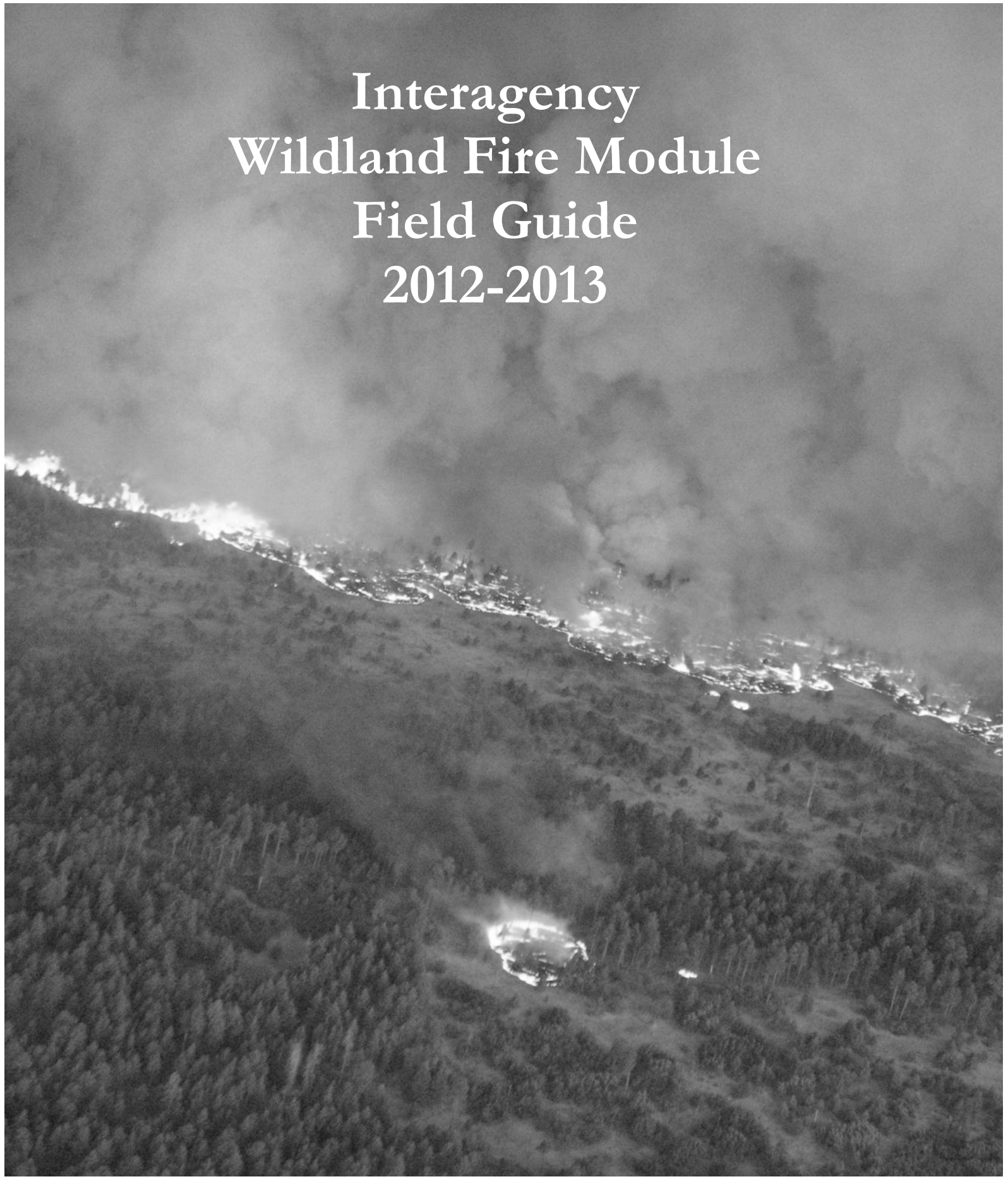


Interagency  
Wildland Fire Module  
Field Guide  
2012-2013



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This document is intended to supplement, and not replace, existing NWCG approved guides including the Incident Response Pocket Guide (IRPG, NFES 1077) and Fireline Handbook (NFES 0065), among others. In addition, this document is not intended to replace previous editions of the Interagency Fire Use Module Field Guide.

Additions/Changes to this document will be considered by the Interagency Wildland Fire Module Steering Committee.

The use of copyrighted corporate names in this document is for the information and convenience of the user, and does not constitute an endorsement of any product or service to the exclusion of others that may be equally suitable.

Thanks to all who helped develop this edition of the guide: Joanie Lawrence, Patrick Lookabaugh, Matt Hilden, Dan Ostmann, Michael Peters, and Sarah Cooper.

Cover photo: Las Conchas fire, July 26, 2011. Photo by Santa Fe Helitack. The Las Conchas fire employed at least 6 modules from 4 agencies

# **MISSION AND PURPOSE**

The **MISSION** of the Interagency Wildland Fire Module Program is to develop and provide self-sufficient, multi-skilled fire professionals with a primary commitment to wildland fire management.

The **PURPOSE** of the Interagency Wildland Fire Module program is to conduct operations involving planned and unplanned wildland fire events with expertise in the areas of planning, fire monitoring, ignition, holding and suppression, prescribed fire preparation and implementation support, hazard fuels reduction, and fire effects monitoring.

# CHIEF OF PARTY CHECKLIST

## General:

- Safety of group at all times is your paramount responsibility
- Accept your role as the leader
- Be ready at all times.
- Work hard, be safe

## Mobilization

- Obtain copy of Resource Order and make 5 copies
- Update crew Manifest and make 5 copies
- Update crew Quals sheet and make 5 copies
- Document accountable property you are taking (e.g. Radios, GPS units, etc.)
- Download GPS Maps for assignment location
- Document start mileage for vehicles
- Plan travel route and ETA, make hotel reservations if necessary
- Collect applicable maps from files
- Coordinate with the incident/requesting unit re: Food, Backcountry Gear, etc.
- Copies to Office: Manifest, Travel Authorizations, Travel Route, and ETA
- Coordinate with incident/requesting unit while en route

## At Assignment

- Check in: Notify Home Unit/Duty Officer of arrival
- Manifest and time records to overhead
- Obtain radio freqs and program by hand or computer (Never Clone from Incident Radios!!)
- Find out specific assignment, sleeping, food, etc.
- Attend all operational briefings.
- Fill out and submit signed CTR's every day
- Pass along any and all updates on progress, changes and status
- Pre-plan Logistical needs: Place orders by 1300 for next shift
- Log chainsaw use and maintenance
- Fill-out and submit 214s and all Documentation
- AAR every shift

## Check-Out

- Verify that times on CTRs match times on FTRs for each person
- On most incidents, never depart without signed FTRs in hand
- Make copies if possible of all reports, assignments, photos and maps
- Obtain S #'s for all equipment to be fire replaced, treat supply nicely
- Obtain and review crew evaluations
- Notify Home Unit/Duty Officer and dispatch of departure and travel plans (ie: routes, ETA, RONs)
- If moving between incidents, Start time = Departure time from current incident

## Return to Station

- Notify Duty Officer and Home Dispatch of return
- Tell Dispatch to change status in ROSS for R&R and module availability
- Fuel all vehicles
- Fill out mileage forms
- Clean inside and outside of vehicles
- Disinfect all food containers, cook equipment and water coolers
- Rehab and log all chainsaws, tools, pumps, etc.
- Before departure, all module gear and vehicles are fire ready
- Restock the fire monitoring kits
- Fill out fire report and make copies and send one to Home Unit
- Fire Folder: All reports, trip manifest, resource order, CTR's collated, Maps, Relevant IAP's, Travel documentation, Crew evaluation, fire report, incident replacement requisitions, C of P Guidelines
- Documentation to Home Unit: Time records, fire reports, crew evaluations, travel sheets, mileage forms

# CHAINSAW GUIDES

**Use caution when making chainsaw carburetor adjustments.  
Instructions below are intended for those who are experienced saw tuners.  
If you are unfamiliar with these procedures, seek out someone who is.**

**If your saw fails to start, check the following:**

1. Gas ( 50:1 )
2. On/off switch is turned ON
3. Spark plug has spark
4. Exhaust screen is clean
5. Air filter is clean
6. Jets are adjusted correctly: NEVER OVER TIGHTEN JETS  
Turn both jets to the right (clockwise) until snug.  
Then, back to the left (counter-clockwise) until desired setting.  
Stihl: high 3/4 turn, low 1/4 turn
7. Carburetor is flooded:  
Tighten high jet until it's snug.  
Pull starter cord until saw starts.  
Turn jet left to correct setting.

## **JET and IDLE Field Adjustments**

1. Clean or replace air filter. You cannot properly tune the carb unless the air filter is clean and in good condition.
2. Run saw at full throttle. Turn HS screw in (clockwise) slowly. As the HS screw is turned in, saw is being leaned out (more air, less gas). Keep leaning as long as the saw flutters. Go to flat line (no flutter) and back off.
3. Release throttle and let saw idle. If saw idles too fast (chain turning) or too slow (dies), adjust idle screw only. Turn screw counter clockwise to stop chain or clockwise if saw dies.
4. Idle for 30 seconds. Do the dump/roll test. Saw should idle in all positions. If saw fails the dump test, tighten (turn clockwise) the LS screw a quarter turn. Fuel is pooling and flooding out the engine. Repeat.
5. Throttle up saw. Saw should immediately respond. If it stutters, the LS is too lean. Back out (counter clockwise) the LS screw a quarter turn or less. Repeat until saw revs immediately. Adjust Idle as needed, and repeat steps 3 thru 5.
6. **TACH TUNE ASAP. HIGH RPMS SHOULD BE 13,500 OR LESS. IDLE RPM~2,500.**

### **Purging Instructions:**

1. Drain fuel tank.
2. Run saw until it stops.
3. Attempt restarting with choke on until saw fails to detonate.
4. Remove fuel tank cap and invert saw for 5 minutes.
5. Remove spark plug
6. Pull starter cord until piston is at lowest point in cylinder
7. Spray WD-40 into cylinder and pull cord a few times
8. Replace cap and plug

Commonly replaced <i>STIHL</i> Parts	
Part Description	<i>STIHL</i> /Mfg Part #
E clip	9460 624 0801
7 tooth Rim Sprocket	0000 642 1223
Sprocket Washer	0000 958 1032
HD Air Filter	0000 120 1654
Fuel Filter/Pick-up body	0000 350 3504
Spark Plug (NGK)	BPMR 7 A
Spark Plug (Bosch)	WSR 6 F
Round File, Box of 1 Dozen	5605 773 5512
91 Driver <b>Full Skip Chisel Chain</b> 3/8" Pitch, .050" gauge	33RSF (specify # of drivers w/ this part #)
28" bar Rollomatic ES Widetip <b>91 drivers 3/8" pitch, .050" gauge</b>	3003 000 9638

<i>STIHL</i> Bars	
3/8" Pitch .050 Gauge	
Bar Length	# of Drivers
25"	84
28"	91
32"	105
36"	114

TACH RPM GUIDE		
Model	Idle	High
<b>Stihl</b>		
<b>MS360</b>	2800	13500
<b>MS440</b>	2500	13500
<b>MS460</b>	2500	13500
<b>MS660</b>	2500	13500
<b>Husky</b>		
<b>372 XP</b>	2700	13500
<b>385 XP</b>	2700	12500
<b>395 XP</b>	2500	12000

<b>1 CUP =</b>	8 ounces
<b>1 PINT =</b>	2 Cups 16 Ounces
<b>1 QUART =</b>	4 Cups 2 Pints 32 Ounces .946 liters
<b>1 GALLON =</b>	4 Quarts 128 Ounces 3.785 liters 8.33 lbs

2-CYCLE MIX QUANTITIES (Ounces)					
Mix Ratio	Gasoline Quantity				
	.5 gal	1.0 gal	2.0 gal	2.5 gal	5 gal
<b>16 : 1</b>	4.0	8.0	16.0	20.0	40.0
<b>24 : 1</b>	2.7	5.4	10.7	13.4	27.0
<b>32 : 1</b>	2.0	4.0	8.0	10.0	20.0
<b>40 : 1</b>	1.6	3.2	6.4	8.0	16.0
<b>50 : 1</b>	1.3	2.6	5.2	6.4	12.8

MIXING GUIDE: 3:1 SLASH MIX- 5 GALLONS		
# of cans	3 Parts Diesel Stop fuel pump@__ gal:	1 Part Gasoline Stop fuel pump@__ gal:
1	<b>3.75</b>	<b>1.25</b>
2	<b>7.5</b>	<b>2.50</b>
3	<b>11.25</b>	<b>3.75</b>
4	<b>15.00</b>	<b>5.00</b>
5	<b>18.75</b>	<b>6.25</b>
6	<b>22.50</b>	<b>7.50</b>
7	<b>26.25</b>	<b>8.75</b>
8	<b>30.00</b>	<b>10.00</b>

# PORTABLE PUMP OPERATING INSTRUCTIONS

## FUEL

- Use **24:1** mix (that's 5 gal. gas / 27 oz. oil) for 2 **stroke**
- **Some new "mini pumps" are 4 stroke engines which take straight gas!! Double check fuel requirements!!**
- Connect fuel can line to tank with quick connect. Loosen lid on tank for venting.

### Fuel Consumption:

- Mark III, 5 gal/ 3 hours
- Shindaiwa 5 gal/ 10 hours

## CAUTIONS:

1. Do not run engine at full speed until it is thoroughly warmed up (1 minute).
2. Do not run engine with pump disconnected
3. Do not run pump dry.
4. Do not use suction hose without foot valve strainer
5. Remove and drain pump after final use, and at night if temperatures below freezing.

## SETTING UP AND STARTING MARK III AND MARK 26 PUMPS

1. Connect fuel line to fuel can and pump as specified above.
2. Connect suction hose to the pump. Be sure to connect the foot valve to the male end of the suction hose. Make sure that the rubber gasket or washer is in place before attaching the female end to the pump. **Tighten firmly with a spanner wrench.** Put the foot valve inside the canvas bucket in the pump kit, and/or use rope or a float to the strainer to keep it from being too close to the water surface or resting on the bottom in the mud.
3. Attach wye valve to discharge side of pump. Hand-tighten only. Twist priming pump onto one leg of the wye and hose on the other. Close valve to the hose, leave primer valve open. Stroke primer till water squirts out the small holes, or until resistance is too great to keep at it. After priming, close valve to primer and open valve to hose.
4. Pull the decompression switch out until it comes to a "click" stop. (New pumps don't have decompression switches).
5. Put the choke on START, if the engine is cold.
6. Move throttle to "START AND WARM UP" position.
7. Give starter rope several quick, steady pulls until engine starts or pops. Turn choke off immediately after engine makes any noise to prevent flooding on the next pull.
8. Put choke on RUN and pull engine over until it starts usually 1 to 3 pulls.
9. Push decompression switch fully in as soon as engine starts.
10. Allow engine to warm up fully (hot to the touch) before using full throttle.

**\*\*If the pump shuts down automatically, you may need to reset the automatic cutout\*\***

*Do this by pushing in on the reset rod (yellow circular wire located below stop switch)*

## STOPPING A MARK III OR MARK 26 PUMP

1. Move throttle lever to "stop" position.
2. Let pump run for about two minutes in this position.
3. Press and hold stop switch until engine is fully stopped.

## ORDERING PUMPS:

- Order two pump kits (NFES 0870) (one is probably short something you really need).
- Hose and appliances: Figure 100 ft. 1" laterals for every 200 ft. 1 ½" trunk line.
- Remember: Gated "Y's", nozzles, hose clamps, reducers, etc.

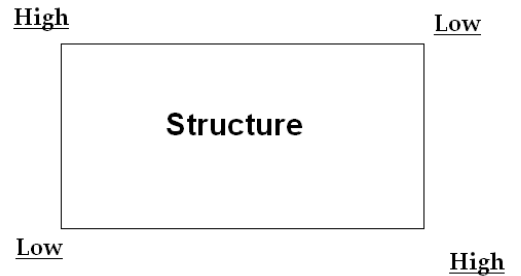
# STRUCTURE PROTECTION TIPS

*From the Alaska Smokejumper Operations Guide*

1. Identify fire hazards that need to be mitigated to protect cabin
  - a) Is the roof clear?
  - b) Are the eaves clear?
  - c) Are there building materials or fire wood stacked against the cabin?
  - d) Are there trees, snags, or other vegetation that pose a direct hazard to the cabin?

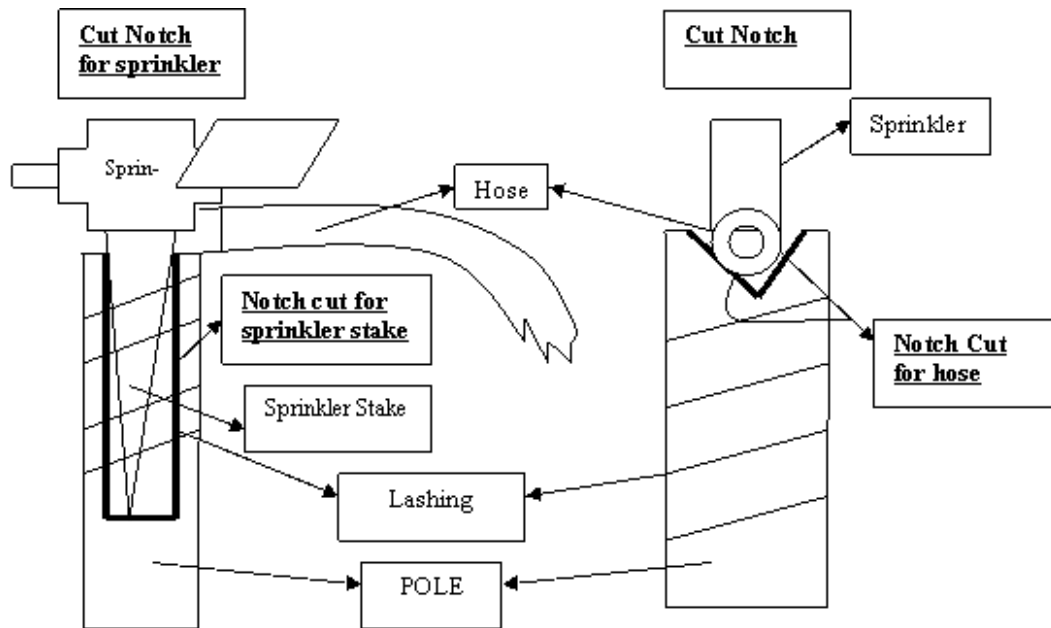
2. Sprinkler system set up tips

- a) Sprinkler coverage should wet all surfaces of the structure.
- b) Sprinklers at the structure corners provide the best coverage**
- c) Vary heights to provide the best coverage.
- d) Set two sprinklers at opposite corners above the roof line and the other two below the roof line.
- e) Adjust sprinklers for long range spray or short range mist.



3. Sprinkler head attachment methods.

- a) Set sprinkler heads on poles, tripods, or stands to get them above ground/cabin



Saw cuts for sprinkler attachment - Notches prevent sprinklers from rotating when hose is charged

4. Pumps

- a) Shindaiwa type pumps work well close to water sources
- b) Use 5 gal can and fuel line attachment in Sprinkler Kit for Shindaiwa
- c) Mark III type pumps work well when the structure is far from, or high above the water source.

5. Misc.

- a) Use extra sprinklers on wood piles or surrounding fuels
- b) Make sure your hose lay is protected**
- c) Take the extra step to prevent water from entering the structure



## BASIC CABIN PROTECTION ORDER

- 1 pump kit (#0870)
- 1 sprinkler kit (either #0920 or #1048)
- 700' of 1" hose (#7273)
- 10 gallon premix (#9027)

## SPRINKLER KIT CONTENTS

Cache Item: NFES 0920

Quantity	Cache Item	Description
8 ea	8621	Adapters, ½" Riser Extension
1 ea	2210	Cap, tee, w/ chain
1 ea	0385	Carton, 7 ¼ x 9 ¼ x 26
8 ea	8609	Coupling, ½"
16 ea	8606	Extensions, 18"
1 ea	0321	Hammer, claw
8 ea	0538	Pin, panel, hold down, 8"
1 hk	1041	Rope, nylon ¼", 100ft
8 ea	8605	Sprinklers
16 ea	0825	Stakes, tent, metal
8 ea	0731	Tee
8 ea	8607	U-bolts 1 ½"
8 ea	8608	Valve, Shutoff ½"
1 ea	0332	Wrench, adjustable, 6"

A more comprehensive kit may also be available from the Great Basin Cache (NFES 1048)

## WRAPPING STRUCTURES – TIPS & CONSIDERATIONS

Structure wrap usually comes in 5' x 150' rolls (750 ft<sup>2</sup>). Sheets of 10' x 50' are also available (500 ft<sup>2</sup>).

### Suggested order list:

- Ladders (min. 2) tall enough to reach roof peak
- Staplers and staples (order extra)
- Scissors
- Needle-nose pliers
- Sharpies/Permanent markers
- 3" Aluminum tape (avail in rolls of 360')

### Things to think about:

- Take some time to plan.
- Start from the bottom of the building so your seams don't catch embers.
- Consider likely wind/fire-front direction when deciding how to overlap vertical seams.
- Using aluminum tape on seams should reduce the number of staples needed.
- Draw windows on outside of wrap to prevent breaking them in the process of wrapping & unwrapping.
- Can you safely work on the roof (if necessary)? Will it support your weight? Are there other options?
- Will you still need access to the inside of the building?
- Consider the unwrapping stage when deciding how many staples to use.

# BENDIX KING DPHX PROGRAMMING AND CLONING INSTRUCTIONS

*\*\*The instructions below are for analog narrowband frequencies. If you need to program digital frequencies, see the **Digital Programming** section below.\*\**

**Use caution when field programming any radio. These instructions are designed for radio users with field programming experience. If you are unfamiliar with these procedures, seek out someone who is.**

1. Using a programming plug, hold red plug button then Function [FCN] key until display shows "-- -- -- ID"
2. Enter Password (usually 000000), then press the Enter [ENT] key
3. Display will read "CH 00". Select a channel by entering the channel you want (1-16) then press the [FCN]key
4. Display will show "RX" receive frequency. To change, press [CLR], then enter desired frequency (the decimal will insert automatically). **THEN PRESS [ENT].**
5. Display will show "MODE--A".\* DO NOT CHANGE. Press [FCN]
6. Display will show RX CG, the Code Guard or Tone. To change, press [CLR], enter in desired 4 digits (the decimal will insert automatically), **THEN PRESS [ENT].** To skip press [FCN].
7. Display will show "NAC0000".\* DO NOT CHANGE-Press [FCN] to skip.
8. Display will show "SQL—NRM".\* DO NOT CHANGE- Press [FCN] to skip.
9. Display will show "TX" transmit frequency. To change, press [CLR], then enter desired frequency (the decimal will insert automatically) **THEN PRESS [ENT].**
10. Display will show "MODE--A" DO NOT CHANGE. Press [FCN] to skip.
11. Display will show TX CG, the Code Guard or Tone. To change, press [CLR], enter in desired 4 digits (the decimal will insert automatically)**THEN PRESS [ENT].** To skip press[FCN].
12. Display will show "NAC0000".\* DO NOT CHANGE. Press [FCN] to skip.
13. Display will show "TG00001".\* DO NOT CHANGE. Press [FCN] to skip.
14. Display will show channel label. See page 9 below for label editing instructions. To skip press [FCN]
15. Display will read "CH XX". Select next channel (press [PRI] for next channel) to program and repeat steps 1-14.

**\*=DIGITAL FUNCTIONS**

## CLONING

1. Obtain programmed Master radio.
2. Turn on Master and Slave (your) radios and attach cloning cable between radios. Make sure all scan and priority switches are OFF for both radios.
3. Select desired group to program in Slave radio
4. Access Programming mode of MASTER radio. (see above)
5. With Master radio display reading "CH 00", press the \* key on the Master radio
6. "PRGM" will appear in screen and flash.
7. Press the Function [FCN] key and "PRGM" will appear without flashing as the slave radio is programmed (Slave radio's screen will flash VH-1)
8. Turn off slave, and connect and program the next slave by pressing the [FCN] key once again. If display reads "FAIL" - an error has occurred. Seek Help.

## NOTES:

- **If you want to change a frequency from Narrowband to Wide band, here's what you do:**
  1. In step 4 above, after you enter in a channel number, 15 for example, you may see 15N. The N means the frequency is Narrowband.
  2. Press the # key. You should see the N disappear, and now the channel is Wideband
- If you have trouble keying in a tone or changing groups, your keypad may be locked. Look at your screen, and if it says "LOCKED" than press and hold the [FCN] key until you see "UNLOCKED."

# BENDIX KING - "ZERO CODES"

The "Zero Codes" control numerous features of your BK radio. USE CAUTION WHEN CHANGING.

- Zero Codes are specific to each group.
- Common settings are indicated with **yellow highlights** below.
- In the table below, a function is enabled if a particular number is **Grey**.
- In your radio, a function is enabled if the number is flashing. For example, to enable DTMF encoder, the number 5 must be flashing in the Group 2 functions. In the chart, you'll see that the number **5** is grey next to the DTMF functions. In the chart, you'll see that the number **5** is grey next to the DTMF functions.
- To change a number from flashing to solid (ie disable a function), simply touch the number on the keypad, **THEN PRESS [ENT]**. The opposite will also work: to enable a function, touch the number on the keypad, **THEN PRESS [ENT]**.
- To change the "LITE" settings (BACKLIGHT OPERATION) touch the [PRI] button to scroll thru your options, **THEN PRESS [ENT]**.

