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# WIMS Technote-2010-01

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## Fire and Aviation Management Staff

**Date:** November 20, 2010

**System:** WIMS

**Subject:** WIMS Version 2.0 Release

**Purpose:** Communicate Important Release Information

**Contact:** Fire and Aviation Management Applications Helpdesk  
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**Scope:** Release of WIMS Version 2.0

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**WIMS 2.0 is scheduled for release on 11/20/2010.** This Technote is being distributed in advance to give users adequate notification for this major release. It fixes several existing issues as well as implements automated State of the Weather/Wet Flag **and** Nelson Dead Fuel Moisture algorithms on the RAWS input gateway.

***If you do nothing else with this information, please ensure the Regular Scheduled Obs. Time in ESTA is set correctly to how you do WIMS business. The new Gateway routines will use that time to estimate and pre-fill State of Weather and Wet Flag for your once-daily NFDRS observation. Because WIMS truncates the hour instead of rounding on ingest, the simple rule of thumb is if your observation/transmission minute is between 00 and 30, use hour 13. Otherwise use 12. The only screen to verify this information is in the DRAWS screen. For instance if the obs transmission time is 1255 the Regular Scheduled Obs Time in ESTA is 12, if the obs transmission time is 1315 the Regular Scheduled Obs Time in ESTA is 13.***

Each item in the release is covered in detail below. Please take the time to read the release and understand how the changes will effect/impact each user.

- ESTA
  - Remove legacy code to prevent false records being produced
  - Three new observing agencies – DOI-FWS, DOD, NOAA-NWS have been added
- EAVG

- Ability to type in SIG name
- DRAWS
  - Add RAWs transmission time to display
  - New time code (RS) shows beginning hour of regular scheduled NFDR observation
- ENFDR
  - Validation for 1<sup>st</sup> priority fuel model and option to re-sequence fuel model priorities when adding or deleting fuel models
  - “Change Archive” in ENFDR screen has print and filtering capability added
  - NFDR processor updated to correctly track the X1000 for each fuel model. ’78 fuel models greened up on different dates will track independently
  - NFDR processor updated so green up on ’78 fuel models can be done from any Herbaceous State
  - Snow Flag added to explicitly declare fuels are snow covered
  - State of weather and Wet Flag thresholds that set SOW/WF on ingest can be edited
- DOBS
  - Added Solar Radiation and computed percent of possible to view.
  - New time code (RS) shows hour of regular scheduled NFDR observation.
- EOBS
  - Major update to display solar radiation information and automatically convert the type “R” observation at your **Regular Scheduled Observation Time** to type “O” and kick off the NFDR computation via a new Publish button. See details below.
  - New time code (RS) shows hour of regular scheduled NFDR observation.
- All NFDR Index Display Models
  - Added selections of O/R and N to support new NFDR types.
- ENRR
  - Recalc updated for new NFDR types (O/R or N).
- DNSR – **Display Nelson Solar Radiation**
  - New analytical module for comparing NFDR components 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
- WXML –
  - Web services module returns data to browser in XML format (new module). See companion WIMS Technote 2010-2.

## Automated State of Weather/Wet Flag in 150 Words

- New gateway routines estimate the SOW and Wet Flag for the “R” observation at regular\_scheduled\_obs\_time from solar radiation (percent of possible for the latitude and date & time) and precipitation amount and duration for the current hour, the previous 3 hours, and the past 24 hours. Default thresholds are by climate class; station owners may adjust thresholds.
- Estimated SOW and Wet Flag values can be edited in EOBS.
- A new NFDR record type “R” will have been computed during ingest for the Regular Observation time. Both the weather and the NFDR record types are “R” at this point. (“R” meaning ‘raw’ data, without user intervention/quality control.)
- EOBS contains a single Save/Publish button. If publishing regular\_scheduled\_obs\_time observations, a summary pop up window distills observations to be published and requires confirmation of the publish process. Upon confirmation, the EOBS screen is refreshed, R’s are changed to O’s and the standard NFDRCALC messages are displayed. If modifying an existing O type record or creating a Special observation (S) the Save/Publish button behaves like the current Save function.

