CHAPTER 9

WORKING WITH NFDRS

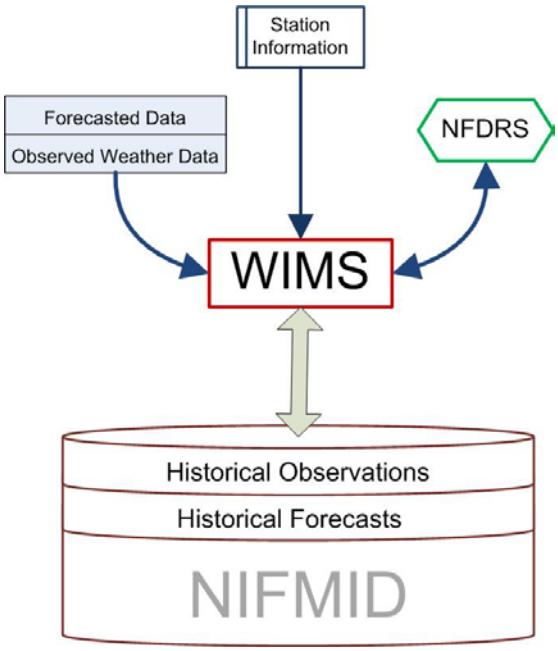
This chapter provides the information needed to display National Fire Danger Rating System (NFDRS) reports.

The menu options and functions available will depend on individual user access levels and not all tasks described in this chapter are available to everyone. For more information about access levels see Chapter 6, "Working with Station Information."

TABLE OF CONTENTS

National Fire Danger Rating System 1
Nelson Dead Fuel Moisture In WIMS Version 2.0 1
DNFDR – Display National Fire Danger Rating 2
NFDR Query Field Descriptions 3
DIDX – Display Index Format 5
DIDM – Display Moisture Format 6
DMGR – Display Manager's Format 7
DSHR – Display Short Format 7
DAVG – Display Average Format 8
Forest Service Region Specific Averaged Outputs 9
Region 5 – Project Activity Level (PAL) 9
Region 6 – Industrial Forests Precaution Level (IFPL) 10
DABR – Display Abbreviated Format 10
DNSR – Display Nelson Solar Radiation Format 11
DNFDR Query Examples 13
Appendix A – Description of Outputs for the NFDRS Display Modules 15
Index 16

National Fire Danger Rating System



The National Fire Danger Rating System provides outputs on current and predicted fire danger conditions. These outputs are calculated using actual or forecasted weather observations and NFDRS mathematical models. NFDRS outputs can be based on a regular daily observation, forecasted weather data or special observations throughout the day.

WIMS houses the NFDRS processor that produces the components, indices and forecasted weather. The WIMS database stores historical forecasts for one year.

For a detailed description about NFDRS components and indices, see Appendix E, "NFDRS technical reference".

Nelson Dead Fuel Moisture In WIMS Version 2.0

New WIMS RAWS Gateway Routines:

- Compute 1-hr and 10-hr dead fuel moistures using the Nelson Dead Fuel Moisture model from hourly weather observation using temperature, relative humidity, precipitation, and solar radiation.
- Compute 100-hr, 1000-hr, live fuel moistures, and KBDI, ***once daily at RS time,*** using standard NFDR routines.
- A new NFDR record type "N" allows for comparison between the Nelson derived and traditional "O" NFDR records. "N" records are created at the Stations RS time and at 6 hour intervals throughout the day and night. (i.e. 1300, 1900, 0100, 0700). Station managers will have more control of the frequency and times in the future.

  - ✓ If the herbaceous fuel is pre-green, frozen, or cured, the herbaceous moisture is set to the current hour's 1-hr fuel moisture.

"N" type records are wholly unedited by WIMS Data Managers; they do not rely on human judgment of State of Weather and Wet Flag. They rely on quality data from RAWS sensors.

DNFDR – Display National Fire Danger Rating

You can obtain NFDRS outputs in a variety of formats and content.

DIDX – Display Index displays wind speed and all NFDRS, moistures and indexes.

DIDM – Display Moisture displays the calculated NFDRS fuel moisture variables.

DMGR – Display Manager displays several fire weather variables and many NFDRS indexes.

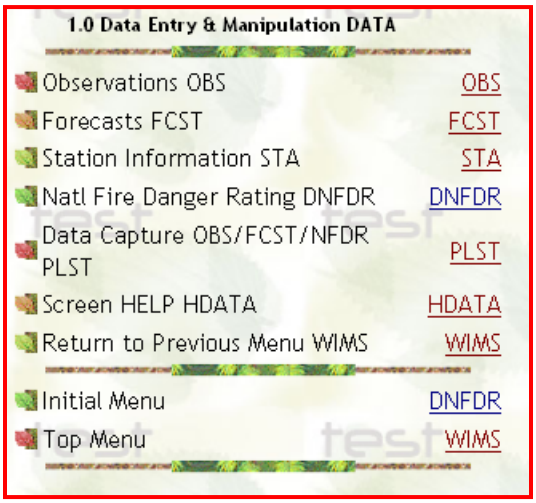
DSHR – Display Short displays precipitation, Staffing Level, and Adjective Fire Danger Rating.

