

# Monitoring the response of moose to large fires in Minnesota

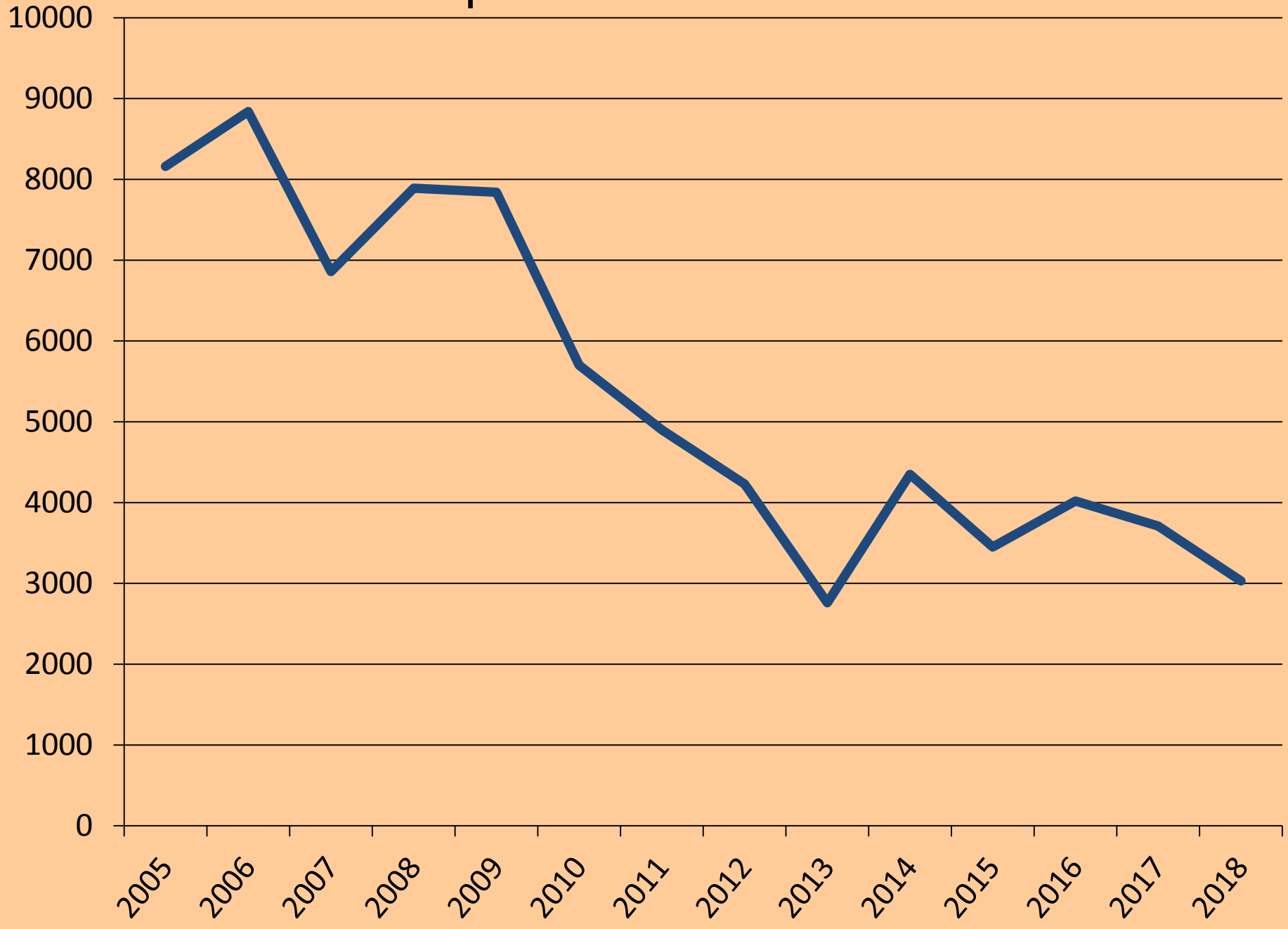


**Mike Schrage**  
**Wildlife Biologist**  
**Fond du Lac Band**





# Moose Population Trend 2005 - 2018



# Why declining?

- Health issues
- Predation
- Climate change
- Habitat decline???



# Moose and Fire

- Moose respond well to fire
- Isle Royale (Aldous and Krefting, 1946)
- Alaska (Spencer and Chatelain, 1953)
- Little Indian Sioux Fire, MN (Peek, 1972)





# Major Foods

- Paper birch
- Quaking aspen
- Mountain and red maple
- Pin and choke cherry
- Willow
- Juneberry
- Red-osier dogwood (winter)
- Balsam fir (winter)
- Hazel (winter)
- Mountain ash (summer)
- Aquatic plants (summer)





# Other habitat needs

- Summer thermal cover
- Winter cover
- Hiding cover
- Large fire can potentially provide good juxtaposition of food and cover





# Moose Population Survey Design

- stratified random sample
- 3 strata – low, medium and high expected moose density
- 436 rectangular survey plots established in 2005
- 2.67x5 miles or 8525 acres in size.
- eight east-west transects flown at .3 mile intervals
- consistent start – early January with 8” of snow.
- Two MDNR helicopters with 2 observers and pilot
- 36-43 randomly selected plots flown each year.
- <10% of total plots flown each year
- “So how the moose doing in \_\_\_\_\_?”
- “Don’t know. Haven’t flown it in \_\_\_\_\_years”.





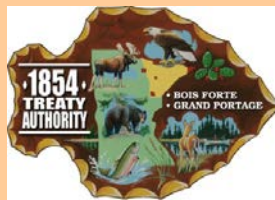
# Moose Habitat Survey





# Moose Habitat Survey

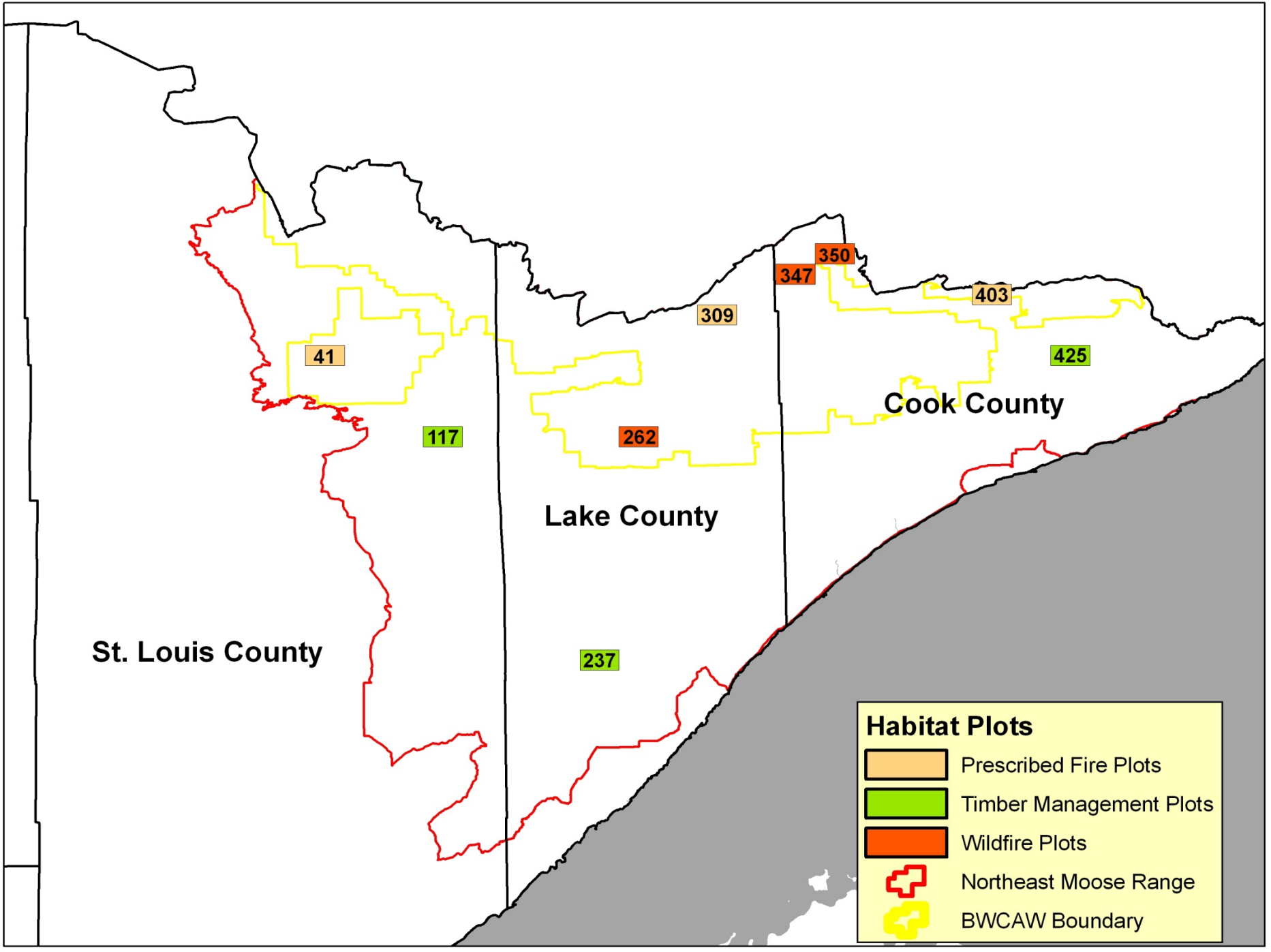
- initiated in January 2012
- understand moose response to large habitat changes over time
- managers need information for decision making
- public wants to know
- Spending money on moose habitat
- fly the same survey plots every year for an extended period (20 years)
- piggyback habitat survey onto existing moose population survey and utilize same techniques and survey plots