## Nelson Dead Fuel Moisture in 150 Words

- There will be a parallel integration for at least a year where both the traditional and the new dead fuel moistures and associated indexes will be computed.
- New gateway routines compute 1-hr and 10-hr dead fuel moistures using the Nelson Dead Fuel Moisture model.
- 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 Regular Scheduled Observation 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 near future.
- 100-hr, 1000-hr, live fuel moistures, and KBDI are computed, once daily at regular\_scheduled\_obs\_time using standard NFDR routines. If the herbaceous fuel is ‘dead’ (pre-green, frozen, or cured) the herbaceous moisture is set to the current hour’s 1-hr fuel moisture. This is also done by the new gateway routines.
- DNSR – Display Nelson Solar Radiation. There is a new analytical module for comparing NFDR components 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.

# ESTA – Edit Station

## 1) Three New Observing Agencies

FWS, DOD, and NWS have not been individually included in the observing agencies list. They have collectively been listed as 8-Other Federal Agencies. With the release of WIMS 2.0 these agencies are listed separately. The WIMS System staff will make the changes for all existing stations but you should verify that your stations were updated to the proper observing agency.

1	USDA FS
2	USDI BLM
3	USDI NPS
4	USDI BIA
5	STATE
6	LOCAL GOVT
7	PVT/COMMRL
8	OTH FEDERL
9	UNKNOWN
10	DOI-FWS
11	DOD
12	NOAA-NWS

## 2) Remove legacy code to prevent false records from being produced

Legacy code was removed from the NFDR processor to prevent NFDR output records from being calculated. This was happening when there was a break in the observations and changes were made to the ENFDR parameter screen.

## 3) Display of new Snow Flag and State of Weather/Wet Flag thresholds (see ENFDR section, page 5).

----- Display/Edit Default NFDRS Parameters -----

Station ID: 241595 Effective Date: 17-Nov-10  [Station Info](#) | [NFDRS Param](#) | [Extra Data Channels](#)

78 & 88 NFDRS	100-hr	25	SOW Thresholds (No Precip last 24 Hrs)	Pct Psbl	SOW & Wet Flag Thresholds (Precip last 24 Hrs)		CC3*
	1000-hr	22			1HR_Drizzle (inches)	0.05	
88 NFDRS	1hr=10hr	N	PCNT_Clear	90	1HR_Rain (inches)	0.1	
	KBDI	79	PCNT_Scattered	75	1HR_Showers (inches)	0.25	
			PCNT_Broken	50	3HR_DUR_WetFlag (hours)	3	
					3HR_AMT_WetFlag (inches)	0.5	
					24HR_DUR_WetFlag (hours)	12	
					24HR_AMT_WetFlag (inches)	1.0	

\* Climate Class of the first priority Fuel Model (7G)

## EAVG – Edit NFDRS Weighted Averages

1) In the EAVG screen the ability to type in a SIG Name has been added. In the past users had to pick the SIG name from a drop-down list.

## DRAWS – Remote Automatic Weather Station Display

1) Display the RAWs transmission time at the bottom of the browser.

Total number of rows retrieved: 24; ##### BLM Boise RAWs data is currently at station local time 28-Oct-10 12:54:56 MST #####

2) New time code (RS) shows beginning hour of regular scheduled NFDR observation.

Page: [1](#) [2](#) **Remote Automatic Weather Station Display DRAWS**

Station ID:  or SIG  Date:  Start Time:

## DOBS – Display Observations

1) RD is raw solar radiation sensor value, SR% is Percent of Possible solar radiation based on RD and the station latitude, and observation day of year and time of day.

2) New time code (RS) shows only hour of regular scheduled NFDR observation for station(s).

