

Revelstoke Caribou Rearing in the Wild - Post-Release Monitoring Guidelines

November 30, 2016

This document outlines procedures and objectives for post-release monitoring of caribou from the Revelstoke Caribou Rearing in the Wild project. It expands on direction provided in the document “Protocols and Guidelines for the Rearing Caribou in the Wild Maternity Penning project, February 2014” (Kellner and Serrouya); please consult the original document for context.

This is a living document and will be updated on annual basis.

Project Level Objectives: (copied from “Protocols and Guidelines for the Rearing Caribou in the Wild Maternity Penning project, February 2014, Kellner and Serrouya.)

Objective 1 is a proximate goal, to determine if maternity penning is logistically feasible and can improve the survival of penned calves, relative to unpenned calves, in the Columbia Mountains Ecosystem (CME). This objective is based on monitoring individually marked cows and calves until calves are 10 months old.

Objective 2 addresses our ultimate goal of improving the population-level response of caribou in the Columbia North caribou subpopulation. Depending upon the results of the first objective, the project will use captive rearing as a management tool to measurably improve the recruitment rate, i.e. the proportion of calves in the entire population.

Monitoring Goal: To effectively monitor released caribou, primarily to determine survival, but also to attempt to determine cause and timing of mortality, seasonal habitat movements, and prevent predation of caribou where feasible.

Monitoring Objectives:

- Maintain consistent once per day monitoring (for survival and location) of radio-collared caribou. In case of satellite failure, monitor monthly using fixed wing aircraft or helicopter if necessary.
- If caribou return to pen site for an extended period, take action where possible to deter them from using the area (due to increased predation risk).
- Investigate mortalities using caution and appropriate safety measures within 36 hours of discovery.

- Estimate survival of calves using a fall survey. Therefore, at a minimum, we will have a survival rate to 6 months of age.
- Estimate survival of calves at 10 months of age in March in conjunction with population census.

Radio-Collar Monitoring

Staff and volunteers will work together to ensure radio-collars are monitored once per day via iridium download. The monitoring schedule (with designated monitor) is set up on google calendar called “RCRWmonitoring”. Collar alerts (separation and mortality events) will be sent to our designated monitoring email [\[insert email address and password\]](#).

Radio-collars are monitored in order to a) detect mortalities b) detect calf separations c) to keep track of caribou locations to ensure they are returning to appropriate seasonal habitat d) to check that all collars continue to function properly and transmit regularly.

Caribou locations/mortality status and calf/proximity data should be reviewed once per day (preferably in the morning).

Functionally, this means that the designated monitor will:

1. The current list of collared animals for reference (note some have dropped collars or are dead) is located at: [\[insert link to google drive\]](#)
2. Check the monitoring email [\[insert email address and password\]](#). Look for separation/mortality alerts.
3. Download the data in the monitoring script located here: [\[insert link to google drive\]](#).
4. Determine if each adult collar has successfully transmitted a signal in the past *two* days. Check for mortality events.
5. Look at calf separation/proximity data to determine if there are any alerts, and if collar has logged the presence of a calf in the last *two days*. If separation isn’t working – check that the calf collar has been picked up by at least one other collar in the last *2 days*.
6. Plot recent locations on google earth and confirm caribou are using appropriate seasonal range and have not returned to the pen site. Download the KML here: [\[insert location data is to be downloaded to\]](#)
7. If the monitoring script or KMZ is not up to date in last 6 hours – check the GPS Plus X software. If there are issues – contact Wildlife Technician or Executive Director.

Whoever is responsible for monitoring caribou on a given day will be required to organize any required operational actions or ensure this responsibility has been clearly passed to someone else. Please update the Executive Director or Project Wildlife Biologist once you have initiated a response.

Adult caribou are fitted with GPS/VHF radio-collars with iridium satellite link and proximity, separation and mortality sensors. Adult GPS collars will transmit an Iridium signal every 8 hours under standard conditions. **If a collar has failed to transmit a location for greater than 3 days please inform the project manager.**

In case of mortality signal (of Calf or Adult), a team should be deployed to investigate ASAP and within 36 hours. The mortality status of adults is included with location data and should trigger a mortality email alert.

Each calf collar has a unique UHF tag along with a standard VHF transmitter. Calf UHF collars transmit their unique ID and mortality/alive status every 1.5s to the Adult GPS collar. The Adult collar records the reception and sends regular status messages via Iridium that can be easily checked using Vectronic software. In case of a mortality event of the calf, the GPS collar will immediately send a message via Iridium (typically within 5-10 minutes) but **ONLY** if it is in within range of the GPS collar (up to 130m). This is a highly unlikely scenario.

If the adult collar has not detected its calf UHF ID for over one hour it will send a separation signal to *[insert email address]*. Some discretion is involved with deciding when to investigate separation signals, as calves may be separated from cows while resting (sending a false separation signal). Consult Project Biologist or Wildlife Technician for advice. **If neither is available, proceed to investigate separation events as a mortality if no calf signal has been detected in 12 hours.** A female may return to investigate a dead calf.

If caribou return to the pen site or enter the valley bottom, please inform Project Biologist or Wildlife Technican.

In case of radio-collar satellite uplink failure – caribou should be monitored at least once per month using fixed wing aircraft. *[insert aircraft company contracted for monitoring]* should be contacted for any fixed wing monitoring requirements and one staff member/volunteer familiar with telemetry work should accompany the plane on flights if possible.

Census Monitoring

We will attempt to relocate all penned caribou that were ear tagged (orange adult ear tags in 2016, blue ear tags in 2015, green adult ear tags in 2014, yellow calf ear tags in 2014) and determine if adults are still accompanied by calves. All 2014 adult collars were recovered from the field in May 2015; as of fall 2016 there are still 2 adult and 4 calf collars from 2015 in the field. Efforts at visual sightings will be conducted in February (for calf survival) and in March 2015 in conjunction with standard caribou census efforts.

