ANNUAL REPORT ON VITAL SIGNS MONITORING OF DISTRIBUTION AND ABUNDANCE OF WOLVES IN YUKON-CHARLEY RIVERS NATIONAL PRESERVE

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Executive Summary

- Wolf populations have been monitored in Yukon-Charley Rivers national Preserve (YUCH) since 1993. Starting in October 2005 the project was incorporated into the Central Alaska Networks Vital signs monitoring program. From 2002 – 2005 field work on the project was substantially curtailed due to lack of funding. Data from those years should be viewed with caution.
- Wolves throughout the greater Yukon-Charley Rivers area are targeted for monitoring of abundance and distribution. Wolf capture was conducted February and March 2006, monitoring radiocollared packs via radio telemetry flights will occur throughout the year with a concentrated period of flights in March – April and again in September – October. All field work is conducted using 1 or 2 biologists and 1 - 3 pilots.
- Over the past 3 years the previous wolf study had been reduced to 2 functioning radio collars in 2 packs. In February 2006 we captured and collared 19 additional wolves in up to 9 packs. Future radiotracking flights will better enumerate the specific packs and their numbers. At least 3 packs remain uncollared and we plan to find and capture wolves from these packs as funding allows.
- A very preliminary population estimate of 58 wolves in 12 packs (3 uncollared). This estimate will change with future radiotracking efforts.
- Eight packs were snow-tracked to initially find them for capture. What was learned from snowtracking (ie. pack identification and counts based on tracks, and general home range) was very different from what was found after wolves were radiocollared and relocated just one time. Snowtracking wolves has potential to produce erroneous information.
- No substantial changes in protocol are anticipated for the upcoming field season in winter 2006 - 2007.

Key Words

Yukon-Charley Rivers National Preserve, wolves, *Canis lupus*, radiotelemetry, population dynamics, density estimation.

Introduction

CAKN has adopted a holistic view of network ecosystems and will track the major physical drivers of ecosystem change and responses of the two major components of the biota, plants and animals. Thus, CAKN has identified Fauna Distribution and Abundance as one of its top three vital signs. In general, CAKN wants to know where fauna are distributed across the landscape and to track changes in both their distribution and abundance. The Fauna Distribution and Abundance vital sign includes monitoring efforts for a suite of vertebrate species spanning the significant elevation gradient found in CAKN parks, and also including species of specific interest within each park. Wolves (*Canis lupus*), occur in all three network parks and are one of six keystone large mammal species in interior Alaska. Wolves are of great importance to people

from both consumptive and non-consumptive viewpoints, and to the ecosystem as a whole. From a monitoring standpoint, wolves are considered to be good indicators of long-term habitat change within park ecosystems because they depend on healthy populations of large ungulate prey, which in turn respond to vegetation, weather and other habitat patterns across the entire landscape (Mech and Peterson 2003, Fuller et al. 2003). As a top predator, wolves may play a key role in influencing ungulate populations, and as a result may influence vegetation patterns (Miller et al. 2001, Ripple and Beschta 2003). The effects of wolves on ungulate populations may be important determinants of ungulate availability for subsistence harvest on NPS park and preserve lands in Alaska, and harvest by the general public on NPS Preserve lands (National Park Service 2003).

Wolves are a species specifically identified in the enabling legislation and management objectives of all three CAKN parks (U. S. Congress 1980). Wolves are of great importance to park visitors because of the unique opportunities to view wolves in Alaskan parks. While the primary objectives of monitoring will be to track the distribution and abundance of wolves, a variety of accessory data will be obtained in the monitoring process, that are likely to have great value for wildlife management and research. The body of data on wolf populations in Alaska parks is of great value in developing scientific models of predator/prey systems. In heavily visited portions of the parks, managers may want to know the locations of active wolf dens and rendezvous sites so that they can be protected from disturbance. When intensive wolf harvest or wolf control take place near parks, it is vital to know the patterns of travel of park packs, in order to determine whether they are being significantly impacted by activities outside the parks. Data on the genetic and morphological characteristics of wolves, obtained as a sidelight to wolf capture, will be important in evaluating long-term changes in wolf populations in Alaska.

