Western Arctic Caribou Herd Overview

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This Presentation

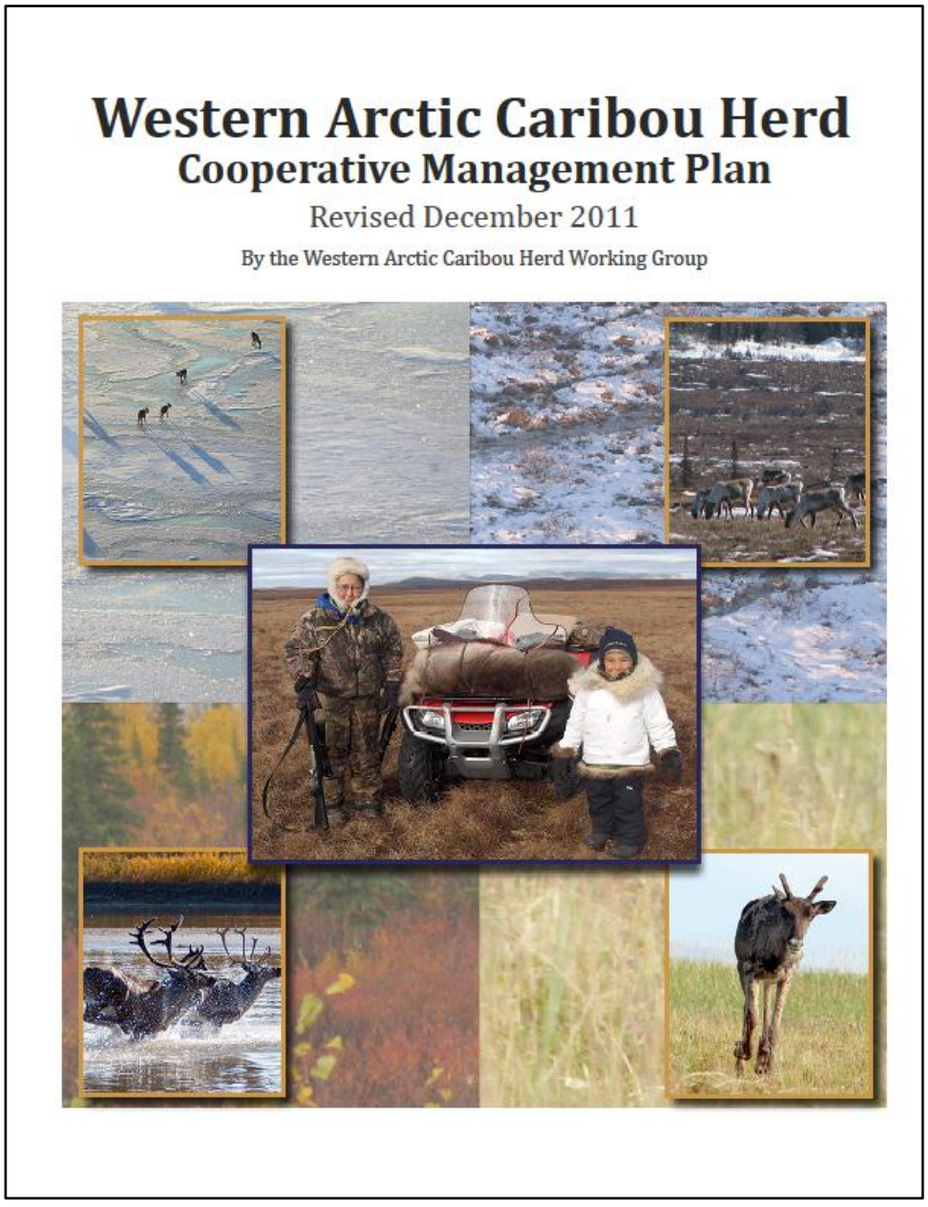
- **Population monitoring activities**
- **WACH Working Group Management Plan**
- **Seasonal distribution & movements**
- **Population size & trend**
- **Trends in recruitment and adult mortality**
    - **factors that may be driving these trends**
- **Management criteria:**
    - **Population & Harvest Objectives**
    - **Amount Necessary for Subsistence**
- **Harvest data**

WAH Management Activities

- **Calving surveys**
- **Photocensus**
- **Collaring project**
- **Spring & Fall range-wide VHF telemetry surveys**
- **Fall sex/age composition surveys**
- **Monitor harvests**
- **Mandible collection**
- **Recruitment surveys**
- **Satellite telemetry program**
- **Health assessments**

Cooperative Management Plan, 2011

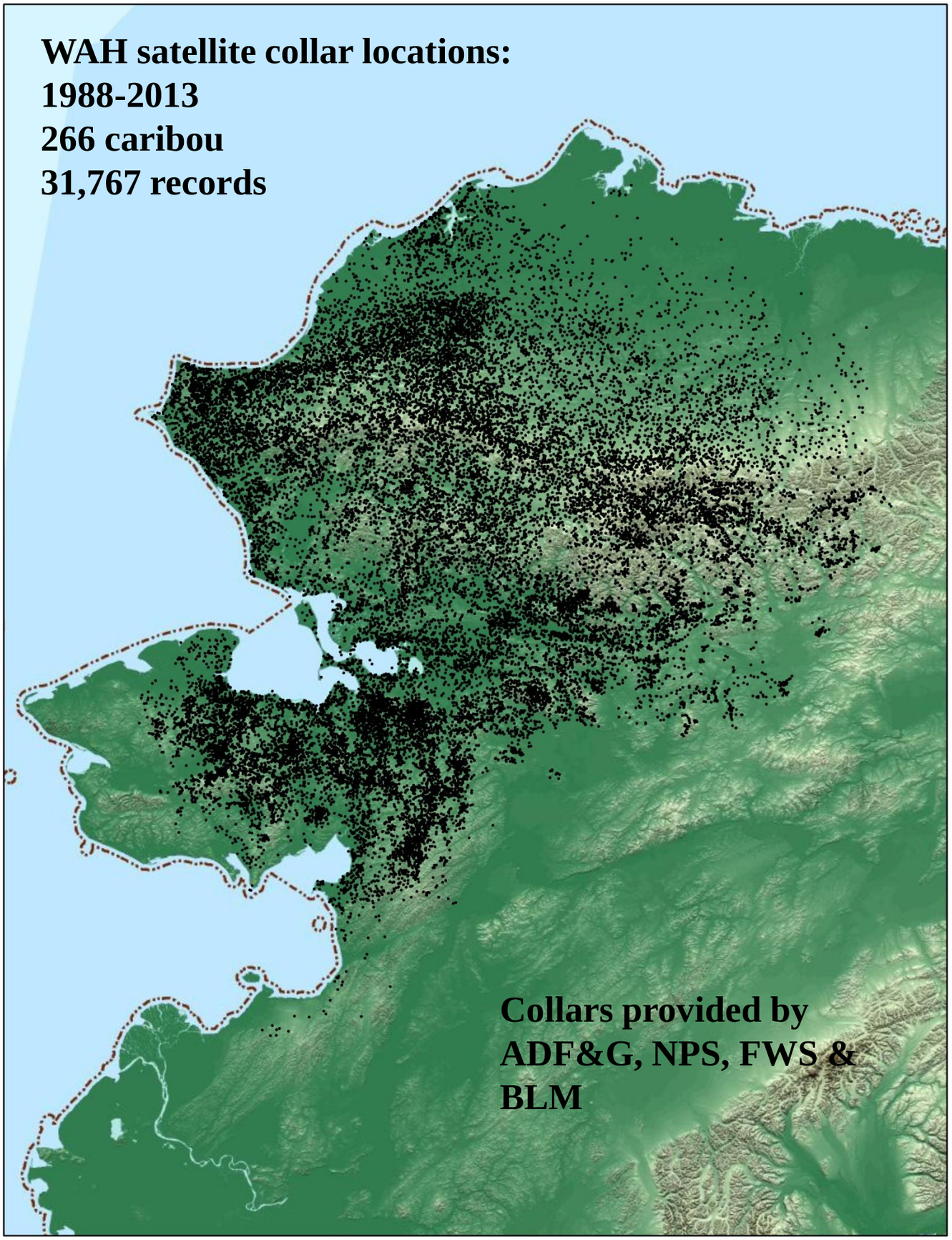
- **This plan was updated by the WACH Working Group in December 2011.**
- **There are 2 parts of the Population Management section relevant to BOG and FSB**
  - **Table 1 – Provides a framework that recommends management strategies and harvest rates in relation to population size and trend**
  - **Appendix 2 – Provides recommendations regarding population monitoring activities (e.g. frequency and types of surveys, education outreach, etc.) and harvest strategies relative to population size and trend**



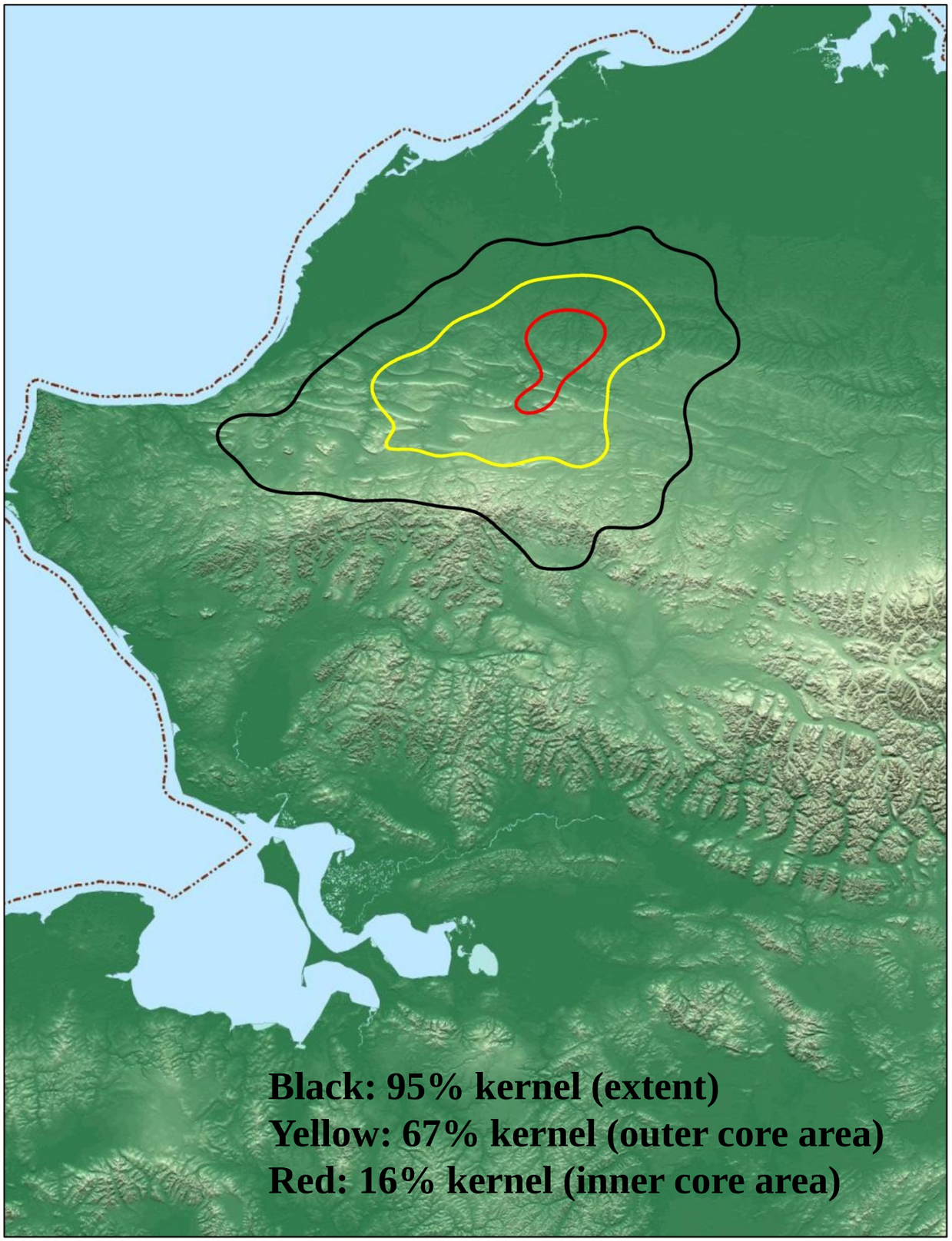
WAH Distribution & Movements

For the next series of maps I've used the following conventions:

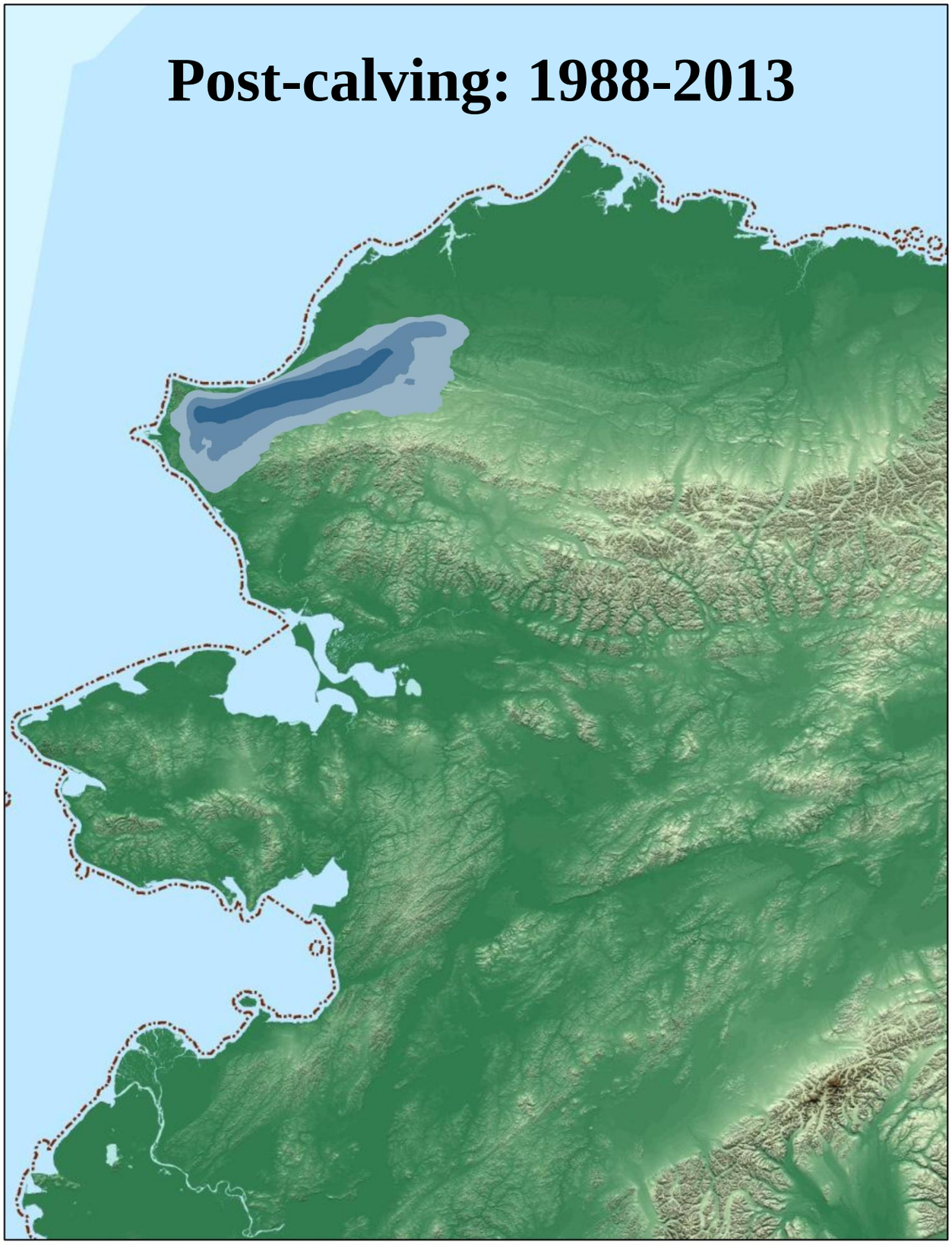
- **Black symbols on maps = all caribou (bulls & cows)**
- **For kernel & line density maps**
  - **Blue areas = cows**
  - **Red areas = bulls**
  - **Yellow/brown = all caribou (bulls & cows)**
  - **Darkest areas = highest use**

