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ABoVE: Post-Fire and Unburned Vegetation Community and Field Data, NWT, Canada, 2019

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Summary

This dataset provides vegetation community characteristics, soil moisture, and biophysical data collected in 2019 from 11 study areas, which contained 28 sites that were burned by wildfires in 2014 and 2015, and 14 unburned sites in the Northwest Territories (NWT), Canada. Burn sites included peatland and upland. These field data include vegetation inventories, ground cover, as well as diameter and height for trees and shrubs in the unburned sites. Similar data were collected for the unburned sites in the years 2015-18 and are available in related separate datasets. In 2019, the focus was on woody and non-woody seedling/sprouting regrowth data in the burned sites. Additional measurements collected at all sites included total peat depth, soil moisture, and active layer thickness (ALT). Soil moisture and ALT were collected for validation of the UAVSAR airborne collection and Radarsat-2 overpasses. This 2019 fieldwork completes five years of field sampling at the wildfire areas.

Burned sites were sampled in 5 m x 10 m (50 m ^{2}) and 10 m x 10 m (100 m ^{2}) plots along two transects to characterize 1 ha sites. Unburned sites were sampled in 40 m x 50 m (0.2 ha) plots to match the minimum mapping unit of a related land cover map; multiple plots were sampled to represent 1 ha sites.

There are eight data files in comma-separated values (*.csv) format included in this dataset and three companion files in Portable Document (*.pdf) format.
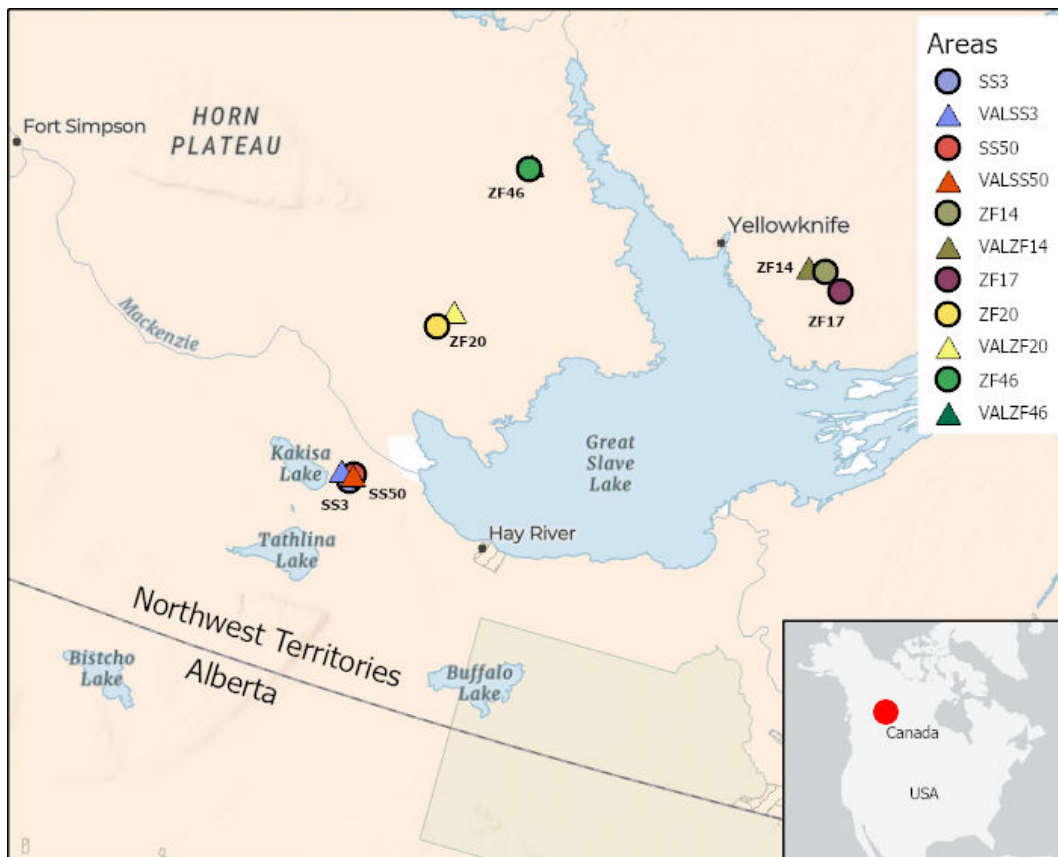

