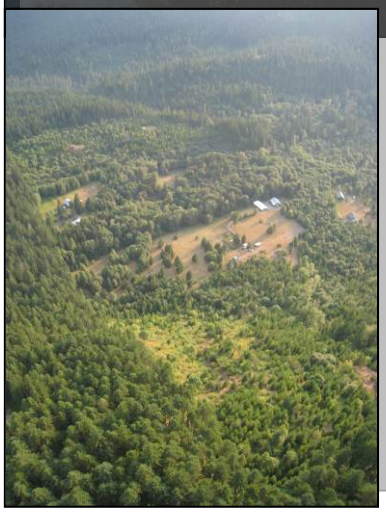
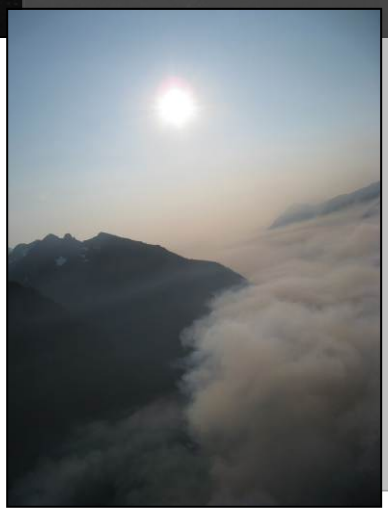
USDA United States Department of Agriculture
Forest Service

Olympic National Forest

Big Hump Fire -2011

Long Term Assessment V1.0 9/11/2011





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Overview

The Big Hump fire started on September 1st 2011 from a human caused ignition in the Duckabush drainage of the Brother Wilderness of the Olympic National Forest. Initial attack efforts were unsuccessful and a long term approach to incident management began.

Incident Objectives – Agency Administrators Intent

- Fire Fighter and the public's safety will guide all management actions on this incident. Any action will consider the risk to fire fighter's and the public's safety before implementation.
- Protection of private property is a high priority in the management of this incident.
- Resource management objectives, as described in the Olympic NF Land and Resource Management Plan will provide direction to management actions.

Purpose of this plan

This long term plan is intended to summarize predicted fire and fuel conditions, mitigation actions and risk assessment for the life of the Big Hump Incident. It is referenced and incorporated into the Wildland Fire Decision Support System (WFDSS) and is part of the decision support process.

---To be effective, this plan must be reviewed and updated as the incident evolves---

Fire Environment

Topography

The area is characterized by steep drainages that are oriented east/west occur on the east side of the Olympic peninsula. The fire is burning on slopes of 35 to over 50 percent. Rolling material, due to these steep slopes is a factor in fire spread. Another significant factor is the topography's proximity to large water bodies (Hood Canal) that has a strong influence on the fire environment. Marine air fluctuation in and out of the canyons creates dramatic inversions pushing dry air over the upper elevations when there is an easterly synoptic flow.

Fuels

Fuel loading in the Olympics is typically heavy, with surface loading over 14 tones an acre. Other factors to fire spread are the continuous layer of moss that acts as a fine fuel layer. Tree crowns tend to be near the surface, creating good opportunity for crown fire initiation. Fuel models include TL5 (High Load Conifer litter, AKA - NFFL FM 11), and some GS2 (Moderate load, Dry Climate Grass-Shrub, AKA NFFL FM6). The majority of the area is modeled as a High Load Conifer litter (TL5).

Weather

When the Big Hump fire originated on 09/01/2011, weather conditions were seasonably cool and humid for August 31 and September 1. A warming trend began on September 2. September 3 started an unusually long 10-day stretch of low elevations high temperatures in the 80s. In fact when considering afternoon high temperatures, September 3-12 marked the warmest 10-day stretch on record for the month of September in over 120 years of record-keeping at nearby Seattle. Days were sunny, and subsidence inversions caused particularly low RH above about 2,000 to 2,500 feet msl. A cooling trend began in earnest on September 13

Strong westerly zonal flow will prevail from Wednesday, September 14, through Monday, September 19. This will lead to strong onshore flow from the Pacific, leading to seasonably cool and humid conditions. This will entail a persistent marine layer over the Olympic Mountains, which will bring

cool, humid and stable conditions to the fire. High temperatures will range from the 50s over the upper elevations of the fire to the 60s over the lower elevations. Minimum RH values of 50%-60% will be the average at all elevations with excellent overnight RH recoveries.

The east side of the Olympics is the dry side of the mountain range; much of the rain and moisture gets deposited in the rain forests on the west side of the Olympics and can skip over the east side. This is particularly true in late summer and early autumn. In fact, the east side of the Olympics is typically the last part of western Washington to moisten fuels to under 90th percentile ERC's, owing to the fact that the first two or three wet fall storm systems often fail to leave a wetting rain (>0.25") on the east side of the Olympic Mountains. It often takes until the 1st or 2nd week of October to get ERC's to drop below the 90th percentile. Though precipitation amounts and frequency usually increase in late September and early October, the truly wet fall storm season usually waits until the second half of October to begin.

Two weather disturbances are expected to brush by western Washington from now through September 19, specifically around Thursday, September 15, and again over the weekend of September 17-18. The weather disturbance on September 15 will likely deposit no rain on the Big Hump Fire; the weather system over the weekend of the 17th-18th will likely leave sub-wetting rainfall amounts on the higher elevations of the fire and little if any rain on the lower elevations.