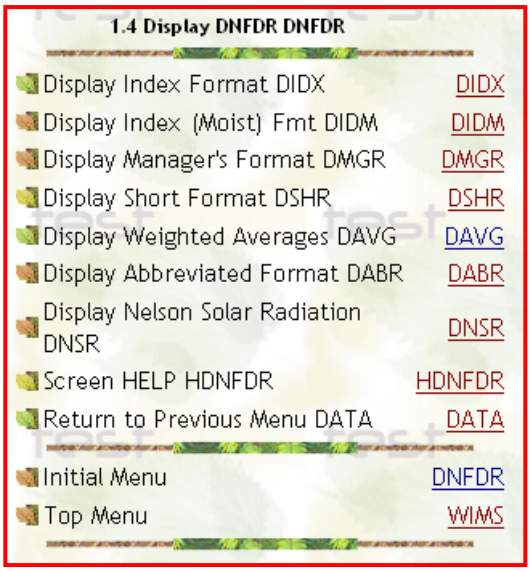
DABR – Display Abbreviated displays 1000-hr fuel moisture and all NFDRS and indexes.

DAVG – Display Averaged displays station-weighted NFDRS outputs for a SIG.

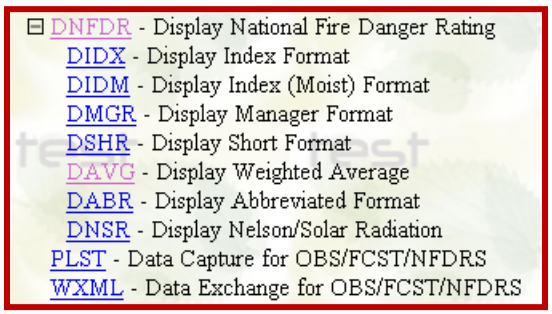
DNSR – Display Nelson Solar Radiation is an analysis module to compare fuel moistures and NFDR indexes based on Nelson Dead Fuel Moisture model for 1-hour and 10-hour timelag fuels versus State of Weather based computation of 1-hour and 10-hour fuels.

The Display National Fire Danger Rating DNFDR menu is accessed from the Data Entry and Manipulation DATA menu. Select the DNFDR hyperlink to open the DNFDR menu.





Or select link from Navigation Tree



Or enter the FastPath DNFDR and select Go.

- ***Remember, you can type the FASTPATH commands:***

  DIDX, to access the Display Index Format

  DIDM, to access the Display Moisture Format

  DMGR, to access the Display Manager Format

  DSHR, to access the Display Short Format

  DAVG, to access the Display Weighted Averages form

  DABR, to access the Display Abbreviated Format

  DNSR, to access the Nelson Solar Radiation Analysis Module

NFDR QUERY FIELD DESCRIPTIONS

Each Display NFDRS form has the following QUERY FIELDS.

Field	Description and action to be taken
Station ID: (Station number)	Enter the number of the NFDRS weather station to display.
SIG: Special Interest Group	Enter the name of a SIG to be displayed.
Type: (NFDRS observation type)	Define the type of NFDRS observation: O/R - Published (O) or Unpublished (R) ➢ There will be a single **R** or **O** type record per fuel model/day, but not both types. A published R record becomes an O type. The hour of the O/R record is the regular_scheduled (RS) time for the station. N - Nelson Dead Fuel Model based – no human interaction ➢ There can be multiple N type records at different hours of the day. O/R+N – Both the O/R and Ns S – Special NFDRS at non RS time(s) F – Next-Day Forecasted for RS time only
Date: (NFDRS observation date)	Enter the NFDRS observation date, in the format: DD-MMM-YY For other date range formats see "Searching by date" in Chapter 5, "Beyond the basics."

Field	Description and action to be taken
Time	Specific hour of an observation to be displayed – HH

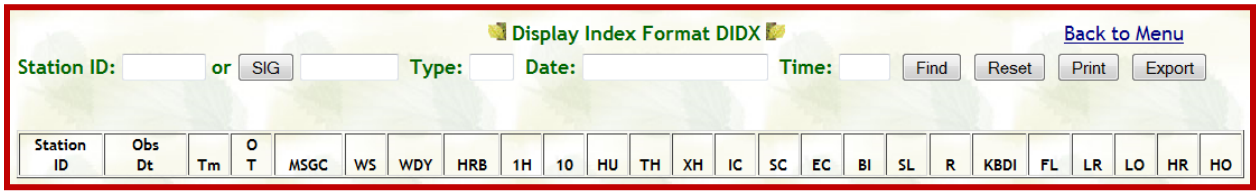
- Each form window contains the standard four function buttons (Find, Reset, Print and Export) as described in Chapter 4, "WIMS Basics."
- Details of the columns displayed in each of the forms are shown in Appendix A of this chapter.
- For more information about NFDRS components, see Appendix E, "NFDRS technical reference."

