

## BehavePlus fire modeling system, version 5.0

### Table Shading Lesson

### Operation Unit

#### Exercise Answer

Continuing with the example in this lesson, change the Acceptable Fire Conditions so there will be no transition to crown fire. The changes will result in the following worksheet.

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**Inputs: SURFACE, CROWN**

Description	Example: No Transition to Crown Fire
Administrative Unit	North End
Prescribed Fire Name	Blue Bird
Prepared By	Mr. Smith

**Fuel/Vegetation, Surface/Understory**

Fuel Model	2
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**Fuel/Vegetation, Overstory**

Canopy Base Height	ft	15
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**Fuel Moisture**

Dead Fuel Moisture	%	14, 13, 12, 11, 10, 9, 8, 7, 6,
Live Fuel Moisture	%	120
Foliar Moisture	%	100

**Weather**

Midflame Wind Speed (upslope)	mi/h	4.0, 6.0, 8.0, 10.0, 12.0
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**Terrain**

Slope Steepness	%	0
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**Acceptable Fire Conditions**

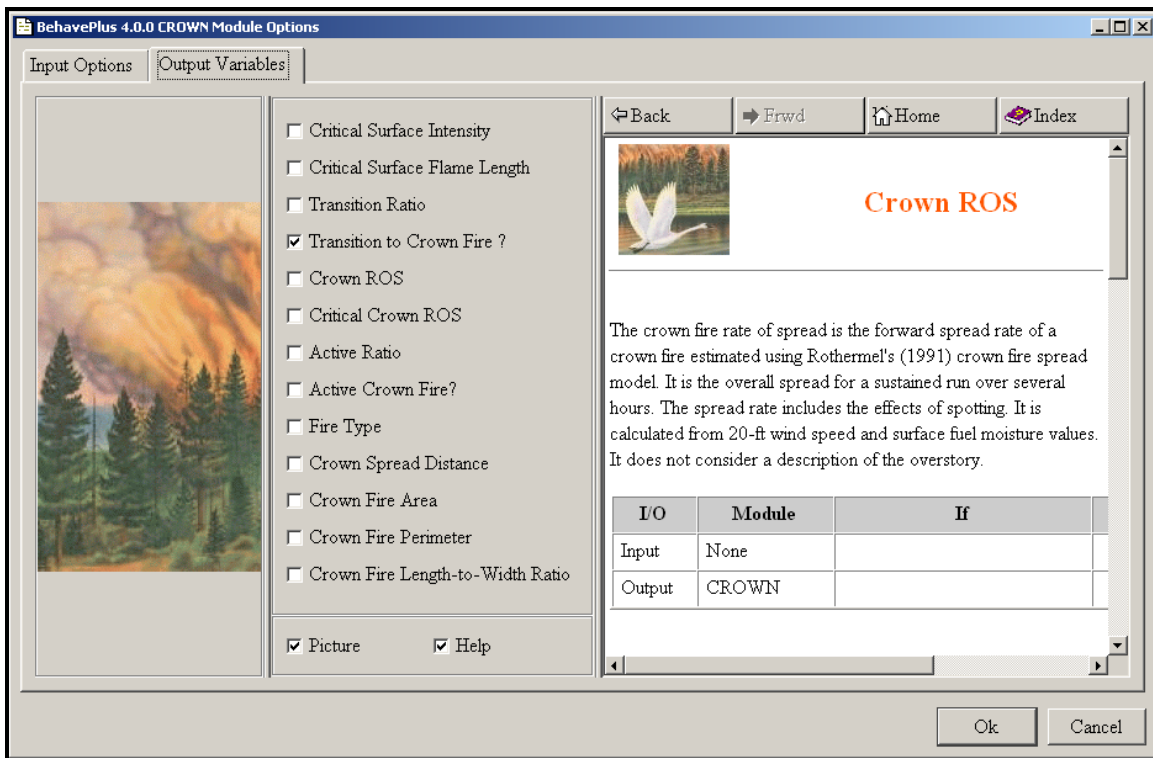
Surface Rate of Spread (maximum)	(ch/h)	<input type="checkbox"/> 15.0	-	200.0
Flame Length	(ft)	<input type="checkbox"/> 2.0	-	8.0
Transition to Crown Fire ?		<input checked="" type="checkbox"/> No		
		<input type="checkbox"/> Yes		

