Flame Length Translator Input File

The Flame Length Translator Input File is used to map FConstMTT Flame Lengths to severity classes (None, Low, Mixed, High) and output severity grids. This input file is denoted by the "**FlameLengthTranslatorFile**:" switch in a FConstMTT inputs file.

The "**FlameLengthTranslatorFile**:" switch is only applicable when using the "**EnvisionFireListFile**:" switch in FConstMTT.

The necessary inputs include a VegClass GeoTIFF, a Region GeoTIFF, and a PVT GeoTIFF. A threshold csv maps values for VegClass, Region, and PVT combinations to flame length thresholds for severity classes.

All GeoTIFF input files must be in the same projection/coordinate system as the landscape file used for the FConstMTT run.

Flame Length Translator Input File Switches:
The format is the same as the FConstMTT input file. Generally, a switch must start in the first column of a line, be followed immediately by a semicolon and a space, followed by the switch data. The file may contain comments, which must contain the # character in the first column. Order of the switches is not important.

Switch: **VegClassGeoTIFF**: (Required)
Purpose: Designate the GeoTIFF of VegClass values

Usage: **VegClassGeoTIFF**:: X
Where X is the complete path to a GeoTIFF file containing the VegClass layer data. While any internal storage can be used for VegClass data, the data will be read as integer values into FConstMTT.

Example:
VegClassGeoTIFF: D:\Data\vegclass geotiff\VegClass.tif

Switch: **RegionGeoTIFF**: (Required)
Purpose: Designate the GeoTIFF of Region values

Usage: **RegionGeoTIFF**:: X
Where X is the complete path to a GeoTIFF file containing the Region layer data. While any internal storage can be used for Region data, the data will be read as integer values into FConstMTT.

Example:
RegionGeoTIFF: D:\Data\vegclass geotiff\Region.tif

Switch: **PVTGeoTIFF**: (Required)

Purpose: Designate the GeoTIFF of PVT values

Usage: **PVTGeoTIFF**:: X
Where X is the complete path to a GeoTIFF file containing the PVT layer data. While any internal storage can be used for PVT data, the data will be read as integer values into FConstMTT.

Example:
PVTGeoTIFF: D:\Data\vegclass geotiff\PVT.tif

Switch: **ThresholdCSV**: (Required)

Purpose: Designate the csv file containing mappings of VegClass, Region, and PVT values to severity class thresholds.

Usage: **ThreasholdCSV**: X
Where X is the complete path to the csv file containing the mappings to severity class threshold values.

Example:
ThresholdCSV: D:\Data\severity_crosswalk_sample_2.csv

Switch: **VegClassField**: (Required)

Purpose: Designate the field in **ThresholdCSV** that indicates VegClass values found in **VegClassGeoTIFF** to be used for flame length to severity class mappings

Usage: **VegClassField**: X
Where X is the name of the field in the first line of ThresholdCSV indicating VegClass data.

Example:
VegClassField: VegClass

Switch: **RegionField**: (Required)

Purpose: Designate the field in **ThresholdCSV** that indicates Region values found in **RegionGeoTIFF** to be used for flame length to severity class mappings.

Usage: **RegionField**: X
Where X is the name of the field in the first line of ThresholdCSV indicating Region data.

Example:
RegionField: Region

Switch: **PVTField**: (Required)

Purpose: Designate the field in **ThresholdCSV** that indicates PVT values found in **PVTGeoTIFF** to be used for flame length to severity class mappings.

Usage: **PVTField**: X
Where X is the name of the field in the first line of ThresholdCSV indicating PVT data.

Example:
PVTField: PVT

Switch: **LowSeverityMaxField**: (Required)

Purpose: Indicate the maximum Flame Length (in meters) for the fire in VegClass/Region/PVT combination cells to be considered Low Severity fire.

Usage: **LowSeverityMaxField**: X
Where X is the name of the field in the first line of ThresholdCSV indicating low severity max flame length data values.

Example::
LowSeverityMaxField: SURFACE_FIRE

Switch: **ModerateSeverityMaxField**: (Required)

Purpose: Indicate the maximum Flame Length (in meters) for the fire in VegClass/Region/PVT combination cells to be considered Low Severity fire.

Usage: **ModerateSeverityMaxField**: X
Where X is the name of the field in the first line of ThresholdCSV indicating mixed severity max flame length data values.
NOTE: Flame length values exceeding ModerateSeverityMaxField values will be considered High Severity.