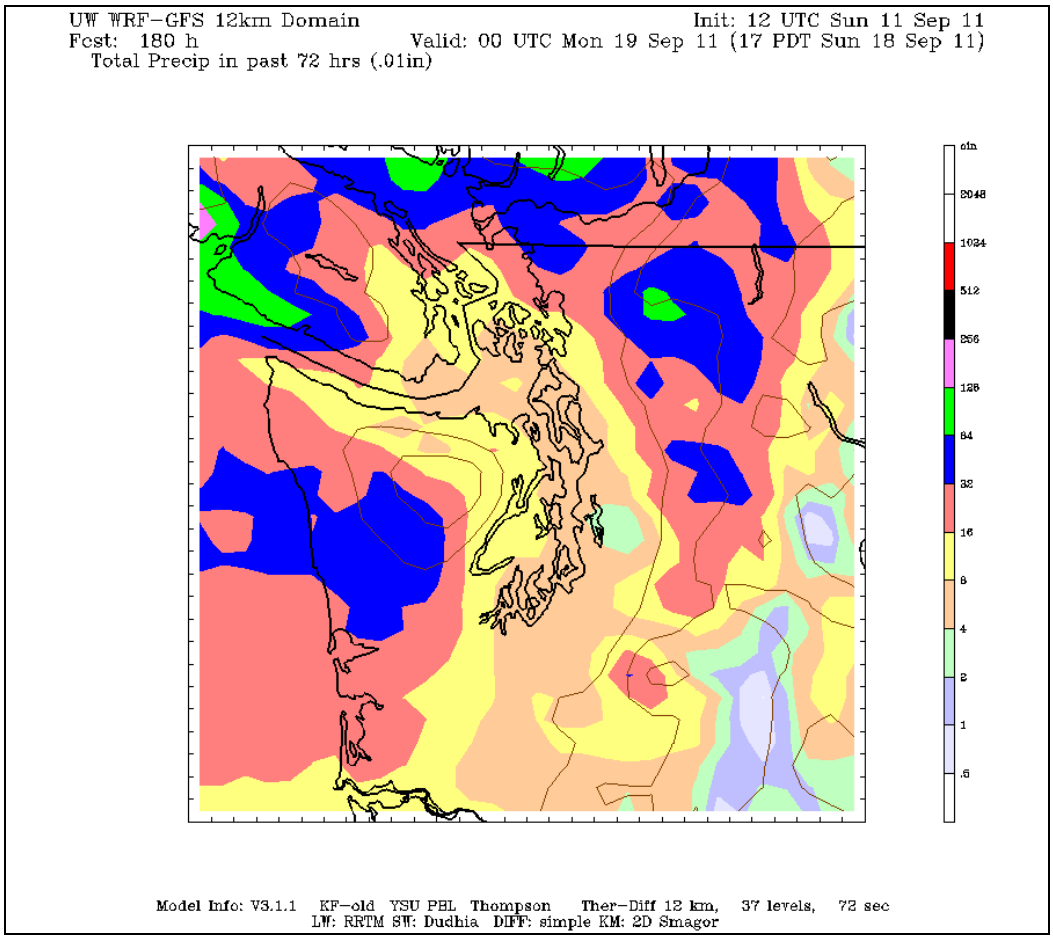


Figure 1 72-hour precipitation forecast ending at 5 PM on Sunday, September 18, from the University of Washington's WRF-GFS model, depicting a sub-wetting rainfall over the Big Hump Fire on the weekend of September 17-18. Model initialized at 5 AM on Sunday, September 11, 2011.

Listed below in table 1 are some of the Remotely Automated Weather Station (RAWS) sites used in assessment. A special Interest Group (SIG) was created from the following stations.

STATION	RAWS NUMBER	ELEVATION	DISTANCE
Quilcene	450207	62	13
Kitsap	450801	350	20
Jefferson	450911	2200	10

Table 1 – Local RAWS stations

Current fuel condition

Energy Release Component (ERC) is a National Fire Danger Rating System (NFDRS) index that is useful to described seasonal fuel conditions. Figure 1 displays 10 year of ERC data for a combination of three NFDRS weather stations on the east side of the Olympic peninsula. We

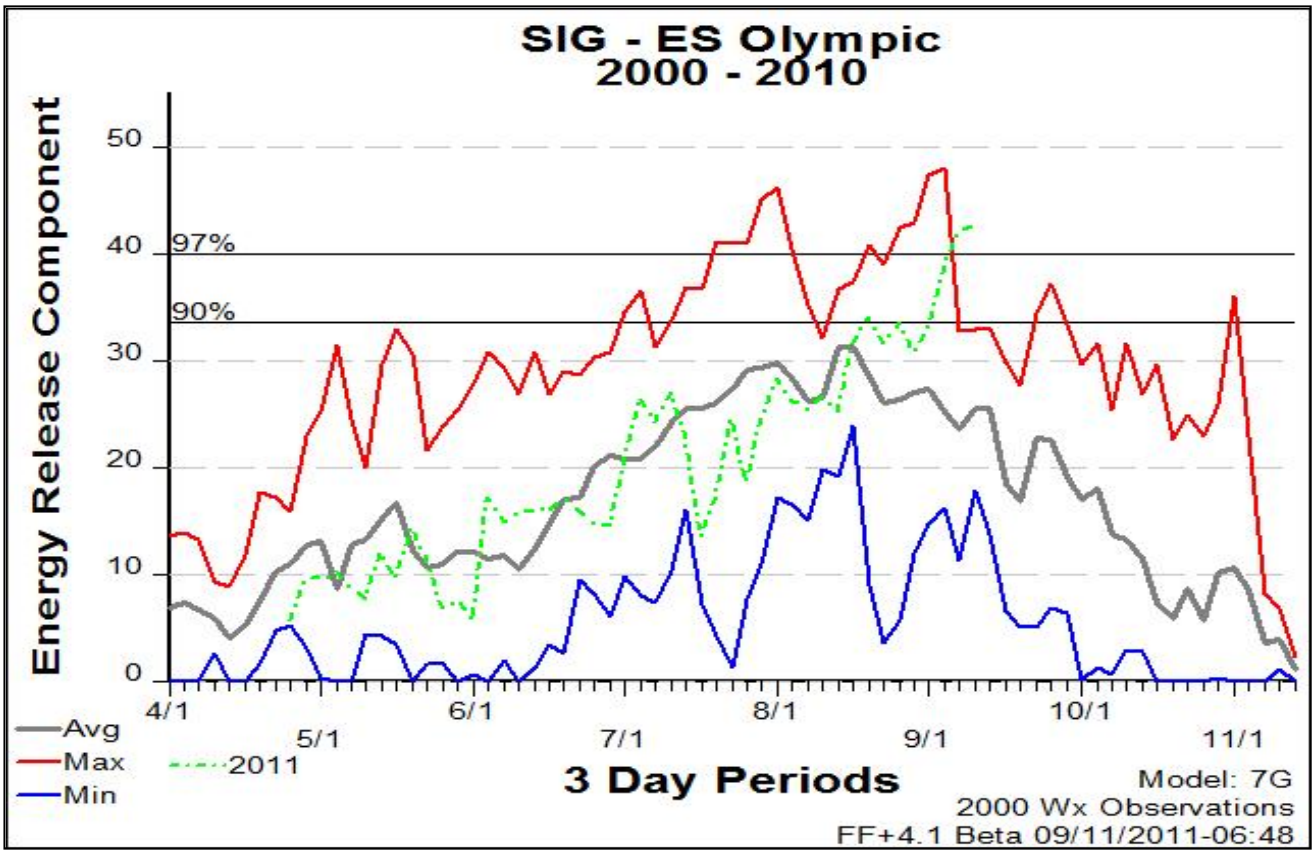


Figure 2 – ERC values

choose Quilcene, Kitsap and Jefferson weather stations in combination to represent local fuel conditions. Based on ten years of data, this station combination is displaying new historic high ERC values.

