



Exercise Answers

- 1. Compare the head fire Rate of Spread and Flame Length for Fuel Model 10 and, from the 40 Fuel Models, the Timber Understory group appropriate for your area (humid or dry). Use a range of Wind Speeds and appropriate Moisture Scenarios for your climate.**

Fuel Models TU1 and TU5 are for a dry climate. TU1 is a dynamic fuel model, while TU5 is a static fuel model.

- Select Moisture Scenario D1L3, which is dry dead fuel (3%, 4%, 5%) and live fuel moisture that represents 1/3 cured herb for dynamic fuel models (90%, 120%), such that:
 - 1-h Fuel Moisture = 3%,
 - 10-h Fuel Moisture = 4%,
 - 100-h Fuel Moisture = 5%,
 - Live Herbaceous Fuel Moisture = 90%, and
 - Live Woody Fuel Moisture = 120%.
- Select Midflame Wind Speeds ranging from 0 to 5 mi/h. This surface fuel is under an overstory, so midflame wind may be 0.2 of the 20-ft Wind Speed.

BehavePlus 4.0.0 Page 1

Inputs: SURFACE

Description

Fuel/Vegetation, Surface/Understory

Fuel Model

Fuel Moisture

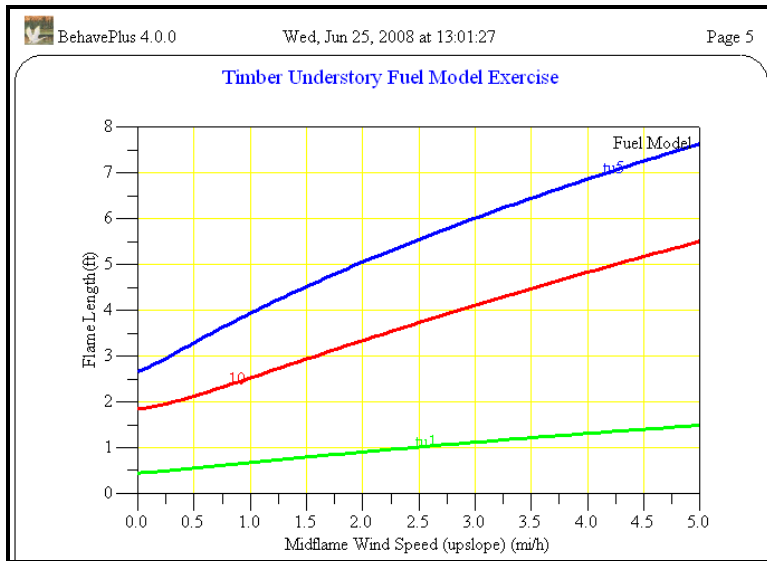
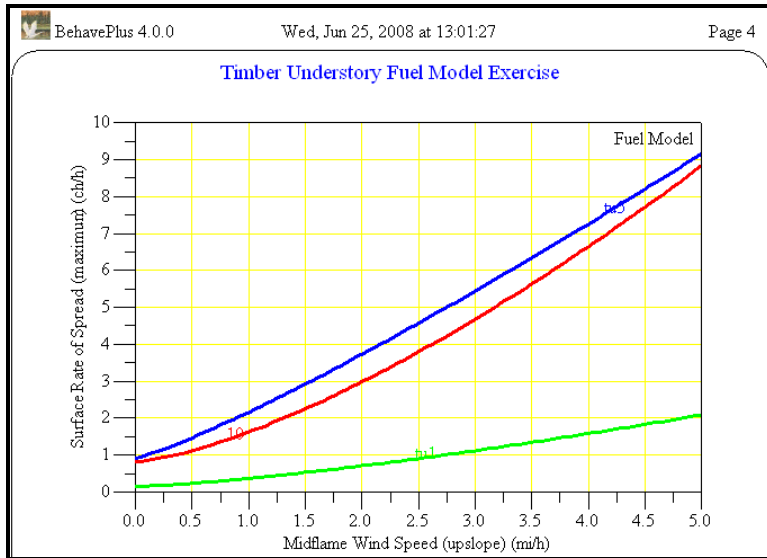
Moisture Scenario

Weather

Midflame Wind Speed (upslope) m/h

Terrain

Slope Steepness %



For these conditions the Rate of Spread for Fuel Model 10 and TU5 is similar, and higher than for TU1. Flame Length for Fuel Model 10 is less than for TU5.

