



# Status of Moose in Minnesota

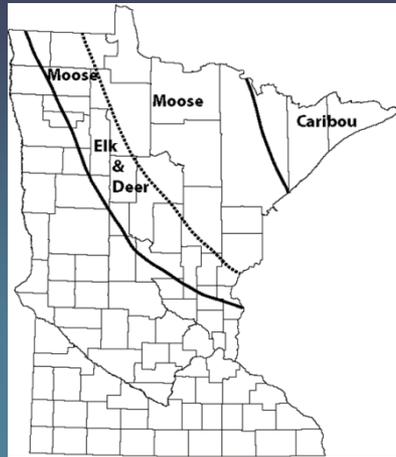
Leslie McInenly,  
Big Game Program  
Leader

*for* Minnesota Forest  
Resources Council

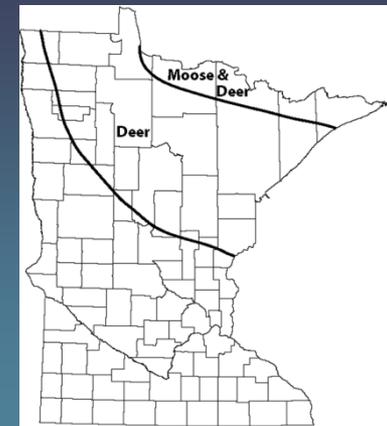
July 24, 2013



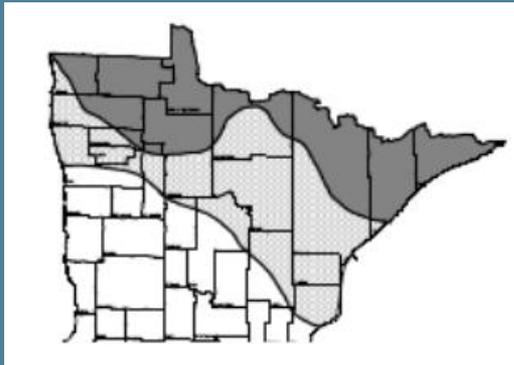
Pre-European Settlement



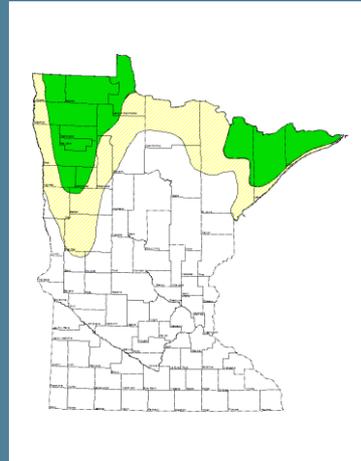
~1880



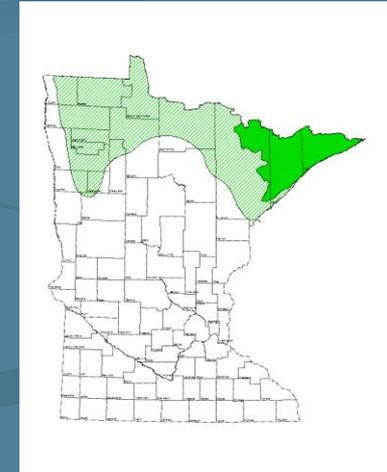
~1920



~1965



