

**MONITORING AND MANAGEMENT ACTIVITIES  
FOR THE AISHIHIK BISON (*BISON BISON*) HERD,  
SOUTHWESTERN YUKON:**

**2012-13 ANNUAL REPORT**

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**Yukon Department of Environment  
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## Summary

- In fiscal year 2012–2013, our main aims in the bison program were to:
  - a) Conclude a management plan for the Aishihik Bison Herd.
  - b) Conclude a GPS collaring study and retrieve remaining GPS collars still deployed in the field.
  - c) Replenish and relocate VHF radio-collared bison in order to document distribution, habitat use, and survival, as well as produce maps to aid hunters in planning their bison hunts.
  - d) Monitor the harvest of bison.
  - e) Where possible, collect biological samples for various testing (e.g. DNA and teeth from incisor bars submitted from hunters).
  - f) Provide a variety of outreach initiatives and products related to bison.
  - g) Substantially progress the work on the socioeconomic and ecological impacts of bison.
- A management plan for the Aishihik bison herd was approved by the Minister in August 2012, and reviewed by the Yukon Bison Technical Team in December 2012.
- Five radio-telemetry flights were flown in 2012–2013 to relocate radio-collared bison and produce maps to aid hunters in deciding on where to plan their hunts.
- We captured 22 adult female bison during two capture sessions: July 2012 and February 2013. We removed GPS collars from 4 bison and replaced them with long-lasting VHF collars. We also placed collars on 16 adult female bison that had not previously been radio-collared. (Two bison died during capture operations in July 2012).
- A Hunt Wisely: Bison brochure was printed in October 2012. Three maps were produced to aid hunters in planning were to look for bison.
- In December 2012, a report on the socio-economic impact of bison to Champagne and Aishihik First Nation was finalized.
- Additionally, work was continued on analyses of data to examine the potential for competition between bison and other ungulates (e.g. moose, caribou and sheep). This work was completed as a partnership between Environment Canada, University of Alberta, and Environment Yukon.

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## Background and Objectives

Beginning in 1980, a large conservation initiative was undertaken to reintroduce wood bison to portions of their historic range in northwestern Canada and interior Alaska. The Yukon was part of this initiative; between 1988 and 1992, 170 animals were released into the wild from a temporary enclosure near the Nisling River (Gates et al. 2001, Government of Yukon 2012). Since then, the herd has grown, and been closely monitored in order to assess the population status of the herd, and provide current information to guide an annual harvest by licensed hunters. Since the herd had few natural predators, it has been steadily increasing in size. Limited hunting began in March 1998. In following years, more liberal harvest strategies were implemented with the goal of reducing population growth and size. The most recent census occurred in July 2014 and provided an estimate of 1470 (90% confidence intervals: 1306 to 1684) bison in the population (Jung and Egli 2014).

Here we report on the activities undertaken in the 2012–2013 fiscal year by Environment Yukon’s Bison Program. Specifically, our objectives for the fiscal year were as follows:

- a) Conclude a management plan for the Aishihik Bison Herd.
- b) Conclude a GPS collaring study and remove remaining GPS collars out in the field.
- c) Replenish and relocate VHF radio-collared bison in order to document distribution, habitat use, and survival, as well as

produce maps to aid hunters in planning their bison hunts.

- d) Monitor the harvest of bison.
- e) Where possible, collect biological samples for various testing (e.g. DNA and teeth from incisor bars submitted from hunters).
- f) Provide a variety of outreach initiatives and products related to bison.
- g) Substantially progress the work on the socioeconomic and ecological impacts of bison.

## Monitoring and Management Activities

### *Radio-telemetry Flights*

Radio-collared bison are used to facilitate population monitoring and provide information on the distribution and habitat use of the herd. Several times a year, radio-collared bison are located via an aerial survey. These aerial telemetry surveys are often conducted prior to a population census, composition count, or capture session in order to increase the efficiency and cost-effectiveness of those operations. Telemetry flights were flown in a Maule M7 fixed wing aircraft at elevations between 8,000 to 13,500 feet asl (above sea level). Transects that comprise a north–south grid over the core bison range, and spaced 15 km apart, are flown to ensure reasonable coverage of the area.

During 2012–2013, 5 radio-telemetry flights were flown (Table 1). The first flight of the season occurred in on 8 July 2012 and the second

**Table 1.** Summary data for 5 wood bison telemetry flights flown in southwestern Yukon, during April 2013 to March 2014. The number of radio-collared bison varied throughout the year, due to mortalities, returned collars, and newly collared animals.

