Rubber boas in Radium Hot Springs

Inventory of habitat, record of sightings, and suggestions for management

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Introduction

The protection of cryptic species is a challenge for wildlife managers because little known may be known of the species' basic ecology and habitat requirements. The rubber boa (*Charina bottae*) presents such a challenge because it is both nocturnal and burrowing. Our present knowledge is therefore vague and incomplete. Rubber boas seem to be found in every biogeoclimatic zone in BC except the boreal forest. Habitat requirements seem to be similarly general, ranging from moist coniferous forest (1) and riparian areas with open areas and rotting logs (2) to drier habitats (3) ranging from sea level to 3000 m. Although habitat requirements may seem general on a large scale, physiological traits (ectothermic yet cold tolerant) coupled with limited dispersal suggest that alteration of microhabitat may have a large impact. In addition, the rubber boa's combination of life-history traits (small litter sizes, late maturation, and slow growth) suggests that they would not recover quickly from habitat alteration.

A habitat that has been profoundly altered is the Radium Hot Springs Resort, home to an unusual population of rubber boas. This population is unusual because there are few reports of populations of ectotherms that are found near hot springs (garter snakes at Banff Hot Springs is another). The hot springs represent a thermal resource for the snakes because they are near the northern limit of their range in Kootenay National Park. The accommodation of this population in a heavily used facility such as the Hot Springs is of obvious importance to the ecology of Kootenay National Park. In addition, it is important to assess the impact of restoration projects within the park such as prescribed burns and logging. This report addresses:

1) Impact of the Hot Springs Resort on the population of rubber boas

2) Impact of restoration projects on rubber boas

3) Identification of potential rubber boa habitat

Methods

Interviews

I collected data for the project from July 29th to 31st, 2003. I interviewed staff from the Radium Hot Springs (Table 1) and recorded their sightings of rubber boas: date (if known), location, observations, and details about the snakes.

• Table 1. Observers of rubber boas in and around Radium Hot Springs.

Name	Last	Phone	Position	Employer
Amy	Bespflug		lifeguard	Radium Hot Springs
Alex	Brown	250-347-9212	retired manager	Radium Hot Springs
Alan	Dibb		wildlife biologist	Kootenay National Park
Ken	Fisher	250-347-2128	Chief Operating Officer	Canadian Rockies Hot Springs
Heather	Funnell		lifeguard (7 yrs experience)	Radium Hot Springs
Rob	Gernack		life guard (10 yrs experience)	Radium Hot Springs
Werner	Lutzer		maintenance	Radium Hot Springs
Nancy	Newhouse	250-342-3205	biologist	Sylvan Consulting
Jill	Parry		assistant manager	Radium Hot Springs
Alisa	Samin		life guard (6 yrs experience)	Radium Hot Springs
Vern	Snively		maintenance	Radium Hot Springs
Shelley	Tamelin		lifeguard	Radium Hot Springs
Joanne	Williams		wildlife biologist	Kootenay National Park

Inventory

Trails

I searched along the Juniper trail, Redstreak Campground trail, and trails around the Redstreak campground for a total effort of eighteen hours. In addition to visually searching, I looked under and replaced rocks and woody debris. Based on my research in Creston[4], I identified suitable habitat and recorded these sites using GPS.

Hot pools

I searched around the hot pools including the rock wall east of the pool, rocks piled at the north end of the pool, and the rock wall west of the pool. I searched periodically during the day and returned to search after closing (23:00).

Habitat Features

Temperature

Rubber boas are ectothermic, that is, they rely on ambient temperature to reach their optimum body temperature. Therefore, the higher temperature of the hot pools is an obvious advantage. For example, a boa was observed at the end of January. This thermal advantage may be critical to the boas because the area in general is at a higher elevation than elsewhere in their range.

Structure

Rubber boas are commonly found in rock piles (4). Here, they can absorb heat from the rocks while remaining hidden from predators. On this basis, I identified several promising boa sites in rockslides and rocky areas on the Juniper trail and around the Redstreak campground (Table 2). In addition, rock piles and the rock wall around the hot springs are good rubber boa habitat.

- Table 2. Existing and potential sites for rubber boas in and around Radium Hot Springs

Location	Description	UTM	Elevation (m)	Captures
Juniper trail	rock slide on N. side of Sinclair creek	5609453	926	potential site
Redstreak trail	rock piles	5608760	1070	potential site
Redstreak trail	rock piles	5608806	1109	potential site
Redstreak trail	rock piles	5609002	1108	potential site
Hot pool		5609685	1027	many

Hibernation

The habitat requirements of rubber boas during their active season are fairly well known. Less well known are habitat requirements during the winter. Although there is some evidence that boas can be active during the winter (Table 3), it is usual for rubber boas to hibernate. In Creston, rubber boas were found in rocky clearings during the summer but hibernated communally in the forest.