DIDX – Display Index Format

Display Index displays **all** NFDRS fuel moistures and indexes for **all** fuel models for a weather station. It is probably the most often used display format. Date ranges are allowed and results are sorted by:

- Station, ascending
- Date, descending
- Time, ascending
- Type, ascending
    - If type "N" is included all records for the day will be listed
- MSGC, ascending priority

DIDX query fields and columns



DIDM – Display Moisture Format

Display Moisture displays all the fuel moisture classes and several intermediate values used in computing live fuel moistures, including X1000 (XH) and the Wet Flag (WF) for the day. This format is very useful when troubleshooting live fuel moisture values and is best used on a single station over the course of several weeks, months, or a fire season. You may display just the primary model (Pri=1) or all fuel models for a station with a radio button selection next to the **Export** button. Primary model only is the default.

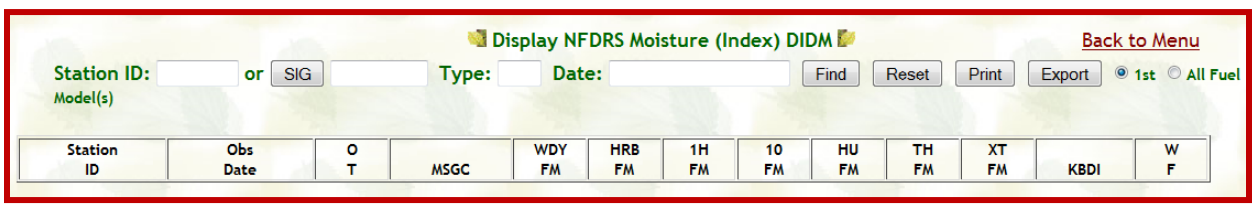
The Moisture Index form makes it easy track:

- Daily progression of fuel moistures and moisture related values, and
- Stages of the live fuel moisture model.

Date ranges are allowed and results are sorted by:

- Station, ascending
- Date, descending
- Time, ascending
- Type, ascending
    - If type "N" is included all records for the day will be listed
- MSGC, ascending priority

DIDM query fields and columns



If a DIDM is generated for a station with at least one 1988 fuel model, columns are inserted to show parameters that control the state of the live fuel moisture model for 1988 fuel models:

- Season Code (SN CD)
- Grass Greenness Factor (Grn GR)
- Shrub Greenness Factors (Grn SH).

DMGR – Display Manager's Format

Display Manager's displays six fire weather variables, all dead fuel moisture values and a partial list of NFDRS information. Date ranges are allowed and results are sorted by:

- Station, ascending
- Date, descending
- Time, ascending
- Type, ascending
    - If type "N" is included all records for the day will be listed
- MSGC, ascending priority

DMGR query fields and columns

DSHR – Display Short Format

Display Short displays precipitation amount and duration along with the commonly used NFDRS outputs of Staffing Level and Adjective Fire Danger Rating. Date ranges are allowed and results are sorted by:

- Station, ascending
- Date, descending
- Time, ascending
- Type, ascending
    - If type "N" is included all records for the day will be listed
- MSGC, ascending (model priority)

DSHR query fields and columns

DAVG – Display Average Format

Display Average displays NFDRS indexes from individual stations within a SIG averaged into a single value, based on weights assigned to each station in the SIG.

- Outputs are based on all reporting stations of the SIG.
- User assigned station weights control the averaging process. Station weights are set or modified only in EAVG (Edit Weighted Averages) by station owners or those with station edit permissions.
- The DAVG form has a **SIG Weights** button, that when clicked will display the assigned weights of each station in a separate window.
- DAVG informs you of missing station observations within a SIG and how the weights have been redistributed.
- If stations within the SIG have different fuel models, Burning Index (BI) and Energy Release Components (ERC) are not valid outputs are are not displayed. All other values, including Spread Component (SC) are displayed.

A station's weight is a percentage between 01 and 99 and represents the influence it has in the calculation. The assigned weights are a management based decision influenced by such factors as the percent of the total area represented by the station, resource values, historic fire occurrence, and public use patterns. The total component weight for individual stations within a SIG must equal 100 percent.

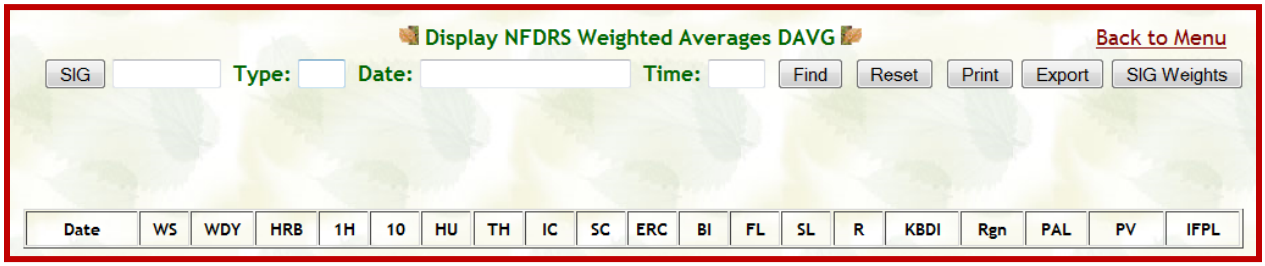
See "Assign NFDR Weighted Averages (EAVG)" in Chapter 6, "Working with Station Information."

