

Lake Tahoe on Fire: The Angora Incident From an IMET Perspective

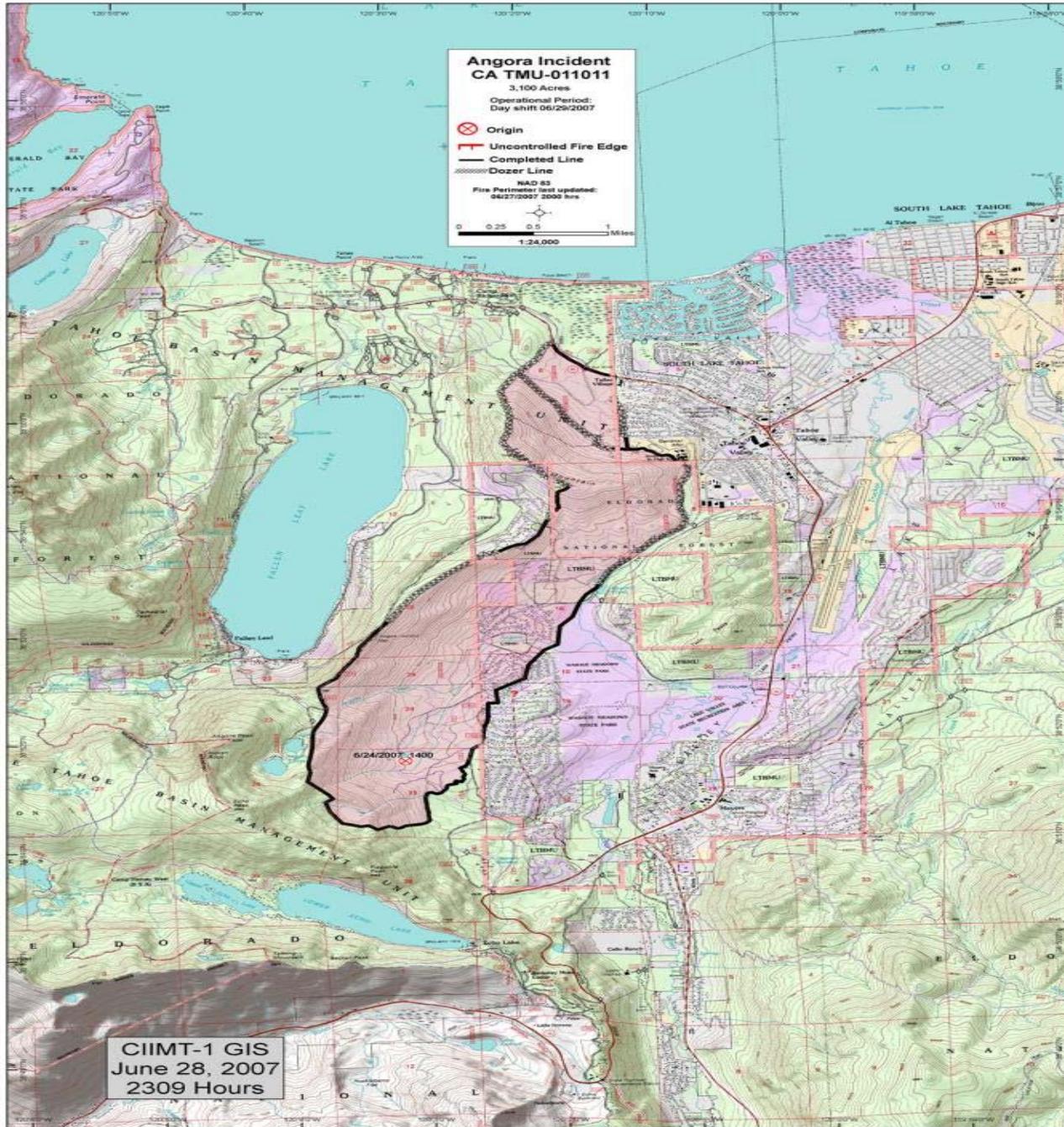
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2008 National Severe Weather Workshop



Topics

- **Impact of the 2007 Angora Fire**
- **Winter-Spring 2007 – What lead to the fuel conditions?**
 - *Other Non-weather factors*
- **June 24, 2007 – What started the fire?**
- **June 25 through July 2 – IMET Dispatch**
 - *June 25 – Arrival*
 - *June 26 - Shelter Deployment/blowup*
 - *June 27 – RAWs siting/Big flight/Red Flag Warning (RFW)*
 - *June 28 – RFW issued/Tables turned*
 - *July 2 – Containment*



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Impacts

- **3100 acres burned**
- **254 Homes destroyed**
- **Several thousand evacuated during the early stages of the fire**
- **\$9+ Million to fight**
- **\$100+ Million total damage estimates**
- **Over 2300 personnel assigned to the fire**



Winter 2006-07

- **Much drier than normal with earlier melting of snow**
 - *April 1 snowpack:*
 - Lake Tahoe Basin – 45% of normal
 - Truckee River Basin – 54% of normal
 - *Precipitation through April 1:*
 - Lake Tahoe Basin and Truckee River Basin: 67% of normal
- **Temperatures near normal through February, but much warmer than normal in March**