Three treatment types selected based on feedback from state, federal and tribal biologists

- Wildfire
  - Rx Burns
  - Timber Management
- 
- Nine permanent “habitat” plots selected
  - 3 in each treatment type.
  - Incorporated into population estimate as 4<sup>th</sup> strata





**Habitat Plots**

-  Prescribed Fire Plots
-  Timber Management Plots
-  Wildfire Plots
-  Northeast Moose Range
-  BWCAW Boundary

# Short comings.....

- Survey technique and plot changes in 2005
- Random selection of plots
  - Little or no pretreatment data
- Limited aircraft time and funds
- Population estimate retained priority
  - habitat survey flown as part of pop. estimate
  - habitat “treatments” had to fit existing plots



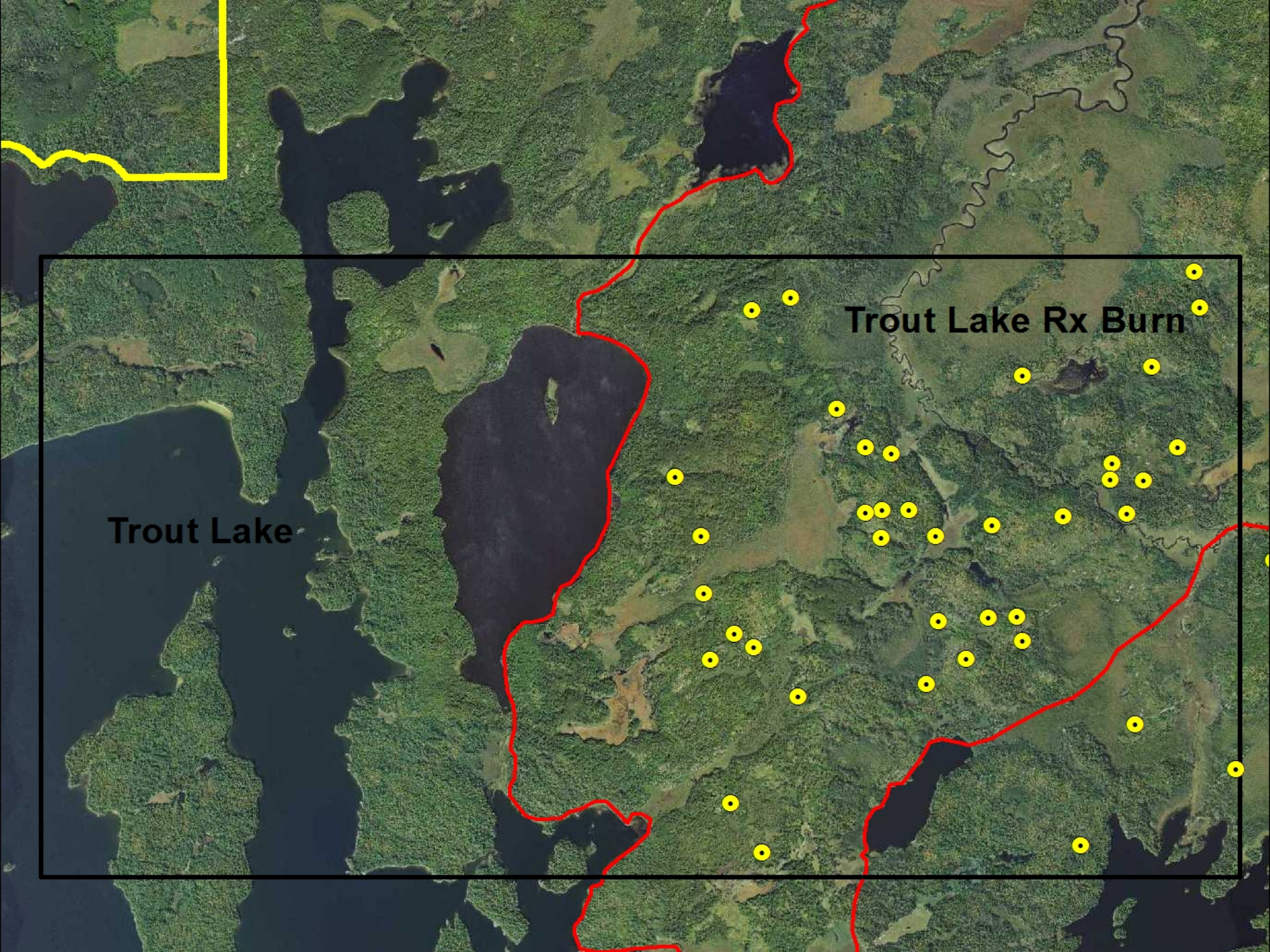


# Trout Lake Rx Burn

- September, 2005. 10,000 acres
- set to reduce 1999 blowdown fuels
- extensive light to severe blowdown damage
- plot had 2 “treatments”
- blowdown + fire tends to reduce conifer regeneration
- regen mix of aspen, jack pine spruce, brush and oak







