Fire Danger Rating Operations Plan 2014

Terry Marsha
Meteorologist - NWCC

Organization

The Northwest Coordination Center (NWCC) is divided into two functions, Emergency Operations and Predictive Services.

The Emergency Operations serves as the focal point for providing logistical support to ongoing and anticipated wildland fire activity for all federal and cooperating state agencies in Oregon and Washington.

Predictive Services was created in 1997 as an enhancement of the Intelligence Coordinator position. Emphasis has centered on the development of scientifically based innovative solutions in a collaborative, team-oriented environment involving intelligence staffers, fire weather meteorologists, fire behavior analysts, and weather and climate research scientists. The goal of Predictive Services is to help promote more proactive resource decision making.

Introduction

With regards to daily fire operations, the primary responsibility of Predictive Services at NWCC is to provide sound guidance to regional and national resource managers concerning current and projected ***"Fire Activity"*** throughout the Northwest Region. The goal of this guidance is to help facilitate efficient and effective resource decisions that make best use of available resources.

Predictive Services provides various levels of guidance on several different time scales including *"seasonal"* outlooks *"monthly*" outlooks and *"daily"* outlooks for the next 7 to 10 days. This Operating Plan will outline material related to NWCC's operational ***"7-Day Significant Fire Potential Model"*** and ***Fire Activity Forecast Model*** (heretofore referred to as "models") including other supportive guidance material as well as the weather monitoring infrastructure designed to support it.

Our "models" are run each morning and, normally, results will be posted to our web site by about 0900 PDT usually commencing in early May and continuing through the entirety of the "fire season". A primary purpose of these "models" is to predict the probability of a ***"Significant Fire Event"*** for each of the next 7 days. By "significant fire event", we mean the following.

> ***"Significant Fire Event"*** – A fire of such size or complexity that will likely require mobilization of additional resources from outside the area in which the fire situation originates.

Weather and Fuels Monitoring Infrastructure

In order to facilitate the assessment of fire potential with some degree of spatial resolution we have broken the region up into a subset of smaller forecast areas. In addition, we have established a manageable sub-network of "key" weather and NFDRS reporting sites. These RAWs will be used for monitoring both weather and fuel conditions needed in the determination of fire potential.

The forecast areas were determined by using a statistical "cluster" algorithm to group existing RAWs into relatively homogeneous sub-groups. The goal of this type of analysis is to establish forecast areas where all RAWs react similarly to daily weather regimes. All RAWs were correlated with one another based on daily minimum relative humidity. Highly correlated RAWs were grouped together forming distinct areas. On an average, RAWs within any particular area tend to correlate better with one another than they do with RAWs in adjoining areas. This analysis resulted in 12 distinct "Predictive Service Areas" or ***PSA***s. A map of our PSAs is included as Appendix 1.

The Pacific Northwest possesses a relatively dense network of over 200 fire danger RAWs with as many as 30 located in some of our PSAs. Many of the RAWs give a certain amount of redundant information, at least for regional scale fire danger rating. We decided to pare the network down to a more manageable number. Again, RAWs within each PSA were correlated with one another and redundant RAWs discarded. This resulted in a sub-network of 73 unique "key" RAWS across the region. These 73 RAWs represent the core RAWs to be used in our models. A listing of the Key RAWS in each PSA is contained within Appendix 2.

Quality Control

NFDRS output is a major factor in determination of fire potential. Poor quality weather observations will guarantee the failure of NFDRS, as well as other programs that rely on accurate weather data. This could lead to costly management decisions at the local, regional and national level and ultimately could affect firefighter safety. Therefore, a program of quality control of RAWS observations is a critical management responsibility. Data should be monitored at all levels. A portion of the responsibility for quality control of RAWs data resides here at NWCC. We collect and archive a full 24 hours of weather data from nearly all RAWS in the region daily. Informal monitoring of the data quality is undertaken. Discovered problems will be communicated to individual RAWS owners.

