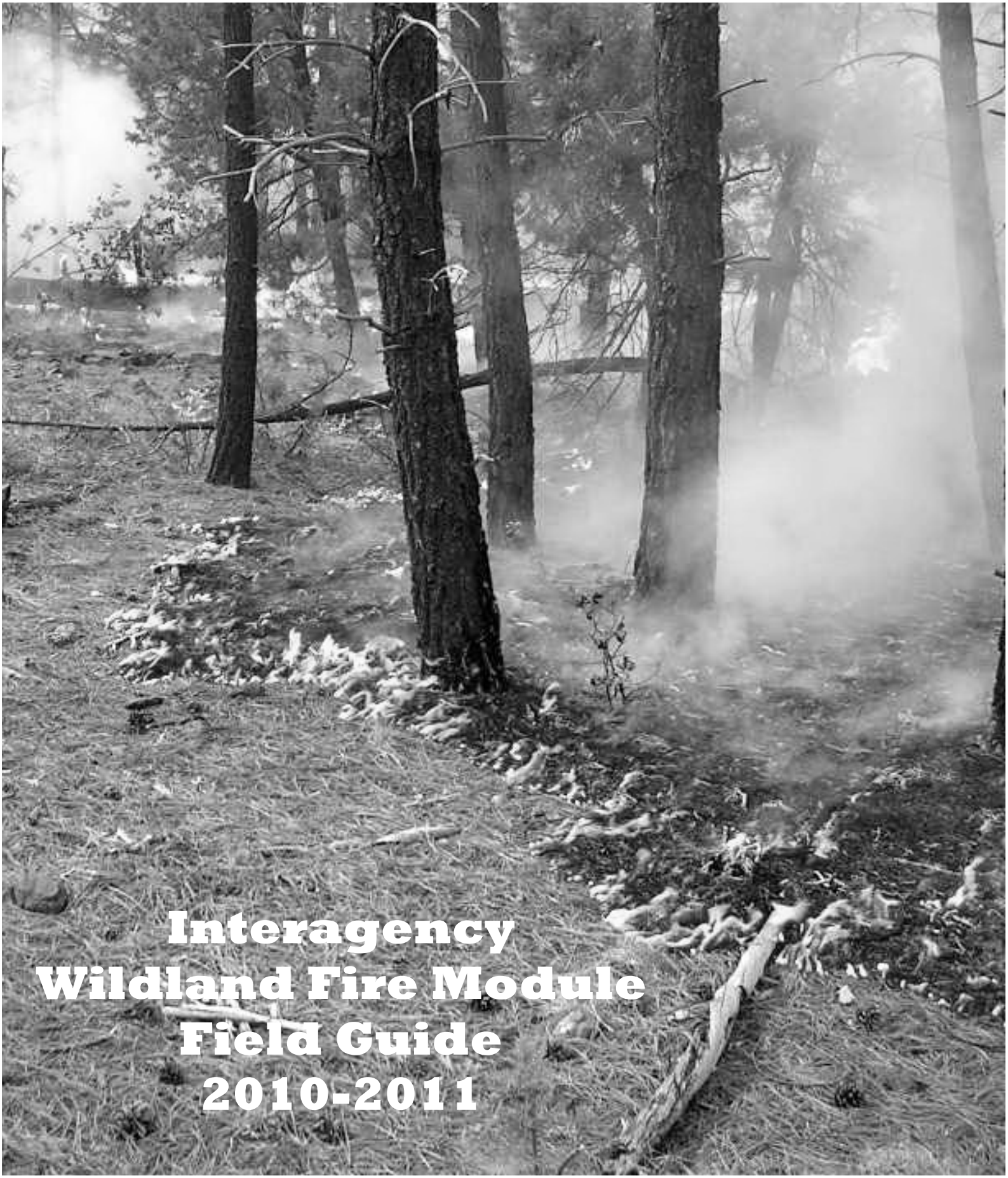

Interagency Wildland Fire Module Field Guide 2010-2011

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

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

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 Fire Use 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 guide: Alex Viktora, Dan Paulson, Joanie Lawrence, Patrick Lookabaugh, Ted Frazer, Marcus Brinkerhoff, and Zion FUM.

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 *STIHL* Parts	
Part Description	***STIHL***/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 **Full Skip Chisel Chain** 3/8" Pitch, .050" gauge	33RSF (specify # of drivers w/ this part #)
28" bar Rollomatic ES Widetip **91 drivers 3/8" pitch, .050" gauge**	3003 000 9638

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

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

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

2-CYCLE MIX QUANTITIES (Ounces)					
	Gasoline Quantity				
Mix Ratio	**.5 gal**	**1.0 gal**	**2.0 gal**	**2.5 gal**	**5 gal**
16 : 1	4.0	8.0	16.0	20.0	40.0
24 : 1	2.7	5.4	10.7	13.4	27.0
32 : 1	2.0	4.0	8.0	10.0	20.0
40 : 1	1.6	3.2	6.4	8.0	16.0
50 : 1	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	**3.75**	**1.25**
2	**7.5**	**2.50**
3	**11.25**	**3.75**
4	**15.00**	**5.00**
5	**18.75**	**6.25**
6	**22.50**	**7.50**
7	**26.25**	**8.75**
8	**30.00**	**10.00**

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 stoke 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
- Shindawa 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:

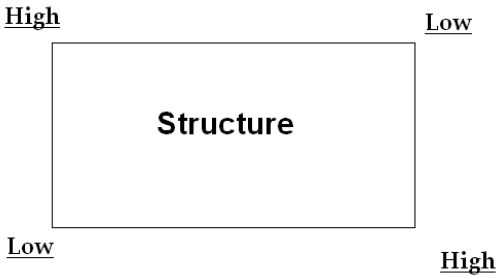
- Order two pump kits (NFES 0870) (one is probably short something you really need).
- Hose and appliances: Figure 100 ft. 1" laterals for every 200 ft. 1 ½" trunk line.
- Remember: Gated "Y's", nozzles, hose clamps, reducers, etc.

STRUCTURE PROTECTION TIPS

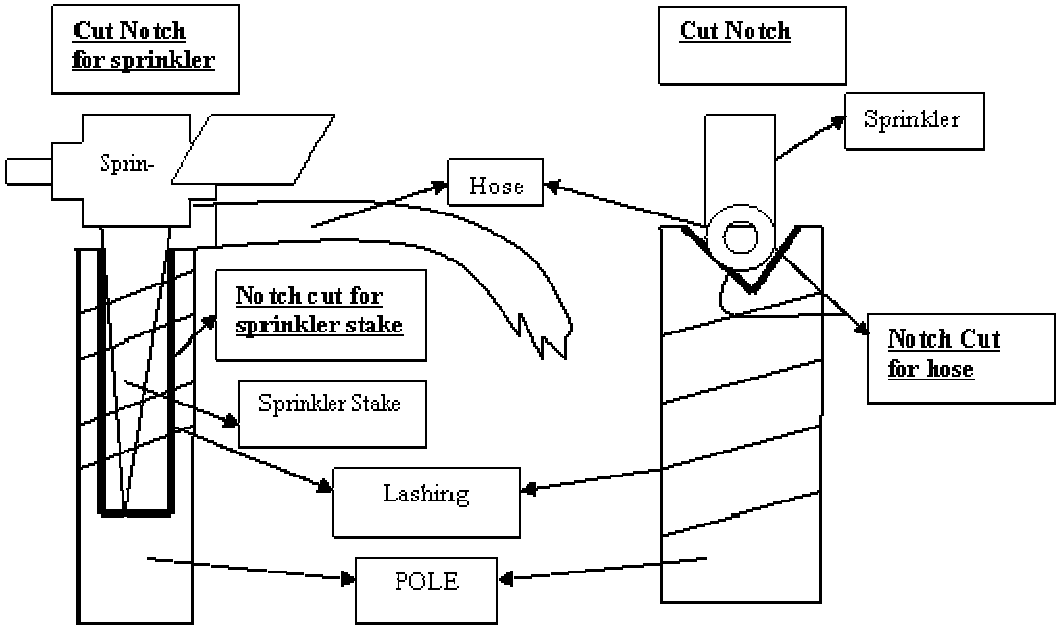
From the Alaska Smokejumper Operations Guide

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) Shindawa type pumps work well close to water sources
   b) Use 5 gal can and fuel line attachment in Sprinkler Kit for Shindawa
   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 #0920or #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^2). Sheets of 10’ x 50’ are also available (500 ft^2).

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 top 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
- 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)
2	**1,3,5**
3	**5**

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

Group One Functions						
Battery Saver Off *(If 1 is flashing, Battery Saver is OFF!!)*	**1**	1	2	3	4	5
Group Scan List	**1**	1	**2**	3	4	5
Transmit on PRI 1 (old PRI Mode C)	**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						
User Code Guard Enabled	**2**	**1**	2	3	4	5
Busy Channel Indicator enabled	**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
Manual DTMF Encoder enabled	**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
Alpha-numeric Mode enabled	**3**	1	2	3	4	**5**
Back Light Duration CHOOSE LITE OFF!!						
Group Label **(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

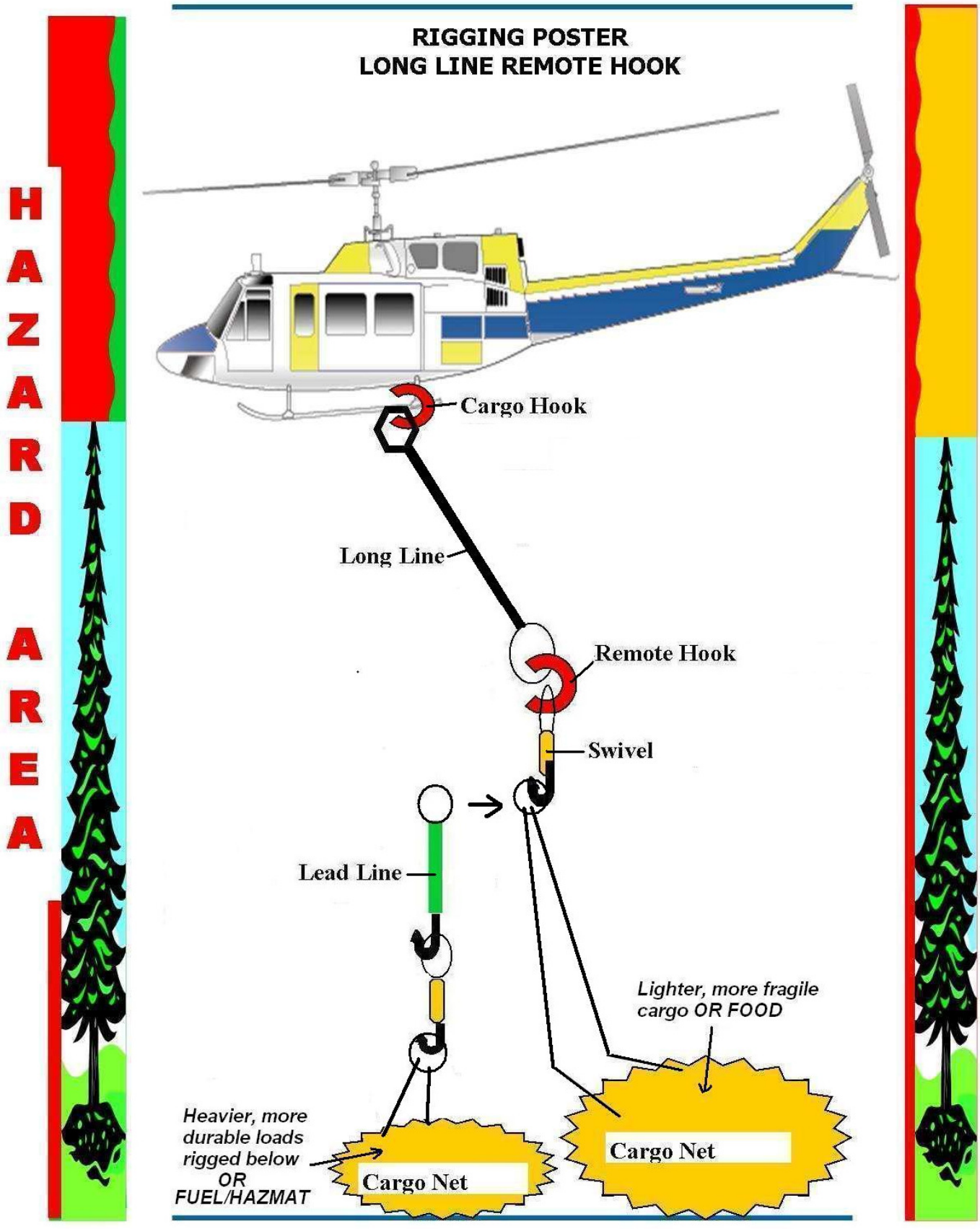
In order to use your DPH as a digital radio, there are several things that you need in order for it to work.

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.



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

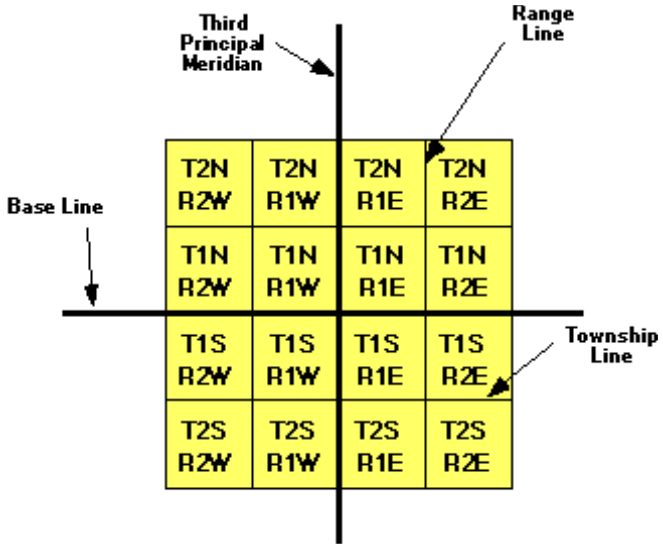
TOWNSHIP/RANGE SYSTEM OF LAND MEASURE

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.

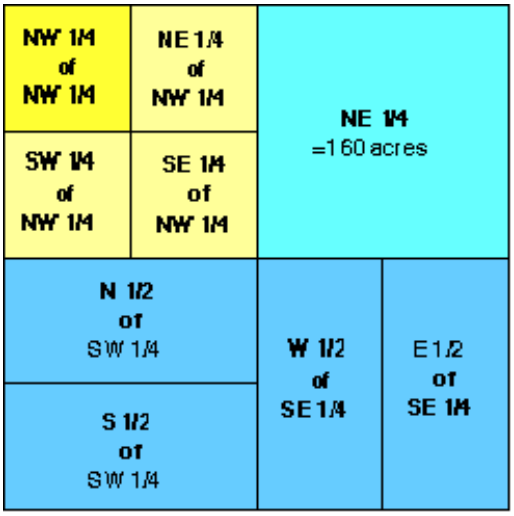
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

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 NW1/4 of the NW1/4.

