All tables below are current as of March 1, 2021. Please see https://github.com/FoRTExperiment/fortedata for all current standards, updates, metadata and data availability.

Map and Landforms table (adopted from Gough et al. 2019

Table S1. This table refers to Fig. 1 within the main manuscript specifically. Each color-coded and alphabetically assigned replicate (A, B, C, D) is contained within a separate landscape ecosystem differentiated by vegetation and soils (Pearsall, 1996), which is also color-coded in Fig. 1. Values are means ± 1 S.E. in parentheses. Adapted from Gough et al. (2019).

Attribute	A	B	C	D
Canopy tree composition by species (DBH > 8 cm)	POGR (61%), ACSA (17%), ACRU (10%), FAGR (10%)	POGR (58%), ACRU (24%), QURU (9%), FAGR (4%)	QURU (43%), POGR (39%), PIST (6%), ACRU (6%)	QURU (72%), POGR (19%), PIST (4%), FAGR (1%)
Stem density (stems ha^{-1}, > 8 cm DBH)	865 (32)	888 (46)	910 (55)	796 (81)
Shannon's Diversity Index	1.05 (0.09)	1.05 (0.05)	1.04 (0.11)	0.92 (0.10)
Landform	Moraine	Outwash over moraine	Outwash plain	Outwash plain
Soil texture	Sandy loam	Sand	Sand	Sand

Plots table

Table S2. Plots table. The `fd_plots()` function is an internal function that contains plot level metadata.

field	description	class	units
replicate	Replicate group (A-D)	character	
plot	Plot number	integer	
latitude_plot	Decimal latitude of plot center	numeric	degrees
longitude_plot	Decimal longitude of plot center	numeric	degrees
plot_area_m2	Plot area	integer	m^2

Subplots table

Table S3. Subplots table. `fd_subplots()` is an internal function that returns subplot-level metadata.

field	description	class	units
replicate	Replicate group (A-D)	character	
plot	Plot number	integer	
subplot	Subplot (E, W)	character	
latitude_subplot	Decimal latitude of subplot center	numeric	degrees
longitude_subplot	Decimal longitude of subplot center	numeric	degrees
subplot_area_m2		integer	m^2
disturbance_severity	severity disturbance assignment	integer	
treatment	disturbance treatment	character	

Nested subplots table

Table S4. Nested subplots table. `fd_nested_subplots()` is an internal function that returns nested subplot metadata. Nested subplots are either sampling points (0, 1, 3, 5, 7) for specific FoRTE measurements (e.g. soil respiration, micrometeorology) or 4 m^2 herbaceous layer vegetation sampling plots (2, 4, 6, 8)—illustrated in Figure 1B.

field	description	class	units
replicate	Replicate group (A-D)	character	
plot	Plot number	integer	
subplot	Subplot (E, W)	character	
nested_subplot	Nested subplot number	integer	
nested_subplot_area_m2	Nested subplot area	integer	m^2

Disturbance and Treatment Assignments table

Table S5. Disturbance and treatments assignments table. `fd_plot_metadata()` is an internal function that returns information about longitude, latitude for plot centroids as well as disturbance severity (in percentage of targeted leaf area reductions) and treatment (B for bottom-up and T for top-down). Table seen here is a truncated version of what appears in the function as the function includes every combination of plot, replicate, subplot, and nested subplot for a total of 336 data rows.

subplot id	latitude	longitude	disturbance severity	treatment
A01E	45.5634	-84.7285	85	B
A01W	45.5634	-84.7285	85	T
A02E	45.56418	-84.728	45	T
A02W	45.56418	-84.728	45	B
A03E	45.563	-84.7271	65	B
A03W	45.563	-84.7271	65	T
A04E	45.5637	-84.7264	0	B
A04W	45.5637	-84.7264	0	T
B01E	45.55669	-84.7269	0	B
B01W	45.55669	-84.7269	0	T
B02E	45.55582	-84.7268	45	T
B02W	45.55582	-84.7268	45	B
B03E	45.55624	-84.7257	85	B
B03W	45.55624	-84.7257	85	T
B04E	45.55625	-84.7244	65	T
B04W	45.55625	-84.7244	65	B
C01E	45.5625	-84.7078	0	T
C01W	45.5625	-84.7078	0	B
C02E	45.56313	-84.7067	65	B
C02W	45.56313	-84.7067	65	T
C03E	45.56307	-84.7054	85	B
C03W	45.56307	-84.7054	85	T
C04E	45.56375	-84.7034	45	T
C04W	45.56375	-84.7034	45	B
D01E	45.5609	-84.707	0	B
D01W	45.5609	-84.707	0	T
D02E	45.56203	-84.705	85	B
D02W	45.56203	-84.705	85	T
D03E	45.56039	-84.7045	45	B
D03W	45.56039	-84.7045	45	T
D04E	45.56178	-84.7036	65	T
D04W	45.56178	-84.7036	65	B