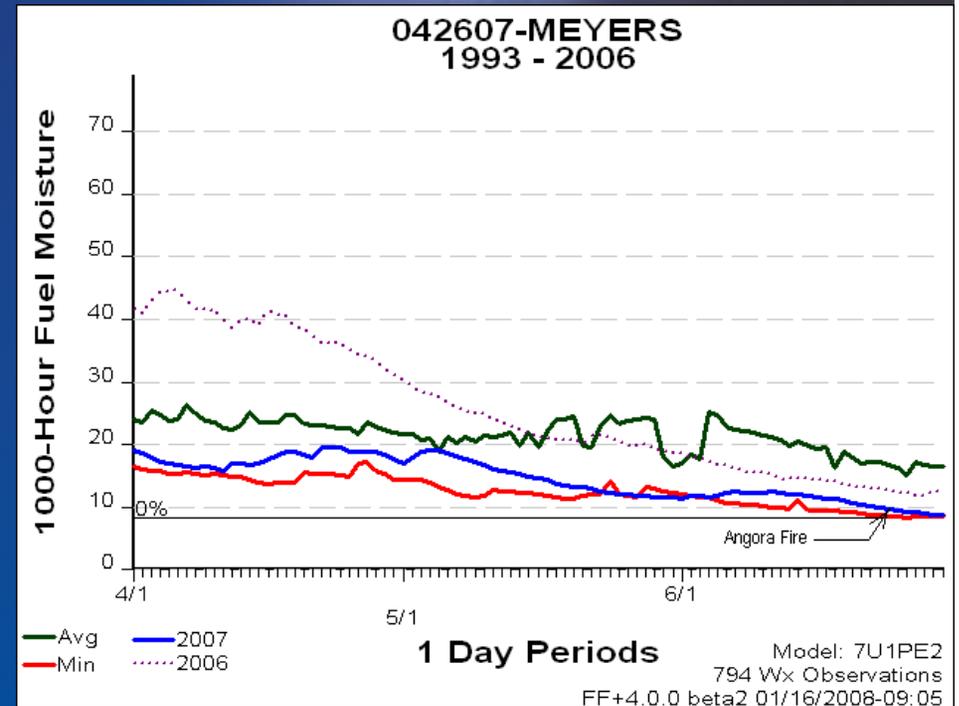
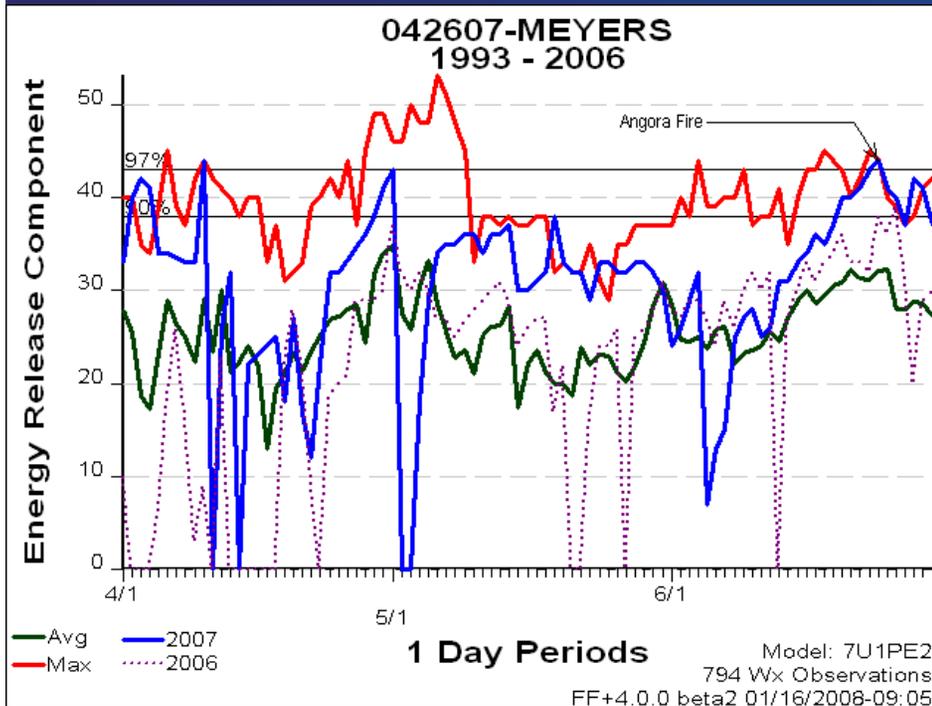


Spring 2007

- **Continued very dry**
 - *Truckee and Tahoe Basin received only 50-60% of normal precipitation*
- **Much above normal temperatures**
 - *The three month period averaged 5 degrees above normal*
- **Last significant precipitation was received on June 5th**



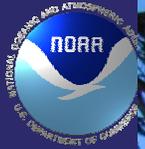
Fire Danger Indices





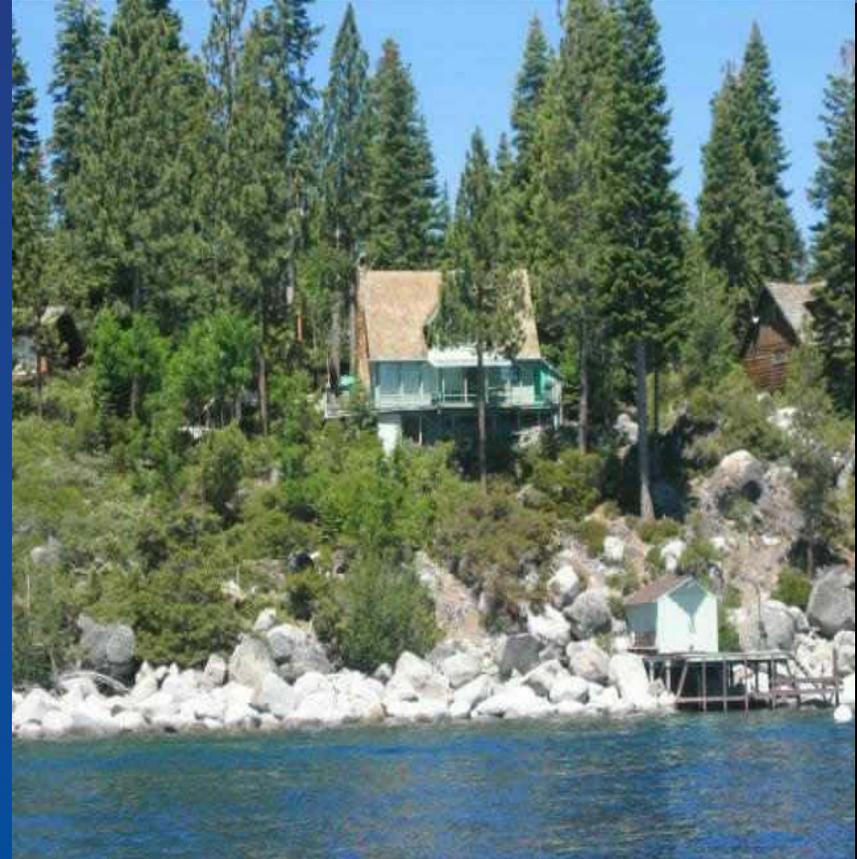
Non-weather factors

- **Most of the Tahoe Basin has not burned in at least 100 years**
 - *Since logging for the gold boom halted*
- **Most of the Tahoe Basin is overgrown**
 - *Extremely dense stands of timber and brush*
 - *Cannot walk through many areas*
- **Homes are built within the forest. Very few homes have any defensible space**
 - *High home values as well*
- **Large number of visitors in summer months**
- **Many in the wildland fire community have noticed fuel loading issues in the last 20 years**
 - *Several Rx burn projects and mechanical thinning*
 - *Most successful around Incline Village, NV*
 - *However, there are many restrictions limiting what needs to be done (California ARB policies – currently being revisited)*
 - *Goal is to have more, less intense fires*





Homes – Defensible Space?





Politics and Attitude

- Tahoe Regional Planning Authority (TRPA)
 - *“Keep Tahoe Blue”*
 - *Has very restrictive policies regarding tree cutting to limit erosion*
 - *Fines for not going through TRPA to mark trees for cutting – 5 figures*
 - *Many homes have several large pines within 15 feet of the house*
 - *Must leave pine needles on bare ground*
- Local attitude (not shared by all)
 - *“It will never happen here”*
 - *Lake Tahoe influence will protect us – Too humid, lake breeze*
 - *Cal Fire will never let it happen, they will always put it out before it gets too big*
- Fire community impression: **ONLY A MATTER OF TIME**