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 (*Aircraft*)	48° 36.12’ 114° 08.12’	“Four-eight degrees, three six point one two minutes.”
B. Degrees Minutes Seconds (*many maps*)	48° 36’ 12” 114° 08’ 12”	“Four-eight degrees, three six minutes, and one two seconds.”
C. Degrees Decimal Degree (*seldom used*)	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’)

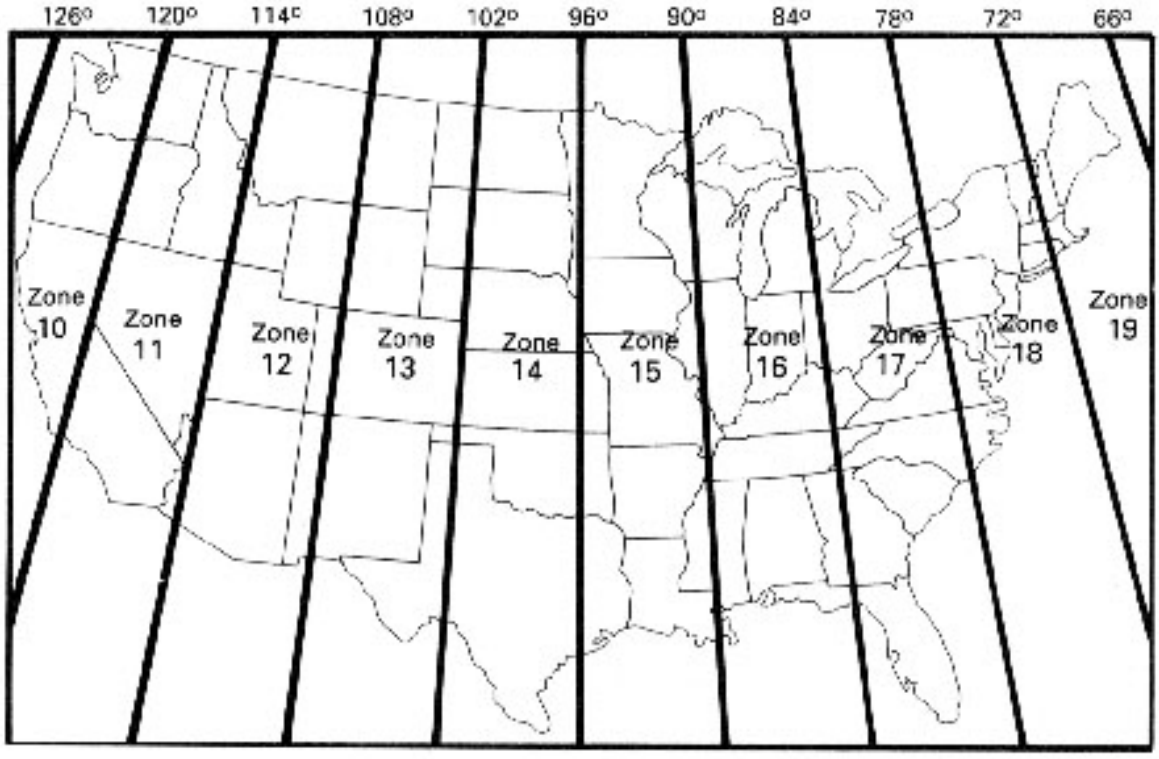
CONVERSION CHARTS

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

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

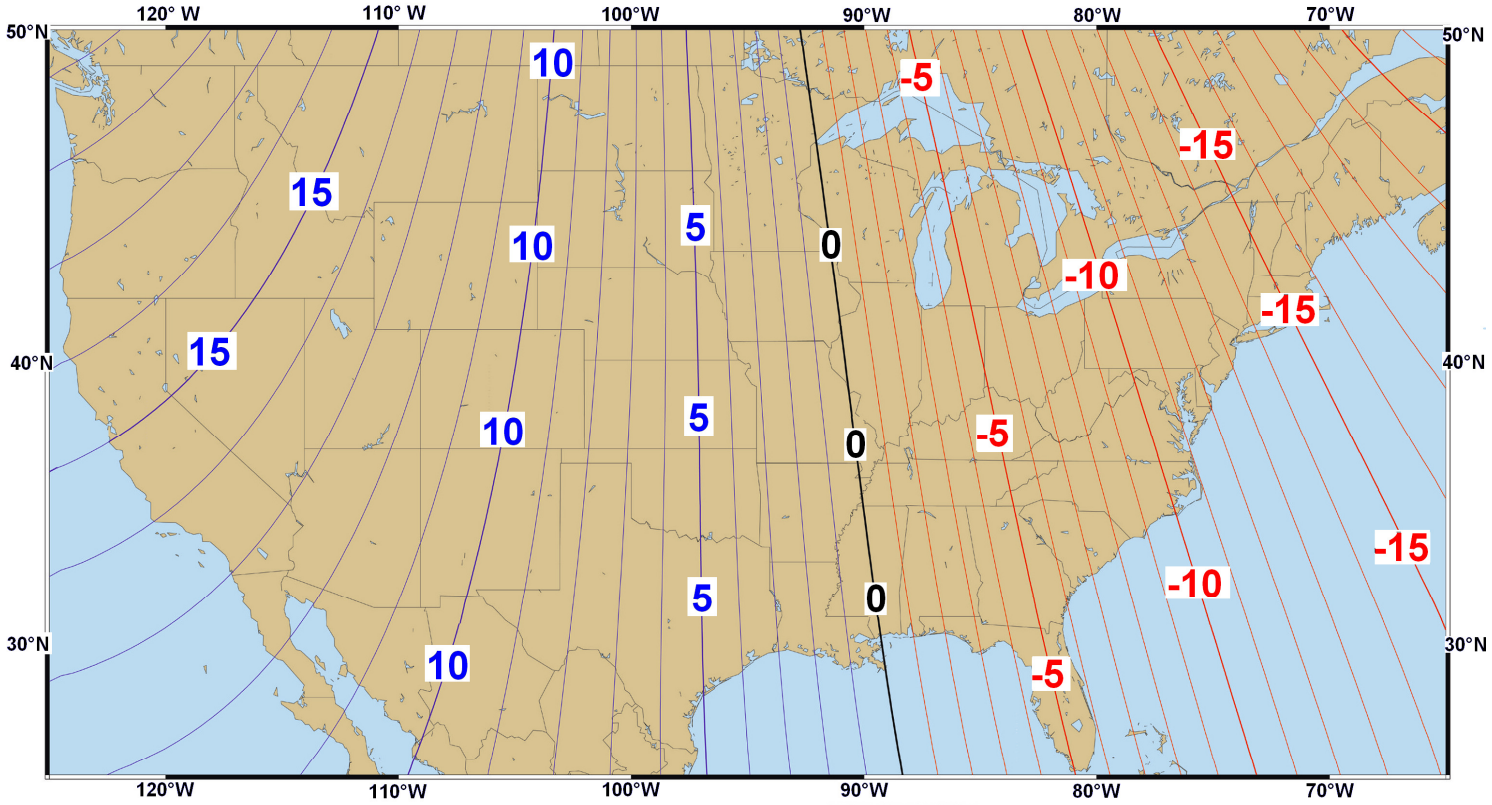
MAP SCALE CONVERSION		
MAP SCALE	**1 inch on the map=**	**1 Mile on the Earth= ___inches on map**
1:5,000	416.67 feet 127.00 meters	12.67
1:10,000	833.33 feet 254.00 meters	6.34
1:12,500	1,041.66 feet 317.00 meters	5.07
1:20,000	1,666.70 feet 508.00 meters	3.17
1:24,000 7.5" Quad	2,000 feet 609.6 meters	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
1:63,360 Alaska Maps	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 CHECKLISTS

Pre-Field - GPS:

- Fresh batteries are loaded and extra sets available.
- Transfer background maps using MapSource for the area of mapping (if available).
- Initialize and download a fresh almanac into a Garmin if more than 1 week has transpired since last collection or you have moved more than 150 miles. This takes 20 minutes in the open, away from buildings, canopy and obstructions.
- Old Waypoints and Tracks are cleared from memory. Download any data you don't need, make a copy and clean up waypoints in list and clear all saved tracks and active tracklogs.
- Turn off active tracklog. Set tracklog to the preferred Collection method (Time is best) and an appropriate logging rate for the data collection. 5 seconds works for most walking collection, but keep in mind the total storage capacity of the GPS.
- Ensure Simulator Mode is not ON when collecting data.
- Check Time and Date (Ensure Daylight Savings Time if needed).
- Check Interface Protocol is set to Garmin.
- **Set the Coordinate System (UTM or LAT/LONG) and Datum to ensure compatibility with any written coordinates you may need to navigate to or Maps.**
- Set Heading to Magnetic or True. If set to True, ensure compass has same declination.

Field – GPS Data Collection:

- Hold GPS antenna away from body with antenna up. Better yet, hold at, or above the head. Purchase an external antenna to free hands if needed or for better reception in vehicles.
- Mark (save) waypoints for point locations and beginning and ending of track log collections. Writing down a position is just backup.
- A Garmin will collect data no matter what the GPS quality is. It's up to you to monitor the GPS Satellite Page continuously for anomalies and Accuracy.
- Collect only when "3D GPS" is shown. Do not collect data in 2D unless absolutely necessary.

Waypoints:

- Collect all waypoints in Averaged Position mode if you are standing still (when possible and if your receiver has that capability). Minimum of 10 positions, maximum of 20 minutes. Somewhere in between is enough to generate a quality position in most cases.
- Collect an instantaneous waypoint only when moving or in a hurry (or if using the eTrex line).
- Edit default waypoint numbers to letters or words that are more descriptive or take good field notes to ensure you remember what features are represented by which numbers.

Tracklogs:

- Use "Stop when Full" or "Fill" Record Mode rather than wrap to prevent overwriting tracklog points when Active Tracklog becomes full.
- Turn on Active Tracklog at start location and immediately begin moving.
- Stop Active Tracklog when movement is stopped temporarily or whenmission is finished.
- Always Stop Active Track just shy of starting point when collecting an area (polygon). Overlapping with start point makes conversion to GIS more challenging.
- Always turn Active Tracklog to OFF when finished collecting or turn receiver off to avoid collecting unwanted positions after mission is complete.
- Use caution when saving an Active Tracklog. Garmin will generalize any active track to save space, thereby degrading data. If you save a track log and clear the active track, you won't be able to go back to the more detailed track log positions.

- Acreage can be obtained by saving tracklog- newer units maintain unsaved tracklog. Area Calculation can also generate acreage.
- Fill out metadata form or summarize field notes.
- Deliver your receiver (and download cable) to GIS specialist for download and provide field notes or metadata forms. Be prepared to answer questions about unclear data.

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 ba asked to defing the output type, choose points (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)

   yyyymmdd_time_incidentname_datatype_source_featuretype_coordinatesystemdatum

   Ex: 20100618_1300_monster_perimeter_ZionWFM_pts_utm12n83.txt/shp

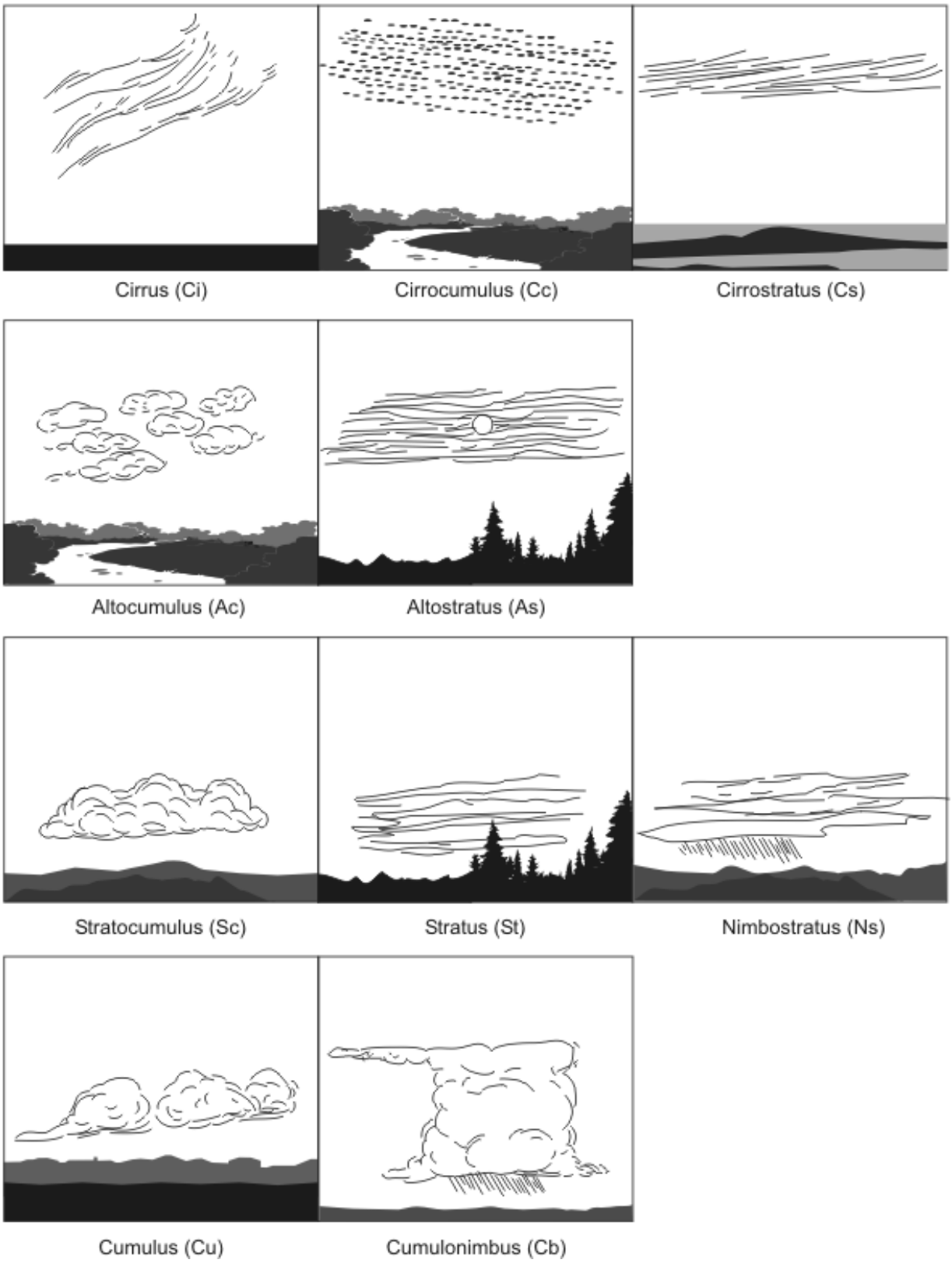
   Datatype= what was mapped (perimeter, dozer line, MAP, etc.); Source= use crew name (& your name); Featuretype= use pts for waypoints, ln for line and pl for polygon.

