

Population Dynamics Research of Moose in Northeastern Minnesota



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Study Background

- little knowledge of population dynamics
- population probably underestimated
- mild winters but no increase in the herd
- crash of northwestern herd



Objectives

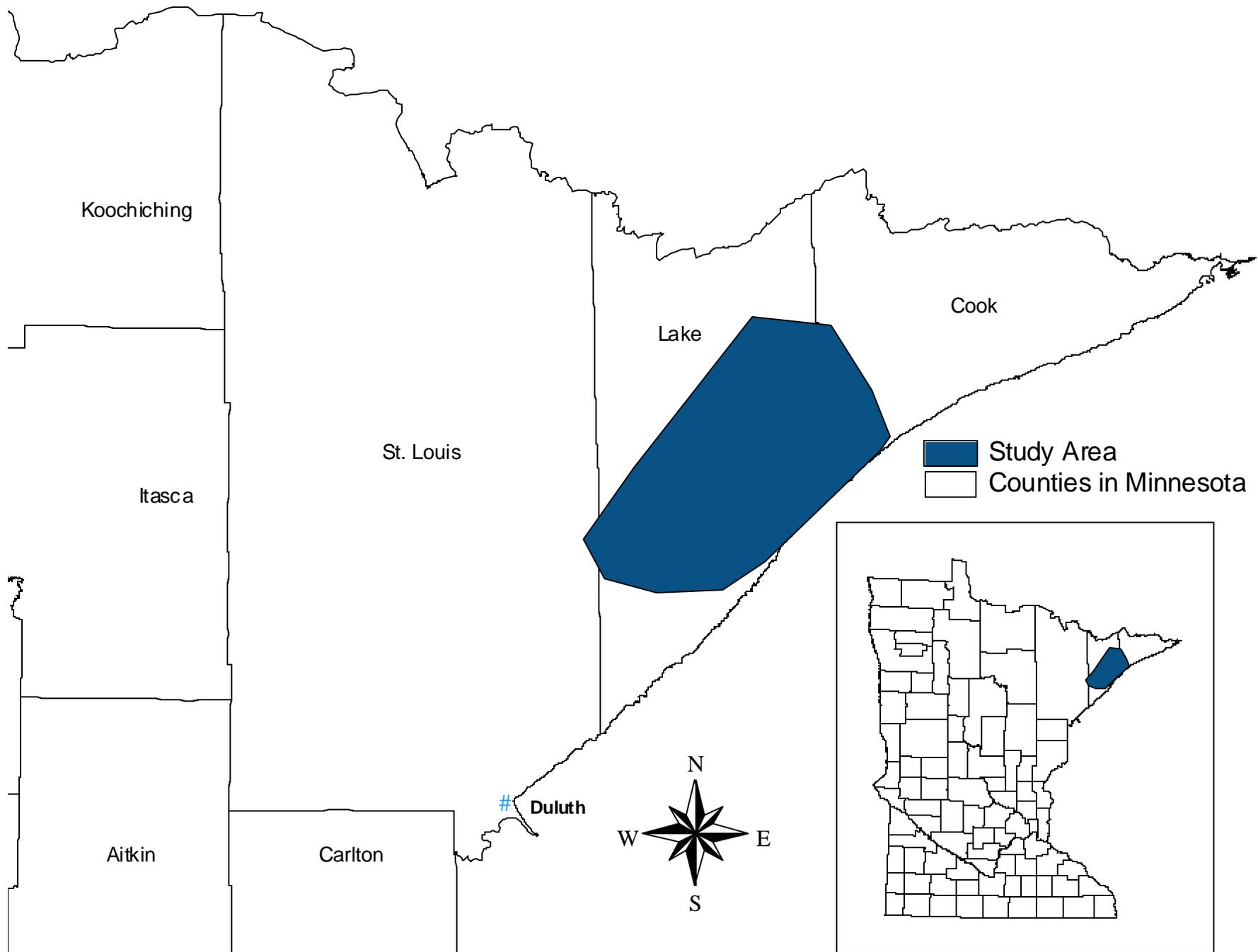
- **Improve aerial survey of moose numbers**
- **Movements and home range**
- **Determine survival rates of calf and adult moose**
- **Determine causes and rates of adult mortality**