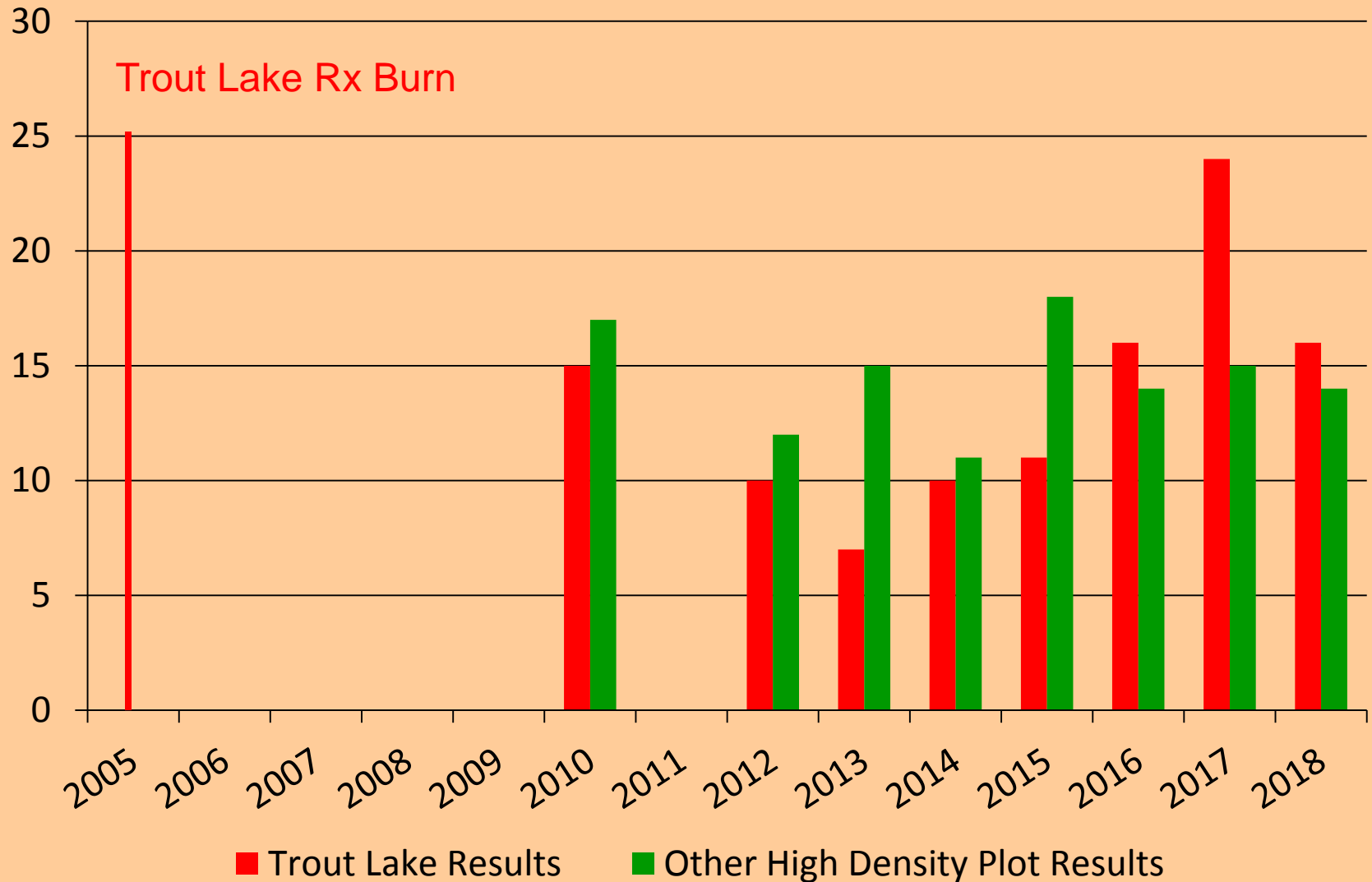
Trout Lake

Trout Lake Rx Burn



# Moose Observations on the Trout Lake Rx Burn Plot

## Moose



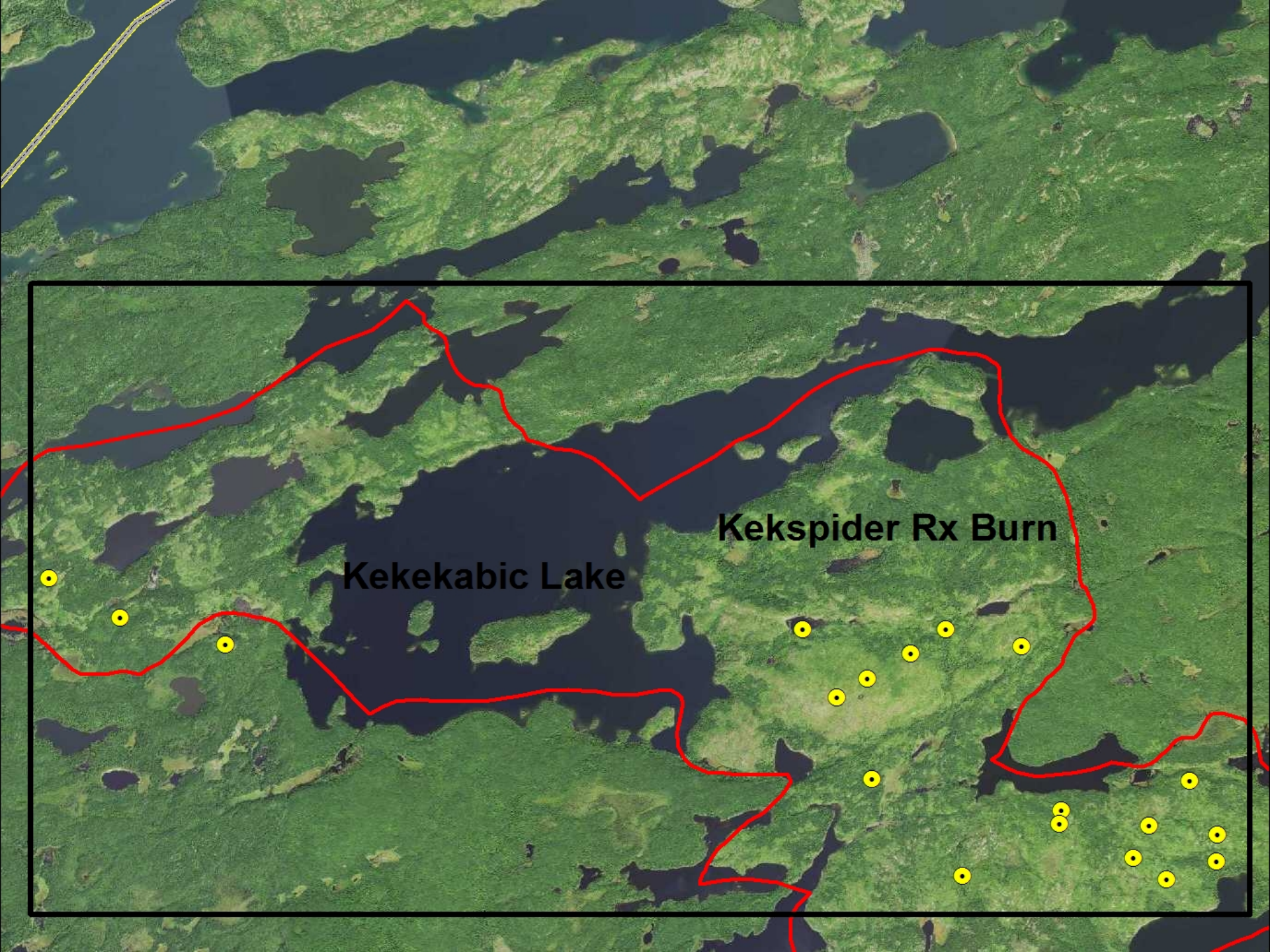


# Kekspider Rx Burn

- October, 2010, 5,000 acres
- reduce fuels from 1999 blowdown
- extensive severe blowdown damage
- rugged topography
- regen has strong conifer component



