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NWCG Guide for Wildland Fire Modules

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The *NWCG Guide for Wildland Fire Modules* is a supplemental guide for wildland fire module operations containing information frequently used in the field. It is not intended to replace existing publications, including the *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461, https://www.nwcg.gov/publications/pms461, *NWCG Standards for Wildland Fire Module Operations*, https://www.nwcg.gov/publications/pms430, among others.

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Operations

Chief of Party Checklist

General

- Safety of the group is your paramount responsibility.
- Accept your role as the leader.
- Be fire ready at any time.
- Work hard.
- Be safe.

Mobilization

- Obtain resource order and make copies.
- Update crew manifest and make copies.
- Update crew qualifications sheet and make copies.
- Document accountable property (radios, laptops, etc.).
- Download GPS maps for assignment location and obtain paper maps if possible.
- Record starting mileage for vehicles.
- Plan travel route and Estimated Time of Arrival (ETA).
- Make hotel reservations as necessary.
- Coordinate with the incident/requesting unit regarding necessary supplies (food, backcountry gear, etc.).
- Make copies of the following for the fire office: manifest, travel authorization, travel route, ETA.
- Coordinate further with incident/requesting unit while in transit.

At Assignment

- At check-in: notify home unit of arrival.
- Provide manifest and time records to overhead.
- Obtain radio frequencies and program by hand or computer.
- Obtain specific information regarding assignment (sleeping arrangements, food, etc.).
- Attend all operational briefings.
- Fill out and submit signed Crew Time Reports (CTRs), SF 261 daily.
- Pass along updates regarding progress, changes, and status.
- Plan early for logistical needs – place orders for the following shift by 1300.
- Log chainsaw use and maintenance.

- Fill out and submit Activity Log (ICS 214) and other required documentation.
- After Action Review (AAR) every shift.

Check-Out

- Verify that times on CTRs match times on Incident Time Reports (OF 288) for each person.
- Don't depart without signed OF 288 in hand.
- Make copies of all reports, assignments, photos, and maps.
- Obtain Supply (S) numbers for all equipment to be replaced.
- Obtain and review crew evaluations.
- Notify home unit and dispatch of departure and travel plans.
- If moving between incidents, start time = departure time from first incident.

Return to Station

- Notify duty officer and dispatch of return.
- Tell dispatch to change status in the Interagency Resource Ordering Capability (IROC) for rest and recuperation (R&R) and module availability.
- Fuel all vehicles.
- Fill out mileage forms.
- Clean inside and outside of vehicles.
- Disinfect all food containers, cooking equipment, and water coolers.
- Rehab and log all chainsaws, tools, pumps, etc.
- Ensure all module gear and vehicles are fire ready before departure.
- Restock fire monitoring kits.
- Fill out fire report and make copies for home unit.
- Update fire folders with the following: fire and other reports, trip manifest, resource order, CTRs, maps, relevant Incident Action Plans (IAPs), travel documentation, crew evaluation, incident replacement requisitions.
- Provide documentation for home unit: time records, fire reports, crew evaluations, travel sheets, mileage forms.

Fireline Leader Responsibilities

- Establish a clear leader's intent and supervise at the scene of action, not in your truck or office.

Initial Attack Incident Commander (ICT4/5)

- Provide for safety and welfare of assigned personnel.
- Initiate and maintain Incident Briefing (ICS 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 Activity Log (ICS 214).
- Solicit feedback and facilitate AARs.

Task Force/Strike Team Leader

- Obtain briefing from Division/Group Supervisor (DIVS)/ Incident Commander (IC).
- Review assignment with assigned resources.
- Travel to and from line with assigned resources.
- Monitor and inspect progress; make changes as necessary.
- Coordinate actions with adjacent resources.
- Keep supervisor informed of status and progress.
- Obtain logistics/equipment needs from assigned resources.
- Retain control of assigned resources while off the fireline.
- Maintain a current Activity Log (ICS 214).

Single Resource Boss (Crew Boss [CRWB], Engine Boss [ENGB], Firing Boss [FIRB], Felling Boss [FELB])

- Supervise and direct a firefighting module (hand crew, engine, dozer, firing team, or 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 weather conditions and expected fire behavior.
- 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 any issues.
- Brief/debrief with relief personnel on the fireline.
- Complete and turn in time records.

Chainsaw Use

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:
  - Gas (50:1).
  - On/off switch is turned ON.
  - Spark plug has spark.
  - Exhaust screen is clean.
  - Air filter is clean.
  - Jets are adjusted correctly:
    - Never over-tighten jets!
    - Turn both jets to the right (clockwise) until snug.
    - Then turn back to the left (counterclockwise) until desired setting.
    - Stihl: high 3/4 turn, low 1/4 turn.
  - Carburetor is flooded:
    - Tighten high jet until snug.
    - Pull starter cord until saw starts.
    - Loosen high jet to correct setting.
- Jet and idle field adjustments:
  - Clean or replace air filter. The carburetor cannot be properly tuned unless the air filter is clean and in good condition.
  - 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 until flatline (no flutter) and back off.
  - Release throttle and let saw idle. If saw idles too fast (chain turning) or too slow (saw dies), adjust idle screw only. Turn screw counterclockwise to stop chain or clockwise if saw dies.
  - 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 the engine. Repeat.
  - Throttle up saw. It should immediately respond. If it stutters, the LS is too lean. Back out (counterclockwise) the LS screw a quarter turn or less. Repeat until saw revs immediately. Adjust idle and repeat steps as needed.
  - Tune the tachometer. High RPMs should be 13,500 or less. Idle RPMs should be around 2,500.
- Purging Instructions:
  - Drain fuel tank.

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

COMMONLY REPLACED STIHL PARTS

Part Description	Stihl Manufacturer Part Number
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 number of drivers)
28” bar, Rollomatic ES wide tip 91 drivers, 3/8" pitch,.050" gauge	3003 000 9638

STIHL BARS

3/8” pitch
.050” gauge

Length	Drivers
25”	84
28”	91
32”	105
36”	114

2-CYCLE MIX QUANTITIES (Ounces)

Gasoline Quantity

Mix	0.5 gal	1.0 gal	2.0 gal	2.5 gal	5.0 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 GALLON CAN

Number of Cans	3 parts diesel fuel Stop Pump @__gal	1 part gasoline Stop Pump @__gal
1	3.75	1.25
2	7.50	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

TACHOMETER RPM GUIDE

Model	Idle	High
Stihl MS360	2800	13500
Stihl MS440	2500	13500
Stihl MS460	2500	13500
Stihl MS660	2500	13500
Husqvarna 372XP	2700	13500
Husqvarna 385XP	2700	12500

CONVERSIONS

1 cup	**8 oz**
1 pint	**2 cups**
	16 oz
1 quart	**2 pints**
	4 cups
	32 oz
	.946 L
1 gallon	**4 quarts**
	8 pints
	16 cups
	128 oz
	3.785 L
	8.33 lbs*

*applies only to water weight; fuel will weigh less

Portable Pump Operating Instructions

Fuel

- Use 24:1 mix (27 ounces of oil per 5 gallons of gasoline) for 2 stroke engines.
- Some pumps may be 4 stroke engines which take straight gas. Double check fuel requirements!
- Fuel consumption: Mark III 5 gallons per 3 hours, Shindaiwa 5 gallons per 10 hours.
- Connect fuel can line to tank with quick connect valve. Loosen lid on tank for venting.

Cautions

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

Setting Up and Starting Mark III Pumps

- Connect fuel line to pump and fuel can as specified above.
- Connect suction hose to pump. Be sure to connect foot valve to male end of suction hose. Make sure rubber gasket or washer is in place before attaching female end to pump. Tighten firmly with spanner wrench. Put foot valve inside canvas bucket from pump kit, and/or use rope or a float to keep strainer from being too close to water surface or resting on the bottom in the mud.
- 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, leaving primer valve open. Stroke priming pump until water squirts out the small holes, or until resistance is too great to continue. After priming, close valve to primer and open valve to hose.
- Pull the decompression switch out until it comes to a “click” stop (newer pumps lack these switches).
- Put the choke on START if the engine is cold.
- Move throttle to START AND WARM UP position.
- 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.
- Put choke on RUN and pull engine over until it starts (usually 1 to 3 pulls).
- Push decompression switch in fully as soon as engine starts.
- 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 by pushing in on the reset rod (yellow circular wire located below stop switch).

Stopping a Mark III Pump

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

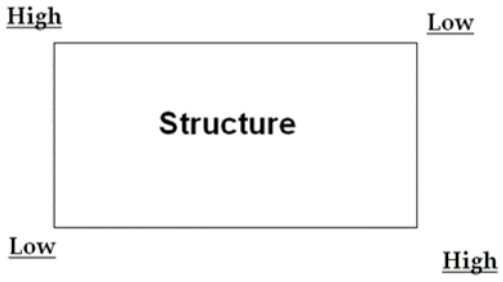
Ordering Pumps

- Order two pump kits (NFES 0870) for redundancy.
- Hose: 100 feet of 1" laterals for every 200 feet of 1 ½" trunk line.
- Remember to order hardware as well: gated wyes, nozzles, hose clamps, reducers, etc.

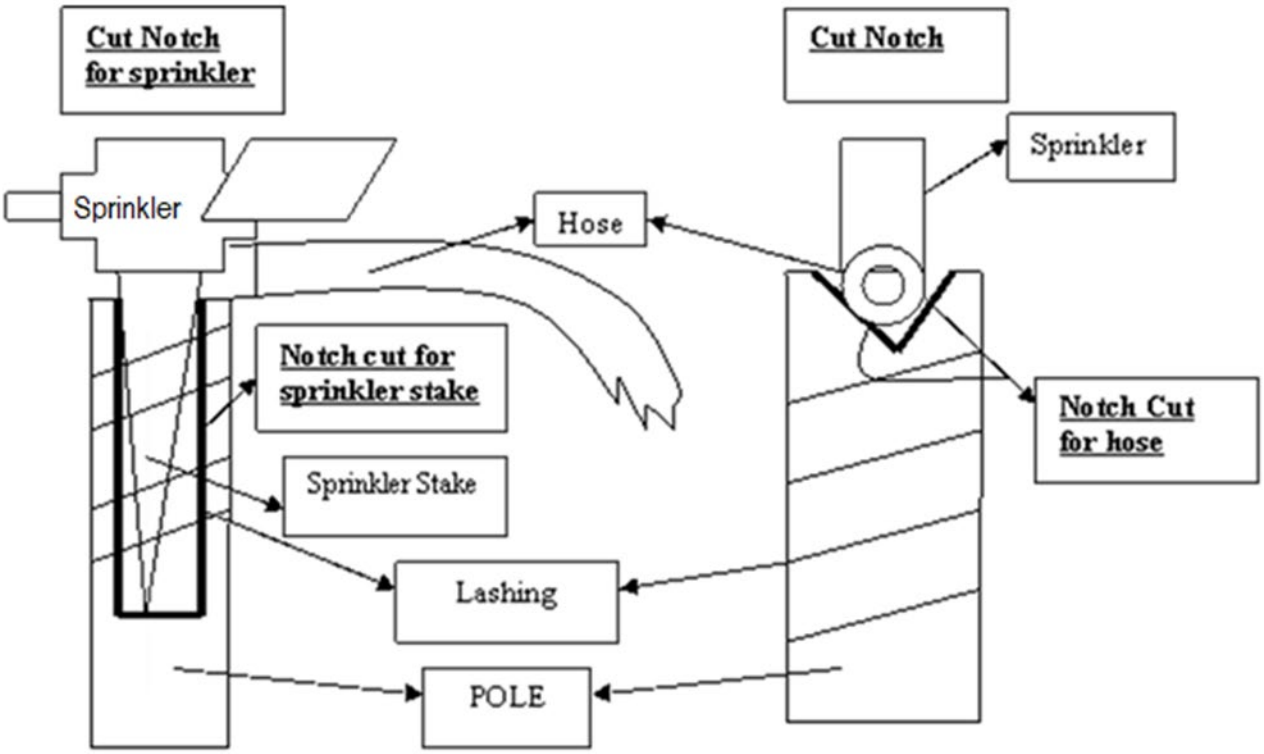
Structure Protection Tips

- Identify fire hazards that need to be mitigated to protect cabin:
  - Is the roof clear?
  - Are the eaves clear?
  - Are there building materials or firewood stacked against the cabin?
  - Are there trees, snags, or other vegetation that pose a direct hazard to the cabin?
- Sprinkler system setup tips:
  - Sprinkler coverage should wet all surfaces of structure.
  - Sprinklers at the corners provide ideal coverage.
  - Vary heights to provide improved coverage.
  - Set two sprinklers at opposite corners above the roof line and the other two below the roof line.
  - Adjust sprinklers for long range (spray) or short range (mist).
- Sprinkler head attachment methods:
  - Set sprinkler heads on poles, tripods, or stands to get them above ground/cabin.

Sprinkler placement on a structure.



Saw cuts for sprinkler attachments. Notches prevent sprinklers from rotating when hose is charged.



- Pumps:
  - Shindaiwa pumps work well close to water sources.
  - Use 5-gallon can and fuel line attachment from sprinkler kit for Shindaiwa pumps.
  - Mark III pumps work well when the structure is far from, or high above the water source.
- Miscellaneous:
  - Use extra sprinklers on wood piles or surrounding fuels.
  - Make sure your hose lay is protected.
  - Take the extra steps necessary to prevent water from entering the structure.

Basic Cabin Protection Order

- 1 pump kit (NFES 0870)
- 1 sprinkler kit (NFES 0920 or NFES 1048)
- 700 feet of 1” hose (NFES 7273)
- 10 gallons of premixed fuel (NFES 7358)

Sprinkler Kit Contents (NFES 1048)

Cache Item	Qty	Description
0010	1	**REDUCER – 1 1/2" NH-F (9 TPI) TO 1" NPSH-M (11 1/2 TPI)**
0136	1	**NOZZLE – GARDEN HOSE, 3/4" NH, ADJUSTABLE, BRASS**
0137	1	**NOZZLE – PLASTIC, 60 GPM, 1 1/2" NH-F X 4 3/4" LONG**
0235	1	**WRENCH – SPANNER, 11", 1 1/2" TO 2 1/2" HOSE SIZE**
0321	1	**HAMMER – CLAW**
0394	12	**TIE WRAPS – ONE WAY, 15" – 17"**
0402	4	**REGULATOR – WATER PRESSURE, R.V.,40-50 PSI, 3/4" M/F-H BRASS**
0473	1	**WRENCH – ADJUSTABLE, 10"**
0538	12	**PIN – PANEL, HOLD DOWN, 8" LONG**
0721	5	**GASKET – GARDEN HOSE, 3/4"**
0729	1	**FORM, – INSTRUCTIONS SPRINKLER KIT**
0731	4	**TEE – HOSELINE, 1 1/2" NH-F X 1 1/2" NH-M X 1" NPSH-M W/CAP**
0733	4	**REDUCER – 1" NPSH-F (11 1/2 TPI) TO 3/4" NH-M (11 1/2 TPI)**
0744	1	**PACKSACK – WATERPROOF, W/STRAPS**
0808	1	**CARTON – FIBERBOARD, 16" X 14" X 12", DOUBLE WALL W/HAND HOLDS**
0824	2	**BLOCK – WOOD, 2" X 4" X 6"**
0835	4	**VALVE – SHUT OFF, BRASS, BALL, 3/4" NH**
0882	1	**NAILS – DUPLEX, DOUBLE HEAD, 16D, 3"**
0904	2	**VALVE – WYE, GATED, BRASS, 3/4" NH-F X 3/4" NF-M X 3/4" NH-M**
0913	8	**STAKE – W/CLAMP, SPRINKLER, METAL, 18" X 1" X 1"**
0937	1	**SAW – PRUNING, 10"**
0999	4	**SPRINKLER ASSEMBLY – 1/2", SPRINKLER HEAD W/COUPLINGS**
1016	5	**HOSE – GARDEN, SYNTHETIC, 3/4" NH X 50'**
3305	2	**CORD – NYLON, 1/8" X 100'**
3318	**1**	**BAG – COTTON, LUNCH OR TOOL, 10" X 24"**

Structure Wrap – Tips and Considerations

- Structure wrap (NFES 0881) comes in 54” x 300’ rolls (1350 square feet).
- Suggested order list:
  - Ladders (minimum of 2) tall enough to reach peak of roof.
  - Staplers and staples (order extra).
  - Scissors.
  - Needle-nose pliers.
  - Permanent markers.
  - 3” aluminum tape (available in rolls of 360’).
- Considerations:
  - Take some time to plan.
  - Start from the bottom of the building so your seams don’t catch embers.
  - Consider likely wind and 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 and 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 future removal of structure wrap when deciding how many staples to use.

Remote Operations

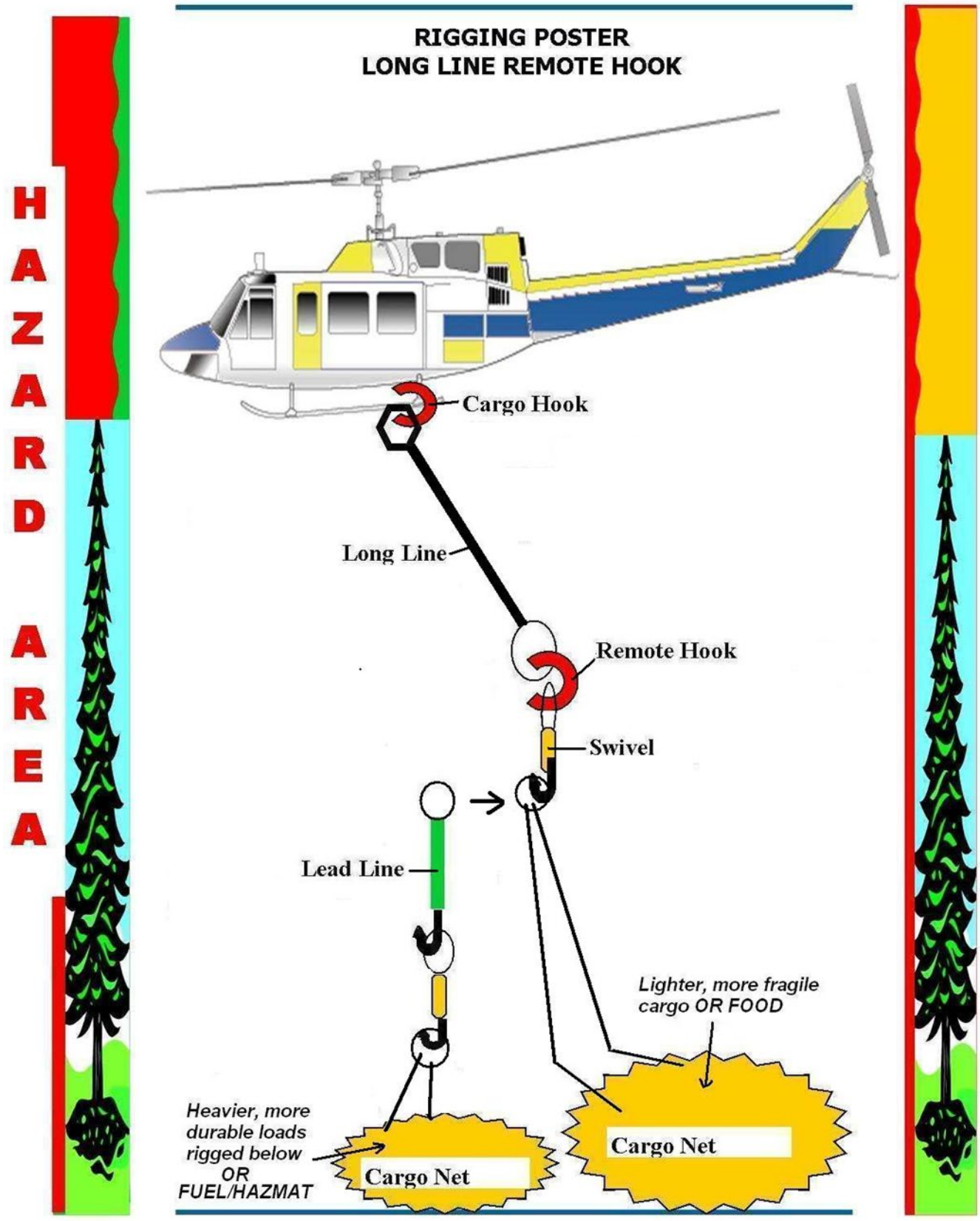
- When providing an update on a remote portion of a fire, managers may have specific questions and will usually share them with you. If not, the items listed below will assist you in painting a picture of ongoing fire status:
  - Estimated (or known) current fire size.
  - Growth overnight or since last checked.
  - Percent active perimeter.
  - Active portion or quadrant (north, south, east, west).
  - Fuel model carrying fire (note fuel model transitions in particular).
  - Observed fire behavior: rate of spread, flame length, torching, spotting, smoke observations.
  - Time of activity (burning window).
  - Weather highlights: highest temperature, lowest relative humidity, wind speed, and direction.
  - Communicate your plan for the shift.
  - Ask if any other information is needed (time of next required update, etc.).
  - Specific safety or operational concerns and mitigations.
- When communicating with a dispatch center or incident command post, consider additional communication standard operating procedures:
  - Notify dispatch when you begin your travel to and from the fire, when you begin driving and when you begin hiking. This may be redundant but err on the side of too much information rather than not enough.
  - 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 is 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

Use the following estimates to order enough supplies for one day on the fireline:

Item	Quantity
Water, 5-gallon cubie	½ per person
MREs	4 per person
Batteries, AA	16 per radio
Toilet paper	1 roll per 5 people
Fuel (unleaded)	5 gallons = 20 hours chainsaw use
Bar oil	10 quarts = 20 hours chainsaw use
2 cycle mix	12.8 ounces = 20 hours chainsaw use
Fuel (24:1)	Mark III: 5 gallons = 3 hours Shindaiwa: 5 gallons = 10 hours

Longline Remote Hook Setup



Radios

KNG-P150S Portable Radio

KNG P150s Front View

KNG P150s Top View

BKR 5000 Portable Radio

Individual KNG-P150S and BKR 5000 radios may be set up differently by local technicians. This information is provided only as a general guide to the use and functionality of the KNG-P150S and BKR 5000.

