YUKON WOODLAND CARIBOU COMPOSITION SURVEYS

2012

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Summary

Fall composition surveys are one of the key tools used by Environment Yukon to monitor mountain-dwelling woodland caribou herds in Yukon. Calf:cow and bull:cow ratios are estimated during aerial surveys, providing measures of the herd's productivity and sex ratio, respectively.

- 10 herds were surveyed in 2012.
- Calf:cow ratios were slightly lower than the long-term averages although there was considerable variability in herd-specific deviations from their average. Lower recruitment in 2012 may be due to poor springtime climatic conditions immediately preceding and during calving.
- Sex ratios for surveyed herds generally matched long-term averages.

Introduction

Fall composition surveys are one of the key tools used by Environment Yukon (ENV) biologists to monitor population parameters of Yukon mountain-dwelling woodland caribou (*Rangifer tarandus caribou*) herds. The 2 key parameters estimated from these surveys are recruitment (representing the number of calves "entering" the breeding population) indexed by the calf:cow ratio, and the sex ratio, provided as the bull:cow ratio. Tracking recruitment allows manager to assess the productivity of the herds which can be useful for assessing factors such as harvest rates. Due to the sex-biased (i.e., bull-only) harvest system for licensed hunters in Yukon, tracking sex ratios may provide an indication of the harvest level on the herds, as reducing bull:cow ratios may be indicative of over-harvest.

A number of herds in Yukon have been monitored relatively continuously for many years (Figures 3 and 4). This long-term monitoring has been crucial for understanding and assessing factors relating to patterns in both recruitment and sex ratios. For instance, recruitment, which is a product of fecundity (i.e., number of calves born) and calf survival (i.e., number of calves that were born that survive to the fall), fluctuates greatly which is to be expected given that calf survival is one of the most variable vital rate for ungulate populations (Gaillard et al. 1998). Sex ratios, on the other hand, show much less annual variability and may be more influenced by longer-term processes (e.g., harvest rates over the previous 3-5 years).

Survey Results

In 2012, 10 herds were surveyed (Table 1, Figure 1).

Research by ENV biologists using the long-term Yukon mountain caribou composition data (Hegel et al. 2010) has found that much of the annual variability observed in recruitment rates can be explained by large-scale climatic conditions emanating from the north Pacific Ocean (i.e., the Pacific Decadal Oscillation – PDO). These climatic conditions may influence birth rates, predation rates, and calf growth and development and subsequent survival. This analysis has indicated that climatic conditions during 2 time periods, winter preceding birth and May. This information can be used to gain an understanding of whether recruitment in Yukon mountain caribou will generally be above or below average.

Table 1. Summary results from fall composition surveys conducted during September/October 2012 and long-term averages.

Herd	2012 Calf:Cow Ratio	Long-Term Average Calf:Cow Ratio	2012 Bull:Cow Ratio	Long-Term Average Bull:Cow Ratio
Aishihik	0.17	0.27	0.54	0.45
Burwash[a]	0.28	0.22	0.66	0.41
Carcross	0.28	0.27	0.44	0.51
Chisana[b]	0.20	0.16	0.65	0.32
Clear Creek	0.135	0.26	0.36	0.40
Ethel Lake	0.28	0.23	0.81	0.45
Finlayson	0.135	0.28	0.63	0.51
Ibex	0.27	0.39	0.51	0.56
Klaza	0.14	0.28	0.27	0.43
Tatchun	0.23	0.27	0.23	0.41
All Herds	**0.21**	**0.26**	**0.51**	**0.45**

a: Also known as the Kluane herd.

b: The Chisana survey is a joint survey between ENV and Alaska Department of Fish & Game. In 2012 the Alaskan portion of the survey was not completed due to poor weather conditions.