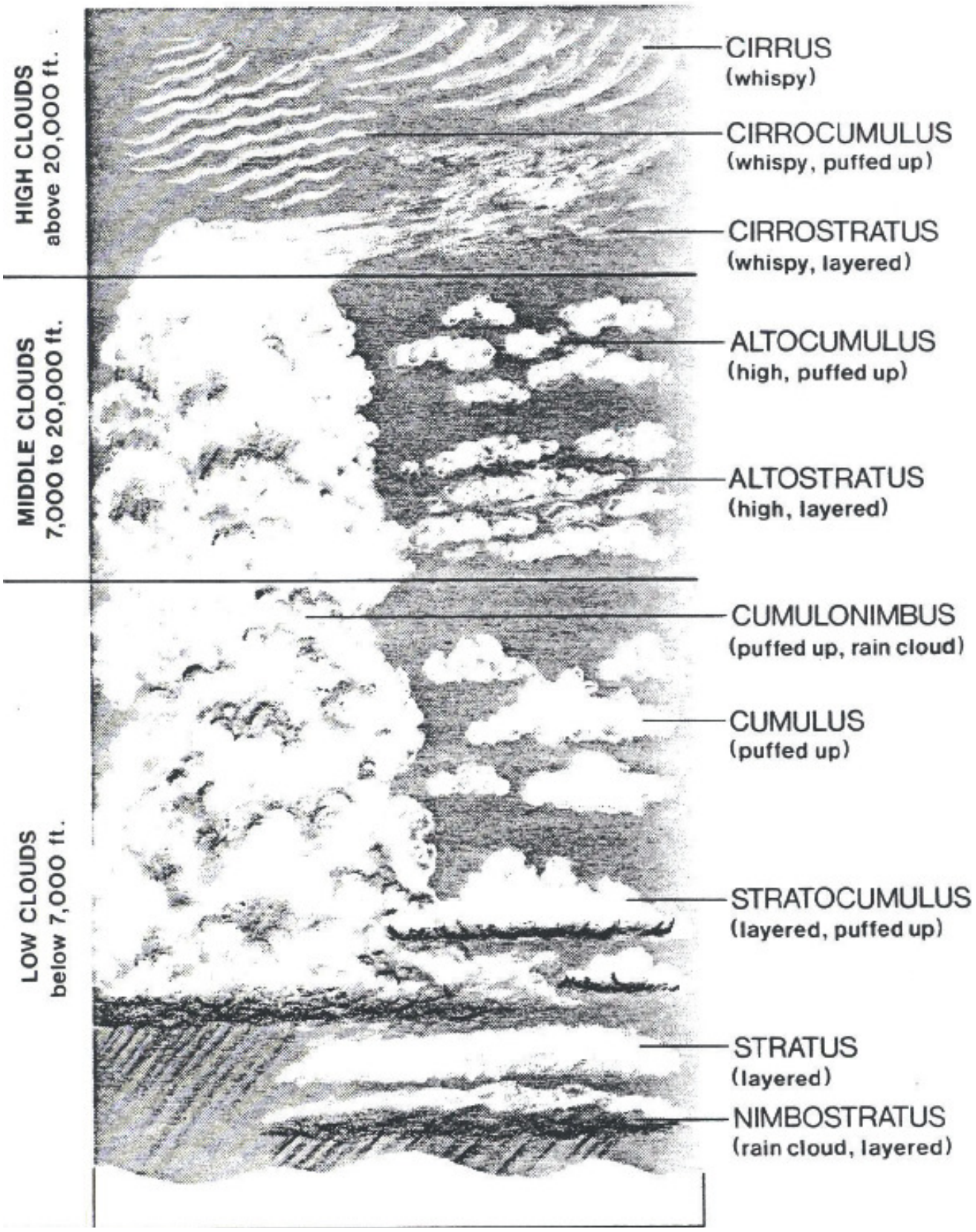
8. If you plan to hand off your data right away, do not drag and drop files to a jump drive or CD. Copy and Paste or Save As to another location.

Other things to consider:

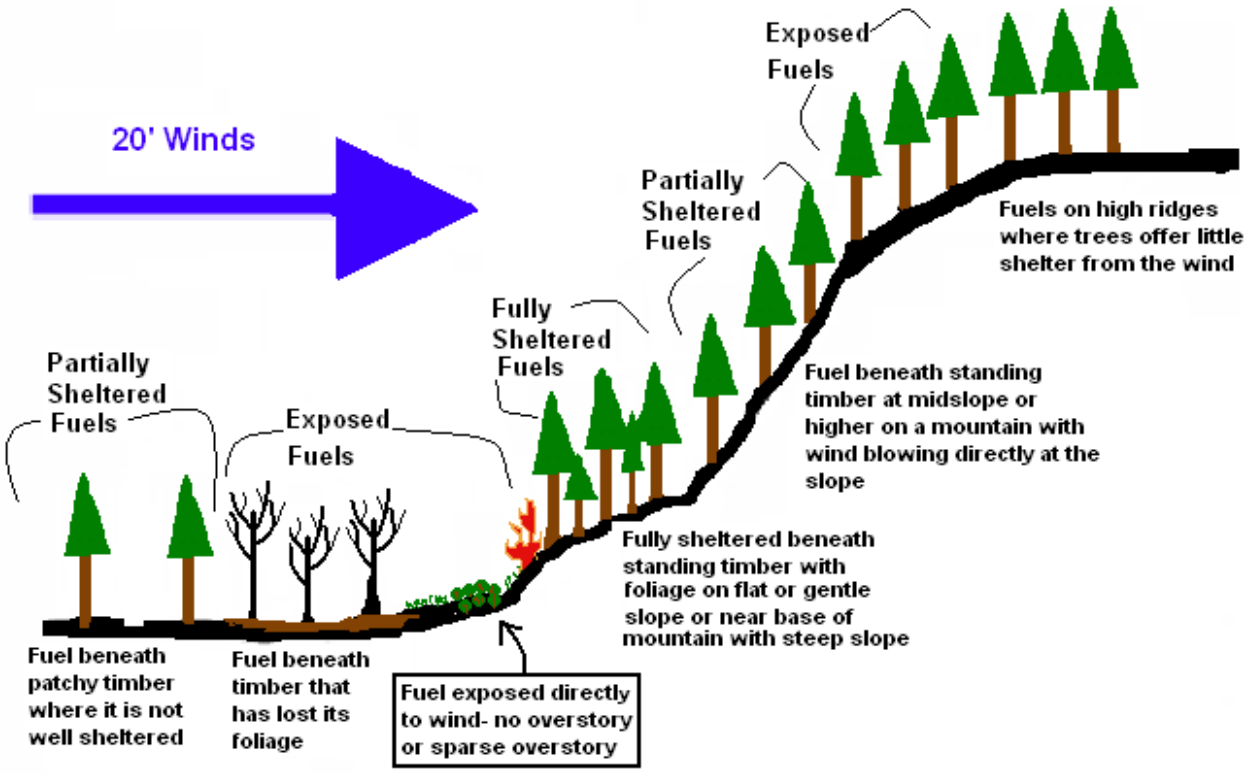
- Consult incident GIS Specialist for preferred file naming conventions.
- Organizing files: place initial downloaded files in C:\20**XX** Fires\Fire Name\ArcGIS\incident_data where "Fire Name" is your current fire and XX=year.
- If you make any changes to your data, save them in the EDITS folder,
- 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
Altocumulus (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.
MIDDLE CLOUDS
7,000 to 20,000 ft.
LOW CLOUDS
below 7,000 ft.
CIRRUS
(whispy)
CIRROCUMULUS
(whispy, puffed up)
CIRROSTRATUS
(whispy, layered)
ALTOCUMULUS
(high, puffed up)
ALTOSTRATUS
(high, layered)
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
Exposed Fuels 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.	**4** **13** **All others***	**0.6** **0.5** **0.4**
Partially Sheltered Fuels 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	All Fuel Models	**0.3**
Fully Sheltered Fuels Fuel sheltered beneath standing timber on flat or gentle slope or near base of mountain with steep slopes	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)				
1	3	5	10	
Time in Minutes(') and Seconds(")				ROS ch/hr
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)				

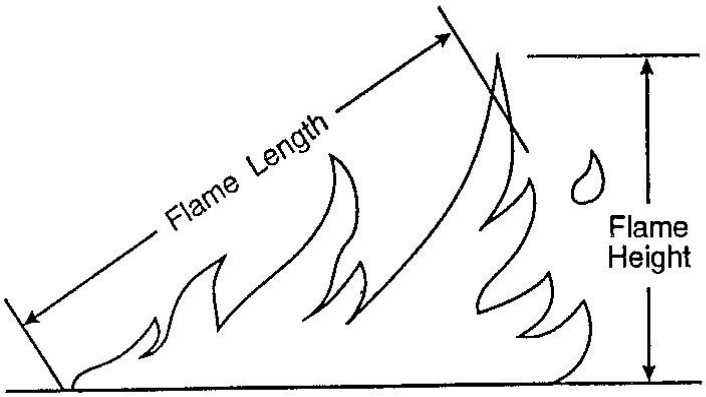
Use this chart as an aid to *estimate* rate of spread

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 anther 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 ¾ 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 ¾ 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
Gross Weight		Container Tare Weight	Water Weight	Dry Weight	% Moisture
Wet	Dry				
Calculation Summary					
A – B = D B – C = E (D / E) x 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
			inches (cm)
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 chapparal, 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. ***Chapparal, 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***

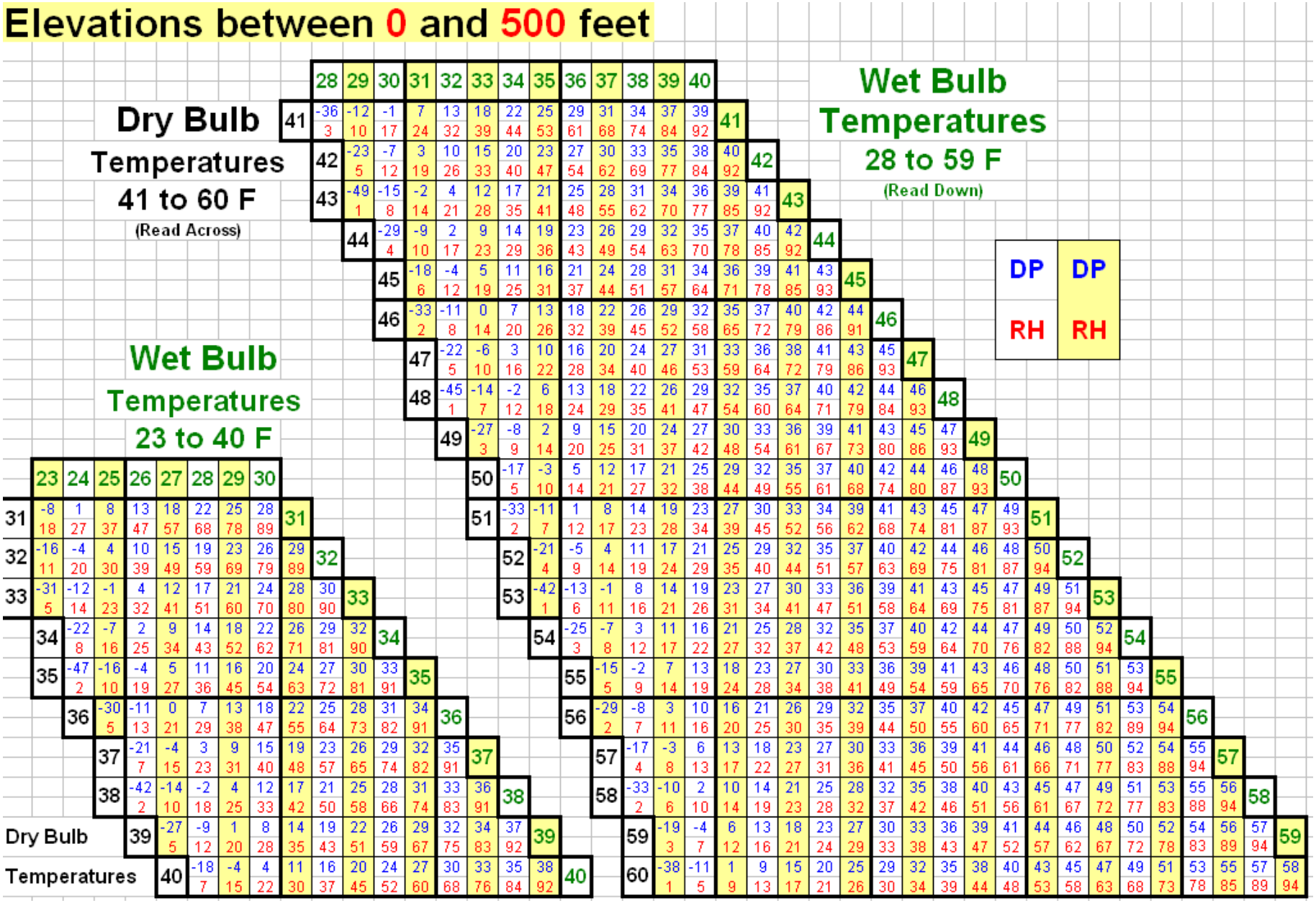
Primary Carrier of the fire is LOGGING SLASH.

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***

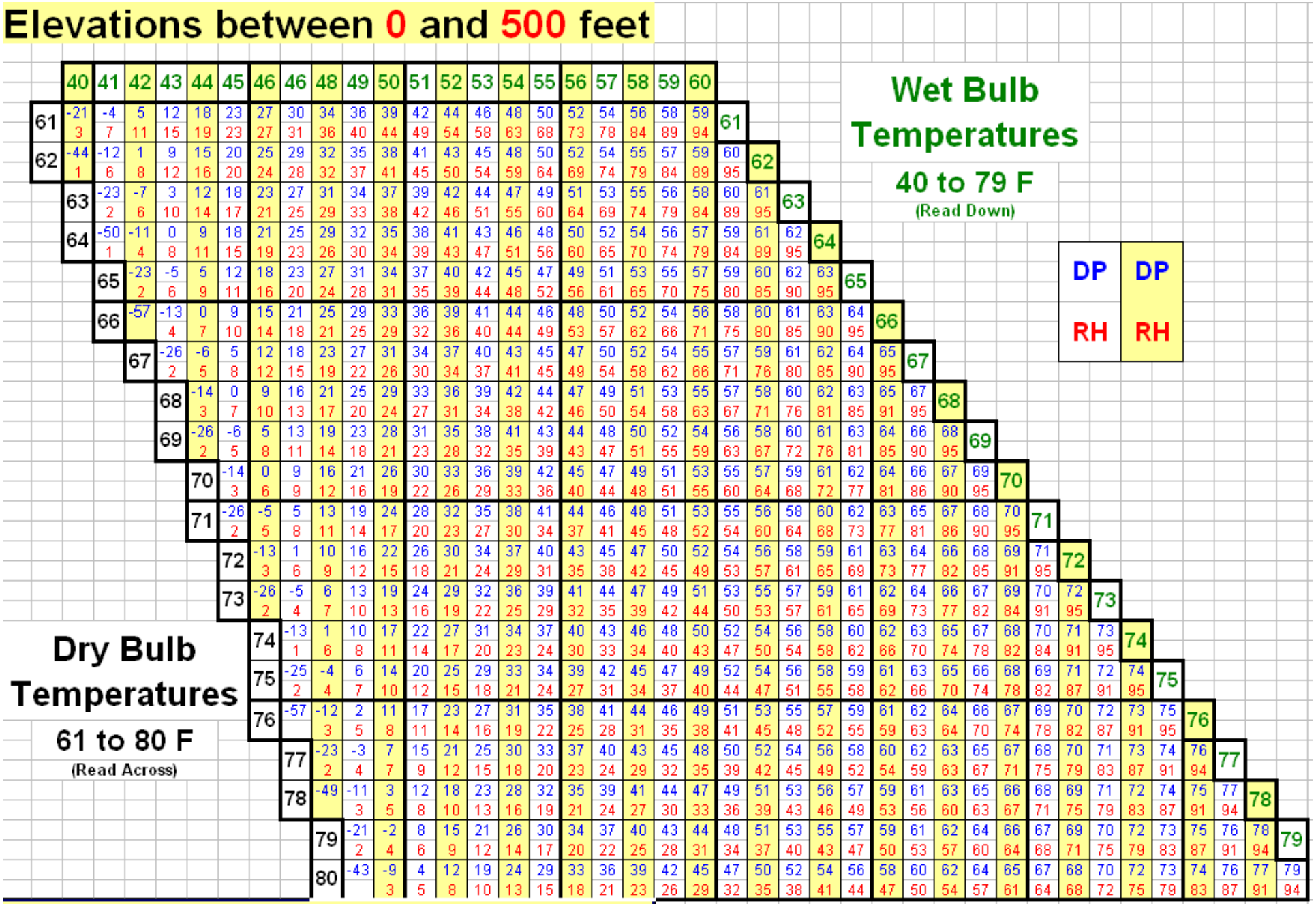
FM12-Slash generally covers the ground (heavier loadings than FM11), though there may be some bare spots or areas of light coverage. Average slash depth is about 2ft. Slash is not excessively compacted. Approximately ½ of the needles may still be on the branches but are not red. Live fuels are absent, 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



