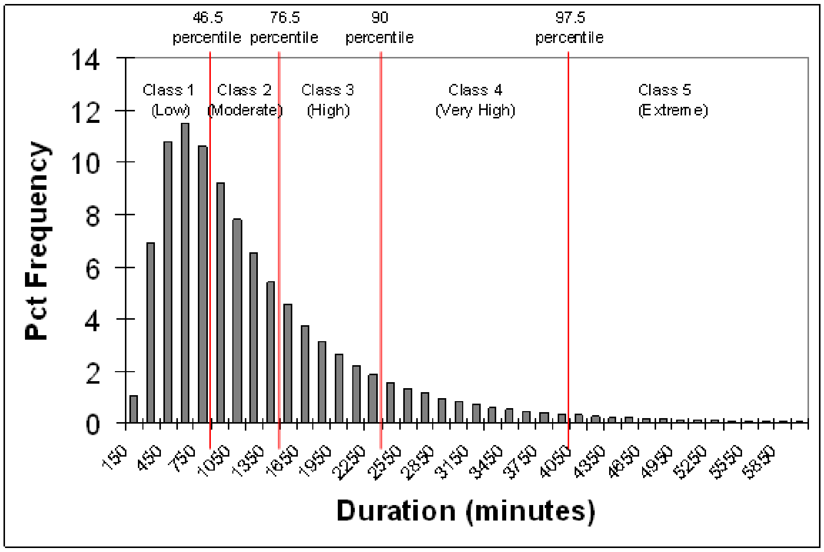
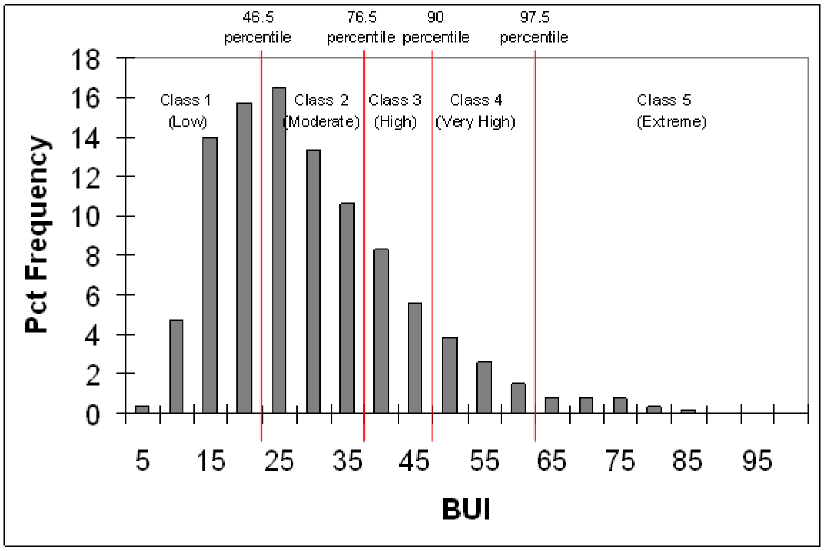
Appendix A: Relative correlation between fire weather and fire size or duration.

Each fire size or duration distribution is divided into five classes defined by percentiles representing fire danger classes ranging from moderate to extreme (Fig. A1). Each fire weather datum requires a corresponding fire weather class listed for each daily weather record. The user can decide how to define these classes, but in general we recommend applying the same percentiles shown in Fig. A1 to the weather variable most correlated with fire size, such as fire weather index or the build-up index. After the fire size or duration has been selected for the event, the selection of weather records is constrained to the fire weather class corresponding with fire intensity class selected for the event. A "weather randomizer" parameter ranging from zero to four defines the degree of correlation between fire size or duration and fire weather by defining the number of adjacent fire weather classes considered for fire weather selection. For example, a value of zero constrains the fire weather class to be the same as the fire intensity class selected for the event, a value of one allows the fire weather class to be the same or one class above or below the fire intensity class, and a value of four eliminates any correlation between fire size/duration and fire weather.