Mortality Investigations

Objectives of Mortality Investigations: First YOUR SAFETY, second finding and confirming the animal is indeed dead, third, collecting samples, most importantly teeth for aging, and information on cause of death. Note that adult collars do not have a rot-off, but do have a blow-off mechanism set for April 15, 2016. Calf collars are more likely to slip off.

In case of a detected mortality or extended separation signal, the location should be investigated immediately. This is a rough guide to actions to follow:

1. Determine most likely access point. Is it realistic to access by boat/truck/foot? Is a helicopter required? Record last GPS location from transmission.
2. Use the call out list to gather a team of 2 people. At least one must be qualified and experienced in use of firearms. At least one must have experience investigating wildlife kills.
3. Check weather and avalanche conditions - Fill out an avalanche trip plan *[insert location of plan]*.
4. Leave one other person on standby that may be required to pick up a carcass with a truck if you fly one out.
5. If a helicopter is required - use the call-out list to book one. Let them know to bring net and line for slinging an animal out. First choice is *[insert company name]* helicopters. Consult with pilot for feasibility.
6. **Set up a check in.**
7. Gather required equipment:
 - a. Ask pilot to pack long line and net.
 - b. All equipment is located upstairs at *[insert location]*. There is a bin labeled 'mortality investigation'.
 - c. Print maps for the area or at least ensure your GPS has 1:20k scale mapping loaded for the area.
 - d. Ensure you have the correct frequencies.
8. Inform pilot you have bear spray and firearm. Follow their instructions. Consider equipment position for the possibility of having to hover exit.
9. Navigate to site using GPS location. If it's a calf collar use telemetry unit get a rough idea of the location of the mortality. HAZE the area extensively with the helicopter. Be aware that this is UNLIKELY to move a bear.
10. Check the beacon rate of the collar. The Vectronic adult and calf collars do not easily revert to a normal status (60bpms) so a bear moving a carcass will likely not revert the collar to normal. If the collar is back on normal status – try and get a visual to see if it is dead or not, and leave the area.
11. Make a plan with the pilot. If you plan on using bear bangers or firing off warning shots - let him know. Make sure you have radio contact the pilot and with *[insert safety check in instructions]* prior to leaving the helicopter. Ensure they are aware of the possibility of an angry bear in the area.
12. Approach site with caution using appropriate measures for bear and firearm safety. Fire off a bunch of bear bangers as a precaution. All members should

- have bear spray ready, with safety off. Discuss the plan with team members BEFORE you proceed into site. ASSUME THERE IS A BEAR ON SCENE.
13. If there is a bear on scene, your safety is priority. Leave the area.
 14. If there is no bear, one person should continue to stand guard with firearm at ready.
 15. Other person investigates the kill.
 16. Take and record an ACCURATE LOCATION
 17. Take photos.
 18. Remove collar and put it in your bag.
 19. Use clues to determine cause of death. Is there scat on site? Does the carcass look scavenged? Is there evidence of more than one predator spp. on scene?
 20. If the carcass is whole, or mostly whole, long line it out to an easily accessible location. Leave someone to guard it with a firearm.
 21. Collect the samples indicated on the mortality form. Collect teeth (front incisors), whole femur (and do not crack it. It needs to remain intact to avoid desiccation before marrow fat analysis is done)(humerus or jaw as second choice, and any long bone if nothing else is available) and hair (put in paper envelope, don't touch with your fingers!). Estimate condition – look at kidney fat, mesentery fat and fat around heart. Take kidneys with fat if they are there. Look for abnormalities. Skin out anything you can to take a look. Take samples of anything that looks out of order.
 22. **Only if a second long bone is available:** crack it and, record the colour and consistency of the marrow fat, and take lots of pictures of it.
 23. Collect predator hair if possible.
 24. Return to office. **CALL YOUR CHECK IN! LABEL all samples** with VHF frequency, DATE, LOCATION, YOUR NAME, SPECIES and CONTENT of BAG.
 25. If you fly out a carcass arrange for a necropsy - get in touch with Project Wildlife Biologist or Project Wildlife Technician, Local Vets, and/or Provincial Veterinarian. Store the carcass in a freezer *[insert location]*.

Mortality kit checklist

Check	Group Equipment
	Map/Location of caribou
	Frequency of collar and any others in area
	Charged telemetry receiver plus instructions (spare batteries if not a rechargeable unit, spare receiver if possible)
	H-antenna (metal recommended)
	2 cables (receiver to antenna)
	Mic to mic line (to plug into helicopter sound system)
	Earbuds (for receiver)
	Firearms and ammunition Only people with valid Possession and Acquisition License will handle firearms.
	Bear bangers, charges and pistol
	First Aid Kit
	SPOT – and extra batteries
	Collar nut driver (vectronic – caribou)
	Mortality form and Pencils
	GPS with Batteries
	SHARP knives (2)
	Pruning saw
	Large garbage bags (3) Medium plastic bags (3)
	Coin Envelopes
	Swabs
	Camera (CHARGED)

Individual Gear Enough to spend an uncomfortable night in the bush.

Person 1	Person 2	Individual Equipment
		Food and Water
		Bear Spray, bear spray tube for heli
		Headlamp
		Charged Radio plus repeater map
		Avalanche equipment (transceiver, probe, shovel)
		Snowshoes
		Toque, gloves, puffy jacket, etc
		Rain Gear
		Tarp and string
		Gaiters
		Work gloves
		Firestarter and matches /lighter
		Compass
		Bug dope
		Sunscreen