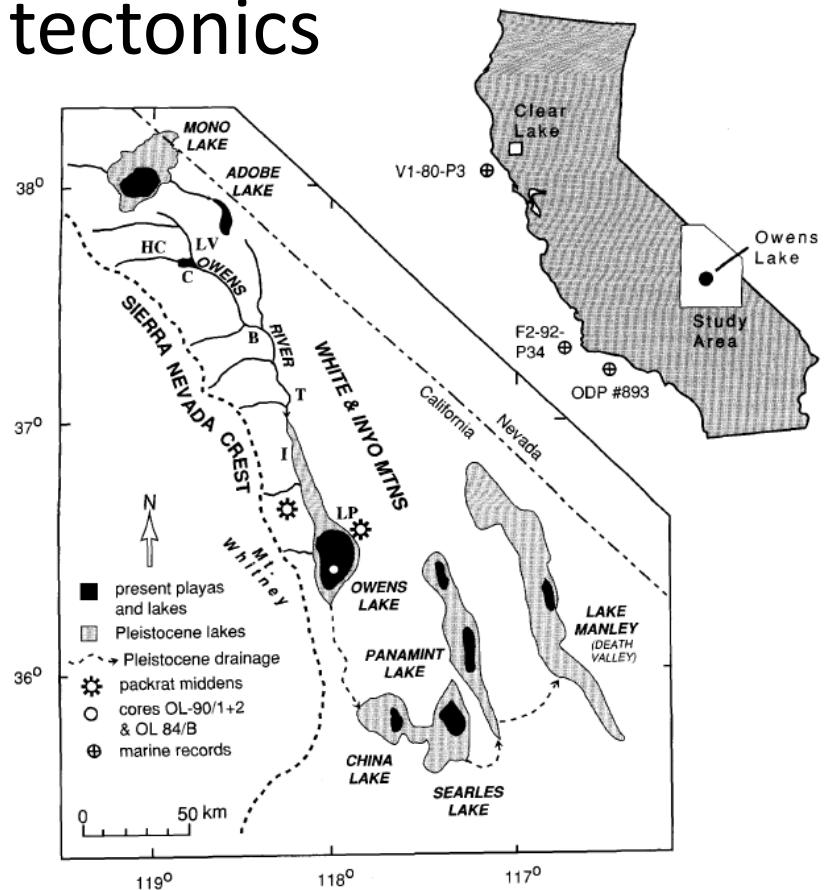


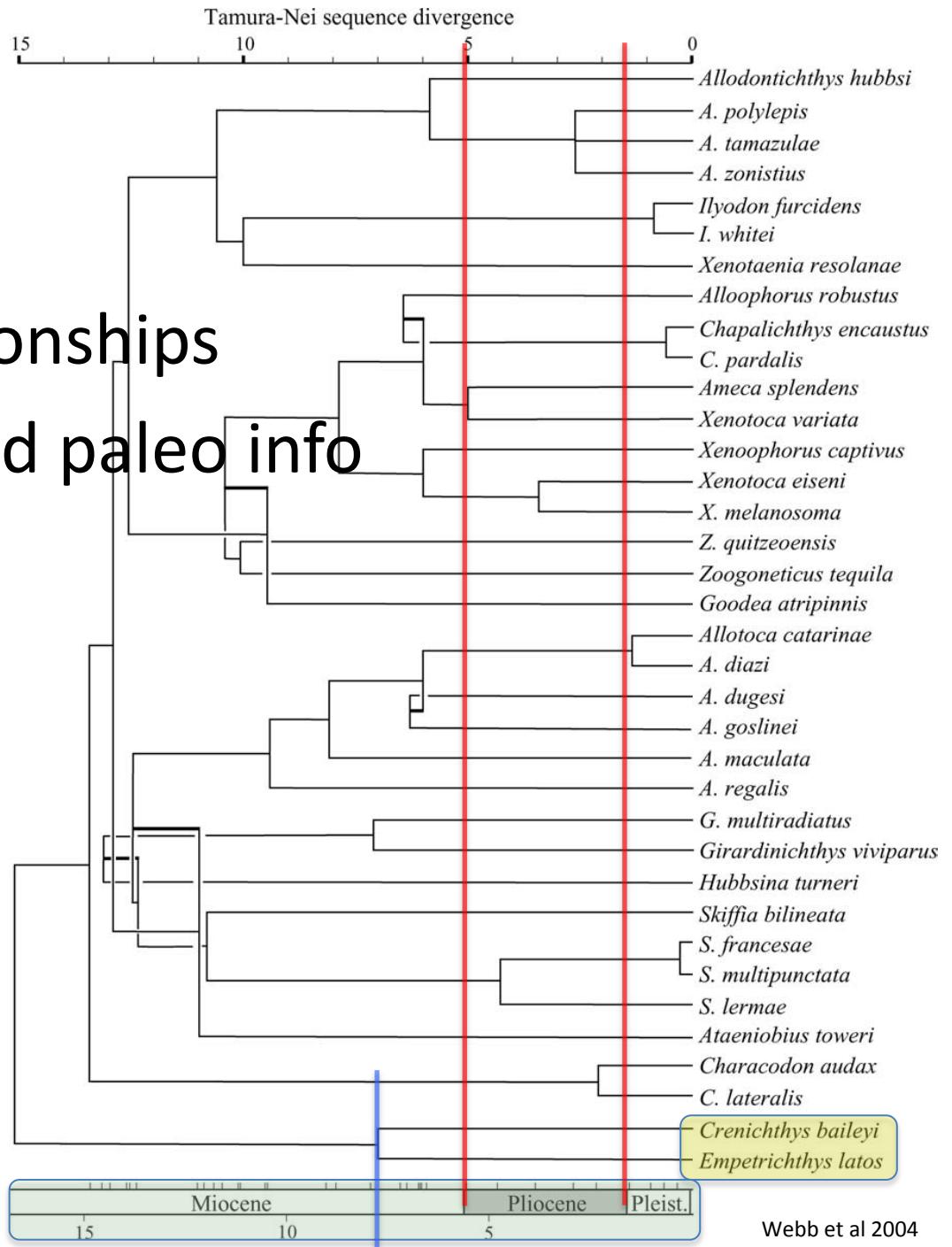
FIGURE 1.—Index map showing Owens Lake and Owens River drainage system in southeastern California and western Nevada. The map includes state boundaries for California and Nevada, and county boundaries for Inyo and Mono counties. Key features labeled include MONO LAKE, ADOBE LAKE, OWENS RIVER, SIERRA NEVADA CREST, WHITE & INYO MTNS, WHITNEY, LP (Lone Pine), OWENS LAKE, PANAMINT LAKE, CHINA LAKE, SEARLES LAKE, and LAKE MANLEY (DEATH VALLEY). The map also shows locations of present玩as and lakes (black squares), Pleistocene lakes (shaded areas), Pleistocene drainage (dashed lines), packrat middens (gears), cores OL-90/1+2 & OL 84/B (circles), and marine records (diamonds). Specific locations marked with symbols include V1-80-P3, F2-92-P34, and ODP #893. A scale bar indicates 50 km, and a