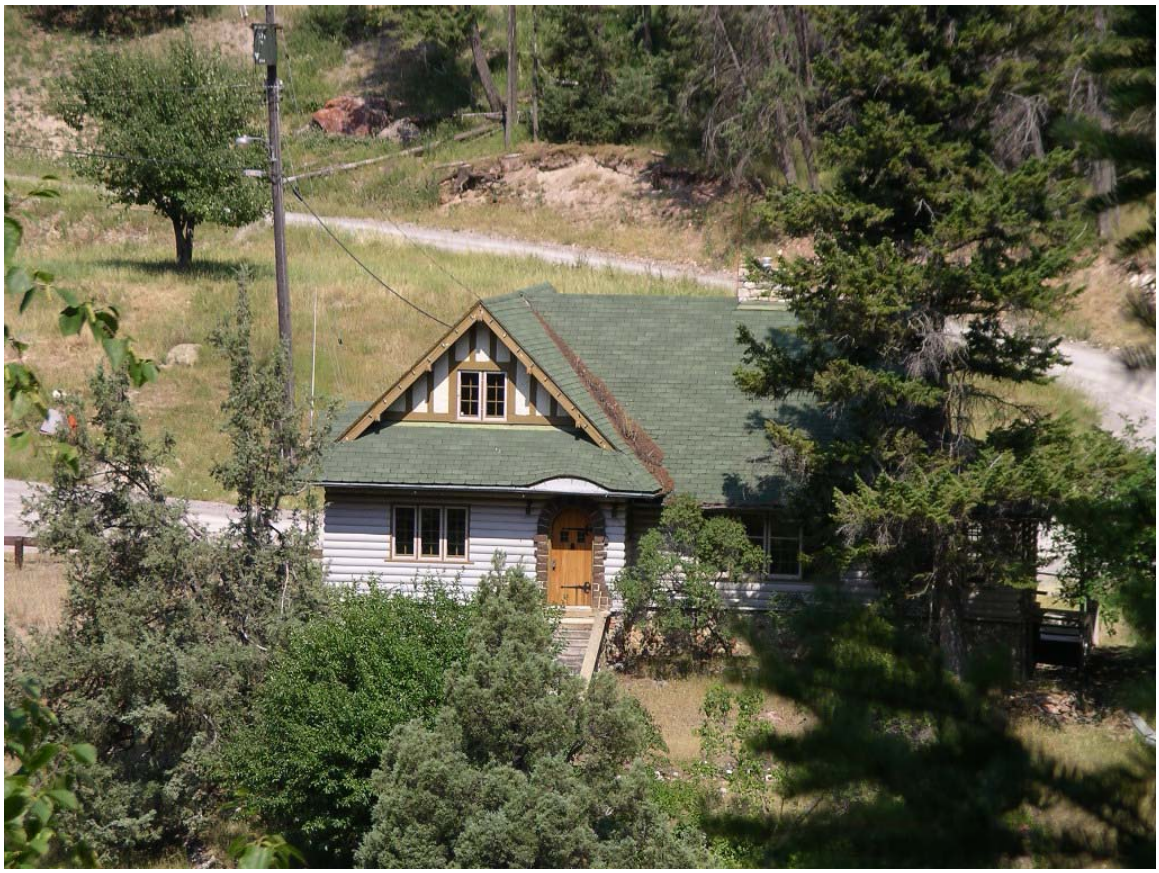
• Table 3. Observations of rubber boas in and around Radium Hot Springs. Observer's initials refer to Table 1.