**Display Observations DOBS** [Back to Menu](#)

Station ID:  or SIG  Type:  Date:  Time:

Station ID	Obs Date	Ob Tm	O T	W	Dry Tmp	RH	M L	HC Rsk	Wind		10 Hr	Temp		RH%		Dur	Amt	Y L	FHC Rsk	RD	SR%
									Dir	SP		Max	Min	Max	Min						

## ENFDR – Edit NFDR Parameters

1) Print functionality and filters for the “View Change Archive” screen

**Display/Edit Default NFDRS Parameters**

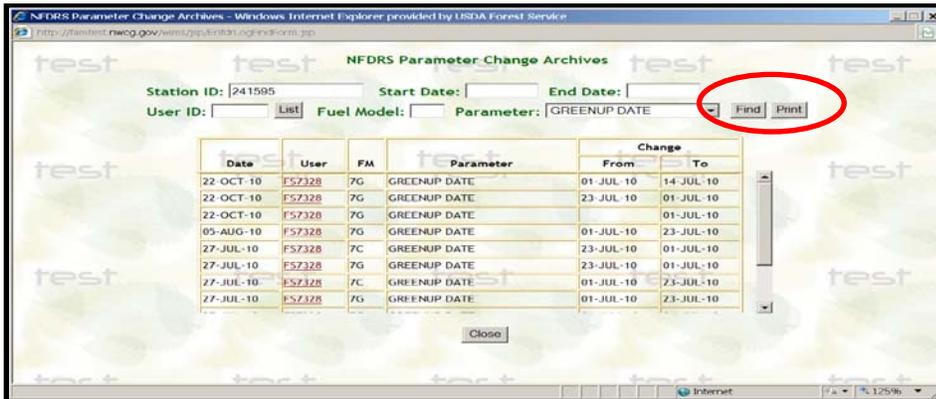
Station ID:  Effective Date:

Users may filter the NFDRS Parameter Change Archive by:

- Start Date
- End Date
- User ID
- Fuel Model
- **Plus** one Parameter:
  - ✓ Green up date

- ✓ Herb Stage (Herbaceous Stage Code)
- ✓ Herb Date (Herbaceous date)
- ✓ Recalc (last recalc date),
- ✓ Season Code and Greenness Factors for the '88 fuel models,

Any or all of the filters may be used. Click **Find** and a printable report will display.



## 2) Validation for 1<sup>st</sup> priority fuel model.

The NFDNR computation module requires a priority 1 fuel model. New functionality ensures a priority 1 fuel model exists after users add, edit, or delete fuel models. Models are re-sequenced to ensure no gaps.

** 78 NFDNR Only **						
D	P		H			
e	r	ID	S	Herb Date	Greenup Date	
<input type="checkbox"/>	1	7G	T	28-Oct-10		
<input type="checkbox"/>	2	70	T	28-Oct-10		
<input type="checkbox"/>	3	7C	T	28-Oct-10		

Three fuel models before deleting the priority 1 model.

** 78 NFDNR Only **						
D	P	ID	H	Herb Date	Greenup Date	
e	r		S			
<input checked="" type="checkbox"/>	1	7G	T	02-Jul-10	14 Jul 10	
<input type="checkbox"/>	2	70	T	28-Oct-10		
<input type="checkbox"/>	3	7C	T	28-Oct-10		

After marking for deletion and Saving, click **Yes** to re-sequence fuel model priorities.

Message from webpage

Do you want the fuel model priorities to be resequenced?

OK Cancel

Info: NFDNR Parameter Information successfully saved.  
Info: Resequence complete. Please click "Find" to refresh.

D e l	P r i	ID	** 78 NFDRS Only **		
			H S	Herb Date	Greenup Date
<input type="checkbox"/>	1	70	T	28-Oct-10	
<input type="checkbox"/>	2	7C	T	28-Oct-10	

Re-sequenced fuel models after priority 1 model was deleted.

3) Green up multiple fuel models on different dates.

