

Leopard Frogs



ASSESSING HABITAT QUALITY FOR PRIORITY WILDLIFE SPECIES IN COLORADO WETLANDS



NORTHERN LEOPARD FROG © KEITH PENNER / PLAINS LEOPARD FROG © RENEE RONDEAU, CNHP

Two species of leopard frogs occur in Colorado. Northern leopard frogs (*Lithobates pipiens*; primary photo, brighter green) are more widespread than plains leopard frogs (*L. blairi*; inset).

Species Description

Identification

Two leopard frogs are included in this guild: northern leopard frog (*Lithobates pipiens*) and plains leopard frog (*L. blairi*). They are roughly the same size (3–4 inches as adults). Northern leopard frogs can be green or brown and plains leopard frogs are typically brown. Both species have two light dorsolateral ridges along the back; in plains leopard frog there is a break in this ridge near the rear legs.

Preferred Habitats

Due to their complicated life history traits, leopard frogs occupy many habitats during different seasons and stages of development, but they are closely associated with wet environments. In general, leopard frogs occupy three categories of habitat: (1) over-wintering habitat with deep water that does not freeze solid; (2) foraging habitat for adults, which may consist of uplands, riparian areas, and wet meadows; and (3) breeding habitat suitable for egg development and tadpole survival. In gen-

eral, plains leopard frogs breed in more ephemeral ponds, while northern leopard frogs use semi-permanent ponds.

Diet

Adult leopard frogs eat primarily insects and other invertebrates, including crustaceans, mollusks, and worms, as well as small vertebrates, such as other amphibians and snakes. Leopard frog tadpoles are herbivorous, eating mostly free-floating algae, but also consuming some animal material.

Conservation Status

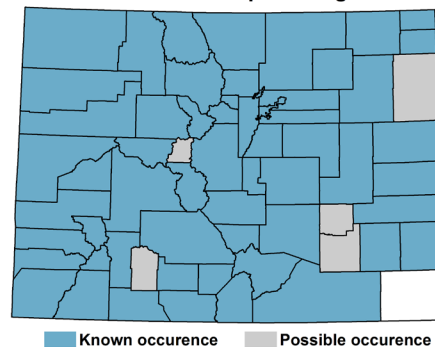
Northern leopard frog populations have declined throughout their range; they are listed in all western states and Canada as sensitive, threatened, or endangered. In Colorado, northern leopard frogs are listed as a Tier 1 Species of Greatest Conservation Need (CPW 2015). Less is known about plains leopard frog populations, but threats to plains leopard frogs are probably similar to those of northern leopard frogs. They are listed as a Tier 2 Species of Greatest Conservation Need in Colorado (CPW 2015).

Species Distribution

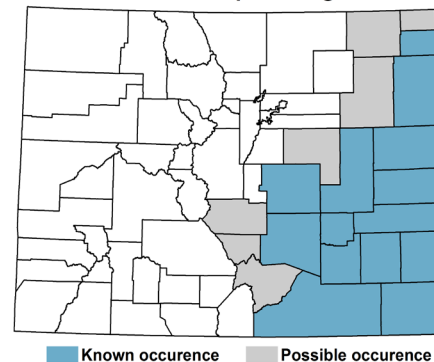
Range

Northern leopard frogs range from the northern United States and Canada to the more northern parts of the southwestern United States. With the exception of a few counties, they occur throughout Colorado. Plains leopard frogs have a much smaller distribution than northern leopard frogs, occurring through the Great Plains into southeastern Arizona and eastern Colorado.

Northern Leopard Frog



Plains Leopard Frog



Leopard frog distribution maps for Colorado adapted from Hammerson (1999) and NDIS (2014).