Figure 1. Locations of field site areas in the Northwest Territories of Canada. Sites include locations burned by wildfire in 2014-2015 and unburned validation sites. Validation areas are indicated by triangles. Source: NWT2019_Field_Data_Summary.csv

Citation

Table of Contents

1. Dataset Overview

This dataset provides vegetation community characteristics, soil moisture, and biophysical data collected in 2019 from 11 study areas, which contained 28 sites that were burned by wildfires in 2014 and 2015, and 14 unburned sites in the Northwest Territories (NWT), Canada. Burn sites included peatland and upland. These field data include vegetation inventories, ground cover, as well as diameter and height for trees and shrubs in the unburned sites. Similar data were collected for the unburned sites in the years 2015–2018 and are available in related separate datasets. In 2019, the focus was on woody and non-woody seedling/sprouting regrowth data in the burned sites. Additional measurements collected at all sites included total peat depth, soil moisture, and active layer thickness (ALT). Soil moisture and ALT were collected for validation of the UAVSAR airborne collection and Radarsat-2 overpasses. This 2019 fieldwork completes five years of field sampling at the wildfire areas.

Burned sites were sampled in 5 m x 10 m (50 m^2) and 10 m x 10 m (100 m^2) plots along two transects to characterize 1 ha sites. Unburned sites were sampled in 40 m x 50 m (0.2 ha) plots to match the minimum mapping unit of a related land cover map; multiple plots were sampled to represent 1 ha sites.

Project: Arctic-Boreal Vulnerability Experiment

The Arctic-Boreal Vulnerability Experiment (ABoVE) is a NASA Terrestrial Ecology Program field campaign being conducted in Alaska and western Canada, for 8 to 10 years, starting in 2015. Research for ABoVE links field-based, process-level studies with geospatial data products derived from airborne and satellite sensors, providing a foundation for improving the analysis, and modeling capabilities needed to understand and predict ecosystem responses to, and societal implications of, climate change in the Arctic and Boreal regions.

Related Datasets

Bourgeau-Chavez, L.L., N.H.F. French, S. Endres, L. Jenkins, M. Battaglia, E. Serocki, and M. Billmire. 2016. ABoVE: Burn Severity, Fire Progression, Landcover and Field Data, NWT, Canada, 2014. ORNL DAAC, Oak Ridge, Tennessee, USA. http://doi.org/10.3334/ORNLDAAC/1307

- Provides maps of peatland vegetation and fire progression during the 2014 fire season along with field data on burn severity, depth of peat, and thawed ground at 30 burned sites. Aboveground biomass, soil moisture, and seedling sprouting data were collected at 17 of the 30 sites.

Bourgeau-Chavez, L.L., S. Endres, L. Jenkins, M. Battaglia, E. Serocki, and M. Billmire. 2017. ABoVE: Burn Severity, Fire Progression, and Field Data, NWT, Canada, 2015-2016. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1548

- Provides a fire progression map for 2015 and field data biophysical and vegetation community characteristics as measured in Bourgeau-Chavez et al. (2016). Field data are from sites burned in 2014 and 2015.

Bourgeau-Chavez, L.L., M. Battaglia, E.S. Kane, L.M. Cohen, and D. Tanzer. 2019. ABoVE: Post-Fire and Unburned Vegetation Community and Field Data, NWT, Canada, 2018. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1703

- Provides field data collected in 2018 from sites burned in 2014 and 2015. In addition, 9 unburned sites were established for validation of UAVSAR airborne data collection. The same biophysical and vegetation community characteristics as measured in Bourgeau-Chavez et al. (2016; 2017) are included along with additional measures of woody vegetation.

Collectively, Bourgeau-Chavez et al. (2016; 2017; 2019; 2021) provide data on the impacts of the 2014 and 2015 fires on peatland ecosystems in NWT and the subsequent recovery of vegetation communities in those ecosystems through 2019. The variables in the field data are highly similar across years; however, there are differences between the datasets due to the addition of new metrics and new sites as well as the abandonment of others.