Measurable Objectives

- Locate wolf packs in the designated survey area by winter snow tracking.
- Determine the makeup (numbers, colors, age structure) of surveyed wolf packs.
- Capture and radio-collar representatives of each wolf pack identified in the study area.
- Obtain morphological measurements from captured wolves.
- Obtain genotypic data (mitochondrial and microsatellite DNA analyses) from captured wolves.
- Obtain immunological (disease exposure) data from captured wolves.
- Define territories of collared wolf packs by radio-tracking.
- Define pack territory mosaic, perform additional track searches and captures to fill gaps.

- Determine pack sizes for collared packs in early winter and late winter each year.
- Calculate wolf density over the survey area for these two time periods each year.
- Perform annual capture efforts to maintain coverage of radio collars in the population.
- Detect pack extinction and pack formation events in the population.
- Detect changes in wolf density over time
- Detect changes in wolf pack size over time
- Detect changes in wolf territory size over time.
- Detect changes in the morphological and genetic makeup of the wolf population over time.

Methods and Materials

Methods followed the wolf monitoring protocol (Meier and Burch 2004) and include aerial radio telemetry and direct observation as its primary technique. Radiotelemetry is by far the most effective way to identify and monitor individual packs and populations of wolves as well as to monitor natality, recruitment, causes and rates of mortality and dispersal, and predator – prey relationships (Mech and Barber 2002).