Example::
ModerateSeverityMaxField: MIXED_SEVERITY

Switch: **OutputEachYear**: (Optional, default = 0)

Purpose: Cause FConstMTT to output severity grids and non-mapped VegClass/Region/PVT values for each simulation year (as indicated in the **EnvisionFireListFile**).

Usage: **OutputEachYear**: X
Where X is an integer value, either 0 to disable output of severity grids and non-mapped VegClass/Region/PVT values for each simulation year, or 1 to enable output of severity grids and non-mapped VegClass/Region/PVT values for each simulation year.

Example:
OutputEachYear: 1

Sample FlameLengthTranslatorFile contents:

VegClassGeoTIFF: D:\Data\vegclass geotiff\VegClass.tif
PVTGeoTIFF: D:\Data\vegclass geotiff\PVT.tif
RegionGeoTIFF: D:\Data\vegclass geotiff\Region.tif
ThresholdCSV: D:\Data\severity_crosswalk_sample_2.csv
VegClassField: VegClass
RegionField: Region
PVTField: PVT
LowSeverityMaxField: SURFACE_FIRE
ModerateSeverityMaxField: MIXED_SEVERITY
OutputEachYear: 1

Sample ThresholdCSV file contents:

VegClass,Region,PVT,PVT_code,CTSS,Forest_Arid,Variant,SURFACE_FIRE,MIXED_SEVERITY,STAND_REPLACING_FIRE
4002000,7,5,OBM_fcm,DF:GF,Forest,1,1000,-999,-999
4003000,7,5,OBM_fcm,DF:S,Forest,1,-999,1.6,1000
4007210,7,5,OBM_fcm,DF:Mm1,Forest,1,4.5,9.6,1000
4007310,7,5,OBM_fcm,DF:Mc1,Forest,1,7,14.4,1000
6102000,7,7,OBM_fsw,WB:GF,Forest,1,1000,-999,-999
7553400,7,12,OBM_fdp,PP:Sp,Forest,1,-999,1.6,1000
7556110,7,12,OBM_fdp,PP:So1,Forest,1,2.5,11.2,1000
7558120,8,4,OSE_fxp,PP:Lo2,Forest,1,-999,11.2,1000
3509220,9,1,OEC_fww,DFal:Gm2,Forest,1,4,16,1000
4003100,9,1,OEC_fww,DF:SHo,Forest,1,1000,-999,-999
4007410,9,1,OEC_fww,DF:M1p,Forest,1,7,14.4,1000
7557310,9,11,OEC_fmx,PP:Mc1,Forest,1,3,9.6,1000
7559320,9,11,OEC_fmx,PP:Gc2,Forest,1,5,17.6,1000
1001100,9,12,OEC_flw,DV:LDV,Forest,1,-999,-999,-999
2553100,9,12,OEC_flw,AW:SHo,Forest,1,-999,8,1000
2553300,9,12,OEC_flw,AW:SHc,Forest,1,-999,3.2,1000
7052000,9,12,OEC_flw,LP:GF,Forest,1,1000,-999,-999
7052100,9,12,OEC_flw,LP:GFp,Forest,1,1000,-999,-999
7054100,9,12,OEC_flw,LP:Yo,Forest,1,-999,1.6,1000
7054400,9,12,OEC_flw,LP:Yop,Forest,1,-999,1.6,1000

Discussion:

Cells that burn more than once:
It is possible for fires to overlap in FConstMTT runs. In these cases the reported severity class is the most frequent occurring severity class. In cases where more than one class share the maximum number of occurrences, the higher severity class is reported.

-999 (NO DATA) values in LowSeverityMaxField and ModerateSeverityMaxField
A -999 in LowSeverityMax fields will mean a cell with that VegClass/Region/PVT mapping will never have a low severity fire.
A -999 in ModerateSeverityMax fields will mean a cell with that VegClass/Region/PVT mapping will never have a Mixed or High severity fire.

The algorithm for determining severity for a burned cell is:

```
Severity =  SEVERITY_NONE
If Flame Length < LowSeverityMax
        Severity = SEVERITY_LOW
Else
If Flame Length < ModerateSeverityMax
        Severity = SEVERITY_MIXED
Else if Flame Length > ModerateSeverityMax AND ModerateSeverityMax > 0
        Severity = SEVERITY_MAX
```