



# Wildland Fire Implementation Plan Stage III Tinpan Wildland Fire Use Fire



**Okanogan and Wenatchee National Forests  
July 2006**

# Table of Contents

<b>Introduction/Objectives.....</b>	<b>1</b>
<b>Maximum Manageable Area.....</b>	<b>1</b>
<b>Fire Weather and Fire Behavior to Date.....</b>	<b>3</b>
<b>Short-Term Outlook.....</b>	<b>6</b>
<b>Long-Term Outlook.....</b>	<b>6</b>
<b>RERAP.....</b>	<b>10</b>
<b>Future Assessment Needs.....</b>	<b>12</b>
<b>Threats to the MMA.....</b>	<b>12</b>
<b>Threats to Firefighter and Public Safety.....</b>	<b>13</b>
<b>Other Threats and Concerns.....</b>	<b>13</b>
<b>Smoke Management.....</b>	<b>14</b>
<b>Monitoring Actions.....</b>	<b>15</b>
<b>Resources Needed to Manage the Fire.....</b>	<b>16</b>
<b>Contingency Actions.....</b>	<b>17</b>
<b>Information Plan.....</b>	<b>18</b>
<b>Post-Burn Evaluation.....</b>	<b>20</b>
<b>Signatures.....</b>	<b>21</b>
<b>Periodic Fire Assessment.....</b>	<b>22</b>
<b>Appendix A – Tinpan WFU Operational Assessment</b>	
<b>Appendix B – Management Action Point Table</b>	

## ***Introduction***

The Wildland Fire Use event that occurred on the Okanogan and Wenatchee National Forest beginning on July 6, 2006 led to the development of the Tinpan Wildland Fire Implementation Plan – Stage III. The Tinpan Fire will be managed through Wildland Fire Implementation Plan, Stage III approved by the Okanogan and Wenatchee Forest Supervisor.

## ***Wildland Fire Implementation Plan (WFIP) Stages I and II***

Prior to the completion of the Wildland Fire Implementation Plan – Stage III and the delegation of management for the Tinpan fire to the Northwest Fire Use Management Team, Stage I and II WFIP for the Tinpan fire were completed by the Entiat Ranger District staff. On July 10<sup>th</sup>, 2006, a transfer of command occurred from local Forest management to the Northwest Fire Use Management Team.

Periodic Assessments of the fire will be completed every 72 hours by the designated Agency Administrator Representative.

Any new starts occurring within the MMA will be managed by the local District using their standard protocols. Management of new starts may be transferred to the Northwest Fire Use Management Team by modifying the Delegation of Authority.

## ***Stage III Objectives***

- 1) Provide for public and firefighter safety by recommending and monitoring trail closures, utilizing the Thirty-mile Hazard Abatement checklist and conducting aviation assessments.
- 2) Manage fire in its natural role to the degree practical, to restore/maintain ecosystem processes within the Glacier Peak Wilderness while limiting adverse impacts to values outside the wilderness.
- 3) Keep costs to a minimum. Track all costs through the Incident Accounting and Reporting System.
- 4) Provide for protection of cultural, historic, developed sites, and other resource values indicated in the Okanogan and Wenatchee Fire Management Plan or as requested by Forest personnel.
- 5) Support Okanogan and Wenatchee Wildland Fire Use Management by providing information about natural and cultural resources and maintaining contact with appropriate agencies, elected officials, business leaders, and members of the public using the Okanogan and Wenatchee National Forest Fire Information Staffing Plan.

## ***Maximum Manageable Area***

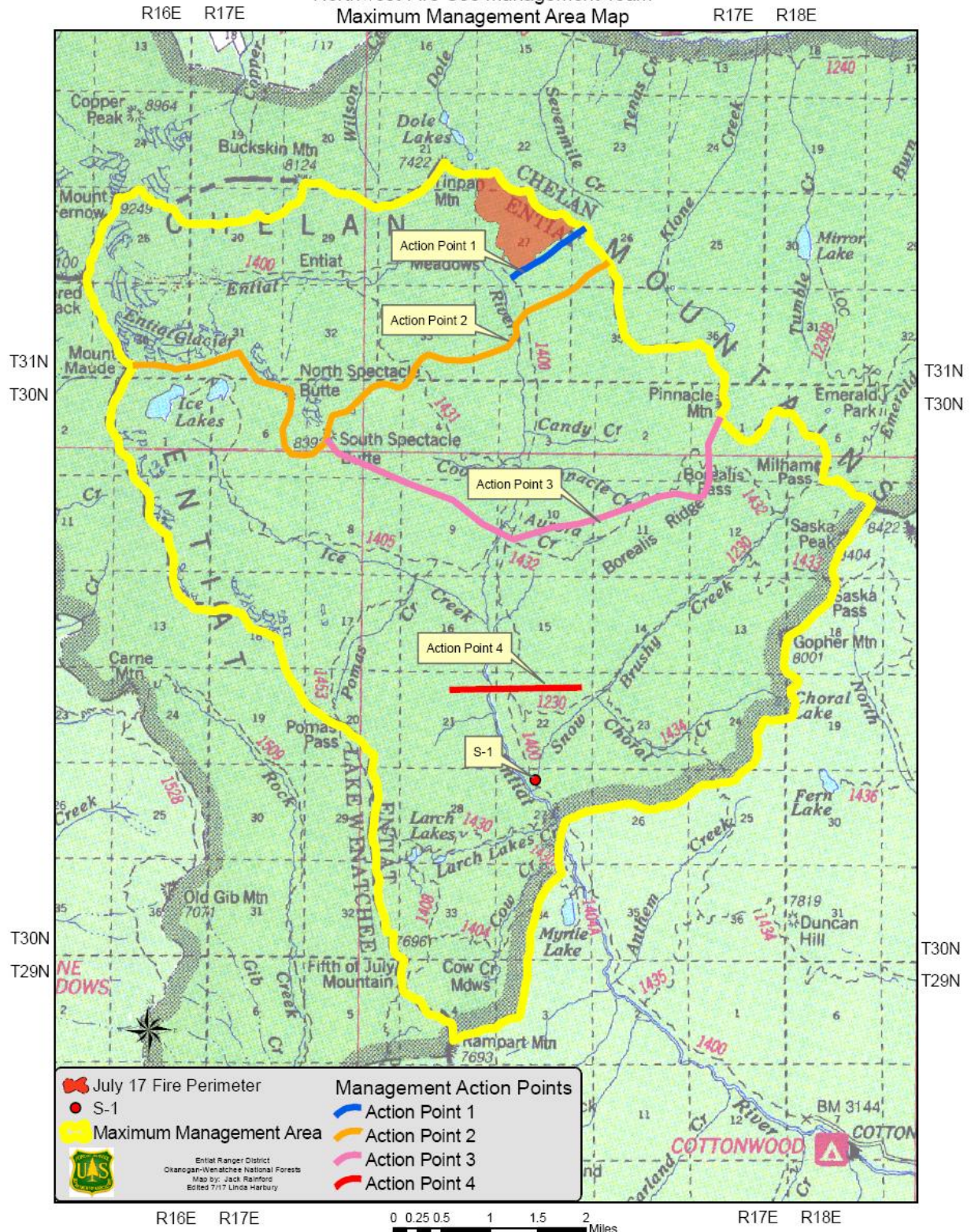
The Maximum Manageable Area (MMA) describes the maximum area within which the fire may be managed. The MMA delineates the geographic limits of the fire area as defined by the capability of management actions to meet resource objectives and mitigate risk for a given wildland fire managed for resource benefits. The Tinpan MMA encompasses a total of 25,554 acres within the Glacier Peak Wilderness, Entiat Ranger District of the Okanogan and Wenatchee National Forests. The MMA also includes the 1996 Myrtle Lake Burn which is outside the wilderness (see MMA/MAP map – Figure 1).

The MMA was developed by selecting major geographic divisions that provide the best available control features, consistent with Forest and Fire Management Plan (FMP) direction. Four Fire Management Areas (FMA) identified in the Okanogan and Wenatchee Forest FMP were selected to form the MMA. The FMAs are Glacier, Meadows, Larch Ice, and Snowbrush. All are suitable for Wildland Fire Use and are considered low complexity.



# Maximum Manageable Area and Management Action Points

Tinpan Fire - OWF-OWF-00304  
 Northwest Fire Use Management Team  
 Maximum Management Area Map



**Management Action Points (MAPS):** Four MAPs have been identified within the MMA.

These include:

MAP #1: Between Chute 4 and Chute 5. This is the current location of southern fire edge (as of July 13, 2006).

MAP #2: Chute 9.

MAP #3: Approximately 3 miles south of the current fire location.

MAP #4: Approximately 5 miles south of the current fire location and 1 mile from the Glacier Peak Wilderness boundary.

Each MAP is associated with a set of management actions as described under Contingency and Mitigation Actions.

### ***Fire Weather and Fire Behavior to Date***

The Tinpan Fire was started by lightning on July 6, 2006, on the upper third of the south slope of Tinpan Mountain in the Glacier Peak Wilderness. The fire was first discovered the following day (July 7), and at initial size-up was 3.5 acres in size. The fire was burning in sub-alpine fir stringers, best characterized as Fuel Model 10. Fire behavior was reported as a creeping surface fire with individual tree torching and short range spotting (<50ft). The timber stringers are separated by brushy avalanche chutes (Fuel Model 5 with some heavier downed fuels). Currently, the chutes are acting as barriers to surface fire spread.