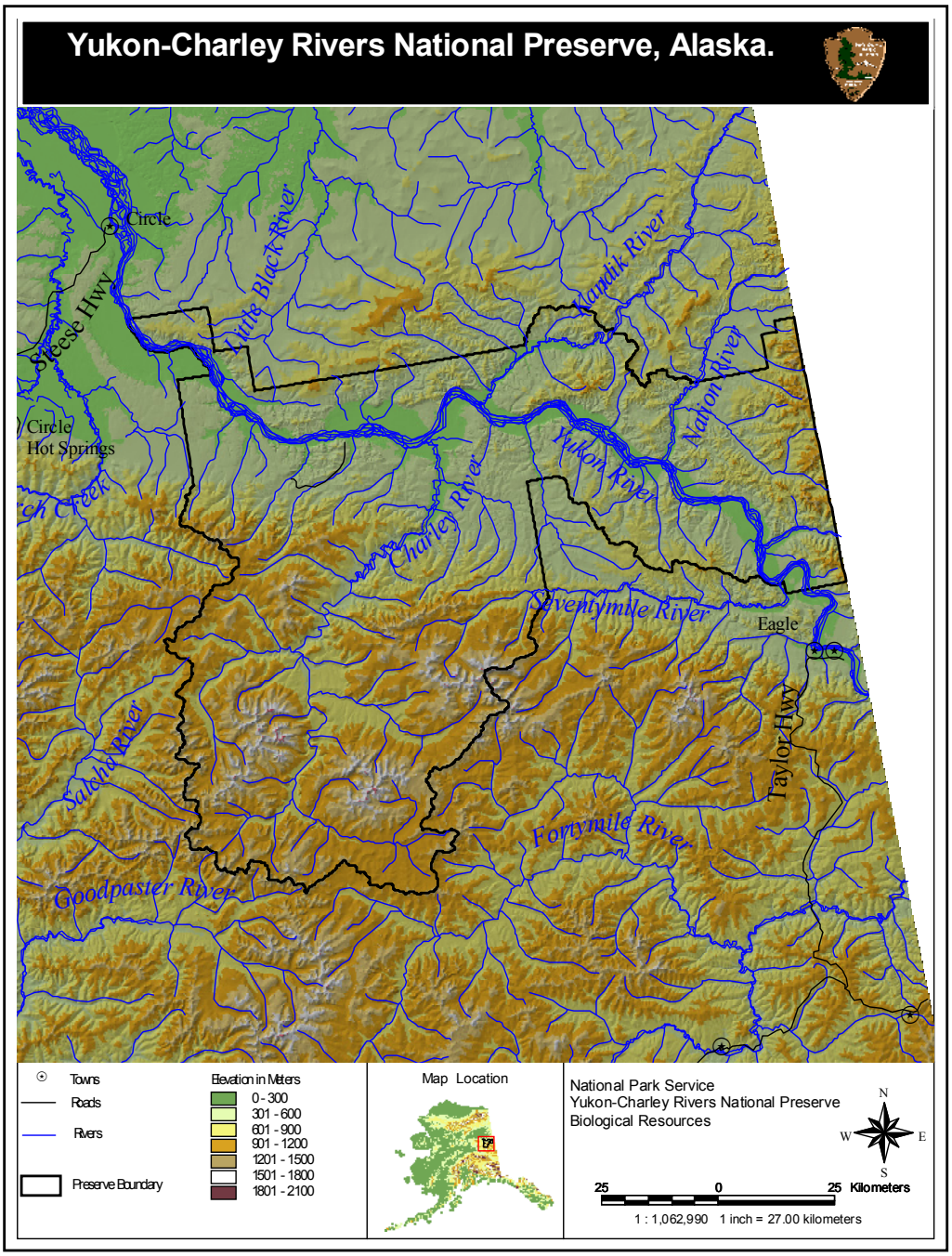

Figure 1. Wolf monitoring study area, Yukon-Charley Rivers National Preserve.

Results and Discussion

Captures and Radio Telemetry

During February 2006, 19 wolves were captured and radio-collared in or near YUCH, 2 of which were recaptures. Sex and age composition of captured wolves included 5 adult males, 8 adult females, 2 yearling males, 1 yearling females, and 3 male pups. The capture sample is biased toward adult wolves as breeding adult wolves were specifically targeted because they are much less likely to disperse. Colors of captured wolves varied widely from black to 'blue' (silver gray) to various shades of gray to white. Weights of captured males ranged from 87-128 lbs., (40-58 kg) averaging 112 lbs. (51 kg) and that of females from 90-115 lbs. (41-52 kg) averaging 102 lbs. (46 kg).

Home range Sizes and Movements

Previous home range sizes for individual preserve packs varied from 268 – 7067 km^2, annual means ranged from 1639 to 3253 km^2 with a grand mean of 2295 km^2 which is larger than found in most other wolf studies (Figures 1-3). With the advent of GPS collars the annual number of locations per pack has increased nearly 10 fold and with it an increase in individual home range size (Burch 2001). Home ranges of packs containing one GPS collar were larger than those found using conventional aerial telemetry. A direct comparison cannot be made with YUCH data because with the advent of GPS collars aerial radiotracking was greatly reduced.

In past years home range size was measured for each radiomarked pack where more than 20 locations were available in a 2 year time block. This was an attempt to overcome the problem of home range size being dependent on the sample size of locations (when calculated using MCPs). Even with this doubling of sample size the relationship still holds (r^2 = 19.4, P = 0.00017, n = 67) (Figure 5) and home range size was still dependent on the number of locations (White and Garrott 1990).

All preserve packs travel outside the boundaries of YUCH, many extensively (Figure 1-4). As a result, regulations regarding wolf management outside YUCH's boundary heavily influence (if not completely regulate) the wolf population utilizing preserve lands. This idea is well illustrated by the recent proposal (#126) before The Board of Game to conduct wolf control up against most of YUCH's boundary south of the Yukon River.