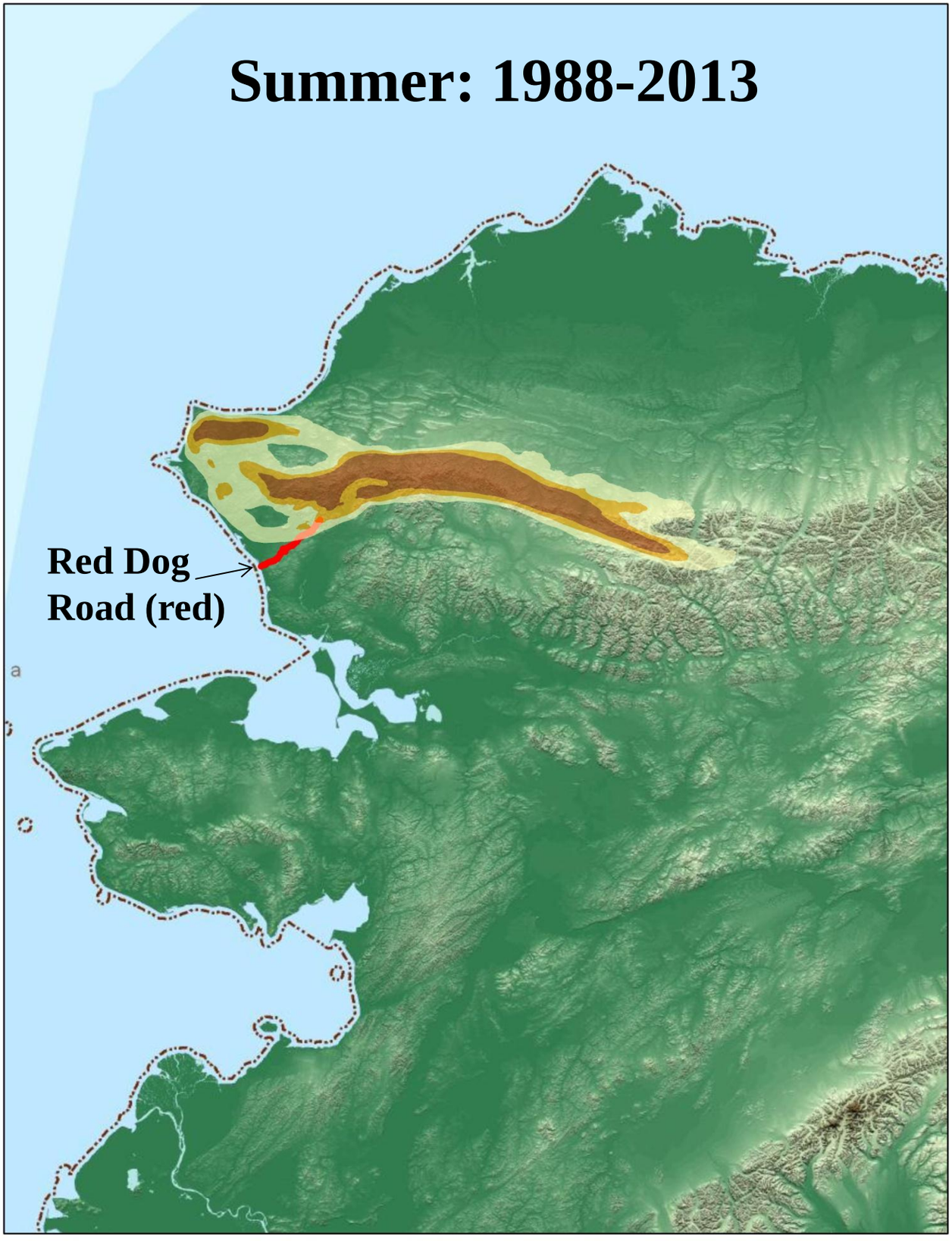

WAH satellite collar locations:
1988-2013
266 caribou
31,767 records
Collars provided by
ADF&G, NPS, FWS &
BLM

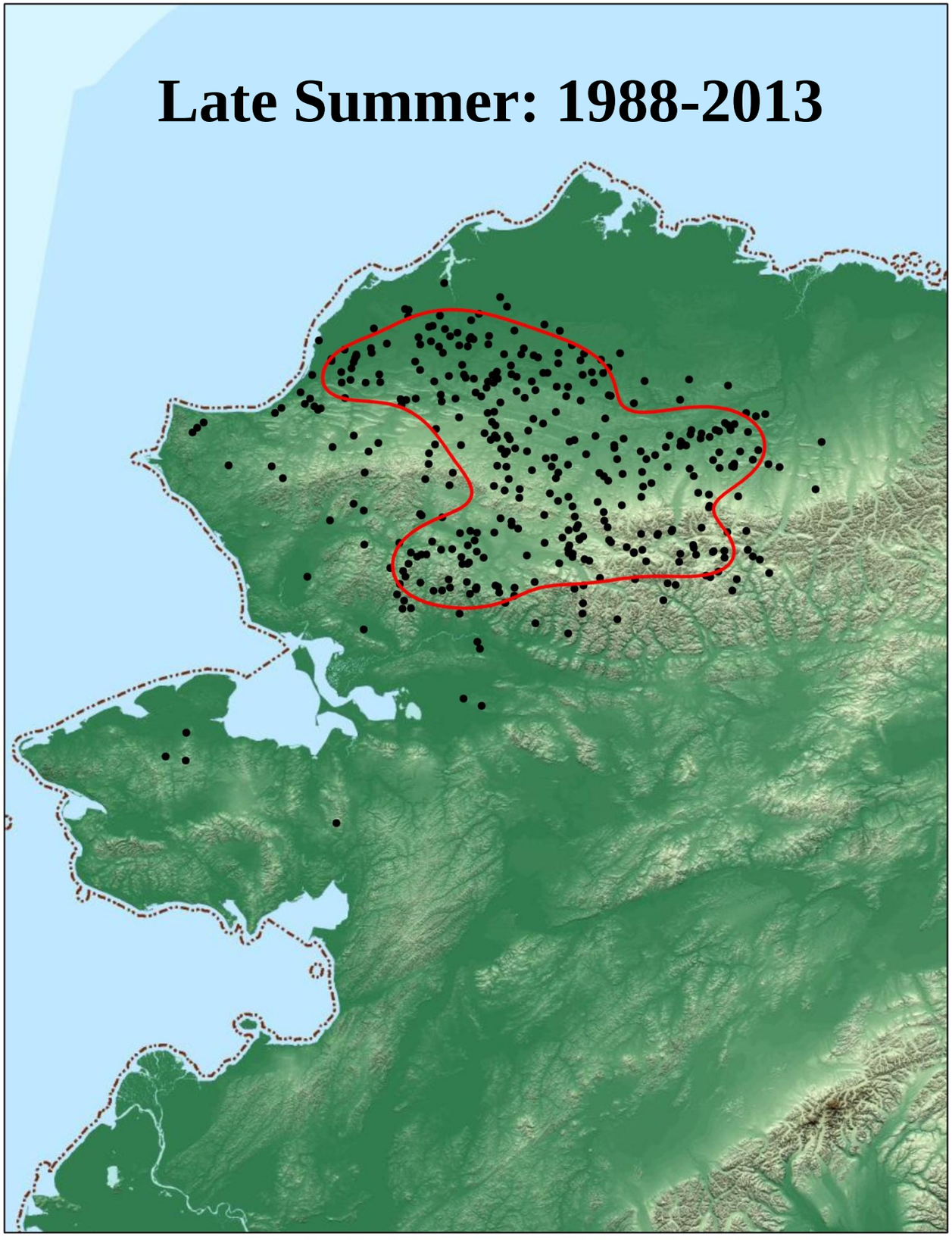
Calving: 1988-2013



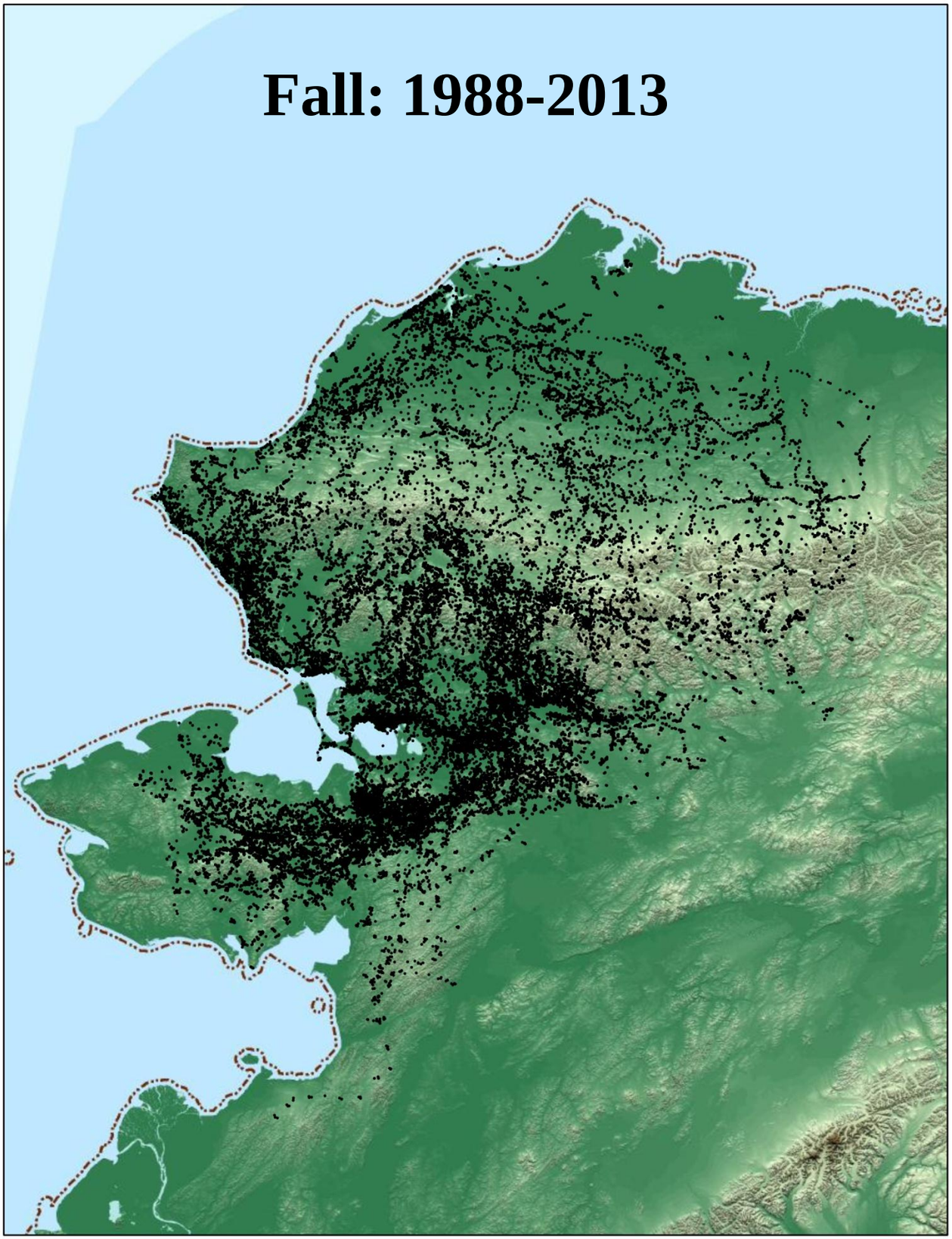
Post-calving: 1988-2013

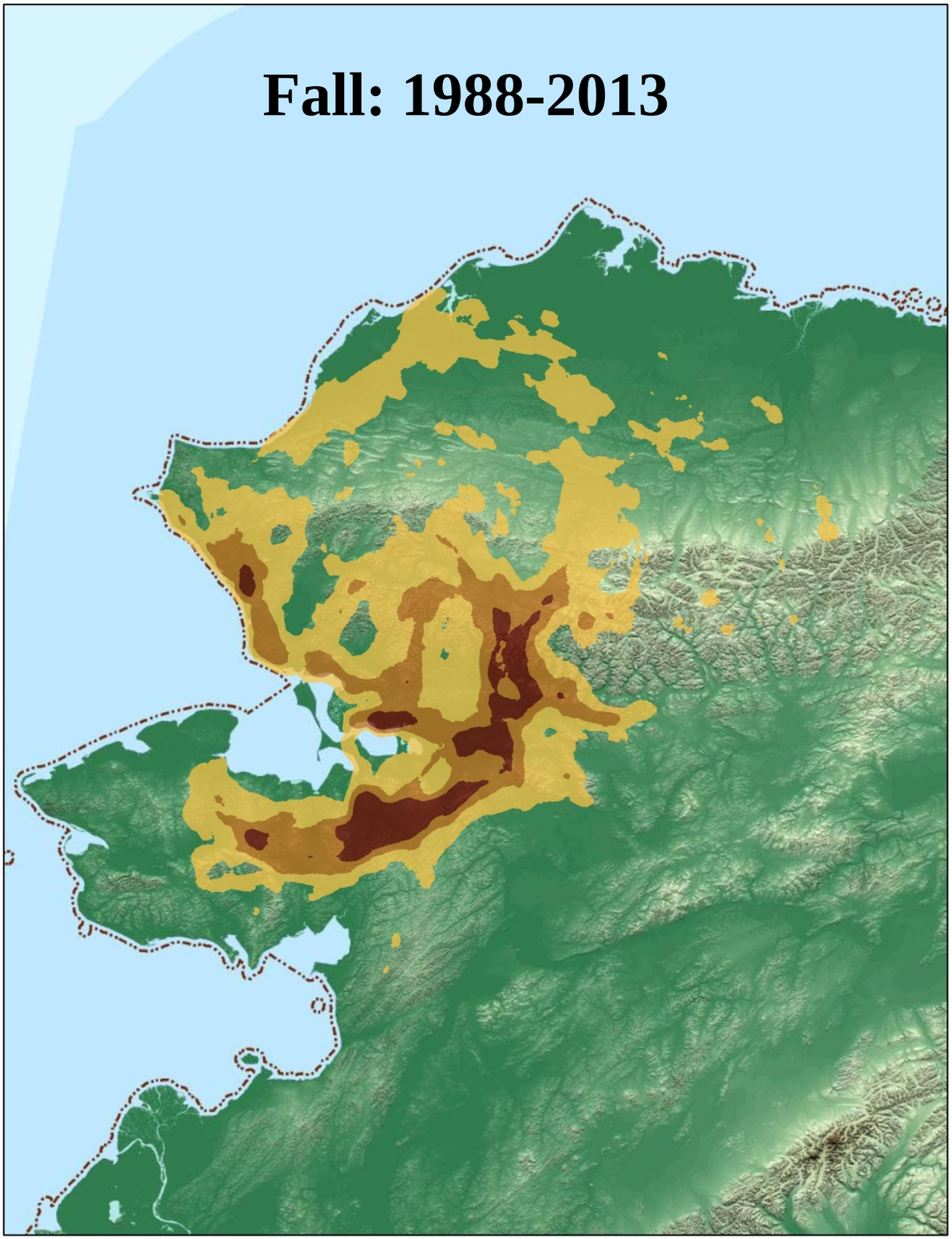


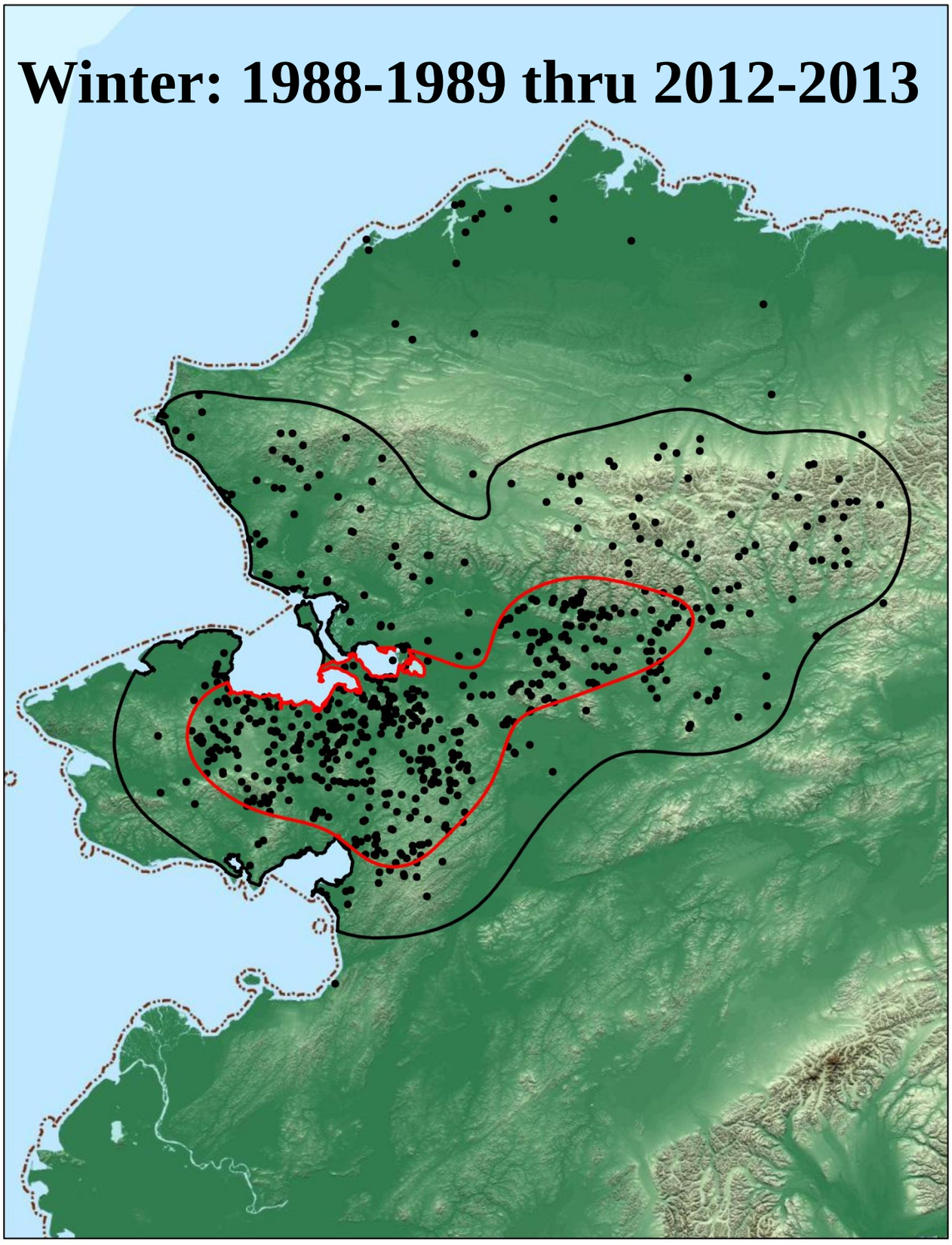

Summer: 1988-2013
Red Dog
Road (red)