Acknowledgments

2. Data Characteristics

Spatial Coverage: Field plots near Great Slave Lake in Northwest Territories, Canada

ABoVE Reference Locations

Domain: Core ABoVE

State/territory: NWT

Region: Great Slave Lake

Grid cells: Ah002v001, Bh012v011, Bh013v010, Bh013v011, Bh014v011, Ch075v071, Ch076v069, Ch076v071, Ch077v068, Ch078v067, Ch078v069, Ch079v065, Ch079v066, Ch083v067, Ch084v067, Ch084v068

Spatial Resolution: Field plot sizes range from 1 m^2 to 100 m^2

Temporal Coverage: 2018-08-16 to 2019-09-05

Temporal Resolution: One-time estimates

Study Area: Latitude and longitude are given in decimal degrees.

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Northwest Territories, Canada	-117.4255	-113.0163	62.5658	60.9206

Data File Information

There are eight data files in comma-separated values (*.csv) format included in this dataset that provide measurements of vegetation, soil moisture, depth of unfrozen ground, and other biophysical data collected in 2019 at 11 areas. These areas include sites that were burned by wildfire in 2014 or 2015 and also unburned sites (Table 2). Also provided are companion files in Portable Document (*.pdf) format that describe protocols for field methods for projects related to remote-sensing missions and calibrations for burned and unburned sites.

Table 1. File names and descriptions.

File Name	Description
Data Files	
NWT2019_10x10mplot_ocular_regrowth.csv	Provides data for percent coverage of woody and herbaceous vegetation, mosses, and liverworts along with measurements of depth of unfrozen soil at 38 sites in 11 study areas.
NWT2019_Biophysical.csv	Provides data on the vegetative cover and biophysical characteristics collected from 15 sites in 6 study areas.
NWT2019_Biophysical_Inventory.csv	This file provided data on woody vegetation at 15 sites in 6 study areas.
NWT2019_FrozenDepth_All.csv	Provides measurements of depth to frozen ground from soil surface for 153 plots at 39 sites in 11 study areas.
NWT2019_Seedling_Sprouting.csv	Provides data on seedlings and sproutlings for 129 plots at 26 sites in 6 study areas affected by wildfires.
NWT2019_Soil_Moisture_Hydrosense1_August.csv	Provides soil moisture and temperature data for 42 sites in 11 study areas.
NWT2019_Soil_Moisture_Hydrosense2_September.csv	Provides soil moisture data for 9 sites in 4 study areas.
NWT2019_Field_Data_Summary.csv	Provides a summary of the field data collected at each site. It includes geographic coordinates, date of sampling, and types of data collected at 210 plots at 42 sites in 11 study areas. Area names that begin with "VAL" indicate areas containing validation sites for this study.
Companion Files	
ALT_Protocol_03.pdf	Standard protocols for ALT surveys to leverage data collected by research teams, government work crews, and land management teams independent of the CALM network.
Establishing_field_sites_for_SAR_studies_R1.docx.	Establishing field sites for studies using SAR data to analyze variations in permafrost, vegetation cover, and soil moisture during the ABoVE Airborne Campaign.
SoilMoistureSamplingProtocol_R2.pdf	Protocol for establishing 100 m x 100 m soil moisture sampling sites.
Calibration_unburned_sites.pdf	Provides organic soil calibrations in burned and non-burned tundra, boreal bog, fen, upland and lowland sites
Calibration_burned_sites.pdf	Provides organic soil calibrations in unburned peatland and upland sites

Data File Details

Missing data are reported as NA for text values and -9999 for numeric values.

Table 2. Summary of data collected in each study area. Refer to the file NWT2019_Field_Data_Summary.csv and Table 3 for more information.