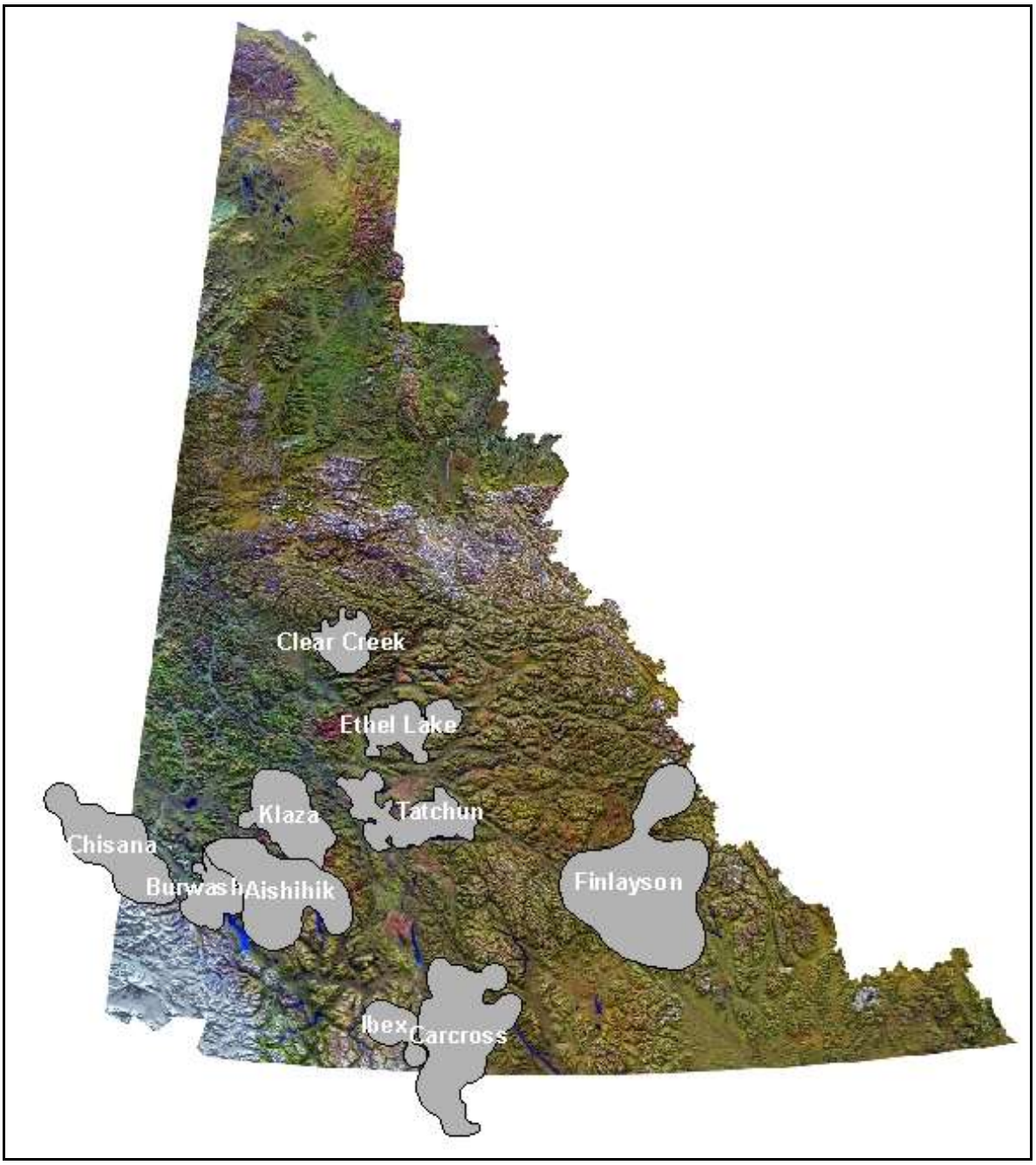

Figure 1. Mountain-dwelling woodland caribou herds that were surveyed during the 2012 fall compositions surveys.

