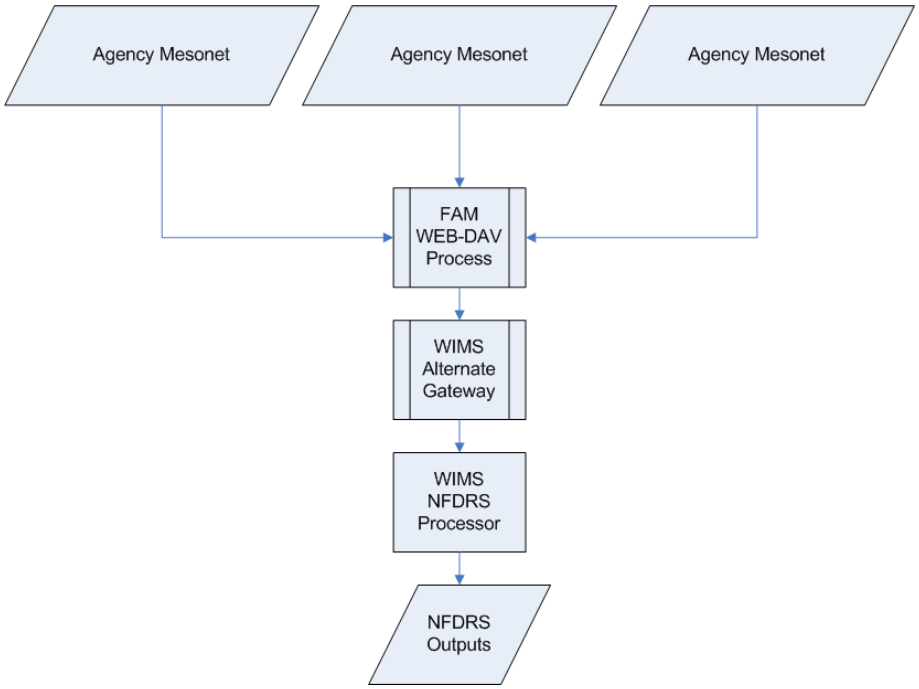
Protocols for WIMS Alternate Gateway

Objective: Provide pathway for observations from non-fire agency weather networks into WIMS to generate NFDRS outputs.



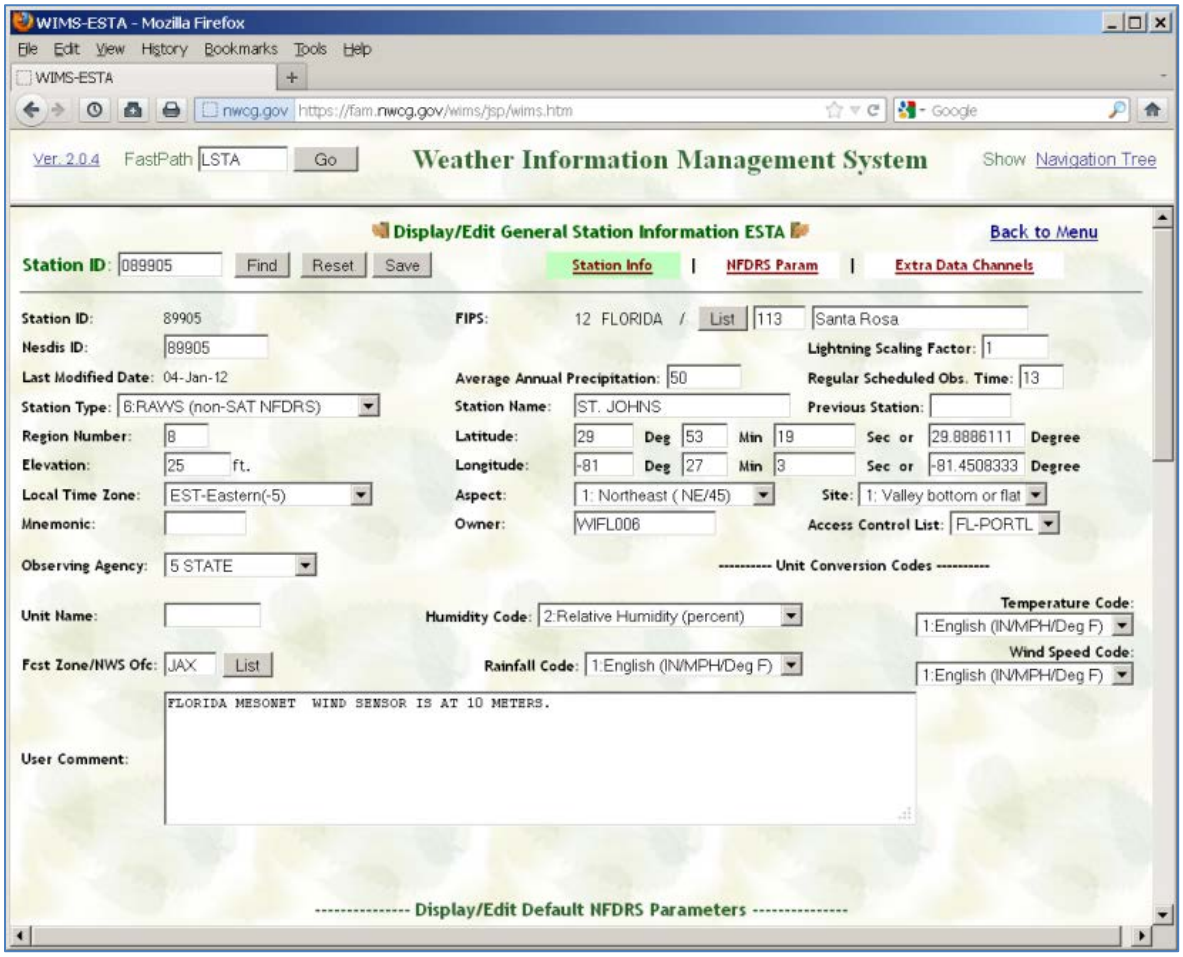
Larry S. Bradshaw
August 2008
Updated July 2012