Elevations between 0 and 500 feet



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

Dry Bulb	Wet Bulb 61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	Dry Bulb
61	61																			61
	94																			
62	60	62																		62
	95																			
63	60	61	63																	63
	89	95																		
64	59	61	62	64																64
	84	89	95																	
65	59	60	62	63	65															65
	80	85	90	95																
66	58	60	61	63	64	66														66
	75	80	85	90	95															
67	57	59	61	62	64	65	67													67
	71	76	80	85	90	95														
68	57	58	60	62	63	65	67	68												68
	67	71	76	81	85	91	95													
69	56	58	60	61	63	64	66	68	69											69
	63	67	72	76	81	85	90	95												
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	54	60	64	68	73	77	81	86	90	95										
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	53	57	61	65	69	73	77	82	85	91	95									
73	53	55	57	59	61	62	64	66	67	69	70	72	73							73
	50	53	57	61	65	69	73	77	82	84	91	95								
74	52	54	56	58	60	62	63	65	67	68	70	71	73	74						74
	47	50	54	58	62	66	70	74	78	82	84	91	95							
75	52	54	56	58	59	61	63	65	66	68	69	71	72	74	75					75
	44	47	51	55	58	62	66	70	74	78	82	87	91	95						
76	51	53	55	57	59	61	62	64	66	67	69	70	72	73	75	76				76
	41	45	48	52	55	59	63	64	70	74	78	82	87	91	95					
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	39	42	45	49	52	54	59	63	67	71	75	79	83	87	91	94				
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	36	39	43	46	49	53	56	60	63	67	71	75	79	83	87	91	94			
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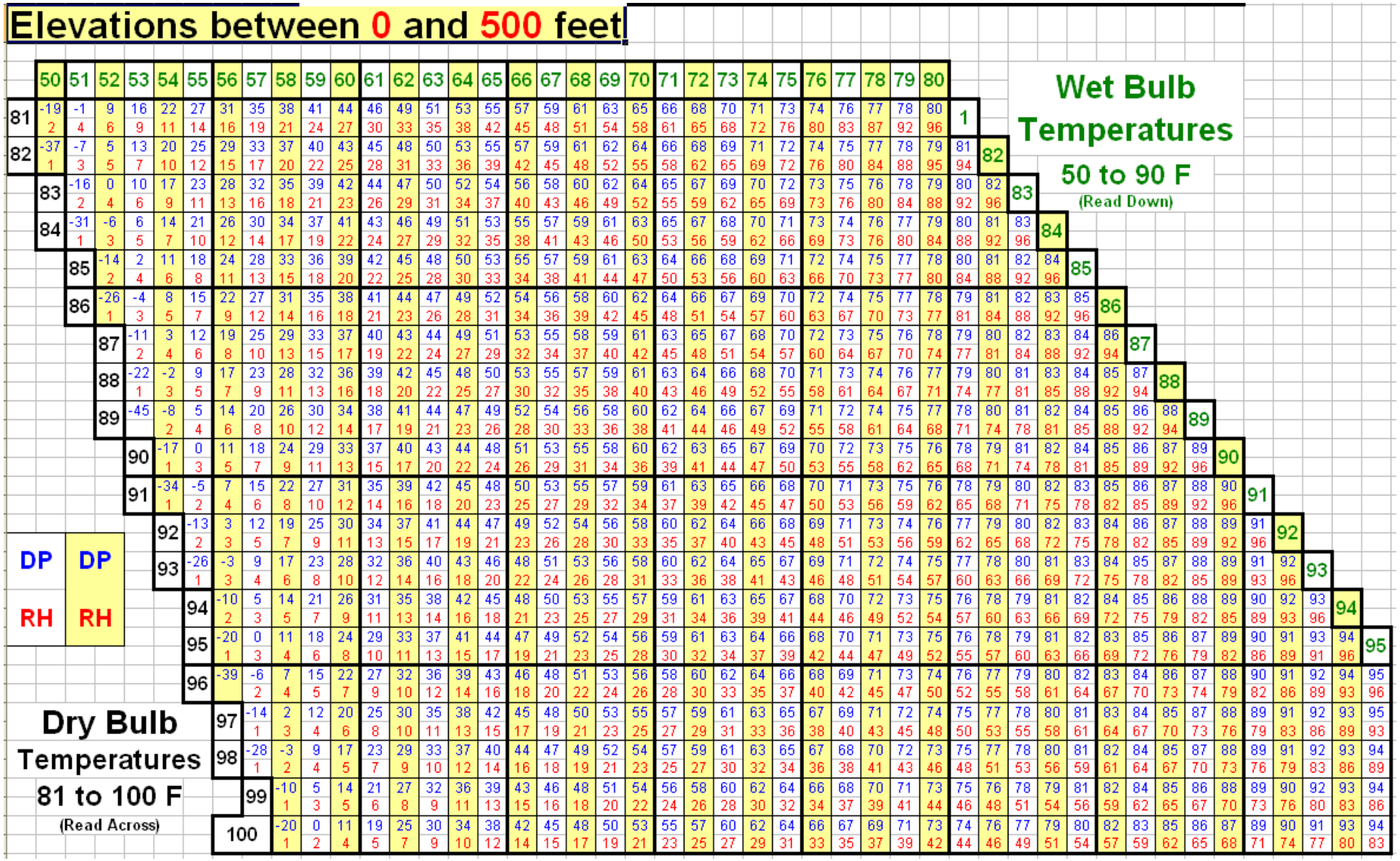
80	47	50	52	54	56	58	60	62	64	65	67	68	70	72	73	74	76	77	79	
	32	35	38	41	44	47	50	54	57	61	64	68	72	75	79	83	87	91	94	

Elevations between 0 and 500 feet



Elevations between 0 and 500 feet

Wet Bulb Temperatures, 58 to 95 F

(Read Down)

Dry Bulb	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	83	84	86	87	88	90	91	92	94
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	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	
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	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	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	41							

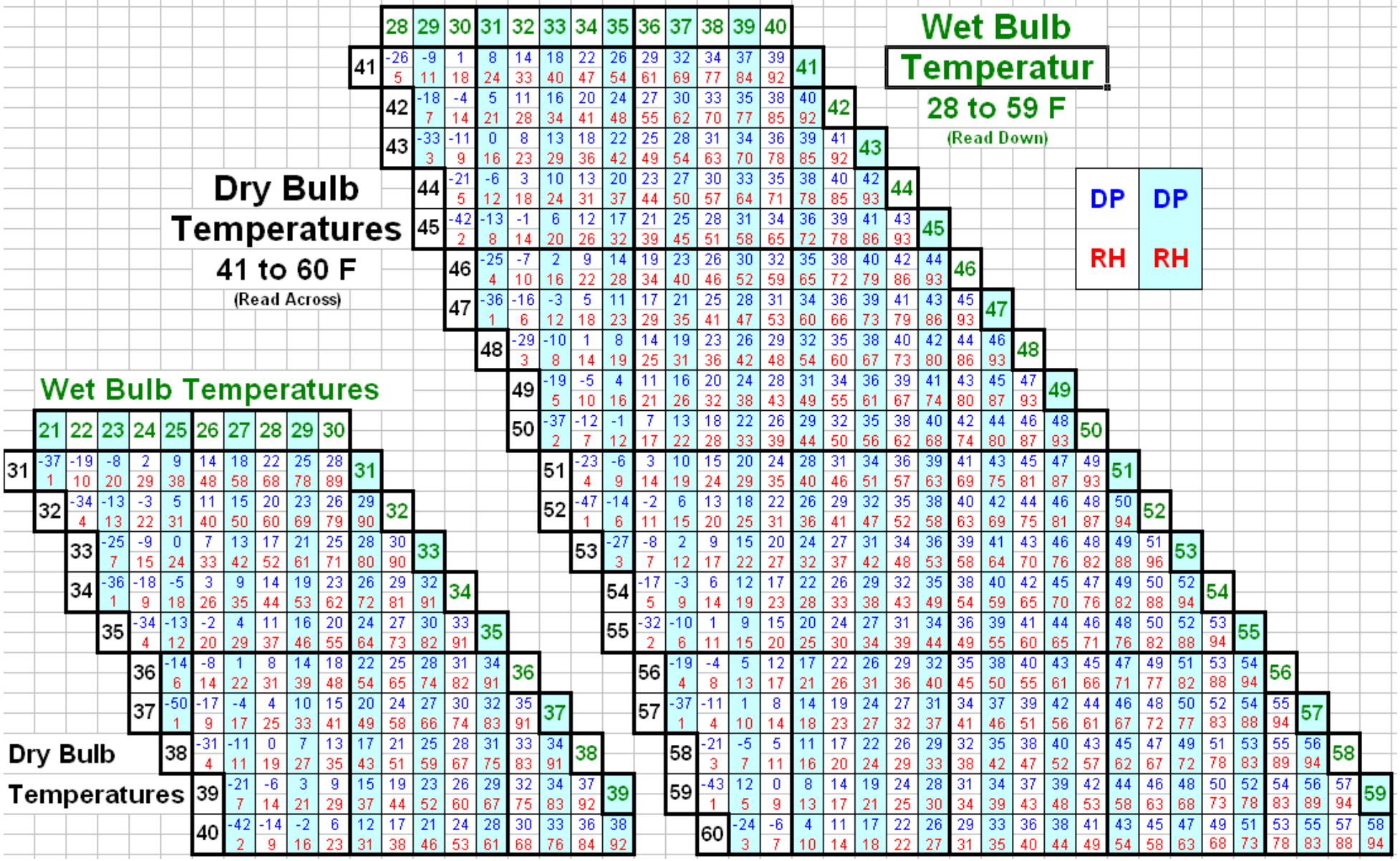
DP DP
RH RH

Dry Bulb Temperatures

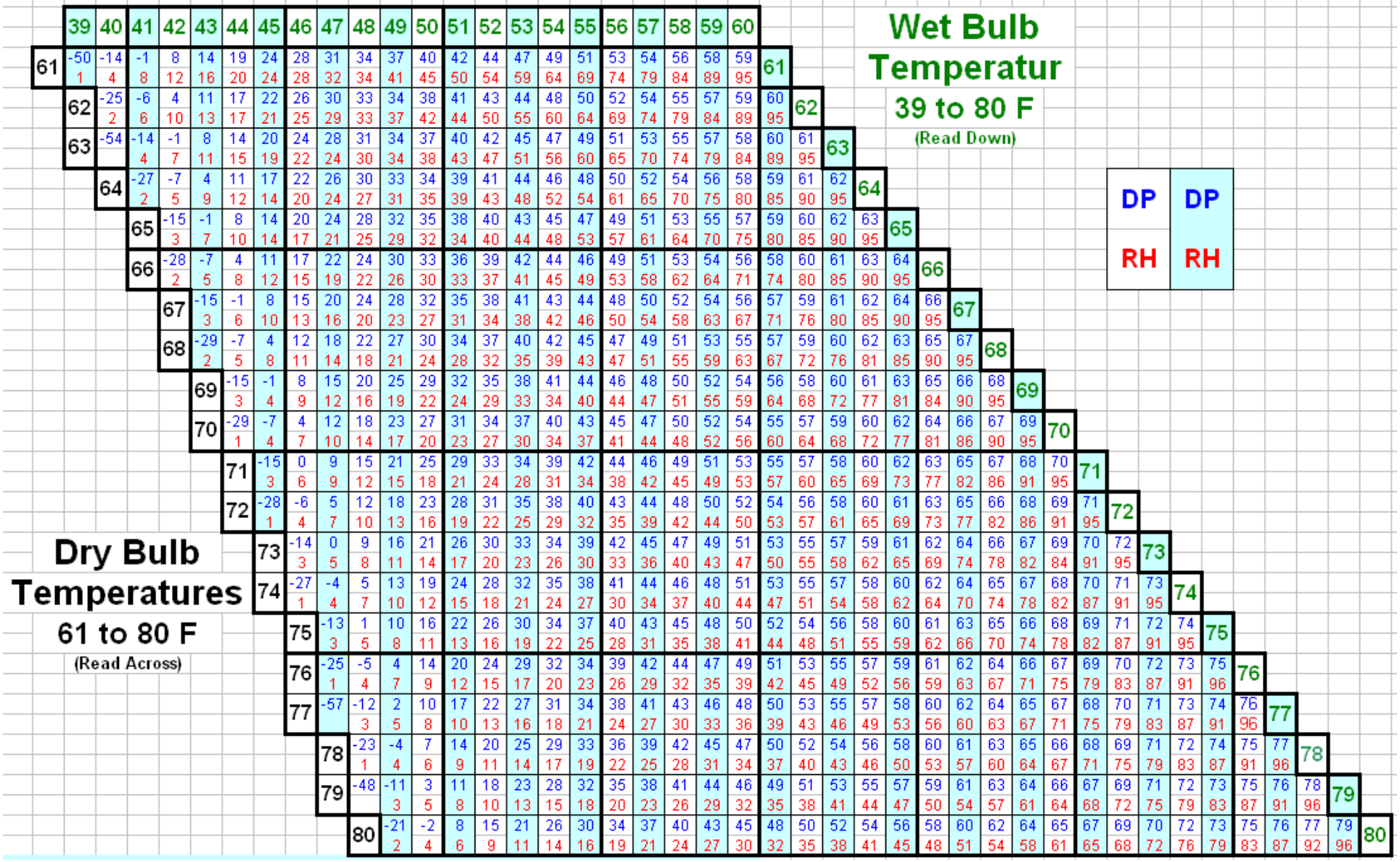
101 to 119 F

(Read Across)