Partners

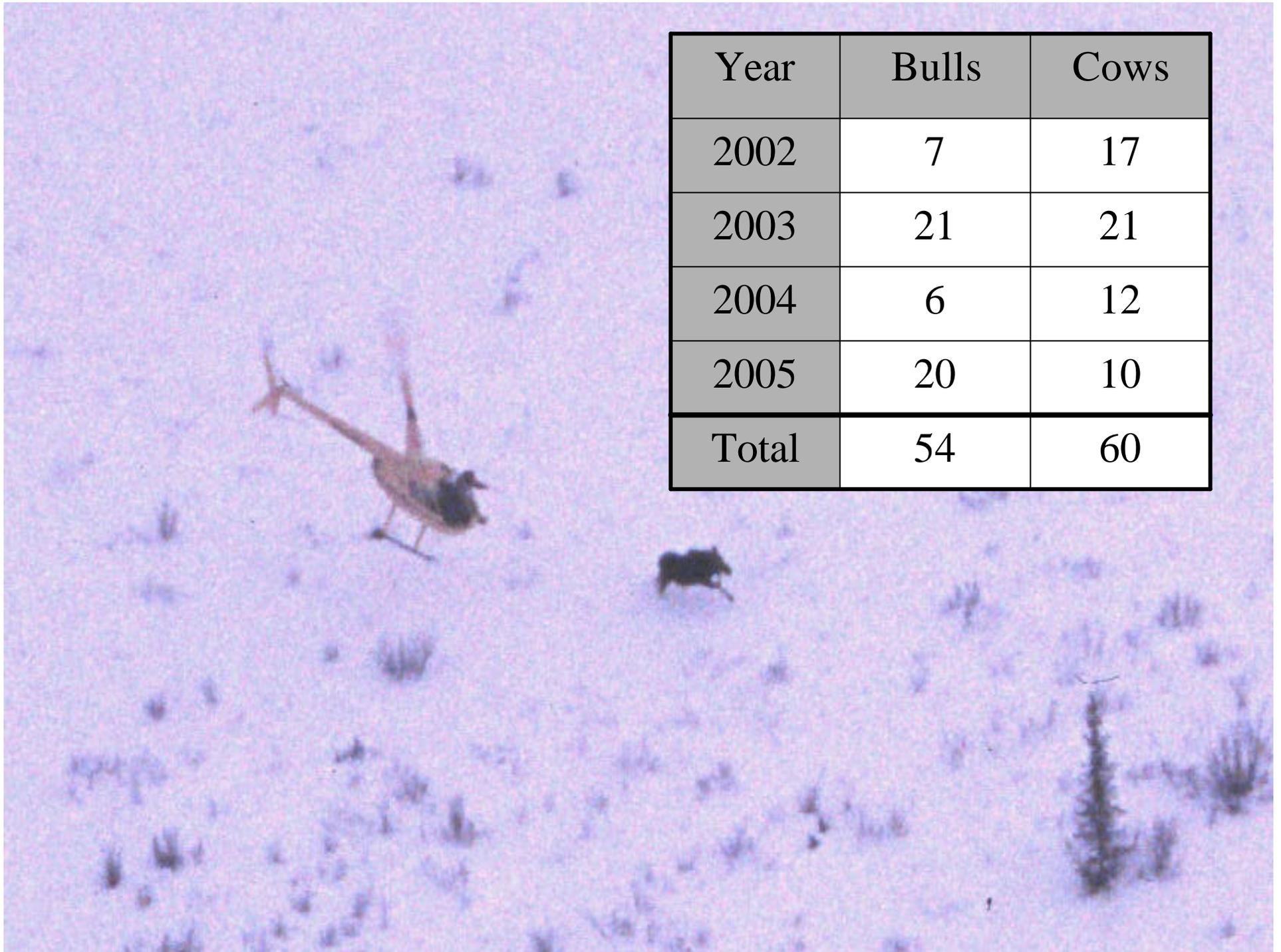
- **Minnesota Department of Natural Resources**
- **1854 Treaty Authority**
- **U.S. Geological Survey**
- **Fond du Lac Band of Lake Superior Chippewa**







Methods



| Year | Bulls | Cows |
|-------|-------|------|
| 2002 | 7 | 17 |
| 2003 | 21 | 21 |
| 2004 | 6 | 12 |
| 2005 | 20 | 10 |
| Total | 54 | 60 |