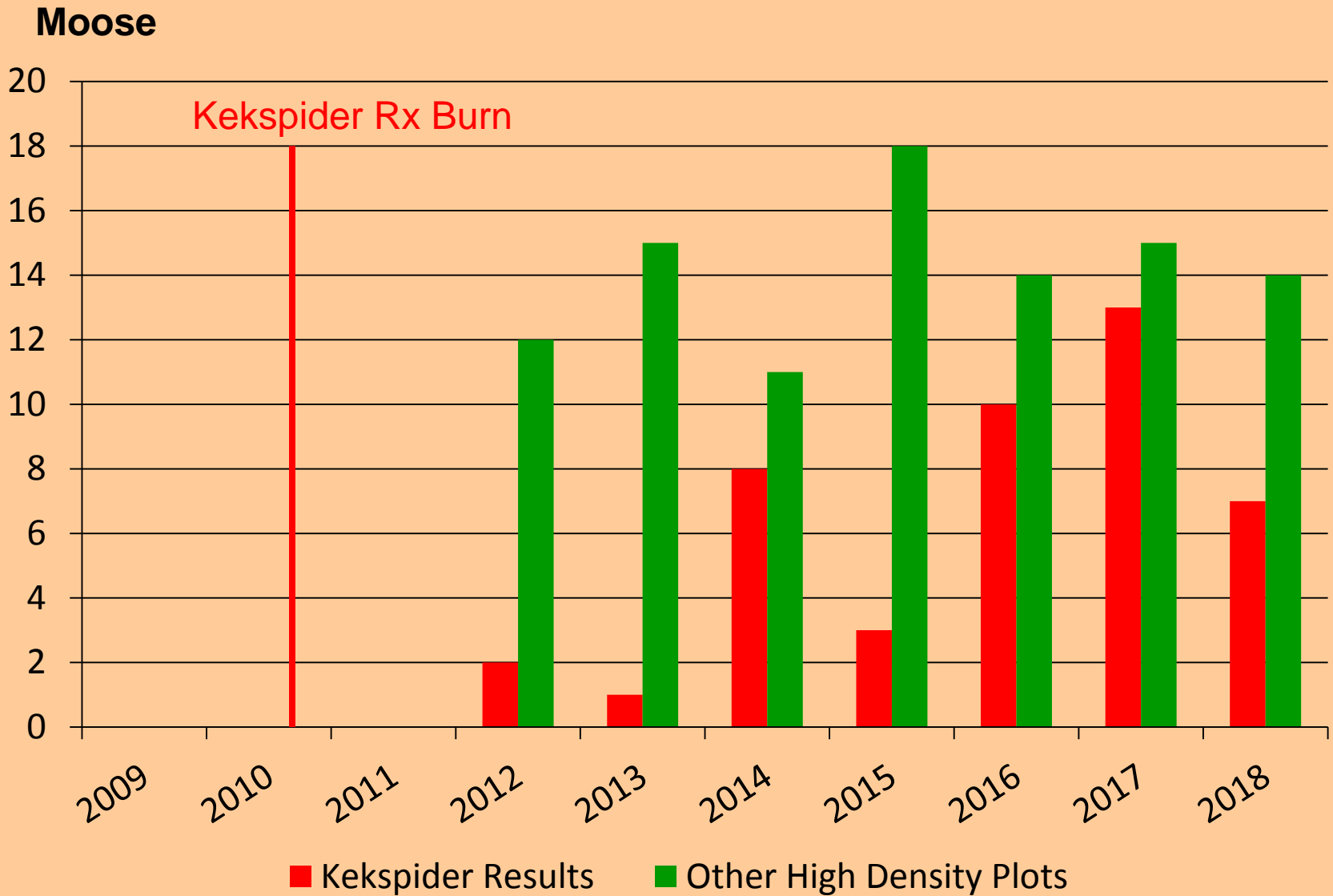




**Kekekabic Lake**

**Kekspider Rx Burn**

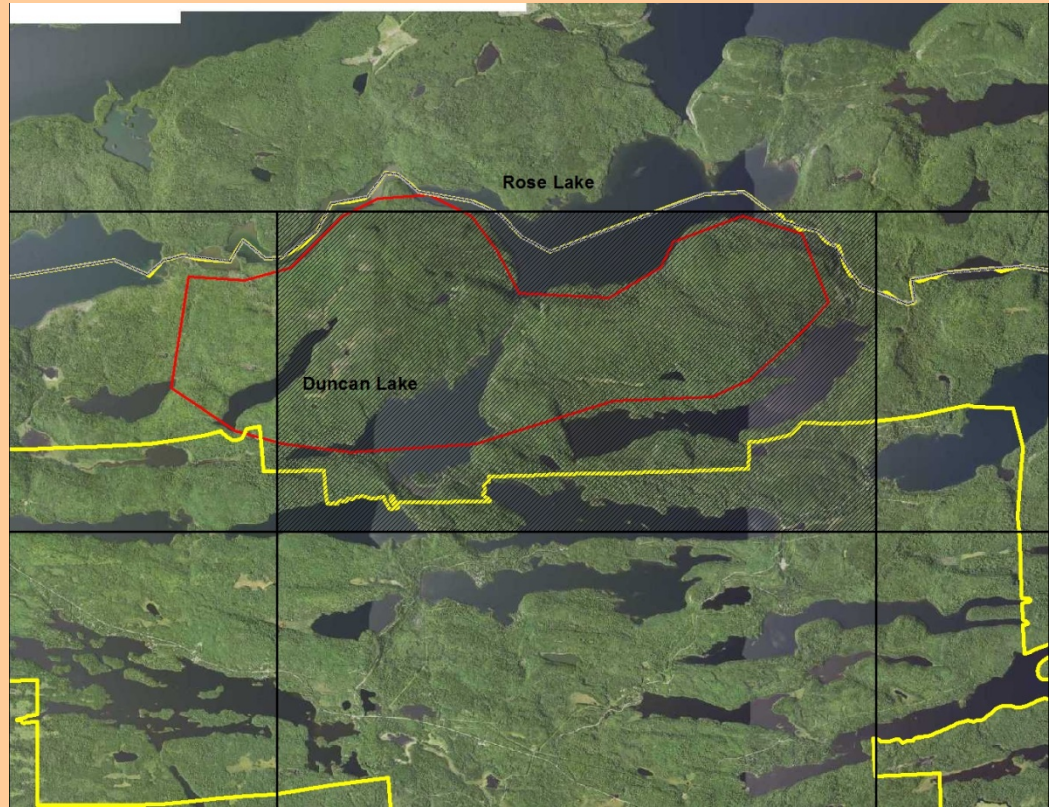
# Moose Observations on the Kekspider Rx Burn Plot





# Planned Duncan Lake Rx Burn

- proposed at 4,780 acres
- fuel reduction from 1999 blowdown
- rugged topography
- mix of light to moderate blowdown and undamaged forest



