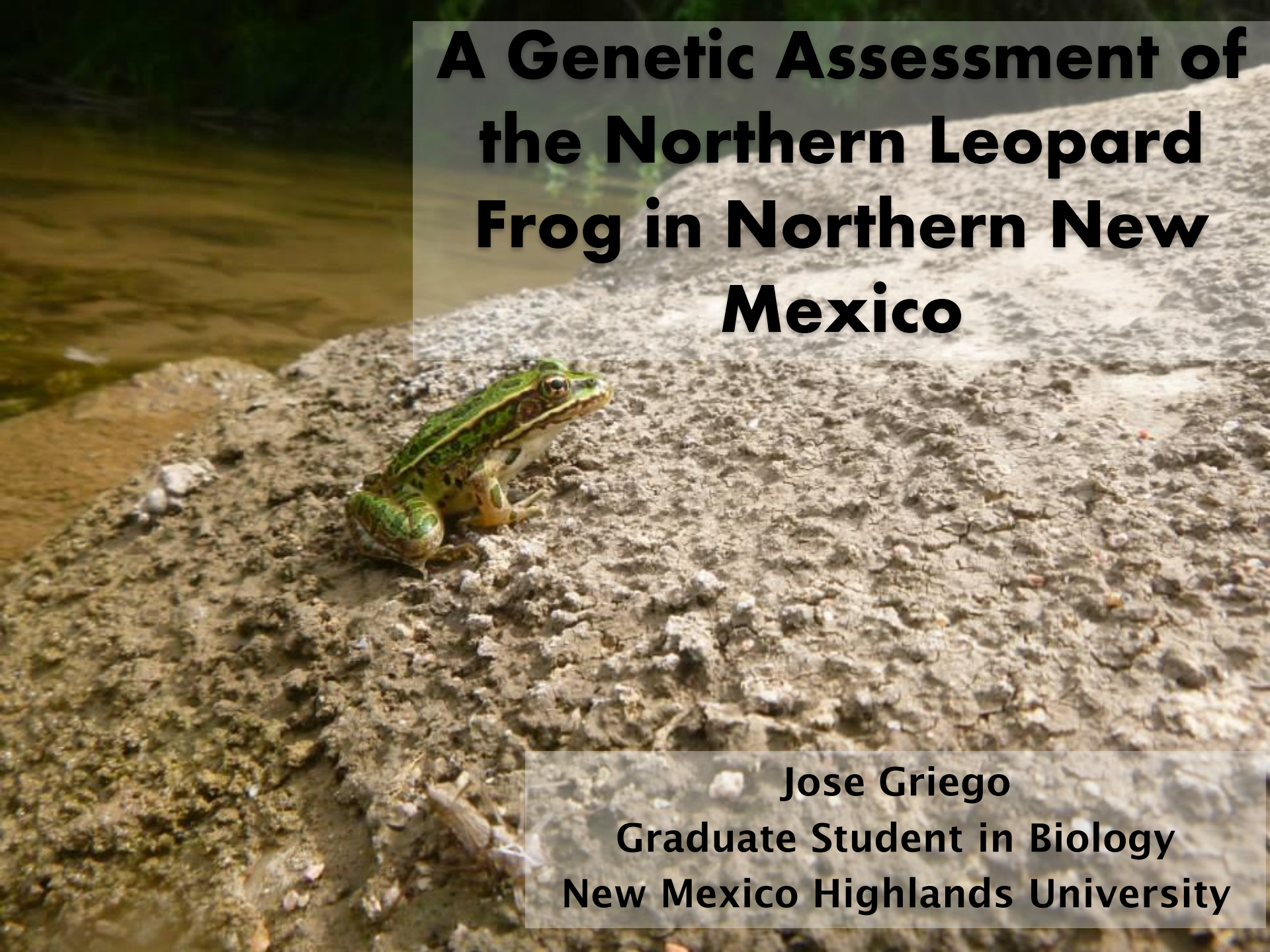
# A Genetic Assessment of the Northern Leopard Frog in Northern New Mexico



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- *Lithobates pipiens*
  - *Widespread Decline Across the western United States*
    - *Enimagtic Decline (climate change, disease, pesticides, habitat loss)*
- Why this specific species of frog?
  - Native to northern NM
  - Morphological Intergrades between species in this area
  - Hybridization..factor for decline?

# Causes of Declines

- Habitat degradation
  - Widespread problem
    - Caused by different factors
      - (deforestation, urbanization, drought)
- Can affect animal populations
  - Limit Gene Flow
  - Isolate populations
  - Increase hybridization?

