COLORADO STATE PARKS
STEWARDSHIP PRESCRIPTION

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Revised:
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Parks Affected: All

Frog and Toad Survey Protocol

Stewardship Rx

This prescription was derived in part from the Frogwatch USA Web Site.

ISSUE

Over the past 150 years, amphibians (frogs, toads, and salamanders) have been particularly hard hit by rapid growth in agriculture, industry, urban development, and environmental changes such as acid deposition and chemical contamination.

It is well recognized among scientists that amphibian populations have declined. Several species are now extinct and once-thriving populations have diminished in numbers. Habitat loss, exposure to contaminants, ultraviolet radiation, introduced species, parasites, and fungal diseases are some of the factors identified as influencing amphibian declines.

Understanding the decline of amphibian populations is crucial in uncovering how people's activities are affecting water quality, wildlife habitat, ecological processes, and other aspects of our environment.

INTENT

The intent of this management prescription is to provide park managers with sufficient information ***to determine where breeding populations of frogs and toads may occur on the lands under their management.***

The prescription seeks to provide specific guidance for:

- Collecting important information about frog and toad populations in the park
- Promotes an appreciation for the presence of frogs and toads
- Fosters an understanding of the importance of wetlands

OVERVIEW OF FROGS AND TOADS IN COLORADO

There are 17 species of frogs and toads in Colorado. With the exception of the bullfrog, all are native. The boreal toad is the species with the highest recognized conservation rating. The state of Colorado considers the species endangered the US Fish and Wildlife Service considers it a candidate species. Most other species are considered to be of special concern to the state. The table below contains a listing of the frog and toad species found in Colorado and their conservation status.

According to Hammerson (1995), most of the amphibians occurring in Colorado are demonstrably secure at a global scale. Nevertheless, restricted ranges and habitat that have been the target of considerable destruction has created a situation where species are vulnerable to extirpation (local extinction). Such is the case with the boreal or mountain toad.

Common Name	**Scientific Name**	**Status (State:CNHP)**
Northern cricket frog	*Acris crepitans*	SC: G5/SH
Western, Mountain or Boreal toad	*Bufo boreas*	E: G4T1Q/S1
Great Plains toad	*Bufo cognatus*	Not rated:G5/S4
Green toad	*Bufo debilis*	Not rated:G5/S2
Red-spotted toad	*Bufo punctatus*	Not rated: G5/S4
Woodhouse's toad	*Bufo woodhousii*	Not rated: G5/S5
Western narrow-mouthed toad	*Gastrophryne olivacea*	SC:G5/S1
Western or Striped chorus frog	*Pseudacris triseriata*	Not rated: G5/S5
Plains leopard frog	*Rana blairi*	SC;G5/S3
Bullfrog	*Rana catesbeiana*	Exotic
Northern leopard frog	*Rana pipiens*	SC:G5/S3
Wood frog	*Rana sylvatica*	SC:G5/S3
Couch's spadefoot	*Scaphiopus couchii*	SC:G5/S1
Plains spadefoot	*Spea bombifrons*	Not rated: G5/S5
Great Basin spadefoot	*Spea intermontana*	SC:G5/S3
Southern or New Mexico spadefoot	*Spea multiplicata*	Not rated: G5/S4

STEP ONE: Familiarize with Species and their Sounds

Begin with the list above, and review the range maps and habitat descriptions in Hammerson (1999). Your district wildlife manager (DWM) may be able to provide you a copy of the book and assistance in developing a local list. Your park's stewardship plan may have this information readily available.

The best way to learn the different calls of your local frog and toad species is to listen to recordings of them until you feel that you can competently identify and differentiate between them outside and at night. There are commercial frog and toad calling recordings that you can purchase or find at your local library. Again, your DWM may have access to some of these recordings. The most appropriate recordings invariably lack some of the species that occur and include some species that you will not find. Many bookshops, nature stores, and museum shops sell these recordings. Check this link for suggestions on recordings.

STEP TWO: Protocol for Observation and Recording of Data

A. Make sure that you have the necessary equipment and that you are ready to monitor at an appropriate time during the year to hear breeding frogs and toads.