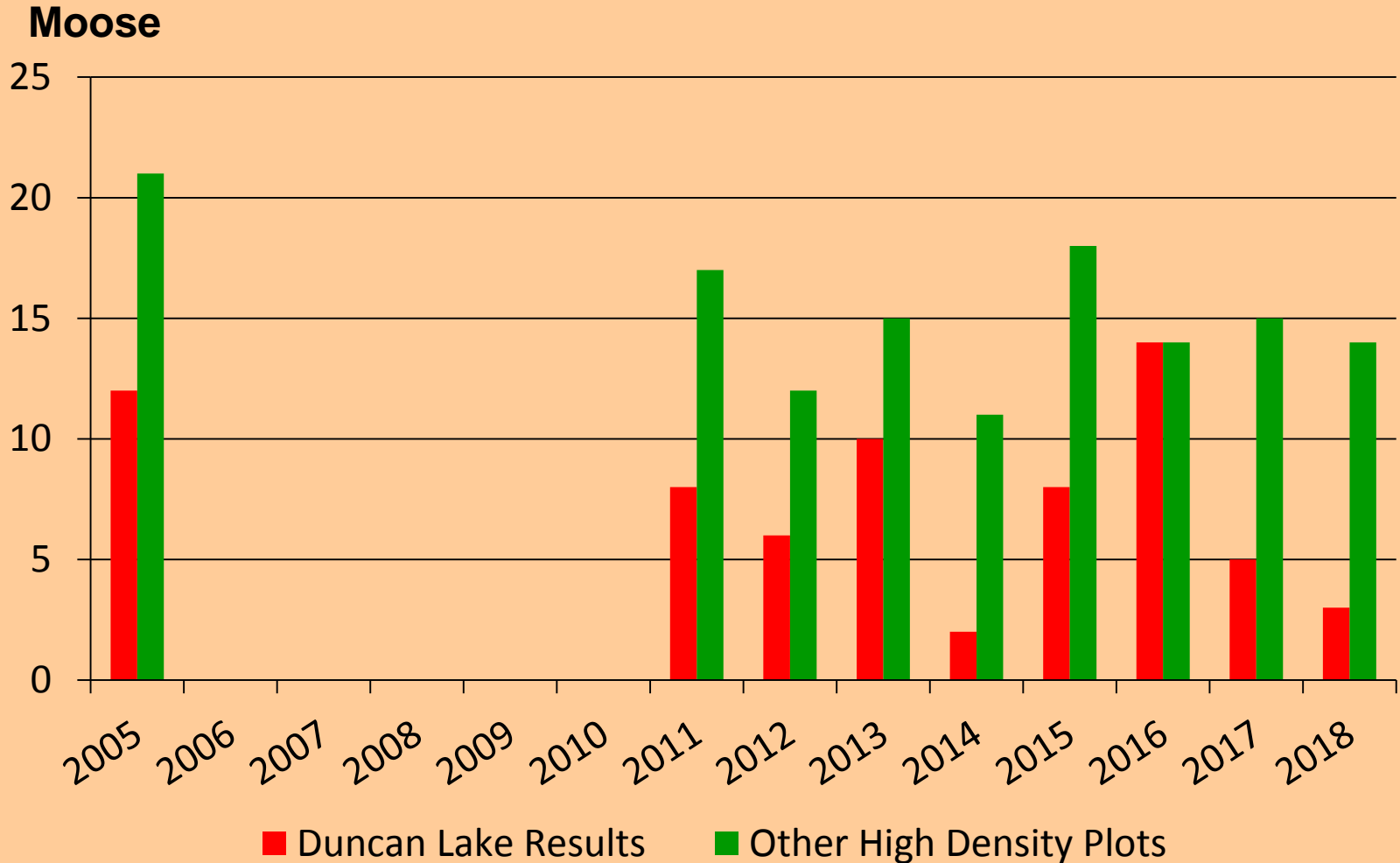


Rose Lake

Duncan Lake



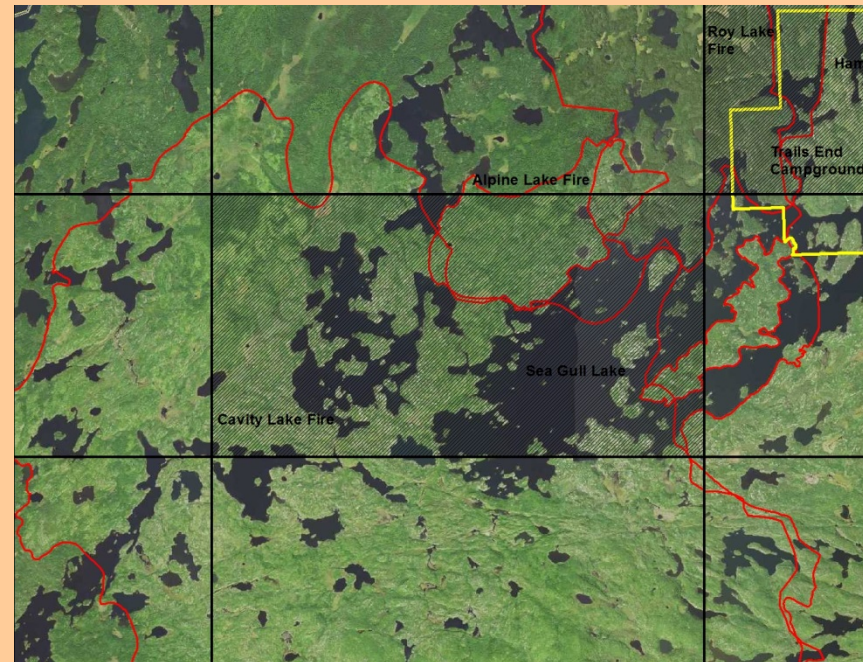
# Moose Observations on the Planned Duncan Lake Rx Burn Plot



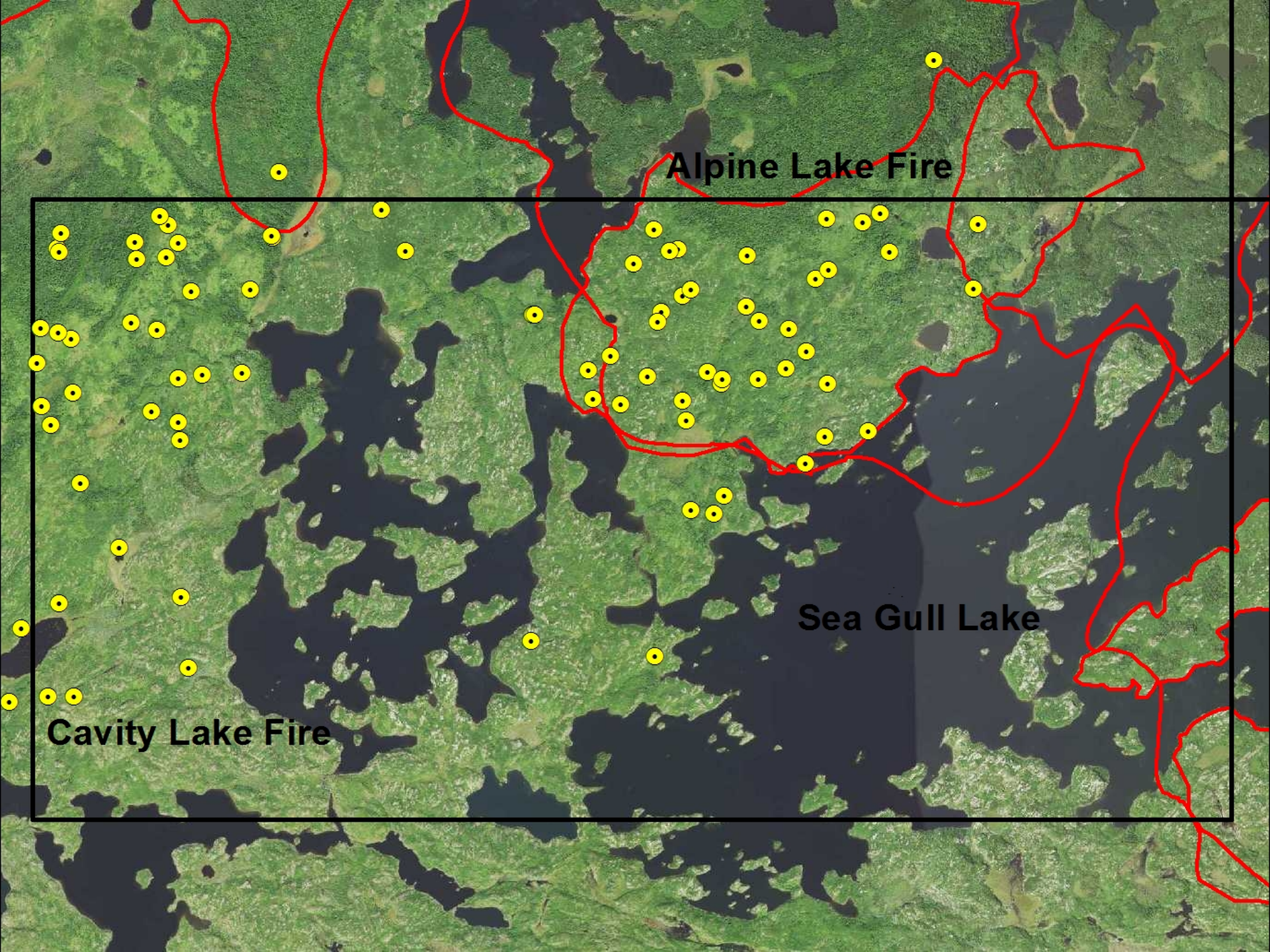


# Cavity Lake Fire

- moderate to severe 1999 blowdown damage
- then it caught fire.....
- August, 2005 Alpine Lake Fire, 1300 acres
- July, 2006 Cavity Lake Fire, 32,000 acres
- conifer regen is patchy
- patches of surviving mature timber remain
- lots of brush and deciduous tree regen