Summary.

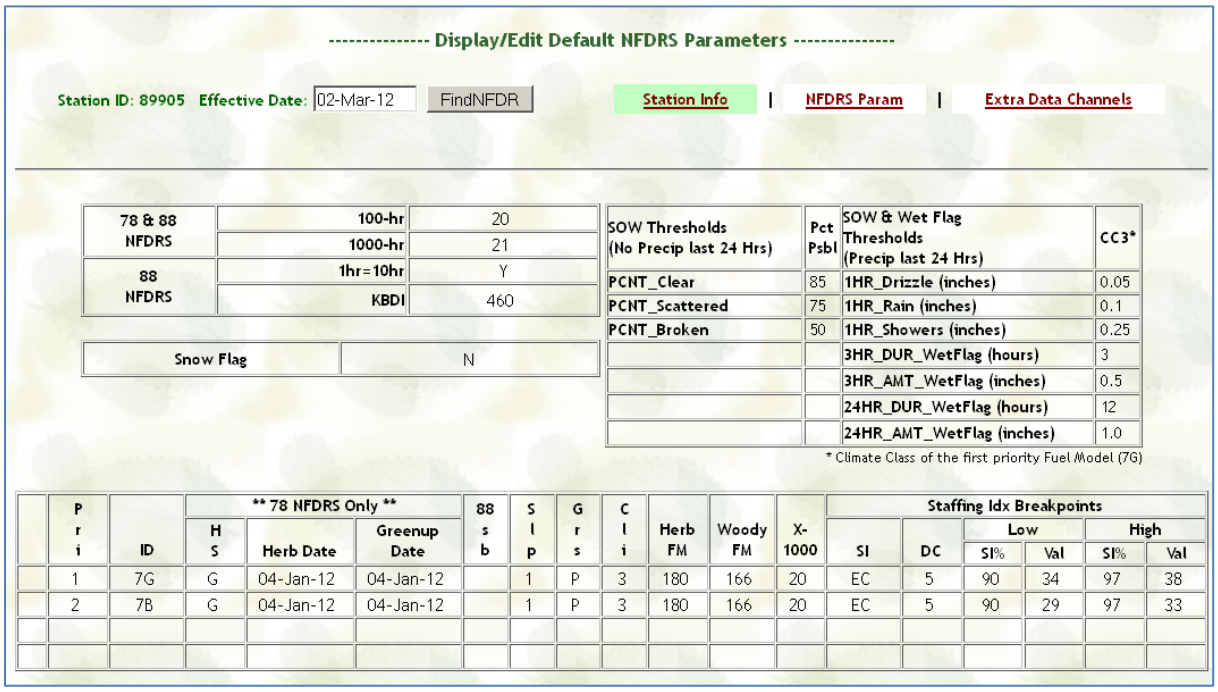
An alternate gateway using WEB-DAV protocols is running on both the WIMS Production (https://fam.nwcg.gov/fam-web/wims/jsp/wims.htm) and Test (https://famtest.nwcg.gov/fam-web/wims/jsp/wims.htm) gateways.

Weather Station Descriptions

Station Information. Stations must be type 6 (RAWS (non-SAT NFDRS) and accurately populated with metadata. The NESDIS ID should be the same as the WIMS/NWS ID. The correct NWS Forecast Office should be specified to receive NFDRS forecasts through WIMS. Wind height sensor should be documented in comment field if different from the NFDR 20-foot standard. Below is an example of Station Information for a Florida Mesonet station.