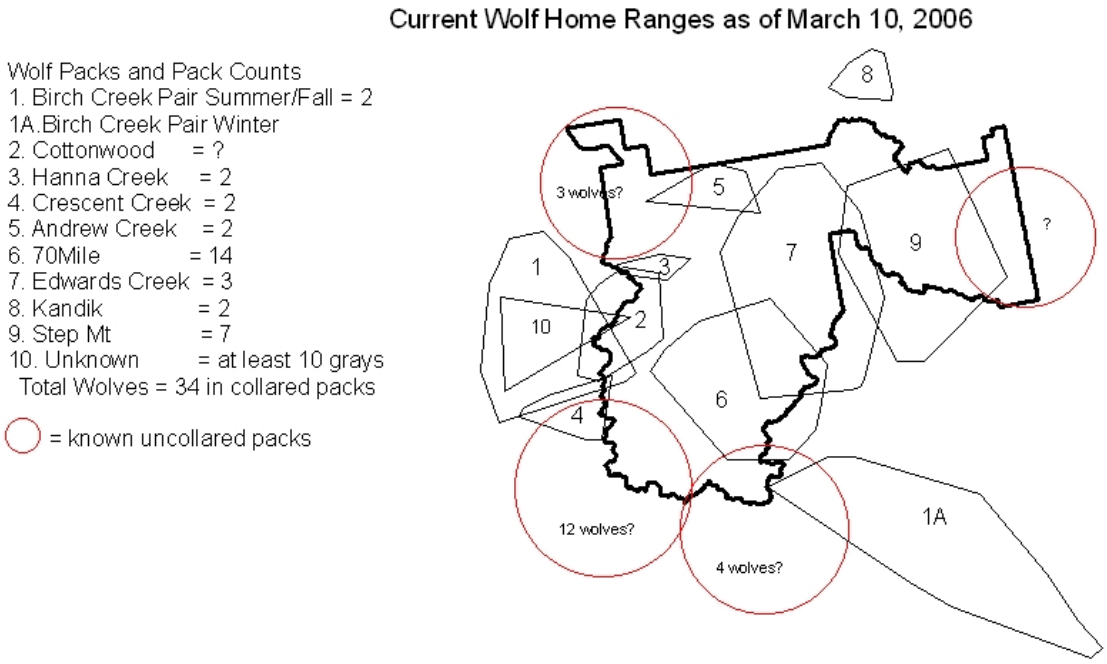

Figure 1. Map of current pack home ranges and pack counts. Includes wolves first collared in February 2006. Minimum convex polygons are used to delineate pack home ranges, red circles are used to depicted known uncollared packs.

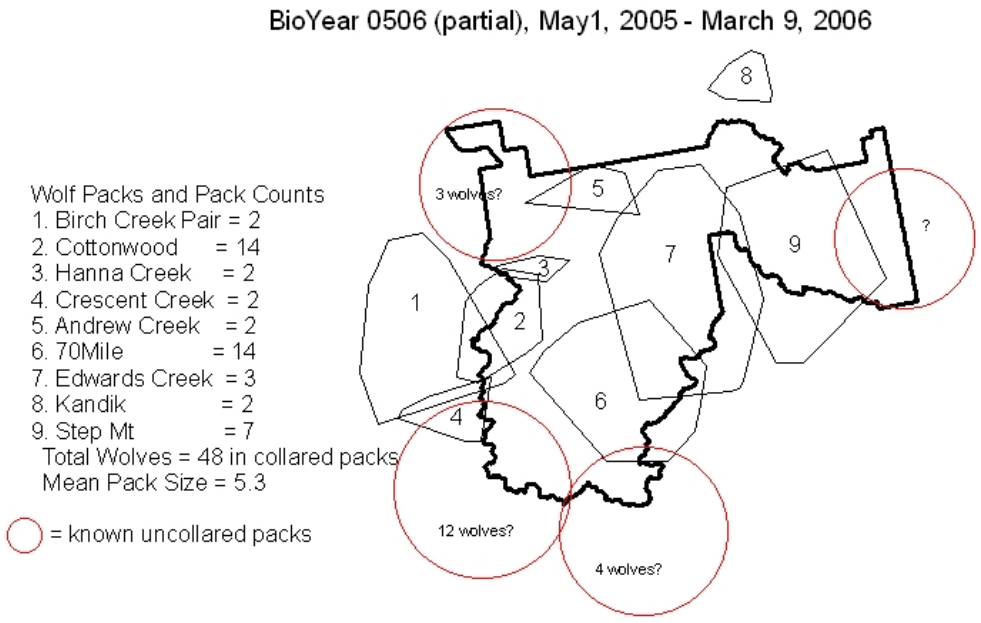

Figure 2. Map of Fall 2005 pack home ranges and pack counts. Includes wolves first collared in February 2006.