- Be sure that the worksheet setup and input variables are the same.
- Use the same Fuel Model ("2"), Live Fuel Moisture ("120"), and Slope ("0") values.
- Dead Fuel Moisture remains the same (**From 14 Thru 2 Step -1**).
- Midflame Wind Speed also remains the same (**From 0 Thru 10 Step 2**).
- Change the description line to read "Example: No Transition to Crown Fire".

#### The Crown Module

- Using **Module Selection**, select the CROWN module.

- Click **Options...** for CROWN.
- Select Transition to Crown Fire? as the only output variable, removing all others from CROWN.



You now need to assign two additional values.

- Set Crown Base Height to “15” ft
- Set Foliar Moisture to “100” (100%)

### Transition to Crown? Determines Acceptable Fire Conditions

Now,

- Remove the check marks by Surface Rate of Spread and Flame Length.
- Add a check mark by Transition to Crown Fire? and also click by “No”.

Acceptable Fire Conditions			
Surface Rate of Spread (maximum)	(ch/h)	<input type="checkbox"/>	15.0 - 200.0
Flame Length	(ft)	<input type="checkbox"/>	2.0 - 8.0
Transition to Crown Fire ?		<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	

- Calculate the run.
- Look at the table.

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Example: No Transition to Crown Fire  
Surface Rate of Spread (maximum) (ch/h)

Dead Fuel Moisture %	Midflame Wind Speed (upslope) mi/h					
	0.0	2.0	4.0	6.0	8.0	10.0
14	0.4	1.5	4.4	8.9	14.8	14.9
13	1.1	4.0	11.5	23.0	38.2	56.9
12	1.3	5.0	14.5	28.9	48.0	71.5
11	1.6	5.8	16.8	33.6	55.7	83.1
10	1.7	6.5	18.6	37.1	61.6	91.9
9	1.9	6.9	19.9	39.8	66.0	98.4
8	1.9	7.3	20.9	41.8	69.4	103.5
7	2.0	7.6	21.8	43.6	72.4	107.9
6	2.1	7.9	22.8	45.5	75.6	112.6
5	2.2	8.3	24.0	47.9	79.6	118.6
4	2.4	8.9	25.7	51.3	85.2	127.0
3	2.6	9.8	28.1	56.2	93.3	139.0
2	2.9	11.0	31.5	63.0	104.6	155.9

- Low wind speeds do not result in a transition to crown fire for the entire range of dead fuel moisture values.
- Change the Midflame Wind Speed values (**From 4 Thru 12 Step 2**).
- Calculate the run.

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Example: No Transition to Crown Fire  
Surface Rate of Spread (maximum) (ch/h)

Dead Fuel Moisture %	Midflame Wind Speed (upslope) mi/h				
	4.0	6.0	8.0	10.0	12.0
14	4.4	8.9	14.8	14.9	14.9
13	11.5	23.0	38.2	56.9	79.0
12	14.5	28.9	48.0	71.5	89.3
11	16.8	33.6	55.7	83.1	115.4
10	18.6	37.1	61.6	91.9	127.6
9	19.9	39.8	66.0	98.4	136.7
8	20.9	41.8	69.4	103.5	143.7
7	21.8	43.6	72.4	107.9	149.9
6	22.8	45.5	75.6	112.6	156.4
5	24.0	47.9	79.6	118.6	164.7
4	25.7	51.3	85.2	127.0	176.4
3	28.1	56.2	93.3	139.0	193.0
2	31.5	63.0	104.6	155.9	216.5

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**Example: No Transition to Crown Fire**  
**Flame Length (ft)**