# Habitat and Morphological Differences

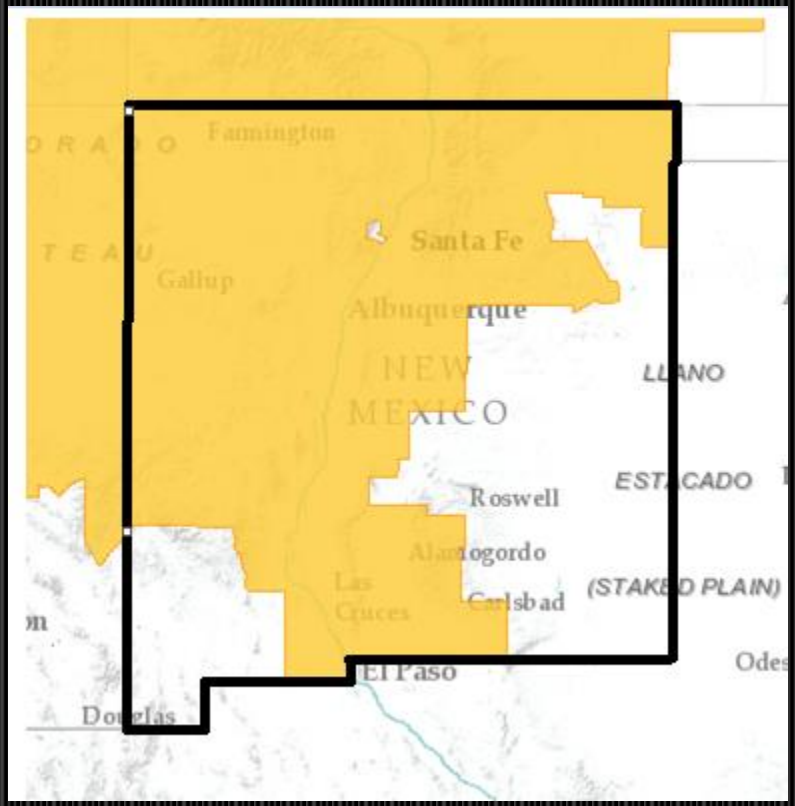
*L. pipiens*

- Larger elevation range

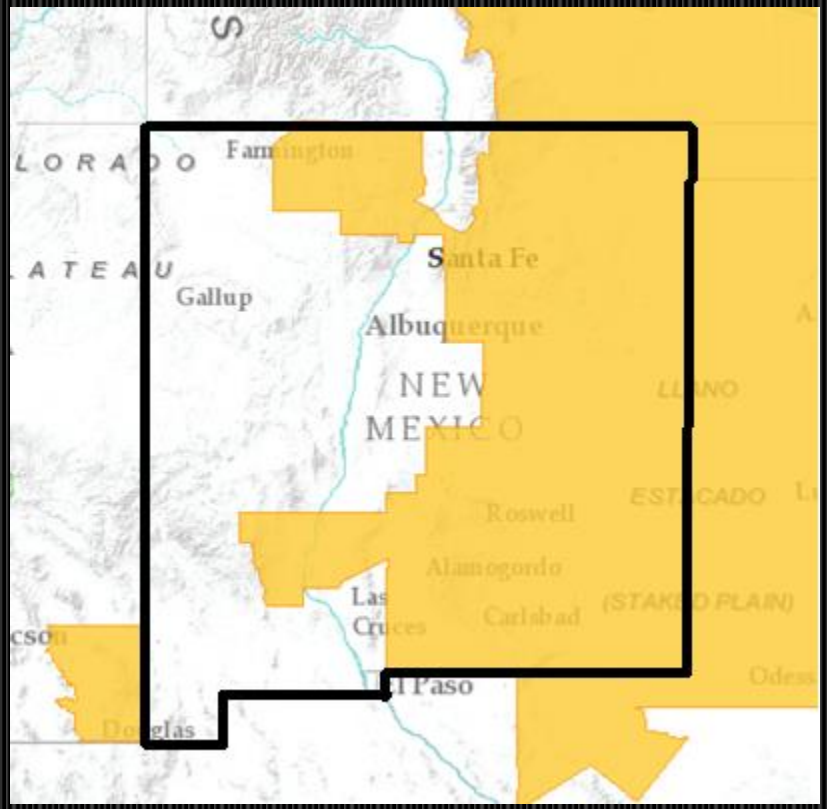
*L. blairi*

- Lower elevation plains

# Habitat Overlap



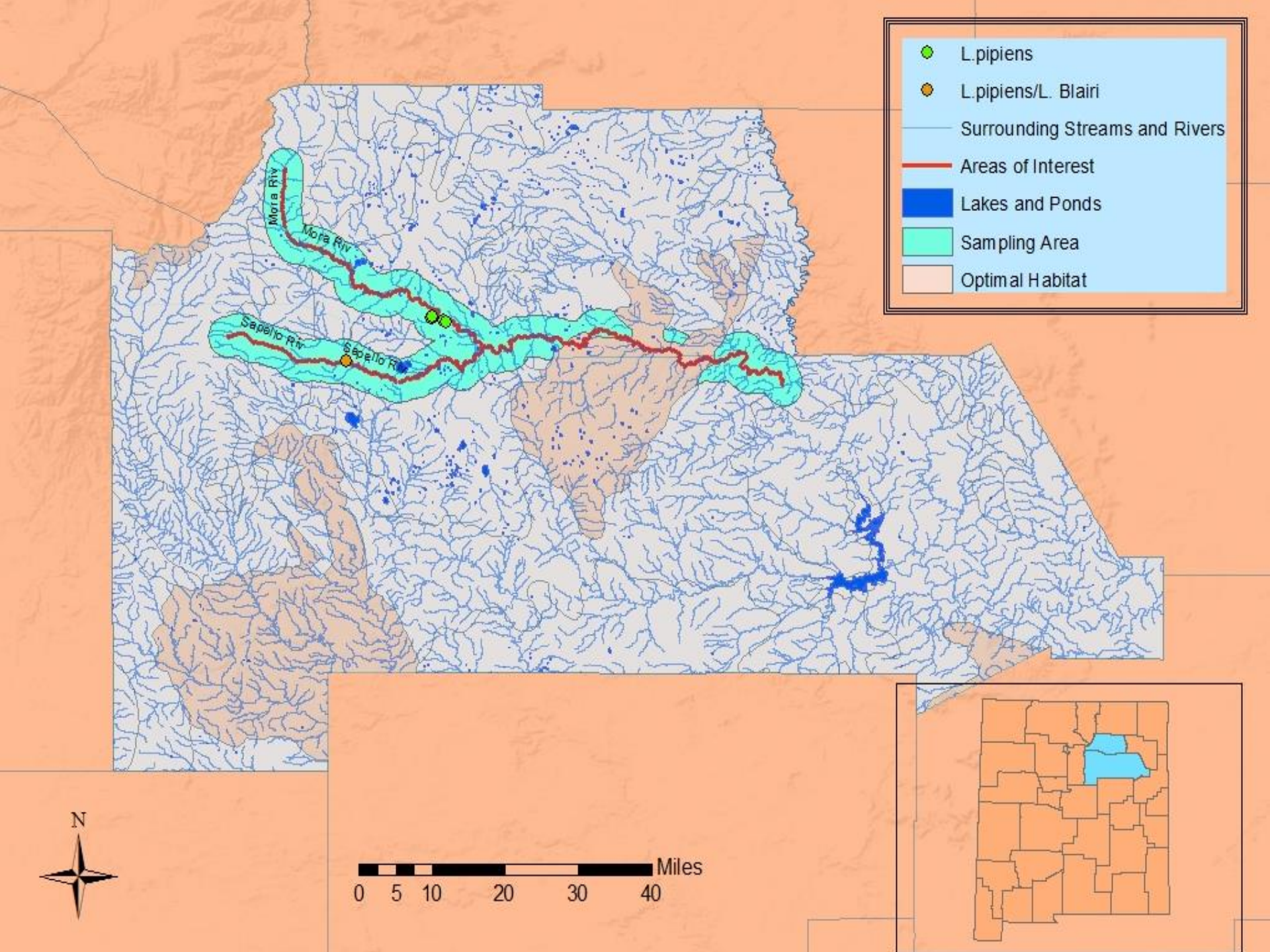

*L. pipiens*




*L. blairi*

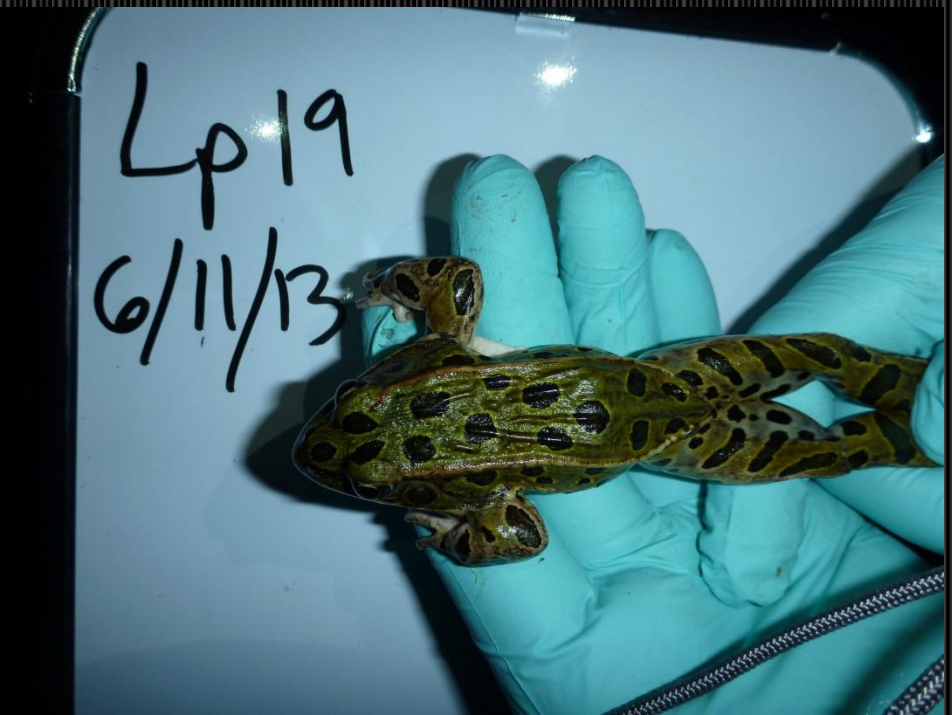
# Sampling Area

- Area of Interest
  - Northern New Mexico along the Mora and Sapello Rivers
- Why the specific sampling area?
  - Opportunity to add to existing data from other areas of the United States
  - Useful to study behavior and populations under changing conditions
  - Drought issues in New Mexico


L.pipiens
L.pipiens/L. Blairi
Surrounding Streams and Rivers
Areas of Interest
Lakes and Ponds
Sampling Area
Optimal Habitat
Mora Riv
Mora Riv
Sapello Riv
Sapello Riv
N
Miles
0 5 10 20 30 40

# Purpose

- Assess the population structure of *L. pipiens* at sites along the Mora and Sapello Rivers and investigate the presence of hybrid individuals.