- Hard copy of the sampling protocol
- Hard copy of the calling index and the Beaufort wind scale.
- Data sheet photocopied on water-resistant paper (or on a clipboard with a waterproof cover)
- Pencil or indelible ink pen
- One flashlight per person
- Extra flashlight (just in case)
- Thermometer
- Watch

The breeding season of a given species depends upon temperature, rainfall, length of the day, and biological factors for a specific locality. A species may call year round in one part of the state and only for a few months in another place.

At your site, some species can be heard vocalizing early in the year, as wood frogs (*Rana sylvatica*) while the breeding season for others starts later in the year. Consult Hammerson (1999) for specific information about the breeding seasons of your local frog and toad species.

B. Arrive at your sampling location around sundown, so you can take notes about changes to the site. You can start 30 minutes after sunset or later. Remember to keep a distance between you and the site. This will ensure that the breeding area is left undisturbed.

C. Record the weather information that is asked for on the data sheet.
    - Air Temperature
    - Wind Speed (using the Beaufort Wind Scale—appendix A)
    - Current Precipitation
    - Weather History

D. Stay quiet for a couple of minutes before starting to listen for frogs and toads. Remain as quiet as possible during this time so you do not disturb the frogs and toads – they may stop singing if you make too much noise.

E. When you are ready, cup your hands around your ears and listen for three minutes. After three minutes, record:
    - The time you started listening.
    - The time you stopped.
    - The different species that you heard.
    - The calling intensity for *each species separately*. Use the calling index below.

    Start over if you are disturbed – for example, an airplane flies overhead, or a car drives past you. Remember to change the time you started on your data sheet.

CALL CODE	DESCRIPTION
0	No frogs or toads can be heard calling.
1	You can clearly hear all individuals of a species and can count them easily: Individual calls are not overlapping.
2	There is some overlap of calls between individuals of a species, but individuals are still distinguishable: A fairly accurate count is possible, based on location of the calls or differences in their voices
3	A full chorus. Calls for a species are a blur of sound: calls are constant, continuous, and overlapping. There are too many to estimate the number of individuals.

F. If you are not sure about what you are hearing, bring your recording of frog and toad calls with you for a reference.

STEP THREE: DATA SHEETS

A sample data sheet is included in appendix 2. You will need to customize this data sheet for your park. Make as many copies hard copies as necessary to record monitoring information. You will need one data sheet for each site 10 sites for each three monitoring events.

STEP FOUR: MONITORING IN THE FIELD

Visit you sites after dark, after a rain, when it not very windy (wind speed less than 8 mph). Wait one minute after arrival and then listen for three minutes at each site. Record the information required on the data sheet.

Ideally, your sites would be monitored twice a week during the breeding season. However, some fundamental information is available if you monitor only tree times. The first monitoring event should take place early in the breeding season when nighttime air temperatures are about 45 degrees Fahrenheit, the second midway through the breeding season at 55 degrees and the third near the end of the breeding season with nighttime air temperatures of 65 degrees.

CONTACTS

United States Geological Survey: Biological Resources Division
Numerous monitoring programs.

Frog web
Web sites: www.frogweb.gov/index.html
www.frogweb.gov/adopt.html

United States Fish and Wildlife Service
Frogwatch USA coordination

Frogwatch USA Coordinator
Patuxent Wildlife Research Center
US Geological Survey - Biological Resources Division
12100 Beech Forest Road Laurel, MD 20708-4038
Phone: (301) 497-5819
Fax: (301) 497-5784
Email: frogwatch@usgs.gov or Gideon_Lachman@usgs.gov

Frogwatch USA web site: www.mp2-pwrc.usgs.gov/FrogWatch/index.htm

Colorado Division of Wildlife
Colorado Frogwatch, species identification, access to field guides, recordings

Tom Nesler Aquatic Nongame Specialist
Coordinator, Colorado Frogwatch Program
(303) 291-7451

Colorado Frogwatch web site: www.dnr.state.co.us/wildlife/cwc/spr94/spr94-3.html

You can also contact your local District Wildlife Manager. If you need information about getting in touch with your DWM, call the nearest regional office.

