
Rubber Boas in Radium Hot Springs: Habitat, Inventory, and Management Strategies

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Abstract: Radium Hot Springs in Kootenay National Park, British Columbia is home to a population of rubber boas (*Charina bottae*). This population is of ecological and physiological interest because the hot springs seem to be a thermal resource for the boas, which are near the northern limit of their range. This population also presents a dilemma to park management because the site is a major tourist destination and provides habitat for the rubber boa, which is listed as a species of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). An additional dilemma is that restoration projects, such as prescribed logging and burning, may increase available habitat for the species but kill individual snakes. Successful management of the population depends on monitoring the population, assessing the impacts of restoration strategies, and mapping both summer and winter habitat. Hibernation sites may be discovered only by using radiotelemetry to follow individuals.

Key Words: rubber boa, *Charina bottae*, Radium Hot Springs, hot springs, snakes, habitat, restoration, Kootenay National Park, British Columbia

Introduction

The presence of rubber boas (*Charina bottae*) at Radium Hot Springs in Kootenay National Park, British Columbia (B.C.) presents some unusual challenges for wildlife managers because the site is a popular tourist resort and provides habitat for the species, which is listed as a species of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2004). The rubber boa's COSEWIC status rank results from the fact that the species is rarely found, and its ecology is little known. It is the only species of boa in Canada and one of only two species in the United States.

Rubber boas are rarely encountered because they spend most of their time underground or under rocks (St. Clair 1999). If they are encountered in the open, it is usually at night. They have small eyes, a shovel-like snout, and smooth scales which give them a rubbery appearance (Figure 1). They have a blunt tail that is exposed when the snake curls into a defensive position; thus, the tail is used as a decoy for the head and often bears scars. Rubber boas eat small mammals and reptiles, and in turn are preyed upon by larger mammals and birds.



Figure 1. Rubber boa (*Charina bottae*) (photo: Robert C. St. Clair).

Rubber boas probably grow slowly. The females are relatively large when they first reproduce; therefore, they have a long period of sexual immaturity. In addition, they probably reproduce only once every two to four years and give birth to only two to six large young (St. Clair 1999; Hoyer and Stewart 2000). These life history traits are characteristic of plants and animals that have high survival rates both as adults and young. Populations are, therefore, vulnerable to increased mortality at any life stage.

The objective of this study was to assess impacts on the rubber boa population in Radium Hot Springs, Kootenay National Park. Our questions were

1. Where might rubber boas be found in the park?
2. Where have rubber boas been observed?
3. What further information do we need to manage this population?

Methods

We surveyed Radium Hot Springs and the surrounding park from 29 to 31 July 2003. To predict where rubber boas might be found, we relied on the results of a study done on the autecology of rubber boas in Creston, B.C. (St. Clair 1999). In that study, rubber boas used rocky outcrops in forest openings during the summer and hibernated in adjacent forested areas during winter. These data were derived by using radiotelemetry to follow large females; thus, it was

possible to estimate habitat use rather than relying solely on the ability to find snakes. This was important because snakes could be found only when they were on the surface or under rocks that could be flipped, which was only 25% of the time. In addition, we interviewed present and former hot pool and parks staff, and where possible, recorded descriptions of snakes observed and approximate time and date of those observations.

Results

Around Radium Hot Springs, rocky openings on the south-facing slopes north of Sinclair Creek were similar to habitat used by rubber boas in Creston; however, observations of rubber boas around hot springs are unique to the Radium area. One male boa (43 cm snout-vent length) was found close to the hot pool on 30 July. In addition, pool staff reported that boas were regularly encountered around the pool at a rate of about six per year. Most of these observations were in the spring and fall, although one was in January 2003. Two juveniles were found dead near the pools; the cause of death was unknown. Additional observations were made in the old Warden's Cabin across the road from the hot pools and along the Redstreak Trail, which joins the hot pools to Redstreak Campground.

Discussion

Habitat that is favorable to rubber boas is partly predictable due to their thermal requirements. Rubber boas can be active at temperatures that are low for snakes in general (5°C) (Dorcas and Peterson 1998), but prefer temperatures similar to those when other snake species are active (30°C) (Dorcas and Peterson 1998). In Creston, temperature-sensitive telemetry data indicated that rubber boas attained body temperatures that were generally higher than surface temperatures except when surface temperatures exceeded 30°C (Figure 2). The snakes probably regulated their body temperature in this way by using rocks as both shelter and a thermal resource and by moving up and down in the soil. Similar opportunities to regulate body temperature exist around Radium Hot Springs. In addition, the hot springs themselves are an obvious thermal resource.