Figure A1. Example a. duration and b. buildup index (BUI) distributions from the central Labrador test case, divided into 5 classes based on the same percentiles. A parameter (RAND) ranging from zero to four defines the degree of correlation between fire size or duration and fire weather by defining the number of adjacent fire weather classes considered for fire weather selection. After the selection of an event duration and duration class (Class A), the weather data for the event would be chosen from weather records within classes ranging from Class (A - RAND) to Class (A + RAND). If RAND is zero, then the selection of weather records is constrained to only the equivalent Class A. If RAND is four, then all weather records can be used for the selection of weather data.





Appendix B. Equations from the Canadian Forest Fire Behavior Prediction System (FBP). This appendix lists equations used in the Dynamic Fire System Extension that are based on equations from the Canadian Forest Fire Behavior Prediction System (FBP). Each equation that comes from the FBP is identified with the equation number (FBP [##]) assigned to the equation in the publication describing the FBP (Forestry Canada Fire Danger Group, 1992). See Table B1 for abbreviation definitions. Note that standard FBP fuel types are identified first by their base (O = open, C = conifer, D = deciduous, M = mixed, and S = slash) followed by a number (e.g., C-2 = boreal spruce).

Calculation of Initial Spread Index (ISI)

$$ISI = 0.208 \times f(W) \times f(F) \qquad \text{FBP [52]}$$

$$f(F) = 91.9 \times e^{(-0.1386 \times m)} \times \left[1 + \frac{m^{5.31}}{4.93 \times 10^{7}}\right] \qquad \text{FBP [45]}$$

$$m = \frac{147.2 \times (101 - FFMC)}{59.5 + FFMC} \qquad \text{FBP [46]}$$

If WS ≤ 40 km/hr:

$$f(W) = e^{0.05039 \times WSV} \qquad \text{FBP [53]}$$

If WS > 40 km/hr:

$$f(W) = 12 \times \left[1 - e^{-0.0818 \times (WSV - 28)}\right] \qquad \text{FBP [53a]}$$

$$ISZ = 0.208 \times f(F)$$

Where FFMC is the fine fuel moisture code, and WS is the wind speed velocity (km/hr) for the event, WSV is the net effective wind speed (see Topography Influence) for the cell, and ISZ is the zero wind ISI.

Calculation of Topography Influence

$$SF = e^{3.533 \times \left(\frac{GS}{100}\right)^{1.2}} \qquad \text{FBP [39]}$$

$$RSF = RSZ \times SF \qquad \text{FBP [40]}$$

For fuel types M-1 and M-2:

$$ISF = \frac{\ln\left[1 - \left(\frac{100 - RSF}{PC \times a}\right)^{\frac{1}{c}}\right]}{-b} \qquad \text{FBP [42]}$$

For fuel type O-1:

$$ISF = \frac{\ln\left[1 - \left(\frac{100 - RSF}{CF \times a}\right)^{\frac{1}{c}}\right]}{-b} \qquad \text{FBP [43]}$$

If C > 50:

$$CF = 0.02 \times C - 1.0 \qquad \text{FBP [35]}$$

If C ≤50:

$$CF = 0$$

For all other fuel types:

$$ISF = \frac{\ln\left[1 - \left(\frac{RSF}{a}\right)^{\frac{1}{c}}\right]}{-b} \qquad \text{FBP [41]}$$

$$WSE = \frac{\ln\left[\frac{ISF}{0.208 \times f(F)}\right]}{0.05039} \qquad \text{FBP [44]}$$

WSX = [WS * sin(WAZ)] + [WSE * sin(SAZ)] FBP [47]

WSY = [WS * cos(WAZ)] + [WSE * cos(SAZ)] FBP [48]

WSV = $\sqrt{(WSX^2 + WSY^2)}$ FBP [49]

RAZ = arccos (WSY/WSV) FBP [50]

If WSX < 0, then RAZ = 360 – RAZ FBP [51]

Where GS is the percent ground slope for the cell, RSZ is the zero wind rate of spread (see Rate of Spread below) for the cell, a, b, and c are fuel-type-specific input parameters, PC is the percent conifer composition for the cell (from Fuel extension), C is the degree of curing for the event, WS is the wind speed velocity (km/hr) for the event, SAZ is the uphill slope azimuth for the cell, WSV is the net effective wind speed (km/hr), and RAZ is the net effective wind direction for the cell.