This relationship can be further explored by comparing the three fuel models for wind speed of 5 mi/h for three moisture scenarios, three levels of dead moisture and the same live moisture.

BehavePlus 4.0.0 Wed, Jun 25, 2008 at 13:01:27 Page 1

Inputs: SURFACE

Description

Fuel/Vegetation, Surface/Understory

Fuel Model

Fuel Moisture

Moisture Scenario

Weather

Midflame Wind Speed (upslope) mi/h

Terrain

Slope Steepness %

BehavePlus 4.0.0 Wed, Jun 25, 2008 at 13:07:37 Page 2

Timber Understory Fuel Model Exercise
Surface Rate of Spread (maximum) (ch/h)

Fuel Model	Moisture Scenario			
	d113	d213	d313	d413
10	8.8	7.5	6.7	6.3
tu1	2.1	0.8	0.7	0.7
tu5	9.2	7.8	6.9	6.3

BehavePlus 4.0.0 Wed, Jun 25, 2008 at 13:07:37 Page 3

Timber Understory Fuel Model Exercise
Flame Length (ft)

Fuel Model	Moisture Scenario			
	d113	d213	d313	d413
10	5.5	4.8	4.4	4.2
tu1	1.5	0.6	0.6	0.5
tu5	7.6	6.7	6.1	5.7

BehavePlus 4.0.0 Wed, Jun 25, 2008 at 13:07:37 Page 4

Discrete Variable Codes Used
Timber Understory Fuel Model Exercise

Fuel Model

10	Timber litter and understory (S)
tu1	Light load, dry climate timber-grass-shrub (D) (161)
tu5	Very high load, dry climate timber-shrub (S) (165)

Moisture Scenario

d113	D1L3 - Very low dead, 1/3 cured herb (3,4,5,90,120)
d213	D2L3 - Low dead, 1/3 cured herb (6,7,8,90,120)
d313	D3L3 - Moderate dead, 1/3 cured herb (9,10,11,90,120)
d413	D4L3 - High dead, 1/3 cured herb (12,13,14,90,120)

2. Examine Fuel Model TU3 for

- **1/3 cured herbaceous fuel,**
- **several levels of 1-h Fuel Moisture, and**
- **a range of Midflame Wind Speeds.**

TU3 is a dynamic Fuel Model.

The Dead Fuel Moisture of Extinction for Fuel Model TU3 is 30%.

BehavePlus 4.0.0 Wed, Jun 25, 2008 at 13:07:37 Page 1

Inputs: SURFACE

Description ➤ Timber Understory Fuel Model Exercise 2

Fuel/Vegetation, Surface/Understory

Fuel Model ➤ tu3

Fuel Moisture

Moisture Scenario ➤ d113, d213, d313, d413

Weather

Midflame Wind Speed (upslope) mi/h ➤ 0.0, 1.0, 2.0, 3.0, 4.0, 5.0

Terrain

Slope Steepness % ➤ 0

BehavePlus 4.0.0 Wed, Jun 25, 2008 at 13:12:55 Page 2

Timber Understory Fuel Model Exercise 2
Surface Rate of Spread (maximum) (ch/h)

Moisture Scenario	Midflame Wind Speed (upslope) m/h					
	0.0	1.0	2.0	3.0	4.0	5.0
d113	1.1	3.4	6.9	11.2	16.1	21.4
d213	1.0	3.0	6.1	9.9	14.2	18.9
d313	0.9	2.8	5.7	9.2	13.1	17.4
d413	0.9	2.6	5.3	8.6	12.3	16.3

BehavePlus 4.0.0 Wed, Jun 25, 2008 at 13:12:55 Page 3

Timber Understory Fuel Model Exercise 2
Flame Length (ft)

Moisture Scenario	Midflame Wind Speed (upslope) m/h					
	0.0	1.0	2.0	3.0	4.0	5.0
d113	1.7	2.8	3.9	4.9	5.8	6.6
d213	1.5	2.6	3.6	4.4	5.2	6.0
d313	1.4	2.4	3.3	4.2	4.9	5.6
d413	1.4	2.3	3.2	3.9	4.7	5.3