Sunday June 24 – The Beginning

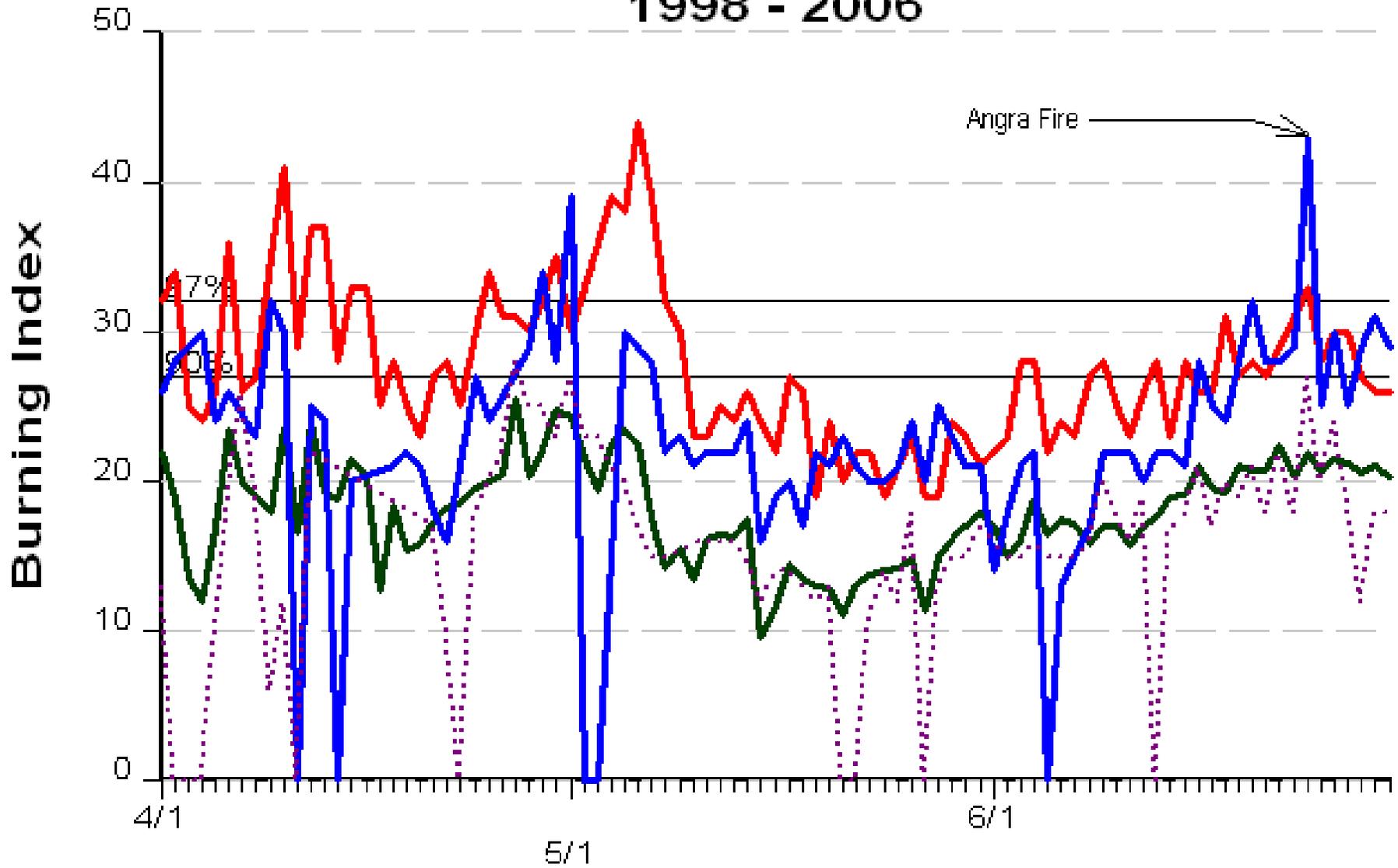
- **Red Flag Warning for strong winds and low relative humidity (RH) @ 1400**
- **Weather from South Lake Tahoe Airport (1400):**
 - *Temp: 68; RH: 13%; Wind: S 7G25*
- **Started by an illegal campfire**
 - *Approximately 2:10 pm*
- **Within 30 minutes, active crown fire was reported by initial crews on scene**
- **The fire continued to burn actively toward the north for the next 12 hours with active crown fire still observed at 4 am**
- **All homes lost during these initial stages of the fire**



Actions Taken by Emergency Responders

- **Sunday evening – a Northern California Type 2 Incident Management Team is ordered**
 - *Assumes command of the fire 0600 June 25th*
- **Several Evacuation Centers set up around Lake Tahoe**
 - *Most residents stay with friends not in the immediate path of the fire*
- **Monday Morning – A National Type 1 Incident Management Team is ordered (CA Team 1)**
 - *Assumes command of the fire 0600 June 26th*
- **1030 Monday – IMET ordered**
 - *Arrived at 1300*
- **Joint Information Center (JIC) set up by Eldorado County EM at South Lake Tahoe Airport**

042607-MEYERS 1998 - 2006



— Avg — 2007
— Max ···· 2006

1 Day Periods

Model: 7U1PE2
668 Wx Observations
FF+4.0.0 beta2 01/15/2008-10:27



Images of beginning of fire





Courtesy Reno Gazette Journal



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Monday June 25th, Day 2

- **Cold front has passed**
 - *Winds are lighter and from the northeast*
 - *Cooler, somewhat more moist air from Lake Tahoe is advected over the fire*
 - *Fire activity much reduced*
 - *MAX: 73 RH: 18% Wind: NE 5-8 mph*
- **IMET arrival at fire at 1300 – ICP at Heavenly Base Lodge**
 - *Spot forecast on track*
 - *Check-in with Type 2 team and Fire Behavior Analyst (FBAN)*
 - *Attend 1500 in-briefing for Type 1 team and give weather forecast for the next few days*
 - *First forecast will be for the night shift with burnouts planned on the NE flank of the fire*
 - *2000 – Plans meeting for Tuesday day shift, weather changes*
- **Find location to set up – trailers still arriving (moved 3x)**