Elevations between 501 and 1,900 feet

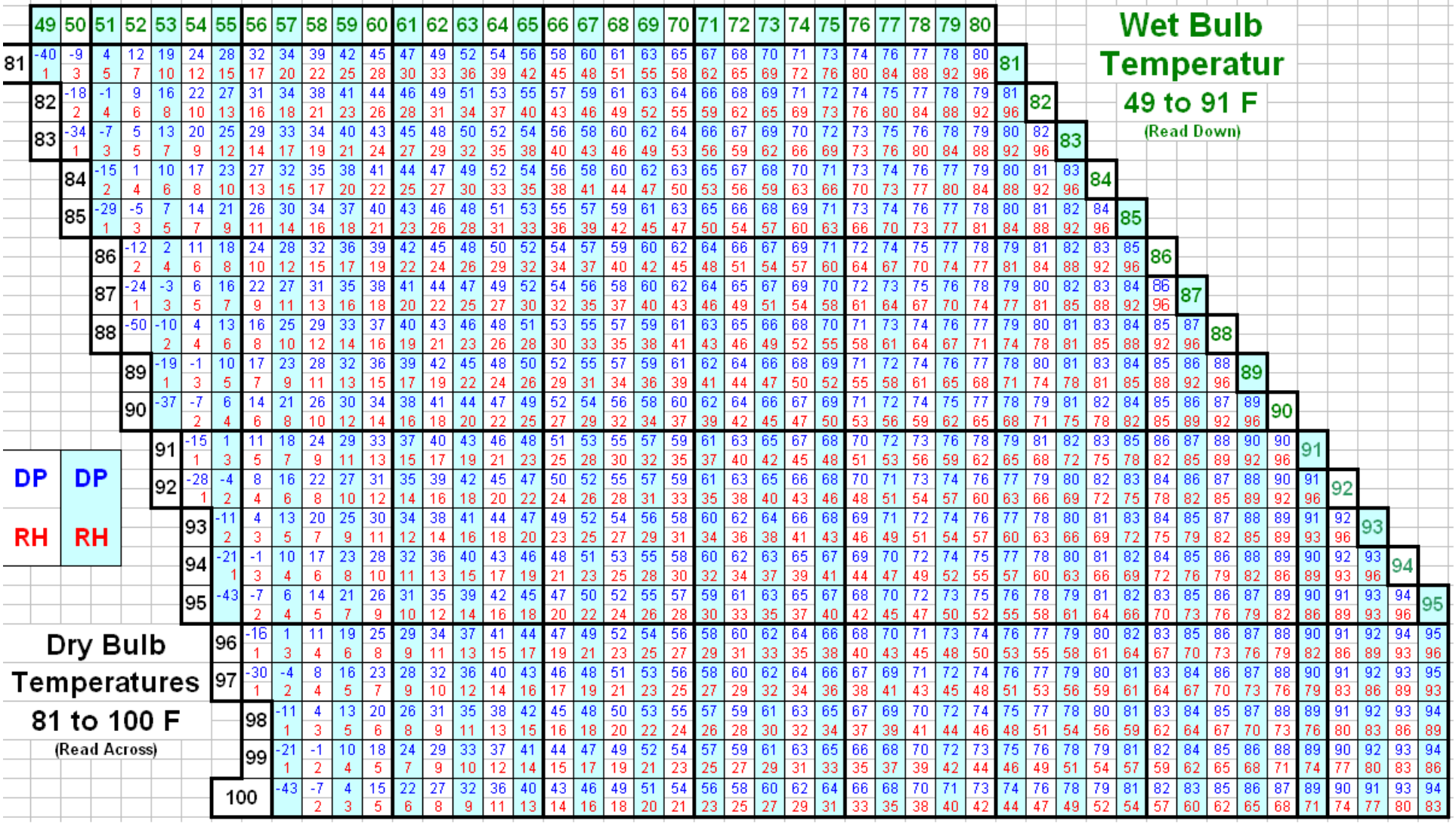


Elevations between 501 and 1,900 feet



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

Elevations between 501 and 1,900 feet



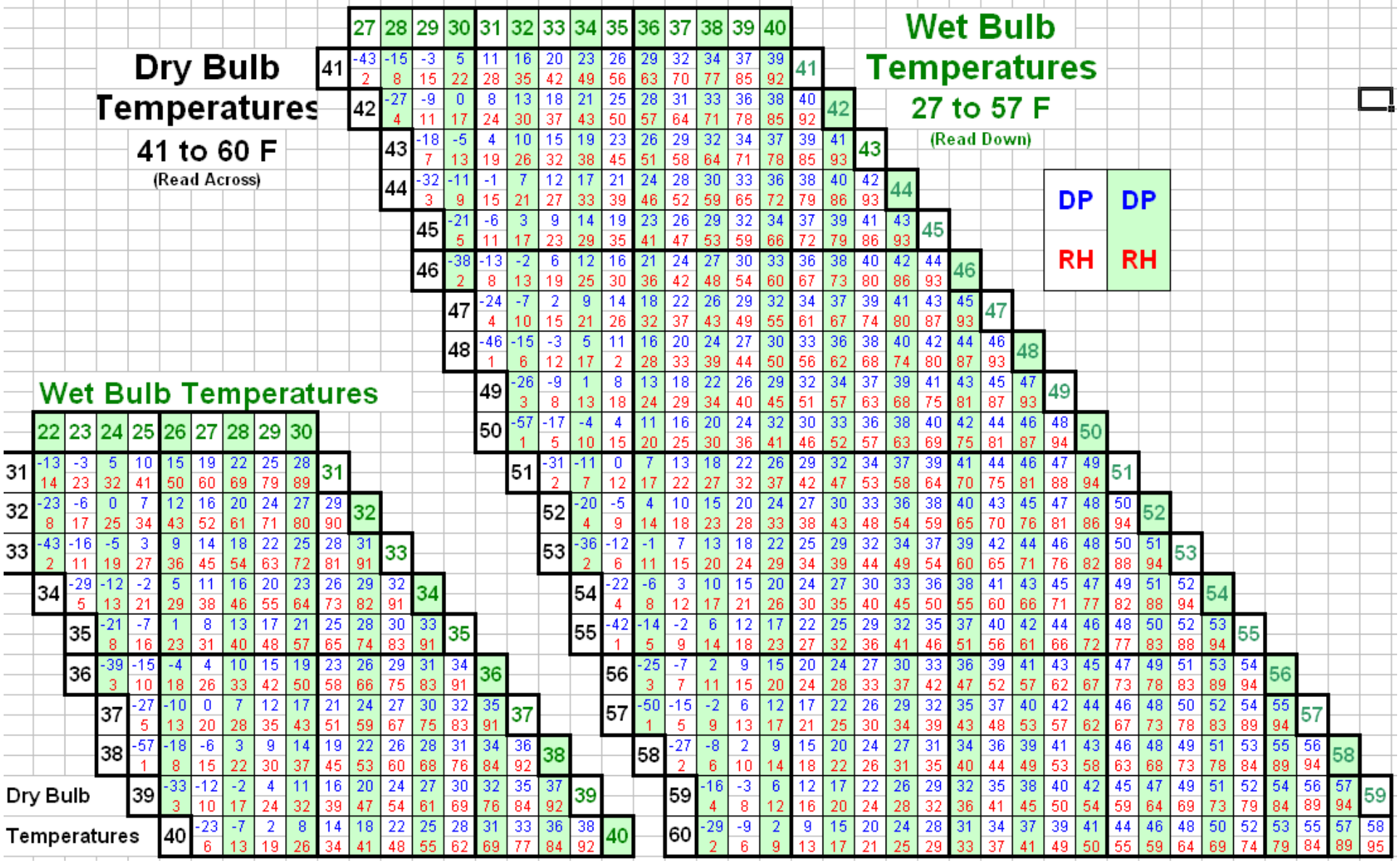
Elevations between 501 and 1,900 feet

Wet Bulb Temperatures, 58 to 95 F

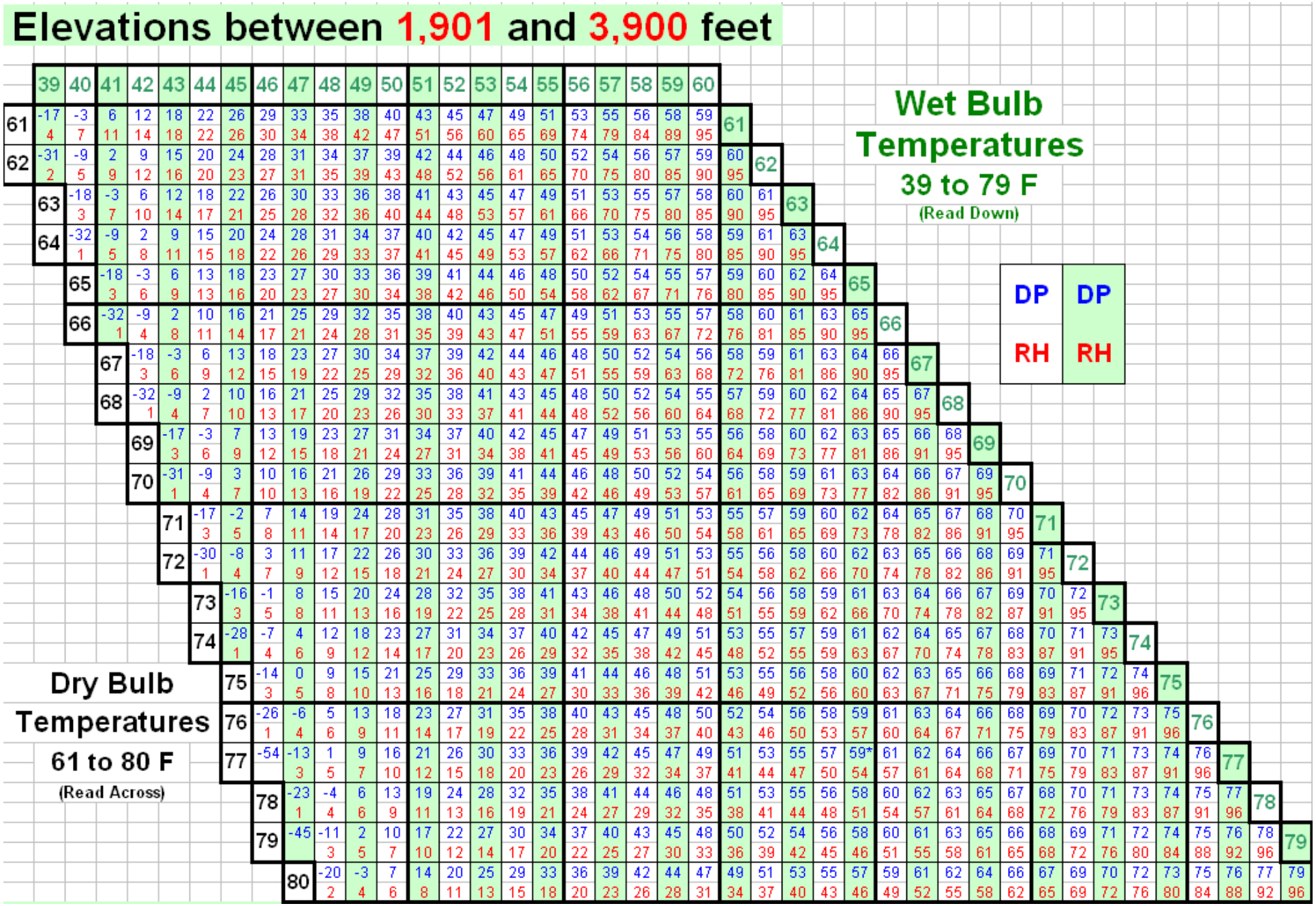
(Read Down)

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

Elevations between 1,901 and 3,900 feet



Elevations between 1,901 and 3,900 feet



Elevations between 1,901 and 3,900 feet

Wet Bulb Temperatures 49 to 89 F (Read Down)

Dry Bulb Temperatures 81 to 100 F (Read Across)