COMMON SETTINGS	
GROUP FUNCTION	FLASHING (ENABLED)
1	2,3
2	1,3,5
3	5

**Grey** numbers = Flashing numbers= Enabled Function  
**Yellow** numbers=Flashing numbers=Common Settings

Group One Functions						
Battery Saver Off <i>(If 1 is flashing, Battery Saver is OFF!!)</i>	1	1	2	3	4	5
<b>Group Scan List</b>	1	1	2	3	4	5
<b>Transmit on PRI 1 (old PRI Mode C)</b>	1	1	2	3	4	5
Priority Key Lockout	1	1	2	3	4	5
Scan List Lockout	1	1	2	3	4	5
Group Two Functions						
<b>User Code Guard Enabled</b>	2	1	2	3	4	5
<b>Busy Channel Indicator enabled</b>	2	1	2	3	4	5
Busy Channel Lockout enabled (rarely enabled)	2	1	2	3	4	5
Busy Channel Override enabled (rarely enabled)	2	1	2	3	4	5
ANI enabled (rarely enabled)	2	1	2	3	4	5
<b>Manual DTMF Encoder enabled</b>	2	1	2	3	4	5
Group Three Functions						
Light on Display Change	3	1	2	3	4	5
Light on Key Press	3	1	2	3	4	5
<b>Alpha-numeric Mode enabled</b>	3	1	2	3	4	5
<b>Back Light Duration</b>	CHOOSE LITE OFF!!					
<b>Group Label</b>	(SEE BELOW)					

National Standard Tones / NACs			
Std Tone #	Analog Freq	DEC NAC	HEX NAC
1	110.9	1109	455
2	123.0	1230	4CE
3	131.8	1318	526
4	136.5	1365	555
5	146.2	1462	5B6
6	156.7	1567	61F
7	167.9	1679	68F
8	103.5	1035	40B
9	100.0	1000	3E8
10	107.2	1072	430
11	114.8	1148	47C
12	127.3	1273	4F9
13	141.3	1413	585
14	151.4	1514	5EA
15	162.2	1622	656
16	192.8	1928	788

NOAA WX Freqs
RX 162.400
RX 162.425
RX 162.450
RX 162.475
RX 162.500
RX 162.525
RX 162.550

## LABEL EDITING

### Channel and Group Labels

1. To enter a new label, press the [FCN] key. The display becomes blank.
2. Press the [PRI] key repeatedly to cycle through characters 0-9, A-Z, -, \*, \$, /, +, %, \, \_, <, >, h, blank, then back to the start again. The characters appear in position eight. (if you pass the desired character, press the [PRI] key repeatedly until you reach that character again).
3. Press the [FCN] key to shift the display left by one position, leaving position eight blank.
4. Press the [PRI] key repeatedly to enter the next character, or press the [FCN] key a second time to enter a blank space.
5. Press number keys to enter 0-9 in positions one through seven. The digits start in position seven, then move left.
6. Press the [#] key to toggle a decimal on or off to the right of the character in position seven. The decimal moves left with the number in position seven as new numbers are entered.
7. To abandon changes, press the [CLR] key, restoring the original label.
8. Press the [ENT] key to store changes and go back to the starting point.

## DIGITAL PROGRAMMING

In order to use your DPH as a digital radio, there are several things that you need in order for it to work.

MODE: Must Be **D** (Digital) or **M** (Mixed)

NAC=Network Access Code: Essentially a digital "tone." This code will be provided for you, and it is required for digital freqs to work. The code may be either HEX or DECIMAL. MAKE SURE YOU KNOW WHICH ONE: Hand programming requires Decimal inputs.

SQ OP: don't change from default of "Normal"

TG=Talk Group ID: provided for you by management unit -usually talk group 1.

### Things to remember:

- DPH radios can be set up with digital and analog frequencies in a single group.
- When transmitting on a digital frequency, key your mic and wait one full second before speaking.
- Digital repeaters may not be set up with a transmission "tail" or "kick-back". An actual voice transmission may be needed to verify contact with the repeater.
- If you know you'll be using digital frequencies, plan ahead- you may have most success programming your radios with the laptop and the BK software.
- You can clone digital frequencies between DPH radios, just like analog frequencies.

### NACS

F7E is what you program in if you want to listen in. F7E will listen to any digital signal

F7e is hexadecimal= 3966 is decimal (Hand Programming Mode Requires Decimal)

F7e is a receive nac only

Convert hexadecimal to decimal and vice-versa with the Microsoft calculator in Scientific Mode.

# IRIDIUM SATELLITE PHONE PROCEDURES

*Adapted from AFS Handy Dandy Field Guide*

1. Ensure SIM card is inserted and battery is charged
2. Ensure antenna is seated firmly against body of phone. Swing antenna up to click stop and extend antenna up to full length
3. Press power button (red circle) on lower left of keyboard
4. Some phones require a PIN. Default PIN is usually 1111. Be sure to check your phone prior to travel.
5. Once the phone displays "Registered" and adequate signal strength is attained (usually 3-4 bars), you should be able to send/receive calls.
6. All calls are initiated with the access code "00" followed by country code and full phone number. For US calls, country code is "1". See **Dialing Procedures** below.
7. Antenna has click stops for maintaining vertical position when using right or left handed.
8. An audible tone is heard indicating the system is connecting the call. When connected, you will hear normal ring sounds. Remind other callers that the satellite system has a slight delay (much like international calling) transmitting audio.
9. The arrow buttons below the display screen allow you to scroll through the various menu options.
10. If all else fails, read the manual!

## DIALING PROCEDURES

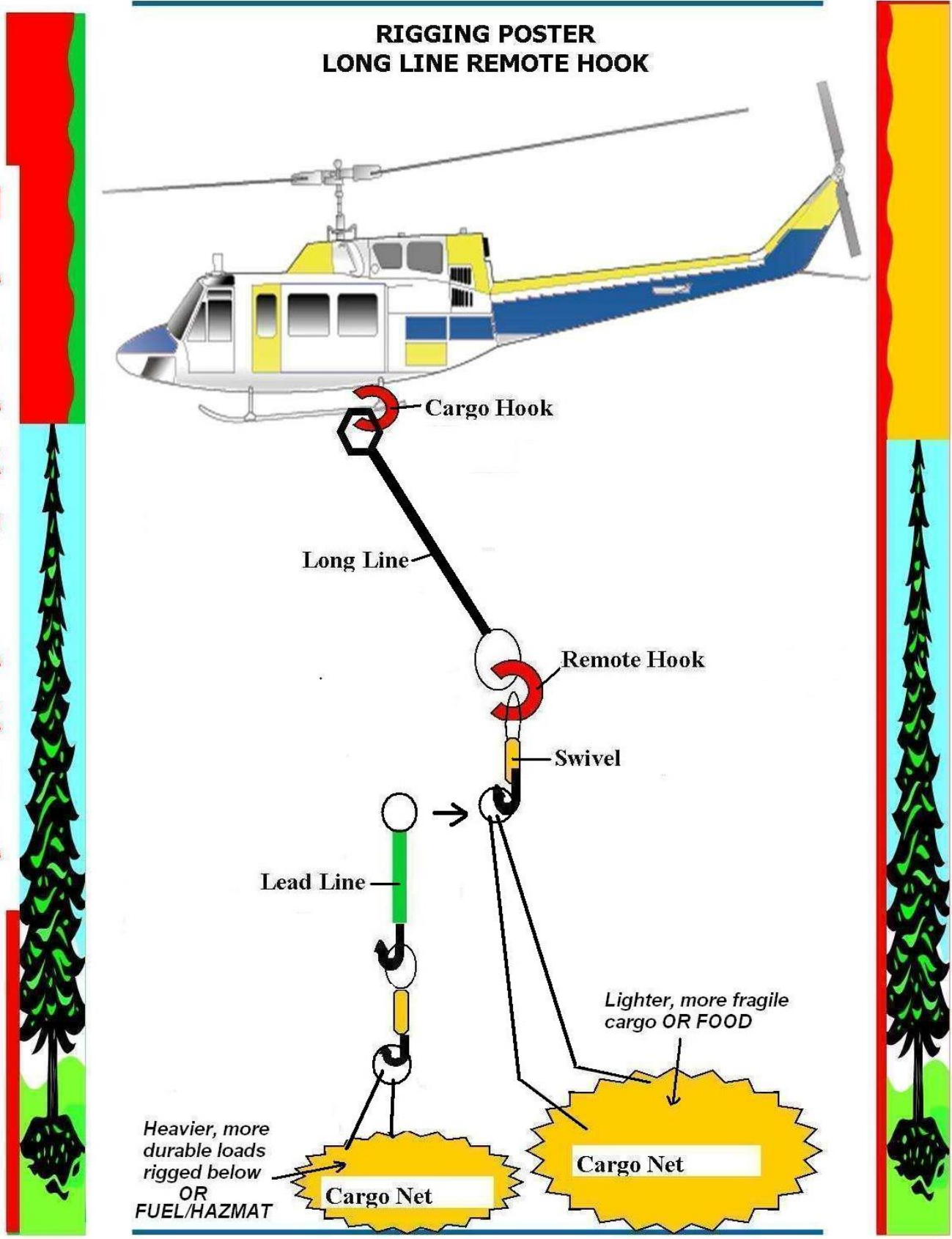
To call from ISU to Landline/mobile device: dial 001 then phone number  
(ex. 001-208-387-5512)

To call from landline/mobile device to ISU: dial 011 then Iridium phone number  
(ex. 011-8816-314-41187)

To call from ISU to ISU: dial 00 then Iridium phone number  
(ex. 00-8816-314-41187)

**RIGGING POSTER  
LONG LINE REMOTE HOOK**

**H  
A  
Z  
A  
R  
D  
  
A  
R  
E  
A**



**Ensure adequate long-lines by providing helibase with accurate tree heights!**

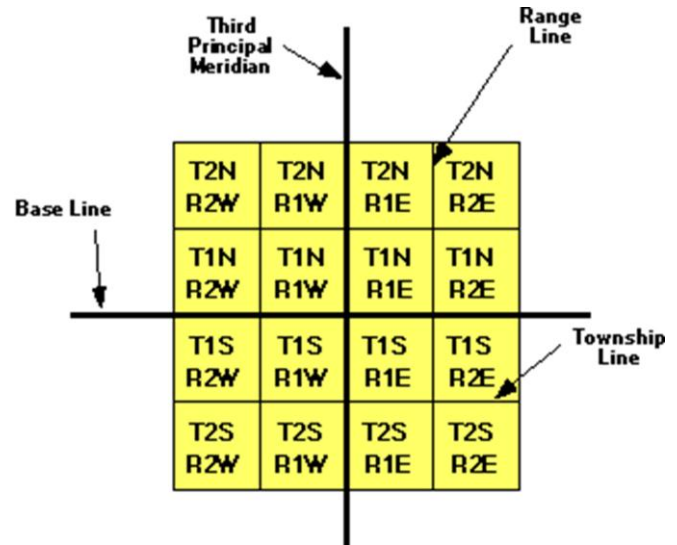
# TOWNSHIP/RANGE SYSTEM OF LAND MEASURE

Township Lines run EAST to WEST six miles apart  
 Range Line run NORTH to SOUTH six miles apart

Within each township are 36 sections, each one mile square. Each section contains 640 acres.

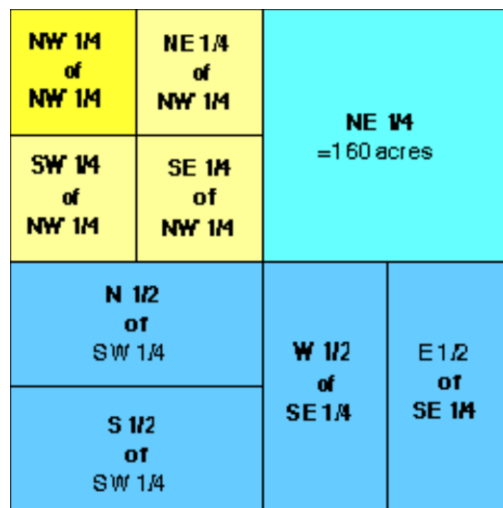
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Section Numbers in a Typical Township



Within each section, the land is referred to as half and quarter sections. A one-sixteenth division is called a quarter of a quarter, as in the NW<sup>1</sup>/<sub>4</sub> of the NW<sup>1</sup>/<sub>4</sub>.

The descriptions are read from the smallest division to the largest. ↓↓



## CONVERTING LATITUDE LONGITUDE

Latitude and Longitude may be shown in three different formats:

FORMAT	WHAT IT LOOKS LIKE	HOW YOU SAY IT (Radio Etiquette)
A. Degrees Decimal Minutes ( <i>Aircraft</i> )	48° 36.12' 114° 08.12'	"Four-eight degrees, three six point one two minutes."
B. Degrees Minutes Seconds ( <i>many maps</i> )	48° 36' 12" 114° 08' 12"	"Four-eight degrees, three six minutes, and one two seconds."
C. Degrees Decimal Degree ( <i>seldom used</i> )	48.3612° 114.0812°	"Four-eight point three six one two degrees."

Most handheld GPS units can be set up to display any format

**If you do not have that option, do this:**

To convert **Degrees Minutes Seconds** to **Degrees Decimal Minutes**, divide seconds by 60.

- Example: 48° 20' 30" ⇨ (30")/60 = .5' ⇨ 48° 20.5'

To convert **Degrees Decimal Minutes** to **Degrees Minutes Seconds**, multiply hundredths (i.e. .12) by 60.

- Example: 48° 20.5' ⇨ .5' x 60 = 30" ⇨ 48° 20' 30"

- **One degree of latitude or longitude = 60 minutes (60')**
- **One minute of latitude or longitude = 60 seconds (60")**
- **A 7.5 minute quad covers 7.5 minutes of longitude and 7.5 minutes of latitude**

**Aviation**  
**Datum=WGS 84**  
**Units: Decimal/Minutes**  
**(ddd°mm.mmm')**



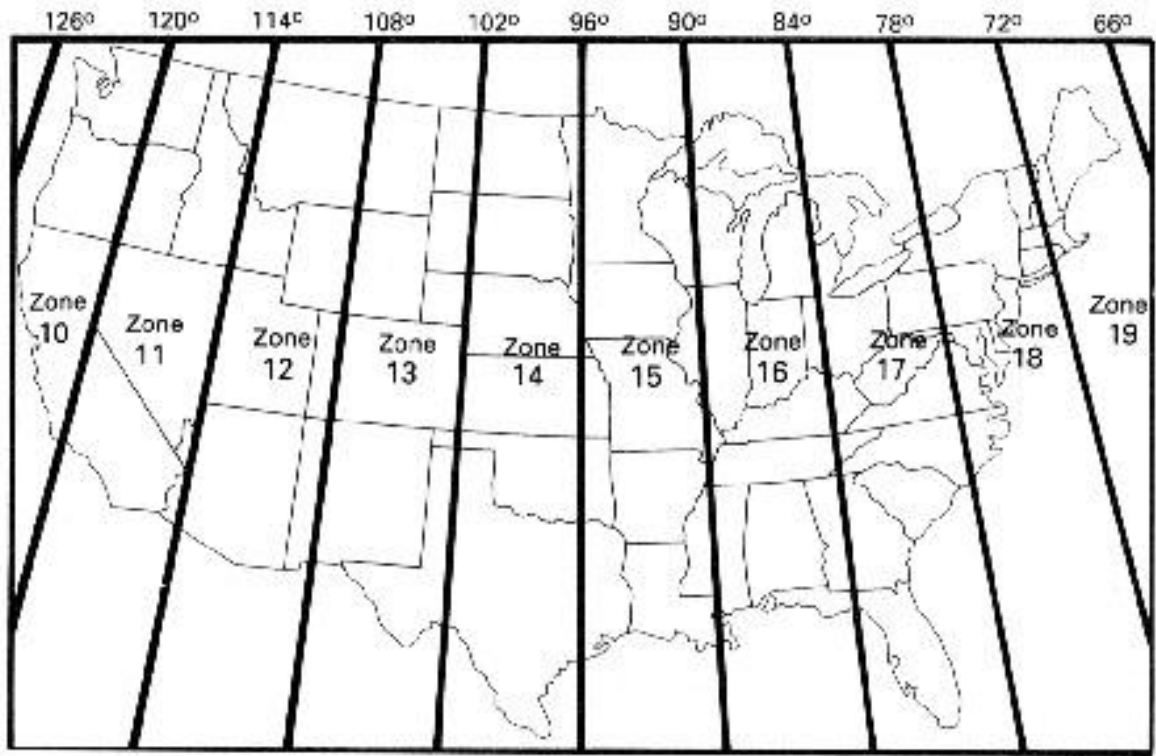
## CONVERSION CHARTS

UNITS OF MEASURE	
<b>1 inch</b>	2.54 centimeters
<b>1 foot</b>	.3048 meters
<b>1 Meter</b>	3.28 feet 39.37 inches
<b>1 Kilometer</b>	.623 miles 1,093.6 yards 3280.8ft
<b>1 Chain</b>	66 feet 20.11 meters
<b>1 Acre</b>	10 square chains 208.7 x 208.7 ft 43,560 sq. feet .405 hectares
<b>1 Mile</b>	5280 feet 80 chains 1.6 kilometers
<b>Township</b>	36 square miles
<b>Section</b>	1 square mile 640 acres

<b>1 CUP</b>	8 ounces
<b>1 PINT</b>	2 Cups 16 Ounces
<b>1 QUART</b>	4 Cups 2 Pints 32 Ounces .946 liters
<b>1 GALLON</b>	4 Quarts 128 Ounces 3.785 liters 8.33 lbs

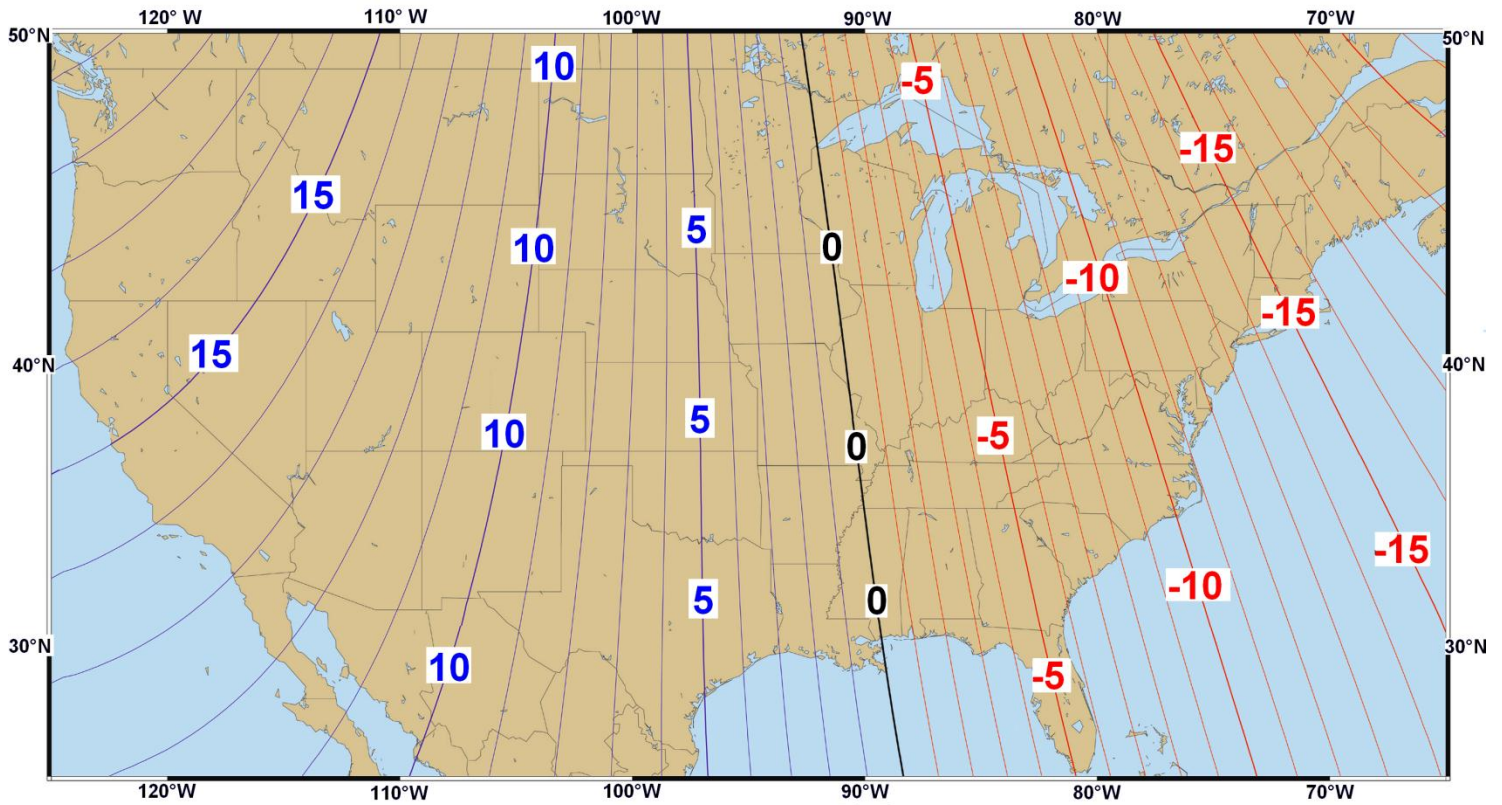
MAP SCALE CONVERSION		
MAP SCALE	1 inch on the map=	1 Mile on the Earth= ___ inches on map
1:5,000	416.67 feet 127.00 meters	12.67
1:10,000	833.33 feet 254.00 meters	6.34
1:12,500	1,041.66 feet 317.00 meters	5.07
1:20,000	1,666.70 feet 508.00 meters	3.17
<b>1:24,000 7.5" Quad</b>	2,000 feet 609.6 meters	2.64
1:25,000 7.5" Quad	2,083.30 feet 635.00 meters	2.53
1:50,000	4,166.70 feet 1,270.0 meters	1.27
1:62,500 15" Quad	.986 Miles 5206.1 feet 1586.8 meters	1.014
<b>1:63,360 Alaska Maps</b>	5,280.00 feet 1,609.3 meters	1
1:100,000	8,333.30 feet 2,540.0 meters	.634
1:250,000	20,833.00 feet 6,350.0 meters	.253
1:500,000	41,667.00 feet 12,700.0 meters	.127

# USA - UTM ZONES



Use Longitude to aid in determining UTM zone

# MAGNETIC DECLINATION FOR THE U.S. 2004



<http://www.ngdc.noaa.gov/geomag/declination.shtml>

# GARMIN GPS CHECKLIST

## Pre-field:

- Make sure your batteries have enough charge to complete the GPS mission; it's a good idea to have an extra set. Make sure your GPS is set to the battery type setting that matches what you are using- alkaline, NiCad, or NiMH.
- Load GPS with background maps of the area you'll be working in using MapSource.
- Clear any waypoints and tracklogs you don't need from your device's memory.
- Set the **coordinate system** to UTM or Lat/Long.
- Set the **position format** to the format you want to use, Dd.dd°, Dd°mm.mm', or Dd°mm'ss.s".
- Choose the **datum** you will be using.

*\* If you will be using a map, you will want the datum, coordinate system and position format to match the map you will be using. If you will be giving coordinates to your local dispatch, it is a good idea to check with them regarding these settings, some dispatch offices have standards they prefer for these settings.*

## In the field:

- If you have moved a long distance from where you were when you last turned your GPS on, be prepared for it to take a few extra minutes for your GPS to acquire satellites.
- Hold your GPS antenna away from your body with the antenna up.
- Wait until you have 3D positioning to collect data.
- **Waypoints:**
  - 1) When creating waypoints, average your position. This will improve the accuracy of your point. Give waypoints meaningful names to help you remember what they are and in case you need to have someone else download your data.
  - 2) In addition, to being able to mark your current location most GPS units will also allow you to enter coordinates to create a waypoint or create a waypoint by pointing to a location on a map.
  - 3) When you create a waypoint, your GPS will use the datum you have your unit set to, to store the coordinates accurately. Once you save a waypoint you can then view it in different datums if need be. Conversely, if you entered coordinates from a paper map that you thought used NAD 27, but later discovered they were really NAD 83, you cannot simply change the settings in your unit- you will need to re-enter the coordinates.
- **Tracklogs:**
  - 1) Turn off "Wrap when full", some devices may say "Stop when full".
  - 2) Set record method to "Auto". (If this is not an option, time seems to produce smoother lines, but be sure to increase the time interval accordingly for larger fires.)
  - 3) Set interval to "Most Often". (If this is not an option, try using 1 second for fires less than an acre. Increase the time as needed for larger fires.)
  - 4) **Before creating a tracklog be sure your active tracklog is clear!** (If you don't, your GPS will connect your new track to the end of the last track you collected- even if one is in Alaska and the other is in Florida. Among other things, this will cause problems when you try to view the acreage of your fire perimeter.)
  - 5) If you need to deviate from your track, be sure to stop/pause your track log. When you return to where you left off, restart your track log
  - 6) Save your track log when you are finished. Give it a descriptive name such as "06182011Perimeter", in case someone else will be downloading and looking at the data. It is good to include date, time, and what the tracklog represents to eliminate confusion.
  - 7) Upon saving your track log, most GPS devices will allow you to see your acreage if your track log was a polygon. Be aware that if you don't walk a complete polygon, but rather a semi-circle, some GPS units will try to make it into a polygon when it saves it by adding a straight line

between your starting and ending points. Your GPS will show you an acreage, but of course it won't be accurate.