north arrow is present. An inset map shows the location of the study area within California and Nevada, with Clear Lake and Owens Lake specifically labeled.

# Water Use and Disturbance

- Potential to further diminish habitat



- Phylogeny – relationships
- When diverged and paleo info



# Differences of US Goodieds

- Empetrichthinae
  - Egg layers, no pelvic fins, no split anal fin
  - Closest to *Characodon*

www.Goodeiden.de copyright: J. C. Merino



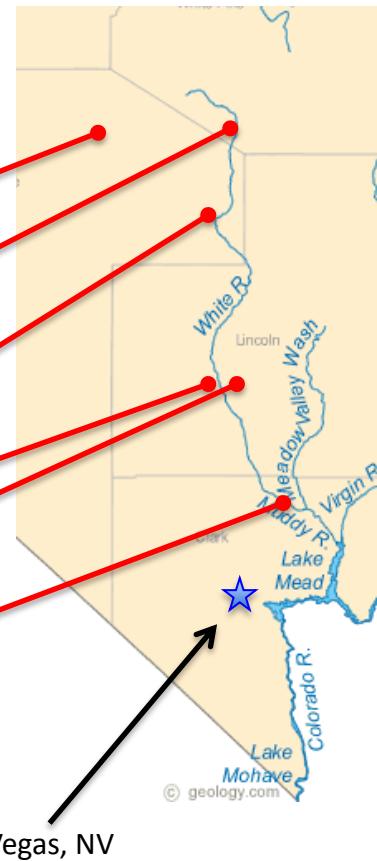
Zoogeneticus quitzeoensis



PAHRUMP POOLFISH  
*Empetrichthys latos*

# Crenichthys

- 2 species (nevadae and baileyi)
- 5 subspecies
  - Morphometrics and genetics
  - Connectivity
- *Crenichthys nevadae*
- *Crenichthys baileyi albivallis*
- *Crenichthys baileyi thermophilus*
- *Crenichthys baileyi grandis*
- *Crenichthys baileyi baileyi*
- *Crenichthys baileyi moapae*