Fire Activity Model

Ten day projections of fire activity are made daily at NWCC. Forecasted elements include *daily probability for an ignition, daily expected number of ignitions, daily probability of a new large fire, expected number of new large fires* and the *expected duration of any new large fires*. Projections will be made for each PSA.

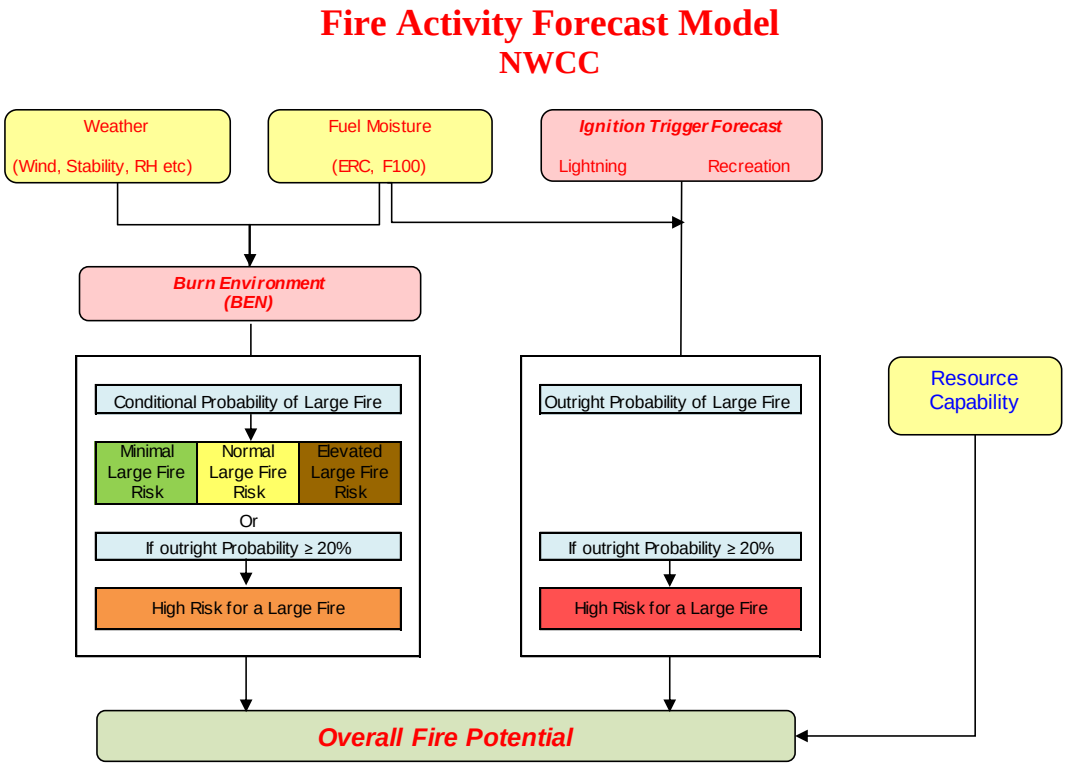
We have adopted the following determination for a **"Large Fire".**

"Large Fire" – A fire meeting or exceeding the size of the top 5% of historic "daily largest fires" for all June/September fire days. This value will be rounded as follows:

When the "95th percentile fire" is,

1. >10,000 acres – round to nearest 1000 acres
2. 1000-10,000 acres – round to nearest 500 acres
3. 100-1000 acres – round to nearest 100 acres
4. <100 acres – round to 100 acres

This criterion results in a "large fire" size unique to each PSA, ranging from as small as 100 acres to as large as 10000 acres. Appendix 2 specifies the size of a large fire for each PSA. "*Large Fire"* sizes will be updated periodically.