NFDRS Parameters. Parameters (fuel models, staffing information, etc.)are the same as any other NFDRS station.



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

Station ID: 89905 Effective Date: 02-Mar-12 FindNFDR | Station Info | NFDRS Param | Extra Data Channels

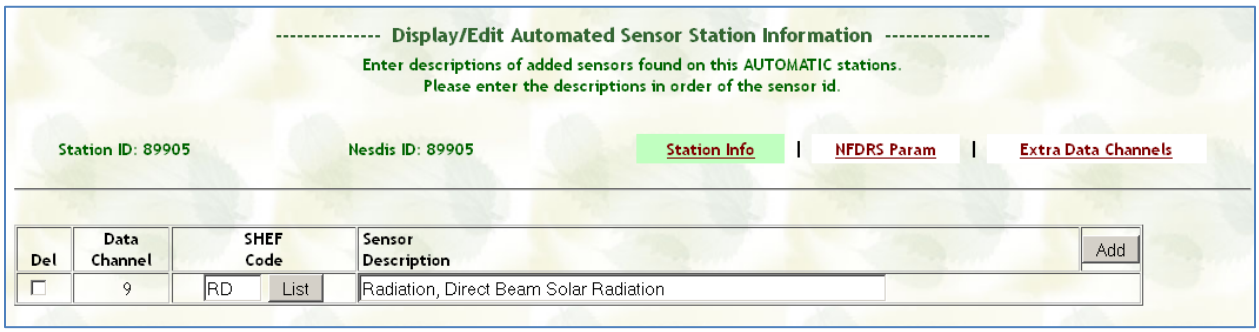
78 & 88 NFDRS	100-hr	20
	1000-hr	21
88 NFDRS	1hr=10hr	Y
	KBDI	460
Snow Flag		N

SOW Thresholds (No Precip last 24 Hrs)	Pct Psbl	SOW & Wet Flag Thresholds (Precip last 24 Hrs)	CC3*
PCNT_Clear	85	1HR_Drizzle (inches)	0.05
PCNT_Scattered	75	1HR_Rain (inches)	0.1
PCNT_Broken	50	1HR_Showers (inches)	0.25
		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)

	Pri	ID	** 78 NFDRS Only ** HS	Herb Date	Greenup Date	88sb	Slp	Grs	Cli	Herb FM	Woody FM	X-1000	Staffing Idx Breakpoints SI	DC	Low SI%	Low Val	High SI%	High Val
	1	7G	G	04-Jan-12	04-Jan-12		1	P	3	180	166	20	EC	5	90	34	97	38
	2	7B	G	04-Jan-12	04-Jan-12		1	P	3	180	166	20	EC	5	90	29	97	33

Extra Sensors. At this time Solar Radiation is the only “extra” sensor field that can be read in from the FW9 formatted data file. If included in the data field it should be on channel 9 using SHEF code RD (Radiation, Direct Beam)



---------- Display/Edit Automated Sensor Station Information ----------

Enter descriptions of added sensors found on this AUTOMATIC stations.
Please enter the descriptions in order of the sensor id.

Station ID: 89905 Nesdis ID: 89905 Station Info | NFDRS Param | Extra Data Channels

Del	Data Channel	SHEF Code	Sensor Description	Add
☐	9	RD List	Radiation, Direct Beam Solar Radiation	

Oracle SQL scripts may be run by WIMS administrators to create stations using the Alternate Gateway. (See Appendix A.)

Data Requirements.

Standard Fire Weather Format. The agreed data transfer format will the WXOBS98 data layout as described on the next page and illustrated below.

The transfer file may contain observations for any number of stations, typically for the same observation date and time. This is example for 5 stations for “R” type observations (0900 LT), including solar radiation.

```
W980899392008030709O0R6 67 90178  9 0 76 57 90 34 7  128N    212  12
W980899332008030709O0R6 67 93177  5 0 76 59 93 33 4  159N    212   7
W980899342008030709O0R6 67 90178  9 0 76 57 90 34 7  128N    212  12
W980899562008030709O0R6 79 72176 14 0 81 70 97 72 3  691N    212 509
W980899182008030709O0R6 62 94171  2 0 72 56 97 37 6  276N    212 142
```