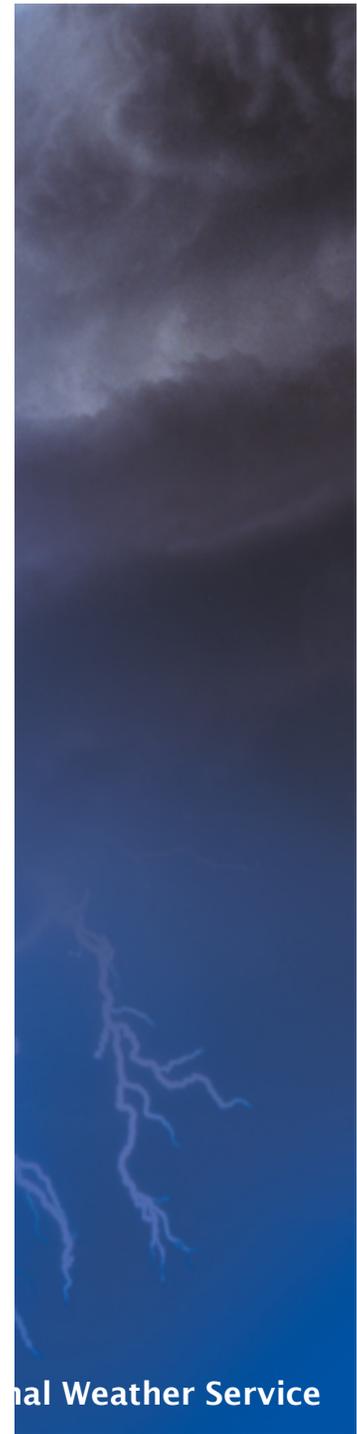
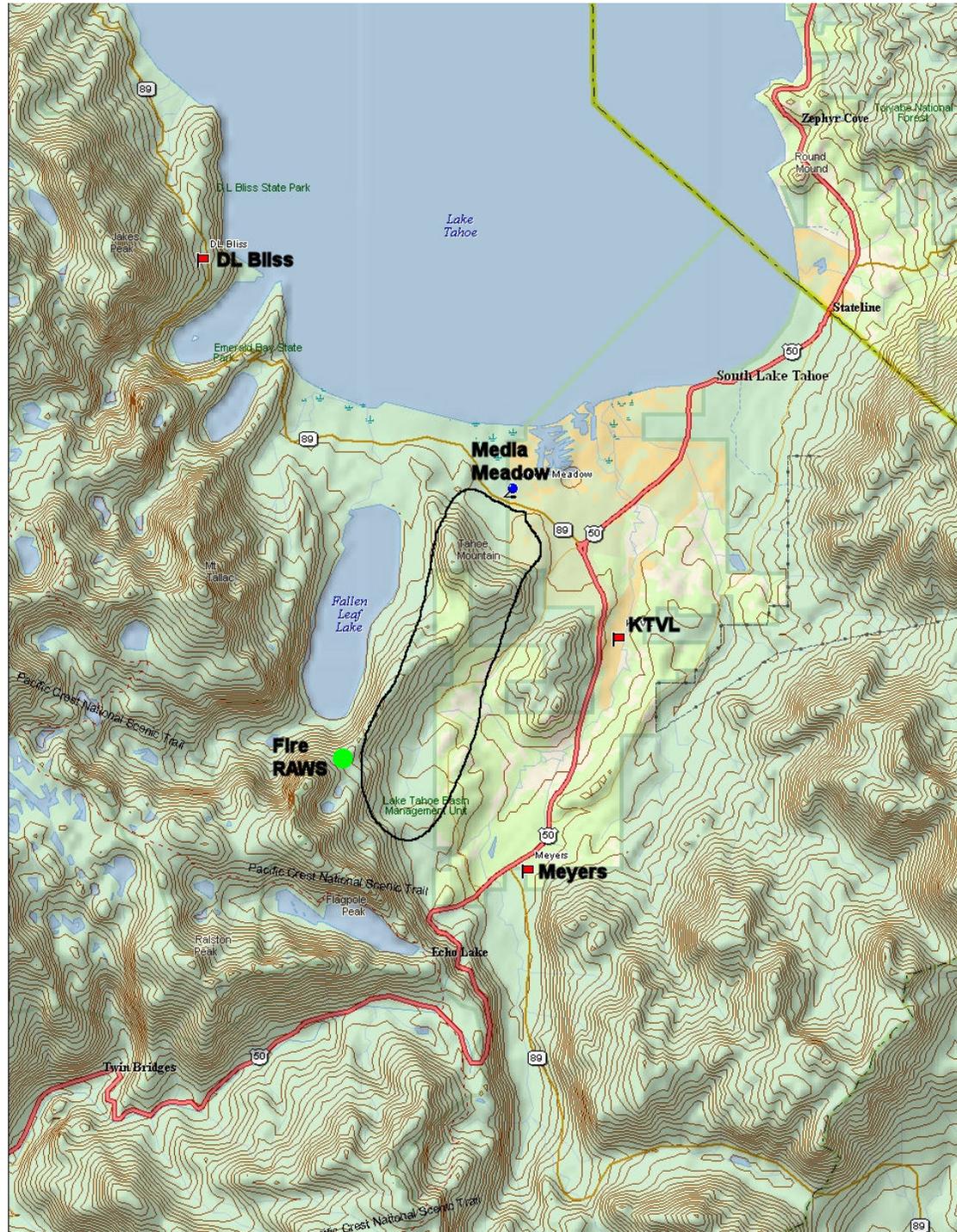


Forecast issues in South Lake Tahoe (SLT)

- **Modified Washoe Zephyr**
 - *Afternoon west wind in Eastern CA and Western NV*
 - *More of a south wind due to channeling effect of the Upper Truckee River Drainage*
 - *Wind often results in increasing RH, driven by Pacific Ocean Marine Layer*
- **Lake Tahoe influence**
 - *“Marine Layer”, how deep and how far away from lake shore*
 - *At night, how high in elevation does this extend? – wind direction dependent*
- **Thunderstorm patterns**
 - *Need SE mid-level flow, NOT GOING TO HAPPEN!*



