

# EXPLORING FACTORS INFLUENCING EXPANSION OF INVASIVE BULLFROGS AND PERSISTENCE OF NATIVE NORTHERN LEOPARD FROGS IN NORTHEASTERN COLORADO

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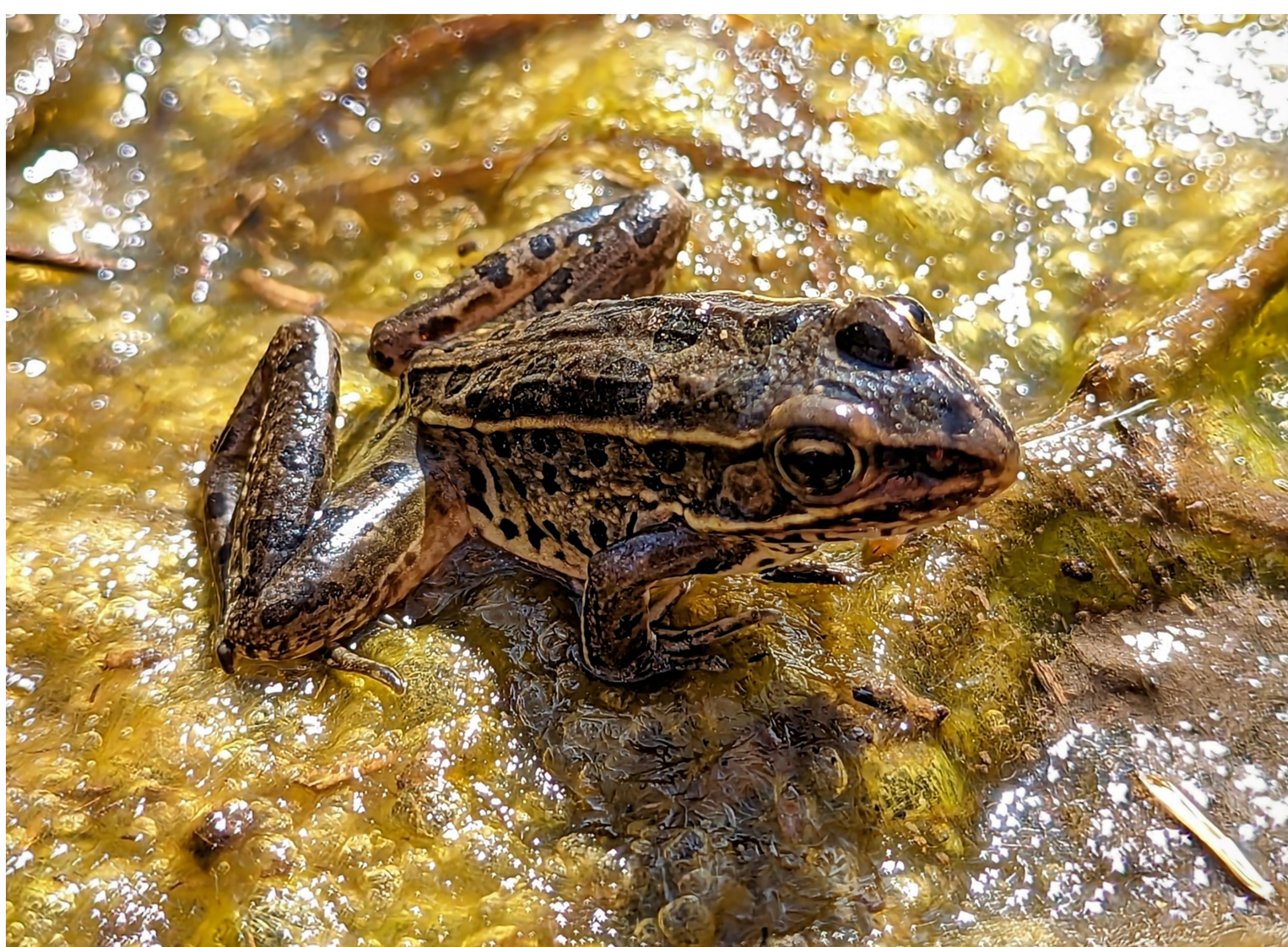
## PROJECT BACKGROUND

