



## National Wildfire Coordinating Group

National Interagency Fire Center  
3833 S Development Avenue  
Boise, Idaho 83705-5354

### MEMORANDUM

Reference: NWCG#016-2012

To: NWCG Committee Chairs  
Geographic Area Coordinating Group (GACG) Chairs  
National IC/AC Council Chair

From: NWCG Chair *Alan Bidabun*

Date: September 25, 2012

Subject: Management Guidance for the Remote Automated Weather Station (RAWS) Network

The interagency Remote Automated Weather Station (RAWS) Network is an essential asset for wildland fire and resource management programs across the United States. Approximately 2,100 stations provide weather observations that are used for creating fire danger ratings, calculating fire behavior predictions, generating spot forecasts, monitoring peak wind speeds, and many other purposes. The remote location of the stations makes this network unique, giving its observations great value to the land management agencies who own them and to weather forecasters, climatologists, and other stakeholders. For example, the network is an important source of observations for initializing the Real-Time Mesoscale Analysis (RTMA), which generates National Weather Service models used for fire weather forecasting.

The National Wildfire Coordinating Group (NWCG) maintains observation standards for the weather stations in the RAWS Network. As agency budgets continue to decline, NWCG has sought to provide guidance for meeting the interagency need for weather observations while managing the size and coverage of the network. Tools have been developed for assessing the value of an individual station's observations, and the impacts of changing station location or station density on data analysis and decision-making. Information is also available about other observation networks and how to include them in routine analyses as an alternative to incurring costs associated with expanding the RAWS Network.

1. The tools for assessing your stations and information about other existing weather networks are presented in the PMS 1003, "[Report to the NWCG: What Is the Appropriate RAWS Network?](#)" In the attached briefing paper (see Attachment A), the NWCG Fire

Environment Committee (FENC) outlines key points from the report, offers recommendations for implementation, and describes its plans for on-going support to the field for managing the RAWS Network.

2. A summary of the steps necessary to include other weather station network data in the Weather Information Management System (WIMS) – the national processor for fire danger rating – is provided in the attached document (see Attachment B), “*Standards for Weather Stations from Non-Fire Agency Networks.*” Note, ingest of a non-RAWS weather station’s data into WIMS must be accompanied by a commitment from a local land management agency to manage the data in WIMS.

The latest revision to the PMS 426-3, *Interagency Wildland Fire Weather Station Standards and Guidelines*, has been published and is available at:

<http://www.nwcg.gov/pms/pubs/426/index.htm>.

Questions can be directed to Paul Schlobohm, NWCG Equipment and Technology Branch Coordinator, (208) 387-5269 or [pschlobo@blm.gov](mailto:pschlobo@blm.gov).

Attachment A: Fire Environment Committee Briefing Paper 2012-1: RAWS Network Analysis

Attachment B: Standards for Weather Stations from Non-Fire Agency Networks

cc: NWCG Executive Board  
NWCG Program Management Unit (PMU)  
NWCG Budget Advisory Unit (BAU) Chair  
Roy Johnson, OWF Deputy Director  
Rod Bloms, OWF Program Analyst  
Brit Rosso, LLC Center Manager

**NATIONAL WILDFIRE COORDINATING GROUP**  
**Fire Environment Committee**  
**Briefing Paper 2012-1**  
RAWS Network Analysis

---

**Date:** August 15, 2012

**Topic:** Remote Automated Weather Stations (RAWS) Network Analysis Report

**Issue:** Introduction to the RAWS Network Analysis Report and how this report can be used as a guiding document for future RAWS infrastructure decisions and integration of other non-NFDRS weather data.

**Background:**

Over the course of the last couple of years, the NWCG Executive Board has asked the fire management community, “*What is the Appropriate RAWS Network?*” These questions came about for many reasons not withstanding an ever increasing need to review the fiscal implications of maintaining a large network of physical stations throughout the United States. A research effort was launched in 2009 to begin the quantitative analysis approach to this question. A contract was awarded to the Desert Research Institute to analyze all the existing RAWS stations throughout the US. The resulting deliverable is a report called “*Report to the NWCG: What is the Appropriate RAWS Network?*” and it is available [here](#).