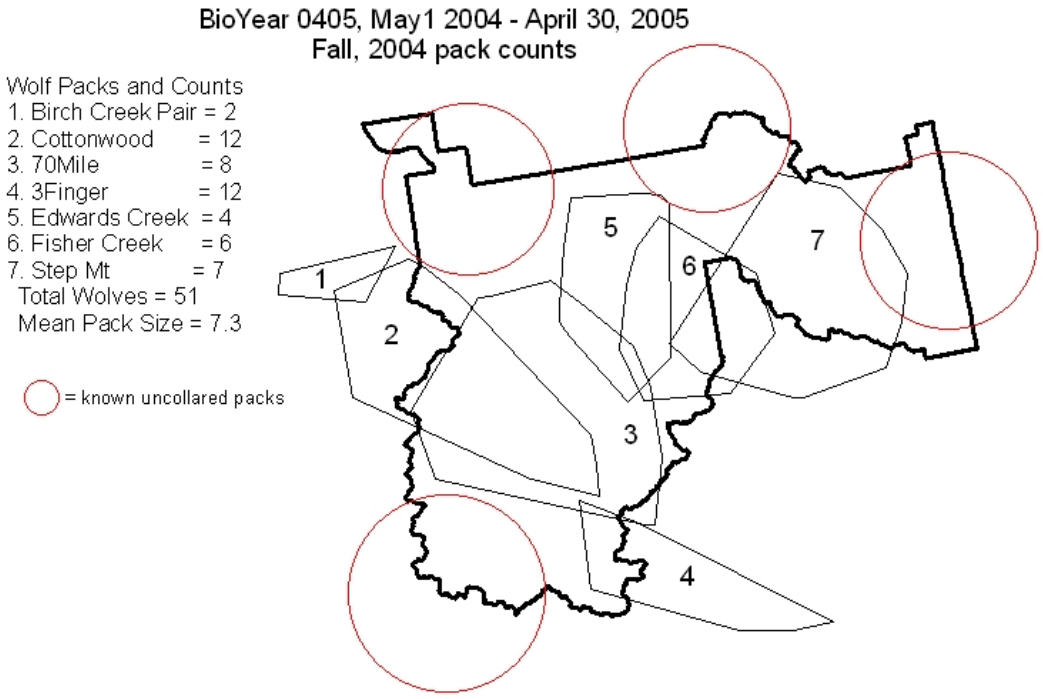

Figure 3. Map of Fall 2004 pack home ranges and pack counts.