8) If you need to record another track log, don't forget to clear your active track log.

\* Clarify the datum and coordinate system you are using if there is any doubt. If reading coordinates over the radio, be clear about the format you are using. For example, N 37° 40' 39", would be read: "North, three seven *degrees*, four zero *minutes*, three nine *seconds*." W 113° 03.71' would be read: "West one one three *degrees*, three, decimal seven one *minutes*."

## DNR GARMIN QUICK DOWNLOAD

1. Turn GPS on => Connect GPS to your computer => Open DNR Garmin.
2. Current versions of DNR Garmin should auto connect to GPS. If not, select **GPS=>Set Port** and choose the correct port. If it still fails to recognize the GPS unit, check to be sure that it is turned on. If not, turn the unit on and select GPS=>Open Port.
3. Ensure DNR Garmin is set to correct projection. Select **File =>Set Projection** to change. **Select ESRI** when changing projections. Select **File =>Get Projection** once DNR Garmin has connected to your GPS to get your current Projection.
4. Select **Track=>Download** for Track data (fire perim) or **Waypoint=>Download** for points. If you have multiple tracklogs or waypoints on your GPS highlight the ones you want to save by clicking on the pt.# (leftmost column) and using the shift key.
5. After data loads, save your data by selecting **File =>Save to =>File...** Save data to correct location: C:\2010Incidents\FireName\ArcGIS\incident\_data where "Fire Name" is your current fire.
6. First save your file as a comma delimited text file (\*.txt), then as a **Projected Shapefile (\*.shp)**. When saving a tracklog, you will be asked to defining the output type, choose line (easiest to edit). Change file types with the Save as type at bottom of the Save as window:



7. When saving a file (.txt or .shp) use the following naming convention ([http://gis.nwcg.gov/gstop\\_sop.html](http://gis.nwcg.gov/gstop_sop.html))  
yyyyymmdd\_time\_incidentname\_datatype\_source\_featuretype\_coordinatesystemdatum  
Ex: 20100618\_1300\_monster\_perimeter\_ZionWFM\_pts\_utm12n83.txt/shp  
Datatype= what was mapped (perimeter, dozer line, MAP, etc.); Source= use crew name (& your name);  
Featuretype= use pts for waypoints, ln for line and pl for polygon.
8. If you plan to hand off your data right away, do not drag and drop files to a jump drive or CD. Copy and Paste or Save As to another location.

Other things to consider:

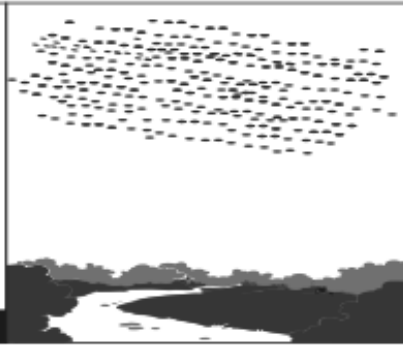
- Consult incident GIS Specialist for preferred file naming conventions.
- Organizing files: place initial downloaded files in C:\20XX Fires\Fire Name\ArcGIS\incident\_data where "Fire Name" is your current fire and XX=year.
- If you make any changes to your data, save them in the EDITS folder,
- Moving files: Copy and Paste all files associated with a shapefile. There will be at least 3 (i.e. .shx, .dbf). Do not drag and drop files! This may permanently move files, and we need to keep a copy of everything we generate.

# Cloud Types

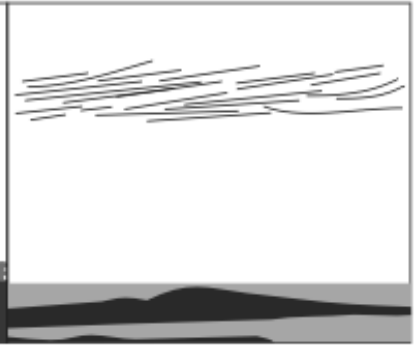
High Clouds



Cirrus (Ci)

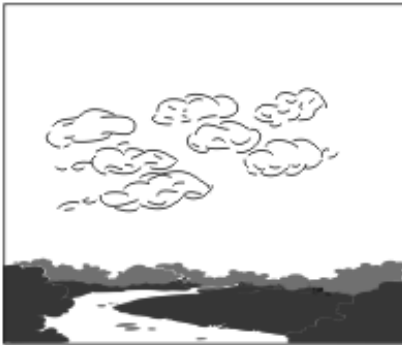


Cirrocumulus (Cc)

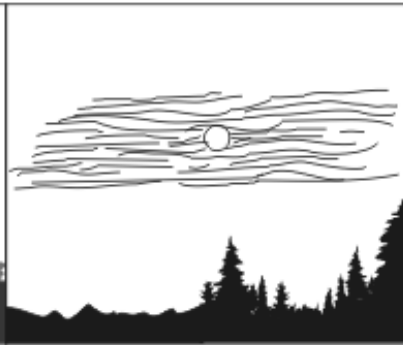


Cirrostratus (Cs)

Middle Clouds

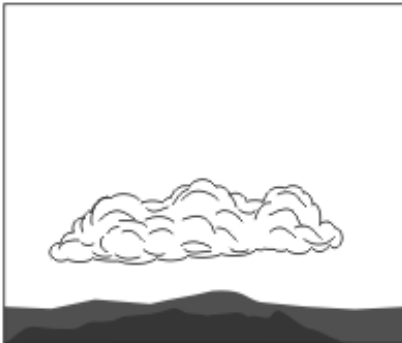


Alto cumulus (Ac)

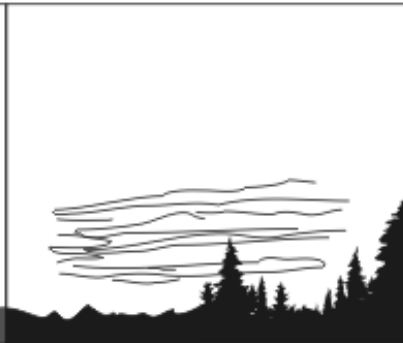


Altostratus (As)

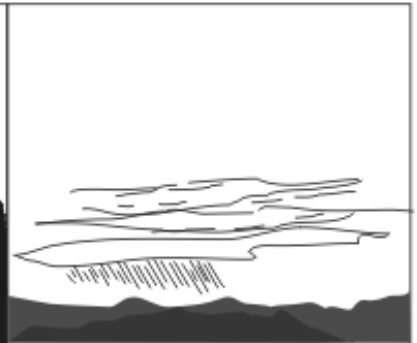
Low Clouds



Stratocumulus (Sc)



Stratus (St)

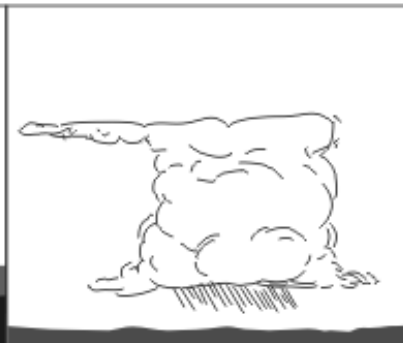


Nimbostratus (Ns)

clouds of Vertical Development

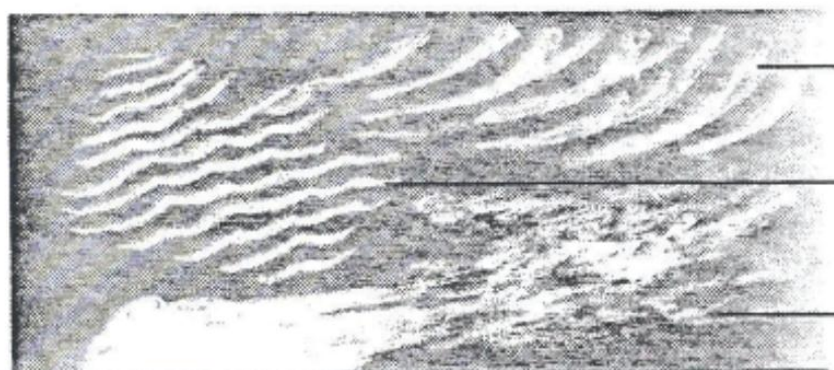


Cumulus (Cu)



Cumulonimbus (Cb)

**HIGH CLOUDS**  
above 20,000 ft.



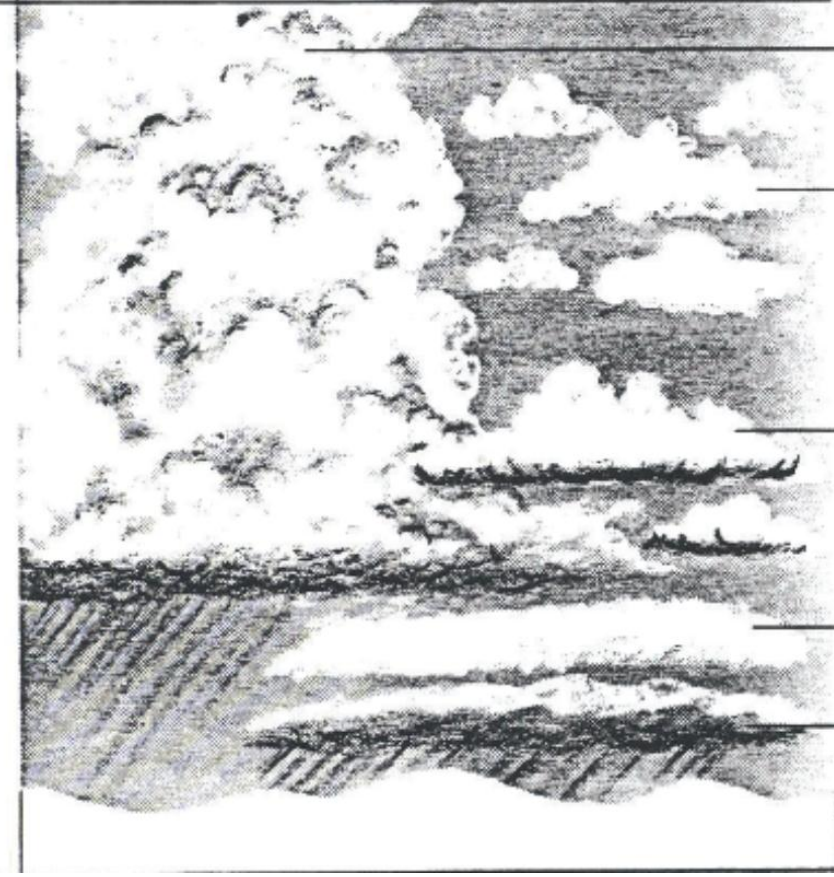
- CIRRUS  
(whispy)
- CIRROCUMULUS  
(whispy, puffed up)
- CIRROSTRATUS  
(whispy, layered)

**MIDDLE CLOUDS**  
7,000 to 20,000 ft.



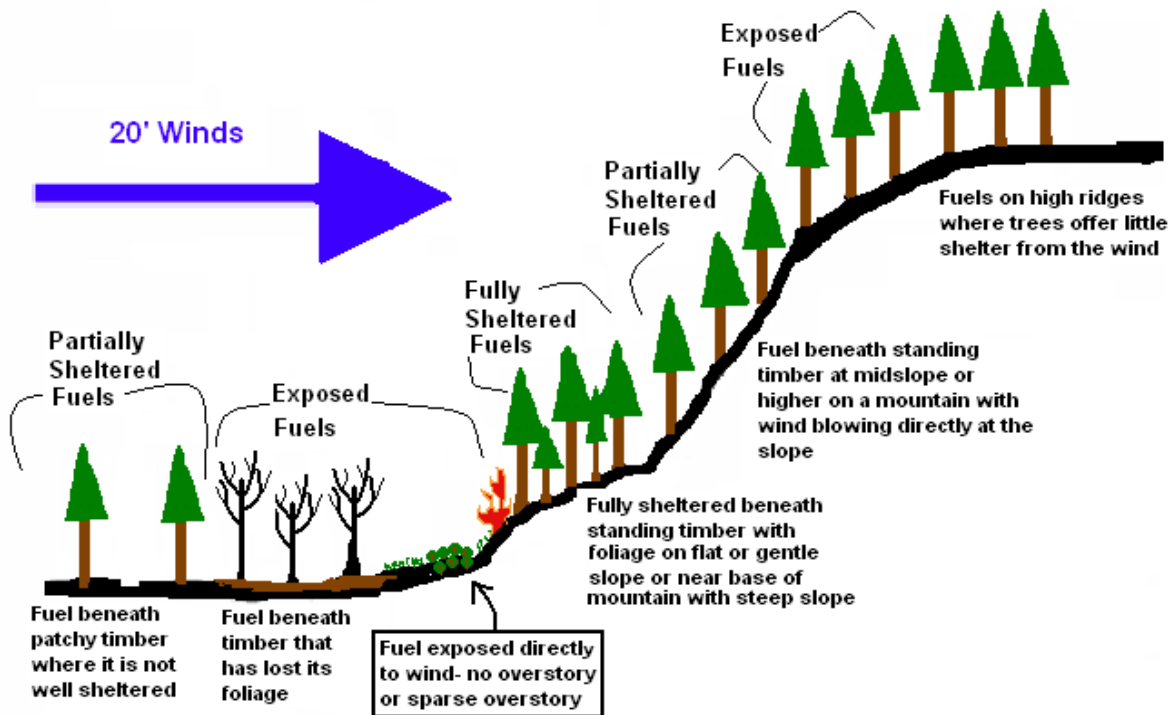
- ALTOCUMULUS  
(high, puffed up)
- ALTOSTRATUS  
(high, layered)

**LOW CLOUDS**  
below 7,000 ft.



- CUMULONIMBUS  
(puffed up, rain cloud)
- CUMULUS  
(puffed up)
- STRATOCUMULUS  
(layered, puffed up)
- STRATUS  
(layered)
- NIMBOSTRATUS  
(rain cloud, layered)

# Wind Adjustment for Exposure of Fuels to Wind



Fuel Exposure	Fuel Model	Adjustment Factor
<p><b>Exposed Fuels</b></p> <p>Fuel exposed directly to the wind. No or sparse overstory. Fuel beneath timber that has lost its foliage overstory; fuel beneath timber near clearings or clear-cuts; fuel on high ridges where trees offer little shelter from the wind.</p>	<p>4</p> <p>13</p> <p>All others*</p>	<p>0.6</p> <p>0.5</p> <p>0.4</p>
<p><b>Partially Sheltered Fuels</b></p> <p>Fuel beneath patchy timber where it is not well sheltered; fuel beneath standing timber at mid-slope or higher on a mountain with wind blowing directly at the slope</p>	All Fuel Models	0.3
<p><b>Fully Sheltered Fuels</b></p> <p>Fuel sheltered beneath standing timber on flat or gentle slope or near base of mountain with steep slopes</p>	All Fuel Models	0.2 Open Stands 0.1 Dense Stands

\*Fuel Models 2 and 7 are usually partially sheltered  
Fuel models 8, 9 and 10 are usually fully sheltered

# RATE OF SPREAD ESTIMATOR

Spread distance (ft)				ROS ch/hr
1	3	5	10	
Time in Minutes(') and Seconds('')				
3'38"	10'55"	18'10"	36'22"	0.25
1'49"	5'27"	9'05"	18'10"	0.5
55"	2'44"	4'33"	9'05"	1
36"	1'49"	3'02"	6'04"	1.5
27"	1'22"	2'16"	4'33"	2
18"	55"	1'31"	3'02"	3
14"	41"	1'08"	2'16"	4
11"	33"	55"	1'49"	5
9"	27"	45"	1'31"	6
8"	23"	39"	1'18"	7
7"	20"	34"	1'08"	8
6"	18"	30"	1'01"	9
5"	16"	27"	55"	10
4"	11"	18"	36"	15
3"	8"	14"	27"	20
2"	7"	11"	22"	25
2"	5"	9"	18"	30
2"	5"	8"	16"	35
1"	4"	7"	14"	40
1"	3"	5"	11"	50
1	3	5	10	
Spread distance (ft)				

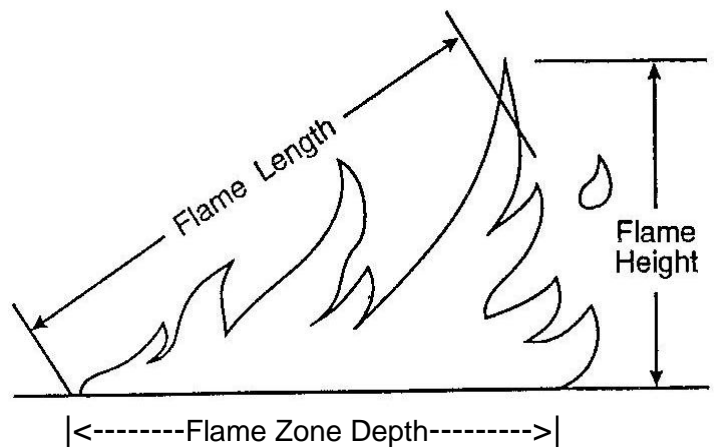
Use this chart as an aid to *estimate* rate of spread

Here's how:

1. Measure out 1, 3, 5 or 10 feet. Mark distance with two points.
2. Time fire as it spreads between your two points and record this time.
3. Using the appropriate spread distance column (1, 3, 5 or 10), place your time on the sheet between two times listed, your "bracketed" times.
4. Move to the right with the bracket times. This is your ROS range.

**Time Key**  
 1' 49" = 1 minute and 49 seconds  
 36" = 36 seconds

Example: Say you're monitoring a backing fire burning in light ponderosa needle cast. You measure out **3 feet**, and place two stones at each of the points. You time the fire as it moves between the stones. In this case, say the fire takes 1 minute 6 seconds (1'6") to move 3 feet. Looking at the 3 column, you move down until you see two times which bracket our time: 1'22" and 55". You then scroll right and see that the rate of spread is between 2 and 3 chains per hour.





## FIRE BEHAVIOR TERMINOLOGY

**Smoldering** – no flame, barely spreading

**Creeping** – low flame, slow spread

**Running** – definite flames, rapid spread in surface fuels with well-defined head

**Torching** – fire runs up ladder fuels into crowns of individual trees with no crown to crown spread

**Crowning** – fire spreading from crown to crown, either dependent or independent of surface fire

**Flame length** – length from base to tip, not vertically

**Rate of spread** – chains per hour = feet per minute

**Ground fire** – fire burning in organic material below surface litter

**Surface fire** – fire that burns surface litter, other loose debris of the forest floor and small vegetation

**Backing** – fire spreading against the wind, or spreading on level or downward-sloping ground with no wind

**Flanking** – fire spreading perpendicular to the wind

**Backfire** – fire used as an indirect attack method to stop, slow or turn a wildfire

**Burnout** – fire set to fuels inside the control line, to strengthen line, as a part of line construction

**Flare-up** – any sudden acceleration of fire spread or intensification of the fire. A flare-up is of relatively short-duration and doesn't radically change existing control plans.

**Spot Fire** – fire outside the perimeter of the main fire started by flying, or rolling sparks or embers

### SLING PSYCHROMETER USE

The following are instructions for determining wet and dry bulb temperatures using the sling psychrometer. These instructions are based on those from page 259 of the S-290 Instructors Manual. Several additional comments have been added.

1. Stand in a shaded, open area away from objects that might be struck during whirling. If in open country, use your body shade to shade the psychrometer. If possible, take your weather observations over a fuel bed that is representative of the fuels that the fire is burning in.
2. If your sling has been in your pack, you may need to hang it in a tree, in the shade, to let it adjust to the outside air temperature.
3. Face the wind to avoid influence of body heat on the thermometers.
4. Saturate the wick of the wet bulb with clean, mineral free water (distilled).
5. Ventilate the thermometers by whirling at full arms length. Your arm should be parallel to the ground. Whirl for 1 minute.
6. Note the wet bulb temperature. Whirl for another 40 or 50 times and read again. If the wet bulb is lower than the first reading, continue to whirl and read until it will go no lower. Read and record the lowest point. If the wet bulb is not read at the lowest point, the calculated relative humidity will be too high.
7. **Read the dry bulb immediately after the lowest wet bulb reading is obtained.**
8. Determine the relative humidity from the tables.

**Important Tips:** Sometimes beginners do not take accurate psychrometer readings because of the following common mistakes:

1. not ventilating the psychrometer long enough to reach equilibrium;
2. not getting the wick wet enough, or letting it dry out;
3. holding it too close to the body or taking too long to read the thermometers;
4. touching the bulb ends with the hands while reading;
5. not facing into the breeze.

*Rule of thumb: RH in % divided by 5 = estimate of FDFM*

# FUEL MOISTURE SAMPLING

## General Guidelines

- Record site name, date, time, observer name, observed weather, general site description
- DO NOT collect samples if water drops or dew are present on samples
- Keep samples in a cool and dry location
- Seal containers with tape that will not leave residue

## Dead Fuels

- Samples should not be attached to live trees or shrubs
- Avoid decayed samples that crumble or splinter when rubbed
- Collect samples from several different plants
- Ensure container is  $\frac{3}{4}$  full or about 20 grams
- Do not collect buried samples
- Pick samples of different size within the time lag class
- Recently fallen material should be avoided
- Remove all lichen, moss, and very loose bark from sample

## Duff and Soil

- Remove all soil and live tree or plant roots from sample
- Avoid any soil particles in duff samples and vice versa

## Litter

- Collect only un-compacted dry litter from both sunny and shady areas

## Live Fuels

- Only collect foliage (needles) and very small twigs remove flowers, seeds, nuts, or berries
- Pack containers loosely to avoid spillage but ensure container is  $\frac{3}{4}$  full
- Include stems of herbaceous plants
- Replace lid on container immediately after collecting sample

## **Drying Samples:**

- Preheat drying oven between 60°C (140°F) – 100°C (212°F). Be sure to note temp used.
- Place sample cans with closed lids on scale and record “wet” weights
- Remove lid just prior to placing in oven. If material is lost, re-weigh sample
- Dry sample for 24 hours (very wet samples 48 hours)
- Replace Lids immediately after sample is removed from oven and weigh
- Calculate fuel moisture using the following formula:

$$\frac{\text{wet weight of sample} - \text{dry weight of sample}}{\text{dry sample weight} - \text{container tare weight}} (100) = \text{percent moisture content}$$

Please see example below:

A	B	C	D	E	F
<b>Gross Weight</b>		<b>Container Tare Weight</b>	<b>Water Weight</b>	<b>Dry Weight</b>	<b>% Moisture</b>
<b>Wet</b>	<b>Dry</b>				
<b>Calculation Summary</b>					
$A - B = D$ $B - C = E$ $(D / E) \times 100 = F$					

### Live Fuel Moisture Estimates

Guidelines for estimating live fuel (foliage) moisture content. Live fuel moisture is required for fuel models 2,4,5,7, and 10. If data are unavailable for estimating live fuel moisture the following rough estimates can be used.

Stage of vegetative development	Moisture content
Fresh foliage, annuals developing, early in growing cycle	300%
Maturing foliage, still developing with full turgor	200%
Mature foliage, new growth complete and comparable to older perennial foliage	100%
Entering dormancy, coloration starting, some leaves may have dropped from stem	50%
Completely cured	Less than 30%, treat as a dead fuel

### FUEL SIZE CLASSES – woody debris

Dead woody class		Piece diameter
		<i>inches (cm)</i>
DWD FWD	1-hr	0–0.25 (0–0.6)
	10-hr	0.25–1.0 (0.6–2.5)
	100-hr	1.0–3.0 (2.5–8.0)
CWD	1,000-hr and greater	3.0 and greater (8.0 and greater)

# SCOTT AND BURGAN FUEL MODELS (2005) - "THE NEW 40"

- Determine the general fire-carrying fuel type (**grass, grass/shrub, shrub, timber/understory, timber litter, slash**).
- Determine general climate for your area (**arid, semi-arid, sub-humid, humid**). TIMBER LITTER Fuel models do not have climate groupings.
- Match **fuel model** description (fuel depth, fuel load, fuel continuity) with fuels of interest.

## 1. Nearly pure grass and/or forb type (Grass):

- **Arid to semiarid climate (rainfall deficient in summer). Extinction moisture content is 15%.**
  - GR1**-Grass is short, patchy and possibly heavily grazed. Spread rate moderate; flame length low.
  - GR2**-Moderately coarse continuous grass, average depth about 1ft. Spread rate high; flame length moderate.
  - GR4**-Moderately coarse continuous grass, average depth about 2ft. Spread rate very high; flame length high.
  - GR7**-Moderately coarse continuous grass, average depth about 3ft. Spread rate very high; flame length very high.
- **Subhumid to humid climate (rainfall adequate in all seasons). Extinction moisture content is 30 - 40 %.**
  - GR1**-Grass is short, patchy, and possibly heavily grazed. Spread rate moderate; flame length low.
  - GR3**-Very coarse grass, average depth about 2 ft. Spread rate high; flame length moderate.
  - GR5**-Dense, coarse grass, average depth about 1 - 2ft. Spread rate very high; flame length high.
  - GR6**-Dryland grass about 1 - 2 ft tall. Spread rate very high; flame length very high.
  - GR8**-Heavy, coarse, continuous grass 3 - 5 ft tall. Spread rate very high; flame length very high.
  - GR9**-Very heavy, coarse, continuous grass 5 - 8 ft tall. Spread rate extreme; flame length extreme.