Determination of daily fire activity needs to consider current and projected burning conditions ***(Burn Environment or BEN)*** and the level of ignitions expected ***(Ignition Potential). Resource Capability*** is also important and, though not formally a part of our objective model, will be subjectively factored into our forecast if thought to be significant. Our model employs objective statistical techniques to forecast fuel moisture, weather and ignition potential each morning. These components are combined in our model to forecast the *"Fire Activity"* for each individual PSA for each of the next 10 days.

This forecast model will be a dynamic project expected to change and hopefully improve over time as we continue to update it with new data and new research

Ignition Potential

Ignition potential can be due to human activity or lightning. Our forecast algorithms address both.

The forecast equations for daily probability of and number of human caused fires consider the following.

1. Day of the year
2. Day of the week

3. Fuel dryness as determined by our forecasts of ERC and/or F100
4. Various recreation events such as the 4th of July

Our lightning fire modules forecast the following.

1. Probability of lightning
2. Number of strikes expected for a particular lightning event
3. Fuel dryness as determined by our forecasts of ERC and/or F100

Burn Environment (BEN)

The burn environment is defined by the fuel and weather conditions that will either aid or inhibit significant fire spread on any given day. The burning conditions play some role in whether or not fires will actually start but are more instrumental in forecasting the probability of larger fires.

We have developed forecast equations that consider the level of ignition potential for each day, as explained above, in conjunction with the burn environment assessment to arrive at the probability of and number of expected large fires. This information is portrayed on our ***"7-Day Significant Fire Potential"*** product issued each morning by about 9am.

7-Day Significant Fire Potential Product

Nationally, this product is the "signature" Predictive Services forecast and is produced by all GACC Predictive Service Units each morning. Its purpose is to convey information regarding the expected potential for large costly wildfires over the next 7 day period. It does so using a 5 color scheme relating to the probability for large fires. At NWCC the following color scheme is incorporated.

1. **Green** – The conditional probability for a large human-caused fire is less than ½ the climatological probability. From a burn environment perspective there is **"little or no threat"** for a large fire.
2. **Yellow** – Represents a rather normal probability for a large human-caused fire. Burning conditions are typical but not out of the ordinary
3. **Brown** – The conditional probability for a large human-caused fire is twice or greater the normal climatological probability. This indicates significantly elevated burning conditions

*Note: *Conditional probability* as used above means the probability if a large fire with the condition that a fire of any size occurs (probability of a large fire on a fire day).

Also note that the "green-yellow-brown" designation refers only to human-caused fires i.e. lightning fires are excluded. The reason for this is that we want these designations to be **reflective of the burn environment** without complication from a mass ignition event which can result in large fires even without elevated burning conditions.

An "Orange" and "Red" color may occasionally be designated on the chart, as well. These represent our **"High Risk"** alerts defined as follows:

4. **Orange –** An outright probability of 20% or greater for a large fire due to critically elevated burning conditions.

5. **Red** – An outright probability of 20% or greater for a large fire due primarily to a mass ignition event. Normally this is a significant lightning event but could also be due to heavy recreation.