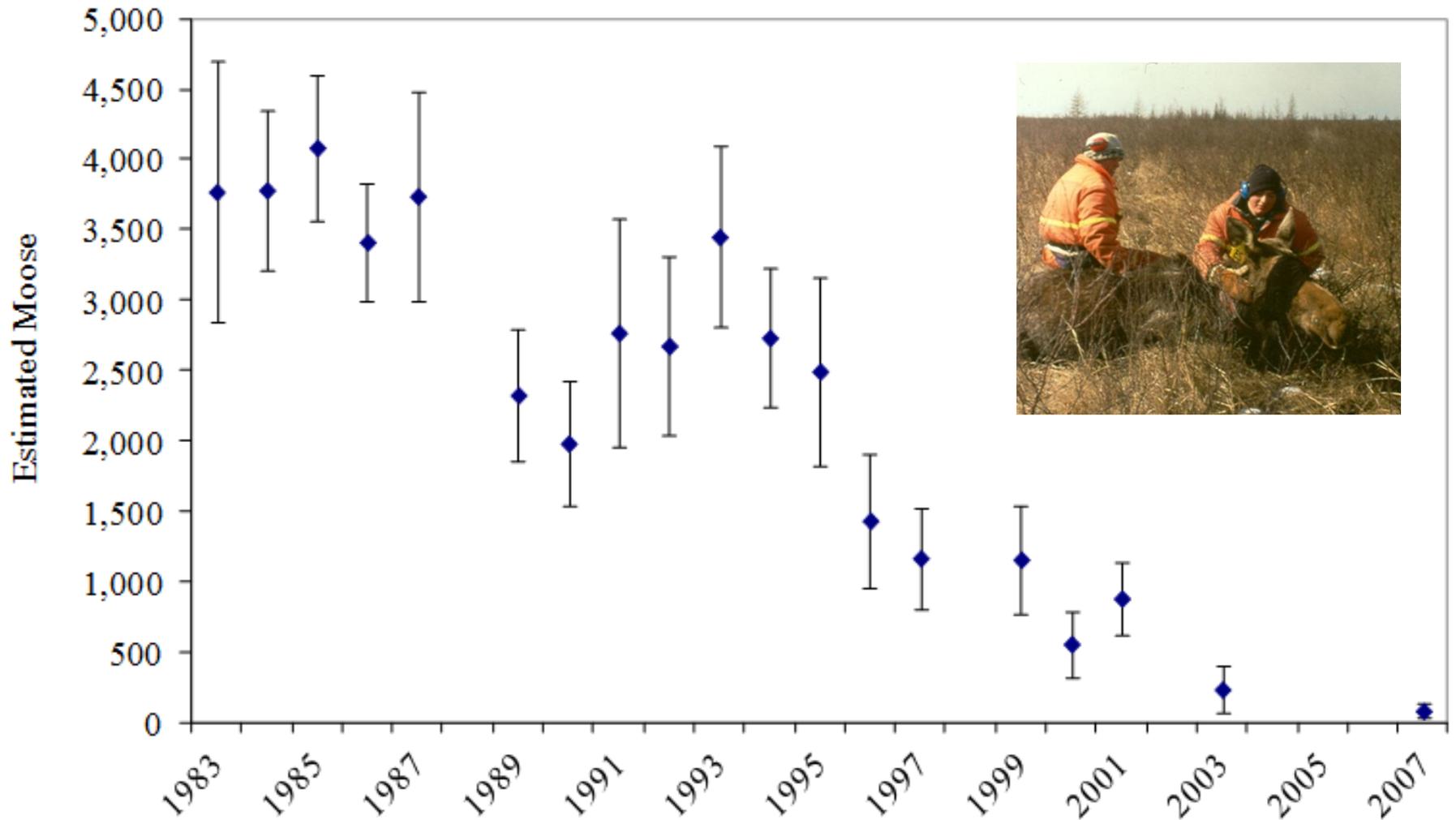
~1985



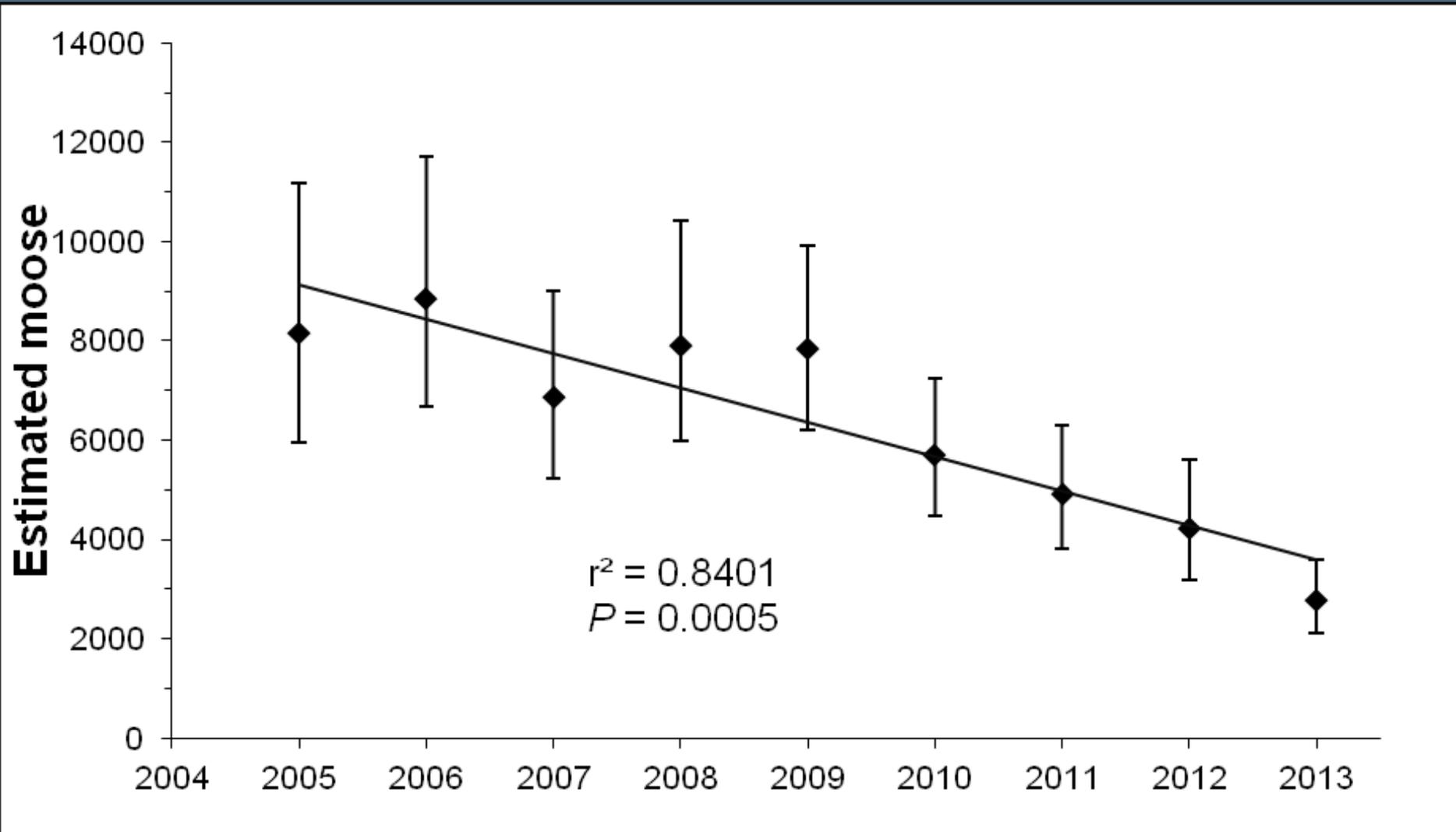
Today



# Northwest Moose



# Northeast Moose



# Minnesota Moose Research and Management Plan



Minnesota Department of Natural Resources

Final Plan Approved: December 21, 2011



## STRATEGY A:

If the bull:cow ratio estimated during the aerial moose survey drops below 67 bulls/100 cows for three consecutive years.

