Parks Canada	Columbia Basin Fish and Wildlife Compensation Program	Tembec Industries Inc.
Radium Hot Springs, BC	Nelson, BC	Cranbrook, BC

Translocation of Badgers to the Upper Columbia Valley: 2002/03 Progress Report

March 31, 2003

Prepared by:

Nancy J. Newhouse, R.P.Bio. and Trevor A. Kinley, R.P.Bio.
Sylvan Consulting Ltd.
RR5, 3519 Toby Creek Road
Invermere, BC V0A 1K5
250-342-3205

sylvan@rockies.net

Abstract

The subspecies of the American badger occurring in British Columbia (*Taxidea taxus jeffersonii*) is listed as endangered in Canada and is on the provincial red-list. A trial translocation of badgers from NW Montana to the upper Columbia Valley was initiated in 2002. The goal of the project is to increase the likelihood of long-term badger population viability in the East Kootenay. A secondary objective is to assess the success of translocation of badgers to determine whether released badgers remain in the area where they are released, survive, and successfully breed. It is assumed that local badger populations were historically viable, and that they have declined due to a combination of habitat loss and human-caused mortality.

Badgers were taken on an "as-available" basis, but the decision was made to only translocate juveniles when they were part of a family group. Twelve badgers were captured in NW Montana. Of these, 3 juveniles were released as we were unsuccessful in capturing their mothers. In addition, 2 adult males were released near the end of the trapping session as we were targeting a roughly even sex ratio. The remaining 5 adult males and 2 adult females were implanted with radiotransmitters and released into vacant suitable habitat in the upper Columbia valley. As of January, 2003, 1 male had not been located since 23 September 2002 (possible transmitter failure or long-distance travel), but the remaining 6 badgers were still within the study area. Relative use of high-quality habitats was similar for translocated and resident badgers. Translocations and monitoring of movement patterns, mortality and reproductive success will continue in 2003/2004.

Introduction and Rationale

The East Kootenay Badger Project has been underway since 1996. During this time, 31 resident American badgers (*Taxidea taxus*) have been captured and implanted with radiotransmitters. Research originally focused on the upper Columbia Valley, but the last tagged badger using the upper Columbia had an apparent transmitter failure in 1999, and efforts to find additional animals in that area have been unsuccessful. Thus, most research in recent years has been farther south, in the Kootenay River drainage. Implanted animals have been monitored from the air and ground, and home range, habitat use and demographics have been documented. Partially as a result of this research, the subspecies of badger occurring in British Columbia (*T. t. jeffersonii*) has been placed on the province's "red list", indicating that this species is threatened or endangered provincially, and on the federal endangered list (COSEWIC 2000). Almost all of the badgers in the province probably occur within the East Kootenay and the Cariboo, Thompson-Nicola and Okanagan-Boundary regions, with estimated populations of less than 100 adult badgers in the East Kootenay (N. Newhouse, Sylvan Consulting Ltd., unpublished data), and about 100 in the other regions combined (R. Weir, Artemis

Wildlife Consultants, unpublished data). Therefore, the provincial population is likely about 200 adult badgers.

In the East Kootenay region, virtually all of the badgers occur within the Kootenay River valley and its tributaries. The portion of the East Kootenay region falling within the upper Columbia Valley has reasonably good habitat conditions and badgers were recently relatively common there. Despite this, as of 2003 the upper Columbia almost certainly has fewer than 10 adult badgers and possibly only 1. Reasons for this decline are not completely understood. Vehicle collisions have played a role, while shooting, trapping and possibly unintentional deaths through consumption of poisoned prey (such as ground squirrels) may also have contributed. At some point during the decline, the population likely reached the lower threshold required for successful breeding, resulting in an accelerated rate of decline. There has been no known successful breeding in the upper Columbia since 1995 (Newhouse and Kinley 2003; N. Newhouse, Sylvan Consulting Ltd., unpublished data). Human developments may have impaired movements and therefore breeding opportunities to some degree, but implanted badgers in the upper Columbia exhibited successful movements through or around all of the major potential barriers from 1996 through 1999. Columbian ground squirrels, the main prey species, have possibly been somewhat reduced from historic levels by direct human actions or by the conversion of open habitats to forest through fire suppression, but appear in recent years to be at least stable, and comparable in density to many locations within the Kootenay River drainage having more badgers. Regardless of the exact causes of the decline, recovery within the Upper Columbia based on the few animals remaining or colonization from nearby areas that are themselves at low densities is unlikely.