The next example illustrates only “O” observations for five stations which would be converted into NFDRS records of type “O.”

```
W980899062008030709O0O3 73 84170 10 0 75 60 93 28 5  137N    212 212
W980899142008030709O0O2 60 96140  9 0 71 57 96 33 6  609N    212  61
W980899152008030709O0O0 64 88  0  0 0 71 51 93 28 7  331N    212 150
W980899162008030709O0O5 64 89140  8 0 69 57 93 39 6  326N    212 127
W980899012008030709O0O6 75 83160 18 0 75 64 93 99 8  144N    212 256
```

Weather Observation Data Transfer Format, 1998 (WxObs 98)				
Item	**Cols**	**Type**	**Description**	**wims.observation column**
1	01-03	3A	Record type (W98). All records begin with this identifier.	***Required***
2	04-09	6N	Station Number.	***Required***
3	10-17	8N	Observation date (YYYYMMDD).	***Required***
4	18-21	4N	Observation time (0000-2359).	***Required***
5	22	1A	Observation type (O=NFDRS, R=RAWS other than at the standard NFDRS observation time).	(O/R) ***Required***
6	23	1N	State of weather code.	(0-9) ***Required*** *if Obs type = "O"*
7	24-26	3N	Dry bulb temperature (deg F).	(-40 to 120) ***Required***
8	27-29	3N	Atmospheric moisture (wet bulb temperature, relative humidity (percent), or dewpoint temperature based on Moisture Type code [col. 62]).	(1 – 100) R***equired***
9	30-32	3N	Wind direction azimuth measured from true north. 0 (zero) means no wind direction, 360 is north.	***Required***
10	33-35	3N	Average windspeed over a 10-minute period (miles per hour).	(0-100) ***Required***
11	36-37	2N	Measured 10-hour time lag fuel moisture.	(1-60) ***Optional***
12	38-40	3N	Maximum Temperature (deg F).	(-40 to 120 & >= DRY_BULB_TEMP) ***Optional***
13	41-43	3N	Minimum Temperature (deg F)	(-40 to 120 & <= DRY_BULB_TEMP) ***Optional***
14	44-46	3N	Maximum relative humidity (percent).	(1 to 100 & >= RELATIVE_HUMIDITY) ***Optional***
15	47-49	3N	Minimum relative humidity (percent).	(1 to 100 & >= RELATIVE_HUMIDITY) ***Optional***
16	50-51	2N	Precipitation duration (hours).	(0 to 24) ***Required***
17	52-56	5N	Precipitation amount based on Measurement Type code [col. 63]. Blanks=no precipitation. *U.S. measurement:* inches with implied decimal nn.nnn format; trace shown as 00005.	(0 to 25) -- 00000 to 25000 ***Required***

18	57	1A	Wet flag (Y/N).	(Y or N) Default is "Y" for State of Weather 5, 6, and 7. ***Required***
19	58-59	2N	Herbaceous greenness factor (0-20).	0 to 20 ***Optional***
20	60-61	2N	Shrub greenness factor (0-20).	0 to 20 ***Optional***
21	62	1N	Moisture Type code (1=Wet bulb, 2=Relative Humidity, 3=Dewpoint).	***Required***
22	63	1N	Measurement Type code: 1=U.S.	***Required***
23	64	1N	Season code (1=Winter, 2=Spring, 3=Summer, 4=Fall).	1 to 4 ***Optional***
24	65-68	4N	Solar radiation (watts per square meter).	0 to 2000 ***Optional***

There may be hourly observations or once daily. If hourly observations are being entered the observation type shall be "R" except for the 1300 (LST) observation, which shall be type "O" to indicate it is the Standard NFDRS observation for the day.

All 24 hour maximum and minimum values are 'running 24-hour values' not for the calendar day.

Data must be formatted exactly to the documented FW9 format. Observation types may be both "R" and "O" (hourly data with 1 NFDRS observation/day) or "O" only (1 NFDRS observation/day).

The "O" observation should have a valid State of Weather Code and Wet Flag. If a 1988 Fuel Model is used, the record should also include a valid Season Code and greenness factors for the Herbaceous and Woody fuel moistures.

1. **NFDR "O/R".** The FW9 format allows for "O" and "R" type observations. The FW9 "O" observation should also have a valid state of the weather code. WRCC *Data Lister* files may have the "O" designation at 1300 local time but will not have a valid state of the weather code (it is blank). FireFamilyPlus will interpret the blank to be zero (0). Non "O" type records are typed "R" (for Raws) and are not processed as NFDRS records in FireFamily.

2. **State of the weather (SOW).** This is an assessment of the sky conditions at the observing station used to indicate the amount of cloud cover and kind of precipitation at the fire weather station at observation time. Within the NFDRS processor, the SOW is used to establish the ground/fuel level temperature and relative humidity at the weather station. These values are used in the dead fuel moisture calculations. It also established some "values by rule" as noted in the table below.