Calculation of Rate of Spread

For fuel types with base fuel types: Conifer, Slash, and Conifer following insect outbreaks:

$$RSI = a \times \left[1 - e^{(-b \times ISI)}\right]^c \qquad \text{FBP [26]}$$

$$RSZ = a \times \left[1 - e^{(-b \times ISZ)}\right]^c$$

For base fuel type Deciduous with leaf-on:

$$RSI = RSI \times 0.2$$

$$RSZ = RSZ \times 0.2$$

For base fuel type Conifer following insect outbreaks (leaf-off):

$$a = 170 \times e^{\left(\frac{-35}{PDF}\right)} \qquad \text{FBP [29]}$$

$$b = 0.082 \times e^{\left(\frac{-36}{PDF}\right)} \qquad \text{FBP [30]}$$

$$c = 1.698 - 0.00303 \times PDF \qquad \text{FBP [31]}$$

For base fuel type Conifer following insect outbreaks (leaf-on):

$$a = 170 \times e^{\left(\frac{-35}{PDF}\right)} \qquad \text{FBP [32]}$$

$$b = 0.0404 \qquad \text{FBP [33]}$$

$$c = 3.02 \times e^{(-0.00714 \times PDF)} \qquad \text{FBP [34]}$$

For base fuel types conifer and deciduous mixed together (leaf-off):

$$RSI = \left[\frac{PC}{100} \times (RSI_{C-\#})\right] + \left[\frac{PH}{100} \times (RSI_{D-1})\right] \qquad \text{FBP [27]}$$

$$RSZ = \left[\frac{PC}{100} \times (RSZ_{C-\#})\right] + \left[\frac{PH}{100} \times (RSZ_{D-1})\right]$$

For base fuel types conifer and deciduous mixed together (leaf-on):

$$RSI = \left[\frac{PC}{100} \times (RSI_{C-\#})\right] + 0.2 \times \left[\frac{PH}{100} \times (RSI_{D-1})\right] \qquad \text{FBP [28]}$$

$$RSI = \left[\frac{PC}{100} \times (RSZ_{C-\#})\right] + 0.2 \times \left[\frac{PH}{100} \times (RSZ_{D-1})\right]$$

For base fuel type Open :

If Curing > 50:

$$CF = 0.02 \times C - 1.0 \qquad \text{FBP [35]}$$

If Curing $\leq$50:

$$CF = 0$$

$$RSI = a \times \left(1 - e^{-b \times ISI}\right)^{c} \times CF \qquad \text{FBP [36]}$$

$$RSZ = a \times \left(1 - e^{-b \times ISZ}\right)^{c} \times CF$$

$$BE = e^{\left[50 \times \ln(q) \times \left(\frac{1}{BUI} - \frac{1}{BUI_0}\right)\right]} \qquad \text{FBP [54]}$$

For all base fuel types except Conifer Plantation:

$$ROS = RSI \times BE \qquad \text{FBP [55]}$$

For base fuel type Conifer Plantation:

$$RSS = RSI \times BE \qquad \text{FBP [63]}$$

$$RSC = 60 \times \left(1 - e^{-0.0497 \times ISI}\right) \times \frac{FME}{FME_{avg}}$$ FBP [64]

$$FME = \left(\frac{\left[1.5 - 0.00275 \times FMC\right]^4}{460 + \left[25.9 \times FMC\right]} \right) \times 1000$$ FBP [61]

$$ROS = RSS + CFB \times \left(RSC - RSS\right)$$ FBP [65]

