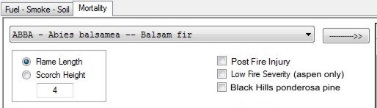
**New Ponderosa Pine Mortality Equations for Black Hills**

When the Interior West region is selected, display a “Black Hills PIPO” checkbox on the Mortality tab.Note order and text of the checkboxes.



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*Added Aug. 22, 2016*

*When Post Fire Injury is checked then hide the Low Fire Severity and Black Hill ponderosa pine checkboxes.*

*User may check Low Fire Severity and Black Hill ponderosa pine checkboxes during a mortality simulation.*

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When the *Black Hills ponderosa pine* box is checked use the equations below for PIPO mortality. For all equations; if P(m)>0.5 then the tree is dead.

Independent variable units: height=meters, flame length=meters, DBH=cm, crown length scorched=meters, canopy base height=meters, tree height=meters.

(1) Seedlings (Height <1.37 m (4.5 ft)):

P(m) = 1/1 + EXP(-(2.714 + (4.08 \* flame length) + (-3.63 \* height)))

(2) Saplings (Height >1.37 m (4.5 ft) and DBH <10.2 cm (4 in.)):

P(m) = 1/1 + EXP(-(-0.7661 + (2.7981 \* flame length) + (-1.2487 \* height)

(3) Other trees (DBH >10.2 (4 in.)):

P(m) = 1/1 + EXP(-(1.104 + (DBH \* -0.156) + (0.013\* pct live crown length scorched) + (0.001 \* DBH \* pct live crown length scorched)))

Where;

pct live crown length scorched = ((max height of crown length scorched – canopy base height)/(tree height – canopy base height)) \*100

NOTES

Black Hills PIPO Eq.1: Battaglia, M.; Smith, F.W.; Sheppard, W.D. 2009. Predicting Mortality of ponderosa pine regeneration after prescribed fire in the Black Hill, South Dakota, USA. Int’l. Jour. Wildland Fire. 18; 176-190

Battaglia, M.; Smith, F.W.; Sheppard, W.D. 2008. Can prescribed fire be used to maintain fuel treatment effectiveness over time in Black Hills ponderosa pine forests? For. Ecol. And Mgt. 256: 2029-2038

*Used published Eq. 2 (table 5) from the IJWF paper (same as Eq. 1 in the For. Ecol. Mgt. paper). Used this equation because independent variables are in FOFEM data.*

Black Hills PIPO Eq.2: Battaglia, M.; Smith, F.W.; Sheppard, W.D. 2009. Predicting Mortality of ponderosa pine regeneration after prescribed fire in the Black Hill, South Dakota, USA. Int’l. Jour. Wildland Fire. 18; 176-190

Battaglia, M.; Smith, F.W.; Sheppard, W.D. 2008. Can prescribed fire be used to maintain fuel treatment effectiveness over time in Black Hills ponderosa pine forests? For. Ecol. And Mgt. 256: 2029-2038

*Used published Eq. 4 (Table 6) from the IJWF paper (same as Eq. 3 in For. Ecol. And Mgt. paper). Picked the DBH limit of 4 in. based on range of saplings described in Table 3 in the IJWF paper. Used this equation because independent variables are in FOFEM data.*

Black Hills PIPO Eq. 3. Keyser, T.L.; Smith, F.W.;Lentile, L.B.; Sheppard, W.D. 2006. Modeling postifire mortality of ponderosa pine following a mixed-severity wildfire in the Black Hill: The role of tree morphology and direct fire effects. For. Sci. 52(5): 530-539

*Used published Eq. 2 (table 1) because it has the highest H-L and ROC of the equations that used independent variables available in FOFEM.*