



## Frequently Asked Questions

### Do I have to share my data?

No. If you would like to prevent data from transferring to the Field Measures cloud, you can change the cloud upload setting. Select Settings and scroll down to the Redundant Storage Options. Under Replicate Up to Cloud, Select No.

### How do I get data off my device if I don't use the Field Measures cloud?

When the Replicate Up to Cloud setting is turned off, data are stored locally but are not transferred to the Field Measures cloud.

## Android

On Android devices, the Export feature can be used to transfer data from the device to Google Drive. The Export function can be used instead of or in addition to cloud replication.

Open the Field Measures Home screen and select Export. Fuels Measure will export data (CSV) and photos (JPG) to the Google Drive account selected in the device settings.

## iOS

Currently, iOS devices only export data in JSON format. Connect the iOS device to the computer and open iTunes. Select the device icon to open the device menu. Select Apps. Scroll down the list of Apps under File Sharing on the left. When Fuels Measure is selected, a list of files appears on the right. Select the files to transfer and click Save to. Select the desired file destination and click Select to copy the files.

### Why can't I see my data on [data.fuelsmeasure.org](http://data.fuelsmeasure.org)?

Verify that the Replicate Up to Cloud setting is turned on by selecting Settings from the Home screen and scroll down to the Redundant Storage Options. Under Replicate Up to Cloud, Select Yes.

### How can I get the photos I took with Fuels Measure?

By default, photos are saved to the photo gallery on the device and saved within Fuels Measure. Photos saved to the device gallery are assigned a name by the device while photos handled by Fuels Measure are assigned meaningful names. To prevent photos from copying to the Gallery, select Settings and scroll down to the Camera section. Turn Copy Photos to Gallery to off. The Copy Photos to Gallery

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setting does not affect the photo saving function within Fuels Measure but does provide an additional layer of security in case of an app malfunction.

Although the Fuels Measure web-based data portal does not currently handle photos, photos collected with Fuels Measure can be transferred from the device using Google Drive or iTunes. Each transferred photo is assigned a name that always includes the Project and Date. If a Plot and Transect Name are also assigned, the photo file name is: Project\_Plot\_Transect\_day\_month\_year\_id. Any field names that include a space will be ignored.

## **Android**

Open the Field Measures Home screen and select Export. Fuels Measure will export the photos (JPG) and data (CSV) to the Google Drive account selected in the device settings.

## **iOS**

Connect the iOS device to the computer and open iTunes. Select the device icon to open the device menu. Select Apps. Scroll down the list of Apps under File Sharing on the left. When Fuels Measure is selected, a list of files appears on the right. Select the photo files (.jpg) to transfer and click Save to. Select the desired file destination and click Select Folder to copy the files.

## **What are fuels?**

Fuels are traditionally defined as above-ground biomass that can contribute to a wildland fire but the volume and distribution of fuels are also important for wildlife habitat, nutrient cycling, and other ecosystem processes. Fuels Measure is designed to measure dead fuels lying on the ground which are referred to as dead and downed fuels. Some dead and downed fuels are woody such as sticks and logs and others are non-woody such as leaves and needles. Woody fuels are separated into fuel classes based on their diameter or width. Fuels Measure refers to fine woody debris as "Sticks" and coarse woody debris as "Logs." Fuels of various types, across various sites, are compared using a standard unit of measurement called the fuel load. Fuel load is a measure of the weight of biomass over an area which is most often tons per acre in the U.S. wildland fire community.

Type	Fuel Class	Size	Method
Sticks	1 hour	<0.25 in	Tallied
	10 hour	0.25-1 in	Tallied
	100 hour	1-3 in	Tallied
Logs	1000 hour	>3 in	Measured individually with decay class



### What is a fuels transect?

Fuels Measure helps scientists use the planar intercept method (a.k.a. Brown's transect) to measure woody surface fuels. The Brown's transect uses a measuring tape as a sampling plane to measure the intersections of downed woody fuel (a.k.a. sticks and logs).

### Does Fuel Measure handle metric units?

Fuels Measure includes a setting to designate metric units on the Project screen but no metric unit calculations are currently performed. Calculations in metric units can be manually applied to the raw data in the CSV file.

### How does Fuels Measure calculate the fuel loads reported at [data.fuelsmeasure.org](http://data.fuelsmeasure.org)?

Measurements entered into Fuels Measure are stored locally on the device. The Replicate Up to Cloud setting must be on to enable data to transfer the cloud. Once the app is opened in the presence of an internet connection, the measurements are uploaded to the Field Measures cloud and calculations are performed.

Project Name and Plot Name are two required fields. Project Name serves only as a label. Plot Name is also a label but data summaries occur at the plot level. An unlimited number of transects can be measured within a plot. The fuel load estimates displayed at [data.fuelsmeasure.org](http://data.fuelsmeasure.org) are based upon the mean value of all the transects within each plot.