For more information on the weighted average calculations see Appendix E, "NFDRS technical reference."

Date ranges are allowed and results are sorted by:

- Station, ascending
- Date, descending
- Time, ascending
- Type, ascending
    - If type "N" is included, ***only the RS hour observation*** is used in DAVG.

NFDRS Weighted Averages DAVG query fields and columns

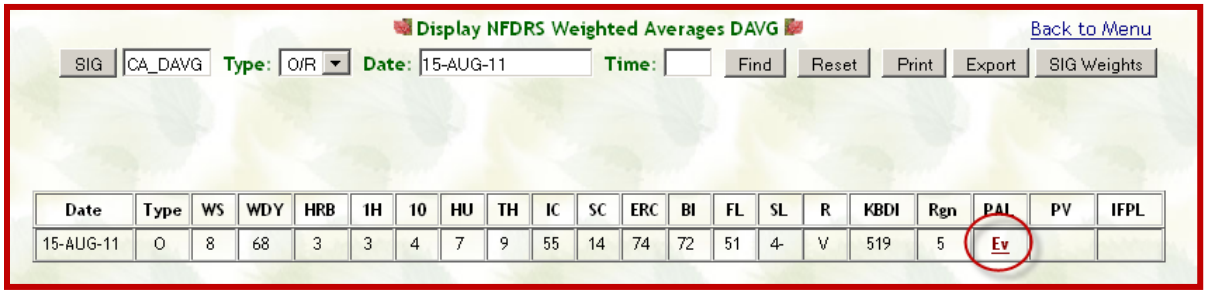


Forest Service Region Specific Averaged Outputs

US Forest Service Region's 5 and 6 (from Station Information) have additional Region specific outputs displayed ***only in DAVG.***

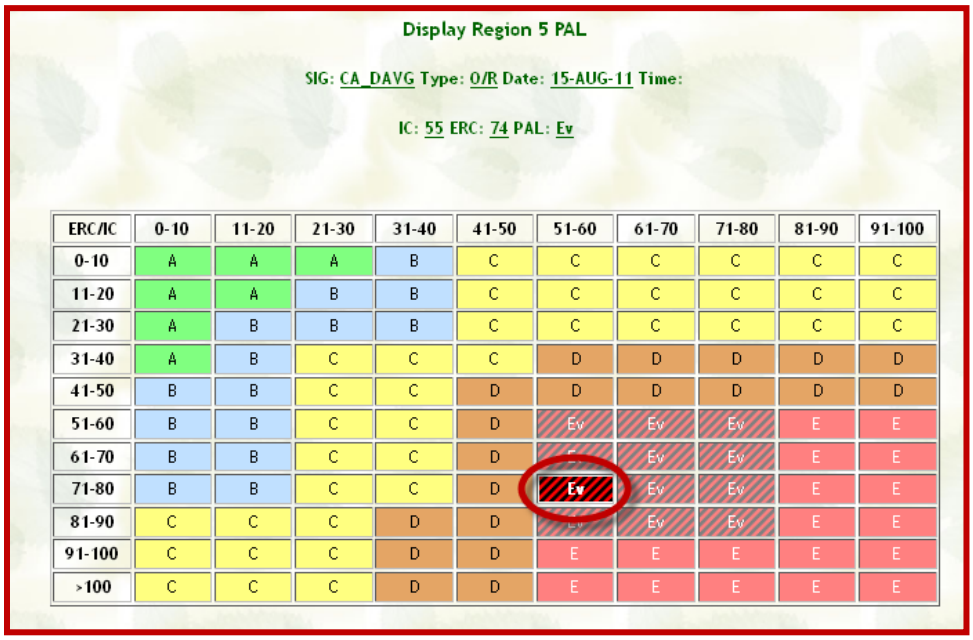
Region 5 – Project Activity Level (PAL)

The Region 5 PAL output is based on a SIG's using fuel model G. Once an output has been generated for a SIG in Region 5 the PAL Value (A,B,C,D,Ev or E) becomes a hyperlink within the form.



Date	Type	WS	WDY	HRB	1H	10	HU	TH	IC	SC	ERC	BI	FL	SL	R	KBDI	Rgn	PAL	PV	IFPL
15-AUG-11	O	8	68	3	3	4	7	9	55	14	74	72	51	4-	V	519	5	Ev		

When selected a "Display Region 5 PAL" form is generated showing the outputs location within the matrix with a flashing box as well as the values for IC and ERC that generated the PAL.