Seasonable warm and dry weather continued through the weekend, and the fire grew to an estimated 35 acres by Sunday July 9. While the avalanche chutes continued to block the spread of surface fire, the torching sub-alpine fir trees generated embers that allowed the fire to move across the chutes through spotting. Heavy dead fuels in the stringers are very receptive to spotting – even at this date, early in the fire season. The fire location, on the south facing slope of Tinpan Mountain, is warmer and drier than most of the surrounding landscape due to relatively long day lengths and direct sunlight. Slope angle and aspect both promote rapid fuel heating and drying.

During the late afternoon and evening of July 10, downslope winds pushed the fire downslope and across chutes to the east and south well into the evening. By the morning of July 11, the fire had grown to about 300 acres. At this point, the canyon orientation changed from E-W to more N-S (thereby changing down-canyon wind direction from east to south). Upslope winds through the day on July 11 pushed the fire back onto itself, and although individual and small group torching was prevalent through this burn period, there was no appreciable growth in fire perimeter down-canyon. There was also no growth down-wind (up-canyon), as the fuel in stringers in this area was more sparse and distant from the torching trees within the perimeter. The backing surface fire moved downslope through the fir stringers with 1 to 2-foot flame lengths, and with very short range (50ft) spotting, but the avalanche snow chutes checked any movement of surface fire moving into the wind (See Fire Progression Map – Figure 2).

A portable RAWS (Chelan Portable, WA, TR757) was set-up at the bottom edge of the fire on July 10. This RAWS was set-up on a small bench at the edge of Entiat Meadows, approximately 30ft in elevation above the valley floor. This RAWS began transmitting information by 1800 on the 10<sup>th</sup>, although the rain gauge was not operating properly until 1000hrs on July 13. RAWS data is available on the Spokane Fire Weather website ([National Weather Service - NWS Spokane](#)) and ROMAN ([MESOWEST STATION INTERFACE](#)). The RAWS weather file from July 10-14 is included in the fire behavior supporting documentation; graphs of temperature and relative humidity for this time period are displayed below (Figure 3).



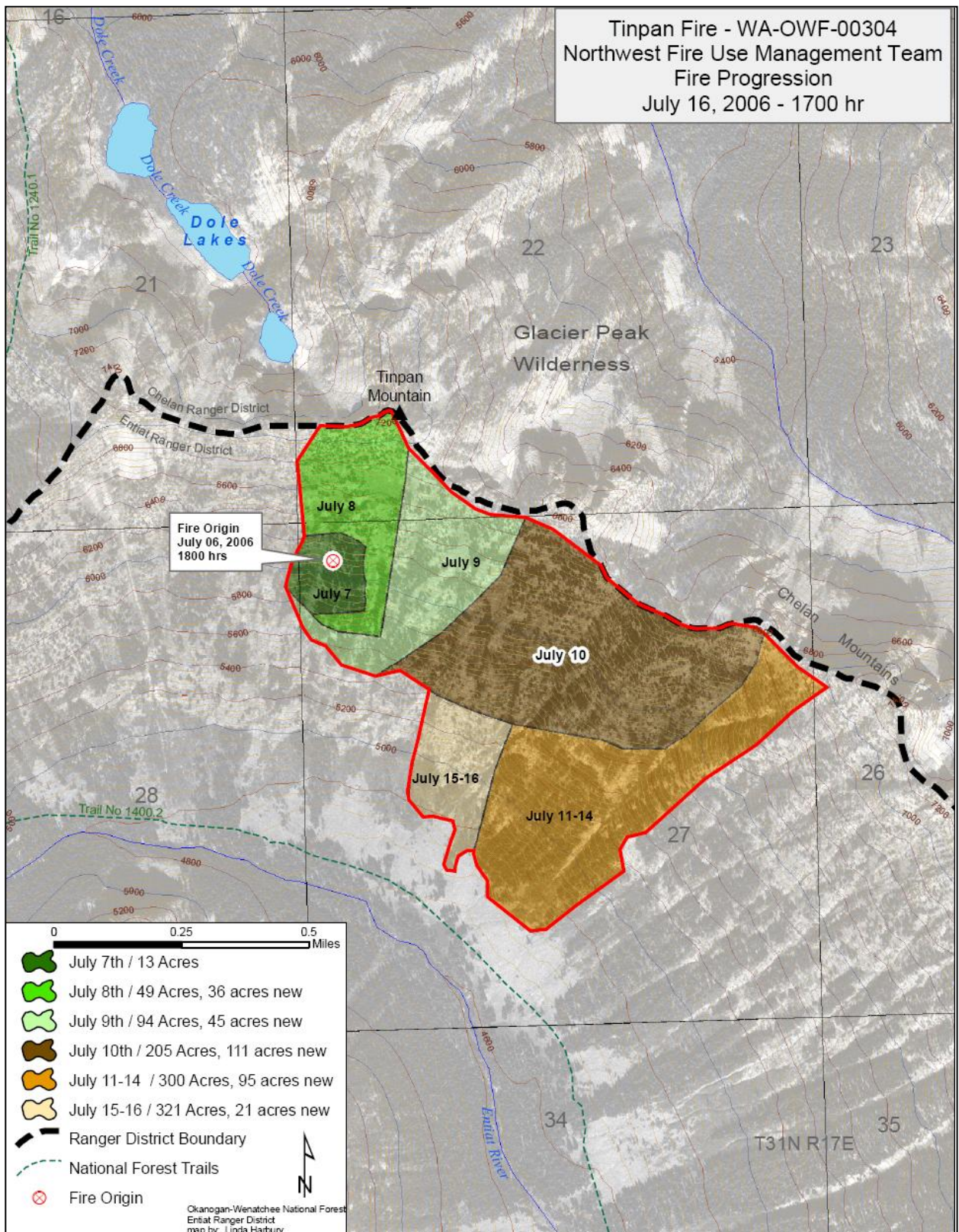


Figure 2: Fire Progression Map

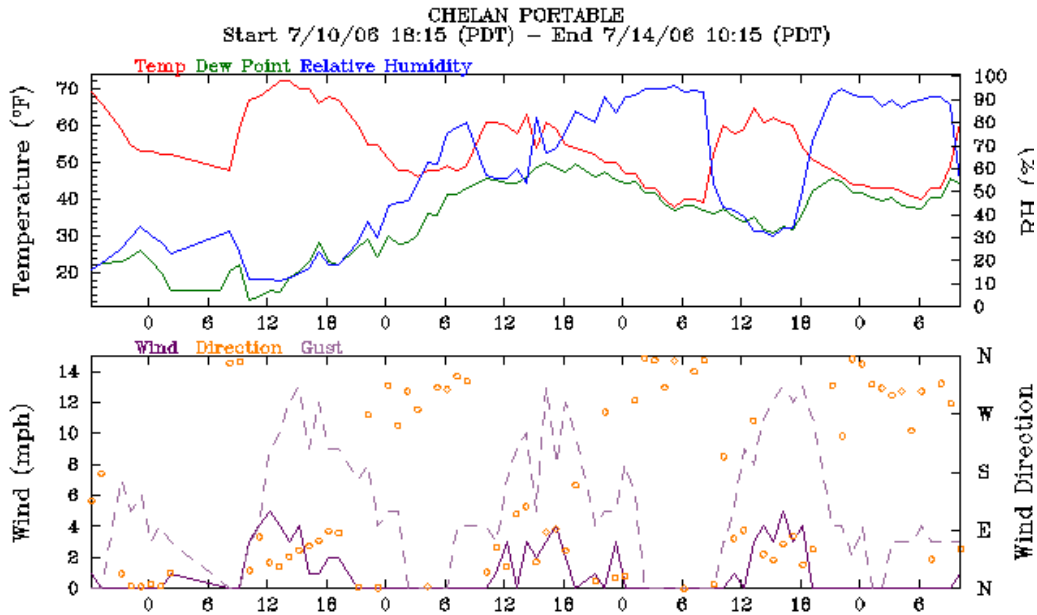


Figure 3: Chelan Portable RAWS Data for Temp, rh, and winds – 7/10 to 7/14/2006

Increasing cloud cover on the afternoon of Tuesday, July 11 over the fire persisted through the following day with the fire receiving ~3 hours of light rain on the afternoon of July 12. Because the rain gauge was not operating correctly, no rainfall was measured on site; an accumulation of less than 0.1 inch seemed reasonable for this period. Isolated torching continued through the day, but there was no appreciable fire spread other than continued slow down-slope spread (FI<2ft) in the stringers where the fire had been established. Winds continued to be upslope/up-canyon and light, moving smoke and any embers from torching back across the burned area.

July 13 was a clear day over the fire during most of the burn period. Water drops with a Type 1 (heavy) helicopter were used to reduce the heat along the down canyon edge, and again there was no fire growth down canyon. A rain shower in the early evening provided ~0.04in of precipitation on the fire at the RAWS site, and relative humidity stayed around 90% throughout the night. Isolated torching within the perimeter was noted by the Fire Effects Monitors (FEMO).



Figure 4: Interior torching with fire backing to chute 5 on July 11



Figure 5: RAWS site at base of fire on edge - Entiat Meadows



## Short-Term Outlook

Near seasonable weather conditions are predicted over the next several days (7/15 to 7/18/06), with light and variable upslope and up canyon winds, temperatures in the upper 60s and lower 70s and relative humidity in the low 30s. Over this period, each day should bring slightly warmer and drier conditions, but with the predicted light and variable winds. The most likely scenario is continued consumption of fuels within the existing fire perimeter. Fire behavior should be limited to single tree and group torching accompanied by a slow backing fire burning the downed heavy fuels.

There is the potential for a change in weather around Tuesday July 18, as an approaching system brings stronger west and northwest winds to the fire site, with more instability and a possibility of thunderstorm activity.