Where a, b, c, q, and BUI_0 are fuel-type-specific input parameters, PDF is the percent dead conifer for the cell (from Biological Disturbance Agent extension), PC is the percent conifer composition for the cell (from Fuel extension), PH is the percent hardwood for the cell (from Fuel extension), C is the degree of curing for the event, RSZ is the zero wind rate of spread (see Topography Influence) for the cell, BUI is the Buildup Index for the event, FMC is the Foliar Moisture Content for the event, FME_{avg} is 0.778, and CFB is crown fraction burned (see Potential Severity).

Calculation of Length to Breadth Ratio

For all base fuel types except Open:

$$LB = 1.0 + 8.729 \times \left[1 - e^{-0.030 \times WSV}\right]^{2.155}$$ FBP [79]

For base fuel types Open:

If WSV ≥ 1.0:

$$LB = 1.1 + WSV^{0.464}$$ FBP [80]

If WSV < 1.0:

$$LB = 1.0$$ FBP [81]

Calculation of Potential Fire Severity

CSI = 0.001 * $CBH^{1.5}$*(460 + 25.9 * FMC)$^{1.5}$ FBP [56]

RSO = CSI/(300 * SFC) FBP [57]

CFB = 1 – e^(-0.23 * (ROS – RSO)) FBP [58]

For fuel type C-1:

SFC = 1.5*(1-$e^{(-0.2230 * [FFMC - 81])}$), FBP [9]

If SFC <0, then SFC = 0

For fuel types C-2, M-3, and M-4:

SFC = 5.0 * (1-$e^{(-0.0115 * BUI)}$) FBP [10]

For fuel types C-3, C-4:

SFC = 5.0 * (1-$e^{(-0.0164 * BUI)}$)$^{2.24}$ FBP [11]

For fuel types C-5, C-6:

SFC = 5.0 * (1-$e^{(-0.0149 * BUI)}$)$^{2.48}$ FBP [12]

For fuel type C-7:

$FFC = 2 * (1-e^{(-0.104*(FFMC - 70)})$, FBP [13]

If FFC <0, then FFC = 0

$WFC = 1.5 * (1-e^{(-0.0201 * BUI)})$ FBP [14]

$SFC = FFC + WFC$ FBP [15]

For fuel type D-1:

$SFC = 1.5 * (1-e^{(-0.0183 * BUI)})$ FBP [16)]

For fuel types M-1 and M-2:

$SFC = (PC/100 * (SFC_{C\text{-}\#})) + (PH/100 * (SFC_{D\text{-}1}))$ FBP [17]

For fuel type O-1:

$SFC = GFL$ FBP [18]

For fuel type S-1:

$FFC = 4.0 * (1-e^{(-0.025 * BUI)})$ FBP [19]

$WFC = 4.0 * (1-e^{(-0.034 * BUI)})$ FBP [20]

For fuel type S-2:

$FFC = 10.0 * (1-e^{(-0.013 * BUI)})$ FBP [21]

$WFC = 6.0 * (1-e^{(-0.060*BUI)})$ FBP [22]

For fuel type S-3:

$FFC = 12.0 * (1-e^{(-0.0166*BUI)})$ FBP [23]

$WFC = 20.0 * (1-e^{(-0.0210 * BUI)})$ FBP [24]

For fuel types S-1, S-2, and S-3:

$SFC = FFC + WFC$ FBP [25]

Where CBH is the crown base height input parameter, FMC is the Foliar Moisture Content for the event, FFMC is the fine fuel moisture code for the event, BUI is the buildup index for the event, PC is the percent conifer composition for the cell (from Fuel extension), PH is the percent hardwood for the cell (from Fuel extension), and GFL is the grass fuel load (standard value 0.3 kg/m^2).