Regional Offices

Colorado Springs	719-227-5200
Denver	303-291-7227
Ft. Collins	970-472-4300
Montrose	970-252-6000
Grand Junction	970-255-6100

Colorado Herpetological Society
Species identification, assistance with survey work, review of vocalization recordings

P.O. Box 150381 Lakewood, CO 80215-0381
info@coloherp.org 303-905-6848 - (Voice Mail) Web Site: www.coloherp.org

SELECTED REFERENCES

Hammerson, G. 1999. Reptiles and Amphibians in Colorado (2nd ed.). University Press of Colorado and the Colorado Division of Wildlife. 484 pp.

Heyer, W.R., ed. 1994. Measuring and monitoring biological diversity: Standard methods for amphibians. Smithsonian Institution Press. Washington, DC. 364 pp.

APPENDIX A:
Beaufort Wind Scale
From the Frogwatch Protocol
www.mp2-pwrc.usgs.gov/FrogWatch/How/Protocol/BeaufortScale/beaufortscale.htm

Beaufort Wind Scale	Wind Speed (mph)	Description
0	<1	CALM: smoke rises vertically.
1	1-3	LIGHT AIR: rising smoke drifts; weather vane inactive.
2	4-7	LIGHT BREEZE: leaves rustle; can feel wind on face.
3	8-12	GENTLE BREEZE: leaves and twigs in constant motion; small flags extend.
4	13-18	MODERATE BREEZE: moves small branches; raises dust and loose paper (too windy to monitor).
5	19-24	FRESH BREEZE: small trees in leaf begin to sway (way to windy to monitor).

The Beaufort Wind Scale is a scale for estimating wind speed based on observing the state of the sea. The scale is named for Sir Francis Beaufort, an admiral of the British navy, who developed the measurement from 1750-1770. For many centuries it was known that the strong the wind speed, the more turbulent the sea. Sir Francis carefully noted the effects of these wind variations and summarized his findings in a 12-point rating that ranges from a calm with mirror-like sea surface to hurricane conditions with waves over 30 feet high. The scale has been adapted for use on land based on observations of the wind's effects on trees and debris.

APPENDIX B
DATA SHEET

(EDITABLE SAMPLE PREPARED FOR ROXBOROUGH STATE PARK)

STATE PARK
FROG AND TOAD SURVEY:

Site Number:_____ Site Name/Description:_____ Date: _____

Run your survey after dark, after rain, and when it is not very windy (wind speed less than 8 mph). Listen for 3 minutes (wait 1 minute after arrival) at each stop and record a **Call Index** value under each stop number.

0 No frogs of given species calling
1 Individuals can be heard and there is space between the calls you hear.
2 Calls of individuals can be distinguished but there is some overlapping (e.g. between **1** and **3**)
3 Full chorus for the species. Calls are constant, continuous, and overlapping.

When you begin and end each run, record the Time, the **Sky Code,** and the **Wind Code**.

Sky Condition

0 clear or only a few clouds
1 partly cloudy or variable
2 drizzle
3 showers
4 fog

Wind Condition (Beaufort Wind Scale)

0 less than 1 mph; smoke rises vertically
1 1-3 mph; smoke drifts with the wind
2 4-7 mph; wind felt on face; leaves rustle
3 over 8 mph; leaves and small twigs in constant motion; wind extends light flag

DO NOT SAMPLE WHEN WINDS > 8 mph

Please write in pencil. Strike out errors (do not erase). Use the back of the sheet for comments, including difficulties (background noise, observed changes in habitat, uncertainty of species, etc.).

Return completed forms as soon as possible and at latest by September 1 to:

Roxborough State Park
4751 N. Roxborough
Littleton, CO 80125

Surveyor's name(s)_____

Circle Run Number:

1 (45^o F+)
2 (55^o F+)
3 **(**65^o F+)

BEGIN
Time:
Wind:
Sky:
Air Temp (F):

END
Time:
Wind:
Sky:
Air Temp (F):

ENTER CALL INDEX

Species Name \ Stop #	1	2	3	4	5	6	7	8	9	10
Northern Leopard Frog										
Western Chorus Frog										
Woodhouse's Toad										

Rana pipiens

Bufo woodhousei