## 2. Mixture of grass and shrub, up to about 50 percent shrub coverage (Grass-Shrub)

- **Arid to semiarid climate (rainfall deficient in summer). Extinction moisture content is 15 %.**
  - GS1**-Shrubs are about 1 ft high, low grass load. Spread rate moderate; flame length low.
  - GS2**-Shrubs are 1 - 3 ft high, moderate grass load. Spread rate high; flame length moderate.
- **Subhumid to humid climate (rainfall adequate in all seasons). Extinction moisture content is 30 – 40%.**
  - GS3**-Moderate grass/shrub load, average grass/shrub depth < 2 ft. Spread rate high; flame length moderate.
  - GS4**-Heavy grass/shrub load, depth greater than 2 ft. Spread rate high; flame length very high.

## 3. Shrubs cover at least 50 percent of the site; grass sparse to nonexistent (Shrub)

- **Arid to semiarid climate (rainfall deficient in summer). Extinction moisture content is 15 %.**
  - SH1**-Low shrub fuel load, fuelbed depth about 1 ft; some grass may be present. Spread rate very low; flame length very low.
  - SH2**-Moderate fuel load (higher than SH1), depth about 1 ft, no grass fuel present. Spread rate low to moderate; flame length low to moderate.
  - SH5**-Heavy shrub load, depth 4 - 6 ft. Spread rate very high; flame length very high.
  - SH7**-Very heavy shrub load, depth 4 - 6 ft. Spread rate lower than SH5, but flame length similar. Spread rate high; flame length very high.
- **Subhumid to humid climate (rainfall adequate in all seasons). Extinction moisture content is 30 – 40%**
  - SH3**-Moderate shrub load, possibly with pine overstory or herbaceous fuel, fuel bed depth 2 - 3 ft. Spread rate low; flame length low.
  - SH4**-Low to moderate shrub and litter load, possibly with pine overstory, fuel bed depth about 3 ft. Spread rate high; flame length moderate.
  - SH6**-Dense shrubs, little or no herb fuel, depth about 2 ft. Spread rate high; flame length high.
  - SH8**-Dense shrubs, little or no herb fuel, depth about 3 ft. Spread rates high; flame length high.
  - SH9**-Dense, finely branched shrubs with significant fine dead fuel, about 4 - 6 ft tall; some herbaceous fuel may be present. Spread rate high, flame length very high.

## 4. Grass or shrubs mixed with litter from forest canopy (Timber-Understory)

- **Semiarid to Subhumid climate. Extinction moisture content is 20 %.**
  - TU1**-Fuelbed is low load of grass and/or shrub with litter. Spread rate low; flame length low.
  - TU4**-Fuelbed is short conifer trees with grass or moss understory. Spread rate moderate; flame length moderate.

**TU5**-Fuelbed is high load conifer litter with shrub understory. Spread rate moderate; flame length moderate.

➤ *Humid climate. Extinction moisture content is 30 %.*

**TU2**-Fuelbed is moderate litter load with shrub component. Spread rate moderate; flame length low.

**TU3**-Fuelbed is moderate litter load with grass and shrub components. Spread rate high; flame length moderate.

#### **5. Dead and down woody fuel (litter) beneath a forest canopy (Timber Litter)**

➤ *Fuelbed is recently burned but able to carry wildland fire.*

**TL1**-Light to moderate load, fuels 1 - 2 in deep. Spread rate very low; flame length very low.

➤ *Fuelbed composed of broadleaf (hardwood) litter.*

**TL2**-Low load, compact. Spread rate very low; flame length very low.

**TL6**-Moderate load, less compact. Spread rate moderate; flame length low.

**TL9**-Very high load, fluffy. Spread rate moderate; flame length moderate.

➤ *Fuelbed composed of long-needle pine litter.*

**TL8**-Moderate load and compactness may include small amount of herbaceous load. Spread rate moderate; flame length low.

➤ *Fuelbed not composed broadleaf or long-needle pine litter.*

**TL4**-Moderate load, includes small diameter downed logs. Spread rate low; flame length low.

**TL7**-Heavy load, includes larger diameter downed logs. Spread rate low; flame length low.

**TL3**-Moderate load conifer litter. Spread rate very low; flame length low.

**TL5**-High load conifer litter; light slash or mortality fuel. Spread rate low; flame length low.

**TL9**-Very high load broadleaf litter; heavy needle-drape in otherwise sparse shrub layer. Spread rate moderate; flame length moderate.

#### **6. Activity fuel (Slash) or debris from wind damage.**

➤ *Fuelbed is activity fuel.*

**SB1**-Fine fuel load is 10 - 20 tons/acre, weighted toward fuels 1 - 3 in diameter class, depth is <1 ft. Spread rate moderate; flame length low.

**SB2**-Fine fuel load is 7 -12 tons/acre, evenly distributed across 0 - 0.25

**SB3**-Fine fuel load is 7 - 12 tons/acre, weighted toward 0 to 0.25 in diameter class, depth is >1 ft. Spread rate high; flame length high.

➤ *Fuelbed is blowdown*

**SB2**-Blowdown is scattered, with many trees still standing. Spread rate moderate; flame length moderate.

**SB3**-Blowdown is moderate, trees compacted to near the ground. Spread rate high; flame length high.

**SB4**-Blowdown is total, fuelbed not compacted, foliage still attached. Spread rate very high; flame length very high.

#### **7. Insufficient wildland fuel to carry wildland fire under any condition (Nonburnable)**

**NB1**-Urban or suburban development; insufficient wildland fuel to carry wildland fire.

**NB2**-Snow/ice.

**NB3**-Agricultural field, maintained in nonburnable condition.

**NB8**-Open water.

**NB9**-Bare ground.

## **ANDERSON FUEL MODELS - "THE ORIGINAL 13"**

### **Primary carrier of the fire is GRASS**

**FM1**-Grass is fine structured, generally below knee level, and cured primarily. Grass is essentially continuous. Spread rate moderate; flame length low. *Grasslands, savanna, grass tundra*

**FM2**-Grass is usually under an open timber or brush overstory. Litter from overstory is involved, but grass carries the fire. Expected ROS is < FM1 and intensity is < FM3. Spread rate moderate; flame length moderate. *Open shrub land and pine stands, some pinon-juniper*

**FM3**-Grass is coarse structured, above knee level (average about 3ft. deep) and can be difficult to walk through. 1/3 of stand is dead or cured. Spread rate high; flame length high.

**Primary Carrier of the fire is BRUSH or litter beneath the BRUSH.**

**FM4**-Brush is head height (>6ft.), with heavy loadings of dead woody fuel. Fire may involve foliage, live and dead woody material and canopy. Spread rate very high; flame length very high. *Mixed chaparral, high pocosins, pine barrens of New Jersey, closed jack pine stands of north central states*

**FM5**-Brush is about 2ft. high, with light loading of brush litter underneath. Litter may carry fire, especially at low wind speeds. Spread rate low to moderate; flame length low to moderate *Young green stands with little or no deadwood. Laurel, vine maple, alder, manzanita*

**FM6**-Live fuels are absent or sparse. Brush averages 2 to 4ft. high. Brush requires moderate winds to carry fire. Spread rate high (with wind); flame length high. FM6 may not predict rate of spread accurately in mature PJ or taller oak brush. *Chaparral, chamise, oak brush, low pocosin, Alaskan black spruce, taiga, shrub tundra, PJ at high winds (20mph at 20' level)*

**FM7**-Fires burn through the surface and shrub strata with equal ease and can occur at higher dead fuel moisture contents due to the flammability of live foliage and other live material. Stands of shrubs are generally between 2 and 6ft. high. Spread rate high; flame length high. *Palmetto-gallberry understory with pine overstory, Alaskan black spruce with shrub*

**Primary Carrier of the fire is LITTER beneath a TIMBER stand.**

**FM8**-Dead foliage is tightly compacted, short needle (2 in. or less) conifer or hardwood litter. Spread rate low; flame length low with occasional jackpot of heavy fuels increasing intensity. *White and lodgepole pine, spruce, true firs, larches*

**FM9**-Dead foliage litter is loosely compacted long needle pine or hardwoods. Spread rate moderate; flame length moderate. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting, and crowning. *Closed stands of long needle pine- Jeffrey ponderosa, and southern pine plantations*

**FM10**-There is a significant amount of larger fuels with attached branches and twigs, or has rotted enough that it is splintered and broken. The larger fuels are fairly well distributed over the area. Some green fuel may be present. Overall depth of the fuel is primarily below knees, but some fuel may be higher. Any forest type may be considered if heavy down material is present. Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficulties. Spread rate moderate to high; flame length high. *Insect- or disease-ridden stands, windthrown stands, overmature situations with deadfall, and aged light thinning or partial-cut slash*

**Primary Carrier of the fire is LOGGING SLASH.**

**FM11**-Slash is not continuous. Needle litter or small amounts of grass or shrubs must be present to carry the fire, but primary carrier is still slash. Live fuels are absent or do not play a significant role in fire behavior. Spread Rate low; flame length moderate. *Light partial cuts or thinning ops in mixed conifer or hardwood stands and southern pine harvests*

**FM12**-Slash generally covers the ground (heavier loadings than FM11), though there may be some bare spots or areas of light coverage. Average slash depth is about 2ft. Slash is not excessively compacted. Approximately ½ of the needles may still be on the branches but are not red. Live fuels are absent, or are not expected to affect fire behavior. Spread rate low; flame length moderate to high. *Heavily thinned conifer stands, clear cuts and med to heavy partial cuts*

**FM13**-Slash is continuous or nearly so (heavier loadings than FM12). Slash is not extremely compacted and has an average depth of 3ft. Approximately ½ of the needles are still present and are red, or all of the needles are still on the branches but are green. Live fuels are not expected to influence fire behavior. Spread rate low; flame length high. *Clear cuts and heavy partial cuts in mature or over mature stands where slash is dominated by >3" material or load like FM12 but with "red" needles still attached*

# Elevations between 0 and 500 feet

Dry Bulb Temperatures 41 to 60 F (Read Across)		Wet Bulb Temperatures 23 to 40 F		Dry Bulb Temperatures 61 to 80 F (Read Down)		Wet Bulb Temperatures 41 to 59 F (Read Down)												
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
28	29	30	31	32	33	34	35	36	37	38	39	40						
-36	-12	-1	7	13	18	22	25	29	31	34	37	39	41					
3	10	17	24	32	39	44	53	61	68	74	84	92						
-23	-7	3	10	15	20	23	27	30	33	35	38	40	42					
5	12	19	26	33	40	47	54	62	69	77	84	92						
-49	-15	-2	4	12	17	21	25	28	31	34	36	39	41	43				
8	14	21	28	35	41	48	55	62	70	77	85	92	43					
-29	-9	2	9	14	19	23	26	29	32	35	37	40	42	44				
4	10	17	23	29	36	43	49	54	63	70	78	85	92					
-18	-4	5	11	16	21	24	28	31	34	36	39	41	43	45				
6	12	19	25	31	37	44	51	57	64	71	78	85	93	45				
-33	-11	0	7	13	18	22	26	29	32	35	37	40	42	44	46			
2	8	14	20	26	32	39	45	52	58	65	72	79	86	91	46			
-22	-6	3	10	16	20	24	27	31	33	36	38	41	43	45	47			
5	10	16	22	28	34	40	46	53	59	64	72	79	86	93	47			
-45	-14	-2	6	13	18	22	26	29	32	35	37	40	42	44	46	48		
1	7	12	18	24	29	35	41	47	54	60	64	71	79	84	93	48		
-27	-8	2	9	15	20	24	27	30	33	36	39	41	43	45	47	49		
3	9	14	20	25	31	37	42	48	54	61	67	73	80	86	93	49		
-17	-3	5	12	17	21	25	29	32	35	37	40	42	44	46	48	50		
5	10	14	21	27	32	38	44	49	55	61	68	74	80	87	93	50		
-33	-11	1	8	14	19	23	27	30	33	36	39	41	43	45	47	49	51	
2	7	12	17	23	28	34	39	45	52	56	62	68	74	81	87	93	51	
-21	-5	4	11	17	21	25	29	32	35	37	40	42	44	46	48	50	52	
4	9	14	19	24	29	35	40	44	51	57	63	69	75	81	87	94	52	
-42	-13	-1	8	14	19	23	27	30	33	36	39	41	43	45	47	49	51	53
1	6	11	16	21	26	31	34	41	47	51	58	64	69	75	81	87	94	53
-25	-7	3	11	16	21	25	28	32	35	37	40	42	44	47	49	50	52	54
3	8	12	17	22	27	32	37	42	48	53	59	64	70	76	82	88	94	54
-15	-2	7	13	18	23	27	30	33	36	39	41	43	46	48	50	51	53	55
5	9	14	19	24	28	34	38	41	49	54	59	65	70	76	82	88	94	55
-29	-8	3	10	16	21	26	29	32	35	37	40	42	45	47	49	51	53	56
2	7	11	16	20	25	30	35	39	44	50	55	60	65	71	77	82	89	94
-17	-3	6	13	18	23	27	30	33	36	39	41	44	46	48	50	52	54	57
4	8	13	17	22	27	31	36	41	45	50	56	61	66	71	77	83	88	94
-33	-10	2	10	14	19	23	28	32	35	38	40	43	45	47	49	51	53	56
2	6	10	14	19	23	28	32	37	42	46	51	56	61	67	72	77	83	88
-19	-4	6	13	18	23	27	30	33	36	39	41	44	46	48	50	52	54	57
5	9	13	17	22	27	31	36	41	45	50	56	61	66	71	77	83	88	94
-38	-11	1	9	15	20	25	29	32	35	38	40	43	45	47	49	51	53	56
1	5	9	13	17	21	26	30	34	39	44	48	53	58	63	68	73	78	85
-18	-4	4	11	16	20	24	27	30	33	35	38	40	43	45	47	49	51	53
7	15	22	30	37	45	52	60	68	76	84	92	40						





# Elevations between 0 and 500 feet

		Wet Bulb Temperatures																																																
		50 to 90 F (Read Down)																																																
81	-19	-1	9	16	22	27	31	35	38	41	44	46	49	51	53	55	57	59	61	63	65	66	68	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
82	-37	-7	5	13	20	25	29	33	37	40	43	45	48	51	54	57	59	61	62	64	66	68	69	71	72	74	75	77	78	79	81	82	84	85	86	87	88	89	90	91	92	93	94	95	96					
83	-16	0	10	17	23	28	32	35	39	42	44	47	50	52	54	56	58	60	62	64	65	67	69	70	72	73	75	76	78	79	80	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96				
84	-31	-6	6	14	21	26	30	34	37	41	43	46	49	51	53	55	57	59	61	63	65	67	68	70	71	73	74	76	77	79	80	81	83	84	85	86	87	88	89	90	91	92	93	94	95	96				
85	-14	2	11	18	24	28	33	36	39	42	45	48	50	53	55	57	59	61	63	64	66	68	69	71	72	74	75	77	78	80	81	82	84	85	86	87	88	89	90	91	92	93	94	95	96					
86	-26	-4	4	8	15	22	27	31	35	38	41	44	47	49	52	54	56	58	60	62	64	66	67	69	70	72	74	75	77	79	81	82	83	85	86	87	88	89	90	91	92	93	94	95	96					
87	-11	3	12	19	25	29	33	37	40	43	44	49	51	53	55	58	59	61	63	65	67	68	70	72	73	75	76	78	79	80	82	83	84	86	87	88	89	90	91	92	93	94	95	96						
88	-22	-2	4	6	10	13	15	17	19	22	24	27	29	32	34	37	40	42	45	48	51	54	57	60	64	67	70	74	77	81	84	88	92	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
89	-45	-8	5	14	20	26	30	34	38	41	44	47	49	52	54	56	58	60	62	64	66	67	69	71	72	74	75	77	78	80	81	82	84	85	86	87	88	89	90	91	92	93	94	95	96					
90	-17	0	11	18	24	29	33	37	40	43	44	48	51	53	55	58	60	62	63	65	67	69	70	72	74	75	76	78	79	81	82	84	85	86	87	88	89	90	91	92	93	94	95	96						
91	-34	-5	7	15	22	27	31	35	39	42	45	48	50	53	55	57	59	61	63	65	66	68	70	71	73	75	76	78	79	80	82	83	85	86	87	88	89	90	91	92	93	94	95	96						
92	-13	3	12	19	25	30	34	37	41	44	47	49	52	54	56	58	60	62	64	66	68	69	71	73	74	76	77	79	80	82	83	84	86	87	88	89	90	91	92	93	94	95	96							
93	-26	-3	9	17	23	28	32	36	40	43	46	48	51	53	56	58	60	62	64	65	67	69	71	72	74	75	77	78	80	81	83	84	85	87	88	89	90	91	92	93	94	95	96							
94	-10	5	14	21	26	31	35	38	42	45	48	50	53	55	57	59	61	63	65	67	68	70	72	73	75	76	78	79	81	82	84	85	86	88	89	90	91	92	93	94	95	96								
95	-20	0	11	18	24	29	33	37	41	44	47	49	52	54	56	59	61	63	64	66	68	70	71	73	75	76	78	79	81	82	83	85	86	87	88	89	90	91	92	93	94	95	96							
96	-39	-6	7	15	22	27	32	36	39	43	46	48	51	53	56	58	60	62	64	66	68	69	71	73	74	76	77	79	80	82	83	84	86	87	88	89	90	91	92	93	94	95	96							
97	-14	2	12	20	25	30	35	38	42	45	48	50	53	55	57	59	61	63	65	67	69	71	72	74	75	77	78	80	81	83	84	85	87	88	89	90	91	92	93	94	95	96								
98	-28	-3	9	17	23	29	33	37	40	44	47	49	52	54	57	59	61	63	65	67	68	70	72	73	75	77	78	80	81	82	84	85	87	88	89	90	91	92	93	94	95	96								
99	-10	5	14	21	27	32	36	39	43	46	48	51	53	56	58	60	62	64	66	68	70	71	73	75	76	78	79	81	82	84	85	86	88	89	90	91	92	93	94	95	96									
100	-20	0	11	19	25	30	34	38	42	45	48	50	53	55	57	60	62	64	66	67	69	71	73	74	76	77	79	80	82	83	85	86	87	88	89	90	91	92	93	94	95	96								

# Elevations between 0 and 500 feet

## Wet Bulb Temperatures, 58 to 95 F

		(Read Down)																																							
		58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95		
101	-40	-6	8	16	23	28	33	37	40	44	47	49	52	54	57	59	61	63	65	67	69	70	72	74	75	77	79	80	81	82	83	84	86	87	88	90	91	92	93	94	95
	2	3	5	6	8	9	11	13	14	16	18	20	21	23	25	27	29	31	33	36	38	40	42	45	47	49	52	54	57	60	62	65	68	71	74	77	80				
102	-14	3	13	21	26	31	36	39	43	46	49	51	54	56	58	61	63	65	66	68	70	72	73	75	77	78	80	81	82	83	84	86	87	88	90	91	92	93			
	1	3	4	5	7	9	10	12	13	15	17	18	20	22	24	26	28	30	32	34	36	38	40	43	45	47	50	52	55	57	60	63	65	68	71	74	77				
103	-26	-2	10	18	24	30	34	38	42	45	48	50	53	55	58	60	62	64	66	68	70	71	73	75	76	78	79	81	82	84	85	87	88	89	91	92	93				
	1	2	3	5	6	8	9	11	12	14	16	17	19	21	23	25	26	28	30	32	34	37	39	41	43	45	48	50	53	55	58	60	63	66	68	71	74				
104	-8	6	15	22	26	33	37	40	44	47	50	52	55	57	59	61	63	65	67	69	71	73	74	76	77	79	80	82	83	85	86	88	89	90	92	93					
	1	3	4	6	7	9	10	12	13	15	16	18	20	22	23	25	27	29	31	33	35	37	39	41	44	46	48	51	53	55	58	61	63	66	69	72					
105	-18	2	12	20	26	31	35	39	43	46	49	51	55	56	59	61	63	65	67	69	70	72	74	75	77	79	80	82	83	85	86	87	89	90	91	93					
	1	2	4	5	6	8	9	11	12	14	15	17	19	20	22	24	26	28	30	31	33	35	38	40	42	44	46	49	51	53	56	58	61	63	66	69					
106	-34	-4	9	18	24	29	34	38	42	45	48	51	53	56	58	60	62	64	66	68	70	72	73	75	77	78	80	81	83	84	86	87	88	90	91	92					
	2	3	4	6	7	8	10	11	13	14	16	18	19	21	23	25	26	28	30	32	34	36	38	40	42	44	47	49	51	54	56	59	61	64	66						
107	-11	5	15	22	28	33	37	41	44	47	50	53	55	57	60	62	64	66	68	70	71	73	75	76	78	79	81	83	84	85	87	88	90	91	92						
	1	2	4	5	6	8	9	11	12	14	15	17	18	20	22	23	25	27	29	31	32	34	36	38	41	43	45	47	49	52	54	56	59	61	64						
108	-22	0	12	20	26	31	35	39	43	46	49	52	54	57	59	61	63	65	67	69	71	73	74	76	78	79	81	82	84	85	87	88	89	91	92						
	1	2	3	4	6	7	8	10	11	13	14	16	17	19	21	22	24	26	27	29	31	33	35	37	39	41	43	45	47	50	52	54	57	59	62						
109	-46	-6	8	17	24	29	34	38	42	45	48	51	54	56	58	61	63	65	67	69	70	72	74	76	77	79	80	82	83	85	86	88	89	90	92						
	1	3	4	5	6	8	9	11	12	14	15	17	18	20	21	23	24	26	28	30	32	33	35	37	39	41	43	46	48	50	52	55	57	60							
110	-14	4	14	22	28	33	37	41	44	47	50	53	55	58	60	62	64	66	68	70	72	74	75	77	78	80	82	83	85	86	87	88	90	91							
	1	2	3	5	6	7	8	10	11	13	14	15	17	19	20	22	23	25	27	28	30	32	34	36	38	40	42	44	46	48	50	53	55	57							
111	-26	-1	11	19	26	31	36	39	43	46	49	52	55	57	59	62	64	66	68	70	71	73	75	76	78	80	81	83	84	86	87	89	90	91							
	2	3	4	5	6	8	9	10	12	13	15	16	18	19	21	22	24	26	27	29	31	33	34	36	38	40	42	44	46	49	51	53	55								
112	-7	8	17	24	29	34	38	42	45	48	51	54	56	59	61	63	65	67	69	71	73	74	76	78	79	81	82	84	85	87	88	90	91								
	1	2	3	5	6	7	8	10	11	12	14	15	17	18	20	21	23	24	26	28	29	31	33	35	37	39	41	43	45	47	49	51	53								
113	-16	3	14	22	28	33	37	41	44	48	50	53	56	58	60	63	65	67	69	70	72	74	76	77	79	81	82	84	85	87	88	89	91								
	1	2	3	4	5	7	8	9	10	12	13	14	16	17	19	20	22	23	25	27	28	30	32	33	35	37	39	41	43	45	47	49	51								
114	-31	-2	11	19	26	31	36	40	43	47	50	52	55	57	60	62	64	66	68	70	72	74	75	77	79	80	82	83	85	86	88	89	91								
	1	3	4	5	6	7	8	10	11	12	14	15	16	18	19	21	22	24	25	27	29	30	32	34	36	38	39	41	43	45	47	50									
115	-9	7	17	24	29	34	39	42	46	49	52	54	57	59	61	64	66	68	70	71	73	75	77	78	80	81	83	85	86	87	89	90									
	1	2	3	4	5	7	8	9	10	12	13	14	16	17	18	20	21	23	24	26	28	29	31	33	34	36	38	40	42	44	46	48									
116	-18	3	14	22	28	33	37	41	45	48	51	54	56	59	61	63	65	67	69	71	73	75	76	78	80	81	83	84	86	87	89	90									
	1	2	3	4	5	6	7	8	10	11	12	13	15	16	17	19	20	22	23	25	26	28	30	31	33	35	37	38	40	42	44	46									
117	-35	-3	11	19	26	31	36	40	44	47	50	53	55	58	60	63	65	67	69	71	72	74	76	78	79	81	82	84	85	87	88	90									
	1	2	3	4	6	7	8	9	10	11	13	14	15	17	18	19	21	22	24	25	27	28	30	32	33	35	37	39	41	43	44										
118	-9	7	17	24	30	35	39	43	46	49	52	55	57	60	62	64	66	68	70	72	74	76	77	79	80	82	84	85	87	88	89										
	1	2	3	4	5	6	7	8	10	11	12	13	15	16	17	19	20	21	23	24	26	27	29	31	32	34	36	37	39	41	43										
119	-19	2	14	22	28	33	38	42	45	48	51	54	57	59	61	64	66	68	70	72	73	75	77	79	80	82	83	85	86	88	89										
	1	2	4	5	6	7	8	9	10	11	13	14	15	16	18	19	20	22	23	25	26	28	29	31	33	34	36	38	40	42	44										