Inventory dataset

Table S6. Inventory dataset. `fd_inventory` is an external function that returns forest inventory data.

field	description	class	units

subplot_id		character	
tag		integer	
species	Species code from the USDA Plants Database	character	
dbh_cm	Bole diameter at 1.37 m	numeric	Cm
health_status	Live (L), moribund (M), or dead (D)	character	
canopy_status	Overstory dominant (OD), overstory submissive (OS), sapling (SA), understory (UN)	character	
date	Date of measurement	date	
notes		character	
replicate	(from plots table)	character	
plot	(from plots table)	integer	
subplot	(from subplots table)	character	

Soil respiration

Table S7. Soil respiration table. `fd_soil_respiration()` is an external function that returns soil respiration collected with a LI-COR Biosciences LI-6400 portable gas analyzer with 10 cm diameter soil CO2 closed chamber cuvette (LI-COR Inc, Lincoln, NE, USA). This dataset includes concurrently measured soil temperature (from surface to 7 cm depth) and soil water content (measured using a Campbell Sciences CS620 (Logan, UT).

field	description	class	units
subplot_id	Subplot ID number, a concatenation of replicate, plot, and subplot codes	character	
replicate	Replicate group (A-D)	character	
plot	Plot number	integer	
subplot	Subplot (E, W)	character	
date	Date of measurement	date	
timestamp	Timestamp of measurement	POSIXct	
nested_subplot	Nested subplot sampling point inside subplot	character	
run	Indicates first or second sample taken with IRGA	integer	

soil_co2_efflux	Soil surface CO2 efflux measured with a LI-6400	numeric	µmol CO_2 m^{-2} s^{-1}
soil_temp	Soil temperature measured at 7 cm depth	numeric	degrees C
vwc	Volumetric water content	numeric	percent

Leaf spectrometry

Table S8. Leaf spectrometry. `fd_leaf_spectrometry()` is an external function that returns vegetation indices calculated from leaf spectra data collected on leaves from understory vegetation with a CID Biosciences CI-710 Handheld spectrometer (Camas, WA).

field	description	class	units
subplot_id	Subplot ID number, a concatenation of replicate, plot, and subplot codes	character	
replicate	Replicate group (A-D)	character	
plot	Plot number	integer	
subplot	Subplot (E, W)	character	
tree_id	Tree ID (Haber plots)	character	
leaf_id	Leaf id	character	
date	Date of measurement	Date	
species	Species code from the USDA Plants Database; see https://plants.sc.egov.usda.gov/java/	character	
index	Spectral index measured from the CID 710	character	
index_value	Measured index value corresponding to the index	numeric	
id	Filename id	character	

Photosynthesis

Table S9. Photosynthesis table. `fd_photosynthesis()` is an external function that returns ecophysiological data (e.g. photosynthesis, transpiration) on subcanopy leaves measured with a LI-COR Biosciences LI-6400 (Lincoln, NE).

field	description	class	units
subplot_id	Subplot ID number, a concatenation of replicate, plot, and subplot codes	character	
replicate	Replicate group (A-D)	character	