Data Category	SS3	SS50	ZF14	ZF17	ZF20	ZF46	VALSS3	VALSS50	VALZF14	VALZF20	VALZF46
Seedling_Sprouting.	x	x	x	x	x	x					
Vegetation cover and regrowth	x	x	x	x	x	x	x	x	x	x	x
Biophysical characteristics				x			x	x	x	x	x
Biophysical Inventory				x			x	x	x	x	x
Active Layer (Frozen Depth)	x	x	x	x	x	x	x	x	x	x	x
Soil Moisture and Temperature	x	x	x	x	x	x	x	x	x	x	x
Soil Moisture only	x	x					x	x			
* Area names that begin with "VAL" indicate study areas containing validation sites for this study											

Note: The header above "SS3 ... VALZF46" spans "Study Area *".

Table 3. Variables in the file NWT2019_Field_Data_Summary.csv.

Variable	Unit	Description
site	text	Unique name given to a field point. Area names that begin with "VAL" indicate validation sites for this study. Site naming convention is *<area>-<site>-<plot>*, although the *plot* designation is not included for all locations.
date	YYYY-MM-DD	Date of field visit
latitude	degree_north	Latitude of corner of 10 x 10 m plot
longitude	degree_east	Longititue of corner of 10 x 10 m plot
burnseverity	text	Presence/absence of Burn Severity Data/other year of collection provided: Yes/No/YYYY
seedling_sprouting	text	Presence/absence of SeedlingSprouting Data/other year of collection provided: Yes/No/YYYY
biophysical	text	Presence/absence of Biophysical Data/other year of collection provided: Yes/No/YYYY
soil_moisture	text	Presence/absence of Soil Moisture Data/other year of collection provided: Yes/No/YYYY
nadir_cover	text	Presence/absence of Nadir Cover Data; presence is marked with the initials of the larger data set connected to the cover with SS for Seedling-Sprouting Data, SM for Soil Moisture Data, and No for not available.
frozen_depth	text	Presence/absence of Frozen Depth Data; presence is marked with the initials of the larger data set connected to the cover with SS for Seedling-Sprouting Data, B for Biophysical, and No for not available
notes	text	Additional notes on site including any irregularities
location	text	Location of site used for data organization: FP for Fort Providence, H for Hearne Lake, CFS for Kakisa_CFS, YK for Yellowknife

Table 4. Variables in the file NWT2019_Seedling_Sprouting.csv.

Variable	Unit	Description
site-plot	text	Unique site identifier & plot number within site
date	YYYY-MM-DD	Date of data collection
observers	text	Initials of person(s) who collected data
plot_size	m	Plot dimensions in meters x meters, 1x1 or 0.5x0.5 typically
species	text	Scientific name of vegetation species measured
condition	text	Condition of vegetation: seedling or sprouting
number	1	Number of seedlings or sproutings. Labeled as -9999 (missing value) if measured by percent cover.
seedbed	text	Seedbed type: sphagnum, unburned organic material (duff and litter), thick burned organic material, thin burned organic material, or exposed mineral soil
percent	percent	If species could not be counted due to life form, abundance was estimated as percent cover of plot. Value of 0.1 indicated 'trace' coverage of <1%.
nadir_1x1_photo	text	Plot photo id number
site_photo_n	text	Photo id number at site facing north
site_photo_e	text	Photo id number at site facing east
site_photo_s	text	Photo id number at site facing south
site_photo_w	text	Photo id number at site facing west
site_photo_nadir	text	Photo id number at site facing nadir
total_peat_depth	cm	Total depth of peat in the site
peat_depth_crevice	cm	Peat depth - in crevice next to earth hummock or hollow
peat_depth_hummock	cm	Peat depth - top of earth hummock or peat hummock
camera_number	text	MTRI camera ID number
comments	text	Notes from field crew

Table 5. Variables in the file NWT2019_10x10mplot_ocular_regrowth.csv.