Date	Number of Collars Found (%)	Number of Hours Flown
8 July 2012	23 (77%)	5.8
25 Sept 2012	32 (84%)	8.2
19 Dec 2012	21 (66%)	5.7
3 Feb 2013	25 (78%)	6.8
7 March 2013	32 (80%)	8.1

flight was on 25 September 2012. The subsequent radio-telemetry flights, were done on 19 December 2012, 3 February 2013, and 7 March 2013 (see figures 1 to 5 for flightpaths) in order to facilitate the production of maps to aid hunters (see Harvest Management).

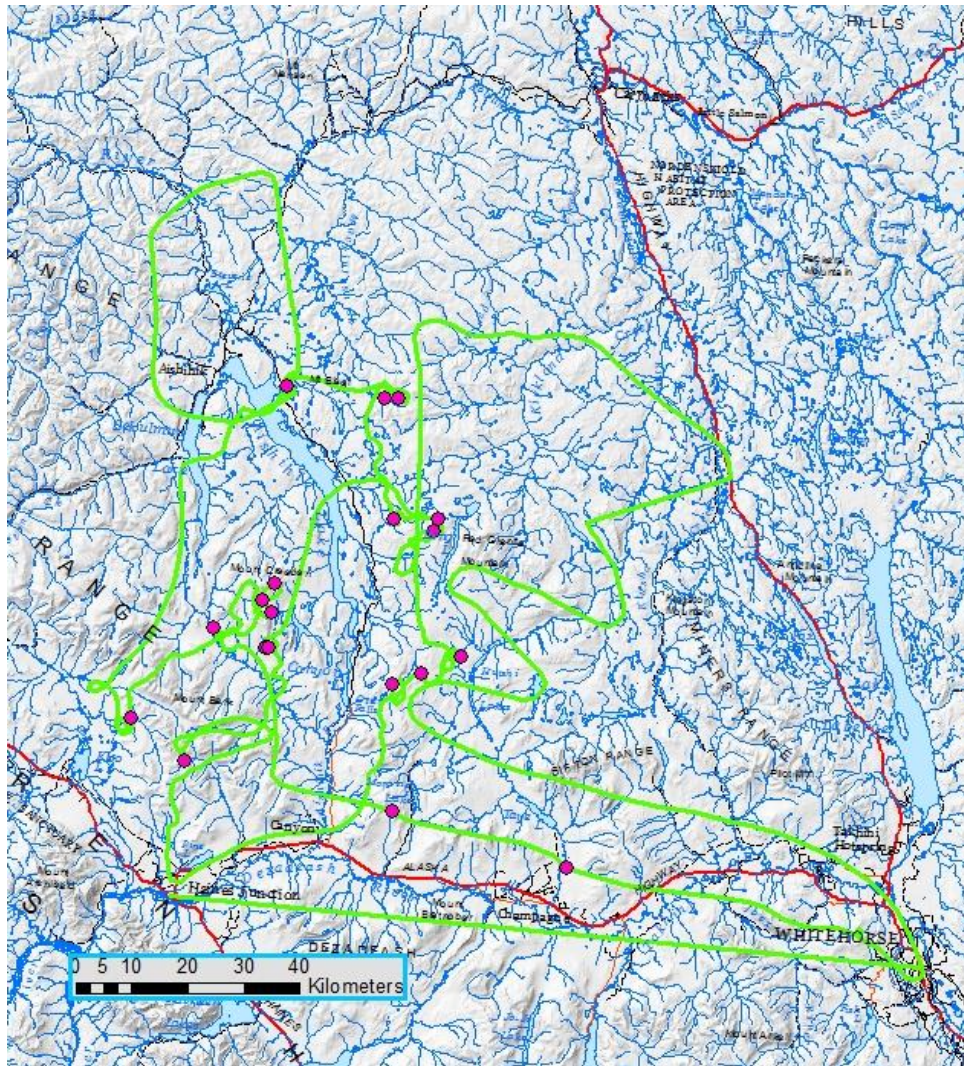
### ***Live capture and radio-collaring***

Radio-collared bison facilitate population surveys (e.g. composition counts and censuses) and they provide important information on the distribution and habitat use of the population. A small number of bison are live-captured and radio-collared each year, in order to maintain working radio-collars on bison (Government of Yukon 2012). During 2012–2013, our goals for the collaring portion of our monitoring work were to: a) remove all remaining GPS collars from bison, and b) to mark a small percentage of the herd with VHF collars. This shift in emphasis from GPS to VHF collars was made because it was felt that we have abundant fine-scale data on bison

