


Moose(*Alces alces gigas)* browse and habitat resources and resource use in response to post-fire succession on Kanuti National Wildlife Refuge, Alaska

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National Wildlife Refuge System

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

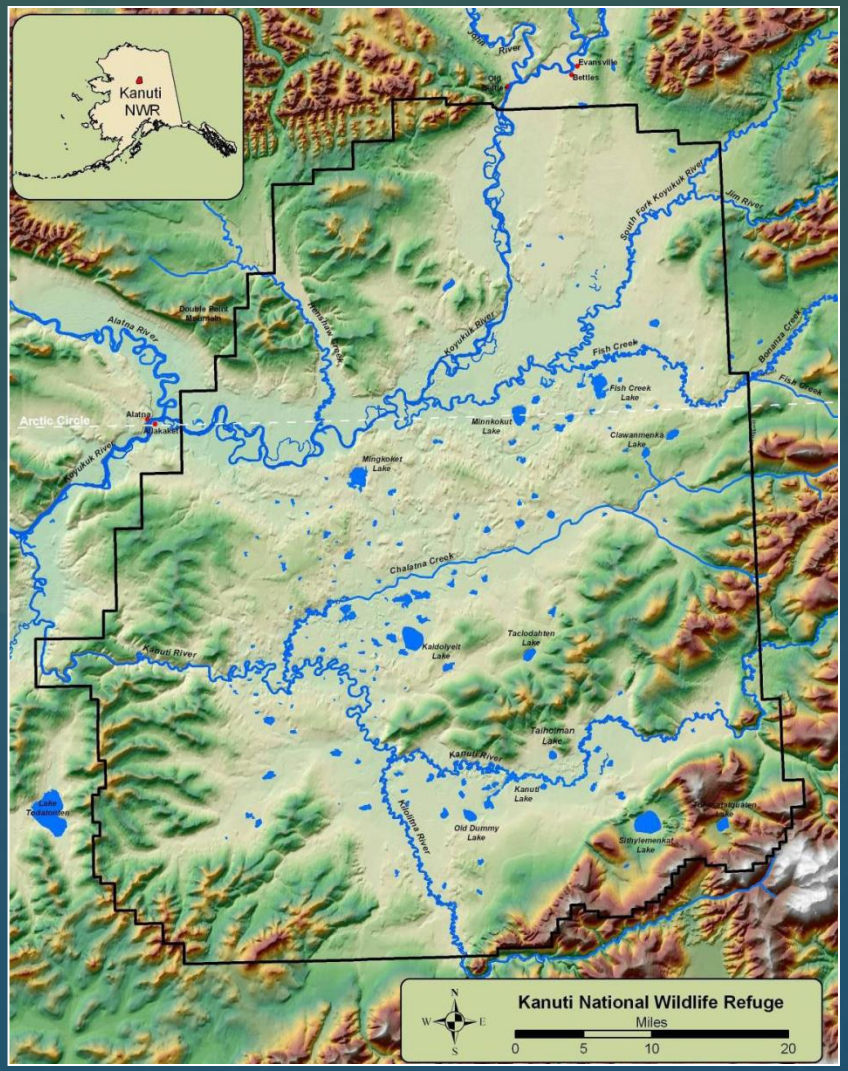
- Federal lands managed by the U.S. Fish and Wildlife Service
- Land management mandate (emphasis on *habitat)*

Kanuti National Wildlife Refuge

- 1.6 million acres in Interior Alaska
- Boreal forest lowlands
- Wildfire and flooding are dominant disturbance factors

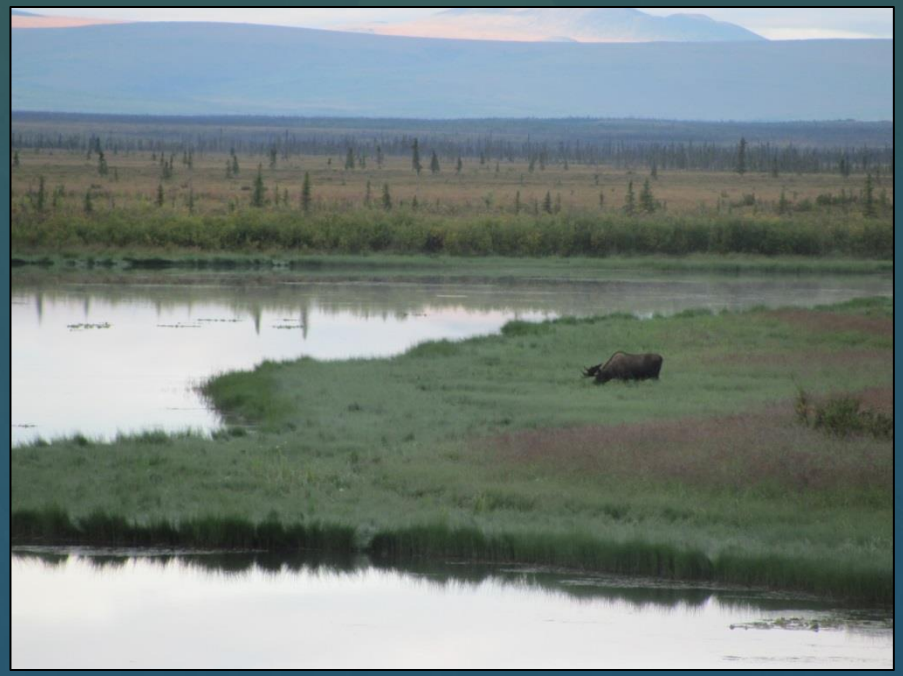
- Well documented fire history
- Many large burns of varying ages