**Key Points:**

- NWCG Executive Board has accepted the RAWS Network Analysis Report.
- This report is a tool for managers to make informed decisions about the current and future viability of their RAWS and where, if any, efficiencies can be gained.
- The purpose of this study was not to make any specific recommendations regarding any individual RAWS. The decision on how RAWS will be managed into the future rests with the individual agencies, GACCs and/or local units.
- This report will help fire managers and meteorologists interpret and use the RAWS Uniqueness Index (RUI) to assess their local and geographic RAWS Network.
- RAWS Uniqueness Index (RUI):
  - The RUI is based on terrain complexity, uniqueness of data, period of record, and maintenance record.
  - The RUI metric is intended to be used as a starting point to assess the viability of existing stations and is not meant to be used as a “cut-off” for which stations have “high value” and which stations have “low value”. Further in-depth research into each station’s value may reveal inaccuracies and assumptions not readily apparent at first glance. For example a station may have good station maintenance, but poor record keeping rendering a low score for station maintenance.
- Data Denial:
  - Data Denial is an analytical technique that assesses the local impact of removing a station from the network.
  - If a station is moved or removed it may have an adverse impact on the network if the station is isolated from other stations and is located in complex terrain. Conversely, if a station is moved to an area with poorer coverage, this decision will enhance the network coverage.

**Recommendations:**

- Use the report as an initial assessment tool when making decisions to move, remove or add RAWS within a geographic area.
- Communicate and coordinate with local units and Predictive Services to validate the RUI value. A process for addressing what may be perceived as missing or inaccurate RUI values may still need to be addressed.
- Use a collaborative effort between local, geographic, and agency members to recommend decisions on choosing which RAWS stations to move, remove or add.
- Consider opportunities to integrate other weather observation networks (ASOS for example) into local fire weather-related analyses to improve fire weather forecasting, fire danger ratings, and fire behavior assessments without the purchase and maintenance costs of new RAWS.
- Encourage local units to apply the RUI to their RAWS network analyses, such as that performed in the development of a Fire Danger Operating Plan (see Chapter 10 of the Interagency Standards for Fire and Fire Aviation Operations (Red Book)).

**Future Fire Environment Committee Plans:**

- The Fire Environment Committee will continue to assess the value added to the RAWS Network by increasing the type and kind of weather data collection systems, especially in areas void of RAWS data where assessing fire danger and fire behavior is critical.
- Look for progress on these and other RAWS activities at the Fire Environment Committee website: <http://www.nwcg.gov/var/sections/equipment-and-technology/fire-environment-committee-fec> .

**Prepared By/Contact:**

Name: Kelly Martin, Chair, Fire Environment Committee

Phone Number: 209-372-0325

E-Mail Address: [kelly\\_martin@nps.gov](mailto:kelly_martin@nps.gov)

# Standards for Weather Stations from Non-Fire Agency Networks

---

The following standards will apply to groups of weather stations not historically used in the calculation of National Fire Danger Rating System (NFDRS) outputs. This would include such networks as the Florida FAWN, the National Weather Service's Automated Surface Observation System (ASOS), and the Oklahoma Mesonet.

Data will be ingested into the Weather Information Management System (WIMS) for processing by NFDRS algorithms by following these [protocols](#) for use of the *Alternate Gateway*. They are processed the same as observations from the RAWS Network (via the Wildland Fire Management Information (WFMI) system) or manual observations entered by users. As such, they are archived in WIMS and available via the standard data access tools (e.g. Data Warehouse, FAMWEB Fire & Weather Web Page).

1. A consistent set of quality observations for at least the past five (5) years from which the necessary climatological inputs and percentiles necessary for the calculation of key NFDRS outputs, such as Staffing Levels and Adjective Fire Danger, can be determined.
2. There is a well-documented maintenance schedule/program for the station or network.
3. The stations in the network comply with [Fire Weather Stations Standards](#) for weather elements collected for NFDRS. A 10 meter 2 minute wind may be used, but it must be documented in the station catalog.
4. Acceptable conversion factors are used to format data in English units.
5. Data are formatted in the published [1998 FW9 format](#). Hourly and once-daily observations are supported and will use the existing WIMS "R" and "O" record type conventions. If an "O" type observation is ingested, the record must contain State of Weather and Wet Flag; if these are present, NFDRS "O" type records will be automatically computed without user intervention.
  - Note: This infers that additional sensors or processing is required by alternate networks (as is the case for NWS ASOS stations).
6. Metadata for each station will be included in a station catalog on WIMS. Sensor heights will be included in the station catalog.
7. Station's numbers will adhere to the standard number scheme used for WIMS stations.
8. There will be a 1 to 3-month evaluation period in the WIMS Test Environment before a network is moved operationally in WIMS Production.
9. Either the network owner or a collaborating land management agency will be the "station owner" in WIMS and provide for NFDR model management and oversight.
10. The Fire Danger Subcommittee will provide oversight and approval of the alternative network. Fire Danger Subcommittee contact information can be found [here](#).