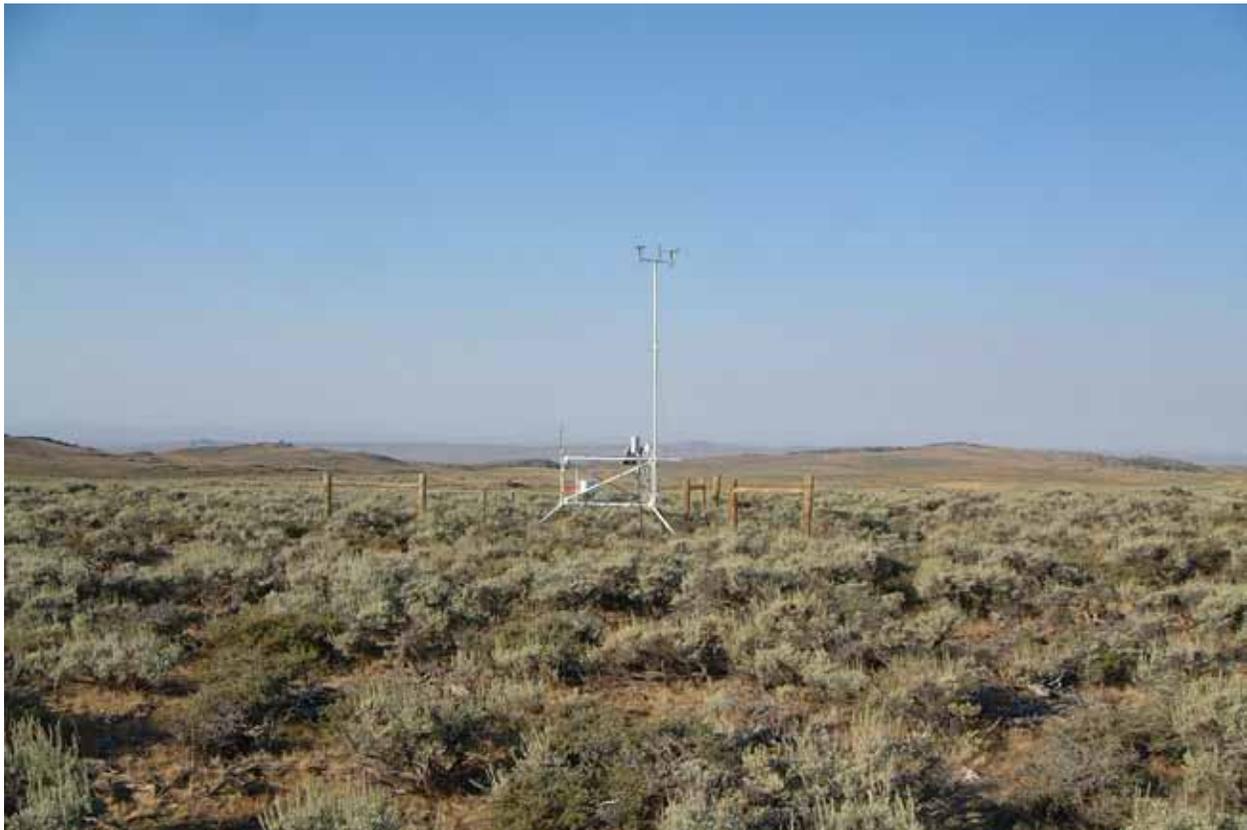


WEATHER INFORMATION MANAGEMENT SYSTEM / REMOTE AUTOMATED WEATHER STATION

(WIMS/RAWS)

OPERATIONS GUIDE

WYOMING BLM



June 2010

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WIMS/RAWS Operating Guide

INTRODUCTION

The Wyoming BLM (WY BLM) WIMS and RAWS programs provide the foundation for the operation of the National Fire Danger Rating System (NFDRS) within the District Fire and Aviation Management programs. Deficiencies in either of the WIMS or RAWS programs will result in miss-leading or erroneous NFDRS outputs which may affect fire and aviation management effectiveness and could ultimately jeopardize firefighter safety. It is important that both the WIMS and RAWS program receive the utmost managerial attention at all times within WY BLM.

GOAL

The goal of the WY BLM is to operate a fire danger rating system (FDRS) that produces an accurate assessment of the wildland fire potential across all units to support planning and implementation of the local district's fire management program.