Fire Season Slowing and Season Ending Events

The potential length of the fire season is important to operational and other management decisions, as the number of burn days left in the season have a direct effect on the likelihood that a free-burning fire will reach any point of concern. Local observations on the Olympic National Forest indicate that active fire behavior and large fire growth are uncommon starting around the date.

Generally, 1 inch of rain over a 3 day period is considered a fire slowing event. If that amount of moisture occurs after September 15, then it is considered a fire ending event. Typically, after September 15th, a combination of a lower sun angle and shorter day-light period will limit the fires ability to gain enough energy to have significant additional spread. Figure 3 displays the probability of that amount of rain occurring at Quilcene Wa.

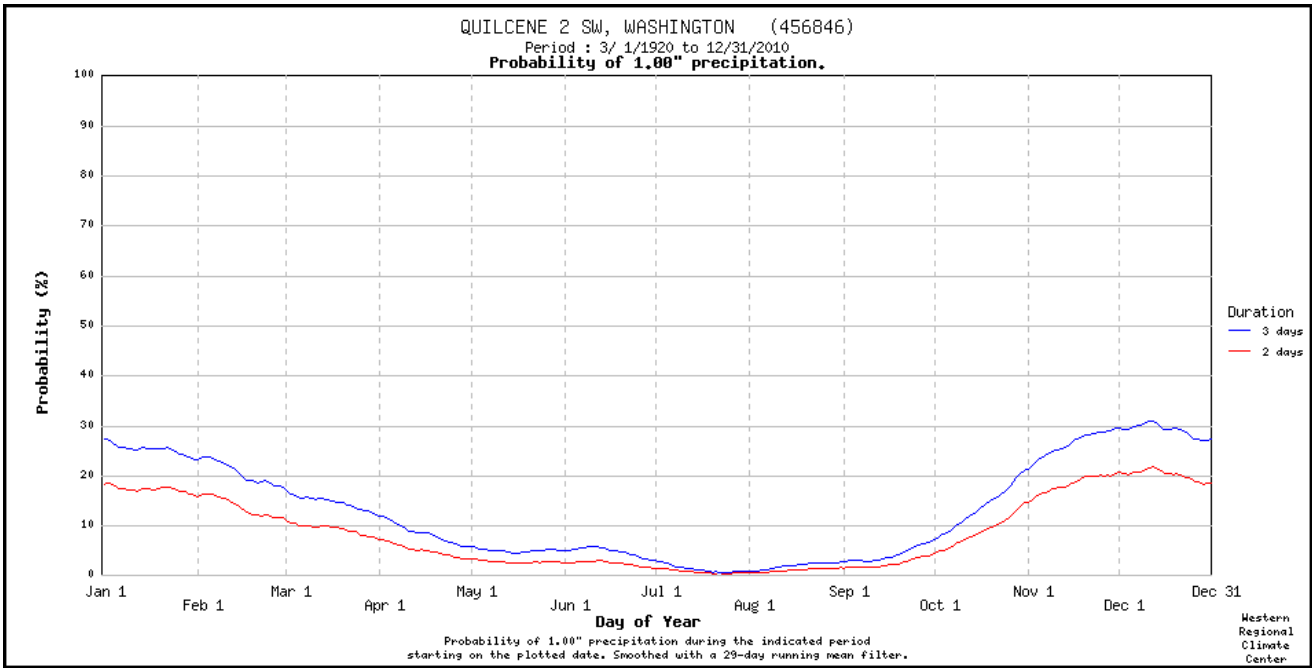
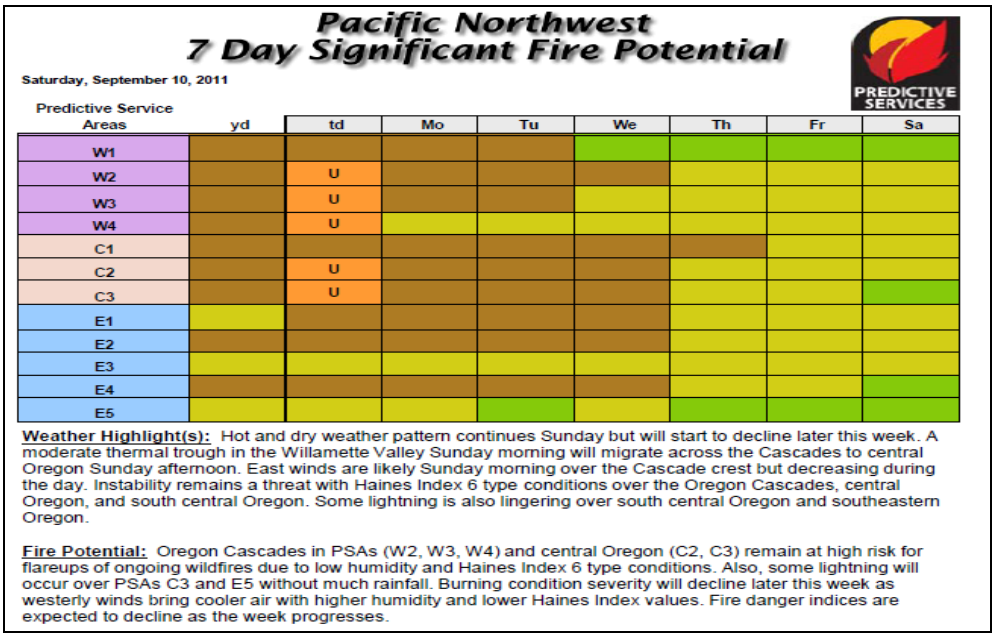


Figure 3 – Precipitation Probability – Quilcene

Below in figure 4 is a summary of the Northwest Coordination Center Predictive Services product [7 Day Significant Fire Potential projection,]



Pacific Northwest
7 Day Significant Fire Potential

Saturday, September 10, 2011

Predictive Service Areas	yd	td	Mo	Tu	We	Th	Fr	Sa
W1								
W2		U						
W3		U						
W4		U						
C1								
C2		U						
C3		U						
E1								
E2								
E3								
E4								
E5								

Weather Highlight(s): Hot and dry weather pattern continues Sunday but will start to decline later this week. A moderate thermal trough in the Willamette Valley Sunday morning will migrate across the Cascades to central Oregon Sunday afternoon. East winds are likely Sunday morning over the Cascade crest but decreasing during the day. Instability remains a threat with Haines Index 6 type conditions over the Oregon Cascades, central Oregon, and south central Oregon. Some lightning is also lingering over south central Oregon and southeastern Oregon.