Version Date: November 2020

Preferred Habitat Conditions

Dominant vegetation in adult foraging wetlands	varies but includes grasses, sedges, and forbs
Dominant vegetation in breeding wetlands	emergent vegetation with buffer of grasses, sedges, rushes, and spike rushes
Landscape context	0.6–1.2 miles between categories of habitat (see above habitat types)
Percent vegetation cover	dense and extensive
Predatory fish, salamanders, and bullfrogs	none
Size of habitat	can be very small
Sunlight	high sunlight exposure
Vegetation height in adult foraging wetlands	6–12 inches
Water depth for winter hibernation	deep enough not to freeze to the bottom
Water depth in breeding wetlands	4–25 inches but can vary
Water quality	neutral pH, well-oxygenated, and unpolluted
Water temperature	54–73°F



NORTHERN LEOPARD FROG © TOM KOERNER, UFWFS

Acknowledgements

Harry Crockett and Tina Jackson (Colorado Parks and Wildlife) reviewed an earlier version and provided input on preferred habitat conditions. Dr. Lauren Livo provided input with regards to preferred water depth in breeding ponds.

Suggested Reading and Citations

- Corn, P. S., and L. J. Livo. 1989. Leopard frog and wood frog reproduction in Colorado and Wyoming. *Northwestern Naturalist* 70: 1-9.
- CPW (Colorado Parks and Wildlife). 2015. State Wildlife Action Plan: A Strategy for Conserving Wildlife in Colorado. Denver, Colorado.
- Hammerson, G. A. 1999. Amphibians and Reptiles in Colorado: A Colorado Field Guide. University Press of Colorado and Colorado Division of Wildlife.
- Nichols, J. 2006. Petition to list the western United States population of northern leopard frog (*Rana pipiens*) as threatened. Petitioners: Center for Native Ecosystems, Biodiversity Conservation Alliance, Defenders of Black Hills, Forest Guardians, Center for Biological Diversity, The Ark Initiative, Native Ecosystems Council, Rocky Mountain Clean Air Action.
- NDIS (Natural Diversity Information Source). 2014. On-line mapping tool formerly available through Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, Colorado.
- Smith, B. E., and D. A. Keinath. 2004. Species assessment for the northern leopard frog (*Rana pipiens*) in Wyoming. United States Department of the Interior, Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming.
- Smith, B. E., and D. A. Keinath. 2005. Plains leopard frog (*Rana blairi*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region.
- Smith, B. E. and D. A. Keinath. 2007. Northern leopard frog (*Rana pipiens*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region.
- USFS (United States Forest Service). 2003. Conservation assessment for plains leopard frog (*Rana blairi*). USDA Forest Service, Eastern Region.

Management Recommendations

This fact sheet contains easy-to-use guidelines for understanding habitat needs of Colorado Parks and Wildlife priority wetland-dependent wildlife. Biologists with expertise in leopard frogs have suggested numerous practical steps that can be taken to improve habitat quality for these species.

Hydrology

- Maintain water depths to avoid water column freezing solid.
- For breeding ponds, maintain water at least 5 inches deep through mid-August at lower elevations or through mid-September at higher elevations
- After mid-July, draw down water containing predatory fish and bullfrog larvae.

Vegetation

- Provide grass buffers around breeding ponds.

Contamination

- Reduce nitrogen loading, pesticides, chemicals and other toxins.
- Reduce predatory fish, salamanders, and bullfrogs.
- Possibly reduce or change mosquito control.

Land Use

- Eliminate livestock access to ponds.
- Avoid or minimize clear-cutting.

Conservation

- Translocate frogs to re-establish populations.
- Promote conservation programs to provide grassland component in the landscape.
- Promote native species in adjacent lands.



NORTHERN LEOPARD FROG © KRISTA LUNDGREN, USFWS



PLAINS LEOPARD FROG © JOHN SOVELL, CNHP

Habitat Scorecard for Leopard Frogs (v. Nov 2020)

Assessment of habitat before and after restoration or management actions

Project Name: _____ Project Area (acres): _____ Habitat Area (acres): _____

Size of Contiguous Habitat outside Project Area (acres): _____ Ownership (circle): Same / Different / Conservation Easement

Scorecard Instructions: Select appropriate checklist: (1) **Breeding Wetlands**, (2) **Adult Foraging Wetlands**, or (3) **Over-wintering Wetlands**. Enter one value that best describes each habitat variable during the appropriate season, using the numbers in the value column. Habitat variables are in shaded boxes; ranges of condition are directly below each variable. **If condition is outside range or is not described, enter a zero.**

Project Area and Habitat Area: The project area includes the entire area affected by the project. The habitat is the area that will provide (in case of pre-project) or does provide (post-project) habitat for each potential target species within the project area. The habitat area may be the same size as the project area or it might be smaller and it may be defined differently for different target species. If there is contiguous habitat area outside the project area, note the size and whether the ownership of the contiguous areas is the same or different and whether it is under conservation easement or other habitat protection. If the habitat area within your project area is noncontiguous and/or if sections are in very different conditions, consider using multiple scorecards so that each scorecard represents the general conditions. If you use multiple scorecards, identify each habitat area on a map.