OBJECTIVE

The objective of this "Operating Guide" is to assign responsibilities for the various components of the WIMS and RAWS programs and to provide operating guidelines for each to ensure that the most accurate and representative NFDRS outputs are generated daily.

ROLES AND RESPONSIBILITIES

- A. District Manager
 1. Ensure a effective fire protection program is in place on the district
 2. Utilizes the best data and technologies possible to support the fire management program.
- B. FMO
 1. Determines the weather station network necessary to provide the support to the fire management program that is needed.
 2. Determine the season of operation for each weather station
 3. Monitor the overall operation of the WIMS and RAWS programs to ensure conformance with agency standards.
 4. Insures that appropriate training is provided to those individuals responsible for the individual components of the WIMS and RAWS programs.
 5. Delegate the responsibility of the WIMS, RAWS and NFDRS programs, and to identify the different positions on the District that are responsible for the following roles and responsibilities.
- C. Weather Station Catalog Owner (WFMI and WIMS)
 1. Assigning data entry and editing responsibilities
 2. Ensuring support staff are trained to perform the jobs expected
 3. Monitoring and managing herbaceous stages throughout the season. Determine pre green, green up date and freeze dates, and relay to Data Manager/Data Entry Person for WIMS input
 4. Monitor day to day operation to ensure that key inputs required for NFDRS calculations are being edited daily and are being done correctly.

5. Ensure that scheduled maintenance of each station has been accomplished and document maintenance accomplishments in WFMI.
- D. Data Manager/Data Entry Person
1. Ensure that 1300 observations are manually entered throughout the normal operating season.
 2. Review the observations daily and report to the Station Owner any missing information and suspicious looking data.
 3. Periodically check the data base to make sure that all observations have been edited for NFDRS calculations. Input of missing data if found. Perform recalculations if necessary.
 4. Once notified by FMO/owner, change station from pre green to green up, freeze etc.
 5. Make sure that appropriate WIMS and/ or RAWS training is included on your individual development plan.
- E. User
1. Report to the Station Owner any suspicious looking NFDRS outputs or situations where the conditions being experienced on the ground are not consistent with the NFDRS outputs for that day.
- F. First Responder
1. Perform minor weather station repairs as requested or needed.
 2. Make sure that appropriate RAWS maintenance training has been provided and that you attend a RAWS Maintenance course or refresher each year.
 3. Be prepared to respond to weather station maintenance needs within the timeframes outlined in the Weather Station Handbook.
- G. Maintenance Depot
1. Responsible for yearly maintenance including replacing sensors, fuel sticks, etc.
 2. Responsible for emergency maintenance when problems occur.
 3. Hour observations are edited in a timely manner on a daily basis.

TRAINING RECOMMENDATIONS

- A. Unit Fire Management Officer
1. Gaining an Understanding of NFDRS
 2. Intermediate NFDRS (S-491)
 3. Advanced NFDRS (desirable)
- B. Station Owner
1. Gaining and Understanding of NFDRS
 2. Basic WIMS
 3. Intermediate NFDRS (S-491)
- C. Data Manager/Data Entry
1. Gaining an Understanding of NFDRS
 2. Basic WIMS
- D. Users
1. Gaining an Understanding of NFDRS
- E. First Responders
1. Gaining and Understanding of NFDRS
 2. First Responder Training

PROTOCOLS

- A. Maintenance and Operation
1. If a station is not working correctly first notification is to the FMO/station owner who will then notify the Depot and dispatch. First responder may be notified in lieu of Depot if it appears to be minor problem.
 2. If Depot is unable to respond in a timely manner first responders may be called to

- determine problem and fix, if possible.
3. All Wyoming BLM permanent Weather Stations are Vaisala 555's.
- B. Station Ownership
1. Primary owner in WIMS will be FMO or delegated personnel (field personnel) – owner will not be Center Manager or Dispatch personnel.
 2. Owner will give Dispatch (Data Manager/Data Entry personnel edit rights to each station (WIMS input etc).
 3. FMO or delegated owner is responsible for monitoring station for obvious errors in outputs/observations; wet flag, 1300 obs, etc.
 4. FMO will identify first responders on their district for station maintenance /repairs. These personnel can be used if minor problems occur i.e., wind direction not changing, or if the Depot is unable to respond to a problem in a short time frame. **(See Appendix D for a list of first responders).**

OPERATING PROCEDURES

- A. Year-round Stations
1. Ensure that the installed equipment is designed to measure accurately all the weather parameters under typical wintertime freezing conditions.
Responsibility—FMO
 2. Pre-fire season—Ensure route to stations are clear and passable for yearly maintenance.
 3. Place station in pre green/green status as conditions change. It will take about one month after station has been placed in pre green to accurately determine 1000 hr fuels and other outputs.
 4. During the fire season –periodic review of outputs to insure station is operating correctly and providing accurate outputs.
 5. Contact Depot/First Responders for any problems with stations.
- B. Seasonal Stations (Portables)
1. Pre-fire season- Ensure all parts and pieces of stations are accounted for and station is in operating condition.
 2. Post fire/prescribed burn season, send the station to the Depot for calibration and maintenance.