Scan and Priority Scan

Scan

- Used to add and delete channels in the scan list and scan channels within the selected zone.
- Within the desired zone, press the [MENU] button (diamond button).
- Scroll down to "Scan List" using the triangle buttons and press [ENT] (square button). This will bring you to the Channel Scan page.
- Press [+/-] (square button) on the display and a + will appear next to the channel. Press [+/-] again to remove a channel from the scan list.
- Continue adding until all desired channels are selected.
- Press [ESC] (diamond button) to return to the home screen.
- While using the channel select knob to scroll through channels, you will see "SCN" appear on the upper part of the display on all channels you selected to scan.
- Toggle the [SCAN] switch forward and back to turn scanning on and off. "SCN" will flash when the currently selected channel is being scanned.
- If a scanned channel becomes unneeded or annoying, the nuisance delete button (if programmed in your radio) can temporarily disable that channel while you are receiving a transmission on it. This will stop the scanning of a channel without deleting it from the scan list. Turn off scan for at least five seconds or cycle radio power to resume normal functionality.

Priority Scan

- Used to add a priority scan channel that will have priority over your other scanned channels and the currently selected channel. When priority scan is activated, you will automatically talk on that channel if the "TX on Priority 1" setting is activated.
- The radio may be programmed with a [PRI] button to allow you to easily change your priority channels. If not, you can access priority settings through "Zone Params" under the keypad programming option.
- In the "Pri Chans" menu, use the triangle buttons to scroll to "Priority 1" and press [ENT].
- Scroll to "Use Per Zone" and press [ENT].
- Use the triangle buttons to scroll to your desired priority channel and press [ENT]. You can also turn priority channels off or use the "Main" setting for your priority channel to be set to whatever channel the select knob is currently turned to.
- Press [ESC] until you are back to the home screen.
- Using the channel select knob, scroll to the channel you selected as priority. You should see a P1 in the upper left part of the display on the home screen.
- Using the channel select knob, scroll to another channel.

- Toggle the [PRI] switch forward and back to turn your priority channel on and off.
- The "Priority 2" setting can be activated using the same method, allowing you to select a secondary priority channel. This channel will take priority over all other channels except the selected priority 1 channel when receiving transmissions.

Scan and Priority Scan Together

- When both the [SCAN] and [PRI] switches are toggled forward, both the scan list and priority channel list will be active and there will be indicators on the upper part of the display.

Squelch

- Used for a channel without a tone on the receiver to control how weak of a signal your radio will pick up. If there is a tone on the receiver and you are receiving poorly or not at all, the squelch setting will not be helpful.
- If your radio is programmed with this functionality, press the [SQL] button on the home screen.
- This will bring you into the "Squelch Set" menu.
- Using the triangle button, scroll to "User Set" and press [ENT].
- Using the triangle buttons, scroll up, or down to adjust your squelch to the desired level. The up-arrow button will open squelch to allow more static noise or weaker RF signals to be heard from the speaker. The down-arrow button will close squelch, requiring the radio to receive a stronger RF signal to be heard at the speaker.
- When finished, press [ENT] to be automatically returned to the home screen.

User TX Tones (Transmit Tone Select)

- Used to select from preprogrammed tones to manually choose a code guard.
- If your radio is programmed with this functionality, press the [TCG] button on the home screen.
- This will bring you into the "User TX Tones" menu.
- Using the number pad, type in the tone you would like to select or use the triangle buttons to scroll to a desired tone.
- Press [ENT] to choose your desired tone and be automatically returned to the home screen.
- The [TCG] marker should now be highlighted, indicating that a code guard has been selected.
- User RX tones (receive code guards) can be selected in an identical fashion by entering the "User RX Tones" option while in the [MENU] settings.

Keypad Programming

- Press the [MENU] button.
- Using the triangle buttons, scroll to "Keypad Prog" and press [ENT].
- Press [ENT] again on the "Keypad Prog" submenu.
- Enter the password. Default is 000000 (six zeros). Press [ENT].
- This will allow you to select from three menus ("Channels," "Zone Params," and "Global

Params"), explained in further detail below.

Channels

- The bulk of programming options are located here.
- Select a zone to hand program from the "Select Zone" menu.
- Select a channel within that zone from the "Select Chan" menu and choose from the following options:
  - Chan Label: Used to edit a channel label. Press [CLR] to clear text. Use the numbers on the number pad to enter text according to the letters printed on the buttons. The "0" key will insert a blank space, while the "#" key will scroll through special characters.
  - RX Freq: Changes the receive frequency. Press [CLR] to clear text. Enter a new frequency using the number pad and press [ENT].
  - RX Mode: Choose between analog and digital mode for receiving transmissions. Should be listed on any fire communications plan, but default to "analog" if you are unsure. Press [ENT] to choose.
  - RX Guard: Changes the tone guard for receive frequencies. Press [CLR] to clear text. Enter a new tone guard using the number pad and press [ENT].
  - RX NAC: Only applicable when in digital mode. This setting is the digital equivalent of a tone guard.
  - Squelch Mode: Only applicable when in digital mode. Used to manipulate how strong or weak of a signal your radio will pick up.
  - TX Freq: Changes the transmit frequency. Press [CLR] to clear text. Enter a new frequency using the number pad and press [ENT].
  - TX Mode: Choose between analog and digital mode for sending transmissions. Should be listed on any fire communications plan, but default to "analog" if you're unsure. Press [ENT] to choose.
  - Bandwidth: Choose between narrowband (12.5 kHz) and wideband (25 kHz). Modern frequencies will generally be narrowband. Press [ENT] to choose.
  - TX Guard: Changes the tone guard for transmit frequencies. Press [CLR] to clear text. Enter a new tone guard using the number pad and press [ENT].
  - TX NAC: Only applicable when in digital mode. This setting is the digital equivalent of a tone guard.
  - TGID: Talkgroup ID. Only applicable to digital mode.
  - Secure Mode: Choose between clear and secure. Secure mode is only used for encryption. Default to clear mode.
  - Key: Refers to encryption keys. Only applicable to digital mode and encryption.
  - Key Lock: Encryption key functionality. Default to off.
  - Low Power Lock: Locks the channel in low power mode. High power mode will be unavailable. Press [ENT] to select on or off.
  - Plist Disable: Turns on or off the ability to select code guards from a picklist. Default to off.

Press [ENT] to make your selection.

- Press [ESC] to return to the "Select Chan" menu. Scroll to the next channel using the triangle buttons and press [ENT] to select. Repeat the steps above to program another channel.

Zone Parameters

- Used to select from options that apply to specific zones. Choose from the following options:
  - Zone Label: Used to edit a channel label. Press [CLR] to clear text. Use the numbers on the number pad to enter text according to the letters printed on the buttons. The "0" key will insert a blank space, while the "#" key will scroll through special characters.
  - Pri 1 Chan: Select a priority channel (discussed above in the "Priority Scan" section).
  - TX on Pri 1: Controls whether your radio will default to transmitting on the currently set priority 1 channel even while the channel select knob is turned to a different channel. Useful for quickly toggling between two channels of interest – set your priority channel to the most important, and use the channel select knob to choose a secondary channel. Toggling the [PRI] switch will now rapidly switch between transmitting on two channels. Press [ENT] to choose between on and off.
  - Pri 2 Chan: Select a secondary priority channel, as discussed above in the "Priority Scan" section.
  - ANI mode: Used to select DTMF tone options. Infrequently used, but useful for obtaining information from Remote Automatic Weather Stations (RAWS) stations.
  - ANI ID: Associated with the ANI mode settings and transmission of DTMF tones.
  - Disable Clone: Disables the ability to clone over this zone.
  - Disable Plist: Disables picklists. Default to off.
  - Ignore Plist: Ignore option for picklists. Default to off.
  - Enable UCG: Enables the ability to manually select code guards from a preprogrammed list. Default to on.
  - UCG TX Only: Selecting code guards will only apply to transmissions if this setting is enabled. Choose from on or off and press [ENT].
  - UCG NAC Only: Digital equivalent of tone guard settings.

Global Parameters

- Used to select from options that apply to all zones on the radio. Choose from the following options:
  - Pri 1 Chan: See above on selecting a priority channel. The difference here is the chosen channel will apply to all zones. Potentially useful if you need to listen to a channel not programmed into your current zone.
  - Pri 1 Zone: Choose the zone for your global priority channel.
  - Pri 2 Chan: As above for priority 2 channel.
  - Pri 2 Zone: As above for priority 2 zone.

- SCN Hold Time: Controls the amount of time a radio will continue looking for new transmissions on a specific channel after a transmission has been received.
- Busy Ch Mode: Controls indicator lights for whether a channel is receiving a transmission.
- TX TOT: Sets a timeout for all transmissions. Potentially useful to avoid a hot mic situation.
- Bklight Mode: Controls how the backlight on the radio behaves. Choose from "Off" (always off), "Keypress" (display lights up on button press), "Display Chn" (display lights up when any new information is received), or "Both."
- Bklight Dur: Controls how long the backlight will light up for. Choose from 1-6 seconds or always off/on.
- Volume Tone: Controls whether sound is played when volume is changed. Default to off.
- Password: Change the password required to enter keypad programming mode.
- P25 Unit ID: Used for P25 digital radio functions (infrequently used).
- TX Max Power: Choose between "Medium" and "High" to alter the power used to send transmissions while in high power mode.
- TX Low Power: Choose between "1 Watt" and "2 Watts" to alter the power used to send transmissions while in low power mode.
- Pri SCN HTime: Affects frequency of scanning for priority channel transmissions.

Giving a Clone

1. Using an appropriate cloning cable, attach the master radio to a compatible radio. Cloning works best with identical radios but can be used with care across Bendix King models.
2. From the home screen, press [MENU] and scroll to "Cloning" and choose from the following options:
    a. Active Zone: Copies the currently selected zone from the master radio and programs it into the currently selected zone on the target radio.
    b. Zone-to-Zone: Allows you to select a specific zone on the master radio to clone to the currently selected zone on the target radio.
    c. Entire Radio: Allows you to clone all zones on the master radio to the target radio.
3. After selection, the radio will ask if you would like to clone UCG/PL. Default to no unless you need specific code guard functionality.
4. The clone will start and inform you on success or failure.
5. Repeat steps 1-4 for the next radio.

Receiving a Clone

- Select the zone you would like to receive the clone on, attach cloning cable to the radio and wait for the clone.

Bendix King DPHX (Legacy) Portable Radio

DPHx Front View

DPHx Top View

Programming

1. Using a programming plug, hold the red plug button and the [FCN] key until the display shows "-- -- -- ID."
    - Older truck radios will be programmed similarly. Press and hold the [HOM/SQL] key on the main unit while holding the [FCN] key on the mic to enter programming mode.
2. Enter the password (default: 000000), then press the [ENT] key.
3. Display will read "CH 00". Select a channel by entering the associated number (1-16), then press the [FCN] key.
4. Display will show "RX" (receive frequency). To change, press [CLR], then enter desired frequency (decimal will be automatically inserted) and press [ENT].
5. Display will show "MODE--A". Do not change. Press [FCN] to skip.
6. Display will show "RX CG", representing the code guard or tone. To change, press [CLR], enter in desired 4 digits (decimal will be automatically inserted), 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 (decimal will be automatically inserted) and press [ENT].
10. Display will show "MODE--A" Do not change. Press [FCN] to skip.
11. Display will show "TX CG", representing the code guard or tone. To change, press [CLR] and enter in desired 4 digits (decimal will be automatically inserted), 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 the next section for label editing instructions. To skip, press [FCN].
15. Display will read "CH XX". Press [PRI] to select next channel to program. Repeat steps 1-14.

Editing Channel and Group Labels

- To enter a new label, press the [FCN] key. The display will become blank.
- 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.
- Press the [FCN] key to shift the display left by one position, leaving position eight blank.
- Press the [PRI] key repeatedly to enter the next character or press the [FCN] key a second time to enter a blank space.
- Press number keys to enter 0-9 in positions one through seven. The digits start in position seven, then move left.

- 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.
- To abandon changes, press the [CLR] key, restoring the original label.
- Press the [ENT] key to store changes and go back to the starting point.

Cloning

1. Obtain programmed master radio.
2. Turn on master radio and radio to be programmed and attach cloning cable. Ensure all scan and priority toggles are OFF on both radios.
3. Select desired group to clone over on radio to be programmed.
4. Access the programming mode of the master radio (see the programming section above).
5. With the master radio display reading "CH 00", press the * key on the master radio.
6. "PRGM" will appear flashing on the screen.
7. Press the Function [FCN] key and "PRGM" will stop flashing as the second radio is programmed. The screen on the second radio will flash "VH-1".
8. Turn off the second radio and connect and program the next radio by pressing the [FCN] key again.
9. If display reads "FAIL", an error has occurred. Turn off both radios and repeat steps 2-8. If "FAIL" appears again, seek help.

Other Notes

- If you want to change a frequency from narrowband to wide:
  - When in programming mode, after entering a channel number you may see an N after the number – for example, 15N. The N means the frequency is narrowband.
  - Press the [#] key. The N should disappear, and the channel will be in wideband mode.
- If you have trouble keying in a tone or changing groups, your keypad may be locked. If the screen says "LOCKED", press and hold the [FCN] key until it reads "UNLOCKED".

Zero Codes

The zero codes control numerous features of the Bendix King (BK) radio. Use caution when changing.

- Follow programming steps 1-2 above. Press the [FCN] key 7 times to arrive at zero code group 1, 8 times for group 2, and 9 times for group 3.
- Zero codes are specific to each individual group.
- A function is enabled in the radio if the associated 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 "Manual DTMF Encoder" setting.
- To change a number from flashing to solid (disable a function), simply touch the number on the keypad, then press [ENT]. The opposite will also work: to change a number from solid to flashing (enable a function), touch the number on the keypad, then press [ENT].

- In the following table, a function is enabled if a particular number is grey.
- For a more detailed explanation of the functions, see the information on the page following the table.

Group One Functions

Battery Saver Off	1	1	2	3	4	5
Group Scan List	1	1	2	3	4	5
Transmit on Priority 1	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	2	1	2	3	4	5
Busy Channel Indicator	2	1	2	3	4	5
Busy Channel Lockout	2	1	2	3	4	5
Busy Channel Override	2	1	2	3	4	5
ANI	2	1	2	3	4	5
Manual DTMF Encoder	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
Alphanumeric Mode	3	1	2	3	4	5

National Standard Tones/NACs

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

Zero Code Function Explanations

- Battery Saver Off: When enabled, disables the battery saver function.
- Group Scan List: When enabled, current group will be scanned if in group scan mode.
- Transmit on Priority 1: When enabled, radio will transmit on priority 1 channel rather than currently selected channel if priority scan is toggled on.
- Priority Key Lockout: When enabled, [PRI] key will be locked out on radio, disabling the user's ability to change the priority 1 channel.
- Scan List Lockout: When enabled, user will not be able to add/remove channels from the scan list.
- User Code Guard: When enabled, allows user to manually select code guard value while transmitting.
- Busy Channel Indicator: When enabled, yellow LED will illuminate when signal is received on selected channel.
- Busy Channel Lockout: When enabled, push-to-talk is disabled when a signal is active on selected channel.
- Busy Channel Override: When enabled, push-to-talk is disabled but can activate squelch code guard.
- ANI: When enabled, programmed ANI ID number will be transmitted on push-to-talk as a DTMF tone.
- Manual DTMF Encoder: When enabled, DTMF tones can be transmitted with the keypad.
- Light on Display Change: When enabled, LCD backlight will illuminate each time the display receives an input.
- Light on Key Press: When enabled, LCD backlight will illuminate each time a key is pressed.
- Alphanumeric Mode: When enabled, LCD will display alphanumeric characters.

Mapping

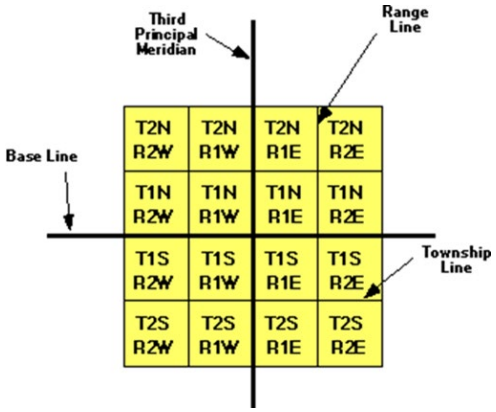
Township/Range/Section System of Land Measure

- Township lines run EAST to WEST six miles apart. Range lines run NORTH to SOUTH six miles apart.
- Within each township are 36 sections, each one-mile square. Each section contains 640 acres.

Section numbers in a typical township.

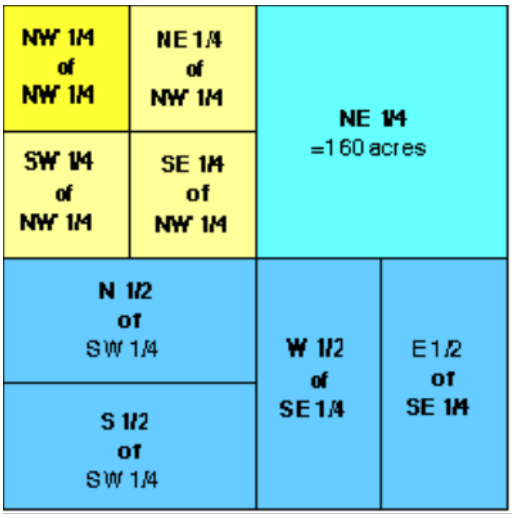
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Line names in the township/range/section system



- Within each section, the land is referred to as half and quarter sections. A one-sixteenth division is called a quarter of a quarter, as in the NW 1/4 of the NW 1/4.
- The descriptions are read from the smallest division to the largest.

Various segments and their descriptions



Converting Latitude/Longitude

- The easiest way to convert GPS coordinates is with a mobile app (Avenza, Gaia, etc.).
- Avenza Maps – in the map view, tap the coordinates displayed at the bottom center of the screen. All possible coordinate systems will be shown, allowing for easy conversion.
- Gaia Maps – Menu > Settings > Coordinate Type.
- If you do not have a mobile app available:
    - Latitude and Longitude may be shown in three different formats:

Format	Visual	Radio Etiquette
Degrees Decimal Minutes	48° 36.12’, 114° 08.12’	“Four-eight degrees, three six point one two minutes.”
Degrees Minutes Seconds	48° 36’ 12”, 114° 08’ 12”	“Four-eight degrees, three six minutes, one two seconds.”
Degrees Decimal Degree	48.3612°, 114.0812°	“Four-eight point three six one two degrees.”

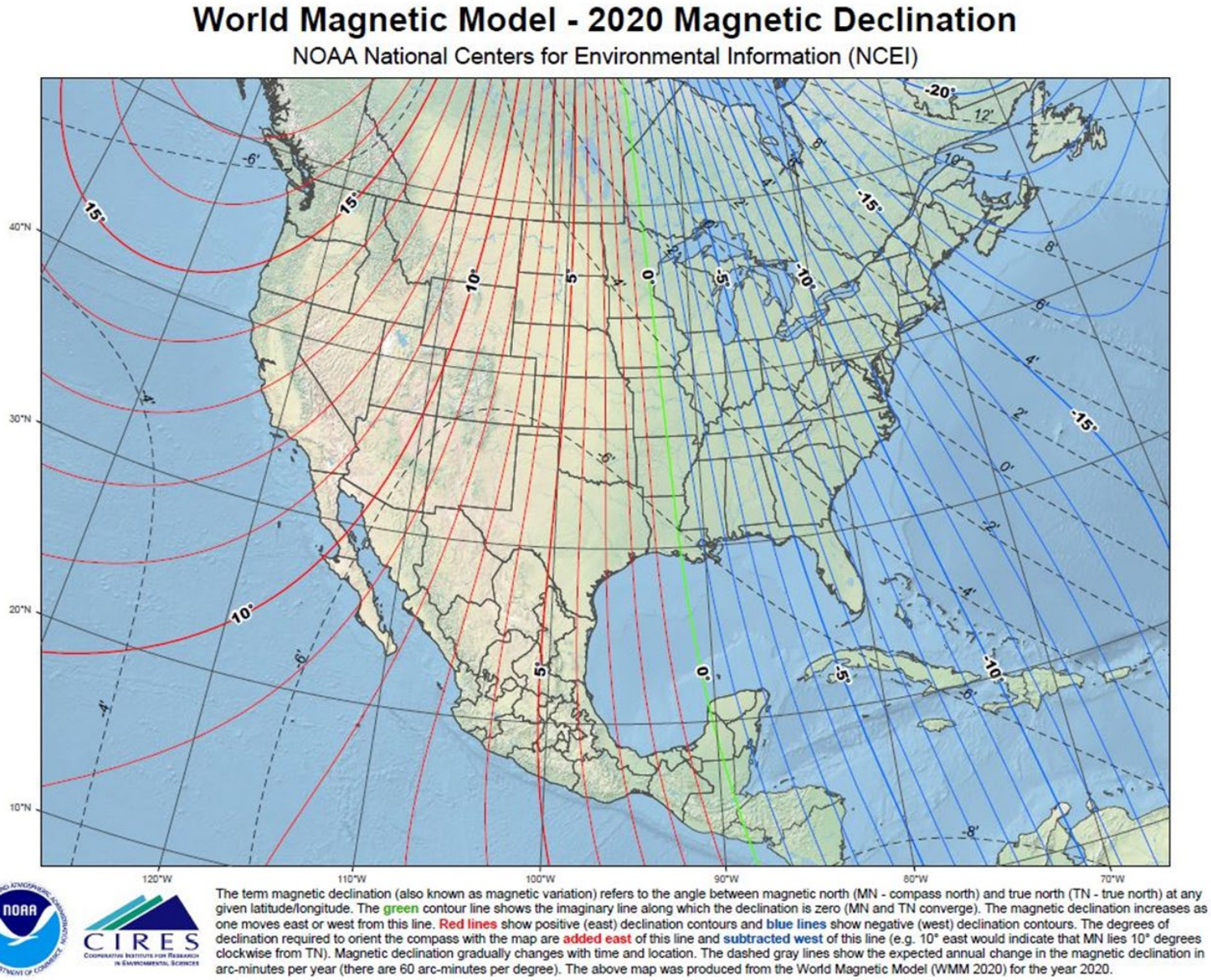
- To convert Degrees Minutes Seconds to Degrees Decimal Minutes, divide seconds by 60.
    - Example: 48° 20’ 30” ⇨ (30”)/60 =.5’ ⇨ 48° 20.5’.
- To convert Degrees Decimal Minutes to Degrees Minutes Seconds, multiply hundredths by 60.
    - Example: 48° 20.5’ ⇨.5’ x 60 = 30” ⇨ 48° 20’ 30”.
- One degree 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.
- For aviation purposes:
    - Datum = WGS84.
    - Units = Degrees Decimal Minutes.
- Degrees Decimal Minutes are a safe default and can be converted to any other desired format.