Down canyon, the same fuel conditions are present for approximately 2,000 feet across the slope. After that point, forest vegetation becomes more continuous, with a mixture of fuel models 8 and 10. Therefore, the fire behavior elements listed below are shown for both fuel models. Flame length and rate of spread are consistent with the fire behavior estimates provided in the Forest's Fire Management Plan.

Fuel Model	ROS	FL	PI	Spot
8	1.6ch/hr	1.0ft	.53	.1mi
10	4ch/hr	3.5ft	.55	.1mi

ROS – rate of spread of surface fire, in chains/hour

FL – flame length

PI – probability of ignition

Spot – maximum spotting distance

Weather inputs from observed conditions on July 11 and short term spot weather forecast: temp 70F, rh20%, winds 8mph (20ft) upslope.

Dead fuels are expected to dry as the season progresses, and over time the fuels that are currently not supporting fire will become available fuels. The north facing slopes and draw bottoms are lagging behind the south slope where the fire is located, but the fuels on these sites will eventually become dry enough to sustain fire.

## Long-Term Outlook

The long-term outlook and drought prognosis is based on examining weather records at the 'Viewpoint' Remote Access Weather Station (RAWS), and several climatological websites, including but not limited to the Climate Prediction Center, Western Regional Climate Center, Natural Resource and Conservation Service, US Geological Service, and the National Climate Data Center. Viewpoint RAWS is located at 3,650 feet elevation approximately 22 miles SSW of the fire area. Viewpoint RAWS was selected because it best represents weather conditions for the upper Entiat River Valley. Other tools include Fire Family Plus, the Fire Area Simulator (FARSITE), the Rare Event Risk Assessment Process (RERAP), and FlamMap.

**Seasonal Severity – Long Range Forecast:** The long range forecasts predict above average temperatures and near average precipitation (Fig. 6), which will lead to above average fire severity potential. We can expect about 90 days until the fire season will end (50% confident of 0.5 inches of rain over three days by Oct. 8th). See RERAP Term File.



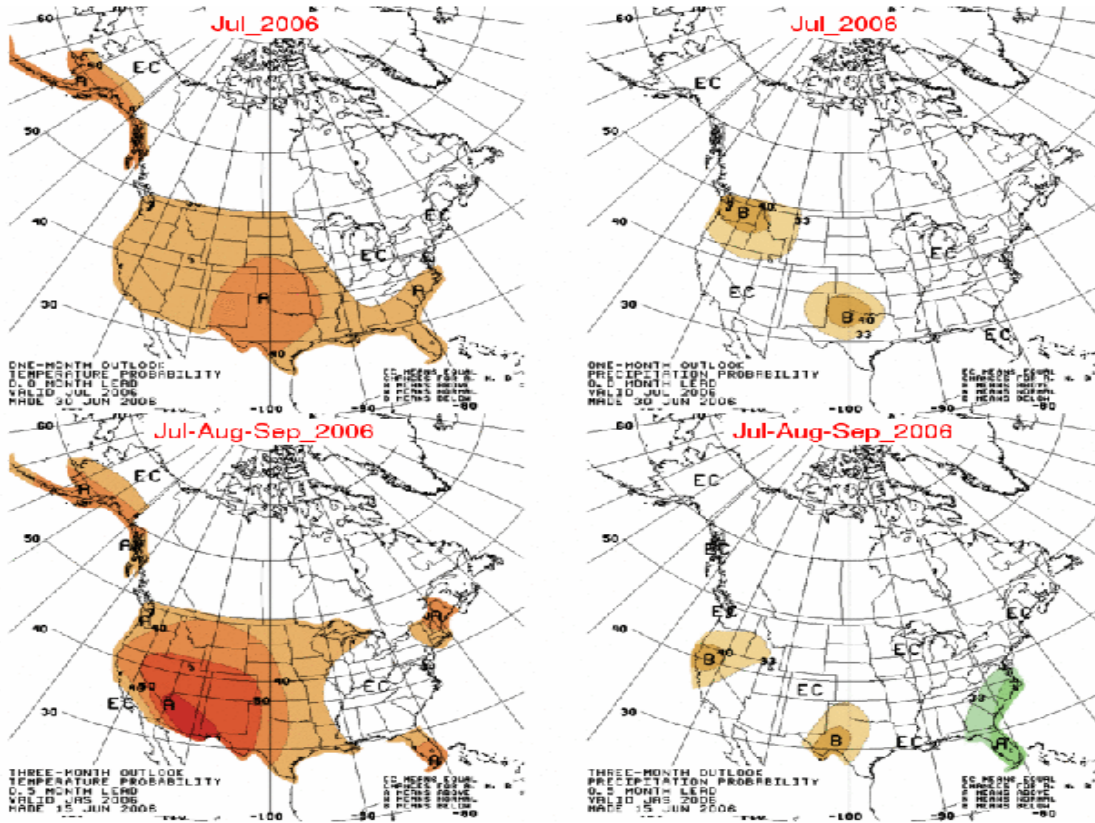


Figure 6: Long-term predictions of temperature & precipitation for July to September 2006.

The Drought Monitor below shows this part of Washington in a normal pattern (Figure 7).

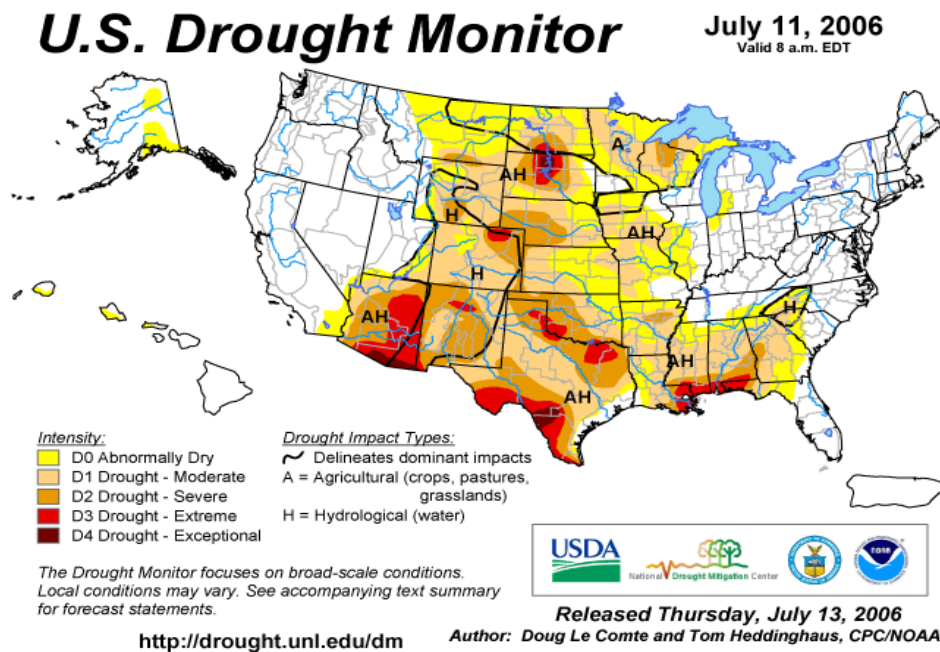


Figure 7: US Drought Monitor for July 11, 2006.

**ERC** - A good indicator of fuel drying and potential fire activity, is the Energy Release Component (ERC). The current year pattern of ERC at Viewpoint has been above average

since the middle of June. ERC has approached the seasonal maximum twice. In average years ERC values tend to increase through mid-July, and then hold at this high level until the first of September. Given this assumption, high to very high fire danger will persist over the next 45 days.

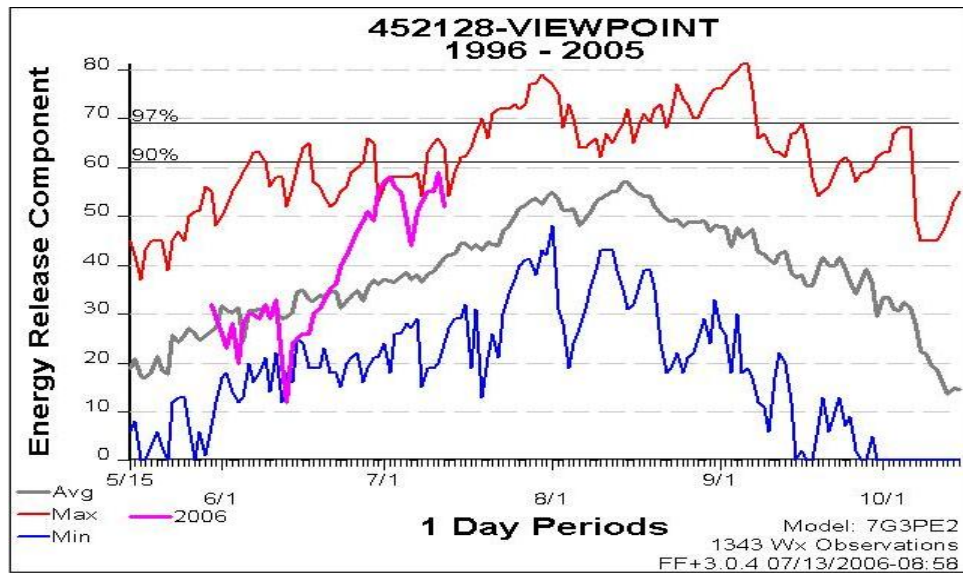


Figure 8: Energy release component at Viewpoint began to move above average the last week in June and was at the Maximum for 1996-2005. The light precipitation on July 12, 2006 slowed the climb of the ERC to near the 90% level.

