



	<b>COLORADO STATE PARKS</b> <b>STEWARDSHIP PRESCRIPTION</b>	
<p><b>Date Created:</b> December 22, 2000 <b>Revised:</b> April 1, 2000 <b>Author:</b> Robert Fenwick <b>Parks Affected:</b> All parks</p>	<b>Rattlesnake Management</b> 	

**Information for this prescription was derived in part from Reptiles and Amphibians of Colorado, 2<sup>nd</sup> Edition by Geoffrey Hammerson, and conversations with and review by Park Managers and professional biologists.**

**ISSUE – Why should I care about rattlesnakes?**

For many Colorado residents and visitors, the rattlesnake is a poorly understood and often highly feared and persecuted member of the natural landscape. Much of the concern and fear associated with rattlesnakes has to do with their ability to seriously injure or even kill humans that encounter them. Each year in the U.S., approximately 8,000



-10,000 people are bitten by venomous snakes of all kinds, including rattlesnakes. However, less than 1% (10-15 people), will actually die as a result. In these terms, the honeybees in your garden, the lightning in a spring rainstorm, or even your daily commute pose a much greater danger. Indeed, humans have been much more destructive to the rattlesnake than it could ever be to us. Though still found throughout much of their historic range, rattlesnakes in many areas have declined significantly from natural levels. Automobiles kill thousands of rattlesnakes every year, and many are destroyed to make room for development. Some snakes are legitimately destroyed in the name of human safety, but many are simply killed on sight and without cause. In reality, rattlesnakes are not the evil, bloodthirsty creatures many people envision them to be, but rather are highly specialized, beneficial and effective predators. They deserve and need to be protected as a unique and important component of Colorado’s ecosystems and wildlife heritage.

**INTENT – What do I need to know about rattlesnakes?**

The primary goal of this prescription is to inform and advise state park managers and staff in how to manage rattlesnakes for conservation purposes while minimizing visitor safety concerns. Specifically, this prescription will address:

- Rattlesnake life history, behavior, ecology, and conservation
- The potential danger they pose to humans, livestock and pets
- Means of identifying rattlesnakes and confusion with non-venomous species



- Description of den sites and how to determine den locations
- How to avoid being bitten by a rattlesnake
- Procedures to follow if bitten and what NOT to do if bitten



## What kinds of rattlesnakes live in Colorado?

Of the 19 species of venomous snake in the United States, 15 are rattlesnakes. Rattlesnakes belong to the family of pit vipers and are thought to be some of the most highly developed snakes in the world. Colorado is home to **two** different species of rattlesnake – the Western or **Prairie rattlesnake**, *Crotalus viridis*, and the **massasauga**, *Sistrurus catenatus*.

### **Western Rattlesnake, *Crotalus viridis* – Fact Sheet**



#### **Range:**

- Widespread throughout Colorado and the western U.S.
- Found in most terrestrial landscapes below 9,000 feet in elevation.

#### **Status:**

- Still fairly common in most areas of suitable habitat in Colorado, but decreasing in number due to development, land conversion (agriculture), and long-term persecution. Exact population estimates are unknown.

#### **Size:**

- Averages 70 cm (nearly three feet) in total length.
- Maximum recorded length of just over 100 cm.

#### **Appearance:**

- Coloration varies widely with combinations of red, brown, and gray being most common in Colorado.
- Markings usually consist of regular dark blotches and flecks on a lighter background, and a dark stripe through the eye.

#### **Disposition:**

- Not aggressive, but will defend themselves if threatened or provoked.

#### **Ecology:**

- Prey includes ground squirrels, prairie dogs, mice, rabbits, lizards, and ground-nesting birds.
- Known predators include hawks, eagles, coyotes and other snakes.

#### **Reproduction:**

- Females mature at a minimum age of four years and reproduce every 2-3 years.



- Courtship and mating occurs in early to mid-summer, and litters are produced in late summer and early fall.
- Litters average 5-10 depending on the size and health of the mother.