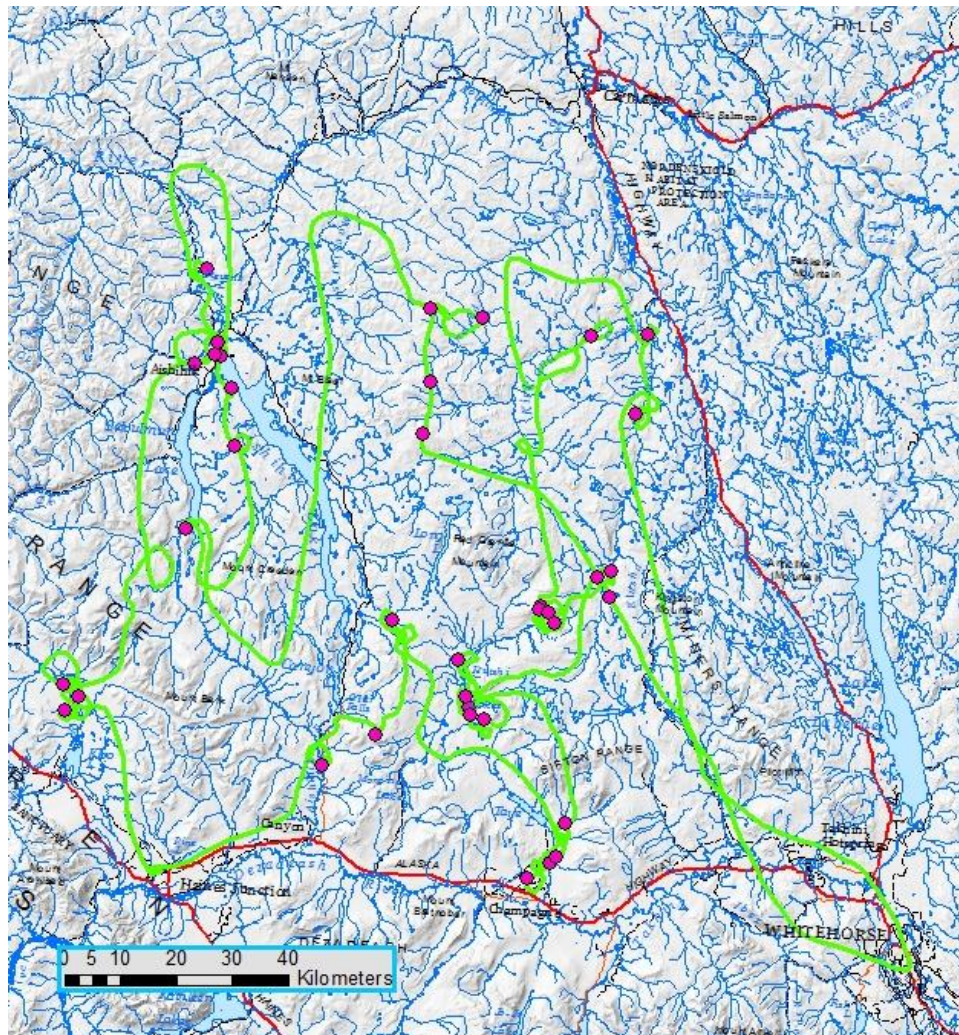
movements and that those data were no longer necessary. Additionally, the GPS collars were likely nearing the end of their operational lifespan. The new emphasis was to use durable, long-lasting VHF collars to monitor broad distributional patterns and survival of adult cows, and facilitate inventory programs. VHF collars are well suited to collecting data on survival and spatial distribution, and are more cost effective because they require less frequent live-capture events due to their reliability and battery longevity.

During 22 to 24 July 2012, 11 adult female bison were captured by chemically immobilizing them, via a dart fired from a Eurocopter A-Star helicopter. A medetomidine-telazol-ketamine combination was used to immobilize bison, which was later reversed using tolazoline and atipamazole. We placed VHF collars on 9 of these bison; 2 other bison died from unknown causes related to our capture work. We ceased captures after the second mortality. One GPS collar was removed during this capture session.