**Seasonal Trends:** When comparing the current year seasonal trends in fire danger indicators at Viewpoint RAWS to the patterns from 1996 through 2005, we see that 2006 is well above average and just under the seasonal, maximum and would expect this trend to continue until the season ending event in the late summer or fall

**KBDI** - Keetch-Byram Drought Index (KBDI) is an indicator of moisture deficit in the soil and duff. It should be noted that the Viewpoint RAWS KBDI (Figure 9) shows significantly higher values than other reporting stations in central Washington.

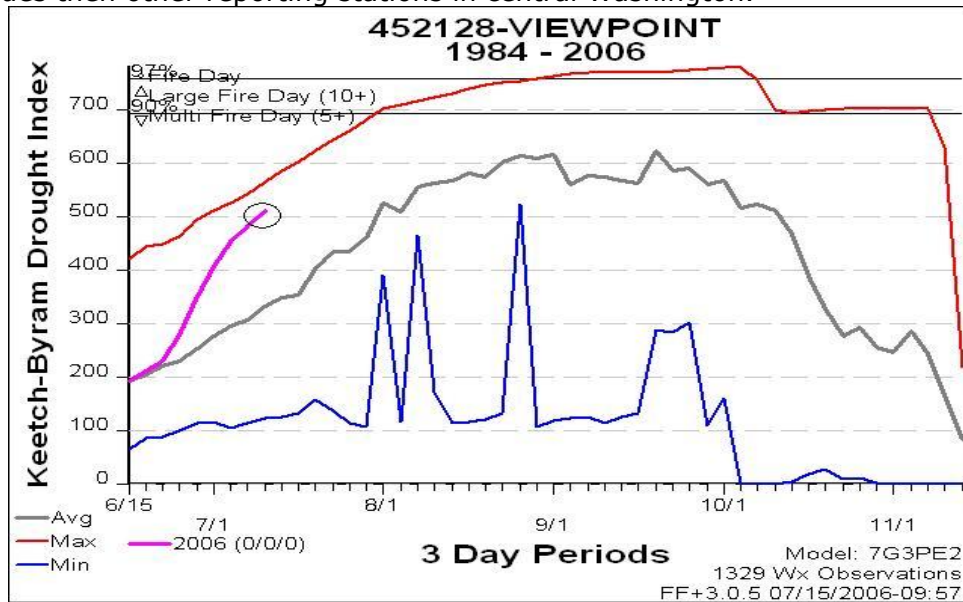


Figure 9: **KBDI** - Keetch-Byram Drought Index (KBDI)

**1000-hour fuel moisture** - Fuel moisture in the large dead surface fuels is another measure of long-term seasonal dryness. We compared 1000-hour fuel moisture for the

current season to the past 20 years. The current year fuel “dryness” (as measured by the 1000 hour fuel moisture) is approaching the 90<sup>th</sup> percentile, and this is validated by the frequent spotting that the Tinpan Fire has experienced. The current fuel moisture is continuing on this downward trend, and the long term weather forecast indicates no change. The historical trends indicate that 1000-hr fuel moisture does not begin to recover until mid-September in most years, and not until November in some years.

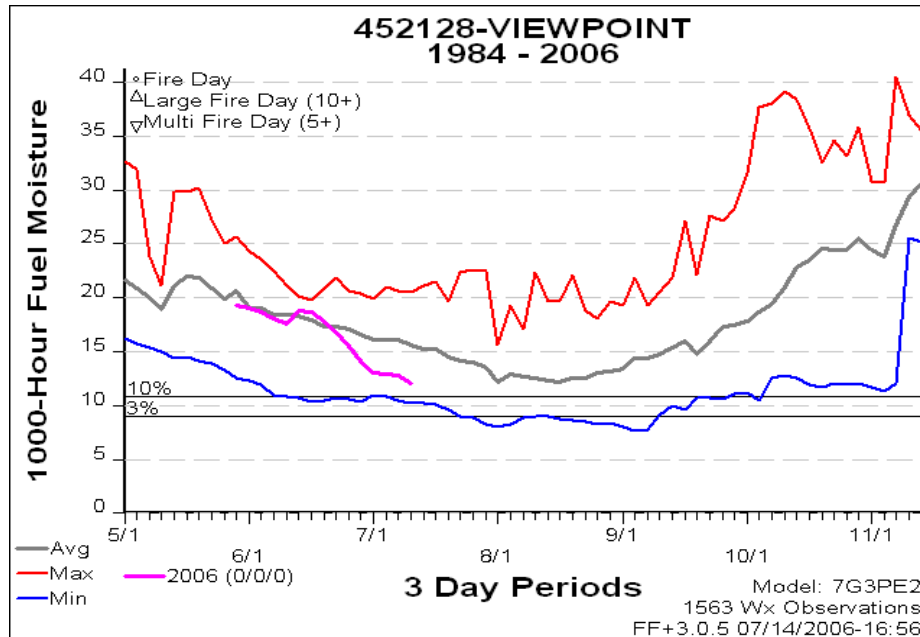


Figure 10: 2006 1000-hour fuel moisture compared to historical average, maximum, and minimum by date for the period 1984-2006.

**Season Ending Event:** Determining the potential length of the season is critical to most operational decisions. For the Okanogan and Wenatchee National Forests, a rain event that delivers at least 0.5” of precipitation over a 3-hour period is defined as a season ending event. The Viewpoint RAWs term file indicates that 50% of the time, the season end should occur by October 8<sup>th</sup>; and 90% of the time by November 1. As stated in the Stage II Assessment, there is a 3% chance of a season ending event by August 24<sup>th</sup>.

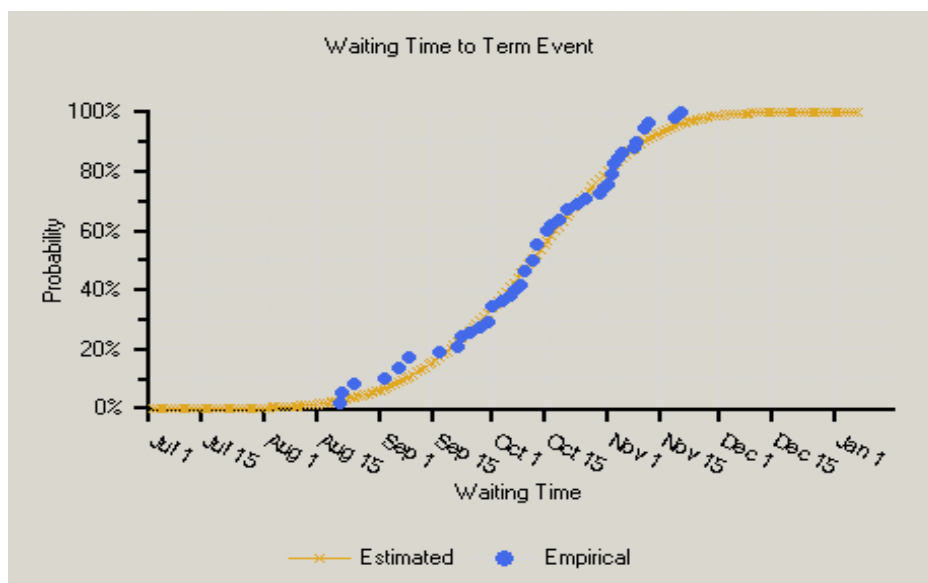


Figure 11: RERAP Term File

**Fire Growth Scenario:** Fire behavior to date includes a slow creeping surface fire combined with individual and group tree torching and spotting in the predominant sub-



alpine fir stands. Fire spread has been largely confined to the steep southerly aspects of Tinpan Mountain. This area is warmer and drier than most of the surrounding landscape due to its high exposure to both solar radiation and predominant winds.

Fire spread has been minimal in sheltered fuels (e.g. north aspects and draws). Available fuel will be an important feature in projecting future fire growth.

Site-specific observations, environmental parameters, and fire danger components indicate fire season is two weeks ahead of schedule. Current fire spread is similar to what is expected for the last week of July in a normal fire year.

Most of the historically large fires on the Entiat District have spread aggressively down the Entiat watershed. Unchecked, it is likely that the Tinpan WFU fire will follow this pattern and spread down the Entiat River drainage from its current position. There is a large block of continuous closed canopy timber from MAP 2 (Chute 9) to the wilderness boundary that represents the greatest threat of the fire breaching the MMA.

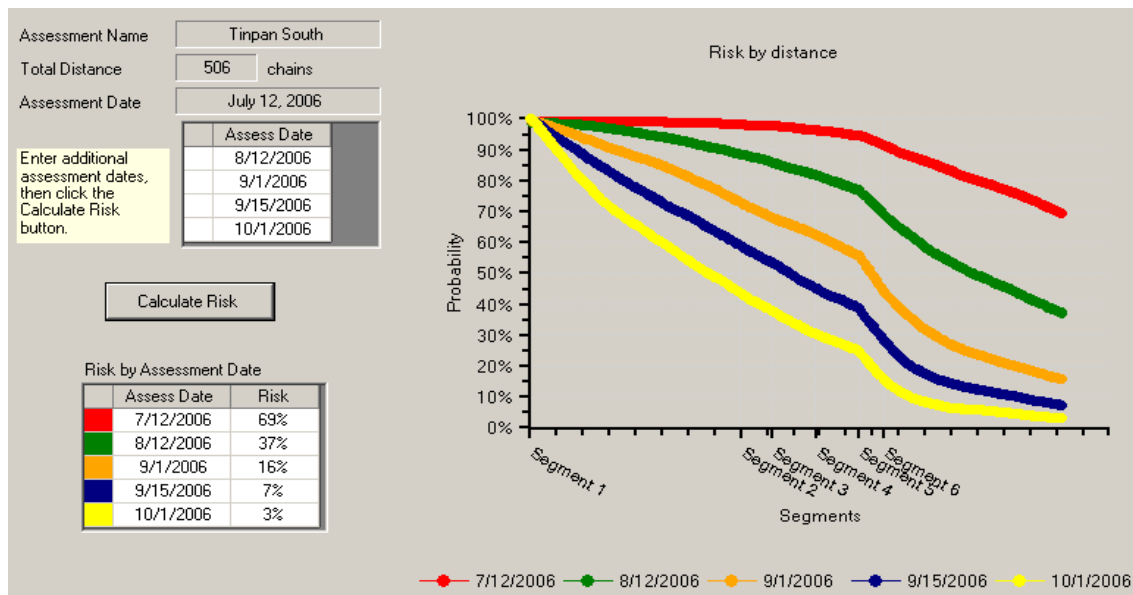
Normal seasonal drying will make larger and larger areas within the MMA available for fire growth. Single and group tree torching and spotting will continue to be the dominant mechanism for fire spread. Surface fires will be the secondary method of fire spread. Active crown fire spread will be an occasional event, but significant in moving the fire.