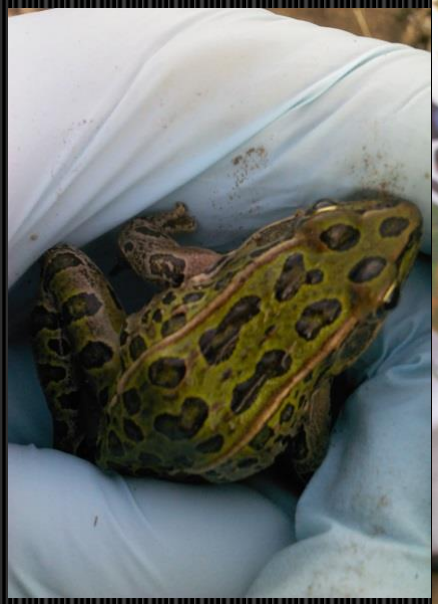

# Areas Sampled

Sapello River

Mora River

# Leopard Frog Samples from Different Habitats

Sapello River



Mora River

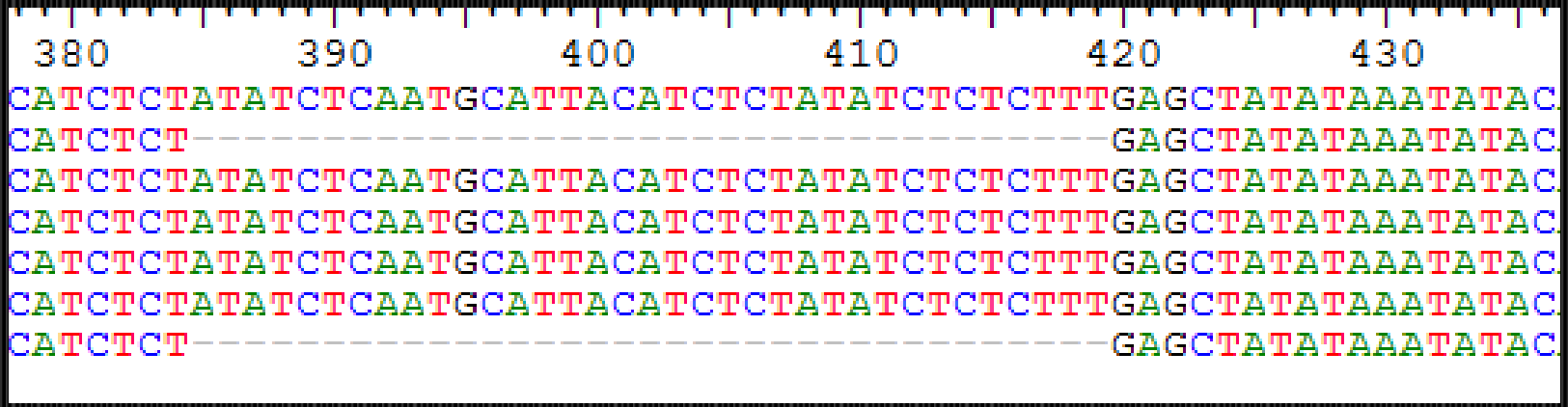
# Sampling Methods

- Sampling
  - Mora and Sapello Rivers
  - Opportunistic catch and release
    - GPS to mark location
- Genetic Analysis
  - Buccal Swabbing for DNA
  - DNA Extraction
  - PCR
  - Sequencing/Genotyping
-