The stick counts and log measurements are converted to tons per acre following Brown (1974):

$$\text{Tons per acre} = (\text{piece count} * 11.64 * \text{SG} * \text{QMD}^2 * \text{secant}) / \text{adjusted length}$$

$$\text{Adjusted length (ft)} = \text{transect length (ft)} / (\sqrt{1 + (\text{transect slope} \% * 0.01)^2})$$

where SG is specific gravity = 0.48 for pieces <1" and 0.40 for pieces ≥1" and QMD is quadratic mean diameter. If a Forest Type is assigned on the Plot Details screen, loading (1-100 hour fuel classes) is

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calculated using quadratic mean diameters provided by Woodall and Monleon (2008, 2010) (Table 1). Fuel loading for the 1000-hour fuel class replaces the QMD with the measured log diameter at the point of intersection. If no Forest Type is selected, default values are applied. If no transect slope value is entered, slope % = 1. The secant is 1.13 for pieces <3" and 1.0 for pieces  $\geq 3$ ".

**Table 1.1. Quadratic mean diameter by forest type group**

Forest Type Group	Code	QMD <sup>2</sup>					Bulk Density	
		Woodall & Monleon 2008	Woodall & Monleon 2010				Woodall & Monleon 2008	
		Small	Med		Large		Litter	Duff
		in	cm	in	cm	in	lbs/ft <sup>3</sup>	lbs/ft <sup>3</sup>
White/red/jack pine	100	0.017	1.2	0.22	4.24	2.79	5.14	13.21
Spruce/fir	120	0.018	1.21	0.23	4.27	2.83	1.85	4.76
Longleaf/slash pine	140	0.02	1.22	0.23	4.3	2.87	5.14	13.21
Loblolly/shortleaf pine	160	0.019	1.19	0.22	4.23	2.77	5.33	13.72
Pinyon/juniper	180	0.018	1.19	0.22	4.24	2.79	3.34	8.59
Douglas fir	200	0.016	1.23	0.23	4.31	2.88	1.85	4.76
Ponderosa pine	220	0.019	1.25	0.24	4.36	2.95	3.34	8.59
Fir/spruce/mountain hemlock	260	0.017	1.27	0.25	4.4	3.00	1.85	8.59
Lodgepole pine	280	0.017	1.24	0.24	4.35	2.93	3.34	8.59
Hemlock/Sitka spruce	300	0.018	1.27	0.25	4.41	3.01	1.85	4.76
Other western softwoods	360	0.019	1.25	0.24	4.35	2.93	3.34	8.59
Oak/pine	400	0.019	1.22	0.23	4.3	2.87	5.24	13.48
Oak/hickory	500	0.018	1.23	0.23	4.32	2.89	4.47	11.51
Oak/gum/cypress	600	0.019	1.25	0.24	4.36	2.95	4.46	11.46
Elm/ash/cottonwood	700	0.019	1.22	0.23	4.3	2.87	3.06	7.87
Maple/beech/birch	800	0.018	1.24	0.24	4.33	2.91	4.37	11.24
Aspen/birch	900	0.019	1.23	0.23	4.31	2.88	4.77	12.27
Western oak	920	0.017	1.17	0.21	4.18	2.71	4.47	11.51
Other western hardwoods	950	0.015	1.18	0.22	4.2	2.73	4.47	11.51
Default - cover not selected		0.018	1.23	0.23	4.31	2.87	4.41	11.33

Litter and duff fuel loads are calculated following Chojnacky and others (2013).

Tons per acre= 1.815 x average depth x BD

Where bd is bulk density. If a forest type is selected on the Plot Details screen, loading is calculated using the bulk density values from Woodall and Monleon (2008) (Table 1). If no forest type is selected, loading is calculated with the default values.

[Can I use my own transect lengths?](#)

Yes. Custom lengths can be entered for each transect segment.

## References

- Brown, J.K. 1974. Handbook for Inventorying Downed Woody Material. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden. Gen. Tech. Rep. No. GTR-INT-16.
- Chojnacky DC, Blinn CE, Prisley SP. 2013. Web application to access and visualize FIA down woody materials data. *Journal Forestry* 111(2):132–138.
- USDI National Park Service. 2003. Fire Monitoring Handbook. Boise (ID): Fire Management Program Center, National Interagency Fire Center. 274p.
- Woodall, C.W.; Monleon, V.J. 2008. Sampling protocol, estimation, and analysis procedures for the down woody materials indicator of the FIA program. Gen. Tech. Rep. NRS-22. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 68 p.
- Woodall, C.W.; Monleon, V.J. 2010. Estimating the quadratic mean diameters of fine woody debris in forests of the United States. *Forest Ecology and Management* 260, 1088-1093.