Area and Distance Conversion Charts

Units of Measure	
1 inch	2.54 cm
1 foot	0.3048 meters
1 meter	39.37 inch
	3.28 feet
1 kilometer	3280.8 feet
	1093.6 yards
	0.623 miles
1 mile	5280 feet
	80 chains
	1.6 kilometers
1 chain	66 feet
	20.11 meters
1 acre	43560 sq ft
	10 sq chains
	.405 hectares
1 section	640 acres
	1 sq miles
1 range	5760 acres
	9 sq miles
1 township	23040 acres
	36 sq miles

Map Scale Conversion		
Map Scale	Earth Measure per Map Inch	Inches on Map per Earth Mile
1:5000	416.67 feet 127 meters	12.67
1:10000	833.3 feet 254 meters	6.34
1:12500	1041.7 feet 317 meters	5.07
1:20000	1666.7 feet 508 meters	3.17
1:24000 (7.5” quad)	2000 feet 609.6 meters	2.64
1:25000 (7.5” quad)	2083.3 feet 635 meters	2.53
1:50000	4166.7 feet 1270 meters	1.27
1:62500 (15” quad)	5206.1 feet 1586.8 meters	1.01
1:63360 (Alaska maps)	5280 feet 1609.3 meters	1.00
1:100000	8333.3 feet 2540 meters	0.63
1:250000	20833 feet 6350 meters	0.25
1:500000	41667 feet 12700 meters	0.13

Declination Map



Avenza and Mobile Mapping Guide

Recording Waypoints and Tracks

- There are several mobile apps that can easily record points and tracks and share them via AirDrop (iPhone), Bluetooth (Android), or email. The following apps have largely replaced separate GPS units for WFM crewmembers:
- Avenza Maps: Commonly used GPS app with downloadable base maps.
- Gaia GPS: Alternative GPS app with different base layers available.
- ArcGIS Field Maps: Used by Incident Management Teams (IMTs) for Field Observers (FOBS) such as data collection on large incidents. Find field guide here:https://ftp.wildfire.gov/public/incident_specific_data/Fuels/AZ_TNF/General/Documents/Field%20Maps%20Guide%20iOS.pdf.
- Acquiring Maps (Avenza Specific):
  - Enter the "Store" tab.
  - Use the search function to download topographical, park and forest, and other maps.
  - It is possible to filter for "free maps only" in the Avenza store.
  - If the relevant incident has a QR code for maps, click the QR symbol at the top right.
  - For large incidents, download the latest maps from https://ftp.wildfire.gov/public/incident_specific_data/.
  - Alternatively, you can find topographical maps from sources like USGS TopoView, download them onto your device, and import directly into Avenza.

Sharing Maps With AirDrop (iPhone Only)

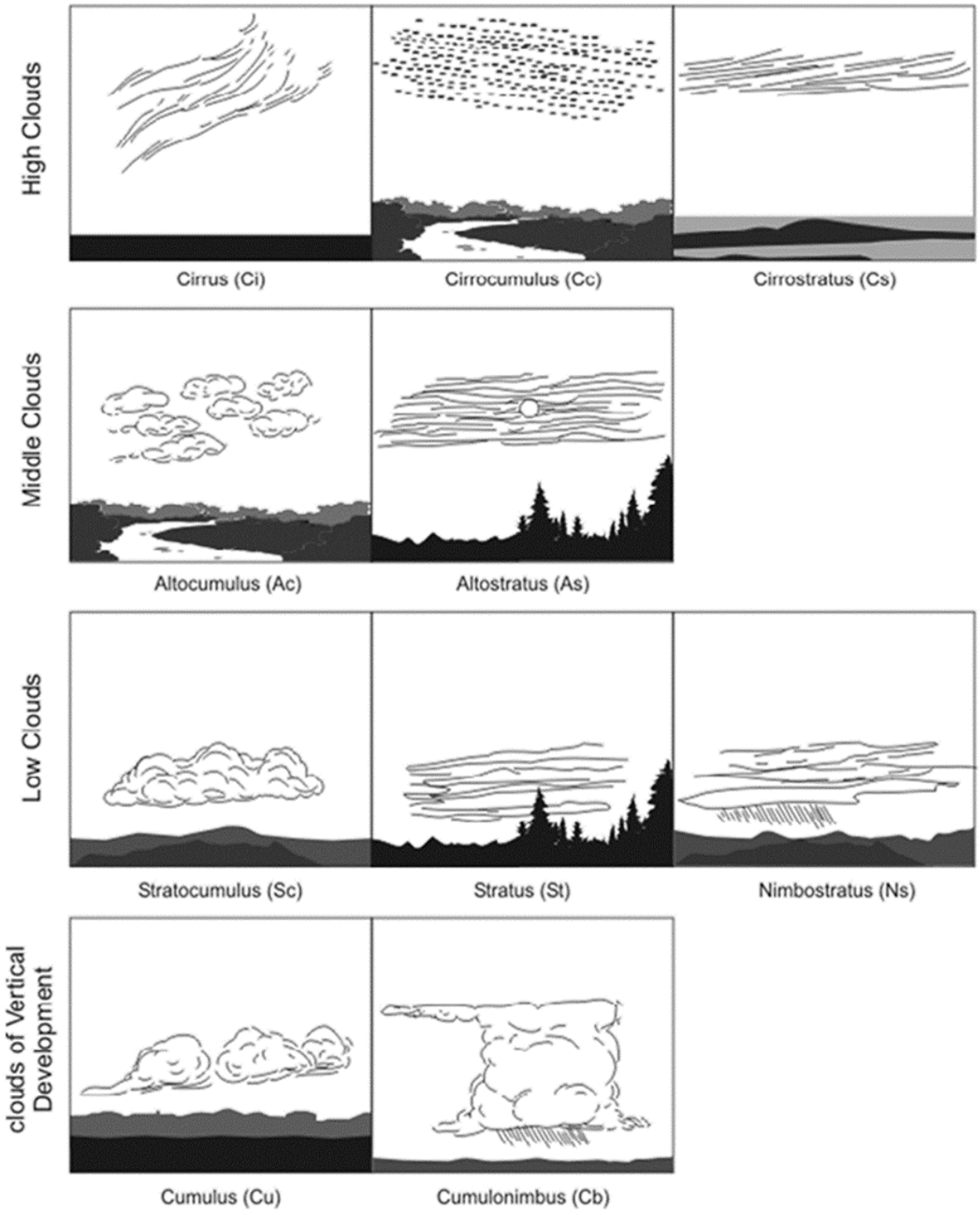
- Open the desired map and click on the map layer symbol at the bottom right.
- Click on the symbol at the bottom right to export.
- Using a straightforward file name, send to "Airdrop," select "Custom" data and make sure you've checked the box next to the map. Tap "Apply."
- Tap "Export," make sure your AirDrop is turned on, and wait for your target's phone to appear on the list.
- The same process is used for sharing points and tracks.

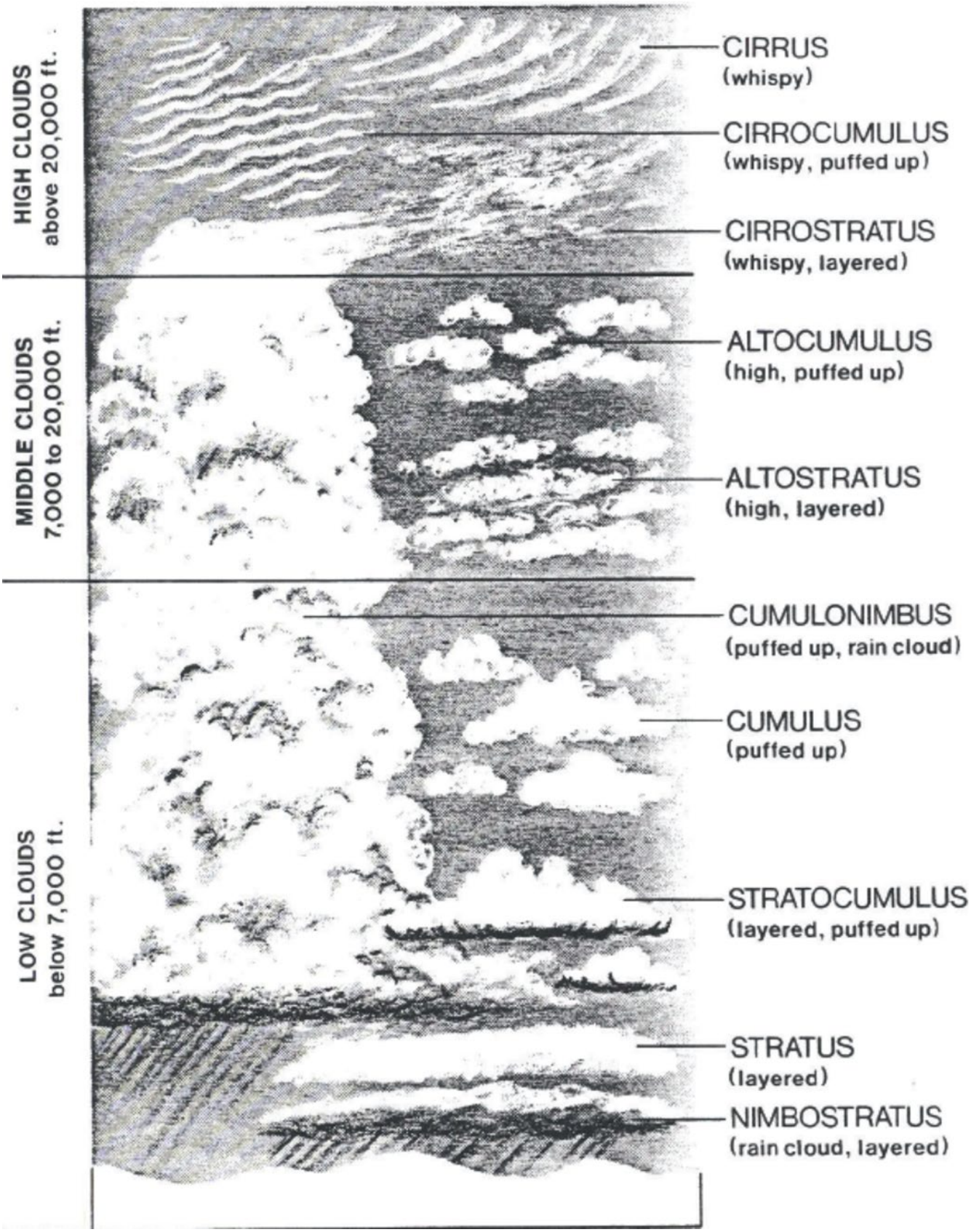
Recording Tracks and Calculating Acreage

- Avenza:
  - While in the map view where your perimeter will go, click on the icon in the bottom right.
  - Tap "Record GPS Tracks," then tap "Start Tracking." Walk the perimeter. Tap "Stop Tracking" when you've finished the track or completed the perimeter.
  - This is the track you will send to whomever needs it. To find the area, tap on the track to enter the "Edit Track" dialogue. Tap "Convert to Area" to transform your track into a polygon showing the area of your unit. Tap on the area that was just created to enter the "Edit Area" dialogue, and tap "Details" to change the units shown for perimeter distance and area (allowing you to obtain the area in acres, square feet, etc. without performing any manual conversions).
- Gaia:
  - Simply record a track, and when you've completed the track, click "convert to area."

Weather and Fire Behavior

Cloud Types

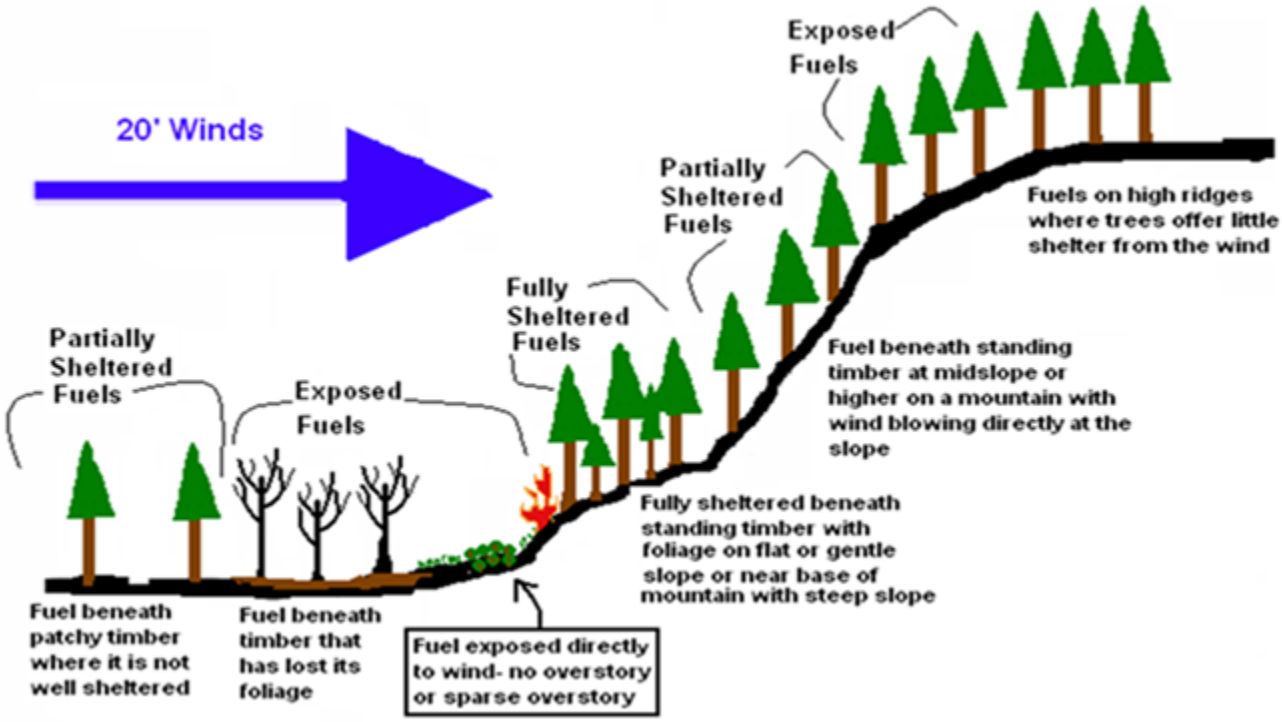



HIGH CLOUDS
above 20,000 ft.
MIDDLE CLOUDS
7,000 to 20,000 ft.
LOW CLOUDS
below 7,000 ft.
CIRRUS
(whispy)
CIRROCUMULUS
(whispy, puffed up)
CIRROSTRATUS
(whispy, layered)
ALTOCUMULUS
(high, puffed up)
ALTOSTRATUS
(high, layered)
CUMULONIMBUS
(puffed up, rain cloud)
CUMULUS
(puffed up)
STRATOCUMULUS
(layered, puffed up)
STRATUS
(layered)
NIMBOSTRATUS
(rain cloud, layered)

Wind Adjustments for Exposure of Fuels to Wind

The following wind adjustments can be used to translate between forecasted 20-foot winds and winds experienced at eye level.

Visual representation of different fuel exposure models



Fuel Exposure	Fuel Model	Adjustment Factor
Exposed Fuels Fuel exposed directly to wind, no, or sparse overstory. Fuel beneath timber that has lost foliage overstory or is near clearings or clear-cuts. Fuel on high ridges where trees offer little shelter from the wind.	4	0.6
	13	0.5
	All others	0.4
Partially Sheltered Fuels Fuel beneath patchy timber 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 slope.	All models (open stands)	0.2
	All models (dense stands)	0.1

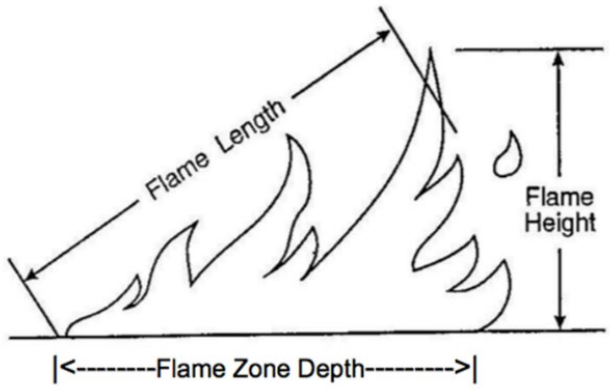
Rate of Spread Estimation

Use the following directions for estimating rate of spread:

- Measure out 1, 3, 5, or 10 feet between two points in an area the fire is spreading toward.
- Record the time it takes for fire to spread between these two points.
- Using the appropriate spread distance column (1, 3, 5, or 10 feet), find the two values the recorded spread time falls between.
- The rate of spread in chains per hour is between the two corresponding numbers in the rightmost column.

Example: Suppose you are monitoring a backing fire burning in light ponderosa needle cast. Measure out 3 feet, and place two stones at each of the points. Time the fire as it moves between the stones. In this case, suppose the fire takes 1 minute and 6 seconds (1'6") to move 3 feet. Looking at the 3 feet column, move down until reaching two times which bracket this time: 1'22" and 55". The corresponding numbers in the rightmost column give us the rate of spread: between 2 and 3 chains per hour.

Flame measurements diagram



Spread Distance (feet)				
1	3	5	10	
Time in Minutes (') and Seconds (")				**Rate Of Spread (Chains /hour)**
3'38"	10'55"	18'10"	36'22"	0.25
1'49"	5'27"	9'05"	18'10"	0.50
55"	2'44"	4'33"	9'05"	1
36"	1'49"	3'02"	6'04"	1.50
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

Sling Psychrometer Use

The following are instructions for determining wet and dry bulb temperatures using the sling psychrometer:

1. Stand in a shaded, open area away from objects that might be struck during whirling. If in open country, use your body to shade the psychrometer. If possible, take 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 allow it to adjust to the outside air temperature.
3. Face the wind to avoid the influence of body heat and moisture on the thermometers.
4. Saturate the wick of the wet bulb with clean, mineral free water (distilled). Never touch the wick.
5. Ventilate the thermometers by whirling at full arm's length. Your arm should be parallel to the ground. Whirl for 1 minute.
6. Note the wet bulb temperature. Whirl another 40-50 times and note the wet bulb temperature again. If the second reading is lower than the first, continue to whirl, and read until it will go no lower. 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. If the wet bulb reading increases, the wick has dried out. Wet the wick and begin again.
8. Determine the relative humidity and dew point using the tables provided.

Tips:

- Never sling weather in the black.
- Ensure a quality sling (clean wick, non-separated mercury/liquid, clean water, etc.).
- Always use the correct elevation chart for relative humidity and dew point.
- As a rule of thumb, divide relative humidity by 5 to obtain an estimate of fine dead fuel moisture.

Fuel Moisture Sampling

General Guidelines

- Record site name, date, time, observer name, observed weather, and 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. Electrical tape works well.

Dead Fuels (1-hour, 10-hour, 100-hour, and 1000-hour)

- 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 to avoid overfilling/spilling between measurements.
- Do not collect buried samples.
- Pick samples of different size within the timelag class.
- Recently fallen material should be avoided, especially for the larger size classes.
- Remove all lichen, moss, and very loose bark from sample.
- 1000-hour fuels should be collected at least 1 foot from the end of the downed log, and should ideally be cut with a handsaw, rather than a chainsaw. Storage of the "cookie" should be in an airtight container and "wet" weight should be read as soon as possible. An auger/drill can also be used to collect 1000-hour woodchips, which can be stored in a standard fuel tin.