**Dry Bulb Temperatures**

**101 to 119 F**  
(Read Across)

# Elevations between 501 and 1,900 feet

28	29	30	31	32	33	34	35	36	37	38	39	40	<p style="text-align: center;"><b>Wet Bulb Temperature</b> 28 to 59 F (Read Down)</p>													
-26	-9	1	8	14	18	22	26	29	32	34	37	39														
41	5	11	18	24	33	40	47	54	61	69	77	84	92	<p style="text-align: center;"><b>Dry Bulb Temperatures</b> 41 to 60 F (Read Across)</p>												
42	7	14	21	28	34	41	48	55	62	70	77	85	92													
43	3	9	16	23	29	36	42	49	54	63	70	78	85	92	<p style="text-align: center;"><b>DP</b>      <b>DP</b> <b>RH</b>      <b>RH</b></p>											
44	-21	-6	3	10	13	20	23	27	30	33	35	38	40	42												
45	-42	-13	-1	6	12	17	21	25	28	31	34	36	39	41	43	45										
46	-25	-7	2	9	14	19	23	26	30	32	35	38	40	42	44	46										
47	-36	-16	-3	5	11	17	21	25	28	31	34	36	39	41	43	45										
48	-29	-10	1	8	14	19	23	26	29	32	35	38	40	42	44	46										
49	-19	-5	4	11	16	20	24	28	31	34	36	39	41	43	45	47	49									
50	-37	-12	-1	7	13	18	22	26	29	32	35	38	40	42	44	46	48									
51	-23	-6	3	10	15	20	24	28	31	34	36	39	41	43	45	47	49	51								
52	-47	-14	-2	6	13	18	22	26	29	32	35	38	40	42	44	46	48	50	52							
53	-27	-8	2	9	15	20	25	31	36	41	47	52	58	63	69	75	81	87	94							
54	-17	-3	6	12	17	22	27	32	37	42	48	53	58	64	70	76	82	88	96							
55	-32	-10	1	9	15	20	24	27	31	34	36	39	41	44	46	48	50	52	53	55						
56	-19	-4	5	12	17	22	26	29	32	35	38	40	43	45	47	49	51	53	54	56						
57	-37	-11	1	8	14	19	24	27	31	34	37	39	42	44	46	48	50	52	54	55	57					
58	-21	-5	5	11	17	22	26	29	32	35	38	40	43	45	47	49	51	53	55	56	58					
59	-43	12	0	8	14	19	24	28	31	34	37	39	42	44	46	48	50	52	54	56	57	59				
60	-24	-6	4	11	17	22	26	29	32	35	38	40	43	45	47	49	51	53	55	57	58	60				
61	3	7	10	14	18	22	27	31	35	40	44	49	54	58	63	68	73	78	83	88	94					

# Elevations between 501 and 1,900 feet

39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	<p style="text-align: center;"><b>Wet Bulb Temperatur 39 to 80 F</b> (Read Down)</p>																			
-50	-14	-1	8	14	19	24	28	31	34	37	40	42	44	47	49	51	53	54	56	58	59											60									
61	4	8	12	16	20	24	28	32	34	41	45	50	54	59	64	69	74	79	84	89	95	61	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #ADD8E6;">DP</td> <td style="background-color: #ADD8E6;">DP</td> </tr> <tr> <td style="background-color: #FF6347;">RH</td> <td style="background-color: #FF6347;">RH</td> </tr> </table>										DP	DP	RH	RH					
DP	DP																																								
RH	RH																																								
-25	-6	4	11	17	22	26	30	33	34	38	41	43	44	48	50	52	54	55	57	59	60	62	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>																		
62	2	6	10	13	17	21	25	29	33	37	42	44	50	55	60	64	69	74	79	84	89	95											62								
-54	-14	-1	8	14	20	24	28	31	34	37	40	42	45	47	49	51	53	55	57	58	60	61	63	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>																	
63	4	7	11	15	19	22	24	30	34	38	43	47	51	56	60	65	70	74	79	84	89	95	63																		
-27	-7	4	11	17	22	26	30	33	34	39	41	44	46	48	50	52	54	56	58	59	61	62	64	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>																	
64	2	5	9	12	14	20	24	27	31	35	39	43	48	52	54	61	66	70	75	80	85	90	95											64							
-15	-1	8	14	20	24	28	32	35	38	40	43	45	47	49	51	53	55	57	59	60	62	63	65	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>																	
65	3	7	10	14	17	21	25	29	32	34	40	44	48	53	57	61	64	70	75	80	85	90	95											65							
-28	-7	4	11	17	22	24	30	33	36	39	42	44	46	49	51	53	54	56	58	60	61	63	64	66	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>																
66	2	5	8	12	15	19	22	26	30	33	37	41	45	49	53	58	62	64	71	74	80	85	90	95											66						
-15	-1	8	15	20	24	28	32	35	38	41	43	44	48	50	52	54	56	57	59	61	62	64	66	67	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>																
67	3	6	10	13	16	20	23	27	31	34	38	42	46	50	54	58	63	67	71	76	80	85	90	95											67						
-29	-7	4	12	18	22	27	30	34	37	40	42	45	47	49	51	53	55	57	59	60	62	63	65	67	68	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>															
68	2	5	8	11	14	18	21	24	28	32	35	39	43	47	51	55	59	63	67	72	76	81	85	90	95											68					
-15	-1	8	15	20	25	29	32	35	38	41	44	46	48	50	52	54	56	58	60	61	63	65	66	68	69	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>															
69	3	4	9	12	16	19	22	24	29	33	40	44	47	51	55	59	64	68	72	77	81	84	90	95	69																
-29	-7	4	12	18	23	27	31	34	37	40	43	45	47	50	52	54	55	57	59	60	62	64	66	67	69	70	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>														
70	1	4	7	10	14	17	20	23	27	30	34	37	40	43	45	47	50	52	54	55	57	59	60	62	64	66											67	69	70		
-15	0	9	15	21	25	29	33	34	39	42	44	46	49	51	53	55	57	58	60	62	63	65	67	68	70	71	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>														
71	3	6	9	12	15	18	21	24	28	31	34	38	42	45	49	53	57	60	65	69	73	77	82	86	91	95											71				
-28	-6	5	12	18	23	28	31	35	38	40	43	44	48	50	52	54	56	58	60	61	63	65	66	68	69	71	72	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>													
72	1	4	7	10	13	16	19	22	25	29	32	35	39	42	44	50	53	57	61	65	69	73	77	82	86	91	95											72			
-14	0	9	16	21	26	30	33	34	39	42	45	47	49	51	53	55	57	59	61	62	64	66	67	69	70	72	73	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>													
73	3	5	8	11	14	17	20	23	26	30	33	36	40	43	47	50	55	58	62	65	69	74	78	82	84	91	95											73			
-27	-4	5	13	19	24	28	32	35	38	41	44	46	48	51	53	55	57	58	60	62	64	65	67	68	70	71	73	74	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>												
74	1	4	7	10	12	15	18	21	24	27	30	34	37	40	44	47	51	54	58	62	64	70	74	78	82	87	91	95											74		
-13	1	10	16	22	26	30	34	37	40	43	45	48	50	52	54	56	58	60	61	63	65	66	68	69	71	72	74	75	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>												
75	3	5	8	11	13	16	19	22	25	28	31	35	38	41	44	48	51	55	59	62	66	70	74	78	82	87	91	95											75		
-25	-5	4	14	20	24	29	32	34	39	42	44	47	49	51	53	55	57	59	61	62	64	66	67	69	70	72	73	75	76	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>											
76	1	4	7	9	12	15	17	20	23	26	29	32	35	39	42	45	49	52	56	59	63	67	71	75	79	83	87	91	96											76	
-57	-12	2	10	17	22	27	31	34	38	41	43	46	48	50	53	55	57	58	60	62	64	65	67	68	70	71	73	74	76	77	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>										
77	3	5	8	10	13	16	18	21	24	27	30	33	36	39	43	46	49	53	56	60	63	67	71	75	79	83	87	91	96	77											
-23	-4	7	14	20	25	29	33	36	39	42	45	47	50	52	54	56	58	60	61	63	65	66	68	69	71	72	74	75	77	78	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>										
78	1	4	6	9	11	14	17	19	22	25	28	31	34	37	40	43	46	50	53	57	60	64	67	71	75	79	83	87	91	96											78
-48	-11	3	11	18	23	28	32	35	38	41	44	46	49	51	53	55	57	59	61	63	64	66	67	69	71	72	73	75	76	78	79	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>									
79	3	5	8	10	13	15	18	20	23	26	29	32	35	38	41	44	47	50	54	57	61	64	66	67	69	71	72	73	75	76	78										
-21	-2	8	15	21	26	30	34	37	40	43	45	48	50	52	54	56	58	60	62	64	65	67	69	70	72	73	75	76	77	79	80	<p style="text-align: center;"><b>DP</b>   <b>DP</b></p> <p style="text-align: center;"><b>RH</b>   <b>RH</b></p>									
80	2	4	6	9	11	14	16	19	21	24	27	30	32	35	38	41	45	48	51	54	58	61	65	67	69	70	72	73	75	76	77										

# Elevations between 501 and 1,900 feet

49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80										
-40	-9	4	12	19	24	28	32	34	39	42	45	47	49	52	54	56	58	60	61	63	65	67	68	70	71	73	74	76	77	78	80										
1	3	5	7	10	12	15	17	20	22	25	28	30	33	36	39	41	55	58	69	72	76	80	84	88	92	96	81														
-18	-1	9	16	22	27	31	34	38	41	44	46	49	51	53	55	57	59	61	63	64	66	68	69	71	72	74	75	77	78	79	81										
2	4	6	8	10	13	16	18	21	23	26	28	31	34	37	40	43	46	49	52	55	59	62	65	69	73	76	80	84	88	92	96										
-34	-7	5	13	20	25	29	33	34	40	43	45	48	50	52	54	56	58	60	62	64	66	67	69	70	72	73	75	76	78	79	80										
1	3	5	7	9	12	14	17	19	21	24	27	29	32	35	38	40	43	46	49	53	56	59	62	66	69	73	76	80	84	88	92	96									
-15	1	10	17	23	27	32	35	38	41	44	47	49	52	54	56	58	60	62	63	65	67	68	70	71	73	74	76	77	79	80	81										
2	4	6	8	10	13	15	17	20	22	25	27	30	33	35	38	41	44	47	50	53	56	59	63	66	70	73	77	80	84	88	92	96									
-29	-5	7	14	21	26	30	34	37	40	43	46	48	51	53	55	57	59	61	63	65	66	68	69	71	73	74	76	77	78	80	81										
1	3	5	7	9	11	14	16	18	21	23	26	28	31	33	36	39	42	45	47	50	54	57	60	63	66	70	73	77	81	84	88	92	96								
-12	2	11	18	24	28	32	36	39	42	45	48	50	52	54	57	59	60	62	64	66	67	69	71	72	74	75	77	78	79	81	82	83									
2	4	6	8	10	12	15	17	19	22	24	26	29	32	34	37	40	42	45	48	51	54	57	60	64	67	70	74	77	81	84	88	92	96								
-24	-3	6	16	22	27	31	35	38	41	44	47	49	52	54	56	58	60	62	64	65	67	69	70	72	73	75	76	78	79	80	82	83									
1	3	5	7	9	11	13	16	18	20	22	25	27	30	32	35	37	40	43	46	49	51	54	58	61	64	67	70	74	77	81	85	88	92	96							
-50	-10	4	13	16	25	29	33	37	40	43	46	48	51	53	55	57	59	61	63	65	66	68	70	71	73	74	76	77	79	80	81	83	84								
2	4	6	8	10	12	14	16	19	21	23	26	28	30	33	35	38	41	43	46	49	52	55	58	61	64	67	71	74	78	81	85	88	92	96							
-19	-1	10	17	23	28	32	36	39	42	45	48	50	52	55	57	59	61	62	64	66	68	69	71	72	74	76	77	78	80	81	83	84									
1	3	5	7	9	11	13	15	17	19	21	23	26	29	31	34	36	39	41	44	47	50	52	55	58	61	65	68	71	74	78	81	85	88	92	96						
-37	-7	6	14	21	26	30	34	38	41	44	47	49	52	54	56	58	60	62	64	66	67	69	71	72	74	75	77	78	79	81	82	84	85	86							
2	4	6	8	10	12	14	16	18	20	22	25	27	29	32	34	37	39	42	45	47	50	53	56	59	62	65	68	71	75	78	82	85	89	92	96						
-15	1	11	18	24	29	33	37	40	43	46	48	51	53	55	57	59	61	63	65	67	68	70	72	73	76	78	79	81	82	83	85	86	87	88	89	90					
91	1	3	5	7	9	11	13	15	17	19	21	23	25	28	30	32	35	37	40	42	45	48	51	53	56	59	62	65	68	72	75	78	82	85	89	92	96				
-28	-4	8	16	22	27	31	35	39	42	45	47	50	52	55	57	59	61	63	65	66	68	70	71	73	74	76	77	79	80	82	83	84	86	87	88	90	91				
1	2	4	6	8	10	12	14	16	18	20	22	24	26	28	31	33	35	38	40	43	46	48	51	54	57	60	63	66	69	72	75	78	82	85	89	92	96				
93	-11	4	13	20	25	30	34	38	41	44	47	49	52	54	56	58	60	62	64	66	68	69	71	72	74	76	77	78	80	81	83	84	85	87	88	89	91	92			
2	3	5	7	9	11	12	14	16	18	20	23	25	27	29	31	34	36	38	41	43	46	49	51	54	57	60	63	66	69	72	75	79	82	85	89	93	96				
-19	-1	10	17	23	28	32	36	40	43	46	48	51	53	55	58	60	62	63	65	67	69	70	72	74	75	77	78	80	81	82	84	85	86	88	89	90	92	93			
94	1	3	4	6	8	10	11	13	15	17	19	21	23	25	28	30	32	34	37	39	41	44	47	49	52	55	57	60	63	66	69	72	76	79	82	86	89	93	96		
-43	-7	6	14	21	26	31	35	39	42	45	47	50	52	55	57	59	61	63	65	67	68	70	72	73	75	76	78	79	81	82	83	85	86	88	89	90	91	93	94		
95	2	4	5	7	9	10	12	14	16	18	20	22	24	26	28	30	33	35	37	40	42	45	47	50	52	55	58	61	64	68	70	73	76	79	82	86	89	93	96		
-16	1	11	19	25	29	34	37	41	44	47	49	52	54	56	58	60	62	64	66	68	70	71	73	74	76	77	79	80	82	83	85	86	87	88	90	91	92	94	95		
96	1	3	4	6	8	9	11	13	15	17	19	21	23	25	27	29	31	33	35	38	40	43	45	48	50	53	55	58	61	64	67	70	73	76	79	82	86	89	93	96	
-30	-4	8	16	23	28	32	36	40	43	46	48	51	53	56	58	60	62	64	66	67	69	71	72	74	76	77	79	80	81	83	84	86	87	88	90	91	92	93	95		
97	1	2	4	5	7	9	10	12	14	16	17	19	21	23	25	27	29	32	34	36	38	41	43	45	48	51	53	56	59	61	64	67	70	73	76	79	83	86	89	93	
-11	4	13	20	26	31	35	38	42	45	48	50	53	55	57	59	61	63	65	67	69	70	72	74	75	77	78	80	81	83	84	85	87	88	89	91	92	93	94	95		
98	1	3	5	6	8	9	11	13	15	16	18	20	22	24	26	28	30	32	34	36	38	41	44	46	48	51	54	56	59	61	64	67	70	73	76	80	83	86	89	93	96
-21	-1	10	18	24	29	33	37	41	44	47	49	52	54	57	59	61	63	65	66	68	70	72	73	75	76	78	79	81	82	84	85	86	88	89	90	92	93	95	96		
99	1	2	4	5	7	9	10	12	14	15	17	19	21	23	25	27	29	31	33	35	37	39	42	44	46	49	51	54	57	59	62	65	68	71	74	77	80	83	86	89	93
-43	-7	4	15	22	27	32	36	40	43	46	49	51	54	56	58	60	62	64	66	68	70	71	73	74	76	78	79	81	82	83	85	86	87	89	90	91	93	94	95	96	
100	2	3	5	6	8	9	11	13	14	16	18	20	21	23	25	27	29	31	33	35	38	40	42	44	47	49	52	54	57	60	62	65	68	71	74	77	80	83	86	89	93

**Wet Bulb  
Temperatur  
49 to 91 F**  
(Read Down)

**DP DP**  
**RH RH**

**Dry Bulb  
Temperatures  
81 to 100 F**  
(Read Across)

# Elevations between 501 and 1,900 feet

## Wet Bulb Temperatures, 58 to 95 F

(Read Down)

	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95			
101	-15 1	2 3	12 4	20 5	28 7	30 8	35 10	38 12	42 13	45 15	48 17	50 18	53 20	55 22	57 24	60 26	62 28	64 30	65 32	67 34	69 36	71 38	72 40	74 43	76 45	77 47	79 50	80 52	82 55	83 57	84 60	86 63	87 65	88 68	89 71	90 74	91 77	92 80	93 83	94 86	95 89
102	-28 1	-3 2	9 3	17 5	24 6	29 8	33 9	37 11	41 12	44 14	47 16	50 17	52 19	55 21	57 23	59 25	61 26	63 28	65 30	67 32	69 34	71 36	72 38	74 41	75 43	77 45	78 48	80 51	81 53	83 55	84 58	85 60	86 63	88 66	89 68	90 71	91 74	92 77	93 80	94 83	95 86
103	-10 1	5 3	15 4	21 6	27 7	32 8	36 10	40 12	43 13	46 15	49 16	51 18	54 20	56 22	58 24	60 26	63 28	66 30	69 32	72 34	75 36	78 38	80 41	82 43	84 45	85 48	87 50	88 53	89 55	90 58	91 60	92 63	93 65	94 68	95 71						
104	-19 1	12 3	19 5	25 6	30 8	35 9	38 11	42 12	45 14	48 15	51 17	53 19	55 21	57 23	59 25	62 26	64 28	66 30	68 32	70 34	72 36	74 38	76 40	77 42	79 44	80 46	82 48	84 51	85 53	87 56	88 58	89 61	90 63	91 66	92 69	93 72	94 75	95 78			
105	-37 1	-5 2	8 3	17 4	23 6	29 7	33 8	37 10	41 11	44 13	47 14	50 16	52 18	55 20	57 22	59 24	61 26	63 28	65 30	67 32	69 34	71 36	72 38	74 40	76 42	77 44	79 46	80 48	82 51	83 53	85 56	86 58	87 61	88 63	89 66	90 69	91 72	92 75	93 78	94 81	95 84
106	-12 1	4 2	14 4	21 5	27 6	32 8	36 9	40 11	43 12	46 14	49 15	52 17	54 19	56 21	58 23	60 25	63 27	66 29	69 31	72 33	75 35	77 37	79 39	81 41	82 43	84 45	85 47	87 49	88 51	90 54	91 56	92 59	93 61	94 64	95 66						
107	-23 1	-1 2	11 3	19 4	25 6	30 7	35 9	38 10	42 11	45 13	48 14	51 16	53 18	55 20	57 22	60 24	62 26	64 28	66 30	68 32	70 34	72 36	74 38	76 40	77 42	79 44	80 46	82 48	84 51	85 53	87 56	88 58	89 61	90 63	91 66	92 69	93 72	94 75	95 78		
108	-49 1	-7 3	7 4	16 5	23 6	29 8	33 9	37 11	41 12	44 13	47 15	50 16	52 18	55 20	57 22	59 24	61 26	63 28	65 30	67 32	69 34	71 36	72 38	74 40	76 42	77 44	79 46	80 48	82 51	83 53	85 56	86 58	87 61	88 63	89 66	90 69	91 72	92 75	93 78	94 81	95 84
109	-15 1	3 2	13 4	21 5	27 6	32 8	36 9	40 11	43 12	46 14	49 15	52 17	54 19	56 21	58 23	60 25	63 27	66 29	69 31	72 33	75 35	77 37	79 39	81 41	82 43	84 45	85 47	87 49	88 51	90 54	91 56	92 59	93 61	94 64	95 66						
110	-28 1	-2 3	10 4	19 5	25 6	30 8	35 9	38 10	42 11	45 13	48 14	51 16	53 18	55 20	57 22	60 24	62 26	64 28	66 30	68 32	70 34	72 36	74 38	76 40	77 42	79 44	80 46	82 48	84 51	85 53	87 56	88 58	89 61	90 63	91 66	92 69	93 72	94 75	95 78		
111	-8 1	7 2	16 3	23 4	29 5	33 7	37 8	41 10	44 11	47 12	50 14	52 15	54 17	56 19	58 21	60 23	63 25	66 27	69 29	72 31	75 33	77 35	79 37	81 39	82 41	84 43	85 45	87 47	88 49	90 51	91 53	92 55	93 58	94 60	95 63						
112	-17 1	-2 3	13 4	21 5	27 6	32 8	36 9	40 11	43 12	46 14	49 15	52 17	54 19	56 21	58 23	60 25	63 27	66 29	69 31	72 33	75 35	77 37	79 39	81 41	82 43	84 45	85 47	87 49	88 51	90 54	91 56	92 59	93 61	94 64	95 66						
113	-32 1	-3 2	10 3	18 4	25 5	30 7	35 8	38 9	42 11	45 12	48 14	50 15	52 17	54 19	56 21	58 23	60 25	63 27	66 29	69 31	72 33	74 35	76 37	78 39	80 41	82 43	84 45	85 47	87 49	88 51	90 54	91 56	92 59	93 61	94 64	95 66					
114	-10 1	1 2	11 3	19 4	26 5	32 7	37 8	41 10	44 11	47 12	50 14	52 15	54 17	56 19	58 21	60 23	63 25	66 27	69 29	72 31	74 33	76 35	78 37	80 39	82 41	84 43	85 45	87 47	88 49	90 51	91 53	92 55	93 58	94 60	95 63						
115	-19 1	-2 3	13 4	21 5	27 6	32 8	36 9	40 11	43 12	46 14	49 15	52 17	54 19	56 21	58 23	60 25	63 27	66 29	69 31	72 33	74 35	76 37	78 39	80 41	82 43	84 45	85 47	87 49	88 51	90 54	91 56	92 59	93 61	94 64	95 66						
116	-3 1	10 2	18 3	25 4	30 5	35 7	38 8	42 10	45 11	48 12	50 14	52 15	54 17	56 19	58 21	60 23	63 25	66 27	69 29	72 31	74 33	76 35	78 37	80 39	82 41	84 43	85 45	87 47	88 49	90 51	91 53	92 55	93 58	94 60	95 63						
117	-10 1	6 2	16 3	23 4	29 5	33 7	37 8	41 10	44 11	47 12	50 14	52 15	54 17	56 19	58 21	60 23	63 25	66 27	69 29	72 31	74 33	76 35	78 37	80 39	82 41	84 43	85 45	87 47	88 49	90 51	91 53	92 55	93 58	94 60	95 63						
118	-20 1	-2 3	13 4	21 5	27 6	32 8	36 9	40 11	43 12	46 14	49 15	52 17	54 19	56 21	58 23	60 25	63 27	66 29	69 31	72 33	74 35	76 37	78 39	80 41	82 43	84 45	85 47	87 49	88 51	90 54	91 56	92 59	93 61	94 64	95 66						
119	-40 1	-4 2	10 3	19 4	25 5	30 7	35 8	38 9	42 11	45 12	48 14	50 15	52 17	54 19	56 21	58 23	60 25	63 27	66 29	69 31	72 33	74 35	76 37	78 39	80 41	82 43	84 45	85 47	87 49	88 51	90 54	91 56	92 59	93 61	94 64	95 66					

DP DP  
RH RH

# Elevations between 1,901 and 3,900 feet

27	28	29	30	31	32	33	34	35	36	37	38	39	40
-43	-15	-3	5	11	16	20	23	26	29	32	34	37	39
2	8	15	22	28	35	42	49	56	63	70	77	85	92
41													
42													
-27	-9	0	8	13	18	25	28	31	33	36	38	40	42
4	11	17	24	30	37	43	50	57	64	71	78	85	92
43													
-18	-5	4	10	15	19	23	26	29	32	34	37	39	41
7	13	19	26	32	38	45	51	58	64	71	78	85	93
44													
-32	-11	-1	7	12	17	21	24	28	30	33	36	38	40
3	9	15	21	27	33	39	46	52	59	65	72	79	86
45													
-21	-6	3	9	14	19	23	26	29	32	34	37	39	41
5	11	17	23	29	35	41	47	53	59	66	72	79	86
46													
-38	-13	-2	6	12	16	21	24	27	30	33	36	38	40
2	8	13	19	25	30	36	42	48	54	60	67	73	80
47													
-24	-7	2	9	14	18	22	26	29	32	34	37	39	41
4	10	15	21	26	32	37	43	49	55	61	67	74	80
48													
-46	-15	-3	5	11	16	20	24	27	30	33	36	38	40
1	6	12	17	2	28	33	39	44	50	56	62	68	74
49													
-26	-9	1	8	13	18	22	26	29	32	34	37	39	41
3	8	13	18	24	29	34	40	45	51	57	63	68	75
50													
-57	-17	-4	4	11	16	20	24	32	30	33	36	38	40
1	5	10	15	20	24	29	34	39	44	48	52	57	63
51													
-31	-11	0	7	13	18	22	26	29	32	34	37	39	41
2	7	12	17	22	27	32	37	42	47	53	58	64	70
52													
-20	-5	4	10	15	20	24	27	30	33	36	38	40	43
4	9	14	18	23	28	33	38	43	48	54	59	65	70
53													
-36	-12	-1	7	13	18	22	25	29	32	34	37	39	42
2	6	11	15	20	24	29	34	39	44	49	54	60	65
54													
-22	-6	3	10	15	20	24	27	30	33	36	38	41	43
4	8	12	17	21	26	30	35	40	45	50	55	60	66
55													
-42	-14	-2	6	12	17	22	25	29	32	35	37	40	42
1	5	9	14	18	23	27	32	36	41	46	51	56	61
56													
-25	-7	2	9	15	20	24	28	33	36	39	41	43	45
7	11	15	20	24	28	33	37	42	47	52	57	62	67
57													
-50	-15	-2	6	12	17	22	26	29	32	35	37	40	42
1	5	9	13	17	21	25	30	34	39	43	48	53	57
58													
-27	-8	2	9	15	20	24	27	31	34	36	39	41	43
2	6	10	14	18	22	26	31	35	40	44	49	53	58
59													
-16	-3	6	12	17	22	26	29	32	35	38	40	42	45
4	8	12	16	20	24	28	32	36	41	45	50	54	59
60													
-29	-9	2	9	15	20	24	28	31	34	37	39	41	44
2	6	9	13	17	21	25	29	33	37	41	44	48	52
61													
-2	6	9	13	17	21	25	29	33	37	41	44	48	52
62													
63													
64													
65													
66													
67													
68													
69													
70													
71													
72													
73													
74													
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81													
82													
83													
84													
85													
86													
87													
88													
89													
90													
91													
92													
93													
94													
95													