Breeding Wetlands (e.g., emergent marshes, ponds, playas, seeps, springs, moist soil units, reservoirs, other impoundments)

Key habitat variable and conditions	Value	Pre-Project	Expected Post-Project	Actual Post-Project
Date of assessment				
Water availability				
Water lasts to depth of > 5 inches during most years through mid-August at lower elevations and through mid-September at higher elevations	14.1			
Water lasts to depth of > 2.5 inches during most years through mid-August at lower elevations and through mid-September at higher elevations	9.4			
Water lasts to depth of > 2.5 inches during most years through July at lower elevations and through August at higher elevations	4.7			
Water quality				
No visual evidence of turbidity or other pollutants	14.1			
Some turbidity or presence of other pollutants, but limited to small and localized areas within the wetland; water may be slightly cloudy	9.4			
Water is cloudy or has unnatural oil sheen, but the bottom is still visible (note: if the sheen breaks apart when you run your finger through it, it is a natural bacterial process and not water pollution)	4.7			
Predominant depth of water				
4 – 25 inches	13.4			
>25 – 40 inches	8.9			
>40 – 80 inches	4.5			
Percent total canopy cover >6.6 feet				
0 – 30%	12.7			
>30 – 50%	8.5			
>50 – 100%	4.2			
Percent emergent and/or submergent vegetation				
>50 – 90%	12.0			
>30 – 50%	8.0			
10 – 30%	4.0			
Height of emergent vegetation				
8 – 40 inches	11.3			
>40 – 80 inches	7.5			
>80 inches	3.8			

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Habitat Scorecard for Leopard Frogs (v. Nov 2020)

Assessment of habitat before and after restoration or management actions

Breeding Wetlands *continued.*

Key habitat variable and conditions	Value	Pre-Project	Expected Post-Project	Actual Post-Project
Distance to good over-wintering habitat				
<0.5 mile	11.3			
0.5—1 mile	7.5			
>1—1.5 miles	3.8			
Distance to good foraging habitat (e.g., wet meadows, shallow ponds and emergent wetlands, small streams, riparian wetlands)				
<0.5 mile	11.3			
0.5—1 mile	7.5			
>1—1.5 miles	3.8			
Total (of 100 possible): add all numbers in before or after columns				

If possible, document the following (no scoring)	Pre-Project	Expected Post-Project	Actual Post-Project
Date of assessment			
pH of water			
Presence of predatory fish, salamanders, and bullfrogs (Y / N)			
Occurrence of deformed frogs (Y / N)			
Occurrence of dead frogs (Y / N)			

Habitat Scorecard for Leopard Frogs (v. Nov 2020)

Assessment of habitat before and after restoration or management actions

Project Name: _____ Project Area (acres): _____ Habitat Area (acres): _____

Size of Contiguous Habitat outside Project Area (acres): _____ Ownership (circle): Same / Different / Conservation Easement

Scorecard Instructions: Select appropriate checklist: (1) **Breeding Wetlands**, (2) **Adult Foraging Wetlands**, or (3) **Over-wintering Wetlands**. Enter one value that best describes each habitat variable during the appropriate season, using the numbers in the value column. Habitat variables are in shaded boxes; ranges of condition are directly below each variable. **If condition is outside range or is not described, enter a zero.**

Project Area and Habitat Area: The project area includes the entire area affected by the project. The habitat is the area that will provide (in case of pre-project) or does provide (post-project) habitat for each potential target species within the project area. The habitat area may be the same size as the project area or it might be smaller and it may be defined differently for different target species. If there is contiguous habitat area outside the project area, note the size and whether the ownership of the contiguous areas is the same or different and whether it is under conservation easement or other habitat protection. If the habitat area within your project area is noncontiguous and/or if sections are in very different conditions, consider using multiple scorecards so that each scorecard represents the general conditions. If you use multiple scorecards, identify each habitat area on a map.