Northern Leopard Frogs (*Lithobates pipiens*), formerly abundant throughout the majority of Colorado, have experienced marked declines in their historical range in the state, especially along the Front Range and the Northeastern Plains. Threats that have likely contributed to their decline include habitat alteration, the fungal pathogen *Batrachochytrium dendrobatidis* (Bd), and the introduction and expansion of invasive American Bullfrogs (*Lithobates catesbeianus*). The purpose of this project is to investigate the specific factors contributing to the persistence/decline of Northern Leopard Frogs, and the expansion of Bullfrogs in the South Platte River Basin. This work was conducted through cooperation with CSU, Colorado Parks and Wildlife, and private landowners.

## GOALS

- Gain experience in a wide variety of techniques for determining the presence of amphibians, including eDNA, acoustic monitoring, and visual encounter surveys.
- Engage with different stakeholders, including state and federal agencies, extension agents, and community educational outreach.
- Gain a more holistic understanding of how a scientific study is conducted, including methods for ensuring data integrity and minimizing bias.

Figure 1. (Newly-Metamorphosed Northern Leopard Frog)



Northern Leopard Frog. (Photo by Anthony Berardi)

## INTERNSHIP ACTIVITIES

My work as an intern included data collection in the form of visual encounter surveys, eDNA, maintenance of acoustic monitoring equipment, and Bd pathogen swabbing at various sites throughout the South Platte river basin.

In addition to collecting data on Northern Leopard Frogs, I also had the opportunity to engage in educational outreach- teaching first-graders at the Chatfield Audubon Center about Leopard Frogs and Bullfrogs. I also helped develop a CSU extension factsheet on Northern Leopard Frogs, to bring more community awareness to the importance of the species to Colorado's native ecosystems. Additionally, I was fortunate to participate in a Boreal Toad mark-recapture survey, as well as Greenback Cutthroat Trout spawn collection.

Figure 2. Surveying a Wetland for Northern Leopard Frogs



Northern Leopard Frog. (Photo by Emma Sudbeck)

### Visual Encounter Surveys:

For our visual encounter surveys, we collected a variety of site data, including water temperature and pH, percentage and type of emergent vegetation, site permanence/ephemerality, the presence or absence of fish/crayfish, and the species, age class, and specific conditions under which each amphibian was found.