One of the tools identified in the National Recovery Strategy for American Badger, *jeffersonii* subspecies (Jeffersonii Badger Recovery Team 2002), was translocation of badgers to vacant habitat. In a translocation plan for the East Kootenay, Newhouse (2002) identified several advantages doing translocations early rather than waiting until the local population has been extirpated. These included:

1. Any remaining residents will likely breed with translocated badgers, providing a larger breeding population than would be present if a translocation did not proceed. The breeding success among remaining residents may be improved by increasing the number of mates, particularly if badgers are induced ovulators.
2. Badgers generally re-use existing burrows previously created by themselves or other badgers, and different animals have been recorded using the same burrow at different times on several occasions (Newhouse and Kinley 2001). The presence of existing burrows probably reduces the energetic requirements of badgers and may play a role in their hunting strategy. Releasing badgers soon would facilitate the use of the existing networks of burrows before these structures collapse.
3. Badgers are still “part of the landscape” to residents of the upper Columbia valley. Currently, there is a high degree of local interest in badgers and support for their conservation. If the population is allowed to become extirpated or nearly so for an

extended time and badgers are therefore no longer recognized as a normal part of the local environment, residents are likely to be less supportive of conservation efforts.
4. Fire-dependent ecosystem restoration programs now underway, coupled with increased public appreciation and concern for this species, may allow successful re-establishment and recovery.

We began translocating badgers of the *jeffersonii* subspecies from northwestern Montana to the upper Columbia Valley in the summer of 2002, and propose to continue in 2003. The primary purpose of the proposed continued translocation is to increase the likelihood of long-term badger population viability in the East Kootenay by creating or enhancing the core population and providing new genetic material to a group that has very likely undergone inbreeding due to its reduced size. A secondary objective is to assess the success of translocation to determine whether badgers remain in the area where they are released, survive, and successfully breed. Such information will be valuable both in the East Kootenay and elsewhere in BC where translocation may become necessary. This report summarizes translocation activities and monitoring results to date.

Methods

The general trapping location was selected by Montana biologists based on high-density badger populations. Traps were set and checked by a BC biologist, Richard Klafki, in cooperation with a contract trapper from Montana, Dave Wallace, and a Montana Fish, Wildlife and Parks biologist, Erik Wenum, following methods outlined in Newhouse and Kinley (2001). Between May and August, 2002, 25 days were spent trapping. After capture, badgers were transported to Kalispell, Montana for veterinary examination and implantation of radiotransmitters by Dr. Charlene Esch of the Ashley Creek Animal Clinic. All badgers were de-wormed and had topical flea ointment applied. Badgers were then transported to the border for Canadian Food Inspection Agency veterinarian examination. Six of the 7 badgers were released the day after capture, and one was released 3 days after capture.

Release sites were selected based on the following criteria:
- within or immediately adjacent to the upper Columbia valley;
- high habitat quality extending over a large area, as indicated by recent habitat suitability modeling (Apps et al. 2002) and subjective assessments incorporating recent or imminent changes to habitat conditions;
- evidence of abundant ground squirrel populations;
- evidence of recent use by badgers;
- low risk of vehicle collisions (few roads and/or roads with little traffic);
- relatively low levels of human settlement; and
- low likelihood of colonization in the absence of a translocation.

Badgers were released at existing but currently unoccupied badger burrows within active ground squirrel colonies. Several frozen ground squirrels were provided to each released badger to ensure it had food immediately and an opportunity to develop familiarity with the release site. Translocated badgers were generally monitored aerially twice per month through October, 2002, and once per month from thereafter. This report summarizes results through January, 2003.