**Weather Station Information
Wyoming BLM RAWS**

High Desert District

FMO- v - Cowan 352-0217
 Station Owner- v - Cowan 352-0217
 First Responders-
 Responsible Dispatch Office--Rawlins Dispatch 1-800-259-9953
 Depot Help Desk 208-387-5475

<u>Stations</u>	<u>Station ID</u>	<u>Lat/Long</u>	WIMS							
WFMI										
Anderson Ridge	481903	42 42 14	108	56	27	42	26	14	108	
		56 27								
Cow Creek	482011	41 30 0	107	55	0	41	16	15	107	
		34 15								
Dodge Creek	482106	41 57 58	105	52	03	41	58	03	105	
		31 10								
Muddy Creek	481801	41 24 02	110	32	35					
Snow Springs Creek	481904	41 25 03	109	02	10					

(red indicates sizable difference between WIMS and WFMI, needs to be checked)

High Plains District

FMO- Jay Esperance 261-7690
 Station Owner – Eric Fransted 261-7696
 First Responders-
 Responsible Dispatch Office--Casper Dispatch 1-800-259-9952
 Depot Help Desk 208-387-5475

<u>Stations</u>	<u>Station ID</u>	<u>Lat/Long</u>								
Casper Mt	481502	42 43 12	106	21	0					
Echeta	480501	44 28 12	105	49	48					
Fales Rock	481504(WIMS)	42 51 23	107	16	20					
	481503 (WFMI)									
Poker Creek	481003	43 34 12	106	58	12					

Wind River- Big Horn Basin District

FMO- Chuck Russell 347-5213

Station Owner- Eve Warren 347-5109

First Responders-

Responsible Dispatch Office- Cody Dispatch 1-800-259-9954

Depot Help Desk 208-387-5475

Stations Station ID Lat/Long

		WIMS						WFMI					
Camp Creek	482010	42	34	28	107	57	30	42	30	45	107	33	10
Hyatt High	480307	44	18	0	107	30	58						
Grass Ck	480804	43	56	0	108	51	14						
Divide													
Hyatt High	480307	44	18	0	107	30	58						
Rattlesnake	480212	44	34	26	109	15	41						
Mt													
Split Rock Ck	480904	43	56	0	107	40	0	43	33	38	107	23	51

(red indicates sizable difference between WIMS and WFMI, needs to be checked)

Appendices

Appendix A—Pre-season Check list

1. Prior to the start of green-up.
 - a. Have local personnel drive to site, clearing blowdown, etc along the way to ensure road is drivable
 - b. Personnel to do any required maintenance to site areas – clear encroaching trees or brush.
 - c. Personnel check station, clear any limb, brush etc that may have blown into the station and could obstruct outputs; branches leaves etc in tipping bucket, on fuels stick, in or on wind gage etc.
 - d. Confirm Lat/Long (first year only)

Appendix B— Training Opportunities

- i. RAWS Maintenance Course N9035 (first responders)
October 4-8 2010
Great Basin, Boise
Nomination form due September 10, 2010
Tuition \$0.00
Coordinator e-mail GB STAFF
208-387-5561
Fax 208-387-5556

Redmond, Oregon
November 14-18, 2011
Nomination due November 1, 2011
tuition \$100

Rock Mountain
October 3-7, 2011 no other info at this time

California
January 31- Feb 4, 2011 no other info at this time

Eastern States
March 3-7, 2011 no other info at this time

National Training Web Site <http://www.nationalfiretraining.net/>

Appendix C—Additional Publications or Reference Guides

1. NWCG Fire Weather Station Standards – <http://www.nwcg.gov/pms/pubs/PMS426-3.pdf>
2. A Review of the Forest Service Remote Automated Weather Station (RAWS) Network – http://www.fs.fed.us/rm/pubs/rmrs_qtr119.pdf
3. Gaining an Understanding of the National Fire Danger Rating System- <http://www.nwcg.gov/pms/pubs/MasterGaining.pdf>

Appendix D—First Responder List

There are no Wyoming BLM qualified first responders at this time. **Individuals will be added as they receive training.**

Appendix E—Annual NFDRS Startup for Seasonal Stations

There are several steps that users of the NFDRS must go through at the start of the season to ensure that the outputs of the system are as representative as possible of their local conditions. They are applicable to all stations but primarily to seasonal stations with a 30-day or longer break in NFDRS observations.