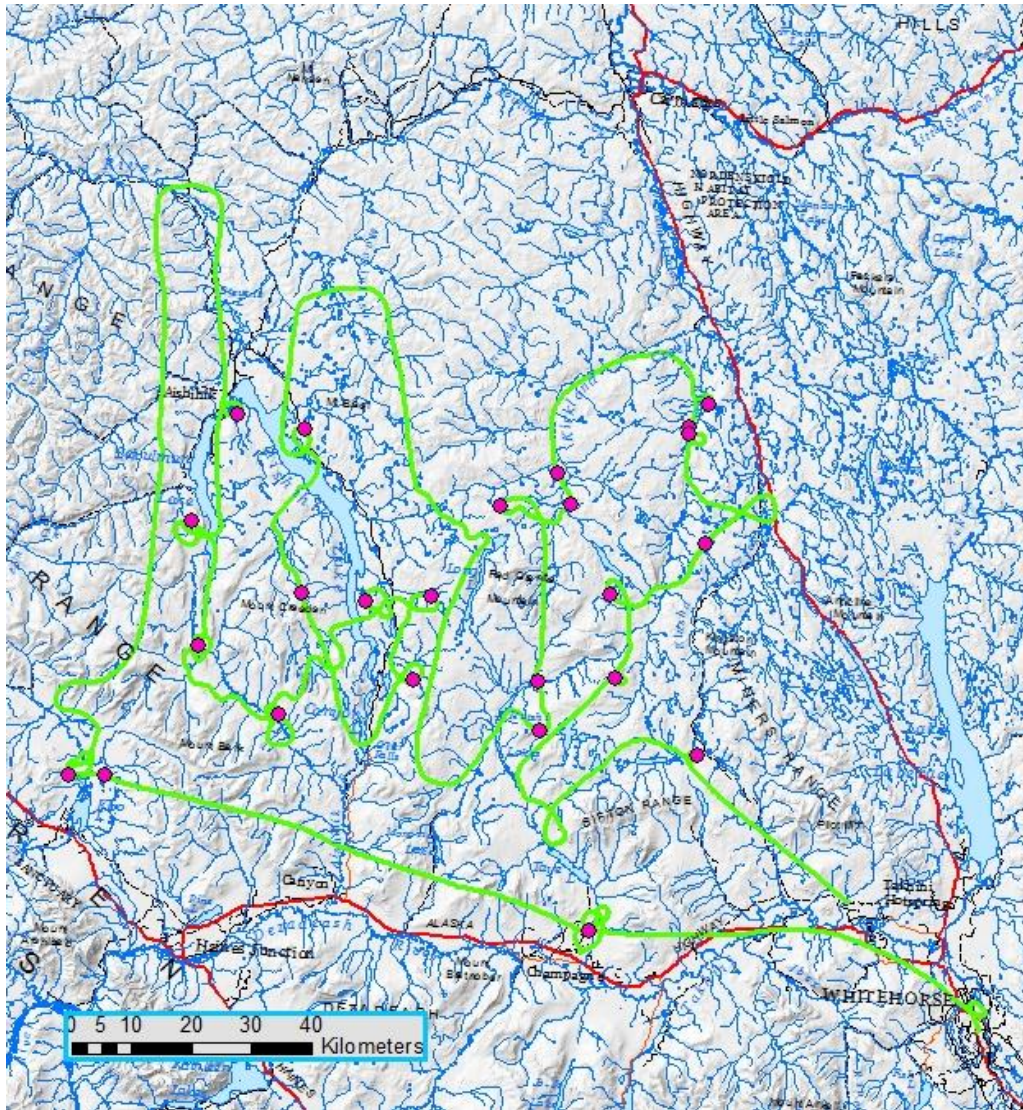




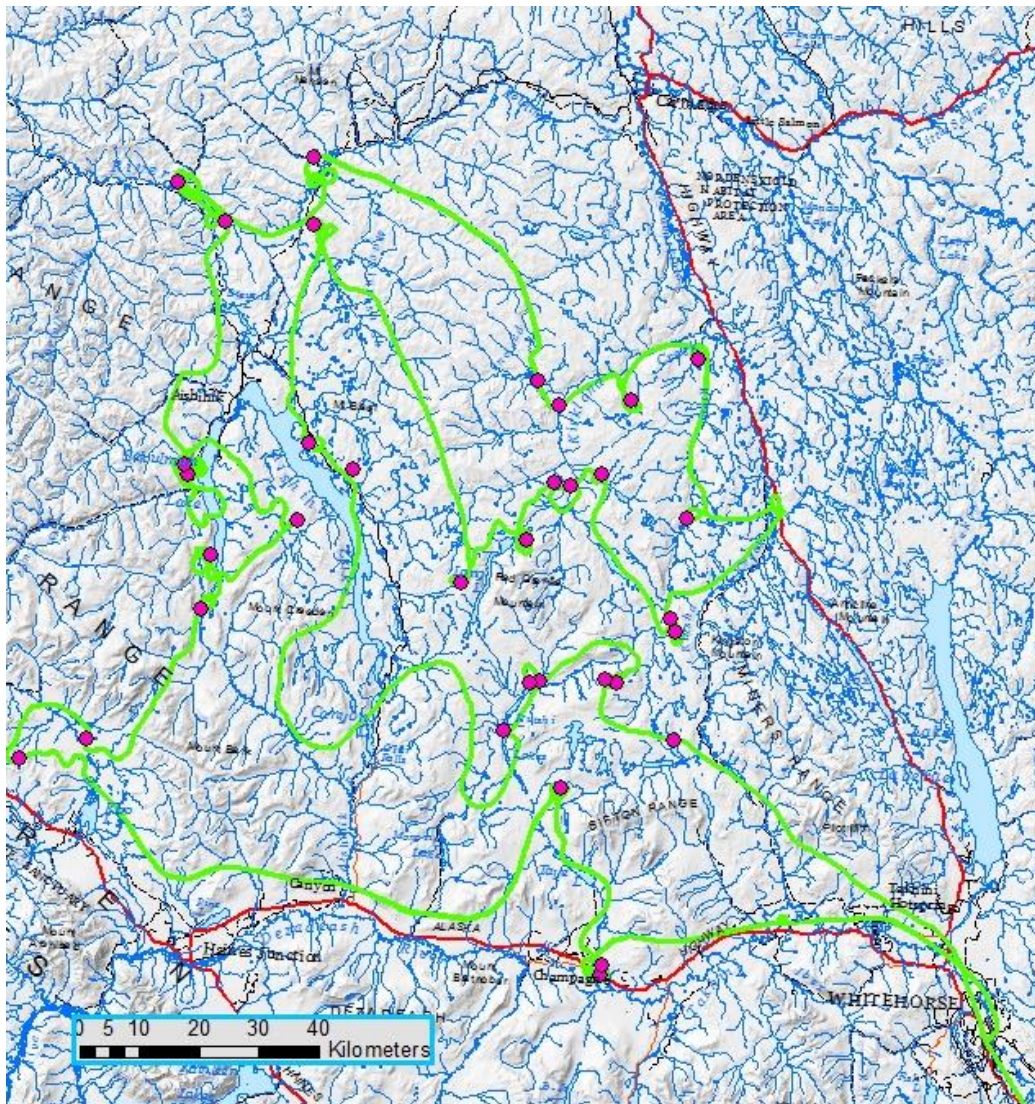
**Figure 1.** Bison telemetry flight flow on 8 July 2012. Pink circles are locations where radio-collared bison were found. Green line is the flight line flow.