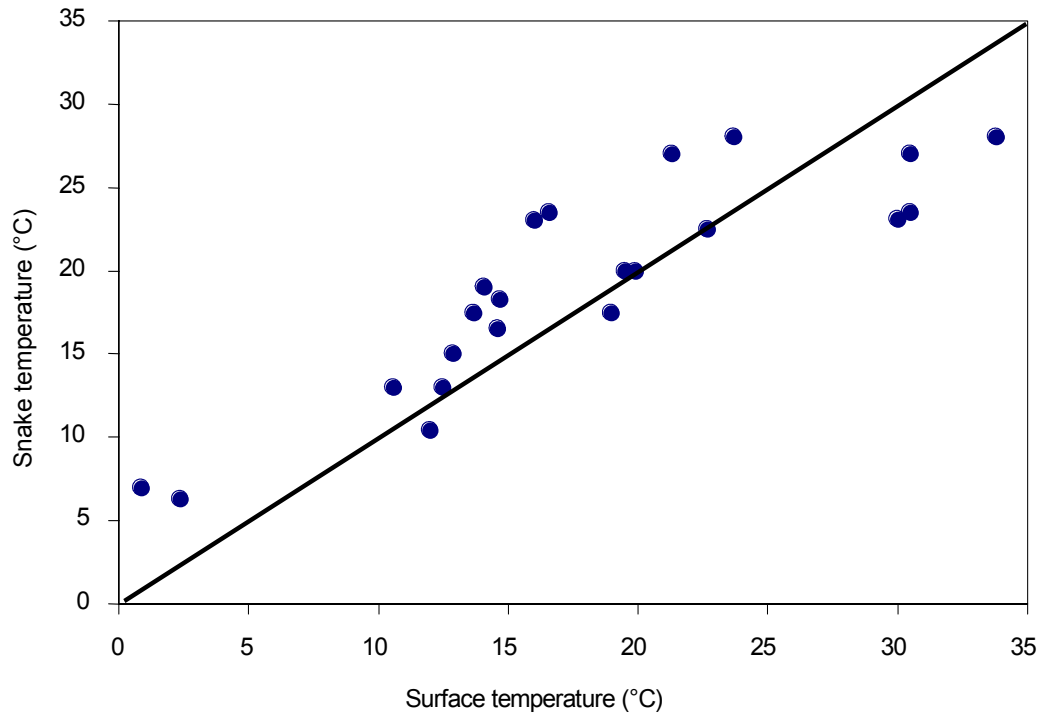


Figure 2. Data from the Creston Wildlife Center, Creston, B.C., indicate that the body temperatures of free-ranging rubber boas are generally above surface temperatures except when surface temperatures exceed 30°C (St. Clair 1999).

Winter habitat for rubber boas is equally as important as summer habitat but is difficult to locate. The use of radiotelemetry at Creston indicated that rubber boas hibernated in groups at about one meter's depth in the soil (St. Clair 1999). These hibernation sites were in the surrounding forest rather than in the open areas that the snakes used during the summer (St. Clair 1999). In Radium Hot Springs, two observations were made in January; consequently, it is possible that some snakes remain active during the winter. We hope to use radiotelemetry to follow individuals and find where rubber boas are hibernating.

Open areas around Radium Hot Springs are increasing due to prescribed logging and burning. Ultimately, this would increase summer habitat for rubber boas; however, the effects of burning and logging could harm individual snakes. These dangers would be moderated by restoring areas during the winter when the boas are underground, but protection of hibernation sites remains a concern. We hope to survey areas before and after restoration, and thereby assess changes in boa habitat. Around the resort, restoration and melioration of habitat for rubber boas and other species could be done by adding rocks or other debris to cleared areas.

Although snakes have been found dead around the hot pools, the cause of death is unknown. Staff and tourists seem to leave the snakes alone, and the facility may have little impact on the boa population. We hope to record rubber boa sightings and enlist the resort staff in monitoring the

population around the hot pools. Through interpretive signs, the public could be informed that they are sharing the facility with an interesting species.

In summary, rubber boas are an interesting and little known part of the ecosystem of Kootenay National Park. We suggest that the population could be monitored and protected by

1. recording rubber boa sightings in and around the hot pools;
2. placing interpretive signs within the facility to increase awareness;
3. increasing habitat structure in open areas around the resort; and
4. mapping hibernation sites by using radiotelemetry.

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