Date	Observer	Location	Observations	Snakes
unknown	AB	island in hot pool, rock wall, outside pool doors, drainage trough	three to four sightings per year, none drowned	
1999	KF	old warden's cabin, living room, escaped into wall		
unknown	RG	hot pool vicinity	no observations to date in 2003, "lots" in 2002	
unknown	AS	hot pool vicinity	seen about 1 per year	
2003 May	AS	hot pool vicinity	one this year	
	HF	hot pool vicinity	never seen one (7 yrs. Experience)	
2003 end of January, again 3 weeks later	ST	hot pool vicinity		about 30 cm long, wounded
2001 Fall	AB	hot pool vicinity		about 12 inches, earthworm-like (NB author, neonate)
2002 Fall	VS	rocks around hot pool	in rocks	1 m. long
	VS	rocks around hot pool	at door to building	neonate (dead)
30/07/2003	author	ground in rock wall near pool		male 43 cm SVL
2003 June	NN, AD	hot pool	gutter, not much water	dead juvenile
2003 July	WL	west rock wall	small boa eating mouse	
2003	JW	Redstreak trail	on trail	in park records

Site Locations

Old Warden's Cabin

One rubber boa had been found inside the cabin (Figure 1, Table 3). In addition, the rocky slope above the cabin seemed very suitable for rubber boas (). One prediction is that rubber boas could use this slope for summer foraging and hibernate in the house.



• Figure 1. Former Warden's cabin.

• Figure 2. Rocky slope above Warden's cabin.

Main hot pool

Rubber boas have been found around and in the hot pools (Table 2). The rocky slopes around the pools are good rubber boa habitat ().

- Figure 3. Rubber boas have been found in the rock walls around the pool. Arrow indicates where I found a boa in July 2003.

Trails

There is a least one record of a rubber boa along the Redstreak Campground trail (Table 2). In addition, there are promising sites along the Juniper trail.

Management Recommendations

Radium Hot Springs Resort

Concerns

The pools themselves may represent a hazard to the rubber boas. For example, two of the rubber boas were found dead (Table 3). Drowning is a possibility although I could not find any reports of this happening to snakes in the wild. In general, the rubber boas seem to co-exist with the facility. In spite of the widespread fear of snakes and perhaps because the boas are rarely encountered, I did not hear that it was a problem to have the rubber boas around the pool.

Surrounding areas in Kootenay Park

Concerns

Summer habitat

Outside the Hot Springs but within the park, logging and prescribed burns have been done to re-create previous habitats. These manipulations could adversely affect rubber boas while increasing rubber boa habitat. Obviously, fires and logging equipment could kill rubber boas. However, rubber boas are most often found in forest openings during the summer and the creation of more openings would therefore be expected to increase their summer habitat.