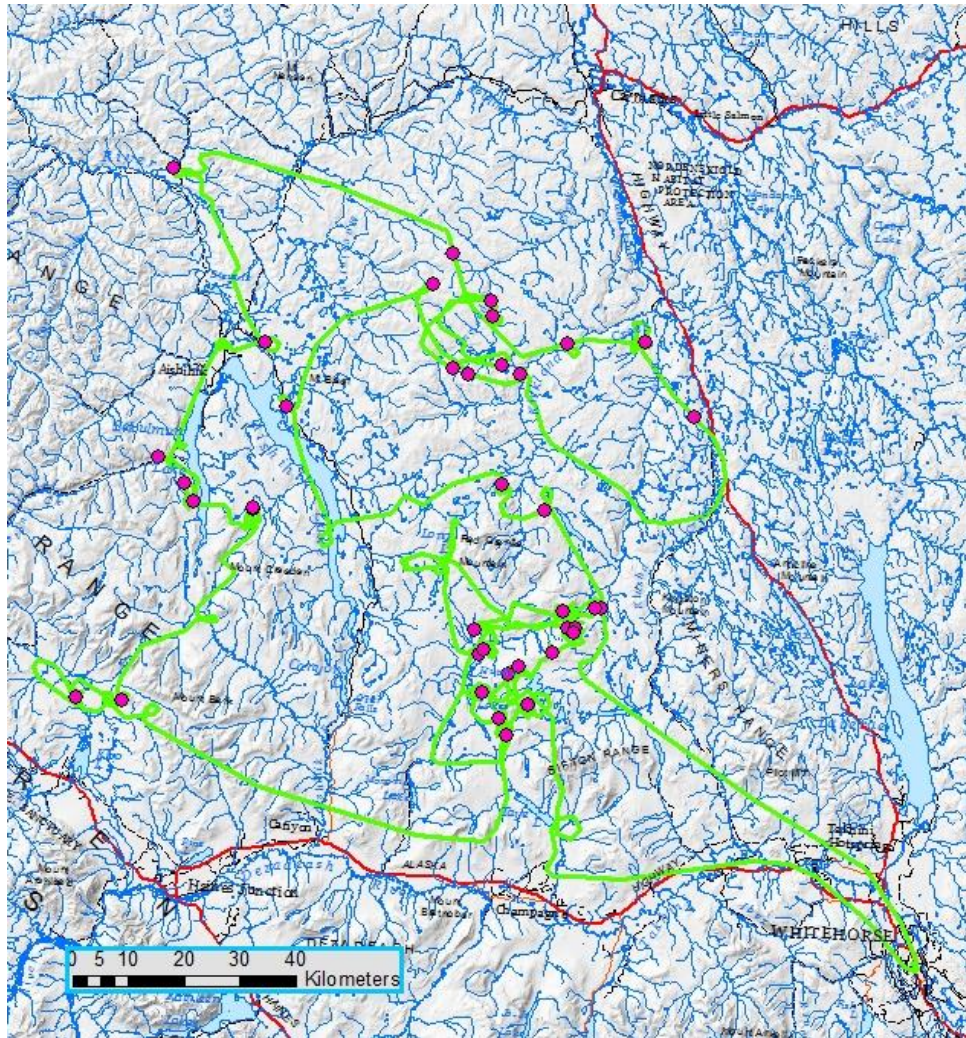
**Figure 2.** Bison telemetry flight flown on 25 September 2012. Pink circles are locations where radio-collared bison were found. Green line is the flight line flown.