Late Summer: 1988-2013

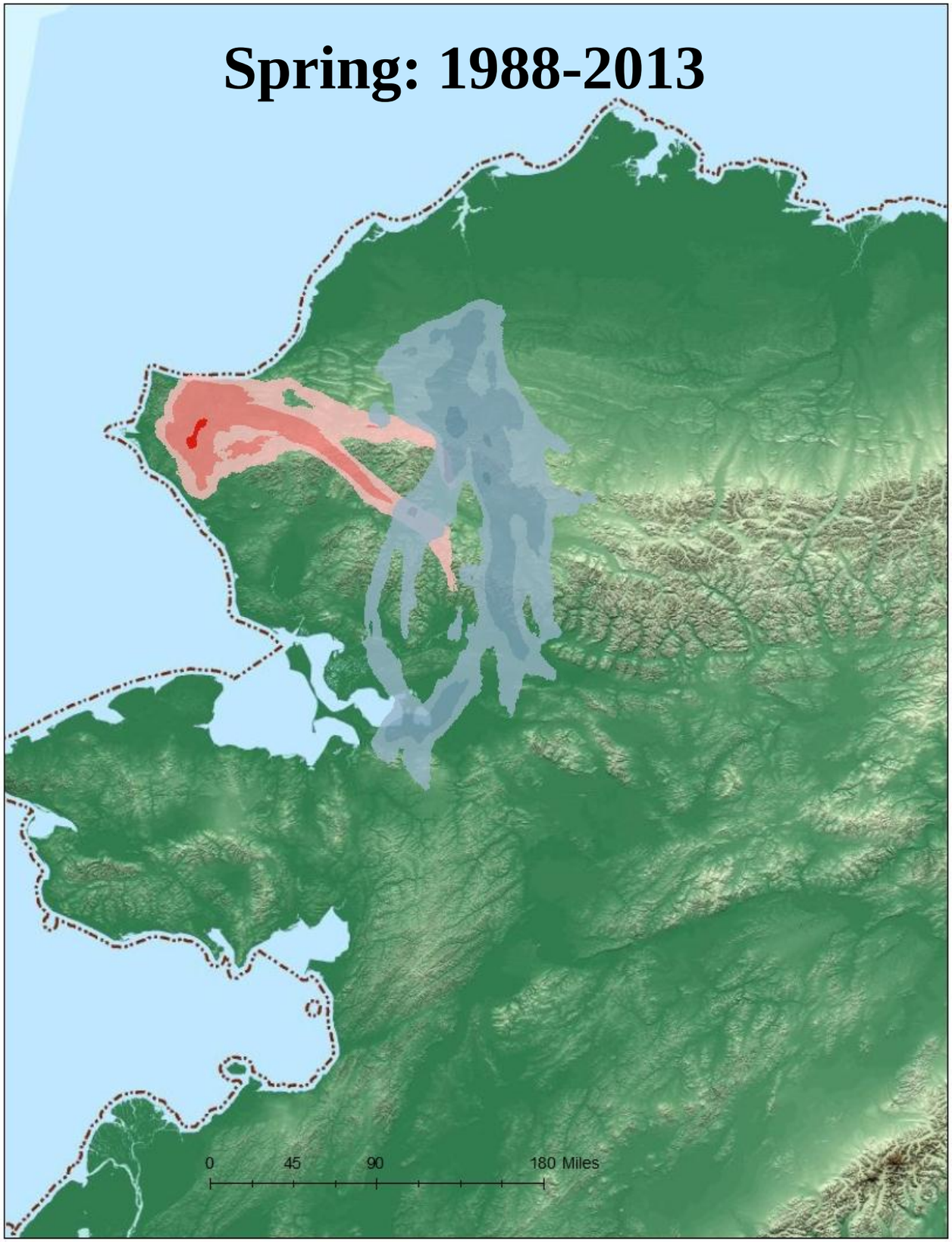
Fall: 1988-2013



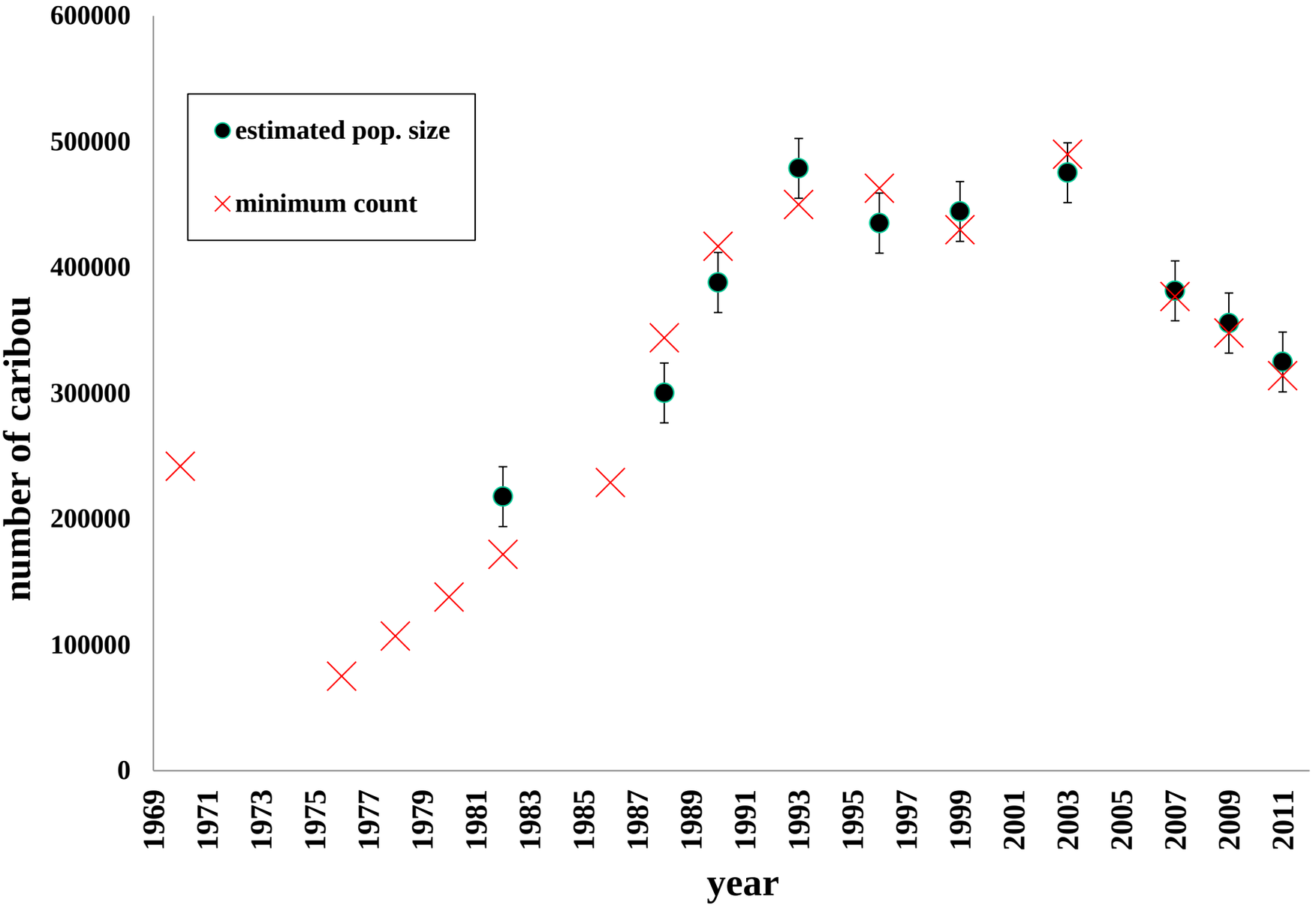

Fall: 1988-2013


Winter: 1988-1989 thru 2012-2013

Spring: 1988-2013



Census Results

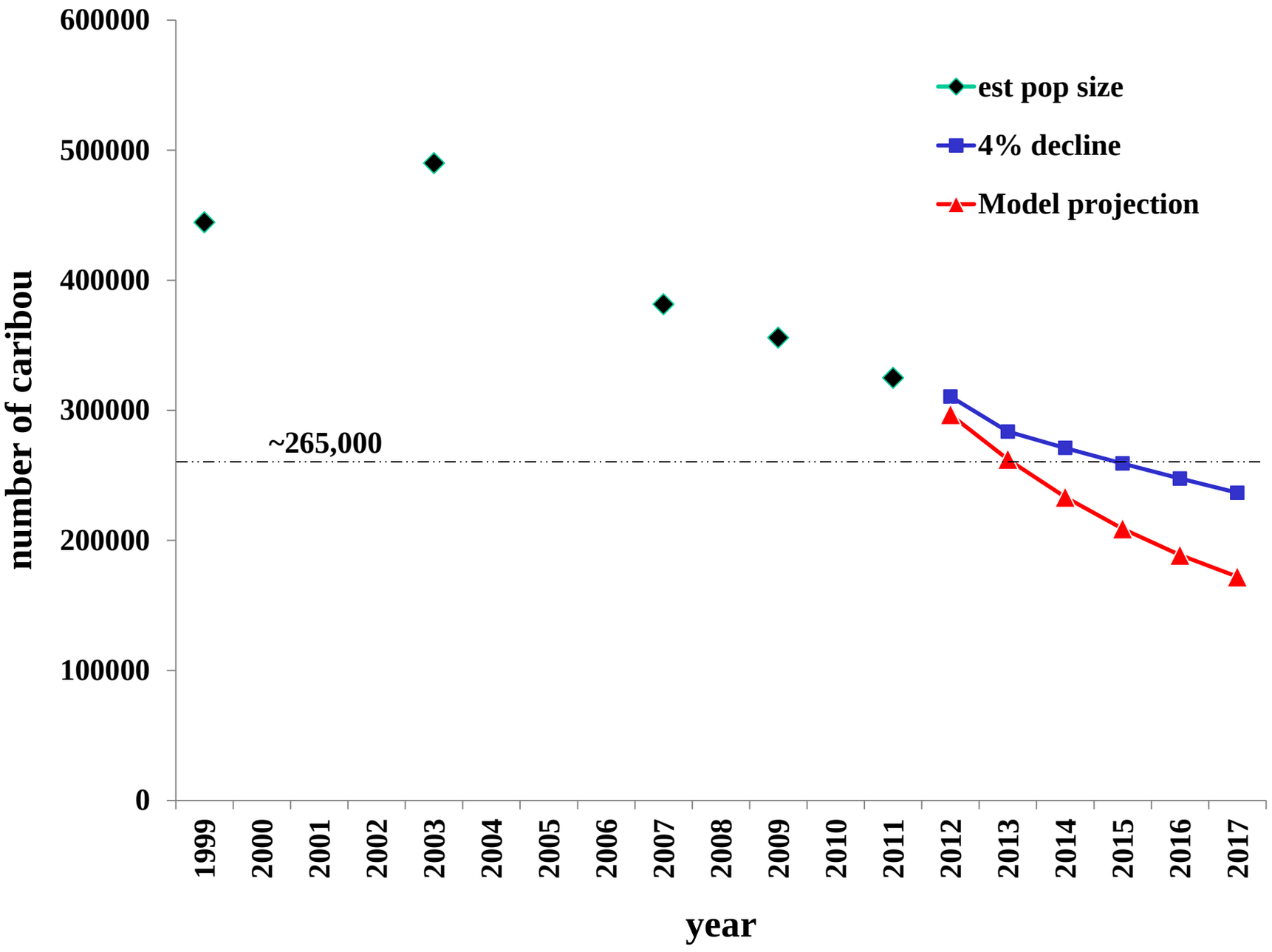


Red 'X' = minimum counts of population size

Black dots = population estimates based only on collared caribou

Vertical bars = ±95% confidence intervals for the population estimates

Census Results & Population Projections



- **Population projections suggest the WAH will decline below 265,000 caribou, the level at which the Management Plan recommends transitioning from 'Liberal' to 'Conservative' management, between 2013 and 2015**

Assumptions for Population Projections

Harvest

- **Subsistence harvest estimates are reasonably accurate – questionable: our model needs to be updated**
- **Estimated harvest by other users is reasonably accurate – probably safe**
- **Total harvest level remains constant – will probably decrease as caribou become more difficult to find**
- **Sex ratio of harvest remains constant at 67% bulls & 33% cows**

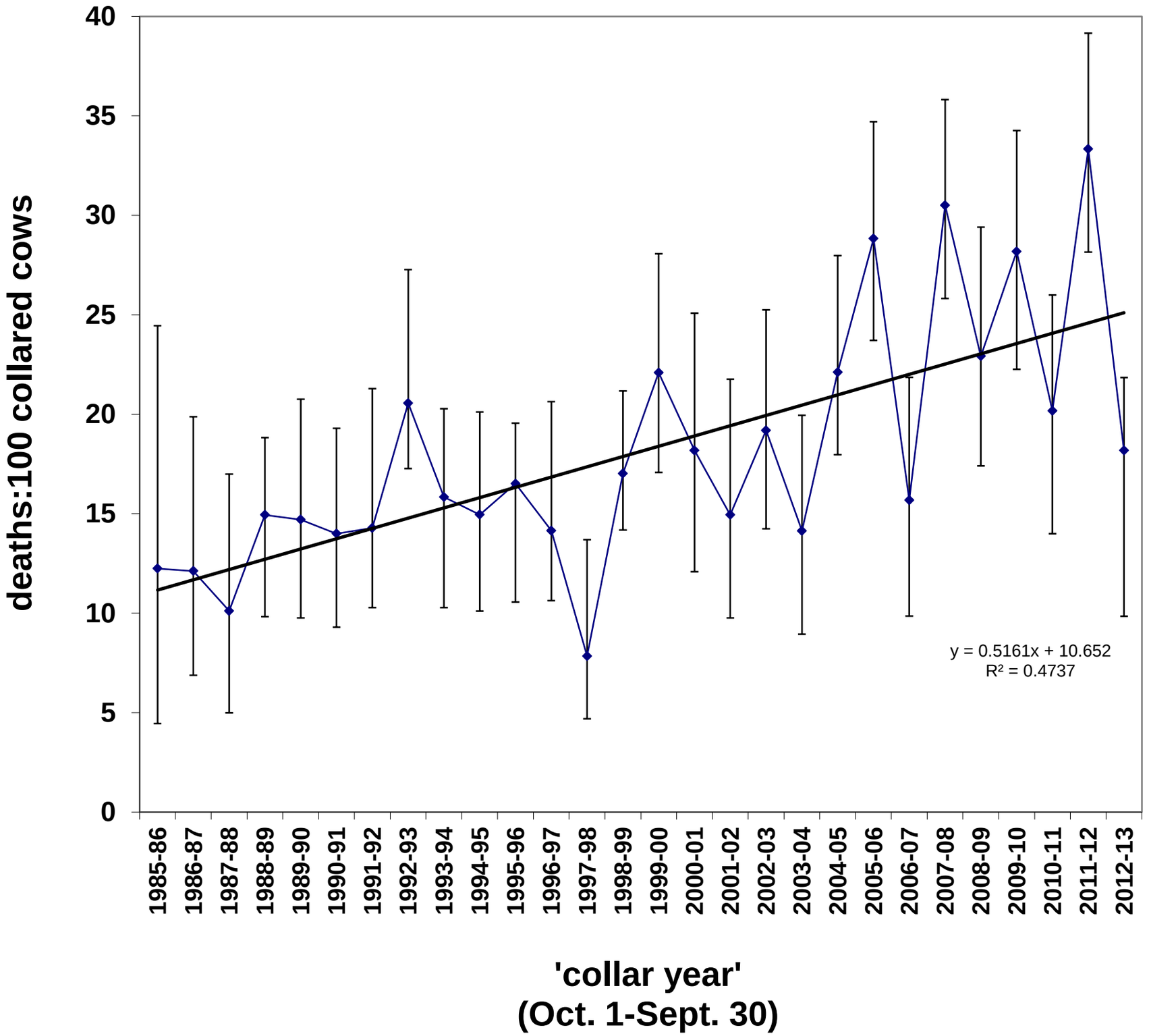
Caribou biology

- **The bull:cow ratio and calf recruitment continue to decline at rates similar to 1992-2012**
- **Cow mortality rate remains constant at 20%/yr (median since 2008-09)**
- **Bull mortality remains constant relative to cow mortality**