The likelihood of one or more dry cold front passage and associated wind event increases in late August through September. Observations by the FEMOs indicate that an rH of 30% or less support single and group tree torching/spotting. Torching still occurs above 30% rH but the probability of ignition is relatively low.

## RERAP

The Rare Event Risk Assessment Process (RERAP) tool is used to estimate the probabilities of the fire reaching specified points of concern based on climatological weather and descriptions of the fuels and environmental conditions along the approximate fire path. The model requires use of several assumptions that simplify the fire environment in order to manage the required inputs. Two important assumptions include:

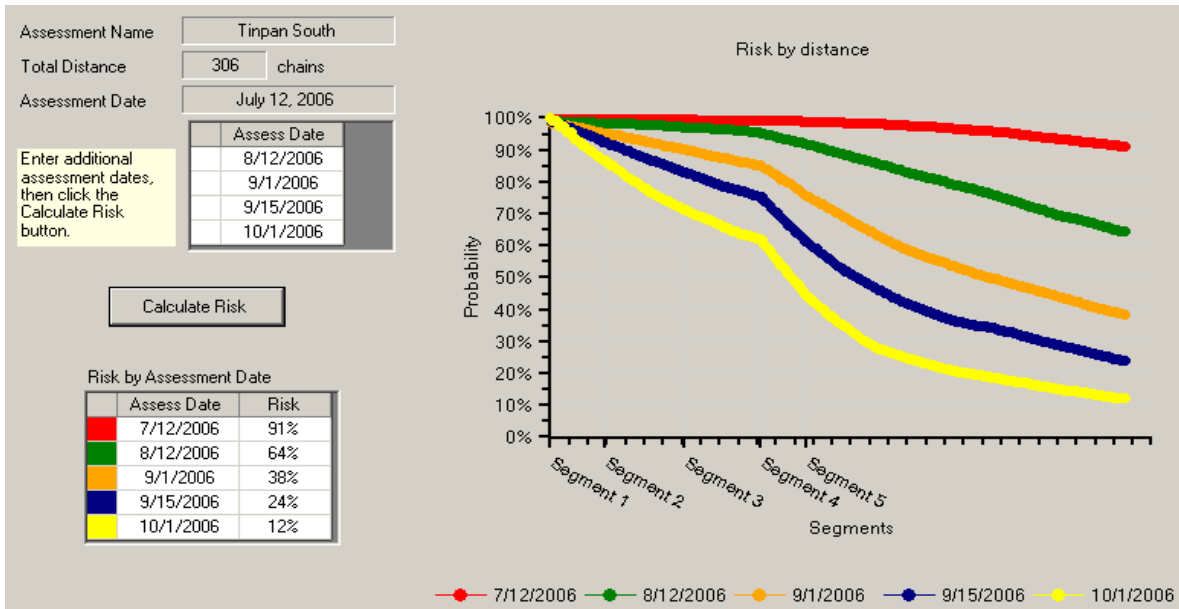
- The weather and fuels information used is representative of the area analyzed.
- No suppression actions are taken to slow or halt fire spread.



(TinPan\_South)

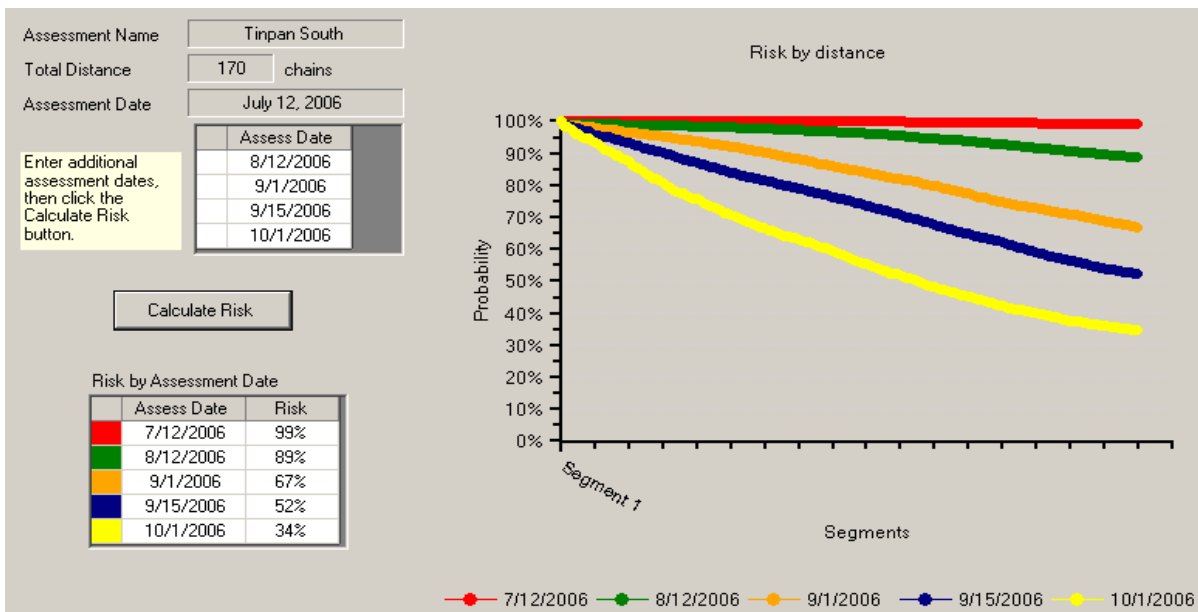
The Tinpan south simulation is 506 chains long and runs midslope in continuous fuels south to the Wilderness Boundary. The six mile distance was differentiated into 6 segments based on local fuel data. The risk assessment period starts from the moment a free burning fire

would leave Management Action Point 2. For example, on July 12, the Fire has a 69% probability of reaching the Wilderness Boundary before the season ending event.



(TinPan\_MAP3)

The above simulation is 306 chains in length running from MAP3 to the wilderness boundary. The fire has a 64% probability of reaching the Wilderness Boundary before the season ending event if the fire was at MAP 3 on August 12.



(TinPan\_MAP4)

The above simulation is 170 chains in length running from MAP4 to the Wilderness boundary. The fire has a 67% probability of reaching the wilderness boundary before the season ending event if the fire was at MAP 4 on September 1.

## ***Future Assessment Needs***

Depending on fire behavior, season and spread rates, the Periodic Assessment may include one or more of the following components:

- **Fire-Slowing Events:** Fire-slowing events would slow fire spread but not necessarily stop it. Two criteria of fire-slowing events include:
  - 1) 0.10-0.24 inches of precipitation/day = slowing for 1 to 3 days
  - 2) 0.25-0.49 inches of precipitation/day = slowing for 3 to 6 days
- **Hard Freeze:** An early season hard freeze will kill then cure herbaceous vegetation and leaves on shrubs, particularly at the higher elevations. Vegetation can freeze-dry and contribute to greater fire intensity and spread rates. The effects of freeze-dried vegetation on fire behavior are difficult to include in fire behavior calculations due to temperature and time variables. For example, a non-lethal freeze may occur when temps are at or below 32°F for several hours, but it may only take a few minutes at 28°F to kill most herbaceous vegetation.
- **FARSITE Analysis:** A FARSITE analysis is recommended should the fire become established in the continuous fuels south of MAP 2.
- **Assessment of Smoke Production and Trajectory.**
- **Assessment of Additional Points of Concern (Values at Risk).**
- **Assessment of Fire Regime Condition Class (FRCC):** Compare current with historic and/or desired future conditions at the landscape scale.
- **Assessment of Historic Precipitation Events**
- **Structure Protection Plan for the Gorden Stuart Cabin**

## ***Threats to the MMA***

The initial assessment identified fire spreading across the ridge onto the Chelan District through a saddle above the fire as the most serious threat to the MMA. The fire burned past this saddle on July 10<sup>th</sup> and now presents little to no risk of a breach at this point. Two spots were known to have crossed the ridge on July 10<sup>th</sup>. These spots were not visible by aerial recon on July 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup> and 15<sup>th</sup>. Rock, snow, and high fuel moisture limit the possibility that embers crossing the ridge will start and sustain a fire. Very isolated spots could occur but are unlikely.

The Stage III Assessment identifies the continuous timber fuels on the west facing aspect south of the fire (south of Chute 9) as the most likely threat for fire spread to breach the wilderness boundary and MMA. Other potential routes of spread are possible, but we believe that they pose a significantly lower probability of threatening the MMA. There is little to no threat to the western edge of the MMA and little threat to Holden Village (3 miles to the NW).

This assessment focuses on the threat to the southern MMA boundary. As the fire progresses, additional assessments should be conducted to ensure that fire behavior predictions and assumptions are still valid.