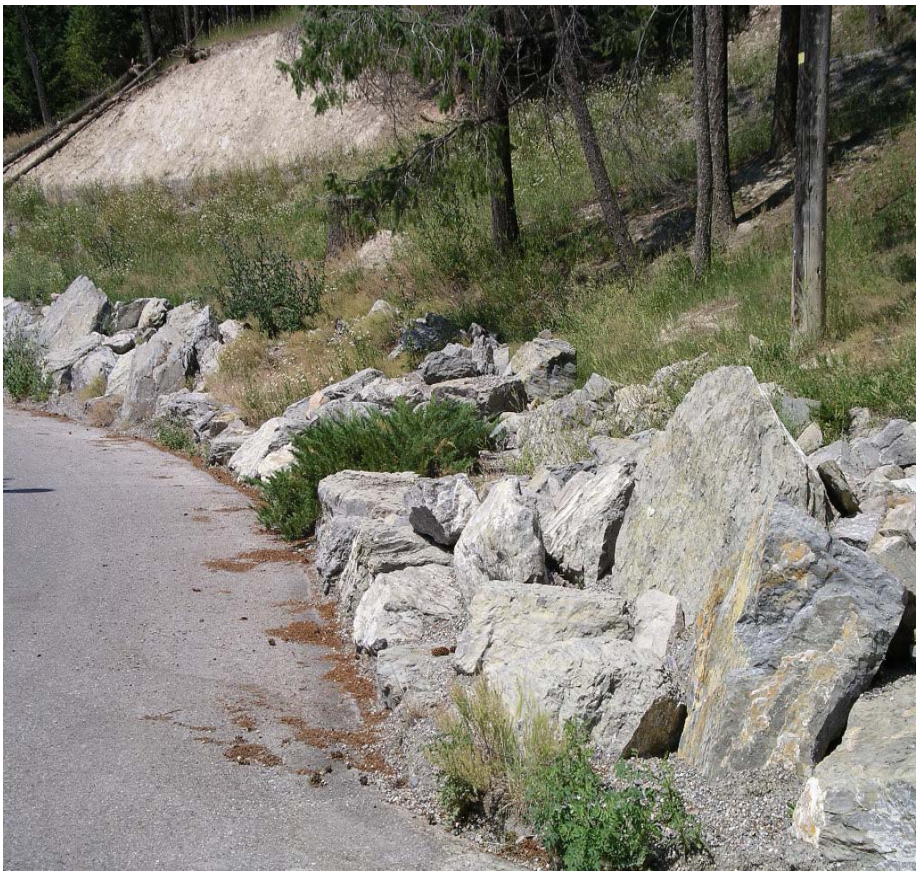
Winter habitat

However, we do not know the effect of logging and prescribed burns on their winter habitat. Our only data on hibernation comes from rubber boas in Creston that were followed using radio transmitters (4). Here I found rubber boas hibernating within the forest and, more important, the rubber boas converged on a few hibernating sites. This suggests that there are critical characteristics peculiar to those sites. We do not know whether present management strategies disrupt hibernation sites.

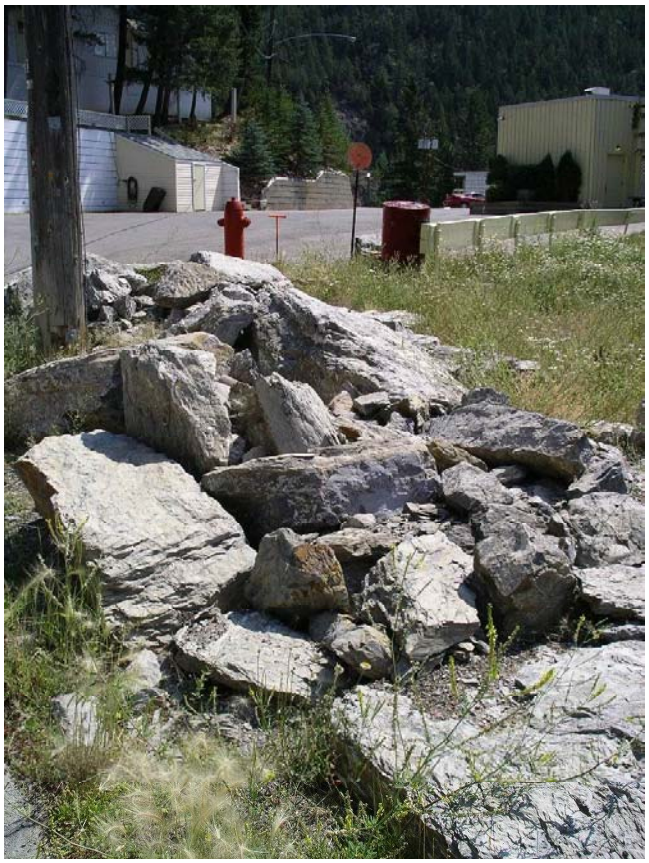
Recommendations

Rock piles

One of the critical habitats for rubber boas is rock piles and rocky outcrops where they can thermoregulate and forage in safety. For example, rock walls should be protected and, where possible, increased (e.g., Figure 4). In addition, rubble could be added to southwest-facing areas, such as lawns (e.g., Figure 5), which are barren of suitable structure (e.g., near Radium lodge,



- Figure 4. Rock wall near Radium Hot Springs Lodge



- Figure 6. Rock pile near Radium Hot Springs Lodge.

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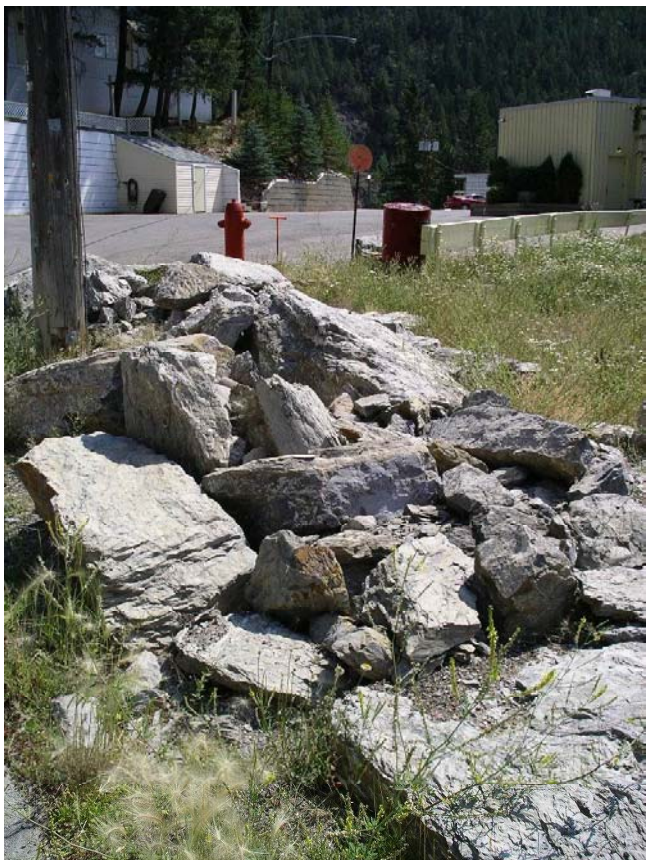
- Figure 5. Open area near Radium Hot Springs Lodge. Here, rock piles would create structure for rubber boas and other species.