Variable	Unit	Description

Variable	Unit	Description
site	text	Unique site identifier
plot	1	Plot number within site
plot_size	m	Size of sampling plot reported in meters by meters
date	YYYY-MM-DD	Sampling date
observers	initials	Person(s) who collected the information identified by initials
thaw_depth_1	cm	Depth to ice measured with a bully tool, sample 1.
thaw_depth_2	cm	Depth to ice measured with a bully tool, sample 2
thaw_depth_3	cm	Depth to ice measured with a bully tool, sample 3
thaw_depth_4	cm	Depth to ice measured with a bully tool, sample 4
thaw_depth_5	cm	Depth to ice measured with a bully tool, sample 5
thaw_depth_6	cm	Depth to ice measured with a bully tool, sample 6
thaw_depth_7	cm	Depth to ice measured with a bully tool, sample 7
nadircover_trees_live	percent	Nadir percent cover of live trees
nadircover_shrublive	percent	Nadir percent cover of live shrubs
nadircover_shrubdead	percent	Nadir percent cover of dead shrubs
nadircover_woodydebrislive	percent	Nadir percent cover of live woody debris
nadircover_woodydebrisdead	percent	Nadir percent cover of woody debris
nadircover_herbaceouslive	percent	Nadir percent cover of live herbaceous
nadircover_herbaceousdead	percent	Nadir percent cover of dead herbaceous
nadircover_mosslive	percent	Nadir percent cover of live moss
nadircover_mossdead	percent	Nadir percent cover of dead moss
nadircover_liverwortlive	percent	Nadir percent cover of live liverwort
nadircover_liverwortdead	percent	Nadir percent cover of dead liverwort
nadircover_mineralsoil	percent	Nadir percent cover of exposed mineral soil
nadircover_equisetumlive	percent	Nadir percent cover of live equisetum
nadircover_water	percent	Nadir percent cover of water
notes	text	Field notes from observers

For *thaw_depth_** data, an entry of ">100" indicates that depth exceeded the length of the 100 cm measurement probe.
The *nadircover_** data were collected in 10 m x 10m plots. All nadir cover values sum to 100%.

Table 6. Variables in the file NWT2019_Biophysical.csv

Variable	Unit	Description
site	text	Unique site identifier
plot	text	Plot number within site
date	YYYY-MM-DD	Sampling date
observers	text	Person(s) who collected the information identified by initials
latitude	degree_north	Latitude coordinate for plot
longitude	degree_east	Longitude coordinate for plot
time	HH:mm	Time at the start of the sampling in the plot reported in local time (MDT)
plot_size	m	Size of sampling plot reported in meters by meters
live_canopy_closure	percent	Percent of canopy (tree) cover classified as live
med_shrub_cover	percent	Percent shrub cover > 30cm but <1m height
dominant_species	text	Scientific name of the dominant species
ecosystem_type	text	Ecosystem type(s) represented in the plot: bog; fen; marsh, swamp, upland, floating aquatic
aspect	text	Aspect of the site