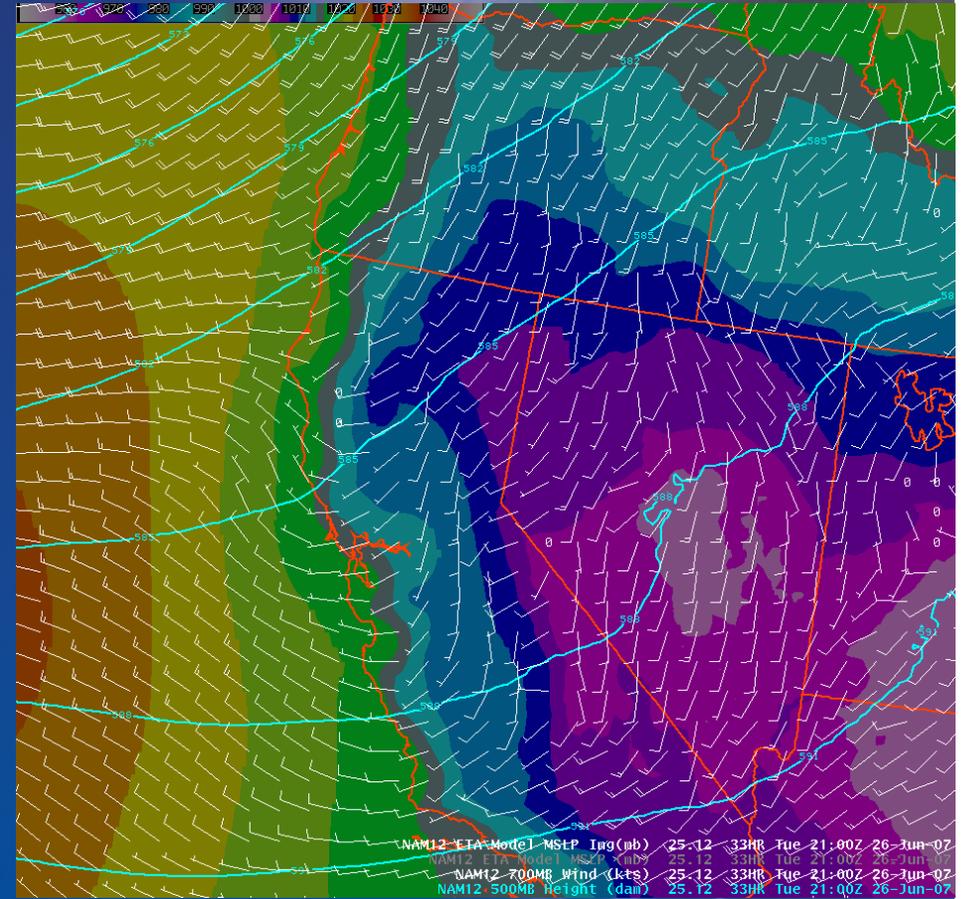
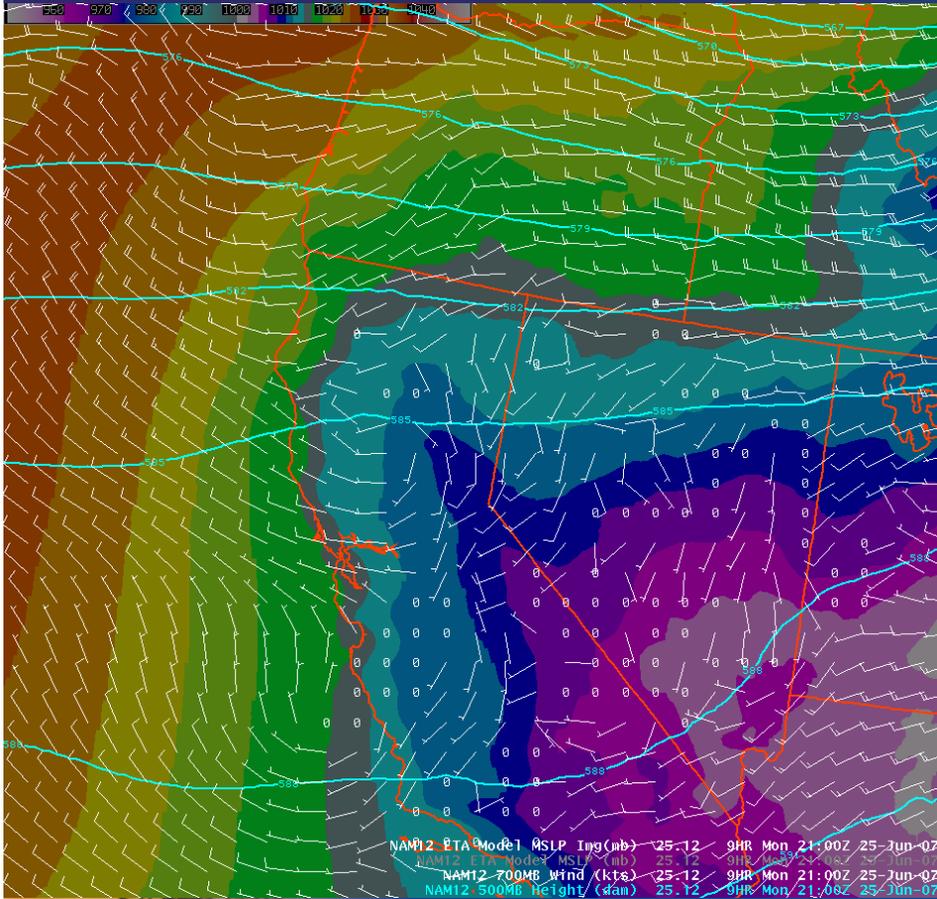
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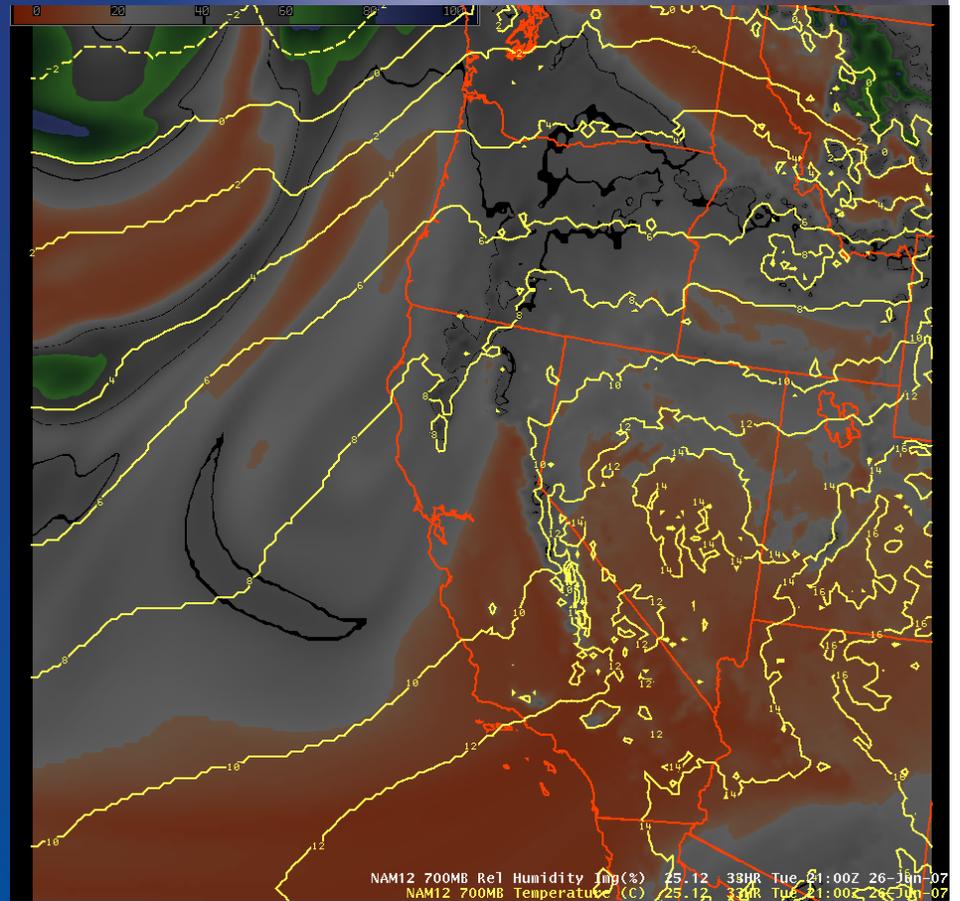
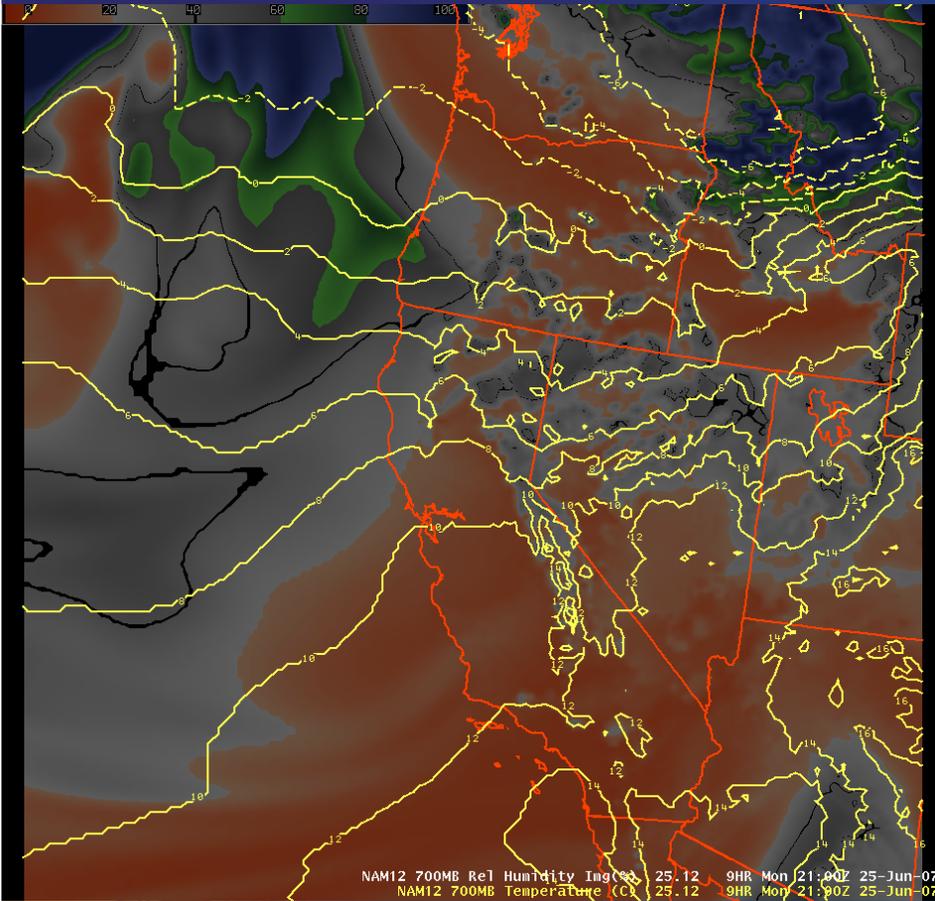