## ***Threats to Firefighter and Public Safety***

### **Firefighter Safety**

**Concern:** Environmental threats include steep slopes, down logs, brush in avalanche chutes, rolling rocks and debris, fire weakened green trees, and snags. Weather related influences include variable winds (speed and direction), thunder cells, rain, varying temperatures and low relative humidity.

Fire behavior related threats include group torching, running crown fire, long range spotting, and potential rapid rates of spread due to fuel conditions and/or wind influence.

Aviation operations pose risks of low-level flights in steep mountainous terrain, high density altitudes, long line delivery of logistical support needs and/or bucket drops to limit fire spread.

**Mitigation:** Continue to adhere to the 10 Standard Fire Orders, 18 Situations that Shout Watch Out, the Risk Management Process and other fire line safety policies and procedures. Ensure that Lookout, Communications, Escape Routes, and Safety Zones (LCES) are in place prior to engaging in all operations. Assess and limit firefighter exposure to hazard trees and steep terrain. Provide current and expected weather and fire behavior forecasts to all personnel to the incident.

Continue to adhere to the Interagency Helicopter Operations Guide for all air operations. Identify and mitigate flight hazards prior to operations. Limit aviation to essential flights only. Implement Temporary Flight Restrictions (TFR) and post Notice to Airmen (NOTAM) for adjacent incidents as needed. Conduct daily briefings with pilots and helibase personnel.

Further recommendations: Use pack horses for long-term support of crews and lookouts. Install web-based surveillance cameras for real-time monitoring of the fire area.

### **Public Safety**

**Concern:** Rapid fire spread can pose risk of entrapment to hikers, hunters, outfitters, and other forest users in the area that may lead to serious injury or fatalities. Fire weakened trees, snags, rocks, and debris can fall potentially striking people and stock, and/or blocking trails and camping spots. Smoke, ash, and ember fallout can affect personal health of forest visitors and the residents of Holden Village. Also, trail access out of the north end of the upper Entiat watershed is considered poor and should not be used as an escape route for this incident. Note: Current threats to the public are relatively low.

**Mitigation:** Continue to evaluate and determine which access points, areas and trails need to be closed as appropriate to minimize opportunities for fire related threats to life and property. Keep hikers, hunters, outfitters, surrounding communities and forest users informed on current and expected fire conditions. Make direct contact and/or post fire information at trailheads, campgrounds, Ranger District Offices, public buildings and local businesses. Monitor recreation and camping areas so that visitors can be contacted quickly if fire conditions change. Maintain an active public information program.

### ***Other Threats and Concerns***

**Concern:** Cutthroat trout habitat – Entiat River Drainage: Potential impacts to downstream cutthroat trout habitat from potentially large, high severity fire event(s).

**Mitigation:** Continue to monitor fire behavior, size and location. Limit size and severity of fire. Current direction supports holding fire to MAP 2 (preferably MAP 1).

**Concern:** Cutthroat trout habitat – Dole Lakes: Potential impacts to cutthroat trout habitat due to operational activities (ie. dipping site for helicopter w/bucket).

**Mitigation:** Continue to monitor lake level. Limit or discontinue use if lake level drops below seasonal norms. Note: At this time Dole Lake inflows far surpass water use.

**Concern:** Historical Resources: Gordon Stuart trapping cabin located at the confluence of Snow Brushy Creek and the Entiat River (1 mile south of MAP 4).

**Mitigation:** Continue to monitor fire location and behavior in relation to this structure. Protect structure with fuels treatment, wrap, and/or sprinklers as needed.

**Concern:** Wilderness designation: There is a concern that operational activities may impair the recreational values and ecological character of the Glacier Peak Wilderness.

**Mitigation:** Follow minimum impact suppression tactics (MIST) procedures outlined in the Incident Response Pocket Guide (PMS#461). Use natural barriers and trails to the extent feasible. Post trailheads and contact wilderness visitors particularly during periods of active fire management.

## ***Smoke Management***

The Washington State Implementation Plan (SIP) provides means by which goals of the Clean Air Act are to be attained. The Clean Air Act also contains a provision that provides for prevention of significant deterioration (PSD) of air quality in areas that currently have very clean air. Three air quality classes were established (Class I, II and III). Class I areas have the smallest increments and therefore allow the least amount of air quality deterioration. The following are the Class I areas in Washington State:

Location	Approximate Distance Miles	Direction
Alpine Lakes Wilderness	30	South
Glacier Peak Wilderness	0	all
Goat Rocks Wilderness	95	South
Mount Adams Wilderness	120	South
Mount Rainier National Park	65	Southwest
North Cascades National Park	60	North
Olympic National Park	120	West
Pasayten Wilderness	120	North
Spokane Indian Reservation	150	Northeast

**Concern:** Given the prevailing wind direction, the Class 1 areas to the north and northeast of the fire area are most likely to experience degradation in visibility during larger fire growth episodes. A large fire growth episode for this purpose is defined as 100 or more acres of growth in forest fuel types in a single burning period.

In addition to concerns related to the National Ambient Air Quality Standards (NAAQS) and visibility, there are public concerns when smoke levels are not sufficient to exceed NAAQS, or so-called nuisance smoke. The Okanogan and Wenatchee National Forests have a long history of large fires. Phone calls to local fire departments, dispatch centers and Entiat and Chelan Ranger District offices increase dramatically when smoke plumes are visible.

**Mitigation:** Continue to monitor smoke volume and dispersal; keep affected communities informed of fire status. Initiate actions to check fire spread (and emission production) as needed. Comply with wildland fire use smoke management provisions as per Washington State DNR Smoke Management Plan. Simulate potential smoke emissions (ie. FOFEM modeling) particularly during periods of relatively high fire activity. Track smoke dispersion forecasts at: <http://www.blueskyrains.org/>

## ***Monitoring Actions***

The Tinpan WFU fire will be monitored by assigned fire personnel to assess fire activity and provide operational feedback to the district and/or WFU Team. Monitoring activities and frequency will be based on fire intensity and proximity to the MMA and MAPs. To reduce the exposure of aerial reconnaissance, daily monitoring actions should be done by Field Observers (FOBS) and Fire Effects Monitors (FEMO).

### Monitoring Standards

Monitoring is important to document fire weather, fire behavior, and for validation of fire behavior predictions. Recorded monitoring variables include: smoke dispersal, live and dead fuel moistures, daily weather observations, fire perimeter location and progression, and observed fire behavior. Monitoring locations will depend on the fire activity of individual fires and threats from that fire. Monitoring frequency will increase or decrease depending on the activity level and location of the fire (ie. high fire activity, relatively high monitoring frequency).

A portable RAWS has been established in Entiat Meadows at the toe of the Tinpan Fire to provide information for management actions and fire behavior predictions. This station should provide hourly weather observations for the duration of the incident.

FEMOs, FOBS, Wildland Fire Use Management Teams, and/or Fire Use Modules may be required for the duration of the incident to assess fire threats to MAP or MMA boundaries

A digital camera should be used to document fire location, smoke movement, fire behavior, fuel types and other site-specific information within the MMA. Smoke concentrations and movement should be documented daily during aerial reconnaissance and/or by ground monitors.

Fine dead fuels may also be evaluated using dead fuel moisture reference tables and from weather station computed values. When requested, fire monitors will collect live fuel samples for determining live fuel moistures.

Fire behavior and daily fire growth will be observed from aerial reconnaissance, and/or by ground monitors. On-site monitoring should provide detailed fire behavior observations.

Monitors should also track significant events such as visibility impairments, days of trail closures, etc.

District specialists will evaluate, identify, and map rehabilitation needs in terms of downed trees, closed trails, damaged trails and bridges, etc.

Nephelometers from the Pacific Northwest Experimental Station-Air Quality Division are available to monitor air quality as needed. Monitoring locations will depend on the fire activity and potential threats from that activity.

Additional Recommendations: Install web-based remote surveillance cameras for real-time monitoring of the fire area. Note: Request for this service has been initiated by the district and NW Fire Use Management Team as of 7/16/06.



## **Resources Needed to Manage the Fire and Estimated Costs**

The Tinpan WFU fire requires operational and support personnel as well as a management organization to supervise and direct the implementation of the Wildland Fire Implementation Plan (WFIP). The following organization was developed to manage the fire given its current location and activity. The WFU organization may be increased or decreased as needed.

- **Fire Use Management Team:**

- FUMT (\$2,000/day)

- **Operational Personnel:**

- 2 FEMOs and/or FOBS (\$400/day)

- **Aircraft and Equipment:**

- 1 Type 3 Helicopter w/Module, flight time 2-4 hrs/day (\$3,400/day)
- 1 Type Type 1 Helicopter w/Mgr. flight time 4-6 hrs/day (\$30,000/day)
- 1 Air Attack Platform, flight time 4-6 hrs/day (\$3,400/day)

**Costs to Date – (Direct and Indirect Costs from 7/8 to 7/14/2006): \$141,717**

Table 8. Recommended resources required to manage the Tinpan WFU.