**Figure 3.** Bison telemetry flight flown on 19 December 2012. Pink circles are locations where radio-collared bison were found. Green line is the flight line flown.



**Figure 4.** Bison telemetry flight flow on 3 February 2013. Pink circles are locations where radio-collared bison were located. Green line is the flight line flow.



**Figure 5.** Bison telemetry flight flown on 7 March 2013. Pink circles are where radio-collared bison were located and the green line is the flight track.

We conducted a second capture session on 7, 8 and 14 February 2013. During this session we captured 11 adult female bison and collared all of them with VHF collars. There were no mortalities and we retrieved 3 GPS collars (those bison were subsequently collared with a VHF collar).

To make the collars more visible to hunters, a bright yellow sleeve of fire hose was fitted over the collar (Figure 6). To facilitate identification, immobilized bison were given an

individually numbered, plastic livestock eartag (Allflex Canada, St-Hyacinthe, Quebec) in one ear and an individually numbered aluminum eartag (Kurl-lock #3, Ketchum, Brockville, Ontario) in the other ear. Cow bison were checked for pregnancy status via palpation. Select biological samples were collected (e.g. blood, feces, and a DNA sample). Locations where bison were captured are provided in Figure 7.



**Figure 6.** An immobilized bison wearing a radio-collar with yellow fire hose to improve visibility and a yellow livestock eartag to aid in identification of individuals.

### **Population Monitoring**

Given other priorities (e.g. radio-collaring field operations, and concluding work on socio-economic and ecological impacts), no composition count was conducted in July 2103.

### **Biological Sample Collection**

We collected biological samples from 2 sources: hunter submitted incisor bars, and during live-capture of individuals for the purposes of radio-collaring (see Live Capture and Radio-Collaring).

From the hunter-submitted incisor bars we obtained an incisiform tooth, and a small piece of tissue (meat). Teeth were sectioned at the root and

the animal's age was determined via cementum analysis. The tissue provides a DNA sample that can be contributed to larger-scale studies (e.g., national) of the genetics of bison.

During live-capture and radio-collaring operations we collected blood, DNA, and feces from captured bison. These samples provide a basis of assessing the health status of the population, and are intended to be archived until larger-scale (e.g. national) studies seeking samples from the population are in place.

In January 2013, we contributed frozen fecal samples from 31 live-captured bison to a University of Calgary research project looking at the presence of *Mycobacterium avium* subsp. *paratuberculosis* (MAP) in

**Table 2.** Summary of the number and percent of wood bison harvested in southwestern Yukon during the 2013–2014 season. Harvest was closed from 1 January to 14 February 2014.

Month	Bull	Cow	Total
September 2012	12	10	<b>22 (14%)</b>
October 2012	3	1	<b>4 (2%)</b>
November 2012	11	4	<b>15 (9%)</b>
December 2012	10	8	<b>18 (11%)</b>
January 2013	0	0	-
February 2013	18	10	<b>28 (17%)</b>
March 2013	34	41	<b>75 (46%)</b>
<b>Totals</b>	<b>88 (54%)</b>	<b>49 (46%)</b>	<b>162 (100%)</b>

reintroduced bison across Canada. That study (Forde et al. 2013) found that all 9 populations tested were positive for MAP, including the Aishihik Herd. Results were presented to the Yukon Wood Bison Technical Team.