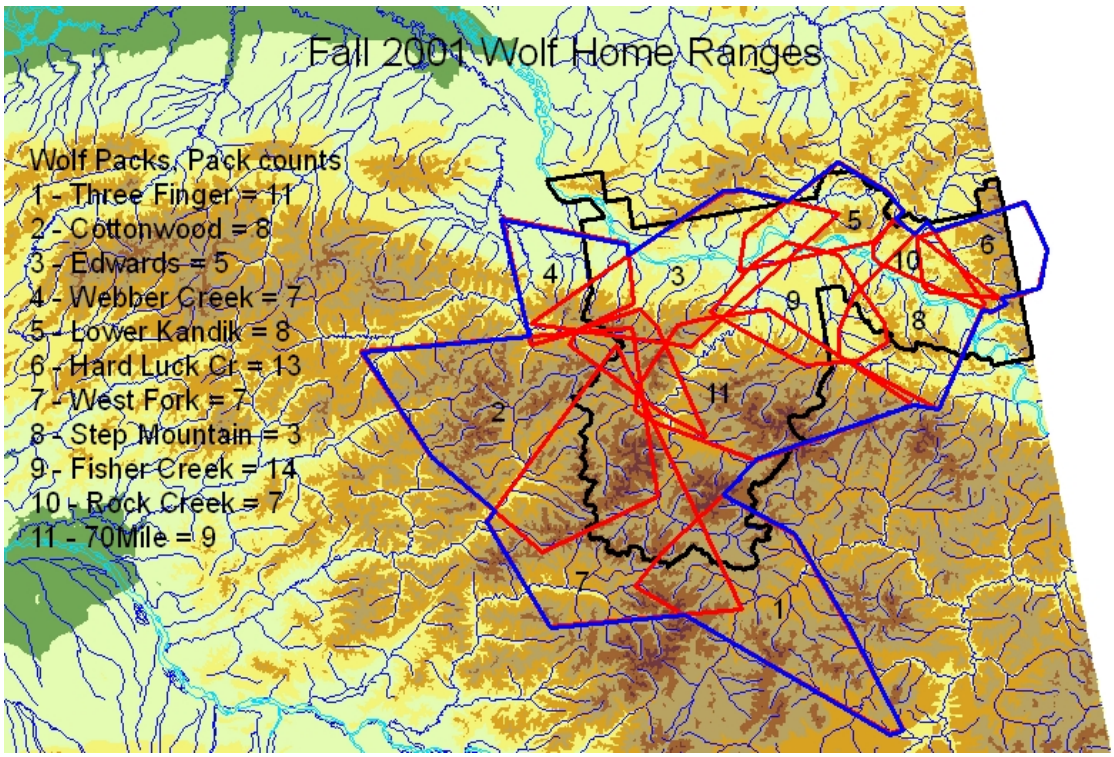

Figure 4. Map of Fall 2001 pack home ranges and counts

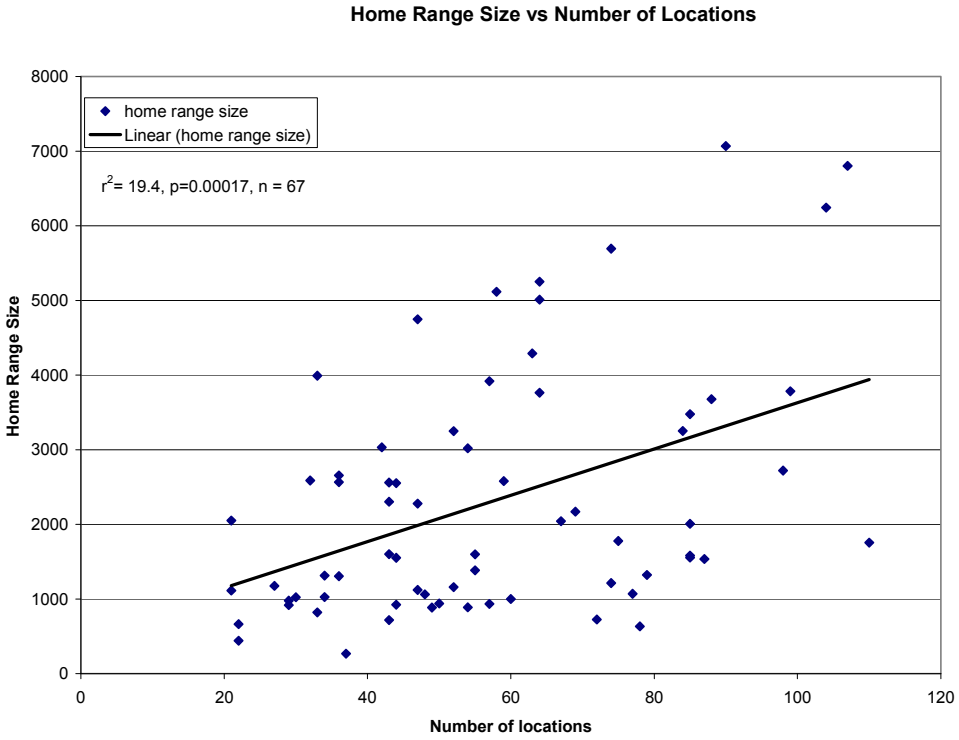

Figure 5. Wolf home range size vs. number of locations showing that home ranges calculated using minimum convex polygons are dependent on sample size of locations. Yukon-Charley Rivers National Preserve, Alaska, 1993 – 2005.