<b>Minimal threat to MAPs or segments of the MMA</b>	<b>Significant threat at MAP 1 or segments of the MMA in this area.</b> (Tinpan WFU status as of 7/14/06)	<b>Significant threat at MAP 2 or segments of the MMA in this area.</b>
Little spread potential No holding actions required	Spread potential has a moderate to high probability of crossing MAP 1 (Chute 4-5). Holding actions required	Spread potential has a moderate to high probability of crossing MAP 2 (Chute 9). More aggressive holding actions required
FUM2 1 T3 Helicopter with module 2 FEMOs or FOBS	FUMT (9 overhead) 1 T3 Helicopter w/Module 1 T1 Helicopter w/Mgr. 1 Air Attack Platform 2 FEMOs or FOBS 1 Resource Advisor Misc. direct/indirect support	FUMT (12 overhead) 1 T3 Helicopter w/Module 1 T2 Helicopter w/Mgr. 1 T1 Helicopter w/Mgr. 1 Air Attack Platform 2 Type 1 Crews 2 FEMOs or FOBS 1 Resource Advisor Misc. direct/indirect support PIOF and Forest PAO
Estimated daily cost of recommended organization \$4,000	Estimated daily cost of recommended organization \$40,000	Estimated daily cost of recommended organization \$60,000

## Contingency Actions

The actions described in the Wildland Fire Implementation Plan (WFIP) are designed to maintain the Tinpan WFU within the boundaries of the MMA. If the fire crosses the MMA boundary at any point along the perimeter, holding resources will be used to achieve desired objectives.

If it appears that management objectives cannot be accomplished within 48 hours after crossing the MMA, the fire must be converted to a 'wildfire', and a Wildland Fire Situation Analysis (WFSA) prepared to evaluate the Appropriate Management Response.

Table 9. Recommended contingency resources and containment strategy by Management Action Points (MAPs). Assessment based on average August weather conditions.

<b>MAPs</b>	<b>Resources by Kind and Type</b>	<b>Strategy</b>
MAP 1	FUMT (9 overhead) 1 T3 Helicopter w/Module 1 T1 Helicopter w/Mgr. 1 Air Attack Platform 2 FEMOs or FOBS 1 Resource Advisor, PIO3 and PAO Misc. direct/indirect support	Use resources to confine and/or contain the fire between Avalanche Chutes 4 and 5. Probability of success: High
MAP 2	FUMT (12 overhead) 1 T3 Helicopter w/Module 1 T2 Helicopter w/Mgr. 1 T1 Helicopter w/Mgr. 1 Air Attack Platform 2 Type 1 Crews 2 FEMOs or FOBS 1 Resource Advisor, PIOF and PAO Misc. direct/indirect support	Due to safety concerns, this is the last feasible control point before the fire reaches continuous fuels to the south and east. Objectives: Confine and/or contain the fire before it reaches continuous fuels beyond this MAP (Chute 9). Begin planning for potential holding actions along the south MMA boundary. Probability of success: High
MAP 3	FUMT (12 overhead) Transition to Type 2 Team 1 T3 Helicopter w/Module 1 T2 Helicopter w/Mgr. 1 T1 Helicopter w/Mgr. 1 Air Attack Platform 2 Type 1 Crews 2 FEMOs or FOBS 1 Resource Advisor, PIOF and PAO Misc. direct/indirect support	Few natural barriers exist to safely and effectively hold the fire from crossing this MAP. Probability of success: Low Objectives: Plan for additional resources for potential holding actions along the south MMA boundary.
MAP 4	Type 2 Team 1 T3 Helicopter w/Module 1 T2 Helicopter w/Mgr. 1 T1 Helicopter w/Mgr. 1 Air Attack Platform 2 Type 1 Crews 2 FEMOs or FOBS 1 Resource Advisor Misc. direct/indirect support	This MAP will validate actions identified in the assessment of MAPs 2 and 3. A checking action should begin at some point between MAP 3 and 4 to give resources time to mobilize and support the holding actions planned for the south MMA boundary. Probability of success: Moderate at the south MMA boundary (1996 Myrtle Lake Burn).

## ***Information Plan***

The primary goal of the Information Plan is to ensure that elected officials, citizens, key contacts, media, and employees continue to receive accurate and timely information of the Tinpan Incident so that they understand the mission of the team, current status of the fire, and future incident plans. Timeliness and extent of information should be commensurate with fire activity and the level of interest conveyed by above parties.

### **Key Messages:**

- Public and firefighter safety is the first priority in **every** fire management activity
- Natural ignition wildland fires in wilderness can be actively managed to use fire to perform its natural function as a disturbance agent to promote healthy ecosystems
- Wildland Fire Use events are educational opportunities to inform the public on the positive attributes of fire in certain ecosystems
- A Fire Use Management Team is a specialized overhead team created to manage wildland fire use activities to optimize resource objectives in defined areas and minimize fire suppression costs.

### **Procedures:**

The following activities are planned to meet the primary goal:

Prepare fire information updates as conditions change that are sent to all employees, external/cooperating agencies, media, legislative offices, local communities, adjacent land owners, and other interested parties on a regular basis. The update will include the current status, detailed map, anticipated planned actions, and other pertinent information regarding such things as smoke management, structure protection, and closures of trails or areas.

Include messages in the daily update that stress fire use objectives and pre-planning that allows this type of fire to only burn naturally within predefined, designated areas.

Post handouts, maps and other important details on the agency website. Make a link to other websites as necessary (i.e. <http://inciweb.org>, <www.activefires.net> when available).

Schedule and conduct public meetings/presentations when appropriate. Coordinate with the local hosting agency for agenda, handouts, location, and timing.

Work with the Entiat Ranger District and the Chelan Ranger District to get updates posted at trapline locations for both districts. Continue to contact Okanogan and Wenatchee NFs PAO Paul Hart and/or Robin DeMario (Executive Assistant to Forest Supervisor Jim Boynton) to determine if there is a need to expand trapline outside of two-district area or to incorporate other information needs.

In the event of increased fire behavior and spread, anticipate forest closure orders needed for trails and other facilities.

For the Tinpan Incident, if renewed fire behavior and spread to management action point (MAP) 1 occurs, utilize district resources (PIO3) and Forest PAO's to initiate renewed information contacts to inform of change of conditions. This may require a Forest Order trail closure of the Entiat River Trail (#1400) at the junction of Ice Lakes Trail (#1405).

For increased fire behavior and spread to Management Action Point (MAP) 2, use district resources and/or order specialized information resource personnel (PIO2) and Forest PAO's to increase the quantity and quality of information. This may require a Forest Order trail closure for the main Entiat River Trail (#1400) at the Cottonwood Trailhead. This type of mobilization of information resources may also be needed in the event that significant smoke events occur in the Entiat and/or Lake Chelan valleys.

Beyond these MAPs a more structured Information Team (PIO1 or PIO2 with PIO3 assistance) will be needed as commensurate with fire activity or IMT structure utilized.



Maintain trailhead information boards with updates and maps for those trails entering immediate fire area or which can access the trail system that does.

Trapline Locations\*:

Entiat RD

Entiat Food Center  
Cooper's Store-Ardenvoir  
Entiat Post Office  
Entiat River #1400 Trailhead  
Entiat City Hall  
The Soapmeister  
Shell Station/Taco Maker  
Entiat Log Cabin  
97 Brew & Sub Shop  
Trader Vicks Fruit Stand  
Entiat Fashions  
Entiat Valley Pastry  
Entiat Liquor Store  
Entiat Valley Campgrounds: Fox Creek,  
Lake Creek, Silver Falls, North Fork,  
Spruce Grove, Three Creek, Cottonwood.

Chelan RD

Chelan Post Office  
Caravel Resort  
Campbell's Resort  
Kelly's Hardware  
Chamber of Commerce  
Chelan City Hall  
Chelan Fire Station  
Apple Cup Restaurant  
Apple Inn Motel  
Mid-Towner Motel  
Apple Store/Fudge Shop  
Chelan Liquor Store  
Local Bars (Dales JB's Restaurant/Bar etc.)  
Manson Post Office  
Manson Main Street establishments

Holden Village fire information can be updated via email to two contacts listed in the transition plan.

\* Always check with District Rangers (Karin Whitehall-Entiat RD and Bob Sheehan-Chelan RD) for additions or further needs as they may deem necessary.

## ***Post-Burn Evaluation***

A post-burn evaluation should be completed within 6 months after the fire has been declared out. The post-burn evaluation should include the following:

- Wildland Fire Use observation record form. Recommended for all Class B or larger fires and Class A fires with special circumstances (e.g. T&E species, high public interest).
- Fire Severity Map
  - Fire Area (acres)
  - % Crown Fire (acres)
  - % lethal underburn (acres)
  - % non-lethal underburn (acres)
  - % un-burned area within fire perimeter (acres)
  - indicate vegetation or habitat type and fuel model
- Fuel consumption: Narrative description of smoke emissions and surface fuel consumption (ie. % duff, 1,000-hr, 100-hr, 10-hr and 1-hr surface fuel reductions).
- Impacts to cultural, historic, and other resources:
  - Trails (e.g. loss of trail structures, miles of trail clearing, etc.). Estimate resources required to restore trail system and complete hazard reductions.
  - Structures (e.g. signs, cabins).
  - Noxious weeds (species, location and extent).
- Review management actions that may have adversely impacted the fire area such as helispots, pump sites, cut trees, spike-camps, and control lines. Determine type and degree of impacts and rehab needs.
- Assess opportunities for long-term fire effects monitoring and research.
- Complete a cost analysis for WFU fires over 100 acres in size. Compare actual costs with the WFS cost analysis.
- Initiate the post-fire evaluation at the Entiat District Office in collaboration with the Okanogan and Wenatchee Supervisors office and Wenatchee Forestry Sciences Laboratory.
- Develop photo points of fire area for future presentations.