- Low moose density
- Population is not food/habitat limited



Wildfire and moose ecology

- Disturbance-dependent species
- Mid-successional stands
  - 10-30 years post-fire = ideal (Maier *et al.* 2005)
  - Nutrition
  - Architecture
- Well-documented relationship
  - Maier *et al.* 2005
  - LeResche and Davis 1973
  - Wolff 1978



  - *Since the earliest efforts to understand the ecological relationships of moose in North America, the species has been associated with post-fire habitats.* (Franzmann and Schwartz 1998)

Project statement

The goal of this project is to evaluate the effects of fire history, plant community composition, and landscape characteristics on moose habitat, forage resources, and resource use by moose on Kanuti NWR.

Key Questions:

How do wildfire characteristics affect browse production?

How do wildfire characteristics affect browse quality?

How do wildfire characteristics affect browse use in a low density moose population?

How does this fit in to the management activities associated with moose in Game Management Unit (GMU) 24B?

Study objectives

The goal of this project is to evaluate the effects of fire history, plant community composition, and landscape characteristics on moose habitat, forage resources, and resource use by moose on Kanuti NWR.

1. Quantify the amount of woody and vegetative browse available in different age burn scars.
2. Quantify browse removal in different age burn scars by moose.
3. Determine browse quality in different age burns.
4. Compare results of habitat study with moose population data and management activities in GMU 24B.

Study objectives and hypotheses

1. Quantify the amount of woody and vegetative browse available in different age burn scars.

   - Browse species regeneration is dependent on fire
   - Browse species are dominant at a certain seral stage of successional progression through time

If a stand is < 11 years old, available browse for moose will be **low**.

If a stand is between 11 and 30 years old, available browse will be **high**.

If a stand is > 30 years old, available browse will be **low**.

Study objectives and hypotheses

1. Quantify the amount of woody and vegetative browse available in different age burn scars.

2. Quantify browse removal in different age burn scars by moose.

   - Moose favor burn scars 10-30 years post-fire (Maier *et al*. 2005)

If a stand is < 11 years old, browse removal by moose will be **low**.

If a stand is between 11 and 30 years old, browse removal by moose will be **high**.

If a stand is > 30 years old, browse removal by moose will be **low**.

Study objectives and hypotheses

1. Quantify the amount of woody and vegetative browse available in different age burn scars.
2. Quantify browse removal in different age burn scars by moose.

3. Determine browse quality in different age burns.

   - Disturbance increases browse quality (Rea and Gillingham 2001, Nellemann 1990)

If a stand is < 11 years old, browse quality will be **low**.

If a stand is between 11 and 30 years old, browse quality will be **high.**

If a stand is > 30 years old, browse quality will be **low.**

Study objectives and hypotheses

1. Quantify the amount of woody and vegetative browse available in different age burn scars.
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4. Compare results of habitat study with moose population data and management activities Game Management Unit (GMU) 24B.

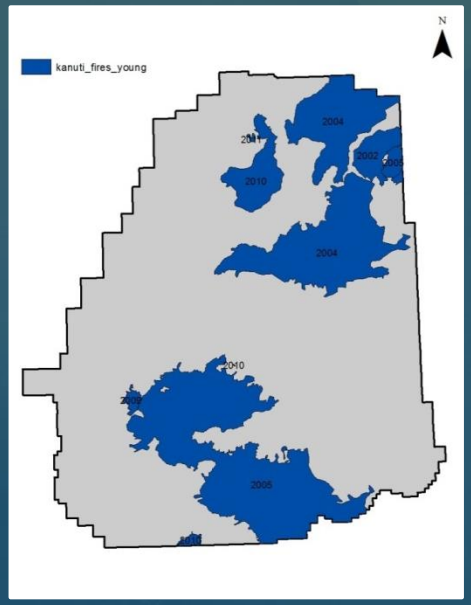
If a stand is < 11 years old, moose densities will be **low**.