**Life History:**

- Females often give birth in a sheltered location, such as a mammal burrow or brush thicket and may remain there with their young for several days.
- Baby rattlesnakes usually do not feed prior to their first winter and may hibernate in adult dens.
- Average growth for juvenile rattlesnakes is about 10-16 cm per year. Adult growth is about 3 cm per year.
- Captive western rattlesnakes can live up to 30 years, but the lifespan of wild snakes is thought to be much lower.

**Massasauga (moss-a-SAW-guh), *Sistrurus catenatus***  
**– Fact Sheet**



**Range:**

- Widely distributed throughout the Midwest, but in Colorado known only from the southeastern plains.
- Restricted to dry grasslands and sandhills below 5,500 feet in elevation.

**Status:**

- Some areas of massasauga habitat in Colorado have been lost to land conversion, but current populations appear stable. A number of privately held cattle ranches support large populations of this snake and these should remain secure as long as natural conditions are preserved. Exact population numbers are unknown.

**Size:**

- Averages 40 cm in total length (about 20 inches).
- Maximum length of about 55 cm.

**Appearance:**

- Usually one or more shades of brown in a loosely checkered pattern.
- Dorsal blotches may be rimmed with white.

**Disposition:**

- Considered shy and not aggressive, but may defend themselves vigorously.



**Ecology:**

- Food items include toads, lizards, small snakes, mice, and centipedes.
- Coyotes, foxes, hawks, and larger snakes are known predators.

**Reproduction:**

- Poorly known for this species, but appear to approximate that of the western rattlesnake-courtship taking place in early summer, and birth in early fall.
- Females are thought to reproduce at a minimum of three years of age.
- Litters average about 6, but may be as large as 11.

**Life History:**

- Newborns average about 16 cm total length
- Growth rates for juveniles and adults have not been studied in Colorado.
- Captive massasaugas may live 20 years, but wild snakes probably do not live as long.

## IDENTIFICATION - How do I know if it's a rattlesnake??

All rattlesnake species share several distinct characteristics in common.

- Large, triangular head
- Heat-sensing pit on snout
- Vertical pupils
- Thick, heavy body
- Distinctive rattle, or a blunt-pointed tail

Perhaps the best identifying characteristic is the rattlesnake's head and body shape. Due to the presence and position of large venom glands on the outside of their upper jaw, rattlesnakes have a **distinctly triangular head** that is much broader than the neck, as shown in the photo below (Courtesy of Steve W. Thompson – used with permission).

### Head of a Prairie Rattlesnake



© Steve W. Thompson



On their snout between the eye and nostril rattlesnakes have a **large, heat-sensing pit** for which the family is named. Rattlesnakes also have **vertical pupils**, like a cat, but getting close enough to a live snake to see the pit or pupils may put you within striking distance!

Rattlesnakes also have **thick bodies** whereas non-venomous snakes, with few exceptions, are lithe and slender. To illustrate, commonly seen racers or garter snakes are often about three feet in length and approximate the diameter of a man's index finger. A three-foot rattlesnake, on the other hand, would be two to three times this diameter, approaching the size of the same man's wrist.

### Rattlesnake rattles



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**The rattle itself is distinctive and unique to these snakes**, but also quite fragile and easily lost. It is not uncommon to find snakes with some or all of their namesake rattle broken or missing. In these instances, and also for very young snakes without a developed rattle, simply look at the end of the tail. Even if the rattle is missing or not developed, a rattlesnake's tail **ends abruptly in a blunt point**. If the snake you observe has a sharply pointed tail, it cannot be a rattlesnake and, at least in Colorado, is non-venomous.



**Prairie rattlesnake-sans rattle.** (photo courtesy of Steve W. Thompson)



## ECOLOGY AND BEHAVIOR:

Unlike many of their relatives, rattlesnakes are not built for speed. They are predators which lie in wait for their prey and may spend hours or even days in the same location waiting for a prey animal to pass by. Their large bodies are designed to help them conserve and store energy for what could be a very long wait for their next meal. This behavior can also aid in identification, as discussed above. Most non-venomous snakes prefer to flee perceived danger and usually have the speed to do so. Rattlesnakes, because of how they are built, often have no choice but to stand their ground when threatened.