Dead Fuel Moisture %	Midflame Wind Speed (upslope) mi/h				
	4.0	6.0	8.0	10.0	12.0
14	1.2	1.7	2.1	2.1	2.1
13	2.9	4.0	5.1	6.1	7.1
12	3.6	4.9	6.2	7.4	8.7
11	4.1	5.6	7.0	8.5	9.8
10	4.4	6.1	7.7	9.2	10.7
9	4.7	6.4	8.1	9.7	11.3
8	4.8	6.6	8.4	10.1	11.7
7	5.0	6.8	8.6	10.4	12.0
6	5.1	7.0	8.9	10.7	12.4
5	5.3	7.3	9.2	11.1	12.9
4	5.6	7.7	9.7	11.7	13.6
3	6.0	8.3	10.4	12.5	14.6
2	6.6	9.1	11.5	13.8	16.0

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**Example: No Transition to Crown Fire**  
**Transition to Crown Fire ?**

Dead Fuel Moisture %	Midflame Wind Speed (upslope) mi/h				
	4.0	6.0	8.0	10.0	12.0
14	No	No	No	No	No
13	No	No	No	No	No
12	No	No	No	No	Yes
11	No	No	No	Yes	Yes
10	No	No	Yes	Yes	Yes
9	No	No	Yes	Yes	Yes
8	No	No	Yes	Yes	Yes
7	No	No	Yes	Yes	Yes
6	No	No	Yes	Yes	Yes
5	No	No	Yes	Yes	Yes
4	No	Yes	Yes	Yes	Yes
3	No	Yes	Yes	Yes	Yes
2	No	Yes	Yes	Yes	Yes

- The Surface Rate of Spread and Flame Length tables have values that have been crossed off whenever there will be a Transition to Crown Fire (Yes on the crown fire table). You can view the corresponding head fire spread rate and Flame Length for conditions that do not lead to Transition to Crown Fire.

## Report Etiquette

- Once you are satisfied that you have obtained the information you need, you can turn on the table shading to create the final tables for reports.
- As you finalize the final run product for a report, you should remove the values for Rate of Spread and Flame Length from the Acceptable Fire Conditions by entering zeroes. Even though there are no checkmarks, indicating these limits are not being used, the reader of your report might not be as familiar with BehavePlus operation as you are and leaving them in the worksheet may lead to confusion. Remember that you should always include the worksheet in any report that contains BehavePlus output tables.

**Acceptable Fire Conditions**

Surface Rate of Spread (maximum) (ch/h) ☐ 0 - 0

Flame Length (ft) ☐ 0 - 0

Transition to Crown Fire ? ☒ No  
☐ Yes

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**Example: No Transition to Crown Fire**  
**Surface Rate of Spread (maximum) (ch/h)**

Dead Fuel Moisture %	Midflame Wind Speed (upslope) mi/h				
	4.0	6.0	8.0	10.0	12.0
14	4.4	8.9	14.8	14.9	14.9
13	11.5	23.0	38.2	56.9	79.0
12	14.5	28.9	48.0	71.5	
11	16.8	33.6	55.7		
10	18.6	37.1			
9	19.9	39.8			
8	20.9	41.8			
7	21.8	43.6			
6	22.8	45.5			
5	24.0	47.9			
4	25.7				
3	28.1				
2	31.5				

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**Example: No Transition to Crown Fire**  
**Flame Length (ft)**

Dead Fuel Moisture %	Midflame Wind Speed (upslope) mi/h				
	4.0	6.0	8.0	10.0	12.0
14	1.2	1.7	2.1	2.1	2.1
13	2.9	4.0	5.1	6.1	7.1
12	3.6	4.9	6.2	7.4	
11	4.1	5.6	7.0		
10	4.4	6.1			
9	4.7	6.4			
8	4.8	6.6			
7	5.0	6.8			
6	5.1	7.0			
5	5.3	7.3			
4	5.6				
3	6.0				
2	6.6				

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**Example: No Transition to Crown Fire**  
**Transition to Crown Fire ?**

Dead Fuel Moisture %	Midflame Wind Speed (upslope) mi/h				
	4.0	6.0	8.0	10.0	12.0
14	No	No	No	No	No
13	No	No	No	No	No
12	No	No	No	No	
11	No	No	No		
10	No	No			
9	No	No			
8	No	No			
7	No	No			
6	No	No			
5	No	No			
4	No				
3	No				
2	No				