Variable	Unit	Description
slope_position	text	Site slope position
slope_percent	percent	Site slope in percent
elevation	m	Elevation of site in meters
wetness	text	Description of the soil moisture status: dry; moist; soggy; standing water or some combination of these conditions
soil_ph	pH scale	pH of soil
camera	text	ID Number of MTRI camera used in field
site_photo_n	text	Photo id number at site facing north
site_photo_e	text	Photo id number at site facing east
site_photo_s	text	Photo id number at site facing south
site_photo_w	text	Photo id number at site facing west
site_photo_nadir	text	Photo id number at site facing nadir
other_photos	text	Photo id of additional Photos and description
os_top_condition	text	Notes on the condition of the top layer of organic soil with respect to type (thatch, live moss, dead moss, etc) and to burning: ash; burned; singed or charred or unburned
os_top_thickness	cm	Thickness of the top component of the organic soil layer reported in centimeters
os_dead_moss_layer_thickness	cm	Thickness of the dead moss component of the organic soil layer reported in centimeters
os_upper_duff_layer_thickness	cm	Thickness of the upper duff component of the organic soil layer reported in centimeters
os_lower_duff_layer_thickness	cm	Thickness of the lower duff component of the organic soil layer reported in centimeters
total_peat_depth	cm	Depth of entire peat layer calculated as the sum of the previous 4 columns reported in centimeters from surface
total_peat_depth_notes	text	Notes on measurement of total peat depth.
gc_sphag_coverage	percent	Percent of ground covered in Sphagnum moss reported as percent of total plot area
gc_sphag_distribution	text	Pattern of distribution of sphagnum: reported as E (even), C (center), P (peripheral), or 0 (absent)
gc_feather_moss_coverage	percent	Percent of ground covered in Feather moss reported as percent of total plot area
gc_feather_moss_distribution	text	Pattern of distribution of feather moss: reported as E (even), C (center), P (peripheral), or 0 (absent)
gc_reindeer_lichen_coverage	percent	Percent of ground covered in reindeer lichen reported as percent of total plot area
gc_reindeer_lichen_distribution	text	Pattern of distribution of reindeer lichen: reported as E (even), C (center), P (peripheral), or 0 (absent)
gc_other_lichen_coverage	percent	Percent of ground covered in other lichen reported as percent of total plot area
gc_other_lichen_distribution	text	Pattern of distribution of other lichen: reported as E (even), C (center), P (peripheral), or 0 (absent)
gc_grasses_coverage	percent	Percent of ground covered in grasses reported as percent of total plot area
gc_grasses_distribution	text	Pattern of distribution of low shrubs: reported as E (even), C (center), P (peripheral), or 0 (absent)
gc_low_shrubs_coverage	percent	Percent of ground covered in low shrubs reported as percent of total plot area
gc_low_shrubs_distribution	text	Pattern of distribution of low shrubs: reported as E (even), C (center), P (peripheral), or 0 (absent)
gc_woody_debris_coverage	percent	Percent of ground covered in woody debris reported as percent of total plot area
gc_woody_debris_distribution	text	Pattern of distribution of woody debris: reported as E (even), C (center), P (peripheral), or 0 (absent)
gc_herbaceous_coverage	percent	Percent of ground covered in herbaceous plants reported as percent of total plot area
gc_herbaceous_distribution	text	Pattern of distribution of herbaceous plants: reported as E (even), C (center), P (peripheral), or 0 (absent)
gc_open_water_coverage	percent	Percent of ground covered in open water reported as percent of total plot area
gc_open_water_distribution	text	Pattern of distribution of low shrubs: reported as E (even), C (center), P (peripheral), or 0 (absent)

Variable	Unit	Description
gc_other_type	text	Description of other ground cover type
gc_other_coverage	percent	Percent of ground covered in other ground cover reported as percent of total plot area
gc_other_distribution	text	Pattern of distribution of other ground cover type: reported as E (even), C (center), P (peripheral), or 0 (absent)
other_species_present_5	text	Other species present at coverage of less than 5%; "0" = no other species present
notes	text	Field notes from observers

Table 7. Variables in the file NWT2019_Biophysical_Inventory.csv.

Variable	Units	Description
site	text	Unique name given to a field location with the - , each site nominally represented a 100 x 100 m area
plot	text	Plot number (1 through 6) representing a plot of 10 x 10 m area nominally for characterization
date	YYYY-MM-DD	Date of data collection
observers	text	Initials of person(s) who collected data
plot_size	m	Plot dimensions in meters x meters (e.g., 10 x 10, 5 x 5)
life_form	text	Life form: tree or shrub
species	text	Scientific name of tree or shrub species measured
status	text	Status of tree or shrub: living or dead
condition	text	Condition of tree or shrub: standing or fallen
diameter_type	text	Whether the tree/shrub stem diameter was measured at base (basal) or at breast height (DBH)
diameter	cm	Stem diameter of the tree or shrub
height	m	Height of the tree or shrub in meters (typically only 5 representative trees were measured for height per plot)
height_to_lowest_living_branch	m	Height to lowest living branch of 5 samples
notes	text	Field notes from observers

Table 8. Variables in the file NWT2019_FrozenDepth_All.csv.

Variable	Unit	Description
site-plot	text	Unique site identifier & plot number within site
date	YYYY-MM-DD	Sampling date
observers	text	Initials of person(s) who collected the data
plot_size	m	Size of sampling plot reported in meters by meters
sample_1	cm	Depth to frozen ground from soil surface for sample 1
sample_2	cm	Depth to frozen ground from soil surface for sample 2
sample_3	cm	Depth to frozen ground from soil surface for sample 3
sample_4	cm	Depth to frozen ground from soil surface for sample 4
sample_5	cm	Depth to frozen ground from soil surface for sample 5
sample_6	cm	Depth to frozen ground from soil surface for sample 6
notes	text	Field notes from observers
For *sample_* * data, an entry of ">100" indicates that depth exceeded the length of the 100 cm measurement probe.		