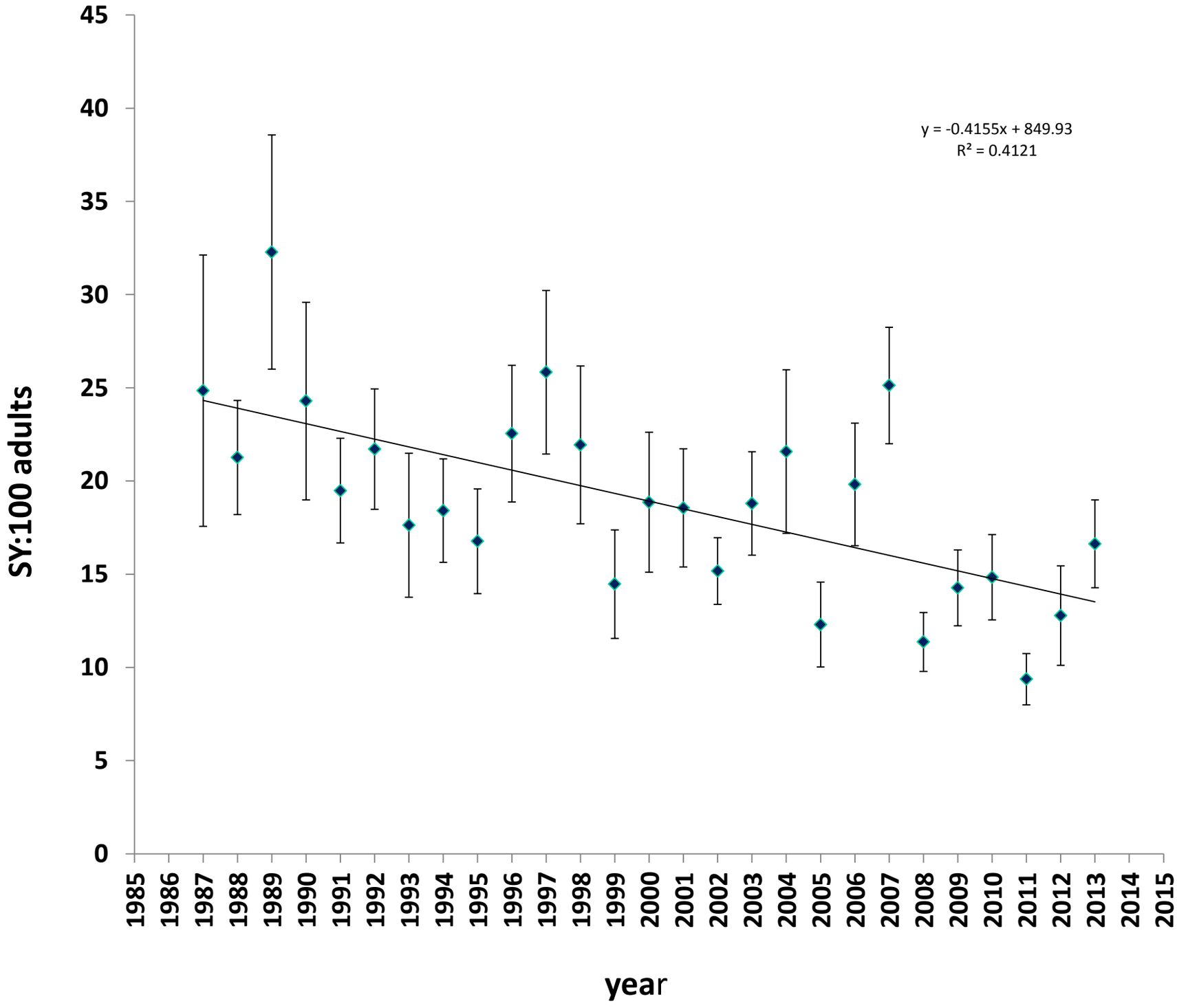
Of course, none of these assumptions will be exactly met – the population projections are provided to give you a rough idea of the future trajectory of this herd

- **WAH photographed (twice) in July 2013**
- **Updated population estimate by spring 2014**

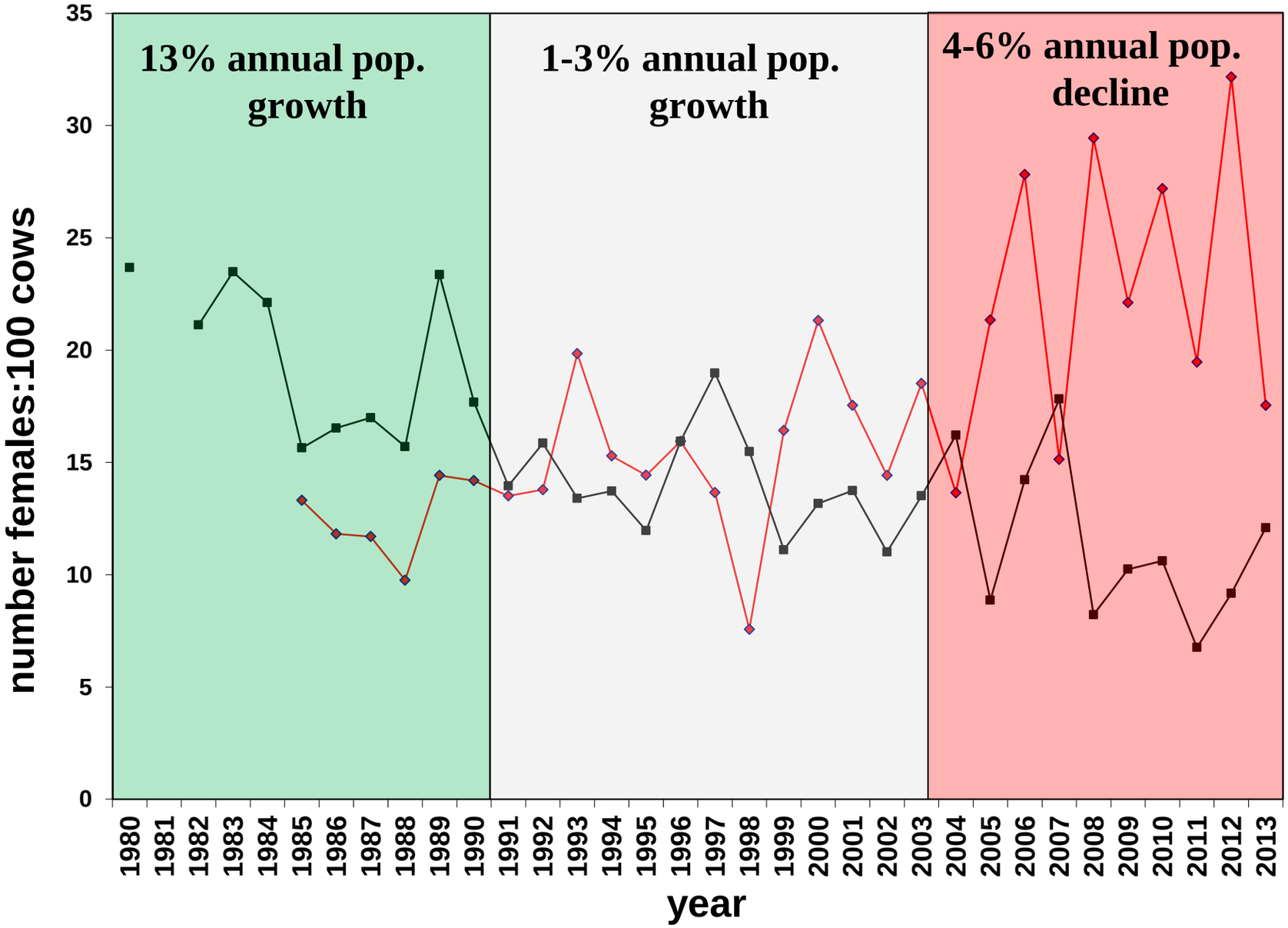
Adult Cow Mortality



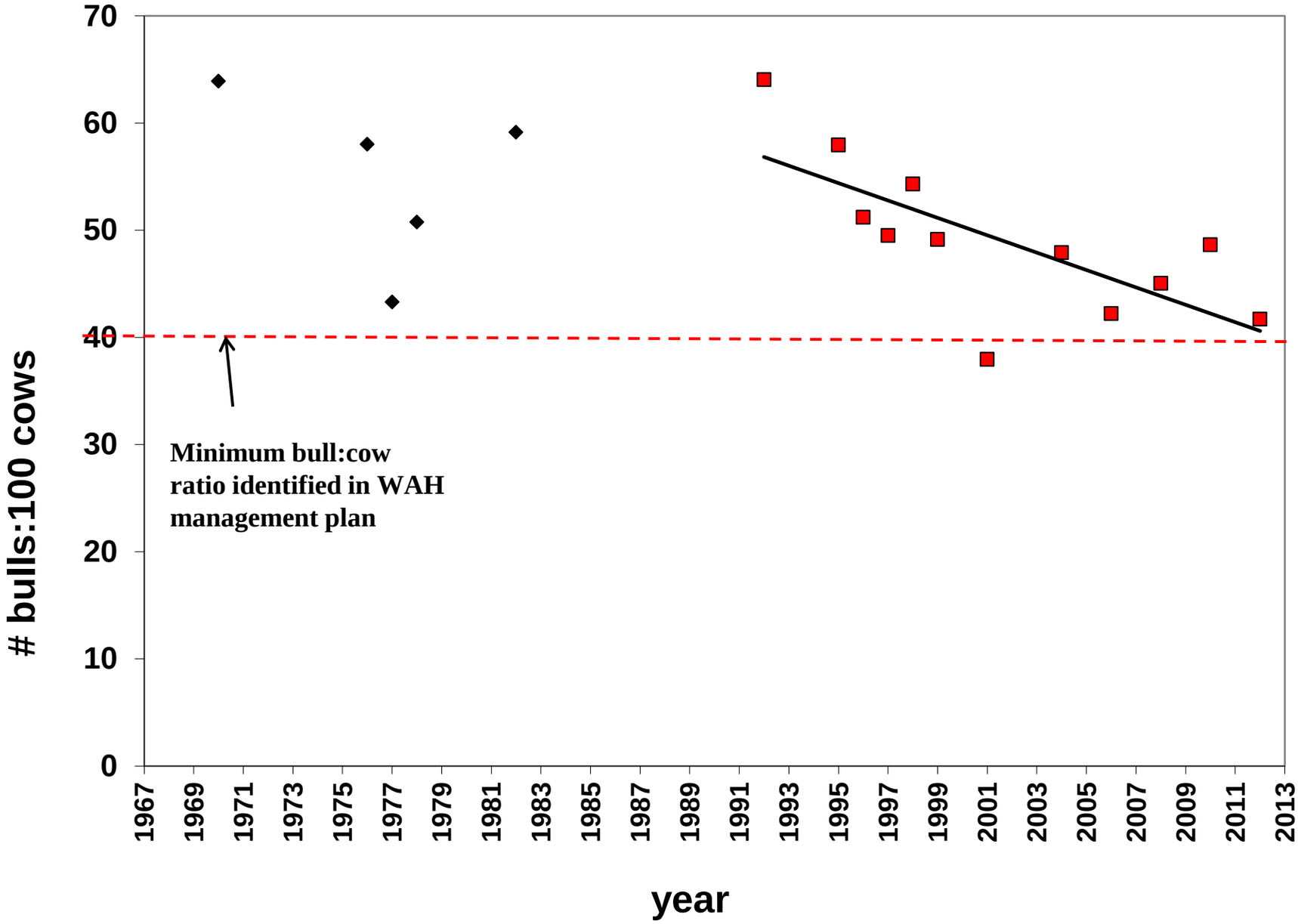
Female Calf Survival



Adult Cow Mortality vs. Female Calf Survival Relative to Population Growth Phase



Fall Bull:Cow Ratios



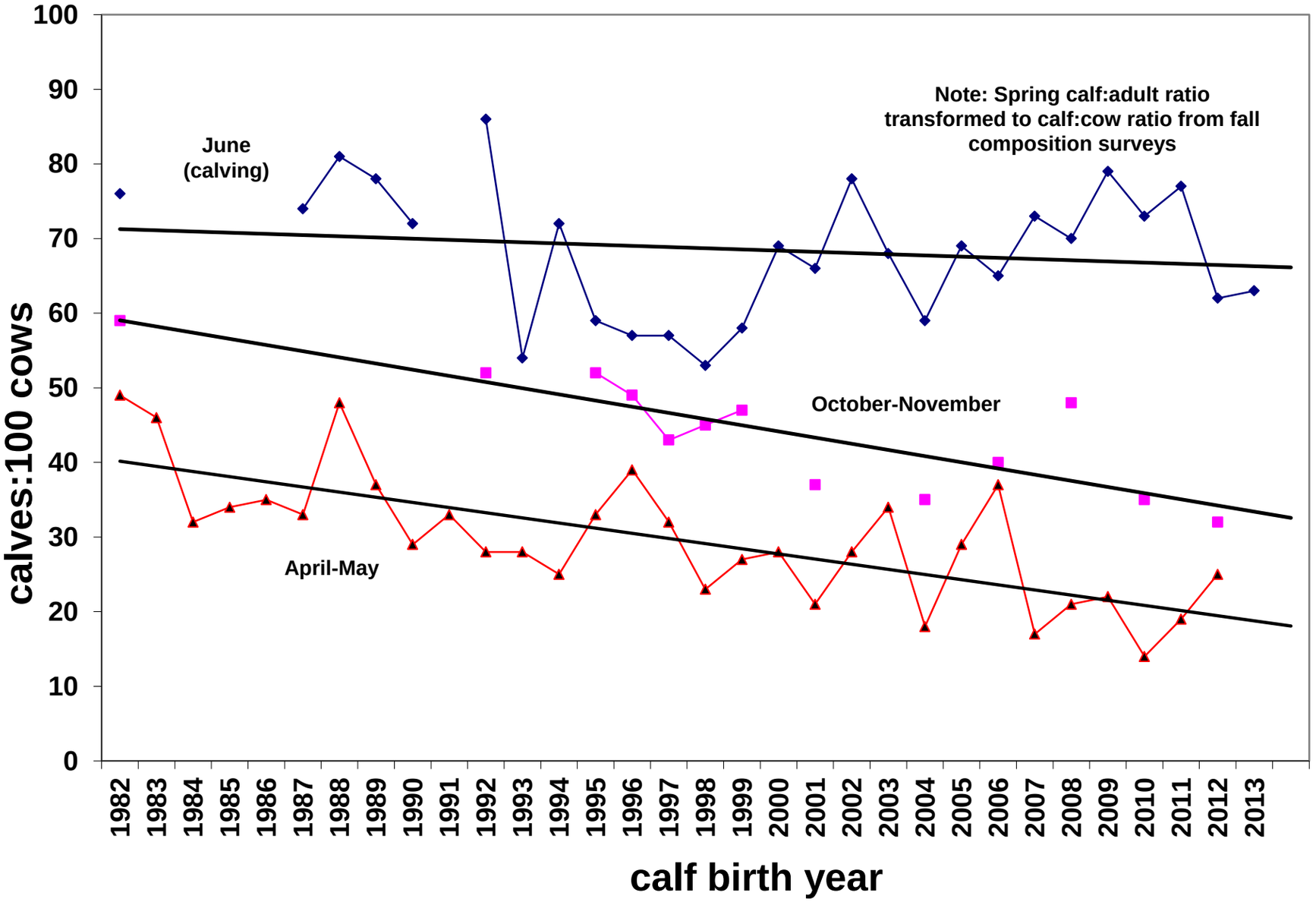
Data collected during late October-early November

Possible Factors Driving WAH Decline: Recruitment & Mortality

Calf Production & Survival

- **Females are producing calves: productivity isn't the problem**
- **Calf survival is declining especially during 1st summer**
- **Little change in calf survival from fall to spring**

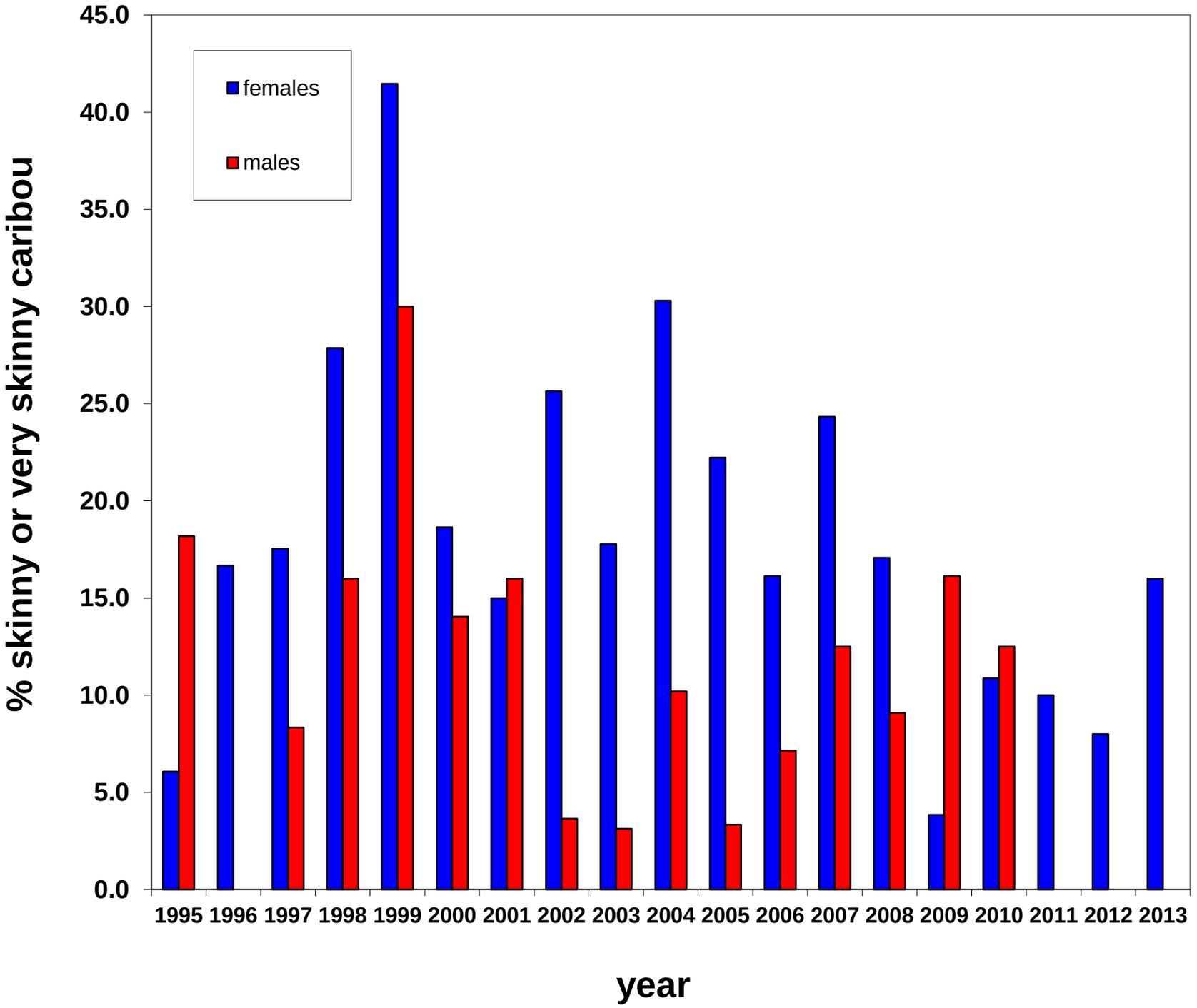
WAH Calf:Cow Ratios:
Calving (June), Fall (October-November) & Spring (April-May)