### **Studies on the Bison Impacts**

In fiscal year 2012–2013 substantial work was done to advance the analysis of samples and data to assess the impact of bison on other ungulates (e.g., caribou, moose, and sheep). This assessment was completed in the following fiscal year (2013–2014) and a report was prepared (Jung and Czetwertynski 2013) and posted on the Environment Yukon website

(<http://www.env.gov.yk.ca/publications-maps/documents/BisonCompetitionReportTR-13-15.pdf>).

A study on the socio-economic impact of bison, which was started in fiscal year 2008–2009, was completed and delivered jointly to Champagne and Aishihik First Nations in December 2012. This work was subsequently presented to the Yukon Bison Technical Team.

### **Harvest Monitoring**

The harvest for the 2012–2013 bison hunting season was 162 bison, with 88 bulls (54%) and 74 (46%) cows hunted (Table 2).

As in most years, March saw the most bison harvested (Table 2). March is generally the preferred month for hunting bison due to the warm weather and the long daylight hours. Twenty-six bison (16%) were harvested during the extended season (September and October).

### **Outreach and Deliverables**

In August 2012, the Management Plan for the Aishihik Wood Bison Herd in Southwestern Yukon was approved. The management plan may be found online at:

[http://www.env.gov.yk.ca/publications-maps/documents/bison\\_management\\_plan.pdf](http://www.env.gov.yk.ca/publications-maps/documents/bison_management_plan.pdf).

In December 2012, the Yukon Wood Bison Technical Team met to review the plan.

A Bison Banter newsletter was not produced in 2012–2013. A Hunt Wisely brochure for bison was reviewed and produced by the

Conservation Officers Services Branch in October 2012. The current version of the Hunt Wisely brochure can be found online at:

[http://www.env.gov.yk.ca/publications-maps/documents/HuntWiselyBison\\_2014-15\\_web.pdf](http://www.env.gov.yk.ca/publications-maps/documents/HuntWiselyBison_2014-15_web.pdf)

Maps showing areas of potential bison concentrations, based on aerial telemetry surveys, were posted on the Environment Yukon website for the early-winter and late-winter seasons (3 maps in total; Figure 8). The intent of the maps was to provide a tool to hunters to better plan their bison hunt.

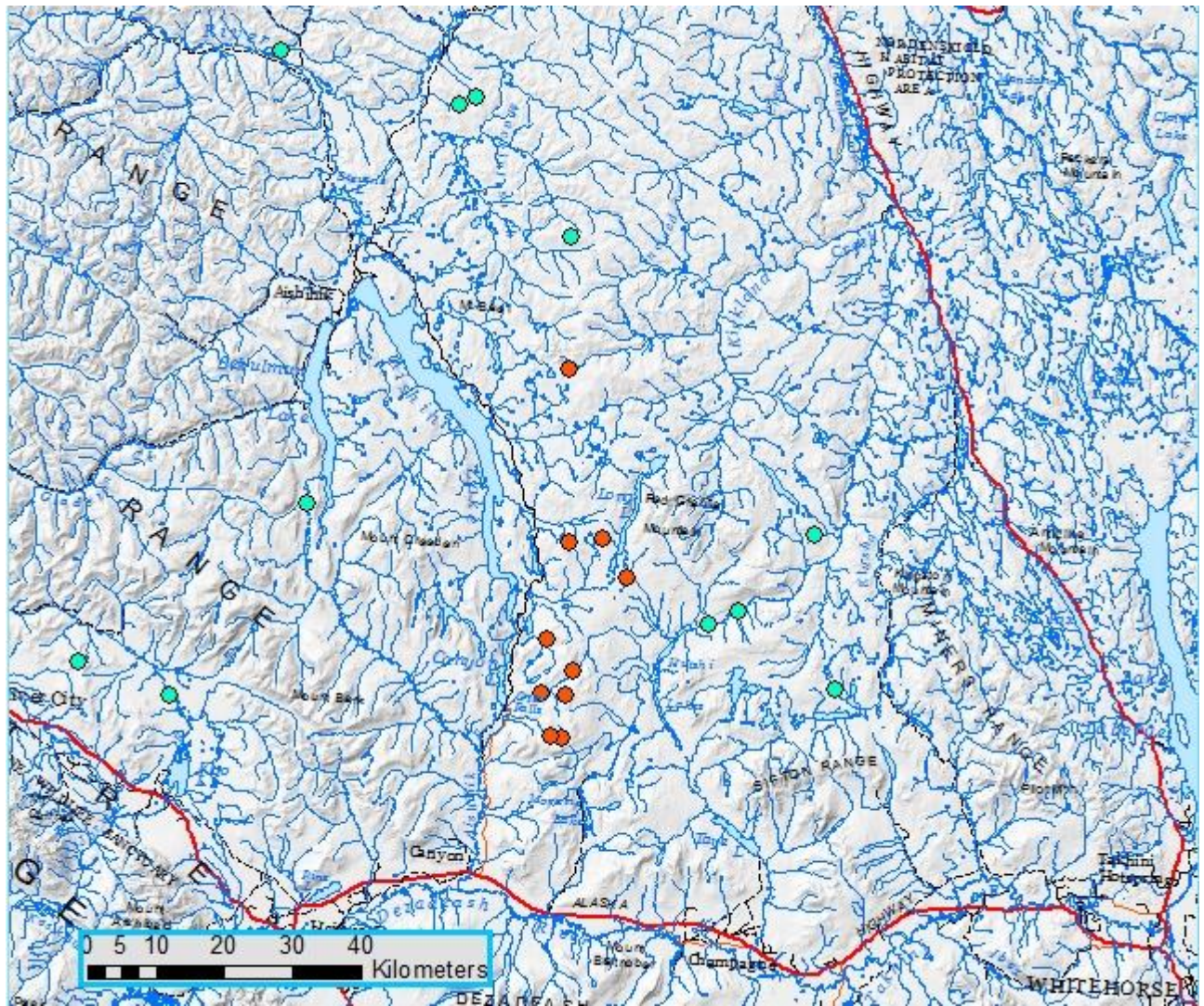
Media interviews were given with Yukon media outlets (e.g. CBC radio, CKRW radio, Yukon News, and