Recruitment rates in 2012 were slightly lower than average, possibly resulting from poor climatic conditions, although there was substantial variability in herd-specific deviations from their longer term average (Table 1). The PDO during May was the lowest in the past 30 years (Figure 2b), and winter PDO was also lower than average (Figure 2a). Notably, the Aishihik, Clear Creek, Finlayson, and Klaza herds had lower than average recruitment, while Burwash and Ethel Lake had higher than average calf:cow ratios.

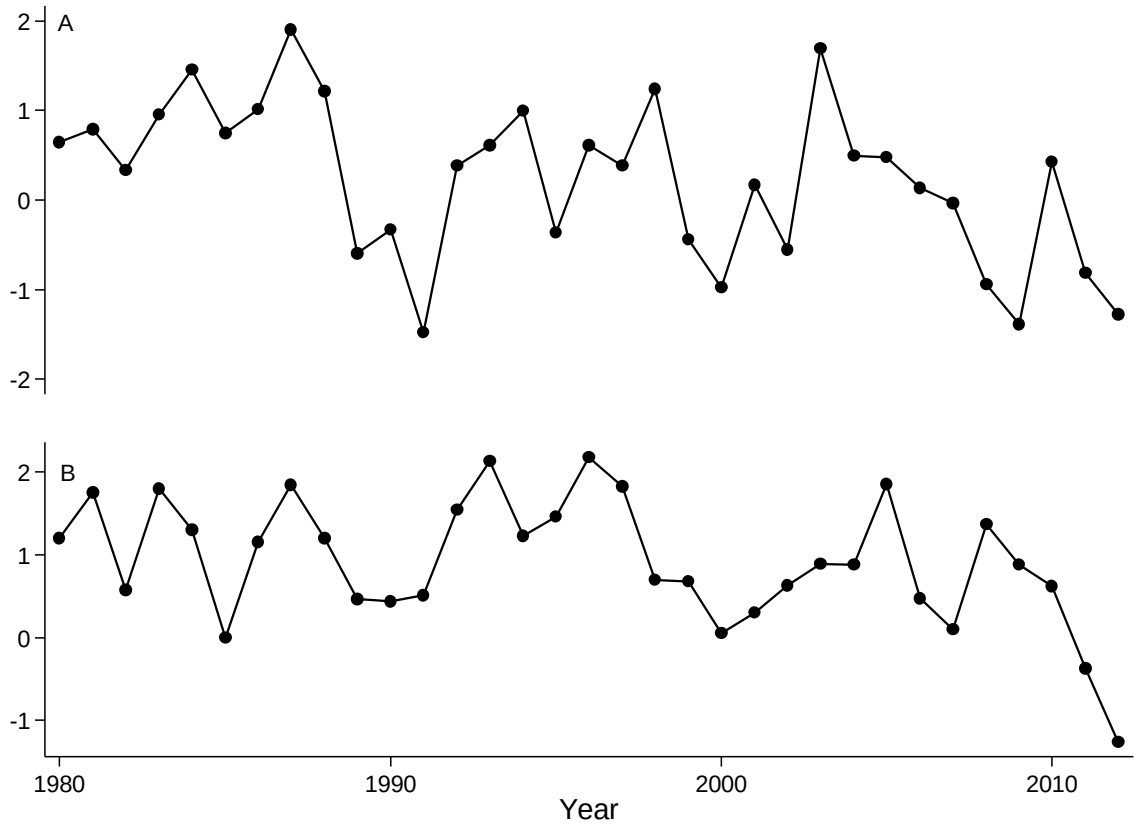

Figure 2. Pacific Decadal Oscillation (PDO) values from 1980 – 2012 for a) Winter (November – April), and b) May.