### The rattlesnake's line of defense:

- 1) **Camouflage.** Rattlesnakes are highly cryptic and blend perfectly with their surroundings. They would usually prefer to not be seen, both for purposes of hunting and for avoiding the hawks, coyotes and other snakes that occasionally prey on them.
- 2) **The Rattle.** If discovered and/or feeling threatened, rattlesnakes will employ their rattle as a warning. The sound emitted is often described as a dry, high-pitched buzzing.
- 3) **The "S" Coil.** If the threat persists, a snake will elevate into an "S" shaped coil and inflate its body to look as large as possible (see photo below). Often the snake will hiss and rattle rapidly. A snake in this position is highly agitated and should absolutely **NOT** be approached.

Prairie Rattlesnake



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- 4) **The Strike.** Lastly, and only if it senses its life is in mortal danger, the snake will strike. Very seldom does a rattlesnake encounter come to the point of a snake striking. This is largely because the snake absolutely needs its venom to survive – it has no other options to subdue its prey. In fact, about one-third of rattlesnake defensive strikes are "dry", meaning that no venom is injected into the wound.



## NON-VENOMOUS MIMICS - But it sure looks like a rattlesnake!

Several of Colorado's non-venomous snakes possess color patterns almost identical to those of native rattlesnakes. Some of these species are even known to mimic the defensive behavior of rattlesnakes – a combination that often results in their demise under a case of mistaken identity. Again, **look for the sharply pointed tail, round pupils and oval-shaped head to distinguish these species from true rattlesnakes.**



**Bullsnake**, (*Pituophis catenifer*)

One of the best known mimics is the gopher snake or **bullsnake**. This is a large snake whose range and diet directly overlaps with the western rattlesnake. The color and pattern of a typical bullsnake approximates that of its venomous cousin and its defensive behavior is nearly identical. Bullsnakes have been observed to coil, hiss and even vibrate their tails when threatened. They may even flatten their heads to mimic the classic triangular shape of a venomous snake (see Hammerson, 1999 for an excellent photo). Taken together, the appearance and behavior of some bullsnakes can produce a very convincing display.



The Great Plains rat snake, or **corn snake**, and the **western hognose snake** (shown at left) can also be easily confused with rattlesnakes. Both are found in areas where rattlesnakes are common and share similar colors, patterns and behavior. The hognose snake likes to burrow and frequents the same sandhill habitat in the southeast corner of the state where the massasauga is found. Hognose snakes are also relatively heavy bodied

and will coil, hiss and strike in a defensive behavior similar to rattlesnakes. Corn snakes are found on the eastern plains and in western slope valleys. Color patterns often closely



approximate the western rattlesnake and this species has been known to coil and vibrate its tail as part of its defensive behavior.

### **When are rattlesnakes active?**

Rattlesnakes have a **fairly predictable pattern of activity**. During the coldest months of the year they shelter in winter dens and usually **resume activity in April or early May**. Once active, adult snakes may **migrate several kilometers** from their dens in search of food. In the spring and fall, cool temperatures require the snakes to **bask in the sun or on warm surfaces** for much of the day. Pavement and other hard surfaces such as trails are often sought out for basking and many times this leads to negative encounters with people and automobiles.

**Hunting usually occurs in the late afternoon and evening** once the snakes have become warm enough for such activity. When temperatures allow, rattlesnakes may also prowl for food in the early afternoon or at night.



Rattlesnake crossing a dirt road.

### **Where do rattlesnakes spend the winter?**

Snakes usually return to the area of their winter den in September and **begin hibernation in October and November**, depending on elevation. Large dens may shelter several hundred rattlesnakes and are often shared with other snake species. In Colorado, **rodent burrows, especially those of prairie dogs**, and the natural cavities of **south and east-facing rock outcrops are preferred den sites**. Rock piles, abandoned cellars and open mine shafts may also be used. Rattlesnakes are often found in high concentrations near their winter dens, especially just before the onset of hibernation. Therefore, **unusual gatherings of rattlesnakes in April and mid-October are a good indication that a winter den site is nearby**. Many rattlesnake “hunts” occur at this time, when cooler temperatures make the snakes particularly vulnerable to human predation.



## Rattlesnake denning area



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### How can I avoid rattlesnakes?