Table B1. List of parameter abbreviations, definitions, and corresponding FBP equations from (Forestry Canada Fire Danger Group, 1992).

Variable Abbreviation	Variable Description	Units	Source
ISI	Initial spread index	Index	FBP [52]
FFMC	Fine fuel moisture code	Index	Event weather
WS	Wind speed	km/hr	Event weather
WSV	Net effective wind speed	km/hr	FBP [49]
ISZ	Zero wind ISI	Index	FBP [52]
GS	Ground slope	Percent	Cell input
SF	Slope factor	Index	FBP [39]
RSZ	Zero wind rate of spread	m/min	FBP [26]
RSF	Slope-adjusted zero wind rate of spread	m/min	FBP [40]
PC	Percent conifer composition	Percent	Input from Fuel Extension
ISF	ISI with slope influence and zero wind	Index	FBP [41] – [43]
CF	Curing factor	Index	FBP [35]
C	Degree of curing	Percent	Event season input
WSE	Slope equivalent wind speed	km/hr	FBP [44]
WSX	Resultant vector magnitude in x-direction	km/hr	FBP [47]
WAZ	Wind azimuth (direction)	Degree	Event weather
SAZ	Uphill slope azimuth (direction)	Degree	Cell input
WSY	Resultant vector magnitude in y-direction	Km/hr	FBP [48]
RAZ	Net effective wind direction	Degree	FBP [50] – [51]
RSI	Initial rate of spread	m/min	FBP [26] – [28], [62]
PDF	Percent dead conifer	Percent	Input from Fuel Extension
PH	Percent hardwood composition	Percent	Input from Fuel Extension
BUI	Buildup index	Index	Event weather
BE	Buildup effect	Index	FBP [54]
ROS	Rate of spread	m/min	FBP [55], [65]
RSS	Surface fire rate of spread	m/min	FBP [63]
RSC	Crown fire spread rate	m/min	FBP [64]
FME	Foliar moisture effect	Index	FBP [61]
FME_{avg}	Average foliar moisture effect	Index	Constant (0.778)
CFB	Crown fraction burned	Index	FBP [58]
LB	Length-to-breadth ratio	Index	FBP [80], [81]
CSI	Critical surface fire intensity	kW/m	FBP [56]
RSO	Critical surface fire spread rate	m/min	FBP [57]
SFC	Surface fuel consumption	kg/m^2	FBP [9] – [12], [15], [17], [18], [25]
FFC	Forest floor consumption	kg/m^2	FBP [13], [19], [21], [23]
WFC	Woody fuel consumption	kg/m^2	FBP [14], [20], [22], [24]
GFL	Grass fuel load	kg/m^2	Constant (0.3)

Appendix C *Fuel Type Parameters*

Each fuel type requires three parameters (*a*, *b*, *c*) that together determine the rate of spread dependent upon weather conditions and fuel moisture (Forestry Canada Fire Danger Group, 1992, Appendix B):

$$RSI = a \times \left[1 - e^{(-b \times ISI)}\right]^{c} \qquad \text{Eq. C1}$$

where RSI is the initial rate of spread in the downwind direction, and ISI is the initial spread index that is a function of fuel moisture and wind speed (Forestry Canada Fire Danger Group, 1992, Appendix B). The rate of spread is further modified by a buildup index for each fuel type and a maximum buildup effect (parameters *q* and BUI_0). The build-up effect (BE) is a multiplier affecting the rate of spread that accounts for long-term fuel moisture, estimated using the following equation:

$$BE = e^{\left[50 \times \ln(q) \times \left(\frac{1}{BUI} - \frac{1}{BUI_0}\right)\right]} \qquad \text{Eq. C2}$$