## STRATEGY B:

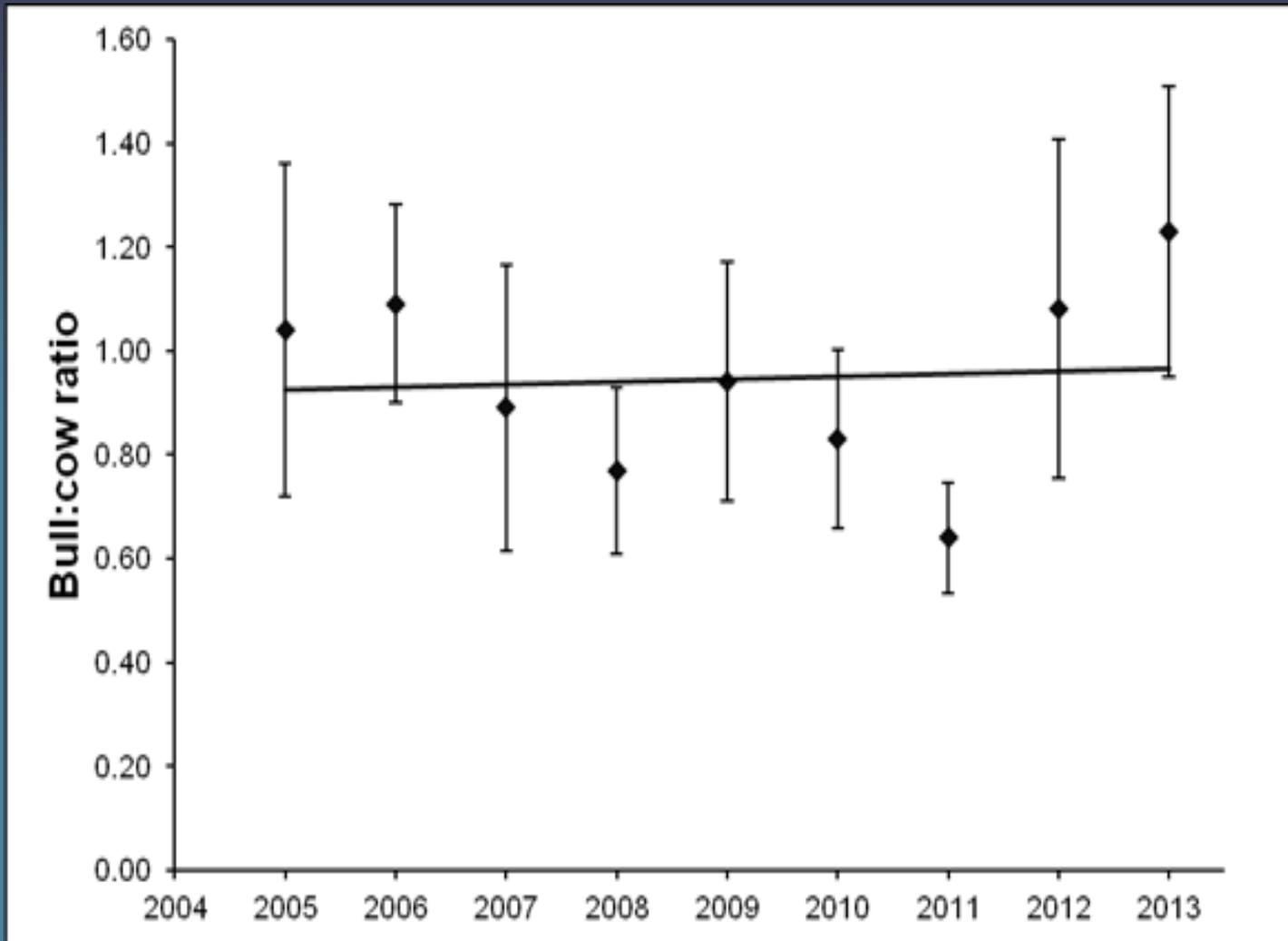
If the success of state hunters averages:

Less than 10% over 3 consecutive hunting seasons in the BWCAW.

Less than 20% over 3 consecutive hunting seasons in zones outside the BWCAW.

## STRATEGY C:

If hunter success (all units combined) drops below 30% for 3 consecutive seasons.



## STRATEGY A:

estimated bull:cow ratio < 67 bulls/100 cows for three consecutive years.

1993

Party
Success
84%
82%
83%
75%
77%
69%
72%
71%
70%
66%
63%
59%
60%
50%
45%
46%
51%
58%
53%

2012

harvest success averages:

< 10% over 3 consecutive hunting seasons in the BWCAW.

< 20% over 3 consecutive seasons in zones outside BWCAW.

(all units combined) drops below 30% for 3 consecutive seasons.



# Moose Seasons in MN

State – Closed in 2013

Treaty -

1854 Treaty Authority – 1988 MoA

1854 Treaty: Article 11 reserves right  
to hunt and fish

1988 MoA: Bands agreed to forbear  
the exercise of certain  
rights reserved by treaty

Fond du Lac – Ceded territory falls under  
both the 1837 and 1854  
treaties.