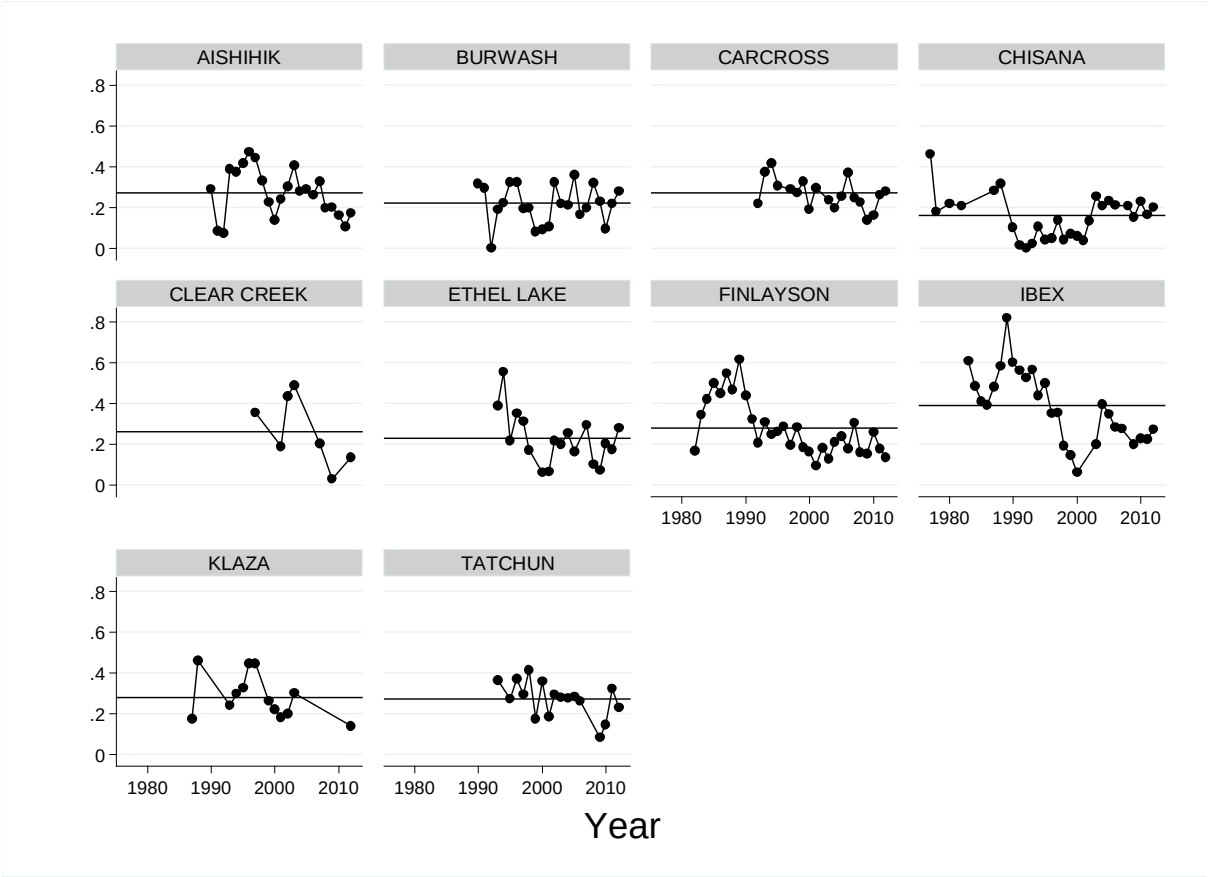

Figure 3. Annual recruitment rates (calf:cow ratio) for herds surveyed in 2012. The solid horizontal lines represent each herd's long-term average recruitment rate.

Overall, sex ratios were slightly higher than long-term averages (Table 1). Sex ratios for the Burwash, Chisana, Ethel Lake, and Finlayson herds were higher than average. Sex ratios are often challenging to estimate if a survey occurs prior to all males reaching the breeding grounds. Thus, surveys in 2013 will be used to evaluate and/or confirm some of the larger deviations in adult sex ratios observed in 2012.