Whitehorse Star) throughout the year on various bison topics, including a review of the 2011–2012 and 2012–2013 harvest.

A presentation on bison biology and history in the Yukon was made at the Bison HEED Workshop on 1 November 2012.

There were no presentations on Yukon bison made at scientific conferences in 2012–2013. However, one scientific paper regarding Yukon bison was published in fiscal year 2012–2013. It pertained to our method for conducting a mark-resight population inventory of bison and caribou (Hegel et al. 2012; see Appendix A).





**Figure 7.** Location of the 22 bison captured and radio-collared during two capture sessions in fiscal year 2012-2013 (red circles = July 2012; green circles = February 2013).

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- JUNG, T.S., AND S.M. CZETWERTYNSKI. 2013. Niche overlap and the potential for competition between reintroduced bison and other ungulates in southwestern Yukon. Yukon Fish and Wildlife Branch report TR-13-15. Whitehorse, Yukon, Canada.
- JUNG, T.S., AND K. EGLI. 2014. Population inventory of the Aishihik Wood Bison (*Bison bison athabascae*) population in southwestern Yukon, 2014. Yukon Fish and Wildlife Branch Report TR-14-00. Whitehorse, Yukon, Canada.

## APPENDIX 1 PEER REVIEWED PUBLICATIONS

### USING TEMPORARY DYE MARKS TO ESTIMATE UNGULATE POPULATION ABUNDANCE IN SOUTHWEST YUKON, CANADA

Below is the citation and abstract of the above paper peer-reviewed and published in the scientific journal Rangifer. The full paper may be found at: <http://septentrio.uit.no/index.php/rangifer/article/view/2271>

**ABSTRACT**—We describe the protocols of two mark-resight abundance surveys, using temporary dye-marks, for the Aishihik woodland caribou (*Rangifer tarandus caribou*) and wood bison (*Bison bison athabasca*) populations (herds) in the southwest Yukon Territory, Canada. We also provide recommendations based on experiences from these surveys for biologists and managers considering this approach. The Aishihik woodland caribou herd was the focus of intensive management in the 1990s aimed at recovering the herd. Following recovery activities, a target size of 2000 animals was determined and the Champagne-Aishihik Traditional Territory Community-Based Wildlife Management Plan recommended an estimate of the herd's size be completed before the year 2013. We used an aerial mark-resight approach to estimate the herd's size in March 2009. Caribou ( $n = 59$ ) were marked from a helicopter with temporary dye, delivered via a CO<sub>2</sub>-powered rifle. Two independent resighting sessions were subsequently carried out via helicopter. The herd was estimated at 2044 animals (90% CI: 1768 – 2420) with an overall resighting rate of 0.47. The mean annual growth rate ( $\lambda$ ) of the herd from 1997 – 2009 was 1.05 (SE = 0.01). The Aishihik wood bison herd was estimated at 1151 (90% CI: 998 – 1355). Our study suggests that ungulates temporarily marked with dye can be successfully used to obtain statistically sound population estimates.

**CITATION:** Hegel, T.M., K. Russel, and T.S. Jung. 2012. Using temporary dye marks to estimate ungulate population abundance in southwest Yukon, Canada. *Rangifer*, Special Issue No. 20: 219–226.