# ETS Listing: Species of Special Concern

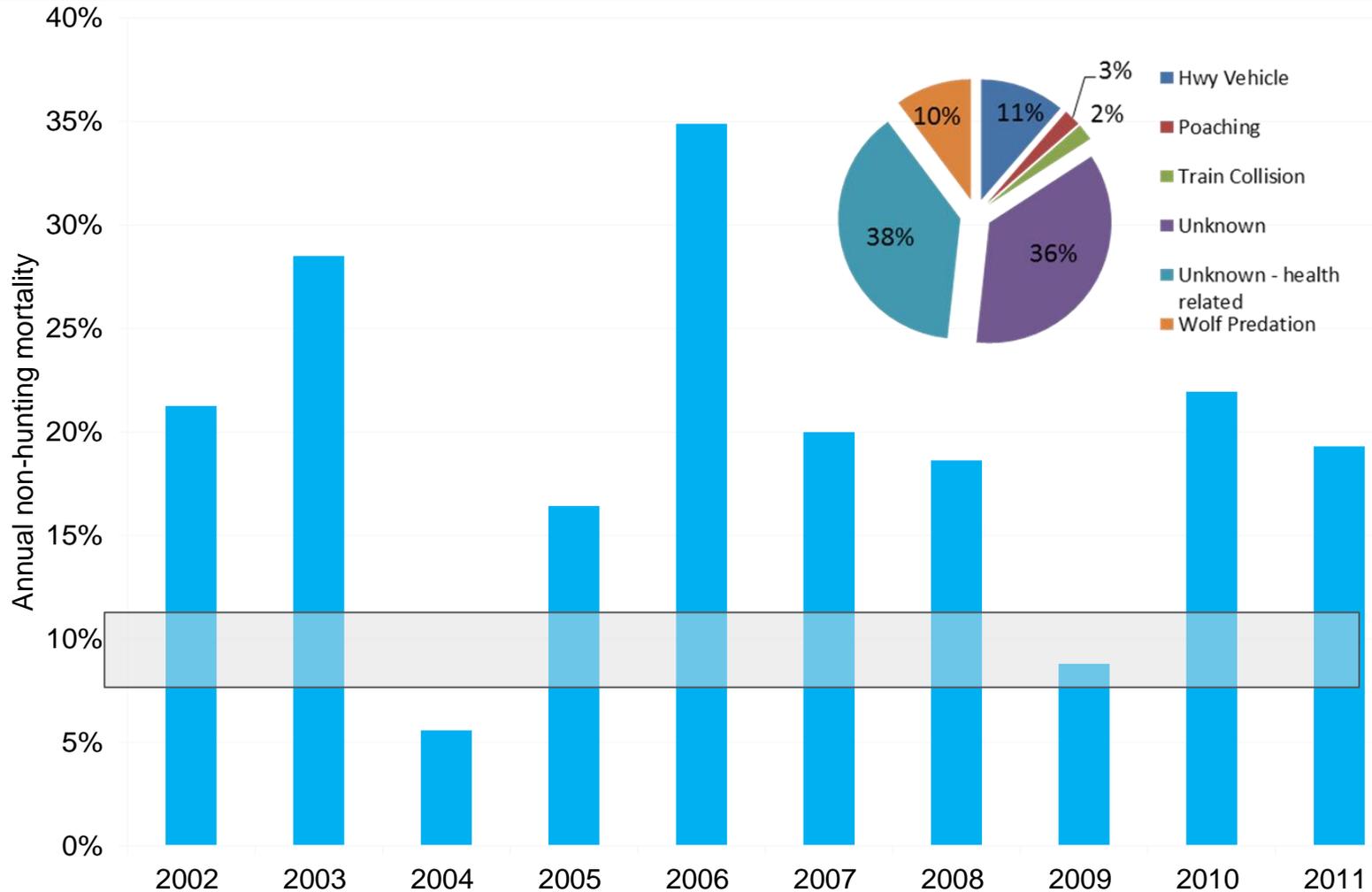
Special Concern listing was proposed due to

- o *The precipitous decline in the NW,*
- o *the recent decline in the NE, and*
- o *concerns re: climate change and changes in landownership and, potentially, forest management.*