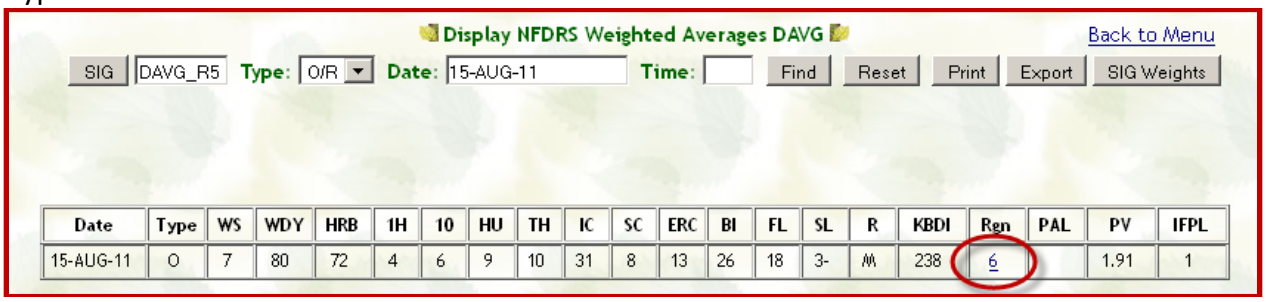


ERC/IC	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
0-10	A	A	A	B	C	C	C	C	C	C
11-20	A	A	B	B	C	C	C	C	C	C
21-30	A	B	B	B	C	C	C	C	C	C
31-40	A	B	C	C	C	D	D	D	D	D
41-50	B	B	C	C	D	D	D	D	D	D
51-60	B	B	C	C	D	Ev	Ev	Ev	E	E
61-70	B	B	C	C	D	Ev	Ev	Ev	E	E
71-80	B	B	C	C	D	Ev	Ev	Ev	E	E
81-90	C	C	C	D	D	Ev	Ev	Ev	E	E
91-100	C	C	C	D	D	E	E	E	E	E
>100	C	C	C	D	D	E	E	E	E	E

The Display Region 5 PAL window also contains the **PAL Value Chart** button that generates a PAL chart.

REGION 6 – INDUSTRIAL FORESTS PRECAUTION LEVEL (IFPL)

Once an output has been generated for a SIG in Region 6 the 6 in the RGN column becomes a hyperlink within the form.



Date	Type	WS	WDY	HRB	1H	10	HU	TH	IC	SC	ERC	BI	FL	SL	R	KBDI	Rgn	PAL	PV	IFPL
15-AUG-11	O	7	80	72	4	6	9	10	31	8	13	26	18	3-	M	238	6		1.91	1

When selected, additional IFPL output is generated.

Display Region 6 Information

SIG: DAVG_R5 Type: O/R Date: 15-AUG-11 Time:

The IFPL calculations displayed below apply to Oregon and Washington users only. IFPL users should refer to the PNWCD Interagency IFPL implementation guidelines for selection of the fuel model and other calculation considerations.

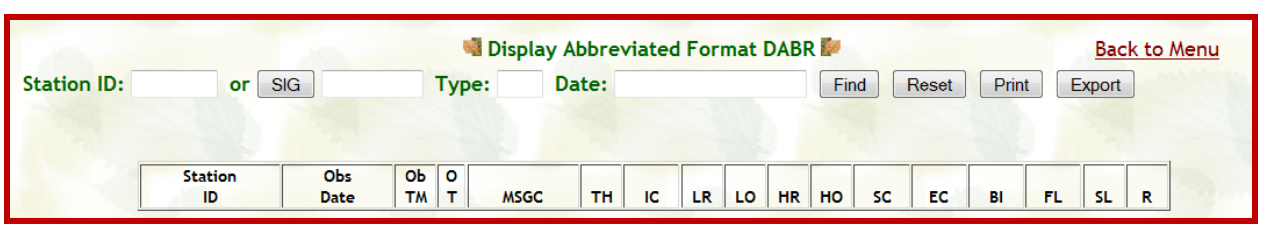
(Region 6 Only Calculation for first models of C, F and G)
Current Region: 6
Precaution Values: 1.91
Industrial Fire Precaution Level (IFPL): 1

DABR – DISPLAY ABBREVIATED FORMAT

Display Abbreviated displays an abbreviated version of the Index form. Date ranges are allowed and results are sorted by:

- Station, ascending
- Date, descending
- Time, ascending
- Type, ascending
- MSGC, ascending priority