Pack Sizes, Density and Population Estimate

Fall mean pack sizes increased from 4.3 in 1993 to a maximum of 9.5 in 2003, with an overall average of 7.2. The wolf population in the area appears to be doing well and is likely responding to population changes in the Fotymile Caribou Herd. From 1993 – 2001 the increasing overall trend in mean pack size was significant (r^2=0.59, *P*=0.015), however the data from 2003 – 2005 should be viewed with caution as there were very few radiotracking flights (when compared to past years) resulting in the pack counts being minimums and there likely were more wolves than the counts revealed (Figures 6 & 7).

Wolf density estimation for 2003 – 2006 is not possible due to lack of either pack count data or home range data, or both. If adequate pack counts are obtained in Fall 2006 and spring 2007, May 2007 would be the next time when a meaningful density estimate could be made based on a biological year (May 1, 2006 – April 30, 2007).

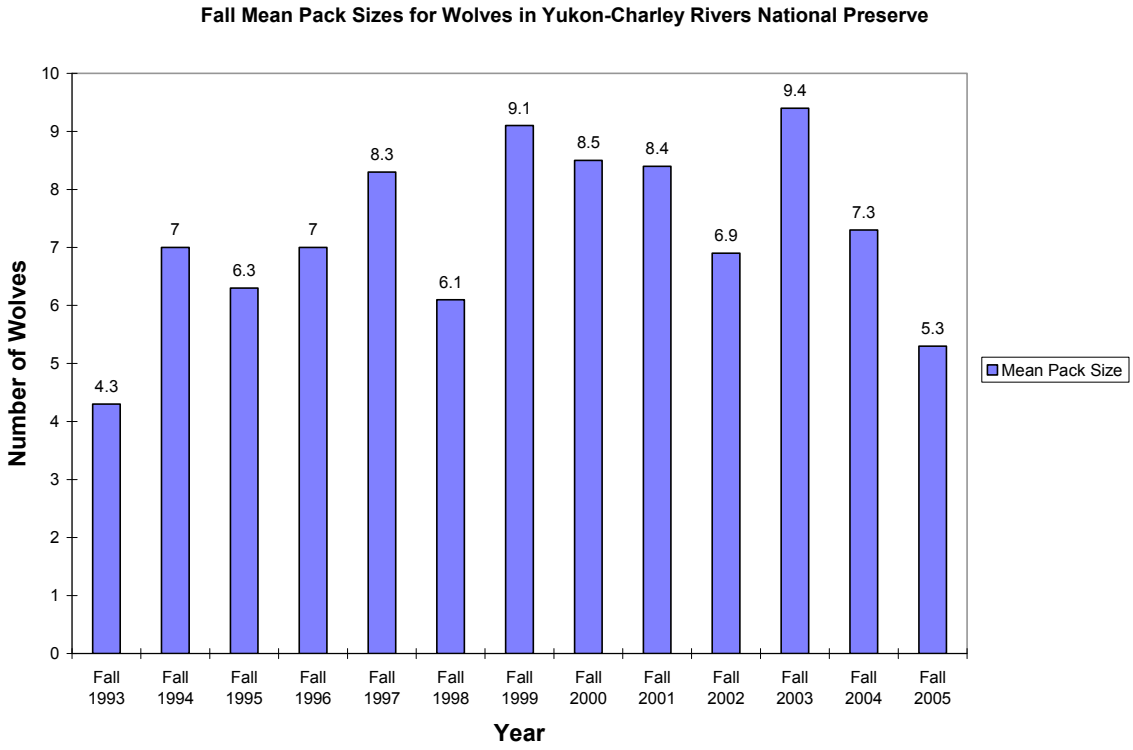

Figure 6. Trend in wolf population using mean pack size. Yukon-Charley Rivers National Preserve 1993 – 2005. Years 2003 – 2005 should be viewed with caution as radiotracking flights were substantially reduced.