State of Weather (SOW) Codes

0 - Clear, less than 1/10 cloud cover	5 - Drizzle
1 - Scattered clouds, 1/10 - 5/10 cloud cover	6 - Rain
2 - Broken clouds, 6/10 - 9/10 cloud cover	7 - Snow or sleet
3 - Overcast, 10/10 cloud cover	8 - Showers
4 - Fog	9 - Thunderstorms
NOTE - 5, 6, and 7 cause an internal wet flag to be set to "Y." In this case, 1 and 10 hour fuel moistures are set to 35% and indices (BI, SC, IC) are set to zero because generalized precipitation over the protection unit is assumed. The ERC is computed as normal. Values 8 and 9 assume localized precipitation and the wet flag is ***not*** set to "Y."	

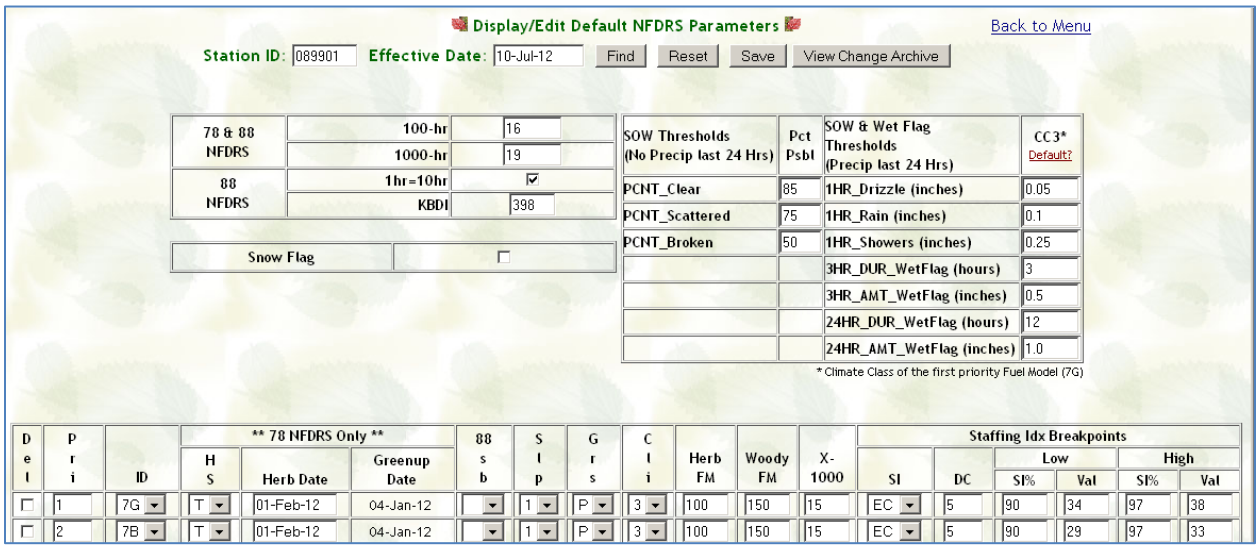
3. **Wet Flag and Snow Cover.** This entry is used in the operational NFDRS (WIMS) to indicate when the fuels are wet at observation time. The Wet Flag is automatically set to "Y" by the danger-rating processor if SOW code "5", "6", or "7" is entered. *Only in FW9 Format from KCFAST and from 1993 on.*

Both year round and seasonal stations should consider snow covered fuels. With the wet flag set to Y, but the SOW is not 5, 6, or 7, the NFDRS processor interprets the wet flag =Y to indicate snow-covered fuels. In this case, the NFDRS processor:

- Internally sets the fuel interface maximum and minimum relative humidity at 100 percent regardless of the ambient relative humidity.
- Invokes the "values by rule" of the wet flag setting.
- Internally estimates hours of snowmelt (precipitation duration) to add moisture to the 100- and 1000-hour fuels based on observation time temperature.

Observation Time Temperature	Hours Fuels Wet
<= 35	0
36 to 40	2
41 to 50	4
51 to 60	6
> 61	8

Station and observation management is done with ENFDR, DRAWS, DOBS/EOBS, DIDX, etc.