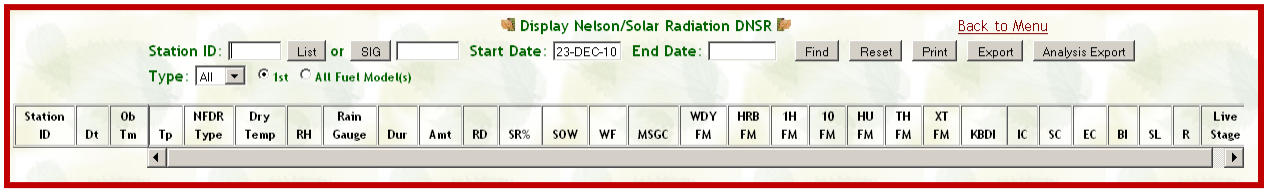
DABR query fields and columns

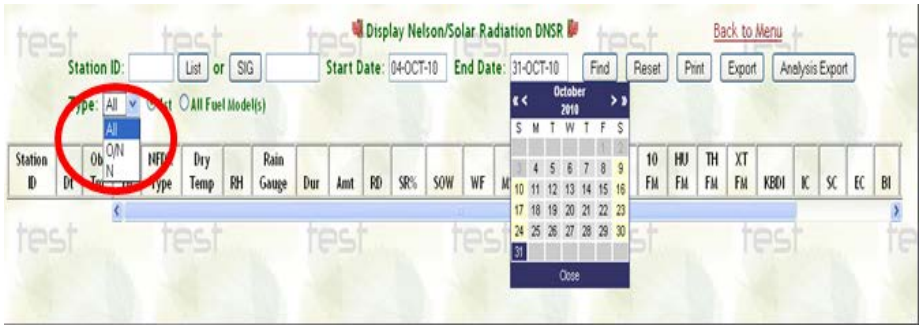


Station ID	Obs Date	Ob TM	O T	MSGC	TH	IC	LR	LO	HR	HO	SC	EC	BI	FL	SL	R

DNSR – Display Nelson Solar Radiation Format

DNSR is a new analytical module in WIMS Version 2. It facilitates comparing NFDR components based on Nelson Dead Fuel Moisture model for 1-hour and 10-hour timelag fuels versus State of Weather/Wet Flag based computation of 1-hour and 10-hour fuels. It displays weather data, fuel moistures and NFDR indexes for matched station/date/hour/fuel model sets. Within WIMS each station/date/hour/model set is displayed as a separate row. The analysis export button converts the row data to column data and exports it to a Comma Separated Value (csv) file for used in spreadsheets or other analysis programs. As a newer WIMS module it has Calendar Pop Ups for date entry and Slider Bars to view all data on the form.



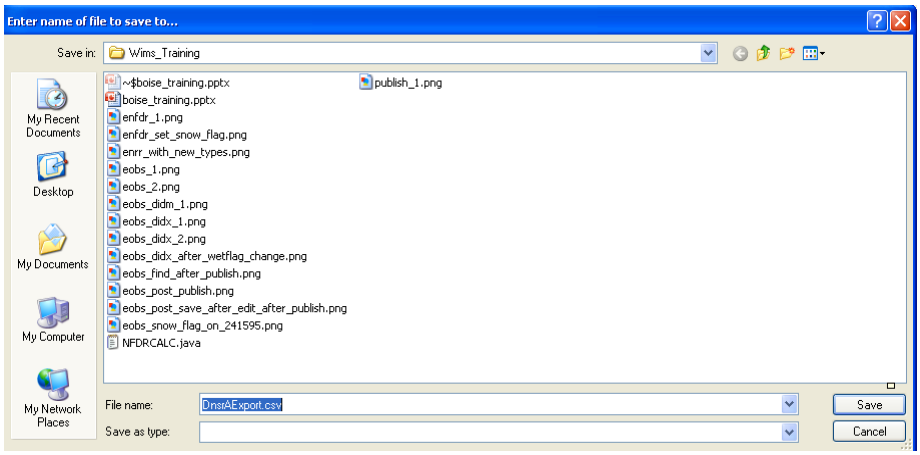


All O/R & N Records

O/N – Only matched O & N NFDRS records at RS observation hour

N – Type "N" only

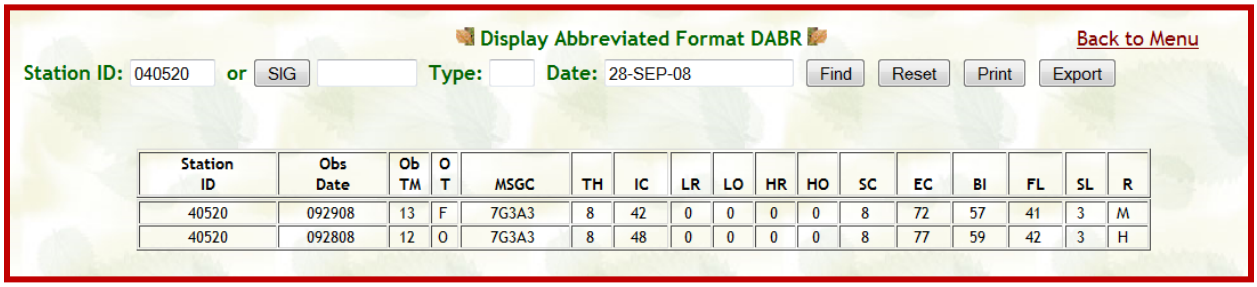
Display Nelson/Solar Radiation DNSR
Back to Menu
Station ID: 241595
List
or
SIG
Start Date: 04-OCT-10
End Date: 04-OCT-10
Find
Reset
Print
Analysis Export
Type: All