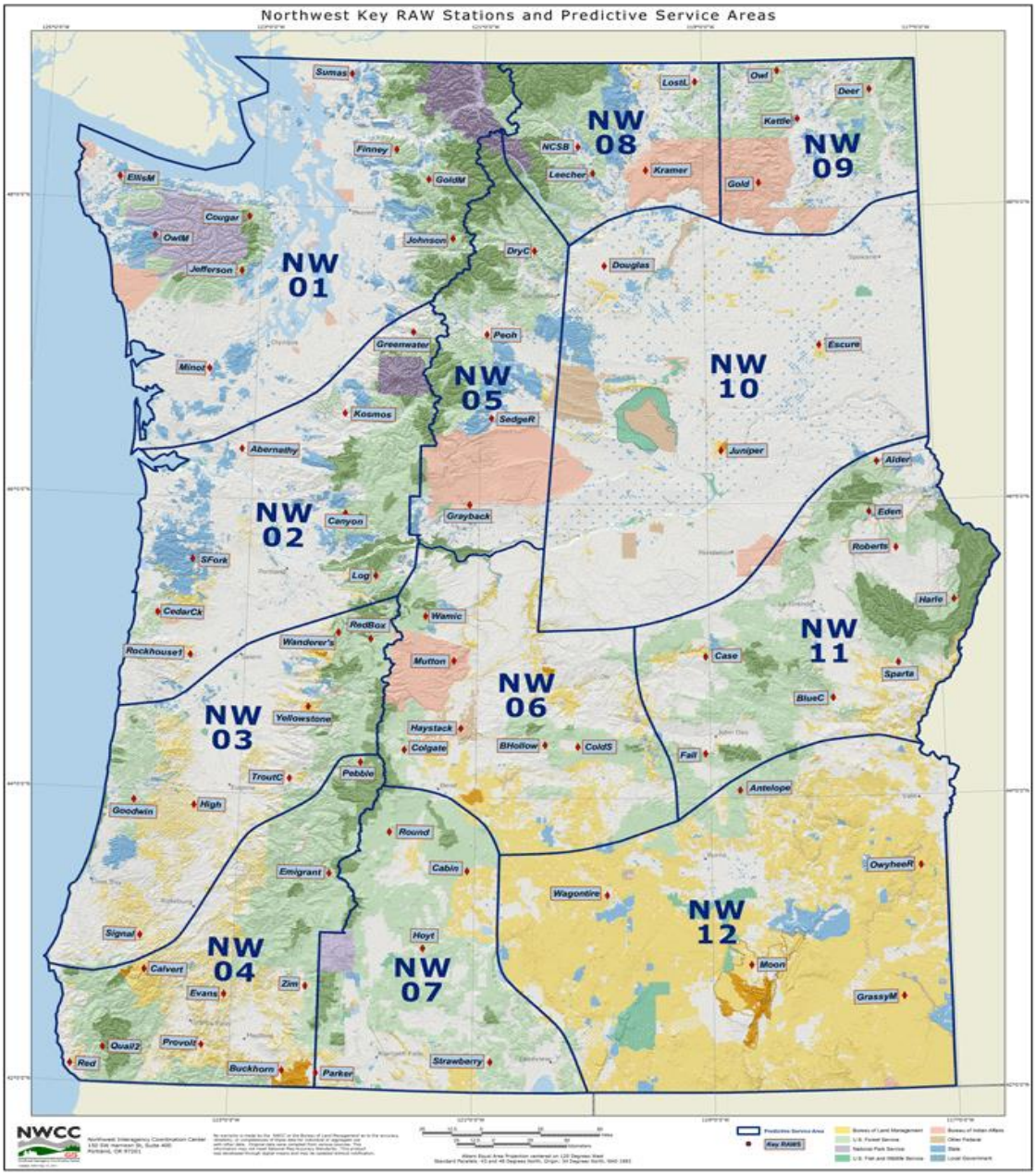
*Note: In the case for orange and red colors we use *Outright probability* rather than conditional probability. Whether or not ignitions are expected is not considered. It simply reflect a scenario where the burn environment and/or the expected number of ignitions is significant enough to lift the probability for a large fire outright to at or above 20%.

Contact:

Terry Marsha – Meteorologist/Analyst - 503-808-2756 (tmarsha@blm.gov)
Northwest Interagency Coordination Center
5420 NE Marine Drive
Portland Oregon 97218

Appendix 1

Map of NWCC's PSAs & Key RAWs



Appendix 2

Individual Details for Each PSA

The following pages shows the threshold values of ERC or F100 used to define the dryness levels for each PSA. Also various pertinent “Large Fire” potential statistics and information is documented.