plot	Plot number	integer	
subplot	Subplot (E, W)	character	
timestamp	Timestamp of measurement	POSIXct	
obs	Observation number within file	integer	
ftime	Number of seconds since logging began	numeric	
ebal	Energy balance on?	integer	
photo	Photosynthetic rate	numeric	μmol CO_2 m^2 s^{-1}
cond	Stomatal conductance	numeric	μmol H_2O m^2 s^{-1}
ci	Intracellular CO2 concentration	numeric	μmol mol^{-1}
trmmol	Transpiration rate	numeric	μmol H_2O m^2 s^{-1}
vpdl	Leaf-level vapor pressure deficit	numeric	kPa
ctleaf	Leaf temperature from energy balance calculation	numeric	degrees C
area	In-chamber leaf area (note that this area is not the true sampled tissue area for needleleaf samples)	numeric	cm^2
blc_1	One sided boundary layer conductance	numeric	mol m^2 s^{-1}
stmrat	Stomatal ratio estimate	numeric	
blcond	Boundary layer conductance	numeric	mol m^2 s^{-1}
tair	Chamber air temperature	numeric	degrees C
tleaf	Leaf surface temperature	numeric	degrees C
tblk	IRGA block temperature	numeric	degrees C
co2r	Reference CO2 concentration	numeric	μmol mol^{-1}
co2s	Sample CO2 concentration	numeric	μmol mol^{-1}
h2or	Reference H20 concentration	numeric	μmol mol^{-1}
h2os	Sample H20 concentration	numeric	μmol mol^{-1}
rh_r	Reference relative humidity	numeric	percent
rh_s	Sample relative humidity	numeric	percent
flow	Flow rate	numeric	μmol mol^{-1}
pari	In-chamber PAR	integer	μmol m^2 s^{-1}
paro	External PAR	integer	μmol m^2 s^{-1}
press	Atmospheric pressure	numeric	kPa

csmch		numeric
hsmch		numeric
csmchsd	Standard deviation of CO2S during averaging time of most recent match	numeric
hsmchsd	Standard deviation of H2OS during averaging time of most recent match	numeric
crmchsd	Standard deviation of CO2S during averaging time of most recent match	numeric
hrmchsd	Standard deviation of CO2R during averaging time of most recent match	numeric
stablef	Stable/total as a fraction	numeric
blcslope	Slope term used in calculating boundary layer conductance	numeric
blcoffst	Intercept term using in calculating boundary layer conductance	numeric
f_parin	Fraction of ParIn_um to use for energy balance	numeric
f_parout	Fraction of ParOut_um to use for energy balance	numeric
alphak	Used in conversion of umol/mol to W/m2	numeric
status	Status variable	integer
species	Species code from the USDA Plants Database; see https://plants.sc.egov.usda.gov/java/	character
sample	Sample number-varies by species by plot	integer
comments	ID of closest vegetation survey plot (NE, SE, SW, NW) to the stem measured, plus any additional comments	character

Litter

Table S10. Litterfall table. `fd_litter()` is an external function that returns dry litter mass collected in litter traps located at nested subplots (1, 3, 5, 7) within each FoRTE subplot. The `bag_mass_g` values represent air-dried mass.

field	description	class	units
subplot_id	Subplot ID number, a concatenation of replicate, plot, and subplot codes	character	
replicate	Replicate group (A-D)	character	

plot	Plot number	integer	
subplot	Subplot (E, W)	character	
year	Year of litter collection	integer	
fraction	Litter fraction	character	
species	Species code from the USDA Plants Database; see https://plants.sc.egov.usda.gov/java/	character	
bagtare_g	Mass of bag	numeric	g
bagmass_g	Mass of bag + litter	numeric	g

Hemispherical camera

Table S11. Hemispherical imagery table. `fd_hemi_camera()` is an external function that returns undercanopy, hemispherical imagery captured using a Sony DSLR camera (Regent Instruments; Quebec, QU) where the blue channel has been replaced with near-infrared in order to calculate normalized difference vegetation index (NDVI). Raw imagery has been processed using WinsCANOPY (Regent Instruments; Quebec, QU).

field	description	class	units
subplot_id	Subplot ID number, a concatenation of replicate, plot, and subplot codes	character	
replicate	Replicate group (A-D)	character	
plot	Plot number	integer	
subplot	Subplot (E, W)	character	
nested_subplot	NestedSubplotSampling points	integer	
date	Date of measurement	Date	
ndvi	Normalized Difference Vegetation Index, estimates greenness	numeric	
gap_fraction	Ratio of gap space in the canopy, or open area	numeric	
openness	Percent of sky in hemisphere	numeric	
lai_cam	Leaf area index	numeric	
clumping_index	the ratio of the effective leaf area index to the true leaf area index	numeric	

Canopy structure

Table S12. Canopy structural traits table. `fd_canopy_structure()` is an external function that returns canopy structural trait data collected using a terrestrial based portable canopy

lidar unit (Regent Instruments 3100 FHS; . Raw lidar data has been processed using `forestr` version 1.0.1 (Atkins et al. 2018) in R 3.6 (R Core Team, 2020) to calculate canopy structural trait metrics.