Enter name of file to save to...
Save in:
Wims_Training
~$boise_training.pptx
boise_training.pptx
enfdr_1.png
enfdr_set_snow_flag.png
enrr_with_new_types.png
eobs_1.png
eobs_2.png
eobs_didm_1.png
eobs_didx_1.png
eobs_didx_2.png
eobs_didx_after_wetflag_change.png
eobs_find_after_publish.png
eobs_post_publish.png
eobs_post_save_after_edit_after_publish.png
eobs_snow_flag_on_241595.png
NFDRCALC.java
publish_1.png
My Recent Documents
Desktop
My Documents
My Computer
My Network Places
File name:
DnstAExport.csv
Save as type:
Save
Cancel

DNFDR Query Examples

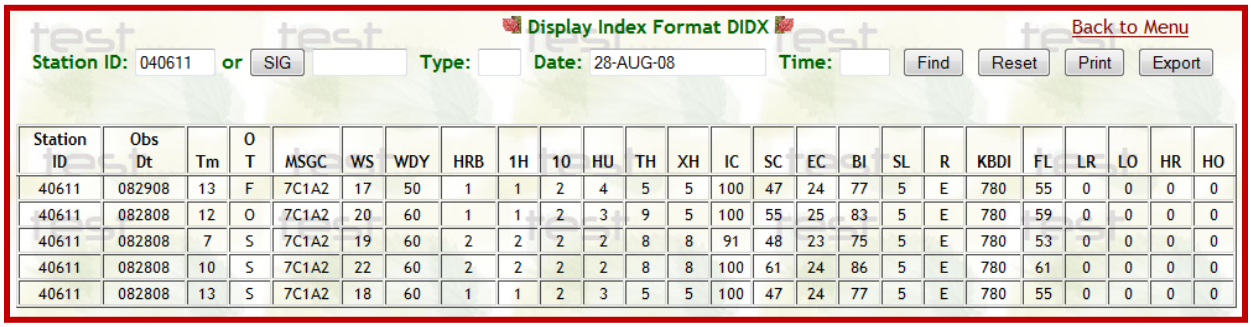
1. Retrieve tomorrow's (forecasted) NFDRS indices for today's observations. Note: Forecast outputs are available only after NWS inputs data into WIMS.
   - In the FastPath field, type the FastPath of the form you want to display and select Go.
   - In the Station ID field, type the number of the station you want to display, or in the SIG field, type the Special Interest Group name.
   - Leave the Type field blank.
   - In the Date field, enter current date and select Find.

The form will display next-day Forecasted (F) and current-day Observed (O) NFDR outputs.



Station ID	Obs Date	Ob TM	O T	MSGC	TH	IC	LR	LO	HR	HO	SC	EC	BI	FL	SL	R
40520	092908	13	F	7G3A3	8	42	0	0	0	0	8	72	57	41	3	M
40520	092808	12	O	7G3A3	8	48	0	0	0	0	8	77	59	42	3	H

2. Retrieve all NFDRS outputs (DIDX) for all observation types for a day. This would include the regularly scheduled observations any special observations and the forecast for tomorrows date.
   - In the FastPath field, type the FastPath DIDX and click **Go**.
   - In the Station ID field, type the number of the station you want to display, or in the SIG field, type the Special Interest Group name.
   - Leave the Type field blank.
   - In the Date field, enter current date and select Find.



Station ID	Obs Dt	Tm	O T	MSGC	WS	WDY	HRB	1H	10	HU	TH	XH	IC	SC	EC	BI	SL	R	KBDI	FL	LR	LO	HR	HO
40611	082908	13	F	7C1A2	17	50	1	1	2	4	5	5	100	47	24	77	5	E	780	55	0	0	0	0
40611	082808	12	O	7C1A2	20	60	1	1	2	3	9	5	100	55	25	83	5	E	780	59	0	0	0	0
40611	082808	7	S	7C1A2	19	60	2	2	2	2	8	8	91	48	23	75	5	E	780	53	0	0	0	0
40611	082808	10	S	7C1A2	22	60	2	2	2	2	8	8	100	61	24	86	5	E	780	61	0	0	0	0
40611	082808	13	S	7C1A2	18	60	1	1	2	3	5	5	100	47	24	77	5	E	780	55	0	0	0	0

3. Generate a DAVG for a SIG for today's regular observation.
   - In the FastPath field, type the FASTPATH DAVG and click **Go**.

- In the SIG field, type the name of the SIG or select the SIG button and choose a SIG from the list. Station ID field should be blank.
- Type field is O (not 0/zero).
- In the Date field, enter current date and select Find.

Display NFDRS Weighted Averages DAVG Back to Menu

SIG ANF4 **Type:** O **Date:** 10-MAY-08 **Time:** Find Reset Print Export SIG Weights

Date	WS	WDY	HRB	1H	10	HU	TH	IC	SC	ERC	BI	FL	SL	R	KBDI	Rgn	PAL	PV	IFPL
10-MAY-08	7	77	5	5	6	10	10	49	23	64	85	60	3+	H	263	5	D		

This SIG is made up of stations from Region 5; all stations have similar fuel models and the fuel model is G. Because of this the SIG will also generate a PAL value.