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

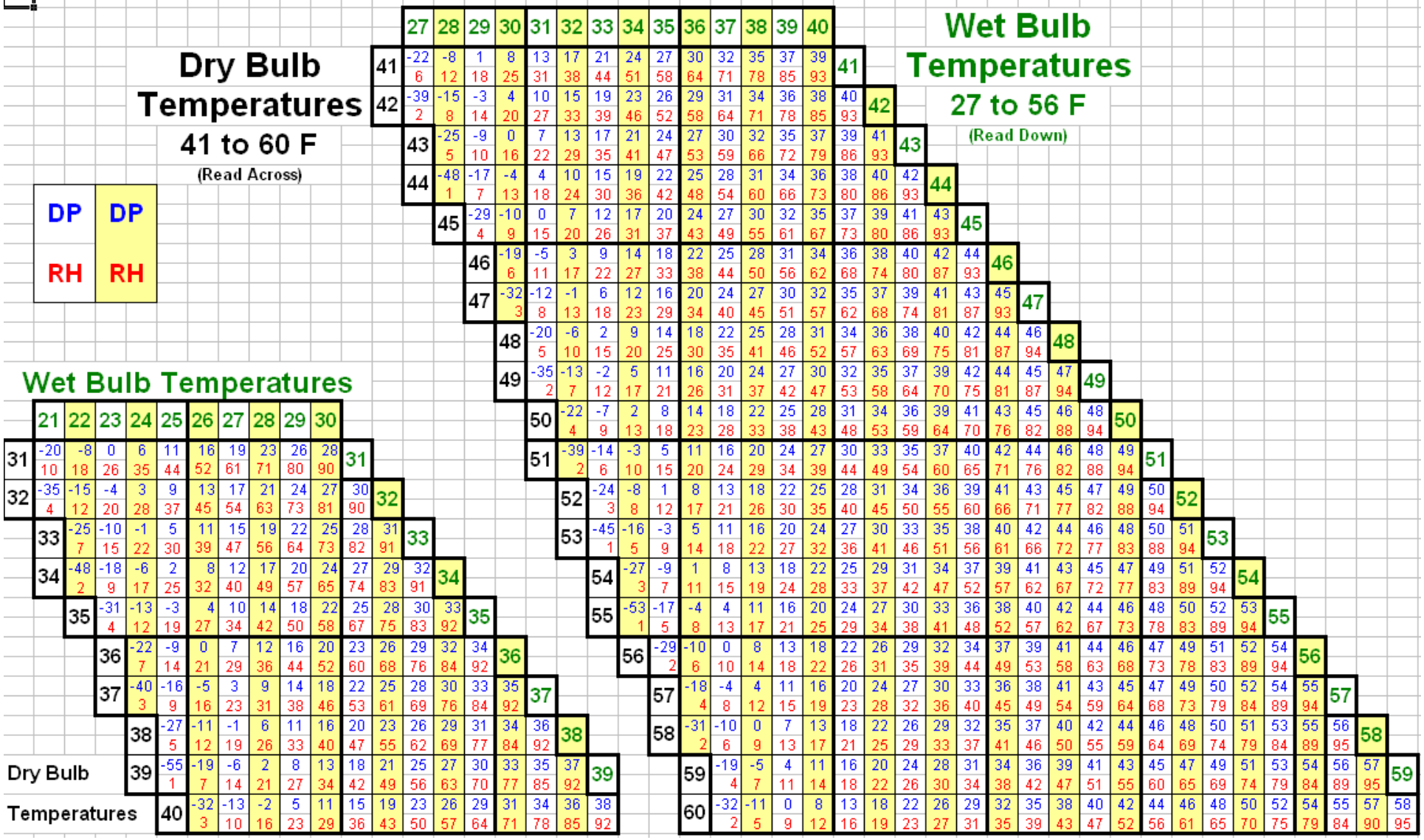
Elevations between 1,901 and 3,900 feet

Wet Bulb Temperatures, 57 to 90 F

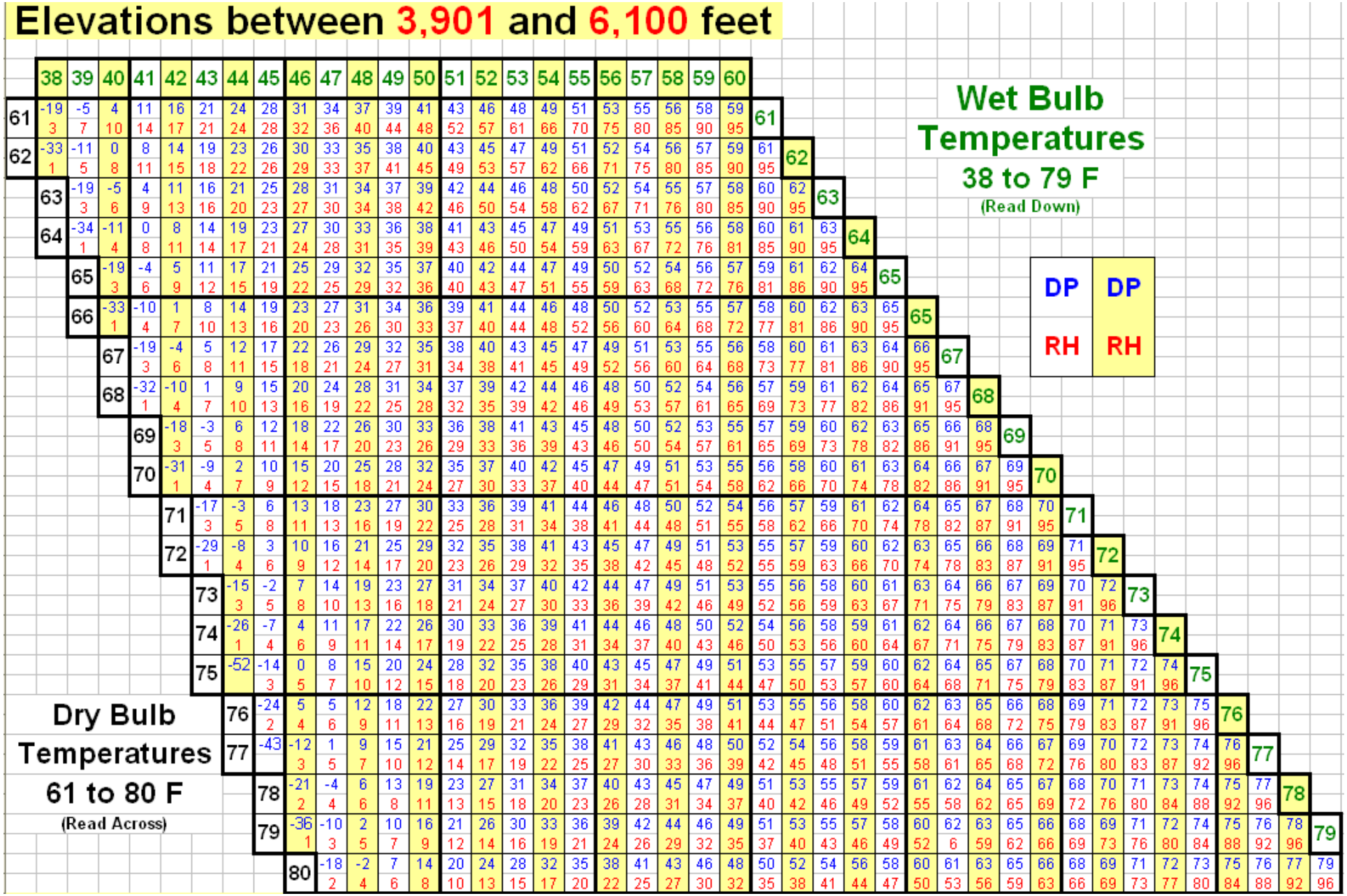
(Read Down)

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

Elevations between 3,901 and 6,100 feet



Elevations between 3,901 and 6,100 feet



Elevations between 3,901 and 6,100 feet

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

DP / RH

Dry Bulb Temperatures 81 to 100 F (Read Across)

Wet Bulb Temperatures 48 to 89 F (Read Down)

Wet Bulb	81	82	83	84	85	86	87	88	89	90
80	80	82	83	84	85	86	87	88	89	90
	96	96	96	96	96	96	96	96	96	96
79	80	81	83	84	85	86	87	88	89	90
	92	92	92	92	92	92	92	92	92	93
78	80	81	82	84	85	86	87	88	89	90
	88	88	88	88	88	89	89	89	89	89
77	79	80	82	83	84	85	86	88	89	90
	85	85	85	85	85	85	85	85	86	86
76	78	80	81	82	84	85	86	87	89	90
	81	81	81	81	81	81	81	81	82	83
75	78	79	81	82	83	85	86	87	88	90
	77	77	77	77	77	77	77	77	78	79
74	77	79	80	81	83	84	85	87	88	89
	73	73	73	73	73	73	73	73	74	75
73	76	78	79	80	82	83	84	86	87	89
	69	69	69	69	69	69	69	69	70	71
72	75	77	78	79	81	82	83	85	86	88
	65	65	65	65	65	65	65	65	66	67
71	74	76	77	78	80	81	82	84	85	87
	62	62	62	62	62	62	62	62	62	63
70	73	75	76	77	79	80	81	83	84	86
	58	58	58	58	58	58	58	58	58	59
69	72	74	75	76	78	79	80	82	83	85
	54	54	54	54	54	54	54	54	54	55
68	71	73	74	75	77	78	79	81	82	84
	50	50	50	50	50	50	50	50	50	51
67	70	72	73	74	76	77	78	80	81	83
	47	47	47	47	47	47	47	47	47	47
66	69	71	72	73	75	76	77	79	80	82
	43	43	43	43	43	43	43	43	43	43
65	68	70	71	72	74	75	76	78	79	81
	40	40	40	40	40	40	40	40	40	40
64	67	69	70	71	73	74	75	77	78	80
	36	36	36	36	36	36	36	36	36	36
63	66	68	69	70	72	73	74	76	77	79
	33	33	33	33	33	33	33	33	33	33
62	65	67	68	69	71	72	73	75	76	78
	29	29	29	29	29	29	29	29	29	29
61	64	66	67	68	70	71	72	74	75	77
	25	25	25	25	25	25	25	25	25	25
60	63	65	66	67	69	70	71	73	74	76
	22	22	22	22	22	22	22	22	22	22
59	62	64	65	66	68	69	70	72	73	75
	18	18	18	18	18	18	18	18	18	18
58	61	63	64	65	67	68	69	71	72	74
	15	15	15	15	15	15	15	15	15	15
57	60	62	63	64	66	67	68	70	71	73
	11	11	11	11	11	11	11	11	11	11
56	59	61	62	63	65	66	67	69	70	72
	8	8	8	8	8	8	8	8	8	8
55	58	60	61	62	64	65	66	68	69	71
	4	4	4	4	4	4	4	4	4	4
54	57	59	60	61	63	64	65	67	68	70
	1	1	1	1	1	1	1	1	1	1
53	56	58	59	60	62	63	64	66	67	69
	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
52	55	57	58	59	61	62	63	65	66	68
	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
51	54	56	57	58	60	61	62	64	65	67
	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
50	53	55	56	57	59	60	61	63	64	66
	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14
49	52	54	55	56	58	59	60	62	63	65
	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18
48	51	53	54	55	57	58	59	61	62	64
	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21

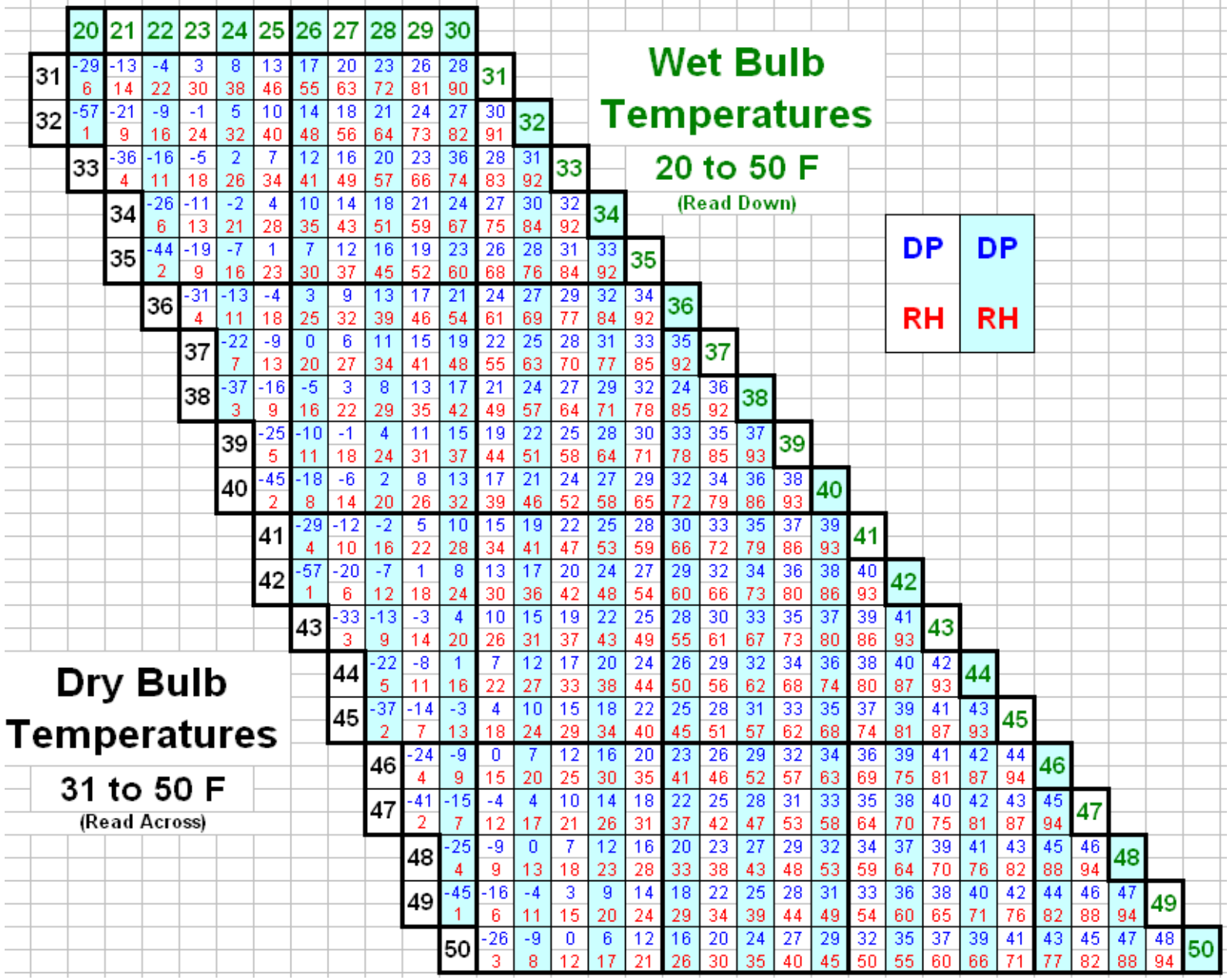
Elevations between 3,901 and 6,100 feet

Wet Bulb Temperatures, 55 to 90 F

(Read Down)

Dry Bulb Temperatures 101 to 119 F (Read Across)	DP / RH	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	DP	-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	81	82	84	85	86	88
	RH		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	DP	-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	
	RH	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	DP	-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	
	RH	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	DP	-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	
	RH		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	DP	-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		
	RH	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	DP	-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		
	RH	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	DP	-47	-8	5	14	20	26	30	35	38	41	44	47	50	52	54	57	59	61	63	65	66	68	70	72	73	75	76	78	79	81	82	83	85	86		
	RH		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	DP	-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			
	RH	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	DP	-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			
	RH		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	DP	-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			
	RH		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			
111	DP	-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				
	RH	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				
112	DP	-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				
	RH		1	2	3	4	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				
113	DP	-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					
	RH		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				
114	DP	-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					
	RH		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				
115	DP	-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					
	RH		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					
116	DP	-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						
	RH		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					
117	DP	-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						
	RH		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					
118	DP	-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						
	RH		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						
119	DP	-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							
	RH		1	2	3	4	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						

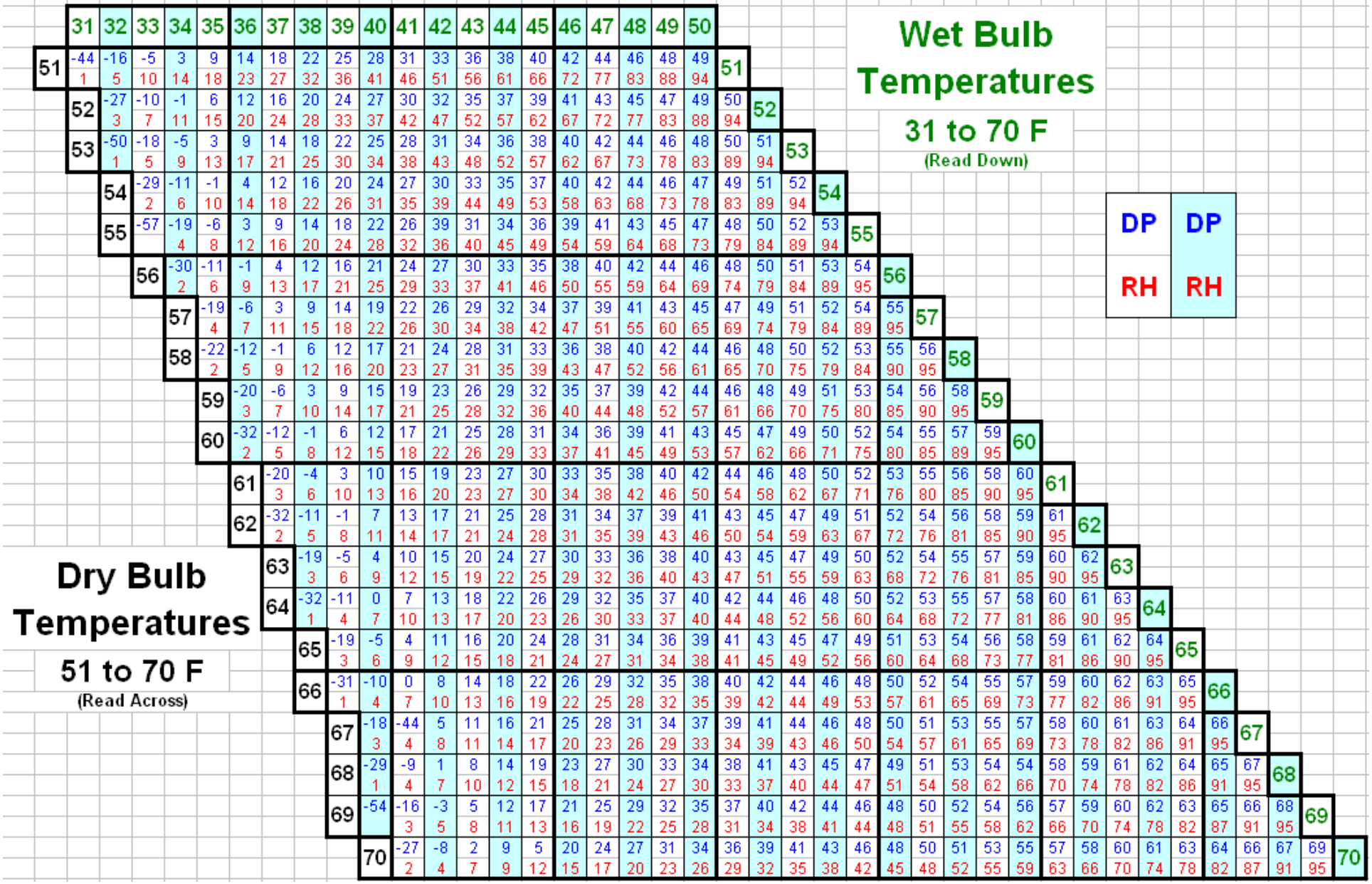
Elevations between 6,101 and 8,500 feet



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

Dry Bulb	Wet Bulb 31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
31																				
32	30																			
	91																			
33	31	33																		
	92																			
34	32	34																		
	92																			
35	33	35																		
	92																			
36	34	36																		
	92																			
37	35	37																		
	92																			
38	24	36	38																	
	85	92																		
39	33	35	37	39																
	78	85	93																	
40	32	34	36	38	40															
	72	79	86	93																
41	30	33	35	37	39	41														
	66	72	79	86	93															
42	29	32	34	36	38	40	42													
	60	66	73	80	86	93														
43	28	30	33	35	37	39	41	43												
	55	61	67	73	80	86	93													
44	26	29	32	34	36	38	40	42	44											
	50	56	62	68	74	80	87	93												
45	25	28	31	33	35	37	39	41	43	45										
	45	51	57	62	68	74	81	87	93											
46	23	26	29	32	34	36	39	41	42	44	46									
	41	46	52	57	63	69	75	81	87	94										
47	22	25	28	31	33	35	38	40	42	43	45	47								
	37	42	47	53	58	64	70	75	81	87	94									
48	20	23	27	29	32	34	37	39	41	43	45	46	48							
	33	38	43	48	53	59	64	70	76	82	88	94								
49	18	22	25	28	31	33	36	38	40	42	44	46	47	49						
	29	34	39	44	49	54	60	65	71	76	82	88	94							
50	16	20	24	27	29	32	35	37	39	41	43	45	47	48	50					
	26	30	35	40	45	50	55	60	66	71	77	82	88	94						