NAM Forecast



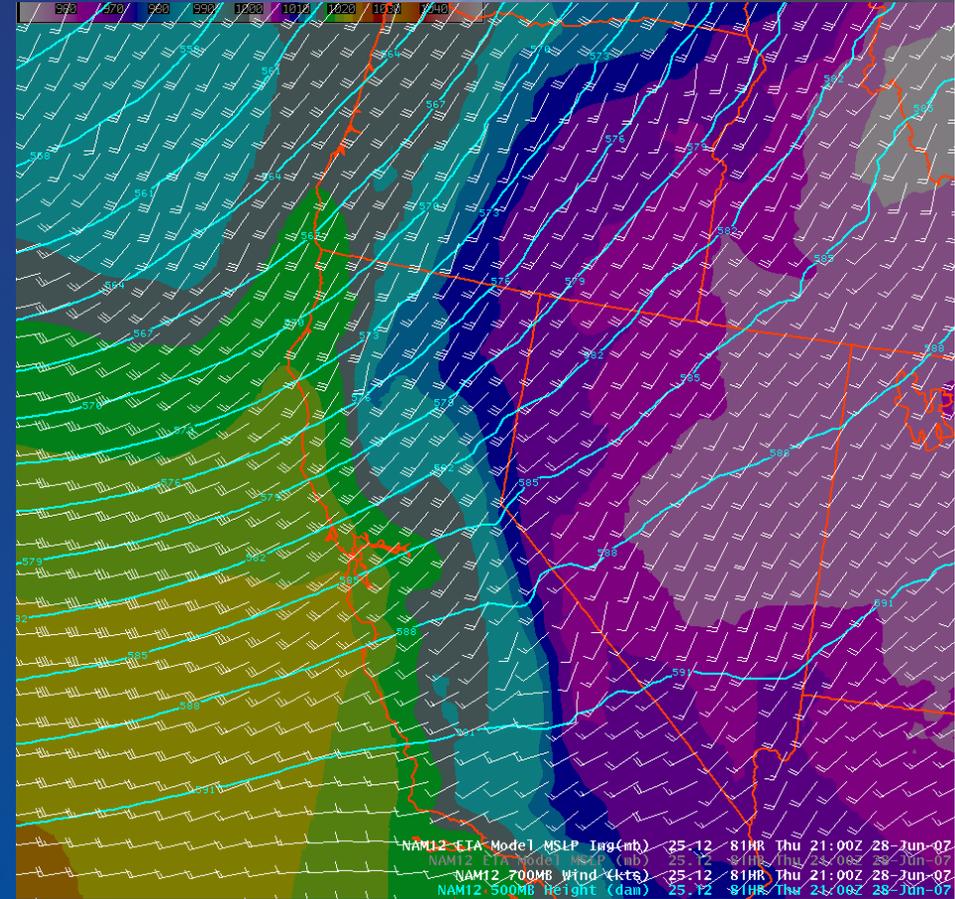
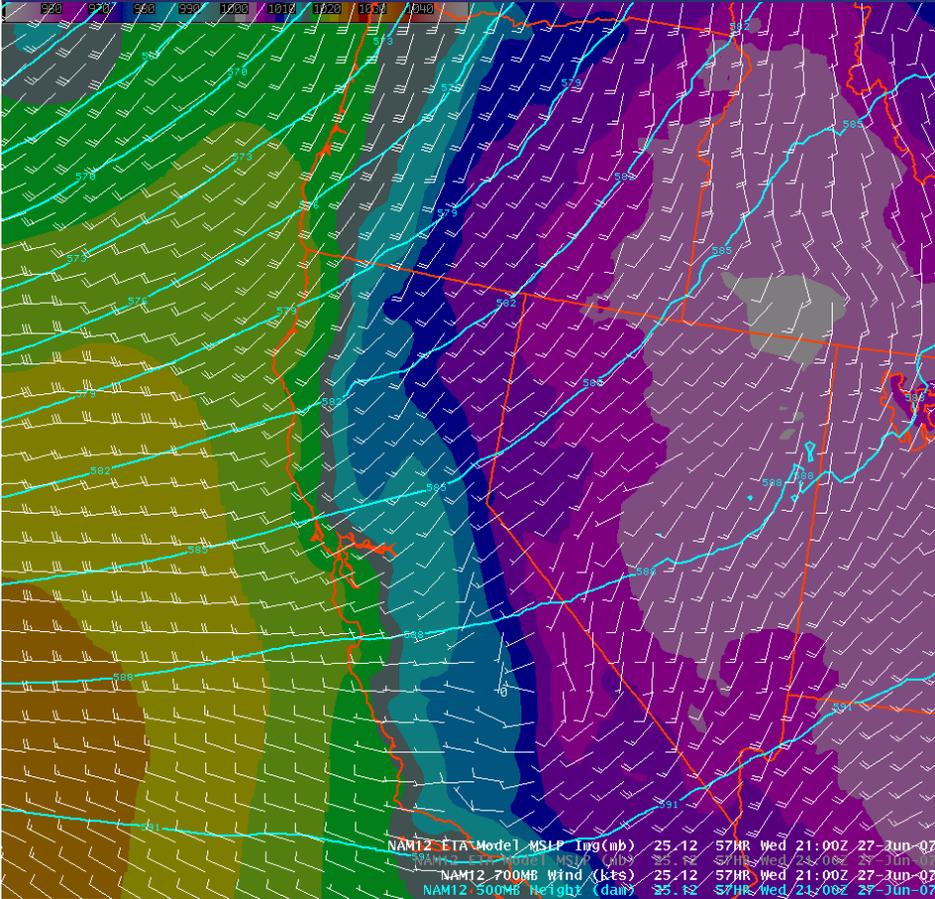