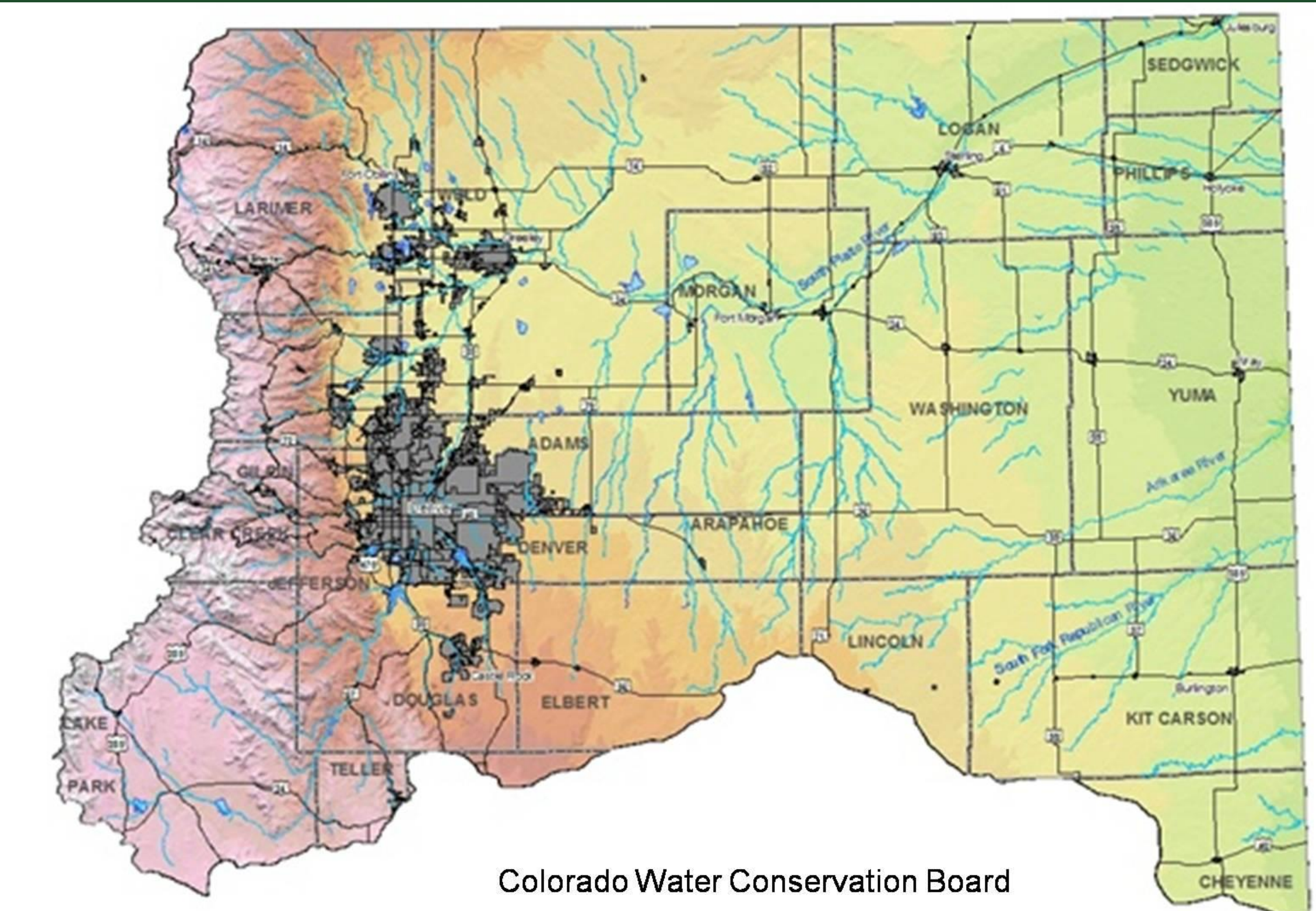
This data will be used to help determine the relative importance of these factors for the persistence of Northern Leopard Frog populations.

## LESSONS LEARNED

As a wildlife biology major with a particular interest in the study and conservation of native herpetofauna, this internship provided a wonderful opportunity for me to gain field experience that will help advance my future career. Some major take-aways for me include:

- A deeper understanding of how a scientific study is conducted, why researchers choose to collect certain types of data depending on the study's goals, and how to minimize bias in study design and operation.
- A more robust working knowledge of the seasonal fluctuations in the activity patterns various species of native amphibians.
- Experiential knowledge in various types of field data collection, and the methodologies employed to ensure that the data collected is not compromised in any way (contamination of samples, etc.)
- An expanded skillset when it comes to the identification of amphibian species in the larval stage.
- A more holistic understanding of the life histories of Northern Leopard Frogs, and how they differ from that of American Bullfrogs or other amphibians within the state.
- An appreciation for the extent to which human cooperation between different stakeholders is essential for the study and conservation of species at the state level.

Figure 3. Study Area- South Platte River Basin



Colorado Water Conservation Board

## NEXT STEPS

The next step for this project is analyzing the data we collected. Based on this analysis, we hope to be better able to identify the factors that are essential for Northern Leopard Frog populations, and what types of human action (cattail mitigation, land use change, etc.) can help ensure their continued survival in the South Platte River Basin.