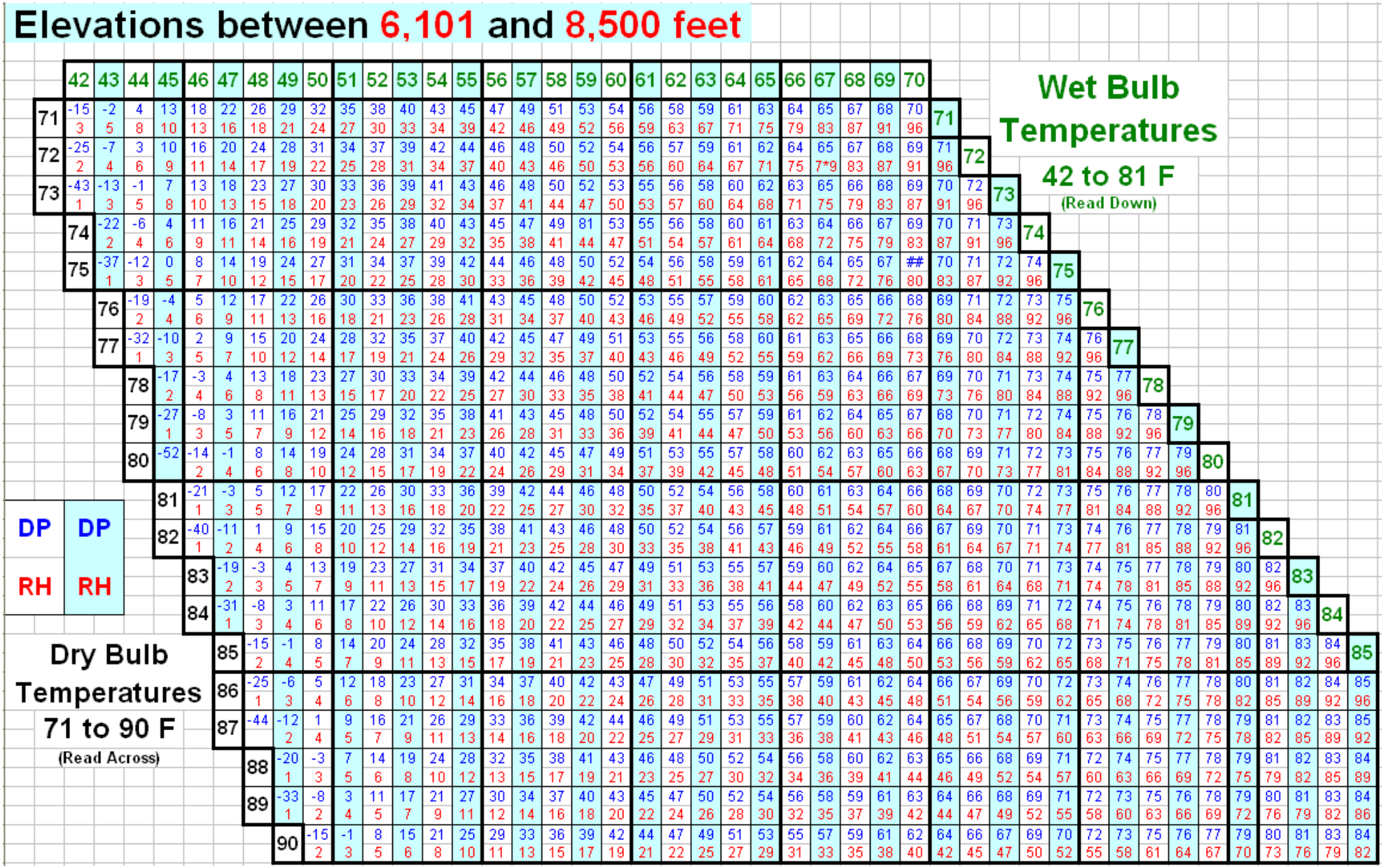
Elevations between 6,101 and 8,500 feet



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

	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
51	50	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	94																			
52	50	51	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	94	94																		
53	49	51	52	53	54	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	89	94	94																	
54	49	51	52	53	54	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	83	89	94	94																
55	48	50	52	53	54	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	79	84	89	94	94															
56	48	50	51	53	54	55	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	74	79	84	89	95	95														
57	47	49	51	52	54	55	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	69	74	79	84	89	95	95													
58	46	48	50	52	53	55	56	58	59	60	61	62	63	64	65	66	67	68	69	70
	65	70	75	79	84	90	95	95												
59	46	48	49	51	53	54	56	58	59	60	61	62	63	64	65	66	67	68	69	70
	61	66	70	75	80	85	90	95	95											
60	45	47	49	50	52	54	55	57	59	60	61	62	63	64	65	66	67	68	69	70
	57	62	66	71	75	80	85	89	95	95										
61	44	46	48	50	52	53	55	56	58	60	61	62	63	64	65	66	67	68	69	70
	54	58	62	67	71	76	80	85	90	95	95									
62	43	45	47	49	51	52	54	56	58	59	61	62	63	64	65	66	67	68	69	70
	50	54	59	63	67	72	76	81	85	90	95	95								
63	43	45	47	49	50	52	54	55	57	59	60	62	63	64	65	66	67	68	69	70
	47	51	55	59	63	68	72	76	81	85	90	95	95							
64	42	44	46	48	50	52	53	55	57	58	60	61	63	64	65	66	67	68	69	70
	44	48	52	56	60	64	68	72	77	81	86	90	95	95						
65	41	43	45	47	49	51	53	54	56	58	59	61	62	64	65	66	67	68	69	70
	41	45	49	52	56	60	64	68	73	77	81	86	90	95	95					
66	40	42	44	46	48	50	52	54	55	57	59	60	62	63	65	66	67	68	69	70
	39	42	44	49	53	57	61	65	69	73	77	82	86	91	95	95				
67	39	41	44	46	48	50	51	53	55	57	58	60	61	63	64	66	67	68	69	70
	34	39	43	46	50	54	57	61	65	69	73	78	82	86	91	95	95			
68	38	41	43	45	47	49	51	53	54	54	58	59	61	62	64	65	67	68	69	70
	33	37	40	44	47	51	54	58	62	66	70	74	78	82	86	91	95	95		
69	37	40	42	44	46	48	50	52	54	56	57	59	60	62	63	65	66	68	69	70
	31	34	38	41	44	48	51	55	58	62	66	70	74	78	82	87	91	95	95	
70	36	39	41	43	46	48	50	51	53	55	57	58	60	61	63	64	66	67	69	70
	29	32	35	38	42	45	48	52	55	59	63	66	70	74	78	82	87	91	95	95

Elevations between 6,101 and 8,500 feet



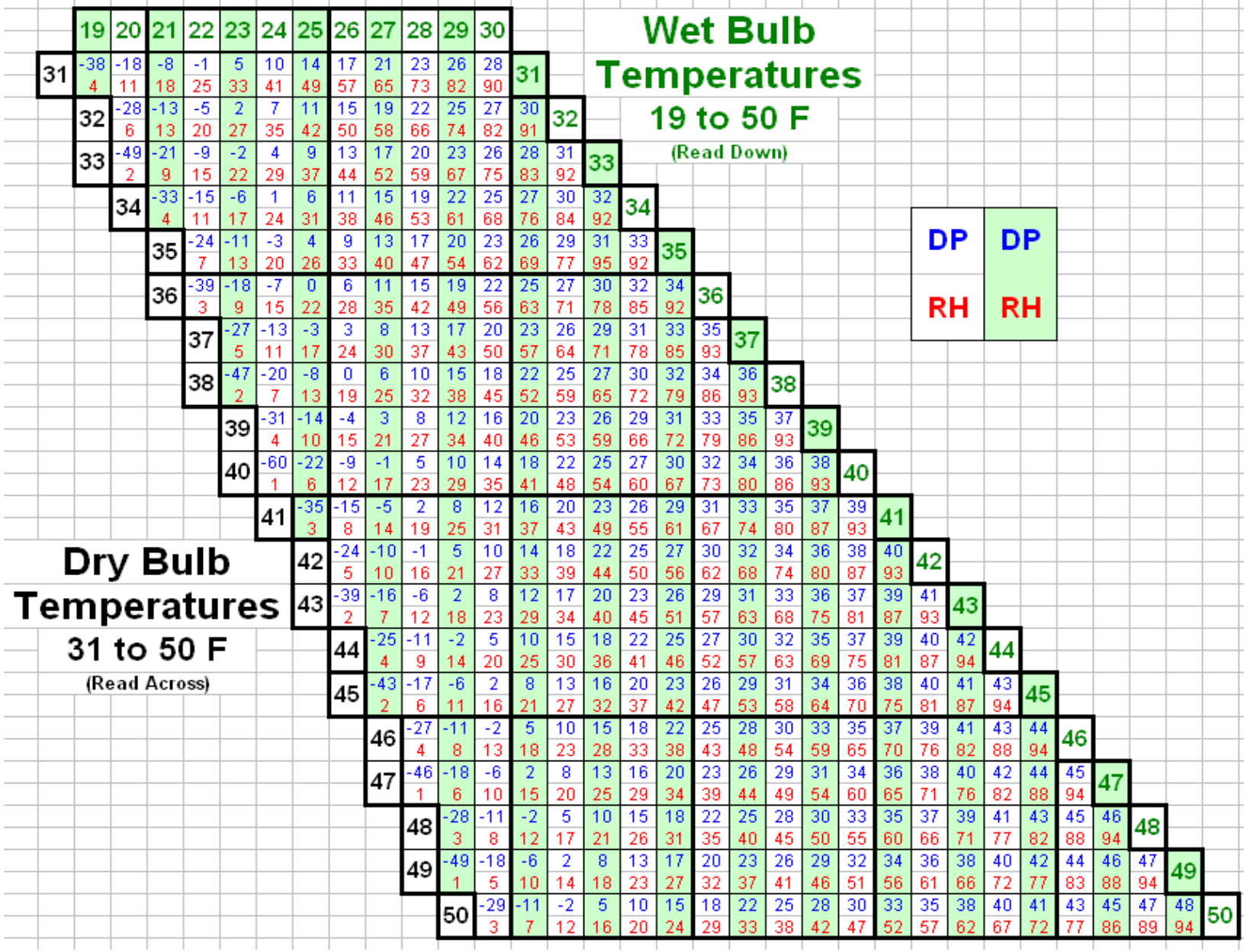
Elevations between 6,101 and 8,500 feet

Wet Bulb Temperatures, 50 to 85 F

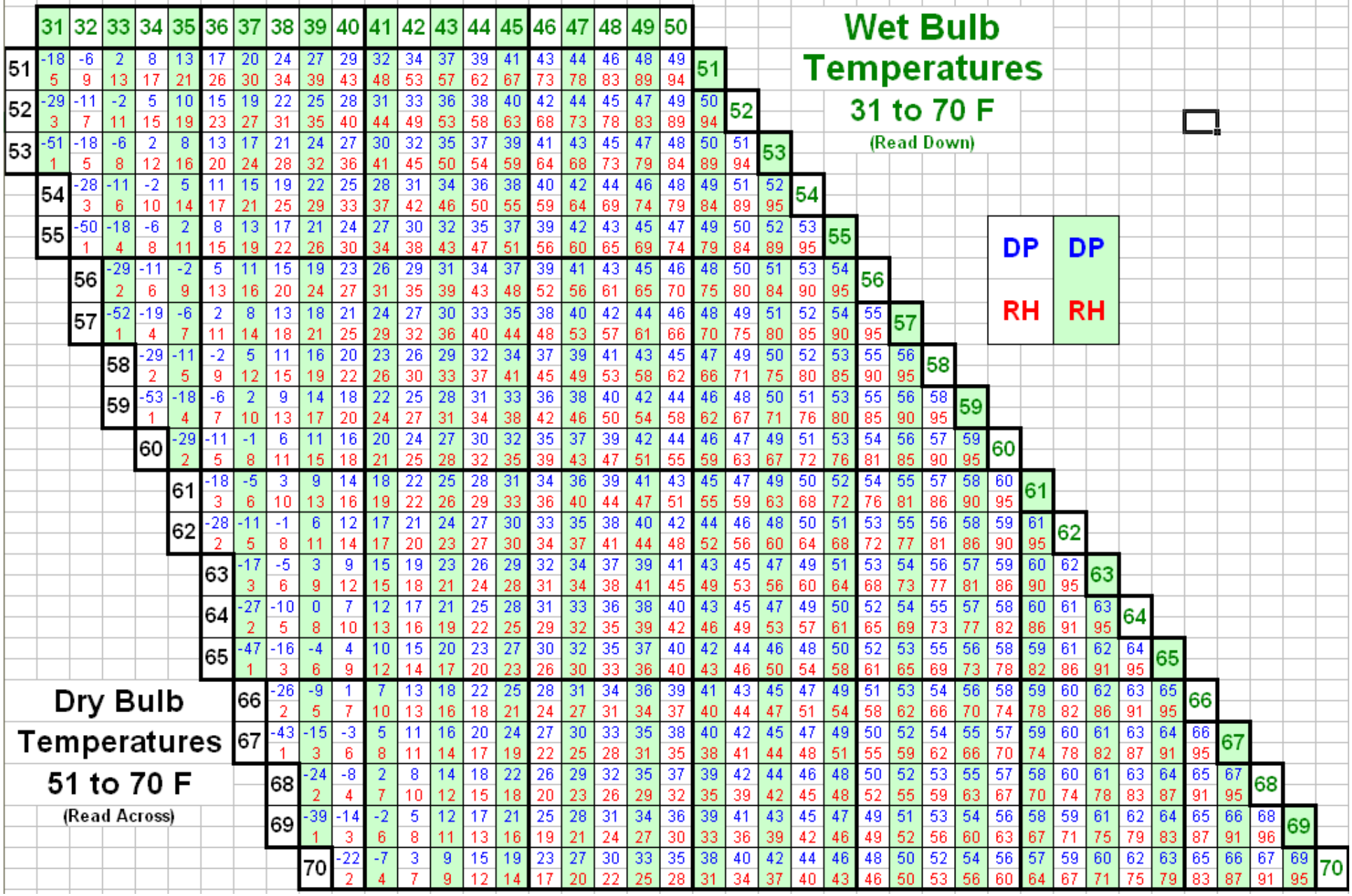
(Read Down)