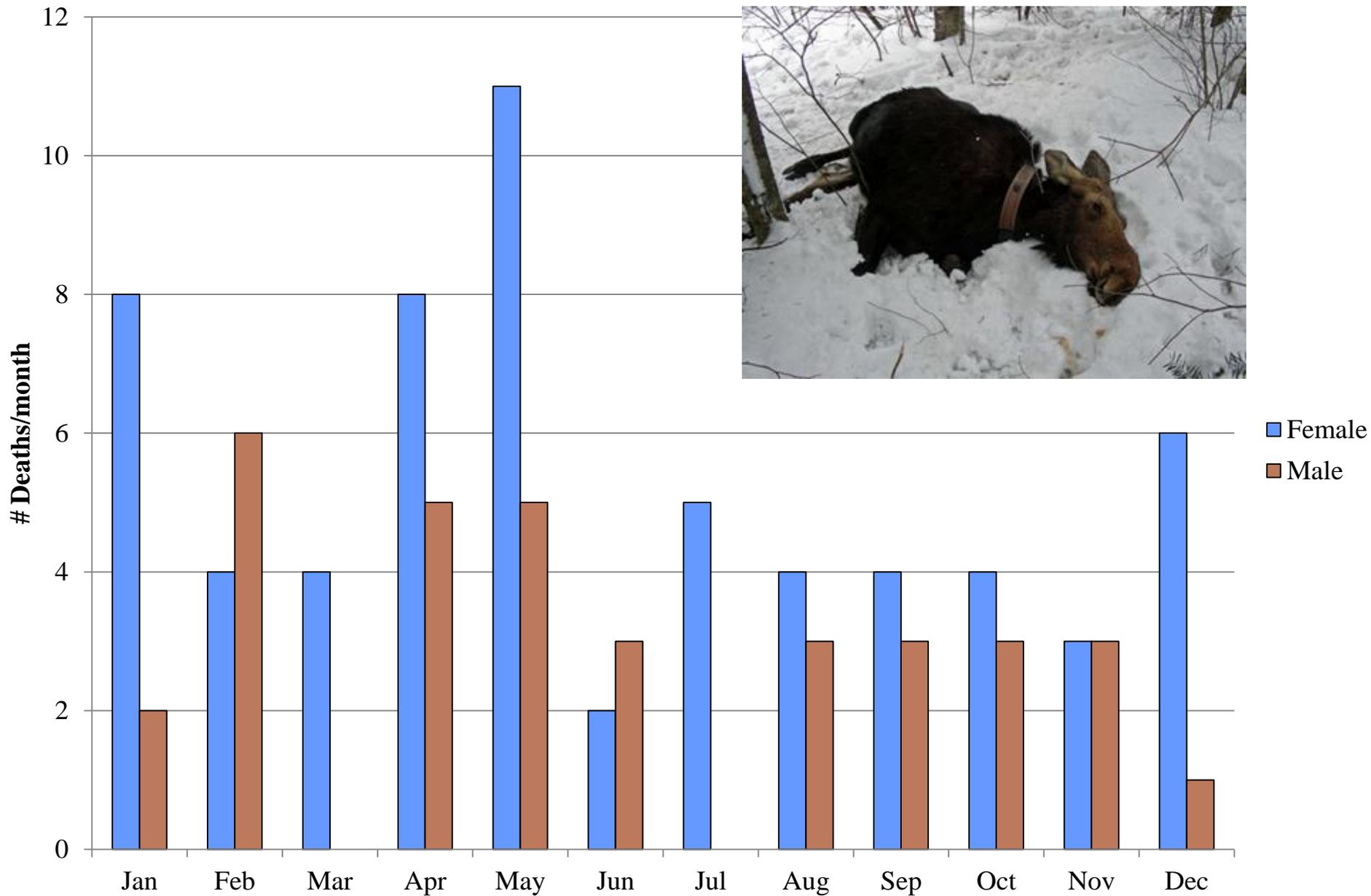
Rule anticipated to go into effect mid-August 2013



# Moose Health



# Non-hunting mortality of radiocollared moose in northeastern Minnesota (2002-2010)



# Moose Health Assessment Project

- The first step is to learn and understand what diseases and parasites moose are being exposed
- 100s of hunter harvested moose screened since 2007
- West Nile Virus - 38% exposure. Is there a detectable changing climate effect?
- Eastern equine encephalitis (EEE) - 4-6% exposure, first documentation in northeastern MN
- Brain examinations showed 6% had lesions from brainworm. What is the impact of brainworm prevalence on moose survival?



Butler et al. 2012

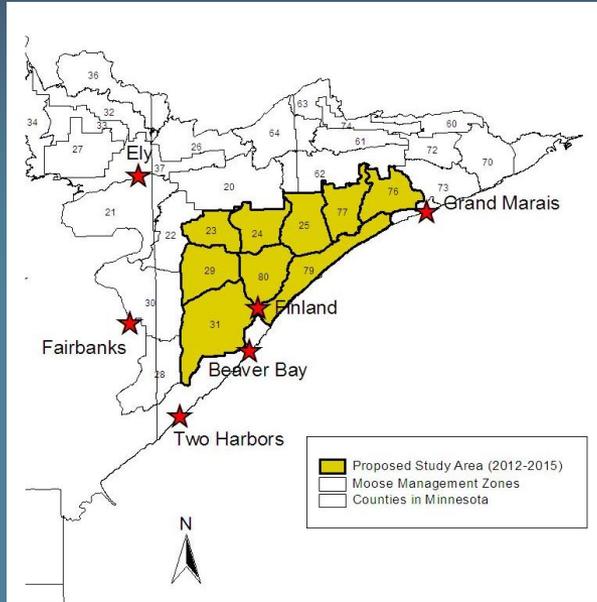


# Understanding the moose decline



- Need fresh carcasses from collared animals for better monitoring
- Sophisticated technology, highly trained staff, more complete and timely sample collection, and faster delivery time to the Diagnostic Lab
- Need more complete disease-screening

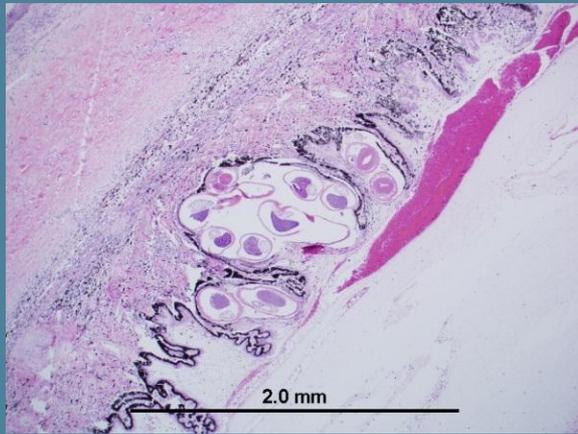
# Northeast Minnesota Moose Mortality Project



- Started this winter
- Field investigation within 24 hours of death by trained staff
- Screen for a wide variety of diseases
- Assess nutritional status of study animals and population overall
- Maintain sample size at 100 for 2 years; collars could last >5 years



# Northeast Minnesota Moose Mortality Project



# Moose reproduction, calf survival, and cause-specific mortality

- Know less about moose calf survival and causes of mortality than for adults
- In northeastern MN average annual pregnancy rates were normal (~83%)
- Average annual survival appears to be low (<40%)
- In NE MN there have been no studies focused on survival of calves, annual recruitment, or specific causes of mortality and contributing factors