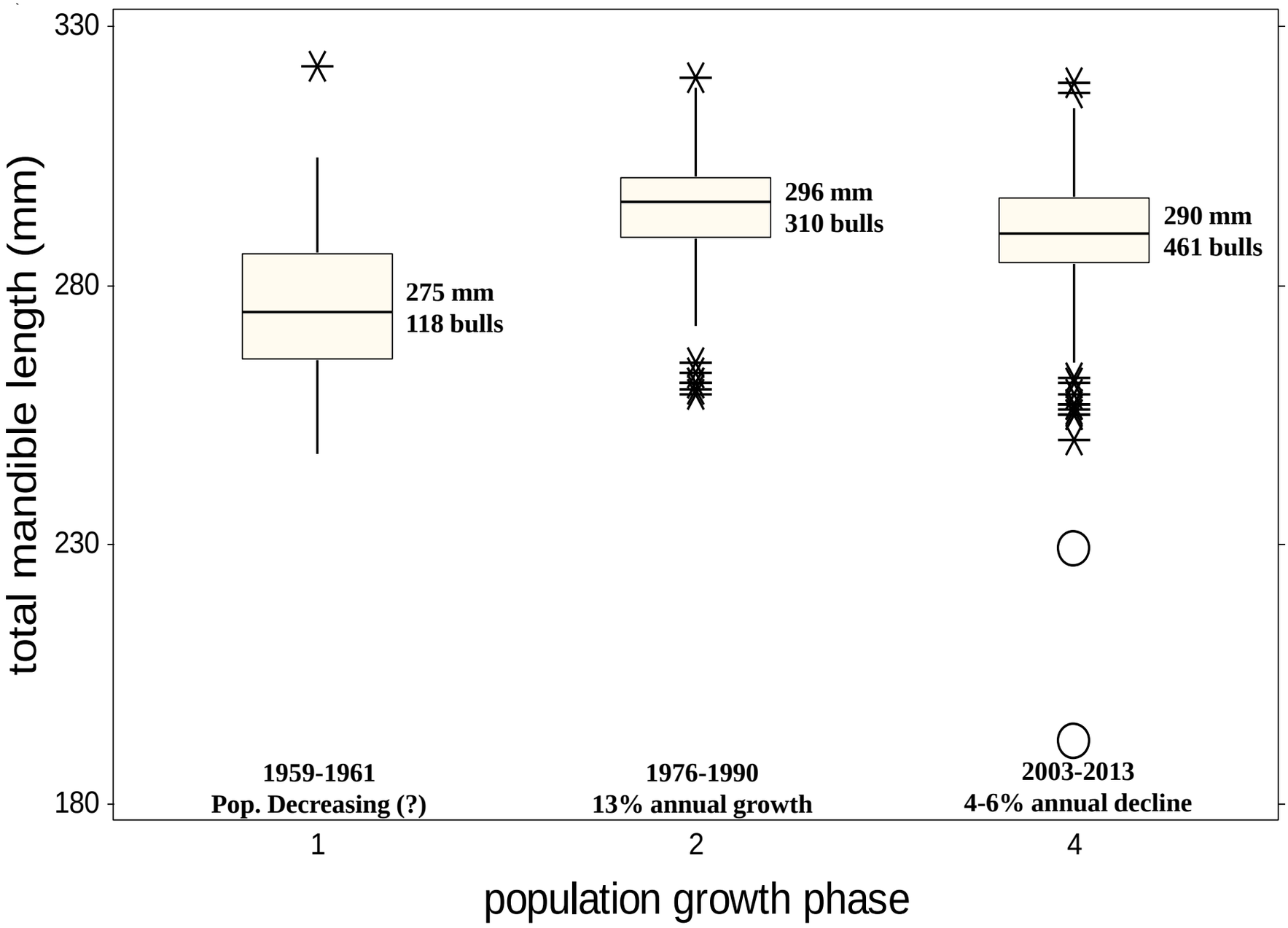
Range Condition

- **From 1981-2005, BLM documented 14% decrease in lichen cover with corresponding increase in grasses/shrubs on WAH winter range**
- **Changes in range condition have not been reflected in the body condition of WAH caribou**
- **However, body size of caribou *may* be decreasing (not certain at this time); if so, this could indicate range limitation**

Percentage of Skinny Caribou: September



Median Mandible Length of Mature Bulls by Population Growth Phase



'Mature bull' defined as ≥5 years old

Weather

- **Photo taken NW of Kivalina, Feb. 2006 following icing event in Dec. 2005**
- **29% adult cow mortality rate that year**

- **Although we're not seeing long term changes in caribou body condition, it appears that short term weather conditions are occasionally preventing caribou from accessing food**
- **Mortality data & our field observations suggest this has happened several times since the mid-1990s**

- **Summer weather conditions have probably also affected caribou mortality**
  - **3 localized WAH mortality events near Cape Thompson:**
    1994-1995
    1999-2000
    2011-2012
  - **Common feature of the 1994-95 & 1999-00 die offs was that caribou were in poor body condition as they left summer range based on our Sept. observations at Onion Portage**

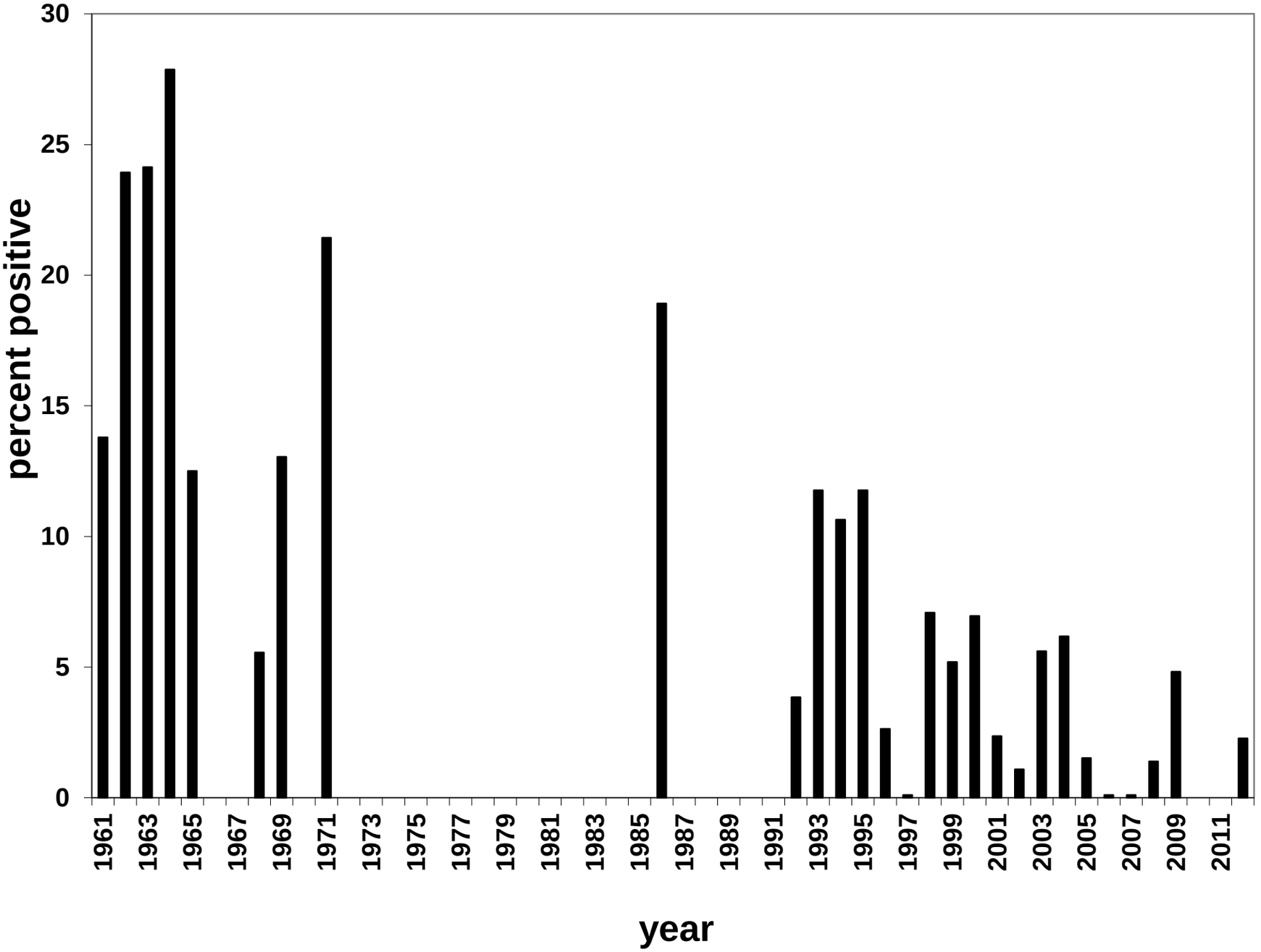
- **Warm, dry conditions in early summer cause:**
  - **Lower biomass of caribou food**
  - **Lower quality food (G. Finstad, UAF)**

Parasites & Disease

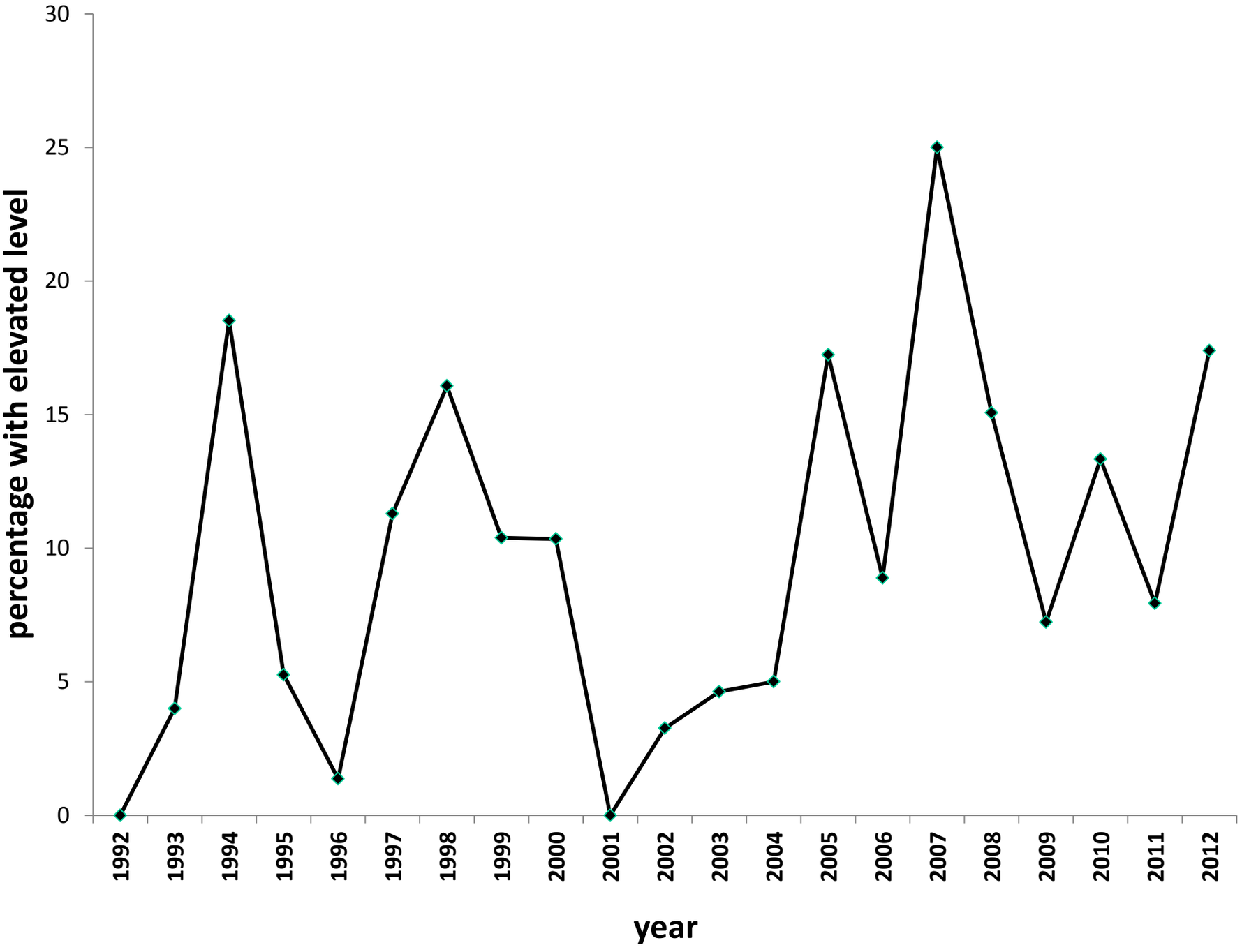
- **WAH health assessments: 2007 and 2010**

- **No red flags in gross characteristics or any lab results from these tissue collections**

Exposure to Brucellosis (from blood samples)



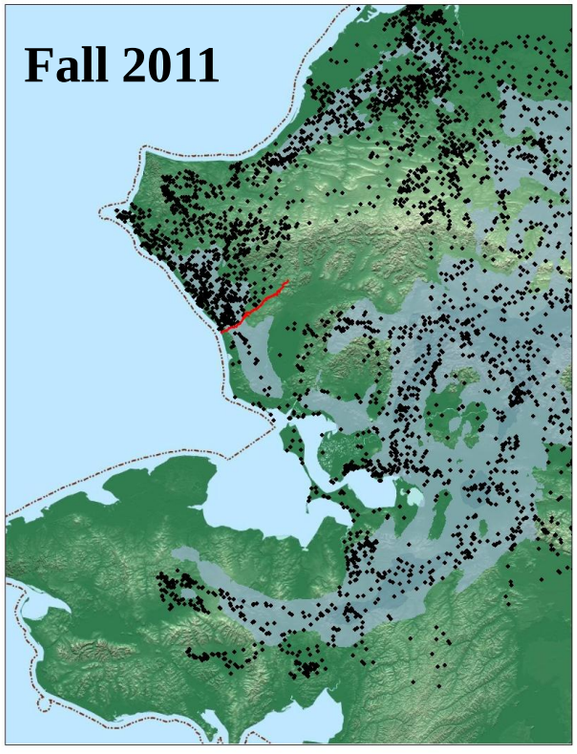
Haptoglobin Levels



Haptoglobins are proteins that indicate inflammation from any source.