D e l	P r i	ID	** 78 NFDRS Only **		
			H S	Herb Date	Greenup Date
<input type="checkbox"/>	1	7G	T	05-Jul-10	10-Jun-10
<input type="checkbox"/>	2	7C	T	05-Jul-10	15-May-10
<input type="checkbox"/>	3	7H	T	05-Jul-10	10-Jun-10

Previous versions used the X1000 value from the priority 1 fuel model to drive the live fuel moisture model. This fix allows '78 fuel models greened up on different dates to track correctly.

4) Snow Flag added to explicitly declare that fuels are snow covered.

- **This replaces the "assumed" snow covered logic when the Wet Flag was set on but the SOW was not 5, 6, or 7.**

The new Snow Flag is a Station Level flag and remains static until changed. It may be turned on ONLY in ENFDR.

Station ID: 241595 Effective Date: 28-Oct-10

78 & 88 NFDRS	100-hr	16
	1000-hr	17
88 NFDRS	1hr=10hr	<input type="checkbox"/>
	KBDI	111
Snow Flag		<input checked="" type="checkbox"/>

It may be turned off in ENFDR or EOBS. In EOBS, a snowflake on a blue observation row indicates the Snow Flag is turned on. Clicking the snowflake allows you to toggle the Snow Flag off.

Station ID: 241595 List or SIG: Type: Date:

Station ID	Ob Tm	O T	W	Dry Tmp	RH%	M L	HC Rsk	Di
241595	12	R	3	49	53	0	0	306

When the Snow Flag is on, the internal NFDRCALC routines:

- Set the 1-hr and 10-hr fuel moisture to 35
- Set the 24 hour maximum and minimum relative humidity at the fuel interface to 100%
- Add up to 8 hours of snow melt based on the observation time temperature
- Computes 100-hr and 1000-hr fuel moistures based on 100% RH and hours of snow melt (precipitation duration)

5) State of Weather and Wet Flag thresholds that set SOW/WF in the RAWs Gateway.

Default Wet Flag thresholds, based on the priority 1 fuel model climate class may be edited. Defaults can be restored by clicking on the “default?” link.

SOW Thresholds (No Precip last 24 Hrs)	Pct Psbl	SOW & Wet Flag Thresholds (Precip last 24 Hrs)	CC 3* Default?	CC 1	CC 2	CC 3	CC 4
PCNT_Clear	85	1HR_Drizzle (inches)	0.05	0.10	0.10	0.05	0.05
PCNT_Scattered	75	1HR_Rain (inches)	0.10	0.15	0.15	0.10	0.10
PCNT_Broken	50	1HR_Showers (inches)	0.25	0.50	0.50	0.25	0.25
		3HR_DUR_WetFlag (hours)	3	2	2	3	3
		3HR_AMT_WetFlag (inches)	0.50	0.75	0.75	0.50	0.40
		24HR_DUR_WetFlag (hours)	12	8	10	12	12
		24HR_AMT_WetFlag (inches)	1.0	2.0	1.5	1.0	.75

\* Climate Class of the first priority Fuel Model (7G)

The following cases define logic & thresholds that set SOW and Wet Flag for the RS observation. Station owners may modify thresholds in the ENFDR module.

### Case 1: No Precipitation in past 24 hours: Set SOW based solely on Solar Radiation

*PCNT\_SOLAR is the 1-hour averaged Solar Radiation (watts/m<sup>2</sup>) converted to percent possible for that station/date/hour. In this example if PCNT\_SOLAR >= 80, SOW would be 0 (clear).*

Condition: (24HR\_PRECIP ==0)

Actions: If (PCNT\_SOLAR >= Pcnt\_Clear) SOW = 0 (Clear, < 1/10 cloud cover)  
If (PCNT\_SOLAR >= Pcnt\_Scattered AND PCNT\_SOLAR < Pcnt\_Clear) SOW = 1 (Scattered, 1/10 to 5/10 cloud cover)  
If (PCNT\_SOLAR >= Pcnt\_Broken AND PCNT\_SOLAR < Pcnt\_Scattered) SOW = 2 (Scattered, 6/10 to 9/10 cloud cover)  
If (PCNT\_SOLAR < Pcnt\_Broken) SOW = 3 (Overcast, > 9/10 cloud cover)  
If (PCNT\_SOLAR < Pcnt\_Broken AND RELATIVE\_HUMIDITY > 95) SOW = 4 (Fog)  
If (OBS\_SOLAR < 25) SOW = 3 Catch observations during the nighttime.  
Wetflag = 'N'

### Case 2: Precipitation in last 24 hours, but none last 3 hours

Condition: (24HR\_PRECIP<>0 AND 3HR\_PRECIP == 0)

Actions: SOW set as in Case 1.