# Update on the calves



- 49 calves
- High twinning rate
- 11 mortalities censored
- Of 38 remaining, 19 have died
- Pathology details pending but 15 mortalities were classified as bear, wolf or possible wolf-kills
- At this point, still ~80:100 calf cow ratio

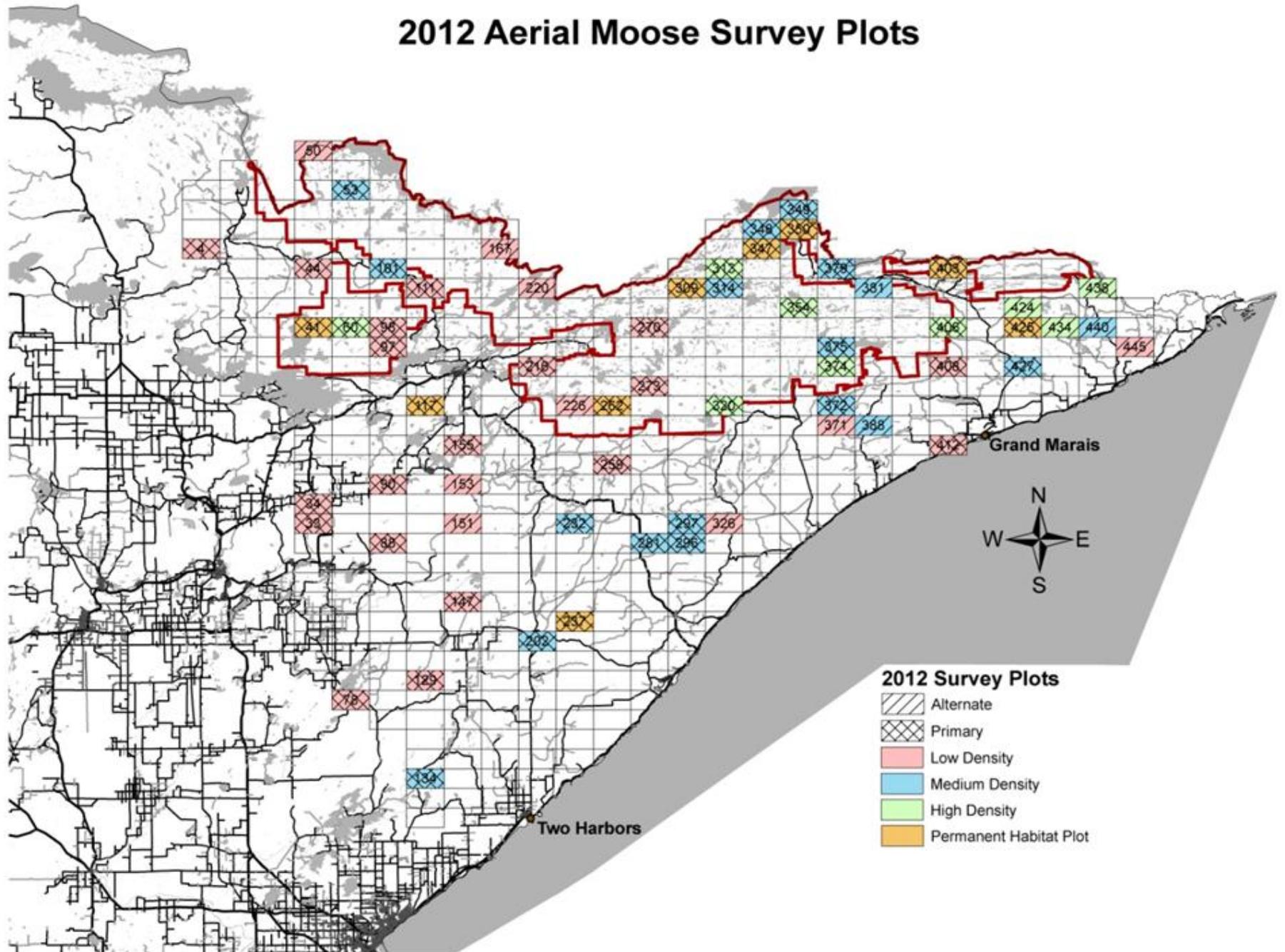


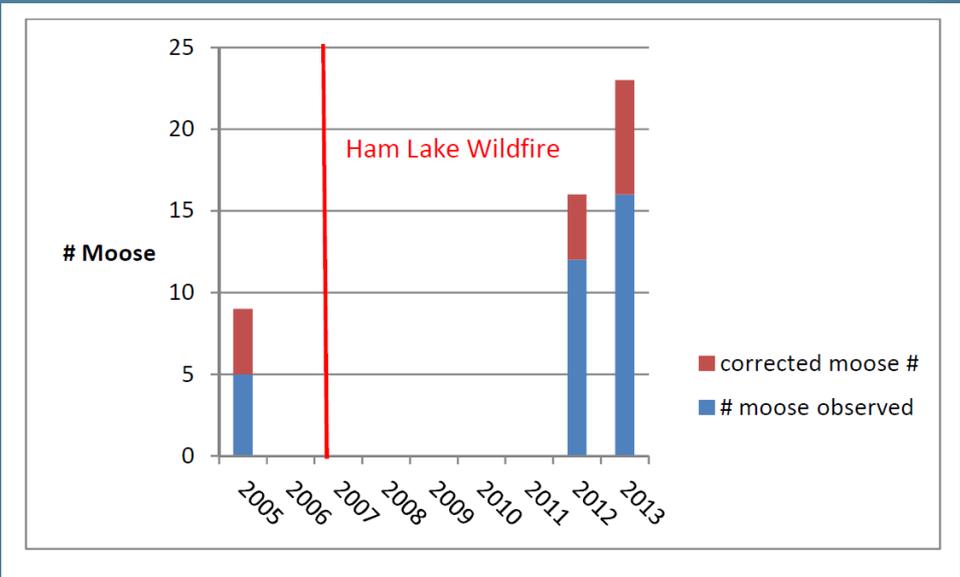
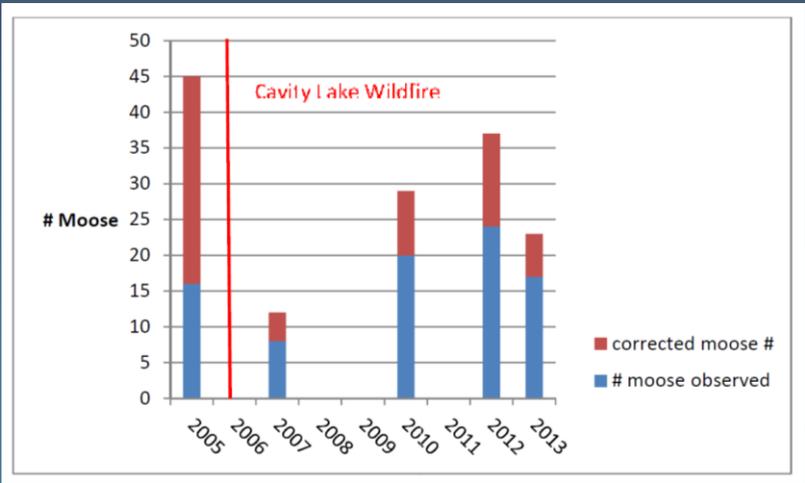
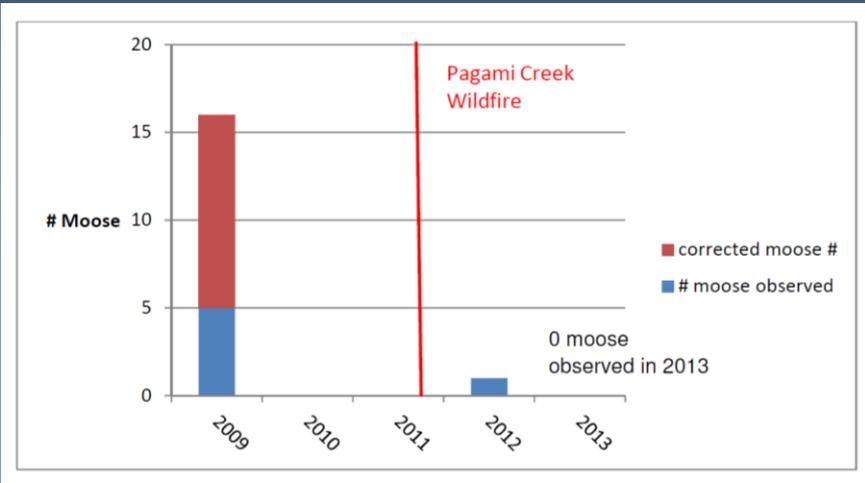