(Note: Seasonal stations also include those RAWS sites that are not winterized to provide accurate winter precipitation measurements during freezing conditions.)

Everyone should have ended last season by changing the herbaceous condition to frozen for each of their weather stations. If you didn't do it, it is a good idea to do it before you start work on the current year. This time of year, even if your stations are still covered by snow, you should change the herbaceous state to pre-green and begin entering daily observations to gain the effect spring rain or melting snow has on the larger dead fuels.

Station Initialization – For those units operating NFDRS using the 1978 fuel models, about 45 days prior to start of spring green-up, make sure you have changed the herbaceous vegetation condition in the station catalog to pre-green and that you have begun entering daily weather observations on a regular basis. This allows the model to adjust from default values and develop carryover values more representative of the current season. This step is not necessary if you are using the 1988 fuel models as the required greenness factor entry accommodates the transition from season to season.

Station Green-up – After the snow melts, you need to start monitoring the greening conditions and edit the station catalog to reflect when general green-up begins. Starting it too early can give you erroneous NFDRS outputs for several months. Remember that green-up begins when the majority of the herbaceous and woody plant species begin to actively grow, not when the first indicators of spring growth appear. You should also focus your attention on when the species that become the fire problem later in the season begin their spring growth.

Enter in the station catalog the date that general green-up begins in the area being represented by the weather station. This is the calendar date that the majority of the herbaceous plant species have begun their annual growth, the buds on woody shrubs begin to swell, or leaf buds begin to open on deciduous species. Since various plant species respond differently to spring weather changes, the key to identifying when green-up begins is when the majority of the species start to respond to the warming weather conditions.

The following are some things to consider when establishing when the start of Green-up should be declared in NFDRS.

- 1. Don't rush it.** Make sure that the spring growing season is actually well under way.
- 2.** Make sure that we are **evaluating the average or typical herbaceous vegetation conditions** (all aspects/all elevations) within the area being represented by the weather station.
- 3.** Evaluate what is happening to the **entire herbaceous and shrub plant community**. Often the south slope cheat grass will start to green as soon as the snow leaves the area while the other species, in particular the low brush, don't start responding until temperatures are much warmer.
- 4.** Remember, that regardless of whatever date you pick to start green-up, **the NFDRS model will reach its maximum live fuel moisture content in 14 days for climate class 2 and 21 days for climate class 3.**
- 5.** After you have started green-up, please monitor the herbaceous and woody fuel moisture values. If they peak before the growing season has actually stopped, you can shift the green-up date in WIMS and recalculate your fuel moistures to reflect the changed condition. It is critical that you maintain continuous weather observations once green-up begins.

Note: *As an aid to identifying when the green-up process is underway in your area, you should monitor the NDVI (Normalized Difference Vegetation Index) satellite imagery and the GSI (Growing Season Index) each week. Once you see the greenness values increasing, it's an indication that green-up is underway.*

Note: *If you have been entering observations throughout the winter months when the fuels may have been covered with snow or the rain gauge frozen, you have most likely been under reporting the affects of precipitation. The NFDRS processor doesn't know the ground is snow covered and uses the air temperature, low humidity values and lack of precipitation to continue to dry the larger dead fuels even though, in reality, they are being affected differently because they are under snow. Your calculated carryover fuel moisture values in the spring are most likely lower than they should be and must be adjusted. If you desire to have year round observations, the use of a heated rain gauge and the fuels wet flag are the only way to deal with situations where there are freezing temperatures and/or the fuels are covered with snow.*

An additional way to determine green up follows:

Download the fire weather data out of KCFast into Fire Family Plus and then run the live fuel moisture index for each station. When the LFMI is at 50 that is a very good indication that the

fuels represented by that station have greened up. If you have questions about the process may want to contact to an FBAN or Clint Dawson with the Forest Service.