Display/Edit Default NFDRS Parameters — Back to Menu

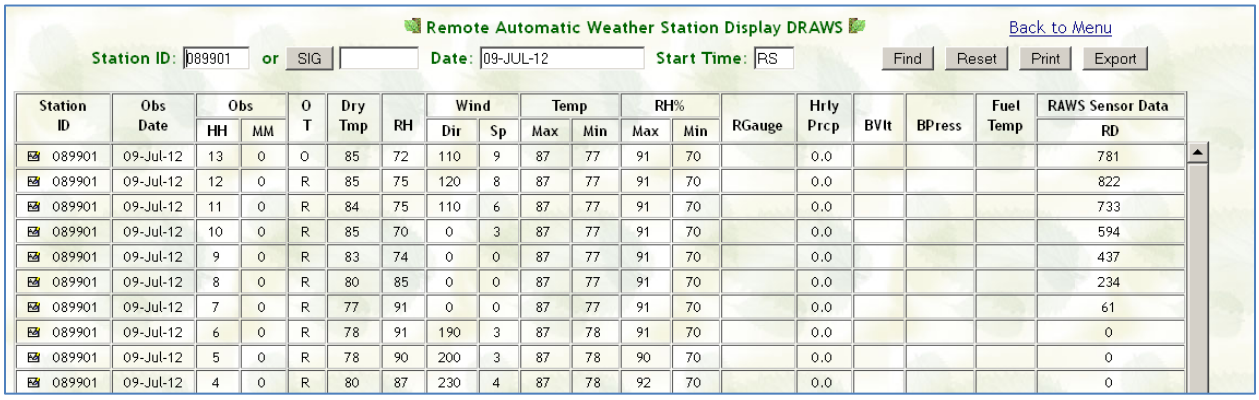
Station ID: 089901 Effective Date: 10-Jul-12 Find Reset Save View Change Archive

78 & 88 NFDRS	100-hr	16
	1000-hr	19
88 NFDRS	1hr=10hr	☑
	KBDI	398
Snow Flag		☐

SOW Thresholds (No Precip last 24 Hrs)	Pct Psbl	SOW & Wet Flag Thresholds (Precip last 24 Hrs)	CC3* Default?
PCNT_Clear	85	1HR_Drizzle (inches)	0.05
PCNT_Scattered	75	1HR_Rain (inches)	0.1
PCNT_Broken	50	1HR_Showers (inches)	0.25
		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)

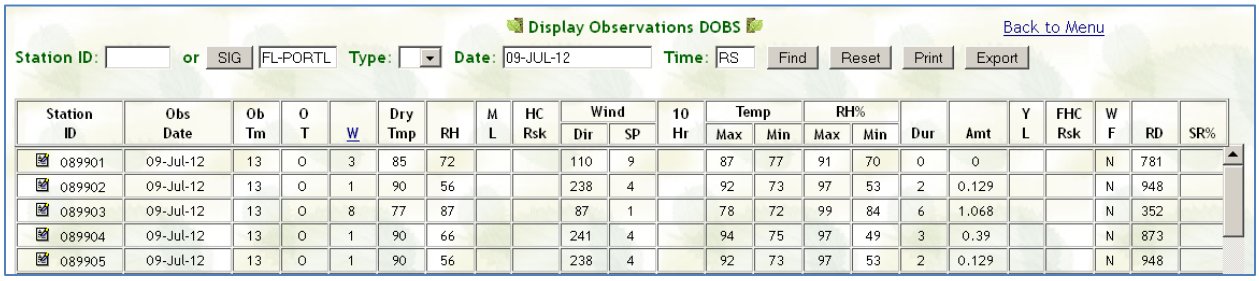
Del	Pri	ID	** 78 NFDRS Only ** HS	Herb Date	Greenup Date	88sb	Slp	Grs	Cli	Herb FM	Woody FM	X-1000	Staffing Idx Breakpoints SI	DC	Low SI%	Low Val	High SI%	High Val
☐	1	7G	T	01-Feb-12	04-Jan-12		1	P	3	100	150	15	EC	5	90	34	97	38
☐	2	7B	T	01-Feb-12	04-Jan-12		1	P	3	100	150	15	EC	5	90	29	97	33