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 (Live Woody Shrub Leaves and Tree Needles/Leaves)

- Only collect foliage and very small twigs and remove flowers, seeds, nuts, and 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 and seal with electrical tape.

Drying Samples

- Preheat drying oven between 60°C (140°F) and 100°C (212°F). Be sure to note temperature used.

- Place sample cans with closed lids on scale and record "wet" weights (be sure to remove tape first).
- Remove lid just prior to placing in oven. If material is lost, re-weigh sample.
- Dry sample for 24 hours (very wet samples may require 48 hours).
- Replace lids immediately after sample is removed from oven and weigh.
- Calculate fuel moisture using the following formula:

$$\frac{wet\ weight\ of\ sample - dry\ weight\ of\ sample}{dry\ weight\ of\ sample - container\ weight} * 100 = \%\ moisture\ content$$

Fuel Moisture Calculation Table

A	B	C	D	E	F
Gross Weight		**Container Tare Weight**	**Water Weight**	**Dry Weight**	**% Moisture Content**
Wet	**Dry**				

Calculation Summary:

A (wet weight of sample) – B (dry weight of sample) = D (water weight)

B (dry weight of sample) – C (container weight) = E (dry weight)

D (water weight) / E (dry weight) * 100 = F (% moisture content)

Fuel Size Classes – Woody Debris

Dead Woody Class	**Piece Diameter**	
	inches	centimeters
1 hour	0-0.25	0-0.6
10 hours	0.25-1.0	0.6-2.5
100 hours	1.0-3.0	2.5-8.0
1000 hours and greater	3.0 and greater	8.0 and greater

Live Fuel Moisture Estimates

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

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 dead fuel)

Fuel Models

Anderson 1982 – "The Original 13"

Primary carrier of the fire is GRASS

- FM1 – Grass is finely structured, generally below knee level, primarily cured, and 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 the overstory is partially involved in carrying fire, but grass is the primary carrier of the fire. Expected rate of spread is less than FM1 and intensity is less than 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 3 feet 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 (over 6 feet), 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 pocosin, pine barrens of New Jersey, closed jack pine stands of north central states.*
- FM5 – Brush is about 2 feet high, with light loading of brush litter underneath. Litter may carry fire, especially at low wind speeds. Young green stands with little or no deadwood. Spread rate low to moderate, flame length low to moderate. *Laurel, vine maple, alder, manzanita.*
- FM6 – Live fuels are absent or sparse. Brush averages 2 to 4 feet high. Brush requires moderate winds to carry fire. May not predict rate of spread accurately in mature pinyon-juniper or taller oak brush. Spread rate high (with wind), flame length high. *Chapparal, chamise, oak brush, low pocosin, Alaskan black spruce, taiga, shrub tundra, pinyon-juniper 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 6 feet 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 inches or less) conifer or hardwood litter. Spread rate low, flame length low (with occasional jackpots 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. Concentrations of dead and down woody material will contribute to possible torching of trees, spotting, and crowning. Spread rate moderate, flame length moderate. *Closed stands of long-needle pine – Jeffrey ponderosa, southern pine plantations.*

- FM10 – There is a significant quantity of larger fuels with attached branches and twigs, or fuels that have rotted enough to be splintered and broken. The larger fuels are reasonably well distributed over the area. Some green fuel may be present. Overall depth of the fuel is primarily below knee level, but some fuel may be higher. Any forest type may qualify if heavy down material is present. Crowning, spotting, and torching of individual trees are more frequent in this fuel model, 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 operations in mixed conifer or hardwood stands and southern pine harvests.*
- FM12 – Slash generally covers the ground, with heavier loadings than FM11, though there may be some bare spots or areas of light coverage. Average slash depth is about 2 feet. 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 not expected to affect fire behavior. Spread rate low, flame length moderate to high. *Heavily thinned conifer stands, clear-cuts, and medium to heavy partial cuts.*
- FM13 – Slash is continuous or nearly so, with heavier loadings than FM12. Slash is not extremely compacted and has an average depth of 3 feet. Approximately ½ of the needles are still present and are red, or all 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 greater than 3-inch diameter materials or load like FM12 but with "red" needles still attached.*

Scott and Burgan 2005 – "The New 40"

- Determine the general fire-carrying fuel type (grass, grass/shrub, shrub, timber/understory, timber litter, slash, or non-burnable).
- Determine general climate in the area (arid, semiarid, subhumid, humid). Timber litter fuel models do not have climate groupings.
- Match a fuel model description (depth, load, continuity) with the fuels of interest.

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 1 foot. Spread rate high, flame length moderate.
- GR4 – Moderately coarse continuous grass, average depth about 2 feet. Spread rate very high, flame length high.
- GR7 – Moderately coarse continuous grass, average depth about 3 feet. 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 feet. Spread rate high, flame length moderate.
- GR5 – Dense coarse grass, average depth about 1-2 feet. Spread rate very high, flame length high.
- GR6 – Dryland grass about 1-2 feet tall. Spread rate very high, flame length very high.
- GR8 – Heavy, coarse, continuous grass 3-5 feet tall. Spread rate very high, flame length very high.
- GR9 – Very heavy, coarse, continuous grass 5-8 feet tall. Spread rate extreme, flame length extreme.

Mixture of grass and shrub, up to about 50% shrub coverage (grass/shrub)

Arid to semiarid climate (rainfall deficient in summer). Extinction moisture content is 15%.

- GS1 – Shrubs are about 1 foot high, low grass load. Spread rate moderate, flame length low.
- GS2 – Shrubs are 1-3 feet 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 less than 2 feet. Spread rate high, flame length moderate.
- GS4 – Heavy grass/shrub load, depth greater than 2 feet. Spread rate high, flame length very high.

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 load, fuel bed depth about 1 foot, some grass may be present. Spread rate very low, flame length very low.
- SH2 – Moderate shrub load (higher than SH1), fuel bed depth about 1 foot, no grass present. Spread rate low to moderate, flame length low to moderate.
- SH5 – Heavy shrub load, depth 4-6 feet. Spread rate very high, flame length very high.
- SH7 – Very heavy shrub load, depth 4-6 feet. Spread rate lower than SH5, but similar flame length. 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 feet. Spread rate low, flame length low.
- SH4 – Low to moderate shrub and litter load, possibly with pine overstory, fuel bed depth about 3 feet. Spread rate high, flame length moderate.
- SH6 – Dense shrubs, little, or no herb fuel, depth about 2 feet. Spread rate high, flame length high.
- SH8 – Dense shrubs, little or no herb fuel, depth about 3 feet. Spread rate high, flame length high.
- SH9 – Dense, finely branched shrubs with significant fine dead fuel, about 4-6 feet tall. Some herbaceous fuel may be present. Spread rate high, flame length very high.

Grass or shrubs mixed with litter from forest canopy (timber/understory).

Semiarid to subhumid climate. Extinction moisture content is 20%.

- TU1 – Fuel bed is low load of grass and/or shrub with litter. Spread rate low, flame length low.
- TU4 – Fuel bed is short conifer trees with grass or moss understory. Spread rate moderate, flame length moderate.
- TU5 – Fuel bed is high load conifer litter with shrub understory. Spread rate moderate, flame length moderate.

Humid climate. Extinction moisture content is 30%.

- TU2 – Fuel bed is moderate litter load with shrub component. Spread rate moderate, flame length low.
- TU3 – Fuel bed is moderate litter load with grass and shrub components. Spread rate high, flame length moderate.

Dead and down woody fuel (litter) beneath a forest canopy (timber litter).

Fuel bed is recently burned but able to carry wildland fire.

- TL1 – Light to moderate load, fuels 1-2 inches deep. Spread rate very low, flame length very low.

Fuel bed 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.

Fuel bed composed of long-needle pine litter.

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

Fuel bed not composed of broadleaf or long-needle pine litter.

- TL3 – Moderate load conifer litter. Spread rate very low, flame length low.
- TL4 – Moderate load, includes small diameter downed logs. Spread rate low, flame length low.
- TL5 – High load conifer litter, light slash, or mortality fuel. Spread rate low, flame length low.
- TL7 – Heavy load, includes larger diameter downed logs. 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.

Activity fuel or debris from wind damage (slash).

Fuel bed is activity fuel.

- SB1 – Fine fuel load is 10-20 tons per acre, weighted toward 1-3 inches diameter class. Depth is less than 1 foot. Spread rate moderate, flame length low.
- SB2 – Fine fuel load is 7-12 tons per acre, evenly distributed across 0-0.25 inches diameter class. Spread rate moderate, flame length moderate.
- SB3 – Fine fuel load is 7-12 tons per acre, weighted toward 0-0.25 inches diameter class. Depth is greater than 1 foot. Spread rate high, flame length high.

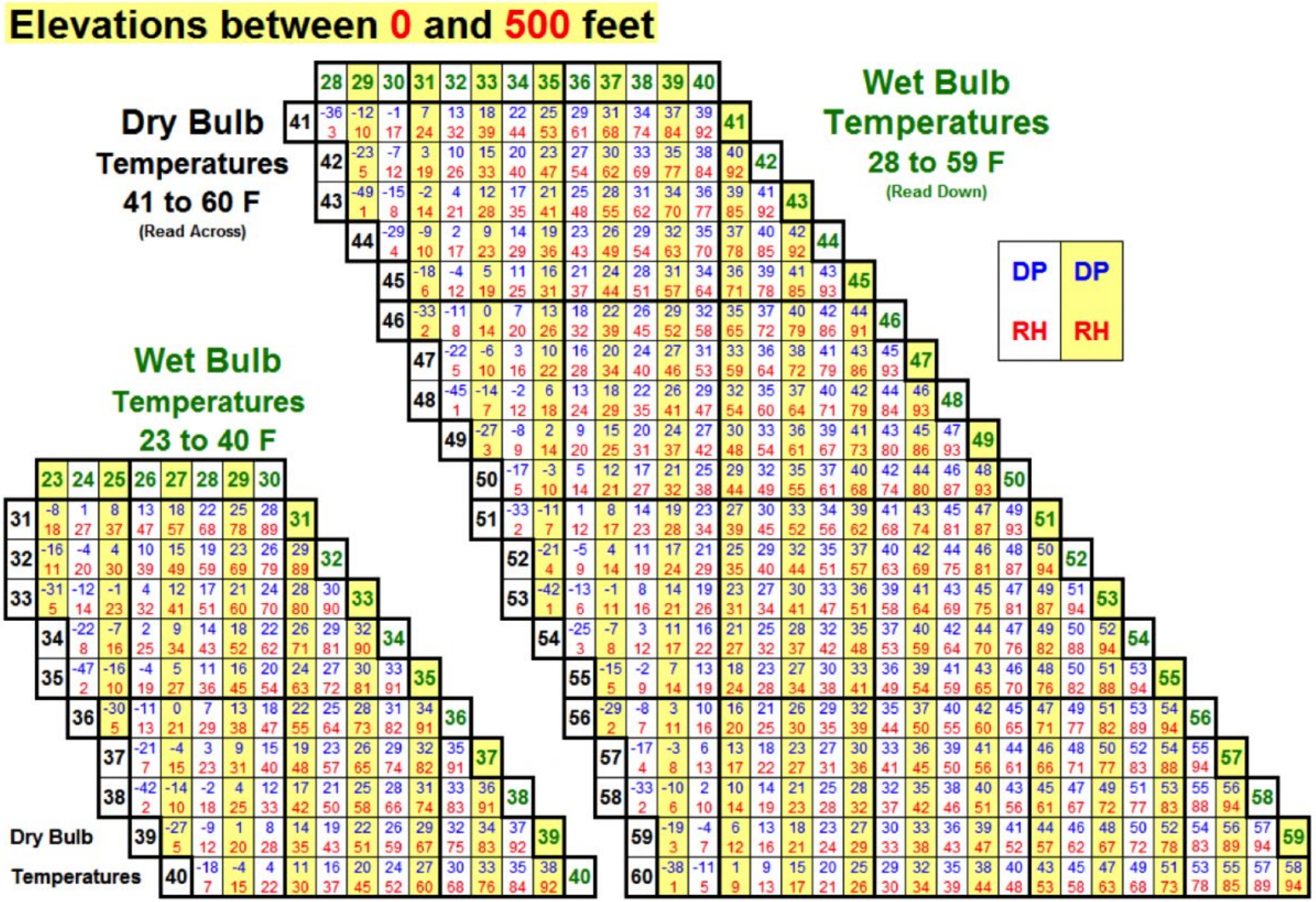
Fuel bed is blowdown.

- 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, fuel bed not compacted, foliage still attached. Spread rate very high, flame length very high.

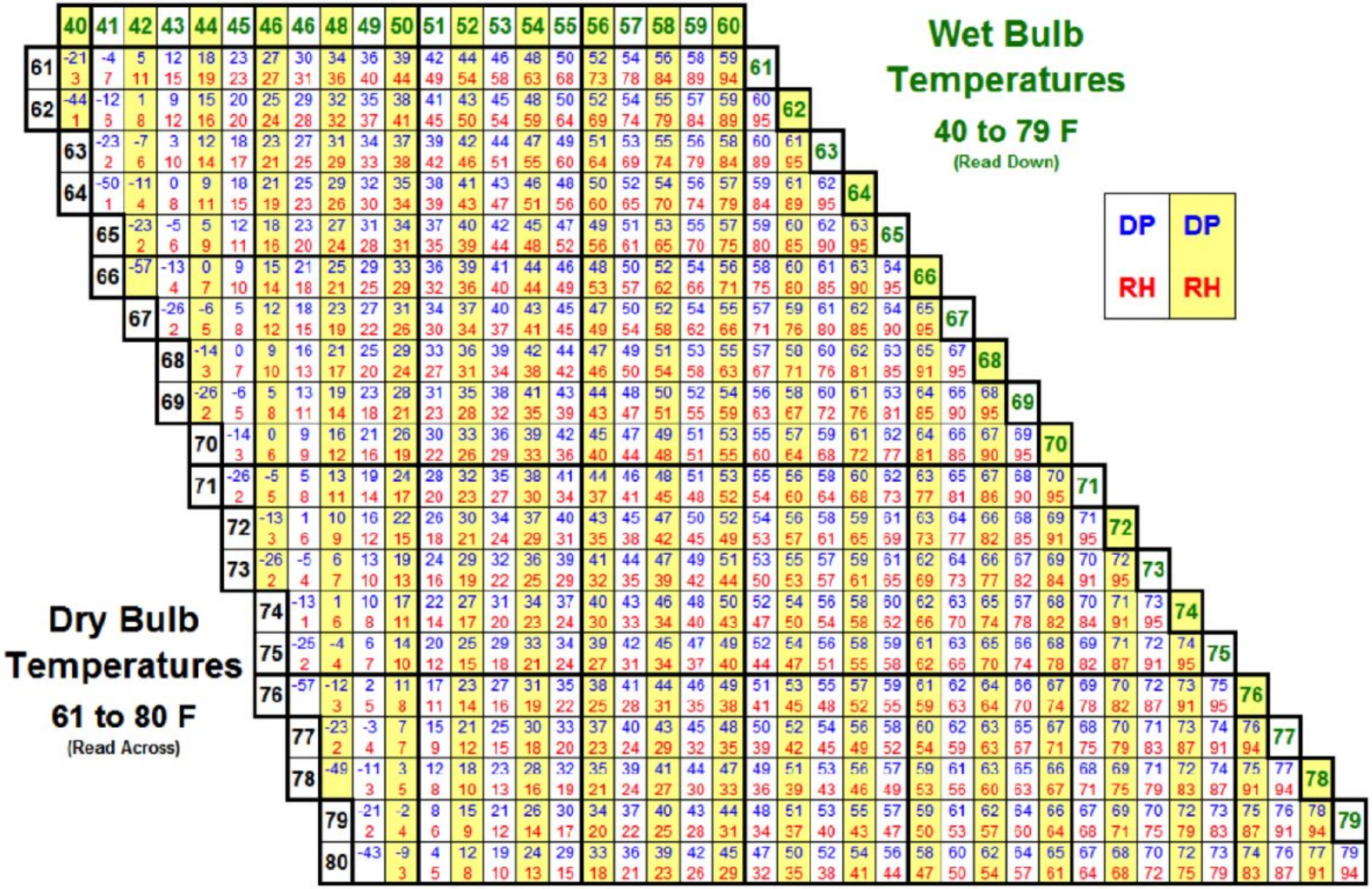
Insufficient fuel to carry wildland fire under any condition (non-burnable).

- NB1 – Urban or suburban development, insufficient fuel to carry wildland fire.
- NB2 – Snow/ice.
- NB3 – Agricultural field, maintained in non-burnable condition.
- NB8 – Open water.
- NB9 – Bare ground.