where BUI is the build-up index (Forestry Canada Fire Danger Group, 1992, Appendix B). For each cell burned during a given fire event, potential fire severity is calculated as a function of the estimated crown-fraction burned (CFB) for that cell, where CFB is estimated using a combination of the fire rate of spread, foliar moisture content, and fuel-type specific parameters defining crown base height (CBH), crown fuel load (CFL), and fuel-type specific equations estimating surface fuel consumption. Each fuel type must be assigned to one of the standard surface fuel types from the Canadian Fire Behavior Prediction system associated standard equations for surface fuel consumption and standard CFL parameters. Standard values for the remaining fuel-specific parameters (*a*, *b*, *c*, *q*, BUI_0, and *CBH*) from the Canadian FBP are set as defaults (Table C1), but can be modified to adapt the system to other fuel types and fire behaviors (see Appendix 4 for an example from the Sierra Nevada case study). Users may also assign fuel-type specific ignition probabilities (default = 1).

Table C1. Standard FBP fuel types and associated default parameter values.

Fuel Type	Descriptive Name	a	b	c	BUI_0	q	CBH (m)	CFL (kg/m^2)
C-1	Spruce-lichen woodland	90	0.0649	4.5	72	0.90	2	0.75
C-2	Boreal spruce	110	0.0282	1.5	64	0.70	3	0.80
C-3	Mature jack or lodgepole pine	110	0.0444	3.0	62	0.75	8	1.15
C-4	Immature jack or lodgepole pine	110	0.0293	1.5	66	0.80	4	1.20
C-5	Red and white pine	30	0.0697	4.0	56	0.80	18	1.20
C-6	Conifer plantation	30	0.0800	3.0	62	0.80	7	1.80
C-7	Ponderosa pine-Douglas-fir	45	0.0305	2.0	106	0.85	10	0.50
D-1	Leafless aspen	30	0.0232	1.6	32	0.90	NA	NA
M-1	Boreal mixedwood-leafless				50	0.80	6	0.80
M-2	Boreal mixedwood-green				50	0.80	6	0.80
M-3	Dead balsam fir mixedwood-leafless				50	0.80	6	0.80
M-4	Dead balsam fir mixedwood-green				50	0.80	6	0.80
S-1	Jack or lodgepole pine slash	75	0.0297	1.3	38	0.75	NA	NA
S-2	White spruce-balsam slash	40	0.0438	1.7	63	0.75	NA	NA
S-3	Coastal cedar-hemlock-Douglas-fir slash	55	0.0829	3.2	31	0.75	NA	NA
O-1a	Grass-matted	190	0.0310	1.4		1.00	NA	NA
O-1b	Grass-standing dead	250	0.0350	1.7		1.00	NA	NA

Appendix D. *Case Study parameterization – Fire Regimes*

Labrador

We used fire records from the Newfoundland and Labrador provincial government to parameterize the Labrador fire regime, using the duration-based option (see Table 1). Thirty years of daily weather observations from the Goose Bay/Happy Valley weather station were used to calculate input fire weather variables for the dynamic fire extension. Weather observations with fire weather index (FWI, Van Wagner, 1987) fewer than 4 were assumed unable to sustain a fire and removed from the fire weather database (Simard, 1973). Initial conditions for forest composition were derived from a forest classification based on Landsat imagery in combination with stand-level inventory and permanent sample plot data from the Province of Newfoundland and Labrador. We assumed that vegetation was dynamic within closed forests only, parameterized as a single FRU. Open forest and wetland FRUs were simulated with constant vegetation types that could burn, but at lower frequencies relative to closed canopy forests (see Table 1). We parameterized the dynamic fuel and fire extensions using standard fuel types from the Canadian FBP. Potential fire severity was an emergent property dependent on fuel type, fire weather, and burn direction relative to wind direction and topography. We assumed that fire weather (BUI) and fire duration were tightly coupled (weather randomizer = 0), and applied a 4-day maximum fire duration cut-off.