PSA NW01 (W1)

This area represents northern portions of western Washington and includes the Olympic Peninsula and west slopes of the north Washington Cascades. PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Sumas Mountain, Finney Creek, Gold Mountain, Johnson Ridge, Ellis Mountain, Cougar, Owl Mountain, Jefferson, Minot Peak

Each RAWS receives equal weighting for NFDRS Index calculations.
Determination of DL: ERC for Fuel Model G
"Large Fire Day" = A day with an occurrence of at least one 100+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large human fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	≤ .5%	73%	20%
Yellow	1%	25%	60%
Brown	≥ 2%	2%	20%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW01

- Burn Environment…The probability of a large fire on any day independent of a lightning episode (i.e. due solely to the burn environment) is less than one-half of 1 percent. There is virtually no correlation between the burn environment and the probability of a large human-caused fire. Therefore we probably will never issue a High Risk for a new large fire due to burning conditions alone. However, we may occasionally issue a High Risk when there is a large fire in progress and burning conditions reach a 95th percentile level determined solely by an ERC value of 40 or higher, especially if there is a thermal trough pattern in western Washington

- Lightning…Between 2000 and 2012 there were about 13 large fires that occurred during lightning episodes which translates to about 1 “large lightning fire event” per year on the average. Any particular lightning event runs about a 5% chance of resulting in a large fire. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a “High Risk” about once per year and can be expected to correctly forecast about 55% of all lightning large fires while forecasting false alarms about 73% of the time.

PSA NW02 (W2)

This area represents southwest Washington and northwest Oregon. Average PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Greenwater, Kosmos, Canyon Creek, Log Creek, Abernathy, South Fork, Cedar Creek, Rockhouse 2

Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine DL: ERC for fuel model G
"Large Fire Day" = A day with an occurrence of at least one 100+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large human fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	≤ .5%	67%	33%
Yellow	1% - 2%	31%	34%
Brown	≥ 3%	2%	33%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW02

- Burn Environment…Wind shows no relationship to large fire occurrence however instability does show a marginal relationship. A probability of as high as 20% is not likely however so it would be highly unusual for us to issue a high risk for a new human-caused large fire. We may, however, issue a High Risk if a large fire is in progress and we expect very dry fuels in conjunction with a thermal trough.

- Lightning…Between 2000 and 2012 there were about 9 large fires days that occurred during lightning episodes. That translated to less than 1 "large lightning fire event" per year with a 4.5% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" about once every year or 2 and can be expected to correctly forecast about 31% of all large lightning fires while forecasting false alarms 65% of the time.

PSA NW03 (W3)

This area represents central portions of western Oregon. Average PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Wanderer's Peak, Red Box Bench, Yellowstone, Trout Creek, Stayton, High Point, Goodwin Peak, Signal Tree

Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine DL: ERC for fuel model: G
"Large Fire Day" = A day with an occurrence of at least one 100+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large human fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	≤ .5%	49%	17%
Yellow	1% - 2%	48%	66%
Brown	≥ 3%	3%	17%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW03

- Burn Environment…Wind shows no relationship to large fire occurrence. There is some marginal correlation between large fires and dry fuels in conjunction with instability. However, a probability of as high as 20% is not likely, so we are not likely to issue a high risk for a new human-caused large fire. We may at times issue a high risk if a large fire is in progress and fuels are dry (ERC reach 53) and a thermal trough is present adding instability.

- Lightning…Between 2000 and 2012 there were about 6 large fires that occurred during lightning episodes. That translated to about 1 "large lightning fire event" every 2 years with a 3.5% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" about once every 2 or 3 years and can be expected to correctly forecast about 49% of all large lightning fires while forecasting false alarms a low 28% of the time.

PSA NW04 (W4)

This area represents southwest Oregon. Average PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Pebble, Emigrant, Zim, Buckhorn Springs, Evans Creek, Provolt, Calvert Peak, Quail Prairie, Red Mound

Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine the DL: 100-HR FM
"Large Fire Day" = A day with an occurrence of at least one 100+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	≤ 1%	53%	22%
Yellow	2% - 3%	32%	36%
Brown	≥ 4%	15%	42%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW04

- Burn Environment…As is the case with all other west-side PSAs, wind shows no relationship to the occurrence of large fires. However dry fuels in conjunction with low level instability does show some correlation. On rare occasions we may issue a high risk for an elevated threat of a new large human-caused fire given very dry and unstable conditions. We may also occasionally issue a High Risk if a large fire is in progress and the ERC reaches 65 or higher in conjunction with a thermal trough.