Fire Potential: Oregon Cascades in PSAs (W2, W3, W4) and central Oregon (C2, C3) remain at high risk for flareups of ongoing wildfires due to low humidity and Haines Index 6 type conditions. Also, some lightning will occur over PSAs C3 and E5 without much rainfall. Burning condition severity will decline later this week as westerly winds bring cooler air with higher humidity and lower Haines Index values. Fire danger indices are expected to decline as the week progresses.

Figure 4 - 7 day outlook starting 9/11/11

Fire Behavior

The fire behavior to date (9/11/11) is characterized by surface fire with occasional single and group torching. Fire behavior above the inversion tends to ventilate and is conducive to good ((8 – 19 ch hr) up-hill runs. Below the inversion, more moderate rates of spread (3 – 4 ch hr) are typical. The moss layer is available and performs as a grass fuels models with moderate rates of spread, even under light winds.

Fire Vicinity influences

Unique conditions effect fire duration and spread on the east side of the Olympic peninsula. Because of the large marine influence, fires tend to stratify burning conditions above and below the marine layer (or inversion). The photo and the cover page of this plan illustrates a typical stratification of burning conditions with ventilated and low humidifies at the top of the ridges and cool and higher humidity at the lower elevation.

The Marine Layer – The marine layer is a layer of cool (T < 65 degrees), humid (RH > 55%) and stable air owing to the large saltwater bodies surrounding the Olympic Peninsula on three sides. It can vary in depth from about 500 feet to 6,000 feet. During early autumn, the top of the marine layer most commonly ranges from 1,500 feet to 2,500 feet msl. When high pressure is in place, the air mass above the marine layer can be significantly drier and more unstable than within the marine layer.

General Wind – The Duckabush and Dosewallips basins exhibit a strong terrain influence. Within the basins under clear skies, upslope and upvalley breezes of 3 to 6 mph prevail from late morning until sunset, then lighter downslope and downvalley breezes of 1 to 4 mph prevail from sunset until about 1000 the next morning. Valley and slope breezes will be lighter or non-existent under thick cloud cover.

East Wind – This is a well-known fire concern west of the Cascades in Washington and Oregon. However, the Big Hump Fire is not in a location that experiences strong east wind. Even so, the fire is prone to the warm and dry conditions which accompany large-scale offshore flow.

Long Term Outlook

9/20/11 – 10/10/11

Climatologically, the weather for the Olympic Mountains from September 20 through October 10 is highly variable, and long-range computer models point to climatological weather patterns. The weather pattern is typically in the process of becoming more active as the region approaches the late October start of the fall storm season. Precipitation amounts and frequency typically increase during this period, but this trend is typically punctuated by a few days of clear skies, mild temperatures and incredibly low humidity.

During the cooler and wetter periods, it would not be uncommon to get a dusting of snow above 4,500 feet, but any snow this early in the fall season is likely to melt and not contribute to the winter snow pack. Again, the lower elevations along the east side of the Olympics will often miss out on wetting rain this early in the fall season. During a wetter period, it would be common to see high elevation temperatures in the 40s with low elevations temperatures in the 50s.

During the warmer and drier periods, which often last from 2-5 days, subsidence inversions can sink into lower elevations, bringing temperatures at all elevations into the 60s and 70s. Some of the lowest RH readings of the year can occur in late September and early October, when mid and high elevations RH's can easily drop into the teens and 20's --- and occasionally into the single digits --- under the influence of strong high pressure. The Griff Peak Fire of 2003 occurred during this time frame and grew large under such conditions.

Seasonal Severity Indicators

Drought outlook indicates little change from current conditions (figure 5). For the water year (starting October 1st 2010) the amount of moisture is above normal for the year (figure 6). The 8 – 14 day prognosis is predicting a slightly higher chance of above normal precipitation and also a slightly higher chance of warmer temperatures (figure 7).