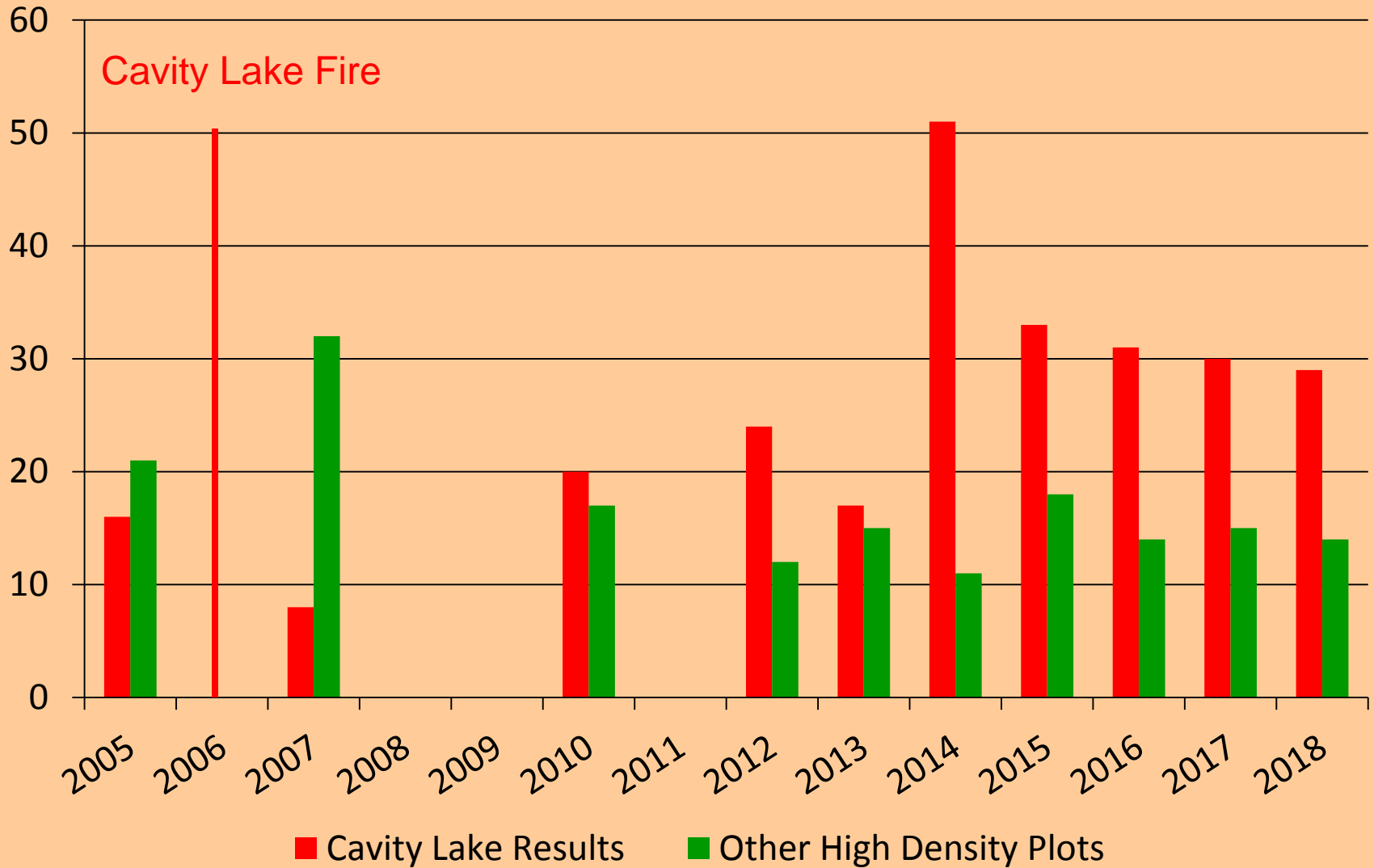
**Alpine Lake Fire**

**Sea Gull Lake**

**Cavity Lake Fire**

# Moose Observations on the Cavity Lake Fire Plot

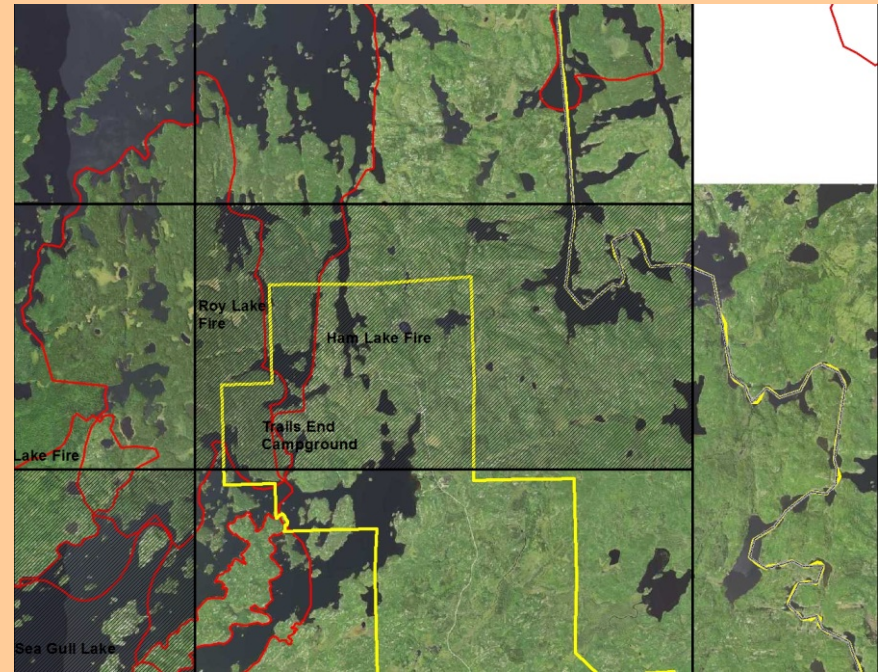
## Moose





# Ham Lake Fire

- 1976 Roy Lake Fire
- Gunflint Trail Corridor
- Light to severe 1999 blowdown damage
- May, 2007, 75,000 acres
- Abundant brush and deciduous tree regen
- Conifer lowlands intact





An aerial photograph of a forested area with numerous lakes and streams. A large black rectangle is drawn over the central and right portions of the image. Within this rectangle, a yellow line outlines a specific area, and a red line outlines another area to the west. Numerous small yellow circles are scattered across the landscape, representing sampling points. A white dashed line follows a path or boundary on the right side of the map.