Table 9. Variables in the file NWT2019_Soil_Moisture_Hydrosense1_August.csv. Soil moisture readings were taken with HydroSense Soil Water Content Measurement System (model CS620, Campbell Scientific) using the default algorithm for loam soil.

Variable	Unit	Description
site	text	Unique name given to a field location
observers	text	Initials of persons collecting data
date	YYYY-MM-DD	Date of soil moisture collection

Variable	Unit	Description
start_time	HH:mm	Time that data collection at that location began, local time
weather	text	Weather at time of collection - important to note if raining or recently rained
past_12_hours	text	Weather 12 hours before time of collection with note if raining or recently rained
site_notes	text	Additional site notes from field collection observers
probe_depth	cm	The depth to which the tip of the Hydrosense probe was inserted
soil_temp_plot1	degree_Celsius	Soil temperature at plot 1
vwc_plot1	1	Volumetric water content (cm3/cm3) of the soil at plot 1
plot_1_period	s-3	The Hydrosense-1 probe period in millisec at plot 1
soil_temp_plot2	degree_Celsius	Soil temperature at plot 2
vwc_plot2	1	Volumetric water content (cm3/cm3) of the soil at plot 2
plot_2_period	s-3	The Hydrosense-1 probe period in millisec at plot 2
soil_temp_plot3	degree_Celsius	Soil temperature at plot 3
vwc_plot3	1	Volumetric water content (cm3/cm3) of the soil at plot 3
plot_3_period	s-3	The Hydrosense-1 probe period in millisec at plot 3
soil_temp_plot4	degree_Celsius	Soil temperature at plot 4
vwc_plot4	1	Volumetric water content (cm3/cm3) of the soil at plot 4
plot_4_period	s-3	The Hydrosense-1 probe period in millisec at plot 4
soil_temp_plot5	degree_Celsius	Soil temperature at plot 5
vwc_plot5	1	Volumetric water content (cm3/cm3) of the soil at plot 5
plot_5_period	s-3	The Hydrosense-1 probe period in millisec at plot 5
soil_temp_plot6	degree_Celsius	Soil temperature at plot 6
vwc_plot6	1	Volumetric water content (cm3/cm3) of the soil at plot 6
plot_6_period	s-3	The Hydrosense-1 probe period in millisec at plot 6

Table 10. Variables in the file NWT2019_Soil_Moisture_Hydrosense2_September.csv. Soil moisture readings were taken with HydroSense II Soil Water Content Measurement System (model HS2, Campbell Scientific) using the default algorithm for loam soil.

Variable	Unit	Description
site	text	Unique name given to a field location
observers	text	Initials of person involved in data collection
date	YYYY-MM-DD	Date of soil moisture collection
start_time	HH:mm	Time that data collection at that location began, local time
weather	text	Weather at time of collection - important to note if raining or recently rained
past_12_hours	text	Weather 12 hours before time of collection - important to note if raining or recently rained
site_notes	text	Additional site notes from field collection observers
probe_depth	cm	The depth to which the tip of the Hydrosense probe was inserted
vwc_plot1	1	Volumetric water content (cm3/cm3) of the soil at plot 1
plot_1_period	s-6	The Hydrosense-II probe period in microsecs at plot 1
vwc_plot2	1	Volumetric water content (cm3/cm3) of the soil at plot 2
plot_2_period	s-6	The Hydrosense-II probe period in microsecs at plot 2
vwc_plot3	1	Volumetric water content (cm3/cm3) of the soil at plot 3
plot_3_period	s-6	The Hydrosense-II probe period in microsecs at plot 3
vwc_plot4	1	Volumetric water content (cm3/cm3) of the soil at plot 4
plot_4_period	s-6	The Hydrosense-II probe period in microsecs at plot 4
vwc_plot5	1	Volumetric water content (cm3/cm3) of the soil at plot 5
plot_5_period	s-6	The Hydrosense-II probe period in microsecs at plot 5
vwc_plot6	1	Volumetric water content (cm3/cm3) of the soil at plot 6

Variable	Unit	Description
plot_6_period	s-6	The Hydrosense-II probe period in microsecs at plot 6

3. Application and Derivation

The goal of this project was to collect remote sensing and field data to support scientific research on the impacts of the 2014–2015 fires in the Northwest Territories of Canada.