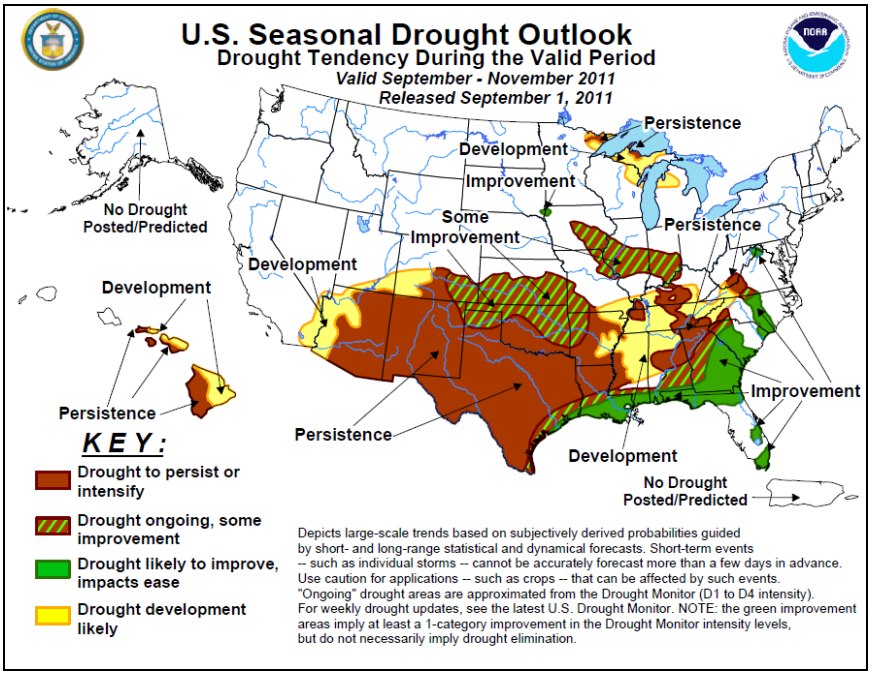


Figure 5 – Seasonal Drought September – November

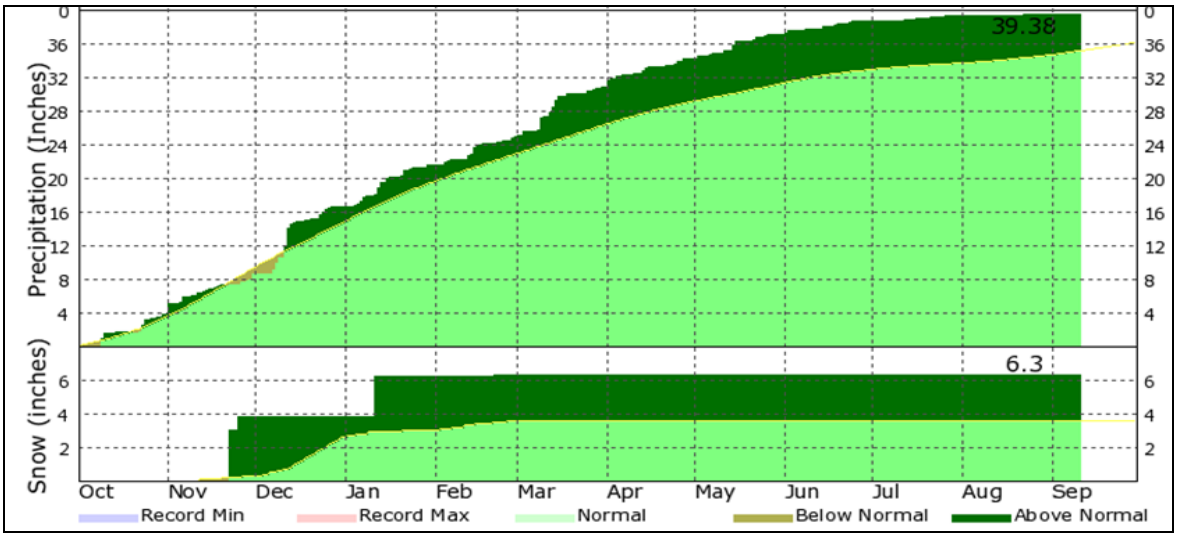


Figure 6 – Water year information for Seattle

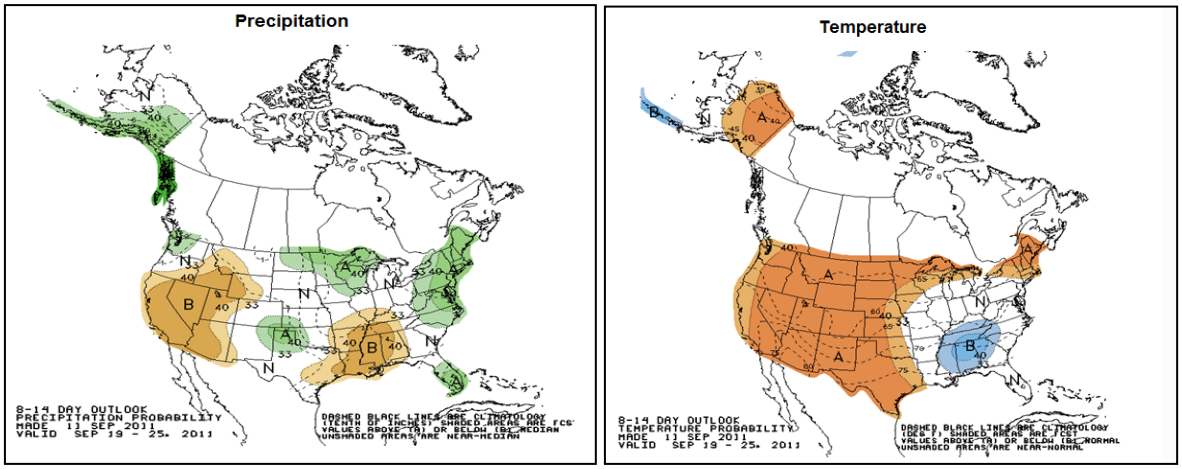


Figure 7 – 8 to 14 day precipitation and temperature outlook – [NWS Climate Prediction Center]

Fire Growth Projections

The outputs are helpful for developing priorities and analyzing values at risk. The WFDSS system can provide more detail on this and other model runs. Below the graphic displays a model that model that simulates many individual fires burning unique historic weather scenarios over a 7 day period. No suppression effort is included in model and the simulation was initiated on 9/11/11. The color bands display the number of times an individual simulated fire burned an individual cell, displayed as a probability. Figure 9 displays the fire size of each of the simulation fire.

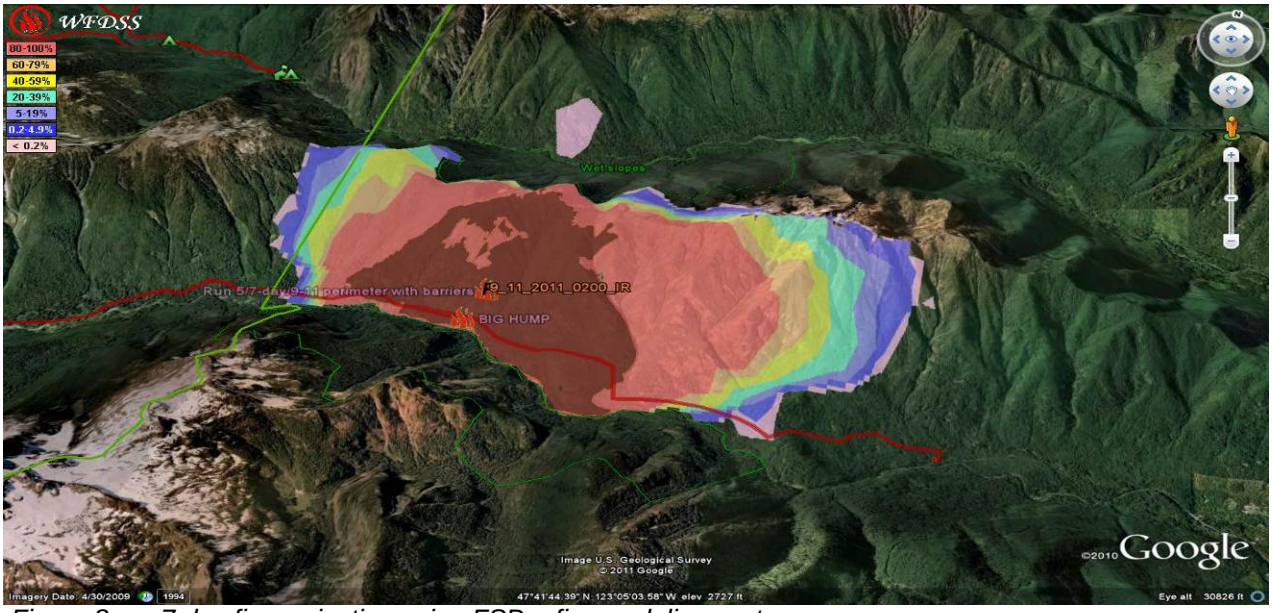


Figure 8 – a 7 day fire projection using FSPro fire modeling system.