**Roy Lake  
Fire**

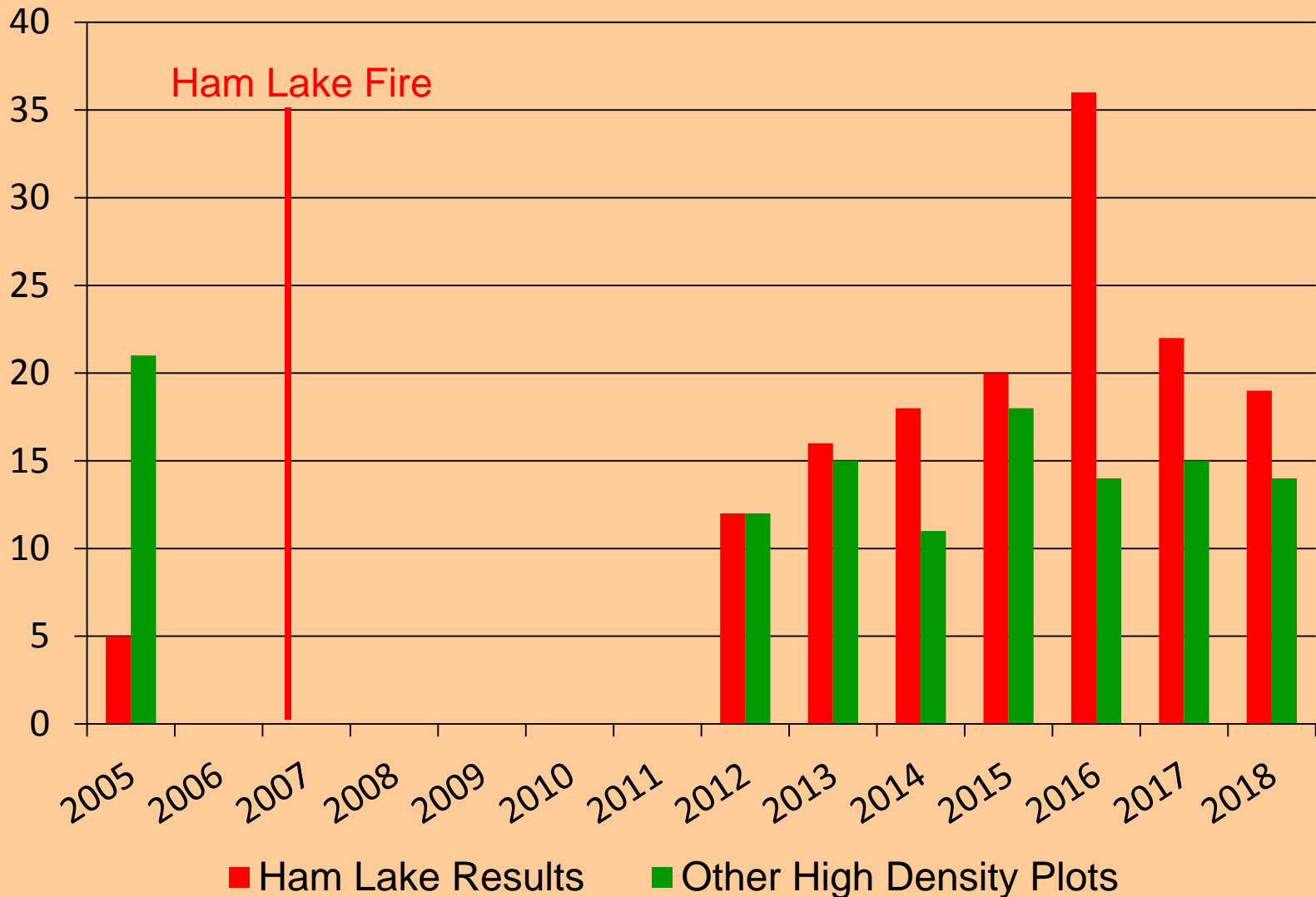
**Ham Lake Fire**

**Trails End  
Campground**



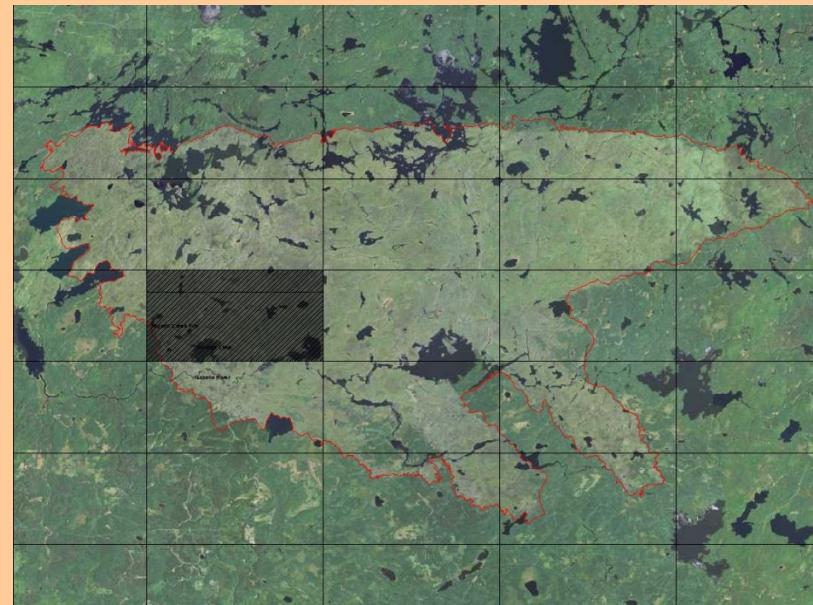
# Moose Observations on the Ham Lake Fire Plot

## Moose

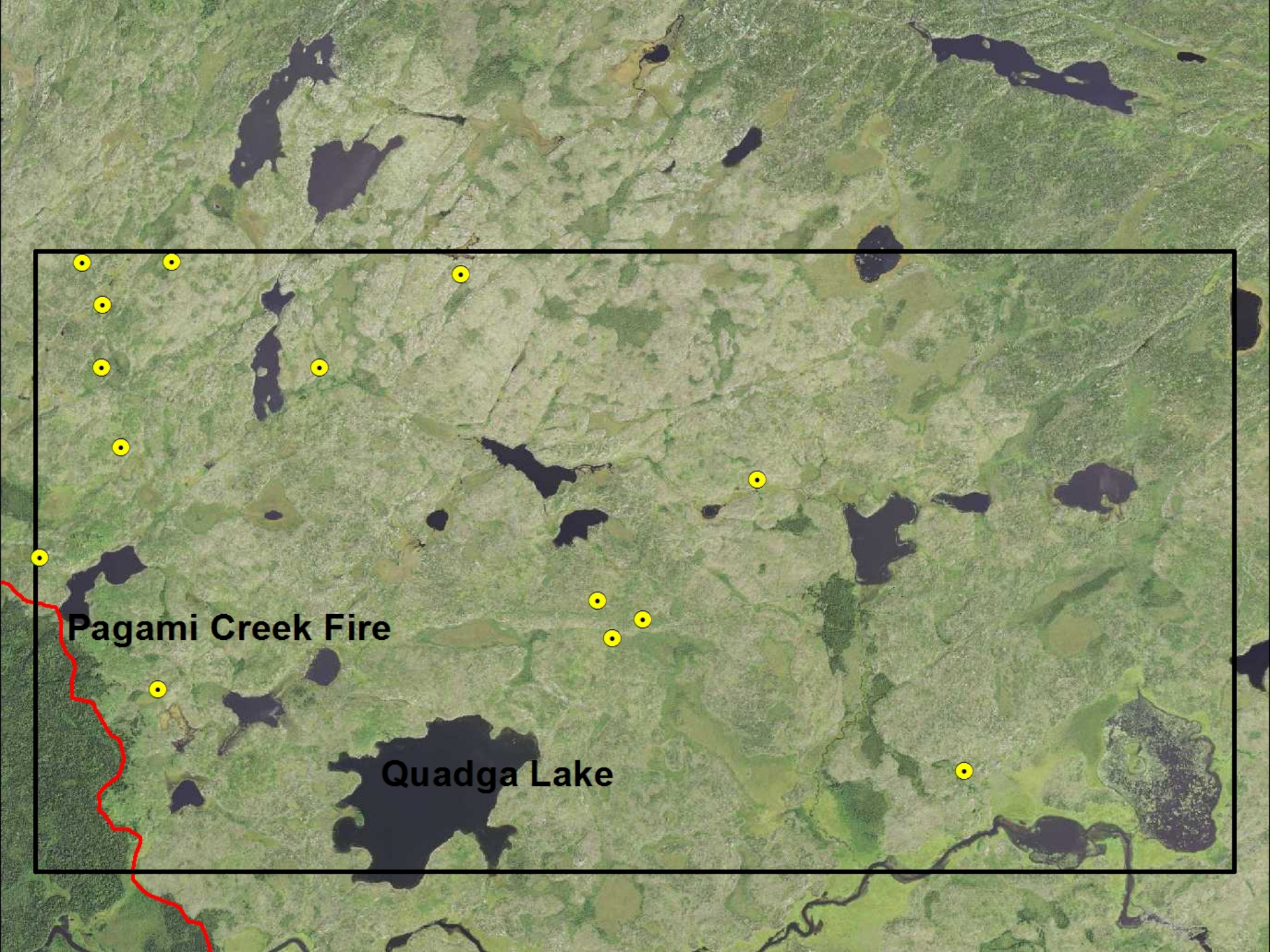


# Pagami Creek Fire

- logging 1949-1965
- almost no blowdown damage
- single “treatment”
- September, 2011, impacted all but 200 acres
- burned very thoroughly
- regen mix of large patches of jack pine intermingled with deciduous patches