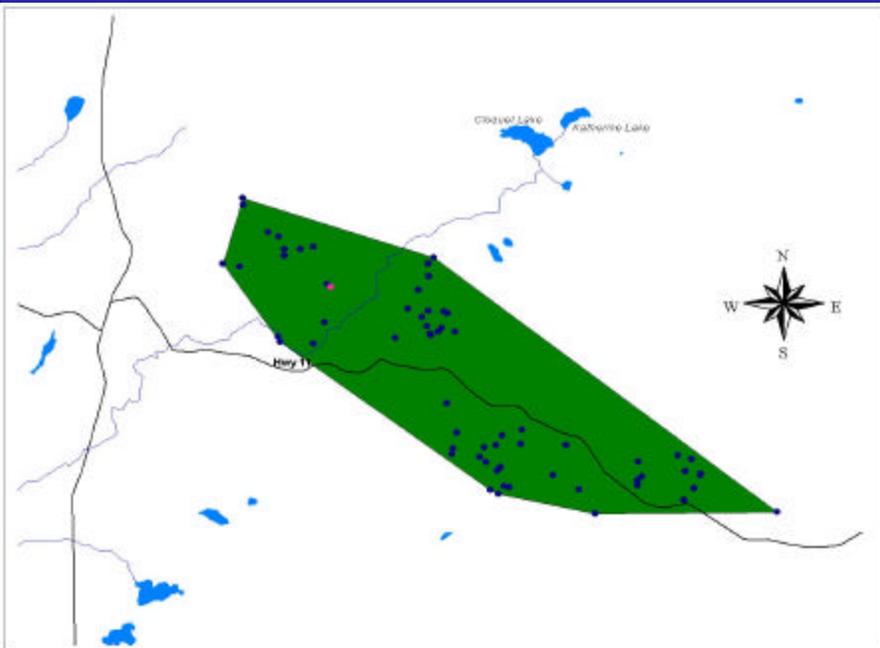


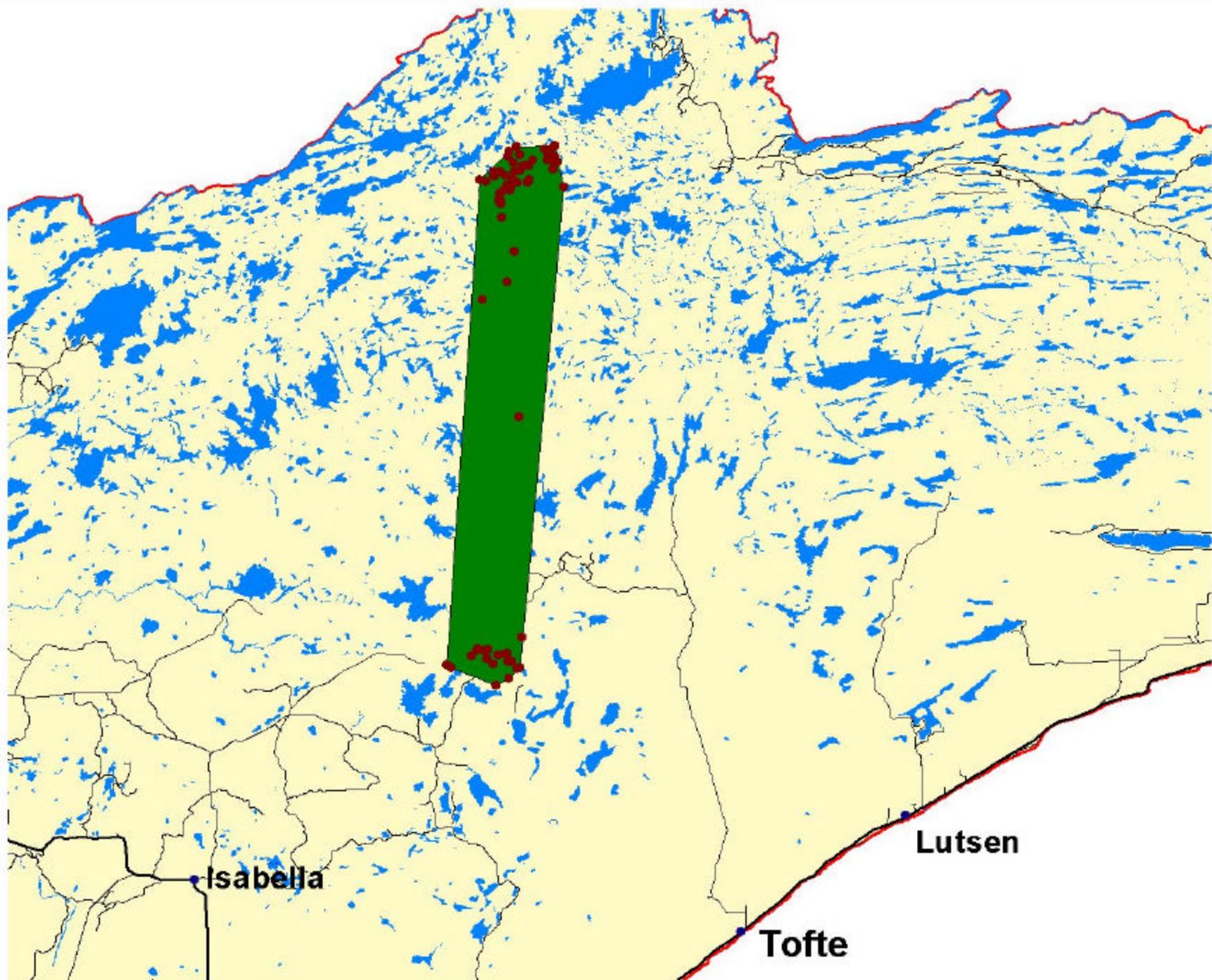


Results

Movements

- **Average Home Range = 20 mi²**
- **Bulls and cows very similar**
- **Range = 5 – 50 mi²**
- **Couple bulls with much bigger ranges**