Relative Humidity and Dew Point Tables

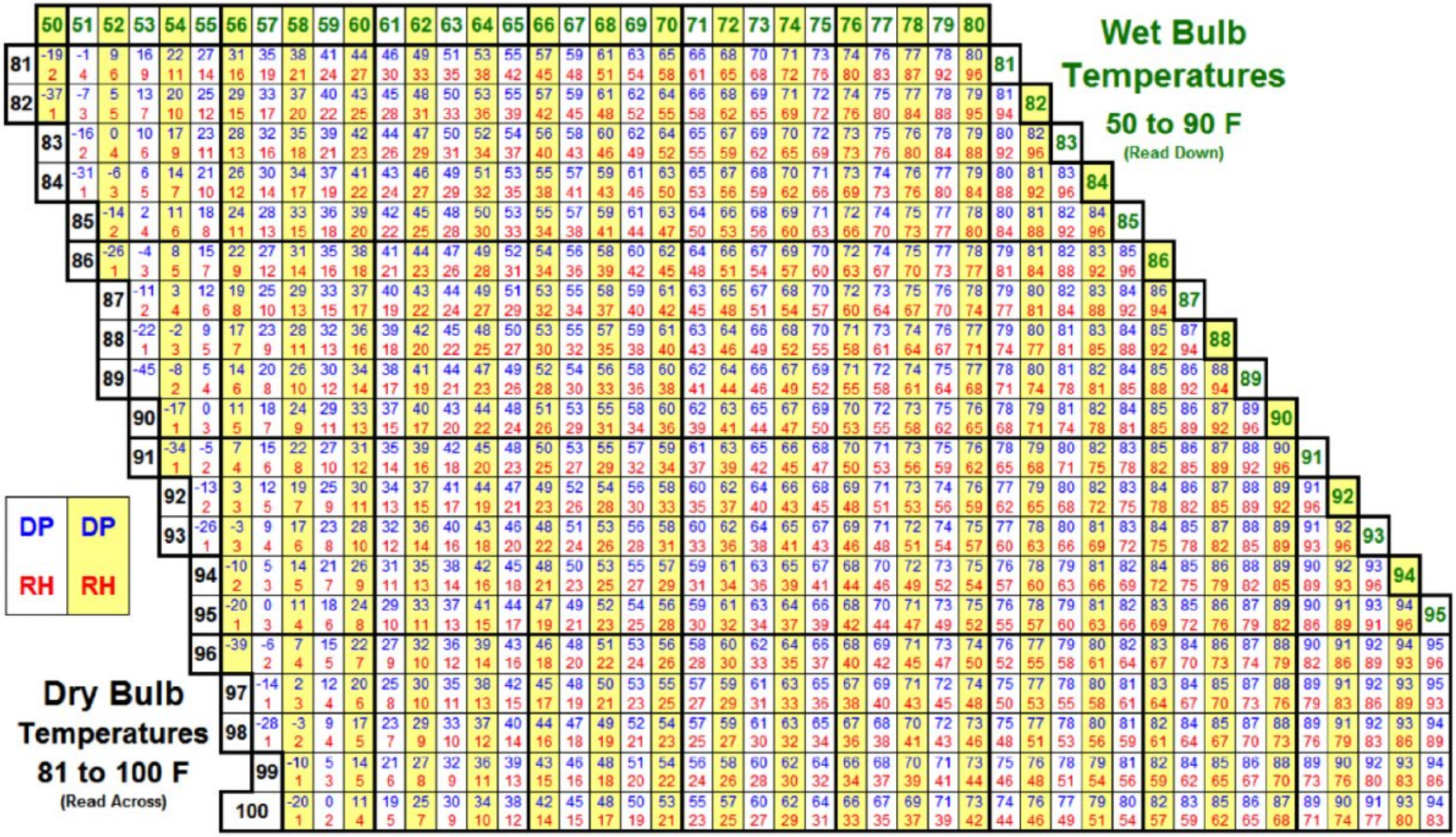


Elevations between 0 and 500 feet



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

Elevations between 0 and 500 feet



Elevations between 0 and 500 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	-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
	RH		2	3	5	6	8	9	11	13	14	16	18	20	21	23	25	27	29	31	33	36	38	40	42	45	47	49	52	54	57	60	62	65	68	71	74	77	80
102	DP	-14	3	3	13	21	26	31	36	39	43	46	49	51	54	56	58	61	63	65	66	68	70	72	73	75	77	78	80	81	83	84	86	87	88	90	91	92	93
	RH		1	3	4	5	7	9	10	12	13	15	17	18	20	22	24	26	28	30	32	34	36	38	40	43	45	47	50	52	55	57	60	63	65	68	71	74	77
103	DP	-26	-2	10	18	24	30	34	38	42	45	48	50	53	55	58	60	62	64	66	68	70	71	73	75	76	78	79	81	82	84	85	87	88	89	91	92	93
	RH		1	2	3	5	6	8	9	11	12	14	16	17	19	21	23	25	26	28	30	32	34	37	39	41	43	45	48	50	53	55	58	60	63	66	68	71	74
104	DP	-8	6	15	22	26	33	37	40	44	47	50	52	55	57	59	61	63	65	67	69	71	73	74	76	77	79	80	82	83	85	86	88	89	90	92	93
	RH		1	3	4	6	7	9	10	12	13	15	16	18	20	22	23	25	27	29	31	33	35	37	39	41	44	46	48	51	53	55	58	61	63	66	69	72
105	DP	-18	2	12	20	26	31	35	39	43	46	49	51	55	56	59	61	63	65	67	69	70	72	74	75	77	79	80	82	83	85	86	87	89	90	91	93
	RH		1	2	4	5	6	8	9	11	12	14	15	17	19	20	22	24	26	28	30	31	33	35	38	40	42	44	46	49	51	53	56	58	61	63	66	69
106	DP	-34	-4	9	18	24	29	34	38	42	45	48	51	53	56	58	60	62	64	66	68	70	72	73	75	77	78	80	81	83	84	86	87	88	90	91	92
	RH		2	3	4	6	7	8	10	11	13	14	16	18	19	21	23	25	26	28	30	32	34	36	38	40	42	44	47	49	51	54	56	59	61	64	66
107	DP	-11	5	15	22	28	33	37	41	44	47	50	53	55	57	60	62	64	66	68	70	71	73	75	76	78	79	81	83	84	85	87	88	90	91	92
	RH		1	2	4	5	6	8	9	11	12	14	15	17	18	20	22	23	25	27	29	31	32	34	36	38	41	43	45	47	49	52	54	56	59	61	64
108	DP	-22	0	12	20	26	31	35	39	43	46	49	52	54	57	59	61	63	65	67	69	71	73	74	76	78	79	81	82	84	85	87	88	89	91	92
	RH		1	2	3	4	6	7	8	10	11	13	14	16	17	19	21	22	24	26	27	29	31	33	35	37	39	41	43	45	47	50	52	54	57	59	62
109	DP	-46	-6	8	17	24	29	34	38	42	45	48	51	54	56	58	61	63	65	67	69	70	72	74	76	77	79	80	82	83	85	86	88	89	90	92
	RH		1	3	4	5	6	8	9	11	12	13	15	16	18	20	21	23	24	26	28	30	32	33	35	37	39	41	43	46	48	50	52	55	57	60
110	DP	-14	4	14	22	28	33	37	41	44	47	50	53	55	58	60	62	64	66	68	70	72	74	75	77	78	80	82	83	85	86	87	89	90	91
	RH		1	2	3	5	6	7	8	10	11	13	14	15	17	19	20	22	23	25	27	28	30	32	34	36	38	40	42	44	46	48	50	53	55	57
111	DP	-26	-1	11	19	26	31	36	39	43	46	49	52	55	57	59	62	64	66	68	70	71	73	75	76	78	80	81	83	84	86	87	89	90	91
	RH		2	3	4	5	6	8	9	10	12	13	15	16	18	19	21	22	24	26	27	29	31	33	34	36	38	40	42	44	46	49	51	53	55
112	DP	-7	8	17	24	29	34	38	42	45	48	51	54	56	59	61	63	65	67	69	71	73	74	76	78	79	81	82	84	85	87	88	90	91
	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
113	DP	-16	3	14	22	28	33	37	41	44	48	50	53	56	58	60	63	65	67	69	70	72	74	76	77	79	81	82	84	85	87	88	89	91
	RH		1	2	3	4	5	7	8	9	10	12	13	14	16	17	19	20	22	23	25	27	28	30	32	33	35	37	39	41	43	45	47	49	51
114	DP	-31	-2	11	19	26	31	36	40	43	47	50	52	55	57	60	62	64	66	68	70	72	74	75	77	79	80	82	83	85	86	88	89	91
	RH		1	3	4	5	6	7	8	10	11	12	14	15	16	18	19	21	22	24	25	27	29	30	32	34	36	38	39	41	43	45	47	50
115	DP	-9	7	17	24	29	34	39	42	46	49	52	54	57	59	61	64	66	68	70	71	73	75	77	78	80	81	83	85	86	87	89	90
	RH		1	2	3	4	5	7	8	9	10	12	13	14	16	17	18	20	21	23	24	26	28	29	31	33	34	36	38	40	42	44	46	48
116	DP	-18	3	14	22	28	33	37	41	45	48	51	54	56	59	61	63	65	67	69	71	73	75	76	78	80	81	83	84	86	87	89	90
	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	37	38	40	42	44	46
117	DP	-35	-3	11	19	26	31	36	40	44	47	50	53	55	58	60	63	65	67	69	71	72	74	76	78	79	81	82	84	85	87	88	90
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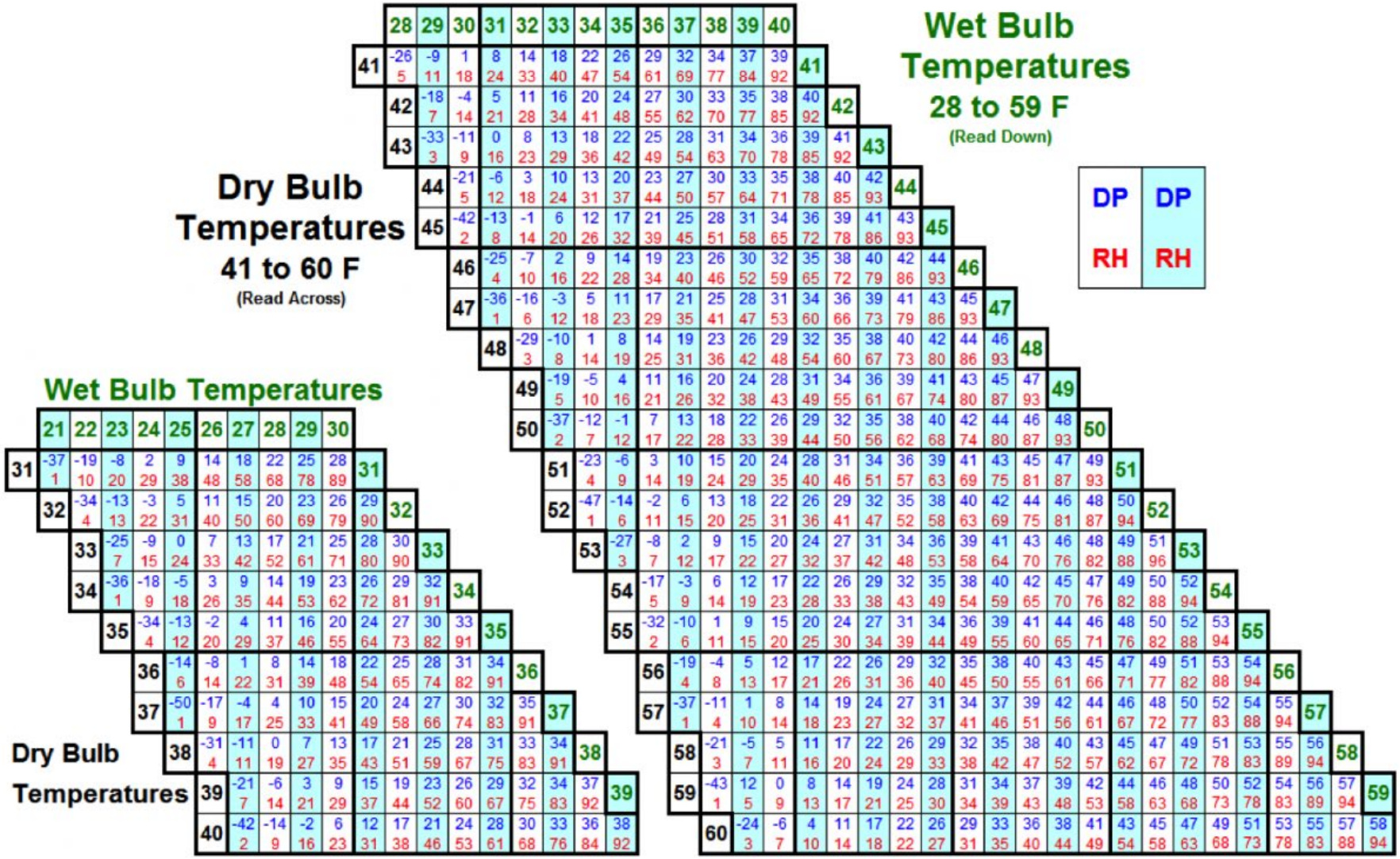
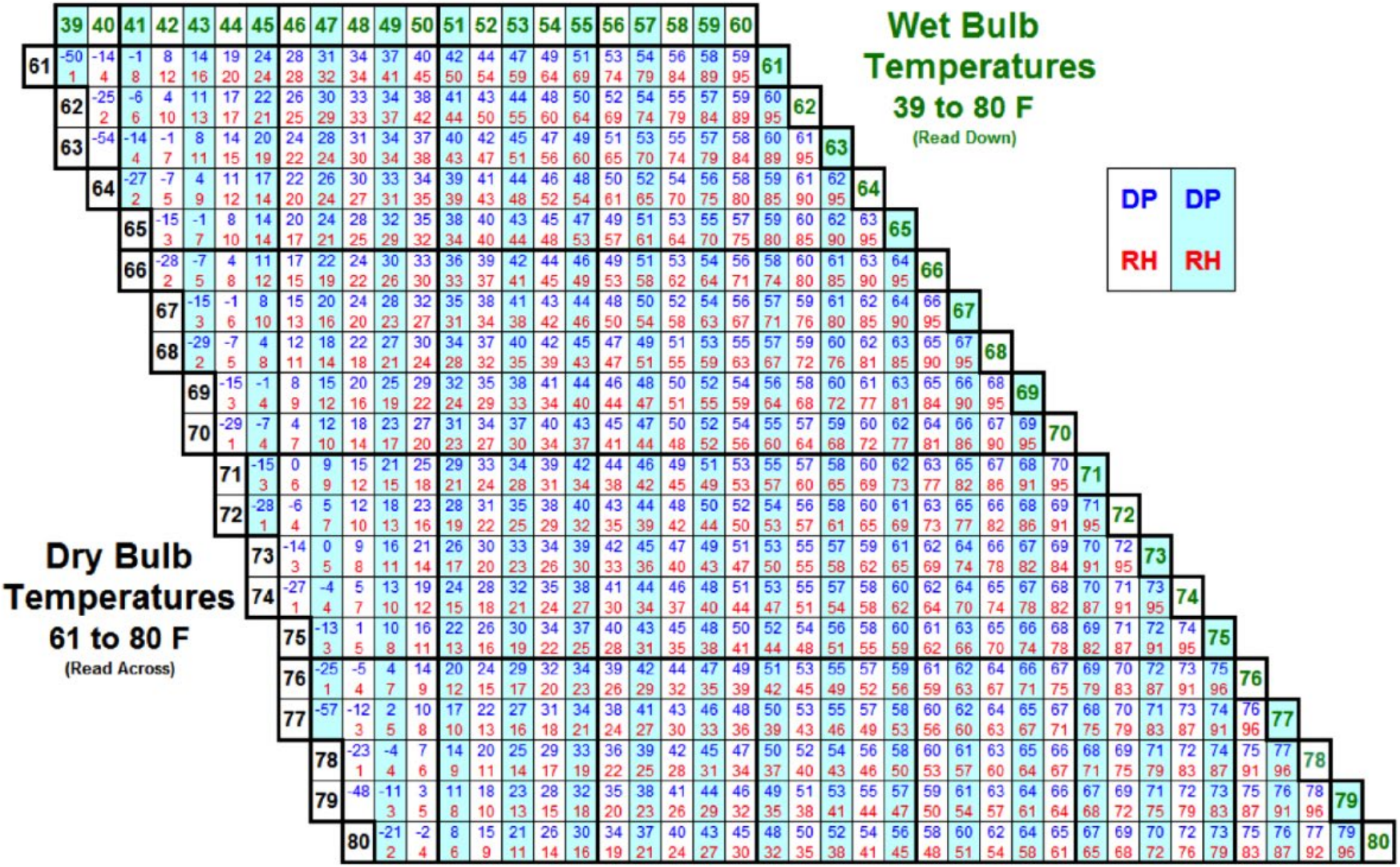
118	DP	-9	7	17	24	30	35	39	43	46	49	52	55	57	60	62	64	66	68	70	72	74	76	77	79	80	82	84	85	87	88	89
	RH		1	2	3	4	5	6	7	8	10	11	12	13	15	16	17	19	20	21	23	24	26	27	29	31	32	34	36	37	39	41	43
119	DP	-19	2	14	22	28	33	38	42	45	48	51	54	57	59	61	64	66	68	70	72	73	75	77	79	80	82	83	85	86	88	89
	RH		1	2	4	5	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

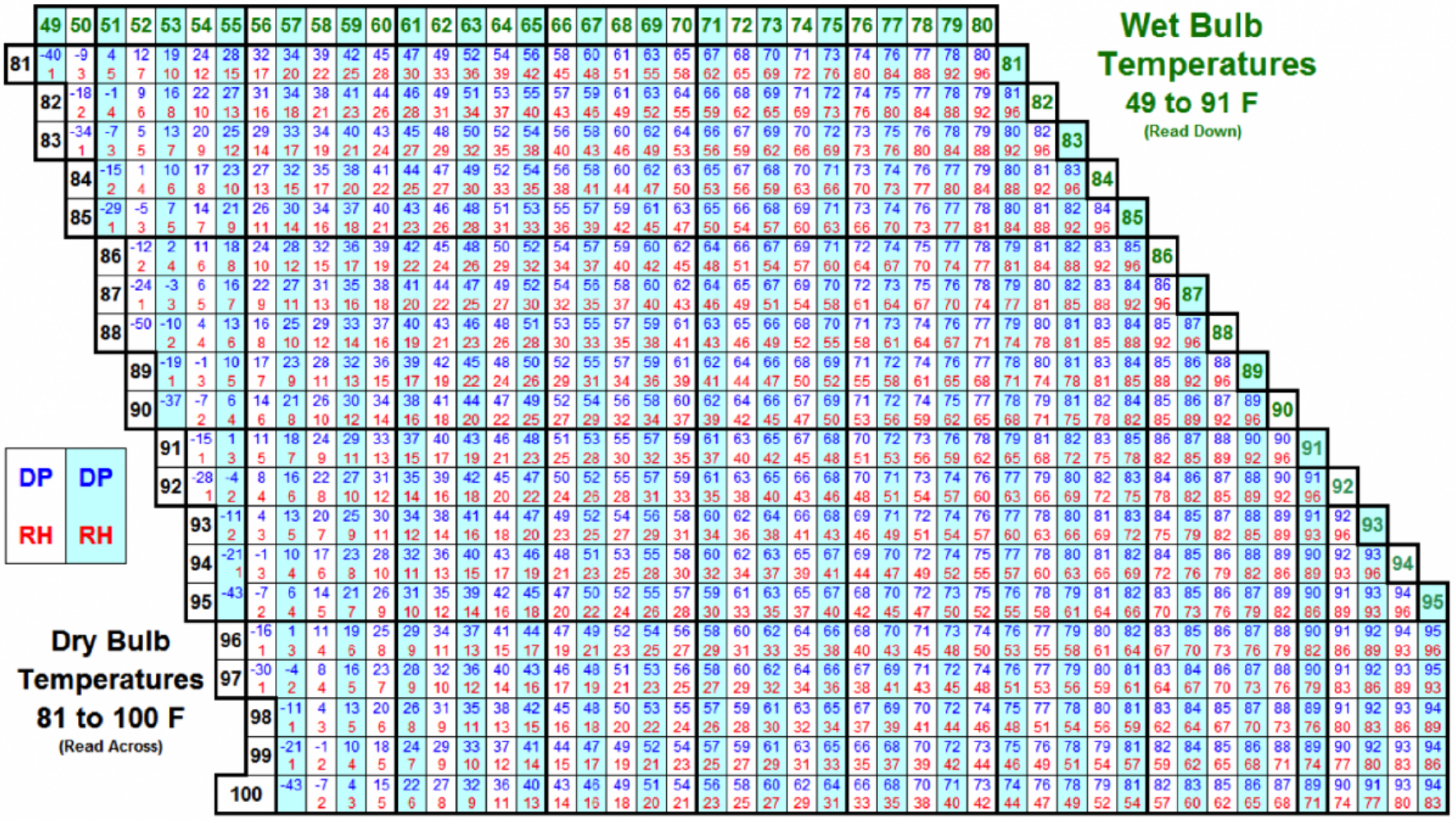
Elevations between 501 and 1,900 feet



Elevations between 501 and 1,900 feet



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 = Dew Point

RH = Relative Humidity

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	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	
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	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				
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	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				
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	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					
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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						
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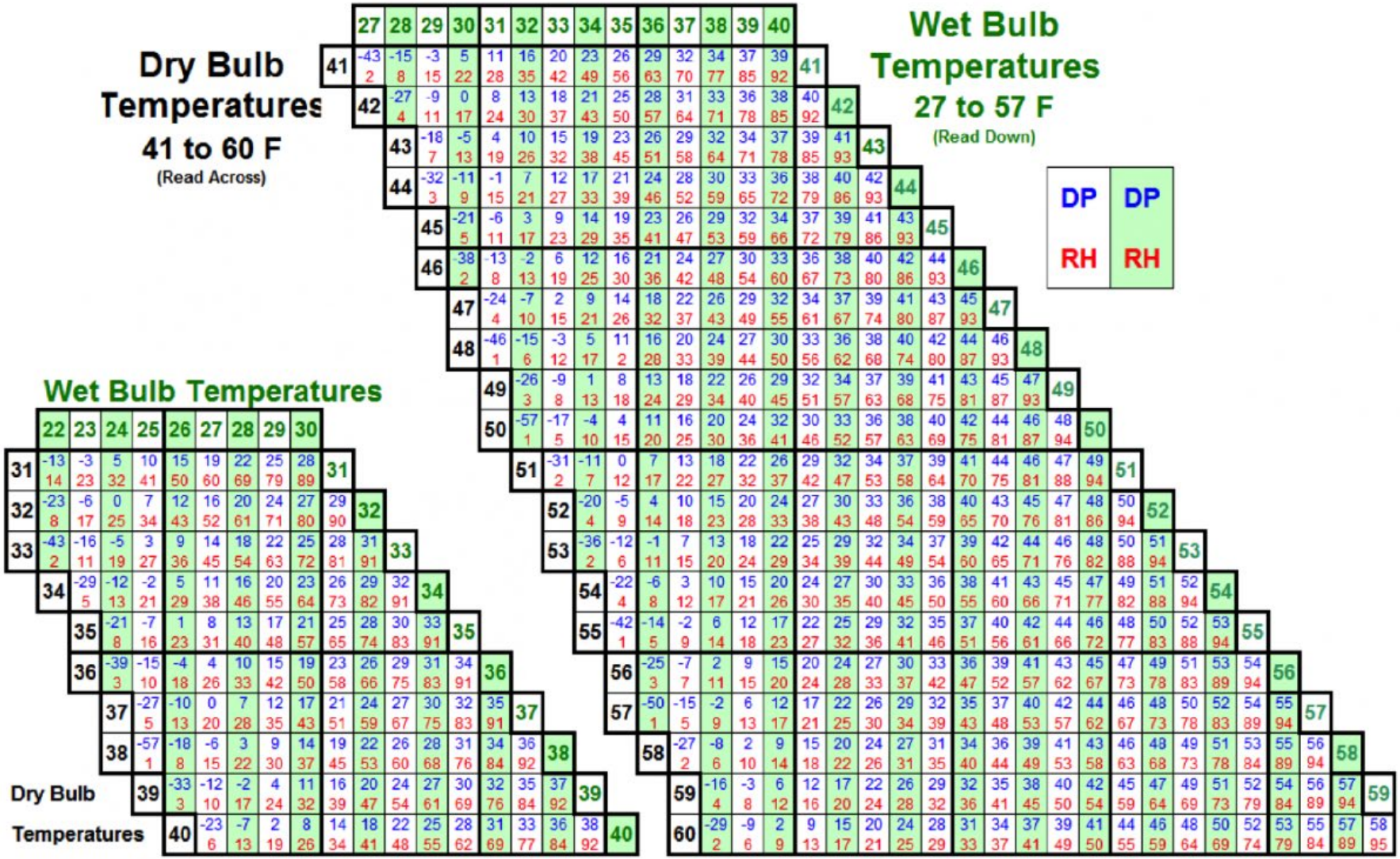
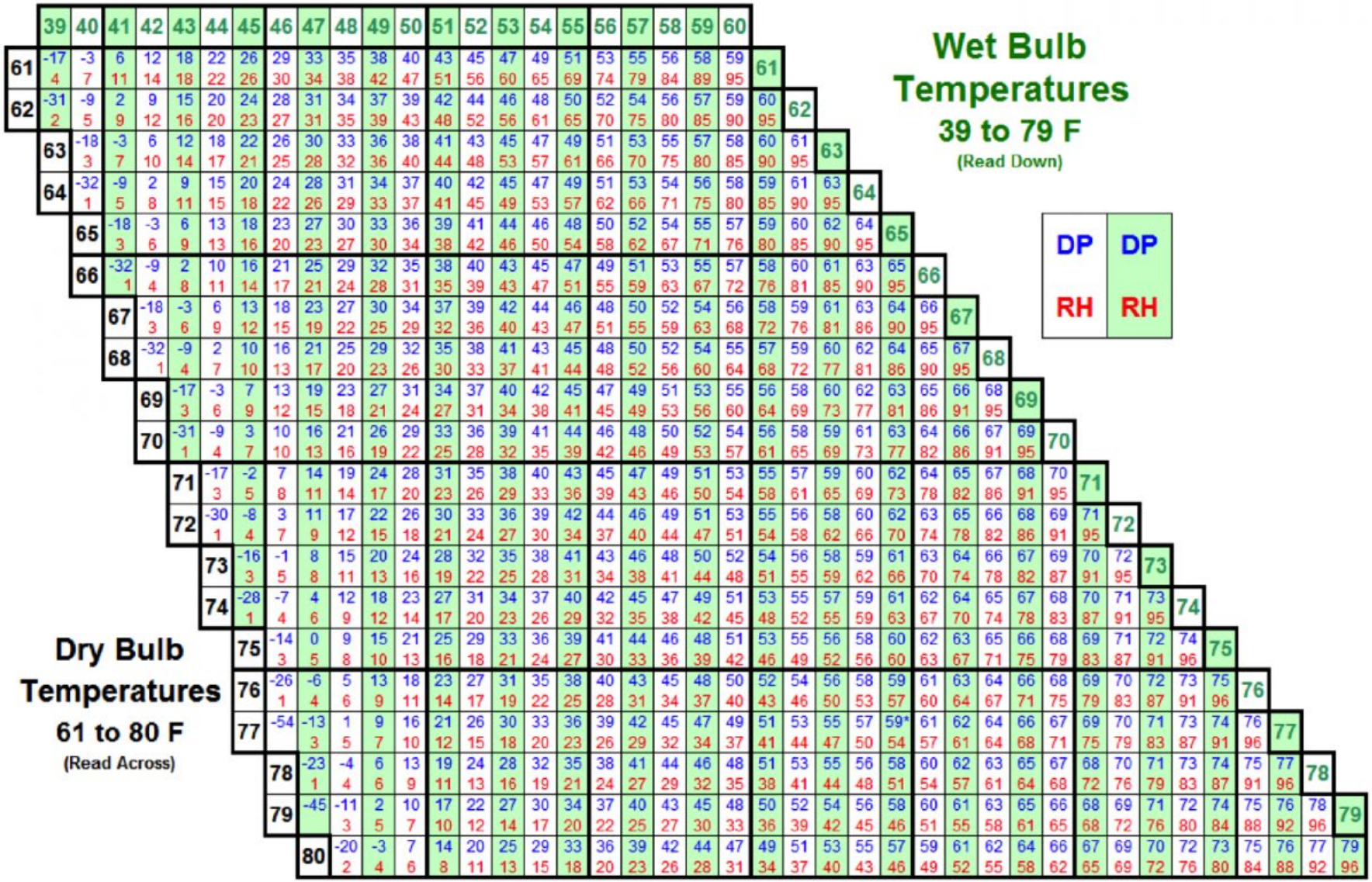
117	DP	-10	6	16	23	29	34	38	42	45	48	51	54	56	59	61	63	65	67	69	71	73	75	76	78	80	81	83	84	86	87	89	90						
	RH	1	2	3	4	5	6	7	8	10	11	12	13	14	16	17	18	20	21	23	24	26	27	29	30	32	34	36	37	39	41	43	45						
118	DP	-20	2	13	21	27	32	37	41	44	47	50	53	56	58	60	63	65	67	69	71	72	74	76	78	79	81	82	84	85	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	16	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