Understanding the biology and behavior of rattlesnakes can go a long way in reducing unwanted encounters. Rattlesnakes are basically creatures of habit and **often bask, hunt, migrate and den in the same areas** year after year.

#### For Park Staff:

**Action: Education.** Whenever possible, park staff should seek to communicate basic information about rattlesnakes and how to avoid being bitten to park visitors. Myths and misconceptions about rattlesnakes abound and a little education can go a long way to benefit both visitors and snakes.

**Action: Restrict use.** Identifying and restricting visitor use in areas of known rattlesnake activity, particularly around den sites and where snakes are known to bask in the sun, will benefit both visitor safety and the snakes. This may include seasonal trail closures during periods of migration from den sites.

**Action: Trail Re-routing.** In areas where trail closure is prohibitive, re-routing portions of the trail to avoid close proximity to sunning or migrating rattlesnakes may be an option to consider. Closed areas should be revegetated with site-appropriate native plants.

**Action: Enforcement.** Strict enforcement of trail regulations will help avoid encounters off-trail where snakes are much harder to see and avoid.

**Action: Clear debris.** Where appropriate and necessary, natural or man-made debris – rocks, logs, heavy brush, etc. should be cleared back a few feet from the edge of trails. Such material could provide cover for rattlesnakes or their prey and lead to negative encounters with visitors. Mowing areas of dense grass cover a few feet back from the trail may also be warranted.

**Note\*\*** Mowing and clearing should not be applied to every inch of park trail, but only in areas where snakes have been observed on a regular basis, such as near probable den locations or along migration routes.



**Action: Snake removal.** Resident snakes may need to be removed if negative encounters with visitors or staff are likely. Pest control agencies, such as Critter Control (303) 770-5969 will remove unwanted animals for a fee. Local fire departments may also be available to remove snakes in emergency situations. Bear in mind that while some snakes are relocated, many are simply killed. Relocation of a nuisance snake to another area of the park should be requested. Unless professionally trained, **PARK STAFF SHOULD NOT** attempt to capture, kill or relocate rattlesnakes in the park.

### **For Park Visitors:**

**Action: Be prepared.** Hikers in rattlesnake country should be knowledgeable and prepared in order to minimize the chances of a snake encounter, and also know what to do in the event a snake is encountered.

**Action: Snakebite protection.** Sturdy leather boots should be the first line of defense. These afford good protection for the feet and ankles that are usually in the closest proximity to rattlesnakes.

**Action: Hike smart.** Hikers should watch where they place feet and hands at all times, being careful to avoid stepping over rocks and logs or reaching into holes that could shelter a resting rattlesnake.

**Action: Limit evening activity.** Extra caution is needed around dusk when the snakes become active and human visibility drops. Gathering firewood (if allowed), using the toilet, etc. should be done before dusk if possible. If late activity is unavoidable, use a light and be sure to wear boots, even in camp!

### **IF A SNAKE IS ENCOUNTERED:**

- 1) **Freeze in place.** Snakes are often heard before they are seen. If you hear a rattlesnake, **FREEZE** in place until you or a companion can locate the animal. Attempting to move away from a snake you can't see may lead you closer to it! Even if the snake is in plain view, **freezing movement will reduce the threat you pose to the snake and help you calmly assess the situation.**
- 2) **Seek to establish a safe distance.** Rattlesnakes can strike to a distance of half their body length, and a good rule of thumb is to **put at least five feet between yourself and the snake.** If possible, move slowly back the way you came.
- 3) **Leave the snake alone.** NEVER, under any circumstances, should you try and catch, kill, or provoke a rattlesnake. Fully **one-third of people who suffer snakebites were bitten as a result of trying to handle or kill the snake.**

### **Why are people bitten and what is the result?**

Rattlesnakes are usually very gracious in terms of their defensive behavior. As has already been described, rattlesnakes have an elaborate defensive strategy that seeks to avoid the need for a venomous bite if at all possible. **Unfortunately, and often because people choose to provoke a defensive snake or are unlucky enough to actually step on an animal, bites do occur.**

**Though usually not fatal for a healthy adult, a bite is nevertheless very painful.**

Rattlesnake venom is hemotoxic and results in the destruction of muscle and soft tissue around



the site of the bite. In prey animals the venom acts not only to subdue, but also begins the process of digestion even before the snake swallows its prey. The same process is in effect when humans are bitten, and tissue damage can be extensive. In extreme cases, reconstructive surgery or even amputation of a finger or limb may be necessary depending on the location of the bite and the immediacy of treatment.