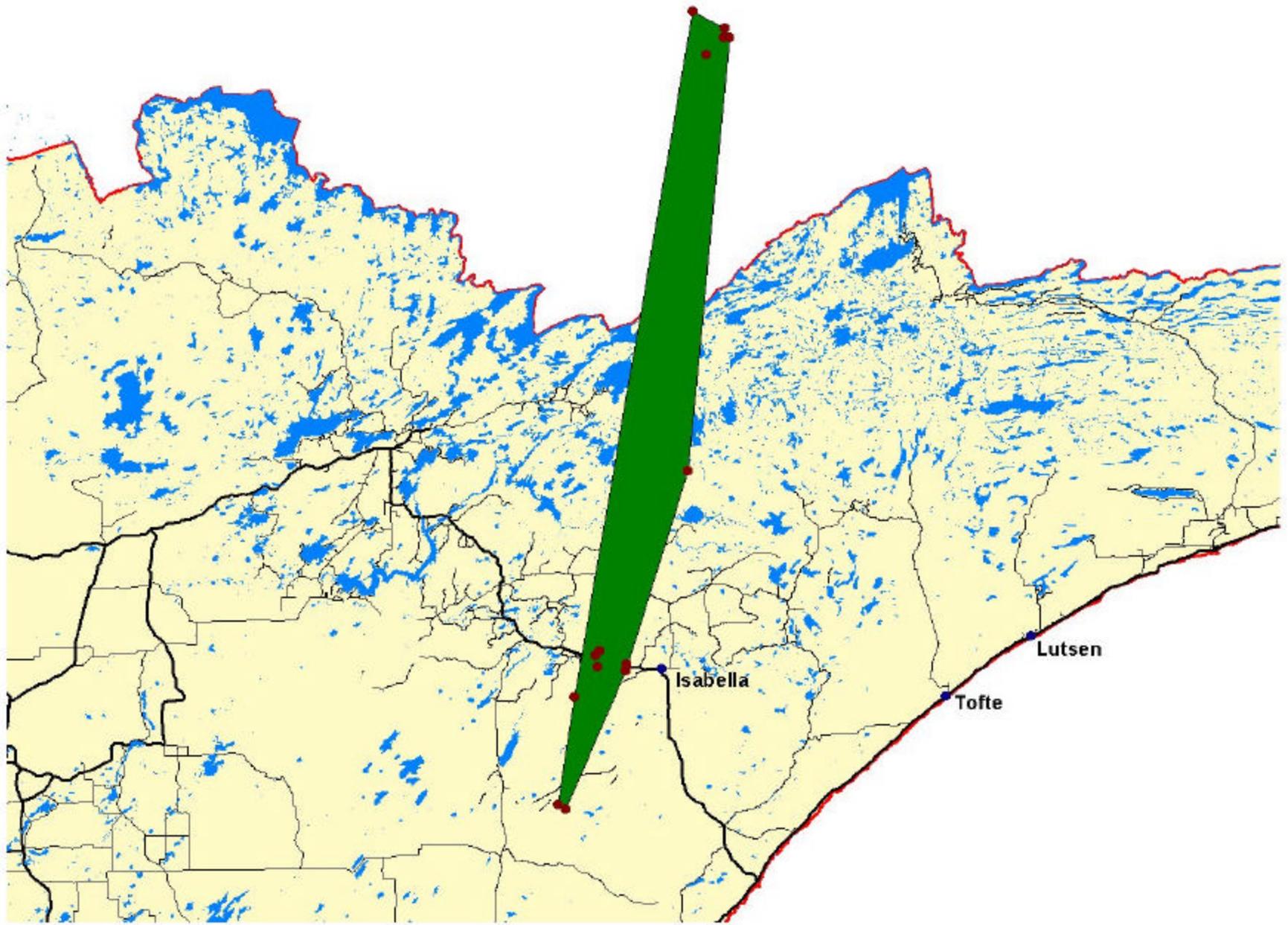




Isabella

Tofte

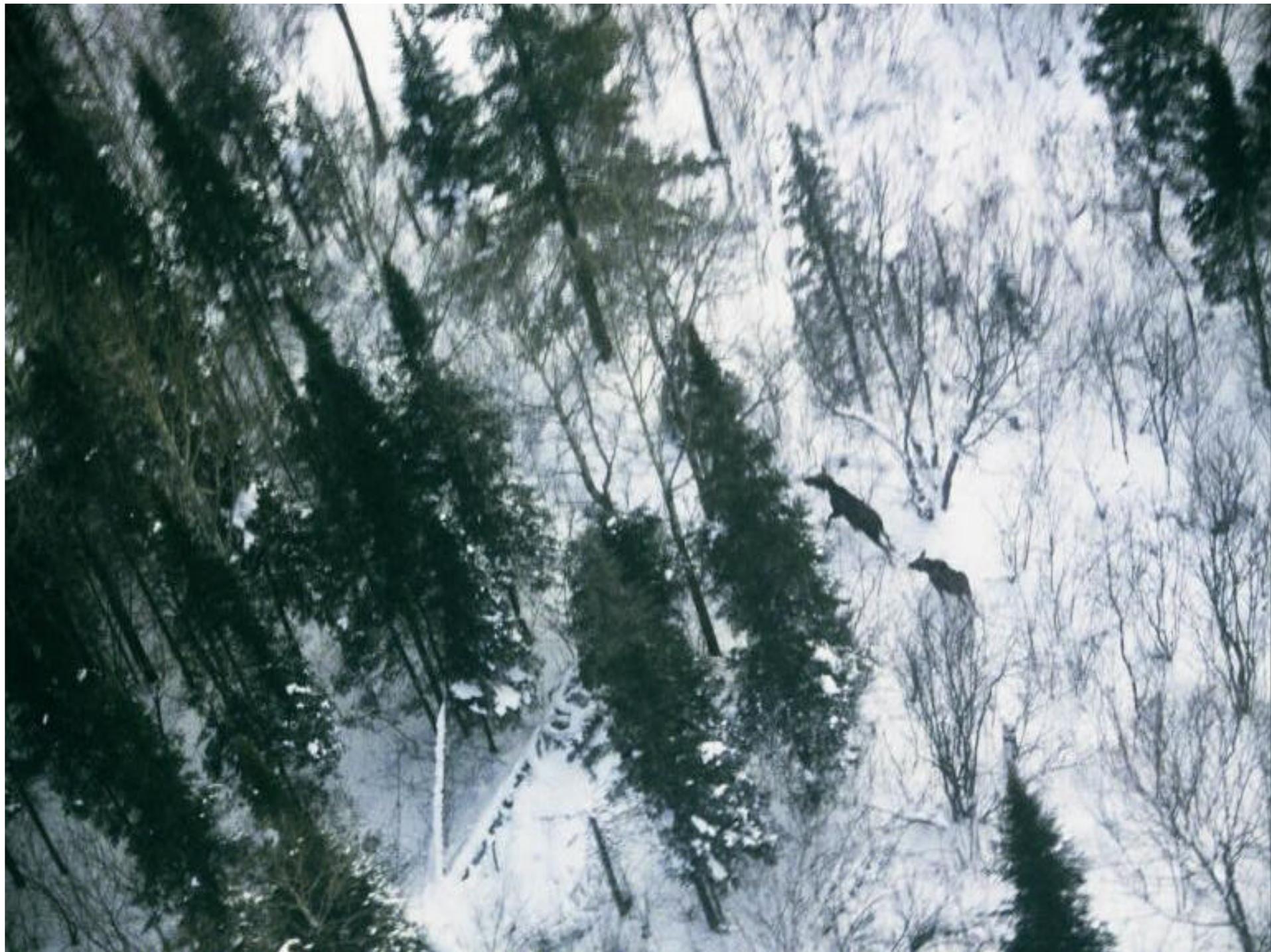
Lutsen



Improve Aerial Survey





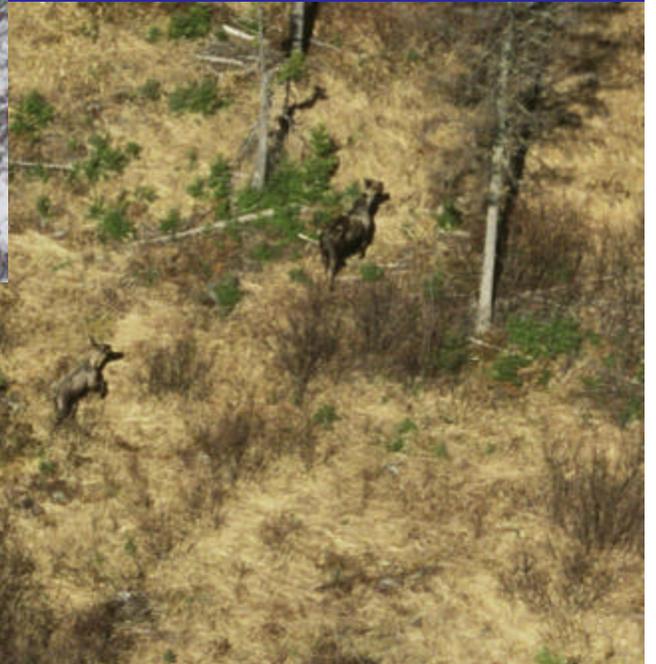


Calf Production



| Year | % Pregnant Serum | % Pregnant Fecal |
|-------|------------------|------------------|
| 2002 | 92% (13) | 94% (16) |
| 2003 | 55% (22) | 59% (22) |
| 2004 | 100% (12) | 100% (13) |
| 2005 | 90% (10) | 100% (9) |
| Total | 79% (57) | 80% (60) |