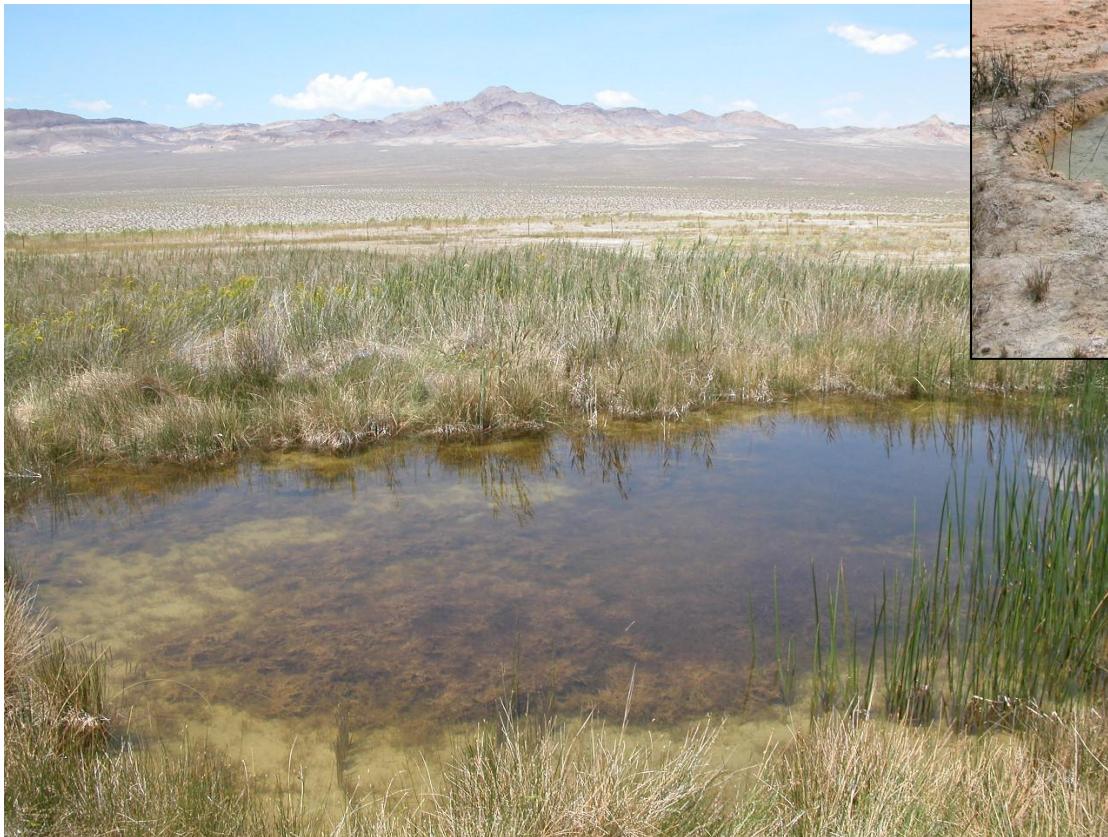
# Railroad Valley Springfish

- *Crenichthys nevadae*



# Railroad Valley Springfish

- Habitat



# Preston White River Springfish

- *Crenichthys baileyi albivallis*



# Moorman Springs Springfish

- *Crenichthys baileyi thermophilus*



# Hiko White River Springfish

- *Crenichthys baileyi grandis*



# Hiko White River Springfish

- Habitats – Blue Link Spring and Crystal Spring



# White River Springfish

- *Crenichthys baileyi baileyi*



# Moapa White River Springfish

- *Crenichthys baileyi moapae*

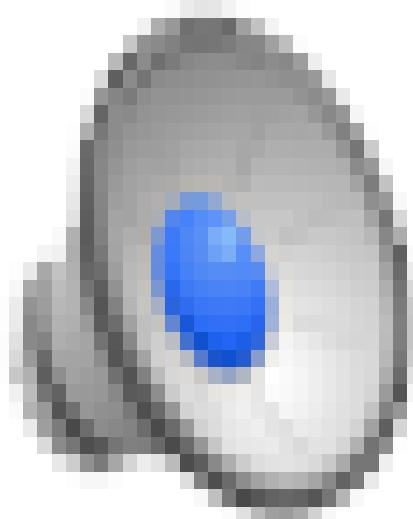


# Stream Viewing Chamber



# Moapa White River Springfish

- *Crenichthys baileyi moapae*



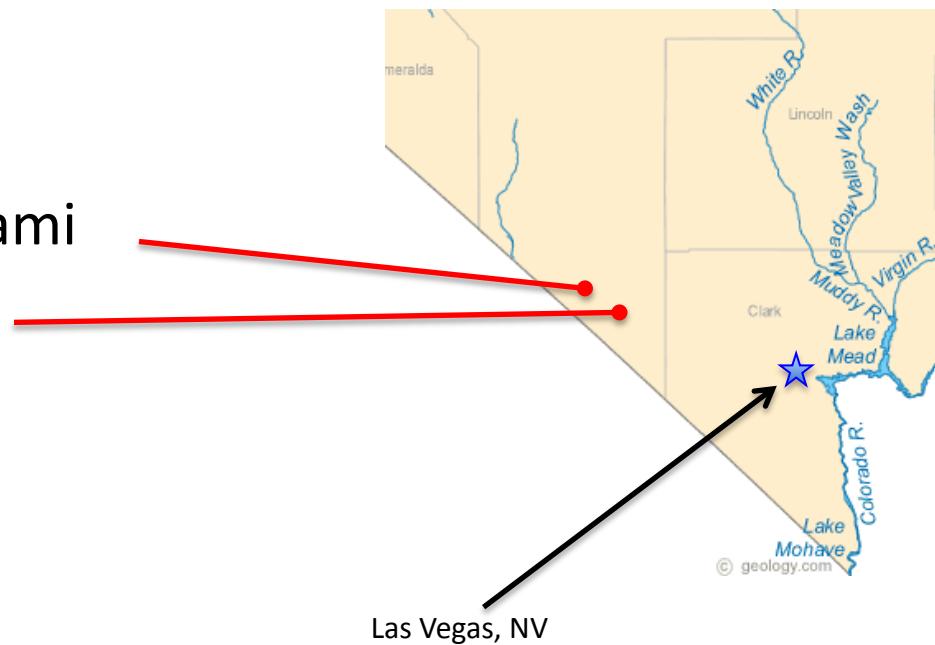
# *Empetrichthys*



# Empetrichthys

- Two Species (One extinct)
- 3 Subspecies (Two extinct)