- Figure 6. Rock pile near Radium Hot Springs Lodge.

Hot pools

If monitoring of the resort (see below) indicates that rubber boas should be excluded from the public pool, a low fence between the gutter and the pool could be constructed. However, the rubber boas could add ecological interest to the pools. I suggest that interpretive signs be placed around the resort with information on how to contact wildlife specialists in the park.

Future research/monitoring

Inventory

Surveying for rubber boas takes considerable effort. For example, in Creston, where there is certainly more rubber boas, approximately 1000 search hours yielded 65 snakes or about one snake every 16 hours. This effort can be maximized by searching when the snakes become active because they are often aggregated when they emerge from hibernation, probably around late May in Radium.

Including others in the inventory would be most efficient and economical. Local naturalists are usually eager to participate in finding and recording rare species. In addition, personnel at the Hot Springs resort were very cooperative in this survey and may be willing to participate further. I suggest that personnel could record time and date of sightings and descriptions of the snakes. Wildlife specialists at Parks Canada should be notified and, if possible, the snakes collected, measured, and the sex of the snake determined. These measurements provide useful information on population structure. Snakes can be individually recognized by scale patterns (Hoyer, pers. comm.) and thus, a mark-recapture estimate of the population size may be possible.

Effects of restoration projects

Prescribed burns

Although creating openings in forested areas will likely increase suitable habitat for rubber boas (see above), prescribed burns may kill some individuals. Therefore, these burns could be monitored for their effects on rubber boas. Where burns are prescribed, the area could be searched for rubber boas before and after the burn. Because the snakes are difficult to find, risk due to fire may be estimated by placing temperature loggers (e.g., Hobos™) in likely boa habitat.

Timing of burns is likely important. Burning an area before the boas are active would minimize danger because boas are at least a metre underground during the winter ().

Prescribed logging

Again, logging likely increases suitable habitat for rubber boa but mechanical disturbance from logging may harm individuals. Likely boa habitat, such as rock piles, could be left undisturbed. In addition, areas in which logging is prescribed should be searched before and after the logging has taken place. Similarly, disturbance could be scheduled for times in which the boas are inactive.

Restoration/demolition of buildings

Because rubber boas have been found in nearby buildings (i.e., such as the Old Warden's Office), I recommend that care be used when altering or demolishing these structures. This care may require limiting the use of large machinery when demolishing these structures.

Location of hibernacula

At present, we do not have enough information to be able to predict where winter habitat may be located. Location of these hibernation sites is necessary for more complete management of this species because they seem to hibernate communally. Because they hibernate communally, protection of a few key overwintering sites may be important. To locate these sites, one has to capture snakes of sufficient size to carry a radio-transmitter, implant the transmitters, and follow the snake to the hibernacula (). Because the snakes do not move far, it is usually only necessary to locate them once a week. By locating more hibernacula, it will become possible to predict winter habitat as well as summer.

Summary

Rubber boas are unique and possibly endangered component of the fauna of Kootenay National Park. Here they are near their northern range limit and their presence at Radium Hot Springs is ecologically and physiologically interesting. Because the boas are ectotherms, the hot springs represent a rare and advantageous thermal environment. There does not seem to be any immediate threat to this population but protection of its habitat and systematic monitoring of the population would be valuable.

References

[1] Stewart, GR. 1977. *Charina*, *C. bottae*. Catalogue of American Amphibians and Reptiles. Soc. for the Study of Amphibians and Reptiles. P 205.1 – 205.2.

[2] Stebbins, RC., 1966. A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston. xvi + 279 p.

[3] Hoyer, R. 1974. Description of a rubber boa (*Charina bottae*) population from Western Oregon. Herpetologica 30:275-283.

[4] St. Clair, RC. 1999. Identifying critical habitat for rubber boas in Creston, BC. 1999. Report to Columbia Basin Fish and Wildlife Compensation Program.