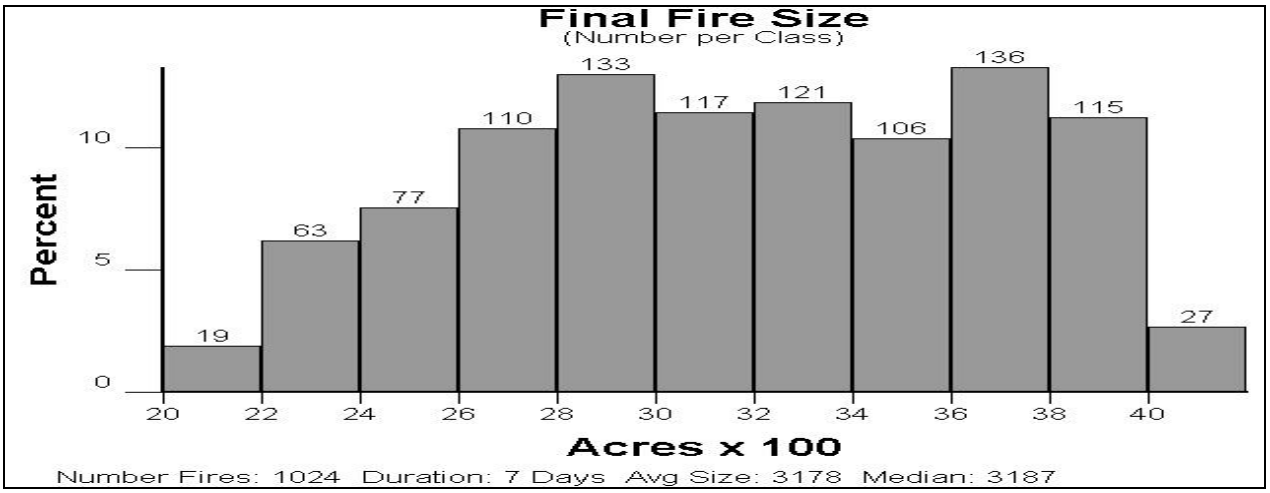


Figure 9 – distribution of fire sizes for the 1024 simulations starting on 9/11/11

Nearby Values and Improvements

- Private land and private land inholdings within the Duckabush drainage
- Historic structures - Interrorem cabin
- The FR 2510 bridge across Duckabush creek – partial wood construction
- Campground in Duckabush drainage
- Trail head signs
- Major power transmission line near Hwy 101

Smoke Management

A few of the smoke sensitive receptor areas have been identified below. Nearby communities to the fire area include:

- Brinnon Wa
- Quilcene Wa
- Hoodsport Wa

Monitoring of smoke impacts will occur through the use of air quality network “airnow”. The U.S. EPA, NOAA, NPS, tribal, state, and local agencies developed the AIRNow Web site to provide the public with easy access to national air quality information. The Web site offers daily AQI forecasts as well as real-time AQI conditions for over 300 cities across the US, and provides links to more detailed State and local air quality Web sites.