# Minnesota Moose Habitat – Management Implications

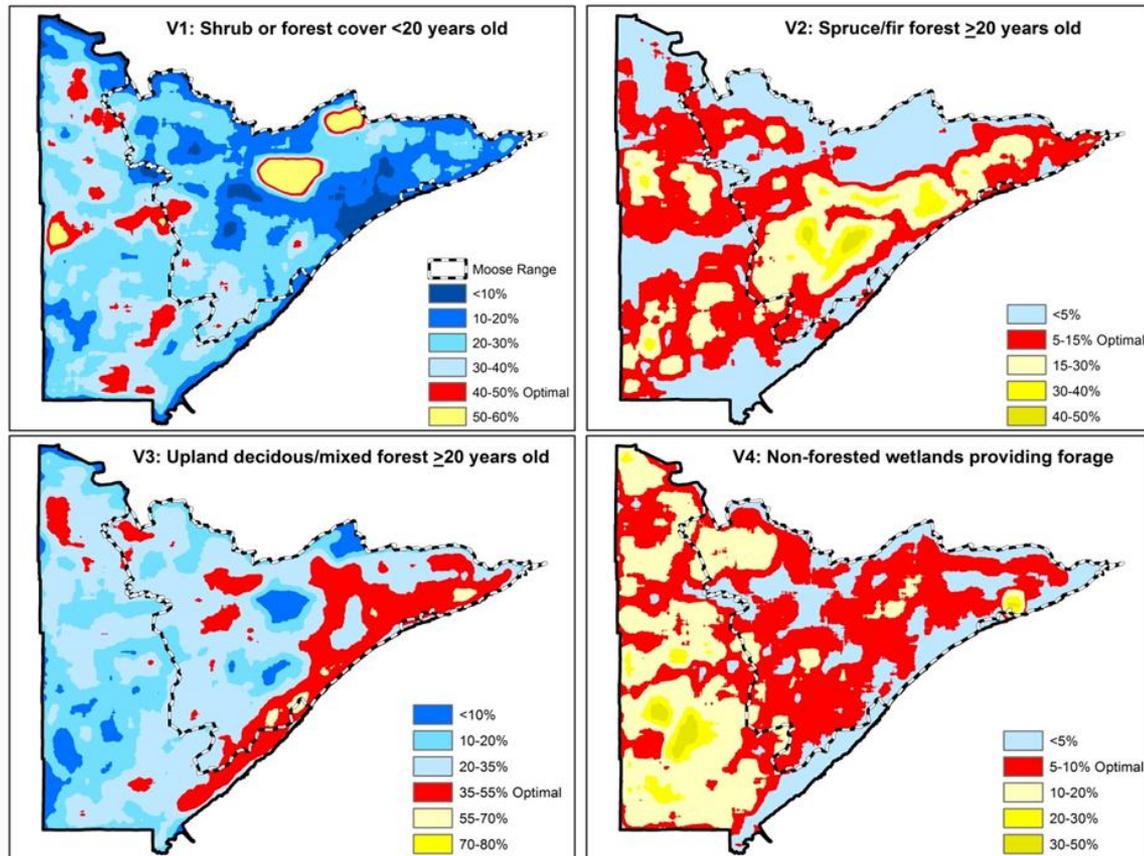
- **Updated Habitat Suitability modeling**
  - New Habitat Assessment biologist working on
- **Results coming in from various research projects**
  - <http://www.dnr.state.mn.us/moose/index.html>
- **LSOHC Moose Habitat Collaborative project**
  - Incorporated into annual moose surveys as additional stratum