We contrasted duration-based fire regimes implemented with the new dynamic fire and fuels extensions with a size-based fire regime implemented with the Base Fire extension (v1.2) derived from the original LANDIS (He and Mladenoff, 1999). In the Base Fire extension, fire regimes are also stratified by FRUs. Fire ignitions are probabilistic functions of FRUs and time since last fire. Fire events are selected from a lognormal size distribution and events spread probabilistically until either the preselected size has been reached or the fire runs out of cells to burn. Burn "intensity" is a function of the time since last fire. Fire regimes for each extension were parameterized using the same fire size data. Fire intensity curves for Base Fire were parameterized analogously to the dynamic fire and fuel extensions, such that the resulting effects (mean potential severity) were similar. For the closed forest FRU, we parameterized a fuel curve assuming that intensity increased from low intensity (Class 1) surface fires to moderate intensity (Class 3) fires over a short period of 20 years, with slightly higher intensity fires (Class 4) assumed by 150 years post fire. This fuel curve assumes a short period of hardwood shrub following fire, followed by closed-canopy, even-aged stand conditions, followed by more uneven-aged stand conditions as the stand begins to break apart. For the remaining FRUs with constant vegetation types, we used the mean potential fire severity class observed for the analogous fuel type used in the dynamic fire and fuel extensions (see Table 1).

Sierra Nevada

We stratified the Sierra Nevada case study area into three primary FRUs that reflect the effect of elevation on regional fire regimes (Agee, 1993), including lightning ignitions (van Wagtendonk and Fites-Kaufman, 2006) The FRUs included low (up to 1190 m), medium (~1190 – 2120 m), and high (above 2120 m) elevations. These FRUs roughly correspond to the foothill shrubland and woodland, lower-montane forest, and upper-montane forest ecological zones in the region (van Wagtendonk and Fites-Kaufman, 2006).

We used historic fire perimeter data (http://www.fs.fed.us/r5/rsl/projects/gis/data/calcovs/CA_R5_FireHistory06_1.html) to calculate mean historic fire rotation periods and the mean, standard deviation, and maximum fire sizes over the period 1985-2006. We calibrated the dynamic fire extension to a) reproduce the historic fire size distribution using the duration-based option, and b) to achieve a mean potential severity of ~3.5 (on a scale from 1 to 5) with a normal distribution. Details of parameterization of the succession extension can be found in (Syphard et al., in review). We assumed that fire weather and fire duration were tightly coupled (weather randomizer = 0), and applied a maximum fire duration of four days.

Daily weather data for the "base weather" scenario (i.e., weather based on the recent past) were derived from the California Climate Data Archive produced by the Western Regional Climate Center (http://www.calclim.dri.edu/stationlist.html). We downloaded the full available history of daily weather data for all of the weather stations located within the three elevation fire regions to find the combination of stations that would provide the longest complete weather histories. For the low-elevation fire region, we used 1994, 1995, and 1997 from the Esperanza station and 2000-2006 from the Trimmer station, resulting in 10 years of data. For the middle elevation fire region, we used 1991, 1992, 1994, and 1995 from Mariposa Grove; 1996, 1997, and 1998 from Shaver; and 1999-2006 from Johnsondale, resulting in 15 years of data. For the high-elevation fire region, we used 1995-2003 from Devils Post Pile and 2004-2006 from Sugar Loaf, for 14 years of data. For the "extreme weather" scenario, we limited the fire weather data to the 90th percentile of FWI in the weather records to restrict fire occurrence to very high and extreme fire weather conditions.

We defined fuel types based on characteristic species assemblages and age ranges that together exemplify relatively uniform fire behavior and rates of spread: Mixed Conifer, Red Fir, Pines and White Fir, Sequoia, Lodgepole Pine and Hemlock, Chaparral, and Deciduous (predominately oaks). Within each group, fuel types were further broken into two or three age groups: young, mid-aged, and old. We adjusted the fuel type parameters to reflect rates of spread characteristic of our fuels types (B. Bahro, USFS, personal communication) (Table D1). For the deciduous fuel type, we derived parameters from fuel class TL6 (broad-leaf deciduous) from the Fire Behavior Fuel Models (FBFM) developed by Scott and Burgan (2005).