**Wet Bulb  
Temperatures  
27 to 57 F**  
(Read Down)

**DP DP**  
**RH RH**

**Wet Bulb Temperatures**

22	23	24	25	26	27	28	29	30
-13	-3	5	10	15	19	22	25	28
14	23	32	41	50	60	69	79	89
31								
-23	-6	0	7	12	16	20	24	27
8	17	25	34	43	52	61	71	80
32								
-43	-16	-5	3	9	14	18	22	25
2	11	19	27	36	45	54	63	72
33								
-29	-12	-2	5	11	16	20	23	26
5	13	21	29	38	46	55	64	73
34								
35								
-21	-7	1	8	13	17	21	25	28
8	16	23	31	40	48	57	65	74
35								
-39	-15	-4	4	10	15	19	23	26
3	10	18	26	33	42	50	58	66
36								
-27	-10	0	7	12	17	21	24	27
5	13	20	28	35	43	51	59	67
37								
-57	-18	-6	3	9	14	19	22	26
1	8	15	22	30	37	45	53	60
38								
-33	-12	-2	4	11	16	20	24	27
3	10	17	24	32	39	47	54	61
39								
-23	-7	2	8	14	18	22	25	28
6	13	19	26	34	41	48	55	62
40								

**Dry Bulb  
Temperatures**

# Elevations between 1,901 and 3,900 feet

39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
-17	-3	6	12	18	22	26	29	33	35	38	40	43	45	47	49	51	53	55	56	58	59
4	7	11	14	18	22	26	30	34	38	42	47	51	56	60	65	69	74	79	84	89	95
-31	-9	2	9	15	20	24	28	31	34	37	39	42	44	46	48	50	52	54	56	57	59
2	5	9	12	16	20	23	27	31	35	39	43	48	52	56	61	65	70	75	80	85	90
-18	-3	6	12	18	22	26	30	33	36	38	41	43	45	47	49	51	53	55	57	58	60
3	7	10	14	17	21	25	28	32	36	40	44	48	53	57	61	66	70	75	80	85	90
-32	-9	2	9	15	20	24	28	31	34	37	40	42	45	47	49	51	53	54	56	58	61
1	5	8	11	15	18	22	26	29	33	37	41	45	49	53	57	62	66	71	75	80	85
-18	-3	6	13	18	23	27	30	33	36	39	41	44	46	48	50	52	54	55	57	59	60
3	6	9	13	16	20	23	27	30	34	38	42	46	50	54	58	62	67	71	76	80	85
-32	-9	2	10	16	21	25	29	32	35	38	40	43	45	47	49	51	53	55	57	58	60
1	4	8	11	14	17	21	24	28	31	35	39	43	47	51	55	59	63	67	72	76	81
-18	-3	6	13	18	23	27	30	33	36	39	41	44	46	48	50	52	54	56	58	59	61
3	6	9	12	15	19	22	25	29	32	36	40	43	47	51	55	59	63	68	72	76	81
-32	-9	2	10	16	21	25	29	32	35	38	40	43	45	48	50	52	54	55	57	59	60
1	4	7	10	13	17	20	23	26	30	33	37	41	44	48	52	56	60	64	68	72	77
-17	-3	6	13	19	23	27	31	34	37	40	42	45	47	49	51	53	55	56	58	60	62
3	6	9	12	15	18	21	24	27	31	34	38	41	45	49	53	56	60	64	69	73	77
-31	-9	3	10	16	21	26	29	33	36	39	41	44	46	48	50	52	54	56	58	59	61
1	4	7	10	13	16	19	22	25	28	32	35	39	42	46	49	53	57	61	65	69	73
-17	-2	7	14	19	24	28	31	35	38	40	43	45	47	49	51	53	55	57	59	60	62
3	5	8	11	14	17	20	23	26	29	33	36	39	43	46	50	54	58	61	65	69	73
-30	-8	3	11	17	22	26	30	33	36	39	42	44	46	49	51	53	55	56	58	60	62
1	4	7	9	12	15	18	21	24	27	30	34	37	40	44	47	51	54	58	62	66	70
-16	-1	8	15	20	24	28	32	35	38	41	43	46	48	50	52	54	56	58	59	61	63
3	5	8	11	13	16	19	22	25	28	31	34	38	41	44	48	51	55	59	62	66	70
-28	-7	4	12	18	23	27	31	34	37	40	42	45	47	49	51	53	55	57	59	61	62
1	4	6	9	12	14	17	20	23	26	29	32	35	38	42	45	48	52	55	59	63	67
75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
-26	-6	5	13	18	23	27	31	35	38	40	43	45	48	50	52	54	56	58	59	61	63
1	4	6	9	11	14	17	19	22	25	28	31	34	37	40	43	46	50	53	57	60	64
-54	-13	1	9	16	21	26	30	33	36	39	42	45	47	49	51	53	55	57	59*	61	62
3	5	7	10	12	15	18	20	23	26	29	32	34	37	41	44	47	50	54	57	61	64
-23	-4	6	13	19	24	28	32	35	38	41	44	46	48	51	53	55	56	58	60	62	63
1	4	6	9	11	13	16	19	21	24	27	29	32	35	38	41	44	48	51	54	57	61
-45	-11	2	10	17	22	27	30	34	37	40	43	45	48	50	52	54	56	58	60	61	63
3	5	7	10	12	14	17	20	22	25	27	30	33	36	39	42	45	46	51	55	58	61
-20	-3	7	14	20	25	29	33	36	39	42	44	47	49	51	53	55	57	59	61	62	64
2	4	6	8	11	13	15	18	20	23	26	28	31	34	37	40	43	46	49	52	55	58

Wet Bulb  
Temperatures

39 to 79 F  
(Read Down)

DP DP  
RH RH

Dry Bulb  
Temperatures

61 to 80 F  
(Read Across)



# Elevations between 1,901 and 3,900 feet

		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80								
<b>81</b>	-9	3	12	18	23	27	31	35	38	41	43	46	48	50	53	55	57	58	60	62	64	65	67	68	70	71	73	74	76	77	78	80	<b>81</b>								
	3	5	7	9	12	14	16	19	21	24	26	29	32	35	37	40	43	46	49	52	56	59	62	66	69	73	76	80	84	88	92	96									
	-17	-1	8	15	21	26	30	33	37	40	42	45	47	50	52	54	56	58	60	61	63	65	66	68	70	71	72	74	75	77	78	79	<b>81</b>								
<b>82</b>	2	4	6	8	10	13	15	17	20	22	25	27	30	33	35	38	41	44	47	50	53	56	59	63	66	69	73	77	80	84	88	92	96								
	-31	-7	5	13	19	24	28	32	35	39	41	44	47	49	51	53	55	57	59	61	63	64	66	68	69	71	72	74	75	76	78	79	<b>82</b>								
	1	3	5	7	9	11	14	16	18	21	23	26	28	31	33	36	39	42	44	47	50	53	57	60	63	66	70	73	77	80	84	88	92	96							
<b>83</b>	-14	1	10	17	22	27	31	34	37	40	43	46	48	50	53	55	57	59	60	62	64	66	67	69	70	72	73	75	76	77	79	80	<b>83</b>								
	2	4	6	8	10	12	15	17	19	21	24	26	29	31	34	37	39	42	45	48	51	54	57	60	63	67	70	74	77	81	84	88	92	96							
	-26	-5	6	14	20	25	29	33	36	39	42	45	47	50	52	54	56	58	60	62	63	65	67	68	70	71	73	74	76	77	78	80	<b>84</b>								
<b>85</b>	1	3	5	7	9	11	13	15	18	20	22	25	27	30	32	35	37	40	43	46	48	51	54	57	61	64	67	70	74	77	81	85	88	92	96						
	-11	2	11	18	23	28	32	35	38	41	44	47	49	51	53	55	57	59	61	63	65	66	68	69	71	72	74	75	77	78	80	<b>85</b>									
	2	4	6	8	10	12	14	16	19	21	23	25	28	30	33	35	38	41	43	46	49	52	55	58	61	64	67	71	74	78	81	85	88	92	96						
<b>87</b>	-21	-2	8	15	21	26	30	34	37	40	43	46	48	50	53	55	57	59	61	62	64	66	67	69	71	72	74	75	76	78	79	<b>87</b>									
	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	36	39	41	44	47	49	52	55	58	61	64	68	71	74	78	81	85	88	92	96					
	-39	-8	4	13	19	24	29	33	36	39	42	45	47	49	51	53	56	58	60	62	63	65	67	69	70	72	73	75	76	78	79	<b>87</b>									
<b>88</b>	2	4	6	8	10	12	14	16	18	20	22	25	27	29	32	34	37	39	42	44	47	50	53	56	59	62	65	68	71	75	78	81	85	89	92	96					
	-17	0	9	17	22	27	31	35	38	41	44	47	49	51	53	56	58	60	62	63	65	67	68	70	71	73	74	76	77	79	80	<b>88</b>									
	1	3	5	7	9	11	13	15	17	19	21	23	25	28	30	32	35	37	40	42	45	48	50	53	56	59	62	65	68	71	75	78	82	85	89	92	96				
<b>90</b>	-30	-6	6	14	20	25	30	34	37	40	43	46	48	51	53	55	57	59	61	63	64	66	68	69	71	72	74	75	77	78	80	<b>89</b>									
	1	2	4	6	8	10	12	13	15	17	19	20	22	24	26	28	31	33	35	38	40	43	45	48	51	54	56	59	62	65	69	72	75	78	82	85	89	92	96		
	-13	2	11	18	23	28	32	36	39	42	45	47	49	51	53	55	57	59	61	62	64	66	67	69	71	72	74	75	77	79	80	<b>90</b>									
<b>91</b>	2	3	5	7	9	11	12	14	16	18	20	22	25	27	29	32	34	37	39	42	44	47	50	53	56	59	62	65	68	71	75	78	81	85	89	92	96				
	-23	-3	8	16	22	27	31	35	38	41	44	47	49	51	54	56	58	60	62	63	65	67	69	70	72	73	75	76	78	79	<b>89</b>										
	1	3	4	6	8	10	11	13	15	17	19	21	23	25	27	30	32	34	36	39	41	44	46	49	52	54	57	60	63	66	69	72	75	79	82	86	89	93			
<b>93</b>	-45	-9	4	13	19	25	29	33	37	40	43	46	48	51	53	55	57	59	61	63	65	66	68	70	71	73	74	76	77	79	80	<b>88</b>									
	2	3	5	7	9	10	12	14	16	18	20	22	24	26	28	30	32	35	37	39	42	44	47	50	52	55	58	60	63	66	69	73	76	79	82	86	89				
	-17	0	10	17	23	28	32	36	39	42	45	47	50	52	54	57	59	61	62	64	66	68	69	71	72	74	76	77	78	80	<b>88</b>										
<b>94</b>	1	3	4	6	8	9	11	13	15	17	19	20	22	24	27	29	31	33	35	38	40	42	45	47	50	53	55	58	61	64	67	70	73	76	79	82	86				
	-31	-5	6	15	21	26	30	34	38	41	44	47	50	52	54	56	58	60	62	64	66	67	69	71	72	74	75	77	78	80	<b>88</b>										
	1	2	4	5	7	9	10	12	14	16	17	19	21	23	25	27	29	31	34	36	38	40	43	45	48	50	53	56	58	61	64	67	70	73	76	79	83				
<b>95</b>	-12	3	12	19	24	29	33	37	40	43	46	48	51	53	55	57	59	61	63	65	67	68	70	72	73	75	76	78	79	<b>88</b>											
	1	3	4	6	8	9	11	13	14	16	18	20	22	24	26	28	30	32	34	36	39	41	43	46	48	51	53	56	59	61	64	67	70	73	76	79					
	-23	-2	9	16	22	27	32	36	39	42	45	48	50	52	55	57	59	61	63	65	66	68	70	71	73	74	76	77	79	80	<b>88</b>										
<b>97</b>	1	2	4	5	7	8	10	12	13	15	17	19	21	23	24	26	28	30	33	35	37	39	41	44	46	49	51	54	56	59	62	65	67	70	73	76					
	-44	-8	5	14	20	26	30	34	38	41	44	47	49	52	54	56	58	60	62	64	66	68	69	71	73	74	76	77	79	80	<b>88</b>										
	2	3	5	6	8	9	11	13	14	16	18	19	21	23	25	27	29	31	33	35	37	40	42	44	47	49	52	54	57	59	62	65	68	71	74						
<b>98</b>	-16	1	11	18	24	29	33	37	40	43	46	49	51	53	56	58	60	62	64	65	67	69	71	72	74	75	77	78	80	<b>88</b>											
	1	2	4	5	7	8	10	12	13	15	17	18	20	22	24	26	28	30	32	34	36	38	40	42	45	47	50	52	55	57	60	62	65	68	71						
	-29	-4	8	16	22	27	32	35	39	42	45	48	50	53	55	57	59	61	63	65	67	68	70	72	73	75	76	78	79	<b>88</b>											
<b>100</b>	1	2	3	5	6	8	9	11	12	14	16	17	19	21	23	24	26	28	30	32	34	36	38	41	43	45	48	50	52	55	57	60	63	65	68						

# Elevations between 1,901 and 3,900 feet

## Net Bulb Temperatures, 57 to 90 F

(Read Down)

	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90					
101	-11	4	13	20	25	30	34	38	41	44	47	50	52	54	57	59	61	63	65	66	68	70	71	73	75	76	78	79	80	81	82	83	84	85	86	87	88	89	90
102	-20	-1	10	18	24	29	33	37	40	43	46	49	51	54	56	58	60	62	64	66	68	69	71	73	74	76	77	79	80	82	83	84	86	87					
103	-37	-6	7	15	22	27	32	36	39	42	45	48	51	53	55	58	60	62	64	65	67	69	71	72	74	75	77	78	80	81	83	84	86	87					
104	-13	3	13	20	25	30	34	38	41	44	47	50	52	54	56	58	60	62	64	65	67	69	71	72	74	75	77	78	80	81	83	84	86	87					
105	-24	-2	9	17	24	29	33	37	40	43	46	49	52	54	56	58	61	63	64	66	68	70	72	73	75	76	78	79	81	82	84	85	86						
106	-48	8	15	22	27	32	36	39	43	46	48	51	53	55	58	60	62	64	66	68	69	71	73	74	76	78	79	80	82	83	85	86							
107	-16	2	12	19	25	30	34	38	42	45	48	50	53	55	57	59	62	64	65	67	69	71	72	74	76	77	79	80	82	83	84	86							
108	-28	-3	9	17	23	29	33	37	41	44	47	49	52	54	57	59	61	63	65	67	69	70	72	74	75	77	78	80	81	83	84	86							
109	-9	5	15	21	27	32	36	40	43	46	49	51	54	56	58	60	63	64	66	68	70	72	73	75	77	78	80	81	83	84	85								
110	-18	1	12	19	25	30	35	38	42	45	48	51	53	56	58	60	62	64	66	68	70	71	73	75	76	78	79	81	82	84	85								
111	-32	-4	9	17	24	29	33	37	41	44	47	49	52	54	57	59	61	64	65	67	69	71	73	74	76	77	79	80	82	83	85								
112	-10	5	15	22	27	32	36	40	43	46	49	52	54	57	59	61	63	65	67	69	70	72	74	76	77	79	80	82	83	85									
113	-19	1	12	19	25	31	35	39	42	45	48	51	54	56	58	60	63	65	66	68	70	72	74	75	77	78	80	81	83	84									
114	-35	-4	9	17	24	29	34	38	41	44	47	50	53	55	58	60	62	64	66	68	70	71	73	75	76	78	80	81	83	84									
115	-11	5	15	22	27	32	36	40	44	47	50	52	55	57	59	61	64	66	67	69	71	73	74	76	77	79	80	81	82	84									
116	-20	1	12	20	26	31	35	39	43	46	49	51	54	56	59	61	63	65	67	69	71	72	74	76	77	79	81	82	84										
117	-38	-4	9	17	24	29	34	38	42	45	48	51	53	56	58	60	63	65	67	68	70	72	74	75	77	79	80	82	83										
118	-11	5	15	22	28	33	37	41	46	47	50	53	55	58	60	62	64	66	67	69	70	72	73	75	76	78	79	80	81	83									
119	-21	1	12	20	26	31	36	40	43	46	49	52	55	57	59	62	64	66	68	69	71	73	75	76	78	79	80	81	83										

## Dry Bulb Temperatures 101 to 119 F

(Read Across)



# Elevations between 3,901 and 6,100 feet

Wet Bulb Temperatures 38 to 79 F (Read Down)		Dry Bulb Temperatures 61 to 80 F (Read Across)																												
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60								
-19	-5	4	11	16	21	24	28	31	34	37	39	41	43	46	48	49	51	53	55	56	58	59	61							
3	7	10	14	17	21	24	28	32	36	40	44	48	52	57	61	66	70	75	80	85	90	95								
-33	-11	0	8	14	19	23	26	30	33	35	38	40	43	45	47	49	51	52	54	56	57	59	61							
1	5	8	11	15	18	22	26	29	33	37	41	45	49	53	57	62	68	71	75	80	85	90	95							
-19	-5	4	11	16	21	25	28	31	34	37	39	42	44	46	48	50	52	54	55	57	58	60	62							
3	6	9	13	16	20	23	27	30	34	38	42	46	50	54	58	62	67	71	76	80	85	90	95							
-34	-11	0	8	14	19	23	27	30	33	36	38	41	43	45	47	49	51	53	55	56	58	60	61							
1	4	8	11	14	17	21	24	28	31	35	39	43	46	50	54	59	63	67	72	76	81	85	90	95						
-19	-4	5	11	17	21	25	29	32	35	37	40	42	44	47	49	50	52	54	56	57	59	61	62							
3	6	9	12	15	19	22	25	29	32	36	40	43	47	51	55	59	63	68	72	76	81	86	90	95						
-33	-10	1	8	14	19	23	27	31	34	36	39	41	44	46	48	50	52	53	55	57	58	60	62							
1	4	7	10	13	16	20	23	26	30	33	37	40	44	48	52	56	60	64	68	72	77	81	86	90	95					
-19	-4	5	11	17	22	26	29	32	35	38	40	43	45	47	49	51	53	55	56	58	60	61	63							
6	8	11	15	18	21	24	27	31	34	38	41	45	49	52	56	60	64	68	73	77	81	86	90	95						
-32	-10	1	9	15	20	24	28	31	34	37	39	42	44	46	48	50	52	54	55	57	58	60	62							
1	4	7	10	13	16	19	22	25	28	32	35	39	42	46	49	53	57	61	65	69	73	77	82	86	91	95				
-18	-3	6	12	18	22	26	30	33	36	38	41	43	45	48	50	52	53	55	57	59	60	62	63							
3	5	8	11	14	17	20	23	26	29	33	36	39	43	46	50	54	57	61	65	69	73	78	82	86	91	95				
-31	-9	2	10	15	20	25	28	32	35	37	40	42	45	49	51	53	55	56	58	60	61	63	64							
1	4	7	9	12	15	18	21	24	27	30	33	37	40	44	47	51	54	58	62	66	70	74	78	82	86	91	95			
-17	-3	6	13	18	23	27	30	33	36	39	41	44	46	48	50	52	54	56	57	59	61	62	64							
3	5	8	11	13	16	19	22	25	28	31	34	38	41	44	48	51	55	58	62	66	70	74	78	82	87	91	95			
-29	-8	3	10	16	21	25	29	32	35	38	41	43	45	47	49	51	53	55	57	59	60	62	63							
1	4	6	9	12	14	17	20	23	26	29	32	35	38	42	45	48	52	55	59	63	66	70	74	78	83	87	91	95		
-15	-2	7	14	19	23	27	31	34	37	40	42	44	47	49	51	53	55	56	58	60	61	63	64							
3	5	8	10	13	16	18	21	24	27	30	33	36	39	42	46	49	52	56	59	63	67	71	75	79	83	87	91	96		
-26	-7	4	11	17	22	26	30	33	36	39	41	44	46	48	50	52	54	56	58	59	61	62	64							
1	4	6	9	11	14	17	19	22	25	28	31	34	37	40	43	46	50	53	56	60	64	67	71	75	79	83	87	91	96	
-52	-14	0	8	15	20	24	28	32	35	38	40	43	45	47	49	51	53	55	57	59	60	62	64							
3	5	7	10	12	15	18	20	23	26	29	31	34	37	41	44	47	50	53	57	60	64	68	71	75	79	83	87	91	96	
-24	5	12	18	22	27	30	33	36	39	42	44	47	49	51	53	55	56	58	60	62	63	65	66							
2	4	6	9	11	13	16	19	21	24	27	29	32	35	38	41	44	47	51	54	57	61	64	68	72	75	79	83	87	91	96
-43	-12	1	9	15	21	25	29	32	35	38	41	43	46	48	50	52	54	56	58	59	61	63	64							
3	5	7	10	12	14	17	19	22	25	27	30	33	36	39	42	45	48	51	55	58	61	65	68	72	76	80	83	87	91	96
-21	-4	6	13	19	23	27	31	34	37	40	43	45	47	49	51	53	55	57	59	61	62	64	65							
78	2	4	6	8	11	13	15	18	20	23	26	28	31	34	37	40	43	46	49	52	55	58	62							
-36	-10	2	10	16	21	26	30	33	36	39	42	44	46	49	51	53	55	57	58	60	62	63	65							
1	3	5	7	9	12	14	16	19	21	24	26	29	32	35	37	40	43	46	49	52	55	58	62							
-18	-2	7	14	20	24	28	32	35	38	41	43	46	48	50	52	54	56	58	60	61	63	65	66							
80	2	4	6	8	10	13	15	17	20	22	25	27	30	32	35	38	41	44	47	50	53	56	59							
2	4	6	8	10	13	15	17	20	22	25	27	30	32	35	38	41	44	47	50	53	56	59	63							
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96						
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93									

# Elevations between 3,901 and 6,100 feet

	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	-8	4	11	17	22	27	30	34	37	40	42	45	47	49	51	53	55	57	59	61	62	64	66	67	69	70	72	73	74	76	77	78	80
82	-15	-1	8	15	21	25	28	33	36	39	41	44	46	49	51	53	55	57	59	60	62	64	65	67	70	71	73	74	75	77	78	80	
83	-26	-6	5	13	19	23	28	31	35	38	41	43	46	48	50	52	54	56	58	60	61	63	65	66	68	69	71	72	74	75	76	78	79
84	-49	-12	1	10	16	22	26	30	34	37	40	42	45	47	49	52	54	56	57	59	61	63	64	66	68	69	71	72	73	75	76	78	79
85	-21	-3	7	14	20	24	28	32	36	39	41	44	46	49	51	53	55	57	59	61	62	64	66	67	69	70	72	73	74	76	77	79	80
86	-37	-9	3	11	18	23	27	31	34	38	40	43	46	48	50	52	54	56	58	60	62	63	65	67	68	70	71	73	74	76	77	78	80
87	-17	-1	8	15	21	26	30	33	36	39	42	45	47	49	52	54	56	58	60	61	63	65	66	68	69	71	72	74	75	77	78	79	81
88	-29	-6	5	13	19	24	28	32	35	38	41	44	46	49	51	53	55	57	59	61	63	64	66	67	69	71	72	73	75	76	78	79	80
89	-13	1	10	17	22	27	31	34	37	40	43	46	48	50	53	55	57	58	60	62	64	65	67	69	70	72	73	7	76	77	79	80	81
90	-22	-3	7	14	20	25	29	33	36	39	42	45	47	49	52	54	56	58	60	62	63	65	67	68	70	71	73	74	76	77	78	80	81
91	-40	-9	3	12	18	23	28	32	35	38	41	44	47	49	51	53	55	57	59	61	63	65	66	68	69	71	72	74	75	77	78	80	
92	-17	-1	9	16	22	26	30	34	37	40	43	46	48	51	53	55	57	59	61	62	64	66	67	69	71	72	74	75	76	78	79	81	
93	-29	-6	6	14	20	25	29	33	36	39	42	45	48	50	52	54	56	58	60	62	64	65	67	69	70	72	73	75	76	78	79	80	
DP	94	2	3	5	7	9	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	
RH	95	1	2	4	5	7	9	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	
Dry Bulb	96	2	3	5	6	8	9	11	13	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	
Temperatures	97	16	0	10	17	23	27	32	35	39	42	44	47	49	52	54	56	58	60	62	64	65	67	69	70	72	73	75	76	78	79	81	
81 to 100 F	98	-27	-4	7	15	21	26	30	34	37	41	44	46	49	51	53	55	58	59	61	63	65	67	68	70	72	73	75	76	78	79	80	
(Read Across)	99	-54	-10	3	12	19	24	29	33	36	40	43	45	48	50	53	55	57	59	61	63	65	66	68	70	71	73	74	76	77	79	80	
	100	-19	-1	9	17	22	27	32	35	39	42	45	47	50	52	54	56	58	60	62	64	66	68	69	71	72	74	75	77	78	80	81	