Permits

The following procedures and permits were obtained to conduct the augmentation:

- The recovery team submitted an "Application for Permit to Conduct Badger Translocation" in February of 2002 to the Director of Biodiversity, Ministry of Water, Land, and Air Protection. This application was approved in April, 2002.
- A permit to import, transport and release badgers was issued by the BC Wildlife Allocation and Use Section Deputy Director.
- A scientific permit (for collection of samples, radiotagging and tracking) was issued by the East Kootenay Regional Wildlife Section Head.
- A scientific collecting permit was issued by Montana Fish, Wildlife and Parks.
- For each badger, a USFWS "Declaration for Importation of Exportation of Fish or Wildlife (Form 3-177) was completed.
- Each badger was inspected by a veterinarian in Montana and issued a Health Certificate titled "Official Certificate of Interstate Movement".
- Each badger was checked at the border by a Canadian Food Inspection Agency (CFIA) veterinarian.

Results

Twelve badgers were captured from 30 May to 07 August 2002 (Table 1) from a total of 478 trap nights. We implanted transmitters in 5 adult males and 2 adult females. Three kits were trapped but released as they were too small for a transmitter and we were not successful in capturing their mother. Two adult males were also released at the point of capture, as our priority was to translocate females and their kits.

As of January, 2003, at least 6 of the translocated animals were still in the East Kootenay study area, including 5 in or adjacent to the upper Columbia Valley, and 1 in the Kootenay River drainage. The remaining badger either had a transmitter failure or moved out of telemetry range.

The two females moved considerably less than the males (Appendix 1). The range of maximum documented straight-line distances moved from release sites was 6 to 52 km by animals #41 (female) and #35 (male) respectively. There is insufficient data to calculate reliable home range sizes for these animals.

We did not continue to provide supplemental ground squirrels throughout the summer as it appeared that the badgers were effectively hunting on their own, based on the presence of many fresh diggings.

Based on the predictive habitat model developed for this area (Apps et al. 2002), 84% of telemetry locations for translocated badgers were in habitat defined as “good” or “best” quality (i.e. locations the model predicted to have a greater than 50% chance of being habitat).

Table 1. Badgers captured in northwestern Montana and translocated to southeastern British Columbia in 2002.

I.D.#	Sex	Capture Date	Capture Location	Release Location	Release Date	Location January 2003
34	M	30-May-02	about 50 km W of Kalispell	Findlay Creek	31-May-02	Findlay Creek
35	M	31-May-02	about 50 km W of Kalispell	Findlay Creek	01-Jun-02	southeast of Kimberley
N/A	F	01-Jun-02	about 30 km W of Kalispell	capture site	01-Jun-02	not implanted
N/A	F	03-Jul-02	about 30 km W of Kalispell	capture site	03-Jul-02	not implanted
N/A	F	03-Jul-02	about 30 km W of Kalispell	capture site	03-Jul-02	not implanted
37	M	05-Jul-02	about 50 km W of Kalispell	Dutch Creek	06-Jul-02	Windermere Creek
N/A	M	06-Jul-02	about 50 km W of Kalispell	capture site	06-Jul-02	not implanted
38	M	28-Jul-02	about 50 km W of Kalispell	Luxor Creek	31-Jul-02	Dunbar Creek (23-Sep-02)
39	M	01-Aug-02	about 50 km W of Kalispell	Kindersley Creek	02-Aug-02	Frances Creek
40	F	01-Aug-02	about 50 km W of Kalispell	Findlay Creek	02-Aug-02	Findlay Creek
N/A	M	02-Aug-02	about 50 km W of Kalispell	capture site	02-Aug-02	not implanted
41	F	07-Aug-02	Kalispell heliplex	Luxor Creek	08-Aug-02	south of Brisco

Discussion and Conclusions

Preliminary indications from this trial augmentation suggest that translocation may be an effective tool as part of an overall conservation effort. The source population in Montana appeared to be relatively dense. One female was a problem badger from the Kalispell heliplex caught after our project trapping was complete. The remaining 11 were all within about 25 km of each other, with 5 of the 12 badgers caught within a 2 km stretch. There were no significant injuries from trapping or handling, and no deaths were known to occur during the 6 months since translocation.