Table D1. Sierra Nevada fuel types and associated parameters.

Fuel Type	Descriptive Name	Ignition Probability	a	b	c	q	Mean BUI	Max BE	CBH (m)
FT1	Young Mixed Conifer	0.01	110	0.0282	1.5	0.7	64	1.321	1
FT2	Mid-aged mixed conifer	0.01	110	0.0282	1.5	0.7	64	1.321	2
FT3	Old mixed conifer	0.01	110	0.0293	1.5	0.8	66	1.184	4
FT4	Young pine/white fir	0.01	110	0.0282	1.5	0.7	64	1.321	1
FT5	Mid-aged pine/white fir	0.01	110	0.0444	3	0.75	62	1.261	2
FT6	Old pine/white fir	0.01	110	0.0444	3	0.75	62	1.261	5
FT7	Young red fir	0.01	110	0.0282	1.5	0.7	64	1.321	1
FT8	Mid-aged red fir	0.01	90	0.0649	4.5	0.9	72	1.076	2
FT9	asypharOld red fir	0.01	90	0.0649	4.5	0.9	72	1.076	8
FT10	Young sequoia	0.01	110	0.0282	1.5	0.7	64	1.321	1
FT11	Mid-aged sequoia	0.01	30	0.0800	3	0.8	62	1.197	3
FT12	Old sequoia	0.01	30	0.0800	3	0.8	62	1.197	10
FT13	Young lodgepole/hemlock	0.01	110	0.0282	1.5	0.7	64	1.321	1
FT14	Mid-aged lodgepole/hemlock	0.01	30	0.0800	3	0.8	62	1.197	2
FT15	Old lodgepole/hemlock	0.01	30	0.0800	3	0.8	62	1.197	5
FT16	Young chaparral	0.01	110	0.0282	1.5	0.7	64	1.321	1
FT17	Mid-aged chaparral	0.02	110	0.0282	1.5	0.7	64	1.321	1
FT18	Old chaparral	0.02	110	0.0282	1.5	0.7	64	1.321	1
FT19	Young deciduous	0.001	30	0.0232	1.6	0.9	32	1.179	1
FT20	Old deciduous	0.001	30	0.0232	1.6	0.9	32	1.179	2

Literature Cited

Agee, J.K., 1993. Fire ecology of Pacific Northwest forests. Island Press, Washington, D.C.

Forestry Canada Fire Danger Group, 1992. Development and structure of the Canadian Forest Fire Behavior Prediction System. Forestry Canada, Science and Sustainable Development Directorate, Information Report ST-X-3.

He, H.S., Mladenoff, D.J., 1999. Spatially explicit and stochastic simulation of forest-landscape fire disturbance and succession. Ecology 80, 81-99.

Scott, J.H., Robert, E.B., 2005. Standard fire behavior fuel models: A comprehensive set for use with Rothermel's surface fire spread model. United States Department of Agriculture Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-153.

Simard, A.J., 1973. Forest fire weather zones of Canada. Environment Canada, Forestry Service, Ottawa, ON Canada.

Syphard, A.D., Scheller, R.M., Ward, B.C., Spencer, W.D., Strittholt, J.R., in review. Long-term, broad-scale effects of fuel treatments on fire regimes in the Sierra Nevada, California. Forest Ecology and Management.

Van Wagner, C.E., 1987. Development and structure of the Canadian Forest Fire Weather Index System. Canadian Forestry Service, Forestry Technical Report 35.

van Wagtendonk, J.W., Fites-Kaufman, J., 2006. Sierra Nevada bioregion In: Sugihara, N.G., van Wagtendonk, J.W., Shaffer, K.E., Fites-Kaufman, J., Thode, A.E. (eds.), Fire in California's ecosystems. The University of California Press, Berkeley, CA, pp. 264-294.