Habitat Fragmentation

- **The Red Dog mine, road and port site comprise the only major development complex within WAH range**
- **Red Dog has changed WAH movements in some years, e.g. 2011**
- **Even so, Red Dog has likely had no effect on the current WAH population decline**



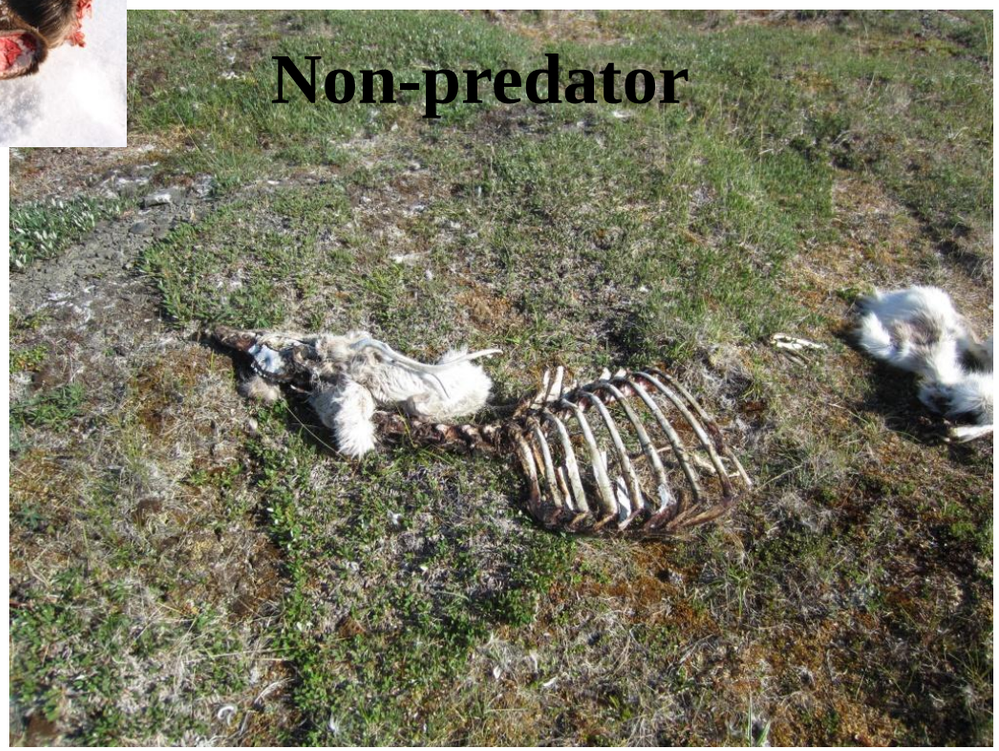
Accidents

Starvation

- **Three localized WAH starvation events: 1994-95, 1999-00, 2011-12**
- **None of these were large enough (≤4000 deaths/event) to show up in our mortality estimates**
- **Malnutrition and the environmental conditions that cause it may increase the vulnerability of caribou to wolves during winter**

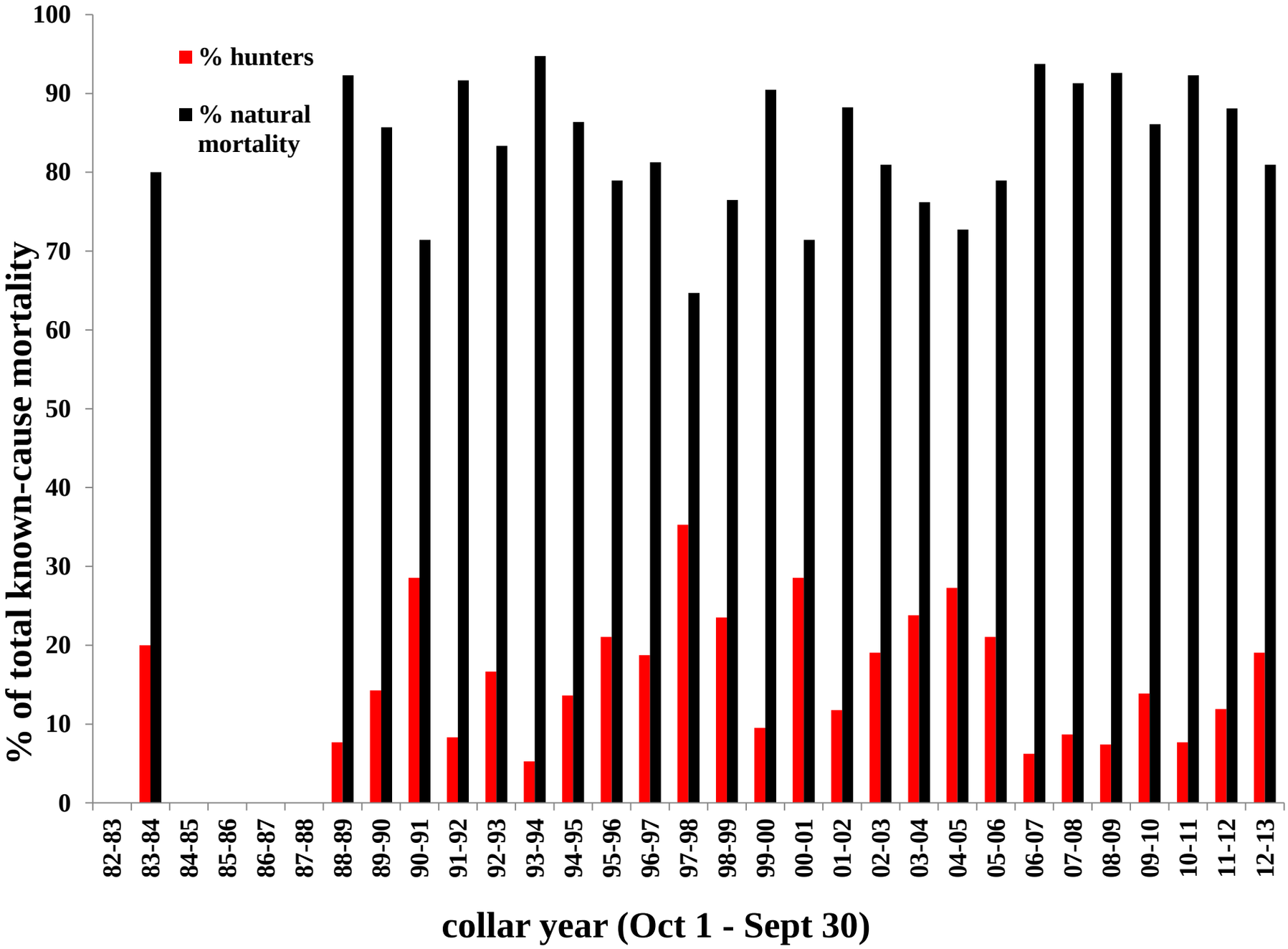
Predation

- **My observations and numerous reports from the public suggest that predators may be taking more WAH caribou now compared to 20 years ago – many qualifications:**
  - **Little quantitative data regarding predator numbers in terms of population abundance or trends**
  - **We rarely get to caribou carcasses soon after death; as a result**
  - **We can usually assign cause of death to at least a broad category but we often cannot determine with 100% certainty specifically what killed collared caribou**



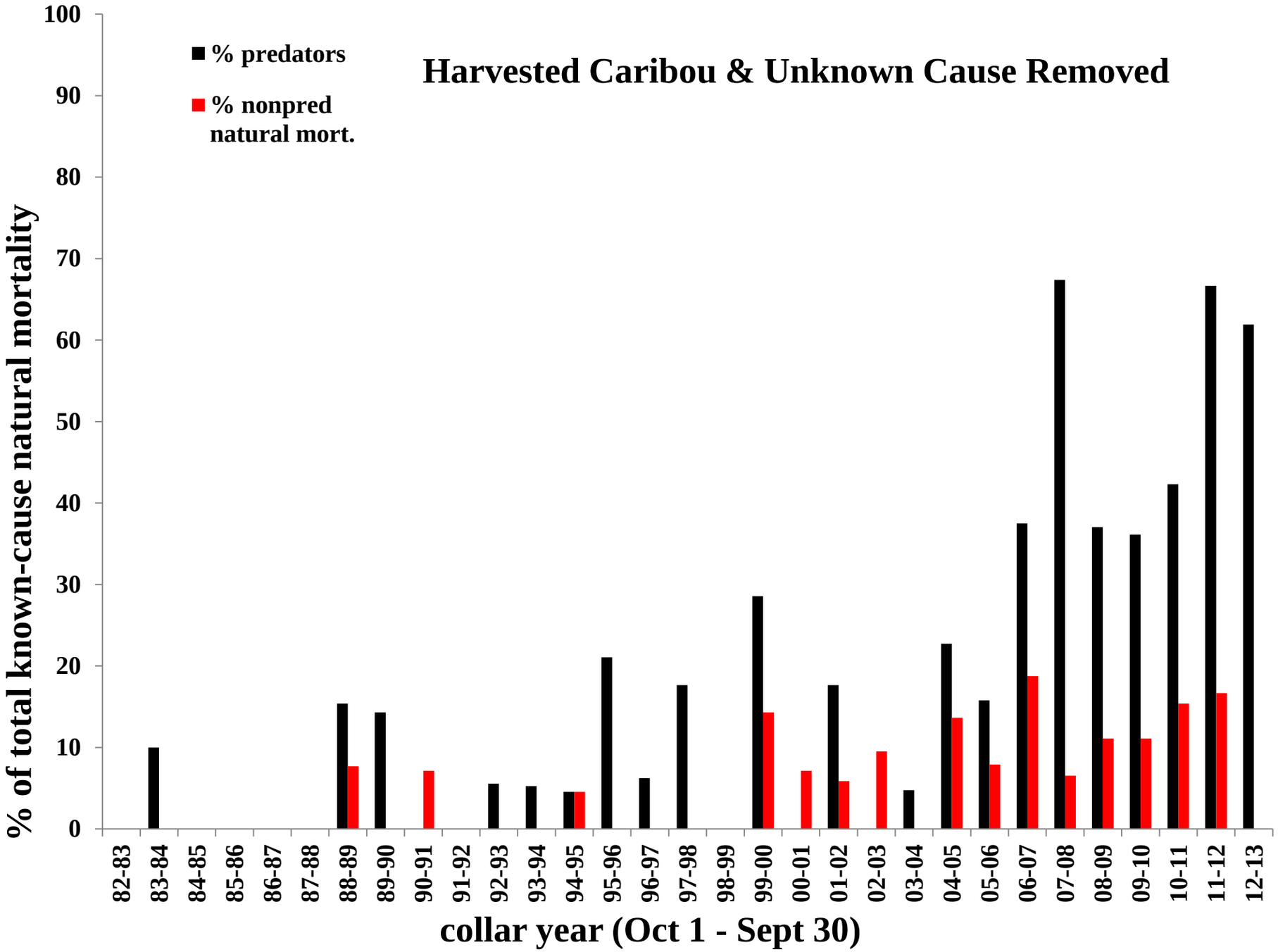
- **699 radio collared caribou have died since the late 1970s**
- **no idea regarding cause of death for only ~17%**

Natural Mortality vs. Harvests of Radio Collared WAH Caribou



Note: I excluded years with <15 known-cause mortalities

Natural Mortality of Radio Collared Caribou: Predators vs. Other Causes



Note: I increased efforts to determine cause of death in 2003. Some – but not all – of the apparent increase in predation is attributable to that change in effort.

Harvests

Table 1. WAH Management Levels Using Herd Size, Population Trend and Harvest Rate (pg 17)

	Population Trend & Harvestable Surplus of Caribou		
Management Level And Harvest Level	Declining Pop. (Low Harvest: 6%)	Stable Pop. (Med. Harvest: 7%)	Increasing Pop. (High Harvest: 8%)
Liberal	Pop: 265,000+ Harvest: 18,550-24,850	Pop: 230,000+ Harvest: 16,100-21,700	Pop: 200,000+ Harvest: 16,000-21,600
Conservative	Pop: 200,000-265,000 Harvest: 14,000-18,550	Pop: 170,000-230,000 Harvest: 11,900-16,100	Pop: 150,000-200,000 Harvest: 12,000-16,000
Preservative	Pop: 130,000-200,000 Harvest: 8,000-12,000	Pop: 115,000-170,000 Harvest: 8,000-12,000	Pop: 100,000-150,000 Harvest: 8,000-12,000
Critical (Maintain ≥40 Bulls:100 Cows)	Pop: <130,000 Harvest: 6,000-8,000	Pop: <115,000 Harvest: 6,000-8,000	Pop: <100,000 Harvest: 6,000-8,000

General Hunts

Tier I

Tier II

WAH Population & Harvest Objectives

Subsistence:

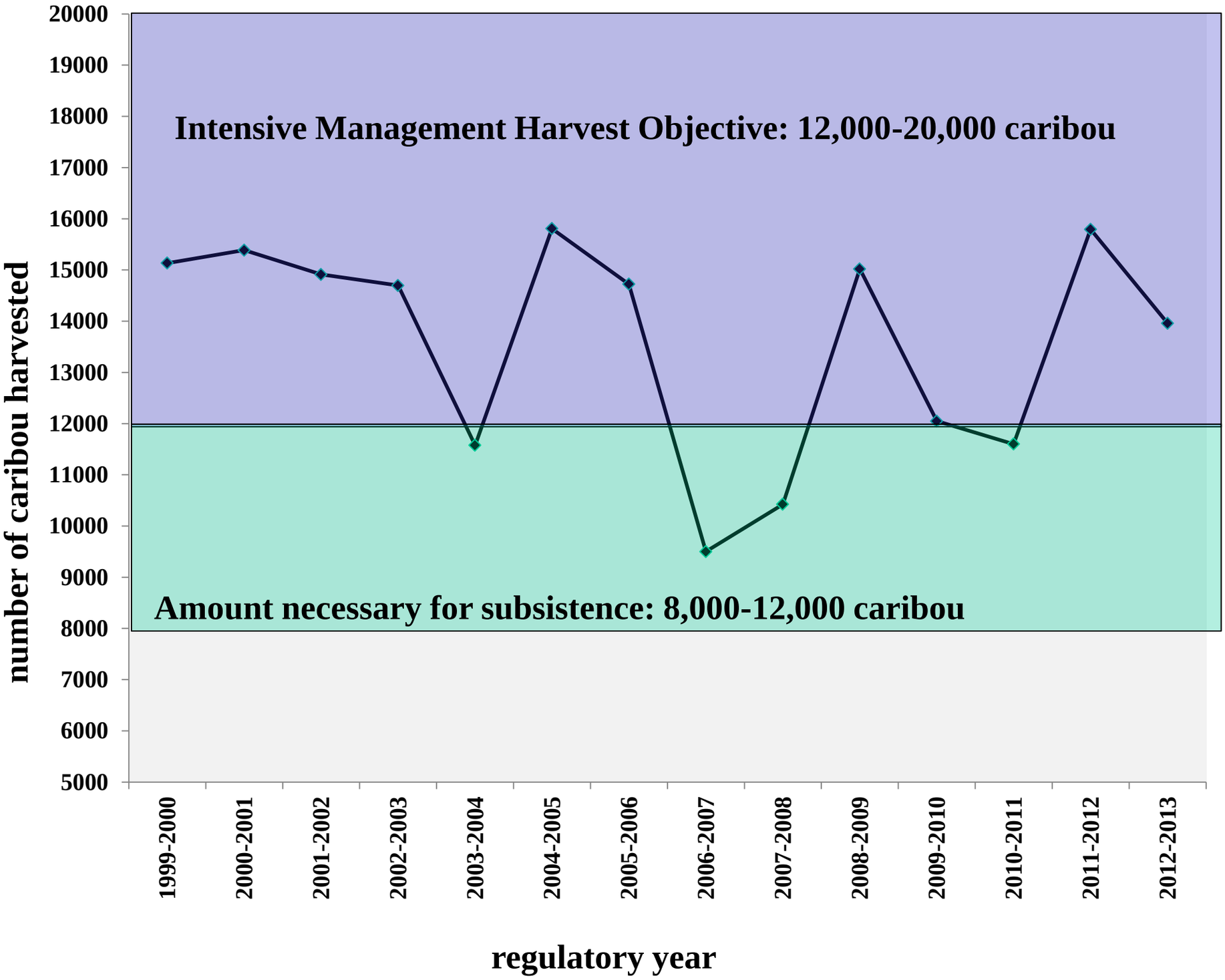
C&T Finding:	**Positive**
Amount Necessary (ANS):	**8,000 – 12,000 caribou**

Intensive Management:

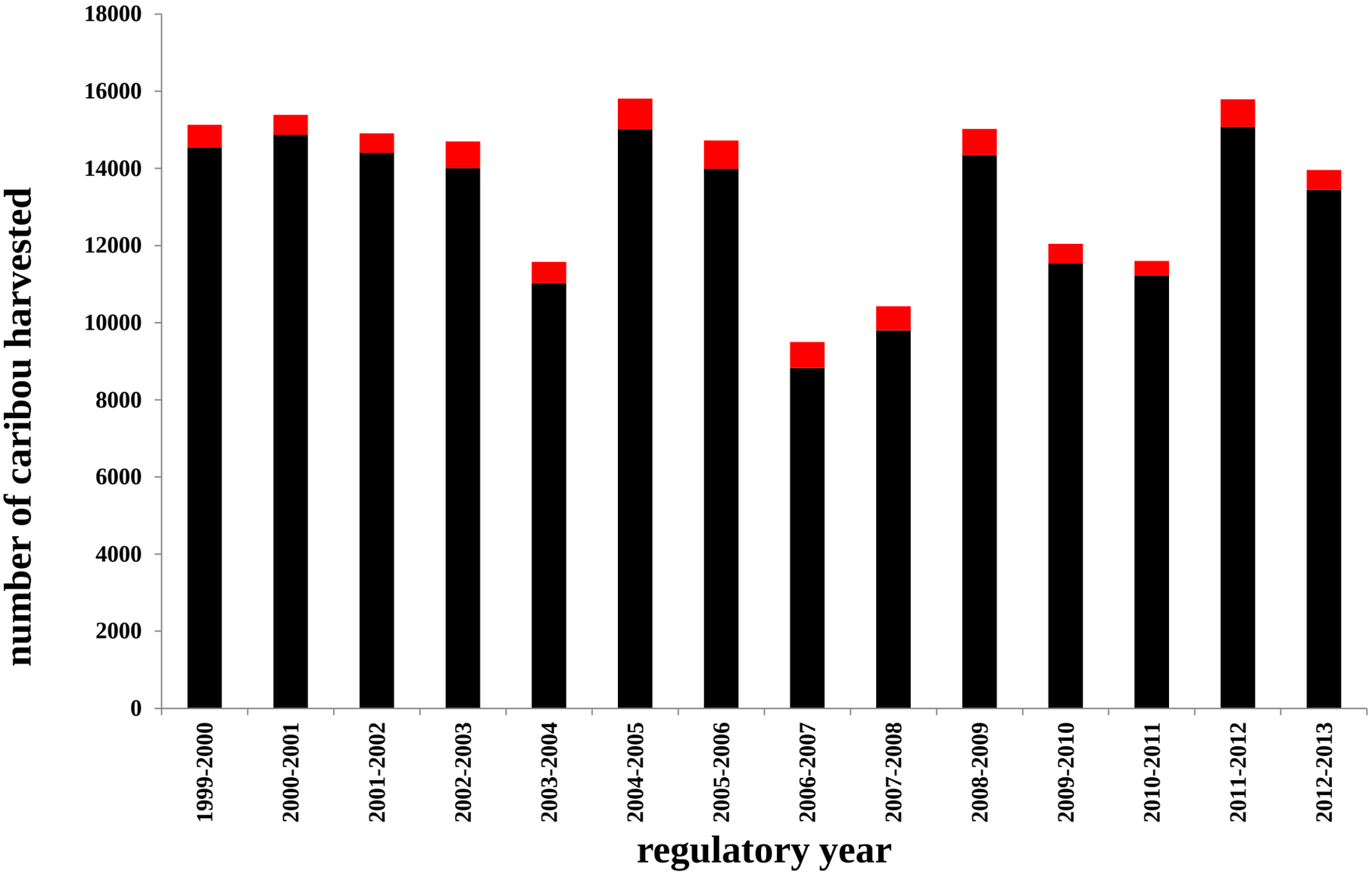
Population Objective:	**>200,000 caribou**
Harvest Objective:	**12,000 – 20,000 caribou**