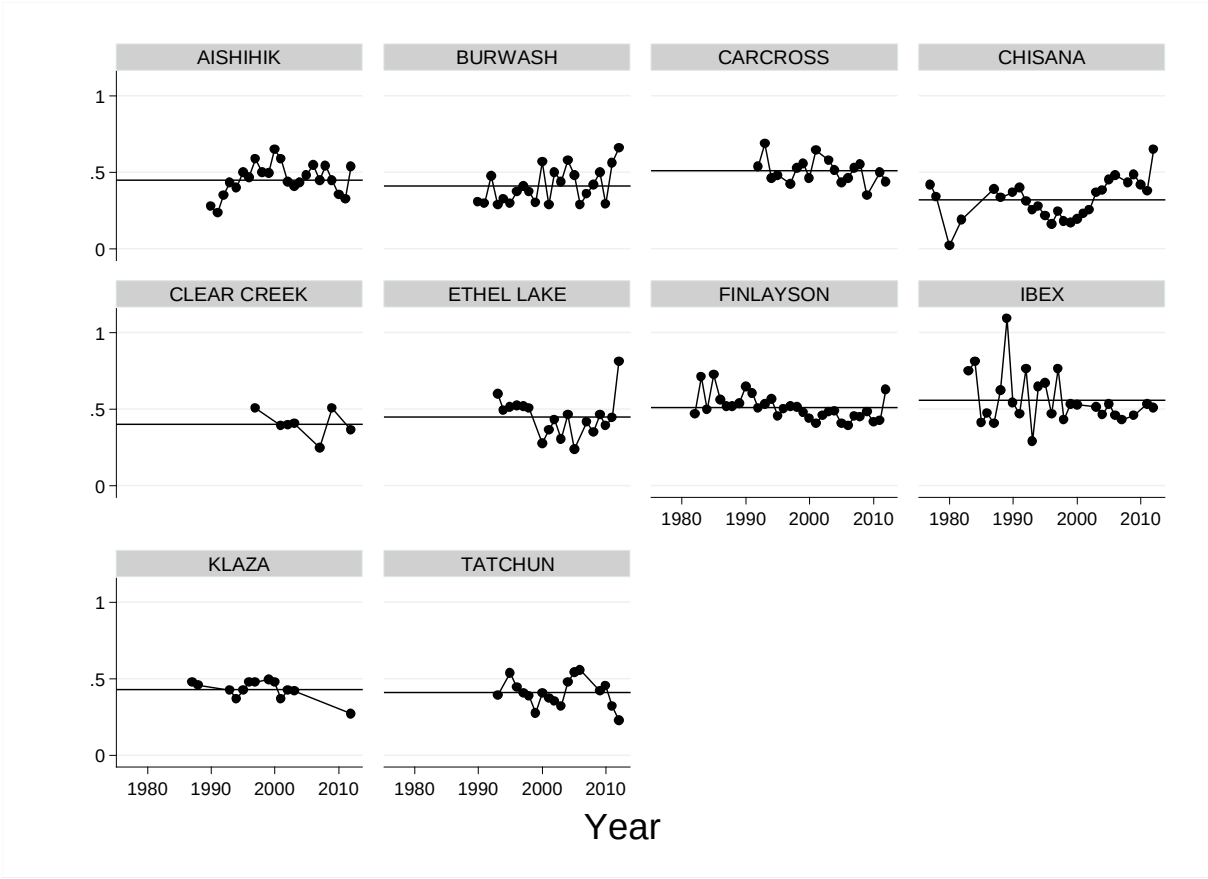

Figure 4. Annual sex ratios (bull:cow ratio) for herds surveyed in 2012. The solid horizontal lines represent each herd's long-term average sex ratio.

References

Gaillard, J.-M., M. Festa-Bianchet, and N. G. Yoccoz. 1998. Population dynamics of large herbivores: Variable recruitment with constant adult survival. Trends in Ecology and Evolution 13: 58-63.

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