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	4	7	11	14	18	22	26	30	34	38	42	47	51	56	60	65	69	74	79	84	89	95	
62	-31	-9	2	9	15	20	24	28	31	34	37	39	42	44	46	48	50	52	54	56	57	59	60	62
	2	5	9	12	16	20	23	27	31	35	39	43	48	52	56	61	65	70	75	80	85	90	95	
63	-18	-3	6	12	18	22	26	30	33	36	38	41	43	45	47	49	51	53	55	57	58	60	61	63
	3	7	10	14	17	21	25	28	32	36	40	44	48	53	57	61	66	70	75	80	85	90	95	
64	-32	-9	2	9	15	20	24	28	31	34	37	40	42	45	47	49	51	53	54	56	58	59	61	63	64
	1	5	8	11	15	18	22	26	29	33	37	41	45	49	53	57	62	66	71	75	80	85	90	95	
65	-18	-3	6	13	18	23	27	30	33	36	39	41	44	46	48	50	52	54	55	57	59	60	62	64	65
	3	6	9	13	16	20	23	27	30	34	38	42	46	50	54	58	62	67	71	76	80	85	90	95	
66	-32	-9	2	10	16	21	25	29	32	35	38	40	43	45	47	49	51	53	55	57	58	60	61	63	65	66
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	3	5	8	11	14	17	20	23	26	29	33	36	39	43	46	50	54	58	61	65	69	73	78	82	86	91	95	
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	1	4	6	9	12	14	17	20	23	26	29	32	35	38	42	45	48	52	55	59	63	67	70	74	78	83	87	91	95	
75	-14	0	9	15	21	25	29	33	36	39	41	44	46	48	51	53	55	56	58	60	62	63	65	66	68	69	71	72	74	75
	3	5	8	10	13	16	18	21	24	27	30	33	36	39	42	46	49	52	56	60	63	67	71	75	79	83	87	91	96	
76	-26	-6	5	13	18	23	27	31	35	38	40	43	45	48	50	52	54	56	58	59	61	63	64	66	68	69	70	72	73	75	76
	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	
77	-54	-13	1	9	16	21	26	30	33	36	39	42	45	47	49	51	53	55	57	59*	61	62	64	66	67	69	70	71	73	74	76	77
		3	5	7	10	12	15	18	20	23	26	29	32	34	37	41	44	47	50	54	57	61	64	68	71	75	79	83	87	91	96	
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	1	4	6	9	11	13	16	19	21	24	27	29	32	35	38	41	44	48	51	54	57	61	64	68	72	76	79	83	87	91	96	
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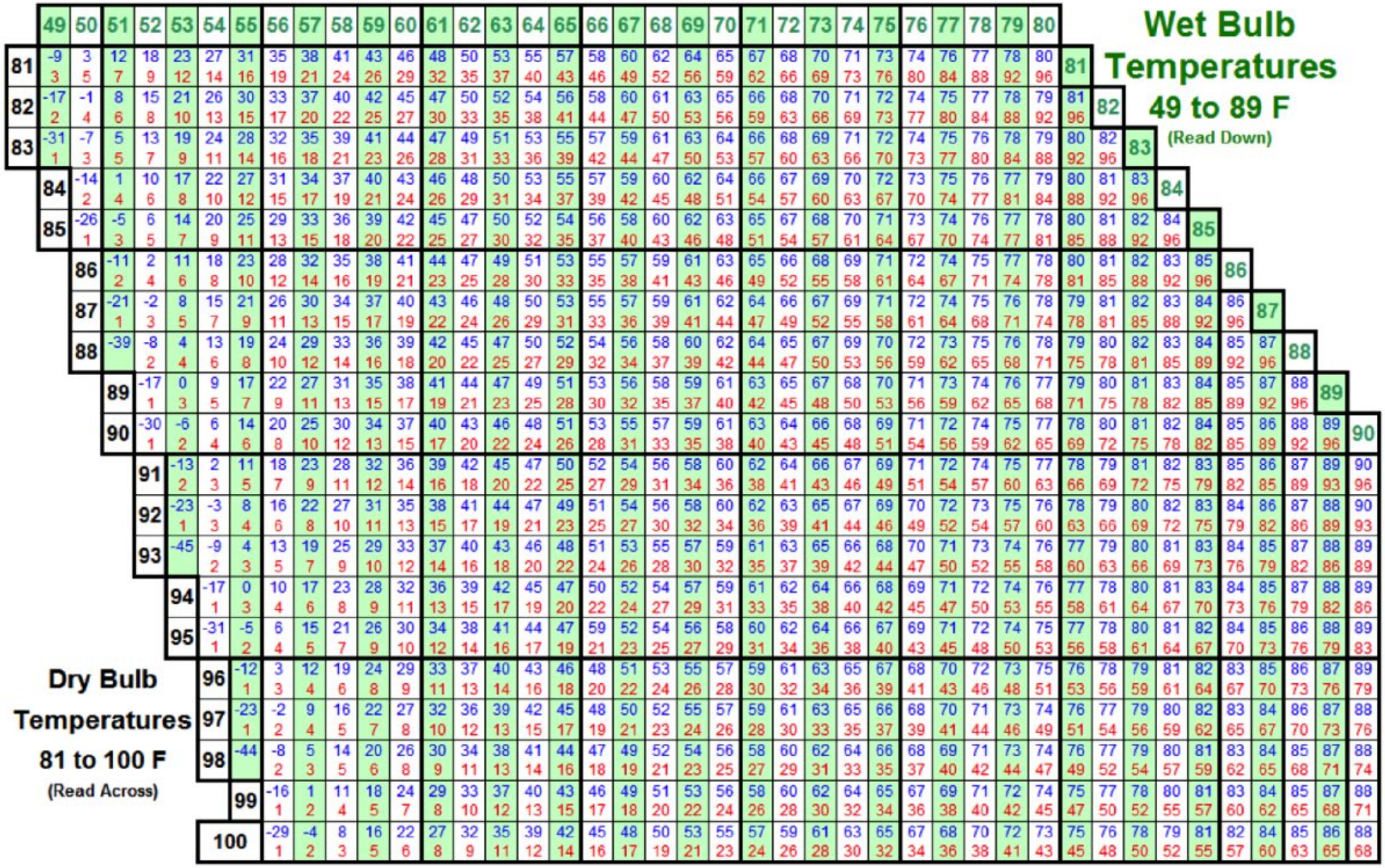
Elevations between 1,901 and 3,900 feet



Elevations between 1,901 and 3,900 feet

Wet Bulb Temperatures, 57 to 90 F

(Read Down)

Dry Bulb (Read Across)	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
101	-11	4	13	20	25	30	34	38	41	44	47	50	52	54	57	59	61	63	65	66	68	70	71	73	75	76	78	79	81	82	83	85	86	87
	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	-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
	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	-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
		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	-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	
	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	-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	
	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	-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	
		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	-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		
	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	-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		
		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	-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			
	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	-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			
	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	-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			
		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	-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				
	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	-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				
	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	-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				
		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	-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					
	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	-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					
	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					
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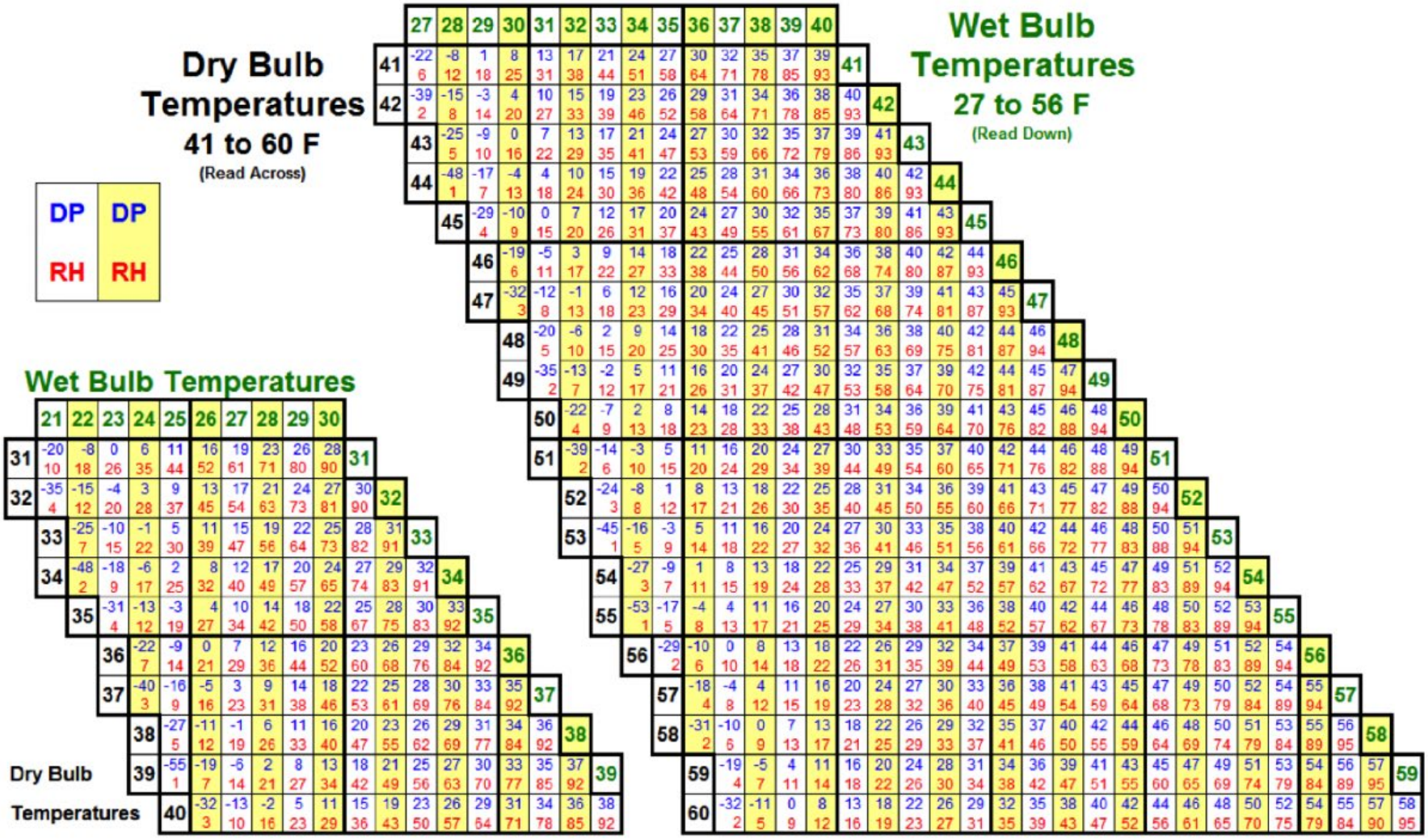
		1	2	3	4	5	6	7	8	9	11	12	13	14	15	17	18	19	21	22	24	25	26	28	30	31	33	34	36					
118	-11	5	15	22	28	33	37	41	46	47	50	53	55	58	60	62	64	66	68	70	72	73	75	77	78	80	81	83						
	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	20	21	23	24	25	27	28	30	32	33	35						
119	-21	1	12	20	26	31	36	40	43	46	49	52	55	57	59	62	64	66	68	69	71	73	75	76	78	80	81	83						
		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						

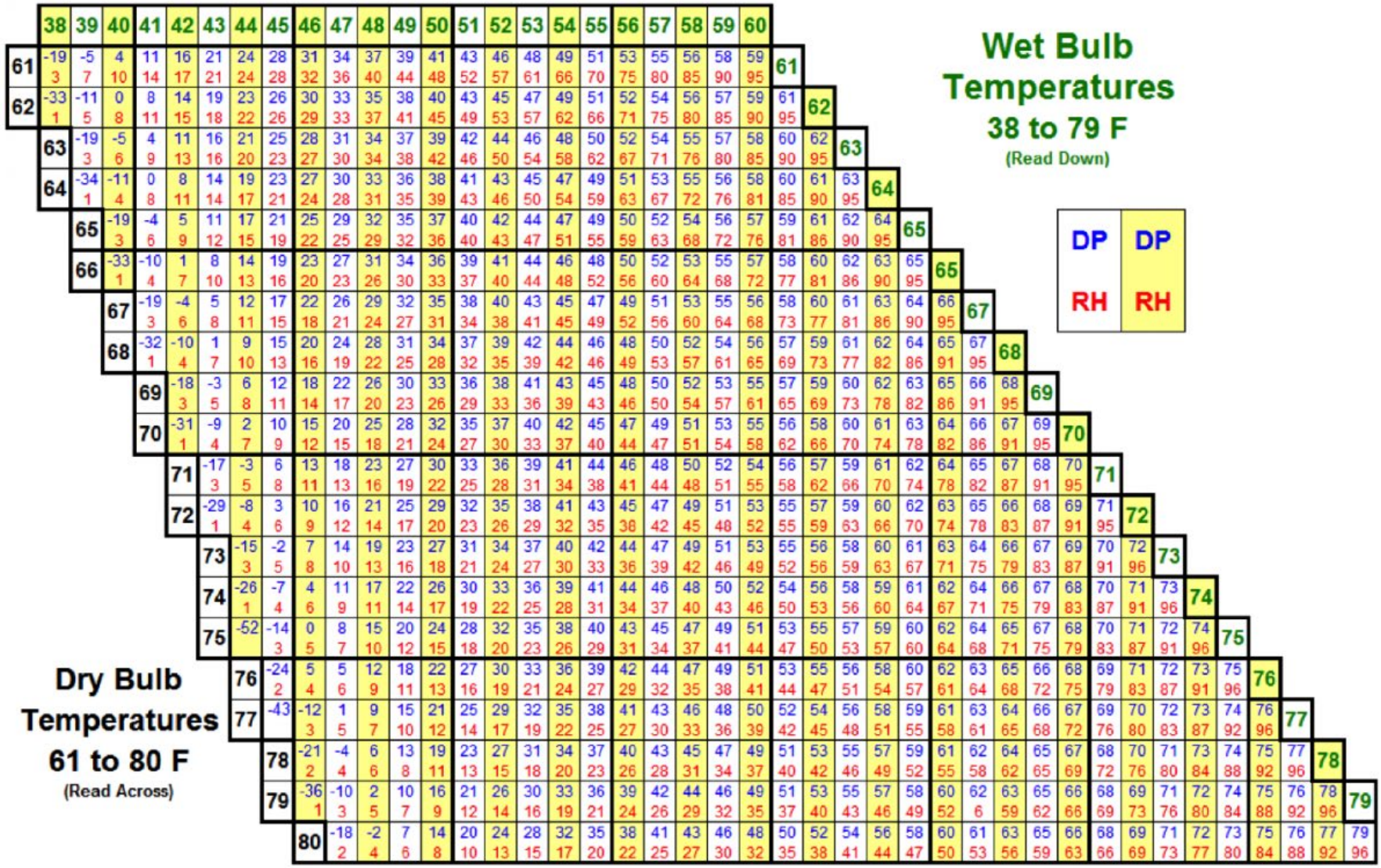
DP	DP
RH	RH

Dry Bulb Temperatures
101 to 119 F
(Read Across)