Air Quality information

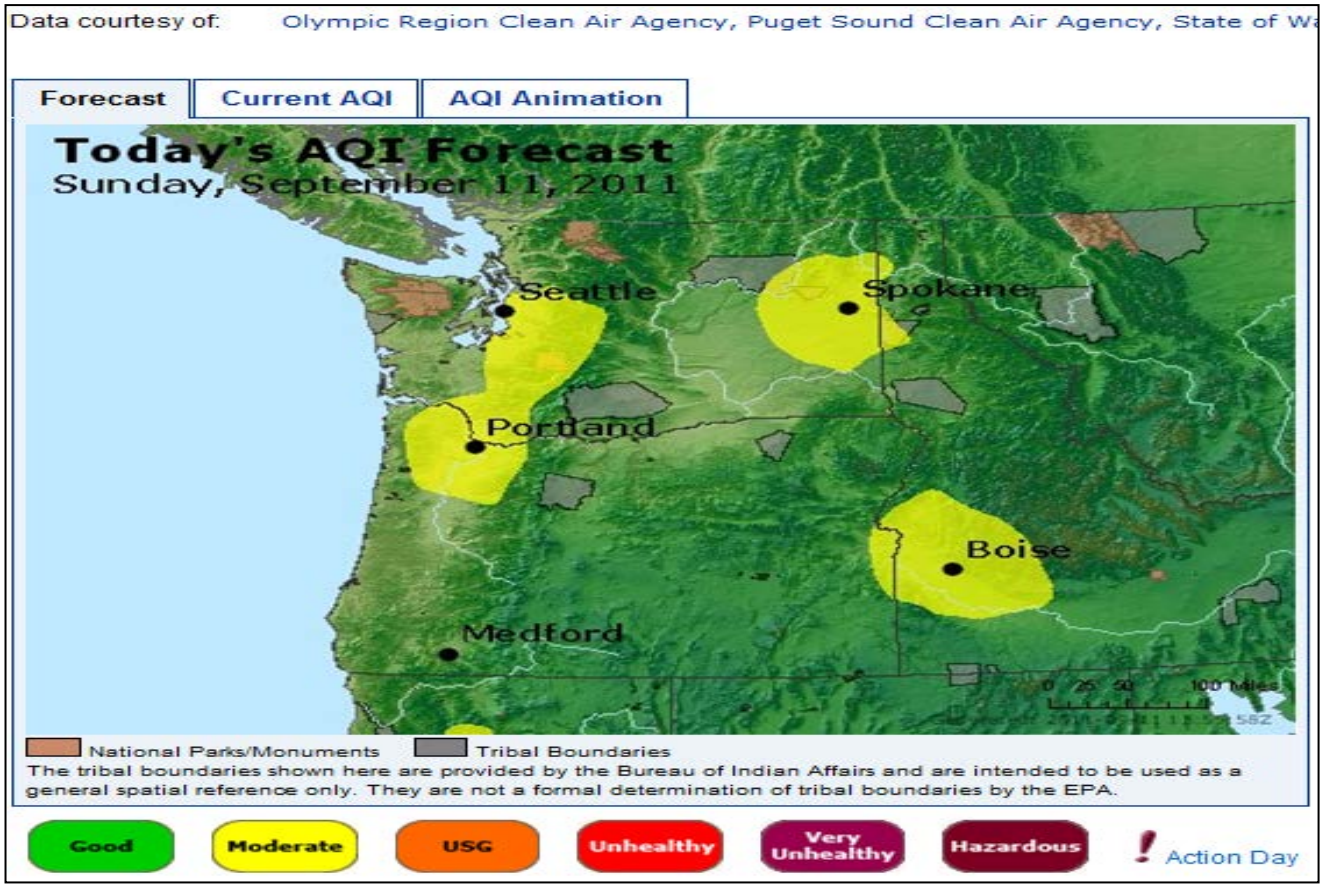


Figure 10 – Air quality monitoring site display for 9/11/11

Management Action Points (Mitigation Actions) and organizational considerations

Incident Management Organization considerations

A management organization to assess and manage this incident will continue until a season ending event. The Management Action Points (MAP) below and general incident management will require differing levels of management capability. As part of the periodic assessment in Wildland Fire Decision Support System (WFDSS) a methodical Organizational Needs Assessment (ONA) should be completed to determine and document the required incident management organization.

MAP #	Conditions	Action	Resources Needed/ Cost
MAP 1 – Delaying actions	Fire crosses or is expected to cross a point starting 1.5 miles east of Mt. Jupiter Peak then due south until the line intersects with Duckabush Cr. (see map)	Use rotor wing resources to delay fire progression to the east. Use a combination of type II and type one rotor wing resources to delay fire spread as it moves onto a SW aspect. Coordinate delaying actions with forecasted weather and fire projection assessments. Continue fire delaying actions until projected fire spread to the east is reduced. In addition, use rotor wing resources to suppress any perimeter spread that may occur to the south of the Duckabush river.	1 Type I Helicopter and or 2 type II Helicopters with support crew and equipment Cost – 30,000/Day Time to complete – 3 to 15 days

MAP #	Conditions	Action	Resources Needed/ Cost
MAP 2 – FR 2510 Preparation	Fire crosses or is expected to cross a point at Mt. Jupiter Peak then due south until the line intersects with Duckabush Cr. (see map)	Brush out Forest Road 2510 and prepare areas for engine and water tender turnaround. Brush out road from the Forest boundary to the west until it crosses the Duckabush creek.	1 - 2 type 2 IA crews and skidder or dozer support Cost – 30,000/Day Time to complete – approx. 5 days

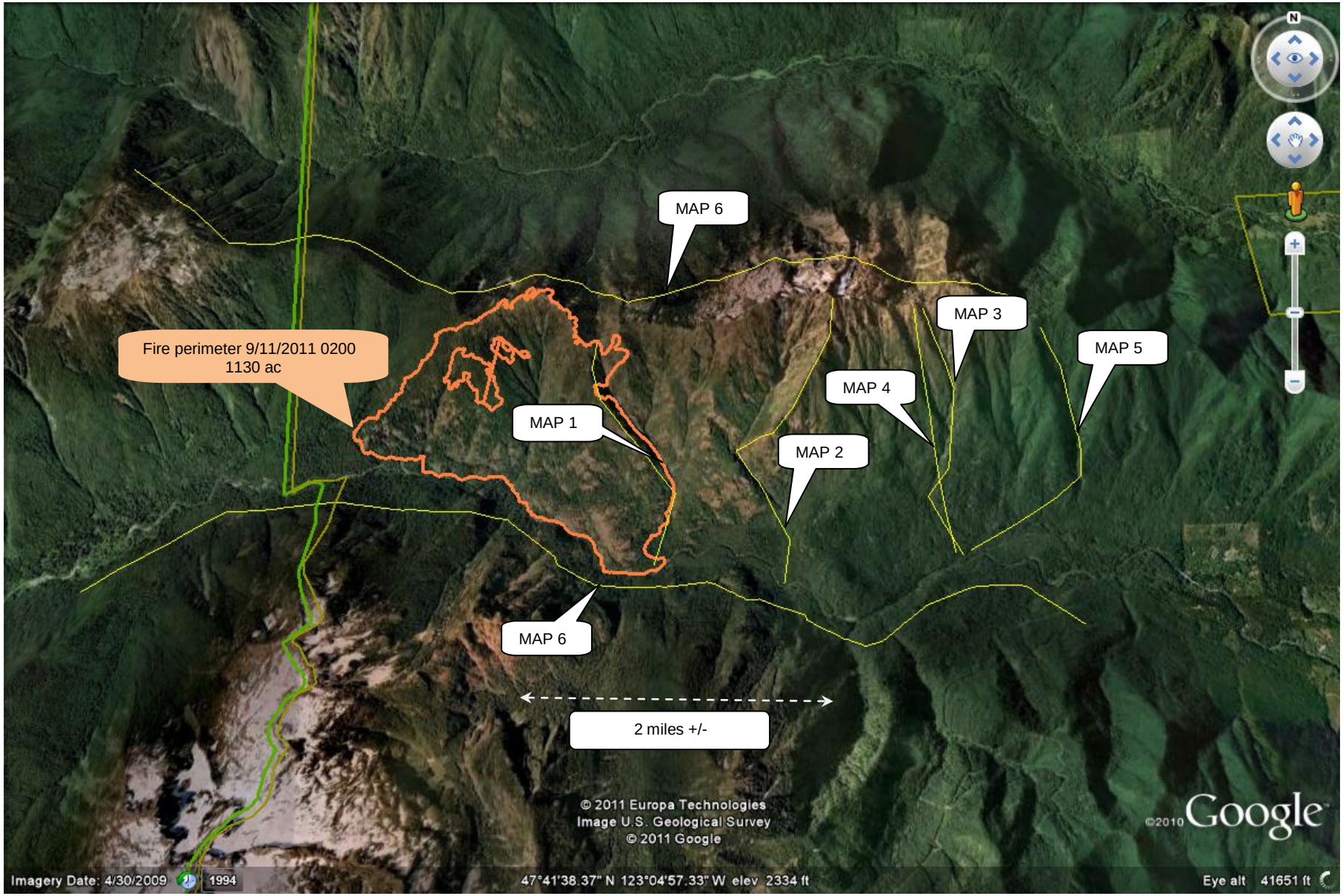
MAP #	Conditions	Action	Resources Needed/ Cost
MAP 3 – Staff FR 2510	Fire crosses or is expected to cross a point east of Mt. Jupiter Peak then due south until the line intersects the FR 2510. (see map)	As dictated by current conditions – manage the fire spread to the north/east of FR 2510 and allow slow movement of fire to east. The objective is to keep the fire on the north side of the FR 2510 while managing the fire spread to east. Little opportunity to safely create a direct line to the ridgeline from FR 2510, so "walking" the fire as slowly as possible to the east is the objective of this action. This action would likely take a day and night shift to manage.	2 taskforces of T4 engine, 2 tactical water tenders Cost – 40,000/Day Time to complete – approx. 7 days – very weather dependent