Park staff can provide visitors a tremendous service by being well prepared for such an emergency. **Preparation should involve both training in the proper procedures for treating snakebite and, just as important, knowledge of what NOT to do.** The following is a step-by-step description of how to properly treat someone bitten by a venomous snake beginning immediately after the bite. This information was taken from the following sources: the HerpMed website, the Food and Drug Administration, the American Red Cross, and the Rocky Mountain Poison Control Center.

<http://www.xmission.com/~gastown/herpmed/snbite.htm>

[http://www.fda.gov/fdac/features/995\\_snakes.html](http://www.fda.gov/fdac/features/995_snakes.html)

## **SNAKEBITE EMERGENCY FIRST-AID INFORMATION:**

### **Human victims-**

1. If snake is still in the vicinity, **move carefully away** to a safe location. Find a place where the victim can lie flat and rest comfortably.
2. Encourage the victim to **remain calm and offer reassurance**. Encourage others in the group and yourself to remain calm as well.
3. If in a group, send one member to **notify park staff and the nearest hospital**. **DO NOT** leave the victim alone in order to get help.
4. **Allow the bite to bleed** freely for about 30 seconds.
5. **Cleanse and disinfect the bite area** with Betadine. If unavailable or if the victim is allergic to iodine, use soap and water.
6. If hospital treatment is more than 30 minutes away, and the bite is on a hand, finger, foot or lower arm or leg, **an ACE, or other wide elastic bandage can be used as a pressure dressing**. The bandage should be wrapped quickly from an area just above the bite past the knee or elbow joint, immobilizing it. Wrap no tighter than for a sprain. The goal is to restrict the movement of venom into the bloodstream without cutting off circulation to the affected limb. Check for pulse above and below bandage and rewrap if too tight.
7. If available, **apply a Sawyer Extractor to the bite** until there is no more drainage. This device is often able to remove some venom from the wound and creates a negative pressure gradient that slows the spread of venom into the body. (This is a very beneficial device recommended by the Rocky Mountain Poison Control Center and experts in medical herpetology. For more information and ordering, see the following websites: [www.xmission.com/~gastown/herpmed/sawyer.htm](http://www.xmission.com/~gastown/herpmed/sawyer.htm) and [www.backcountry-equipment.com/accessrs/a-emerg/venom\\_extractor.html](http://www.backcountry-equipment.com/accessrs/a-emerg/venom_extractor.html))
8. If an extractor is not available, **apply direct pressure to the bite** using a 4x4 gauze pad folded in half twice. Soak the pad in Betadine and tape it in place.
9. **Remove all rings, watches, jewelry and tight fitting clothing**. The bite area and most of the bitten appendage will swell.



10. **Immobilize the bitten extremity** as much as possible, using splints if necessary.
11. Try to **keep the bite location even with the heart**. Raising it above the heart will increase the spread of venom into the body. Swelling will increase if kept below heart level.
12. After administering first aid, **take the victim to the nearest hospital** or medical facility. Move slowly and deliberately, offer encouragement and avoid any unnecessary excitement or stress.
13. If not done previously, **get someone to call ahead** to the nearest hospital so that it will be prepared for the victim's arrival.

#### AT THE HOSPITAL:

1. Ask staff to **contact Poison Control immediately** at (303) 629-1123.
2. Request that staff **use the Poison Control physician consultants** and also obtain antivenom available through the hospital pharmacy
3. **Leave pressure bandages in place** until antivenom is ready to be administered to the victim.