NAM Forecast - RH





NAM Forecast – 27/28

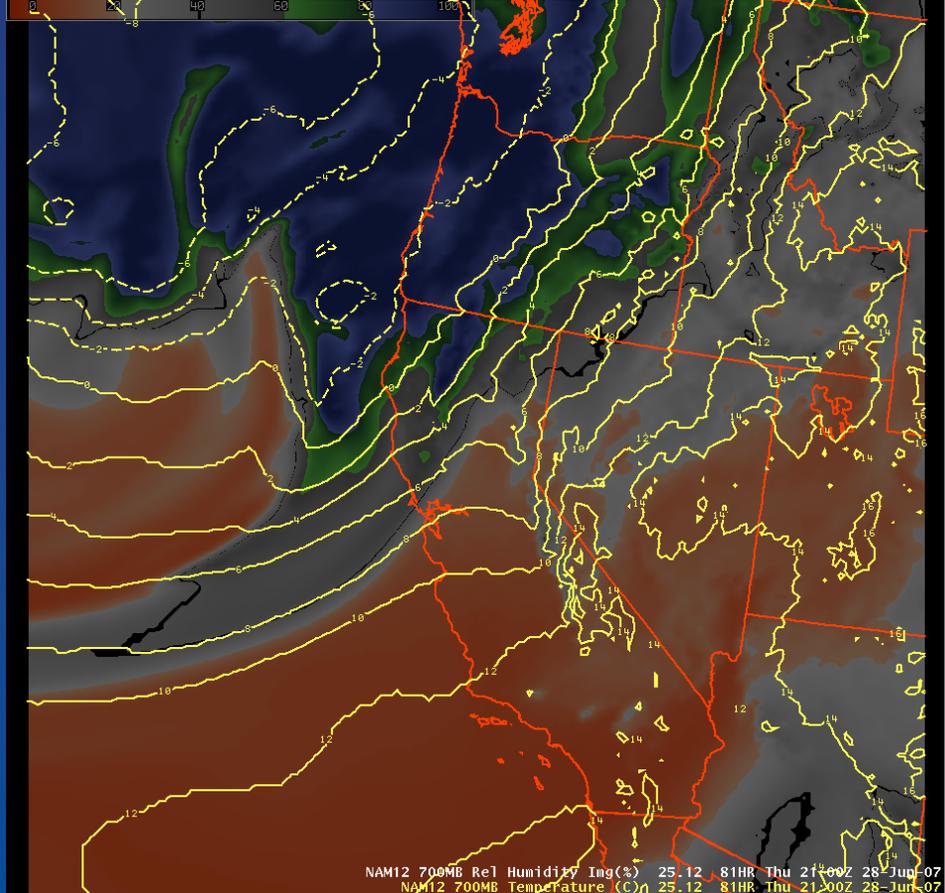
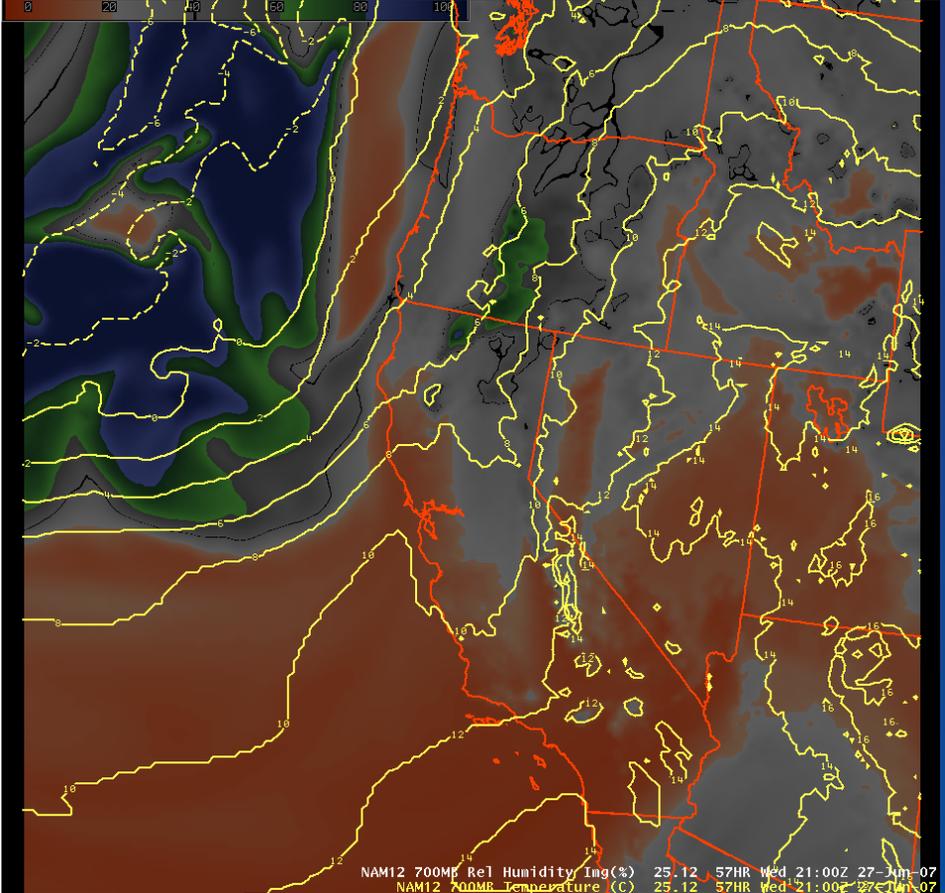


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NAM Forecast – RH 27/28





Forecast for June 26th

- Light NE winds in the morning, increasing slightly early afternoon
- Winds will become SSW in the early afternoon at 10-15 mph with gusts near 22 mph
- Max Temp: 75-80
- Min RH: 10-15%, will drop below 25% around 1100
- Fire operations plan was to continue burnout into morning hours then shut down for the day and hold
- Outlook for Wednesday was increasing wind with continued low humidity, Fire Weather Watch issued
 - *Conditions marginal for Red Flag (50-50%)*
 - *Stronger winds expected Thursday and possibly Friday*
 - *Lighter winds for the weekend with hotter temperatures*





Tuesday June 26th

- Briefing at 0600 focused on wind shift expected early afternoon. Timing of shift would be 1300 on the ridges and 1330 on the lower slopes
 - *12+ TV cameras taped the briefing with many more print reporters*
 - *Did live interview with The Weather Channel at 0700 to discuss the upcoming weather*
- Night shift plans meeting, winds will die off around 1900-2000 with light downslope after
 - *Poor humidity recovery ridges – good lower slopes*
- Forecast still on track – Sierra Crest winds switch to southwest between 1100 and 1200



Tuesday (Fireline trip)

- Also to look at siting of nearby Remote Automated Weather Stations (RAWS)
- Trip to DL Bliss first, passing by morning burnout above Highway 89
 - *DL Bliss is well-sited, but the microclimate is different*
- Highway 89 was NOT closed at this time, with active fire less than 1 mile southwest of the highway from earlier burnout
 - *Numerous media vans are stationed at “Media Meadow”*
 - *Several cars (and bicyclists) stop for several minutes southbound on 89*