# 2012 Aerial Moose Survey Plots





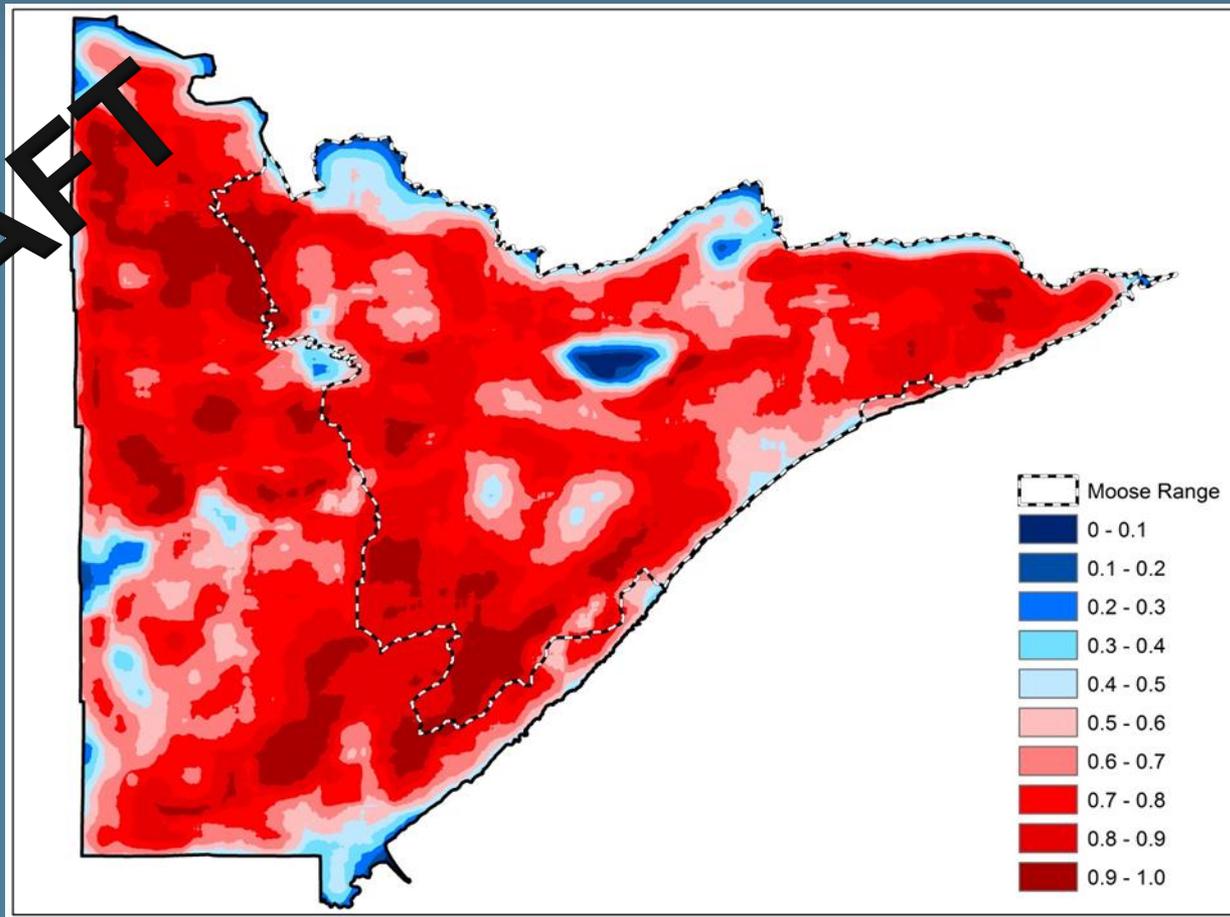


Variable	Definition	Life Requisite	Optimal Percent
V <sub>1</sub>	Percent area in shrub or forest cover types < 20 years old.	Forage	40 – 50
V <sub>2</sub>	Percent area in spruce/fir forest ≥ 20 years old.	Cover	5 – 15
V <sub>3</sub>	Percent area in upland deciduous or mixed forest ≥ 20 years old.	Cover Forage	35 – 55
V <sub>4</sub>	Percent area in non-forested wetlands.	Forage Thermoregulation	5 – 10



# Overall Habitat Suitability Index (1.0 = optimal habitat) for moose in northeastern Minnesota

**DRAFT**



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[mndnr.gov](http://mndnr.gov)

[mndnr.gov/moose](http://mndnr.gov/moose)



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