(The IM harvest objective is simplistic: it does not consider the proportion of cows in the total harvest)

Total Harvest by Year



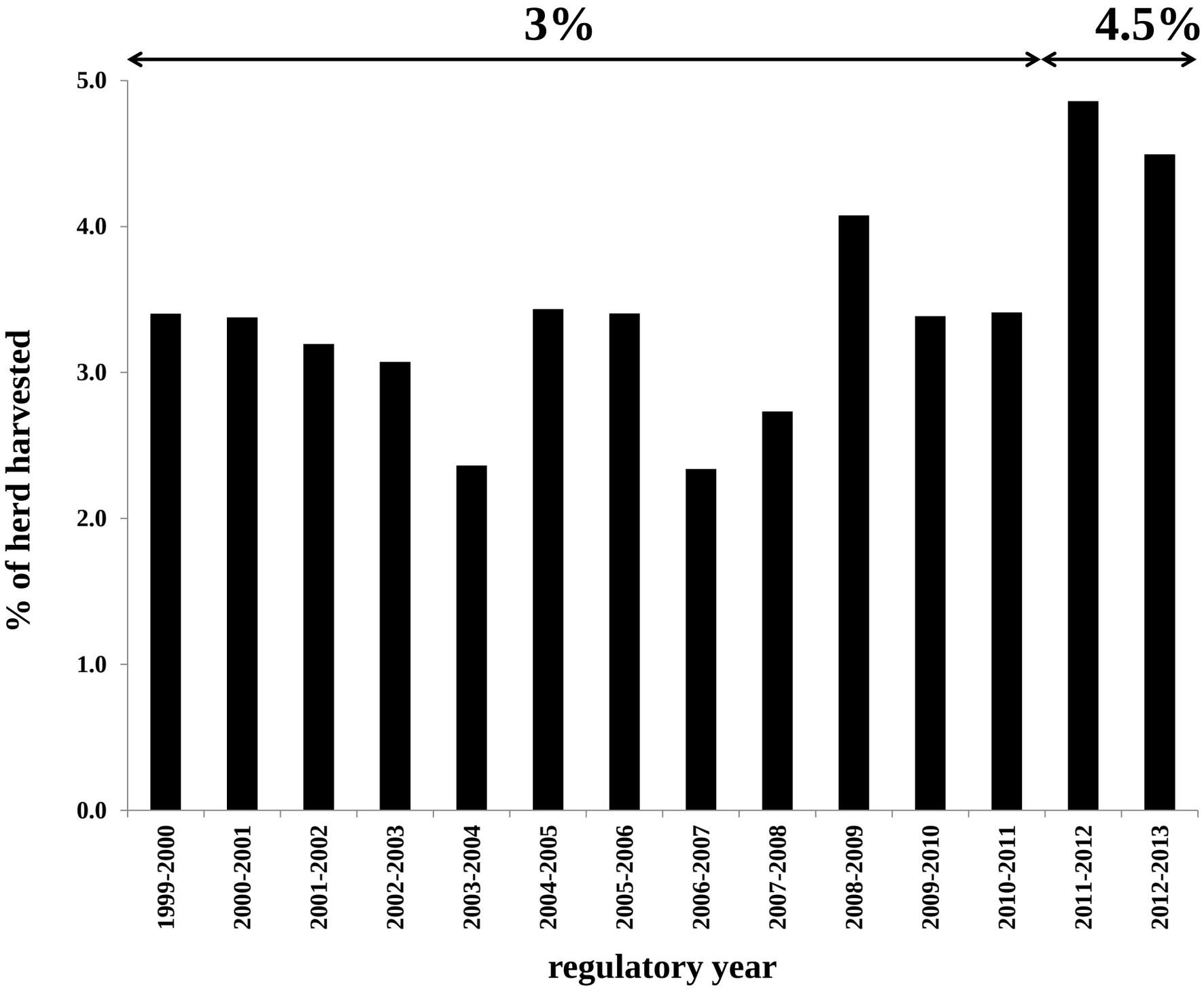
Total Harvest - Year & User Group



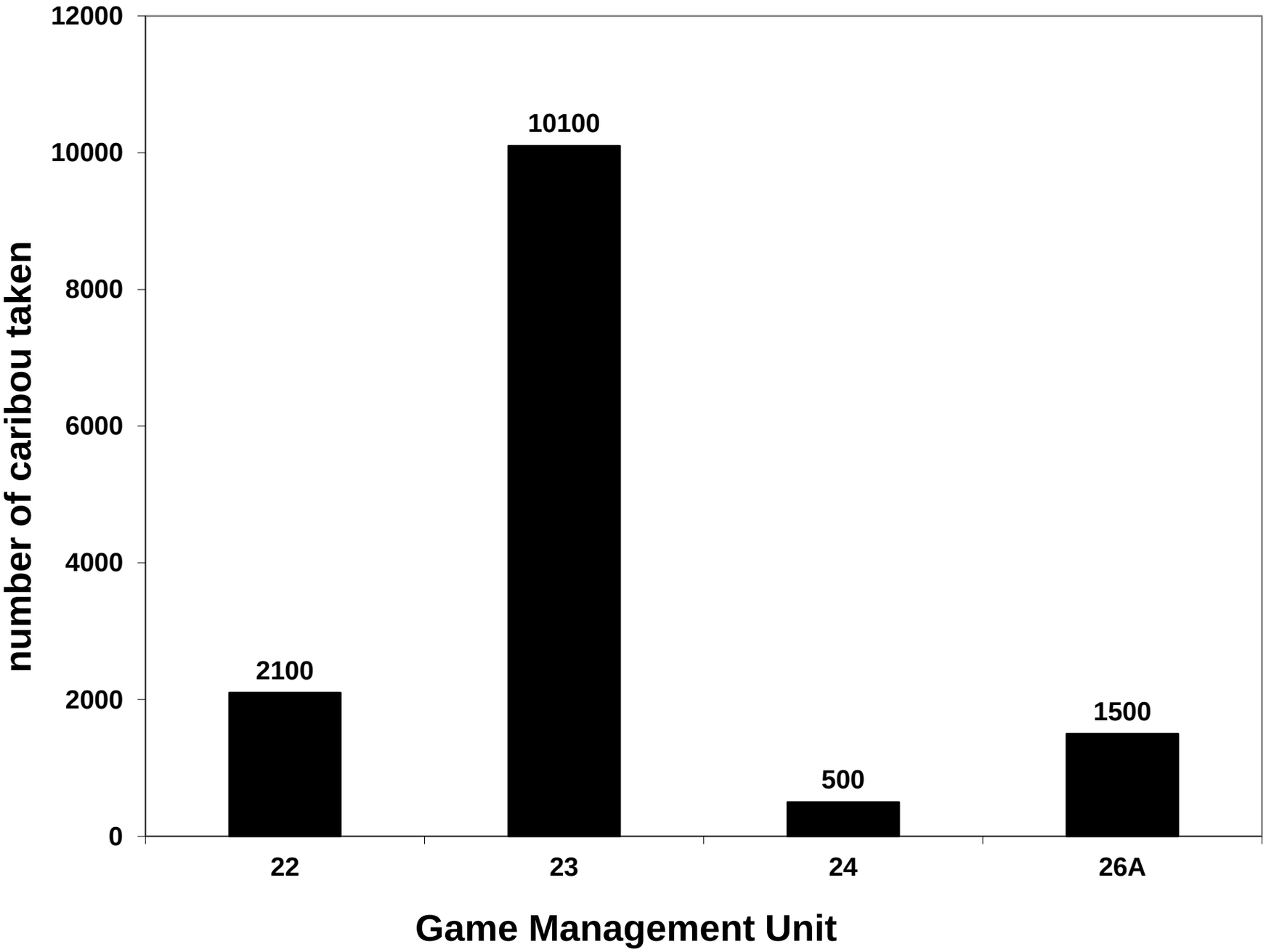
- **Household Survey Data (Subs. Div.) – residents within WAH range**
  - **95% of total annual harvest**
  - **Approximately 60% bulls, 30% cows, 10% unknown sex**

- **Statewide Harvest Tickets (Winfonet) – residents outside WAH range & nonresidents**
  - **Approximately 90% bulls, 9% cows, 1% unknown sex**

Total Annual Harvest as a Percentage of WAH Population Size

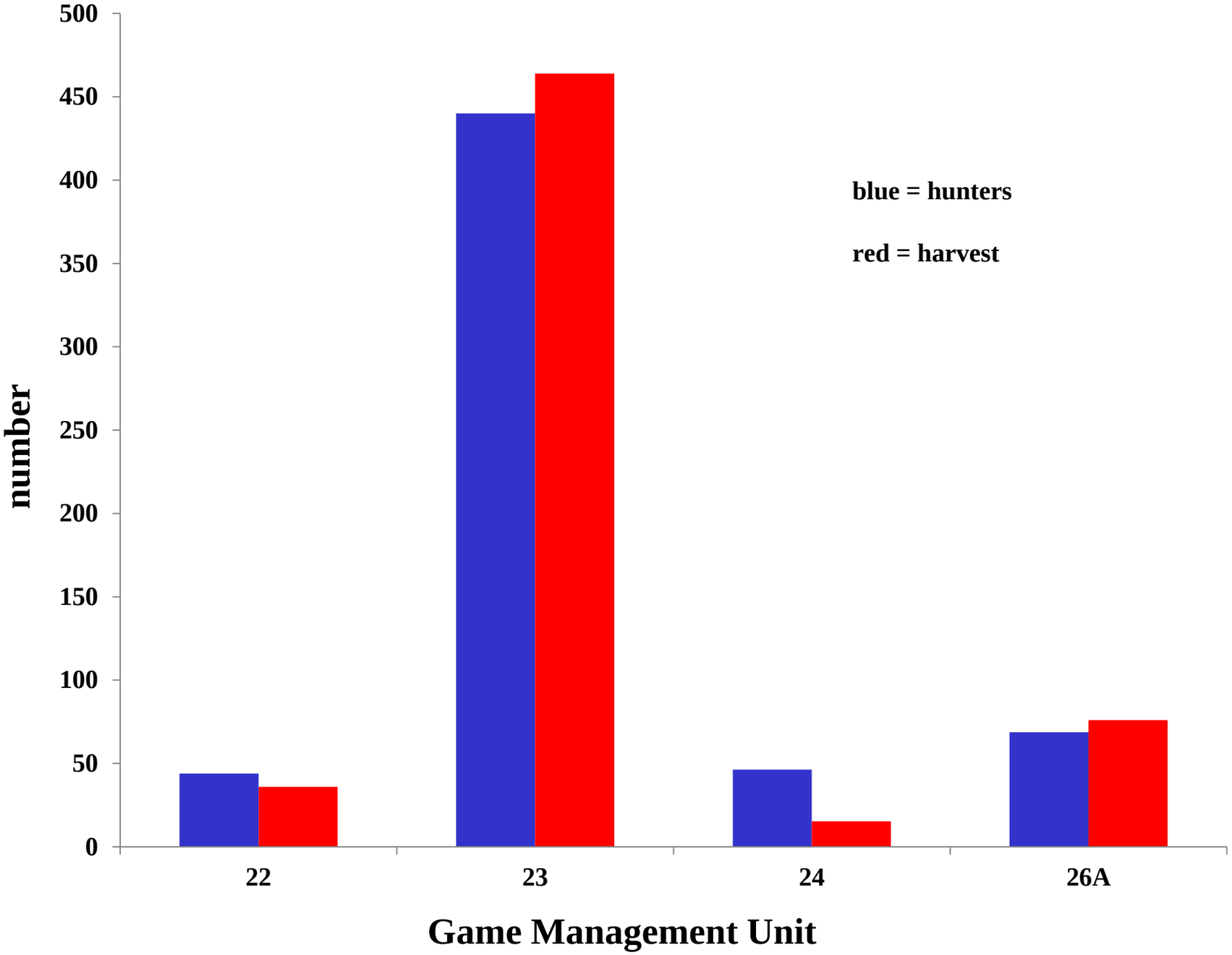


Average Annual Harvest – Household Survey Data
RY1998 through RY2012

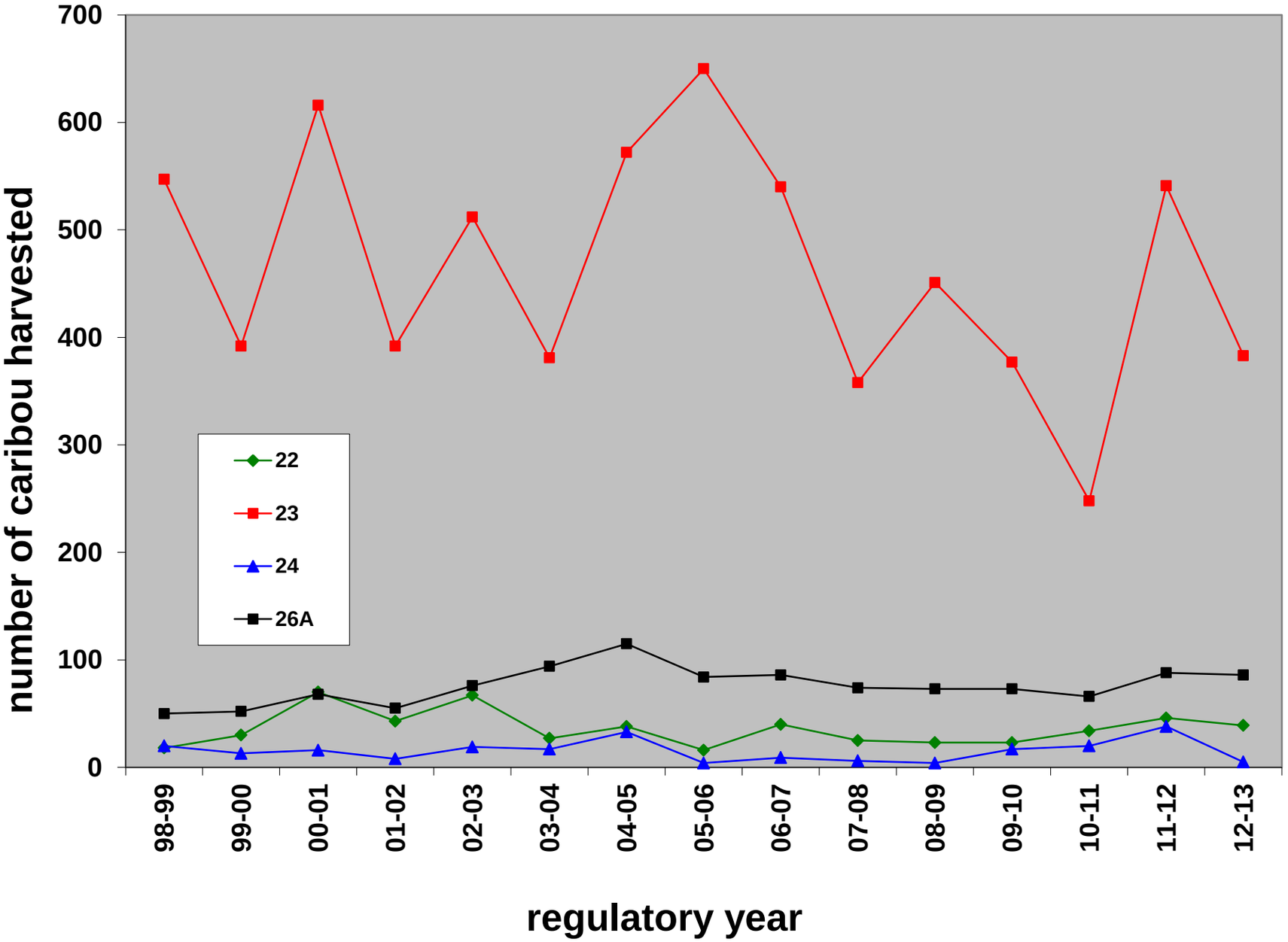


(Data collected by Subsistence Division)