WetFlag = 'N'  
IF (24HR\_DURATION > 24HR\_DUR\_WetFlag OR 24HR\_AMT > 24HR\_AMT\_WetFlag) WetFlag = "Y"

### Case 3: Precipitation during previous 3 hours but none last hour

Condition: (3HR\_PRECIP> 0 AND 1HR\_PRECIP== 0)

Actions: SOW set as in Case 1.

WetFlag = 'N'  
IF (3HR\_PRECIP\_DUR > 3HR\_DUR\_WetFlag OR 3HR\_PRECIP\_AMT > 3HR\_AMT\_WetFlag) WetFlag = "Y"

### Case 4: Precipitation during previous hour

Condition: (1HR\_PRECIP > 0)

Actions:

```
if (oneHrPrecipAmt <= one_hr_drizzle) SOW and WetFlag set as in Case 1.
Otherwise
if (oneHrPrecipAmt > one_hr_drizzle and oneHrPrecipAmt <= one_hr_rain) sow = 6; // rain
if (oneHrPrecipAmt > one_hr_rain and oneHrPrecipAmt <= one_hr_shower) sow = 8; //t-showers
if (oneHrPrecipAmt > one_hr_shower) sow = 9; //thunderstorm
if (dbtemp<=32.0f) sow = 7; //snow/sleet
Then set WetFlag for SOW or 3-hr or 24-hour WF Thresholds
wetflag = "N" ;
if (sow==6 or sow==7 or twentyfourHrPrecipDur> twentyfour_hr_dur_wetflag or twentyfourHrPrecipAmt > twentyfour_hr_amt_wetflag
or threeHrPrecipDur>three_hr_dur_wetflag or threeHrPrecipAmt>three_hr_amt_wetflag) wetflag = "Y";
```

## EOBS – Edit Observations

- Only three observations types: R, O, S (legacy types A and X removed)
- New time code (RS) returns only hour of regular scheduled NFDR observation for station(s).
- Direct Links to DIDM & DIDX
- Save/Publish Button replaces Save
- Solar Radiation (RD) and Percent of Possible (SR%) are displayed if station has solar radiation (SHEFS Code = RD) as an extra sensor.
- These changes are consistent in EOBS whether it is invoked via EOBS or an edit link in DOBS or DRAWS.

WIMS-EOBS

Ver. 2.0.0 FastPath EOBS Go Weather Information Management System Show Navigation Tree

Edit Observations EOBS Back to Menu

Station ID: 251513 List or SIG Type:  Date: 13-OCT-10 Time:  Find Reset Save/Publish  
DIDM DIDX

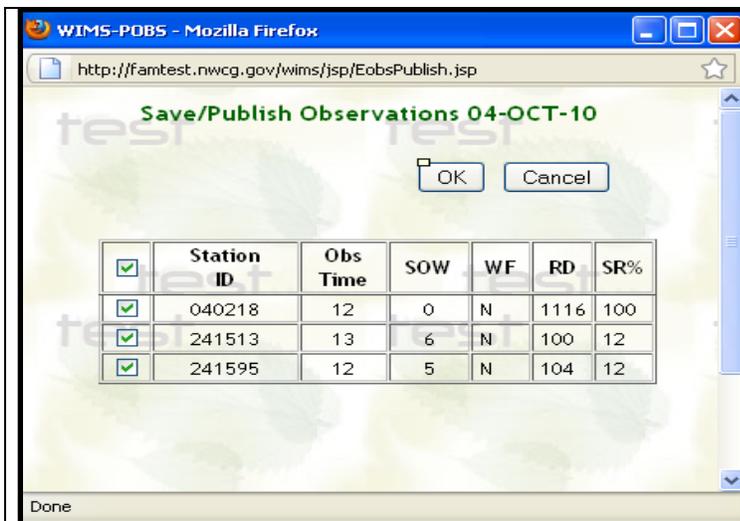
Station ID	Ob Tm	O T	W	Dry Tmp	RH%	M L	HC Rsk	Wind Dir	SP	10 Hr	Temp Max	Temp Min	RH% Max	RH% Min	Dur	Amt	Y L	FHC Rsk	W F	SC	GGF	SGF	RD	SR%