Calf Survival





- **2 complete years of data**
- **60% disappearance of calves**
- **22-33% of litters are twins**
- **Association with swamps and bogs?**

Annual Non-Hunting Mortality

| Year | Bulls | Cows | Combined |
|------|------------|------------|------------|
| 2002 | 0% (n=7) | 29% (n=17) | 21% (n=24) |
| 2003 | 27% (n=27) | 23% (n=33) | 24% (n=60) |
| 2004 | 14% (n=23) | 6% (n=35) | 9% (n=58) |
| 2005 | 16% (n=35) | 19% (n=43) | 17% (n=78) |
| 2006 | 21% (n=24) | 29% (n=35) | 25% (n=59) |

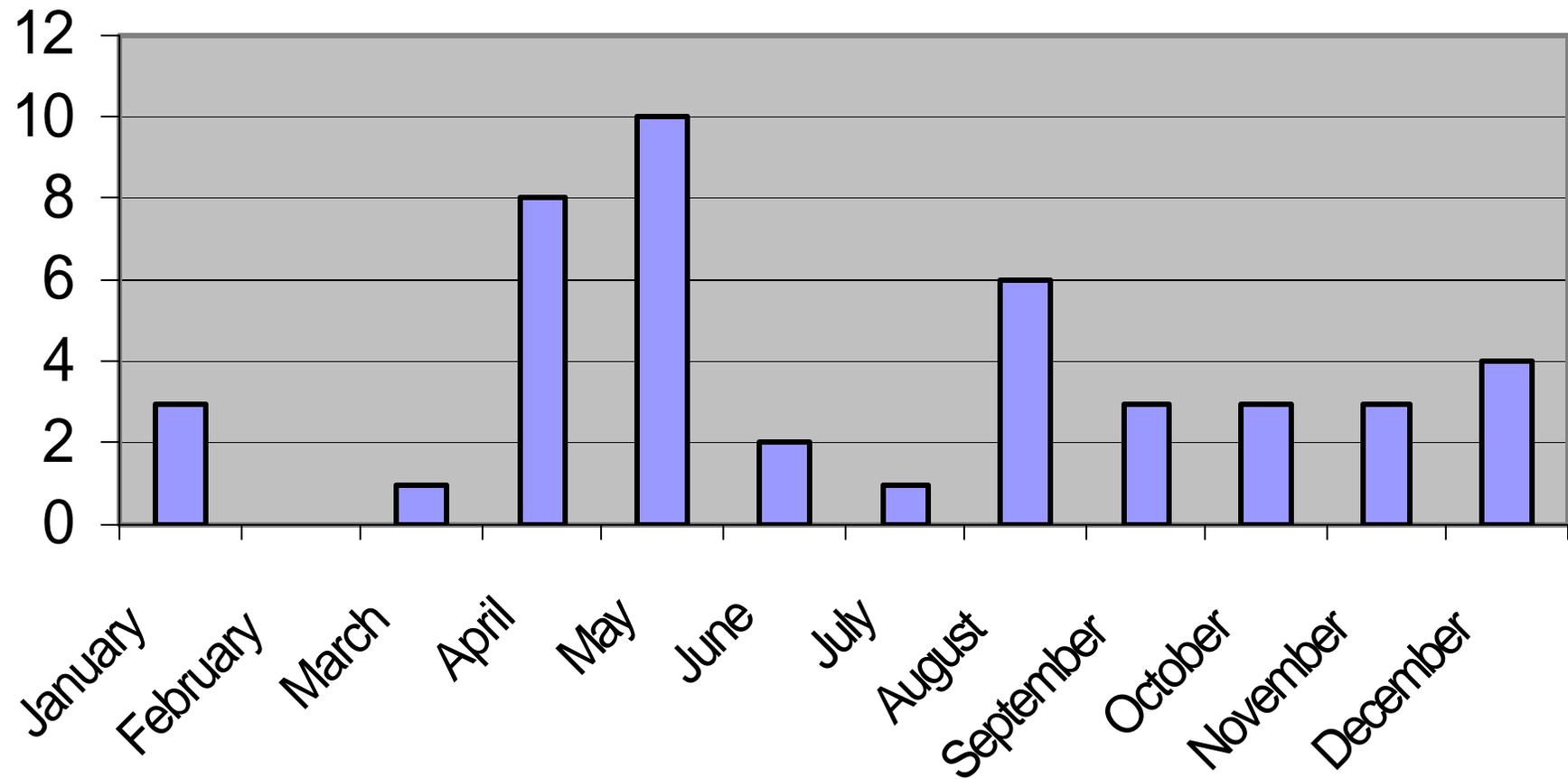
“Normally” 8-12% non-hunting mortality

Causes of Mortality

- **Bacterial Meningitis = 1**
- **Accidents =7**
- **Wolves =7 (maybe higher)**
- **Tribal and State Hunters =15**
- **Poached =2**
- **Unknown =36**