4. Quality Assessment

Quality control checks were performed on the field data. Data were recorded in the field on field sheets, then entered into excel in the lab. A second person checked the entered data against the original field sheets. A third person cross-referenced field data with information available from additional field sheets, GPS, or cameras, checked for missing values and anomalies (out-of-range values); corrections were made as needed.

Soil moisture is sampled at each plot with five repeated samples within an arm's length at each depth with the Hydrosense instrument. This replication allows for spatial averaging across the site (6 plots x 5 samples per plot = 30 samples per site).

5. Data Acquisition, Materials, and Methods

Study Areas

This project characterized the impacts of wildfires that occurred in 2014 and 2015 in the North Slave, South Slave, and Dehcho Regions of Northwest Territories, Canada. In 2019, field data were collected from 11 study areas: SS3, SS50, VALSS50, VALZF14, VALZF20, VALZF46, ZF2, ZF14, ZF20, ZF28, and ZF46.

This 2019 dataset completes five years of field sampling. The companion files describe protocols for field methods for projects related to the   NGEE Arctic Project remote-sensing missions. Users should refer to the related datasets (Bourgeau-Chavez et al., 2016; 2017; 2019) for additional data. Bourgeau-Chavez et al. (2019) provide details about field methods.

Field Data

Aboveground biomass, biophysical site characteristics, burn severity, soil moisture, thaw depth, and woody seedling/sapling data were collected in plots along two transects at sites affected by wildfire in 2014 and 2015. These areas included SS3, SS50, ZF2, ZF14, ZF20, ZF28, and ZF46. Within each area, multiple sites were sampled by collecting data in six plots per site. Plots were arranged in two transects within the site. Plot sizes varied with measurement technique and ranged from 1 m x 1 m, for fine-scaled samples of vegetation and seedlings, to 10 m x 10 m for biophysical measurements.

The woody plant community was inventoried at the same 26 sites where the biophysical data was collected. The tree/shrub species, DBH or basal diameter, height, and status (dead or live) were recorded for each standing stem. Woody seedlings and sprouting vegetation were recorded along with measurements of ground cover.

Soil moisture and soil temperature were recorded at 42 sites using HydroSense handheld soil moisture sensors (Campbell Scientific, models CS620 and HS2). Each site had six plots, and soil moisture was sampled at probe depths of 6, 12, and 20 cm. Soil temperature was measured one time at each plot using a Hannah Instruments HI 145 probe (Bourgeau-Chavez et al., 2017; 2016). The companion file *Establishing_field_sites_for_SAR_studies.pdf* describes protocols for setting up field plots and sampling soils.

The depth of unfrozen soil (active layer) was measured by pushing a 100 cm probe into the soil until it touched frozen soil. At some sites, this depth exceeded the length of the probe and the value ">100" was entered on the field datasheets. The companion file *ALT_Protocol_03.pdf* describes methods for sampling active layer thickness (ALT).

Validation

Validation sites were previously selected from unburned regions. Data from validation sites was used to train algorithms for mapping pre-burn vegetation Bourgeau-Chavez et al., 2017). In 2019, five areas were sampled including VALSS3, VALSS50, VALZF14, VALZF20, and VALZF46. Data collections followed a standardized protocol established in previous years that recorded ecosystem type, plant diversity and dominant species, water level, vegetation life stages, and height and density of the overstory. Thaw depth was measured with a soil probe from the soil or moss surface to the frozen layer as described above (Bourgeau-Chavez et al., 2016).

6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

ABoVE: Post-Fire and Unburned Vegetation Community and Field Data, NWT, Canada, 2019

Contact for Data Center Access Information:

- E-mail: uso@daac.ornl.gov
- Telephone: +1 (865) 241-3952

7. References

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