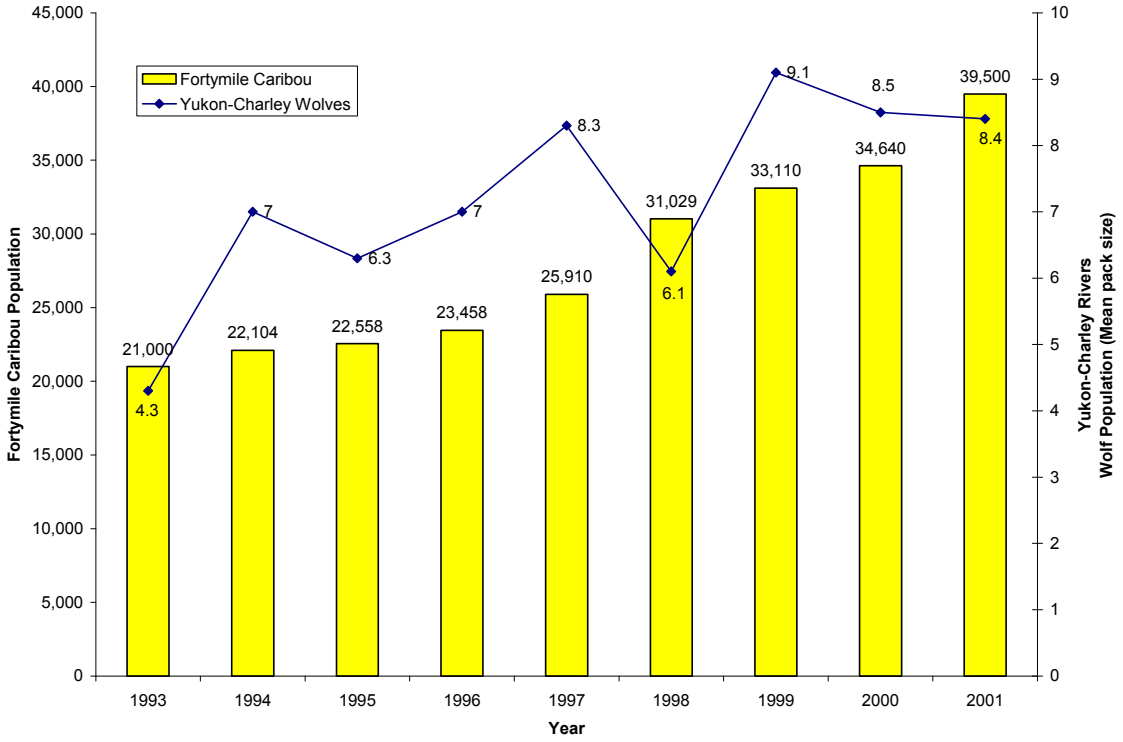

Figure 7. Trend in population change for the Fortymile Caribou Herd (trend in photo census counts) and wolves (trend in mean pack size) in Yukon-Charley Rivers National Preserve, Alaska, 1993 – 2001.

Plans for Coming Year

Later in March or April 2006, and next November we will try to find and collar 2 or 3 members of 3 additional packs (3Finger West Fork and Webber Creek). During this same time frame we will also be raditracking the collared wolves from aircraft to get accurate pack counts for a spring population estimate. During September and October of 2006 the wolves will be raditracked 5 – 10 times to generate a fall population estimate and estimate pup production and survival.

Acknowledgments

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