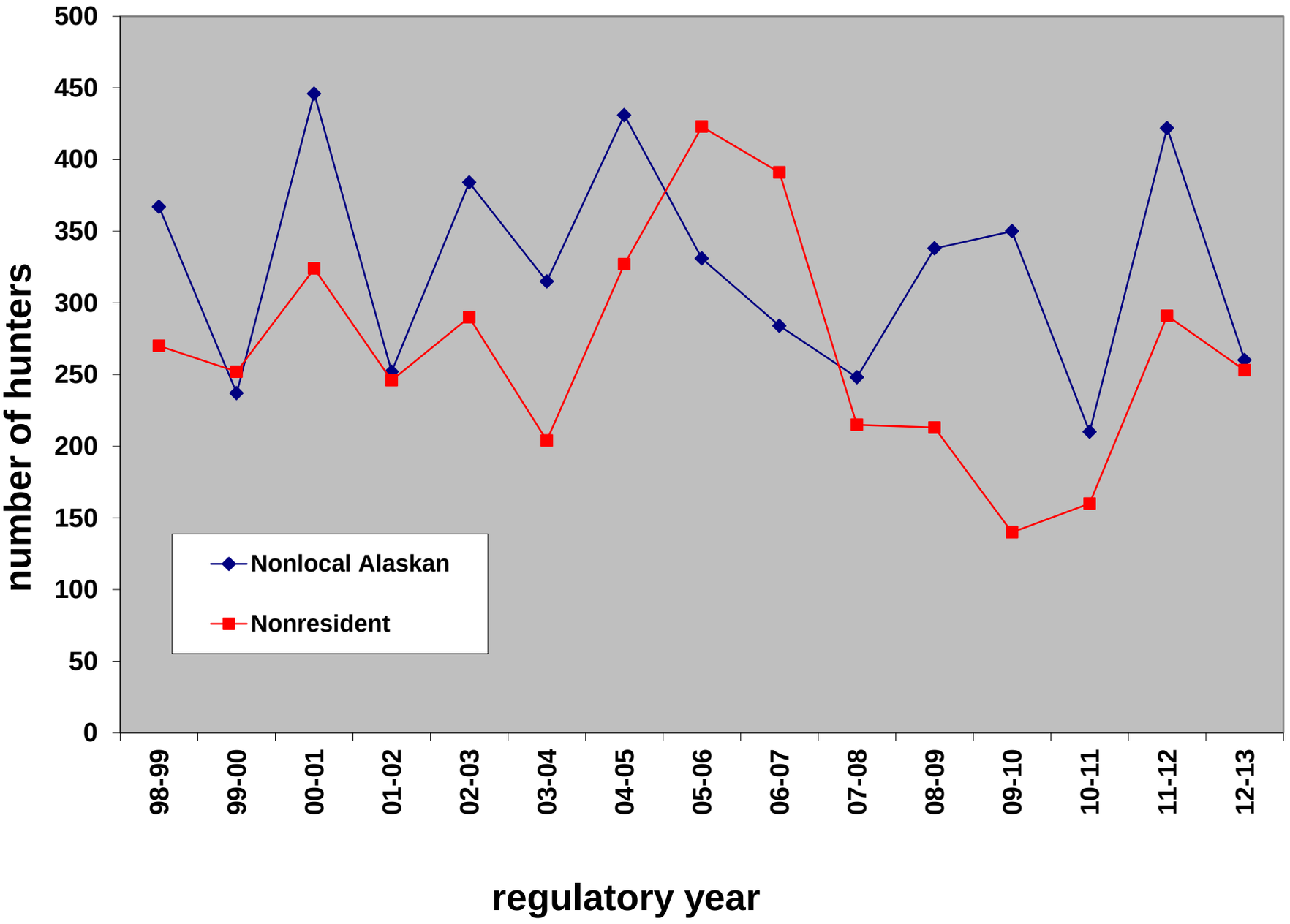
Average Annual Hunters & Harvests
Harvest Ticket Data
RY1998 through RY2012



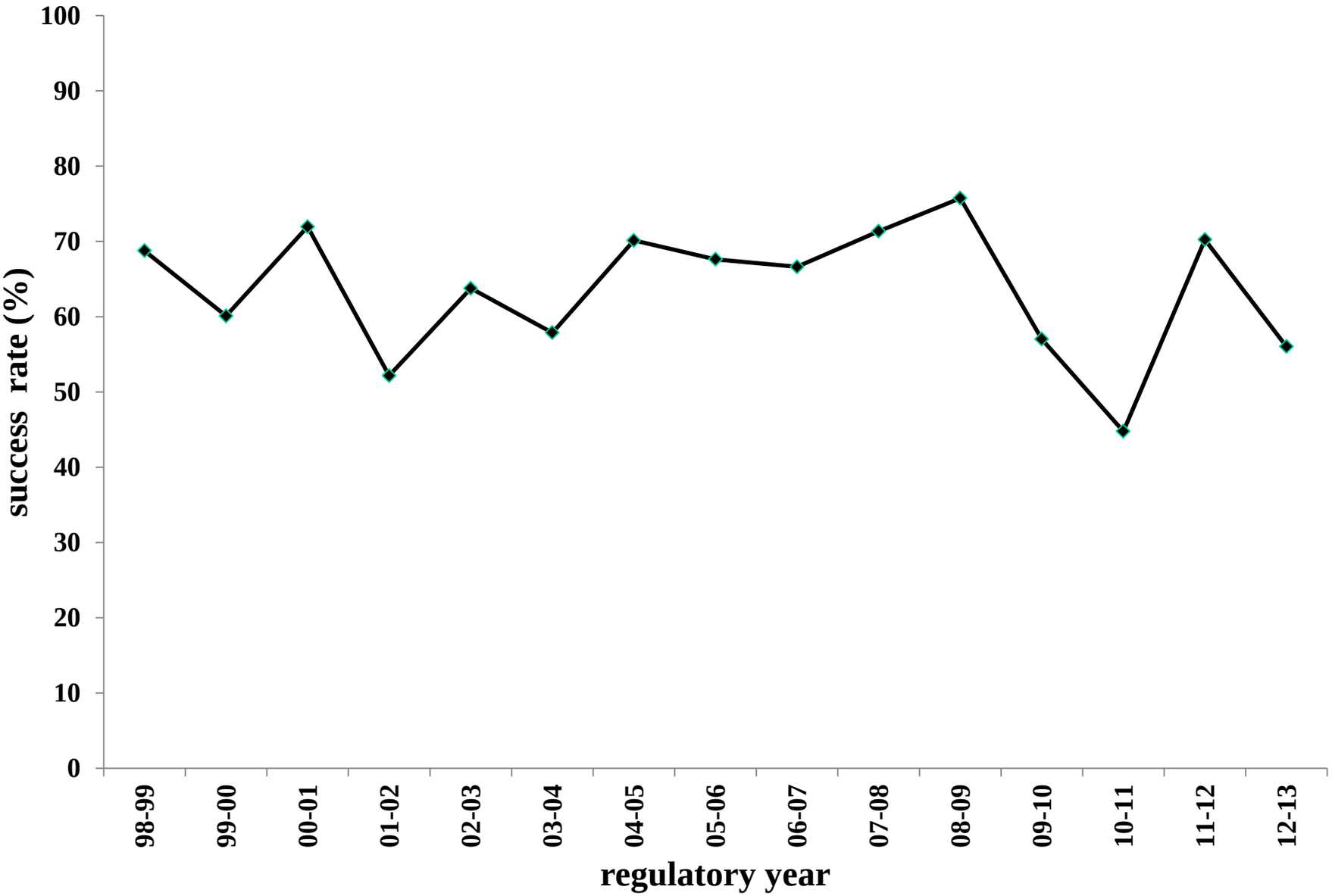
Annual Harvests by Year & GMU: Harvest Ticket Data (Residents & Nonresidents)



Number of Hunters by Residence: Harvest Ticket Data (Residents and Nonresidents)

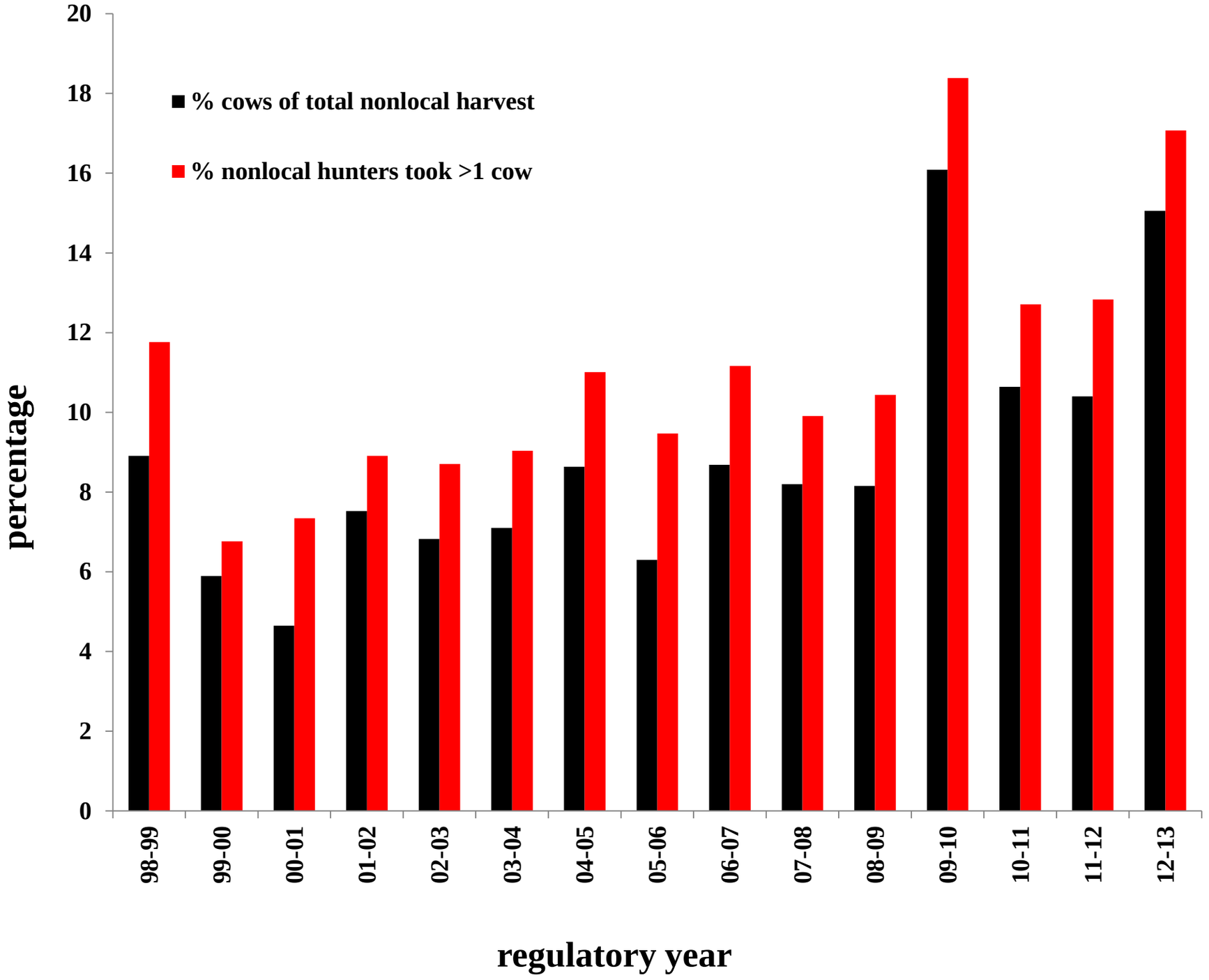


Hunter Success Rate by Year: Harvest Ticket Data (Residents & Nonresidents)



"Successful" = harvested ≥1 caribou of either sex

WAH Cow Harvest by Year: Harvest Ticket Data (Residents & Nonresidents)



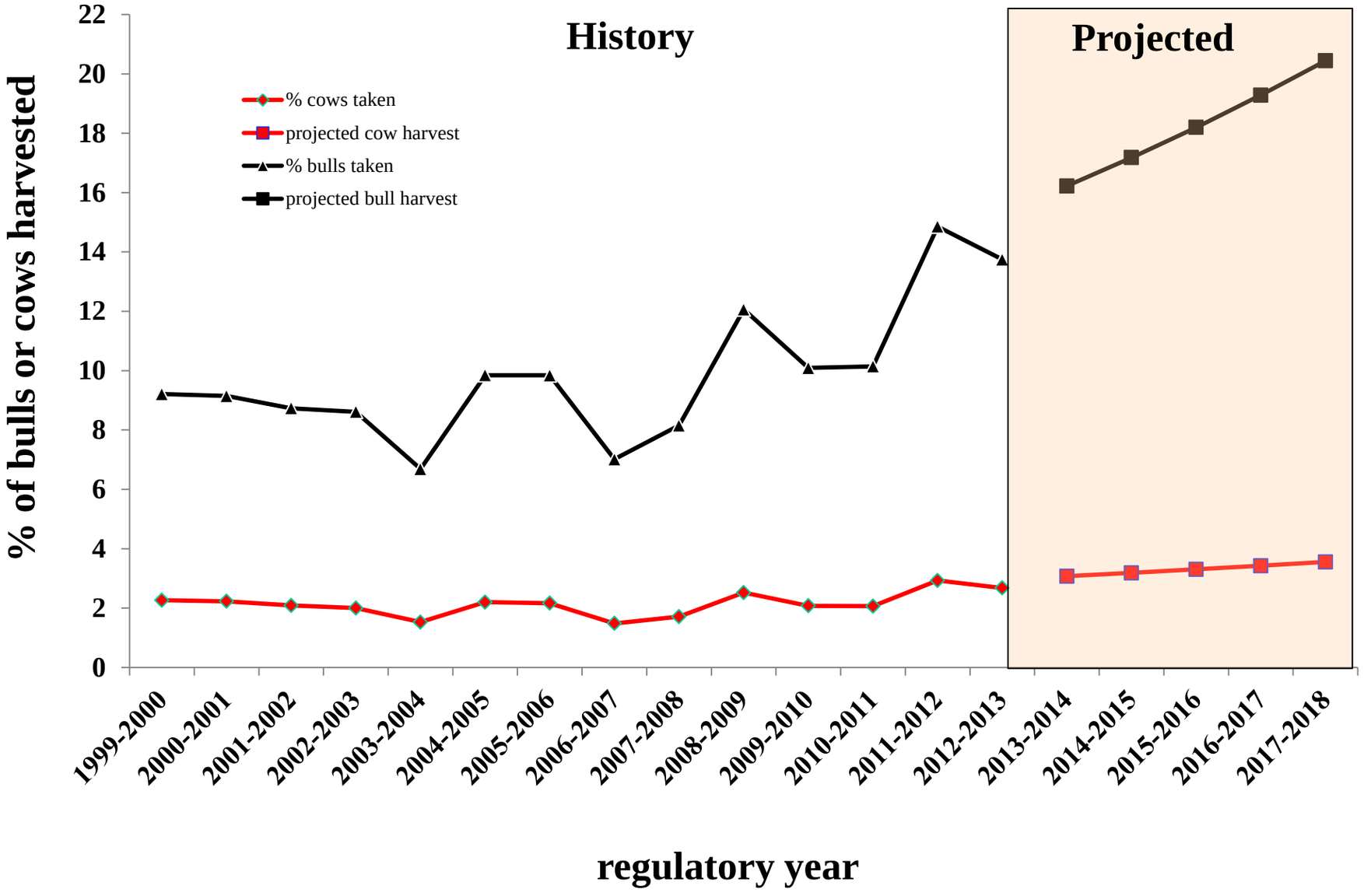
Estimated Annual Cow Harvest

- **Harvest ticket data: 50-100 cows taken annually since RY1998**
- **Household survey data: 4,000-5,000 cows taken annually since RY1998**

<u>Note that cow harvest could increase in the future if:</u>

- **caribou become more difficult to find as numbers decline;**
- **the fall migration shifts later in time and bulls don't reach communities until after they're in rut (unpalatable)**

What Harvest Levels Are Sustainable?



- **Most bull harvest is probably compensatory: old bulls taken for food or trophies**
- **Most cow harvest is probably non-compensatory: prime-age or young cows taken (Note: small changes in cow mortality can substantially affect population trend)**
- **May need to manage bull:cow ratios before dealing with population decline**

Summary: Herd Status and Trends

- **Long-term changes to winter range have occurred but are probably not yet major factors limiting WAH numbers**
- **Long-term trends in calf survival, bull:cow ratios & body size suggest that density dependent factors or climate change may have been subtly affecting this herd for many years**

➢ ***Short-term, density independent effects of summer and winter weather appear to have caused spikes of high mortality***

- ***these events may have precipitated the onset of this decline***

➢ ***Predators may now exert more influence than 10-20 years ago:***

- ***wolf & brown bear population levels appear higher now***
- ***weather conditions that cause malnutrition in caribou may make them more vulnerable to wolves as well***

- **Unmanaged harvests will likely soon directly depress bull:cow ratios**
- **Future harvests will likely drive WAH numbers down if:**
  - **demand remains stable and the herd continues to decline**
  - **hunters take an increasing proportion of cows because of timing of migration in relation to rut and access to caribou**

- **Proposal 29: Sale of antlers, affects WAH caribou**
- **Proposal 23: TCH ANS, could also affect WAH management**

Questions?