Exercise Answers

1. Question – Why are graphs not produced for this Run?

A single value is entered for each variable. No multiple variables are entered, so there is no range of fire behavior. See next question and answer.

2. Question – How does 10-h fuel moisture affect the calculated Surface Rate of Spread and Flame Length?

For Fuel Model 9, 10-h Moisture has little or no effect on Surface Rate of Spread (ROS) and Flame Length. See next question and answer.

10-h Moisture %	ROS (max) ch/h	Flame Length ft
4	7.8	2.7
8	7.7	2.7
12	7.7	2.7

3. Question – How does 1-h fuel moisture affect the calculated Surface Rate of Spread and Flame Length?

1-h Moisture has a significant effect on Surface Rate of Spread and Flame Length. As 1-h Moisture increases, Surface Rate of Spread and Flame Length decrease. Fire behavior at the flaming front is influenced greatly by the fine dead fuels. 1-h fuel moisture has a much greater influence on calculated fire behavior than does

10-h fuel moisture.

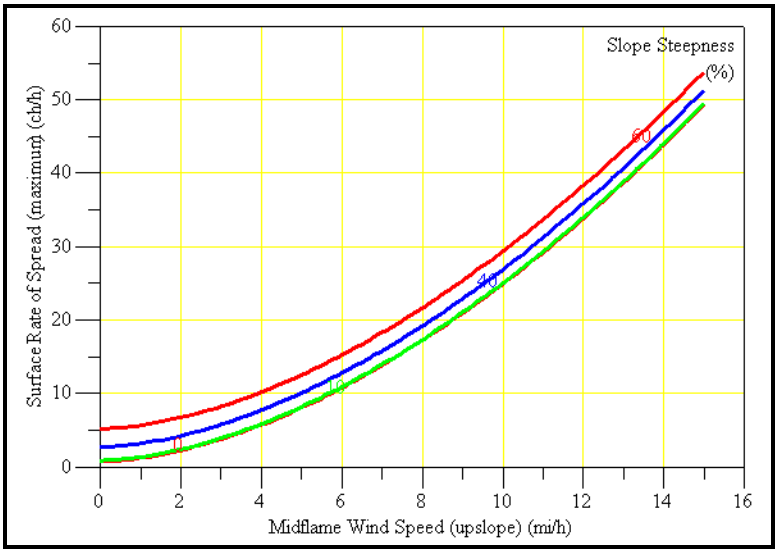
1-h Moisture %	ROS (max) ch/h	Flame Length ft
4	10.1	3.3
8	7.3	2.6
12	6.0	2.3

4. Question – How much does the change in the Slope Steepness from 0% to 10% change the fire behavior?

In this example, there is very little change. The table shows the change in Surface Rate of Spread is about 0.1 ch/h. The graph shows that the 0% and the 10% slope lines are essentially the same.

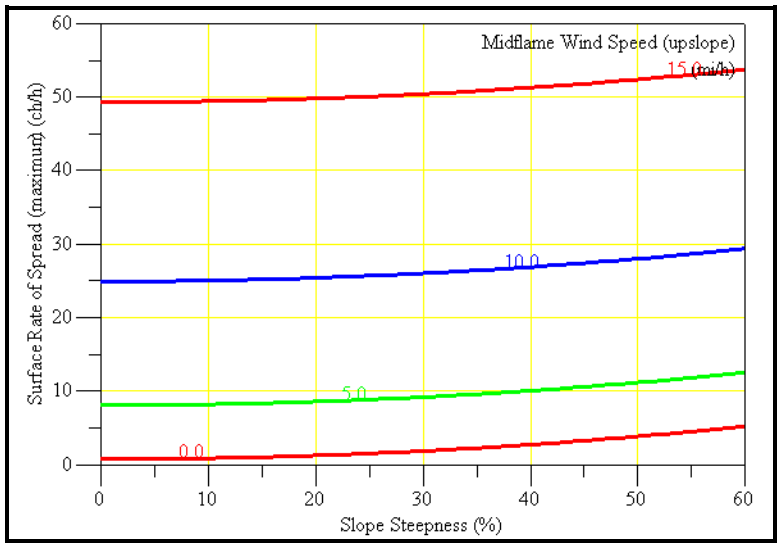
Surface Rate of Spread (maximum) (ch/h)

Midflame Wind Speed mi/h	Slope Steepness % 0	10	40	60
0.0	0.8	0.9	2.8	5.2
5.0	8.1	8.2	10.1	12.6
10.0	24.9	25.1	26.9	29.4
15.0	49.3	49.4	51.3	53.8



5. Question – Does wind or slope have a greater effect on fire behavior? How do the graphs help you reach that conclusion?

In this example, wind speed has more effect on Surface Rate of Spread and Flame Length than does slope. The graph in Question 4 with X-axis of wind shows Surface Rate of Spread increasing significantly with an increase in wind. There is very little difference for the four slope curves. When the X-axis is Slope Steepness, the curves are quite flat showing little increase in Surface Rate of Spread with an increase in wind. There is a significant difference between curves for different wind speeds.



6. Question – Try the above exercises with other fuel models. (Try Fuel Model 13). Are the results different?

You have been using Fuel Model 9, which represents long needle or hardwood litter. Most of the fuel is in the 1-h category. Fuel loadings are:

- 1-h = 2.9 ton/ac,
- 10-h = 0.41 ton/ac, and
- 100-h = 0.15 tons/ac.

Fuel Bed Depth is 0.2 ft.

Try the very different Fuel Model 13, which represents heavy logging slash. Fuel loadings are:

- 1-h = 7 ton/ac,
- 10-h = 23 ton/ac, and
- 100-h = 28tons/ac.

Fuel Bed Depth is 3 ft.

Neither Fuel Model 9 nor 13 includes live fuel.

10-h Moisture has a greater influence for Fuel Model 13 than for Fuel Model 9 because of the relative amount of 10-h fuel in the fuel models. 1-h has a greater influence than 10-h in both cases.

The following output table corresponds to that shown for Question 2, but with Fuel Model 13 substituted for Fuel Model 9.

10-h Moisture %	ROS (max) ch/h	Flame Length ft
4	16.7	10.7
8	16.1	10.4
12	15.6	10.1