# Genetic Analysis

- Fibrinogen Intron 7 (FIBI7)
- Microsatellites
- ND1

Indels in FIB Sequences



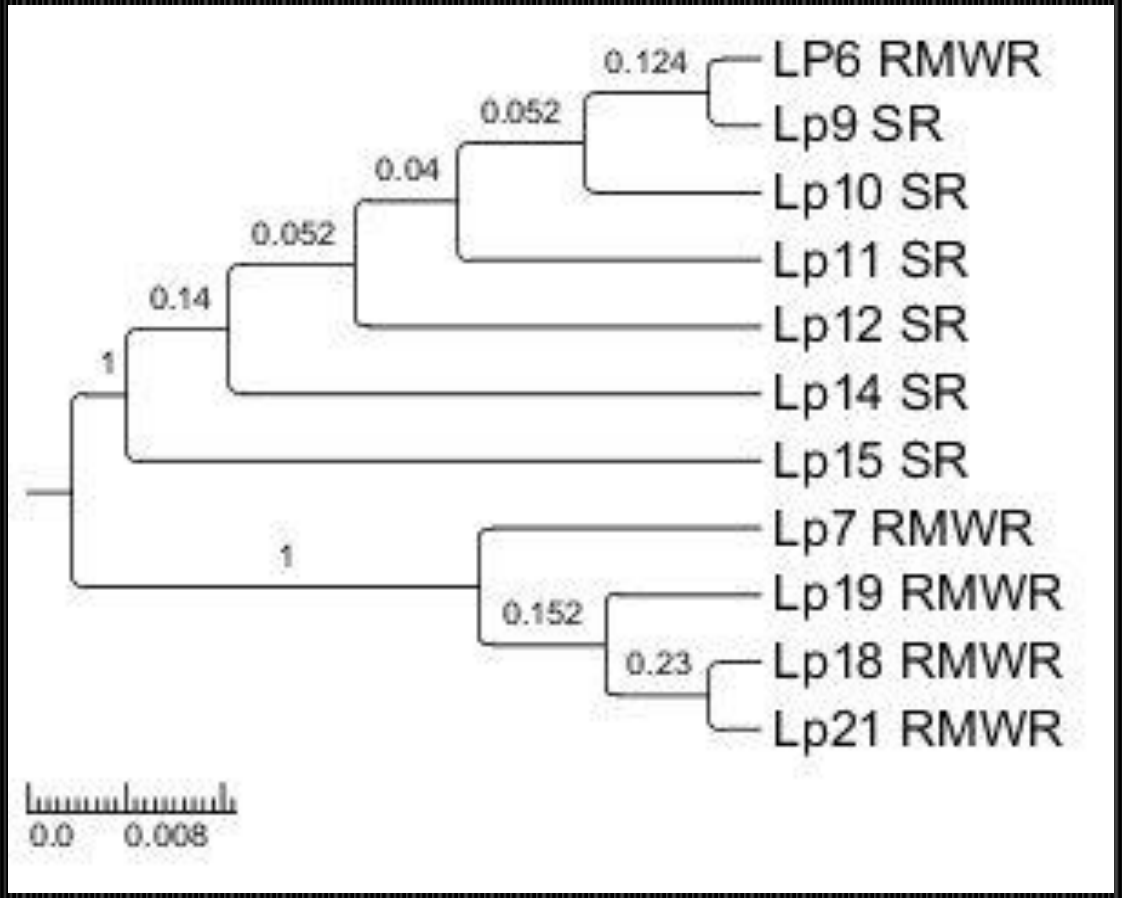
Lp12a

CATCTCTATATCTCAATGCATTACATCTCTATATCTCTCTTTGAGCTATATAAATATAC


Lp19a

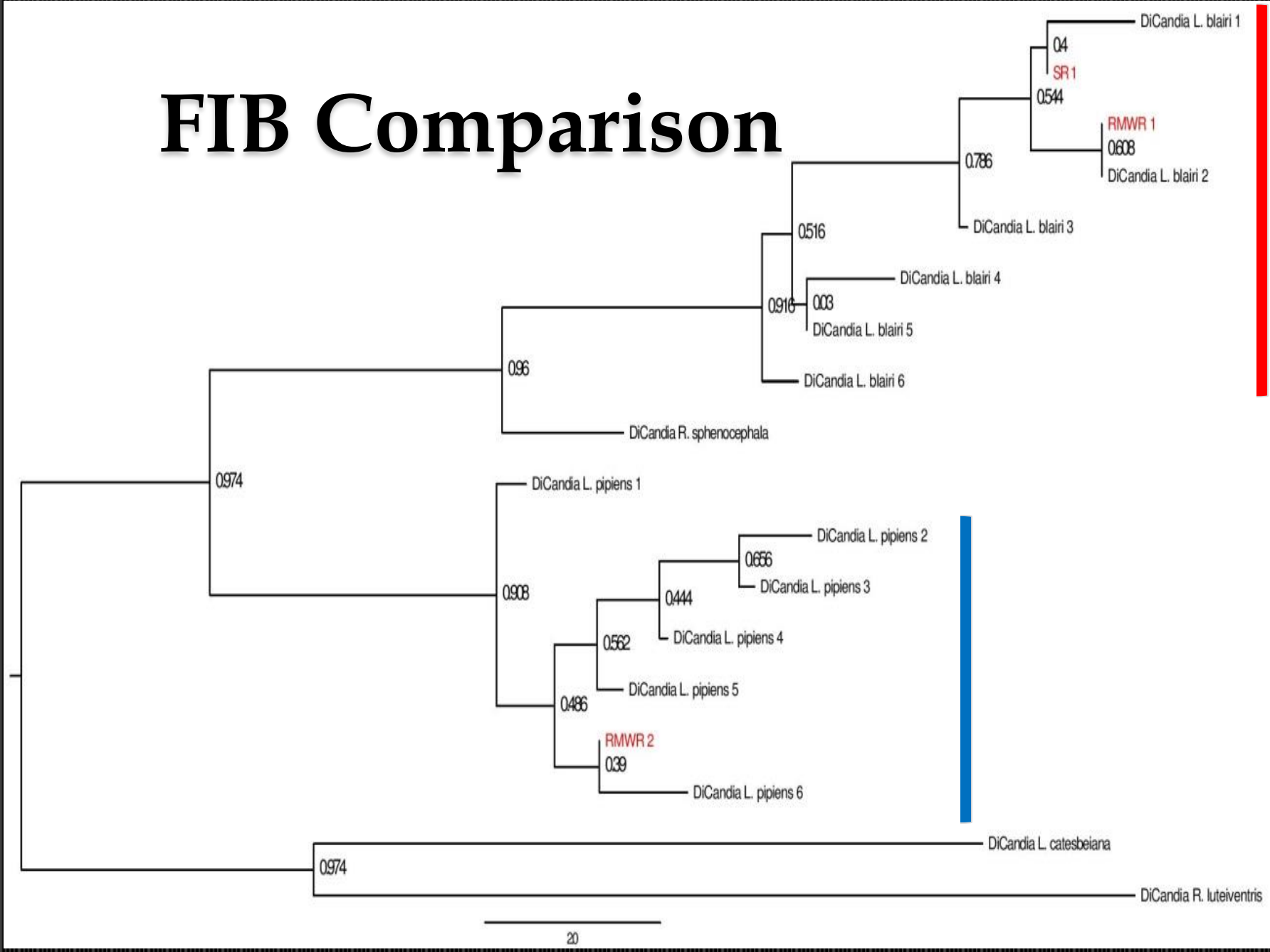
- CATCTCT-------------------------------GAGCTATATAAATATAC