The 84% of translocated badger telemetry locations falling within high-quality habitat compares to about 88% for resident badger locations (Apps et al. 2002, p.1236). Thus, translocated badgers chose high-quality habitat at about the same rate as resident badgers, and used many of the same areas that had been used previously by resident radiotagged badgers. Monitoring over the next several years will determine survival and reproductive rates of these translocated badgers, but preliminary indications are that at least 6 and possibly 7 of them have survived the first 6 to 8 months. If the translocated animals continue to thrive, this would suggest that habitat in the Upper Columbia valley is capable of supporting badgers and that other ecological or human factors that were

limiting prior to 1999 (but not now) were responsible for the demise of the native population (Newhouse and Kinley 2003). In fact, such limiting factors may have had their effect in the relatively distant past, with the period in which research was conducted reflecting a population that was so small that it was either extremely susceptible to chance effects, or was below a density threshold needed for successful breeding. Any conclusions about changes in conditions can be drawn only if the translocated badgers and their offspring develop into a larger population. However, if this proves to be the case, the most likely factors to have changed would be:

- less direct killing or possibly less secondary poisoning by humans;
- less predation;
- an increased ground squirrel population;
- by chance, the presence of individuals with greater reproductive capacity (this would only explain changes relative to the final phase of the decline, as this would have been unlikely when a larger population was present).

Factors that are unlikely to explain any potential improvement in population viability are the number of roadkills and the amount of open habitat, as both of these factors have almost certainly worsened over time.

Monitoring of translocated badgers will continue in 2003/2004, and up to 10 additional animals will be released. Efforts will focus on capturing females with kits, but badgers will still be taken opportunistically.

Acknowledgements

We thank J. Williams, L. Ingham, A. Dibb, B. Forbes, I. Teske, I. Adams and M. Belcher for administrative and technical support; R. Klafki, E. Wenum, T. McAllister and D.Wallace for field work and photography; R. Washtak for accommodations, and C. Esch and M. Zehnder for implanting radiotransmitters. Financial, technical and administrative support was provided by the Columbia Basin Fish and Wildlife Compensation Program, Montana Fish, Wildlife and Parks, Forest Investment Account, Tembec Industries Inc., and the Ministry of Water, Land and Air Protection. This manuscript benefited from reviews by A. Dibb and L. Ingham.

Literature Cited

Apps, C. D., N. J. Newhouse, and T. A. Kinley. 2002. Habitat associations of American badgers in southeastern British Columbia. Canadian Journal of Zoology 80:1228-1239.

COSEWIC. 2000. Canadian species at risk, May 2000. Canadian Wildlife Service, Environment Canada, Ottawa, Ontario.

Jeffersonii Badger Recovery Team 2002. National recovery strategy for American badger, *jeffersonii* subspecies (*Taxidea taxus jeffersonii*). Prepared for RENEW, Environment Canada, Ottawa, Ontario.

Newhouse, N. J. 2002. Progress report: conservation of badgers in the East Kootenay of British Columbia. Prepared for Columbia Basin Fish and Wildlife Compensation Program, Nelson, British Columbia, Forest Renewal British Columbia, Cranbrook, British Columbia, East Kootenay Environmental Society, Kimberley, British Columbia, Tembec Industries Inc., Cranbrook, British Columbia, and Parks Canada, Radium Hot Springs, British Columbia.

Newhouse, N. J., and T. A. Kinley. 2001. Ecology of badgers near a range limit in British Columbia. Prepared for Columbia Basin Fish and Wildlife Compensation Program, Nelson, British Columbia, and Parks Canada, Radium Hot Springs, British Columbia.

Newhouse, N. J., and T. A. Kinley. 2003. 2002-2003 Annual ecology update for the East Kootenay Badger Project: space use and demographics. Prepared for Parks Canada, Radium Hot Springs, British Columbia, Columbia Basin Fish and Wildlife Compensation Program, Nelson, British Columbia, and Tembec Industries Inc., Cranbrook, British Columbia.

Appendix 1

Radiolocations of Translocated Badgers to December, 2002