If a stand is between 11 and 30 years old, moose densities will be **high**.

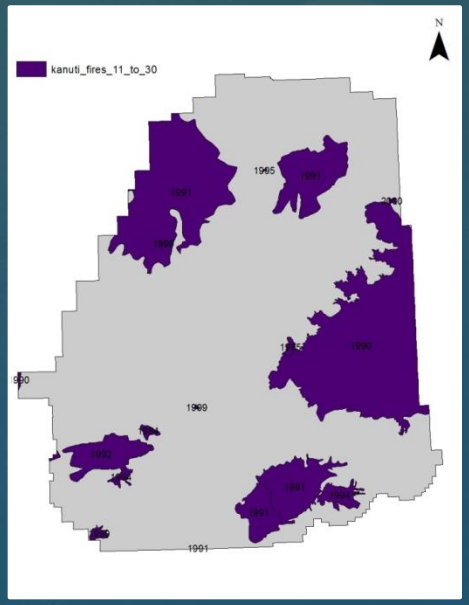
If a stand is > 30 years old, moose densities will be **low**.

Methods: study area

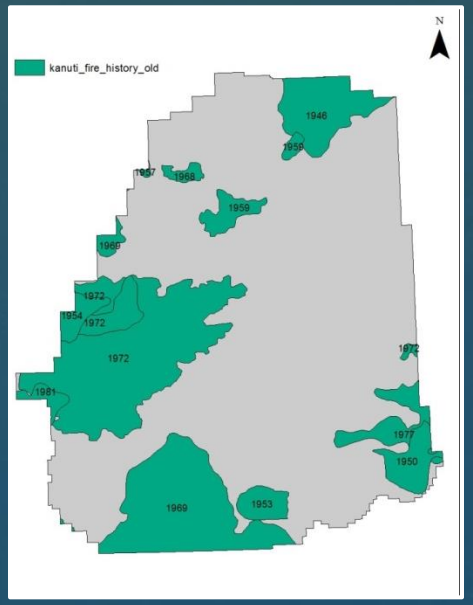
- Study area: stratification and site selection
  - Selected burn strata: 1972, 1990, 2005, and Unburned
  - ArcMap; selected appropriate vegetation types using the Kanuti/Ray Mountains/Hogatza River Earth Cover Classification (BLM 2002)
  - Randomly selected points in burns with appropriate vegetation classification
    - Sites limited to within 500m of the Kanuti River in 2013