#### What NOT to do if bitten by a rattlesnake:

1. **Do not assume that a bite is not serious** or that treatment can be delayed.
2. **Do not leave the victim** alone in order to get help.
3. **Do not apply oral (mouth) suction to the bite**. Such action has the potential to introduce harmful bacteria into the wound that could cause sepsis. Also, venom will pass into the would-be-rescuers system through any cuts or sores in the mouth.
4. **Do not make any sort of incision** into or around the bite marks. This will only increase trauma to the bite location and further agitate a victim who needs to remain as calm as possible.
5. **Do not apply a narrow, constrictive tourniquet** such as a belt, shoelace or cord. Restricting blood flow in this manner puts the bitten extremity at a high risk for amputation.
6. **Do not engage in strenuous physical activity**. This will only speed the spread of venom to vital organs.
7. **Do not apply ice, hot or cold packs** to the bite. These have no proven beneficial effects and may compound tissue damage through burns or frostbite.
8. **Do not use a stun gun or electric shock treatment** of any kind. Electric shock also has no proven beneficial effect and increases victim stress and trauma.
9. **Do not allow the victim to drink alcohol, take aspirin or use any medication**.
10. **Do not give the victim anything to eat or drink** unless approved by the attending physician.
11. **Do not remove pressure dressings** until antivenom is available.
12. **Do not waste time or take any additional risks attempting to kill or capture the offending snake**. The only wild venomous snakes in Colorado are rattlesnakes and treatment is the same for both species.

#### Canine victims (i.e. pet dogs) –

1. Move a safe distance away from the snake and calm the dog.



2. Clean the wound with soap and water and treat with antibiotic ointment if available.
3. A Sawyer or other venom extractor should not be used because the dog's hair will prevent a good seal from forming.
4. Limit physical exertion and get the animal to veterinary care immediately, calling ahead if possible.

**Livestock victims (i.e. horses) – (c) 1994, Willis Lamm, *TrailBlazer Magazine***

1. Stay calm and get safely away from the snake. Forget about going after the snake and focus your attention on settling the horse down.
2. Constricting bands may be applied similar to those used on humans for bites on the lower leg.
3. For nose and face bites, insert a piece of garden hose, about 5 to 6 inches long, into each nostril. These may have to be taped at first, but soon the swelling will secure them in place. (Two pieces, cut from an old, stiff garden hose, should be carried whenever riding in rattlesnake country.)
4. Trailer the horse to veterinary care or try to get the vet to come out to the horse. Try not to walk the horse unless absolutely necessary.
5. To avoid complications due to tissue damage, do not delay getting veterinary help for the horse.

As with humans, DO NOT cut the bite, DO NOT apply a tourniquet, and NEVER try to suck out the venom by mouth.

**Important Facts to Remember!!!**

- Rattlesnakes are highly developed predators that are poorly understood and often unjustly persecuted.
- Rattlesnakes are an important component of many Colorado ecosystems and should receive the same protection as other wildlife species.
- Rattlesnakes have an elaborate defensive strategy that seeks to avoid the need for a venomous bite.
- Rattlesnakes need their venom to hunt effectively and will not bite unless they perceive a mortal threat to their existence.
- Venomous snakebites are very rare and seldom fatal if treated properly.
- Remaining calm and using your head are the best things you can do for a bite victim.



**FOR MORE INFORMATION:**

**[Prairie Rattlesnake](http://www.geocities.com/Baja/Dunes/1845)** (<http://www.geocities.com/Baja/Dunes/1845>)

-This is an excellent website specific to the biology, life history, and behavior of the Prairie rattlesnake hosted by Steve W. Thompson. This site goes into much greater detail about many of the topics included in this prescription.

**[American International Rattlesnake Museum - Albuquerque, New Mexico](http://www.rattlesnakes.com/header.html)**

(<http://www.rattlesnakes.com/header.html>)

-A very good source for all kinds of rattlesnake information, including many excellent diagrams. This is a great site to learn more about the amazing diversity of rattlesnakes and the need to protect them.

**[For Goodness Snakes: Treating and Preventing Venomous Bites](http://www.fda.gov/fdac/features/995_snakes.html)**

([http://www.fda.gov/fdac/features/995\\_snakes.html](http://www.fda.gov/fdac/features/995_snakes.html))

-This is a good site supported by the FDA, and includes much detail on the medical effects and treatment of venomous snakebite.