MAP #	Conditions	Action	Resources Needed/ Cost
MAP 4 – Level 1 evacuations	Fire crosses or is expected to cross a point at Mt. Jupiter Peak then due south until the line intersects with Duckabush Cr. (see map)	Area of evacuation would be based on the current and predicted fire behavior and identified to the county Sherriff.	Local fire district personnel would conduct the notification under the authority of the country Sherriff Cost – 5,000/Day Time to complete – 3 hours

MAP #	Conditions	Action	Resources Needed/ Cost
MAP 5 – Fuel break and structure defense preparation	Fire crosses or is expected to cross a point east of Mt. Jupiter Peak then due south until the line intersects the FR 2510. (see map)	Base on predicted fire spread, create shaded fuel break around the northern boundary of the private land in-holding off of FR 2510. Complete structure protection around the Interrorem cabin.	2 Type 1 crews, 4 fallers, skidder support Time to complete action based on identified resources Cost – 44,000/Day Time to complete – approx. four days

MAP #	Conditions	Action	Resources Needed/ Cost
MAP 6 – North aspect fire spread	Fire crosses onto north aspect and becomes establish with likely continued spread. This has the potential to occur in the Duckabush (bottom of drainage) and Dosewallips (top of ridge) drainages. Detection of this condition would be from aerial reconnaissance and/or airborne infrared survey.	Reassess values at risk and recalibrate fire spread models to incorporate the changed condition. Determine mitigation actions for values at risk.	Long-term analysis, Operations Section Chief or Division Supervisor Cost – 6,000/Day Time to complete – approx. 4 days

Management Action Point - location Map



Risk Assessment

Values At Risk – Firefighter and public safety are the primary values at risk. The fire is burning on steep slope with heavy fuel loadings. It is located within a wilderness area with limited accessibility. There is also a popular hiking trail located at the bottom of the fire that provides access to Olympic National Park. Back country hikers may be unaware of the fire and may try to pass through on their way to the trail head. The nature of the valley and smoke also present a hazard to aviation activates. Natural resources at risk include wilderness social values, recreational trail, old growth ecosystem, threatened and endanger species in the area. Social values include public concern over the fire and potential public health concerns from prolonged exposure to smoke. There are also residences in a wildland urban interface, a historic cabin and a Forest Service campground down canyon from the fire.

Probability of Harm – The probability of harm to fire fighters engaging the fire and public passing through on the trail is high. The probability of harm to aviation activities in conjunction to suppression efforts is also a concern. The potential for harm to other resources in the immediate area is moderate and low and decreasingly less away from the current fire location. The potential to prolonged exposure to smoke is uncertain, but likely low. The probability of the fire moving down canyon into the WUI and threatening residences, the campground and the historic cabin is low.

Consequences of Harm **–** The consequences of harm to firefighter, hiker, and aviation resources is serious injury of death. The consequences to most natural resources are low. The consequence of harm to the trail is potential closure for extended periods. The effect to T&E species in moderate and could include loss of potential habitat and increased sediment in the Duckabush River. If the fire were to move down canyon it could result in loss of Forest Service infrastructure, irreplaceable cultural resources, evacuations and potential loss of private residences.
Risk Analysis

Objectives – The objective are to suppress the fire considering the associated values at risk, costs and consequences.

Alternative Tradeoffs – Alternative range from direct suppression techniques, to indirect, to monitoring the fire until an end of season event occurs. Closure of the Duckabush Trail to the public would be included in all alternatives.
Firefighter Exposure – Direct suppression has a high level of firefighter exposure as well as aviation resources exposure. The exposure decreases with indirect and monitoring techniques. Exposure to aviation resources is increased somewhat with indirect and monitoring tactics.

Exposure Tradeoffs – An aggressive suppression strategy would result in a very high risk and exposure to firefighters and aviation resources. Values at likely risk are minimal. A indirect strategy still has a high level of firefighter exposure, but a reduced probability of harm. Monitoring the fire reduces firefighter exposure, but still has a significant exposure for aviation resources. Since the fire is unlikely to make a significant moves down canyon to the east, exposure to public in the WUI and Forest Service infrastructure and minimal in any alternative. Exposure to hikers passing through on the Duckabush trail is also the same for all alternatives.

Risk Communication
Stakeholder Consultation – Stakeholders include Jamestown S'Klallam, Port Gamble S'Klallam and Skokomish tribes; Jefferson County Commissioners; Chief Bob Herbst, Jefferson County Fire District 4; Olympic National Park; Judith Morris, Congressman Norm Dicks' Field Representative; and Region 6 Regional Forester.

Risk Assessed Analysis Shared – Contact has been made or attempted with tribes; county commissioners and congressional staff have been briefed and updated on fire and community situation. Local fire district chief is engaged and briefed. The Regional Foresters representative has been on site and understands and supports the objectives and strategy.
Stake Holder Documentation

Risk Sharing – Stakeholder meeting will be offered for local officials. The Olympic National Park will be kept informed of any changes in strategies and plans. The Regional Forester will be kept informed if strategies or conditions dramatically change.

Risk Decision – The strategy employed on this fire will be to minimize exposure to firefighters, aviation resources and the public. The objective will be to monitor activity with the intent of keeping the fire contained in a broad geographic are defined by the Duckabush River to the south, the Dosewallips River to the north and the MT Jupiter and Duckabush Trailheads to the east. No effort will be made to keep the fire moving westward in the Olympic National Park. Check points will be established. If the fire reaches these checkpoints suppression strategies will be re-evaluated and alternatives considered.

Summary of expected final fire size and extent

- Final fire size based on expected weather is expected to be 1800 - 2500 acres
- Fire will remain primarily on the south aspect of Duckabush drainage
- We expect slightly more spread down-drainage to the east than to west
- Few “large” (400 ac +) spread days are expected through the fire season end
- We anticipate the fire to require some level of active management for the next 30 days based on season ending criteria and climate outlook.