Remote Automatic Weather Station Display DRAWS — Back to Menu

Station ID: 089901 or SIG Date: 09-JUL-12 Start Time: RS Find Reset Print Export

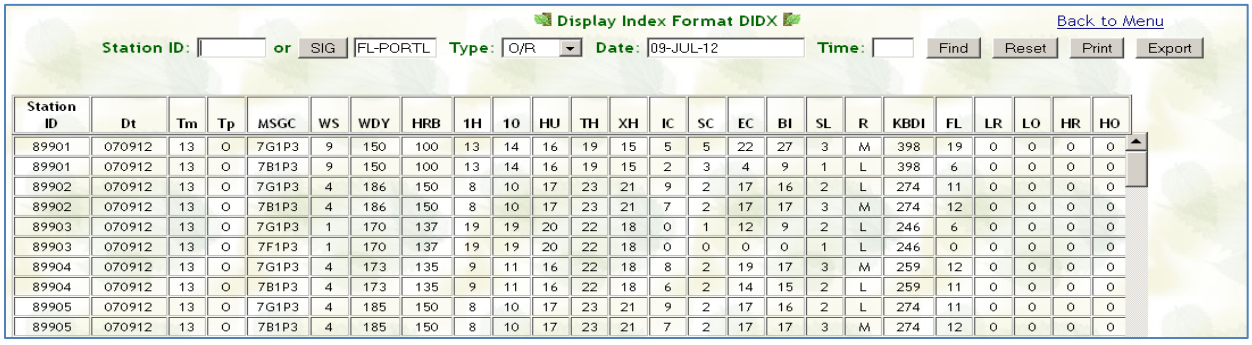
Station ID	Obs Date	Obs HH	Obs MM	OT	Dry Tmp	RH	Wind Dir	Wind Sp	Temp Max	Temp Min	RH% Max	RH% Min	RGauge	Hrly Prcp	BVlt	BPress	Fuel Temp	RAWS Sensor Data RD
089901	09-Jul-12	13	0	O	85	72	110	9	87	77	91	70		0.0				781
089901	09-Jul-12	12	0	R	85	75	120	8	87	77	91	70		0.0				822
089901	09-Jul-12	11	0	R	84	75	110	6	87	77	91	70		0.0				733
089901	09-Jul-12	10	0	R	85	70	0	3	87	77	91	70		0.0				594
089901	09-Jul-12	9	0	R	83	74	0	0	87	77	91	70		0.0				437
089901	09-Jul-12	8	0	R	80	85	0	0	87	77	91	70		0.0				234
089901	09-Jul-12	7	0	R	77	91	0	0	87	77	91	70		0.0				61
089901	09-Jul-12	6	0	R	78	91	190	3	87	78	91	70		0.0				0
089901	09-Jul-12	5	0	R	78	90	200	3	87	78	90	70		0.0				0
089901	09-Jul-12	4	0	R	80	87	230	4	87	78	92	70		0.0				0



Display Observations DOBS — Back to Menu

Station ID: or SIG FL-PORTL Type: Date: 09-JUL-12 Time: RS Find Reset Print Export

Station ID	Obs Date	Ob Tm	OT	W	Dry Tmp	RH	ML	HC Rsk	Wind Dir	Wind SP	10 Hr	Temp Max	Temp Min	RH% Max	RH% Min	Dur	Amt	YL	FHC Rsk	WF	RD	SR%
089901	09-Jul-12	13	O	3	85	72			110	9		87	77	91	70	0	0			N	781	
089902	09-Jul-12	13	O	1	90	56			238	4		92	73	97	53	2	0.129			N	948	
089903	09-Jul-12	13	O	8	77	87			87	1		78	72	99	84	6	1.068			N	352	
089904	09-Jul-12	13	O	1	90	66			241	4		94	75	97	49	3	0.39			N	873	
089905	09-Jul-12	13	O	1	90	56			238	4		92	73	97	53	2	0.129			N	948	



Display Index Format DIDX — Back to Menu

Station ID: or SIG FL-PORTL Type: O/R Date: 09-JUL-12 Time: Find Reset Print Export

Station ID	Dt	Tm	Tp	MSGC	WS	WDY	HRB	1H	10	HU	TH	XH	IC	SC	EC	BI	SL	R	KBDI	FL	LR	LO	HR	HO
89901	070912	13	O	7G1P3	9	150	100	13	14	16	19	15	5	5	22	27	3	M	398	19	0	0	0	0
89901	070912	13	O	7B1P3	9	150	100	13	14	16	19	15	2	3	4	9	1	L	398	6	0	0	0	0
89902	070912	13	O	7G1P3	4	186	150	8	10	17	23	21	9	2	17	16	2	L	274	11	0	0	0	0
89902	070912	13	O	7B1P3	4	186	150	8	10	17	23	21	7	2	17	17	3	M	274	12	0	0	0	0
89903	070912	13	O	7G1P3	1	170	137	19	19	20	22	18	0	1	12	9	2	L	246	6	0	0	0	0
89903	070912	13	O	7F1P3	1	170	137	19	19	20	22	18	0	0	0	0	1	L	246	0	0	0	0	0
89904	070912	13	O	7G1P3	4	173	135	9	11	16	22	18	8	2	19	17	3	M	259	12	0	0	0	0
89904	070912	13	O	7B1P3	4	173	135	9	11	16	22	18	6	2	14	15	2	L	259	11	0	0	0	0
89905	070912	13	O	7G1P3	4	185	150	8	10	17	23	21	9	2	17	16	2	L	274	11	0	0	0	0
89905	070912	13	O	7B1P3	4	185	150	8	10	17	23	21	7	2	17	17	3	M	274	12	0	0	0	0

Data Archive:. Both the ‘O’ and ‘R’ type observations will automatically be archived in the WIMS archive and the FAMWEB Data Warehouse.