Wet Bulb  
Temperatures  
48 to 89 F  
(Read Down)

# Elevations between 3,901 and 6,100 feet

## Wet Bulb Temperatures, 55 to 90 F

		(Read Down)																																							
		55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90				
101	-33	-6	6	14	21	26	30	34	38	41	44	46	49	51	54	56	58	60	62	64	65	67	69	70	72	74	75	77	78	79	80	81	82	83	84	85	86	87	88	89	90
	2	3	4	6	7	8	10	11	13	14	16	18	19	21	23	24	26	28	30	32	34	36	38	40	42	44	46	49	51	53	56	58	61	63	66						
102	-13	2	12	19	24	29	33	37	40	43	46	48	51	53	55	57	59	61	63	65	67	68	70	72	73	75	76	78	79	81	82	83	85	86	87						
	1	2	4	5	6	8	9	11	12	13	15	17	18	20	21	23	25	27	28	30	32	34	36	38	40	42	44	47	49	51	54	56	59	61	64						
103	-22	-2	9	16	22	27	32	35	39	42	45	48	50	52	55	57	59	61	63	65	66	68	70	71	73	74	76	77	79	80	82	83	84	86	87						
	1	2	3	4	6	7	8	10	11	13	14	16	17	19	20	22	24	25	27	29	31	33	35	37	39	41	43	45	47	49	52	54	56	59	61						
104	-39	-7	5	14	20	26	30	34	38	41	44	47	49	52	54	56	58	60	62	64	66	68	69	71	73	74	76	77	79	80	81	83	84	86	87						
	1	3	4	5	6	8	9	10	12	13	15	16	18	19	21	23	24	26	28	29	31	33	35	37	39	41	43	45	47	50	52	54	57	59							
105	-14	2	11	18	24	29	33	37	40	43	46	49	51	53	56	58	60	62	64	65	67	69	71	72	74	75	77	78	80	81	83	84	85	87							
	1	2	3	5	6	7	8	10	11	12	14	15	17	18	20	21	23	25	26	28	30	32	34	36	37	39	41	44	46	48	50	52	55	57							
106	-25	-3	8	16	22	27	32	36	39	42	45	48	50	53	55	57	59	61	63	65	67	69	70	72	73	75	77	78	80	81	82	84	85	86							
	1	2	3	4	5	6	8	9	10	12	13	14	16	17	19	20	22	24	25	27	29	30	32	34	36	38	40	42	44	46	48	50	53	55							
107	-47	-8	5	14	20	26	30	35	38	41	44	47	49	52	54	56	58	60	62	64	66	68	69	71	73	75	76	78	79	81	82	83	85	86							
	1	2	4	5	6	7	8	10	11	12	14	15	17	18	19	21	23	24	26	27	29	31	33	35	36	38	40	42	44	46	49	51	55								
108	-16	1	11	18	24	29	33	37	40	44	46	49	52	54	56	58	60	62	64	66	68	69	71	73	74	76	77	79	80	82	83	85	86								
	1	2	3	4	5	7	8	9	10	12	13	14	16	17	19	20	22	23	25	26	28	30	31	33	35	37	39	41	43	45	47	49	51								
109	-27	-3	8	16	23	28	32	36	39	43	46	48	51	53	56	58	60	62	64	66	67	69	71	72	74	76	77	79	80	82	83	84	86								
	2	3	4	5	6	7	8	10	11	12	13	15	16	18	19	21	22	24	25	27	28	30	32	34	35	37	39	41	43	45	47	49									
110	-58	-9	5	14	21	26	31	35	38	42	45	48	50	53	55	57	59	61	63	65	67	69	70	72	74	75	77	78	80	81	83	84	85								
	1	2	3	4	5	7	8	9	10	11	13	14	15	17	18	20	21	23	24	26	27	29	31	32	34	36	38	40	41	43	45	47									
DP	111	-17	1	11	19	24	29	34	37	41	44	47	49	52	54	57	59	61	63	65	67	68	70	72	73	75	77	78	80	81	82	84	85								
	112	1	2	3	4	5	6	7	8	10	11	12	13	15	16	17	19	20	22	23	25	26	28	29	31	33	34	36	38	40	42	44	46								
RH	113	-29	-4	8	16	23	28	32	36	40	43	46	49	51	54	56	58	60	62	64	66	68	70	71	73	75	76	78	79	81	82	84	85								
	114	1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	18	19	21	22	24	25	27	28	30	31	33	35	37	38	39	42	44								
RH	115	-10	5	14	21	26	31	35	39	42	45	48	51	53	55	58	60	62	64	66	68	69	71	73	74	76	77	79	80	82	83	85									
	116	1	2	3	4	5	6	7	8	10	11	12	13	14	16	17	18	20	21	23	24	26	27	29	30	32	34	35	37	39	41	43									
Dry Bulb	117	-18	1	11	19	25	30	34	38	41	44	47	50	53	55	57	59	61	63	65	67	69	71	72	74	76	77	79	80	82	83	85									
	118	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17	19	20	22	23	24	26	27	29	31	32	34	36	37	39	41									
Temperatures	119	-31	-4	8	17	23	28	33	37	40	44	47	49	52	54	57	59	61	63	65	67	69	70	72	74	75	77	78	80	81	83	84									
	120	1	2	3	4	5	6	7	8	9	11	12	13	14	15	17	18	19	21	22	23	25	26	28	29	31	33	34	36	38	40										
101 to 119 F	116	-10	5	14	21	27	32	36	39	43	46	49	51	54	56	58	60	62	64	66	68	70	72	73	75	77	78	80	81	83	84										
	117	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	20	21	23	24	25	27	28	30	31	33	35	36	38										
(Read Across)	118	-18	1	12	19	25	30	35	38	42	45	48	51	53	55	58	60	62	64	66	68	70	71	73	75	76	78	79	81	82	84										
	119	1	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	18	19	20	22	23	24	26	27	29	30	32	33	35	37										
101 to 119 F	118	-31	-3	9	17	24	29	33	37	41	44	47	50	52	55	57	59	62	64	65	67	69	71	73	74	76	78	79	81	82	84										
	119	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	21	22	23	25	26	28	29	31	32	34	35											
(Read Across)	118	-9	6	15	22	27	32	36	40	43	46	49	52	54	57	59	61	63	65	67	69	71	72	74	76	77	79	80	82	83											
	119	1	2	3	4	5	6	7	8	9	10	12	13	14	15	16	17	19	20	21	22	24	25	27	28	30	31	33	34												









# Elevations between 6,101 and 8,500 feet Wet Bulb Temperatures, 50 to 85 F

		(Read Down)																																			
		50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
<b>91</b>	-25	-5	5	13	19	24	28	32	35	38	41	43	46	48	50	53	55	57	58	60	62	64	65	67	68	70	71	73	74	76	77	78	80	81	82	84	
	1	2	4	5	7	9	10	12	14	16	17	19	21	23	25	27	29	31	34	36	38	40	43	45	48	50	53	56	58	61	64	67	70	73	76	79	
<b>92</b>	-44	-11	2	10	17	22	27	30	34	37	40	43	45	48	50	52	54	56	58	60	61	63	65	66	68	70	71	73	74	75	77	78	79	81	82	83	
	2	3	5	6	8	10	11	13	15	16	18	20	22	24	26	28	30	32	34	36	39	41	43	46	48	51	53	56	59	61	64	67	70	73	76		
<b>93</b>	-18	-2	6	15	20	25	29	33	36	39	42	44	47	49	51	53	55	57	59	61	63	64	66	69	71	72	74	75	76	78	79	81	82	83			
	1	3	4	6	7	9	10	12	14	15	17	19	21	23	24	26	28	30	33	35	37	39	41	44	46	49	51	54	56	59	62	64	67	70	73		
<b>94</b>	-31	-7	4	12	18	23	28	32	35	38	41	44	46	49	51	53	55	57	59	61	62	64	66	67	69	70	72	73	75	76	78	79	80	82	83		
	1	2	3	5	6	8	9	11	13	14	16	18	20	21	23	25	27	29	31	33	35	37	40	42	44	47	49	51	54	57	59	62	65	68	71		
<b>95</b>	-13	1	10	16	22	26	30	34	37	40	43	45	48	50	52	54	56	58	60	62	64	65	67	69	70	72	73	75	76	77	79	80	81	83			
	1	3	4	6	7	9	10	12	13	15	17	18	20	22	24	26	28	30	32	34	36	38	40	42	45	47	49	52	54	57	60	62	65	68			
<b>96</b>	-22	-3	7	14	20	25	29	33	36	39	42	45	47	50	52	54	56	58	60	61	63	65	67	68	70	71	73	74	76	77	78	80	81	82			
	1	2	4	5	6	8	9	11	12	14	16	17	19	21	23	24	26	28	30	32	34	36	38	41	43	45	47	50	52	55	57	60	63	65			
<b>97</b>	-38	-9	4	12	18	23	28	32	35	38	41	44	46	49	51	53	55	57	59	61	63	64	66	68	69	71	72	74	75	77	78	80	81	82			
	2	3	4	6	7	9	10	12	13	15	16	18	20	21	23	25	27	29	31	33	35	37	40	42	44	47	49	51	54	57	59	62	65	68	71		
<b>98</b>	-16	0	3	16	22	26	30	34	37	40	43	46	48	50	53	55	57	59	61	62	64	66	67	69	71	75	74	75	76	78	79	81	82				
	1	2	4	5	6	8	9	11	12	14	15	17	19	20	22	24	26	27	29	31	33	35	37	39	41	44	46	48	51	53	55	58	60				
<b>99</b>	-26	-5	4	14	20	25	29	33	36	39	42	45	48	50	52	54	56	58	60	62	64	65	67	69	70	72	73	75	76	78	79	80	81				
	1	2	3	4	6	7	9	10	11	13	14	16	18	19	21	23	24	26	28	30	32	34	36	38	40	42	44	46	49	51	53	56	58				
<b>100</b>	-47	-10	3	11	18	23	28	32	35	39	42	44	47	49	51	54	56	58	60	61	63	65	67	68	70	71	73	74	76	77	79	80	81				
	1	3	4	5	7	8	9	11	12	14	15	17	18	20	21	23	25	27	28	30	32	34	36	38	40	42	44	47	49	51	54	56					
<b>101</b>	-18	-1	9	16	22	26	31	34	38	41	43	46	49	51	53	55	57	59	61	63	65	66	68	70	71	73	74	75	77	78	80	81					
	1	2	3	5	6	7	9	10	11	13	14	16	17	19	20	22	24	25	27	29	31	33	35	37	39	41	43	45	47	49	52	54					
<b>102</b>	-29	-4	6	14	20	25	29	33	37	40	43	45	48	50	53	55	57	59	61	62	64	66	68	69	71	72	74	75	77	78	80	81					
	2	3	4	5	7	8	9	11	12	13	15	16	18	19	21	23	24	26	28	29	31	33	35	37	39	41	43	45	47	50	52						
<b>103</b>	-12	2	11	18	23	28	32	36	39	42	45	47	50	52	54	56	58	60	62	64	66	67	69	70	72	74	75	76	78	79	81						
	1	2	4	5	6	7	9	10	11	13	14	15	17	18	20	22	23	25	26	28	30	32	34	35	37	39	41	43	46	48	50						
<b>104</b>	-20	-2	9	16	22	27	31	35	38	41	44	46	49	51	54	56	58	60	62	63	65	67	68	70	72	73	75	76	78	79	80						
	1	2	3	4	5	7	8	9	10	12	13	15	16	17	19	20	22	24	25	27	29	30	32	34	36	38	40	42	44	46	48						
<b>105</b>	-33	-6	14	20	25	30	33	37	40	43	44	48	51	53	55	57	59	61	63	65	66	68	70	71	73	74	76	77	79	80							
	1	3	4	5	6	7	9	10	11	12	14	15	17	18	20	21	23	24	26	27	29	31	33	34	36	38	40	42	44	46							
<b>106</b>	-13	2	11	18	24	28	32	36	39	42	45	48	50	52	55	57	59	61	63	64	66	68	69	71	73	74	76	77	79	80							
	1	2	3	4	6	7	8	9	10	12	13	14	16	17	19	20	22	23	25	26	28	30	31	33	35	37	39	41	43	45							
<b>107</b>	-21	-2	9	16	22	27	31	35	38	41	44	47	49	52	54	56	58	60	62	64	66	67	69	71	72	74	75	77	78	80							
	1	2	3	4	5	6	7	9	10	11	12	14	15	16	18	19	21	22	24	25	27	28	30	32	34	35	37	39	41	43							
<b>108</b>	-35	-7	5	14	20	25	30	34	37	41	43	44	49	51	53	56	58	60	62	63	65	67	69	70	72	74	75	77	78	79							
	1	2	3	5	6	7	8	9	10	12	13	14	15	17	18	20	21	23	24	26	27	29	31	32	34	36	38	39	41								
<b>109</b>	-13	2	11	18	24	29	33	36	40	43	45	48	51	53	55	57	59	61	63	65	67	68	70	72	73	75	76	78	79								
	1	2	3	4	5	6	7	9	10	11	12	13	15	16	17	19	20	22	23	25	26	28	29	31	33	34	36	38	39	41							

## Dry Bulb Temperatures

**91 to 109 F**  
(Read Across)

# Elevations between 8,501 and 11,000 feet

Wet Bulb Temperatures 19 to 50 F (Read Down)													
19	20	21	22	23	24	25	26	27	28	29	30		
31	-38 4	-18 11	-1 <brtd>18</brtd>	5 25	10 33	14 41	17 49	21 57	23 65	26 73	28 82	29 90	30 91
32	-28 6	-13 13	-5 20	2 27	7 35	11 42	15 50	19 58	22 66	25 74	27 82	30 91	32 91
33	-49 2	-21 9	-9 15	-2 22	4 29	9 37	13 44	17 52	20 59	23 67	26 75	28 83	31 92
34	-33 4	-15 11	-6 17	-6 24	1 31	6 38	11 46	15 53	19 61	22 68	25 76	29 84	32 92
35	-24 7	-11 13	-3 20	-3 26	4 33	9 40	13 47	17 54	20 62	23 69	26 77	29 85	31 92
36	-39 3	-18 9	-7 15	-7 22	0 28	5 35	11 42	15 49	19 56	22 63	25 71	28 78	30 85
37	-27 5	-13 11	-3 17	-3 24	3 30	8 37	13 44	17 51	20 58	23 65	26 72	29 79	31 86
38	-47 2	-20 13	-8 19	-8 25	0 32	5 39	11 46	15 53	19 60	22 67	25 74	28 81	30 88
39	-31 4	-14 10	-4 15	-4 21	3 27	8 34	12 40	16 46	20 53	23 60	26 67	29 74	31 81
40	-60 1	-22 12	-9 17	-9 23	-1 29	4 35	10 41	14 48	18 54	22 60	25 67	29 73	32 80
41	-35 3	-15 14	-5 19	-5 25	2 31	7 38	12 45	16 51	20 58	23 65	26 72	29 79	31 86
42	-24 5	-10 10	-1 16	-1 21	5 27	10 33	14 39	18 45	22 51	25 58	28 65	31 72	34 80
43	-39 2	-16 7	-6 12	-6 18	-6 23	2 29	7 34	11 40	15 46	19 52	23 58	26 64	29 70
44	-25 4	-11 9	-1 14	-1 20	-2 25	5 30	10 36	14 41	18 47	22 53	25 60	28 67	31 74
45	-43 2	-17 6	-6 11	-6 16	-6 21	2 27	7 32	11 38	15 44	19 50	23 56	26 62	29 68
46	-27 4	-11 8	-1 13	-1 18	-2 23	5 28	10 34	14 40	18 46	22 52	25 59	28 65	31 71
47	-46 1	-18 6	-6 10	-6 15	-6 20	2 25	7 30	11 36	15 42	19 48	23 54	26 60	29 66
48	-28 3	-11 8	-1 12	-1 17	-2 21	5 26	10 32	14 38	18 44	22 50	25 56	28 62	31 68
49	-49 1	-18 5	-6 10	-6 14	-6 18	2 23	7 29	11 35	15 41	19 47	23 53	26 59	29 65
50	-29 3	-11 7	-1 12	-1 16	-2 20	5 24	10 30	14 36	18 42	22 48	25 54	28 60	31 66

DP  
RH

# Elevations between 8,501 and 11,000 feet

		31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50									
51	-18	-6	2	8	13	17	20	24	27	29	32	34	37	39	41	43	44	46	48	49	51									
	5	9	13	17	21	26	30	34	39	43	48	53	57	62	67	73	78	83	89	94										
52	-29	-11	-2	5	10	15	19	22	25	28	31	33	36	38	40	42	44	45	47	49	50									
	3	7	11	15	19	23	27	31	35	40	44	49	53	58	63	68	73	78	83	89	94									
53	-51	-18	-6	2	8	13	17	21	24	27	30	32	35	37	39	41	43	45	47	48	50									
	1	5	8	12	16	20	24	28	32	36	41	45	50	54	59	64	68	73	79	84	89	94								
54	-28	-11	-2	5	11	15	19	22	25	28	31	34	36	38	40	42	44	46	48	49	51									
	3	6	10	14	17	21	25	29	33	37	42	46	50	55	59	64	69	74	79	84	89	95								
55	-50	-18	-6	2	8	13	17	21	24	27	30	32	35	37	39	42	43	45	47	49	50									
	1	4	8	11	15	19	22	26	30	34	38	43	47	51	56	60	65	69	74	79	84	89	95							
	56	-29	-11	-2	5	11	15	19	23	26	29	31	34	37	39	41	43	45	46	48	50									
	2	6	9	13	16	20	24	27	31	35	39	43	48	52	56	61	65	70	75	80	84	90	95							
57	-52	-19	-6	2	8	13	18	21	24	27	30	33	35	38	40	42	44	46	48	49	51									
	1	4	7	11	14	18	21	25	29	32	36	40	44	48	53	57	61	66	70	75	80	85	90	95						
	58	2	5	9	12	15	19	22	26	30	33	37	41	45	49	53	58	62	66	71	75	80	85	90	95					
59	-53	-18	-6	2	9	14	18	22	25	28	31	33	36	38	40	42	44	46	48	50	51									
	1	4	7	10	13	17	20	24	27	31	34	38	42	46	50	54	58	62	67	71	76	80	85	90	95					
	60	2	5	8	11	15	18	21	25	28	32	35	39	43	47	51	55	59	63	67	72	76	81	85	90	95				
	61	-18	-5	3	9	14	18	22	25	28	31	34	36	39	41	43	45	47	49	50	52	54								
	3	6	10	13	16	19	22	26	29	33	36	40	44	47	51	55	59	63	68	72	76	81	86	90	95					
	62	-28	-11	-1	6	12	17	21	24	27	30	33	35	38	40	42	44	46	48	50	51									
	2	5	8	11	14	17	20	23	27	30	34	37	41	44	48	52	56	60	64	68	72	77	81	86	90	95				
	63	-17	-5	3	9	15	19	23	26	29	32	34	37	39	41	43	45	47	49	51	53									
	3	6	9	12	15	18	21	24	28	31	34	38	41	45	49	53	56	60	64	68	73	77	81	86	90	95				
	64	-27	-10	0	7	12	17	21	25	28	31	33	36	38	40	43	45	47	49	50	52	54								
	2	5	8	10	13	16	19	22	25	29	32	35	39	42	46	49	53	57	61	65	69	73	77	82	86	91	95			
	65	-47	-16	-4	4	10	15	20	23	27	30	32	35	37	40	42	44	46	48	50	52	53								
	1	3	6	9	12	14	17	20	23	26	30	33	36	40	43	46	50	54	58	61	65	69	73	78	82	86	91	95		
	66	-26	-9	1	7	13	18	22	25	28	31	34	36	39	41	43	45	47	49	51	53	54								
	2	5	7	10	13	16	18	21	24	27	31	34	37	40	44	47	51	54	58	62	66	70	74	78	82	86	91	95		
	67	-43	-15	-3	5	11	16	20	24	27	30	33	35	38	40	42	45	47	49	50	52	54								
	1	3	6	8	11	14	17	19	22	25	28	31	35	38	41	44	48	51	55	59	62	66	70	74	78	82	87	91	95	
	68	-24	-8	2	8	14	18	22	26	29	32	35	37	39	42	44	46	48	50	52	53									
	2	4	7	10	12	15	18	20	23	26	29	32	35	39	42	45	48	52	55	59	63	67	70	74	78	83	87	91	95	
	69	-39	-14	-2	5	12	17	21	25	28	31	34	36	39	41	43	45	47	49	51	53	54								
	1	3	6	8	11	13	16	19	21	24	27	30	33	36	39	42	46	49	52	56	60	63	67	71	75	79	83	87	91	96
	70	-22	-7	3	9	15	19	23	27	30	33	35	38	40	42	44	46	48	50	52	54	56								
	2	4	7	9	12	14	17	20	22	25	28	31	34	37	40	43	46	50	53	56	60	64	67	71	75	79	83	87	91	95

Wet Bulb  
Temperatures  
31 to 70 F  
(Read Down)

DP  
RH  
RH

Dry Bulb  
Temperatures  
51 to 70 F  
(Read Across)



# FINE DEAD FUEL MOISTURE TABLES

Reference Fuel Moisture (1) + Fuel moisture correction (2E/2S) = Fine Dead Fuel Moisture (3E/3S)

- 1+2E= 3E Exposed Fuel Moisture (<50% fuels shaded by clouds/canopy)
- 1+2S= 3S Shaded Fuel Moisture (>50% fuels shaded by clouds/canopy)

❖ Before you begin: What time is it? What month is it? B, L or A? (see pg 54)

## Reference Fuel Moisture Day Time 0800 - 1959

1	Relative Humidity (%)																				
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	80 - 84	85 - 89	90 - 94	95 - 99	100
Dry Bulb Temp. (F)	10 - 29	2	2	3	4	5	5	6	7	8	8	9	9	10	11	12	12	13	13	14	
	30 - 49	1	2	2	3	4	5	5	6	7	7	8	9	9	10	10	11	12	13	13	13
	50 - 69	1	2	2	3	4	5	5	6	6	7	7	8	8	9	9	10	11	12	12	13
	70 - 89	1	1	2	2	3	4	5	5	6	7	7	8	8	8	9	10	10	11	12	13
	90 - 109	1	1	2	2	3	4	5	5	6	7	7	8	8	8	9	10	10	11	12	13
	109 +	1	1	2	2	3	4	4	5	6	7	7	8	8	8	9	10	10	11	12	13

## Dead Fuel Moisture Content Corrections

Feb. March April Aug. Sept. Oct.

2E		EXPOSED																	
		Exposed - Less than 50% shading of surface fuels																	
ASPCT	Slope	0800 to			1000 to			1200 to			1400 to			1600 to			1800 to		
		B	L	A	B	L	A	B	L	A	B	L	A	B	L	A	B	L	A
N	0 - 30%	3	4	5	1	2	3	1	1	2	1	1	2	1	2	3	3	4	5
	31%+	3	4	5	3	3	4	2	3	4	2	3	4	3	3	4	3	4	5
E	0 - 30%	3	4	5	1	2	3	1	1	1	1	1	2	1	2	3	3	4	5
	31%+	3	3	4	1	1	1	1	1	1	1	2	3	3	4	5	4	5	6
S	0 - 30%	3	4	5	1	2	2	1	1	1	1	1	1	1	2	3	3	4	5
	31%+	3	4	5	1	2	2	0	1	1	0	1	1	1	2	2	3	4	5
W	0 - 30%	3	4	5	1	2	3	1	1	1	1	1	1	1	2	3	3	4	5
	31%+	4	5	6	3	4	5	1	2	3	1	1	1	1	1	1	3	3	4
2S		SHADED																	
		Shaded - Greater than or equal to 50% shading of surface fuels																	
N	All	4	5	6	4	5	5	3	4	5	3	4	5	4	5	5	4	5	6
E	All	4	5	6	3	4	5	3	4	5	3	4	5	4	5	6	4	5	6
S	All	4	5	6	3	4	5	3	4	5	3	4	5	3	4	5	4	5	6
W	All	4	5	6	4	5	6	3	4	5	3	4	5	3	4	5	4	5	6

# DEAD FUEL MOISTURE CONTENT CORRECTIONS

May June July

<b>2E</b>		<b>EXPOSED</b>																	
		Exposed - Less than 50% shading of surface fuels																	
ASPCT	Slope	0800 to			1000 to			1200 to			1400 to			1600 to			1800 to		
		B	L	A	B	L	A	B	L	A	B	L	A	B	L	A	B	L	A
N	0 - 30%	2	3	4	1	1	1	0	0	1	0	0	1	1	1	1	2	3	4
	31%+	3	4	4	1	2	2	1	1	2	1	1	2	1	2	2	3	4	4
E	0 - 30%	2	2	3	1	1	1	0	0	1	0	0	1	1	1	2	3	4	4
	31%+	1	2	2	0	0	1	0	0	1	1	1	2	2	3	4	4	5	6
S	0 - 30%	2	3	3	1	1	1	0	0	1	0	0	1	1	1	1	2	3	3
	31%+	2	3	3	1	1	2	0	1	1	0	1	1	1	1	2	2	3	3
W	0 - 30%	2	3	4	1	1	2	0	0	1	0	0	1	0	1	1	2	3	3
	31%+	4	5	6	2	3	4	1	1	2	0	0	1	0	0	1	1	2	2
<b>2S</b>		<b>SHADED</b>																	
		Shaded - Greater than or equal to 50% shading of surface fuels																	
N	All	4	5	5	3	4	5	3	3	4	3	3	4	3	4	5	4	5	5
E	All	4	4	5	3	4	5	3	3	4	3	4	4	3	4	5	4	5	6
S	All	4	4	5	3	4	5	3	3	4	3	3	4	3	4	5	4	5	6
W	All	4	5	6	3	4	5	3	3	4	3	3	4	3	4	5	4	4	5

## Dead Fuel Moisture Content Corrections

Nov. Dec. Jan.