***Signatures***

**Prepared by:** \_\_\_\_\_

Jim Furlong, Incident Commander

\_\_\_\_\_

Date

**Approved by:** \_\_\_\_\_

James L. Boynton, Forest Supervisor  
Okanokan-Wenatchee National Forest

\_\_\_\_\_

Date

## **PERIODIC FIRE ASSESSMENT INSTRUCTIONS**

The Periodic Fire Assessment is a process to prevent the unchecked escalation of an individual fire situation or the total fire management situation without evaluation and adequate planning. Part 1 evaluates the capability to continue implementation of the appropriate management response to this fire for achieving resource benefits for a specified period following the assessment i.e., the next 24 hour period or longer, depending upon fire weather and fire behavior forecasts or other anticipated conditions. This assessment will be completed and periodically reviewed for validity. The "assessment frequency" box on page 1 specifies the frequency of assessing the particular fire. Assessment frequencies will be set by the local unit but are recommended to range from every day to every ten (10) days depending on the fuel type and geographic location of the fire. Recommendations for minimum assessment frequency include the following: Grass fuel types = daily; shrub and timber fuel types = every 1 – 5 days; Alaska = every 1 – 10 days.

The "valid date(s)" box is inclusive of those dates where the assessment remains valid, as indicated by the dated signature. When any decision elements change from "No" to "Yes", a new checklist must be completed for documentation purposes. A "Yes" response to any element on the Part 1 checklist indicates that the selected appropriate management response is not accomplishing or will not accomplish desired objectives and that a new strategic alternative should be developed immediately through the use of a Wildland Fire Situation Analysis (WFSA).

The Periodic Fire Assessment, Part 2 is a process that must be completed periodically for all wildland fires managed for resource benefits that do not have a completed WFIP Stage III. For isolated ignitions in fuel-limited situations, Part 2 does not have to be completed. When completing Part 2 of this checklist, if the chart indicates that WFIP Stage III is needed, it must be prepared within 24 hours.

When units establish monitoring and assessment frequency, it may be appropriate to develop a "step-up" system based on fire size or levels of fire activity. Then, as an individual fire gets larger or becomes more active, the monitoring and assessment frequency can correspondingly increase. Conversely, as fire activity lessens and fire size increases become less common, monitoring and assessment can "step-down" and become less frequent. Units must identify standards and rationale for establishing assessment frequency, especially "step-up" and "step-down" actions. If fire size is used as a determinant, then past burning rates should be used to formulate standards. If fire activity is used, then levels of burning (acres per day, etc.) must be definable and justifiable.

The Agency Administrator or delegated individual must sign the Signature Page on the specified assessment frequency.



**PERIODIC FIRE ASSESSMENT**

**PART 1: RE-VALIDATION CHECKLIST**

*Decision Element*

**Is there a threat to life, property, or resources that cannot be mitigated?**

**Are potential effects on cultural and natural resources outside the range of acceptable effects?**

**Are relative risk indicators and/or risk assessment results unacceptable to the appropriate Agency Administrator?**

**Is there other proximate fire activity that limits or precludes successful management of this fire?**

**Are there other Agency Administrator issues that preclude wildland fire use?**

**Do expected management needs for this fire exceed known capabilities?**

Yes	No



## ***Appendix A - TINPAN WFU OPERATIONAL ASSESSMENT***

The operational assessment will address Management Action Points (MAP) identified by the NW Fire Use Mgmt team within the MMA. These MAP points are designed to be assessment points and not necessarily proposed action points. The line officer, if so desired, can choose to assess or consider proposed action outside given MAP points identified by the NW Fire Use Mgmt team within the MMA boundary. All MAP's include safety considerations relating to firefighter and public safety.

**Management Action Point 1:** At this point, MAP 1 is identified on the map between chute 4 and 5. Proposed resources and objectives would include: 1 type FUM2, 1 Division Supervisor or 1 Type 3 IC, 1 Safety Officer, Type 2 or 3 1 type 1 Helicopter, 1 twenty person hot shot crew and 1 or 2 ten person Fire use modules. Objective would be to use these resources to confine or contain the fire spread to chute #4 and prevent fire spread to trigger point 2.

**Management Action Point 2:** MAP 2 is identified on the map at chute #9. Due to safety concerns this is the last feasible proposed action or assessment point before the fire reaches the continuous fuel model located to the East. Proposed resources would be similar to MAP 1 with several additions which include: 1 FUM2, 1 DIVS or 1 ICT3, 1 SOF2 or SOFR, Type 2 or 3 2 type 1 Helicopters, 2 twenty person hot shot crews or 2 Fire use module teams. Objective would be to use these resources to confine or contain the fire spread to chute #9 and prevent fire spread to the continuous fuel model located beyond chute #9. In addition the planning process would begin for holding or suppression actions along the Wilderness boundary to the south. This MAP should be used to determine key planning points such as: Number and type of resources needed (air and ground), available resources, potential fire and spike camp locations, water sources, communications, availability of Type 1 or 2 teams and other resources.

**Management Action Point 3:** MAP 3 assumes the Tinpan WFU has breached MAP 1 and 2. As stated earlier due to heavy and continuous fuels beyond MAP 2 there is no feasible safe proposed actions or assessment points until the fire reaches the wilderness boundary to the south. This is not to say the Line Officer cannot choose to take checking action to slow the progression of the fire. If MAP 3 is breached this MAP will be used to order additional resources to support the prep work at Myrtle Lake.

**MAP 4:** This MAP will validate actions identified in the planning actions for MAP 2 and 3. A checking action should begin at some point between MAP 3 and 4 to give time for the resources to arrive and support the prep work already in progress at the Wilderness boundary to the south. Again, it is extremely critical to identify resources needed in the planning phase of MAP 2. The organization in place at the time of a breach across MAP 3 will be instrumental in determining successful holding or suppression actions at the Wilderness boundary.

**Operational Assessment and proposals along the top end MMA boundary running west to east: Spotting at this point has been identified as having a low potential to occur. However if spotting does occur an assessment proposal should include the following proposed actions. Minor holding actions outside the MMA boundary in railroad Creek would not be considered suppression action. The fire will still be a WFU managed incident unless the fire becomes established in Railroad Creek. The Chelan Ranger District will be notified of any spots across the MMA and what if any holding actions would take place.**

**Cost Assessment: MAP 1: FUM2, \$200.00 per day, ICT3 or DIVS, \$200.00 per day, SOF2, \$200.00 per day, 1 hotshot crew or 2 ten-person Fire Use Modules, \$4,800.00 per day for each, 1 type 1 helicopter, \$40,000 per day, 1 type 3 helicopter, \$2,500 per day. 3 days total at a cost of \$156,000.**

**Cost Assessment: MAP 2: FUM2, \$200.00 per day, ICT3 or DIVS, \$200.00 per day, SOF2, \$200.00 per day, 2 hotshot crew or 2 ten person Fire Use Modules, \$9600 per day for each, 1 type 1 helicopter, \$40,000 per day, 1 type 3 helicopter, \$2,500 per day. 4 days total for a cost of \$368,000. In addition to the above resources, planning should begin for resources needed for holding or suppression actions along the wilderness boundary to the South.**

**Cost Assessment: MAP 3: If the fire breaches MAP 2 these resources listed will be moved from MAP 2 to begin prep work along the Wilderness boundary located at the old Myrtle Lake Fire. FUM2, \$200.00 per day, ICT3 or DIVS, \$200.00 per day, SOF2 or SOFR, \$200.00 per day, 2 hotshot crews or 2 ten person Fire Use Modules, \$9600 per day for each, 1 type 1 helicopter, \$40,000 per day, 1 type 3 helicopter, \$2,500 per day. In addition to the above resources a proposed action would be to order a Type 2 team and at that point additional resources would be ordered through them: \$225,000 per day including aircraft. 14 days for a total of \$6.1 million.**

**Cost Assessment: MAP 4: FUM1, \$200.00 per day, ICT3 or DIVS, \$200.00 per day, SOF2 or SOFR, \$200.00 per day, 2 hotshot crew or 2 ten person Fire Use Modules, \$9600 per day for each, 1 type 1 helicopter, \$40,000 per day, 1 type 3 helicopter, \$2,500 per day, 1 type 2 team, \$225,000 per day. 14 days for a total of \$6.1 million.**



### Appendix B – Management Action Point Table

MAP	Values or Areas of Concern	Action Needed	Remarks	Status
MAP 1	Between Avalanche Chutes 4 and 5	<b>If fire threatens to breach MAP 1:</b> Preferred Alt: Confine and/or contain fire from breaching this point.	Fuels in this area are largely SAF stringers (FM 10) separated by brushy avalanche chutes (FM 5). Steep slopes and numerous hazard trees necessitate aerial (vs ground) holding and checking actions (ie. helicopter w/bucket). Good safety zone at Entiat Meadow.	Initiated
MAP 2	Chute 9	<b>If fire threatens to breach MAP 2:</b> Preferred Alt: Confine and/or contain the fire from breaching this point.	Due to safety concerns, this is the last feasible control point before the fire reaches continuous fuels (FM 10) beyond this MAP. Begin planning for potential holding actions along south MMA boundary.	
MAP 3	Confluence of Aurora Creek and Entiat River	<b>If fire threatens to breach MAP 3:</b> Plan for additional resources for potential holding actions along the south MMA boundary.	Few natural barriers exist to safely and effectively hold the fire from crossing this MAP. Fuels are continuous (FM 10) with heavy budworm damage within the Douglas-fir (located at midslope).	
MAP 4	Gorden Stuart trapping cabin (1 mile south of MAP 4)	<b>If fire threatens to breach MAP 4:</b> Checking/holding action should begin at some point between MAP 3 and MAP 4 to give resources time to mobilize and support the holding actions planned for the south MMA boundary. Protect Gorden Stuart cabin with fuels treatment, wrap and/or sprinklers as needed.	This MAP will validate actions identified in the assessment of MAP's 2 and 3. The 1996 Myrtle Lake Burn should provide an effective control feature at the south MMA.	