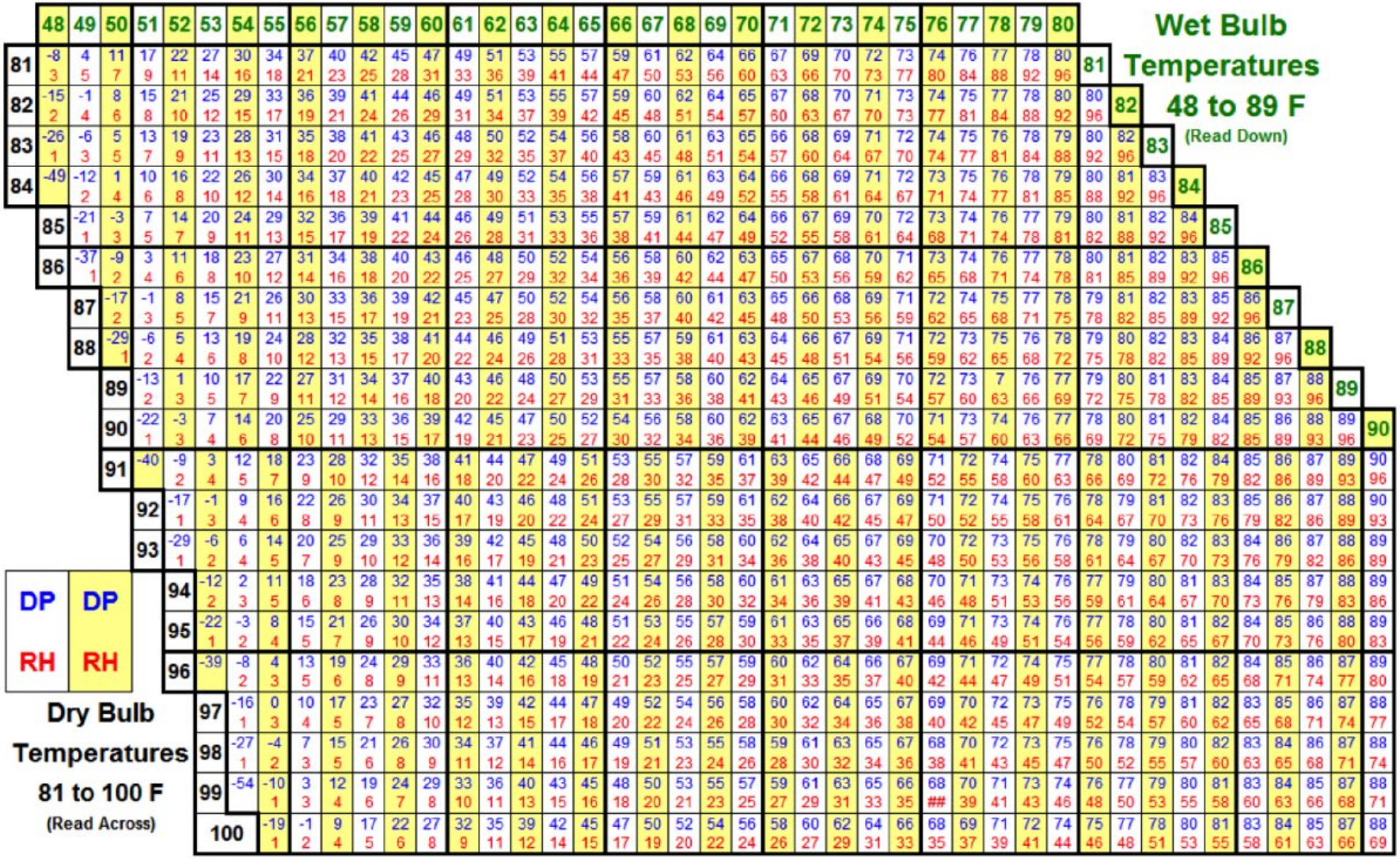
Elevations between 3,901 and 6,100 feet



Elevations between 3,901 and 6,100 feet



Elevations between 3,901 and 6,100 feet



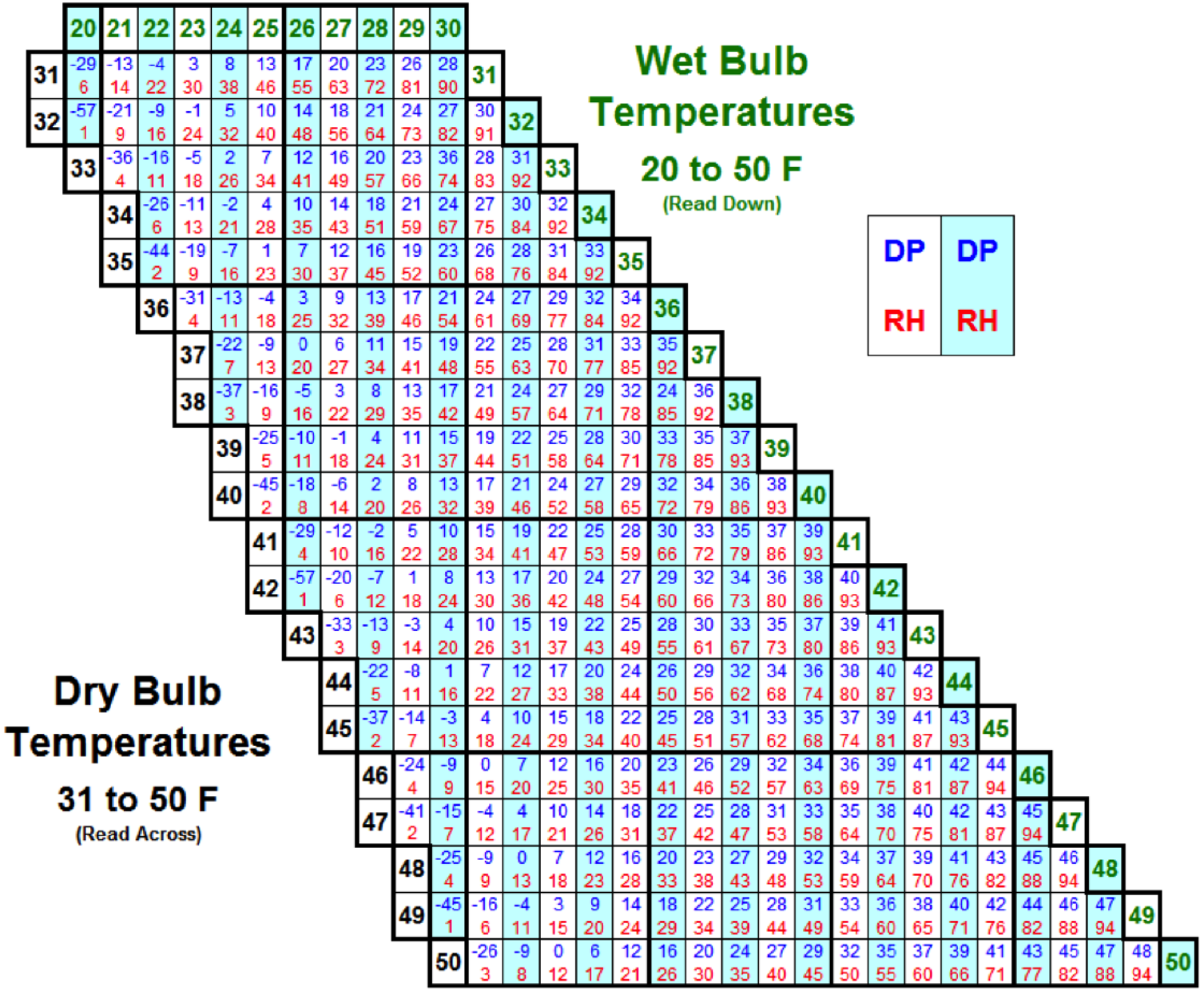
Elevations between 3,901 and 6,100 feet

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	5	6	7	8	9	10	12	13	14	15	16	17	19	20	21	22	24	25	27	28	30	31	33	34

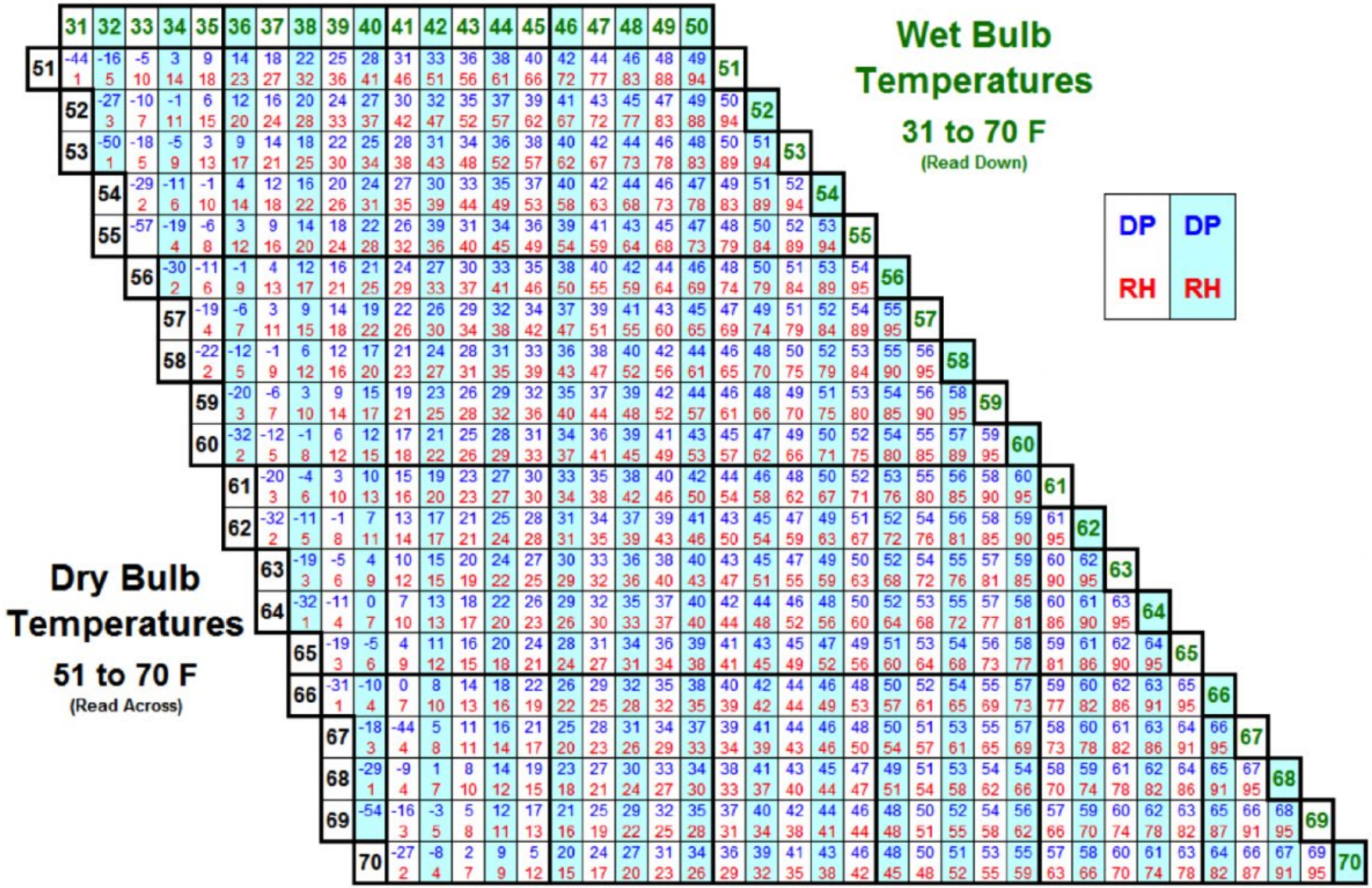
Elevations between 6,101 and 8,500 feet



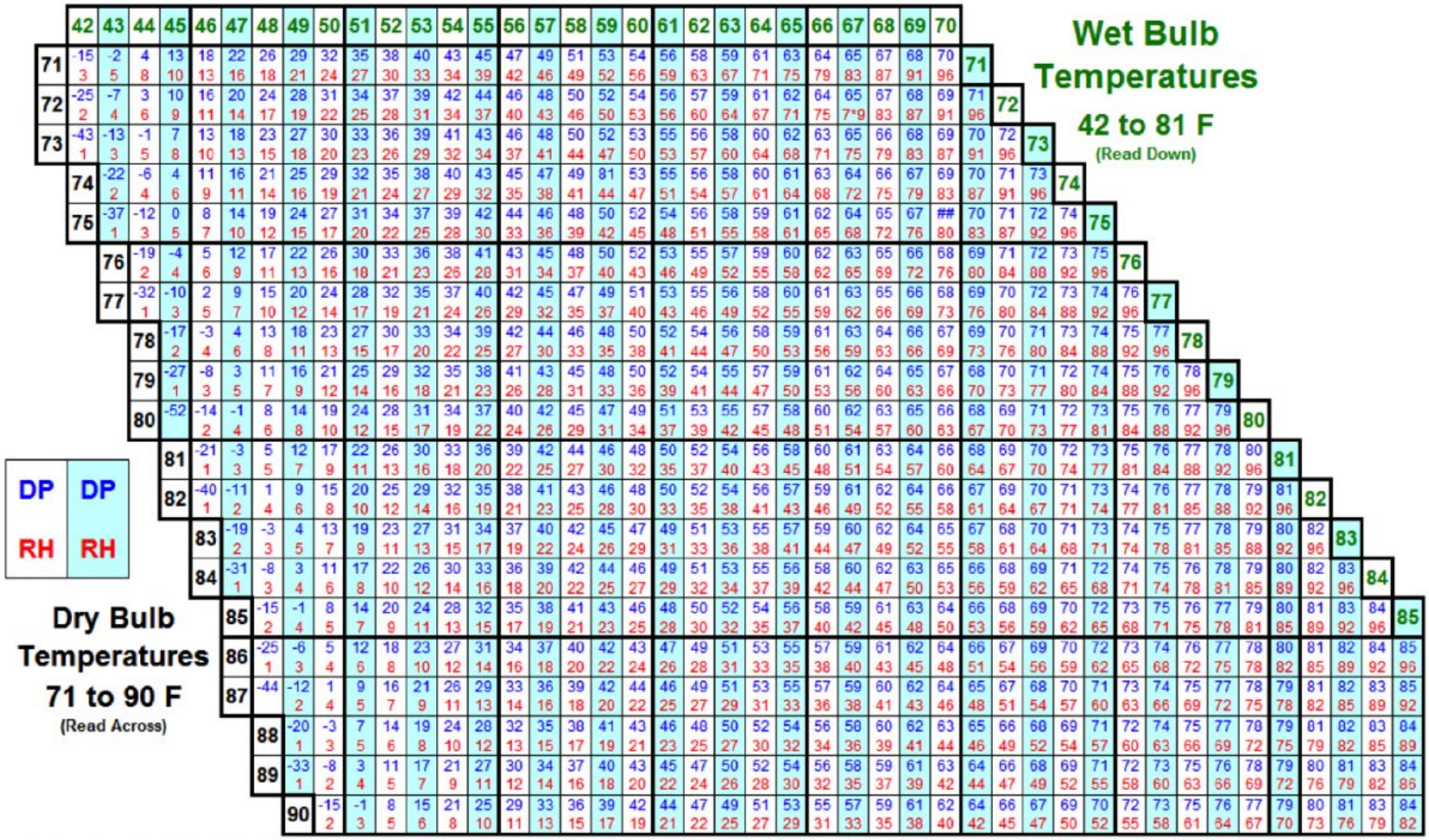
Dry Bulb	Wet Bulb 20	21	22	23	24	25	26	27	28	29	30
31	-29 / 6	-13 / 14	-4 / 22	3 / 30	8 / 38	13 / 46	17 / 55	20 / 63	23 / 72	26 / 81	28 / 90
32	-57 / 1	-21 / 9	-9 / 16	-1 / 24	5 / 32	10 / 40	14 / 48	18 / 56	21 / 64	24 / 73	27 / 82
33	-36 / 4	-16 / 11	-5 / 18	2 / 26	7 / 34	12 / 41	16 / 49	20 / 57	23 /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

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	31																			
32	30 / 91	32																		
33	31 / 92	33	33																	
34	32 / 92	34	34	34																
35	33 / 92	35	35	35	35															
36	34 / 92	36	36	36	36	36														
37	33 / 85	35 / 92	37	37	37	37	37													
38	32 / 78	24 / 85	36 / 92	38	38	38	38	38												
39	30 / 71	33 / 78	35 / 85	37 / 93	39	39	39	39	39											
40	29 / 65	32 / 72	34 / 79	36 / 86	38 / 93	40	40	40	40	40										
41	28 / 59	30 / 66	33 / 72	35 / 79	37 / 86	39 / 93	41	41	41	41	41									
42	27 / 54	29 / 60	32 / 66	34 / 73	36 / 80	38 / 86	40 / 93	42	42	42	42	42								
43	25 / 49	28 / 55	30 / 61	33 / 67	35 / 73	37 / 80	39 / 86	41 / 93	43	43	43	43	43							
44	24 / 44	26 / 50	29 / 56	32 / 62	34 / 68	36 / 74	38 / 80	40 / 87	42 / 93	44	44	44	44	44						
45	22 / 40	25 / 45	28 / 51	31 / 57	33 / 62	35 / 68	37 / 74	39 / 81	41 / 87	43 / 93	45	45	45	45	45					
46	20 / 35	23 / 41	26 / 46	29 / 52	32 / 57	34 / 63	36 / 69	39 / 75	41 / 81	42 / 87	44 / 94	46	46	46	46	46				
47	18 / 31	22 / 37	25 / 42	28 / 47	31 / 53	33 / 58	35 / 64	38 / 70	40 / 75	42 / 81	43 / 87	45 / 94	47	47	47	47	47			
48	16 / 26	20 / 33	23 / 38	27 / 43	29 / 48	32 / 53	34 / 59	37 / 64	39 / 70	41 / 76	43 / 82	45 / 88	46 / 94	48	48	48	48	48		
49	14 / 24	18 / 29	22 / 34	25 / 39	28 / 44	31 / 49	33 / 54	36 / 60	38 / 65	40 / 71	42 / 76	44 / 82	46 / 88	47 / 94	49	49	49	49	49	
50	12 / 17	16 / 21	20 / 26	24 / 30	27 / 35	29 / 40	32 / 45	35 / 50	37 / 55	39 / 60	41 / 66	43 / 71	45 / 77	47 / 82	48 / 88	48 / 94	50	50	50	50

Elevations between 6,101 and 8,500 feet



Elevations between 6,101 and 8,500 feet



Elevations between 6,101 and 8,500 feet

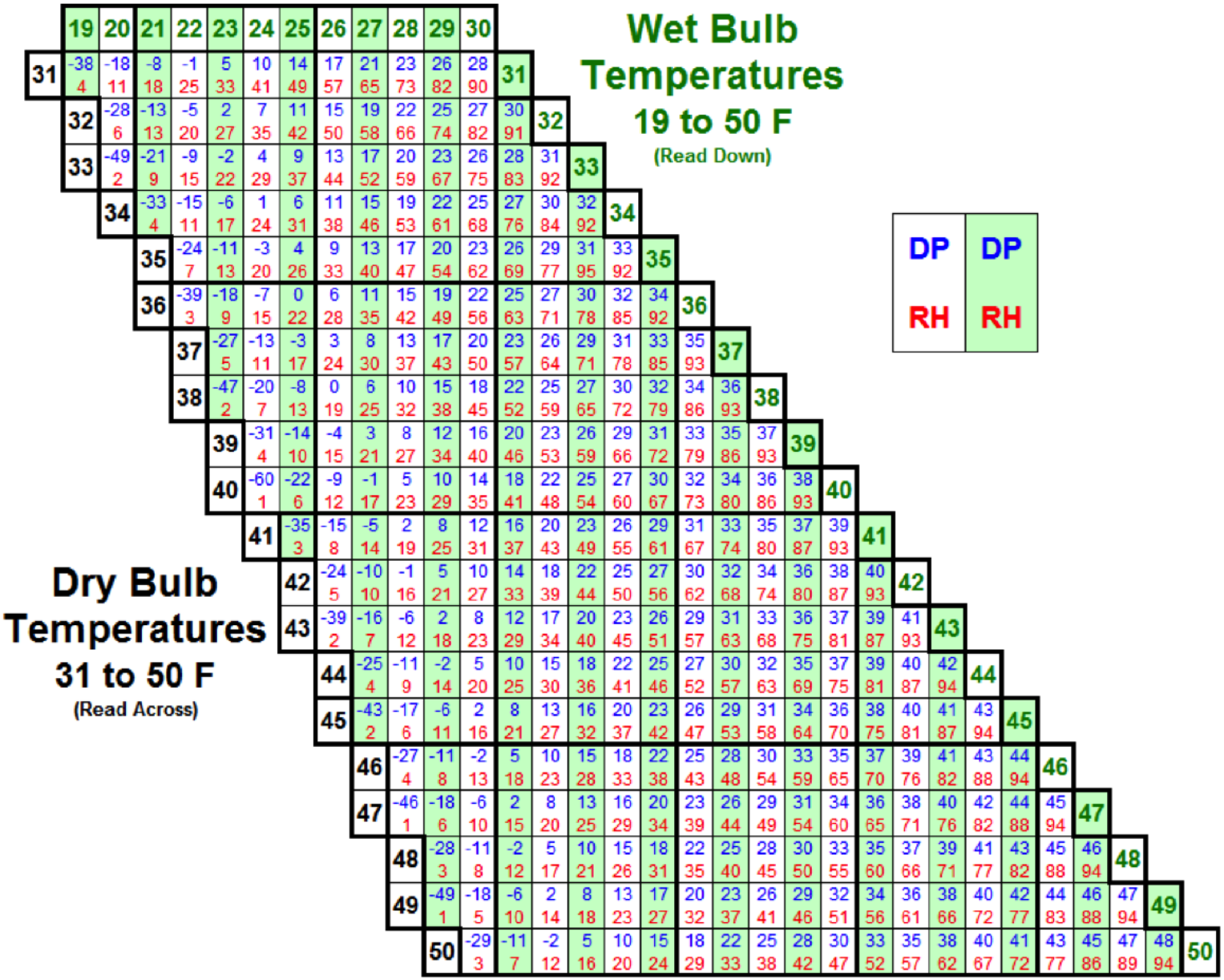
Wet Bulb Temperatures, 50 to 85 F

(Read Down)

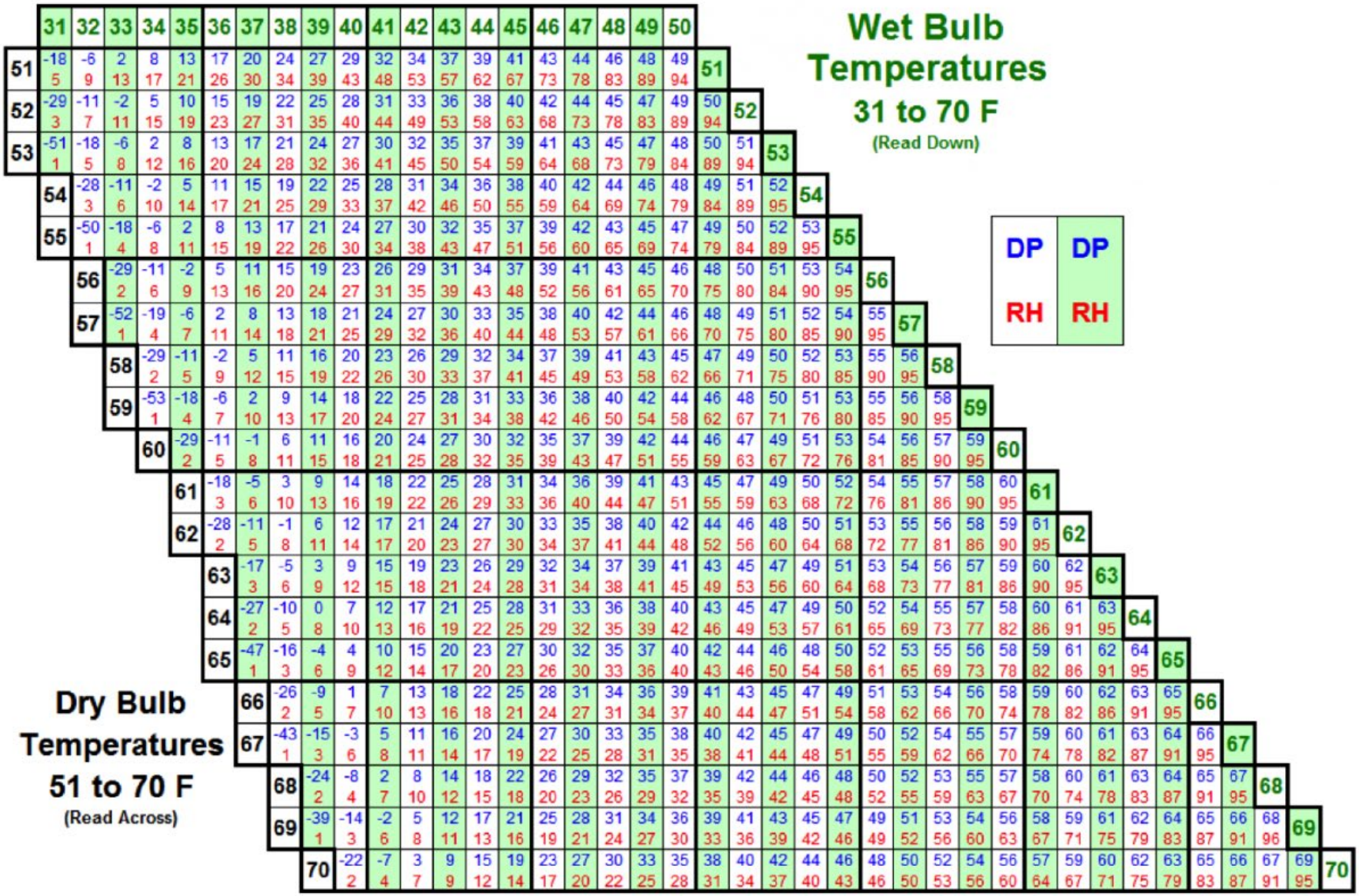
Dry Bulb Temperatures 91 to 109 F (Read Across)	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
91	-25	-5	5	13	19	24	28	32	35	38	41	43	46	48	50	53	55	57	58	60	62	64	65	67	68	70	71	73	74	76	77	78	80	81	82	84
	1	2	4	5	7	9	10	12	14	16	17	19	21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