# FIB Neighbor Joining Tree Results

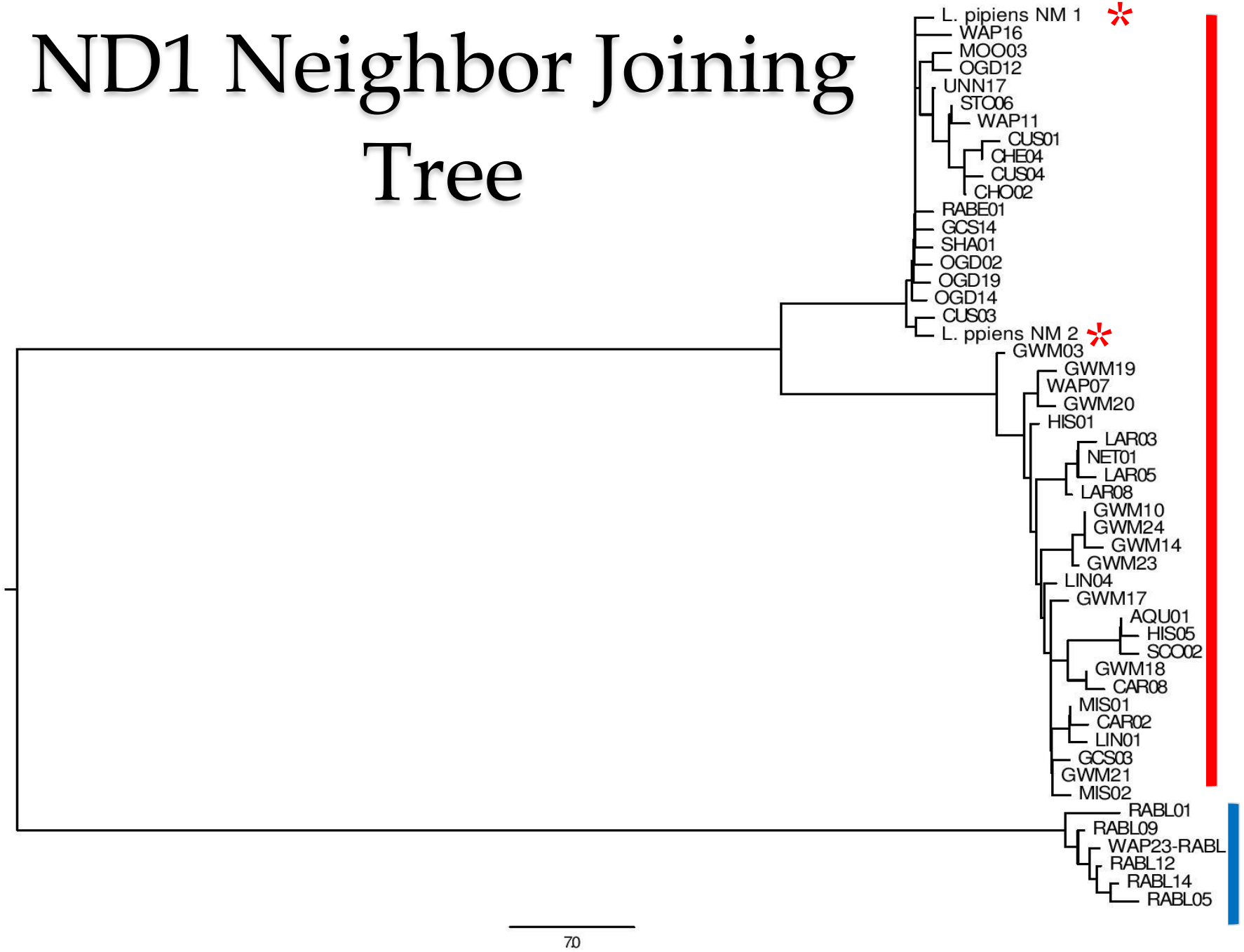




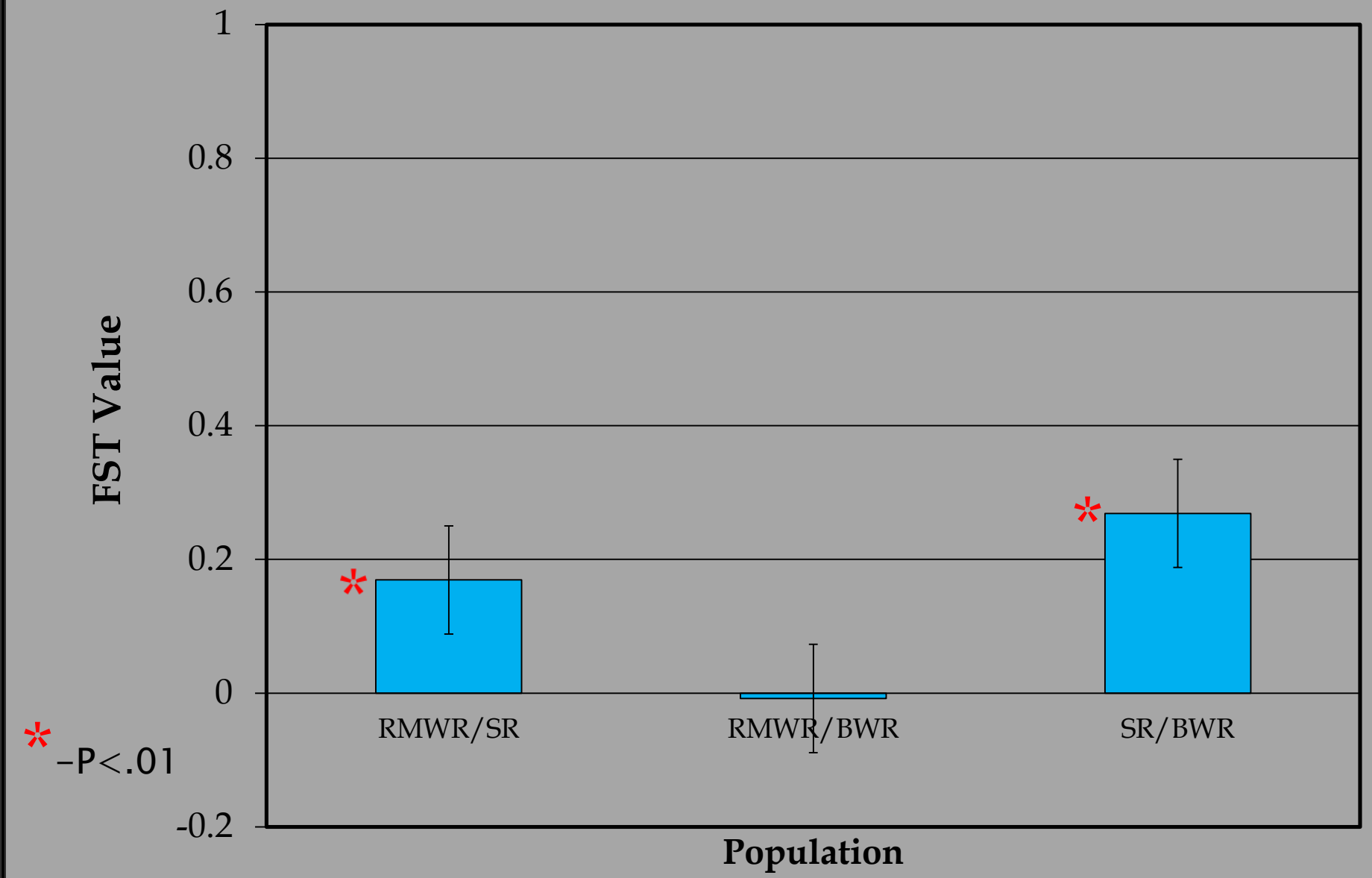
# FIB Comparison



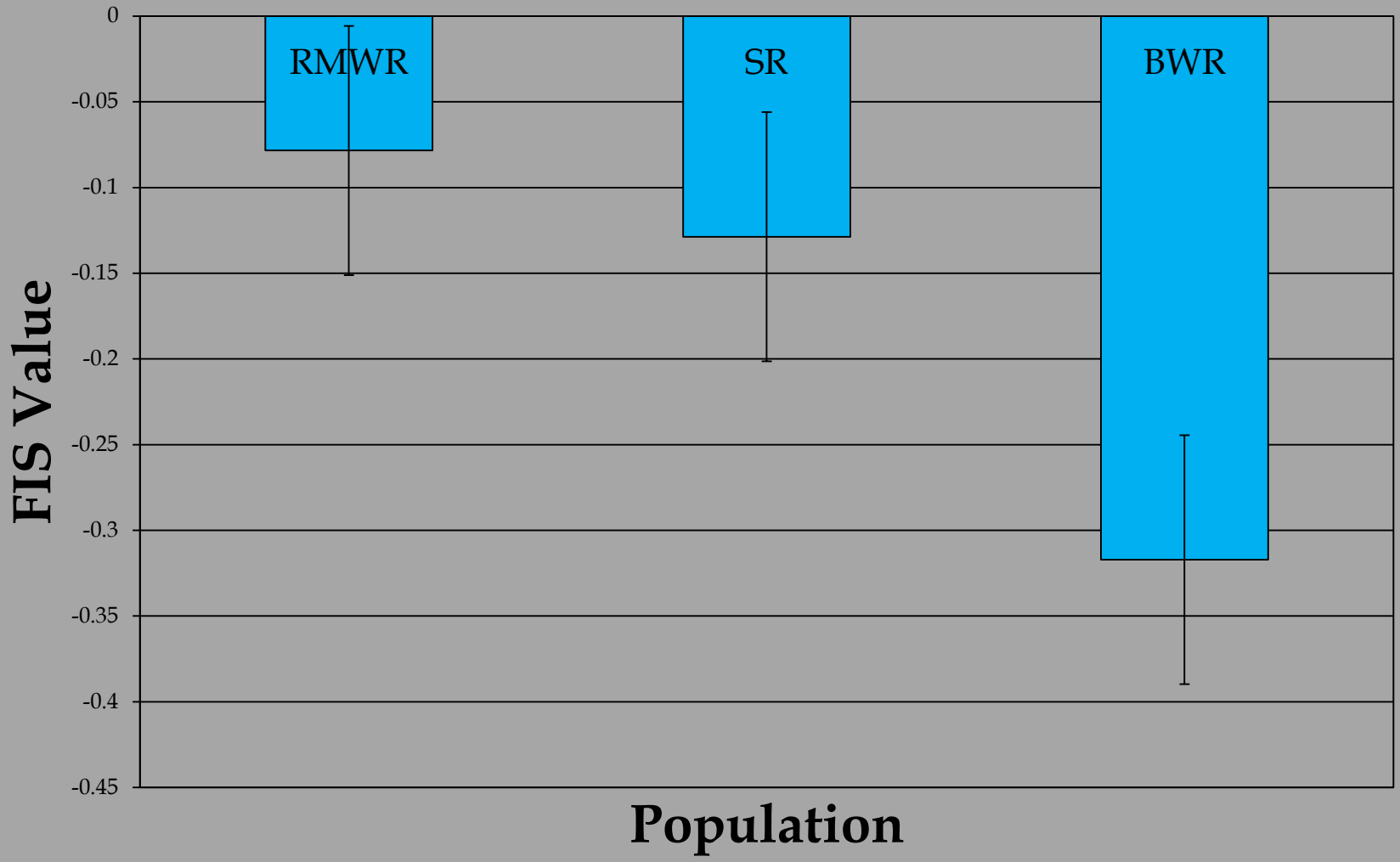
# ND1 Neighbor Joining Tree



# Microsatellites-Population Structuring



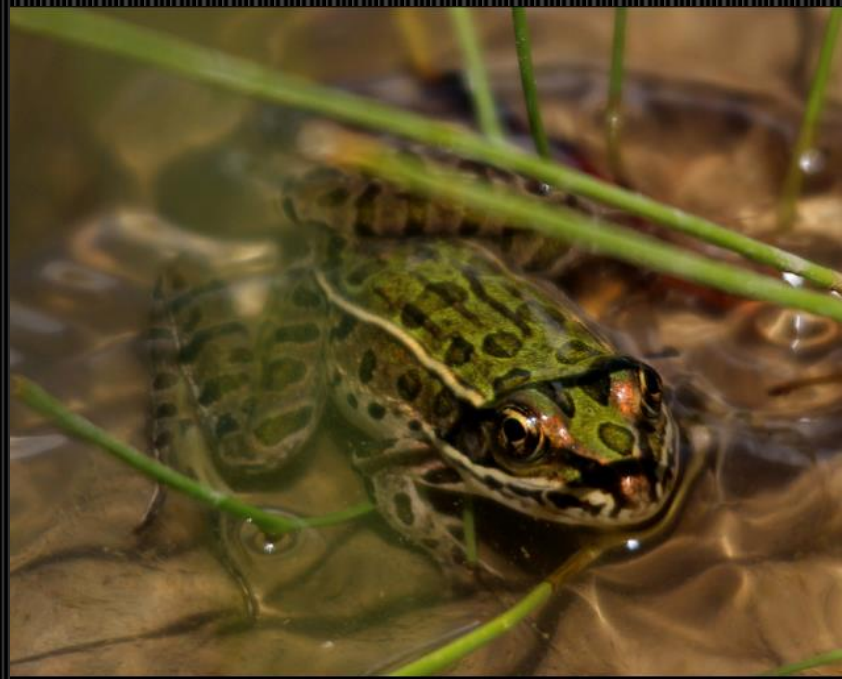
# Inbreeding (FIS) of Populations



# Conclusion

- In the samples presented, morphological classification does not match results of the FIBI7 marker.
- ND1 results illustrate discordance between nuclear and mitochondrial areas.
- Strong population structure between all samples along the Mora River compared to Sapello indicate the possibility of a barrier inhibiting complete panmixia.

- Based on the discordance between nuclear and mitochondrial markers, a hybrid zone is present in the Sapello River.
- Two rivers that are connected still do not provide a guaranteed corridor for dispersal.
- Even though populations were structured, within population isolation is not to the point of inbreeding.



# Significance

- The results of this research indicate that hybrization may be occurring more than previous literature has suggested.
- Outbreeding depression may be an indicator of the inability to disperse and breed with conspecifics.
- If the climatic trend we are seeing persists, these results may begin occurring at a larger scale which will only add to the many stressors present to leopard frog populations.

# Acknowledgements


- New Mexico EPSCoR
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- NMHU Student Senate
- Citgo

- Dr. Sarah Corey-Rivas, Dr. Jesus Rivas

- All members of the Molecular Ecology Lab and the Highlands Ecology Lab

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# Questions?