Dry Bulb Temperatures 91 to 109 F (Read Across)	DP RH	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
91	DP	-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
	RH	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
92	DP	-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
	RH		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
93	DP	-18	-2	6	15	20	25	29	33	36	39	42	44	47	49	51	53	55	57	59	61	63	64	66	69	69	71	72	74	75	76	78	79	81	82	83
	RH	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
94	DP	-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
	RH	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
95	DP	-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
	RH	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
96	DP	-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
	RH	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
97	DP	-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
	RH		2	3	4	6	7	9	10	12	13	15	16	18	20	21	23	25	27	29	31	33	35	37	39	41	43	45	48	50	53	55	58	60	63
98	DP	-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
	RH	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
99	DP	-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
	RH	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
100	DP	-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
	RH		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
101	DP	-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
	RH	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
102	DP	-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
	RH		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
103	DP	-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
	RH	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
104	DP	-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
	RH	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
105	DP	-33	-6	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
	RH		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
106	DP	-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
	RH	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
107	DP	-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
	RH	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
108	DP	-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
	RH		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
109	DP	-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
	RH	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	40

Elevations between 8,501 and 11,000 feet



Elevations between 8,501 and 11,000 feet



Elevations between 8,501 and 11,000 feet

Wet Bulb Temperatures 41 to 89°F

DP	DP
RH	RH

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

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

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)**

ReferenceFuel Moisture
Day Time
0800 - 1959

1

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	2	3	4	5	5	6	7	8	8	8	9	9	10	11	12	12	13	13	14
30 - 49	1	2	2	3	4	5	5	6	7	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	12	13
70 - 89	1	1	2	2	3	4	5	5	6	7	7	8	8	8	9	10	10	11	12	12	13
90 - 109	1	1	2	2	3	4	5	5	6	7	7	8	8	8	9	10	10	11	12	12	13
109 +	1	1	2	2	3	4	4	5	6	7	7	8	8	8	9	10	10	11	12	12	12

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

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%	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

2S SHADED

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.

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%	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

2S SHADED

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

	Relative Humidity (%)																				
Dry Bulb Temp. (F)	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

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

PROBABILITY OF IGNITION TABLE

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

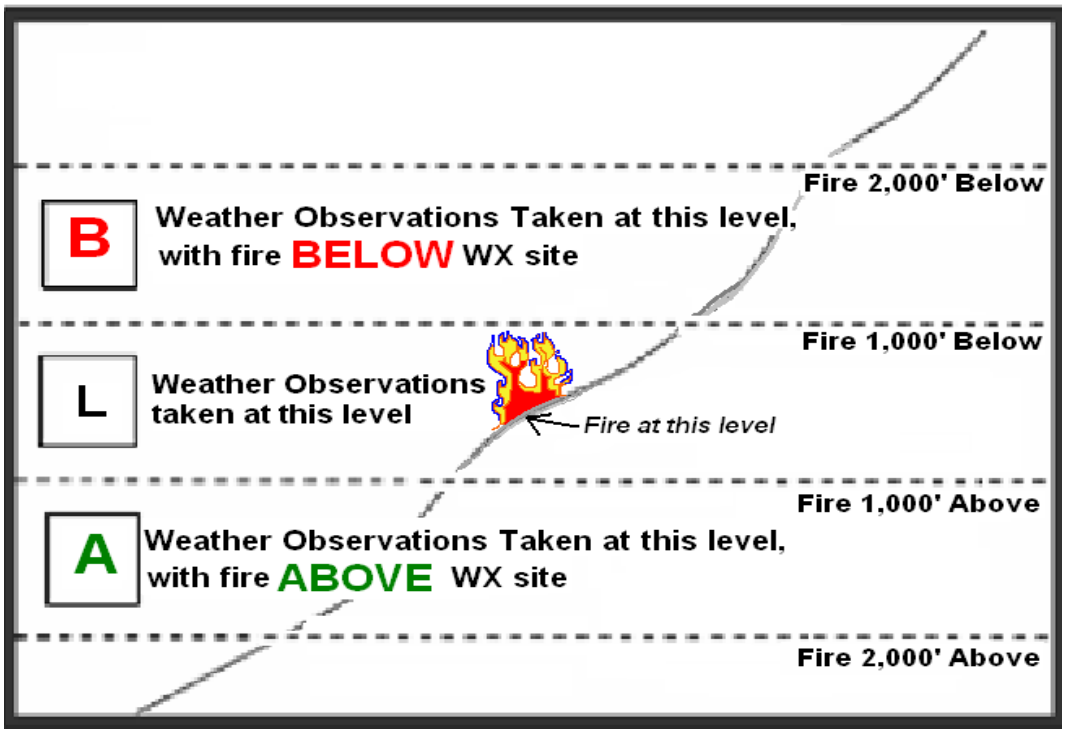
L – Weather observations are taken between 1,000 above and 1,000' below or' **Level** with the fire behavior observations/projections.

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



2010 PAYROLL SCHEDULE

(1) END OF PAY PERIOD

HOLIDAYS

JANUARY

S	M	T	W	T	F	S	
					1	2	(1)
3	4	5	6	7	8	9	
10	11	12	13	14	15	16	(2)
17	18	19	20	21	22	23	
24	25	26	27	28	29	30	(3)
31							

FEBRUARY

S	M	T	W	T	F	S	
	1	2	3	4	5	6	
7	8	9	10	11	12	13	(4)
14	15	16	17	18	19	20	
21	22	23	24	25	26	27	(5)
28							

MARCH

S	M	T	W	T	F	S	
	1	2	3	4	5	6	
7	8	9	10	11	12	13	(6)
14	15	16	17	18	19	20	
21	22	23	24	25	26	27	(7)
28	29	30	31				

APRIL

S	M	T	W	T	F	S	
				1	2	3	
4	5	6	7	8	9	10	(8)
11	12	13	14	15	16	17	
18	19	20	21	22	23	24	(9)
25	26	27	28	29	30		

MAY

S	M	T	W	T	F	S	
						1	
2	3	4	5	6	7	8	(10)
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	(11)
23	24	25	26	27	28	29	
30	31						

JUNE

S	M	T	W	T	F	S	
		1	2	3	4	5	(12)
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	(13)
20	21	22	23	24	25	26	
27	28	29	30				

JULY

S	M	T	W	T	F	S	
				1	2	3	(14)
4	5	6	7	8	9	10	
11	12	13	14	15	16	17	(15)
18	19	20	21	22	23	24	
25	26	27	28	29	30	31	(16)

AUGUST

S	M	T	W	T	F	S	
1	2	3	4	5	6	7	
8	9	10	11	12	13	14	(17)
15	16	17	18	19	20	21	
22	23	24	25	26	27	28	(18)
29	30	31					

SEPTEMBER

S	M	T	W	T	F	S	
			1	2	3	4	
5	6	7	8	9	10	11	(19)
12	13	14	15	16	17	18	
19	20	21	22	23	24	25	(20)
26	27	28	29	30			

OCTOBER

S	M	T	W	T	F	S	
					1	2	
3	4	5	6	7	8	9	(21)
10	11	12	13	14	15	16	
17	18	19	20	21	22	23	(22)
24	25	26	27	28	29	30	
31							

NOVEMBER

S	M	T	W	T	F	S	
	1	2	3	4	5	6	(23)
7	8	9	10	11	12	13	
14	15	16	17	18	19	20	(24)
21	22	23	24	25	26	27	
28	29	30					

DECEMBER

S	M	T	W	T	F	S	
			1	2	3	4	(25)
5	6	7	8	9	10	11	
12	13	14	15	16	17	18	(26)
19	20	21	22	23	24	25	
26	27	28	29	30	31		

Insert 2011 payroll schedule (not available at time of printing)

AIR AMBULANCE PHONE LIST

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

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	
Patient #1 [ ] MALE [ ] FEMALE Age_____ Conscious [ ] YES [ ]NO Breathing [ ] YES [ ]NO	**<u>Patient Assessment :</u>** -Level of Consciousness -Breathing Rate -Pulse Rate -Skin Condition
Patient #2 [ ] MALE [ ] FEMALE Age_____ Conscious [ ] YES [ ]NO Breathing [ ] YES [ ]NO	**<u>Injury:</u>** Bleeding Heat Fracture Burns Head Injury Bee Stings Eye Injury
3. LEVEL OF SEVERITY	
RED – URGENT (Life or death/loss of limb/severe medical, Altered LOC, 2° or 3° burn more than 4 palm sizes)	**<u>EMERGENCY</u>** Ambulance or Med-evac Helicopter. Medical radio traffic has priority.
YELLOW – PRIORITY (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.
GREEN – MINOR INJURY (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_2, 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 **(00° 00.00' - 000° 00.00')** 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:	Grass Brush	Re-prod Slash	Snag Logs	Duff Hardwood	Timber (light, heavy)
ADJACENT FUELS:	Grass Brush	Re-prod Slash	Snag Logs	Duff Hardwood	Timber (light, heavy)
8. CHARACTER OF FIRE:	Smoldering Creeping		Running Torching		Crowning Spotting
9. FLAME LENGTH:	under 2’	2-4’	4-8	8-11	11 plus
10. POSITION ON SLOPE:	Bottom 1/3		Middle 1/3		Top 1/3
11. PERCENT SLOPE:	0-30	45-60		30-45	60 plus
12. ASPECT:	North	East	South	West	Flat/Ridge top
13. WIND SPEED:					
WIND DIRECTION:	N E S W		Upslope Down Slope		Up Canyon Down Canyon
14. WIND INDICATORS:	Cumulus	Lenticular	Cold Fronts	Other:	

15. GROWTH POTENTIAL (estimate acres for next operational period):			Acres:	
None	Low	Moderate	High	Very High

16. VALUES AT RISK (Check all that apply):			
Houses Improvements	T&E Species Cultural/Historical	Water Quality Other:	Public Safety
17. IS FIRE NEAR ANY SENSITIVE AREAS?	☐ No	☐ Yes - *Check Below*	
Rivers or Streams Meadow	Surface Waters Forest Edge	Aspen Trees Other (Specify)	5 Needle Pines
18. HAZARDS OR CONCERNS (Check all that apply):			
Snags Mine Shafts	Hazmat Evacuation Concerns	Urban Interface Cliffs	Power Lines Other

19. CAUSE:	Lightning	Human Cause	Other
20. PROPOSED ACTION:	Resource Benefit	Confine	Suppress

21. ADDITIONAL RESOURCES:		☐ No	☐ Yes - *Specify Below*
Personnel:	Equipment:	Supplies:	Aircraft:

REMOTE OPERATIONS UPDATE
CALL-IN CHEAT SHEET

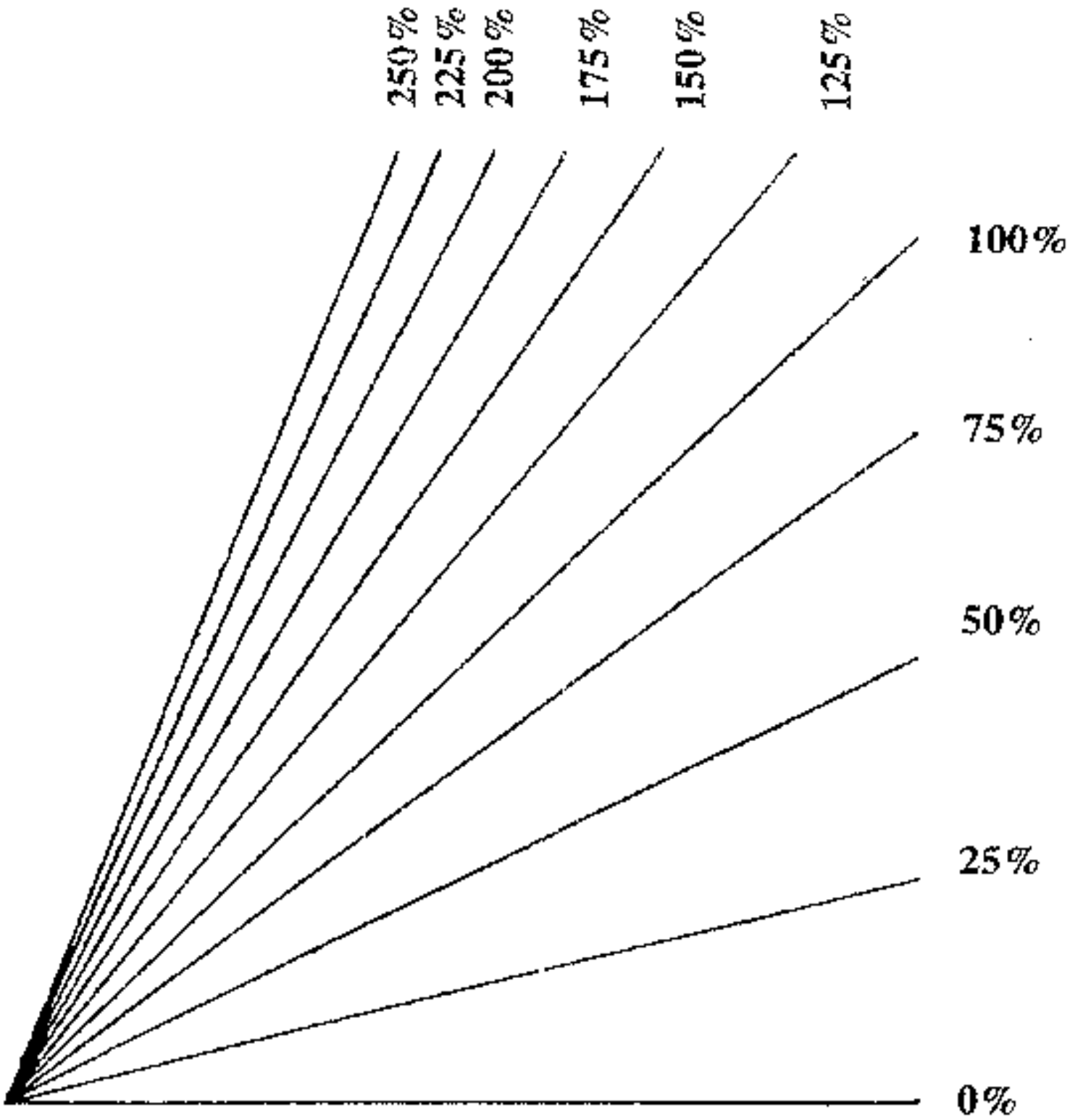
When providing an update on a remote portion of a fire, managers may have specific questions about the current status of a fire, and they'll usually let you know what those are. If not, these items listed below will assist you in painting a decent picture of an ongoing fire's status.

- 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 a 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 Percentage Table