- Lightning…Between 2000 and 2012 there were a whopping 49 large fires that occurred during lightning episodes. That translated to nearly 2 "large lightning fire events" per year and a 10.7% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" about 2 or 3 times per year and can be expected to correctly forecast about 69% of all large lightning fires with a false alarm frequency of 57%.

PSA NW05 (C1)

This area represents the east slopes of the Washington Cascades and lower valleys. Average PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Dry Creek, Peoh Point, Sedge Ridge, Grayback

Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine DL: 100-HR FM
"Large Fire Day" = A day with an occurrence of at least one 800+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	< 2%	30%	11%
Yellow	2% -5%	59%	56%
Brown	≥ 6%	11%	33%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW05

- Burn Environment…Though difficult to reach a probability of 20% for a new human-caused large fire there is a decent relationship between large fire occurrence and the burn environment with probabilities reaching above 10% under dry and windy conditions. It would be rare for us to issue a high risk for new large fires due to the burn environment but certainly if a large fire is in progress, a high risk would be issued for windy and dry as well as windy and unstable conditions. This scenario can occur with the presence of a thermal trough or ahead of a "marine push".

- Lightning…Between 2000 and 2012 there were 28 large fires that occurred during lightning episodes. That translated to between 1 and 2 "large lightning fire events" per year with a 7.2% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" close to twice per year and can be expected to correctly forecast about 59% of all large lightning fires while forecasting false alarms 65% of the time.

PSA NW06 (C2)

This area represents north central Oregon including the east slopes of the north Oregon Cascades. . PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Wamic Mill, Mutton Mountain, Colgate, Haystack, Board Hollow, Cold Springs

Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine DL: 100-HR FM and ERC
"Large Fire Day" = A day with an occurrence of at least one 2000+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	< 2%	47%	5%
Yellow	2% - 4%	42%	42%
Brown	≥ 5%	11%	53%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW06

- Burn Environment…There is a decent relationship between new human-caused large fires and the burn environment. Probabilities can reach as high as 20% under extreme scenarios relating to both dry and windy as well as dry and unstable conditions. High risk alerts will be issued on rare occasions for an elevated threat for a new large fire due to a critical burn environment. Certainly when a large fire is in progress and dry and windy or dry and unstable conditions are in place a high risk will also be issued. This can happen under the influence of a thermal trough or ahead of a "marine push".

- Lightning…Between 2000 and 2012 there were a whopping 86 large fires that occurred during lightning episodes. That translated to about 3.5 "large lightning fire events" per year with a 13.2% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" about 5 or 6 times per year and can be expected to correctly forecast almost 79% of all large lightning fires while only forecasting false alarms around 54% of the time.

PSA NW07 (C3)

This area represents south central Oregon. . PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Round Mountain, Cabin Lake, Hoyt, Parker Mountain, Strawberry
Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine DL: 100-HR FM
"Large Fire Day" = A day with an occurrence of at least one 100+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	< 2%	43%	12%
Yellow	2% - 4%	44%	52%
Brown	≥ 5%	13%	36%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW07

- Burn Environment…There is a bit of a relationship between new human-caused large fires and the burn environment. However, the probability it not likely to reach our 20% high risk threshold. We will not likely ever issue a high risk for a new large fire due to an elevated burn environment but may occasionally issue one if a large fire is in progress and it is expected to be dry and windy or dry and unstable as may occur with the presence of a thermal trough or ahead of an incoming upper trough.