More Tuesday

- **Active plume continues from burnout, good for now, but Fire Behavior Analyst is concerned if active fire lasts too much longer due to wind shift**
- **Visit to Meyers RAWS next (1300)**
 - *Poor siting, significant sheltering, 15 feet north of parking lot*
 - *At least KTVL ASOS can be used for low elevations*
- **Need a RAWS!!!!**
- **Arrival back at camp 1400**



Tuesday - Deployment

- By 1330, reports are coming in of the wind switching to S-SW as forecast
- Initial gusts as high as 25 mph
 - *Rotor briefly forms in the immediate lee of Tahoe Mountain*
- Fire reacts and becomes much more active
- By 1430, continued gusts result in spot fires across control lines
 - *Highway 89 shut down, new evacuations are triggered*
 - *Several crews are engaged on these spot fires, but new spots are created all the time*
- Disengagement occurs between 1515 and 1530
- Several firefighters feel trapped and deploy their fire shelters at 1540
- Fire continues to make a run at Highway 89 and Tahoe Keys



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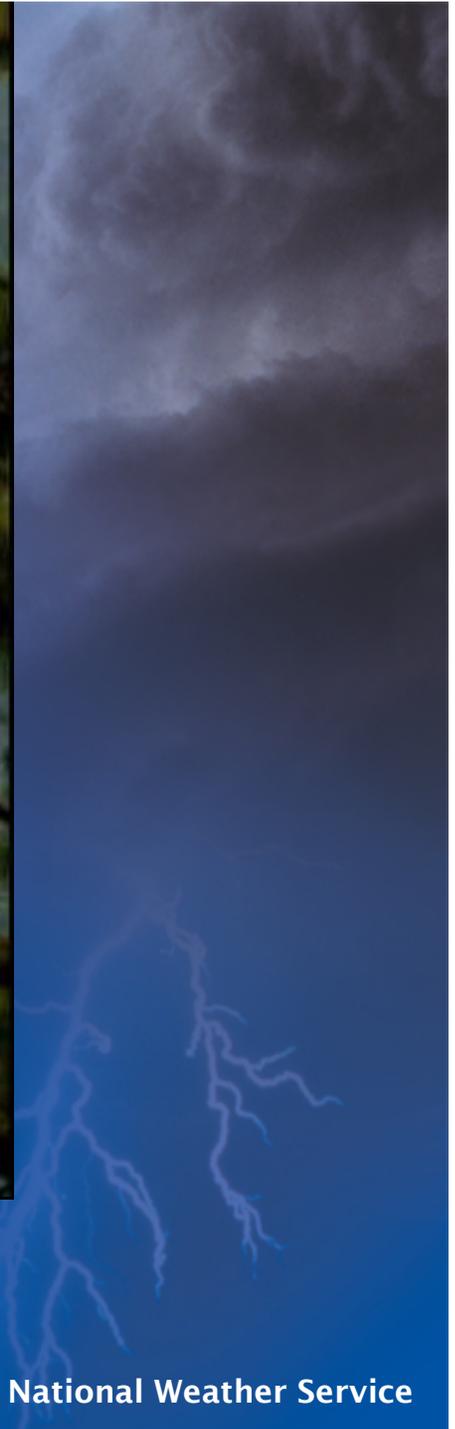




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Tuesday - Continued

- **Called WFO to make sure weather data for the day is archived**
 - *No observations called in from the fireline during the day, need to fix this!!!*
- **Fire begins to calm down around 1700**
- **Firefighters who deployed are found unharmed**
- **Fire activity close to Highway 89 – Spot forecast request at 1800 for the evening hours**
 - *Given over the radio, winds to die off by 2000 with light downslope afterward and increasing RH*
- **Fire RAWS and IMET Trainee ordered**



A First

- **The Governor will be visiting the fire**
 - *Arrival time at SLT about 10 am*
 - *Smoke issues*
- **Heavy smoke at the airport**
 - *Visibility 1 mile or less*
 - *Airport minimums are 5SM and 1100 feet CIGS*
- **When can he fly in?**
- **Based on inversion forecast and clearing yesterday, delay arrival 45 minutes**
 - *Vis by that time 5SM*
- **NV governor Gibbons also at camp this day**





Wednesday-Thursday June 27-28th

- Forecast still on track from previous
 - *Low Grade Red Flag Warning issued – min RH 15%*
 - *Several print interviews done on expected weather*
- Jane Hollingsworth, MIC arrives in SLT to give weather at JIC.
 - *IMET's forecast for the fire, adds other information around SLT during briefings*
- Trip to fireline to look for a suitable site for RAWS before techs arrive
 - *Site found south of Fallen Leaf Lake*
- IMET Trainee arrives
- Thursday – Red Flag Warning
 - *Gusts to 35 mph, RH 15-20%*
- Fire activity moderated both days with only smokes and small flare-ups



Friday-Sunday

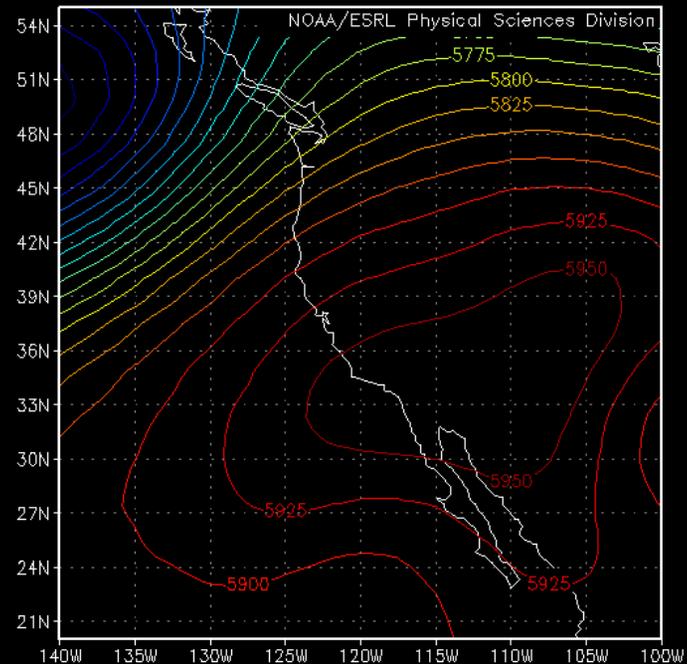
- **Occasionally gusty winds continue through Sunday**
 - *Gusts to 25 mph*
 - *RH 25% Friday, decreasing to 15% on Sunday*
- **Firefighter/Media presence slowly declines**
- **By Monday, only 300 firefighters are in camp**
- **As fire winds down, more tours occur**
 - *Local families, tourists, etc.*
- **More fire resources are staged for initial attack**
- **Saturday – Wedding at mid-mountain**
 - *Arson fire spotted on the mountain*
 - *Available engines and helicopters contain fire within 1-hour*
 - *Slash pile – no spread*



Monday

- Last day
- Strong high pressure builds
- Hotter and drier, zephyr occurring later in the day
- No issues on the fire, only ash devils
- Demob at 1700
- Hot, dry pattern continues next 3 days until....

lon: plotted from -140 to -100
lat: plotted from 20 to 55
lev: 500.00
t: Jul 3 2007
Mean hgt m



MAX=5972
MIN=5490

GrADS image



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service



Questions/Comments????

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