<b>2E</b>		<b>EXPOSED</b>																	
		Exposed - Less than 50% shading of surface fuels																	
ASPCT	Slope	0800 to			1000 to			1200 to			1400 to			1600 to			1800 to		
		B	L	A	B	L	A	B	L	A	B	L	A	B	L	A	B	L	A
N	0 - 30%	4	5	6	3	4	5	2	3	4	2	3	4	3	4	5	4	5	6
	31%+	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6
E	0 - 30%	4	5	6	3	4	4	2	3	3	2	3	3	3	4	5	4	5	6
	31%+	4	5	6	2	3	4	2	2	3	3	4	4	4	5	6	4	5	6
S	0 - 30%	4	5	6	3	4	5	2	3	3	2	2	3	3	4	4	4	5	6
	31%+	4	5	6	2	3	3	1	1	2	1	1	2	2	3	3	4	5	6
W	0 - 30%	4	5	6	3	4	5	2	3	3	2	3	3	3	4	4	4	5	6
	31%+	4	5	6	4	5	6	3	4	4	2	2	3	2	3	4	4	5	6
<b>2S</b>		<b>SHADED</b>																	
		Shaded - Greater than or equal to 50% shading of surface fuels																	
N	All	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6
E	All	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6
S	All	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6
W	All	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6

# NIGHT TIME FUEL MOISTURE CHARTS

Reference Fuel Moisture

Night Time

2000 - 0759

Dry Bulb Temp. (F)	Relative Humidity (%)																				
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	80 - 84	85 - 89	90 - 94	95 - 99	100
10 - 29	1	2	4	5	5	6	7	8	9	10	11	12	12	14	15	17	19	22	25	25+	25+
30 - 49	1	2	3	4	5	6	7	8	9	9	11	11	12	13	14	16	18	21	24	25+	25+
50 - 69	1	2	3	4	5	6	6	8	8	9	10	11	11	12	14	16	17	20	23	25+	25+
70 - 89	1	2	3	4	4	5	6	7	8	9	10	10	11	12	13	15	17	20	23	25+	25+
90 - 109	1	2	3	3	4	5	6	7	8	9	9	10	10	11	13	14	16	19	22	25	25+
109 +	1	2	2	3	4	5	6	6	8	8	9	9	10	11	12	14	16	19	21	24	25+

# Dead Fuel Moisture Corrections

Night Time

2000 - 0759

Aspect	2000 to		2200 to		2400 to		0200 to		0400 to		0600 to	
	B	L	B	L	B	L	B	L	B	L	B	L
N & E	9	1	13	1	2	16	2	17	1	18	1	16
S & W	9	0	14	0	1	16	0	17	0	18	0	9



# PROBABILITY OF IGNITION TABLE

		Fine Dead Fuel Moisture (%)																		
		Dry Bulb Temperature (°F)		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<b>3E</b>	EXPOSED	Unshaded <50%	110+	100	80	80	70	60	60	50	40	40	40	30	30	20	20	20	10	
			100 - 109	100	90	80	70	60	60	50	40	40	40	30	30	30	20	20	20	10
			90 - 99	100	90	80	70	60	60	50	40	40	40	30	30	30	20	20	20	10
		Shaded >50%	80 - 89	100	90	80	70	60	60	50	40	40	40	30	30	30	20	20	20	10
			70 - 79	100	80	70	60	60	50	40	40	40	30	30	30	20	20	20	10	10
			60 - 69	90	80	70	60	60	50	40	40	40	30	30	20	20	20	10	10	10
			50 - 59	90	80	70	60	60	50	40	40	40	30	30	20	20	20	10	10	10
			40 - 49	90	80	70	60	60	50	40	40	40	30	30	20	20	20	10	10	10
			30 - 39	80	70	60	60	50	40	40	40	30	30	20	20	20	10	10	10	10
			<b>3S</b>	SHADED	110+	100	90	80	70	60	60	50	40	40	40	30	30	20	20	20
100 - 109	100	90			80	70	60	60	50	40	40	40	30	30	30	20	20	20	10	
90 - 99	100	90			80	70	60	60	50	40	40	40	30	30	30	20	20	20	10	
80 - 89	100	80			70	60	60	50	40	40	40	30	30	30	20	20	20	10	10	
70 - 79	90	80			70	60	60	50	40	40	40	30	30	30	20	20	20	10	10	
60 - 69	90	80			70	60	60	50	40	40	40	30	30	20	20	20	10	10	10	
50 - 59	90	80			70	60	60	50	40	40	40	30	30	20	20	20	10	10	10	
40 - 49	90	80	60	50	50	40	40	30	30	30	20	20	20	10	10	10	10			
30 - 39	80	80	60	50	50	40	30	30	30	20	20	20	10	10	10	10	10			

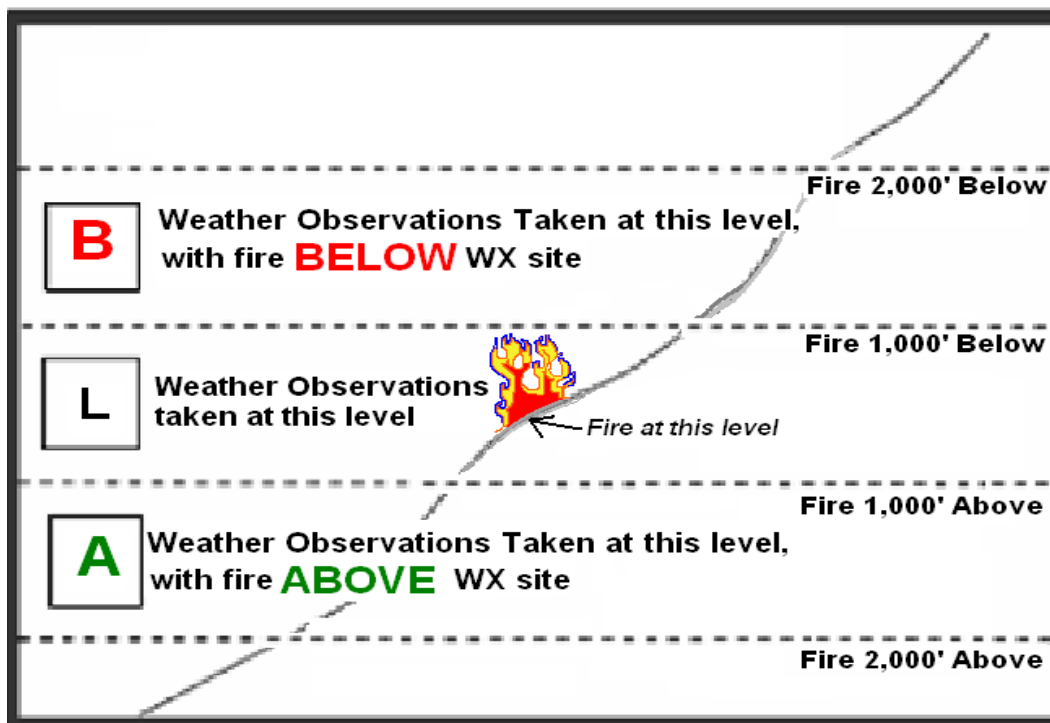
## Determining A, L, B For Fine Dead Fuel Moisture Calculations

- A** – Weather observations are taken between 1,000' and 2,000' **ABOVE** the fire behavior observations/projections.
- L** – Weather observations are taken between 1,000' above and 1,000' below or **Level** with the fire behavior observations/projections.
- B** – Weather observations are taken between 1,000' and 2,000' **BELOW** the fire behavior observations/projections.

The question is simple: "Where is the Fire?"

Is the fire **ABOVE** your WX site? If so, use **A**

Is the Fire **BELOW** your WX site? If so, use **B**



# 2012 PAYROLL SCHEDULE

○ END OF PAY PERIOD

■ HOLIDAYS

## JANUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
	8	9	10	11	12	13
	15	16	17	18	19	20
	22	23	24	25	26	27
	29	30	31			

## APRIL

S	M	T	W	T	F	S
	1	2	3	4	5	6
	8	9	10	11	12	13
	15	16	17	18	19	20
	22	23	24	25	26	27
	29	30				

## JULY

S	M	T	W	T	F	S
	1	2	3	4	5	6
	8	9	10	11	12	13
	15	16	17	18	19	20
	22	23	24	25	26	27
	29	30	31			

## OCTOBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
	7	8	9	10	11	12
	14	15	16	17	18	19
	21	22	23	24	25	26
	28	29	30	31		

## FEBRUARY

S	M	T	W	T	F	S
	1	2	3	4		
	5	6	7	8	9	10
	12	13	14	15	16	17
	19	20	21	22	23	24
	26	27	28	29		

## MAY

S	M	T	W	T	F	S
	1	2	3	4	5	6
	6	7	8	9	10	11
	13	14	15	16	17	18
	20	21	22	23	24	25
	27	28	29	30	31	

## AUGUST

S	M	T	W	T	F	S
	1	2	3	4		
	5	6	7	8	9	10
	12	13	14	15	16	17
	19	20	21	22	23	24
	26	27	28	29	30	31

## NOVEMBER

S	M	T	W	T	F	S
			1	2	3	4
	4	5	6	7	8	9
	11	12	13	14	15	16
	18	19	20	21	22	23
	25	26	27	28	29	30

## MARCH

S	M	T	W	T	F	S
			1	2	3	4
	4	5	6	7	8	9
	11	12	13	14	15	16
	18	19	20	21	22	23
	25	26	27	28	29	30

## JUNE

S	M	T	W	T	F	S
					1	2
	3	4	5	6	7	8
	10	11	12	13	14	15
	17	18	19	20	21	22
	24	25	26	27	28	29

## SEPTEMBER

S	M	T	W	T	F	S
						1
	2	3	4	5	6	7
	9	10	11	12	13	14
	16	17	18	19	20	21
	23	24	25	26	27	28

## DECEMBER

S	M	T	W	T	F	S
						1
	2	3	4	5	6	7
	9	10	11	12	13	14
	16	17	18	19	20	21
	23	24	25	26	27	28

*Insert 2013 payroll schedule (not available at time of printing)*

## AIR AMBULANCE PHONE LIST

STATE	SERVICE NAME	HOSPITAL / LOCATION	PHONE #'S
<b>ALASKA</b>	MAST	AK STATE TROOPERS	<b>907-451-5333/5100</b>
<b>ARIZONA</b>	GUARDIAN AIR	FLAGSTAFF MEDICAL CTR	<b>800-523-9391</b>
	CLASSIC LIFE GUARD	PAGE	<b>800-444-9223</b>
<b>CALIFORNIA</b>	MERCY AIR AMB.	MERCY MED CTR, REDDING	<b>530-225-7252</b>
	MOUNTAIN LIFEFLIGHT	SUSANVILLE	<b>800-926-0801</b>
	AIR MED TEAM	REDDING MED CTR	<b>800-432-9944</b>
<b>COLORADO</b>	ST. MARY'S AIR LIFE	ST. MARY'S, GRAND JUNCTION	<b>800-332-4923</b>
	YAMPA VALLEY AIR AMB.	STEAMBOAT SPRINGS	<b>800-900-6800</b>
	FLIGHT FOR LIFE	COLORADO SPRINGS	<b>800-4222254</b>
	AIR RESPONSE	ENGLEWOOD	<b>303-768-8089</b>
	FLIGHT FOR LIFE	ST ANTHONY'S, DENVER	<b>800-525-3712</b>
	TRANSPORT CARE	MEMORIAL, COLO SPRINGS	<b>800-763-4373</b>
<b>IDAHO</b>	LIFE FLIGHT	ST. ALPHONSUS, BOISE	<b>800-367-3230</b>
	LIFE FLIGHT	BANNOK MED CTR, POCATELLO	<b>800-232-0911</b>
	ACCESS AIR	BOISE	<b>208-333-9911</b>
<b>MONTANA</b>	LIFE FLIGHT	ST. PATRICK'S, MISSOULA	<b>800-991-SEND</b>
	MERCY FLIGHT/MEDFLIGHT	GREAT FALLS	<b>800-972-4000</b>
	MEDFLIGHT	BILLINGS	<b>800-325-1774</b>
<b>NEVADA</b>	MERCY AIR	LAS VEGAS	<b>800-842-4431</b>
	MEDIC AIR	RENO	<b>800-234-3822</b>
	ACCESS AIR	ELKO	<b>775-738-3493</b>
	CARE FLIGHT	RENO, GARDNERVILLE, TRUKEE	<b>775-858-5700</b>
<b>NEW MEXICO</b>	SOUTHWEST AIR AMB.	FAIRACRES/LAS CRUCES	<b>505-525-2660</b>
	MED FLIGHT AIR AMB.	ALBUQUERQUE	<b>800-842-4431</b>
	LIFEGUARD AIR EMERGENCY	ALBUQUERQUE	<b>800-633-5438</b>
	GALLUP MED FLIGHT	GALLUP	<b>505-863-6606</b>
<b>OREGON</b>	AIR LIFE OF OREGON	BEND	<b>800-522-2828</b>
	LIFE FLIGHT	PORTLAND	<b>800-452-7434</b>
	LIFEGUARD AIR AMB.	HILLSBORO	<b>503-640-2927</b>
<b>UTAH</b>	AIR MED	U OF UT HEALTH CTR, SALT LAKE	<b>800-453-0120</b>
	LIFE FLIGHT	INTERMT HLTH CARE, SALT LAKE	<b>801-321-1234</b>
<b>WASHINGTON</b>	NORTHWEST MEDSTAR	SPOKANE	<b>800-422-2440</b>
	AIRLIFT NORTHWEST	SEATTLE	<b>800-426-2430</b>
<b>WYOMING</b>	WYOMING LIFE FLIGHT	WY MED CTR, CASPER	<b>800-442-2222</b>

# MED-EVAC - 9 LINE REPORT

Date: \_\_\_\_\_ Time: \_\_\_\_\_

1. PATIENT LOCATION	
Lat: _____° _____' Long: _____° _____' Physical Description:	Datum set to WGS 84. Use Degrees, Decimal Minutes Drop Point, Staging area, Division, Spike Camp.
2. PATIENT CHIEF COMPLAINT/ASSESSMENT	
<b>Patient #1</b> <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE Age _____ Conscious <input type="checkbox"/> YES <input type="checkbox"/> NO Breathing <input type="checkbox"/> YES <input type="checkbox"/> NO	<b><u>Patient Assessment :</u></b> -Level of Consciousness -Breathing Rate -Pulse Rate -Skin Condition
<b>Patient #2</b> <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE Age _____ Conscious <input type="checkbox"/> YES <input type="checkbox"/> NO Breathing <input type="checkbox"/> YES <input type="checkbox"/> NO	<b><u>Injury:</u></b> Bleeding      Heat Fracture      Burns Head Injury   Bee Stings Eye Injury
3. LEVEL OF SEVERITY	
<b>RED – URGENT</b> (Life or death/loss of limb/severe medical, Altered LOC, 2° or 3° burn more than 4 palm sizes)	<b><u>EMERGENCY</u></b> Ambulance or Med-evac Helicopter. Medical radio traffic has priority.
<b>YELLOW – PRIORITY</b> (Significant trauma; Not able to walk, 2° or 3° burn more than 1 or 2 palm size)	Ambulance or consider air transport if at remote location. Medical radio traffic may have priority depending on injury.
<b>GREEN – MINOR INJURY</b> (1° or 2° burn less than 1 palm size)	Delayed ground transport via crew or field medic. Non-Emergency. Fire radio traffic unchanged.
4. SPECIAL EQUIPMENT NEEDED	
	Short Haul, SKED, Backboard, Litter, Rope Rescue, Trauma Bag, O <sub>2</sub> , IV.
5. ON SCENE MEDIC AND IC	
	Crew medic, Field medic, Who is IC for this incident?
6. OPERATIONAL CHANNEL	
Air to Ground      Air Guard/ MED      Command      Tactical	What frequency or channel will the incident be on?
7. LZ/ EVAC LOCATION	
Lat: _____° _____' Long: _____° _____' Ground Contact:	Set GPS Datum to WGS-84 Use Degrees, Decimal Minutes <b>(00° 00.00' - 000° 00.00')</b> Mark LZ location
8. LZ SPECIAL HAZARDS	
	Trees, power lines, wind direction, slope.
9. PATIENT AFFILIATION	
	Agency, Contractor, Military

# **FIRE LINE LEADER RESPONSIBILITIES**

**(Establish clear Leader's Intent and Supervise at the scene of action not in your truck/office)**

## **Initial Attack Incident Commander (ICT4/5): also see pages 60-61**

- Provide for Safety and welfare of assigned personnel
- Initiate and maintain Incident Briefing(ICS Form 201)
- Size up fire situation and concisely communicate resource needs
- Analyze Incident complexity
- Plan appropriate method of attack
- Brief personnel and keep them informed
- Direct and coordinate assigned resources
- Monitor weather, fire behavior, and environmental factors to anticipate changes
- Adjust tactics to meet changing conditions
- Maintain current Unit Log(ICS Form 214)
- Solicit Feedback and participate in AARs

## **Task Force/Strike Team Leader:**

- Obtain briefing from DIVS/IC
- Review assignment with assigned resources
- Travel to and from line with assigned resources
- Monitor and inspect progress; make changes as necessary
- Coordinate action with adjacent resources
- Keep supervisor informed of status and progress
- Obtain logistics/equipment needs from assigned resources
- Retain control of assigned resources while off-line
- Maintain a current unit log (ICS form 214)

## **Single Resource Boss (CRWB, ENGB, FIRB, FELB):**

- Responsible for supervising and directing a firefighting module such as: hand crew, engine, dozer, firing team, and fallers.
- Obtain briefing from Task Force/Strike Team Leader/IC
- Review assignment with module and assign work tasks
- Obtain Necessary equipment and supplies
- Review current and predicted Wx conditions and expected Fire Bx
- Brief module on safety including escape routes and safety zones
- Monitor work progress; make changes as necessary
- Keep supervisor informed of progress and changes
- Inform supervisor promptly of problems
- Brief/Debrief with relief personnel on the fireline
- Complete and turn in time records

INITIAL ATTACK FIRE SIZE-UP				
1. FIRE NAME:		FIRE NUMBER	DOI	
			USDA	
2. IC NAME:			STATE	
			PRIVATE	
Descriptive location:				
Reported by:				
3. ARRIVAL DATE:			TIME:	
4. LEGAL:	Township:	Range:		Section(s):
Coordinates:	Latitude:		Longitude:	
UTM:	E:		N:	
5. ESTIMATED SIZE (acres):		6. OWNERSHIP:		
7. FUELS BURNING:	<input type="checkbox"/> Grass	<input type="checkbox"/> Re-prod	<input type="checkbox"/> Snag	<input type="checkbox"/> Duff
	<input type="checkbox"/> Brush	<input type="checkbox"/> Slash	<input type="checkbox"/> Logs	<input type="checkbox"/> Hardwood
ADJACENT FUELS:	<input type="checkbox"/> Grass	<input type="checkbox"/> Re-prod	<input type="checkbox"/> Snag	<input type="checkbox"/> Duff
	<input type="checkbox"/> Brush	<input type="checkbox"/> Slash	<input type="checkbox"/> Logs	<input type="checkbox"/> Hardwood
8. CHARACTER OF FIRE:	<input type="checkbox"/> Smoldering	<input type="checkbox"/> Running	<input type="checkbox"/> Crowning	
	<input type="checkbox"/> Creeping	<input type="checkbox"/> Torching	<input type="checkbox"/> Spotting	
9. FLAME LENGTH:	<input type="checkbox"/> under 2'	<input type="checkbox"/> 2-4'	<input type="checkbox"/> 4-8	<input type="checkbox"/> 8-11
				<input type="checkbox"/> 11 plus
10. POSITION ON SLOPE:	<input type="checkbox"/> Bottom 1/3	<input type="checkbox"/> Middle 1/3		<input type="checkbox"/> Top 1/3
11. PERCENT SLOPE:	<input type="checkbox"/> 0-30	<input type="checkbox"/> 45-60	<input type="checkbox"/> 30-45	<input type="checkbox"/> 60 plus
12. ASPECT:	<input type="checkbox"/> North	<input type="checkbox"/> East	<input type="checkbox"/> South	<input type="checkbox"/> West
				<input type="checkbox"/> Flat/Ridge top
13. WIND SPEED:				
WIND DIRECTION:	<input type="checkbox"/> N	<input type="checkbox"/> E	<input type="checkbox"/> S	<input type="checkbox"/> W
			<input type="checkbox"/> Upslope	<input type="checkbox"/> Up Canyon
			<input type="checkbox"/> Down Slope	<input type="checkbox"/> Down Canyon
14. WIND INDICATORS:	<input type="checkbox"/> Cumulus	<input type="checkbox"/> Lenticular	<input type="checkbox"/> Cold Fronts	<input type="checkbox"/> Other:
15. GROWTH POTENTIAL (estimate acres for next operational period):				<input type="checkbox"/> Acres:
	<input type="checkbox"/> None	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
				<input type="checkbox"/> Very High
16. VALUES AT RISK (Check all that apply):				
<input type="checkbox"/> Houses	<input type="checkbox"/> T&E Species	<input type="checkbox"/> Water Quality	<input type="checkbox"/> Public Safety	
<input type="checkbox"/> Improvements	<input type="checkbox"/> Cultural/Historical	<input type="checkbox"/> Other:		
17. IS FIRE NEAR ANY SENSITIVE AREAS?	<input type="checkbox"/> No	<input type="checkbox"/> Yes - Check Below		
<input type="checkbox"/> Rivers or Streams	<input type="checkbox"/> Surface Waters	<input type="checkbox"/> Aspen Trees	<input type="checkbox"/> 5 Needle Pines	
<input type="checkbox"/> Meadow	<input type="checkbox"/> Forest Edge	<input type="checkbox"/> Other (Specify)		
18. HAZARDS OR CONCERNS (Check all that apply):				
<input type="checkbox"/> Snags	<input type="checkbox"/> Hazmat	<input type="checkbox"/> Urban Interface	<input type="checkbox"/> Power Lines	
<input type="checkbox"/> Mine Shafts	<input type="checkbox"/> Evacuation Concerns	<input type="checkbox"/> Cliffs	<input type="checkbox"/> Other	
19. CAUSE:	<input type="checkbox"/> Lightning	<input type="checkbox"/> Human Cause	<input type="checkbox"/> Other	
20. PROPOSED ACTION:	<input type="checkbox"/> Resource Benefit	<input type="checkbox"/> Confine	<input type="checkbox"/> Suppress	
21. ADDITIONAL RESOURCES:	<input type="checkbox"/> No	<input type="checkbox"/> Yes - Specify Below		
Personnel:	Equipment:	Supplies:	Aircraft:	



## REMOTE OPERATIONS UPDATE CALL-IN CHEAT SHEET

When providing an update on a remote portion of a fire, managers may have specific questions about the current status of a fire, and they'll usually let you know what those are. If not, these items listed below will assist you in painting a decent picture of an ongoing fire's status.

- Estimated (or known) current fire size
- Growth Overnight/ since last checked
- % Active Perimeter
- Active portion / quadrant (N, S, E, W)
- Fuel Model carrying fire ( pay special attention to FM transitions)
- Fire Behavior Observed: ROS, Flame Length, torching, spotting, smoke obs.
- Time of Activity (burning window)
- Weather highlights: High Temps, Low RH, wind speed and direction
- Communicate your plan for the shift
- Ask if any other information is needed (when they'd like the next update, etc)
- Specific safety or operational concerns/mitigations

When communicating with a dispatch center/ ICP, consider the additional communication SOPs:

- Notify Dispatch when you begin your travel to and from the fire, when you begin driving and when you begin hiking. This may get redundant, but they'll at least know where you are.
- Let Dispatch know when you've arrived on the fire, and give them an estimate of when you'll provide a fire update.
- Communicate your info only when it's appropriate to do so: if other radio traffic exists, wait patiently for a break in radio traffic, and be only as detailed as necessary with your update.
- Always be cordial and polite when communicating with dispatch centers.

### ONE DAY ORDER AMOUNTS

ITEM	QUANTITY
Water, 5 gal cubie	½ per person
MRE's	4 per person
Batteries, AA	15 per radio
Toilet Paper	1 roll per 8 people
Fuel (unleaded)	5 gal = 20 hours chainsaw use
Bar Oil	10 qts = 20 hours chainsaw use
2 cycle mix	12.8 oz = 20 hours chainsaw use
Fuel (24:1)	Mark III 5 gal = 3 hours, Shindawa 5 gal = 10hrs

# SLOPE