Back to DOBS Edit Observations EOBS Back to Menu

Station ID:  List or SIG N-TEST Type:  Date: 04-OCT-10 Time:  Find Reset Save/Publish  
DIDM DIDX

Station ID	Ob Tm	O T	W	Dry Tmp	RH%	M L	HC Rsk	Wind Dir	SP	10 Hr	Temp Max	Temp Min	RH% Max	RH% Min	Dur	Amt	Y L	FHC Rsk	W F	SC	GGF	SGF	RD	SR%
040218	12	R	0	67	41	0	0	315	3		83	50	97	26	2	0.1	0	0	N				1116	100
241513	13	R	6	57	95	0	0	68	2		79	54	97	21	6	0.19	0	0	N				100	12
241595	12	R	5	57	89	0	0	331	4		83	54	96	26	4	0.2	0	0	N	2	5	5	104	12

Using Time = RS in a SIG displays all stations even with if hours are different. Note that for the RS hour, type is R but SOW and Wet Flag are estimated from Gateway routines but can be edited. After quality assurance is complete, click on **Save/Publish**.



The Save/Publish Window distills the observations that are candidates to publish. Publishing automatically converts the type to "O" and generates the "O" NFDR record. Checked stations will be published, unchecked will remain as type "R" when **OK** is clicked. **Cancel** abandons the current publish sequence.



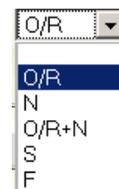
After **OK** is clicked EOBBS screen is updated: Published R's are changed to O's and the standard XCNFDRS messages are displayed.



Clicking on **DIDM** from **EOBS** after publish shows ALL NFDR records for the day. Notice the new Nelson ("N") at 6 hour intervals through the day and the changing 1-hr and 10-hr moistures. And there is a matched O/N pair at the RS hour. If **DIDM** was clicked **prior** to published, the O records would have been type R – the raw NFDR record.

You can now restrict the NFDR types:

- Blank = All NFDR
- O/R = O or R: 1/day
- N = Nelson only: 4/day
- O/R+N = O or R and Nelson
- S = Special Only
- F = Forecast Only



## New Business Rules in EOBS:

Station ID	Ob Tm	O T	W
040218	12	R	3
241513	13	R	2
241595	12	R	2

**Only** at RS Time **and** plus or minus 1 hour may R's be changed to O. SOW/WF is pre-filled **only** at the RS hour.  
**Why RS +/- 1 hour?** In the event of a data interruption and the RS observation is missing, if there is an observation within 1 hour of RS, it may be used for the "O" type for the day. If not, the user may create an "O" observation for the day via NOBS (New Observation).  
**You may no longer edit the time of any observation.**

Station ID	Ob Tm	O T	W
040218	10	R	
241513	10	S	
241595	10	R	

At times more than 1 hour before or after RS, R can only be changed to S and you must enter SOW & Wet Flag to create a Special.

Station ID	Ob Tm	O T	W
040218	12	O	0
241513	13	O	6
241595	12	O	5

Type for O records cannot be changed. Data values may be edited and the Save/Publish button will update the existing O NFDR record to reflect edits.

Station ID: 241595 List or SIG

Station ID	Ob Tm	O T	W	Dry Temp	RF
241595	12	R	3	49	53

By Clicking on the Snow Icon in EOBS you can turn if off before Publishing the observation.

