

Below is a list of potential measurements ABoVE researchers could be making, organized by Measurement Theme. This list can be updated as the needs of ABoVE projects change.

## Wildlife

- Position (robin)
- Position (golden eagle)
- Population (caribou)
- Position data (caribou)
- age structure (caribou)
- health (caribou)
- harvest (caribou)
- Population (Dall Sheep)
- Position (Dall Sheep)
- age structure (Dall Sheep)
- health (Dall Sheep)
- harvest (Dall Sheep)
- Population data (moose)
- Position data (moose)
- age structure (moose)
- health (moose)
- harvest (moose)
- Population data (wolf)
- Position data (wolf)
- age structure (wolf)
- health (wolf)
- harvest (wolf)
- Population data (brown bear)
- Position data (brown bear)
- age structure (brown bear)
- health (brown bear)
- harvest (brown bear)
- Population (other)
- Position (other)
- age structure (other)
- health (other)
- harvest (other)

## Vegetation

- Ground Lidar
- FIA plots [details in USFS]
- Aboveground biomass
- Canopy height & structure
- Leaf area index
- NDVI- from ground sensor
- fPAR
- PAR
- PYR

PRI  
Light use efficiency  
Phenology  
Vegetation cover  
Vegetation type  
Soil Organic Matter Amount  
Soil Organic Layer Thickness  
Dendrochronologies  
Tree health  
Standing dead  
stand age  
tree density  
tussock density  
Surface temperature  
Soil temperature  
Tussock diameter  
P, K, Fe concentrations of organic soil profiles  
C, N, P, K and Fe concentrations of tree components (boles, bark, branches, needles/leaves)

## Disturbance

Vegetation type identification  
Composite burn index, AK amendment to reflect ground layer burning  
Tundra burn classes  
Slope, aspect  
Soil texture  
Drainage class  
Adventitious root depth to burned organic layer surface (black spruce)  
Tussock meristem to burned organic layer surface (moist acidic tundra)  
Shrub burn scar to burned organic layer surface (shrub tundra)  
Tree inventory (DBH, density, species, live or dead)  
Tree combustion estimates (based on allometric classes)  
Shrub inventory (basal diameter, density, species)  
Shrub combustion estimates (based on allometric classes)  
Residual moss and lichen inventory  
Thaw depth (depth from ground surface to frozen ground)  
Depth of residual soil organic layer (depth from burned surface to mineral soil)  
Depth of active layer (time series or late-season thaw depth)  
Diversity and or density of resprouting plant species  
Density and diversity of seeding understory species  
Density and diversity of tree seedlings  
Seed rain  
Coarse woody debris using standardized methodology (id pre-fire standing and downed woody debris)  
Depth to water table  
Soil texture  
Soil organic layer profile description  
Soil organic layer bulk density, carbon and nitrogen concentration  
Age of burned soil organic layer surface

Basal age of soil organic layer  
Soil organic layer coarse organic debris density and carbon concentration  
Index of soil moisture  
electrical resistivity tomography (ERT)  
Insect outbreak extent and severity  
Anthropogenic disturbance  
Distance to road or structure  
Distance to unburned patch  
Burn Severity Index  
Adventitious root depth to burned organic layer surface (non-black spruce)

## Carbon Dynamics

Carbon dioxide (CO<sub>2</sub>) concentration  
Carbon dioxide (CO<sub>2</sub>) flux  
Methane (CH<sub>4</sub>) concentration  
Methane (CH<sub>4</sub>) flux  
Carbon monoxide (CO) concentration  
Carbon monoxide (CO) flux  
14C  
13C  
12C  
Water Vapor  
Eddy Covariance Flux Tower Data [details from AmeriFlux]  
GPP  
NPP  
NEE  
Ra  
ET  
Rh  
Respiration (tower)  
Respiration (chamber)  
Soil respiration  
Ecosystem respiration  
Tall Tower Carbon Species  
Flask Air Samples  
Surface Energy Budget  
DOC, POC, DIC, PIC  
14C of Black Carbon  
C, N, P, K and Fe concentrations of Organic Carbon and Black Carbon  
Ebullition bubble surveys

## Hydrology

Stream flow  
Inundation  
Water level  
pH  
Salinity

Ice Thickness  
Ice Jam Characteristics  
Bathymetric Survey  
Freeze/thaw  
Lake Ice presence/absence  
Water temperature

## Weather

Wind speed  
Wind direction  
Precipitation amount  
Precipitation type  
Air temperature  
Radiation (four component)  
Web Cam Ground View  
Web Cam Sky View

## Snow

Snow Depth  
Snow Water Equivalent  
Snow Percent Cover  
Surface Albedo  
Surface temperature  
Snow stratigraphy  
Snow course survey (ground-based)  
Snow depth (aerial-based)

## Permafrost

Active Layer Thickness  
Borehole Temperature Profile  
Resistivity  
soil moisture content  
ground ice content  
thaw subsidence  
thaw-related vegetation and soil disturbances  
lateral erosion  
talik dimensions  
surface deformation  
surface nuclear magnetic resonance (NMR)

## Ecosystem Services

Quality, Availability, Dynamics, and Use of Natural Resources  
Subsistence Harvest Data  
Economic Indicators (income distribution, labor force participation)  
Incidence of Disease and Injury  
Cultural Vitality (e.g., indigenous language use)

Road Location/Age/Status (including winter roads)  
Length of Season for Winter Transportation and Exploration  
Mineral, Oil, and Gas Exploration and Extraction Activities  
Drinking Water Sources  
Location and Use of Wastewater Treatment Facilities  
Heating and Electricity Sources  
Building Location/Age/Status  
Historically Important Places  
Climate Mitigation Activities

### Airborne Remote Sensing

Airborne Lidar  
AirMOSS  
AEM (Airborne Electromagnetic)  
UAVSAR

### Miscellaneous

Site Visit