Timing of Mortality





11/20/2002





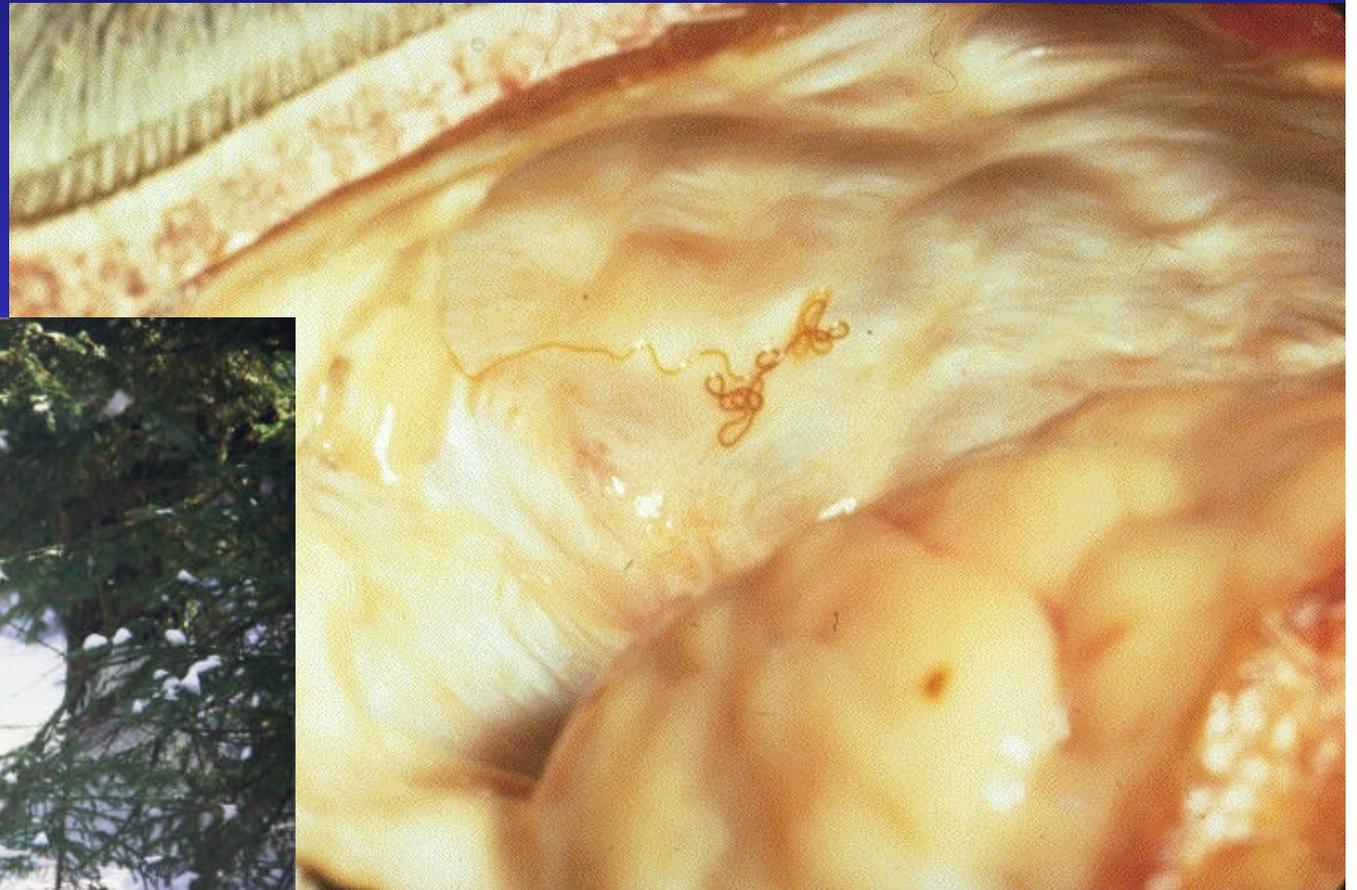


“Tipover Disease”