field	description	class	units
subplot_id	Subplot ID number, a concatenation of replicate, plot, and subplot codes	character	
replicate	Replicate group (A-D)	character	
plot	Plot number	integer	
subplot	Subplot (E, W)	character	
year	Year of measurement	integer	
mean_height_mean	Mean leaf height	numeric	m
height_2	Standard deviation of mean leaf height	numeric	m
mean_height_median	median of mean leaf height	numeric	m
mean_height_var	Variance of mean height	numeric	m
mean_height_rms	Root mean square height	numeric	m
transect_length	Length of transect	integer	m
can_max_ht	Maximum measured canopy height	numeric	m
moch	Mean outer canopy height or moch	numeric	m
can_max_ht_median	Median outer canopy height	numeric	m
vai_mean	Mean vegetation area index	numeric	
vai_sd	Standard deviation of VAI	numeric	
vai_median	Median of VAI	numeric	
vai_column_max	Need to cut, artifact	integer	
vai_max_ht_mean	Mean height of maximum VAI density	numeric	m
vai_max_ht_sd	SD of maximum VAI density height	numeric	m
vai_max_ht_median	Median of max VAI density	numeric	
vai_max	Max VAI density for any x,z	numeric	
vai_mean_peak	Mean peak VAI for entire transect	numeric	

vai_peak_sd	SD of peak VAI	numeric	
vai_peak_median	Median of peak VAI	numeric	
deep_gaps	Number of 1 m wide bins with no lidar returns	integer	
deep_gap_fraction	Deep gaps divided by transect length	numeric	
porosity	Ratio of empty to filled bins in the canopy	numeric	
std_std	Precursor to rugosity	numeric	
mean_std	Precursor to rugosity	numeric	
rugosity	Accumulated canopy complexity metric	numeric	m
top_rugosity	Standard deviation of final lidar returns	numeric	
mean_return_ht	Mean raw lidar return height	numeric	m
sd_return_ht	Standard deviation of raw lidar return distances	numeric	m
median_ht	Median of raw lidar return distances	numeric	m
sky_fraction	Ratio of sky hits to lidar returns	numeric	
cover_fraction	1/sky fraction	numeric	
max_ht	Same as max can ht, removed in later forestr updates	numeric	m
scan_density	No. of lidar returns divided by transect length	numeric	
rumple	Outer surface variability divided by transect length	numeric	
clumping_index	the ratio of the effective leaf area index to the true leaf area index	numeric	
enl	Effective number of layers	numeric	
fhd	Distribution of canopy cover among forest strata expressed as a diversity index	numeric	
gini	a statistical measure of the degree of variation or inequality represented in a set of values	numeric	
mean_intensity	Mean of lidar intensity values	numeric	
median_intensity	Median of lidar intensity values	integer	
sd_intensity	SD of lidar intensity values	numeric	
max_intensity	Maximum lidar intensity value	numeric	

min_intensity	Minimum lidar intensity value	numeric
skew_intensity	Skewness of intensity values	numeric
kurtosis_intensity	Kurtosis of intensity values	numeric
p10	10 percentile height	numeric
p25	25 percentile height	numeric
p50	50 percentile height	numeric
p75	75 percentile height	numeric
p90	90 percentile height	numeric

Ceptometer

Table S13. Ceptometer table. `fd_par()` is an external function that returns concurrently measured above- and below-canopy light availability, as well as leaf area index (calculated from above- and below-canopy light) collected along 40 m long north-to-south and east-to-west transects through the center of each FoRTE subplot. Data were collected using a Decagon Devices LP-80 handheld ceptometer (Pullman, WA).

field	description	class	units
subplot_id	Subplot ID number, a concatenation of replicate, plot, and subplot codes	character	
replicate	Replicate group (A-D)	character	
plot	Plot number	integer	
subplot	Subplot (E, W)	character	
timestamp	Timestamp of measurement	POSIXct	
a_par	Above canopy PAR (photosynthetically available radiation)	numeric	µmol m^2 s^{-1}
b_par	Below canopy PAR (photosynthetically available radiation)	numeric	µmol m^2 s^{-1}
fapar	Fraction of PAR absorbed by the canopy	numeric	
lai_cept	Leaf area index derived from ceptometer	numeric	