- Lightning…Between 2000 and 2012 there were 28 large fires that occurred during lightning episodes. That translated to 1 or 2 "large lightning fire events" per year with a 6% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" about 4 to 5 times per year and can be expected to correctly forecast about 75% of all large lightning fires while forecasting false alarms 76% of the time.

PSA NW08 (E1)

This area represents north central Washington (Okanogan country). . PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Leecher Mtn, NCSB, Kramer, Lost Lake

Each RAWS receives equal weighting for NFDRS Index calculations.
Used for determination of DL: 100-HR FM
"Large Fire Day" = A day with an occurrence of at least one 2200+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	< 2%	43%	7%
Yellow	2% - 4%	46%	53%
Brown	≥ 5%	11%	40%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW08

- Burn Environment…There does seem to be some relationship between new large human-caused fires with dry and unstable conditions as might occur with a thermal trough. However, dry and windy conditions do not show much of a correlation. A probability as high as 20% is not likely. Therefore, we are not likely to even issue a high risk for a new large fire solely due to the burn environmentWe may however issue one if a large fire is in progress and burning conditions are elevated especially if a thermal trough is present.

- Lightning…Between 2000 and 2012 there were 30 large fires that occurred during lightning episodes. That translated to 2 “large lightning fire events” per year and a 7.5% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a “High Risk” about 4 times per year and can be expected to correctly forecast about 64% of all large lightning fires with a false alarm frequency of about 69%.

PSA NW09 (E2)

This area represents the northeast Washington Mountains (Colville country). . PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Owl Mountain, Deer Mountain, Kettle Falls, Gold Mountain

Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine DL: 100-HR FM
"Large Fire Day" = A day with an occurrence of at least one 100+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	< 2%	52%	26%
Yellow	2% - 3%	35%	37%
Brown	≥ 4%	13%	37%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW09

- Burn Environment…Windy and dry condions due seem to have some effect on the occurrence of new large human-caused fires. However, a probability as high as 20% is not likely. We are not apt to issue a high risk for a new large solely due to the burn environment but might at times if a large fire is in progress.

- Lightning…Between 2000 and 2012 there were 21 large fires that occurred during lightning episodes. That translated to 1 or 2 "large lightning fire events" per year with a 3.5% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" about 1 to 2 times per year and can be expected to correctly forecast about 46% of all large lightning fires with a false alarm frequency of about 66%.

PSA NW10 (E3)

This area represents the Columbia Basin of eastern Washington extending into north central Oregon. . PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Douglas, Escure, Juniper Dunes

Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine DL: 100-HR FM
"Large Fire Day" = A day with an occurrence of at least one 2500+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	≤ 2%	21%	2%
Yellow	3% - 7%	72%	72%
Brown	≥ 8%	7%	26%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW10

- Burn Environment… The burn environment particularly dry and windy conditions definitely show a correlation with the occurrence of new large fires. Probabilities as high as 20% may be reached on occasion. Don't expect a lot of high risk alerts due to the burning environment but expect them occasionally usually ahead of a "marine push" for windy and dry conditions.

- Lightning…Between 2000 and 2012 there were about 10 lightning events that led to large fires with a total of about 20 large fires. That translated to about 1 "large lightning fire event" per year and a 2% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" about 2times per year and can be expected to correctly forecast about 56% of all large lightning fires with a false alarm frequency of about 69%.

PSA NW11 (E4)

This area represents the mountains of northeast Oregon, essentially the Wallowas and eastern portions of the Blue Mountains. . PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Alder, Roberts Butte, Harle Butte, Eden, Sparta Butte, Blue Canyon, Case, Fall Mountain

Each RAWS receives equal weighting for NFDRS Index calculations.
Used for determination of DL: ERC for fuel moisture G
"Large Fire Day" = A day with an occurrence of at least one 500+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large human-caused fire days
Green	< 1%	46%	10%
Yellow	1%	30%	20%
Brown	≥ 2%	24%	70%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Specifics for PSA NW11

- Burn Environment… The conditional probability for a large human-caused fire shows only a very marginal correlation to the burn environment. Wind does not seem to be much of a factor but dry and unstable conditions can boost the probability a bit though not much more than to about 8% tops. For that reason we will likely never issue a high risk for a new large fire due to burn environment considerations. We may on occasion issue one if a large fire is in progress and it may be expected to react to elevated burning conditions such as instability or wind.