# ENRR – NFDR Recalc

## 1) Added O/R and N types for Recalc

- O/R – Primary once-daily NFDR record is O, but if O is missing on a day, the R is recomputed to keep a continuous weather stream for NFDR calculations.
- N – Hourly recomputation of NFDR records for four/day NFDR records.
  - **Caution:** The N selection computes from the hourly weather data. One month of computation could have up to 744 hourly records and take up to 5 minutes. There is not generally a need to recompute N records since it does not use State of Weather or Wet Flag. It only uses weather elements.

Recalculate NFDRS ENRR

Enter NFDRS Recalculation Parameters

Station ID:  List

Observation Date(s): From:  To:

Type:   
N  
S  
F

View/Edit Live Fuel Parameters

A note of caution for advanced users of the ENRR. Although you likely will not often Recalc the N models, you need to be aware that for '78 fuel models both the O/R and N records use the same Herb Stage fields. So if you do a complete season green up to transition ENRR with O/R and then want to recalc the N types, there Herb Stage will be where the last O/R record left it. To correctly match the O + N records, you would have to reset the Herb Stage to Green before recalculation of the N records.

# DNSR – Display Nelson Solar Radiation

DNSR is a new module with Calendar Pop Up's and Slider Bars to view all columns on the form. Designed to display raw weather data and outputs for comparing Nelson derived NFDR records to current NFDR methods.

Station ID:  List or SIG  Start Date: 04-OCT-10 End Date: 31-OCT-10 Find Reset Print Export Analysis Export

Type: All (circled in red)

Calendar: October 2010

Station ID	Dt	Ob	N	NFDR	Dry Temp	RH	Rain Gauge	Dur	Amt	RD	SR%	SOW	WF	M	W	H	H	TH	XT	KBOI	IC	SC	EC	BI
------------	----	----	---	------	----------	----	------------	-----	-----	----	-----	-----	----	---	---	---	---	----	----	------	----	----	----	----

All O/R & N Records

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

N – Type “N” only

Station ID: 241595 List or SIG  Start Date: 04-OCT-10 End Date: 04-OCT-10 Find Reset Print Export Analysis Export (circled in red)

Type: All

Station ID	Dt	Ob	N	NFDR	Dry Temp	RH	Rain Gauge	Dur	Amt	RD	SR%	SOW	WF	M	W	H	H	TH	XT	KBOI	IC	SC		
241595	04-Oct-10	18	R	N	56	85	7.82	6	0.24	1	0	3	N	761P3	109	71	33	41	18	15	12	128	0	0
241595		12	O	O	57	89	7.78	4	0.2	104	12	5	N	761P3	105	65	35	35	16	14	11	128	0	0
241595			O	N	57	89	7.78	4	0.2	104	12	5	Y	761P3	109	71	60	46	18	15	12	128	0	0
241595		6	R	N	54	85	7.64	1	0.06	0	0	4	N	761P3	103	66	23	23	16	14	11	123	0	0
241595			O	R	N	61	67	7.58	0	0.0	0	3	N	761P3	103	66	14	11	16	14	11	123	2	6

Enter name of file to save to...

Save in: Wims\_Training

File name: DNSR@Export.csv

Save as type: CSV

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Station ID	Obs Date	Obs Tm	MSGC	SR%	SOW_N	SOW_O	WF_N	WF_O	JH_N	JH_O	10H_N	10H_O	HU_N	HU_O	TH_N	TH_O	WOY_N	WOY_O
2	241595	4-Oct-10	12.76103		12	5	5Y	N		60	35	46	35	10	16	15	14	109	78

Analysis Export pivots row data from DNSR to column data for easy analysis in spreadsheets, databases or statistical programs.

## WXML - WIMS Web Services Availability

In 2009, WIMS began providing Web Services from either within the WIMS application or directly from a browser or other web utility services such as WGET. This service returns XML documents that can be used in subsequent applications.

Full documentation of the Web Services is contained in companion WIMS Technote 2010-2.