- *Empetrichthys merriami*
- *Empetrichthys latos*



# Historic Poolfish Distribution

Ash Meadows NWR

Amargosa River

Pahrump, NV

manse

Image © 2012 TerraMetrics  
© 2012 Google

36°19'29.18" N 116°08'40.84" W elev 3045 ft

Google earth

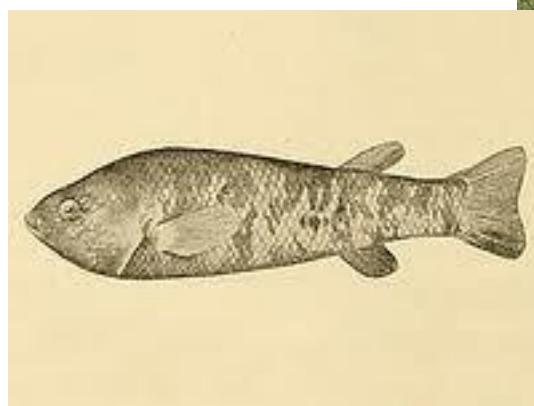
Eye alt 37.54 mi

# Historic Poolfish Distribution



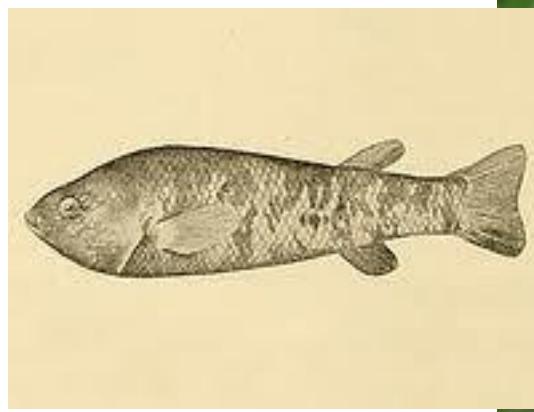
# *Empetrichthys merriami*

- Occurred in Big Spring, Ash Meadows
- Extinct



# *Empetrichthys merriami*

- Niche Overlap – Mollies and Pupfish



# *Empetrichthys latos latos*

- Occurred in Manse Spring, Pahrump, Nevada

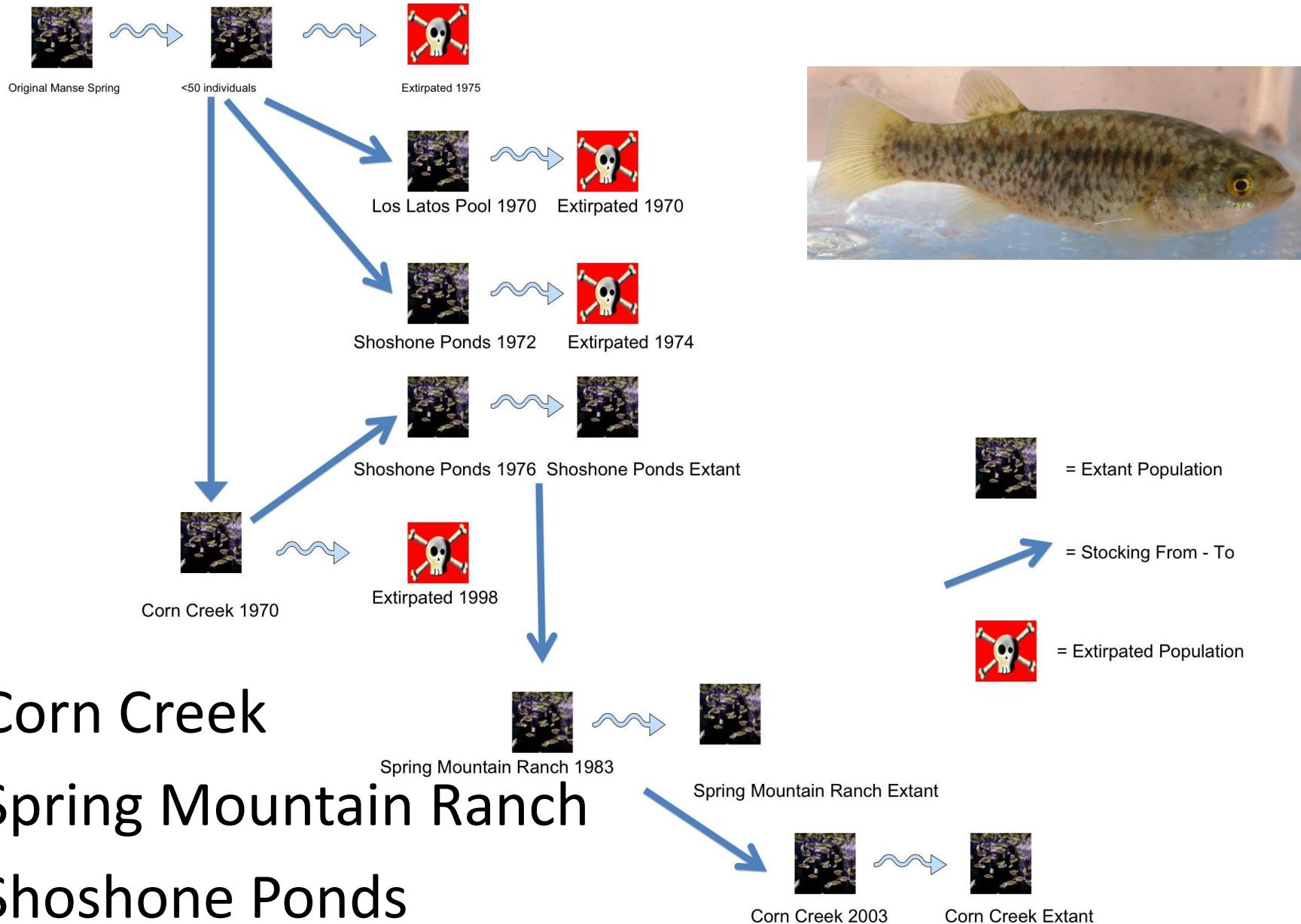


Deacon, 1964



1942, Robert R. Miller

# *Empetrichthys latos*



- Corn Creek
- Spring Mountain Ranch
- Shoshone Ponds

# *E. latos* – Spring Mountain Ranch

- One large lake, a dammed spring
- > 15,000 individuals



# *E. latos* – Corn Creek

- Extirpated by crayfish
- Built a 2-chambered tank
- <100 individuals



# *E. latos* – Shoshone Ponds

- Three existing and one extirpated populations
- Approximately 6000 individuals



# Abnormal Coloration



# Other Native Species - Prehistoric



# Other Native Species - Modern



# Management

- Alien Species Removal
- Habitat Restoration
- Refuges



# Alien Species



# Physical Removal



# Habitat manipulation



# Rotenone



# Habitat Restoration



# Habitat Restoration



# Habitat Restoration



# Thank You