- Lightning…Between 2000 and 2012 there were 47 large fires that occurred during lightning episodes. That translated to between 2 and 3 "large lightning fire events" per year and a 5.7% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" about 4 times per year and can be expected to correctly forecast about 79% of all large lightning fires with a false alarm frequency of about 59%.

  Forecasting large fires in NW11 relies primarily on correct forecasts of lightning amount. There is a strong relationship between large fires and lightning amount in conjunction with fuel moisture.

PSA NW12 (E5)

This area represents the high desert regions of southeast Oregon. . PSA fuel moistures are determined by the average of the Key RAWS in the zone.

Key RAWS: Antelope, Owyhee Ridge, Grassy Mountain, Moon Hill, Wagontire

Each RAWS receives equal weighting for NFDRS Index calculations.
Used to determine DL: 100-HR FM
"Large Fire Day" = A day with an occurrence of at least one 10,000+ acre fire

Brief Overview of NWCC Fire Activity Forecast Model

Our assumption is that large fires occur as a consequence of a critical burn environment (i.e. dry fuels, wind, instability) and/or mass ignitions that overwhelm IA capability (usually lightning). The "green-yellow-brown" designation as shown on our ***"7-day Significant Fire Potential"*** represents an assessment of the burn environment and is calibrated to the conditional probability for a large human-caused fire;
Green – when the probability ≤ ½ the normal climatological probability,
Yellow – then the probability is about normal,
Brown – when the probability is ≥ twice the normal climatological probability.

A day is considered a "High Risk" for a large fire when, with forecaster discretion, the outright large fire probability from our Fire Activity Forecast model reaches 20% or higher. "High Risk" alerts will be indicated on the 7-Day Significant Fire Potential Chart as either orange if the high risk is due to a critical Burn Environment or as RED if the high risk is due to a significant Ignition Trigger.

A High Risk may also be issued for the potential for significant growth on an existing large fire due to an elevated burning environment. This is a more subjective call but our large fire probabilities are used as guidance.

Forecasts of lightning amount, ERC, F100, wind speed and low level instability are made each morning at NWCC. These forecasts define the level of criticality of both the burn environment as well as the lightning episode and therefore form the basis for our forecasts of fire activity (i.e. number of ignitions, large fire probability and number of large fires).

Burn Environment Details

Burn Environment (BEN)	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Green	≤ 1%	60%	11%
Yellow	2% - 4%	28%	33%
Brown	≥ 5%	12%	56%

*Probability is conditional: Assumes at least 1 ignition

High Risk	*Threshold (Probability for a large fire)	% frequency of all fire season days	% of all large fire days
Orange	≥ 20%		
Red	≥ 20%		

*Non-conditional Probability

Do to the extremely low number of human-caused large fires in NW10 the above color designation use all fires, human-caused and lightning caused.

Specifics for PSA NW12

- Burn Environment… The burn environment in NW12 is primarily dictated a function of dry fuels (F100) but the probability for a large fire without a significant lightning event never tops out above 10%. We would not expect to issue a high risk for a large fire unless lightning is involved.

- Lightning…Between 2000 and 2012 there were 33 large fires that occurred during lightning episodes. That translated to about 2 "large lightning fire events" per year and a 4.3% chance of a large fire per event. As currently calibrated, our Fire Activity Forecast Model will normally forecast a large fire probability high enough for a "High Risk" between 4 and 5 times per year and can be expected to correctly forecast about 58% of all large lightning fires with a false alarm frequency of about 75%.

  Forecasting large fires in NW12 relies primarily on correct forecasts of lightning amount.