Clicking the **SIG Weights** button displays the stations and weights DAVG used to consolidate values from eight stations a single values for the SIG.

Weight Percentage for SIG - ANF4

Station	Name	Fcst Zone	Time	FM Prio	Fuel Model	Weight Percent
45401	BIG PINES	507	12	2	7G	12
45405	CLEAR CREEK	506	12	2	7G	12
45411	LITTLE TUJUNGA	509	12	2	7G	12
45421	TANBARK	509	12	2	7G	16
45423	VALYERMO	514	12	4	7G	12
45426	WARM SPRINGS L.O.	506	12	2	7G	12
45435	MILL CREEK	507	12	2	7G	12
45436	CHILAO	507	12	2	7G	12

APPENDIX A – DESCRIPTION OF OUTPUTS FOR THE NFDRS DISPLAY MODULES

Output Field Definitions		NFDRS Display Module						
Field	**Brief description**	**DIDX**	**DIDM**	**DMGR**	**DSHR**	**DAVG**	**DABR**	**DNSR**
Station ID	WIMS Station Number	X	X	X	X		X	X
Obs Date or Dt	Date (mmddyy)	X	X	X	X	X	X	X
Tm	Observation Time (12, 13)	X	X	X	X		X	X
OT or Tp	Observation Type (O, R, S, F, N)	X	X	X	X		X	X
MSGC	Fuel Model:Slope:Grass:Climate Class	X	X	X	X		X	X
WS	Wind Speed (10-minute)	X		X		X		
WDY	Live woody fuel moisture	X	X			X		X
HRB	Herbaceous moisture content	X	X			X		X
1H	1-hour timelag fuel moisture (TLFM)	X	X	X		X		X
10	10-hour TLFM	X	X	X		X		X
HU	100-hour TLFM	X	X	X		X		X
TH	1000-hour TLFM	X	X	X		X	X	X
XT	X1000 -- Live fuel moisture recovery value, used to compute HRB	X	X					X
IC	Ignition Component	X		X		X	X	X
SC	Spread Component	X		X		X	X	X
EC	Energy Release Component	X		X		X	X	X
BI	Burning Index	X		X		X	X	X
SL	Staffing Level	X		X	X	X	X	X
R	Adjective Fire Danger Rating	X		X	X	X	X	X
KBDI	Keetch-Byram Drought Index	X	X			X		X
FL	Fire Load Index	X		X		X	X	
LR	Lightning Risk	X					X	
LO	Lightning-caused fire Occurrence Index	X					X	
HR	Human-Caused Risk	X					X	
HO	Human-caused fire Occurrence index	X					X	
SN CD	Season Code (1988 fuel models only)		X					
Grn GR	Grass Greenness Factor (1988 fuel models only)		X					
Grn SH	Shrub Greenness Factor (1988 fuel models only)		X					
WF	Fuels Wet Flag		X					X
DBT or Dry Temp	Dry Bulb Temperature, F			X				X
DPT	Dew Point Temperature, F			X				
RH	Relative Humidity, %			X				X
PPTAMT or Amt	24 Hour Precipitation, In.			X	X			X
PD or Dur	24 Hour Precipitation Duration, hours			X	X			X
Rgn	USFS Region					X		
PAL	Project Activity Level, USFS Region 5 Only					X		
PV	Precaution Level, USFS Region 6 Only					X		
IFPL	Inductrial Fire Pecautions Level, USFS Region 6 Only					X		
Rain Gauge	RAWS Rain Gauge Reading							X
RD	Solar Radiation, Watt/meter^2							X
SR%	RD converted to percent of possible for station/date/time							X
SOW	Estimated State of Weather							X
Live State	Current Stage of 78 Herbaceous Model							X

INDEX

A

Adjective Fire Danger Rating 17

B

Burning Index 17

C

Climate class 17

D

Date 4
Display Abbreviated (DABR) 12
Display Index 6
Display Manager's Format DMGR 8
Display Short format 8

E

Energy Release Component 17

F

Fire Load Index 17
Fuel Model 17
function buttons 4

G

Grass type 17

H

herbaceous moisture 17
Human-caused fire Occurrence index 17
Human-Caused Risk 17

I

Ignition Component 17
Industrial Forests Precaution Level 11

K

Keetch-Byram Drought Index 17

L

Lightning Risk 17
Lightning-caused fire Occurrence Index 17
Live fuel moisture recovery value 17

N

Navigation Tree 3
NFDRS Query field descriptions 3

O

Observation Date (mmddyy) 17
Observation Time 17
Observation Type (O, R, S, F, N) 17
one-hour timelag fuel moisture 17

P

Project Activity Level 11
PV/IFPL 12

R

regular_scheduled_ time (RS) 4
RS 4, 5, 10, 13

S

SIG 4
Slope class 17
Special Interest Group 4
Spread Component 17
Staffing Level 17
Station ID 4

T

Time 4
Type 4

W

Wind Speed 17
woody fuel moisture 17