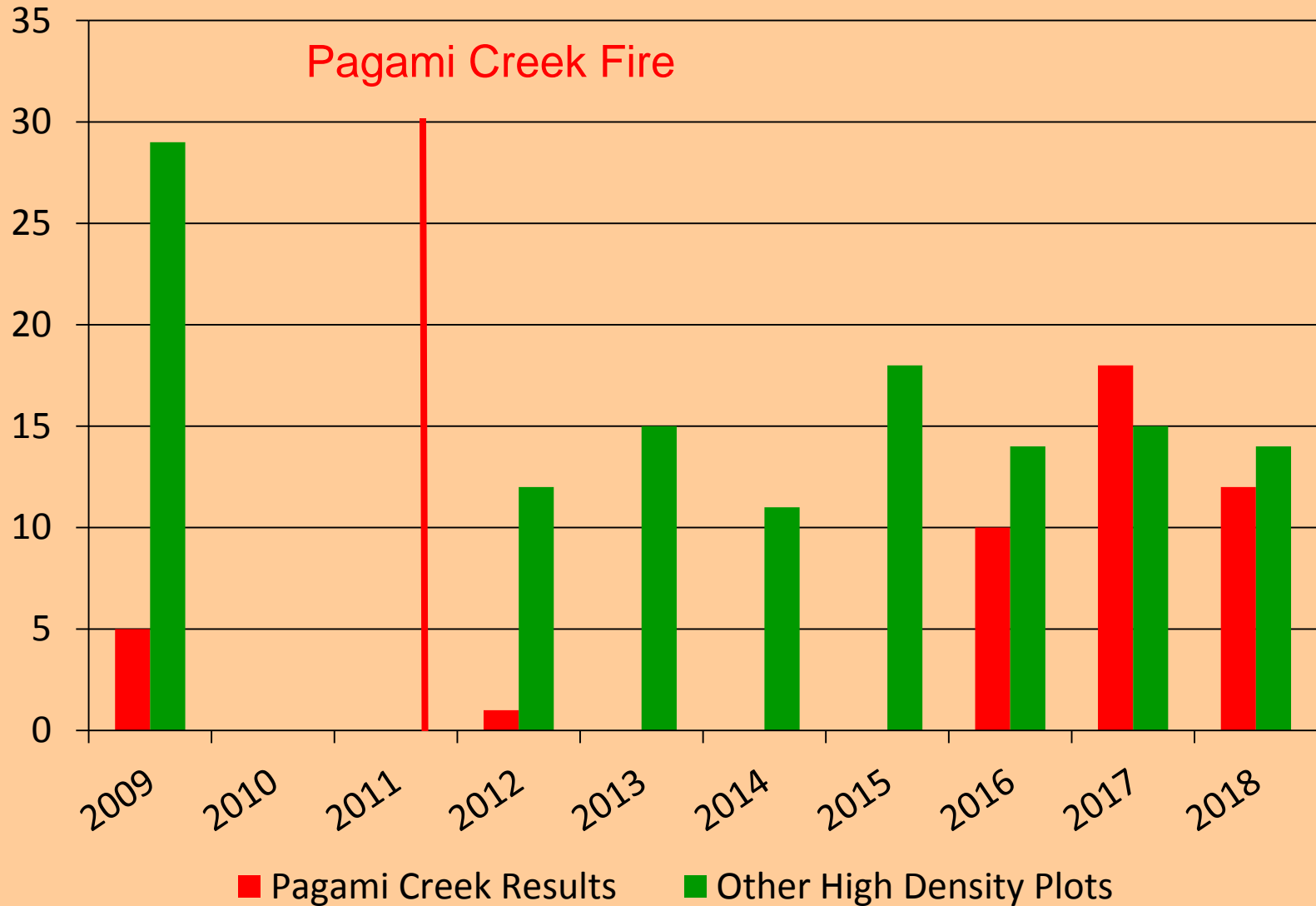


**Pagami Creek Fire**

**Quadga Lake**

# Moose Observations on the Pagami Cr. Fire Plot

## Moose







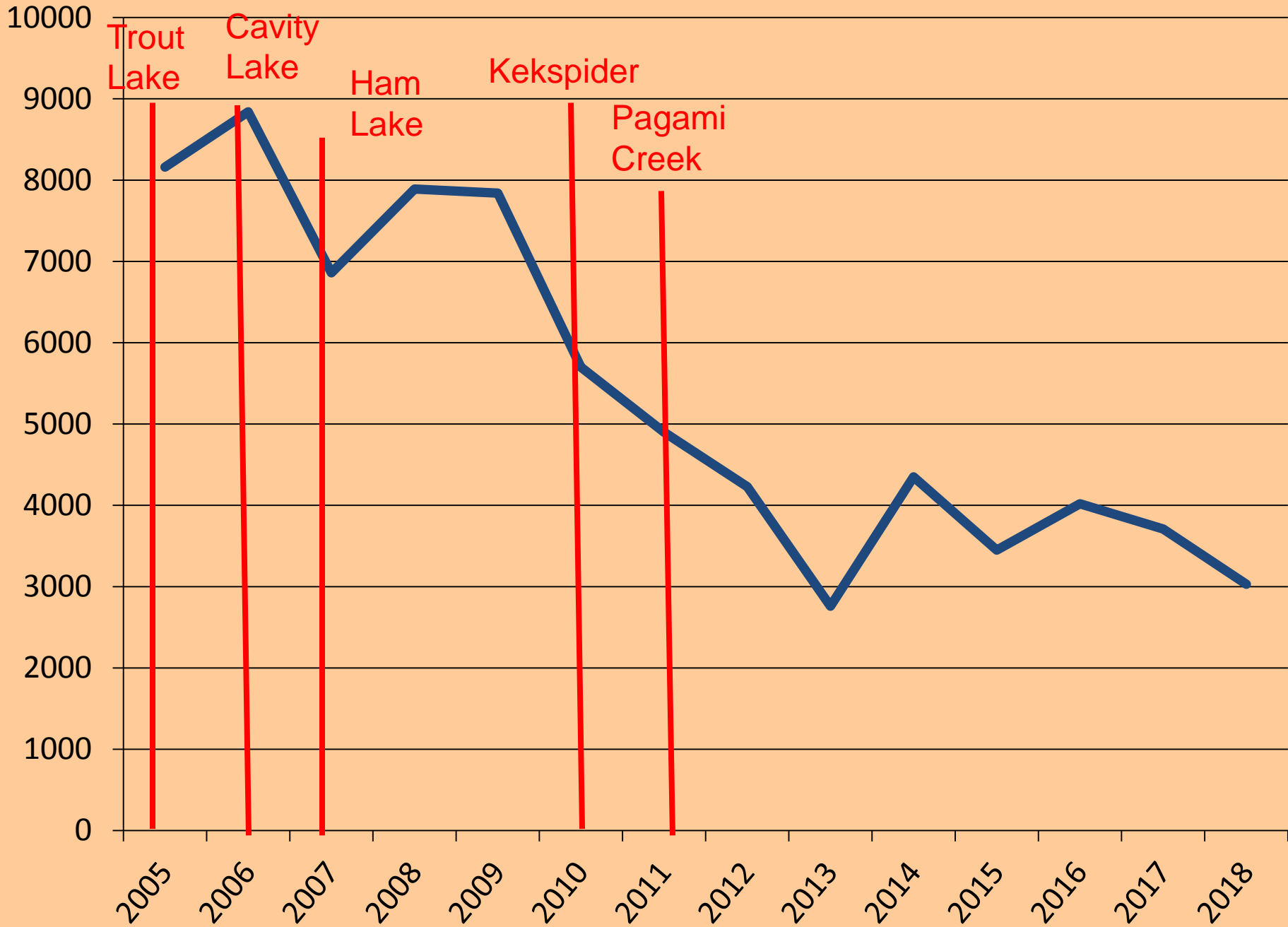
# Other metrics?

- Does seeing more moose really mean more moose?
- Survival and reproduction improved?
- Other times of the year?
- Vegetation response?





# Moose



# Moose/Fire Recommendations

- Fire is good for moose in most cases
- Creates *abundant* forage
- Provides juxtaposition of cover and forage
- Probably reduces or eliminates parasites
- Let wildfire burn and aggressively use more Rx fire.
- Go big, go hot or go home







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