Currently the hourly observations will not be sent to the Western Region Climate Center where hourly RAWS observations are stored.

Error and Process Logs:

Error and processing information will be available under the WIMS fastpath LAWS (Log of Automated Weather Stations).

Log Information A1206200 000001 End Back to List

12062 00:35:02 Alternative Automated Weather Station - Automated Gateway
12062 00:35:02 WIMS-AWS Gateway is now available
12062 00:35:02 Version 1.0.0 - PRODUCTION
12062 00:35:02 AWS015D-WIMS: Duplicate deletion flag is TRUE
12062 00:35:07 AWS017N-WIMS: Commit point reached record count = 67
12062 00:35:07 SPECIAL: Valid AWS Obs: 67 ## Invalid: 0 ## Total Records: 67
12062 01:35:02 Alternative Automated Weather Station - Automated Gateway
12062 01:35:02 WIMS-AWS Gateway is now available
12062 01:35:02 Version 1.0.0 - PRODUCTION
12062 01:35:02 AWS015D-WIMS: Duplicate deletion flag is TRUE
12062 01:35:06 AWS017N-WIMS: Commit point reached record count = 67
12062 01:35:06 SPECIAL: Valid AWS Obs: 67 ## Invalid: 0 ## Total Records: 67
12062 02:35:03 Alternative Automated Weather Station - Automated Gateway
12062 02:35:03 WIMS-AWS Gateway is now available
12062 02:35:03 Version 1.0.0 - PRODUCTION
12062 02:35:03 AWS015D-WIMS: Duplicate deletion flag is TRUE
12062 02:35:08 AWS017N-WIMS: Commit point reached record count = 67
12062 02:35:08 SPECIAL: Valid AWS Obs: 67 ## Invalid: 0 ## Total Records: 67

Appendix A – Sample Script to Create a Type 6 Station via Script instead of the WIMS Application.

INSERT INTO station_information (station_id, aspect, assoc_manual_station, previous_station, access_list, default_woody_fm, elevation, fcst_zone, unit_name, fuel_stick_installation_date, humidity_code, latitude, latitude_deg, latitude_min, latitude_sec, lightning_scaling_factor, longitude, longitude_deg, longitude_min, longitude_sec, nesdis_id, observing_agency, fips_state, fips_cnty, avg_annual_precip, pressure_code, region_number, station_type, site, reg_scheduled_observation_time, station_create_mod_date, station_name, temperature_code, time_zone, nemonic, user_comments, user_id, wind_direction_code, wind_speed_code, init_kbdi, season_code, one_ten_flag, woody_fm_meas_date, state, grass_green_factor, shrub_green_factor, snow_flag, pcnt_clear, pcnt_scattered, pcnt_broken) VALUES (313441, '6', NULL, NULL, 'NC-CLIM', NULL, 6200, 'GSP', NULL, NULL, 2, 35.7585, 35, 45, 31, 1, -82.2712, -82, 16, 16, '313441', 5, 37, 199, 72.97, 1, 8, 6, 2, 13, '16-Apr-2012', 'MT MITCHELL ST PARK', 1, 'EST', 'MITC', 'NC ECONET', 'WINC058', 1, 1, NULL, NULL, NULL, NULL, 'NC', NULL, NULL, 'N', 85, 75, 50);COMMIT;

INSERT INTO raws_sensors (nesdis_id, sensor_id, short_desc, sensor_desc) VALUES ('313441', 9, 'RD', 'Radiation, Direct Beam Solar Radiation');COMMIT;

INSERT INTO fuel_models (station_id, fuel_model, model_priority, date_modified, percent_fm_rep, slopeclass, grasstype, shrub_type, greenup_date, herb_veg_date, herb_veg_stage_code, herb_veg_stage_number, grass_green_factor, shrub_green_factor, silo_value, sihi_value, silo_percent, sihi_percent, number_display_classes, climate_class, staffing_index) VALUES (313441, '7G', 1, '16-Apr-2012', 100, 1, 'P', 'D', '01-Jun-2012', '01-Jun-2012', 'P', 1, NULL, NULL, NULL, NULL, NULL, NULL, NULL, 3, NULL);COMMIT;

INSERT INTO station_sow_para (station_id, climate_class, one_hr_drizzle, one_hr_rain, one_hr_shower, three_hr_dur_wetflag, three_hr_amt_wetflag, twentyfour_hr_dur_wetflag, twentyfour_hr_amt_wetflag) VALUES (313441, 3, 0.05, 0.1, 0.25, 3, 0.5, 12, 1.0);COMMIT;