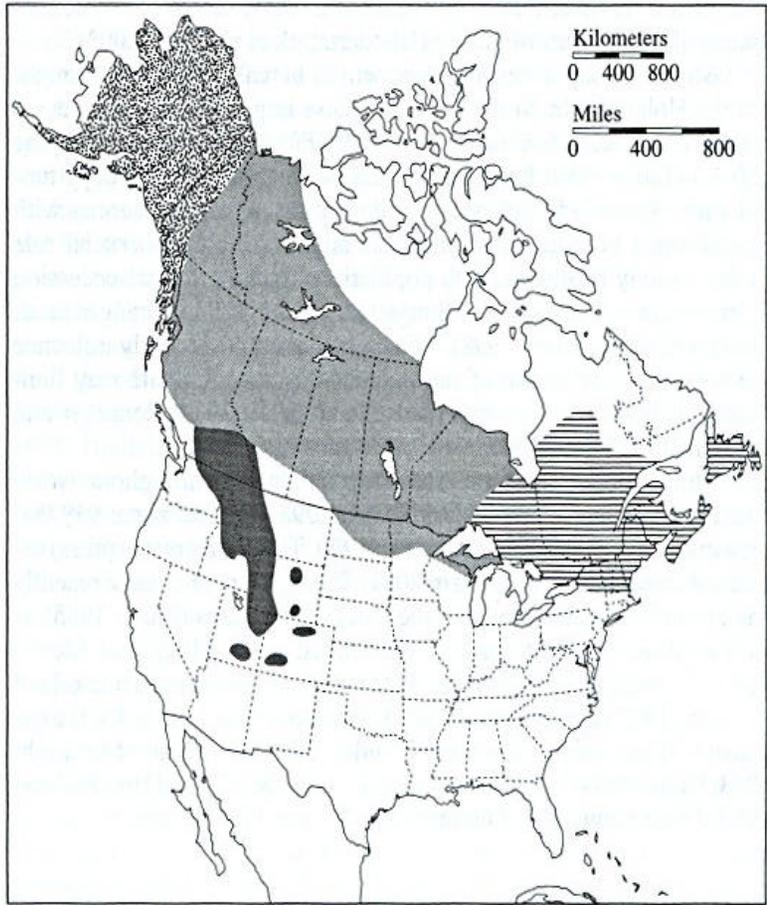
- 18 of 109 animals + for *P. tenuis* antibodies
- 10 of 18 died after av. =18 months, range 3-54
- 1 of 10 showed cranial evidence of worm
- 8 moose alive, some for 3+ years









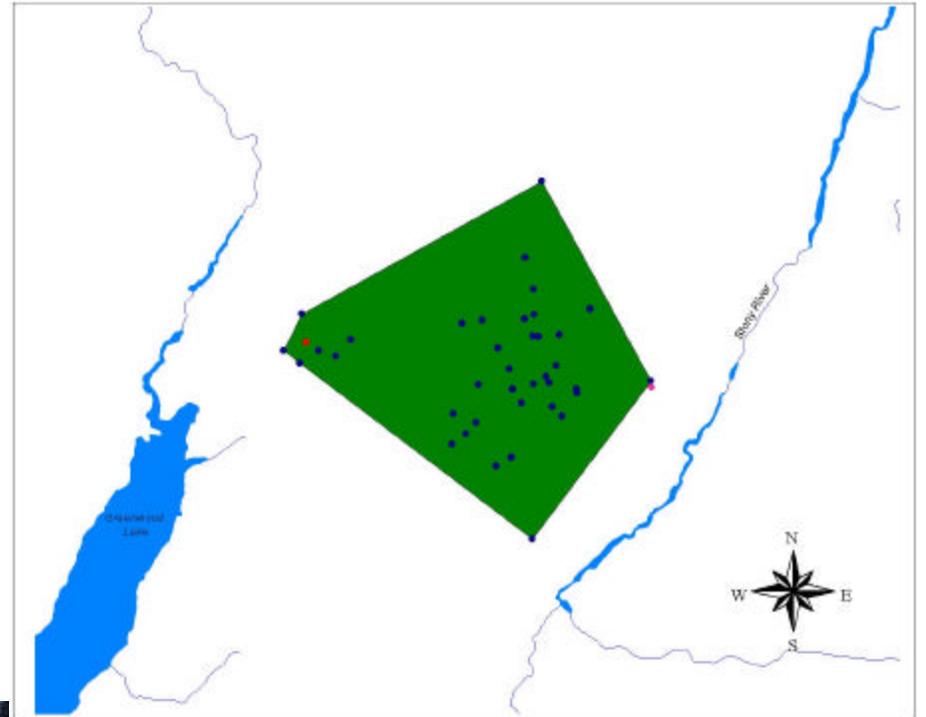


-  *A.a. americana*
-  *A.a. andersoni*
-  *A.a. gigas*
-  *A.a. shirasi*

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Conclusions



Future Plans

- **Current study completed by Dec. 07**
- **Investigate mortality rates and summer heat relationship**
- **Heavy metals and trace elements analysis**



What Could be Next?

- Find funding to continue study
- Monitor long term calf and adult survival
- Explain causes of mortality
- Correlation with deer #s
- Summer cooling habitat
- Do moose use this habitat?