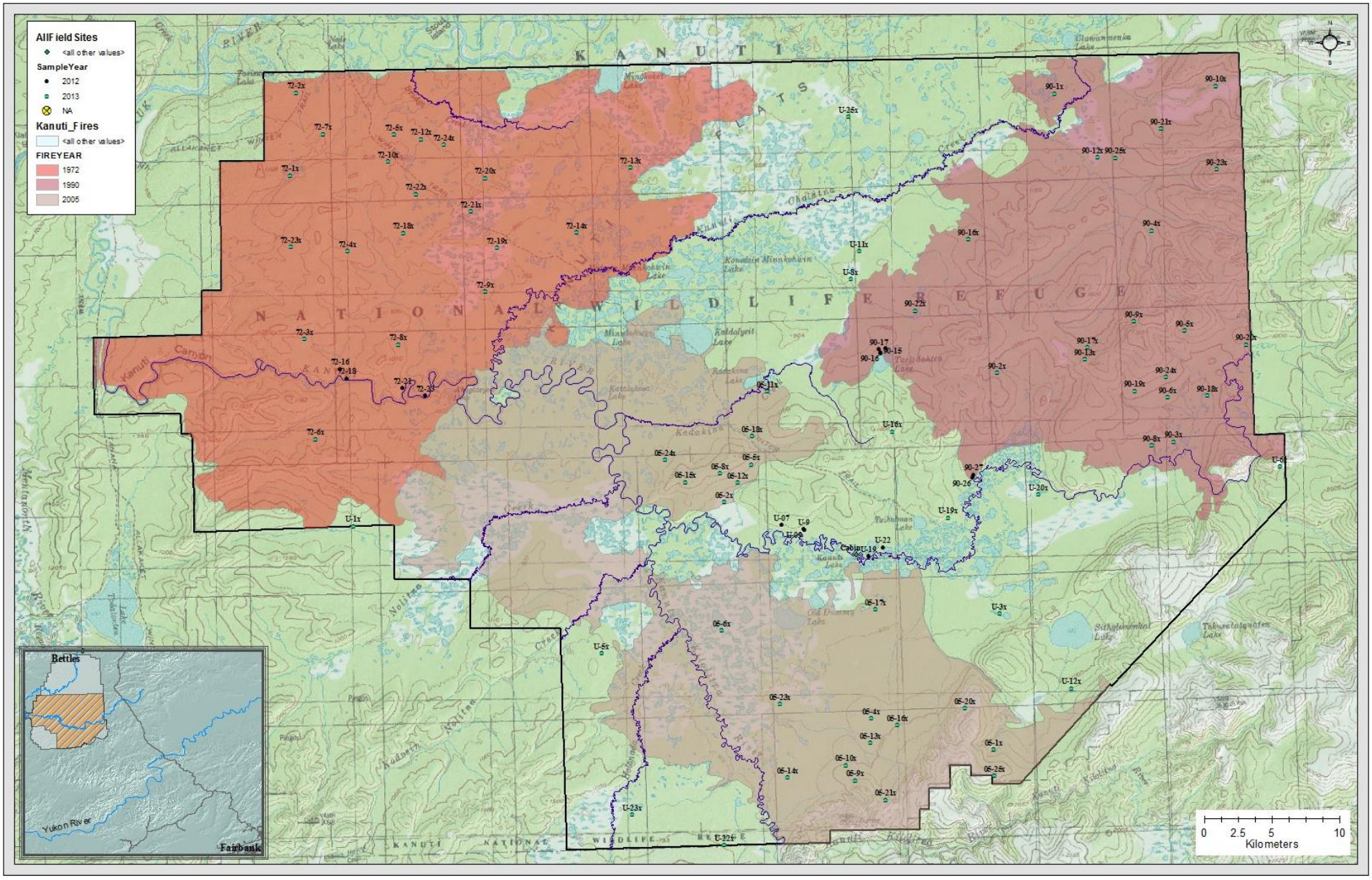
Fire Age < 11years



Fire Age 11-30 years



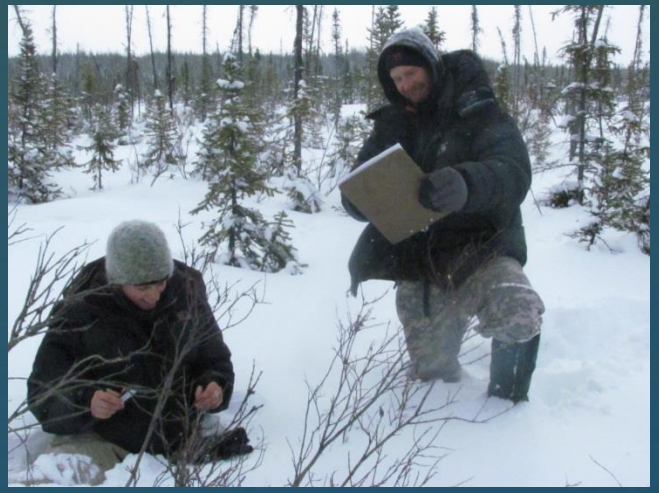
Fire Age > 30years


AllField Sites
<all other values>
SampleYear
2012
2013
NA
Kanuti_Fires
<all other values>
FIREYEAR
1972
1990
2005
KANUTI
NATIONAL WILDLIFE REFUGE
Bettles
Yukon River
Fairbanks
0 2.5 5 10
Kilometers

Methods

- 34 sites

- Summer field work
  - August, 2012; 2013
  - Browse species biomass
  - Browse species samples (leaves and stems)
  - Site description
  - Species composition
  - Stand age (tree cookie samples)



- Winter field work
  - April, 2013; 2014 (*upcoming*)

  - Used established technique to estimate woody browse production and removal (kg/ha) (Seaton 2002)
  - Collected samples to determine diameter : mass regression relationships

Methods: management activity data

MOOSE:

- GeoSpatial Population Estimator (GSPE) survey data; 2000-present (ADFG)
- Twinning survey data (USFWS, ADFG)
- Trend Count Area (TCA) data (USFWS, ADFG)
- Moose telemetry data (2008-present) (USFWS, BLM, ADFG)
- Paratrition data (ADFG)

OTHER:

- Browse survey data (2007, USFWS, ADFG)
- Predation data (ADFG)
- GMU 24B hunting data (ADFG)
- Local subsistence use data (ADFG)

Expected results

SUMMER:

- Browse biomass (leaves and current annual growth) for preferred species (kg/ha)
- Browse density (stems/ha)
- Browse use (stems/ha)
- Nutrient composition for browse species
- Site species composition
- Abiotic/general site data
- Stand age
- Qualitative burn information

WINTER:

- Woody browse biomass (kg/ha)
- Woody browse biomass removal (kg/ha)
- Snow depth and available browse

COMPARE:

- Summer biomass and winter availability
- Habitat study data with available population data and human use data

Questions?

References

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