Adult Foraging Wetlands (e.g., wet meadows, emergent marshes, small streams, shallow areas of other wetlands)

Key habitat variable and conditions	Value	Pre-Project	Expected Post-Project	Actual Post-Project
Date of assessment				
Height of herbaceous cover				
2 – 20 inches	22.5			
>20 – 40 inches	15.0			
>40 – 80 inches	7.5			
Predominant depth of water				
moist soil – 4 inches	21.3			
>4 – 8 inches	14.2			
>8 – 12 inches	7.1			
Percent of herbaceous cover (answer for ONLY one, using best option)				
Percent of herbaceous cover in wet meadows				
>80%	20.2			
>60 – 80%	13.5			
40 – 60%	6.7			
Percent of herbaceous cover in other wetlands				
25 – 50%	20.2			
>50 – 75%	13.5			
<25% or >75%	6.7			
Distance to good breeding habitat				
<0.5 mile	18.0			
0.5 – 1 mile	12.0			
>1 – 1.5 miles	6.0			
Distance to good over-wintering habitat				
<0.5 mile	18.0			
0.5 – 1 mile	12.0			
>1 – 1.5 miles	6.0			
Total (of 100 possible): add all numbers in before or after columns				

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Habitat Scorecard for Leopard Frogs (v. Nov 2020)

Assessment of habitat before and after restoration or management actions

Adult Foraging Wetlands *continued.*

If possible, document the following (no scoring)	Pre-Project	Expected Post-Project	Actual Post-Project
Date of assessment			
pH of water			
Presence of predatory fish, salamanders, and bullfrogs (Y / N)			
Occurrence of deformed frogs (Y / N)			
Occurrence of dead frogs (Y / N)			

Habitat Scorecard for Leopard Frogs (v. Nov 2020)

Assessment of habitat before and after restoration or management actions

Project Name: _____ Project Area (acres): _____ Habitat Area (acres): _____

Size of Contiguous Habitat outside Project Area (acres): _____ Ownership (circle): Same / Different / Conservation Easement

Scorecard Instructions: Select appropriate checklist: (1) **Breeding Wetlands**, (2) **Adult Foraging Wetlands**, or (3) **Over-wintering Wetlands**. Enter one value that best describes each habitat variable during the appropriate season, using the numbers in the value column. Habitat variables are in shaded boxes; ranges of condition are directly below each variable. **If condition is outside range or is not described, enter a zero.**

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Over-wintering Wetlands (oxbows, deep ponds and emergent wetlands, stream channels, warm water sloughs, gravel pits, and reservoirs)

Key habitat variable and conditions	Value	Pre-Project	Expected Post-Project	Actual Post-Project
Date of assessment				
Freezing potential				
All years: Water does not freeze to bottom (usually >40 inches in colder areas or fed by warmer water)	23.3			
Most years: Water does not freeze to bottom	15.5			
Few years: Water does not freeze to bottom	7.8			
Water quality				
No visual evidence of turbidity or other pollutants.	22.1			
Some turbidity or presence of other pollutants, but limited to small and localized areas within the wetland; water may be slightly cloudy	14.7			
Water is cloudy or has unnatural oil sheen, but the bottom is still visible (note: if the sheen breaks apart when you run your finger through it, it is a natural bacterial process and not water pollution)	7.4			
Distance to good breeding habitat				
<0.5 mile	18.6			
0.5 – 1 mile	12.4			
>1 – 1.5 miles	6.2			
Distance to good foraging habitat (e.g., wet meadows, ponds, small streams, riparian wetlands)				
<0.5 mile	18.6			
0.5 – 1 mile	12.4			
>1 – 1.5 miles	6.2			
Percent of submergent vegetation				
>30 – 60%	17.4			
10 – 30%	11.6			
<10%	5.8			
Total (of 100 possible): add all numbers in before or after columns				

If possible, document the following (no scoring)	Pre-Project	Expected Post-Project	Actual Post-Project
pH of water			
Presence of predatory fish, salamanders, and bullfrogs (Y / N)			
Occurrence of deformed frogs (Y / N)			
Occurrence of dead frogs (Y / N)			