DP	DP
RH	RH

Elevations between 8,501 and 11,000 feet



Elevations between 8,501 and 11,000 feet



Elevations between 8,501 and 11,000 feet

Fine Dead Fuel Moisture

Determining Below, Level, Above

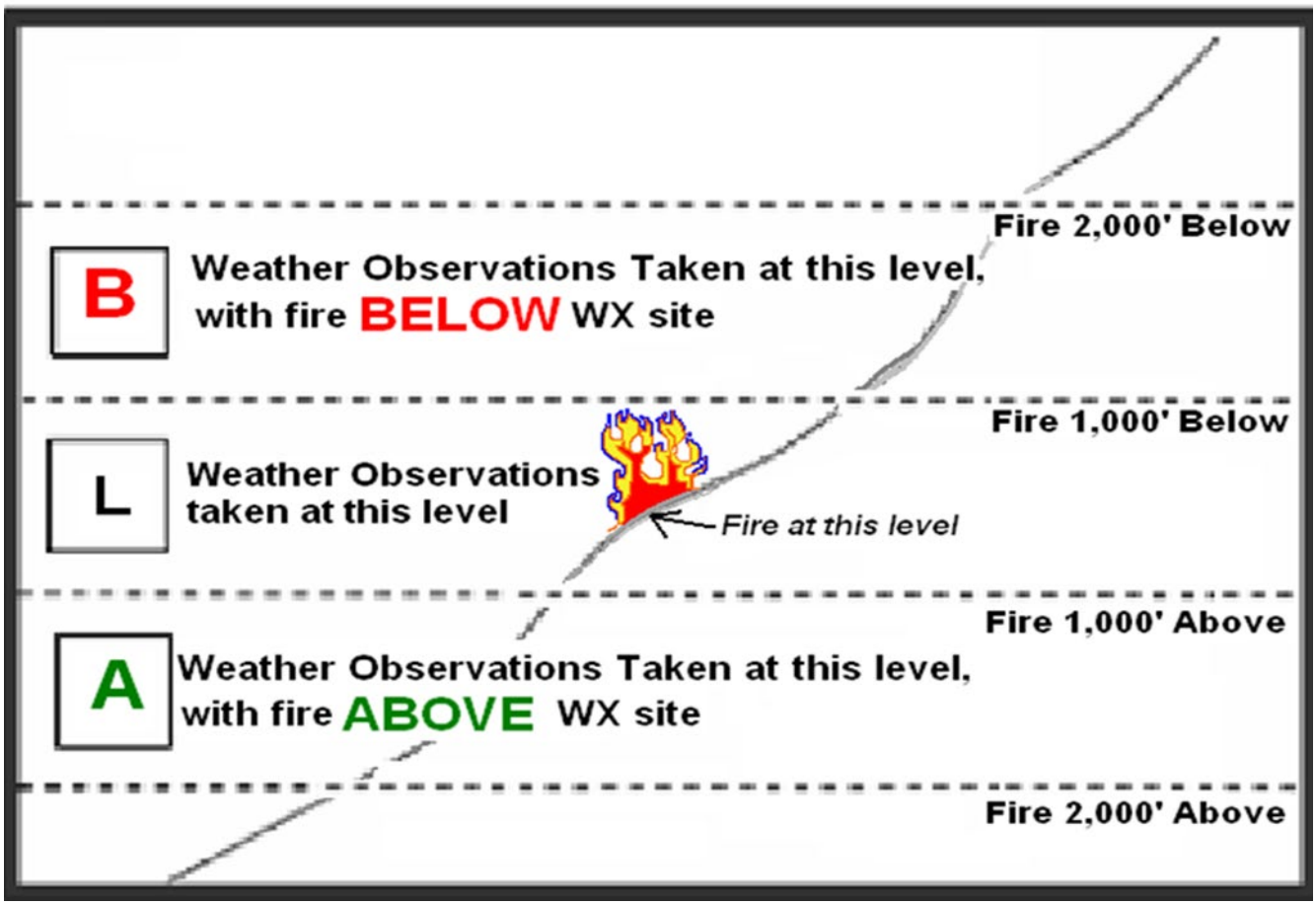
- B – Weather observations are taken between 1,000 and 2,000 feet ABOVE the fire behavior observations/projections. The fire is BELOW the weather site.
- L – Weather observations are taken between 1,000 feet above and 1,000 feet below or LEVEL with the fire behavior observations/predictions.
- A – Weather observations are taken between 1,000 and 2,000 feet BELOW the fire behavior observations/projections. The fire is ABOVE the weather site.

How to choose from below/level/above for fuel moisture calculations

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



Determining Fine Dead Fuel Moisture

- Reference fuel moisture (1) + fuel moisture correction (2E/2S) = fine dead fuel moisture (3E/3S).
- 1 + 2E = 3E (exposed fuel moisture, less than 50% of fuels shaded by clouds/canopy).
- 1 + 2S = 3S (shaded fuel moisture, greater than 50% of fuels shaded by clouds/canopy).
- Before beginning:
  - What time is it?
  - What month is it?
  - Below, level, or above?

Reference Fuel Moisture

Day Time
0800 – 1959

1	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	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 Mar Apr Aug Sept Oct

2E		EXPOSED																	
		Exposed – Less Than 50% Shading Of Surface Fuels																	
		0800 to			1000 to			1200 to			1400 to			1600 to			1800 to		
Aspect	Slope	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

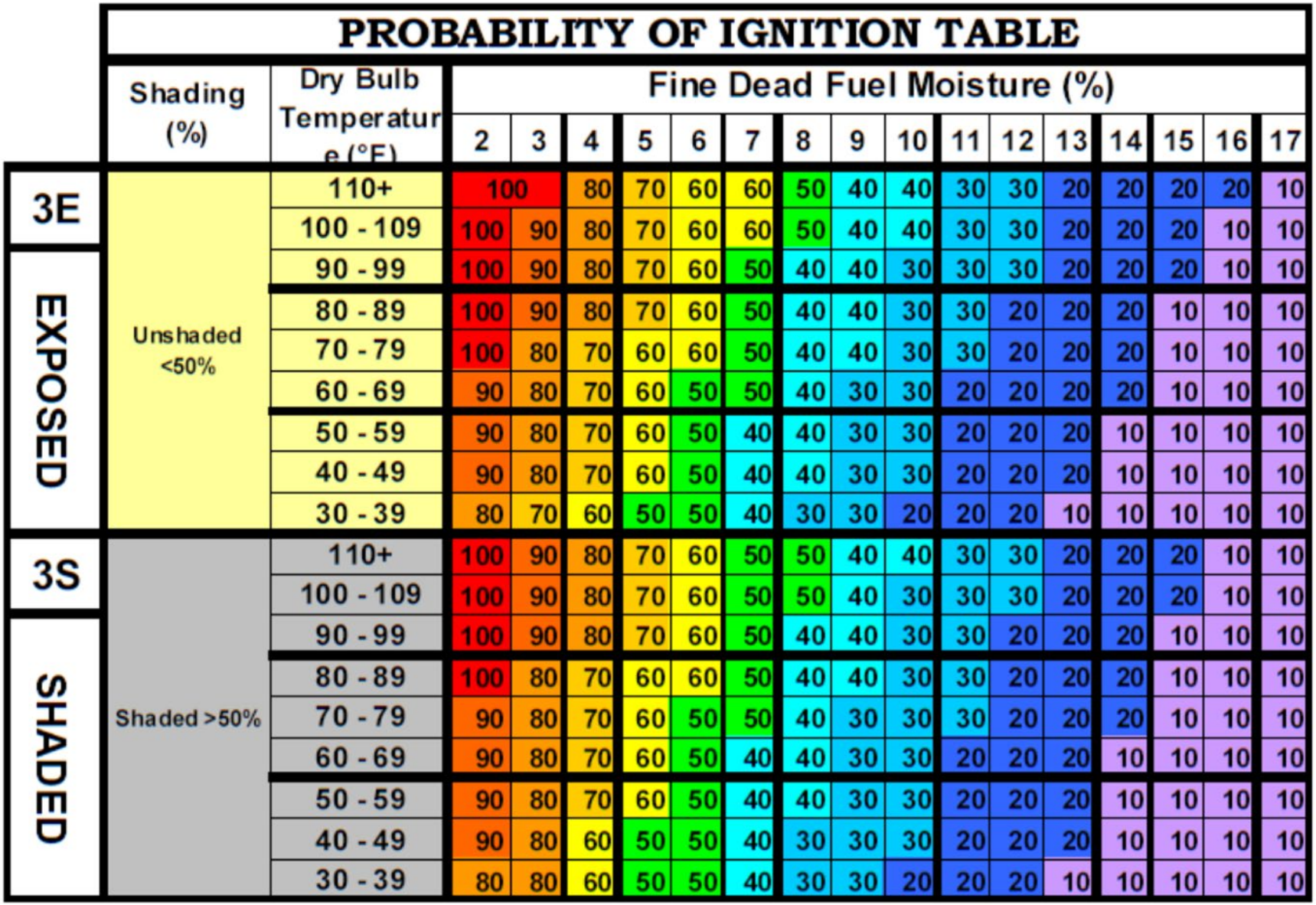
May June July

2E		EXPOSED																	
		Exposed – Less than 50% shading of surface fuels																	
		0800 to			1000 to			1200 to			1400 to			1600 to			1800 to		
Aspect	Slope	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

Nov Dec Jan

2E		EXPOSED																	
		Exposed – Less than 50% shading of surface fuels																	
		0800 to			1000 to			1200 to			1400 to			1600 to			1800 to		
Aspect	Slope	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

Probability of Ignition Table



	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

References

Western Air Ambulance Phone List

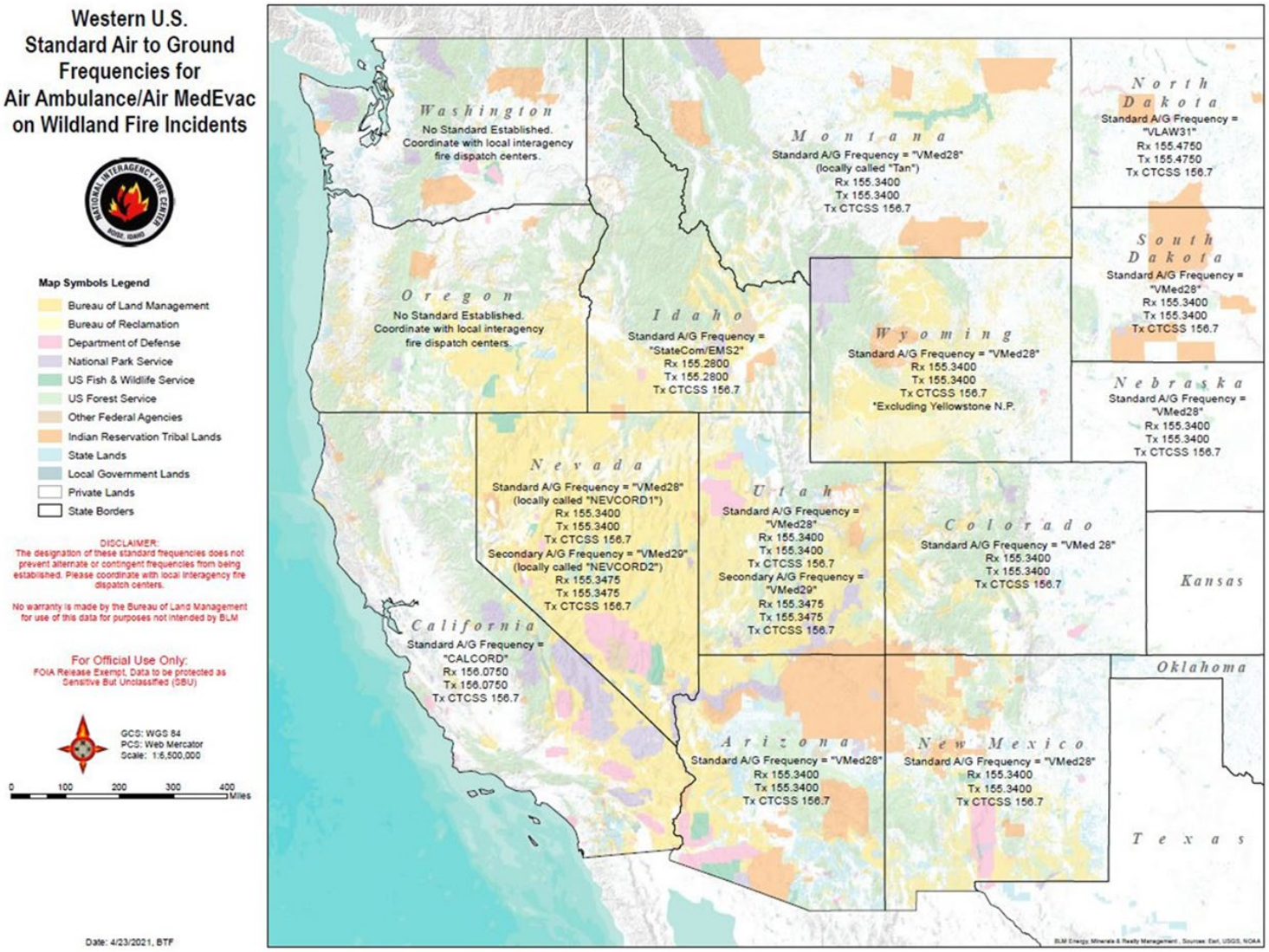
Phone numbers are not guaranteed to be current – be sure to double check!

STATE	SERVICE NAME	HOSPITAL / LOCATION	PHONE #
Alaska	MAST	Alaska State Troopers	907-451-5333
Arizona	Guardian Air	Flagstaff Medical Center	800-523-9391
	Intermountain Air	Page	385-226-2860
California	Mercy Air Ambulance	Mercy Medical Center, Redding	866-480-5718
	PHI Air Medical	Redding	800-421-6111
	Reach Air	McClellan	916-921-4000
Colorado	CareFlight of the Rockies	Grand Junction	800-332-4923
	AirLife Denver	Denver	303-360-3400
	Med Evac	Greeley	800-247-5433
	Guardian Flight	Englewood	855-291-8989
	Flight for Life	St. Anthony's, Denver	800-332-3123
Idaho	Life Flight	St. Alphonsus, Boise	800-232-0911
	Life Flight	Coeur d'Alene	800-232-0911
	Victory Medical Flights	Boise	208-321-1703
Montana	Life Flight	Missoula	800-232-0911
	Mercy Flight	Great Falls	800-972-4000
	Medflight	Billings	406-255-8411
Nevada	Mercy Air	Las Vegas	866-480-5718
	Medical Air Service	Reno	929-579-0653

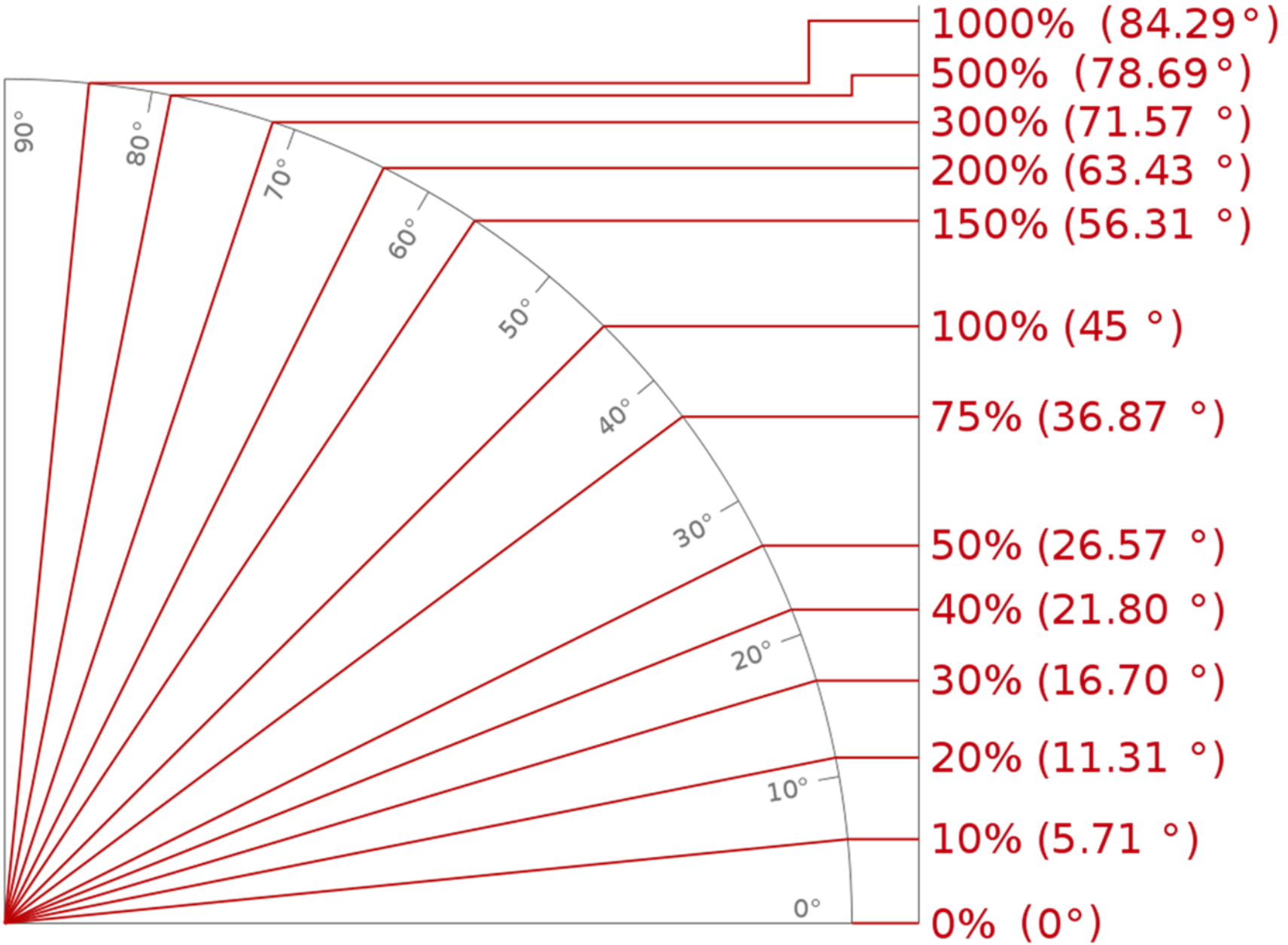
	Access Air	Elko	775-738-3493
	Care Flight	Reno, Gardnerville, Truckee	775-858-5700
New Mexico	Air Ambulance 1	Las Cruces	800-424-9000
	Medical Flight Air Ambulance	Albuquerque	505-842-4433
	Lifeguard Air Emergency	Albuquerque	505-272-3115
	Gallup Med Flight	Gallup	505-726-0053
Oregon	AirLink	Bend	800-621-5433
	Life Flight	Portland, Redmond, Salem	800-232-0911
	Lifeguard Air Ambulance	Hillsboro	503-640-2927
Utah	Air Medical	University of Utah Health Center, Salt Lake City	801-581-2500
	Life Flight	Intermountain Health Care, Salt Lake City	385-226-2860
Washington	Life Flight	Spokane	800-232-0911
	Airlift Northwest	Seattle	800-426-2430
Wyoming	Wyoming Life Flight	Wyoming Medical Center, Casper	800-442-2222 (Craig Dispatch)

Air to Ground Frequency Reference Map

Radio frequencies may change over time. Always double check!



Slope


90°
80°
70°
60°
50°
40°
30°
20°
10°
0°
1000% (84.29°)
500% (78.69°)
300% (71.57 °)
200% (63.43 °)
150% (56.31 °)
100% (45 °)
75% (36.87 °)
50% (26.57 °)
40% (21.80 °)
30% (16.70 °)
20% (11.31 °)
10% (5.71 °)
0% (0°)

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